
**Large Attachments to Citizens United for Resources and the
Environment, Inc. and Consejo de Desarrollo Economico de Mexicali
Comment Letter**

EXHIBIT "1"

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AGAINST POLLUTION

18 **UNITED STATES DISTRICT COURT**

19 **DISTRICT OF NEVADA**

20
21 **CONSEJO de DESARROLLO ECONOMICO**
de MEXICALI, A.C.; CITIZENS UNITED
22 **FOR RESOURCES AND THE ENVIRON-**
23 **MENT; DESERT CITIZENS AGAINST**
POLLUTION,

24 Plaintiffs,

25 vs.

26 **UNITED STATES OF AMERICA, et al.,**

27 Defendants

) **CASE NO. CV-S-05-0870-PMP (GWF)**
)
) **DECLARATION OF STEVEN P. LARSON**
) **IN SUPPORT OF PRELIMINARY**
) **INJUNCTION MOTION**

28

1 I, Steven P. Larson, declare and state as follows:

2 1. I am a groundwater hydrologist presently employed as the Senior Principal at S.S.
3 Papadopulos & Associates, Inc., Bethesda, Maryland. I have been employed at S.S. Papadopulos &
4 Associates, Inc. since 1980. S.S. Papadopulos & Associates, Inc. is one of the leading groundwater
5 hydrology firms in the United States employing approximately 40 professionals. Prior to my
6 employment with S.S. Papadopulos & Associates, Inc., I worked as an hydrologist with the United
7 States Geological Survey ("USGS") at St. Paul, Minnesota, and Reston, Virginia, between 1971-
8 1980.

9
10 2. I hold a Bachelor of Science Degree in civil engineering from the University of
11 Minnesota (1969) (with high distinction) and a Master Degree in civil engineering from the University
12 of Minnesota in civil engineering (1971). I am a Certified Professional Hydrologist of the American
13 Institute of Hydrology and a member of the American Institute of Hydrology, and have published
14 extensively in the field of groundwater hydrology. Attached as Exhibit A is a true and correct copy
15 of my Curriculum Vitae. I have extensive experience in developing methodologies for analyzing
16 groundwater flow, groundwater recharge, and surface water-groundwater interactions including
17 groundwater simulation models and groundwater solute transport models.

18
19 3. As Senior Principal of the company, I assist in the management of the company and in
20 the conduct and management of projects dealing with a wide variety of environmental and water-
21 resource issues. I have been involved in numerous projects covering a wide spectrum of technical,
22 environmental, and legal issues involving water resources management in the United States similar to
23 the hydrology issues raised in connection with seepage and the All-American Canal ("AAC").

24
25 4. I have conducted several water-supply development evaluations, including an
26 assessment of potential impacts of salt water intrusion on water supply development in Oman,
27 Portugal and Florida; and, an analysis of potential impacts of power plant cooling water on
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1 groundwater and surface water in Wyoming. In the Oman project, a freshwater/saltwater groundwater
2 model was developed to assess the potential impacts of groundwater development on the intrusion of
3 salt water into a coastal area. In the Wyoming project, a groundwater model was developed to assess
4 the potential impacts associated with developing a water supply for power plant cooling water and to
5 optimize the proposed well field design.

6
7 5. I have served as a water resource consultant to the States of Kansas and Nebraska in
8 original actions in the Supreme Court of the United States involving disputes over interstate surface
9 water and interrelated groundwater on the Republican River (Kansas, Nebraska, and Colorado), the
10 Arkansas River (Kansas and Colorado) and the North Platte River (Colorado, Wyoming, and
11 Nebraska). I also have undertaken evaluations of water-rights permitting and adjudication of water
12 rights in New Mexico, Texas, Colorado, Kansas, Nebraska, Arizona, and Idaho. I served as an expert
13 in a water permitting dispute between the City of El Paso and the State of New Mexico regarding
14 applications for new appropriations in the Hueco Bolson and the Mesilla Bolson. These matters
15 specifically dealt with the potential effects of additional groundwater development on groundwater
16 levels and groundwater quality in these basins, and on depletion of drain flows from altered
17 groundwater conditions. I testified in hearings before the State Engineer of New Mexico regarding
18 modeling studies that were conducted to quantitatively evaluate the potential impacts of proposed
19 groundwater development.
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21
22 6. I further have served as a consultant and expert for the State of Kansas regarding two
23 interstate water disputes that were under the jurisdiction of the United States Supreme Court. The first
24 was a dispute with the State of Colorado over the waters of the Arkansas River. In that matter, I have
25 served as an expert in modeling to assist Kansas in demonstrating the impacts of post-compact
26 pumping in Colorado on stream flows crossing the state line. I gave testimony on behalf of Kansas in
27 proceedings before a special master who was appointed to oversee the case. The second was a dispute
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1 with the State of Nebraska over the waters of the Republican River. In that case, a settlement was
2 reached that called for the development of a regional groundwater model to quantify the effects of
3 regional pumping from the Ogallala Aquifer on stream flow so those effects could be incorporated
4 into the accounting conducted pursuant the interstate compact associated with the river. I served as
5 the principal modeling consultant for Kansas to a committee formed by the states to develop the
6 groundwater model. The model was ultimately adopted and integrated into the compact accounting
7 process.
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9 7. Finally, I have served as a third party reviewer of modeling studies that had been
10 conducted of the impacts of water supply development on the N-aquifer in northeastern Arizona. I
11 was retained by parties, Peabody Coal, the Navajo Nation, and the Hopi Tribe, to review and evaluate
12 groundwater modeling studies conducted by the U. S. Geological Survey and to determine what
13 additional studies or monitoring should be undertaken to update the analysis. On another project in
14 the same area, I was retained to develop a groundwater model of the C-aquifer to assess the potential
15 impacts of additional groundwater development on water levels and stream flows as part of an overall
16 environmental impact assessment. I have also served as a peer reviewer for groundwater models that
17 were being developed by the Colorado State Engineer's Office for evaluating tributary and non-
18 tributary groundwater in the Denver Basin. In that capacity, I testified on behalf of the state
19 engineer's staff in hearings related to the proposed rules and regulations associated with the
20 tributary/non-tributary groundwater determination.
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23 8. I was retained by the Consejo Desarrollo Economico de Mexicali ("CDEM") in May of
24 2005 to analyze issues related to hydrology of the Mexicali Valley and the specific issues surrounding
25 the elimination of recharge from the All-American Canal ("AAC"). Specifically, CDEM requested
26 that we assess whether the Bureau of Reclamation had reasonably quantified the impacts of the
27 construction of a new All-American Canal, and to address whether changes have occurred since 1994
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1 that require re-evaluation. I have concluded that the Bureau of Reclamation relied on simplistic
2 qualitative assessments to evaluate impacts in Mexico when conducting its original analysis and that
3 since 1994, additional data and information have been developed that would allow for a more
4 comprehensive and quantitative assessment of the potential consequences to Mexicali caused by
5 construction of the new canal.
6

7 9. Staff under my direct supervision obtained and reviewed the data pertaining to the
8 Mexicali Valley and border region, much of which pertains to the past 12-year period and provides a
9 basis for updating hydrologic assessments of the 1994 Environmental Impact Study. The information
10 reviewed included:
11

- 12 Diversions to canals in Mexicali Valley for irrigation
- 13 Diversions to canals in Mexicali Valley for artificial recharge
- 14 Drain outflow in Mexicali Valley
- 15 Irrigation water applied to lands in Mexicali Valley, surface and groundwater
- 16 Irrigated acres and cropping patterns in Mexicali Valley
- 17 Well identification and completion data
- Aquifer test analyses
- Groundwater elevations
- Groundwater pumpage volumes
- Groundwater quality

18 10. These data were compiled during the course of and following two field visits conducted
19 by staff. The field visits included observations of key water diversion and conveyance works, the
20 irrigated area of the Mexicali Valley, the AAC and the Dren de la Mesa (Dren Mesa). The Dren Mesa
21 is a drain constructed by Mexico to mitigate water-logging problems that occurred following
22 construction of the AAC; water intercepted by this drain has been used to supply water to farms in
23 Mexico for many decades.
24

25 11. My staff and I have reviewed the source material attached as Exhibit B to this
26 Declaration, including the Final Environmental Impact Statement/Final Environmental Impact Report
27 (March, 1994) ("FEIS") prepared by the Bureau of Reclamation; related documents such as the
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1 Geohydrology Appendix and the Record of Decision (May, 1994); and, the Supplemental Information
2 Report (January 12, 2006) ("SIR").

3 12. My opinions are based on my experience and review of the data and records.

4 13. The conclusions presented in the 1994 FEIS regarding potential groundwater impacts
5 from the various alternatives for capturing seepage from the AAC were based on simplistic qualitative
6 assessments. The Bureau's conclusions also referred to assumptions regarding the reoccurrence of
7 surplus conditions on the Colorado River such as those experienced in the 1980s. The assumptions
8 concerning the availability of surplus flows that might mitigate other impacts are not supported by
9 recent data or by expected future conditions.
10

11 14. The FEIS notes that water level declines due to the canal construction would be expected,
12 but that such declines may be halted and reversed whenever surplus flows occur. The Final FEIS
13 states (page III-6):
14

15 "The post-lining water table decline may be temporarily *halted* whenever Colorado
16 River flows spill from Morelos dam. The resulting recharge of the aquifer under the
17 Mexicali Valley by infiltration through the riverbed and canals in Mexico may
temporarily *raise* ground-water levels. Periodic high flows from 1979 to 1993 led to a
significant rise in the water table".

18 15. This statement suggests that declines will not be significant, or, that they will be
19 mitigated, given the occurrence of periodic surplus. However, as has been reported in western
20 newspapers and documented by the Bureau of Reclamation, the Colorado River has not experienced
21 significant surplus flows for many years. With the exception of only four of the past seventeen years,
22 little excess flow has flowed to Mexico. Following this extended period of drought, an unusually
23 extended wet period would be required to fill upstream reservoirs and achieve conditions under which
24 surplus flows might occur. However, given improved efficiency in water operations and water use in
25 the United States, the absence of surplus flows to Mexico is expected to be the norm in the future,
26 regardless of upstream supply conditions. The hydrologic condition without the occurrence of surplus
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1 conditions is, at present, and will be in the future, different than was assumed in the FEIS based on the
2 occurrence of high surplus flows in the 1979 to 1993 period. Without the periodic high flows, water
3 level declines caused by the cessation of All-American Canal seepage will not be fortuitously
4 mitigated, or, "halted" and "raised", thorough acts of nature. The FEIS failed to identify a
5 meaningful process for mitigation of groundwater declines to be experienced by Mexico as a result of
6 the analyzed alternatives.
7

8 16. Since the issuance of the FEIS, additional hydrologic data have been collected providing
9 significant, additional information about groundwater conditions along the AAC and extending into
10 Mexico. Additional data includes groundwater elevation changes in both the United States and
11 Mexico over the past 15 years, pumping data, and irrigation records. The data collected over the past
12 15 years reflect conditions without the extreme levels of surplus as seen in the 1980s and with existing
13 conditions of river management, i.e., management that minimizes excess flow to Mexico. This data is
14 available to calibrate groundwater models that could, in a scientifically defensible manner, quantify
15 the potential impacts of the new canal. The data collected over the past 15-year period provide a basis
16 for updating, refining, and extending earlier groundwater modeling efforts to provide a sound
17 quantitative basis for assessing potential impacts of the alternatives on groundwater in the Mexicali
18 aquifer rather than relying on simplistic concepts, schematic diagrams, and early modeling efforts.
19

20 17. Seepage from the AAC and previously from the Alamo Canal in Mexico when it was
21 used to convey water to the Imperial Valley has provided the primary source of recharge to
22 groundwater in northern areas of the Mexicali Valley. This recharge allowed for groundwater
23 development to supply irrigation water for lands that do not have access to other Colorado River
24 waters. The Mexicali Valley is divided into a number of areas for purposes of managing and
25 regulating irrigation water supplies. These areas are referred to as "modulos". Modulo 4 is the sub-
26 region of the irrigation district within the Mexicali Valley that is in closest proximity to the AAC.
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1 Modulo 4 is one of the larger sub-regions within the Mexicali Valley, with 14,065 irrigated hectares in
2 2004 (34,754 acres). Modulo 4 receives no water directly from the Colorado River. The water
3 supply to this modulo solely consists of groundwater pumped from wells and seepage from the AAC
4 that is intercepted by the Dren Mesa. The amount of pumping from this area is on the order of
5 100,000 acre-feet per year, an amount which is in large part balanced by the seepage from the AAC.
6
7 Without recharge from the AAC, the water balance in this region will be adversely impacted.

8 18. The U.S. has underestimated the amount of seepage from the AAC and thus has
9 underestimated the impacts from its stoppage. Canal seepage has been estimated by the U.S. Bureau
10 of Reclamation and the Imperial Irrigation District based on flow measurements. The estimated
11 seepage is variable from year to year, but data provided in the FEIS Geohydrology Appendix suggest
12 that an average seepage of 96,800 acre-feet per year, from Pilot Knob to Drop 3, has occurred (in the
13 period reported, from 1960). However, a baseline amount of 84,600 acre-feet per year forms the basis
14 of the FEIS analysis. Underestimating the baseline seepage by 12% will result in a similar degree of
15 underestimation of impacts.
16

17 19. The water supply for irrigation in Modulo 4 is derived from seepage from the AAC;
18 historically, this supply has been supplemented by excess boundary flows that are routed through the
19 Alamo Canal. Since it is unlikely that excess boundary flows will be available in the future, the only
20 remaining source of water supply to Modulo 4 is the seepage from the AAC. When this seepage is
21 eliminated, the groundwater in Modulo 4 and surrounding areas will be subject to additional water
22 level declines. Groundwater storage depletion will accelerate and groundwater quality will
23 deteriorate. Pumping lifts and associated pumping costs will increase with these incremental water
24 level declines. Ultimately, groundwater development from the reservoir will become impractical,
25 either from an economic perspective or from a water quality perspective, or both.
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1 20. The projected reduction in seepage from the AAC will cause flow reduction in the
2 Dren Mesa alone of approximately 25,000 acre feet per year, an amount equivalent to that needed for
3 irrigation of approximately 8,000 acres. A substantial portion of this impact will occur within a
4 matter of a few years. Groundwater declines will be experienced throughout the module's 34,700
5 acres and beyond. The Bureau has not credibly re-assessed these impacts utilizing updated data
6 beyond that available in 1994.
7

8 21. One of the few solutions to avoid shortening the life of Mexicali's finite groundwater
9 resource would be the fallowing of agricultural land to reduce water use in an amount equal to the
10 reduction in water supply. The fallowing of approximately 20,000 to 24,000 acres would be required
11 to accomplish this purpose.

12 22. Another consequence not considered in the FEIS relates to the potential impact of this
13 action on the Salton Sea. The Salton Sea depends on inflow from the New River that flows from
14 Mexico north to the Sea in the United States. Runoff from the farms in the Mexicali Valley
15 contributes to flow in the New River. The fallowing of farms in the Mexicali Valley due to the
16 elimination of seepage will reduce waters available to the New River. These impacts have not been
17 quantified and may negatively impact the restoration of the Sea. The January 12, 2006 Supplemental
18 Information Report ("SIR") references other documents that supposedly address impacts to the Salton
19 Sea but the SIR did not provide the referenced documents for any analysis.
20

21 23. The SIR purports to provide "a thorough reexamination and analysis of the AAC Final
22 BIS/EIR" (page ES-1). It also claims to provide "an examination of new information relevant to the
23 Project" (page ES-1). I have reviewed the information provided in the SIR related to hydrologic
24 issues and found that the so-called "thorough reexamination" is simply more general conclusory
25 statements without substantive technical or quantitative analysis. For example, the SIR cites that
26 recent groundwater levels are higher than they were in 1983 and 1986 as described in the
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1 Geohydrology Appendix to the FEIR. These higher levels are then summarily dismissed by saying
2 the levels "do not change any environmental impact" and then that conclusion is vaguely supported
3 with statements such as "may be caused by excess surface water" or "are expected to be temporary"
4 (page 3-6). They also cite to two Mexico (CNA 2005a and 2005b) reports regarding groundwater
5 conditions in Mexico but acknowledge that the April 2005 (2005a) report is "largely a repetition" of a
6 1991 report. There is no technical discussion or quantitative analysis provided to demonstrate that
7 these conclusory statements are reliable. In fact, the April 2005 CNA report describes an impacts
8 analysis that relied on a model calibrated to data provided, most recently, in 1994 by the Bureau of
9 Reclamation. While it is true that the 2005 CNA reports included additional data, there is no
10 indication that any of the data was used to re-calibrate the model or to conduct an updated impacts
11 analysis. This would make the analysis dated and incomplete. Another example is in regard to
12 potential impacts to the Salton Sea. The SIR acknowledges a 1999 study that utilized a groundwater
13 model to determine the reduction in inflow to the Salton Sea from the lining of the All-American
14 Canal and the Coachella Canal. The SIR states that "results of that study produced a range of values
15 bordering on insignificance" (page 3-11). This would appear to indicate that the study results revealed
16 impacts that were not insignificant. The SIR, however, suggests in a couple of sentences that the
17 study was somehow flawed and so the Bureau "did not rely on the Study's projected inflow
18 conclusions in preparing this Supplemental Information Report". This appears to be a situation where
19 negative results from the more recent study have been dismissed without substantive discussion.
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23 24. The examples outlined above do not represent a thorough reexamination and analysis
24 of the AAC Final EIS/EIR, at least with respect to these hydrologic issues.

25 I declare under penalty of perjury under the laws of the State of Maryland that the foregoing is
26 true and correct and that this Declaration is signed on February 1, 2006 at Bethesda
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STEVEN P. LARSON

Exhibit A

STEVEN P. LARSON

Groundwater Hydrologist

| | |
|--|---|
| EDUCATION | <p>MS Civil Engineering, 1971, University of Minnesota, Minneapolis, Minnesota</p> <p>BS Civil Engineering (with high distinction), 1969, University of Minnesota, Minneapolis, Minnesota</p> |
| REGISTRATIONS | <p>Certified Professional Hydrologist American Institute of Hydrology</p> |
| PROFESSIONAL HISTORY | <p>S.S. Papadopoulos & Associates, Inc., Bethesda, Maryland Executive Vice President, 1980-present</p> <p>U.S. Geological Survey, Water Resources Division, Reston, Virginia Hydrologist, 1975-1980</p> <p>U.S. Geological Survey, Water Resources Division, St. Paul, Minnesota Hydrologist, 1971-1975</p> <p>U.S. Geological Survey, Water Resources Division – National Training Center, Denver, Colorado Hydrologist, 1971</p> <p>St. Anthony Falls Hydraulic Laboratory, Minneapolis, Minnesota Research Assistant, 1969-1971</p> |
| SUMMARY OF QUALIFICATIONS | <p>Mr. Larson is a recognized authority on numerical simulation models and their application in the analysis of a variety of groundwater problems. He has developed such models for analyzing groundwater flow, mass- and heat-transport in groundwater systems, contaminant migration, recovery of petroleum products from groundwater, saltwater intrusion in coastal aquifers, and thermal energy storage in aquifers. In addition, he has been in the forefront of combining these methods with linear programming techniques to optimize the development of groundwater supplies or remediation of contaminated groundwater. He has conducted training courses on the use of these models and provided technical support on their application to a variety of hydrologic conditions. Mr. Larson has authored and co-authored publications on the application of aquifer simulation models that are widely used by practicing hydrologists. He has served as an expert witness in numerous judicial forums regarding groundwater issues and the application of simulation models for demonstrating the fate of soil/groundwater contamination and the effect of remediation alternatives.</p> |
| AWARDS & HONORS | <p>Civil Servant of the Year, U.S. Geological Survey, 1974</p> <p>U.S. Geological Survey Incentive Award, 1974</p> <p>American Society of Civil Engineering Student Award, 1969</p> |
| REPRESENTATIVE PROJECT EXPERIENCE | <p>S.S. Papadopoulos & Associates, Inc., Bethesda, Maryland</p> <p>As senior principal of the company, Mr. Larson assists in the management of the company and in the conduct and management of projects dealing with a wide variety of environmental and water-resource issues. During his many years at SSP&A, he has been involved in numerous projects covering a wide spectrum of technical, environmental, and legal issues including:</p> <ul style="list-style-type: none"> ▪ Site evaluations for remedial investigations, feasibility studies, engineering evaluation/cost analyses, or remedial action plans at CERCLA and other waste disposal sites including the Stringfellow site in California, the FMC Fridley site in Minnesota, the Chem Dyne site in Ohio, the Conservation Chemical site in |



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**REPRESENTATIVE
PROJECT
EXPERIENCE**
— continued

Missouri, the Hardage-Criner site in Oklahoma, and the Hastings site in Nebraska.

- Evaluations of groundwater contamination at CERCLA and other waste-disposal sites including Love Canal, New York; Savannah River Plant, South Carolina; Tucson Airport, Arizona; Ottati & Goss site, New Hampshire; Martin-Marietta site, Colorado; and Western Processing site in Washington.
- Environmental impact evaluations of the effects of water development for proposed coal slurry operations in Wyoming, of in-situ mining for trona minerals in Wyoming, and of groundwater development on the shallow-water-table in South Dakota.
- Evaluations of the effects of discharge on groundwater from chemical-manufacturing waste disposal in Wyoming, Virginia, and New York.
- Water-supply development evaluations, including potential impacts of salt water intrusion on water supply development, in Oman, Portugal and in Florida; and analysis of potential impacts of power plant cooling water on groundwater and surface water in Wyoming.
- Evaluations of permitting, licensing, and environmental issues associated with coal mining in Wyoming, Montana, and Arizona, copper mining in Montana and Utah, trona mining in Wyoming, and uranium mining in New Mexico.
- Evaluations of water-rights permitting and adjudication in New Mexico, Texas, Colorado, Kansas, Wyoming, Nebraska, Arizona, and Idaho.
- Environmental audits, groundwater monitoring plans, and other environmental investigations at the Oaks Landfill in Maryland, the FMC Carteret facility in Wyoming, the former IBM facility in Indiana, and the Insilco site in Florida.

SPECIFIC PROJECT EXPERIENCE

- Far-Mar-Co Subsite, Hastings Superfund Site, Nebraska – Supervised the preparation of an engineering evaluation/cost analysis (EE/CA) to support implementation of remediation of groundwater contamination. Worked with regulatory agencies to gain approval of the EE/CA and progress toward design and implementation. Previously, on behalf of Morrison Enterprises, supervised completion of a remedial investigation and a feasibility study which focused on carbon tetrachloride and ethylene dibromide contamination.
- Stringfellow site near Riverside, California – Served as the principal technical advisor on groundwater issues to the Pyrite Canyon Group, which overviewed investigations and remedial activities sponsored by the responsible parties. Designed and evaluated several investigations and remediation programs. Represented the client as a technical spokesperson in workshops, technical seminars, and meetings with regulatory agencies and other interested parties. Prepared key documents to support the decision-making process toward the final Record of Decision.
- In the case of *Kansas v. Colorado* before the U.S. Supreme Court – Served on a team of technical advisors to the State of Kansas in its litigation with Colorado over violations of the Arkansas River Compact. Assisted in obtaining a finding



STEVEN P. LARSON

Groundwater Hydrologist

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**REPRESENTATIVE
PROJECT
EXPERIENCE**
— *continued*

of compact violation regarding the pumping of groundwater from wells along the river valley in Colorado. Continues as a technical expert as the case moves into subsequent phases involving the quantification of depletions of supply, assessments of damage, and future compliance by Colorado.

EXPERT AND FACT WITNESS EXPERIENCE

- Litigation associated with soil and groundwater contamination at CERCLA, RCRA, and other facility sites in California, Kansas, Missouri, Oklahoma, Tennessee, Montana, Florida, Iowa, and Nebraska.
- Toxic tort, property damage, and liability litigation regarding soil and groundwater contamination at sites or facilities in New York, Tennessee, Texas, Virginia, Ohio, and other states.
- Insurance recovery litigation associated with contamination at a variety of sites or facilities for commercial clients such as General Electric, FMC Corporation, Upjohn, AT&T, Rohr Industries, Beazer East/Koppers, North American Phillips, DOW Chemical, Occidental Chemical, and Southern California Edison.
- Water-rights permitting litigation and water adjudication including cases in New Mexico, Colorado, and Arizona, as well as interstate river compact disputes involving the states of Kansas, Colorado, Wyoming, and Nebraska.

U.S. Geological Survey, Water Resources Division, Reston, Virginia

Originated, planned and conducted research in the development of numerical simulation models and techniques for the analysis of a variety of problems related to groundwater systems. Mr. Larson applied the developed models to actual field situations for verification and further refinement, and documented these models in a manner suitable for use by others. He served as coordinator and instructor for training courses on groundwater simulation models and methodologies conducted by the Division, and provided primary technical assistance to many groundwater projects conducted by District. Mr. Larson participated in and represented the U.S. Geological Survey in national and international meetings. He conducted groundwater studies of national and regional interest and participated in, or was detailed to, overseas projects conducted or managed by other U.S. agencies and the World Bank.

U.S. Geological Survey, Water Resources Division, St. Paul, Minnesota

Served as Project Chief and participated in studies involving the evaluation of groundwater resources, the assessment of stream-water quality, and the analysis of surface-water/groundwater relationships in various parts of Minnesota.

U.S. Geological Survey, Water Resources Division, National Training Center, Denver

Participated in an extended training program providing in-depth training on both office and field techniques for the collection and the analysis of data and the conduct of surface-water, groundwater, and water-quality studies.

STEVEN P. LARSON

Groundwater Hydrologist

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- REPRESENTATIVE PROJECT EXPERIENCE**
— *continued*
- St. Anthony Falls Hydraulic Laboratory, Minneapolis, Minnesota**
As a Research Assistant, participated in the development and operation of an urban-runoff model to predict sewer flow distribution for the Minneapolis – St. Paul Sanitary District. Assisted in runoff prediction studies for St. Paul and participated in a project to survey and summarize computer programs used in water resources engineering.
- PROFESSIONAL SOCIETIES**
- Association of Ground Water Scientists and Engineers
American Institute of Hydrology
Chi Epsilon
- PUBLICATIONS**
- Tonkin, M.J., S.P. Larson, and C. Muffels. 2004. Assessment of Hydraulic Capture through Interpolation of Measured Water Level Data. Presented at Conference on Accelerating Site Closeout, Improving Performance, and Reducing Costs through Optimization, Environmental Protection Agency, Federal Remediation Technology Roundtable, June 15-17, 2004, Dallas, Texas.
- Tonkin, M.J., and S.P. Larson. 2002. Kriging Water Levels with a Regional-Linear and Point-Logarithmic Drifts: *Ground Water*. 40, no. 2, March-April: 185-193.
- Blum, V.S., S. Israel, and S.P. Larson. 2001. Adapting MODFLOW to Simulate Water Movement in the Unsaturated Zone. MODFLOW 2001 and Other Modeling Odysseys, Proceedings, International Groundwater Modeling Center (IGWMC), September 11-14, 2001, Colorado School of Mines, Golden, Colorado. 60-65.
- Andrews, C.B., and S.P. Larson. 1988. Evolution of Water Quality in the Lower Rio Grande Valley, New Mexico: *Eos*. 69, no. 16: 357.
- Larson, S.P., C.B. Andrews, M.D. Howland, and D.T. Feinstein. 1987. Three-Dimensional Modeling Analysis of Groundwater Pumping Schemes for Containment of Shallow Groundwater Contamination. In *Solving Ground Water Problems with Models*. Dublin, OH: National Water Well Association. p. 517-536.
- Bennett, G.D., A.L. Kontis, and S.P. Larson. 1982. Representation of Multi-Aquifer Well Effects in Three-Dimensional Groundwater Flow Simulation: *Ground Water*. 20, no. 3: 334-341.
- Helgesen, J.O., S.P. Larson, and A.C. Razem. 1982. *Model Modifications for Simulation of Flow Through Stratified Rocks in Eastern Ohio*. U.S. Geological Survey. Water-Resources Investigations 82-4019.
- Larson, S.P., S.S. Papadopoulos, and J.E. Kelly. 1981. Simulation Analysis of a Double-Transmissivity Concept for the Madison Aquifer System (abstract). Proceedings of the 10th Annual Rocky Mountain Ground-Water Conference, Laramie, Wyoming, April 30-May 2. p. 76.
- Mercer, J.W., S.P. Larson, and C.F. Faust. 1980. *Finite-Difference Model to Simulate the Real Flow of Saltwater and Fresh Water Separated by an Interface*. U.S. Geological Survey. Open-File Report 80-407.

**STEVEN P. LARSON**

Groundwater Hydrologist

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PUBLICATIONS

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Exhibit B

EXHIBIT B

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EXHIBIT "2"



Petition to Form the Salton Sea Harbor Improvement District of Riverside County

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Released on = August 18, 2005, 11:04 am

Press Release Author = National Outdoor Recreation Council

Industry = Environment

Press Release Summary = Owners of property, within the proposed harbor improvement district, petitioned the Riverside County Board of Supervisors (CA) today to form the Salton Sea Harbor Improvement District of Riverside County

Press Release Body = PREAMBLE TO THE PETITION TO FORM THE SALTON SEA HARBOR IMPROVEMENT DISTRICT OF RIVERSIDE COUNTY

PURPOSE OF THE PREAMBLE

This preamble is part of the Petition to form the Salton Sea Harbor Improvement District of Riverside County (hereinafter the "Petition"). Its purpose is to provide additional information, in the way of further explanation, to the "freeholders" (the real property owners) within the proposed Salton Sea Harbor Improvement District of Riverside County, (hereinafter the "Harbor District of Riverside Co."), so that they will more apply be able to make informed decisions as to;

- (1) whether to sign the Petition; and,
- (2) whether to vote in favor of formation of the proposed Harbor District of Riverside Co., when and if it is presented on special ballot.

The Petition will, often, mention its adjoining, to be formed, Salton Sea Harbor Improvement District of Imperial County (hereinafter the "Harbor District of Imperial Co."); and its adjoining, alternative, to be formed, Salton Sea Harbor Improvement District of San Diego County (hereinafter the "Harbor District of San Diego Co."). However, throughout this Preamble and

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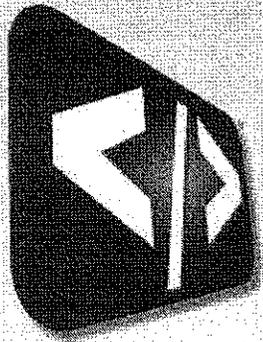
the Petition, only the two, the Harbor District of Riverside Co. and the Harbor District of Imperial Co., will be referred to, hereinafter, as (the "Harbor Districts").

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As they are written for the freeholders to understand, this Preamble to the Petition, the Petition, and the Ordinance, are not written in legal jargon; though, they do not shy away from tackling the pertinent legal issues. Complex subjects, especially the cost estimate and profit potential sections, were intentionally oversimplified. The National Outdoor Recreation Council or (NORC), the writer, oversimplified complex issues, at the risk of incurring criticism, so that each and every freeholder could understand them. If any freeholder does not understand what NORC has written here, they will explain further. For more information, contact NORC at:

NATIONAL OUTDOOR RECREATION COUNCIL (a Calif. Non-profit Corp.)
(www.nationaloutdoorrecreationcouncil.us) 39565
Terwilliger Rd., Ste. A Anza, CA 92539
Tele.: (951) 763-0604
Attn: Walter H. Eason, Jr., President and CEO
(riversideharbordistrict@norc.us)

As the Petition was not targeted for the professional reader, professionals are directed to contact NORC, and in writing, should they have any professional questions. Such questions should be presented in writing to allow for a meaningful response. Though, NORC's funding is scant, they will make every possible effort to respond appropriately.

ADOPTION OF THE SALTON SEA

When the U.S. Congress enacted the National Outdoor Recreation Act of 1963 they found "it to be desirable that all American people of present and future generations be assured adequate outdoor recreation resources." (16 USCS § 460I) In the past, the U.S. Congress dedicated a prolific amount of outdoor recreation facilities. In recent years, however, the emphasis has shifted to the protection of threatened and endangered species (T&E species). Rather than mitigating the impact of outdoor recreation or working towards recovery of T&E species, government has selected to, instead, close the brunt of existing outdoor recreation facilities. The need to protect existing

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outdoor recreation facilities, from permanent closure, thus arose.

NORC (a California non-profit Corp.) was formed to fill that gap. NORC is dedicated to preserving as much of the prior existing outdoor recreation facilities as possible. It does this, primarily, by adopting threatened prior existing outdoor recreation facilities, upon application. After adoption, NORC provides mitigation and restoration to maintain those facilities; to the extent it is able to, and where applicable.

Not too long ago, many people looked forward to recreating at the Salton Sea. Fred Dungan said; "When my father first took me to the Salton Sea 40 years ago, it was one of the most popular recreational areas in Southern California with almost as many visitors as Yosemite." (Fred Dungan, www.fdungan.com/salton.htm) This is no longer true because, as is well known, the Salton Sea is in dire need of restoration.

To seek NORC's help to restore the Salton Sea, Branko Belicevski applied for its adoption. After investigation, NORC determined that assistance was necessary and that it could provide a significant portion of it. Upon that determination, NORC adopted the Salton Sea. After adoption, NORC studied the matter of restoration and, upon the information gathered, decided it would be best to begin by facilitating the bringing of the Petition.

PETITION'S PROPOSED METHOD FOR RESTORATION OF THE SALTON SEA

Upon study, NORC found a number of proposals for restoration of the Salton Sea. (See Salton Sea Restoration: Final Preferred Project Report, Salton Sea Authority, July 2004, www.salttonsea.ca.gov) A similar proposal to NORC's, one which was to convey (channel) water from the Salton Sea to the Gulf of California and back, was considered by the Salton Sea Authority. (p. 18) That proposal was rejected by them, however, because they found it to be too costly; in the "\$10s of billions". NORC discovered that the Salton Sea Authority was very wrong in their calculations for that alternative, as will be shown. NORC found the inverse to be the true; that, a channel from the Gulf of California would realize a net profit in the \$10s of billions, instead. The Salton Sea Authority published its preferred

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alternative, (the "Preferred Project").(ES-8) That alternative was rejected by NORC because it would significantly reduce the water surface area of the Salton Sea, would significantly increase (further concentrate) contaminants in the remaining portion; and, on balance, would result in a net expense, (a loss), to be born by the taxpayers, in the \$10s of billions. The actual cost of the Preferred Project is not revealed in the Salton Sea Authority's, July 2004, Final Preferred Project Report.

The Salton Sea Authority proposes to reduce contamination, for their Preferred Project, in various ways. They propose to create more wetlands which are labeled "contaminate traps" by their critiques. (p. 60) NORC concurs with their critiques. Wetlands do not dispose of hazardous waste such as selenium; they merely collect (trap) it elsewhere. The new \$100 million addition to the wastewater treatment plant in Mexicali is only going to remove (10) percent of the phosphorous that now reaches the Salton Sea. (p. 61) That means that it will probably cost \$10 billion, or more, to eliminate all the phosphorous. In addition, they propose to extend the Alamo and New Rivers for (21 miles). That's going to cost \$10s of billions, as well, and will create even more contaminate traps. Worse, is that the Preferred Project is conspicuous by the absence of any real provision to remove contaminants now in the Salton Sea. To be polite, the Preferred Project is not actually a restoration project. It passes off actual restoration to some undisclosed point far, far, into the future. In reality, the Preferred Project is nothing more than a water allotment reduction project, in the guise of a restoration project. This is unacceptable to NORC.

The Salton Sea Authority is not the only ones to have considered channels from the Gulf of California as a means for restoration of the Salton Sea. Fred Dungan presented a similar proposal to theirs; one that also called for two channels. (www.fdungan.com/salton.htm) One engineering firm (Metcalf & Eddy) has even drawn up plans for channels to convey sea water from the Gulf of California to, and from, the Salton Sea. (www.fdungan.com/salton.htm)

Fred Dungan's proposal significantly differs from NORC's, though. His proposal entails "expanding the Salton Sea's boundaries to approximately those of ancient Lake Cahuilla". This would,

effectively, inundate a lot of existing cities and development. That was an agency of the U.S. Federal government's proposal in 1938; one which was drawn up before all the new cities and new development occurred out there. For this reason, that it would inundate a large amount of existing cities and existing development, NORC found Mr. Dungan's proposal wholly infeasible, economically.

NORC's proposal does not entail the building of a series of locks. Locks, to allow for direct shipping access to the Salton Sea, may, however, be added later. If ancient Lake Cahuilla is not inundated, then locks would have to be built to allow direct shipping access to the Salton Sea (because it is more than 220 feet below sea level). To restore the Salton Sea, all that would be necessary is to draw no more than (1.7 million acre feet a year (maf/yr)) of sea water from the Gulf of California. To prevent entrainment and a dangerous rate of flow, that channel would have to hold a much greater amount of seawater. As will be shown, such a channel would be large enough for ships to travel. Thus, to restore the Salton Sea, NORC concluded that a harbor would necessarily have to be developed. After that discovery, the question then became, by whom; and, how? California code revealed the answers to these questions.

AUTHORITY TO BRING THE PETITION

The Petition is to develop a harbor in the County of Riverside, California. More than the required fifty qualified persons, (registered voters, residents, and also freeholders within the proposed Harbor District of Riverside Co.), will have indicated their desire to form the Harbor District of Riverside Co. by signing it. (Cal Harb & Nav Code § 5824) A "freeholder" is an owner of real property or an owner of interest in real property. The Petitioners have a lawful right to present their Petition to the Board of Supervisors of Riverside County for formal disposition. (Cal Harb & Nav Code § 5821) After publication of notice in a local newspaper, "at the time and place specified in the notice the board of supervisors shall consider the petition". (Cal Harb & Nav Code § 5830)

ASSUMPTION OF COMMITMENTS TO BUILD

CONNECTING HARBORS

The Petition is to petition to form a harbor improvement district to develop a harbor; the portion within Riverside County. It assumes that a connecting harbor (channel) will be built through Mexico from the Gulf of California to the United States/Mexico border by Mexico; and that another connecting harbor (channel), to that one, will be built through California from the United States/Mexico border to the Imperial County/Riverside County border by the Salton Sea Harbor Improvement District of Imperial County.

In the event that Mexico does not commit, in time, to build a connecting harbor, (channel), the Petition assumes that a connecting harbor (channel) will be built, in the alternative, through California from the Pacific Ocean to the San Diego County/Imperial County border by the Salton Sea Harbor Improvement District of San Diego County. That harbor (channel) will then connect to a harbor (channel) at the San Diego County/Imperial County border, and which will first travel east then north to the Riverside County/Imperial County border to be built by the Salton Sea Harbor Improvement District of Imperial County.

AFFECT OF SIGNING THE PETITION

Essentially, by signing the Petition, one is petitioning the Board of Supervisors of the County of Riverside to place the issue, as to whether to form the proposed Salton Sea Harbor Improvement District of Riverside County, up for election on a special ballot. Only freeholders, within the proposed Harbor District of Riverside Co., will be able to vote upon it. A summary of the sequence of events to expect follows.

No less than fifty freeholders can petition the board of supervisors of the county to form a harbor improvement district for the development of a harbor. (Cal Harb & Nav Code §§ 5821 and 5824) Notification of the time and place for the hearing on that petition is then to be published in a local newspaper. (Cal Harb & Nav Code § 5825) The board must consider the petition, investigate the matter, and make a determination upon that investigation. (Cal Harb & Nav Code §§ 5830 and 5835) The board can adjust the boundaries of the proposed harbor improvement district but must give notice of any

adjustments they may make. (Cal Harb & Nav Code §§ 5832 to 5834) The board may continue the hearing (to study the matter) but, for no longer than six (6) months. (Cal Harb & Nav Code § 5836) The board is to make specific findings after the hearing of the matter. (Cal Harb & Nav Code §§ 5839 to 5841) Should the board approve the petition, it is to put it to a vote, to the freeholders in the harbor improvement district, as to whether to form the harbor improvement district, etc. (Cal Harb & Nav Code §§ 5859 to 5874)

JURISDICTION TO FORM THE HARBOR IMPROVEMENT DISTRICT

The California Harbors and Navigation Code, for the formation of a harbor improvement district, raises the presumption that the State of California has sole jurisdiction to develop harbors in the state. Moreover, authorization to cooperate with agencies of the U.S. Federal government, and procedures for that, are expressly provided for by California statute. (Cal Harb & Nav Code § 5903) There is no United States Code, or Code of Federal Regulation, to the contrary. Nor, is there any United States Code, or Code of Federal Regulation, which confers sole jurisdiction of harbor development unto any agency of the United States government.

It has been asserted that the mere fact that the Harbor District of Riverside Co.'s main channel will connect to a channel in Mexico is enough grounds to warrant U.S. Federal agency sole jurisdiction. Were that the case, California Interstate 5 and numerous other state highways, throughout the United States, would be U.S. Federal agency owned, managed, and controlled; which, they not.

It has been asserted that the freeholders could not petition to form a harbor district until preliminary planning and engineering is completed; and, that the cost of such preliminary planning and engineering is so high that U.S. Federal agency funding would be required to perform it. It has been further asserted that if U.S. Federal agency funding is provided, for preliminary planning and engineering, that it would be enough grounds to warrant U.S. Federal agency sole jurisdiction. Preliminary planning and engineering is indeed very high; estimated at \$372 million, (1) percent of estimated planning and engineering, for both Harbor Districts. The

required contents of the Petition are specific in California statutes and none require the extent of preliminary planning and engineering so envisioned. A "general description" of the proposed improvement and development work, as was adequately provided for with the Petition, is sufficient. (Cal Harb & Nav Code § 5822) Were it otherwise, only the extremely wealthy could petition to form a harbor district; and, that is not the law. (Cal Harb & Nav Code § 5824) In other words, it would be unconscionable to require the freeholders of the proposed Harbor District of Riverside Co. to pay, or come up with, \$136 million in preliminary planning and engineering work before they would be allowed to petition for the formation of the Harbor District of Riverside Co.; that is, assuming that the freeholders of the proposed Harbor District of Imperial Co. pay, or come up with, their share, \$236 million. Such preliminary planning and engineering is simply just not required for decision making. The Board of Supervisors of the County of Riverside and the freeholders within the proposed Harbor District of Riverside Co. will not find it necessary to review detailed engineering plans and drawings to make their decisions as to whether to form the Harbor District of Riverside Co. Their decisions are expected to be premised, primarily, upon economic factors, as are presented and discussed here. Even were U.S. Federal agency funding provided, there is a mechanism for that (Cal Harb & Nav Code § 5903) and it does not call for turning over ownership, management, or control of the Harbor District of Riverside Co. to any agency of the U.S. Federal government.

POTENTIAL TAKEOVER BY A U.S. FEDERAL AGENCY

An agency of the U.S. Federal government can conceivably, through future legislation, (a long drawn out process by itself), take control of the land area slated here as the, to be formed, Harbor Districts; and, for the same purpose, to build a channel. Forming the Harbor District of Riverside Co., or attempting to form the Harbor District of Riverside Co., however, is likely to fend off a U.S. Federal agency takeover because it will shed light on it. Conversely, failing to form or failing to attempt to form, the Harbor District of Riverside Co. is to invite a U.S. Federal agency takeover. For this reason, NORC will have succeeded in staying off a U.S. Federal agency takeover just by facilitating this attempt to form the Harbor

District of Riverside Co. NORC is adamantly opposed to a U.S. Federal agency takeover, here, because it would be devastating to:

- (1) the freeholders therein;
- (2) the local governments;
- (3) the local agencies; and,
- (4) the State of California.

Were freeholders to have their properties taken by an agency of the U.S. Federal government, (by right of eminent domain), they would not receive even current (pre-Harbor District of Riverside Co.) value in compensation because of how those properties would be assessed. More than likely, freeholders will have to wait 20 years, after the taking of their properties is affected, before they will receive any payment in compensation from an agency of the U.S. Federal government, whatsoever; and, payment won't include any real interest. They probably won't even be able to borrow against their properties or the expected, so called, "just compensation", in the interim. Such loan are not usually given. Worse, is that an agency of the U.S. Federal government, because of the recent *Kelo v. City of New London* U.S. Supreme Court decision, is, more than likely, going to take all the property in the Harbor District of Riverside Co. and then re-sell the portions which can be privately developed to the highest private bidder. (*Kelo v. City of New London*, No. 04-108, Supreme Court of the United States, 2005 U.S. LEXIS 5011) In other words, should an agency of the U.S. Federal government take control of the Harbor District of Riverside Co., more than likely, all of the freeholders are going to lose all their properties therein; and, without receiving any compensation, whatsoever, for that taking. Local government is not expected to fair any better under U.S. Federal agency control. Not only would the local governments, the local agencies, and the State of California lose their tax base, more than likely, they would not see a penny in revenue from any agency of the U.S. Federal government, in return.

COOPERATION WITH MEXICO

Mexico has as much, if not more, to gain from a channel from the Gulf of California to the United States; and, not just in increased profits. To restore the Salton Sea it will be necessary to restore the New and the Alamo Rivers and their watersheds; much of which is in Mexico. To take seawater from the Gulf of California it will be

necessary to restore that ecosystem, as well.

It is NORC's understanding that the Fox Administration, in principle, is in favor of such a channel. The Mexican government may desire to see preliminary engineered plans before initiating formal negotiations, though. Such preliminary engineered plans would cost approximately \$372 million; (roughly (1) percent of estimated planning and engineering). That is too large an investment to expect of anyone before committing to build the channel. In addition, there is much to be discussed, between the two Nations, before such detailed engineered plans can be prepared. Not only is forming the Harbor District of Riverside Co. necessary to raise the vast funds required for such preliminary planning and engineering but, its formation is necessary to show California's resolve to build the channel. The commitment to raise funds for preliminary planning and engineering coupled with the resolve to build the channel (which formation of the Harbor Districts would show) should be a sufficient enough impetus to initiate formal negotiations between the two Nations.

COOPERATION WITH FEDERAL AGENCIES OF THE UNITED STATES

As was discussed, cooperation between the Harbor District of Riverside Co. and the agencies of the U.S. Federal government is authorized and circumscribed by State law. (Cal Harb & Nav Code § 5903) Transfers of U.S. Federal agency land, however, are circumscribed by U.S. Federal law.

U.S. Federal agency lands are excluded until transferred. Some U.S. Federal agency land, within the Harbor District of Riverside Co., will have to be transferred to the Harbor District of Riverside Co. for harbor development purposes. The Secretary of the U.S. Army is the only one authorized to make such transfers. Application for the transfer of U.S. Federal agency lands, sought for harbor development purposes, is made to the Secretary of the U.S. Army, pursuant to (33 USCS § 558b), and not to the U.S. Secretary of the Interior, pursuant to (43 USCS § 869). To offset the loss of those lands, the Harbor District of Riverside Co. will, primarily, pay in desalinated water. Payment in water should be sufficient since the agencies of the U.S. Federal government have no other source for additional water. The Harbor District of Riverside Co. can

also pay with an exchange of lands, if need be.

In light of the fact that the U.S. Forest Service may attempt to exercise control over most of the water in California, (and in all other states), there is a concern that an agency of the U.S. Federal government will do so over the Harbor District of Riverside Co., as well. The U.S. Congress can conceivably take control of the Harbor District of Riverside Co. through future legislation; though it is very unlikely that they will. Even if they try, no U.S. Congressional Committee can do it (take control of the Harbor District of Riverside Co.) acting alone. (33 USCS § 568) This is because the U.S. Congress considered the channel from the Gulf of California in 1938. Now, only the full U.S. Congress, acting together, can take the Harbor District of Riverside Co., if that is what an agency of the U.S. Federal government intends to do.

COOPERATION WITH LOCAL CITIES AND COUNTIES

Much incorporated and unincorporated land, other than for direct harbor development purposes, is also included in the Harbor Districts. This was done to facilitate specific planning so as to maximize the economic potential of the Harbor Districts. All of the lands, within the Harbor Districts, will diminish the tax base of the affected cities and counties. To offset this loss, the Harbor District of Riverside Co., (by this condition), will provide (25) percent of its net revenue to the affected cities and county, proportionately. Still, even at this percentage, they are expected to gain far more than they would otherwise have.

COOPERATION WITH THE STATE OF CALIFORNIA

State lands are excluded until transferred. Some State land, within the Harbor District of Riverside Co., will have to be transferred to the Harbor District of Riverside Co. for harbor development purposes. Other State lands would best be transferred to facilitate specific planning. Yet, other State lands would best be moved, (have their boundaries adjusted), also to facilitate specific planning. State permitting will be required for the desalination and electric generation facilities, etc. The Harbor District of Riverside Co. can provide a reasonable percentage of its net

revenue for this cooperation. It can also pay in water and/or the exchange of lands, if need be. As will be explained more fully later, such payment may very well extinguish the State Debt; and, within 10 years.

NEGOTIATING WITH SOVEREIGN INDIAN TRIBES

Sovereign Tribal Indian lands are neither incorporated or unincorporated; and, as such, the County of Riverside, for this purpose, has no jurisdiction over them. Sovereign Tribal Indian lands are therefore excluded from the Harbor District of Riverside Co. Should the affected Indian Tribes, of said sovereign Tribal Indian lands, wish to negotiate to participate in the specific planning of the Harbor District of Riverside Co., to include some of their properties in that planning, they may do so. This they are expected to do, however, with the, to be concurrently formed, Harbor Commission.

NEGOTIATING WITH FREEHOLDERS

"The harbor district may, in any year, levy assessments, reassessments, or special taxes and issue bonds to finance waterway construction projects and related operations and maintenance, or operations and maintenance projects independent of construction projects". (Cal Harb & Nav Code § 5904) That power, however, is precisely limited by the statute which created it. Those limitations insure that existing development will not be unduly taxed. It also limits taxation of new development to existing law. Thus, there will be no extraordinary taxation. Moreover, a condition of the Petition, hereby made, is that there will be no extraordinary assessment or taxation on existing development, and properties, or on new development.

"The board may exercise the right of eminent domain to take any property necessary or convenient to the exercise of the powers conferred." (Cal Harb & Nav Code § 5900.4) The Board of Supervisors of Riverside County, by concurrent Ordinance, (a condition of the Petition), will have delegated that power to the Harbor Commission. This right of eminent domain raises four major concerns. First, the freeholders in the Harbor District of Riverside Co. will not know who's properties, amongst them, are to be taken because the actual channel is not drawn (shown). Second, the freeholders who will

not have their properties taken are expected to profit to a far greater degree do to the substantial increase in value that the harbor will bring. Third, the freeholders, who will have their properties taken, may not receive compensation, at all; what to speak of within a reasonable time. Fourth, is that, according to the recent *Kelo v. City of New London* U.S. Supreme Court decision, the Harbor District of Riverside Co. may take all the properties in the Harbor District of Riverside Co. and re-sell the ones that can be developed by private developers to the highest private bidder. To resolve these dilemmas, the Petition provides, hereby makes, the following conditions:

- (1) Any property to be taken by the right of eminent domain is to be compensated for by payment of three times its current (pre-Harbor District of Riverside Co.) tax appraised value;
- (2) Payment for that compensation is to be made immediately;
- (3) The Harbor District of Riverside Co. is to provide a date certain when compensation will be paid, in full, upon and on notice of the taking;
- (4) Payment for that compensation is to be in any combination (at the freeholder's choice only) of U.S. dollars and highest yield bonds of the Harbor District of Riverside Co.;
- (5) Interest is paid from the time of notice of taking until full payment on the unpaid balance in the amount of 1 percent over inflation or 7 percent, whichever is greater;
- (6) No property shall be taken for private (for profit) development purposes by the Harbor District of Riverside Co.
- (7) The Harbor District of Riverside Co. is to guarantee loans for that compensation as long as any such loan is assigned to the Harbor District of Riverside Co. to collect should the freeholder default.

The term "immediately", here, means paid before any other non-imperative allocations of funds are made, as soon as funds become reasonably available.

HARBOR DISTRICT'S OBLIGATIONS TO PARKS, RECREATION, AND SPORTS

NORC facilitated the bringing of the Petition forward to insure that its adopted outdoor recreation facility, the Salton Sea, will be restored. NORC's interest in restoring the Salton Sea is to assure the citizens of the United States adequate and quality recreation and sports

facilities. The Petition is, hereby, conditioned to make certain that this purpose is accomplished. The Petition does this by conditioning the Harbor Districts to provide (by this condition) NORC with, a fee simple, one (1) percent of their total land area.

Total land area, encompassed by the boundaries of the Harbor Districts, is approximately (2,164 sq mi). Less the water surface area of the Salton Sea (365 sq mi) the Harbor Districts bound approximately (1,799 sq mi) of land. About 8531; of that is either Federal, State, or Sovereign Tribal Indian, etc., land. Thus, the Harbor Districts may include as much as (1,199 sq mi) of land. One percent of that, which is to be deeded to NORC, is (12.0 sq mi). This land is to be used for developing, operating, and maintaining inland parks and recreation/sports areas.

The Petition (by this condition) is also giving NORC second choice of land in the Harbor Districts. The main channel and pipeline to the Salton Sea, therefrom, are first choice; and, nothing else is.

The Petition (by this condition) is conditioning the Harbor Districts to provide NORC with (1) percent of their total net income, from all sources, or \$300 million per year, (\$110 million for the Harbor District of Riverside Co. and \$190 million for the Harbor District of Imperial Co.), whichever is the greater amount, so that NORC can acquire, develop, operate and maintain these lands and the facilities it will build on them.

The Petition (by this condition) is making these conditions in addition to and not in lieu of the Harbor Districts' legal obligations to provide for open space, parks, beaches, recreation and sports.

The Harbor Districts are authorized to comply to the above conditions of the Petition. (Cal Harb & Nav Code §§ 5950, 5950.5, and 5955) In addition to these obligations to NORC, the Harbor Districts are to devote, by law, at least (75) percent of their annual expenditures, initially, and at least (50) percent of their annual expenditures, thereafter, to acquire, develop, operate, and maintain inland parks and recreation areas. (Cal Harb & Nav Code §§ 5952 and 5953) As such, the Harbor Districts'

obligations to NORC are relatively minimal compared to the Harbor Districts' significant obligations to acquire, develop, operate, and maintain inland parks and recreation areas.

ORDINANCE TO APPOINT A HARBOR COMMISSION

An ordinance (the "Ordinance") to appoint a Harbor Commission by the Board of Supervisors of Riverside County is processed concurrently with the Petition. The Petition is withdrawn, by the Petitioners, if that Ordinance is not passed, concurrently with it. The reason being that the Harbor Districts will not likely be approved unless the environmental community (at large) supports it. The environmental community is not expected to support passage of the Harbor Districts unless it can be assured (at the onset) that (overall) it will be a tremendous (net) asset to the environment. The Ordinance provides that assurance.

The board of supervisors may only appoint seven members to the harbor commission, by law. (Harb. & Nav. Code § 5902) That is the reason that the number of Harbor Commissioners was limited to seven.

Marta (Marcias) Brown was selected to lead (Chair) the Harbor Commission, and delegated with the power to select three other Harbor Commissioners, (two in the alternate circumstance where a Harbor District of San Diego Co. would be necessary), for five compelling reasons:

- (1) She is a member of the Board of Governors for the United States-Mexico Foundation for Science (FUMEC).
- (2) She, along with the her late husband, U.S. Congress - Representative George E. Brown, Jr., tried to restore the Salton Sea.
- (3) She, given the power and funding which the Petition and the Ordinance does, will restore the Salton Sea and not compromise its restoration to achieve any other party objectives.
- (4) She, given the power and funding which the Petition and the Ordinance does, will make certain that the ecosystems affected by the Harbor District of Riverside Co. will be protected and not compromise them to achieve any other party objectives.
- (5) She has the trust of the environmental

community (at large).

Walter H. Eason, Jr. was selected as a Harbor Commissioner for five compelling reasons:

- (1) The method being proposed for restoring the Salton Sea, by the Petition, was his idea to begin with; that is, before it was discovered by NORC that others had similar ideas.
- (2) He is the leader of the organization (the National Outdoor Recreation Council, "NORC") which facilitated the bringing of the Petition forward, which designed the method of restoration proposed by it, and which adopted the Salton Sea.
- (3) He is committed to public recreation and sports.
- (4) He will make certain that adequate and quality recreation and sports facilities are provided to the public.
- (5) He believes in strict adherence to the law (as codified) and for that reason he will bring levity and integrity to the Harbor Commission.

Branko Belicevski was selected as a Special Advisor for five compelling reasons:

- (1) He worked with Marta Brown and the late George E. Brown, Jr. in their attempt to restore the Salton Sea.
- (2) He applied to NORC for it to adopt the Salton Sea, which NORC did.
- (3) He, given the power and funding, will restore the Salton Sea.
- (4) He is fluent in Spanish and has access to and regular contact with the Mexican officials who will make decisions pertaining to the Harbor District of Riverside Co.
- (5) He has access to and regular contact with the United States officials who will make decisions pertaining to the Harbor District of Riverside Co..

Governor Arnold Schwarzenegger, of the State of California, was delegated with the power to appoint a Special Advisor to the Harbor Commission because he is the leader of the state which has given, by statute, the lawful jurisdiction to authorize the formation of the Harbor District of Riverside Co. President George W. Bush, of the United States, was delegated the power to appoint a Special Advisor to the Harbor Commission because he is the leader of the country in which the Harbor District of Riverside Co. occurs and is ultimately responsible for

negotiations with Mexico on behalf of the Harbor District of Riverside Co. President Vicente Fox, of the Republic of Mexico, was delegated the power to appoint a Special Advisor to the Harbor Commission to instill trust and to facilitate planning. Special Advisors have all the same powers of Harbor Commissioners except one; they cannot vote. Thus, all information gathered by the Harbor Commission is accessible to Special Advisors, at all times. In addition, the advice given by Special Advisors, because they have the same right to speak at all Harbor Commission meetings as do Harbor Commissioners, must be formally considered.

RESTORATION OF THE SALTON SEA WOULD BE A PROFITABLE VENTURE

The Petition encumbers the Harbor Districts (by this condition) with a specific method of restoration of the Salton Sea, (channeling seawater from the ocean); though, it is flexible about how. A number of other things, besides channeling seawater, will have to be done to complete restoration of the Salton Sea. They are not discussed at any length here, even if mentioned. It is presumed that the Harbor Commission will study and employ all necessary methods to fully restore the Salton Sea. The Petition, however, commits (by this condition) the Harbor Districts to complete restoration of the Salton Sea; and, within 40 years (20 years for planning, engineering and construction of all necessary facilities; and, 20 years to affect a (99) percent completion of actual restoration). The Petition also conditions, (by this condition), that restoration of the Salton Sea will not entail a reduction of water level of the Salton Sea below that of its 1959 to 2003 levels.

The method of restoration of the Salton Sea (channeling seawater) conditioned on Petition here was considered by the Salton Sea Authority to be a net expense (a loss); one so large, "\$10s of billions", that the government would not afford it. (Salton Sea Restoration: Final Preferred Project Report, Salton Sea Authority, July 2004, p. 18) Recently, it has been agreed (by the Quantification Settlement Agreement of 2003 (QSA), p. 1) that much of the water, apportioned to the Salton Sea from the Colorado River, (1.3 maf/yr), would be better utilized elsewhere. The Salton Sea Authority, for its Preferred Project, proposes that to a degree; a reduction of that

apportionment between (0.4 and 0.5 maf/yr). (p. ES-3).

NORC found the inverse to be true; that restoration of the Salton Sea will result in a net profit, instead. There is a good amount of evidence to support the conclusion that the Salton Sea is rich in accumulated precious metals. There may even have been mining operations there in the past. This can and should be verified. If assaying shows value, then the precious metals should be extracted and the proceeds, therefrom, used to restore the Salton Sea.

The selenium and other contaminants will have to be removed from the soil to restore the Salton Sea anyway. Mining is just as good a method as any for doing that. In this way, the precious metals can be extracted and the hazardous waste can be removed. It would be unconscionable to return that hazardous waste back to the Salton Sea after extracting the precious metals from the soil containing it. No one in their right mind would do that. Hazardous waste, of course, will have to be disposed of properly. The proceeds from the sale of any precious metals extracted will be credited to the Harbor Districts' Salton Sea Restoration Fund; and, they could be in the \$10s of billions. Precious metals are not the only potential assets available to offset the cost of restoration of the Salton Sea.

The Salton Sea receives (1.3 maf/yr) in an apportionment from the Colorado River to maintain its level. This water will no longer be needed for that purpose for the Harbor Districts will provide seawater to maintain (and restore) the Salton Sea. As the apportionment of Colorado River water is to the Salton Sea, it is considered an asset of the Salton Sea. (Salton Sea Restoration; Final Preferred Project Report, July 2004, pp. 1 & 70) As such, any application of that apportionment should be credited to the Harbor Districts' Salton Sea Restoration Fund.

The proposed Harbor Districts will build a main channel for shipping which will cause a tremendous amount of development to occur; estimated at between \$400 and 600 trillion in assessed value, on the United States side alone. Most of that development, by far, will cause, on balance, a huge initial and ongoing revenue gain to the Harbor Districts. As that revenue is to be shared with the affected

Counties, Cities and the State of California, it will be a huge initial and ongoing revenue gain for them, as well. Even at a very simplistic (1) percent net revenue gain, the Harbor Districts are expected to receive a net revenue gain, from their share of that development, of between \$2.0 to 3.0 billion a year; a good portion of which will be credited to the Harbor Districts' Salton Sea Restoration Fund. The State of California's share of the revenue from that development may be so high, between \$0.50 to \$0.75 billion a year, that it, alone, may pay off the California State Debt within less than 10 years. California's "total debt-service costs will be \$4.8 billion in 2004-05, rising to a peak of \$7.4 billion in 2009-10." (An Overview of State Bond Debt, July 2004, www.lao.ca.gov/ballot/2004/bond_11_2004.htm)

The above is a conservative estimate of the revenue to be expected from development in and around the proposed Harbor Districts. The Unified Port of San Diego's August 2003 Economic Impact Analysis showed that the Port and its tenants generate \$8.4 billion in total revenue. (Unified Port of San Diego Strategic Plan 2002 - 2006, Update June 2004, p. 4, www.portofsandiego.org) That is a more realistic estimate of revenue to be expected from development in and around the proposed Harbor Districts.

The proposed Harbor Districts will build desalination plants and electric generation facilities to provide water (and maybe electricity) for themselves and a vast number of other people. The Harbor Districts may very well have commitments for no less than (30 maf/yr) to as much as (300 maf/yr) of fresh drinking water. The net gain to be expected from the sale of that water boggles the mind. Even at a meager (25) percent net gain (\$250/ac ft) that is no less than \$7.5 billion a year, and as much as \$75.0 billion a year, to be credited to the Harbor Districts; a good portion of which will be credited to the Harbor Districts' Salton Sea Restoration Fund. At the more realistic (50) percent net gain figure, (\$500/ac ft), that is between \$15.0 to \$150.0 billion a year to be credited to the Harbor Districts; (between \$5.5 and \$55.0 billion for the Harbor District of Riverside Co. and between \$9.5 and \$95 billion for the Harbor District of Imperial Co.).

The proposed Harbor Districts will build shipping and port facilities such as; channels, shipways,

ship berths, anchorage places, turning basins, jetties, breakwaters, bulkheads, seawalls, wharves, ferry slips, and warehouses. The net gain the Harbor Districts will realize from the fees for the use of these facilities are also expected to be high; ranging from between \$100 to \$300 million a year; (between \$36.5 and \$109.5 million for the Harbor District of Riverside Co. and between \$63.5 and \$190.5 million for the Harbor District of Imperial Co.); a good portion of which will be credited to the Harbor Districts' Salton Sea Restoration Fund.

The major ongoing cost to the Harbor Districts would be that of servicing the bonds for the initial construction. Even at the lowest yield, (1) percent real net profit, developers are expected to buy all the bonds necessary to complete construction, regardless of the cost. This is because they have so much more to gain from private development; \$400 to 600 trillion. Were actual cost of initial construction (on the U.S. side) to be more than twice that estimated, here, roughly \$1 trillion, cost to the Harbor Districts would only be approximately \$10.0 billion a year to service those bonds; (\$3.7 billion a year for the Harbor District of Riverside Co. and \$6.3 billion a year for the Harbor District of Imperial Co.). Even for the most extravagant option, (the one that would produce 300 maf/yr of fresh water), at the high estimate of \$5 trillion for initial construction, cost to the Harbor Districts would still be within range, approximately \$50.0 billion a year to service those bonds; (\$18.2 billion a year for the Harbor District of Riverside Co. and \$31.8 billion a year for the Harbor District of Imperial Co.). In other words, the Harbor Districts will profit no matter how extravagant the cost of construction may be and, regardless of the cost necessary to fully restore the Salton Sea.

AUXILIARY CHANNEL

The proposed channel, for both Harbor Districts, would travel from the United States/Mexico border, just west of Calexico, northerly to Palm Desert, Ca.; 115 miles through Imperial County and 66 miles through Riverside County. The Petition makes the assumption that there will be a Mexican harbor (channel) from the Gulf of California to the United States/Mexico border. To form the Harbor District of Riverside Co., however, this assumption will have to be formalized. A letter of

intent from Mexico should be sufficient for that purpose.

If such a letter of intent from Mexico cannot be obtained before the Board of Supervisors of Riverside County votes on whether to form the Harbor District of Riverside Co., an auxiliary channel is proposed, instead; (the "Auxiliary Channel"). The Auxiliary Channel would originate from the Pacific Ocean, within or near Border Field State Park, and travel east through San Diego County to meet up with the channel in the Harbor District of Imperial Co. It would add another 15 miles of channel through Imperial County and 63 miles through San Diego County. The map of this Auxiliary Channel can be obtained, after publication, from the NORC web site; (www.nationaloutdoorrecreationcouncil.us).

**PETITION TO FORM THE SALTON
SEA HARBOR IMPROVEMENT
DISTRICT OF RIVERSIDE COUNTY**

We, the signatory freeholders (the "Petitioners") of the proposed Salton Sea Harbor Improvement District of Riverside County, (hereinafter the "Harbor District of Riverside Co."), by this Petition, do, hereby, petition the Board of Supervisors of Riverside County to form said Harbor District of Riverside Co. as follows.

**NAME OF THE PROPOSED HARBOR
IMPROVEMENT DISTRICT**

Pursuant to Cal Harb & Nav Code § 5822(a), the petition "shall show" the name of the proposed harbor improvement district. The name of this proposed harbor improvement district is to be the SALTON SEA HARBOR IMPROVEMENT DISTRICT OF RIVERSIDE COUNTY.

**OFFICIAL NAME BY WHICH THE HARBOR WILL BE
COMMONLY KNOWN**

Pursuant to Cal Harb & Nav Code § 5822(b), the petition "shall show" the official name or name by which the harbor will be commonly known. The name by which this harbor improvement district will commonly be known, if formed, is the "Harbor District of Riverside Co."

**NOT VESTED, NOR EXERCISED BY, AN EXISTING
HARBOR COMMISSION**Pursuant to Cal Harb &

Nav Code § 5822(c), the petition "shall show" whether the improvement, development, protection, maintenance, management or control of the harbor, or any part of it, is vested in or exercised by a harbor commission. The improvement, development, protection, maintenance, management or control of the proposed Harbor District of Riverside Co., or any part of it, is not vested in, nor exercised by, any existing harbor commission.

This Petition to form the Harbor District of Riverside Co. is being proposed, simultaneously, with the petition to form the Harbor District of Imperial Co.; and, alternatively, the petition to form the Harbor District of San Diego Co. Those petitions, like this Petition to form the Harbor District of Riverside Co., are also being processed concurrently with an ordinance to create a harbor commission. Those ordinances to create harbor commissions are the same as the Ordinance, here, to create the Harbor Commission for the Harbor District of Riverside Co. In other words, the Harbor Commissioners and Special Advisors for the Harbor District of Riverside Co. are the same persons who will make up the harbor commission for the Harbor District of Imperial Co.; and, alternatively, the Harbor District of San Diego Co. As all the Harbor Commissions will be made up of the same persons, there cannot be any conflict between the Harbor Commissioners, the Special Advisors, or the Harbor Commissions.

PROPOSED HARBOR IMPROVEMENT DISTRICT BOUNDARIES

Pursuant to Cal Harb & Nav Code § 5822(d), the petition "shall show" the exterior boundaries of the proposed harbor improvement district, which may include incorporated territory, or both incorporated and unincorporated territory but shall include the whole or some part of the harbor proposed to be improved or developed. Signatories of this Petition, before signing, were shown the detailed maps of the exterior boundaries of the proposed Harbor District of Riverside Co., the proposed Harbor District of Imperial Co. and, the alternative proposed Harbor District of San Diego Co. A single map (of less detail) showing the exterior boundaries of the proposed Harbor Districts will be included with the published notice. The more

detailed maps can be viewed, after that publication, on the NORC web site; (www.nationaloutdoorrecreationcouncil.us).

Request for Formation of the Harbor District of Riverside County

Pursuant to Cal Harb & Nav Code § 5823, this Petition request that the territory included within the boundaries of the proposed Harbor District of Riverside Co., as shown, be formed into a harbor district for the purpose of the development of a harbor.

PROPOSED DEVELOPMENT

Pursuant to Cal Harb & Nav Code § 5822(e), the petition "shall show" a "general description" of the proposed improvement and development work. The work may include the dredging of channels, shipways, ship berths, anchorage places, and turning basins, and the construction of jetties, breakwaters, bulkheads, seawalls, wharves, ferry slips, and warehouses. (Cal Harb & Nav Code § 5820)

A main channel, (which is more fully described herein below), no less than 1/2 mile wide and 80 feet high (carrying a 60 feet depth of seawater, MLLW), will be built in the Harbor Districts. To take advantage of that channel, for approximately 2 1/4 miles on both sides of it, development will be specific planned. Specific planning will include all types of development including all that which is authorized under (Cal Harb & Nav Code § 5820). It will also include the public recreation and sports facilities to be built, maintained, and managed, by NORC. It will also include the desalination and electric generation facilities (which are more fully described herein below) to be built, maintained, and managed, by the Harbor Districts.

Fred Dungan saw the vast potential of building the proposed channel; "Marinas could be built along the entire length of the canal, increasing the value of desert real estate in both the United States and Mexico." (www.fdungon.com/salton.htm)

The Salton Sea is included in the Harbor Districts to insure its restoration and because it will take seawater from the main channel. It is also included in the Harbor Districts in the event that locks are built to allow access to it by ships.

Development will be specific planned for (2) miles surrounding the Salton Sea. Specific planning will include all types of development including all that which is authorized under (Cal Harb & Nav Code § 5820). It will also include the public recreation and sports facilities to be built, maintained, and managed, by NORC. It will also include the desalination and electric generation facilities to be built, maintained, and managed, by the Harbor Districts.

ESTIMATED COST OF DEVELOPMENT AND INCIDENTAL EXPENSES

Pursuant to Cal Harb & Nav Code § 5822(f), the petition "shall show" an estimated cost of the development, and the incidental expenses.

Delimiting Channel Design Factor

Initially, it was thought that the delimiting factor for determining the ultimate width of the main channel would be the berth and number of largest ships that may traverse it, at any given point and time. This is easily calculated.

For one-way traffic, a multiplier of three times the design ship beam is a conservative design factor. This results in a conservative channel design width of (306 feet). For two-way traffic, a multiplier of six times the design ship beam is a conservative design factor, resulting in a conservative channel design width of (610 feet). (Draft San Diego Harbor Deepening Detailed Project Report, Nov. 2002, p. 6-5)

Turning basins require an even greater design width; in certain places. According to EM 1110-2-1613, "the size of the turning basin should provide a minimum turning diameter of at least 1.2 times the length of the design ship where prevailing currents are 1/2 knots or less." The length of the design vessel is 650 feet; therefore, the diameter of the basin should be a minimum of 780 feet. A conservative turning basin design is 2 times the design ship's length. For a design ship (650 feet) in length, this calls for a (1300 ft) diameter turning basin. (Draft San Diego Harbor Deepening Detailed Project Report, Nov. 2002, p. 6-6)

Other factors, however, may require a wider design width. Depth is, relatively, a constant. Depth will not much more than (53 feet) MLLW. (Draft San Diego Harbor Deepening Detailed

Project Report, Nov. 2002, p. 2-1) This is because depth must be, at least, (53 feet) MLLW to allow for the larger Navy ships and (42 feet) MLLW to allow for the larger cargo ships, fully loaded at low tide; and, cost increases significantly to make a channel deeper. With a (5 ft) under keel clearance, (p. 6-5), the depth of the seawater in the main channel should be no less than (58 feet) MLLW. A couple of feet more were added for good measure; making the total seawater depth to be (60 feet) MLLW.

The Harbor District of Riverside Co. is to produce desalinated water. It takes approximately (2) gallons of seawater to produce (1) gallon of fresh water. The amount of that water is directly proportional to the design width of the main channel. The larger the amount of desalinated water, to be produced, the larger the design width of the main channel. If the demand for water is large, then the design width of the main channel will also be large.

For this estimate; a main channel that is to produce (29 maf/yr) of fresh water, and pipe another (2 maf/yr) of seawater for the Salton Sea, (60 maf/yr; also, 164,384 ac ft/day) of seawater altogether, may have to hold, at least, 20 times that daily volume to prevent entrainment and a dangerous (un-navigable) flow; (3,287,671 ac ft). Such a channel, at the depth of (60 ft) MLLW of seawater, would be (2,440 ft) wide along the bottom. Its sides would add another (180 ft) to the width across the top of the main channel; (2,620 ft). With just one (20 ft) service road that would be a main channel (1/2) mile wide; (2,640 ft).

A (1/2) mile wide main channel would allow for 8 way traffic of large ships while allowing 2 way traffic for smaller vessels, at the same time. It could even allow, all along its length, two of the larger cargo ships to turn around at the same time. As such, the delimiting factor for determining the ultimate width of the main channel, should the Harbor Districts produce a large quantity of drinking water is the demand thereof.

Desalinated Fresh Water Demand

As was previously established, the amount of drinking water to be produced (if large) is the delimiting factor in determining the ultimate

design width of the main channel. To make a credible approximation of cost, the dimensions of the proposed main channel must be known. By law, a petition to form a harbor improvement district must include a credible estimate of cost. As such, for this Petition, the demand for desalinated drinking water must therefore be estimated.

Given the choice, one is expected to buy fresh water at the lower rate. If fresh water is available from another source, at a cheaper rate, then one is not expected to buy desalinated fresh water from the Harbor Districts. California Department of Water Resources (DWR) considers desalinated water to be, cost wise, competitive with certain other sources. (Draft California Water Plan, April 2005, p. 6-4) Whether desalinated water is actually competitive, or just comparable, to other sources may not be relevant. If no other source can provide the demand for fresh water, and more fresh water must be had, then desalinated fresh water makes good economic sense, even at a somewhat (comparably) greater cost.

California Water Plan's (2005 - 2030) Provision of Water for the Environment

The Draft California Water Plan, April 2005, plans to provide for the water demands of Californians through the year 2030. This, of course, is without considering the Harbor Districts' proposed addition.

The Draft California Water Plan, April 2005, plans to provide for (2 maf/yr) of water to stop groundwater overdraft and one (1 maf/yr) of water to meet current environmental water objectives. (p. 4-14)

Affect of the Karuk Tribe Legal Action on Water Demand for the Environment

According to the Equal Footing Doctrine (that the Territories enter the Union on an equal footing with the original 13 States) and a slew of other U.S. laws, the States own title to and control the land under their waters and the water therein. Through a series of relatively recent legal actions, (the most recent being the Karuk Tribe Case), the courts have whittled away to nothing that State ownership

and control.

On October 8, 2004 the Karuk Tribe (of California) filed action against the U.S. Forest Service in the United States District Court for the Northern District of California, (Case No.: C 04-4275 SBA). On June 13, 2005 and again on July 1, 2005, Judge Sandra Brown Armstrong, by her Orders of the Court, refused to consider arguments opposing the jurisdiction of the U.S. Forest Service over the land under the waters of the State of California and to the water therein. Instead, she assumed, hypothetically, that the U.S. Forest Service had jurisdiction and then, under that assumption, ruled on the issues presented by the Tribe. Essentially, by ignored the law and facts to the contrary, she is allowing the U.S. Forest Service to assume control over all waters, occurring within the National Forests. Most waters and headwaters occur within the National Forests. As a consequence of Judge Armstrong's decisions, the U.S. Forest Service may now take control of almost all water in th e United States.

The U.S. Forest Service is expected to exercise control over most of the water in the State of California for a reason. That reason is that they plan to dedicate considerably more applied water to the environment than DWR did. As the change in jurisdiction occurred, quietly, and the decision was most recent, July 2005, the Draft California Water Plan of April 2005 does not show the additional amount of applied water to be dedicated to the environment by the U.S. Forest Service. Neither do any of the other States' water plans.

None of the States present that the U.S. Forest Service may now exercise control over most of their water. The States may simply be unaware that they may no longer be in control of the brunt of the water in their State. If they are aware, they did not reflect that fact in their water plans.

The U.S. Forest Service would not exercise control over most of the water in a State to affect only a small increase in applied water to the environment. At the very least, they intend to double the applied water to be dedicated to the environment. It would be more realistic, though, to expect a quadruple increase or more. This estimate, however, will be premised on the lower figure.

Colorado River Basin States Fresh Water Demand for the Environment

The Draft California Water Plan, April 2005, plans to provide for (3 maf/yr) for the environment. (p. 4-14) As was established, the U.S. Forest Service is expected to, at least, require an additional dedication of twice that amount. Double that amount would be (6 maf/yr) of water for the environment in California; (3 maf/yr) for which is unplanned.

The Harbor Districts could, effectively, provide water for all seven of the Colorado River Basin States, and the regions of Texas which receive Colorado River and Rio Grande River water. California is, roughly, one fourth the size of all the Colorado River Basin States. (www.50states.com) As such, the U.S. Forest Service is expected, at least, to require an additional dedication of (9 maf/yr) of water for the environment for the other Colorado River Basin States, other than California. Altogether, the U.S Forest Service is expected, at least, to require an additional dedication of (12 maf/yr) of water for the environment for the Colorado River Basin States, all for which is unplanned.

Generally speaking, the Harbor Districts will not pump desalinated water up to the hydraulic regions that will require additional water for the environment. Pumping both ways does not make good economic sense. Instead, the Harbor Districts will simply provide desalinated water to the hydraulic regions closest to it thereby allowing the farther hydraulic regions to discontinue pumping water to those hydraulic regions. Not only will those farther hydraulic regions gain water but they will no longer have to dedicate electricity for pumping or have to maintain the canals for transporting water to the hydraulic regions close to the Harbor Districts.

Mexican Fresh Water Demand on the United States Side

As the main channel would originate from the Gulf of California, a significant portion of the main channel's desalinated water, to be produced, would be consumed by Mexico. As the main channel is at sea level, the desalinated water to be produced for Mexico would be, more economically, produced on the Mexico side. However, some of the desalinated water to be

produced from the main channel for Mexico must, by necessity, be produced on the United States side. For design purposes in the Harbor Districts, the concern is, primarily, for water demand to be produced on the United States side.

Originally, it was thought that the Harbor Districts, for their impending agreement with Mexico, would have to foot much of the cost to build the main channel, desalination plants, and electric generation facilities, etc., in Mexico; from the border to the Gulf of California. Were that the case, this Petition would also have to calculate (estimate) that cost, as well. However, Mexico is not expected to have a problem raising the necessary monies needed. Businesses (developers, manufacturers, and such, who will benefit directly) on both sides of the border are expected to buy all the bonds necessary to build the main channel, desalination plants, and electric generation facilities, etc., in Mexico. Even were the Harbor Districts to offer (negotiate) to pay for construction, Mexico may not allow them to do so for fear of possible interference, in its business affairs, and for fear of possible unfair distribution of the profits.

As far back as 1929, Mexican officials demanded (4.5 maf/yr) of water to be allocated to them from the Colorado River. (www.crwua.org/colorado_river/lor.htm) The original 1944 Treaty, however only assured Mexico (1.5 maf/yr); just (⅓) of that originally demanded. In recent years, the United States has had difficulty not only in maintaining the agreed upon level of water quality (evidenced by the 1974 Treaty) but in providing the amount originally agreed upon. Worse, is that the integrity of the ecosystems of the Gulf of California and the Cienega de Santa Clara are being "devastated" by, amongst other things, the failure to allow a sufficient amount of the Colorado River water to reach the Gulf of California. (www.itt.com/waterbook/arizona.asp and www.mechdir.com/press/catalog/106/index.html)

The Harbor Districts will draw all their seawater from the Gulf of California. Without fully restoring the ecosystem of the Gulf of California, it is assumed that the environmental community will not allow the Harbor Districts to do this. Full restoration of the Gulf of California and the

Cienega de Santa Clara may very well require allowing the full amount of historic flow from the Colorado River to reach the Gulf of California. This Petition assumes that the Mexican officials, in 1929, demanded what they believed to be the average amount of water which historically flowed from the Colorado River and reached the Gulf of California. The demand of desalinated water to restore the Gulf of California and the Cienega de Santa Clara is therefore estimated to be no more than (4.5 maf/yr).

It is estimated that the difference between what was agreed upon (the 1944 Treaty) and what is actually delivered to be about (0.25 maf/yr). It would take (0.5 maf/yr) to make up for the loss, over the years, though. As such, the total Mexican demand for fresh water on the United States side is estimated to be (5 maf/yr).

Mexican Fresh Water Demand on the Mexico Side

As the cost of construction of the main channel, desalination plants, and electric generation facilities, etc., on the Mexico side, will, more than likely, be paid for by Mexico, (and/or businesses with interests there and in the main channel itself), the Mexican demand for desalinated water does not enter into the calculation (estimate) of the cost to the Harbor Districts. Never-the-less, since the Mexican government is to receive copies of this Petition, a short discussion on the subject is in order.

In 1929 Mexico demanded all the water which historically flowed from the Colorado River and reached the Gulf of California, through their country. For the purposes of this Petition, the assumption is that they expected to use it all. It is also assumed that demand for water (in the local hydraulic regions there) has significantly increased since then. Current demand for water in those hydraulic regions may be twice the amount demanded in 1929; now (9 maf/yr). Future demand in those hydraulic regions may be twice the current estimated demand; (18 maf/yr). This is considered to be a conservative estimate of demand for desalinated water for it does not take into account any other hydraulic regions.

Business proponents would have the main channel, on the Mexico side, produce as much desalinated water as is possible. They claim that as much as can be produced would be consumed.

They may even pay to insure huge reservations and that planning reflect those reservations. There are limitations which would define the amount of desalinated water which can be used but it is not known whether they exceed the limitations on production. For these reasons, and a proliferation of others, planning and engineering on the Mexico side is expected to be very challenging.

Current Fresh Water Demand in and Adjacent to the Harbor Districts

According to the California Water Plan, (April 2005 Draft), DWR is expecting, at most, an increase in demand for water in the hydraulic region of the Harbor Districts, and the adjoining hydraulic regions, of approximately (2 maf/yr) by 2030. (p. 4-42, Figure 4-4) This is planned for, and as such, is not considered a demand for which the Harbor Districts would be required to provide.

Future Harbor Districts Fresh Water Demand

Though, the California Water Plan, (April 2005 Draft), planned for an increase within the Harbor Districts, approximately (0.25 maf/yr), DWR did not consider (foresee) the affect of the Harbor Districts because they were conceived afterward. (p. 4-42, Figure 4-4) Development will be far more intensive, because of the main channel, than originally anticipated. Upon completion, demand for water is estimated to be approximately (2 maf/yr) in the Harbor Districts. The main channel, however, must be designed with maximum demand for water in mind. Otherwise development along the edge of the main channel would not be feasible for a buffer zone would have to be maintained in order to allow for future expansion. To allow for development along the edge of the main channel, total potential future demand will have to be conservatively estimated. To be conservative, demand for water may increase as much as four fold within the Harbor Districts; to (8 maf/yr).

Future Fresh Water Demand in Adjacent Hydraulic Regions

Entrainment is deemed to be so adverse to the environment that proponents, proposing desalination plants along the coast of California, are not being permitted to build any new inlet

pipes. (www.carlsbaddesal.com) For this reason, and the fact that no other source of water is as economically feasible, the adjacent hydraulic regions are expected to fill their future demand for water entirely from the Harbor Districts. After all, the main channel solves the entrainment problem in a way that would not be economically feasible to duplicate along the South Coast.

Growth in the South Coast Hydraulic Region is expected to increase but not as dramatically as in the Colorado River Region (where the Harbor District of Riverside Co. is located). This is because building in that Region is nearing saturation. Demand for water may increase as much as two fold there; to (3 maf/yr).

Growth in the South Lahontan Hydraulic Region is expected to increase to a lesser degree to that within the Harbor Districts but to a greater degree to that within the South Coast Hydraulic Region. Demand for water may increase as much as three fold there; to (1 maf/yr).

Salton Sea Restoration Seawater Demand

Restoration of the Salton Sea will not require desalinated water. However, conveying seawater from the main channel to the Salton Sea has almost all of the same design affects of desalination plants. Thus, that demand is considered. Restoration may necessitate maintaining the Salton Sea at its current level. Providing seawater in an amount equal to or less than that which evaporates yearly would do that. Pan evaporation, less rainfall, of the Salton Sea is 1.7 maf/yr. Less seawater may be required to restore the Salton Sea due to agricultural runoff. However, if that runoff is treated, which may very well be the case, then the full amount may be required. The full amount, (1.7 maf/yr) of seawater, is the amount for which this estimate uses.

Channel Pan Evaporation Seawater Demand

The main channel, itself, will experience significant pan evaporation; roughly (0.3 maf/yr) of seawater. To calculate the size of the main channel, this demand is also considered.

Expected Demand for Fresh Water

The Harbor Districts can expect to fill demand for fresh water that no other source can provide for, or which can be provided for at a competitive (lower actual cost) rate. Such demands for fresh water were discussed above and are totaled as follows:

Expected Demand for Fresh Water

maf/yr

Colorado River Basin States Environment 12
Mexican Demand Affecting the Harbor Districts 5
Unplanned for Demand Within the Harbor Districts 8
Unplanned for Demand in Adjacent Hydraulic Regions 4
Total Demand of (desalinated fresh water) 29

Conservatively, the Harbor Districts can expect to build a main channel to supply this demand for fresh water; (29 maf/yr). However, it is more than likely that the Harbor Districts will have to build a main channel to accommodate potential demand, as well. Of course, letters of intent to purchase fresh water will be required before any such planning or construction would occur. It is not incumbent upon the Petitioners to produce such letters. Still, it is advantageous to discuss what might occur.

Potential Demand for Fresh Water in California

Potential demand for fresh water is demand that is already being supplied (or is planned for) and which is comparable (or competitive) in cost. Potential demand does not include expected demand, discussed above. It is over and above that. The Colorado River Basin States, including California, may very well desire to pay for desalinated water to be transported to them from the Harbor Districts. This is because Harbor Districts' water would be more reliable, of higher quality, less costly, less burdensome, and considerably more environmentally friendly, than current sources. Amongst the Colorado River Basin States, only the potential demand in California is discussed, here.

About (75) percent of the total dedicated supply of water in California is consumed south of Sacramento. (California Water Plan, 1998, p. 3-2) Normal total dedicated supply by DWR is (85 maf/yr); approximately (64 maf/yr) of which is dedicated, on average, south of Sacramento.

(California Water Plan, April 2005 Draft, p. 3-4, Table 3-1) A potential demand of (64 maf/yr) of fresh water would require the Harbor Districts to plan for (128 maf/yr) of additional draw down of seawater.

Cost of Constructing Desalination Facilities

Now that it is known how much desalinated fresh water the main channel (on the United States side) must produce, (29 maf/yr at a minimum), the cost to construct desalination facilities to produce, and to convey, that amount can be estimated. This cost estimate is premised upon the proposed (to be completed in 2008) Carlsbad desalination facility. (Daily Transcript, 6-27-05) Because that plant will only produce, initially, (56,000 ac ft/yr; also, 0.056 maf/yr), this cost estimate, premised thereupon, may be unreasonably high. Economies of scale are expected to yield a much lower actual cost. The Carlsbad facility is estimated to cost \$270 million to construct the plant and another \$42 million to construct the facilities to convey the water produced by that plant. The combined cost to construct facilities to produce, and to convey (29 maf/yr) of desalinated freshwater is estimated at \$161.5 billion. Of course, that amount is for both Harbor Districts.

Cost of Constructing Desalination Facilities

| | | |
|------------------------------|--------|------------|
| miles | maf/yr | \$billions |
| Harb. Dist. of Riverside Co. | 66 | 10.6 59.0 |
| Harb. Dist. of Imperial Co. | 115 | 18.4 102.5 |
| Both Harb. Districts | 181 | 29.0 161.5 |

Cost of Constructing Electric Generation Facilities

It takes a constant flow of (33 MW) (megawatts) of electricity to produce (50,000 ac ft; also, 0.05 maf/yr) of fresh water. (California Water Plan, April 2005 Draft, p. 6-5) To produce (29 maf/yr) of fresh water, the Harbor Districts would have to generate an additional (19,140 MW; also, 19.1 gigawatts) of electricity. The Harbor Districts will utilize, amongst other sources, hydroelectric generation facilities. It cost Turlock Irrigation District approximately \$2.3 million, per megawatt, to construct such hydroelectric generation facilities. (www.tid.org) The cost to construct facilities to produce (19.1 GW) of electricity is estimated at \$43.9 billion. Of course, that amount is for both Harbor Districts.

**Cost of Constructing Electric Generation Facilities
for Desalination Facilities**

| | | |
|------------------------------|---------------|------------|
| miles maf/yr | gigawatts | \$billions |
| Harb. Dist. of Riverside Co. | 66 10.6 7.0 | 16.1 |
| Harb. Dist. of Imperial Co. | 115 18.4 12.1 | 27.8 |
| Both Harb. Districts | 181 29.0 19.1 | 43.9 |

Desalination facilities are not the only demand for electricity that the Harbor Districts will cause. The Harbor Districts will cause a great deal of private development. They will have to produce the electricity for that development, as well. Private development may be as much as (4.5 square miles) for every linear mile of Channel. Each square mile of private development will demand, roughly, (2 megawatts) of electricity. There may be as much as (814.5 sq mi) of private development in the Harbor Districts. The cost to construct facilities to produce (1629 MW; also, 1.6 GW) of electricity is estimated at \$3.8 billion. Of course, that amount is for both Harbor Districts.

**Cost of Constructing Electric Generation Facilities
for Private Development**

| | | |
|------------------------------|---------------|------------|
| Channel Dev. | | |
| miles sq mi | gigawatts | \$billions |
| Harb. Dist. of Riverside Co. | 66 297.0 0.6 | 1.4 |
| Harb. Dist. of Imperial Co. | 115 517.5 1.0 | 2.4 |
| Both Harb. Districts | 181 814.5 1.6 | 3.8 |

Cost of Land

The Harbor Districts consist of approximately (1,199 sq mi). The main channel, through both Harbor Districts consist of (91 sq mi), altogether; (33 sq mi in the Harbor District of Riverside Co. and 58 sq mi in the Harbor District of Imperial Co.). The commitment to NORC is (1) percent of the Harbor Districts, (12 sq mi); (4.4 sq mi in the Harbor District of Riverside Co. and 7.6 sq mi in the Harbor District of Imperial Co.). The Harbor Districts may have to utilize another (77 sq mi) for recreation, sports, parks, open space, transfers, desalination facilities, electric generation facilities, and the like. Thus, a total of (200 sq mi; 73 sq mi in the Harbor District of Riverside Co. and 127 sq mi in the Harbor District of Imperial Co.) will have to be purchased for harbor development purposes.

This Petition is conditioned on providing three times assessed value for land to be purchased for

harbor development purposes. The average assessed value of land, in the Harbor Districts, is approximately \$40,000/ac; and, three times that amount is \$120,000/ac. As such the cost of land (128,000 ac; 46,720 ac in the Harbor District of Riverside Co. and 81,280 ac in the Harbor District of Imperial Co.) is estimated to be approximately \$15.4 billion for both Harbor Districts; (\$5.6 billion for the Harbor District of Riverside Co. and \$9.8 billion for the Harbor District of Imperial Co.).

Cost of Land

Channel Harbor Land

miles sq mi \$billions

Harb. Dist. of Riverside Co. 66 73.0 5.6

Harb. Dist. of Imperial Co. 115 127.0 9.8

Both Harb. Districts 181 200.0 15.4

Cost of Constructing the Main Channel

The main channel is designed for the amount of seawater required.

Demand for Seawater

maf/yr

Seawater Demand to Produce Fresh Water (29 maf/yr x 2)

Web Site =

<http://www.nationaloutdoorrecreationcouncil.us>

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Amtronix, Inc. Introduces A New Battery Care Product

Released on = August 18, 2005, 12:47 pm

Press Release Author = Richard Morrow / Amtronix

Industry = Energy

Press Release Summary = Amtronix, Inc. is introducing ABC-DS12, an innovative 12V Battery Desulfator. This product is fairly new to the US market, but has been a popular money saving

product in Europe.

Press Release Body = Amptronix, Inc. is introducing ABC-DS12, an innovative 12V Battery Desulfator. This product is fairly new to the US market, but has been a popular money saving product in Europe.

In order to keep batteries in good shape, they require maintenance just like any other product. The Battery Desulfator was developed to do just that for lead batteries. By utilizing the power of the battery and returning it as a surge or pulse, it actually delays and reduces sulfation within the battery. "Sulfation is the primary cause of premature battery failure," explains Yvonne Wu, Vice President of Amptronix, Inc. "The Desulfator actually has the ability to revive old batteries back to a state of normal functionality."

Availability

The ABC-DS12 is available immediately by calling Amptronix, Inc. at (909) 839.2858 or visiting its Web site at www.amptronix.com.

About Amptronix

Amptronix, Inc. manufactures and markets a variety of mobile electronic products, including 3-stage battery chargers, true sinewave / pure sinewave inverters, modified sinewave power inverters, battery-care products, automotive TFT displays, MP3 player, MP4 players with 2.5" to 7" display, and mobile coolers. With more than 20 years of OEM experience, our manufacturing has successfully supported name brands worldwide with quality products. With a strong R&D capability and TUV audited ISO-9001 production facilities, we are dedicated to providing our partners with competitive services in price, quality, and local support.

Web Site = <http://www.amptronix.com>

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EXHIBIT "3"

SAVE THE SALTON SEA



"Bureaucracy, made up entirely of petty minds, stands as an obstacle to the prosperity of the nation; delays for seven years, by its machinery, the project of a canal which would have stimulated the production of a province." -
Honoré de Balzac

When my father first took me to the Salton Sea 40 years ago, it was one of the most popular recreational areas in Southern California with almost as many visitors as Yosemite. But over the years the vast inland sea has been used as a sump for the polluted leachings of local irrigation districts, causing the once plentiful birds and fish to die.

Today, the Salton Sea is experiencing an environmental meltdown. It is already 25 percent saltier than the Pacific Ocean. If a solution is not forthcoming soon, the sea and

everything that depends on it—fish, migratory waterfowl, and the region's economy—will be dead. The time for environmental studies and reports has run out—either we begin saving the sea now or there soon will be nothing left to save. In the summer months of June, July, and August, 2000, 413 brown pelicans (an endangered species) died. With over 90 percent of California's wetlands gone, these birds are increasingly dependent upon the Salton Sea. When 2 million fish, mostly tilapia, died on August 27-28, the shoreline quickly became a putrefying, malodorous mass of carcasses rotting in 120 degree heat and 75 percent humidity.

Formed by accident between 1905 and 1907 when the Colorado River burst through shoddily constructed irrigation gates south of Yuma, Arizona, the Salton Sea lies within Riverside and Imperial counties near the U.S./Mexico border in southeastern California. Nearly the entire output of the raging Colorado flowed into the Salton Basin for several years, inundating communities, farms, Indian reservations, and the Southern Pacific railway. Flooding was finally checked in 1907 by a dike built by railcars dumping boulders into the onrushing waters. By then, the Salton Sea was about 40 miles long and 13 miles wide.

The Salton Sea is currently 35 miles by 15 miles and has been as long as 40 miles by 20 during a period when the Mojave Desert got an unusually large amount of rain. It has an average depth of 29.9 feet and, at its deepest location, is 51 feet. The sea contains 7.1 million acre feet of water, 1.3 million acre feet of which evaporates annually. A five-mile-long trench on the south end of the Salton Sea forms its deepest point. Approximately 220

feet below sea level, the Salton Sea lies only thirteen feet above Death Valley, the lowest spot in North America.

Irrigation runoff from farms in the Coachella and Imperial valleys and two streams - the Alamo River and the New River - feed the Salton Sea. There is a danger that impending legislation will transfer some of the local farmers' share of Colorado River water to San Diego developers which studies show would make the shoreline recede by more than a mile.

The New River originates just south of Mexicali, Mexico, and picks up agricultural pesticides, dead cats, industrial wastes, and human excrement as it flows north. A recent report by the California Water Resources Control Board found that Mexicali is dumping 20 to 25 million gallons of raw sewage into the New River daily because of breakdowns in its municipal treatment system. By the time the New River crosses the U.S./Mexico border near Calexico, California, the river violates water quality standards by several hundred-fold. Border Patrol agents who have jumped into the toxic flow to rescue drowning immigrants have had to be treated for skin rashes and infections. The New River is a caustic cocktail whose ingredients include 26 viruses - hepatitis A and polio to name a few - assorted pesticides from Mexican farms (some of which have been banned in the United States), together with hazardous chemicals and heavy metals from maquiladora factories.

A recent report by the U.S. Centers for Disease Control noted that California has twice the rate of infections of two food-borne pathogens associated with human sewage, campylobacter and shigella, than any other state. Still,

state and federal legislators are reluctant to do what is necessary to clean up the pollution. Although the U.S. Environmental Protection Agency is paying 55 percent of a \$50 million addition to Mexicali's sewage treatment facility, it has yet to tackle the pollution which has already been carried across the border and deposited in the Salton Sea. Fecal coliform is at levels of 100,000 to 5 million colonies per milliliter at the border checkpoint, far above the U.S.-Mexico treaty limit of 240 colonies. The New River is so heavily polluted that technicians usually wear two sets of gloves and other protective clothing when testing the water. However, state officials claim that contaminants in the Salton Basin do not exceed acceptable levels and pose no risk to the region's inhabitants, a large proportion of whom are senior citizens.

Because the Salton Sea has no outlet, selenium from sewage and agricultural runoff accumulates in the silt at the bottom where it is ingested by pile worms. These worms are in turn eaten by the fish who serve as food for higher life forms - including people. At each successive level of the food chain the selenium becomes more and more concentrated.

According to the Encyclopedia Americana, "all selenium compounds are toxic, except for copper and lead selenides. . . their. . . effects. . . resemble those of arsenic, causing lung and liver damage, vomiting, diarrhea, and abdominal pains or cramps. . . contact with selenium or its salts may cause dermatitis. . . no more than three parts per million of the element has been suggested as the safe concentration limit in foods."

In past years, the U.S. Geological Survey and the Fish and Wildlife Service released joint studies in response to concern about drainwater contamination that could "pose a threat" to human beings along with fish and wildlife resources "of the Salton Sea area." One scientific study concluded that "drainwater contaminants. . . are accumulating in tissues of migratory and resident birds that use food sources in the Imperial Valley and Salton Sea. Selenium concentrations in fish-eating birds, shorebirds. . . could affect reproduction."

Of even greater concern is the high concentration of arsenic found in local wells. Residents of Pioneertown and Bombay Beach are concerned about carcinogens in their drinking water. Pioneertown, a community of 150 people west of Joshua Tree National Park, has arsenic levels as high as 82.1 parts per billion in its wells (current Environmental Protection Agency standards permit a maximum of 50 parts per billion and the Bush administration is committed to lowering the standard to 10 parts per billion by 2006).

The only practical, long range solution is to dig a sea level canal from the Laguna de Salada in Baja California to the Salton Sea. This would keep the sea from getting any saltier and would also provide inland Southern California with a convenient port for international shipping. Sportfishing and other recreational activities would soon return. Marinas could be built along the entire length of the canal, increasing the value of desert real estate in both the United States and Mexico. Since the Salton Sea is presently 220 feet below sea level, a connection with the Pacific Ocean would result in a vast inflow of seawater, expanding the Salton Sea's boundaries to approximately

those of ancient Lake Cahuilla, the freshwater lake that filled the Salton basin as recently as 500 years ago.

Metcalf & Eddy, a Massachusetts based firm with almost a century of experience in large scale water resources management, has proposed building two canals, the largest of which would be navigable for ocean going vessels. The cost for digging the U.S. section is estimated at \$300 million, with the final pricetag for the completed canals approaching \$3 billion. While this is indeed a considerable chunk of money, it is nonetheless a good bargain, considering the increased revenue in land and commerce taxes which local governments stand to gain.

I live in Riverside, California, about halfway between Los Angeles and the Salton Sea. Several times a day, freight trains pass through my community on their way to San Bernardino, Palm Springs, and other inland cities loaded with ocean-going containers from the Orient stacked two high on flatbed cars. Some of these trains stretch for a mile or longer. Of course each container means more revenue for the congested ports of Long Beach and San Pedro and higher shipping costs paid for consumer goods by the residents of inland Southern California.

Digging a canal through the desert would involve no insurmountable problems. In fact, the U.S. Army Corps of Engineers faced a considerably tougher task in constructing the Panama Canal a century ago.

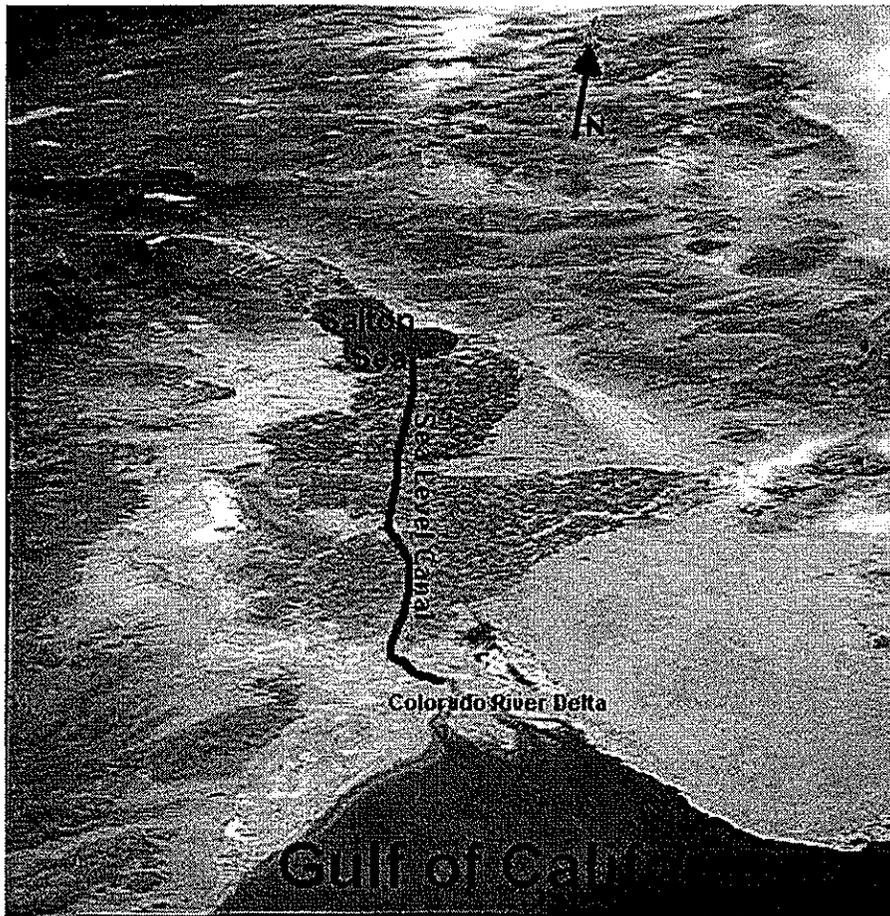
Famous Navigable Canals

| Name | Location | Length in Miles | Year Completed |
|---------------------|-----------|-------------------|----------------|
| St. Lawrence Seaway | US/Canada | 2400.0 | 1959 |
| Suez | Egypt | 100.6 | 1869 |
| Albert | Belgium | 80.0 | 1939 |
| Kiel (Nord-Ostsee) | Germany | 61.3 | 1895 |
| Panama | Panama | 50.7 | 1914 |
| Salton Sea | US/Mexico | 131.4 (estimated) | ? |

What's stopping us from building a sea level canal today? All we need is the will. Prior to his death in a tragic skiing accident, Congressman Sonny Bono was actively seeking public support for the issue. Perhaps the Salton Sea's strongest supporter in the House of Representatives was the late Congressman George Brown whom I had the pleasure of meeting several years ago. He was the driving force behind restoration of the sea and his death was a great loss to the Salton Sea, California, and the world. He understood the crucial environmental role the sea plays as an intrinsic part of the Pacific Flyway. To Congressman Brown, saving the Salton Sea was more than a regional concern of the United States and Mexico. It was—and is—an international issue with global impact.

There are many parallels between the Salton Sea, which lies near the U.S./Mexico border and the Dead Sea, which is on the border between Israel and Jordan. The Dead Sea is three-hundred-sixty-five meters below sea level, the lowest point on Earth. Unless something is done soon, the Salton Sea will resemble the Dead Sea, which is so salty that it cannot support life. The Dead Sea is shrinking by almost one meter each year. Most of the water that flows into the Dead Sea comes from the Jordan River. However, fresh water flowing from the Jordan River has

been tapped for other uses in the area. Environmentalists believe that within the next fifty years, the Dead Sea could shrink to less than half of its current size. To prevent that, Israel and Jordan plan to build a pipeline more than three-hundred kilometers long. The pipeline would pump water from the Red Sea into the Dead Sea. After the pipeline is built, the two countries hope to build a canal and a salt removal system that will provide fresh water to Jordanians, Israelis and Palestinians. The pipeline will take at least three years to build and will cost a billion dollars. Israel and Jordan plan to pay for it with aid from other countries. The project is expected to begin after a nine-month study is completed. The water project is seen as a major step forward towards peace in the Middle East. Experts say the agreement sends a message that the environment, ecology and nature are more important than borders or political conflicts. Why Israel and Jordan can do it and the United States and Mexico can't is a question that no one seems to be able to answer.



According to an article by Ben Spillman in the September 11, 2005 edition of *The Desert Sun*, a study financed by the Salton Sea Authority claims that the Salton Sea could support 80,000 new homes along its shores once the waters are rendered less polluted by the proposed use of dams and dikes. The report estimates that tax revenue from development could support future improvement projects. The Salton Sea Authority Plan calls for the construction of a dike that would divide the sea. As proposed, there would be a shallow 135 mile lake on the north and a lesser, 35 mile lake in the south. In other words, the once great Salton Sea would be reduced to a couple of brine lakes with no guarantee of sufficient freshwater inflow to prevent them from evaporating with time.

This article was taken from Chapter 14 of *Bushwhacked* by Fred Dungan.
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EXHIBIT "4"

White Paper: For Review and Comment

The Salton Sea: A Valuable Natural Resource in Crisis

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Updated 30 May, 1997

Prepared for the Inland Empire Congressional Delegation Salton Sea Task Force

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Background

- The Salton Sea: California's Largest Lake--Critical Link in Pacific Migration Flyway.
- Crash of Ecosystem is Underway; Half as Many Bird and Fish Deaths as from the Exxon Valdez Oil Spill. Wildlife and human pathogens pose increasing risks to region.
- Complications: Colorado River Allocations, Polluted Mexican River Waters. Agricultural Water Use and Conservation; Increasing Urban Water Needs.

Current Situation

- Slow Pace of Cleanup of Mexican Rivers. Unacceptable Cross-Border Sewage Releases.
- Pending Sales and Transfer of Conserved Agricultural Water to Urban Water Users.
- Potential Severe Reduction in Dilution Waters to the Salton Sea.
- Accelerating Pace of Bird Deaths this Year; Increasing, Broadening Concern.

Solution Plan

1. Formation of a Collaborative Authority Linking Salton Sea Authority with Local, Regional, State, and National Stakeholders. Similar, but not identical, to CALFED Bay-Delta solution process. Includes regional university expertise for data, technical, support.
2. Example Funding Plan: Remediation and Maintenance of the Sea Funded by Share of Proceeds from Sales of Conserved Agricultural Water Exported From Region. State and Federal Cost-share. \$1.88 billion Identified in Example Plan.
3. Example Technical Plan Selected by Steering Committee of Collaborative, Subject to Peer-review, Competitive RFP Process and Overall Consensus. Initial physical characteristics of Plan include transfer of Sea of Cortez water through New River to the Salton Sea, and transfer of Salton Sea salts to Laguna Salada. Estimated Costs of \$1.75 billion, plus annual costs of approximately \$50 million.

Legislative Goals

1. Recognize Priority of Local Stakeholder and Community Interests in Legislation.
2. Maximize State's Participation in Technical and Legislative Contribution.
3. Provide Implementing Federal Legislation Aimed at Supporting and Enhancing Local and State Efforts. Similar, but not identical, to Central Valley Project Legislation.

Stakeholders and Interested Parties

- Local**: Salton Sea Authority and Member Agencies; Local Government Offices; Regional Universities, and other Non-governmental Organizations.
- State**: California Water Agencies and Environmental Agencies; State Offices.
- Federal**: Bono, Brown, Calvert, Hunter, and Lewis Congressional Offices. Boxer, Feinstein Senate Offices. Interior (Fish & Wildlife Service and Bureau of Reclamation) EPA, State Department (International Boundary and Water Commission)

Tentative Schedule

Data Collection: 1996-99; Congressional Field Hearings: Summer 1997; Collaboration Formation: Summer 1997; Draft Legislation: During 105th Congress. Solution Formulation and Selection: 1998-99; Engineering, Impact Studies and Groundbreaking: 1999-2000.

The Salton Sea: A Valuable Natural Resource in Crisis

SUMMARY

The Salton Sea is California's largest lake, located 30 to 60 miles (50 to 100 km) north of the U.S./Mexico border. The Sea encompasses 378 square miles of area and 7.5 million acre-feet of volume. The Sea was formed in 1907 by an 18-month accidental diversion of the Colorado River, and has since been predominately maintained by agricultural run-off from the Imperial Valley combined with flow from the New and Alamo Rivers. Since its creation, the Sea has served as a valuable economic and environmental resource, attracting waterfront development and supporting extensive fish and waterfowl ecosystems. The Sea is now a critical way-station on the Pacific Flyway linking Canada and the U.S. to Mexico and Central America.

During the past 20 years, rising levels of salt and contaminants have threatened water quality at the Sea. Endangered bird species from the US, Canada, and Mexico are threatened. The economic value and environmental health of the Salton Sea is entering a critical phase.

Over 175,000 birds, and probably millions of fish, have died at the Sea over the last four years. An ecological disaster approaching half the impact of the Exxon Valdez oil spill is underway.

Rising concern over this worsening situation has prompted increased interest in maintaining a

stable water level, removing salt, and removing pathogens from the Sea. Local economic impacts, environmental impacts, and water availability will need to be addressed in order to implement any mitigation effort. Any proposed plan will necessarily involve the coordinated interaction of a large number of informed participant organizations, specifically the membership of the Salton Sea Authority. The U.S. Environmental Protection Agency, the U.S. Bureau of Reclamation and U.S. Fish and Wildlife Service of the Department of Interior, as well as California Department of Fish and Game and Department of Water Resources are also stakeholders. Local development interests; agricultural interest; environmental imperatives; local, regional, national and international politics; and competing demands for Colorado River water, have converged to create a situation of major importance.

Conserved Water Transfers Provide for An Attractive Funding Option

Allocation of Colorado River water defines the amount and quality of water available to the Sea. The Imperial Irrigation District (IID) is presently negotiating with the Coachella Valley Irrigation District (CVWD) to provide CVWD with a permanent allocation of water. In turn, IID and San Diego County Water Authority (SDCWA) have announced plans to transfer water from IID to SDCWA via infrastructure maintained by the Metropolitan Water

District (MWD). For several years agricultural water users have come under increasing pressure to conserve water, and to sell that water to urban users at market rates, all the while maintaining environmental quality and mitigating potentially adverse economic impacts. The costs associated with these measures, mandated in recent court cases, as yet, have not received sufficient attention. The basic plan is to have the IID farming community implement water conservation practices, then sell the conserved water to SDCWA via the aqueduct. Significant water savings are feasible using a combination of water-saving, re-use, canal relining, and brackish-water agricultural techniques currently being pioneered around the world.

The upcoming transfers to the urban communities present the Imperial Valley with the opportunity to support a Salton Sea restoration and maintenance plan, funded from a portion of the earnings from the transfers. The wheeling of conserved water out of the Imperial Valley is thus linked to the maintenance of the environment in the Imperial Valley. Since the urban-agricultural price difference is high, a plan is envisioned which rewards conservative agricultural water use, improves the reliability of urban water supplies in Southern California, and restores the Salton Sea to its previous condition as an attractive cultural asset, recreational hub, and stable ecosystem.

The communities of Coachella Valley and Imperial Valley support restoration of the Salton Sea to its former prominence as a viable economic asset, emphasizing its

livability, recreation potential, and desirability as a community center. A solution will require the coordinated effort of all stakeholders. An airing of alternative solutions in an unbiased forum, modeled roughly after the recent CALFED Bay-Delta process, is an option. Once a forum has been created by the stakeholder collaborative, then alternative technical solutions can be reviewed by all stakeholders. It will be necessary to identify a technical fix which is wholly compatible with economic realities while also addressing the possible impacts of potential water transfers and changes in the use of Colorado River water, including a structure for retaining the proceeds from negotiated water transfers for maintaining the local environment. A solution will require both federal agency cooperation and the passage of supporting legislation dealing with water wheeling rights, water allocations and transfers through negotiated agreements of Colorado River water resources.

Water Transfers Provide Opportunity for An Attraction Technical Solution

A major open question relating to the Salton Sea is the future disposition of the output from the New River, should the water quality be significantly improved and subsequently viewed as a more valuable asset for Mexico's domestic purposes. The wheeling of conserved water out of the Imperial Valley, coupled with a possible diversion of the New River, could severely curtail flow to the Sea. Reduced flows are not projected to cause the Sea to simply disappear. Rather, the coast line and volume of the

Sea would extensively shrink, with resulting sharp (barring intervention) increases in salinity and contaminant concentrations. The likelihood, costs, and impacts of these possible scenarios will also need to be characterized.

One promising technical option involves transfers of water from the Sea of Cortez, through Mexico, to the New River in Mexico, to the Salton Sea. The Sea of Cortez is the most economical source of water available for this purpose. This scenario is based on the assumption that New River flows in Mexico will be diverted from the U.S. south to the Colorado river delta. The newly-created capacity in the New River would then be utilized as a channel for Sea of Cortez water entering the United States at the border. An added benefit is the creation of a bi-national riparian corridor using this new channel. In order to address salt-loading of the Salton Sea, the Plan includes the building of a second conduit to transfer Salton Sea water to the Laguna Salada salt flats in Mexico. This technical solution has several critical advantages. First, the Salton Sea is stabilized in elevation, salinity, and in the management of contaminants. Second, the pumping energy requirements for such a scenario are lowest; it is possible that this system will actually be an energy producer. Third, the solution is compatible with both economic development at the Salton Sea as well as the ecological restoration of the entire Lower Colorado River Basin and Colorado River Delta.

It is technically feasible to remediate the Salton Sea. In the process, it can be transformed into an enduring, produc-

tive ecological and economic asset for all of Southern California. Predicted transfers of water outside the region will inevitably cause the Sea to contract to about one-half to two-thirds its current size. As its volume is re-stabilized, its salt content can concurrently be restored to a permanent level similar to that of the ocean. In the meantime, its viability as an ecosystem and economic asset will further collapse, as the present large fish and bird kill attests.

Over the time required for the Sea to be recreated, commercial and recreational developments dependent on it will need to be re-planned and re-developed. In the process, water use and allocation of water in the Lower Colorado River Basin will require review. Environmental and third party economic impacts will need to be properly addressed. Trustees representing the owners of the water (all of the citizens of the U.S.) must be permitted to act as stakeholders in water transfer contracts to insure equity in the economic benefits of transactions.

The proposed technical solution has identified an approximate cost of \$1.75 billion for this project, plus approximately \$50 million per year for operations costs. The example funding solution identifies a potential \$1.8 billion in proceeds available for this project. Thus, the costs and financing are, at this stage in the analysis, compatible. Details of the plan will need to be developed by the stakeholder collaborative. Impacts on other community development and environmental initiatives are expected to be generally positive.

MOST RECENT DEVELOPMENTS

The Salton Sea and its major tributaries are shown in Figure 1. The Salton Sea has undergone consistent change since its creation in 1905-1907. Originally a fresh-water lake in the first part of the century, its increasing salinity provided viability for salt-water species after WWII. However, continuing salinity increases in the past two decades have reached the point of even stressing hardy fish species. The National Wildlife Health Center in Madison, Wisconsin has characterized the Sea's problems as both "systematic and pervasive."¹

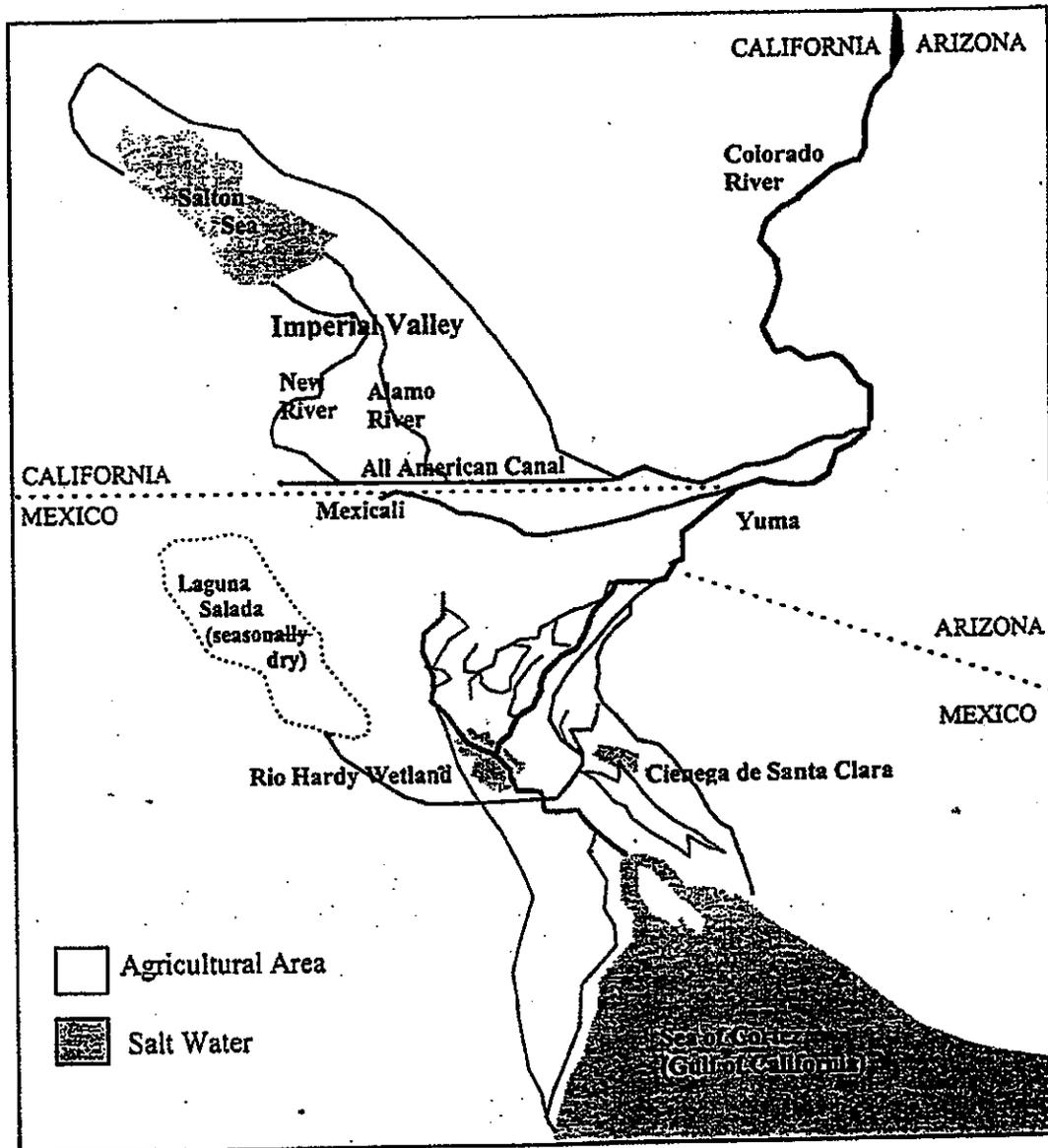


FIGURE 1. The Lower Colorado River delta, including the Salton Sea.

Bird and Fish Mortality at the Sea

Over the last four years, the Salton Sea has experienced at least three massive die-offs, involving over 175,000 waterfowl. In 1992, at least 150,000 eared grebes died on the Sea. Between August and November of 1996, avian botulism at the Sea caused the deaths of over 14,000 birds, including 1,400 endangered California brown pelicans. Over ten percent of the west coast American white pelican population perished at the Sea. The 1996 die-off was also associated with a concurrent die-off of possibly millions of fish².

The scale of the bird and fish die-off represents a little-publicized ecological disaster currently approaching half the impact of the Exxon Valdez oil spill³.

Table 1 lists the number of birds found dead in 1996 at the Salton Sea by the U.S. Fish and Wildlife Service. Over 8,500 white pelicans, over 1,100 brown pelicans, and over 4,400 birds of other species were found dead, and were pulled from the Sea⁴.

Over the years, the composition of the fish population at the Sea has evolved from fresh-water, to salt-water, to hardy salt-water species. The most abundant fish in the Salton Sea at this time is tilapia, an African species with a tolerance for high temperatures, high salinity, and periodic low concentration of dissolved oxygen. The large number of fish-eating birds attracted to the Sea is an indication of the great number of fish available for feeding at the Sea.

Water Allocations, Negotiations and Conservation Programs

Most of the water output from the Sea is evaporative; the average evaporation rate is in excess of five feet per year. Various water inputs maintain the volume of the Salton Sea. Water coming to the Sea includes irrigation runoff from Imperial Valley, Coachella Valley and Mexicali Valley farms. The source of most of this water, in turn, is ultimately the Colorado River. Farms on the U.S. side of the border purchase Colorado River water through their respective irrigation districts. In the case of the Mexicali farms, water is procured through the Mexican government.

These agricultural users are also served from pumped water sources, particularly in Mexico, since leakage of the canals carrying Colorado River water is a major source of recharge for the aquifers in the region. Irrigation return flow is channeled into the Salton Sea largely by the Alamo and New Rivers at the south end of the Sea, and the Whitewater River at the north end of the Sea. A small amount of water enters the Sea from surface water runoff, drainage channels, and rainfall on the surface of the Sea. The Alamo and New Rivers also receive large amounts of domestic, agricultural and industrial waste, including toxic metals. These chemicals, pesticides, dead animals, etc. have led to the characterization of the New River as "the most polluted rivers in America".

TABLE 1. Body Count by species as of November 21, 1996.
 Compiled by U.S. Fish and Wildlife Service,
 Salton Sea National Wildlife Refuge⁵.

| Species | Count | Species | Count |
|---------------------------|-------|------------------------|--------------|
| Common Loon | 3 | Unidentified Ducks | 37 |
| Pied-billed Grebe | 4 | Osprey | 2 |
| Eared Grebe | 144 | Sora Rail | 1 |
| Western Grebe | 46 | American Coot | 104 |
| Clarks Grebe | 2 | Black Bellied Plover | 4 |
| Sooty Shearwater | 2 | Semipalmated Plover | 8 |
| Blue-footed Booby | 1 | Killdeer | 1 |
| American White Pelican | 8538 | Black-necked Stilt | 125 |
| Brown Pelican | 1129 | American Avocet | 107 |
| Double-crested Cormorant | 122 | Greater Yellowlegs | 1 |
| American Bittern | 11 | Lesser Yellowlegs | 6 |
| Least Bittern | 5 | Willet | 31 |
| Great Blue Heron | 172 | Spotted Sandpiper | 1 |
| Great Egret | 779 | Whimbrel | 10 |
| Snowy Egret | 271 | Long-billed Curlew | 6 |
| Cattle Egret | 55 | Marbled Godwit | 11 |
| Unidentified Egrets | 287 | Ruddy Turnstone | 1 |
| Green Heron | 5 | Western Sandpiper | 190 |
| Black-crowned Night Heron | 169 | Dowitcher | 73 |
| White-faced Ibis | 7 | Sanderling | 4 |
| Fulvous Whistling duck | 1 | Wilson's Phalarope | 2 |
| Brant | 1 | Unidentified Phalarope | 9 |
| Green-winged Teal | 53 | Unidentified Shorebird | 60 |
| Mallard | 5 | Bonapart's Gull | 23 |
| Northern Pintail | 27 | Ring-billed gull | 614 |
| American Wigeon | 1 | California Gull | 25 |
| Blue Winged Teal | 1 | Yellow-footed Gull | 3 |
| Cinnamon Teal | 9 | Herring Gull | 86 |
| Northern Shoveler | 78 | Unidentified Gull | 527 |
| Gadwall | 7 | Gull-billed Tern | 1 |
| Canvasback | 2 | Caspian Tern | 32 |
| Redhead Duck | 12 | Forster's Tern | 8 |
| Lesser Scaup | 5 | Unidentified Tern | 18 |
| Common Merganser | 2 | Black Skimmer | 10 |
| Red-breasted Merganser | 5 | American Crow | 1 |
| Ruddy duck | 27 | Belted Kingfisher | 1 |
| | | TOTAL | 14131 |

Efforts are currently underway to clean up the New River in Mexico. Major financial resources for studies and clean-up projects were provided for this purpose as a result of legislation passed in concert with the North American Free Trade Agreement (NAFTA). A series of "Quick Fixes" are almost completed, and a water treatment plant has been specified, but is not yet built, for the New River.

A major question relating to the Salton Sea is the future disposition of the output from the New River, should the water quality be significantly improved. Currently, the New River is of such a poor quality that Mexico has no interest in redirecting it from its way north into the United States. If the water were to be rendered sufficiently clean, Mexico may view it more valuable for domestic purposes, such as the economic improvement of Mexico's Colorado delta region, and re-circulate it in the Mexicali Valley.

Since the Colorado River plays such an important part in providing water to the Salton Sea, allocations of Colorado River water define the amount of water available to maintain the volume of the Sea. The Imperial Irrigation District has long-standing rights to approximately 3.1 million acre-feet per year of Colorado River Water. IID's costs for obtaining and transporting the water to customers is currently roughly \$12.50 per acre-foot⁶.

The IID is presently in negotiation with the Coachella Valley Irrigation District (CVWD), the water district serving customers north and east of the Salton Sea, to provide CVWD with an assured allocation of water, where previously CVWD's rights were subordinate to those rights held by IID. CVWD, which serves nearby agricultural areas and the City of Palm Springs, is presently overdrafting its underground water resources by approximately 150,000 acre-feet per year⁷. Discussions are currently stalled due to an inability to agree on the amount of water for CVWD. IID has offered approximately 330,000 acre-feet per year, whereas CVWD's position is for an allocation of 500,000 acre-feet per year, the difference being roughly equal to the volume needed by CVWD to recharge its aquifers.

In April 1997, CVWD unveiled a plan to allow regional water agencies to take advantage of its unfilled groundwater aquifer capacity. In the southwest U.S., underground storage is viable in comparison to above-ground storage because of the very high (five feet per year) evaporation rate. CVWD proposed to devote its millions of acre-feet of available capacity for use as a regional water-bank. The implications for the region, including Arizona and Nevada water interests, would be the ability to build a hedge against year-to-year variation in the availability of Colorado River supplies. The further implication for the Salton Sea is that this "water bank" could potentially provide greater regional flexibility in water use, and greater stability in water level of the Sea.

An agreement between IID and CVWD has the potential to pave the way for succeeding water negotiations and agreements in the region. IID and San Diego County Water Authority (SDCWA) have developed plans to transfer (wheel) water from IID to SDCWA via aqueducts maintained by the Metropolitan Water District (MWD). This transfer is motivated by the tremendous difference in the cost of water, about twenty-fold, between SDCWA prices and IID costs⁸. The basic plan is to have IID farmers implement water conservation practices, then sell the conserved water to SDCWA via

the aqueduct. Two agreements currently stand in the way; the CVWD allocation agreement, and an agreement with MWD on their wheeling charges. MWD has opened negotiations for wheeling at a price at least \$171 per acre-foot, plus power costs. IID analysts and others have argued that the actual cost of wheeling should be in the range of \$75 per acre-foot⁹. MWD currently serves SDCWA, so that, from MWD's perspective, the second source of water from IID represents a competitive source and potential income loss.

The prospective agreement between IID and CVWD, followed by an agreement for economic wheeling of conserved water between IID and MWD, would result in significant amounts of water diverted from the Salton Sea. As a result, the size of the Sea would necessarily shrink, with corresponding adverse impacts to the economy and environmental conditions. Added to the potential for reduced input due to a diversion of the New River in Mexico, the Sea may incur severely reduced flows. In any case, reduced flows are not projected to cause the Sea to simply disappear. Rather, the coast line and volume of the Sea are projected to extensively shrink, with concomitant (barring intervention) increases in salinity and contaminant concentrations.

The economic value and environmental health of the Salton Sea is presently entering a critical phase. Local development interests; agricultural requirements; environmental imperatives; local, regional, national and international politics; and competing demand for Colorado River water have converged to create a situation of major importance. The manner in which this crisis is now handled will determine the quality of life in the region for generations of Californians.

BACKGROUND AND ANALYSIS

History and Description of the Salton Sea

The Salton Sea is approximately 35 miles long and 15 miles wide (378 square miles), with a maximum depth of about 50 feet and an average depth of about 30 feet. Water temperature varies seasonally from the low 50's to the upper 90's. The surface of the water lies 227 feet below sea level¹⁰. It is California's largest lake, located 30 to 60 miles (50 to 100) km north of the U.S./Mexico border. The Sea encompasses 378 square miles of area and 7.5 million acre-feet of volume.

The Sea was formed in 1907 by an 18-month accidental diversion of the Colorado River, and has since been predominately maintained by agricultural run-off from the Imperial Valley combined with flow from the New and Alamo Rivers. Since its creation, the Sea has served as a valuable economic and environmental resource, attracting waterfront development and supporting extensive fish and waterfowl ecosystems.

Historically, the basin containing the Salton Sea has experienced severe cycles of flooding and drying-up. Evidence of an ancient fresh-water lake at least twice the size of the Salton Sea, Lake Cahuilla, is found in the geology of the surrounding area. As late as five hundred years ago, the Cahuilla Indians inhabited the local area and depended on the lake resources. When Europeans arrived in the Lower Colorado River Basin, the lake had disappeared, leaving behind a substantial salt deposit. In the late 1800's salt works were built and operated on the flats in what was then called the Salton Sink.

In 1900, the California Development Company built irrigation canals from the Colorado River to the "Imperial Valley", introducing the region to farming. By 1904, over 100,000 acres were irrigated. In the fall of 1904, silt in the irrigation canal cut off flow to the valley. The California Development Company, in an effort to bypass the silted portion, dug a cut around the blockage. The Spring floods of 1905 catastrophically overwhelmed the cut, however, releasing the entire flow of the Colorado into the Basin. Water carved out the courses of the Alamo River and New River, then flowed into the Salton Sink. Many new farms, homes, and businesses were flooded. Only after an appeal by President Theodore Roosevelt to the Union Pacific's President in 1907 was the breach repaired, after an heroic, round-the-clock operation requiring the construction of a rail spur and 6,000 train-car loads of gravel and rock dumped at the site¹¹.

The Salton Sea was thus formed, with an initial salinity of about one part per thousand (ppt). Evaporation of water (which leaves behind salts and other dissolved components), plus saline inputs from irrigation runoff, the rivers from Mexico, and the Salton Sink, have worked together to consistently move the salt concentration of the Sea

upward. Four million tons of salt are brought to the Sea each year. The Sea acquired "ocean-like" salinity two decades ago, and presently stands at 44 ppt salinity, 25% higher than ocean salinity. The current rate of increase is roughly about one percent per year. Figure 2 shows the historic record of salinity and elevation increases.

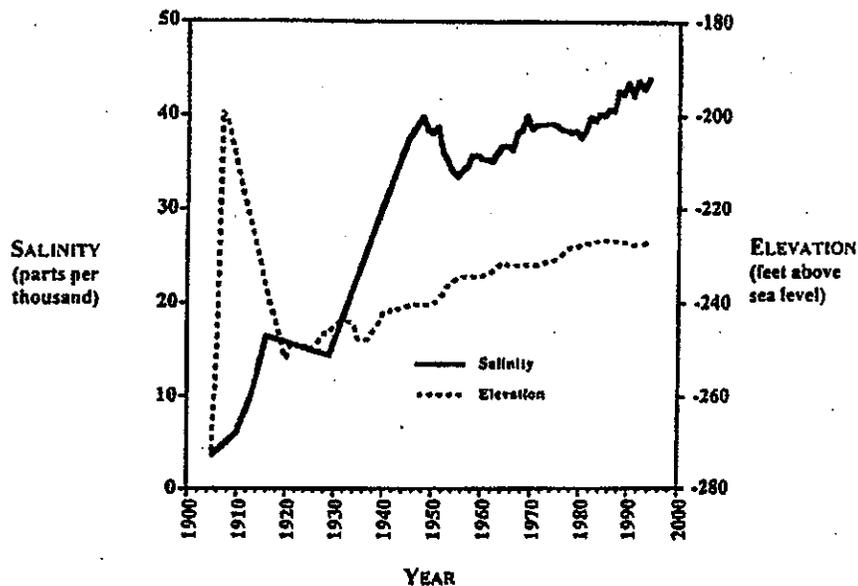


FIGURE 2. Historic Variation of Salinity and Elevation at the Salton Sea.

Tributaries

Today, the Salton Sea is maintained at approximately 7.5 million acre-feet by 1.3 million acre-feet per year of Imperial Valley runoff, the Whitewater River, the Alamo River, the New River, and other sources. Figure 3 shows the proportion of water inputs to the Salton Sea from each source.

From Figure 3, it can be seen that the largest sources of water to the Salton Sea are the New River and the Alamo River. The New River is extremely polluted as it emerges from the Mexican border, serving as a sewer for the 750,000 people of the city of Mexicali, Mexico.

Up to 25 million gallons per day of raw and partially-treated sewage from the city cross the border each day. This effluent, plus landfill leachate, industrial waste, and slaughterhouse waste are carried off by the River¹². Dead animals, toilet paper, and foams from phosphate detergents are seen in the river. The river also carries significant human health hazards; active viruses, high bacteria levels, and other pathogens may exist in the River.

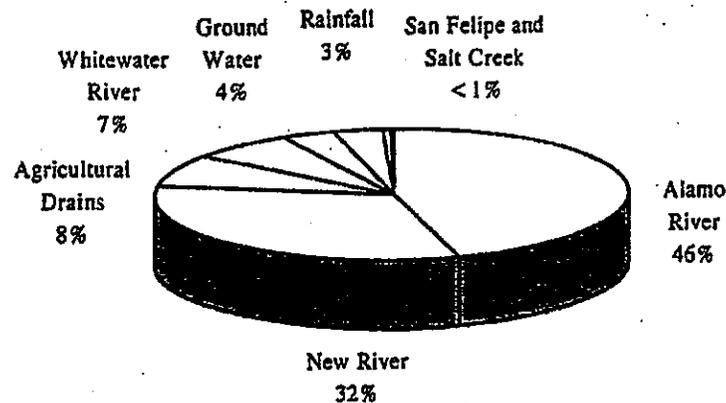


FIGURE 3. Proportion of Water Inputs to the Salton Sea¹³.

Uses of the Sea

Shortly after its creation, the Salton Sea was envisioned as an oasis of great value and potential for the greater region including the Lower Colorado and low deserts of Southern California. Millions of dollars were spent building infrastructure to support growing communities and recreational facilities along the shore, similar to other emerging towns being built along the Colorado River. Unfortunately, development has now been arrested by the worsening environmental instability at the Sea.

Economic Use

Years ago, the Salton Sea was envisioned to be the center of an ambitious recreation-centered community in the Southern California desert near Palm Springs. Expected annual economic value of such a community was roughly projected to be around \$500 million per year. Today, recreation is greatly reduced. Current turnover attributed to recreation and community activity is about \$100 million per year.

The Sea provides a facility of great economic value to the Imperial Valley, as a repository for irrigation run-off and other wastes. Without the Sea, major water treatment facilities would necessarily be required to meet state and federal environmental standards.

A major benefit to the residents living near the Sea is its attractiveness for birds. The Sea has a reputation for having recorded some of the highest concentrations and highest number of species of waterfowl in the U.S. These concentrations have resulted in the designation of a portion of the Sea as a National Wildlife Refuge by the U.S.

Fish and Wildlife Service. Thousands of tourists each year visit the Salton Sea to observe the great masses of birds at the Refuge¹⁴. The wildlife tourist business is now a significant contributor to the local economy.

Wildlife Activity

Because of the high amounts of nutrients draining into the sea from irrigation runoff and the Rivers, the Sea has historically had a very high degree of wildlife activity. The fish populations, once dominated by fresh-water species such as orange-mouth corvina, and now hardy salt-tolerant species such as tilapia, have sustained the great numbers of birds coming to the Sea.

A hundred years ago, birds traveling the Pacific Flyway from the northwest down to Mexico traveled predominately along temperate coastal routes. Urban development along the coast of Southern California has virtually eliminated most of the wetlands along the coast. After the Sea was created, an inland route emerged with a major way-station at the Salton Sea. The Sea now forms a critical link, a "pinch-point", in the Pacific Flyway. Coupled with the rich source of fish as a food supply, migrating waterfowl have now become habituated to utilizing the Sea. Figure 4 shows the current pathways for the Pacific Flyway.

Instead of being an oasis for waterfowl, the last four years have seen the Sea begin a transformation into a cruelly lethal trap. Fish and birds are dying at an increasing rate. Rising levels of salt and contaminants have threatened water quality. In the last four years, over 175,000 birds and possibly millions of fish have died at the Sea. Just last year, over ten percent of the west coast American white pelican population perished at the Sea¹⁵. Arriving as a matter of habit, hunger and thirst, waterfowl land and begin feeding at the Sea. After feeding, some birds ingest sufficient toxin, in many cases from botulism-infested fish, to become lethargic and unable to fly. Feeding weakly, the birds succumb directly from toxins or drown.

In 1996, the die-off of waterfowl was consistent with warm temperatures of summer and fall. Significant numbers of dying birds were not observed until the second half of the year. This year the die-off has already begun, with first reports in March. Over 3,600 birds have died this year by mid-May. Since over ten percent of the west coast pelican species perished at the Sea in 1996, it is not improbable that another ten percent or more of the remainder will die this year.

The Pacific Flyway links the threat to birds at the Salton Sea to populations of endangered species in Alaska, Washington, Oregon, California, and Nevada, as well as Canada and Mexico. The long-term implications of the taking of so many endangered waterfowl each year portends catastrophic decimation of pelican numbers in the west.

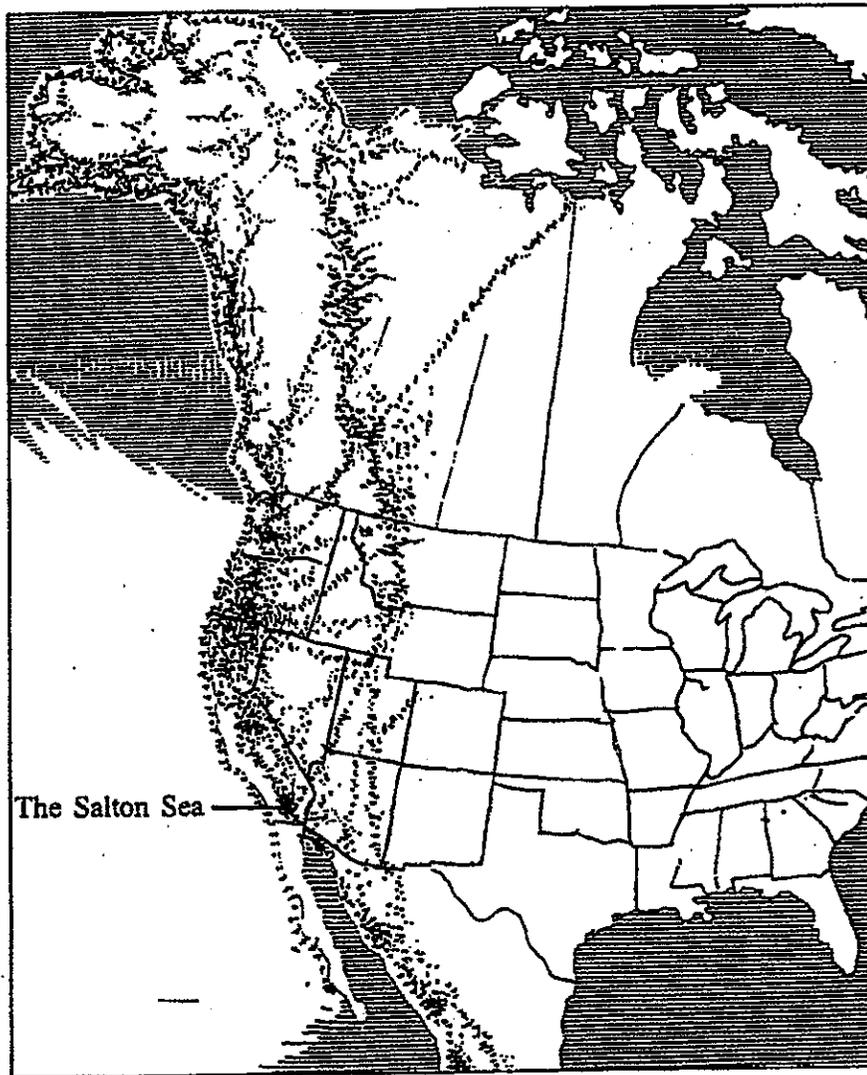


FIGURE 4. Current pathways for the Pacific Flyway¹⁶.

Current Conditions at the Sea

Shoreline Instability

The precocious nature of rainfall in the West has caused such wildly varying changes in the coastline of the Sea that coastal agricultural lands have been periodically flooded. Figure 2 shows the long-term variation over time. Short-term variations can also be significant. The Imperial Irrigation District has, as a result, lost a lawsuit amounting to several millions of dollars from damage claims. The legal implication of these suits has been that a precedent may have been set for IID liability in coastal matters¹⁷.

Salinity and Contaminants

Figure 2 also shows the salinity increases in the Sea over the years. The local concentration of ionic constituents varies greatly according to location. At the mouths of the New River and Alamo River, for example, salinity is lower. Unfortunately, the lower salinity attracts waterfowl to the pathogens entering from those rivers.

The concentration of selenium is another matter of emerging concern¹⁸. Although selenium is required for normal biological development, tolerance to high levels is poor, and toxic levels can easily be reached in inland waters fed by irrigation run-off. Current levels in the water are not yet critical, but rising levels in sediments are the primary cause for concern. A famous recent example of selenium contamination is the environmental crisis at the Kesterson Reservoir in California's central valley. Unfortunately, should the Salton Sea achieve similar concentrations, mitigation would likely require an effort on a scale larger by at least an order of magnitude.

Pathogens

In 1997, workers at the Salton Sea National Wildlife Refuge were advised to begin wearing personal protective gear, to avoid contamination from handling the dead and dying birds. The National Wildlife Health Center in Madison, Wisconsin identified one strain of pathogens which is a prime suspect in the bird deaths as potentially harmful to humans.

Stakeholders and Other Organizations with Interests in the Sea

A great deal of organizations have direct stake in the Salton Sea, or are interested or involved in activities related to the Sea. This section lists samples of the membership in each of these groups. It is expected that comprehensive lists would be much longer for each category.

Local Organizations (not comprehensive)

In 1993, the Salton Sea Authority (the SSA) was formed as a "Joint Powers Authority" mandated to provide stewardship of the Salton Sea. The Authority membership is composed of the primary stakeholders in the area: Coachella Valley Water District, Imperial Irrigation District, Imperial County and Riverside County. Table 2 lists the projects undertaken by the SSA. The SSA has provided extensive leadership in sponsoring work to evaluate options to save the Salton Sea.

TABLE 2. Projects Undertaken by the Salton Sea Authority since 1993¹⁹.

| Project | Amount | Funding Sources |
|---|-----------|---|
| "White Paper" (Dangermond & Assoc.) FY '93-'94 | \$30,000 | CVWD (\$15,000) Riverside Cty. (\$15,000) |
| Clean Lakes Grant (Section 314) _____ FY '94-'95, '95-'96 | \$133,000 | EPA (\$95,000) SSA (\$38,000) |
| Work Plan 1.1 (SSA/BOR/DWR) FY '94-'95, '95-'96 PL 102-575 | \$225,000 | SSA (100,000) BOR (\$100,000) DWR (25,000) |
| Work Plan 2.0 (SSA/BOR/DWR) FY '95-'96, '96-'97 PL 102-575 | \$425,000 | SSA (100,000) BOR (\$200,000) DWR (125,000) |
| Clean Water Grant FY '97-98 | \$77,155 | EPA (\$59,180) SSA (17,975) |
| Ongoing Administration | \$67,572 | SCAG (\$15,000) Fed. Enterprise Community (\$52,572) |

The SSA is supported by member organizations, plus the U.S. Bureau of Reclamation, the California Department of Water Resources, the U.S. Environmental Protection Agency, an enterprise Community Grant, the Southern California Association of Governments (SCAG) and California Proposition 204 \$2.5 million to match federal funding. SSA has in turn matched USBR funding to support depth mapping, water movement and dike structure studies²⁰.

In March 1996, SSA contracted with Ogden Environmental and Energy Services (Ogden) to prepare "Salton Sea Management Project Evaluation of Salinity and Elevation Management Alternatives" to study the Sea and screen alternatives designed to improve stability and lower salinity. The study, funded by the 1994 Clean Lakes Grant, presented a range of diking options to SSA as the most promising strategies at the funding levels available to SSA²¹. SSA has completed and contracted for studies and grants totaling \$957,727 since 1993.

The Salton Sea Test Base (SSTB) is located in Imperial County about ten miles south of Salton City. It occupies approximately 7,945 acres of land and 13,642 acres of water in the southwest portion of Salton Sea. SSTB was established in 1942 as an operational base for seaplanes. Facilities at SSTB primarily included equipment utility buildings used for storage, repair, shelter, and testing of military arms and equipment.

Over the years, the base was expanded and used for testing, research, and training maneuvers by the military and other tenants, including the Atomic Energy Commission and the Sandia Branch of Los Alamos Scientific Laboratory. SSTB is no longer in use and has been inactive since 1987. However, prior to the Gulf War, SSTB was used as a training site for Operation Desert Shield/Desert Storm. The SSTB facility has been identified as the site of hazardous groundwater contamination, including leachate from landfills containing arsenic, chromium, DDT and uranium²².

In addition to the SSA stakeholders, other important local organizations have interest in the conditions at the Salton Sea. Table 3 lists selected local interests. Native communities have existed at the Salton Sea for many generations. Some sites of particular cultural interest are located on the SSTB. It is planned that the sites will be reviewed by the National Register of Historic Places for eligibility for special designation. Several tribes, specifically the Torres Martinez Band of Mission Indians, live in the region. Significant portions of native lands were also inundated when the Salton Sea was formed, as well, and tribes continue to express an interest in recovering their flooded lands.

Regional Organizations

Regional stakeholders include university and county organizations. Table 4 lists some of the organizations with interests in the Salton Sea. The University of Redlands has obtained substantial funding to build a detailed Geographical Information System

(GIS) map of the region.²³ The University of California at Riverside has desalination and salt-tolerant agricultural expertise applicable to the problems at the Sea. In past years, the University of California at San Diego and University of California at Davis have sponsored graduate student research of the Salton Sea.

TABLE 3. Various Local Organizations with Interests in the Salton Sea (not comprehensive).

| Local Organization | Primary Interest |
|---|--|
| Imperial Irrigation District | Salton Sea Authority Member |
| Coachella Valley Water District | Salton Sea Authority Member |
| Imperial Valley Administration | Salton Sea Authority Member |
| Riverside County Administration | Salton Sea Authority Member |
| Coachella Valley Association of Governments | Community Development |
| Torres Martinez Band of Mission Indians | Cultural Sites, Native Issues, Development |
| 12 Area Fish Farms | Water Quality, Geothermal Sources |
| Western Farms | Large Agriculture Business |
| Salton Sea Test Base | Hazardous Waste, Cultural Interests |
| Imperial County Health Dept. | Community Health Issues |
| Imperial Valley Growers and Citizens for Responsible Water Conservation | Agriculture, Community Development |
| Brawley, California | Community, Geothermal Power |
| Calexico, California | Community, Border Issues |
| Calipatria California | Community Development |
| Coachella, California | Water, Community Development |
| El Centro, California | Agriculture, Community Development |
| Holtville, California | Agriculture, Community Development |
| Indio, California | Agriculture, Community Development |
| Mecca, California | Agriculture, Community Development |
| Palm Springs, California | Water Allocations, Community Development |
| Salton City, California | Environment, Community Development |
| Seeley, California | Agriculture, Community Development |
| Westmoreland, California | Agriculture, Community Development |
| Desert Shores | Community Development |

Water districts in the region also have an interest in any possible solution strategies, since selected options may impact allocations and availability in times of drought. The Southern California Association of Governments (SCAGS) has expressed its interest in the Sea by supporting a portion of SSA's administrative costs.

TABLE 4. Examples of Regional Organizations with Interests in the Salton Sea (not comprehensive).

| Regional Organization | Primary Interest |
|---|-------------------------------------|
| Lower Colorado River Authority | Water Allocations, Agreements |
| Alliance for Water Reliability | IID Water for San Diego County |
| University of Redlands | Environmental Studies, Planning |
| UC-Riverside | Desalination, Environmental Studies |
| UC-San Diego | Environmental Programs |
| UC-Davis | Environmental Programs |
| Imperial Valley College | Cultural Resources |
| Metropolitan Water District | Wheeling, Water Allocations |
| Southern California Water Company | Wastewater, Water Facilities |
| San Diego County Water Authority | Water Allocations, Wheeling |
| MWD Customer Agencies | Water Allocations |
| Association of California Water Agencies | Water Agreements |
| Water Education Foundation | Education, Advocacy |
| Colorado River Basin Salinity Control Forum | Water Agreements |
| Coalition for Fair Water Policy | Agriculture |
| California Farm Bureau | Agriculture |
| So. Cal. Association of Governments | Regional Issues |

Consulting and Other Related Organizations

A number of consulting and other related organizations have participated in analyses of the Salton Sea, and are working to become more involved in mitigation planning. Ogden Environmental and Energy Services completed the diking strategy report for the Salton Sea Authority. Other consultants have jointly proposed to coordinate the construction of a bi-national riparian corridor²⁴. Other groups have interests in the CVWD and IID water negotiations and water allocations. Table 5 lists some of the commercial and consulting organizations involved with Salton Sea issues.

TABLE 5. Selected Consulting and Other Related Organizations and Agencies with Interests in the Salton Sea (not comprehensive).

| Non-governmental Organization | Primary Interest |
|---|---------------------------------|
| Ogden Environmental and Energy Services | Consulting Engineering |
| Timberock USA Co. | Facilitation, Consulting |
| Windwalkers, Inc., & TSS Consultants | Riparian Corridor Proposal |
| American Desalting Association | Water Supply Improvement |
| ReUse Association of California | Recycling, Water Infrastructure |
| San Diego Gas & Electric Co. | Utility Infrastructure |

State and National Interests

The State of California recognizes the importance of the Salton Sea through its support of the Salton Sea Authority, through the California Department of Water Resources and the California Department of Fish and Game. Table 6 lists several of the California state agencies with active interest in the Sea. Also included in the table are the local government officials which have been active with issues related to the Sea. California State Assemblywoman Denise Moreno Ducheny has sponsored fact-finding trips to the border areas with water issues. State Senator Kelley has sponsored a bill in the California Senate to appropriate funding to support Salton Sea studies.

TABLE 6. Several California Organizations and Offices with Interests in the Salton Sea (not comprehensive).

| State Organization | Primary Interest |
|---|--------------------------------------|
| Cal. Water Commission | Water Agreements |
| Cal. Dept. of Water Resources | Water Supply Infrastructure |
| Cal. Environmental Protection Agency | Environment, Water Quality |
| Cal. Dept. of Parks and Recreation | Environment |
| Cal. Dept. of Fish and Game | Environment |
| Colorado River board of California | Colorado River Allocations |
| Cal. Regional Water Quality Control Board | Water Quality |
| Governor Pete Wilson | State Agreements |
| Assemblywoman Denise Moreno Ducheny (D) | 79 th Assembly District |
| Assemblyman Jim Battin (R) | 80 th Assembly District |
| Senator Jim Costa (R) | 17 th Senatorial District |
| Senator David Kelley (R) | 37 th Senatorial District |

The federal government is intricately involved in activities at the Sea. The Department of the Interior has conducted the bulk of federal activity at the Sea, through the U.S. Fish and Wildlife Service and the U.S. Bureau of Reclamation. U.S. Fish and Wildlife employees at the Salton Sea National Wildlife Refuge have conducted heroic operations to remove dead and dying birds, and rehabilitate as many as possible. Table 7 lists selected U.S. agencies involved at the Sea.

Table 7 also lists the congressional offices with interest, activity or jurisdiction in the Salton Sea region. The Sea is within the congressional districts of Congressmen Sonny Bono and Duncan Hunter. The New River is within Congressman Hunter's congressional district. Congressman George E. Brown, Jr., as ranking minority Member of the House Science Committee, is involved with the scientific findings and the creation of systems-based solutions to the problems at the Sea. Congressmen Jerry Lewis and Ken Calvert have a major interest because of the close proximity of the

Salton Sea to their congressional districts, and because the problems at the Sea fall within the jurisdictions of some of their congressional Committee assignments.

TABLE 7. Selected Federal Organizations and Offices with Interests in the Salton Sea (not comprehensive).

| National Organization | Primary Interest |
|--|---|
| U.S. Bureau of Land Management (DOI) | Environment, Land Use |
| U.S. Bureau of Reclamation (DOI) | Water Supply Infrastructure |
| U.S. Fish and Wildlife Service (DOI) | Environment, Ecosystems |
| U.S. Geological Survey (DOI) | Natural Resources |
| U.S. Bureau of Indian Affairs (DOI) | Tribal Issues, Cultural Sites |
| National Irrigation Water Quality Program (DOI) | Agriculture, Water Quality |
| U.S. Department of Defense | SSTB Issues, Army Corps. of Engineers |
| U.S. State Department | Border Water Issues, IBWC |
| U.S. National Oceanic and Atmospheric Administration (DOC) | Tribal Issues, Cultural Sites |
| Congressman Jerry Lewis | 40 th Congressional District (R) |
| Congressman George E. Brown, Jr. | 42 nd Congressional District (D) |
| Congressman Ken Calvert | 43 rd Congressional District (R) |
| Congressman Sonny Bono | 44 th Congressional District (R) |
| Congressman Bob Filner | 50 th Congressional District (D) |
| Congressman Duncan Hunter | 52 nd Congressional District (R) |
| Senator Barbara Boxer | Environment, Public Works |
| Senator Dianne Feinstein | Border Issues, Regulation |

Table 8 lists a number of nationally-based environmental organizations which have shown interest in mitigating the problems at the Salton Sea. Support from additional institutions is anticipated should there be a well-publicized plan to remediate the environmental problems at the Sea. Membership of the Audubon Society, Sierra Club, and Environmental Defense Fund have shown interest in the environmental situation. The American Desalting Association is involved in desalination technology development and demonstration. The Water Reuse Association and the National Water Research Institute are concerned principally with efficient use of water, including reuse of irrigation water.

International Organizations

Since the Salton Sea lies within 100 kilometers of the border with Mexico, border issues are of critical importance. Allocation of Colorado River water between the U.S. and Mexico impact the amount available for remediation of the Sea²⁵. Many of the remediation options for the Salton Sea involve potential negotiation and collaboration

with the government of Mexico and its agencies. Although these organizations are not primary stakeholders, it will be important to recognize their interests in the solution-making process. Table 9 lists selected Mexican-based organizations with potential interest in remediation plans for the Salton Sea.

TABLE 8. Selected Environmental Organizations with Interests in the Salton Sea (not comprehensive).

| National Organization | Primary Interest |
|-----------------------------------|-------------------------|
| Audubon Society | Waterfowl, Environment |
| Sierra Club | Waterfowl, Environment |
| Ducks Unlimited | Waterfowl, Environment |
| Environmental Defense Fund | Environment |
| National Water Research Institute | New River, Water Policy |

TABLE 9. Selected Internationally-based Organizations with interests in the Salton Sea (not comprehensive).

| Regional Organization | Primary Interest |
|---|---------------------------------------|
| Government of Mexico | Border Water Issues, Rivers |
| International Boundary & Water Commission | Border Water Issues, Rivers |
| Border Environment Cooperation Commission | Border Water Issues, Rivers |
| North American Development Bank | Funding Border Environmental Projects |
| UC-MEXUS | Education, International Cooperation |
| US-Mexico Border XXI Program | Environment, Health, Resources |
| Border Environmental CC | Border Water Issues, Rivers |
| Mexicali, Mexico | Sewage Treatment, Water Supply |

Table 9 includes the U.S.-Mexico Border XXI Program, whose mandate has been to integrate the activities of the U.S. and Mexico federal agencies responsible for the border environment. Figure 5 depicts Border XXI's California-Baja California Region. The Salton Sea falls entirely within the Border XXI jurisdiction.

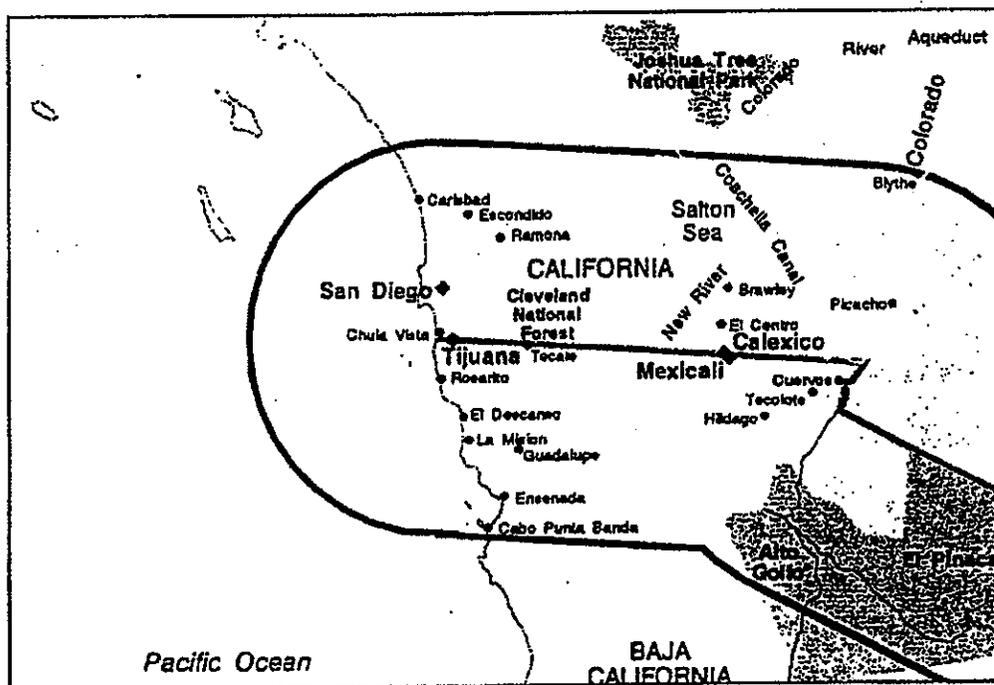


FIGURE 5. California-Baja California Region of the U.S.-Mexico Border XXI Program

Current Intervention Strategies

The U.S. Fish and Wildlife Service National Wildlife Refuge monitors the pace of bird die-offs. Figure 6 shows the pace of die-offs late last year. The rate can be used to make predictions of the severity of the die-offs. This year, for example, the Service has reported finding sickened and birds many months earlier than was the case last year. Refuge personnel have conducted the difficult job of keeping the waters of the Salton Sea free of bird carcasses. Last year, over 15,000 carcasses were pulled from the Sea. Cleanup is important because some fish species may be feeding on infected carcasses, thereby transmitting disease to healthy birds who later eat the fish.

Ominously, a pathogen harmful to humans is included this year in the list of potential causes. For this reason, the collection program has become both more dangerous for the staff, and a greater potential threat to the region. In response to the increased role, the Refuge has undertaken a plan to build a more permanent facility for managing the collection and disposal of carcasses. A significant portion of the costs of the facility have been provided by local and non-governmental organizations.

Intervention activities by other community leaders to mitigate the problems at the Sea have gained momentum in recent years. Local authorities, community organizations, state agencies and federal government agencies are sponsoring studies of the situation and considering solutions. The Salton Sea Authority membership has significantly scaled up its activities in the last three years, to identify and subsequently implement a workable plan. The efforts of the Authority have led to the greater visibility of the Sea as a valuable natural and economic resource.

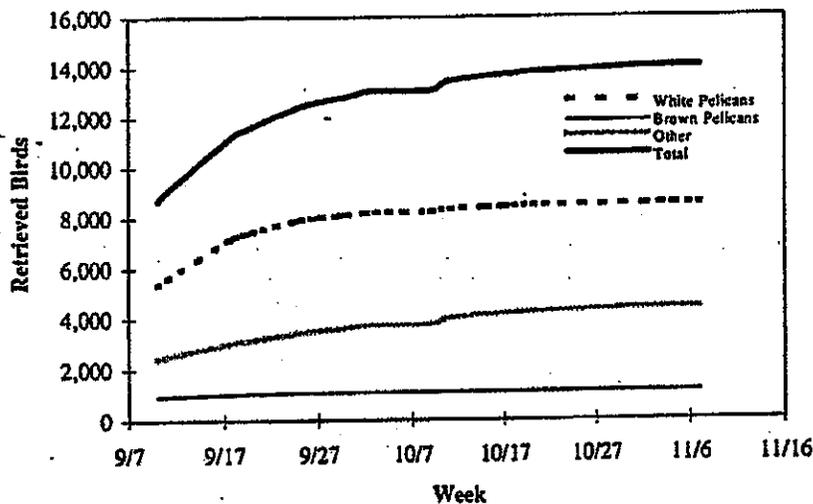


FIGURE 6. Pace of bird die-offs late last year²⁶.

Draft Plan for Restoration and Maintenance of the Sea

Several long term strategies have been proposed for the restoration and subsequent maintenance of the Sea. An acceptable solution will need to incorporate:

- A workable political solution providing benefits to all stakeholders.
- A successful funding mechanism and economic plan; and
- A feasible technical plan incorporating sound civil and environmental engineering.

A solution will require the coordinated effort of the major stakeholders working in consensus. An airing of alternative solutions in an unbiased forum, modeled after the CALFED Bay-Delta process, is an attractive process²⁷. Several key elements will be required in order to support the process. First, the establishment of an accessible repository for data, maps and scientific data will be needed. Second, stakeholders will need to be identified and assembled to begin the collaborative process. Third, an impartial facilitator or convenor will be needed to set an agenda, convene meetings and disseminate information. This position will require significant ability to marshal stakeholders, maintain order toward a consensus solution, and provide a neutral forum²⁸. After a solution is identified, supporting local, state and federal legislation can be written and passed, if required. An example of a collaborative group structure is listed in Table 10 and is depicted in Figure 7.

TABLE 10. Example Collaborative Group Structure.

| |
|---|
| Group 1: Primary Stakeholders: Membership of the Salton Sea Authority. |
| Group 2: Local Stakeholders: Communities, Agriculture, Local Development Agencies. |
| Group 3: Regional Stakeholders: Other Water Agencies, Infrastructure Providers. |
| Group 4: State, Federal and International Stakeholders: Trans-regional Interests, Agencies. |
| Group 5: Universities, Non-governmental Organizations and Consultants: Technical Resources. |

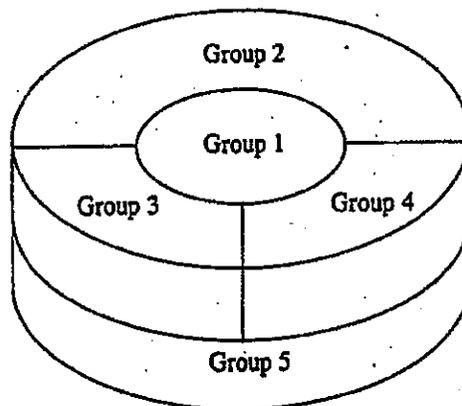


FIGURE 7. Example Collaborative Group Relationships.

This decision-making collaborative must necessarily be provided with supporting legislation dealing with water wheeling rights, water allocations and water transfers, through negotiated agreements of Colorado River water resources. It will be necessary to identify a technical fix which is wholly compatible with both the economic constraints and the reformulated water allocations and transfers, including a structure for allocating the proceeds from negotiated water transfers. The CVWD and IID allocation negotiation is a potential keystone agreement which will allow subsequent agreements regarding MWD wheeling, overdrafting within CVWD and, solutions to the Salton Sea salinity and water level problems.

The communities of the Coachella Valley and Imperial Valley support restoration of the Salton Sea to its former prominence as a viable economic asset, emphasizing its livability, recreation potential, and desirability as a community center. This is not to exclude its restoration as a wetland, but to place the emphasis first on its value to the people of California and the region. Local participation and control will be essential. Interested participants will have to be vigilant to see that local authorities and other institutions are not "cut-out" of the collaborative solution process. A successful plan must include local control, inclusive decision-making, and avoidance of "unfunded mandates".

An Example Funding Mechanism

Overlaying the technical challenge of restoring the Sea, is the matter of funding the solution. The sustainable funding of a solution is possible through a mechanism somewhat similar, but not identical to the funding provisions of the Central Valley Improvement Act. In one example, the funding of Salton Sea restoration is met by a portion of the proceeds from the sale of conserved water transferred from IID to the urban sector²⁹. The wheeling of conserved water out of the Imperial Valley is thus linked to the maintenance of the Imperial Valley's economy and environment. Since there is considerable difference between the cost of agricultural water and the cost urban water users are willing to pay for conserved water, then a plan is feasible which rewards conservative agricultural water use, improves the reliability of urban water supplies in Southern California, and restores the Salton Sea to its previous condition as an attractive regional asset, recreational hub, and stable ecosystem.

A number of concepts for conserving water in the region have been discussed over the years. Each of these approaches has the potential to conserve hundreds of thousands of acre-feet per year. These proposals, are:

- Lining the All American River in Sand Dune Areas;
- On-farm Water Conservation Methods, As Used in Middle East;
- Recycling of Irrigation Return Flows; and
- Canal Lining in Mexicali through both Canal Lining and Off-farm Improvements.

Important issues to be addressed with the above proposals, in any conservation effort, are: the strength and nature of conservation incentives; participation by Mexican water users, in particular Mexicali Valley farmers; and the impacts of reduced recharge of aquifers to Mexican communities relying on pumped water resources.

Table 11 lists an example calculation of the use of proceeds from the sale of this conserved IID water to urban users under the terms of a thirty year contract³⁰. For purposes of the example, one-third of the proceeds are designated the Sea. Conserved water increases by 20,000 acre-feet per year over the life of the contract, rising to a maximum of twenty percent (620,000 acre-feet per year) in year 30 of the contract. The sale price is set at \$250 per acre-foot, with wheeling and other costs external to the calculation. The sales price reflects a likely outcome from wheeling rate negotiations. Sale prices incur a real cost escalation of 4% per year, which is not unreasonable, considering the historic trend of growing demand for water in Southern California.

TABLE 11. An example calculation of the proceeds from the sale of conserved IID water under the terms of a thirty year contract³¹.

| Year | Conserved acre-ft. | Percent Savings | Sale Price dollar/af. | Net Price dollar/af. | Water Sales Proceeds (\$) | Salton Sea Proceeds (\$) | Imperial Valley Proceeds(\$) |
|--------|-----------------------|--------------------|--------------------------|-------------------------|------------------------------|-----------------------------|---------------------------------|
| 0 | 20,000 | 0.6% | 250 | 250 | 5,000,000 | 1,667,000 | 3,333,000 |
| 1 | 40,000 | 1.3% | 260 | 260 | 10,400,000 | 3,467,000 | 6,933,000 |
| 2 | 60,000 | 1.9% | 270 | 270 | 16,224,000 | 5,408,000 | 10,816,000 |
| 3 | 80,000 | 2.6% | 281 | 281 | 22,497,000 | 7,499,000 | 14,998,000 |
| 4 | 100,000 | 3.2% | 292 | 292 | 29,246,000 | 9,749,000 | 19,497,000 |
| 5 | 120,000 | 3.9% | 304 | 304 | 36,500,000 | 12,167,000 | 24,333,000 |
| 6 | 140,000 | 4.5% | 316 | 316 | 44,286,000 | 14,762,000 | 29,524,000 |
| 7 | 160,000 | 5.2% | 329 | 329 | 52,637,000 | 17,546,000 | 35,091,000 |
| 8 | 180,000 | 5.8% | 342 | 342 | 61,586,000 | 20,529,000 | 41,057,000 |
| 9 | 200,000 | 6.5% | 356 | 356 | 71,166,000 | 23,722,000 | 47,444,000 |
| 10 | 220,000 | 7.1% | 370 | 370 | 81,413,000 | 27,138,000 | 54,275,000 |
| 11 | 240,000 | 7.7% | 385 | 385 | 92,367,000 | 30,789,000 | 61,578,000 |
| 12 | 260,000 | 8.4% | 400 | 400 | 104,067,000 | 34,689,000 | 69,378,000 |
| 13 | 280,000 | 9.0% | 416 | 416 | 116,555,000 | 38,852,000 | 77,703,000 |
| 14 | 300,000 | 9.7% | 433 | 433 | 129,876,000 | 43,292,000 | 86,584,000 |
| 15 | 320,000 | 10.3% | 450 | 450 | 144,075,000 | 48,025,000 | 96,050,000 |
| 16 | 340,000 | 11.0% | 468 | 468 | 159,203,000 | 53,068,000 | 106,135,000 |
| 17 | 360,000 | 11.6% | 487 | 487 | 175,311,000 | 58,437,000 | 116,874,000 |
| 18 | 380,000 | 12.3% | 506 | 506 | 192,453,000 | 64,151,000 | 128,302,000 |
| 19 | 400,000 | 12.9% | 527 | 527 | 210,685,000 | 70,228,000 | 140,457,000 |
| 20 | 420,000 | 13.5% | 548 | 548 | 230,068,000 | 76,689,000 | 153,379,000 |
| 21 | 440,000 | 14.2% | 570 | 570 | 250,664,000 | 83,555,000 | 167,109,000 |
| 22 | 460,000 | 14.8% | 592 | 592 | 272,541,000 | 90,847,000 | 181,694,000 |
| 23 | 480,000 | 15.5% | 616 | 616 | 295,766,000 | 98,589,000 | 197,177,000 |
| 24 | 500,000 | 16.1% | 641 | 641 | 320,413,000 | 106,804,000 | 213,609,000 |
| 25 | 520,000 | 16.8% | 666 | 666 | 346,559,000 | 115,520,000 | 231,039,000 |
| 26 | 540,000 | 17.4% | 693 | 693 | 374,283,000 | 124,761,000 | 249,522,000 |
| 27 | 560,000 | 18.1% | 721 | 721 | 403,672,000 | 134,557,000 | 269,115,000 |
| 28 | 580,000 | 18.7% | 750 | 750 | 434,812,000 | 144,937,000 | 289,875,000 |
| 29 | 600,000 | 19.4% | 780 | 780 | 467,798,000 | 155,933,000 | 311,865,000 |
| 30 | 620,000 | 20.0% | 811 | 811 | 502,727,000 | 167,576,000 | 335,151,000 |
| Totals | | | | | \$5,654,850,000 | \$1,884,953,000 | \$3,769,897,000 |

This one example shows that it is possible to raise over \$5.6 billion from the sale of water conserved from the Imperial Valley over 30 years. Just one-third of these proceeds can provide the Salton Sea over \$1.8 billion of local funds for a restoration plan. The overall impacts of such a funding plan are:

| | |
|---|-------|
| Average percentage of conserved IID water: | 10.3% |
| Percent of proceeds allocated from IID conserved water: | 8.0% |
| Percent of proceeds from initial \$50 reduction in MWD wheeling rate: | 25.0% |

The implication of the availability of the level of funding in this example is that together with state and local cost-sharing, higher-cost restoration options may be contemplated. The above example was developed using an assumption of a fixed one-third allocation of proceeds, for Salton Sea funding. The balance of the proceeds would then fall to the Imperial Valley. Out of the Imperial Valley's portion of the proceeds, conservation measures could then be funded at attractive benefit-to-cost ratios. In reality, costs for conservation measures generally increase, as greater percentages of water are conserved. In the above example, water conservation does not continue past 20 percent. A staged sequence of conservation practices, beginning with the least-expensive, are envisioned. A detailed plan would therefore include the sequence of management practices to be implemented to achieve the desired conservation. In general practice, agricultural conservation practices achieving no more than 20 percent savings are likely to exhibit very favorable benefit-to-cost ratios.

At first glance, it may appear that a redirection of selected proceeds from water sales could be portrayed as a diversion of financial resources outside the community. In fact, the opposite result is likely; apportioned funds will be spent on local public works in the community, creating employment and infrastructure. For this reason, community benefits may in fact be greater from the Salton Sea apportioned funding than from the unapportioned funding.

Table 12 lists the summary results across a range of plans using alternative assumptions. The various plans allow approximately from \$1 billion to \$4 billion for the funding of Salton Sea restoration. The example plan results in \$1.88 billion in financing available for the project.

Table 12. Summary results of the example local funding plan.

| Model | Total Proceeds [\$ billion] | Salton Sea Proceeds [\$ billion] | Imperial Valley Proceeds [\$ billion] |
|---|-----------------------------------|---|--|
| Allocated Proceeds Decreased to 20% from 33%. | 5.65 | 1.13 | 4.52 |
| Example Model As Shown in Table 11. | 5.65 | <u>1.88</u> | 3.77 |
| Project Life Increased from 30 years to 40 years. | 11.9 | 3.97 | 7.93 |

These examples are not definitive, but illustrate the feasibility of a potential solution strategy for funding a large portion of the restoration and maintenance of the Sea through sales of conserved water. The implication is that with no more than a twenty percent maximum (10.3 percent average) conservation of IID's 3.1 million acre-feet per year usage, significant funds can be made available to provide for the sustainable maintenance of the Salton Sea.

Technical Approach

Once the framework for selecting a long term funding plan has been created by the stakeholder collaborative, then the work of the collaborative will be to evaluate both feasible water conservation approaches and Salton Sea mitigation strategies.

Water savings of up to twenty percent of IID's usage are likely feasible through a combination of water-saving, re-use, canal relining and brackish water agricultural techniques. The details of the water savings plan can be developed in a full-scale agricultural and engineering study. Many of the approaches proposed for the Salton Sea have been demonstrated in a more complex and difficult arena: the collaborative Egyptian/Israeli water management program for agriculture on the Sinai peninsula³².

The most challenging technical problem will be the development of a Salton Sea Restoration and Maintenance Plan. Most of the possible alternative technical solutions have been assessed in the Ogden Report. The most publicized strategy to date is the diking strategy initially identified by the Salton Sea Authority from options developed by Ogden Environmental and Energy Services. The plan is to set aside a percentage of the Sea to stabilize both salinity and water level. In late 1996, the Salton Sea Authority announced a plan to adopt the Ogden recommendations for diking the Sea. The Authority scored a selection of alternatives, including wildlife impacts, in arriving at the announced solution. Nevertheless, the plan was criticized by wildlife agencies and other organizations outside the process, for placing priority on salt and stability control over contaminant and pathogen mitigation. Another factor subsequently threatening the plan is the effect of the coming reductions in flows to the Sea; if the Sea is to be reduced in size, the diked portion is likely to become stranded many miles from the main body of the Sea. Although a good plan for the available funding identified at the time, its announcement precipitated extensive debate on the availability of additional funding to provide for larger-scale options.

One of the constraints implicit in the selection of a diking strategy was the limited budget available for funding a solution at the Sea. Since significantly greater funds are now identified through allocation of proceeds of sales of conserved water, more comprehensive technical options are now available. The most attractive group of more expensive options are described as the "pump-in/pump-out" solutions. An example candidate solution is depicted in Figure 8. The basic design of this solution is the construction of a canal providing water from the Sea of Cortez to the New River in

Mexico, then flowing across the international border by gravity to the Salton Sea. A second conduit will also be required to "pump-out" Salton Sea water from the Sea to an evaporation pond in the Laguna Salada, in order to deal with the accumulation of salts in the Sea.

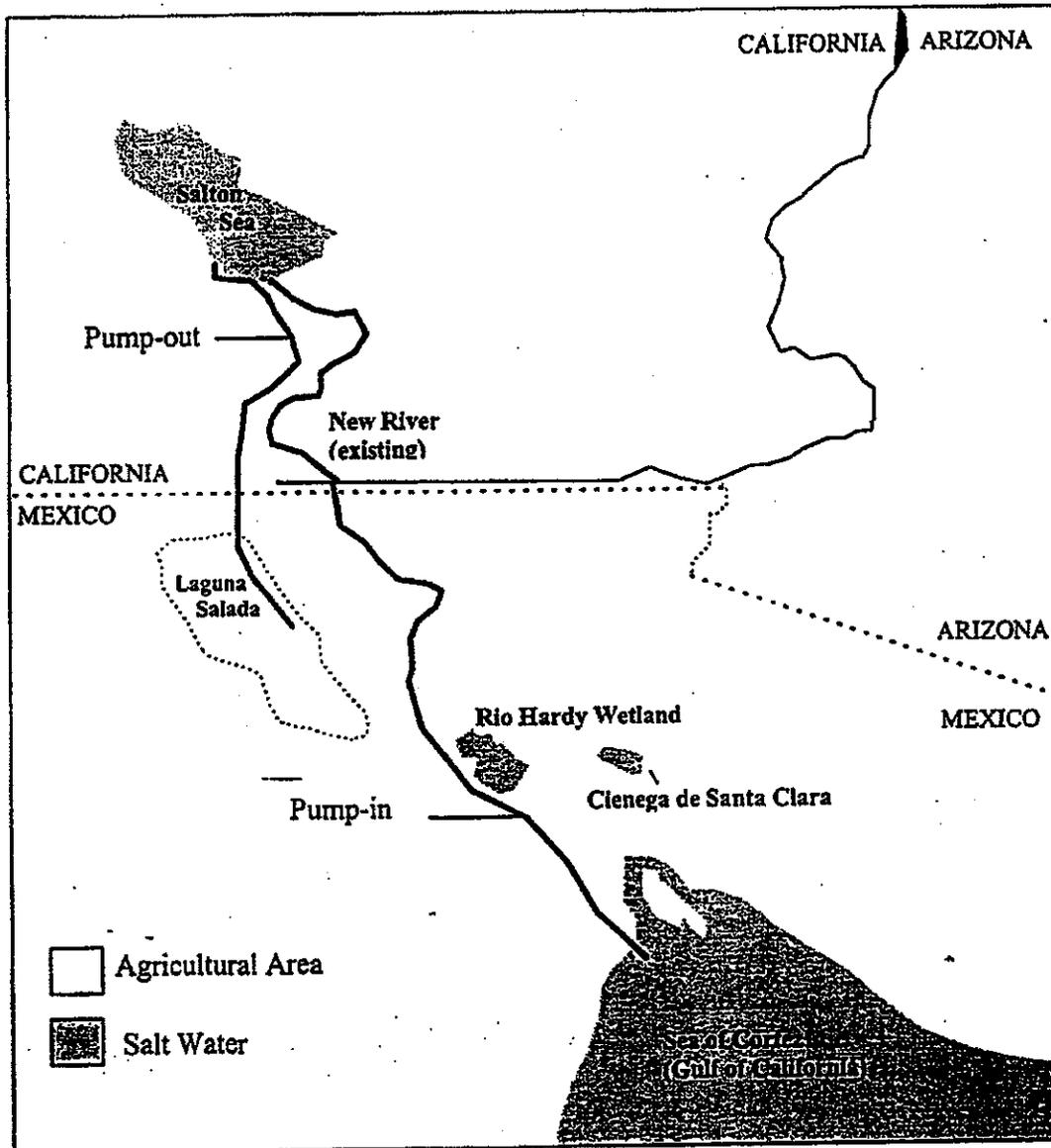


FIGURE 8. Candidate "pump-in/pump-out" plan for Salton Sea restoration and maintenance.

A further enhancement of this concept is the creation of a 'bi-national riparian corridor', for the open channel from the Sea of Cortez to the Salton Sea. This would

allow for the canals in Mexico and the New River in the U.S. to be created with recreational and wildlife components, in conjunction with their role in bringing water to the Salton Sea. This concept, originally detailed by Windwalkers and TSS Consultants in San Diego, has additional merit in improving the environmental impact of the proposed channel in Mexico.

An example plan composed of a 200,000 acre-ft per year pump-out and 400,000 acre-ft per year pump-in is a likely candidate for the technical solution selected by the stakeholders. The water pumped in is at sea-water salinity. The water pumped out is at elevated salinity of the upper Salton Sea. Ogden evaluated 200,000 and 400,000 acre-ft per year pump-out options. This example is based on the Ogden studies.

Pump-in

The pump-in solution begins with an intake pipeline taking water from the Sea of Cortez to the Las Amajas Pumping Plant. Water would then be transported 35 miles by pipeline to Cerro Prieto, Mexico. A canal would then carry the water north to the New River, then to the Salton Sea. An 11,000 foot double-inverted siphon would be required to carry water through the Naval Reservation area. A 6 MW power plant could be located at Cerro Prieto to generate electricity as the water flowed down to the Salton Sea.

Pump-out

The pump-out solution is based on the construction of an evaporation pond, and a 200,000 acre-ft per year conduit line to take the saturated brine to an evaporation pond located in the Laguna Salada. A short intake channel would carry the water to a pumping plant located at the Salton Sea. The water would be pumped in two 96-inch concrete pipes. Section 1 carries the water 25,000 feet to a pumping plant. Section 2 carries the water 12,000 to the La Rosita pumping plant at the tip of the Naval Reservation. Section 3 carries water 12,000 feet to the saddle of the Laguna Salada. A fourth section, 8,000 feet in length, would carry the water to sea-level. A final 3,000 ft section carries the water the remainder to the Laguna Salada Basin. If necessary, a 76-mile conduit would be required to allow the water to flow by gravity the remaining distance to the Sea of Cortez. Total cost: up to (1991\$) \$532 million.

Total System Capital Costs and Maintenance Costs

The net power requirement for this example project is envisioned to be $16.4 + 4.1 + 13 - 6 \text{ MW} = 27.5 \text{ MW}$. This represents about 241 million kWh per year of energy usage, or about \$4 million to \$10 million in energy costs per year.

Ogden identified costs for the various elements of the proposed plan. Nominal capital costs (1991 dollars) for an entire pump-in/pump-out project very similar to this plan were quoted at \$875 million to 1.5 billion. Taking into account the effects of

inflation and other related increases, a nominal maximum total project cost of 1.75 billion is envisioned. Nominal maintenance costs of \$20 to \$50 million per year are estimated, for purposes of this example.

Integrated Funding/Technical Solution

The example funding and technical solutions are compatible, at this stage of analysis. The funding mechanism identifies \$1.88 billion available for financing the project, while the technical solution identifies a maximum \$1.75 billion cost for restoration of the Sea, and up to \$50 million annual operations and maintenance costs. Thus, local funding has the potential to finance over 90%, perhaps 100%, of the project cost, including all of the capital costs.

An actual plan will require much more detailed work to develop a plan for conservation practices, civil engineering, and environmental engineering. Hopefully, the plan detailed in this report will elicit the necessary thinking to further advance development and implementation of a successful solution.

A successful solution will necessarily require significant resources and a rapid pace. The Salton Sea is extremely stressed at this time, and work will require a number of years for completion. Extensive data collection and compilation activities are currently underway at the University of Redlands; further research and mapping is anticipated over the next two years. In the summer of 1997 congressional hearings on the Salton Sea are planned. Subsequently, it is anticipated that workshops and Collaborative formation will be initiated in late 1997. Introduction of model draft federal legislation is planned for the later months of the 105th Congress. Following on these tasks, solution formulation and selection could take place in 1998 or 1999, with engineering, impact studies, and construction beginning in 1999 or 2000.

Potential Impacts on Related Initiatives

The example Plan has potential impacts on a number of related initiatives. These are:

Water Transfer Agreement Between IID and SDCWA: The example plan will reduce the benefit/cost ratio to IID of the proposed transfer. However, the benefit/cost ratio for the transfer will still be expected to be excellent, given the costs for conserving up to 20% of current water use.

Water Allocation Agreement Between IID and CVWD: The example plan will likely accelerate a completed negotiation between the parties on this issue. It will be important for IID and CVWD agricultural interests to know upcoming water allocations for planning purposes.

Wheeling Rate Negotiation Between MWD and SDCWA: The funding of the example plan hinges on a water transfer cost somewhat lower than the price currently set by MWD for wheeling water. It is expected that the plan will precipitate increased scrutiny and oversight into MWD's pricing mechanism for this wheeling of the conserved water.

Water Banking Initiative by CVWD: The proposed plan has synergies with CVWD's proposed water banking plan. The existence of the water bank will allow more flexible use of precious fresh-water resources in the Southwest, and is expected to provide for a more robust water supply infrastructure, through drought and flood years. This will, in turn, allow more consistent management of freshwater flows to the Salton Sea.

Restoration of Colorado River Delta: The diversion of clean water from the New River to Mexico will provide a significant beneficial source of water to the Colorado River Delta.

Cleanup of New River at Mexicali II: The need for the New River to serve as a canal for imported water from the Sea of Cortez will accelerate the demand to complete the Mexicali II treatment facility. This will have tremendous local benefit.

This example plan has been carefully composed to provide positive impacts for the greatest majority of stakeholders in the region. Hopefully, it will serve as an example that there is indeed a workable solution. More importantly, it will provide the impetus for the creation of the mechanism for the subsequent return of the Salton Sea to its former prominence.

Selected Legislative Interest and Activities (not comprehensive)

In the 104th Congress, Representatives Sonny Bono, George Brown, Duncan Hunter, and Ken Calvert successfully obtained \$300,000 for the Bureau of Reclamation for its support of the work of the Salton Sea Authority.

Also in the 104th Congress, Senate Bill 811, (Paul Simon) authorized \$35 million for research and development and \$40 million for desalinization projects over 5 years. H.R. 4944 (George Miller) passed the House on October 4, 1994. H.R. 4944 gave responsibility to DOI alone, but was otherwise similar to S.811, except for an authorization of \$96 million rather than \$75 million--i.e., research and development increased to \$45 million and demonstration projects to \$50 million. S.617, which was similar to S.811 but with authorization of \$95 million, passed the Senate on August 5, 1994. In the closing days of the 103rd, the House and Senate had agreed on the Miller text, but time expired before the Senate could move on the agreed-upon text.

Public Law 102-575 Authorizes \$10 million for Salton Sea Investigations by the U.S. Bureau of Reclamation, through Title XI of the Reclamation Projects

Authorization and Adjustment Act of 1993. A line item in the Bureau's budget is needed to utilize the full amount for planning and preparation of environmental documents. The Presidents' FY 1998 Bureau of Reclamation budget includes \$400,000 for the Bureau for this project: state and local funds have provided a 100% non-federal match.

California Prop 204 and other funds are anticipated for use in federal matching. California Senate Bill 99, introduced by California Senate Member David Kelley in December 1996, "appropriates \$2,500,000 in the Drainage Management Sub-account in the Clean Water and Water Recycling Account in the fund to the State Water Resources Control Board for grants to local agencies for the purpose of providing the nonfederal share of the costs of the Salton Sea Research Project".

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⁵ Bloom, Clark, Ibid.

⁶ Clinton, Mike, Imperial Irrigation District, personal communication. Wednesday March 5, 1997.

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⁹ Watton, Mark, *MWD Nearer Decision on Delivery Fee*. Imperial Valley Press. Mr. Watton is Chair of the San-Diego County Water Authority, October 10, 1996. pp A1, A7.

¹⁰ Imperial Irrigation District, *Salton Sea Fact Sheet*, 1997.

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¹³ Ogden Environmental and Energy Services Co., Inc., *Salton Sea Management Project, Evaluation of Salinity and Elevation Management Alternatives*, prepared for The Salton Sea Authority, 333 E. Barioni Drive, Imperial, CA 92251.

¹⁴ U.S. Fish and Wildlife Service, Salton Sea National Refuge, 1996.

¹⁵ U.S. Geological Survey, Ibid.

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- ¹⁶ U.S. Fish and Wildlife Service.
- ¹⁷ Imperial Valley Irrigation District, Congressional Briefing, Wednesday, March 5, 1997.
- ¹⁸ Imperial Irrigation District, *Salton Sea Fact Sheet*, 1997.
- ¹⁹ Imperial Irrigation District, *Salton Sea Fact Sheet*, 1997.
- ²⁰ Setmire, James G., et al., 1993. *Detailed Study of Water Quality, Bottom Sediment and Biota Associated with Irrigation Drainage in the Salton Sea Area, California, 1988-90*. U.S. Geological Survey, Water-Resources Investigations Report 93-4014.
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- ²³ Nan Jenks-Jay, personal communication. March 1997.
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- ²⁵ US-Mexico Border XXI Program, *Executive Summary*, EPA 160-S-96-001, October 1996.
- ²⁶ Bloom, Clark, U.S. Fish and Wildlife Service, Salton Sea National Refuge, Bird Counts received via fax. Weekly, 1996.
- ²⁷ California Water Policy Council, *California's Bay-Delta Estuary: Regional Solutions to Improve National Environmental & Economic Health*. 1997.
- ²⁸ California Water Policy Council, *California's Bay-Delta Estuary: Regional Solutions to Improve National Environmental & Economic Health*. 1997.
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- ³¹ Pasternak, D., *Optimization of Water Use in Dry Climates - The Israeli Experience*, The Institutes for Applied Research, Ben Gurion University of the Negev, P.O. Box 653, Beer-Sheva 84105, Israel (undated).
- ³² Brown, George E., *Ibid*.

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on the Salton Sea Ecosystem Restoration Program
Draft Programmatic Environmental Impact Report

A Supplemental Proposal That Would Strengthen All Restoration Plans Being Considered for the Salton Sea

January 16, 2007

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ABSTRACT

A Supplemental Proposal That Would Strengthen All Restoration Plans Being Considered for the Salton Sea

The strategic placement of solar-powered circulators in less than 20% of the Sea would improve the ecology of 100% of the Sea. The circulators would immediately improve the habitat for humans and wildlife, and would eliminate or greatly reduce major odor events for the next 25 years.

The circulators are compatible with, and would supplement, all other pending Sea restoration alternatives, including the "no action" alternative. The portable circulators can easily be re-located to accommodate any changes in size, shape, or depth. Furthermore, based on experiences in thousands of other water bodies it is virtually certain that other Sea restoration efforts alone, without circulation, will fail to solve the problems of harmful algae blooms (HABs), fish kills and odor events. However, circulators placed around the perimeter and in four (4) 2-miles-square zones in the middle of the Sea, including the two "deep-holes" would directly address the problems of HABs, fish kills and odors. A 4-year phased approach is proposed, but could be accelerated.

The proposed circulators have already demonstrated their ability at the Sea to prevent HABs, keep fish alive and control chronic odor events, in Desert Shores pilot testing in 2005-2006 and in USBR testing in 2003-2004.



SolarBee at the Fingers at Desert Shores, Imperial County, CA

I. TECHNICAL NARRATIVE

The key to success of any restoration efforts at the Salton Sea is to control the harmful algae blooms (HABs). When an algae bloom in salt water dies off, there is a very rapid (within hours) depletion of oxygen and formation of large amounts of H₂S. The combination is lethal to fish and triggers massive odor events. The immediate and strategic placement of long distance solar-powered circulators in less than 20% (42,000 acres) of the Sea would improve the ecology of 100% (230,000 acres) of the Sea. This proposal focuses on deploying long distance solar-powered circulators to control HABs in the near-term. Addressing the HABs issues of the Sea is a necessary and critical component of any successful restoration effort of the Sea. *This proposal seeks to provide the most benefit to the Sea at the least cost and in a manner that allows the most flexibility to complement and aid future restoration efforts.*

A. Purpose and Objectives:

The purpose of installing circulators in the Salton Sea would be to provide a near-term solution for the majority of the water quality and odor problems at the Sea in a way that would be compatible with and supplements all other pending restoration efforts, including the ‘no action’ alternative. The specific objectives include the control of HABs and H₂S in the worst areas with the impaired water quality. By addressing these two issues immediately, the local residents and wildlife would benefit immediately. Portable solar-powered long-distance circulators would be strategically deployed with a focus on two areas: **1)** the 85 miles perimeter of the Sea; **2)** The deep holes in the middle of the Sea. The specific objectives for these two areas are described in detail below. See **Figure 1** for conceptual placement of the circulators.

1) Perimeter machines: The purpose of the perimeter machines would be to circulate the area most prone to harmful algae blooms (HABs) and which receives the brunt of the impact of surface scum and algae blooms that are blown up against shore. These areas experience high rates of algae decay, low oxygen, and H₂S formation that rapidly lead to fish kills and odor events. The objective would be to provide circulation in the perimeter to control the HABs, and draw up the H₂S laden waters from the near shore bottom and mix with high Dissolved Oxygen (DO) waters on the surface thereby controlling odor events and preventing fish kills originating in the perimeter.

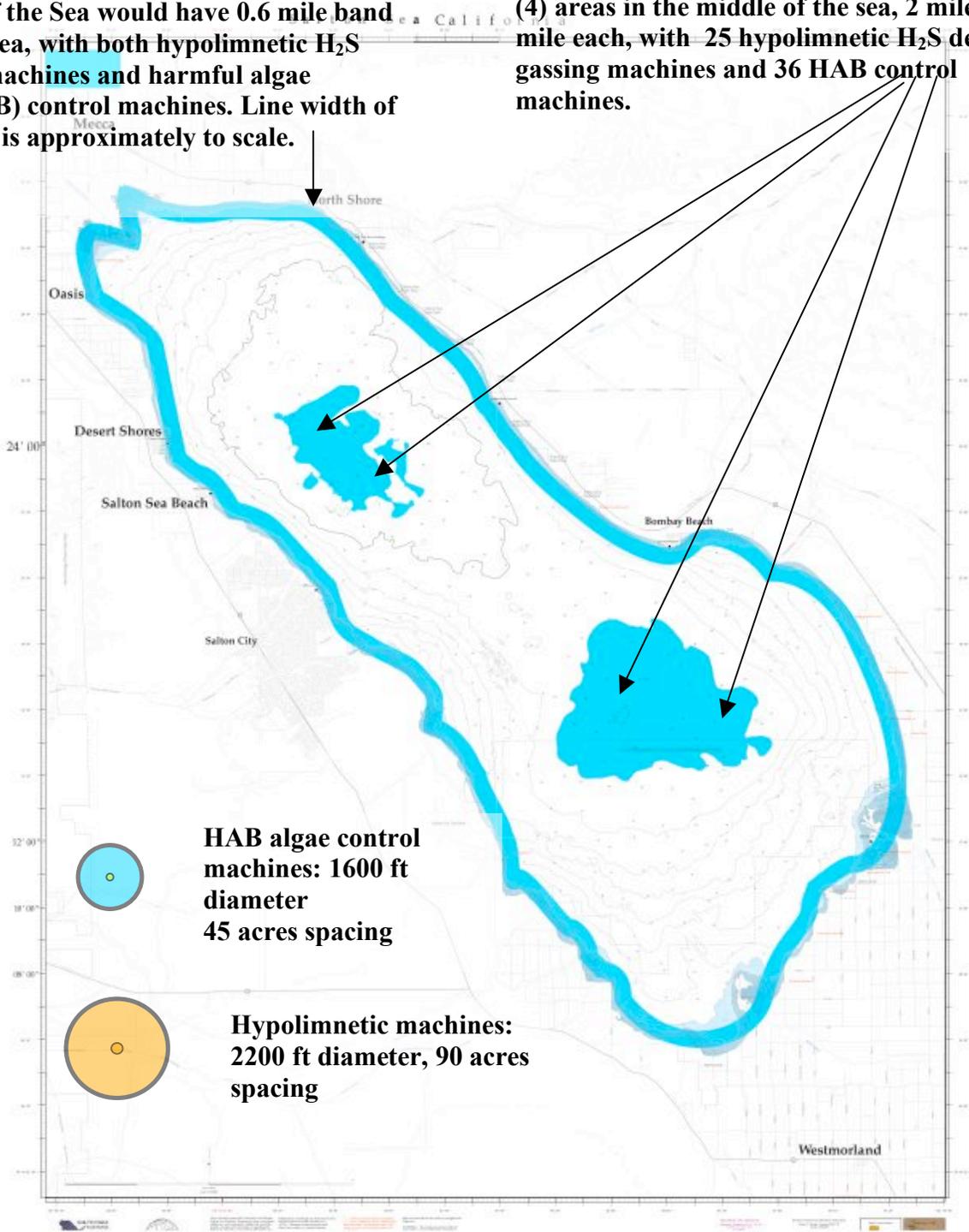
2) Deep Area machines: The H₂S from the deep areas of the Sea is responsible for major and chronic odor events and contributing to massive fish kills due to the toxicity of H₂S that forms quickly in salt water. The purpose of installing these deep area machines would be to continually de-gas H₂S that has concentrated in the deep holes in the sea. By bringing up and mixing with surface waters, the circulators would be providing a slow and constant release for the H₂S. Any H₂S that does not gas off at the machines will be oxidized to sulfate. The objective would be to provide sufficient degassing in the deep holes to control odor events and prevent fish kills originating in the deep areas of the Sea.

Figure 2 illustrates the different deployment methods for the solar-powered circulators.

FIGURE 1

Perimeter of the Sea would have 0.6 mile band of treated area, with both hypolimnetic H₂S de-gassing machines and harmful algae blooms (HAB) control machines. Line width of treated area is approximately to scale.

(4) areas in the middle of the sea, 2 mile x 2 mile each, with 25 hypolimnetic H₂S de-gassing machines and 36 HAB control machines.



**HAB algae control machines: 1600 ft diameter
45 acres spacing**

Hypolimnetic machines: 2200 ft diameter, 90 acres spacing

Perimeter treatment would have 2 rows of HAB control machines and 1 row of hypolimnetic H₂S de-gassing machines. 0.6 mile wide band.

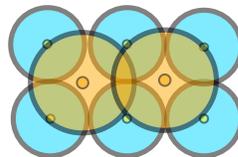
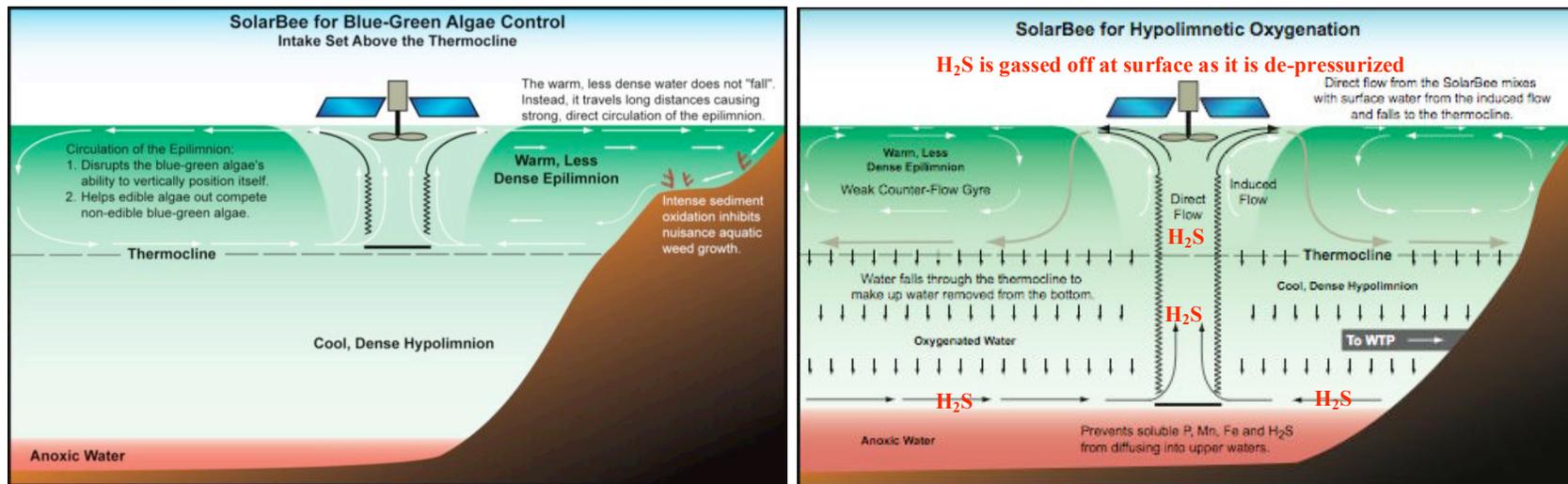


FIGURE 2



The shallow-set algae control machines shown above have 20 ft long intake hoses that are set at the thermocline and circulate the epilimnion (from the thermocline to the surface).

These units are elsewhere in the proposal referred to as the epilimnetic machines.

The deep-set machines shown above have longer intake hoses (30-50 ft long) that are set close to the bottom, below the thermocline, and draw up water from near the bottom to the surface. The intake plate sets the floor of the circulation pattern and water/sediment is **not** drawn from below the intake plate.

These machines are elsewhere in the proposal referred to as hypolimnetic machines.

B. Discussion:

The Proposer has focused on the key to successful restoration efforts at the Salton Sea: any plan must include the control of HABs. In the past 6 years, long distance solar-powered circulators have solved HAB problems in almost 200 lakes including 60 drinking water reservoirs, and in salt water systems in the US and Canada. In many of these lakes, other methods were tried previously without success to control HABs, including nutrient limitation, aeration, alum, and other methods with a theoretical chance of success. But other than these 200 circulator projects, virtually every lake restoration project ever attempted in the US and worldwide over the past 50 years, no matter how many hundreds of millions of dollars were spent, has failed to control HABs. Thus it appears to be a virtual certainty that the Sea will experience on-going problems of HABs and die-offs, fish kills, and intense odor events unless and until long distance circulators are made part of the solution.

The equipment being proposed would be effective immediately upon installation and can easily be re-located for ongoing maximum effectiveness as the Sea changes in shape, size, or depth.

This equipment has been successfully demonstrated at the Salton Sea. Those experiences are summarized below:

Odor Abatement Pilot Study at the Salton Sea with Solar-Powered

Circulators: The proposed circulators have been successfully tested at the Salton Sea. In 2005-2006, the Salton Sea Authority sponsored the pilot study at Desert Shores. Results indicate that SolarBees can effectively and sustainably control localized noxious odors, control harmful algae blooms, and reduce surface scum. There is further empirical evidence that SolarBees promote fish habitat and spawning, while preventing localized massive and chronic fish kills. The pilot study indicates that SolarBees can help make the Salton Sea a healthier and viable recreational water body supporting many beneficial uses.

United States Bureau of Reclamation (USBR) Research Project at the Salton Sea with Solar-Powered Circulators: In solar-powered circulator testing by the USBR in 2003-2004, at the end of the test the control pond was 'biologically dead', but the pond with circulation provided 'noticeable ecological benefits' including a thriving population of 300 corvina despite elevated salinity levels of 87 ppt.

While the benefits of circulation have been understood and appreciated for more than 30 years, using circulators in large bodies of water was not practical until recent advances in long-distance circulation technology.

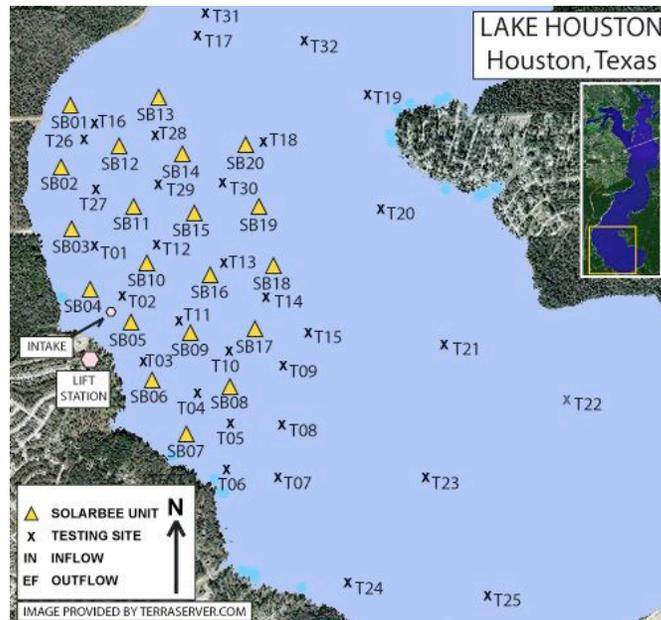
Nor was it known that just part of a large water body could be successfully treated with circulation. See insert below for details of a recent example of a partial large lake approach in Houston Texas where the circulators were deployed over a portion of the whole lake.

For example, in 12,000-acre Lake Houston, just 660 acres are being treated, with excellent results, in front of a 40 MGD drinking water treatment plant. This experience supports the approach of treating the most critical areas of the Salton Sea in order to effect water quality over the whole Sea. Note that the nutrient loading of the Sea is not nearly as severe as in many freshwater lakes and reservoirs in the US.

20 solar-powered circulators installed April 2006, treating 660 acres of a 12,000 acres lake serving the City of Houston, TX.

Objective: control blue-green algae blooms.

Results: Not one taste and odor complaint, plant operation improved significantly.



C. Timing of Impacts with Solar-Powered Circulators:

The circulators being proposed would have an immediate benefit on water quality at the Sea whereas the current alternatives under consideration in the Programmatic Environmental Impact Report (PEIR) would not start construction until 2014 at the soonest and most would not be completed until 2020 to 2030.

So even if an accepted plan would eventually be effective without circulators (a low-to-zero probability based on history), 25 years is unnecessarily long to wait for any improvement to water quality at the Sea. By that time the Sea could experience a total ecological collapse.

It is proposed that the circulators would be installed over a four-year period to phase in the implementation. However, that schedule could be accelerated.

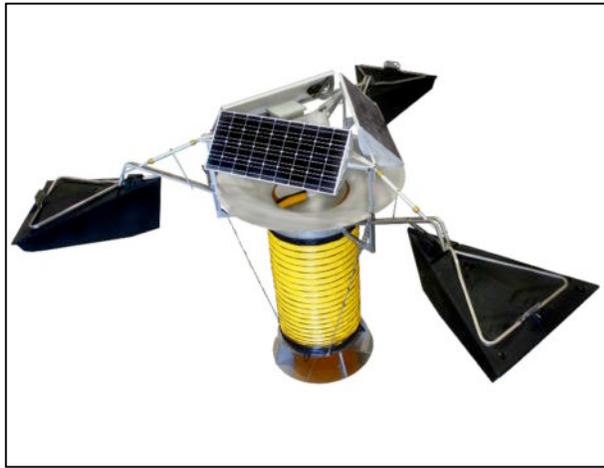
D. Equipment Description:

The proposed solar-powered circulators are 17-ft diameter x 3-ft above the water surface, and would float on the surface of the Sea and be held in place with mooring blocks. They are constructed of 316L stainless steel and would be equipped high-wave float arms and intakes to handle conditions at the Salton Sea. Each machine pumps brings to 3,000 gallons per minute (gpm) of direct flow up the hose, and 7,000 gpm of induced flow from beneath the flow dish, for 10,000 gpm leaving the machine. For machine deployed with the intake hoses set deep, in a hypolimnetic mode, only the direct flow up the intake hose, 3,000 gpm, would be used to calculate the rate of withdrawal from the hypolimnion.

The machines operate day and night from power supplied by three (3) on-board photovoltaic-modules charging an on-board battery system.

The on-board battery system is a military grade deep cycle marine battery that was originally designed for aircraft landing on aircraft carriers.

The machines have a 25-year life: the frame, motor and solar panels have a 25-year life; the battery has an expected life of 5 to 15 years; the hose has an expected life of 5 years, assuming routine maintenance.



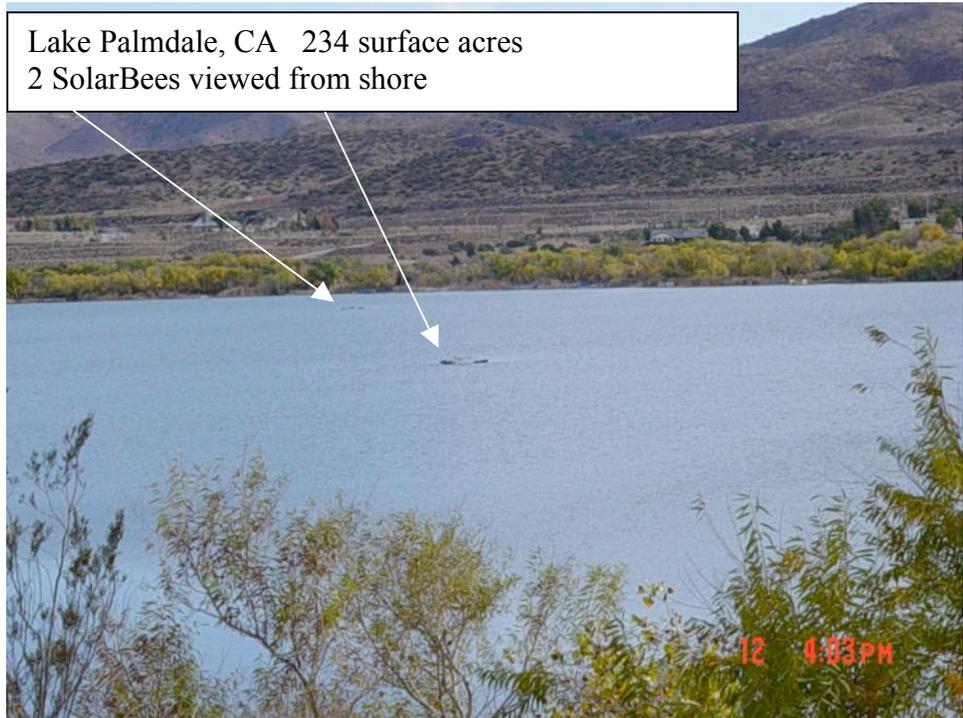
No infrastructure is needed and the machines are portable so they can be easily re-located from time to time for optimal benefits as the Sea is changing or being restored. These machines have survived hurricanes in Florida, so damage would not be expected from earthquakes or high waves.

All machines would be equipped with digital programmable controllers, GPS, and SCADA radio-link outputs. On-shore transceivers would be able to obtain the signals from the SCADA system and maintain a record of the operation for each unit.

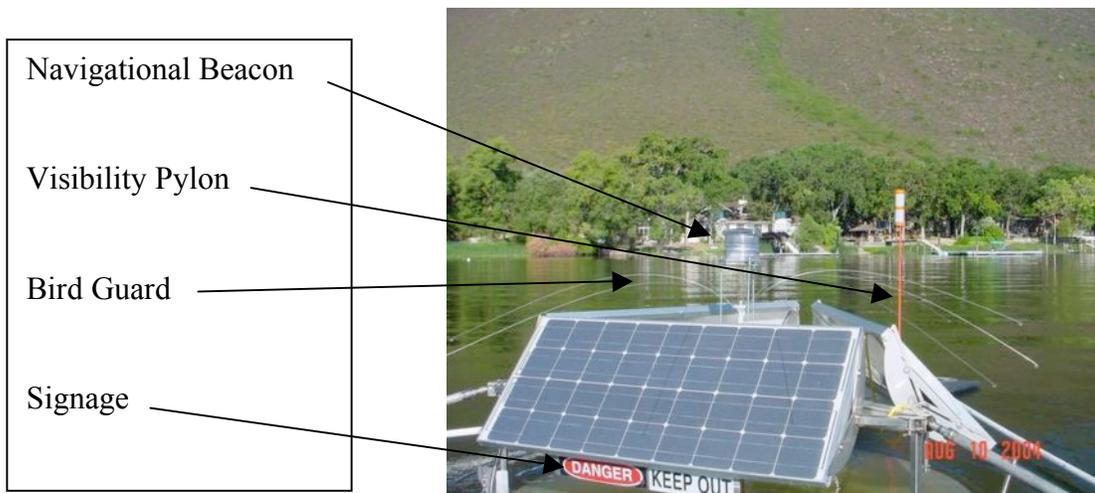
It may be possible to have extra battery power potentially available most months of the year for possible add-on water quality monitoring devices.

It would be hard to see more than three or four perimeter units from any one point on shore or on the water, and the units at the deep holes would not be visible from shore. The photos shown below were taken from the shoreline at Lake Palmdale to illustrate the visibility issues.

There are seven (7) SolarBees in Lake Palmdale, Los Angeles County, CA. This recreational lake is a raw water storage reservoir ahead of a drinking water plant.



The machines would also be equipped with solar-powered navigational beacons and boater safety kits. Warning signs would be mounted on the units in English and Spanish, asking the public to keep 50 ft from the units. See photo below of the SolarBee detailing navigational beacon and boater safety kit and warning signs.



II. STATEMENT OF WORK:

The Proposer would manufacture the equipment at its Dickinson, ND plant and provide factory installation of the circulators at the Salton Sea over a four-year period. The manufacturer would also propose to service the machines over life of the machines.

Based on previous experience at the Salton Sea, the Proposer understands what it will take to maintain the machines to be relatively free of bio-fouling due to barnacles.

Machines would be installed with a custom-designed barge that would remain in place at the Sea to service, maintain and monitor the circulators.

Perimeter Machines: All perimeter machines would be deployed as follows: Two rows of shallow-set machines for harmful algae control and one row of deep-set H₂S de-gassing machines. The first row of algae machines would be spaced 800 ft from shore and 1,600 ft apart from each other. The adjacent row of algae machines would be spaced 2,400 ft from shore and 1,600 ft apart from each other. A row of deep-set de-gassing machines would be spaced 2,000 ft from shore and 1,600 ft apart from each other, with each de-gassing machine centered between four algae control machines.

Deep Area Machines: In each of the 4 zones there would be 36 shallow-set algae-control machines, in a 1,600 ft square spacing pattern, and 25 deep-set de-gassing machines, one centered between each algae-control machine.

A. Detailed Schedule and Milestones By Phases:

Table 1 outlines the number of machines and conceptual location by phases.

In Year One, a total of **103** machines would be deployed as follows:

Perimeter Machines: 42 units would be installed along the near-shore perimeter of the Sea. The machines deployed along the perimeter would be placed in three rows, two rows for epilimnetic circulation and one row for de-gassing of H₂S in the hypolimnion. In total these machines would cover about 8.5 miles of the perimeter (or about 10% of the total perimeter of the Sea).

Deep Area Machines: 61 machines would be installed in one deep area zone of the Sea covering about 4 square miles (2 miles x 2 miles). There would be 25 deep-set degassing machine and 36 shallow-set algae-control machines, all in a square spacing pattern. One primary objective in this first phase for the deep area machines would be to evaluate the best methods and means for measuring the rate of degassing of H₂S in one deep holes, and the rate of flux of H₂S in the treated deep hole as compared to the other deep holes.

TABLE 1
A Supplemental Proposal That Would Strengthen All Restoration Plans Being Considered for the Salton Sea

| | | | | | | |
|---|----------------|--------------|-------------------|--------------------|-------|-----|
| Total perimeter, miles | | 85 | 448,800 | lineal feet | | |
| PERIMETER MACHINES | | | | | | |
| Year | % of perimeter | Lineal Ft | Epilimnetic Units | Hypolimnetic Units | Total | |
| 1 | 10% | 44,880 | 28 | 14 | 42 | |
| 2 | 25% | 112,200 | 70 | 35 | 105 | |
| 3 | 30% | 134,640 | 84 | 42 | 126 | |
| 4 | 35% | 157,080 | 98 | 49 | 147 | |
| TOTAL PERIMETER MACHINES | | 100% | 448,800 | 280 | 140 | 420 |
| DEEP AREA MACHINES | | | | | | |
| Year | | Miles Square | Epilimnetic Units | Hypolimnetic Units | Total | |
| 1 | North Hole-A | 2 | 36 | 25 | 61 | |
| 2 | North Hole-B | 2 | 36 | 25 | 61 | |
| 3 | South Hole-A | 2 | 36 | 25 | 61 | |
| 4 | South Hole-B | 2 | 36 | 25 | 61 | |
| TOTAL DEEP AREA MACHINES | | | 144 | 100 | 244 | |
| GRAND TOTAL | | | 424 | 240 | 664 | |
| PERIMETER & DEEP AREA MACHINES BY YEAR | | | Epilimnetic Units | Hypolimnetic Units | Total | |
| Year | | | | | | |
| 1 | | | 64 | 39 | 103 | |
| 2 | | | 106 | 60 | 166 | |
| 3 | | | 120 | 67 | 187 | |
| 4 | | | 134 | 74 | 208 | |
| GRAND TOTAL | | | 424 | 240 | 664 | |

Year 1 Schedule: It would take approximately 3 to 4 months to manufacture, deliver and install these **103** machines.

Year 1 Milestone: Factory crews would conduct basic water testing prior to installation at GPS designated points prior to the installation. Depending upon the time of year that the machines would be installed, changes in water quality could be detected within 1 week. Machine monitoring would be by SCADA and Radio Signal to an on-shore transceiver. Water quality monitoring would be a separate task but could be done at the same time by factory crews or by a third party.

In Year Two, a total of **166 machines** would be installed as follows:

Perimeter Machines: 105 machines would be installed along the near-shore perimeter of the Sea. The machines deployed in rows as noted above. In total these machines in this phase would cover about 21.5 miles of the perimeter (or about 25% of the total perimeter of the Sea).

Deep Area Machines: 61 machines would be installed in one subsection section of one of the two deep areas in the Sea covering about 2 mile squares.

Year 2 Schedule: It would take approximately 4 to 5 months to manufacture, deliver and install these **166** machines.

Year 2 Milestone: Testing would be done prior to installation at GPS designated points prior to the installation. Depending upon the time of year that the machines would be installed, changes in water quality could be detected within 1 week. Inspection monitoring would be by SCADA and Radio Signal.

In Year Three, a total of **187 machines** would be installed as follows:

Perimeter Machines: 126 machines would be installed along the near-shore perimeter of the Sea. The machines deployed in rows as noted above. In total these machines in this phase would cover about 25.5 miles of the perimeter (or about 30% of the total perimeter of the Sea).

Deep Area Machines: 61 machines would be installed in one subsection section of one of the two deep holes in the Sea covering about 2 miles square.

Year 3 Schedule: It would take approximately 4 to 6 months to manufacture, deliver and install these **187** machines.

Year 3 Milestone: Testing would be done prior to installation at GPS designated points prior to the installation. Depending upon the time of year that the machines would be installed, changes in water quality could be detected within 1 week. Inspection monitoring would be by SCADA and Radio Signal.

In Year Four a total of **208 machines** would be installed as follows:

Perimeter Machines: 147 machines would be installed along the near-shore perimeter of the Sea. The machines deployed in rows as noted above. In total these machines in this phase would cover about 25.5 miles of the perimeter (or about 30% of the total

perimeter of the Sea).

Deep Area Machines: 61 machines would be installed in one subsection section of one of the two deep holes in the Sea covering about 2 miles square.

Year 4 Schedule: It would take approximately 6 to 7 months to manufacture, deliver and install these **208** machines.

Year 4 Milestone: Testing would be done prior to installation at GPS designated points prior to the installation. Depending upon the time of year that the machines would be installed, changes in water quality could be detected within 1 week. Inspection monitoring would be by SCADA and Radio Signal.

Total Project over Four Years is a total of 644 machines would be installed as follows:

Perimeter Machines: 420 machines would be installed along the near-shore perimeter of the Sea. The machines deployed as noted above. In total these machines in this phase would cover about 85 miles of the perimeter (or 100% of the total perimeter of the Sea).

Deep Area Machines: 244 machines would be installed in the two deep holes in the Sea.

Schedule: 4 years to install all **644** machines.

B. Monitoring:

Weekly or bi-weekly water quality testing in the treated areas and control areas could be conducted by the Proposer's service crews or by a third party. The service crews typically use a Yellow Springs Instrument (YSI) Sonde 6600 with a 60 ft length probe to test the following parameters throughout the water column depth: Dissolved Oxygen, pH, Temp, ORP, and Specific Conductivity. A Hach Test Kit (HS-WR, range 0. - 11.25 mg/L) could be used to test H₂S levels at the bottom and at multiple depths, including one at the surface. A Kemmerer Sampler could be used to collect water sample bottle for laboratory analysis.

C. Qualifications:

This section details the Proposer's experience in solar-powered circulation. The Proposer is the developer, manufacturer and installer of more than 1,000 solar powered circulators. They have installed circulators in almost 200 impaired lakes and reservoirs around the US and Canada. As a part of the Company's on-going Research and Development (R&D) program, it is collecting water quality data from more lakes and reservoirs than any other private entity in the US. Its staff includes two Ph.D.s who are also Certified Lake Managers. These credentials and commitment to extending the field of circulation make the Company the world's leading authority in long-distance horizontal and vertical mixing in open bodies of water.

The Company maintains a fleet of ten (10) service crews to install and service the machines. The Company would provide all of the equipment and resources necessary to deliver, install and service the machines. With the installation of the first machines, a specially designed barge would be mobilized to install and service the units.

Specific to the Salton Sea, and previously noted, the Company has extensive experience in 2003 and 2004 with the USBR's evaporation workgroup conducting testing on solar-powered circulators at the Navy Test Site at the Salton Sea. In addition, the Company has a contract with the Salton Sea Authority conducting a pilot project for Odor Abatement at Desert Shores.

The Company has a General Service Administration Contract. The contract number is GS-07F-5628R, and is listed under Pump Systems, Inc., which owns 100% of SolarBee, Inc. The name Pump Systems, Inc. is being changed to Medora Environmental, Inc. in early 2007. The GSA contract will be amended to reflect the new name at that time.

In addition, the Company has a 29-year history in pumps and custom pump system design and manufacturing.

D. Management Information:

The Proposer is a private entity that employs more than 65 technical and support staff whose entire focus is the research and development and commercialization of solar-powered circulators for open bodies of water with impaired water quality.

Key personnel:

Mr. Joel Bleth is President and Chief Applications Engineer, SolarBee, Inc. Mr. Bleth is an industrial engineer and lawyer; he earned his degrees from University of North Dakota, Grand Forks, ND in 1975 (B.S.) and 1978 (J.D.). He and Mr. Tormaschy started Pump Systems, Inc. in 1978 (PSI was renamed Medora Environmental, Inc. in 2006). The Company specializes in pumps and custom pump packaging. Mr. Bleth and Mr. Tormaschy are the patent holders for the SolarBee technology.

Mr. Bleth's work for the past 15 years has been focused on the development of new applied science technology for water treatment. Currently, he is the chief science advisor for the SolarBee team that developed the SolarBee technology and now markets the circulators for wastewater, freshwater and potable water applications. There are now more than 1,000 SolarBees installed around the US and Canada. Applications range from very large (100 million gallons) potable drinking water covered reservoirs to freshwater lakes (1 acre to 12,000 acres), as well as wastewater treatment systems, including high strength industrial wastewater treatment plants, and municipal wastewater systems. Mr. Bleth manages all research and development efforts for new applications for SolarBees.

Mr. Willard Tormaschy is Vice President of Manufacturing and Engineering, SolarBee, Inc.. Mr. Tormaschy is an industrial engineer and earned his degree from University of North Dakota, Grand Forks, ND in 1975. He and Mr. Bleth started Pump Systems, Inc. in 1978 specializing in pumps and custom pump packaging. Mr. Bleth and Mr. Tormaschy are the patent holders for the

SolarBee technology.

Christopher Knud-Hansen, Ph.D., Certified Lake Manager, for the staff limnologist for SolarBee, Inc. Chris Knud-Hansen has a B.A. degree in Biology from Gettysburg College (1972), a M.S.P.H. degree in Environmental Sciences and Engineering from the University of North Carolina, Chapel Hill (1975), a Ph.D. degree in Limnology/Ecology from the University of California, Davis (1983), and J.D. degree with a focus on water law from the University of Colorado, Boulder (1995). Over the years he has been on the faculty at the National University of El Salvador (Biology Dept., as a Peace Corps Volunteer), Michigan State University (Dept. of Fisheries and Wildlife), and the Asian Institute of Technology (Aquaculture Program, Bangkok, Thailand), and also worked as a limnological consultant with Aquatic Solutions, LLC (Boulder, CO).

As a scientist-in-residence, Dr. Knud-Hansen has over 10 years experience conducting and supervising university-based limnological research in El Salvador, Honduras, Venezuela, Indonesia, and Thailand. Research interests include nutrient cycling and eutrophication processes in freshwater systems, and natural food production for warmwater aquaculture. While associated with various US and international universities, Dr. Knud-Hansen has taught courses in Limnology (in English and Spanish), Aquatic Ecology, Analysis and Simulation of Complex Systems, Experimental Design and Analysis, and Scientific Analysis and the Law. He has also given workshops on bio-statistics, water quality analysis, and pond management for sustainable warmwater aquaculture. He has authored and published over 20 peer-reviewed articles, assists in the peer-review process for several international scientific journals, and has presented scientific research at international conferences since 1982. Knud-Hansen is a former Director and past President (2005) of the Colorado Lake and Reservoir Management Association.

Dr. Knud-Hansen has been the staff limnologist at the SolarBee Division of Pump Systems, Inc. since 2004, where he assists in the application of SolarBees for improving water quality and the ecological restoration of lakes, reservoirs, ponds, and estuaries.

Dr. Knud-Hansen's Curriculum vitae and List of Publications appears in Appendix I.

Sandra Walker is the California Regional Manager, SolarBee, Inc.. Ms. Walker is a former resident of the Imperial Valley and is familiar with the climate and culture of the region. She has been with SolarBee for 5 years and is responsible for the California region. Her background is in the field of renewable resources and renewable energy. Ms. Walker also has a background in large-scale project management and venture capital with a focus on the sustainable technologies. She earned her BA from Wilson College in Chambersburg, PA and her MBA from California Coast University in Santa Ana, CA.

Harvey Hibl is Southwest Regional Manager, SolarBee, Inc.. Mr. Hibl is the primary sales engineer for SolarBee and operates out of SolarBee's Denver office in Westminster. Mr. Hibl has been involved with Pump Systems, Inc. since 1979 where he has been designing and engineering pump packages in fluid handling for the industrial and municipal markets. He attended the College of Engineering and Applied Science at University of Colorado. For the last seven years Mr. Hibl has focused on the development of new applied science technology for water treatment. He is one of a team of science advisors that developed and now markets the SolarBee circulators

for freshwater, potable water and wastewater applications and is helping to develop new applications of the technology.

Bruce Richards, Ph.D., CLM, is the Northeast Regional Manager for SolarBee, Inc, in Hockessin Delaware. He is the Company's leading authority in estuary and oceanography issues. His current position encompasses technical sales and applications engineering of SolarBee units from Virginia to Maine. Prior to this position Dr. Richards served as the Executive Director of the Delaware Center for the Inland Bays (National Estuary Program) in Lewes, DE from 1995 before joining SolarBee in the summer of 2004. Dr. Richards also served as the chair of the Delaware Invasive Species Council (2001-2004) and is currently a commissioner with the Delaware Lagoon Commission (2003-2009). Prior to this position, Dr. Richards served as a Senior Extension Agent for Penn State University, College of Agriculture in southeast Pennsylvania. He has a Masters and Ph.D. in Agriculture and Extension Education from Penn State University, a Bachelors degree in Animal Science and a Masters in Oceanography both from the University of Delaware.

E. Resource Requirements:

This proposed project would represent a significant but not majority percentage of the resources of the Proposer to implement. Additional staff, primarily local personnel, would be added on a phased basis to maintain and monitor the units once installed. The manufacturer currently owns 35,000 square feet of manufacturing space that is sufficient to produce the number of units over the next four years. The Proposer currently owns and operates specially designed and equipped installation truck-trailer-boat rigs that would be sufficient to install the circulators over the next four years. In addition, the Proposer has designed and manufactured its own barge to deploying circulators in large open bodies of water, and for lifting circulators out of the water for in-situ cleaning.

F. Control Approaches:

The control approaches for this proposed project would be divided into two parts:

Part 1 -- Contract Management The Proposer would assign a staff person to manage the contracting elements of the project according to the terms and conditions of the contract. In this case, the manufacturer would assign an internal program manager located at the factory to manage the contract, schedule and billing issues. This person would report to the Project Manager for this proposed project.

Part 2 -- Project Implementation The Proposer would assign a staff person to manage the installation and service crews throughout the project. All circulators would have digital programmable controllers, Global Positioning Satellite (GPS), and Supervisory Control and Data Acquisition (SCADA) outputs for remote and/or on-shore monitoring of the machines and, if added, water quality parameters. These features would allow the monitoring of the operations of the machines once installed. In this case, the manufacturer would assign an internal project manager located at the factory to manage the installation and on-going monitoring and maintenance phases of the project. This person would report to the Project Manager for this

proposed project.

G. Project Management:

The Proposer has experienced technical and support staff to manage this type of project. It has also developed its own installation and servicing barges specially designed for these circulators.

H. Previous or Ongoing Related Work:

The Proposer has extensive experience in 2003 and 2004 with the USBR's evaporation workgroup conducting testing on solar-powered circulators at the Navy Test Site.

In addition, the Proposer had a contract with the Salton Sea Authority conducting a pilot project for Odor Abatement at Desert Shores and Varner Harbor. Funding has run out for that project.

See Appendix II provide a list of peer-reviewed, scientific papers relevant to the inhibition of harmful algal blooms through habitat disturbance.

I. Subcontracted Work:

This proposal does not foresee utilizing subcontractors to implement the Proposer's portion of the contract. The Proposer's Scope of Work would be limited to installation, operation, and on-going maintenance and monitoring services for the units. It may be in the future that there would be a cost benefit to employing local personnel to provide on-going maintenance and monitoring services for the units.

It is assumed that on-going water quality testing would be contracted to a third party. This proposal does not include an estimate for on-going water quality testing.

III. COST PROPOSAL

This proposal for the acquisition of equipment is covered in this proposal.

A. Equipment Costs

The Cost for Equipment appears in Table 1. There has been no attempt to include costs incurred by others to manage or monitor this proposed project.

Table III-1

A Supplemental Proposal That Would Strengthen All Restoration Plans Being Considered for the Salton Sea Equipment Budget Cost Proposal

| Year | Number of Units | Installed Unit Cost-average | Total Equipment Cost |
|-------|-----------------|-----------------------------|----------------------|
| 1 | 103 | \$66,000 | \$6,798,000 |
| | 1 custom barge | \$150,000 | \$150,000 |
| 2 | 166 | \$72,000 | \$11,952,000 |
| 3 | 187 | \$80,000 | \$14,960,000 |
| 4 | 208 | \$88,000 | \$18,304,000 |
| Total | 664 | | \$52,164,000 |

These unit costs are budget costs including special coatings for bio-fouling, high wave action features, navigational beacons and signage, GPS and SCADA outputs and radios.

The Proposer acknowledges that title to purchased equipment may be retained by Reclamation upon award or at the completion of the work, subject to the conditions of any applicable OMB Circulars.

B. Maintenance Costs

A maintenance and service contract is also required for this proposed project. The Table 2 below shows that costs for a maintenance and service contract for the units installed on a cumulative basis.

These costs do **not** include any water quality monitoring tasks. There has been no attempt to include costs incurred by the USBR to manage or monitor this proposed project.

It may be possible for a third party, local, to take over some or all of the maintenance and service tasks.

| Table III-2 | | | | |
|--|----------|--------------------|-----------|--------------------|
| A Supplemental Proposal That Would Strengthen All Restoration Plans Being Considered for the Salton Sea | | | | |
| Maintenance and Service Cost Proposal | | | | |
| Year | Units/Yr | Cumulative # Units | Unit Cost | Total Service Cost |
| 1 | 103 | 103 | \$1,500 | \$154,500 |
| 2 | 166 | 269 | \$1,400 | \$376,600 |
| 3 | 187 | 456 | \$1,200 | \$547,200 |
| 4 | 208 | 664 | \$1,000 | \$664,000 |
| Total | 664 | | | \$1,742,300 |

C. Summary of Project Costs

Table 3 provides a summary of the total cost for the proposed project.

There has been no attempt to include costs incurred by others to manage or monitor this proposed project.

| Table III-3 | | | | |
|--|----------|----------------|--------------|--------------|
| A Supplemental Proposal That Would Strengthen All Restoration Plans Being Considered for the Salton Sea Total Cost Proposal | | | | |
| Year | Units/Yr | Equipment Cost | Service Cost | Total Costs |
| 1 | 103 | \$6,948,000 | \$154,500 | \$7,102,500 |
| 2 | 166 | \$11,952,000 | \$376,600 | \$12,328,600 |
| 3 | 187 | \$14,960,000 | \$547,200 | \$15,507,200 |
| 4 | 208 | \$18,304,000 | \$664,000 | \$18,968,000 |
| Total | 664 | \$52,164,000 | \$1,742,300 | \$53,906,300 |

APPENDIX I

Christopher F. Knud-Hansen Curriculum Vitae

Education:

J.D. (Water Law), University of Colorado School of Law; Boulder, CO (1995)
Ph.D. (Limnology/Ecology), University of California at Davis, CA (1983)
M.S.P.H. (Environmental Chemistry & Biology), University of North Carolina at Chapel Hill, NC (1975)
B.A. (Biology), Gettysburg College; Gettysburg, PA (1972)

Fields of Specialization:

Nutrient cycling and eutrophication processes in freshwater ecosystems; biostatistics and experimental design; international development, warm-water aquaculture, water law and environmental policy
Licensed to practice law in Colorado since 1996.
Certified Lake Manager (CLM) by the North American Lake Management Society
Fluency in Spanish

Legal Experience:

Law School: Participated in the Colorado Journal of International Environmental Law & Policy (Articles Editor), Jessup International Moot Court Competition, clinic with the National Wildlife Federation, joint internship with the Colorado Attorney General's Office and the Colorado Water Quality Commission. Received the American Jurisprudence Book Award for *Legal Writing* course.

Adjunct Faculty, University of Colorado School of Law, Boulder, CO (1998)
Taught course titled *Science and the Law*.

Scientific Professional Experience:

Limnologist, SolarBee Inc. (2004-present)
Provides limnological consulting and application assistance for SolarBee, Inc., a company that developed and manufactures the SolarBee, a solar-powered water circulator used in lake management applications for preventing cyanobacteria blooms and restoring lake ecology.

President/Owner, Aquatic Solutions, LLC, Boulder, CO (1998-2003), independent consultant (1995-98)
Founded the ecological consulting firm Aquatic Solutions, LLC in 1998. Firm conducted scientific projects, research designs, and statistical analyses related to aquatic productivity, lake eutrophication, and watershed management. Clients included the Colorado cities of Greenwood Village, Westminster, Thornton, and Northglenn, the Sierra Club, Water & Waste Engineering, Inc., Muller Engineering, Inc., Big Thompson Watershed Forum, Geoplayers International, Inc., Pontius Water Consultants, Inc., Drexel, Barrell & Co, and Platte River Power.

Associate Professor (1991-93)/Assistant Professor (1989-91), Michigan State University, seconded to the Asian Institute of Technology (Aquaculture Program); Bangkok, Thailand (1988-93)
Directed field activities for M.S.U.'s USAID-funded Pond Dynamics (Aquaculture) Collaborative Research Support Program, supervised seven M.Sc. students, and taught graduate course titled *Experimental Design and Analysis in Aquaculture* for five years.

Visiting Professor, Universiti Sains Malaysia; Penang, Malaysia (May 1990)
Presented workshop titled *Experimental Design, Biostatistics and Computer-based Data Analysis for Fish Health Researchers* to Asian scientists.

- Limnologist, Aquatic and Wetland Consultants; Boulder, CO (1987-88)
Investigated water quality issues regarding Boulder Creek, Boulder, CO.
- Research Associate, Michigan State University seconded to Institut Pertanian Bogor (Faculty of Fisheries); Bogor, Indonesia (1986-87)
Directed field operations for M.S.U.'s Pond Dynamics Collaborative Research Support Program in Indonesia, and supervised theses for two M.Sc. students.
- Visiting Professor, Universitas Brawijaya; Malang, Indonesia (Nov. 1986)
Presented workshop titled *Water Quality Analysis* to Indonesian scientists.
- Research Associate, University of Colorado; Boulder, CO (1985-86)
Investigated water quality issues of Rocky Mountain wetland ecosystems.
- Visiting Professor, University of Colorado; Boulder, CO (Jan. 1986)
Taught undergraduate course titled *Freshwater Ecology*.
- Visiting Professor, University of Colorado; Boulder, CO (Spring 1985)
Taught two undergraduate courses titled *Limnology* and *Techniques in Aquatic Ecology*, and supervised one undergraduate student's independent study.
- Research Associate, University of Colorado; Boulder, CO (1984 -85)
Directed field operations for ecosystems investigation of the Orinoco River, Venezuela.
- Laboratory Director/Resident Limnologist, University of California at Davis; Davis, CA (1979-80)
Directed on-site research operations for a pre-impoundment investigation of the El Cajón hydroelectric project at Santa Cruz de Yojoa, Honduras.
- Research Assistant, University of North Carolina; Chapel Hill, NC (1977-78)
- Peace Corps Volunteer/Visiting Professor, Universidad Nacional de El Salvador; San Salvador, El Salvador (1975-77)

Memberships:

- Scientific Societies: American Association for the Advancement of Science, Ecological Society of America, International Association of Theoretical and Applied Limnology (SIL), North American Lake Management Society, Colorado Lake and Reservoir Management Association (President 2005, Board of Directors 2002-06), Sigma Xi, Union of Concerned Scientists
Legal Associations: American Bar Assoc., Colorado Bar Assoc., Boulder County Bar Assoc.

Scientific Refereed Publications:

- Knud-Hansen, C.F., Hopkins, and H. Guttman. 2003. A comparative analysis of the fixed-input, computer modeling, and algal assay approaches for identifying pond fertilization requirements. *Aquaculture*, 228: 189-214.
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- Knud-Hansen, C.F., C.D. McNabb, and T.R. Batterson. 1991. Application of limnology for efficient nutrient utilization in tropical pond aquaculture. *Verh. Internat. Verein. Limnol.*, 24: 2541-2543.
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Large Attachments to Harmut Walter Comment Letter

WESTERN TANAGER



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A Better Salton Sea for Our Birds

by Hartmut S Walter

Is this a good time to discuss the Salton Sea? You bet it is: there are some serious proposals in the pipeline that will affect migrating, wintering and breeding birds of the Salton Sink area for decades to come. So, get some info and evaluate my humble assessment of an unusually complex set of background documents, opinions, and hundreds of pages of agency materials. At first, I nurtured a deep suspicion that some powerful development interests were seeking a real estate and resort bonanza by transforming the Salton Sea into another leisure lake with all its trimmings (boating, jet skis, fishing, casinos?); it made me really uncomfortable that foremost among the Salton Sea development boosters was the argument that this was a first-class bird paradise with over 400 bird species. This hype was even echoed by the venerable and data-sensitive *National Geographic* magazine (February 2005). It states:

"Somehow this odd accidental lake, with its prolific fish and nearby fields, has become one of the most important migratory bird habitats in the U.S., if not in the world. Millions of birds representing more than 400 species can be spotted here, including endangered brown pelicans and Yuma clapper rails."

This sentence contains at least three inaccuracies and some exaggeration (most fish species have vanished from the lake, the

Brown Pelican is not really endangered anymore [although still on the list], the Yuma Clapper Rail prefers freshwater marshes rather than the open and highly saline lakeshore, and I can list a number of more spectacular migratory bird habitats around the world). More importantly, however, were birds really of interest to the proponents of Salton Sea change? And could there actually be 400 bird species using this often putrid, highly

saline and polluted desert lake? I began to collect an atlas devoted to the Salton Sea (see reference [5]) a bird monograph [3], and every available science paper [6&7].

Then -- in October 2006 -- the Salton Sea Restoration Project of the Department of Water Resources in Sacramento released the Draft Programmatic Environmental Impact Report (PEIR) on

the future of the Salton Sea [2]. Colorful maps and numerous charts and tables (all easily accessible online) accompany a total of eight so-called final alternatives for restoration. In addition, there are two possible scenarios of the future of this lake without any restoration. After absorbing this information I became very concerned about the price tag for the massive engineering and maintenance operations and looked longingly at the still undeveloped but water-starved wetlands at and near the deltas of the Colorado River not far to the south across the border with Mexico. Maybe, the millions of birds using the Salton Sea and its adjacent wetland habitats would be better off in Mexico without the massive disturbance resulting from more than 20 years of earth- and water-moving manipulation of the Salton Sea ecosystem.

Upon further reflection I began to ponder the place of

Fig. 1 Map of the Salton Sink and Colorado River Delta Region.



the Salton Sea in the context of the historical transformation of the American West and particularly California. Have we not lost most of the natural wetlands that covered many areas of the State, among them San Francisco Bay, the huge Tulare Lake in the San Joaquin Valley, Owens Lake, and the coastal marshes and estuaries of Santa Monica Bay in the last century? Will the Salton Sea enter the history books as yet another degraded and ultimately destroyed wildlife resource? Enough is enough, I began to think, because even a minimum of environmental ethic should mandate that we rise to the challenge and not only save and clean up this enormous saltwater habitat but actually improve its usefulness for wildlife. So, energized by this quite rational conclusion, I will now lay out basic, relevant, as well as new information that should help you to participate in the public comment phase of the current decision-making process (deadline: mid January 2007).

The 1905 accidental gift of a breached Colorado River embankment to the parched desert lands of the Imperial Valley has become a sometimes deadly soup of toxic gases and high salinity coupled with poisonous concentrations of selenium in its sediments. Its putrid smell and somewhat unpredictable water level have been the cause of a frightful real estate bust along its shores, and its two largest natural inflows were regarded as the most polluted U.S. rivers in the 1970s. Officially sanctioned by Congress as an agricultural wastewater sump, this largest lake of California will begin to shrink (due to evaporation) after 2017 because of permanent contractual reductions in water inflows (the water will instead flow to San Diego!); eventually the Salton Sea may recede by 4-5 miles from its southern shoreline thereby exposing some 134 square miles of highly volatile lakebed dust (a more severe problem than presently experienced at Owens Lake). It will also become much saltier (unfit for any fish and fish-eating birds). If we want to avoid an American repeat of the infamous Aral Sea disaster in the former Soviet Union we have to intervene and change or "restore" the Salton Sea. Doing nothing has been termed "hazardous" [1].

My visiting student Christian Hof and I developed a database of all so-called 'waterbirds' of the Salton Sea incorporating relevant data from the recent Salton Sink avifauna monograph [2], the species summaries of the Birds of North America series [4], a large number of technical papers dealing with the interface between birds and the unique properties of the Salton Sea, discussion with some agency personnel, attendance of a birding festival in Imperial County, and personal observations of Salton Sea birds and their habitats (2003-2004). An excellent source for analysis and evaluation of Salton Sea bird life was found in the professional papers published in *Studies in Avian Biology*, No. 27 [6]. This database was queried about qualitative and quantitative characteristics of bird abundance, nesting, seasonal dynamics, productivity, mortality, and habitat preferences in the spatial context of local areas around the lake, regional locations in the Imperial Valley and in northern Mexico, the State of California, and all of North America. I have to thank K. C. Molina and K. L. Garrett for thoughtful comments on an earlier draft of this

Species Richness

At least 415 bird species (including the recent sighting of a Ross's Gull) have been recorded for the Salton Sink region (comprising the mostly dry area of the prehistoric Lake Cahuilla, see map) which is a high but not exceptional diversity in North America (San Diego County has 492 species). It remains unclear how the 'Salton Sea bird paradise' slogan developed but the recent book *Birds of the Salton Sea* by Patten et al. [3] has done little to decrease its popular appeal. Except for its somewhat misleading title, this avifauna deserves much praise. It is a thorough and invaluable reference for all bird-related matters. The book is actually a regional avifauna of the extremely dry and hot desert surrounding and including the Salton Sea - the Salton Sink and the entire landmass filled by the prehistoric Lake Cahuilla. The birds covered by the authors include therefore hundreds of bird species that have nothing to do with the Salton Sea itself (species such as Brown Creeper, Cactus Wren, Burrowing Owl, and Lad-

der-backed Woodpecker) but are part of the multi-habitat Salton Sink ecosystem. The Mountain Plover, for instance, frequents the large expanses of irrigated agricultural fields of the Imperial Valley. The authoritative recent publications by Cohen and Hyun [1] and the PEIR [2] contain more or less the same information: the former states that "402 native and 5 non-native [bird] species have been recorded in and around the Salton Sea" (p. 20 and p. 27) while the latter asserts that "more than 400 resident, migratory, and special status bird species have been recorded in the Salton Sea area since its formation, with about 270 of those species using the Salton Sea on a fairly regular basis" (Executive Summary p. ES-6).

We were able to label a total of 159 species of the Salton Sink's avifauna as 'waterbirds' associated in some -often marginal ways- with the Salton Sea Sink. This includes the Yuma Clapper Rail which prefers to breed in the freshwater marshes on the south side of the Salton Sea (Wister, Unit 1, and marshes along the New River according to [3]) as well as many species that have been recorded once or a few times at most. A majority, namely 110 of these waterbird species actually use the open water and the muddy or rocky shores of this inland sea; included in this number are all species designated as common, fairly common, uncommon, or rare breeders or visitors by Patten et al. [3]. Accidental vagrant visitors such as the Blue-footed Booby were excluded, however, even though the Salton Sea appears to have acted as a magnet for sightings of accidental vagrants. When we add the fish-feeding Bald Eagle and Osprey to this list we arrive at a total of 112 bird species associated directly with the Salton Sea. Some 16 species are common to rare regular breeders found at the Salton Sea (Table 1, after [3]).

A Polluted and Perilous Bird Habitat

It is widely known that the Salton Sea is highly contaminated with an assortment of unusually concentrated natural elements (selenium) and anorganic compounds (hydrogen sulfide and ammonia) that are considered harmful to birds as well as other vertebrates (including fish species). In its current state, the

Salton Sea can become a very perilous ecosystem for birds. California government agencies have been unable to clean up the Salton Sea and its highly polluted inflows from Mexican urban runoff and agricultural drains in the Imperial Valley. The Salton Sea should have been sealed off as a poisonous sump were it not such a huge lake. As a rather shallow body of water it has experienced occasional episodes of low oxygen following high turbidity and/or rich algal blooms. This results in large fish die-offs and bacterial contamination. The severity and frequency of bird die-offs at the Salton Sea "has increased since the 1970s" (Patten et al. 2003 [3]). My readings on the last major bird catastrophes in the 1990s filled me with sadness and the conviction that something has to be done because birds deserve a better Salton Sea than the presently existing desert sump.

Importance of the Salton Sea for Bird Migration

The Salton Sea and the surrounding fields and marshes can provide an extraordinary birding experience. The region is without doubt a hugely important stopover ecosystem for large numbers of shorebirds and waterfowl on the Pacific Flyway. It cannot function - and never has - as replacement for the many lost wetlands further north and west in California and elsewhere. Most of those freeze over in the winter and have therefore never been able to accommodate the 100,000s of migrating waterfowl and shorebirds. The southern latitude and hot climate of the Salton Sea have been a bonus for waterbirds since 1906; to a large extent, the Salton Sea region may have served as an alternate for those transient bird populations that lost their traditional Colorado River stopover and wintering habitats in the last century.

How significant are the numbers of migrating and wintering birds? The numbers are staggering, reaching tens of thousands, even millions of birds at peak migration. Some 14 species exceed 5% of their N. American population size in the Salton Sink area. Four species exceed more than 20%. The Eared Grebe is by far the most abundant non-breeding species of the Salton Sea, followed in its percentage rank by Gull-billed Tern, Ring-billed Gull and Black-necked Stilt.

Table 1: Breeding Birds of the Salton Sea

Species Status and Seasonal Presence

| | |
|--------------------------|--------|
| Clark's Grebe | fR |
| Western Grebe | uS, fW |
| Brown Pelican | rS |
| Double-crested Cormorant | cP |
| Great Blue Heron | cP |
| Great Egret | cP |
| Snowy Egret | cP |
| Cattle Egret | cR |
| Snowy Plover | cS |
| Killdeer | cR |
| Black-necked Stilt | cR |
| Laughing Gull | rS, fT |
| California Gull | rS, cW |
| Gull-billed Tern | fS |
| Caspian Tern | fS, rW |
| Black Skimmer | fS |

Data from Patten et al. (2003); abbreviations:

c = common, f = fairly common, u = uncommon, r = rare; S = summer visitor, T = transient, W = winter visitor, R = resident, P = perennial visitor.

See Table 2.

Habitat Needs of Priority Bird Species

Only four of the fourteen highly ranked species prefer saltwater habitats. They are Eared Grebe, Gull-billed Tern, Black-necked Stilt, and American Avocet. In addition, Snowy Plover, Caspian Tern and Black Skimmer have a preference for saline environments. Selected shore habitats and shallow saline habitats can serve all of these species except the Eared Grebe. The latter species is quite unique in its breeding and transient habitat-associated movements [7]. It is, however, the most abundant of all Podiceps species in the world. The American subspecies has a very large population and up to 85% of it may spend a few weeks at the Salton Sea going to and returning from the Gulf of California and Mono Lake. A hundred years ago, where did these birds fatten up before embarking on their long distance migration when there were no pile worms from the Salton Sea available to them? The lakes to the north are too cold (frozen) and

without food in late fall and winter. If they moved across SE California they must have continued on to the original Colorado wetlands and delta region. In our world today, the saline but sometimes perilous Salton Sea constitutes a crucial survival link between wintering and breeding areas. The other top-ranked species (Table 2) prefer open water and/or lagoons and marshes which will continue to be available during and after a Salton Sea restoration in the existing river deltas and wildlife refuges.

The Restoration Alternatives

The final eight Restoration Alternatives for the future of the Salton Sea (PEIR [2]) show a great promise for cleaning up the pollution of the entire region, for providing low and high salinity lakes and for creating thousand of acres of additional shallow saline habitats that are of the greatest utility for all saline water bird specialists including Snowy Plover, Caspian Tern, Gull-billed Tern and Black Skimmer. Some of the alternatives require massive engineering works, however, that may not be completed for 20 or 50 years. None provides an ideal solution of the Salton Sea emergency that can satisfy all stakeholders (farmers, motorized boating fans, public health departments, fishing enthusiasts, birders, etc). All of them have a price tag of \$2.3 to 5.9 billion most of which would be needed for construction phase 1 and phase 2 over the next 25 years or so. This appears to be expensive but pales when we compare it to the costs of freeway construction in urban areas. Some alternatives include the construction of a barrier berm or dam that would separate half or more of the lake surface as a deep and low salinity lake from a brine lake and other habitats. I will discuss two of the eight alternatives (see map) as they pertain to the diversity and welfare of birds.

Alternative 2 (Saline Habitat Complex II)

This Alternative would create two separate brine sink lakes (85,000 acres) and three so-called Saline Habitat Complex areas (75,000 acres); the latter resemble the shallow water salt evaporation ponds found in the French Camargue region and in Sardinia; I have stud-

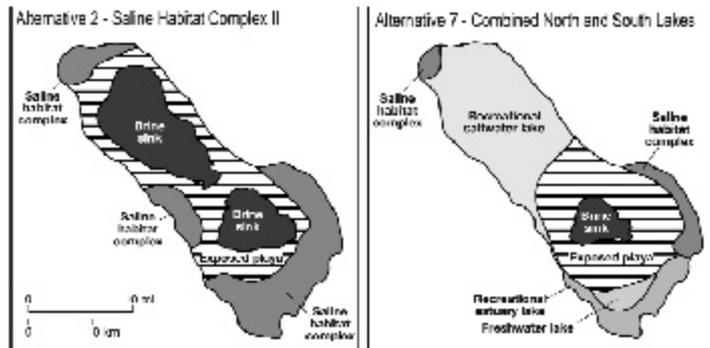
Fig. 2 The proposed Salton Sea Restoration Alternatives 2 & 7.

ied these areas in the past and found them to be extremely attractive to the same set of shore and other waterbirds that frequent the Salton Sea today. If supplied with sufficient berms and islets above the water these 'salinas' would provide exceptional breeding and feeding opportunities for grebes, shorebirds, and literally hundreds if not thousands of pairs of Snowy Plover, Stilt, and other saltwater birds. This Alternative could easily accommodate a multiple number of today's breeding and migratory waterbirds. Efficient water pollution treatment facilities would also be in operation and provide for a much healthier water quality. Air quality management actions would include spraying of the exposed dry Playa areas (91,000 acres) with brine, and irrigation of salt-tolerant vegetation in areas prone to dust storms containing micro-particles. Construction cost: \$3.3 billion. Annual operations and maintenance cost: \$107 million in 2006 dollars. The Saline Habitat Complex would be constructed in five periods beginning around 2012 and ending in 2028.

Alternative 7

(Combined North and South Lake)

This ambitious Alternative would develop a Deep Marine Sea [recreational saltwater lake] in the north combined with a moderately deep Marine Sea in the south (104,000 - 115,000 acres depending on water inflows). There would be two smaller Saline Habitat Complex areas (12,000 acres), a small Brine Sink (15,000 acres), an exposed dry Playa (97,000 acres) as well as an 11,000 acre freshwater reservoir operated by the Imperial Irrigation District. Construction cost: \$5.2 billion. Annual operations and maintenance cost: \$82 million in 2006 dollars. The Saline Habitat Complex would be constructed in three periods between 2012 and 2022. The Marine Sea would achieve its salinity objectives by 2056 at the earliest. The dry Playa would be coated with a protective salt crust using salt crystallizer ponds. Birds would therefore have the choice of four different water bodies, an unusual diversity within a desert sea. This Alternative could easily provide excellent habitat for many fish species and could therefore serve as breeding and wintering habitat for large numbers of fish-eating birds such as pelicans as



well as for the millions of Eared Grebes passing through the Salton Sea ecosystem.

Enhancing the Natural Capital

At this stage in the debate I will not endorse any particular Alternative. Because so many factors need to be considered (general feasibility, fiscal constraints, public health advocacy, recreation, etc.) it is likely that some compromise using elements from more than one Alternative will be agreed upon in the end. Along with this 'restoration' effort (I always hesitate when using this term because strictly speaking we are talking here about creating something quite new in order to rehabilitate and enhance the so-called natural capital of the Salton Sink ecosystem) come extensive water conservation efforts, urban water treatment plants for the polluted river systems, etc. that will benefit the wildlife of the Salton Sink and the entire Imperial Valley. I wish, however, to endorse and press for a strong binational cooperative effort to return some Imperial Valley irrigation water to the Colorado River thereby increasing its flow near its delta. Such a strategy was proposed by Rodger Schlickeisen, President of Defenders of Wildlife, in the Foreword to an excellent book on the plight of the Colorado Delta (Bergman 2002 [8]). The potentially abundant wetlands, salt flats, and lagoons of the Colorado Delta complex would and should complement the Salton Sea ecosystem to form one of the finest and largest wetland habitat complexes in North America.

CONCLUSIONS

Without restoration the Salton Sea will become even more hazardous for people and the surrounding landscapes than it is today; it will also become much smaller and less attractive as a wildlife habitat. Managing a shrinking Salton Sea and mitigating its adverse effects on human and natural systems would become more expensive as well (anticipated future operations and maintenance costs: \$48 million per year). Therefore California needs to address the Salton Sea restoration issue now. The carefully crafted eight Restoration Alternatives offer the potential for a much healthier Salton Sink ecosystem and for more accessible and better bird habitats than have existed for the last 50 years. We must support the restoration effort and let our decision-makers know of our resolve to fight for the revitalization of this unique ecosystem. California has lost too many wetland habitats already. This one must persist!

Against all odds, the Salton Sea has attracted an exceptional diversity of birds over its relatively short existence and has been a high priority visiting locale for multitudes of birdwatchers. So, if organizations and corporations not affiliated with Audubon tout the Salton Sea as a bird paradise, we should welcome it as long as their goals and actions favor the wildlife of the region. I have the hope that the restoration initiatives for the Salton Sea can greatly benefit the Salton Sink avifauna and create an ecosystem with great environmental health attributes that can truly become a bird paradise for California and the world. Let's have a better Salton Sea!

AUDUBON & THE SALTON SEA

Table 2: Rank of Bird Species Using Salton Sea Wetland/Lake/Shore Habitats

| Rank | Species | Salton Sea Abundance | N.American Population | Salton Sea's % |
|---------------|-------------------------------|----------------------|-----------------------|----------------|
| 80-90% | | | | |
| 1 | Eared Grebe | 3,500,000 | 4,100,000 | 85.37 |
| 40-50% | | | | |
| 2 | Gull-billed Tern | 340 | 780 | 43.59 |
| 20-30% | | | | |
| 3 | Ring-billed Gull | 500,000 | 1,700,000 | 29.41 |
| 4 | Black-necked Stilt | 35,000 | 150,000 | 23.33 |
| 10-20% | | | | |
| 5 | Ruddy Duck | 75,000 | 409,783 | 18.30 |
| 6 | White-faced Ibis | 15,000 | 100,000 | 15.00 |
| 7 | California Gull | 75,000 | 500,000 | 15.00 |
| 8 | Whimbrel | 7,500 | 57,000 | 13.16 |
| 9 | Long-billed Dowitcher | 60,000 | 500,000 | 12.00 |
| 10 | American Avocet | 50,000 | 450,000 | 11.11 |
| 11 | American White Pelican | 10,000 | 100,000 | 10.00 |
| 5-10% | | | | |
| 12 | Western & Clark's Grebe | 8,600 | 118,000 | 7.29 |
| 13 | Marbled Godwit | 10,000 | 169,500 | 5.90 |
| 14 | Clapper Rail ssp. <i>yum.</i> | 400 | 7,364 | 5.43 |

Note: Mountain Plover and Long-billed Curlew have been omitted since they frequent Imperial Valley field habitats.

There are more resources on the Salton Sea on the websites listed below. Audubon California and Salton Sea Coalition take the position that "none of the alternatives presented in the Draft PEIR satisfies the legal requirements to maximize wildlife habitat, air and water quality protection in a reasonable timeframe." Their "evolved" alternative distilled from parts of all of the alternatives and sample comment letters are included on their websites, along with their histories of involvement on the Salton Sea.

The deadline for comments on the draft PEIR from the public is January 16, 2007. A final EIR is expected in Spring, 2007 from the Salton Sea Authority.

For a history of Audubon California's involvement in the Salton Sea and a sample letter visit

www.audubon-ca.org/salton_sea.html

For sample letters of comment on the Draft PEIR to send to your representative visit

www.saltonseacoalition.org

For the Salton Sea Authority draft Programmatic EIR including the alternatives visit

www.saltonsea.water.ca.gov/PEIR/

Join Nick Freeman on the LA Audubon field trip to the Salton Sea on Saturday and Sunday, January 13 and 14th. See FIELD TRIPS in this issue for details!

The Editor would especially like to thank Kimball Garrett, Kathy Molina, Kathie Satterfield and Julia Levin for their generous and considerable contributions to the editorial process of this article.

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The author is a Professor at the University of California, Los Angeles.



GREAT BACKYARD BIRD COUNT FEBRUARY 16-19, 2007

**The City of Beverly Hills and Los Angeles Audubon Society
join in the
10th annual Great Backyard Bird Count
Friday-Monday, February 16-19, 2007.**

The Great Backyard Bird Count (GBBC) is a national yearly four-day event that engages citizens of all levels of bird watching in counting birds for as little or as long as they wish in their backyards, parks, or other natural areas. The results are entered anytime into the Great Backyard Bird Count web site <http://www.birdsource.org/gbbc/> to give scientists at the Cornell Lab of Ornithology a mid-winter snapshot of the numbers, kinds, and distribution of birds across the continent. The program is hosted by Audubon and Cornell.

To receive a flyer with more details, to sign up for the class or to join the four day event call Beverly Hills Recs & Parks at 310-550-4761.

Introduction to Birdwatching

Los Angeles Audubon presents the basics of bird watching in advance of the Great Backyard Bird Count. Topics including how to use the best optics and field guides, and how to observe and identify birds in your backyard, local parks, or nature areas around Los Angeles.
Instructors: Eleanor Osgood & Jenny Jones

Day: Saturday, February 10, 2007
Time: 10am-12pm (including possible bird watch around Roxbury Park depending on weather).
Site: Roxbury Park Community Center Auditorium

To sign up call Beverly Hills Recs & Parks at 310-550-4761.

Bring your binoculars and field guide, or shop for them at
Los Angeles Audubon Nature Store in West Hollywood
323-876-0202
www.laaudubon.org.

City of Beverly Hills

COMMUNITY SERVICES DEPARTMENT

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American Goldfinch



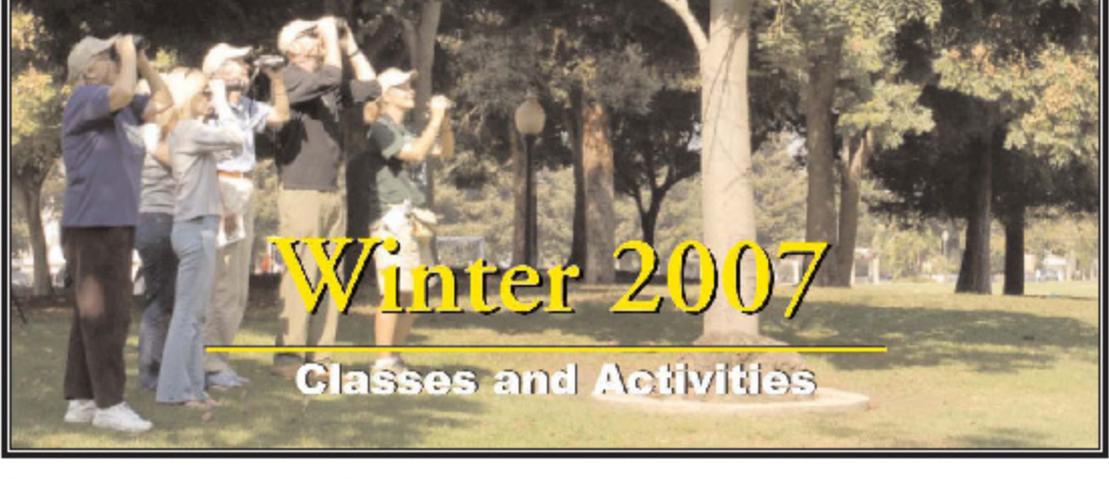
Northern Mockingbird



Western Scrub-Jay



Townsend's Warbler

A photograph of a group of people in a park setting, all holding binoculars and looking towards the trees. They are dressed in casual outdoor attire. The background shows large trees and a clear sky.

Winter 2007

Classes and Activities



CONSERVATION CONVERSATION

by Garry George

Why we care about Great Blue Herons in LA

Los Angeles Audubon Society is involved in the issue of heron and egret rookeries in densely populated coastal areas. The story has received worldwide press coverage through articles in the Associated Press, South Bay Daily Breeze, the Argonaut, on KCET "Life and Times" and in an upcoming story on NPR. The media interest is focused primarily on the conflicts between human use and roosting and nesting Great Blue Herons at a restaurant and marina in Long Beach, and at Villa Venicia and Marina Harbor apartment and condo complexes in Marina del Rey. Black-crowned Night-herons, Green Herons, Great Egrets and Snowy Egrets are also found in the colonies and recently a nesting White-tailed Kite was photographed at Villa Venicia but the media and biological consultants working for developers focus on Great Blue Heron as the species of greatest importance and nuisance, possibly due to its size and ease in photography, even though KCET got it wrong and filmed Double-crested Cormorants in their story. The emergence of the Great Blue Heron as a symbol of the paradigm of the struggles of nature versus the needs of man is interesting and could be productive for the (recently revised) mission of Los Angeles Audubon "to promote the enjoyment and protection of birds and other wildlife through recreation, education, conservation and restoration." That mission clearly puts us into the controversy on the side of the birds, but is there an opportunity presenting itself while ironically advocating for the conservation of non-native trees in urban environments? Could the Great

Blue Heron be a flagship species that could awaken Angelenos to the joys of birds and a cleaner, greener Los Angeles and be the symbol for a greater appreciation of all native birds in Los Angeles?

Populations of Great Blue Herons are also a topic of discussion in stakeholder committees on Master Plans for Los Angeles River and Silverlake Reservoir and in peripheral discussions on Channel Islands Harbor in Ventura, Los Alamitos Marina in Long Beach and in Long Beach Harbor.

In the Audubon tradition, our role is to advocate for the birds with good science. This alone is a tremendous step in the partisan process while advocates on both sides claim science that justifies their goal, and raw data is often interpreted to reach Alice in Wonderland conclusions that makes anyone taking the time to read the data feel like they've fallen down a hole. Public hearings are contentious and often bereft of fact.





So, let's celebrate the Great Blue Heron's recovery in Los Angeles County and find common ground by

1) providing protected habitat. With all the great minds and financial resources of the greening of Los Angeles and passage of Proposition 84, there must be some out of the box re-vegetation that could provide sufficient habitat for these birds so that people can enjoy them without considering them a nuisance. Los Angeles City engineers recently created floating habitat in Echo Park Lake that cleans the water and provides food and shelter for wildlife. Why not let ecology experts build islands in the Marina del Rey channel, Silverlake Reservoir and LA River where the birds could be protected from predators and people could watch them from afar? If enough new habitat were built and became functional, i.e. the birds began using it successfully, then there could be less heated discussions about removing current habitat.

2) making the Great Blue Heron a symbol of the city and the County. Portland, the greenest city in the U.S., prides itself on the protected island habitat it provides for Great Blue Herons and that bird has become a symbol of the city's environment. Portland even celebrates the heron with a brewery of Great Blue Heron pale ale! We could do the same with a public campaign that generates interest in birds and nature and clean water.

3) protecting "filopatric" species nests year round. Current federal, state, city and county laws protect native birds during nesting season but the habitat is fair game during the rest of time unless protected by the Coastal Commission or some other state or federal agency. This year, an attempt was made in the Parks, Wildlife and Water Committee of the California Assembly by our own Assembly-member Paul Koretz (D-West Los Angeles) to amend the Fish & Game code to protect nests of "filopatric" birds (birds that are faithful to their nests by returning to them) year round rather than just during the nesting season. Filopatric birds include herons and egrets as well as eagle, osprey, some owls and other raptors. That attempt failed in Committee by one vote, but the effort could be restarted in the Assembly and in the Senate.

Here's what we know about populations of Great Blue Herons in Los Angeles County:

1. Great Blue Herons are making a dramatic comeback.

Late in the 19th century, Grinnell (1898) wrote that Great Blue Heron "breeds sparingly in the county." According to the upcoming Los Angeles Audubon Breeding Bird Atlas (courtesy co-author Larry Allen) "No county [breeding] colonies could be cited in publications from 1933 or 1981 (Garrett and Dunn 1981, Willett 1933). In 2000, surveys recorded 300 breeding bird pairs.

2. Great Blue Herons have adapted to non-native vegetation.

Once a nester in forests near water, the lack of habitat has prompted the herons to adapt to non-native tall trees near their feeding grounds. In Marina del Rey they nest and roost in cypress, pine and fan palm and in Silverlake they nest in eucalyptus.

3. Great Blue Herons are extending their nesting periods.

The Breeding Bird Atlas found nesting periods from 26 February to 10 August and recent documentation by Urban Wildlife Task Force members Jason Stuck and Lisa Fimiani show fledglings in trees in October and member David DeLange has recorded courtship display as early as December in Marina del Rey.

4. Great Blue Herons are a symbol for and evidence of environmental recovery

New signs on the Los Angeles River signs feature an illustration of a Great Blue Heron. The recent cover of LA WEEKLY on streams in Los Angeles featured an illustration of a Great Blue Heron. Both Larry Allen, co-author of LA Audubon Breeding Bird Atlas and Robert Butler, author of the recent book *The Great Blue Heron* attribute the comeback to increased environmental recovery through clean water programs and habitat restoration.



BIRDS OF THE SEASON

by Jon Fisher

August through October are months in the birding year that most of us anticipate more than any others. The variety of birds, of both the rare and regular variety, is what makes the fall migration period so intriguing. It's also a time of year that has the potential for producing real rarities. This fall did not disappoint in that regard in that it produced two new birds for the county. The only problem is there never seems to be enough time to get to all the places you want to bird. Fortunately there are a lot of dedicated observers out there and if I can't see all the good birds myself, I'll settle for living vicariously through them.

Interesting this fall was the fact that no real high-end eastern warblers or vireos were reported from the county this season. The best birds this fall were all non-passerines. In early October, reports from a number of observers indicated an above average movement of Mountain Chickadees, White-breasted Nuthatches and even a handful of Brown Creepers into the lowlands. This trend continued through the period with reports of chickadees being widespread and a White-breasted Nuthatch even making it to Malibu Lagoon.

September and October are still early for many waterfowl, but not too early for a Cackling Goose on the lake at Hansen Dam on October 23 (Kimball Garrett). Almost a week later a possible "Aleutian" Cackling Goose was at Ballona Freshwater Marsh on October 28 (Kevin Larson, Richard Barth, Carol Selvey). Six Greater White-fronted Geese, regular but rare, were at Bonelli Regional Park in San Dimas on October 28 (Ted Kopf), and a sizeable flock of thirty-six was at

Piute Ponds on October 8 (Mike San Miguel). An immature Snow Goose was at Malibu Lagoon on November 5 (Jon Fisher) where several spent last winter. Also of interest well away from the coast was a Surf Scoter at Piute Ponds on October 15 (Russ & Dorothy Stone).

An October 14 boat trip out of San Pedro turned up two excellent finds. First, a Masked Booby was spotted on the breakwater near Cabrillo Beach. Only two other coastal records exist for this species in L.A. County (including one identified as either a Nazca or Masked Booby), with several other reports from San Clemente Island. Later in the morning, and several miles northwest of Palos Verdes point, a Red-footed Booby was seen over Redondo Canyon (both Kimball Garrett). This ends a long absence for this species in the county with the last record being one brought into rehab in August 1991. Also of note was an errant Brown Pelican along the San Gabriel River at Wilderness Park in Downey on October 7 (Larry Schmah).

Swainson's Hawks are scarce west of the deserts, but a few flocks are reported passing through the area each spring and fall. A dozen birds were observed over Pasadena on October 10 (John DeModena) and smaller groups were seen over Claremont on October 23 and 26 (Tom Miko).

Very unusual was a Sandhill Crane seen briefly at Santa Fe Dam in Irwindale on October 7 (Andrew Lee). An additional sighting for the period was a group of four immature Sandhill Cranes in the Antelope Valley on October 21 (Mike San Miguel).

The lower Los Angeles River was excellent for shorebirds for most of the season, with good numbers of birds as well as rarities being the rule rather than the exception. An adult Pacific Golden-Plover with an injured leg that was first found on August 31 continued through September 10 (Richard Barth). A superb and surprising find was L.A. County's first Upland Sandpiper seen just above Willow Street on September 23 (Larry Schmah, Mickey Long). After it was identified, the bird flew to the top of the west bank where it was in easy view of participants from two Audubon field trips. The bird was reported again on September 24, but apparently continued south after that. Uplands are typically associated with grassland habitats, so the apparent preference for concrete is puzzling. One has to assume that given the location there wasn't much good habitat to choose from. Outside the county, another Upland Sandpiper was found on an LAAS trip to the Oxnard Plain on October 28 (Nick & Mary Freeman).

A few Baird's, Solitary and Pectoral Sandpipers were present through much of the period on the river, with a high count of nine Baird's Sandpipers made on September 9 (Kevin Larson). Away from the river, single Baird's were found on September 8 along Ballona Creek at Inglewood Blvd. (Don Sterba) and at Malibu Lagoon on September 11 (Irwin Woldman). At the Piute Ponds two Baird's Sandpipers and two Pectoral Sandpipers were present on September 8 (Mike San Miguel) and another was there on October 8 (Irwin Woldman). Another Pectoral offered extremely close views at Malibu Lagoon from October 20-22 (Muriel Kotin).

It was a good year for Ruffs. One found on the LA River on September 2 continued through September 10. Another individual, its noticeably larger size indicating a male, was on the river from September 25 through October 22 (both Richard Barth). Still another Ruff, either the third or fourth on the river this fall, was discovered just above Willow Street during a shorebird survey on November 5 (Kevin Larson).

Two Parasitic Jaegers were at Cabrillo Beach in San Pedro on September 30 (Bernardo Alps). One lingered on the beach there through October 4. Another Parasitic was found at the Piute Ponds on Edwards Air Force Base on September 8 (Mike San Miguel). Rare for the San Gabriel Valley was a Common Tern at Peck Pit in Arcadia from September 16-24 (Andrew Lee). Another inland tern worthy of note was an Arctic Tern at Piute Ponds on October 8 (Mike San Miguel).

Columbiformes of interest included two Eurasian Collared-Doves at Wilderness Park in Downey on October 7 and a Common Ground-Dove nearby on the same day (both Larry Schmah). The big surprise though, and a first record for the county, was an adult male Ruddy Ground-Dove found at a private residence in La Canada October 10 (Mark Hunter).

Very rare coastally was a Short-eared Owl that showed up at the Ballona Freshwater Marsh from October 28-29 (Richard Barth, Don Sterba). Burrowing Owls are scarce migrants anywhere in the L.A. Basin, but one that spent the day perched in a tree on Spring Street in downtown L.A. on October 20 (Sue Horton) was even more noteworthy because of the odd location.

Few flycatchers of note were found this fall. A Tropical Kingbird at Holy Cross Cemetery in Culver City on October 14 (Tom Miko) was the only one reported. As might have been predicted, the Thick-billed Kingbird that spent last winter at Banning Park in Wilmington returned. It was first seen on November 4 (Kevin Larson). The Vermilion Flycatcher that wintered last year at a soccer field in South El Monte returned as of

October 22 (Jeff Webster). Another repeat Vermilion was back in Willowbrook as of October 25 (Richard Barth). A Gray Flycatcher at Hahamongna Watershed Park in Pasadena on November 4 (Ron Cyger) was the only one reported.

Reports of Plumbeous Vireos included birds at Peck Pit in Arcadia on September 16 (Andrew Lee), at DeForest Park in Long Beach on September 23 (Richard Barth), in Claremont on October 25 (Mike San Miguel) and in Hahamongna Park Pasadena on November 4 (Ron Cyger). Also of note was a Bell's Vireo at DeForest Park in Long Beach on September 24 (Richard Barth).

Horned Larks are now quite rare west of the deserts and interior valleys, thus one at Hansen Dam on October 14(?) - 23 (Kimball Garrett) and another flying over Sepulveda Basin on November 4 (Jon Fisher) were noteworthy. Another sparse migrant was a Purple Martin was at DeForest Park on September 16 (Kevin Larson) for only the second coastal report this fall.

As expected, a variety of 'eastern' warblers passed through during the period. Four reports of Tennessee Warblers came in during October with the first being one at the Village Green Condos in Los Angeles on October 7 (Andy Birch). Another (?) was there on October 23 - November 1 (Don Sterba). Other Tennessee Warblers were at Wilderness Park in Redondo Beach on October 14 (Kevin Larson) and Legg Lake in South El Monte on October 15 (Larry Schmah). A Virginia's Warbler at Piute Ponds on September 10 (Mark & Janet Scheel) was the first one reported this fall. Other Virginia's were at DeForest Park in Long Beach on September 14 (Karen Gilbert) at Peck Pit in Arcadia on September 17 (Andrew Lee) and in Los Angeles at the Kenneth Hahn Recreation Area on October 3 (Pete & Mary Shen). The only Northern Parula was in La Crescenta on September 25 (John Kelly).

A Chestnut-sided Warbler at Oak Park Cemetery in Claremont September 26 (Michael San Miguel Jr.) was the only one found. Four Blackpoll Warblers were recorded, with one at Oak Park

Cemetery on September 26 (Michael San Miguel Jr.), another at the Village Green Condos in Los Angeles from October 3-6 (Don Sterba), one in El Segundo Library Park on September 21 (Richard Barth) and the last at Ballona Freshwater Marsh October 20 (Don Sterba). Palm Warblers were represented by just three individuals. One was at Balboa Lake in Encino on September 24 (Andy Birch), another was at Madrona Marsh in Torrance on October 14 (Dave Moody) and a third was at Hansen Dam in Sylmar on October 23 (Kimball Garrett). A nice find was an adult male Black-throated Green Warbler at Peck Pit in Arcadia on September 17 (Andrew Lee).

A handful of Black-and-White Warblers were found with birds seen at Sand Dune Park on September 17 (Kevin Larson) and October 10 (Lori Conrad). Reports also came from Oak Park Cemetery in Claremont on September 23 (Rick Clements), Ladera Heights on October 4-6 (Richard Barth), Ed Vincent Park in Inglewood on October 10 and Arwater Village on October 16 and (both Richard Barth). The latest report was of one at Legg Lake in South El Monte on October 15 (Larry Schmah). The only Northern Waterthrush reported was at Madrona Marsh in Torrance on September 17 (Kevin Larson).

Several American Redstarts turned up, with one at Sand Dune Park in Manhattan Beach on September 15 (Kevin Larson), another at Sepulveda Basin in Van Nuys September 29-30 (Bob Pann, Alan Dunn) and one at El Segundo Library Park on September 21 (Richard Barth).

In the last issue I wrote that one thing we know for sure is that "this year will not be a carbon copy of the last one". In one respect though, it very nearly is. Four of last year's six Painted Redstarts returned to the same locations where they spent the winter of 2005-06. The redstart at Bonelli Park in San Dimas was first noted on October 8 (Andrew Lee). One of two birds that spent last winter at Elysian Park was found again on October 23 (Sue Horton), and single birds were rediscovered at Big Dalton Canyon near Glendora and at Monrovia Canyon on November 1 and 2 respectively (both Mike San Miguel).

BIRDS OF THE SEASON

Summer Tanagers were in Claremont on September 12 (Tom Miko) and at Sepulveda Basin on October 12 (Alan Dunn). Four more appeared within days of each other in early November. These birds were at Exposition Park on November 1 (Kimball Garrett), in Ladera Heights and Inglewood on November 2 (Richard Barth, Don Sterba) and in Bailey Canyon in Sierra Madre on November 5 (Elaine MacPherson).

Though a fairly common breeder in our higher mountains and regular as a migrant on the deserts, Green-tailed Towhees are quite scarce in the L.A. basin. The only report was from Loyola Marymount University in Westchester on September 30 (Russell Stone). A "Large-billed" Savannah Sparrow was at Cabrillo Beach San Pedro on September 8 (Bernardo Alps). Though they breed locally, Grasshopper Sparrows are extraordinarily scarce as migrants. Thus single birds along the L.A. River in Van Nuys on September 9 and another at Peck Pit in Arcadia on September 24 (both Jon Fisher) were of interest.

It was a good fall for Clay-colored Sparrows with single birds found at Sand Dune Park in Manhattan Beach on October 5 (Richard Barth) along the San Gabriel River below Slauson on October 7 (Larry Schmah) at Madrona Marsh in Torrance on October 14 (Dave Moody), Bonelli Park San Dimas on October 20 (Rod Higbie), Hansen Dam October 23 (Kimball Garrett) and at Oak Park Cemetery in Claremont on October 25 (Mike San Miguel).

The only coastal report of a Vesper Sparrow was one at Hansen Dam on October 23 (Kimball Garrett). A returning Swamp Sparrow was back at Bonelli Regional Park in San Dimas on October 16 (Rod Higbie) and another was near the Piute Ponds in the Antelope Valley on October 27 (Mike San Miguel). Other sparrows included the only reported White-throated Sparrow at Descanso Gardens November 1 (Will & Lois Fulmer) and a "Pink-sided" Junco, very rare in the county, seen in Westchester on November 1 (Richard Barth).

Two Lapland Longspurs, rare anywhere on the coastal plain, flew over Harbor Park in Wilmington on October 21 (Kevin Larson). A McCown's Longspur was at a ranch in the Antelope Valley on October 27 (Mike San Miguel).

Baltimore Orioles were at Oak Park Cemetery in Claremont on October 1 (Mike San Miguel) and at West L.A. College October 23 (Don Sterba). Reports of Yellow-headed Blackbirds came from the San Gabriel River near Whittier on October 7 (Larry Schmah) and at Sepulveda Basin on October 21 (Jon Fisher). Bobolinks were few in number with one at the Ballona Freshwater Marsh on September 15 (Robb Hamilton) and another along the L.A. River in Van Nuys on September 9 (Jon Fisher). Well to the northeast of us in San Bernardino County, but well worth mentioning, was a Streak-backed Oriole found at Zzyzx on October 9 (Michael San Miguel Jr.). The bird lingered there for a week and accommodated many L.A. area birders.

It was certainly a respectable fall, but it always seems to go by in a flash. The lower L.A. River, wonderfully productive over the last few months, has already seen a significant decrease in the number and diversity of shorebirds. The first substantial rains will dramatically accelerate that trend. And now as I'm finishing this column, the first Christmas Bird Counts will be taking place in five short weeks.

As we head into late fall and winter, things will settle down and our birding habits will inevitably change accordingly. Working our local parks and other little green patches along the coast and in the valleys will offer rewards as lingering, wintering and returning vagrants will continue to be found. The Antelope Valley, though likely windy and cold, can be explored through the winter for longspurs, sparrows and raptors. The San Gabriels still hold woodpeckers and owls and perhaps a flock of Evening Grosbeaks. Or try birding somewhere you've never been before, or a spot that receives little or no coverage. Don't forget to check your backyard... you just might find a Ruddy Ground-Dove.

Records of rare and unusual birds reported in this column should be considered tentative pending review by the regional editors of *North American Birds* or, if appropriate, by the California Birds Records Committee.

To report birds, send observations with as many details as possible to:

Birds of the Season.

North American Birds, L.A. County
Kimball L. Garrett
Ornithology Collections Manager
Natural History Museum of L.A. County
900 Exposition Blvd.
Los Angeles, CA 90007
e-mail: kgarrett@nhm.org

California Bird Records Committee
Guy McCaskie
P.O. Box 275
Imperial Beach, CA 91933-0275
e-mail: guymcc@pacbell.net

To report birds for the tips, call:

Jon Fisher: (818) 544-5009 (work)
e-mail: JonF60@hotmail.com

NEWS & ANNOUNCEMENTS

TERNs & PLOVERS

LOS ANGELES AUDUBON and SANTA MONICA BAY AUDUBON have jointly received a grant of \$2,500 from Chapter Funding of Audubon California to survey and monitor Western Snowy Plovers and Least Terns on Los Angeles County beaches. No breeding pairs of Western Snowy Plovers have been found in the last few years in LA County, and one of the goals will be to survey historic nesting sites to look for breeding birds. LAAS and SMBAY have applied for another grant for the project to Audubon for funds provided by a grant from the Packard Foundation. A Volunteer program will begin in January. Check www.laaudubon.org for details.

SHRIKE ENDANGERED?

On October 12, 2006 Hartmut Walter, author of the cover article on the Salton Sea petitioned the U.S. Fish & Wildlife Service to list the *Lanius ludovicianus anthonyi* subspecies of loggerhead shrike as "endangered" throughout its range and requested that critical habitat be designated concurrently with the final listing rule. Dr. Walter's research on the Loggerhead Shrike of Santa Cruz Island was funded in part by LA Audubon grants, and was the subject of a cover article in the Tanager in 2005.

THE PEOPLE SPEAK

Thanks to the support of voters in California and the efforts of Audubon Prop 84 passed by a slim margin and will provide 5.2 billion dollars in funding for clean water and conservation projects. At the same time Prop 90 projected to have a negative impact on conservation efforts was defeated. Thank you!

Los Angeles Audubon Society expresses our heartfelt thanks to all of the members and donors who are supporting our endeavors!

ROBIN FLIES

Executive Secretary Robin Gose has resigned from the Board due to increased pressures from her work at Culver City High School. Robin served two years on the Board as 2nd VP and Executive Secretary, and as Education Chair. Robin wrote the current naturalist curriculum for LA Audubon.

EDUCATIONAL MATERIALS

LA AUDUBON received a grant from Metropolitan Water District of Southern California in the amount of \$ 3,000 for printing and publication of a booklet to accompany the Baldwin Hills Native Plant & Wildlife Garden Education Program. The booklet will be based on the template of the booklets created years ago for Ballona and Sepulveda. Those had illustrations by Jonathan Aldefer but he is no longer available. The Baldwin Hills booklet will include illustrations and text of some native plants and butterflies as well as birds. Barbara Courtois and Cindy Harding, who manage the Ballona education program, are creating the program at Baldwin Hills which is funded by a contribution from an Anonymous Donor.

THANK YOU!

Roy & Patricia Disney

Jeri Hughes

Marjorie Kim

Phoebe S Liebig

Pamela Plotkin

Daniel Shulman

Catherine Waters

WELCOME!

NEW & RENEWED MEMBERS

Peter Barnes

Lorna Brown

David M Campbell DDS

Kathleen Crandall

Sandra Ferrari Disner

Patty & Leonard Garland

Allen & Carol Goldstein

Cindy & Jonathan Hardin

Jan Harmon

Steven & Leslie Hartman

Carol Louise Johnson

John Kelly

Giles Manwaring

Cherie D Miller

Marilyn E Morgan

Sonya C Onderwyzer

Marilyn Porter

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Board of Directors, Los Angeles

Audubon Society

FIELD TRIPS & BIRD WALKS

Before setting out on any field trip, please, call the LAAS bird tape at (323) 874-1318 for special instructions or possible cancellations that may have occurred by the Thursday before the trip

Monday, January 1 (note change of date!)

Los Angeles

Christmas Bird Count.

Compiler: **Raymond Schep**. It's not too late to do a CBC! To participate, contact Ray at: rayooohoo@yahoo.com.

Saturday, January 6

Debs Park Audubon Center

Join Jenny Jones for a leisurely morning walk through the diverse natural areas that surround the Audubon Center at Debs Park. A wide variety of birds from riparian, chaparral, and walnut woodland habitats can be found, including raptors.

Debs Park Audubon Center is located at 4700 N Griffin Ave., Los Angeles CA 90031, on the west side of the park.

From the south: take the Pasadena Freeway (110) north to the Avenue 43 exit. Bear left on Avenue 43rd, up the hill to Griffin Ave. Turn left on Griffin Ave. and go about a quarter mile to the Center's driveway, which goes steeply uphill on the right. From the north: exit the Pasadena Freeway (110) south at Avenue 52. Turn left on Avenue 52, and follow it across the freeway to where it becomes Griffin Ave. The driveway is a quarter mile on the left. Meet at 9:00 AM.

Sunday, January 7

Topanga State Park.

Ken Wheeland & Chris Tosdevin will lead participants through this beautiful and diverse coastal mountain area. An ideal trip for a beginning birder or someone new in the area. From Ventura Blvd., take Topanga Canyon Blvd. 7 miles S, turn E uphill on Entrada Rd. Follow the signs and turn left into Trippet Ranch parking lot. From PCH, take Topanga Cyn. Blvd. 5 miles to Entrada Rd. Parking \$5. Meet at 8:00 AM.

Sat. & Sun., January 13 & 14 Salton Sea.

Leader: **Nick Freeman**. Yellow-footed Gull, Ruddy Ground-Dove, Snow & Ross' geese, Sandhill Cranes, Stilt Sandpiper, and Gila Woodpecker all hopeful to certain. Fee: \$10. No Limit, but sign up with phone, e-mail, and SASE for more details. Meet at 7:00 AM Saturday. Calipatria Inn (800) 830-1113 (leader's preference) and Brawley Inn (760) 344-1199 are recommended. FRS radios & 'scopes helpful. Arrive fed, bring lunches, dinner together.

Saturday, January 20 East Antelope Valley.

Leaders: **Scott Harris** and **Stan Gray**. Beyond 50th Street East is uncharted territory for many birders. However, Scott has DFG oversight of the area, and Stan birds the area extensively, so they know that Mountain Plover, raptors, LeConte's Thrasher and other AV specialties are sometimes easiest to find in the far eastern reaches of the Valley. Take Hwy 14 N to Avenue S (next to Lake Palmdale). Drive into the Park-and-Ride just to the east of the offramp. Meet at 8:00 AM at the W end of the main lot. Bring lunch and a full tank of gas for a full day of fun in the field. No fee, no reservation. 'Scopes and FRS radios helpful.

Saturday, January 20 Kenneth Hahn State Recreation Area.

Leader: **Ann & Eric Brooks**. This trip covers landscaped parkland and natural coastal scrub habitats, and is paced for beginning birders and members of the Baldwin Hills community. The park entrance is off of La Cienega Blvd. Between Rodeo Rd. and Stocker St. After passing the entrance kiosk (\$4 parking fee), turn left (leading to the "Olympic Forest") and park in the first available spaces. Meet at 8:00 AM.

Sunday, January 21

Ballona Wetlands.

Bob Shanman leads this trip to our nearest wetland and adjacent rocky jetty. Shorebirds and gulls should be well-entrenched for the Winter. Meet at the Del Rey Lagoon parking lot. Take the Marina Fwy (90 W) to Culver Blvd. and turn left for a mile, turn right on Pacific Ave. The lot is on the right. Lot or street parking is usually not a problem. Three-hour walk. 'Scopes helpful. Meet at 8:00 AM.

Saturday, January 27

Parrot Patrol.

Parrots have become a common sight in much of the LA basin, with many species well established. **Larry Allen** will take us to staging areas and roosting spots for up to eight species of parrots and parakeets now found in the San Gabriel Valley. Meet at 3:00 PM in South Pasadena, and pick out parrots until about 5:00 PM. Take the Pasadena Fwy (110) to Orange Grove Ave, turn S, and meet on the W side of this small street just beyond the offramp.

Saturday, January 27

Whittier Narrows.

Leader: **Ray Jillson**. View colorful resident and migrating birds, possibly including the introduced Northern Cardinal. Take Peck Dr. off the 60 Fwy in South El Monte (just west of the 605 Fwy). Take the off ramp onto Durfee Ave. heading W (right) and turn left into the Nature Center, 1000 Durfee Ave. Meet at 8:15 AM.

Sunday, January 28

Sepulveda Basin Wildlife Area.

Leader: **Kris Ohlenkamp**. "Freeway close" morning of birding. Kris has led this walk on-and-off for 20 years, noting 200 species, and averaging 60-65 per walk. Take the 405 fwy N into the San Fernando Valley, turn W on Burbank Blvd. and N (Rt.) on Woodley Ave. to the second Rt., which is marked "Wildlife Area". Turn here and park in the lot at the end. Meet at 8:00 AM, and bird until about 11:30 AM.

FIELD TRIPS & BIRD WALKS

Saturday, February 3
Debs Park Audubon Center
Leader: Dexter Kelly
See January 6 for details

Saturday, February 3
Seal Beach Naval Weapons Station Wetlands.

Martin Byhower and a base biologist will drive 12 lucky LAAS participants around this prime wetlands site where Pacific Golden-Plover, Nelson's Sharp-tailed Sparrow, Sage Thrasher and numerous raptors have been known to winter. Decent high tide expected in AM. Base will confirm with us around January 10. Send SASE to Audubon House with e-mail and phone number (phone # required) by January 24. Only SASE-confirmed U.S. citizens with photo ID allowed on base. No cameras or weapons. Meet at the main public lot at 800 Seal Beach Blvd. at 7:30 AM, and bird until noon. Take Seal Beach Blvd. S from the 405 FWY, pass Westminster Blvd., turn left onto the base at the Forrester Lane light, and left again into the lot.

Sunday, February 4
Topanga State Park.
Leaders: Ken Wheeland & Chris Tosdevin. Meet at 8:00 AM. \$5 parking fee. See January 7 listing for details.

Friday, February 9
Gull Study Workshop Lecture.
Speaker Larry Allen will discuss most gulls that have appeared in North America – most of which have made it to California. Larry will specifically address general aspects of gull topography, the confusing logic of molt sequences, and the finer aspects of identification to age and species. Slides, study skins and handouts will be used. Meet at Audubon House, 7-10 PM, with one break. 20 maximum. \$15 fee, SASE, phone and e-mail numbers mailed to LAAS gets you the lecture & field trip, and flyer with directions. Not offered separately. Park in the south lot, so you don't get locked in.

Sunday, February 11
Gull Study Workshop Field Trip.
Leader: Larry Allen. Put your new knowledge to use in the field, perhaps even identifying California & Ring-billed gulls as they fly overhead! Meet at 7:45 AM at Doheny State Beach in Orange County, and oggle the gulls until we're all gull identification experts! 20 maximum. See above to reserve lecture & field trip. Parking fee usually starts at 8:00 AM. Bring a lunch.

Sat. thru Tues.,
February 17 thru 20
Winter SE AZ.

Meet 9AM at Wilcox Playa. Our travels should center around Sulphur Springs Valley and San Rafael Grasslands. \$50 entitles you to follow Nick & Mary Freeman around, as they ogle and pish their way through the sparrows, hawks, thrashers, cranes, plovers and others of this scenic corner of the southwest. Bird until perhaps 3PM on Tuesday. Send check, e-mail, phone number and SASE to LAAS. Maximum 10, minimum 6 participants. You need to reserve & pay for your own car, food, rooms, etc. Hotel names provided. We will try to arrange carpooling. Anticipate breakfast and dinner restaurant options, and lunches on the road.

Saturday, February 17
Kenneth Hahn State Recreation Area.
Leader: Karen Johnson. Meet at 8:00 AM. \$4 entry fee. See January 20 listing for details.

Sunday, February 18
Ballona Wetlands.
Leader Bob Shanman. Meet at 8:00 AM. See January 21 listing for details.

WESTERN Tanager
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FIELD TRIPS & BIRD WALKS

Saturday and Sunday, February 24 and 25 Carrizo Plain.

Leaders: Larry Allen & Mary Freeman. Meet at 8AM in Maricopa. Spectacular scenery. We will see Ferruginous Hawks, Prairie Falcons, Golden Eagles, LeConte's Thrasher, Merlin and pronghorn; with likely Rough-legged Hawk, Mountain Plover and Sandhill Crane. To spice up the trip, we will meet in Maricopa, access the Plain via Crocker Springs Road (as conditions allow), and stay in Butte-willow Saturday night; then Sunday leave the Plain north via Bitterwater Road before we away to LA. If possible, please car-pool or avail your vehicle to others when you reserve. Your phone number will be released for carpooling unless you request otherwise. Send name, phone number, \$5 per person, and SASE to sign-up with Audubon House for exact directions and information. Reserve your own room in Butte-willow for Saturday night (Motel 6 is here). FRS radios & 'scopes helpful. Limit: 14.

Saturday, February 24 Whittier Narrows.

Leader: Ray Jillson. Meet at 8:15 AM. See January 27 listing for details.

Saturday, March 3 Bonelli Regional Park.

Leader Rod Higbie. Bonelli Regional Park is a remarkable island of habitat. It has lake, coastal sage, mixed woodland, park and riparian habitats. Birds regularly seen in the past include California Gnatcatcher, Cactus Wren, dancing grebes, and occasionally Golden Eagle. 200 other species throughout the year. From LA, take the 10 or 210 Fwy east towards San Dimas to the top stretch of the 57 Fwy. Proceed N from the 10, or S from the 210 on the 57 Fwy to the Via Verde exit just N of the 10/57 interchange (at the bottom of Kellogg Hill). If coming from the N, turn left onto Via Verde, and left into the "Park and Ride" lot. If coming from the S, be alert that the offramp comes up fast. Proceed Rt. off the ramp onto Via Verde to the "Park and Ride" lot. We will meet here at 7:30 AM to carpool

since there is a \$7.00/car park entrance fee. Rod will continue after lunch, if there is interest. There are picnic tables and facilities. Bring lunch, if you plan to bird past noon. No limit or reservation.

Sunday, March 4 Topanga State Park.

Leaders: Ken Wheeland & Chris Tosdevin. Meet at 8:00 AM. See January 7 listing for details.

Saturday, March 10 Upper Franklin Canyon Birdwalk.

Docent Steve Botts will be escorting us around this local bird haven, with stunning Wood Ducks, resident chaparral species, and a few migrating songbirds expected. Franklin Canyon is located between Sherman Oaks and Beverly Hills. Meet in the parking lot at 8:00 AM, and bird for a few hours. From the 101 Fwy, take Coldwater Cyn. Ave. S into the hills. Immediately after Mulholland Dr. merges from the W with Coldwater Cyn. Ave., make a 90-degree right turn onto Franklin Cyn. Dr. and continue west to the Sooky Goldberg Nature Center. The lot is through a gated drive on the left.

Saturday and Sunday, March 17 and 18 Anza Borrego

Birds, Butterflies and Beyond.

Leader: Fred Heath. High points over the years: Swainson's Hawks, blooming desert evening-primrose and indigo bush, chuckwalla, desert bighorn (annual), LeConte's Thrasher, Long-eared Owl (hopeful). Suggested accommodations: Tamarisk Grove Campground (reserve through www.reserveamerica.com), or Stanlund Motel in Borrego Springs (760) 767-5501. Anticipate a busy weekend, and reserve camping and motels very early. Limit 20 people. Send SASE with phone number, e-mail and \$5 fee to LAAS to learn 7:00 AM meeting place and more details. Pleasant to warm days, cool to cold nights.

Saturday and Sunday, April 14 and 15

Owens Valley Grouse Trip.

Mary Freeman leads. Sage Grouse on the lek, breathtaking scenery, raptor-rich valleys, shorebirds heading north. Meet early Saturday morning in Bishop. Limited to 20. To sign up, send \$20 and a SASE to LAAS. More details in mailer. Reserve rooms and trip early, for this immensely popular trip. Motel 6, Mountain View Inn, Bishop Elms are some of many hotels in Bishop.

Friday through Monday, April 27-30

Kern River Valley Spring Nature Fest.

200+ spp./festival. Trips to Butterbred Spring, Kern NWR, Kern R. Preserve, Mojave Desert, Sequoia NF. Contact bird trips organizer Bob Barnes at bbarnes@lightspeed.net, or check <http://kern.audubon.org/bioregion.htm>.

RESERVATION AND FEE EVENTS (Limited Participation) Policy and Procedure

Reservations will be accepted ONLY if ALL the following information is supplied:

- 1) Trip desired
 - 2) Names of people in your party
 - 3) Phone numbers:
 - (a) usual and
 - (b) evening before event, in case of cancellation
 - 4) Separate check (no cash please) to LAAS for exact amount for each trip
 - 5) Self-addressed stamped envelope for confirmation and associated trip information
- Send to: LAAS Reservations
P.O. Box 931057
Los Angeles, CA 90093-1057

If there is insufficient response, the trip will be cancelled two Wednesdays prior to the scheduled date (four weeks for pelagics). You will be so notified and your fee returned. Your cancellation after that time will bring a refund only if there is a paid replacement. Millie Newton is available at Audubon House on Wednesdays from noon to 4:00 PM to answer questions about field trips. Our office staff is also available Monday through Thursday for most reservation services.

INTERNATIONAL BIRDING TOURS

THE BEST OF COSTA RICA

February 5-17, 2008

Costa Rica, with its well deserved reputation as a country sincerely interested in conserving its natural resources, is one that is invariably on all birder's lists to visit. Its tropical forests harbor howler monkeys, Resplendent Quetzals, poison-dart frogs, giant morpho butterflies, over 830 species of birds, and the beauty of thousands of plant species. We will visit six of the major locations that are distinctive, each offering a marvelous profusion of tropical birds.

Habitats encountered will range from semiarid ranch land, to misty cloud forest, the transition zone between the dry and moist forests of the Pacific lowlands, the treeless paramo, and what may well be the highlight of our trip, a visit to La Selva, a lowland rainforest where nearly 400 birds have been recorded. As part of a small group, enjoy some of the best tropical birding in Costa Rica., where you will be accompanied by outstanding leaders throughout.
Space is limited.



Photo by Herb Clarke

Resplendent Quetzal

KENYA BIRDING & WILDLIFE SAFARI

November 2-14, 2007

Post-Extension Eastern Kenya:

November 13-21, 2007

For information and itinerary, contact:
Olga Clarke - Travel Director
Los Angeles Audubon Society
2027 El Arbolito Dr.
Glendale, CA 91208
Ph/Fax: 818-249-9511
e-mail: oclarketravel@earthlink.net

Kenya, one of the great birding and wildlife destinations in the world, offers an opportunity for you to experience much of East Africa within a short period of time. Over 1100 species have been recorded in Kenya, and many are easily seen. Besides its incredible birdlife, Kenya has become synonymous with the historic great wildlife of Africa, and Kenya may be the very best place to see large numbers of wildlife, namely the "Big Five", elephant, rhinoceros, leopard, lion and buffalo. In addition, the variety of wildlife, often at the same time you are viewing fascinating birds, is difficult to believe. From Nairobi to Samburu, the slopes of Mt. Kenya, Lake Nakuru, and the great plains of the Masai Mara, this is sure to be your African trip of a lifetime.

On the extension, we plan to travel from Nairobi to the Tsavo West National Park and Mzima Springs, with views of Mount Kilimanjaro. Then we are on to Shimba Hills National Reserve, just a short distance from the Indian Ocean, and the last remaining breeding population in Kenya of the indigenous Sable Antelope. Birding stops will be made along the way. Experience for yourself the wonders of East Africa on this Los Angeles Audubon Safari. Space is limited.



Photo by Herb Clarke

Hippo

NATURE SHOP & BOOKSTORE

REGULAR SCHEDULE

Open: Monday through Thursday

9:30 AM to 4:00 PM

Normally closed: Friday, Saturday and Sunday

SPECIAL

SATURDAY SCHEDULE

Saturday, January 6, 2007

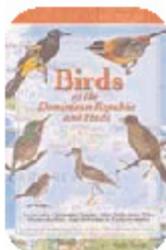
Saturday, February 3, 2007

Open from 9:00 AM to 3:00 PM

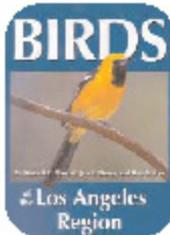
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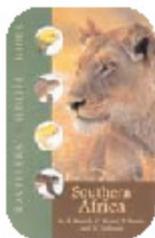
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N12154



NEW TITLES

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The Bookstore now stocks Plastic Book Covers in a variety of sizes for all your soft bound books.

With a book purchase

\$0.79

Without a book purchase

\$1.99

Bird Voices of Alta Floresta and Southeastern Amazonian Brazil

Six CD set has vocalizations of 446 birds and 10 mammal species occurring in the lowland forests of Amazonian Brazil south of the Amazon River from the Rio Madeira east to the southeastern edge of the Amazon basin in Maranhao.

Curtis A. Marantz & Kevin J Zimmer, 2006

\$48.95

Bird Songs in Cuba

Re-release of the 1988 record album onto a 2 CD set, covers 130 species, the booklet and voice announcements are in both Spanish and English. George B. Reynard & Orlando H. Garrido, 1988

\$29.95

Princeton Field Guides: Birds of the Dominican Republic and Haiti

Covers 300 species, 57 color plates, range maps, listing of local bird names, text on ecology, behavior and status.

Steven Latta, Christopher Rimmer et al., 2006

\$35.00

Birdsongs of the Pacific Northwest

CD and book, songs and calls of 165 species, color illustrations of each species. Martyn Stewart, Stephen R. Whitney, and Elizabeth Brains Hart, 2006

\$21.95

Birds of the Los Angeles Region

Photo guide to the common birds of LA, color coding by species, easy-to-carry size, each species has a Did you Know? feature, that provides the reader unique facts on that species.

Kimball Garrett, Jon Dunn, and Bob Morse, 2006

\$15.95

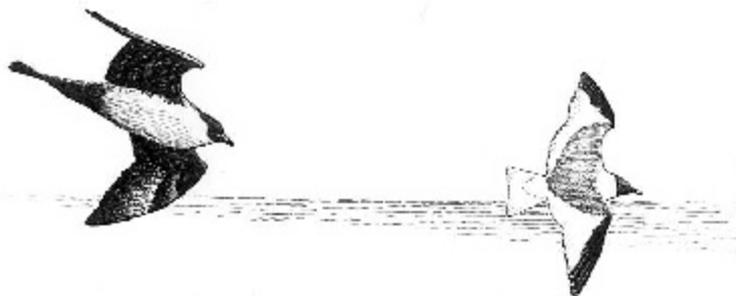
Traveller's Wildlife Guides: Southern Africa

Identification and location information on the most frequently seen amphibians, reptiles, birds, and mammals. Color illustrations of over 500 species, information on ecology, behavior and conservation.

B. Branch, C. Stuart, T. Stuart, and W. Tarboton, 2006

\$27.95

With spring just around the corner, check with the bookstore for your flower identification books and butterfly books.



PELAGIC TRIPS 2007

Save \$8.00 with an early sign-up
60 days prior to the trip departure.

SATURDAY, FEBRUARY 24

Palos Verdes Escarpment and Redondo Canyon. This 8 hour trip departs from Marina del Rey Dock at 7:30 a.m. on the r/v UCLA Seaworld. Birds seen on prior trips: Northern Fulmar; Short-tailed, Black-vented, Sooty and possibly Pink-footed shearwaters; Pomarine and Parasitic jaegers; rocky shorebirds (up to 5); Xantus Murrelet; Cassin's and Rhinoceros auklets. Occasionally: Ancient Murrelet. Rarity: Manx Shearwater. Gray Whales and several species of dolphins are often seen.

Leaders: Jon Feenstra, Kimball Garrett and Todd McGrath. \$79 There is no galley on board, but coffee and hot water are available.

SATURDAY, APRIL 21

A deep water trip toward the San Juan Seamount. This trip departs from the Santa Barbara Harbor on the fast catamaran Condor Express at 7:00 a.m. and will return approximately by 8:00 p.m. This is a One Day Murphy Petrel Search! We will cruise along the deep water shelf by the San Juan Seamount. Birds previously seen: Laysan and Black-footed albatross; Northern Fulmar; Sooty and Pink-footed shearwaters; Parasitic, Pomarine and Long-tailed jaegers; Leach's and Fork-tailed storm-petrels; Cassin's Auklet, Xantus Murrelet and Tufted Puffin. Rare possibilities are Cook's Petrel and Red-billed Tropicbird.

Leaders: Dave Compton, Jon Feenstra, Todd McGrath, David Pereksta and Wes Fritz. \$198 There is a complete galley that serves breakfast, lunch and dinner.

SATURDAY, JUNE 9

Land on Santa Cruz Island for the Island Scrub Jay, and then out to sea. This 8 hour trip departs from the Island Packer dock in the Oxnard Harbor at 8:00 a.m. on the m/v Van-

guard. We will land at Prisoner's Cove where the endemic Island Scrub-Jay is easily seen. Then we will cruise out to sea for pelagic birding, returning by Anacapa Island. Birds seen on prior trips: Northern Fulmar; Sooty and Pink-footed shearwaters; South Polar Skua; Parasitic and Pomarine jaegers; Sabine's Gull; rocky shorebirds (up to 5); Pigeon Guillemot; Xantus Murrelet. Rareties: Flesh-footed Shearwater. A Tufted Puffin was seen in 2002.

Leaders: Jon Feenstra, Todd McGrath and David Pereksta. \$96 A box lunch and breakfast can be ordered from the adjoining dock-side deli, or bring a picnic lunch and drinks.

SATURDAY, JULY 21

A deep water trip towards the San Juan Seamount. This trip departs from the Santa Barbara Harbor on the fast catamaran Condor Express at 7:00 a.m. and will return approximately by 8:00 p.m. We will cruise along the deep water shelf by the San Juan Seamount. This time of year Cook's Petrels and Red-billed Tropicbirds are seen in this area, and this is an ideal time to look for mega-rarities such as Dark-rumped and Stejneger's petrels; as well as Wedge-rumped Storm-petrel. Birds expected: Pink-footed and Sooty shearwaters; Leach's, Ashy and Black storm-petrels; Cormorants(3); Red-necked and Red phalaropes; South Polar Skua; Pomarine Jaeger; Pigeon Guillemot; Common Murres; Xantus and Craven's murrelets; Cassin's Auklet.

Leaders: Dave Compton, Jon Feenstra, Kimball Garrett, Todd McGrath, David Pereksta and Wes Fritz. \$198 If there is insufficient response 35 days prior to the departure, the trip will be cancelled. There is a complete galley that serves breakfast, lunch and dinner.

SATURDAY, SEPTEMBER 8

A deep water trip to Cherry, Tanner and Cortez Banks. This trip departs from the Santa Barbara Harbor at 7:00 a.m. on the fast catamaran Condor Express, and returns

REFUND POLICY FOR PELAGIC TRIPS

If a participant cancels 31 days or more prior to departure, a \$4 service charge will be deducted from the refund. There is no participant refund if requested fewer than 30 days before departure, unless there is a paid replacement available. Call LAAS for a possible replacement. Please do not offer the trip to a friend as it would be unfair to those on the waiting list.

All pelagic trips
must be filled 35 days prior to sailing.
Please reserve early.

NOTE: Destinations may be changed in order to maximize bird sightings, or minimize rough seas. In order to meet unexpected increases in fuel costs, there can be a \$5 to \$10 energy surcharge per person.

approximately at 8:00 p.m.

This is our **Red-billed Tropicbird** trip. We are far offshore in 3 counties Santa Barbara, Ventura and Los Angeles. Birds expected: Black, Least, Ashy and Leach's storm-petrels; South Polar Skua; Parasitic, Pomarine and Long-tailed jaegers; Sabine's Gull; Arctic Tern. Rareties: Black-footed Albatross; Buller's Shearwater; Craven's Murrelet. Blue, Fin and Minke whales as well as several species of dolphins are usually seen.

Leaders: Jon Feenstra, Kimball Garrett, Todd McGrath, David Pereksta and Wes Fritz. \$198 The trip will be cancelled if there is insufficient response 35 days prior to departure. There is a complete galley that serves breakfast lunch and dinner.

SATURDAY, OCTOBER 20

A trip around the Northern Channel Islands Monument. This 8 hour trip departs from the Island Packer's dock in the Ventura Harbor at 8:00 a.m. on the fast catamaran Islander. After dropping off campers on Santa Cruz Island, we will have the boat to ourselves and cruise around Santa Cruz Island to the Santa Cruz passage by Santa Rosa Island and along the Santa Rosa Flats to the deeper water near San Nicolas Island. We will return by Arch Rock at Anacapa Island. Birds seen on prior trips: Northern Fulmar; Sooty, Pink-footed and Black-vented shearwaters; Leach's, Least and Ashy storm-petrels; cormorants (3); Parasitic and Pomarine jaegers; Sabine's Gull; rocky shorebirds (up to 5); Common Murre; Xantus Murrelet; Cassin's Auklet. Rareties: Buller's and Flesh-footed shearwaters; South Polar Skua; Long-tailed Jaeger. In 2002 a Streaked Shearwater, and in 2003 a Brown Booby and 2 Manx Shearwaters were seen. Blue, Fin and Humpback whales have been seen on this trip.

Leaders: Jon Feenstra, Todd McGrath and David Pereksta. \$120 There is a snack galley with beverages, bring your own lunch.

PROGRAMS & EVENING MEETINGS

Meet at 7:30 at Audubon House in Plummer Park
7377 Santa Monica Blvd (at Martel between La Brea and Fairfax)
323-876-0202

Wednesday, January 10, 2007
Don DesJardin presents:
Birds of Ventura County

**Please note change in
meeting nights from
Tuesdays to Wednesdays.**

Don DesJardin has been birding and photographing birds for the last 16 years in what he calls his "local patch", Ventura County. Even though Don's primary passion was the 35mm camera, he had always wanted to explore the world of capturing birds on video. After much research, he decided to take the plunge into the video world by purchasing a Canon XL1 Mini DV video camera in April of 2000. This is an awesome camera, and with a 3CCD chip, and being a digital format, it approaches near broadcast video quality. Since then he has acquired an extensive collection of local and migratory Ventura County birds, shorebirds being one of his most favorite groups. Don's program is a 60-minute video that he has produced called "Birds of Ventura County". This is not a bird identification video, but what he calls "bird eye candy", that will show over 285 separate video clips covering over 130 species and shows just how diverse the bird life is for Ventura County, even though it represents only a small portion of the total bird species ever recorded for the county.



Don DesJardin



Phil Barnes

Wednesday, February 14, 2007
Phil Barnes presents:
How Flies the Albatross - Understanding Dynamic Soaring

Learn from aerospace engineer Phil Barnes, how the Wandering Albatross remains aloft, without flapping its wings as it travels several times per year around the globe. This multi-disciplinary presentation, with something for everyone, applies math and science to understand the phenomenon of dynamic soaring. Phil has a master's degree in aeronautical engineering, and has been with Northrop-Grumman Corporation for over 25 years. He hopes that the presentation, which closes with computer simulations of the albatross in flight, will stir greater interest in halting the slide to extinction of this wonderful bird.

**Please note change in
meeting nights from
Tuesdays to Wednesdays.**

Los Angeles Audubon Society
P.O. Box 931057
Los Angeles, CA 90093-1057

*DATED MATERIAL
Please Expedite*

Great Backyard

Bird Count

Feb., 16-19, 2007

See page 6