

APPENDIX A REFERENCES

- (CIMIS, 2010) California Irrigation Management Information System, Department of Water Resources, Office of Water Use Efficiency. *Standard Monthly Evapotranspiration Data*. Station 117: Victorville. February 1994 to March 2011. [www.cimis.water.ca.gov]
- (DOF, 2000) California Department of Finance. *E-4 Historical Population Estimates for Cities, Counties and the State, 1991-2000, with 1990 and 2000 Census Counts*. Retrieved November 2010. [http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/1991-2000/]
- (DOF, 2010) California Department of Finance. *E-4 Population Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark*. Retrieved November 2010. [http://www.dof.ca.gov/research/demographic/reports/estimates/e-4/2001-10/]
- (DWR, 2003) State of California Department of Water Resources (DWR). *Bulletin 118: California's Groundwater Bulletin*. Updated 2003. Accessed 7 April 2011. [http://www.water.ca.gov/groundwater/gwmanagement/court_adjudications.cfm]
- (DWR, 2005) State of California Department of Water Resources (DWR). *Bulletin 160: California Water Plan Update 2005*. Accessed 22 October 2010. [http://www.water.ca.gov/groundwater/gwmanagement/court_adjudications.cfm]
- (GP, 2009) City of Victorville. *2030 General Plan*. October 2008.
- (MWA, 2005) Mojave Water Agency. *2005 Urban Water Management*. 2005.
- (MWA, 2006) Mojave Water Agency. *Water Delivery Facilities*. February 2006
- (MWA, 2010) Kennedy Jenks Consultants. *Mojave Water Agency 2010 Urban Water Management Plan*. April 2011
- (RBF, 2009) RBF Consulting. *VVWRA Flow Projection Update*. April 2009
- (RCSC, 1996) Riverside County Superior Court. *Judgment After Trial*. Case No. 208568. January 10, 1996.
- (SCAG, 2007) Southern California Association of Governments. *Integrated Growth Forecast*. Adopted 2008. Retrieved 4 November 2010. [http://www.scag.ca.gov/forecast/downloads/excel/RTP07_TRACT.xls]
- (SMP, 2008) EarthTech., *City of Victorville, Sewer System Master Plan and Collection System Model*. Draft Final for Review. Revised March 2008.
- (SMP, 2010) RBF Consulting. *Sewer Master Plan, Modeling and Condition Assessment*. Final Draft, August 2010.
- (USCB, 2000) United States Census Bureau. *Census 2000 Summary File*. Retrieved October 2010.

- [http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuld=&_lang=en&_ts=]
- (UWMP, 2005) Carollo Engineers. *Victor Valley Water District Urban Water Management Plan 2005*. December 2005
- (VWRA, 2007) Victor Valley Wastewater Reclamation Authority, "Ordinance 001". Amended June 22, 2007
- (WMP, 2010) Carollo Engineers. *Water Master Plan*. September 2010
- (WRCC, 1988) Western Regional Climate Center, *Station 049325 – Victorville*. January 1917 to July May 2008.
[<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca2031>].

PUBLIC REVIEW AND ADOPTION MATERIALS

This Page Left Blank Intentionally

**VICTORVILLE WATER DISTRICT
RESOLUTION NO. VWD 11-008**

**A RESOLUTION OF THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT ADOPTING THE
VICTORVILLE WATER DISTRICT 2010 URBAN WATER MANAGEMENT PLAN (UWMP)**

WHEREAS, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq. known as the Urban Water Management Planning Act 1983); and

WHEREAS, the Urban Water Management Planning Act and its subsequent amendments mandate that every supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually, must prepare and update an Urban Water Management Plan (UWMP) every five years, the primary objective of which is to plan for adequate supply, efficient use, and conservation of water; and

WHEREAS, the Victorville Water District is an urban supplier of water to a population of over 100,000; and

WHEREAS, the plan must be adopted by July 1, 2011 after public review and hearing, and must be filed with the California Department of Water Resources by July 22, 2011; and

WHEREAS, the District has therefore prepared and circulated for public review a draft UWMP, and a properly noticed public hearing regarding said UWMP was held by the District on June 7, 2011.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT

Section 1. In all respects, the recitals above are true and correct

Section 2. The Victorville Water District 2010 Urban Water Management Plan is hereby adopted and ordered filed with the Secretary; the City Manager or his designee is hereby authorized and directed to file the UWMP with the California Department of Water Resources by July 22, 2011.

Section 3. The City Manager or his designee is hereby authorized to implement the water conservation programs outlined in the 2010 UWMP, in order to carry out effective and equitable water conservation programs.

Section 4. In a water shortage, the City Manager is hereby authorized to promulgate a drought management plan as noted in the Water Shortage Contingency Plan section.

Resolution No. VWD 11-008

PASSED, APPROVED AND ADOPTED this 21st day of JUNE 2011



CHAIRMAN OF THE BOARD OF DIRECTORS

ATTEST:



BOARD SECRETARY

APPROVED AS TO FORM:



LEGAL COUNSEL FOR VICTORVILLE WATER DISTRICT

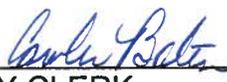
I, CAROLEE BATES, City Clerk of the City of Victorville and ex-officio Clerk to the Victorville Water District of said City, DO HEREBY CERTIFY that the foregoing is a true and correct copy of Resolution No. VWD 11-008 and was adopted at a meeting held on the 21st day of June 2011, by the following roll call vote, to wit:

AYES: Board Members Kennedy, McEachron, Rothschild and Valles

NOES: None

ABSENT: Board Member Cabriaes

ABSTAIN: None



CITY CLERK



NEWS RELEASE

DATE: May 17, 2011 **For Immediate Release**

CONTACT: Dana Armstrong
Victorville Water District
Phone: (760) 955-5086

**Victorville Water District 2010 Urban Water Management Plan
Available For Public Review and Comment**

A copy of the Victorville Water District's 2010 Urban Water Management Plan is now available for public review and comment. A copy of the document is available at the following locations:

Victorville Water District offices
Victorville City Hall, 2nd Floor
14343 Civic Drive
Victorville, CA 92392
Monday-Thursday 7:30 a.m. to 5:30 p.m.

Victorville City Library
15011 Circle Drive
Victorville, CA 92394
Monday-Thursday: 9:00 a.m. to 8:00 p.m.
Friday: 9:00 a.m. to 6:00 p.m.
Saturday: 9:00 a.m. to 5:00 p.m.

City of Victorville Website
www.ci.victorville.ca.us

Background: The California State Water Code requires urban water suppliers to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR). These plans must be updated every five years and must comply with the requirements of the Urban Water Management Planning Act of 1983 and subsequent amendments. The purpose of the UWMP is to ensure planning for adequate water supplies for current and future demand.

The updated 2010 UWMP must be adopted by July 1, 2011, and must be received by the DWR by July 22, 2011. There will be a public hearing on Tuesday, June 7, 2011 at 7:00 p.m. to receive public comments on the Victorville Water District's draft UWMP. The public hearing will be held at the Victorville City Council Chambers located at Victorville City Hall, 14343 Civic Drive, Victorville. A final draft of the UWMP will be considered for adoption at the June 21, 2011 Board of Directors meeting of the Victorville Water District.

Distribution List for letter dated March 23, 2011 re:
Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)

Frank W. Robinson, Town Manager
Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, CA 92307

Dr. James Hart, City Manager
City of Adelanto
11600 Air Expressway
Adelanto, CA 92301

Gregory C. Devereaux, Chief Executive Officer
County of San Bernardino
County Administrative Office
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0120

David Wert, Public Information Officer
County of San Bernardino
County Administrative Office
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0120

Mike Podegracz, City Manager
City of Hesperia
9700 Seventh Avenue
Hesperia, CA 92345

Curt Mitchell, City Manager
City of Barstow
220 East Mountain View Street, Suite A
Barstow, CA 92311

Kirby Brill, General Manager
Mojave Water Agency
22450 Headquarters Drive
Apple Valley, CA 92307

CITY OF VICTORVILLE



760.955.5000
FAX 760.245.7243
vville@ci.victorville.ca.us
http://ci.victorville.ca.us

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

March 23, 2011

David Wert, Public Information Officer
County of San Bernardino
County Administrative Office
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0120

Subject: Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)

Dear Mr. Wert:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), *"Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan."*

This letter is intended to notify your agency that the City of Victorville is in the process of preparing the 2010 UWMP and expects to have a draft available for review in the first week of May 2011. Comments can be submitted prior to or at the public hearing for the 2010 UWMP which will take place on June 7, 2011 at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

If you have any questions regarding this matter, please do not hesitate to call me at (760) 955-5086.

Sincerely,

Dana Armstrong
Manager, Conservation/Solid Waste/Recycling
Department of Public Works/Water

cc: James L. Cox, City Manager
Doug Mathews, Manager, Public Works

DA:lm

CITY OF VICTORVILLE



760.955.5000
FAX 760.245.7243
ville@ci.victorville.ca.us
http://ci.victorville.ca.us

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

March 23, 2011

Frank W. Robinson, Town Manager
Town of Apple Valley
14955 Dale Evans Parkway
Apple Valley, CA 92307

Subject: Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)

Dear Mr. Robinson:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), *"Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan."*

This letter is intended to notify your agency that the City of Victorville is in the process of preparing the 2010 UWMP and expects to have a draft available for review in the first week of May 2011. Comments can be submitted prior to or at the public hearing for the 2010 UWMP which will take place on June 7, 2011 at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

If you have any questions regarding this matter, please do not hesitate to call me at (760) 955-5086.

Sincerely,

Dana Armstrong
Manager, Conservation/Solid Waste/Recycling
Department of Public Works/Water

cc: James L. Cox, City Manager
Doug Mathews, Manager, Public Works

DA:lm

CITY OF VICTORVILLE



760.955.5000
FAX 760.245.7243
vville@ci.victorville.ca.us
<http://ci.victorville.ca.us>

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

March 23, 2011

Kirby Brill, General Manager
Mojave Water Agency
22450 Headquarters Drive
Apple Valley, CA 92307

Subject: Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)

Dear Mr. Brill:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), *"Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan."*

This letter is intended to notify your agency that the City of Victorville is in the process of preparing the 2010 UWMP and expects to have a draft available for review in the first week of May 2011. Comments can be submitted prior to or at the public hearing for the 2010 UWMP which will take place on June 7, 2011 at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

If you have any questions regarding this matter, please do not hesitate to call me at (760) 955-5086.

Sincerely,

Dana Armstrong
Manager, Conservation/Solid Waste/Recycling
Department of Public Works/Water

cc: James L. Cox, City Manager
Doug Mathews, Manager, Public Works

DA:lm

CITY OF VICTORVILLE



760.955.5000
FAX 760.245.7243
ville@ci.victorville.ca.us
http://ci.victorville.ca.us

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

March 23, 2011

Mike Podegracz, City Manager
City of Hesperia
9700 Seventh Avenue
Hesperia, CA 92345

Subject: Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)

Dear Mr. Podegracz:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), *"Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan."*

This letter is intended to notify your agency that the City of Victorville is in the process of preparing the 2010 UWMP and expects to have a draft available for review in the first week of May 2011. Comments can be submitted prior to or at the public hearing for the 2010 UWMP which will take place on June 7, 2011 at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

If you have any questions regarding this matter, please do not hesitate to call me at (760) 955-5086.

Sincerely,

Dana Armstrong
Manager, Conservation/Solid Waste/Recycling
Department of Public Works/Water

cc: James L. Cox, City Manager
Doug Mathews, Manager, Public Works

DA:lm

CITY OF VICTORVILLE



760.955.5000
FAX 760.245.7243
vville@ci.victorville.ca.us
http://ci.victorville.ca.us

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

March 23, 2011

Gregory C. Devereaux, Chief Executive Officer
County of San Bernardino
County Administrative Office
385 N. Arrowhead Ave.
San Bernardino, CA 92415-0120

Subject: **Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)**

Dear Mr. Devereaux:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), *"Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan."*

This letter is intended to notify your agency that the City of Victorville is in the process of preparing the 2010 UWMP and expects to have a draft available for review in the first week of May 2011. Comments can be submitted prior to or at the public hearing for the 2010 UWMP which will take place on June 7, 2011 at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

If you have any questions regarding this matter, please do not hesitate to call me at (760) 955-5086.

Sincerely,

Dana Armstrong
Manager, Conservation/Solid Waste/Recycling
Department of Public Works/Water

cc: James L. Cox, City Manager
Doug Mathews, Manager, Public Works

DA:lm

CITY OF VICTORVILLE



760.955.5000
FAX 760.245.7243
vville@ci.victorville.ca.us
http://ci.victorville.ca.us

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

March 23, 2011

Dr. James Hart, City Manager
City of Adelanto
11600 Air Expressway
Adelanto, CA 92301

Subject: Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)

Dear Dr. Hart:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), *"Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan."*

This letter is intended to notify your agency that the City of Victorville is in the process of preparing the 2010 UWMP and expects to have a draft available for review in the first week of May 2011. Comments can be submitted prior to or at the public hearing for the 2010 UWMP which will take place on June 7, 2011 at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

If you have any questions regarding this matter, please do not hesitate to call me at (760) 955-5086.

Sincerely,

Dana Armstrong
Manager, Conservation/Solid Waste/Recycling
Department of Public Works/Water

cc: James L. Cox, City Manager
Doug Mathews, Manager, Public Works

DA:lm

CITY OF VICTORVILLE



760.955.5000
FAX 760.245.7243
vville@ci.victorville.ca.us
http://ci.victorville.ca.us

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

March 23, 2011

Curt Mitchell, City Manager
City of Barstow
220 East Mountain View Street, Suite A
Barstow, CA 92311

Subject: Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)

Dear Mr. Mitchell:

Pursuant to the requirements of the California Water Code, Division 6, Part 2.6 Urban Water Management Planning, Section 10621 (b), *"Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan."*

This letter is intended to notify your agency that the City of Victorville is in the process of preparing the 2010 UWMP and expects to have a draft available for review in the first week of May 2011. Comments can be submitted prior to or at the public hearing for the 2010 UWMP which will take place on June 7, 2011 at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

If you have any questions regarding this matter, please do not hesitate to call me at (760) 955-5086.

Sincerely,

Dana Armstrong
Manager, Conservation/Solid Waste/Recycling
Department of Public Works/Water

cc: James L. Cox, City Manager
Doug Mathews, Manager, Public Works

DA:lm

CITY OF
VICTORVILLE



760-955-5086
FAX 760-269-0024
vville@ci.victorville.ca.us
<http://ci.victorville.ca.us>

14343 Civic Drive
P.O. Box 5001
Victorville, California 92393-5001

April 28, 2011

Mr. Logan Olds, General Manager
Victor Valley Water Reclamation Authority
15776 Main Street, Suite 3
Hesperia CA 92345

Subject: Notice of Preparation of the 2010 City of Victorville Urban Water Management Plan (UWMP)

Dear Mr. Olds:

Please be advised that the Victorville Water District is currently in the process of updating its Urban Water Management Plan. Your agency has already been supplied with a preliminary draft, and a revised draft will be available for review May 16, 2011.

Comments may be submitted prior to or at the public hearing for the 2010 UWMP which will take place on Tuesday, June 7, 2011 at 7:00 p.m. at the Victorville City Council Chambers, 14343 Civic Drive, Victorville, CA 92392.

Thank you for your attention to this matter and for any comments you may have on the draft plan. If you have any questions regarding this matter, please feel free to contact me at 760-955-5086.

Sincerely,

Dana Armstrong, Manager
Conservation/Solid Waste/Recycling
Department of Public Works/Water

URBAN WATER MANAGEMENT PLAN ACT

This Page Left Blank Intentionally

WATER CODE

SECTION 10610-10610.4

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of

5/26/2011

CA Codes (wat:10610-10610.4)

urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

WATER CODE

SECTION 10611-10617

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

WATER CODE

SECTION 10620-10621

10620. (a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d) (1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621. (a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

WATER CODE

SECTION 10630-10634

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter that shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) (1) Describe the reliability of the water supply and

vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

- (A) An average water year.
- (B) A single dry water year.
- (C) Multiple dry water years.

(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

- (A) Single-family residential.
- (B) Multifamily.
- (C) Commercial.
- (D) Industrial.
- (E) Institutional and governmental.
- (F) Landscape.
- (G) Sales to other agencies.

(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.

(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

- (A) Water survey programs for single-family residential and multifamily residential customers.
- (B) Residential plumbing retrofit.
- (C) System water audits, leak detection, and repair.
- (D) Metering with commodity rates for all new connections and retrofit of existing connections.
- (E) Large landscape conservation programs and incentives.
- (F) High-efficiency washing machine rebate programs.
- (G) Public information programs.
- (H) School education programs.
- (I) Conservation programs for commercial, industrial, and institutional accounts.
- (J) Wholesale agency programs.
- (K) Conservation pricing.
- (L) Water conservation coordinator.
- (M) Water waste prohibition.
- (N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures

implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivisions (f) and (g) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(k) Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with

subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

10631.1. (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

10631.5. (a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an

exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

10631.7. The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

10632. (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

(1) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions that are applicable to each stage.

(2) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(3) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(4) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(5) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent

reduction in water supply.

(6) Penalties or charges for excessive use, where applicable.

(7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(8) A draft water shortage contingency resolution or ordinance.

(9) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

(b) Commencing with the urban water management plan update due December 31, 2015, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

WATER CODE

SECTION 10635

10635. (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

WATER CODE

SECTION 10640-10645

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644. (a) An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the exemplary

elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report those water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section 10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

WATER CODE

SECTION 10650-10656

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes

the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

WATER CODE

SECTION 10608-10608.8

10608. The Legislature finds and declares all of the following:

(a) Water is a public resource that the California Constitution protects against waste and unreasonable use.

(b) Growing population, climate change, and the need to protect and grow California's economy while protecting and restoring our fish and wildlife habitats make it essential that the state manage its water resources as efficiently as possible.

(c) Diverse regional water supply portfolios will increase water supply reliability and reduce dependence on the Delta.

(d) Reduced water use through conservation provides significant energy and environmental benefits, and can help protect water quality, improve streamflows, and reduce greenhouse gas emissions.

(e) The success of state and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes related to water use or efficiency.

(f) Improvements in technology and management practices offer the potential for increasing water efficiency in California over time, providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.

(g) The Governor has called for a 20 percent per capita reduction in urban water use statewide by 2020.

(h) The factors used to formulate water use efficiency targets can vary significantly from location to location based on factors including weather, patterns of urban and suburban development, and past efforts to enhance water use efficiency.

(i) Per capita water use is a valid measure of a water provider's efforts to reduce urban water use within its service area. However, per capita water use is less useful for measuring relative water use efficiency between different water providers. Differences in weather, historical patterns of urban and suburban development, and density of housing in a particular location need to be considered when assessing per capita water use as a measure of efficiency.

10608.4. It is the intent of the Legislature, by the enactment of this part, to do all of the following:

(a) Require all water suppliers to increase the efficiency of use of this essential resource.

(b) Establish a framework to meet the state targets for urban water conservation identified in this part and called for by the Governor.

(c) Measure increased efficiency of urban water use on a per capita basis.

(d) Establish a method or methods for urban retail water suppliers to determine targets for achieving increased water use efficiency by the year 2020, in accordance with the Governor's goal of a 20-percent reduction.

(e) Establish consistent water use efficiency planning and

implementation standards for urban water suppliers and agricultural water suppliers.

(f) Promote urban water conservation standards that are consistent with the California Urban Water Conservation Council's adopted best management practices and the requirements for demand management in Section 10631.

(g) Establish standards that recognize and provide credit to water suppliers that made substantial capital investments in urban water conservation since the drought of the early 1990s.

(h) Recognize and account for the investment of urban retail water suppliers in providing recycled water for beneficial uses.

(i) Require implementation of specified efficient water management practices for agricultural water suppliers.

(j) Support the economic productivity of California's agricultural, commercial, and industrial sectors.

(k) Advance regional water resources management.

10608.8. (a) (1) Water use efficiency measures adopted and implemented pursuant to this part or Part 2.8 (commencing with Section 10800) are water conservation measures subject to the protections provided under Section 1011.

(2) Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, an urban retail water supplier's failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to January 1, 2021. Nothing in this paragraph limits the use of data reported to the department or the board in litigation or an administrative proceeding. This paragraph shall become inoperative on January 1, 2021.

(3) To the extent feasible, the department and the board shall provide for the use of water conservation reports required under this part to meet the requirements of Section 1011 for water conservation reporting.

(b) This part does not limit or otherwise affect the application of Chapter 3.5 (commencing with Section 11340), Chapter 4 (commencing with Section 11370), Chapter 4.5 (commencing with Section 11400), and Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code.

(c) This part does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population growth may have greater effects on water use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors.

(d) The requirements of this part do not apply to an agricultural water supplier that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect. After the expiration of the Quantification Settlement Agreement, to the extent conservation water projects implemented as part of the Quantification Settlement Agreement remain in effect, the conserved water created as part of those projects shall be credited against the obligations of the agricultural water supplier pursuant to this part.

WATER CODE

SECTION 10608.12

10608.12. Unless the context otherwise requires, the following definitions govern the construction of this part:

(a) "Agricultural water supplier" means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right, that distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include the department.

(b) "Base daily per capita water use" means any of the following:

(1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(3) For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

(c) "Baseline commercial, industrial, and institutional water use" means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.

(d) "Commercial water user" means a water user that provides or distributes a product or service.

(e) "Compliance daily per capita water use" means the gross water use during the final year of the reporting period, reported in gallons per capita per day.

(f) "Disadvantaged community" means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(g) "Gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.

(2) The net volume of water that the urban retail water supplier places into long-term storage.

(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.

(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.

(h) "Industrial water user" means a water user that is primarily a

manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

(i) "Institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(j) "Interim urban water use target" means the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020.

(k) "Locally cost effective" means that the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure.

(l) "Process water" means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry.

(m) "Recycled water" means recycled water, as defined in subdivision (n) of Section 13050, that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse, that meets the following requirements, where applicable:

(1) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(A) Metered.

(B) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(C) Treated to a minimum tertiary level.

(D) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(2) For reservoir augmentation, water supplies that meet the criteria of paragraph (1) and are conveyed through a distribution system constructed specifically for recycled water.

(n) "Regional water resources management" means sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:

(1) The capture and reuse of stormwater or rainwater.

(2) The use of recycled water.

(3) The desalination of brackish groundwater.

(4) The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin.

(o) "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets.

(p) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(q) "Urban water use target" means the urban retail water supplier's targeted future daily per capita water use.

(r) "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

WATER CODE

SECTION 10608.16-10608.44

10608.16. (a) The state shall achieve a 20-percent reduction in urban per capita water use in California on or before December 31, 2020.

(b) The state shall make incremental progress towards the state target specified in subdivision (a) by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

10608.20. (a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

(2) It is the intent of the Legislature that the urban water use targets described in paragraph (1) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.

(b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

(1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.

(2) The per capita daily water use that is estimated using the sum of the following performance standards:

(A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

(B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or

area.

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

(c) If the department adopts a regulation pursuant to paragraph (4) of subdivision (b) that results in a requirement that an urban retail water supplier achieve a reduction in daily per capita water use that is greater than 20 percent by December 31, 2020, an urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may limit its urban water use target to a reduction of not more than 20 percent by December 31, 2020, by adopting the method described in paragraph (1) of subdivision (b).

(d) The department shall update the method described in paragraph (4) of subdivision (b) and report to the Legislature by December 31, 2014. An urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may adopt a new urban daily per capita water use target pursuant to this updated method.

(e) An urban retail water supplier shall include in its urban water management plan due in 2010 pursuant to Part 2.6 (commencing with Section 10610) the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

(f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.

(g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

(h) (1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:

(A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.

(B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.

(2) The department shall post the methodologies and criteria

developed pursuant to this subdivision on its Internet Web site, and make written copies available, by October 1, 2010. An urban retail water supplier shall use the methods developed by the department in compliance with this part.

(i) (1) The department shall adopt regulations for implementation of the provisions relating to process water in accordance with subdivision (1) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

(j) (1) An urban retail water supplier is granted an extension to July 1, 2011, for adoption of an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) due in 2010 to allow the use of technical methodologies developed by the department pursuant to paragraph (4) of subdivision (b) and subdivision (h). An urban retail water supplier that adopts an urban water management plan due in 2010 that does not use the methodologies developed by the department pursuant to subdivision (h) shall amend the plan by July 1, 2011, to comply with this part.

(2) An urban wholesale water supplier whose urban water management plan prepared pursuant to Part 2.6 (commencing with Section 10610) was due and not submitted in 2010 is granted an extension to July 1, 2011, to permit coordination between an urban wholesale water supplier and urban retail water suppliers.

10608.22. Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

10608.24. (a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

(b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

(c) An urban retail water supplier's compliance daily per capita water use shall be the measure of progress toward achievement of its urban water use target.

(d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.

(B) Substantial changes to commercial or industrial water use

resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

(e) When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

(f) (1) An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres.

(2) An urban retail water supplier, that is also an agricultural water supplier, is not subject to the requirements of Chapter 4 (commencing with Section 10608.48), if the agricultural water use is incorporated into its urban water use target pursuant to paragraph (1).

10608.26. (a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

(b) In complying with this part, an urban retail water supplier may meet its urban water use target through efficiency improvements in any combination among its customer sectors. An urban retail water supplier shall avoid placing a disproportionate burden on any customer sector.

(c) For an urban retail water supplier that supplies water to a United States Department of Defense military installation, the urban retail water supplier's implementation plan for complying with this part shall consider the conservation of that military installation under federal Executive Order 13514.

(d) (1) Any ordinance or resolution adopted by an urban retail water supplier after the effective date of this section shall not require existing customers as of the effective date of this section, to undertake changes in product formulation, operations, or equipment

that would reduce process water use, but may provide technical assistance and financial incentives to those customers to implement efficiency measures for process water. This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

(2) This part shall not be construed or enforced so as to interfere with the requirements of Chapter 4 (commencing with Section 113980) to Chapter 13 (commencing with Section 114380), inclusive, of Part 7 of Division 104 of the Health and Safety Code, or any requirement or standard for the protection of public health, public safety, or worker safety established by federal, state, or local government or recommended by recognized standard setting organizations or trade associations.

10608.28. (a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

10608.32. All costs incurred pursuant to this part by a water utility regulated by the Public Utilities Commission may be recoverable in rates subject to review and approval by the Public Utilities Commission, and may be recorded in a memorandum account and reviewed for reasonableness by the Public Utilities Commission.

10608.36. Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

10608.40. Urban water retail suppliers shall report to the

department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

10608.42. The department shall review the 2015 urban water management plans and report to the Legislature by December 31, 2016, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets in order to achieve the 20-percent reduction and to reflect updated efficiency information and technology changes.

10608.43. The department, in conjunction with the California Urban Water Conservation Council, by April 1, 2010, shall convene a representative task force consisting of academic experts, urban retail water suppliers, environmental organizations, commercial water users, industrial water users, and institutional water users to develop alternative best management practices for commercial, industrial, and institutional users and an assessment of the potential statewide water use efficiency improvement in the commercial, industrial, and institutional sectors that would result from implementation of these best management practices. The taskforce, in conjunction with the department, shall submit a report to the Legislature by April 1, 2012, that shall include a review of multiple sectors within commercial, industrial, and institutional users and that shall recommend water use efficiency standards for commercial, industrial, and institutional users among various sectors of water use. The report shall include, but not be limited to, the following:

(a) Appropriate metrics for evaluating commercial, industrial, and institutional water use.

(b) Evaluation of water demands for manufacturing processes, goods, and cooling.

(c) Evaluation of public infrastructure necessary for delivery of recycled water to the commercial, industrial, and institutional sectors.

(d) Evaluation of institutional and economic barriers to increased recycled water use within the commercial, industrial, and institutional sectors.

(e) Identification of technical feasibility and cost of the best management practices to achieve more efficient water use statewide in the commercial, industrial, and institutional sectors that is consistent with the public interest and reflects past investments in water use efficiency.

10608.44. Each state agency shall reduce water use at facilities it operates to support urban retail water suppliers in meeting the target identified in Section 10608.16.

WATER CODE

SECTION 10608.48

10608.48. (a) On or before July 31, 2012, an agricultural water supplier shall implement efficient water management practices pursuant to subdivisions (b) and (c).

(b) Agricultural water suppliers shall implement all of the following critical efficient management practices:

(1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).

(2) Adopt a pricing structure for water customers based at least in part on quantity delivered.

(c) Agricultural water suppliers shall implement additional efficient management practices, including, but not limited to, practices to accomplish all of the following, if the measures are locally cost effective and technically feasible:

(1) Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage.

(2) Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not harm crops or soils.

(3) Facilitate the financing of capital improvements for on-farm irrigation systems.

(4) Implement an incentive pricing structure that promotes one or more of the following goals:

(A) More efficient water use at the farm level.

(B) Conjunctive use of groundwater.

(C) Appropriate increase of groundwater recharge.

(D) Reduction in problem drainage.

(E) Improved management of environmental resources.

(F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.

(5) Expand line or pipe distribution systems, and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage.

(6) Increase flexibility in water ordering by, and delivery to, water customers within operational limits.

(7) Construct and operate supplier spill and tailwater recovery systems.

(8) Increase planned conjunctive use of surface water and groundwater within the supplier service area.

(9) Automate canal control structures.

(10) Facilitate or promote customer pump testing and evaluation.

(11) Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.

(12) Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following:

(A) On-farm irrigation and drainage system evaluations.

(B) Normal year and real-time irrigation scheduling and crop evapotranspiration information.

(C) Surface water, groundwater, and drainage water quantity and quality data.

(D) Agricultural water management educational programs and materials for farmers, staff, and the public.

(13) Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage.

(14) Evaluate and improve the efficiencies of the supplier's pumps.

(d) Agricultural water suppliers shall include in the agricultural water management plans required pursuant to Part 2.8 (commencing with Section 10800) a report on which efficient water management practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.

(e) The data shall be reported using a standardized form developed pursuant to Section 10608.52.

(f) An agricultural water supplier may meet the requirements of subdivisions (d) and (e) by submitting to the department a water conservation plan submitted to the United States Bureau of Reclamation that meets the requirements described in Section 10828.

(g) On or before December 31, 2013, December 31, 2016, and December 31, 2021, the department, in consultation with the board, shall submit to the Legislature a report on the agricultural efficient water management practices that have been implemented and are planned to be implemented and an assessment of the manner in which the implementation of those efficient water management practices has affected and will affect agricultural operations, including estimated water use efficiency improvements, if any.

(h) The department may update the efficient water management practices required pursuant to subdivision (c), in consultation with the Agricultural Water Management Council, the United States Bureau of Reclamation, and the board. All efficient water management practices for agricultural water use pursuant to this chapter shall be adopted or revised by the department only after the department conducts public hearings to allow participation of the diverse geographical areas and interests of the state.

(i) (1) The department shall adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirement in paragraph (1) of subdivision (b).

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

WATER CODE

SECTION 10608.50

10608.50. (a) The department, in consultation with the board, shall promote implementation of regional water resources management practices through increased incentives and removal of barriers consistent with state and federal law. Potential changes may include, but are not limited to, all of the following:

(1) Revisions to the requirements for urban and agricultural water management plans.

(2) Revisions to the requirements for integrated regional water management plans.

(3) Revisions to the eligibility for state water management grants and loans.

(4) Revisions to state or local permitting requirements that increase water supply opportunities, but do not weaken water quality protection under state and federal law.

(5) Increased funding for research, feasibility studies, and project construction.

(6) Expanding technical and educational support for local land use and water management agencies.

(b) No later than January 1, 2011, and updated as part of the California Water Plan, the department, in consultation with the board, and with public input, shall propose new statewide targets, or review and update existing statewide targets, for regional water resources management practices, including, but not limited to, recycled water, brackish groundwater desalination, and infiltration and direct use of urban stormwater runoff.

WATER CODE

SECTION 10608.52

10608.52. (a) The department, in consultation with the board, the California Bay-Delta Authority or its successor agency, the State Department of Public Health, and the Public Utilities Commission, shall develop a single standardized water use reporting form to meet the water use information needs of each agency, including the needs of urban water suppliers that elect to determine and report progress toward achieving targets on a regional basis as provided in subdivision (a) of Section 10608.28.

(b) At a minimum, the form shall be developed to accommodate information sufficient to assess an urban water supplier's compliance with conservation targets pursuant to Section 10608.24 and an agricultural water supplier's compliance with implementation of efficient water management practices pursuant to subdivision (a) of Section 10608.48. The form shall accommodate reporting by urban water suppliers on an individual or regional basis as provided in subdivision (a) of Section 10608.28.

WATER CODE

SECTION 10608.56-10608.60

10608.56. (a) On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

(b) On and after July 1, 2013, an agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

(c) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions. The supplier may request grant or loan funds to achieve the per capita reductions to the extent the request is consistent with the eligibility requirements applicable to the water funds.

(d) Notwithstanding subdivision (b), the department shall determine that an agricultural water supplier is eligible for a water grant or loan even though the supplier is not implementing all of the efficient water management practices described in Section 10608.48, if the agricultural water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the efficient water management practices. The supplier may request grant or loan funds to implement the efficient water management practices to the extent the request is consistent with the eligibility requirements applicable to the water funds.

(e) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval documentation demonstrating that its entire service area qualifies as a disadvantaged community.

(f) The department shall not deny eligibility to an urban retail water supplier or agricultural water supplier in compliance with the requirements of this part and Part 2.8 (commencing with Section 10800), that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the requirements of this part or Part 2.8 (commencing with Section 10800).

10608.60. (a) It is the intent of the Legislature that funds made available by Section 75026 of the Public Resources Code should be expended, consistent with Division 43 (commencing with Section 75001)

of the Public Resources Code and upon appropriation by the Legislature, for grants to implement this part. In the allocation of funding, it is the intent of the Legislature that the department give consideration to disadvantaged communities to assist in implementing the requirements of this part.

(b) It is the intent of the Legislature that funds made available by Section 75041 of the Public Resources Code, should be expended, consistent with Division 43 (commencing with Section 75001) of the Public Resources Code and upon appropriation by the Legislature, for direct expenditures to implement this part.

WATER CODE

SECTION 10608.64

10608.64. The department, in consultation with the Agricultural Water Management Council, academic experts, and other stakeholders, shall develop a methodology for quantifying the efficiency of agricultural water use. Alternatives to be assessed shall include, but not be limited to, determination of efficiency levels based on crop type or irrigation system distribution uniformity. On or before December 31, 2011, the department shall report to the Legislature on a proposed methodology and a plan for implementation. The plan shall include the estimated implementation costs and the types of data needed to support the methodology. Nothing in this section authorizes the department to implement a methodology established pursuant to this section.

GROUNDWATER BASIN INFORMATION

This Appendix contains the following material related to the description of the groundwater basins underlying Victorville Water District:

- Judgment After Trial – Mojave Basin Area Adjudication
- Mojave Water Agency 2004 Groundwater (Regional) Management Plan
- DWR Bulletin 118
 - South Lahontan Hydrologic Region
 - 6-42 – Upper Mojave River Valley

This Page Left Blank Intentionally

JUDGMENT AFTER TRIAL

JANUARY 10, 1996

**MOJAVE BASIN AREA ADJUDICATION
CITY OF BARSTOW, ET AL V. CITY OF ADELANTO, ET AL
RIVERSIDE COUNTY SUPERIOR COURT CASE NO. 208568**



CHAMBERS OF
VICTOR MICELI
JUDGE OF THE SUPERIOR COURT

Superior Court
STATE OF CALIFORNIA
COUNTY OF RIVERSIDE

COURTHOUSE
4050 MAIN STREET
RIVERSIDE, CALIFORNIA 92501

January 10, 1996

TO: ALL PARTIES LISTED ON THE ATTACHED MAILING LIST
FROM: E. MICHAEL KAISER, JUDGE *by ss*
SUBJECT: CITY OF BARSTOW VS CITY OF ADELANTO, Case No.: 208568

The Judgment in the above-entitled case was signed on January 10, 1996. Please find attached the amended two pages of Exhibit B, Table B-1.

Please find attached two amended pages of Exhibit B, Table B-1.

~~03/20/92~~
~~01/20/92~~
~~09/03/92~~
~~04/18/92~~
~~07/20/92~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA	PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
				FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
SAN BERNARDINO CO SERVICE AREA 70J		1,005	0.8233	1,005	954	904	854	804
SAN BERNARDINO CO SERVICE AREA 70L		355	0.2901	355	337	319	301	284
SAN FILIPPO, JOSEPH & SHILLEY		35	0.0286	35	33	31	29	28
SILVER LAKES ASSOCIATION		3,987	3.2583	3,987	3,787	2,588	3,388	3,189
SOUTHDOWN, INC		1,519	1.2414	1,519	1,443	1,367	1,291	2,215
SOUTHERN CALIFORNIA WATER COMPANY		940	0.7682	940	893	846	799	752
SPRING VALLEY LAKE ASSOCIATION		3,056	2.4974	3,056	2,903	2,750	2,597	2,444
SPRING VALLEY LAKE COUNTRY CLUB		977	0.7984	977	928	879	830	781
STORM, RANDALL		62	0.0507	62	58	55	52	49
SUDMEYER, GLENN W		121	0.0989	121	114	108	102	96
SUMMIT VALLEY RANCH		452	0.3694	452	429	406	384	361
TATRO, RICHARD K & SANDRA A		280	0.2288	280	266	252	238	224
TATUM, JAMES B		829	0.6775	829	787	746	704	663
TAYLOR, ALLEN C / HAYMAKER RANCH		456	0.3727	456	433	410	387	364
THOMAS, S DALE		440	0.3596	440	418	396	374	352
THOMAS, WALTER		36	0.0294	36	34	32	30	28
THOMPSON, JAMES A		418	0.3416	418	397	376	355	334
THOMPSON, RODGER		76	0.0621	76	72	68	64	60
THRASHER, GARY		373	0.3048	373	354	335	317	298
THUNDERBIRD COUNTY WATER DISTRICT		118	0.0964	118	112	106	100	94
TURNER, ROBERT		70	0.0572	70	66	63	59	56
VAIL, JOSEPH B & PAULA S		126	0.1030	126	119	113	107	100
VAN BURGERS, CARL		710	0.5802	710	674	639	603	568
VAN LERWEN FAMILY TRUST		341	0.2787	341	323	306	289	272

* Durston Well, location 06N/04W-18E, APN 468-151-11 - water production right of 357 acre/feet, claimed by Durston/Van Burger/CVB Investments and Industrial Asphalt. Product right to be determined in a subsequent severed proceeding, jurisdiction reserved.

~~12/10/92~~
~~01/30/93~~
~~02/01/93~~
~~04/16/93~~
~~04/30/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA PRODUCER	BASE ANNUAL 1 PRODUCTION (ACRE-FBET)	BASE ANNUAL 2 PRODUCTION (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FBET)				
			FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
AGCON, INC	0	0.0000	0	0	0	0	0
AGUAYO, JEANETTE L	212	0.3742	212	201	190	180	169
ATCHILSON, TOPEKA, SANTA FE RAILWAY CO	120	0.2118	120	114	108	102	96
AVDEEF, THOMAS	34	0.0600	34	32	30	28	27
AZTEC FARM DEVELOPMENT COMPANY (Now, Virgil Gorman)	220	0.3883	220	209	198	187	176
BARNES, PAY - EXECUTOR OF ESTATE OF WAYNE BARNES	243	0.4289	243	230	218	206	194
BROWNER, HARVIN	361	0.6372	361	342	324	306	288
BURNS, RITA J & PAMELA E	16	0.0282	16	15	14	13	12
CHAPA, LARRY R	96	0.1694	96	91	86	81	76
CHOI, YONG IL & JOUNG AE	38	0.0671	38	36	34	32	30
CHRISTISON, JOEL	75	0.1324	75	71	67	63	60
COOK, KWON W	169	0.2993	169	160	152	143	135
DE VRIES, NEIL	3,800	6.7070	3,800	3,610	3,420	3,230	3,040
DESERT COMMUNITY BANK	156	0.2753	156	148	140	132	124
DURAN, FRANK T	50	0.0883	50	47	45	42	40
GAINES, JACK	117	0.2065	117	111	105	99	93
GESIRIECH, WAYNE	121	0.2136	121	114	108	102	96
GORMAN, VIRGIL	138	0.2436	138	131	124	117	110
GRIEDER, RAYMOND H & DORISANNE	30	0.0530	30	28	27	25	24
GRILL, NICHOLAS P & MILLIE D	21	0.0371	21	19	18	17	16
GROEN, CORNELIS	1,043	1.8409	1,043	990	938	886	834
HANIFY, DEB - WHITE BEAR RANCH	152	0.2683	152	144	136	129	121
HARMSEN, JAMES & RUTH ANN	1,522	2.6863	1,522	1,445	1,365	1,293	1,217
HARPER LAKE COMPANY	1,433	2.5293	1,433	1,361	1,289	1,218	1,146

Steven A. Figueroa, President
Latino's Unidos M.A.P.A. Victor Valley
P.O. Box 520
Victorville, CA 92393-0520

Arthur G. Kidman, Esq.
Douglas J. Evertz, Esq.
McCormick, Kidman & Behrens
3100 Bristol St., #290
Costa Mesa, CA 92626-3033

William J. Brunick, Esq.
Boyd L. Hill, Esq.
Brunick, Alvarez & Battersby
1839 Commercenter West
P.O. Box 6425
San Bernardino, CA 92412

James L. Markman, Esq.
William P. Curley, III, Esq.
Number One Civic Center Circle
P.O. Box 1059
Brea, CA 92622-1059

Arthur L. Littleworth, Esq.
Best, Best & Krieger
3750 University Ave., #400
Riverside, CA 92501

Frederick A. Fudacz, Esq.
John Ossiff, Esq.
445 So. Figueroa St., Floor 31
Los Angeles, CA 90071-1602

Steven B. Abbott, Esq.
Redwine & Sherrill
1950 Market St.
Riverside, CA 92501

Therese Exline Parker
P.O. Box 1318
Upland CA 91785-1318

Office of the Attorney General
Marilyn H. Levin, Dep.
300 So. Spring St.
Floor 11, North Tower
Los Angeles, CA 90004

Office of the Attorney General
Joseph Barbieri, Dep.
2101 Webster St., 12th Fl.
Oakland, CA 94612-3049

Edward C. Dygert, Esq.
Cox, Castle & Nicholson
2049 Century Park East
28th Floor
Los Angeles, CA 90067

Pryke Properties, Trustee
P.O. Box 400937
Hesperia, CA 92340-0937

Office of the County Counsel
of San Bernardino County
Paul M. St. John, Dep.
385 No. Arrowhead Ave.
San Bernardino, CA 92401

Thomas P. McGuire, Esq.
Monteleone & McCrory
10 Universal City Plaza, #2500
P.O. Box 7806
Universal City, CA 91608-7806

Robert E. Dougherty, Esq.
Eric S. Vail, Esq.
Covington & Crowe
1131 West 6th St., #300
Ontario, CA 91762

Michael Duane Davis, Esq.
Gresham, Varner, Savage
& Nolan
14011 Park Ave., #140
Victorville, CA 92392

Nino J. Mascolo, Esq.
So. Cal. Edison Co.
2244 Walnut Grove Ave.
P.O. Box 800
Rosemead, CA 91770

Calvin R. House, Esq.
Lisa R. Klein, Esq.
Fulbright & Jaworski
865 So. Figueroa St., Fl. 29
Los Angeles, CA 90017-2571

Mark B. Salas
205 No. Acacia, #D
Fullerton, CA 92631

Joseph B. Vail
16993 Abby Lane
Victorville, CA 92392

R. Zaiden Corrado, APC
By: Robert Corrado
420 N. Montebello Blvd. #204
Montebello, CA 90640

BRUNICK, ALVAREZ & BATTERSBY
PROFESSIONAL LAW CORPORATION
1839 COMMERCENTER WEST
POST OFFICE BOX 6425
SAN BERNARDINO, CALIFORNIA 92412
TELEPHONE: (909) 889-8301 824-0623

FILED
RIVERSIDE COUNTY

JAN 10 1996

William J. Brunick, (Bar No. 46289)
Boyd L. Hill, (Bar No. 140435)

Attorneys for

Cross-Complainant
MOJAVE WATER AGENCY

ARTHUR A. GIBBY, Clerk
By *Y.A. Burns* Y.A. Burns
Deputy

SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF RIVERSIDE

CITY OF BARSTOW, et al,

Plaintiff,

v.

CITY OF ADELANTO, et al,

Defendant.

CASE NO. 208568

ASSIGNED TO JUDGE KAISER
DEPT. 4 FOR ALL PURPOSES

JUDGMENT AFTER TRIAL

MOJAVE WATER AGENCY,

Cross-complainant,

v.

ANDERSON, RONALD H. et al,

Cross-defendants.

TABLE OF CONTENTS

1			
2			
3	I.	<u>INTRODUCTION</u>	1
4		A. The Complaint.....	1
5		B. The MWA Cross-Complaint.....	1
6		C. The Arc Las Flores Cross-Complaint.....	2
7		D. Stipulation and Trial.....	2
8	II.	<u>DECREE</u>	3
9		A. JURISDICTION, PARTIES, DEFINITIONS.....	3
10		1. Jurisdiction and Parties.....	3
11		a. Jurisdiction.....	3
12		b. Parties.....	3
13		c. Minimal Producers.....	3
14		2. Physical and Legal Complexity.....	5
15		3. Need for a Declaration of Rights	
16		and Obligations and for Physical	
17		Solution.....	5
18		4. Definitions.....	7
19		a. Afton	7
20		b. Annual or Year	7
21		c. Aquaculture Water.....	7
22		d. Assessments.....	7
23		e. Barstow.....	7
24		f. Base Annual Production.....	7
25		g. Base Annual Production Right.....	8
26		h. Base Flow.....	8
27		i. Carry Over Right.....	8
28		j. Consumption or Consumptive Use.....	9
		k. Free Production Allowance.....	9
		l. Groundwater.....	9
		m. Harper Lake Basin.....	9
		n. Lower Narrows.....	9
		o. Makeup Water.....	9
		p. Makeup Obligation.....	9
		q. Minimal Producer.....	9
		r. Minimum Subarea Obligation.....	10
		s. Mojave Basin Area or Basin Area.....	10
		t. MWA.....	10
		u. Overdraft.....	10
		v. Party (Parties).....	10
		w. Person(s).....	11
		x. Produce.....	11
		y. Producer.....	11

1	z.	Production.....	11
	aa.	Production Safe Yield.....	11
2	bb.	Purpose of Use.....	11
	cc.	Recirculated Water.....	12
3	dd.	Replacement Obligation.....	12
	ee.	Replacement Water.....	12
4	ff.	Responsible Party.....	12
	gg.	Stored Water.....	12
5	hh.	Storm Flow.....	12
	ii.	Subareas.....	13
6	jj.	Subarea Obligation.....	13
	kk.	Subsurface Flow.....	13
7	ll.	Supplemental Water.....	13
	mm.	Transition Zone.....	13
8	nn.	Watermaster.....	13
9	5.	Exhibits.....	13
10	B.	DECLARATION OF HYDROLOGIC CONDITIONS.....	14
11	6.	Mojave Basin Area as Common Source of Supply.....	14
12	7.	Existence of Overdraft.....	14
13	C.	DECLARATION OF RIGHTS AND OBLIGATIONS.....	15
14	8.	Production Rights of the Parties.....	15
15	a.	Aquaculture.....	15
16	b.	Camp Cady.....	16
	c.	Recreational Lakes in Baja Subarea...	16
17	9.	MWA Obligation.....	17
18	a.	Secure Supplemental Water.....	17
19	b.	Supplemental Water Prices.....	17
20	c.	Supplemental Water Deliver Plan.....	17
	d.	Water Delivery Cost Allocation.....	18
	e.	Legislative Changes.....	19
	f.	Court Review and Determination of Benefit.....	19
21	10.	Priority and Determination of Production Rights.....	19
22	11.	Exercise of Carry Over Rights.....	21
23	12.	Production Only Pursuant to Judgment.....	21
24	13.	Declaration of Subarea Rights and Obligations.....	21
25	III.	<u>INJUNCTION</u>	22
26	14.	Injunction Against Unauthorized Production.....	22
27			
28			

1	15.	Injunction Re Change in Purpose of Use Without Notice Thereof to Watermaster.....	23
2			
3	16.	Injunction Against Unauthorized Recharge.....	23
4	17.	Injunction Against Transportation from Mojave Basin Area.....	23
5	18.	Injunction Against Diverting Storm Flows.....	23
6			
7	IV.	<u>CONTINUING JURISDICTION</u>	24
8		19. Jurisdiction Reserved.....	24
9	V.	<u>PHYSICAL SOLUTION</u>	24
10	A.	GENERAL.....	24
11		20. Purpose and Objective.....	24
12		21. Need for Flexibility.....	25
13		22. General Pattern of Operations.....	25
14	B.	ADMINISTRATION.....	26
15		23. Administration by Watermaster.....	26
16		(a) Standard of Performance	27
17		(b) Removal of Watermaster	27
18		(c) MWA Appointed as Initial Watermaster.....	27
19		24. Powers and Duties.....	28
20		(a) Rules and Regulations.....	28
21		(b) Employment of Experts and Agents.....	28
22		(c) Makeup and Replacement Obligations...	29
23		(d) Measuring Devices, etc.....	29
24		(e) Hydrologic Data Collection.....	29
25		(f) Assessments.....	29
26		(g) Purchase of and Recharge with Supplemental Water.....	30
27		(h) Water Quality.....	30
28		(i) Notice List.....	30
		(j) Annual Administrative Budget.....	30
		(k) Annual Report to Court.....	30
		(l) Investment of Funds.....	32
		(m) Borrowing.....	32
		(n) Transfers.....	32
		(o) Free Production Allowance.....	32
		(p) Production Reports.....	32
		(q) Production Adjustment for Change in Purpose of Use.....	33

1	(r)	Reallocation of Base Annual Production Rights.....	34
2	(s)	Storage Agreements.....	34
3	(t)	Subarea Advisory Committee Meetings.....	34
4	(u)	Unauthorized Production.....	35
4	(v)	Meetings and Records.....	35
5	(w)	Data, Estimates and Procedures.....	35
5	(x)	Biological Resource Mitigation.....	35
6	C.	ASSESSMENTS.....	36
7	25.	Purpose.....	36
8	(a)	Administrative Assessments.....	36
8	(b)	Replacement Water Assessments.....	36
9	(c)	Makeup Water Assessments.....	36
9	(d)	Biological Resource Assessment.....	36
9	(e)	MWA Assessment of Minimal Producers..	37
10	26.	Procedure.....	37
11	27.	Availability of Supplemental Water.....	38
12	28.	Use of Replacement Water Assessment Proceeds and Makeup Water Assessment Proceeds.....	39
13	28.	Use of Replacement Water Assessment Proceeds and Makeup Water Assessment Proceeds.....	39
14	29.	MWA Annual Report to the Watermaster.....	39
15	D.	SUBAREA ADVISORY COMMITTEES.....	40
16	30.	Authorization.....	40
17	31.	Composition and Election.....	40
18	32.	Compensation.....	41
19	33.	Powers and Functions.....	41
20	E.	TRANSFERABILITY.....	41
21	34.	Assignment, Transfer, etc. of Rights.....	41
22	F.	MISCELLANEOUS PROVISIONS.....	41
23	35.	Water Quality	41
24	36.	Review Procedures.....	41
25	(a)	Effective Date of Watermaster Action.	41
26	(b)	Notice of Motion.....	42
26	(c)	Time for Motion.....	42
27	(d)	De Novo Nature of Proceeding.....	42
27	(e)	Decision.....	43
28	(f)	Payment of Assessments.....	43

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

37. Designation of Address for Notice and Service..... 43
38. Service of Documents..... 44
39. No Abandonment of Rights..... 44
40. Intervention After Judgment..... 44
41. Recordation of Notice..... 45
42. Judgment Binding on Successors, etc..... 45
43. Costs..... 45
44. Entry of Judgment..... 45

Exhibit "A" - Map entitled, "Map showing Mojave Water Agency, Mojave River, Mojave Basin Area and Hydrologic Subareas and Limits of Adjudicated Area Together with Geologic and Other Pertinent Features."

Exhibit "B" - Tables entitled, "Table B-1: Table Showing Base Annual Production, Base Annual Production Right of Each Producer Within Each Subarea, and Free Production Allowance for Subareas for First Five Years of the Judgment" and "Table B-2: Table Showing Total Water Production for Aquaculture and Recreational Lake Purposes."

Exhibit "C" - Engineering Appendix.

Exhibit "D" - Time Schedules.

Exhibit "E" - List of Producers and Their Designees.

Exhibit "F" - Transfers of Base Annual Production Rights.

Exhibit "G" - Subarea Obligations.

Exhibit "H" - Biological Resource Mitigation.

Exhibit "I" - Map Showing Potential Groundwater Recharge Areas

1 I. INTRODUCTION

2 A. The Complaint. The original complaint herein was filed
3 by the City of Barstow and Southern California Water Company
4 (collectively "Plaintiffs") in San Bernardino Superior Court, North
5 Desert District, on May 30, 1990 as Case No. BCV6672, and
6 transferred to Riverside County Superior Court on November 27,
7 1990. Plaintiffs allege that the cumulative water Production
8 upstream of the City of Barstow Overdrafted the Mojave River
9 system, and request an average Annual flow of 30,000 acre-feet of
10 surface water to the City of Barstow area. The complaint also
11 includes a request for a writ of mandate to require the Mojave
12 Water Agency ("MWA") to act pursuant to its statutory authority to
13 obtain and provide Supplemental Water for use within the Mojave
14 Basin Area.

15 B. The MWA Cross-Complaint. On July 26, 1991, the MWA filed
16 its first amended cross-complaint in this case. The MWA first
17 amended cross-complaint and its ROE amendments name Producers who
18 collectively claim substantially all rights of water use within the
19 Mojave Basin Area, including Parties downstream of the City of
20 Barstow. The MWA cross-complaint, as currently amended, requests
21 a declaration that the available native water supply to the Mojave
22 Basin Area (not including water imported from the California State
23 Water Project) is inadequate to meet the demands of the combined
24 Parties and requests a determination of the water rights of
25 whatever nature within the MWA boundaries and the Mojave Basin
26 Area. The MWA has named as Parties several hundred Producers
27 within the Basin Area.

28 ///

1 C. The Arc Las Flores Cross-Complaint. On July 3, 1991, Arc
2 Las Flores filed a cross-complaint for declaratory relief seeking
3 a declaration of water rights of certain named cross-defendants and
4 a declaration that the appropriative, overlying and riparian rights
5 of Arc Las Flores be determined to be prior and paramount to any
6 rights of the Plaintiffs and other appropriators.

7 D. Stipulation and Trial. On October 16, 1991, the Court
8 ordered a litigation standstill. The purpose of the standstill was
9 to give the parties time to negotiate a settlement and develop a
10 solution to the overdraft existing in the Mojave River Basin.

11 A committee of engineers and attorneys, representing a variety
12 of water users and interests throughout the Mojave River Basin, was
13 created to develop a physical solution to the water shortage
14 problem. The work of the committee resulted in a stipulated
15 interlocutory order and judgment, which was entered by the court on
16 September 23, 1993.

17 Several non-stipulating parties requested a trial. On April
18 20, 1994, the Court issued a memorandum setting forth the trial
19 issues. This cause came on regularly for trial on February 6,
20 1995, and was tried in Department 4 of the above-entitled Court,
21 the Honorable E. Michael Kaiser, Judge, Presiding, without a jury.
22 Oral and documentary evidence was introduced on behalf of the
23 respective parties and the cause was argued and submitted for
24 decision.

25 ///

26 ///

27 ///

28 ///

1 II. DECREE

2 NOW, THEREFORE, IT IS ORDERED, ADJUDGED AND DECREED:

3 A. JURISDICTION, PARTIES, DEFINITIONS.

4 1. Jurisdiction and Parties.

5 a. Jurisdiction. This Court has jurisdiction to
6 enter Judgment declaring and adjudicating the rights to reasonable
7 and beneficial use of water by the Parties in the Mojave Basin Area
8 pursuant to Article X, Section 2 of the California Constitution.
9 This Judgment constitutes an adjudication of water rights of the
10 Mojave Basin Area pursuant to Section 37 of Chapter 2146 of
11 Statutes of 1959 ("the MWA Act").

12 b. Parties. All Parties to the MWA cross-
13 complaint are included in this Judgment. The MWA has notified
14 those Persons claiming any right, title or interest to the natural
15 waters within the Mojave Basin Area to make claims. Such notice
16 has been given: 1) in conformity with the notice requirements of
17 Water Code §§ 2500 et seq.; 2) pursuant to Section 37 of the MWA
18 Act; and 3) pursuant to order of this Court. Subsequently, all
19 Producers making claims have been or will be included as Parties.
20 The defaults of certain Parties have been entered, and certain
21 named cross-defendants to the MWA cross-complaint who are not
22 Producers have been dismissed. All named Parties who have not been
23 dismissed have appeared herein or have been given adequate
24 opportunity to appear herein. The Court has jurisdiction of the
25 subject matter of this action and of the Parties hereto.

26 c. Minimal Producers. There are numerous Minimal
27 Producers in the Basin Area and their number is expected to
28 increase in the future. In order to minimize the cost of

1 administering this Judgment and to assure that every Person
2 producing water in the Basin Area participates fairly in the
3 Physical Solution, MWA shall:

4 i. within one Year following entry of this
5 Judgment, prepare a report to the Court: 1) setting forth the
6 identity and verified Base Annual Production of each Minimal
7 Producer in each Subarea of the Basin Area; and 2)
8 recommending a proposed system of Minimal Producer
9 Assessments. The system of Minimal Producer Assessments shall
10 achieve an equitable allocation of the costs of the Physical
11 Solution that are attributable to Production of verified Base
12 Annual Production amounts by Minimal Producers in each Subarea
13 to and among such Minimal Producers. Minimal Producer
14 Assessments need not be the same for existing Minimal
15 Producers as for future Minimal Producers.

16 ii. within one Year following entry of this
17 Judgment, prepare a report to the Court setting forth a
18 proposed program to be undertaken by MWA, pursuant to its
19 statutory authority, to implement the proposed system of
20 Minimal Producer Assessments. The Court may order MWA to
21 implement the proposed program or, if MWA's statutory
22 authority is inadequate to enable implementation, or if either
23 the proposed program or the proposed system of Minimal
24 Producer Assessments is unacceptable to the Court, the Court
25 may then order MWA either to implement an alternative program
26 or system, or in the alternative, to name all Minimal
27 Producers as Parties to this litigation and to serve them for
28 the purpose of adjudicating their water rights.

1 Any Minimal Producer whose Annual Production exceeds ten (10) acre-
2 feet in any Year following the date of entry of Judgment shall be
3 made a Party pursuant to Paragraph 12 and shall be subject to
4 Administrative, Replacement Water, Makeup Water and Biological
5 Resources Assessments. Any Minimal Producer who produced during
6 the 1986-1990 period may become a Party pursuant to Paragraph 40
7 with a Base Annual Production Right based on such Minimal
8 Producer's verified Base Annual Production. To account properly
9 for aggregate Production by Minimal Producers in each Subarea,
10 Table B-1 of Exhibit B shall include an estimated aggregate amount
11 of Base Annual Production by all Minimal Producers in each Subarea.
12 The Base Annual Production of any Minimal Producer who becomes a
13 Party shall be deducted from the aggregate amount and assigned to
14 such Minimal Producer.

15 2. Physical and Legal Complexity. The physical and
16 legal issues of the case as framed by the complaint and cross-
17 complaints are extremely complex. Production of more than 1,000
18 Persons producing water in the Basin Area has been ascertained. In
19 excess of 1,000 Persons have been served. The water supply and
20 water rights of the entire Mojave Basin Area and its hydrologic
21 Subareas extending over 4000 square miles have been brought into
22 issue. Most types and natures of water right known to California
23 law are at issue in the case. Engineering studies by the Parties,
24 jointly and severally, leading toward adjudication of these rights
25 and a Physical Solution, have required the expenditure of over two
26 Years' time and hundreds of thousands of dollars.

27 3. Need for a Declaration of Rights and Obligations and
28 for Physical Solution. A Physical Solution for the Mojave Basin

1 Area based upon a declaration of water rights and a formula for
2 Intra- and Inter-Subarea allocation of rights and obligations is
3 necessary to implement the mandate of Article X, Section 2 of the
4 California Constitution and California water policy. Such Physical
5 Solution requires the definition of the individual rights of all
6 Producers within the Basin Area in a manner which will equitably
7 allocate the natural water supplies and which will provide for
8 equitable sharing of costs for Supplemental Water. Nontributary
9 supplemental sources of water are or will be available in amounts,
10 which when combined with water conservation, water reclamation,
11 water transfers, and improved conveyance and distribution methods
12 within the Basin Area, will be sufficient in quantity and quality
13 to assure implementation of a Physical Solution. Sufficient
14 information and data are known to formulate a reasonable and just
15 allocation of existing water supplies as between the hydrologic
16 Subareas within the Basin Area and as among the water users within
17 each Subarea. Such Physical Solution will allow the public water
18 supply agencies and individual water users within each hydrologic
19 Subarea to proceed with orderly water resource planning and
20 development. It will be necessary for MWA to construct conveyance
21 facilities to implement the Physical Solution. Absent the
22 construction of conveyance facilities, some Subareas may be
23 deprived of an equitable share of the benefits made possible by the
24 Physical Solution. Accordingly, this Physical Solution mandates
25 the acquisition or construction of conveyance facilities for
26 importation and equitable distribution of Supplemental Water to the
27 respective Subareas. Such construction is dependent on the
28 availability of appropriate financing, and any such financing

1 assessed to the Parties will be based upon benefit to the Parties
2 in accordance with the MWA Act.

3 4. Definitions. As used in this judgment, the
4 following terms shall have the meanings herein set forth:

5 a. Afton - The United States Geological Survey gauging
6 station "Mojave River at Afton, CA."

7 b. Annual or Year - As used in this Judgment refers to
8 the Annual period beginning October 1 and ending
9 September 30 of the following Year.

10 c. Aquaculture Water - Water so identified in Exhibit
11 "B". Such water may be used only for fish breeding
12 and rearing. The Annual Consumptive Use of such
13 water in acre-feet is equal to the water surface
14 area, in acres, of the fish rearing facilities
15 multiplied by seven (feet).

16 d. Assessments - Those Assessments levied and
17 collected pursuant to this judgment including
18 Replacement Water, Makeup Water, Administrative and
19 Biological Resource Assessments.

20 e. Barstow - The United States Geological Survey
21 Gauging Station "Mojave River at Barstow, CA."

22 f. Base Annual Production - The verified maximum Year
23 Production, in acre-feet, for each Producer for the
24 five Year Period 1986-1990 as set forth in Table
25 B-1 of Exhibit "B", except where otherwise noted
26 therein. The maximum Year Production for each
27 Producer was verified based on one or more of the
28 following: flow meter readings, electrical power

1 or diesel usage records or estimated applied water
2 duty. The Base Annual Production for recreational
3 lakes in the Baja Subarea and for Aquaculture shall
4 be equal either to the area of water surface
5 multiplied by seven feet or to verified Production,
6 whichever is less. The five Year period 1986-1990
7 shall also be the time period for which Base Annual
8 Production for Minimal Producers shall be
9 calculated.

10 g. Base Annual Production Right - The relative Annual
11 right of each Producer to the Free Production
12 Allowance within a given Subarea, expressed as a
13 percentage of the aggregate of all Producers' Base
14 Annual Production in the Subarea. The percentage
15 for each Producer is calculated by multiplying that
16 Producer's Base Annual Production in a Subarea
17 times one hundred (100) and dividing the result by
18 the aggregate Base Annual Production for all
19 Producers in the Subarea. The percentage shall be
20 rounded off to the nearest one ten-thousandth of
21 one per cent.

22 h. Base Flow - That portion of the total surface flow
23 measured Annually at Lower Narrows which remains
24 after subtracting Storm Flow.

25 i. Carry Over Right - The right of a Producer to delay
26 and accumulate the Production of such Producer's
27 share of a Subarea Free Production Allowance until
28

///

1 and only until the following Year free of any
2 Replacement Water Assessment.

3 j. Consumption or Consumptive Use - The permanent
4 removal of water from the Mojave Basin Area through
5 evaporation or evapo-transpiration. The
6 Consumptive Use rates resulting from particular
7 types of water use are identified in Paragraph 2 of
8 Exhibit "F".

9 k. Free Production Allowance - The total amount of
10 water, and any Producer's share thereof, that may
11 be Produced from a Subarea each Year free of any
12 Replacement Obligation.

13 l. Groundwater - Water beneath the surface of the
14 ground and within the zone of saturation; i.e.,
15 below the existing water table, whether or not
16 flowing through known and definite channels.

17 m. Harper Lake Basin - That portion of the Centro
18 Subarea identified as such on Exhibit "A".

19 n. Lower Narrows - The United States Geological Survey
20 gauging station "Mojave River near Victorville,
21 CA."

22 o. Makeup Water - Water needed to satisfy a Minimum
23 Subarea Obligation.

24 p. Makeup Obligation - The obligation of a Subarea to
25 pay for Makeup Water to satisfy its Subarea
26 Obligation.

27 q. Minimal Producer - Any Person whose Base Annual
28 Production, as verified by MWA is not greater than

1 ten (10) acre-feet. A Person designated as a
2 Minimal Producer whose Annual Production exceeds
3 ten (10) acre-feet in any Year following the date
4 of entry of Judgment is no longer a Minimal
5 Producer.

6 r. Minimum Subarea Obligation - The minimum Annual
7 amount of water a Subarea is obligated to provide
8 to an adjoining downstream Subarea or the
9 Transition Zone or, in the case of the Baja
10 Subarea, the minimum Annual Subsurface Flow at the
11 MWA eastern boundary toward Afton in any Year, as
12 set forth in Exhibit "G".

13 s. Mojave Basin Area or Basin Area - The area shown on
14 Exhibit "A" that lies within the boundaries of the
15 line labelled "Limits of Adjudicated Area" which
16 generally includes the area tributary to the Mojave
17 River and its tributaries except for such area not
18 included within the Mojave Water Agency's
19 jurisdiction.

20 t. MWA - Cross complainant Mojave Water Agency.

21 u. Overdraft - A condition wherein the current total
22 Annual Consumptive Use of water in the Mojave Basin
23 Area or any of its Subareas exceeds the long term
24 average Annual natural water supply to the Basin
25 Area or Subarea.

26 v. Party (Parties) - Any Person(s) named in this
27 action who has intervened in this case or has

28 ///

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

become subject to this Judgment either through stipulation, default, trial or otherwise.

- w. Person(s) - Any natural person, firm, association, organization, joint venture, partnership, business, trust, corporation, or public entity.
- x. Produce - To pump or divert water.
- y. Producer(s) - A Person, other than a Minimal Producer, who Produces water.
- z. Production - Annual amount of water produced, stated in acre-feet of water.
- aa. Production Safe Yield - The highest average Annual Amount of water that can be produced from a Subarea: (1) over a sequence of years that is representative of long-term average annual natural water supply to the Subarea net of long-term average annual natural outflow from the Subarea, (2) under given patterns of Production, applied water, return flows and Consumptive Use, and (3) without resulting in a long-term net reduction of groundwater in storage in the Subarea.
- bb. Purpose of Use - The broad category of type of water use including but not limited to municipal, irrigation, industrial, aquaculture, and lakes purposes. A change in Purpose of Use includes any reallocation of water among mixed or sequential uses, excluding direct reuse of municipal wastewater.

///

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

- cc. Recirculated Water - Water that is Produced but not consumed by the Parties listed in Table B-2 of Exhibit "B" and then returned either to the Mojave River or to the Groundwater basin underlying the place of use.
- dd. Replacement Obligation - The obligation of a Producer to pay for Replacement Water for Production from a Subarea in any Year in excess of the sum of such Producer's share of that Year's Free Production Allowance for the Subarea plus any Production pursuant to a Carry Over Right.
- ee. Replacement Water - Water purchased by Watermaster or otherwise provided to satisfy a Replacement Obligation.
- ff. Responsible Party - The Person designated by a Party as the Person responsible for purposes of filing reports and receiving notices pursuant to the provisions of this Judgment.
- gg. Stored Water - Water held in storage pursuant to a Storage Agreement with Watermaster.
- hh. Storm Flow - That portion of the total surface flow originating from precipitation and runoff without having first percolated to Groundwater storage in the zone of saturation and passing a particular point of reckoning, as determined annually by the Watermaster.

///
///

1 ii. Subareas - The five Subareas of the Mojave Basin
2 Area -- Este, Oeste, Alto, Centro and Baja -- as
3 shown on Exhibit "A".

4 jj. Subarea Obligation - The average Annual amount of
5 water that a Subarea is obligated to provide to an
6 adjoining downstream Subarea or the Transition Zone
7 or, in the case of the Baja Subarea, the average
8 Annual Subsurface Flow toward Afton at the MWA
9 eastern boundary as set forth in Exhibit "G".

10 kk. Subsurface Flow - Groundwater which flows beneath
11 the earth's surface.

12 ll. Supplemental Water - Water imported to the Basin
13 Area from outside the Basin Area, water that would
14 otherwise be lost from the Basin Area but which is
15 captured and made available for use in the Basin
16 Area, or any Producer's share of Free Production
17 Allowance that is not Produced and is acquired by
18 Watermaster pursuant to this Judgment.

19 mm. Transition Zone - The portion of the Alto Subarea,
20 shown on Exhibit "A", that lies generally between
21 the Lower Narrows and the Helendale Fault.

22 nn. Watermaster - The Person(s) appointed by the Court
23 to administer the provisions of this Judgment.

24 5. Exhibits. The following exhibits are attached to this
25 Judgment and made a part hereof.

26 Exhibit "A" - Map entitled, "Map showing Mojave Water
27 Agency, Mojave River, Mojave Basin Area and Hydrologic Subareas and
28

///

1 Limits of Adjudicated Area Together with Geologic and Other
2 Pertinent Features."

3 Exhibit "B" - Table entitled, "Table B-1: Table Showing
4 Base Annual Production and Base Annual Production Right of Each
5 Producer Within Each Subarea, and Free Production Allowances for
6 Subareas for First Five Years after entry of the Interlocutory
7 Judgment" and "Table B-2: Table Showing Total Water Production for
8 Aquaculture and Recreational Lake Purposes."

9 Exhibit "C" - Engineering Appendix.

10 Exhibit "D" - Time Schedules.

11 Exhibit "E" - List of Producers and Their Designees.

12 Exhibit "F" - Transfers of Base Annual Production Rights.

13 Exhibit "G" - Subarea Obligations.

14 Exhibit "H" - Biological Resource Mitigation.

15 Exhibit "I" - Map Showing Potential Groundwater Recharge
16 Areas

17 B. DECLARATION OF HYDROLOGIC CONDITIONS.

18 6. Mojave Basin Area as Common Source of Supply. The
19 area shown on Exhibit "A" as the Mojave Basin Area is comprised of
20 five Subareas. The waters derived from the Mojave River and its
21 tributaries constitute a common source of supply of the five
22 Subareas and of the Persons producing therefrom.

23 7. Existence of Overdraft. In each and every Year, for
24 a period in excess of five (5) years prior to the May 30, 1990
25 filing date of Plaintiffs' Complaint, the Mojave Basin Area and
26 each of its respective Subareas have been and are in a state of
27 Overdraft, and it is hereby found that there is no water available

28 ///

1 for Production from the Basin Area or any Subarea therein except
2 pursuant to this Judgment.

3 C. DECLARATION OF RIGHTS AND OBLIGATIONS.

4 8. Production Rights of the Parties. The Base Annual
5 Production and Base Annual Production Right of each Party are
6 declared as set forth in Table B-1 of Exhibit "B". Certain Parties
7 also have the right to continue to Produce Recirculated Water in
8 the amounts set forth in Table B-2 of Exhibit "B", subject to the
9 following:

10 a. Aquaculture. Two of the Producers listed in
11 Table B-2 of Exhibit "B", California Department of Fish and Game
12 Mojave River Fish Hatchery (Hatchery) and Jess Ranch Water Company
13 (Jess), Produce Recirculated Water for Aquaculture. The Hatchery
14 and Jess or their successors or assignees shall have the right to
15 continue to Produce up to the amounts listed in Table B-2 of
16 Exhibit "B" as Recirculated Water for Aquaculture on the property
17 where it was used in the Year for which Base Annual Production was
18 verified. Production of such amount of Recirculated water by Jess
19 shall be free of any Replacement Water Assessments, Makeup Water
20 Assessments or Administrative Assessments but shall be subject to
21 Biological Resources Assessments and each Jess well producing
22 Recirculated Water shall be subject to an Annual administrative fee
23 equal to the lowest Annual fee paid to MWA by a Minimal Producer.
24 Neither the Hatchery nor Jess Recirculated Water may be transferred
25 or used for any other purpose or transferred for use on any other
26 property, except as provided in Paragraph 7 of Exhibit "F" for the
27 Hatchery. Any Production of Recirculated Water by Jess in excess
28 of the amount shown in Table B-2 shall be subject to all

1 Assessments. Production of Recirculated Water by the Hatchery will
2 be subject to the rules set forth in Paragraph 7 of Exhibit "F".
3 All Jess Aquaculture Recirculated Water shall be discharged
4 immediately and directly to the Mojave River.

5 b. Camp Cady. One Producer listed in Table B-2 of
6 Exhibit "B", California Department of Fish and Game-Camp Cady (Camp
7 Cady), Produces Recirculated Water for Lakes containing Tui Chub,
8 an endangered species of fish. Camp Cady or its successors or
9 assignees shall have the right to continue to Produce up to the
10 amount listed in Table-B-2 of Exhibit "B" as Recirculated Water at
11 Camp Cady. Production of each amount of Recirculated water shall
12 be free of any Assessments. Camp Cady Recirculated Water may not
13 be transferred or used for any other purpose or transferred for use
14 on any other property. Any Production of Recirculated Water by
15 Camp Cady in excess of the amount shown in Table B-2 of Exhibit "B"
16 shall be subject to all Assessments except Biological Resource
17 Assessments. All Camp Cady Recirculated Water shall be allowed to
18 percolate immediately and directly to the Groundwater basin
19 underlying Camp Cady.

20 c. Recreational Lakes in Baja Subarea. All
21 Producers listed in Table B-2 of Exhibit "B" except the Hatchery,
22 Jess and Camp Cady Produce Recirculated Water for recreational
23 lakes in the Baja Subarea. Such Producers or their successors or
24 assignees shall have the right to continue to Produce up to the
25 amounts identified in Table B-2 of Exhibit "B" as Recirculated
26 Water for use in recreational lakes on the property where it was
27 used in the Year for which Base Annual Production was verified,
28 free of any Replacement Water Assessments, Makeup Water

1 Assessments, or Administrative Assessments, but such Production
2 shall be subject to any Biological Resource Assessment. Each well
3 producing such Recirculated Water shall be subject to an Annual
4 administrative fee equal to the lowest Annual fee paid by a Minimal
5 Producer. Recirculated Water cannot be transferred or used for any
6 other purpose. All recreational lake Recirculated Water shall be
7 allowed to percolate immediately and directly to the Groundwater
8 basin underlying the recreational lake.

9 9. MWA Obligations. The Physical Solution is intended
10 to provide for delivery and equitable distribution to the
11 respective Subareas by MWA of the best quality of Supplemental
12 Water reasonably available. MWA shall develop conveyance or other
13 facilities to deliver this Supplemental Water to the areas depicted
14 in Exhibit "I," unless prevented by forces outside its reasonable
15 control such as an inability to secure financing consistent with
16 sound municipal financing practices and standards.

17 a. Secure Supplemental Water. MWA, separate and
18 apart from its duties as the initial Watermaster designated under
19 this Judgment, shall exercise its authority under Sections 1.5 and
20 15 of the MWA Act to pursue promptly, continuously and diligently
21 all reasonable sources to secure Supplemental Water as necessary to
22 fully implement the provisions of this Judgment.

23 b. Supplemental Water Prices. The MWA shall
24 establish fair and equitable prices for Supplemental Water
25 delivered to the Watermaster under this Judgment.

26 c. Supplemental Water Delivery Plan. Not later
27 than September 30, 1996, MWA shall prepare a report on potential
28 alternative facilities or methods to deliver Supplemental Water to

1 the areas shown on Exhibit "I." The report shall include, for each
2 alternative, a development time schedule, a summary of cost
3 estimates, an analysis of the relative benefits to Producers in
4 each Subarea and an analysis of alternative methods of financing
5 and cost allocation, including any state or federal sources of
6 funding that may be available.

7 d. Water Delivery Cost Allocation. The report
8 required by subdivision (c) above shall recommend methods of
9 financing and cost allocation that are based on benefits to be
10 received. MWA's cost allocation plan shall be subject to Court
11 review as provided in subdivision (f) below to verify that costs
12 are allocated fairly and according to benefits to be received. The
13 MWA financing and cost allocation plan may include a mix of revenue
14 sources including the following:

15 (1) Developer or connection fees to the
16 extent MWA can demonstrate a nexus, as
17 required by law, between the fees and the
18 impact of the development upon the water
19 resources of the Mojave Basin Area and
20 each subarea thereof;

21 (2) Other methods of financing available to
22 MWA, including but not limited to
23 property based taxes, assessments or
24 standby charges;

25 (3) Water sales revenues, but only to the
26 extent other sources are not available or
27 appropriate, and in no event shall the
28 water sales price to cover facility

1 capital costs exceed a rate equal to
2 fifty percent of the variable cost rate
3 charged to MWA under its contract for
4 water delivery from the California State
5 Water Project;

6 e. Legislative Changes. MWA shall seek promptly
7 to have enacted amendments to the MWA Act (Water Code Appendix,
8 Part 97) that allow MWA to implement any methods of governmental
9 financing available to any public entity in California.

10 f. Court Review and Determination of Benefit. Not
11 later than September 30, 1996, MWA shall submit its report to the
12 Court in a noticed motion pursuant to Paragraph 36. The report
13 shall set forth MWA's recommendations as to the following: (1)
14 which alternatives should be implemented; (2) methods of cost
15 allocation for the recommended alternatives; (3) financing for the
16 recommended alternatives; and (4) a time schedule to complete the
17 recommended alternatives. The Court may approve or reject the
18 recommendations. The Court may further order the use of
19 alternatives and time schedules or it may order additional studies
20 and resubmittals, as it may deem proper.

21 10. Priority and Determination of Production Rights.
22 The water rights involved herein are of differing types and
23 commenced at different times. Many of the rights involved are
24 devoted to public uses. The Declaration of Water Rights that is
25 part of the judgment and the Physical Solution decreed herein takes
26 into consideration the competing priorities which have been
27 asserted in addition to the equitable principles applicable to
28 apportionment of water in this situation. The following factors

1 have been considered in the formulation of each Producer's Base
2 Annual Production Right:

3 a. The Mojave Basin Area and each of its hydrologic
4 Subareas have continuously for many Years been in a state of
5 system-wide Overdraft;

6 b. All Producers have contributed to the Overdraft;

7 c. None of the priorities asserted by any of the
8 Producers is without dispute;

9 d. Under the complex scheme of California water
10 law, the allocation of water and rights mechanically based upon the
11 asserted priorities would be extremely difficult, if not
12 impossible, and would not result in the most equitable
13 apportionment of water;

14 e. Such mechanical allocation would, in fact,
15 impose undue hardship on many Parties;

16 f. There is a need for conserving and making
17 maximum beneficial use of the water resources of the State;

18 g. The economy of the Mojave Basin Area has to a
19 great extent been established on the basis of the existing
20 Production;

21 h. The Judgment and Physical Solution take into
22 consideration the unique physical and climatic conditions of the
23 Mojave Basin Area, the Consumptive Use of water in the several
24 sections of the Basin, the character and rate of return flows, the
25 extent of established uses, the availability of storage water, the
26 relative benefits and detriments between upstream areas and
27 downstream areas if a limitation is imposed on one and not the

28 ///

1 other, and the need to protect public interest and public trust
2 concerns.

3 In consideration of the foregoing factors, and in
4 accordance with the terms and conditions of this Judgment, the
5 Parties are estopped and barred from asserting special priorities
6 or preferences.

7 11. Exercise of Carry Over Rights. The first water
8 Produced by a Producer during any Year shall be deemed to be an
9 exercise of any Carry Over Right. Such Carry Over Right may be
10 transferred in accordance with Exhibit "F".

11 12. Production Only Pursuant to Judgment. This
12 Judgment, and the Physical Solution decreed herein, addresses all
13 Production within the Mojave Basin Area. Because of the existence
14 of Overdraft, any Production outside the framework of this Judgment
15 and Physical Solution will contribute to an increased Overdraft,
16 potentially damage the Mojave Basin Area and public interests in
17 the Basin Area, injure the rights of all Parties, and interfere
18 with the Physical Solution. Watermaster shall bring an action or
19 a motion to enjoin any Production that is not pursuant to the terms
20 of this Judgment.

21 13. Declaration of Subarea Rights and Obligations. In
22 the aggregate, Producers within certain Subareas have rights, as
23 against those in adjoining upstream Subareas, to receive average
24 Annual water supplies and, in any one Year, to receive minimum
25 Annual water supplies equal to the amounts set forth in Exhibit
26 "G", in addition to any Storm Flows. In turn, in the aggregate,
27 Producers within certain Subareas have an obligation to provide to
28 adjoining downstream Subareas such average Annual water supplies in

1 the amounts and in the manner set forth in Exhibit "G". In any one
2 Year, Producers within certain Subareas have an obligation to
3 provide to adjoining downstream Subareas such minimum Annual water
4 supplies in the amounts and in the manner set forth in Exhibit "G".
5 The Producers in the Baja Subarea have an obligation to provide
6 average and minimum Subsurface Flows toward Afton at the MWA
7 eastern boundary equal to the amounts shown in Exhibit "G".
8 Producers in each of the Subareas have rights in the aggregate, as
9 against each adjoining downstream Subarea or, in the case of the
10 Baja Subarea, as against flows at the MWA eastern boundary toward
11 Afton, to divert, pump, extract, conserve, and use all surface
12 water and Groundwater supplies originating therein or accruing
13 thereto, and so long as the adjoining downstream Subarea
14 Obligations are satisfied under this Judgment and there is
15 compliance with all of its provisions. Watermaster shall maintain
16 a continuing account of the status of each Subarea's compliance
17 with its Subarea Obligation, including any cumulative credits or
18 debits and any requirement for providing Makeup Water. The
19 accounting and determinations relative to Subarea Obligations shall
20 be made in accordance with procedures set forth in Exhibit "G".
21

22 III. INJUNCTION

23 14. Injunction Against Unauthorized Production. Each
24 and every Party, its officers, agents, employees, successors, and
25 assigns, is ENJOINED AND RESTRAINED from Producing water from the
26 Basin Area except pursuant to the provisions of the Physical
27 Solution in this Judgment.

28 ///

1 15. Injunction Re Change in Purpose of Use Without
2 Notice Thereof to Watermaster. Each and every Party, its officers,
3 agents, employees, successors, and assigns, is ENJOINED AND
4 RESTRAINED from changing its Purpose of Use at any time without
5 first notifying Watermaster of the intended change.

6 16. Injunction Against Unauthorized Recharge. Each and
7 every Party, its officers, agents, employees, successors and
8 assigns, is ENJOINED AND RESTRAINED from claiming any right to
9 recapture Water that has been recharged in the Basin Area except
10 pursuant to a Storage Agreement with Watermaster. This provision
11 does not prohibit Parties from importing Supplemental Water into
12 the Basin Area for direct use.

13 17. Injunction Against Transportation from Mojave Basin
14 Area. Except upon further order of the Court, each and every
15 Party, its officers, agents, employees, successors and assigns, is
16 ENJOINED AND RESTRAINED from transporting water hereafter Produced
17 from the Basin Area to areas outside the Basin Area.

18 18. Injunction Against Diverting Storm Flows. No Party
19 may undertake or cause the construction of any project that will
20 directly reduce the amount of Storm Flow that would otherwise go
21 through the naturally occurring hydrologic regime to a downstream
22 Subarea or that will reduce the surface area over which Storm Flow
23 currently occurs by alteration to the bed of the Mojave River.
24 This paragraph shall not prevent any flood control agency or
25 municipality from taking such emergency action as may be necessary
26 to protect the physical safety of its residents and its structures
27 from flooding. Any such action shall be done in a manner that will
28 minimize any reduction in the quantity of Storm Flows.

1 IV. CONTINUING JURISDICTION

2 19. Jurisdiction Reserved. Full jurisdiction, power and
3 authority are retained by and reserved to the Court for purposes of
4 enabling the Court upon the application of any Party, by a motion
5 noticed in accordance with the notice procedures of Paragraph 36
6 hereof, to make such further or supplemental order or directions as
7 may be necessary or appropriate for interim operation before the
8 Physical Solution is fully operative, or for interpretation,
9 enforcement or carrying out of this Judgment, and to modify, amend
10 or amplify any of the provisions of this Judgment or to add to the
11 provisions thereof consistent with the rights herein decreed;
12 provided, that nothing in this paragraph shall authorize either a
13 reduction of the Base Annual Production Right of any Party, except
14 in accordance with the rules set forth in Exhibit "F", or a
15 reduction of the Base Flow portion of any Subarea Obligation.

16
17 V. Physical Solution

18 A. GENERAL

19 20. Purpose and Objective. The Court hereby declares
20 and decrees that the Physical Solution herein contained: 1) is a
21 fair and equitable basis for satisfaction of all water rights in
22 the Mojave Basin Area; 2) is in furtherance of the mandate of the
23 State Constitution and the water policy of the State of California;
24 and 3) takes into account applicable public trust interests; and
25 therefore adopts and orders the Parties to comply with the Physical
26 Solution. As noted in Paragraph 3 of this Judgment, the
27 declaration of rights and obligations of the Parties and Subareas
28 is a necessary component of this Physical Solution. The purpose of

1 the Physical Solution is to establish a legal and practical means
2 for making the maximum reasonable beneficial use of the waters of
3 the Basin Area by providing for the long-term conjunctive
4 utilization of all water available thereto to meet the reasonable
5 beneficial use requirements of water users therein.

6 21. Need for Flexibility. It is essential that this
7 Physical Solution provide maximum flexibility and adaptability in
8 order that the Court may be free to use existing and future
9 technological, social, institutional and economic options in order
10 to maximize reasonable beneficial use of the waters of the Basin
11 Area. To that end, the Court's retained jurisdiction may be
12 utilized where appropriate, to supplement the Physical Solution.

13 22. General Pattern of Operations. The Producers will
14 be divided into five Subareas for purposes of administration. The
15 Subarea rights and obligations are herein decreed. A fundamental
16 premise of the Physical Solution is that all Parties will be
17 allowed, subject to this Judgment, to Produce sufficient water to
18 meet their reasonable beneficial use requirements. To the extent
19 that Production by a Producer in any Subarea exceeds such
20 Producer's share of the Free Production Allowance of that Subarea,
21 Watermaster will provide Replacement Water to replace such excess
22 Production according to the methods set forth herein. To the
23 extent that any Subarea incurs a Makeup Obligation, Watermaster
24 will provide Supplemental Water to satisfy such Makeup Obligation
25 according to the methods set forth herein. For the initial five
26 (5) full Years after entry of this Judgment (including any
27 interlocutory Judgment), the Free Production Allowance for each
28 Subarea shall be set as the amount of water equal to the following

1 percentages of the aggregate Base Annual Production for that
2 Subarea:

	<u>Judgment Year</u>	<u>Percentage</u>	
3			
4	1993-1994	First Full Year	100
5	1994-1995	Second Full Year	95
6	1995-1996	Third Full Year	90
7	1996-1997	Fourth Full Year	85
8	1997-1998	Fifth Full Year	80

9 The extent of Overdraft now varies between Subareas and the
10 reasonableness of any physical solution as applied to each Producer
11 depends in part upon such Producer's foreseeable needs and the
12 present and future availability of water within the Subarea in
13 which each Producer is located. The Physical Solution described in
14 this Judgment in part generally contemplates (i) initially allowing
15 significant unassessed production on a substantially uniform basis
16 for all Producers and Subareas and (ii) a phasing in of the
17 monetary obligations necessary to obtain Supplemental Water. The
18 above two provisions will affect each Subarea differently, may not
19 be sufficient to ultimately eliminate the condition of Overdraft in
20 each Subarea and could result in increased Overdraft within a
21 Subarea. Any adverse impact to any Subarea caused by the
22 implementation of the provisions shall be the responsibility of the
23 Producers in each such Subarea.

24 B. ADMINISTRATION.

25 23. Administration by Watermaster. Watermaster shall
26 administer and enforce the provisions of the Judgment and any
27 subsequent instructions or orders of this Court.

28 ///

1 (a) Standard of Performance. Watermaster shall, in
2 carrying out its duties, powers and responsibilities herein, act in
3 an impartial manner without favor or prejudice to any Subarea,
4 Producer, Party or Purpose of Use.

5 (b) Removal of Watermaster. Full jurisdiction, power
6 and authority are retained and reserved by the Court for the
7 purpose of enabling the Court on its own motion, or upon
8 application of any Party, and upon notice in accordance with the
9 notice procedures of paragraph 36 hereof, and after hearing
10 thereon, to remove any appointed Watermaster and substitute a new
11 Watermaster in its place. The Court shall find good cause for the
12 removal of Watermaster upon a showing that Watermaster has failed
13 to perform its duties, powers and responsibilities in an impartial
14 manner, or has otherwise failed to act in the manner consistent
15 with the provisions set forth in this Judgment or subsequent order
16 of the Court.

17 (c) MWA Appointed as Initial Watermaster. The MWA is
18 hereby appointed, until further order of the Court, as Watermaster
19 to administer and enforce the provisions of this Judgment and any
20 subsequent orders of this Court issued in the performance of its
21 continuing jurisdiction. In carrying out this appointment, MWA
22 shall segregate and separately exercise in all respects the
23 Watermaster powers delegated by the Court under this Judgment from
24 MWA's statutory powers. All funds received, held, and disbursed by
25 MWA as Watermaster shall be by way of separate Watermaster
26 accounts, subject to separate accounting and auditing. Meetings
27 and hearings held by the MWA Board of Directors when acting as
28 Watermaster shall be noticed and conducted separately from MWA

1 meetings. All Watermaster staff and consultant functions shall be
2 separate and distinct from MWA staff and consultant functions;
3 provided, however, that pursuant to duly adopted Watermaster rules,
4 which shall be subject to review according to Paragraph 36 hereof,
5 Watermaster staff and consultant functions may be accomplished by
6 MWA staff and consultants, subject to strict time and cost
7 accounting principles so that Watermaster functions, and the
8 Assessments provided under this Judgment, do not subsidize, and are
9 not subsidized by, MWA functions. Subject to these principles, MWA
10 shall implement practicable cost efficiencies through consolidation
11 of Watermaster and MWA staff and consultant functions.

12 24. Powers and Duties. Subject to the continuing
13 supervision and control of the Court, Watermaster shall have and
14 may exercise the following express powers, and shall perform the
15 following duties, together with any specific powers, authority and
16 duties granted or imposed elsewhere in this Judgment or hereafter
17 ordered or authorized by the Court in the exercise of its
18 continuing jurisdiction:

19 a. Rules and Regulations. To adopt any and all
20 appropriate rules and regulations for conduct pursuant to this
21 Judgment after public hearing. Notice of hearing and a copy of the
22 proposed rules and regulations, and any amendments thereof, shall
23 be mailed to all Parties thirty days prior to the date of the
24 hearing thereon.

25 b. Employment of Experts and Agents. To employ
26 such administrative personnel, engineering, legal, accounting, or
27 other specialty services and consulting assistants as may be deemed
28 appropriate in carrying out the terms of this Judgment.

1 c. Makeup and Replacement Obligations. To
2 determine the Makeup Obligations for each Subarea and Replacement
3 Obligations for each Producer and each Subarea, pursuant to the
4 terms of the Judgment.

5 d. Measuring Devices, etc. To adopt rules and
6 regulations regarding determination of amounts of Production and
7 installation of individual water meters. The rules and regulations
8 shall provide for approved devices or methods to measure or
9 estimate Production. Producers who meter Production on the date of
10 entry of this Judgment shall continue to meter Production.
11 Thereafter, Producers who do not meter Production on the effective
12 date of entry of this Judgment may be required by Watermaster rules
13 and regulations to install water meters upon a showing that then
14 employed measurement devices or methods do not accurately determine
15 actual Production. The rules and regulations shall require that
16 within three Years after the date of entry of this Judgment, any
17 Producer who provides piped water for human Consumption to more
18 than five service connections shall have installed an individual
19 water meter on each service connection.

20 e. Hydrologic Data Collection. To install, operate
21 and maintain such wells, measuring devices and/or meters necessary
22 to monitor stream flow, precipitation and groundwater levels and to
23 obtain such other data as may be necessary to carry out the
24 provisions of this Judgment, including a study of the Basin Area
25 phreatophyte consumptive use.

26 f. Assessments. To set, levy and collect all
27 Assessments specified herein.

28 ///

1 g. Purchase of and Recharge with Supplemental
2 Water. In accordance with Paragraph 27, to the extent Supplemental
3 Water is available and is reasonably needed for Replacement Water
4 or Makeup Water, to use Replacement Water Assessment proceeds to
5 purchase Replacement Water, and to use Makeup Water Assessment
6 proceeds to purchase Makeup Water and to have such Replacement
7 Water and Makeup Water provided to the appropriate Subarea as soon
8 as practicable. Watermaster may prepurchase Supplemental Water and
9 apply subsequent Assessments towards the costs of such
10 prepurchases.

11 h. Water Quality. To take all reasonable steps to
12 assist and encourage appropriate regulatory agencies to enforce
13 reasonable water quality regulations affecting the Basin Area,
14 including regulation of solid and liquid waste disposal.

15 i. Notice List. To maintain a current list of
16 Responsible Parties to receive notice hereunder.

17 j. Annual Administrative Budget. To prepare a
18 proposed administrative budget for each Year, hold hearings
19 thereon, and adopt an administrative budget according to the time
20 schedule set forth in Exhibit "D". The administrative budget shall
21 set forth budgeted items and Administrative Assessments in
22 sufficient detail to show the allocation of the expense among the
23 Producers. Following the adoption of the budget, expenditures
24 within budgeted items may thereafter be made by Watermaster in the
25 exercise of powers herein granted, as a matter of course.

26 k. Annual Report to Court.

27 (1) To file an Annual report with this Court
28 not later than April 1 of each Year beginning April 1 following the

1 first full Year after entry of Judgment. Prior to filing the
2 Annual report with the Court, Watermaster shall notify all Parties
3 that a draft of the report is available for review and shall
4 provide notice of a hearing to receive comments and recommendations
5 for changes in the report. The public hearing shall be conducted
6 on the same date and at the same place as the hearings required by
7 Paragraphs 3 and 4 of Exhibit "D". The notice of hearing may
8 include such summary of the draft report as Watermaster may deem
9 appropriate. Watermaster shall also distribute the report to the
10 Parties requesting copies.

11 (2) The Annual report shall include an Annual
12 fiscal report of the preceding Year's operation and shall include
13 details as to operation of each of the Subareas and an audit of all
14 Assessments and expenditures pursuant to this Physical Solution and
15 a review of Watermaster activities pursuant to this Judgment. The
16 Annual report shall include a compilation of at least the
17 following:

18 Determinations and data required by:

- 19 i) Paragraph 24(c) (Makeup and Replacement Obligations)
- 20 ii) Paragraph 24(e) (Hydrologic Data Collection)
- 21 iii) Paragraph 24(g) (Purchase of and Recharge with
22 Supplemental Water)
- 23 iv) Paragraph 24(i) (Notice List)

24 Rules and regulations adopted pursuant to:

- 25 v) Paragraph 24(a) (Rules and Regulations)
- 26 vi) Paragraph 24(d) (Measuring Devices, etc.)
- 27 vii) Paragraph 24(s) (Storage Agreements)

28 Reports required by:

- 1 viii) Paragraph 24(j) (Annual Administrative Budget)
2 ix) Paragraph 24(n) (Transfers)
3 x) Paragraph 24(o) (Free Production Allowance)
4 xi) Paragraph 24(p) (Production Reports)
5 xii) Exhibit "D" (Prior Year Report)
6 xiii) Exhibit "F" (Transfers of Base Annual Production
7 Rights)
8 xiv) Exhibit "G" (Status of Subarea Obligation)
9 xv) Exhibit "H" (Biological Resource Mitigation)

10 1. Investment of Funds. To hold and invest any
11 funds in investments authorized from time to time for public
12 agencies in the State of California.

13 m. Borrowing. To borrow in anticipation of receipt
14 of Assessment proceeds in an amount not to exceed the Annual amount
15 of Assessments levied but uncollected.

16 n. Transfers. To prepare on an Annual basis and
17 maintain a report or record of any transfer of Base Annual
18 Production Rights. Such report or record shall be available for
19 inspection by any Party upon reasonable notice to the Watermaster.

20 o. Free Production Allowance. Not later than the
21 end of the 1997-1998 Water Year, and Annually thereafter, to
22 recommend in the Watermaster Annual Report an adjustment, if
23 needed, to the Free Production Allowance for any Subarea. In
24 making its recommendation, Watermaster shall be guided by the
25 factors set forth in Exhibit "C", including but not limited to an
26 annual calculation of the change of water in storage. The Annual
27 report shall include all assumptions and calculations relied upon
28 in making its recommendations. Following the 1997-1998 Water Year,

1 or any time thereafter, Watermaster shall obtain prior Court
2 approval for any increase or reduction of any Subarea's Free
3 Production Allowance. In no event shall a reduction in any Year
4 for a Subarea exceed five percent of the aggregate Base Annual
5 Production of that Subarea. In the event Watermaster recommends in
6 its report to the Court that the Free Production Allowance for any
7 Subarea may need to be increased or reduced, the Court shall
8 conduct a hearing, after notice given by Watermaster according to
9 paragraph 36, upon Watermaster's recommendations and may order such
10 changes in Subarea Free Production Allowance. The most recent
11 Subarea Free Production Allowances shall remain in effect until
12 revised according to this Paragraph 24(o).

13 p. Production Reports. To require each Producer to
14 file with Watermaster, pursuant to procedures and time schedules to
15 be established by Watermaster, a report on a form to be prescribed
16 by Watermaster showing the total Production of such Party for each
17 reporting period rounded off to the nearest tenth of an acre foot,
18 and such additional information and supporting documentation as
19 Watermaster may require.

20 q. Production Adjustment for Change in Purpose of
21 Use. If Watermaster determines, using the Consumptive Use rates
22 set forth in Exhibit "F", that a new Purpose of Use of any
23 Producer's Production for any Year has resulted in a higher rate of
24 Consumption than the rate applicable to the original Purpose of Use
25 of that Producer's Production in the Year for which Base Annual
26 Production was determined, Watermaster shall use a multiplier (1)
27 to adjust upward such Production for the purpose of determining the
28 Producer's Replacement Water Assessment and, (2) to adjust upward

1 the Free Production Allowance portion of such Production for the
2 purpose of determining the Producer's Makeup Water Assessment. The
3 multiplier shall be determined by dividing the number of acre feet
4 of Consumption that occurred under the new Purpose of Use by the
5 number of acre feet of Consumption that would have occurred under
6 the original Purpose of Use for the same Production.

7 r. Reallocation of Base Annual Production Rights.

8 To reallocate annually the Base Annual Production Rights in each
9 Subarea to reflect any permanent transfers of such Rights among
10 Parties.

11 s. Storage Agreements. To enter into Storage
12 Agreements with any Party in order to accommodate the acquisition
13 of Supplemental Water. Watermaster may not enter into Storage
14 Agreements with non-Parties unless such non-Parties become subject
15 to the provisions of this Judgment and the jurisdiction of the
16 Court. Such Storage Agreements shall by their terms preclude
17 operations which will have a substantial adverse impact on any
18 Producer. If a Party pursuant to a Storage Agreement has provided
19 for predelivery or postdelivery of Replacement Water for the
20 Party's use, Watermaster shall at the Party's request credit such
21 water to the Party's Replacement Obligation. Watermaster shall
22 adopt uniformly applicable rules for Storage Agreements.
23 Watermaster shall calculate additions, extractions and losses of
24 water stored under Storage Agreements and maintain an Annual
25 account of all such water.

26 t. Subarea Advisory Committee Meetings. To meet on
27 a regular basis and at least semi-annually with the Subarea
28 Advisory Committees to review Watermaster activities pursuant to

1 this Judgment and to receive advisory recommendations from the
2 Subarea Advisory Committees.

3 u. Unauthorized Production. To bring such action
4 or motion as is necessary to enjoin unauthorized Production as
5 provided in Paragraph 12 hereinabove.

6 v. Meetings and Records. To ensure that all
7 meetings and hearings by Watermaster shall be noticed and conducted
8 according to then current requirements of the Ralph M. Brown Act,
9 Government Code Sections 54950, et seq. Watermaster files and
10 records shall be available to any person according to the
11 provisions of the Public Records Act, Government Code §§ 6200 et
12 seq.

13 w. Data, Estimates and Procedures. To rely on and
14 use the best available records and data to support the
15 implementation of this Judgment. Where actual records of data are
16 not available, Watermaster shall rely on and use sound scientific
17 and engineering estimates. Watermaster may use preliminary records
18 of measurements, and, if revisions are subsequently made,
19 Watermaster may reflect such revisions in subsequent accounting.
20 Exhibit "C" sets forth methods and procedures for determining
21 surface flow components. Watermaster shall use either the same
22 procedures or procedures that will yield results of equal or
23 greater accuracy.

24 x. Biological Resource Mitigation. To implement
25 the Biological Resource Mitigation measures set forth in Exhibit
26 "H" herein.

27 ///

28 ///

1 C. ASSESSMENTS

2 25. Purpose. Watermaster shall levy and collect
3 Assessments from the Parties based upon Production in accordance
4 with the time schedules set forth in Exhibit "D". Watermaster
5 shall levy and collect such Assessments as follows:

6 a. Administrative Assessments. Administrative
7 Assessments to fund the Administrative Budget adopted by the
8 Watermaster pursuant to Paragraph 24(j) shall be levied uniformly
9 against each acre foot of Production. A Producer who does not
10 Produce in a given Year shall pay an Administrative Assessment in
11 amount equal to the lowest MWA assessment for Minimal Producers for
12 that Year.

13 b. Replacement Water Assessments. Replacement
14 Water Assessments shall be levied against each Producer on account
15 of such Producer's Production, after any adjustment pursuant to
16 Paragraph 24(q), in excess of such Producer's share of the Free
17 Production Allowance in each Subarea during the prior Year.

18 c. Makeup Water Assessments. Makeup Water
19 Assessments shall be levied against each Producer in each Subarea
20 on account of each acre-foot of Production therein which does not
21 bear a Replacement Assessment hereunder, after any adjustment
22 pursuant to Paragraph 24(q), to pay all necessary costs of
23 satisfying the Makeup Obligation, if any, of that Subarea.

24 d. Biological Resource Assessment. To establish
25 and, to the extent needed, to maintain the Biological Resource
26 Trust Fund balance at one million dollars (in 1993 dollars)
27 pursuant to Paragraph 24(x) and Exhibit "H", a Biological Resource
28 Assessment in an amount not to exceed fifty cents (in 1993 dollars)

1 for each acre-feet of Production shall be levied uniformly against
2 each producer except the California Department of Fish and Game.

3 e. MWA Assessment of Minimal Producers. The MWA
4 shall identify and assess Minimal Producers through its own
5 administrative procedures, and not acting as Watermaster.

6 26. Procedure. Each Party hereto is ordered to pay the
7 Assessments herein provided for, which shall be levied and
8 collected in accordance with the procedures and schedules set forth
9 in Exhibit "D". Any Assessment which becomes delinquent, as
10 defined in Paragraph 7 of Exhibit "D", shall bear interest at the
11 then current San Bernardino County property tax delinquency rate
12 Said interest rate shall be applicable to any said delinquent
13 Assessment from the due date thereof until paid. Such delinquent
14 Assessment, together with interest thereon, costs of suit,
15 attorneys fees and reasonable costs of collection, may be collected
16 pursuant to motion giving notice to the delinquent Party only, or
17 Order to Show Cause proceeding, or such other lawful proceeding as
18 may be instituted by the Watermaster; and shall, if provided for in
19 the MWA Act, constitute a lien on the property of the Party as of
20 the same time and in the same manner as does the tax lien securing
21 County property taxes. The Watermaster shall Annually certify a
22 list of all such unpaid delinquent Assessments to the MWA (in
23 accordance with applicable provisions of the MWA Act). The MWA (in
24 accordance with applicable provisions of the MWA Act) shall include
25 the names of those Parties and the amounts of the liens in its list
26 to the County Assessor's Office in the same manner and at the same
27 time as it does its administrative assessments. MWA shall account
28 for receipt of all collections of Assessments collected pursuant to

1 this Judgment, and shall pay such amounts collected pursuant to
2 this Judgment to the Watermaster. The Watermaster shall also have
3 the ability to enjoin production of those Persons who do not pay
4 Assessments pursuant to this Judgment.

5 27. Availability of Supplemental Water. All
6 Replacement and Makeup Water Assessments collected by the
7 Watermaster shall be used to acquire Supplemental Water from MWA.
8 Watermaster shall determine when to request Supplemental Water from
9 MWA and shall determine the amount of Supplemental Water to be
10 requested. MWA shall use its best efforts to acquire as much
11 Supplemental Water as possible in a timely manner. If MWA
12 encounters delays in the acquisition of Supplemental Water which,
13 due to cost increases, results in collected assessment proceeds
14 being insufficient to purchase all Supplemental Water for which the
15 Assessments were made, MWA shall purchase as much water as the
16 proceeds will allow when the water becomes available. If available
17 Supplemental Water is insufficient to meet all Makeup and
18 Replacement Water obligations, Watermaster shall allocate the
19 Supplemental Water for delivery to the Subareas on an equitable and
20 practicable basis pursuant to duly adopted Watermaster rules and
21 regulations, giving preference to: First, Transition Zone
22 Replacement Water Obligations as set forth in Exhibit "G"; Second,
23 Makeup Water Obligations; and Third, other Replacement Water
24 Obligations. MWA may acquire Supplemental Water at any time. MWA
25 shall be entitled to enter into a Storage Agreement with
26 Watermaster to store water MWA acquires prior to being paid to do
27 so by Watermaster. Such water, including such water acquired and
28 stored prior to the date of this Judgment or prior to the entry of

1 a Storage Agreement, may later be used to satisfy MWA's duty under
2 this paragraph.

3 28. Use of Replacement Water Assessment Proceeds and
4 Makeup Water Assessment Proceeds. The Proceeds of Replacement
5 Water Assessments and any interest accrued thereon shall only be
6 used for the purchase of Replacement Water for that Subarea from
7 which they were collected. In addition, the proceeds of
8 Replacement Water Assessments collected on account of Production in
9 the Transition Zone, except as provided in Exhibit "G", shall only
10 be used for the purchase of Replacement Water for the Transition
11 Zone, and the proceeds of Replacement Water Assessments collected
12 on account of Production in that portion of the Baja Subarea
13 downstream of the Calico-Newberry fault shall only be used for the
14 purchase of Replacement Water for that portion of the Baja Subarea
15 downstream of the Calico-Newberry fault. The proceeds of Makeup
16 Water Assessments and any interest accrued thereon shall only be
17 used for the purchase of Makeup Water to satisfy the Makeup
18 Obligation for which they are collected.

19 29. MWA Annual Report to the Watermaster. MWA shall
20 Produce and deliver to Watermaster an Annual written report
21 regarding actions of MWA required by the terms of this Judgment.
22 The report shall contain: 1) a summary of the actions taken by MWA
23 in identifying and assessing Minimal Producers, including a report
24 of Assessments made and collected; 2) a summary of other MWA
25 activities in collecting Assessment on behalf of Watermaster; 3) a
26 report of water purchases and water distribution for the previous
27 Year; 4) actions taken to implement its Regional Water Management
28 Plan, including actions relating to conveyance facilities referred

1 to in this Judgment. The MWA report will be provided to
2 Watermaster not less than 30 days prior to the Annual Watermaster
3 report to the Court required by this Judgment.

4 D. SUBAREA ADVISORY COMMITTEES.

5 30. Authorization. The Producers in each of the five
6 Subareas are hereby authorized and directed to cause committees of
7 Producer representatives to be organized and to act as Subarea
8 Advisory Committees.

9 31. Composition and Election. Each Subarea Advisory
10 Committee shall consist of five (5) Persons who shall be called
11 advisors. In the election of advisors, every Party shall be
12 entitled to one vote for every acre-foot of Base Annual Production
13 for that Party in that particular Subarea. Parties may cumulate
14 their votes and give one candidate a number of votes equal to the
15 number of advisors to be elected multiplied by the number of votes
16 to which the Party is normally entitled, or distribute the Party's
17 votes on the same principle among as many candidates as the Party
18 thinks fit. In any election of advisors, the candidates receiving
19 the highest number of affirmative votes of the Parties are elected.
20 Elections shall be held upon entry of this Judgment and thereafter
21 every third year. In the event a vacancy arises, a temporary
22 advisor shall be appointed by unanimous decision of the other four
23 advisors to continue in office until the next scheduled election.
24 The California Department of Fish and Game shall serve as a
25 permanent ex-officio member of the Alto and Baja Subarea Advisory
26 Committees. Rules and regulations regarding organization, meetings
27 and other activities shall be at the discretion of the individual

28 ///

1 Subarea Advisory Committees, except that all meetings of the
2 committees shall be open to the public.

3 32. Compensation. The Subarea Advisory Committee
4 members shall serve without compensation.

5 33. Powers and Functions. The Subarea Advisory
6 Committee for each Subarea shall act in an advisory capacity only
7 and shall have the duty to study, review and make recommendations
8 on all discretionary determinations made or to be made hereunder by
9 Watermaster which may affect that Subarea.

10 E. TRANSFERABILITY.

11 34. Assignment, Transfer, etc. of Rights. In order to
12 further the purposes of this Judgment and Physical Solution, any
13 Base Annual Production Right, or any portion thereof, may be sold,
14 assigned, transferred, licensed or leased pursuant to the rules and
15 procedures set forth in Exhibit "F".

16 F. MISCELLANEOUS PROVISIONS.

17 35. Water Quality. Nothing in this Judgment shall be
18 interpreted as relieving any Party of its responsibilities to
19 comply with state or federal laws for the protection of water
20 quality or the provisions of any permits, standards, requirements,
21 or orders promulgated thereunder.

22 36. Review Procedures. Any action, decision, rule or
23 procedure of Watermaster pursuant to this Judgment shall be subject
24 to review by the Court on its own motion or on timely motion by any
25 Party, as follows:

26 a. Effective Date of Watermaster Action. Any
27 order, decision or action of Watermaster pursuant to this Judgment
28 on noticed specific agenda items shall be deemed to have occurred

1 on the date of the order, decision or action.

2 b. Notice of Motion. Any Party, may, by a
3 regularly noticed motion, petition the Court for review of
4 Watermaster's action or decision pursuant to this Judgment. The
5 motion shall be deemed to be filed when a copy, conformed as filed
6 with the Court, has been delivered to Watermaster together with the
7 service fee established by Watermaster sufficient to cover the cost
8 to photocopy and mail the motion to each Party. Watermaster shall
9 prepare copies and mail a copy of the motion to each Party or its
10 designee according to the official service list which shall be
11 maintained by Watermaster according to Paragraph 37. A Party's
12 obligation to serve notice of a motion upon the Parties is deemed
13 to be satisfied by filing the motion as provided herein. Unless
14 ordered by the Court, any such petition shall not operate to stay
15 the effect of any Watermaster action or decision which is
16 challenged.

17 c. Time for Motion. A motion to review any
18 Watermaster action or decision shall be filed within ninety (90)
19 days after such Watermaster action or decision, except that motions
20 to review Watermaster Assessments hereunder shall be filed within
21 thirty (30) days of mailing of notice of the Assessment.

22 d. De Novo Nature of Proceeding. Upon filing of a
23 petition to review Watermaster action, the Watermaster shall notify
24 the Parties of a date when the Court will take evidence and hear
25 argument. The Court's review shall be de novo and the Watermaster
26 decision or action shall have no evidentiary weight in such
27 proceeding.

28 ///

1 e. Decision. The decision of the Court in such
2 proceeding shall be an appealable Supplemental Order in this case.
3 When the same is final, it shall be binding upon Watermaster and
4 the Parties.

5 f. Payment of Assessments. Payment of Assessments
6 levied by Watermaster hereunder shall be made pursuant to the time
7 schedule in Exhibit "D"; notwithstanding any motion for review of
8 Watermaster actions, decisions, rules or procedures, including
9 review of Watermaster Assessments.

10 37. Designation of Address for Notice and Service. Each
11 Party shall designate the name and address to be used for purposes
12 of all subsequent notices and service herein, either by its
13 endorsement on the Stipulation for Judgment or by a separate
14 designation to be filed within thirty (30) days after Judgment has
15 been entered. Said designation may be changed from time to time by
16 filing a written notice of such change with Watermaster. Any Party
17 desiring to be relieved of receiving notices of Watermaster
18 activity may file a waiver of notice on a form to be provided by
19 Watermaster. Watermaster shall maintain at all times a current
20 list of Parties to whom notices are to be sent and their addresses
21 for purposes of service. Watermaster shall also maintain a full
22 current list of names and addresses of all Parties or their
23 successors, as filed herein. Copies of such lists shall be
24 available to any Person. If no designation is made, a Party's
25 designee shall be deemed to be, in order of priority: i) the
26 Party's attorney of record; ii) if the Party does not have an
27 attorney of record, the Party itself at the address on the
28 Watermaster list.

1 38. Service of Documents. Delivery to or service upon
2 any Party by Watermaster, by any other Party, or by the Court, of
3 any document required to be served upon or delivered to a Party
4 under or pursuant to the Judgment shall be deemed made if made by
5 Deposit thereof (or by copy thereof) in the mail, first class,
6 postage prepaid, addressed to the designee of the Party and at the
7 address shown in the latest designation filed by that Party.

8 39. No Abandonment of Rights. It is in the interest of
9 reasonable beneficial use of the Basin Area and its water supply
10 that no Party be encouraged to take and use more water in any Year
11 than is actually required. Failure to Produce all of the water to
12 which a Party is entitled hereunder shall not, in and of itself, be
13 deemed or constitute an abandonment of such Party's right, in whole
14 or in part.

15 40. Intervention After Judgment. Any person who is not
16 a Party or successor to a Party and who proposes to Produce water
17 from the Basin Area may seek to become a Party to this Judgment
18 through a Stipulation for Intervention entered into with
19 Watermaster. Watermaster may execute said Stipulation on behalf of
20 the other Parties herein but such Stipulation shall not preclude a
21 Party from opposing such Intervention at the time of the Court
22 hearing thereon. Said Stipulation for Intervention must thereupon
23 be filed with the Court, which will consider an order confirming
24 said intervention following thirty (30) days' notice to the
25 Parties. Thereafter, if approved by the Court, such intervenor
26 shall be a Party bound by this Judgment and entitled to the rights
27 and privileges accorded under the Physical Solution herein.

28 ///

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

41. Recordation of Notice. MWA shall within sixty (60) days following entry of this Judgment record in the Office of the County Recorder of the County of San Bernardino a notice substantially complying with the notice content requirements set forth in Section 2529 of the California Water Code.

42. Judgment Binding on Successors, etc. Subject to specific provisions hereinbefore contained, this Judgment and all provisions thereof are applicable to and binding upon and inure to the benefit of not only the Parties to this action, but as well to their respective heirs, executors, administrators, successors, assigns, lessees, licensees and to the agents, employees and attorneys in fact of any such Persons.

43. Costs. No Party stipulating to this Judgment shall recover any costs or attorneys fees in this proceeding from another stipulating Party.

44. Entry of Judgment. The Clerk shall enter this Judgment.

Dated: JAN 10 1996

E. MICHAEL KAISER

E. Michael Kaiser, Judge
Superior Court of the State
of California for the
County of Riverside

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT A

MAP OF MOJAVE BASIN AREA

[INDEX MAP AND DETAIL SHEET CONSISTING OF 42
1" = 4,000' SCALE MAPS COVERING THE BASIN
AREA; THE MAP IS ON DISPLAY AT THE OFFICE OF
THE MOJAVE WATER AGENCY, 22450 HEADQUARTERS,
APPLE VALLEY, CA 92307 AND ON FILE WITH THE
COURT]

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT B

PRODUCTION TABLES

CONTENTS

TABLE B-1: TABLE SHOWING BASE ANNUAL PRODUCTION AND BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN EACH SUBAREA AND FREE PRODUCTION ALLOWANCES FOR EACH SUBAREA FOR THE FIRST FIVE YEARS AFTER ENTRY OF THE INTERLOCUTORY JUDGMENT

TABLE B-2: TABLE SHOWING TOTAL VERIFIED PRODUCTION, BASE ANNUAL PRODUCTION AND RECIRCULATED WATER PRODUCTION FOR AQUACULTURE AND FOR RECREATIONAL LAKES

~~10/10/02~~
~~01/10/02~~
~~02/02/02~~
~~04/10/02~~
~~04/02/02~~
09/25/95

EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
ABSHIRE, DAVID V	24	0.1093	24	22	21	20	19
ANDERSON, ROSS C & BETTY J	34	0.1548	34	32	30	28	27
BAR H MUTUAL WATER COMPANY	53	0.2414	53	50	47	45	42
BELL, CHUCK	494	2.2497	494	469	444	419	395
BURNS, BOBBY J & EVELYN J	1,300	5.9204	1,300	1,235	1,170	1,105	1,040
CASA COLINA FOUNDATION	90	0.4099	90	85	81	76	72
CENTER WATER CO	40	0.1822	40	38	36	34	32
CLUB VIEW PARTNERS	1,276	5.8111	1,276	1,212	1,148	1,084	1,020
CROSS, LAWRENCE B	23	0.1047	23	21	20	19	18
CRYSTAL HILLS WATER COMPANY	194	0.8835	194	184	174	164	155
DAHLQUIST, GEORGE R	594	2.7052	594	564	534	504	475
DELPERDANG, ROBERT H	56	0.2550	56	53	50	47	44
DESBERT DAWN MUTUAL WATER COMPANY	15	0.0683	15	14	13	12	12
GRETA, TRINIDAD	512	2.3317	512	486	460	435	409
GAYJIKIAN, SAMUEL & HAZEL	102	0.4645	102	96	91	86	81
GRACETOWN INVESTMENT CO - JETCO PROP FUND	752	3.4247	752	714	676	639	601
GUEBLER, HANS	30	0.1366	30	28	27	25	24
HAL-DOR LTD	23	0.1047	23	21	20	19	18
HANDLEY, DON R & MARY ANN	73	0.3325	73	69	65	62	58
HART, MERRILL W	473	2.1541	473	449	425	402	378
HERT, SCOTT	276	1.2569	276	262	248	234	220
HI-GRADE MATERIALS	442	2.0129	442	419	397	375	353
HITCHIN LICENSHE, INC	16	0.0729	16	15	14	13	12
JAMS RANCH	28	0.1275	28	26	25	23	22

~~09/20/92~~
~~09/20/92~~
~~09/20/92~~
~~04/20/92~~
~~04/20/92~~
09/25/95

EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
JUBILEE MUTUAL WATER COMPANY	142	0.6467	142	134	127	120	113
JUNIFER RIVIERA COUNTY WATER DISTRICT	37	0.1685	37	35	33	31	29
LEE, DOO HWAN	78	0.3552	78	74	70	66	62
LOPEZ, BALTAZAR	385	1.7533	385	365	346	327	308
LUA, ANTONIO	348	1.5848	348	330	313	295	278
LUCERNE VALLEY MUTUAL WATER COMPANY	54	0.2459	54	51	48	45	43
LUCERNE VALLEY PARTNERS	1,213	5.5242	1,213	1,152	1,091	1,031	970
LUCERNE VISTA WATER CO	21	0.0956	21	19	18	17	16
MITSUBISHI CEMENT CORPORATION	1,299	5.9158	1,299	1,234	1,169	1,104	1,039
MONACO INVESTMENT COMPANY	70	0.3188	70	66	63	59	56
MOSS, LAWRENCE W & HELEN J	43	0.1958	43	40	38	36	34
PARK, CHANHO	597	2.7188	597	567	537	507	477
PARK, JEONG, IL & HEA JA	96	0.4372	96	91	86	81	76
PEREZ, EVA	247	1.1249	247	234	222	209	197
PETTIGREW, DAN	1,422	6.4760	1,422	1,350	1,279	1,208	1,137
PETTIGREW, HOWARD L	1,500	6.8312	1,500	1,425	1,350	1,275	1,200
PLUESS-STAUER CALIFORNIA INC	23	0.1047	23	21	20	19	18
REED, MIKE	58	0.2641	58	55	52	49	46
ROGERS, ROY	1,449	6.5990	1,449	1,376	1,304	1,231	1,159
SAN BERNARDINO CO SERVICE AREA 29	21	0.0956	21	19	18	17	16
SEALS, LAWRENCE	113	0.5146	113	107	101	96	90
SON'S RANCH	140	0.6376	140	133	126	119	112
SOUTHERN CALIFORNIA WATER COMPANY	178	0.8106	178	169	160	151	142
SPECIALTY MINERALS, INC	42	0.1913	42	39	37	35	33

~~02/09/02~~
~~03/00/03~~
~~03/00/03~~
~~04/00/03~~
~~04/00/03~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)		BASE ANNUAL ² RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
	23	54		FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
SPILLMAN, JAMES R & NANCY J	23		0.1947	23	21	20	19	18
STEWART WATER COMPANY	54		0.2459	54	51	48	45	43
STRINGER, W EDWARD	573		2.6095	573	544	515	487	458
THE CUSHENBURY TRUST, C/O SPECIALTY MINERALS, INC	10		0.0455	10	9	9	8	8
TURNER, LOYD & CAROL	77		0.3507	77	73	69	65	61
VISOSKY, JOSEPH F JR	1,120		5.1006	1,120	1,064	1,008	952	896
WEISSER, SIDNEY & RAQUEL	90		0.4099	90	85	81	76	72
WILLOW BELLS MUTUAL WATER COMPANY	30		0.1366	30	28	27	25	24

~~10/10/02~~
~~02/20/02~~
~~02/02/02~~
~~04/20/02~~
~~04/20/02~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ESTE SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ESTE SUBAREA PRODUCER	BASE ANNUAL PRODUCTION (ACRB-FRET) ¹	BASE ANNUAL PRODUCTION RIGHT (PERCENT) ²	FREE PRODUCTION ALLOWANCES (ACRB-FRET)				
			FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
MINIMAL PRODUCER POOL	2,000	9.1083	2,000	1,900	1,800	1,700	1,600
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	1,485	6.7629					
ESTE SUBAREA TOTALS *	21,958	100					

¹ Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

² Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

³ Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

~~12/10/92~~
~~02/20/93~~
~~03/02/93~~
~~04/18/93~~
~~04/20/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN OBSTE SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

OBSTE SUBAREA PRODUCER	BASE ANNUAL 1 PRODUCTION (ACRE-FBET)		BASE ANNUAL 2 PRODUCTION (PERCENT)		FREE PRODUCTION ALLOWANCES (ACRE-FBET)				
					FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
AEROCHEN, INC	660	5.3645	660	627	594	561	528		
BROWN, DOUG & SUE	46	0.3739	46	43	41	39	36		
CHAMISAL MUTUAL	96	0.7803	96	91	86	81	76		
DAVIS, PAUL	19	0.1544	19	18	17	16	15		
DOSSEY, D A	14	0.1138	14	13	12	11	11		
MEADOWBROOK DAIRY	2,335	18.9791	2,335	2,216	2,101	1,984	1,868		
RESSEGUR, JOHN & BILL	259	2.1052	259	246	233	220	207		
SAN BERNARDINO CO SERVICE AREA 70G	110	0.8941	110	104	99	93	88		
SAN BERNARDINO CO SERVICE AREA 70L	1,306	10.6153	1,306	1,240	1,175	1,110	1,044		
THORSON, ROBERT P & A KATHLEEN	40	0.3251	40	38	36	34	32		
TROBGER, RICHARD H	112	0.9103	112	106	100	95	89		
VAN DAM BROTHERS	1,860	15.1183	1,860	1,767	1,674	1,581	1,488		

~~02/30/92~~
~~02/30/92~~
~~02/02/92~~
~~04/18/92~~
~~04/28/92~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ORSTE SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ORSTE SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
MINIMAL PRODUCER POOL	1,500	12.1921	1,500	1,425	1,350	1,275	1,200
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	3,946	32.0735					
ORSTE SUBAREA TOTALS *	12,303	100					

¹ Base Annual Production is the reported maximum year production for each producer for the five year period 1966-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

² Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

³ Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

~~12/10/92~~
~~01/10/93~~
~~02/09/93~~
~~04/18/93~~
~~04/28/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)		BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)		FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
	FIRST YEAR	SECOND YEAR	FIRST YEAR	SECOND YEAR	FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
ABBOND, EDWARD & GRACE	28	28	0.0229	26	25	23	22	22	
ABBOTT, LEONARD C	284	284	0.2321	269	255	241	227	227	
ADELANTO, CITY OF	1,573	1,573	1.2855	1,494	1,415	1,337	1,258	1,258	
ADELANTO, CITY OF - GEORGE A F B	3,433	3,433	2.8055	3,261	3,089	2,918	2,746	2,746	
AGCON, INC	384	384	0.3138	364	345	326	307	307	
APPLE VALLEY COUNTRY CLUB	709	709	0.5794	673	638	602	567	567	
APPLE VALLEY DEVELOPMENT	724	724	0.5917	687	651	615	579	579	
APPLE VALLEY FOOTHILL CO WATER DISTRICT	167	167	0.1365	158	150	141	133	133	
APPLE VALLEY HEIGHTS COUNTY WATER DISTRICT	125	125	0.1022	118	112	106	100	100	
APPLE VALLEY RANCHOS WATER COMPANY	13,022	13,022	10.6419	12,370	11,719	11,068	10,417	10,417	
APPLE VALLEY RECREATION & PARKS	45	45	0.0368	42	40	38	36	36	
APPLE VALLEY VIEW MUTUAL WATER CO	36	36	0.0294	34	32	30	28	28	
APPLE VALLEY, TOWN OF	298	298	0.2435	283	268	253	238	238	
ARC LAS FLORES	6,331	6,331	5.1739	6,014	5,697	5,381	5,064	5,064	
BACA, ENRIQUE	74	74	0.0605	70	66	62	59	59	
BALDY MESA WATER DISTRICT	1,495	1,495	1.2218	1,420	1,345	1,270	1,196	1,196	
BASS, NEWTON T	514	514	0.4201	488	462	436	411	411	
BASTIANON, REMO	77	77	0.0629	73	69	65	61	61	
BASURA, STEVE	25	25	0.0204	23	22	21	20	20	
BEINSCHROTH, A J	90	90	0.0736	85	81	76	72	72	
BOYCE, KENNETH & WILLA	102	102	0.0834	96	91	86	81	81	
BROWN, BOBBY G & VALERIA R	42	42	0.0343	39	37	35	33	33	
BURNS, ULYSSES & ANNIE L	164	164	0.1340	155	147	139	131	131	
CARDOSO, MANUEL & MARIA	909	909	0.7429	863	818	772	727	727	

~~10/10/92~~
~~01/20/92~~
~~02/02/92~~
~~04/10/92~~
~~06/20/92~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
CDPG - MOJAVE NARROWS REGIONAL PARK	2,107	1.7219	2,107	2,001	1,896	1,790	1,685
CDPG - MOJAVE RIVER FISH HATCHERY	20	0.0163	20	19	18	17	16
CLARK, KENNETH R	223	0.1822	223	211	200	189	178
CLEAR VIEW FARMS	501	0.4094	501	475	450	425	400
COPELAND, ET AL (C/O DON W. LITTLE)	175	0.1430	175	166	157	148	140
CRAMER, MARGARET MUIR	280	0.2288	280	266	252	238	224
CUNNINGHAM, WILLIAM	29	0.0237	29	27	26	24	23
DEXTER, CLAIR F	175	0.1430	175	166	157	148	140
DEXTER, J P	515	0.4209	515	489	463	437	412
DIBERNARDO, JOHN	203	0.1659	203	192	182	172	162
DOLCH, ROBERT & JUDY	426	0.3481	426	404	383	362	340
DOBROWSKI, MICHAEL W & SUSAN M	19	0.0155	19	18	17	16	15
DOMSE, PHILIP	20	0.0163	20	19	18	17	16
EVENSON, EDWIN H & JOYCELAINE	70	0.0572	70	66	63	59	56
FISHER, DOLORES DR	48	0.0392	48	45	43	40	38
FISHER, JEROME	633	0.5173	633	601	569	538	506
PITZWATER, R S	291	0.2378	291	276	261	247	232
GARCIA, SONIA L	288	0.2354	288	273	259	244	230
GOMEZ, CIRIL - LIVING TRUST	330	0.2697	330	313	297	280	264
GREEN ACRES ESTATES	25	0.0204	25	23	22	21	20
GULBRANSON, MERLIN	163	0.1332	163	154	146	138	130
HELENDALE SCHOOL DISTRICT	18	0.0147	18	17	16	15	14
HESPERIA GOLF AND COUNTRY CLUB	678	0.5541	678	644	610	576	542
HESPERIA WATER DISTRICT	12,213	9.9808	12,213	11,602	10,991	10,381	9,770

~~12/20/02~~
~~01/20/02~~
~~02/02/02~~
~~04/20/02~~
~~04/20/02~~
09/25/95

EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
HI-GRADE MATERIALS	149	0.1218	149	141	114	126	119
HODGE, STANLEY W	67	0.0548	67	63	60	56	53
HOLWAY, ROBERT	88	0.0719	88	83	79	74	70
HRUBIK, THOMAS A	3,862	3.1561	3,862	3,668	3,475	3,282	3,089
INDUSTRIAL ASPHALT	109	0.0891	109	103	98	92	87
JESS RANCH WATER COMPANY	7,480	6.1129	7,480	7,106	6,732	6,358	5,984
JOHNSON, LARRY & CARLEAN	82	0.0670	82	77	73	69	65
JOHNSON, RONALD	31	0.0253	31	29	27	26	24
JOHNSTON, HARRIET AND LARRY W	127	0.1038	127	120	114	107	101
KEMPER CAMPBELL RANCH	473	0.3865	473	449	425	402	378
LAKE ARROWHEAD COMMUNITY SERVICES DISTRICT	658	0.5377	658	625	592	559	526
LAWSON, ERNEST & BARBARA	15	0.0123	15	14	13	12	12
LENHART, RONALD & TONI	37	0.0302	37	35	33	31	29
LEWIS HOMES OF CALIFORNIA	1,693	1.3836	1,693	1,608	1,523	1,439	1,354
LONGMAN, JACK	115	0.0940	115	109	103	97	92
LOUNSBURY, J PETER & CAROLYN	208	0.1700	208	197	187	176	166
LOW, ROBERT	399	0.3261	399	379	359	339	319
LUCKEY, MANLEY J	800	0.6538	800	760	720	680	640
LUTH, KEN	27	0.0221	27	25	24	22	21
MARIANA RANCHOS COUNTY WATER DISTRICT	245	0.2002	245	232	220	208	196
MCCALL, REX	44	0.0360	44	41	39	37	35
MCINNIS, WILLIAM S	30	0.0245	30	28	27	25	24
MITCHELL, ROBIN & JUDITH	36	0.0294	36	34	32	30	28
MURPHY, BERNARD H	25	0.0204	25	23	22	21	20

~~09/15/95~~
~~09/15/95~~
~~09/15/95~~
~~09/15/95~~
~~09/15/95~~
09/15/95

EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL ¹	BASE ANNUAL ²	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
	PRODUCTION (ACRE-FEET)	PRODUCTION RIGHT (PERCENT)	FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
MURPHY, BERNARD TRUST	162	0.1324	162	153	145	137	129
MURPHY, KENNETH	42	0.0343	42	39	37	35	33
MUTUAL FUNDING CORP	101	0.0825	101	95	90	85	80
NAVAJO MUTUAL WATER CO	88	0.0719	88	83	79	74	70
NUNN, DONALD & PEARL	66	0.0539	66	62	59	56	52
O'BRYANT, ROBERT C & BARBARA	107	0.0874	107	101	96	90	85
ORMSBY, HARRY G	386	0.3154	386	366	347	328	308
PALISADES RANCH	824	0.6734	824	782	741	700	659
PARKER, DAVID E	37	0.0302	37	35	33	31	29
PEARL, ALICE	147	0.1201	147	139	132	124	117
PEARSON, DERYL B	22	0.0180	22	20	19	18	17
PERRY, THOMAS A	35	0.0286	35	33	31	29	28
PETTIS TRUST	126	0.1030	126	119	113	107	100
PHENIX PROPERTIES LTD	652	0.5328	652	619	586	554	521
PITTMAN, LEROY W	148	0.1209	148	140	133	125	118
POLICH, LEE & DONNA	65	0.0531	65	61	58	55	52
RANCHERITOS MUTUAL WATER CO	169	0.1381	169	160	152	143	135
RIVERSIDE CEMENT CO - ORO GRANDE PLANT	3,452	2.8211	3,452	3,279	3,106	2,934	2,761
ROGERS, ROY (ORO GRANDE RANCH)	115	0.0940	115	109	103	97	92
RUDMAN, ROBERT T	300	0.2452	300	285	270	255	240
RUE RANCH	30	0.0245	30	28	27	25	24
SAN BERNARDINO CO SERVICE AREA 42	465	0.3800	465	441	418	395	372
SAN BERNARDINO CO SERVICE AREA 64	3,822	3.1234	3,822	3,630	3,439	3,248	3,057
SAN BERNARDINO CO SERVICE AREA 70C	2,346	1.9172	2,346	2,228	2,111	1,994	1,876

~~12/10/92~~
~~01/20/93~~
~~03/02/93~~
~~04/26/93~~
~~04/26/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
SAN BERNARDINO CO SERVICE AREA 70J	1,005	0.8213	1,005	954	904	854	804
SAN BERNARDINO CO SERVICE AREA 70L	355	0.2901	355	337	319	301	284
SAN FILIPPO, JOSEPH & SHELLEY	35	0.0286	35	33	31	29	28
SILVER LAKES ASSOCIATION	3,987	3.2583	3,987	3,787	3,588	3,388	3,189
SOUTHDOWN, INC	1,519	1.2414	1,519	1,443	1,367	1,291	1,215
SOUTHERN CALIFORNIA WATER COMPANY	940	0.7682	940	893	846	799	752
SPRING VALLEY LAKE ASSOCIATION	3,056	2.4974	3,056	2,903	2,750	2,597	2,444
SPRING VALLEY LAKE COUNTRY CLUB	977	0.7984	977	928	879	830	781
STORM, RANDALL	62	0.0507	62	58	55	52	49
SUDMIER, GLENN W	121	0.0989	121	114	108	102	96
SUMMIT VALLEY RANCH	452	0.3694	452	429	406	384	361
TATRO, RICHARD K & SANDRA A	280	0.2288	280	266	252	238	224
TATUM, JAMES B	829	0.6775	829	787	746	704	663
TAYLOR, ALLEN C / HAYMAKER RANCH	456	0.3727	456	433	410	387	364
THOMAS, S DALE	440	0.3596	440	418	396	374	352
THOMAS, WALTER	36	0.0294	36	34	32	30	28
THOMPSON, JAMES A	418	0.3416	418	397	376	355	334
THOMPSON, RODGER	76	0.0621	76	72	68	64	60
THRASHER, GARY	373	0.3048	373	354	335	317	298
THUNDERBIRD COUNTY WATER DISTRICT	118	0.0964	118	112	106	100	94
TURNER, ROBERT	70	0.0572	70	66	63	59	56
VAIL, JOSEPH B & PAULA B	126	0.1030	126	119	113	107	100
VAN BURGER, CARL	710	0.5802	710	674	639	603	568
VAN LEEUWEN FAMILY TRUST	341	0.2787	341	323	306	289	272

~~01/20/93~~
~~01/20/93~~
~~02/02/93~~
~~04/18/93~~
~~04/28/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)		BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
	54	240		FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
VANNI, MIKE	54	240	0.0441	54	51	48	45	43
VICTOR VALLEY COMMUNITY COLLEGE DIST	240	240	0.1961	240	228	216	204	192
VICTOR VALLEY WATER DISTRICT	13,354	13,354	10.9133	13,354	12,686	12,018	11,350	10,683
VICTORVILLE, CITY OF	12	12	0.0098	12	11	10	10	9
VOGLER, ALBERT H	132	132	0.1079	132	125	116	112	105
WACKEN, CAESAR	1,635	1,635	1.3362	1,635	1,553	1,471	1,389	1,308
WAKULA, JOHN	291	291	0.2378	291	276	261	247	232
WARD, KEN & BARBARA	65	65	0.0531	65	61	58	55	52
WEBER, DAVE	80	80	0.0654	80	76	72	68	64
WEST, CAROLYN & SMITH, RICHARD	24	24	0.0196	24	22	21	20	19
WEST, HOWARD & SUZY	72	72	0.0588	72	68	64	61	57
WHITTINGHAM, RICHARD V	15	15	0.0123	15	14	13	12	12
YRAGER, B L - CONSTRUCTION COMPANY INC	34	34	0.0278	34	32	30	28	27

~~12/10/82~~
~~01/20/82~~
~~02/02/82~~
~~04/26/82~~
~~07/09/82~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN ALTO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

ALTO SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
MINIMAL PRODUCER POOL	4,000	3.2689	4,000	3,800	3,600	3,400	3,200
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	4,967	4.0592					
ALTO SUBAREA TOTALS *	122,365	100					

¹ Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

² Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

³ Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

~~11/10/92~~
~~03/30/93~~
~~03/03/93~~
~~04/18/93~~
~~04/28/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)		BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
	0	212		FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
AGCON, INC	0	0.0000	0	0	0	0	0	0
AGUAYO, JHANETTE L	212	0.3742	212	201	190	180	169	
ATCHISON, TOPEKA, SANTA FE RAILWAY CO	120	0.2118	120	114	108	102	96	
AVDEEF, THOMAS	34	0.0600	34	32	30	28	27	
AZTEC FARM DEVELOPMENT COMPANY	220	0.3683	220	209	198	187	176	
BARNES, FAY - EXECUTOR OF ESTATE OF WAYNE BARNES	243	0.4289	243	230	218	206	194	
BROMBER, HARVIN	361	0.6372	361	342	324	306	288	
BURNS, RITA J & PAMELA E	16	0.0282	16	15	14	13	12	
CHAPA, LARRY R	96	0.1694	96	91	86	81	76	
CHOI, YONG IL & JOUNG AE	38	0.0671	38	36	34	32	30	
CHRISTISON, JOEL	75	0.1324	75	71	67	63	60	
COOK, KWON W	169	0.2983	169	160	152	143	135	
DE VRIES, NEIL	3,800	6.7070	3,800	3,610	3,420	3,230	3,040	
DESERT COMMUNITY BANK	156	0.2753	156	148	140	132	124	
DURAN, FRANK T	50	0.0883	50	47	45	42	40	
GAINES, JACK	117	0.2065	117	111	105	99	93	
GESIRICH, WAYNE	121	0.2136	121	114	108	102	96	
CORMAN, VIRGIL	138	0.2436	138	131	124	117	110	
GRIEBER, RAYMOND H & DORISANNE	30	0.0530	30	28	27	25	24	
GRILL, NICHOLAS P & WILLIE D	21	0.0371	21	19	18	17	16	
GROBN, CORNELIUS	1,043	1.8409	1,043	990	938	886	834	
HANIFY, DBA - WHITE BEAR RANCH	152	0.2683	152	144	136	129	121	
HARNSEN, JAMES & RUTH ANN	1,522	2.6863	1,522	1,445	1,369	1,293	1,217	
HAPPER LAKE COMPANY	1,433	2.5293	1,433	1,361	1,289	1,218	1,146	

~~01/01/93~~
~~01/01/93~~
~~02/02/93~~
~~04/04/93~~
~~04/04/93~~
 05/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA	PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-PEET)		BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-PEET)				
		34	35		FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
	HI DESERT MUTUAL WATER CO	34	0.0600	34	32	30	28	27	
	HILFMAN, KATHERINE	19	0.0135	19	18	17	16	15	
	HILL, MELVIN	2,335	4.1213	2,335	2,218	2,101	1,984	1,868	
	HOY, MIKE	632	1.1155	632	600	568	537	505	
	JORDAN, RAYMOND	460	0.8119	460	437	414	391	368	
	JUSTICE, CHRIS	421	0.7431	421	399	378	357	336	
	KING, GENEVIEVE B	69	0.1218	69	65	62	58	55	
	LEE, SEPOONG ETAL & WOO POONG	77	0.1359	77	73	69	65	61	
	LEYERLY, GENEVA	65	0.1147	65	61	58	55	52	
	LEYERLY, RICHARD	862	1.5214	862	818	775	732	689	
	LUDINGTON, JAMES B & JO ANN	58	0.1024	58	55	52	49	46	
	LYON, LOUIS & BRIKA	130	0.2295	130	123	117	110	104	
	MARTIN, LENDELL	14	0.0247	14	13	12	11	11	
	MCCOLLUM, CHARLES L	347	0.6125	347	329	312	294	277	
	MEAD, G C	90	0.1589	90	85	81	76	72	
	MEYERS, LONNIE	27	0.0477	27	25	24	22	21	
	MITCHELL, CHARLES A	201	0.3548	201	190	180	170	160	
	MOFFITT, THOMAS R & EDITH I	62	0.1094	62	58	55	52	49	
	MOST, MILTON W	9,660	17.0500	9,660	9,177	8,694	8,211	7,728	
	NELSON, MILDRED L	52	0.0918	52	49	46	44	41	
	NEWBERRY SPRINGS COMPANY, INC	2,489	4.3931	2,489	2,364	2,240	2,115	1,991	
	OHAI, REYNOLDS & DOROTHY	137	0.2418	137	130	123	116	109	
	OROEZA, JOSE M	190	0.3354	190	180	171	161	152	
	OSTERKAMP, GEROLD	260	0.4589	260	247	234	221	208	

~~10/10/93~~
~~01/30/93~~
~~03/03/93~~
~~04/18/93~~
~~04/28/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)		BASE ANNUAL ² PRODUCTION (PERCENT)		FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
					FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
OWL ROCK PRODUCTS COMPANY	466	0.8225	466	442	419	396	372		
PG & E	1,657	2.9246	1,657	1,574	1,491	1,408	1,325		
REDDY, BONMI V & KARUNA V	24	0.0424	24	22	21	20	19		
ROWLAND, JAMES & HELEN	22	0.0388	22	20	19	18	17		
RUISCH, DALE W	650	1.1473	650	617	585	552	520		
SHIRKEY, ALAN G & MARY E	35	0.0618	35	33	31	29	28		
SMITH, ROBERT A	43	0.0759	43	40	38	36	34		
SOPPELAND, WAYNE	783	1.3820	783	743	704	665	626		
SOUTHERN CALIFORNIA WATER COMPANY	11,309	19.9605	11,309	10,743	10,178	9,612	9,047		
SPINK, WALTHALL	44	0.0777	44	41	39	37	35		
ST CHARLES, DONALD B	609	1.0749	609	578	548	517	487		
SUN 'N SKY COUNTRY CLUB	337	0.5948	337	320	303	286	269		
TALLAKSON, WILLIAM V	17	0.0300	17	16	15	14	13		
TILLENA, HAROLD	874	1.5426	874	830	786	742	699		
VAN DAM, ELBERT & SUSAN	722	1.2713	722	685	649	613	577		
VAN LEEUWEN, JOHN	1,922	3.3923	1,922	1,825	1,729	1,633	1,537		
VAN VLIET, HENDRIKA	820	1.4473	820	779	738	697	656		
VANHOY, LUTHER C	23	0.0406	23	21	20	19	18		
VERNOLA, PAT	3,116	5.4998	3,116	2,960	2,804	2,648	2,492		
VISSER, ANNIE	91	0.1606	91	86	81	77	72		
YANG, YOUNG MO	371	0.6548	371	352	333	315	296		
YKEMA HARMSEN DAIRY	1,600	1.7650	1,600	950	900	850	800		

~~12/10/93~~
~~01/30/93~~
~~02/02/93~~
~~04/18/93~~
~~04/28/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN CENTRO SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

CENTRO SUBAREA PRODUCER	BASE ANNUAL 1	BASE ANNUAL 2	FREE PRODUCTION ALLOWANCES (ACRE-PEET)				
	PRODUCTION (ACRE-PEET)	PRODUCTION RIGHT (PERCENT)	FIRST YEAR	SECOND 3 YEAR	THIRD 3 YEAR	FOURTH 3 YEAR	FIFTH 3 YEAR
MINIMAL PRODUCER POOL	2,000	3.5300	2,000	1,900	1,800	1,700	1,600
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	864	1.5250					
CENTRO SUBAREA TOTALS =	56,657	100					

- 1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.
- 2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.
- 3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

02/10/92
 03/20/92
 03/02/92
 04/10/92
 04/20/92
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL ¹	BASE ANNUAL ²	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
	PRODUCTION (ACRE-FEET)	PRODUCTION RIGHT (PERCENT)	FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
AKE, CHARLES J & MARJORIE M	23	0.0333	23	21	20	19	18
ANGERSER, ROBERT J & PEGGY	24	0.0347	24	22	21	20	19
ANTELOPE VALLEY DAIRY	5,430	7.8597	5,430	5,158	4,887	4,615	4,344
ARGUELLES, ALFREDO	1,047	1.5155	1,047	994	942	889	837
ATCHISON, TOPSKA, SANTA FE RAILWAY CO	80	0.1158	80	76	72	68	64
BAGLEY, ROY	20	0.0289	20	19	18	17	16
BALDERAMA, ALFRED & LINDA	250	0.3619	250	237	225	212	200
BALL, DAVID P	81	0.1172	81	76	72	68	64
BARAK, RICHARD	132	0.1911	132	125	118	112	105
BARBER, JAMES B	167	0.2417	167	158	150	141	133
BARSTOW CALICO K O A	24	0.0347	24	22	21	20	19
BAUR, KARL & RITA	26	0.0376	26	24	23	22	20
BRDINGFIELD, LYNDELL & CHARLENE	56	0.0811	56	53	50	47	44
BENTON, PHILIP G	35	0.0507	35	33	31	29	28
BORGONO, STEVEN & LILLIAN B	1,844	2.6691	1,844	1,751	1,659	1,567	1,475
BOHMAN, EDWIN L	31	0.0449	31	29	27	26	24
BROWN, RONALD A	1,080	1.5632	1,080	1,026	972	918	864
BROMY, ORVILLE & LOUISE	33	0.0478	33	31	29	28	26
BRUINS, NICHOLAS	29	0.0420	29	27	26	24	23
CALICO LAKES HOMESMERS ASSOCIATION	1,031	1.4923	1,031	979	927	876	824
CALIF DEPT OF TRANSPORTATION	71	0.1028	71	67	63	60	56
CAMPBELL, M A & DIANNE	22	0.0318	22	20	19	18	17
CARTER, JOHN THOMAS	746	1.0798	746	708	671	634	596
CDFG - CAMP CADY	14	0.0203	14	13	12	11	11

-12/10/92-
 -01/30/93-
 -02/09/93-
 -04/20/93-
 -04/30/93-
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)		BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)		FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
					FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
CHANG, TIMOTHY & JANE	18	0.0261	17	16	15	14			
CHASTAIN, W C	100	0.1447	95	90	85	80			
CHEYERNE LAKE, INC	122	0.1766	115	109	103	97			
CHIAO MHI DEVELOPMENT	451	0.6528	428	405	383	360			
CHO BROTHERS RANCH	758	1.0972	720	682	644	606			
CHUANG, MARSHAL	70	0.1013	66	63	59	56			
CONNOR, WILLIAM H	25	0.0362	23	22	21	20			
COOL WATER RANCH	76	0.1100	72	68	64	60			
CRYSTAL LAKES PROPERTY OWNERS ASSOCIATION	447	0.6470	424	402	379	357			
DIAGETT COMMUNITY SERVICES DISTRICT	235	0.3402	223	211	199	188			
DALJO CORPORATION	31	0.0449	29	27	26	24			
DAVIS, RONALD & DONNA	53	0.0767	50	47	45	42			
DE JONG, ALAN L	1,648	2.3854	1,565	1,483	1,400	1,318			
DENNISON, QUENTIN D	29	0.0420	27	26	24	23			
DESERT LAKES CORPORATION - (LAKE DOLORES)	483	0.6991	458	434	410	386			
DOCIMO, DONALD P & PATRICIA J	23	0.0333	21	20	19	18			
DONALDSON, JERRY & BEVERLY	90	0.1303	85	81	76	72			
ELLISON, SUSAN	15	0.0217	14	13	12	12			
EYKHAMIAN, JAMES H	110	0.1592	104	99	93	88			
FANCETT, EDWARD C	20	0.0289	19	18	17	16			
FELIX, ALAN E & CAROL L	36	0.0521	34	32	30	28			
FERRO, DENNIS & NORMA	32	0.0463	30	28	27	25			
FRIEND, JOSEPH & DEBORAH	60	0.0868	57	54	51	48			
FUNDAMENTAL CHRISTIAN ENDEAVOR	285	0.4125	270	256	242	228			

~~10/10/02~~
~~02/00/02~~
~~02/02/02~~
~~04/10/02~~
~~04/00/02~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
GARCIA, DANIEL	23	0.0333	23	21	20	19	18
GOLD, HAROLD	249	0.3604	249	236	224	211	199
GRAVES, CHESTER B	32	0.0463	32	30	28	27	25
HAIGH, WILLYDN & MARGARET	32	0.0463	32	30	28	27	25
HALL, LARRY	23	0.0333	23	21	20	19	18
HARALIK, BESS & ROBERT	27	0.0391	27	25	24	22	21
HARDESTY, LESLIE E & BECKY J	47	0.0680	47	44	42	39	37
HARESON, NICHOLAS & MARY	30	0.0434	30	28	27	25	24
HARTER FARMS	1,083	1.5676	1,083	1,028	974	920	866
HARTER, JOE & SUE	738	1.0682	738	701	664	627	590
HARTLEY, LONNIE	19	0.0275	19	18	17	16	15
HARVSY, FRANK	38	0.0550	38	36	34	32	30
HENDLEY, RICK & BARBARA	48	0.0695	48	45	43	40	38
HIETT, PATRICIA J	16	0.0232	16	15	14	13	12
HILARIDES, FRANK	1,210	1.7514	1,210	1,149	1,089	1,028	968
HOLLISTER, ROBERT H & RUTH M	44	0.0637	44	41	39	37	35
HONG, PAUL E & MAY	95	0.1375	95	90	85	80	76
HORTON'S CHILDREN'S TRUST	106	0.1534	106	100	95	90	84
HORTON, JOHN MD	183	0.2649	183	173	164	155	146
HOSKING, JOHN W & JEAN	94	0.1361	94	89	84	79	75
HUBBARD, ESTER & MIZUNO, ARLEAN	28	0.0405	28	26	25	23	22
HUNT, RALPH M & LILLIAN P	31	0.0449	31	29	27	26	24
HUTCHISON, WILLIAM O	901	1.3042	901	855	810	765	720
HYATT, JAMES & BRENDA	210	0.3040	210	199	189	178	168

~~12/10/02~~
~~01/20/02~~
~~03/02/02~~
~~04/12/02~~
~~04/20/02~~
09/25/95

EXHIBIT B
TABLE B-1
TABLE SHOWING BASE ANNUAL PRODUCTION AND
BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
TOGETHER WITH FREE PRODUCTION ALLOWANCES
FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)		BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
	29	54		FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
IRVIN, BERTRAND W	29	54	0.0420	29	27	26	24	23
J V A AIR INC	54	54	0.0782	54	51	48	45	43
JACKSON, RAY	20	20	0.0283	20	19	18	17	16
JOHNSON, JAMES R	247	247	0.3575	247	234	222	209	197
JUSTICE, CHRIS	6	6	0.0087	6	5	5	5	4
KAPLAN, ABRAHAM H	76	76	0.1100	76	72	68	64	60
KASNER, ROBERT	1,001	1,001	1.4489	1,001	950	900	850	800
KATCHER, AUGUST M & MARCELINE	23	23	0.0333	23	21	20	19	18
KEMP, ROBERT & ROSE	32	32	0.0463	32	30	28	27	25
KIBL, MARY	34	34	0.0492	34	32	30	28	27
KIN, JOON HO	764	764	1.1059	764	725	687	649	611
KOSHAREK, JOHN & JOANNE	54	54	0.0782	54	51	48	45	43
LAKE JODIE PROPERTY OWNERS ASSOCIATION	254	254	0.3677	254	241	228	215	203
LAKE HAIKIKI	98	98	0.1419	98	93	88	83	78
LAKE HAINANI OWNERS ASSOCIATION	202	202	0.2924	202	191	181	171	161
LANGLEY, MICHAEL R	20	20	0.0289	20	19	18	17	16
LAWRENCE, WILLIAM W	45	45	0.0651	45	42	40	38	36
LEE, MOON & OKBEA	49	49	0.0709	49	46	44	41	39
LEE, VIN JANG T	630	630	0.9119	630	598	567	535	504
LESHIN, CONNIE & SOL	1,416	1,416	2.0496	1,416	1,345	1,274	1,203	1,132
LESHIN, SOL	1,997	1,997	2.8906	1,997	1,897	1,797	1,697	1,597
LEVINE, DR LESLIE	1,637	1,637	2.3695	1,637	1,555	1,473	1,391	1,309
LONG, BALLARD	35	35	0.0507	35	33	31	29	28
M BIRD CONSTRUCTION	41	41	0.0593	41	38	36	34	32

~~10/20/02~~
~~01/20/02~~
~~02/02/02~~
~~04/20/02~~
~~04/20/02~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
MAHJOUBI, APSAR S	63	0.0912	63	59	56	53	50
MALIN, LILY	54	0.0782	54	51	48	45	43
MALONEY, JANICE	36	0.0521	36	34	32	30	28
MARCROFT, JAMES A & JOAN	38	0.0550	38	36	34	32	30
MARSHALL, CHARLES	20	0.0289	20	19	18	17	16
MAYBERRY, DONALD J	41	0.0593	41	38	36	34	32
MILBRAT, IRVING	73	0.1057	73	69	65	62	58
MITCHELL, CHARLOTTE	115	0.1665	115	109	103	97	92
MITCHELL, JAMES L & CHERYL A	155	0.2244	155	147	139	131	124
MOORE, WAYNE G & JULIA H	103	0.1491	103	97	92	87	82
MORRIS, KARL	304	0.4400	304	280	273	258	243
MULLIGAN, ROBERT & INEZ	35	0.0507	35	33	31	29	28
NEWBERRY COMMUNITY SERVICE DIST	23	0.0333	23	21	20	19	18
NU VIEW DEVELOPMENT, INC	2,899	4.1962	2,899	2,754	2,609	2,464	2,319
O F D L INC	109	0.1578	109	103	98	92	87
O'KEEFE, SARAH-LEE & JOKE E	50	0.0724	50	47	45	42	40
P & H ENGINEERING & DEV CORP	667	0.9654	667	633	600	566	533
PARKER, GEORGE R	144	0.2084	144	136	129	122	115
PATHFINDER INVESTORS	472	0.6832	472	448	424	401	377
PAYAN, PAUL	32	0.0463	32	30	28	27	25
PERKO, BERT K	332	0.1911	332	325	318	312	305
PITTS, JOE	30	0.0434	30	28	27	25	24
POHL, ANDREAS & CATHLYN	17	0.0246	17	16	15	14	13
POLAND, JOHN R & SANDRA M	92	0.1332	92	87	82	78	73

~~12/10/93~~
~~01/30/93~~
~~03/09/93~~
~~04/18/93~~
~~04/28/93~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND YEAR	THIRD YEAR	FOURTH YEAR	FIFTH YEAR
PRICE, ALAN E	37	0.0536	37	35	33	31	29
PRICE, DONALD	42	0.0608	42	39	37	35	33
FUCKHABER, WILLIAM F TRUST	63	0.0912	63	59	56	53	50
PURCIO, THOMAS F & PATRICIA A	80	0.1158	80	76	72	68	64
RANDOLPH, JOAN E	24	0.0347	24	22	21	20	19
REEVES, RICHARD	230	0.3329	230	218	207	195	184
RICE, DANIEL & MARY	121	0.1751	121	114	108	102	96
RICE, HENRY C & DYANA	24	0.0347	24	22	21	20	19
RIEGER, WALTER M	62	0.0897	62	58	55	52	49
RIKOO CORPORATION	1,517	2.1958	1,517	1,441	1,365	1,289	1,213
ROSSI, JAMES L & NAOMI I	614	0.8887	614	583	552	521	491
ROTEX CONSTRUCTION COMPANY	2,529	3.6606	2,529	2,402	2,276	2,149	2,023
SAN BERNARDINO COUNTY BARSTON - DAGGETT AIRPORT	168	0.2432	168	159	151	142	134
SANTUCCI, ANTONIO & WILSA	30	0.0434	30	28	27	25	24
SCOGGINS, JERRY	105	0.1520	105	99	94	89	84
SHEPPARD, THOMAS & GLORIA	217	0.3141	217	206	195	184	173
SHORT, CHARLES & MARGARET	54	0.0782	54	51	48	45	43
SHORT, JRFP	30	0.0434	30	28	27	25	24
SILVER VALLEY RANCH, INC	109	0.1578	109	103	98	92	87
SMITH, WILLIAM E	19	0.0275	19	18	17	16	15
SNYDER, KYRL K & ROUTH, RICHARD J	64	0.0926	64	60	57	54	51
SOUTHERN CALIFORNIA EDISON CO - AGRICULTURE	5,858	8.4792	5,858	5,565	5,272	4,979	4,686
SOUTHERN CALIFORNIA EDISON CO - INDUSTRIAL	4,565	6.6076	4,565	4,336	4,108	3,880	3,652
SOUTHERN CALIFORNIA GAS COMPANY	98	0.1419	98	93	88	83	78

02/10/92
 02/10/92
 02/10/92
 04/10/92
 04/10/92
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
ST ANTHONY COPTIC ORTHODOX MONASTERY	130	0.1882	130	123	117	110	104
STEWART, STANLEY & PATRICIA	27	0.0391	27	25	24	22	21
SUGA, TAKEAKI	154	0.2229	154	146	138	130	123
SUNDOWN LAKES, INC	168	0.2432	168	159	151	142	134
SWARTZ, ROBERT & IRENE	50	0.0724	50	47	45	42	40
TAPIE, RAYMOND & MURIEL	18	0.0261	18	17	16	15	14
TAYLOR, TOM	503	0.7281	503	477	452	427	402
THAYER, SHARON	58	0.0840	58	55	52	49	46
THE 160 NEWBERRY RANCH CALIFORNIA, LTD	1,033	1.4952	1,033	981	929	878	826
TRIPLE H PARTNERSHIP	993	1.4373	993	943	893	844	794
UNION PACIFIC RAILROAD COMPANY	249	0.3604	249	236	224	211	199
VAN BASTELAAR, ALPHONSE	78	0.1129	78	74	70	66	62
VAN DIRST, CORNELIUS	934	1.3519	934	887	840	793	747
VAN LERUEN, JOHN	1,084	1.5690	1,084	1,029	975	921	867
VANDER DUSSEN, AGNES	1,792	2.5938	1,792	1,702	1,612	1,523	1,433
VAUGHT, ROBERT E & KAREN M	43	0.0622	43	40	38	36	34
VERMOLA, PAT	1,310	1.8962	1,310	1,244	1,179	1,113	1,048
WARD, ERNEST & LAURA	38	0.0550	38	36	34	32	30
WARD, RONNY H	130	0.1882	130	123	117	110	104
WEBER, F R & JUNELL	96	0.1390	96	91	86	81	76
WEBSTER, THOMAS M & PATRICIA J	24	0.0347	24	22	21	20	19
WEIDKNECHT, ARTHUR J & PEGGY A	79	0.1143	79	75	71	67	63
WESTERN HORIZON ASSOCIATES INC	1,188	1.7196	1,188	1,128	1,069	1,009	950
WESTERN ROCK PRODUCTS	31	0.0449	31	29	27	26	24

~~12/10/02~~
~~01/08/03~~
~~02/03/03~~
~~04/18/02~~
~~04/28/02~~
 09/25/95

EXHIBIT B
 TABLE B-1
 TABLE SHOWING BASE ANNUAL PRODUCTION AND
 BASE ANNUAL PRODUCTION RIGHT OF EACH PRODUCER WITHIN BAJA SUBAREA
 TOGETHER WITH FREE PRODUCTION ALLOWANCES
 FOR FIRST FIVE YEARS OF THE JUDGMENT

BAJA SUBAREA PRODUCER	BASE ANNUAL ¹ PRODUCTION (ACRE-FEET)	BASE ANNUAL ² PRODUCTION RIGHT (PERCENT)	FREE PRODUCTION ALLOWANCES (ACRE-FEET)				
			FIRST YEAR	SECOND ³ YEAR	THIRD ³ YEAR	FOURTH ³ YEAR	FIFTH ³ YEAR
WRT SET, INC	129	0.1867	129	122	116	109	103
WITTE, R DANIEL	27	0.0391	27	25	24	22	21
WLSR INC	333	0.1925	333	126	119	113	106
WORSEY, REVAE	29	0.0420	29	27	26	24	23
YARD, BETTY	26	0.0376	26	24	23	22	20
YERMO WATER COMPANY	453	0.6557	453	430	407	385	362
YOUNG, KEITH O - (DESERT TURF)	312	0.4516	312	296	280	265	249
MINIMAL PRODUCER POOL	3,500	5.0661	3,500	3,325	3,150	2,975	2,800
UNIDENTIFIED/UNVERIFIED PRODUCER POOL	320	0.4632					
BAJA SUBAREA TOTALS =	69,087	100					

1 Base Annual Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records, site inspection, land use estimates from 1987 and 1989 aerial photography and responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production Right expressed as a percentage of the Total Base Annual Production.

3 Values based on production ramp down of five percent (5%) per year. Free Production Allowance for the fifth year is equal to eighty percent (80%) of the Base Annual Production.

EXHIBIT B
 TABLE B-2
 TABLE SHOWING TOTAL WATER PRODUCTION
 FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
 ALTO SUBAREA

PRODUCER	TOTAL WATER PRODUCTION ¹	BASE ANNUAL ² PRODUCTION	RECIRCULATED ³ WATER
	(ACRE-FEET)		
CDFG - MOJAVE RIVER FISH HATCHERY	10,678	20	10,658
JESS RANCH WATER COMPANY	18,025	7,480	11,145
ALTO SUBAREA TOTALS =	29,303	7,500	21,803

Total Water Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records; James C. Hanson site inspection; land use estimates from 1989 aerial photography; responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production as shown on Table B-1.
 3 Amount shown is the difference between the Total Water Production and the Base Annual Production.

.HIBIT B
TABLE B-2
TABLE SHOWING TOTAL WATER PRODUCTION
FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
BAJA SUBAREA

PRODUCER	(ACRE-FEET)		
	TOTAL WATER ¹ PRODUCTION	BASE ANNUAL ² PRODUCTION	RECIRCULATED ³ WATER
BROWY, ORVILLE & LOUISE	210	33	177
CALICO LAKES HOMEOWNERS ASSOCIATION	2,513	1,031	1,482
CDFG - CAMP CADY	102	14	88
CHEYENNE LAKE, INC	638	122	516
CRYSTAL LAKES PROPERTY OWNERS ASSOCIATION	6,575	447	6,128
DESERT LAKES CORPORATION - (LAKE DOLORES)	928	483	445
FUNDAMENTAL CHRISTIAN ENDEAVOR	440	285	155
HORTON'S CHILDREN'S TRUST	1,291	106	1,185
HORTON, JOHN MD	672	183	489
KIEL, MARY	188	34	154
LAKE JODIE PROPERTY OWNERS ASSOCIATION	2,805	254	2,551
LAKE WAIKIKI	400	98	302
LAKE WAINANI OWNERS ASSOCIATION	1,420	202	1,218
LEE, MOON & OKBEA	171	49	122
O F D L INC	434	109	325
RICE, DANIEL & MARY	614	121	493
SCOGGINS, JERRY	922	105	817
SILVER VALLEY RANCH, INC	455	109	346
S MITH, WILLIAM E	153	19	134
SUNDOWN LAKES, INC	1,109	168	941
TAPIE, RAYMOND & MURIEL	108	18	90
THAYER, SHARON	159	58	101
WET SET, INC	441	129	312
WLSR INC	678	133	545

EXHIBIT B
 TABLE B-2
 TABLE SHOWING TOTAL WATER PRODUCTION
 FOR AQUACULTURE AND RECREATIONAL LAKE PURPOSES
 BAJA SUBAREA

PRODUCER	TOTAL WATER ¹ PRODUCTION	BASE ANNUAL ² PRODUCTION	RECIRCULATED ³ WATER
	(ACRE-FEET)		

BAJA SUBAREA TOTALS = 23,426 4,310 19,116

1 Total Water Production is the reported maximum year production for each producer for the five year period 1986-1990. These values reflect the maximum production determined by one or more of the following: Southern California Edison records; James C. Hanson site inspection; land use estimates from 1989 aerial photography; responses to special interrogatories. All values are subject to change if additional information is made available, or if any value reported herein is found to be in error.

2 Base Annual Production as shown on Table B-1.

3 Amount shown is the difference between the Total Water Production and the Base Annual Production.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT C

ENGINEERING APPENDIX

CONTENTS

- A. ADJUSTMENT OF FREE PRODUCTION ALLOWANCES
- B. DETERMINATION OF SURFACE FLOW COMPONENTS

TABLE C-1: MOJAVE BASIN AREA ADJUDICATION SUBAREA HYDROLOGICAL INVENTORY BASED ON LONG-TERM AVERAGE NATURAL WATER SUPPLY AND OUTFLOW AND CURRENT YEAR IMPORTS AND CONSUMPTIVE USE

1 total measured surface flow at Lower Narrows was Storm Flow and
2 what portion was Base Flow.

3 The Parties in reaching the physical solution provided for in
4 the Judgment, used certain procedures to separate the Storm Flow
5 and Base Flow components of the total measured surface flow at
6 Lower Narrows. Hydrographs of the mean daily discharge at Lower
7 Narrows were plotted for the Year under consideration together with
8 corresponding rainfall data obtained from the National Oceanic and
9 Atmospheric Administration (NOAA) for Lake Arrowhead. Hydrographs
10 were also plotted for the combined flow of West Fork Mojave River
11 and Deep Creek which together with the Lake Arrowhead precipitation
12 data served as a guide for interpreting those periods during which
13 Storm Flow was likely to have occurred at Lower Narrows.

14 Other factors considered included:

15 * Occurrences of Storm Flow at Barstow and Afton Canyon,
16 * Precipitation at Victorville and Barstow,
17 * Consideration of the time of Year and temperature, &
18 * Shape of hydrographs for Years having similar Base Flow
19 characteristics.

20 Based on interpretation of all of the foregoing information,
21 the flows occurring on those days during which Storm Flow most
22 likely occurred were "scalped" by projecting an estimated Base Flow
23 Curve through the Storm Flow Period. The Base Flow component of
24 the total monthly flow was then determined as follows:

25 a. For those periods during which there was obviously no
26 Storm Flow, the entire recorded mean daily flows were assumed to be
27 Base Flow.

1 b. For the remaining Storm Flow periods, the Base Flow
2 component was taken as the area under the Base Flow Curve, except
3 that for those days within the Storm Flow period when the actual
4 mean daily discharge is less than the amount indicated by the Base
5 Flow Scalping Curves, then the actual recorded amount is used.

6 2. Determination of Surface Flow Components at Waterman
7 Fault. The total amount of surface flow passing the Waterman Fault
8 (under current riverbed conditions) is considered to be Storm Flow
9 and can be estimated from the Storm Flow passing the USGS gauging
10 station Mojave River at Barstow. The following table was developed
11 to provide a method for estimating flow at Waterman Fault:

12	Storm Flow At Barstow Gage ¹ 13 <u>(Acre-Feet)</u>	Estimated Surface Flow at Waterman Fault 14 <u>(Acre-Feet)</u>
14	2,000	0
15	10,000	6,200
16	20,000	14,300
17	30,000	22,600
18	40,000	31,400
19	50,000	40,500
20	60,000	49,200
21	70,000	58,400
22	80,000	67,800
23	90,000	76,800
24	100,000	85,400

25
26
27 ¹From Recorded Flow at USGS Gaging Station Mojave River at
28 Barstow. Relationship is based on single storm events. More than
one storm event separated by more than five day of zero flow will
be considered as separate storms.

1 3. Determination of Surface Flow Components at Afton.

2 Records available for the discharge of the Mojave River at Afton,
3 California, provide data on the total amount of surface flow and
4 since storm runoff occurs during and immediately following a major
5 storm event in the watershed area tributary to the Baja Basin below
6 Barstow or in the event of large Storm Flows at Barstow which reach
7 Afton, it was necessary to determine what portion of the total
8 measured surface flow at Afton is Storm Flow and what portion of
9 Base Flow.

10 The Parties, in reaching the physical solution provided for in
11 the Judgment, used certain procedures to separate the Storm Flow
12 and Base Flow components of the total measured surface flow at
13 Afton. Hydrographs of the mean daily discharge at Afton were
14 plotted for the water Year under consideration. In the absence of
15 Storm Flow, the Base Flow curve at Afton was generally a relatively
16 constant amount. Storm Flows were evidenced by sharp spikes or
17 abrupt departures from the antecedent Base Flow and a fairly rapid
18 return to pre-storm Base Flow Condition. The hydrograph of flows
19 at Barstow served as a guide for identifying those periods during
20 which Storm Flow was likely to have occurred at Afton.

21 Based on interpretation of all of the foregoing information,
22 the flows occurring on those days during which Storm Flow most
23 likely occurred were "scalped" by projecting an estimated Base Flow
24 Curve through the Storm Flow Period. The Base Flow component of
25 the total monthly flow was then determined as follows:

26 a. For those periods during which there is obviously no
27 Storm Flow, the entire recorded mean daily flows were assumed to be
28 Base Flow.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

b. For the remaining Storm Flow periods, the Base Flow component was taken as the area under the Base Flow Curve except that for those days within the Storm Flow period when the actual mean daily discharge was less than the amount indicated by the Base Flow Scalping Curves, then the actual recorded amount was used.

4. Engineers' Work Papers. These procedures are reflected in the Work Papers of the Engineers, copies of which are filed with the Watermaster.

TABLE 5-1
Mojave Basin Area Adjudication
Subarea Hydrological Inventory Based On
Long-Term Average Natural Water Supply and Outflow
and Current Year Imports and Consumptive Use
(All Amounts in Acre-Feet)

	Este	Oeste	Alto	Centro	Baja	Basin Totals
WATER SUPPLY						
Surface Water Inflow						
Gaged	0	0	65,000	0	0	65,000 ¹
Ungaged	1,700	1,500	3,000	37,300	14,300	6,500 ²
Subsurface Inflow	0	0	1,000	2,000	1,200	0 ⁴
Deep Percolation of Precipitation	0	0	3,500	0	100	3,600
Imports						
Lake Arrowhead CSD	0	0	1,500	0	0	1,500
Big Bear ARWWA	2,000	0	0	0	0	2,000
TOTAL	3,700	1,500	74,000	39,300	15,600	78,600
CONSUMPTIVE USE AND OUTFLOW						
Surface Water Outflow						
Gaged	0	0	0	0	8,200	8,200
Ungaged	0	0	37,300	14,000	0	0
Subsurface Outflow	400	800	2,000	1,200	0	0
Consumptive Use						
Agriculture	6,800	2,900	16,300	20,300	30,200	76,500
Urban	1,900	1,200	36,300	9,500	9,700	58,600
Phreatophytes	0	0	5,100	900	1,500	7,500 ⁶
Exports	0	0	0	0	0	0
TOTAL	8,900	4,900	97,000	45,900	49,600	150,800
Surplus / (Deficit)	(5,200)	(3,400)	(23,000)	(6,600)	(34,000)	(72,200)
Total Estimated Production (Current Year) ⁷	15,700	7,600	98,900	46,500	54,300	223,000
PRODUCTION SAFE YIELD (Current Year)	10,500	4,200	75,900	39,900	20,300	150,800

¹ Estimated from reported flows at USGS gaging station, Mojave River at Victorville Narrows.
² Includes 14,000 acre-feet of Mojave River surface flow across the Waterman Fault estimated from reported flows at USGS gaging station, Mojave River at Baratow, and 300 acre-feet of local surface inflow from Kane Wash.
³ Represents the sum of Este (1,700 af), Oeste (1,500 af), Alto (3,000 af) and Baja (300 af from Kane Wash).
⁴ Inter subarea subsurface flows do not accrue to the total basin water supply.
⁵ Estimated from reported flows at USGS gaging station, Mojave River at Baratow.
⁶ Estimated by Bookman-Edmonston.
⁷ For purposes of this Table, the current year is 1990.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT D
TIME SCHEDULES

1 Production Allowance, Watermaster shall notify all Parties as to
2 its recommendation not later than February 1, shall hold a public
3 hearing thereon not later than March 1, and shall submit any such
4 recommendation, which may be revised pursuant to the public
5 hearing, to the Court not later than April 1.

6 5. Payment of Administrative Assessments and Biological
7 Resource Assessments. Each Producer shall submit quarterly along
8 with the Production report required by Paragraph 24 (p) an
9 Administrative Assessment payment in an amount equal to the current
10 Year Administrative Assessment Rate multiplied times the acre-feet
11 of water Produced during the quarter and a Biological Resource
12 Assessment payment in an amount equal to the current Year
13 Biological Resource Assessment Rate multiplied times the acre-feet
14 of water Produced during the quarter.

15 6. Payment of Replacement Water Assessments and Makeup Water
16 Assessments. Replacement Water Assessments and Makeup Water
17 Assessments for the prior Year shall be due and payable on July 1.

18 7. Delinquency of Assessments. Any assessment payable
19 pursuant to this Judgment shall be deemed delinquent: i) if paid in
20 Person, if not paid within five (5) days of the date due; ii) if
21 paid by electronic funds transfer, if not paid within three (3)
22 banking days of the date due; or iii) if paid by any other means,
23 if not paid within ten (10) days of the date due. "Payment" shall
24 occur when good and sufficient funds have been received by the
25 Watermaster. Any assessment shall also be deemed delinquent in the
26 event that any attempted payment is by funds that are not good and
27 sufficient.

28

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT E

LIST OF PRODUCERS AND THEIR DESIGNEES

EXHIBIT E

PRODUCER

ABBOND, EDWARD & GRACE
ABBOTT, LEONARD C
ABSHIRE, DAVID V
ADELANTO, CITY OF
ADELANTO, CITY OF/GEORGE AFB
AEROCHEM, INC
AGCON, INC
AGCON, INC.
AGUAYO, JEANETTE L.
AKE, CHARLES J & MARJORIE M
ANDERSON, ROSS C & BETTY J
ANGERER, ROBERT J & PEGGY
ANTELOPE VALLEY DAIRY
APPLE VALLEY COUNTRY CLUB
APPLE VALLEY DEVELOPMENT
APPLE VALLEY FOOTHILL CO WATER
APPLE VALLEY HEIGHTS CO. WATER
APPLE VALLEY RANCHOS WATER
APPLE VALLEY REC. & PARKS
APPLE VALLEY VIEW MUTUAL WATER CO.
APPLE VALLEY, TOWN OF
ARC LAS FLORES
ARGUELLES, ALFREDO
ATCHISON, TOPEKA, SANTA FE
ATCHISON, TOPEKA, SANTA FE
AVDEEF, THOMAS & LUCILLE
AZTEC FARM DEVELOPMENT CO
BACA, ENRIQUE
BAGLEY, ROY
BALDERRAMA, ALFRED & LINDA
BALDY MESA WATER DISTRICT

DESIGNEE

Same
Therese E. Parker, Esq.
Same
Michael B. Jackson, Esq.

James Heiser, Esq.
Robert E. Hove
Robert E. Hove
Same
Same
Same
Same
Dick Van Dam
Terry Caldwell, Esq.
Same
Doreen Ryssel
Elizabeth Hanna, Esq.
Fredric Fudacz, Esq.
Elizabeth Hanna, Esq.
Joseph Saltmeris, Esq.
Sandra Dunn, Esq.
William De Wolfe, Esq.
Therese Parker, Esq.
Curtis Ballantyne, Esq.
Curtis Ballantyne, Esq.
Same
Al Jackson
Same
Same
Same
William Smillie

PRODUCER

BALL, DAVID P
BAR H MUTUAL WATER COMPANY
BARAK, RICHARD
BARBER, JAMES B
BARNES, FAY
BARSTOW CALICO K O A
BASS, NEWTON T
BASTIANON, REMO
BASURA, STEVE
BAUR, KARL & RITA
BEDINGFIELD, LYNDELL&CHARLENE
BEINSCHROTH, A J
BELL, CHUCK
BENTON, PHILIP G
BORGOGNO, STEVEN & LILLIAN
BOWMAN, EDWIN L
 YCE, KENNETH & WILLA
BROMMER, MARVIN
BROWN, BOBBY G & VALERIA R
BROWN, DOUG & SUE
BROWN, RONALD A
BROWY, ORVILLE & LOUISE
BRUINS, NICHOLAS
BURNS, BOBBY J & EVELYN J
BURNS, RITA J & PAMELA E
BURNS, ANNIE L
CALICO LAKES HOMEOWNERS
CALIF DEPT OF TRANSPORTATION
CAMPBELL, M A & DIANNE
CARDOZO, MANUEL & MARIA
CARTER, JOHN THOMAS
CASA COLINA FOUNDATION
CDFG - CAMP CADY

DESIGNEE

Same
Paul Nelson, President
Therese Parker, Esq.
Same
Kirtland Mahlum, Esq.
Robert L. Moore
Barbara Davisson, Business Manager
Same
Same
Same
Same
Same
Therese Parker, Esq.
Same
Therese Parker, Esq.
Same
Same
Billy Wyckoff
Alexander De Vorkin, Esq.
Same
Robert Dougherty, Esq.
Therese Parker, Esq.
Charles E. Schwartz
Marilyn Levin, Esq.

PRODUCER

CDFG - MOJAVE NARROWS REG.
CDFG - MOJAVE RIVER FISH
CENTER WATER CO
CHAFA, LARRY R
CHAMISAL MUTUAL
CHANG, TIMOTHY & JANE
CHASTAIN, W C
CHEYENNE LAKE, INC
CHIAO MEI DEVELOPMENT
CHO BROTHERS RANCH
CHOI, YONG IL & JOUNG AE
CHRISTISON, JOEL
CHUANG, MARSHAL
CLARK, KENNETH R
CLEAR VIEW FARMS
CLUB VIEW PARTNERS
CONNER, WILLIAM H
COOK, KWON W
COOL WATER RANCH
COPELAND, ETAL
CRAMER, MARGARET MUIR
CROSS, LAWRENCE E & SHARON I
CRYSTAL HILLS WATER COMPANY
CRYSTAL LAKES PROPERTY OWNERS
CUNNINGHAM, WILLIAM
DAGGETT COMMUNITY SERVICES
DAHLQUIST, GEORGE R
DALJO CORPORATION
DAVIS, Paul
DAVIS, RONALD & DONNA
DEJONG, ALAN L
DELPERDANG, ROBERT H
DENNISON, QUENTIN c/o Clegg, Frizell & Joke

DESIGNEE

Marilyn Levin, Esq.
Marilyn Levin, Esq.
Morgan Daniels
Same
Earl D. McCool
Same
Same
Michael Hayes
Maple Sia
Chung Cho Gong
Same
Same
Therese Parker, Esq.
Same
Terry Caldwell, Esq.
Manoucher Sarbaz
Same
Same
Paul Henderson, Esq.
Don W. Little
Terry Caldwell, Esq.
Same
Same
Russell Khouri
Same
Lawrence Alf, CSD Chairman
Therese Parker, Esq.
George Rubsch
Same
Same
Therese Parker, Esq.
Same
Same

JUCER

DESERT DAWN MUTUAL WATER COMPANY
DESERT LAKES CORPORATION - (LAKE DOLORES)
DESERT COMMUNITY BANK
DEVRIES, NEIL
DEXTER, CLAIR F
DEXTER, J P
DIBERNARDO, JOHN
DOCIMO, DONALD P & PATRICIA J
DOLCH, ROBERT & JUDY
DOMBROWSKI, MICHAEL W & SUSAN M
DONALDSON, JERRY & BEVERLY
DOSSEY, D A
DOWSE, PHILIP
DURAN, FRANK T
ELLISON, SUSAN
EVENSON, EDWIN H & JOYCELAINE
HANIAN, JAMES H & PHYLLIA
FAWCETT, EDWARD C
FELIX, ALAN E & CAROL L
FERRO, DENNIS & NORMA
FISHER, DR DOLORES
FISHER, JEROME
FITZWATER, R E
FRIEND, JOSEPH & DEBORAH
FUNDAMENTAL CHRISTIAN ENDEAVOR
GAETA, TRINIDAD C/O BLUE BEAD FARMS
GAINES, JACK & MARY
GARCIA, DANIEL
GARCIA, SONIA L
GAYJIKIAN, SAMUEL & HAZEL
GESIRIECH, WAYNE
GILBERT, HERBERT & BERNICE
GOLD, HAROLD

DESIGNEE

Same
Terry Christianson
Same
Robert Dougherty, Esq.
Same
Same
Same
Terry Caldwell, Esq.
Same
Same
Same
Same
Therese Parker, Esq.
Same
Same
Same
Same
Same
Same
Same
Same
Same
Robert Dougherty, Esq.
Same
Betty Brock
Therese Parker, Esq.
Same
Same
Same
Same
Therese Parker, Esq.
Same
Therese Parker, Esq.

PRODUCER

GOMEZ, CIRIL - LIVING TRUST
GORMAN, VIRGIL
GRACETOWN INVESTMENT CO - JETCO PROP FUND
GRAVES, CHESTER B
GREEN ACRES ESTATES
GRIEDER, RAYMOND H & DORISANNE
GRILL, NICHOLAS P & MILLIE D
GROEN, CORNELIUS
GUBLER, HANS
GULBRANSON, MERLIN
HAIGH, WHILLDYN & MARGARET
HAL-DOR LTD
HALL, LARRY
HANDLEY, DON R & MARY ANN
HANIFY, DBA - WHITE BEAR RANCH
HARALIK, BESS & ROBERT
HARDESTY, LESLIE E & BECKY J
HARESON, NICHOLAS & MARY
HARPER LAKE CO;UC OPERATING/HARPER DRY LAKE
HART, MERRILL W
HARTER FARMS
HARTER, JOE & SUE
HARTLEY, LONNIE
HARVEY, FRANK
HELENDALE SCHOOL DISTRICT
HENDLEY, RICK & BARBARA
HERT, SCOTT
HESPERIA GOLF AND COUNTRY CLUB
HESPERIA WATER DISTRICT
HI DESERT MUTUAL WATER CO
HI-GRADE MATERIALS
HI-GRADE MATERIALS CO.
HIETT, HARRY L & PATRICIA J

DESIGNEE

Therese Parker, Esq.
Robert Dougherty, Esq.
Same
Same
Susan Zutavern
Same
Therese Parker, Esq.
Robert Dougherty, Esq.
Same
Therese Parker, Esq.
Same
Russ Jones, Owner
Same
Same
Same
Same
Same
David J. Cooper, Esq.
Same
Richard Slivikin, Esq.
Richard Slivikin, Esq.
Same
Same
Patricia Bristol
Same
Therese Parker, Esq.
Michael Davis, Esq.
James Markman, Esq.
Stanley Derryberry
Robert E. Hove
Robert E. Hove
Same

DUCER

HILARIDES, FRANK
HILEMAN, KATHERINE
HILL, MELVIN
HITCHIN LUCERNE, INC
HODGE, STANLEY W
HOLLISTER, ROBERT H & RUTH M
HOLWAY, ROBERT
HONG, PAUL B & MAY
HORTON'S CHILDREN'S TRUST
HORTON, JOHN MD
HOSKING, JOHN W & JEAN
HOY, MIKE
HRUBIK, THOMAS A
HUBBARD, ESTER & MIZUNO, ARLEAN
HUNT, RALPH M & LILLIAN F
HUTCHISON, WILLIAM O
TT, JAMES & BRENDA
INDUSTRIAL ASPHALT
IRVIN, BERTRAND W
JACKSON, RAY
JAMS RANCH
JESS RANCH WATER COMPANY
JOHNSON, JAMES R
JOHNSON, LARRY & CARLEAN
JOHNSON, RONALD
JOHNSTON, HARRIET AND LARRY W
JORDAN, RAYMOND
JUBILEE MUTUAL WATER COMPANY
JUNIPER RIVIERA COUNTY WATER DISTRICT
JUSTICE, CHRIS
JUSTICE, CHRIS
J V A AIR INC
KAPLAN, ABRAHAM M

DESIGNEE

Same
Same
Therese Parker, Esq.
Same
Same
Same
Same
Same
Same
John W. Horton, M.D.
Same
Same
Therese Parker, Esq.
Dan McKinney, Esq.
Same
Same
Same
Same
Martha Guy, Esq.
Same
Same
Melvin Finklestein
Calvin House, Esq.
Same
Same
Same
Same
Same
Ray Clark
William Smillie
Same
Same
Jim Anders
Same

PRODUCER

KASNER, ROBERT
KATCHER, AUGUST M & MARCELINE
KEMP, ROBERT & ROSE
KEMPER CAMPBELL RANCH
KIEL, MARY
KIM, JOON HO
KING, GENEVIEVE E
KOSHAREK, JOHN & JOANN
LAKE ARROWHEAD COMMUNITY SERVICES DISTRICT
LAKE JODIE PROPERTY OWNERS ASSOCIATION
LAKE WAIKIKI
LAKE WAINANI OWNERS ASSOCIATION
LANGLEY, MICHAEL R & SHARON
LAWRENCE, WILLIAM W
LAWSON, ERNEST & BARBARA
LEE, DOO HWAN
LEE, MOON & OKBEA
LEE, SEPOONG ETAL & WOO POONG
LEE PHD, VIN JANG T C/O ARCHIBEK, ERIC&SANDI
LENHERT, RONALD & TONI
LESHIN, CONNIE & SOL
LESHIN, SOL
LEVINE, DR LESLIE
LEWIS HOMES OF CALIFORNIA
LEYERLY, GENEVA
LEYERLY, RICHARD
LINT, GORDON
LONG, BALLARD
LONGMAN, JACK
LOPEZ, BALTAZAR
LOUNSBURY, J PETER & CAROLYN
LOW, ROBERT
LUA, ANTONIO

DESIGNEE

Same
Same
Same
Steve Abbott
Same
Same
Same
Same
Steve Abbott, Esq.
Same
Virginia Cahill, Esq.
Same
Therese Parker, Esq.
Kenneth P. Corhan, Esq.
Robert Dougherty, Esq.
Robert Dougherty, Esq.
Same
Same
Same
Same
Therese Parker, Esq.
Same
Same

PRODUCER

MOST, MILTON W
MULLIGAN, ROBERT & INEZ
MURPHY, BERNARD H
MURPHY, BERNARD TRUST
MURPHY, KENNETH
MUTUAL FUNDING CORP
NAVAJO MUTUAL WATER CO
NELSON, MILDRED L
NEWBERRY COMMUNITY SERVICE DIST
NEWBERRY SPRINGS COMPANY
NUNN, DONALD & PEARL
NU VIEW DEVELOPMENT, INC
O'BRYANT, ROBERT C & BARBARA
O F D L INC
OHAI, REYNOLDS & DOROTHY
O'KEEFE, SARAH-LEE & JOKE E
ORMSBY, HARRY G
OROPEZA, JOSE M
OSTERKAMP, GEROLD
OWL ROCK PRODUCTS COMPANY
P & H ENGINEERING & DEV CORP
PALISADES RANCH
PARK, CHANHO
PARK, HEA JA & JEONG IL
PARKER, DAVID E
PARKER, GEORGE R
PATHFINDER INVESTORS
PAYAN, PAUL
PEARL, ALICE
BORUFF, PAUL & LINDA; PEARSON, DERYL B
PEREZ, EVA
PERKO, BERT K
PERRY, THOMAS A

DESIGNEE

Therese Parker, Esq.
Same
Same
Same
Same
Ron Yee-Dong, President
James Hanson
Same
Vicki Morris
Ed Dygert, Esq.
Paul Henderson, Esq.
Richard Slivkin, Esq.
Same
Virginia Cahill, Esq.
Same
Same
Same
Same
Robert Dougherty, Esq.
Vince Dommarito, Area Manager
Same
Robert Dougherty, Esq.
Same
Same
Same
Therese Parker, Esq.
Same
Same
Same
Same
Therese Parker, Esq.
Same
Same

DUCER

PETTIGREW, DAN
PETTIGREW, HOWARD L
PETTIS FAMILY TRUST
P G & E
PHENIX PROPERTIES LTD
PITTMAN, LEROY W
PITTS, JOE & STELLA
PLUESS-STAUFER CALIFORNIA INC
POHL, ANDREAS & CATHLYN
POLAND, JOHN R & SANDRA M
POLICH, LEE & DONNA
PRICE, ALAN E
PRICE, DONALD & RUTH
PUCKHABER TRUST, WILLIAM F
PURCIO, THOMAS F & PATRICIA A
RANCHERITOS MUTUAL WATER CO
DOLPH, JOAN E
REDDY, BOMMI V & KARUNA V
REED, MIKE
REEVES, RICHARD
RESSEQUE, JOHN & BILL
RICE, DANIEL & MARY
RICE, HENRY C & DIANA
RIEGER, WALTER M
RIKUO CORPORATION
RIVERSIDE CEMENT CO - ORO GRANDE PLANT
ROGERS, ROY
ROGERS, ROY (ORO GRANDE RANCH)
ROSSI, JAMES L & NAOMI I
ROTEX CONSTRUCTION COMPANY
ROWLAND, JAMES & HELEN
RUDMAN, ROBERT T
RUE RANCH

DESIGNEE

Therese Parker, Esq.
Therese Parker, Esq.
Therese Parker, Esq.
Robert Rickett, Esq.
Elizabeth Taylor, Manager
Same
Same
David Aladjem, Esq.
Same
Same
Same
Same
Same
Same
Same
Same
Therese Parker, Esq.
Same
Same
Same
Same
Same
Same
Same
Same
Joseph Deering, Jr., Esq.
Warren P. Felger, Esq.
Terry Caldwell, Esq.
Terry Caldwell, Esq.
Same
Yong Cho
Same
Terry Caldwell, Esq.
Joe Zack Feltz, President

PRODUCER

RUISCH, DALE W
SAN BERNARDINO CSA #29
SAN BERNARDINO CSA #42
SAN BERNARDINO CSA #64
SAN BERNARDINO CSA #70C
SAN BERNARDINO CSA #70G
SAN BERNARDINO CSA #70J
SAN BERNARDINO CSA #70L
SAN BERNARDINO CO. BARSTOW-DAGGETT AIRPORT
SAN FILIPPO, JOSEPH & SHELLEY
SANTUCCI, ANTONIO & WILSA
SAN BERNARDINO CSA #70L
SCOGGINS, JERRY
SEALS, LAWRENCE
SHEPPARD, THOMAS & GLORIA
SHIRKEY, ALAN G & MARY E
SHORT, CHARLES & MARGARET
SHORT, JEFF
SILVER LAKES ASSOCIATION
SILVER VALLEY RANCH, INC
SMITH, ROBERT A
SMITH, WILLIAM E
SNYDER, KRYL K & ROUTH, RICHARD J
SON'S RANCH
SOPPELAND, WAYNE
SOUTHERN CALIFORNIA EDISON CO - AGRICULTURE
SOUTHERN CALIFORNIA EDISON CO - INDUSTRIAL
SOUTHERN CALIFORNIA GAS COMPANY
SOUTHERN CALIFORNIA WATER CO
SOUTHDOWN, INC.
SOUTHERN CALIFORNIA WATER CO
SOUTHERN CALIFORNIA WATER CO
SPECIALTY MINERALS, INC

DESIGNEE

Same
William Smillie
Same
Same
William Smillie
Same
Same
Same
Same
Therese Parker, Esq.
Same
Michael Davis, Esq.
Richard A. Ruben, Esq.
Therese Parker, Esq.
Same
Terry Caldwell, Esq.
Therese Parker, Esq.
Terry Caldwell, Esq.
Douglas Ditonto, Esq.
Douglas Ditonto, Esq.
Jane Goichman, Esq.
Arthur Kidman, Esq.
Steve Abbott, Esq.
Arthur Kidman, Esq.
Arthur Kidman, Esq.
Michael Davis

PUCER

SPILLMAN, JAMES R & NANCY J
SPINK, WALTHALL
SPRING VALLEY LAKE ASSOCIATION
SPRING VALLEY LAKE COUNTRY CLUB
ST ANTHONY COPTIC ORTHODOX MONASTERY
DONALD B ST CHARLES, ATTY AT LAW
STEWART WATER COMPANY
STEWART, STANLEY & PATRICIA
STORM, RANDALL
STRINGER, W EDWARD
SUDMEIER, GLENN W
SUGA, TAKEAKI
SUMMIT VALLEY RANCH
SUNDOWN LAKES, INC
SUN & SKY COUNTRY CLUB
SWARTZ, ROBERT & IRENE
LAKSON, WILLIAM V & ELIZABETH A
TAPIE, RAYMOND & MURIEL
TATUM, JAMES B
TATRO, RICHARD K. & SANDRA A.
TAYLOR, ALLEN C / HAYMAKER RANCH
TAYLOR, TOM
THAYER, SHARON
THE 160 NEWBERRY RANCH CALIFORNIA, LTD
THE CUSHENBURY TRUST, C/O SPECIALTY MINERALS
THOMAS FARMS
THOMAS, WALTER
THOMPSON, JAMES A
THOMPSON, RODGER
THORESON, ROBERT F & A KATHLEEN
THRASHER, GARY
THUNDERBIRD COUNTY WATER DISTRICT
TILLEMA, HAROLD

DESIGNEE

Same
Same
Thomas Bunn, III, Esq.
Richard Opper, Esq.
Mike Stiller, Esq/Karas (Bishop)
Same
Isidro Baca
Therese Parker, Esq.
Same
Therese Parker, Esq.
Same
Same
Michael Davis, Esq.
Thomas Hargraves
Everett Hughes
Same
Same
Same
Same
Same
Therese Parker, Esq.
Same
Therese Parker, Esq.
Michael Davis, Esq.
Therese Parker, Esq.
Same
Therese Parker, Esq.
Same
Same
Same
Same
Peter Taylor, General Manager
Same

PRODUCER

TRIPLE H PARTNERSHIP
TROEGER FAMILY TRUST, RICHARD H
TURNER, LOYD & CAROL
TURNER, ROBERT
UNION PACIFIC RAILROAD COMPANY
VAIL, JOSEPH B & PAULA E
VAN BASTELAAR, ALPHONSE
VAN DAM BROTHERS
VAN DAM, ELDERT & SUSAN
VAN DIEST, CORNELIUS
VAN LEEUWEN FAMILY TRUST
VAN LEEUWEN, JOHN
VAN VLIET, HENDRIKA
VANDER DUSSEN, ED
VANHOY, LUTHER C & ROBERTA L
VANNI, MIKE
VAN BURGER, CARL c\o CVB INVESTMENT
VAUGHT, ROBERT E. & KAREN M.
VERNOLA, PAT
VERNOLA, PAT
VICTOR VALLEY COMMUNITY COLLEGE DIST
VICTOR VALLEY WATER DISTRICT
VICTORVILLE, CITY OF
VISOSKY JR, JOSEPH F
VISSER, ANNIE
VOGLER, ALBERT H
WACKEEN, CAESAR
WAKULA, JOHN & HELEN
WARD, KEN & BARBARA
WARD, RONNY H
WEBER, DAVE
WEBER, F R & JUNELL
WEBSTER, THOMAS M & PATRICIA J

DESIGNEE

Ronald A. Van Blarcom, Esq.
Rollin N. Rauschl, Esq.
Same
Same
Jim Barclay
Same
Same
Same
Same
Therese Parker, Esq.
Therese Parker, Esq.
Robert Dougherty, Esq.
Robert Dougherty, Esq.
Steve Tyler, Esq.
Same
Tom O'Donnell
Same
Same
Robert Dougherty, Esq.
Robert Dougherty, Esq.
W. W. Miller, Esq.
Thomas McGuire, Esq.
Thomas McGuire, Esq.
Same
Same
Therese Parker, Esq.
Jack W. Evarone, Esq.
Same
Same
Same
Same
Same

PRODUCER

WEIDKNECHT, ARTHUR J & PEGGY A
WEISER, SIDNEY & RAQUEL
WEST, CAROLYN & SMITH, RICHARD
WEST, HOWARD & SUZY
WESTERN HORIZON ASSOCIATES INC
WESTERN ROCK PRODUCTS
WET SET, INC
WHITTINGHAM, RICHARD V
WILLOW WELLS MUTUAL WATER COMPANY
WITTE, E DANIEL & MARCIA
WLSR INC
WOO, CHEN C/O ASTER DUCK CO
WORSEY, JOSEPH A & REVAE
YANG, YOUNG MO
YARD, WILLIAM & BETTY
YEAGER, E L - CONSTRUCTION COMPANY INC
SRMO WATER COMPANY
YKEMA HARMSSEN DAIRY
YKEMA TRUST
YOUNG, KEITH O - (DESERT TURF)

DESIGNEE

Same
Same
Same
Same
Ernest Leff, Esq.
Kathleen Daprato
Thomas Ferruzzo, Esq.
Same
Richard A. Joh
Same
Steve Winfield
Same
Same
Same
Same
Roger Luebs, Esq.
Donald Walker
Therese Parker, Esq.
Therese Parker, Esq.
Therese Parker, Esq.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT F
TRANSFERS OF BASE ANNUAL PRODUCTION RIGHTS.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT F
TRANSFERS OF
BASE ANNUAL PRODUCTION RIGHTS

1. Transferability. Any Base Annual Production Right, including any Carryover Right (Right) or any portion thereof may be sold, assigned, transferred, licensed or leased subject to the rules set forth in this Exhibit "F".

2. Consumptive Use Adjustments. A transferred Right shall be adjusted so as not to cause an increased Consumptive Use of water. For either inter Subarea or intra Subarea transfers, if the transferee's Consumptive Use of water Produced under the transferred Right would be at a higher rate than that of transferor, the transferred Right shall be reduced by Watermaster to a level that equalizes the Consumptive Use to that of transferor. Any such adjustments by Watermaster shall be made using the following Consumptive Use rates. If a transfer would cause the same or a decreased Consumptive Use, no adjustment shall be made.

Type of Water Use	Consumptive Use Rate
Municipal	50%
Irrigation	50%
Industrial	case by case
Lakes or Aquaculture	surface acres x 7 ft.

For mixed or sequential uses of water excluding direct reuse of municipal wastewater, the total acre-feet of Consumptive Use shall be the sum of Consumptive Uses for each use.

1 3. Notice to Watermaster. No transfer shall become operable
2 until the Parties to the transfer have jointly notified Watermaster
3 of the terms and conditions of the transfer, the price to be paid
4 by the transferee, the name of the Responsible Party and the name
5 of the Person who will pay any applicable Assessments. Intra-
6 Subarea transfers shall not require Watermaster authorization after
7 giving notice. No inter-Subarea transfer shall become operable
8 until authorized by Watermaster after giving notice. Watermaster
9 shall authorize such transfers in the order of the date of notice,
10 provided that funds are available as set forth in Paragraph 4 of
11 this Exhibit "F".

12 4. Inter Subarea Transfers of Rights. A Party's Right in a
13 (Source) Subarea may be transferred (by lease only) to a Party in
14 another (Use) Subarea provided that in any Year the resulting
15 unconsumed water in the Source Subarea due to all such transfers
16 shall not be greater than the Replacement Water requirement of the
17 Source Subarea in the preceding Year. Watermaster shall replace
18 the resulting Consumptive Use in the Use Subarea that is
19 attributable to the transfer, utilizing Replacement Water
20 Assessments from the Source Subarea.

21 5. Transfers to Meet Replacement Water or Makeup Water
22 Obligations. Watermaster may use Assessment proceeds to purchase
23 or lease Rights in a Subarea in order to obtain water to meet an
24 Obligation. The water so obtained shall be equal to the
25 Consumptive Use portion of the transferred and unproduced Rights.
26 No such purchases of leases of Rights in the Harper Lake Basin may
27 be used to satisfy Obligations in other parts of the Centro
28 Subarea.

1 6. Inter Subarea Transfers of Water. Water Produced in one
2 (source) Subarea and exported to another Subarea for use or
3 disposal shall bear a Replacement Water Obligation equal to the sum
4 of the Production in excess of the Producer's share of the Free
5 Production Allowance in the source Subarea plus the amount of water
6 exported that would normally have been returned to the source
7 Subarea. Such exported water shall be credited to the appropriate
8 Subarea Obligation unless it has been purchased or leased as
9 Replacement Water pursuant to a transfer agreement.

10 7. Verde Ranch Producers. Together the Spring Valley Lake
11 Country Club ("the Country Club"), the Spring Valley Lake
12 Association ("the Association"), the California Department of Fish
13 and Game (DFG) Mojave Narrows Regional Park ("the Park") the Kemper
14 Campbell Ranch ("the Ranch") comprise a group herein called the
15 Verde Ranch Producers. Each Verde Ranch Producer has the ability
16 physically both to Produce Groundwater and to Produce water that
17 originated as tailwater flowing from the DFG Mojave River Fish
18 Hatchery. DFG Producer Groundwater to supply the Hatchery, and
19 Hatchery tailwater can be discharged in part or entirely to the
20 Mojave River or in part or entirely to a lined channel that conveys
21 tailwater to points where the Verde Ranch Producers can Produce it.
22 The present flow regimen is as follows: Hatchery Production flows
23 through the Hatchery and is then discharged to the River and/or the
24 lined channel. Water discharged to the lined channel flows to a
25 Country Club lake. The Country Club Produces Groundwater that is
26 discharged to the Country Club lake. The Country Club property is
27 irrigated by pumping from the Country Club lake. Water overflowing
28 from the Country Club lake flows through a lined channel and

1 through other Country Club lakes, and finally is discharged to
2 Spring Valley Lake. The Association Produces Groundwater that is
3 discharged to Spring Valley Lake. Water overflowing from Spring
4 Valley Lake flows to lakes in the Park. The Park Produces
5 Groundwater that is discharged to the lakes in the Park. The Park
6 also Produces Groundwater that is used directly for irrigation of
7 the Park. The Park is also irrigated by pumping from the lakes in
8 the Park. Water overflowing from the lakes in the Park is
9 discharged to the Mojave River. Some water from the lakes in the
10 Park also flows to a lake on the Ranch. The Ranch also Produces
11 Groundwater. The Ranch is irrigated from the lake on the Ranch.
12 No water flows on the surface from the Ranch property to the Mojave
13 River.

14 In order to continue the present arrangements among the
15 Hatchery and the Verde Ranch Producers while assuring that they
16 participate fairly in the Physical Solution the following rules
17 shall apply:

18 a. Total Production by the Country Club will be
19 calculated as the sum of Country Club Groundwater Production plus
20 inflow of Hatchery tailwater minus outflow to Spring Valley Lake.
21 The Country Club shall monitor and report to Watermaster the
22 amounts of such Groundwater Production, inflow and outflow.

23 b. Total Production by the Association will be
24 calculated as the sum of Association Groundwater Production plus
25 inflow from the Country Club minus outflow to the Park. The
26 Association shall monitor and report to Watermaster the amounts of
27 such Groundwater Production, inflow and outflow.

28

1 c. Total Production by the Park will be calculated as
2 the sum of Park Groundwater Production plus inflow from the
3 Association minus outflow to the Ranch minus outflow to the Mojave
4 River. The Park shall monitor and report to Watermaster as to such
5 Groundwater Production, inflow and outflows.

6 d. Total Production by the Ranch will be calculated as
7 the sum of Ranch Groundwater Production plus inflow from the Park.
8 The Ranch shall monitor and report to Watermaster the amounts of
9 such Groundwater Production and inflow.

10 e. Hatchery Production up to 10,678 acre-feet per Year
11 will be permitted free of any Assessments against the Hatchery.
12 The Hatchery shall monitor and report to Watermaster its
13 Groundwater Production and the amounts of tailwater discharged to
14 the River and to the artificial channel. In any Year the Hatchery
15 may Produce more than 10,678 acre-feet free of any Assessments
16 against the Hatchery, provided such Production in excess of 10,678
17 acre-feet is reported as Groundwater Production by one or more of
18 the Verde Ranch Producers in the same Year pursuant to operating
19 agreements by and between the Hatchery and such Producer(s) filed
20 with the Watermaster. The operating agreement shall specify the
21 responsibility for payment of assessments. In the operating
22 agreement, the Verde Ranch Producers may elect to have assessments
23 be based on the aggregate Production of the Verde Ranch Producers,
24 and may freely transfer Base Annual Production Rights internally,
25 provided that the aggregate consumptive use of the Verde Ranch
26 Producers shall not be increased. In the absence of such operating
27 agreements, or if the operating agreements do not otherwise
28 allocate responsibility for payment of Assessments, the Hatchery

1 shall be liable for Administrative, Replacement Water and
2 Biological Resource Assessments on the amount of water Produced by
3 the Hatchery in excess of 10,678 acre-feet in any Year. In the
4 event that Verde Ranch Producer who is allocated responsibility for
5 payment of Assessments pursuant to an operating agreement is
6 delinquent in making any such payment, the Hatchery shall not be
7 liable therefor.

8 f. In any Year, if the total discharge to the River
9 from the Hatchery and the Verde Ranch Producers exceeds the
10 Groundwater Production by the Hatchery, such excess discharge shall
11 be subject to Administrative, Replacement Water and, except for the
12 Park, Biological Resource Assessments. Such Assessments shall be
13 levied against individual Verde Ranch Producers in proportion to
14 the extent that outflow from each Producer exceeds inflow to that
15 Producer.

16 g. The Hatchery and the Verde Ranch Producers shall
17 install all stage recorders, meters or other measuring devices
18 necessary to determine inflows, outflows and Production that they
19 are responsible for monitoring and reporting to Watermaster. Such
20 stage recorders, meters or other measuring devices shall be
21 installed, calibrated and operated in manner satisfactory to
22 Watermaster.

23 h. Any change in the flow regimen described above will
24 be subject to the same general rules set forth in this Paragraph 7.
25 Any such change shall be reported to Watermaster in advance.

26 8. Harper Lake Basin. No Producer in the Harper Lake Basin
27 may transfer any Base Annual Production Right or any portion
28 thereof to Producers outside of Harper Lake Basin except by

1 physically conveying the water in compliance with the rules set
2 forth in this Exhibit "F".

3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT G

SUBAREA OBLIGATIONS

1 e. Alto Subarea Producers--an average Annual combined
2 Subsurface Flow and Base Flow of 23,000 acre-feet per Year to the
3 Transition Zone. For the purposes of Paragraph 6 of this Exhibit
4 G, the Subsurface Flow component shall be deemed to be 2,000 acre-
5 feet per Year. In any Year Alto Subarea Producers shall have an
6 obligation to provide to the Transition Zone a minimum combined
7 Subsurface Flow and Base Flow as follows:

8 i. If the accounting pursuant to Paragraph 5, below,
9 reflects a net cumulative credit at the beginning of the Year,
10 the combined minimum flow obligation shall be 18,400 acre-feet
11 minus any net cumulative credit, but shall be not less than
12 15,000 acre-feet.

13 ii. If the accounting pursuant to Paragraph 5, below,
14 does not reflect a net cumulative credit at the beginning of
15 the Year, the combined minimum flow obligation shall be 18,400
16 acre-feet plus one-third of any net cumulative debit plus any
17 additional amount of water required to reduce the net
18 cumulative debit to 23,000 acre-feet.

19 2. Obligation for Transition Zone Replacement Water.

20 a. Until the Court approves Groundwater levels to be
21 established and maintained pursuant to Subparagraph 2b of this
22 Exhibit, Watermaster shall provide Replacement Water in the
23 Transition Zone equal to Production in the Transition Zone that is
24 in excess of the Transition Zone Producers' share of the Alto
25 Subarea Free Production Allowance for that Year. All such
26 Replacement Water shall be provided as soon as practicable during
27 the next ensuing Year.

1 b. As soon as is practicable, the MWA shall establish
2 key wells to be used to monitor Groundwater levels in the
3 Transition Zone and, subject to approval by the Court, Watermaster
4 shall establish minimum water levels to be maintained in the key
5 wells.

6 c. After water level elevations have been established
7 pursuant to Subparagraph 2b of this Exhibit, Watermaster shall
8 provide Replacement Water in the Transition Zone as necessary to
9 maintain the minimum water levels. Water purchased with
10 Replacement Water Assessments paid by Producers in the Transition
11 Zone in excess of the quantity of water needed to maintain said
12 water levels shall be provided elsewhere in the Alto Subarea.

13 3. Other Water. "Other Water" that may be credited to a
14 Subarea Obligation may include water conveyed and discharged across
15 a boundary or Free Production Allowance water that is not Produced.
16 Water other than Base Flow, Subsurface Flow or Storm Flow that is
17 conveyed and discharged across a boundary between Subareas other
18 than pursuant to a transfer agreement, shall be credited or
19 debited, as appropriate, to the pertinent Subarea Obligation during
20 the Year in which it is so conveyed and discharged. Any portion of
21 the Subarea's Free Production Allowance that is allowed to remain
22 unproduced in a Subarea pursuant to transfer agreements in order to
23 satisfy a Subarea Obligation shall be credited to the pertinent
24 Subarea Obligation in accordance with the terms of the transfer
25 agreements.

26 4. Makeup Water. Assessments for Makeup Water shall be paid
27 in accordance with the time schedule set forth in Exhibit D.
28

1 Makeup Water shall be credited to the Subarea Obligation at the end
2 of the Year in which the Makeup Water Assessment is paid.

3 5. Accounting. Watermaster shall Annually not later than
4 February 1 cause to be prepared a report of the status of each
5 Subarea Obligation as of the end of the prior Year. The report
6 shall set forth at least the following information for each Subarea
7 Obligation:

8 a. The cumulative total of the average Annual Subarea
9 Obligations since the Judgment was entered as of the beginning of
10 the prior Year;

11 b. The cumulative total of all water credited to the
12 Subarea Obligation since the Judgment was entered as of the
13 beginning of the prior Year;

14 c. The net cumulative credit or debit [the difference
15 between (a) and (b)] as of the beginning of the prior Year;

16 d. The amounts of water credited to the Subarea
17 Obligation during the prior Year including, as appropriate, Base
18 Flow, Subsurface Flow, Other Water and Makeup Water;

19 e. The cumulative total of the average Annual Subarea
20 Obligations as of the end of the prior Year;

21 f. The cumulative total of all water credited to the
22 Subarea Obligation as of the end of the prior Year;

23 g. The net cumulative credit or debit as of the end of
24 the prior Year;

25 h. Any Makeup Water Obligation;

26 i. The Minimum Subarea Obligation for the current Year.

27 6. Subsurface Flow Assumptions. Some Subarea Obligations
28 are expressed as average Annual or minimum Annual Subsurface Flow.

1 In all cases the Subsurface Flow obligations have been established
2 initially at amounts equal to the estimated historical average
3 Subsurface Flow across Subarea boundaries. Not later than two
4 Years following entry of this Judgment MWA shall begin to install
5 monitoring wells to be used to obtain data to enable improved
6 estimates of Subsurface Flow at each Subarea boundary where there
7 is a Subsurface Flow obligation and to develop methodology for
8 future determinations of actual Subsurface Flow. Not later than
9 ten years following entry of this Judgment Watermaster shall
10 prepare a report setting forth the results of the monitoring
11 program and the future methodology. Following opportunity for
12 review of Watermaster's report by all Parties, Watermaster shall
13 prepare a recommendation to the Court as to the likely accuracy of
14 the estimated historical Subsurface Flows and any revision of
15 Subarea Obligations that may be indicated. Pending Watermaster's
16 report to the Court, Subsurface Flows shall be assumed to be equal
17 to the Subsurface Flow obligations for purposed of accounting for
18 compliance therewith.

19 7. Example Calculation. Table G-1 sets forth an example of
20 Subarea Obligation accounting procedures using hypothetical flows.
21
22
23
24
25
26
27
28

TABLE G-1
 HYPOTHETICAL EXAMPLE
 ACCOUNTING FOR COMPLIANCE WITH SUBAREA OBLIGATIONS

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	
OBLIGATION OF SUBAREA A TO SUBAREA B											
AVERAGE ANNUAL:	23,000 AFA	(21,000 AFA)	BASEFLOW + 2,000 AFA	SUBSURFACE FLOW							
MINIMUM ANNUAL:	18,400 AFA + 1/3 OF ANY NET CUMULATIVE DEBIT;	OR 18,400 AFA - ANY NET CUMULATIVE CREDIT, BUT NOT LESS THAN 15,000 AFA									
STATUS AT BEGINNING OF YEAR	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	
CUMULATIVE OBLIGATION	0	23,000	46,000	69,000	92,000	115,000	138,000	161,000	184,000	207,000	
CUMULATIVE FLOW	0	17,000	32,600	50,000	69,067	87,067	107,111	139,978	168,378	198,978	
NET CUMULATIVE CREDIT (DEBIT)	0	(6,000)	(13,400)	(18,200)	(22,933)	(27,933)	(30,889)	(21,022)	(15,622)	(8,022)	
FLOW DURING THE YEAR (HYPOTHETICAL)											
BASE FLOW	8,800	5,000	4,000	4,000	2,000	2,000	15,000	18,000	20,000	23,000	
SUBSURFACE FLOW	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,800	
OTHER WATER	7,000	7,200	7,400	7,600	7,800	8,000	8,200	8,400	8,600	8,800	
MAKEUP WATER PURCHASED	0	1,400	4,000	4,667	6,200	8,044	7,667	0	0	0	
TOTAL FLOW	17,000	15,600	18,200	18,267	18,000	20,044	32,867	28,400	30,600	33,800	
MINIMUM OBLIGATION DURING THE YEAR	18,400	20,400	22,067	24,467	26,044	27,711	28,696	25,407	23,607	21,074	
MAKEUP OBLIGATION INCURRED	1,400	4,800	4,667	6,200	8,044	7,667	0	0	0	0	
STATUS AT END OF YEAR											
CUMULATIVE OBLIGATION	23,000	46,000	69,000	92,000	115,000	138,000	161,000	184,000	207,000	230,000	
CUMULATIVE FLOW	17,000	32,600	50,000	69,067	87,067	107,111	139,978	168,378	198,978	232,778	
NET CUMULATIVE CREDIT (DEBIT)	(6,000)	(13,400)	(18,200)	(22,933)	(27,933)	(30,889)	(21,022)	(15,622)	(8,022)	2,778	
FOLLOWING YEAR MINIMUM OBLIGATION											
18,400 + 1/3 OF NET CUM. DEBIT	20,400	22,067	24,467	26,044	27,711	28,696	25,407	23,607	21,074	0	
ADDITIONAL TO REDUCE DEBIT TO 23,000	0	0	0	0	0	0	0	0	0	0	
18,400 - CUM. CREDIT, BUT NOT 15,000	0	0	0	0	0	0	0	0	0	15,622	
MINIMUM OBLIGATION	20,400	22,067	24,467	26,044	27,711	28,696	25,407	23,607	21,074	15,622	

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

EXHIBIT H

BIOLOGICAL RESOURCE MITIGATION

1 Allowance, shall compare the Free Production Allowance with the
2 estimated Production Safe Yield. In the event the Free Production
3 Allowance exceeds the estimated Production Safe Yield by five
4 percent or more, Watermaster shall recommend a reduction of the
5 Free Production Allowance equal to a full five percent of the
6 aggregate Subarea Base Annual Production. In considering whether
7 to increase or decrease the Free Production Allowance in a Subarea,
8 Watermaster shall, among other factors, take into consideration for
9 the areas shown on Figure H-1 the Consumptive Use of water by
10 riparian habitat, the protection of public trust resources,
11 including the species listed in Table H-1 and the riparian habitat
12 areas shown on Figure H-1, and whether an increase would be
13 detrimental to the protection of public trust resources.

14 b. If, pursuant to Paragraph 27, Watermaster buys or
15 leases Free Production Allowance in the Baja Subarea below the
16 Calico-Newberry Fault to satisfy the need for Replacement Water,
17 priority shall be given to purchases or leases that will result in
18 reducing Production in or near the area described in Subparagraph
19 1(c) of this Exhibit.

20 c. Pursuant to Paragraph 2 of Exhibit "G", Watermaster
21 shall purchase Replacement Water to maintain Groundwater levels in
22 the Transition Zone.

23 3. Additional Protection Pursuant to Trust Fund Established
24 by Watermaster Using the Proceeds of Biological Resource
25 Assessments.

26 a. Watermaster shall establish a Biological Resources
27 Trust Fund account for the benefit of the riparian habitat areas
28 shown on Figure H-1 and the species listed on Table H-1. To

1 establish and maintain the Trust Fund Watermaster shall levy
2 against each acre-foot of Production within the Basin Area, other
3 than Production by the California Department of Fish and Game
4 (DFG), a Biological Resource Assessment of fifty cents (\$0.50)
5 (1993 dollars) to be collected at the same time and in the same
6 manner as the Administrative Assessment, except that no Biological
7 Resources Assessment shall be levied whenever the Trust Fund
8 account balance exceeds \$1,000,000 (1993 dollars).

9 b. Watermaster shall make funds held in the Biological
10 Resources Trust Fund available to DFG only in the event that
11 Groundwater levels are not maintained as set forth in Table H-2.
12 Watermaster shall take action to acknowledge any proposed
13 expenditure from the Biological Resources Trust Fund by DFG. Such
14 Watermaster action shall be subject to the review procedures set
15 forth in Paragraph 36 of the Judgment, provided that any motion
16 made pursuant thereto and any Court disapproval of such Watermaster
17 action and proposed DFG expenditure may be based only: 1) on the
18 ground that the Groundwater levels set forth in Table H-2 are being
19 maintained; and/or 2) the ground that the proposed expenditure is
20 not for any of the purposes set forth in Subparagraphs 3.b.(i),
21 (ii), or (iii) below in this Exhibit. The Biological Resources
22 Trust Fund may be used only for the following purposes and only in
23 the three areas identified on Figure H-1:

24 1. not to exceed \$100,000 for the preparation by DFG of
25 a DFG habitat water supply management plan, which plan shall
26 include the water needs of the species listed in Table H-1 and
27 the riparian habitat areas shown on Figure H-1.
28

1 ii. the purchase or lease by DFG of Supplemental Water
2 or the lease or purchase of DFG of Base Annual Production
3 Rights to be used to meet riparian habitat water needs of the
4 species listed in Table H-1 and the riparian habitat areas
5 shown on Figure H-1.

6 iii. the construction, repair and replacement of wells or
7 other facilities identified in the plan prepared pursuant to
8 Subparagraph (i), above, and/or any other measures necessary
9 to implement the plan.

10 DFG shall not prepare or make any expenditure from the trust fund
11 for the payment of administrative overhead or staff of DFG.

12 4. DFG agrees that absent substantial changed circumstances,
13 DFG shall not seek to modify the provisions of this Judgment in any
14 way to add to or change the above-stated measures to protect the
15 referenced species or habitat. Nothing stated in this Judgment or
16 in this Exhibit "H" is intended nor shall be deemed to relieve any
17 Party hereto from any obligation or obligations not specifically
18 referenced in this Exhibit H. Nothing in this Judgment or in this
19 Exhibit H is intended or shall be construed to be a waiver by the
20 State or any of its departments or agencies, including DFG, of its
21 rights and obligations under the common law, the public trust
22 doctrine, the constitution, statutes and regulations to preserve,
23 protect or enhance the natural resources of the State including
24 rare, threatened or endangered species or species of concern.

TABLE H-1

LIST OF SPECIES
(CONT'D)

SPECIES	ALTO			CENTRO			BAJA		
	Forks Dam to Upper Narrows	Upper Narrows to Lower Narrows	Lower Narrows to Helendale	Helendale to Hodge	Hodge to Barstow	Barstow to Harvard Road	Harvard Road to Mannix Wash	Afton Canyon	
Yellow Warbler	9								
Yellow-breasted Chat	8	8			8	8			
Summer Tanager	8	8						8	
Pale Big Eared Bat	8								
Mohave Ground Squirrel	4, 6		4, 6	4, 6					
Mohave Vole			6	6					
Nelson's Bighorn Sheep					10	10		10	
TOTAL NUMBER OF SPECIES = 30									
TOTAL NUMBER OF SPECIES IN EACH AREA:	25	11	7	8	7	8	3	5	

- 1 = Federally Endangered
- 2 = Federally Threatened
- 3 = State Endangered
- 4 = State Threatened
- 5 = Federal Category: 1
- 6 = Federal Category: 2
- 7 = Federal Category: 3b
- 8 = State: Special Concern
- 9 = State: Sensitive
- 10 = State: Fully Protected

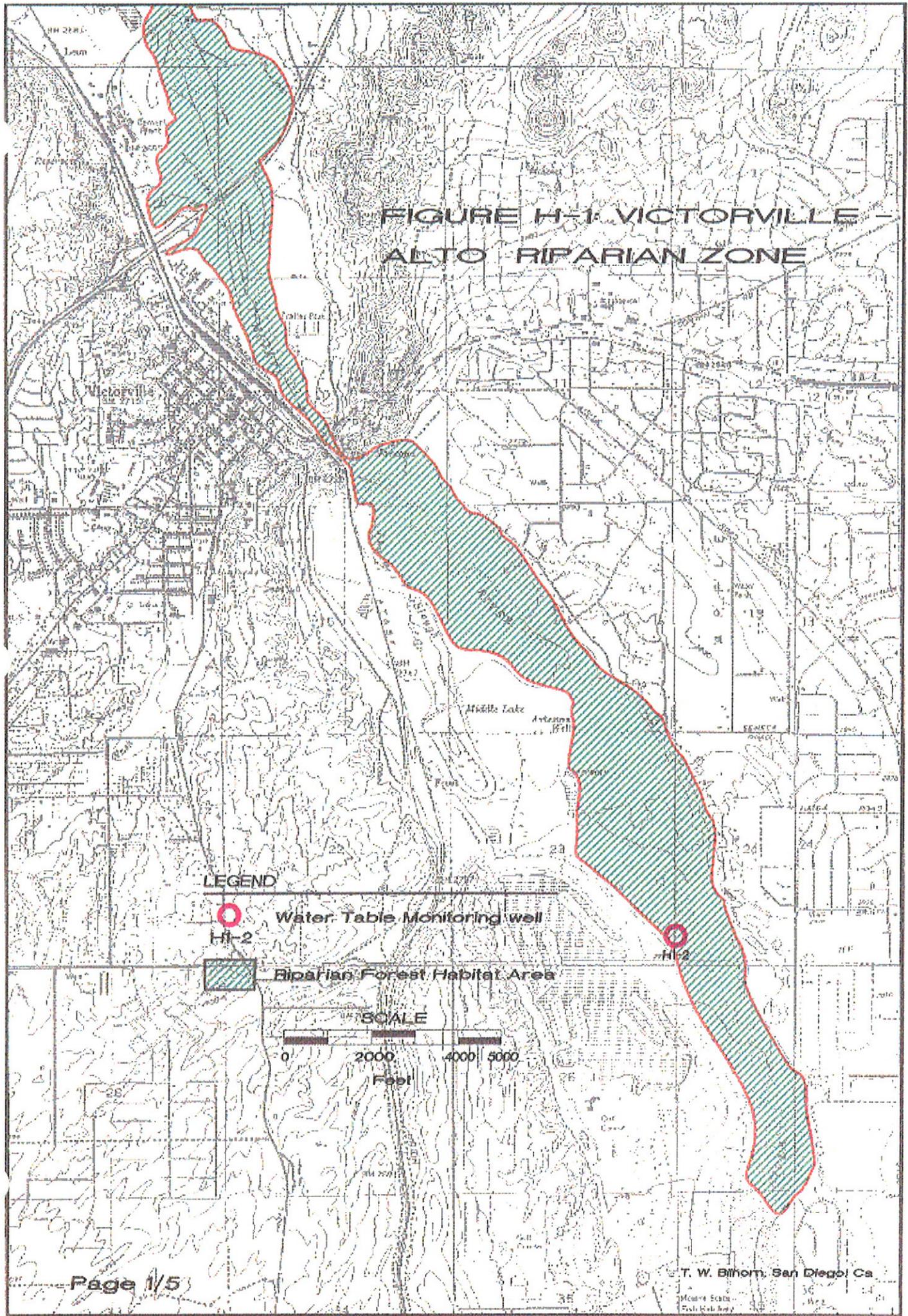
TABLE H-2

RIPARIAN HABITAT MONITORING WELL
WATER LEVEL CRITERIA

ZONE	WELL NUMBER	MAXIMUM DEPTH BELOW GROUND
Victorville/Alto	H1-1	Seven (7) Feet
Victorville/Alto	H1-2	Seven (7) Feet
Lower Narrows/Transition	H2-1	Ten (10) Feet
Harvard/Eastern Baja Riparian Forest Habitat	H3-1	Seven (7) Feet
Harvard/Eastern Baja Surface Water Habitat	H3-2	Plus One (1) Foot (1705 Ft msl)*

* Surface Water Habitat water surface elevation of 1705 ft. msl is approximate pending ground elevation survey.

FIGURE H-1 VICTORVILLE - ALTO RIPARIAN ZONE

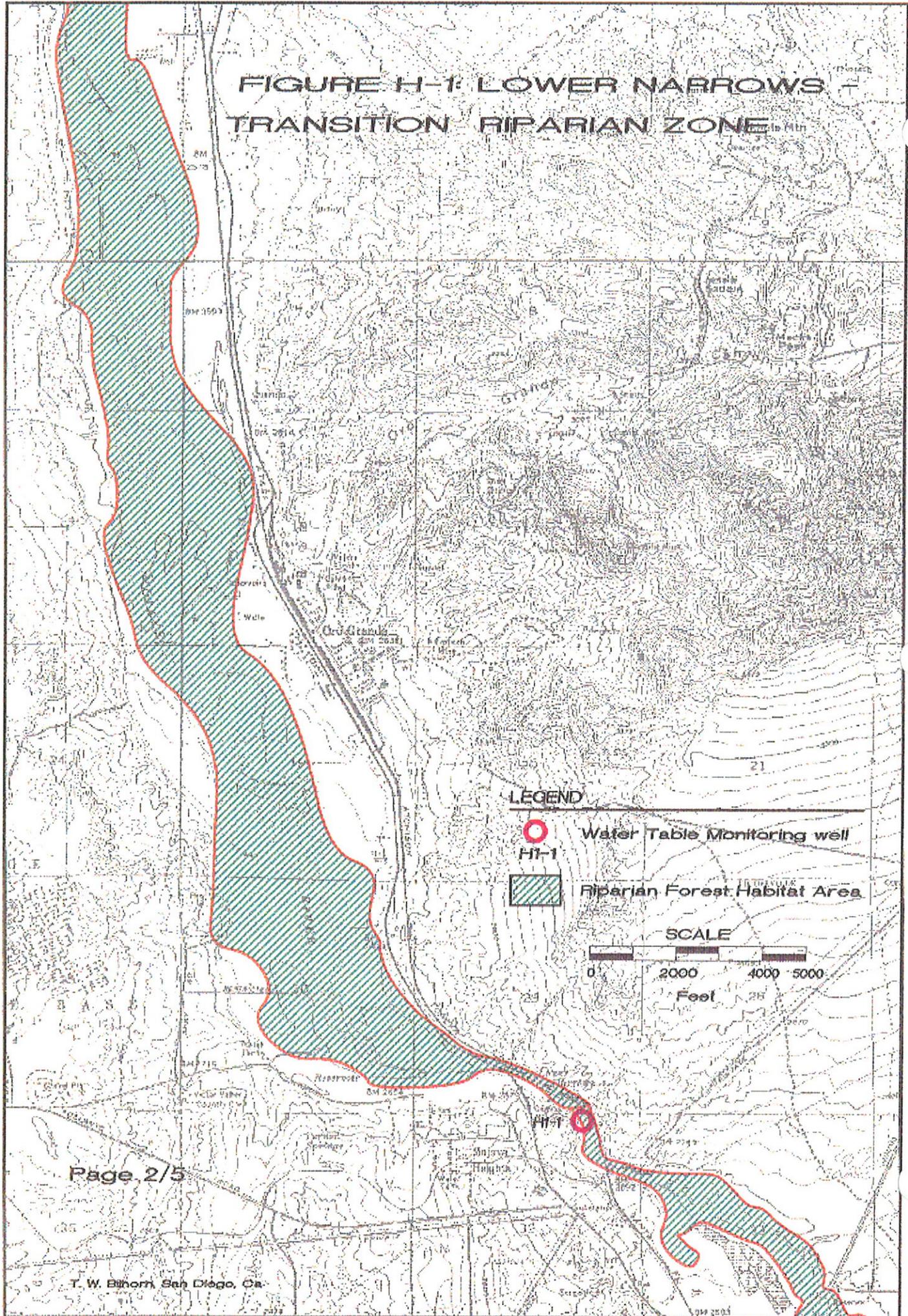


LEGEND

-  Water Table Monitoring well
-  Riparian Forest Habitat Area



FIGURE H-1: LOWER NARROWS TRANSITION RIPARIAN ZONE



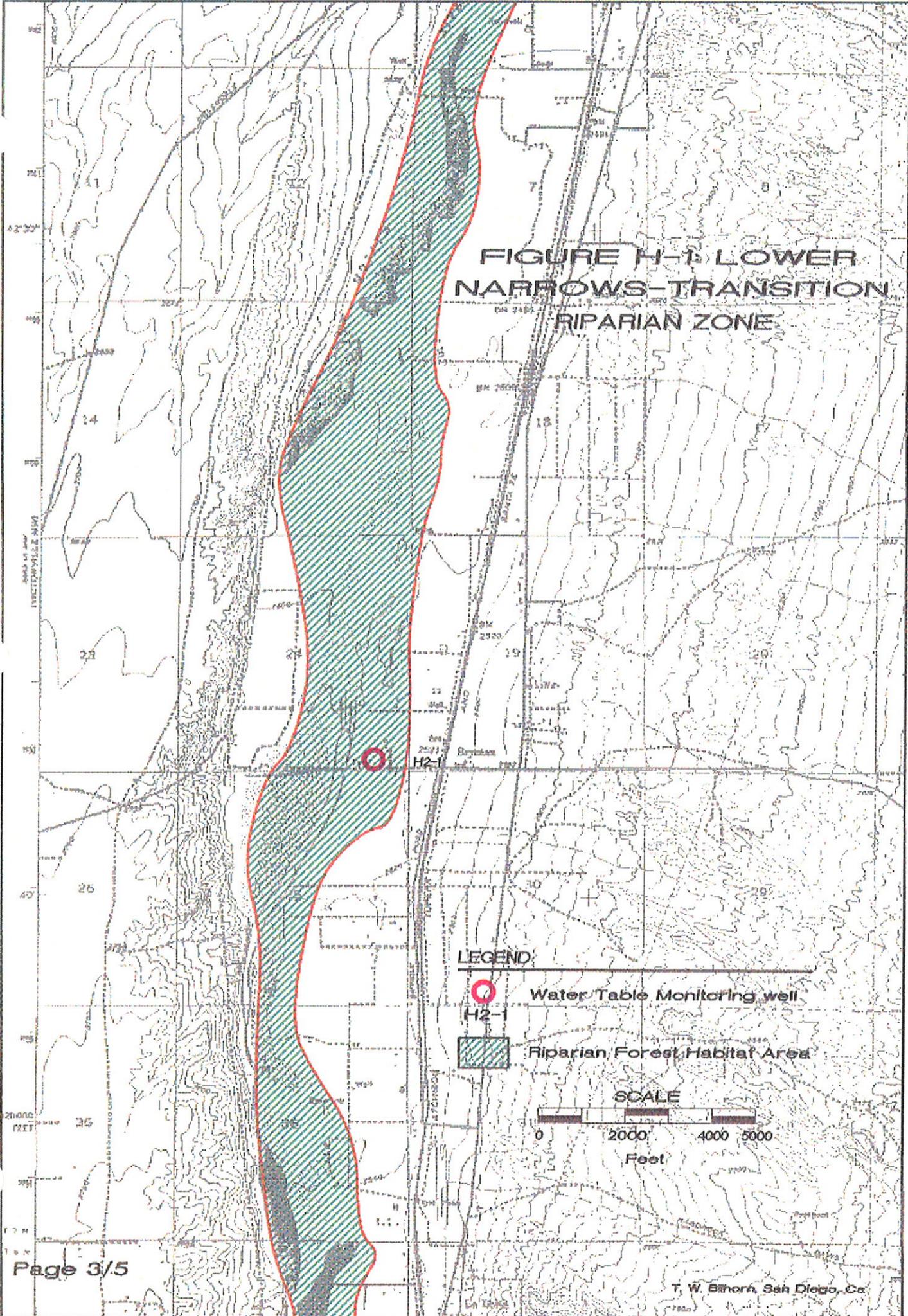
LEGEND

-  Water Table Monitoring well
H1-1
-  Riparian Forest Habitat Area

SCALE



**FIGURE H-1: LOWER
NARROWS-TRANSITION
RIPARIAN ZONE**



LEGEND:

-  Water Table Monitoring well
H2-1
-  Riparian Forest Habitat Area

SCALE

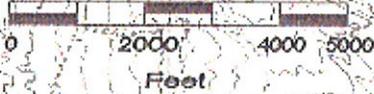


FIGURE HE-TRANSITION RIPARIAN ZONE

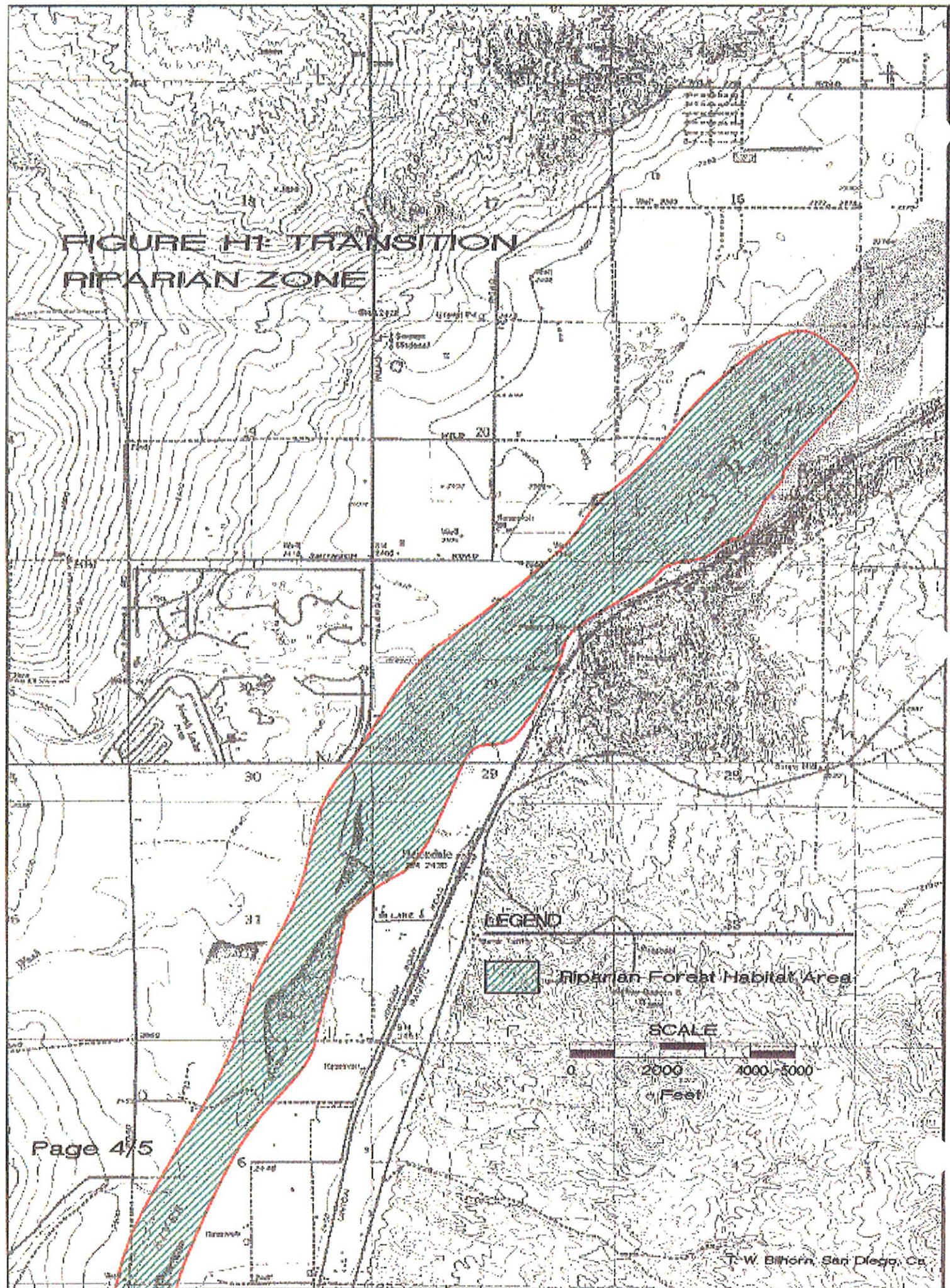
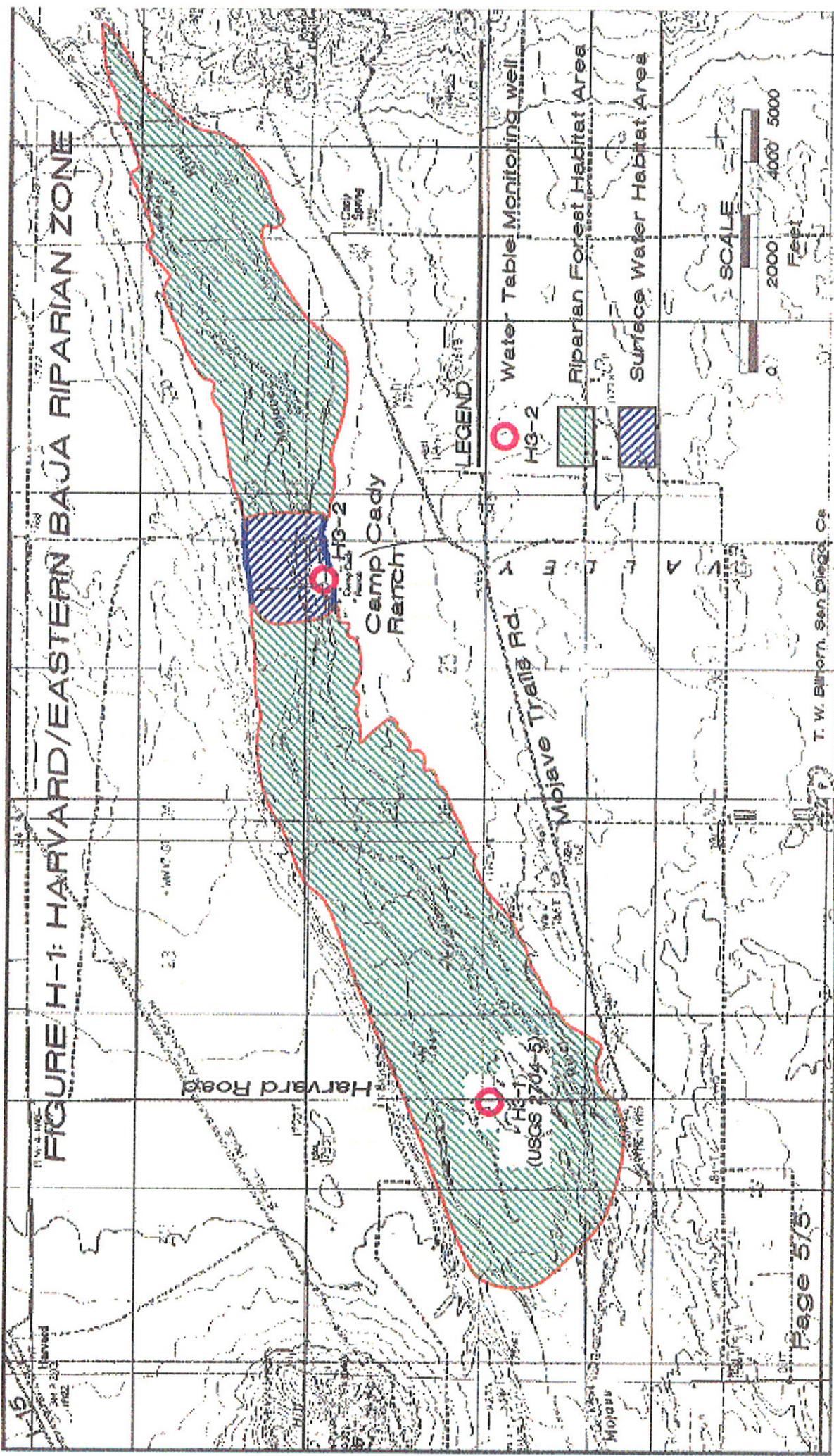


FIGURE H-1: HARVARD/EASTERN BAJA RIPARIAN ZONE



LEGEND

- POTENTIAL RECHARGE AREA

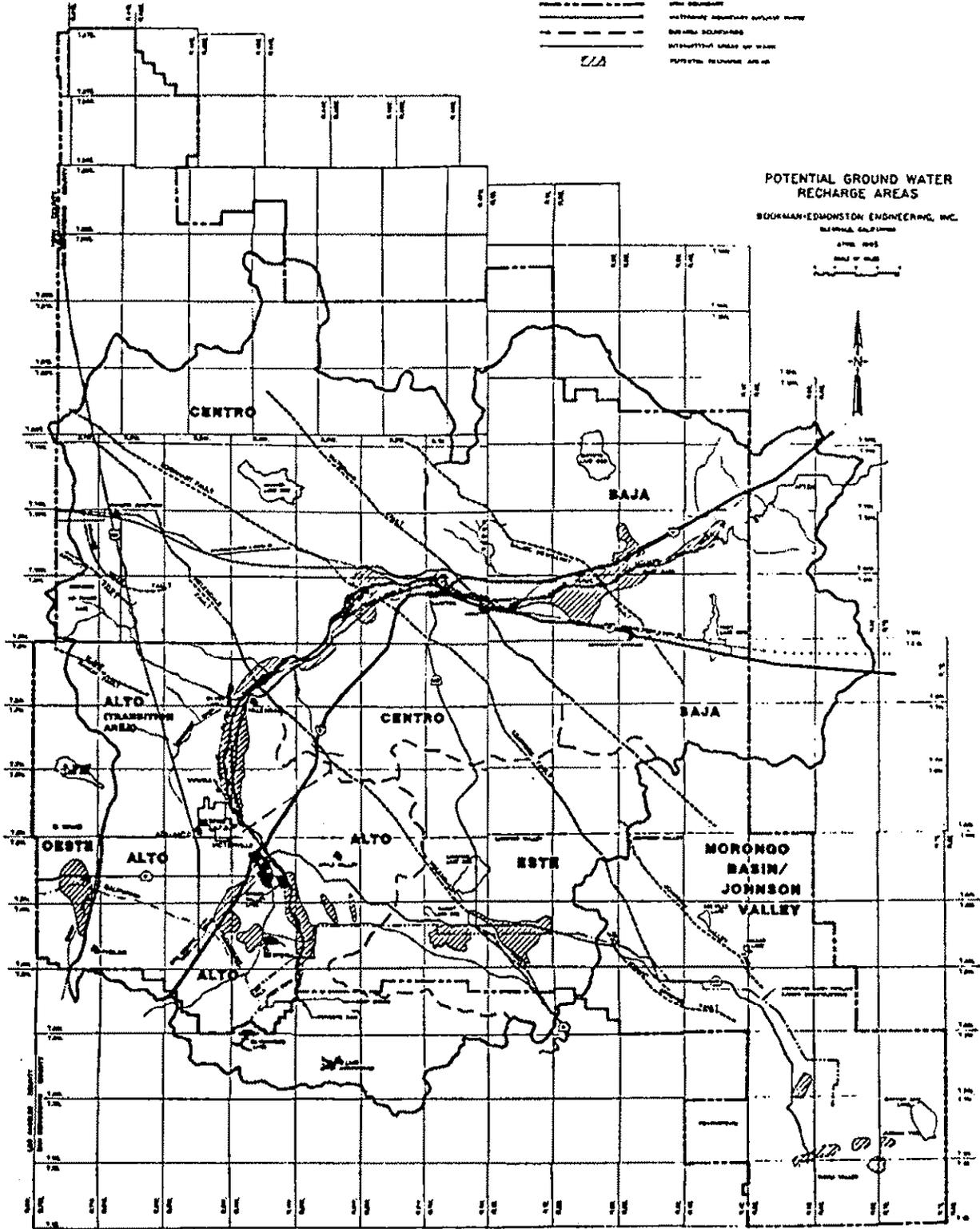
POTENTIAL GROUND WATER RECHARGE AREAS

BOOKMAN-EDMONSTON ENGINEERING, INC.

BERNARD, CALIFORNIA

APRIL 1995

SCALE OF 1:50,000



MOJAVE WATER AGENCY
REGIONAL WATER MANAGEMENT PLAN

MOJAVE WATER AGENCY



2004 REGIONAL WATER MANAGEMENT PLAN

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
GROUNDWATER MANAGEMENT PLAN
URBAN WATER MANAGEMENT PLAN



VOLUME 1:
REPORT

September 2004
Adopted February 24, 2005

Schlumberger
Water Services

TABLE OF CONTENTS

VOLUME 1: REPORT

CHAPTER 1: INTRODUCTION	1
Purpose	2
Integrated Water Management Plan	4
Urban Water Management Plan.....	4
Groundwater Management Plan	5
Public Outreach	5
Interrelation of Plan Elements	5
Checklists.....	6
Integrated Regional Water Management Plan Checklist	7
Urban Water Management Plan Checklist	8
Groundwater Management Plan	12
CHAPTER 2: AGENCY AND STAKEHOLDER BACKGROUND	1
Mojave Water Agency	1
Adjudication	6
Mojave Basin Area	6
Warren Valley Basin	7
Summary of 1994 Regional Water Management Plan.....	7
Major Stakeholders	10
Water Agencies.....	10
State and Federal Agencies	11
Municipalities (cities, county, other).....	12
Miscellaneous Community Interests.....	12
FIGURES	
Figure 2-1: MWA Location	2
Figure 2-2: Base Map	4
Figure 2-3: Current and Future Facilities	5
CHAPTER 3: PHYSICAL SETTING	1
Physiographic Setting.....	1
Geology	9
Groundwater	11
DWR Documentation of Overdraft Conditions	18
Efforts to Eliminate Overdraft	18
Surface Water	19
Riparian Habitat/Wetlands	19
Exhibit H.....	19
Areas outside Exhibit H	20
Climate	23

Wastewater	23
The City of Adelanto	24
The City of Barstow	24
Victor Valley Wastewater Reclamation Authority	24
TABLES	
Table 3-1: DWR Groundwater Basins.....	5
Table 3-2: Groundwater Elevations Established in Exhibit H	20
Table 3-3: Total Wastewater Flow Projections (MGD)	25
Table 3-4: Recycled Water Projections (MGD)	25
FIGURES	
Figure 3-1: Hydrologic Setting.....	3
Figure 3-2: Groundwater Basins and Water Districts.....	6
Figure 3-3: Morongo Basin/Johnson Valley Area Subbasins	8
Figure 3-4: Typical Geologic Cross-Section of Mojave River Groundwater Basin	9
Figure 3-5: Geology of Mojave River Groundwater Basin.....	10
Figure 3-6: 1998 Water Level Contours	13
Figure 3-7: Riparian Habitat and Dry Lake Beds	22
CHAPTER 4: WATER SUPPLY.....	1
Mojave Basin Area.....	1
Gaged Surface Inflow and Outflow	1
Annual Variability of Water Supply	7
Ungaged Surface Inflow and Outflow	9
Subsurface Flow	10
Deep Percolation of Precipitation.....	11
Wastewater Imports	11
Phreatophyte Consumption.....	11
Groundwater	12
Dry Year and Multiple Dry Year Water Supply	16
Morongo Basin/Johnson Valley Area	17
Dry Year and Multiple Dry Year Water Supply	21
Well Data	21
State Water Project	24
Water Quality	28
Inconsistent Water Sources.....	29
Planned Water Supply Sources Through 2020 in Five-year Increments.....	29
Water Quality and Management Strategies	33
Water Quality and Supply Reliability	33
Opportunities for Short and Long-Term Transfers.....	33
Timeline for Implementation of Proposed Projects	34
TABLES	
Table 4-1: Mojave River Stream Gages	2
Table 4-2: Mojave Basin Area - Net Average Annual Water Supply	10

Table 4-3:	Mojave Basin Area - Average Annual Dry Year Water Supply	18
Table 4-4:	Mojave Basin Area - Average Annual Multiple Dry Year Water Supply	19
Table 4-5:	Morongó Basin/Johnson Valley Area Net Average Annual Water Supply	20
Table 4-6:	Morongó Basin/Johnson Valley Area Average Annual Dry Year Water Supply	21
Table 4-7:	Deliveries of State Water Project Water to the MWA 1978-2001	25
Table 4-8:	Average Annual State Water Project Supplies	27
Table 4-9:	Available Water Supply Sources through 2020	33
Table 4-10:	Permanent Transfers of Base Annual Production by Subarea WY94-02	34

FIGURES

Figure 4-1:	Stream Gage Locations	4
Figure 4-2:	Annual Volume of Gaged Surface Water Entering and Exiting the Basin (1921-2001)	6
Figure 4-3:	Accumulated Departure from Base Period (1931-1990) average for seasonal discharge at the Forks	8
Figure 4-4:	Percent Exceedence at the Forks (1931-2001).....	9
Figure 4-5:	Historical Groundwater Levels for State Well Number 05N01E17D01, located in the Regional Aquifer in the Este Subarea	13
Figure 4-6:	Historical Groundwater Levels for State Well Number 05N05W22E02, located in the Regional Aquifer in the Alto Subarea.....	14
Figure 4-7:	Historical Groundwater Levels for State Well Number 11N03W28R02, located in the Regional Aquifer in the Centro Subarea.....	14
Figure 4-8:	Historical Groundwater Levels for State Well Number 5N04W11P03, located in the Floodplain Aquifer in the Alto Subarea.....	15
Figure 4-9:	Historical Groundwater Levels for State Well Number 90N03W13R01, located in the Floodplain Aquifer in the Centro Subarea.....	15
Figure 4-10:	Ground Water Wells Measuring Above 500 mg/L Total Dissolved Solids	23
Figure 4-11:	Total Dissolved Solids (TDS) with Water Level (feet above mean sea level) for State Well 08N03W05J01	24
Figure 4-12:	Historical SWP Percent of Deliveries Requested by Contractors	26
Figure 4-13:	Percent Exceedence of SWP Deliveries in 2020.....	27
Figure 4-14:	Total Dissolved Solids.....	30
Figure 4-15:	Nitrates.....	30
Figure 4-16:	Manganese	31

Figure 4-17: Iron.....	31
Figure 4-18: Fluoride	32
Figure 4-19: Arsenic	32
CHAPTER 5: WATER DEMAND	1
Introduction.....	1
Current Water Demand.....	2
Demographics.....	2
Consumptive Use	4
Mojave Basin area	6
Alto (Figure 5-5)	7
Baja (Figure 5-6)	7
Centro (Figure 5-7)	7
Este (Figure 5-8)	7
Oeste (Figure 5-9)	7
Morongo Basin/Johnson Valley Area	12
Copper Mountain Valley (Figure 5-11)	14
Means/Ames Valley (Figure 5-12)	14
Warren Valley (Figure 5-12).....	14
Current Water Balance	17
Future Water Demand.....	18
Demographics.....	18
Consumptive Use	19
Mojave Basin Area	20
Alto (Figures 5-17 and 5-18)	24
Baja (Figures 5-19 and 5-20)	25
Centro (Figure 5-21).....	27
Este (Figures 5-22 and 5-23)	27
Oeste (Figures 5-24 and 5-25)	28
Morongo Basin/Johnson Valley Area	28
Copper Mountain Valley (Figure 5-27)	32
Mean/Ames Valley (Figure 5-28)	32
Warren Valley (Figure 5-29).....	32
Year 2020 Water Balance	32
Agriculture Scenario 1.....	32
Agriculture Scenario 2.....	36
Summary.....	37
Dry Year and Multiple Dry Year Water Balance in 2020.....	37
Future Supply Versus Demand in 5-Year Increments	39
TABLES	
Table 5-1: Comparison of Actual and Projected 2000 Population.....	2
Table 5-2: Year 2000 Demographic Data for Selected Cities	3
Table 5-3: 1995 and 2000 Projected and Actual Consumptive Use	4
Table 5-4: Mojave Basin Area Historical Consumptive Use (Acre-feet/year)	8

Table 5-5:	Morongo Basin/Johnson Valley Area Historical Consumptive Use	13
Table 5-6:	Year 2000 Average Annual Water Balance (Acre-feet/year)	17
Table 5-7:	Current and Projected Population Estimates	18
Table 5-8:	Projected Agricultural Consumptive Use (Acre-feet/year) ..	20
Table 5-9:	Mojave Basin Area Current and Projected Consumptive Use	23
Table 5-10:	Morongo Basin/Johnson Valley Area Projected Consumptive Use	31
Table 5-11:	Year 2020 Average Annual Water Balance under Agriculture Scenario 1 (Acre-feet/year)	35
Table 5-12:	Year 2020 Average Annual Water Balance under Agriculture Scenario 2 (Acre-feet/year)	36
Table 5-13:	Year 2020 Average Annual Dry Year Water Balance under Agriculture Scenario 2 (Acre-feet/year)	38
Table 5-14:	Year 2020 Multiple Dry Year Average Annual Water Balance under Agriculture Scenario 2 (Acre-feet/year)	39
Table 5-15:	Average Annual Surplus or Deficit under Agriculture Scenario 2 in 5-Year Increments (Acre-feet/year)	40
Table 5-16:	Average Annual Dry Year Surplus or Deficit under Agriculture Scenario 2 in 5-Year Increments (Acre-feet/year)	40
Table 5-17:	Average Annual Multiple Dry Year Surplus or Deficit under Agriculture Scenario 2 in 5-Year Increments (Acre-feet/year)	41

FIGURES

Figure 5-1:	Mojave Basin Area Actual Total and Urban Consumptive Use for 1990-2000 and 1994 RWMP Projected Use	5
Figure 5-2:	Mojave Basin Area Actual Total and Agricultural Consumptive Use or 1990-2000 and 1994 RWMP Projected Use	5
Figure 5-3:	Morongo Basin/Johnson Valley Area Actual Total Consumptive Use for 1990-2000 and 1994 RWMP Projected Use	6
Figure 5-4:	Mojave Basin Area Total Consumptive Use by Sector For 1995-2001	9
Figure 5-5:	Alto Subarea Consumptive Use by Sector for 1995-2001	9
Figure 5-6:	Baja Subarea Consumptive Use by Sector for 1995-2001	10
Figure 5-7:	Centro Subarea Consumptive Use by Sector for 1995-2001 ..	10
Figure 5-8:	Este Subarea Consumptive Use by Sector for 1995-2001	11
Figure 5-9:	Oeste Subarea Consumptive Use by Sector for 1995-2001 ...	11
Figure 5-10:	Morongo Basin/Johnson Valley Area total Consumptive Use by Sector for 1995-2000	15
Figure 5-11:	Copper Mountain Valley Subbasin Consumptive Use by Sector for 1995-2000	15
Figure 5-12:	Mean/Ames Valley Subbain Consumption Use by Sector for 1995-2000	16

Figure 5-13: Warren Valley Subbasin Consumptive Use by Sector for 1995-2000	16
Figure 5-14: Agricultural Consumptive Use from 2001 through 2020 Under Agriculture Scenario 2 Assumptions	21
Figure 5-15: Mojave Basin Area Total Consumptive use for the Year 2000 and Projections through Year 2020 under Agriculture Scenario 2	22
Figure 5-16: Mojave Basin Area Total Consumptive Use for the Year 2000 and Projections through Year 2020 under Agriculture Scenario 2	22
Figure 5-17: Alto Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 1	24
Figure 5-18: Alto Subarea Consumptive Use for the Year 2000 and Projections	25
Figure 5-19: Baja Subarea Consumptive Use for the Year 2000 and Projections through Year 2020 Under Agriculture Scenario 1	26
Figure 5-20: Baja Subarea Consumptive Use for the Year 2000 and Projections through Year 2020 Under Agriculture Scenario 2	26
Figure 5-21: Centro Subarea Consumptive Use for the Year 2000 and Projections through Year 2020 Under Agriculture Scenarios 1 and 2	27
Figure 5-22: Este Subarea Consumptive Use for the Year 2000 and Projections through Year 2020 Under Agriculture Scenario 1	29
Figure 5-23: Este Subarea Consumptive Use for the Year 2000 and Projections through Year 2020 Under Agriculture Scenario 2	29
Figure 5-24: Oeste Subarea Consumptive Use for the Year 2000 and Projections through Year 2020 Under Agriculture Scenario 1	30
Figure 5-25: Oeste Subarea Consumptive Use for the Year 2000 and Projections through Year 2020 Under Agriculture Scenario 2	30
Figure 5-26: Morongo Basin/Johnson Valley Area Total Consumptive Use for the Year 2000 and Projections through Year 2020 ..	33
Figure 5-27: Copper Mountain Valley Subbasin Consumptive Use for The Year 2000 and Projections through Year 2020	33
Figure 5-28: Means/Ames Valley Subbasin Consumptive Use for the Year 2000 and Projections through Year 2020	34
Figure 5-29: Warren Valley Subbasin Consumptive Use for the Year 2000 and Projections through Year 2020	34

CHAPTER 6: WATER SHORTAGE CONTINGENCY PLANNING	1
Mojave Water Agency	1
Cities and Water Agencies	2
Adelanto Water Authority	3
Apple Valley Ranchos Water Company	3
Hesperia Water District	3
Hi-Desert Water District	4
Joshua Basin Water District	4
Southern California Water Company	5
Victor Valley Water District	5
CHAPTER 7: WATER CONSERVATION AND DEMAND MANAGEMENT MEASURES	1
Coordinated Water Conservation Efforts	1
Alliance for Water Awareness and Conservation	1
Participants	2
MWA and Lewis Center for Education and Research MOU	2
MWA and Mojave Desert Resource Conservation District MOU	3
MWA and Mojave Weed Management Area MOU	3
MWA and Copper Mountain College MOU	4
MWA and Barstow Community College MOU	4
MWA and Victor Valley College MOU	4
MWA Mojave Desert Resource Conservation District Demonstration Project	4
Urban Water Management Plans	5
Demand Management Measures	6
TABLES	
Table 7-1: Demand Management Measures	6
Table 7-2: Implementation Status for DMMs	7
Table 7-3: Summary of Conservation Planning	8
Table 7-4: Conservation Savings for DMM1	8
Table 7-5: Conservation Savings for DMM2	9
CHAPTER 8: STAKEHOLDER ASSESSMENT AND PUBLIC OUTREACH	1
Assessment Approach	1
Summary of Stakeholder Issues	3
Issues Common to All Stakeholders	11
Key Water Management Issues	12
Coordination of IWMP, GMP and UWMP with Other Agencies	18
Method for Public Participation	18
TABLES	
Table 8-1: Baja Subarea Water Management Issues	14
Table 8-2: Centro Subarea Water Management Issues	15
Table 8-3: Alto Subarea Water Management Issues	16
Table 8-4: Oeste Subarea Water Management Issues	17
Table 8-5: Este Subarea Management Issues	17
Table 8-6: Morongo Basin/Johnson Valley Water Management Issues ...	18

CHAPTER 9: BASIN MANAGEMENT OBJECTIVE AND ALTERNATIVES	1
Mojave Water Agency	1
Basin Management Objectives	2
Performance Measures	3
Projects and Management Actions	3
Methodology	4
Normalized Project Cost Methodology	5
Supply Enhancement Projects and Management Action Groupings	5
Supply Enhancement Projects	10
SWS/Non-Floodplain Aquifer Recharge	10
SWP/Floodplain Aquifer Recharge	15
Baja Storm Flow Non-SWP/Increase Recharge Efficiency	19
Non-SWP/Change Source of Groundwater Supply	22
Management Actions.....	23
Water Treatment and Blending	23
Improve Riparian Health.....	27
Conservation and Storage Agreements	28
The MWA Screening Model.....	29
Alternative Overview	30
Initial Alternatives	30
Revised and Final Alternatives.....	32
Demands Met	33
Groundwater Storage.....	35
Groundwater Levels	35
Subarea Interaction.....	37
Water Quality.....	39
Alternative Cost	39
Recommended Alternatives	39
Common Features.....	40
Project and Management Action Priorities	40
TABLES	
Table 9-1: Abbreviated Normalized Cost Table (2003 Dollars)	7
Table 9-2: Supply Enhancement Project	8
Table 9-3: Management Actions	9
Table 9-4: Initial Alternative Assumptions and Results	31
Table 9-5: Revised and Final Alternative Assumptions and Results.....	32
Table 9-6: Representative Projects and Management Actions Included in each Revised and Final Alternatives.....	34
Table 9-7: Average Annual Change in Groundwater Storage.....	35
Table 9-8: Annualized Cost of Each Alternative	39
Table 9-9: Recommended Priority for each Project or Management Action	42
FIGURES	
Figure 9-1: Screening Model Aquifer Units.....	6
Figure 9-2: Time Series of Elevations in the Baja Regional Aquifer	36

Figure 9-3: Time Series of Elevations in the Alto Floodplain Aquifer	37
Figure 9-4: Average Annual Mojave River Flows	38
Figure 9-5: Average Annual Groundwater Flows.....	38
CHAPTER 10: MANAGEMENT ACTIONS.....	1
Management Authority	1
Management Actions.....	2
1. Monitoring.....	2
Role of the Mojave Basin Area Watermaster	3
Groundwater Levels	4
Water Quality	6
Water Supply Measurement	7
Population Growth and Development	8
Effectiveness of Water Conservation Measures	9
Evapotranspiration	10
Regional Water Level Changes and Land Subsidence	11
Data Management.....	12
Extraction Sites/Consumption	12
2. Improving Basin Understanding	13
Infiltration Rates.....	13
Aquifer Characterization	13
Modeling.....	14
Update Water Budget	15
3. Continue Long-Term Planning	15
Vulnerability Assessment	15
Review Land Use Plans.....	16
Identify Post 2020 Water Supply	16
State Water Project	17
Transportation Infrastructure.....	18
Regular Updates	18
4. Groundwater Projection	19
Recharge Site Management Activities	19
Identification and Destruction of Abandoned Wells.....	20
Hazardous Materials Response.....	21
Protection of Recharge Areas.....	21
5. Construction and Implementation	22
6. Financing	23
7. Public Participation/Community Outreach	24
Implementation Schedule	25
FIGURES	
Figure 10-1: Well Locations with Known Construction Data.....	4
Figure 10-2: Master Schedule for MWA Management Action Plan	26

References

VOLUME 2: APPENDICIES

Appendicies:

- Appendix A Judgment After Trial January 10, 1996, Mojave Basin Area Adjudication
- Appendix B Technical Memo 3
- Appendix C Water Demand Estimation
- Appendix D Issues Questionnaire, Summary of Responses to the Issues Questionnaire
- Appendix E Technical Advisory Committee to the Mojave Water Agency Minutes
- Appendix F *The Panorama* -A newsletter published by the Mojave Water Agency
- Appendix G Resolution approving the Mojave Water Agency 2004 Regional Water Management Plan
- Appendix H Existing Monitoring Protocols
- Appendix I Well Construction Data from MWA Well Database
- Appendix J AB 3030 - Groundwater Management Planning
SB 1938 - Groundwater Management and State Funding
California Urban Water Management Planning Act
Proposition 50 - Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002

1

INTRODUCTION

The Mojave Water Agency (MWA) was formed in 1959 by an act of the California Legislature and was activated by a vote of the residents in 1960 to manage declining groundwater levels in the Mojave Basin Area, Lucerne Valley and El Mirage Basin. The Morongo Basin and Johnson Valley areas were annexed in 1965. MWA covers over 4,900 square miles, a hydrologically diverse region that has a unique set of water management issues. Over the last decade, much has been accomplished toward the development and implementation of a comprehensive water resources plan to address these issues. Key accomplishments and events of recent years include:

1. The 1993 Stipulated Judgment, 1996 Judgment After Trial and several court decisions that have followed
2. Adoption of the 1994 Regional Water Management Plan
3. Construction of a number of key facilities including the Morongo Basin Pipeline, Rock Springs Outlet, Hi-Desert Water District recharge facilities, Mojave River Pipeline and the Hodge, Lenwood and Dagget recharge facilities
4. Purchase of an additional 25,000 acre-feet of supply from the State Water Project
5. Completion of several studies by USGS including the report entitled “Simulation of Ground-Water Flow in the Mojave River Basin”

Essentially all water supplies within MWA are pumped from the local groundwater basins and groundwater levels generally have been declining for the past 50 years or more. Adjudication proceedings were initiated due to concerns that rapid population growth would lead to further overdraft. The resulting Warren Valley Basin Judgment and the Mojave Basin Area Judgment both require that additional surface water be imported to help balance the basins.

MWA has an annual contract for up to 75,800 acre-feet of water from the State Water Project (SWP) although due to variability in deliveries of SWP water, the average annual supply available to MWA is currently estimated to be 58,400 acre-feet. In order to balance the basin by the year 2020, it will be necessary for MWA to utilize its full SWP supply. Construction of

projects by MWA within its service area is necessary to build, operate, maintain and replace the State Water Project facilities to which MWA is contractually obligated. These projects are necessary to fulfill MWA's contractual obligations with the State of California and to insure water availability to all of its residents.

Purpose

MWA first prepared a Regional Water Management Plan in 1994 (Bookman-Edmonston Engineering, Inc. 1994). Since that time, several developments have prompted MWA to prepare a plan update. These developments include advancements in the basin adjudication process, a more refined understanding of the hydrology and hydrogeology of the service area, population increases, shifts in agricultural and urban water demands, and the growing realization that the Mojave region can be a strategic element in the long-term management of California's water supplies. The Mojave Groundwater Basin is located along the California Aqueduct and has nearly two million acre-feet of available storage, which could make the region a strategic player in solving state-wide water storage and conjunctive use problems while addressing its internal water resources needs. Recent additions to California law promote development of integrated water resource management plans and groundwater management plans by providing preference to agencies with such plans for funding through state grant programs. **This Plan serves as an Integrated Regional Water Management Plan, Groundwater Management Plan and Urban Water Management Plan and meets the requirements of SB 221, SB 610, SB 1938 and AB 901.**

The RWMP was supported through a March 22, 2001 Memorandum of Understanding (MOU) with the DWR Integrated Storage Investigation which requires a "Basin Advisory Panel" of local civic and technical leaders and other stakeholders. This update was prepared in three phases with input from a Technical Advisory Committee (TAC) convened as the advisory panel. Objectives were: 1) to review and revise, as necessary, previous estimates of water supply and demand, 2) identify and solicit input from stakeholders with interest in long-term reliable water supplies for the region, and 3) identify a suite of preliminary alternatives that will help MWA achieve its goals in water supply management for the next two decades. Proposed projects and management actions are tailored to address at least one key water management issue in the basin.

The following six key water management issues emerged as a result of this process:

- Current demand exceeds supply; future demand will also exceed supply unless corrective actions are taken
- Naturally occurring water quality problems affect drinking water supplies
- Many of the groundwater basins are in overdraft
- All but two of the subareas have riparian ecosystem maintenance issues

- Wastewater infrastructure issues affect the two subareas with the largest water demands
- Many subareas within MWA are impacted by activities in other subareas

Fundamental objectives established with the input of the TAC are to: 1) balance future water demands with available supplies and, 2) maximize the overall beneficial use of water throughout MWA. To compare expected performance of alternative combinations of projects and management alternatives, a screening model was developed. The screening model simulates the changes to groundwater hydrology, Mojave River flows, and pumping and return flows that would result from implementation of the identified projects and management actions. Each alternative was evaluated and ranked according to its effectiveness in meeting the long-term needs of the basin.

This draft Regional Water Management Plan incorporates the highest-ranking alternatives. The draft will undergo an environmental review and the MWA Board of Directors will adopt a final Plan. This Plan provides MWA with long-term direction for management and development of resources and describes MWA's resource management and development strategy through the year 2020. The Plan concludes with 60 Management Actions. Chapters of the Plan are summarized below.

Chapter 2, Agency and Stakeholder Background, describes the MWA and the adjudications of the Mojave Basin Area and Morongo Basin/Johnson Valley Area. The previous 1994 Regional Water Management Plan is summarized and the major stakeholders are identified.

Chapter 3, Physical Setting, describes geography, geology, groundwater conditions, aquifers, groundwater basins, water districts, surface water resources, climate, and wastewater systems.

Chapter 4, Water Supply, provides a detailed description of natural and imported water supplies and their variability within the MWA.

Chapter 5, Water Demand, describes current and projected future water demand in the Mojave Basin Area and Morongo Basin/Johnson Valley Area. Water balances for the year 2020 are presented for two different agricultural demand scenarios, including single dry year and multiple dry year scenarios.

Chapter 6, Water Shortage Contingency Planning, summarizes water shortage contingency plans of MWA and service area water purveyors.

Chapter 7, Water Conservation and Demand Management Measures, provides an overview of water conservation plans and practices of the MWA, cities, water agencies and other groups in the MWA service area.

Chapter 8, Stakeholder Assessment and Public Outreach, describes the public outreach efforts taken by the MWA during the development of this Plan and summaries water management issues of stakeholders in the MWA service area.

Chapter 9, Basin Management Objectives and Alternatives, describes the development of Basin Management Objectives and performance measures developed with the Technical Advisory Committee, a description of supply enhancement projects, and the development and evaluation of alternatives.

Chapter 10, Management Actions, contains 60 actions for implementation of the Plan.

Integrated Water Management Plan

California Water Code Section 79562.5 (b) states that DWR shall establish standards that address, at a minimum “the major water related objectives and conflicts of the watersheds in the region covered by the plan, including water supply, groundwater management, ecosystem restoration, and water quality elements.” While specific standards for Integrated Regional Water Management Plans have not yet been developed, this Plan was developed to address all four Integrated Regional Water Management Plan elements identified in the Water Code.

MWA has developed this Regional Water Management Plan through a comprehensive systems approach. The Plan integrates components related to groundwater management, urban water management, agricultural water use, environmental habitat protection and restoration, water quality, and stakeholder and public outreach. The Plan meets requirements of the Urban Water Management Planning Act and requirements for Groundwater Management Plans pursuant to the Water Code and components recommended by DWR as elaborated below.

Urban Water Management Plan

This Regional Water Management Plan was prepared for the MWA in order to comply with 2003 California Urban Water Management Act requirements including amendments made by Senate Bill 610 and Assembly Bill 901. The California Urban Water Management Planning Act (Division 6 Part 2.6 of the Water Code) requires water suppliers with over 3,000 customers or that supply over 3,000 acre-feet of water annually to prepare Urban Water Management Plans (UWMP). MWA does not supply water directly, but holds the State Water Project contract and imports water to replenish groundwater basins and to meet obligations of the Mojave Basin Area

and Warren Valley judgments. Seven water supply agencies within the MWA have developed UWMPs. The checklist at the end of this chapter indicates where in this Plan specific UWMP components are located.

Groundwater Management Plan

This Plan contains components included in California Water Code Sections 10750-10753.10 related to Groundwater Management Plans. The California State Legislature passed Assembly Bill 3030 (AB 3030) during the 1992 legislative session allowing local agencies to develop Groundwater Management Plans. The legislation declares that groundwater is a valuable resource that should be carefully managed to ensure its safe production and quality. The legislation also encourages local agencies to work cooperatively to manage groundwater resources within their jurisdiction. Senate Bill 1938 was passed by the Legislature September 16, 2002 and made changes and additions to sections of the Water Code created by AB 3030. This Plan addresses all the relevant components related to Groundwater Management Plans in the Water Code, as well as the components recommended by DWR in *California's Groundwater*, Bulletin 118 (DWR, 2003).

The Water Code sections related to Groundwater Management Plans apply to all groundwater basins identified in the California Department of Water Resources (DWR) Bulletin 118 (DWR, 1980), except those basins already subject to groundwater management by a local agency or a watermaster unless approved by the watermaster. The MWA overlies several groundwater basins (see Chapter 3), as defined by DWR in Bulletin 118. Nothing in this Plan supercedes the Mojave Basin or Warren Valley Basin adjudications. The checklist at the end of this chapter indicates where in this Plan specific Groundwater Management Plan components are located.

Public Outreach

Significant public outreach efforts were made during development of this Plan. These efforts involved evaluation of questionnaires and holding meetings with individuals, groups and a Technical Advisory Committee. Outreach efforts were directed at stakeholders from local water agencies, state and federal agencies, municipalities, San Bernardino County, and 13 local community groups. Lists of stakeholders are included in Chapter 2 of this Plan. Stakeholder assessment and public outreach efforts are discussed in Chapter 8.

Interrelation of Plan Elements

There is overlap in the requirements of Integrated Regional Water Management Plans, Urban Water Management Plans and Groundwater Management Plans. New laws now require UWMPs of water suppliers that utilize groundwater (all urban suppliers in MWA use groundwater) to

include a description of the groundwater basin and location and amounts of groundwater pumped. Plan elements specific to Integrated Regional Water Management Plans, Urban Water Management Plans and Groundwater Management Plans are located throughout this Plan, placed in chapters according to general subject.

Checklists

Three checklists are contained on the following pages. The first relates to Integrated Regional Water Management Plans, the second relates to Urban Water Management Plans and the third relates to Groundwater Management Plans. The checklists contain a summary of Water Code elements to be addressed, section numbers of the Water Code where the requirement can be found, and the location in this Plan where the subject is addressed. Copies of the relevant Water Code sections are included in Appendix J.

Integrated Regional Water Management

Plan Checklist

Items to Address	Section of Law	Location in Plan
Water related objectives and conflicts	79562.5(b)	Chapter 9
Water supply	79562.5(b)	Chapter 4
Groundwater management	79562.5(b)	Chapter 10
Ecosystem Restoration	79562.5(b)	Chapter 10
Water quality	79562.5(b)	Chapter 10

Urban Water Management Plan Checklist

Checklist Organized According to Subject

Items to Address	Section of Law	Location in Plan
Public and Stakeholder Outreach		
Make plan available for public inspection before its adoption.	10642	Chapter 8 Appendix F
Adopt plan as prepared or as modified after the public hearing.		Appendix G
Coordinate the preparation of its plan with other appropriate agencies, including direct and indirect suppliers, wastewater, groundwater, and planning agencies (refer to Section 10633).	10620 (d) (2)	Pg. 2 - 8
Demand, Supply, Reliability and Contingency Planning		
Provide current and projected population in 5-year increments to 20 years.	10631 (a)	Table 5 - 20
Describe the climate and demographic factors.		Pg. 3 - 25
Identify and quantify the existing and planned sources of water available in 5-year increments to 20 years	10631 (b)	Table 4 - 9
Describe opportunities for exchanges or transfers of water on short-term or long-term basis.	10631 (d)	Pg. 4 - 36
Quantify current and past water use in 5-year increments to 20 years.	10631 (e) (1)	Pg. 5 - 21
Identify projected water uses among water use sectors in 5-year increments to 20 years.	10631 (e) (2)	Pg. 5 - 21
Describe average, single dry and multiple dry water year data.	10631 (c)	Tables 4 - 3, Pg. 4 - 4
Describe any plans to replace inconsistent water sources.		Pg. 4 - 30
Provide minimum water supply estimates based on driest three-year historic sequence.	10632 (b)	Table 4 - 4
Describe the reliability of water supply.	10631 (c)	Pg. 4 - 30
Describe the vulnerability of water supply to seasonal or climatic shortage.		Pg. 4 - 30
Provide an assessment of the reliability of the water supplier's water service to its customers during normal, single dry, and multiple dry water years.	10635 (a)	Pg. 4 - 17
Compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in 5-year increments (refer to 10631 (c)).		Table 5 - 15

Items to Address	Section of Law	Location in Plan
Compare normal, single dry, and multiple dry water year projected water supply sources available to the water supplier with the normal, single dry, multiple dry water year projected water uses (refer to 10631 (c)).		Table 5 - 14
Provide actions a water supplier will take to prepare for a catastrophe.	10632 (c)	Chapter 6
Provide a copy of a draft water shortage contingency resolution or ordinance	10632 (h)	
Provide water shortage stages of action, including up to a 50 percent reduction outlining specific water supply conditions at each stage.	10632 (a)	Chapter 6
Provide mandatory prohibitions.	10632 (d)	Chapter 6
Provide penalties or charges.	10632 (f)	Chapter 6
Provide consumption reduction methods	10632 (e)	Chapter 6
Provide an analysis of the impacts on the water supplier revenues and expenditures	10632 (g)	Chapter 6
Provide measures to overcome revenue and expenditure impacts.		Chapter 6
Provide a mechanism for determining actual reductions in water use.	10632 (i)	Chapter 6

Wastewater and Reclamation

Describe the wastewater collection and treatment systems in the supplier's service area.	10633 (a)	Pg. 3 - 25
Quantify the amount of wastewater collected and treated in the supplier's service area.		Pg. 3 - 27
Describe the methods of wastewater disposal in the supplier's service area.		Pg. 3 - 25
Describe the type, place, and quantity of recycled water currently used in the supplier's service area.	10633 (b)	Pg. 3 - 25
Describe and quantify potential uses of recycled water in 5-year increments to 20 years.	10633 (c) (d)	Table 3 - 4
Describe the technical and economic feasibility of serving the potential users of recycled water.		Pg. 3 - 27
Describe the actions that may be taken to encourage recycled water use.	10633 (e)	Pg. 3 - 25
Provide the projected acre-feet results of recycled water used per year.	10633 (e)	Table 3 - 4
Provide a plan for optimizing the use of recycled water in the supplier's service area.	10633 (f)	Pg. 3 - 25
Provide actions to facilitate the installation of dual distribution systems and to promote recirculating uses.		Pg. 3 - 25

Items to Address	Section of Law	Location in Plan
Groundwater		
Identification of groundwater as a water supply source.	10631 (b)(1)	Pg. 4 - 12
Groundwater management plan preparation.		Pg. 1 - 2
Groundwater management plan adoption.		Appendix G
Copy of the groundwater management plan.		This Plan
Describe groundwater basin(s).	10631 (b)(2)	Pg. 3 - 5
Identify the groundwater basin(s).		Pg. 3 - 6
Identify adjudicated basins.		Pg. 2 - 3
Copy of order or decree of adjudication.		Appendix A
Describe the amount of groundwater the supplier has the legal right to pump.		Appendix A
Describe and analyze location of groundwater pumped for past 5 years based on information that is reasonably available.	10631 (b) (3)	Appendix H
Describe and analyze amount of groundwater pumped for past 5 years based on information that is reasonably available.		
Describe and analyze sufficiency of groundwater pumped for past 5 years based on information that is reasonably available.		Pg. 4 - 13
Describe and analyze location of groundwater that is projected to be pumped based on information that is reasonably available.	10631 (b)(4)	Appendix H
Describe and analyze amount of groundwater that is projected to be pumped based on information that is reasonably available.		Chapter 5

Water Supply Projects and Water Supply Programs

The description explains how all the water supply projects and water supply programs increase the water supplies to meet the total projected water use as established pursuant to subdivision (a) of Section 10635.	10631 (h)	Chapter 9
Identify specific future water supply projects and water supply programs that may be implemented to increase the amount of water available during average, single-dry and multiple-dry water years.		Chapter 9
Describe the increase in water supply that is expected to be available from each of the specific future water supply projects and water supply programs.		Chapter 9
Describe the estimated implementation timeline for each future water supply project and water supply program.		Chapter 9

Items to Address

Section of Law

Location in Plan

Water Quality

Includes information, to the extent practicable, relating to the quality of existing water supply sources over the next 20 years in five year increments.

10634

Pg. 4 - 29

Describes the manner in which water quality affects water management strategies.

Chapter 10

Describes the manner in which water quality affects supply reliability.

Chapter 10

Groundwater Management Plan

Checklist Organized According to Required and Recommended Components

Items to Address	Section of Law	Location in Plan
-------------------------	-----------------------	-------------------------

Required Components

Provide documentation that a written statement was provided to the public describing the manner in which interested parties may participate in developing the groundwater management plan.	10753.4(b)	Appendix F
Provide basin management objectives for the groundwater basin that is subject to the plan.	10753.7 (a)(1)	Chapter 9
Describe components relating to the monitoring and management of groundwater levels, groundwater quality, inelastic land surface subsidence and changes in surface flow and surface water quality that directly affect groundwater levels or quality or are caused by pumping.	10753.7 (a)(1)	Chapter 10 Appendix H
Describe plan to involve other agencies that enables the local agency to work cooperatively with other public entities whose service area or boundary overlies the groundwater basin.	10753.7 (a)(2)	Ch 8
Adoption of monitoring protocols for the components in Water Code Section 10753.7 (a)(1)	10753.7 (a)(4)	Appendix H
Provide a map showing the area of the groundwater basin as defined by DWR Bulletin 118 with the area of the local agency subject to the plan as well as the boundaries of other local agencies that overlie the basin in which the agency is developing a groundwater management plan.	10753.7 (a)(3)	Fig 3 - 2

Recommended Components

Manage with the guidance of an Advisory Committee.		Chapter 8 Appendix E
Describe the area to be managed under the plan including historical data related to groundwater levels, quality, subsidence, groundwater/surface water interactions, issues of concern and a discussion of supplies and demands.		Chapter 3
Describe how each of the management objectives helps meet goals.		Chapter 9
Provide a map showing locations of monitoring sites for groundwater levels and quality and stream gauges.		Appendix H
Summarize types of monitoring, types and frequency of measurements.		Appendix H
List monitoring well characteristics including well depth, screened intervals and well type.		Appendix I

2

AGENCY AND STAKEHOLDER BACKGROUND

Mojave Water Agency

The California State Legislature authorized the formation of the Mojave Water Agency (MWA) in 1959 for the purpose of managing declining groundwater levels in the Mojave Basin Area, El Mirage Basin, and Lucerne Basin. The Legislature’s act required the vote of the residents within the boundaries of the proposed agency, which would finalize the creation of the agency. With the vote of the people, MWA was formed on July 21, 1960. MWA was expanded by annexation in 1965 to include the Johnson Valley and Morongo Basin areas. Today, MWA covers an area of over 4,900 square miles, as seen in Figure 2-1.

MWA was formed to manage groundwater levels that have been in decline since the early 1950s. Today, overdraft has reduced groundwater stored in the region by nearly two million acre-feet. The enabling act authorizes MWA to do “any and every act necessary, so that sufficient water

MWA was formed to manage groundwater levels that have been in decline since the early 1950s.

may be available for any present or future beneficial use of the lands and inhabitants within MWA's jurisdiction.” Clearly, MWA needed to find ways to assure a long-term, reliable water supply and where possible, reverse the overdraft of the groundwater basin.

The first step MWA took to reduce the water shortage within its jurisdiction was to become a SWP contractor, which entitled it to 50,800 acre-feet per year of water delivered via the California Aqueduct. Later, MWA purchased an additional 25,000 acre-feet of entitlement from Berrenda Mesa Water District to bring its total annual entitlement to 75,800 acre-feet.



**Schlumberger
Water Services**

MWA Location

Mojave Water Agency
2004 Regional Water Management Plan

Figure 2-1

Date: January 2004

Prepared By: KTW

For management purposes under the Mojave Basin Area Judgment, MWA split the Mojave River watershed and associated groundwater basins into five separate “subareas.” The locations of the five subareas (Oeste, Este, Alto, Centro, and Baja) are shown in Figure 2-2. The subarea boundaries are based on hydrologic divisions defined in previous studies (DWR 1967), evolving over time based on a combination of hydrologic, geologic, engineering and political considerations. Also for the purposes of implementing the Judgment, the northern part of the

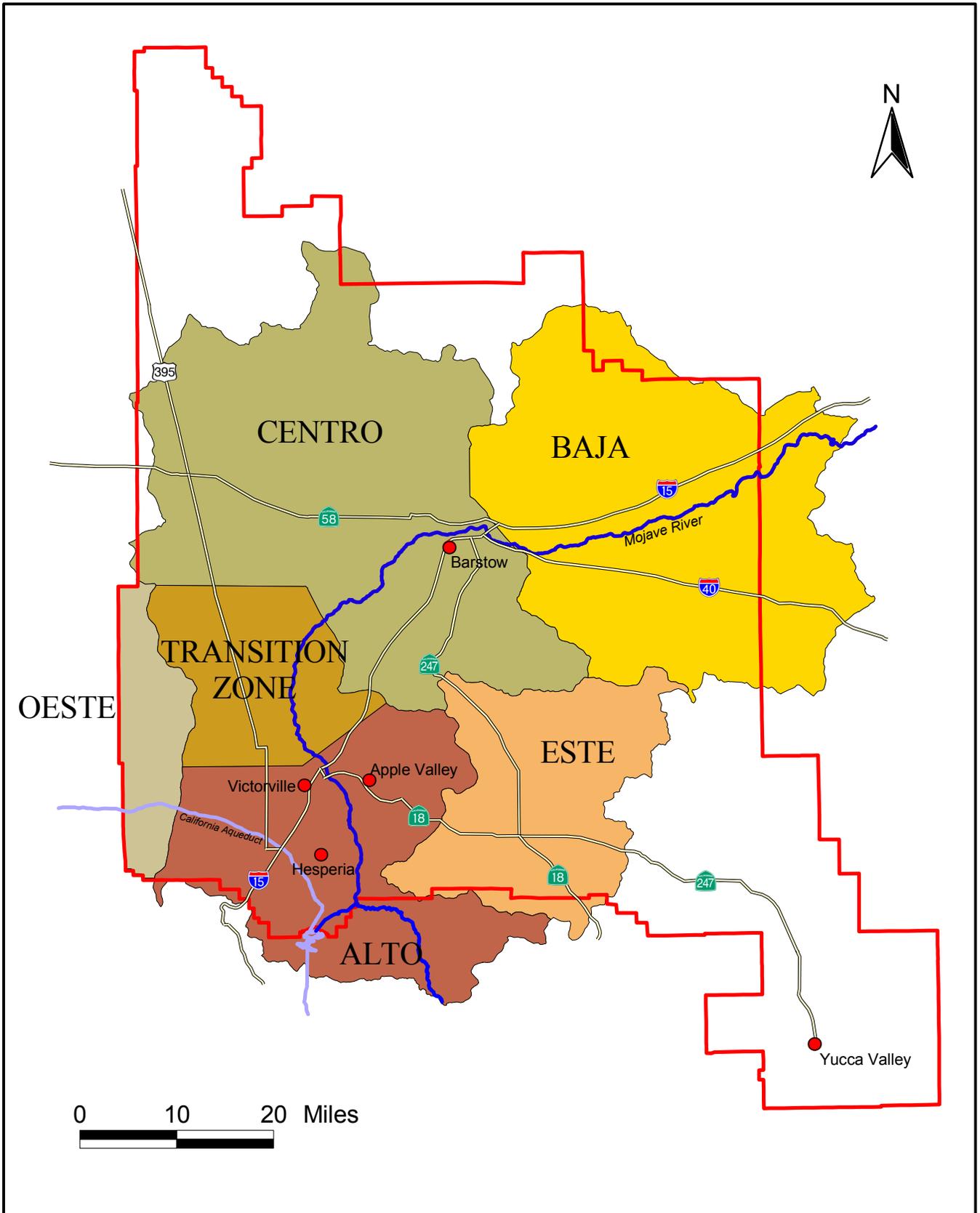


Alto Subarea was defined as a sub-management unit – the Alto Transition Zone; this zone was created to acknowledge local geology and to better address the water flow from Alto to Centro.

To distribute the water to the points of need, MWA has taken a central role in designing and constructing the Morongo Basin and Mojave River pipelines, which extend from the California Aqueduct. The Morongo Basin Pipeline was completed in 1994 and deliveries began in 1995 to the Hi-Desert Water District. Water flowing through the pipeline is diverted to recharge ponds in an effort to reduce overdraft in the Warren Valley Basin. The MWA also financed and

constructed the oversize of reach 1 of the Morongo Basin Pipeline to facilitate artificial recharge of the Alto Subarea along the Mojave River in the vicinity of Hesperia and Apple Valley. The Mojave River pipeline is being built in phases. Facilities have been constructed from the California Aqueduct to the vicinity of Barstow. The Hodge and Lenwood Recharge Sites, located west of Barstow, have also been constructed and received a total of 3,842 acre-feet of water during 1999-2000. The Daggett Recharge Site, east of Barstow, was completed in 2001. Investigations are underway to site additional recharge basins in the Baja Subarea. Figure 2-3 shows the locations of MWA’s current and future conveyance and recharge features.

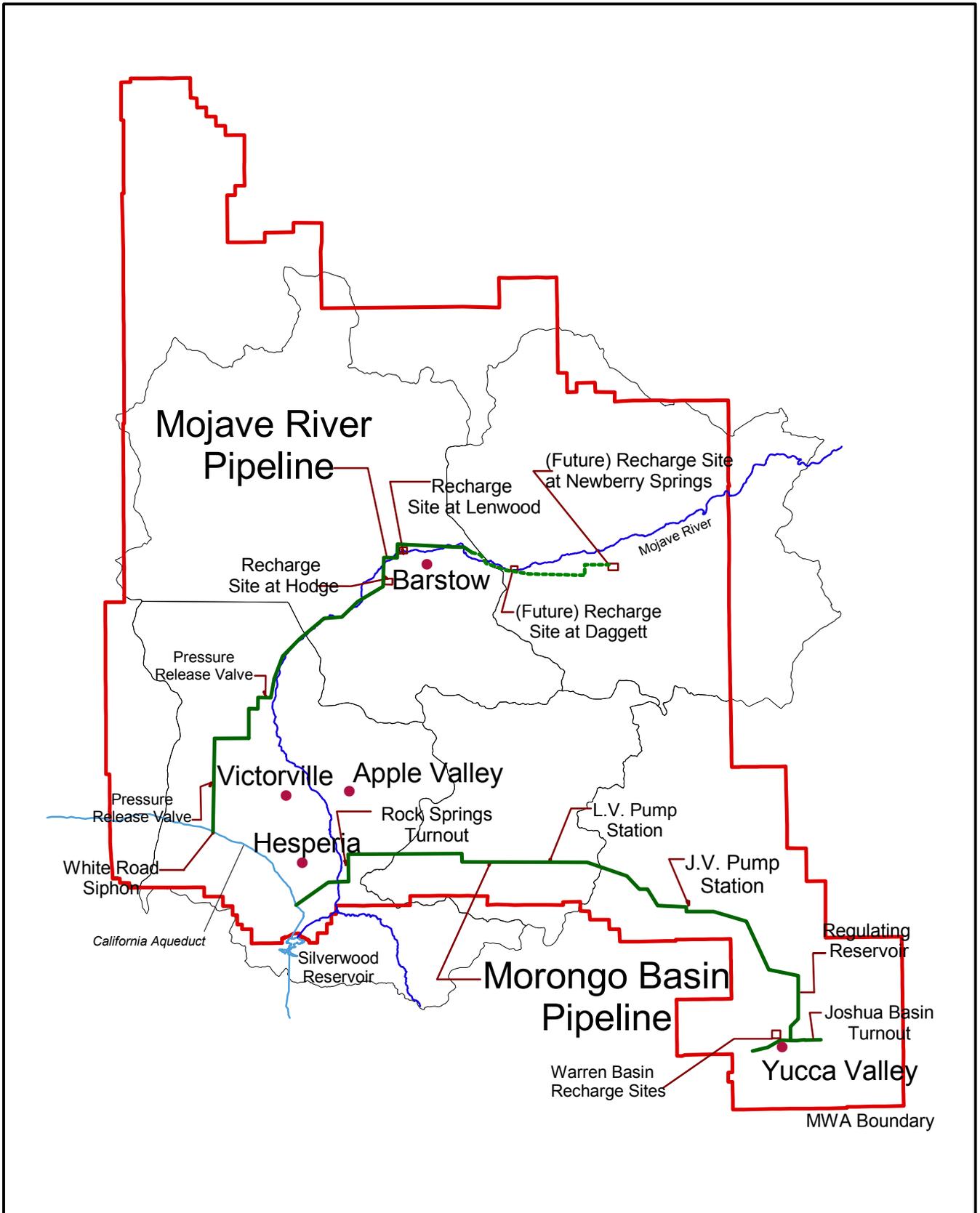
MWA roles and responsibilities have expanded since 1960. Today, MWA is involved with educational programs, water rights administration, and data collection. Adjudication of water rights within the Mojave Basin Area is a major role of the agency today and will be discussed in greater detail later in this chapter. MWA also has gradually assembled the data necessary to better understand the dynamic interaction between surface water and groundwater flows in the basins, and in particular, the significant role that the geology in the area plays in the migration of groundwater from south to north. Teaming with the U.S. Geological Survey (USGS), MWA has



**Schlumberger
Water Services**

Base Map
Mojave Water Agency
2004 Regional Water Management

Figure 2-2
Date: January 2004
Prepared By: KTW



**Schlumberger
Water Services**

Current and Future Facilities

Mojave Water Agency
2004 Regional Water Management Plan

Figure 2-3

Date: January 2004

Prepared By: KTW

constructed monitoring wells to measure groundwater quality and water levels, run geophysical surveys to understand variations in subsurface geology, installed an auxiliary Lower Narrows low flow gage on the bank opposite the main gage, took over as USGS cooperator for some gages that the California Department of Water Resources (DWR) had funded until the early 1990's, and established weather stations to monitor rainfall and evaporation. MWA also assumed responsibility for assignment of local well numbers in cooperation with DWR.

Adjudication

Mojave Basin Area

Fearing uncontrolled overdraft of the Mojave Basin, adjudication proceedings were initiated in the mid-1960s, but were never finalized. Triggered by the rapid growth within the Mojave Water Agency service area, particularly in the Victor Valley area, the City of Barstow and the Southern California Water Company filed a complaint in 1990 against upstream water users claiming that the increased withdrawals and lowering of groundwater levels reduced the amount of natural water available to downstream users. The complaint requested that 30,000 acre-feet of water be made available to the Barstow area annually and that MWA obtain supplemental water for use in other areas of MWA's service area.

About a year later, the Mojave Water Agency filed a cross-complaint which declared that the native waters of the Mojave River and underlying groundwater were insufficient to meet the current and future demands made upon them. The cross-complaint asked the court to determine the water rights of all surface water and groundwater users within the Mojave Basin Area and the Lucerne and El Mirage Basins. During the following two years, negotiations resulted in a proposed Stipulated Judgment that: 1) formed a minimal class of producers using 10 acre-feet or less per year who were dismissed from the litigation, and 2) offered a physical solution for water production by the remaining producers. The Superior Court bound the stipulating parties to the Stipulated Judgment in September 1993. The Court further bound the non-stipulating parties to the terms of the Stipulated Judgment in January 1996 following trial. The text of the Stipulated Judgment can be found in Appendix A.

Some of the non-stipulating parties appealed the Judgment of the Superior Court and the Appellate Court issued a final decision in June 1998. The final decision of the Appellate Court held the stipulating parties to the terms of the Stipulated Judgment, but excluded the appealing parties, with the exception of one appellant who sought a revised water production right under the Judgment. MWA requested the California Supreme Court to review the Appellate Court's decision in July 1998. The Supreme Court affirmed the Appellate Court's decision in August

2000 regarding the Stipulated Judgment and the exclusion of the appealing parties from the Judgment, but over-turned the decision of the Appeals Court as to the one party seeking additional production rights.



The Mojave Basin Judgment assigned Base Annual Production (BAP) quotas to each producer using 10 acre-feet per year or more, based on historical production. Users are assigned a variable Free Production Allowance (FPA), which is a uniform percentage of BAP set for each subarea. This percentage is reduced, or “ramped-down” over time until total FPA comes into balance with available supplies. This percentage was set at 70% for most subareas as of June 2003. Any water user that pumps more than their FPA is compelled to purchase replenishment water from MWA equal to the amount of production in excess of the FPA.

Warren Valley Basin

Groundwater from the Warren Valley Basin is used to supply Yucca Valley and its environs. Extractions from the Basin began exceeding extractions in the 1950s. The progressively increasing overdraft led to adjudication of the Basin in 1977.¹ In its Judgment, the court appointed the Hi-Desert Water District as Watermaster and ordered it to develop a physical solution for halting overdraft. Objectives identified by the Watermaster Board included managing extraction, importing water supplies, conserving stormwater, encouragement of conservation and reclamation, and protecting groundwater quality. A Basin Management Plan² was adopted that called for importing SWP water from MWA through the then-proposed Morongo Basin Pipeline to balance demand and replenish past overdraft. The text of the Warren Valley Judgment can be found in Appendix A.

Summary of 1994 Regional Water Management Plan

The first Regional Water Management Plan (RWMP) was completed in June 1994 by Bookman-Edmonston Engineering, Inc. The plan developed recommendations that followed the following broad objectives:

¹ Hi-Desert Water District v. Yucca Water Company Ltd., Case Number 172103, San Bernardino, California, September 16, 1977.

² Warren Valley Basin Management Plan, Kennedy/Jenks/Chilton, January 31, 1991. Adopted by Watermaster May 10, 1991.

1. Eliminate overdraft and meet future demands on the groundwater basins by obtaining additional imported water supplies and/or reducing consumptive use demands.
2. Protect the groundwater basins from degradations in water quality.
3. Participate in implementation of any judgment resulting from ongoing Mojave River adjudication.
4. Be responsive to changing conditions by modifying the present plan as necessary.
5. Work closely with local agencies and water purveyors on key issues, particularly water conservation.
6. Accomplish the above in a cost-effective and environmentally sound manner.

The plan provided the details for structural and non-structural projects that could be completed in part or in full over three phases. Phase 1 projects were proposed for development over the ensuing 5 years. Phase 2 projects were anticipated during the following 5 to 10 years, as financing would allow. Phase 3 projects were considered long-term goals scheduled for completion by the year 2015. The recommended projects for Phases 1, 2, and 3 are listed below, along with the current status of each.

Phase 1 (Structural)

- Drilling wells for monitoring program
Status: incomplete; more wells are needed away from Mojave River and deeper beneath the river
- Rock Springs recharge facility & turnout
Status: completed
- Increase recharge of natural supplies
Status: no action
- Groundwater recharge in the Centro and Baja subareas from Mojave River Pipeline
Status: Centro has two recharge basins (Hodge & Lenwood) and Baja has (Daggett). One additional basin is planned for Baja and siting studies are ongoing.
- Groundwater recharge in Este (Lucerne) from Morongo Basin Pipeline
Status: incomplete; no recharge, purchased land in Lucerne Valley, prepared preliminary design and performed environmental review
- Groundwater recharge in Oeste (El Mirage)
Status: no action, except for USGS feasibility of recharge in Sheep Creek
- Recharge in Morongo Basin with Morongo Basin Pipeline Extension
Status: recharge taking place in Warren Valley Basin

Phase 1 (Non-structural)

- Release to Mojave River from Lake Silverwood
Status: releases discontinued since the completion of the Rock Springs Turnout
- Water monitoring programs
Status: completed, but expanding
- Purchase of State Water Project (SWP) Water
Status: ongoing; however not all available water has been purchased due to financial constraints
- Legislative changes to MWA Act
Status: Act amended to allow MWA to implement well programs in furtherance of the Judgment
- Water Quality Protection Programs
Status: water quality monitoring for recharge programs at Rock Springs Outlet, Hodge, Lenwood and Warren Basin; MWA wells used to support water quality monitoring for Mojave Watershed program with State Board.
- Water conservation program to reduce consumptive use
Status: ongoing through education programs and demonstration gardens
- Investigation of additional water importation projects
Status: ongoing; purchased 25,000 acre-feet/yr of SWP entitlement from Berrenda-Mesa Water District; executed water exchange agreement with Solano County Water Agency
- Zones of Benefit to collect benefit assessments
Status: no action
- Improvement districts to finance facilities
Status: no action

Phase 2 (Structural)

- Groundwater extraction & delivery to Mojave River Aqueduct
Status: no action

Phase 2 (Non-Structural)

- Zones of Benefit to collect benefit assessments
Status: no action
- Improvement districts to finance facilities
Status: no action
- Contracts with purveyors
Status: ongoing

Phase 3 (Structural)

- Delivery of imported water and groundwater to water users
Status: Ordinance 9 water sale approved for City of Victorville from Mojave River Pipeline, ongoing deliveries to Hi-Desert Water District, Makeup and Replacement Water deliveries under the Judgment
- Meeting peaking requirements and constructing water treatment facilities
Status: no action

Phase 3 (Non-Structural)

- Contracts with purveyors
Status: ongoing
- Water allocation policies
Status: hierarchy of water delivery priorities during shortages identified through Ordinance 9; ongoing

Major Stakeholders

Success of any water management plan depends on the degree of involvement with the stakeholder community. In developing the water management alternatives for evaluation, MWA has been careful to involve stakeholders from the beginning of the process. This involvement

Success of any water management plan depends on the degree of involvement with the stakeholder community.

has included one-on-one interviews, group meetings, and evaluation questionnaires. Water users form the core of the stakeholder group in the basin, including water districts, cities, private water agencies, and agribusiness. Additional essential stakeholder involvement includes environmental organizations, regulatory agencies, development interests, and community associations.

The stakeholders noted in the following list have been notified regarding the outreach process organized by MWA during the RWMP update. Some of the common interests of the stakeholders in each group are also noted in the list. Chapter 8 provides a more detailed list of the stakeholder issues developed from the individual/group meetings and questionnaire process.

Water Agencies

Local water agencies share many issues related to local and regional water supplies. They are all interested in the ability of their individual systems to meet the needs of their customers. Each agency has its own set of quantity and quality needs and each agency has individual goals for the regional water system.

- Apple Valley Foothill County Water District
- Apple Valley Heights County Water District
- Apple Valley Ranchos Water Company
- Apple Valley View Water District
- Baldy Mesa Water District
- Bar H Mutual Water Company
- Bighorn-Desert View Water Agency
- Chamisal Mutual Water Company
- Daggett Community Services District
- Hesperia Water District
- Hi-Desert Water District
- Joshua Basin Water District
- Jubilee Mutual Water Company
- Juniper Riviera County Water District
- Lucerne Valley County Service Area 29
- Lucerne Valley Mutual Water Company
- Lucerne Vista Municipal Water Company
- Mariana Ranchos County Water District
- Newberry Community Services District
- Rancharitos Mutual Water Company
- San Bernardino County Special Districts
- Sheep Creek Water Company
- Silver Lakes Association
- Southern California Water Company
- Spring Valley Lake Association
- Thunderbird County Water District
- Victor Valley Water District
- Victor Valley Water Reclamation Authority
- Willow Wells Mutual Water
- Yermo Community Services District

State and Federal Agencies

The state regulatory agencies are charged with enforcing the State's laws associated with water rights, environmental protection, and the protection of water quality. The California Department of Water Resources has provided financial assistance for preparation of this plan. The U.S. Geological Survey has provided a variety of services for over 100 years, including stream gaging, hydrogeologic assessment and modeling. It is imperative that MWA works cooperatively with these agencies.

- California Department of Water Resources
- California Department of Fish and Game
- State Water Resources Control Board
- Lahontan Regional Water Quality Control Board
- U.S. Geological Survey

Municipalities (cities, county, other)

Municipalities may or may not be water purveyors. Regardless, all municipalities share a keen interest in their local and regional water supplies. The economic health of a region is tied to its ability to demonstrate that affordable high quality water is going to be available as the region develops.

- City of Adelanto
- City of Barstow
- City of Hesperia
- City of Victorville
- San Bernardino County Department of Public Works and Flood Control
- San Bernardino County Planning Department
- Town of Apple Valley
- Town of Yucca Valley

Miscellaneous Community Interests

Local community groups have an opportunity to provide input on issues and needs associated with their particular location. This type of specific input is very beneficial to the regional planning process.

- El Mirage Property Owners Association
- Public Works Advisory Committee, City of Hesperia
- Silver Valley Realty
- Mojave Basin Area Judgment Subarea Advisory Committees
- MWA Technical Advisory Committee (TAC)
- The Bradco Companies (real estate)
- Citizens for a Better Community
- Jess Ranch
- Newberry Springs – Harvard Property Owners Association
- Palisades Ranch
- Rancho Los Flores
- Silver Lakes Association
- Spring Valley Lakes Association

3

PHYSICAL SETTING

Much has been written about the geology and hydrology of the Mojave area, with some information dating back to the early 1900s. The U.S. Geological Survey (USGS), in cooperation with the Mojave Water Agency (MWA), conducted the most recent work in the area.³ Their

Developing viable alternatives requires a clear understanding of the region's physical setting.

report culminated several years of intense field work that included installation of groundwater monitoring wells along the Mojave River, geophysical surveys, surface water hydrology measurements, groundwater level measurements, groundwater quality sampling, meteorological measurements, and well production tests. The final component of this effort was the development of a comprehensive groundwater flow simulation model, used as an analysis tool to evaluate past and present groundwater conditions, as well as a predictive tool to evaluate the effects of future water usage and management scenarios.

This chapter summarizes the pertinent findings regarding the physical setting for the Mojave Basin Area and the Morongo Basin/Johnson Valley Area. The principal objective of this chapter is to highlight conclusions regarding the physical setting that have been developed since the publication of the 1994 Regional Water Management Plan (RWMP). The latest USGS study contains a more thorough presentation of these subjects.⁴

Physiographic Setting

The MWA service area lies in the California High Desert, which is part of the Mojave Desert (Figure 3-1). The High Desert Area is located on the northeastern flanks of the San Bernardino and San Gabriel Mountains, which separate the High Desert from the coastal basins and inland valleys of the greater Los Angeles area. These mountains, which reach elevations of over 10,000 feet above sea level, were uplifted along the San Andreas Fault. The High Desert Area is

³ Stamos et al. 2001

⁴ *ibid*

characterized overall as an alluvial plain. This plain consists of valleys and closed basins composed of water-bearing unconsolidated sediments. Hills and low mountains consisting of non-water-bearing consolidated bedrock separate these valleys and basins. The plain is criss-crossed by a series of northwest-trending geologic faults, resulting in offsets of geologic layering and barriers to groundwater flow. Overall, land surface elevations within the MWA service area range from 5,500 feet above sea level in the San Bernardino Mountains on the southern boundary to 1,500 feet near Afton Canyon on the eastern boundary.

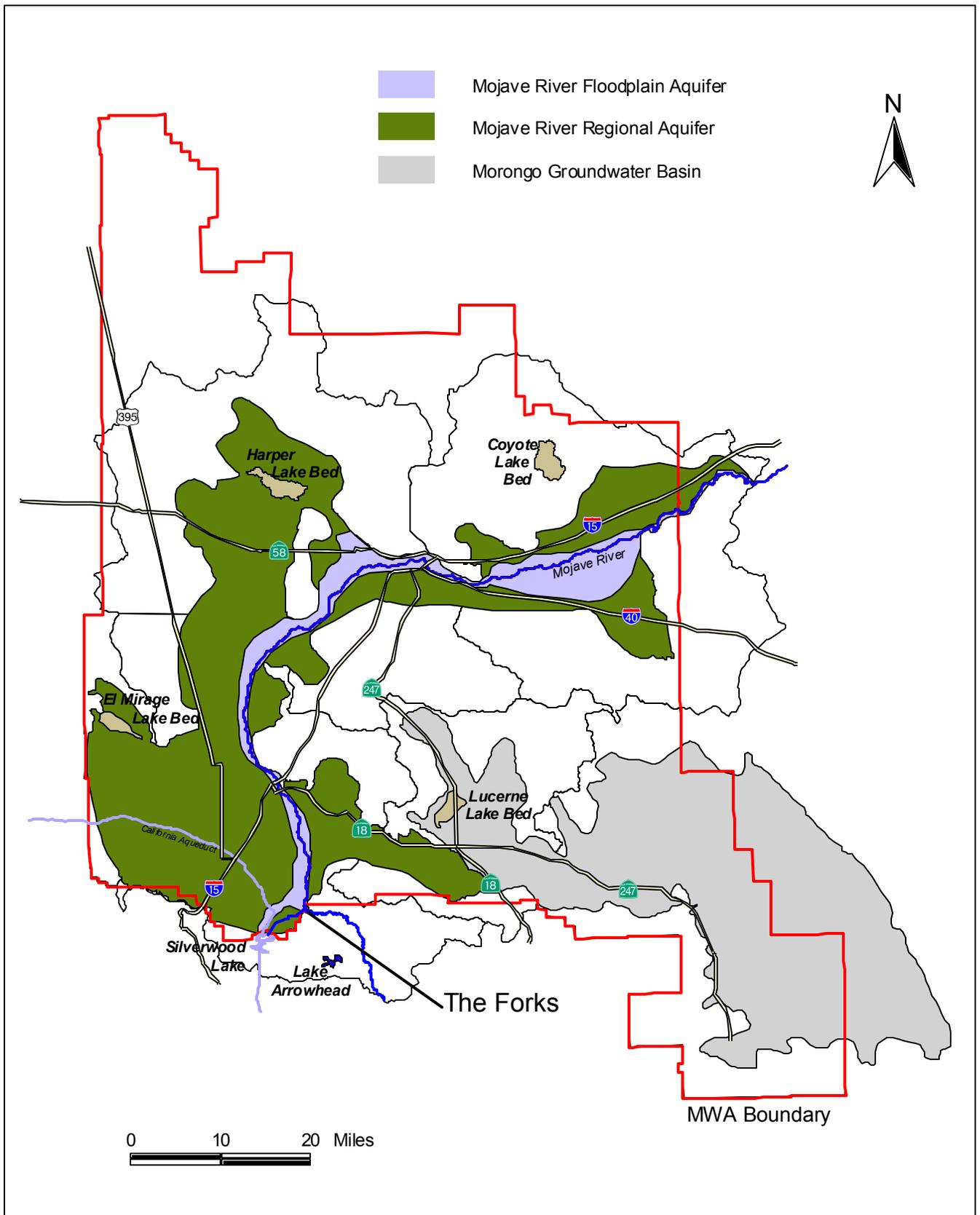
The MWA service area is divided into two major surface water drainage areas:

- the Mojave River Area that drains into the Mojave River or local terminal dry lakes. The Mojave River Area is the larger and more developed of the two.
- the Morongo Basin/Johnson Valley Area that drains into the Colorado River drainage or local terminal dry lakes.

Terminal dry lakes (often referred to as playas) are lake beds that collect water only during periods when there is sufficient runoff, have no outlet, and lose all their water to evaporation.

The Mojave River is the main surface water drainage feature within the MWA service area. The surface water drainage of the Mojave River covers an area of 3,800 square miles.⁵ It is fed by rainfall and snow pack from the San Bernardino Mountains. The river is formed by the confluence of two smaller streams descending from the mountains at a place called The Forks (Figure 3-1).

⁵ *ibid*



Hydrologic Setting

Mojave Water Agency
2004 Regional Water Management Plan

Figure 3-1

Date: June 2002

Prepared By: BCW

The river then runs north and then east for about 100 miles, where it flows through Afton Canyon and terminates at Soda and East Cronese Lakes; these lakes pond water only after major storm events. At present the Mojave River is perennial (continuously flowing) only along a short section downstream of The Forks, in the vicinity of Upper and Lower Narrows and Afton Canyon, and in the section immediately downstream of the Victor Valley Wastewater Reclamation Authority's treatment plant, about 4 miles downstream of the Lower Narrows. However, during and immediately after storms (principally during the winter), the Mojave River flows along several (sometimes all) of its reaches. Most of the river flow occurs immediately after storms.

The Morongo Basin/Johnson Valley area has no sizeable rivers, only small ephemeral streams that collect runoff from surrounding mountains during storms. The mountain stream runoff either percolates into the stream bed or, during large storm events, flows to dry lake beds where it evaporates. The area encompasses parts of five separate surface water drainages – Warren, Copper Mountain, Emerson, Means, and Johnson.

The groundwater basins have been designated in a number of ways. The Department of Water Resources Bulletin 118-03 defines 22 groundwater basins within the two broad hydrologic regions overlying the Mojave Water Agency area. The Mojave River Basin lies within the South Lahontan hydrologic region. The Warren Valley/Johnson Valley area and the portion of the Lucerne Valley east of the Helendale Fault lie in the Colorado River hydrologic region. The DWR basins are listed in Table 3-1. The DWR basins and the overlying water suppliers are displayed in Figure 3-2.

The DWR Coyote Lake Valley, Caves Canyon Valley, Kane Wash Area and Lower Mojave River Valley groundwater basins lie primarily in the Baja subarea. The Middle Mojave River Valley includes parts of the Transition Zone and Centro subarea. The Harper Valley groundwater basin is within the Centro subarea. The Upper Mojave River Valley basin includes parts of the Transition Zone, Alto, and Este subareas. The El Mirage Valley groundwater basin is primarily within the Oeste subarea. The Mojave River Valley basins cover an area of 1,400 square miles (Figure 3-1).

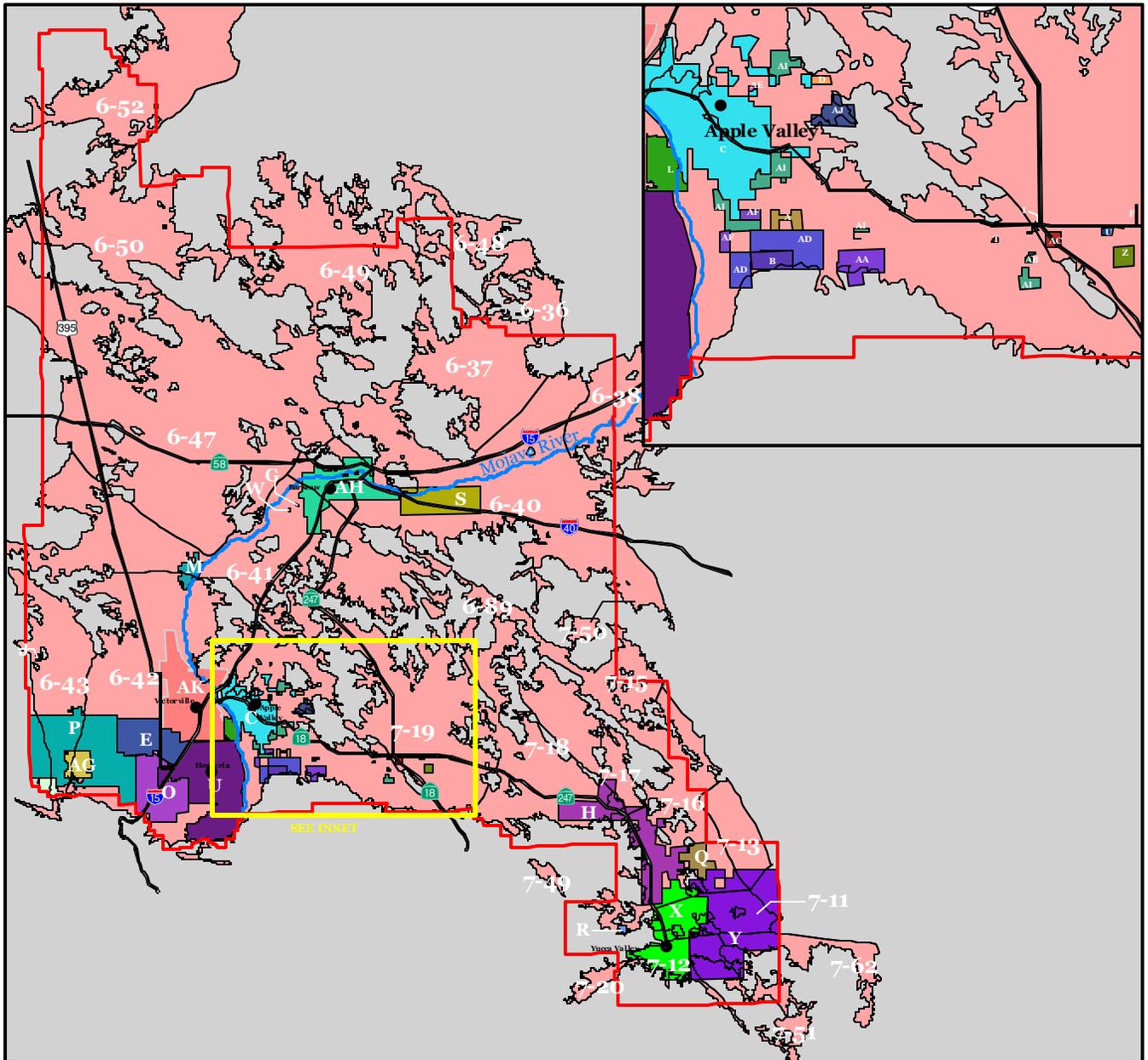
Table 3-1: DWR Groundwater Basins

Basin Number	Basin Name	Area ⁶ (acres)	Groundwater Budget Type ⁷
South Lahontan Hydrologic Region			
6-37	Coyote Lake Valley	88,200	A
6-38	Caves Canyon Valley	73,100	A
6-40	Lower Mojave River Valley	286,000	A
6-41	Middle Mojave River Valley	211,000	A
6-42	Upper Mojave River Valley	413,000	A
6-43	El Mirage Valley	75,900	A
6-47	Harper Valley	410,000	A
6-49	Superior Valley	120,000	C
6-50	Cuddeback Valley	94,900	C
6-52	Searles Valley	197,000	C
6-89	Kane Wash Area	5,960	C
Colorado River Hydrologic Region			
7-11	Copper Mountain Valley	30,300	A
7-12	Warren Valley	17,200	A
7-13	Deadman Valley	118,500	C
7-15	Bessemer Valley	39,100	C
7-16	Ames Valley	110,000	C
7-17	Means Valley	15,000	C
7-18	Johnson Valley Area	111,600	C
7-19	Lucerne Valley	148,000	A
7-20	Morongo Valley	7,240	C
7-50	Iron Ridge Area	5,250	C
7-62	Joshua Tree	33,800	A

⁶ Total area of basin both in and outside of MWA boundary

⁷ Type A – either a groundwater budget or model exists, or actual extraction data is available

Type C – not enough available data to provide an estimate of the groundwater budget or basin extraction



	DWR groundwater basin in (#-#)		County Svc Area-64		Joshua Basin WD
	MWA boundary		County Svc Area-70c		Jubilee Mutual Water Co
	Apple Valley Foothill Company WD		County Svc Area-70g		Juniper Riviera Co WD
	Apple Valley Heights (South)		County Svc Area-70j		Lucerne Valley Mutual Water Co
	Apple Valley Ranchos Water Co		County Svc Area-70l		Lucerne Vista Mutual Water Co
	Apple Valley View Mutual Water Co		County Svc Area-w1		Mariana Ranchos Co
	Baldy Mesa WD		County Svc Area-w4		Navajo Mutual Water Co
	Bar 'H' Mutual Water Co		Daggett Community Svcs District		Rancharitos Mutual Water Co
	Bar Len Mutual Water Co		Desert Dawn Mutual Water Co		Sheep Creek Water Co
	Bighorn Desert View WA		Desert Springs Mutual Water Co		So Cal Water Co- North
	Center Water Co		Hesperia WD		So Cal Water Co- South
	Chamisa Mutual Water Co		Hi Desert Mutual Water Co		Thunderbird Co WD
	County Svc Area-42		Hi Desert WD		Victor Valley Water District

**Schlumberger
Water Services**

Groundwater Basins and Water Districts

Mojave Water Agency
2004 Regional Water Management Plan

Figure 3-2

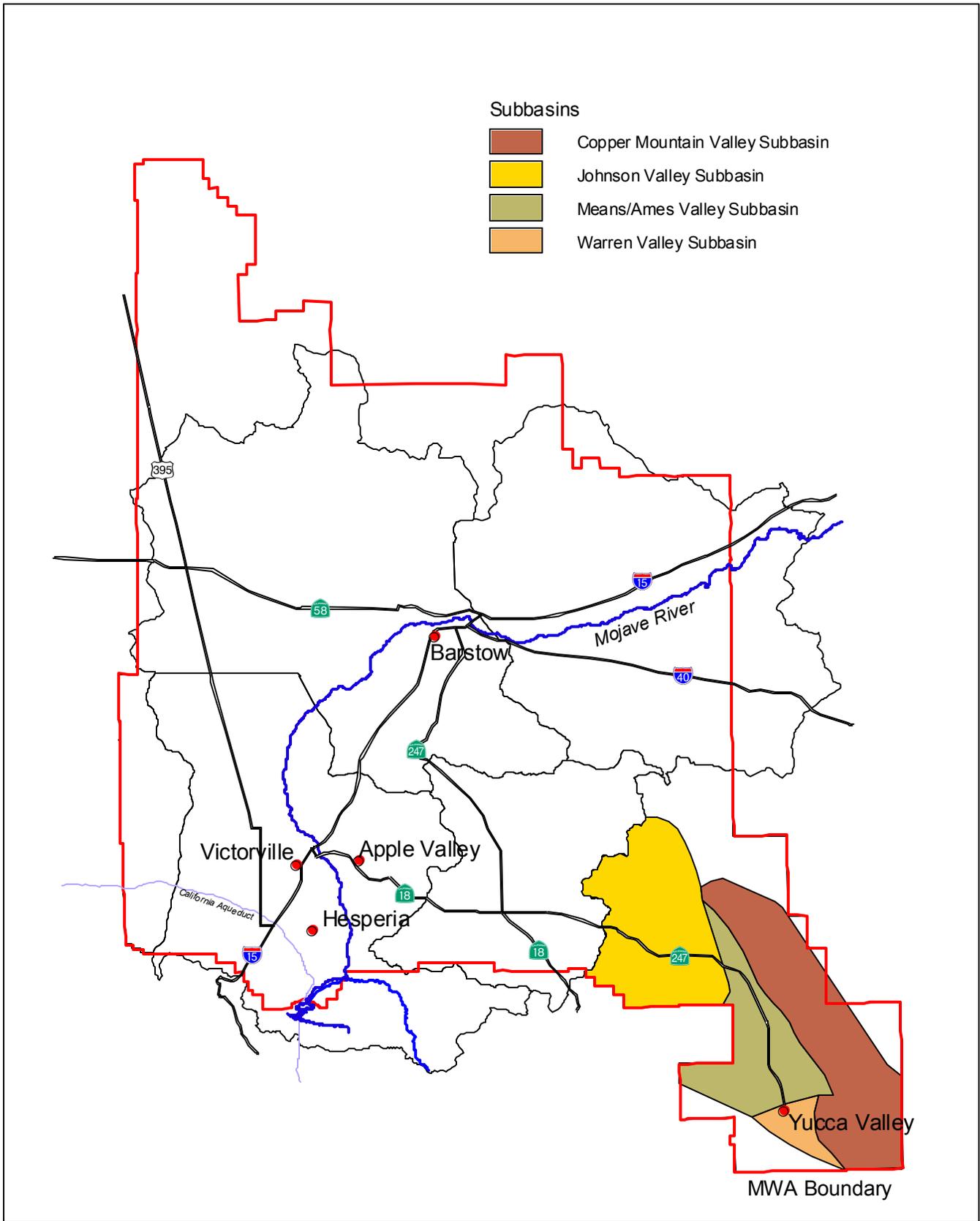
Date: October 2003

Prepared By: KTW

The northern portion of MWA also overlies portions of the Searles Valley, Cuddeback Valley, and Superior Valley groundwater basins. These areas are mostly unpopulated Federal lands administered by the Bureau of Land Management (BLM).

During recent investigations, USGS has grouped the other basins within the MWA service area into the Morongo Groundwater Basin. Including the portion of the Lucerne Valley east of the Helendale Fault in the Este subarea, this grouping encompasses nearly 1,000 square miles (Figure 3-1). The Morongo Groundwater Basin has been divided into as many as 17 subbasins by investigators in the past. All or part of 11 of these groundwater basins are within the MWA boundary. Three of these, Deadman Valley, Bessemer Valley, and Iron Ridge groundwater basins are mostly unpopulated Federal lands administered by BLM and lie near MWA's eastern boundary. Bulletin 118-03 states that there is not enough available data to provide either an estimate of groundwater budgets nor extractions from these basins. These basins are not further considered in this Plan.

There have been many different and conflicting references to the basins and subbasins within the MWA service area. For the purposes of this report, major "basins" are referred to as the Mojave Basin Area and the Morongo Basin/Johnson Valley Area. The Mojave Basin Area subbasin classifications used in this report are the: Este, Alto, Oeste, Centro, and Baja subareas defined in the Mojave Basin Judgment. The Morongo Basin/Johnson Valley Area subbasin classifications are shown in Figure 3-3. The subbasin classifications are Johnson Valley, Means/Ames Valley, Warren Valley, and Copper Mountain Valley. These are the same classifications used in the 1994 RWMP. *Groundwater* basins defined in DWR Bulletin 118 are different from the major basins and are shown in Figure 3-2. This figure also shows the boundaries of the overlying water supply agencies.



**Morongo Basin/Johnson Valley
Area Subbasins**

Mojave Water Agency
2004 Regional Water Management Plan

Figure 3-3

Date: January 2004

Prepared By: KTW

Geology

The geology of the Mojave Basin Area is characterized by sedimentary alluvial basins bordered by igneous and metamorphic mountain ranges and uplands; the uplands dominated by the San Gabriel and San Bernardino Ranges along the Mojave Basin's southern border. A typical geologic cross-section depicting the geologic sequence is shown in Figure 3-4. The recently updated geologic map for the basin is shown in Figure 3-5.⁸ The ranges and uplands are composed of pre-Tertiary (greater than 65 million years ago) igneous and metamorphic rocks (labeled as pTb in accompanying figures), and Tertiary (1.64 to 65 million years ago) volcanic and sedimentary rocks (Tv and Ts, respectively). Numerous extensive strike-slip faults trend northwest to southeast across the basin, causing predominantly horizontal displacement (but also vertical displacement for some faults) in the geologic section.

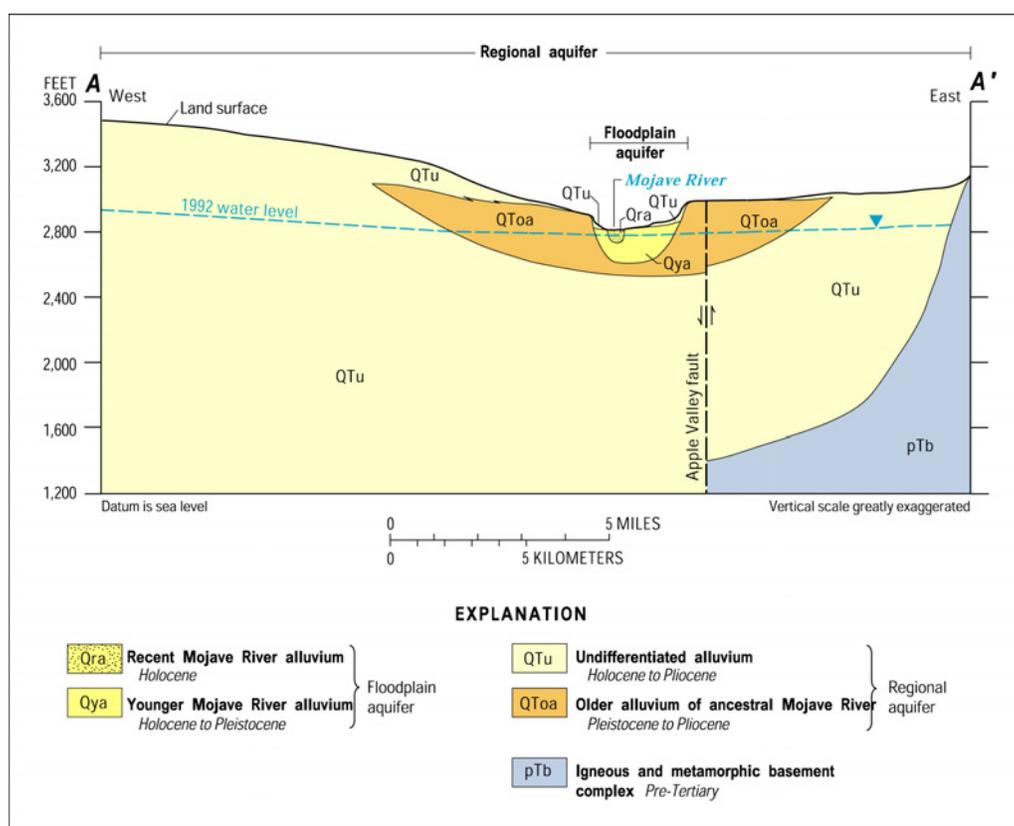
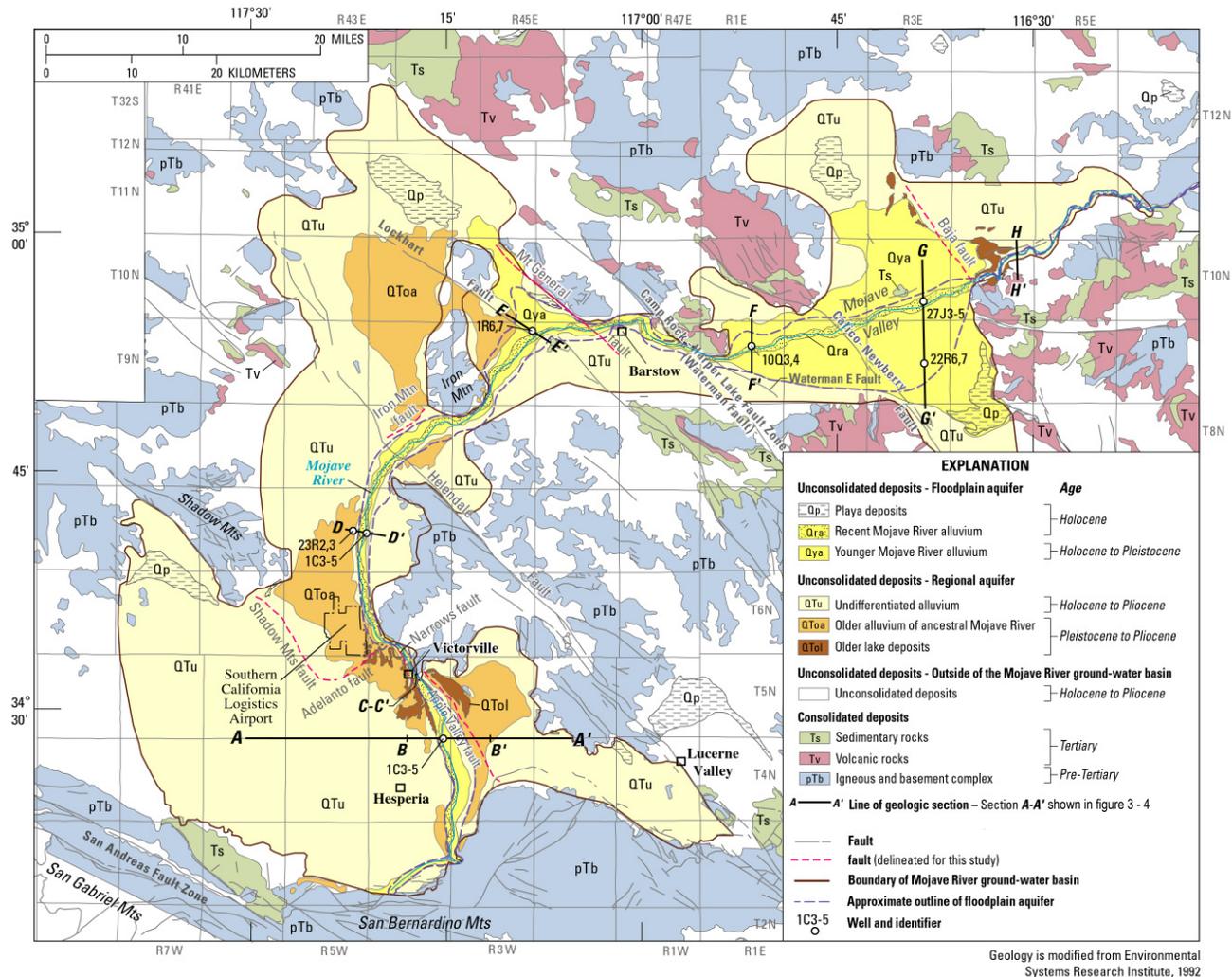


Figure 3-4: Typical Geologic Cross-Section of Mojave River Groundwater Basin⁹

⁸Stamos, et al., 2001

⁹ibid



Source: Stamos et al., 2001

Geology of Mojave River Groundwater Basin

Mojave Water Agency
2004 Regional Water Management Plan

Figure 3-5

Date: January 2004

Prepared By: KTW

Schlumberger
Water Services

The alluvial basins are composed of Quaternary (0 to 1.64 million years ago) unconsolidated river, lake, and playa deposits. The river deposits comprise different ages of granitic sand, silt, and gravel laid down by the Mojave River and its predecessors – the youngest deposits directly surrounding the current river bed, with progressively older deposits further from the river or deeper below it. Surrounding and underlying the current and ancestral Mojave River alluvium are poorly sorted alluvial deposits from ancestral alluvial fans, braided-streams, lakes or playas.

The geology of the Morongo Basin/Johnson Valley Area has not been investigated to the same degree as the Mojave Basin Area. In general, the area is similar to the Mojave Basin Area – sedimentary basins surrounded by igneous/metamorphic mountain ranges/uplands. The sedimentary basins are composed of Quaternary and Tertiary continental deposits (Smith and Pimentel 2000).¹⁰ The mountain ranges include the Ord and Granite Mountains in the north, Bullion Mountains in the east, San Bernardino Mountains in the southwest, and Pinto and Little San Bernardino Mountains in the south. As in the Mojave Basin Area, numerous northwest to southeast trending strike-slip faults traverse the Morongo Basin/Johnson Valley Area.

Groundwater

The predominant groundwater basin within the MWA service area is the Mojave River Groundwater Basin, encompassing 1,400 square miles as outlined in Figure 3-1, and having an estimated total water storage capacity of nearly 5 million acre-feet.¹¹ This basin is essentially a closed basin – very little groundwater enters or exits the basin. However, within the basin groundwater movement occurs between the different subareas, as well as groundwater-surface

water and groundwater-atmosphere interchanges. Groundwater is recharged into the basin predominantly by (1) infiltration of water from the Mojave River, accounting for 80% of the total basin natural recharge¹² (2) infiltration of storm runoff from the mountains, and (3) manmade recharge (from irrigation, wastewater, fish hatcheries, and imported water).

The Mojave River Groundwater Basin has nearly 5 million acre-feet of storage capacity.

Over 90% of the basin groundwater recharge originates in the San Gabriel and San Bernardino Mountains.¹³ Groundwater is discharged from the basin primarily by well pumping, evaporation through the soil, transpiration by plants, seepage into dry lakes where accumulated water evaporates, and seepage into the Mojave River.

¹⁰ Smith and Pimentel 2000

¹¹ Bookman-Edmonston Engineering, Inc. 1994

¹² Stamos et al. 2001b

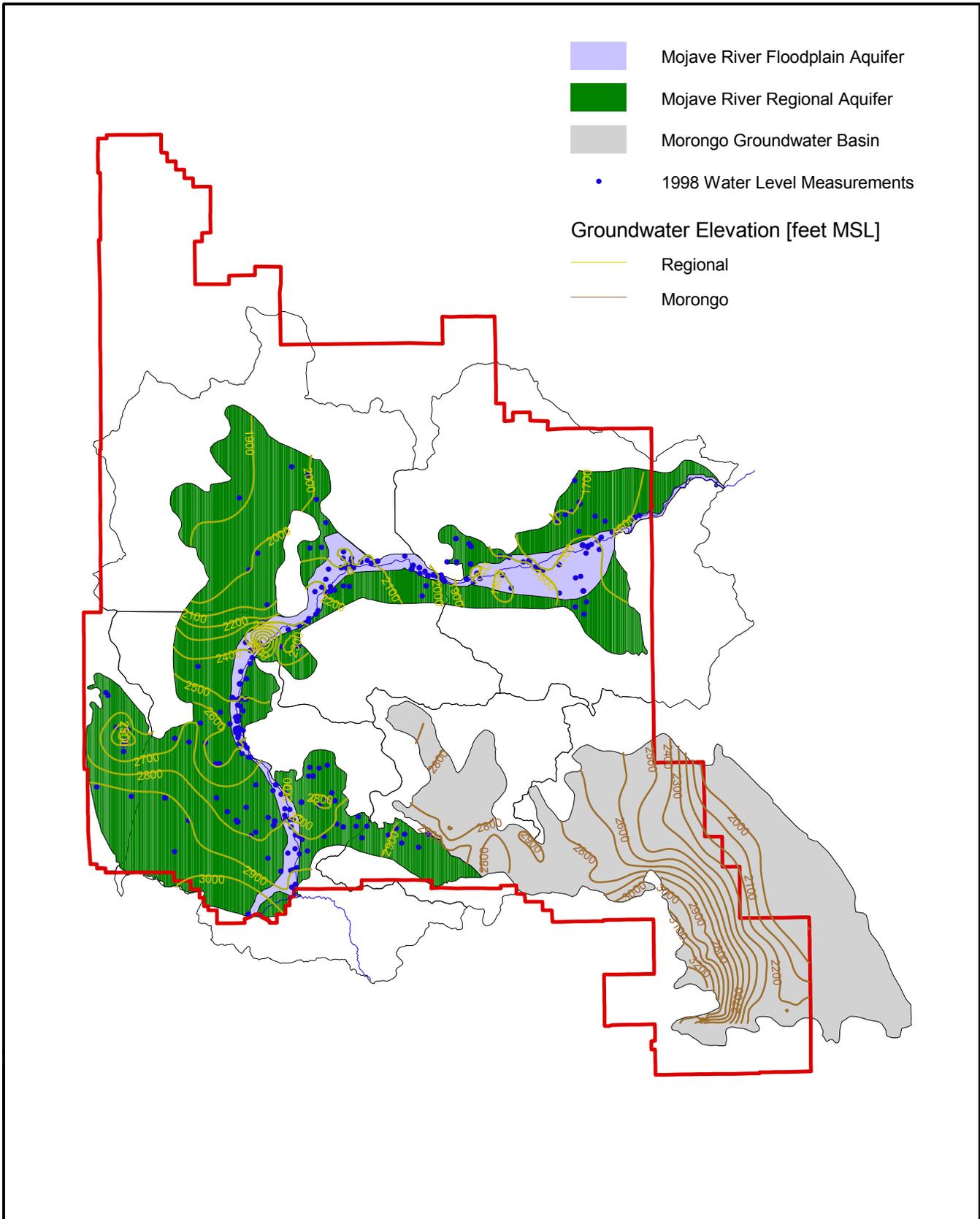
¹³ Hardt 1971

The Morongo Groundwater Basin (including a portion of the Lucerne Basin which is in the Este Subarea) encompasses 1,000 square miles, of which about 60% lies within the MWA service area (Figure 3-1). This basin is composed of a large number of both closed and connected subbasins. Groundwater is recharged into the basin primarily by (1) infiltration of water from ephemeral streams and (2) manmade recharge. In 1995, artificial recharge ponds were installed by MWA near Yucca Valley in the Warren Valley subbasin with funding provided by a DWR loan which is currently being repaid by Hi-Desert Water District customers.

Groundwater is discharged from the Morongo Groundwater Basin primarily by well pumping, evaporation through the soil, transpiration by plants, and seepage into dry lakes where accumulated water evaporates.

Figure 3-6 shows a water table contour map of the Mojave River and Morongo Groundwater basins determined from well water level measurements in 1998. The direction of groundwater flow is perpendicular to the contours. Within the Mojave Basin Area, the groundwater flow direction is generally to the north from the base of the San Gabriel and San Bernardino mountains to near Iron Mountain; the flow then changes to the east from Iron Mountain to Afton Canyon. On a subbasin scale, the groundwater flow direction is as follows:

- Este Subarea – east to west on the southwest side of the Helendale Fault, changing to more northward at the Alto Subarea boundary. The Helendale Fault acts as a groundwater flow barrier, resulting in higher groundwater levels on the southwest side of the fault. On the northeast side of the fault, flow is radially inwards towards the northeast part of Lucerne (dry) Lake – an evaporation discharge site
- Oeste Subarea – south to north/northeast, with a dry lake in the northern part of the subarea (El Mirage Lake) that acts as an evaporation discharge site
- Alto Subarea – south to north/northeast
- Centro Subarea – south to north on the west side of Iron Mountain, leading to Harper Lake that acts as an evaporation discharge site. East of Iron Mountain there is flow south to north and northwest around the mountain, ending at Harper Lake, as well as flow to the east/northeast
- Baja Subarea – west to east/northeast towards Afton Canyon, with some flow heading northward to Coyote Lake – another evaporative discharge site



Schlumberger
Water Services

1998 Water Level Contours

Mojave Water Agency
2004 Regional Water Management Plan

Figure 3-6
Date: January 2004
Prepared By: KTW

Groundwater flow in the Morongo Groundwater Basin east of the Este Subarea is generally from west to east-northeast (Figure 3-6). Natural recharge influx originates from the mountains on the southern and western boundaries of the basin – resulting in groundwater flow gradients to the north, east, and south adjacent to these boundaries, before turning to the east-northeast.

Groundwater is almost universally flowing in an east-northeast direction to the eastern boundary of MWA. There is no water level data to verify whether the flow continues in this direction beyond MWA boundary. Localized groundwater flow conditions exist in the vicinity of the developed area of Yucca Valley, where there is an artificial recharge site.

The Regional Aquifer in the Morongo Groundwater Basin is composed of Quaternary and Tertiary sediments of continental origin, bounded and traversed by faults in many of the subbasins.¹⁴ The sediments are unconsolidated near the surface, becoming partly consolidated and less permeable at depth; most well production comes from the unconsolidated section. Aquifer thickness is not well known throughout the basin, but is known to be greater than 750 feet near Yucca Valley and Joshua Tree based on well depths and is believed to be as much as 10,000 feet thick.¹⁵ The aquifer system in the Morongo Groundwater Basin has not been characterized in detail. Water quality is not known at depth.

The major development in understanding the geology and hydrogeology of the Mojave Basin Area in the past few years has been a better differentiation of the alluvial aquifers that lie beneath and near the Mojave River, and in particular, the nature of groundwater flow through these units. In the past, the conceptual model for the alluvium that lies beneath the Mojave River has been more or less a homogeneous unit of interbedded sands, gravels, silts and clays. Recently studies have led researchers to conclude that the permeability of the alluvium changes significantly with horizontal and vertical distance from the river course, resulting in two interconnected aquifers: the Floodplain Aquifer and the Regional Aquifer.¹⁶

The new conceptual model is illustrated by the USGS cross-section¹⁷ presented herein as Figure 3-4. Directly beneath the river, unconsolidated alluvium up to 250 feet thick called Recent Mojave River Alluvium (Qra) and Younger Mojave River Alluvium (Qya) has relatively high permeability with mostly clean sands and gravels, which results in rapid percolation of surface flow. In some places Qra and Qya are separated by a low permeability, clay-rich layer; this layer is most pervasive in the Alto Transition Zone. This alluvium (Qra and Qya) has been designated

¹⁴ Smith and Pimentel 2000

¹⁵ Moyle 1984

¹⁶ Stamos, et al., 2001

¹⁷ *ibid*

the Floodplain Aquifer. The aquifer extends in width from 120 feet at the Upper Narrows to more than five miles in parts of the Baja Subarea, as shown in Figure 3-1.¹⁸

One of the formations comprising the Regional Aquifer is an older unconsolidated alluvial unit called the Older Alluvium of the Ancestral Mojave River (QToa). This unit lies directly beneath and alongside the Qya alluvium, extending up to five miles on each side of the present river course – not always outcropping at the surface (Figure 3-4). The thickness of the unit is about

The unique characteristics of the Floodplain and Regional Aquifers are important considerations for developing alternatives.

400 to 500 feet south of the Southern California Logistics Airport and about 25 to 80 feet north of that point.¹⁹ The Older Alluvium has lower permeability than the Floodplain Aquifer units and is made up of fluvial sands, gravels, and silts deposited by the ancestral Mojave River during the middle Pleistocene (about 800,000 years ago).

The other unit comprising the Regional Aquifer is the Undifferentiated Alluvium (QTu), which is generally less influenced by the recent and ancestral Mojave River. This is by far the largest alluvial unit in the basin, consisting of poorly sorted sands, gravels, silts, and clays. The Undifferentiated Alluvium has lower permeability than the alluvium deposited by the recent and ancestral Mojave River due to the accumulation of secondary cementing agents and poor grain sorting. Also, the permeability in this unit decreases with increasing depth, resulting in reduced flow between the upper 300 to 800 feet and lower zones (as deep as 2,000 feet). The surface boundaries of the two aquifers approximated by USGS are shown in Figure 3-1.

The difference in groundwater flow characteristics between the Floodplain and Regional aquifers is well illustrated by the difference in representative hydrologic properties. The two most important characteristics describing the occurrence and movement of groundwater are the rate at which water can move through a cross-section of the aquifer and the amount of water that can be drained from a volume of the aquifer; these characteristics are quantified by the properties of transmissivity and specific yield, respectively.

Transmissivity is directly proportional to a particular aquifer's thickness. Comparison of transmissivity estimates in the two aquifers, determined from well pumping analysis²⁰ and calibration of the USGS simulation model,²¹ indicate that as much as a 10 to over 1,000 times greater amount of water can be moved across an identical width of the Floodplain Aquifer within

¹⁸ *ibid*

¹⁹ *ibid*

²⁰ Hardt 1971

²¹ Stamos, et al., 2001

the same time period as compared to the Regional Aquifer. Comparison of specific yield estimates determined from calibration of the USGS simulation model²² indicate that the Floodplain Aquifer can store about two to four times as much removable water per unit volume than the Regional Aquifer.



While the Floodplain and Regional aquifers have different hydrologic properties, they are connected hydraulically; that is, water and fluid pressure responses are transmitted between the aquifers.²³ Unlike many of the faults in the area that are barriers to flow, there is not a continuous impermeable barrier between the two aquifers; the geologic conceptual model is that the younger, higher permeability, unconsolidated alluvium of the Floodplain Aquifer lays directly on top of the older, lower

permeability, unconsolidated alluvium of the Regional Aquifer.²⁴ The hydraulic connection between aquifers is supported by chemical and isotopic data which indicate that in areas near the river the Regional Aquifer contains water that was recharged by the Mojave River less than 50 years ago.²⁵ However, the same study concludes that the earliest the water at some distance from the Mojave River (located within the Regional Aquifer) has been recharged is on the order of thousands of years.

Recent groundwater simulation model runs by the USGS have shown that in the Alto, Transition Zone and Baja subareas the groundwater flowed from the Regional Aquifer to the Floodplain Aquifer during predevelopment conditions and from the Floodplain Aquifer to the Regional Aquifer (a reversal of flow) during the adjudication period from 1931-90.²⁶ In the Centro Subarea groundwater flowed from the Floodplain Aquifer to the Regional Aquifer during both periods, but the rate of flow increased significantly during the adjudication period. These results indicate that pumpage can cause changes in fluid pressure that can dramatically reverse and increase the amount of groundwater flowing from the Floodplain to the Regional Aquifer – further supporting the contention that the aquifer systems are connected. However, the results do not necessarily show that the reverse scenario is plausible – that changes in the pumpage or recharge can cause a large inflow of groundwater from the Regional to the Floodplain Aquifer.

²² *ibid*

²³ Stamos et al. 2001b

²⁴ *ibid*

²⁵ Izbicki et al. 1995

²⁶ Stamos et al. 2001b

Nor do the results indicate how far into the Regional Aquifer, and at what rate, the inflow from the Floodplain Aquifer reaches.

The USGS has applied their model to simulate the effect of artificial recharge on groundwater levels in the Mojave River Groundwater Basin.²⁷ These modeled results show that 20 years of artificial recharge at eight sites along the Mojave River and a few locations in the Regional Aquifer markedly mitigate the decline in groundwater levels within a ten mile radius of the recharge sites, particularly compared to drought conditions. The simulation does not explicitly account for the movement of the artificial recharge water through the unsaturated zone to the water table, a process that could take a long time and result in considerable water losses. A chemical tracer study performed by the USGS at a potential artificial recharge site near Victorville (Alto Subarea)²⁸ in a wash off the main Mojave River channel concludes that it takes about 200 years for natural recharge water from an intermittent stream bed to infiltrate to the water table 130 meters below the surface. However, it should be noted that constant wetting from artificial recharge should considerably decrease the time required for water to reach the water table.

The significance of the recent geologic and hydrogeologic findings from a regional water management standpoint is that water moves through the Floodplain Aquifer at much higher rates than through the Regional Aquifer, although the two aquifers appear to be hydraulically linked. As a consequence, stresses originating from either of the aquifers can significantly affect groundwater flow direction and rates in the Floodplain Aquifer, as well as recharge rates from the Mojave River into the Floodplain Aquifer – which accounts for 80% of the total recharge to the Mojave River Groundwater Basin.²⁹

The slow groundwater flow rates in the Regional Aquifer and the preferential groundwater flow path along the much more permeable Mojave River may make it difficult to recharge the pumping depressions in the Regional Aquifer by way of percolation ponds along the river. Therefore, overcoming low groundwater levels in pumping depressions that are away from the river will require recharge facilities overlying the Regional Aquifer. Further, because of the very low permeability zones layered within the undifferentiated alluvium that might restrict vertical migration of recharge water, injection wells should be investigated as a mechanism to recharge these areas.

²⁷ *ibid*

²⁸ Izbicki et al. 2000

²⁹ Stamos et al. 2001b

Another key finding is how significantly the numerous geologic faults impede groundwater flow in the basin. At least 12 of the faults that cross the basin (faults are shown in Figure 3-4), mostly in a northwest-southeast direction, are horizontal barriers, or partial barriers, to flow in the Regional Aquifer and, in some cases, the Floodplain Aquifer.³⁰ These faults are characterized by large, “stair step” drops in the water table across the faults and, in some cases, significant changes in the groundwater flow direction – indicating limited groundwater movement across the faults.

DWR Documentation of Overdraft Conditions

The Department of Water Resources’ Bulletin 118 series documents conditions in California’s groundwater basins. The 1980 edition of Bulletin 118 states that there is evidence of overdraft in the following basins: Lower Mojave River Valley, Middle Mojave River Valley, Upper Mojave River Valley, Harper Valley, Warren Valley and Lucerne Valley.

The 2003 edition of Bulletin 118 did not include an evaluation of individual groundwater basins to determine if they were in overdraft.

Efforts to Eliminate Overdraft

Each of the groundwater basins that are identified as being in overdraft in Bulletin 118 has been subjected to adjudication. The Lucerne Valley and Upper, Middle, and Lower Mojave River Valley basins are included in the Mojave Basin Area Judgment. The Warren Valley Basin is adjudicated by the Warren Valley Basin Judgment. The Mojave Basin Area and Warren Valley adjudications mandate that the groundwater extractions from each basin do not exceed the estimated annual supplies, and empower the Watermasters of each basin to enforce pumping limits to ensure that the groundwater basins are not overdrafted.

One of the fundamental objectives of this Plan is to “balance future water demands with available supplies recognizing the need to stabilize the groundwater basin storage balance over long-term hydrologic cycles.” As part of preparation of this Plan update, projects and management actions were identified that would allow MWA to meet this objective by 2020 while also meeting a second objective to “maximize the overall beneficial use of water throughout MWA by supplying water in quantity and of quality suitable to the various beneficial uses.” These objectives are described in greater detail in Chapter 9.

³⁰ *ibid*

Surface Water

Riparian Habitat/Wetlands

Within the Mojave Water Agency boundaries are various habitat types that are mostly characterized by desert plants and animals. However, there are some important wetland and riparian areas that exist along the Mojave River, Harper Dry Lake, portions of Sheep Creek, and various other drainages. How the agency addresses these areas is mostly dependent on whether they lie within, or outside, the Mojave Basin adjudicated area and Exhibit H to the Judgment. Exhibit H outlines a Biological Resource Mitigation Trust Fund that provides funding to support water table elevations that DFG proposes as necessary to maintain the riparian habitat of these areas, including specific species. Specific wells and monitoring locations are established in Exhibit H. A biological mitigation fund is described which will be expended for mitigation if certain criteria aren't met. For a detailed list of species, monitoring requirements, and biological trust fund conditions please refer to Exhibit H of the Mojave River Area Judgment located in Appendix A of this Plan.

Exhibit H

Exhibit H of the Mojave River Area Judgment defines riparian areas to be maintained in the Mojave River Floodplain from approximately the Upper Narrows to the Lower Narrows, the Lower Narrows to the Helendale Fault, Transition Zone, and the Baja Subarea reach of the Mojave River also referred to as the Camp Cady area (refer to habitat figures in Exhibit H). Mitigations defined for these riparian areas consist of hydrologic flow requirements and groundwater or surface water elevations.

Exhibit H specifies the flow desired by Fish and Game to maintain riparian habitat in the Transition Zone to be 21,000 acre-feet per year. Much of the flow in the Transition Zone comes from the wastewater treatment facility owned and operated by the Victor Valley Wastewater Reclamation Authority (VWVRA) who is not a party to the adjudication. In order to assure maintenance of the riparian area in the Transition Zone, DFG entered into a Memorandum of Understanding with VWVRA in July 2003 to maintain flows from the wastewater treatment facility that will, in conjunction with base flow, provide 15,000 acre-feet per year to the Transition Zone. VWVRA discharge obligations will be limited to 9,000 acre-feet per year from the treatment facility. This MOU was entered into to ensure that any construction and operation of sub-regional treatment facilities would not adversely affect the riparian areas of the Transition Zone.

Riparian areas between the Upper and Lower Narrows consist mostly of Cottonwood Willow habitat that is in fairly good condition. The San Bernardino County Flood Control District does regular mechanical maintenance of the channel, and the area is highly urbanized. DFG is not currently concentrating efforts to restore habitat in this area.³¹

As recent as the mid-1970s, the Camp Cady area had thriving Mesquite groves with three ponds in the central and eastern sections. Since then, groundwater elevations have dropped about 40 feet and most of the Mesquite trees on the western end are dead or dying. Flood flows in the 1990s damaged earthen dikes impounding water in the channel and the ponds have since emptied leaving little water in the river channel. DFG has purchased property at the western edge of this area and is focusing efforts on maintaining channel flows, and perhaps reestablishing surface water ponding, to provide habitat for terrestrial animals.

Groundwater levels were established in Exhibit H for key wells in the Mojave River floodplain. These wells, and their associated groundwater levels as measured from the ground surface to standing water are included below in Table 3-2.

Table 3-2: Groundwater Elevations Established in Exhibit H

Well	Location	Groundwater Level (feet)
H1-1	Victorville/Alto zone (upper Narrows area)	7.0 below surface
H1-2	Victorville/Alto zone (upper Narrows area)	7.0 below surface
H2-1	Lower Narrows/Transition Zone zone	10.0 below surface
H3-1	Harvard/Eastern Baja Riparian Forest Habitat (Camp Cady Area)	7.0 below surface
H3-2	Harvard/Eastern Baja Riparian Forest Habitat (Camp Cady Area)	1.0 above surface

Note: Of these wells, only H3-1 has been installed; other monitoring is accomplished using surrogate wells or gauging stations (L. Eckhart, personal communication, November 26, 2003).

Areas outside Exhibit H

There are also riparian areas outside of the adjudicated area boundary both within and outside the MWA service area. Most notably are riparian areas from Big Bear to the adjudicated area along the Deep Creek, the Western Fork of the Mojave River from Silverwood Lake, the Afton Canyon area on the eastern end of the adjudicated area, and areas in Harper Dry Lake and Lucerne Valley.³²

Most of the land along Deep Creek is owned and managed by the U.S. Forest Service. The riparian habitat from the Fish Hatchery to the adjudicated area is in good condition. An area known as Rancho Los Flores has riparian habitat in good condition that is currently under

³¹ T. Billhorn, personal communication, Nov. 17, 2003

³² B. Jones, personal communication, Nov. 24, 2003

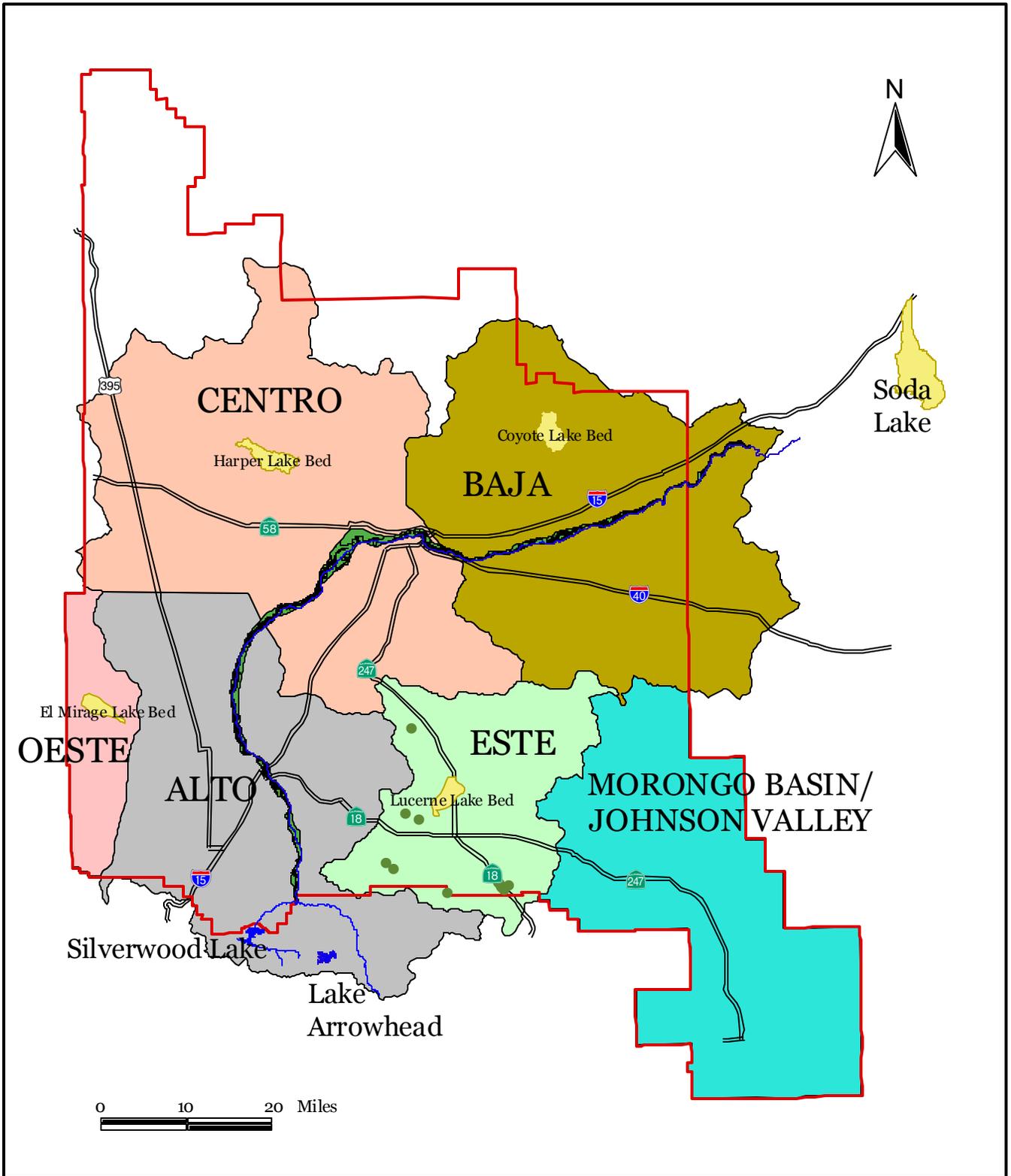
pressure from development. The DFG is working with the developers to address these issues. The Fish Hatchery diverts about 9,000 acre-feet per year of water, but most of this is returned to the river after flowing through the hatchery.

Harper Dry Lake has federally-designated wetlands (marked by emergent vegetation) that historically were maintained mostly by agricultural irrigation runoff from the Most agricultural property that went out of business in the early 1990s. Since then, the Bureau of Land Management (BLM) has been working with FPL Energy Operating Services, a company that manages a nearby solar power plant, to reestablish flows to specific marsh areas, mostly the southeastern portion of Harper Dry Lake. The California Energy Commission made enhancement of the marsh areas a condition of the power plant permit and incorporated this into the mitigation measures. BLM designated this area a Watchable Wildlife Area, which has abundant wildlife species including migrant waterfowl. BLM is currently looking to acquire more property in the area to further enhance the wetland areas.

Lucerne Valley has some riparian areas scattered mainly around washes and springs along the mountain ranges to the south. These areas include Rabbit Springs, Old Woman Springs, and various washes. Most of these properties, such as Rabbit Springs, are in private ownership. The habitat is marked by Cottonwood/Willow habitat with many sensitive species. The source of water for these areas is naturally occurring springs that continue to produce good quality water. Most of the habitat is located at spots along the Helendale fault. There are groups of individuals working with the property owners to preserve portions of the riparian areas on the property.³³

Afton Canyon Natural Area is located 37 miles northeast of Barstow along Interstate 15 between the Afton Road and Basin Road exits. Afton Canyon is designated as an Area of Critical Environmental Concern to protect plant and wildlife habitat, and to preserve scenic values of the riparian area within the canyon. Afton Canyon is one of two stretches of the Mojave River that maintains continuous flow throughout the year. The BLM is currently in the fourth year of a multi-year effort to restore the riparian and wetland values in the area. Riparian areas determined by MWA are shown in Figure 3-7.

³³ C. Bell, personal communication, Nov. 25, 2003



MWA boundary

● Riparian locations

 Riparian vegetation



Riparian Habitat and Dry Lake Beds
 Mojave Water Agency
 2004 Regional Water Management Plan

Figure 3-7
 November 2003
 Prepared by: KTW

Climate

The Mojave Water Agency maintains a Climatology Network that consists of 14 weather stations collecting various weather data on temperature, precipitation, and evaporation. Rain gages are mostly located within the Mojave Basin Area and the surrounding mountains. Runoff in the upper watershed contributes substantially more to the recharge of the basin than precipitation falling in the basin. Average rainfall within the lower lying areas of the Mojave Basin Area and Morongo Basin/Johnson Valley area is roughly five inches per year. Data for precipitation at the Lake Arrowhead gage, located in the San Bernardino Mountains, was analyzed to evaluate the extreme annual variations in stream flow. The average yearly precipitation at this gage is 43.2 inches per year. The standard deviation about the mean is 19.7 inches per year. This high standard deviation correlates to large fluctuations in the annual amount of rainfall received in the San Bernardino and San Gabriel Mountains – the former being the primary source of recharge for the groundwater basin. The large variation in annual rainfall within the surrounding mountains directly affects the annual water supply of the basin, and is further discussed in Chapter 4 of this Plan.

Wastewater

Wastewater is imported to the Mojave Basin Area from the Lake Arrowhead Community Services District, Big Bear Area Regional Wastewater Agency, and Crestline Sanitation District.³⁴ In 2000, the Alto Subarea received 1,941 acre-feet from the Lake Arrowhead CSD, discharged into the Mojave River about two miles downstream of the Forks. The Crestline Sanitation District discharged 863 acre-feet into the Alto subarea upstream of the West Fork gage at the Los Flores Ranch. In 2000, the Este Subarea received 2,600 acre-feet from Big Bear ARWWA, discharged near Camp Rock Road and Highway 247 in the Lucerne Valley.

The City of Adelanto, the City of Barstow, and the Victor Valley Wastewater Reclamation Authority (VWVRA) provide wastewater collection and treatment services within the Mojave Water Agencies boundaries. The VWVRA serves Victorville, Hesperia, Apple Valley, and San Bernardino County Service Areas 42 and 64. VWVRA is by far the largest of the wastewater agencies with a current treatment capacity of 11.0 million gallons per day (MGD) with plans to expand by another 7.0 to 8.5 MGD by 2020. The City of Adelanto treats 1.2 MGD while the City of Barstow treats 0.066 MGD. County Service Area 70-C serves Silver Lakes. The USMC camp at Nebo also provides wastewater treatment services. There are currently no users of reclaimed wastewater in the MWA service area, although there are a number of entities identified to receive reclaimed wastewater in the future.

³⁴ Mojave Basin Area Watermaster 2001

The City of Adelanto

The City of Adelanto currently treats 1.2 MGD of wastewater and discharges this quantity to percolation ponds.

The City of Barstow

The City of Barstow collects wastewater through a system constructed starting in 1939. Barstow currently contracts the operation of its wastewater collection and treatment system. The system has the capacity to treat 7.5 MGD through aeration basins, secondary clarifiers, a chlorine contact chamber, and a chlorine contact lagoon. After treatment, the effluent is discharged to the Mojave River adjacent to the treatment facilities. Currently the City collects and treats 66 thousand gallons per day (0.066 MGD) of wastewater. With anticipated growth, the treatment plant is anticipated to treat 1.75 MGD by 2020. There is currently no wastewater recycling activity nor are there plans to recycle wastewater in the future.³⁵

Victor Valley Wastewater Reclamation Authority

VVWRA conveys wastewater using 40.5 miles of interceptor sewer and two pump stations to its Regional Wastewater Reclamation Plant. Approximately 9.8 MGD is currently treated at the VVWRA facility which has a capacity of 11.0 MGD. Processes employed include screening, grit removal, primary clarification, biological oxidation of wastes with complete nitrification and partial denitrification, secondary clarification, coagulation, flocculation, filtration, and disinfection. Dissolved air flotation thickening and anaerobic digestion stabilizes biosolids that are then dewatered and dried prior to disposal via direct agricultural land application or by mixing with finished compost for agricultural markets. The reclaimed water is then discharged directly into the Mojave River channel or percolated into ponds in the Floodplain Aquifer. VVWRA and the Department of Fish and Game entered into an MOU to provide minimum discharge of approximately 9,000 acre-feet per year (24.7 acre-feet per day) to the Mojave River Channel to support riparian vegetation and habitat.

VVWRA estimates that its capacity to collect and treat wastewater with the existing facilities will be surpassed around 2006.³⁶ VVWRA estimates that the wastewater flow by 2020 will be approximately 18.62 MGD. The current plan for dealing with the additional growth and increase in wastewater treatment requirements is to construct two sub-regional recycled water facilities by the year 2005. Another two sub-regional facilities are projected to be built by 2010. These facilities will provide additional wastewater treatment and at the same time, produce recycled

³⁵ City of Barstow General Plan – Part C, Chapter VI.2 Utilities and Public Services, Technical Report 4/20/1997

³⁶ Sewerage Facilities Plan Update, Year 2000 Amendment, Adopted by the VVWRA Board of Commissioners October 26, 2000.

water for the surrounding communities. There are currently no off-site consumers of reclaimed wastewater in the VVWRA service area although in June 2003 the Lahontan Regional Water Quality Control Board granted VVWRA a permit to use recycled water to irrigate the golf course and landscaped areas at the Southern California Logistics Airport. The project represents VVWRA's first off-site recycled water use project (landscaping at the treatment facility on Shay Road is already irrigated with recycled water, and recycled water is used for processing, dust control, and fire protection at the on-site regional compost facility). 131 potential recycled water customers have been identified with a combined need for about 37,400 acre-feet per year (afy). Twenty-two large customers were identified with a total need for 8,677 afy including several golf courses, parks, municipalities, and schools. The quantity of expected wastewater flows is described in Table 3-3 in 5-year increments to 2020.

Table 3-3: Total Wastewater Flow Projections (MGD)

Member Agency	2000	2005	2010	2015	2020
Victorville including SCLA	5.38	6.33	7.58	8.96	10.29
CSA 42	0.05	0.05	0.05	0.05	0.05
CSA 64	0.74	0.89	1.04	1.21	1.28
Apple Valley	1.46	1.87	2.26	2.80	3.42
Hesperia	1.06	1.52	2.07	2.75	3.58
Total	8.69	10.66	13.00	15.77	18.62

Based on the assumption that all of the additional flows would be recycled, and the identified possible users, the projected recycled wastewater that will be produced and used is shown in Table 3-4.

Table 3-4: Recycled Water Projections (MGD)

Member Agency	2000	2005	2010	2015	2020
Victorville including SCLA	0.00	0.95	2.20	3.58	4.91
CSA 42	0.00	0.00	0.00	0.00	0.00
CSA 64	0.00	0.15	0.30	0.47	0.54
Apple Valley	0.00	0.41	0.80	1.34	1.96
Hesperia	0.00	0.46	1.01	1.69	2.52
Total	0.00	1.97	4.31	7.08	9.93

The estimated cost to provide facilities to reclaim the projected amount of wastewater is \$75 million to \$125 million. Annual operation and maintenance costs for each subregional facility ranges from \$0.55 to \$1.13 million. The project is to be funded from a number of federal or state grants and low-interest loans obtained through the State Revolving Fund. Consultants have been retained to provide engineering and environmental documentation services for the four

subregional treatment facilities. The cost of providing reclaimed water, transmission infrastructure, and ownership of distribution facilities has yet to be determined.

The Wastewater Reclamation and Recycling Program address a number of issues in the VVWRA service area. The need for additional collection and transmission facilities, the desire of the member agencies to use water as wisely as possible, and the need for additional treatment capacity have all contributed to the aggressive pursuit of this program.

4

Water Supply

This chapter reviews the current understanding of the water supply within the Mojave Water Agency (MWA). The variability of water supply and delivery capability of the State Water Project (SWP) are summarized. Actual water deliveries from the SWP to the MWA from 1978-2001 are also presented.

Mojave Basin Area

A summary of the water supply for the Mojave Basin Area is included in this section based on the average and median surface water inflows. The average and median water supplies are compared to illustrate the extreme variations in annual water supply for the Basin. Elements of

Water supplies in the Mojave Water Agency service area are highly variable - an important factor in developing project alternatives.

water supply examined in this section include: gaged surface flow, unged surface flow, subsurface flow, deep percolation of precipitation, wastewater imports, and phreatophyte consumption.

Gaged Surface Inflow and Outflow

The average water supply to the basin during the period 1931-2001 was determined in part from U.S. Geological Survey (USGS) stream gage records. A review of these records indicates the flow of the river and thus the Basin water supply is highly variable.

A number of sites on the Mojave River have historically been monitored for surface flow. Records for some sites extend as far back as 1900. Consistent records are available from 1931 when USGS established gaging stations on the Mojave River. Consequently, data from 1931 and forward are utilized for water supply planning purposes.

Five stream gage locations with records to at least 1931 are currently monitored on the Mojave River. Table 4-1 summarizes these gages, indicating the period of record, average, median, peak and minimum flow at each gage. The stream gages are maintained and operated by the USGS

under a cooperative program with MWA. All gages currently in operation record river stage data in fifteen-minute increments. USGS personnel take a direct stream measurement at least once a month and more frequently during storm events. The Lower Narrows Gage has direct measurements taken at least once a week.

Table 4-1: Mojave River Stream Gages

Gage Name and Station Number	Period of Record ¹	Average Flow ²	Median Flow ²	Peak Flow ² (Year)	Minimum Flow ² (Year)
West Fork Near Hesperia (10261000) ³	1930	23,500	6,200	134,400 (1978)	0 (1951)
Deep Creek Near Hesperia (10260500)	1905	47,800	21,000	304,400 (1993)	2,200 (1951)
Lower Narrows Near Victorville (10261500) ⁴	1900	52,400	23,200	298,500 (1969)	5,300 (2001)
Barstow (10262500)	1931	16,700	0	151,800 (1969)	0 (Many)
Afton (10263000)	1930-32, 1952-78, 1981-02 ⁵	8,100	900	75,600 (1969)	200 (1975)

¹All gages listed are currently operational.

²For period of record 1931-2001. Flow refers to acre-feet per year.

³The USGS has operated two gages at West Fork since 1930, 10261000 and 10260950.

⁴The Lower Narrows Gage was located about 3 miles upstream from its current location and operated there from 1900-1906 and 1931-36.

⁵USGS has estimated the record for the missing periods.

Three additional sites on the Mojave River were previously gaged to monitor stream flow. These sites were eventually determined to be unsuitable primarily due to unstable controls and changing stage-discharge relationships, and were abandoned. The sites and their periods of record include Below Forks Near Hesperia (1972– 96), Wild’s Crossing Near Helendale (1967-70) and Hodge (1931, 1971-92).

Figure 4-1 shows the location of the operating stream gages summarized in Table 4-1. The Deep Creek station is located about 1 mile upstream of the confluence with the West Fork of the Mojave River (known as the “Forks”). The drainage area tributary to the Deep Creek Gage is 134 square miles.

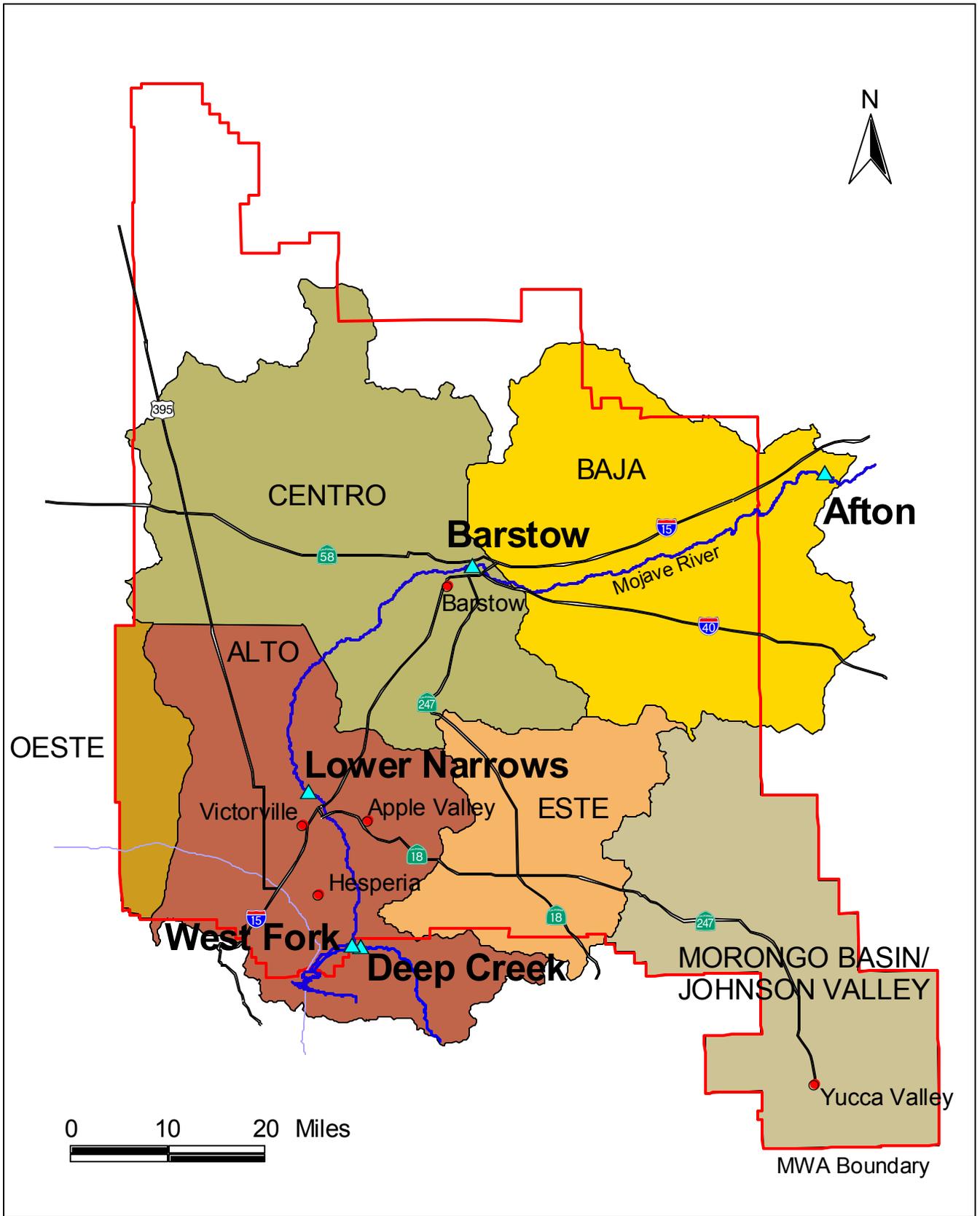
Two gaging stations have been operated on the West Fork of the Mojave River. The first station (10261000) was located approximately 0.5 mile upstream of the Forks and operated from 1930-71, before the construction of the Cedar Springs Dam at Silverwood Lake and the Mojave River Dam at the Forks. The second station (10260950) is located approximately 0.6 mile upstream of

the Forks and has been operated since 1974. The drainage area tributary to the West Fork Gage is 70.3 square miles.

The dam at the Forks is ungated and serves to attenuate peak flows during large storm events and prevent downstream flooding. The flow at this location constitutes the primary water supply to the main stem of the Mojave River; consequently, the combined data from the Deep Creek and West Fork gages represent the total flow at the headwaters of the Mojave River. The average annual discharge at the Forks is 71,300 acre-feet for the period 1931 through 2001.

The source of water at the Forks is runoff from snowmelt and rainfall originating in the San Bernardino Mountains. Lower velocity flows from snowmelt and smaller storm events usually percolate into the riverbed a short distance downstream of the Forks. The surface water tends to flow in a northerly direction within the river channel towards the Narrows, which is approximately five miles in length and is subdivided into the Upper and Lower Narrows. The groundwater gradient is in the same general direction and groundwater is discharged into the River upstream of the Upper Narrows about 12 miles below the Forks. This occurs due to shallow bedrock that forces groundwater back into the River channel.

The Lower Narrows gage is located approximately 18 miles downstream of the Forks near the City of Victorville. The drainage area tributary to the gage is 513 square miles. A second gage was installed at this site in 1996 to refine recordings of low flows. The low flow gage was washed out in the winter of 1998 and replaced the following summer.



Stream Gauge Locations
 Mojave Water Agency
 Regional Water Management Plan Update

Figure 4-1
 Date: January 2004
 Prepared By: KTW

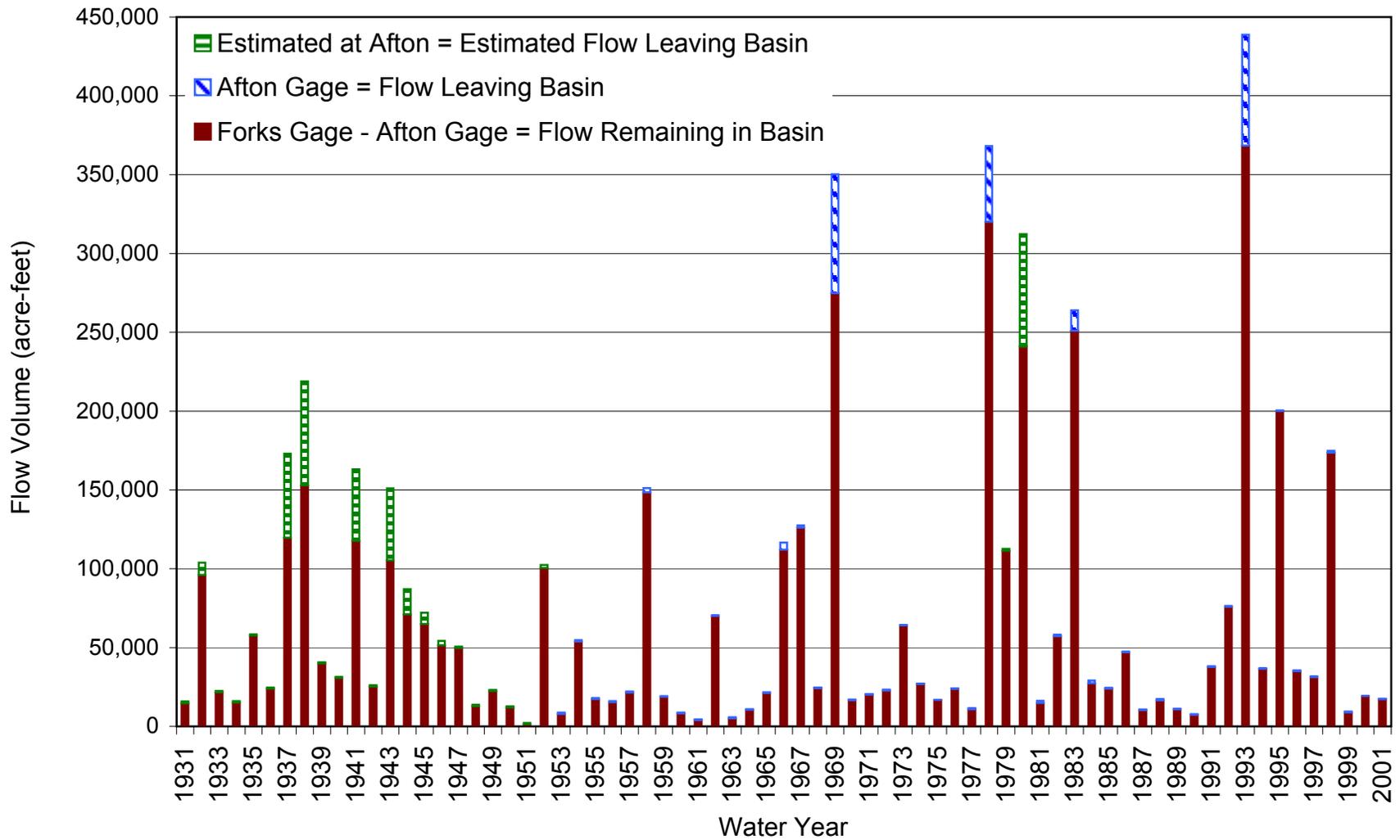
Data from this site is used to determine compliance with obligations for the maintenance of a certain minimum base flow from the Alto to the Centro Subarea as mandated by the Mojave Basin Area Judgment (1996). Base flow is defined by the Judgment as “that portion of the total surface flow measured annually at Lower Narrows which remains after subtracting storm flow.” The average annual discharge of total flows at Lower Narrows is 52,400 acre-feet for the period from 1931 to 2001. Base flow there has historically been as high as 26,700 acre-feet in Water Year 1940-41 and averaged approximately 21,000 acre per year for the period 1931-90. The base flow at the Lower Narrows in Water Year 2001 is at a historic low of 5,345 acre-feet.

Base flow leaving the Lower Narrows region quickly infiltrates back into the river channel. Surface flows are augmented about 22 miles downstream of the Forks (4 miles downstream of the Lower Narrows) by discharges from the Victor Valley Wastewater Reclamation Authority (VWVRA). The discharges from the treatment plant continue as surface flows for about 4 miles nearly to the community of Silver Lakes. Discharges from the VWVRA totaled 9,006 acre-feet in Water Year 2000.

The Barstow gage is approximately 53 miles downstream from the Forks. This gage site is typically dry because the River flows at Barstow only in response to large storm events in the watershed. The average annual discharge at this location is 16,700 acre-feet for the period from 1931 to 2001. The Barstow gage has recorded surface flow in 35 of the 71 years of operation. The tributary drainage area is 1,291 square miles.

The Afton gage is located about 100 miles downstream of the Forks and is about 6 miles downstream (east) of the eastern boundary of the Baja Subarea, providing a measure of surface water exiting the Mojave Basin Area. The Afton gage generally has a small component of baseflow, caused by thinning of the aquifer and associated low groundwater discharge. In some years the base flow has ceased, but averages about 400 acre-feet per year. The combined baseflow and stormflow results in an average annual discharge of 8,100 acre-feet at the Afton gage between 1931 and 2001. The drainage area for the Afton site is 2,121 square miles.

The stream gage data demonstrate that the majority of flow in the Mojave River is retained (recharged) in the Basin. During approximately 80% of the recorded years, discharge at the Afton gage averaged less than 1,000 acre-feet. The average difference between flow entering the Basin at the Forks and flow leaving the Basin at Afton is roughly 63,200 acre-feet per year during 1931 through 2001. Figure 4-2 compares the total flow entering the Basin to the total flow exiting the Basin annually. In most years, almost all of the surface water entering the Basin infiltrates within the Basin. Records show that a few large flows pass the Afton gage every nine



years on average. However, the recharge from these large storm event years (inflows minus outflows) contributes substantial amounts of water to the regional groundwater supply, and almost all of the water supply to the Centro and Baja subareas.

Annual Variability of Water Supply

Average water supplies derived from a specific period of record are typically selected to be representative of long-term water supply conditions. Precipitation and runoff are highly variable and reliance upon an inappropriate period of record will misrepresent the quantity of water that may be available over the longer term. A representative hydrologic base period should contain a distribution of wet, dry and normal years. Determining average water supplies in this manner provides some certainty to the process of planning for the quantity of water that should be available and can accrue to groundwater storage.

The 1994 RWMP and the Mojave Basin Area Judgment utilize the hydrologic base period encompassing Water Years 1931 through 1990. This period was selected because the data available for the gages was continuous. The average flow at the Forks from 1931-90 was 65,000 acre-feet, with annual flows ranging from less than 6,500 acre-feet to more than 360,000 acre-feet. The median flow at the Forks for this same period was 24,700 acre-feet. Given the range of measured annual flows during this 60-year period, the median flow is the best representation of the amount of supply that can be expected in any given year over a long-term period.

A plot of the accumulated annual departure from the base period (1931-1990) average of 65,000 acre-feet for surface flows measured at the Forks is shown in Figure 4-3. This plot illustrates water supply trends on an annual basis for inflow recorded at the Forks. A negative sloping line from one water year to the next indicates a below average inflow and a positive sloping line indicates an above average inflow. The purpose of Figure 4-3 is to illustrate that since the base period (1931-1990) average of 65,000 acre-feet was established, the basin has experienced a wetter hydrologic period relative to that established average. This report recognizes the recent wet period (1991-2001) and utilizes this hydrologic data to calculate an updated basin water supply.

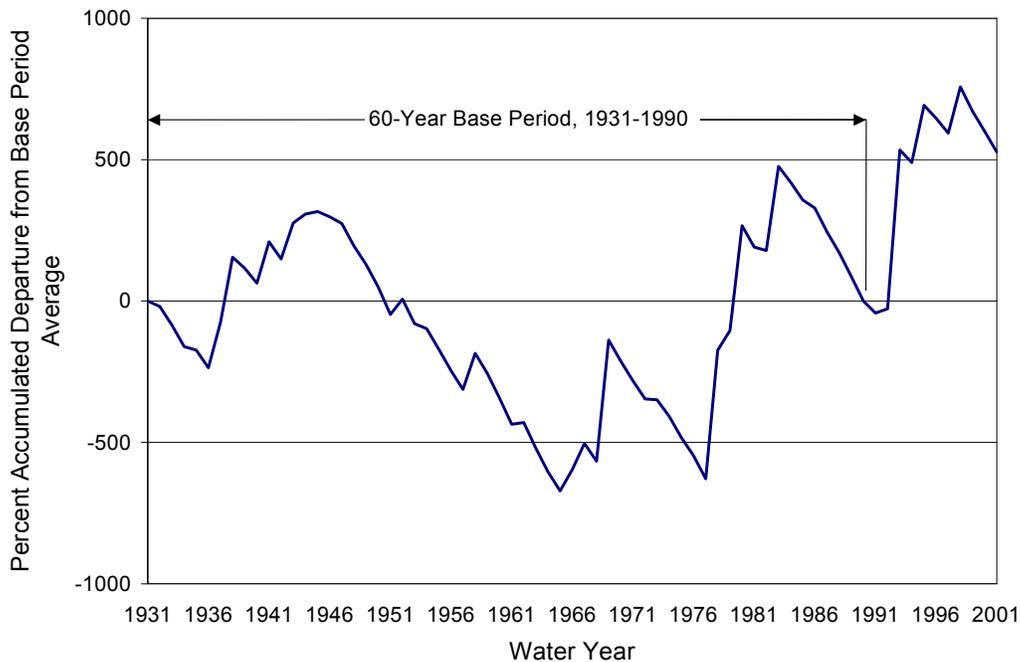


Figure 4-3: Accumulated Departure from Base Period (1931-1990) Average for Seasonal Discharge at the Forks

Extreme variations in streamflow have occurred at the Forks during the period of record. Annual values have ranged from 6,380 acre-feet to 428,700 acre-feet between 1931 and 2001. The extreme variations in streamflow at the Forks result in large annual fluctuations in available groundwater recharge.

Figure 4-4 displays a plot of exceedence probabilities for discharge at the Forks. The exceedence probability plot illustrates how often an annual flow of a certain magnitude is expected to occur. As an example, the average annual flow at the Forks is 71,300 acre-feet for 1931-2001. As shown on Figure 4-4, this average is weighted by the larger events that occur sporadically. Approximately 68% of the annual recorded flows have been below this average and 32% have been above this average. This should be considered for planning periods of five years or less because annual inflows less than the average volume are likely to occur in two out of three years. Statistically, three to five-year periods will occur where inflows to the basin will be well below the average total inflow. The basin is more likely to receive annual inflows closer to the median inflow of 27,200 acre-feet per year based on the period of record from 1931-2001. This means that half of the time the basin will receive more than 27,200 acre-feet per year and

less than 27,200 acre-feet per year the rest of the time. Water supply planning alternatives should consider the effect that variations from the average supply might have on any proposed alternatives.

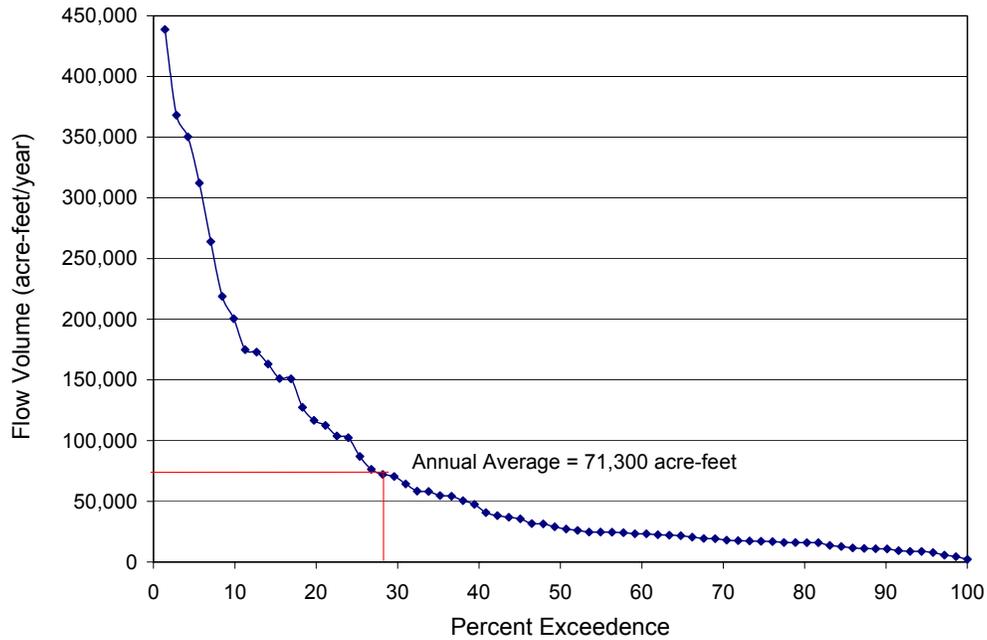


Figure 4-4: Percent Exceedence at the Forks (1931-2001)

Ungaged Surface Inflow and Outflow

Table 4-2 shows that an estimated 7,200 acre-feet of ungaged water flows annually into the Este, Oeste, Alto, and Baja subareas of the Mojave Basin Area (Webb 2000). The only surface water outflow in the Mojave Basin Area is gaged through Afton Canyon.

Table 4-2: Mojave Basin Area - Net Average Annual Water Supply

	Este	Oeste	Alto	Centro	Baja	Entire Basin
WATER SUPPLY						
Surface Water Inflow						
Gaged	0	0	71,300 ^a	0	0	71,300
Ungaged	1,700	1,500	3,600	34,700 ¹	14,400 ²	7,200 ³
Subsurface Inflow	0	0	1,200	2,000	1,200	0 ⁴
Deep Percolation of Precipitation	0	0	3,500	0	100	3,600 ⁵
Import Wastewater						
Lake Arrowhead CSD	0	0	1,900	0	0	1,900 ⁶
Big Bear ARWWA	2,600	0	0	0	0	2,600 ⁶
Crestline Sanitation District	0	0	900	0	0	900 ⁶
Total:	4,300	1,500	82,400	36,700	15,700	87,500
OUTFLOW AND LOSSES						
Surface Water Outflow						
Gaged	0	0	0	0	8,100 ^b	8,100
Ungaged	0	0	34,700 ¹	14,000 ⁷	0	0 ⁴
Subsurface Outflow	800	400	2,000	1,200	0	0 ⁴
Phreatophyte Consumption	0	0	11,000 ⁸	3,000 ⁸	2,000 ⁸	16,000
Total:	800	400	47,700	18,200	10,100	24,100
NET AVERAGE ANNUAL WATER SUPPLY:						63,400

¹Estimates taken from Webb 2000

²Includes 14,000 ac.ft. of Mojave River flow from Centro and 400 ac.ft. of inflow from Kane Wash and Boom Creek; estimates taken from Webb 2000

³Sum of ungaged surface water inflows less ungaged surface water outflows; estimates taken from Webb 2000

⁴All subsurface flow is assumed to exchange within subareas (no external inflows or outflows). No external ungaged surface water outflow

⁵Estimates taken from Webb 2000

⁶Mojave Basin Area Watermaster 2001

⁷From reported flows at USGS gaging station, Mojave River at Barstow

⁸Phreatophyte consumption taken from Lines and Bilhorn (1996)

a Period of record from 1931-2001

b Period of record from 1931-2001; 1931-1952 are estimated values

Subsurface Flow

Table 4-2 summarizes the subsurface inflow for the subareas within the Mojave Basin Area. No significant amount of groundwater is exchanged with areas outside the Mojave Basin Area. However, subsurface exchange does occur between subareas within the Basin (Webb 2000).

Approximately 1,200 acre-feet of groundwater combined annually flows from Este and Oeste to Alto; 2,000 acre-feet flows from Alto to Centro; and 1,200 acre-feet per year flows from Centro to Baja.

Deep Percolation of Precipitation

An estimated 3,600 acre-feet of deep percolation of precipitation occurs annually in the Mojave Basin Area as shown on Table 4-2 (Webb 2000). The majority of the deep percolation of precipitation takes place in the Alto Subarea (3,500 acre-feet per year) and a minor component takes place in the Baja Subarea (100 acre-feet per year).

Wastewater Imports

Wastewater is imported to the Mojave Basin Area from the Lake Arrowhead Community Services District, Big Bear Area Regional Wastewater Agency, and Crestline Sanitation District (Mojave Basin Area Watermaster 2001). In 2000, the Alto Subarea received 1,941 acre-feet from the Lake Arrowhead CSD, discharged into the Mojave River about 2 miles downstream of the Forks near the City of Hesperia. The Crestline Sanitation District discharged 863 acre-feet into Alto upstream of the West Fork gage at the Los Flores Ranch. In 2000, the Este Subarea received 2,600 acre-feet from Big Bear ARWWA, discharged near Camp Rock Road and Highway 247 in the Lucerne Valley.

Phreatophyte Consumption

The most recent estimate of annual phreatophyte consumption is 16,000 acre-feet for 10,000 acres of riparian vegetation. The data is derived from analysis prepared in 1995 in a cooperative effort between the USGS, California Department of Fish and Game and the MWA (Lines and Bilhorn 1996). The analysis determined that 1995 was considered an average year of water consumption for the existing riparian vegetation, and noted that annual water use by riparian vegetation will vary by up to 50% from the average. Variation would depend on available water supply, with up to 50% more water than the average consumed during wet years and up to 50% less consumed during dry years. As shown in Table 4-2, the average consumption by riparian vegetation within Alto is 11,000 acre-feet per year, 3,000 acre-feet per year in Centro, and 2,000 acre-feet per year in Baja. The analysis found that of the 11,000 acre-feet average in Alto, 5,000 acre-feet is consumed above the Lower Narrows and 6,000 acre-feet is consumed between the Lower Narrows and the boundary with Centro (an area referred to as the “Transition Zone”). Another 600 acre-feet of average annual water consumption by riparian vegetation were also identified in the Afton Canyon area, outside of the MWA.

Groundwater

Essentially all of the water used within the MWA is supplied by pumping groundwater. The Physical Solution to the Mojave Basin Area Judgment set limits on the amount of groundwater production that can occur in each subarea without incurring an obligation to buy imported water. Subareas upstream have an annual obligation to subareas downstream based on long-term averages between 1931 and 1990. Each major producer has an established Free Production Allowance (FPA) that is currently 80% of its Base Annual Production (BAP), which is defined as the producer's highest annual use verified for the 5-year base period from 1986-90, for all

Essentially all of the water used within the MWA is supplied by pumping groundwater.

uses other than municipal and industrial use in Alto. FPA for Alto municipal and industrial use has been reduced to 70% of BAP for the 2003-04 water year, with an additional reduction to 65% of BAP scheduled for the 2004-05 water year. The allocated FPA represents each producer's share of the water supply available for that subarea. The Judgment requires that reductions in FPA occur in increments of 5% per year until the available FPA in each subarea is in balance with the available water supply. Producers are required to replace any water pumped above their FPA determined for that year. Replacement can occur either by paying the Mojave Basin Area Watermaster to purchase supplemental water from MWA or by transferring unused production rights within that subarea from another party to the Judgment.

As described in the previous chapter, the Alto, Centro and Baja subareas contain two interconnected aquifers referred to as the Floodplain Aquifer and the Regional Aquifer; Oeste and Este subareas only contain the Regional Aquifer. The Floodplain Aquifer is located along the path of the Mojave River and is directly recharged by the river. The Regional Aquifer underlies and surrounds the Floodplain Aquifer, encompassing the remainder of the Mojave River Groundwater Basin. Prior to development in the area, groundwater flowed primarily from the Regional Aquifer to the Floodplain Aquifer. However, the groundwater flows have reversed in recent years, and the groundwater flow from the Floodplain Aquifer is currently the primary recharge component for the Regional Aquifer (Stamos et al. 2001b). The Regional Aquifer is also recharged to a lesser degree by deep percolation of precipitation and storm runoff from ungaged tributaries.

Groundwater production was initially developed along the Mojave River in the early 1900s. By the mid-1950's, when long-term overdraft is recognized to have commenced, groundwater production was about 190,000 acre-feet, with the majority occurring along the Mojave River. By 1994, about half of the pumping came from wells located away from the River in the Regional Aquifer (Stamos et al. 2001b). As noted in Chapter 3, the increase in water production in the

basin has significantly influenced the interaction between the Floodplain and Regional Aquifers. The changes in location of production indicate that Plan alternatives will need to recharge heavily pumped areas within the Regional Aquifer.

Figures 4-5 through 4-7 show historical water level data for wells within the Regional Aquifer. The decline in groundwater levels range from 50 feet to 100 feet for the three wells displayed. These figures illustrate the steady decline in water levels over the past 50 years, and that the Regional Aquifer is generally in a state of overdraft.

Figures 4-8 and 4-9 display historical water level data for wells within the Floodplain Aquifer. These figures illustrate the direct affect the Mojave River has on groundwater levels within the Floodplain Aquifer. During the 1980s, annual flows in the Mojave River were below average and groundwater levels within the Floodplain Aquifer declined. Conversely, the 1990s were a much wetter period and groundwater levels within the Floodplain Aquifer increased. It is important to note that while groundwater levels in the Floodplain Aquifer respond relatively rapidly to hydrologic conditions as compared to the Regional Aquifer, the long-term average water level in the Floodplain Aquifer is also declining.

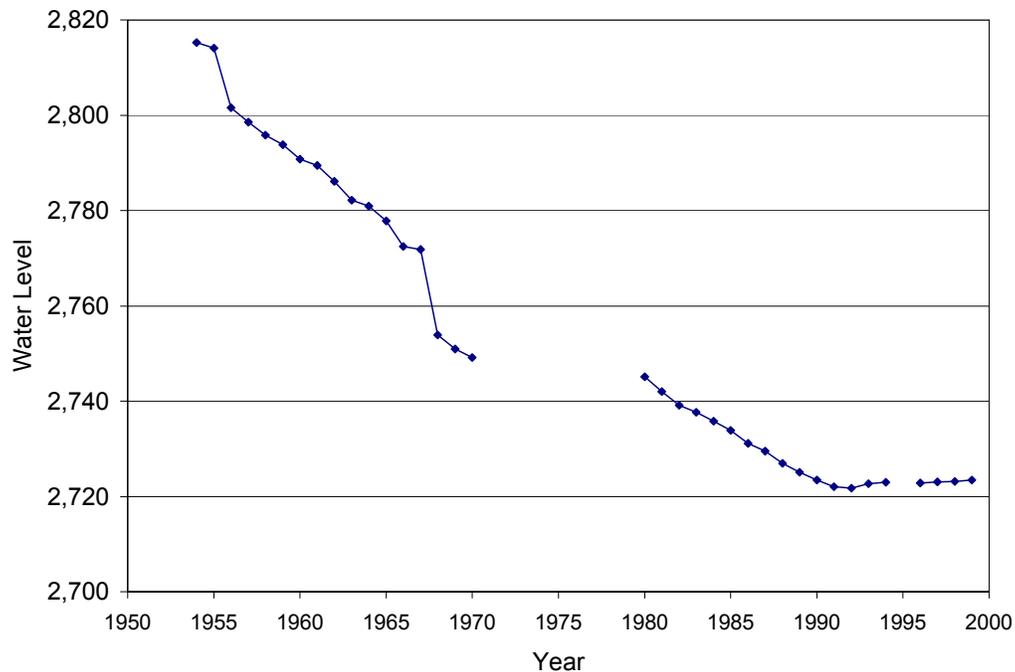


Figure 4-5: Historical Groundwater Levels for State Well Number 05N01E17D01, located in the Regional Aquifer in the Este Subarea

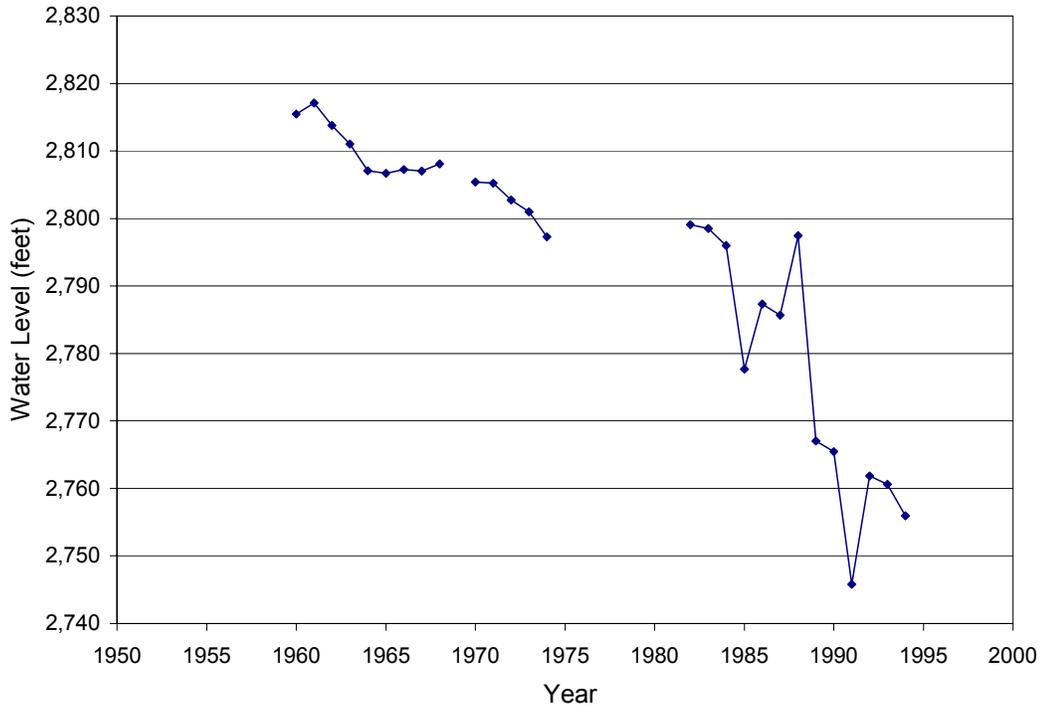


Figure 4-6: Historical Groundwater Levels for State Well Number 05N05W22E02, located in the Regional Aquifer in the Alto Subarea

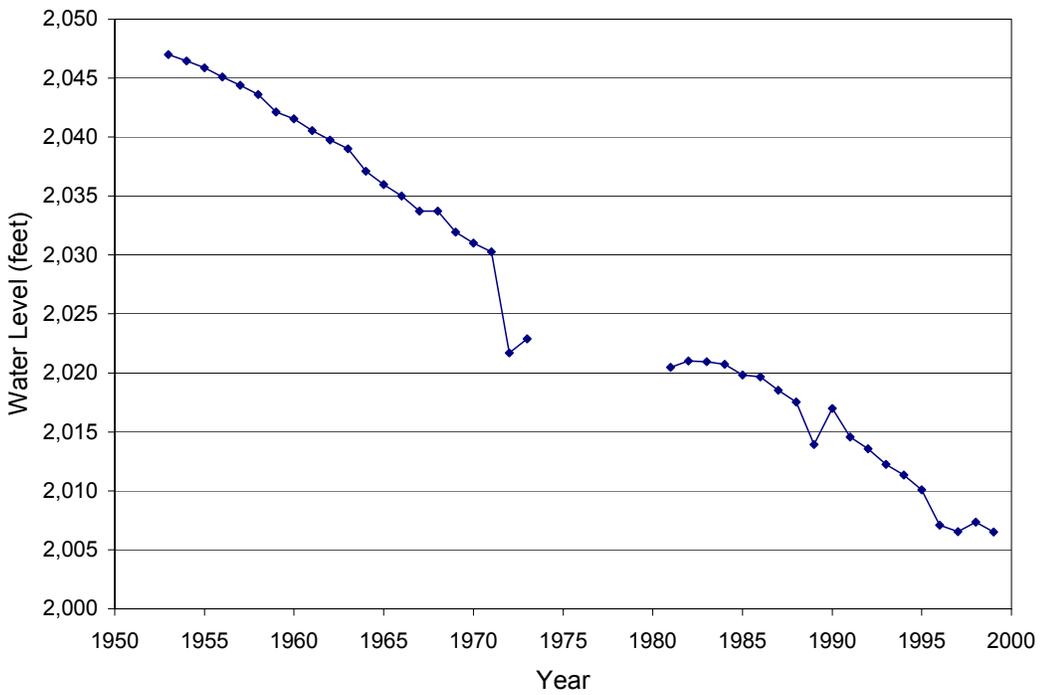


Figure 4-7: Historical Groundwater Levels for State Well Number 11N03W28R02, located in the Regional Aquifer in the Centro Subarea

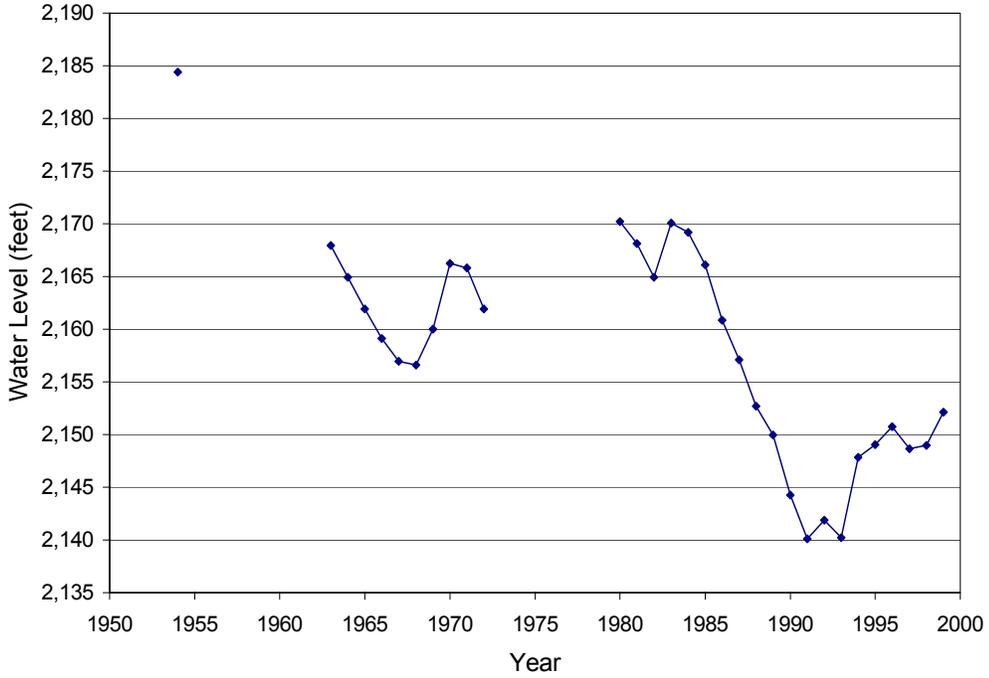


Figure 4-8: Historical Groundwater Levels for State Well Number 5N04W11P03, located in the Floodplain Aquifer in the Alto Subarea

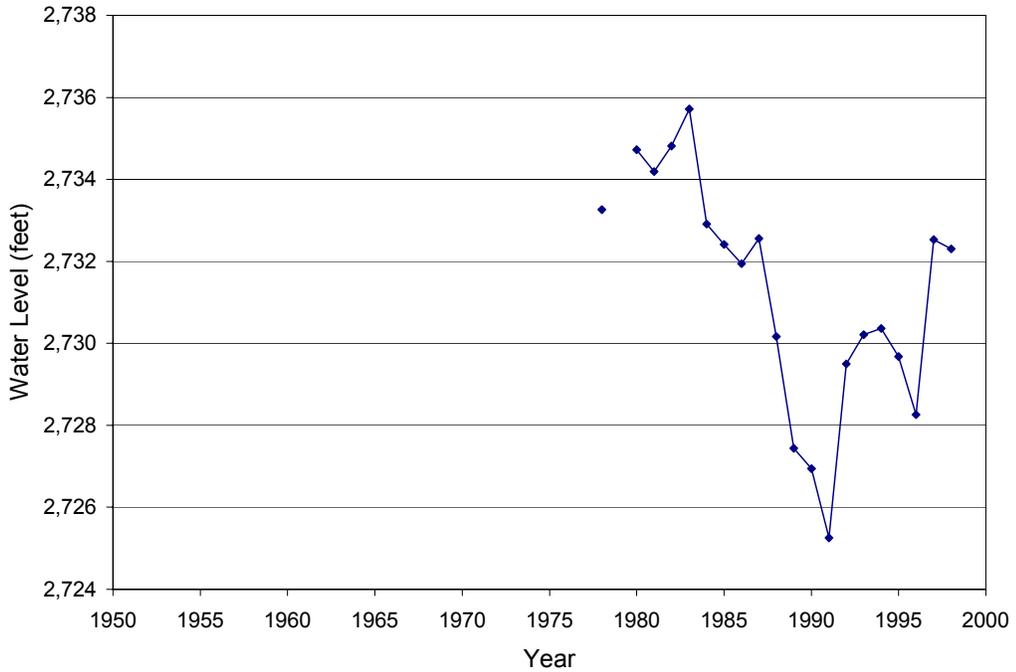


Figure 4-9: Historical Groundwater Levels for State Well Number 09N03W13R01, located in the Floodplain Aquifer in the Centro Subarea

The average annual net water supply for the Mojave Basin Area is estimated in Table 4-2. The volume of water available to meet water supply needs averages 63,400 acre-feet annually for the period 1931-2001. The Alto Subarea has the largest water supply, primarily due to proximity to the headwaters of the Mojave River. The Centro and Baja subareas are dependent upon infrequent, very large storm events for groundwater recharge. The Este and Oeste subareas have the least amount of supply, most of which originates from ungaged surface water. The Este Subarea receives the majority of its current water supply from wastewater imports. Table 4-2 reflects averaged values and does not take into account the annual variation in water supply.

The average annual water supply estimates in Table 4-2 are higher than estimates from the 1994 RWMP for the period 1931-90. This analysis averages USGS stream gage data from 1931 to 2001. The increase is attributed to above average streamflow and increased wastewater imports since 1990. 1993 was the highest year of record for inflow at the Forks. The inflow of about 428,700 acre-feet was 660% of the 1931-90 average of 65,000 acre-feet. 1995 and 1998 were also substantially wetter than average. The period 1931-2001 was about 10% wetter than the period 1931-1990. Generally, the previous 35 years have been considerably wetter than average when compared to the 1931-1990 period; conversely, the period 1945-1965 was considerably drier than average. This illustrates the extreme variation in annual water supply.

Dry Year and Multiple Dry Year Water Supply

An estimate of the average annual dry year water supply for each subarea within the Mojave Basin Area is shown on Table 4-3. Dry year water supplies are assumed to be equal to the median water supply values on the Mojave River. By this definition, half of all years would be considered dry, or less than 22,100 acre-feet per year. Median values for gaged surface flow cover the period of record, 1931-2001. Median values for ungaged surface flows are adjusted from the average values found in Table 4-2, to median values based on the percent difference (62%) between average and median flow at the Forks. This assumption was made based on the correlation that over 90% of ungaged surface flow entering the Basin originates in the same mountains as the gaged surface flow measured at the Forks. Thus, it is assumed that the difference between the average and median flow at the Forks provides a reasonable correlation to the difference between the average and median flow of ungaged surface water entering the Mojave Basin.

An estimate of the average annual multiple dry year water supply for each subarea within the Mojave Basin Area is shown on Table 4-4. Multiple dry year estimates represent the average Mojave River flow during the period 1988-1990. Values for ungaged surface flows are reduced from the average values found in Table 4-2 by the same method described above.

While the annual average net water supply is 63,400 acre-feet per year, average annual dry year water supply is only 22,100 acre-feet and average annual multiple dry year water supply is only 3,900 acre-feet. This demonstrates the area's dependence on large, infrequent storm events to provide the majority of groundwater recharge. Dry year water supply probabilities should be taken into consideration when evaluating the near-term implications of water supply alternatives. Decreases in groundwater levels caused by temporary declines in annual water supply may not harm the long-term water supply of a basin but can have adverse impacts. Evaluating the dry year water supply for near-term implications may be important for a number of reasons. Temporary declines in groundwater can increase pumping costs, diminish groundwater quality, and harm riparian habitat by decreasing the amount of water available in the root zone. Management issues concerned with near-term implications should consider the dry year water supply of the Mojave River Basin since it is a better representation of the expected annual water supply for any three- to five-year period. When evaluating long-term water supply management issues, the average values summarized in Table 4-2 are appropriate.

Morongo Basin/Johnson Valley Area

The groundwater basins within the Morongo Basin/Johnson Valley Area are bounded by the Ord and Granite Mountains to the north; the Bullion Mountains to the east; the San Bernardino Mountains to the Southwest; and the Pinto and Little San Bernardino Mountains to the south. Different investigations have divided the region's groundwater basins into 17 subbasins, but not all of them are contained within MWA (Smith and Pimentel 2000). The water supply estimates prepared for the 1994 Regional Water Management Plan compiled water supply data for the region into 4 subbasins. Table 4-5 summarizes the net average annual water supply estimates for each of the groundwater basins that comprise the Morongo Basin/Johnson Valley Area.

Table 4-3: Mojave Basin Area - Average Annual Dry Year Water Supply

	Este	Oeste	Alto	Centro	Baja	Entire Basin
WATER SUPPLY						
Surface Water Inflow						
Gaged	0	0	27,200 ^a	0	0	27,200
Ungaged	650 ¹	550 ¹	1,400 ¹	13,200 ¹	200 ¹	2,800 ²
Subsurface Inflow	0	0	1,200	2,000	1,200	0 ³
Deep Percolation of Precipitation	0	0	1,750	0	50	1,800 ⁴
Import Wastewater						
Lake Arrowhead CSD	0	0	1,900	0	0	1,900
Big Bear ARWWA	2,600	0	0	0	0	2,600
Crestline Sanitation District	0	0	900	0	0	900
Total:	3,250	550	34,350	15,200	1,450	37,200
OUTFLOW AND LOSSES						
Surface Water Outflow						
Gaged	0	0	0	0	900 ^b	900
Ungaged	0	0	13,200 ¹	0	0	0
Subsurface Outflow	800	400	2,000	1,200	0	0
Phreatophyte Consumption	0	0	5,500 ⁵	1,500 ⁵	1,000 ⁵	8,000
Total:	800	400	20,700	2,700	1,900	8,900
NET MEDIAN ANNUAL WATER SUPPLY:						28,300

¹Estimates based on ratio of dry year inflow to average inflow

²Sum of Este (700 ac.ft.), Oeste (600 ac.ft.), Alto (1,400 ac.ft.) and Baja (200 ac.ft from Kane Wash and Boom Creek).

³All subsurface flow is assumed to exchange within subareas (no external inflows or outflows)

⁴Because historical precipitation during dry years has been approximately 50% of the long-term average, deep percolation of precipitation during dry years is assumed to be equal to 50% of the long-term average deep percolation

⁵Phreatophyte consumption taken from Lines and Bilhorn (1996)

a Period of record from 1931-2001

b Period of record from 1931-2001; 1931-1952 are estimated values

**Table 4-4: Mojave Basin Area
Average Annual Multiple Dry Year Water Supply**

	Este	Oeste	Alto	Centro	Baja	Entire Basin
WATER SUPPLY						
Surface Water Inflow						
Gaged	0	0	10,800 ^a	0	0	10,800
Ungaged	100 ¹	100 ¹	200 ¹	2,000 ¹	0 ¹	400 ²
Subsurface Inflow	0	0	1,200	2,000	1,200	0 ³
Deep Percolation of Precipitation	0	0	1,750	0	50	1,800 ⁴
Import Wastewater						
Lake Arrowhead CSD	0	0	1,900	0	0	1,900
Big Bear ARWWA	2,600	0	0	0	0	2,600
Crestline Sanitation District	0	0	900	0	0	900
Total:	2,700	100	16,750	4,000	1,250	18,400
OUTFLOW AND LOSSES						
Surface Water Outflow						
Gaged	0	0	0	0	300 ^a	300
Ungaged	0	0	2,000 ¹	0 ¹	0	0
Subsurface Outflow	800	400	2,000	1,200	0	0
Phreatophyte Consumption	0	0	5,500 ⁵	1,500 ⁵	1,000 ⁵	8,000
Total:	800	400	9,500	2,700	1,300	8,300
MULTIPLE DRY YEAR NET ANNUAL WATER SUPPLY:						10,100

¹Estimates based on ratio of multiple dry year inflow to average inflow

²Sum of Este (100 ac.ft.), Oeste (100 ac.ft.), and Alto (200 ac.ft.)

³All subsurface flow is assumed to exchange within subareas (no external inflows or outflows)

⁴Because historical precipitation during dry years has been approximately 50% of the long-term average, deep percolation of precipitation during dry years is assumed to be equal to 50% of the long-term average deep percolation

⁵Phreatophyte consumption taken from Lines and Bilhorn (1996)

a Period of record from 1988-1990

**Table 4-5: Morongo Basin/Johnson Valley Area
Net Average Annual Water Supply**

Basin	Net Average Annual Supply (Acre-feet per Year)
Means/Ames Valley	600
Copper Mountain Valley	600
Johnson Valley	2,300
Warren Valley	900*

Source: Boyle Engineering Corporation 1993 (for Copper Mountain 550 was rounded to 600)

* Hi-Desert Water District reports unpublished USGS estimates of 200 acre-feet per year net average annual supply in Warren Valley.

The net average water yield of the entire Morongo Basin/Johnson Valley Area is about 4,400 acre-feet per year. However, the net average water supply for the relatively uninhabited Johnson Valley is relatively undeveloped and has water quality constraints in some areas. The 1994 RWMP estimated that the Johnson Valley Basin net average annual water supply is about 2,300 acre-feet per year. The Johnson Valley supply was not considered in the net water supply balance, resulting in a net average water supply of 2,100 acre-feet per year for the developed groundwater basins.

The water supply is derived primarily from precipitation in the tributary areas within the Little San Bernardino and San Bernardino Mountains. Major ephemeral streams in the area include the Pipes Wash and Yucca Creek.

A great portion of water water supply needs relies on MWA’s ability to provide State Water Project water through the Morongo Basin Pipeline. Without that water or a different source of supplemental water, overdraft of the Warren Valley Basin is likely to occur once again. In 1995 the Morongo Basin Pipeline was completed from the California Aqueduct near the City of Hesperia to the Town of Yucca Valley. Two recharge sites have been developed to take water from this facility and are receiving imported State Water Project water. The quantities of water imported to date for the Hi-Desert Water District are presented in Table 4-5. The imported water supplies recharge the previously overdrafted Warren Valley Basin. The Pipeline has capacity to also deliver water to the benefit of the Big Horn-Desert View Water Agency, the Joshua Basin Water District and the County of San Bernardino.

Dry Year and Multiple Dry Year Water Supply

The dry year and multiple dry year water supplies in the Morongo Basin/Johnson Valley area are assumed to be reduced proportionally to the reduction in surface water flows at the Forks. These values are shown for each subbasin in Table 4-6. Excluding the Johnson Valley subbasin, the net annual dry year water supply is 800 acre-feet/year during an average dry year and 110 acre-feet/year during a multiple dry year period.

**Table 4-6: Morongo Basin/Johnson Valley Area
Average Annual Dry Year Water Supply**

Basin	Dry Year Average Annual Supply (Acre-feet per Year)	Multiple Dry Year Average Annual Supply (Acre-feet per Year)
Means/Ames Valley	230	30
Copper Mountain Valley	230	30
Johnson Valley	880	130
Warren Valley	340	50

Well Data

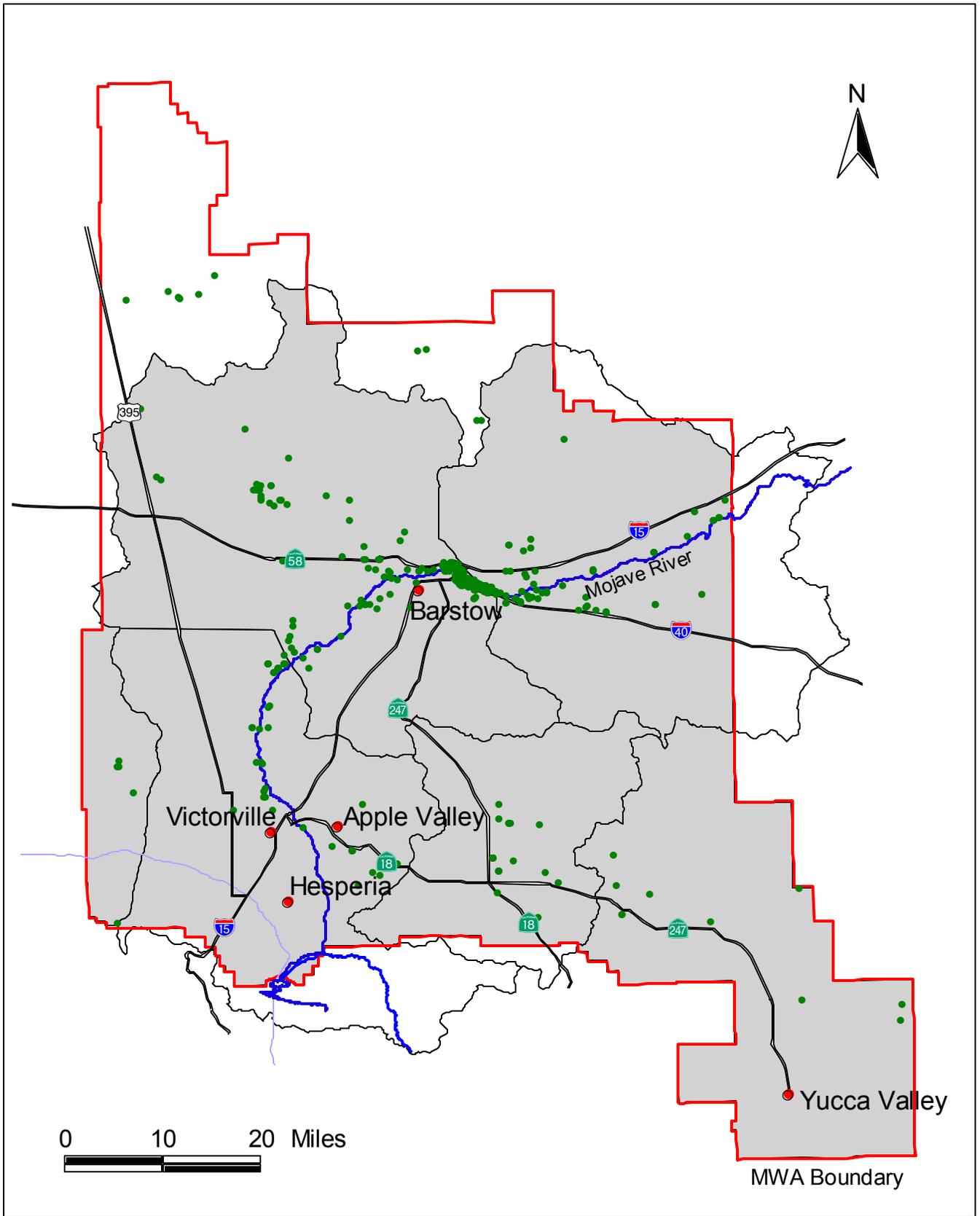
Digital well data provided by MWA was compiled in a database for data query and analysis. Data attributes in the database include water quality, water levels, well production, and GPS locations. The GPS well locations supplied by MWA were compared to the water quality, water level, and water production data to assess data spatial distribution within the MWA. A database query that contains well number, well depth, perforated interval, well type and status is included as Appendix I.

Samples of spatial and temporal analyses utilizing the database and a geographic information system (GIS) are provided on Figures 4-10 and 4-11. A complete analysis of water quality within the Basin is extremely labor intensive and beyond the scope of this Plan, but the Agency anticipates undertaking this effort in the near future.

Figure 4-10 displays the wells within the current database that have at least one historical measurement for total dissolved solids (TDS) above 500 mg/L. Using GIS to analyze water quality is beneficial for locating areas with particular water quality concerns. As seen on the plot the densest concentration of wells with TDS measurements above 500 mg/L is in the Barstow area. It is important to note that the majority of monitoring wells are concentrated in the Floodplain Aquifer and thus the majority of water quality measurements are taken from the Floodplain Aquifer.

Additional monitoring wells in the Regional Aquifer would help evaluate differences in water quality between the two aquifers. Besides spatial analysis, a temporal analysis can be done to evaluate how water level fluctuations affect water quality. Figure 4-11 displays the water level and TDS measurements for State Well 08N03W05J01.

As part of future efforts, the entire database could be linked to a GIS to provide spatial analyses of water level data and all water quality parameters within the Basin. Additional work could also focus on collecting, filtering, and adding supplementary water quality data available from the Department of Health Services and local agencies within the MWA service area.



**Groundwater Wells Measuring Above
500 mg/L Total Dissolved Solids**

Mojave Water Agency
Regional Water Management Plan Update

Figure 4-10
Date: January 2004
Prepared By: KTW

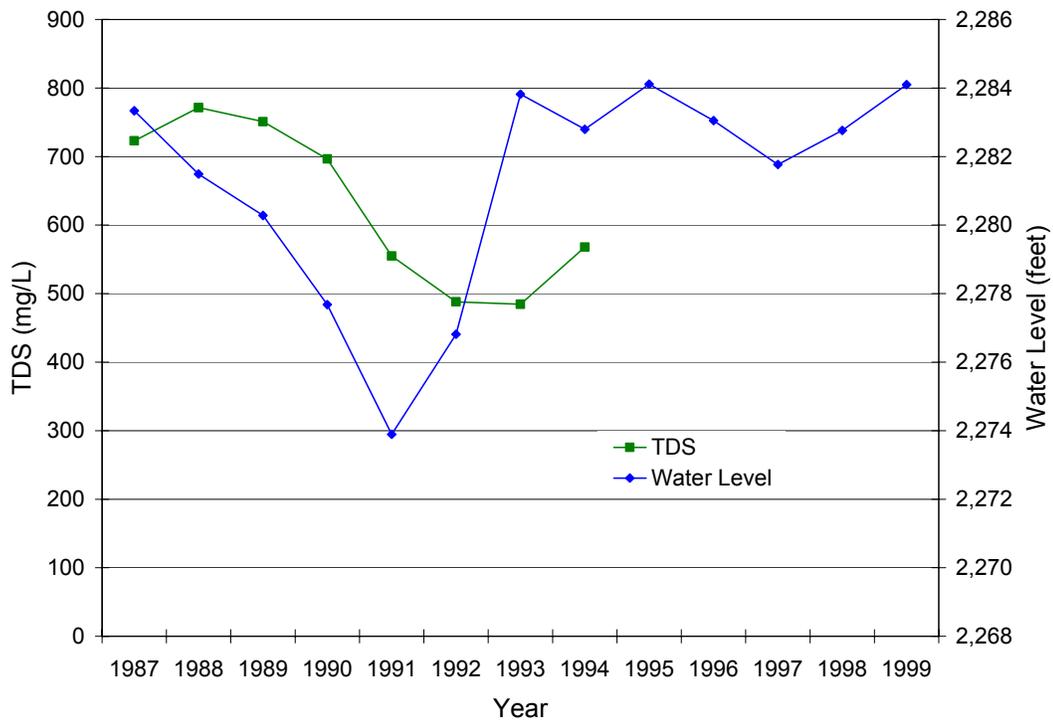


Figure 4-11: Total Dissolved Solids (TDS) with Water Level (feet above mean sea level) for State Well 08N03W05J01

State Water Project

MWA is entitled to 75,800 acre-feet of State Water Project (SWP) water per year. This includes the addition of 25,000 acre-feet of entitlement that was purchased from the Berrenda-Mesa Water District in 1998. Imported SWP water has historically been supplied to the MWA through the Mojave Basin and Morongo Basin pipelines and releases from Silverwood Lake. The State Water Project has delivered approximately 150,000 acre-feet of water to MWA from 1972 through 2001 (DWR 2001, and MWA). Table 4-7 summarizes the imported State Water Project water delivered to MWA.

Table 4-7: Deliveries of State Water Project Water to the MWA, 1978-2001

Year	Lake Silverwood¹	Rock Springs²	Kramer Junction (AVEK)³	Hodge⁴	Lenwood⁵	Hi-Desert Pipeline⁶	Total
1978	22,500	0	0	0	0	0	22,500
1979	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0
1983	24,489	0	0	0	0	0	24,489
1984	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0
1991	2,032	0	1,391	0	0	0	3,423
1992	9,334	30	1,310	0	0	0	10,674
1993	9,973	0	1,514	0	0	0	11,487
1994	819	15,434	1,399	0	0	0	17,652
1995	0	4,503	1,227	0	0	3,010	8,740
1996	0	2,134	1,316	0	0	3,977	7,427
1997	0	7,134	1,405	0	0	5,501	14,040
1998	0	2,190	1,345	0	0	2,357	5,892
1999	0	283	1,439	994	2,673	2,682	8,071
2000	0	2,451	1,361	2,144	1,476	3,930	11,362
2001	0	57	1,385	0	0	2,878	4,320
TOTAL	69,147	34,216	15,092	3,138	4,149	24,335	150,077

¹Lake Silverwood releases do not include releases made by DWR for purposes other than delivery to MWA. Prior to construction of the Morongo Basin Pipeline, the only means to deliver SWP water to MWA was through releases at Cedar Springs Dam at Silverwood Lake, upstream of the West Fork Gage in the Alto Subarea. The 1978 releases were part of a conjunctive use demonstration project with the DWR. The 1983 releases were non-entitlement water purchased from the Central Valley and delivered by SWP facilities.

²The Rock Springs Outlet was constructed on the Morongo Basin Pipeline in 1994 to release SWP water into the Mojave River in the Alto Subarea near the City of Hesperia at Rock Springs Road approximately 5 miles downstream of the Forks. All subsequent deliveries to Alto have been made here.

³The MWA has an agreement with the Antelope Valley-East Kern Water Agency (AVEK) to transfer MWA entitlement to AVEK each year sufficient to allow AVEK to transport the MWA entitlement to a power plant in the Kramer Junction area within the MWA boundary (Centro Subarea).

⁴The Hodge recharge facility, located about 40 miles downstream of the Forks, was constructed in 1999 to deliver SWP water to the Centro Subarea from the Mojave River Pipeline.

⁵The Lenwood recharge facility, located about 48 miles downstream of the Forks, was constructed in 1999 to deliver SWP water to the Centro Subarea from the Mojave River Pipeline.

⁶The Morongo Basin Pipeline was completed to Landers in the Morongo Basin/Johnson Valley Area in 1994, and the Hi-Desert Pipeline extension was completed to the Town of Yucca Valley in 1995.

The only internal allocations of SWP water within MWA is for a maximum of 7,257 acre-feet to Improvement District M (IDM) located in the Morongo Basin/Johnson Valley Area. These allocation deliveries may be limited to the same percentage of total entitlement that MWA is approved to receive from the State Water Project by the State Department of Water Resources. Limitations have not occurred to date because neither MWA nor the IDM member entities have approached maximum delivery capability. MWA also has an existing agreement to transfer up to 2,250 acre-feet per year to the Antelope Valley-East Kern Water Agency (AVEK). The water is transported by AVEK to a power plant located near Kramer Junction within the MWA. One of the major issues raised by stakeholders in the basin is how the remaining SWP entitlement will be distributed in the basin.

Figure 4-12 displays historical deliveries of SWP water for the years 1978 to 2001 to all State Water Project Contractors (DWR 2001b). The figure shows the percent of water requested by the Contractors that was delivered. The SWP Contractors have received the entire amount of water requested 75% of the time. On average, Contractors received 88% of the water requested. There were six years during the early 90's, 2000 and 2001 when deliveries were less than 100 percent of request. The allocation of entitlement for 2001 was 39%. At this level of allocation, MWA would have been able to receive 29,600 acre-feet of water.

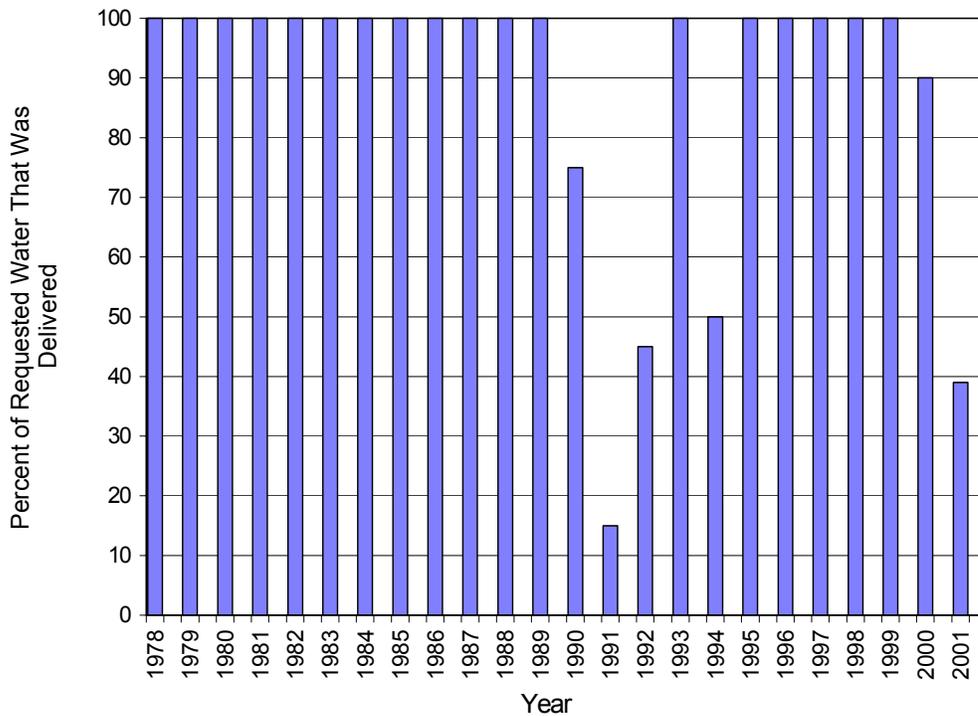


Figure 4-12: Historical SWP Percent of Deliveries Requested by Contractors

The variability of SWP deliveries is expected to increase in the future as Contractors request larger amounts of their maximum entitlement. System constraints such as Delta export restrictions and competition for the available water supply will increase management challenges. Even if MWA chooses to purchase its full entitlement of 75,800 acre-feet annually, its full entitlement will not be available every year. According to the State Water Project Reliability Report (DWR 2002), MWA can expect to receive an average of 58,400 acre-feet of its SWP supply under 2020 conditions. This estimate is based on 2020 demand projections with the current facilities in place. During a dry or critical year as defined by the Sacramento River Index, the SWP will be able to supply an average of 43,200 acre-feet. During a multiple dry year period (1988-1990), MWA's SWP supply will be about 22,900 acre-feet/year. Table 4-8 shows the average annual SWP supply available during all years, dry years, and in a multiple dry-year period. Figure 4-13 shows the projected probability of exceedance of SWP deliveries to MWA in 2020.

Table 4-8: Average Annual State Water Project Supplies

Year Type	State Water Project Supply (Acre-feet per Year)
Average	58,400
Dry Year	43,200
Multiple Dry Year	22,900

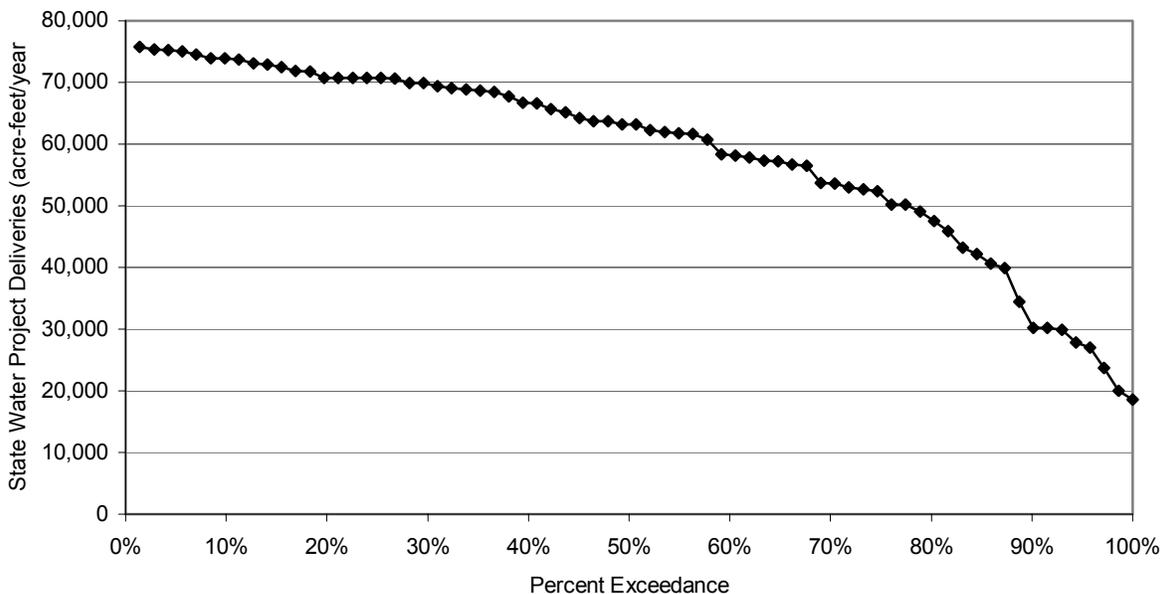


Figure 4-13: Percent Exceedance of SWP Deliveries in 2020

The recent history of deliveries and current efforts to improve system flexibility and reliability indicate that deliveries from the SWP will continue to be variable for the next ten to fifteen years. Efforts to meet water supply delivery objectives continue to be developed by the Department of Water Resources and the State Water Contractors. For example, contract provisions allow for the delivery of “interruptible” water supplies to Contractors during periods of abundant water supply after other SWP water supply and storage objectives have been met. The Contractors and the Department also continue to develop programs allowing transfers of entitlement between Contractors to maximize storage of Project water supplies when available.

MWA currently has an entitlement exchange program in place with the Solano County Water Agency (SCWA). This Agreement allows MWA to receive entitlement deliveries from the SCWA during hydrologic periods when the SCWA has approved entitlement in excess of their needs. MWA will subsequently allow the SCWA to utilize some of their approved entitlement during periods of drought, but not more than half of the quantity of SCWA entitlement that has previously been delivered to MWA. It is possible that in some years MWA could receive more than its full entitlement due to these programs. Therefore basin recharge alternatives designed to use SWP water should consider the effects of a variable water supply.

Water Quality

MWA’s groundwater basins contain numerous areas with water quality issues. These issues are described in Chapter 8. Key contaminants include arsenic, nitrates, iron, manganese, Chromium VI, total dissolved solids (TDS), total petroleum hydrocarbons (TPH), and volatile organic compounds (VOC’s). Measurements in excess of drinking water standards have been found for many of these constituents within each subarea in the Mojave Basin Area and each subbasin within the Morongo Basin/Johnson Valley area. Groundwater in these areas will have to be treated or replaced.

Another potential water quality issue facing MWA is the accumulation of salt in the groundwater basins. Because the Mojave River Basin and Morongo Basin/Johnson Valley areas are closed basins, salt contained in imported reclaimed wastewater and State Water Project (SWP) supplies are mostly not removed from the basin. An average of about 5,400 acre-feet of reclaimed wastewater is discharged into the MWA from outside its boundary and about 8,400 acre-feet of State Water Project water are currently imported each year. MWA is planning to increase its SWP utilization to 58,000 acre-feet per year, which will further increase the introduction of salts into the system.

MWA has initiated efforts to develop a groundwater quality analysis system for the entire MWA service area. The project will include an evaluation of existing groundwater data and identification of data needs, the development of an information management system that will allow MWA to collect, reconcile, analyze, and access water quality information, and the development of a water quality and analysis system to meet MWA's long-term water quality objectives.

Digital well data provided by MWA was compiled in a Microsoft® Access 2000 Database for data query and analysis. Data attributes in the database include water quality, water levels, well production, and GPS locations. The GPS well locations supplied by MWA were compared to the water quality, water level, and water production data to assess data spatial distribution within the MWA. Groundwater quality for a number of constituents and for each subarea are presented in Figures 4-3 through 4-9.

Inconsistent Water Sources

Because water use within the MWA service area is supplied entirely by groundwater, MWA does not have any inconsistent water sources that cause reduced deliveries to users within the service area. A potential exception is areas where water quality could limit use as a potable supply. Wellhead treatment or provision of an alternative supply is planned for these areas. While many of the sources that recharge the groundwater basin have high annual variability, including flows on the Mojave River and supplies from the State Water Project, the groundwater basins used within the MWA service area are sufficiently large to allow for continued water use during dry periods with only a temporary decline in groundwater levels.

Planned Water Supply Sources Through 2020 in Five-year Increments

The amount of available water supply to the Mojave Water Agency is not expected to change between now and 2020. In addition to its net average annual supply of 63,400 acre-feet per year, MWA has an average annual SWP supply of 58,400 acre-feet per year, for a total supply of 121,800 acre-feet per year. Table 4-9 shows the availability of each of these types of water in five-year increments through 2020.

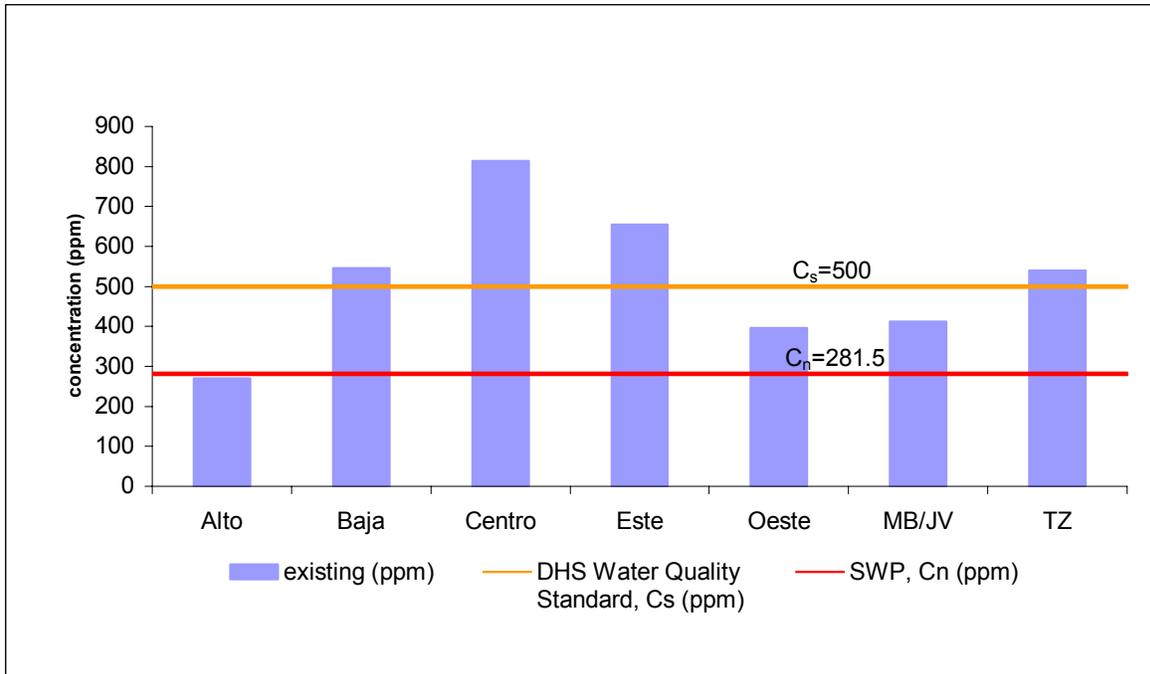


Figure 4-14: Total Dissolved Solids

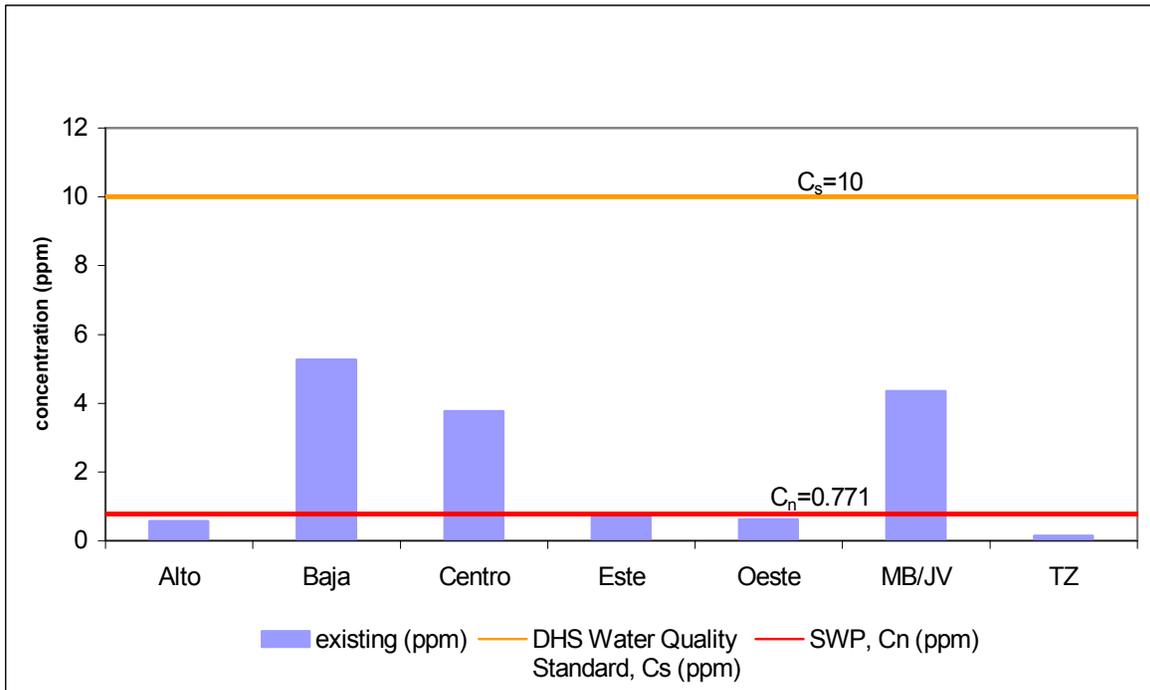


Figure 4-15: Nitrates

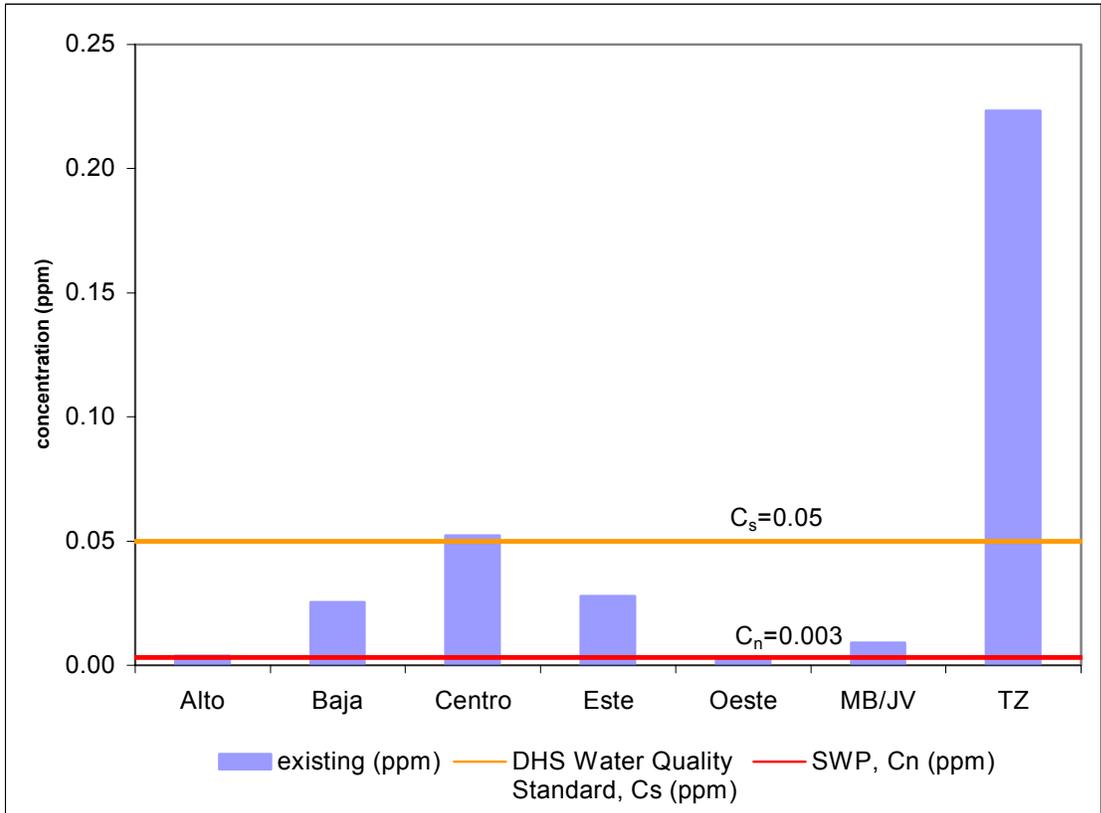


Figure 4-16: Manganese

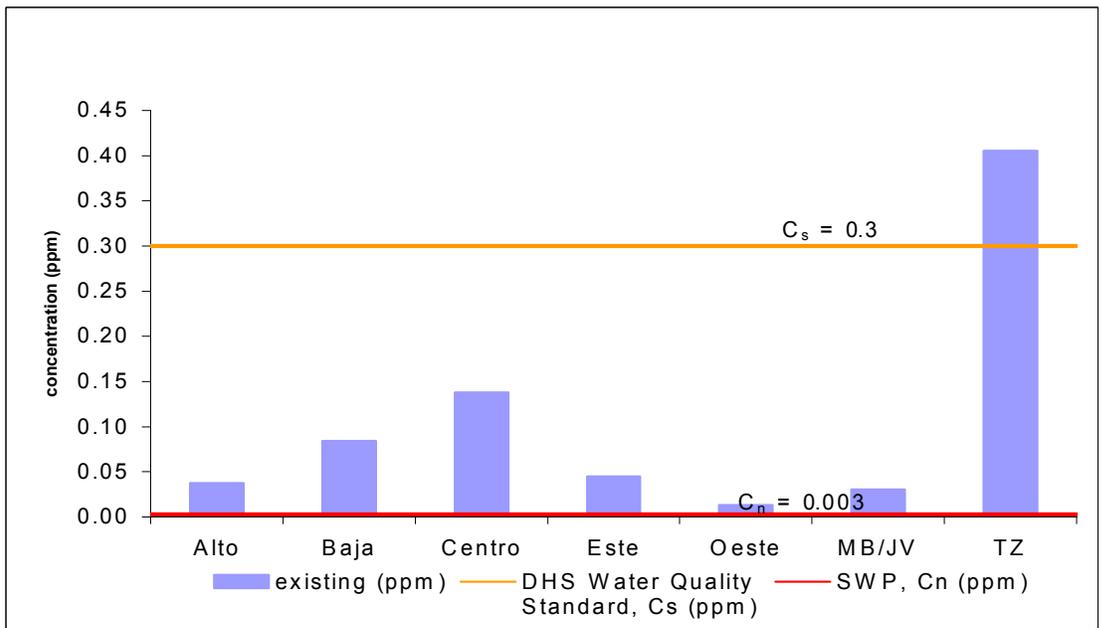


Figure 4-17: Iron

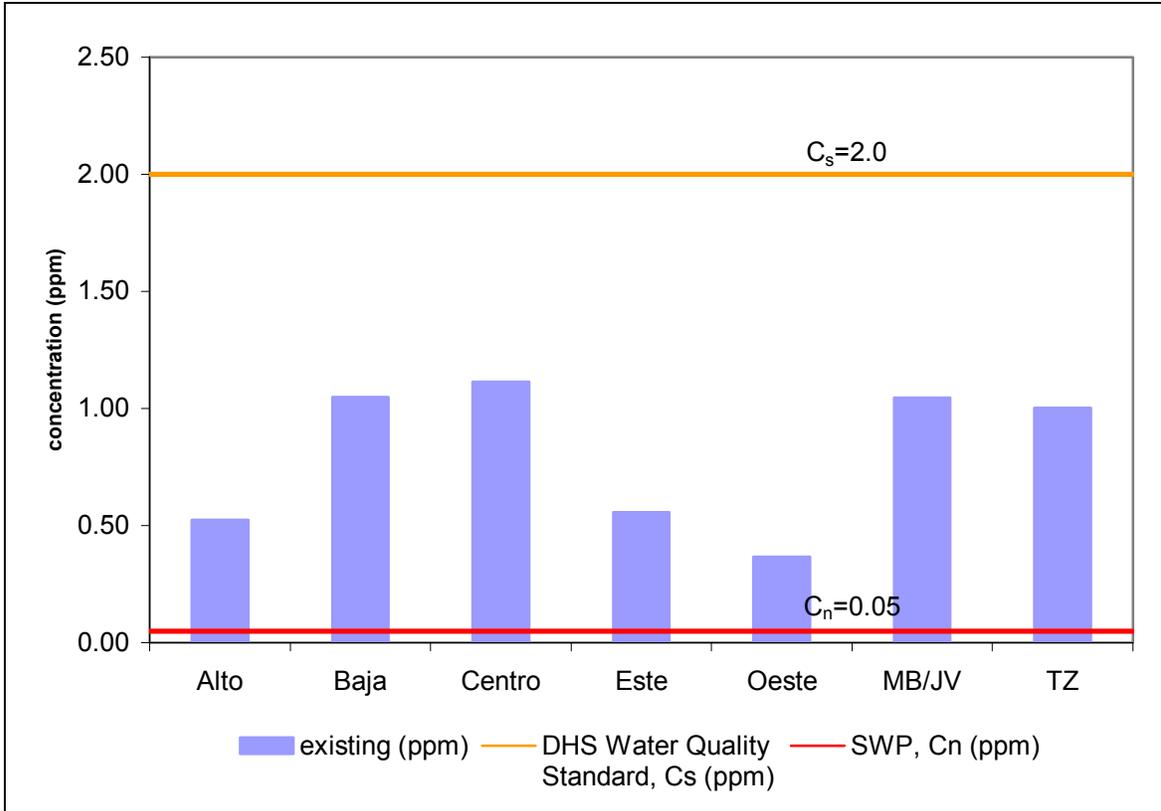


Figure 4-18: Fluoride

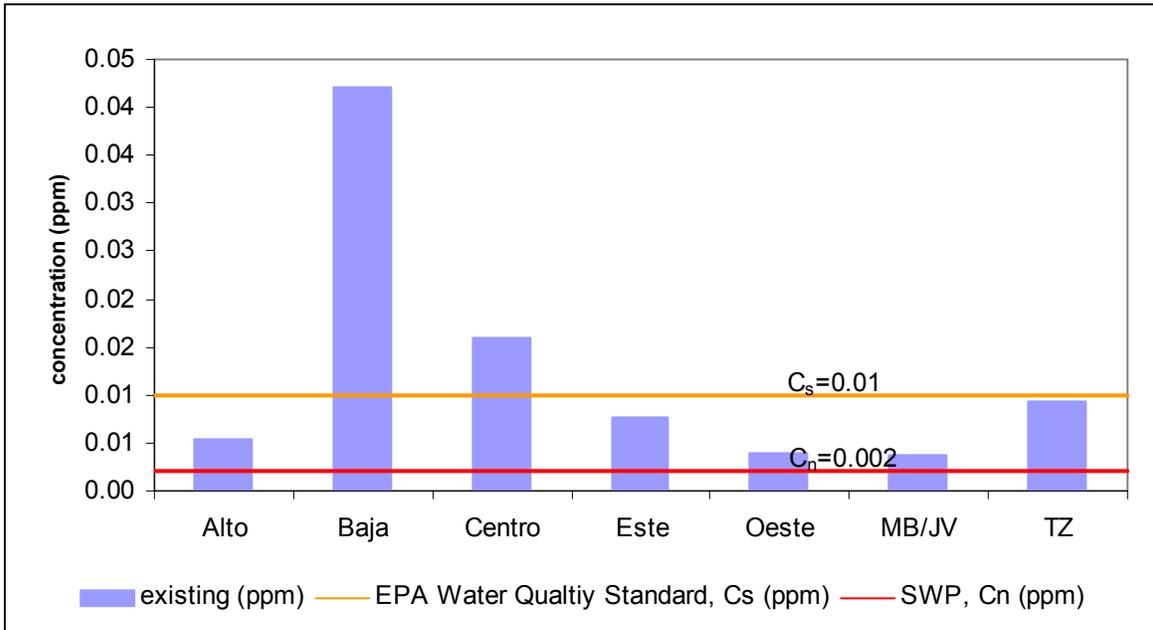


Figure 4-9: Arsenic

Water Quality and Management Strategies

The quality of water dictates numerous management strategies a water purveyor will implement, including, but not limited to, the selection of raw water sources, treatment alternatives, blending options, and modifications to existing treatment facilities. Maintaining and utilizing high quality sources of water simplifies management strategies by increasing water supply alternatives, water supply reliability, and decreasing the cost of treatment. The source water supplies are of good quality. Maintaining high quality source water allows for efficiently management of water resources by minimizing costs while distributing high quality water.

Water Quality and Supply Reliability

Maintaining the quality of water supplies increases the reliability of each source by ensuring that deliveries are not interrupted due to water quality concerns. A direct result from the degradation of a water supply source is increased treatment cost before consumption. The poorer the quality of the source water, the greater the treatment cost. Groundwater may degrade in quality to the point that is not economically feasible for treatment. In this scenario the degraded source water is taken off-line. This in turn decreases water supply reliability by decreasing the total supply and increasing demands on alternative water supplies.

Currently, water quality does not affect water supply reliability. Maintaining the current level of quality is vital to maintaining a reliable water supply.

Table 4-9: Available Water Supply Sources Through 2020

Supply Type	2000	2005	2010	2015	2020
Natural*	63,400	63,400	63,400	63,400	63,400
SWP	58,400	58,400	58,400	58,400	58,400
Total	121,800	121,800	121,800	121,800	121,800

*Average annual natural water supply data as shown in Table 4-2

Opportunities for Short and Long-Term Transfers

MWA is expected to have an estimated 400,000 acre-feet of unused State Water Project supply between now and 2020. One option for utilizing this supply would be to transfer a portion of it to another party as part of a storage agreement or exchange program. MWA and the Metropolitan Water District of Southern California (Metropolitan) recently agreed on a Water Exchange Pilot Program with the goals of facilitating a water exchange in the short term and helping to determine the feasibility of a similar long-term exchange program between the two parties. Under the terms of the Pilot Program, Metropolitan will deliver to Mojave up to 75,000 acre-feet of its SWP deliveries or other water. In exchange, in years when Metropolitan requests

water, MWA will provide Metropolitan water through exchange of MWA’s SWP deliveries for that year.

In addition, the rules of the Mojave Basin Area Adjudication allow for the possibility of in-basin transfers. Under the rules of the Judgment producers are allowed to sell unused Base Annual Production (BAP) and Free Production Allowance (FPA) to other parties within the same subarea. This mechanism allows industrial and municipal users to purchase BAP from agricultural or other users to augment their ability to pump water. Table 4-10 summarizes the amount of transfers that have occurred in each subarea through 2002.

Table 4-10: Permanent Transfers of Base Annual Production by Subarea WY94-02

Year Type	BAP Transfers (Acre-feet)
Alto	22,941
Baja	24,928
Centro	28,566
Este	5,248
Oeste	1,247
Total	82,930

Timeline for Implementation of Proposed Projects

As part of the RWMP Update, 19 projects and management actions were identified to address the water supply and water quality issues that MWA must address to provide a sustainable water supply through 2020. These projects and management actions can be found in Appendix B. This list includes both MWA and non-MWA projects, as well as projects and actions that might be developed in partnership with MWA. The following projects have been identified as having the highest priority:

- implementing 10% municipal conservation in the Mojave Basin and 5% in Morango Basin/Johnson Valley
- wastewater reclamation in Alto
- wellhead treatment in Alto
- recharge in the Alto Floodplain and Regional and Warren Valley aquifers
- providing a new water supply for Pioneertown

Each of these projects will begin implementation within the next 3-5 years.

The following projects have lower priority, but are being evaluated for possible implementation by 2020:

- a regional treatment plant in Alto
- recharge in the Alto Transition Zone, Baja, Centro, Este, Oeste, Copper Mountain Valley, and Means/Ames Valley
- providing a new water supply for Hinkley

5

WATER DEMAND

Introduction

As discussed in Chapter 3, the Mojave Water Agency (MWA) consists of two distinct hydrologic planning areas referred to as the Mojave Basin Area and the Morongo Basin/Johnson Valley Area. The Mojave Basin Area is further sub-divided into five subareas (hydrologic subbasins) known as Alto, Baja, Centro, Este, and Oeste. The Morongo Basin/Johnson Valley Area also contains four hydrologic subbasins referred to as Johnson Valley, Means/Ames Valley, Copper Mountain Valley and Warren Valley Basins. These subareas are used for planning purposes to determine safe yield and to report groundwater well production.

Since 1994, MWA has tabulated production in these planning subareas organized by demand sector. The demand sectors include agriculture, municipal, industrial, golf courses and parks, and recreational lakes. These data are used to characterize the current water demand within each subarea and also to project possible future water production within each sector in each subarea.

Groundwater production is an accurate measure of the water demand within each subarea, but it cannot be compared directly with the water supply estimates presented in Chapter 4. A portion of the water pumped is returned to the groundwater aquifer and becomes part of the available

water supply. For example, much of the water applied to agriculture, golf courses, and parks percolates back to the groundwater aquifer. The portion of the groundwater pumped that does not return to the aquifer is referred to as consumptive use. In this chapter, consumptive use totals are presented rather than groundwater production to allow for a direct comparison with the estimated water supply in each subarea. The consumptive use rates used in this report are derived from Webb (2000), which performed a detailed analysis of the production and consumptive use for each subarea within the Mojave Basin Area.

Production and consumptive use are two important concepts. Consumptive use values are presented in this chapter.

This chapter presents the current and projected future consumptive use for each subarea. All of the data contained in this chapter is presented by water year. For a detailed discussion of the data available and of the methods used to generate the numbers presented in this chapter, please refer to Appendix C.

Current Water Demand

Demographics

Table 5-1 shows the 1990 and 2000 estimated populations for each subarea in the Mojave Basin Area and for each subbasin in the Morongo Basin/Johnson Valley Area in 1990 and 2000. The population increased in every subarea in the Mojave.

Table 5-1: Comparison of Actual and Projected 2000 Population

	1990 Actual ¹	2000 Actual	Annual Pct Change	2000 Projected ¹	Percent Difference
Mojave Basin Area					
Alto	180,700	236,600	+2.7%	259,200	-8.7%
Baja	8,800	5,100	-5.3%	12,600	-59.5%
Centro	33,000	33,700	+0.2%	47,300	-28.8%
Este	5,300	6,000	+1.2%	7,600	-21.1%
Oeste	5,800	7,400	+2.5%	8,300	-10.8%
Subtotal Mojave	233,600	288,800	+2.1%	335,000	-13.8%
MB/JV Area²					
Copper Mtn. Valley	10,200	9,600	-0.6%	11,500	-27.5%
Johnson Valley	N/A	400	N/A	N/A	N/A
Means/Ames Valley	4,700	7,500	+4.8%	5,900	+27.0%
Warren Valley	24,300	14,700	-4.9%	32,700	-55.0%
Subtotal MB/JV	39,200	32,200	-1.9%	51,900	-37.9%
Total	272,800	321,000	+1.6%	386,900	-17.0%

¹1990 actual and 2000 projected population estimates from 1994 RWMP.

²Morongo Basin/Johnson Valley subbasin populations represent the population served by each subbasin, not the population that overlies the subbasin. This assumption is consistent with the 1994 RWMP.

Basin Area except for Baja. The largest increase was in Alto, which experienced an annual percent growth rate of 2.7% per year between 1990 and 2000. Baja showed a population reduction of 5.3% per year between 1990 and 2000. The overall population of the Mojave Basin Area increased from about 234,000 to about 289,000 between 1990 and 2000.

The 2000 population of the Morongo Basin/Johnson Valley area is estimated to be about 32,000 in 2000, which is about 7,000 less than the estimate for 1990 in the 1994 RWMP. However, many people in the area suspect that the 1990 population was overestimated. The population

estimates shown in Table 5-1 represent the population served by the production in each groundwater basin. These estimates do not therefore necessarily represent the population living in any particular geographic area. This assumption is consistent with the 1994 RWMP. For example, the Hi-Desert Water District (HDWD) operates production wells that draw from both the Means/Ames Valley and Warren Valley subbasins. Between 1990 and 2000, the quantity of water that was extracted by HDWD in the Means/Ames Valley subbasin was greatly increased due to the operation of the newly drilled Well #24, and the extractions from the Warren Valley subbasin were correspondingly reduced. This shift in production is the reason why the Means/Ames subbasin shows a 4.8% average annual increase in population and the Warren Valley subbasin shows a 4.9% decrease in population between 1990 and 2000. If HDWD had continued to pump primarily from the Warren Valley subbasin in 2000 as it had in 1990, the population served by both the Means/Ames and Warren Valley subbasins would have been less in 2000 than it was in 1990.

Table 5-1 also shows the projected 2000 populations from the 1994 Regional Water Management Plan (RWMP). Every subarea and subbasin in the Mojave Water Agency except for the Means/Ames subbasin experienced less growth than was projected in the 1994 RWMP. The increase in population shown for the Means/Ames Valley subbasin does not represent an increase in actual population, but a shift in service for a portion of HDWD from the Warren Valley subbasin.

The overall population of the Mojave Water Agency increased from about 273,000 in 1990 to about 321,000 in 2000, which represents an average annual growth rate of 1.6% per year. The year 2000 population was 17% less than what was projected in the 1994 RWMP.

Table 5-2 shows year 2000 estimates of population, housing units, average household size, land area and population per acre for individual cities within the Mojave Water Agency.

Table 5-2: Year 2000 Demographic Data for Selected Cities

City	Subarea	Population*	Housing Units*	Average Household Size*	Land Area (sq. miles)	Population per acre
Adelanto	Alto	18,130	5,547	3.53	63	0.45
Apple Valley	Alto	54,239	20,163	2.90	73	1.16
Barstow	Centro	21,119	9,153	2.71	33	1.00
Hesperia	Alto	62,582	21,348	3.12	67	1.45
Victorville	Alto	64,029	22,498	3.03	74	1.35
Yucca Valley	MB/JV Area	16,865	7,952	2.38	40	0.66

*Population, Housing Unit and Household Size data from 2000 U.S. Census

Consumptive Use

Table 5-3 summarizes the difference between the projected consumptive use estimates for 1995 and 2000 by the 1994 RWMP and actual consumptive use estimates for those two years. Figures 5-1, 5-2 and 5-3 graphically present the Mojave Basin Area data from Table 5-3. The actual urban consumptive use in the Mojave Basin Area was 7% higher than the projected amount for 1995 while agricultural consumptive use was 23% less than the projected amount. The Mojave Basin Area urban consumptive use for year 2000 was 14% greater than projected and the agricultural consumptive use was about 44% less than projected. In the Morongo Basin/Johnson Valley area, the actual consumptive use was 17% less than the projected consumptive use in 1995 and 32% less in 2000.

Table 5-3: 1995 and 2000 Projected and Actual Consumptive Use
(Acre-feet/year)

	1995 Projected	1995 Actual	Difference	Percent Difference
Mojave Basin Area				
Urban Uses*	53,800	57,500	3,700	7%
Agricultural Uses	70,500	54,400	-16,100	-23%
Subtotal Mojave	124,300	111,900	-12,400	-10%
MB/JV Area				
Urban Uses*	3,270	2,700	-570	-17%
Total	127,600	114,600	-13,000	-10%
	2000 Projected	2000 Actual	Difference	Percent Difference
Mojave Basin Area				
Urban Uses*	61,700	70,300	8,600	14%
Agricultural Uses	62,600	34,900	-27,700	-44%
Subtotal Mojave	124,300	105,200	-19,100	-15%
MB/JV Area				
Urban Uses*	3,810	2,600	-1,210	-32%
Total	128,100	107,800	-20,300	-16%

*Urban uses include municipal, industrial, golf course, and recreational water uses

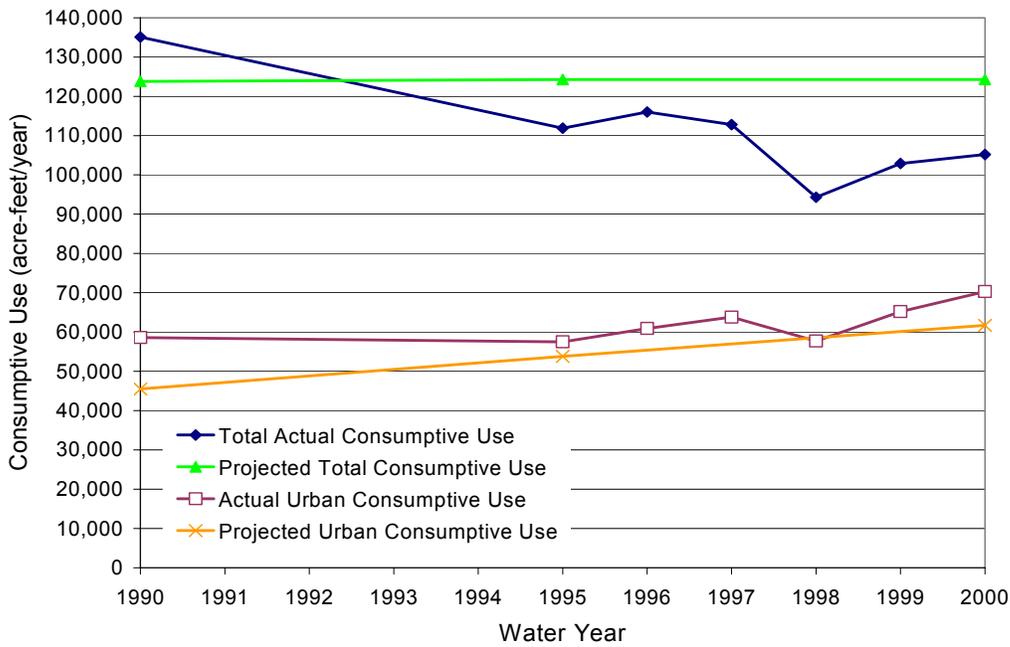


Figure 5-1: Mojave Basin Area Actual Total and Urban Consumptive Use for 1990 - 2000 and 1994 RWMP Projected Use

The 1994 RWMP projected a 1.1% total increase in total Mojave Water Agency consumptive use between 1990 and 2000. The actual consumptive use during this period decreased by 14.9%, which represents a decline of about 18,700 acre-feet.

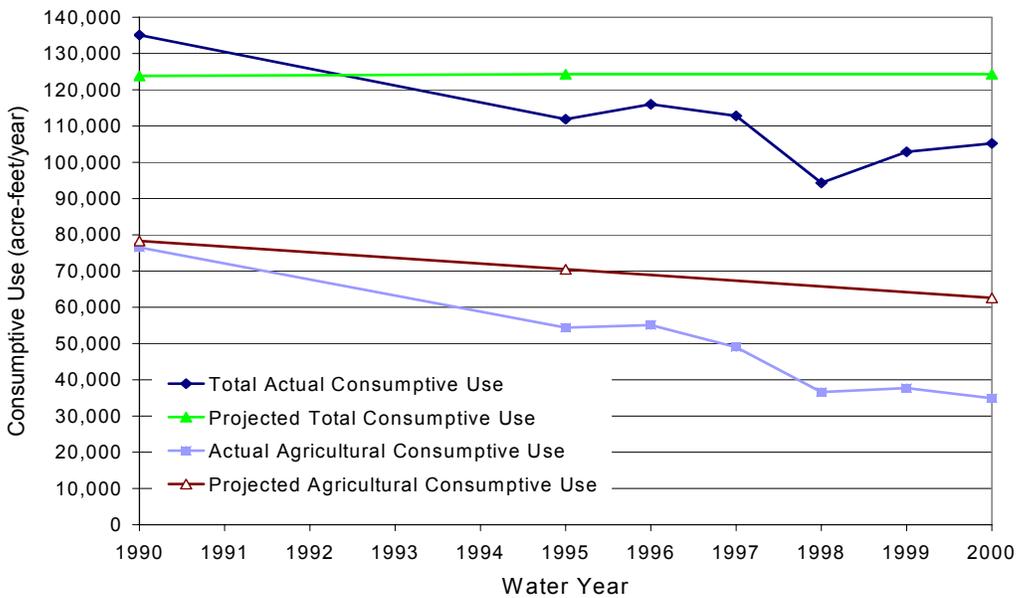


Figure 5-2: Mojave Basin Area Actual Total and Agricultural Consumptive Use for 1990-2000 and 1994 RWMP Projected Use

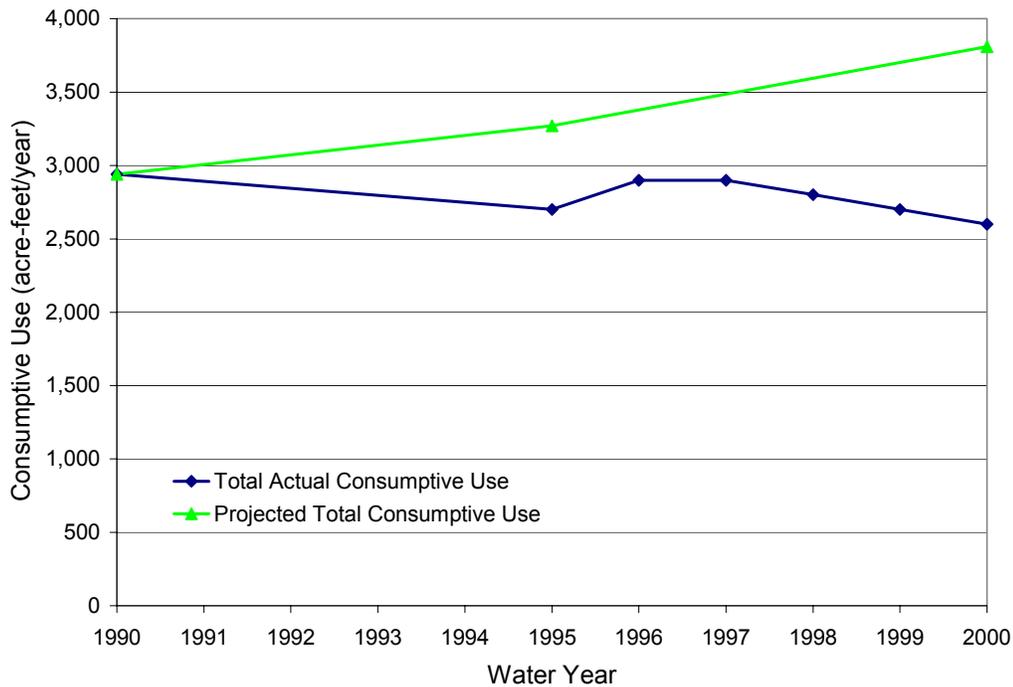


Figure 5-3: Morongo Basin/Johnson Valley Area Actual Total Consumptive Use for 1990-2000 and 1994 RWMP Projected Use

Mojave Basin Area

The urban consumptive use amounts cited above include all of the non-agricultural uses such as industrial, municipal, golf courses and parks, and recreational lakes. MWA has more recently estimated production for each of these uses separately. Table 5-4 shows estimates of historical consumptive use from 1995 to 2001 for each subarea in the Mojave Basin Area for the various water uses identified above. Figure 5-4 shows the total Mojave Basin Area consumptive use estimates during this time period. The municipal consumptive use estimates in Alto and Oeste have been adjusted to account for the operation of County Service Area (CSA) 70L. While the population of CSA 70L is almost evenly split between Alto and Oeste, about 80% of the production is in Oeste. As a result, the municipal consumptive use estimates in Oeste are greater than 50% of production while the estimates for Alto are less than 50% of production.

Agricultural consumptive use has been declining in all subareas in the Mojave Basin Area since about 1990 while other consumptive uses have remained fairly constant since 1995. The additional decrease in consumptive use of applied water during 1998 as shown on Figure 5-4 was possibly the result of an unusually large amount of local precipitation during that year.

Figures 5-5 through 5-9 show the consumptive use in Alto, Baja, Centro, Este, and Oeste for the various types of use from 1995 through 2001. The recent trends within each subarea are discussed briefly below.

Alto (Figure 5-5)

Since 1995, municipal consumptive use has increased 16.5% from 28,400 acre-feet to 33,100 acre-feet. During the same time period, however, agricultural consumptive use in Alto has decreased by 72.2%, from 9,000 acre-feet to 2,500 acre-feet. As a result, total consumptive use in Alto has remained fairly steady in recent years.

Baja (Figure 5-6)

Agriculture is the primary use of water in the Baja Subarea. Between 1995 and 2001, agricultural consumptive use in Baja declined by 31.4%, from 22,300 acre-feet to 15,300 acre-feet. Industrial consumptive use has increased by 350% since 1995, from 1,400 acre-feet to 6,300 acre-feet in 2001, due mostly to an increase in water use by power generating facilities in the area. Between 1995 and 2001 total consumptive use in the Baja Subarea declined by 1,900 acre-feet.

Centro (Figure 5-7)

In Centro, both agricultural and urban consumptive use has been declining in recent years. Between 1995 and 2001, municipal and industrial use declined by about 11.6% from 8,600 acre-feet to 7,600 acre-feet. Agricultural consumptive use declined by 59.2%, from 16,900 acre-feet to 6,900 acre-feet. Total consumptive use in Centro has declined from 25,700 acre-feet to 14,700 acre-feet between 1995 and 2001.

Este (Figure 5-8)

Agricultural water use has been decreasing in recent years in Este. Between 1995 and 2001 agricultural consumptive use decreased by 29.3%, from 4,100 acre-feet to 2,900 acre-feet. Urban consumptive use remained fairly constant during these years. Total consumptive use in Este was about 4,600 acre-feet in 2001, compared to 6,300 acre-feet in 1995.

Oeste (Figure 5-9)

Oeste agricultural consumptive use in 2001 was 1,000 acre-feet, compared to 2,100 acre-feet in 1995. Municipal consumptive use has increased between 1995 and 2001 from 1,500 acre-feet to 1,900 acre-feet. Because the decrease in agricultural consumptive use has been greater than the increase in urban use, total consumptive use in Oeste decreased by 700 acre-feet between 1995 and 2001.

**Table 5-4: Mojave Basin Area Historical Consumptive Use
(Acre-feet/year)**

Alto							
	1995	1996	1997	1998	1999	2000	2001
Agricultural	9,000	8,200	9,100	4,800	4,500	3,800	2,500
Industrial	5,300	4,000	3,700	3,100	4,000	4,200	3,900
Municipal	28,400	32,000	31,900	28,800	31,300	34,400	33,100
Golf Courses	2,500	2,300	2,200	2,300	2,800	2,200	2,400
Recreational	2,800	3,800	4,100	4,900	6,100	6,900	5,800
Total	48,000	50,300	51,000	43,900	48,700	51,500	47,700
Baja							
	1995	1996	1997	1998	1999	2000	2001
Agricultural	22,300	24,900	21,000	18,300	18,800	17,700	15,300
Industrial	1,400	1,100	3,300	2,500	4,300	5,500	6,300
Municipal	2,000	2,800	2,200	1,700	2,400	2,500	2,400
Golf Courses	0	0	0	0	0	0	0
Recreational	2,600	2,300	3,200	3,900	2,600	2,500	2,400
Total	28,300	31,100	29,700	26,400	28,100	28,200	26,400
Centro							
	1995	1996	1997	1998	1999	2000	2001
Agricultural	16,900	14,900	12,600	8,400	9,800	8,900	6,900
Industrial	2,500	2,500	2,700	1,600	1,800	1,900	1,900
Municipal	6,100	6,600	6,500	5,700	5,900	6,300	5,700
Golf Courses	200	200	200	100	200	200	200
Recreational	0	0	0	0	0	0	0
Total	25,700	24,200	22,000	15,800	17,700	17,300	14,700
Este							
	1995	1996	1997	1998	1999	2000	2001
Agricultural	4,100	4,800	4,000	3,300	3,200	3,200	2,900
Industrial	1,500	800	1,300	800	1,000	900	700
Municipal	700	900	900	900	900	900	1,000
Golf Courses	0	0	0	0	0	0	0
Recreational	0	0	0	0	0	0	0
Total	6,300	6,500	6,200	5,000	5,100	5,000	4,600
Oeste							
	1995	1996	1997	1998	1999	2000	2001
Agricultural	2,100	2,300	2,300	1,800	1,400	1,300	1,000
Industrial	0	0	0	0	0	0	0
Municipal	1,500	1,600	1,600	1,400	1,900	1,900	1,900
Golf Courses	0	0	0	0	0	0	0
Recreational	0	0	0	0	0	0	0
Total	3,600	3,900	3,900	3,200	3,300	3,200	2,900
Total Mojave Basin Area							
	1995	1996	1997	1998	1999	2000	2001
Agricultural	54,400	55,100	49,000	36,600	37,700	34,900	28,600
Industrial	10,700	8,400	11,000	8,000	11,100	12,500	12,800
Municipal	38,700	43,900	43,100	38,500	42,400	46,000	44,100
Golf Courses	2,700	2,500	2,400	2,400	3,000	2,400	2,600
Recreational	5,400	6,100	7,300	8,800	8,700	9,400	8,200
Total	111,900	116,000	112,800	94,300	102,900	105,200	96,300

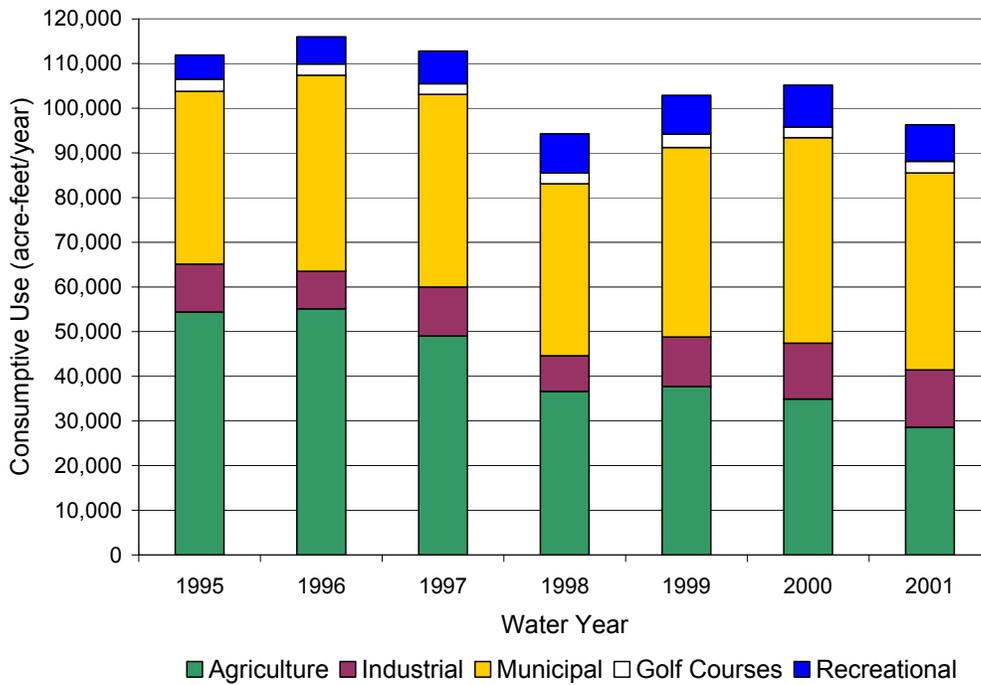


Figure 5-4: Mojave Basin Area Total Consumptive Use by Sector for 1995-2001

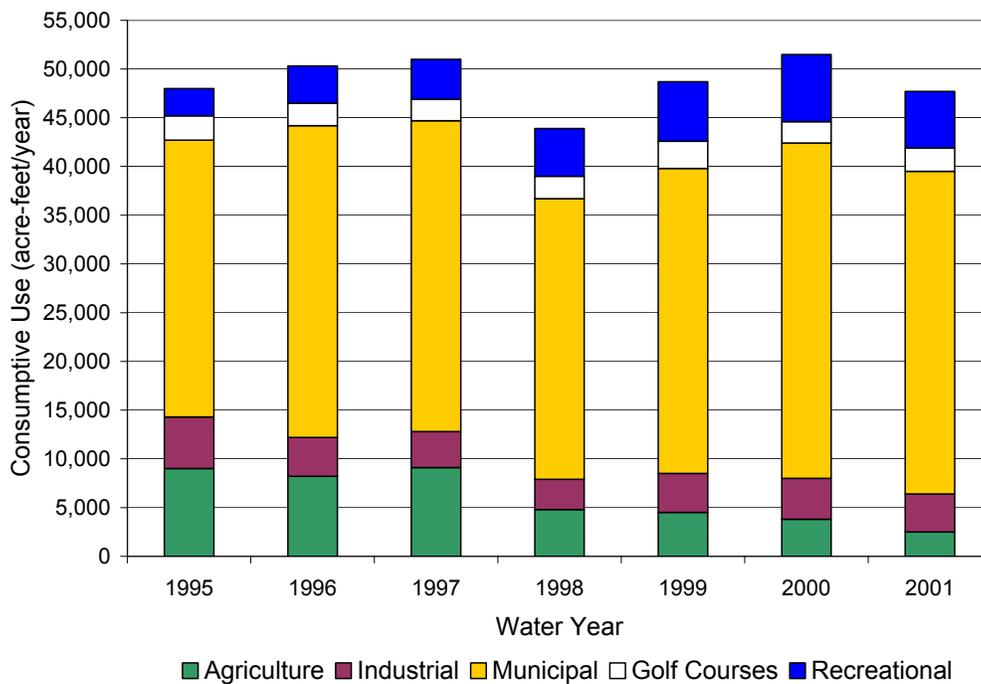


Figure 5-5: Alto Subarea Consumptive Use by Sector for 1995-2001

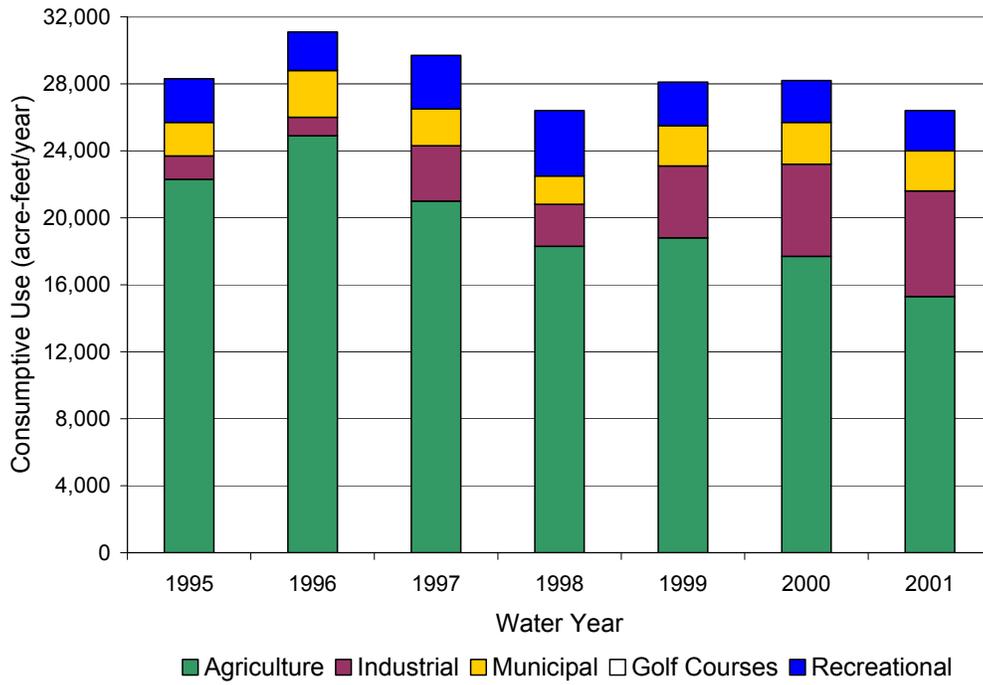


Figure 5-6: Baja Subarea Consumptive Use by Sector for 1995-2001

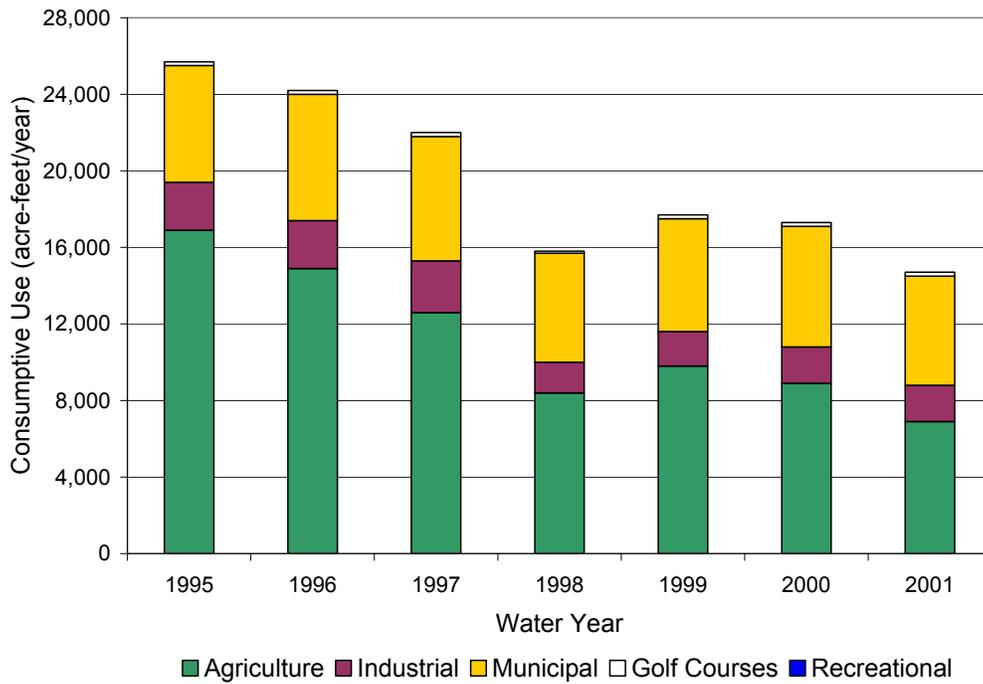


Figure 5-7: Centro Subarea Consumptive Use by Sector for 1995-2001

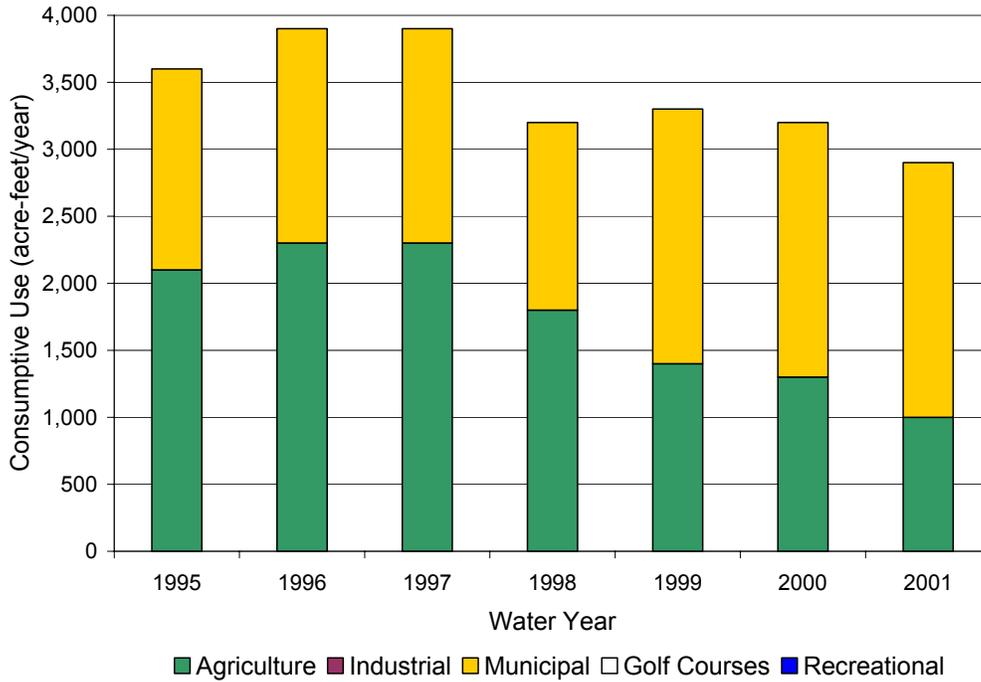


Figure 5-8: Este Subarea Consumptive Use by Sector for 1995-2001

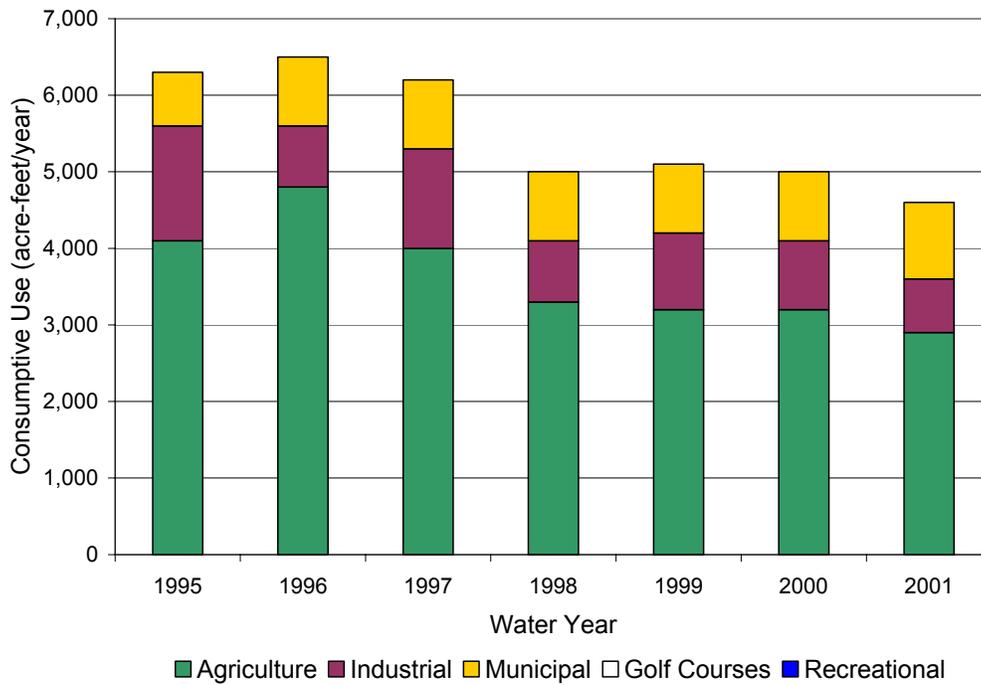


Figure 5-9: Oeste Subarea Consumptive Use by Sector for 1995-2001

Morongo Basin/Johnson Valley Area

Table 5-5 shows consumptive use estimates for each demand sector within each subbasin in the Morongo Basin/Johnson Valley Area. Because production estimates were not available in the Morongo Basin/Johnson Valley Area for 2001, Table 5-5 shows consumptive use estimates from 1995-2000. Production data is not available for the Johnson Valley subbasin. The consumptive use estimate for the Johnson Valley Area for 2000 was determined using the 2000 population estimate shown in Table 5-1 and assuming that the per capita use was the same as the remainder of the Morongo Basin/Johnson Valley Area.

The municipal consumptive use in the Means/Ames Valley and Warren Valley subbasins has not necessarily been proportional to the production in each of those subbasins. This is due to: (1) the pumping operation of the HDWD, which overlies both subbasins and has production wells in each subbasin, and (2) the operation of the Bighorn Desert View Intertie, through which water pumped outside of HDWD in the Means/Ames Valley subbasin was transferred to HDWD in 1995, 1996 and 2000. In 2000, 81% of the population of HDWD resided on top of the Warren Valley subbasin, with the remainder residing on top of the Means/Ames Valley subbasin. It is therefore assumed that the 81% of the return flow from total HDWD production would return to the Warren Valley subbasin. However, the proportion of HDWD's production that was extracted from each subbasin has been variable, with as little as 61% being extracted from the Warren Valley subbasin in 1996 and as much as 79% in 2000. Because a higher proportion of population than production in the HDWD service area has been in the Warren Valley subbasin, the consumptive use as a percent of production has been higher in the Means/Ames Valley subbasin than in the Warren Valley subbasin. The Bighorn Desert View Intertie operation had the further effect of increasing the consumptive use in the Means/Ames subbasin and reducing it in the Warren Valley subbasin because all of the production passing through the Intertie occurred in the Means/Ames Valley subbasin but 81% of the return flow went to the Warren Valley subbasin.

Table 5-5: Morongo Basin/Johnson Valley Area Historical Consumptive Use
(Acre-feet/year)

Copper Mountain Valley						
	1995	1996	1997	1998	1999	2000
Agricultural	0	0	0	0	0	0
Industrial	0	0	0	0	0	0
Municipal	700	800	800	700	800	800
Golf Courses	0	0	0	0	0	0
Recreational	0	0	0	0	0	0
Total	700	800	800	700	800	800
Johnson Valley						
	1995	1996	1997	1998	1999	2000
Agricultural	N/A	N/A	N/A	N/A	N/A	0
Industrial	N/A	N/A	N/A	N/A	N/A	0
Municipal	N/A	N/A	N/A	N/A	N/A	30
Golf Courses	N/A	N/A	N/A	N/A	N/A	0
Recreational	N/A	N/A	N/A	N/A	N/A	0
Total	N/A	N/A	N/A	N/A	N/A	30
Means/Ames Valley						
	1995	1996	1997	1998	1999	2000
Agricultural	0	0	0	0	0	0
Industrial	0	0	0	0	0	0
Municipal	1,200	1,700	900	1,200	900	600
Golf Courses	0	0	0	0	0	0
Recreational	0	0	0	0	0	0
Total	1,200	1,700	900	1,200	900	600
Warren Valley						
	1995	1996	1997	1998	1999	2000
Agricultural	0	0	0	0	0	0
Industrial	0	0	0	0	0	0
Municipal	600	200	1,000	700	800	1,100
Golf Courses	200	200	200	200	200	100
Recreational	0	0	0	0	0	0
Total	800	400	1,200	900	1,000	1,200
Total Morongo Basin/Johnson Valley Area*						
	1995	1996	1997	1998	1999	2000
Agricultural	0	0	0	0	0	0
Industrial	0	0	0	0	0	0
Municipal	2,500	2,700	2,700	2,600	2,500	2,500
Golf Courses	200	200	200	200	200	100
Recreational	0	0	0	0	0	0
Total	2,700	2,900	2,900	2,800	2,700	2,600

*Johnson Valley is not included in the Morongo Basin/Johnson Valley Area totals because the supply is not included as noted in Chapter 4.

Figure 5-10 shows the total Morongo Basin/Johnson Valley Area consumptive use estimates during this time period. Consumptive use in the Morongo Basin/Johnson Valley area has stayed fairly constant in these years, fluctuating between about 2,600 acre-feet and about 2,900 acre-feet. About 95% of the consumptive use in the Morongo Basin/Johnson Valley area is municipal use, with the remainder being used for a golf course in the Warren Valley. The area contains only minimal agricultural, industrial, or recreational lakes uses.

Figures 5-11 through 5-13 show the consumptive use in the Copper Mountain Valley, Means/Ames Valley, and Warren Valley subbasins for each type of use from 1995 through 2000. The recent trends within each subbasin are discussed briefly below.

Copper Mountain Valley (Figure 5-11)

All of the production from the Copper Mountain Valley subbasin is for municipal uses. The consumptive use in the Copper Mountain Valley subbasin has been fairly stable in recent years, ranging from a low of 700 acre-feet in 1998 to a high of 800 acre-feet in 1996.

Means/Ames Valley (Figure 5-12)

Consumptive use in the Means/Ames Valley has been highly variable because of fluctuations in the production ratio of HDWD and the operation of the Bighorn Desert View Intertie. In 1996, the Means/Ames Valley consumptive use was very high because 39% of the HDWD pumping was out of the Means/Ames Valley subbasin and an additional 700 acre-feet was pumped from the subbasin and transferred to HDWD. However, from 1997-1999 the Bighorn Desert View Intertie did not operate and only 27 acre-feet were transferred in 2000. Furthermore, in 1997, 1999, and 2000 less than 30% of HDWD's production was out of the Means/Ames Valley subbasin. As a result of these differences in operation, the consumptive use in the Means/Ames Valley subbasin was 1,700 acre-feet in 1996 but 900 acre-feet or less in 1997, 1999, and 2000.

Warren Valley (Figure 5-13)

Consumptive use in the Warren Valley has been highly variable for the same reasons as in the Means/Ames Valley. The effects of these changes in operation have been the opposite in the Warren Valley than those in the Means/Ames Valley. In 1996, for example, while the Means/Ames Valley had a very high consumptive use, the Warren Valley subbasin had only about 400 acre-feet of consumptive use. In 1997, 1999 and 2000, by contrast, the Warren Valley had at least 1,000 acre-feet of consumptive use each year.

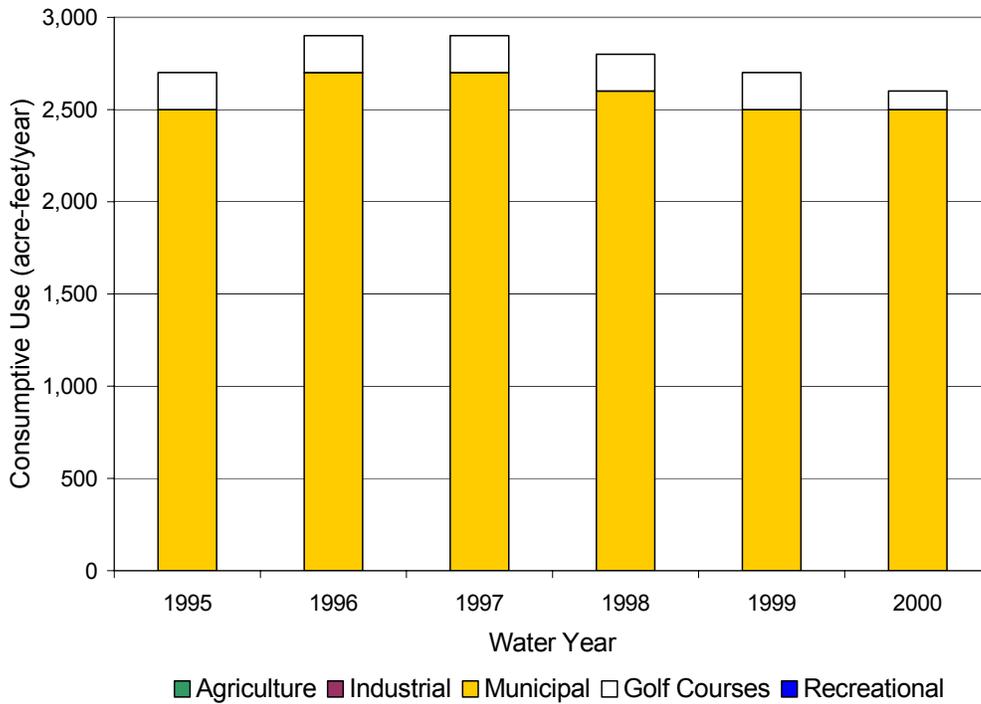


Figure 5-10: Morongo Basin/Johnson Valley Area Total Consumptive Use by Sector for 1995-2000

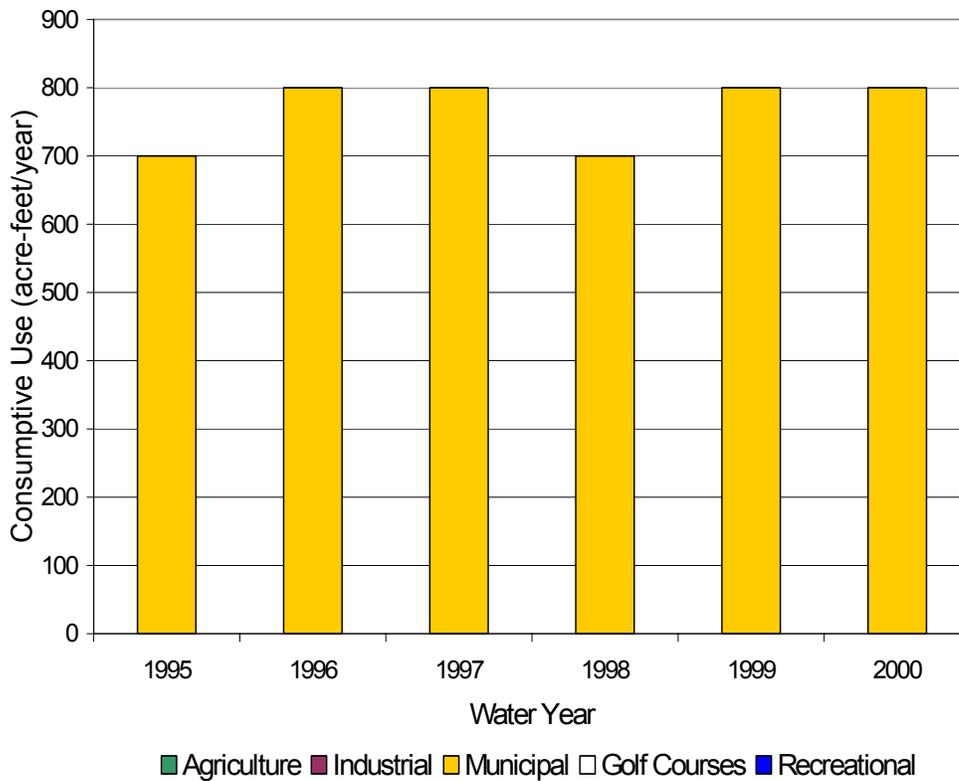


Figure 5-11: Copper Mountain Valley Subbasin Consumptive Use by Sector for 1995-2000

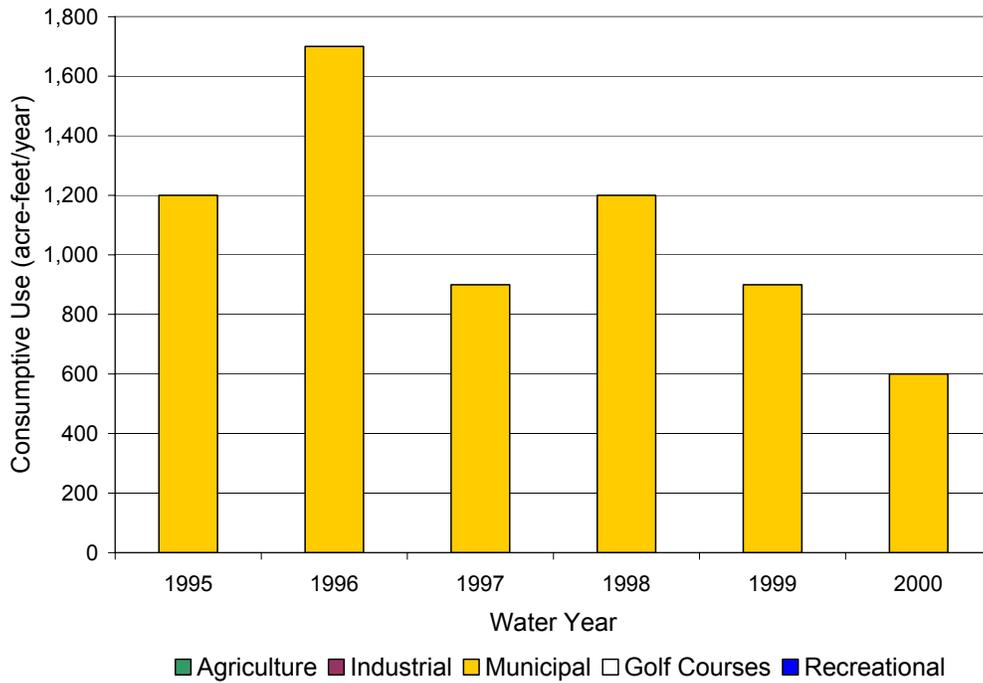


Figure 5-12: Means/Ames Valley Subbasin Consumptive Use by Sector for 1995-2000

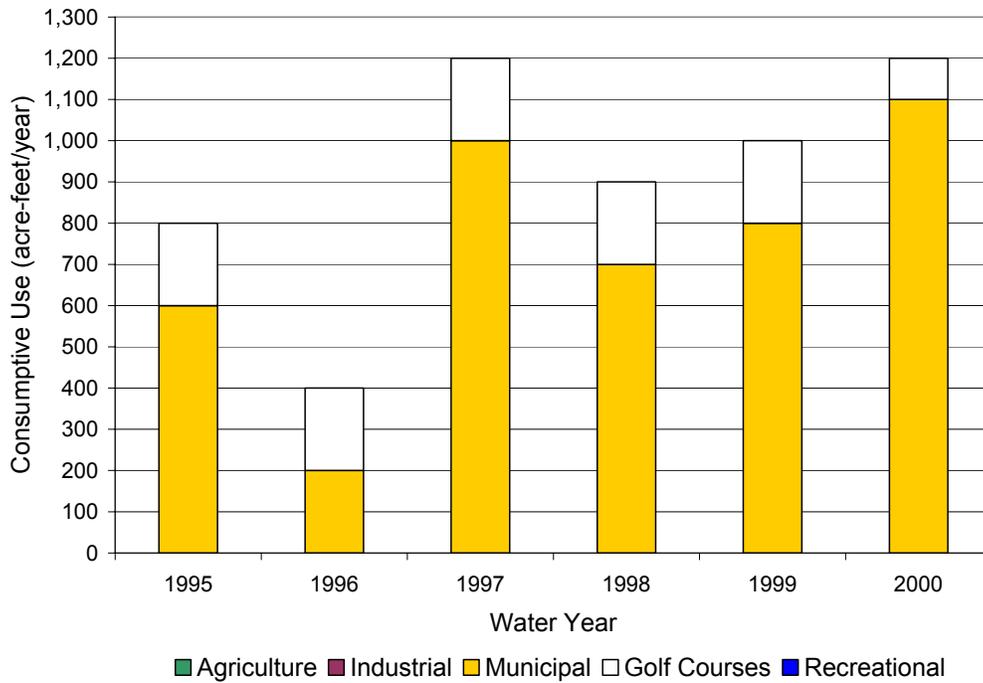


Figure 5-13: Warren Valley Subbasin Consumptive Use by Sector for 1995-2000

Current Water Balance

MWA's current water demand, as discussed above, is compared with the average annual water supply discussed in Chapter 4 to develop the water balance shown in Table 5-6.

Table 5-6: Year 2000 Average Annual Water Balance (Acre-feet/year)

	Net Average	Consumptive Use			Surplus/ Deficit
	Annual Water Supply ¹	Agricultural	Urban ²	Total	
Mojave Basin Area					
Alto	34,700	3,800	47,700	51,500	-16,800
Baja	5,600	17,700	10,500	28,200	-22,600
Centro	18,500	8,900	8,400	17,300	+1,200
Este	3,500	3,200	1,800	5,000	-1,500
Oeste	1,100	1,300	1,900	3,200	-2,100
Subtotal Mojave	63,400	34,900	70,300	105,200	-41,800
MB/JV Area					
Copper Mtn. Valley	600	0	800	800	-200
Johnson Valley	2,300	0	30	30	+2,270
Means/Ames Valley	600	0	600	600	0
Warren Valley	900 ³	0	1,200	1,200	-300
Subtotal MB/JV⁴	2,100	0	2,600	2,600	-500
Total	65,500	34,900	72,900	107,800	-42,300
Average Annual SWP Supply:					8,000
Surplus/Deficit with SWP Supply:					-34,300

¹Net average annual water supply data as shown in Tables 4-2 and 4-5 of Chapter 4.

²Urban uses include municipal, industrial, golf course, and recreational water uses.

³Hi-Desert Water District reports unpublished USGS estimates of 200 acre-feet per year net average annual supply in the Warren Valley subbasin.

⁴Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

As shown in Table 5-6, the average water deficit in the Mojave Basin Area without State Water Project (SWP) supply for the year 2000 is approximately 41,800 acre-feet per year. Baja, with a deficit of 22,600 acre-feet, and Alto, at 16,800 acre-feet, constitute most of the current water deficit. Centro currently has slightly more water supply than demand. Este has a water deficit of approximately 1,500 acre-feet per year and Oeste has a deficit of approximately 2,100 acre-feet per year.

Outside of the Johnson Valley, the Morongo Basin/Johnson Valley Area has an average water deficit of approximately 500 acre-feet per year without SWP supply. The Warren Valley subbasin has the largest deficit, at about 300 acre-feet per year.

Since 1999, an average of about 8,000 acre-feet per year of SWP water has been imported into the Mojave Water Agency. Of this amount, about 3,500 acre-feet has been purchased by the Hi-Desert Water District and delivered to the Warren Valley subbasin by the Morongo Basin Pipeline to offset the deficit and to add to groundwater in storage.

When the current average annual SWP delivery is included, the Mojave Water Agency currently has a long-term average annual water deficit of approximately 34,300 acre-feet per year.

Future Water Demand

Demographics

Table 5-7 shows the estimated 2000 population and projected future population for each subarea and the average annual percent increase between 2000 and 2020. These population estimates were determined using data provided by the Southern California Association of Governments and data contained in stakeholder surveys.

Table 5-7: Current and Projected Population Estimates

	2000	2005	2010	2015	2020	Annual Percent Change
Mojave Basin Area						
Alto	236,600	266,700	303,700	348,900	407,700	+2.8%
Baja	5,100	5,300	5,600	5,900	6,200	+1.0%
Centro	33,700	36,100	41,500	47,100	54,100	+2.4%
Este	6,000	6,800	8,100	9,400	11,300	+3.2%
Oeste	7,400	8,300	9,400	11,300	13,600	+3.1%
Subtotal Mojave	288,800	323,200	368,300	422,600	492,900	+2.7%
MB/JV Area*						
Copper Mtn. Valley	9,600	10,300	11,000	11,800	12,700	+1.4%
Johnson Valley	400	400	500	500	600	+2.0%
Means/Ames Valley	7,500	8,300	9,300	10,400	11,700	+2.2%
Warren Valley	14,700	16,600	18,600	21,000	23,600	+2.4%
Subtotal MB/JV	32,200	35,600	39,400	43,700	48,600	+2.1%
Total	321,000	358,800	407,700	466,300	541,500	+2.6%

*Morongo Basin/Johnson Valley Area subbasin populations represent the population served by each subbasin, not the population that overlies the subbasin. This assumption is consistent with the 1994 RWMP.

Consumptive Use

The following assumptions were used to estimate the future consumptive use through 2020 for various water uses:

- Industrial and recreational lakes water uses were assumed to remain constant at year 2000 levels. The one exception was industrial use in Alto, which was assumed to increase by 4,000 acre-feet due to the expected operation of the new Hi-Desert Power Project.
- Municipal water use was assumed to change in direct proportion to the population in each subarea. The population estimates used are shown in Table 5-6. Total water use was determined by multiplying these population estimates by per capita water use rates calculated for the year 2000.
- Golf course consumptive use was assumed to change in direct proportion with the change in municipal consumptive use.
- Agricultural consumptive use was estimated under two possible scenarios intended to provide a maximum and minimum estimate of future agricultural demand.

Agriculture Scenario 1: assumes that agricultural water use does not change from the year 2000 estimates through 2020. Under this assumption, any current non-agricultural water deficit within the subarea and all increases in non-agricultural water uses would have to be supplied by imported water.

Agriculture Scenario 2: assumes that rampdown under the Mojave Basin Area Judgment (1996) resumes in 2002 at 5% per year until balance is achieved between production rights and available supply as required by the Judgment. Non-agricultural water use was assumed to be met by existing non-agricultural Free Production Allowances and through voluntary transfers of agricultural free production allowance. It was assumed, however, that at least 1,300 acre-feet of agricultural consumptive use (2,100 acre-feet of production) would remain in Alto, 300 acre-feet of consumptive use (500 acre-feet of production) would remain in Oeste, and 600 acre feet of consumptive use (900 acre-feet of production) would remain in Baja.

These two scenarios result in significantly different estimates of future agricultural consumptive use, especially in Baja. Projected agricultural consumptive uses can be seen for each scenario in Table 5-8. Under Agriculture Scenario 1, the year 2000 values remain unchanged through the year 2020. Under Agriculture Scenario 2, there are significant decreases in agricultural consumptive use because of the assumption that agriculture will voluntarily transfer its free production allowance to non-agricultural uses in-lieu of purchasing replacement water. Figure 5-

14 graphically shows the projected future agricultural consumptive use in each subarea under Scenario 2.

Table 5-8: Projected Agricultural Consumptive Use (Acre-feet/year)

	Ag Scenario 1		Ag Scenario 2			
	All years	2000	2005	2010	2015	2020
Mojave Basin Area						
Alto	3,800	3,800	1,300	1,300	1,300	1,300
Baja	17,700	17,700	17,700	6,700	600	600
Centro	8,900	8,900	8,900	8,900	8,900	8,900
Este	3,200	3,200	3,200	3,200	3,200	1,400
Oeste	1,300	1,300	1,300	1,300	1,300	300
Subtotal Mojave	34,900	34,900	34,900	32,400	15,300	12,500
MB/JV Area						
Copper Mtn. Valley	0	0	0	0	0	0
Johnson Valley	0	0	0	0	0	0
Means/Ames Valley	0	0	0	0	0	0
Warren Valley	0	0	0	0	0	0
Subtotal MB/JV	0	0	0	0	0	0
TOTAL	34,900	34,900	32,400	21,400	15,300	12,500

It should be noted that agricultural use has already declined in every subarea relative to year 2000 levels. However, these data are still considered to be valid for planning purposes because Agriculture Scenarios 1 and 2 are intended to provide low and high estimates of future agricultural use. The Technical Advisory Committee for the RWMP Update has determined that Agriculture Scenario 2 is the most appropriate to be used as the basis for the Plan.

Mojave Basin Area

As a result of the differences in agricultural use, the two scenarios show very different pictures of future consumptive use in the Mojave Basin Area. Table 5-9 shows the projected consumptive use for the non-agricultural demand sectors in each subarea in the Mojave Basin Area. Table 5-8 also shows the total consumptive use for each subarea under each scenario when the agricultural estimates from Table 5-8 are added to the totals. The projected total consumptive use in the Mojave Basin Area can also be seen for each scenario in Figures 5-15 and 5-16. Between 2000 and 2020, municipal consumptive use is projected to increase by about 31,600 acre-feet, an increase of 2.6% per year. In addition, golf course and park use is projected to increase by about 1,700 acre-feet, and industrial use is projected to increase by about 4,000 acre-feet. Therefore, when agricultural consumptive use is held constant as in Agriculture

Scenario 1, the overall water demand would increase by about 37,300 acre-feet. Under Agricultural Scenario 2, however, much of the increase in municipal consumptive use is offset by reductions in agricultural use, resulting in a total increase of only about 14,900 acre-feet between 2000 and 2020.

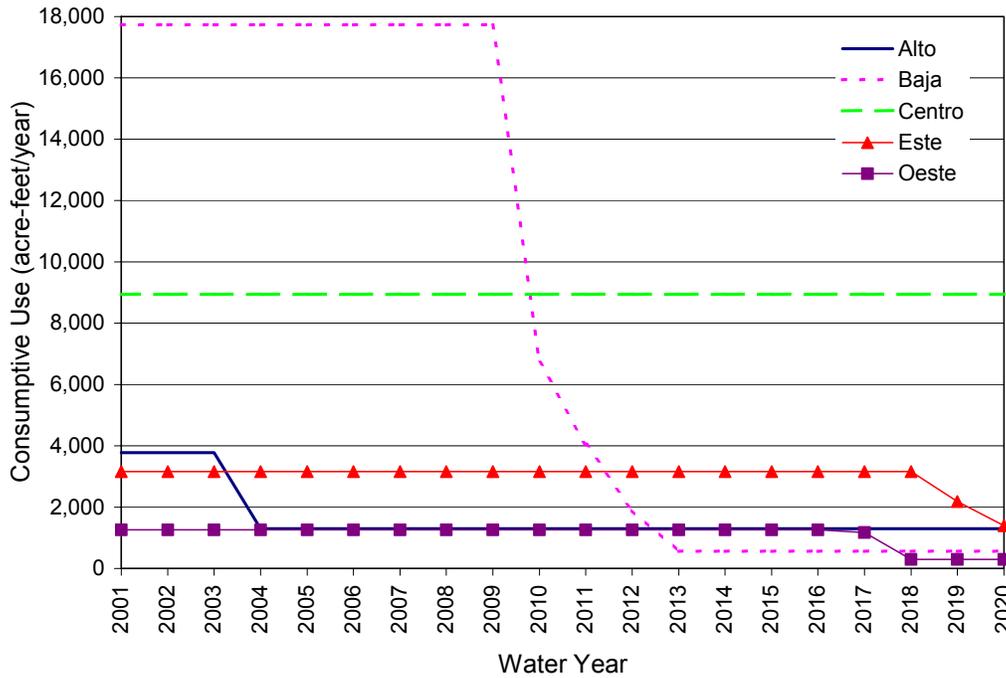


Figure 5-14: Agricultural Consumptive Use From 2001 Through 2020 Under Agriculture Scenario 2 Assumptions

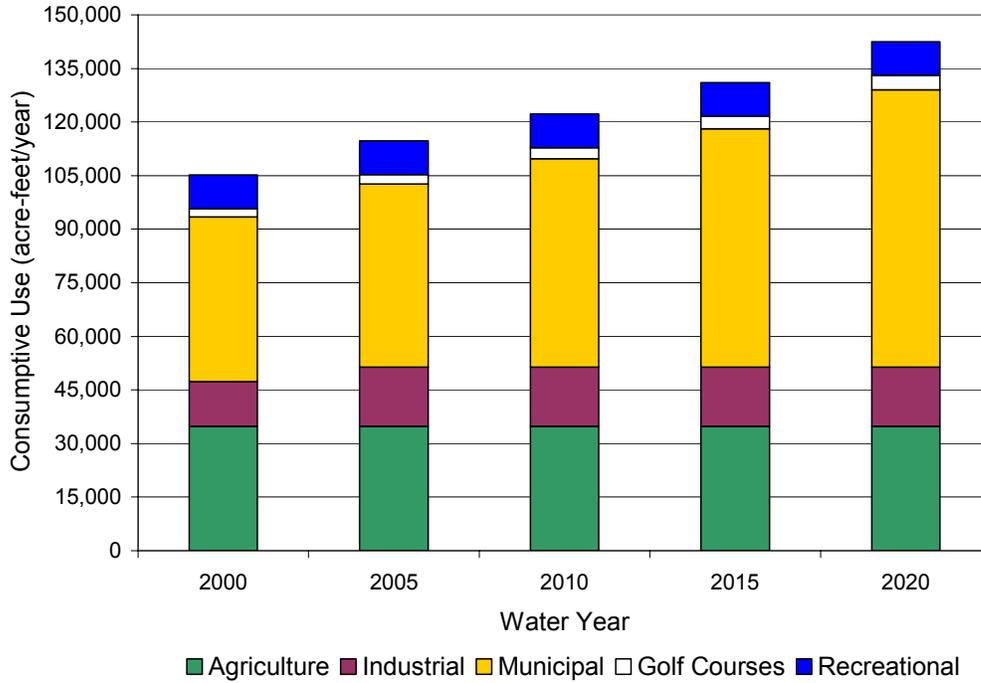


Figure 5-15: Mojave Basin Area Total Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 1

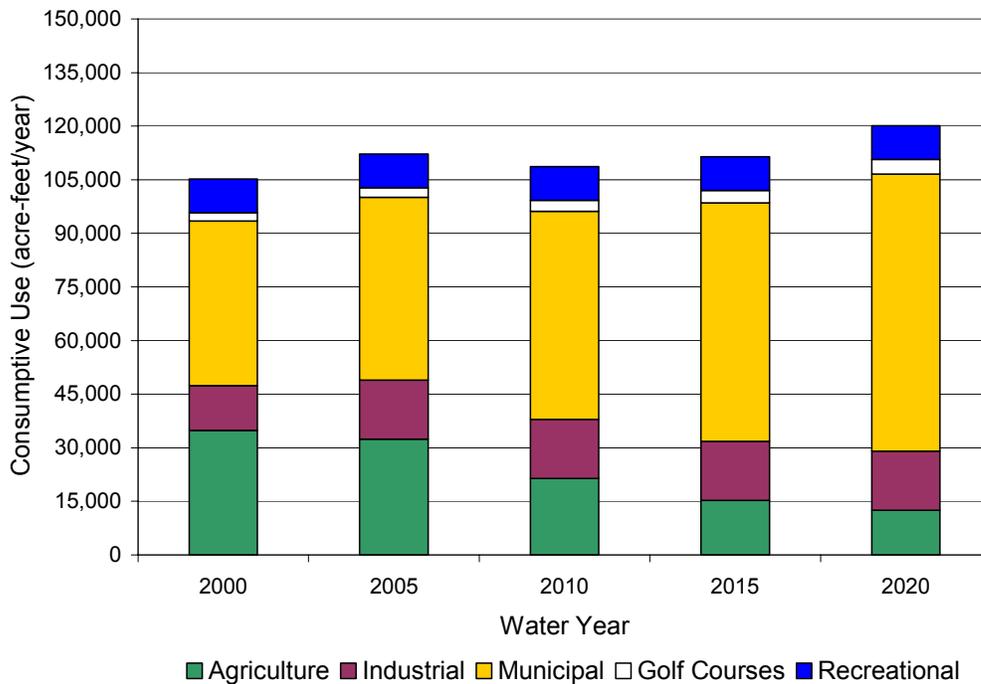


Figure 5-16: Mojave Basin Area Total Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 2

Table 5-9: Mojave Basin Area Current and Projected Consumptive Use
(Acre-feet/year)

Alto					
	2000	2005	2010	2015	2020
Industrial	4,200	8,200	8,200	8,200	8,200
Municipal	34,400	38,700	44,100	50,700	59,200
Golf Courses	2,200	2,500	2,900	3,300	3,800
Recreational	6,900	6,900	6,900	6,900	6,900
Total: Including Ag Scenario 1	51,500	60,100	65,900	72,900	81,900
Total: Including Ag Scenario 2	51,500	57,600	63,400	70,400	79,400
Baja					
	2000	2005	2010	2015	2020
Industrial	5,500	5,500	5,500	5,500	5,500
Municipal	2,500	2,600	2,800	2,900	3,100
Golf Courses	0	0	0	0	0
Recreational	2,500	2,500	2,500	2,500	2,500
Total: Including Ag Scenario 1	28,200	28,300	28,500	28,600	28,800
Total: Including Ag Scenario 2	28,200	28,300	17,500	11,500	11,700
Centro					
	2000	2005	2010	2015	2020
Industrial	1,900	1,900	1,900	1,900	1,900
Municipal	6,300	6,700	7,700	8,800	10,100
Golf Courses	200	200	200	200	300
Recreational	0	0	0	0	0
Total: Including Ag Scenario 1	17,300	17,700	18,700	19,800	21,200
Total: Including Ag Scenario 2	17,300	17,700	18,700	19,800	21,200
Este					
	2000	2005	2010	2015	2020
Industrial	900	900	900	900	900
Municipal	900	1,000	1,200	1,400	1,700
Golf Courses	0	0	0	0	0
Recreational	0	0	0	0	0
Total: Including Ag Scenario 1	5,000	5,100	5,300	5,500	5,800
Total: Including Ag Scenario 2	5,000	5,100	5,300	5,500	4,000
Oeste					
	2000	2005	2010	2015	2020
Industrial	0	0	0	0	0
Municipal	1,900	2,200	2,500	2,900	3,500
Golf Courses	0	0	0	0	0
Recreational	0	0	0	0	0
Total: Including Ag Scenario 1	3,200	3,500	3,800	4,200	4,800
Total: Including Ag Scenario 2	3,200	3,500	3,800	4,200	3,800
Total Mojave Basin Area					
	2000	2005	2010	2015	2020
Industrial	12,500	16,500	16,500	16,500	16,500
Municipal	46,000	51,200	58,300	66,700	77,600
Golf Courses	2,400	2,700	3,100	3,500	4,100
Recreational	9,400	9,400	9,400	9,400	9,400
Total: Including Ag Scenario 1	105,200	114,700	122,200	131,000	142,500
Total: Including Ag Scenario 2	105,200	112,200	108,700	111,400	120,100

In the following sections, projected changes in consumptive use are discussed for each subarea.

Alto (Figures 5-17 and 5-18)

Figures 5-17 and 5-18 show projected consumptive use in Alto under each scenario. Municipal use is projected to increase by about 24,800 acre-feet between 2000 and 2020. This represents a growth rate of 2.8% per year on average. Consumptive use by golf courses and parks is projected to increase by about 1,600 acre-feet and industrial use is projected to increase by about 4,000 acre-feet. Therefore, total consumptive use would increase by approximately 30,400 acre-feet if agricultural use were to remain constant at its current total of about 3,800 acre-feet. If agricultural consumptive use were reduced to about 1,300 acre-feet, as it would be under Agriculture Scenario 2, total consumptive use in Alto would still increase by approximately 27,900 acre-feet.

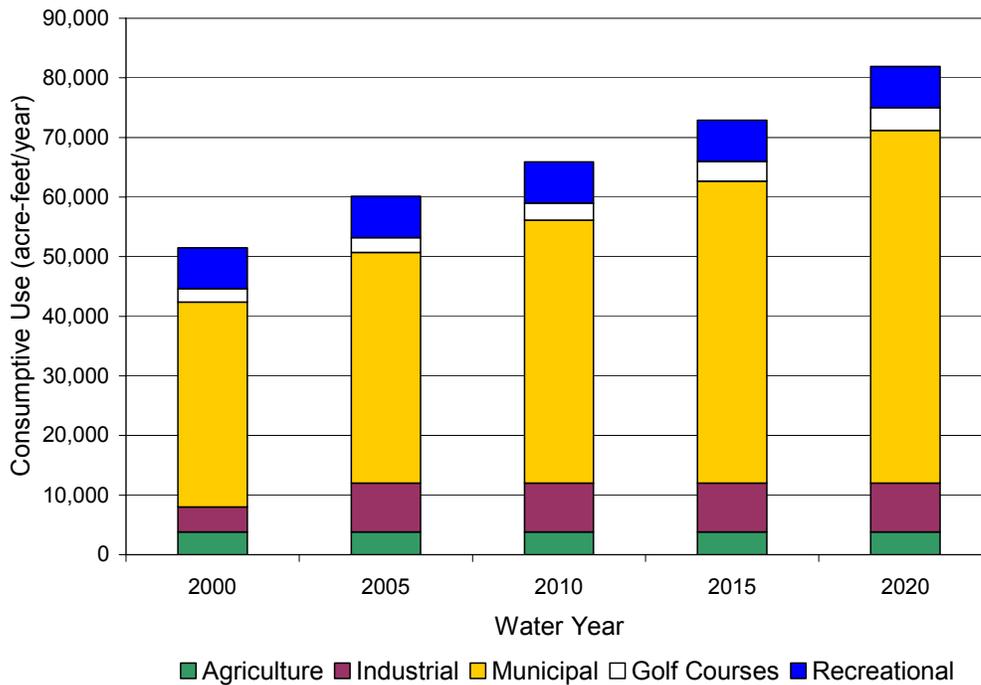


Figure 5-17: Alto Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 1

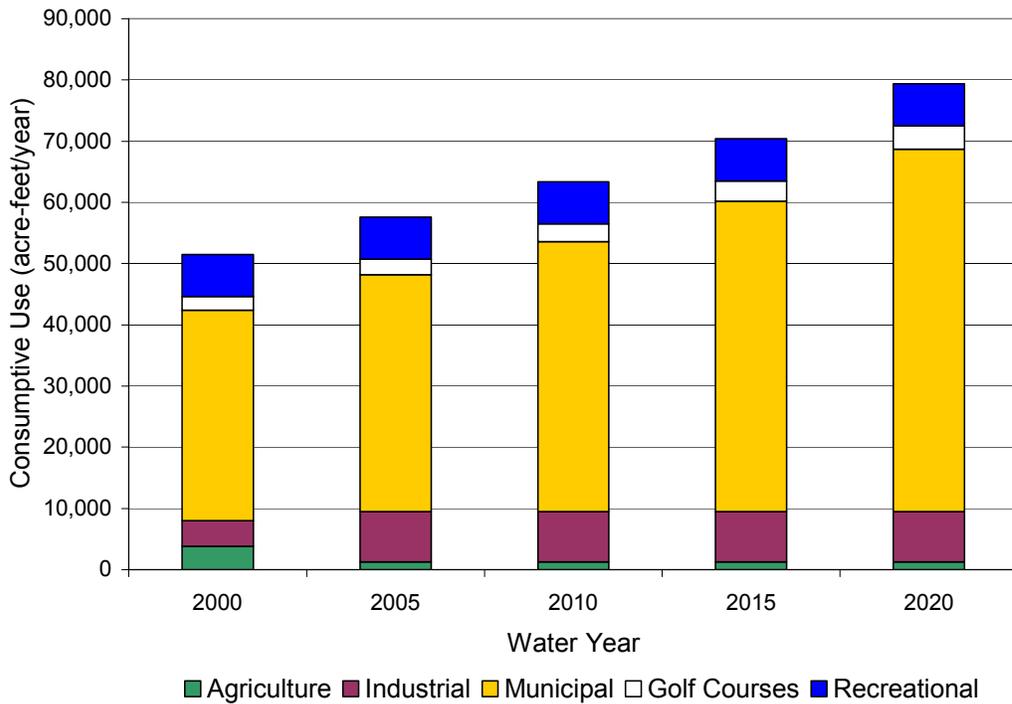


Figure 5-18: Alto Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 2

Baja (Figures 5-19 and 5-20)

Figures 5-19 and 5-20 show future consumptive use in Baja under each scenario. If agricultural consumptive use remains constant, as in Figure 5-18, total consumptive use is projected to increase by about 600 acre-feet due to a small increase in municipal water use, which is projected to increase at an annual average of 1.0%. Under Agriculture Scenario 2, as shown on Figure 5-20, agricultural consumptive use would be reduced to about 600 acre-feet by 2015 and remain constant at that level through 2020. This would cause the total consumptive use in the subarea to decline from about 28,200 to 11,700 acre-feet between 2000 and 2020.

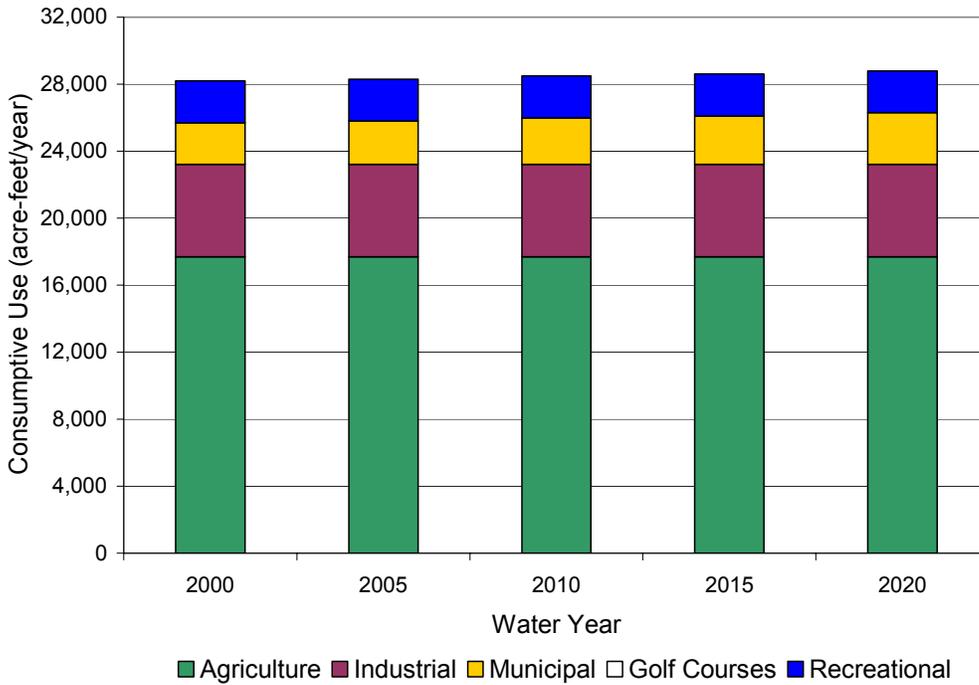


Figure 5-19: Baja Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 1

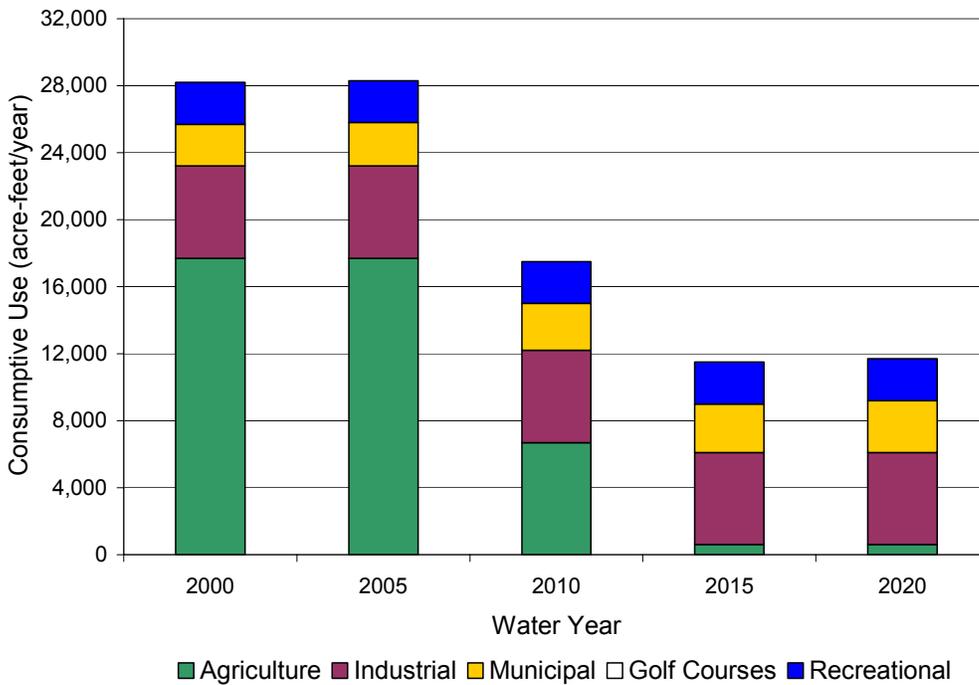


Figure 5-20: Baja Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 2

Centro (Figure 5-21)

No reduction in agricultural use is expected in Centro under either scenario. Figure 5-21 shows that municipal consumptive use for Centro is projected to increase by about 3,800 acre-feet and that golf course use is projected to increase by about 100 acre-feet between 2000 and 2020, assuming an average annual growth rate of 2.4%.

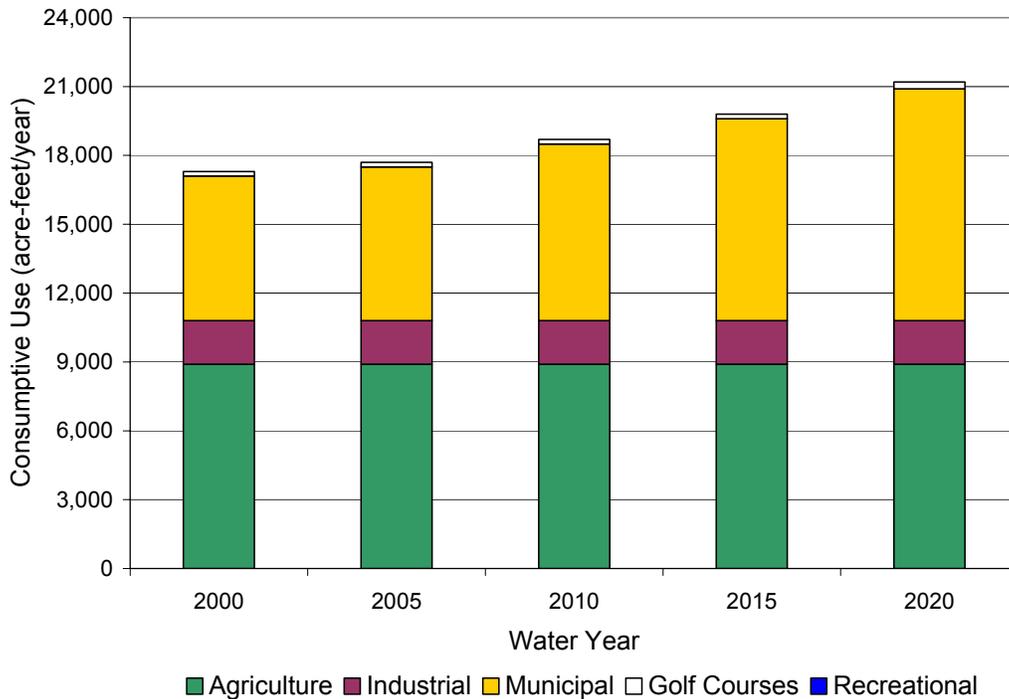


Figure 5-21: Centro Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenarios 1 and 2

Este (Figures 5-22 and 5-23)

Figures 5-22 and 5-23 show projected consumptive use in Este under each scenario. Municipal consumptive use is projected to increase in Este by about 800 acre-feet between 2000 and 2020, assuming an annual average growth rate of 3.2%. Under Agriculture Scenario 2, agricultural consumptive use is projected to decrease by about 1,800 acre-feet, which would result in a net reduction in Este consumptive use of about 1,000 acre-feet between 2000 and 2020.

Oeste (Figures 5-24 and 5-25)

Figures 5-24 and 5-25 show the projected consumptive use in Oeste under each scenario. Municipal consumptive use is expected to increase by about 1,600 acre-feet between 2000 and 2020, assuming an annual average growth rate of 3.1%. Under Scenario 2, agricultural consumptive use would decline from about 1,300 acre-feet to approximately 300 acre-feet, resulting in a net increase in total annual consumptive use of about 600 acre-feet.

Morongo Basin/Johnson Valley Area

The Morongo Basin/Johnson Valley area contains very little agriculture. Table 5-10 shows the projected consumptive use for each subbasin in the Morongo Basin and Johnson Valley. Figure 5-26 shows the total projected Morongo Basin/Johnson Valley consumptive use projections. Between 2000 and 2020, municipal consumptive use is projected to increase from about 2,500 acre-feet to about 3,700 acre-feet (an increase of 2.1% per year). Golf course consumptive use is projected to increase by about 100 acre-feet. The total projected increase for the entire area is about 1,300 acre-feet between 2000 and 2020.

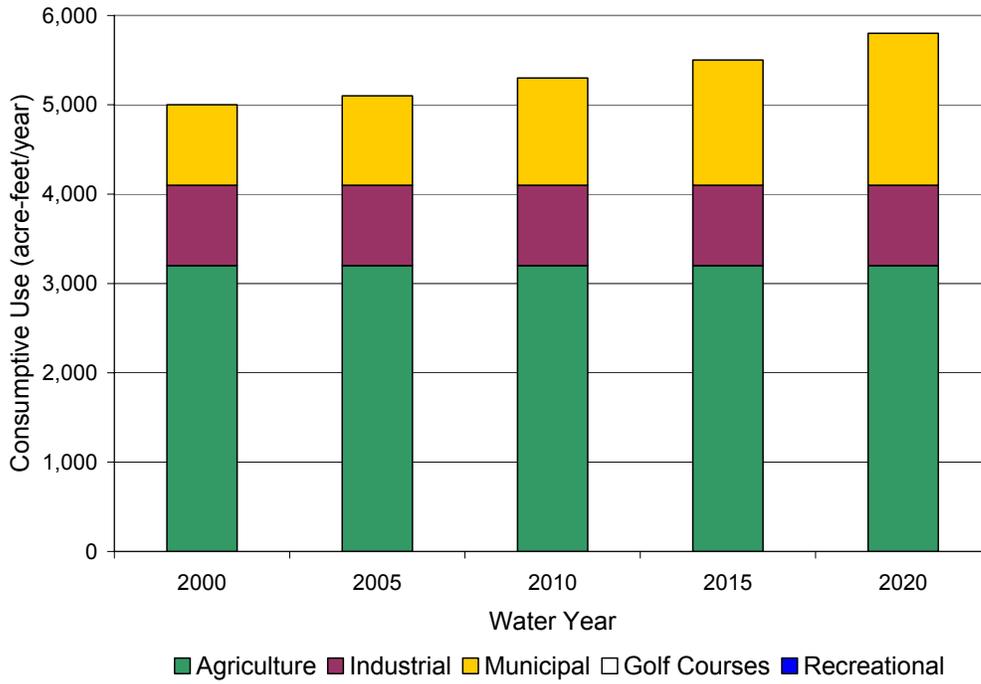


Figure 5-22: Este Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 1

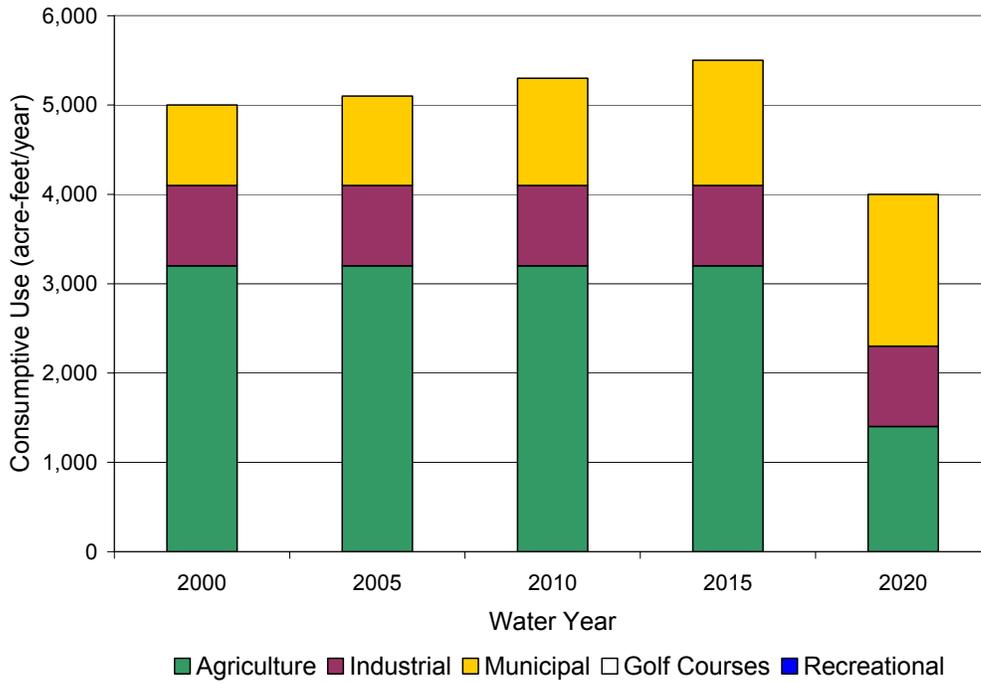


Figure 5-23: Este Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 2

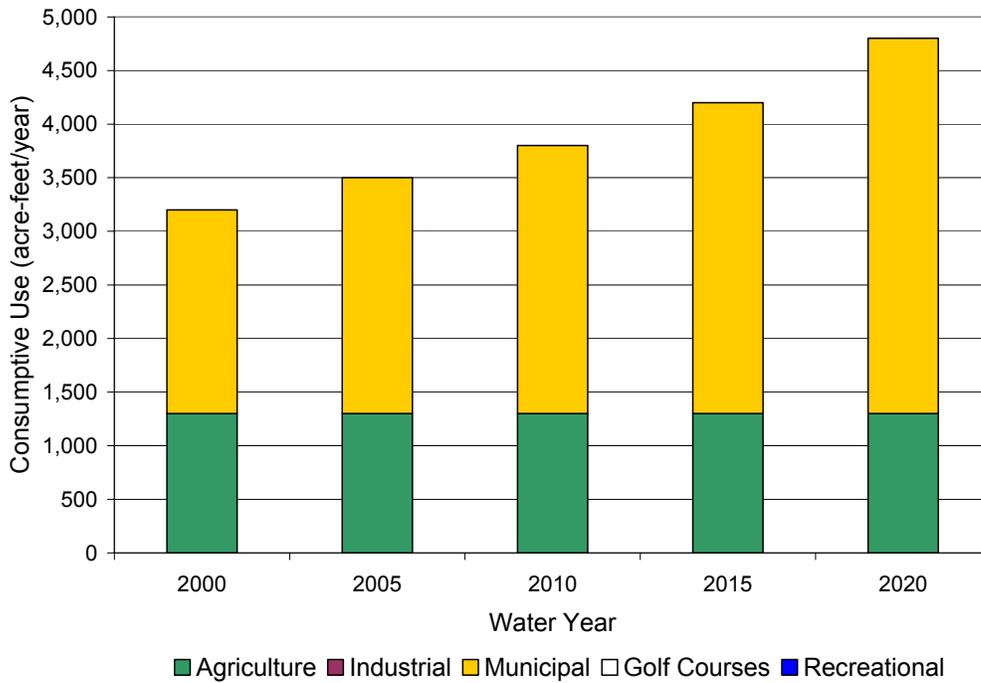


Figure 5-24: Oeste Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 1

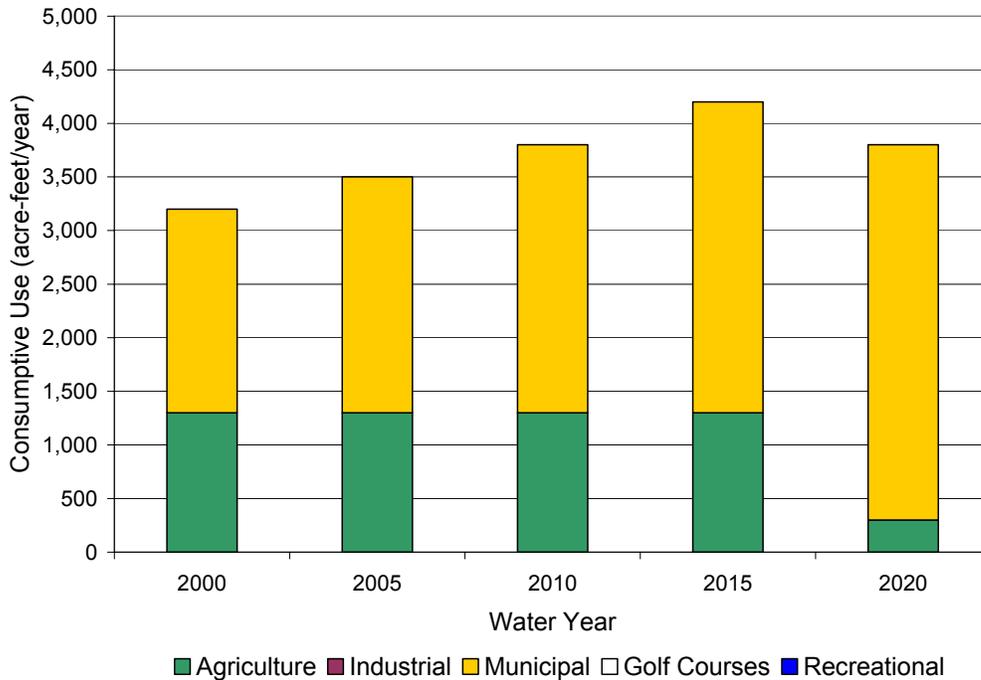


Figure 5-25: Oeste Subarea Consumptive Use for the Year 2000 and Projections Through Year 2020 Under Agriculture Scenario 2

**Table 5-10: Morongo Basin/Johnson Valley Area Projected Consumptive Use
(Acre-feet/year)**

Copper Mountain Valley					
	2000	2005	2010	2015	2020
Agricultural	0	0	0	0	0
Industrial	0	0	0	0	0
Municipal	800	900	900	1,000	1,000
Golf Courses	0	0	0	0	0
Recreational	0	0	0	0	0
Total	800	900	900	1,000	1,000
Johnson Valley					
	2000	2005	2010	2015	2020
Agricultural	0	0	0	0	0
Industrial	0	0	0	0	0
Municipal	30	30	40	40	50
Golf Courses	0	0	0	0	0
Recreational	0	0	0	0	0
Total	30	N/A	N/A	N/A	N/A
Means/Ames Valley					
	2000	2005	2010	2015	2020
Agricultural	0	0	0	0	0
Industrial	0	0	0	0	0
Municipal	600	700	700	800	900
Golf Courses	0	0	0	0	0
Recreational	0	0	0	0	0
Total	600	700	700	800	900
Warren Valley					
	2000	2005	2010	2015	2020
Agricultural	0	0	0	0	0
Industrial	0	0	0	0	0
Municipal	1,100	1,300	1,400	1,600	1,800
Golf Courses	200 ¹	200	200	300	300
Recreational	0	0	0	0	0
Total	1,200	1,500	1,600	1,900	2,100
Total Morongo Basin/Johnson Valley Area²					
	2000	2005	2010	2015	2020
Agricultural	0	0	0	0	0
Industrial	0	0	0	0	0
Municipal	2,500	2,900	3,000	3,400	3,700
Golf Courses	200	200	200	300	300
Recreational	0	0	0	0	0
Total	2,700	3,100	3,200	3,700	4,000

¹For the purpose of projecting consumptive use, year 2000 golf course use in the Warren Valley is set at 200 acre-feet (the average from 1995-99), due to a temporary reduction in pumping during 2000 caused by mechanical problems with the well.

²Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

Figures 5-27 through 5-29 show the projected future consumptive use in the Copper Mountain Valley, Means/Ames Valley, and Warren Valley subbasins.

Copper Mountain Valley (Figure 5-27)

Municipal consumptive use in the Copper Mountain Valley subbasin is projected to increase from about 800 acre-feet in 2000 to about 1,000 acre-feet in 2020, which represents a growth rate of 1.4% per year.

Means/Ames Valley (Figure 5-28)

Municipal consumptive use in the Means/Ames Valley subbasin is projected to increase by about 300 acre-feet between 2000 and 2020, from 600 to 900 acre-feet. This represents a growth rate of about 2.2% per year.

Warren Valley (Figure 5-29)

Municipal consumptive use in the Warren Valley subbasin is projected to increase at a rate of 2.4% per year, from about 1,100 acre-feet in 2000 to about 1,800 acre-feet in 2020. Golf course use is projected to increase by 100 acre-feet. The total projected increase in consumptive use is approximately 800 acre-feet.

Year 2020 Water Balance

Agriculture Scenario 1

Table 5-11 shows the projected total consumptive use under Agriculture Scenario 1 using the average annual water supply values presented in Chapter 4.

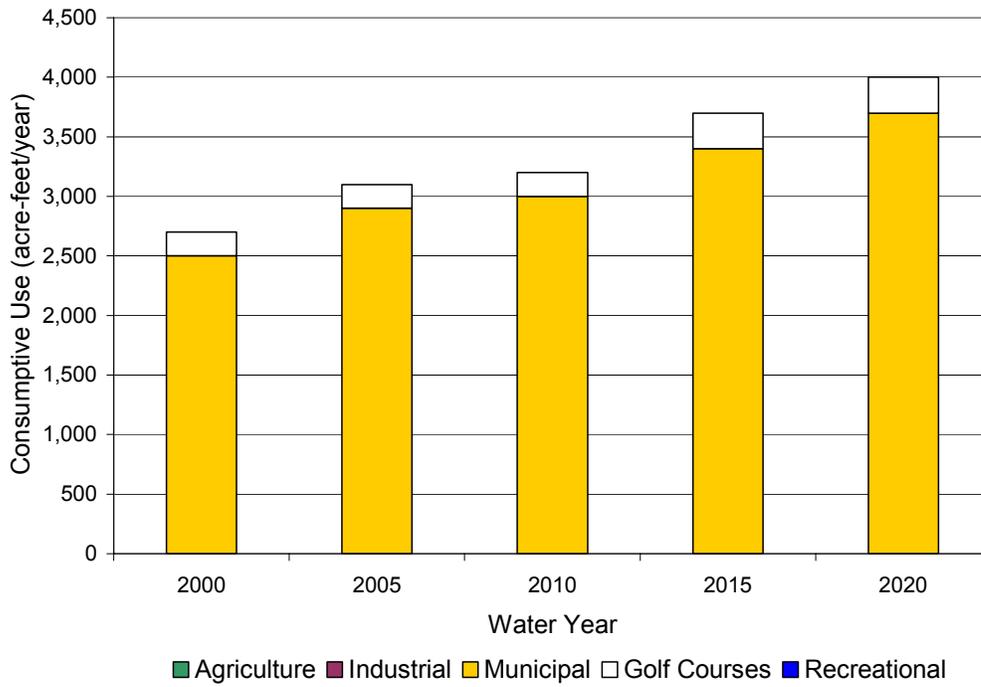


Figure 5-26: Morongo Basin/Johnson Valley Area Total Consumptive Use for the Year 2000 and Projections Through Year 2020

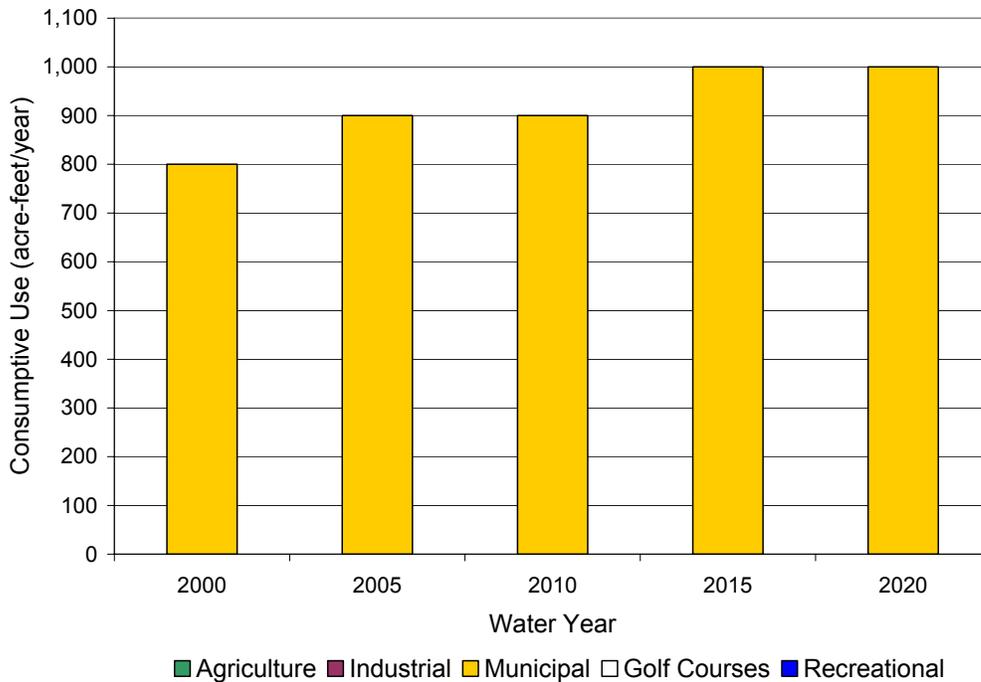


Figure 5-27: Copper Mountain Valley Subbasin Consumptive Use for the Year 2000 and Projections Through Year 2020

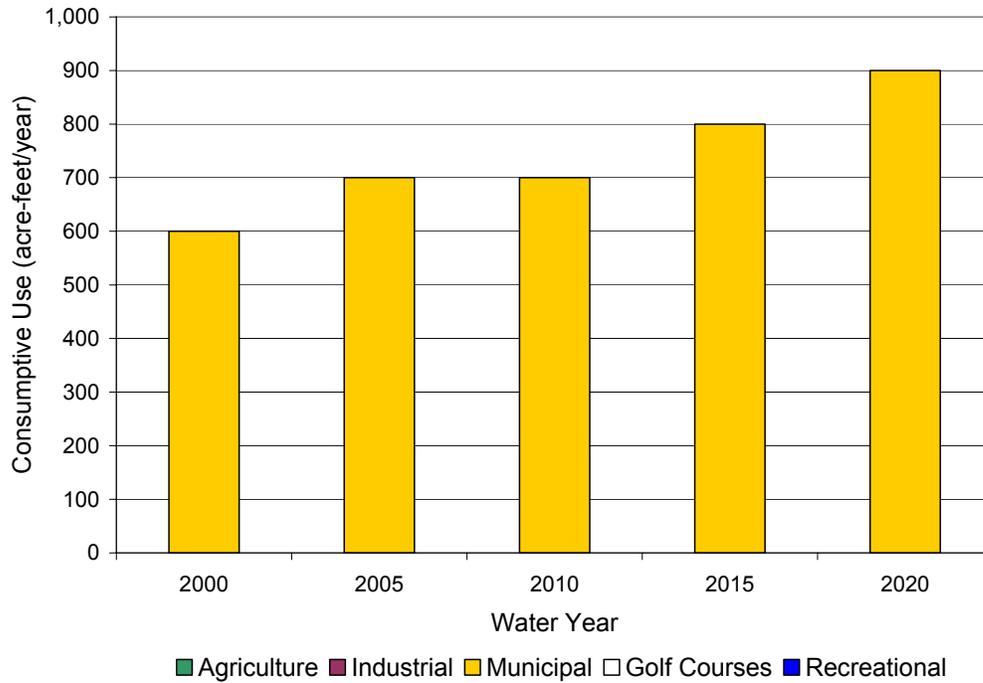


Figure 5-28: Means/Ames Valley Subbasin Consumptive Use for the Year 2000 and Projections Through Year 2020

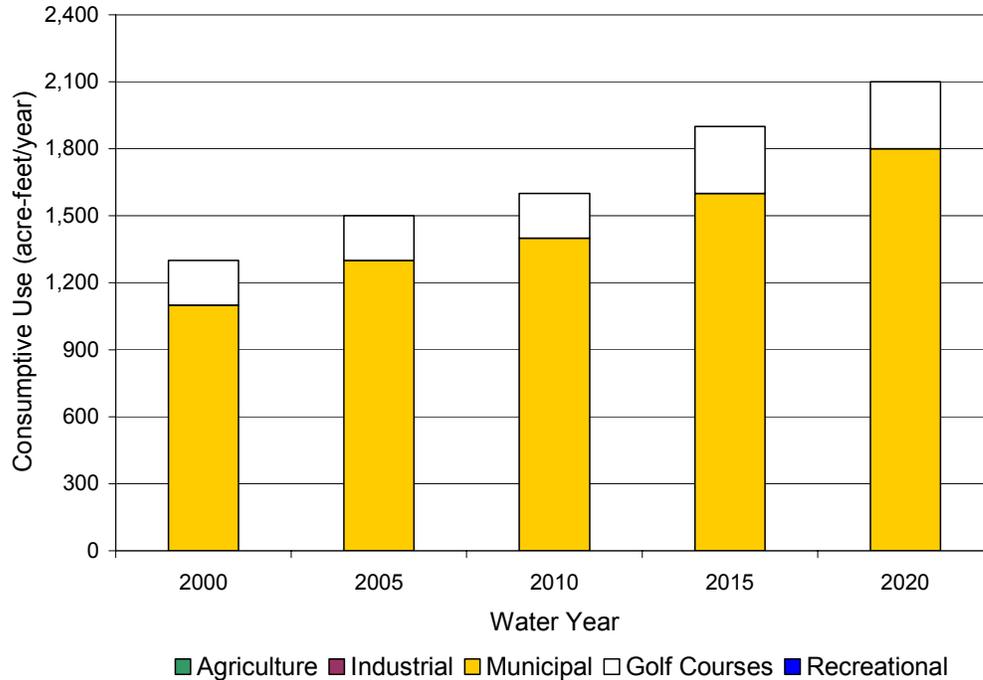


Figure 5-29: Warren Valley Subbasin Consumptive Use for the Year 2000 and Projections Through Year 2020

Table 5-11
Year 2020 Average Annual Water Balance Under Agriculture Scenario 1
(Acre-feet/year)

	Net Average Annual Water Supply¹	Agricultural	Water Use Urban²	Total	Surplus/ Deficit
Mojave Basin Area					
Alto	34,700	3,800	78,100	81,900	-47,200
Baja	5,600	17,700	11,100	28,800	-23,200
Centro	18,500	8,900	12,300	21,200	-2,700
Este	3,500	3,200	2,600	5,800	-2,300
Oeste	1,100	1,300	3,500	4,800	-2,900
Subtotal Mojave	63,400	34,900	107,600	142,500	-79,100
MB/JV Area					
Copper Mtn. Valley	600	0	1,000	1,000	-400
Johnson Valley	2,300	0	50	50	+2,250
Means/Ames Valley	600	0	900	900	-300
Warren Valley	900 ³	0	2,100	2,100	-1,200
Subtotal MB/JV⁴	2,100	0	4,000	4,000	-1,900
Total	65,500	34,900	111,600	146,500	-81,000
Average Annual SWP Supply:					58,400
Surplus/Deficit with SWP Supply:					-22,600

¹Net average annual water supply data as shown in Tables 4-2 and 4-5 of Chapter 4.

²Urban uses include municipal, industrial, golf course, and recreational water uses.

³Hi-Desert Water District reports unpublished USGS estimates of 200 acre-feet per year net average annual supply in the Warren Valley subbasin.

⁴Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

All of the regions are projected to have larger water deficits in 2020 than they had in 2000. The largest difference occurs in Alto, where the average annual water deficit is projected to increase from 16,800 acre-feet in 2000 to 47,200 acre-feet in 2020. In Centro, the water demand is projected to exceed the average annual supply in 2020, causing the year 2000 water surplus to be replaced with a water deficit of about 2,700 acre-feet. Overall, under Agriculture Scenario 1, the Mojave Basin Area is projected to have a water deficit of 79,100 acre-feet per year on average in 2020.

In the Morongo Basin/Johnson Valley Area, all of the subbasins except for Johnson Valley are projected to have water deficits in 2020. The largest of these is in the Warren Valley, where an average annual deficit of about 1,200 acre-feet is projected. Excluding the Johnson Valley, the Morongo Basin/Johnson Valley Area is projected to have a total average annual deficit of about 1,900 acre-feet per year in 2020.

Including the water deficit expected in the Morongo Basin/Johnson Valley area, the Mojave Water Agency is projected to face an average annual water deficit of about 81,000 acre-feet per year under Agriculture Scenario 1. If MWA were to fully utilize its average annual SWP supply of 58,400 acre-feet per year, the total deficit would be approximately 22,600 acre-feet per year.

Agriculture Scenario 2

Table 5-12 compares the projected total consumptive use under Agriculture Scenario 2 with the average annual water supply.

Table 5-12
Year 2020 Average Annual Water Balance under Agriculture Scenario 2
(Acre-feet/year)

	Net Average Annual Water Supply ¹	Agricultural	Water Use Urban ²	Total	Surplus/ Deficit
Mojave Basin Area					
Alto	34,700	1,300	78,100	79,400	-44,700
Baja	5,600	600	11,100	11,700	-6,100
Centro	18,500	8,900	12,300	21,200	-2,700
Este	3,500	1,400	2,600	4,000	-500
Oeste	1,100	300	3,500	3,800	-2,700
Subtotal Mojave	63,400	12,500	107,600	120,100	-56,700
MB/JV Area					
Copper Mtn. Valley	600	0	1,000	1,000	-400
Johnson Valley	2,300	0	50	50	+2,250
Means/Ames Valley	600	0	600	600	0
Warren Valley	900	0	2,100	2,100	-1,200
Subtotal MB/JV³	2,100	0	4,000	4,000	-1,900
Total	65,500	12,500	111,600	124,100	-58,600
Average Annual SWP Supply:					58,400
Surplus/Deficit with SWP Supply:					-200

¹Net average annual water supply data as shown in Tables 4-2 and 4-5 of Chapter 4.

²Urban uses include municipal, industrial, golf course, and recreational water uses.

³Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

In the Mojave Basin Area, Alto, Baja, Este and Oeste would all have smaller water deficits in 2020 under Agriculture Scenario 2 than they would under Agriculture Scenario 1. The largest difference is in Baja, which would have an average annual water deficit of only about 6,100 acre-feet. In Centro the projected average annual water deficits are the same under Agriculture Scenario 2 as in Agriculture Scenario 1. Because the Morongo Basin/Johnson Valley area has

very little agriculture, the projected consumptive uses for all subbasins under Agriculture Scenario 2 are the same as for Agriculture Scenario 1.

Overall under Agriculture Scenario 2, the Mojave Basin Area would have an average annual water deficit of about 56,700 acre-feet per year in 2020. The Mojave Water Agency as a whole has a projected average annual water deficit of about 59,000 acre-feet per year. If MWA were to fully utilize its average annual SWP supply of 58,400 acre-feet per year, under the assumptions outlined above, the total deficit would be approximately 200 acre-feet per year.

Summary

Agriculture Scenarios 1 and 2 represent the low and high estimates of consumptive use in the Mojave Water Agency. Under Agriculture Scenario 1, the projected long-term average annual water deficit in the Mojave Water Agency in 2020 is about 22,600 acre-feet per year with full utilization of MWA's current SWP supply. Under Agriculture Scenario 2, the projected long-term average annual water deficit in 2020 is about 200 acre-feet per year. The Technical Advisory Committee for the RWMP Update has determined that Agriculture Scenario 2 is the most appropriate to be used as the basis for the Plan.

Dry Year and Multiple Dry Year Water Balance in 2020

Table 5-13 shows the projected total consumptive use under Agricultural Scenario 2 with the average annual dry year water supply values presented in Chapter 4. With the net natural water supply reduced to 22,900 acre-feet per year and the average State Water Project supply reduced to 43,200 acre-feet per year, the total MWA deficit during dry years is projected to be 58,000 acre-feet per year in an average dry year.

Table 5-13: Year 2020 Average Annual Dry Year Water Balance under Agriculture Scenario 2 (Acre-feet/year)

	Net Average Annual Dry Year Water Supply ¹	Agricultural	Water Use Urban ²	Total	Surplus/ Deficit
Mojave Basin Area					
Alto	9,900	1,300	78,100	79,400	-69,500
Baja	-1,400	600	11,100	11,700	-13,100
Centro	11,000	8,900	12,300	21,200	-10,200
Este	2,450	1,400	2,600	4,000	-1,550
Oeste	150	300	3,500	3,800	-3,650
Subtotal Mojave	22,100	12,500	107,600	120,100	-98,000
MB/JV Area					
Copper Mtn. Valley	230	0	1,000	1,000	-770
Johnson Valley	880	0	50	50	+830
Means/Ames Valley	230	0	900	900	-670
Warren Valley	340	0	2,100	2,100	-1,760
Subtotal MB/JV³	800	0	4,000	4,000	-3,200
Total	22,900	12,500	111,600	124,100	-101,200
Average Annual SWP Supply:					43,200
Surplus/Deficit with SWP Supply:					-58,000

¹Net average annual dry year water supply data as shown in Tables 4-3 and 4-6 of Chapter 4.

²Urban uses include municipal, industrial, golf course, and recreational water uses.

³Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

Table 5-14 shows the projected total consumptive use under Agricultural Scenario 2 and average annual water supply during a multiple dry-year period (1988-1990) using values presented in Chapter 4. With the net natural water supply reduced to 4,010 acre-feet per year and the average State Water Project supply reduced to 22,900 acre-feet per year, the total MWA deficit during dry years is projected to be 97,190 acre-feet per year during the multiple dry-year period.

Table 5-14: Year 2020 Multiple Dry Year Average Annual Water Balance under Agriculture Scenario 2 (Acre-feet/year)

	Net Annual Multiple Dry Year		Water Use		Surplus/ Deficit
	Water Supply ¹	Agricultural	Urban ²	Total	
Mojave Basin Area					
Alto	3,500	1,300	78,100	79,400	-75,900
Baja	-1,000	600	11,100	11,700	-12,700
Centro	-200	8,900	12,300	21,200	-21,400
Este	1,900	1,400	2,600	4,000	-2,100
Oeste	-300	300	3,500	3,800	-4,100
Subtotal Mojave	3,900	12,500	107,600	120,100	-116,200
MB/JV Area					
Copper Mtn. Valley	30	0	1,000	1,000	-970
Johnson Valley	130	0	50	50	+80
Means/Ames Valley	30	0	900	900	-870
Warren Valley	50	0	2,100	2,100	-2,050
Subtotal MB/JV³	110	0	4,000	4,000	-3,890
Total	4,010	12,500	111,600	124,100	-120,090
Average Annual SWP Supply:					22,900
Surplus/Deficit with SWP Supply:					-97,190

¹Net average annual dry year water supply data as shown in Tables 4-4 and 4-6 of Chapter 4.

²Urban uses include municipal, industrial, golf course, and recreational water uses.

³Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

These deficits represent the amount of groundwater overdraft that MWA can expect during a dry year and during a multiple dry-year period. However, because MWA overlies a very large groundwater basin, the Agency should be able to weather such dry periods with only a temporary decline in groundwater levels. If the supply and demand are in approximate long-term balance, as they are under Agriculture Scenario 2 with full utilization of MWA’s projected 2020 SWP supply, groundwater levels could be maintained at relative long-term balance with no reduction in the ability to supply MWA water users.

Future Supply Versus Demand in 5-Year Increments

Table 5-15 shows the average annual surplus or deficit for each for each subarea in the Mojave Basin Area and subbasin in the Morongo Basin/Johnson Valley area in five-year increments through 2020. Tables 5-16 and 5-17 show the same data for an average annual dry year and an average annual multiple dry year. The data shown in these tables are equal to the supply values shown in Chapter 4 minus the incremental demand values shown in Tables 5-9 and 5-10.

Table 5-15: Average Annual Surplus or Deficit under Agriculture
Scenario 2 in 5-Year Increments (Acre-feet/year)

	2000	2005	2010	2015	2020
Mojave Basin Area					
Alto	-16,800	-22,900	-28,700	-35,700	-44,700
Baja	-22,600	-22,700	-11,900	-5,900	-6,100
Centro	+1,200	+800	-200	-1,300	-2,700
Este	-1,500	-1,600	-1,800	-2,000	-500
Oeste	-2,100	-2,400	-2,700	-3,100	-2,700
Subtotal Mojave	-41,800	-48,800	-45,300	-48,000	-56,700
MB/JV Area					
Copper Mtn. Valley	-200	-300	-300	-400	-400
Johnson Valley	+2,270	+2,270	+2,260	+2,260	+2,250
Means/Ames Valley	0	-100	-100	-200	-300
Warren Valley	-400	-600	-700	-1,000	-1,200
Subtotal MB/JV*	-600	-1,000	-1,100	-1,600	-1,900
Total	-42,400	-49,800	-46,400	-49,600	-58,600
Average Annual SWP Supply:	58,400	58,400	58,400	58,400	58,400
Surplus/Deficit with SWP Supply:	+16,000	+8,600	+12,000	+8,800	-200

*Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

Table 5-16: Average Annual Dry Year Surplus or Deficit under Agriculture
Scenario 2 in 5-Year Increments (Acre-feet/year)

	2000	2005	2010	2015	2020
Mojave Basin Area					
Alto	-41,600	-47,700	-53,500	-60,500	-69,500
Baja	-29,600	-29,700	-18,900	-12,900	-13,100
Centro	-6,300	-6,700	-7,700	-8,800	-10,200
Este	-2,550	-2,650	-2,850	-3,050	-1,550
Oeste	-3,050	-3,350	-3,650	-4,050	-3,650
Subtotal Mojave	-83,100	-90,100	-86,600	-89,300	-98,000
MB/JV Area					
Copper Mtn. Valley	-570	-670	-670	-770	-770
Johnson Valley	+850	+850	+840	+840	+830
Means/Ames Valley	-370	-470	-470	-570	-670
Warren Valley	-960	-1,160	-1,260	-1,560	-1,760
Subtotal MB/JV*	-1,900	-2,300	-2,400	-2,900	-3,200
Total	-85,000	-92,400	-89,000	-92,200	-101,200
Average Annual SWP Supply:	43,200	43,200	43,200	43,200	43,200
Surplus/Deficit with SWP Supply:	-41,800	-49,200	-45,800	-49,000	-58,000

*Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

Table 5-17: Average Annual Multiple Dry Year Surplus or Deficit under Agriculture Scenario 2 in 5-Year Increments (Acre-feet/year)

	2000	2005	2010	2015	2020
Mojave Basin Area					
Alto	-48,000	-54,100	-59,900	-66,900	-75,900
Baja	-29,200	-29,300	-18,500	-12,500	-12,700
Centro	-17,500	-17,900	-18,900	-20,000	-21,400
Este	-3,100	-3,200	-3,400	-3,600	-2,100
Oeste	-3,500	-3,800	-4,100	-4,500	-4,100
Subtotal Mojave	-101,300	-108,300	-104,800	-107,500	-116,200
MB/JV Area					
Copper Mtn. Valley	-770	-870	-870	-970	-970
Johnson Valley	+100	+100	+90	+90	+80
Means/Ames Valley	-570	-670	-670	-770	-870
Warren Valley	-1,250	-1,450	-1,550	-1,850	-2,050
Subtotal MB/JV*	-2,590	-2,990	-3,090	-3,590	-3,890
Total	-103,890	-111,290	-107,890	-111,090	-120,090
Average Annual SWP Supply:	22,900	22,900	22,900	22,900	22,900
Surplus/Deficit with SWP Supply:	-80,990	-88,390	-84,990	-88,190	-97,190

*Johnson Valley is not included in the Morongo Basin/Johnson Valley totals because the supply is not included as noted in Chapter 4.

6

WATER SHORTAGE CONTINGENCY PLANNING

This chapter describes water shortage planning efforts of the Mojave Water Agency and summarizes water shortage planning efforts of individual water purveyors in the MWA service area.

Cities and water agencies within MWA rely on large groundwater reserves to meet potable water supply needs. During previous drought periods, municipal water suppliers continued to draft from these reserves to meet customer needs without imposing restrictions on water use, but at rates exceeding natural replenishment in most areas. The large groundwater basin in the area serves as a reservoir and buffers the impacts of seasonal and year-to-year variations in precipitation and surface water deliveries. By 2020 when this Plan is fully implemented, the area aquifers are expected to be in balance due to the combination of water imports and/or production rampdown. During multiple-year droughts or State Water Project outages, the basin will continue to be pumped to meet demands. Actions of the MWA to address water shortages are summarized below.

Mojave Water Agency

The Mojave Water Agency was formed to manage declining groundwater levels within the Agency's service area. In this capacity, MWA has been planning and implementing projects to increase water supply reliability and prevent future water shortages. MWA became a State Water Project (SWP) contractor and has an annual entitlement of 75,800 acre-feet. This water is diverted from the California Aqueduct and distributed to recharge sites throughout the area (see Chapter 2) in order to replace groundwater withdrawn by producers. Deliveries from the SWP are variable and MWA's full entitlement is not available every year. During dry and multiple dry years, it is expected that SWP deliveries will be significantly reduced.

The Mojave Basin Judgment calls for charging producers for use above their production allowance and using these funds to import water so that over time extractions come into balance with available supplies. Production allowances may also be reduced to achieve this balance. Similar principles are employed in the Warren Valley Basin to achieve long-term balance of supply and demand. Once the basin is in balance it will be less impacted by fluctuations in deliveries of water from the SWP.

As part of this Plan, MWA will construct facilities to utilize the full SWP contract supplies. This will enable the MWA to recharge the groundwater basins in wetter years and therefore enable water purveyors to meet demands during dry years without exceeding safe yield. This Plan includes an estimate of the reliability of deliveries of water from the SWP. The volume of SWP water recharged to the basin is computed based on this reliability.

MWA is not a direct purveyor of municipal water supplies and does not have the authority to implement water shortage plans within its boundaries but relies instead on efforts of the individual cities and water agencies.

Cities and Water Agencies

To meet the requirements of the Urban Water Management Planning Act, plans must address a number of topics including current and future water supply availability, projected demands for the next 20 years, reliability of supplies, supply and demand comparisons, the potential for recycling, implementation of Demand Management (water conservation) Measures, and water shortage contingency planning.

Cities and water agencies within the MWA service area that have developed and adopted Urban Water Management Plans are listed below:

- Adelanto Water Authority (serving Adelanto)
- Apple Valley Ranchos Water Company (serving Apple Valley)
- Hesperia Water District (serving Hesperia)
- Hi-Desert Water District (serving Yucca Valley)
- Joshua Basin Water District (serving Joshua Tree)
- Southern California Water Company (serving Barstow, parts of Apple Valley and Lucerne Valley)
- Victor Valley Water District (serving Victorville)

All of these entities have Water Shortage Contingency Plans included in their Urban Water Management Plans.

Water Shortage Contingency Plans of these entities utilize a variety of methods to reduce water demand including mandatory prohibitions on water wasting, voluntary water conservation measures, mandatory water conservation measures and prohibitions on certain uses of water during severe shortages, specific triggering mechanisms for determining the appropriate stage of alert, and water supply allotments for each stage of alert. The plans are summarized below.

Adelanto Water Authority

The Adelanto Water Authority (Authority) has adopted, via resolution, a four-stage plan of action to address a long-term drought condition or loss of supply. Stage 1 becomes effective when the Authority declares a water shortage exists and involves increased public outreach and education to seek a 10% reduction in water use through voluntary measures. Stage 2 is entered into when the Stage 1 reduction goal has not been met for two consecutive years of a drought. Public awareness efforts will continue and a survey will be conducted on Stage 1 efforts. The Authority will establish a water conservation advisory committee comprised of officials from the Authority and the City of Adelanto. Stage 3 goes into effect if the water shortage continues for four consecutive years; this stage recommends 10% mandatory and 20% voluntary reductions. A plan and ordinance to enforce penalties for excessive water use will be developed as part of Stage 3. The Authority will examine the impact conservation has on revenue and expenditures and propose corrective measures as necessary. In addition to the water conservation efforts of the Authority, the City of Adelanto has a water conservation ordinance (adopted in 1984) designed to achieve a 10% reduction in water use.

Apple Valley Ranchos Water Company

During a declared water shortage, Apple Valley Ranchos Water Company (AVR) would base individual customer allotments on a recorded base year. According to their plan, AVR, as a private water utility, is unable to enforce conservation stages, adopt ordinances or administer penalties or charges for excessive use. Their plan includes rules from the California Public Utilities Commission (CPUC) related to water conservation and discontinuation and restoration of service. The Town of Apple Valley adopted, via ordinance, a Water Conservation Plan that includes water regulations prohibiting wasteful water use practices including excessive runoff of landscape irrigation water and washing driveways and walkways with water. Penalties have been established for violation of water regulations. In accordance with CPUC rules, AVR has established a conservation memorandum account to offset loss of revenues due to conservation.

Hesperia Water District

The Hesperia Water District (HWD) and the City of Hesperia developed and adopted, via ordinances, a three-stage drought-related water shortage plan. Stage 1 is in effect during normal conditions and involves voluntary wise water use practices and mandatory timed irrigation

systems and drought tolerant plants for new developments. Stage 2 is triggered in the event of a water supply shortage that threatens HWD's ability to provide water. During this stage, conservation measures will include at least the following: prohibiting runoff from irrigated landscapes, use of the most efficient agricultural irrigation practices, development of conservation plans by commercial facilities, irrigation of parks, golf courses and school grounds only between the hours of 11:00 p.m. and 5:00 a.m., requiring covers for swimming pools and prohibiting washing driveways, sidewalks and other hard surfaces with water. In the event of a disaster or other disruption in the water supply, Stage 3 will be in effect and mandatory conservation measures will be implemented. Measures include prohibiting landscape irrigation or filling of swimming pools, and suspension of issuance of new construction permits. The HWD Board of Directors will determine the appropriate stages of alert during noticed public hearings. Violations of mandatory water conservation measures may result in criminal penalties, monetary fines and discontinuation of service. To make up for decreased revenues associated with conservation, HWD will consider reducing operating and maintenance costs, deferring certain capital improvement projects until revenues increase, deferring certain purchases and utilizing facility replacement reserve funds.

Hi-Desert Water District

The Urban Water Management Plan for the Hi-Desert Water District is comprised of the Warren Valley Basin Management Plan and associated addenda. The plan contains a description of their Emergency Stage Response Plan (ESRP) to implement more stringent water conservation measures during times when water demand exceeds supply. The initial, although undefined, provisions of the ESRP are implemented when the water supply system reaches 80 percent of capacity for three consecutive days. When demand increases further, Stage 2 becomes effective and places increasing, yet undefined, restrictions on water use, particularly outdoor water use. If delivery capacity continues to be inadequate, Stage 3 becomes effective and requests unspecified, voluntary conservation measures until such time as delivery problems can be mitigated.

Joshua Basin Water District

The Joshua Basin Water District (District) has developed a four-stage plan for responding to water shortages. The plan was a component of their Urban Water Management Plan, adopted via ordinance. The plan includes voluntary and mandatory stages to address a reduction in water supply that exceeds 60%. The Stage 1 reduction goal of 10% is triggered when water supplies are 60-75% of normal. The Stage 2 reduction goal of 15% is triggered when water supplies are 45-60% of normal. The Stage 3 reduction goal of 20% is triggered when supplies are 40-50% of normal and Stage 4 reduction goal of 25% is triggered when supplies are 40% of normal. Stages of alert may be triggered by groundwater shortages, equipment failures or catastrophes. The

District has developed an allocation method that will be used by the General Manager to determine consumption limits by customer type in the event of a water supply shortage. During all declared water shortage emergencies, customers who exceed their established allotment will be required to pay a surcharge of two times the highest rate for excess water used during the first or second billing cycle and a surcharge of four times the highest rate for subsequent billing periods. Approximately 47% of the District's annual water revenues are from meter charges with water sales making up the remainder. The plan indicates annual water system revenue declines due to conservation during the 4 stages of alert range from 3% to 9%. Financial reserves of the District are adequate to offset these modest decreases in revenue.

Southern California Water Company

The Southern California Water Company (SCWC) has developed a water shortage contingency plan with four stages of action to address up to a 50% water supply shortage. Stage 1 is a voluntary effort to reduce demand by 10% through increased community outreach. Stage 2 addresses shortages of 10 to 20% and involves voluntary and mandatory water conservation efforts such as prohibitions on cleaning sidewalks and other hard surfaces with water, washing cars, irrigating non-permanent agriculture, uncorrected plumbing leaks, gutter flooding and filling swimming pools. SCWC is an investor-owned utility and is subject to regulation by the California Public Utilities Commission (CPUC) and must gain approval from CPUC prior to imposing water consumption regulations and restrictions. During stages when water shortages require restricting water use, SCWC will first obtain permission from the CPUC. Stage 3 consists of water allotments and mandatory conservation rules. Stage 4 intensifies all previous conservation efforts and monitors daily compliance with required reductions. The SCWC District Manager will determine the appropriate stage of alert during water supply shortages. Their plan includes Mandatory Water Conservation, Restrictions and Rationing Program rules from the CPUC. The CPUC authorizes utilities to establish memorandum accounts for revenues and expenses due to water conservation. A surcharge may be implemented to cover revenue reductions due to conservation.

Victor Valley Water District

The Victor Valley Water District's (VVWD) water shortage contingency plan has four stages of action to address up to a 50% water supply shortage. The Stage 1 demand reduction goal of 10% is triggered when water shortages are 10% or less. The Stage 2A demand reduction goal of 20% is triggered when water shortages are 11-20%. The Stage 2B reduction goal of 30% is triggered when water shortages are 21-35% and Stage 3 demand reduction goal of 50% and greater is triggered when water shortages are 36-50%. VVWD would address water supply shortages with voluntary and mandatory conservation efforts targeting specific water allocations associated with

each of the stages of alert. Penalties have been set for non-compliance with the allocations set in each of the stages of alert. The plan was adopted via ordinance.

The District does not anticipate adverse financial impacts due to conservation during water supply shortages. Fixed monthly service charges account for approximately 30% of total revenue. Reduced pumping expenses would offset decreased revenues from water consumption charges. Penalties for exceeding water allotments in Stages 3 and 4 would provide additional revenues that would help offset revenues lost through conservation.

7

WATER CONSERVATION AND DEMAND MANAGEMENT MEASURES

This chapter describes the water conservation practices of the Mojave Water Agency, individual cities and water agencies, and groups of entities in the basin.

Coordinated Water Conservation Efforts

In addition to the water conservation efforts of individual water agencies and cities, there are a number of cooperative efforts underway in the basin. These efforts include cooperative partnerships between MWA and a number of individual entities and groups of entities such as water agencies, cities, colleges, other educational institutions, and the Mojave Desert Resource Conservation District. These partnerships, formed through Memoranda of Understanding (MOUs), are described below.

Alliance for Water Awareness and Conservation

Based on findings in Phase 2 of this Regional Water Management Plan in 2003, local stakeholders decided that a united regional water conservation program was needed to improve water use efficiency. To this end, the Alliance for Water Awareness and Conservation (AWAC) was formed in August of 2003. According to the enabling MOU, the purpose of the AWAC is to “provide a vehicle to attract support for a regional water conservation program and coordinate implementation of activities by forming partnerships to obtain common measurable goals.”

Goals of the Alliance, as provided in the MOU, are listed below:

- Educate the local communities on the importance of water conservation.
- Provide the local communities with the tools to effectively reduce per capita consumption to targeted goals.
- Reduce regional water use by 10 percent gross per capita by 2010 and 15 percent gross per capita by 2015 (5 percent in the Morongo Basin by 2015) to achieve a sustainable, reliable supply to meet regional water demands.

The AWAC will determine the appropriate mix, market penetration, budget and schedule for implementation of demand management measures in order to achieve the desired water reduction goals. Initially the AWAC is targeting outdoor irrigation where there is the greatest potential for significant reduction in water use. The primary targeted audiences are:

- New and existing home owners
- Commercial, industrial and institutional water users
- Landscape suppliers
- Professional and commercial landscapers
- Retail water providers and cities
- Developers

Cities and water agencies, through the AWAC, will determine actual reductions in water use. This can be accomplished by establishing baseline annual per capita water use in the cities and comparing this to annual per capita water use data as programs are implemented.

Participants

Current participants in the Alliance for Water Awareness and Conservation are listed in the sidebar table.

Alliance for Water Awareness and Conservation Participants

- City of Adelanto
- Apple Valley Country Club
- Town of Apple Valley
- Apple Valley Ranchos Water Company
- Baldy Mesa Water District
- City of Barstow
- Barstow College
- Bighorn-Desert View Water Agency
- Bureau of Land Management
- Bureau of Reclamation
- Copper Mountain College
- City of Hesperia
- Hi-Desert Water District
- Mojave Desert & Mountain Waste Management JPA
- Mojave Desert Resource Conservation District
- Mojave Water Agency
- Mojave Weed Management Area
- San Bernardino County Special Districts, Water/Sanitation Division
- Southern California Water Company
- Victor Valley College
- Victor Valley Wastewater Reclamation Authority
- Victor Valley Water District
- City of Victorville
- Town of Yucca Valley

MWA and Lewis Center for Education and Research MOU

The MWA and the Lewis Center for Education and Research (LCER) have entered into an MOU for raising water awareness of the High Desert community. According to the MOU, topics include improving understanding of:

- the role water resources play in supporting beneficial uses by all consumers within the High Desert
- sensitive biotic components of the High Desert ecosystem that are dependant on surface and near surface water
- concerns and consequences related to a declining water table

- best resource conservation practices for reducing consumptive uses of water
- how land use activities can impact water supply, water quality and biotic resources

According to the MOU, the two entities are working together in order to:

- coordinate an educational program that will expose students and citizens throughout the region to the value and benefit natural water resources provide to the community, thereby increasing the community's understanding of the importance of long-term management of the region's water resources
- provide a learning environment for LCER students in an attempt to further understanding of the region's water resources and their role in the management of those resources
- establish specific time schedules prior to program development and implementation in order to carry out the objectives of the MOU

MWA and Mojave Desert Resource Conservation District MOU

The MWA and the Mojave Desert Resource Conservation District have entered into an MOU to heighten the public's awareness of ways to conserve water and convert high water use landscaping to low-maintenance trees and scrubs. This will be accomplished through at least the following:

- conducting a desert adaptive plant sale
- publishing educational materials
- developing demonstration projects

MWA and Mojave Weed Management Area MOU

The MWA, the Mojave Desert Resource Conservation District, and seventeen other entities have entered into an MOU to work to prevent and control weeds throughout the Mojave Desert in California. Invasive weed species can crowd out native species and increase evapotranspiration of water supplies. Weed control and prevention will be accomplished in many ways, but specifically the MWA has agreed to:

- participate in seeking grants to fund weed management efforts in cooperation with the Mojave Weed Management Area partners and other organizations attempting to manage weeds
- promote the control and treatment of weeds on MWA property
- support efforts to educate the public about weeds, their identification, prevention, and methods of control

MWA has provided funding to MDRCD for removal of invasive plants from the Mojave River riparian habitat.

MWA and Copper Mountain College MOU

The MWA and the Copper Mountain College have entered into an MOU to increase awareness about the need to manage and conserve the water resources of the Morongo Basin and to provide practical solutions to conserve water. The partners will work to achieve these goals through at least the following efforts:

- developing a college curriculum that will provide educational opportunities in the area of natural plant vegetation and conservation programs
- developing demonstration gardens

MWA and Barstow Community College MOU

Similar to the Copper Mountain College MOU, MWA and the Barstow Community College have entered into an MOU to increase awareness about the need to manage and conserve High Desert water resources and to provide practical solutions regarding water-wise habits. The partners will work to achieve these goals through at least the following efforts:

- developing a college curriculum and present workshops that advance public education related to water availability, quality, use, conservation-based best management practices, and the management practices that directly encourage High Desert water consumers to support a sustainable approach to water resource management
- developing a plan to expand the current demonstration garden

MWA and Victor Valley College MOU

Similar to the Copper Mountain College and Barstow Community College MOUs, MWA and the Victor Valley College have entered into a MOU to create a greater awareness about the need to manage and conserve High Desert water resources and to provide practical solutions that will promote efficient use of water. The partners will work to achieve these goals through at least the following efforts:

- developing a water conservation curriculum that will culminate in students receiving a Water Conservation Technician certificate
- developing a Conservation Outreach Day for the public with workshops on drip irrigation design and the use of adaptive plants
- expanding the GIS curriculum to facilitate water conservation mapping and other natural resource management projects

MWA Mojave Desert Resource Conservation District Demonstration Project

MWA, the Mojave Desert Resource Conservation District, and the Apple Valley Country Club are working cooperatively on a demonstration project to evaluate and reduce turf water use at a golf course. The project will replace two acres of turf with native and other drought-tolerant

plants and monitor plant growth and water use over a one-year period. The project is intended to provide a tool to document, display and promote effective methods to save water, reduce costs and develop attractive desert adaptive landscapes.

Urban Water Management Plans

“The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.” California Water Code

In 1983, the California Urban Water Management Planning Act was added to the California Water Code (Division 6 Part 2.6) with the signing of Assembly Bill 797. The Act has been amended several times. The Act requires water suppliers with over 3,000 customers or that supply over 3,000 acre-feet of water annually to prepare Urban

Water Management Plans (UWMP) and submit the plans to the California Department of Water Resources (DWR). The plans must be updated at least every five years in years that end in 0 or 5.

Changes made in late 2001 (Senate Bill 610) now require Urban Water Management Plans to include additional information. If updated plans were not submitted by December 31, 2001 or if plans submitted after January 1, 2002 do not contain the required additional information, the urban water supplier will be prohibited from receiving specified bond funds administered by DWR.

Cities and water agencies within the MWA boundaries have developed and adopted Urban Water Management Plans to comply with the Urban Water Management Planning Act in the California Water Code. Entities with adopted UWMPs are listed below:

- Adelanto Water Authority (serving Adelanto)
- Apple Valley Ranchos Water Company (serving Apple Valley)
- Hesperia Water District (serving Hesperia)
- Hi-Desert Water District (serving Yucca Valley)
- Joshua Basin Water District (serving Joshua Tree)
- Southern California Water Company (serving Barstow and parts of Apple Valley and Lucerne Valley)
- Victor Valley Water District (serving Victorville)

To meet the requirements of the Urban Water Management Planning Act, plans must address a number of topics including current and future water supply availability, projected demands for the next 20 years, reliability of supplies, supply and demand comparisons, the potential for recycling, penalties for wasting water, analysis of impacts on revenues from reductions in water

deliveries, measures to overcome revenue impacts, Demand Management (water conservation) Measures and water shortage contingency plans. The following section describes the Demand Management Measures described in the Act.

Demand Management Measures

The Mojave Water Agency Act authorized MWA "to pursue all necessary water conservation measures," and "reduce the waste of water."

Fourteen Demand Management Measures (DMMs) are identified in Table 7 - 1. These measures represent the Best Management Practices that the California Department of Water Resources requires to be addressed in Urban Water Management Plans. The DMMs are intended to reduce current and future water demands through more efficient water use. Additional programs may be necessary during periodic water supply shortages. The DMM descriptions, methods to evaluate effectiveness and estimated water savings associated with the DMMs are taken from the "Memorandum of Understanding Regarding Urban Water Conservation in California" produced by the California Urban Water Conservation Council (CUWCC, 2002). Two agencies in the basin are members of the Council: the Hi-Desert Water District and the Southern California Water Company (which supplies water to the City of Barstow and parts of Apple Valley and Lucerne Valley). MWA adopted the DMMs in 1997.³⁷

Table 7-1: Demand Management Measures

DMM	DMM Description
1	Water survey programs for single-family and multi-family customers
2	Residential plumbing retrofit
3	System water audits, leak detection, and repair
4	Metering and commodity rates for new connections and retrofit of existing connections
5	Large landscape conservation programs and incentives
6	High-efficiency washing machine rebate programs
7	Public information programs
8	School education programs
9	Conservation programs
10	Wholesale agency programs
11	Conservation pricing
12	Water conservation
13	Water waste prohibition
14	Residential ultra-low-flush toilet replacement programs

³⁷ Resolution 630-97, January 28, 1997

MWA is not a direct purveyor of drinking water and therefore is not required to implement the DMMs. In addition, MWA does not have the authority to implement programs in cities where water users are supplied water by their city or water agency. MWA is implementing some of the DMMs and is working with water agencies and cities both individually and collectively through the AWAC to promote the efficient use of water. Table 7-2 shows the implementation status of the DMMs for some of the drinking water purveyors in the basin.

Table 7-2: Implementation Status for DMMs

Demand Management Measures	Entity													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Water survey programs for single-family and multi-family customers	-	*	Y	Y	*	N	*	*	N	N/A	Y	*	Y	N
Residential plumbing retrofit	Y	Y	Y	Y	Y	N	Y	Y	Y	N/A	Y	Y	Y	N
System water audits, leak detection, and repair	Y	Y	Y	Y	N	N	Y	Y	N	N/A	Y	Y	Y	N
Metering and commodity rates for new connections and retrofit of existing connections	Y	Y	Y	Y	Y	N	Y	Y	N	N/A	Y	Y	Y	Y
Large landscape conservation programs and incentives	+	Y	Y	Y	N	N	Y	N	N	N/A	Y	Y	Y	N
High-efficiency washing machine rebate programs		N/A	N/A	N/A	N/A	N/A	Y	Y	N/A	Y	N/A	Y	N/A	N/A
Public information programs														
School education programs														
Conservation programs for commercial, industrial, and institutional accounts														
Wholesale agency programs														
Conservation pricing														
Water conservation coordinator														
Water waste prohibition														
Residential ultra-low-flush toilet replacement programs														

* Recommended in 1997 UWMP
 + Recommended in 2000 UWMP
 N/A - Not applicable

Additional information from the Urban Water Management Plans is included in Table 7-3. Adelanto Water District, Joshua Basin Water District and the Southern California Water Company included schedules for implementation of additional DMMs.

Table 7-3: Summary of Conservation Planning

Entity	City Served	Document	Date	Number of DMMs Implemented	Number of DMMs Planned
Adelanto WA	Adelanto	UWMP	1997	4	5
Apple Valley WC	Apple Valley	UWMP	2000	10	
Hesperia WD	Hesperia	UWMP	2000	9	
Hi Desert WD	Yucca Valley	UWMP	2000	11	
Joshua Basin WD	Joshua Tree	UWMP	2000	7	1
MWA N/A		RWMP	2004	4	
Southern CA WC	Barstow	UWMP	2000	7	4
VVWD Victorville	Victorville	UWMP	2000	7	

Listed below are descriptions of the 14 DMMs, implementation status, and an estimate of water savings.

DMM 1. Water Survey Programs for Single-Family and Multi-Family Customers

Residential surveys, carried out by agency staff or contractors, can identify some of the more common residential water wasting practices. A typical survey includes checking for leaking faucets and toilets, identifying older fixtures that do not meet current water conserving plumbing standards, checking irrigation systems for leaks and proper coverage, reviewing or developing irrigation schedules and setting irrigation controllers accordingly, and checking the water meter.

Implementation Status

This DMM is being implemented to some degree in 5 of the 7 water service areas.

Conservation Savings

A potential for water savings exists if the surveys identify water-wasting practices that can be changed. Water savings vary depending on the water fixture and the type of repair or retrofit. Estimates of anticipated water savings are given in Table 7-4 (CUWCC, 2002).

Table 7-4: Conservation Savings for DMM 1

Device	Pre-1980 Construction	Post-1980 Construction
Low-flow showerhead retrofit	7.2 gcd*	2.9 gcd
Toilet retrofit (five year life)	1.3 gcd	0.0 gcd
Leak repair	0.5 gcd	0.0 gcd
Landscape survey	10%	10%

*gcd = gallons per capita per day

DMM 2. Residential Plumbing Retrofit

Retrofitting residences with water efficient plumbing fixtures can be cost effective and reduce per capita indoor water use, particularly in residences constructed prior to 1992. Typical retrofit programs involve replacing old fixtures with low-flow showerheads and faucet aerators and installing toilet displacement devices or retrofitting with water conserving toilets (as needed).

Implementation Status

Plumbing fixture standards are being enforced throughout the basin. Retrofit programs are being implemented in 5 of the 7 water service areas.

Conservation Savings

Water savings vary depending on the water fixture replaced. Estimates of anticipated water savings are given in Table 7-5 (CUWCC, 2002).

Table 7-5: Conservation Savings for DMM 2

Device	Pre-1980 Construction	Post-1980 Construction
Low-flow showerhead retrofit	7.2 gcd*	2.9 gcd
Toilet retrofit	1.3 gcd	0.0 gcd

*gcd = gallons per capita per day

DMM 3. System Water Audits, Leak Detection, and Repair

Full-scale water system audits estimate water lost due to leaks in the supply system. If the audit results indicate a significant quantity of water is not accounted for, a leak detection and repair effort may be warranted. Methodology is described in the American Water Works Association (AWWA) Water Audit and Leak Detection Guidebook (AWWA, 1992). Customers should be advised whenever it appears possible that leaks exist on the customer's side of the meter.

Implementation Status

This DMM is being implemented in all 7 water service areas.

Conservation Savings

Leak detection and repair may result in water and energy savings for cities and water agencies. Customers may benefit from an effective program or may face repair costs if leaks are detected on their side of the water meter.

DMM 4. Metering and Commodity Rates for New Connections and Retrofit of Existing Connections

The most equitable way to charge for water is through rates based on the quantity consumed. This requires metering service connections and billing customers by volume of use. According to current law, all new connections must be metered. Programs can be developed to retrofit existing unmetered connections.

Implementation Status

All of the water service areas are metered and require water meter installation on new construction. Metered connections are billed by volume of use.

Conservation Savings

Metered water service connections save up to 20% compared to unmetered connections (CUWCC, 2002).

DMM 5. Large Landscape Conservation Programs and Incentives

Large irrigated landscapes represent areas where significant water savings may be made. Efforts to improve water use efficiency of large landscapes include designing and using evapotranspiration-based water use budgets, providing notices each billing cycle showing the relationship between the budget and actual consumption, providing notices at the start and end of the irrigation season alerting customers to check their irrigation systems, marketing landscape surveys to existing accounts with large landscapes, and providing information on climate-appropriate landscape design, efficient irrigation equipment to new customers and change-of-service customer accounts.

Surveys of all landscapes at cities and water agencies could be conducted and appropriate adjustments made as indicated from results of the survey. Climate-appropriate water efficient landscaping could be installed at city and water agency facilities, and dual metering where appropriate.

Implementation Status

This DMM is being implemented in 4 of the 7 water service areas.

Conservation Savings

Landscapes and/or irrigation equipment that are modified as a result of water audits could reduce water use by 15% (CUWCC, 2002).

DMM 6. High-Efficiency Washing Machine Rebate Programs

High-efficiency washing machines save water and energy needed to heat water. Energy service providers often offer financial incentive for the purchase of high-efficiency washing machines. Cities and water agencies could also offer a cost-effective financial incentive based on the marginal benefits of the water savings.

Implementation Status

This DMM is not currently being implemented.

Conservation Savings

The estimate of reliable annual water savings per replacement of a low-efficiency washing machine with a high-efficiency washing machine is 5,100 gallons (CUWCC, 2002).

DMM 7. Public Information Programs

Public information programs to promote the wise use of water and the related benefits are in place throughout the MWA service area. Programs include providing speakers to employees, community groups and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills showing use in gallons per day for the last billing period compared to the same period the year before; providing public information to promote wise water use practices; and coordinating with other government agencies, industry groups, public interest groups, and the media.

Implementation Status

MWA, the AWAC and all cities and water agencies have public information programs.

Conservation Savings

There is no method to quantify the savings of this DMM.

DMM 8. School Education Programs

School education programs promote wise water use and related benefits. Programs include working with school districts and private schools in the area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Education materials should meet the state education framework requirements, and grade appropriate materials should be distributed to grade levels K-3, 4-6, 7-8, and high school.

Implementation Status

This DMM is being implemented in 6 of the 7 water service areas.

Conservation Savings

There is no method to quantify the savings of this DMM.

DMM 9. Conservation Programs for Commercial, Industrial and Institutional Accounts

Water conservation efforts for commercial, industrial and institutional water users include replacement of existing high-water-using toilets with ultra-low-flush (1.6 gallons or less) toilets, water use surveys and customer incentives. Water use surveys include a site visit, an evaluation of all water-using apparatus and processes, and a customer report identifying recommended efficiency measures, their expected payback, and available agency incentives.

Implementation Status

This DMM is being implemented in 2 of the 7 water service areas.

Conservation Savings

Commercial water reduction from DMMs such as interior and landscape water surveys, plumbing codes, and other factors (includes savings accounted for in other DMMs) is estimated as 12% (CUWCC, 2002).

Industrial water reduction results from DMMs such as waste discharge fees, new technologies, water surveys, plumbing codes and other factors (including savings accounted for in other DMMs) is estimated at 15% (CUWCC, 2002). Institutional water reductions vary significantly.

DMM 10. Wholesaler Agency Programs

Implementation Status

MWA is assisting other agencies in the basin with water conservation through a number of cooperative efforts. These are discussed in the *Coordinated Water Conservation Efforts* section of this chapter.

Further water conservation could be achieved by the following means:

Regional Conservation Partnerships

- Develop partnerships where financial incentives or equivalent resources, are made available to advance water conservation efforts and effectiveness

- Explore financial support for all DMMs implemented by cooperating retail water agencies which can be shown to be cost-effective in terms of avoided cost of water from the wholesaler's perspective

Technical Facilitation

MWA can provide conservation-related technical support and information to all retail agencies through facilitation of groups such as the Alliance for Water Awareness and Conservation. Specific cooperative technical facilitation activities could include providing staff to work with retail agencies on DMM implementation, conducting or arranging workshops, and developing guidelines for:

- Calculating program savings, costs and cost-effectiveness
- DMM implementation measurement and reporting procedures
- Issues associated with water conservation activities for ULFT replacement, residential retrofits, surveys of commercial, industrial and institutional uses, residential and large turf irrigation, and conservation-related rates and pricing
- Encouraging and rewarding cost-effective investments in long-term conservation shown to advance regional water supply reliability and sufficiency.

Water Savings Assumptions

There is no method to quantify savings from this DMM.

DMM 11. Conservation Pricing

Conservation pricing provides incentives to customers to reduce average use, peak use, or both. Such pricing includes rates designed to recover the cost of providing service and billing for water and sewer service based on metered water use. Conservation pricing is also characterized by one or more of the following components: rates in which the unit rate increases as the quantity used increases (increasing block rates); seasonal rates or excess-use surcharges to reduce peak demands during summer months; or rates based on the long-term marginal cost or the cost of adding the next unit of capacity to the system.

Implementation Status

All of the cities and water agencies currently bill for water based on conservation priced commodity rates.

Conservation Savings

There is no method to quantify the savings of this DMM.

DMM 12. Water Conservation Coordinator

Water conservation coordinators and support staff (if necessary) perform a number of functions including coordination and oversight of conservation programs and DMM implementation, preparation of reports, promotion of water conservation issues to the city or water agency senior management, coordination of agency conservation programs with operations and planning staff, preparation of annual conservation budgets, and preparation of the conservation elements of the agency's Urban Water Management Plan.

Implementation Status

MWA and all of the cities and water agencies have staff that is dedicated to serving in this capacity.

Conservation Savings

There is no method to quantify the savings of this DMM.

DMM 13. Water Waste Prohibition

Water waste prohibitions involve enacted and enforced measures prohibiting gutter flooding, single pass cooling systems in new connections, nonrecirculating systems in all new conveyer car wash and commercial laundry systems, and nonrecycling decorative water fountains.

Implementation Status

Ordinances prohibiting water waste have been adopted in all of the water service areas.

Conservation Savings

There is no method to quantify the savings of this DMM.

DMM 14. Residential Ultra-Low-Flush Toilet Replacement Programs

Ultra-low-flush toilet replacement programs replace existing high-water-using toilets with ultra-low-flush (1.6 gallons or less) toilets in single-family and multi-family residences. Some programs involve requiring toilet replacement at time of resale.

Implementation Status

This DMM is currently being implemented in 3 of the water service areas.

Conservation Savings

Water savings depend on the type and number of toilets replaced.

8

STAKEHOLDER ASSESSMENT AND PUBLIC OUTREACH

Significant public outreach efforts were made during development of this Regional Water Management Plan. These efforts involved meetings with individuals, groups, a Technical Advisory Committee and evaluation of questionnaires. Outreach efforts were directed at stakeholders from local water agencies, state and federal agencies, municipalities, San Bernardino County, and 13 local community groups. Lists of stakeholders are included in Chapter 2 of this Plan. The assessment of stakeholders' concerns is described in the following section.

Assessment Approach

Stakeholders in the Mojave Water Agency (MWA) have a variety of issues related to potential water management activities. In an effort to identify those issues, several actions were taken as part of this planning process. Those actions included the following:

- review of existing data and reports provided by MWA and some stakeholders
- meetings with the MWA Technical Advisory Committee (TAC)
- individual and group meetings with stakeholders
- preparation and distribution of a written questionnaire; collection and review of responses

MWA arranged meetings with individual stakeholders or groups of related stakeholders. MWA selected those agencies thought to have critical issues that would benefit from individual discussions. The agencies that participated are as follows:

1. Victor Valley Wastewater Reclamation Authority
2. Baldy Mesa Water District
3. City of Barstow & Southern California Water Company
4. Joint Subarea Advisory Committee
5. City of Adelanto

6. City of Hesperia
7. Victor Valley Water District
8. Lahontan Regional Water Quality Control Board (Lahontan RWQCB)
9. Morongo Basin/Johnson Valley Area
 - a. Joshua Basin Water District
 - b. Hi-Desert Water District
 - c. Bighorn-Desert View Water Agency
 - d. San Bernardino County Special Districts
10. California Department of Fish and Game
11. San Bernardino County Special Districts

The written questionnaire was developed to provide an opportunity for all agencies and a greater number of individuals in MWA to provide input to the Regional Water Management Plan (RWMP) Update. The TAC provided review comments on the draft questionnaire and was instrumental in the development of the final version (Appendix D). The questionnaires were distributed in July 2001 in several ways: MWA mailed questionnaires directly to 26 entities, TAC members distributed copies to their constituent groups, and copies were distributed at other MWA meetings.

The following nineteen agencies and individuals submitted completed questionnaires:

Regional/Multiple Subareas

1. California Department of Fish and Game
2. County of San Bernardino Special Districts
3. Lahontan Regional Water Quality Control Board (RWQCB)
4. Southern California Water Company
5. Unknown (respondent's name was not provided)

Morongo Basin/Johnson Valley Area

1. Bighorn-Desert View Water Agency
2. Hi-Desert Water District
3. Joshua Basin Water District

Alto Subarea

1. City of Adelanto
2. City of Hesperia
3. City of Victorville

4. Jess Ranch
5. Joe Monroe
6. Victor Valley Water District
7. Victor Valley Wastewater Reclamation Authority

Este Subarea

1. Chuck Bell / Este Subcommittee
2. Norman Nichols

Oeste Subarea

1. Paul Davis

Centro Subarea

1. City of Barstow



Baja Subarea

None submitted (several attempts were made to solicit a response)

The responses to the questionnaire varied, but they included several consistent themes. All of the responses to the questionnaire are summarized by subarea respondent in Appendix D.

Summary of Stakeholder Issues

The following is a summary of the key stakeholder issues, as developed from the individual/group meetings and questionnaires.

Regional/Multiple Subareas

1. California Department of Fish and Game (DFG)
 - a. Highest priority for the RWMP Update is increasing and maintaining the flows from Alto to Centro subareas. Replacement water needs to be delivered in the Narrows to benefit the riparian habitat.
 - b. RWMP Update should establish short-term actions in addition to long-term actions.
 - c. DFG would like Alto Subarea water level raised to create spillover to Lower Narrows.
 - d. RWMP Update should evaluate recharge at several locations: Rock Springs, upstream of Rock Springs, Transition Zone, and Silver Lakes area (south of Helendale Fault).
 - e. RWMP Update should address the need for additional water quality data.

- f. RWMP Update should address the needs of the existing riparian habitat. Minimum water levels for key habitats are included in Appendix H to the Judgment.
 - g. RWMP Update should address the viability of wastewater reclamation and its impact on riparian habitat.
 - h. RWMP Update should evaluate the viability of a diversion or dam at the lower end of the Mojave River upstream of Afton Canyon to retain storm water for use in the Baja Subarea.
 - i. RWMP Update should acknowledge the benefits of removing non-native vegetation in favor of native vegetation in the riparian habitat areas.
 - j. RWMP Update should evaluate the potential for MWA to assist with the funding of land purchases around sensitive riparian habitat.
 - k. Water quality concerns associated with the fish hatchery operations include: potential increases in levels of TDS and nutrients, and the potential for translocated pathogens from the State Water Project (SWP) water.
2. County of San Bernardino Special Districts
(See Morongo Basin/Johnson Valley Area, Alto Subarea, and Oeste Subarea)
3. Lahontan RWQCB
- a. Highest priority for the RWMP Update is to address the long-term impacts of the increased salt levels associated with the delivery of SWP water.
 - b. Next year [2002], Lahontan RWQCB anticipates starting the process to revise the Basin Plan Objectives.
 - c. Would like a basin-wide water quality model to be used to evaluate alternative projects.
 - d. Would like the water quality model used to evaluate any proposed recycled water project.
 - e. Water conservation should be an integral part of the RWMP Update. MWA should take a leadership role in promoting water conservation.
4. Southern California Water Company
- a. Southern California Water Company (SCWC) operates systems in Alto Subarea (Apple Valley), Centro Subarea (Barstow), and Este Subarea (Lucerne Valley).
 - b. RWMP Update should include provisions to provide adequate supplies of water to each area of the region.
 - c. RWMP Update should evaluate all the competing interests for water and develop a plan for the greatest good of the group.

- d. Local soil conditions should be considered when selecting a recharge site to make sure recharge would not mobilize local contaminants that have been previously “locked” in the soil.
 - e. The quality of SWP water, as compared to existing and emerging contaminant standards, should be considered as part of the RWMP Update.
 - f. The storage capacity of a local basin should be utilized first for the benefit of local basin users. Once local needs are met, use of the storage capacity for others should be considered and this use should provide some benefit to the local users.
5. Unknown (respondent’s name was not provided)
- a. The overdraft must be stopped.
 - b. Projects and policies developed in the RWMP Update should be fair to all.

Morongo Basin/Johnson Valley Area

- 1. Bighorn-Desert View Water Agency
 - a. District would like assistance with obtaining grant funding for system upgrades and replacements.
- 2. County of San Bernardino Special Districts
 - a. County operates 2 service areas in this subarea.
 - i. Zone 70 W-4 (Pioneertown)
 - ii. Zone 70 W-1 (Landers)
 - b. County would like assistance with obtaining grant funding for system upgrades and replacements.
 - c. High levels of uranium and arsenic (Zone 70 W-4) are concerns.
 - d. RWMP Update should address the issues of all regions within MWA.



- 3. Hi-Desert Water District
 - a. Highest priority for RWMP Update is the extension of the Morongo Basin Pipeline and the construction of an additional recharge facility.
 - b. Nitrate levels are a concern.
 - c. Would like an evaluation of the potential for a conjunctive use project in the Mesa area included in the RWMP Update.
 - d. RWMP Update should include a policy on how the SWP entitlement is to be allocated or shared.

- e. RWMP Update should include an evaluation of a treatment facility at the terminal reservoir for the Morongo Basin Pipeline.
4. Joshua Basin Water District
- a. Highest priority for RWMP Update is the extension of the Morongo Basin Pipeline to the District and the construction of a recharge facility.
 - b. District would like MWA assistance with obtaining grant funding for the pipeline extension and recharge facilities.
 - c. Fluoride and salt levels are a minor concern.
 - d. RWMP Update should address the need for additional SWP entitlement for the Morongo Basin/Johnson Valley Area.
 - e. RWMP Update should include an evaluation of a treatment facility at the terminal reservoir for the Morongo Basin Pipeline.

Alto Subarea

1. Baldy Mesa Water District
- a. Significant urban growth and increased water demand are anticipated.
 - b. Water quality issues should be addressed. Arsenic levels are above 10 ppb.
 - c. How various stakeholders will gain access to MWA's SWP entitlement should be addressed.
 - d. How treatment of SWP water can fit into the regional plan and how reliable it will be should be addressed.
 - e. Would like MWA to jointly work with them to evaluate injection well feasibility and percolation basin feasibility. Oro Grande Wash and No Name Wash are identified recharge sites.
 - f. Would like the potential of moving their production to the Mojave River area East of Hesperia to be evaluated. A transmission system from the River to the District would be required.
2. City of Adelanto
- a. Significant urban growth and increased water demand are anticipated.
 - b. Highest priority for RWMP Update is to evaluate ways to recharge the Transition Zone to increase the reliability of the City's wells.
 - c. Water quality issues should be addressed. The City's wells on the Mesa have high TDS and fluoride levels.
 - d. How treatment of SWP water can fit into the regional plan and how reliable it will be should be addressed.
 - e. Would like the potential for injection in the Mesa area to be evaluated.

3. City of Hesperia
 - a. Significant urban growth and increased water demand are anticipated.
 - b. Water levels have dropped an average of 8 feet over the past 2 years due to 2 years of dry weather and minimal Mojave River flows.
 - c. Welcome the evaluation of a project to move Baldy Mesa Water District production to the Mojave River area East of the City. Feel such a project could be beneficial to the entire region.
 - d. City has no water quality concerns.
 - e. RWMP Update should be a regional plan, not a series of individual plans.
 - f. A treatment facility for SWP water should be evaluated as a regional project.
 - g. Direct use of SWP water for irrigation should be evaluated as an in-lieu project.
 - h. Existing and proposed local stormwater retention/detention basins should be evaluated for their potential dual use as recharge facilities.
 - i. Water conservation should be an integral part of the RWMP Update.
 - j. RWMP Update should mention the Army Corps of Engineers proposal to make the Mojave River Forks Dam a retention basin.

4. City of Victorville
 - a. RWMP Update needs to include alternatives for recharging the regional aquifer close to points of withdrawal.
 - b. The need for a water treatment facility for SWP water needs to be evaluated in the RWMP Update.
 - c. The RWMP Update process needs to be coupled with an aggressive public information program to educate the general public on the regional water supply issues.
 - d. Recycled water and water conservation should be an integral part of the RWMP Update.

5. County of San Bernardino Special Districts
 - a. County operates 5 service areas in this subarea.
 - i. Zone 42 (Oro Grande) in Transition Zone
 - ii. Zone 70 C (Silver Lakes) in Transition Zone
 - iii. Zone 64 (Spring Valley Lake)
 - iv. Zone 70 J (Oak Hills)
 - v. Zone 70 L (Pinion Hills – Phelan Area) most of production is in Oeste and most of consumption is in Alto

- b. Water quality issues: chromium VI (Zone 70 J), iron and magnesium (Zones 42 and 70 C), nitrate (Zone 64), arsenic (Zone 70 C), TDS (Zone 70 C), and fluoride (Zone 70 C).
- c. Zone 42 (Oro Grande) would benefit from recharge in the Transition Zone as proposed by City of Adelanto. Wells almost run dry seasonally.
- d. RWMP Update should address the issues of all regions within MWA.

6. Jess Ranch

- a. RWMP Update should include the concept of recharging large quantities of water in the Floodplain Aquifer via the Rock Springs facility and extracting that water for distribution to Alto, Este, and Morongo Basin/Johnson Valley users.
- b. RWMP Update should address consumptive use issues.
- c. Farmers need to be treated equitably.
- d. MWA should only be involved in the educational aspects of water conservation. MWA should focus on supplying supplemental water as a wholesaler.
- e. RWMP Update should address the potential of degrading local groundwater quality by recharging the aquifer with SWP water.
- f. RWMP Update should be an update to the existing plan and not a new plan. Any changes to the existing plan should be clearly identified.
- g. RWMP Update should focus on getting supplemental water flowing as soon as possible.

7. Joe Monroe

- a. The time should be taken to prepare an RWMP Update that provides for an adequate, equitable, and reliable water supply.

8. Victor Valley Water District



- a. Significant urban growth and increased water demand are anticipated.
- b. Water quality concerns include arsenic and temperature. 58% of well capacity is over 10 ppb level for arsenic. Are beginning to see some low levels of nitrate.
- c. RWMP Update focus should be on bringing in wet water.
- d. Would like to build treatment facility for SWP water for direct delivery and for injection.
- e. Percolation of SWP water is considered an option, but there is concern over where the water goes once it is recharged.

- f. Relying on projects that would pump additional water from around the Mojave River may be problematic for two reasons: water quality may not be adequate and increased pumping may have a detrimental affect on riparian habitat.
 - g. The use of recycled wastewater should be evaluated. The impact on the make-up obligations of Alto producers must be included in the evaluation.
 - h. RWMP Update should include a policy on how the SWP entitlement is to be allocated or shared.
 - i. Groundwater banking programs should be addressed in the RWMP Update. Principles must be developed that clearly state how the stakeholders establish benefits from these programs and how the benefits will be equitably shared.
 - j. RWMP Update should be plan that provides regional guidance while maintaining local control of facilities.
9. Victor Valley Wastewater Reclamation Authority
- a. Highest priority for RWMP Update is to determine and support the highest and best use of recycled wastewater.
 - b. Adjudication should recognize the benefits of wastewater reclamation.
 - c. Adjustments to the Physical Solution would be helpful.
 - d. Some of the Authority's main interceptors are reaching their capacity and/or design life.
 - e. Sub-regional wastewater reclamation facilities would eliminate or greatly reduce the need for major interceptor rehabilitation and/or replacement.
 - f. Recycled water from sub-regional facilities could be used for urban irrigation and groundwater recharge.
 - g. Regional facility would continue to treat solids and could continue to provide flow to the Mojave River.

Este Subarea

- 1. Chuck Bell / Este Subarea Advisory Committee
 - a. A recharge facility for SWP water via the Morongo Basin Pipeline must be a part of the RWMP Update.
 - b. RWMP Update should include a wide range of options, recharge locations, financial incentive, etc.
 - c. Some concern regarding increasing TDS levels.
- 2. Norman Nichols
 - a. RWMP Update must treat farmers fairly and equitably.
 - b. Some concern regarding increasing TDS levels.
 - c. RWMP Update should include evaluation of groundwater storage programs in Este.

Oeste Subarea

1. County of San Bernardino Special Districts
 - a. County operates 1 service area in this subarea
 - i. Zone 70 L (Pinion Hills – Phelan Area) most of production is in Oeste and most of consumption is in Alto
 - b. Water quality issues: MTBE
 - c. RWMP Update should evaluate the potential to recharge SWP water in Sheep Creek.
 - d. RWMP Update should address the issues of all regions within MWA.
2. Paul Davis
 - a. RWMP Update must fully address the needs of the outlying areas such as Este and Oeste.
 - b. Conservation needs to be a very important part of the RWMP Update.
 - c. Minimal users should pay their fair share of costs for regional programs and improvements.

Centro Subarea

1. City of Barstow
 - a. Centro is close to being in balance, but there is a significant amount of FPA not currently being used.
 - b. TDS levels are a concern. Fourteen wells have TDS levels over 500 mg/l.
 - c. Want to make sure that Alto Subarea users are doing their part to get Alto in balance.
 - d. RWMP Update should focus on stopping the overdraft and reversing it if necessary.
 - e. RWMP Update should clearly state how MWA allocates SWP entitlement and how much it will cost so that developers will be able to evaluate the viability of new development.
 - f. RWMP Update should include Best Management Practices for each subarea.
 - g. Concerned that water introduced at the Transition Zone is not reaching Barstow.
 - h. RWMP Update should acknowledge the benefits of removing non-native vegetation in favor of native vegetation in the riparian habitat areas.
 - i. Want to have assurances that the requirement for 23,000 acre-feet per year to pass through the Narrows is being met.
 - j. SWP water delivered through the Mojave River Pipeline should be paid for on a postage stamp basis, not a railroad ticket basis.
 - k. Recognize that VVWRA discharge is currently the primary recharge mechanism for Barstow. Are willing to have alternatives that would make use of SWP water for

Transition Zone flow and allow some upstream wastewater reclamation. Centro and Barstow must not be negatively impacted.

Baja Subarea

A formal response to the questionnaire was not received, but the following comments were among several received in discussions with TAC members.

1. RWMP Update needs to treat Baja interests fairly.
2. Concerned about the lack of water reaching Baja.
3. Concerned that increased development upstream will negatively impact local water supplies.
4. Concerned about a drop in local property values due to concerns about the water supply.
5. Would like to see support for obtaining grant funds to assist local farmers with water conserving improvements.
6. Would like to see MWA and USGS confirm that the aquifer in the Newberry Springs area is recharged from the Mojave River system.

Issues Common to All Stakeholders

The assessment and evaluation of the meetings and questionnaires point to several issues that are common to virtually all stakeholders. These issues, as articulated below, helped to develop the suite of project alternatives evaluated in detail during Phase 2 of the RWMP Update.

1. Groundwater overdraft needs to be stopped and local water levels recovered if it is financially viable to do so.
2. Purchase of additional SWP entitlement should be pursued, if it makes financial sense to do so.
3. Groundwater banking with agencies outside and inside MWA should be considered as long as they provide benefit to the local basin.
4. The RWMP Update should strive to maximize the use of recycled water while meeting the obligations of the Adjudication.
5. Water conservation should be a key component in the long-term water supply.
6. The RWMP Update should treat all water users fairly and equitably.
7. Continued open dialog and stakeholder involvement is critical to the development of an effective RWMP Update.

Key Water Management Issues

Identifying the key water management issues facing the Mojave Water Agency (MWA) service area is an important step in the Agency's planning process. Clearly articulating these issues helped define the water management actions and projects presented in the next chapter of this report.

The identification of the area's key water management issues stemmed from our evaluation of recent hydrogeologic data, our update of supply and demand estimates, and our stakeholder assessment process. The following six key water management issues emerged from this process:

1) Demand Exceeds Supply

The projected year 2020 water balance shows a water deficit in the Mojave Basin area ranging from 57,200 acre-feet to 79,600 acre-feet. The projected 2020 deficit in the Morongo Basin/Johnson Valley Area is 1,900 acre-feet.

2) Water Quality

Water quality problems affect drinking water supplies throughout the MWA service area. The key contaminants of concern include arsenic, nitrates, iron, manganese, chromium VI and TDS.

3) Overdraft of the Groundwater Basins

Declining groundwater levels occur in all subareas of the Mojave Basin Area and in the Morongo Basin/Johnson Valley Area.

4) Riparian Ecosystem Maintenance

All but two of the subareas (Oeste and Morongo Basin/Johnson Valley) have potential riparian maintenance issues to consider, such as invasive species and habitat preservation.

5) Wastewater Infrastructure

Wastewater infrastructure issues affect the two subareas with the largest urban water demands within the Mojave Basin Area (Alto and Centro).

6) Subarea Interaction

Many subareas within the MWA service area are impacted by activities in other subareas. These impacts include water supply and water quality issues.

Each subarea has a unique set of these key issues. To help identify the issues that are specific to each subarea, the following series of tables were developed. The tables also show the locations affected within the subarea and the aquifer(s) potentially impacted.

Table 8-1: Baja Subarea Water Management Issues

Issue	Specification	Location	Aquifer(s)
Demand Exceeds Supply	2020 deficit: 6,100 to 23,200 af/yr	Overall subarea	Floodplain & Regional
Water Quality	Arsenic > 10 ppb	<ul style="list-style-type: none"> • Military Base • Individual Homeowner Wells 	Floodplain & Regional
	Local Organics	Same as above	Floodplain
	Boron	Same as above	Floodplain
	Chromium VI	Newberry Springs area	Floodplain
	Fluoride	Isolated areas	Floodplain & Regional
	High TDS	Isolated areas	Floodplain & Regional
Overdraft	<ul style="list-style-type: none"> • Largest historical decline of Mojave R. Basin subareas • Causing wells to run dry • Potentially causing degradation in water quality • Potential ground subsidence NE of Newberry Springs 	Overall subarea	Floodplain & Regional
Riparian Ecosystem Maintenance	<ul style="list-style-type: none"> • Declining water levels have caused harm to riparian growth and sustainability • Issue – Keeping groundwater levels in appropriate root zone • Listed species negatively effected 	Camp Cady	Floodplain
	Blowsand conditions and vegetation loss due to lowered water levels	Calico-Newberry Fault zone	Floodplain & Regional
Wastewater Infrastructure	Not an issue		
Subarea Interaction	Judgment requiring: <ul style="list-style-type: none"> - Minimum subsurface flow from Centro - Minimum subsurface flow toward Afton 	Overall subarea	Floodplain

Table 8-2: Centro Subarea Water Management Issues

Issue	Specification	Location	Aquifer(s)
Demand Exceeds Supply	2020 deficit: 2,700 af/yr	Overall subarea	Floodplain & Regional
Water Quality	Arsenic > 10 ppb	Barstow and Harper Dry Lake areas	Floodplain & Regional
	TDS	Same as above. 14 wells have TDS levels over 500 mg/l.	Floodplain & Regional
	Fluoride	Barstow	Regional
	Nitrates	Barstow and isolated areas	Floodplain & Regional
Overdraft	<ul style="list-style-type: none"> Causing wells to run dry Potentially causing degradation in water quality Potential ground subsidence near Harper Dry Lake 	Harper Lake area	Regional
Riparian Ecosystem Maintenance	<ul style="list-style-type: none"> Habitat health based on groundwater level Per Judgment, gw levels for riparian have been set, but two of the monitoring wells have not been drilled. Invasive species – eradicate phreatophytes because of their consumption. 	Along Mojave River and Harper Lake Habitat Preserve	Floodplain & Regional
Wastewater Infrastructure	<ul style="list-style-type: none"> ~9,000 af/yr Alto discharges provide supply to Centro. Several entities protesting change of point of discharge. DFG wants 8,500 af/yr plus 37% of additional water treated to continue to be discharged at present location. 	Victorville area	Floodplain & Regional
Subarea Interaction	<ul style="list-style-type: none"> Judgment requiring minimum subsurface flow from Alto and to Baja VVWRA wastewater point of discharge issue related to meeting downstream flow requirements. 	Overall subarea	Floodplain

Table 8-3: Alto Subarea Water Management Issues

Issue	Specification	Location	Aquifer(s)
Demand Exceeds Supply	2020 deficit: 46,000 to 48,500 af/yr	Overall subarea	Floodplain & Regional
Water Quality	Arsenic > 10 ppb	<ul style="list-style-type: none"> • Various locations. • 58% of Victor Valley WD well capacity > 10 ppb Arsenic. 	Mostly Regional, but also some in Floodplain
	High TDS	Adelanto	Regional
		Silver Lakes	Floodplain
	Fluoride	Adelanto, Silver Lakes, and isolated areas	Regional
	Nitrates (low priority, below MCLs)	Victorville	Floodplain & Regional
	Manganese, Iron	North of SCLA, Oro Grande, and isolated areas	Floodplain & Regional
	Chromium VI, Iron, Manganese, Arsenic, others	Upper Part of Mojave Watershed	Regional
	Organics	SCLA	Regional
High Temperature	Victorville	Regional	
Overdraft	Causing wells to run dry	Apple Valley	Regional
	Potentially causing degradation in water quality	Victorville	Floodplain & Regional
		Adelanto	Floodplain & Regional
		Baldy Mesa	Regional
	Hesperia	Floodplain & Regional	
Riparian Ecosystem Maintenance	<ul style="list-style-type: none"> • Habitat health based on groundwater level and Mojave River flows • Water level needs to be raised to return to and maintain habitat 	Along Mojave River – 24-mile corridor from Spring Valley Lakes to the Helendale fault area	Floodplain
Wastewater Infrastructure	<ul style="list-style-type: none"> • Return flow policy • Need for additional infrastructure • Satellite treatment and recycle 	Overall subarea	Floodplain & Regional
Subarea Interaction	<ul style="list-style-type: none"> • Judgment requiring minimum subsurface flow from Este and Oeste and subsurface and surface flow to Centro • Tied to VVWRA wastewater point of discharge issue 	Overall subarea	Floodplain & Regional

Table 8-4: Oeste Subarea Water Management Issues

Issue	Specification	Location	Aquifer(s)
Demand Exceeds Supply	2020 deficit: 1,900 to 2,900 af/yr	Overall subarea	Regional
Water Quality	Arsenic > 10 ppb	Localized	Regional
	MTBE	Southern region	Regional
	Moderately high TDS Chromium VI	Near El Mirage Dry Lake	Regional
	Fluoride	Isolated areas	Regional
Overdraft	<ul style="list-style-type: none"> Causing wells to run dry Potentially causing degradation in water quality Potential ground subsidence 	Depression beneath El Mirage Dry Lake	Regional
Riparian Ecosystem Maintenance	None identified		
Wastewater Infrastructure	Not an issue		
Subarea Interaction	Judgment requiring subsurface flow from Oeste to Alto	Overall subarea	Regional

Table 8-5: Este Subarea Water Management Issues

Issue	Specification	Location	Aquifer(s)
Demand Exceeds Supply	2020 deficit: 500 to 2,300 af/yr	Overall subarea	Regional & Lucerne
Water Quality	High TDS	Near Rabbit Dry Lake	Regional
		Near Lucerne Dry Lake	Lucerne
	Fluoride	Isolated areas	Lucerne
	Arsenic > 10 ppb	Isolated areas	Lucerne
	Nitrate concentrations near BBARWA discharge	Near Hwy 247 and Camp Rock Road	Lucerne
Overdraft	<ul style="list-style-type: none"> Causing wells to run dry Potentially causing degradation in water quality Potential ground subsidence near Lucerne Dry Lake 	Overall Subarea	Lucerne
Riparian Ecosystem Maintenance	Springs along Helendale Fault support habitat (Rabbit Spring, Cushenberry Spring, & several unnamed springs)	Overall subarea	Regional & Lucerne
Wastewater Infrastructure	Not an issue		
Subarea Interaction	Judgment requiring subsurface flow from Este to Alto	Overall subarea	Regional

Table 8-6: Morongo Basin/Johnson Valley Water Management Issues

Issue	Specification	Location	Aquifer(s)
Demand Exceeds Supply	2020 deficit: 1,900 af/yr (Not including imported supply and Johnson Valley)	Overall subarea	Morongo Regional
Water Quality	Nitrates (septic contamination of recharged water)	Warren Valley Basin	Morongo Regional
	Arsenic > 10 ppb	Pioneertown	Morongo Regional
	Uranium	Pioneertown	Morongo Regional
	Iron & manganese	Pioneertown	Morongo Regional
	Fluoride	Isolated areas	Morongo Regional
	Moderate TDS	Warren Valley Basin	Morongo Regional
Overdraft		<ul style="list-style-type: none"> Joshua Tree Subbasin – some decline Warren Basin is now stabilized with imported water 	Morongo Regional
Riparian Ecosystem Maintenance	None		
Wastewater Infrastructure	Treatment Plant being pursued for Warren Valley Basin	Warren Valley Basin	Morongo Regional
Subarea Interaction	Warren Valley Basin Judgment	Warren Valley Basin	Morongo Regional

A review of the tables above shows that the impacts caused by the six key issues are widespread in the MWA service area. This compilation of water management issues provides a tool for identifying linkages between specific issues and subareas. These linkages can be used to craft project alternatives and water management strategies that address the issues in an integrated manner.

Coordination of IWMP, GMP and UWMP with Other Agencies

In the development of this Integrated Water Management Plan, input was sought from other agencies in the Mojave Basin through the Technical Advisory Committee. The committee discussed the content of the plan and provided input during its development. Agendas and minutes from TAC meetings are included in Appendix E.

Method for Public Participation

MWA utilized numerous methods for informing the public about the development of its IWMP and describing means by which the public could have input into development of the plan. The methods are described below.

Technical Advisory Committee

MWA formed a Technical Advisory Committee (TAC) comprised of local stakeholders with an interest in the areas groundwater. The TAC met regularly during development of the Regional Water Management Plan, reviewing and providing comments and suggestions on the Plan. The following entities comprise the Technical Advisory Committee:

Apple Valley Ranchos
Baldy Mesa Water District
Bar-H Mutual Water Company
Bighorn Desert View Water Agency
California Department of Fish & Game
Citizens for a Better Community
City of Barstow
City of Hesperia
City of Victorville
County of San Bernardino Special Districts
Department of Water Resources
Hi-Desert Water District
Jess Ranch
Joshua Basin Water District
Jubilee Mutual Water Company
Lahontan Regional Water Quality Control Board
Mariana Ranchos County Water District
Mojave Basin Area Judgment Subarea Advisory Committees
Newberry Springs-Harvard Property Owners Association
Palisades Ranch
Rancho Los Flores
Silver Lakes Association
Southern California Water Company
Spring Valley Lakes Association
Town of Apple Valley
Victor Valley Wastewater Reclamation Authority
Victor Valley Water District

In addition, approximately 20 individuals participated. Other stakeholders in the Regional Water Management Plan Update process are listed in Chapter 2.

Newsletter

The Panorama, the newsletter of the MWA is published regularly and mailed to those on its growing distribution list. Regular updates on the development of the Regional Water Management Plan have been included. A copy of Volume 3, Issue 1 published in the winter of 2003 is included in Appendix F.

Website

MWA's web site (<http://www.mojavewater.org/>) contains information on MWA projects, water supplies and resources, water education, Watermaster, Agency publications, a calendar of events and general information about MWA. MWA will continue to provide this service.

Annual Symposia

MWA organized and held water symposia in Victorville in Spring 2003 and in Joshua Tree in Fall 2003. Water leaders and regulators participated in discussion and information sessions. The Agency plans to make the symposia an annual event.

Alliance for Water Awareness and Conservation

MWA is a member of the Alliance for Water Awareness and Conservation, a group of local water purveyors who are collaborating on demand management measures.

Speakers Bureau

MWA provides speakers to a variety of local and community groups on MWA's plans and projects.

MWA Community Liaison Officer

MWA will continue its outreach and education efforts through the position of the Community Liaison Officer.

Subarea Advisory Committees

The 1996 Mojave Basin Area Judgment stipulated formation of Subarea Advisory Committees for each of the five Subareas. The Committee for each area acts in an advisory capacity and studies, reviews and makes recommendations on all discretionary determinations made by the Watermaster which may affect that Subarea.

Written statement to the public

A copy of the statement (MWA Newsletter) on how interested agencies and other stakeholders could participate in the development of this Plan is included in Appendix F. Additional written statements include agendas for the TAC meetings that were mailed to the TAC members (Appendix E).

9

BASIN MANAGEMENT OBJECTIVES AND ALTERNATIVES

Mojave Water Agency

Basin Management Objectives (BMOs) and performance measures were developed as part of this Regional Water Management Plan (RWMP) Update using input from the Technical Advisory Committee (TAC) during two workshops in July and August 2002. Water supply projects and management actions were identified to provide a means to achieve these BMOs. Various combinations of these water supply projects and management actions were assembled into alternatives which were then evaluated for their ability to achieve the BMOs. This process is described in detail in this chapter.

During Phase 2 of the RWMP Update the TAC screened and selected the best combinations of projects and management actions that address key MWA water issues using a four-step systems approach. The first step was to clearly articulate what MWA wants to accomplish through the update of the RWMP.

The intended accomplishments are specified as Basin Management Objectives and performance measures. The BMOs spell out what MWA wants to accomplish, and the performance measures provide a tool to compare the relative success of alternative solutions in producing the desired results. Steps 2 through 4 are employed to generate alternative solutions, evaluate those alternatives, and ultimately select the best alternatives to implement.

The first step in this process was articulation of Basin Management Objectives and establishment of performance measures. The BMOs listed here were adopted by the TAC as a representative

Steps in Screening Process using Systems Approach

1. *Define Problem*
 - *Articulate Fundamental Objectives*
 - *Establish Performance Measures*
2. *Generate Alternatives*
3. *Evaluate Alternatives*
4. *Select Alternatives to Implement*

statement of what should be accomplished through the RWMP Update. The performance measures provide a set of indicators that can be used to help decide how effectively possible alternatives solutions provide the desired outcomes.

Basin Management Objectives

The Fundamental Basin Management Objectives developed with the TAC are presented below. The objectives established for the Mojave Water Agency Regional Water Management Plan (MWA RWMP) through 2020 are to:

Balance future water demands with available supplies recognizing the need to:

- stabilize the groundwater basin storage balance over long-term hydrologic cycles
- protect and restore riparian habitat areas as identified in Exhibit H of the Mojave Basin Area Judgment and the Department of Fish & Game management plan required by Exhibit H
- limit the potential for well dewatering, land subsidence, and migration of poor quality water
- maintain a sustainable water supply through extended drought periods; and
- select projects with the highest likelihood of being implemented.

Maximize the overall beneficial use of water throughout MWA by:

- supplying water in quantity and of quality suitable to the various beneficial uses
- addressing at a minimum Table 7-1 issues throughout the MWA service area recognizing the interconnection and interaction between different areas
- distributing benefits that can be provided by MWA in an equitable and fair manner
- ensuring that costs incurred to meet beneficial uses provide the greatest potential return to beneficiaries of the project(s)
- avoiding redirected impacts; and
- identifying sustainable funding sources including consideration of affordability.

Balancing future water demands with available supplies will increase water supply reliability by preventing continued overdraft of the groundwater. With groundwater storage stabilized, there will be groundwater available during surface water supply shortages and delivery interruptions. With a balanced basin, groundwater elevations will be relatively stable and be kept above historic low. This will reduce the potential for land subsidence and associated aquifer compaction. By limiting migration of poor quality water, available supplies will be of sufficient quality to meet drinking water objectives, thereby increasing long-term water supply reliability.

Performance Measures

For each part of the Basin Management Objectives, performance measures were proposed and discussed at the August TAC workshop. Input from this discussion is included below. The resulting performance measures can be grouped into six broad categories, as follows:

- Storage levels – relating to groundwater accessibility, environmental groundwater elevations, and subsidence potential
- Supply-demand balance – relating to water supply sustainability, mismatch between supply and demand, water supply operations and contingency plans
- Economics – relating to project costs, benefits related to water supply, mitigation requirements, and funding sources
- Water quality – relating to the suitability of water for a particular use, and expected changes in water quality
- Equity – relating to the fair and equitable distribution of benefits and costs
- Implementability – relating to the institutional complexity, potential redirected impacts, and environmental impact of proposed projects

A discussion of the Performance Measures proposed for use for the MWA Regional Water Management Plan Update is presented in Appendix B.

Projects and Management Actions

Phase 1 of the Regional Water Management Plan Update (RWMP Update) provided an array of projects and management actions that can both mitigate groundwater overdraft and meet the water supply needs of the MWA service area for the next two decades. Proposed projects and management actions were tailored to address at least one key water management issue in the basin, as well as help satisfy the Basin Management Objectives.

The purpose of this evaluation is to reasonably estimate specific parameters for **Supply Enhancement Projects** and **Management Actions** identified for the RWMP Update. These parameters were used to develop and evaluate **Alternatives** designed to address the key water management issues summarized above.

The following terms defined below are used throughout this document:

Supply Enhancement Project (Project) - A project providing water supply enhancement through groundwater recharge or an increase in groundwater recharge efficiency.

Management Action - An action improving water quality or environmental habitat. Additionally, an action increasing net water supply by implementing conservation, storage agreements, or water transfers.

Alternative - A combination of projects and/or management actions focused on addressing water management issues.

Methodology

To evaluate the relative impacts and benefits of an alternative, key parameters for the projects and management actions that compose an alternative are necessary. The following is a list of key parameters defined or estimated for each project and most management actions:

1. Project Location - by aquifer unit in the STELLA screening model presented below under the “MWA Screening Model” heading.
2. Recharge Capacity - acre-feet per year
3. Capital Cost - total cost in current (2003) dollars
4. Operation and Maintenance (O&M) Cost – dollars per year
5. Specific Issues - any known issues specific to that project
6. Facilities Required - new and existing facilities needed

The majority of the numbers presented in this document for cost and capacity are derived from a normalized unit cost analysis and should be considered rough estimates of actual design conditions. The costs reported in this document are for nominally-sized facilities and in many cases the projects were resized to match water supply needs in the screening model. The model evaluated multiple sizes and capacities of projects and management actions to spatially optimize recharge in the MWA service area for every alternative.

Normalized Project Cost Methodology

A large number of projects and management actions included in this document have not been studied in detail. Consequently, comparable cost estimates were not available. While further refinement of each potential project and management action is needed, a detailed analysis was beyond the scope of this Plan. To provide a reasonable estimate of capital and operating cost for comparing all projects, a normalized cost table was developed and applied to projects and management actions lacking detailed information.

The normalized cost table was created to provide a unit cost for varying recharge capacities, pipeline diameters, recharge areas, pumping requirements, etc. Unit costs were developed from data provided by MWA composed of contract bids, previous engineering estimates, design documents, and previous reports. Table 9-1 shows an abbreviated version of the normalized cost table with major cost categories shown. These estimates are reflective of relative costs of the various projects based on known parameters. Actual costs may differ once site specific information is developed.

Capital costs were developed based on estimates of pipeline diameters, pipeline lengths, capacity, and various factors specific to a project. In discussions with MWA, the overall project cost is usually 30 percent greater than the construction cost. Therefore, 30 percent was added to the estimated construction cost. This expenditure is associated with project implementation cost and includes geotechnical analysis, right of way, permitting, environmental mitigation, consulting services, and other associated costs.

Operating and maintenance costs were developed from energy requirements, standard costs for maintenance of recharge areas and pipeline lengths, SWP water purchases, and various factors specific to a project.

Supply Enhancement Projects and Management Action Groupings

Specific groups of projects and management actions have been developed to facilitate discussions of alternatives and to provide organization. Table 9-2 presents supply enhancement projects and Table 9-3 presents management actions. Both tables list the specific **aquifer unit** each project or management action overlays. To model the water system, the Mojave River Basin floodplain and regional aquifers have been subdivided into 19 distinct but inter-connected aquifer units, as illustrated in Figure 9-1.

Supply enhancement projects are divided between projects that recharge groundwater utilizing State Water Project (SWP) water and projects that utilize other sources of water (Non-SWP). The SWP section is further divided by projects that recharge the floodplain aquifer and those that recharge areas other than the floodplain aquifer. The Non-SWP section is further divided by projects that increase recharge efficiencies within the MWA service area and projects that change a source of groundwater supply.

Management actions are divided into three groups: actions that treat or blend water supplies, actions that improve riparian health, and actions focused on conservation and storage agreements.

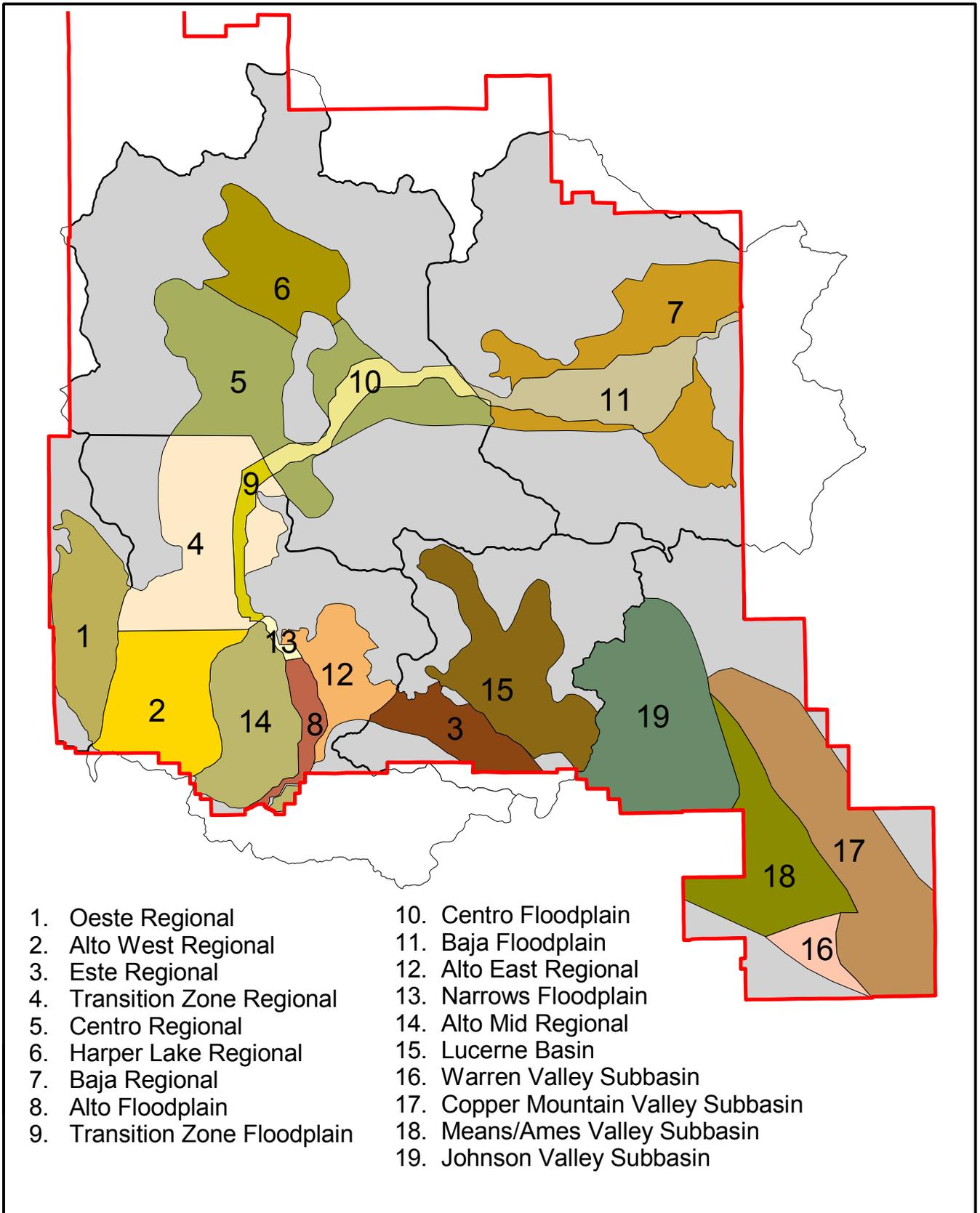


Table 9 - 1
Abbreviated Normalized Cost Table
(2003 dollars)

Description	Design Capacity (acre-feet/ year)	Peaking Factor	Operation Frequency	Recharge Pond Cost (\$)	Pipeline Length (ft)	Pipeline Cost (\$)	Capital Cost Estimate (\$)	Annual O&M Estimate (\$)	SWP Water Purchase (\$)	Cost Summary	
										Capital Cost with 30% Contingency (\$)	Annual O&M and SWP Cost (\$)
Kane Wash/ Newberry Springs Recharge Ponds	6,000	2.0	70%	\$660,000	53,400	\$3,500,000	\$4,200,000	\$50,000	\$1,200,000	\$5,500,000	\$1,300,000
El Mirage Dry Lake Recharge Ponds	2,500	2.0	70%	\$270,000	21,000	\$1,300,000	\$1,600,000	\$30,000	\$500,000	\$2,100,000	\$500,000
Sheep Creek Recharge Ponds	2,500	2.0	70%	\$270,000	10,000	\$600,000	\$1,000,000	\$140,000	\$500,000	\$1,300,000	\$700,000
Oro Grande Recharge Ponds	8,000	2.0	70%	\$880,000	0	\$0	\$1,600,000	\$60,000	\$1,600,000	\$2,100,000	\$1,700,000
Cedar Street Detention Basin	3,500	2.0	70%	\$1,000,000	0	\$0	\$1,500,000	\$70,000	\$700,000	\$2,000,000	\$800,000
Antelope Valley Wash Recharge Ponds	3,500	2.0	70%	\$780,000	0	\$0	\$1,300,000	\$60,000	\$700,000	\$1,700,000	\$800,000
Recharge Facilities South of Apple Valley	1,000	2.0	70%	\$110,000	10,000	\$600,000	\$700,000	\$130,000	\$200,000	\$900,000	\$300,000
Lucerne Valley Recharge Ponds	5,000	2.0	70%	\$550,000	5,000	\$300,000	\$900,000	\$530,000	\$1,000,000	\$1,200,000	\$1,600,000
Recharge Ponds West of Hellendale Fault	5,000	2.0	70%	\$550,000	5,000	\$300,000	\$900,000	\$530,000	\$1,000,000	\$1,200,000	\$1,600,000
Means/Ames Recharge Ponds	2,500	2.0	70%	\$270,000	10,000	\$600,000	\$900,000	\$30,000	\$500,000	\$1,200,000	\$500,000
Hi-Desert Water District Recharge Basin #3	6,400	2.0	70%	\$700,000	7,500	\$500,000	\$1,200,000	\$60,000	\$1,280,000	\$1,600,000	\$1,300,000
Joshua Basin District Recharge and Pipeline	1,000	2.0	70%	\$110,000	10,000	\$600,000	\$700,000	\$30,000	\$200,000	\$900,000	\$200,000
Minneola Recharge Ponds	3,600	2.0	70%	\$390,000	22,000	\$1,300,000	\$1,700,000	\$40,000	\$720,000	\$2,200,000	\$800,000
Daggett Recharge Ponds	16,800	2.0	70%	\$1,840,000	34,000	\$2,700,000	\$4,500,000	\$110,000	\$3,360,000	\$5,900,000	\$3,500,000
Recharge North of Helendale Fault	5,000	2.0	70%	\$550,000	7,500	\$500,000	\$1,100,000	\$50,000	\$1,000,000	\$1,400,000	\$1,100,000
In-Lieu Supply to Silver Lakes	5,000	2.0	70%	\$0	7,500	\$500,000	\$500,000	\$20,000	\$1,000,000	\$700,000	\$1,000,000
Mojave River Pipeline Extension - Transition Zone	2,500	2.0	70%	\$270,000	26,000	\$1,600,000	\$1,900,000	\$30,000	\$500,000	\$2,500,000	\$500,000
Hesperia Lakes Recharge	3,000	2.0	70%	\$330,000	16,000	\$1,000,000	\$1,300,000	\$40,000	\$600,000	\$1,700,000	\$600,000
Recharge Facilities South of Rock Springs Turnout	8,000	2.0	70%	\$880,000	21,000	\$1,700,000	\$2,600,000	\$60,000	\$1,600,000	\$3,400,000	\$1,700,000

Table 9-2: Supply Enhancement Project

SWP	
<i>Non-Floodplain Aquifer Recharge (14)</i>	<i>Aquifer Unit</i>
Kane Wash Recharge Ponds	Baja Regional
El Mirage Recharge Ponds	Oeste Regional
Sheep Creek Recharge Ponds	Oeste Regional
AVEK	Centro Regional
Oro Grande Wash Recharge Ponds	Alto West Regional
Cedar Street Detention Basin	Alto Mid Regional
Antelope Valley Wash Recharge Ponds	Alto Mid Regional
Recharge Facilities South of Apple Valley	Alto East Regional
Recharge Ponds West of Helendale Fault	Este Regional
Lucerne Valley Recharge Ponds	Lucerne Valley
Means/Ames Valley Recharge Ponds	Means/Ames Valley
Hi-Desert Water District: Warren Valley Recharge	Warren Valley
Hi-Desert Water District Recharge Basin #3	Warren Valley
Joshua Basin District Recharge & Pipeline	Copper Mountain Valley
<i>Floodplain Aquifer Recharge (12)</i>	<i>Aquifer Unit</i>
Newberry Springs Recharge Ponds	Baja Floodplain
Minneola Recharge Ponds	Baja Floodplain
Daggett Recharge Ponds	Baja Floodplain
Lenwood Recharge Ponds	Centro Floodplain
Hodge Recharge Ponds	Centro Floodplain
Recharge Ponds North of Helendale Fault	Centro Floodplain
In-Lieu Supply to Silver Lakes	Transition Zone Floodplain
Mojave River Pipeline Extension - Transition Zone	Transition Zone Floodplain
Rock Springs Release	Alto Floodplain
Hesperia Lakes Recharge	Alto Floodplain
Recharge Facilities South of Rock Springs Turnout	Alto Floodplain
Release SWP from Silverwood Lake	Alto Floodplain
Non-SWP	
<i>Increase Recharge Efficiency (5)</i>	<i>Aquifer Unit</i>
Baja Storm Flow Retention - 2 locations	Baja Floodplain
Gates for Mojave River Dam	Alto Floodplain
Cushenbury Flood Detention Basin	Lucerne Valley
Injection Wells in Mesa Area of Adelanto	Alto Mid Regional
Injection Wells in Victorville Area	Alto Mid Regional
<i>Change Source of Groundwater Supply (5)</i>	<i>Aquifer Unit</i>
SCWC Moving Wells to Serve Barstow	Centro Floodplain
Hinkley Water Supply Augmentation by SCWC	Centro Floodplain
JBWD Wells	Copper Mountain Valley
New Supply for Pioneertown	Means/Ames Valley
Old Woman Springs Ranch Supply	Lucerne Valley

Table 9-3: Management Actions

<i>Water Treatment and Blending (9)</i>	<i>Aquifer Unit</i>
Regional Surface Water Treatment Plant	Alto West Regional
Blending local water with treated SWP	Alto Mid Regional
Blending local water with Floodplain Aquifer	Alto Mid Regional
Local Wastewater Treatment Plants (Alto)	Alto Mid Regional
VVWRA Reclamation	Alto Regional
HDWD Nitrate Removal Plant	Warren Valley
Yucca Valley Wastewater Treatment	Warren Valley
Local Wastewater Treatment Plant (Lucerne)	Lucerne Valley
Individual Wellhead Treatment	Entire MWA
<i>Improve Riparian Health (2)</i>	<i>Aquifer Unit</i>
Land Purchase to Protect Riparian Habitat	Baja Floodplain
Eradication of Non-native Plant Species	MWA Floodplain
<i>Conservation and Storage Agreements (6)</i>	<i>Aquifer Unit</i>
Agricultural Conservation Programs	Entire MWA
Urban Conservation Programs	Entire MWA
Storage agreements with agencies within MWA	Entire MWA
Banking water agreements with outside agencies	Entire MWA
Pre-delivering SWP Water	Entire MWA
Water (entitlement) exchanges	Entire MWA

Supply Enhancement Projects

This section provides a technical summary of specific parameters estimated for supply enhancement projects listed in Table 9 - 2. Supply enhancement projects have the potential to address the following key water management issues as discussed in Chapter 8.

- Demand exceeds supply
- Overdraft of the groundwater basins
- Localized water quality issues
- Subarea interactions

SWP/Non-Floodplain Aquifer Recharge

Kane Wash Recharge Ponds represents a proposed terminal point in the Mojave River Pipeline where water would percolate into ponds adjacent to Kane Wash in the lower Baja Subarea. This recharge facility has been discussed as a possible alternative or addition to the Minneola or Newberry Springs recharge facilities. Currently, the pipeline is constructed to a location northeast of Barstow.

Kane Wash/Newberry Springs Recharge Ponds

<i>Location of Project:</i>	Baja Regional Aquifer
<i>Recharge Capacity:</i>	6,000 acre-feet/year
<i>Recharge Assumptions:</i>	Technical Document No. 2 MWA Steady State Hydraulic Analysis of Mojave River Pipeline, July 1999
<i>Capital Cost:</i>	\$5,400,000
<i>O&M and SWP Cost:</i>	\$1,300,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Appropriate location; Recharge potential of site
<i>Facilities Required:</i>	Mojave River Pipeline; New pipeline extension

El Mirage Dry Lake Recharge Ponds could address the significant drop in groundwater levels in this area of the Oeste Subarea. Perched groundwater, return flow from local dairies, and other naturally-occurring contaminant are issues, and selecting an appropriate location that would accommodate recharge will require additional technical evaluation.

El Mirage Dry Lake Recharge Ponds

<i>Location of Project:</i>	Oeste Regional Aquifer
<i>Recharge Capacity:</i>	2,500 acre-feet/year
<i>Recharge Assumptions:</i>	Based on capacity for 18" pipe with a design flow rate of 5 cfs and peaking of 2; 70% of design flow assumed on annual basis
<i>Capital Cost:</i>	\$2,000,000
<i>O&M and SWP Cost:</i>	\$500,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Appropriate Location; Perched groundwater conditions
<i>Facilities Required:</i>	California Aqueduct Turnout #1; El Mirage Pipeline

Sheep Creek Recharge Ponds is the preferred project for recharging the regional aquifer in the Oeste Subarea. The 1994 RWMP identified three potential sites for recharge along Sheep Creek. Two of the sites are located south of the California Aqueduct and one is to the north. The site farthest south (upstream) is anticipated to have the greatest beneficial impact to the Phelan area (San Bernardino County Service Area 70L). Due to the relatively low permeability of soils in the region, distributing the recharge over a large area would be beneficial (Stamos et al. 2001).

Sheep Creek Recharge Ponds

<i>Location of Project:</i>	Oeste Regional Aquifer
<i>Recharge Capacity:</i>	2,500 acre-feet/year
<i>Recharge Assumptions:</i>	Based on capacity for 18" pipe with a design flow rate of 5 cfs and peaking factor of 2; 70% of design flow assumed on annual basis
<i>Capital Cost:</i>	\$1,300,000
<i>O&M and SWP Cost:</i>	\$700,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Appropriate Location; Water quality (MTBE)
<i>Facilities Required:</i>	California Aqueduct Turnout #1; El Mirage Pipeline; Pump station

Antelope Valley-East Kern Water Agency (AVEK) has taken an average of 1,372 acre-feet of water from 1991 to the present to supply a powerplant located in the Centro Subarea. It is assumed that this use remains constant through 2020.

Antelope Valley-East Kern Water Agency (AVEK)

<i>Location of Project:</i>	Centro Regional Aquifer
<i>Recharge Capacity:</i>	1,372 acre-feet/year
<i>Recharge Assumptions:</i>	Average water use from 1991 to the present; Table 4-5 RWMP Update
<i>Capital Cost:</i>	Not applicable
<i>O&M and SWP Cost:</i>	\$270,000 per year
<i>Cost Assumptions:</i>	\$200 acre-foot SWP water cost
<i>Specific Issues:</i>	Not applicable
<i>Facilities Required:</i>	Supply to existing powerplant

Oro Grande Wash Recharge Ponds are advantageous because the site is located upgradient from Baldy Mesa Water District (BMWD) and Victor Valley Water District (VVWD). MWA and USGS, working with VVWD and BMWD, initiated two pilot recharge projects along the Oro Grande Wash. The *Victorville Master Plan of Drainage* identifies the reach of the Wash just upstream of the California Aqueduct as a potential storm water detention basin. The Wash may be able to serve the dual purpose of a storm water detention basin and a recharge facility. VVWD has also recently selected a site further downstream on the Oro Grande Wash near the Green Tree Golf Course as a potential recharge location.

Oro Grande Wash Recharge Ponds

<i>Location of Project:</i>	Alto Regional Aquifer – West
<i>Recharge Capacity:</i>	8,000 acre-feet/year
<i>Recharge Assumptions:</i>	USGS is currently conducting a pilot project to determine the recharge capacity of the wash; 8,000 acre-feet/year is assumed from USGS Model Run Dated 6/19/2002. MWA has conducted a separate demonstration recharge project approximately two miles upstream of the USGS site. VVWD has also recently selected a site further downstream on the Oro Grande Wash near the Green Tree Golf Course as a potential recharge location.
<i>Capital Cost:</i>	\$2,100,000
<i>O&M and SWP Cost:</i>	\$1,700,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Location relative to California Aqueduct
<i>Facilities Required:</i>	California Aqueduct (new turnout)

Cedar Street Detention Basin may provide the opportunity for recharge upgradient from City of Hesperia wells. The Hesperia Master Plan of Drainage identifies a potential site for a storm water detention basin at the east end of Cedar Street and southwesterly of the California Aqueduct. In addition to storm water detention, the 120-acre site might be able to accommodate groundwater recharge. The California Aqueduct would be the source of recharge water.

Cedar Street Detention Basin

<i>Location of Project:</i>	Alto Mid Regional
<i>Recharge Capacity:</i>	3,500 acre-feet/year
<i>Recharge Assumptions:</i>	Assumed recharge capacity
<i>Capital Cost:</i>	\$2,000,000
<i>O&M and SWP Cost:</i>	\$800,000
<i>Cost Assumptions:</i>	Cost Normalization Table
<i>Facilities Required:</i>	California Aqueduct (new turnout)

Antelope Valley Wash Recharge Ponds could provide groundwater recharge upgradient from City of Hesperia wells. The Hesperia Master Plan of Drainage identifies a 65-acre site for a storm water detention basin in the Antelope Valley Wash south of Rancho Road. In addition to storm water detention, the site might be able to accommodate groundwater recharge. The Morongo Basin Pipeline passes by this area and would be the source of recharge water.

Antelope Valley Wash Recharge Ponds

<i>Location of Project:</i>	Alto Mid Regional
<i>Recharge Capacity:</i>	3,500 acre-feet/year
<i>Recharge Assumptions:</i>	Assumed recharge capacity
<i>Capital Cost:</i>	\$1,700,000
<i>O&M and SWP Cost:</i>	\$800,000
<i>Cost Assumptions:</i>	Cost Normalization Table
<i>Facilities Required:</i>	California Aqueduct (new turnout)

Recharge Facilities South of Apple Valley may provide opportunities for limited recharge utilizing the stream channels located south of Apple Valley that are crossed by the Morongo Basin Pipeline. If technically possible, these sites might provide some needed recharge to the Apple Valley area.

Recharge Facilities South of Apple Valley

<i>Location of Project:</i>	Alto Regional Aquifer – East
<i>Recharge Capacity:</i>	1,000 acre-feet/year
<i>Recharge Assumptions:</i>	Assumed recharge capacity; RWMP Update states this site may have the potential for limited recharge
<i>Capital Cost:</i>	\$900,000
<i>O&M and SWP Cost:</i>	\$300,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Recharge potential of site
<i>Facilities Required:</i>	Morongo Basin Pipeline

Lucerne Valley Recharge Ponds (East of Helendale Fault) provides an opportunity for recharge in the Este Subarea. Recharge sites have been contemplated both east and west of the Helendale Fault. The 1994 RWMP recommended constructing a facility east of the fault because the majority of groundwater pumping occurs east of the fault. MWA has purchased the land for a recharge facility, prepared preliminary construction plans, and performed the necessary environmental reviews.

Lucerne Valley Recharge Ponds (East of Helendale Fault)

<i>Location of Project:</i>	Lucerne Valley Subbasin
<i>Recharge Capacity:</i>	5,000 acre-feet/year
<i>Recharge Assumptions:</i>	From RWMP Update – MWA estimate
<i>Capital Cost:</i>	\$1,200,000
<i>O&M and SWP Cost:</i>	\$1,600,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table; includes annual O&M cost of \$500,000 for using the Morongo Basin Pipeline under a joint-use agreement with MBP participants (estimate RWMP 1994); MWA has purchased land
<i>Facilities Required:</i>	Morongo Basin Pipeline; Potential recharge site purchased

Recharge Ponds West of Helendale Fault were evaluated to compare the relative effects of recharging in Este on each side of Helendale Fault.

Recharge Ponds West of Helendale Fault

<i>Location of Project:</i>	Este Regional Aquifer
<i>Recharge Capacity:</i>	5,000 acre-feet/year
<i>Recharge Assumptions:</i>	From RWMP Update – MWA estimate
<i>Capital Cost:</i>	\$1,200,000
<i>O&M and SWP Cost:</i>	\$1,600,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table; includes annual O&M cost of \$500,000 for using the Morongo Basin Pipeline under a joint-use agreement with MBP participants (estimate RWMP 1994)
<i>Facilities Required:</i>	Morongo Basin Pipeline

Means/Ames Valley Recharge Ponds would serve Bighorn-Desert View, Hi-Desert, County Service Area 70 W-1, with potential benefit to Pioneertown.³⁸ Further study will determine benefits to the Joshua Basin Water District. The project consists of a feasibility study, extension of the Morongo Basin Pipeline between one and one and a half miles, recharge to the Pipes Wash, installation of monitoring wells, and installation of production wells.

Means/Ames Valley Recharge Ponds

<i>Location of Project:</i>	Means/Ames Valley Subbasin
<i>Recharge Capacity:</i>	2,500 acre-feet/year
<i>Recharge Assumptions:</i>	Based on capacity for 18" pipe with a design flow rate of 5 cfs and a peaking factor of 2; 70% of design flow assumed on annual basis
<i>Capital Cost:</i>	\$1,100,000
<i>O&M and SWP Cost:</i>	\$500,000 per year plus possible supplemental pumping cost
<i>Cost Assumptions:</i>	\$200 acre-foot SWP cost
<i>Facilities Required:</i>	Morongo Basin Pipeline

Hi-Desert Water District: Warren Valley Recharge has been occurring since 1995. The average amount of SWP water Hi-Desert has utilized from 1995 to 2001 is 3,475 acre-feet/year.

Hi-Desert Water District: Warren Valley Recharge

<i>Location of Project:</i>	Warren Valley Subbasin
<i>Historic Recharge:</i>	3,475 acre-feet/year
<i>Recharge Assumptions:</i>	Average water use from 1995 to the present; Table 4-5 RWMP Update
<i>Capital Cost:</i>	Completed
<i>O&M and SWP Cost:</i>	\$720,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Nitrate Leaching
<i>Facilities Required:</i>	Morongo Basin Pipeline

Hi-Desert Water District (HDWD) Recharge Basin #3 would extend the existing Morongo Basin Pipeline 7500 feet and provide recharge capability in Hydrogeologic Unit 1 of the HDWD. The project would provide the HDWD the ability to slightly lower the water levels in Hydrogeologic Unit 2 to reduce the impacts of contaminants (nitrate) that leach into the water from the upper zones of the aquifer.

Hi-Desert Water District (HDWD) Recharge Basin #3

<i>Location of Project:</i>	Warren Valley Subbasin
<i>Recharge Capacity:</i>	6,400 acre-feet/year
<i>Recharge Assumptions:</i>	RWMP Update
<i>Capital Cost:</i>	\$1,600,000
<i>O&M and SWP Cost:</i>	\$1,300,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Nitrate Leaching
<i>Facilities Required:</i>	Morongo Basin Pipeline; Pipeline extension

³⁸ E-mail correspondence with Hi-Desert Water District 1-3-03

Joshua Basin District Recharge & Pipeline would create a mechanism for the Joshua Basin Water District (JBWD) to make use of SWP water via the Morongo Basin Pipeline. The JBWD is a part of Improvement District M and therefore is paying a share of the debt associated with the construction of the Morongo Pipeline facilities. The project would provide needed recharge into the Copper Mountain Valley Subbasin.

Joshua Basin District Recharge & Pipeline

<i>Location of Project:</i>	Copper Mountain Valley Subbasin
<i>Recharge Capacity:</i>	1,000 acre-feet/year
<i>Recharge Assumptions:</i>	Assumed recharge capacity
<i>Capital Cost:</i>	\$900,000
<i>O&M and SWP Cost:</i>	\$200,000 per year plus possible supplemental pumping cost
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Facilities Required:</i>	Morongo Basin Pipeline; Pipeline extension

SWP/Floodplain Aquifer Recharge

Newberry Springs Recharge Ponds represents a proposed terminal point in the Mojave River Pipeline where water would percolate into ponds central to the lower Baja Subarea. This recharge facility has been discussed as a possible alternative or addition to the Minneola or Kane Wash recharge facilities. Currently, the pipeline is constructed to a location northeast of Barstow.

Newberry Springs Recharge Ponds

<i>Location of Project:</i>	Baja Regional Aquifer
<i>Recharge Capacity:</i>	6,000 acre-feet/year
<i>Recharge Assumptions:</i>	Technical Document No. 2 MWA Steady State Hydraulic Analysis of Mojave River Pipeline, July 1999
<i>Capital Cost:</i>	\$5,400,000
<i>O&M and SWP Cost:</i>	\$1,300,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Appropriate location; Recharge potential of site
<i>Facilities Required:</i>	Mojave River Pipeline; New pipeline extension

Minneola Recharge Ponds represents a potential terminal point in the Mojave River Pipeline supplying recharge to the Baja Floodplain Aquifer. The project would require construction of the Mojave River Pipeline from Daggett to this location.

Minneola Recharge Ponds

<i>Location of Project:</i>	Baja Floodplain Aquifer
<i>Recharge Capacity:</i>	3,600 acre-feet/year
<i>Recharge Assumptions:</i>	Technical Document No. 2 MWA Steady State Hydraulic Analysis of Mojave River Pipeline, July 1999
<i>Capital Cost:</i>	\$2,200,000
<i>O&M and SWP Cost:</i>	\$800,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Recharge potential of site
<i>Facilities Required:</i>	Mojave River Pipeline; Pipeline extension

Daggett Recharge Ponds are a current recharge option. The Mojave River Pipeline is currently being constructed beyond this location in the Baja Floodplain Aquifer.

Daggett Recharge Ponds

<i>Location of Project:</i>	Baja Floodplain Aquifer
<i>Recharge Capacity:</i>	16,800 acre-feet/year
<i>Recharge Assumptions:</i>	Technical Document No. 2 MWA Steady State Hydraulic Analysis of Mojave River Pipeline, July 1999
<i>Capital Cost:</i>	\$227,400
<i>O&M and SWP Cost:</i>	\$3,500,000 per year
<i>Cost Assumptions:</i>	Actual construction cost for completed facility
<i>Specific Issues:</i>	Facility completed
<i>Facilities Required:</i>	Mojave River Pipeline

Lenwood Recharge Ponds have been used for the delivery of Replacement Water, and for Makeup Water from the Alto Subarea, in compliance with the Judgment.

Lenwood Recharge Ponds

<i>Location of Project:</i>	Centro Floodplain Aquifer
<i>Recharge Capacity:</i>	9,000 acre-feet/year
<i>Recharge Assumptions:</i>	Technical Document No. 2 MWA Steady State Hydraulic Analysis of Mojave River Pipeline, July 1999
<i>Capital Cost:</i>	Completed
<i>O&M and SWP Cost:</i>	\$1,900,000 per year
<i>Cost Assumptions:</i>	\$200 acre-foot SWP water
<i>Facilities Required:</i>	Mojave River Pipeline

Hodge Recharge Ponds have been used for the delivery of Replacement Water, and for Makeup Water from the Alto Subarea, in compliance with the Judgment.

Hodge Recharge Ponds

<i>Location of Project:</i>	Centro Floodplain Aquifer
<i>Recharge Capacity:</i>	9,000 acre-feet/year
<i>Recharge Assumptions:</i>	Technical Document No. 2 MWA Steady State Hydraulic Analysis of Mojave River Pipeline, July 1999
<i>Capital Cost:</i>	Completed
<i>O&M and SWP Cost:</i>	\$1,900,000 per year
<i>Cost Assumptions:</i>	\$200 acre-foot SWP water
<i>Specific Issues:</i>	
<i>Facilities Required:</i>	Mojave River Pipeline

Recharge North of Helendale Fault was suggested as a potential project. To date, this project has not been modeled because the Centro Floodplain Aquifer is relatively balanced and existing recharge facilities (Hodge and Lenwood) are already operating.

Recharge North of Helendale Fault

<i>Location of Project:</i>	Centro Floodplain Aquifer
<i>Recharge Capacity:</i>	5,000 acre-feet/year
<i>Recharge Assumptions:</i>	Based on capacity for 24" pipe with a design flow rate of 10 cfs and a peaking factor of 2; 70% of design flow assumed on annual basis
<i>Capital Cost:</i>	\$1,400,000
<i>O&M and SWP Cost:</i>	\$1,100,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Facilities Required:</i>	Mojave River Pipeline

In-Lieu Supply to Silver Lakes would augment current groundwater pumping with SWP supply to fill recreational lakes to be used in-lieu of the production of some or all of Silver Lakes' Base Annual Production (BAP), thereby leaving that amount of groundwater in storage. The proposal would swap up to 4,987 acre-feet of BAP for SWP supply. BAP currently allows extraction of 0.70 acre-feet for each acre-foot of BAP. Additional SWP supply would be stored in the existing Silver Lakes until released to percolate in the natural channel of Fremont Wash in the Transition Zone Floodplain Aquifer. This project would exist almost entirely on the private property of a willing participant, which may expedite implementation and minimize constraints and costs. Project would provide water in a location suitable for maintaining the TZ "water bridge", and could be compatible with plans for the reuse of treated water from County Service Area 70B.

In-Lieu Supply to Silver Lakes

<i>Location of Project:</i>	Transition Zone Floodplain Aquifer
<i>Recharge Capacity:</i>	5,000 acre-feet/year
<i>Recharge Assumptions:</i>	Correspondence with Silver Lakes Association
<i>Capital Cost:</i>	\$700,000
<i>O&M and SWP Cost:</i>	\$1,100,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Facilities Required:</i>	Mojave River Pipeline

Mojave River Pipeline Extension - Transition Zone Recharge has the potential to benefit the riparian habitat in the Transition Zone as well as enhance the groundwater production reliability. Water for this recharge operation would be conveyed to the recharge site(s) in a new pipeline that would be an extension of the existing Mojave River Pipeline.

Mojave River Pipeline Extension - Transition Zone Recharge

<i>Location of Project:</i>	Transition Zone Floodplain Aquifer
<i>Recharge Capacity:</i>	2,500 acre-feet/year
<i>Recharge Assumptions:</i>	Based on capacity for 18" pipe with a design flow rate of 5 cfs and a peaking factor of 2; 70% of design flow assumed on annual basis
<i>Capital Cost:</i>	\$2,500,000
<i>O&M and SWP Cost:</i>	\$500,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Facilities Required:</i>	Mojave River Pipeline

Rock Springs Release can discharge large volumes of SWP water from the Rock Springs Outlet to percolate into the Floodplain Aquifer. The construction of extraction wells and transmission pipelines would allow this stored water to be used where needed throughout MWA.

Transmission facilities could be constructed to deliver the water to the City of Hesperia, Baldy Mesa WD, Victor Valley WD, and the Centro and Baja subbasins via the Mojave River Pipeline. The water could be used directly, blended with local waters to meet quality objectives, or recharged into local groundwater basins for future use.

Rock Springs Release

<i>Location of Project:</i>	Alto Floodplain Aquifer
<i>Recharge Capacity:</i>	40,000 acre-feet/year
<i>Recharge Assumptions:</i>	MWA – capacity of Rock Springs Outlet
<i>Capital Cost:</i>	None assumed
<i>O&M and SWP Cost:</i>	\$8,100,000
<i>Cost Assumptions:</i>	Cost Normalization Table; Current modeling effort does not include a distribution system downstream of the Rocks Spring Outlet (no capital cost)
<i>Specific Issues:</i>	Affecting ability to recharge with flood flows
<i>Facilities Required:</i>	Rock Springs Outlet

Hesperia Lakes Recharge would provide recharge south of the MWA’s Rock Springs Turnout. The City of Hesperia operates fishing lakes at its park complex adjacent to Lake Arrowhead Road. Recharge of SWP water in the Mojave River channel near the site has been suggested as a possible project.

Hesperia Lakes Recharge

<i>Location of Project:</i>	Alto Floodplain Aquifer
<i>Recharge Capacity:</i>	3,000 acre-feet/year
<i>Recharge Assumptions:</i>	USGS Model Run Dated 6/19/2002
<i>Capital Cost:</i>	\$1,700,000
<i>O&M and SWP Cost:</i>	\$600,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Moronggo Basin Pipeline; Pipeline extension
<i>Facilities Required:</i>	Rock Springs Outlet; Wellfield; Distribution System

Recharge Facilities South of Rock Springs Turnout is similar in concept and location to the Hesperia Lakes Recharge. In order to maximize the use of the available storage in the Floodplain Aquifer, a pipeline would be constructed from the Moronggo Basin Pipeline to a turnout located as far south (upstream) in the river channel as possible. The hydraulic pressure head available in the Moronggo Basin Pipeline, approximately 400 feet, would limit the length of the pipeline to about four miles.

Recharge Facilities South of Rock Springs Turnout

<i>Location of Project:</i>	Alto Floodplain Aquifer
<i>Recharge Capacity:</i>	8,000 acre-feet/year
<i>Recharge Assumptions:</i>	Based on capacity for 30" pipe with a design flow rate of 15 cfs and peaking factor of 2; 70% of design flow assumed on annual basis
<i>Capital Cost:</i>	\$3,400,000
<i>O&M and SWP Cost:</i>	\$1,700,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Facilities Required:</i>	Morongo Basin Pipeline; Pipeline extension; temporary levees in Mojave River Channel

Release SWP water from Silverwood Lake can introduce SWP water to areas upstream of the Rock Springs Outlet through Cedar Springs Dam. This alternative would require evaluation of the potential for impacts to/from land uses at the Los Flores ranch and the institutional arrangements necessary with the Department of Water Resources under their contract with the MWA. Large flows to the Mojave River can be accomplished through Cedar Springs Dam, which has a maximum discharge of 5,000 cfs.³⁹

Release SWP water from Silverwood Lake

<i>Location of Project:</i>	Alto Floodplain Aquifer
<i>Recharge Capacity:</i>	25,000 acre-feet/year
<i>Recharge Assumptions:</i>	Max annual release (1983) from Table 4-5 of RWMP Update
<i>Capital Cost:</i>	None assumed
<i>O&M and SWP Cost:</i>	\$5,200,000 per year
<i>Cost Assumptions:</i>	RWMP 1994 states there is a \$9.25 per acre-foot SWP cost of using the California Aqueduct from MWA Turnout #3 to Silverwood Lake
<i>Specific Issues:</i>	Land use impacts (Los Flores Ranch); DWR operations; Affecting ability to recharge with flood flows; Federally-designated endangered Arroyo Toad
<i>Facilities Required:</i>	Cedar Springs Dam; temporary levees in Mojave River Channel

Baja Storm Flow Non-SWP\Increase Recharge Efficiency

Retention would construct seasonal (temporary) sand dams, dikes, or other facilities in the Mojave River channel that could enhance the natural recharge of the Floodplain Aquifer. Stakeholders have suggested that there are two or more locations in the vicinity of Daggett and Minneola that should be evaluated.

³⁹ Water Resources Analysis of the Upper Mojave River Basin - Alto Subarea, Todd 1993

Baja Storm Flow Retention

<i>Location of Project:</i>	Baja Floodplain Aquifer
<i>Recharge Capacity:</i>	2,000 acre-feet/year
<i>Recharge Assumptions:</i>	Assuming capture of 25% of average annual flow at Afton; average flow is heavily weighted by very large infrequent flow, which may quickly erode earthen detention barriers
<i>Capital Cost:</i>	None assumed
<i>O&M Cost:</i>	\$130,000 per year
<i>Cost Assumptions:</i>	RWMP 1994
<i>Specific Issues:</i>	Environmental review; Streambed alteration agreement and 401/404 permits; Mojave Basin Area Judgment
<i>Facilities Required:</i>	None assumed

Gates for Mojave River Dam was studied in 1986 by the U.S. Army Corps of Engineers (USACE) to evaluate the feasibility of installing gates at the Mojave River (Forks) Dam to store up to approximately 62,700 acre-feet of storm water behind the dam for controlled release. USACE found that the modifications were technically and economically feasible at the time. However, they also noted that there was potential for adverse impacts to Federal listed endangered species downstream, and that significant opposition was expressed by several environmental organizations. Due to these concerns and because the County of San Bernardino and the Mojave Water Agency did not support the plan due to the cost of the project, USACE recommended that no action be taken to modify the Dam. The project is also inconsistent with current prohibitions in the Mojave Basin Area Judgment against interference with stormflows.

Gates for Mojave River Dam

<i>Location of Project:</i>	Alto Floodplain Aquifer
<i>Recharge Capacity:</i>	3,760 acre-feet/year
<i>Recharge Assumptions:</i>	USACE 1986
<i>Capital Cost:</i>	\$9,000,000 – \$30,000,000
<i>O&M Cost:</i>	\$500,000 per year
<i>Cost Assumptions:</i>	USACE 1986
<i>Specific Issues:</i>	Environmental opposition; Endangered species; High cost; Adjudication restrictions
<i>Facilities Required:</i>	Mojave River Dam

Cushenbury Flood Detention Basin is proposed to capture runoff from the San Bernardino Mountains in the Lucerne Valley Subbasin. Currently, large storm flows drain to dry lake beds in the area that have low percolation rates. Consequently, the majority of water that drains to the lake beds is lost to evaporation and never enters the basin. The project would divert storm flows to detention basins with high rates of percolation to decrease losses from evaporation.

Cushenbury Flood Detention Basin

<i>Location of Project:</i>	Lucerne Valley Subbasin
<i>Recharge Capacity:</i>	400 acre-feet/year
<i>Recharge Assumptions:</i>	Assumed capacity from discussion with MWA staff
<i>Capital Cost:</i>	\$200,000
<i>O&M Cost:</i>	\$80,000 per year
<i>Cost Assumptions:</i>	Normalized Cost Table
<i>Specific Issues:</i>	Environmental review; potential dust from dry lakes; potential Adjudication restrictions
<i>Facilities Required:</i>	Stormflow Diversion and Detention Basin

Injection Wells in the Mesa Area of Adelanto are proposed because the geology in the Mesa area is not conducive to surface recharge facilities. The technical and financial feasibility of using injection wells to recharge the aquifer in this location needs to be investigated.

Injection Wells in the Mesa Area of Adelanto

<i>Location of Project:</i>	Alto Regional Aquifer – West
<i>Recharge Capacity:</i>	1,000 acre-feet/year
<i>Recharge Assumptions:</i>	USGS Model Run Dated 6/19/2002
<i>Capital Cost:</i>	\$500,000
<i>O&M and SWP Cost:</i>	\$350,000 per year
<i>Cost Assumptions:</i>	Initial assumption of one injection well; technical feasibility of project needs better quantification to determine financial aspects of operation
<i>Specific Issues:</i>	New wells
<i>Facilities Required:</i>	Injection Well, Distribution System

Injection Wells in the Victorville Area is under consideration by Victor Valley WD to inject treated SWP water in their wells to recharge the aquifer. This blending of SWP water with native groundwater is intended to lower some native constituent levels such as arsenic.

Injection Wells in the Victorville Area

<i>Location of Project:</i>	Alto Regional Aquifer – West
<i>Recharge Capacity:</i>	1,000 acre-feet/year
<i>Recharge Assumptions:</i>	USGS Model Run Dated 6/19/2002
<i>Capital Cost:</i>	\$500,000
<i>O&M Cost:</i>	\$350,000 per year
<i>Cost Assumptions:</i>	Initial assumption of one injection well; technical feasibility of project needs better quantification to determine financial aspects of operation
<i>Specific Issues:</i>	New wells
<i>Facilities Required:</i>	Injection Well, Distribution System

Non-SWP\Change Source of Groundwater Supply

Southern California Water Company Moving Wells to Serve Barstow will improve the quality of the water it delivers to the City of Barstow. More such alternative supplies are planned. The new wells will be located up-river from the city and down-river from the Lenwood Recharge Facility.

Southern California Water Company Moving Wells to Serve Barstow

<i>Location of Project:</i>	Centro Floodplain Aquifer
<i>Capacity:</i>	Not applicable
<i>Assumptions:</i>	SCWC Project
<i>Capital Cost:</i>	Not applicable
<i>O&M Cost:</i>	Not applicable
<i>Cost Assumptions:</i>	SCWC Project
<i>Facilities Required:</i>	SCWC Wells

Hinkley Water Supply Augmentation by Southern California Water Company: Hinkley is overdrafted locally, and the school well has recently gone dry. SCWC already serves most of Barstow, Lenwood, and much of the surrounding area in Centro. MWA has been studying the area, and has budgeted funds for further analysis.

Hinkley Water Supply Augmentation by Southern California Water Company

<i>Location of Project:</i>	Centro Floodplain Aquifer to Regional Aquifer
<i>Capacity:</i>	To be determined
<i>Assumptions:</i>	To be determined
<i>Capital Cost:</i>	To be determined
<i>O&M Cost:</i>	To be determined
<i>Cost Assumptions:</i>	To be determined
<i>Specific Issues:</i>	To be determined
<i>Facilities Required:</i>	New wells; Distribution System

Joshua Basin Water District Wells will move some of the JBWD groundwater production to the Copper Mountain Valley Subbasin. Pumping from new wells in the underutilized Copper Mountain Valley Subbasin will allow the District to reduce pumping in the Joshua Tree Subbasin to the recognized safe yield.

Joshua Basin Water District Wells

<i>Location of Project:</i>	Copper Mountain Valley Subbasin
<i>Capacity:</i>	Not applicable
<i>Assumptions:</i>	JBWD Project
<i>Capital Cost:</i>	Not applicable
<i>O&M Cost:</i>	Not applicable
<i>Cost Assumptions:</i>	JBWD Project
<i>Facilities Required:</i>	<i>New wells; Distribution system</i>

New Supply for Pioneertown to replace the San Bernardino County Service Area W-4's water supply that does not meet health standards for several constituents including arsenic, uranium,

iron, and manganese. One possible way for the community to receive water of acceptable quality would be for CSA W-4 to obtain its water from either HDWD or BDVWA.

New Supply for Pioneertown

<i>Location of Project:</i>	Means/Ames Valley Subbasin
<i>Capacity:</i>	To be determined
<i>Assumptions:</i>	To be determined
<i>Capital Cost:</i>	To be determined
<i>O&M Cost:</i>	To be determined
<i>Cost Assumptions:</i>	Unknown
<i>Specific Issues:</i>	Source of supply; identification of servicing entity
<i>Facilities Required:</i>	Distribution System

Old Woman Springs Ranch Supply is being evaluated by MWA as a potential source of water. MWA is discussing the purchase of Old Woman Springs Ranch in Johnson Valley for rights to its water basin for future groundwater production.

Old Woman Springs Ranch Supply

<i>Location of Project:</i>	Johnson Valley
<i>Recharge Capacity:</i>	To be determined
<i>Recharge Assumptions:</i>	To be determined
<i>Capital Cost:</i>	To be determined
<i>O&M Cost:</i>	To be determined
<i>Cost Assumptions:</i>	To be determined
<i>Specific Issues:</i>	To be determined
<i>Facilities Required:</i>	New wells; distribution System; possible wellhead treatment

Management Actions

This section provides a technical summary of specific parameters estimated for management actions listed in Table 9-3. Management actions have the potential to address the following key water management issues:

- demand exceeds supply
- riparian ecosystem maintenance issues
- localized water quality issues
- overdraft of the groundwater basins
- wastewater infrastructure issues

Water Treatment and Blending

Regional Surface Water Treatment Plant options were studied by Parsons, 2001. The proposed project would treat SWP water from the California Aqueduct for delivery to four agencies in Alto, which include Baldy Mesa Water District, Victor Valley Water District, Adelanto Water Authority and San Bernardino County Special Districts. The delivery would be considered an in-lieu groundwater recharge project by curtailing groundwater production in the Alto Basin.

Regional Surface Water Treatment Plant

<i>Location of Project:</i>	Alto Regional Aquifer - West
<i>Treatment Capacity:</i>	up to 56,000 acre-feet/year
<i>Treatment Assumptions:</i>	Assumes recommended alternative (50 MGD Treatment Plant) constructed as stated in Alternatives for Water Supply from the California Aqueduct (Parsons 2001)
<i>Capital Cost:</i>	\$107,000,000 (proportional cost assumed for smaller plants)
<i>O&M Cost:</i>	\$3,300,000 per year
<i>Cost Assumptions:</i>	Data from recommended alternative (Parsons 2001), does not include injection or Silverwood options
<i>Specific Issues:</i>	High cost; would require internal SWP allocation
<i>Facilities Required:</i>	California Aqueduct (new turnout); Treatment plant

Blending Local Water with Treated SWP Water may be able to address some of the water quality concerns of Baldy Mesa WD, Victor Valley WD, and others.

Blending Local Water with Treated SWP Water

<i>Location of Project:</i>	Alto Regional Aquifer - West
<i>Capacity:</i>	To be determined
<i>Assumptions:</i>	To be determined
<i>Capital Cost:</i>	To be determined
<i>O&M Cost:</i>	To be determined
<i>Cost Assumptions:</i>	To be determined
<i>Specific Issues:</i>	To be determined
<i>Facilities Required:</i>	Surface water treatment plant; Pipeline infrastructure

Blending Local Water with Floodplain Aquifer Water may be able to address some of the water quality and quantity concerns of Baldy Mesa WD, Victor Valley WD, and others.

Blending Local Water with Floodplain Aquifer Water

<i>Location of Project:</i>	Alto Regional Aquifer - West
<i>Capacity:</i>	To be determined
<i>Assumptions:</i>	To be determined
<i>Capital Cost:</i>	To be determined
<i>O&M Cost:</i>	To be determined
<i>Cost Assumptions:</i>	To be determined
<i>Specific Issues:</i>	To be determined
<i>Facilities Required:</i>	Pipeline infrastructure

Local Wastewater Treatment Plant (Alto) is being considered for several communities in the Alto Subarea. This sub-regional treatment plant concept is an alternative to the large-scale expansion of the VVWRA treatment plant. VVWRA is encouraging this concept for several reasons: (1) several large diameter pipelines are reaching their expected service lives and will need to be replaced soon, (2) flow volumes will soon exceed the capacity of several existing pipelines, and (3) local treatment of the liquid portion of the wastewater flow would be cost-effective as long as VVWRA is allowed to sell the recycled water to the local purveyors.

Local Wastewater Treatment Plant (Alto)

<i>Location of Project:</i>	Alto Regional Aquifer
<i>Treatment Capacity:</i>	1,100 acre-feet/year (up to 11,000 acre-feet per year may be required)
<i>Treatment Assumptions:</i>	Based on plant capacity of 1.0 MGD (up to 10 MGD may be required)
<i>Capital Cost:</i>	\$13,000,000
<i>O&M Cost:</i>	\$1,000,000 per year
<i>Cost Assumptions:</i>	VVWRA Sewerage Facilities Update Year 2000 Amendment
<i>Specific Issues:</i>	Several locations proposed
<i>Facilities Required:</i>	Current sewer infrastructure; New treatment plants; Distribution system

VVWRA Reclamation will likely remain in the Alto Subarea as a supply to urban, recreational, and agricultural interests. Approximately 9.8 MGD is treated at the VVWRA regional treatment facility, which has a capacity of 11.0 MGD. The reclaimed water is then discharged directly into the Mojave River channel or percolated into the Mojave River Floodplain Aquifer. VVWRA and the Department of Fish and Game entered into a Memorandum of Understanding to provide discharge of approximately 9,000 acre-feet per year (24.7 acre-feet per day) to the Mojave River Channel to support riparian vegetation and habitat. VVWRA estimates that its capacity to collect and treat wastewater with the existing facilities will be surpassed by wastewater production in approximately 2006.⁴⁰ VVWRA estimates that the wastewater flow by 2020 will be approximately 18.62 MGD. This expansion of the current treatment plant is an alternative to the current plan for dealing with wastewater treatment requirements by constructing two sub-regional recycled water facilities by the year 2005, and another two by 2010. These facilities will provide additional wastewater treatment and at the same time, produce recycled water for the surrounding communities. Without the sub-regional treatment facilities, VVWRA will need to expand its collection system and treatment facilities to handle up to 20 MGD.

VVWRA Reclamation

<i>Location of Project:</i>	Alto/Transition Zone Regional Aquifer
<i>Treatment Capacity:</i>	10,000 acre-feet/year
<i>Treatment Assumptions:</i>	VVWRA Sewerage Facilities Update 2000 estimates an increase in wastewater flows of 10 MGD from 2000 to 2020
<i>Capital Cost:</i>	\$28,000,000
<i>O&M Cost:</i>	\$4,000,000 per year
<i>Cost Assumptions:</i>	VVWRA Sewerage Facilities Update 2000 – 20 MGD expansion estimate without subregional facilities
<i>Specific Issues:</i>	Non-degradation of groundwater quality; increases consumptive use which affects rampdown under the Mojave Basin Area Judgment
<i>Facilities Required:</i>	VVWRA Expansion

⁴⁰ Sewerage Facilities Plan Update, Year 2000 Amendment, Adopted by the VVWRA Board of Commissioners October 26, 2000.

Hi-Desert Water District Nitrate Removal Plant was recently constructed to improve the quality of the groundwater HDWD serves.

Hi-Desert Water District Nitrate Removal Plant

<i>Location of Project:</i>	Means/Ames Valley Subbasin
<i>Treatment Capacity:</i>	1,000 acre-feet/year
<i>Treatment Assumptions:</i>	HDWD states the plant allows for two wells to be put back in service, assuming each well produces 300 gpm (rough district average) then the total is approximately 1,000 acre-feet/year
<i>Capital Cost:</i>	Completed
<i>O&M Cost:</i>	
<i>Cost Assumptions:</i>	HDWD has recently constructed the plant
<i>Facilities Required:</i>	HDWD has recently constructed the plant

Local Wastewater Treatment Plant (Lucerne) Wastewater treatment in the region is currently provided by individual septic tank systems. It is likely that at some point in the future, a municipal wastewater treatment facility will have to be built.

Local Wastewater Treatment Plant (Lucerne)

<i>Location of Project:</i>	Lucerne Subbasin
<i>Treatment Capacity:</i>	1,100 acre-feet/year
<i>Treatment Assumptions:</i>	Based on plant capacity of 1.0 MGD
<i>Capital Cost:</i>	\$13,000,000
<i>O&M Cost:</i>	\$1,000,000 per year
<i>Cost Assumptions:</i>	Cost factors from VVWRA Sewerage Facilities Update Year 2000 Amendment
<i>Facilities Required:</i>	Current sewer infrastructure; New treatment plants; Distribution system

Local Wastewater Treatment Plant (Yucca Valley) Presently, Yucca Valley uses septic systems to process waste. The need for a local wastewater treatment facility is mainly due to the growing number of wells testing high in nitrate, which to some degree can be attributed to septic tanks. Hi-Desert Water District has been discussing the necessity of a wastewater treatment facility with a 20-year time frame for construction of a facility.⁴¹

Local Wastewater Treatment Plant (Yucca Valley)

<i>Location of Project:</i>	Means/Ames Valley Subbasin
<i>Treatment Capacity:</i>	1,100 acre-feet/year
<i>Treatment Assumptions:</i>	Based on plant capacity of 1.0 MGD
<i>Capital Cost:</i>	\$13,000,000
<i>O&M Cost:</i>	\$1,000,000 per year
<i>Cost Assumptions:</i>	Cost factors from VVWRA Sewerage Facilities Update Year 2000 Amendment
<i>Facilities Required:</i>	Current sewer infrastructure; New treatment plants; Distribution system

⁴¹ Hi-Desert Water District website, 2003

Individual Wellhead Treatment is an option to address localized water quality issues and has been considered to treat elevated levels of arsenic and nitrate.

Individual Wellhead Treatment

<i>Location of Project:</i>	MWA
<i>Treatment Capacity:</i>	800 acre-feet/year
<i>Treatment Assumptions:</i>	Based on one well pumping continuously at 500 gallons per minute
<i>Capital Cost:</i>	\$600,000
<i>O&M Cost:</i>	\$40,000 per year
<i>Cost Assumptions:</i>	Estimates based on installation and operation costs of a standard Granular Activated Carbon system
<i>Facilities Required:</i>	Individual treatment devices

Improve Riparian Health

Land Purchase to Protect Riparian Habitat could possibly benefit the remaining riparian habitat in the Camp Cady area through a land purchase program. The general concept of the project is to reduce local pumping near the Mojave River in the Camp Cady area, allowing groundwater levels to increase due to the elimination of local cones of depression (drawdown) from local wells.

Land Purchase to Protect Riparian Habitat

<i>Location of Project:</i>	Baja Floodplain Aquifer
<i>Conservation:</i>	1,200 acre-feet/year
<i>Conservation Assumptions:</i>	Estimate of production of wells in 1997 that are in the vicinity of land purchase
<i>Capital Cost:</i>	\$2,000,000
<i>O&M Cost:</i>	None assumed
<i>Cost Assumptions:</i>	Assumes purchase of 400 acres of land at \$5,000/acre
<i>Specific Issues:</i>	Benefit from changing location of pumping needs further study
<i>Facilities Required:</i>	None assumed

Eradication of Non-Native Riparian Species in the Mojave River channel has been identified as a way to enhance the health of riparian habitat. Many of the non-native plants consume significant amounts of water. MWA is currently funding part of a cooperative effort to eradicate non-native species spearheaded by the Mojave Desert Resource Conservation District.

Eradication of Non-Native Riparian Species

<i>Location of Project:</i>	MWA Floodplain Aquifer
<i>Conservation:</i>	2,500 acre-feet/year
<i>Conservation Assumptions:</i>	Assumes all non-native species are eradicated and replaced with the same density of native species; consumption values and aerial densities from: Riparian Vegetation and its Water use During 1995 Along the Mojave River (USGS)
<i>Capital Cost:</i>	None Assumed
<i>O&M Cost:</i>	\$730,000 per year
<i>Cost Assumptions:</i>	Based on the Pecos River Project in New Mexico; \$182 dollars per/acre to remove salt cedars; assumes 4,000 acres in MWA
<i>Specific Issues:</i>	Feasibility of successfully eradicating non-native species; UC Davis studies have shown salt cedar is extremely resilient
<i>Facilities Required:</i>	None Assumed

Conservation and Storage Agreements

Agricultural Conservation Programs including educational programs and monetary support to implement Agricultural Efficient Water Management Practices, as identified by the Agricultural Water Management Council.

Urban Conservation Programs including educational programs and monetary support to implement Best Management Practices, as identified by the California Urban Water Conservation Council.

Storage Agreements with Agencies within MWA: Parties to the Judgment (including the MWA) can enter into storage agreements with the Mojave Basin Area Watermaster. The rules under which these types of agreements are possible are contained in the Rules and Regulations of the Mojave Basin Area Watermaster. These types of agreements provide parties to the Judgment the opportunity to store water for their future use or to meet future obligations under the Judgment.

Banking water agreements with outside agencies can provide benefits by cooperatively using available storage space in aquifers within the MWA service area. Groundwater banking typically involves importing surface water provided by a project partner (or partners) and storing the surface water in the groundwater basins underlying MWA. Typically, the partner banks their water during times of surplus for a right to take a portion of their water during a time of need. The potential benefits to MWA and area stakeholders from groundwater banking could be significant, including financial assistance to construct capital facilities, reduced pumping lifts and water supply for mitigation of overdraft conditions.

Currently, MWA and Metropolitan Water District of Southern California (MWD) are participating in a pilot study to bank MWD entitlement water from the California Aqueduct in the Mojave Water Agency during wet years in exchange for MWA entitlement during dry years. If this proves successful, the MWD and MWA might enter into longer-term agreements to bank water. Many details would need to be worked out by both agencies including the method to return water to MWD, infrastructure, accounting, and mitigation or avoidance of any negative affects.

Pre-delivering SWP water could be accomplished if MWA banks SWP water in subareas for future purchase and use by local pumpers. This would in essence be pre-delivering water to local pumpers for their use when needed.

Water (entitlement) exchanges are currently in place with the Solano County Water Agency (SCWA), another SWP contractor. Similar agreements could be pursued. The SCWA agreement allows MWA to receive entitlement deliveries from SCWA during hydrologic periods

when SCWA has approved entitlement in excess of their needs. MWA will subsequently allow SCWA to utilize some of their approved entitlement during periods of drought, but not more than half of the quantity of SCWA entitlement that has previously been delivered to MWA.

The MWA Screening Model

The projects and management actions were grouped into alternatives that were evaluated to determine how well they mitigated the key management issues identified above. This evaluation was performed using a simulation model developed for this Plan. Using the results of the evaluation, two recommended alternatives have been selected and the projects and management actions included in those alternatives that have the highest priority for implementation have been identified.

The MWA Screening Model simulates the changes to groundwater hydrology, Mojave River flows, and pumping and return flow patterns that would result from implementation of the projects and management actions identified in the Phase 1 Report. The model was developed using the Stella 7.0 software, a simulation modeling package that allows model parameters to be changed and new results obtained quickly and easily.

To model the water system, the Mojave River Basin floodplain and regional aquifers have been subdivided into 14 distinct but inter-connected aquifer units. The Lucerne Valley, Copper Mountain Valley, Means/Ames Valley, and Warren Valley aquifers are modeled independently. The modeled aquifer units are shown in Figure 9 - 1. The model simulates groundwater storage and levels within each aquifer unit, groundwater flow between aquifer units, and leakance from the Mojave River into the aquifer units for the hydrologic period 1931-2001 using equations derived from the output of the USGS Modflow model of the Mojave River Basin.⁴²

For each alternative, pumping and return flow quantities are determined for each sector within each subarea based on the amount of State Water Project (SWP) import and the Mojave Basin Area Judgment rules. These quantities are disaggregated among the subarea's aquifer units based on current pumping patterns and year 2020 population projections. The computed consumptive use is subtracted from the storage within each aquifer. MWA's SWP supplies are distributed to the alternative's SWP projects according to an algorithm that takes into account each project's demand and capacity and the capacities of the Mojave River and Morongo Pipelines. The model imposes projected 2020 demands on the historical hydrologic sequence. The model thus assumes that historical hydrology is a reasonable estimate of future hydrologic conditions.

⁴² Stamos et al. 2001

The model is flexible enough to simulate a wide variety of proposed projects and management actions. For each new alternative, the input data can be modified and the model run in an hour or less, allowing for the easy evaluation of new alternatives.

Alternatives Overview

A total of 18 alternatives were evaluated in the course of this study. These include eight initial alternatives presented at the Technical Advisory Committee (TAC) meeting on February 19, 2003, eight revised alternatives presented at the TAC meeting on March 19, 2003, and two final alternatives developed based on the recommendations made at the March 19 meeting. The initial alternatives are labeled 'A' and 'B', and the revised and final alternatives are labeled 'C' and 'D.' The alternatives are further described below.

The following assumptions were common to each of these alternatives:

- 2020 demand assumptions from the Phase 1 report
- Implementation of the Mojave Basin Area Judgment (1996)
- Delivery of SWP water to the Antelope Valley-East Kern Water Agency (AVEK), to the Warren Valley subbasin for use by the Hi-Desert Water District (HDWD), and to the Hodge and Lenwood recharge ponds to meet Alto makeup obligations to Centro under the Judgment

The following seven additional primary factors can be used to distinguish between the alternatives:

- Representation of the Transition Zone
- Level of Judgment Implementation
- Agricultural demand (Scenario 1 or Scenario 2 from the Phase 1 Report)
- Amount of municipal conservation
- Presence and size of a regional water treatment plant in Alto
- Amount of Victor Valley Water Reclamation Authority (VWRA) discharge that is used for reclamation
- Amount of SWP discharge into the Mojave River at Rock Springs

The 'A' and 'C' alternatives assume Agricultural Scenario 1 while the 'B' and 'D' Alternatives assume Agricultural Scenario 2. Alternatives A0, B0, C0, and D0 are year 2020 No Action alternatives, in which the only SWP imports are those that go to AVEK, HDWD, or to the Hodge and Lenwood recharge ponds for Alto Makeup to Centro.

Initial Alternatives

The initial alternatives include A0, A1, A2, B0, B1, B2, B3, and B4. Table 9 - 4 shows the principal characteristics that define each alternative. All of these alternatives assume full implementation of the Judgment by 2020, with consumptive use set to equal natural supply plus imports.

Alternatives A0 and B0 are No Action alternatives, which do not utilize any projects or management actions other than those in current use. Alternatives A1 and B1 attempt to meet each subarea’s demands with SWP imports, including a large Rock Springs release. Alternatives A2 and B2 include a 56,000 AF/year capacity treatment plant in Alto. Alternatives B3 and B4 are similar to Alternative B1 except that they include 5% municipal conservation as well. All of the alternatives other than B4 assume that the first 9,700 acre-feet of VVWRA’s discharge is released to the Mojave River, with the remaining being allocated to reclamation to golf course and municipal users. In Alternative B4 it is assumed that all VVWRA discharge is released to the Mojave River.

Table 9 - 4 shows the demands met under each alternative. Alternative A0 meets only 45% and Alternative B0 meets only 51% of the total MWA demand. In each of these No Action Alternatives, the Alto Baja, and Oeste subareas have less than 40% of their demands met.

Table 9-4: Initial Alternative Assumptions and Results

Alternative:	A			B				
	A0	A1	A2	B0	B1	B2	B3	B4
Common	AVEK, Hodge, Lenwood, Warren Valley							
Judgement Implementation	Full			Full				
Ag demand scenario	Ag Scenario 1			Ag Scenario 2				
Municipal Conservation	0%					5%		
Regional WTP			56K			56K		
Alto Reclamation		5.7K	11.0K		9.3K	11.0K	9.3K	
Rock Springs release		40K			40K		40K	40K
Demands Met (KAF/yr)								
Total	113	207	209	110	206	202	205	204
Percent Total	45%	82%	83%	51%	95%	93%	96%	98%
Agricultural	33	52	38	20	20	20	20	20
Municipal	68	129	154	70	153	162	152	152

Because they are trying to meet full municipal and agricultural demands under Agricultural Scenario 1, Alternatives A1 and A2 show significant shortages. Alternative A1 meets only 82% of total MWA demand, while Alternative A2 meets only 83%. Thus, these results indicate that it is impossible to meet full 2020 demands under Agricultural Scenario 1 with no conservation even while importing MWA’s entire SWP supply. Conservation of almost 30 percent of municipal consumptive use would be required to avoid significant shortages under this scenario.

Alternatives B1, B2, B3, and B4 all meet at least 93% of total MWA demands. However, because SWP deliveries to the treatment plant in Alto are given priority, Alternative B2 has

significant shortages in Baja, Oeste, and Este. Alternatives B3 and B4 have fewer shortages because they assume 5% municipal conservation.

The initial alternatives are formulated to balance supply and demand at the subarea level, but no attempt was made to select recharge projects that would balance each individual aquifer unit. As a result, although each subarea is in balance as a whole, many aquifer units show significant declines. In addition, the Transition Zone floodplain region shows unreasonable increases in elevation because no cap was placed on its available storage in the initial alternatives. This limitation in aquifer unit elevation has been resolved in the revised and final alternatives.

Revised and Final Alternatives

In response to the comments received at the February 19, 2003 TAC meeting, eight new alternatives were developed and presented at the March 19 TAC meeting: C0, C3, D0, D2, D3, D5, D6, and D7. Table 9 - 5 shows the principal characteristics that define these alternatives. All of these alternatives except for C3 assume full implementation of the Judgment by 2020, with consumptive use set to equal natural supply plus imports. Alternative C3 assumes that the rampdown of agricultural producers will remain at 80% in 2020. In Alternative C3, agricultural production is permitted to continue even if it results in drawdowns in the groundwater aquifers.

Table 9-5: Revised and Final Alternative Assumptions and Results

Alternative:	C		D							
	C0	C3	D0	D2	D3	D5	D5r	D6	D6r	D7
Common	AVEK, Hodge, Lenwood, Warren Valley									
Judgement Implementation	Full	80% Ag	Full							
Ag demand scenario	Ag Scenario 1		Ag Scenario 2							
Municipal Conservation	0%	0%	5%	20%*	10%*	20%*	10%*	20%*	10%*	20%*
Regional WTP			46K		26K	12K				
Alto Reclamation		6.3K	9.9K	8.7K	6.8K	8.7K	6.8K	8.7K	6.8K	8.7K
Rock Springs release		10K		10K	10K	10K	10K	10K	10K	40K

*Municipal conservation in the Morongo Basin/Johnson Valley Area is 5% in these alternatives

Demands Met (KAF/yr)										
Total	102	216	101	198	200	182	199	185	198	185
Percent Total	40%	85%	47%	95%	96%	98%	99%	100%	98%	100%
Agricultural	30	56	20	20	20	20	20	20	20	20
Municipal	59	138	63	153	148	131	146	131	145	131

The revised alternatives build off of the initial 'A' and 'B' alternatives. In these alternatives, the problem of unreasonably high elevation increases in the Transition Zone has been resolved by limiting the amount of recharge into the aquifer from the Mojave River such that the aquifer elevation could not exceed 2,510 feet. In addition, an attempt has been made in each alternative to select a combination of recharge projects for SWP water that would result in reasonable balance in each of the aquifers units.

Alternative D2 is a revised version of B2, with a 46,000 acre-foot/year regional water treatment plant in Alto and with 5 percent municipal conservation. Alternative D3 also has 5% municipal conservation but does not include a regional treatment plant. Alternatives D5, D6, and D7 include 20% municipal conservation in the Mojave River Basin. Alternative D5 includes a smaller 26,000 acre-foot/year regional treatment plant. Alternative D7 is the only new alternative with a large Rock Springs release.

After presentation of the results of these alternatives at the TAC meeting, it was decided to create two final alternatives that would be revisions of the D5 and D6 alternatives. D5r is similar to D5 except that it includes only 10% municipal conservation in the Mojave River Basin and the size of the Regional Treatment Plant has been reduced to 12,000 acre-feet/year capacity. D6r is similar to D6 except that the amount of municipal conservation is reduced to 10 percent. Table 9 - 6 shows the projects and management actions that were modeled in each of the revised and final alternatives. The following sections briefly describe each alternative's performance under different performance measures.

Demands Met

Table 9 - 6 shows the demands met under each revised and final alternative. Alternative C0 meets only 40% and Alternative D0 meets only 47% of the total MWA demand. In each of these No Action Alternatives, Alto, Baja, and Oeste have 50% or less of their demands met. The results of Alternative C3 demonstrate that it is not possible to meet 2020 demand levels while keeping agricultural free production allowance at 80% rampdown levels. In this alternative, only 85% of total MWA demands are met, and significant overdraft of the Baja Subarea occurs.

Alternatives D2, D3, D5, D5r, D6, D6r, and D7 all meet at least 95% of total MWA demand. However, Alternative D2 has significant shortages in Baja and Oeste due to the lack of flexibility offered by the inclusion of a large treatment plant in Alto. With 20% municipal conservation, Alternatives D5, D6, and D7 are able to meet very close to 100% of total MWA demand. At the intermediate level of 10% municipal conservation, Alternatives D5r and D6r are each able to meet at least 98% of total MWA demand, with no significant shortage in any subarea.

All action alternatives meet significantly more demand than do the No Action Alternatives. Alternative C3 supplies the most total demand because it is not constrained to achieve balance in the groundwater aquifers. Alternatives D2 and D3 meet more total demand than the other 'D' alternatives because they include less municipal conservation, while Alternatives D5, D6, and D7 meet the least demand of all the non-No Action Alternatives because they include the greatest municipal conservation.

Table 9-6: Representative Projects and Management Actions Included in each Revised and Final Alternatives

Project/Management Action	Subarea	Alternative									
		C0	D0	C3	D2	D3	D5	D5r	D6	D6r	D7
(volume is in average annual acre-feet)											
Additional Recharge Facilities South of Rock Springs Outlet	Alto				1,408	11,956	3,555		7,280		
Alto wellhead treatment	Alto			0*	0*	0*	0*	0*	0*	0*	0*
Antelope Valley Wash Recharge Ponds	Alto			7,702	1,665	5,231	5,688	5,640	6,471	7,157	3,458
Cedar Street Detention Basin Recharge	Alto			7,702	1,665	4,857		5,640	6,471	7,157	
Hesperia Lakes Recharge	Alto					2,242		6,345		7,885	
Mojave River Pipeline Extension - Transition Zone	Alto			5,602							2,527
Oro Grande Wash Recharge Ponds	Alto			11,203	3,805	11,956	5,688	8,601	12,133	12,015	6,762
Recharge Ponds South of Apple Valley	Alto			4,201		4,110	711	2,820	4,044	3,755	
Regional Surface Water Treatment Plant	Alto				40,670		24,559	11,963			
Silver Lakes In-Lieu Recharge	Alto								2,427	2,253	2,527
Rock Springs Release	Alto			7,348		7,444	7,256	7,155	8,164	7,591	31,762
Baja Stormflow Retention	Baja			2,000		2,000	2,000	2,000	2,000	2,000	2,000
Daggett Recharge Ponds	Baja			6,337							
Kane Wash/Newberry Springs Recharge Ponds	Baja				2,671	3,449	2,510	2,604	2,855	2,800	2,984
Alto Makeup (to Hodge and Lenwood)	Centro	1,984	1,984	890	1,369	915	909	909	909	908	
AVEK	Centro	1,372	1,372	1,372	1,372	1,372	1,372	1,372	1,372	1,372	1,372
Hinkley water supply	Centro			0*	0*	0*	0*	0*	0*	0*	0*
Cushenbury Wash Stormflow retention	Este			400				400	400	400	400
Lucerne Valley Recharge Ponds	Este			1,190							
Recharge Ponds West of Helendale Fault	Este			342	450	708	496	343	241	369	252
Hi-Desert WD: Warren Valley	MBJV	1,557	1,557	1,557	1,450	1,450	1,450	1,450	1,450	1,450	1,450
Joshua Basin District Recharge and Pipeline	MBJV			445	393	393	393	393	393	393	393
Means/Ames Recharge Ponds	MBJV						1,000	1,000	1,000	1,000	1,000
Pioneertown water supply	MBJV			0*	0*	0*	0*	0*	0*	0*	0*
Sheep Creek Recharge Ponds	Oeste			2,485	1,459	2,293	1,881	2,109	2,140	2,260	2,236
SUBTOTAL IMPORTS		4,913	4,913	60,777	58,377	60,374	59,467	60,744	59,750	60,762	59,122
Urban Conservation		0	0	0	8,142	8,142	31,417	15,900	31,417	15,900	31,417
VVWRA Reclamation		0	0	6,335	9,925	8,841	6,826	8,656	6,826	8,437	6,826

*This project does not represent a new water supply

Groundwater Storage

Table 9 - 7 shows the average annual change in groundwater storage in each subarea under each alternative. The Centro Subarea shows a surplus in all alternatives. In Alternative C3 there is a significant reduction in groundwater storage in Baja because there is not enough supply available to meet the agricultural production at 80% of Base Annual Production. Alternative D7 includes a large Rock Springs release, which is not effective in overcoming deficits in the Alto Regional aquifer and causes greater surpluses in Centro and Baja due to increased Mojave River flow downstream.

Alternatives D5 and D6 perform the best under this measure, with total net increases of 15,800 and 13,500 acre-feet/year, respectively and no deficits in any subarea. This occurs because the high 20% municipal conservation reduces the need for SWP supply to meet demand and allows a certain amount of SWP water to be imported for the purpose of replenishing the groundwater basins.

Table 9-7: Average Annual Change in Groundwater Storage

	Morongo	Este	Oeste	Alto	Centro	Baja	Total	Rank
No-Action Alternative C0	0	0	0	0	7,200	0	7,200	7
No-Action Alternative D0	0	100	0	0	6,600	0	6,700	9
C3	0	0	400	2,500	5,800	(10,900)	(2,200)	10
D2	0	100	500	1,100	5,400	(300)	6,800	8
D3	0	0	500	1,500	5,400	100	7,500	6
D5	1,000	600	500	2,600	10,000	1,100	15,800	1
D5r	1,000	100	500	1,300	7,400	200	10,500	3
D6	1,000	200	600	2,400	8,600	700	13,500	2
D6r	1,000	0	500	500	6,700	100	8,800	5
D7	1,000	(200)	400	(10,900)	12,800	6,400	9,500	4

Groundwater Levels

In all of the alternatives following the initial alternatives, an effort has been made to select recharge projects in locations that would achieve relative balance in all subareas in the aquifer. This has been achieved in all alternatives except for Alternatives C3, D2 and D7.

In Alternative C3, the floodplain and regional aquifers in Baja are significantly depleted because agricultural production is allowed to remain at levels that cannot be supported by the available supply. Figure 9 - 2 shows the groundwater levels in the Baja Regional aquifer under each

alternative. In Alternative C3, the groundwater elevations drop 24 feet in this alternative, compared to 8 feet or less in each of the other alternatives.

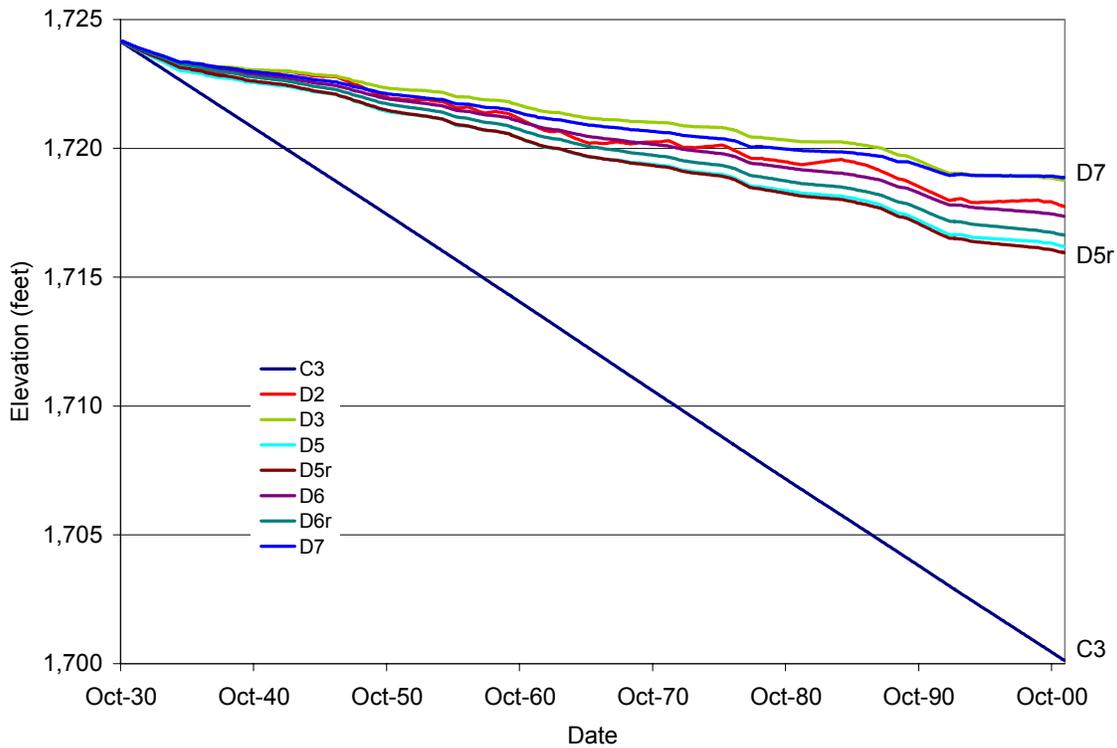


Figure 9-2: Time Series of Elevations in the Baja Regional Aquifer

In Alternative D2, there is not enough flexibility to balance all of the aquifers because such a large portion of the SWP supply is allocated to an Alto Treatment Plant. Figure 9 - 3 shows the groundwater levels in the Alto Floodplain Aquifer under each alternative. The groundwater levels in Alternative D2 drop 18 feet over the course of the model period compared to a decline of less than 8 feet for every alternative other than D7.

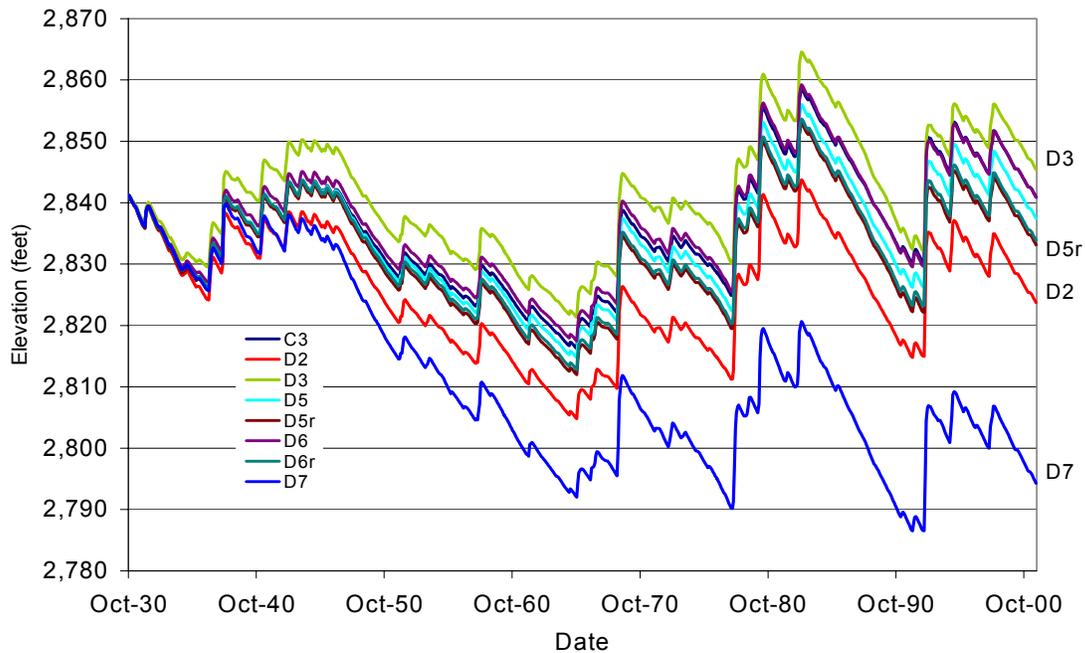


Figure 9-3: Time Series of Elevations in the Alto Floodplain Aquifer

In Alternative D7, the Alto West Regional, Mid-Regional, East Regional, and Floodplain aquifers are significantly depleted. This occurs because of the heavy reliance in this alternative on a Rock Springs release into the Mojave River to meet Alto’s supply needs. In Alternative D7, the Alto Floodplain aquifer drops 47 feet in elevation over the course of the modeled period.

Subarea Interaction

Subarea interaction is measured by the amount of Mojave River flow and groundwater flow that passes from one subarea to another. Figure 9 - 4 shows the average annual Mojave River flows in each alternative. Alternative D7 has significantly higher river flows in all river reaches compared to the other alternatives because a large Rock Springs release has been included in the alternative. Several thousand acre-feet of additional outflow from the basin through Afton Canyon would occur annually due to this operation. All of the other alternatives have similar magnitude Mojave River flows on average.

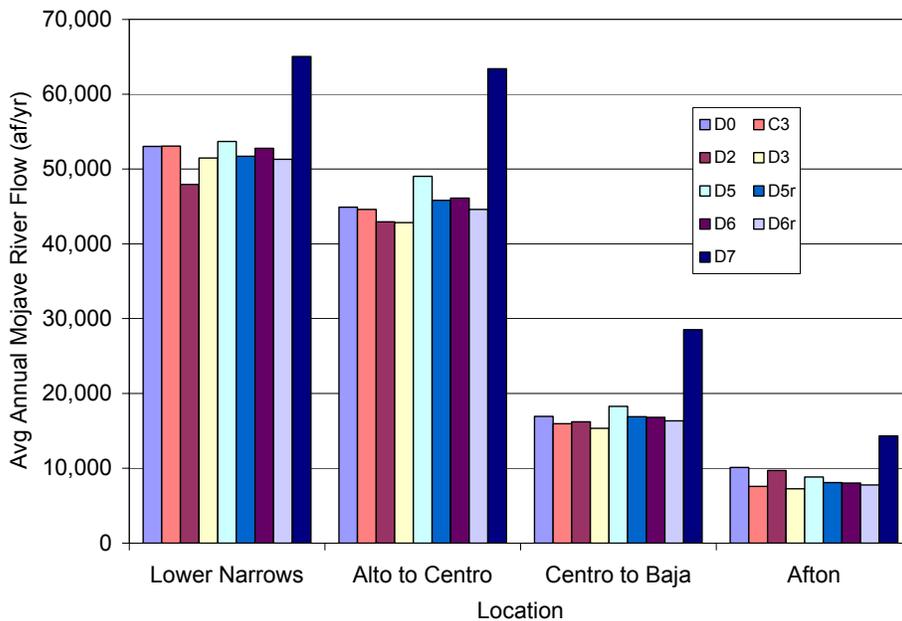


Figure 9-4: Average Annual Mojave River Flows

Figure 9 - 5 shows the average annual groundwater flows between subareas in each alternative. In Alternative D7 there is additional groundwater flow from Este and Oeste into Alto because the Alto regional aquifer has been depleted due to insufficient SWP recharge. Alternative C3 has the highest groundwater flows from Centro to Baja because Baja's aquifers are depleted. The other alternatives have similar magnitude groundwater flows.

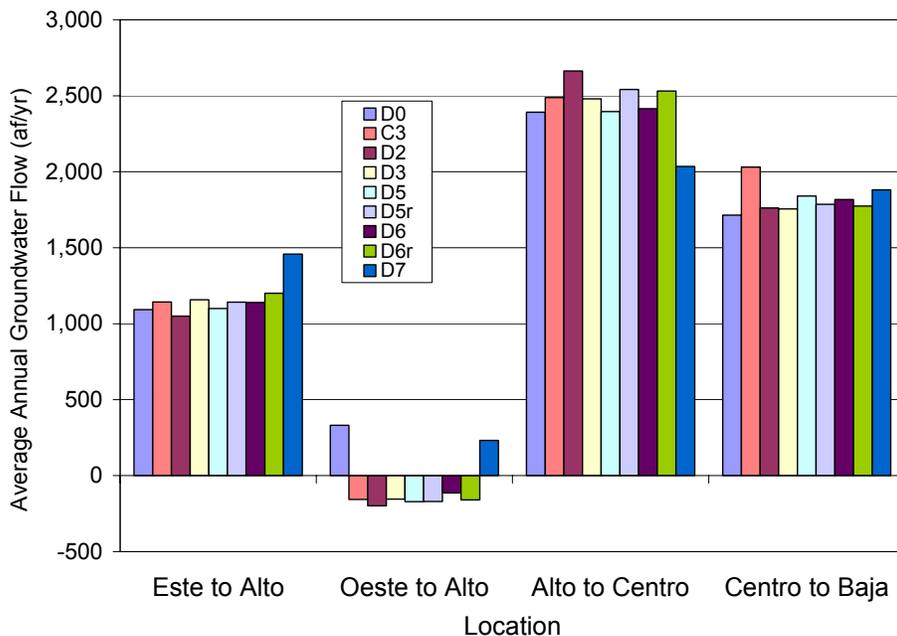


Figure 9-5: Average Annual Groundwater Flows

Water Quality

All of the alternatives were evaluated to estimate the effects that the proposed imports of SWP water would have on the water quality of each subarea. For each constituent, the estimated quality of SWP water was compared to the quality of the existing water and to the constituent's drinking water standard to determine the degree of improvement or detriment caused by the introduction of SWP water. SWP water is of higher quality than drinking water standards for all constituents.

For most constituents and in most subareas, the quality of SWP water was superior to the existing water quality. However, constituent concentrations in the SWP water were slightly higher than the existing concentrations of boron, nitrates, and TDS in Alto and of boron and nitrates in Oeste.

Alternative Cost

Table 9 - 8 shows the total estimated annualized capital and operating cost for each alternative. The alternatives that include an Alto Regional Treatment Plant (D2, D5, and D5r) have the highest costs.

Table 9-8: Annualized Cost of Each Alternative

Alternative	Annualized Cost (\$ millions/year)
C3	\$14.6
D2	\$22.9
D3	\$14.1
D5	\$21.3
D5r	\$20.8
D6	\$15.9
D6r	\$16.1
D7	\$14.6

Recommended Alternatives

Alternatives D5r and D6r were identified as recommended alternatives to be carried forward for evaluation in greater detail in the programmatic environmental documentation. Each of these alternatives provide the following benefits:

- 99% of total MWA demand is met with no significant shortage in any subarea or demand sector
- include an attainable level of 10% municipal conservation
- provide water quality improvements over existing conditions
- all groundwater aquifer units are in balance
- each alternative provides benefits to all subareas without negatively impacting other areas

Common Features

A complete list of projects and management actions included in Alternatives D5r and D6r was shown in Table 9 - 6. These alternatives have many common features, including:

- 10% Municipal conservation in the Mojave River Basin, 5% in the Morongo Basin/Johnson Valley area
- Agricultural Scenario 2
- Reclamation of VVWRA discharge above 9,700 acre-feet/year
- Recharge of SWP water into the Alto Mid-Regional, East Regional, and Floodplain aquifers, and into the Baja Regional, Este Regional, Oeste Regional, Warren Valley, Copper Mountain Valley, and Means/Ames Valley aquifers
- Baja and Cushenberry Canyon stormflow retention or equivalent pond recharge projects
- Water supply augmentation for Hinkley and Pioneertown
- Alto wellhead treatment

The primary difference between the two alternatives is that Alternative D5r includes a 12,000 acre-foot/year capacity regional treatment plant in Alto. Alternative D6r includes in-lieu supply of SWP water to Silver Lakes (or the equivalent pond recharge projects)⁴³ and larger sized recharge facilities in all Alto aquifers.

Project and Management Action Priorities

An important goal of the RWMP Update was to identify those projects and management actions that would have the highest priority. For this purpose, each project and management action included in Alternatives D5r or D6r has been categorized as having High, Moderate, or Low Priority. The designation of priority for each project or management action was determined using the following criteria:

- whether it is an existing project or is already being pursued by MWA
- the level of current overdraft that the project attempts to mitigate
- expected growth in the subarea where the project will be applied

Table 9 - 9 shows the recommended priority of each project and management action. The projects that have the highest priority include implementing 10% municipal conservation, VVWRA wastewater reclamation, Alto wellhead treatment, a new water supply for Pioneertown, and the recharge of SWP water into the Warren Valley and into the Floodplain, West Regional, and Mid-Regional aquifers in Alto. Municipal conservation is considered to have the highest

⁴³ Equivalent pond recharge projects would involve additional facilities and easements at higher cost.

priority because measures will need to be initiated immediately in order to achieve 10% conservation by 2020. Recharge of SWP water into the Alto Floodplain, West Regional, and Mid-Regional aquifers will require feasibility studies to determine the optimal locations for building the necessary recharge facilities. Many such projects have been proposed, including projects at Oro Grande Wash, Antelope Valley, and Cedar Street in the West and Mid-Regional aquifers, and an Upper Mojave Wellfield Distribution System utilizing Rock Springs or Hesperia Lakes or other additional recharge facilities South of Rock Springs in the Floodplain aquifer.

Table 9-9: Recommended Priority for each Project or Management Action

Project or Action	Aquifer	Existing or Being Pursued?	Amount of Current Overdraft in Aquifer?	Expected Subarea Growth?	New Projects (not in 1994 plan)	Designed or Complete EIR	Comments	Priority
10% Municipal Conservation	All	No	High	High			5% in Morongo/Johnson ;Needs to start immediately	High
Wastewater Reclamation	All of Alto	Yes	High	High	√		VVWRA is actively pursuing	High
Alto Regional Treatment Plant	All of Alto	No	High	High	√		High expected cost	Moderate
Alto Wellhead Treatment	All of Alto	Yes	N/A	N/A	√		Addresses localized water quality problems; arsenic standard implementation by 2006	High
Recharge	Alto Floodplain	Yes	High	High		√	Rock Springs existing; feasibility studies needed	High
Recharge	Alto Mid-Regional	Yes	High	High	√		Feasibility studies needed	High
Recharge	Alto West-Regional	Yes	High	High	√		Feasibility studies needed; Oro Grande tests proceeding	High
Recharge	Alto East Regional	No	Moderate	High	√		Feasibility studies needed	Moderate
Recharge/ In-lieu Recharge	Transition Zone Floodplain	No Lo	w	High	√		Recharge not needed; assumes continued VVWRA recharge; limited drought buffer	Moderate
Recharge or Stormflow Retention	Baja Floodplain	No	High	Low	√		Feasibility studies needed	Moderate
Recharge	Baja Regional	Yes	High	Low		√	Feasibility studies needed	Moderate
Hinkley Water Supply	Centro Regional	No	N/A	N/A	√		Addresses water quality and quantity problems	Moderate
Recharge or Stormflow Retention	Este Regional	No	Moderate	Moderate			Feasibility uncertain; Judgment limitations for stormflow retention; listed County flood control project	Moderate
Recharge	Lucerne Valley	No	Low	Moderate		√	Feasibility studies needed; no current demand	Low
Recharge	Oeste Regional	No	Moderate	Moderate			Feasibility studies needed	Moderate
Recharge	Copper Mtn Valley	Yes	Moderate	Moderate			Feasibility studies in progress	Moderate
Pioneertown Water Supply	Means/Ames Valley	No	High	N/A			Addresses water quality and quantity problems; no potable water currently available	High
Recharge	Means/Ames Valley	No	Moderate	Moderate			Feasibility studies needed	Moderate
Recharge	Warren Valley	Yes	Low	Moderate			Existing facility, new facilities being investigated	High

10

MANAGEMENT ACTIONS

This chapter describes the Management Actions for Mojave Water Agency’s implementation of the 2004 Regional Water Management Plan. These actions will be taken to help achieve the Basin Management Objectives described in Chapter 9 of this Plan.

The Management Actions neither supercede nor conflict with the Mojave Basin Judgment or the Warren Valley Judgment. All provisions of these Judgments are integral parts of the foundation of this Plan.

Inter-agency coordination and collaboration during development of this Plan took place through the Mojave Technical Advisory Committee (TAC). Committee members had an opportunity to review and comment on elements of the Plan including the Management Actions presented here. More information on the TAC is included in Chapter 8 of this Plan. The Agency is committed to continued inter-agency coordination as Plan elements are put into action both independently and by implementing agencies.

Management Authority

The California State Legislature authorized the formation of the Mojave Water Agency (MWA) in 1959 for the purpose of managing declining groundwater levels in the Mojave Basin Area, El Mirage Basin, and Lucerne Basin. The Legislature’s act required the vote of residents within the boundaries of the proposed agency, which would finalize the creation of the agency. With the vote of the people, MWA was formed on July 21, 1960. MWA was expanded by annexation in 1965 to include the Johnson Valley and Morongo Basin areas.

The enabling act authorizes MWA to do “any and every act necessary, so that sufficient water may be available for any present or future beneficial use of the lands and inhabitants within MWA's jurisdiction.” To fulfill this objective, the Agency currently performs the following:

- MWA acts as the wholesale administrator of State Water Project water delivered to parties within the MWA service area
- MWA is the current Court-appointed Watermaster for the Mojave Basin Area Judgment
- Monitoring programs and special studies throughout the Mojave Water Agency territory
- MWA has prepared this Regional Water Management Plan to plan water supplies and use in the Agency through 2020

As discussed in this Plan, the management authority of MWA is considerable in scope and areal extent, and extends to areas outside of the Court-administered judgments. The Mojave Basin Area Judgment requires that annual water production records be collected and verified by producers exceeding 10 acre-feet per year of production within each of the five subareas. Production outside the judgments includes groundwater use by several large landowners in the basin who were not parties to the Judgment and producers whose extractions are less than 10 acre-feet per year. More information on Minimal Producers can be found in the *Extraction Sites/Consumption* section later in this Chapter. MWA Ordinance 11 may provide a water charge structure for Minimal Producers. The Court has continuing jurisdiction and could order other controls in the future. The Warren Valley Basin is subject to a Court judgment that is administered by the Hi-Desert Water District acting as the Court-appointed Watermaster. Annual reports are developed by the Watermaster on water levels and matters that may impact safe yield.

Management Actions

The Management Actions consist of 60 specific actions that can be grouped into the following seven elements:

1. Monitoring
2. Improve characterization of the basin
3. Continue long-term planning
4. Groundwater protection
5. Construction and implementation
6. Financing
7. Public participation

The specific actions as grouped into these seven elements are presented below:

1) Monitoring

As regional groundwater manager, MWA has the authority for monitoring regional groundwater quantity and quality, and has implemented programs to accomplish this. The State Water

Resources Control Board is the primary State agency responsible for water quality management issues in California. Much of the responsibility for implementation of the SWRCB's policies is delegated to nine Regional Water Quality Control Boards. The Lahontan RWQCB and Colorado River RWQCB overlie MWA. Court-ordered requirements compel collection of data focused on components of the water balance, which the Agency measures, compiles, and disseminates. Cooperators in monitoring efforts include local water agencies, independent well owners, and the U.S. Geological Survey. Information collected or compiled by the Agency is utilized by local water managers and the Watermasters.

Role of the Mojave Basin Area Watermaster

By order of the Mojave Basin Area Judgment, the Mojave Basin Area Watermaster reports and interprets monitoring data to ensure that the mandates of the Judgment are enforced. The MWA Board acts as the Watermaster. Monitoring requirements are described in the Judgment After Trial (1996) and in the Mojave Basin Area Watermaster Annual Reports. Some components of the water budget called for in the Judgment, such as flows across subarea boundaries, must be estimated from collected data. The Watermaster is currently responsible for reporting the following types of data in the Mojave Basin Area:

- Verification of reported groundwater production
- Mojave River flows
- Precipitation
- Wastewater discharges
- Subsurface flow
- State Water Project and wastewater imports
- Groundwater levels
- Ungaged surface water inflows
- Consumptive use

A more detailed description of the Watermaster's monitoring activities can be found in Appendix H.

Action: MWA and the Watermaster will continue to perform monitoring activities prescribed by the Judgment, and will endeavor to improve methodologies to quantify components of the water budget and to facilitate integration of collected information with the MWA data set.

Groundwater Levels

MWA has several programs for groundwater level monitoring, and has been increasing in-house staff efforts for collection, compilation, and archiving an increasing quantity of collected data. This work is supplemented by efforts of the U.S. Geological Survey (USGS) as part of a cooperative water services program with MWA. There are 121 monitoring wells within the Mojave Basin Area from which water level and water quality samples are taken.

These include 53 wells from which the samples are taken annually and 46 wells from which samples are taken semi-annually. Monitoring wells are concentrated primarily near existing areas of production. Figure 10 - 1 shows the location of 191 wells with known well construction data including depth and perforation intervals collected from USGS and other sources.

The Riverside County Superior Court Judgment After Trial of January 10, 1996⁴⁴ (the Judgment) ordered certain parties in the litigation to undertake certain actions. The Judgment requires the Watermaster to establish a Biological Resources Trust Fund for the benefit of the riparian habitat areas and species identified in the Judgment. The Judgment also refers to a Habitat Water Supply Management Plan (Conservation Plan) to be prepared by the CDFG for the benefit of these riparian habitat areas and species identified in the Judgment. These riparian habitat areas and species are listed in Exhibit H of the Judgment. The Conservation Plan was released in June 2004.

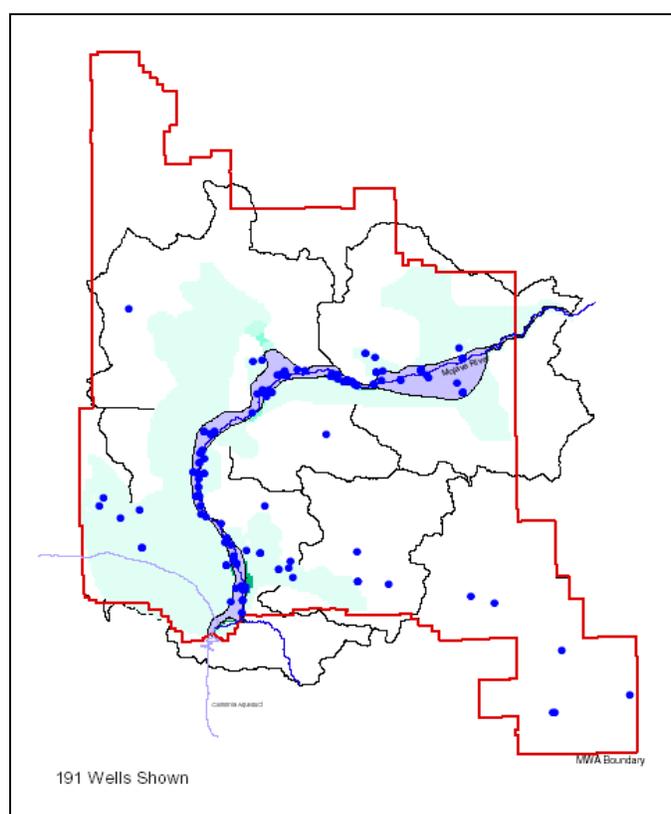


Figure 10-1: Well locations with known construction data

Groundwater levels were established in Exhibit H of the Judgment for key wells in the Mojave River floodplain. These wells, and their associated groundwater level target as measured from the ground surface to standing water are:

⁴⁴ City of Barstow et al v. City of Adelanto, Riverside County Superior Court. Case No. 208568

- wells H1-1 and H1-2 in the Victorville/Alto Zone (upper Narrows area) are to be maintained at 7 feet
- well H2-1 in the Lower Narrows/Transition zone is to be maintained at 10 feet
- well H3-1 in the Harvard/Eastern Baja Riparian Forest Habitat (Camp Cady area) is to be maintained at 7 feet. Well H3-2, also in the Camp Cady area, is to be maintained at 1 foot above ground surface to ensure adequate surface water habitat

Of these wells, only H3-1 has been installed; other monitoring is accomplished using surrogate wells or gaging stations.⁴⁵ If these water levels are not maintained, funds from the Biological Trust Fund will be expended on mitigation activities. MWA is continuing to coordinate with DFG, to further final well siting and installations.

MWA is working to increase use of water level measurements to better quantify the movement and storage of groundwater, and to effectively increase understanding of the ground water basins. This effort will include improvements to existing data collection programs through improved use of technology, including automated data collection processes and use of spatial database software. These processes should provide consistent data collection, a more geographically representative range of data, and measurements that are more discrete at depth and over time. Current efforts are focused on development of the Agency's Key Well program and a computerized geographic information database system. SCADA telemetry technologies are also being developed to obtain real-time data and control of the Agency's pipeline facilities and to minimize travel time of field staff.

Action: MWA will ensure that sufficient monitoring wells are installed around each recharge site to provide information needed to determine vertical and horizontal groundwater flow conditions and potential groundwater mounding in the vicinity of each site. In general, this means that monitoring points will be established around each recharge site, depending upon local conditions. Sites with complex geology may require multiple completion wells to monitor water levels in all affected strata. Movement of recharged water will be tracked to monitor recharge effectiveness.

Action: Existing monitoring wells will be maintained and gaps in data identified. The need for additional monitoring wells will be assessed and a plan developed for construction of additional wells if necessary. This assessment could lead to the identification and elimination of some superfluous measurement points.

⁴⁵ N. Caouette, personal communication, November 26, 2003

Action: MWA will work with the California Department of Fish and Game to continue development of wells needed for monitoring of biological resources at key locations.

Water Quality

MWA has initiated a monitoring effort to greatly enhance the cooperative water services program between MWA and USGS described above, which includes 65 wells from which the water quality samples are taken. Water quality samples are collected once a year from 23 water quality wells located in the floodplain aquifer and once every two years in 42 water quality wells located in the regional aquifer. Individual water purveyors monitor drinking water quality. Water quality enforcement responsibilities reside with the RWQCBs and the State Department of Health Services. MWA has initiated a concerted effort to expand its monitoring efforts in the Este Subarea through its basin conceptual model and Key Well Program. This program includes water level measurement and water quality testing at multiple locations across the subbasin. Such efforts will continue basin by basin throughout the MWA service area over the next several years.

Action: MWA will continue water quality monitoring efforts and will collect and summarize drinking water quality data from cities, coordinating these efforts with other entities including USGS, the State Department of Health Services, the Lahontan and Colorado River Regional Water Quality Control Boards, the State Department of Water Resources, and others. MWA will explore the viability of acting as a regional clearinghouse for this data. Data will be compiled, compared and tracked in a data management system. All data will be made available to area water purveyors. Needs for additional water quality sampling will be determined.

Action: MWA will begin implementation of a regional water quality model to be used as a predictive tool to manage the recharge of imported water. This is envisioned to be a multi-year effort, with the initial phases focused on data compilation, assessment, and conceptual model development.

Several state, regional and county agencies have jurisdiction and responsibility for monitoring water quality and contaminant sites. Programs administered by these agencies include contaminant cleanup, public outreach, and emergency spill response. The agencies include the Department of Toxic Substances, Department of Health Services, Regional Water Quality Control Board, U.S. Environmental Protection Agency and the County Division of Environmental Health. Much of the data is stored in publicly available databases.

MWA has commenced a project to develop a groundwater quality analysis system for the entire MWA service area. The project will include an evaluation of existing groundwater data and identification of data needs, the development of an information management system that will allow MWA to collect, reconcile, analyze, and access water quality information, and the development of a water quality and analysis system to meet MWA's long-term water quality objectives.

Once the system is developed it can be used in conjunction with regulatory agency databases to help identify areas with water quality problems and support efforts to remediate them.

Action: MWA will continue or begin coordination and data exchange with state, regional and county agencies to support efforts to ensure groundwater quality concerns are understood by the agencies and can be appropriately addressed. MWA will compile all reasonably available data including data on areas with known contaminants and/or poor quality groundwater and perform a trend analysis. This data, and the future modeling tool, will be used to site recharge and extraction facilities to maximize protection of water supplies.

Water Supply Measurement

Supply components of the water balance include streamflow, subsurface flow across subarea boundaries, and imported water supplies. As part of the cooperative water services program with MWA, the USGS operates and maintains the following gaging stations on the Mojave River:

- Deep Creek near Hesperia
- Mojave River at Lower Narrows near Victorville
- Mojave River near Barstow
- Mojave River at Afton

Flows from these gaging stations and the West Fork of the Mojave River (cooperatively funded by the U.S. Army Corps of Engineers) are reported to the Mojave Basin Area Watermaster and are used to determine annual water balances within each subarea as described in Chapter 11. Interflow between basins is estimated in this process. Flow from the Transition Zone into the Centro Subarea is a key part of the Watermaster's water balance. At one time, an additional gaging station was placed in the vicinity of the Transition Zone/Centro boundary. However, it was not possible to obtain reliable flow measurement at this station because of a lack of hydraulic control and shifting riverbed conditions. The Watermaster currently assumes the Mojave River flow at this location is equal to the base flow determined at the Lower Narrows plus the amount of reclaimed water discharged into the Mojave River by VVWRA.

Action: Because a reliable gaging station closer to the Alto/Centro boundary would improve the estimates of flow at that location, MWA will work to identify and maintain the most reliable measurement method practicable.

Action: MWA will assess current methods for estimating subsurface flow across subarea boundaries, and will develop additional monitoring points, follow through with plans to automate inventory of water supply components, or take other appropriate measures to improve the accuracy of these estimates.

Action: MWA will continue to account for and report quantities of water imported for groundwater replenishment. A data base application will also be developed to enhance current ability to inventory and value water within MWA storage programs.

Population Growth and Development

As reported in Chapter 5, MWA's population is expected to grow from about 321,000 in 2000 to about 541,500 in 2020. Water to meet the demands of most of this growth will be supplied by existing purveyors, importation of State Water Project water, or through purchase of Free Production Allowance under the terms of the Mojave Area Judgment. According to Mojave Water Agency Ordinance 11, new Minimal Producers who pump less than 10 acre-feet per year and who do not have a Free Production Allowance will be assessed the Replacement Water cost by the Mojave Water Agency for one acre-foot. The Agency would then import State Water Project water to replace the pumped water. However, Ordinance 11 is under review by the Court and has not yet been implemented pending a decision.

MWA will take the following steps to track the expected growth and ensure consistency with projected planned growth:

Action:MWA will work with cities, San Bernardino County, and water agencies to track building permits in order to monitor the pace of growth as compared to that projected in this Plan. This comparison will be made at least every five years. If actual growth varies significantly from the Plan benchmark, the pace of Plan implementainon will be adjusted or revisited.

Action:Under Senate Bills 221 and 610, the developers of new housing developments with 500 or more housing units, or commercial and industrial development with with equivalent demands, must receive written verification from the local water supply agency that a sufficient water supply exists to provide the needs of the new development. The Mojave Water Agency will provide information regarding regional water balances and avilability of supplemental supply to

local purveyors to allow them to reach appropriate conclusions regarding the sufficiency of supply.

Action: New developments for which Free Production Allowance rights are acquired will have their production monitored by the Watermaster. Other developments will be assessed the Replacement Water cost by the Watermaster, who will request MWA to import State Water Project water to replace the pumped water.

Action: MWA will work with local planning agencies to ensure that areas that should be set aside to recharge the groundwater basin are reserved for that purpose and are not subject to development.

Effectiveness of Water Conservation Measures

There are numerous reasons for evaluating water conservation measures:

- to provide a review of the program in context of its intended goals
- to allow for modification of programs that are not meeting intended goals
- better projection of water demands
- to document performance of pilot programs and for design of full-scale programs.

The Alliance for Water Awareness and Conservation (AWAC) was formed to help develop and implement a united regional water conservation program to maximize water use efficiency. As discussed in Chapter 7, the Alliance was formed in August 2003 and is composed of 24 local cities, water suppliers, and institutions, as well as regional resource management agencies. Goals of the Alliance are to:

1. Educate the local communities on the importance of water conservation.
2. Provide the local communities with the tools to effectively reduce per capita consumption to targeted goals.

Alliance for Water Awareness and Conservation Participants

City of Adelanto
Apple Valley Country Club
Town of Apple Valley
Apple Valley Ranchos Water Company
Baldy Mesa Water District
City of Barstow
Barstow College
Bighorn-Desert View Water Agency
Bureau of Land Management
Bureau of Reclamation
Copper Mountain College
City of Hesperia
Hi-Desert Water District
Mojave Desert & Mountain Waste Management JPA
Mohave Desert Resource Conservation District
Mojave Water Agency
Mojave Weed Management Area
San Bernardino County Special Districts, Water/Sanitation Division
Southern California Water Company
Victor Valley College
Victor Valley Wastewater Reclamation Authority
Victor Valley Water District
City of Victorville
Town of Yucca Valley

3. Reduce regional water use by 10 percent gross per capita by 2010 and 15 percent gross per capita by 2015 (5 percent in the Morongo Basin by 2015) to achieve a sustainable, reliable supply to meet regional water demands.

Action: MWA will work with the Alliance for Water Awareness and Conservation (AWAC) and serve as a clearinghouse for water conservation measures and performance data. Water conservation programs will be evaluated through the AWAC and actions taken as needed. Evaluation will include at least the following:

- Summarize baseline water usage for water purveyors' 2000 Urban Water Management Plans
- Establish and summarize Demand Management Measures
- Track implementation of Demand Management Measures
- Tabulate per capita water use by member agency and subarea annually or at a reporting interval deemed appropriate by the Alliance

Action: Increased water conservation efforts will be identified and plans developed for implementation of cost effective demand management measures based on the reports on effectiveness.

Evapotranspiration

The Mojave Water Agency maintains a network of 14 weather stations collecting various weather data including temperature and precipitation. Approximately six of these stations have Class A evaporation pans that provide data on evaporation for the entire region. This provides information on both evaporation from open bodies of water and soil surfaces, and transpiration from the soil by plants. These evaporative processes are together referred to as “evapotranspiration”, an important component in the overall water balance. MWA is planning to improve and supplement this part of local water use information by utilizing two technologies:

- the California Irrigation Management Information System (CIMIS)
- the Surface Energy Balance Algorithm for Land (SEBAL)

The California Irrigation Management Information System (CIMIS) is a repository of meteorological data collected from an integrated network of over 100 computerized weather stations located in key agricultural and municipal sites throughout the state. The system helps growers and turf managers in determining when to irrigate and how much water to apply.

The Surface Energy Balance Algorithm for Land (SEBAL) is a system that uses data from satellite-based sensors to compute energy balance to provide a refined estimate of evapotranspiration, a key component of the water balance.

Each of these technologies is described in more detail in Appendix H.

Action: MWA will review the adequacy of the existing evapotranspiration network and expand the number of measuring stations as necessary.

Action: MWA will continue to collect data on evapotranspiration and characterize its seasonal and areal distribution.

Action: MWA will work to improve the accuracy of areal evapotranspiration estimates through use of SEBAL or other appropriate technologies.

Action: MWA will make collected data available to agricultural and large urban landscape irrigators to encourage and facilitate the use of evapotranspiration data to increase irrigation efficiency.

Regional Water Level Changes and Land Subsidence

The USGS performed a study of land subsidence in the following four study areas using Interferometric Synthetic Aperture Radar (InSAR) methods⁴⁶:

- El Mirage area (Oeste)
- Lockhart-Harper Lake area (Centro)
- Newberry Springs area (Baja)
- Lucerne Valley area (Este)

The study was performed as part of a cooperative program with the USGS. Results of the study indicate land subsidence has occurred in the area, which generally occurs during initial dewatering of compressible sediments.

Action: MWA will continue its cooperative land subsidence program, expanded to determine the relationship between groundwater levels and land surface elevation changes. Additional scrutiny should be given to areas where subsidence has occurred and where the depth to groundwater decreases below historic low levels.

⁴⁶ Sneed et al. 2003

Data Management

MWA has numerous data management systems existing or in development to support its various monitoring programs. It is imperative for the Agency to implement a data management system as a means to store, archive, and access data in a timely, unambiguous way meaningful to decision makers.

In its role as Mojave Basin Area Watermaster, MWA maintains records of producers, production wells, and annual production from stipulating parties' wells within the Mojave Basin Area. The Hi-Desert Water District performs these functions in its role of Warren Basin Watermaster. In cooperation with MWA, the USGS maintains a database to store river flow, water quality and water level data collected by MWA and USGS staff. Significant additional information is anticipated to be collected as part of this Plan to better characterize the groundwater system and the performance of recharge projects.

Action: MWA will continue development of a data management system based on a relational database structure to efficiently compile, store, archive, and access collected data. The system will be designed to provide data for a geographic information system and to accommodate data from additional collection efforts developed through implementation of this Plan.

Action: MWA will begin implementation of a regional water quality model. The project will include development of an information management system that will allow MWA to collect, reconcile, analyze, and access water quality information.

Action: MWA will make compiled data available to local water suppliers.

Extraction Sites/Consumption

In its role as Mojave Basin Area Watermaster, MWA collects and verifies production data within the Mojave Basin Area, with Hi-Desert Water District performing this role as Warren Basin Watermaster. The Judgment requires that annual water production records be collected and verified by producers exceeding 10 acre-feet per year of production within each of the five subareas. These records are used to document water usage and to determine Replacement Water and Makeup Water Obligations.

In addition, the MWA tracks well production as part of the Minimal Producer Program. Minimal Producers are defined as those producers who have an annual production of less than 10 acre-feet and are not subject to the Judgment. MWA estimates total production by Minimal Producers in each subarea of the Mojave Basin Area.

Action: Additional production wells will be constructed in the future to accommodate the expected increase in population. The Watermasters and MWA will collect data and verify the location and production from these new wells in addition to existing well production.

2) Improving Basin Understanding

Infiltration Rates

Numerous groundwater recharge projects will be required to meet the water balance objectives of this Plan. In order to understand the feasibility of, and best locations for, these projects, more data is needed as to the infiltration rates in different areas of the aquifer system. A pilot test project at the Oro Grande recharge site is already underway.

Action: MWA will expand infiltration pilot testing to identify suitable recharge sites capable of recharging groundwater at a rate adequate to meet forecasted needs.

Aquifer Characterization

Recharging the large quantities of water projected in this Plan will require extensive investigation of aquifer properties and storage capacities. Means to effect this aquifer characterization include geophysical testing, aquifer stress tests, and expanded monitoring networks. Methods for geophysical testing include surface geophysical methods such as seismic reflection and refraction, gravity surveys and resistivity imaging, and down-well methods such as electronic logging, pump testing, and other methods. These methods are used to develop a mapping of the aquifer flow system that can be used to optimize the interaction of groundwater recharge and extraction activities. New down-well technologies are available that can provide refined, depth-specific aquifer properties cost-effectively. MWA has employed many of these techniques in its exploration for suitable recharge sites.

Action: MWA will expand its aquifer characterization program to improve understanding of basin conditions, leading to more effective recharge project operations. Geophysical methods will be employed as appropriate to identify the sites most appropriate for groundwater recharge.

Action: MWA will employ new technologies that can develop high resolution, depth-specific aquifer characterization in the most cost-effective manner.

Action: MWA will expand its monitoring well network as appropriate to track aquifer response from pilot and full-scale groundwater recharge and production facilities.

Action: Data collected will be compatible and integrated with regional modeling and data management efforts.

Modeling

To date, three models of MWA's groundwater basins have been developed to aid in management of the water system:

- A groundwater simulation model of the Mojave River Basin developed in Modflow by the USGS⁴⁷
- A groundwater simulation model of a portion of the Warren Basin by the USGS
- A screening model developed in Stella as part of this RWMP Update to estimate the effects of implementation of proposed projects and management actions

Modeling of the groundwater basin can be useful to help determine the best locations for recharge or extraction sites and to help optimize operation of the groundwater basin. The existing models described above provide insight into these questions, but have significant limitations. The existing models are appropriate for conceptual regional planning efforts, but more refined models will be necessary for in-depth analysis of a large-scale recharge system, or for site-specific analysis. The initial focus should be on additional data collection to support the detailed effort.

MWA is considering a multi-year effort to develop a more detailed flow model that incorporates considerations of water quality, in particular the effects of salinity on the groundwater basin.

Action: MWA will begin development of a regional water quality model. The initial efforts of this modeling program will be focused on data compilation, assessment, and conceptual model development. The model will make use of data contained in the existing models, and will be compatible with and integrated with data collected in the geophysical aquifer testing efforts.

⁴⁷ Stamos et al. 2001

Update Water Budget

The water budgets prepared annually by the Watermaster include groundwater flow, ungaged surface water inflows, deep percolation of precipitation estimates, and phreatophyte use in the riparian area. Each of these components are fixed estimates which could be improved with new information.

Action: MWA will develop improved estimates of water budget components to provide a refined assessment of subbasin interactions and water supply obligations under the Mojave Basin Area Judgment. A likely initial focus is improvement of evapotranspiration and consumptive use using the technologies discussed above in the Monitoring element. Improved groundwater level monitoring and modeling to provide a better estimate of subsurface flow is another component that might be implemented near-term.

Action: MWA will utilize their data systems to develop and produce annual Agency-wide progress reports on key water budget components including water inflows, outflows, and change in storage by subarea and make recommendations on how these quantities can be better measured.

3) Continue Long-Term Planning

Since its inception in the 1960s, the MWA has been developing and updating plans to guide the Agency as it carries out its mission to ensure sufficient water availability for present or future beneficial uses within the Agency's jurisdiction. The Agency will continue its commitment to long-term planning. The following section describes the planning efforts the Agency is focusing on.

Vulnerability Assessment

The California Department of Health Services has prepared a checklist of security measures for water utilities. According the checklist, recommended actions to better secure water related facilities include the following:

1. At offices, well houses, treatment plants and vaults, make it a rule that doors are locked and alarms set
2. Tell employees to ask questions of strangers at facilities
3. Limit access to facilities. Indicate restricted areas by posting "Employees Only" signs
4. Increase lighting in parking lots, treatment bays and other areas with limited staffing
5. Remove keys for equipment
6. Invite local law enforcement to become familiar with facilities and establish a protocol for reporting and responding to threats

7. Discuss detection, response, and notification issues with public health officials and establish a protocol
8. Establish a chain of command and emergency call list in case of emergencies
9. Provide copies of operational procedures to law enforcement and emergency management personnel
10. Limit access to water supply reservoirs
11. Fence and lock vulnerable areas

Action: MWA will inform and work cooperatively with groundwater purveyors in their efforts to ensure that minimum water security measures are in place. Additional security measures will be identified and implemented as necessary. MWA will implement these measures on its facilities where appropriate.

Review Land Use Plans

Land use plans in the basin are developed by a number of different entities including the county and each of the cities through their General Plans, General Plan Amendments and Public Facilities Element amendments.

Action: MWA will coordinate with local planning agencies to ensure that growth projections, proposed land use changes, and types of proposed developments are consistent with water planning efforts, as required by SB 221 and SB 610. Significant deviations from projected growth and water needs will be noted and corrective action taken. Corrective actions could include securing additional sources of water, or making a finding pursuant to SB221 or SB 610 that an adequate water supply does not exist and notifying the water purveyor.

Identify Post 2020 Water Supply

MWA has a State Water Project water contract for up to 75,800 acre-feet per year. The water supply-demand analysis performed as part of this Plan (Chapter 5) indicates that, assuming municipal conservation of 10 percent, the full available SWP supply will be needed by 2020. Preliminary estimates of future water demand, assuming current trends continue, indicate that an additional 60,000 to 100,000 acre-feet per year will be needed by 2050. MWA has initiated efforts to determine sources where this additional supply might be obtained. Potential options include pre-banking of existing supplies, new appropriations, water banking or exchange arrangements, water transfers, developing water conservation or desalination credits, and aggressive management of existing supplies, including exploring higher levels of conservation. MWA has recently negotiated a short-term groundwater banking arrangement with the

Metropolitan Water District, and discussions for a larger, long-term banking project are underway. The feasibility of the post-2020 options has yet to be examined.

Action: MWA will continue to research options for meeting post-2020 water needs, categorize and prioritize the options, and examine and implement the higher-priority options.

State Water Project

MWA has an annual State Water Project entitlement of 75,800 acre-feet per year. According to the Final State Water Project Reliability Report (DWR 2002), MWA should expect to receive an average of about 58,400 acre-feet per year each year if they request their full entitlement. As indicated in Chapter 5, MWA will need to utilize their entire SWP entitlement in order to bring the groundwater basin into balance in 2020.

Action: MWA will stay actively involved in State Water Project planning processes that are conducted by the Department of Water Resources and other water planning agencies. The expected reliability of State Water Project could be affected by changes in system operation or by modifications in planning models that are used to project SWP deliveries. MWA will advocate for operations that enhance its supply, track changes in SWP reliability, and adjust its plans accordingly.

Transportation Infrastructure

Future transportation facilities will need to be developed to handle the needs of a growing population. As facility needs are identified, their planning should be coordinated with the MWA to ensure that groundwater recharge areas are protected. MWA will work with the Southern California Association of Governments (SCAG) to this end.

SCAG is mandated by the federal government to develop plans for, among other things, transportation and growth management. One of the foremost activities of SCAG is the development of a comprehensive and coordinated Regional Transportation Plan. SCAG's Water Policy Task Force provides planning advice on water supply and water quality on issues affecting the long-term sustainability of communities and industry. Among its duties, the Task Force provides SCAG committees with water quality assessment information for regionally-significant transportation projects planned for future implementation. The Task Force is composed of officials (both elected and appointed) who participate actively in local government and in organizations concerned with water policy, planning and management.⁴⁸

⁴⁸ SCAG web site

Action: MWA will work with the Water Policy Task Force to ensure that there is maximum coordination in order to protect high priority recharge sites from impervious surfaces and potential contaminating activities, and to plan for a sustainable water supply to support future development.

Regular Updates

This Regional Water Management Plan contains elements that address several planning procedures, including an Integrated Water Management Plan, an Urban Water Management Plan (UWMP) and Groundwater Management Plan. As required by the Urban Water Management Planning Act, California Water Code, Section 10610 et seq., the UWMP plan must be updated every five years in years ending in zero and five. Additionally, MWA will prepare biennial updates on the status of completion of the various aspects of the Groundwater Management Plan. These summary reports will be coordinated with, and tied to, the Agency's Capital Improvement Plan process. Updates on many of these activities are included in the Annual Reports of the Mojave Basin Area Watermaster.

MWA will produce the biennial updates on the other activities contained in these Management Actions. The information contained in the biennial updates should be used to evaluate how often it will be necessary to update the Groundwater Management Plan.

Action: MWA will produce a biennial report summarizing progress made in achieving Plan Actions for the previous two years, considering monitored performance of the water management system. Minor adjustments to planning assumptions, operations, or Actions will be adopted as necessary. If significant deviations from the Plan are determined to exist, the Plan will be revised in its entirety.

Action: MWA will perform a comprehensive update revision of the Regional Water Management Plan at least every ten years. The performance of implemented projects will be compared to original project objectives to ensure objectives were met.

Action: MWA will supplement the sections of the Regional Water Management Plan required for its Urban Water Management Plan every five years, in years ending in zero or five, consistent with law.

4) Groundwater Protection

The general goal of groundwater protection activities is to maintain the groundwater and the aquifer to ensure a reliable high quality supply. Activities to meet this goal include continued and increased monitoring, data sharing, education and coordination with other agencies that have local or regional authority or programs. MWA currently has no groundwater production wells that it operates, but could in the future. To increase its groundwater protection activities, MWA will take action as presented below.

Recharge Site Management Activities

Management activities for protection of recharge sites include:

- establishing Site Control Zones to protect the area immediately surrounding the site from potentially contaminating activities
- controlling access to recharge zones
- Well and recharge facility construction standards
- researching and mapping pollution sites to minimize siting and operational conflicts

A more detailed description of recharge site activities is included in Chapter 3 of this Plan.

The Drinking Water Source Assessment and Protection (DWSAP) program was developed by the California Department of Health Services to meet requirements in amendments to the Safe Drinking Water Act. All wells providing public drinking water supplies must comply with this program. The DWSAP program is intended to address assessments and facilitate the development of protection programs for ground and surface waters. The Department of Health Services and larger water utilities perform these assessments for pre-2002 wells. The well owner is generally required to perform the assessment for newer wells. The DWSAP consists of the following:

- delineating the two-, five-, and ten-year time of travel capture zones for wells
- inventorying possible contaminating activities
- determining vulnerability of wells to potential contaminants

Action: For probable recharge locations, MWA will perform an inventory and map potential sources of contamination including toxic investigation sites, industrial sites, gas stations, dairies, and sites investigated by the RWQCBs, and use this information in selecting recharge sites and in planning recharge site operation in order to minimize the potential for water supply contamination. MWA will

compile existing DWSAP reports developed for existing wells to aid in mapping potentially contaminating activities.

Action: MWA will coordinate with regional water quality agencies, including the U.S. EPA, California EPA, Lahontan and Colorado River RWQCBs, the California Department of Health Services, and San Bernardino County Health Services to identify potential water quality threats to candidate recharge sites, and compile this information into a data management system for use in selection of recharge sites.

Identification and Destruction of Abandoned Wells

The presence of abandoned groundwater wells represents a potential hazard to the quality of the groundwater basin. Abandoned and improperly destroyed wells can act as conduits for contaminants to reach drinking water supplies. It is vital for the long-term protection of the basin that abandoned wells be located and destroyed. Well records kept by the Agency and the Mojave Basin Area Watermaster can help in the process of identifying existing abandoned wells and in identifying wells that are abandoned (stop production) in the future.

While it is the landowner's responsibility to destroy an abandoned well, local water agencies should be proactive about making sure that abandoned wells are in fact destroyed. The destruction of abandoned groundwater wells should be performed in accordance with state standards. California Water Code Section 13750.5 requires that those responsible for the destruction of water wells possess a C-57 Water Well Contractor's License. Whenever a water well is destroyed, a report of completion must be filed with the California Department of Water Resources within 60 days of the completion of the work. The San Bernardino County Department of Public Health, Division of Environmental Health Services is responsible for permitting and inspecting construction and destruction of wells.

Action: MWA will work with the County to develop a plan to identify and destroy abandoned wells. Federal and State grants will be sought for these purposes, as appropriate. MWA will encourage local water agencies to actively search for existing abandoned wells in their service areas so that they can be destroyed. Consideration will be given to developing ordinances requiring protocols for identification of abandoned wells upon sale or transfer of property.

Hazardous Materials Response

Currently, city and county hazardous materials teams handle responses to hazardous materials incidents. Increased coordination between MWA and hazardous materials teams will allow for assessment of the potential for chemical spills to impact groundwater and recharge sites.

Action: MWA will establish notification protocols with hazardous materials response agencies so that the Agency can be immediately informed of a threat to vulnerable areas, and to delineate any potentially threatened water facilities to the responders.

Protection of Recharge Areas

Only a small portion (approximately 4%) of groundwater recharge in the MWA territory is from direct percolation of rainfall. Over 89 percent is from percolation in the Mojave River channel, ephemeral washes, and mountain fronts. The following efforts will be undertaken to protect recharge areas:

Action: Through review of General Plans and other land use plans, the MWA will identify potential projects that may have a significant impact on the quality or quantity of water supplies entering the basin through recharge sites, establish buffer zones, and provide this information to the planning agency. MWA will identify sites with high potential for recharge and proactively identify them to land use planning agencies. More information on land use planning efforts is provided in the Monitoring section of this chapter.

Action: MWA will continue to coordinate with watershed related entities including the Lahontan and Colorado River Regional Water Quality Control Boards, Mojave Desert Resource Conservation District and the U. S. Bureau of Land Management.

5) Construction and Implementation

Construction of projects by MWA within its service area is necessary to build, operate, maintain and replace the State Water Project facilities to which MWA is contractually obligated. These projects are necessary to fulfill MWA's contractual obligations with the State of California and to insure water availability to all of its residents.

Table 9-9 in the previous chapter shows the recommended priority of each project and management action. The projects that have the highest priority include implementing municipal conservation, VVWRA wastewater reclamation, Alto subarea wellhead treatment, a new water

supply for Pioneertown, and the recharge of SWP water into the Warren Valley aquifer and into the Floodplain, West Regional, and Mid-Regional aquifers in the Alto subarea. Municipal conservation is considered to have the highest priority because measures will need to be initiated immediately in order to achieve 10 percent conservation by 2020. Recharge of SWP water into the Alto Floodplain, West Regional, and Mid-Regional aquifers will require feasibility studies to determine the optimal locations for building the necessary recharge facilities.

Projects and management actions with a high priority are those expected to begin implementation within the next five years. Those with a moderate priority are those expected to begin implementation within the next five to ten years, and those with lower priority will be pursued within a ten to twenty year timeframe.

Action: MWA will identify implementing agencies for high priority projects and management actions, and will coordinate with those agencies in putting them into service. High priority projects and management actions are those expected to begin implementation within the next five years, and include:

- Municipal conservation of 10 percent of consumptive use in the Mojave River Basin and 5 percent in Morongo Basin/Johnson Valley
- Wastewater reclamation in the Alto subarea
- Wellhead treatment in the Alto subarea
- Groundwater recharge in the Alto Floodplain aquifer
- Groundwater recharge in the Alto Mid-Regional aquifer
- Groundwater recharge in the Alto West-Regional aquifer
- Developing an alternative supply for Pioneertown
- Groundwater recharge in the Warren Valley
- Continue development of regional water banking arrangements

Action: MWA will identify implementing agencies for moderate priority projects and management actions, and will coordinate with those agencies in putting them into service. Moderate priority projects and management actions are those expected to begin implementation within the next five to ten years, and include:

- continued implementation of high priority projects and actions
- construction of a regional water treatment plant in the Alto subarea
- groundwater recharge in the Alto East-Regional aquifer
- direct or in-lieu groundwater recharge in the Transition Zone Floodplain aquifer

- groundwater recharge and/or stormwater retention in the Baja Floodplain aquifer
- address municipal water supply issues in the Hinkley area of the Centro Regional aquifer
- groundwater recharge and/or stormwater retention in the Este Regional aquifer
- groundwater recharge in the Oeste Regional aquifer
- groundwater recharge in the Copper Mountain Valley
- groundwater recharge in the Means/Ames Valleys

Action: MWA will identify implementing agencies for lower priority projects and management actions, and coordinate in putting them into service. Lower priority projects and management actions are those expected to begin implementation within the next ten to twenty years, and include:

- continued implementation of high and moderate priority projects and actions
- groundwater recharge in the Lucerne Valley

6) Financing

Implementing the Regional Water Management Plan (RWMP) will require an array of financing mechanisms, such as bonds, grants, or low interest loans. The Mojave Basin Area Judgment provides a revenue stream for purchasing imported water. Cost savings may be incurred through implementation of conservation and water reuse projects. In addition, cooperative funding agreements between MWA and other water managers in the MWA service area or cost-share agreements between MWA and local, state, or federal agencies may also provide funding for RWMP projects and management actions.

Action: As project and management actions in the RWMP are defined in more detail, MWA will conduct a review of federal, state, and regional funding sources as well as potential assessments, fees, and charges to develop a financing plan that comprises an array of financing mechanisms appropriate for each RWMP project or management action, including bond funding, low-interest loans and grants, and cooperative cost-share agreements.

Action: MWA will develop a multi-year Capital Improvement Program (CIP) using the RWMP as its basis. The plan will include a schedule, priority and cost for implementation.

Action: MWA will research and pursue grants, with an emphasis on Proposition 50 funds, and identify potential Federal funds to be used for CIP implementation.

Action: MWA will identify local cost-sharing partners among the benefiting entities and determine the best mix of debt, fees and charges for implementing projects and management actions.

7) Public Participation/Community Outreach

MWA formed a Technical Advisory Committee (TAC) comprised of local stakeholders and water purveyors. The TAC met regularly during development of the Regional Water Management Plan, reviewing and providing comments and suggestions on the Plan. TAC members are listed in Chapter 8. MWA will continue to consult with the TAC on project implementation and financing.

MWA is a member of the Alliance for Water Awareness and Conservation, a group of local water purveyors who are collaborating on demand management measures. MWA has also signed seven cooperation agreements or Memoranda of Understanding with local public entities to promote water conservation, as described in Chapter 7.

Action: MWA will continue to coordinate, participate in, and implement recommendations of the Alliance.

MWA has organized and held three water symposia with local water leaders and regulators in Victorville, Morongo Basin, and Lucerne Valley in 2003 and early 2004.

Action: The Agency plans to make the water symposium an annual event.

Action: MWA will continue its outreach and education efforts through continued funding of the Community Liaison Officer.

The Panorama, the newsletter of the MWA is published regularly and mailed to those on its growing distribution list. Regular updates on the development of the Regional Water Management Plan have been included. A copy of Volume 3, Issue 1 published in the winter of 2003 is included in Appendix F.

Action: MWA will continue to develop and publish its newsletter, *The Panorama*.

MWA has an established Speakers Bureau which provides Board members and Agency staff to address water related topics with local audiences.

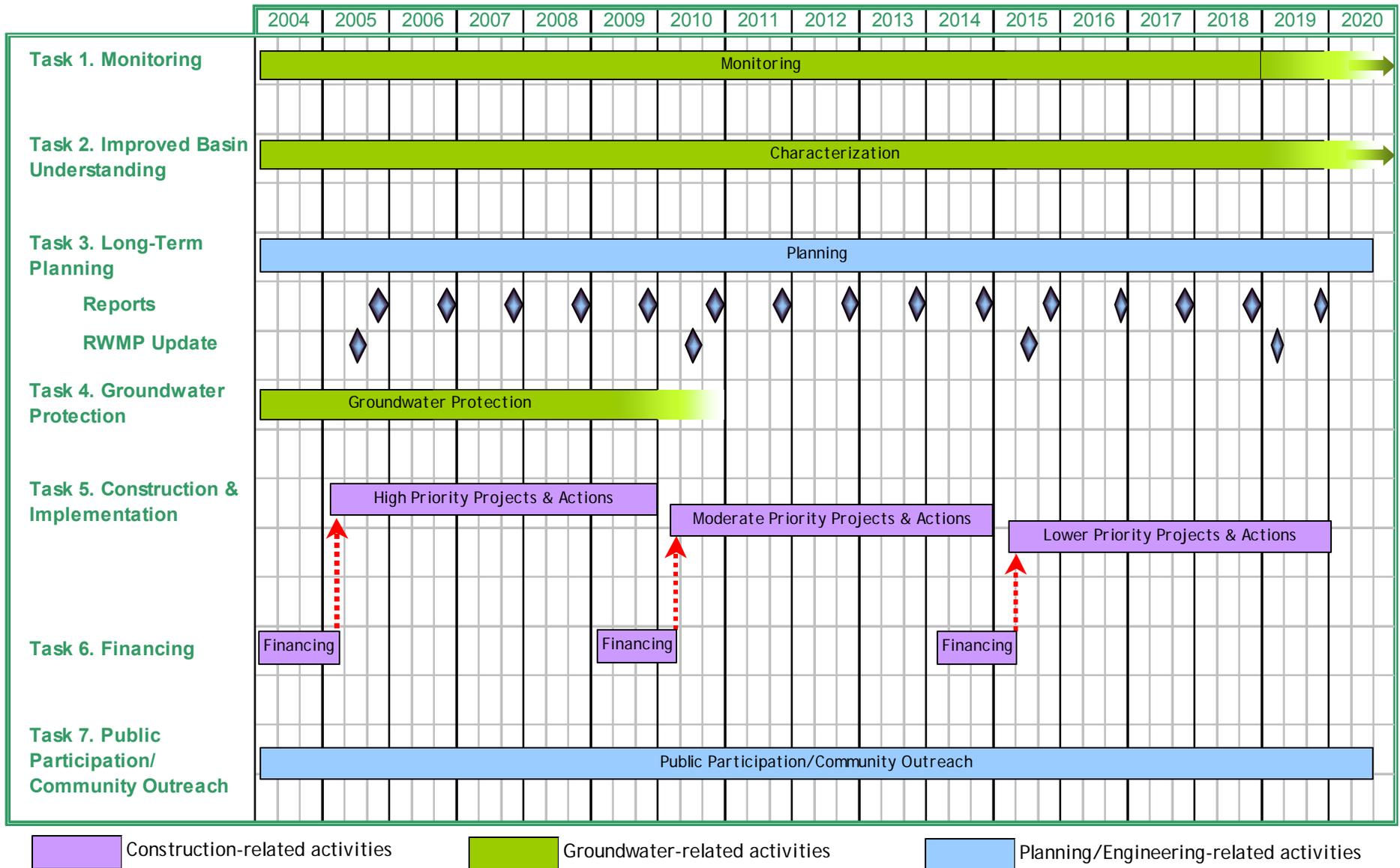
Action:MWA will maintain its Speakers Bureau to provide timely water related information to the public.

Action:MWA's web site (<http://www.mojavewater.org/>) contains information on MWA projects, water supplies and resources, water education, Watermaster, Agency publications, a calendar of events, meeting agendas, and general information about MWA. MWA will continue to provide this service.

Implementation Schedule

A schedule for implementation of the Management Action Plan is provided in Figure 10-2.

Figure 10 - 2. Master Schedule for MWA Management Action Plan



References

Apple Valley Ranchos Water Company (2000) *Urban Water Management Plan*. Apple Valley Ranchos Water Company, Apple Valley, CA

Bell, C. (2003) pers. comm.

Billhorn, T. (2003) pers. comm.

Bookman-Edmonston Engineering, Inc. (1994) *Mojave Water Agency Regional Water Management Plan*. Bookman-Edmonston Engineering, Inc., Glendale, CA.

Boyle Engineering Corporation (1993) *Regional Water Management Plan Johnson Valley/Morongo Basin Area*. Boyle Engineering Corporation, Newport Beach, CA.

City of Barstow (1997) *Utilities and Public Service Technical Report City of Barstow General Plan – Part C, Chapter VI.2*.

City of Hesperia (2000) *Hesperia Water District Urban Water Management Plan*. City of Hesperia, Hesperia CA

DWR (1967) *Mojave River Ground Water Basins Investigation Bulletin No. 84*. CA Department of Water Resources, Sacramento, CA.

DWR (1998) *California Water Plan Update Bulletin 160-98*. CA Department of Water Resources, Sacramento, CA.

DWR (2001) *Management of the California State Water Project Bulletin 132-01*. CA Department of Water Resources, Sacramento, CA.

DWR (2001b) *Data Provided by Division of Water Deliveries and Schedules*. CA Department of Water Resources, Sacramento, CA.

Eckhart, L. (2003) pers. comm.

Hanson, J. C. (1993) Preliminary Report on Analysis of the Flow of the Mojave River at Afton, CA, San Bernardino County, California. James C. Hanson, Consulting Civil Engineer, Sacramento, CA.

Hardt, W.F. (1971) *Hydrologic analysis of Mojave River Basin, California, Using Electric Analog Model*. U.S. Geological Survey, U.S. Geological Survey, Menlo Park, CA, August, 1971.

Hi-Desert Water District (2003) Home Page <<http://www.hdwd.com>>.

Hi-Desert Water District (2003) pers. comm.

Izbicki, J.A., Martin, Peter, and Michel, R.L. (1995) *Source, Movement and Age of Groundwater in the Upper Part of the Mojave River Basin, California, U.S.A.* Application of Tracers in Arid Zone Hydrology: International Association of Hydrological Sciences, no. 232, p. 43-56, Adar, E.M., and Leibundgut, Christian, eds. LAHS Publishers.

Izbicki, J.A., Radyk, J.C., and Michel, R.L. (2000) Water Movement Through a Thick Unsaturated Zone Underlying an Intermittent Stream in Western Mojave Desert, Southern California, U.S.A.: *Journal of Hydrology*, v. 238, p. 194-217.

Jones, B. (2003) pers. comm.

Joshua Basin Water District (2000) *Joshua Basin Water District 2000 Urban Water Management Plan*. Joshua Basin Water District, Joshua Tree, CA

Kennedy/Jenks/Chilton (1991) Warren Valley Basin Management Plan.

Lines, G. C., and Bilhorn, T. W. (1996) *Riparian Vegetation and its Water Use During 1995 Along the Mojave River, Southern California*. Water-Resources Investigations Report 96-4241, U.S. Geological Survey, Sacramento, CA.

Mojave Basin Area Judgment (1996) *Judgment After Trial, City of Barstow et al. Vs. City of Adelanto et al.* Superior Court Case No. 208568, Riverside County, CA.

Mojave Basin Area Watermaster (2001) *Seventh Annual Report of the Mojave Basin Area Watermaster for Water Year 1999-2000*. Mojave Basin Area Watermaster, Apple Valley, CA, April, 2001.

Moyle, W.R., Jr. (1984) *Bouguer Gravity Anomaly Map of the Twentynine Palms Marine Corps Base and Vicinity, California*. Water-Resources Investigations Report 84-4004, U.S. Geological Survey, Sacramento, CA.

MWA (1996) Engineer's Report on Water Supply for Water Year 1994-1995. Mojave Water Agency, Apple Valley, CA.

MWA (1997) Engineer's Report on Water Supply for Water Year 1995-1996. Mojave Water Agency, Apple Valley, CA.

MWA (1998) Engineer's Report on Water Supply for Water Year 1996-1997. Mojave Water Agency, Apple Valley, CA.

MWA (1999) Engineer's Report on Water Supply for Water Year 1997-1998. Mojave Water Agency, Apple Valley, CA.

MWA (2000) Engineer's Report on Water Supply for Water Year 1998-1999. Mojave Water Agency, Apple Valley, CA.

MWA (2001) Engineer's Report on Water Supply for Water Year 1999-2000 (Draft). Mojave Water Agency, Apple Valley, CA.

MWA (2002) Engineer's Report on Water Supply for Water Year 2000-2001 (Draft). Mojave Water Agency, Apple Valley, CA.

San Bernadino County (1977) *Hi-Desert Water District v. Yucca Water Company Ltd.*, Case Number 172103, San Bernardino, CA.

Smith, G.A. and Pimentel, M.I. (2000) *Regional Water Table (1998) and Ground-Water-Level Changes in the Mojave River and the Morongo Ground-Water Basins, San Bernardino County, California*. Water-Resources Investigations Report 00-4090, U.S. Geological Survey, Sacramento, CA.

Sneed, Michelle, Ikehara, Marti E., Stork, Sylvia V., Amelung, Falk, and Galloway, Devin L., (2003) *Water Resources Investigations Report 03-4015*, U.S. Geological Survey, Sacramento, CA.

So & Associates Engineers Inc. (2000) *Baldy Mesa Water District 2000 Urban Water Management Plan*. So & Associates Engineers Inc., Apple Valley, CA

So & Associates Engineers Inc. (2000) *Victor Valley Water District 2000 Urban Water Management Plan*. So & Associates Engineers Inc., Apple Valley, CA

Southern California Association of Governments (2003) Home Page <<http://scag.ca.gov>>.

Southern California Water Company (2000) *Southern California Water Company Urban Water Management Plan – Barstow System*, Southern California Water Company, Ontario, CA

Stamos, C.L., Martin, P., Nishikawa, T., and Cox, B.F. (2001) *Simulation of Ground-Water Flow in the Mojave River Basin, California*. Water-Resources Investigations Report 01-4002 Version 3, U.S. Geological Survey, Sacramento, CA.

Stamos, C.L., Nishikawa, T., and Martin, P. (2001b) *Water Supply in the Mojave River Ground-Water Basin, 1931-99, and the Benefits of Artificial Recharge*. Water Fact Sheet 122-01, U.S. Geological Survey, Sacramento, CA.

Todd Engineers (1993) *Water Resources Analysis of the Upper Mojave River Basin - Alto Subarea*, Todd Engineers, Emeryville, CA.

Urban Logic Consultants (1997) *City of Adelanto Urban Water Management Plan*. Urban Logic Consultants, Temecula, CA

USACE (1986) *Mojave River Dam, San Bernardino County, California, Final Feasibility Report*. U.S. Army Corps of Engineers, Los Angeles District, Los Angeles, CA, March 1986.

Victor Valley Wastewater Reclamation Authority (2000) *Sewerage Facilities Plan Update*, Victor Valley Wastewater Reclamation Authority, Victorville, CA.

Webb (2000) *Consumptive Water Use Study and Update of Production Safe Yield Calculations for the Mojave Basin Area*. Albert A. Webb Associates, Riverside, CA.

Upper Mojave River Valley Groundwater Basin

- Groundwater Basin Number: 6-42
- County: San Bernardino
- Surface Area: 413,000 acres (645 square miles)

Basin Boundaries and Hydrology

The Upper Mojave River Valley Groundwater Basin underlies an elongate north-south valley, with the Mojave River flowing (occasionally) through the valley from the San Bernardino Mountains on the south, northward into the Middle Mojave River Valley Groundwater Basin at the town of Helendale. The groundwater basin is bounded on the north by a roughly east-west line from basement rock outcrops near Helendale to those in the Shadow Mountains. The southern boundary is the contact between Quaternary sedimentary deposits and unconsolidated basement rocks of the San Bernardino Mountains. The basin is bounded on the southeast by the Helendale fault and on the east by basement exposures of the mountains surrounding Apple Valley. In the west, the boundary is marked by a surface drainage divide between this basin and El Mirage Valley Basin, and a contact between alluvium and basement rocks that form the Shadow Mountains. Average precipitation varies across the basin from 5 to 36 inches with the average for the basin near 12 inches (USDA 1999).

Hydrogeologic Information

Water Bearing Formations

The two primary water-bearing units within the Mojave River Valley Basin system consist of regional Pliocene and younger alluvial fan deposits (fan unit) and of overlying Pleistocene and younger river channel and floodplain deposits, which have been called the floodplain unit (DWR 1967), or the floodplain aquifer (Lines 1996; Stamos and others 2001). Other potential, but not regionally significant, water-bearing units include older alluvium, old fan deposits, old lake and lakeshore deposits, and dune sand deposits (DWR 1967). Water-bearing deposits in this basin are predominantly unconfined, though some perched water appears near Adelanto. Well yields typically range from 100 to 2000 gpm (Hardt 1969; Lines 1996; Stamos and others 2001) with an average of about 630 gpm for all units (BEE 1994).

Pleistocene and Younger Floodplain Unit. The floodplain unit is the more productive and extensively studied of the two units and extends 50 to 200 feet deep in this basin, but is restricted to within about 1 mile of the active Mojave River channel (Stamos and others 2001). The average thickness is estimated to be about 150 feet through this basin. Specific yield for this unit ranges from 23 to 39 percent (Lines 1996) and the average specific yield for this unit is about 27 percent in this basin (DWR 1967; Lines 1996).

Pliocene and Younger Fan Unit. The regional fan unit is composed of late Tertiary and younger unconsolidated to partially consolidated alluvial fan deposits up to 1,000 feet thick (Stamos and Predmore 1995; Lines 1996). The permeability of these deposits decreases with depth (Stamos and others 2001). Estimated average effective thickness in the Upper Mojave River

Valley Groundwater Basin is about 300 feet thick (DWR 1967). Available information indicates that specific yields and well yields are generally less for the fan unit compared to the floodplain unit, but suggest generally higher well yields for younger fan deposits and lower well yields for older fan deposits (DWR 1967). The specific yields for this unit range from 4 percent to 25 percent with an estimated average of 10 percent (DWR 1967).

Restrictive Structures

This groundwater basin is bounded on the northeast by the Helendale fault zone which forms a barrier to groundwater flow in the regional fan unit, but does not appear to be a barrier to groundwater flow in the floodplain unit (Stamos and Predmore 1995; Stamos and others 2001). The fault zone causes an eastward lowering of the water table across the southeastern boundary into the Lucerne Valley Basin in the fan unit deposits (Stamos and Predmore 1995; Lines 1996). Stamos and others (2001) also interpret unexposed faults acting as barriers to cause steep groundwater gradients between Victorville and Adelanto.

In the southern portion of the basin, bedrock constriction causes water to rise to the surface of the Mojave River at the Upper and Lower Narrows (Lines 1996; Stamos and others 2001). Historically, such locations have been used for camping and watering spots, such as Lane's Crossing just north of the Lower Narrows (Lines 1996).

Recharge Areas

Natural recharge of the basin is from direct precipitation, ephemeral stream flow, infrequent surface flow of the Mojave River, and underflow of the Mojave River into the basin from the southwest (Eccles 1981; Stamos and Predmore 1995; Lines 1996). Treated wastewater effluent, septic tank effluent, effluent from two fish hatchery operations, and irrigation waters are allowed to percolate into the ground and recharge the groundwater system (Eccles 1981; Lines 1996). A large, but sporadic contribution to recharge occurs when the Mojave River is flowing, with 40 feet of rise in the water table observed during 1969 and 16 to 48 feet of rise observed in 1993 (Hardt 1969; Robson 1974; Lines 1996). The general groundwater flow is toward the active channel of the Mojave River and then it follows the course of the river through the valley (Stamos and Predmore 1995; Lines 1996). The Helendale fault forms a barrier to groundwater flow in the southeast corner of the basin. This barrier causes groundwater to flow northwestward under a surface drainage divide into the Mojave River drainage instead of northeastward into Lucerne Lake (dry) in the Lucerne Valley Basin.

Groundwater Level Trends

Groundwater levels in wells in the floodplain unit near the Mojave River tend to vary in concert with rainfall and runoff rates, whereas groundwater levels in the fan unit do not show significant changes due to local rainfall (MWA 1999). The general trend in this basin is for declining groundwater levels, particularly in the fan unit. Three of the ten highest precipitation years over a 60-year base period occurred during 1991 through 1999 (MWA 1999). Infiltration of the runoff from this relatively abundant precipitation has produced an increase in groundwater level (and groundwater storage) in the

floodplain unit near the Mojave River (MWA 1999). A hydrograph for a well near Adelanto shows a gentle decline of about 25 feet during 1955 through 1985 and a faster decline of about 35 feet since about 1985. Another well near Victorville in the fan unit shows a range of about 30 feet in water level over the last 20 years, with a decrease in water level of about 10 feet (MWA 1999).

Groundwater Storage

Groundwater Storage Capacity. Published total storage capacity for the Upper Mojave River Valley Groundwater Basin varies. The boundaries of the Upper Mojave River Valley Groundwater Basin of this report correspond closely to the Upper Mojave River Basin and Fifteen Mile storage units discussed by DWR (1967). DWR (1967) calculated the total storage capacity for these storage units using the base of water-bearing materials, an average of about 300 feet. The total storage for the Upper Mojave River Basin and Fifteen Mile storage units is 27,839,000 af (DWR 1967). The Upper Mojave River Valley Groundwater Basin also roughly underlies the Alto subarea and about one-third of the Este subarea under the administration of the Mojave Water Agency (MWA 1999). The MWA uses an economic pumping depth of 100 feet as a limit for effective basin depth, and calculates a total effective storage capacity of 2,086,000 af for the Alto subarea and 530,000 af for the Este subarea (BEE, 1994). Using an overlying area of about 413,000 acres, an average thickness of about 300 feet, and an average specific yield of about 10.5 percent indicates a total storage capacity of about 13,000,000 af.

Groundwater in Storage. MWA (1999) calculated the available stored groundwater underlying the Alto subarea at the end of 1998 was 960,000 af and the available storage space was 1,126,000 af. MWA (1999) calculated the available stored groundwater in the Este subarea at the end of 1998 was 420,000 af and the available storage space was 110,000 af. The basin is considered to be effectively full when 1930 water level elevations are reached (BEE, 1994). Assuming an overlying area of about 413,000 acres, a saturated thickness of about 250 feet, and a specific yield of 10.5 percent indicates about 10,800,000 af of stored groundwater at the end of 1998. This amount indicates that about 2,200,000 af of additional storage space was available.

Groundwater Budget (Type A)

Not enough data exist to compile a detailed groundwater budget for the basin. However, MWA monitors groundwater extraction and reports extractions of 58,300 af for urban uses, 7,800 af for agriculture, and 11,900 af for industrial and recreational uses in the 1997-1998 water year (MWA 1999). In addition to the extraction data, several other components of the water budget have been reported. For the 1997-1998 water year, MWA (1999) estimated natural recharge at 105,000 af, artificial recharge at 16,350 af, and applied water recharge at 3,900 af. Subsurface inflow and outflow averages are estimated by DWR (1967) at 950 af inflow and 2,000 af outflow. Bookman-Edmonston Engineering (1994) set the average inflow at about 1,000 af and the average outflow at 2,000 af. Stamos and others (2001) an estimate that 5,000 to 6,000 af flows through the floodplain unit into the Middle Mojave River Valley Groundwater Basin near the Helendale fault.

Groundwater Quality

Characterization. Calcium bicarbonate character waters are found near the San Bernardino Mountains and near the Mojave River channel. Sodium bicarbonate waters are found near Victorville. Sodium bicarbonate-sulfate waters are found near Adelanto. Sodium-calcium sulfate waters occur west of Victorville. Sodium chloride waters are found in Apple Valley. Small areas of calcium-sodium sulfate and calcium-sodium bicarbonate also occur in this basin (DWR 1967). Total dissolved solids content typically is less than 500 mg/L (BEE 1994), but concentrations up to 1,105 mg/L were found near Apple Valley (DWR 1967). Electrical Conductivity readings range as high as 1,529 μ mhos, with lower values of 650 μ mhos found near Apple Valley, and 550 μ mhos found near Adelanto (DWR 1967).

Impairments. High nitrate concentrations occur in the southern portion of the basin and high iron and manganese concentrations are found near Oro Grande. Groundwater has been contaminated with trichloroethane (TCE) at the former George Air Force Base, now a federal Superfund site (BEE 1994). Leaking underground storage tanks in and around Victorville have introduced fuel additives benzene, toluene, ethylbenzene, xylene, and methyl tertiary butyl ether (MTBE) into groundwater (BEE 1994; MWA 1999).

Water Quality in Public Supply Wells

Constituent Group ¹	Number of wells sampled ²	Number of wells with a concentration above an MCL ³
Inorganics – Primary	122	9
Radiological 115		2
Nitrates 125		2
Pesticides 117		0
VOCs and SVOCs	120	0
Inorganics – Secondary	122	11

¹ A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

² Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

³ Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Production Characteristics

Well yields (gal/min)		
Municipal/Irrigation	Range: to 5,500 gal/min	Average: 1,030 gal/min Median: 980 (130 Well Completion Reports)
	100-2,000 gal/min for floodplain unit (Hardt 1969; Lines 1996)	Average = 630 gal/min for all units (BEE 1994)
Total depths (ft)		
Domestic	Range: 22-1,140 ft	Average: 250 ft Median: 210 ft (1,188 Well Completion Reports)
Municipal/Irrigation	Range: 50-1,970 ft	Average: 360ft Median: 300 ft (326 Well Completion Reports)

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
US Geological Survey	Water level	120/ Annually
US Geological Survey	Water Quality	22/ Annually
Department of Health Services	Title 22 Water Quality	153/ Annually

Basin Management

Groundwater management The Upper Mojave River Valley Groundwater Basin is a portion of an area adjudicated in 1996 setting the Mojave Water Agency as watermaster. MWA has proposed three basic management strategy alternatives that would reduce and eliminate overdraft in the basin: water conservation, water supply enhancement, and water allocation. These alternatives will likely be implemented together in the final management strategy adopted by MWA (BEE 1994).

Water agencies

Public	Mojave Water Agency, Victor Valley Water District, Thunderbird County Water District, Juniper Riveria County Water District, Mariana Ranchos County Water District, Hesperia Water District, Baldy Mesa Water District, County Service Area Number 64, Apple Valley Heights County Water District, Apple Valley Foothill County Water District
Private	Apple Valley Ranchos Water Company, Southern California Water Company, Rancheritos Mutual Water Company

References Cited

- Bookman-Edmonston Engineering Inc. (BEE). 1994. *Regional Water Management Plan*. Apple Valley, California: Mojave Water Agency. 135 p.
- California Department of Water Resources (DWR). 1967. *Mojave River Groundwater Basins Investigation*. Bulletin No. 84. 151 p.
- Eccles, L.A. 1981. *Ground-Water Quality along the Mojave River near Barstow, California, 1974-79*. U.S. Geological Survey Water-Resources Investigations Report 80-109. 63 p.
- Hardt, W.F. 1969. *Mojave River Basin Ground-Water Recharge, With Particular Reference to the California Floods of January and February 1969*. U.S. Geological Survey Open-File Report. 13 p.
- Lines, G.C. 1996. *Ground-Water and Surface-Water Relations Along the Mojave River, Southern California*. U.S. Geological Survey Water-Resources Investigations Report 95-4189. 43 p.
- Mojave Water Agency (MWA). 1999. *Fourth Annual Engineer's Report on Water Supply for Water Year 1997-1998*. Apple Valley, California. 77 p.
- Robson, S.G. 1974. *Feasibility of Digital Water-Quality Modeling Illustrated by Application at Barstow, California*. U.S. Geological Survey Water-Resources Investigations Report 46-73. 66 p.
- Stamos, C.L., P. Martin, T. Nishikawa, and B. F. Cox. 2001. *Simulation of Ground-Water Flow in the Mojave River Basin, California*. U. S. Geological Survey Water-Resources Investigations Report 01-4002, Version 1.1. 129 p.
- Stamos, C.L. and S.K. Predmore. 1995. *Data and Water-Table Map of the Mojave River Ground-Water Basin, San Bernardino County, California, November 1992*. U.S. Geological Survey Water-Resources Investigations Report 95-4148.
- United States Department of Agriculture (USDA). 1999, *California Annual Precipitation*, scale 1:850,000, 1 sheet.

Additional References

- Buono, Anthony, and D.J. Lang. 1980. *Aquifer Recharge from the 1969 and 1978 Floods in the Mojave River Basin, California*. U.S. Geological Survey Open-File Report 80-207. 25 p.
- California Department of Water Resources (DWR). 1963. *Wells and Springs in the Lower Mojave Valley Area, San Bernardino County, California*. Bulletin No. 91-10. 19 p.
- Hughes, J.L. 1975. *Evaluation of Ground-Water Degradation Resulting from Waste Disposal to Alluvium near Barstow, California*. U.S. Geological Survey Professional Paper 878. 33 p.
- Hughes, J.L., L.A. Eccles, and R.L. Malcolm. 1974. "Dissolved Organic Carbon (DOC), An Index of Organic Contamination in Ground Water near Barstow, California." *Ground Water*. 12(5): 283-290.
- Hughes, J.L., and D.L. Patridge. 1973. *Data on Wells in the Barstow Area, Mojave River Basin, California*. U.S. Geological Survey Open-File Report. 102 p.
- Hughes, J.L., and S.G. Robson. 1973. Effects of Waste Percolation on Ground Water in Alluvium near Barstow, California. *Underground Waste Management and Artificial Recharge*. International Symposium, American Association of Petroleum Geologists, U.S. Geological Survey, and International Association of Hydrology Science. 1: 91-129.
- James, J. 1992. *Precipitation/evaporation Climatology of the Mojave Water Agency*. Apple Valley, California. Mojave Water Agency. 21 p.
- Mendez, G.O. and A.H. Christensen. 1997. *Regional Water Table (1996) and Water-Level Changes in the Mojave River, the Morongo, and the Fort Irwin Ground-Water Basins, San Bernardino County, California*. U.S. Geological Survey Water-Resources Investigations Report 97-4160. 34 p.
- Robson, S.G. 1978. *Application of Digital Profile Modeling Techniques to Ground-Water Solute Transport at Barstow, California*. U.S. Geological Survey Water-Supply Paper 2050. 28 p.
- Robson, S.G. and J.D. Bredehoeft. 1972. *Use of a Water Quality Model for the Analysis of Ground Water Contamination at Barstow, California*. Geological Society of America, Abstract with Programs, Annual Meeting, 4(7): 640-641.
- Thompson, D.G. 1920. *Special Report on Ground-Water Conditions along Mohave River, San Bernardino County, California*. U.S. Geological Survey Open-File Report. 61 p.
- Umari, A.M.J., P. Martin, and R.A. Schroeder. 1989. "Attenuation of Nitrogen and Fecal Coliforms from Septic-Tank Effluent Through a Thick Unsaturated Zone, Upper Mojave River Basin, California." Pederson, G.L., and M.M. Smith, compilers. *U.S. Geological Survey Second National Symposium on Water Quality* (November 12-17). Abstracts of the Technical Sessions, Orlando, Florida. U.S. Geological Survey Open-File Report 89-409. p. 102.
- Woolfenden, L.R. 1984. *A Ground-Water-Quality Monitoring Network for the Lower Mojave River Valley, California*. U.S. Geological Survey Water-Resources Investigations Report 83-4148. 58 p.

Errata

Substantive changes made to the basin description will be noted here.

APPENDIX E
2010 WATER QUALITY REPORT

This Page Left Blank Intentionally

The Water Resource

2010 CONSUMER CONFIDENCE REPORT



Once Again Your Water Quality Passes the Test

We are pleased to provide you with this year's Annual Water Quality Report. It provides the results of our extensive water quality tests conducted during 2010. The bottom line, your drinking water meets or is better than all drinking water requirements.

In addition, the report provides a description of where your water comes from, answers to common questions about water quality and provides other useful information.

Our Customers Enjoy High-Quality Water

Your water comes from an underground aquifer in an area known as the Alto Subarea of the Upper Mojave River Basin.

Historically known for its good taste, this is a high-quality water supply for the High Desert. Through 36 wells, we deliver more than 7.4 billion gallons of water each year to a population of over 100,000 people within the boundaries of the City of Victorville.



City Council

Jim Kennedy, Councilmember
Mike Rothschild, Councilmember
Angela Valles, Councilmember

Rudy Cabriaes, Mayor Pro Tem
Ryan McEachron, Mayor



HOW WE KEEP YOUR WATER SAFE

Our state-certified water-quality staff works as a team to ensure that the water we provide to your home or business is safe and clean.

INTENSIVE TESTING: Water-quality technicians test water in the pipeline system weekly at 26 locations. Each year they collect hundreds of samples. An independent lab conducts thousands of intensive tests for over 100 potential contaminants.

DISINFECT FOR SAFETY: The production crew adds small amounts of chlorine to disinfect the water. Chlorine prevents the growth of bacteria as the water travels through more than 600 miles of pipeline.

FLUSH TO KEEP THE SYSTEM CLEAN: Pipelines periodically need to be cleaned, so we flush water out of fire hydrants at high volume. This removes small amounts of natural sand and minerals that slowly build up in pipelines.



WATER IN THE ENVIRONMENT

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.

Radioactive contaminants, that can be naturally-occurring or be the result of oil and gas production and mining activities.

WATER QUALITY STANDARDS

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Department of Public Health (Department) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

FOR MORE INFORMATION

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

PEOPLE WITH SPECIAL NEEDS

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice from their health care providers about drinking water. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

DRINKING WATER SOURCE ASSESSMENT AND PROTECTION PROGRAM

A source water assessment was conducted for Well #144 and Well #209 of the Victorville Water District in June and August, 2010. These wells are used by the District to supply drinking water to District customers. The assessment, in compliance with California water quality regulations, assists the District in identifying potential sources of contamination and to develop methods to protect the water supply. All new wells are subjected to an assessment before being placed into service.

According to the assessment, the underground aquifer that is the source of supply for Well #144 is potentially vulnerable to contamination from a variety of sources, including commercial, industrial, and residential sewer collection systems; high and low density septic systems; mall parking lots; high density housing; other water supply wells; storm drain discharge points; fleet, truck, and bus terminals; injection wells, dry wells, and sumps; RV and mini storage; transportation corridors, including freeways, state highways, roads, and streets; monitoring and test wells; and contractor and government agency equipment storage yards.

The assessment concluded that the underground aquifer that is the source of supply for Well #209 is potentially vulnerable to contamination from a variety of sources, including commercial and industrial sewer collection systems; automobile gas stations; mall parking lots; hardware, lumber, and parts stores; other water supply wells; transportation corridors including freeways, state highways, roads, and streets; automobile repair shops; injection wells, dry wells, and sumps; monitoring and test wells; and motor pools.

The District regularly monitors the water quality in all groundwater wells supplying water to District customers and there have been no detected contaminants in either of these wells from the sources listed above.

A copy of the complete assessment(s) is/are available for public inspection at the Public Works/Water counter located on the second floor of Victorville City Hall by contacting Water Production Supervisor Arnold Villarreal at (760) 955-2993 or at the California Department of Public Health's San Bernardino District Office located at 464 West Fourth Street, Suite 437, San Bernardino, CA. 92401. You may request a summary of the assessment(s) be sent to you by contacting the CDPH.

RESULTS OF 2010 DRINKING-WATER-QUALITY TESTS

The Victorville Water District tests for hundreds of substances. Below is a list of substances detected in your drinking water in 2010. As the chart shows, very few substances could even be detected, and all are within strict water quality standards established to protect water customers.

Inorganic Contaminants						
	VWD Average	VWD Range	MCL	PHG (MCLG)	Violation	Major Sources In Drinking Water
Arsenic* (PPB)	8.6	0 - 24	10	.004	No	Erosion of natural deposits; runoff from orchards, glass and electronics production wastes
Chromium (PPB)	5.39	0 - 9.3	50	(100)	No	Discharge from steel and pulp mills and chrome plating; erosion of natural deposits
Fluoride (PPM)	.47	.2 - 1.2	2	1	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Nitrate (as No3) (PPM)	3.9	0 - 8.8	45	45	No	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Disinfection Byproducts						
	VWD Average	VWD Range	MCL	PHG (MCLG)	Violation	Major Sources In Drinking Water
Total Trihalomethanes (TTHMs) (PPB)	11.65	0 - 50	80	N/A	No	By-product of drinking water disinfection
	VWD Average	VWD Range	MRDL	MRDLG	Violation	Major Sources In Drinking Water
Chlorine (PPM)	.68	.30 - 1.2	4	4	No	Drinking water disinfectant added for treatment
Regulated Contaminants with Secondary MCLs						
	VWD Average	VWD Range	Secondary MCL	Violation	Typical Source of Contaminant	
Chloride (PPM)	7.55	2.1 - 38	500	No	Runoff/leaching from natural deposits; seawater influence	
Specific Conductance (Micromhos)	247.7	180 - 430	1600	No	Substances that form ions when in water; seawater influence	
Sulfate (PPM)	14.6	2.5 - 140	500	No	Runoff/leaching from natural deposits; industrial wastes	
Total Dissolved Solids (PPM)	154.66	110 - 286	1000	No	Runoff/leaching from natural deposits	
Turbidity (NTU)	.11	0 - .29	5	No	Soil runoff	
Unregulated Parameters That May Be of Interest to Consumers						
	VWD Average	VWD Range	MCL	PHG (MCLG)		
Alkalinity (PPM)	91.1	51 - 202	N/S	N/S		
Calcium (PPM)	7.9	0 - 37	N/S	N/S		
Hardness (PPM)	18.1	3 - 52	N/S	N/S		
Magnesium (PPM)	1.31	0 - 5.8	N/S	N/S		
Potassium (PPM)	1.09	0 - 8	N/S	N/S		
Sodium (PPM)	37.5	20 - 64	N/S	N/S		

***Arsenic.** While your drinking water meets the federal and state standard for arsenic, it does contain low levels of arsenic. The arsenic standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. The U.S. Environmental Protection Agency continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

ABBREVIATIONS AND DEFINITIONS TO HELP YOU UNDERSTAND THIS REPORT

These abbreviations and definitions of water-quality goals and standards will help you better understand the water-quality information in this report. The information shows how your water compares to requirements established by state and federal regulators to safeguard public health.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

N/A: Not applicable.

N/S: No standard.

NTU: Nephelometric turbidity unit.

pCi/L: Pico curies per liter, a measure of radiation.

Primary Drinking Water Standard (PDWS) MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

PPB: Parts per billion. 1 PPB is equal to about one drop in 17,000 gallons of water.

PPM: Parts per million, or milligrams per liter. 1 PPM is equal to about one drop in 17 gallons of water.

Regulatory Action Level (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

We Are Prepared to Serve You 24/7

We prepare in many ways to make sure that we can provide you with reliable water service on a daily basis and during emergencies, as shown in the examples below:

- **Emergency Power.** We have three trailer-mounted power generators that can be used to keep our wells pumping. Also, a fixed generator at our administrative office can keep the office working during blackouts.
- **Automated Control and Monitoring.** An automated, computer-based monitoring system, known as SCADA, tracks reservoir, well and pump operations, sounding alarms if problems occur.



- **Earthquake Resistant Construction.** Our facilities meet or exceed modern earthquake standards to provide reliable service.
- **74 Million Gallons of Water Storage.** Our 26 reservoir tanks are located above ground so we can deliver water by gravity flow, even during a power outage.
- **Membership in Statewide Mutual Aid Program.** We are a member of WARN, a statewide agency that promotes emergency preparedness, disaster responses and mutual assistance.

Please Contact us With Your Questions

For more information about your water quality, call the Water Production Supervisor at 760/955-2993 between 7:00 a.m. and 4:00 p.m. Monday through Thursday.

Please Join Us at a City Council Meeting

To learn more about water in your community, we suggest that you attend meetings of our City Council, which are held the first and third Tuesdays each month at 7:00 p.m. at the Victorville City Hall, 14343 Civic Drive in Victorville. You also may visit our website at ci.victorville.ca.us.

En Español

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.



SAVE WATER & MONEY!

Free Home Water Audits

You may be eligible to receive FREE water saving products.

Appointments are now being scheduled for Spring & Summer 2011.

Reserve your spot today.
Call the Conservation Division at
1-866-955-4426.

Watering Hours

June 1-Sept 30: 10:00PM-6:00AM
Oct 1-May 31: 9:00AM-3:00PM

Victorville Water District
Conservation Division
1-866/955-4426

www.VictorvilleWater.com

"Conserving Today For Tomorrow"

TAP WATER IS THE SMART CHOICE

Not only is bottled water far more expensive, and may not be as carefully tested as tap water, it requires much more energy and creates far more pollution to bottle and transport.



CITY OF VICTORVILLE WATER DISTRICT Bringing Water to Life

14343 Civic Drive, Victorville, CA 92392-5887
760/245-6424 general information
ci.victorville.ca.us

QUESTIONS? Call the City Of Victorville Water District: 760/245-6424

ORDINANCES AND RESOLUTIONS

This Appendix includes the following ordinances and resolutions of Victorville Water District related to water conservation:

- Ordinances 13.60.010 –13.60.195
- Ordinances 2114, 2133, 2135
- Ordinance VWD-004
- Baldy Mesa WD Ordinance 1996-3
- VVWD Ordinance A-101-89

This Page Left Blank Intentionally

Victorville, California, Code of Ordinances >> - VICTORVILLE, CALIFORNIA MUNICIPAL CODE >> Title 13 - PUBLIC PEACE, SAFETY AND MORALS* >> Chapter 13.60 - WATER CONSERVATION >>

Chapter 13.60 - WATER CONSERVATION

Sections:

[13.60.010 - Definitions.](#)

[13.60.020 - Application of this chapter.](#)

[13.60.030 - Drought tolerant plants.](#)

[13.60.040 - Prohibited water uses and water waste.](#)

[13.60.050 - Limitation on water intensive landscape and turf areas within new nonresidential facilities.](#)

[13.60.060 - Limitations on model home and new residential development landscaping.](#)

[13.60.070 - Public education.](#)

[13.60.080 - Drought management plan implementation.](#)

[13.60.090 - Notification and publication of drought management plan.](#)

[13.60.100 - Enforcement of drought management plan.](#)

[13.60.110 - Variances from drought management plan.](#)

[13.60.120 - Limited exemption to restrictions for users of reclaimed water.](#)

[13.60.130 - Violations.](#)

[13.60.140 - Right to hearing.](#)

[13.60.195 - Reclaimed water pipelines.](#)

13.60.010 - Definitions.

"Acre-foot of water" means that quantity of water required to cover one acre of land one foot deep, or three hundred twenty-five thousand, eight hundred fifty-one gallons.

"Active recreational area" means an area designated and primarily used for organized sports, including, without limitation, softball, baseball, football, soccer or a similar related sport, including all amenities related to the activity.

"Body of water" means any artificially constructed lake, pond or lagoon, regardless of size.

"City" means the city of Victorville.

"Controller" means a mechanical timer capable of operating valve stations to set days, length of time and frequency of water application.

"Escaped water" means the pumping, flow release, escape or leakage of any water from any pipe, valve, faucet, connection, diversion berm, well or any facility for the purposes of water supply, transport, storage, disposal or delivery onto adjacent property or public right-of-way.

"Excess runoff" means water accumulation on streets, gutters, neighboring properties or other areas in an amount sufficient to cause flow.

"Manager" means the city manager or the city manager's designee.

"Lot" means a legally created parcel of land occupied or intended for occupancy by one main building together with its accessory buildings, and uses customarily incidental to it, including the open space required by the city's zoning ordinance, and having its principal frontage upon a street as defined in the city's zoning ordinance.

"Model home" means a facility used exclusively for the promotion and sale of homes similar to the model.

"Person" means an individual, corporation, partnership, incorporated association or any other similar entity.

"Public water system" means any publicly or privately owned network of pipes, conduits, wells, reservoirs, holding tanks and other components, including any combination thereof, which supplies water to water users, who are charged a fee of any kind or nature for such purpose, or which is designed to supply water or is capable of supplying water to water users for a fee, and includes any such system whether it is operated under the regulatory authority of the city, but does not include any irrigation company or district whose primary purpose is to supply water for farming.

"Residential development" means the development of any type of dwelling unit or units suitable or designed for human habitation, including, but not limited to, single family homes, condominiums or manufactured homes, but not including hotels, motels, licensed convalescent homes, commercially operated retirement homes, time share units or the like. "Residential development" shall not include remodeling or reconstruction where no new dwelling unit is created.

"Right-of-way" means land which by deed, conveyance, agreement, easement, dedication, usage or process of law is reserved for or dedicated to the general public for street, highway, alley, public utility or pedestrian walkway purposes.

"Turf" means a surface layer of earth containing grass with its roots.

"Turf-related facility" means a school, public recreational facility, cemetery, golf course, industrial park or common area of a housing development that applies water from any source, including effluent.

"Water intensive landscape" means an area of land that is watered with a permanent water application system and planted primarily with plants not listed in Section 13.60.110 "Drought Tolerant Plants." Included is the total surface area of all water features (i.e. swimming pools of any size, fountains, ponds, water courses, waterfalls and other artificial water structures) filled or refilled with water from any source.

"Water purveyor" means the owner or operator of a public water system.

"Water user" means those persons, customers and properties served by a water purveyor within the incorporated boundaries of the city.

"Water waste" means the intentional or unintentional use or excessive dissipation of water, which is unproductive or does not reasonably sustain life or economic benefits.

(Ord. 2114 § 2 (part), 2005)

13.60.020 - Application of this chapter.

The provisions of this chapter shall apply to all water users. The restrictions or prohibitions in this chapter shall not apply to water use, runoff or flow:

- (1) Resulting from fire fighting, hydrant flushing or fire training activities; or
- (2) Necessary to prevent or abate threats to the public health or safety; or
- (3) From routine maintenance of any public water system, well flushing or from temporary water system failures or malfunctions.

(Ord. 2114 § 2 (part), 2005)

13.60.030 - Drought tolerant plants.

- (a) The planning director, or his or her designee, shall establish, and make available to the public, a list categorizing plants that are "drought tolerant plants" (the "List"). Such drought tolerant plants are not subject to any limitations in this chapter relating to water intensive landscape restrictions. The planning director, or his or her designee, shall establish the List within thirty days of the effective date of this ordinance.
- (b) The planning director, or his or her designee, may amend the List from time to time, as necessary, for the purpose of adding any drought tolerant plant to the List, or removing any non-drought tolerant plant from the List.

(Ord. 2135 § 2, 2006; Ord. 2133 § 2, 2006; Ord. 2114 § 2 (part), 2005)

13.60.040 - Prohibited water uses and water waste.

- (a) It shall be unlawful for any water user of a public water system to allow water waste at any location or premises within the city limits after having been served with a notice of violation, pursuant to Section 13.60.130 of this chapter, for wasting water from the same location or premises.
- (b) It shall be unlawful for any owner, occupier or manager of real property within the city to allow water waste at any such real property after having been served with a notice of violation, pursuant to Section 13.60.200 of this chapter, for wasting water from the same location or premises.
- (c) It shall be unlawful for any water user within the city to make, cause, use or permit the use of water for residential, commercial, industrial, agricultural or any other purpose in a manner contrary to any provision of this chapter.
- (d) It shall be unlawful for any water user to cause or permit any water furnished to any property within the city to run or to escape from any hose, pipe, valve, faucet, sprinkler or irrigation device onto any sidewalk, street or gutter or to otherwise escape from the property, if such running or escaping can reasonably be prevented.
- (e) It shall be unlawful for any water user to wash any vehicle, equipment or other object, or any driveway, parking lot, sidewalk, street or other paved surface, in any manner permitting runoff for more than five consecutive minutes, or a total of twenty minutes in any twenty-four hour period.
- (f) Commercial and noncommercial watering of turf, ground cover, open ground, shrubbery, crops, gardens and trees, including agricultural irrigation, in a manner or to an extent which allows excess runoff shall not be permitted. A minimum amount of runoff, which is a natural consequence of conservative watering, either by hand or by mechanical or automated sprinkling facilities, is permitted, so long as such runoff does not amount to excess runoff as defined in this chapter.
- (g) It shall be unlawful for any water user permit the excess use, loss or escape of water through breaks, leaks or other malfunctions in the water user's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected.
- (h) It shall be unlawful for any water user to willfully or negligently permit or cause the escape or flow of irrigation water in such quantity as to cause flooding, impede vehicular or pedestrian traffic, create a hazardous condition to such traffic or cause damage to public or private rights of way through failure or neglect to properly operate or maintain any irrigation structure, delivery ditch or waste ditch.
- (i) It shall be unlawful for any water user to water or permit the watering of water intensive landscape or turf at time other than as authorized by the water purveyor.
- (j) It shall be unlawful for any water user to willfully or negligently fail to accept irrigation water after it has been ordered.

(Ord. 2114 § 2 (part), 2005)

13.60.050 - Limitation on water intensive landscape and turf areas within new nonresidential facilities.

- (a) The following types of facilities shall limit the water intensive landscape and turf within the landscaped area to the following percentages of the total lot area, and all remaining landscaped area shall consist of plants listed in Section 13.60.030 of this chapter:
 - (1) Churches: Twenty five percent of total lot area.
 - (2) Resorts, including hotels and motels: Ten percent of the total lot area.
 - (3) Commercial and industrial uses, fewer than nine thousand square feet: Ten percent of the total lot area.
 - (4) Commercial and industrial uses, nine thousand square feet to one acre: Ten percent of the first nine thousand square feet, and five percent of the remaining lot area.
 - (5) Commercial and industrial uses, greater than one acre: No additional water intensive landscape and turf beyond the amounts allowed in Section 13.60.120(a) (4).
 - (6) Common areas in residential developments: Ten percent of the first acre and five percent of each additional acre up to five acres. Residential developments larger than five acres shall not plant any additional water intensive landscape and turf in common areas.
- (b) Active recreational areas shall not be considered in calculating the percentage of the total lot area and

shall not be considered in determining compliance with this section.

- (c) No water intensive landscape or turf shall be permitted in any right-of-way.

(Ord. 2114 § 2 (part), 2005)

13.60.060 - Limitations on model home and new residential development landscaping.

- (a) All new model homes and new residential development shall limit water intensive landscape and turf area to the rear yard at the following percentage of the total lot area, and all remaining landscaped area shall consist of plants listed in Section 13.60.030 of this chapter:
- (1) Nine thousand square feet or less. Ten percent of the total lot area.
 - (2) Nine thousand one square feet to one acre. Ten percent of the first nine thousand square feet and five percent of the remainder of the lot area.
 - (3) Greater than one acre. No additional water intensive landscape or turf area shall be permitted beyond that allowed in subsection (a) (2) of this section.
- (b) Water intensive landscape or turf shall only be located in rear yards.
- (c) No water intensive landscape or turf shall be planted in any right of way. Drought tolerant plants or landscape listed under Section 13.60.030 shall not be planted in any right of way, unless prior approval is obtained from the city.
- (d) Prior to closing on a new residential unit, the developer shall provide the homeowner with a copy of the city requirements for water conservation. Upon receipt, the homeowner shall sign an affidavit of acceptance. The developer shall permanently maintain the signed affidavit.

(Ord. 2114 § 2 (part), 2005)

13.60.070 - Public education.

The city will use intensive public education to assist water users to understand the city's need for voluntary compliance. In addition to education, the city may use enforcement measures to curb water misuse.

(Ord. 2114 § 2 (part), 2005)

13.60.080 - Drought management plan implementation.

- (a) The city manager shall promulgate a drought management plan containing regulations setting forth the criteria for implementation and termination of various water use reduction stages.
- (b) The city manager is authorized to declare a drought, and to implement a drought management plan, in response to events including, but not limited to, the following: reductions in supply from any water purveyor, or when an insufficient supply appears likely due to water system limitations or structural failure.
- (c) Such declaration may designate the entire area of the city or a portion of it if the shortage is not citywide.
- (d) The city manager may terminate the drought declaration when it is determined that the events that triggered the drought no longer exist.

(Ord. 2114 § 2 (part), 2005)

13.60.090 - Notification and publication of drought management plan.

If the city manager determines that the health and safety of the city dictate implementing the drought management plan, notification shall be published in a paper of general circulation, to educate the public about the need for the plan, and give them notice of conservation regulations and requirements of the applicable stage of the plan. A copy of the drought management plan shall also be available for inspection at the city clerk's office.

(Ord. 2114 § 2 (part), 2005)

13.60.100 - Enforcement of drought management plan.

- (a) The city manager or his or her designee shall have authority to take actions to enforce any mandatory elements that are part of drought management plans.
- (b) A written notice shall be placed on the property when a first violation occurs, and a duplicate mailed to the person who is responsible for the service to the property where the violation took place. The notice shall describe the violation and order that it be abated immediately.
- (c) For subsequent violations, the city will issue citations and fines according to the provisions of this chapter.
- (d) Funds generated by the fines under this section shall be used to mitigate the impact of the drought.

(Ord. 2114 § 2 (part), 2005)

13.60.110 - Variances from drought management plan.

Variances to drought management plan provisions may be granted at the discretion of the city manager or his or her designee. Applicants for a variance must apply in writing to the city manager or his or her designee, and demonstrate special circumstances such as health and safety needs or obligation of contract.

(Ord. 2114 § 2 (part), 2005)

13.60.120 - Limited exemption to restrictions for users of reclaimed water.

To the extent they are exempt from the drought management plan, users of reclaimed or recycled water shall clearly post notices stating that the water being used is not potable and not from the public drinking water supply, and is in conformance to drought management plan in force at the time.

13.60.130 - Violations.

- (a) For a first violation of any provision of this chapter, the city shall issue a written notice of first violation and provide the violator with educational materials on water conservation, including a copy of the relevant provisions of this chapter. The city shall give the water user a reasonable period of time to correct the violation. Failure to correct the violation within a reasonable period of time shall constitute a second violation.
- (b) For a second violation of any provision of this chapter, the city shall issue a written notice of second violation to the water user imposing a fine in an amount not to exceed fifty dollars, and requiring immediate correction of the violation.
- (c) For a third violation of any provision of this section, the city shall issue a written notice of third violation to the water user imposing a fine in an amount not to exceed two hundred dollar, and requiring immediate correction of the violation.
- (d) For a fourth or subsequent violation of this section, the city shall impose a fine in an amount not to exceed five hundred dollars. The fourth and each subsequent violation of this chapter shall be deemed a public nuisance, which may be abated pursuant to the procedures provided in Chapter 13.02 "Nuisances" of this code.
- (e) Any fine imposed under this section shall be collected in accordance with the procedures of Chapter 1.05 "Administrative remedies" of this code. Failure to pay any portion of a water user's account, including any fines imposed pursuant to this section, shall subject the account to termination of water service in accordance with the provisions of this section.
- (f) In addition to the remedies set forth above, the city may seize equipment, line, fountains and other devices that are operated in violation of this chapter, until the fine is paid. The city may dispose of these items if the fine is not paid in six months from the date the equipment was confiscated.

(Ord. 2114 § 2 (part), 2005)

13.60.140 - Right to hearing.

Any water user against whom a penalty is levied under this chapter shall have a right to a hearing before the city manager or his or her designee.

(Ord. 2114 § 2 (part), 2005)

13.60.195 - Reclaimed water pipelines.

- (a) All new residential tract development shall provide for the installation of reclaimed water pipelines, to the extent required by the responsible water purveyor. Such pipelines shall be connected to the water purveyor's reclaimed water system. The foregoing requirements are not applicable to individual residential lots.
- (b) It is the policy of the city to encourage the use of reclaimed water, whenever such use is appropriate and safe, in order to conserve potable water in the Victor Valley. To further these efforts, all water users with reclaimed water pipelines should make reasonable efforts to use reclaimed water for landscaping purposes, whenever reclaimed water is readily available and will not pose a danger to human health and safety.

(Ord. 2138 § 2, 2006)

ORDINANCE NO. 2114

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF
VICTORVILLE AMENDING CHAPTER 13.60 "WATER
CONSERVATION" OF THE VICTORVILLE MUNICIPAL CODE
RELATING TO WATER CONSERVATION AND LANDSCAPING

WHEREAS, the rapid growth of the Victor Valley (the "Valley") generally, and the City of Victorville (the "City") specifically, has placed and continues to place a substantial strain on the water resources of the Valley; and

WHEREAS, it is the policy of the City to conserve and protect its valuable and critical water resources; and

WHEREAS, it is the intent and policy of the City Council of the City (the "City Council") to ensure the continued health, safety, welfare, and quality of life for the existing and future residents and visitors to the City by assisting in the conservation of its water resources; and

WHEREAS, the City Council finds that it is in the best interests of citizens of the City to enact an ordinance that seeks to prevent the misuse of our water supply through measures that include restrictions on water usage; and

WHEREAS, enforcement of water restrictions may be made more effective through education and/or the use of a citation system; and

WHEREAS, use of the citation system will allow the imposition of civil penalties for violation of the provisions of the Water Conservation Ordinance; and

WHEREAS, the imposition of civil penalties for violations of the Water Conservation Ordinance will protect the water resources of the City;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF VICTORVILLE DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. RECITALS

The recitals set forth above are true and correct, and are hereby incorporated by this reference as if set forth in their entirety.

Section 2. AMENDMENT OF CHAPTER 13.60 "WATER CONSERVATION"

The Victorville Municipal Code Chapter 13.60 "Water Conservation" shall be amended to read as follows:

- 13.60.100 Definitions
- 13.60.105 Application of Chapter
- 13.60.110 Drought Tolerant Plants
- 13.60.115 Prohibited Water Uses
- 13.60.120 Limitation on Water Intensive Landscape and Turf Areas Within New Nonresidential Facilities
- 13.60.130 Limitations on Model Home Landscaping
- 13.60.140 Public Education During Drought
- 13.60.150 Drought Management Plan Implementation
- 13.60.160 Notification and Publication of Drought Management Plan
- 13.60.170 Enforcement of Drought Management Plan
- 13.60.180 Variances From Drought Management Plan
- 13.60.190 Limited Exemption to Restrictions for Users of Reclaimed Water
- 13.60.200 Violations
- 13.60.210 Right to Hearing

13.60.100 Definitions

Acre-foot of water means that quantity of water required to cover one (1) acre of land one (1) foot deep, or three hundred twenty-five thousand, eight hundred fifty-one (325,851) gallons.

Active recreational area means an area designated and primarily used for organized sports, including, without limitation, softball, baseball, football, soccer or a similar related sport, including all amenities related to the activity.

Body of water means any artificially constructed lake, pond or lagoon, regardless of size.

City means the City of Victorville.

Controller means a mechanical timer capable of operating valve stations to set days, length of time and frequency of water application.

Escaped water means the pumping, flow release, escape or leakage of any water from any pipe, valve, faucet, connection,

diversion berm, well, or any facility for the purposes of water supply, transport, storage, disposal, or delivery onto adjacent property or public right-of-way.

Excess runoff means water accumulation on streets, gutters, neighboring properties or other areas in an amount sufficient to cause flow.

Manager means the City Manager or the City Manager's designee.

Lot means a legally created parcel of land occupied or intended for occupancy by one (1) main building together with its accessory buildings, and uses customarily incidental to it, including the open space required by the City's zoning ordinance, and having its principal frontage upon a street as defined in the City's zoning ordinance.

Model home means a facility used exclusively for the promotion and sale of homes similar to the model.

Person means an individual, corporation, partnership, incorporated association or any other similar entity.

Public water system means any publicly or privately owned network of pipes, conduits, wells, reservoirs, holding tanks and other components, including any combination thereof, which supplies water to water users, who are charged a fee of any kind or nature for such purpose, or which is designed to supply water or is capable of supplying water to water users for a fee, and includes any such system whether it is operated under the regulatory authority of the City of Victorville, but does not include any irrigation company or district whose primary purpose is to supply water for farming.

Residential development means the development of any type of dwelling unit or units suitable or designed for human habitation, including, but not limited to, single family homes, condominiums or manufactured homes, but not including hotels, motels, licensed convalescent homes, commercially operated retirement homes, time share units, or the like. "Residential development" shall not include remodeling or reconstruction where no new dwelling unit is created.

Right of way means land which by deed, conveyance, agreement, easement, dedication, usage or process of law is

reserved for or dedicated to the general public for street, highway, alley, public utility, or pedestrian walkway purposes.

Turf means a surface layer of earth containing grass with its roots.

Turf-related facility means a school, public recreational facility, cemetery, golf course, industrial park or common area of a housing development that applies water from any source, including effluent.

Water intensive landscape means an area of land that is watered with a permanent water application system and planted primarily with plants not listed in section 13.60.110 "Drought Tolerant Plants." Included is the total surface area of all water features (i.e. swimming pools of any size, fountains, ponds, water courses, waterfalls, and other artificial water structures) filled or refilled with water from any source.

Water purveyor means the owner or operator of a public water system.

Water user means those persons, customers and properties served by a water purveyor within the incorporated boundaries of the City.

Water waste means the intentional or unintentional use or excessive dissipation of water, which is unproductive or does not reasonably sustain life or economic benefits.

13.60.105 Application of Chapter

The provisions of this chapter shall apply to all water users. The restrictions or prohibitions in this chapter shall not apply to water use, runoff or flow:

- (a) resulting from fire fighting, hydrant flushing or fire training activities; or
- (b) necessary to prevent or abate threats to the public health or safety; or
- (c) from routine maintenance of any public water system, well flushing, or from temporary water system failures or malfunctions.

13.60.110 Drought Tolerant Plants

The following categories of plants are hereby designated as "drought tolerant plants" and are not subject to any limitations in this chapter relating to water intensive landscape restrictions.

Accents

Agave species: *A. Americana* (Century Plant);
A. parryi huachucensis; *A. victoriae-reginae*
Dasyllirion wheeleri, Desert Spoon
Nolina microcarpa, Bear Grass
Hesperaloe parviflora, Red Yucca
Kniphofia uvaria, Red-Hot Poker, Torch Lily
Yucca species: *Y. aloifolia*, Spanish Bayonet;
Y. baccata, Banana Yucca, Datil; *Y.*
brevifolia, Joshua Tree; *Y. elata*, Soaptree
Yucca
Chamaerops humilis, Mediterranean Fan Palm
Trachycarpus fortunei, Windmill Palm
Washingtonia filifera, California Fan Palm

Grasses

Ornamental

Muhlenbergia rigens, Deer Grass
Muhlenbergia capillaris, Regal Mist
Muhlenbergia lindheimeri, Autumn Glow
Festuca ovina glauca, Blue Fescue
Bouteloua gracilis, Blue Grama
Nassella tenuissima (*Stipa tenuissima*),
Mexican Feather Grass

Turf

Buchloe dactyloides, Buffalo Grass (Legacy)
Buchloe dactyloides, Buffalo Grass (UC
Verde)

Warm-Season Grasses (winter dormant):

Zoysia, Zoysia Grass

Stenotaphrum secundatum, St. Augustine Grass

Cool-Season Grasses (year round):

Festuca arundinacea, Tall Fescue

Lolium perenne, Perennial Ryegrass

Poa pratensis, Kentucky Bluegrass

Ground Covers

Oenothera berlandieri, Mexican Evening Primrose

Santolina chamaecyparissus, Lavender Cotton

Cerastium tomentosum, Snow-in-Summer

Gazania, most varieties

Sedum, most varieties

Thymus, most varieties

Verbena peruviana; *V. pulchella*

Dalea greggii, Trailing Indigo Bush

Rosmarinus officinalis, 'Prostratus'

Phlox, most varieties

Perennial Flowers

Coreopsis, most varieties

Penstemon ambiguus, *P. barbatus*, *P. centranthifolius*, *P. eatonii*, *P. palmeri*, *P. parryi*, *P. pinifolius*, *P. pseudospectabilis*, *P. strictus*

Cosmos, most varieties

Convolvulus cneorum, Bush Morning Glory

Perovskia, Russian Sage or Blue Spire

Berlandiera lyrata, Chocolate Flower

Gaura lindheimeri, 'Whirling Butterflies,' 'Siskiyou Pink'

Hemerocallis, Daylily, most varieties

Rosmarinus officinalis, most prostrate and upright varieties

Verbena gooddingii, *V. peruviana*, *V. rigida*

Shrubs

Salvia greggii, Red Sage, Autumn Sage

Salvia clevelandii, Blue Sage, Cleveland Sage

Salvia chamaedryoides, Germander Sage

Fallugia paradoxa, Apache Plume

Leucophyllum frutescens, Texas Ranger species, several varieties

Leucophyllum laevigatum, Chihuahuan Sage

Baccharis 'Centennial', Coyote Bush

Baccharis pilularis, Dwarf Coyote Brush

Artemisia, 'Powis Castle'

Cotoneaster horizontalis, Rock Cotoneaster

Photinia fraseri

Grevillea 'Noellii'

Trees

Evergreen

Eucalyptus camaldulensis (rostrata), Red River

Eucalyptus microtheca, Coolibah

Pinus eldarica, Eldarica Pine, Afghan Pine, Russian Pine

Pinus halepensis, Aleppo Pine

Pinus pinea, Italian Stone Pine

Cedrus deodara, Deodar Cedar

Calocedrus decurrens, Incense Cedar

Heteromeles arbutifolia, Toyon

Sophora secundiflora, Texas Mountain Laurel

Arbutus unedo, Strawberry Tree
Pithecellobium flexicaule, Texas Ebony

Deciduous

Albizia julibrissin, Silk Tree, Mimosa
Chilopsis linearis, Desert Willow, 'Burgundy'
Chitalpa tashkentensis, Pink Dawn, Morning Cloud
Parkinsonia floridum, Blue Palo Verde
Parkinsonia microphyllum, Littleleaf Palo Verde
Parkinsonia aculeata, Mexican Palo Verde
Fraxinus angustifolia, 'Raywood' (Raywood Ash)
Fraxinus velutina, Arizona Ash
Fraxinus velutina, 'Modesto' (Modesto Ash)
Prosopis chilensis, Chilean Mesquite
Prosopis glandulosa, Honey Mesquite
Prosopis pubescens, Screw Bean Mesquite
Gleditsia triacanthos, Honey Locust
Pistacia chinensis, Chinese Pistache
Vitex agnus-castus, Chaste Tree, Monk Tree

13.60.115 Prohibited Water Uses and Water Waste

(a) It shall be unlawful for any water user of a public water system to allow water waste at any location or premises within the City limits after having been served with a notice of violation, pursuant to section 13.60.200 of this chapter, for wasting water from the same location or premises.

(b) It shall be unlawful for any owner, occupier or manager of real property within the City to allow water waste at any such real property after having been served with a notice of violation, pursuant to section 13.60.200 of this chapter, for wasting water from the same location or premises.

(c) It shall be unlawful for any water user within the City to make, cause, use or permit the use of water for residential, commercial, industrial, agricultural or any other purpose in a manner contrary to any provision of this chapter.

(d) It shall be unlawful for any water user to cause or permit any water furnished to any property within the City to run or to escape from any hose, pipe, valve, faucet, sprinkler or irrigation device onto any sidewalk, street or gutter or to otherwise escape from the property, if such running or escaping can reasonably be prevented.

(e) It shall be unlawful for any water user to wash any vehicle, equipment, or other object, or any driveway, parking lot, sidewalk, street or other paved surface, in any manner permitting runoff for more than five consecutive minutes, or a total of twenty minutes in any 24-hour period.

(f) Commercial and noncommercial watering of turf, ground cover, open ground, shrubbery, crops, gardens and trees, including agricultural irrigation, in a manner or to an extent which allows excess runoff shall not be permitted. A minimum amount of runoff, which is a natural consequence of conservative watering, either by hand or by mechanical or automated sprinkling facilities, is permitted, so long as such runoff does not amount to excess runoff as defined in this chapter.

(g) It shall be unlawful for any water user permit the excess use, loss or escape of water through breaks, leaks or other malfunctions in the water user's plumbing or distribution system for any period of time after such escape of water should have reasonably been discovered and corrected.

(h) It shall be unlawful for any water user to willfully or negligently permit or cause the escape or flow of irrigation water in such quantity as to cause flooding, impede vehicular or pedestrian traffic, create a hazardous condition to such traffic, or cause damage to public or private rights of way through failure or neglect to properly operate or maintain any irrigation structure, delivery ditch or waste ditch.

(i) It shall be unlawful for any water user to water or permit the watering of water intensive landscape or turf at time other than as authorized by the water purveyor.

(j) It shall be unlawful for any water user to willfully or negligently fail to accept irrigation water after it has been ordered.

13.60.120 Limitation on Water Intensive Landscape and Turf Areas Within New Nonresidential Facilities

(a) The following types of facilities shall limit the water intensive landscape and turf within the landscaped area to the following percentages of the total lot area, and all remaining landscaped area shall consist of plants listed in section 13.60.110 of this chapter:

(1) Churches: Twenty five percent (25%) of total lot area.

(2) Resorts, including hotels and motels: Ten percent (10%) of the total lot area.

(3) Commercial and industrial uses, fewer than nine thousand square feet: Ten percent (10%) of the total lot area.

(4) Commercial and industrial uses, nine thousand square feet to one acre: Ten percent (10%) of the first nine thousand (9,000) square feet, and five percent (5%) of the remaining lot area.

(5) Commercial and industrial uses, greater than one acre: No additional water intensive landscape and turf beyond the amounts allowed in section 13.60.120(a)(4).

(6) Common areas in residential developments: Ten percent (10%) of the first acre and five percent (5%) of each additional acre up to five (5) acres. Residential developments larger than five (5) acres shall not plant any additional water intensive landscape and turf in common areas.

(b) Active recreational areas shall not be considered in calculating the percentage of the total lot area and shall not be considered in determining compliance with this section.

(c) No water intensive landscape or turf shall be permitted in any right of way.

13.60.130 Limitations on Model Home and New Residential Development Landscaping

(a) All new model homes and new residential development shall limit water intensive landscape and turf area to the rear yard at the following percentage of the total lot area, and all remaining landscaped area shall consist of plants listed in section 13.60.110 of this chapter:

(1) Nine thousand (9,000) square feet or less. Ten percent (10%) of the total lot area.

(2) Nine thousand one (9,001) square feet to one (1) acre. Ten percent (10%) of the first nine thousand (9,000) square feet and five (5) percent of the remainder of the lot area.

(3) Greater than one (1) acre. No additional water intensive landscape or turf area shall be permitted beyond that allowed in section 13.60.130(a)(2).

(b) Water intensive landscape or turf shall only be located in rear yards.

(c) No water intensive landscape or turf shall be planted in any right of way. Drought tolerant plants or landscape listed under section 13.60.110 shall not be planted in any right of way, unless prior approval is obtained from the City.

(d) Prior to closing on a new residential unit, the developer shall provide the homeowner with a copy of the City requirements for water conservation. Upon receipt, the homeowner shall sign an affidavit of acceptance. The developer shall permanently maintain the signed affidavit.

13.60.140 Public Education

The City will use intensive public education to assist water users to understand the City's need for voluntary compliance. In addition to education, the City may use enforcement measures to curb water misuse.

13.60.150 Drought Management Plan Implementation

(a) The City Manager shall promulgate a drought management plan containing regulations setting forth the criteria for

implementation and termination of various water use reduction stages.

(b) The City Manager is authorized to declare a drought, and to implement a drought management plan, in response to events including, but not limited to, the following: reductions in supply from any water purveyor, or when an insufficient supply appears likely due to water system limitations or structural failure.

(c) Such declaration may designate the entire area of the City, or a portion of it if the shortage is not citywide.

(d) The City Manager may terminate the drought declaration when it is determined that the events that triggered the drought no longer exist.

13.60.160 Notification and Publication of Drought Management Plan

If the City Manager determines that the health and safety of the City dictate implementing the drought management plan, notification shall be published in a paper of general circulation, to educate the public about the need for the plan, and give them notice of conservation regulations and requirements of the applicable stage of the plan. A copy of the drought management plan shall also be available for inspection at the City Clerk's office.

13.60.170 Enforcement of Drought Management Plan

(a) The City Manager or his or her designee shall have authority to take actions to enforce any mandatory elements that are part of drought management plans.

(b) A written notice shall be placed on the property when a first violation occurs, and a duplicate mailed to the person who responsible for the service to the property where the violation took place. The notice shall describe the violation and order that it be abated immediately.

(c) For subsequent violations, the City will issue citations and fines according to the provisions of this chapter.

(d) Funds generated by the fines under this section shall be used to mitigate the impact of the drought.

13.60.180 Variances From Drought Management Plan

Variances to drought management plan provisions may be granted at the discretion of the City Manager or his or her designee. Applicants for a variance must apply in writing to the City manager or his or her designee, and demonstrate special circumstances such as health and safety needs or obligation of contract.

13.60.190 Limited Exemption to Restrictions for Users of Reclaimed Water

To the extent they are exempt from the drought management plan, users of reclaimed or recycled water shall clearly post notices stating that the water being used is not potable and not from the public drinking water supply, and is in conformance to drought management plan in force at the time.

13.60.200 Violations

(a) For a first violation of any provision of this chapter, the City shall issue a written notice of first violation and provide the violator with educational materials on water conservation, including a copy of the relevant provisions of this chapter. The City shall give the water user a reasonable period of time to correct the violation. Failure to correct the violation within a reasonable period of time shall constitute a second violation.

(b) For a second violation of any provision of this chapter, the City shall issue a written notice of second violation to the water user imposing a fine in an amount not to exceed Fifty Dollars (\$50.00), and requiring immediate correction of the violation.

(c) For a third violation of any provision of this section, the City shall issue a written notice of third violation to the water user imposing a fine in an amount not to exceed Two Hundred Dollar (\$200.00), and requiring immediate correction of the violation.

(d) For a fourth or subsequent violation of this section, the City shall impose a fine in an amount not to exceed Five Hundred Dollars (\$500.00). The fourth and each subsequent violation of this chapter shall be deemed a public nuisance, which may be abated pursuant to the procedures provided in Chapter 13.02 "Nuisances" of this Code.

(e) Any fine imposed under this section shall be collected in accordance with the procedures of Chapter 1.05 "Administrative Remedies" of this Code. Failure to pay any portion of a water user's account, including any fines imposed pursuant to this section, shall subject said account to termination of water service in accordance with the provisions of this section.

(f) In addition to the remedies set forth above, the City may seize equipment, line, fountains and other devices that are operated in violation of this chapter, until the fine is paid. The City may dispose of these items if the fine is not paid in six (6) months from the date the equipment was confiscated.

13.60.210 Right to Hearing

Any water user against whom a penalty is levied under this chapter shall have a right to a hearing before the City Manager or his or her designee.

Section 3. SEVERABILITY

The City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

Section 4. REPEAL OF CONFLICTING PROVISIONS

All the provisions of the Victorville Municipal Code as heretofore adopted by the City of Victorville that are in conflict with the provisions of this ordinance are hereby repealed.

THIS ORDINANCE SHALL BE IN FULL FORCE AND EFFECT ON NOVEMBER 3, 2005.

PASSED, APPROVED AND ADOPTED THIS 4TH DAY OF OCTOBER, 2005.

Mike Rothschild
MAYOR OF THE CITY OF VICTORVILLE

ATTEST:

Carolee Bates
CITY CLERK

APPROVED AS TO FORM:

Asst. City Attorney
CITY ATTORNEY

I, CAROLEE BATES, City Clerk of the City of Victorville and ex-officio Clerk to the City Council of said City, DO HEREBY CERTIFY that the foregoing is a true and correct copy of Ordinance No. 2114 which was introduced at a meeting held on September 20, 2005 and duly adopted at a meeting held on the 4th day of October, 2005 by the following roll call vote, to wit:

AYES: Councilmembers Almond, Cabriales, Caldwell and Rothschild

NOES: None

ABSENT: Councilmember Hunter

ABSTAIN: None

Carolee Bates
CITY CLERK OF THE CITY OF VICTORVILLE

CERTIFICATION OF ORDINANCE

The following is a true and correct copy of City of Victorville Ordinance No. 2114 which was duly adopted at a meeting of the City Council of the City of Victorville held October 4, 2005 and published pursuant to California Government Code Section 36933(c)(1)

Marcie Watters, Deputy
Carolee Bates, City Clerk
City of Victorville

URGENCY INTERIM ORDINANCE NO. 2133

AN URGENCY INTERIM ORDINANCE OF THE CITY COUNCIL OF THE CITY OF VICTORVILLE TEMPORARILY AMENDING SECTION 13.60.110 "DROUGHT TOLERANT PLANTS" OF THE VICTORVILLE MUNICIPAL CODE TO PROHIBIT THE USE OF WATER INTENSIVE PLANTS FOR LANDSCAPING PURPOSES

WHEREAS, California Government Code section 65858 provides that an interim ordinance may be adopted by a four-fifths vote following notice pursuant to Section 65090 and public hearing, in which case it shall be of no further force and effect 45 days from its date of adoption; and

WHEREAS, the rapid growth of the Victor Valley generally, and the City of Victorville specifically, has placed and continues to place a substantial strain on the water resources of the Victor Valley; and

WHEREAS, on October 4, 2005, the City adopted Ordinance No. 2114, amending Chapter 13.60 of the Victorville Municipal Code; and

WHEREAS, Ordinance No. 2114 defined certain plants as "drought tolerant plants," which plants the City has subsequently determined to be water intensive and not drought tolerant; and

WHEREAS, the City desires to amend Section 13.60.110 "Drought tolerant plants" of Chapter 13.60 "Water Conservation" to authorize the Planning Director to establish a list of drought tolerant plants, and to amend that list from time to time, as necessary; and

WHEREAS, the scarcity of water resources in the Victor Valley has created a current and immediate threat to the public health, safety, or welfare of the residents of the City, and the approval of additional entitlements for development would result in that threat to public health, safety, or welfare.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF VICTORVILLE DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. RECITALS

The recitals set forth above are true and correct, and are hereby incorporated by this reference as if set forth in their entirety.

Section 2. AMENDMENT OF SECTION 13.60.110 "WATER CONSERVATION"

The Victorville Municipal Code Section 13.60.110 "Drought tolerant plants" shall be amended to read as follows:

13.60.110 Drought Tolerant Plants

a. The Planning Director, or his or her designee, shall establish, and make available to the public, a list categorizing plants that are "drought tolerant plants." Such drought tolerant plants are not subject to any limitations in this chapter relating to water intensive landscape restrictions. Such list shall be established within thirty (30) days of the effective date of this ordinance.

b. The Planning Director, or his or her designee, may amend this list from time to time, as necessary, for the purpose of adding any drought tolerant plant to the list referenced in subsection (a), or removing any non-drought tolerant plant from the list referenced in subsection (a).

Section 3. SEVERABILITY

The City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

Section 4. REPEAL OF CONFLICTING PROVISIONS

All the provisions of the Victorville Municipal Code as heretofore adopted by the City of Victorville that are in conflict with the provisions of this ordinance are hereby repealed.

Section 5. EFFECTIVE DATE

This ordinance is an urgency ordinance for the immediate preservation of the public health and safety; therefore it shall be passed immediately upon its introduction and shall become effective immediately upon its introduction pursuant to California Government Code Section 36937, and shall expire upon forty five days from the effective date pursuant to Government Code Section 65858.

THIS ORDINANCE SHALL BE IN FULL FORCE AND EFFECT UPON ITS ADOPTION.

PASSED, APPROVED AND ADOPTED THIS 17th DAY OF JANUARY, 2006.

Mike Rothschild
MAYOR OF THE CITY OF VICTORVILLE

ATTEST:

Carla Bates
CITY CLERK

APPROVED AS TO FORM:

207 *Gle Robertson*
CITY ATTORNEY

I, CAROLEE BATES, City Clerk of the City of Victorville and ex-officio Clerk to the City Council of said City, DO HEREBY CERTIFY that the foregoing is a true and correct copy of Urgency Interim Ordinance No. 2133 which was adopted at a meeting held on January 17, 2006 by the following roll call vote, to wit:

AYES: Councilmembers Almond, Cabriales, Caldwell, Hunter and Rothschild

NOES: None

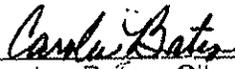
ABSENT: None

ABSTAIN: None

Carla Bates
CITY CLERK OF THE CITY OF VICTORVILLE

CERTIFICATION OF ORDINANCE

The following is a true and correct copy of City of Victorville Ordinance No. 2133 which was duly adopted at a meeting of the City Council of the City of Victorville held February 7, 2006 and published pursuant to California Government Code Section 36933(c)(1)



Carolee Bates, City Clerk
City of Victorville

ORDINANCE NO. 2135

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF VICTORVILLE AMENDING SECTION 13.60.110 "DROUGHT TOLERANT PLANTS" OF CHAPTER 13.60 "WATER CONSERVATION" OF THE VICTORVILLE MUNICIPAL CODE RELATING TO WATER CONSERVATION AND LANDSCAPING

WHEREAS, on October 4, 2005, the City of Victorville (the "City") adopted Ordinance No. 2114, amending Chapter 13.60 of the Victorville Municipal Code; and

WHEREAS, the City desires to permanently amend Section 13.60.110 "Drought tolerant plants" of Chapter 13.60 "Water Conservation" to authorize the Planning Director to establish a list of drought tolerant plants, and to amend that list from time to time, as necessary; and

WHEREAS, on January 17, 2006, the City adopted Urgency Interim Ordinance No. 2133, temporarily amending section 13.60.110 to allow the Planning Director to establish a list of drought tolerant plants; and

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF VICTORVILLE DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. RECITALS

The recitals set forth above are true and correct, and are hereby incorporated by this reference as if set forth in their entirety.

Section 2. AMENDMENT OF SECTION 13.60.110 "DROUGHT TOLERANT PLANTS"

The Victorville Municipal Code Section 13.60.110 "Drought tolerant plants" shall be amended to read as follows:

13.60.110 Drought Tolerant Plants

a. The Planning Director, or his or her designee, shall establish, and make available to the public, a list categorizing plants that are "drought tolerant plants" (the "List"). Such drought tolerant plants are not subject to any limitations in this chapter relating to water intensive landscape restrictions. The Planning Director, or his or her designee, shall establish the List within thirty (30) days of the effective date of this ordinance.

b. The Planning Director, or his or her designee, may amend the List from time to time, as necessary, for the purpose of adding any drought tolerant plant to the List, or removing any non-drought tolerant plant from the List.

Section 3. SEVERABILITY

The City Council declares that, should any provision, section, paragraph, sentence or word of this ordinance be rendered or declared invalid by any final court action in a court of competent jurisdiction or by reason of any preemptive legislation, the remaining provisions, sections, paragraphs, sentences or words of this ordinance as hereby adopted shall remain in full force and effect.

Section 4. REPEAL OF CONFLICTING PROVISIONS

All the provisions of the Victorville Municipal Code as heretofore adopted by the City of Victorville that are in conflict with the provisions of this ordinance are hereby repealed.

The provisions of this Ordinance supersede Urgency Interim Ordinance No. 2133, which is hereby repealed in its entirety.

THIS ORDINANCE SHALL BE IN FULL FORCE AND EFFECT ON MARCH 23, 2006.

PASSED, APPROVED AND ADOPTED THIS 21st DAY OF FEBRUARY, 2006.

Mike Rothschild
MAYOR OF THE CITY OF VICTORVILLE

ATTEST:

Carolee Bates
CITY CLERK

APPROVED AS TO FORM:

Carolee Bates
CITY ATTORNEY

I, CAROLEE BATES, City Clerk of the City of Victorville and ex-officio Clerk to the City Council of said City, DO HEREBY CERTIFY that the foregoing is a true and correct copy of Ordinance No. 2135 which was introduced at a meeting held on February 7, 2006 and duly adopted at a meeting held on the 21st day of February, 2006 by the following roll call vote, to wit:

AYES: Councilmembers Almond, Cabriales, Caldwell and Rothschild

NOES: Councilmember Hunter

ABSENT: None

ABSTAIN: None

Carolee Bates
CITY CLERK OF THE CITY OF VICTORVILLE

CERTIFICATION OF ORDINANCE

The following is a true and correct copy of City of Victorville Ordinance No. 2135 which was duly adopted at a meeting of the City Council of the City of Victorville held February 21, 2006 and published pursuant to California Government Code Section 36933(c)(1)

Marcie Wolters

Marcie Wolters, Deputy City Clerk
City of Victorville

ORDINANCE NO. VWD-004

AN ORDINANCE OF THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT ("DISTRICT") SUPERSEDING AND REPEALING VICTOR VALLEY WATER DISTRICT ORDINANCE NO. A-112-04 AND BALDY MESA WATER DISTRICT ORDINANCE NO. 1995-8 FOR THE PURPOSES OF: REVISING AND CONSOLIDATING THE RULES AND REGULATIONS OF THE FORMER INDIVIDUAL WATER DISTRICTS TO APPLY UNIFORMLY TO THE DISTRICT; ADOPTING AND FACILITATING FUTURE ADOPTION OF UNIFIED PROCEDURES FOR THE ADMINISTRATION, BILLING AND COLLECTION OF THE RATES, FEES AND CHARGES ASSOCIATED WITH WATER SERVICES PROVIDED BY THE DISTRICT; AND IMPLEMENTING ENABLING PROVISIONS RELATED TO WATER ACCOUNT ADMINISTRATIVE CHARGES AND LIENS

WHEREAS, Local Agency Formation Commission of the County of San Bernardino pursuant to Resolution No. 2959, (Proposal No. LAFCO 2991) ("LAFCO Resolution") approved the reorganization consolidating the Baldy Mesa Water District ("BMWD"), and the Victor Valley Water District ("VVWD") into the Victorville Water District (the "District"); and

WHEREAS, the pursuant to the LAFCO Resolution, the District is a California county water district, and a subsidiary district of the City of Victorville, organized under and existing pursuant to the generally applicable provisions of the laws of the State of California and of the United States of America, and particularly the *County Water District Law* [California Water Code, Section 30000 *et seq.*]; and

WHEREAS, the former VVWD Ordinance Number A-112-04 provided in various sections that fees can be adopted via resolution; and

WHEREAS, the former BWMD Ordinance Number 1995-8 provided that the ordinance may be amended from time to time by action of the Board; and

WHEREAS, the District desires to harmonize, revise and consolidate the policies and procedures set forth in the aforementioned ordinances of the VVWD and the BMWD, having previously revised, harmonized and adopted the rates, fees, and charges for both the former BMWD and the former VVWD by resolutions as described in further detail below; and

WHEREAS, this Ordinance does not increase rates or fees, and does not impose any new rates or fees for water services provided by the District, and

WHEREAS, the establishment of the connection fees, and water service rates and charges associated with water services was duly authorized by the previously duly adopted Victorville Water District Resolution Numbers VWD 08-002, VWD 08-013, VWD 08-015 and VWD 10-012 (“District Rate Resolutions”); and

WHEREAS, the District constructs, owns, operates, improves and maintains the water system and related facilities and infrastructure that serves the District’s existing customers and provides water service availability to new customers and developments within the jurisdictional boundaries of the District; and

WHEREAS, the District wishes to establish, by Ordinance, reasonable and uniform procedures for obtaining water service from the District and for connecting to the District’s water distribution facilities, and procedures and penalties to be enforced in order to ensure the protection of the District’s facilities and to protect the public health, safety and welfare; and

WHEREAS, adequate penalties must be established to deter loss and damage, and to compensate the District for all losses actually suffered and all damages actually incurred due to unlawful connections to the District’s water production and distribution facilities and the unlawful taking of water from the District’s water system; and

WHEREAS, the District wishes for the penalties and charges imposed by this Ordinance to have the full force and effect of law, and for the violation of any provision of this Ordinance to constitute a violation of law, punishable in accordance with the laws of the State of California, by fine and/or imprisonment,

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF DIRECTORS OF THE VICTORVILLE WATER DISTRICT AS FOLLOWS:

SECTION 1. FINDINGS, AUTHORITY, AND GENERAL PROVISIONS

- 1.01. In establishing its procedures, the Board of Directors (the “Board”) has:
 - 1.01.01. given notice of the public hearing to be held in connection with this Ordinance and the District has complied with all notice and public hearing requirements of the law; and
 - 1.01.02. received, reviewed and given due consideration to the evidence presented in connection with the procedures established by this Ordinance, including the various reports and other information received by the Board of Directors in the course of its business; and
- 1.02. The Board has found that the adoption of this Ordinance is exempt from the requirements of the *California Environmental Quality Act (Public Resources Code Section 21000 et seq.)* in that it is not a project as provided for under Section 15601(b) (1) of Title 14 of the *California Code of Regulations (“CCR”)*; in that it does not have a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment.

- 1.03. Authority and Enabling Statutes.** This Ordinance is adopted pursuant to the applicable provisions of Division 12 of the Water Code, the applicable provisions of the Government Code, and further pursuant to the Constitution of the State of California. The District is further authorized by Water Code Section 31027 to prescribe and define by Ordinance those restrictions, prohibitions and exclusions it may determine to be necessary pursuant to the California Constitution Article X, Section 2 and Water Code Sections 31026, 375-377 and 1009 to restrict the use of District water during threatened or existing water shortages. It is therefore the intent of the Board of Directors to establish by this Ordinance those procedures and policies necessary to the orderly administration of a water conservation program to prohibit waste and to restrict the use of water during a water shortage emergency.
- 1.04. Short Title.** This Ordinance may be cited as the "Victorville Water District Water Regulations and Service Ordinance".
- 1.05. Purpose.** This Ordinance is intended to provide rules and regulations applicable to the administration and operational activities of the District. This Ordinance may be amended from time to time by action of the Board of Directors of the District. If not otherwise provided, such amendments shall be done by Ordinance.
- 1.06. Application.** This Ordinance shall apply to all water facilities constructed, maintained, and operated by the District and all water services provided by the District.
- 1.07. Words and Phrases.** For the purpose of this Ordinance all words used herein in the present tense shall include the future; all words in the plural number shall include the singular number; and all words in the singular number shall include the plural number.
- 1.08. Means of Enforcement.** The District hereby declares that the procedures contained herein are established as a means of enforcement of the terms and conditions of its Ordinances, rules and regulations and not as a penalty.
- 1.09. Notices.** Whenever a notice is required to be given under this Ordinance, unless different provisions are specifically made herein, such notice may be made by a good faith effort to provide such notice either by personal delivery thereof to the person to be notified or by deposit in the U.S. Mail in a sealed envelope, postage prepaid, addressed to such person at his/her last known business or residence address as the name appears on public records or other records pertaining to the matter to which the notice is directed. Service by mail shall be deemed to have been completed at the time of deposit in the post office. Proof of giving any notice may be made by the certificate of any officer or employee of the District or by affidavit of any person over the age of eighteen years, which shows service in conformity with this Ordinance or other provisions of law applicable to the subject matter concerned.

- 1.10. Ruling Final.** All rulings of the District shall be final. All rulings of the Authorized Administrator shall be final, unless appealed in writing to the Board within five (5) business days of the Authorized Administrator's decision. When appealed, the Board's ruling shall be final. Appeals to the Board shall be processed in accordance with Section 6 of this Ordinance.
- 1.11. Investigative Powers.** In order to enforce the provisions of this Ordinance, the District may enter upon the private property of any person within the jurisdiction of the District in accordance with Water Code Section 31016, which includes procedures for emergencies.

SECTION 2. DEFINITIONS. Unless the context specifically indicates otherwise, the following terms and phrases shall have the meanings hereinafter designated.

- 2.01. "Applicant"** shall mean the person making application for water service from the District and who shall be the owner of the property and/or premises involved, or an authorized agent or assignee, so authorized in writing to the District. Where a property is already receiving water service from the District and no application for such service has been submitted to the District, the owner of the property shall be recorded as the applicant.
- 2.02. "Authorized Administrator"** shall mean the person or position so designated in an authorized Resolution of the Board, or the duly authorized designee of such Authorized Administrator. Where there is no such designation in an authorized Resolution, the Director of District, or his/her duly authorized designee shall act as the Authorized Administrator.
- 2.03. "Board"** shall mean the Board of Directors of the Victorville Water District, acting in its capacity as the governing body of the District.
- 2.04. "Connection"** shall mean the pipe line and appurtenant facilities such as the curb stop, meter and meter box, all used to extend water service from the main to premises, the laying thereof and the tapping of the main. Where services are divided at the curb or property line to serve several customers, each such branch service shall be deemed a separate service.
- 2.05. "Cost"** shall mean the cost of labor, materials, transportation, supervision, engineering, and all other necessary overhead expenses.
- 2.06. "County"** shall mean the County of San Bernardino, California.
- 2.07. "Customer"** shall mean any person supplied or entitled to be supplied with water service by the District and who shall be the owner of the property and/or premises involved, or his/her authorized agent or assignee, so authorized in writing to the District.

- 2.08. **“Customer’s Service Valve”** shall mean a valve independent of the District’s facilities located in the customer’s piping, the operation of which will control the entire water supply from the meter.
- 2.09. **“Cross-Connection”** shall mean any actual or potential connection or structural arrangement between the public water system or consumer’s potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas, or substance other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel or change-over devices and other temporary or permanent devices through which or because of which backflow can occur are considered to be cross-connections.
- 2.10. **“District”** shall mean the Victorville Water District, a County Water District formed under the provisions of Water Code Section 30000 et seq., within San Bernardino County, California, and a subsidiary district of the City of Victorville (the “City”). The members of the City Council serve ex-officio as members of the Board.
- 2.11. **“Engineer” or “District Engineer”** shall mean a person or firm appointed by the Board to act as an engineer of the District, and who shall be registered as a Civil Engineer by the State of California.
- 2.12. **“May”** shall mean any act, service, or performance that is permissive.
- 2.13. **“Meter”** shall mean the water meter, meter valve, curb cock, wheel valve, other valve, whether located within the meter box or not, along with any other appurtenances, equipment or facilities used for the purpose of rendering water service or the making of such water services available to the premises. Meters are the property of the District and are to be installed and operated only by authorized District personnel.
- 2.14. **“Owner”** shall mean the person owning in fee title, or in whose name the legal title to the property appears, by deed duly recorded in the County Recorder’s office.
- 2.15. **“Permit”** shall mean any written authorization required pursuant to this or any other regulation of the District.
- 2.16. **“Person”** shall mean any human being, individual, firm, company, partnership, association and private, public or Municipal Corporation, the United States of America, the State of California, district, special district, and any other political subdivision, governmental agency, or other public entity or agency.
- 2.17. **“Premises”** shall mean a lot or parcel of real property under one ownership, except where there are well-defined boundaries or partitions such as fences, hedges or other restrictions preventing the common use of the property by several tenants, in which case each portion shall be deemed separate premises. Apartment houses and office buildings may be classified as separate premises.

- 2.18. **“Private Fire Protection Service”** shall mean water service and facilities for building sprinkler systems, hydrants, hose reels and other facilities are installed on private property for fire protection and the water available therefore.
- 2.19. **“Public Fire Protection Service”** shall mean the service and facilities of the entire water supply, storage and distribution system of the District, including the fire hydrants affixed thereto, and the water available for fire protection, excepting house service connections and appurtenances thereto.
- 2.20. **“Regular Water Service”** shall mean water service and facilities rendered for normal potable domestic, commercial and industrial purposes on a permanent basis, and the water available therefore.
- 2.21. **“Residential”** shall mean any single family unit, any duplex or triplex family unit not requiring licensing for occupancy and operation.
- 2.22. **“Secretary”** shall mean the Secretary to the Board.
- 2.23. **“Shall” or “Will”** shall mean any act, service, or performance that is mandatory or otherwise required.
- 2.24. **“Temporary Water Service”** shall mean water service and facilities rendered for construction work and other uses of limited duration, and the water available therefore.
- 2.25. **“Waste”** shall mean any unreasonable or non-beneficial use of water, or any unreasonable method of use of water, including, but not limited to; the use of water for any purpose which allows flooding or runoff in gutters, driveways, streets or adjacent lands; the use of water in violation of any of the specific uses prohibited and restricted by this Ordinance as hereinafter set forth; or the use of water in violation of any other ordinance or resolution of the District either in effect at this time or as hereinafter adopted.
- 2.26. **“Water”** shall mean water in any form or condition supplied by the District.
- 2.27. **“Water Service Connection”** shall mean the connection of a meter or service to District systems or facilities; the installation of a meter or service connection.
- 2.28. **“Water System”** shall mean all property owned by the District for the production, transmission, collection, storage or treatment of water.

SECTION 3. WATER SYSTEM

- 3.01. **Water System.** The District will furnish a system, plant, works and undertakings used for and useful in obtaining, conserving, providing and disposing of water for public and private uses, including all parts of the enterprise, all appurtenances to it, and lands, easements, rights in land, water rights, contract rights, franchises, and other water supply, storage and distribution facilities and equipment.

- 3.02. Standard Requirements for Water System.** As permitted by law, the Board may, from time to time, adopt standard requirements for the design, construction, repair and maintenance, or connection to the District water system in addition to those set forth in this Ordinance in a manner that is authorized by law.

SECTION 4. DISTRICT SERVICES

- 4.01. Initiating Water Service.** The owner of the property and/or premises that has been connected to a District meter, or his/her authorized agent or assignee, so authorized in writing to the District, shall make application for water service in accordance with the District's policies and procedures in effect from time to time. Such owner or owner agent shall personally sign an application for water service form provided by the District and pay those fees, charges and deposits required for new water service pursuant the several provisions of this Ordinance or as prescribed in the most recent resolution adopted by the Board of Directors.
- 4.02. Connection, Reconnection and Service Turn-on.** The owner of the property and/or premises that has been connected or reconnected to a District meter, or his/her authorized agent or assignee, so authorized in writing to the District, shall be present when water services are initially provided by the turn-on or opening of the water meter valve, curb cock, or wheel valve to the property and/or premises by the District. Such owner or agent shall be responsible for all water leaks, open valves or fixtures, or other water which may cause damage to the property and/or premises. The District's jurisdiction and responsibility ends at the property line or right-of-way and the District shall in no case be liable for or assume any responsibility for damages occasioned by water running from open or faulty fixtures, or from broken or damaged pipes inside the property line or outside of the District's right-of-way. In the absence of such owner or agent, the property owner may waive all rights to redress for damages caused by the turn-on or opening of the water meter valve, curb cock, or wheel valve by the District. Such waiver must be signed by the owner or assignee and submitted to the District prior to service turn-on.
- 4.03. Number of Services per Premises.** The applicant may apply for as many services as may be reasonably required for his/her premises provided that the pipeline system for each service is independent of the others and that they not be interconnected.
- 4.04. Authorized Water Service Connections.** It shall be unlawful to maintain a Water Service Connection except in conformity with the following rules:
- 4.04.01. Separate Building.** Each house or building under separate ownership shall be provided with a separate connection.
- 4.04.02. Single Connection.** Not more than one service connection of water supply shall be installed for one building, except under special conditions.

- 4.04.03. Different Owners.** A service connection shall not be used to supply any adjoining property or property across a street, alley or easement.
- 4.04.04. Divided Property.** When property provided with a service connection is divided, the service connection shall be considered as belonging to the lot or parcel of land which it directly enters.
- 4.04.05. Multiple Buildings.** Multiple houses or buildings under one ownership and on the same lot or parcel of land may be supplied through the same service connection provided that the service connection shall be of such size to adequately serve said houses or buildings.
- 4.05. Size and Location of Water Connections.** The District reserves the right to determine the size of service connections and their location with respect to the boundaries of the premises to be served. Service installations will be made only to property abutting on distribution mains as have been constructed in public streets, alleys or easements, or to extensions thereof as herein provided. Services installed in new subdivisions prior to the construction of streets in advance of street improvements must be accepted by the applicant at the installed location. The laying of the property owner's pipeline to the curb shall not be done until the location of the service connection has been approved by the District. Curb and gutter shall be installed before water mains or service is to be installed for all subdivisions.
- 4.06. Ingress and Egress.** Representatives of the District shall have the right of ingress and egress to the customer's premises at reasonable hours for any purpose reasonably connected with the furnishing of water service.
- 4.07. Changes in Owner's or Customer's Equipment.** Owners or customers making any material changes in the size, character, or extent of the equipment or operations utilizing water service, or whose change in operations result in a significant increase in the use of water, shall give the District written notice of the nature of the change five (5) business days prior to the change.
- 4.08. Unsafe Apparatus.** Water service may be refused or discontinued to any premises where apparatus or appliances are in use which might endanger or disturb the service to other customers.
- 4.09. Cross-Connections.** Pursuant to Title 17, Division 1, Chapter 5 of the California Code of Regulations, the District is responsible to protect the public water supply system from the possibility of contamination or pollution by isolating within the consumer's internal distribution system(s), the consumer's private water system(s), or a consumer's temporary water distribution system such contamination or pollution which could backflow into the public water supply system. Water service may be refused or discontinued to any premises where there exists an actual or potential cross-connection as defined in this Ordinance.

- 4.10. Meters.** Meters are the property of the District and are to be installed and operated only by authorized District personnel.
- 4.10.01. Change in Location of Meters.** Meters moved for the convenience of the customer will be relocated at the customer's expense. Meters moved to protect the District's property will be moved at District expense.
- 4.10.02. Access to Meters.** The District reserves the right to enter upon the customer's premises for the purpose of reading, repairing or replacing the water service meter. The customer is responsible for the removal of any structure, equipment, or obstruction that inhibits the free access of the District to its equipment or property located on any premises. The customer shall be solely responsible for the control of all animals which may pose a potential threat to District employees and shall be liable for any injury to District employees resulting from unrestrained animals. Should an applicant for new service fail to properly restrain animals present on his/her property, the District may, upon written notice, refuse to install or turn on service until such time as the District determines that a threat to its employees no longer exists. In the case of existing customers, where District employees may encounter some personal risk in attempting to read a meter (due to the presence of unrestrained animals, or otherwise), the employee is not required to read the meter, and the customer's bill will be estimated based upon a reasonable method. At the request of the customer, the meter may be read in the presence of the customer or someone of his/her choosing, so that over estimates and under estimates of use may be rectified on the bill.
- 4.11. Curb Cock.** Every service connection installed by the District shall be equipped with a curb cock or wheel valve on the inlet side of the meter. Such valve or curb cock is intended for the exclusive use of the District in controlling the water supply through the service connection pipe. If the curb cock or wheel valve is damaged by the owner's or consumer's use to an extent requiring replacement, such replacement shall be at the owner's expense.
- 4.12. Customer's Service Valve - Control Valve on the Customer Property.** The property owner shall provide a valve on his/her side of the service installation to control the flow of water to the piping on his/her premises. The customer shall not use the service curb stop to turn water on and off for his/her convenience. A hand valve (can be turned on or off without the aid of any tool) located on the downstream (customer side) of the meter may be turned off or on by the customer or authorized agent on a temporary, emergency, or seasonal basis. The customer shall be fully responsible for any damages or loss resulting from such use of the hand valve.

- 4.13. Customer Responsibility for Equipment.** The customer shall, at his/her own risk and expense, furnish, install and keep in good and safe condition all equipment that may be required for receiving, controlling, applying and utilizing water, and the District shall not be responsible for any loss or damage caused by the improper installation of such equipment, or the negligence, fault, or other wrongful act of the customer or of any of his/her tenants, agents, employees, contractors, licensees or permittees in installing, maintaining, operating or interfering with such equipment. The District shall not be responsible for damage to property, including but expressly not limited to any damage caused by faucets, valves and other equipment, which are open when water is turned on at the meter, either originally or when turned on after a temporary shutdown.
- 4.14. District Responsibility for Equipment on Customer Premises.** All facilities installed by the District on private property for the purpose of rendering water service shall remain the property of the District and may be maintained, repaired or replaced by the District without consent or interference of the owner or occupant of the property. The property owner shall use reasonable care in the protection of the facilities and maintenance of safe access to or past such facilities including all meter boxes.
- 4.15. Service Connections Maintenance** - The service connection extending from the water main to the property line and including the meter, meter box, and curb cock or wheel valve shall be maintained by the District. All pipes and fixtures extending or lying beyond the property line or right-of-way shall be installed and maintained by the owner of the property.
- 4.16. Damage to Water System Facilities.** The property owner shall be liable for, and water service will be discontinued for damage to the District's water production, distribution, transmission and storage facilities including all service facilities, when such damage is from causes originating on the premises by an act or omission of the owner or his/her tenants, agents, employees, contractors, assignees or licensees, including the breaking or destruction of locks or seals by the customer, or others, on or near a meter, and any damage to a meter that may result from hot water or steam from a boiler or heater on the owner's premises. Prior to the District continuing water service, the owner shall pay for all repairs and/or replacement of the damaged facilities plus all applicable charges, which shall include legal, administration and overhead. The District shall be reimbursed by the owner for any such damage promptly on presentation of a bill.

- 4.17. Maintenance of Water Pressure and Pressure Conditions.** The District shall not accept any responsibility for the maintenance of pressure and it reserves the right to discontinue service while making emergency repairs, or other work required on the water system as determined by the Authorized Administrator. Customers dependent upon a continuous supply should provide emergency storage. All applicants for service connections or water service shall be required to accept such conditions of pressure and service as are provided by the distributing system at the location of the proposed service connection, and to hold the District harmless for any damages arising out of low pressure or high pressure conditions or interruptions of service.
- 4.18. Interruptions in Service.** The District shall not be liable for damage which may result from an interruption in service from a cause beyond the control of the District.
- 4.19. Water Loss -** The District's jurisdiction and responsibility ends at the property line and the District will in no case be liable for or assume any responsibility for damages occasioned by water running from the customer's open or faulty fixtures, or from broken or damaged pipes inside the property line.
- 4.20. New Water Service Connections.** All new Water Service Connections shall comply with the rules and procedures of this Section.
- 4.20.01. Will Serve Letters.** The receipt by the District of a completed, duly executed and notarized "will serve" letter. Written application must be made to the District for each "will serve" letter. Written applications for "will serve" letters for multiple connections in excess of five (5) must be approved in advance by action of the Board of Directors.
- 4.20.02. New Water Service Fees and Deposits.** The receipt by the District of payment by the applicant of the District fees, charges and deposits required by Section 5 of this Ordinance.
- 4.20.03. Additional Requirements:** Additional conditions as may be required from time to time.
- 4.20.04. Installation of New Service Connections.** Only duly authorized employees or agents of the District shall be authorized to install service connections. All service connections shall comply with the specifications of the District. Meters will be installed in the parkway area, and shall be owned by the District. No rent or other charge will be paid by the District for a meter or other facilities, including connections. All meters will be sealed by the District at the time of installation, and no seal shall be altered or broken except by one of its authorized employees or agents.

4.21. Main Extensions. General water main extensions may be made within the District as follows:

4.21.01. Property Owners. Owners of property desiring the District to install the extension of one or more water mains to serve such property shall deposit with the District the estimated cost per foot for all frontage to be benefitted from said main extension as determined by the District. Deposit shall be estimated at cost per foot.

4.21.02. Application. Any owner of one or more lots or parcels of land, or subdivider of a tract of land, desiring the extension of one or more water mains to service such property shall make a written application therefore to the District. Said application shall contain the legal description of the property to be served and tract number thereof, and any additional information which may be required by the District. Said application shall also be accompanied by a map showing the location of the proposed connections. The application shall be made a minimum of twelve (12) business days prior to a regular meeting of the Board of Directors.

4.21.03. Investigation. Upon receipt of the application, the Authorized Administrator shall make an investigation and survey of the proposed extension and shall report his/her findings to the Board, including the estimated cost thereof.

4.21.04. Ruling. The Board shall thereupon consider said application and report; and, after such consideration, reject or approve it.

4.21.05. District Lines. All extensions thus provided for, in accordance with these regulations, shall be offered for dedication to the District and, upon acceptance of the dedication by the District, shall become and remain the property of the District.

4.21.06. Dead-End Lines. No dead-end lines shall be permitted except at the discretion of the District and, in cases where circulation lines are necessary, shall be designed and installed as part of the cost of the extension. Any dead-end line permitted shall have a flush-out provided by the applicant at his/her expense.

- 4.21.07. System Requirements.** At the time of laying out and subdividing or re-subdividing any tract or parcel of land within the District, the owners of said tract or parcel of land shall, at their own expense, provide for such water mains, valves, fire hydrants, services, and appurtenances as may be necessary for the distribution of water to each lot, piece, or parcel of land. The service shall be carried to the lot line and clearly marked on the property. When installed, such mains, valves, fire hydrants, services, and appurtenances shall be offered for dedication to the District and, upon acceptance by the District shall become the property of the District. The owners shall provide to the District a detailed as-built blueprint signed by a registered civil engineer, and a CAD disc (AutoCad format) of the water system.
- 4.21.08. Specifications.** The size, type, and quality of materials and location of the lines, fire hydrants, and valves shall be specified by the District and the actual construction shall be done by a contractor acceptable to the District in accordance with the District's Master Plan and specifications, and supervised and inspected by the District. Inspection fees shall be established by Board resolution and deposited with the District prior to construction approval. Nothing herein is intended to make the contractor an employee or agent of the District.
- 4.21.09. Payment of Cost of Oversized Mains.** In the event the District elects to install mains of greater size than shall be adequate to supply any new subdivision with water and fire protection, as determined by the District, the owner or owners of the proposed subdivision shall not be required to pay more than the cost of mains which, in the opinion of the District, are adequate to supply such subdivision with water and fire protection, but no other adjustment of the cost of installation shall be made.
- 4.21.10. Pay Back Agreements.** When main extensions are made by the District and paid for by an applicant and said main extension shall be of benefit to another person or persons in the future, said applicant shall enter into a payback agreement with the District. The pay back agreement shall provide for a refund payment for main service charges collected by the District for service connection to a main, paid for by new applicant. The pay back shall be computed on the basis of actual cost to the person making the original main extension per front foot benefitted for which the main service charge is collected. Pay back agreements are not transferable. All pay back agreements shall become null and void ten (10) years from the date first written.

4.21.11. Property of District. Upon completion of such installation, the facilities shall be dedicated to the District and, upon acceptance of the dedication by the District, shall become and remain the property of the District.

4.22. Subdivisions.

4.22.01. Application. A person desiring to have water services provided within a tract of land which he or she proposes to subdivide within the District's boundaries shall make written application therefore. Application shall be made a minimum of twelve (12) business days prior to a regular meeting of the Board of Directors.

4.22.02. Contents. The application shall state the number of the tract, the name of the subdivision, and its location. It shall be accompanied by a copy of the tentative map and a deposit for expenses involved in investigation.

4.22.03. Investigation. Upon receiving the application and deposit, the Authorized Administrator shall make an investigation and survey of the proposed subdivision and shall report his/her findings to the Board, including a recommendation as to the facilities required and the estimated cost of the proposed water system therefore.

4.22.04. Ruling. The Board shall thereupon consider said application and report; and, after such consideration, reject, or approve it. If approved, applicant will receive conditional "will serve" letter valid for one year. Applicant can apply for extension to "will serve" letter.

4.22.05. System Requirements. At the time of laying out and subdividing or re-subdividing any tract or parcel of land within the District, the owners of said tract or parcel of land shall, at their own expense, provide for such water mains, valves, fire hydrants, services, and appurtenances as may be necessary for the distribution of water to each lot, piece, or parcel of land. The service shall be carried to the lot line and clearly marked on the property. When installed, such mains, valves, fire hydrants, services, and appurtenances shall be offered for dedication to the District, and upon acceptance by the District shall become the property of the District. A detailed blueprint of the water system shall be signed by a registered civil engineer and CAD disc (AutoCad format) shall be supplied to the District.

- 4.22.06. Specifications and Construction.** The size, type, and quality of materials and location of the lines, fire hydrants, and valves shall be specified by the District and the actual construction shall be done by a contractor acceptable to the District in accordance with the District's Master Plan and specifications, and supervised and inspected by the District. Inspection fees shall be established by the Board and deposited with the District prior to construction approval. Nothing herein is intended to make the contractor an employee or agent of the District.
- 4.22.07. Property of District.** All facilities, upon completion and final inspection, shall be offered for dedication to the District, and upon acceptance of dedication, shall become the property of the District.
- 4.22.08. Water Rights and Improvements.** Whenever land is to be subdivided, any water well, water-bearing land, mains, and easements needed therefore which may be appurtenant thereto or which may be used exclusively thereon shall be deeded to the District in consideration of the District's approving any application for water service to such tract or subdivision. Said deed to the District shall be executed before any such application shall be approved by the District; provided, however, that where water wells and equipment as described in this paragraph are used to supply water to additional land not subdivided, such wells and equipment may continue to supply the un-subdivided portion previously served until such time as the total area served is subdivided.
- 4.23. Annexations.**
- 4.23.01. Application.** A person desiring to annex land to the District shall make written application accompanied by maps showing location and area of the land with legal description.
- 4.23.02. Terms of Annexation.** Terms and fees shall be determined by the Board, but in all cases, transfers of water rights, wells, and springs shall be made to the District.

4.23.03. Annexations of Developed Land. Owner or owners of land requesting annexation to the District, where said land is developed, shall, at their own expense, provide for such water mains, valves, fire hydrants, services, and appurtenances as may be necessary for the distribution of water to each lot, piece, or parcel of land as a condition of annexation. The service shall be carried to the lot line and clearly marked on the property. When installed, such water improvements shall become and be the property of the District. Any existing water system or portion thereof in the annexed section shall first be brought to the design standards of the District at the expense of the owner or owners of property desiring annexation. Extension of water mains to uninhabited or underdeveloped land proposed to be annexed to the District shall be made in compliance with the main extension and/or subdivision policies for subdivisions as herein set forth.

4.24. Supply from Hydrants.

4.24.01. Primary Hydrant Use. Hydrants are primarily for use by the District and by organized fire protection. Other persons desiring to use hydrants for any purpose must first obtain written permission from the District in the form of a Hydrant Flow Meter Permit and shall operate the hydrant(s) in accordance with all instructions issued by the District. The District and, in the event of an emergency, fire protection agencies, reserve the right to interrupt and/or remove any hydrant flow meter without prior notice.

4.24.02. Temporary Secondary Use. All other uses of District hydrants are for temporary secondary use, for which a Hydrant Flow Meter Permit (Permit) is required. A written application, accompanied by a security deposit in an amount equal to the current estimated cost of the hydrant flow meter, must be submitted to the District for each Permit. The submission to the District of an application for a Permit shall constitute a written commitment by the applicant to operate the hydrant flow meter for which the Permit is sought, in strict accordance with the policies and procedures of the District. A separate Permit and deposit is required for each hydrant flow meter to be operated. The location of the hydrant which shall be used shall be determined by the District. Where a meter may be used in various locations, the District will approve all permissible locations in advance and the Permit holder is responsible for contacting the District when a meter is to be removed from a given location. In no case may any District meter be used outside the District.

- 4.24.03. Protection of District Equipment and Property.** The holder of a Permit shall exercise the utmost care to protect and prevent damage to the hydrant flow meter, the hydrant, and other District equipment, infrastructure components and property which are involved in the furnishing of temporary water service until such time as the equipment has been returned to the District. The flow meter must be used as issued and may not be altered or modified without explicit District authorization.
- 4.24.04. Meter Availability.** The applicant shall make the hydrant meter available as prescribed by the District for reading on a periodic basis. The customer shall provide such consumptive and other data to the District in a manner and at such times as shall be requested.
- 4.24.05. Reading and Inspection of Hydrant Flow Meters.** The District reserves the right to inspect and read all hydrant flow meters at any time. The District will obtain readings and require inspections pursuant to District procedures as established by the Authorized Administrator. Failure to follow established District procedures will subject the Permit holder to charges as established by a duly adopted resolution of the Board of Directors. On the occurrence of the third (3rd) such failure to provide a reading, to bring the meter in for inspection, or other failure to follow the District's policies and procedures governing the Permit, the Permit shall be revoked and the hydrant flow meter shall be returned to the District.
- 4.24.06. Billing.** All charges for temporary secondary use water service will be billed as established by District procedure.
- 4.24.07. Expiration/Termination of Hydrant Flow Meter Permit.** Upon the expiration or earlier termination of the Permit and return of the hydrant flow meter to the District, the District will inspect and secure the hydrant flow meter. The District will then provide the holder of the Permit with a closing bill which will reflect the deduction of all penalties and charges from the security deposit posted with the District and which will reflect any balance then due to the District.
- 4.24.08. Unauthorized Operation of District Hydrant.** Operation of a District hydrant without both the requisite hydrant flow meter and Permit is unauthorized and shall subject the operator and the person and/or entity for whose benefit the hydrant is being operated to the penalties and consequences enumerated in this Ordinance.

4.24.09. Unauthorized Use of Hydrants. Tampering with any fire hydrant for the unauthorized use of water therefrom, or for any other purpose, is and subject to a penalty charge for each occurrence as enumerated in this Ordinance.

4.25. Fire Protection.

4.25.01. Public Fire Protection. The following pertains to the use of District facilities for public fire protection:

4.25.01.1 Use of Fire Hydrants. Fire hydrants are for use by the District or by organized fire protection agencies pursuant to contract with the District. Other parties desiring to use fire hydrants for any purpose shall first obtain a Permit from the District prior to use and shall operate the hydrant in accordance with instructions issued by the District. Unauthorized use of hydrants in violation of any provision of this Section shall be penalized and/or prosecuted according to law. No provision herein shall preclude the District from taking any other legal actions to restrain any violation of this Section.

4.25.01.2 Moving of Fire Hydrants. When a fire hydrant has been installed in the location specified by the proper authority, the District has fulfilled its obligation. If a property owner or other party desires a change in the size, type or location of the hydrant, they shall bear all costs of such charges, without refund. Any change in the location of fire hydrant shall be approved by the District and any other proper authority.

4.25.02. Private Fire Protection Service. The following pertains to the use of District facilities for private fire protection systems:

4.25.02.1. Payment of Cost. The applicant for private fire protection service shall pay the total actual cost of installation of the service from the distribution main to the service location including the cost of a reduced pressure detector assembly or other suitable and equivalent device, including any device, valve, meter, meter box; the extension from the distribution main, and any associated installed device, valve, meter, or meter box to become the property of the District.

- 4.25.02.2. No Connection to Other System.** There shall be no connection between this fire protection system and any other water distribution system on the premises.
- 4.25.02.3. Use.** There shall be no water used through the fire protection service except to extinguish fires and for testing the firefighting equipment.
- 4.25.02.4. Charges for Water Used.** Any consumption recorded on the meter will be charged as provided in District resolution except that no charge will be made for water used to extinguish fires where such fires have been reported to the fire department.
- 4.25.02.5. Periodic Rates.** The periodic (approximately monthly) rates for private fire protection shall be established from time to time by resolution of the Board of Directors.
- 4.25.02.6. Water for Fire Storage Tanks.** Water may be obtained from a private fire service for filling a tank connected with the fire service, but only if written permission is secured from the District in advance and an approved means of measurement is available.
- 4.25.02.7. Violation of Agreement.** If water is used from a private fire service in violation of the agreement or this Ordinance, the District may, at its option, discontinue and remove the service.
- 4.25.02.8. Meter.** If the District does not require a meter, and if water is used through a fire service connection for any other purpose than extinguishing of fires, the District shall have the right to place a meter on the fire service connection at the owner's expense, or disconnect the entire water supply from such premises, in addition to any and all other civil and criminal remedies available by law.
- 4.25.02.9. Additional Service.** The District shall have the right to take a domestic, commercial or industrial service connection from the fire service connection at the curb to supply the same premises as those to which the fire service connection belongs. The District shall also have the right to determine the proportion of the installation costs properly chargeable to each service connection, if such segregation of costs shall become necessary.

- 4.25.02.10. **Backflow Prevention Device.** A reduced pressure detector assembly backflow prevention device shall be installed on all fire service connections of a type approved by University of Southern California Foundation for Cross-Connection Control and Hydraulic Research at the expense of the owner of the property.
- 4.25.02.11. **Water Pressure and Supply.** The District assumes no responsibility for loss or damage due to lack of water or pressure, either high or low, and merely agrees to furnish such qualities and pressures as are available in its general distribution system. The service is subject to shut-downs and variations required by the operation of the system.

SECTION 5. SERVICE RATES, FEES AND CHARGES

- 5.01. **Adoption of Fees and Charges.** Pursuant to the LAFCO Resolution and the District Rate Resolutions, the District has previously duly adopted and established fees, charges, and deposits pursuant to the enabling authority provided by the former VVWD Ordinance Number A-112-04 and former BMWD Ordinance Number 1995-8, which enabling authority is retained by the District. These fees, charges and deposits may be amended from time to time by duly adopted resolutions of the Board. All fees and charges under this Section for providing services or sales outside the District's jurisdictional boundaries shall be charged in such amounts as are sufficient to cover the costs associated with providing such extra-jurisdictional water and services as determined by a supported rate study.
- 5.02. **Adoption of Rates for Water Service.** Pursuant to the LAFCO Resolution and the District Rate Resolutions, the District has previously duly adopted and established water rates. These rates may be amended from time to time by duly adopted resolutions of the Board.
- 5.03. **Adoption of Administrative Charges, Fees and Deposits.** Pursuant to the LAFCO Resolution and District Rate Resolutions, the District has previously duly adopted and established administrative fees and charges. These administrative fees and charges may be amended from time to time by duly adopted resolutions of the Board.
- 5.04. **Repair Charge.** The charge incurred by the District in repairing any damage to any District meters, water mains, water lines and/or any other appurtenances.
- 5.05. **Water Rights Charge.** Charges in lieu of delivery of water rights for new service connections, and any other charge necessary for the purchase of replacement water.

- 5.06. Water System Design Charge.** A non-refundable charge required for checking plans provided for all main extensions, service connections and/or special facilities or for requiring the preparation of engineering plans and drawings by District personnel or consultants.
- 5.07. Accounting and Processing Fees.** The District shall charge and collect against all delinquent assessments the fully burdened cost of collecting said delinquencies, including accounting and administration costs for services rendered by District staff, contract consultants and legal counsel.
- 5.08. Unauthorized Use of Water Charge.** The District shall impose a charge on any person, organization or agency for each unauthorized use of District water, or for tampering in any manner with any meter belonging to the District.

SECTION 6. ADMINISTRATION OF CUSTOMER ACCOUNTS

- 6.01. Establishment of Water Service Accounts.** Except as set forth otherwise in this section, the rules, regulations, policies and procedures governing the billing, collection, and administration of water services shall be as set forth in such resolutions as the District may adopt from time to time by majority vote.
- 6.02. Owner Account in Arrears.** In accordance with Government Code Section 60370, et seq., for services provided or furnished to a master metered or an individually metered multiunit residential structure or mobile home park where the owner or owner assignee is listed by the District as the customer of record of the service, the District will make a good faith effort to inform the actual user(s) of the services, when the account is in arrears, by means of notice, that service will be terminated in ten (10) calendar days. The notice shall further inform the actual users that they have the right to become customers of the District without being required to pay the amount due on the delinquent account.
- 6.03. Liens for Unpaid Bills.** Fees and charges for water services which remain delinquent for a period of sixty (60) shall constitute a lien against the property to which the services were provided, pursuant to these rules, regulations and California Water Code Section 31701.5, et seq. or any successor statute, or as otherwise authorized by law, and any additional procedures related to liens, notification of property owners thereof and/or the District's election to collect water fees or charges on the county tax rolls. Any such additional procedures relating to the matters set forth in the preceding sentence shall be adopted by Resolution by the Board of Directors.
- 6.04. Upon Vacating Premises.** Customers vacating the premises should so notify the District in writing a minimum of four (4) business days prior to vacating the premises.

6.05. Disputes.

- 6.08.01. Right to Meet.** Should a customer have a complaint with regard to the application of any provision of this Section of this Ordinance, any resolution implementing this Section of this Ordinance, or any complaint or dispute with regard to water service, or the accuracy of a bill for water service or other charges, the customer has the right to meet with the Authorized Administrator to discuss the dispute and present any evidence the customer has to support their position. In the case of disputes over bills, the customer shall be required to submit his/her complaint, request for a meeting or request for initiation of an investigation in writing not later than five (5) business days of his/her receipt of the disputed bill or not later than thirteen (13) days of mailing of the notice of termination of water service.
- 6.08.02. Arrangement of Meeting.** To arrange such a meeting the customer shall contact the District office, either in writing or by telephone during normal business hours as may be set by the Board.
- 6.08.03. Presentation of Evidence.** The customer may be accompanied by a friend, attorney, or other representative to meet with the Authorized Administrator or his/her designee and may present any evidence they may have to support their position. The Authorized Administrator must provide a written determination to the customer evidencing his/her findings within eight (8) business days of his/her decision.
- 6.08.04. Unresolved Disputes.** The customer may submit a detailed written appeal to the Board of the Authorized Administrator's decision within twelve (12) business days of the Authorized Administrator's decision.
- 6.08.05. Appearance before the Board of Directors.** Upon submittal of an appeal, which appeal has been submitted timely pursuant to Section 6.08.04., the appellant may appear before the Board at the next regularly scheduled Board meeting, or at a Board Meeting in which the customer and the Board agree, by notifying the District Secretary not fewer than seven (7) business days prior to the Board meeting either by telephone or in writing of the date he or she wishes to attend and the subject matter of the dispute. The customer may then present the complaint and any evidence in support of his/her position and ask for a decision by the Board.

- 6.08.06. Board Determination.** The Board shall provide a written response to the customer within eight (8) business days of the Board's final decision. The Board may delay a resolution of the dispute to a subsequent regular meeting in order to investigate the dispute or receive special reports related to the dispute.
- 6.08.07. Decision of the Board.** The decision of the Board of Directors shall be final.
- 6.06. Service Charges for Violations.** If water service is discontinued for violation of any of the District's rules, regulations, resolutions or ordinances, service shall not be reinstated until the violations have been corrected and all applicable security deposits, service charges, fees, and penalties, as provided for herein have been paid.
- 6.07. Multiple Service Accounts.** Where multiple services are consolidated and recorded on a single customer account (such as, but not limited to, storm drain, solid waste, sewer, water, recycled water), additional fees and charges such as late fees, delinquency charges, service charges, and deposits may be assessed to the customer account on a consolidated basis as provided for by the enabling legislation. Such fees and charges will be applied to the consolidated customer account as determined by the Authorized Administrator or his/her designee.

SECTION 7. WATER USAGE AND DAMAGE TO WATER FACILITIES AND OTHER DISTRICT PROPERTY

- 7.01. Lost or Unintentionally Damaged District Property.** Lost or unintentionally damaged District property, including meters, connection devices, padlocks and other locking devices, shall be assessed to the customer at the actual repair or replacement cost, together with established labor and administrative costs.
- 7.02. Unauthorized Use or Application of District Water a Misdemeanor.** It is hereby declared to be a misdemeanor for any person or entity to use or apply any water received or obtained from the District in contravention of the provisions of this Ordinance.
- 7.03. Waste of Water.** No customer shall knowingly permit leaks or waste of water. Where water is wastefully or negligently used on a customer's premises, the District may discontinue the service if such conditions are not corrected after giving notice of violation as provided in this Ordinance or as provided in any other ordinance, resolution, rule or regulation in effect at this time or as hereinafter adopted or amended.
- 7.04. Unauthorized Use of District Facilities.** The unauthorized use of District Facilities in violation of this Ordinance - is hereby deemed unlawful and to pose a potential threat to the public health and safety.
- 7.04.01. Intentional Unauthorized Utilization of District Equipment and Facilities.** The intentional unauthorized operation, connection, disconnection, reconnection, removal, replacement, alteration or other utilization of any District equipment, water system component or infrastructure, including but not limited to meters, valves, hydrants, pipelines, wells, pumps, tanks, and their component parts, is hereby deemed unlawful and to pose a potential threat to the public health and safety. The District shall seek the prosecution of any person or entity who willfully commits or causes another to commit, or who acts with callous disregard to the health and safety of others, the intentional unauthorized operation, connection, disconnection, reconnection, removal, replacement, alteration or other utilization of any District equipment, water system component or infrastructure.

7.04.02. Inadvertent Unauthorized Utilization of District Equipment and Facilities. The inadvertent unauthorized operation, disconnection, removal or alteration of any District equipment, water system component or infrastructure, including but not limited to meters, valves, hydrants, pipelines, wells, pumps, tanks, and their component parts, is also deemed to pose a potential threat to the public health and safety. Accordingly, every unauthorized act or occurrence must be immediately reported to the District, so as to permit the District to promptly take appropriate action to remediate any damage and to protect the public health and safety.

7.05. Damage to Water System – It shall be unlawful for an unauthorized person to maliciously, willfully, or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is a part of the District's water system.

7.06. Fraud or Abuse. Service may be discontinued, up to and including the seizure of District-owned facilities, and penalties imposed, if necessary, to protect the District against fraud or abuse.

Fraud or abuse is the act of any person to commit, authorize, solicit, aid, abet, or attempt any of the following acts:

7.06.01. Divert, or cause to be diverted, water service by any means.

7.06.02. Make or cause to be made any connection or reconnection to the District's Water System without the authorization or consent of the District.

7.06.03. Tamper with or otherwise interfere with any water meter or other water flow measurement device so as to prevent the accurate measurement of water use.

7.06.04. Use or receipt of the benefit of water from the District's water system with knowledge or reason to believe that the use or receipt of such water is unauthorized by the District.

7.06.05. Tamper with any property owned or used by the District to provide water service.

7.06.06. A violation exists if, on premises owned or controlled by the customer or by the person using or receiving the direct benefit of the water service, there is either of the following:

7.06.07. Any instrument, apparatus, or device designed to be used to obtain service without paying the full lawful charge therefore.

- 7.06.08.** Any meter that is altered, tampered with or bypassed so as to cause no measurement or inaccurate measurement of water service.
- 7.07. Ground Wire Attachments.** All persons are forbidden to attach any ground wire or wires to any plumbing which is or may be connected to a service connection or main belonging to the District. The District will hold the customer liable for any damage to its property occasioned by such ground wire attachments.
- 7.08. Vandalism.** Nothing in this Ordinance shall limit or impair the right of the District to take any and all appropriate measures to protect the District water system and its equipment and infrastructure from acts of vandalism. Graffiti shall be considered vandalism for purposes of this provision.
- 7.09. Sabotage and Terrorism.** Nothing in this Ordinance shall limit or impair the right or ability of the District to take any and all appropriate action to protect the District's water system and other property from acts of sabotage and/or terrorism.

SECTION 8. VIOLATIONS; PENALTIES FOR VIOLATIONS

- 8.01. Violations.** It shall be unlawful for any person to connect to, construct, install, provide, maintain or use any other means of water facilities from any building, structure, or premises in the area serviced with water provided by the District except by connection to water facilities in the manner as provided for in this Ordinance. It shall also be a violation if, on premises owned or controlled by the customer or by the person using or receiving the direct benefit of the water service, there is either of the following:
- 8.01.01.** Any instrument, apparatus, or device designed to be used to obtain service without paying the full lawful charge therefore.
- 8.01.02.** Any meter that is altered, tampered with or bypassed so as to cause no measurement or inaccurate measurement of water service.
- 8.02. Device Removal.** The District may remove any device used in violation of this Ordinance.
- 8.03. Noncompliance with Regulations.** As an alternative method of enforcing the provisions of this or any other ordinance, resolution, rule, or regulation of the District, the District shall have the power to disconnect the user or subdivision water service from the water mains of the District in accordance with any applicable law. Upon disconnection, an authorized representative of the District shall estimate the cost of disconnection from and reconnection to the system and such user shall pay the cost, as estimated, of disconnection and reconnection before such user is reconnected to the system.

- 8.04. Cost Recovery for Damages - Indemnification.** Any damage to District property shall also subject the unauthorized user to the actual costs of replacement, repair, treatment and/or other remediation, together with such actual administrative and legal costs as the District may incur. The District shall be held harmless and indemnified by any person and/or entity for the costs of defense of any action brought for damages resulting from, and for any damages arising out of any unauthorized utilization of any District equipment and/or facilities.
- 8.05. Notice of Violation.** Wherever or whenever practicable under the particular circumstances, which practicability shall be determined by the Authorized Administrator, any person found to be violating any provision of this or any other Ordinance, resolution, rule or regulation of the District shall be served, by an authorized person, with written notice stating the nature of the violation and providing a reasonable time limit for the satisfactory correction thereof. Such time limit shall be reasonable and shall be specified in the notice. The offender shall, within the period of time stated in such notice, permanently cease all violations. Upon being notified by an authorized representative of the District of any defect arising in any water facility or of any violation of this Ordinance, the person or persons having charge of said work shall immediately correct the same. All persons shall be held strictly responsible for any and all acts of agents or employees done in violation of this Ordinance. No such notice to afford an opportunity to comply need be given in those instances in which the non-compliance may cause conditions dangerous and detrimental to public health, safety and welfare, or are in violation of state law or applicable sections of the California Penal Code.
- 8.06. Relief on Own Motion.** The Board may, on its own motion, find that by reason of special circumstances, any provisions of its ordinances, rules or regulations should be suspended or modified as applied to a particular person or premises and may, by resolution, order such suspension or modification for such premises during the period of such special circumstances or any part thereof.
- 8.07. Liability for Violation.** Any person violating any of the provisions of this Ordinance or permitting or maintaining any property in violation hereof, shall be liable to the District for any expense, loss or damage, occasioned by the District by reason of such violation. Such liability shall be in addition to any other civil or criminal penalties imposed under this Ordinance or under any other provision of law.

- 8.08. Penalty for Violation.** The failure of a customer to comply with all or any part of this Ordinance may be cause for discontinuation of service. Water shall not be supplied by the District to such customer until such violation(s) has been cured and until the customer is in full compliance with the rules and regulations of this Ordinance. The District shall have the right to assess such penalties on violators of this Ordinance as may be permitted by law. Any person who is determined by the District to have violated the provisions of this Ordinance shall be billed by the District for any damage caused by the violator to the property owned or used by the District to provide service, the actual cost to remove and reinstall District facilities, and for loss of water.
- 8.09. Civil Action.** Upon approval of the Board of Directors, the District may bring civil action pursuant to Section 1882.1 of the California Civil Code to recover up to three (3) times the actual damages suffered by the District, plus the cost of suit and reasonable attorney's fees, for a violation of the provisions of this section.
- 8.10. Remedies.** The remedies set forth in this Ordinance shall be in addition to all other remedies available to the District for violation of the provisions of this Ordinance or for any ordinance, resolution, rule or regulation of the District, or any provision of the federal, state or local law.

SECTION 9. Severability. In approving the rules and regulations set forth in this Ordinance, the Board of Directors of the District intends to comply with all applicable laws. If any provision established herein is held to be invalid under existing or subsequently enacted law, it is the intent of the Board of Directors that any provisions of the Ordinance found to be invalid, if possible, shall be deemed revised to the extent required to render them valid and lawful; and that such provisions approved herein which are not so invalidated shall be in full force and effect until repealed or modified by action of the Board of Directors. Further, if any section, subsection, sentence, clause or phrase of this Ordinance is found, for any reason, to be unconstitutional or otherwise invalid, such decision shall not affect the validity of the remaining provisions of this Ordinance.

SECTION 10. Posting. Upon adoption, this Ordinance shall be entered in the minutes of the Board and certified copies hereof shall be posted in accordance with the law.

SECTION 11. Effect of Heading. The title, division or section headings contained in this Ordinance shall not be deemed to govern, limit or modify in any manner, the scope, meaning or intent of any section or subsection of this Ordinance.

SECTION 12. Conflict in Provisions. In the event that the provisions of this Ordinance conflict with any code, ordinance or regulation of the District, the provisions of this Ordinance shall govern. In the event any provision of this Ordinance conflicts with a preemptive provision of State law, this Ordinance shall be interpreted and applied in conformity with State law.

SECTION 13. EFFECTIVE DATE. This Ordinance shall take effect thirty (30) days after its final passage.

ORDINANCE NO. 1996-9

**ORDINANCE OF THE BALDY MESA WATER DISTRICT COUNTY
OF SAN BERNARDINO, CALIFORNIA, AMENDING PORTIONS OF
OF THE BALDY MESA WATER DISTRICT ORDINANCE NO. 1990-7
ESTABLISHING ADDITIONAL CONSERVATION MEASURES**

WHEREAS, the Board of Directors of Baldy Mesa Water District finds that there is a critical water situation caused by continued overdraft of the groundwater, and

WHEREAS, the Board of Directors has determined that it is essential to conserve water in order to continue to meet the health and safety of the properties and residents of the District,

NOW, THEREFORE, BE IT ORDAINED by the Board of Directors of Baldy Mesa Water District as follows:

SECTION 1: PURPOSE, INTENT AND FINDINGS

1.1 The Baldy Mesa Water District ("District") is a public agency created under the County Water District Act, California Water Code Sections 30000 et seq. to, among other purposes, provide water service to the water users within the boundaries of the District.

1.2 The District is authorized by Water Code Sections 375-377, 1009 and 31026 to restrict the use of District water during any emergency caused by overdraft, drought or other threatened or existing water shortage, and to prohibit the waste of District water or the use of District water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the District and may prohibit use of such water during such periods for specific uses which the District may from time to time find to be nonessential.

1.3 The District is further authorized by Water Code Sections 375-377, 1009, and 31027 to prescribe and define by ordinance those restrictions, prohibitions and exclusions it may determine to be necessary to restrict the use of District water during threatened or existing water shortages, and is authorized by Water Code Sections 377 and 31029 to declare violations of this Ordinance to be a misdemeanor.

1.4 The Board of Directors of Baldy Mesa Water District hereby finds that:

a. The Board of Directors at a duly-noticed public hearing considered the following evidence regarding water supplies in the Baldy Mesa Water District:

- (1) The water production records and consumption of water;
- (2) The Water Master Plan for the District;
- (3) The stipulated judgment, statement of decision and judgment in City of Barstow v. City of Adelanto (Riverside Superior Court Case No. 208568), in which it has been determined that there is an overdraft of the Mojave River Basin Area and Each of its respective Subareas, including but not limited to the Subarea of which Baldy Mesa Water District is a part;
- (4) Current problems existing with respect to the overuse and waste of water provided by the District to certain customers in connection with irrigation of landscaping and other outdoor vegetation, lawns, and other growth; and
- (5) Other relevant evidence.

b. A water shortage emergency condition prevails within the geographic area served by the District, due to the limited amount of groundwater in the area, and the failure of rainfall to provide the average annual amounts for recovery of the water resources of the State and to provide for recharge of the water to the underground basins used to supply water to the District, creating the threat of a water shortage for the people of the District.

1.5 It is in the best interest of the public and the customers and users of District water services, for the Board of Directors to exercise its rights in the operation and use of its water system and providing of water, and to find that the prohibitions in this Ordinance are necessary to restrict the use and misuse of water and to prohibit waste of water, until and subject to further action by the District.

1.6 It is therefore the intent of the Board of Directors to establish by the Ordinance those procedures required to maximize the beneficial use of its available water resources to the extent to which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented and the conservation of such water is to be extended with a view to the reasonable and beneficial use thereof in the interests of the people of the community served by the Baldy Mesa Water District.

1.7 WHEREAS the purpose of the amendments is to provide the District with additional tools to control the amount of water utilized within the District's service area, particularly to control potential wasteful uses of scarce water resources when water supplies are limited. The Board of Directors hereby finds that the amendments will have a beneficial effect by ensuring that there will be adequate water supplies for all District customers while protecting the public health and safety. Based on the foregoing, the

Board of Directors has determined that there is no possibility that the amendments have any potential to cause significant effects on the environment, and that, pursuant to the California Environmental Quality Act (Public Resources Code Sections 21000, et seq.) ("CEQA"), the amendments do not constitute a "project" under Sections 15061 and 15378 of the State CEQA Guidelines, and are therefore exempt from environmental review"

SECTION 2. DEFINITIONS

2.1 "District" shall mean the Baldy Mesa Water District.

2.2 "Board of Directors" shall mean the Board of Directors of the Baldy Mesa Water District.

2.3 "General Manager" shall mean that person appointed by the Board of Directors pursuant to California Water Code Section 30540 to manage the activities of the Baldy Mesa Water District or his designee.

2.4 "May" shall mean an action which is discretionary.

2.5 "Overdraft" shall mean that wherein the current total annual consumptive use of water in the Mojave Basin Area exceeds the long-term average annual natural water supply to the Basin Area or Subarea.

2.6 "Shall" or "Must" shall mean an action which is mandatory.

2.7 "Water Supply Shortage" shall mean any water shortage caused by drought or any other threatened or existing water shortage, disaster or facility failure, earthquake, extended loss of electrical power, pipeline failure or other condition which results in or threatens to result in the District's inability to meet the water demands of its customers.

2.8 "Waste of Water" shall mean any unreasonable or non-beneficial use of water or any unreasonable method or use of water, including but expressly not limited to, the specific uses, conditions, actions or omissions prohibited or restricted by this Ordinance, as hereinafter set forth.

2.9 "Water User" shall mean any person, firm, partnership, association, corporation or political entity using water obtained from the water system of the District.

2.10 "Water" shall mean that water supplied by the Baldy Mesa Water District.

SECTION 3. WATER SUPPLY PLAN CREATED.

3.1 Stage No. 1. Normal Conditions: Conservation Measures. Normal conditions shall be in effect when the District is able to meet all the water demands of its customers in the immediate future. During normal conditions, all water users shall continue to use water wisely, to prevent the waste or unreasonable use of water, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes. No water user shall allow water to be wasted or misused. All of the following applications or uses of water are determined to be a waste of water and are hereby prohibited.

- a. The watering of lawns, grass, shrubbery, ground cover or other landscaping at any time between the hours of 9:00 A.M. and 6:00 p.m. during the months of May through October; and at any time between 3:00 P. M. and 9:00 A.M. during the remaining months of November through April.
- b. The use of water for any purpose which allows flooding or runoff in gutters, driveways, streets or adjacent lands.
- c. The washing of driveways, sidewalks, parking lots or other hard surfaces by direct hosing except when necessary to prevent or eliminate risk of fire or contamination which could result in a risk to public health and safety.
- d. Allowing the waste of water through leaks or breaks in the users's water system. All leaks or breaks shall be repaired immediately upon discovery.
- e. Noncommercial washing of privately owned vehicles, trailers, motor homes, buses, boats and mobile homes is prohibited except from bucket and EXCEPT that from a hose equipped with an automatic shut-off nozzle may be used for a quick rinse.
- f. Water shall not be used to clean, fill, operate or maintain levels in decorative fountains, unless such water is a part of a recycling system.
- g. Restaurants or other public places where food is served are requested to not routinely provide glasses of drinking water to customers unless specifically requested.
- h. All new construction, including residential, commercial and industrial, shall install water conserving devices.

- i. Water used for cooling systems must be recycled to the extent possible.
- j. Evaporation resistant covers and water recirculation systems are required for all new swimming pools and hot tubs and are encouraged for existing pools.
- k. Hotels/Motels shall post notices urging guests to conserve water.
- l. All current water customers are encouraged to install low flush toilets, shower heads, flow reducers, and faucet aerators.

3.2 Stage No. 2. Threatened Water Supply Shortage. In the event of a threatened water supply shortage which will affect the District's ability to provide water for ordinary domestic and commercial uses, the Board of Directors shall hold a noticed public hearing after giving at least ten days notice by publication in a newspaper of general circulation. At said public hearing, consumers of the water supply shall have the opportunity to testify concerning the pending water supply shortage and for the District to determine required conservation measures to include restrictions of use and/or requirements for state of art irrigation systems, automatic controllers, use of drought resistant plants, shrubs, and drought resistant turf. The Board may, by Resolution, declare a water shortage condition to exist, and may impose any or all of the following conservation measures:

a. Exterior Landscape Plans. Exterior landscape plans for all new multi-family, commercial and industrial development shall provide for timed irrigation systems and shall require the use of drought resistant varieties of plants, shrubs, and turf. Such plans shall be presented to and approved by the District prior to issuance of a water service letter. Areas required for turf shall be restricted to no more than 20% of the total landscaped area.

b. Agricultural Irrigation. Persons receiving water from the District who are engaged in agricultural practices, whether for the purpose of crop production, growing of commercial ornamental plants or maintaining existing nursery stock shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. The General Manager may require the owner or operators of these systems to prepare a plan describing their irrigation practices and equipment, including but not limited to, an estimate of the efficiency or the use of water on their properties.

c. Commercial Facilities. Commercial and industrial facilities shall, upon request of the General Manager, provide the District with their plan to insure conservation of water at their facilities. The District will provide these facilities with information regarding the average monthly water use by the facility for the last two year

period. The facility shall provide the District with a plan to conserve or reduce the amount of water used by that percentage deemed by the Board of Directors to be necessary under the circumstances. After review and approval by the General Manager, the water conservation plan shall be considered subject to inspection and enforcement by the District.

3.3 Stage No. 3. Water Shortage Emergency: Mandatory Conservation Measures. In the event of an unforeseeable disaster or water emergency such as an earthquake or other major disruption in the water supply or any emergency that prevents the District from meeting the water demands of the community, the General Manager is authorized to declare a water shortage emergency, subject to the ratification by the Board of Directors at a public hearing held within 72 hours of such declaration, or within such additional time as may be reasonable and necessary under the circumstances.

In the event of a foreseeable emergency such as extended drought conditions, the Board of Directors shall hold a public hearing after giving public notice as deemed reasonable by the General Manager under the circumstances.

At any public hearing held under this Section, customers of the District shall have the opportunity to protest and to present their respective needs to the Board of Directors. Public notice will follow enactment of the water shortage emergency by publishing notice of said action in a newspaper of general circulation.

After declaration of any water shortage emergency under this Section, the following rules and regulations, and any other rules and regulations deemed necessary by the General Manager and/or Board of Directors, shall be in effect immediately, and their violation may be enforced by Sections 6 through 11 of this Ordinance:

- a. Watering of parks, school grounds and golf courses is prohibited.
- b. Lawn watering and landscape irrigation is prohibited.
- c. Washing down of driveways, parking lots or other impervious surfaces is prohibited.
- d. Washing of vehicles is prohibited, except when done by commercial car wash establishments using recycled or reclaimed water.
- e. Filling or adding water to swimming pools, wading pools, spas, ornamental ponds, fountains and artificial lakes is prohibited.

- f. Restaurants shall not serve drinking water to patrons except by request.
- g. No new construction meter permits shall be issued by the District
- h. All existing construction meters shall be removed and/or locked.
- i. Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.

SECTION 4. IMPLEMENTATION AND TERMINATION OF MANDATORY COMPLIANCE STAGES. The General Manager of the District shall monitor the supply and demand for water on a daily basis to determine the level of conservation required by the water shortage emergency or to recommend termination of the Water Conservation Plan Stages, and shall notify the Board of Directors of the necessity for the implementation or termination of each stage. Each declaration of the Board of Directors implementing or terminating a water conservation stage shall be published at least once in a newspaper of general circulation, and shall remain in effect until the Board of Directors otherwise declares, as provided herein.

SECTION 5. EXCEPTIONS.

5.1 Application for Exception Permit. The General Manager may grant permits for uses of water otherwise prohibited under the provisions of this Ordinance if he finds and determines that special circumstances make compliance impossible, or that restrictions herein would:

- a. Emergency - Cause an emergency condition affecting the health, sanitation, fire protection or safety of the water user or of the public.
- b. Hardship - Cause an unnecessary and undue hardship to the water user of the public.

Such exceptions may be granted only upon written application therefor. Upon granting such exception permit, the General Manager may impose any conditions he determines to be just and proper.

5.2 Appeal to Board of Directors.

a. Deadline - Any person whose application for an exception permit is denied by the General Manager, may appeal the denial to the Board of Directors. The applicant shall file a written appeal not later than ten (10) days following issuance of the General Manager's decision.

b. Hearing - The appeal shall be scheduled for the next regular meeting of the Board of Directors; provided that, the Board of Directors may continue the appeal hearing in order to carry out an investigation of the dispute and/or to receive additional information relating to the dispute.

c. Decision of the Board - The Board of Directors may affirm or deny any appeal, and may impose any and all conditions that the Board determines to be reasonable and necessary under the circumstances. The decision of the Board of Directors shall be final. Should the Board not render a decision within thirty (30) days of submittal of the appeal to the Board, this failure to act shall be deemed to be a denial of the appeal unless both parties have agreed to extend the resolution period.

SECTION 6. ENFORCEMENT.

6.1 Inspection. Authorized employees of the District, after proper identification, may during reasonable hours, inspect any facility having a water conservation plan, and may enter onto private property for the purpose of observing the operation of any water conservation device, irrigation equipment or water facility, and to investigate possible violations of this Ordinance.

The investigation shall be made with consent of the owner or tenant of the property. If consent is refused, the District may apply to the Superior Court for a warrant pursuant to California Code of Civil Procedure Section 1822.50, et seq.

6.2 Criminal Penalties for Violation. A person violating any provision of this Ordinance shall be guilty of a misdemeanor, and shall be punishable by imprisonment in the County jail for not more than 30 days, or by a fine of not more than six hundred dollars (\$600.00), or by both such fine and imprisonment as may be allowed by law. Each and every violation of this Ordinance and each day during which such violation is committed or continued shall constitute a separate offense.

6.3 Surcharge for Violation. In addition to criminal penalties, violators of the mandatory provisions of this Ordinance shall be subject to surcharge and other enforcement rights of the District, as follows:

a. First Violation. For a first violation, the District shall issue a written notice of violation to the water user violating the provisions of this Ordinance. The notice shall be given pursuant to the requirements of Sections 7 herein.

b. Second Violation: \$100.00 Surcharge. For a second violation of this Ordinance within a 6-month period, or for failure to comply with the notice of violation within the period stated, a surcharge of \$100.00 is hereby imposed for the meter through which the wasted water was supplied.

c. **Third Violation: \$200.00 Surcharge and/or Installation of Flow Restrictor.** For a third violation of this Ordinance within a 12-month period, or for continued failure to comply within 30 days after notice and imposition of second violation sanctions, a monthly penalty surcharge in the amount of \$200.00 is hereby imposed for the meter through which the wasted water was supplied and will continue until the violation is corrected to the satisfaction of the District. In addition to the surcharge, the District may, at its discretion, install a flow-restricting device at such meter with a one-eighth inch orifice for services up to one and one-half inch size, and comparatively sized restructures of large services, on the service of the customer at the premises in which the violation occurred for a period of not less than 48 hours. The charge to the customer for installing a flow-restricting device shall be based upon the size of the meter and the actual cost of installation but shall not be less than that provided in the District's Rules and Regulations. The charge for removal of the flow-restricting device and restoration of normal service shall be as provided in the District's Rules and Regulations.

d. **Subsequent Violations: Discontinuance of service for any fourth violation of this Ordinance within 24 calendar months after the first violation as provided in Section 6.3.a. hereof,** the District may discontinue water service to that customer at the premises or to the meter where the violation occurred after giving reasonable notice pursuant to District regulations. The charge for reconnection and restoration of normal service shall be as provided in the Rules and Regulations of the District. Such restoration of service shall not be made until the General Manger of the District has determined that the water user has provided reasonable assurances that future violations of this Ordinance by such user will not occur.

SECTION 7. NOTICE

7.1 **First Violation.** For a first violation, written notice shall be given to the customer and/or property owner personally or by regular mail.

7.2 **Subsequent Violations.** If the penalty assessed is a surcharge for a second or third violation, notice may be given by regular mail.

7.3 **Violations Involving Installation of Flow-Restrictors or Discontinuance of Water Service.** If the penalty assessed is, or includes, the installation of a flow restrictor or the discontinuance of water service to the customer for any period of time, notice of the violation shall be given in the following manner:

a. By giving written notice thereof to the occupant and/or property owner personally; or

b. If the occupant and/or property owner is absent from his/her place of residence and from his/her assumed place of business, by leaving a copy with some person of suitable age and discretion at either place, and sending a copy through the United States mail addressed to the occupant and/or owner at his/her place of business or residence; or

c. If such place of residence and business cannot be ascertained, or a person of suitable age or discretion cannot be located, then by affixing a copy in a conspicuous place on the property where the failure to comply is occurring and also by delivering a copy to a person there residing, if such person can be found, and also sending a copy through the United States mail addressed to the occupant at the place where the property is situated and to the owner, if different.

d. Form of Notice. All notices provided for in this Section shall contain, in addition to the facts of the violation, a statement of the possible penalties for each violation and a statement informing the occupant/owner of his/her right to a hearing on the violation.

SECTION 8. HEARING.

8.1 General Manager Hearing. Any customer or property owner against whom a penalty is levied pursuant to this Ordinance, shall have a right to a hearing. A written request for a hearing before the General Manager shall be filed with the General Manager within ten (10) business days after notification by the District of the alleged violation.

8.2 Appeal. The customer or property owner may appeal the General Manager's decision to the Board of Directors. Such appeal shall be filed within ten (10) business days of issuance of the General Manager's decision. The appeal shall be scheduled at the next regularly scheduled meeting of the Board of Directors; provided that, the Board of Directors may continue the appeal hearing in order to carry out an investigation of the dispute and/or to receive additional information relating to the dispute. The customer or property owner may appear and present any evidence in support of his/her position to the Board of Directors.

8.3 Decision of the Board. The Board of Directors may affirm, reverse or modify the decision of the General Manager, in its discretion. The decision of the Board of Directors shall be final. Should the Board not render a decision within thirty (30) days of submittal of the appeal to the Board, this failure to act shall be deemed to be a denial of the appeal unless both parties have agreed to extend the resolution period.

SECTION 9. INJUNCTION. In addition to the remedies set forth in this Ordinance, the District may file a civil action to compel compliance with this Ordinance, including but expressly not limited to, an action to enjoin any pending or future violations of the Ordinance, or for the issuance of an order stopping or disconnecting a service if the charges for that service are unpaid at the time specified in the Ordinance.

SECTION 10. ENFORCEMENT OFFICER. The General Manager is hereby declared and appointed as the enforcement officer of this Ordinance, and shall be empowered to issue criminal citations for violations of this Ordinance, and to take such other actions as authorized herein, or as may be authorized by the Board of Directors, for enforcement of the Ordinance.

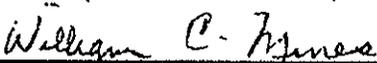
SECTION 11. RESERVATION OF RIGHTS. All remedies set forth in this Ordinance are herein declared to be cumulative and non-exclusive, and shall not preclude the District from enforcing any other rights or remedies to discontinue service and/or otherwise enforce this Ordinance or any other rules and regulations of the District.

SECTION 12. SEVERABILITY. If any section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be unconstitutional or invalid, such decisions shall not affect the validity of the remaining portions of this Ordinance.

SECTION 13. REPEAL OF PRIOR ORDINANCE. Ordinance No. 1990-7 is hereby repealed in its entirety.

SECTION 14. PUBLICATION AND POSTING. The Secretary of the Board of Directors is hereby directed to cause a summary of this Ordinance to be published at least five (5) days prior to the date of adoption hereof in a newspaper of general circulation printed and a copy of the full text must be posted at the District office at least five (5) days prior to the meeting. The summary must be published again within fifteen (15) days after adoption with the names of the directors voting for and against the adoption, and the full text must likewise be posted at the District office.

SECTION 12. EFFECTIVE DATE. This Ordinance shall become effective immediately upon its adoption. **APPROVED AND ADOPTED** this 17th day of October, 1996.



President of the Baldy Mesa Water
District and of the Board of Directors
thereof.

ORDINANCE NO. A-101-89

ORDINANCE OF THE BOARD OF DIRECTORS OF THE
VICTOR VALLEY COUNTY WATER DISTRICT ADOPTING A PROGRAM OF
VOLUNTARY WATER CONSERVATION AND RESTRICTING
WATER USE DURING WATER SUPPLY SHORTAGES AND EMERGENCIES

IT IS HEREBY ORDAINED BY THE BOARD OF DIRECTORS OF THE
VICTOR VALLEY COUNTY WATER DISTRICT AS FOLLOWS:

SECTION 1. Purpose, Intent and Findings.

- 1.1 The VICTOR VALLEY COUNTY WATER DISTRICT ("District") is a public agency created under the County Water District Act, Water Code Sections 30000 et seq. to, among other purposes, provide water service to the water users within the boundaries of the District.
- 1.2 The District is authorized by Water Code Section 31026 to restrict the use of District water during any emergency caused by drought, or other threatened or existing water shortage, and to prohibit the waste of district water or the use of district water during such periods, for any purpose other than household uses or such other restricted uses as may be determined to be necessary by the District and may prohibit use of such water during such periods for specific uses which the District may from time to time find to be nonessential.
- 1.3 The District is further authorized by Water Code Section 31027 to prescribe and define by ordinance those

restrictions, prohibitions and exclusions it may determine to be necessary pursuant to Water Code Section 31026 in restricting the use of district water during threatened or existing water shortages.

- 1.4 It is therefore the intent of the Board of Directors to establish by this Ordinance those procedures and policies necessary to the orderly administration of a water conservation program to prohibit waste and to restrict the use of water during a water shortage emergency.

SECTION 2. Definitions.

- 2.1 "District" shall mean the Victor Valley County Water District.
- 2.2 "Board of Directors" shall mean the Board of Directors of the Victor Valley County Water District.
- 2.3 "General Manager" shall mean that person appointed by the Board of Directors to manage the activities of the Victor Valley County Water District, or his designee.
- 2.4 "Water Supply Shortage" shall mean any water shortage caused by drought or any other threatened or existing water shortage, disaster or facility failure, earthquake, loss of electrical power, pipe line breakage, or other condition which results in or threatens to result in the District's inability to meet the water demands of its customers.
- 2.5 "Waste" shall mean any unreasonable or nonbeneficial use of water, or any unreasonable method of use of water,

including, but not limited to, the specific uses prohibited and restricted by this Ordinance as hereinafter set forth.

2.6 "Water User" shall mean any person, firm, partnership, association, corporation or political entity using water obtained from the water system of the District.

2.7 "Water" shall mean that water supplied by the Victor Valley County Water District.

SECTION 3. Waste or Nuisance Water and Other Substances.

It is unlawful for any person, firm or corporation, to deposit, drain, wash, allow to run or divert into or upon any public road, highway, street or alley, drainage ditch, storm drain, or flood control channel owned by or controlled by any public agency within the District, any water, mud, sand, oil or petroleum product except that, upon written application of any person filed with the District and approved by the General Manager, the District may, upon such terms and conditions as it may deem advisable to impose, including the charging of a fee therefor, grant a permit to such person to do any of the acts prohibited by this section, provided the same shall not be detrimental to the public health, safety or welfare. For purposes of enforcement of this Section, the owner of the meter or property which is the source of the waste or nuisance water or other substance as defined herein is considered the party responsible for any violations cited hereunder.

SECTION 4. Water Supply Plan Created.

4.1 Stage No. 1. Normal Conditions: Voluntary Conservation Measures.

Normal conditions shall be in effect when the District is able to meet all the water demands of its customers in the immediate future. During normal conditions, all water users should continue to use water wisely, to prevent the waste or unreasonable use of water, to protect the water supply of the District, and to reduce water consumption to that necessary for ordinary domestic and commercial purposes.

4.2 Stage No. 2. Threatened Water Supply Shortage.

In the event of a threatened water supply shortage which could affect the District's ability to provide water for ordinary domestic and commercial uses, the Board of Directors shall hold a public hearing at which consumers of the water supply shall have the opportunity to protest and to present their respective needs to the District. The Board may then, by Resolution, declare a water shortage condition to prevail, and the following conservation measures shall be in effect:

4.2.a. Exterior landscape plans.

Exterior landscape plans for all new residential, commercial and industrial development shall provide for timed irrigation and shall consider the use of drought resistant varieties of flora. Such plans shall be presented to and approved by

the District prior to issuance of a water service letter.

4.2.b. Excessive Irrigation and Related Waste.

No customer of the District or other person acting on behalf of or under the direction of a customer shall cause or permit the use of water for irrigation of landscaping or other outdoor vegetation, plantings, lawns or other growth, to exceed the amount required to provide reasonable irrigation of same, and shall not cause or permit any unreasonable or excessive waste of water from said irrigation activities or from watering devices or systems. The free flow of water away from an irrigated site shall be presumptively considered excessive irrigation and waste as defined in Section 3 herein.

4.2.c. Agricultural Irrigation.

Persons receiving water from the District who are engaged in agricultural practices, whether for the purpose of crop production or growing of commercial ornamental plants shall provide, maintain and use irrigation equipment and practices which are the most efficient possible. Upon the request of the General Manager, these persons may be required to prepare a plan describing their irrigation practices and equipment, including but not limited to, an

estimate of the efficiency of the use of water on their properties.

4.2.d. Commercial Facilities.

Commercial and industrial facilities shall, upon request of the General Manager, provide the District with a plan to conserve water at their facilities. The District will provide these facilities with information regarding the average monthly water use by the facility for the last two year period. The facility will be expected to provide the District with a plan to conserve or reduce the amount of water used by that percentage deemed by the Board of Directors to be necessary under the circumstances. After review and approval by the General Manager, the water conservation plan shall be considered subject to inspection and enforcement by the District.

4.2.e. Parks, Golf Courses and School Grounds.

Parks, golf courses (municipal and private) and school grounds which use water provided by the District shall be irrigated between the hours of 11:00 p.m. and 5:00 a.m. Standard Time.

4.2.f. Domestic Irrigation.

Upon notice and public hearing, the District may determine that the irrigation of exterior vegetation shall be conducted only during specified hours and/or days, and may impose other

restrictions on the use of water for such irrigation. The irrigation of exterior vegetation at other than these times shall be considered to be a waste of water.

4.2.g. Swimming Pools.

All residential, public and recreational swimming pools shall use evaporation resistant covers and shall recirculate water. Any swimming pool which does not have a cover installed during periods of nonuse shall be considered a waste of water.

4.2.h. Run-off and Wash-down.

No water provided by the District shall be used for the purposes of wash-down of impervious areas, without specific written authorization of the General Manager. Any water used on a premises that is allowed to escape the premises and run off into gutters or storm drains shall be considered a waste of water.

4.2.i. Vehicle Washing.

The washing of cars, truck or other vehicles is not permitted, except with a hose equipped with an automatic shut-off device, or at a commercial facility designed and so designated on the District's billing records.

4.2.j. Drinking Water Provided by Restaurants.

Restaurants are requested not to provide drinking water to patrons except by request.

4.3 Stage No. 3. Water Shortage Emergency: Mandatory Conservation Measures.

In the event of a water shortage emergency in which the District may be prevented from meeting the water demands of its customers, the Board of Directors shall, if possible given the time and circumstances, immediately hold a public hearing at which customers of the District shall have the opportunity to protest and to present their respective needs to the Board. No public hearing shall be required in the event of a breakage or failure of a pump, pipeline, conduit causing an immediate emergency. The General Manager is empowered to declare a water shortage emergency, subject to the ratification of the Board of Directors within 72 hours of such declaration, and the following rules and regulations shall be in effect immediately following such declaration:

- 4.3.a. Watering of parks, school grounds and golf courses is prohibited.
- 4.3.b. Lawn watering and landscape irrigation is prohibited.
- 4.3.c. Washing down of driveways, parking lots or other impervious surfaces is prohibited.
- 4.3.d. Washing of vehicles is prohibited, except when done by commercial car wash establishments using recycled or reclaimed water.
- 4.3.e. Filling or adding water to swimming pools, wading

pools, spas, ornamental ponds, fountains and artificial lakes is prohibited.

4.3.f. Restaurants shall not serve drinking water to patrons except by request.

4.3.g. No new construction meter permits shall be issued by the District.

4.3.h. All existing construction meters shall be removed and/or locked.

4.3.i. Commercial nurseries shall discontinue all watering and irrigation. Watering of livestock is permitted as necessary.

SECTION 5. Implementation and Termination of Mandatory

Compliance Stages. The General Manager of the District shall monitor the supply and demand for water on a daily basis to determine the level of conservation required by the implementation or termination of the Water Conservation Plan Stages, and shall notify the Board of Directors of the necessity for the implementation or termination of each stage. Each declaration of the Board of Directors implementing or terminating a water conservation stage shall be published at least once in a newspaper of general circulation, and shall remain in effect until the Board of Directors otherwise declares, as provided herein.

SECTION 6. Exceptions.

6.1 Application for Exception Permit.

The General Manager may grant permits for uses of water otherwise prohibited under the provisions of this

Ordinance if he finds and determines that special circumstances make compliance not reasonably possible, or that restrictions herein would either:

6.1.a. Cause an unnecessary and undue hardship to the water user or the public; or

6.1.b. Cause an emergency condition affecting the health, sanitation, fire protection or safety of the water use or of the public.

Such exceptions may be granted only upon written application therefor. Upon granting such exception permit, the General Manager may impose any conditions he determines to be just and proper.

SECTION 7. Enforcement.

7.1 Inspection.

Authorized employees of the District, after proper identification may, during reasonable hours, inspect any facility having a water conservation plan, and may enter onto private property for the purpose of observing the operation of any water conservation device, irrigation equipment or water facility. Employees of the District may also observe the use of water or irrigation equipment within the district from public rights-of-way and as alleged violations are reported to the District.

7.2 Criminal Penalties for Violation.

Water Code Section 31029 makes any violation of this Ordinance a misdemeanor, and upon conviction thereof, the violator shall be punished by imprisonment, fine or

by both such fine and imprisonment as may be allowed by law.

7.3 Civil Penalties for Violation.

In addition to criminal penalties, violators of the mandatory provisions of this Ordinance shall be subject to civil action initiated by the District, as follows:

7.3.a. First violation. For a first violation, the District shall issue a written notice of violation to the water user violating the provisions of this Ordinance. The notice shall be given pursuant to the requirements of Section 8 below.

7.3.b. Second violation: \$100.00 surcharge. For a second violation of this Ordinance within a 12-month period, or for failure to comply with the notice of violation within the period stated, a surcharge of \$100.00 is hereby imposed for the meter through which the wasted water was supplied.

7.3.c. Third violation: \$200.00 surcharge and/or installation of flow restrictor. For a third violation of this Ordinance within a 12-month period, or for continued failure to comply within 30 days after notice and imposition of second violation sanctions, a one-month penalty surcharge in the amount of \$200.00 is hereby imposed for the meter through which the wasted

water was supplied. In addition to the surcharge, the District may, at its discretion, install a flow-restricting device at such meter with a one-eighth inch orifice for services up to one and one-half inch size, and comparatively sized restrictors for larger services, on the service of the customer at the premises at which the violation occurred for a period of not less than 48 hours. The charge to the customer for installing a flow-restricting device shall be based upon the size of the meter and the actual cost of installation but shall not be less than that provided in the District's Rules and Regulations. The charge for removal of the flow-restricting device and restoration of normal service shall be as provided in the District's Rules and Regulations.

7.3.d Subsequent violations: Discontinuance of Service. For any subsequent violation of this Ordinance within the 24 calendar months after a first violation as provided in Section 7.3.b hereof, the penalty surcharge provided in Section 7.3.c hereof shall be imposed and the District may discontinue water service to that customer at the premises or to the meter where the violation occurred. The charge for reconnection and restoration of normal service shall be as

provided in the Rules and Regulations of the District. Such restoration of service shall not be made until the General Manager of the District has determined that the water user has provided reasonable assurances that future violations of this Ordinance by such user will not occur.

SECTION 8. Notice.

- 8.1 First Violation. For a first violation, written notice shall be given to the customer and/or property owner personally or by regular mail.
- 8.2 Subsequent Violations. If the penalty assessed is a surcharge for a second or third violation, notice may be given by regular mail.
- 8.3 Violations involving installation of flow-restrictors or discontinuance of water service. If the penalty assessed is, or includes, the installation of a flow restrictor or the discontinuance of water service to the customer for any period of time, notice of the violation shall be given in the following manner:
 - 8.3.a. By giving written notice thereof to the occupant and/or property owner personally; or
 - 8.3.b. If the occupant and/or property owner is absent from his/her place of residence and from his/her assumed place of business, by leaving a copy with some person of suitable age and discretion at either place, and sending a copy through the United States Mail addressed to the occupant

and/or owner at his/her place of business or residence; or

8.3.c. If such place of residence and business cannot be ascertained, or a person of suitable age or discretion cannot be located, then by affixing a copy in a conspicuous place on the property where the failure to comply is occurring and also by delivering a copy to a person there residing, if such person can be found, and also sending a copy through the United States Mail addressed to the occupant at the place where the property is situated and to the owner, if different.

8.3.d. Form of Notice. All notices provided for in this Section shall contain, in addition to the facts of the violation, a statement of the possible penalties for each violation and a statement informing the occupant/owner of his/her right to a hearing on the violation.

SECTION 9. Hearing.

Any customer or property owner against whom a penalty is levied pursuant to this Ordinance shall have a right to a hearing, in the first instance by the General Manager, with the right of appeal to the Board of Directors, on the merits of the alleged violation upon the written request of that customer within fifteen (15) days of the date of alleged violation.

SECTION 10. Reservation of Rights.

The rights of the District hereunder shall be cumulative to any other right of the District to discontinue service.

SECTION 11. Severability.

If any section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be unconstitutional or invalid, such decisions shall not affect the validity of the remaining portions of this Ordinance.

SECTION 12. Publication and Posting.

The Secretary of the Board of Directors is hereby directed to cause this Ordinance to be published once in full within 10 days after the date of adoption hereof in a newspaper of general circulation printed, published and circulated in the District, and to be posted within 10 days after the date of adoption hereof in three public places within the District.

SECTION 13. Effective Date.

This Ordinance shall become effective 30 days after adoption.

APPROVED AND ADOPTED this 21st day of February, 1989.

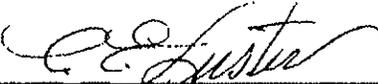
Ayes: President Jordan, Vice-President Petersen,
Directors Lugo, Songer and Zimprich

Noes: None

Absent:


Sally R. Jordan, President of the
Board of Directors

ATTEST:


Charles E. Luster, Secretary
to the Board of Directors

This appendix includes the following materials regarding water conservation:

- The Alliance for Water Awareness and Conservation Operational Plan
- Water Survey Programs – VWD / Shared WCIP Program C4G Landscape Retrofits DMM1
- VWD Residential Plumbing Retrofit DMM2
- Washing Machine Rebate Program DMM6
- Water Cycle Bracelet Presentation – Tailor for Teacher Objectives K-12

This Page Left Blank Intentionally

The Alliance for Water Awareness and Conservation



Operational Plan

Adopted November 2006; amended November 2009

**Alliance for Water Awareness and Conservation
(AWAC)
Operational Plan**

Table of Contents

Purpose of Operational Plan			Page 3
Applications	Page		4
Operational	Guidelines	Page	6
Actions	Page		8
Results	Page		11
AWAC	Participating Agencies	Page	12
Results	Data	Appendix	A

Purpose

This operational plan is intended for the use of AWAC's participating agencies to illustrate and report on conservation activities in their service areas in accordance with state requirements. Non-participating agencies or companies may refer to this plan for purposes of illustrating region-wide water conservation efforts.

The activities and outreach undertaken by participating agencies in AWAC include feasible water conservation alternatives for: execution of conservation goals and programmatic requirements of retail water agencies and companies with an adopted Urban Water Management Plan (UWMP); implementation of the Demand Management Measures (DMM) and conservation priorities as contained in the Mojave Water Agency Integrated Regional Water Management Plan (IRWMP); meeting the water conservation goals of the signatories to the Memorandum of Understanding (MOU), including the Best Management Practices (BMP) as established by the California Urban Water Conservation Council (CUWCC); non-signatories to the CUWCC MOU implementing DMM or BMP outside of the parameters of the MOU; and, any water producing entity, public or private, with water conservation and awareness objectives.

Participation agencies are public and private agencies acting collaboratively as stakeholders in water conservation within the Mojave Water Agency (MWA) 4,900 square mile service area. In order to establish comprehensive regional support for water conservation and awareness, AWAC works cooperatively and aggressively to develop, promote and implement water conservation throughout the region.

AWAC Applications

Founded in August 2003, AWAC has worked to meet the water conservation needs of the region through cooperation between participating agencies. AWAC works to help all water customers use water more efficiently, including: new and existing homeowners; landscape suppliers; professional and commercial landscapers; developers; commercial, industrial, and institutional entities; and, retail and municipal water providers. AWAC was formed to provide a vehicle to attract support for a regional water conservation program and to coordinate implementation of activities by forming partnerships to obtain common measurable goals. AWAC set three goals that aim to change water-use habits and empower High Desert communities with the tools to ensure adequate supplies of water for future generations:

- (1) Educate the local communities with the understanding of the importance of water conservation;
- (2) Provide the local communities with the tools to effectively reduce per capita consumption to targeted goals; and,
- (3) Reduce regional water use by 10 percent gross per capita by 2010 and 20 percent gross per capita by 2020 (5 percent in the Morongo Basin by 2015) to achieve a sustainable, reliable supply to meet regional water demands.

UWMP Act and Regional Implications

Each participating agency that has adopted an UWMP in accordance with the 2003 California Urban Water Management Act requirements including amendments made by Senate Bill 610 and Assembly Bill 901 has responsibilities for achieving water conservation goals, often implemented as DMM in a UWMP. This Operational Plan illustrates region-wide efforts toward water demand management that can be applied to and used to help satisfy reporting on some of these requirements.

Mojave Water Agency IRWMP DMM

MWA has developed an IRWMP through a comprehensive systems approach. The Plan integrates components related to groundwater management, urban water management, agricultural water use, environmental habitat protection and restoration, water quality, and stakeholder and public outreach. The Plan meets requirements of the Urban Water Management Planning Act and requirements for Groundwater Management Plans pursuant to the Water Code and components recommended by the California Department of Water Resources (DWR).

The fourteen (14) DMM identified in the MWA IRWMP are based on the BMP established by the CUWCC. When applicable, each AWAC action listed in this plan will be directly linked to the specific DMM for the use of both CUWCC signatory and non-signatory agencies. The DMM are as follows:

- 1- Water survey programs for single-family and multi-family customers
- 2- Residential plumbing retrofit
- 3- System water audits, leak detection and repair
- 4- Metering with commodity rates for all new connections and retrofit of existing connections
- 5- Large landscape conservation programs and incentives
- 6- High efficiency clothes washing machine financial incentive programs
- 7- Public information programs
- 8- School education programs
- 9- Conservation programs for CII accounts
- 10- Wholesale agency assistance programs
- 11- Retail conservation pricing
- 12- Conservation coordinator
- 13- Water waste prohibition
- 14- Residential high efficiency toilet replacement programs

Desert Communities Water Awareness Expo Convergence

The Desert Communities Water Awareness Expo (Expo) was formed in 1993, and promoted water awareness in High Desert venues, including trade shows and at the Victor Valley Mall. In 2007, in order to combine resources for more effective outreach and conservation, the Expo group consolidated with AWAC, becoming the Expo Committee. The long-term commitment and recognition attributed to Expo added a great resource to the AWAC group and mission.

Water Use Reduction Goals

As illustrated in the goals set by AWAC, actual water use reduction is a primary indicator for the effectiveness of foundational water conservation outreach and education. By monitoring production data and delivery volume by retailers throughout the MWA service area, the consolidation of that data into a common database can be used to track use reduction throughout the MWA service area.

Through the promotion and establishment of water efficient ordinances for landscaping, water waste and mandated irrigating and outdoor washing times, many communities enforce water conservation by implementing jurisdictional mandates related to water conservation. Participating agencies in AWAC have unique jurisdictional requirements varying from town, to city, to county. Each reporting jurisdiction will have a different combination of ways to meet the DMM based on which components of mandatory water conservation have been adopted in their communities.

AWAC Operational Guidelines

AWAC is funded through participating member contributions and includes volunteering, in-kind services and materials.

AWAC conservation goals are primarily accomplished through event and committee-based participation.

Committee Structure

The AWAC committee structure includes the general membership, specialized standing committees, a Steering Committee and an Executive Director.

General Membership

The general membership is comprised of individual employees who represent the participating agencies. This group meets on a quarterly basis to discuss programs and policies and to prioritize time, events and resources.

Specialized Committees

Specialized committees are standing committees that include the Education, Expo, Landscape and Morongo Basin Committees. All committee members develop, implement and participate in event-based conservation outreach throughout the MWA service area. Each committee has a chairperson who provides a report on their committee decisions and activities to the general membership and the Steering Committee on a quarterly basis.

Education Committee

The Education Committee is responsible for organizing and implementing the development of public education materials for event participation, promoting curriculum for school-aged presentations and programs, and planning and executing workshops on water conservation and awareness, including landscape-related workshops. Members of the Education Committee provide primary input on information and outreach materials used by staff at AWAC and participating agency-specific events.

Expo Committee

The Expo Committee is responsible for planning AWAC participation in the annual springtime Home and Garden trade show. Planning for the: staffing and stocking of booths dedicated to unique components of water conservation; children's activities; water conserving prize raffle; and, providing informational outreach ranging from mini-workshops to one-on-one public education by professionals in the water field. Members of the Expo Committee include members who have been working on water conservation outreach in the High Desert for over fifteen years.

Finance Committee

The Finance Committee is responsible for monitoring the financial aspects of AWAC. Members of the Finance Committee work with the MWA Finance Department to report on revenues and expenditures, and also provide outreach to acquire contributions from member agencies.

Landscape Committee

The Landscape Committee is responsible for developing and implementing water efficient landscape and irrigation information, working with regional nurseries to provide public information on water efficient landscapes and irrigation, writing and arranging for the publication of a Plant of the Month, keeping water efficient plant lists, and developing the AWAC Calendar. Members of the Landscape Committee are knowledgeable about and promote water efficient landscape practices.

Morongo Basin Committee

The Morongo Basin Committee is responsible for implementing programs unique to the Morongo Basin area and providing input and participation to general membership, especially on water conservation programs that are currently being implemented in Morongo Basin area jurisdictions (ie. resale retrofit, greywater ordinances, and native plant availability). Members of the Morongo Basin Committee are from an area with unique water availability issues, historically low water use and a culture of water efficiency.

Steering Committee

The Steering Committee is responsible for making decisions based on input from the general membership and recommendations from the specialized committees. This committee works with the Executive Director and MWA Finance Department to supervise revenues and expenditures.

Members of the Steering Committee are the chairpersons of the specialized committees and have decision-making authority on: financial and budget management; prioritization of projects and events; and, other organization-wide planning efforts. The Steering Committee meets on a bi-monthly basis.

Executive Director

The Executive Director is responsible for participating in the activities of and providing support to the specialized committees; managing the regional incentive program; purchasing and allocating outreach materials; public relations and marketing; overseeing the MWA demonstration garden and providing technical and financial support to other High Desert water conservation demonstration gardens and projects; coordinating the Speakers Bureau; managing and coordinating website content and consultant; and, evaluating and making recommendations for conservation programs and priorities.

Actions

Cooperation (DMM 10)

- Technical and Legislative Support for Agency Collaboration- provide wholesaler level support on technical issues regarding water conservation
- Vendors- coordination with landscape and irrigation professionals on outreach, pilot programs and workshops
- Water Professionals- every level of employee, from crew staff to managerial staff are relied upon for input on programs, priorities and implementation

Event Participation (DMM 7)

Annuals:

- Adelanto Community Water Awareness Festival- Adelanto
- Apple Valley Town Festival- Apple Valley
- Cinco de Mayo Festival- Victorville
- Earth Day- Yucca Valley
- Healthy Seniors Aging Fair- County Fairgrounds, Victorville
- Grubstakes Days- Yucca Valley
- Hesperia Public Works Day- Hesperia
- Home and Garden Trade Show- County Fairgrounds, Victorville
- Landers Orchid Festival- Landers
- Morongo Basin Relay for Life - Yucca Valley
- Phelan Phamily Phun Days- Phelan
- Pinon Hills Summerfest- Pinon Hills
- San Bernardino County Fair- Victorville
- Turtle Days- Joshua Tree
- Victorville Garden Party- Victorville

Innovation

- Water Conservation Incentive Program (may meet any combination of **DMM 5, 6, 9 or 10**)
 - High efficiency clothes washer rebates
 - High efficiency toilet rebates and vouchers
 - Turf replacement incentives for residential and commercial users
- Production and Conservation Data Compilation- tracks results of conservation activities by monitoring production data region-wide
- Water-efficient Landscape Ordinances- AB 1881 compliant ordinance template developed and adopted throughout multiple jurisdictions region-wide

Outreach (DMM 7)

- Calendar- annual publication contains water conservation tips, watering hours and desert adaptive landscaping photos
- Chambers of Commerce- membership in and presentations to business leaders to provide commercial sector outreach (may also meet **DMM 9**, under specific circumstances and depending on the level of programmatic coordination)
- Demonstration Gardens- throughout the MWA service area
- Newsletters- water conservation education, landscaping information, event and workshop advertisement, organizational summary provided to decision-makers
- Newspapers- special section inserts, incentive program advertisement
- Plumbing Retrofit Items- water conserving hardware is distributed with AWAC logo and website address
- Promotional Items- various items distributed with AWAC logo and website address
- Public Service Announcements (radio and television)- water conservation education, incentive program advertisement
- Public Workshops (specific workshop topics also meet other **DMM**)
 - Agricultural Pumping Efficiency
 - High Desert Adaptive Plant Types and Native Species
 - Indoor and Outdoor Water Conservation
 - Utility Billing and Governmental Powers
 - Water Efficient Irrigation Planning, Installation and Maintenance
 - Water Efficient Landscaping Planning, Installation and Maintenance
 - Winterizing to Avoid Water Emergencies and Repairs
- Speakers Bureau- engage with community organizations and groups on water conservation appearances, lectures and speeches
- Website- provide all-hour access to up-to-date water conservation and efficiency information

Literature/Curriculum (DMM 8)

- Educational Partnerships- working with school districts, charter schools, Barstow College, Copper Mountain College, and Victor Valley College
- Landscape Templates (also **DMM 5**)- developed for homeowners, businesses and landscaping professionals for use in designing desert appropriate landscapes
- *Beautiful High Desert Gardening* CD-Rom- provides in-depth analysis of plant types, soil types and hydrozones for High Desert species
- *High Desert Water-wise Landscaping* DVD- promoting water efficient landscaping techniques in design and implementation using a workshop approach
- Mojave Environmental Education Consortium (MEEC) Executive Board Position- developing curriculum and funding environmental education region-wide

- Nursery Program and Informational Plant Stands- water efficient plant types and desert adaptive species are presented to the public in attractive displays for use by professional plant nurseries
- Outreach Materials- developed for distribution and informational purposes
 - *A Guide to High Desert Landscaping* Booklet
 - *A Complete Guide to High Desert Water Conservation* Booklet
 - *High Desert Vegetable Planting Guide*
 - Water Efficient and Native Plant Lists
 - *Water Efficient Irrigation* Pamphlet
 - *Water Efficient Landscaping* Handout
 - *Water-Smart Landscaping* Pamphlet
- Plant of the Month- monthly publication in local newspapers illustrating the beauty and efficiency of High Desert natives and water efficient plant types
- Project WET Training- working with water agency staff to provide educational training in water conservation in order to provide lessons on water conservation to school-aged children

Results

Production Reduction

As stated in the purpose of this plan, water use reduction is a strong indicator of the success of water conservation efforts. 2000-2008 production data shows a region-wide water use reduction of approximately 22% within the MWA service area (Appendix A). This has been accomplished while AWAC provided public education and worked with High Desert decision makers to adopt water conservation ordinances and policies. When combined with the 40% population growth experienced in the High Desert during this same period of time, it can be confidently stated that the efforts of AWAC are successfully contributing to water use reduction.

Physical Landscape Changes

The transplanted lawn with tropical accent plants is a thing of the past for new and rehabilitated landscapes in the High Desert. Through promotion and education on desert adaptive landscapes, AWAC's participating members have led the way in educating decision-makers to enforce and adopt stricter requirements for landscaping in residents. Desert-adaptive landscaping and drought tolerant plant species are replacing turf in all land use types.

This has also become the norm within the High Desert's commercial sector. Renewable energy, green building and water-energy nexus decisions have become a common component of business planning decisions. Business owners who incorporate water conservation into their business plans save money and resources and may gain additional credit in the entitlement process. AWAC helps businesses by developing information on water conservation and providing rebates for turf replacement.

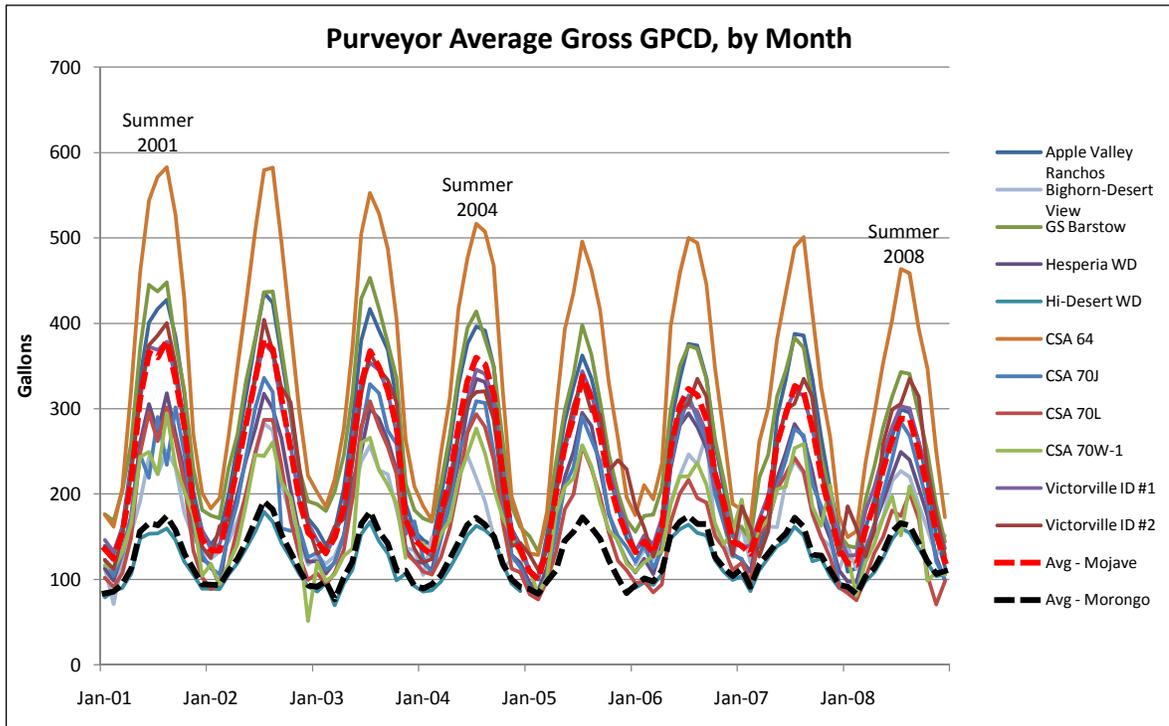
Cultural Shifts

The foundational qualities of outreach and public education provide immeasurable value in an arid, desert environment. Through agency cooperation and sponsorship of event participation to promote water conservation, AWAC has increased its visibility and recognition throughout the desert. With continuing growth and residents moving from other areas within California and beyond, there is constantly a fresh audience to educate on the importance of water resources in an arid environment. AWAC will continue to make water conservation education available at public events and through agency-specific activities to ensure that the population is equipped with the tools and information to wisely manage our water supply.

AWAC Participating Agencies

City of Adelanto
Town of Apple Valley
Apple Valley Heights County Water District
Apple Valley Ranchos Water Company
City of Barstow
Barstow College
Bighorn-Desert View Water Agency
Bureau of Land Management
Copper Mountain College
Golden State Water Company
City of Hesperia
Helendale Community Services District
Hi-Desert Water District
Joshua Basin Water District
Juniper Riviera Water District
Mariana Ranchos Water District
Mojave Desert and Mountain Recycling Authority
Mojave Desert Resource Conservation District
Mojave Water Agency
Mojave Weed Management Area
Phelan Pinon Hills Community Services District
San Bernardino County Special Districts Water/Sanitation Division
San Bernardino County Fairgrounds
Thunderbird County Water District
University of California Cooperative Extension
Victor Valley College
Victor Valley Wastewater Reclamation Authority
Victorville Water District

Appendix A



*GPCD calculated as total water production for month (gallons), divided by 30.4 days, divided by estimated population.

**Not all purveyors in the region are included in the Mojave and Morongo basin area averages – only purveyors listed in the chart legend.

WATER SURVEY PROGRAMS-VWD/SHARED WCIP PROGRAM
C4G LANDSCAPE RETROFITS
- DMM 1 -

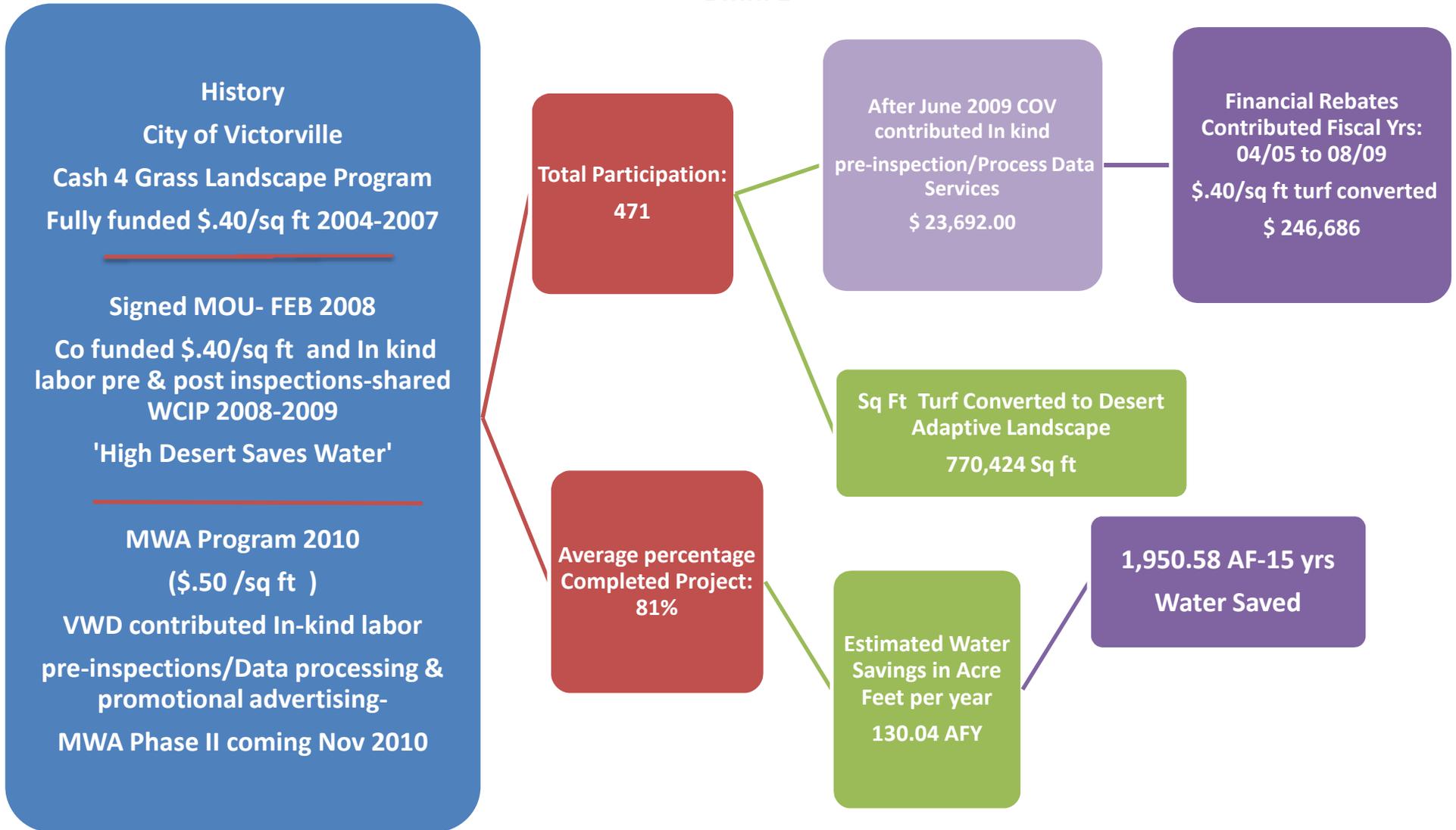
History of VWD Program	APPS RECV'D	PROJECTS COMPLTD		Percentage Compltd	Total Participation	Average Percentage Completed	Rebates Contributed to Date 04/05 to 08/09	Sq Ft Turf Removed	Water Savings Assumption AFY (55 ga per sq ft/yr)	Anticipated Life of Project (15 Yr) AF
FY 04/05	2	2		100	471	81%	\$ 246,685.00	730,424.00		1,950.58
FY 05/06	16	12		75						
FY 06/07	57	36		63						
FY 07/08	120	87	(66)MWA	73						
FY 08/09 (ID1 & 2 combined)	276	208		75						

* Signed Mou to 'Partner with High Desert Saves Water' AWAC in February 2008
 (additional funding and advertisement contributed by MWA in the amount of \$.50 per sq ft turf converted)

WCIP-MWA only Snapshot May 2010	126	100
------------------------------------	-----	-----

(rate) QTY
 \$67.50 351 \$23,692.50 In-kind labor only for MWA program

**WATER SURVEY PROGRAMS-VWD/SHARED WCIP PROGRAM
C4G LANDSCAPE RETROFITS
- DMM 1 -**



WATER SURVEY PROGRAMS-VWD/SHARED WCIP PROGRAM

C4G LANDSCAPE RETROFITS

Labor Visits - **DMM 1** - Free retrofits supplied

WATER AUDITS SF AND MF	connections	Population	PROJECTS COMPLTD	% Complete	Total Visits	Average Percentage Completed	Shower heads	Low-flow Faucet areators	shut off nozzles for outdoor hose	Water Savings Afy	Water Savings Af-15 yr
FY 04/05	25,859	85,336	1144	4	6,990	4%	\$ -	-	-	32.04	480.58
FY 05/06	30,946	102,122	1156	4			(purchased 300)	(purchased 500)	(purchased 500)	32.37	485.62
FY 06/07	33,018		1094	3			180	260	200	30.64	459.57
FY 07/08	33,631		1070	3			35	70	100	29.97	449.49
FY 08/09	32,730		1204	4			35	70	100	33.72	505.78
FY 10/11	33,505		1322	4			50	100	100	37.02	555.35
Total Water Savings based on Assumptions: (see page 2 for back up data)										195.76	2,936.38

Based on actual home visits:

indoor/outdoor home audit	NWA survey/recheck	high water use analysis requests	C4G inspections
---------------------------	--------------------	----------------------------------	-----------------

30-40 1040 25 10% of total Average per year
(annual average visits)

Water Surveys- Water Surveys, i.e. audits are conducted throughout the year. During the free audit, the customer is shown how to operate the programmer for the sprinkler system, how to read and use the meter to determine water use applications and how to find a leak. Water saving products such as: low flow shower heads, low flow kitchen and bath aerators and self audit kits are given to consumers. Water Audits are also requested by customers who receive a notification of run-off from property and need assistance to mitigate the problems

WATER SURVEY PROGRAMS-VWD/SHARED WCIP PROGRAM

C4G LANDSCAPE RETROFITS

- DMM 1 -

page 2 -back up data

Water Savings AC-FT/YR	Water Savings:	<u>25(6,990)(365)</u>	<u>63,783,750 Gallons</u>	Total Water Savings Ea Yr	<u>195.76 AC FT/YR</u>
For 6,990 visits			325,828 Gallons/AC Ft	15yr lifetime est. 2,936 AC FT Savings	

Background support for water savings used:

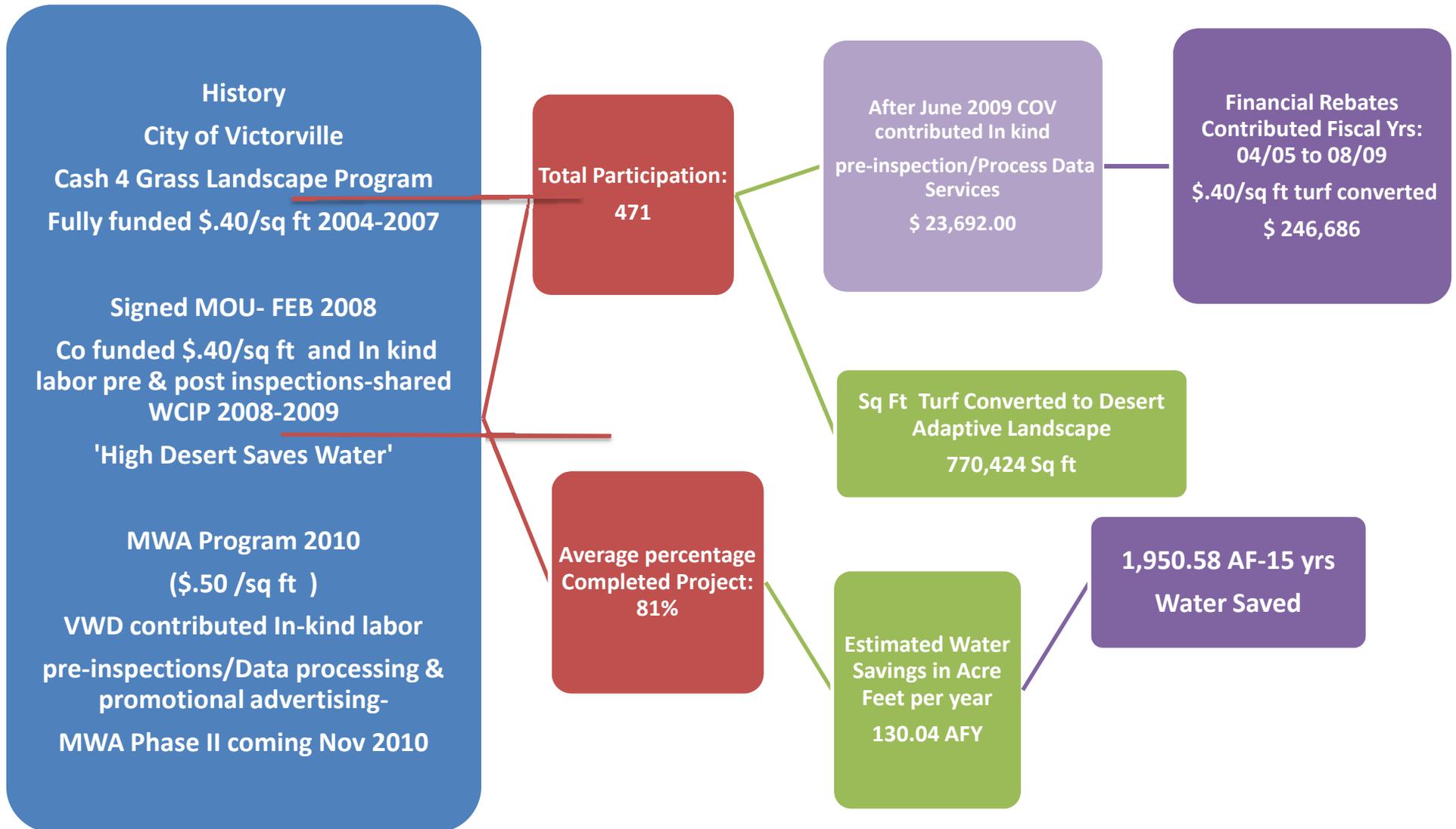
If an entire dwelling unit was retrofitted to include toilets we would have assumed water savings of at least 50% using as a base: 245 EDU for indoor use.

If we retrofitted everything else but the toilets we would be using savings of 44 gallons per day (dwelling unit) or 9 gpcd

For accuracy because not every home received a retrofit product; specifically only 125 homes received physical devices.

The remainder of the home visits benefited by analysis of water use, timer programming assistance, bringing to their attention water waste issues as well as leak detection assistance, we are using 25 gallons per day for each unit visited.

**WATER SURVEY PROGRAMS-VWD/SHARED WCIP PROGRAM
C4G LANDSCAPE RETROFITS
- DMM 1 -**



VWD RESIDENTIAL PLUMBING RETROFIT

- DMM 2 -

DATE	ULFT 1.6 gpf toilets Retrofitted	HET-1.28 gpf toilets Retrofitted	Water Savings AFY	Water Savings AFY -13 Yrs	WID1 Amount Budgeted
2005	260		4.7	61	\$ 23,000.00
2008		96	1.7	23	\$4,800
2009		298	5.4	70	\$10,900
2010		176	3.2	42	(MWA)
Sub-total:	296	570			
Total Toilets Retrofitted:	866		15 AFY	196 AFY-13 Yrs	\$ 38,700.00

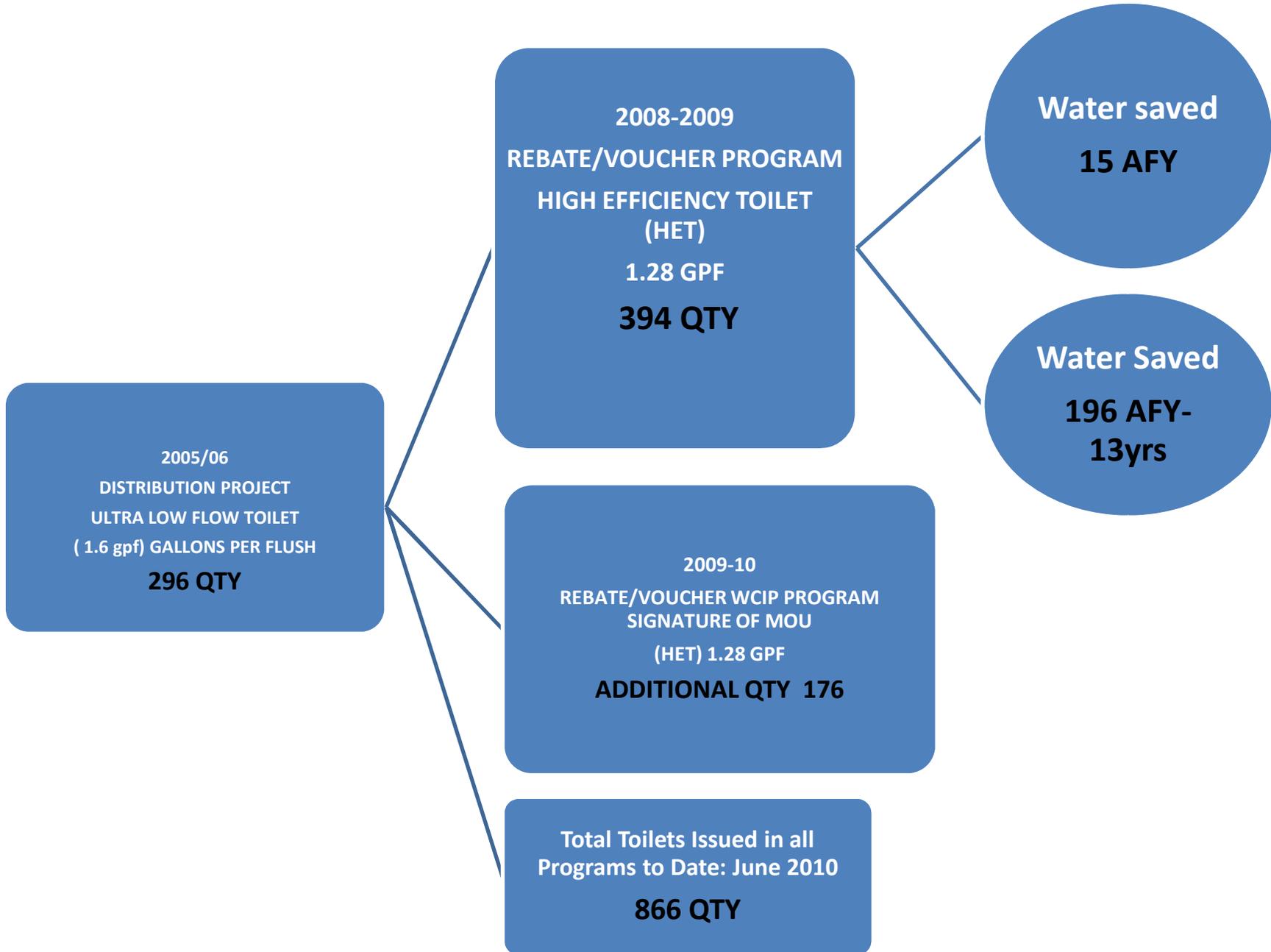
Additional budget: Promotional advertising for Program -Staff labor in-kind etc., \$ 5,800.00
T.V. Commercials, Magazine article and billing stuffers, flyers

- HET** (High Efficiency Toilet program) offers a rebate/voucher of as much as \$215 towards a new high efficiency flush toilet to replace older units using above 1.6 gallons per flush. By replacing a standard toilet with a HET, a family can realize an annual water savings of 12,000 gallons. Partial funding provided by Mojave Water Agency

- Partial funding through Department Water Resource-ULFT Rebate:** In 05/06, department processed 260 rebates/credits to customers who applied and replaced pre-1994 standard toilets with ultra flow toilets using 1.6 gallons per flush. The average savings per subject came to 68 HCF (hundred cubic feet) or 50,864 gallons of water during the second year.

VWD RESIDENTIAL PLUMBING RETROFIT

- DMM 2 -



WASHING MACHINE REBATE PROGRAM

- DMM 6 -

(VWD/WCIP SHARED PROGRAM)

DATE	HECW-High Efficiency Clothes Washer Rebate Program Shared WCIP (water factor <6.0)	Water Savings AFY	Water Savings AFY - 15 Yrs	WID1 Amount Budgeted
2008	26	1.01	15	\$ 2,080.00
2009	94	3.63	55	\$ 7,520.00
2010	192	7.42	111	(MWA)
Sub-total:	312			
Total HECW REBATED:	312	24 AFY	181 AFY-15 Yrs	\$ 9,600.00

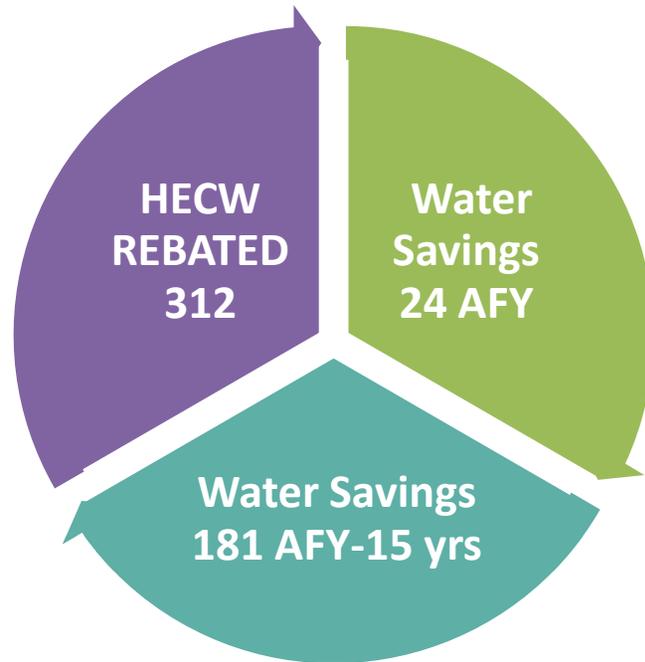
Additional budget: Promotional advertising for Program -Staff labor in-kind etc., \$ 1,440.00
 T.V. Commercials, Magazine article and billing stuffers, flyers

TOTAL \$ 11,040.00

- **HECW (High Efficiency Clothes Washer program)** offers a rebate towards the purchase of a high efficiency clothes washer to replace standard ones—a water savings of as much as 25 gallons per load. Partial funding provided by Mojave Water Agency

WASHING MACHINE REBATE PROGRAM

- DMM 6 -



Water Cycle Bracelet Presentation

Tailor for Teacher objectives K-12

Discussion points: Natures Recycling System, The Forms of Water, Precipitation, Infiltration, Sources of water (ground and surface), Transpiration, The Sun, Evaporation, Condensation and Water Conservation.

Do you think the water you drink and use today is the same water that dinosaurs drank millions of years ago? The Earth, the planet we live on, is made up of what? (Plants . . .) In the sky, we can see what? (The sun . . .) Sometimes when it rains, we get wet. Or, when it snow's, we get to build a snowman. What do you know about the Water cycle? Did you know it is **natures recycling system**? The Water cycle is always moving, from the sky, to the land, from the land back up to the sky; a natural process of water used over and over again. (Poster of the Water Cycle- visual aid).

When something is recycled, it is made new again to use over. We don't wear our clothes only once and throw them away! Instead, we put on clean clothes. After we wear them, they are washed, folded and put in our drawers to wear again some other day. **Recycling is using stuff again.** Do you have a favorite shirt? I bet you like to wear it more than once.

Water takes many forms. Do you know what forms I am talking about? Water changes from a solid to liquid to gas. The cycle of water goes round and round. We are going to make a bracelet using colored beads to represent the water cycle. The water cycle does not have a beginning or an end, but we will begin with **PRECIPITATION**

Who can name a kind of precipitation? Precipitation happens when water falls to the earth. Whether or not it hits the earth as a raindrop, snow (brrrr) . . . or a big piece of hail depends on the temperature and the location. In the desert, where we live, the humidity is very low. This means our air is very dry. Because of this dry air, most of the time, rain will not reach the ground. It will evaporate poof! And disappear on the way down. (Review Poster) We will use a **light blue bead** to represent rain on the longest end of the leather.

When the rain reaches the ground, we call this **INFILTRATION**. Water fills the pore spaces between soil particles. It is like when dirt becomes mud. Some of this water seeps into the ground and becomes groundwater, which is where your family gets your drinking water. Groundwater is water that fills the spaces between rocks and gravel underground. Like this water fills the spaces in this sponge. (Pour some water over the sponge to demonstrate) **Lets use the brown bead to represent the ground and infiltration.**

Not all water **goes into the ground**, some runs off across the land surface (called runoff), or falls onto the streets and sidewalks, then flows over the land into large bodies of water. Do you know any large bodies of water? **Lets use the dark blue bead to represent sources of water. Water running off into large bodies of water on the surface or under the ground. REVIEW THE BEADS!**

Once water goes into the soil, it can be sucked up by green stuff outside. Do you know what is green outside that needs water? Plants need water to stay alive. **Their roots drink it up.** Once they have used all the water they need, they give it off through their leaves as water vapor or gas. This process is **TRANSPIRATION**. Lets use a green bead to represent the plants that use the water and then give it off as Transpiration.

The next part of our water cycle is that big yellow thing in the sky. Do you know what that is? **The sun.** The sun is **the energy that moves the water cycle back up into the sky** from the large bodies of water. Lets use the yellow bead to represent the sun.

When it is heated, the water leaves large bodies of water as vapor you cannot see. Have you ever watched your mom boil water and it turns into steam, kind of, like it is invisible, but it is still there? This water vapor

evaporates up into the sky. Have you ever watched your breath in the snow? This is water vapor leaving your warm mouth and moving into the cold air. Lets use the clear bead to represent **Evaporation**: water that evaporates back into the sky.

When the warm water vapor rises up, higher and higher into the sky, it reaches cold air and changes into a liquid and condenses into a water drop. These water drops join together to form the white fluffy things you see up there in the sky. What are those? **Clouds**. Lets use the white bead to represent **Condensation**: when water vapor returns to the sky and forms into a cloud. **REVIEW THE BEADS!**

Light blue bead represent? Rain. Water falls to the Earth as Precipitation.

Brown bead represent? The ground. Water lands on the ground and goes inside. Infiltration.

Dark blue bead represent? Oceans, rivers, streams. Water runs off into oceans, rivers and streams.

Green bead represent? Plants, trees and flowers. Plants suck up the water and let go of what they do not use through their leaves. Transpiration.

Yellow bead represent? The sun. When water is heated, it evaporates into the sky.

Clear bead represent? Evaporation. When water is heated, it evaporates into the sky.

White bead represent? Condensation. Water vapor cools, changes to liquid and forms into a cloud.

As many drops form together, the clouds get bigger and bigger. What do you think happens? They get so full of water they have to go. Have you ever drank a lot of water and just had to go? Well these clouds have to let go of the water as **Precipitation** back down to Earth. It happens all over again. This is the water cycle. Sometimes it takes a long time for rain to fall back down, we need to conserve it. How can we do that? (Tie bracelets on).

Edible Aquifer Presentation

Tailor for Teacher objectives K-12

Discussion points:

Source of Water: Ground Water, Water Basins, Aquifers, Confining Layer, Water As our Resource, Natures filter system-soil and dirt, Contaminants, Gravity, Wells, Pumps, Water Overdraft, Water Recharge, Conservation, Experiment, i.e. observation.

Now we are going to talk about the rain that falls to the ground and goes inside. **Do you remember what the brown bead represented? Infiltration, (The ground)**. When the rain falls down to earth and goes into the ground, it soaks into the ground where it is stored in **underground water systems called aquifers** The plastic cup in front of you represents a water basin. A water basin holds ground water in the aquifer, which is made up of sediment, rocks, and gravel. Are you ready to make a delicious aquifer? Everything we are using today will represent parts of our underground water system.

Plastic cup: water basin under the ground. This room can be a **basin** because it is holding us in it. Basins store water, way down, deep in the ground.

Gummy bears and crushed ice: represent **sediment, rocks, gravel in the aquifer-bedrock)**

Soda: represents **precipitation** and ground water. Water falls to the ground as rain and replenishes the ground water aquifer, filling the pore spaces of sediment and rocks=saturated zone in the water basin

Scoop of vanilla ice cream: represents a **confining layer**- it is made of clay and rock. Confines the water. Have you ever been sent to your room? When this happens you cannot get out and nothing can get in. (sprinkles on top)

Crushed cookies: represent **soil layer** on top and acts as a filter to protect the water. Why would our water need to be protected? Because our water is a precious resource.

What is a resource? Something we cannot live without it. We need water. What are some of the ways you use water every day? So, water is a resource, we need. If you loved to read this book and learned about things from reading the pages, it would be your resource, something you need. This book will help you learn, it is a resource; something to help you, something you need. What would happen if the pages were torn out, or scribbled on with crayon? Could you use it anymore? Can you name another important resource to you?

Can we drink yucky water? The soil is trying to keep out many things that are bad for our water that should not be dumped on the ground. When bad stuff is dumped on the ground because of **gravity** it can fall into our ground water. Do you know what gravity is? If I take this book and drop it, will it go up into the air or fall to the ground? The Earth's atmosphere pulls things to the ground. If we did not have gravity, we could float around.

What would we not want in our water? What would make our water unsafe to drink? **Contaminants**. It is important that we have clean drinking water. Sprinkles: represent these contaminants. Do you see anything happening in your aquifer? Are the contaminants getting into your water? Which would be better? A thick confining layer or a thin one? Why?

How does the Water District get the water out? A well is drilled into the ground and down to the water table underneath. Now then, what can we use to represent a **well**? The straw! Remember I said everything we will be using represents something else? Let's review everything we used to make our delicious aquifer. **REVIEW!**

Plastic Cup represents: Water basin

Gummies represents: Gravel, rock and sediment-the aquifer under the ground.

Soda represents: Precipitation, rain and surface and ground water

Ice cream represents: A confining layer

Cookies represent: Soil and dirt, nature's natural filter

Sprinkles represents: Pollution and contaminants

Straw represents: A well

When the water company drills a well, we make sure there are no contaminants within miles from the area we are going to drill, because we want to serve you clean, fresh drinking water. We do a study and make sure there has been no activity up stream from the well that would pollute the ground water. **Water travels down stream-**the least path of resistance, so it is important to investigate or look around. If AJ was cleaning up dog poop and it dropped onto the ground and then he washed it off, yuck! Where would the water go? Down to Bray because she is down from him, oooohhhh

Let's drill our well into our aquifer. Take your well and we will do this at the same time ok? Be careful you do not want to pull the contaminants down. I'm going to count to three, when I get to three we will **sink the well**, only sink it one time, don't pull it out once it is in there. One, two, three, Sink your wells. Did you get any **contaminants into your aquifer**? Observe.

Now how do you suppose after drilling the well, we are going to get that water out? We cannot use a spoon, sometimes the water is 1100 feet down there, that is a long way, and our arms would not reach. What else can we use? Hmmm. You can **represent the pumps**. Can I use you? Can you be the pumps and suck out the water?

Did everyone drink all their water? How much do you have left? How old are you. What age do you plan to live to 10 years old, twenty, or a hundred? Without water, you will not live that long- how long do you think a person can live without water before they die?

Now what are you going to do? You **drained your water basin** of all the water. Where can you get some more? **Remember the water cycle**; look at the beads on your bracelet. **Precipitation**. How often does it rain in the desert? That is why **water conservation**, using our water wisely is important. We must not waste our water, so there will be enough to go around. What are ways we can do our part to **conserve**?