APPENDIX A

2005 DWR Urban Water Management Plan Checklist

2005 Urban Water Management Plan Checklist

CITY OF MERCED

Coordination with Appropriate Agencies	**(Water Code § 10620 (d)(1)(2))**		
X	Describe the coordination of the plan preparation and anticipated benefits.	1-2	Reference &Page Number
Describe resource maximization / import minimization plan	**(Water Code §10620 (f))**		
X	Describe how water management tools / options maximize resources &minimize need to import water	1-3	Reference &Page Number
Plan Updated in Years Ending in Five and Zero	**(Water Code § 10621(a))**		
X	Date updated and adopted plan received _____(enter date)	1-2	Reference &Page Number
City and County Notification and Participation	**(Water Code § 10621(b))**		
X	Notify any city or county within service area of UWMP of plan review &evision	1-3	Reference &Page Number
X	Consult and obtain comments from cities and counties within service area	1-3	Reference &Page Number
Service Area Information	**Water Code § 10631 (a))**		
X	Include current and projected population	3-2	Reference &Page Number
X	Population projections were based on data from state, regional or local agency	3-3	Reference &Page Number
X	Describe climate characteristics that affect water management	2-3	Reference &Page Number
X	Describe other demographic factors affecting water management	2-3	Reference &Page Number
Water Sources	**(Water Code § 10631 (b))**		
X	Identify existing and planned water supply sources	4-1, 4-12	Reference &Page Number
X	Provide current water supply quantities	4-9	Reference &Page Number
X	Provide planned water supply quantities	4-9	Reference &Page Number
If Groundwater identified as existing or planned source	**(Water Code §10631 (b)(1-4))**		
X	Has management plan	4-5	Reference &Page Number
X	Attached management plan (b)(1)	App. D	Reference &Page Number
X	Description of basin(s) (b)(2)	4-1	Reference &Page Number
X	Basin is adjudicated	4-3	Reference &Page Number
X	If adjudicated, attached order or decree (b)(2)	4-3	Reference &Page Number
X	Quantified amount of legal pumping right (b)(2)	4-7	Reference &Page Number
X	DWR identified, or projected to be, in overdraft (b)(2)	4-3	Reference &Page Number
X	Plan to eliminate overdraft (b)(2)	4-4	Reference &Page Number
X	Analysis of location, amount &sufficiency, last five years (b)(3)	3-5	Reference &Page Number
X	Analysis of location &amount projected, 20 years (b)(4)	4-11	Reference &Page Number
Reliability of Supply	**(Water Code §10631 (c) (1-3)**		
X	Describes the reliability of the water supply and vulnerability to seasonal or climatic shortage	4-10	Reference &Page Number
Water Sources Not Available on a Consistent Basis	**(Water Code §10631 (c))**		
X	Describe the reliability of the water supply due to seasonal or climatic shortages	4-10	Reference &Page Number
X	Describe the vulnerability of the water supply to seasonal or climatic shortages	4-10	Reference &Page Number
X	No unreliable sources	4-10	Reference &Page Number
X	Describe plans to supplement or replace inconsistent sources with alternative sources or DMMs	4-11	Reference &Page Number
X	No inconsistent sources	4-11	Reference &Page Number
Transfer or Exchange Opportunities	**(Water Code §10631 (d))**		
X	Describe short term and long term exchange or transfer opportunities	4-13	Reference &Page Number
X	No transfer opportunities	4-13	Reference &Page Number
Water Use Provisions	**(Water Code §10631 (e)(1)(2))**		
X	Quantify past water use by sector	3-5	Reference &Page Number
X	Quantify current water use by sector	3-8	Reference &Page Number
X	Project future water use by sector	3-8	Reference &Page Number
X	Identify and quantify sales to other agencies	4-1	Reference &Page Number
X	No sales to other agencies	4-1	Reference &Page Number
X	Identify and quantify additional water uses	3-8	Reference &Page Number
Demand Management measures	**(Water Code §10631 (f)**		
The Checklist for the Demand Management Measures (Water Code §0631 (f) &g), is found in last part of checklist.			
Planned Water Supply Projects, Programs and non-implemented DMMs	**(Water Code §10631 (g))**		
X	No future water supply projects or programs	4-12	Reference &Page Number
X	No non-implemented / not scheduled DMMs	6-2	Reference &Page Number
X	Cost-Benefit includes economic and non-economic factors	6-18	Reference &Page Number
X	Cost-Benefit analysis includes total benefits and total costs	6-17	Reference &Page Number
X	Identifies funding available for projects with higher per-unit-cost than DMMs	6-18	Reference &Page Number
X	Identifies Suppliers'legal authority to implement DMMs	6-18	Reference &Page Number
X	Identifies Suppliers' efforts to implement the measures	6-2	Reference &Page Number
X	Identifies Suppliers'efforts to identify cost share partners	6-18	Reference &Page Number
Planned Water Supply Projects and Programs	**(Water Code §10631 (h))**		
X	No future water supply projects or programs	4-12	Reference &Page Number
X	Detailed description of expected future supply projects &programs	4-12	Reference &Page Number
X	Timeline for each proposed project	4-12	Reference &Page Number
X	Quantification of each projects normal yield (AFY	4-13	Reference &Page Number
X	Quantification of each projects single dry-year yield (AFY	4-13	Reference &Page Number
X	Quantification of each projects multiple dry-year yield (AFY	4-13	Reference &Page Number
Opportunities for development of desalinated water	**(Water Code §10631 (i))**		
X	Describes opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply	4-7	Reference &Page Number

District is a CUWCC signatory **(Water Code § 10631 (j))**

Urban suppliers that are CUWCC members may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g). The supplier's CUWCC Best Management Practices report should be attached to the UWMP.

[X]	Agency is a CUWCC member	6-1	Reference &Page Number
[X]	2003-04 annual updates are attached to plan	6-1	Reference &Page Number
[X]	Both annual updates are considered completed by CUWCC website	6-1	Reference &Page Number

If Supplier receives or projects receiving water from a wholesale supplier **(Water Code §10631 (k))**

[X]	Agency receives or projects receiving wholesale water	4-1	Reference &Page Number
[X]	Agency provided written demand projections to wholesaler, 20 years	4-1	Reference &Page Number
[X]	ALL wholesalers provided written water availability projections, by source, to agency, 20 years	4-1	Reference &Page Number
[X]	Reliability of wholesale supply provided in writing by ALL wholesale agencies	4-1	Reference &Page Number

Water Shortage Contingency Plan Section (Water Code § 10632)

Stages of Action **(Water Code § 10632 (a))**

[X]	Provide stages of action	7-5	Reference &Page Number
[X]	Provide the water supply conditions for each stage	7-5	Reference &Page Number
[X]	Includes plan for 50 percent supply shortage	7-5	Reference &Page Number

Three-Year Minimum Water Supply **(Water Code §10632 (b))**

[X]	Identifies driest 3-year period	7-5	Reference &Page Number
[X]	Minimum water supply available by source for the next three years	7-5	Reference &Page Number

Preparation for catastrophic water supply interruption **(Water Code §10632 (c))**

[X]	Provided catastrophic supply interruption plan Need to request a copy of Emergency Plan from Warrant	7-5	Reference &Page Number

Prohibitions **(Water Code § 10632 (d))**

[X]	List the mandatory prohibitions against specific water use practices during water shortages	7-6	Reference &Page Number

Consumption Reduction Methods **(Water Code § 10632 (e))**

[X]	List consumption reduction methods ..to reduce water use in the most restrictive stages with up to a 50% reduction.	7-6	Refere nce &Page Number

Penalties **(Water Code § 10632 (f))**

[X]	List excessive use penalties or charges for excessive use	7-7	Reference &Page Number

Revenue and Expenditure Impacts **(Water Code § 10632 (g))**

[X]	Describe how actions and conditions impact revenues	7-7	Reference &Page Number
[X]	Describe how actions and conditions impact expenditures	7-7	Reference &Page Number
[X]	Describe measures to overcome the revenue and expenditure impacts	7-7	Reference &Page Number

Water Shortage Contingency Ordinance/Resolution **(Water Code § 10632 (h))**

[X]	Attach a copy of the draft water shortage contingency resolution or ordinance.	App. E	Reference &Page Number

Reduction Measuring Mechanism **(Water Code § 10632 (i))**

[X]	Provided mechanisms for determining actual reductions	7-8	Reference &Page Number

Recycling Plan Agency Coordination **Water Code § 10633**

[X]	Describe the coordination of the recycling plan preparation information to the extent available..	5-1	Reference &Page Number

Wastewater System Description **(Water Code § 10633 (a))**

[X]	Describe the wastewater collection and treatment systems in the supplier's service area	5-3	Reference &Page Number
[X]	Quantify the volume of wastewater collected and treated	5-2	Reference &Page Number

Wastewater Disposal and Recycled Water Uses **(Water Code § 10633 (a - d))**

[X]	Describes methods of wastewater disposal	5-4	Reference &Page Number
[X]	Describe the current type, place and use of recycled water	5-3, 5-4	Reference &Page Number
[X]	Describe and quantify potential uses of recycled water	5-5	Reference &Page Number
[X]	Determination of technical and economic feasibility of serving the potential uses	5-4	Reference &Page Number
[X]	No opportunities for recycled water.	5-4	Reference &Page Number

Projected Uses of Recycled Water **(Water Code § 10633 (e))**

[X]	Projected use of recycled water, 20 years	5-7	Reference &Page Number
[X]	Compare UWMP 2000 projections with UWMP 2005 actual (10633(e))	5-8	Reference &Page Number

Plan to Optimize Use of Recycled Water **(Water Code § 10633 (f))**

[X]	Describe actions that might be taken to encourage recycled water uses	5-8	Reference &Page Number
[X]	Describe projected results of these actions in terms of acre-feet of recycled water used per year	5-8	Reference &Page Number
[X]	Provide a recycled water use optimization plan which includes actions to facilitate the use of recycled water	5-8	Reference &Pa ge Number

Water quality impacts on availability of supply **(Water Code §10634)**

[X]	Discusses water quality impacts (by source) upon water management strategies and supply reliability	4-8	Reference &Page Number
[X]	No water quality impacts projected	4-9	Reference &Page Number

Supply and Demand Comparison to 20 Years **(Water Code § 10635 (a))**

[X]	Compare the projected normal water supply to projected normal water use over the next 20 years, in 5-year increments.	7-1	Refere nce &Page Number

Supply and Demand Comparison: Single-dry Year Scenario **(Water Code § 10635 (a))**

[X]	Compare the projected single-dry year water supply to projected single-dry year water use over the next 20 years, in 5-year increments	7-1	Reference &Page Number

Supply and Demand Comparison: Multiple-dry Year Scenario **(Water Code § 10635 (a))**

[X]	Project a multiple-dry year period occurring between 2006-2010 and compare projected s/d during those years	7-2	Reference &Page Number
[X]	Project a multiple-dry year period occurring between 2011-2015 and compare projected s/d during those years	7-2	Reference &Page Number
[X]	Project a multiple-dry year period occurring between 2016-2020 and compare projected s/d during those years	7-3	Reference &Page Number
[X]	Project a multiple-dry year period occurring between 2021-2025 and compare projected s/d during those years	7-3	Reference &Page Number

Provision of Water Service Reliability section to cities/counties **(Water Code § 10635(b))**

[X]	Provided Water Service Reliability section of UWMP to cities and counties ..of UWMP submission to DWR	4-1	Reference &Page Numb er

Does the Plan Include Public Participation and Plan Adoption **(Water Code § 10642)**

X	Attach a copy of adoption resolution	App. C	Reference &Page Number
X	Encourage involvement of social, cultural &economic community groups	1-2	Reference &Page Number
X	Plan available for public inspection	1-2	Reference &Page Number
X	Provide proof of public hearing	App. C	Reference &Page Number
X	Provided meeting notice to local governments	1-2	Reference &Page Number

Review of implementation of 2000 UWMP **(Water Code § 10643)**

X	Reviewed implementation plan and schedule of 2000 UWMP	1-1	Reference &Page Number
X	Implemented in accordance with the schedule set forth in plan	1-1	Reference &Page Number
X	2000 UWMP not required	1-1	Reference &Page Number

Provision of 2005 UWMP to local governments **(Water Code § 10644 (a))**

X	Provide 2005 UWMP to DWR, and cities and counties within 30 days of adoption	1-2	Reference &Page Number

Proof plan is available for public review **(Water Code § 10645)**

X	Does UWMP or correspondence accompanying it show where it is available for public review	1-2	Reference &Page Number

2005 Urban Water Management Plan Checklist

DMM 1 -Water Survey Programs for Single-Family and Multi-Family Residential Customers (10631 f(1)(A))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-2	Reference &Page Number
X	Describes steps necessary to implement measure	6-2	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-2	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the suppliers ability to further reduce demand (10631(f)(4))	6-2	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 2 - Residential Plumbing Retrofit (10631 (f)(1)(B))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-3	Reference &Page Number
X	Describes steps necessary to implement measure	6-3	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-3	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the suppliers ability to further reduce demand (10631(f)(4))	6-3	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 3 - System Water Audits, Leak Detection and Repair (10631 (f)(1)(C))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-4	Reference &Page Number
X	Describes steps necessary to implement measure	6-4	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-4	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the suppliers ability to further reduce demand (10631(f)(4))	6-4	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 4 - Metering with Commodity Rates (10631 (f)(1)(D))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-6	Reference &Page Number
X	Describes steps necessary to implement measure	6-6	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-6	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631(f)(4))	6-6	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 5 - Large Landscape Conservation Programs and Incentives (10631 (f)(1)(E))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-8	Reference &Page Number
X	Describes steps necessary to implement measure	6-8	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-8	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631(f)(4))	6-8	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 6 - High-Efficiency Washing Machine Rebate Programs (10631 (f)(1)(F))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-9	Reference &Page Number
X	Describes steps necessary to implement measure	6-9	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-9	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631(f)(4))	6-9	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 7 - Public Information Programs (10631 (f)(1)(G))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-9	Reference &Page Number
X	Describes steps necessary to implement measure	6-9	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-9	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631(f)(4))	6-9	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 8 - School Education Programs (10631 (f)(1)(H))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-10	Reference &Page Number
X	Describes steps necessary to implement measure	6-10	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-10	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631(f)(4))	6-10	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 9 - Conservation Programs for Commercial, Industrial and Institutional (10631 (f)(1)(I))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-11	Reference &Page Number
X	Describes steps necessary to implement measure	6-11	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-11	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631(f)(4))	6-11	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 10 - Wholesale Agency Programs (10631 (f)(1)(J))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-12	Reference &Page Number
X	Describes steps necessary to implement measure	6-12	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-12	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631(f)(4))	6-12	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 11 - Conservation Pricing (10631 (f)(1)(K))

Implementation **(Section 10631 (f) & (h))**

X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-12	Reference &Page Number
X	Describes steps necessary to implement measure	6-12	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-12	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the supplier's ability to further reduce demand (10631(f)(4))	6-12	Reference &Page Number

Provided an evaluation for this DMM if it is not implemented **(Section 10631 (g))**

X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number

If Another Agency Implementing

X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 12 - Water Conservation Coordinator (10631 (f)(1)(L))

Implementation		**(Section 10631 (f) & (h))**	
X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-13	Reference &Page Number
X	Describes steps necessary to implement measure	6-13	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-13	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the suppliers ability to further reduce demand (10631(f)(4))	6-13	Reference &Page Number
Provided an evaluation for this DMM if it is not implemented		**(Section 10631 (g))**	
X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number
If Another Agency Implementing			
X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 13 - Waste Water Prohibition (10631 (f)(1)(M))

Implementation		**(Section 10631 (f) & (h))**	
X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-15	Reference &Page Number
X	Describes steps necessary to implement measure	6-15	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-15	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the suppliers ability to further reduce demand (10631(f)(4))	6-15	Reference &Page Number
Provided an evaluation for this DMM if it is not implemented		**(Section 10631 (g))**	
X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number
If Another Agency Implementing			
X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

DMM 14 - Residential Ultra-Low-Flush Toilet Replacement Programs (10631 (f)(1)(N))

Implementation		**(Section 10631 (f) & (h))**	
X	Describe DMM currently being implemented or scheduled for implementation (10631 (f) (1)(2))	6-16	Reference &Page Number
X	Describes steps necessary to implement measure	6-16	Reference &Page Number
X	Describe the methods, if any, used to evaluate the effectiveness of this DMM (10631 (f)(3))	6-16	Reference &Page Number
X	Provide estimates, if available, of existing conservation savings on water use and the effect of such savings on the suppliers ability to further reduce demand (10631(f)(4))	6-16	Reference &Page Number
Provided an evaluation for this DMM if it is not implemented		**(Section 10631 (g))**	
X	Evaluate legal authority (10631(g)(4))	6-18	Reference &Page Number
X	Evaluate economic and non-economic factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate environmental, social, health factors (10631(g)(1))	6-18	Reference &Page Number
X	Evaluate customer impact &echnological factors (10631(g)(1))	6-18	Reference &Page Number
X	Describe efforts to work with other relevant agencies to ensure implementation of the measure and to share the cost of implementation (10631 (g)(4))	6-18 6-18	Reference &Page Number
X	Describe funding available to implement any planned water supply project that would provide water at a higher unit cost (10631 (g)(3) &h))	6-18	Reference &Page Number
If Another Agency Implementing			
X	If another Agency is implementing (10631 (g)(4))	6-2	Reference &Page Number

APPENDIX B

Notice of Public Hearing and Adopted Resolution

RESOLUTION NO. 2005-146

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MERCED, CALIFORNIA, APPROVING AND ADOPTING THE URBAN WATER MANAGEMENT PLAN FOR THE CITY OF MERCED

WHEREAS, the California State Legislature has authorized the City of Merced and other qualifying local public entities to develop a groundwater management plan pursuant to Water Code Section 10750, *et seq.*; and,

WHEREAS, pursuant to the Urban Water Management Planning Act, the City Council of the City of Merced has authorized development of the Urban Water Plan for the City of Merced; and,

WHEREAS, staff has developed the Urban Water Management Plan for the City of Merced; and,

WHEREAS, notice of the public hearing on whether or not the City Council of the City of Merced should adopt the Urban Water Management Plan was duly published, the matter was presented for public hearing at the time, date and place set forth in the notice, all persons desiring to be heard were permitted to present their views orally and in writing to the City Council, and all such comments were duly considered by the City Council.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF MERCED DOES HEREBY RESOLVE, DETERMINE, FIND, AND ORDER AS FOLLOWS:

SECTION 1. The City Council of the City of Merced hereby adopts the Urban Water Management Plan for the City of Merced as presented and on file with the City Clerk, and implements the Urban Water Management Program presented therein.

///

///

///

PASSED AND ADOPTED by the City Council of the City of Merced at a regular meeting held on the 5th day of December 2005, by the following vote:

AYES:	Council Members:	SANDERS, CORTEZ, SPRIGGS, GABRIAULT-ACOSTA, WOOTEN
NOES:	Council Members:	NONE
ABSENT:	Council Members:	OSORIO
ABSTAIN:	Council Members:	NONE

APPROVED:

Mayor

ATTEST:
JAMES G. MARSHALL, CITY CLERK

BY: _____
Deputy City Clerk

(SEAL)

CITY of MERCED, CALIFORNIA
INCORPORATED APRIL 1, A.D. 1889

APPROVED AS TO FORM:

City Attorney

PROOF OF PUBLICATION

(2015.5 C.C.P)

Proof of Publication of

STATE OF CALIFORNIA)
)ss.
)
COUNTY O F MERCED

I am a citizen of the United States and a resident of the county aforesaid; I am over the age of eighteen years, and not a party to or interested in the above-entitled matter. I am the printer foreman or principal clerk of The Merced County Times, a newspaper of general circulation, printed and published in the City of Merced, County of Merced, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Merced, State of California, under the date of December 14, 1999, Case Number 143600; that the notice, of which the annexed is a printed copy has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to-wit:

November 17, 24, 2005.

Notice of Public Hearing on Urban Water Management Plan Update.

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: November 28, 2005

This space is for the County Clerk's Filing Stamp

Copy of n

LEGAL# 6943
CITY OF MERCED
NOTICE OF PUBLIC HEARING ON URBAN WATER MANAGEMENT PLAN UPDATE

NOTICE IS HEREBY GIVEN THAT PURSUANT TO THE PROVISIONS OF Section 10621 of the Water Code, the City of Merced has prepared its Urban Water Management Plan and the City intends to adopt said Plan as a result of said preparation.

That said Plan and the proposed changes and amendments are available for public inspection at the office of the Engineering Department Second Floor, City Hall located at 678 West 18th Street, Merced, California. Loaner copies of the Plan are also available for checkout at the City office. In addition copies of the Plan are available for public inspection at the following public libraries:

Merced County Library, 2100 O Street, Merced, CA 95340.

NOTICE IS FURTHER GIVEN that a public hearing will be held on the proposed Plan at a meeting of the City Council to be held on the Fifth day of December at the hour of 7:00 pm at the City Council Chambers.

Upon completion of said public hearing, the Plan will be adopted as prepared or as modified.

This notice shall be published once a week for two successive weeks in the Merced County Times.

Dated: November 14, 2005
City of Merced by: Dana Davidson, Deputy City Clerk
Published Dates: 11/17/24/05

CITY OF MERCED
NOTICE OF PUBLIC HEARING ON URBAN WATER MANAGEMENT PLAN UPDATE

NOTICE IS HEREBY GIVEN THAT PURSUANT TO THE PROVISIONS OF Section 10621 of the Water Code, the City of Merced has prepared its Urban Water Management Plan and the City intends to adopt said Plan as a result of said preparation.

That said Plan and the proposed changes and amendments are available for public inspection at the office of the Engineering Department, Second Floor, City Hall located at 678 West 18th Street, Merced, California. Loaner copies of the Plan are also available for checkout at the City office. In addition, copies of the Plan are available for public inspection at the following public libraries:

Merced County Library, 2100 O Street, Merced, CA 95340

NOTICE IS FURTHER GIVEN that a public hearing will be held on the proposed Plan at a meeting of the City Council to be held on the Fifth day of December at the hour of 7:00 pm at the City Council Chambers.

Upon completion of said public hearing, the Plan will be adopted as prepared or as modified.

This notice shall be published once a week for two successive weeks in the Merced County Times.

Dated: November 14, 2005

City of Merced by/ Dana Davidson, Deputy City Clerk

APPENDIX C

City of Merced Groundwater Management Plan

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN

December 1997

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
TABLE OF CONTENTS

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
TABLE OF CONTENTS

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
TABLE OF CONTENTS

MERCED GROUNDWATER BASIN

Final Draft

GROUNDWATER MANAGEMENT PLAN

I. INTRODUCTION

A. Legal Authority Under AB 3030

The Groundwater Management Act (AB 3030) was passed by the State legislature during the 1992 session, and became law on January 1, 1993. The Groundwater Management Act, as codified in California Water Code sections 10750 *et seq.*, identifies groundwater as a valuable resource that should be managed to ensure both its safe production and its quality. AB 3030 also encourages local agencies to work cooperatively to manage groundwater resources within their jurisdiction.

The act applies to all groundwater basins identified in the Department of Water Resources (DWR) Bulletin 118 (dated September 1975), except those already subject to groundwater management by a local agency or watermaster pursuant to other law, court order, judgment or decree, unless the local agency or watermaster agrees. Bulletin 118 specifically identifies the Merced Groundwater Basin making it eligible for groundwater management under AB 3030.

The law provides that any district or other political subdivision of the state that is authorized to provide water service and is exercising that authority, may by ordinance or resolution adopt and implement a groundwater management plan within all or a portion of its service area. The law also indicates that a local public agency that provides flood control, groundwater management, groundwater replenishment, or a local agency, formed pursuant to the Water Code for the principal purpose of providing water service, that has not yet provided that service, may establish an AB 3030 groundwater management plan within its boundaries provided that those areas are not served by another local agency.

The act also authorizes a local public agency to exercise the specified powers of a water replenishment district, subject to the approval of the voters within the agency's service area.

B. Definition of Groundwater Management

The California Department of Water Resources Bulletin 118-80 defines a "groundwater management plan" as "planned use of the groundwater basin yield, storage space, transmission capability, and water storage." A "groundwater management program," as defined by the Water Code section 10752 (e), is a coordinated and ongoing activity undertaken for the benefit of a groundwater basin pursuant to a groundwater management plan adopted as specified in AB 3030.

C. Groundwater Management Within the Merced Groundwater Basin

Certain agencies within the Merced Groundwater Basin, following their public hearings, have adopted Resolutions of Intention to Adopt a Groundwater Management Plan pursuant to Water Code

section 10753 et seq. (See Appendix F). In addition, the agencies have adopted a Memorandum of Understanding (See Appendix E) creating an association identified as the Merced Area Groundwater Pool Interests ("MAGPI"), for the purpose of developing a basin-wide groundwater management plan. Based on the foregoing, the MAGPI undertakes this groundwater management plan to guide the management of the groundwater resources within the Merced Groundwater Basin.

The Merced Irrigation District (MID), a member of MAGPI, has already prepared and adopted a groundwater management plan pursuant to AB3030. That plan pertains only to the groundwater resources lying within the boundaries of MID, which are wholly contained within the Merced Groundwater Basin. The MID groundwater management plan, which will remain in effect, contains provisions for coordination with the MAGPI regional groundwater management plan and visa versa.

II. GOALS

A. Goals of the Association

The agencies within the MAGPI agree that the groundwater and surface water resources within the Merced Groundwater Basin are vitally important resources in that they provide the foundation for environmental, agricultural, domestic, municipal and industrial needs, as well as other needs, and to maintain the economic viability and prosperity of the Basin area. The eastern Merced County area occupied by the Merced Groundwater Basin is a vital agricultural area with increasing importance in industry and education. Because of increasing demands for California's finite water resources, it is critical that those persons and agencies making use of the region's limited water supplies do so in an efficient and knowledgeable manner to preserve the resources for all elements of the local economy. The MAGPI parties acknowledge that long-term overdraft of groundwater supplies can result in water quality as well as quantity issues, cause land subsidence, increase costs to produce agricultural, industrial and domestic water supplies, and eventually restrict economic development.

In light of these matters the parties desire to achieve the following goals:

1. Determine the extent and evaluate the quantity and quality of the Basin's existing groundwater supplies;

2. Consider developing and/or utilizing an existing numerical model of the Basin's groundwater supplies;

3. Determine the Basin's need for additional or improved water extraction, storage, delivery, conservation, reuse and recharge facilities;

4. Provide information and guidance for the management, preservation, protection and enhancement of the Basin;

5. Provide a way to maintain local control of the region's water resources;

6. Promote coordinated planning to make the best use of available water resources to meet the needs of the association's respective constituents and service territories in the mutual best interests of the inhabitants and resources of the Basin; and

7. Prepare and promote a draft groundwater management plan for the Basin, which could be adopted by the appropriate agency or agencies.

B. Goal of the Basin-wide Groundwater Management Plan

The goal of the groundwater management plan is to identify, formulate, and implement sound groundwater management practices, in order to maintain the available groundwater resources to meet the beneficial uses and needs of the Merced Groundwater Basin. The groundwater management plan includes sound principles of groundwater utilization, which includes, but is not limited to, the following:

1. Protection and planned maintenance of groundwater quality;

2. Protection and beneficial use of recharge areas; and

3. Monitoring of Basin parameters for the primary purpose of maintaining groundwater quantities and eliminating conditions of long-term overdraft.

The groundwater management plan will also document existing groundwater management activities and practices.

III. DESCRIPTION OF THE BASIN

A. Geographical Description of the Basin

The Merced Groundwater Basin lies on the eastern side of the San Joaquin Valley, located entirely within Merced County, and is generally described as the eastern one-half of Merced County. The groundwater system is bounded by the Merced River on the north, the San Joaquin River on the west, and the Chowchilla River on the south, as shown in Figure 1. The eastern boundary of the system is the western extent of the outcrop of low-permeability Valley Springs formation rocks in the foothills of the Sierra Nevada.

B. Geological Description of the Basin

In a December, 1977 Open File Report (77-454) of the United States Geological Survey, written by R. W. Page, entitled: "APPRAISAL OF GROUNDWATER CONDITIONS IN MERCED, CALIFORNIA AND VICINITY", Page recognized four aquifers beneath the Merced area. From deepest to shallowest, they are as follows:

- The Mehrten Formation: maximum thickness of 700 feet; composed of sandstone, siltstone and claystone; low to moderate hydraulic conductivity; total dissolved solids (TDS) greater than 2,000 ppm throughout the area.

- A confined aquifer between the Mehrten Formation and the base of the E-clay (Corcoran Clay): maximum thickness of 700 feet; composed of gravels, sand, silt and clay; moderate to high hydraulic conductivity; TDS generally less than 2,000 ppm, except in far western portion of the area.

- An intermediate aquifer above the Corcoran Clay and below the shallow clay: maximum thickness 700 feet; composed of gravels, sand, silt and clay; moderate to high hydraulic conductivity; TDS generally less than 2,000 ppm.

- A shallow unconfined aquifer: maximum thickness 100 feet; composed of gravels, sand and fine sand; moderate to high hydraulic conductivity; TDS generally less than 2,000 ppm.

The 1995 Merced Water Supply Plan summarized Basin characteristics as follows:

"The groundwater basin that underlies the study area consists of a wedge of unconsolidated sedimentary deposits of sand, gravel, silt and clay that thickens from a feather edge at the mountain front in the east to its greatest thickness at the western margin of the study area near the San Joaquin River. The thickness of the sedimentary deposits are estimated to be more than 12,000 feet near the San Joaquin River, but the effective thickness of usable aquifer is only about 1,000 feet because the deeper sedimentary deposits contain salt water. Although the entire study area is underlain by aquifers, the most prolific aquifers of the area are west of the eastern boundary of MID where well yields are adequate for agricultural and municipal supply throughout the study area.

The groundwater basin represents a huge reservoir of fresh water: about 30 million acre-feet of water is stored beneath the study area. Although this is a large amount of water, not all of this water can be safely removed from the basin because it would cause excessive declines in groundwater levels, intrusion of poor water into currently clean aquifers, and subsidence of the land surface."

C. Agencies within the Merced Groundwater Basin

The following agencies lie either wholly or partly in the Merced Groundwater Basin and therefore are eligible to participate in an AB 3030 groundwater management plan: the County of Merced; the Merced Irrigation District; the LeGrand-Athlone, and Turner Island Water Districts, the cities of Merced, Atwater and Livingston; the Winton Water & Sanitary District; the Merquin County Water District; the Planada and LeGrand Community Services Districts; the Black Rascal and Meadowbrook Water Companies; Stevinson Water District; and the East Merced Resources Conservation District.

At this time, it is understood that each agency shall adopt the regional groundwater management plan to manage groundwater resources within its jurisdiction. If Merced County adopts a groundwater management plan, the plan shall apply to those areas lying outside of the boundaries of other agencies that have adopted groundwater management plans.

IV. GROUNDWATER BASIN CONDITIONS

A. Water Supply

1. PRECIPITATION

Within the Merced Basin, precipitation alone does not satisfy urban and agricultural water supply requirements. The amount of precipitation in this part of the valley varies widely from year to year. The average annual precipitation for the Basin is 12.12 inches, based on 101 years of records collected by the Merced Irrigation District and its predecessors. Since the majority of precipitation falls in the winter, most landscaping, crops and orchards are dependent upon irrigation during the growing season (March through October). While the precipitation does not fully satisfy water demands, it does contribute to groundwater recharge. Therefore, the groundwater system contains some portion of water that originated from the direct infiltration of precipitation.

2. SURFACE WATER

The Merced Irrigation District (MID) and the Stevinson Water District are the only entities within the Basin with access to firm supplies of developed surface water. The MID supplies its water primarily to irrigators within the MID; however, during wet years, at the discretion of the MID, irrigators outside the districts boundaries, but situated along the districts canals, are offered surface

water that has been deemed by the MID as "surplus and salable". In addition, there are some individual properties with riparian or adjudicated water rights that utilize water from the Merced River, which generally borders such lands.

The MID's predominant source of surface water is the Merced River. MID operates Lake McClure and Lake McSwain (The Merced River Development Project) to store winter and spring runoff for irrigation during the growing season, from 1,054 (+/-) square miles of watershed located predominately in Yosemite National Park. The surface water available to MID each year is based on the runoff for that year coupled with the MID's direct diversion rights and stored water from Lake McClure. Minor amounts of surface water flowing from small, local watersheds are intercepted by MID canals in some years and are delivered to MID water users.

Merced River surface water diverted by MID supplies an average of 522,000 acre-feet or ninety-six percent (96%) of the total irrigation water applied annually to land within the District. A significant part of applied irrigation water percolates past the root zone to become groundwater recharge. In addition, seepage occurs from MID's conveyance and distribution canals, which are predominantly unlined. Deep percolation and canal seepage represent the two largest elements of groundwater recharge.

The Stevinson Water District (SWD) provides surface water for irrigation purposes to approximately 5,000 acres, of which 3,600 are irrigated. The SWD receives its surface water from the Merced Irrigation District through a 1929 Adjudication, which provides for up to 24,000 acre-feet (plus losses) of water delivered annually by MID through a prescribed list of natural streams and MID man-made conveyances. In addition, SWD has access to water from the San Joaquin River and water that is spilled from MID, by nature of the location of the water district being downstream of MID, on natural streams such as Bear Creek, Owens Creek and Duck Slough.

The Merquin County Water District (MCWD), consisting of 9,700 acres, has no surface water rights, but purchases surface water from SWD when available. On average, 22,000 acre-feet of surface water is distributed annually through a groundwater conveyance system operated and maintained by MCWD.

The Turner Island Water District (TIWD), consisting of 7,519 acres, has no surface water rights, but purchases surface water from various sources when available. Surface water, when available, is distributed through a network of drains and lift pumps which are operated and maintained by TIWD.

3. GROUNDWATER

The MID supplements its surface water supply with groundwater to satisfy irrigation demands. The amount of groundwater pumped varies from year to year depending on the availability of surface water. The MID pumps groundwater directly into canals, laterals and pipelines from MID-owned drainage and irrigation wells for distribution to users within its irrigation service area. In addition, depending on availability of surface water, some individual growers within the District pump groundwater to supplement their surface water supplies, while others use their private groundwater irrigation wells to meet their entire crop-water requirement.

Only in severe drought conditions does the MID permit the discharge and wheeling of groundwater from privately owned wells into the Merced ID's water conveyance system.

The LeGrand-Athlone Water District relies exclusively upon groundwater to supply its crop-water requirements. Over the past several years, the MID has sold surplus irrigation water to the district to supplement its groundwater supplies.

The Merquin County Water District provides about 3,000 acre-feet of groundwater annually (about 12% of annual deliveries to its customers). The Turner Island Water District's predominant source of water is groundwater. The Stevinson Water District sells small quantities of water to both districts when it is available.

There are extensive agricultural areas located outside of the MID boundaries, not included within other water agency jurisdictions, that are primarily with groundwater. There is a fairly large area located southerly and southwesterly of the southern MID boundary, which is developed and irrigated exclusively with groundwater. In addition, there are undeveloped areas northerly, southerly and westerly of the MID boundaries, which are expected to develop for agricultural purposes that would be irrigated with groundwater. It is unknown at this time the exact extent of the planned agricultural development and water usage in these areas.

The total annual application of groundwater for irrigation purposes varies from year to year depending on the availability of surface water. Groundwater supplies an average of fifty-one percent (51%) of the total irrigation water applied to land within the basin, or approximately 621,000 acre-feet per year. Deep percolation of groundwater used for irrigation returns a portion of the extracted groundwater to the aquifer.

Presently, municipal, industrial and individual domestic water users rely solely on groundwater. While the supply has been adequate, the groundwater quality has deteriorated in some areas to the point where treatment is required to make it suitable for these uses.

4. RECLAMATION

The City of Merced reclaims and reuses approximately 140 acre-feet of treated effluent annually on 600 acres of City owned cropland and reuses approximately 1,370 acre-feet of treated effluent annually on 385 acres of wetland/habitat. An additional 815 acre-feet of cannery wastewater from the Lipton (Ragu) Plant is also used on the City owned cropland annually. The reclaimed water and the cannery wastewater meet virtually all of the water needs of the cropland and the wetland area. The remaining 5,200 acre-feet of the City's treated effluent is discharged to Hartley Slough, where it is fully utilized by downstream agricultural and duck club interests. These reclamation activities save 7,525 acre-feet of groundwater annually.

The City of Atwater's treated effluent, about 3,700 acre-feet annually, is used by downstream agricultural interests, saving an equal quantity of groundwater. Wash waters from the Atwater Canning Company, totaling about 300 to 400 acre-feet annually, are reclaimed and used for crop irrigation, saving additional 4,050 acre-feet of groundwater annually.

B. Water Demand/Usage

1. AGRICULTURAL

a. Historical Usage

Agricultural land within the Basin uses an average of 1,272,400 acre-feet per year. On the average, the total crop-water requirement is comprised of approximately fifty percent (50%), or 640,800 acre-feet of groundwater, and approximately fifty percent (50%), or 631,600 acre-feet of surface water.

The average annual agricultural usage within the Merced Irrigation District is approximately 542,000 acre-feet. Surface water supplies an average of ninety-six percent

(96%) of the total deliveries, or approximately 522,000 acre-feet per year. In addition, some individual growers within the Merced ID meet their crop-water requirement from their own groundwater supplies. The extent of this type of pumping is unknown at this time.

Over the last 30 to 40 years, through 1994, MID has been providing less water, either from surface water or from its irrigation well system, and more water has been supplied by private pumping. The three main reasons for this trend are drought, changing water service requirements, and the availability of plentiful, suitable and relatively low cost groundwater. From 1994 to the present, the MID has implemented various irrigation efficiency improvement programs to encourage the use of MID surface water, including a surface water incentive program, low volume incentive program, and the Highlands Project, MID hopes to slow or reverse the trends of declining surface water use and increasing private groundwater pumping through similar programs.

With the exception of minor amounts of surface water made available from MID when it is available outside of its boundaries, irrigators within the LeGrand-Athlone Water District rely on groundwater to meet their irrigation requirements. The LeGrand-Athlone Water District's irrigation requirement is estimated to be 73,800 acre-feet per year.

The agricultural areas located outside of the other agency boundaries primarily utilize groundwater to irrigate their crops. It is unknown at this time the exact extent of the agricultural development or water usage in these areas.

A small portion of the agricultural land within the Basin utilizes municipal wastewater effluent for irrigation. The majority of the water is used to irrigate field crops such as barley and oats, as well as pasture land. The City of Merced and the City of Atwater supply the majority of the reclaimed water currently used for irrigation purposes in the Basin.

b. Projected Water Demands

Average annual water demands within the Basin are projected to decrease by 12% over the next forty-(40) years. Nearly all of the anticipated reduction is projected to be within MID, due primarily to urban expansion, while agricultural demands outside MID, and within the Basin, will remain stable or increase slightly. Agricultural water needs, currently met by surface water deliveries from MID and pumped groundwater, will remain the dominant segment of water demand in the Basin. As stated, while total agricultural demand is projected to decline slightly during the 40 years, nearly two-thirds of the future water use will be in the agricultural segment, depending on the extent of increased in-stream flow demands on the Merced River for environmental purposes. Overall, the Basin's agricultural acreage is expected to modestly increase, although total water use will decline because of increased water use efficiency and a trend toward cultivation of lower water use crops.

While the total applied water is expected to decline, the change in sources of water, if the trend continues, will critically affect groundwater reserves. As more water is pumped from the groundwater, levels will drop at an increasing rate, not only because of the pumping but more importantly, because of the reductions of imported surface water. The surface water supply to users not only replaces the amount of water pumped, but because of seepage and other delivery losses, the MID's conveyance system recharges the groundwater. The importance of surface water to recharge groundwater cannot be overlooked; surface water from MID is the major source of groundwater recharge, contributing 90 to 95 percent of the total groundwater recharge of the Basin.

MID's New Exchequer Dam and reservoir, Lake McClure, on the Merced River, operate under permits issued by the Federal Energy Regulatory Commission (FERC). The FERC

requires, as a condition of the permits, that certain flow releases be made to maintain downstream fish habitats (in-stream flows). In addition, The State of California, Department of Water Resources (DWR), through a contract known as the Davis-Grunsky contract, which provided state funding of certain FERC-required improvements at Lake McClure, requires additional in-stream flows. Any increase in FERC or DWR release requirements will result in a decreased amount of surface water available to MID irrigators, and a correspondingly increased reliance upon groundwater supplies to replace surface water shortages. Any additional flows required by other regulatory agencies would also affect the surface water available for irrigation and impact reliance upon groundwater resources.

c. Irrigation Practices

There are a variety of irrigation methods available. The Basin's agricultural community uses a combination of flood, furrow, sprinkler and mist/micro-spray irrigation methods. The flood and furrow irrigation methods provide the necessary crop-water requirements, while a portion of the water percolates down to recharge the groundwater basin. Other methods are available, such as drip/micro-spray and sprinkler irrigation systems, designed to provide better water-use efficiency. As a result, these alternative irrigation methods, when compared to flood and furrow irrigation, provide increased efficiency and decreased groundwater recharge.

Historically, when farms converted from flood to drip irrigation systems they typically converted from surface to groundwater usage, creating an increased demand for groundwater supplies. Recent droughts have contributed to this change in irrigation practices. As stated earlier, to minimize potentially adverse impacts to the groundwater system, MID has implemented various programs to encourage groundwater pumpers to convert their systems to surface water:

- **In-Canal Surface Water Incentive Program**: Partial or complete funding of new delivery gate structures, measuring devices, and pre-screening devices.

- **On-Farm Low-Volume Incentive Program**: Up to $200/Acre subsidy, depending on the scope of improvements, for on-farm improvements to convert from groundwater mist/micro-spray systems to surface water mist/micro-spray systems, with the commitment from the participant to purchase MID surface water for a prescribed period of time at a pre-set water price, to insure project payback.

- **Highlands Pilot Project**: Construction of an agricultural water treatment plant, regulating reservoir and pressure pipeline network which provides filtered, pressurized (40-70 psi) surface water to the farm gate for use with sprinkler, mist and micro-spray irrigation systems. The system serves approximately 500 acres. Like the On-Farm Low-Volume Incentive Program, growers must commit to the future purchase of MID surface water. In addition, growers share in the maintenance costs of the system, the lease of the reservoir property, the pressurization costs and the capital costs.

2. MUNICIPAL & INDUSTRIAL

a. Historical Usage

From about 1890 to about 1915, the City of Merced used surface water, conveyed by pipeline from Lake Yosemite, for its primary supply. Since about 1915, all municipal consumers within the Basin have relied solely on groundwater as the source of supply. The municipal suppliers (major utilities) within the Basin are: the cities of Merced, Atwater, and Livingston; the Winton Water &

Sanitary District; the Planada and Le Grand Community Services Districts; the Black Rascal Mutual Water Company and the Meadowbrook Water Company. The total water produced by the water utilities shown in Appendix B, Table 2 in 1996 was 36,134 acre-feet (36.1 MGD), supplied entirely through groundwater pumping. An additional estimated 3,866 acre-feet (3.4 MGD) was produced by small private residential water systems, commercial businesses and industrial plants not served by the major utilities.

There are many industrial users within the Basin. The majority of industries using large amounts of water are related to agriculture, including milk and poultry processing and canneries. The vast majority of the industrial water is currently supplied by the municipal agencies. However, a few industries do rely on their own water wells as a source of supply. For planning purposes, their overall impact on the local groundwater supply is assumed to be minimal.

Seventy-seven percent (77%) of the 36,134 acre-feet (32.3 MGD) of water produced by the Appendix B, Table 2 water utilities in 1996 was concentrated in two areas along State Highway 99; the City of Merced and the Atwater areas. The City of Merced is the largest municipal water producer, with fifty-seven percent (57%) of the total.

Water use varies dramatically on a seasonal basis. Appendix B, Tables 3 and 4 present the typical monthly flow distribution by percent of average month and percent of annual usage, respectively, expected for this area. Water use on a hot summer day is approximately four times that of a winter day. Maximum demands for water occur in June, July and August because the hot, dry weather creates a substantial demand for landscape irrigation.

b. Projected Water Demands

The population and developed municipal acreage are projected to triple by the year 2030. Using the current population trends, as determined by Merced County Association of Governments, the regional planning agency, the Basin's population is expected to increase from 180,000 in 1996 to over 540,000 by 2030 with developed acreage increasing proportionately. As a result, the average daily urban water use is expected to increase from 35.6 MGD in 1996 to 108 MGD in the year 2030. In addition, the majority of municipal/industrial demand is projected to be concentrated along the Highway 99 corridor. If groundwater remains the sole source of municipal supply, it is estimated that 72 new wells will be required to serve the cities of Atwater, Livingston, and Merced and the University of California Merced Campus.

c. Water Conservation

Since the late 1980's, the larger municipal suppliers have generally utilized alternate day and time of day use restrictions on landscape irrigation to reduce water use and lower peak demand. In addition, water has increasingly been conserved since the State required mandatory metering of all new water services, beginning January 1, 1992. Changes in Uniform Building Code standards to mandate more efficient water conserving fixtures, especially toilets, have further reduced consumption without significantly affecting lifestyles. By 1995, the new building code standards and metering of new water services in the City of Merced's water supply system reduced average flows to the City's wastewater treatment facility by 40,000 gallons per day. Additional conservation may be achieved in the future by retrofitting water meters on existing flat rate services and/or retrofitting more efficient fixtures in offices and homes.

Future water conservation efforts are expected to reduce the current per capita water usage even further. There is currently a wide variance in water consumption among the various agencies and additional water conservation savings are expected to be greater for those agencies with the highest consumption.

3. SUMMARY OF BASIN WATER DEMAND/USAGE

As municipal/industrial development encroaches on agricultural lands within the Basin, it is anticipated that the use of water will also change. The 1995 Merced Water Supply Plan estimated agricultural water demand within the MID sphere of influence would decrease from 891,000 acre-feet annually (AF/YR) in 1990 to 788,000 AF/YR in 2030. During the same period, urban water use (including demands from the proposed U.C. Merced campus) is expected to increase from 40,000 acre-feet AF/YR in 1990 to 121,000 AF/YR by 2030. Merced River instream flows and environmental uses of water are expected to triple.

In anticipation of the projected increased demand for municipal water supplies and as a means of addressing water quality issues of groundwater, Merced Irrigation District and the municipal suppliers are investigating the feasibility of constructing artificial recharge basins to bank water for later use. However, because there is projected to be a 10,000-acre decrease in irrigated agricultural lands by 2030, recharge efforts must be augmented by water conservation in all user groups (municipal, industrial, agricultural, and environmental).

C. Water Balance/Safe Yield

Safe yield of an aquifer is defined as the amount of water that can be withdrawn annually without producing a permanent, undesired result such as groundwater overdraft, quality degradation and declines in river levels or discharge rates to wetlands resulting from increased pumping of the groundwater basin. An understanding of the safe yield of an aquifer, based on water availability, begins with understanding the hydrologic budget of the Basin. A hydrologic budget is a mass balance expression that quantifies the amount of water input to and output from the Basin.

Basin inflow cannot be casually pumped from the Basin without experiencing other impacts, such as localized overdraft, which can create water quality degradation and increase pumping costs. It is not atypical in the San Joaquin Valley to have varying levels of water supply to different areas within a groundwater basin. This is the condition within the Merced Groundwater Basin where the absence of surface supplies on the east side of the valley has resulted in concentrated pumping to support irrigated agriculture. Various methods of reducing overdraft to the Basin are discussed in "Section V" of this plan.

D. Groundwater Levels

1. MONITORING

The Merced Irrigation District monitors static and high groundwater levels on a monthly basis from a total of 196 active wells within its irrigation boundaries. In addition, the MID monitors shallow monitoring wells, located at the section comers, to determine localized areas of high or perched groundwater table conditions.

The municipalities within the Basin monitor groundwater levels on a monthly basis. The City of Merced also monitors water levels at more than 120 monitoring wells on a quarterly basis.

2. HISTORICAL TRENDS

Groundwater conditions within the Basin vary. Groundwater flow in the Merced area is generally from northeast to southwest although groundwater pumping creates cones of depression and irrigation may cause mounding, complicating the flow patterns and causing them to change over time. The

response of the aquifers to changes in pumping and irrigation is relatively rapid, and localized flow directions are affected by these changes.

A map of the unconfined aquifer water levels with more coverage of the area was presented by the Department of Water Resources (State of California, 1991). This map indicates several major cones of depression. One cone is centered approximately 13 miles southeast of Merced in the Le Grand-Athlone area. The second major cone shown on the map is 17 miles northwest of Merced.

The groundwater elevations relative to the elevations of the major rivers and the interaction of these cones with the rivers suggest that some reaches of the rivers lose water to groundwater while others gain water from groundwater discharge. Comparison of Chowchilla River elevations with groundwater levels indicates that the river is higher than the groundwater. Consequently, the river probably contributes some recharge to groundwater along the reach south of the study area. The pumping cones near the Chowchilla River do not appear to be affected by the presence of the river.

The groundwater elevation data indicate that there is groundwater discharge along the San Joaquin River. There is a trough in the water table elevations that follow the San Joaquin River. Groundwater inflow to the river and surrounding areas occurs from both sides of the San Joaquin valley. This river and the surrounding areas are the primary groundwater discharge area for the valley.

On the north side of the Basin west of Highway 99, the lower reaches of the Merced River appear to be a groundwater discharge area. East of the highway, the river may be acting as a constant head source and supplying water to the large cone of depression centered approximately 17 miles northwest of Merced. East of Oakdale Road (Township 5 South, Range 12 East, Section 36), the river is higher than the groundwater and probably provides some recharge to the groundwater.

The vertical groundwater gradient, and hence the direction of vertical groundwater movement, is downwards from the shallowest groundwater to the deeper aquifers according to an August, 1984 U. S. Geological Survey water resources investigation (Report 83-4081) written by Ann L. Elliott, entitled: "GROUNDWATER CONDITIONS AND SHALLOW TEST-WELL INFORMATION IN THE EASTERN HALF OF MERCED COUNTY, CALIFORNIA 1967-82". Consequently, degradation of shallow groundwater can potentially affect deeper water supply wells where this downward movement is significant and dilution and chemical/biological processes are insufficient to adequately reduce the concentrations of constituents of concern.

Historically, groundwater levels have been high to the point of requiring pumping in certain areas of MID to keep the groundwater from encroaching into the root zone of agricultural crops. MID operated a system of drainage wells in that area to lower the local high groundwater condition. Since the 1987-1992 drought, groundwater levels have dropped in these areas to a level sufficient for MID to curtail groundwater drainage pumping.

3. HIGH GROUNDWATER LEVELS/DRAINAGE PUMPING

The area of the Basin located generally between the cities of Atwater and Livingston, south of State Highway 99 and north of State Highway 140, has experienced localized high groundwater levels. Groundwater levels have varied from year to year and over the course of an irrigation season as a result of pumping, precipitation and applied irrigation water. If left uncontrolled, groundwater levels of less than six (6) feet from ground level would not be uncommon, resulting in potentially adverse impacts to local crop production.

To minimize these potentially adverse impacts, the MID provided groundwater control or "drainage pumping" in areas where groundwater levels were within 6 feet of the ground surface. Ninety-five (95) wells, specifically designed and located for drainage purposes, were used. This localized high groundwater

condition within MID has declined steadily over the last 10 years. As a result, many of the drainage wells are now used exclusively for irrigation purposes during periods when insufficient surface water is available. Water pumped from these wells is typically discharged into the District's water distribution system where it is utilized, as much as possible, for irrigation purposes.

4. INFLUENCE OF THE RIVERS

As discussed in Section III. A., the Basin is bounded on three sides by the Chowchilla, San Joaquin and Merced Rivers. Depending on localized conditions, portions of all three rivers that may be gaining (carrying groundwater from the Basin) or losing (recharging water into the Basin). The extent of the reaches which gain or lose water, and their impacts on the Basin, are not currently known.

E. Water Quality

1. GROUNDWATER QUALITY MONITORING

Water quality monitoring requirements for public water systems are set by Title 22, Chapter 15, of the California Code of Regulations and vary depending upon the size and type of water system. Large public water systems (greater than 200 service connections) are regulated by the State of California. Wells at large public water systems must be sampled, for general mineral, physical, inorganic, organic, and radiological analyses. Monitoring frequency is increased when a problem is suspected or detected. The Merced County Division of Environmental Health regulates small public water systems (less than 200 service connections). Sampling of small public water systems is dependent upon type of water system: small community, nontransient-noncommunity, transient-noncommunity, or state small. Specific definitions may be found in Appendix D. Public water systems are required to perform routine bacteriological/chemical analyses, usually from water distribution systems. Frequency of bacteriological analyses is defined in Title 22, Chapter 15, California Code of Regulations, and varies depending upon the size and type of water system.

A standardized monitoring system has not been established for the agricultural community. Individual farmers and agencies do monitor groundwater quality, however, the monitoring frequency and constituents monitored varies widely throughout the Basin.

2. WATER QUALITY CONDITIONS

There are numerous constituents found in the Basin's groundwater supply. Some constituents are naturally occurring, while others have been introduced into the groundwater from man-made sources. There are many constituents found in groundwater which do not, according to current water quality standards, have the potential to impact groundwater usage within the Basin. These constituents are not addressed in this section. The constituents identified in this section either currently, impact groundwater usage within the Basin, or have the potential to impact the Basin's future groundwater usage.

a. Salinity

Salinity levels within the Basin range from excellent to unusable for household and agricultural purposes (total dissolved solids (TDS) of 90 to 5,390 ppm). For comparison, the suggested guidelines for the TDS content of irrigation water for various crops, determined by the University of California Cooperative Extension Service in the Merced area, are shown on Table 5. These guidelines show the allowable TDS for salt tolerant crops is as low as 450 ppm.

Total dissolved solids in groundwater in the eastern two-thirds of the Basin are generally less than 500 ppm. TDS in groundwater increases westward and southwestward towards the San Joaquin River and southward towards the Chowchilla River. In these areas, high TDS water is found in wells deeper than 350 feet. Better quality groundwater (less than 1,000 ppm) in these areas is found at shallower depths.

Groundwater with high TDS concentrations in the Basin is principally the result of the migration of a deep, saline water body which originates in regionally deposited, marine sedimentary rocks that underlie the San Joaquin Valley. The depth of this saline water body within the Basin boundaries, is very shallow compared to other parts of the Valley.

Groundwater with high concentrations of total dissolved solids is present beneath the entire Basin at depths from about 400 feet in the west to over 800 feet in the east. The shallowest high TDS groundwater occurs in zones five (5) to six (6) miles wide adjacent and parallel to the San Joaquin River and the lower part of the Merced River west of Hilmar, where high TDS groundwater is upwelling.

Under natural pressure, the saline groundwater body is migrating upward. Brines move up through permeable sedimentary rocks and also up through wells, faults and fractures. The chemistry of groundwater in the Basin indicates that mixing is occurring between the shallow, fresh groundwater and the brines, which produces the high TDS groundwater observed. Pumping of deep wells in the western and southern parts of the Basin may be causing these saline brines to upwell and mix with fresh water aquifers more rapidly than under natural conditions.

The Corcoran clay has provided a natural impediment to the migration of high TDS groundwater from the confined aquifer into the unconfined aquifer. High permeability pathways through the clay from the confined to the unconfined aquifer may be created by wells perforated in both the unconfined and confined aquifers.

b. Nitrates

Nitrate, an important parameter in drinking water, occurs from both natural and man-made sources and is widespread in groundwater in many parts of the San Joaquin Valley. High concentrations of nitrate in groundwater are primarily a concern for potable water supplies. The Meadowbrook Water Company has one well (of four) that, based on a 10-year trend analysis, is expected to reach the MCL in 10 to 12 years. The Planada Community Services District has two wells (of five) that are at or near the MCL. The maximum contaminant level (MCL) for nitrate in public drinking water supplies is 45 mg/L (as N03).

Nitrate in irrigation water is not a major concern for many crops, since it acts as fertilizer. However, permanent crop production, including grape vineyards, may be adversely affected by excess nitrate concentrations. High nitrate concentrations, typically found in shallower groundwater zones, has been attributed to various sources, such as agricultural fertilizers, sewer effluent, septic tank disposal, and animal wastes.

c. Iron and Manganese

Groundwater in some areas within the Basin has elevated iron and manganese levels. For example, manganese is found near the Merced Airport at relatively shallow levels. Generally "reducing conditions" (lack of oxygen) may lead to elevated iron and manganese levels in groundwater. Also, shallow groundwater near streams often has high manganese and sometimes high iron concentrations.

d. Arsenic

Arsenic concentrations in water from public water supply wells in the Basin are below the current MCL of 0.05 mg/l. The Environmental Protection Agency (EPA) is currently evaluating the MCL for arsenic, which if lowered significantly, could have a decided impact on groundwater usage and cost within the Basin.

e. Radionuclides

The MCL for gross alpha is 15 picocuries per liter, and the MCL for uranium has recently been increased from 5 to 20 picocuries per liter. Radionuclides are primarily from natural sources and can affect drinking water supplies. Sampling in the Basin for radiological constituents has generally been limited to public water systems.

The EPA has discussed establishing a standard for radon in drinking water. Depending on how low this standard is set, the natural activity of radon could be a significant concern in the future, especially in the San Joaquin Valley.

f. Bacteria

Bacteriological quality in the Basin is generally acceptable in deep groundwater aquifers. Bacteriological quality of groundwater pumped by individual wells can not be generalized and depends on many factors pertaining to the well and surrounding conditions.

Inadequately constructed and improperly located, destroyed or abandoned water wells may contribute to bacteriological contamination of groundwater. Some of the factors that may influence contamination of water wells include: location with respect to sources of contamination; inadequate construction features being present on wells; general deterioration and or inadequate maintenance of wells; improper use of water wells for disposal of wastes.

Bacteriological contamination of groundwater is a health concern since groundwater is used for drinking water. State Department of Health Services standards require periodic sampling and testing for pathogenic microorganisms. The minimum number to tests depends on the number of service connections in the system.

g. Pesticides

Pesticide contamination is primarily the result of the widespread use of the agricultural nematicide Dibromochloropropane (DBCP) on croplands for several decades before it was banned in 1977. DBCP in the groundwater is usually associated with vineyards or orchards where the pesticide was used. DBCP is a carcinogen at very low concentrations in water, and is a concern for potable water supplies. It moves freely with the groundwater and persists for long periods. The MCL for DBCP is 0.2 micrograms per Liter (μg/l). DBCP has been found in public water supply wells in the Merced area at levels either at or below the MCL. For public water purveyors, the frequency of monitoring for DBCP, where it has been detected, is set by DOHS.

Another agricultural pesticide (nematicide) that has been detected in the Basin's groundwater is ethylene dibromide (EDB). Used primarily on vineyards, EDB was banned in the early 1980's, but has been detected in at least one public water supply well and individual wells in the Atwater/Livingston area.

h. Trichloroethylene

Trichloroethylene (TCE) is a nonflammable, colorless liquid with a sweet odor and is used as a solvent for dyes, rug cleaners, as well as a degreaser for metal parts. Improper storage and disposal have made TCE a major contaminant of groundwater supplies in California. Two locations in the Basin, Castle Airport & Aviation & Development Center and in Merced's Eastern Industrial Park have identified plumes and have remediation activities in progress. The City of Merced's Well No. 10A was replaced with Well No. 10B in 1988 when TCE concentrations reached the MCL.

The California Drinking Water Action Level of 5 ppb (5 parts per billion is equivalent to *5 μg/l)* for TCE is based upon what is considered a negligible risk level for cancer. In other words, if one million people drank about 2 liters of water containing TCE at this level every day over a 70-year lifetime, there would theoretically be no more than one additional case of cancer in the million people exposed.

i. Perchloroethylene

Perchloroethylene (PCE) has been detected at one time or another in some of the Basin's public water supply wells. Industrial wastes and dry cleaners are a recognized source of PCE in groundwater in many municipal areas, including the City of Merced. Beginning in the 1986, PCE was detected in three of the City of Merced's wells. As the direct result of PCE contamination, these wells, #3A, 3B, and 5, were replaced in the late 1980's and Well# 6 was rebuilt to seal off PCE contaminated aquifers. Wells #1A, 1B, 1C, 2A, and 2B are known to be at risk. Intensive monitoring and studies continue in an effort to manage the PCE problem in Merced. Improper use, storage and accidents have resulted in unauthorized releases of these substances.

j. Other Trace Organics

Other trace organic compounds have been detected in the Basin's groundwater including, but are not limited to, carbon tetrachloride, Perchloroethylene and hydrocarbon-based products. Improper use, storage and accidents have resulted in unauthorized releases of these substances.

Volatile organic compounds (VOC's) derived primarily from solvents have contaminated the groundwater, in some areas. Some of these can be attributed to industries that handle, store and use solvents.

Carbon tetrachloride is often attributed to auto repair shops, which have historically used it as a solvent or degreaser. There are no records of carbon tetrachloride being found in concentrations above the MCL of 0.5 μg/l in public water supply wells within the Basin.

Several unauthorized releases from underground storage tanks (UST) have occurred in the Basin. Most of these cases are very localized in nature in terms of groundwater impacts, and public water supply wells are not known to have been affected. The Merced County Division of Environmental Health is involved in monitoring and regulating the clean-up of sites involving many volatile organic compounds (VOC) and UST spills. MCDEH has a contract with the State Water Resources Control Board to provide mitigation services for the definition and clean up of releases resulting from underground storage tanks. Benzene, toluene, xylene, methyl-tertiary-butyl-ether (MTBE), and 1,2-dichloroethane (1,2 DCA) are the constituents of concern in groundwater.

MTBE, a mandatory gasoline additive designed to reduce air emissions, has started showing up in various locations, primarily shallow monitoring wells. This material is very mobile and very soluble in water, but does not behave like other petroleum product constituents. It is also resistant to the biological treatment methods commonly used to clean up hydrocarbon spills. The incidence of

MTBE may be more common than many realize because it does not show up in the commonly used EPA test methods, however it can be detected by EPA methods 502.2 or 602.

F. Areas of Concern

Agricultural and municipal agencies within the Basin are concerned about maintaining adequate supplies of groundwater within the Basin. Generally, groundwater is the primary source of water for municipal and agricultural agencies on the eastern side of the Basin. As a result, many are concerned about the continued decline of groundwater levels. The municipalities are especially concerned about the supplies needed to meet demand as the urban areas continue to expand.

Agencies within the Basin are also concerned about maintaining the Basin's groundwater quality. The Basin, generally, has good quality groundwater. As a result, the municipalities are not currently required to provide significant water treatment. However, there are some areas of water quality concern. For example, saline brines continue to migrate upward from the saline confined aquifer, resulting in increased salinity levels. In addition, constituents such as PCE, TCE, DBCP, EDB, Radionuclides, nitrates, manganese, and iron have been found in a few water supply wells within the Basin.

In a few cases, these constituents have impacted the municipalities' ability to utilize the wells to supply potable water and resulting in the wells being retired, or requiring some form of treatment. In the future, the municipalities within the Basin may be required to investigate various options, such as well head treatment, to meet ever increasingly stringent minimum water quality requirements.

V. ELEMENTS OF A GROUNDWATER MANAGEMENT PLAN

1. CONTROL OF SALINE WATER INTRUSION

Permanent degradation of good quality groundwater can occur if poor quality groundwater migrates into aquifer zones containing better quality water. Such degradation can seriously affect the usability of the groundwater especially for potable uses. Variations in soil conditions, soil type, geologic structure, irrigation practices, and irrigation water quality can result in wide variation in the quality of groundwater, especially in the upper water bearing zones. Because of these influences, groundwater salinity is generally lowest in the easterly portion of the Merced Groundwater Basin, in and adjoining MID, and increases westward towards the San Joaquin River and southward towards the Chowchilla River. Increased groundwater pumping can alter historical flow patterns and cause the poor quality groundwater to commingle with and contaminate the better quality groundwater.

Also, there is the natural tendency of deep saline water to upwell; i.e., move vertically upward and mix with the better quality water above it. Increasing the pumping of the fresh water increases the hydraulic gradient between the two zones, which increases the rate of fresh water degradation.

To maximize the sustainability of the groundwater basin, knowledge of the various water quality zones and the groundwater flow patterns is necessary. With this information, groundwater management techniques can be evaluated to protect zones of high quality water so that the beneficial use of the groundwater supply can be sustained.

A program to minimize water quality degradation due to saline water intrusion should include the following elements:

a. Establish a network of monitoring wells completed to various depths throughout the management area.

b. Monitor well water quality annually for salinity, nitrates, boron, and other constituents that may be of concern, i.e., and certain organic chemicals such as Dibromochloropropane (DBCP). Monitoring requirements may change with evidence of salinity change.

c. Identify areas where the groundwater flow patterns suggest a high probability of water quality degradation.

d. Identify zones of marginal quality water that can be used in conjunction with surface water to increase the water supply for agricultural purposes and reduce migration of saline water into zones containing potable groundwater.

e. Identify water management strategies that may be employed to minimize degradation.

Considering that saline groundwater intrusion is not presently known to be a problem, but that there is the potential for it to develop, the groundwater management plan will initially emphasize monitoring. If water quality changes begin to occur, the cause will be investigated and remedial actions considered to reverse the trend.

Initially, groundwater quality monitoring will be performed through the existing activities of the individual parties to the Plan to the maximum practical extent, as described under Section 7, below.

2. IDENTIFICATION AND MANAGEMENT OF WELLHEAD PROTECTION AND RECHARGE AREAS

The Federal Wellhead Protection Program (WPP) established by Section 1428 of the Safe Drinking Water Act Amendments of 1986 is designed to protect groundwater resources of public drinking water from contamination to minimize the need for costly treatment to meet drinking water standards. A wellhead protection area (WPA), as defined by the 1986 Amendments, is *"the surface and subsurface area surrounding a water well or wellfield supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water or wellfield."* Under the act, the states are required to develop an EPA approved WPP. California does not have a formal program, but relies on public agencies to plan and implement programs under AB 3030. The basic task of wellhead and recharge area protection programs is the identification of zones around public water supply wells and groundwater recharge areas where land use must be controlled to minimize the possibility of contamination of the drinking water supply. Merced County has developed and adopted a comprehensive countywide wellhead protection program (Appendix H).

Recharge in the Merced Groundwater Basin occurs primarily from percolation of excess irrigation water, seepage losses from canals and ditches and, to a lesser extent, from rainfall. In fact, the 1995 Merced Water Supply Plan Study determined that recharge from percolation of excess irrigation water, seepage losses from canals and ditches constitutes about 95% of total recharge. Protection of recharge areas is realized by controlling or regulating surface contaminants before they migrate into the groundwater. This migration occurs either by percolation or via wells that have not been properly constructed or destroyed.

The Regional Water Quality Control Board (RWQCB), the Department of Toxic Substances Control (DTSC), and the Merced County Division of Environmental Health (MCDEH) regulate waste disposal. Each participating agency should provide assistance to the RWQCB, DTSC, and MCDEH by identifying areas that are the most susceptible to groundwater contamination.

To protect recharge areas, each participating agency should review applications for Waste Discharge Permits within and adjoining their boundaries that have the potential to degrade groundwater quality. Such waste disposal systems include disposal of dairy wastes, disposal of industrial wastes, sewage

treatment plant effluent disposal, and solid waste disposal. Environmental documents for such facilities and Tentative Waste Discharge Permits issued by the RWQCB should be closely reviewed such that appropriate monitoring and mitigation measures are developed to preclude the possibility of migration of pollutants from the disposal sites. Each participating agency should be on the lookout for existing and proposed land use activities that have the potential to degrade groundwater quality, so that appropriate action can be taken.

The Merced County Wellhead Protection Program for public water supply contains the following basic plan elements:

a. Identification and description of all public water supply wells in the Merced Groundwater Basin.

b. Delineation of the WPA for each well based on groundwater flow and quality information developed under Elements # 1, Control of Saline Water Intrusion, and 7, Monitoring and Controlling Groundwater Levels, Quality and Storage.

c. Identification of potential sources of contaminants within each WPA.

d. Establishment of land use ordinances to preclude or control future land uses within each WPA that have the potential for groundwater contamination.

e. Development of site-specific well construction and abandonment programs to minimize contaminant migration

f. Development of a contingency plan to implement if a WPA becomes contaminated.

3. REGULATING CONTAMINANT MIGRATION IN GROUNDWATER

Contaminants in this section are those that result from improper application, storage or disposal of petroleum products, solvents, pesticides, fertilizers, sewage effluent, and chemicals used by business and industry, and are distinguished from the salinity degradation that is addressed in Element #1, Control of Saline Water Intrusion. Each participating agency's role in protecting groundwater from contamination by point sources should include supporting the RWQCB, which holds the primary responsibility for enforcing water quality regulations, and the MCDEH, which oversees soil and groundwater cleanup activities from leaking underground storage tanks and other point source contamination sites. Each participating agency should assist in understanding the hydrogeology of the Merced Groundwater Basin, the vertical and lateral groundwater flow directions, and groundwater quality based on the groundwater monitoring activities carried out by each participating agency. In addition, each participating agency should make the appropriate regulating agency aware of changes in groundwater quality, which may indicate that point source contamination is occurring.

4. ADMINISTRATION OF WELL ABANDONMENT AND WELL DESTRUCTION PROGRAMS

State regulations require that all unused or inactive wells be properly maintained, as defined by the "Water Well Standards: State of California DWR Bulletins 74-81 and 74-90. State regulations also require all inactive wells that are not properly maintained (in accordance with Section 24400 of the California Health and Safety Code) be properly destroyed. Wells that are not properly maintained or destroyed can act as conduits for mixing of groundwater of differing quality or create a safety problem. Non-pumped wells are a much greater threat than pumped wells, since pumping normally quickly removes contaminants that may have migrated during idle periods.

Permits are required from the applicable county and/or city for destruction of wells within their respective jurisdictions. For public water supply wells, the State Department of Health Services (DOHS) may prescribe additional requirements. Each participating agency will rely on continued administration of the well abandonment and destruction program by the permitting agencies. Each participating agency's role in well abandonment and destruction should be to provide available groundwater data, assist in identifying locations of operating and abandoned wells, and advise well owners why proper well destruction is important for protection of water quality.

5. MITIGATION OF GROUNDWATER OVERDRAFT

For years, the amount of pumping has exceeded the local recharge, creating a condition of local groundwater overdraft, although it is not considered significant at this time. According to the Merced Water Supply Plan, the average annual overdraft, within the plan study area, is estimated to be about 20,000 acre-feet per year. Unlike the rapid groundwater level recovery experienced in 1978 due to the wet winter that followed the disastrous drought of 1976-77, groundwater levels, following the unprecedented six consecutive years of drought between 1987 and 1992, have not shown any sign of recovery due to the wet winters of 1993, 1995, and 1996. In general, groundwater levels have been on a steady decline since 1983, with accelerated rates of decline during the 1987-1992 drought.

Unless the amount of recharge is increased or the amount of pumping is reduced, eventually groundwater levels may decline to such depths that farming the overlying lands, which rely primarily on groundwater, could no longer be economical. In addition, wells surrounding areas of overdraft may be adversely affected by the lowering of the water table and/or by water quality changes that can occur due to changes in hydraulic gradients. The depletion also reduces the amount of groundwater available within the Basin for use when surface water supplies are low. To avoid these impacts, it is necessary that methods to recharge the overdraft area be identified, evaluated, and implemented, if economically and environmentally feasible. Restrictions on pumping is the other available method of mitigating groundwater overdraft, but should not be considered until all possible and reasonable means of recharge have been shown not to be viable.

One of the most cost-effective ways to manage the Basin to achieve aquifer recharge is through a conjunctive use program. Conjunctive use of surface water and groundwater is discussed in more detail under Element #8, Facilitating Conjunctive Use Operations.

6. REPLENISHMENT OF GROUNDWATER EXTRACTED BY PRODUCERS

Most of the recharge of the Merced Groundwater Basin occurs from irrigation water diverted from the Merced River. As the water is transported and distributed to the field, a certain amount of seepage loss occurs, which percolates through the soil and recharges the groundwater basin. As irrigation water is applied to crops, a portion of the applied water percolates past the root zones and continues downward, also recharging the groundwater basin. To increase replenishment, additional surface water must be absorbed within the Basin either by increasing surface water irrigation to displace groundwater use, or by direct recharge. Through implementation of Element #8 (Facilitating Conjunctive Use Operations), each participating agency should be exploring methods of replenishing the depleted groundwater supplies and optimizing use of available aquifer storage.

7. MONITORING AND CONTROLLING GROUNDWATER LEVELS, QUALITY AND STORAGE

The purposes of a groundwater level and quality-monitoring program are to identify areas of overdraft and provide information that will allow computation of the changes in groundwater quality and storage. Groundwater level monitoring is essential to understand the impacts on the aquifer resulting from changes in surface water supply conditions and in groundwater pumping activities. Such monitoring is

also necessary for administering any conjunctive use program. Groundwater quality monitoring is essential to detect any adverse impacts on the groundwater supply and indicate any necessary changes to protect the Basin's groundwater quality.

Several local agencies throughout the Basin have established groundwater-monitoring programs. The MID, for example, has recorded water levels in a network of shallow groundwater monitoring wells since 1942 and, since 1959, has recorded beginning and end-of-season levels in its production wells. In addition, the cities are required to routinely test the groundwater quality of their water supply wells. These existing monitoring programs should be coordinated and expanded to develop a comprehensive basinwide groundwater-monitoring program. The MCDEH also maintains a groundwater-monitoring program for individual domestic wells.

Monitoring well networks should be established to monitor water levels both above and below the Corcoran Clay. Water levels in the confined aquifer below the Corcoran Clay can then be compared to water levels in the unconfined level above the Corcoran Clay to determine the hydraulic gradient between the two zones. The hydraulic gradient is an important component in understanding how pumping affects the movement of water between aquifer zones, and the potential for such movement to impact groundwater quality. An adequate monitoring well network should include representative wells that tap the two major aquifer zones in the Basin. Basic elements should include:

a. Expand the current network of monitoring wells to cover the entire Basin.

b. Compile the necessary data on the monitoring wells, e.g., location, depth, Driller's Log, E-log, casing elevation and ground surface elevation.

c. Establish the frequency of water level and quality monitoring.

d. Inventory active wells and determine annual pumping amounts.

e. Develop a standardized data collection method.

f. Tabulate data and prepare groundwater mapping.

g. Interpret and disseminate results.

Considering the substantial cost of implementing a comprehensive groundwater-monitoring program, monitoring will initially be accomplished through the existing, ongoing monitoring activities of the participating agencies. Each year, monitoring data collected by the individual agencies will be pooled and a report prepared covering groundwater conditions in the Basin. The report will address groundwater production, groundwater levels and storage changes, groundwater inflow and outflow, groundwater quality and other topics that may be deemed appropriate.

Subject to agreement among the agencies, a numerical model of the Basin will be used as a means of consolidating the data and preparing estimates of groundwater flow conditions.

8. FACILITATING CONJUNCTIVE USE OPERATIONS

Conjunctive use of groundwater and surface water in a groundwater basin typically occurs when the surface water supply to the Basin varies from year to year and Basin water demand is relatively constant. In some years, the surface water supply is greater than the Basin water demand; in other years, the surface water supply is less than the Basin water demand. In the years of plentiful supply, surface water is utilized to recharge the groundwater aquifer. Recharge can occur either directly by surface recharge or injection well, or by using surface water in lieu of groundwater when it is available. In effect, the

groundwater basin is utilized as a storage reservoir and water is placed in the reservoir during wet years and withdrawn from the reservoir during dry years. This description generally portrays conditions in the Merced groundwater basin.

In the MID portion of the Basin, groundwater and surface water have historically been utilized conjunctively on an intentional but informal basis. For example, in view of the important part that canal seepage plays in recharging the Basin's aquifers, MID has elected to not line the vast majority of its canal system. However, there has been no formalized plan for recharge nor have recharged or extracted volumes been systematically inventoried.

It is widely believed by the agencies that there may be opportunity for better utilization of the Basin's overall water supply, to meet increasing regional as well as local water needs, through expansion of the existing conjunctive use capabilities. For example, a conjunctive use program offers the best opportunity to provide relief to the local overdraft conditions that exist in certain parts of the Basin.

The parties to this Plan agree to pursue cooperative arrangements for the purpose of expanding the region's conjunctive use capabilities. The primary thrust of these activities will be to identify and evaluate options for delivering available surface waters, when surplus to identified and rightful needs, to Basin lands presently relying wholly or substantially on groundwater.

9. WELL CONSTRUCTION

Improperly constructed wells can establish pathways for pollutants to enter from surface drainage and can cause mixing of water between aquifers of differing quality. Sections 13700 through 13806 of the California Water Code require proper construction of wells. The standards of well construction are specified in DWR Bulletins 74-81 and 74-90.

The county and cities within the Merced Groundwater Basin have the responsibility to enforce well construction standards. Well construction permits are required to drill a new well or to modify an existing well. Well Driller's Reports must be filed with the DWR and the county. Merced County, and the City of Merced, have adopted their own standards which are stricter than the established DWR standards.

Because of their responsibility to enforce standards for construction and destruction of wells and for issuance of drinking water permits for small public water systems, the County Environmental Health Department maintains records on wells and groundwater quality. The records maintained by the County should be supplemented with data on water levels and groundwater quality collected by each participating agency to identify locations susceptible to intermingling of aquifer zones of varying water quality. The information would be used to establish specifications for well construction and destruction to optimize well water quality and minimize mixing of water between zones of varying water quality. Better understanding of the subsurface geology and water quality is needed to define the confining beds between aquifer zones of differing water quality. Site specific hydrogeologic investigations may be necessary to support well designs and should be submitted with the proposed well designs to obtain the well drilling permit.

Authority over well construction will remain with the county and cities. A method needs to be developed to exchange pertinent well information to assist in groundwater management activities.

10. CONSTRUCTION AND OPERATION OF RECHARGE, STORAGE, CONSERVATION, WATER RECYCLING AND EXTRACTION PROJECTS

As part of the groundwater management plan, projects to improve water utilization within the Merced Groundwater Basin should be identified and evaluated. Potential projects include:

a) Use of reclaimed wastewater for agricultural or landscape irrigation purposes.

b) Expanded surface water distribution systems to increase its use.

c) Construction of recharge facilities in areas of overdraft within the Basin.

d) Construction of additional surface water storage facilities to increase water availability.

For items b) and c), sufficient additional surface water or conserved water must become available to make these projects viable. Construction of additional surface water storage facilities or redistribution of current supplies under an expanded conjunctive use program may be needed to increase water supply. Increased usage of reclaimed water could potentially reduce additional surface water requirements.

Along with the potential benefits that these projects can provide, there are associated costs. Any project must undergo a thorough evaluation to quantify the water supply benefits and to identify all costs associated with the project. In addition, many legal, contractual, and political issues are sure to arise when evaluating such projects.

11. DEVELOPMENT OF RELATIONSHIPS WITH LOCAL, STATE AND FEDERAL AGENCIES

Each participating agency recognizes the benefit of close coordination between their efforts and the work performed by various local, state and federal agencies to monitor and protect groundwater in the Merced Groundwater Basin. The DWR monitors groundwater levels in the San Joaquin Valley on a semi-annual basis, they also perform special studies from time to time on San Joaquin Valley water supply conditions.

The Regional Water Quality Control Board (RWQCB), under the State Water Resources Control Board, has a responsibility to protect waters of the state by reviewing projects and issuing waste discharge permits, as necessary, for disposal activities that threaten both the surface and groundwater supplies. They are also the agency with the responsibility to oversee clean up of contaminated water.

The Merced County Division of Environmental Health monitors the installation and abandonment of wells to protect the groundwater from degradation due to improper well installation and destruction. Environmental Health also oversees the clean up of contamination from leaking underground tanks.

Federal regulations for protection of groundwater are developed through the Environmental Protection Agency (EPA), which looks to the state for implementation. The U.S. Geological Survey (USGS) provides technical studies and reports, and maintains a database of surface and groundwater quality.

12. REVIEW OF LAND USE PLANS AND COORDINATION WITH LAND USE PLANNING AGENCIES

Each participating agency should review proposed development plans and associated environmental documentation to assess the potential groundwater impacts of proposed land use changes. Planning departments should refer development proposals to MCDEH for direction on potential impacts, studies,

and mitigation. Each participating agency should review initial studies, proposed negative declarations, draft environmental impact reports, and provide comments as appropriate to insure that potential threats to groundwater can be addressed and avoided. In cases where the proposed land use involves disposal of wastes, storage of hazardous materials, or handling of petroleum products, solvents, or chemicals such as pesticides and fertilizers, each participating agency should coordinate with the appropriate State regulatory agencies to insure that compliance with regulations for containment and disposal of wastes is obtained.

During periodic land use plan preparation and updates, the cities and county in the Merced Groundwater Basin should consult with the appropriate participating agency to avail themselves of the latest information on groundwater conditions that may be affected by proposed activities, so that necessary mitigation measures can be included in the plans.

VI. IMPLEMENTATION OF THE PLAN

The agencies who have cooperated in the development of this groundwater management plan (GMP), include the county, cities, rural communities served by community services districts or county water districts, and irrigation or water districts that provide water primarily for agricultural use. As described in the GMP, all of the agencies rely on groundwater to some degree for their water supply. The Merced Irrigation District is the only agency that currently utilizes surface water conjunctively with groundwater. The area of the Basin that relies solely on groundwater is in a potential condition of long term overdraft. Addressing the potential overdraft is of high priority to those agencies that are most affected by the overdraft.

Public health considerations require that water quality standards for domestic water supply be more stringent than water quality considerations for agricultural use. Since groundwater exists within the Basin that meets the current domestic water quality standards, communities have been able to utilize untreated groundwater as a source of their domestic supply. Since untreated groundwater is the most economical water supply source, maintenance of groundwater quality is a high priority to the cities and communities.

The above examples are set forth to demonstrate that the priorities in groundwater management will vary from agency to agency, depending upon the local groundwater resource conditions and the use of the groundwater supply. Accordingly, in GMP implementation, agencies will have differing priorities regarding which elements to pursue and differing appropriate investment levels for those pursued. This situation may complicate implementation and mandates a flexible implementation strategy to accommodate the varying priorities. However, since regional water resources planning provides more opportunity for optimizing use of groundwater resources, the expected complications of GMP implementation should be far outweighed by the benefits to be achieved.

Pursuant to Water Code Section 10753.5, each participating agency must hold a second public hearing to review and take comments on the proposed GMP, and to consider protests to the adoption of the GMP. At the same time, each agency must take the appropriate action under the California Environmental Quality Act (CEQA), since the GMP may be deemed a project, as defined under CEQA. If an agency does not receive a protest for adoption of the GMP by a majority of the landowners, the agency must adopt the GMP within 35 days after conclusion of the second public hearing.

Water Code Section 10753.8 specifies that the local agency shall adopt rules and regulations to implement and enforce a GMP. In adopting the rules and regulations pursuant to this section, a local agency must consider the potential impact of the rules and regulations on business activities, including agricultural operations, and minimize impacts to such business activities.

In consideration of the regional nature of the GMP, the varying water resource management priorities among the local agencies and the requirements for developing rules and regulations for GMP

implementation, the following strategy has been set forth to move the GMP from preparation and adoption by each agency to regionally coordinated implementation:

1. After adoption of the GMP by each participating agency, an implementation coordinating committee shall be established and shall consist of one member and one alternate member from each participating agency.

2. The committee shall meet at least quarterly to assist in the coordination of groundwater management within the Basin and to guide implementation of the GMP.

3. The committee will develop rules and regulations for GMP implementation, pursuant to Water Code Section 10753.8, to be recommended for adoption by each participating agency.

4. With consideration given to identified problem areas set forth in the GMP, the committee shall establish a priority list for management actions.

5. Management activity groups will be formed of those local agencies interested in implementing certain elements of the GMP to specify management actions for the element, develop budgets, apportion costs, and conduct the appropriate environmental review of proposed projects. Binding activity agreements will be prepared specifying duties and obligations of each agency participating in the activity.

6. Each management activity group will prepare an annual summary describing the activities that have taken place, which will collectively provide an annual update of the activities under the GMP.

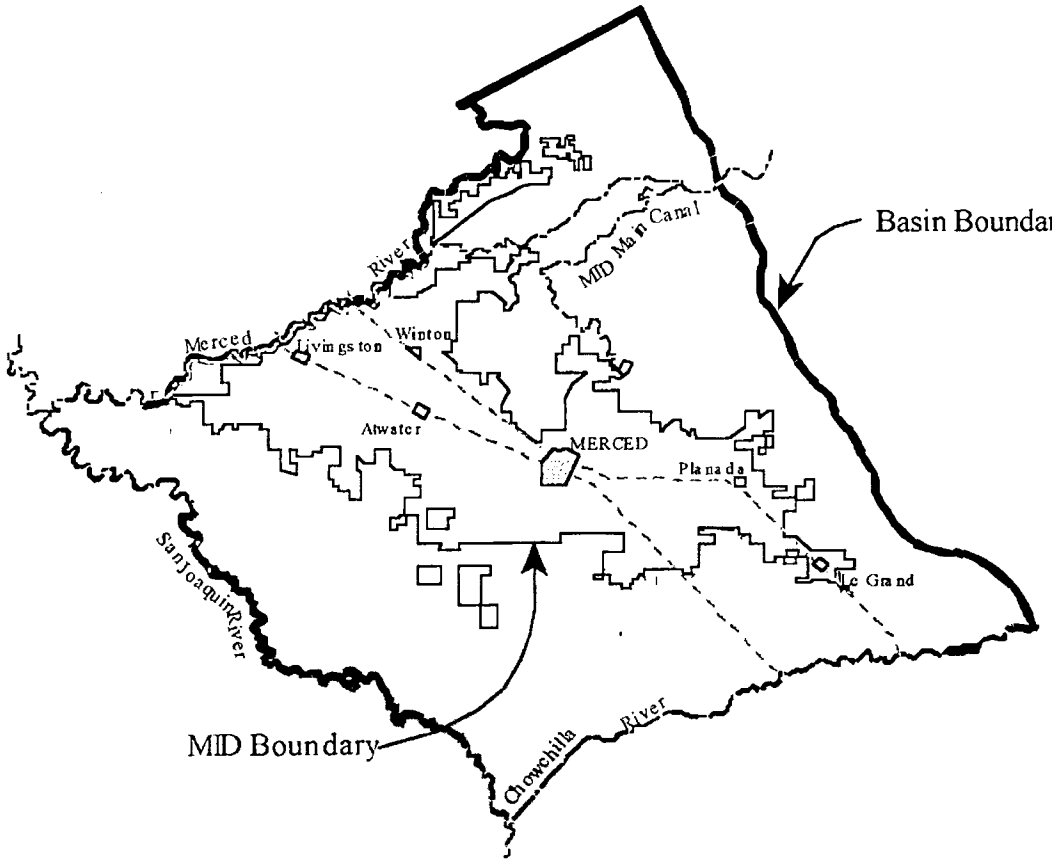
This implementation strategy is expected to be refined as necessary.

Appendix A

Figures

Figure 1

Merced Groundwater Basin



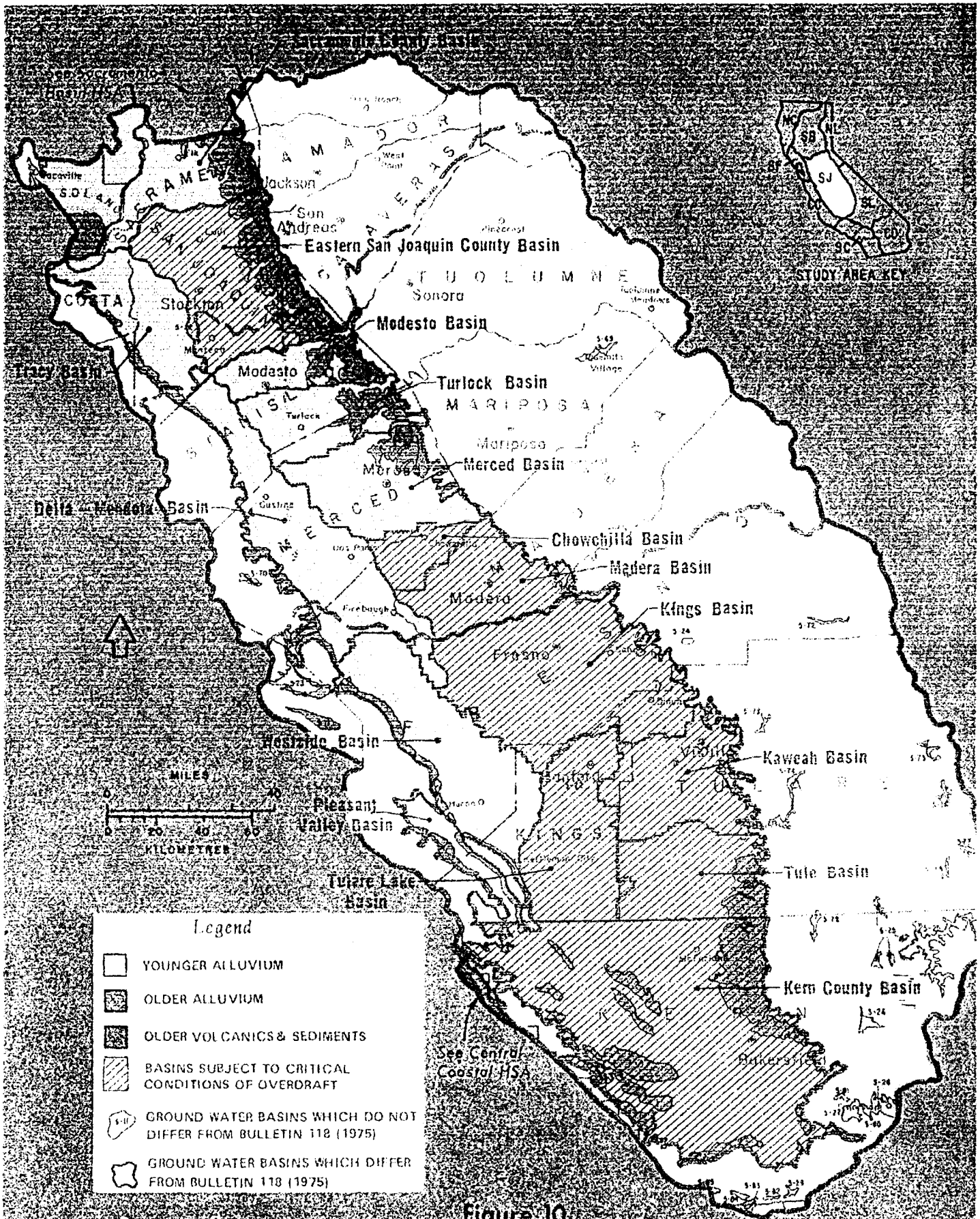
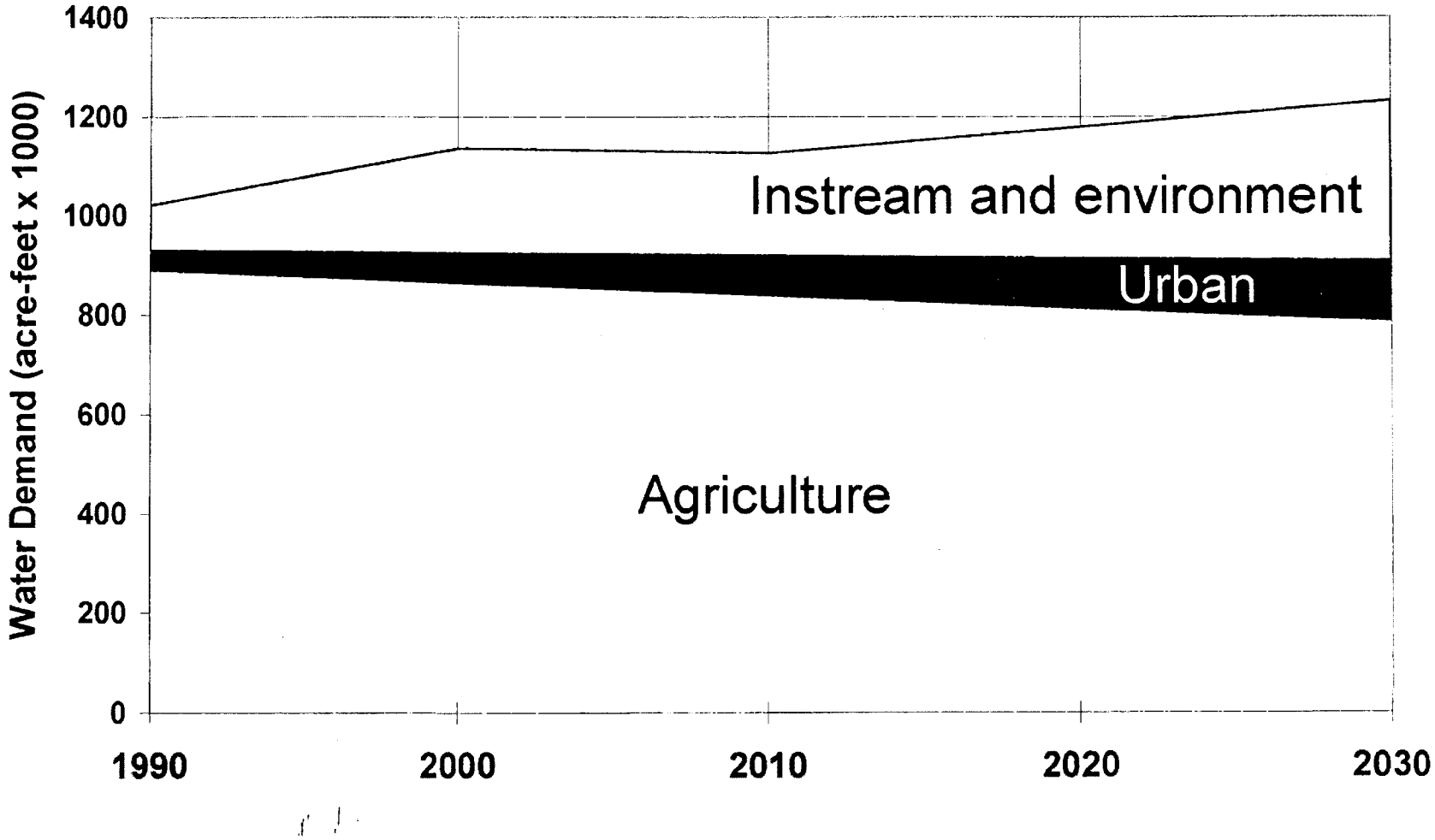


Figure 10

GROUND WATER BASINS - SAN JOAQUIN BASIN HYDROLOGIC STUDY AREA

Projected Water Demands
Eastern Merced County



Appendix B

Tables

Table 1 Average Annual Agricultural Water Usage

Agency	Surface Water Ac. FT/YR	Surface Water %	Groundwater Ac. FT/YR	Groundwater Percent	Total Ac. FT/YR
Merced Irrigation District	522,000	96.3%	20,000	3.7%	542,000
Individual Growers MID & SOI	-	0.0%	510,000	100.0%	510,000
LeGrand-Athlone Water District	5,000	6.8%	68,800	93.2%	73,800
Merquin Water District	22,000	88.0%	3,000	12.0%	25,000
Stevinson Water District	26,400	100.0%	-	0.0%	26,400
Turner Island Water District	-	0.0%	-	100.0%	-
Total	575,400	48.9%	601,800	51.1%	1,177,200

Agency	Surface Water Ac. FT/YR	Surface Water %	Groundwater Ac. FT/YR	Groundwater Percent	Total Ac. FT/YR
Atwater Canning (effluent)	350	100.0%	-	0.0%	350
City of Atwater WWTP (effluent)	4,050	100.0%	-	0.0%	4,050
City of Merced WWTP (effluent)	7,525	100.0%	-	0.0%	7,525
Lipton/Ragu (effluent)	815	100.0%	-	0.0%	815
Total	12,740	100.0%	-	0.0%	12,740

	Surface Water Ac. FT/YR		Groundwater Ac. FT/YR		Total Ac. FT/YR
Grand Total	588,140	49.4%	601,800	50.6%	1,189,940

Table 2 Groundwater Usage by Municipalities/Urban Areas

Agency	1996 Population	Annual Production Mil. Gal.	Annual Production Percent	Per Capita gpd	Note
Black Rascal Water	320	43	0.4%	366	D
City of Atwater	21,133	2,367	20.1%	307	C
City of Livingston	10,490	1,491	12.7%	389	E
City of Merced	61,187	6,729	57.2%	301	C
Le Grand CSD	-	-	0.0%	-	
Meadowbrook	3,960	359	3.0%	248	A
Planada CSD	3,500	275	2.3%	215	G
Winton Water & San.	9,000	511	4.3%	155	F
Total	109,590	11,774	100.0%	294	
Total (acre-feet)		36,134			

Note:

A Population estimated from 1,200 DU x 3.3 people per DU
B Population is 1995, includes 23 commercial & 4 industrial customers
C Population is average of 1/1/96 and 1/1/97 estimates
D Includes 129 DU, 1 community swimming pool
E Residential/Commercial is 32% of the total flow shown
F Population is approximate
G Population is average; seasonal maximum is 4,000.

Table 3 Municipal Monthly Flow Distribution

	Percent of Average Month				
Month	City of Atwater	City of Merced	Meadowbrook Water Co.	Black Rascal Water Co.	City of Livingston
January	45	54	50	26	81
February	40	47	52	33	94
March	49	57	55	40	81
April	81	80	80	88	104
May	133	119	107	129	115
June	142	140	145	163	108
July	196	178	215	205	118
August	166	172	161	205	132
September	143	138	119	151	109
October	106	97	106	93	97
November	59	62	56	41	92
December	40	56	54	27	69
Data year	1996	1996	1996	1996	96/97

	Percent of Average Month				
Month	Winton Water				
January	56				
February	53				
March	66				
April	92				
May	127				
June	147				
July	171				
August	155				
September	122				
October	96				
November	60				
December	55				
Data year	1996				

Table 4 Municipal Monthly Flow Distribution

	Percent of Annual Usage				
Month	City of Atwater	City of Merced	Meadowbrook Water Co.	Black Rascal Water Co.	City of Livingston
January	4	5	4	2	7
February	3	4	4	3	8
March	4	5	5	3	7
April	7	7	7	7	9
May	11	10	9	11	10
June	12	12	12	14	9
July	16	15	18	17	10
August	14	14	13	17	11
September	12	12	10	13	9
October	9	8	9	8	8
November	5	5	5	3	8
December	3	5	5	2	6
Total	100	100	100	100	100
Data year	1996	1996	1996	1996	96/97

	Percent of Annual Usage				
Month	Winton Water				
January	5				
February	4				
March	5				
April	8				
May	11				
June	12				
July	14				
August	13				
September	10				
October	8				
November	5				
December	5				
Total	100				
Data year	1996				

Appendix C

General Definitions

Term	Definition
µg/l	Micrograms per liter (approximately equal to ppb)
AB 3030	Assembly Bill 3030 (Costa), the Groundwater Management Act (codified in California Water Code sections 10750 *et. seq.*) was passed by the State legislature during the 1992 session and became law on January 1, 1993.
Abandonment	See "Well Abandonment"
AF/YR	Acre-feet per year (conversion factor: 1,120 AF/YR = 1 MGD)
Aquifer	A geologic formation that stores, transmits and yields significant quantities of water to wells and springs.
Basin	See "Merced Groundwater Basin"
CEQA	California Environmental Quality Act
Conjunctive Use	The operation of a groundwater basin in coordination with a surface water reservoir system for the purpose of artificially recharging the basin during years of above average precipitation so the water can be withdrawn during years of below average precipitation and surface supplies are below normal.
DBCP	Dibromochloropropane
DOHS	California Department of Health Services
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
EDB	Ethylene dibromide
EPA	United States Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GMP	Groundwater Management Plan, developed under AB 3030
Groundwater	Subsurface water occurring in the zone of saturation

Term	Definition
GW	Groundwater
High Groundwater	Groundwater levels higher than 6 feet below the ground level which can adversely affect crops. "Perched" water, overall high groundwater, or other factors can cause high groundwater.
Inactive Wells	An unused well that the owner demonstrates his intention to use the well again. California Water Well Standards (Bulletins 74-81 & 74-90) include specific guidelines for things the owner must do to show evidence of his intention to continue to use the well.
SWD	Stevinson Water District
JPA	Joint Powers Authority
Local county environmental health agency	Merced County Division of Environmental Health
MAGPI	Merced Area Groundwater Pool Interests
MCL	Maximum Contaminant Level
MCDEH	Merced County Division of Environmental Health
MCWD	Merquin County Water District
Merced ID	Merced Irrigation District
mg/l	Milligrams per liter (approximately equal to ppm)
MGD	Million gallons per day (conversion factor: 1 MGD = 1,120 AF/YR
MID	Merced Irrigation District
Overdraft	The condition of a groundwater basin where the amount of water withdrawn from the aquifer or groundwater basin exceeds the amount of water replenishing the basin (net recharge) over a period of time.
Participating Agency	Any agency within the Merced Groundwater Basin eligible to participate in an AB 3030 groundwater management plan, including Merced Irrigation District, LeGrand-Athlone Water District, City of Merced, City of Atwater, City of Livingston, Winton Water & Sanitary District, Planada Community Services District, Le Grand

Term	Definition
	Community Services District, Black Rascal Mutual Water Company, Meadowbrook Water Company, East Merced Resources Conservation District, and Merced County.
PCE	Perchloroethylene
ppb	Parts per billion (approximately equal to µg/l)
ppm	Parts per million (approximately equal to mg/l)
Public Water System	See Appendix D, "Public Water System Definitions"
Recharge	Flow to groundwater storage from precipitation, infiltration from streams, and other sources of water
Reducing Conditions	A lack of oxygen in the groundwater
RWQCB	Regional Water Quality Control Board
Safe Yield	The maximum quantity of water that can be continuously withdrawn form a groundwater basin without adverse effect.
Saline	Consisting of or containing salts, the most common of which are potassium, sodium, or magnesium in combination with chloride, nitrate or carbonate.
SCADA	Supervisory Control and Data Acquisition - a type of remote monitoring and control system.
SW	Abbreviation for "surface water"
TCE	Trichloroethylene
TDS	"Total Dissolved Solids," the quantity of minerals (salts) in solution in water, usually expressed in milligrams per liter (mg/l) or in parts per million (ppm).
TIWD	Turner Island Water District
Unused Wells	Wells that are not being used. Wells that are not used for a period of one year are considered "abandoned," unless the owner demonstrates his intention to use the well again. (See "Inactive wells")

Term	Definition
USGS	United Stated Geological Survey
UST	Underground Storage Tanks
VOC	Volatile Organic Compound
Well Abandonment	According to the California State Well Standards "a well is considered *"abandoned"... if it has not been used for one year, unless the owner demonstrates intention to use the well again... ."* All "abandoned" wells must be properly destroyed. (See "Well Destruction")
Well Destruction	All "abandoned" wells (see "Well Abandonment") and exploration or test holes must be properly destroyed. The objective of well destruction is to restore subsurface conditions as nearly as possible to the condition that existed before the well was constructed, taking into account any changes which may have occurred since the time of construction. The county and each of the cities in the Basin have established well standards that specify well destruction requirements.
WPA	Wellhead Protection Area, defined by the Safe Drinking Water Act Amendments of 1986 as *"the surface and subsurface area surrounding a water well or well field supplying a public water system, through which contaminants are reasonably likely to more toward and reach such water or well field."*
WPP	Federal Wellhead Protection Program established by Section 1428 of the Safe Drinking Water Act Amendments of 1986. They are designed to protect groundwater resources of public drinking water from contamination to minimize the need for costly treatment to meet drinking water standards.

Appendix D

Public Water System Definitions

Public Water System Definitions

CALIFORNIA HEALTH & SAFETY CODE, DIVISION 5, SANITATION PART 1. SANITARY PROVISIONS, CHAPTER 7, CALIFORNIA SAFE DRINKING WATER ACT Section 4010.1, Definitions:

(h) "Public water system" means a system for the provision of piped water to the public for human consumption that has 15 or more connections or regularly serves at least 25 individuals daily at least 60 days out of the year. A public water system includes the following:

(1) Any collection, treatment, storage, and distribution facilities under the control of the operator of the system which are used primarily in connection with the system.

(2) Any collection or pretreatment storage facilities not under the control of the operator that are used primarily in connection with the system.

(3) Any water system that treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

(i) "Community water system" means a public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 year long residents.

(j) "Noncommunity water system" means a public water system that meets one of the following criteria:

(1) Serves drinking water to at least 25 nonresident individuals daily at least 60 days of the year, but not more than 24 yearlong residents.

(2) Serves 15 or more service connections and any number of nonresident individuals at least 60 days of the year, but no yearlong residents.

(m) "State small water system" means a system for the provision of piped water to the public for human consumption that serves at least five, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year.

TITLE 22, CHAPTER 15. DOMESTIC WATER QUALITY AND MONITORING, ARTICLE 1, Definitions, Section 64400.80:

"Nontransient-noncommunity water system": means a public water system that is not a community water system and that regularly serves at least the same 25 persons over 6 months per year.

TITLE 22, CHAPTER 15. DOMESTIC WATER QUALITY AND MONITORING, ARTICLE 1, Definitions, Section 64401.85:

"Transient-noncommunity water system": means a public water system that is not a community water system or a nontransient-noncommunity water system.

Appendix E

Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING
FOR THE
ESTABLISHMENT AND OPERATION
OF THE
MERCED AREA GROUNDWATER POOL INTERESTS
(MAGPI)

RECITALS

The parties to this Memorandum of Understanding, hereafter "MOU", as set forth herein have entered this MOU based upon the following facts and principles:

A. The Merced Groundwater Basin, hereafter "Basin", is defined roughly and is herein understood to be bound on the east by the Merced County line, on the south by the Chowchilla River, on the west by the San Joaquin River, and on the north by the Merced River.

B. Groundwater and surface water resources within the Merced Groundwater Basin are vitally important resources, in that they provide the foundation for environmental, agricultural, domestic, municipal and industrial needs, as well as other needs, and to maintain the economic viability and prosperity of the Basin area.

C. The eastern Merced County area occupied by the Merced Groundwater Basin is a vital agricultural area with increasing importance in industry and education. Because of increasing demands for California's finite water resources, it is critical that those persons and agencies making use of the regions limited water supplies do so in an efficient and knowledgeable manner to preserve the resources for all elements of the local economy.

D. The permanent overdraft of groundwater supplies can result in water quality as well as quantity issues, cause land subsidence, increase costs to produce agricultural, industrial and domestic water supplies, and eventually restrict economic development.

In light of these matters the parties desire to form an association to be known as Merced Area Groundwater Pool Interests (MAGPI) on terms as follows:

1. Goals: The purposes and goals of MAGPI are:

   a. To determine and evaluate the Basin's existing groundwater supplies;

   b. Prepare and promote a draft groundwater management plan for the Basin, which could be adopted by the appropriate agencies, or in the event the parties deem appropriate to form a Joint Powers Authority (JPA) to adopt such a plan, which would then be ratified by the JPA members;

   c. Consider developing and/or adopting an existing hydrologic groundwater model of the Basin's groundwater supplies for association analysis of the Basin;

   d. Determine the Basin's need for additional or improved water extraction, storage, delivery, conservation, reuse and recharge facilities;

   e. Provide information and guidance for the management, preservation, protection and enhancement of the Basin; and

   f. To begin to determine the safe yield of the Basin.

2. Principles:

   a. The parties believe that non-coordinated action by water providers and users within the Basin could result in counter productive competition for finite resources resulting in adverse impacts to the groundwater and surface water supplies within the Basin.

b. The parties believe that a mutually acceptable groundwater management plan for water suppliers and users within the Basin is important to protect groundwater and surface water resources and will assist in meeting the needs of all current and future users of such resources within the Basin.

c. Because of the enactment of State legislation, it is now clear to the Parties that local management of water resources is desirable in order that local control be maintained over such resources.

d. The parties hereto desire to enter into this MOU in order to form an association to promote common goals and provide coordinated planning to make the best use of, and provide the most protection for, available water resources to meet the needs of their respective constituents and service areas in the mutual best interests of the people residing and working in the Basin.

e. In forming the Association, it is the parties' desire, at this time, that the Association not be formed as a separate governmental entity, nor have any enforceable regulatory authority over any party's facilities or any party's respective surface water or groundwater supplies or rights, nor duplicate any services, duties or authority of any other agency.

f. However, the parties recognize that achieving the goals and objectives of MAGPI may require certain activities in the future which may require a more formal organization in the nature of a Joint Powers Authority (JPA). Should such a need arise, each party hereto shall determine its continuing participation as it shall deem appropriate.

3. Definitions: The following terms shall have the meanings specified in this Section 3:

a. Board: That body, consisting of one representative from each of the parties, which governs the Association, as established pursuant to Section 5.2 of this MOU.

b. Chairperson: The presiding officer of the Association as elected by the Board. In the absence of the Chairperson, the Vice-Chairperson will perform all duties of the Chairperson.

c. Governing Bodies: The legislative bodies of the governmental parties to this MOU, and the Boards of Directors of the privately owned parties to this MOU.

d. Parties: Include County of Merced, Merced Irrigation District, City of Merced, together with all parties admitted to the MOU as hereafter set forth.

4. Organization:

a. The parties to this MOU hereby form an Association known as Merced Area Groundwater Pool Interests (MAGPI). This Association shall have no enforceable regulatory authority over any person or entity, including parties or parties' facilities property or rights.

b. Board: The Association shall be governed by a Board whose membership, duties and responsibilities are set forth herein.

(1) Each party shall designate one person to serve as a member of the Board, and one or more alternates and notify the Chairperson of those appointments. Each member of the Board, and each alternate, shall serve at the pleasure of the party appointing such member. A party's alternate may serve in the place of that party's member in the absence of such member and, in such case, the alternate shall have the powers of the member.

(2) The Board, at its first meeting, shall elect a Chairperson and Vice-Chairperson from its members. Such officers shall serve as the pleasure of the Board and in such capacities until the first meeting of the Board in 1998 at which time the Board shall elect new officers. Thereafter, the Board shall elect a Chairperson and Vice-Chairperson from its members at the first meeting of each calendar year. The Chairperson shall be responsible for presiding over meetings of the Board, and shall notify committee members of meetings of the Board. The Board shall establish a date, time and place for its regular meetings, and may hold special meetings when required for the proper transaction of business. All meetings of the Board shall be held in accordance with the provisions of the Brown Act, California Government Code §54950 et seq. The Board shall prescribe such procedures for the conduct of its business as it deems appropriate.

(3) A quorum shall consist of one more than fifty percent (50%) of the members of the Board, except that less than a quorum may adjourn meetings of the Board from time to time. Alternatively, the Chairperson may adjourn a meeting of the Board to a specified time, date and place if there is less than a quorum of members present for a meeting. Except for actions for which a different approval standard is set forth in this MOU, all actions of the Board shall be approved by a majority of the members present.

(4) The Board shall have the following duties and responsibilities:

(a) Develop and implement the activities, including work schedule, designated to achieve the objectives of the Association as set forth in Sections 1 and 2 of this MOU.

(b) Monitor work activities of the Association.

(c) Establish such committees as may be necessary or desirable to carry out the purposes of the Association, and to exercise general supervision over such committees.

c. Staff; Employees: The Association shall have no employees, but may obtain staff and support services through the parties.

d. New Parties: New parties may join the Association, provided that they meet the requirements as follows:

(1) Any local public agency, whose service area includes land located within the Basin, which is authorized to provide water service, flood control, groundwater quality management, or groundwater replenishment within its service area, and whose service area includes all or a portion of the Basin, may apply for membership in the Association.

(2) A water corporation regulated by the California Public Utilities Commission or a mutual water company, whose service area includes land located within the Basin, which is authorized to provide water service within its service area, and whose service area includes all or a portion of the Basin, may apply for membership in the Association.

(3) Application for membership shall be subject to approval by the Governing Bodies of the parties; approval shall require the affirmative vote of the Governing Bodies of two-thirds (2/3) of the parties. Each member sitting on the Board shall be responsible for placing on the agenda of his or her

Governing Body the application for membership of any applying party once requested by the Board.

(4) Any new party to this agreement shall, as a condition of admission to the Association, be required to first pay its proportionate share of back contributions, if any, as determined by the Board.

5. Technical Committee: A Technical Committee shall be established composed of staff of the participating member agencies, and will cause the preparation of a proposed draft groundwater management plan for the Basin.

6. Association Costs: Costs incurred by any party in connection with any functions of the Association, or any committee established by the Board, and expenses of a party's personnel including, without limitations, the regular and alternate members appointed by a party to any committee while performing such functions, shall not be reimbursed by the Association except upon approval of the Board.

7. Funding and Voting Percentages:

a. It is expected that the Parties will fund their own staff work, it is not anticipated that additional funding will be required. Any funding contribution by the parties for the preparation of a draft groundwater management plan monitoring activities, and/or restoration activities shall be approved by a unanimous vote of the Board members present.

b. Voting Rights: Each party's representative on the Board shall be entitled to one vote.

c. Modification by Party: Funding percentages and/or voting percentages as indicated in this Section, may be changed only upon the approval of the Governing Bodies of all of the parties.

8. Term of this MOU: The term of this MOU shall commence upon execution by three (3) parties, and continue until terminated by majority of the Board or withdrawal of members such that only two (2) or less remain. Upon termination of this MOU, the Board shall determine the assets and liabilities of the Association; make every effort to satisfy all obligations within sixty (60) days of the termination of the MOU; and distribute the remaining fund balance, if any, equitably to each party in proportion to each party's funding contribution to the Association.

9. General Provisions Governing MOU:

a. Construction of Terms: This MOU is for the sole benefit of the parties and shall not be construed as granting rights to any person other than the parties or imposing obligations on a party to any person other than another party.

b. Withdrawal or Termination of Membership: Except in the event of the termination of this MOU pursuant to Section 9, a party who withdraws or terminates its membership in the Association shall not be entitled to a refund of its funding contributions, if any. Any party may terminate membership and withdraw from this Association upon thirty-(30) days written notice of termination to the Association. If a party withdraws from the Association when the Party is in arrears as to its agreed funding contributions to the Association, that party's entitlement to use any groundwater model or other work product of the Association as provided for herein shall be determined by the Board.

c. Amendment: An amendment to this MOU must be approved by the affirmative vote of the Governing Bodies of two-thirds (2/3) of the Parties.

d. Counterpart Execution: This MOU may be executed in counterparts each of which shall be deemed an original but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have caused this MOU to be executed, each signatory hereto represents that he has been appropriately authorized to enter into this MOU on behalf of the party for whom he/she signs.

CITY OF MERCED

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
AND
MEMORANDUM OF UNDERSTANDING
MERCED AREA GROUNDWATER POOL INTERESTS
(Signature Page)

By: Mary Jo Knudsen 12/19/97
MARY JO KNUDSEN
Mayor

ATTEST

By: James G. Marshall 12/19/97
JAMES G. MARSHALL
City Manager

APPROVED AS TO FORM

By: 12/19/97
STEVEN E. NORD
City Attorney

BEFORE THE BOARD OF SUPERVISORS

OF THE COUNTY OF MERCED, STATE OF CALIFORNIA

In the matter of:

RESOLUTION ADOPTING THE MERCED GROUNDWATER BASIN, GROUNDWATER MANAGEMENT PLAN AND MEMORANDUM OF UNDERSTANDING FOR THE MERCED AREA GROUNDWATER POOL INTEREST)

Resolution No. 97-261

WHEREAS, on November 4, 1997, the Merced County Board of Supervisors ("Board") adopted and published its Resolution of Intention to a Draft Groundwater Management Plan pursuant to California Code Sections 10750 et seq., commonly known as "AB 3030," following proceedings as prescribed by the Water Code; and

WHEREAS, the Board thereafter caused to be prepared the County's proposed Groundwater Management Plan, a copy of which is on file with Secretary hereof; and

WHEREAS, on November 25, 1997, the Board conducted a second hearing on the proposed plan after due notice and publication, all as required by Water Code Section 10750, et seq., including notice that copies of the Plan were available to the public; and

WHEREAS, at the second public hearing opportunity was provided for public input and questions, and the hearing was duly concluded; and

WHEREAS, at no time prior to or during said hearing process did the Board receive protest in writing from a majority of landowners of the County; and

WHEREAS, the Board has considered the Groundwater Management Plan and has determined that it is within the public affairs and in the best interest of the County to adopt the proposed plan.

NOW THEREFORE BE IT RESOLVED BY THE Board of Supervisors of the County of Merced, State of California as follows:

1. It is in the best interest of local agencies and Merced County, and its inhabitants, that the County approve and adopt the Merced Groundwater Basin, Groundwater Management Plan pursuant to Part 2.75 of Division 6 of the Water Code.

2. The Board approves the Memorandum of Understanding for the Merced Area Groundwater Pool Interest (MAGPI) and authorizes the Chairman to sign the Agreement.

3. The Director of the Division of Environmental Health is appointed as the county representative to the Merced Area Groundwater Pool Interests (MAGPI) and is hereby directed to coordinate issues with all applicable county departments and regularly report to the Board issues relating to groundwater management.

I, GREGORY B. WELLMAN, Clerk of the Board of Supervisors of the County of Merced, do hereby certify that the foregoing resolutions was regularly introduced, passed and adopted by said Board at a regular meeting thereof held on the 25th day of November 1997 by the following vote:

SUPERVISORS:

AYES: Joe Rivero, Gloria Cortez Keene, Deidre F. Kelsey, Jerry O'Banion

NOES: None

ABSENT: Kathleen M. Crookham

WITNESS my hand and the Seal of this Board this 25th day of November, 1997

GREGORY B. WELLMAN, CLERK

By _____
Deputy

MERCED IRRIGATION DISTRICT

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
AND
MEMORANDUM OF UNDERSTANDING
MERCED AREA GROUNDWATER POOL INTERESTS
(Signature Page)

JACK F. HOOPER
President

TIMOTHY L. PELLISSIER
Secretary

Approved as to Form:

KENNETH M. ROBBINS
Flanagan, Mason, Robbins & Gnass
General Counsel

CITY COUNCIL
OF THE
CITY OF ATWATER

RESOLUTION NO. 1397-97

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ATWATER ADOPTING THE CITY OF ATWATER GROUNDWATER MANAGEMENT PLAN, FINDING THAT THE PLAN IS EXEMPT FROM THE CALIFORNIA ENVIRONMENTAL QUALITY ACT, AND AUTHORIZING FILING OF NOTICE OF EXEMPTION.

WHEREAS, the Merced Area Groundwater Pool Interests (MAGPI) of which the City of Atwater is a member, has developed a basin-wide groundwater management plan pursuant to Water Code Sections 10750 et. seq., and staff participated in the development of the plan;

WHEREAS, staff recommends that the City Council of the City of Atwater adopt the Atwater Groundwater Basin Groundwater Management Plan; and

WHEREAS, the California Environmental Quality Act ("CEQA") exempts certain projects from the environmental review process. Staff recommends that the Council consider making a finding that adoption of the Merced Groundwater Basin Groundwater Management Plan is eligible for a Statutory Exemption under the California Environmental Quality Act (CEQA); and

WHEREAS, staff has conducted a thorough review of the project and it's CEQA ramifications and has presented that review to the Council.

NOW, THEREFORE, BE IT RESOLVED as follows:

1. The findings and evidence set forth in attachment "A" are hereby adopted.

2. Pursuant to the findings of Attachment "A", the City Council finds that the project is statutorily exempt from CEQA and the City Clerk is authorized and directed to file a notice of exemption for the project pursuant to the requirements of CEQA.

3. The Mayor of the City Council is hereby authorized to sign the Memorandum of Understanding for the establishment and operation of the Merced Area Groundwater Pool

Interests. The Public Works Director/City Engineer is hereby appointed to be the City of Atwater's representative to the Merced Area Groundwater Pool Interests.

4. The plan is hereby adopted.

The foregoing resolution is hereby adopted this 8th day of December, 1997.

AYES: Anderson, Duddy, Krotik, DeVoe

NOES: None

ABSENT: Abercrombie

APPROVED:

Kenneth N. DeVoe

KENNETH N. DEVOE, MAYOR

ATTEST:

Frances M. Barrett

FRANCES M. BARRETT, CITY CLERK

"I, Frances M. Barrett, City Clerk of the City of Atwater and as such Ex-Officio Clerk of the City Council of the City of Atwater, hereby certify that the foregoing resolution is a true, correct, and complete copy of the original of such resolution, which is on file in my office.

Frances M. Barrett, City Clerk of the City of Atwater, and Ex-Officio Clerk of the City Council of the City of Atwater, State of California."

BLACK RASCAL WATER COMPANY

By: _____
President
Black Rascal Water Company
December 11, 1997

By: _____
Secretary
Black Rascal Water Company
December 11, 1997

Approved as to Form:

By: _____

CITY OF LIVINGSTON

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
AND
MEMORANDUM OF UNDERSTANDING
MERCED AREA GROUNDWATER POOL INTERESTS
(Signature Page)

By: _____ _____

Mayor

ATTEST

By: _____ _____

TIM KERR
City Manager

APPROVED AS TO FORM

By: _____ _____

City Attorney

EAST MERCED RESOURCES CONSERVATION DISTRICT

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
AND
MEMORANDUM OF UNDERSTANDING
MERCED AREA GROUNDWATER POOL INTERESTS
(Signature Page)

By:_____ _____

Chairman of the Board of Directors

ATTEST

By:_____ _____

General Manager

APPROVED AS TO FORM

By:_____ _____

General Counsel

LE GRAND – ATHLONE WATER DISTRICT

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
AND
MEMORANDUM OF UNDERSTANDING
MERCED AREA GROUNDWATER POOL INTERESTS
(Signature Page)

By: David Serrano 12-30-97
DAVID SERRANO
President

By: Elmo Giampoli 12-30-97
ELMO GIAMPOLI
Vice President

By: Pauline Fudge 12-30-97
PAULINE FUDGE
Secretary

LE GRAND COMMUNITY SERVICES DISTRICT

Sewer Service Water Service

P.O. Box 82
Library Bldg.
13038 Jefferson St.
Le Grand, CA 95333

Phone:389-4173
FAX:(209) 389-0663

Resolution No. 97-11

Resolution Adopting the Memorandum of Understanding Relating to the Formation and Operation of the Merced Groundwater Basin, And the Merced Groundwater Basin Groundwater Management Plan, Finding that the Plan is Categorically Exempt From the California Environmental Quality Act, And Authorizing Filing of Notice of Exemption

WHEREAS, the Merced Area Groundwater Pool Interests (MAGPI) of which the LeGrand Community Services District is a member, has developed a basin-wide groundwater management plan pursuant to Water Code Sections 10750 et. seq., and staff participated in the development of the plan;

WHEREAS, staff recommends that this Board of Directors adopt a Memorandum of Understanding relating to the formation and operation of the Merced Groundwater Basin (MOU, hereafter); and

WHEREAS, staff recommends that this Board of Directors of the LeGrand Community Services District ("Board") adopt the Merced Groundwater Basin Groundwater Management Plan ("plan" or "project"); and

WHEREAS, the California Environmental Quality Act ("CEQA") exempts certain projects from the environmental review process; and

WHEREAS, the County of Merced, as lead agency regarding CEQA matters, has determined or will determine that the project qualifies for Class 7 and Class 8 Categorical Exemption from the requirements of the California Environmental Quality Act; and

WHEREAS, the Board of Directors of the LeGrand Community Services District finds that the provisions of the County staff report attached hereto are true and correct;

NOW, THEREFORE, be it hereby resolved as follows:

1. The MOU is hereby adopted.

2. The findings and evidence set forth in attachment "A" are hereby adopted.

3. Pursuant to the Declaration of the County of Merced relative to 14 CCR Sections 15307 and 15308 that the Plan is determined to be categorically exempt from the requirements of CEQA. Posting of the notice of exemption for the project pursuant to the requirements of CEQA will be accomplished by the County of Merced. This action is taken subject to final approval and compliance by the County of Merced with such requirements.

4. The plan is hereby adopted.

LE GRAND COMMUNITY SERVICES DISTRICT
Sewer Service Water Service

P.O. Box 82
Library Bldg.
13038 Jefferson St.
Le Grand, CA 95333

Phone:389-4173
FAX:(209) 389-0663

AYES: DIRECTORS: Smith, Moroni, McPherson, Watts.

NOES: DIRECTORS: Ramirez.

I, SECRETARY TO THE BOARD OF DIRECTORS, do hereby certify the resolution was duly adopted by the Board of Directors of the Le Grand Community Services District, at a regular meeting held on November 6, 1997, with a full quorum present and acting throughout.

_____, SECRETARY/MANAGER

_____, PRESIDENT OF THE BOARD

RESOLUTION NO. 97-2

RESOLUTION AUTHORIZING THE PRESIDENT OF THE BOARD OF DIRECTORS AND THE GENERAL MANAGER TO EXECUTE THE MEMORANDUM OF UNDERSTANDING FOR THE ESTABLISHMENT AND OPERATION OF THE MERCED AREA GROUNDWATER POOL INTERESTS ASSOCIATION

WHEREAS, the Merced Groundwater Basin (the"Basin") is defined roughly and is understood to be bound on the east by the Merced County line, on the south by the Chowchilla River, on the west by the San Joaquin River, and on the north by the Merced River; and

WHEREAS, groundwater and surface water resources within the Merced Groundwater Basin are vitally important resources, in that they provide the foundation for environmental, agricultural, domestic, municipal and industrial needs, as well as other needs, and to maintain the economic viability and prosperity of the Basin area; and

WHEREAS, the eastern Merced County area occupied by the Merced Groundwater Basin is a vital agricultural area with increasing importance in industry and education, and because of increasing demands for California's finite water resources, it is critical that those persons and agencies making use of the region's limited water supplies do so in an efficient and knowledgeable manner to preserve the resources for all elements of the local economy; and

WHEREAS, the permanent overdraft of groundwater supplies can result in water quality as well as quantity issues, cause land subsidence, increase costs to produce agricultural, industrial and domestic water supplies, and eventually restrict economic development; and

WHEREAS, the goals of the Merced Area Groundwater Pool Interests Association are (1) to determine and evaluate the Basin's existing groundwater supplies, (2) to prepare and promote a draft groundwater management plan for the Basin, (3) to consider developing and/or adopting an existing hydrologic groundwater model of the Basin's groundwater supplies, (4) to determine the Basin's need for additional or improved water extraction, storage, delivery, conservation, reuse and recharge facilities, (5) to provide information and guidance for the management, preservation, protection, and enhancement of the Basin, and (6) to determine the safe yield of the Basin.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Merquin County Water District that it is in the best interests of the Merquin County Water District to enter into the Memorandum of Understanding for the Merced Area Groundwater Pool Interests Association, that the President of the Board of Directors and the General Manager be authorized to execute the Memorandum of Understanding on behalf of the District, and that the General Manager serve as the District's representative on the Merced Area Groundwater Pool Interests Association.

MEADOWBROOK WATER COMPANY

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
AND
MEMORANDUM OF UNDERSTANDING
MERCED AREA GROUNDWATER POOL INTERESTS
(Signature Page)

Fred H. Walker
Fred H. Walker
President

CITY OF MERCED By:_____ MARY JO KNUDSEN Mayor ATTEST By:_____ JAMES G. MARSHALL City Manager APPROVED AS TO FORM By:_____ STEVEN F. NORD City Attorney	**CITY OF ATWATER** By:_____ KEN DEVOE Mayor ATTEST By:_____ ANTHONY J. ALTFELD City Manager APPROVED AS TO FORM By:_____ GEORGE LOGAN City Attorney
WINTON WATER & SANITARY DISTRICT By:_____ SHIELLA SHAMBLIN President of the Board of Directors ATTEST By:_____ INA JOHNSON Administrator APPROVED AS TO FORM By:_____ DALE BACIGALUPI General Counsel	**LE GRAND-ATHLONE WATER DISTRICT** By:_____ DAVID SERRANO President of the Board of Directors ATTEST By:_____ General Manager APPROVED AS TO FORM By:_____ General Counsel

MERQUIN COUNTY WATER DISTRICT

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
AND
MEMORANDUM OF UNDERSTANDING
MERCED AREA GROUNDWATER POOL INTERESTS
(Signature Page)

By:_____ _____

Chairman of the Board of Directors

ATTEST

By:_____ _____

General Manager

APPROVED AS TO FORM

By:_____ _____

General Counsel

PLANADA COUMMUNITY SERVICES DISTRICT

MERCED GROUNDWATER BASIN
GROUNDWATER MANAGEMENT PLAN
AND
MEMORANDUM OF UNDERSTANDING
MERCED AREA GROUNDWATER POOL INTERESTS
(Signature Page)

By:_____ _____
DANIEL CHAVEZ
Chairman of the Board of Directors

By:_____ _____
RUTH WATTS
Office Manager

APPROVED AS TO FORM

By:_____ _____
DAVE CAPRON
Attorney

PLANADA COMMUNITY SERVICES DISTRICT By:_____ DANIEL CHAVEZ Chairman of the Board of Directors ATTEST By:_____ RUTH WATTS Office Manager APPROVED AS TO FORM By:_____ DAVE CAPRON Attorney	**BLACK RASCAL WATER COMPANY** By:_____ DAVID HAMM President ATTEST By:_____ TIM DICKSON Secretary
MERQUIN COUNTY WATER DISTRICT By:_____ Chairman of the Board of Directors ATTEST By:_____ General Manager APPROVED AS TO FORM By:_____ General Counsel	**STEVINSON WATER DISTRICT** By: Robert D. Kelley Robert D. Kelley, Jr. President ATTEST By: Kevin F. Kelley Kevin F. Kelley Secretary

Telephone
209/826-4935

TURNER ISLAND WATER DISTRICT

P.O. Box 311
LOS BANOS, CALIFORNIA 93635

December 9, 1997

Mr. Ted Selb
Merced Area Groundwater Pool Interests
c/o Merced Irrigation District
P.O. Box 2288
Merced, CA 95344-0288

RE: Merced Basin Groundwater Management Plan

Dear Mr. Selb:

As you are aware, the Turner Island Water District is a California water district located in Merced County which has been approached about participation in the Merced Basin Groundwater Management Plan now being finalized by the Merced Area Groundwater Pool Interests (the "Plan"). The purpose of this letter is to express our interest in participating in the Plan as soon as we can complete the required approval process under AB 3030, and we ask that you provide this letter to the California Department of Water Resources with any other materials you forward to the Plan in order to confirm our District's interest in participating.

Unfortunately, because we were unable to hear your presentation on the Plan until today (December 9), our Board was not previously in a position to act on participation. Due to the various requirements of AB 3030, we will not be able to adopt the Plan until January, but wish to make clear that we intend to do so.

We also wish to make clear that we have previously adopted our own AB 3030 plan (which is similar to the Plan), and have entered into a memorandum of understanding with a neighboring mutual water company (the Lone Tree Mutual Water Company) pursuant to our existing plan with the Plan, but until we have done so we commit to coordinate our actions with the Plan in order to achieve the regional goals of the Plan. Thank you for asking us to participate in the Plan.

Very truly yours,

Donald C. Skinner
President

DS/cjc

cc: Mr. Carl Hauge
Mr. George Park
Edward Amaral, Esq.
Gary W. Sawyers, Esq.

(don\tiwd-1)

ORDINANCE NO. 97-45

AN ORDINANCE OF THE WINTON WATER AND SANITARY DISTRICT ADOPTING A GROUNDWATER MANAGEMENT PLAN AND A MEMORANDUM OF UNDERSTANDING FOR THE ESTABLISHMENT AND OPERATION OF THE MERCED AREA GROUNDWATER POOL INTERESTS (MAGPI)

WHEREAS, the Board of Directors of the Winton Water and Sanitary District have adopted Resolution No. 97-465, A Resolution of Intent to Prepare a Groundwater Management Plan on October 9, 1997; and Resolution No. 97-466, A Resolution of Intent to Implement a Groundwater Management Plan on October 13, 1997; and

NOW, THEREFORE, the Board of Directors of the Winton Water and Sanitary District, by adoption of this ordinance, shall hereby administer the Groundwater Management Plan and the Memorandum and Operation of the Merced Area Groundwater Pool Interests (MAGPI).

SECTION 1: The Groundwater Management Plan is attached to this ordinance under Addendum A and the Memorandum of Understanding included in Appendix E of this Addendum.

SECTION 2: This ordinance shall take effect thirty (30) days from the date of its passage. Before the expiration of fifteen (15) days after its passage, this ordinance shall be published once in the Winton Times, a newspaper of general circulation printed and published in the Winton Water and Sanitary District.

* * *

The foregoing Ordinance was passed and adopted at a Regular Meeting of the Board of Directors of the Winton Water and Sanitary District held on the 27th day of October 1997 by the following vote:

AYES: SHAMBLIN, PITCHFORD, BONIN, BOWMAN, COX

NOES: NONE

ABSTAIN: NONE

ABSENT: NONE

Shiella Shamblin

SHIELLA SHAMBLIN, President of the Board of Directors of the Winton Water & Sanitary District

Exhibit I

ATTEST:

Marie Schipper

Marie Schipper, Secretary

CERTIFICATE

STATE OF CALIFORNIA)
COUNTY OF MERCED) ss.
COMMUNITY OF WINTON)

I, Marie Schipper, Secretary of the Board of Directors of the Winton Water and Sanitary District, do hereby certify the foregoing Ordinance, No. 97-45, was duly passed and adopted at a Special Meeting of the Board of Directors of the Winton Water and Sanitary District on the 27th day of October 1997.

DATED: October 27, 1997

Marie Schipper

Marie Schipper, Secretary

Appendix F

Water Code Definitions

§ 10709. Water replenishment districts; assessments

For purposes of groundwater management, a local agency authorized to establish programs for the management of groundwater resources pursuant to this part may, in addition to the powers set forth in this act, exercise any of the powers of a water replenishment district under Part 4 (commencing with Section 60220) of Division 18 and may levy a water replenishment assessment in accordance with Part 6 (commencing with Section 60300) of Division 18. *(Added by Stats.1987, c. 472, § 1.)*

§ 10710. Replenishment assessments and extraction rates; authorization election

Before a local agency may levy a water replenishment assessment as authorized in Section 10709 or may otherwise fix and collect rates for the extraction of groundwater pursuant to this part, the local agency shall hold an election on the proposition of whether or not the local agency shall be authorized to levy a water replenishment assessment or to fix and collect rates for the extraction of groundwater, and a majority of the votes cast at the election shall be in favor of the proposition. The election shall be conducted in the manner prescribed by the principal act of the local agency. *(Added by Stats.1987, c. 472, § 1.)*

§ 10711. Agency boundaries; other agencies authorized to provide water service

No local agency shall exercise the powers authorized by this part within the boundaries of another local agency authorized by law to provide water service to any or all of the lands within its boundaries, without the prior agreement of the governing body of that other local agency. *(Added by Stats.1987, c. 472, § 1.)*

§ 10712. Agency boundaries; other agencies providing water service

No local agency shall exercise the powers authorized by this part within the boundaries of another local agency providing water service to any or all of the lands within its boundaries, without the prior agreement of the governing body of that other local agency. *(Added by Stats.1987, c. 472, § 1.)*

§ 10713. Annexations

If a local agency annexes land subject to a groundwater management program of another local agency, the local agency annexing the land shall continue to comply with the groundwater management program for the annexed property. *(Added by Stats.1987, c. 472, § 1.)*

§ 10714. Other groundwater basins

This part neither preempts, negates, affects, nor infers the existence of any powers of a local agency in other groundwater basins of the state to establish programs for the management of groundwater resources. *(Added by Stats.1987, c. 472, § 1.)*

§ 10715. Other powers

This part is in addition to, and not a limitation on, any powers of a local agency otherwise granted by law. *(Added by Stats.1987, c. 472, § 1.)*

§ 10716. Treasurer's approval under other acts

This part does not exempt any local agency formed under any act requiring the approval of its leases, contracts, or issuance of securities by the Treasurer from obtaining the report, investigation, and approval of the Treasurer as required by that act or by the District Securities Investigation Law of 1965.[1] *(Added by Stats.1987, c. 472, § 1.)*

[1] Repealed. See, Government Code former § 58750 et seq.

§ 10717. Duration of authority

A local agency shall no longer be authorized to exercise the powers conferred by this part upon the completion and implementation of a municipal central water system supplying water to the inhabitants within the boundaries of the local agency. *(Added by Stats.1987, c. 472, § 1.)*

Part 2.75

GROUNDWATER MANAGEMENT

CHAPTER 1. GENERAL PROVISIONS

§ 10750. Legislative findings, declarations and intent

The Legislature finds and declares that groundwater is a valuable natural resource in California, and should be managed to ensure both its safe production and its quality. It is the intent of the Legislature to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10750.2. Application of part

(a) Subject to subdivision (b), this part applies to all groundwater basins in the state.

(b) This part does not apply to any portion of a groundwater basin that is subject to groundwater management by a local agency or a watermaster pursuant to other provisions of law or a court order, judgment, or decree, unless the local agency or watermaster agrees to the application of this part. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10750.4. Adoption of groundwater management plan or program not required

Nothing in this part requires a local agency overlying a groundwater basin to adopt or implement a groundwater management plan or groundwater management program pursuant to this part. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10750.6. Authority of local agencies or watermaster to manage groundwater not affected

Nothing in this part affects the authority of a local agency or a watermaster to manage groundwater pursuant to other provisions of law or a court order, judgment, or decree. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10750.7. Management by local agencies within service area of another agency, water corporation or mutual water company without agreement prohibited; application of section

(a) A local agency may not manage groundwater pursuant to this part within the service area of another local agency, a water corporation regulated by the Public Utilities Commission, or a mutual water company without the agreement of that other entity.

(b) This section applies only to groundwater basins that are not critically overdrafted. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10750.8. Management by local agencies within service area of another agency without agreement prohibited; application of section

(a) A local agency may not manage groundwater pursuant to this part within the service area of another local agency without the agreement of that other entity.

(b) This section applies only to groundwater basins that are critically overdrafted. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10750.9. Groundwater management program; procedures to establish commenced prior to January 1, 1993; completion; amendment

(a) A local agency that commences procedures, prior to January 1, 1993, to adopt an ordinance or resolution to establish a program for the management of groundwater pursuant to Part 2.75 (commencing with Section 10750), as added by Chapter 903 of the Statutes of 1991, may proceed to adopt the ordinance

or resolution pursuant to * * * Part 2.75, and the completion of those procedures is deemed to meet the requirements of this part.

(b) A local agency that has adopted an ordinance or resolution pursuant to Part 2.75 (commencing with Section 10750), as added by Chapter 903 of the Statutes of 1991, may amend its groundwater management program by ordinance or resolution of the governing body of the local agency to include any of the plan components set forth in Section 10753.7. *(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), § 1.)*

§ 10750.10. Other powers

This part is in addition to, and not a limitation on, the authority granted to a local agency pursuant to other provisions of law. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

CHAPTER 2. DEFINITIONS

Section
10752. Definitions.

§ 10752. Definitions

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

(a) "Groundwater" means all water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water which flows in known and definite channels.

(b) "Groundwater basin" means any basin identified in the department's Bulletin No. 118, dated September 1975, and any amendments to that bulletin, but does not include a basin in which the average well yield is less than 100 gallons per minute.

(c) "Groundwater extraction facility" means any device or method for the extraction of groundwater within a groundwater basin.

(d) "Groundwater management plan" or "plan" means a document that describes the activities intended to be included in a groundwater management program.

(e) "Groundwater management program" or "program" means a coordinated and ongoing activity undertaken for the benefit of a groundwater basin, or a portion of a groundwater basin, pursuant to a groundwater management plan adopted pursuant to this part.

(f) "Groundwater recharge" means the augmentation of groundwater, by natural or artificial means, with surface water or recycled water.

(g) "Local agency" means any local public agency that provides water service to all or a portion of its service area, and includes a joint powers authority formed by local public agencies that provide water service.

(h) "Recharge area" means the area that supplies water to an aquifer in a groundwater basin and includes multiple wellhead protection areas.

(i) "Watermaster" means a watermaster appointed by a court or pursuant to other provisions of law.

(j) "Wellhead protection area" means the surface and subsurface area surrounding a water well or well field that supplies a public water system through which contaminants are reasonably likely to migrate toward the water well or well field. *(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), § 2.)*

CHAPTER 3. GROUNDWATER MANAGEMENT PLANS

Section
10753. Adoption or implementation of plan.
10753.2. Hearing; notice; resolution of intention to adopt plan.
10753.3. Publication of resolution of intention.
10753.4. Preparation of plan; adoption; expiration of resolution of intention.
10753.5. Second hearing; notice; protests to adoption of plan.
10753.6. Written protest; contents; majority protest.
10753.7. Plan components.
10753.8. Rules and regulations to implement and enforce plan.
10753.9. Potential impact of rules and regulations on business activities; consideration.

§ 10753. Adoption or implementation of plan

(a) Any local agency, whose service area includes a groundwater basin, or a portion of a groundwater basin, that is not subject to groundwater management pursuant to other provisions of law or a court order,

judgment, or decree, may, by ordinance, or by resolution if the local agency is not authorized to act by ordinance, adopt and implement a groundwater management plan pursuant to this part within all or a portion of its service area.

(b) Notwithstanding subdivision (a), a local public agency, other than an agency defined in subdivision (g) of Section 10752, that provides flood control, groundwater management, or groundwater replenishment, or a local agency formed pursuant to this code for the principal purpose of providing water service that has not yet provided that service, may exercise the authority of this part within a groundwater basin * * * that is located within its boundaries within areas that are either of the following:

(1) * * * Not served by a local agency.

(2) * * * Served by a local * * * agency * * * whose governing body, by a majority vote, declines to exercise the authority of this part and enters into an agreement with the local public agency pursuant to Section 10750.7 or 10750.8. *(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), § 3.)*

§ 10753.2. Hearing; notice; resolution of intention to adopt plan

(a) Prior to adopting a resolution of intention to draft a groundwater management plan, a local agency shall hold a hearing, after publication of notice pursuant to Section 6066 of the Government Code, on whether or not to adopt a resolution of intention to draft a groundwater management plan pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program.

(b) At the conclusion of the hearing, the local agency may draft a resolution of intention to adopt a groundwater management plan pursuant to this part for the purposes of implementing the plan and establishing a groundwater management program. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10753.3. Publication of resolution of intention

(a) After the conclusion of the hearing, and if the local agency adopts a resolution of intention, the local agency shall publish the resolution of intention in the same manner that notice for the hearing held under Section 10753.2 was published.

(b) Upon written request, the local agency shall provide any interested person with a copy of the resolution of intention. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10753.4. Preparation of plan; adoption; expiration of resolution of intention

The local agency shall prepare a groundwater management plan within two years of the date of the adoption of the resolution of intention. If the plan is not adopted within two years, the resolution of intention expires, and no plan may be adopted except pursuant to a new resolution of intention adopted in accordance with this chapter. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10753.5. Second hearing; notice; protests to adoption of plan

(a) After a groundwater management plan is prepared, the local agency shall hold a second hearing to determine whether to adopt the plan. Notice of the hearing shall be given pursuant to Section 6066 of the Government Code. The notice shall include a summary of the plan and shall state that copies of the plan may be obtained for the cost of reproduction at the office of the local agency.

(b) At the second hearing, the local agency shall consider protests to the adoption of the plan. At any time prior to the conclusion of the second hearing, any landowner within the local agency may file a written protest or withdraw a protest previously filed. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10753.6. Written protest; contents; majority protest

(a) A written protest filed by a landowner shall include the landowner's signature and a description of the land owned sufficient to identify the land. A public agency owning land is deemed to be a landowner for the purpose of making a written protest.

(b) The secretary of the local agency shall compare the names and property descriptions on the protest against the property ownership records of the county assessors.

(c) (1) A majority protest shall be determined to exist if the governing board of the local agency finds that the protests filed and not withdrawn prior to the conclusion of the second hearing represent more than 50 percent of the assessed value of the land within the local agency subject to groundwater management pursuant to this part.

(2) If the local agency determines that a majority protest exists, the groundwater plan may not be adopted and the local agency shall not consider adopting a plan for the area proposed to be included within the program for a period of one year after the date of the second hearing.

(3) If a majority protest has not been filed, the local agency, within 35 days after the conclusion of the second hearing, may adopt the groundwater management plan. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10753.7. Plan components

A groundwater management plan may include components relating to all of the following:

(a) The control of saline water intrusion.

(b) Identification and management of wellhead protection areas and recharge areas.

(c) Regulation of the migration of contaminated groundwater.

(d) The administration of a well abandonment and well destruction program.

(e) Mitigation of conditions of overdraft.

(f) Replenishment of groundwater extracted by water producers.

(g) Monitoring of groundwater levels and storage.

(h) Facilitating conjunctive use operations.

(i) Identification of well construction policies.

(j) The construction and operation by the local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.

(k) The development of relationships with state and federal regulatory agencies.

(*l*) The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10753.8. Rules and regulations to implement and enforce plan

(a) A local agency shall adopt rules and regulations to implement and enforce a groundwater management plan adopted pursuant to this part.

(b) Nothing in this part shall be construed as authorizing the local agency to make a binding determination of the water rights of any person or entity.

(c) Nothing in this part shall be construed as authorizing the local agency to limit or suspend extractions unless the local agency has determined through study and investigation that groundwater replenishment programs or other alternative sources of water supply have proved insufficient or infeasible to lessen the demand for groundwater. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10753.9. Potential impact of rules and regulations on business activities; consideration

In adopting rules and regulations pursuant to Section 10753.8, the local agency shall consider the potential impact of those rules and regulations on business activities, including agricultural operations, and to the extent practicable and consistent with the protection of the groundwater resources, minimize any adverse impacts on those business activities. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

CHAPTER 4. FINANCES

§ 10754. Local agencies; water replenishment district powers; fees and assessments

For purposes of groundwater management, a local agency that adopts a groundwater management plan pursuant to this part has the authority of a water replenishment district pursuant to Part 4 (commencing with Section 60220) of Division 18 and may fix and collect fees and assessments for groundwater management in accordance with Part 6 (commencing with Section 60300) of Division 18. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10754.2. Annual fees and assessments based on amount of groundwater extracted; payment of costs; remediation program excluded

(a) Subject to Section 10754.3, except as specified in subdivision (b), a local agency that adopts a groundwater management plan pursuant to this part, may impose equitable annual fees and assessments for groundwater management based on the amount of groundwater extracted from the groundwater basin

within the area included in the groundwater management plan to pay for costs incurred by the local agency for groundwater management, including, but not limited to, the costs associated with the acquisition of replenishment water, administrative and operating costs, and costs of construction of capital facilities necessary to implement the groundwater management plan.

(b) The local agency may not impose fees or assessments on the extraction and replacement of groundwater pursuant to a groundwater remediation program required by other provisions of law or a groundwater storage contract with the local agency. *(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), § 4.)*

§ 10754.3. Elections to authorize assessments or fees

Before a local agency may levy a water management assessment pursuant to Section 10754.2 or otherwise fix and collect fees for the replenishment or extraction of groundwater pursuant to this part, the local agency shall hold an election on the proposition of whether or not the local agency shall be authorized to levy a groundwater management assessment or fix and collect fees for the replenishment or extraction of groundwater. The local agency shall be so authorized if a majority of the votes cast at the election is in favor of the proposition. The election shall be conducted in the manner prescribed by the laws applicable to the local agency or, if there are no laws so applicable, then as prescribed by laws relating to local elections. The election shall be conducted only within the portion of the jurisdiction of the local agency subject to groundwater management pursuant to this part. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

CHAPTER 5. MISCELLANEOUS

§ 10755. Annexed land; compliance with plan

(a) If a local agency annexes land subject to a groundwater management plan adopted pursuant to this part, the local agency annexing the land shall comply with the groundwater management plan for the annexed property.

(b) If a local agency subject to a groundwater management plan adopted pursuant to this part annexes land not subject to a groundwater management plan adopted pursuant to this part at the time of annexation. the annexed territory shall be subject to the groundwater management plan of the local agency annexing the land. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

§ 10755.2. Coordinated plans for local agencies within same groundwater basin; joint powers agreements; agreements with public entities or private parties

(a) It is the intent of the Legislature to encourage local agencies, within the same groundwater basin, that are authorized to adopt groundwater management plans pursuant to this part, to adopt and implement a coordinated groundwater management plan.

(b) For the purpose of adopting and implementing a coordinated groundwater management program pursuant to this part, a local agency may enter into a joint powers agreement pursuant to Chapter 5 (commencing with Section 6500) of Division 7 of Title 1 of the Government Code with public agencies, or a memorandum of understanding with public or private entities providing water service.

(c) A local agency may enter into agreements with public entities or private parties for the purpose of implementing a coordinated groundwater management plan. *(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1993, c. 320 (A.B.1152), §5.)*

§ 10755.3. Meetings to coordinate plans

Local agencies within the same groundwater basin that conduct groundwater management programs within that basin pursuant to this part, and cities and counties that either manage groundwater pursuant to this part or have ordinances relating to groundwater within that basin, shall, at least annually, meet to coordinate those programs. *(Added by Stats.1992, c. 947 (A.B.3030), § 2. Amended by Stats.1995, c. 833 (S.B.1305), § 2.)*

§ 10755.4. Limitation on application of part

Except in those groundwater basins that are subject to critical conditions of groundwater overdraft, as identified in the department's Bulletin 118–80, revised on December 24, 1982, the requirements of a

groundwater management plan that is implemented pursuant to this part do not apply to the extraction of groundwater by means of a groundwater extraction facility that is used to provide water for domestic purposes to a single-unit residence and, if applicable, any dwelling unit authorized to be constructed pursuant to Section 65852.1 or 65852.2 of the Government Code. *(Added by Stats.1992, c. 947 (A.B.3030), § 2.)*

Part 2.8

AGRICULTURAL WATER MANAGEMENT PLANNING

Duration

Duration and operative effect of Part 2.8, see § 10855.

CHAPTER 1. GENERAL DECLARATIONS AND POLICY

Duration

Duration and operative effect of Part 2.8, see § 10855.

§ 10800. Short title

This part shall be known and may be cited as the Agricultural Water Management Planning Act. *(Added by Stats.1986, c. 954, § 1.)*

§ 10801. Legislative findings and declarations

The Legislature finds and declares as follows:

(a) The waters of the state are a limited and renewable resource.

(b) The Constitution requires that water in the state be used in a reasonable and beneficial way.

(c) Urban water districts, which represent more than 22,000,000 Californians and use less than 12 percent of the water consumed in the state, are required by Part 2.6 (commencing with Section 10610) to submit water management plans.

(d) More than 84 percent of the water used in the state is used for agricultural purposes.

(e) The conservation of agricultural water supplies are of great statewide concern.

(f) There is a great amount of reuse of delivered water, both inside and outside the water service areas.

(g) Significant noncrop beneficial uses are associated with agricultural water use, including streamflows and wildlife habitat.

(h) Significant opportunities exist in some areas, through improved irrigation water management, to conserve water or to reduce the quantity of highly saline or toxic drainage water.

(i) Changes in water management practices shall be carefully planned and implemented to minimize adverse effects on other beneficial uses currently being served.

(j) Agricultural water suppliers that receive water from the federal Central Valley Project are required by federal law to develop and implement water conservation plans.

(k) Agricultural water users applying for a permit to appropriate water from the State Water Resources Control Board are required to develop and implement water conservation plans. *(Added by Stats.1986, c. 954, § 1.)*

§ 10802. Legislative findings and declarations; state policy

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

(a) The conservation of water shall be pursued actively to protect both the people of the state and their water resources.

ballots upon which are printed the names of the candidates for office in said district. *(Added by Stats.1955, c. 1514, p. 2769, § 1.)*

§ 60213. Form of ballot

In counties in which districts are located the county clerk or registrar of voters is hereby given authority, and he hereby is authorized to have printed upon the official ballots provided for voters at elections for directors a heading in the same form as that provided by the Elections Code for nonpartisan officers, which heading shall be marked "Water Replenishment District," with a subheading "For a Member of the Board of Directors, Division ..... (here inserting the number of the division)—Vote for One," and beneath which shall appear the names of the candidates for the office of member of the board for such division of the district, with the appropriate blank space for the writing in of the name of a candidate if desired by the voters, and with a voting square placed opposite the space. The ballots thus provided shall be furnished by the precinct officers only to those voters within their respective precincts who shall appear on the register as duly registered voters within that division of the district, and in precincts which lie partly within such district and partly without the precinct board shall be supplied with two kinds of ballots by said county clerk or registrar of voters, one of which shall contain the matters hereinabove set forth for the use of voters of such district, and the other of which shall be without such heading containing the names of candidates for the office of member of the board, and which shall be furnished to those voters who are not voters of the district and who are voters of the precinct. *(Added by Stats.1955, c. 1514, p. 2769, § 1.)*

§ 60214. Call and canvass of elections

The board shall call and canvass all elections involving matters of initiative and referendum and shall call all other elections which it is authorized to canvass. *(Added by Stats.1955, c. 1514, p. 2770, § 1.)*

§ 60215. Compensation of election officers; precincts and polling places; appointment of election officers

The governing body calling or conducting any election under the provisions of this act shall fix the compensation to be paid the officers of the election and shall designate the precincts and polling places for each division of the district and shall appoint the officers of such election, who shall consist of one inspector, one judge, and two clerks, unless, in case of consolidated elections, other officers of election are required by law. *(Added by Stats.1955, c. 1514, p. 2770, § 1.)*

§ 60216. Precincts

The voting precincts for any such election may be established and the boundaries thereof fixed and described by such governing body, or such voting precincts may consist of either the regular election precincts or portions thereof within the district established for holding state or county elections, or a consolidation of any or all of such regular election precincts or portions thereof last established. *(Added by Stats.1955, c. 1514, p. 2770, § 1.)*

§ 60217. Precincts, polling places, and election officers in consolidated election

If any district election is consolidated with any state or county election, then the voting precincts, polling places, and election officers for the district election shall be the same as those established for such state or county election. *(Added by Stats.1955, c. 1514, p. 2770, § 1.)*

Part 4

POWERS

CHAPTER 1. PURPOSES AND POWERS

§ 60220. Replenishment of ground water; acts necessary

A district may do any act necessary to replenish the ground water of said district. *(Added by Stats.1955, c. 1514, p. 2770, § 1.)*

§ 60221. Replenishment of ground water; powers

Without being limited to the following enumerations, a district may, among other things but only for the purposes of replenishing the groundwater supplies within the district:

(a) Buy and sell water;

(b) Exchange water;

(c) Distribute water to persons in exchange for ceasing or reducing ground water extractions;

(d) Spread, sink and inject water into the underground;

(e) Store, transport, recapture, recycle, purify, treat or otherwise manage and control water for the beneficial use of persons or property within the district.

(f) Build the necessary works to achieve ground water replenishment. *(Added by Stats.1955, c. 1514, p. 2770, § 1. Amended by Stats.1995, c. 28 (A.B.1247), § 51.)*

§ 60222. Protection of water and water rights

A district may take any action necessary to protect or prevent interference with water, the quality thereof, or water rights of persons or property within the district, subject to the limitations contained in Section 60230. *(Added by Stats.1955, c. 1514, p. 2771, § 1.)*

§ 60223. Beneficial use of water

For the purposes of replenishing the ground water supplies within the district, a district may do any act in order to put to beneficial use any water under its control or management. *(Added by Stats.1955, c. 1514, p. 2771, § 1.)*

§ 60224. Protection and preservation of groundwater supplies

For the purpose of protecting and preserving the groundwater supplies within the district for beneficial uses, a district may take any action, within the district, including, but not limited to, capital expenditures and legal actions, which in the discretion of the board is necessary or desirable to accomplish any of the following:

(a) Prevent contaminants from entering the groundwater supplies of the district, whether or not the threat is immediate.

(b) Remove contaminants from the groundwater supplies of the district.

(c) Determine the existence, extent, and location of contaminants in, or which may enter, the groundwater supplies of the district.

(d) Determine persons, whether natural persons or public entities, responsible for those contaminants.

(e) Perform or obtain engineering, hydrologic, and scientific studies for any of the foregoing purposes. *(Added by Stats.1990, c. 389 (S.B.2016), § 3.)*

§ 60225. Actions outside the district

A district may take any action outside the district, including, but not limited to, those set forth in Section 60224, provided the board finds both of the following:

(a) The action is reasonably necessary to protect groundwater supplies within the district.

(b) There is a direct, material relationship between the groundwater supply where the action is to be taken and the groundwater supply within the district. *(Added by Stats.1990, c. 389 (S.B.2016), § 4.)*

§ 60226. District expenditures; recovery; fees and court costs; injunctive relief

A district may sue and recover the amount of any district expenditures under Section 60224 from the person or persons responsible for the contaminants causing the expenditures. In proceeding under any state or federal law, a district may recover those expenses from responsible persons and governmental insurance funds. In any action the district, if successful, may recover reasonable attorney's fees and court costs, as determined by the court. The right or power to recover damages shall not be deemed an adequate remedy at law precluding use of injunctive relief under this section or any other provision of this division or any other statute. In any action for injunctive relief relating to contaminants, no bond shall be required of a district as a condition to granting a preliminary injunction. *(Added by Stats.1990, c. 389 (S.B.2016), § 4.5.)*

CHAPTER 2. POWERS

§ 60230. Corporate and political powers

For the purposes of replenishing the groundwater supplies within the district, a district shall have power:

(a) To have perpetual succession.

(b) To sue and be sued, except as otherwise provided * * * in this division or by law, in all actions and proceedings in all courts and tribunals.

(c) To adopt a seal and alter it at pleasure.

(d) To take by grant, purchase, gift, devise, or lease, to hold, use and enjoy, and to lease, convey or dispose of, real and personal property of every kind, within or without the district, necessary or convenient to the full exercise of its power.

(e) Within or outside of the district to construct, purchase, lease, or otherwise acquire, and to operate and maintain necessary waterworks and other works, machinery and facilities, canals, conduits, waters, water rights, spreading grounds, lands, rights and privileges useful or necessary to replenish the underground water basin within the district, or to augment the common water supplies of the district, including, but not limited to, the exercise of any power under Section 60224.

(f) For the common benefit of the district, to store water in underground water basins or reservoirs within or outside of the district, to appropriate and acquire water and water rights within or outside of the district, to import water into the district, and to conserve water within or outside of the district.

(g) To carry out the purposes of this division, to commence, maintain, intervene in, defend and compromise, in the name of the district, or otherwise, and to assume the costs and expenses of any and all actions and proceedings now or hereafter begun to determine or adjudicate all or a portion of the rights to divert, extract, or use waters within the district, or within any segments thereof or subbasins therein, as between owners of or claimants to those rights, to prevent any interference with water or water rights used or useful to the lands, inhabitants, owners, operators, or producers within the district, or to prevent the diminution of the quantity or quality of the water supply of the district, or to prevent unlawful exportation of water from the district.

(h) To exercise the right of eminent domain to take any property necessary to supply the district or any portion thereof with replenishment water, including, but not limited to, the exercise of any power under Section 60224, except that the right of eminent domain may not be exercised with respect to (1) water and water rights already devoted to beneficial use, and (2) property (other than water and water rights) already appropriated to public use unless the taking be for a more necessary public use than that to which the property is already appropriated; provided that the district in exercising that power shall in addition to the damage for taking, injuring, or destruction of property also pay the cost of removal, reconstruction, or relocation of any structure, including, but not limited to, railways, mains, pipes, conduits, wires, cables, towers, or poles of any public utility which is required to be removed to a new location. No use by a district of property owned, at the time the action to condemn is brought, by an existing agency having powers to provide for the replenishment of groundwater, shall constitute a more necessary public use than the use to which the property is already appropriated.

A district shall not exercise the right of eminent domain to acquire property outside the boundaries of the principal county in which the district is situated unless it first obtains the consent thereto of the board of supervisors of the county in which the property is located.

(i) To act jointly with or cooperate with the United States or any agency thereof, and * * * cooperate and act jointly with the * * * state, or any county or agency thereof, or any political subdivision or district therein, including flood control districts, public and private corporations, and any person, to the end that the purposes and activities of the district may be fully and economically performed.

(j) To cause assessments and charges to be levied as * * * provided in this division to accomplish the purposes of this division and to maintain such reserve funds for the future purchase of water for replenishment purposes as * * * may be authorized to be levied.

(k) To make contracts, * * * employ labor, and * * * do all acts necessary for the full exercise of the foregoing powers.

(l) To carry on technical and other investigations of all kinds, necessary to carry out the provisions of this division, and for this purpose the district shall have the right of access through its authorized representative to all properties within the district.

(m) To borrow money and incur indebtedness and to issue bonds or other evidences of that indebtedness; * * * to refund or retire any indebtedness or lien that may exist against the district or property thereof; * * * to issue warrants to pay the formation expenses of the district, which * * * may bear interest at a rate not exceeding 6 percent a year from the date of issue until funds are available to pay the warrants, and which formation expenses may include fees of attorneys and others employed to conduct the formation proceedings, but shall not include the expenses of holding and conducting the formation election.

(n) To cause taxes to be levied, in the manner * * * provided in this division, for the purpose of paying any obligation of the district, including its formation expenses and any warrants issued therefor.

(o) To fix the rates at which water shall be sold for replenishment purposes, and to establish different rates for different classes of service or conditions of service, provided the rates shall be uniform for like classes and conditions of service.

(p) To fix the terms and conditions of any contract under which producers may agree voluntarily to use replenishment water from a nontributary source in lieu of groundwater, and to that end a district may become a party to the contract and pay from district funds that portion of the cost of the replenishment waters as will encourage the purchase and use of that water in lieu of pumping so long as the persons or property within the district are directly or indirectly benefited by the resulting replenishment. *(Added by Stats.1955, c. 1514, p. 2771, § 1. Amended by Stats.1961, c. 585, p. 1726, § 4; Stats.1975, c. 582, p. 1176, § 41; Stats.1990, c. 389 (S.B.2016), § 5.)*

§ 60231. Exercise of powers; facilities of existing agency

The powers and duties herein enumerated shall, except as herein otherwise expressly provided, be exercised and performed by the board of the district. In the event an existing agency has facilities available and adequate to accomplish any part of the purposes of a district created under this act, the district shall investigate and determine the cost of contracting for the accomplishment of such purpose through such existing agency. Thereupon, the board shall make a finding as to whether or not the purpose proposed to be accomplished by the district can be achieved more economically and for the best interests of the area to be benefited by entering into such a contract with an existing agency. If the board finds that such contract is more economical and for the best interests of the area to be benefited, it shall so contract for the accomplishment of said purpose, if such agency so agrees. The purpose of this section is to avoid duplication of similar operations by existing agencies and replenishment districts. *(Added by Stats.1955, c. 1514, p. 2773, § 1.)*

§ 60232. Necessary acts

Each district has the power generally to perform all acts necessary to carry out fully the provisions of this act. *(Added by Stats.1955, c. 1514, p. 2773, § 1.)*

Part 5

FINANCES

CHAPTER 1. DEPOSITARY

§ 60240. Money; deposit, investment, and withdrawal

Any money belonging to a district may be deposited or invested and drawn out as provided in Title 5, Division 2, Part 1, Chapter 4, Article 2 of the Government Code,[1] as now or hereafter amended. *(Added by Stats.1955, c. 1514, p. 2773, § 1.)*

[1] Government Code § 53630.

§ 60277. Canvass; declaration of result

The returns of such election shall be made, the votes canvassed by said board within seven days following said election, and the results thereof ascertained and declared in accordance with the provisions of the Elections Code, so far as they may be applicable, except as in this act otherwise provided. *(Added by Stats.1955, c. 1514, p. 2776, § 1.)*

§ 60278. Entry of result

The secretary of the board, as soon as the result is declared, shall enter in the records of such board a statement of such results. *(Added by Stats.1955, c. 1514, p. 2776, § 1.)*

§ 60279. Irregularities or informalities

No irregularities or informalities in conducting such election shall invalidate the same, if the election shall have otherwise been fairly conducted. *(Added by Stats.1955, c. 1514, p. 2776, § 1.)*

§ 60280. Actions to test validity; limitation

Any action or proceeding, wherein the validity of any such bonds or of the proceedings in relation thereto is contested, questioned or denied, shall be commenced within three months from the date of such election; otherwise, said bonds and all proceedings in relation thereto shall be held to be valid and in every respect legal and incontestable. *(Added by Stats.1955, c. 1514, p. 2776, § 1.)*

§ 60281. Favorable vote; provision for form, execution, and issuance; sale

If from such returns it appears that more than two-thirds of the votes cast at such election held pursuant to the provisions of this chapter were in favor of and assented to the incurring of such indebtedness, then the board may, by resolution, at such time or times as it deems proper, provide for the form and execution of such bonds and for issuance of any part thereof, and may sell or dispose of the bonds so issued at such times or in such manner, either for cash in lawful money of the United States or its equivalent, as it may deem to be to the public interest. *(Added by Stats.1955, c. 1514, p. 2776, § 1.)*

§ 60282. Force, value and use; tax exemption

Any bonds issued by any district are hereby given the same force, value and use as bonds issued by any city and shall be exempt from all taxation within the State of California. *(Added by Stats.1955, c. 1514, p. 2776, § 1.)*

Part 6

WATER REPLENISHMENT ASSESSMENT

CHAPTER 1. SURVEY

§ 60300. Engineering survey and report; time; contents

Not later than the second Tuesday in February each year the board shall order an engineering survey and report to be made regarding the ground water supplies of the district. The same shall include, among all other information and data which the board may require, the following:

(1) Records, data and other information for the consideration of the board in its determination of the annual overdraft;

(2) Records, data and other information for the consideration of the board in its determination of the accumulated overdraft as of the last day of the preceding water year;

(3) A report, with supporting data, as to the total production of ground water from the ground water supplies within the replenishment district during the preceding water year;

(4) A report, with supporting data, as to the changes during the preceding water year in the pressure levels or piezometric heights of the ground water contained within pressure-level areas of the replenishment district, and as to the effects thereof upon the ground water supplies within such replenishment district;

(5) An estimate of the annual overdraft for the current water year and for the ensuing water year;

(6) An estimate of the accumulated overdraft as of the last day of the current water year;

(7) An estimate of the total production of ground water from the ground water supplies within the replenishment district for the current water year and for the ensuing water year;

(8) An estimate of the changes during the current water year in the pressure levels or piezometric heights of the ground water contained within pressure-level areas of the replenishment district, and of the effects thereof upon the ground water supplies within such replenishment district;

(9) An estimate of the quantity, source, and cost of water available for replenishment of the ground water supplies during the ensuing water year under the provisions of Section 60315. *(Added by Stats.1955, c. 1514, p. 2776, § 1. Amended by Stats.1961, c. 585, p. 1729, § 5; Stats.1963, c. 309, p. 1085, § 5.)*

§ 60301. Statement of proposed action or alternate actions and estimated costs; inclusion in survey and report

If the district has received an engineering evaluation as to any matter within the powers of the district under Section 60224 and containing proposed action or alternate actions and estimated costs, including engineering and legal fees and expenses and district overhead, the board may, not later than the second Tuesday in February of each year, order the inclusion in the engineering survey and report referred to in Section 60300 of a statement of the proposed action or alternate actions and those estimated costs. *(Added by Stats.1990, c. 389 (S.B.2016), § 6.)*

CHAPTER 2. HEARINGS

§ 60305. Resolution to raise funds; manner of raising funds

On or before the second Tuesday in March of each year, and provided the survey and report called for by Section 60300 has been made, the board, by resolution, shall declare whether funds shall be raised to purchase water for replenishment during the next ensuing fiscal year and whether the funds shall be raised either by (a) a water charge, as provided in Chapter 2 (commencing with Section 60245) of Part 5 * * *, (b) a general assessment, as provided in Chapter 3 (commencing with Section 60250) of Part 5 * * *, (c) a replenishment assessment as provided in this chapter, or (d) a combination of any two or more * * * of the foregoing, and whether the funds so to be raised, whether by a water charge, a general assessment, a replenishment assessment or a combination of * * * those means, will benefit, directly or indirectly, all of the persons or real property and improvements within the district. The resolution shall also declare whether funds shall be raised to remove contaminants from groundwater supplies during the next ensuing fiscal year or to exercise any other power under Section 60224, and whether funds for that purpose shall be raised by a replenishment assessment as provided in this chapter, with a like statement of benefit. *(Added by Stats.1955, c. 1514, p. 2777, § 1. Amended by Stats.1990, c. 389 (S.B.2016), § 7.)*

§ 60306. Replenishment assessment; notice of hearing

If the board, by resolution, determines that all or a portion of the funds needed to purchase replenishment water, or to remove contaminants from the groundwater supplies of the district, or to exercise any other power under Section 60224, shall be raised by the levy of a replenishment assessment, then the board shall immediately publish a notice that a public hearing will be held on the second Tuesday of April for the purpose of determining whether and to what extent the estimated * * * costs thereof for the ensuing year shall be paid for by a replenishment assessment. The notice shall contain a copy of the board's resolution, the time and place of the hearing, and an invitation to all interested parties to attend and be heard in support of or opposition to the proposed assessment, the engineering survey and report, and the board's determination, and shall invite inspection of the engineering survey and report upon which the board acted. The notice shall be published in each affected county pursuant to Section 6061 of the Government Code, at least 10 days before the hearing date. *(Added by Stats.1955, c. 1514, p. 2778, § 1. Amended by Stats.1957, c. 357, p. 1058, § 211; Stats.1961, c. 585, p. 1729, § 6; Stats.1990, c. 389 (S.B.2016), § 8.)*

§ 60307. Hearing

Said hearing shall be held before the board and a quorum shall be present. The hearing may be adjourned from time to time by the president or presiding officer or hearing officer but shall be completed by the first Tuesday in May next following. *(Added by Stats.1955, c. 1514, p. 2778, § 1.)*

§ 60308. Hearing officer

The board may appoint a qualified registered engineer familiar with water problems as a hearing officer to conduct said hearing. *(Added by Stats.1955, c. 1514, p. 2778, § 1.)*

§ 60309. Evidence

All evidence relevant to the engineering survey and report and the board's determination that such a replenishment assessment shall be levied may be introduced. *(Added by Stats.1955, c. 1514, p. 2778, § 1.)*

CHAPTER 3. FINDINGS AND ORDER

§ 60315. Findings

Upon completing the hearing, but no later than the second Tuesday in May, the board shall, by resolution, find the following:

(a) The annual overdraft for the preceding water year.

(b) The estimated annual overdraft for the current water year.

(c) The estimated annual overdraft for the ensuing water year.

(d) The accumulated overdraft as of the last day of the preceding water year.

(e) The estimated accumulated overdraft as of the last day of the current water year.

(f) The total production of groundwater from the groundwater supplies within the * * * district during the preceding water year.

(g) The estimated total production of groundwater from the groundwater supplies within the * * * district for the current water year.

(h) The estimated total production of groundwater from the groundwater supplies within the * * * district for the ensuing water year.

(i) The changes during the preceding water year in the pressure levels or piezometric heights of the groundwater contained within pressure-level areas of the * * * district, and the effects thereof upon the groundwater supplies within * * * the district.

(j) The estimated changes during the current water year in the pressure levels or piezometric heights of the groundwater contained within pressure-level areas of the * * * district, and the estimated effects thereof upon the groundwater supplies within * * * the district.

(k) The quantity of water which should be purchased for the replenishment of the groundwater supplies of the * * * district during the ensuing water year.

(l) The source and estimated cost of water available for the replenishment.

(m) The estimated costs of replenishing * * * the groundwater supplies with the water so purchased.

(n) The estimated costs of purchasing, in water years succeeding the ensuing water year, that portion of the quantity of water which should be purchased for the replenishment of the groundwater supplies of the * * * district during the ensuing water year, but which is estimated to be unavailable for purchase during the ensuing water year; * * * estimated costs shall be based on the estimated price of water for replenishment purposes during the ensuing water year.

(o) The estimated rate of the replenishment assessment required to be levied upon the production of groundwater from the groundwater supplies within the * * * district during the ensuing fiscal year for the purposes of accomplishing the replenishment and providing a reserve fund to purchase in future years, when available, that portion of the quantity of water which should be purchased for the replenishment of the groundwater supplies of the * * * district during the ensuing water year, but which is estimated to be unavailable for purchase during that ensuing water year.

(p) Whether any contaminants should be removed from groundwater supplies during the ensuing fiscal year, and whether any other actions under Section 60224 should be undertaken during the ensuing fiscal year, the estimated costs thereof, and the estimated additional rate of replenishment assessment required to be levied upon the production of groundwater from the groundwater supplies within the district during the ensuing fiscal year for those purposes.

(q) Whether any program for removal of contaminants or other actions under Section 60224 should be a multiyear program or is a continuation of a previously authorized multiyear program. *(Added by Stats.1955, c. 1514, p. 2778, § 1. Amended by Stats.1961, c. 585, p. 1730, § 7; Stats.1990, c. 389 (S.B.2016), § 9.)*

§ 60316. Determination

Based on the findings pursuant to Section 60315, the board shall, by resolution, determine all of the following:

(a) What portion, if any, of the estimated cost of purchasing water for replenishment for the ensuing fiscal year shall be paid for by a replenishment assessment.

* * * (b) What portion, not exceeding 25 percent of the above portion, of the estimated cost of purchasing in the future that quantity of water which should be purchased during the ensuing water year, but which is estimated to be unavailable during that year, shall be raised by a replenishment assessment.

(c) What portion of the estimated costs of removing contaminants from groundwater supplies and of taking other actions under Section 60224 during the ensuing fiscal year shall be paid for by a replenishment assessment. *(Added by Stats.1955, c. 1514, p. 2779, § 1. Amended by Stats.1961, c. 585, p. 1731, § 8; Stats.1990, c. 389 (S.B.2016), § 10.)*

§ 60317. Levy on production of groundwater; payment by producers

If the board determines that a replenishment assessment shall be levied upon the production of groundwater from groundwater supplies within the * * * district during the ensuing fiscal year, * * * immediately following the making of that determination the board shall levy a replenishment assessment on the production of groundwater from the groundwater supplies within the * * * district during the fiscal year commencing on July 1st next, and the replenishment assessment shall be fixed by the board at a uniform rate per acre-foot of groundwater so produced. The producers of that groundwater shall pay the replenishment assessment to the * * * district at the times and in the manner * * * provided in this division. That part of the assessment levied pursuant to the determination provided in subdivision (c) of Section 60316, exclusive of any part thereof for district administrative and overhead expenses, shall not exceed 50 percent of the average assessment levied for the current and four preceding fiscal years pursuant to determinations under subdivisions (a) and (b) of Section 60316, exclusive of any part thereof for district administrative and overhead expenses. *(Added by Stats.1955, c. 1514, p. 2779, § 1. Amended by Stats.1990, c. 389 (S.B.2016), § 11.)*

§ 60317.5. Funds from replenishment assessments; uses

Except as set forth in this section, nothing in this division prevents the use of district funds from any source for powers and functions authorized under this division. That part of a replenishment assessment levied pursuant to determinations under subdivisions (a) and (b) of Section 60316 shall not be utilized for the direct costs of prevention and removal of contaminants under subdivisions (a) and (b) of Section 60224. Any part of a replenishment assessment levied pursuant to a determination under subdivision (c) of Section 60316 which is not expended may be obligated and expended for other uses authorized by Section 60224 after hearing and findings pursuant to Sections 60306 and 60315. Any part of a replenishment assessment levied pursuant to a determination under subdivision (c) of Section 60316 which remains unexpended and unobligated for five fiscal years after the last obligation thereof, or any shorter period which the board may by resolution determine, shall be deemed to have been levied for other costs and expenses for which a replenishment assessment is authorized under this division. Funds from a replenishment assessment, although restricted as to use, may be loaned for any use for which and within the monetary limits for which, such an assessment has been levied. Any such loan shall be for a period not longer than 18 months and shall bear interest, as nearly as practicable in the discretion of the board, at the rate which those funds might have otherwise been invested at the time of the loan. *(Added by Stats.1990, c. 389 (S.B.2016), § 12.)*

§ 60318. Groundwater contamination; programs to remedy; exemption from replenishment assessment; resolution by board; rescission or modification

If the board determines by resolution that there is a problem of groundwater contamination that a proposed program will remedy or ameliorate, an operator may make extractions of groundwater to remedy or ameliorate that problem exempt from any replenishment assessment if the water is not applied

to beneficial surface use, its extractions are made in compliance with all the terms and conditions of the board resolution, and the board has determined in the resolution either of the following:

(a) The groundwater to be extracted is unusable and cannot be economically blended for use with other water.

(b) The proposed program involves extraction of usable water in the same quantity as will be returned to the underground without degradation of quality.

The resolution may provide those terms and conditions the board deems appropriate, including, but not limited to, restrictions on the quantity of extractions to be so exempted, limitations on time, periodic reviews, requirement of submission of test results from a board-approved laboratory, and any other relevant terms or conditions. Upon written notice to the operator involved, the board may rescind or modify its resolution. The rescission or modification of the resolution shall apply to groundwater extractions occurring more than 10 days after the rescission or modification. Notice of rescission or modification shall be either mailed first-class mail, postage prepaid, at least two weeks prior to the meeting of the board at which the rescission or modification will be made to the address of record of the operator or personally delivered two weeks prior to the meeting. All board determinations shall be final. *(Added by Stats.1985, c. 537, § 1.)*

CHAPTER 4. COLLECTION OF ASSESSMENTS

§ 60325. Notice of levy; contents; mailing

The district, after the levying of the replenishment assessment, shall give notice thereof to the operators of all water-producing facilities in the district as disclosed by the records of such district, which notice shall state the rate of replenishment assessment for each acre-foot of ground water to be produced during the ensuing fiscal year. The notice may be sent by postal card or by other first-class mail with postage prepaid by the district. *(Added by Stats.1955, c. 1514, p. 2779, § 1.)*

§ 60326. Ground water production statement; filing; contents; additional reports

The operator of each water-producing facility within the district, on or before the last day of the month immediately following the respective quarterly periods ending March 31st, June 30th, September 30th, and December 31st of each year, shall file with the district a sworn statement setting forth the total production in acre-feet of ground water from such water-producing facility during the respective quarterly periods immediately preceding the filing of the respective statements, a general description or number locating such water-producing facility, and the method or basis of the computation of such ground water production. Each statement also shall contain such other information as the district may require. The first such statement required to be filed after the formation of such district shall cover the first calendar quarter commencing not less than thirty (30) days after such formation.

If the board by its resolution determines that additional reports or statements are necessary or useful to carry out the purposes of this act and to administer the replenishment of the ground water supplies within the district, then the board shall by its resolution so declare and shall give notice of the adoption of said resolution by immediately publishing the same in each effected county pursuant to Section 6061 of the Government Code. Effective thirty (30) days after such publication, the operator of each water-producing facility in such district shall file with the district the report or statement required by such resolution, at such times and in such manner and form as are provided in such resolution. *(Added by Stats.1955, c. 1514, p. 2779, § 1. Amended by Stats.1961, c. 585, p. 1731, § 9.)*

§ 60326.1. Water Replenishment District of Southern California; groundwater production reports from water-producing facilities

Notwithstanding Section 60326, the operator of each water-producing facility in the Water Replenishment District of Southern California shall file with the district, by the last day of the month following the statement period, a sworn statement declaring all of the following:

(a) The facility's total groundwater production, measured in acre-feet, during the month preceding the filing of the statement.

(b) A general description or number locating the facility.

(c) The method used to compute the groundwater production.

(d) Other information that the district may require. *(Added by Stats.1993, c. 52 (A.B.2235), § 1.)*

§ 60327. Quarterly payments; computation of amount

Any replenishment assessment levied pursuant to this act shall be due and payable to the district by each producer in quarterly installments on the last day for filing the statement of the production of ground water from the water-producing facility operated by such producer during the quarterly period required to be covered by such statement. The amount so due and payable shall be computed by multiplying the production in acre-feet of ground water so produced from such water-producing facility, as reported in such statement, by the rate of the replenishment assessment fixed and levied by the board of the district for the fiscal year in which such production shall occur. *(Added by Stats.1955, c. 1514, p. 2780, § 1.)*

§ 60327.1. Groundwater production assessments; calculation; payments to Water Replenishment District of Southern California

Notwithstanding Section 60327, each producer shall pay the Water Replenishment District of Southern California a replenishment assessment, imposed pursuant to this act, in monthly installments due on the last day for filing the groundwater production statement required by Section 60326.1. The assessment amount shall be computed by multiplying the facility's stated groundwater production, measured in acre-feet, by the replenishment assessment rate imposed by the district board for the fiscal year in which the production occurs. *(Added by Stats.1993, c. 52 (A.B.2235), § 2.)*

§ 60328. Refunds

The board shall authorize, and the district shall make, refunds in whole or in part of replenishment assessments theretofore paid, to any producer who has erroneously overstated his production of ground water in any sworn statement for a quarterly period required under the provisions of Section 60326, and who has overpaid his replenishment assessment for that quarter, but only upon compliance by the producer with the procedure hereinafter set forth and within the time hereinafter provided.

Any such producer, within one year of the last day for filing of the said sworn statement for the quarterly period in question, may file a verified application with the district on a form to be furnished by the district, containing such information as the district may require, requesting a refund of that portion of any replenishment assessment claimed to have been paid by reason of that producer's erroneous overstatement of ground water production. If incomplete information is contained in said application, or if the board desires other or further information then called for by that application, the same shall also be furnished by a verified statement within 30 days of mailing of written notice of request therefor to the producer at his address as shown by the district's records, or the application shall be deemed abandoned. Such request by the board shall not cause any application otherwise timely filed to be considered as not filed within said one-year period. The board may authorize, and the district may pay, any refund claimed without a hearing thereon, but no application shall be denied in whole or in part without a hearing being accorded to the applicant in which he shall have the burden of proof. Any determination by the board on any matter in connection with said application shall be final and conclusive upon the producer.

Any refund authorized to be paid under the provisions of this section may be paid only out of moneys realized from replenishment assessments levied pursuant to Section 60317, then or thereafter raised. Upon election of the producer, any refund determined by the board to be owing may be credited to the producer against any subsequent replenishment assessments which might become due and owing from him. No refunds shall be made except as authorized by this section. *(Added by Stats.1963, c. 253, p. 1014, § 1.)*

§ 60329. Quarterly payments; minimum

The board, by action uniformly applicable as to any quarter, and adopted prior to the commencement of the quarter, may provide that there shall not be due or payable any quarterly installment of less than three dollars ($3) otherwise payable by a producer under Section 60327 with respect to production of groundwater from all water-producing facilities operated by the producer during the quarterly period. *(Added by Stats.1985, c. 536, § 4.)*

CHAPTER 5. PENALTIES AND EXEMPTIONS

§ 60335. Tardy payment; interest

If any producer shall knowingly fail to pay a replenishment assessment within 30 days of when due, such producer shall become liable to the district for interest at the rate of 1 percent per month on the delinquent amount of the assessment. *(Added by Stats.1955, c. 1514, p. 2780, § 1. Amended by Stats.1961, c. 585, p. 1731, § 10.)*

§ 60336. Failure to register of file statement or other reports; penalty

Should any operator of a water-producing facility knowingly fail to register his water-producing facility or knowingly fail to file the ground water production statement, or knowingly fail to file and furnish any other reports or statements required by resolution of the board adopted pursuant to Section 60326, he shall, in addition to interest as provided in Section 60335, become liable to the district for a penalty of one hundred fifty dollars ($150). *(Added by Stats.1955, c. 1514, p. 2780, § 1. Amended by Stats.1961, c. 585, p. 1732, § 11.)*

§ 60337. Exemption from statement of production retirements

The board, at the time of fixing the replenishment assessment rate, may provide by resolution that any producer operating a water-producing facility having a discharge opening not greater than two inches in diameter and providing ground water for domestic or irrigation uses on an area not exceeding one acre in extent, shall pay the amount fixed in such resolution as the replenishment assessment to be paid by such producer. No sworn statement as to the production of ground water from such water-producing facility need be filed. *(Added by Stats.1955, c. 1514, p. 2781, § 1.)*

§ 60339. Injunctive relief; service of process; procedure

(a) The superior court of the county in which the major portion of the district lies may issue a temporary restraining order upon the filing by the district with the court of a verified petition or complaint setting forth that the person named therein as defendant is the operator of a water-producing facility which has not been registered with the district or that the defendant is delinquent in the payment of a replenishment assessment. The temporary restraining order shall be returnable to the court on or before ten (10) days after its issuance.

(b) The court may issue and grant an injunction restraining and prohibiting the named defendant from the operation of any water-producing facility when it is established by the preponderance of the evidence at a hearing that the defendant has failed to register the water-producing facility with the district or that the defendant is delinquent in the payment of a replenishment assessment. The court may provide that the injunction so made and issued shall be stayed for a period not to exceed 10 * * * days to permit the defendant to register the water-producing facility or to pay the delinquent replenishment assessment.

(c) Service of process shall be made by posting a copy of the summons and complaint upon the water-producing facility or the parcel of land upon which the water-producing facility is located and by personal service of * * * summons and complaint upon the named defendant.

(d) The right to proceed for injunctive relief as provided * * * in this section shall be in addition to any other right which may be provided elsewhere in this act or which may be otherwise allowed by law. The procedure provided in * * * Chapter 3 (commencing with Section 525) of Title 7 of Part 2 of the Code of Civil Procedure regarding injunctions shall be followed except insofar as it may be otherwise provided * * * in this section. * * * *(Added by Stats.1955, c. 1514, p. 2781, § 1. Amended by Stats.1982, c. 517, p. 2431, § 408.)*

§ 60340. Investigation and report; production limits; meters; determination of excess production; protest; hearing and determination; payment

If the board of a district shall have probable cause to believe that the production of ground water from any water-producing facility is in excess of that disclosed by the sworn statements covering such water-producing facility, or if no statements are filed covering a water-producing facility, the board of such district may cause an investigation and report to be made concerning the production of ground water from such water-producing facility. The board of the district may fix the amount of ground water production from any such water-producing facility at an amount not to exceed the maximum production capacity of such water-producing facility; provided, however, where a water-measuring device is permanently

attached thereto, the record of production as disclosed by such water-measuring device shall be presumed to be accurate and the burden is upon the district to establish to the contrary.

After such determination has been made by the board of the district, a written notice thereof shall be mailed to the operator of such water-producing facility at his address as shown by the district's records. Any such determination made by the district shall be conclusive on the operator, and on any producer producing water from such water-producing facility, and the replenishment assessment based thereon, together with interest and penalties, shall be payable forthwith, unless such operator or producer shall file with the board of directors of the district within ten (10) days after the mailing of such notice a written protest setting forth the ground or grounds for protesting the amount of production so fixed or the replenishment assessment, interest, and penalties so levied thereon. Upon the filing of such protest, said board shall hold a hearing at which time the total amount of the ground water production and the replenishment assessment thereon shall be determined, and the interest and penalties fixed, which action shall be conclusive if based upon substantial evidence. A notice of such hearing shall be mailed to protestant at least 10 days before the date fixed for the hearing. Notice of the determination by the board shall be mailed to each protestant. The producer shall have 20 days from the date of mailing of such notice to pay the replenishment assessment, interest and penalties so fixed by the board. *(Added by Stats.1955, c. 1514, p. 2782, § 1.)*

§ 60341. Delinquent assessments; action for collection; costs; penalties; attachment

The district may bring a suit in the court having jurisdiction against any producer of ground water from the ground water supplies within the district for the collection of any delinquent replenishment assessment, interest, or penalties. The court having jurisdiction of the suit may, in addition to any judgment, award interest and costs on any judgment as allowed by law. Should the district seek an attachment against the property of any named defendant therein, the district shall not be required to furnish bond or other undertaking as provided in Part 2, Title 7, Chapter 4 of the Code of Civil Procedure.[1] *(Added by Stats.1955, c. 1514, p. 2782, § 1. Amended by Stats.1961, c. 585, p. 1732, § 12.)*

[1] Code of Civil Procedure § 537 et seq.

§ 60342. Meters

It shall be unlawful to produce groundwater from any water-producing facility within any district from and after one year following the adoption of the resolution provided for in Section 60305 hereof, unless such water-producing facility shall have a water-measuring device affixed thereto capable of registering the accumulated amount of groundwater produced therefrom.

The board by resolution may extend such date on a year-to-year basis upon its determination that availability, price of water-measuring devices, or other circumstances justify such extension. Should the date be extended, notice thereof shall be published in the district pursuant to Section 6066 of the Government Code, such publication to be completed not less than two months prior to the date so extended.

This section shall not be applicable to any operator of a water-producing facility having a discharge opening two inches or less in diameter and providing groundwater for domestic or irrigation uses on an area not exceeding one acre in extent, who is required to pay a replenishment assessment in an amount fixed by resolution of the board of the district as hereinabove in this act provided.

Violation of this section shall be punishable by a fine not to exceed one thousand dollars ($1,000), or by imprisonment in the county jail for not to exceed six * * * months, or by both such fine and imprisonment. Each day of operation of a water-producing facility in violation hereof shall constitute a separate offense. *(Added by Stats.1955, c. 1514, p. 2783, § 1. Amended by Stats.1957, c. 357, p. 1059, § 212; Stats.1983, c. 1092, § 416, eff. Sept. 27, 1983, operative Jan. 1, 1984.)*

§ 60343. Resolution suspending date for affixing a water-measuring device; publication; revocation; notice

If another public entity, or public entities, or a watermaster, or watermasters, appointed in one or more court adjudications, or any combination of the foregoing (hereafter "other regulator or regulators") is monitoring by appropriate means the water production of substantially all water producers within the district, the board may, by resolution, indefinitely suspend the date for affixing a water-measuring device as referenced in Section 60342.

The suspension does not affect any requirements of any other regulator or regulators. The suspension may be revoked, and the date for affixing water measuring devices established, by further board resolution.

All resolutions adopted under this section shall be published in the district pursuant to Section 6006 of the Government Code. In the case of any revocation, the publication shall be completed not less than two

months prior to the operative date of the revocation. In the case of any revocation, notice of the operative date shall be given by first-class mail, postage prepaid, to operators at any address of record within the district within the time required for publication, but no defect in or failure to mail the notice to any operator affects the operative date of the revocation. *(Added by Stats.1985, c. 536, § 5.)*

CHAPTER 6. ADJUDICATION

§ 60350. Determination of natural safe yield; exemption from assessment of proportionate share of yield

Commencing with the third fiscal year following a final adjudication of all or substantially all of the rights to extract ground water and a determination of the natural safe yield of the ground water supplies within the district, and a determination of the amount or extent to which the rights to extract ground water so adjudicated may be exercised without exceeding the natural safe yield of such ground water supplies, the board of such district shall recognize such judicial determination by exempting from replenishment assessments the amount of water pumped by each person whose rights have been so adjudicated which does not exceed his proportionate share of the natural safe yield of the ground water supplies of the district, as so adjudicated from time to time by the court having jurisdiction over such adjudication proceeding. The replenishment assessment shall thenceforth be levied on each producer by multiplying the production in acre-feet of ground water so produced by such producer's water-producing facility in excess of his said adjudicated share of the natural safe yield by the rate of the replenishment assessment fixed and levied by the board for the fiscal year in which such production shall occur.

Upon such final adjudication, the board may, and within 90 days after receipt of a written notice from a producer shall, by resolution make a determination whether the adjudication will invoke the provisions of this section as of the beginning of the third fiscal year. Such determination is subject at any time to review de novo by any court of competent jurisdiction in any action for declaratory relief, or other appropriate action. *(Added by Stats.1955, c. 1514, p. 2783, § 1. Amended by Stats.1963, c. 253, p. 1015, § 3.)*

§ 60351. Property in waters distributed for replenishment purposes

To the extent that ground water supplies are replenished under this act no person shall acquire any property or other right in the waters distributed by the district for replenishment purposes. *(Added by Stats.1955, c. 1514, p. 2784, § 1.)*

§ 60352. Benefit of assessment

To the extent that the replenishment assessment after adjudication hereunder shifts from all producers to those who extract water in excess of their respective shares of the natural safe yield of the ground water supplies within the district as so adjudicated, such replenishment assessment shall be deemed to benefit those persons who continue to pump and extract ground water in excess of their adjudicated shares of the natural safe yield. Inasmuch as such persons must buy supplemental water or be in contempt of the court's order limiting their extraction of ground water, they shall be deemed to benefit by the payment of a replenishment assessment which is used to purchase water to supplement the natural supplies of ground water available for use. *(Added by Stats.1955, c. 1514, p. 2784, § 1.)*

Part 7

CHANGES IN ORGANIZATION

CHAPTER 1. INCLUSION

Appendix G

Powers Granted Under AB 3030

A. Rules and Regulations

The local agency is authorized to adopt rules and regulations to implement and enforce the Groundwater Management Program. The local agency may not limit or suspend extractions unless the local agency has determined through study and investigation that groundwater replenishment programs or other alternative sources of water supply have proved insufficient or infeasible to lessen groundwater demand. In adopting the rules and regulations, the local agency must consider the potential impact of those rules and regulations on business activities, including agricultural operations. In addition, to the extent practicable and consistent with groundwater resource protection, the local agency must minimize any adverse impacts on these business activities.

B. Financing

The local agency has the authority to levy and collect general groundwater replenishment assessments, as well as water extraction fees based on the amount of groundwater extracted from the aquifer (Water Code sections 10751 and 10760). These fees would pay for expenses incurred by the local agency for purposes of groundwater management including, but not limited to administrative expenses and real costs associated with the acquisition of replenishment water. These fees must be 'ratified" by the majority vote in an election according to the election rules applicable to the local agency.

C. Water Replenishment District

Pursuant to State Water Code sections 10750, et seq. (AB 3030) and conditioned upon the adoption of a Groundwater Management Plan, an agency may, in addition to those powers enumerated in AB 3030, also exercise many of the powers of a water replenishment district including, but are not limited to the following:

1. The local agency may do any act necessary to replenish the groundwater of the local agency. (Water Code sections 60220 and 6022 1) For example, the agency may, for the purpose of replenishing groundwater:

    a. Buy and sell water;

    b. Distribute water to persons in exchange for ceasing or reducing groundwater extractions;

    c. Spread, sink and inject water into the underground;

    d. Store, transport, capture, reclaim, purify, treat or otherwise manage and control water for the beneficial use of persons or property within the local agency; and

    e. Build the necessary works to achieve groundwater replenishment.

2. The local agency may take any action to protect or prevent interference with water, its quality or water rights of persons or property within the local agency, subject to limitations set forth in the Water Code. (Water Code section 60223)

3. The local agency may take any action necessary to put water under its control or management to beneficial use. (Water Code section 60223)

4. The local agency may take any action needed for and to preserve the water within the agency for beneficial uses based on water quality goals to prevent contaminants from entering the local agency's groundwater supplies, removing contaminants, locating and characterizing contaminants within the agency, identifying parties responsible for contamination of the groundwater, and performing studies relative to the water quality goals. (Water Code section 60224)

5. The local agency may take any action needed outside the local agency. including those set forth in the Water Quality Provisions, if these actions are required to protect the local agency's groundwater supplies, and there is a direct, material relationship between the groundwater where the action is taken and protect the local agency's groundwater. (Water Code section 60225)

6. The local agency may sue to recover the amount of the agency's expenditures for groundwater quality protection from the parties responsible for the contamination. (Water Code section 60226)

7. The local agency is granted additional powers of a Replenishment District, which allow it, pursuant to Water Code section 60230, to:

   a. Acquire and operate facilities, water and rights needed to replenish the groundwater supplies;

   b. Store water in groundwater basins, acquire water rights, import water into the local agency and conserve water;

   c. Participate in legal proceedings as required to defend water rights, and water supplies, and to prevent unlawful exportation of water from the local agency;

   d. Under certain conditions, to exercise the right of eminent domain;

   e. Act jointly with other entities in order to economically perform required activities;

   f. Carry out investigations required to implement programs;

   g. Fix rates for water replenishment purposes; and

   h. Fix the terms and conditions of contracts for use of surface water in lieu of groundwater.

8. The local agency must investigate the use of existing facilities of other agencies to carry out programs under the plan, and if economically feasible and in the best interests of the local agency, an attempt should be made to enter into a contract with the other agency for use of the facility. (Water Code section 60231)

Appendix H

Merced County Wellhead Protection Program

Executive Summary

Background

Merced County government, recognizing the importance of protecting its groundwater resource, applied for and received a grant from the U.S. Environmental Protection Agency to formulate a county-wide Wellhead Protection Program. After the EPA grant was approved, the Merced County Department of Public Health, Division of Environmental Health (DEH) selected Boyle Engineering Corporation (Boyle) to assist in preparing this most important program.

DEH staff worked closely with Boyle staff during the project to gather a great amount of data in basically two areas:

- Construction and location data of all existing public water system wells
- Miscellaneous information on actual and potential groundwater pollution sources throughout Merced County

The above data was summarized, tabulated, and plotted on U.S. Geological maps and on computer-based GIS mapping. This data provided the framework for the Wellhead Protection Program recommended in this report.

Report Organization

This report consists of the following documents:

- Report entitled, *Wellhead Protection Program*, dated April 1996.
- *Wellhead Protection Program, Appendix A (Large Water System Well Logs)*
- *Wellhead Protection Program, Appendix B (Small Water System Well Logs)*
- U.S. Geological maps of Merced County (showing public water system wells, potential pollution sources, and 10-year well capture zones).

The project report consists of four sections:

Section 1 presents detailed information on the project background and describes the project purpose. It describes the types and categories of public water systems that currently exist in Merced County. It explains how these water systems (and their wells) are being permitted involving the California Department of Health Services (DHS) and Merced County government. The section provides information on the protective Corcoran (E) clay layer in the county. All large public water systems regulated by DHS are individually described. Each well, based on construction, is classified as either vulnerable, less vulnerable, or not vulnerable. The same appraisal is made for all small groundwater systems and wells regulated by the DEH. The section also includes discussion on other wells such as private wells and agricultural irrigation wells. The concepts of "point pollution sources" versus

"nonpoint pollution sources" are explained. The existing Merced County Well Construction Ordinance is described as are city well ordinances and the State Water Well Standards.

Lastly, the section outlines EPA's requirements for formulating wellhead protection programs and provides information on available EPA publications related to wellhead protection programs and their formulations. Section 1 includes tables that show the occurrence of the E-clay, the depth to the clay, and the approximate thickness of this clay at various locations throughout the county. The large public water systems regulated by DHS are listed along with the number of wells each system owns and operates. Well construction and equipping information is provided for each large and small water system well. The data described in Section 1 was plotted on the U.S. Geological maps and on GIS.

Section 2 explains in detail what information was collected by DEH staff for large and small water system wells and what additional well information should be collected in the future on agricultural and privately owned wells. The section lists the information that was collected on the following sources of potential groundwater contamination:

- Sewage treatment plants
- Unsewered areas on private sewage disposal systems
- Confined animal waste production sites
- Sanitary landfills
- Auto dismantlers/car wrecking sites
- Storm water ponding basins
- Users/generators of hazardous materials/wastes
- Leaking underground tanks
- Dry cleaners
- Hazardous waste spill areas
- Known groundwater contamination plumes
- Shallow groundwater control and dry wells
- Planned groundwater recharge areas

Section 2 contains tables that summarize the data collected from the above outlined list of existing premises in Merced County that either are or may be impacting groundwater quality.

The end of Section 2 contains a list of additional types of premises that should be targeted by DEH staff for data collection and evaluation in the future. The data described in Section 2 was plotted on the U.S. Geological maps and on GIS as to location.

Section 3 provides information on project area hydrology and wellhead protection zone estimation for each public water system well. Section 3 provides general concept information for estimating the length and width of 10-year well capture zones using prevailing groundwater flow direction, groundwater slope, groundwater velocity, well pumping capacity, well duty cycle, and other considerations such as water level drawdown.

The estimated well capture zones for each public water system well were plotted on the U.S. Geological maps and on GIS.

Section 4 outlines the recommended Wellhead Protection Program Plan for the existing and future public water system wells. Information on agencies that might provide assistance to DEH in implementing a WHPP are cited. Other jurisdictions that have formulated WHPPs are listed. Reasons why DEH should be declared as the "Responsible County WHPP Agency" are given. Public awareness program alternatives are discussed to gain understanding, support, and cooperation for WHP implementation. The recommended priority and approach for WHP are provided

- Priority One - Existing active wells not yet polluted
  - Vulnerable
  - Semi-vulnerable
  - Not vulnerable
- Priority Two - Existing active wells already polluted
- Priority Three - Existing nonactive wells not yet polluted
- Priority Four - Existing nonactive wells already polluted
- Future Wells - As being proposed

A recommended program is outlined for the protection of future wells. Contingency planning for well owners and DEH is discussed. Additional County regulations that might become necessary are discussed such as revising the County Well Ordinance and consolidating administration of all septic tank/leach field installations under DEH.

The tables in Section 4 pinpoint which wells should be protected first based on vulnerability due to construction and existing land use within their respective well capture zones.

Summary

The purpose of the Merced County WHPP is to protect future and existing groundwater sources that supply public drinking water systems. The Merced County WHPP consists of the following elements:

- Specifies roles and duties of federal, state, local agencies, and water utilities with respect to groundwater protection.
- The plan delineates the wellhead protection areas for each public water system well.
- Sources of contamination and potential contamination are identified.
- The plan has developed approaches to protect the water supplies within wellhead protection areas.
- The plan identifies contingency plans for each public water supply system to respond to well or well field contamination.

- The plan identifies criteria for siting new wells.
- The plan includes a public awareness component.

The plan specifically details the following information as it relates to the WHPP for Merced County.

Item #1: Roles and Responsibilities

The WHPP identifies the following agency responsibilities for wellhead protection:

Agency	Responsibility
State Department of Health Services Division of Drinking Water and Environmental Management	Regulates public water systems over 200 connections.
State Regional Water Quality Control Board	Regulates wastewater treatment plants and animal confinement facilities. Issues NPDES permits.
State Department of Fish and Game	Responds to discharges into surface waters.
State Department of Toxic Substances Control	Issues permits to hazardous waste treatment facilities.
State Department of Water Resources	Develops minimum water well standards.
Local Agencies	
Public Water Systems Large (14)	Provides safe drinking water to consumers. Regulates discharges into the sanitary sewage systems.
Cities of Atwater, Dos Palos, Gustine, Livingston, and Merced	Enforces the city water well ordinance.
Public Water Systems Small (117)	Provides safe drinking water to consumers.
Irrigation/Drainage Districts (26)	Provides surface and groundwater for irrigation of farmlands
Merced County Agricultural Commissioner's Office	Permits application of pesticides.
Merced County Environmental Health	Regulates small water systems.
	Implements the county well ordinance. Permits all wells in the unincorporated areas of the county and the city of Los Banos.
	Regulates underground storage tanks.

Merced County Environmental Health	Regulates hazardous material/waste storage facilities.
	Oversees cleanup of leaking underground storage tank sites.
	Oversees cleanup of hazardous waste sites with DTSC approval.
	Implements the household hazardous waste program.
	Regulates active and closed sanitary landfills.
	Regulates the application of sludge pursuant to the County Sludge Ordinance.
	Permits on-site sewage systems.
	Permits septage haulers.
	Enforces the County Solid Waste Ordinance.
	Enforces the County Animal Confinement Ordinance.
	Implements a cross-connection control program for 10 large water systems.
	Maintains a list of all contamination sites in Merced County.
	Maintains a map of showing groundwater contamination areas of Merced County.
	Enforces medical waste regulations.

Item #2: Delineation of Wellhead Protection Areas

The plan recommends a 10-year wellhead capture zone for public water wells.

Item #3: Sources of Contamination

The sources and potential sources of contamination are identified in Section 2.

Item #4: Approaches to Protect Water Supplies

The plan requires strict enforcement of regulations potentially impacting groundwater quality by the appropriate regulatory agency, especially those activities that may be occurring within the 10-year capture zone.

Item #5: Contingency Plans

All large public water systems have existing contingency plans for responding to contamination problems. The majority of small public water systems only have one well and no backup source.

Item #6: Siting Criteria for New Wells

The plan recommends that the location of all new public wells be assessed by first identifying the 10-year capture zone. Once that is completed, existing contamination of potential contamination sources should be identified. If significant contamination sources exist, the well should not be constructed on the site. The well should meet the setback and construction requirements in the well ordinance. Adequate land use zoning practices must also be in place to protect the public water source.

Item #7: Public Awareness Program

The plan recommends the development of fact sheets, public meetings, press releases, phone hotlines, volunteer services, permitting and compliance assistance, and development of best management practice information.

Future Activities

The WHPP identifies the following major future activities:

- Formation of a countywide technical advisory committee for wellhead protection issues.
- Revision of the County Water Well Ordinance.
- Jurisdictions should revise zoning ordinances to allow for the review and approval of land uses within 10-year well capture zones for new wells.
- Develop a county cross-connection control program for irrigation wells.
- Submit the WHPP plan to DHS for consideration of the reduction or elimination of water sampling by public water systems.
- Consolidation of the on-site sewage system inspections under the DEH.
- All well ordinances within the county and adjacent to Merced County should be as consistent as possible and enforced uniformly.
- Submit the Wellhead Protection Program plan to the Merced County Board of Supervisors and the city councils for formal approval.

APPENDIX D

Water Shortage Contingency Plan
(Ordinance No. 1842)

ORDINANCE NO. 1842

AN ORDINANCE ADDING CHAPTER 15.42 TO THE MERCED MUNICIPAL CODE PROHIBITING CERTAIN USES OF WATER FOR WATER CONSERVATION PURPOSES AND DECLARING AN EMERGENCY

WHEREAS, a water shortage emergency exists because of shortage of water due to a prolonged drought; and

WHEREAS, this Council finds that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply to the extent that there would be insufficient water for human consumption, sanitation, and fire protection; and

WHEREAS, it is imperative to the public well-being that those uses of water which are not essential to public health, safety, or welfare be either prohibited or restricted; and

WHEREAS, the regulations and penalty rate structure hereinafter enacted is designed to discourage violations of the prohibitions hereinafter enacted and other nonessential or wasteful uses, encourage conservation, minimize peak load demands on City facilities, conserve the water supply of the City for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection, and to avoid the necessity of even more serious rationing measures; and

WHEREAS, the usage regulations hereinafter established will spread the burden of restricted usage most equally and equitably over all consumers of City water regardless of the category or type of use.

WHEREAS, the actions herein taken are exempt from the provisions of the California Environmental Quality Act of 1970 as a project undertaken as immediate action necessary to prevent or mitigate an emergency pursuant to Section 15071(c) of the State guidelines.

THE CITY COUNCIL OF THE CITY OF MERCED DOES ORDAIN AS FOLLOWS:

SECTION 1. ADDITION TO CODE. Chapter 15.42 is hereby added to the Merced Municipal Code to read as follows:

"CHAPTER 15.42
WATER SHORTAGE REGULATIONS

Section 15.42.010. DECLARATION OF EMERGENCY.

It is hereby found and declared that a water shortage and emergency exists within the water source and service area of the Water Department of the City of Merced, and that it is necessary to prohibit and regulate water uses as provided in this Chapter.

Section 15.42.020. APPLICATION OF REGULATIONS.

The provisions of this Chapter shall apply to all persons using water both in and outside the City served by the City water system, and regardless of whether any person using water shall have a contract for water service with the City.

Section 15.42.030. PROVISIONS SUPERSEDED.

Notwithstanding other Code provisions inconsistent with this Chapter, the provisions of this Chapter shall supersede and prevail for the duration of the emergency and until repeal of this Chapter.

Section 15.42.040. PROHIBITED USES.

It is unlawful for any person to use water obtained from the water system of the City of Merced through fraud, including misrepresentations made to obtain a particular allocation of water, or for any prohibited use as hereinafter defined:

A. The washing of sidewalks, driveways, filling station aprons, porches or other outdoor surfaces except when necessary to protect the public health and safety.

B. The washing of the exterior of dwellings, buildings, and structures, with the following exceptions:

1. Window washing.

2. Washing in conjunction with the painting of the exterior of a dwelling, building or structure.

3. Washing of a dwelling, building or structure may be allowed once every twelve months.

All exceptions listed above must comply with Section 15.42.090 (A. and B.) and the hose(s) must be fitted with an automatic shut-off device(s).

C. The operation of any ornamental fountain or other such structure making a use of water from the City domestic water system, unless said fountain or structure uses a recirculating water system.

D. The use of water, except for domestic use, where an adequate alternate source of water is available whether such

alternate source is reclaimed water, well water, spring water, or other source.

E. The external washing of trailers, trailer houses, mobile homes, and home exteriors unless in conjunction with painting the exterior of said trailers, or homes.

F. The washing of boats or motor vehicles in with a hose that is not fitted with an automatic shut off device.

G. The indiscriminate running of water or washing with water not otherwise prohibited above which is wasteful and without reasonable purpose.

Section 15.42.050. VARIANCES.

The Director of Public Works may grant variances for uses of water otherwise prohibited if he finds and determines that to fail to do so would cause an emergency condition affecting health, sanitation, or fire protection to the applicant or the public. His determination shall be final.

Section 15.42.060. DISCONNECTION FOR VIOLATION.

Any person within the water service area who is in violation of the water prohibition provisions of Section 15.42.040 shall be subject to immediate disconnection of water service and/or the installation of a meter at the violator's expense. Upon disconnection of water service a written notice shall be served upon the violator which shall state the time, place, and general

description of the violation or penalty, and the method by which reconnection can be made.

Section 15.42.070. RECONNECTION CONDITIONS.

Where water service has been disconnected as authorized in Section 15.42.050, the water service shall be immediately reconnected on condition that:

A. The Public Works Department be authorized by the appropriate person to install a water meter on the consumer's water service; and

B. An installation charge be paid for the installation of said meter in accordance with the Merced Municipal Code; and

C. A reconnection charge is paid in an amount fixed pursuant to the Merced Municipal Code Section 15.32.170.

Section 15.42.080. EQUIPMENT TAMPERING ILLEGAL.

It is unlawful for any person to remove, replace, alter or damage any water meter or components thereof including, but not limited to, the meter face, its dials or other water usage indicators.

Section 15.42.090. PROHIBITED USES - MANDATORY.

The following uses, methods, types or techniques of use of water are hereby determined and declared non-essential and are prohibited:

A. ALL USERS.

1. Allowing broken or defective plumbing, or sprinklers, watering or irrigation systems which permit the escape or leakage of water.

2. The use of water in any manner which causes, allows, or permits the flooding of any premises, or any portion thereof.

3. All uses of non-potable water without the permission of the Public Works Department.

B. GARDENS AND LANDSCAPING

1. Any sprinkling, watering or irrigation between the hours of 11:00 a.m. and 7:00 p.m.

2. Any watering by persons with even numbered addresses is prohibited on Sunday, Wednesday and Friday.

3. Any watering by persons with odd numbered addresses is prohibited on Tuesday, Thursday and Saturday.

4. Any watering by persons on Monday.

C. NEW PLANTING. Notwithstanding the prohibitions contained in B. above, new lawns, ground cover, or bedding plants, may be watered every day between 7:00 p.m. and 11:00 a.m. provided the following conditions are met:

1. New lawns, ground cover, or bedding plants shall not include the reseeding of existing lawns or replacement of existing ground cover, or bedding plants, and shall be newly rototilled earth.

2. A permit must be obtained from the Department of Public Works and a $10.00 permit fee paid.

3. The permit shall be limited to thirty (30) days duration.

4. The Director of Public Works may impose such other restrictions as are deemed necessary to prevent the waste of water.

Section 15.42.100. IMPLEMENTATION.

A. The Director of Public Works is hereby authorized and empowered to delegate his authority hereunder to such deputies, officers, employees, or agents of the City as he shall designate, and to establish such rules, regulations, and procedures, and to prepare or furnish such forms, warnings, et cetera as he deems necessary or appropriate to carry out the provisions of this Chapter.

B. Upon a determination by the Director of Public Works, or his designee, that a person has consumed or used water in violation of any of the mandatory provisions of this Chapter, or of any exception granted pursuant to the provisions of Section 15.40.080 hereof, the Director may issue an Order to Cease and Desist from such violation, and further order such person to comply forthwith with such provisions or exceptions, or otherwise to take appropriate remedial or preventive action. Any Cease and Desist Order may be served personally, by mail, or by leaving a copy at or posted upon the person's residence or place of business.

C. If, after the issuance of such Cease and Desist Order, such person continues to consume or use, or again consumes or uses, water in violation of any such provision or exception, the Director may issue a Notice of Intention to Impose a Penalty. Said Notice shall:

(1) Identify the date, time and circumstances of violation,

(2) State the amount of penalty to be imposed, and

(3) Advise the person of the appeal rights as provided herein.

The Notice of Intention to Impose a Penalty shall be served in the same manner as the Cease and Desist Order.

D. After a Notice of Intention to Impose a Penalty is served, a penalty shall be assessed to the utility account of the person in the amount of $25 for the first violation, $50 for the second violation and $100 for the third and each of any subsequent violations. The penalty shall be subject to collection in the same manner as any unpaid water service charges.

E. A person shall have the right to appeal the imposition of the penalty assessed to the utility account. The person must request an appeal hearing in writing within fifteen (15) days from the date of service of the Notice of Intention to Impose a Penalty. The request for hearing must be addressed to the Public Works Director and shall be deemed served only when received by the City.

Failure to properly serve the request for hearing within the fifteen day period shall be deemed a waiver of the right to appeal the matter, and the penalty will be assessed against the person's account.

F. The appeal hearing shall be held before the Public Works Director, or his designee, who shall make a factual finding on the existence of a violation. The person to be assessed shall be allowed to present such witnesses and evidence as he or she may desire and may be represented by an attorney or other representative of his or her choosing. The hearing officer shall give written notice by first class mail of the date and time of the appeal hearing at least ten (10) days prior thereto. Said hearing shall be held not later than thirty (30) days from receipt of the request for hearing unless continued by mutual consent of the person to be assessed and the hearing officer. The decision of the hearing officer shall be final. If a violation is found, the penalty shall be assessed to the utility account."

SECTION 2. REPEAL OF PRIOR ORDINANCE. Ordinance No. 1781 is hereby repealed.

SECTION 3. DECLARATION OF URGENCY. This Ordinance is declared to be an emergency measure adopted pursuant to the provisions of the Merced City Charter and is necessary for preserving the public peace, health, safety, and property, and the

general welfare and the urgency for its adoption is set forth in the findings above.

SECTION 4. EFFECTIVE DATE. This ordinance shall take effect immediately upon adoption and shall remain in effect until rescinded by the City Council of the City of Merced.

SECTION 5. PUBLICATION. The City Clerk is directed to cause a copy of this ordinance to be published in the official newspaper at least once within fifteen (15) days after its adoption.

The foregoing ordinance was introduced and adopted at a regular meeting of said Council held on the 19th day of January _____, 1993, by the following called vote:

AYES:	Council Members:	BERGMAN, BERNASCONI, KNUDSEN, DIAS, HASSETT, LINDSEY
NOES:	Council Members:	NONE
ABSTAIN:	Council Members:	NONE
ABSENT:	Council Members:	NONE (one vacancy)

APPROVED:

Mayor

ATTEST:

JAMES G. MARSHALL, CITY CLERK

BY: Deputy City Clerk

(SEAL)

C15WTRCON

APPENDIX E

Economic Analysis of Best Management Practices

Table E-1. Definition of Terms Used in the Economic Analysis

Term	Definition	Comments
GENERAL:		
Interventions	Actions or activities required to implement each BMP.	An example is the survey at a single family dwelling unit to evaluate the plumbing fixtures to determine the plumbing retrofit necessary for BMP 2.
BENEFITS:		
Avoided Capital Costs	Capital costs that are avoided by implementing the BMP.	An example is the cost of a well that would not have to be installed due to implementation of the BMP.
Avoided Variable Costs	Variable costs that are avoided by implementing the BMP.	An example is the cost of electricity that would be saved if the BMP were implemented.
Avoided Purchase Costs	Purchase costs that are avoided by implementing the BMP.	An example is the cost of purchasing water that would not be needed due to implementation of the BMP.
Total Undiscounted Benefits	The sum of avoided capital costs, avoided variable costs and avoided purchase costs.	--
Total Discounted Benefits	The present value of the sum of avoided capital costs, avoided variable costs and avoided purchase costs.	An annual percentage rate consisting of the cost of borrowing money minus the inflation rate.
COSTS:		
Capital Costs	Capital costs incurred by implementing the BMP.	For example, the cost to purchase and install meters for BMP 4.
Financial Incentives	The cost of financial incentives paid to connections.	Copay or distribution for purchasing low-flow plumbing devices or washing machines are examples of financial incentives.
Operating Expenses	Operational expenses incurred during implementation of the BMP.	For example, the administrative, overhead, and installation costs for implementing a BMP.
Total Undiscounted Costs	The sum of capital costs, financial incentives, and operating expenses.	--
Total Discounted Costs	The present value of the sum of capital costs, financial incentives, and operating expenses.	The discount rate is used to calculate discounted costs from undiscounted costs.
Net Present Value (NPV)	Total discounted benefits minus total discounted costs.	A value greater than zero indicates an economically justifiable BMP.
RESULTS:		
Benefit to Cost Ratio	The sum of the total discounted benefits divided by the sum of the total discounted costs.	A ratio greater than one indicates an economically justifiable BMP.
Simple Pay-Back Period	The number of years required for the benefits to pay back the costs of the BMP, calculated as the sum of the total discounted costs divided by the average annual total discounted benefits.	A low value is considered economically attractive.
Discounted Cost/Water Saved	The present-value cost to save one acre-foot of water, calculated as the sum of the total discounted costs divided by the total acre-feet of water saved over the study period.	A low value is considered economically attractive because it indicates a low implementation cost. Value must be less than the marginal cost of new water to be cost effective.
Net Present Value/Water Saved	The net value of saving one acre-foot of water, calculated as the sum of the net present value divided by the total acre-feet of water saved over the study period.	A high value is considered economically attractive.

Table E-2. Assumptions Used for Economic Analysis of Water Conservation BMPs City of Merced

BMP 1 – Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers

Description: Conduct water surveys that include both indoor and outdoor components. Provide recommendations and install plumbing retrofit devices where needed.

Assumptions:

1. The implementation schedule is assumed to be as defined for agencies signing the MOU in the year 2005.

2. Number of surveys necessary to complete is 15% of the baseline number of housing units in 2005. 15% of single-family units and 15% of multi-family units will be surveyed within 10 years of the date implementation is to commence. Surveys will be conducted according to the following schedule: 1.5% by end of the first reporting period, 3.6% by end of second reporting period, 6.3% by end of third reporting period, 9.6% by end of fourth reporting period, and 15% by end of the fifth reporting period.

MOU, page 16 and page 17 Section E.d. California legislation requires that plumbing fixtures manufactured, sold or installed after early 1992 be low-water-use fixtures. Therefore, the greatest water savings can be achieved in pre-1992 homes.

3. Single-family water usage = 825 gpd/unit (60% is outdoor use)

Single-family water usage was calculated based on historical water use and the number of single-family households. The average monthly indoor water use is assumed to be equivalent to the average of 90 percent of the total water used in the lowest water use month in 1997 as provided by City of Merced. Outdoor water use is calculated as the difference between annual total use and the assumed annual indoor water use. The result was 56% outdoor water use; however, due to the lack of historical data, this result was increased slightly based on comparisons with other cities with similar demographics.

4. Multi-family water usage = 325 gpd/unit (40% is outdoor use)

Multi-family water usage was calculated based on historical water use and the number of multi-family households. The average monthly indoor water use is assumed to be equivalent to the average of 90 percent of the total water used in the lowest water use month in 1997 as provided by City of Merced. Outdoor water use is calculated as the difference between annual total use and the assumed annual indoor water use. The result was 56% outdoor water use; however, due to the lack of historical data, this result was decreased based on comparisons with other cities with similar demographics

5. Water savings from indoor leak detection, not including toilet leaks = 0.5 gpd per residence

A & N Technical Services report (2000, page 2-20) (12.4 gpd per household repair; 4 percent of households audited have leaks).

6. Water surveys decrease outdoor water use by 10%

MOU estimate is 10% (page 18, Section F).

7. Each water survey costs $55.00

This cost estimate is based on the Southern California Water Company (SCWC) pilot exemption request filed with the CUWCC and dated June 29, 1999. The estimate includes marketing, contract labor, SCWC labor, overhead and materials. It is assumed that the City's cost would be similar to SCWC's. It is assumed that this BMP is done in conjunction with BMP 2.

8. The life span of a water survey is four years.

A & N Technical Services report (2000, page 2-20) gives life spans for various components of a water survey. Four years was selected as a reasonable average value based on that information.

9. Water savings from indoor plumbing retrofits are tracked under BMP 2. Only water savings from a decrease in outdoor water use and water savings from indoor leak detection are tracked in BMP 1 to avoid double counting of water savings.

Table E-2. Assumptions Used for Economic Analysis of Water Conservation BMPs
City of Merced

BMP 2 – Residential Plumbing Retrofit

Description: Install plumbing retrofit devices in single- and multi- family residences.

Assumptions:

1. Plumbing retrofit devices will be installed at a minimum of 10% of residences per reporting period until it can be demonstrated that 75% of pre-1992 single-family residences and 75% of pre-1992 multi-family residences have low flow showerheads (LFSHs).

MOU, page 19.

2. 22.5% of residences have low-water-use fixtures.

We estimate, based on professional judgement, that 45% of plumbing fixtures in pre-1992 residences have been replaced with low-water-use fixtures due to natural attrition. Assuming that one-half of these plumbing fixtures have replaced all fixtures in some pre-1992 residences and one-half of these plumbing fixtures are spread out, replacing only a portion of the fixtures in some pre-1992 residences, then 22.5 percent of pre-1992 residences already have low-water-use fixtures.

3. It will take approximately 10.5 years to demonstrate that 75% of residences have LFSHs.

We are assuming that two LFSHs in a residence must be replaced to meet MOU requirements. If 22.5% of the residences have low-water-use fixtures, then 52.5% of the pre-1992 residences must still be replaced. At 5% of the residences replaced per year (10% replaced per reporting period) it would take 10.5 years to demonstrate that a total of 75% of residences have LFSHs.

4. There are an average of 1.1 showers, 1.6 toilets, and 2.4 faucets (1 kitchen faucet and 1.4 other faucets) per residence.

For BMP 14, we determined that there is an average of 1.6 toilets per residence (see BMP 14 for details). Based on professional judgement, we assumed there are two-thirds the number of showers as toilets, and 1.5 times the number of faucets as toilets. This assumption will be modified based upon updated data gathered in the future.

5. Water savings from one low-flow showerhead = 5.5 gpd

A & N Technical Services report (2000, page 2-16).

6. Water savings from one faucet aerator = 1.5 gpd

A & N Technical Services report (2000, page 2-16).

7. Water savings from one toilet flapper = 8 gpd; assume 20 percent of toilets leak.

A & N Technical Services report (2000, page 2-16). Percentage of toilets with leaks based on SCWC data.

8. Water savings from kitchen "flip" faucet aerator = 3.0 gpd.

Based on SCWC data. Kitchen faucet water savings are due to the intermittent use of the flip feature during the rinse cycle.

9. Indoor water savings = 13.7 gpd/unit.

We used the following equation to calculate indoor water savings, based on assumptions 4 through 8:

$$[(1.1*5.5) + (1.0*3.0+1.4*1.5) + (1.6*8*0.20)]$$

10. The BMP will cost an average of $20.00 per residence.

We based this cost estimate on information provided by SCWC. It is assumed that this BMP is done in conjunction with BMP 1.

11. The life span of the retrofit devices is four years.

A & N Technical Services report (2000, page 2-16) gives life spans for various components of a water survey. We selected four years as a reasonable average value based on that information.

Table E-2. Assumptions Used for Economic Analysis of Water Conservation BMPs City of Merced

BMP 5 – Large Landscape Conservation Programs and Incentives

Description: Conduct water surveys for accounts with large landscaped areas including schools, cemeteries, parks, and civic centers. Provide recommendations for water conservation.

Assumptions:

1. ETo-based water use budgets will be developed for 90 percent of the CII accounts with dedicated irrigation meters by the end of the second reporting period (22.5 percent per year for four years).

MOU (Page 28, Section C.a.)

2. Water surveys will be offered to 20 percent of the CII accounts with mixed use or no meters every reporting period (10 percent per year).

MOU (Page 28, Section C.b.)

3. Irrigation water use surveys will be completed for 15 percent of CII accounts with mixed use or no meters within 10 years of the date implementation was to commence. An agency will be considered on track if the percent of CII accounts with mixed use or no meters receiving landscape water use equals or exceeds the following: 1.5% by end of the first reporting period, 3.6% by end of second reporting period, 6.3% by end of third reporting period, 9.6% by end of fourth reporting period, and 13.5 percent by end of the fifth reporting period. 15% must be reached by the end of the fifth reporting period.

MOU (Page 29, Section E.d.)

4. There are 118 dedicated landscape accounts and 1,158 CII mixed use accounts.

This is based on data provided by the City of Merced.

5. Dedicated landscape accounts are an average size of 19.4 acres.

This is based on data provided by the City of Merced.

6. CII mixed use account landscape areas are assumed to be an average of 0.5 acre in size.

This is based on professional judgement.

7. Water use prior to the survey is 5.1 ft per year.

Irrigation allocation is equal to 100 percent of local evapotranspiration (ETo), and the MOU estimates that surveys will reduce water usage by 15 percent. The local ETo was determined (54.4 inches/year based on California Irrigation Management Information System data [CIMIS, 2005]) and multiplied by 1.15 to obtain 62.6 inches (5.2 ft) per year for current water use. This is the most conservative approach for the economic analysis.

8. Surveys will reduce water usage by 15%.

MOU, Section F, page 30.

9. The life span of the large landscape water surveys is four years.

A & N Technical Services report (2000) gives a life span of four years for turf audits (page 2-20). It is assumed that water surveys for large landscapes will have a similar life span.

10. Each survey will cost $250 per acre.

This estimate is based on information presented in Cal Poly's 1988/89 annual report on their landscape water management program. The estimate includes labor, administration, evaluation and overhead.

Table E-2. Assumptions Used for Economic Analysis of Water Conservation BMPs
City of Merced

BMP 6 – High-Efficiency Washing Machine Rebate Programs
Description: Provide rebates to single-family residences for high-efficiency washing machines.
Assumptions 1. Each rebate will cost $75. *The MOU does not require implementation of this BMP if the maximum cost-effective rebate is less than $50 (MOU, page 31). A $50 rebate plus an additional $25 per rebate for program administration and overhead was assumed.* 2. Each high efficiency washing machine will reduce water usage by 1,170 gallons per year. *MOU, Section F, page 38.* 3. Rebates will be accepted by one percent of single-family residences per year for 20 years. *Estimate based on professional judgement.* 4. The life span of a high efficiency washing machine is 12 years. *Pekelney, D.M., T.W. Chesnutt, and W.M. Hanemann. 1996. Guidelines for Preparing Cost Effective Analysis of Urban Water Conservation Best Management Practices. Prepared for the California Urban Water Conservation Council. September 1996.*

Table E-2. Assumptions Used for Economic Analysis of Water Conservation BMPs
City of Merced

BMP 9 – Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Description: Implement a program to conduct water-use surveys and customer incentives programs for CII customers.

Assumptions:

1. Water-use surveys will be conducted at 10% of CII accounts within 10 years of the date implementation is to commence. Surveys will be conducted according to the following schedule: 0.5% of the total number of surveys required by the end of the first reporting period, 2.4% by end of second reporting period, 4.2% by end of third reporting period, 6.4% by end of fourth reporting period, and 10% by the end of the fifth reporting period. Those customers will also be included in an incentives program.

MOU, page 37 and page 40, Section E.b.3

2. Ultra-low-flush toilets (ULFT) in CII establishments will be replaced to produce water savings over a 10 year implementation period equal to 15% of total water savings potential as determined in Table E-2. Economic Analysis Worksheets.

MOU, BMP 9, A.(b)ii.

3. Given the choice to implement BMP 9 A (c) or (d), we have selected to implement (c), CII Water Use Survey and Customer Incentives program.

MOU BMP 9, A.(c)

4. The life span of a water survey is four years.

It was assumed that the life span for a CII water survey is the same as the life span for a residential survey. A & N Technical Services report (2000, page 2-20) gives life spans for various components of a residential water survey. Four years was selected as a reasonable average value based on that information.

5. The average annual water savings resulting from a commercial and institutional water survey is 0.83 acre-feet per account.

A & N Technical Services report (2000, page 2-35) gives average annual water savings for three types of surveys; "analyst surveys", "consultant surveys" and "water efficiency studies". Analyst surveys are conducted by non-engineers, consultant surveys are conducted by engineers for sites that have process water, and water efficiency studies are conducted at major industrial facilities that use very large quantities of water. For purposes of this economic analysis, it was assumed that only analyst surveys will be conducted for commercial and institutional account surveys. Values for water savings in the A & N report represent the maximum potential water savings that could occur if a customer were to implement every possible water conservation measure. Experience has shown that approximately 25% of the maximum potential water savings is actually realized, which is what was assumed (personal communication with John Sweeten, Metropolitan Water District, 5-9-00.)

6. The average annual water savings resulting from an industrial water survey is 2.1 acre-feet per account.

A & N Technical Services report (2000, page 2-35) gives average annual water savings for three types of surveys; "analyst surveys", "consultant surveys" and "water efficiency studies". Analyst surveys are conducted by non-engineers, consultant surveys are conducted by engineers for sites that have process water, and water efficiency studies are conducted at major industrial facilities that use very large quantities of water. For purposes of this economic analysis, it was assumed that only consultant surveys will be conducted for industrial account surveys. Values for water savings in the A & N report represent the maximum potential water savings that could occur if a customer were to implement every possible water conservation measure. Experience has shown that approximately 25% of the maximum potential water savings is actually realized, which is what was assumed (personal communication with John Sweeten, Metropolitan Water District, 5-9-00.)

Table E-2. Assumptions Used for Economic Analysis of Water Conservation BMPs
City of Merced

BMP 9 – Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts
Description: Implement a program to conduct water-use surveys and customer incentives programs for CII customers.
(Continued) 7. Each analyst survey (for commercial and institutional accounts) will cost an average of $680 and each consultant survey (for industrial accounts) will cost an average of $1,680. These costs include the cost of conducting the survey and overhead. *A & N Technical Services report (2000, page 2-35).* 8. The cost of toilets, advertising, administration, overhead, and toilet recycling is $126 per ULFT. The cost does not include installation, which will be covered by the customer. 9. The life span of the new ULFTs is 20 years. *MOU, page 70.* 10. Table E-2. Economic Analysis Worksheet for BMP 9 requires the input of toilet counts per CII subsector. Number of 1992 toilets per CII subgroup has been estimated.

Table E-2. Assumptions Used for Economic Analysis of Water Conservation BMPs City of Merced

BMP 14 – Residential ULFT Replacement Programs

Description: Implement a program to replace existing high-water-using toilets with ultra-low-flush toilets (ULFT) in single- and multi-family residences.

Assumptions:

1. There are an average of 3.1 people per single-family residence and 2.2 people per multi-family residence.

Lodi has an average of 2.6 people per household (California Department of Finance Report E-5, Table 2 "City/County Population and Housing Estimates" January 1, 2000). Because useful data quantifying single-family and multi-family household sizes in this CSA are unavailable, it is assumed that a ratio of multi-family to single-family household sizes is 0.7.

2. There are an average of 1.6 toilets per single-family residence and 1.5 toilets per multi-family residence.

An average of 1.58 toilets per unit was calculated using 1990 census data concerning the number of bedrooms per housing unit. Based on professional judgement, it was assumed a one bedroom unit has 1 toilet, a two bedroom unit has 1.5 toilets, a three bedroom unit has 2 toilets, a four bedroom unit has 2.5 toilets and a five bedroom unit has 3 toilets. Because multi-family units tend to have fewer toilets on average than single-family units, it was assumed 1.5 toilets per multi-family residence and calculated that the single-family units would need to have 1.6 toilets per unit to achieve an overall average of 1.58 toilets per dwelling unit.

3. Water savings from ULFTs are 36.5 gpd/unit for single-family residences and 49.0 gpd/unit for multi-family residences.

MOU, Exhibit 6, Table 1 and Table 2.

4. Homes constructed after 1991 already have ULFTs.

As of January 1992, California legislation requires that ULFTs be installed in all newly constructed homes.

5. The life span of the new ULFTs is 20 years.

MOU, page 70.

6. Natural toilet replacement rate is 4% per year.

MOU, page 70.

7. Average resale rate for single-family units in Merced County is 2.94%

Assumption based on the 1996 single-family average resale rate for Merced County. This rate was obtained from the CUWCC Website, www.cuwcc.org, August 2001.

8. Average resale rate for multi-family units in Merced County is 5.62%

Assumption based on the 1998 multi-family average resale rate for Merced County. This rate was obtained from the CUWCC Website, www.cuwcc.org, August 2001.

9. The cost of toilets, advertising, administration, overhead, and toilet recycling is $150 per ULFT. The cost does not include installation, which will be covered by the customer.

City of Merced

Table E-3. Economic Analysis Worksheets

BMP 1. Water Survey Programs for Single-Family and Multi-Family Residential Customers

									Benefits ($)					Costs ($)					
Calendar Year	Single Family Interventions	Multi Family Interventions	Percent Units Surveyed[a]	Single-Family Outdoor Savings (AF/yr)	Multi-Family Outdoor Savings (AF/yr)	Total Outdoor Savings (AF/yr)	Total Indoor Savings (AF/yr)	Annual Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
Pre-2006	0	0	0.0%	0	0.0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0
2006	117	77	0.8%	6	1.1	8	0.11	8	0	2,772	0	2,772	2,612	0	0	10,635	10,635	10,019	-7,408
2007	117	77	0.8%	6	1.1	8	0.11	15	0	5,544	0	5,544	4,921	0	0	10,635	10,635	9,439	-4,518
2008	164	107	1.1%	9	1.6	11	0.15	26	0	9,426	0	9,426	7,880	0	0	14,890	14,890	12,449	-4,568
2009	164	107	1.1%	9	1.6	11	0.15	37	0	13,307	0	13,307	10,481	0	0	14,890	14,890	11,728	-1,247
2010	210	138	1.4%	12	2.0	14	0.19	43	0	15,525	0	15,525	11,519	0	0	19,144	19,144	14,205	-2,686
2011	210	138	1.4%	12	2.0	14	0.19	49	0	17,742	0	17,742	12,402	0	0	19,144	19,144	13,382	-980
2012	257	168	1.7%	14	2.5	17	0.24	55	0	19,960	0	19,960	13,144	0	0	23,398	23,398	15,408	-2,264
2013	257	168	1.7%	14	2.5	17	0.24	62	0	22,178	0	22,178	13,758	0	0	23,398	23,398	14,515	-757
2014	421	276	2.7%	23	4.0	27	0.39	75	0	27,168	0	27,168	15,877	0	0	38,288	38,288	22,376	-6,499
2015	421	276	2.7%	23	4.0	27	0.39	89	0	32,158	0	32,158	17,705	0	0	38,288	38,288	21,079	-3,375
2016								72	0	26,059	0	26,059	13,516						13,516
2017								55	0	19,960	0	19,960	9,753						9,753
2018								28	0	9,980	0	9,980	4,594						4,594
2019																			
2020																			
2021																			
2022																			
2023																			
2024																			
2025																			
Totals:	2,336	1,531	15%	--	--	--	--	616	0	221,779	0	221,779	138,161	0	0	212,710	212,710	144,599	-6,438

Note: Economic analysis performed in 2005 dollars.

[a]Percent surveyed from MOU, Exhibit 1,1.E(d)

Value of conserved water ($/AF) =	360
Discount rate (real) =	6.15%
Indoor water savings (gpd/unit) =	0.50
Outdoor water savings =	10%
Single-family outdoor water usage (gpd/unit) =	495
Multi-family outdoor water usage (gpd/unit) =	130
Conservation measure unit cost ($) =	55.00
2005 single family units =	15,576
2005 multi-family units =	10,207
Year signed MOU =	2005
Year implement BMP =	2006

Benefit to cost ratio:	**0.96**
Simple pay-back period (years):	**13.6**
Discounted cost / water saved ($/acre-feet):	**235**
NPV / water saved ($/acre-feet):	**-10**

Credit Table for Previously Performed Surveys

Year	Single family units surveys	Multi-family units surveys	% Credit	Single family credits	Multi-family credits
Pre-1990			0.0%	0	0
1990			12.5%	0	0
1991			25.0%	0	0
1992			37.5%	0	0
1993			50.0%	0	0
1994			62.5%	0	0
1995			75.0%	0	0
1996			87.5%	0	0
1997			100.0%	0	0
1998			100.0%	0	0
1999			100.0%	0	0
2000			100.0%	0	0
2001			100.0%	0	0
2002			100.0%	0	0
2003			100.0%	0	0
2004			100.0%	0	0
2005			100.0%	0	0
				0	0

Implementation schedule (MOU Exhibit 1.E.d, page 17)

On track if the percent of single family and multi-family accounts receiving surveys equals or exceeds:

1.5%	by end of first reporting period
3.6%	by end of second reporting period
6.3%	by end of third reporting period
9.6%	by end of fourth reporting period
13.5%	by end of fifth reporting period
15%	Single family surveys within 10 years
15%	Single family surveys within 10 years

City of Merced
Table E-3. Economic Analysis Worksheets
BMP 2. *Residential Plumbing Retrofit*

						Benefits ($)					Costs ($)					
Calendar Year	Single Family Interventions	Multi Family Interventions	Percent Units Receiving Retrofits	Incremental Water Savings (AF/yr)	Annual Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
2006	586	382	5.0%	14.9	15	0	5,348	0	5,348	5,038	0	0	19,360	19,360	18,238	-13,200
2007	586	382	5.0%	14.9	30	0	10,696	0	10,696	9,492	0	0	19,360	19,360	17,182	-7,689
2008	586	382	5.0%	14.9	45	0	16,044	0	16,044	13,414	0	0	19,360	19,360	16,186	-2,772
2009	586	382	5.0%	14.9	59	0	21,392	0	21,392	16,849	0	0	19,360	19,360	15,248	1,600
2010	586	382	5.0%	14.9	59	0	21,392	0	21,392	15,873	0	0	19,360	19,360	14,365	1,508
2011	586	382	5.0%	14.9	59	0	21,392	0	21,392	14,953	0	0	19,360	19,360	13,533	1,420
2012	586	382	5.0%	14.9	59	0	21,392	0	21,392	14,087	0	0	19,360	19,360	12,749	1,338
2013	586	382	5.0%	14.9	59	0	21,392	0	21,392	13,271	0	0	19,360	19,360	12,010	1,260
2014	586	382	5.0%	14.9	59	0	21,392	0	21,392	12,502	0	0	19,360	19,360	11,314	1,187
2015	586	382	5.0%	14.9	59	0	21,392	0	21,392	11,777	0	0	19,360	19,360	10,659	1,119
2016	293	191	2.5%	7.4	52	0	18,718	0	18,718	9,708	0	0	9,680	9,680	5,021	4,688
2017					37	0	13,370	0	13,370	6,533						6,533
2018					22	0	8,022	0	8,022	3,692						3,692
2019					7	0	2,674	0	2,674	1,160						1,160
2020																
2021																
2022																
2023																
2024																
2025																
Totals:	6,154	4,010	--	--	624	0	224,614	0	224,614	148,348	0	0	203,280	203,280	146,505	1,843

Notc: Economic analysis performed in 2005 dollars.	Value of conserved water ($/AF) =	360	Benefit to cost ratio: **1.0**
	Discount rate (real) =	6.15%	Simple pay-back period (years): **14**
	Water savings (gpd/unit) =	13.7	Discounted cost / water saved ($/acre-feet): **235**
	Conservation measure unit cost ($) =	20.00	NPV / water saved ($/acre-feet): **3**
	Percent units receiving retrofits =	5%	
	1991 single family units =	11,722	
	1991 multi-family units =	7,638	
	Year signed MOU =	2005	
	Year implement BMP =	2006	

City of Merced

Table E-3. Economic Analysis Worksheets

BMP 5. Large Landscape Conservation Programs and Incentives

Calendar Year	CII Accounts w/Dedicated Irr. Meters	CII Accounts w/Mixed Use or No Meters	CII Accounts w/Mixed Use or No Meters		Incremental Water Savings	Annual Water Savings	Benefits ($)					Costs ($)					Net Present Value ($)
							Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	
	Interventions	*Offered Surveys*	*Percent Surveyed*[a]	*Interventions*	(AF/yr)	(AF/yr)											
Pre-2007				0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	27	116	0.8%	9	399	399	0	143,607	0	143,607	127,449	0	0	129,853	129,853	115,242	12,206
2008	27	116	0.8%	9	399	798	0	287,214	0	287,214	240,130	0	0	129,853	129,853	108,566	131,564
2009	27	116	1.1%	12	400	1,198	0	431,302	0	431,302	339,704	0	0	130,287	130,287	102,618	237,087
2010	3	116	1.1%	12	49	1,247	0	449,074	0	449,074	333,210	0	0	16,070	16,070	11,924	321,286
2011		116	1.4%	16	6	855	0	307,628	0	307,628	215,033	0	0	1,954	1,954	1,366	213,667
2012		116	1.4%	16	6	462	0	166,182	0	166,182	109,432	0	0	1,954	1,954	1,287	108,145
2013		116	1.7%	19	7	69	0	24,736	0	24,736	15,345	0	0	2,388	2,388	1,482	13,863
2014		116	1.7%	19	7	27	0	9,605	0	9,605	5,613	0	0	2,388	2,388	1,396	4,217
2015		116	2.7%	31	12	33	0	11,766	0	11,766	6,478	0	0	3,908	3,908	2,152	4,326
2016		116	2.7%	31	12	39	0	13,927	0	13,927	7,223	0	0	3,908	3,908	2,027	5,196
2017						31	0	11,286	0	11,286	5,514						5,514
2018						24	0	8,644	0	8,644	3,979						3,979
2019						12	0	4,322	0	4,322	1,874						1,874
2020																	
2021																	
2022																	
2023																	
2024																	
Totals:	83	1158	15%	174	--	5,192	0	1,869,292	0	1,869,292	1,410,985	0	0	422,565	422,565	348,058	1,062,926

Note: Economic analysis performed in 2005 dollars.

[a]Percent surveyed from MOU, Exhibit 1,5.E(d)

Credit Table for Previously Performed Surveys			
Year	# of Surveys	% Credit	Credits
Surveyed prior to July 1, 1996 w/follow up inspection		100%	0
Surveyed prior to July 1, 1996 - have not received follow up inspection		50%	0
Surveyed after July 1, 1996		100%	0
Total			0

Value of conserved water ($/AF) =	360
Discount rate (real) =	6.15%
Acres / CII accounts with dedicated irrigation meters =	19.4
Acres / CII accounts with mixed use meters =	0.5
Annual water use (ac-ft/acre) =	5.1
Water savings =	15%
Conservation measure unit cost ($/acre) =	250
Number of CII accounts with dedicated irrigation meters in 2005 =	118
Number of CII accounts with mixed use or no meter as of 2005 =	1,158
Percent of CII accounts with dedicated irrigation meters to receive Eto-based water use budgets annually for two reporting periods =	22.5%
Percent of CII accounts with mixed use or no meters offered surveys annually =	10%
Year signed MOU =	2005
Year implement BMP =	2007

Benefit to cost ratio:	4.1
Simple pay-back period (years):	3.2
Discounted cost / water saved ($/acre-feet):	67
NPV / water saved ($/acre-feet):	205

City of Merced
Table E-3. Economic Analysis Worksheets
BMP 6. High-Efficiency Washing Machine Rebate Programs

					Benefits ($)					Costs ($)					
Calendar Year	Total Single-Family Units	Number of Units Accepting Rebates	Incremental Water Savings (AF/yr)	Annual Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
2006	16003	160	0.6	1	0	207	0	207	195	0	8,002	4,001	12,002	11,307	-11,112
2007	16430	164	0.6	1	0	419	0	419	372	0	8,215	4,108	12,323	10,936	-10,564
2008	16857	169	0.6	2	0	637	0	637	533	0	8,429	4,214	12,643	10,570	-10,037
2009	17284	173	0.6	2	0	861	0	861	678	0	8,642	4,321	12,963	10,210	-9,532
2010	17711	177	0.6	3	0	1,090	0	1,090	808	0	8,856	4,428	13,283	9,856	-9,048
2011	18056	181	0.6	4	0	1,323	0	1,323	925	0	9,028	4,514	13,542	9,466	-8,541
2012	18402	184	0.7	4	0	1,561	0	1,561	1,028	0	9,201	4,600	13,801	9,088	-8,060
2013	18747	187	0.7	5	0	1,803	0	1,803	1,119	0	9,374	4,687	14,060	8,722	-7,604
2014	19093	191	0.7	6	0	2,050	0	2,050	1,198	0	9,546	4,773	14,319	8,368	-7,170
2015	19438	194	0.7	6	0	2,301	0	2,301	1,267	0	9,719	4,860	14,579	8,026	-6,759
2016	19748	197	0.7	7	0	2,556	0	2,556	1,326	0	9,874	4,937	14,811	7,682	-6,356
2017	20058	201	0.7	8	0	2,816	0	2,816	1,376	0	10,029	5,014	15,043	7,350	-5,974
2018	20367	204	0.7	8	0	2,872	0	2,872	1,322	0	10,184	5,092	15,276	7,031	-5,709
2019	20677	207	0.7	8	0	2,927	0	2,927	1,269	0	10,339	5,169	15,508	6,725	-5,455
2020	20987	210	0.8	8	0	2,980	0	2,980	1,218	0	10,494	5,247	15,740	6,430	-5,212
2021	21322	213	0.8	8	0	3,033	0	3,033	1,167	0	10,661	5,330	15,991	6,154	-4,987
2022	21656	217	0.8	9	0	3,084	0	3,084	1,118	0	10,828	5,414	16,242	5,888	-4,771
2023	21991	220	0.8	9	0	3,135	0	3,135	1,071	0	10,995	5,498	16,493	5,633	-4,562
2024	22325	223	0.8	9	0	3,185	0	3,185	1,025	0	11,163	5,581	16,744	5,387	-4,363
2025	22660	227	0.8	9	0	3,236	0	3,236	981	0	11,330	5,665	16,995	5,151	-4,171
Totals:		3,898	--	117	0	42,075	0	42,075	19,994	194,906	194,906	97,453	292,359	159,983	-139,989

Note: Economic analysis performed in 2005 dollars.

Value of conserved water ($/AF) =	360
Discount rate (real) =	6.15%
Water savings (gpy/unit) =	1,170
Amount of rebate ($) =	50
Cost to administer rebate ($) =	25
Percent accepting rebates =	1.0%
Single family units in 2005 =	15,576
Single family units in 2010 =	17,711
Single family units in 2015 =	19,438
Single family units in 2020 =	20,987
Single family units in 2025 =	22,660
Year signed MOU =	2005
Year implement BMP =	2006

Benefit to cost ratio:	**0.1**
Simple pay-back period (years):	**160**
Discounted cost / water saved ($/acre-feet):	**1369**
NPV / water saved ($/acre-feet):	**-1198**

City of Merced

Table E-3. Economic Analysis Worksheets (2 pages)

BMP 9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Calendar Year	*From BMP 9 ULFT Coverage Calculator*		CII accounts surveyed				Incremental Savings (Surveys)	Annual Savings (Total)	Benefits ($)					Costs ($)						Net Present Value ($)
									Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	
	No. of Installed Toilets	Annual Savings (AF/yr)	*Percent Surveyed*[a]	Commercial Interventions	Industrial Interventions	Institutional Interventions	(AF/yr)	(AF/yr)											
Pre-2007			0.0%	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0
2007			1.2%	13.5	0.4	0.4	12.4	12	0	4,446	0	4,446	3,946	0	0	10,102	10,102	8,965	-5,019
2008			1.2%	13.5	0.4	0.4	12.4	25	0	8,892	0	8,892	7,435	0	0	10,102	10,102	8,446	-1,011
2009	104	3	0.9%	10.1	0.3	0.3	9.3	37	0	13,381	0	13,381	10,539	0	0	20,628	20,628	16,247	-5,708
2010	104	6	0.9%	10.1	0.3	0.3	9.3	50	0	17,870	0	17,870	13,259	0	0	20,628	20,628	15,306	-2,046
2011	104	10	1.1%	12.4	0.4	0.3	11.3	52	0	18,654	0	18,654	13,039	0	0	22,311	22,311	15,596	-2,557
2012	104	13	1.1%	12.4	0.4	0.3	11.3	54	0	19,437	0	19,437	12,799	0	0	22,311	22,311	14,692	-1,893
2013	104	16	1.8%	20.2	0.6	0.5	18.5	66	0	23,926	0	23,926	14,843	0	0	28,204	28,204	17,497	-2,654
2014	104	19	1.8%	20.2	0.6	0.5	18.5	79	0	28,415	0	28,415	16,606	0	0	28,204	28,204	16,483	123
2015	104	22						71	0	25,493	0	25,493	14,035	0	0	13,051	13,051	7,185	6,850
2016	104	26						63	0	22,571	0	22,571	11,707	0	0	13,051	13,051	6,769	4,938
2017	104	29						47	0	17,056	0	17,056	8,334	0	0	13,051	13,051	6,377	1,957
2018	104	32						32	0	11,541	0	11,541	5,312	0	0	13,051	13,051	6,007	-695
2019								32	0	11,541	0	11,541	5,005						5,005
2020								32	0	11,541	0	11,541	4,715						4,715
2021								32	0	11,541	0	11,541	4,441						4,441
2022								32	0	11,541	0	11,541	4,184						4,184
2023								32	0	11,541	0	11,541	3,942						3,942
2024								32	0	11,541	0	11,541	3,713						3,713
Totals:	1,036	176	10.0%	112	3	3	103	780	0	280,929	0	280,929	157,854	0	0	214,696	214,696	139,571	18,283

Note: Economic analysis performed in 2005 dollars.

[a]Percent surveyed from MOU, Exhibit 1.9.E(b.3)

Value of conserved water ($/AF) =	360
Discount rate (real) =	6.15%

Benefit to cost ratio: **1.1**

Simple pay-back period (years): **10.6**

Credit Table for Previously Installed Toilets

Year	Avg. # of Installed Toilets	Incremental Water Savings (Ac-ft/yr)	Annual Water Savings (AF)	Year	Avg. # of Installed Toilets	Incremental Water Savings (Ac-ft/yr)	Annual Water Savings (AF)
1991		0	0	2001		0	0
1992		0	0	2002		0	0
1993		0	0	2003		0	0
1994		0	0	2004		0	0
1995		0	0	2005		0	0
1996		0	0				
1997		0	0				
1998		0	0				
1999		0	0				
2000		0	0				
Total			0	Total			0

Analyst survey - Annual water savings (AF/account) =	0.83
Analyst survey - Conservation measure unit cost ($) =	680
Consultant survey - Annual water savings (AF/account) =	2.1
Consultant survey - Conservation measure unit cost ($) =	1,680
Cost of conservation measure for ULFT replacement ($) =	126
Number of Commercial accounts in 2005[a] =	1124
Number of Industrial accounts in 2005[a] =	34
Number of Institutional accounts in 2005[a] =	30
Percent units surveyed =	10%
Year signed MOU =	2005
Year implement BMP =	2007

Discounted cost / water saved ($/acre-feet): **179**

NPV / water saved ($/acre-feet): **23**

[a]Number of accounts estimated based on information provided by the City of Merced.

City of Merced

Table E-3. Economic Analysis Worksheets (2 pages)

BMP 9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts

Credit Table for Previously Performed Surveys								
Year	# of Surveys				Credits			
	Commercial	Industrial	Institutional	% Credit	Commercial	Industrial	Institutional
Surveyed prior to July 1, 1996 w/follow up inspection				100%	0	0	0
Surveyed prior to July 1, 1996 - have not received follow up inspection				50%	0	0	0
Surveyed after July 1, 1996				100%	0	0	0
Total					0	0	0

Enter CII Toilet Census Results				Annual Savings (gpd)										
CII Subsector	Unadjusted Toilet Count	Adjusted Toilet Count	Savings Per ULFT (gpd)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Hotels/Motels	556	355	16	6,161	5,914	5,678	5,451	5,233	5,023	4,822	4,630	4,444	4,267	51,622
Eating and Drinking	189	121	47	6,152	5,906	5,669	5,443	5,225	5,016	4,815	4,623	4,438	4,260	51,547
Health Services	1,320	842	21	19,197	18,429	17,692	16,984	16,305	15,653	15,027	14,426	13,849	13,295	160,856
Offices	881	562	20	12,202	11,714	11,246	10,796	10,364	9,950	9,552	9,169	8,803	8,451	102,247
Retail/Wholesale	2,198	1,403	40	60,888	58,452	56,114	53,869	51,715	49,646	47,660	45,754	43,924	42,167	510,188
Other	363	232	18	4,525	4,344	4,170	4,003	3,843	3,690	3,542	3,400	3,264	3,134	37,916
Industrial	282	180	23	4,492	4,312	4,140	3,974	3,815	3,662	3,516	3,375	3,240	3,111	37,637
Churches	111	71	28	2,152	2,066	1,984	1,904	1,828	1,755	1,685	1,617	1,553	1,491	18,035
Gov't	157	100	25	2,718	2,609	2,505	2,405	2,309	2,216	2,128	2,043	1,961	1,882	22,776
Schools: K to 12	488	311	20	6,759	6,489	6,229	5,980	5,741	5,511	5,291	5,079	4,876	4,681	56,636
Total	6,545	4,177	258	125,246	120,236	115,427	110,810	106,377	102,122	98,037	94,116	90,351	86,737	1,049,461

Estimated Rate of CII Toilet Turnover (percent of remaining stock per year)	0.04
Average Savings per toilet (gpd)	27.63

Coverage requirement is 15 percent of Total Savings Potential minus savings from credits:	
(gpd)	(ac-ft)
157,419	176

City of Merced
Table E-3. Economic Analysis Worksheets (3 pages)
BMP 14. Residential ULFT Replacement Programs

	Determination of Water Conservation Goal: Single-Family Units										
Calendar Year	Single-Family Units	SF Units Naturally Retrofitted	SF Toilets Naturally Retrofitted	Water Savings from Natural Replacement SF (AF/yr)	Single-Family Units	SF Units Naturally Retrofitted	Single-Family Turnover	Combined SF Homes Retrofitted	Combined SF Toilets Retrofitted	Water Savings from Natural Replacement and Turnover SF (AF/yr)	Water Savings from Turnover SF (AF/yr)
First year program is implemented.											
2006	6,312	252	404	10	6,312	252	186	438	701	18	8
2007	6,060	242	388	10	5,874	235	173	408	652	17	7
2008	5,817	233	372	10	5,466	219	161	379	607	16	6
2009	5,585	223	357	9	5,087	203	150	353	565	15	5
2010	5,361	214	343	9	4,734	189	139	329	526	14	5
2011	5,147	206	329	9	4,405	176	130	306	489	13	4
2012	4,941	198	316	8	4,100	164	121	285	455	12	4
2013	4,743	190	304	8	3,815	153	112	265	424	11	3
2014	4,553	182	291	8	3,550	142	104	246	394	10	3
2015	4,371	175	280	7	3,304	132	97	229	367	10	2
2016	4,196	168	269	7	3,075	123	90	213	341	9	2
2017	4,029	161	258	7	2,861	114	84	199	318	8	2
2018	3,867	155	248	6	2,663	107	78	185	296	8	1
2019	3,713	149	238	6	2,478	99	73	172	275	7	1
2020	3,564	143	228	6	2,306	92	68	160	256	7	1
2021	3,422	137	219	6	2,146	86	63	149	238	6	1
2022	3,285	131	210	5	1,997	80	59	139	222	6	0
2023	3,153	126	202	5	1,858	74	55	129	206	5	0
2024	3,027	121	194	5	1,729	69	51	120	192	5	0
2025	2,906	116	186	5	1,609	64	47	112	179	5	0
Totals:		**3,522**	**5,635**	**146**	**69,371**	**2,775**	**2,040**	**4,814**	**7,703**	**200**	**54**

Credit Table for Previously Installed ULF Toilets

Year	Avg. # of Installed Toilets: Single Family	Avg. # of Installed Toilets: Multi-family	Incremental Water Savings (Ac-ft/yr)	Annual Water Savings (Ac-ft/yr)
1991			0	0
1992			0	0
1993			0	0
1994			0	0
1995			0	0
1996			0	0
1997			0	0
1998			0	0
1999			0	0
2000			0	0
	0	0		0

City of Merced
Table E-3. Economic Analysis Worksheets (3 pages)
BMP 14. Residential ULFT Replacement Programs

	Determination of Water Conservation Goal: Multi-Family Units											Conservation Goal - Combined	
Calendar Year	Multi-Family Units	MF Units Naturally Retrofitted	MF Toilets Naturally Retrofitted	Water Savings from Natural Replacement MF (AF/yr)	Multi-Family Units	MF Units Naturally Retrofitted	Multi-Family Turnover	Combined MF Homes Retrofitted	Combined MF Toilets Retrofitted	Water Savings from Natural Replacement and Turnover MF (AF/yr)	Water Savings from Turnover MF (AF/yr)	Annual Water Savings from Turnover (AF/yr)	Cumulative Water Savings from Turnover (AF/yr)
2006	4,081	163	245	9.0	4,081	163	229	393	589	22	13	20	20
2007	3,918	157	235	8.6	3,688	148	207	355	532	19	11	38	58
2008	3,761	150	226	8.3	3,333	133	187	321	481	18	9	53	112
2009	3,610	144	217	7.9	3,013	121	169	290	435	16	8	67	179
2010	3,466	139	208	7.6	2,723	109	153	262	393	14	7	78	257
2011	3,327	133	200	7.3	2,461	98	138	237	355	13	6	88	345
2012	3,194	128	192	7.0	2,224	89	125	214	321	12	5	97	442
2013	3,067	123	184	6.7	2,010	80	113	193	290	11	4	104	545
2014	2,944	118	177	6.5	1,817	73	102	175	262	10	3	109	655
2015	2,826	113	170	6.2	1,642	66	92	158	237	9	2	114	769
2016	2,713	109	163	6.0	1,484	59	83	143	214	8	2	118	887
2017	2,605	104	156	5.7	1,341	54	75	129	194	7	1	121	1,007
2018	2,500	100	150	5.5	1,212	48	68	117	175	6	1	123	1,130
2019	2,400	96	144	5.3	1,096	44	62	105	158	6	1	124	1,255
2020	2,304	92	138	5.1	990	40	56	95	143	5	0	125	1,380
2021	2,212	88	133	4.9	895	36	50	86	129	5	0	126	1,506
2022	2,124	85	127	4.7	809	32	45	78	117	4	0	126	1,632
2023	2,039	82	122	4.5	731	29	41	70	105	4	0	126	1,758
2024	1,957	78	117	4.3	661	26	37	64	95	3	0	126	1,884
2025	1,879	75	113	4.1	597	24	34	57	86	3	0	126	2,011
	56,927	**2,277**	**3,416**	**125**	**36,809**	**1,472**	**2,069**	**3,541**	**5,312**	**194**	**72**	**2,011**	

Value of conserved water ($/AF) =	360
Discount rate (real) =	6.15%
Natural toilet replacement rate =	4.0%
Annual single-family housing turnover rate =	2.94%
Annual multi-family housing turnover rate =	5.62%
Water savings due to toilet replacement at SF homes (gal/dwelling unit/day) =	37.1
Water savings due to toilet replacement at MF homes (gal/dwelling unit/day) =	49.0
Number of toilets per SF home =	1.6
Number of toilets per MF home =	1.5
Cost of conservation measure ($) =	140
1991 single family units =	11,644
1991 multi-family units =	7,528
Year signed MOU =	2005
Year implement BMP =	2006

City of Merced
Table E-3. Economic Analysis Worksheets (3 pages)
BMP 14. Residential ULFT Replacement Programs

	Water Savings from ULFT Replacement Program						Benefits ($)					Costs ($)					
Calendar Year	No. of SF Toilets Required to be Replaced	Incremental[a] Water Savings SF (AF/yr)	No. of MF Toilets Required to be Replaced	Incremental[a] Water Savings MF (AF/yr)	Annual[b] Water Savings (AF/yr)	Cummulative[c] Water Savings (AF/yr)	Avoided Capital Costs	Avoided Variable Costs	Avoided Purchase Costs	Total Undiscounted Benefits	Total Discounted Benefits	Capital Costs	Financial Incentives	Operating Expenses	Total Undiscounted Costs	Total Discounted Costs	Net Present Value ($)
10-year toilet replacement program.																	
Pre-2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	320	8	320	12	20	20	0	7,208	0	7,208	6,790	0	0	89,600	89,600	84,409	-77,619
2007	280	7	280	10	38	58	0	13,514	0	13,514	11,994	0	0	78,400	78,400	69,579	-57,585
2008	270	7	270	10	54	112	0	19,596	0	19,596	16,384	0	0	75,600	75,600	63,207	-46,823
2009	200	5	200	7	67	179	0	24,101	0	24,101	18,982	0	0	56,000	56,000	44,107	-25,125
2010	175	5	175	6	78	257	0	28,043	0	28,043	20,807	0	0	49,000	49,000	36,358	-15,550
2011	170	4	170	6	89	345	0	31,872	0	31,872	22,278	0	0	47,600	47,600	33,273	-10,994
2012	130	3	130	5	97	442	0	34,800	0	34,800	22,916	0	0	36,400	36,400	23,970	-1,054
2013	100	3	100	4	103	545	0	37,052	0	37,052	22,985	0	0	28,000	28,000	17,370	5,616
2014	120	3	120	4	110	655	0	39,755	0	39,755	23,233	0	0	33,600	33,600	19,636	3,597
2015	55	1	55	2	114	769	0	40,994	0	40,994	22,569	0	0	15,400	15,400	8,479	14,091
2016	60	2	60	2	118	**887**	0	42,345	0	42,345	21,963	0	0	16,800	16,800	8,713	13,249
2017					118	1,005	0	42,345	0	42,345	20,690	0	0	0	0	0	20,690
2018					118	1,122	0	42,345	0	42,345	19,492	0	0	0	0	0	19,492
2019					118	1,240	0	42,345	0	42,345	18,362	0	0	0	0	0	18,362
2020					118	1,357	0	42,345	0	42,345	17,298	0	0	0	0	0	17,298
2021					118	1,475	0	42,345	0	42,345	16,296	0	0	0	0	0	16,296
2022					118	1,593	0	42,345	0	42,345	15,352	0	0	0	0	0	15,352
2023					118	1,710	0	42,345	0	42,345	14,463	0	0	0	0	0	14,463
2024					118	1,828	0	42,345	0	42,345	13,625	0	0	0	0	0	13,625
2025					118	1,946	0	42,345	0	42,345	12,835	0	0	0	0	0	12,835
	1,880		**1,880**		**1,946**		**0**	**700,388**	**0**	**700,388**	**359,316**	**0**	**0**	**526,400**	**526,400**	**409,099**	**-49,784**

[a]Incremental Water Savings is water savings from replaced toilets during corresponding year only.

[b]Annual Water Savings is water savings from all replaced toilets through corresponding year.

[c]Cummulative Water Savings is running total of water saved through corresponding year. "Cummulative Water Savings" must match "Cummulative Water Savings from Turnover" within 10% each reporting period through 2008.

Note: Economic analysis performed in 2005 dollars.

Benefit to cost ratio:	**0.9**
Simple pay-back period (years):	**23**
Discounted cost / water saved ($/acre-feet):	**210**
NPV / water saved ($/acre-feet):	**-26**

APPENDIX F

Water Conservation Materials

CITY OF MERCED

WATER CONSERVATION

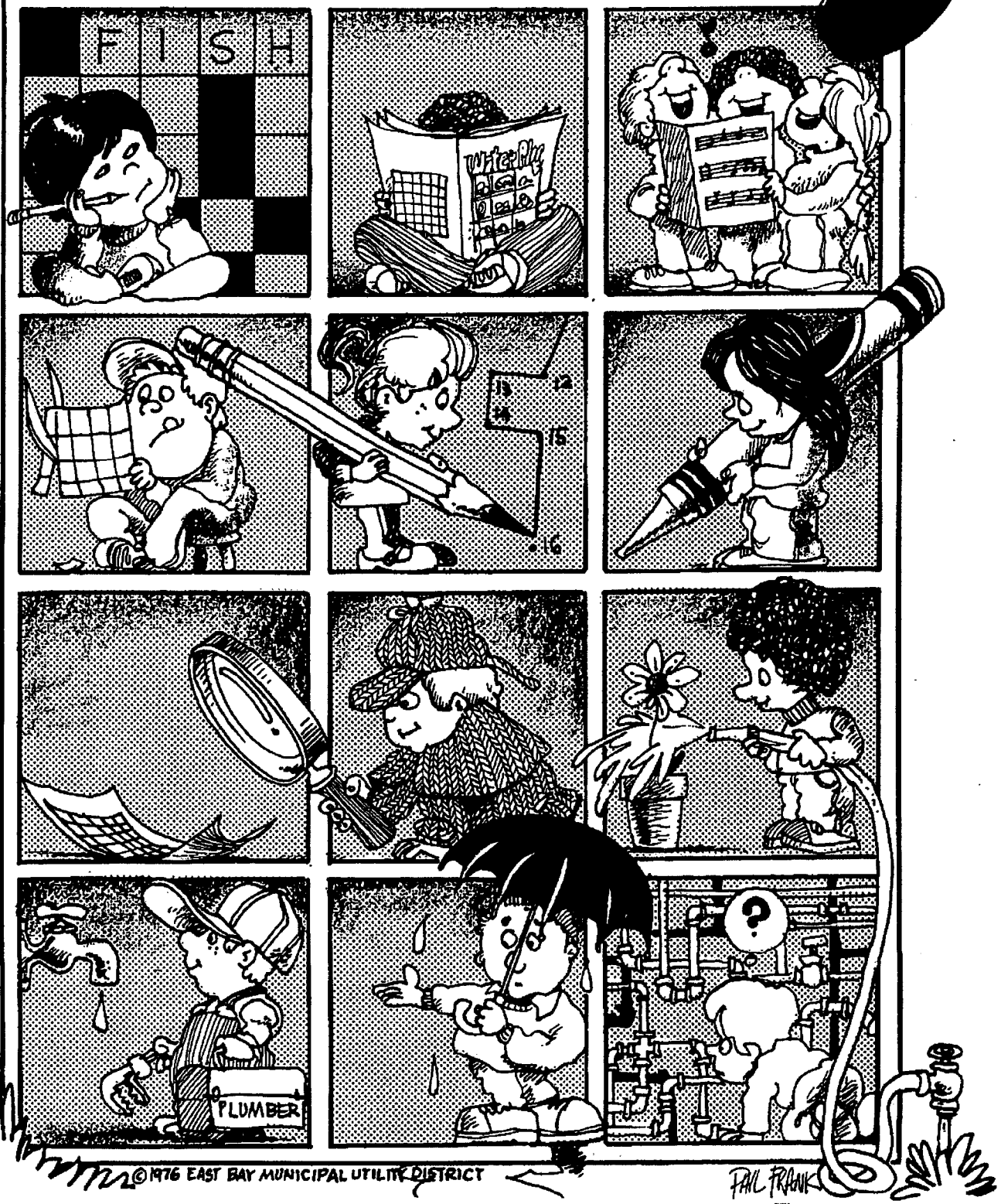
	SUN	MON	TUE	WED	THU	FRI	SAT
Midnight to 11 am	OK to Water	DO NOT WATER	OK to Water	OK to Water	OK to Water	OK to Water	OK to Water
11 am to 7 pm	DO NOT WATER	DO NOT WATER	DO NOT WATER	DO NOT WATER	DO NOT WATER	DO NOT WATER	DO NOT WATER
7 pm to Midnight	OK to Water	DO NOT WATER	OK to Water	OK to Water	OK to Water	OK to Water	OK to Water
	(ODD)		(EVEN)	(ODD)	(EVEN)	(ODD)	(EVEN)

FOR MORE INFORMATION OR TO REPORT WATER WASTE

PLEASE CALL 385-6800

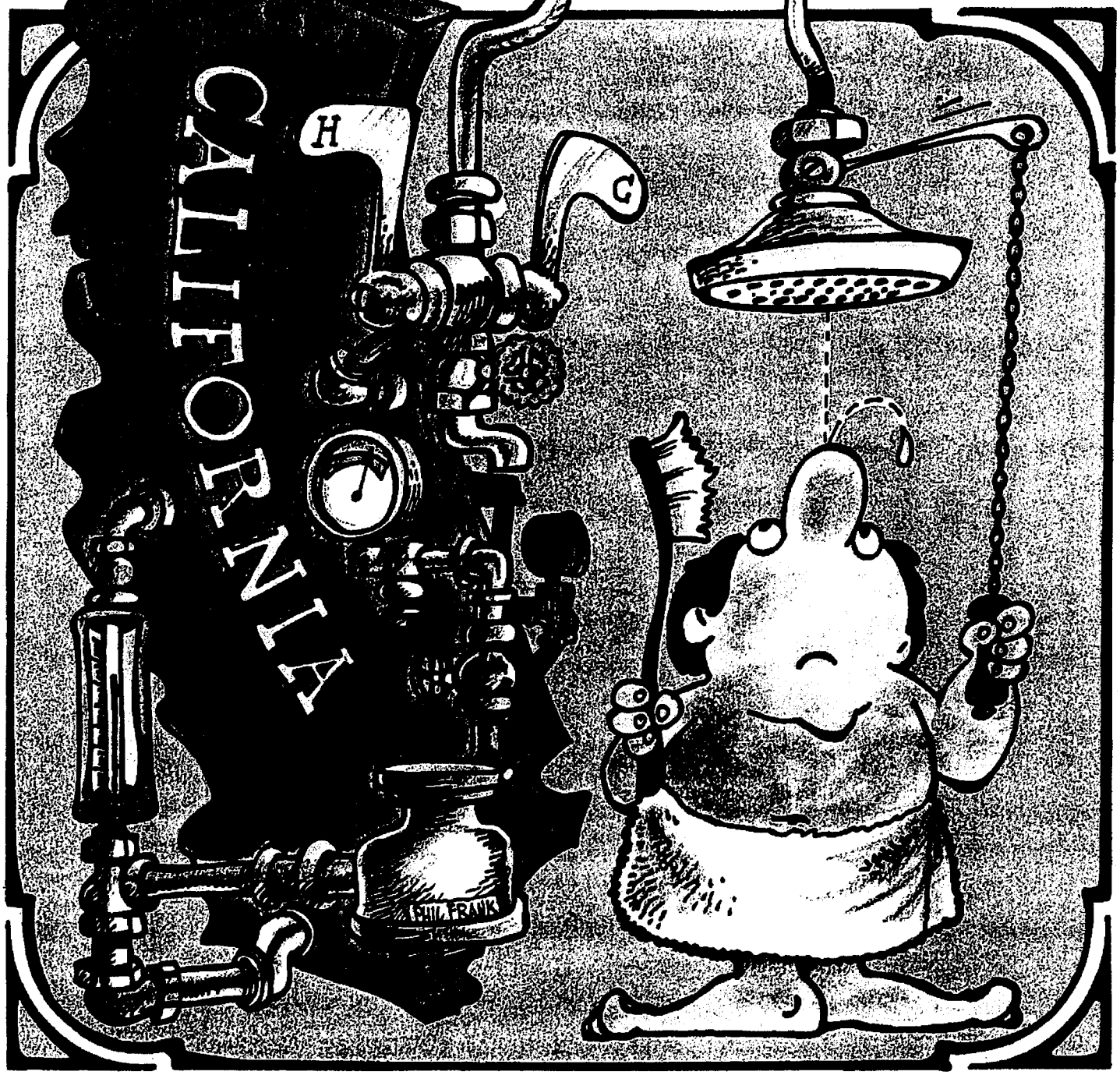
Water Pi

TEACHERS GUIDE



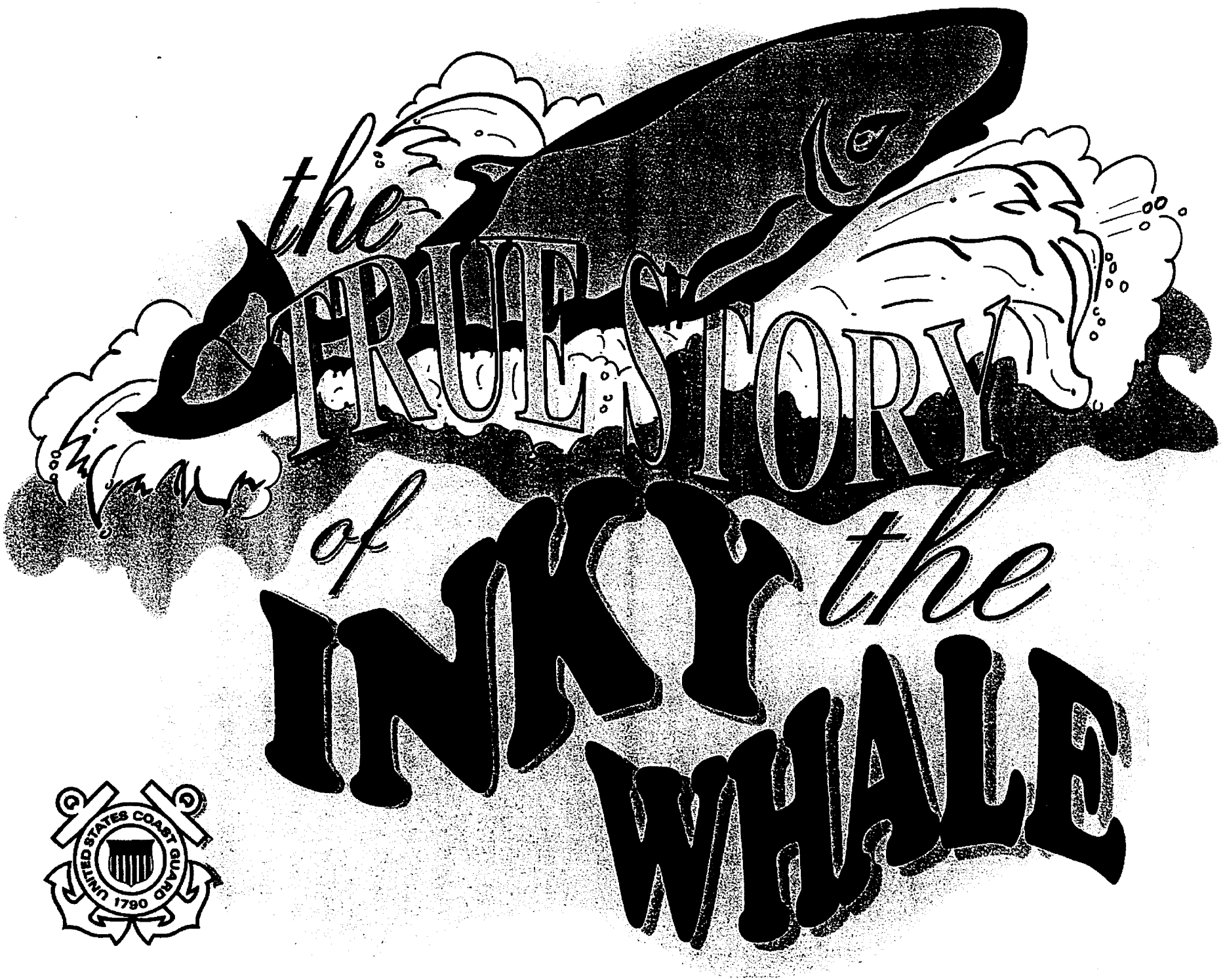
· A PUBLICATION OF PROJECT WATER ·
LESSONS BY BOB JOHNSON · ART BY PHIL FRANK

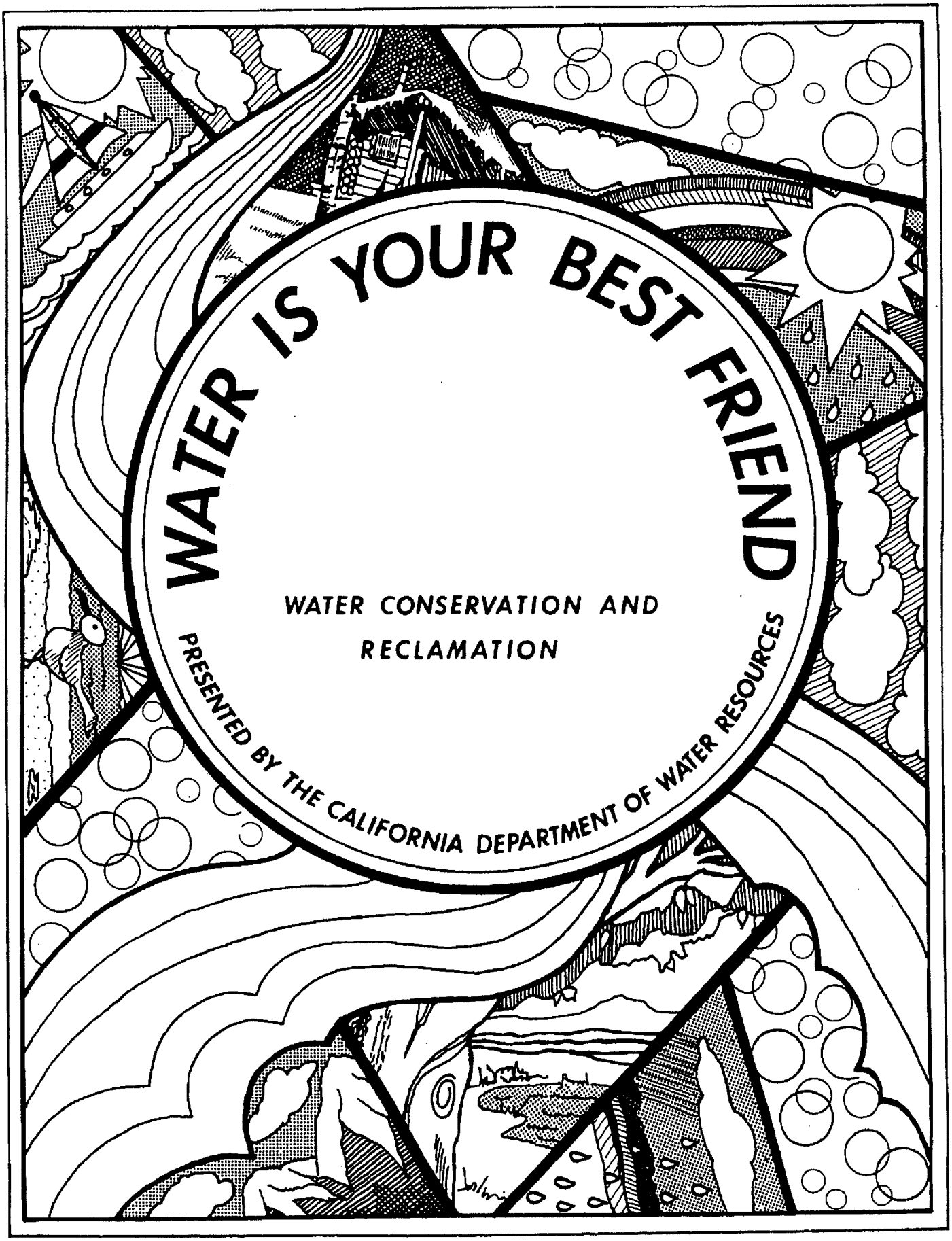
THE CALIFORNIA WATER WORKS



AND WHY IT DOES...

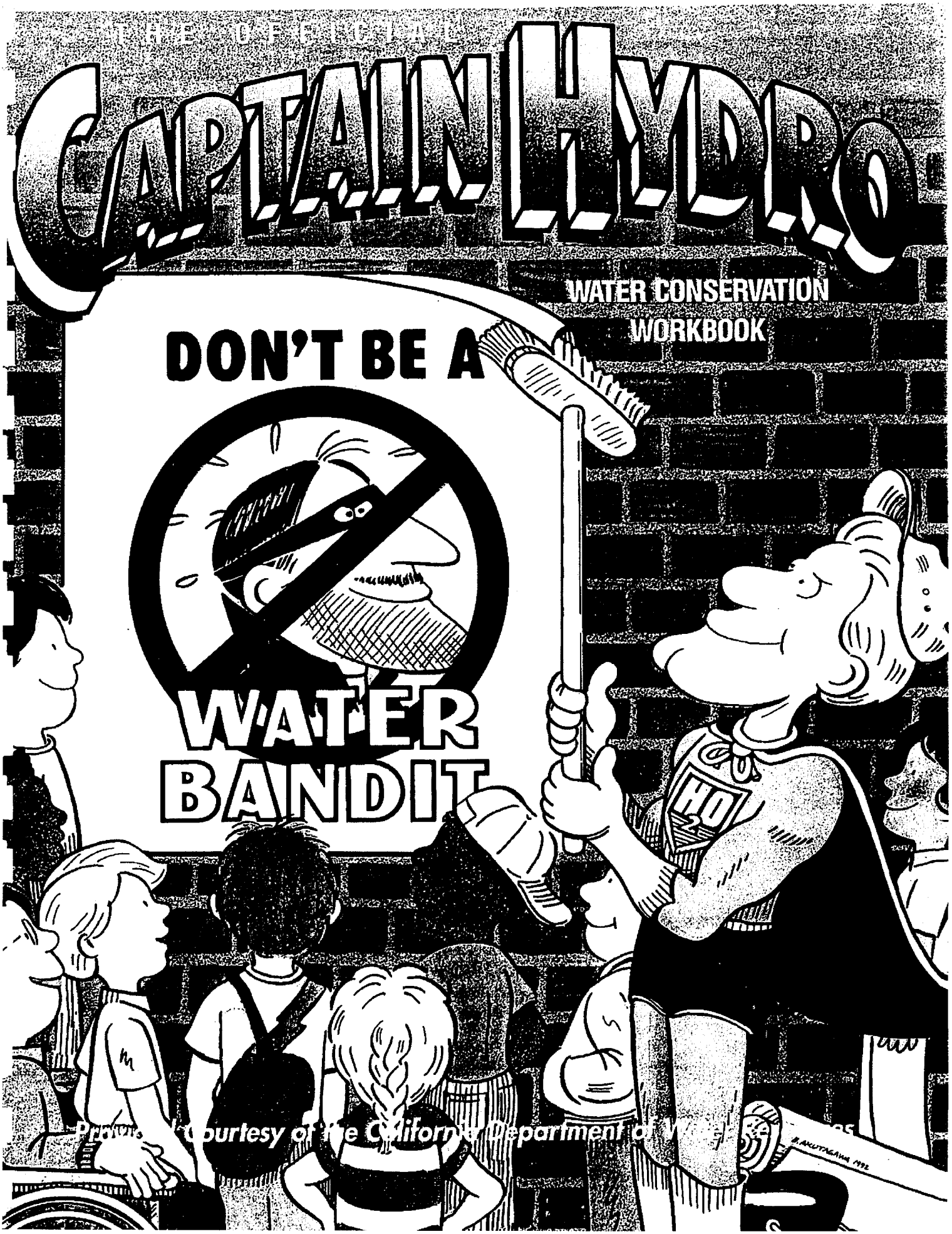
PRESENTED BY THE CALIFORNIA DEPARTMENT OF WATER RESOURCES, SACRAMENTO, CAL.


the TRUE STORY of the INKY WHALE
UNITED STATES COAST GUARD
1790


WATER IS YOUR BEST FRIEND
WATER CONSERVATION AND
RECLAMATION
PRESENTED BY THE CALIFORNIA DEPARTMENT OF WATER RESOURCES

CAPTAIN H.Y.D.R.O.

WATER CONSERVATION WORKBOOK



Produced courtesy of the California Department of Water

TRASH

IT'S ALL WASHED UP

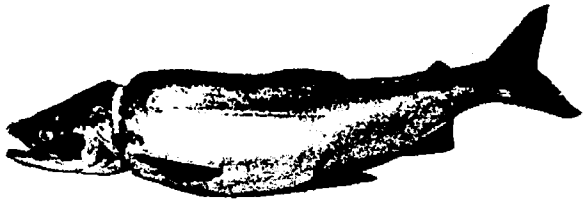
Each year, hundreds of tons of trash wash up on our shores.

If you have ever walked along a beach, a stream or a lake, you've seen the problem. Trash is everywhere. It impacts wildlife and habitats, recreation and commerce. Birds and marine animals are injured or killed by debris. Boats are damaged. Beaches scarred.

What can you do to protect our waters from trash?

Dispose of garbage properly in shoreside containers. Teach your children and others to do the same. Report illegal dumping to the U.S. Coast Guard or local authorities. Be a part of the solution and keep our waters clean for tomorrow.

ITW Hi-Cone



Cecil Ranney

. . . And The Animals Are Suffering.

Printed on Recycled Paper

Brochure concept by National Marine Fisheries Service Marine Refuse Disposal Project, Newport, Oregon

Plastics can last for hundreds of years in lakes, rivers and marine waters. A careless moment lasts generations.

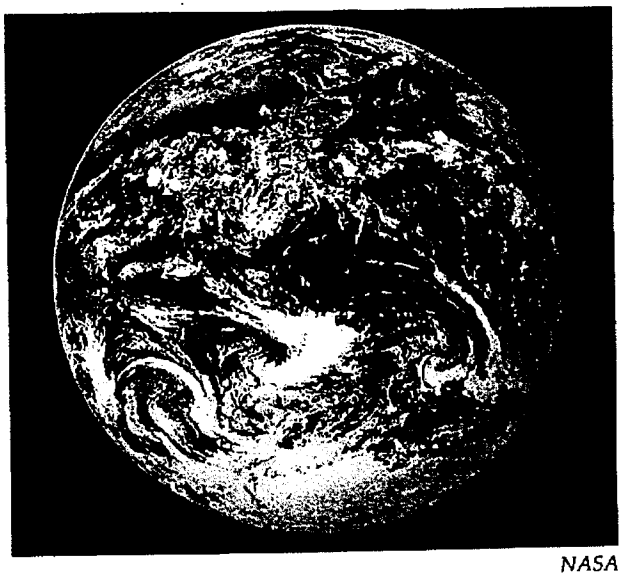
Jim Boeder

You can help!

- Make it boat policy that no trash is discarded, washed or blown overboard.
- Minimize the amount of non-degradable products on board. Provision your vessel using bulk/refillable containers.
- Stow trash for disposal in port. Encourage your port or marina to provide convenient refuse disposal facilities.
- Where possible retrieve trash encountered in the water.
- Share your concern with friends, fellow mariners and family.
- Participate in beach clean-ups, and leave the beach clean after visits.

Don't Teach Your Trash To Swim! WGM

The National Marine Fisheries Service Encourages All Boaters And Beach-Goers To Protect The Marine Environment



NASA

Our Water Planet Is Becoming Polluted With Plastic Debris . . .

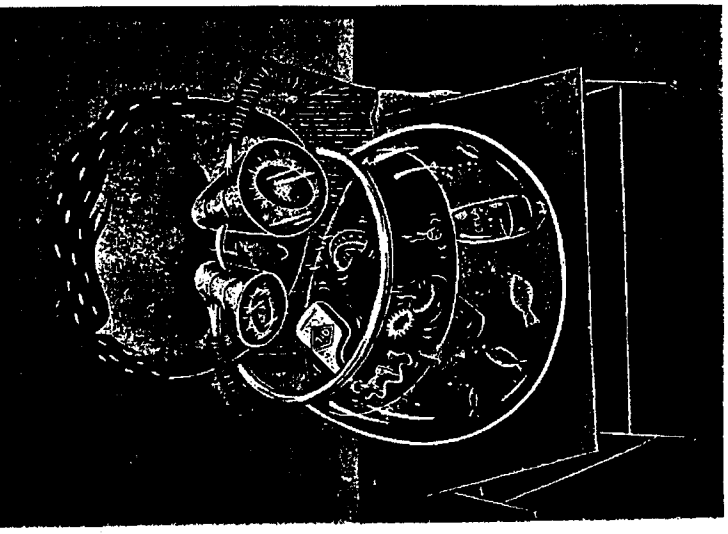
Center for Marine Conservation

1725 DeSales Street, NW, #600
Washington, DC 20036
(202) 429-5609

http://www.cmc-ocean.org

HOW'S THE WATER?

Citizen's Report Form For Water Pollution



CITIZEN REPORT FORM

WHAT DO YOU SEE IN THE WATER?

★ *Take video footage or photographs if you can.*

Type of pollution and description: garbage / oil / drums / wood / plastic / sewage / other

(Describe): _____

Dimensions or quantity of discharged material: _____

(Note: Do not risk contamination by trying to identify material!)

Does material leave a rainbow sheen on the water? yes / no

WHERE IS POLLUTION COMING FROM?

Is it coming from a specific source? yes / no (Describe): _____

If it is from a specific vessel, please provide details below:

Type of vessel: tanker / cargo / passenger / commercial fishing / sailboat / motorboat / barge

(Describe): _____

Registration state and number or flag/homeport of ship: _____

Name of boat or ship: _____

Approximate length and other information about vessel: _____

Approximate course and speed: _____

Position of vessel discharging, if different from your position: _____

If offshore, approximate distance from land: _____ nautical miles. Body of water: _____

WHERE ARE YOU?

Observation made from: shore / boat / other. (Describe): _____

Specific location of boat (use GPS or Loran coordinates, waterway name, etc) or place on shore where observation was made: _____

Date and local time of sighting: _____

WHO ARE YOU?

You are not required to give this information in order to report a violation. You may request anonymity, which is guaranteed by law. However, if you submit a report anonymously, it may receive lower priority than a report with an identified observer.

Name/Affiliation _____

Address _____

Phone Number (home) _____ (work) _____

Other Witnesses _____

Address _____

Phone Number (home) _____ (work) _____

NOW WHAT?

Contact the U.S. Coast Guard via the National Response Center at 1-800-424-8802 or the closest Coast Guard Office on the phone or VHF radio channel 9 or 16.

For more information, contact your local U.S. Coast Guard office or:

U.S. Coast Guard Headquarters
Marine Environmental Protection Division
2100 Second Street, S.W.

CENTER FOR MARINE CONSERVATION

1725 DeSales Street, N.W.
Washington, D.C. 20036
202-429-5609