

Implementation of a Status and Trends Program to Evaluate Extent and Distribution of Aquatic Resources in California

I. Introduction

California was one of the first states in the nation to set a “no-net loss” policy for wetlands. In 1993 the administration of Governor Pete Wilson, through the Natural Resources Agency, established the California Wetlands Conservation Policy.¹ This policy provides over 30 actions intended to reduce and eliminate loss of wetlands throughout California. The policy also established several statewide initiatives including, but not limited to:

- A Statewide Wetlands Inventory
- Support for wetlands planning
- Improved administration of existing regulatory programs
- Strengthened landowner initiatives to protect wetlands
- Support for mitigation banking
- Integration of wetlands policy and planning with other environmental and land use processes
- Support for regional wetland partnerships

This policy continues to provide the framework for many of California’s programs and priorities.

In 2010 the California Natural Resources released its second State of the State’s Wetlands report. This report reaffirmed the need for development of a toolkit of standardized methods to map and assess the health of wetlands. The state of California’s wetlands can be evaluated based on these questions:

- Where are California wetlands located and how much acreage do we have?
- Are we gaining or losing wetlands over time?
- What are the major factors responsible for poor wetland health?
- How healthy are our wetlands?

After nearly two decades of attempting to implement a statewide wetlands mapping program to answer these fundamental questions, the California Natural Resources

¹ <http://ceres.ca.gov/wetlands/policies/governor.html>

Agency (CNRA) determined that a change detection program based on periodic comprehensive statewide mapping was not economically feasible.

II. Discussion of State Policies and Programs That Would Use Wetland Extent and Distribution Data to Fulfill Policy and Program Objectives

A. Governor's Executive Order: State Wetlands Conservation Policy

The goal of the California Wetlands Conservation Policy is to establish a policy framework and strategy that will: *Ensure no overall net loss and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship and respect for private property.*

Among other things, the policy calls for the creation of statewide wetlands inventory and accounting system to serve as a baseline from which to determine losses and gains (both functional and acreage) to the State's wetlands base.

B. California Water Quality Monitoring Council

California State Senate Bill 1070 was signed into law in 2006, requiring the California Environmental Protection Agency and the California Natural Resources Agency to enter into a Memorandum of Understanding establishing the California Water Quality Monitoring Council (Monitoring Council). The Monitoring Council was tasked with developing recommendations to improve the efficiency and effectiveness of California's water quality and related ecosystem monitoring and assessment systems and to ensure that the resulting data and information are made available to decision makers and the public via the internet. Those recommendations for A Comprehensive Monitoring Program Strategy for California were delivered to the Agency Secretaries in December 2010.

Members of the Monitoring Council represent a diversity of interests, including: state regulatory, resource management, and public health agencies; regulated storm water, wastewater and agricultural interests; water suppliers; citizen monitoring groups; the scientific community; and the public. Theme-specific workgroups, under the overarching guidance of the Monitoring Council, evaluate existing monitoring, assessment and reporting efforts and work to enhance those efforts so as to improve the delivery of water quality and associated ecosystem health information to the user in the form of theme-based internet portals. Currently, there are six theme-specific workgroups including, but not limited to, wetlands, estuaries, swimming safety and drinking water safety. The workgroups are comprised of issue-experts representing key stakeholders, from both inside and outside state government, that develop a web portal devoted to their specific theme. Each workgroup endeavors to coordinate existing monitoring programs within their theme, developing monitoring and assessment methods and data

management procedures according to performance measures defined by the Monitoring Council.

The mission of the California Wetlands Monitoring Workgroup, is to improve the monitoring and assessment of wetland and riparian resources by developing and supporting implementation of a comprehensive wetland monitoring plan for California, through improved coordination and collaboration among local, state, and federal agencies, tribes, and non-governmental organizations and through coordination with Monitoring Council workgroups. The workgroup will strive to accomplish this mission through review of technical and policy aspects of wetland monitoring tool development, implementation and use of data to improve wetland management in California and through setting a common vision for achieving these goals. The Status and Trends (S&T) program will be a key component of monitoring tool implementation.

C. State Water Resources Control Board's Wetlands Protection Policy

Where available, wetland data on extent and condition would be used to track the policy's overall goal of wetland protection. A stated purpose of the Water Boards proposed Wetland Area Protection Policy (policy) is to further "statewide efforts to ensure no overall net loss and a long-term net gain in the quantity, quality and sustainability of wetlands in California." To achieve this goal, the policy implements a number of wetland regulatory controls and also supports standardized approaches to wetland monitoring and assessment as endorsed by the California Water Quality Monitoring Council (Monitoring Council).

The S&T program supports the policy in this regard by employing the WRAMP framework recommended by the monitoring council for standardized wetland data gathering and reporting. The information generated by the S&T program would be a vital tool in evaluating the policy's performance. For example, if over time the S&T program documents geographical areas or specific wetland types subject to loss, directed measures could be taken to counter these trends. Such efficiencies gained by strategically fine tuning the policy's regulatory focus could not be achieved without this statewide trends information.

D. Clean Water Act (CWA) Sec. 401 Water Quality Certification

The California Water Boards have relied on the CWA 401 water quality certification program to protect wetlands. This CWA program regulates the discharge of dredged or fill material into federal waters, including wetlands. The California Water Board's also rely on their Porter-Cologne authorities to regulate discharges to non-federal waters and wetlands. The water quality certification program performance is measured by internal tracking of such project specific metrics as annual wetland fill and annual compensatory mitigation in acres. This provides some indication of whether the goal of "no net loss" of wetlands is being achieved. The Status and Trends information would more reliably track the goal

of “no net loss.” The effectiveness of the program’s efforts to protect wetlands would also be enhanced with wetland status and trends information. Program resources could be more effectively directed based on the information. For example, projects impacting certain wetland types or projects in critical geographical areas could be flagged for pre-planned regulatory approaches.

E. Surface Water Ambient Monitoring Program (SWAMP)

The goal of the State Water Resources Control Board’s SWAMP program is to “evaluate the condition of all waters throughout California”. The large extent and expansive distribution of aquatic resources makes comprehensive evaluation impossible (e.g., approximately 30,000 miles of streams, 7,800 mi² of water bodies, including 6,200 mi² of wetlands). To meet this challenge, the SWAMP program uses a probabilistic design where a statistically representative set of locations are identified and sampled. The results of this assessment can then be extrapolated to provide estimates of statewide condition. Effective use of a probabilistic design relies on a map that represents the complete distribution of the resource of interest, from which the representative sample can be randomly selected. To date, SWAMP has focused on evaluation of streams, largely because high quality stream maps exist for the entire State of California. Nevertheless, the stated goal of SWAMP is to evaluate the condition of all of California’s waters. Application of the probabilistic design to other water body types will require a map from which the samples can be selected. It is unlikely that sufficient time and resources exist to create a comprehensive map of all aquatic resources in California to serve this need.

The proposed S&T program can serve as the base map and provide plots for SWAMP assessments of other waterbody types besides streams. The S&T plots will be selected using the same probabilistic design employed by SWAMP and therefore will provide a statistically representative map of aquatic resources in the state (although not a comprehensive map). The plots can be used as the sample frame for subsequent condition assessments, in that SWAMP could select lake or wetland sampling sites based on the S&T plots. Condition assessments of lakes or wetlands drawn from the S&T plots would allow extrapolation to overall statewide condition of these resources, without the need to generate a comprehensive, all inclusive map.

F. Lake and Streambed Alteration Agreements (Fish and Game Code 1600 *et seq.*)

The California Department of Fish and Wildlife enters into a Lake or Streambed Alteration (LSA) Agreement when an entity 1) notifies the Department and proposes an activity that would substantially alter the bed, bank, channel, or natural flow of a river, stream, or lake, and 2) the Department determines that activity may result in adverse impacts to an existing fish and wildlife resource. The LSA Agreement includes a project description, project impacts, existing fish and wildlife resources, and reasonable measures to protect those resources. The

Department must also comply with the California Environmental Quality Act (CEQA) before issuing an Agreement.

While most LSA agreements cover short-term and localized impacts that can be avoided and minimized through best management practices, compensatory mitigation is a measure that has also been included in LSA Agreements. Compensatory mitigation has been based on project and site specific conditions.

Wetland extent and distribution are not tracked by the LSA Program. Assessment of regional and cumulative effects of lake and stream alterations would benefit from the development of a new electronic tracking system. That tracking system would necessitate additional staffing to both collect and enter data into that system. To the extent that wetlands are part of the impacts addressed by an LSA agreement, the S&T program could provide data to better inform cumulative impact assessments and compensatory mitigation decisions.

G. State Water Plan Periodic Updates (California Department of Water Resources)

The California Water Plan is required by statute to be published once every 5 years. From its early issuance as an estimate of future water demand it has evolved into a continuing strategic planning process supported by local, state, and federal agencies. Today the California Water Plan presents the status and trends of California's water-dependent natural resources; water supplies; and agricultural, urban, and environmental water demands for a range of plausible future scenarios. The Water Plan presents multiple water resource management strategies. This is designed to provide a spectrum of future conditions and a tool box of methods and approaches to assist water managers throughout California in being better stewards of the state's water resources.

One key goal of the current Water Plan is an effort to improve the quantitative tools applied to water assessment. Decision makers are being asked to do a better job of sustaining our ecosystems while improving our water availability, quality, reliability, flood risk, and general community quality. The Water Plan provides various tools to assist with this goal, but is limited when basic information is lacking.

Wetlands are key parts of the natural and constructed infrastructure supporting water resource management. The lack of good information about the extent and condition of wetlands has limited the value of Water Plan modeling. The relative lack of data on the extent and condition of wetlands risks missing opportunities to integrate wetlands into our water supply strategies. A probabilistic wetland monitoring program could provide essential information that would be readily folded into the Water Plan process.

H. Riparian Mapping (California Department of Water Resources)

Riparian habitats, those lands that lie between rivers or streams and the dry uplands, are important to the overall ecological quality of California's natural resources. Riparian habitats support a high level of biodiversity and are home to many important ecosystem processes and functions. Riparian areas have been greatly diminished as land was converted to human uses, leaving only a few percent of the original expanse of riparian areas. The role of riparian areas in floodplains has recently gained attention and the Central Valley Flood Protection Plan (CVFPP) now contains emphasis on restoring some riparian functions and habitats as part of flood management efforts.

As part of the CVFPP the Department of Water Resources with assistance from the Riparian Habitat Joint Venture has undertaken mapping riparian habitats based on vegetation complexes at two different scales; a medium scale useful for regional planning, and a fine scale useful for project development. This mapping greatly improves our ability to track the extent of riparian areas and to some degree the quality or condition of that habitat. However, these recent mapping efforts are limited to the Central Valley and do not provide a statewide ability to assess the extent of riparian areas. The Central Valley mapping efforts can be used for quality control of a probabilistic statewide wetland monitoring program.

I. Natural Communities Conservation Plans (California Department of Fish and Wildlife)

All Natural Communities Conservation Plans (NCCPs) that are permitted and being implemented are track gains and losses of sensitive habitats. In the case of wetlands, if regulatory compliance has been built into a NCCP as part of the condition of the permit, then the net loss or gain of wetlands is tracked at a fine scale. This is only for a completed NCCP, not necessarily for those in formation. However, some NCCPs in process have done fairly extensive inventory and mapping of wetlands and sensitive habitats (e.g., Placer County and South Sacramento). At this time only East Contra Costa NCCP is tracking estimates of wetland habitat that has changed in the NCCP area.

J. State conservancies, refuges, and joint ventures

Wetland and riparian habitat, state conservancies, refuges, and joint ventures share the common mission of acquiring and protecting wetland and riparian habitat. Historically, the largest joint ventures operating in California (i.e., the Central Valley Joint Venture and the San Francisco Bay Joint Venture) have relied upon a wetland tracking system developed by Ducks Unlimited for tracking habitat. As a result of outreach performed by CDFW and CNRA, both joint ventures have indicated their interest in and support of implementing an S&T in California. In addition, the joint ventures, because of their respective board compositions, have provided a conduit to state and federal refuges in California. The other two major joint ventures operating in California (i.e., the Pacific Coast

Joint Venture and the Intermountain West Joint Venture) showed initial interest in partnering with the implementation of the S&T program, but require further outreach.

The State Coastal Conservancy, the primary governmental acquiring coastal (including coastal watersheds) habitat in California, expressed its support for the S&T program by including it in the regional monitoring framework for the Southern California Wetlands Recovery Project. Additional outreach remains to be done, however, with other state conservancies; e.g., Rivers and Mountains Conservancy, Sierra-Nevada Conservancy.

III. *Technical Design for a Status & Trends Monitoring Program to Evaluate Extent and Distribution of Aquatic Resources in California (S&T Study)*

As discussed in the introduction of this paper, California currently lacks the ability to accurately report on wetland extent, distribution, and trends on a regular basis. This makes it impossible to reliably answer questions regarding the extent of wetlands in California, and whether our management programs are successful in helping to meet the stated goal of “no net loss” and “long-term net gain” of wetlands. The principal challenge to accurate assessment and effective monitoring over time is the expense of comprehensive mapping; conservative estimates provided by the U.S. Fish and Wildlife Services’ National Wetlands Inventory predict comprehensive mapping of California’s wetland resources would cost at least \$8.4 million. It is important to note that this figure does not include other costs that the state would incur if it were to implement a change detection program based on periodic comprehensive statewide wetlands mapping; e.g., data stewardship, change analysis, staffing.

In 2009, CNRA collaborated with the Southern California Coastal Water Research Project (SCCWRP) and the California Department of Fish and Wildlife in drafting a grant proposal for consideration by the U.S. Environmental Protection (USEPA). The purpose of the proposed project was the development and testing of a cost-effective method for tracking statewide wetland (and riparian) gains and losses.

The proposed project was based on a probabilistic method developed by the USFWS and USEPA in conjunction with conducting a periodic National Wetlands Status and Trends Program. Probabilistic mapping can provide a cost-effective alternative for monitoring aquatic resource extent and distribution. Under a probabilistic program, detailed wetland maps are produced for a set of random plots, placed across the entire state. Information from these plots is extrapolated to provide statewide estimates of extent and distribution.

As a deliverable of the USEPA grant, SCCWRP released and delivered to CNRA a report in September 2012 entitled, *Technical Design for a Status & Trends*

Monitoring Program to Evaluate Extent and Distribution of Aquatic Resources in California (SCCWRP Technical Report #706) that provides a set of recommendation for implementation of a probabilistic mapping program. It is important to note that the study was coordinated through a diverse technical advisory committee.

IV. S&T Study Design Recommendations

Design recommendations for the California S&T program were developed with input from the project's technical advisory committee (TAC) and based on a review of existing S&T programs. A series of design alternatives were identified for various program elements. Each design alternative was tested through repetitive simulation and modeling using the most comprehensive wetland and stream maps currently available. Simulation results allowed statistical comparison of each alternative and resulted in optimized technical design parameters with respect to California's S&T program objectives. Modeling results were discussed with the TAC, who produced the following design recommendations:

- A. Select samples by generalized random tessellation stratified (GRTS) sampling without geographic pre-stratification. This will increase precision of estimates and provide a simple mechanism for regional intensification.
- B. Use the entire state as a sample frame, rather than relying solely on areas with previously mapped aquatic resources. This will ensure that estimates reflect comprehensive extent and distribution of wetlands and aquatic resources statewide.
- C. Map and classify all elements within sample plots, including aquatic resources and upland land use. This will provide information about proximal anthropogenic influences and impacts on wetlands and aquatic resources.
- D. Approximately 2,000 plots statewide will be necessary to achieve a recommend accuracy of $\pm 10\%$ accuracy at a 95% confidence interval. Plots will be mapped over a 5 year cycle; approximately 400 plots per year will be mapped. Reporting will be done at the end of the initial 5-year cycle.
- E. Plots will be 4 km² in size in order to balance cost-effectiveness with variability and accuracy considerations.
- F. A static plot design will be used; therefore, starting in year 6, plots will be revisited. It is likely that annual costs may decline following the initial 5 year mapping effort because only incremental changes in the static plots will need to be mapped.

G. Mapping will be done using existing, available imagery such as that provided by the USDA National Agriculture Imagery Program (NAIP).

H. The California Aquatic Resources Inventory (CARI) mapping standards and classification will be used.

I. Approximately 5% of the plots will be ground-truthed for quality control purposes.

The recommended program design was validated through a pilot-scale application at 60 plots in the Salinas River Valley and Southern California regions. This validation quantified expected random and systematic errors between map producers and between probabilistic estimates and comprehensive values. These error rates can be used to develop data quality objectives for use during program implementation.

V. Tasks and Budget Associated with Implementing the Recommended Program

Implementation of the recommended program will require committed funding, agency oversight and coordination, and data stewardship.

Task 1 - Plot reconnaissance – Randomly selected plots may or may not include wetlands or streams. Plots will be reviewed using readily available aerial images, and attributed based on whether they are likely to include the target resources for mapping.

Task 2 – Mapping – All wetlands and streams in plots that pass initial reconnaissance will be mapped using the California Aquatic Resources Inventory (CARI) standards and classification system. Approximately 400 plots per year will be mapped.

Task 3 – Data management and QA – All maps will conform to data and metadata standards established by CNRA and/or CalEPA. Data products will be uploaded to the designated data management system (e.g., BIOS). Approximately 10% of the plots will be selected for quality control (QC) checks by an independent mapper. These QC plots will be used to assess mapping accuracy and to determine if mapping meets established data quality objectives. Systematic errors may result in the need for selected remapping.

Task 4 – Ground-truthing – Each year, approximately 5% of the mapped plots will be selected at random for ground-truthing. For each plot a team of two individuals will spend up to one day in the field verifying mapped resources on the ground. Results of ground-truthing will be used to assess mapping accuracy and to determine if mapping meets established data quality objectives. Systematic errors may result in the need for selected remapping. Ground-truthing results may also inform future refinements of the mapping protocols.

Task 5 – Program administration, oversight, training, outreach – Program implementation will require ongoing oversight of workflow, schedules, QA and data management. In addition, periodic outreach via briefings, meetings and presentations will be necessary. Finally, agency staff or contractors may require occasional training on the mapping protocols or other elements of the status and trends program.

Task 6 – Reporting – At the end of each five year mapping cycle a summary report, and associated web material, will be prepared that highlights the key findings and recommendations of the program and offers suggestions for future program refinement.

Budget – Implementation of the S&T program can occur through external mechanisms, such as subcontracting, internally using existing agency staff, or a hybrid of the two. Tables 1a-b and 2 provide cost estimates for external (e.g., a state university) and internal (e.g., CDFW, CDWR) implementation approaches, respectively.

Table 1a: Annual Implementation Budget Based on External Costs

Task 1	Plot reconnaissance	\$0
Task 2	Mapping	\$42,821
Task 3	Data management/QA	\$44,830
Task 4	Groundtruthing	\$25,973
Task 5	Administration/Training/Outreach	\$56,512
Task 6	Reporting	\$25,880
	Total	\$196,016

Because baseline mapping and initial change analysis would both occur during the first five-year period, the first period would have a higher annual budget than subsequent periods.

Table 1b: Annual Implementation Budget for First Five-year Cycle Based on External Costs

Task 1	Plot reconnaissance	\$10,907
Task 2	Mapping	\$86,447
Task 3	Data management/QA	\$44,830
Task 4	Groundtruthing	\$25,973
Task 5	Administration/Training/Outreach	\$56,512
Task 6	Reporting	\$25,880
	Total	\$250,549

Table 2: Annual Implementation Budget Based on Internal CDFW Costs

Personnel	Hours	Hourly Rate*	Total	Benefits
Project Manager	100	\$ 44.00	\$ 4,400.00	\$ 1,716.00
Environmental Scientist	2080	\$ 33.00	\$ 68,640.00	\$ 26,769.60
Field intern	520	\$ 15.00	\$ 7,800.00	\$ 3,042.00
GIS Research Analyst	520	\$ 31.00	\$ 16,120.00	\$ 6,286.80
Subtotals			\$ 96,960.00	\$ 37,814.40
Personnel Subtotal			\$ 134,774.40	
	Days	Avg. Daily Rate		
Travel	40	\$ 500.00	\$ 20,000.00	
Subtotal			\$ 154,774.40	
Indirect (26% of all above, could be in-kind)			\$ 40,241.34	
		Total	\$ 195,015.74	

Note: The above cost estimates assume the following parameters: 1) 4x4 km plots; 2) +/- 10% 95% C.I.; 3) 2000 plots total; 4) 5-year sample interval; 5) 400 plots per year.

VI. Funding for Implementing the S&T Program

A. Funding options for ongoing Implementation

Based on feedback received from the California Department of Finance (DOF) in response to a S&T funding proposal submitted by CNRA to the department in the spring of 2014, CNRA has concluded the following: (1) funding of the S&T program should be shared among at least three agencies, (2) existing state funds must be used for program implementation, and (3) an appropriation request for the state general fund would almost certainly be rejected by DOF. To this end, CNRA has worked over the last several months on securing non-general fund monies from agencies that would directly benefit from S&T program implementation. As of Fall of 2014, CNRA and the State Water Resources Control Board (SWRCB) have committed 2/3s of the annual cost of implementing the program. CNRA's contribution will come from the state Environmental License Plate Fund and the SWRCB's contribution will come from fees collected in connection with SWRCB Waste Discharge Requirements. CNRA is actively pursuing the final third from other state agencies. Once a commitment for the final 1/3 is secured, CNRA will submit a formal budget change proposal to (DOF) for its consideration. If approved by DOF, the program would appear in the Governor's approved budget to be voted on by the state legislature.

B. Funding for start-up costs

As discussed above, S&T implementation will be on a five-year cycle. The first five-year cycle will have start-up costs of approximately \$55,000 per year. Because these costs are not recurring, they can be covered without the approval of DOF or the legislature. The State Coastal Conservancy and the Wildlife Conservation Board have indicated that would entertain proposals for these costs because they are one-time in nature and thus could be covered by a grant.

C. Additional options

An option that has not been explored by CNRA, but would be more appropriate for the wetlands conservation community to explore (e.g., joint ventures) is state legislation that directs an agency (or a group of agencies) to implement the S&T program. The legislation would also need to include an appropriation for funding the program as no agency would be able or willing to implement an unfunded mandate.

VII. **Challenges to Implementation of the S&T Program and Potential Solutions**

The primary barriers to implementation of the S&T program fall into two main categories; i.e., financial and institutional.

A. Financial challenges

The periodic and long-term nature of an S&T program creates funding challenges even though the annual budget is relatively modest when compared to other state programs; i.e., approximately \$200,000 per year. As discussed above, CNRA upper management and DOF officials have indicated that odds of S&T program being funded with state general fund monies is practically nil and that responsibility of funding the program should be share among at least a few of the benefitting state agencies. The most practical solution to this funding reality is a funding strategy that includes multiple funders with access to state non-general funds; e.g., license plate fees collected for environmental programs, hunting and fishing licenses, boating registration fees, and regulatory permitting fees.

B. Institutional challenges

Again, because of the periodic and long-term nature of S&T program implementation, there are unique institutional challenges to program implementation. These challenges include, but are not limited to (1) long-term data management and stewardship; (2) ongoing state, federal, and local collaboration and leadership, (3) reluctance of state agencies to take on new programs, and (4) providing opportunities for non-governmental participation and collaboration. Potential solutions for these challenges are discussed below.

1. A fully implemented S&T program would result in decades of wetlands data that would require stewardship and management. Consequently, an agency or university with a proven track record

of data stewardship would be the most appropriate steward. Potential stewards and related programs include but are not limited to: (1) CDFW's Biographic Information and Observation System; (2) CDWR's Data Publication, Exchange and Management Division, and (3) California State University Northridge's Center for Geographical Studies.

2. Because the State Wetlands Conservation Policy charges the CNRA and CalEPA with the implementation of the policy, oversight and sponsorship of the S&T program should remain with these two agencies or with its delegates. Under this scenario, the Water Quality Monitoring Council and its wetlands working group, the California Wetlands Monitoring Workgroup, would provide scientific and technical support and guidance to CNRA and CalEPA.
3. The reluctance of state agencies to take on new programs is understandable under the current state fiscal climate. This situation can only be addressed two ways; i.e., a directive in legislation or an executive order that requires a state agency to implement S&T. Either scenario would require that the funding situation be addressed as well. Consequently, the most pragmatic and expedient approach to program implementation would be a contractor working for CNRA or CalEPA or its delegated department.
4. The success of an S&T program will be measured in decades, not years. Consequently, providing opportunities for ongoing participation by nongovernmental organizations (NGOs) such as joint ventures will help ensure continued support. These opportunities include, but are not limited to, regional intensification efforts, inclusion of NGOs in future S&T reporting, and consultation on technical issues.

VIII. Recommendations and Conclusion

The following is a discussion of recommendations for S&T implementation which are based on the collective experiences of CNRA and its sub-grantees (i.e., SCCWRP and CDFW). The recommendations also reflect CNRA's desire to implement a program within the next two years.

- A. Long-term/on-going program funding to be the shared responsibility of at least three state agencies which would benefit from S&T data. These agencies include, but are not limited to, CNRA, CDFW, SWRCB, and CDWR.

- B. Funding to be state non-general fund. As discussed above, this recommendation is based on input received from DOF in response to a funding proposal submitted by CNRA.
- C. Because of CNRA's access to DOF, its subordinate departments, and the legislature and its seat on the Water Quality Monitoring Council, CNRA to continue to lead the effort in securing permanent funding. Assistance to be provided by the Water Quality Monitoring Council.
- D. Once permanent funding is secured, the S&T program to be implemented under contract to the Center for Geographic Studies at California State University Northridge (CSUN). This recommendation is based on CSUN participation/performance in the S&T pilot and the organization's desire to participate (see attached proposal). CSUN to also provide long-term data stewardship and outreach to data users. CNRA to provide management and oversight of contract because of the explicit responsibilities set out in the State Wetlands Conservation Policy (e.g., tracking "no net loss", statewide wetlands inventory) and its desire to report periodically on the state of the state's wetlands. The CWMW to provide technical guidance and support to CNRA and CSUN.
- E. The CWMW and the CNRA to continue conducting outreach to develop a broad constituency of supporters. Presumably, an outreach strategy currently under development by the CWMW would include the S&T program.

In closing, it is important to note that this document is intended to be a living a document and thus can be revised at any time to reflect new monitoring technologies, funding opportunities, partnerships, and policy initiatives.