

**STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – CENTRAL VALLEY REGIONAL WATER BOARD
JANUARY 20, 2015**

ITEM 5

SUBJECT

CENTRAL VALLEY SALINITY ALTERNATIVES FOR LONG-TERM SUSTAINABILITY (CV-SALTS): ANNUAL PROGRESS REPORT

DISCUSSION

Summaries of the expenditures and accomplishments to date as well as key accomplishments, future activities and timelines will be presented.

BACKGROUND

CV-SALTS is a stakeholder lead initiative developing a Central Valley-wide salt and nitrate management plan. The goals of CV-SALTS are to provide for an environmentally and economically sustainable future within the Central Valley and to address legacy groundwater nitrate concentrations that are impacting drinking water supplies. Cleanup and Abatement (CAA) funds were authorized in two separate resolutions to provide seed money for the initiative. [Resolution No. 2009-0023](#) authorized \$1.2-million and [Resolution No. 2010-0042](#) authorized \$3.8-million. The \$3.8-million was allocated in two phases with \$2.0-million available upon adoption of the resolution and the final \$1.8-million authorized in December 2012. To track progress, Resolution No. 2010-0042 included a requirement that the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) report annual progress on the initiative at a publicly noticed State Water Resource Control Board (State Water Board) meeting. The progress report is to include a detailed accounting of expenditures, services received, a line item report of in-kind and contract services contributions from Central Valley Salinity Coalition (CVSC) members and/or additional public and private entities, a summary of work accomplishments to date and timeline for completion of work.

Details of the required information are included in the attached staff report. A brief summary is provided.

Expenditures and Cost Share:

Since 2008, total expenditures related to development of a Salt and Nitrate Management Plan (SNMP) for the CV-SALTS initiative are \$17,370,310. Of this total, \$2,901,874 (17%) has been provided from the authorized CAA funds, while \$14,468,436 (83%) has been expended by CV-SALTS Stakeholders, which include CVSC members, other organizations, and agencies. As of September 2014, \$1,113,024 of the CAA funding provided through Resolution No. 2009-0023 and \$1,788,850 of the funding provided through Resolution No. 2010-0042 had been expended. Workplan elements totaling an additional \$2,098,126 are in progress or identified for implementation during 2016.

CVSC members have provided over \$1,583,150 in cash contributions through membership fees which have been used towards project development. CVSC members and other stakeholders have also provided \$1,953,500 in direct match for workplan items and \$12,875,291 for efforts related to the workplan such as basin planning efforts, monitoring activities and pilot studies that provide foundational support for the development of a final SNMP. In addition, CVSC members and other organizations have initiated implementation activities for salinity and nitrate reduction. A sampling of these efforts combined with workplan related activities, identified projects totaling over \$55 million. The projects are being evaluated as the implementation program is developed.

Services Provided:

The amounts listed above do not account for the time spent by stakeholders to participate on policy and technical committees that identify tasks, scope the work, conduct and oversee work, and review and approve final products (approximately monthly policy meetings and two meetings per month for various technical subcommittees). Stakeholder produced products are discussed under accomplishments. In addition, stakeholders provided services for program management, meeting and website management and cost-shared a number of the contracted items listed below. Contracted services include a Technical Project Management team that provides Basin Plan and technical and facilitation support to assist with the accomplishments listed below.

Accomplishments to Date:

Stakeholder Driven:

- ✓ Pilot salt source identification/ interaction studies covering 14% of the Central Valley;
 - Evaluation of completeness of the three studies conducted in the Sacramento, San Joaquin, and Tulare Basins;
- ✓ Preliminary framework for standardizing future salt source studies;
- ✓ February 2011 Leadership Team meeting to review progress;
- ✓ Interim and Subsequent Salinity Project Funding Plan;
- ✓ Pilot studies for desalinization and containment alternatives;
- ✓ Screening mechanism for management practices in order to develop a validated “toolbox” to support industry in reducing salt and nitrate impacts;
- ✓ Technical recommendations regarding use of modeling tools to develop site specific salinity objectives to protect irrigated agriculture;
- ✓ Technical review of salinity and nitrate water quality criteria and recommendations to protect stock watering;
- ✓ June 2012 and December 2013 Central Valley Water Board Workshops;
- ✓ Co-sponsor of and participant in the Groundwater Resources Association Salinity and Nitrate Conference in Fresno (June 2012);
- ✓ International Salinity Expert Panel convened in Riverside (June 2014);
- ✓ Drafted revised Chapter 19 (Salt and Salinity Management) for the California Water Plan, and;
- ✓ Initial policy recommendations related to:
 - Application of Secondary MCLs to protect MUN beneficial uses;
 - Conceptual regulatory framework for protection of AGR beneficial uses;
 - Principles for calculating background water quality and assimilative capacity; and,
 - Management zone concept and alternative compliance strategies;
- ✓ Coordination, oversight and cost share of case studies and technical projects identified below.

Contract Supported:

- ✓ Updated 2012 Strategic Plan, Framework and Workplan
- ✓ Salinity water quality criteria review for aquatic life;
- ✓ White paper on salinity and nitrate impacts on municipal and domestic supply;
- ✓ White paper on salinity impacts on irrigated agriculture;
- ✓ GIS database and beneficial use maps for the Central Valley and Delta (coordinated with State Water Board effort);
- ✓ Initial salinity/nitrate conceptual model (ICM)--data compilation; source/fate; initial background and trend analysis for 22 analyses zones;
- ✓ Phase 1 of the Management zone based evaluation of appropriate salinity water quality objectives to protect irrigated agriculture was completed, phase II is not currently being undertaken;
- ✓ Phase 1 Strategic Salt Accumulation Land and Transport Study (SSALTS) evaluation of salt disposal options;
- ✓ SSALTS Phase 2: Development of alternatives for in-valley, out-of-valley, and combination salt management strategies;
- ✓ Central Valley Salinity brochure;
- ✓ Improved functionality of the CV-SALTS website; and,
- ✓ Support for Regional Water Board CEQA Scoping meetings in Modesto, Rancho Cordova, Colusa and Fresno.

In Progress:

- ✓ Phase II Conceptual Model: refine calculations for background, assimilative capacity and trend; focused management zone study;
- ✓ SSALTS Phase 3: Develop salt management implementation measures and a phased implementation strategy for inclusion in the SNMP; and,
- ✓ Case studies to ground-truth policy and implementation recommendations (in progress):
 - Appropriate application and protection of municipal and domestic supply in agriculturally dominated surface water bodies (Publicly Owned Treatment Works receiving waters in the Sacramento River Basin);
 - Appropriate application and protection of municipal and domestic supply and agricultural supply in a portion of the unconfined aquifer within the Tulare Lake Bed;
 - Lower San Joaquin River salinity and boron water quality objectives and implementation program;
 - Planning and coordination for early implementation project to provide safe drinking water for disadvantaged community.

Timeline for Completion of Work:

The timeline for completion of a draft Central Valley Salt and Nutrient Management Plan was extended by Resolution 2013-0149 of the Central Valley Regional Water Board to May 14, 2016 based on demonstration of substantial progress made by CV-SALTS and the need for additional time to insure thorough environmental and economic review of proposed alternatives before submitting a final plan. This two year time extension is consistent with requirements of the State Water Board's Recycled Water Policy.

POLICY ISSUE

None

FISCAL IMPACT

None

REGIONAL BOARD IMPACT

None

STAFF RECOMMENDATION

None

This information item assists the Water Boards in reaching Goal 5 of the Strategic Plan Update: 2008-2012 to improve transparency and accountability.

STAFF REPORT CV-SALTS ANNUAL PROGRESS REPORT—JANUARY 2015

The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative is a stakeholder-led process to develop a Salt and Nitrate Management Plan (SNMP) for the Central Valley and basin plan amendment recommendations to support implementation of the SNMP. The goals of CV-SALTS are to provide for an environmentally and economically sustainable future within the Central Valley and to address legacy groundwater nitrate concentrations that are impacting drinking water supplies. The initiative was formally recognized under a signed Memorandum of Agreement (MOA) between the State Water Board, Central Valley Water Board and Central Valley Salinity Coalition (non-profit stakeholder group) in March 2010 and an extension of the MOA was signed in December 2014. Several committees and subcommittees have been formed to work on both policy and technical issues with meetings held on a monthly basis. The Executive Committee is the primary decision making body and is comprised of members of the stakeholder coalition as well as state and federal agencies and members of disadvantaged communities and the public.

On September 7, 2010, the State Water Resources Control Board approved Resolution No. 2010-0042 authorizing \$3.8-million from the Cleanup and Abatement Account (CAA) to augment funding for the development of the Central Valley Salinity and Nitrate Management Plan (SNMP or Project). The funding augments \$1.2-million provided through Resolution No. 2009-0023.

Resolution No. 2010-0042, allocated the \$3.8-million in two phases with \$2.0-million available upon adoption of the resolution and \$1.8-million approved by the State Water Board in December 2012. To track progress, the resolution included a requirement that the Central Valley Water Board report annual progress on the initiative at a publicly noticed State Water Board meeting. The progress report is to include a detailed accounting of expenditures, services received, a line item report of in-kind and contract services contributions from Central Valley Salinity Coalition (CVSC) members and/or additional public and private entities, a summary of work accomplishments to date and timeline for completion of work. The following document provides the required information. Expanded discussion of the project is provided at annual Central Valley Water Board workshops.

Expenditures for Services and Contributions from Stakeholders

Table 1 provides a detailed accounting of the expenditures for services received utilizing Clean-up and Abatement (CAA) funds. Table 2 summarizes the Stakeholder Contributions, both those directly supporting workplan tasks identified in Table 1 as well as additional efforts related to the workplan such as basin planning efforts, monitoring activities and pilot studies that provide foundational support for the development of a final SNMP. Tables 1 and 2 track funding and expenditures from July 2008, which is when the CVSC formed.

Table 3 and Figure 1 summarize the cumulative available funding, encumbered funding (funding allocated to specific tasks), and actual expenditures by year that are related to developing the final SNMP. Based on the summary information, total expenditures for the CV-SALTS initiative since July 2008, were \$17,370,310. Of this total, \$2,901,874 (17%) has been provided from the authorized CAA funds, while \$14,458,436 (83%) has

been expended by CV-SALTS Stakeholders, which include CVSC members, other organizations, and agencies. As of September 2014, \$1,113,024 of the CAA funding provided through Resolution No. 2009-003 and \$1,788,850 of the funding provided through Resolution No. 2010-0042 had been expended. Workplan elements totaling an additional \$2,098,126 are either in progress or slated for fine tuning implementation alternatives and conducting environmental and economic analyses.

Stakeholder cash contributions from CVSC membership fees and a consultant's contribution toward workplan elements total \$1,660,335 to date. Additional stakeholder contributions directly supporting workplan elements including additional match for some CAA funded projects, total \$1,308,150. Additional contributions related to the workplan include compilation of water quality information (\$3,401,207) and pilot studies evaluating treatment alternatives (\$8,259,102). Specific activities are listed in Table 2 with additional detail in Table 4.

In addition to these contributions, CVSC members and other organizations have initiated implementation activities for salinity and nitrate reduction, both voluntarily and through current regulation. A sampling of these efforts identified projects totaling over \$63 million (Table 4). Table 4 includes detail on several projects and reflects a broad array of activities including: investigating various treatment alternatives for agricultural, urban and industrial drainage and wastewater; supporting basin planning activities; gathering water quality information to feed the decision processes; and implementing on the ground practices to control salt and nitrate. The permit required costs noted in the table (over \$7.25-million) include just a sampling of the types of costs faced by dischargers to quantify salt sources, develop salt minimization plans, and monitor/evaluate management practices. Some key efforts identified include the San Joaquin River Real-time Water Quality Monitoring by the CA Department of Water Resources, Wine Institute Practice Manuals, the Representative Monitoring Program by Dairy Cares and Western United Dairymen, and programs for control and management of subsurface agricultural drainage being implemented by Tulare Lake Bed interest and the Grassland Area Farmers. The projects are being evaluated as the implementation program is developed.

Tables 2 and 3 and Figure 1 do not account for the time spent by stakeholders to participate on policy and technical committees that identify tasks, scope work, conduct and oversee work, and review and approve final products (approximately monthly policy and administrative meetings and two meetings per month for various technical committees and subcommittees). A rough estimate of stakeholder participation can be determined by assuming a standard rate of \$100/hour per person. Based on the number of meetings and attendance, between July 2009 and October 2014, CV-SALTS Committee Members contributed more than 13,520 hours participating in Committee and subcommittee meetings supporting CV-SALTS. This participation represents an approximate additional expenditure by the stakeholders of \$1,352,000 for the period.

Services provided to date have ranged from coordinating administrative, technical and facilitation support to developing screening tools and technical review and recommendations to completing technical studies. Results of the stakeholder oversight and efforts are listed under stakeholder driven accomplishments below.

Work Accomplishments to Date

CV-SALTS developed a revised strategy and workplan in February 2012 to help prioritize and focus activities of participating stakeholders. CV-SALTS has completed several of the workplan items, is in-progress on many more and has identified a timeline to insure thorough economic and environmental review of proposed alternatives for the Central Valley SNMP. Accomplishments can be summarized by those completed by the stakeholders as committee projects and those completed as contracted elements as follows:

Stakeholder Driven:

- ✓ Pilot salt source identification/interaction studies covering 14% of the Central Valley;
 - Evaluation of completeness of the three studies conducted in the Sacramento, San Joaquin, and Tulare Basins;
- ✓ Knowledge Gained Subcommittee Guidance for Salt Source Identification Studies
- ✓ Interim and Subsequent Salinity Project Funding Plan
 - New CVSC Members and forthcoming Expansion Plans
 - Contributions in Direct and Indirect studies as well as support for CV-SALTS and implementation of projects to control salinity and nitrates (Tables 2 and 4)
- ✓ Management Practices Subcommittee Guidance for Development of a Salt and Nitrate BMP Toolbox;
- ✓ Technical recommendations regarding use of modeling tools to develop site specific salinity objectives to protect irrigated agriculture;
- ✓ Technical review of salinity and nitrate water quality criteria and recommendations to protect stock watering;
- ✓ Technical review of salinity and nitrate issues relating to studies by the City of Dixon, City of Davis, City of Live Oak and others;
- ✓ Technical support for development of a site-specific boron objective for City of Dixon
- ✓ June 2012 and December 2013 Central Valley Water Board Workshop;
- ✓ Co-sponsor of and participant in the Groundwater Resources Association Salinity and Nitrate June 2012 Conference in Fresno;
- ✓ International Salinity Expert Panel convened in Riverside(June 2014)
- ✓ Draft revised Chapter 19 (Salt and Salinity Management) for the California Water Plan; and,
- ✓ Coordination, oversight and cost share of case studies identified below.

Contract Supported:

- ✓ Updated Strategic Framework and Workplan (February 2012);
- ✓ Salinity water quality criteria review for aquatic life (January 2014);
- ✓ White paper on salinity and nitrate impacts on municipal and domestic supply (MUN) (August 2012);
- ✓ White paper on salinity impacts on irrigated agriculture (August 2012);
- ✓ GIS database and beneficial use maps for the Central Valley and Delta (coordinated with State Water Board effort) (October 2013);
- ✓ Initial salinity/nitrate conceptual model (ICM) compiled data; source/fate; initial background and trend analysis for 22 analysis zones (December 2013);

- ✓ Phase 1 of the Strategic Salt Accumulation Land and Transport Study (SSALTS) implementation alternatives study completed (December 2013);
- ✓ Central Valley Salinity brochure available at:
- ✓ http://cvsalinity.org/index.php/document-listing/doc_download/984-salt-story-brochure;
- ✓ Improved functionality of the CV-SALTS website;
- ✓ Four California Environmental Quality Act (CEQA) Scoping meetings were held during October 2013;
- ✓ Phase 1 of the Management zone based evaluation of appropriate salinity water quality objectives to protect irrigated agriculture (April 2014), Phase II is not currently scheduled; and,
- ✓ SSALTS Phase 2: Development of a range of salt disposal/treatment alternatives for in-valley, out-of-valley, and combination salt management strategies (September 2014).

In Progress:

- ✓ Phase II Conceptual Model: Updated CV-SALTS project database, develop calculation methods for background water quality and determination of available assimilative capacity in groundwater; focused management zone study; development of preliminary draft SNMP that incorporates outcomes of completed technical studies;
- ✓ SSALTS Phase 3: Develop salt management implementation measures and a phased implementation strategy for inclusion in the SNMP; and
- ✓ Case studies to ground-truth policy and implementation recommendations:
 - Appropriate application and protection of municipal and domestic supply in agriculturally dominated surface water bodies (Publicly Owned Treatment Works receiving waters in the Sacramento River Basin);
 - Appropriate application and protection of municipal and domestic supply and agricultural beneficial uses in a portion of the unconfined aquifer within the Tulare Lake Bed;
 - Lower San Joaquin River salinity and boron water quality objectives and implementation program; and
 - Planning and coordination for early implementation project to provide safe drinking water for disadvantaged community.

A Summary of Technical Projects Supporting a Central Valley-wide Salt and Nitrate Management Plan is included as Attachment A to provide additional information on the various projects.

Additional discussion of CV-SALTS activities is provided below.

During 2014, the Executive Committee continued working on the technical and policy elements of the workplan. The strategy envisions an overarching framework to provide consistency throughout the Central Valley with case studies conducted to ground-truth policy and technical recommendations. Therefore, significant work was completed on refining and expanding the Conceptual Model that identified source and fate as well as current and trending concentration of salt and nitrate, in order to support preparation of the Salt/Nitrate Management Plan (SNMP). Phase 2 of this project builds off the findings of the Initial Conceptual Model which was a high level review of overall source and fate of salinity and nitrate in the Central Valley. Scope of work elements for Phase 2 include targeted refinements to the project database, development of salt and nitrate data

analysis methods to support regulatory decisions, implementation of an archetype or pilot analysis to evaluate salt and/or nitrate management options at a management zone scale, and preparation of the first drafts of the technical elements of the SNMP.

Phases 1 and 2 of the Strategic Salt Accumulation Land and Transportation Study (SSALTS) that evaluates alternative salt containment and disposal options were completed. Project reports on Phase 1, which focused on an evaluation of current salt disposal/treatment practices at selected study areas and Phase 2, which concentrates on the development of potential future salt disposal and treatment alternatives for the Central Valley was completed in 2014. SSALTS Phase 3 is developing salt management implementation measures and a phased implementation strategy (based on the findings of Phases 1 and 2) for consideration by CV-SALTS for inclusion in the SNMP. This project is nearing completion at the time of this Annual Report. In addition, specific case studies are ongoing with contributions from the stakeholders that evaluate: (a) appropriate application and reasonable protection of Municipal and Domestic Supply beneficial uses in surface water (Sacramento Valley POTW receiving waters); (b) appropriate application and reasonable protection of the Municipal and Domestic Supply and Agricultural beneficial uses in Tulare Lake Bed groundwater; and (c) appropriate salt and boron water quality objectives to protect beneficial uses and implementation alternatives (the Lower San Joaquin River).

As the technical efforts and case studies proceeded, the Executive Committee continued focused policy discussions in several areas. Listed below are policy issues that are complete or near final in their development and those where policy discussions have already been initiated but are still ongoing: Over the next six months the Executive Committee will develop consensus recommendations for the “Near Final” issues listed below. These recommendations will be used to support development of the draft SNMP.

Near Final

- ✓ Potential establishment of a “Limited-AGR” Use for high salinity groundwaters
- ✓ Clarify application of Secondary MCLs to protect MUN
- ✓ Establishment of a procedure to translate narrative salinity objectives when developing WDRs for AGR uses
- ✓ Principles for calculating background water quality and assimilative capacity
- ✓ Management Zone Concept
- ✓ Potential alternative compliance strategies (alternate water supplies, offsets, etc.)
- ✓ Description of existing regulations and policies that determine salt and nitrate management—benefits and limitations
- ✓ Identification of factors to be considered when evaluating Best Practicable Treatment or Control (BPTC), Best Management Practices (BMPs), and “best efforts”
- ✓ Maximum benefit guidance

Ongoing

- Consider development of a “Limited-MUN” Use
- Revision of narrative objective for “General Constituents” to be consistent with a narrative translator approach
- Potential revision of salinity objectives for livestock watering

- Further delineation of surface water bodies and/or groundwater basins to increase regulatory flexibility and facilitate management zone implementation
- Identification of acceptable methods to characterize trends in assimilative capacity and assess effect of discharge on available assimilative capacity
- Establishing authorities to support pollutant trading and offset programs and long-term compliance schedules in groundwaters
- Integrate SNMP with other state policies to facilitate conservation, stormwater harvesting, recycled water reuse, groundwater recharge and drought management

The group continues to closely coordinate with work being conducted by stakeholders in the Tulare Lake Basin to identify safe drinking water pilot projects. The Alta Irrigation District is participating in the development of a pilot archetype to address Disadvantaged Communities and Nitrate issues.

The first of annual Central Valley Water Board workshops on the initiative was conducted in June 2012, with discussion of state resources spent to date, match contribution by participating stakeholders, products produced, updated project timeline and focus on the developing case studies and how they fit into the broader valley-wide framework. The Central Valley Water Board heard an informational item on policy discussions in July 2013, and held another workshop in December 2013, to receive an update on CV-SALTS and approved a resolution to extend the end date of the project by two years to May 2016.

The various committees completed additional key tasks as noted below.

During 2014, the Lower San Joaquin River (LSJR) Committee and its subcontractors reviewed salinity criteria and guidelines identified in previous Beneficial Use Source studies commissioned by CV-SALTS. The reviews included water quality criteria for the protection of municipal drinking water, irrigation supply water, stock watering, and aquatic life. In addition, the LSJR Committee and subcontractors identified almonds as the most sensitive crop grown in the LSJR basin based on guidelines recommended by the CV-SALTS Executive Committee. Through the use of the Hoffman model (Hoffman, G. J. 2010. Salt Tolerance of Crops in the Southern Sacramento-San Joaquin Delta), an EC range of 1.01 to 1.55 micro Siemens per centimeter ($\mu\text{S}/\text{cm}$) was identified for consideration of salinity WQO for the LSJR. The LSJR Committee is in the process of comparing potential objectives with historical water quality data and modeled salt loading anticipated in the future under various implementation alternatives.

Based on the Committee timeline, a Basin Plan Amendment proposing salt and boron water quality objectives and an implementation program for the LSJR is planned for Board consideration in April 2016.

The Technical Committee continues to provide technical review of CV-SALTS work products and technical recommendations where appropriate to support policy discussions. For example, the Technical Committee has previously provided technical recommendations to the Central Valley Water Board NPDES and WDR Program Managers on the use of various models (e.g. Hoffman and Grattan) to calculate site specific electrical conductivity objectives for the protection of irrigated agriculture, based on reviews of the cities of Dixon, Live Oak, Roseville, Manteca, Colusa, and Vacaville.

The recommendations included default leaching fractions and comparison of key model inputs. The committee also highlighted and deferred to the Executive Committee key policy recommendations including:

- Reasonable yield protections;
- Special considerations during seasons or under drought conditions;
- Selection of most sensitive crop within an area; and
- Role of management and grower input in determining appropriate objectives.

In addition, to providing periodic updates on technical issues related to salt and nitrate management, in 2014 the Technical Committee provided critical support to CV-SALTS in the following key areas:

- Site-specific Boron water quality objective for Dixon – The Technical Committee reviewed the technical report prepared to support a boron site-specific objective to protect the agricultural groundwater supply use in the City of Dixon area. The Technical Committee provided recommendations to Central Valley Water Board staff for consideration during development of the City's discharge permit.
- SSALTS – The Technical Committee reviewed and commented on drafts of the Phase 1 and 2 SSALTS reports.

The Technical Committee oversaw projects evaluating current salinity criteria utilized to protect stock watering, current criteria to protect aquatic life, and the majority of the projects listed in Attachment A.

The Funding and Fundraising Committee continued work on its two phase plan for fundraising. Phase 1 continues the addition of members to the CVSC to support ongoing planning efforts and the development of matching funding for the planning efforts. During 2013, two new members joined bringing the total membership to 28, covering most of the irrigated agriculture within the Central Valley in addition to representatives for most of the urban areas, food processors, and dairy industry, with some representation from water supply entities and other industry. In addition to new members, CVSC also received more than \$60,000 in project specific contributions. CVSC members also agreed to significantly increase their annual dues to support the critical project being undertaken in CV-SALTS.

Phase 2 of the funding plan, targets grant support of salinity management and nitrate projects, which has resulted in USDA funding of a specialty crop grant for nitrogen management. Although current efforts have focused on funding within existing programs, the group continues to evaluate opportunities to develop new funding programs for salt and nitrate management.

Support for CVSC Members and CV-SALTS participants in securing grants from existing programs at the State and federal levels will continue as will efforts to engage the help of legislators and agencies to develop new funding sources for the implementation plan that will be required for CV-SALTS. CVSC Funding committee did not identify workable new funding areas in 2014, but expects to develop federal and other strategies in 2015 for implementation.

The main CV-SALTS webpage was updated to clarify content and improve usability in 2013. Through 2014 updates and website maintenance has continued. The site is located at: <http://cvsalinity.org>

To support and provide consistency for the stakeholder driven effort, the Executive Committee hired full-time program coordinators. An Administrative Program Coordinator was hired in January 2011, to facilitate policy meetings, update the existing workplan and initiate contracts for the needed technical work. A Technical Project Manager was hired in September 2011 and replaced in August 2012; to insure technical information needed to support the initiative and a final basin plan amendment are completed on time and on budget. In summer 2014 the CVSC began to fund the Administrative Program Coordinator and the Technical Project Manager.

Timeline for Completion of Work

In early 2012, the Executive Committee updated the existing scope and timeline of the project so that the updated workplan better reflects resource and time constraints. The development of a draft Central Valley Salt and Nitrate Management Plan for review by the Central Valley Water Board was slated for May 2014, with ultimate project completion in May 2016. The revised timeline provides additional time for detailed environmental and economic review of the alternatives identified and is consistent with requirements of the State Water Board's Recycled Water Policy.

On December 6, 2013, the Regional Water Board approved an extension to the Schedule for CV-SALTS through Resolution R5 2013-0149. The updated timeline includes the following activities:

January 2015 – May 2015

- ✓ Complete Phase 2 Conceptual Model
- ✓ Initiate development of Monitoring & Surveillance Plan
- ✓ Initiate development of antidegradation analysis to support SNMP preparation
- ✓ Sacramento Valley Ag Dominated Surface Water MUN Evaluation Archetype
- ✓ Continue work on archetypes and evaluation of implementation alternatives
- ✓ Refine and identify additional management alternatives
- ✓ Initiate economic review of alternatives
- ✓ Initiate CEQA Equivalent Documentation
- ✓ Tulare Lake Bed Groundwater MUN Evaluation Archetype
- ✓ Informational Central Valley Water Board Workshop
- ✓ Policy discussions:
 - Potential establishment of a "Limited-AGR" Use for high salinity groundwaters
 - Establishment of a procedure to translate narrative salinity objectives when developing WDRs for AGR uses
 - Clarify application of Secondary MCLs to protect MUN
 - Potential revision of salinity objectives for livestock watering
 - Revision of narrative objective for "General Constituents" to be consistent with a narrative translator approach

- Integrate SNMP with other state policies to facilitate conservation, stormwater harvesting, recycled water reuse, groundwater recharge and drought management
- Identification of factors to be considered when evaluating Best Practicable Treatment or Control (BPTC), Best Management Practices (BMPs), and “best efforts”
- Maximum benefit guidance

June 2015 – December 2015

- ✓ Continue economic review of alternatives
- ✓ Continue CEQA Equivalent Documentation
- ✓ Lower San Joaquin River Salt and Boron Water Quality Objectives
- ✓ Prepare SNMP
- ✓ Policy Discussions
 - Consider development of a “Limited-MUN” Use
 - Identification of acceptable methods to characterize trends in assimilative capacity and assess effect of discharge on available assimilative capacity
 - Establishing authorities to support pollutant trading and offset programs and long-term compliance schedules in groundwaters

January 2016 – May 2016

- ✓ Submit Central Valley Salt and Nitrate Management Plan for Central Valley Water Board review

Annual updates to the State Water Board and annual workshops for the Central Valley Water Board are included within the workplan to evaluate progress and keep the public apprised of activities. Figure 2 provides a brief summary of the overall project timeline, while Figure 3 provides a more detailed timeline for the technical projects.

In order to meet the activities and timelines identified above and in Figures 2 and 3, a contract extension of the existing CAA funding to 2016 is needed. The CAA contract time extension is currently with the Department of Administrative Services for review.

CAA Funding	Resolution 2009-0023 (\$1.2-mil)					Total
	Obligated	Expended	Remaining	Projected FY14/15	Projected FY 15/16	
SJVDA Contract #09-076-150 (\$1.2-million)						
a. SJVDA Mgt. Services	\$82,262	\$80,061	\$2,201	\$2,201		\$82,262
b. BUOS Phase I	\$49,982	\$49,982				\$49,982
c. Program Mgt/Facilitation	\$742,756	\$742,747	\$9	\$9		\$742,756
<input type="checkbox"/> Strategy/Framework/Workplan Feb 2012						
<input type="checkbox"/> Facilitation of Policy Discussions						
<input type="checkbox"/> Outreach (website, brochure, workshops)						
d. Technical Support						
• Technical Project Management	\$111,915	\$111,915	\$0			\$111,915
<input type="checkbox"/> Framing Conceptual Model; finalize Salt Source guidance; Initial budget reviews						
• Long Term LSJR Committee Manager	\$213,085	\$128,319	\$84,766	\$84,766		
Total :	\$1,200,000	\$1,113,024	\$86,976	\$86,976	\$0	\$1,200,000
Percent of \$1.2-million:	100%	93%	7%	100%	0%	100%

*Work Products

Percent of Remaining

CAA Funding	Resolution 2010-0042 (\$3.8-mil)					Total
	Obligated	Expended	Allocated	Projected FY14/15	Projected FY 15/16	
SJVDA Contract #11-123-555 (\$3.8-million)						
a-1. SJVDA Mgt. Services	\$176,500	\$78,979	\$97,521	\$73,141	\$24,380	\$176,500
b. Technical Support						
• Technical Project Manager	\$296,098	\$296,086	\$12	\$12		\$296,086
*Scopes of work: Concept Model; BUOS II; AGR Zone; Groundwater MUN; LSJR wkpln						
• Basin Planning Support	\$104,789	\$104,776	\$13	\$13		\$104,776
<input type="checkbox"/> White Paper-Salinity Effects on MUN-Related Uses of Water						
<input type="checkbox"/> White Paper-Salinity Effects on AGR-Related Uses of Water						
• Interim LSJR Committee Manager	\$50,000	\$31,413	\$18,587	\$18,587		\$31,413
• LSJR Committee Manager contract (unallocated)	\$65,615		\$65,615	\$65,615		\$65,615
*Final wkpln; problem statement; background; beneficial use review; RFQ for technical work						
c. Refine BUOS Phase II						
• Additional GIS Work	\$100,004	\$98,630	\$1,374	\$1,374		\$98,630
d. Conceptual Model (Three Phases)						
• Initial Conceptual Model Phase 1	\$473,864	\$472,007	\$1,857	\$1,857		\$472,007
Additional Data Support	\$22,000	\$22,000	\$0			\$22,000
e. Technical Studies						
<input type="checkbox"/> Aquatic Life Criteria Review	\$31,500	\$31,150	\$350	\$350		\$31,150
<input type="checkbox"/> Tulare Lake Bed GW MUN Archetype	\$100,000	\$0	\$100,000	\$100,000		\$100,000
<input type="checkbox"/> MUN POTW Archetype	\$199,868	\$19,087	\$180,781	\$180,781		\$199,868
<input type="checkbox"/> MUN POTW Water Analysis	\$60,000	\$43,535	\$16,465	\$16,465		\$43,535
<input type="checkbox"/> AGR Water Quality Zones	\$120,000	\$119,897	\$103	\$103		\$119,897
<input type="checkbox"/> Strategic Salt Accumulation Land and Transportation Study (SSALTS)	\$345,000	\$327,288	\$17,712	\$17,712		\$345,000
a-2. SJVDA Mgt. Services allocation 2	\$142,500	\$0	\$142,500	\$71,250	\$71,250	\$142,500
f. Technical Studies						
• Conceptual Model Phase 2:SNMP	\$550,000	\$119,007	\$430,993	\$344,794	\$86,199	\$550,000
* Work Plan	\$25,000	\$24,995	\$5	\$5		\$25,000
*Assess sustainable salt/nitrate balanced						
*ID large scale MP's for evaluation						
*Incorporate Changes to BUs and WQOs from Archetypes						
*Prepare CV SNMP Assessment						
*Review and Prepare SNMP Document						
• Conceptual Model Phase 3:refine SNMP			\$471,026	\$376,821	\$94,205	\$471,026
*Incorporate regional SNMP Info in Conceptual Model						
*Conduct Economic Analyses						
*Perform Antidegradation Analysis						
• Completion SSALTS Implementation Study			\$100,000	\$100,000		\$100,000
g. CEQA Documentation			\$300,000	\$60,000	\$240,000	\$300,000
h. CV SNMP			\$104,997	\$52,499	\$52,499	\$104,997
Total	\$2,862,738	\$1,788,850	\$2,049,911	\$1,481,378	\$568,533	\$3,800,000
Percent of 3.8 million:	75%	47%	54%	72%	28%	100%

Percent of Remaining

Obligated = subcontract approved and/or in progress

Table 2 CV-SALTS Stakeholder Contributions: 2008 - 2014 with Projections

As of 11/1/14

Stakeholder Contributions	Calendar Year						Projected 2015-16 **	Projected Total
	2008-2009	2010	2011	2012	2013	2014		
Contracted by CVSC								
Project Support	\$228,491	\$206,942	\$120,000	\$48,000	\$220,000	\$275,000	\$1,308,150	\$2,406,583
Technical Studies								
a. Salt Source Pilot Study	\$170,228	\$100,000	\$100,000	\$68,896				\$439,124
b. LWA Consultant Contribution		\$55,588						\$55,588
Subtotal:	\$398,719	\$362,530	\$220,000	\$116,896	\$220,000	\$275,000	\$1,308,150	\$2,901,295
Specific Stakeholder Funded Projects								
Stock Watering Study				\$29,000				\$29,000
Ag Zone Water Quality Mapping								\$0
Tulare Groundwater Archetype				\$50,000	\$100,000	\$10,000	\$80,000	\$240,000
MUN POTW Archetype						\$33,000	\$80,000	\$113,000
Subtotal:	\$0	\$0	\$0	\$79,000	\$100,000	\$43,000	\$160,000	\$382,000
Treatment Alternatives								\$8,465,542
Support for Basin Planning Activities								\$3,400,386
Gathering Water Quality Information								\$6,204,328
Implementation Activities to Manage Salt and Nitrate								\$40,720,390
Ongoing Agency Efforts That Parallel and are Linked to CV-SALTS								\$13,200,000
Subtotal:	\$7,446,869	\$7,615,611	\$11,660,307	\$14,032,770	\$9,275,709	\$5,283,895	\$0	\$55,315,162
Total:	\$7,845,588	\$7,978,141	\$11,880,307	\$14,149,666	\$9,495,709	\$5,558,895	\$1,308,150	\$58,216,457

* Project details included in Table 4, Summary of Stakeholder Contributions

** Projected totals based on past efforts not agency commitments

Ongoing multi-year projects may be averaged over years presented

Costs above do not include efforts required by RWQCB Permits

Table 3 CV-SALTS Annual Resources: Available Funding, Expenditures & Projections

Annual	Year						
	2009	2010	2011	2012	2013	2014	2015 +**
CVSC	\$398,719	\$362,530	\$220,000	\$116,896	\$220,000	\$275,000	\$1,308,150
Other Stakeholder*	\$307,604	\$511,611	\$4,556,307	\$2,415,164	\$4,538,209	\$546,395	\$0
CAA Expended	\$0	\$63,706	\$389,129	\$930,774	\$1,076,543	\$441,722	
CAA Projected							\$ 2,098,126
Expended To Date	\$706,323	\$937,847	\$5,165,436	\$3,462,834	\$5,834,752	\$1,263,117	\$3,406,276
Cumulative	2009	2010	2011	2012	2013	2014	2015 +**
CVSC Funds	\$398,719	\$761,249	\$981,249	\$1,098,145	\$1,421,249	\$1,593,145	\$2,502,576
Other Stakeholder*	\$307,604	\$819,216	\$5,375,523	\$7,790,687	\$12,328,896	\$12,875,291	\$12,567,687
Total Stakeholder Expenditures	\$706,323	\$1,580,465	\$6,356,772	\$8,888,832	\$13,750,145	\$14,468,436	\$15,070,263
CAA Uncontracted	\$1,054,070	\$745,294	\$976,766	\$ 2,083,852	\$ 937,263	\$0.00	\$0.00
CAA Committed to Contracts	\$145,930	\$454,706	\$2,223,224	\$2,916,148	\$4,062,737	\$5,000,000	\$5,000,000
Expended To Date	\$706,323	\$1,644,171	\$6,809,607	\$10,272,441	\$16,107,193	\$17,370,310	
Projected Expenditures				10000000		\$17,500,000	\$19,800,000
% Stakeholder Expended Funds	100%	96%	93%	87%	85%	83%	76%

* Other Stakeholder expenditures for this chart do not include Implementation Costs of \$38,764,871

Costs above do not include efforts required by RWQCB Permits

** Projected

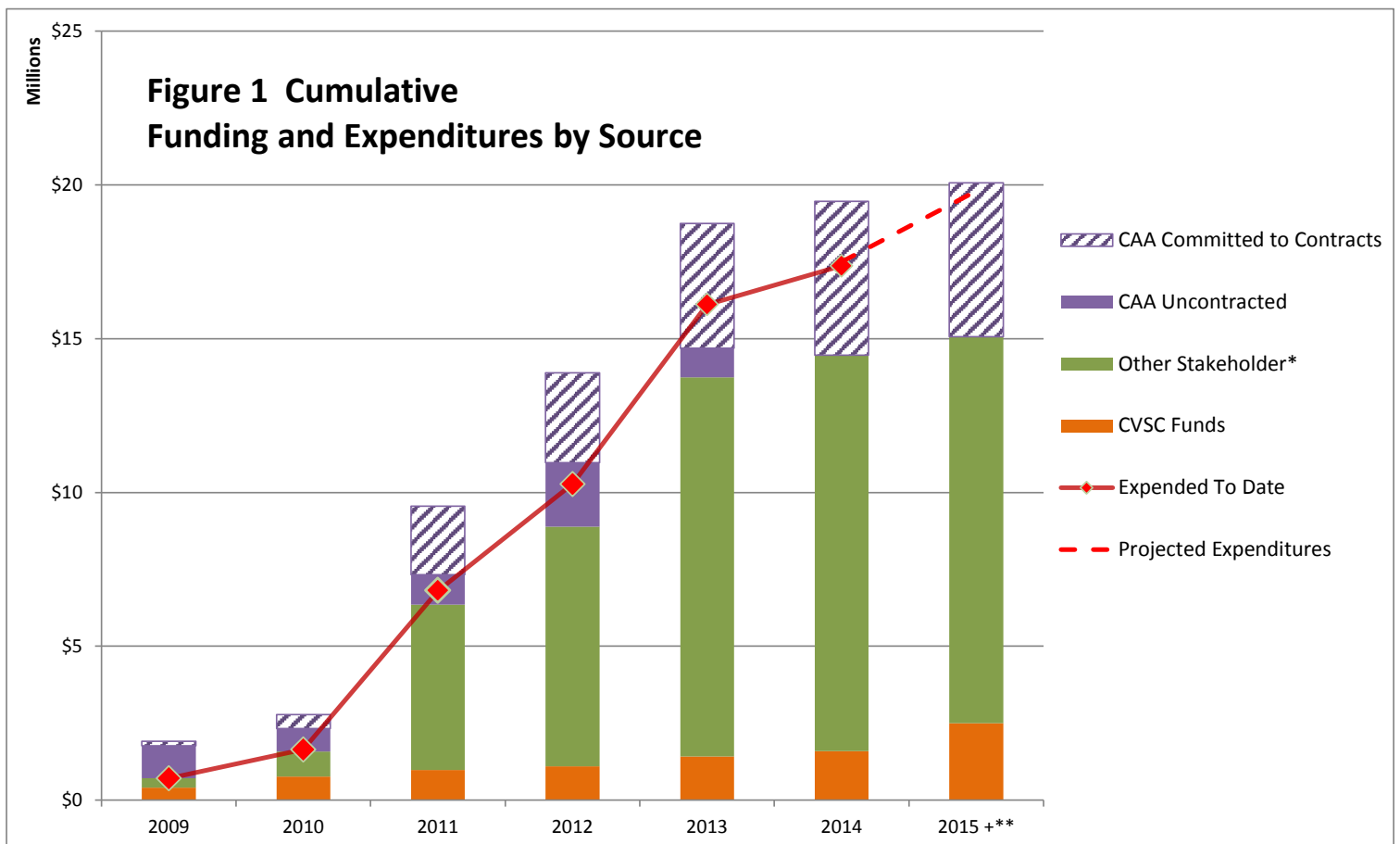


Table 4. Detailed Selected Stakeholder Contributions to Manage Central Valley Salt and Nitrate

11/5/2014

Table 4 Expands and provides further detail for the categories listed in Table 2

Type of Contribution	Agency	Project/Effort Name	Cost to Date		Total Projected 2015 +	Total Voluntary	Total All
			Voluntary	Permit Required			
Treatment Alternatives			\$7,564,913	\$206,440	\$694,189	\$8,259,102	\$8,465,542
City of Vacaville							
	Alternate Water Supply and Source Water Treatment Feasibility Cost Analysis	Alternate Water Supply and Source Water Treatment Feasibility Cost Analysis	\$62,588			\$62,588	\$62,588
	Major permitted industrial users conduct Salinity Treatment Feasibility Cost Analysis.	Determine feasibility and costs of treating major salinity waste streams, identified from Source Identification Studies, to achieve a specified reduction in salinity mass loading.	\$240,000	\$40,800		\$240,000	\$280,800
	Receiving Water Study	Characterize Receiving water follow-on work from the WQM Study		\$57,988		\$0	\$57,988
Tulare Lake Drainage District (TLDD)							
	Metropolitan Water District (MWD) Drainage Water Treatment Feasibility Study	TLDD and MWD evaluated the feasibility of using agricultural drainage water to secure additional water supplies by processing the drainage water through reverse osmosis	\$150,000			\$150,000	\$150,000
	Pearl H2O Pilot Drainage Water Treatment Trial	Engineering designed and tested a lab scale pilot that treated TLDD's drainage water utilizing an anaerobic selenium bioreactor and reverse osmosis	\$1,692,000			\$1,692,000	\$1,692,000
	Combined Solar Technologies Drainage Water Treatment Pilot	Pilot plant treating TLDD's drainage water with local bio-fuel, thermal reactors, and boilers to convert drainage water into product water and zero-liquid discharge	\$186,131			\$186,131	\$186,131
	Renewable Energy and Water Drainage Water Pilot	Evaluated the feasibility of treating TLDD's drainage water with an on-site pilot plant utilizing a polymer based resin and reverse osmosis	\$731,941			\$731,941	\$731,941
	UCLA Water Technology Research for Reverse Osmosis advances	UCLA researchers testing new class of reverse-osmosis membranes for desalination that resists the clogging from drainage water desalination.	\$350,000			\$350,000	\$350,000
	New Sky Energy Ag Water Treatment Pilot	Developing technology to treat agricultural drainage water with reverse osmosis and convert the waste concentrate into useable products	\$10,000			\$10,000	\$10,000
	Merlin Bird Radar and Deterrent Technology	Merlin tested the bird deterrent effectiveness of their radar controlled automated tracking and long range acoustical sound devise on TLDD's evaporation basins	\$30,000			\$30,000	\$30,000
	Enhanced Evaporation Trial with Large Impact Sprinklers	Tested the effectiveness of enhancing evaporation over an evaporation basin cell utilizing large volume impact sprinkler heads	\$115,000			\$115,000	\$115,000
	Spray Field (Enhanced Evaporation) Pilot Trial with Small Micron Nozzles (1 Acre)	Testing the effectiveness of "enhanced evaporation" over ponded water in a basin cell employing closely spaced small micron spray heads for drainage water disposal	\$1,200,000		\$500,000	\$1,700,000	\$1,700,000
Sac Regional CSD							

Table 4. Detailed Selected Stakeholder Contributions to Manage Central Valley Salt and Nitrate

11/5/2014

Table 4 Expands and provides further detail for the categories listed in Table 2

Type of Contribution	Agency	Project/Effort Name	Cost to Date		Total Projected 2015 +	Total Voluntary	Total All
			Voluntary	Permit Required			
			Contributes to CV-SALTS by:				
Salinity Minimization Plan		Sac Regional has completed a Salinity Minimization Plan under their NPDES Permit to manage salts identifying salt sources for CV-SALTS.		\$63,064		\$0	\$63,064
Source Evaluation Study		Analyzing salinity in the metropolitan Sacramento Area		\$44,588		\$0	\$44,588
Facilities and Staff Support for CV-SALTS		Meeting Location and support service provided for three plus years.	\$100,000		\$20,000	\$120,000	\$120,000
Central Valley Clean Water Association							
Salinity Toolbox for POTWs		CV-SALTS, POTWs, and RWB staff with effective management tools to control salts at POTWs. The toolbox will be vetted through CV-SALTS and streamline future efforts by all parties involved.	\$44,050			\$44,050	\$44,050
Food Processors/Wine							
Low Salt Peeling Research and Development (FREP Grant)		Implementation study by UC and CSU facilities under FREP into the source reduction options for food processing by low salt or steam peeling while maintaining product quality.	\$900,000			\$900,000	\$900,000
Wine Institute							
Land application Study for Wineries		Improving land application practices for wineries and reducing nitrate and salt contributions	\$1,050,000			\$1,050,000	\$1,050,000
Salinity and Energy Reduction Manual		Reducing Salt Contribution in process water discharges and energy reduction across the organizations in Central Valley.	\$250,000			\$250,000	\$250,000
Coalition Urban Rural Environmental Stewardship (CURES)							
Cost Efficient Nitrate BMP Development for Irrigated Agriculture (FREP Grant)		Study, identify, and pilot test methods for measuring movement of nitrates beyond the root zone of irrigated crops by a nutrient management plans via Specialty Crop Block Grant.	\$174,189		\$174,189	\$348,378	\$348,378
Dairy Cares/Western United Dairymen							
Animal Waste Pond Studies		2007 and 2012 studies reviewed literature on pond performance as salinity and nutrient sources to groundwater and recommendation pond characterization method	\$279,014			\$279,014	\$279,014
Support for Basin Planning Activities			\$1,953,500	\$13,886	\$1,433,000	\$3,386,500	\$3,400,386
City of Vacaville							
General Salinity Public Education and Outreach		To increase awareness of salinity impacts to the wastewater treatment plant effluent and environment.		\$13,886		\$0	\$13,886
Central Valley Clean Water Association							
Variance Basin Plan Amendment Assistance		Provides the regulatory option while CV-SALTS is developed to participate in CV-SALTS and ultimate long term solutions rather than immediate low benefit projects.	\$129,744			\$129,744	\$129,744
CV-SALTS Committee and Engagement Support		Supports CV-SALTS and CVCWA Members by engagement on work of CV-SALTS meetings, committees, for technical & regulatory support towards a long-term sustainable solution.	\$53,200		\$50,000	\$103,200	\$103,200
Central Valley Salinity Coalition							

Table 4. Detailed Selected Stakeholder Contributions to Manage Central Valley Salt and Nitrate

11/5/2014

Table 4 Expands and provides further detail for the categories listed in Table 2

Type of Contribution	Agency	Project/Effort Name	Cost to Date		Total Projected 2015 +	Total Voluntary	Total All
			Voluntary	Permit Required			
		Contributes to CV-SALTS by:					
Support for Administration Facilitation		CVSC provides support for CV-SALTS Committees, Committee meetings, website, logistics and for Coalition Building supporting SNMP. Providing support for TAC Chair and specialty consultants.	\$1,082,844		\$1,308,000	\$2,390,844	\$2,390,844
Pilot Salt and Nutrient Source Identification Study		The Salinity Coalition funded and managed study as a predecessor to SNMP, covering approximately 10% of the Central Valley. The consultants performed work in addition to the scope paid	\$519,712			\$519,712	\$519,712
Dairy Cares/Western United Dairymen							
Stock Water Quality Criteria Study (FREP Grant)		Study to document the water quality criteria of stock animals for salt and nitrates to support CV-SALTS standard setting processes and planning	\$29,000			\$29,000	\$29,000
Tulare Lake Drainage District							
Committee Chair Support		Tulare Lake interests authorized a consultant familiar with the Central Valley needs and Ag interests to participate in CV-SALTS as the TAC Chair.	\$50,000		\$25,000	\$75,000	\$75,000
California Rice Commission							
Consultant Participation and Support		Agricultural Coalitions and interested funded consultants to participate on their behalf in CV-SALTS committees and assist in outreach development and in meetings.	\$54,000		\$50,000	\$104,000	\$104,000
City of Dixon							
Committee Chair Support		The City of Dixon authorized a consultant familiar with the Central Valley needs and wastewater issues to participate in CV-SALTS as the Education and Outreach Chair.	\$35,000			\$35,000	\$35,000
Gathering Water Quality Information			\$3,173,000	\$2,803,121	\$228,207	\$3,401,207	\$6,204,328
City of Vacaville							
Household Self Regenerating Water Softener Study		Determines contribution of salinity, if any, from residential water softeners relative to baseline levels from homes without water softeners.		\$61,391		\$0	\$61,391
Conduct Electrical Conductivity Monitoring in Sanitary Sewer System		Quantify contribution of salinity from sanitary sewer service areas based on continuous measurement of electrical conductivity.		\$28,678		\$0	\$28,678
Conduct Citywide Water Softener Survey		To obtain an estimate of the number, location, age, type, and status of water softeners installed at residential, commercial, and industrial addresses.		\$37,886		\$0	\$37,886
Industrial User Monitoring of Source Water and Wastewater		Determine maximum salinity mass loading reduction by determining change in salinity from source water to wastewater.		\$17,856		\$0	\$17,856
Major industrial users conduct Salinity Source Identification Studies		To quantify salinity sources of various waste streams generated within major industrial permitted industries.		\$120,000		\$0	\$120,000
US Bureau of Reclamation							

Table 4. Detailed Selected Stakeholder Contributions to Manage Central Valley Salt and Nitrate

11/5/2014

Table 4 Expands and provides further detail for the categories listed in Table 2

Type of Contribution		Cost to Date		Total Projected 2015 +	Total Voluntary	Total All
		Voluntary	Permit Required			
Agency		Contributes to CV-SALTS by:				
Project/Effort Name						
West Side SJR Salt and Nutrient Source Study	Provides information on the sources of salts and nitrated focused on the West side of the San Joaquin River and coordinated with data needed for CV-SALTS.	\$425,000		\$150,000	\$575,000	\$575,000
Ironhouse Sanitary District						
Salinity Management Plan	Determining sources of salinity from a 95% domestic system		\$37,310		\$0	\$37,310
EKI Consultants						
Turlock Salt Management Study	Independent Study of the Turlock basin for Salt Balance contributed to CV-SALTS.	\$50,000			\$50,000	\$50,000
LWA Team of Consultants						
Value Added ICM Report Contribution	Ensuring that the innovative work that was completed for CV-SALTS met the original scope of work and provided a solid foundation for the Phase II Conceptual Model. Costs in excess of amount billed.	\$568,000			\$568,000	\$568,000
Dairy Cares/Western United Dairymen						
Representative Monitoring Program	Conducts groundwater monitoring on 45 dairies/300 monitoring wells plus dairy operating and physical conditions to assess management practices. Provides info to CV-SALTS	\$2,130,000	\$2,500,000	\$78,207	\$2,208,207	\$4,708,207
Implementation Activities to Manage Salt and Nitrate		\$32,490,086	\$4,230,304	\$4,000,000	\$36,490,086	\$40,720,390
Grassland Area Farmers						
San Joaquin River Improvement Project	The SJRIP has many project components some of the elements that are most related to salinity management and CV-SALTS are included. Only Local districts and federal funds shown.	\$16,921,215	\$4,230,304	\$4,000,000	\$20,921,215	\$25,151,519
Grasslands Area Firebaugh Canal WD salinity reduction projects	Many projects which reduce salinity through reduction of seepage from canals which result in problematic saline waters in the environment. Only local funding share shown.	\$9,545,000			\$9,545,000	\$9,545,000
US Bureau of Reclamation						\$0
Real Time Management Studies and efforts	Research and coordination on an alternative for management of salt in the San Joaquin River to improve water quality and more efficiently use dilution waters.	\$725,000			\$725,000	\$725,000
Tulare Lake Drainage District (TLDD)						\$0
Spray Field (Enhanced Evaporation) project with Small Micron Nozzles (120) Acres	Full Scale trial project utilizing "enhanced evaporation" over ponded water in a basin cell employing closely spaced small micron spray heads for drainage water disposal	\$5,263,606			\$5,263,606	\$5,263,606
Dairy Cares/Western United Dairymen						\$0
California dairy industry-wide study of salinity sources and management practices	Study identified main salinity sources on dairies, irrigation water/feeds and identified management practices used to reduce or minimize salinity	\$35,265			\$35,265	\$35,265

Table 4. Detailed Selected Stakeholder Contributions to Manage Central Valley Salt and Nitrate

11/5/2014

Table 4 Expands and provides further detail for the categories listed in Table 2

Type of Contribution	Agency	Project/Effort Name	Cost to Date		Total Projected 2015 +	Total Voluntary	Total All
			Voluntary	Permit Required			
Ongoing Agency Efforts That Parallel and are Linked to CV-SALTS							
CA Department of Water Resources							
	Agricultural Drainage Program	Participating in the CV-SALTS program and conducting the Ag. Drainage Program which activities are compatible with the goals of the CV-SALTS.	\$11,000,000	\$0	\$2,200,000	\$13,200,000	\$13,200,000
	San Joaquin River Real-time Water Quality Monitoring	Meeting SJR water quality objectives for salinity near Vernalis and preserving high quality New Melons water while lowering salt concentrations entering the Delta.	\$9,750,000		\$1,950,000	\$11,700,000	\$11,700,000
			\$1,250,000		\$250,000	\$1,500,000	\$1,500,000
Total Voluntary Contributions, Regulatory Required and Agency Efforts:			\$56,181,499	\$7,253,751	\$8,555,396	\$64,736,895	\$71,990,646

Figure 2 - Summarized CV-SALTS Workplan Schedule

Revised 11/1/14

Draft SNMP To Regional Board →

Final SNMP →

BPA →

CV-SALTS Program Element	2011	2012	2013	2014	2015	2016	2017	2018	+
Program Management	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	
Technical Studies	Green	Green	Green	Green	Green	Green			
Archetypes/Case Studies		Green	Green	Green	Green	Green			
Groundwater MUN (Tulare)		Green	Green	Green	Green	Green			
Surface Water MUN (Sac Valley POTWs)		Green	Green	Green	Green				
Management Practice Development	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Lower San Joaquin River Salt and Boron Objectives	Blue	Blue	Blue	Blue	Blue	Blue			
Implementation Planning		Red	Red	Red	Red				
Documentation for Approval						Blue	Blue	Blue	Blue
CEQA Equivalent Documentation						Blue	Blue	Blue	Blue
BPA Documentation Process Support						Blue	Blue	Blue	Blue
Initial Implementation			Red	Red	Red	Red	Red	Red	Red
Monitoring and Reporting							Orange	Orange	Orange
Phase II SNMP								Grey	Grey

Attachment A.

Technical Projects Supporting Central Valley-wide Salt and Nitrate Management Plan

Conceptual Model Development

Salt and Nitrate Sources Pilot Implementation Study - The *Salt and Nitrate Sources Pilot Implementation Study* ("Pilot Study") was the precursor to what is now described as the development of a Conceptual Model for the Central Valley. The primary objective of the Pilot Study was to develop a methodology and provide guidance for development of the Salt/Nutrient Management Plan for the Central Valley. Specifically, the project developed and documented methods to fairly and equitably quantify salt and nitrate sources. These methods were then pilot tested in selected Central Valley areas to evaluate their appropriateness for region-wide application. Following completion of the Pilot Study, CV-SALTS developed *A Framework for Salt/Nitrate Source Identification Studies* based on the findings from the Pilot Study. Status: Project was completed in February 2010.

Initial Conceptual Model (ICM) - Development of the ICM is the first phase of a planned three-phased effort to develop the technical and regulatory basis for adoption of a Salt/Nutrient Management Plan (SNMP) for the Central Valley. The purpose of this phase is to develop a conceptual level (or 30,000 foot level) analysis of water balance and associated salt and nutrient (nitrate) conditions in the Central Valley. This effort will rely on the establishment of Initial Analysis Zones (IAZs) to complete water quantity and quality analyses within smaller areas within the valley and detailed analyses in two selected subareas of the Central Valley. The IAZs provide the foundation for the eventual establishment of salt/nutrient management zones in the Basin Plan. The outcome of the ICM project will be an assessment of salt/nitrate conditions in the Central Valley, including identification of hotspots and long term trends for salt and nitrate concentrations. Subsequent phases will refine the findings from the ICM and develop the SNMP which includes preparation of a salt/nitrate program of implementation and completion of regulatory analyses to support adoption of the SNMP into the Basin Plan. Status: Project was initiated in September 2012 and completed in December 2013.

Phase 2 Conceptual Model - Development of the Conceptual Model to support preparation of the Salt/Nitrate Management Plan (SNMP) was initiated under CV-SALTS' Initial Conceptual Model (ICM) Project (completed in December 2013). This project builds off the findings of the ICM to begin development of a draft SNMP for the Central Valley. Scope of work elements include targeted refinements to the project database, development of salt and nitrate data analysis methods to support regulatory decisions, implementation of an archetype or pilot analysis to evaluate salt and/or nitrate management options at a management zone scale, and preparation of the first drafts of the technical elements of the SNMP. Status: Project was initiated in April 2014; completion expected in early summer 2015.

Phase 3 Conceptual Model - Development of the Conceptual Model to support preparation of the Salt/Nitrate Management Plan (SNMP) was initiated under CV-SALTS' Initial Conceptual Model (ICM) Project (to be completed in October 2013) and refined under the CV-SALTS' Phase 2 Conceptual Model project. This project will build off the work completed under Phase 2 and focus on completion of regulatory-related analyses and preparation of documentation to support adoption of the SNMP into the Basin Plan. Status: Project is planned for initiation in 2015.

Data Development Projects

GIS Services - Phase 1 Beneficial Use & Objectives Study (BUOS) - CV-SALTS began data gathering and Geographic Information System (GIS) development efforts through the implementation of the Phase 1 BUOS. This project included three tasks: (a) Identification of existing and potential beneficial uses in the Central Valley which included development of GIS mapping layers showing beneficial use categories assigned to surface water and groundwaters; (b) compilation of data for use in the development of the beneficial use map layers; and (c) completion of a literature review of criteria related to salt and nutrients and protection of various beneficial uses. Status: Project was completed in September 2010.

GIS Services – Phase 2 - CV-SALTS continues to develop a Geographic Information System (GIS) to organize information pertaining to the beneficial uses, water quality objectives, water use infrastructure, and water quality of surface water and groundwater in the Central Valley. Development of this GIS supports ongoing efforts to develop a Salt/Nutrient Management Plan (SNMP) for the Central Valley by providing a centralized geodatabase for all matters pertaining to the development and implementation of the SNMP. This project builds off the CV-SALTS Phase 1 Beneficial Use Objectives Study (BUOS), which established baseline GIS-related data to support CV-SALTS. Phase 2 will update the existing geodatabase to incorporate the 2012 National Hydrography Dataset and incorporate new water infrastructure-related data, e.g., municipal surface water intakes, locations of wastewater facility discharges to surface water, agricultural water intakes, and groundwater wells. Status: Project initiated in September 2012 and completed October 2013.

GIS Services – Agricultural Zone Mapping - CV-SALTS implemented a GIS project to develop map layers of agricultural-related data to support development and implementation of water quality objectives to protect waters used for agricultural irrigation. Data layers incorporated into the CV-SALTS geodatabase included agricultural-related jurisdictional boundaries, soil characteristics, irrigation supply sources, water quality, historic and current cropping patterns, as well as other relevant data. These data layers were used to identify potential Crop Sensitivity Zones (CSZs) based on similar hydrologic and hydrogeologic conditions, cropping patterns, management practices, and other factors related to crop sensitivity to salinity. This project was originally planned to occur in two phases. Phase 1 was authorized in 2013, but Phase 2 authorization was deferred, pending the findings of the Phase 1 work. Phase 1 deliverables included (a) developing agricultural-related data and preparing appropriate GIS map layers; (b) identifying up to 25 CSZs for the Central Valley; and (c) conducting a workshop with the agricultural community to discuss project findings. The need for a second phase for this project has not yet been determined by CV-SALTS. Status: Phase 1 project was implemented February 2013 and was completed in April 2014.

Beneficial Use Designation Studies

Tulare Lake Bed MUN Archetype - As part of its effort to develop a Salt/Nutrient Management Plan (SNMP) for the Central Valley, CV-SALTS is evaluating appropriate designations and level of protection for waterbodies currently designated with the MUN beneficial use, taking into account the requirements of the California Sources of Drinking Water Policy (SDWP) (Resolution 88-63) and other environmental characteristics. Through this activity, a portion of the Tulare Lake Bed groundwater basin has been identified as an area that appears to meet the exemption

criteria set forth in the SDWP. In portions of this same area the AGR use also may not be applicable. Accordingly, CV-SALTS initiated technical studies and basin planning activities in collaboration with the Tulare Lake Drainage District to develop the required documentation to support de-designation of MUN (and possibly AGR) from a portion of groundwater body underlying the Tulare Lake Bed. The expected final outcome is a Basin Plan Amendment. In addition, the project deliverables will support development of the Central Valley SNMP by providing an archetype or template for other studies designed to evaluate the applicability of beneficial uses on a groundwater body. Status: Project initiated in September 2012; completion expected in 2015.

MUN Beneficial Use in Agriculturally Dominated Water Bodies Archetype - By way of the Sources of Drinking Water Policy (Resolution 88-63), the Central Valley Regional Water Quality Control Board Basin Plans (Basin Plans) designate MUN beneficial use to all surface and groundwater bodies unless they are specifically listed in a Basin Plan as water bodies that are not designated with MUN. Recent court findings have confirmed that to utilize exceptions identified in Resolution 88-63, for constructed and modified natural channels used to transport agricultural drainage, a basin plan amendment is required. The CV-SALTS initiative has identified the need to evaluate the appropriate designation and level of protection of MUN beneficial uses in constructed agricultural drains as well as other agriculturally dominated water bodies. The receiving waters of four POTWs in the cities of Willows, Colusa, Biggs and Live Oak are serving as archetypes or case studies for the development of a framework to evaluate the appropriate level of MUN beneficial use protection in agriculturally-dominated water bodies throughout the Central Valley. Status: Project initiated in the latter part of 2011; completion expected in 2015.

Water Quality Objectives Review

Aquatic Life Study - CV-SALTS implemented a study to identify potential water quality criteria that could be used to establish salinity-related water quality objectives to protect aquatic life in Central Valley surface waters. This study researched the following information sources to fulfill the project purpose: (a) recent literature reviews conducted by selected states to establish water quality criteria for salinity-related constituents; (b) peer-reviewed published literature; (c) data and methodologies developed by federal agencies, including U.S. Environmental Protection and Department of Interior; (d) recommendations developed by selected international agencies; and (e) any information developed by other California agencies. The final report provided technical recommendations for adoption of salinity-related water quality objectives to protect aquatic life. Status: Project initiated in December 2012; completed in January 2014.

Stock Watering Study - CV-SALTS implemented this study to identify water quality criteria that may be used to establish salinity and nitrate-related water quality objectives to protect stock watering supplies in the Central Valley. This study was completed through the completion of research on the following information sources: (a) water quality objectives established in other regions of California or in other selected states; (b) review of U.S. Environmental Protection Agency recommendations; (c) university extension publications and specialists; (d) published peer-reviewed literature; and (e) selected international agencies. The final report provides recommendations for protection of stock watering sources which will be used to support development of a Salt/Nutrient Management Plan for the Central Valley. Status: Project was initiated in January 2012; completed May 2013.

Salinity-related Effects on Agricultural Irrigation Uses - CV-SALTS completed research to define what constitutes reasonable protection of existing and probable future use of water for agricultural irrigation. This research focused on the preparation of a summary of the current state of knowledge regarding the effects of elevated salinity concentrations on crop yields, wetland plants and vegetation commonly used for landscaping. In addition, the research effort reviewed water quality objectives established in other California regions, federal recommendations developed by the U.S. Environmental Protection Agency, water quality standards adopted by other states to protect water used for irrigation, and guidelines established by selected international entities. The resulting White Paper provides a summary of the key findings along with supporting data and references to support development of a Salt/Nutrient Management Plan for the Central Valley and ensure that waters used for agricultural irrigation are appropriately protected. Status: Project was initiated in June 2012. A draft White Paper was submitted in July; a Final Draft White Paper was submitted in August 2012. A final document is in preparation.

Salinity Effects on MUN-related Uses of Water - CV-SALTS completed research to define what constitutes reasonable protection of existing and probable future MUN (Municipal and Domestic Supply) uses. This research focused on the preparation of a summary of the current state of knowledge regarding the effects of elevated salinity concentrations on drinking water supply, including human health concerns, and other domestic uses of water, including impacts of salinity on residential, commercial and industrial water-using devices. In addition, the research effort reviewed water quality objectives established in other California regions, federal recommendations developed by the U.S. Environmental Protection Agency, MUN-related water quality standards adopted by other states, and guidelines established by selected international entities. The resulting White Paper provides a summary of the key findings along with supporting data and references. CV-SALTS is using the findings of the White Paper to support development of a Salt/Nutrient Management Plan for the Central Valley and ensure that MUN-related uses of water are appropriately protected. Status: Project was initiated June 2012; draft White Paper was submitted in July 2012; Final Draft White Paper was submitted in August 2012; Document currently undergoing technical review; final White Paper will be prepared following completion of technical reviews.

Water Quality Objectives Review and Implementation Planning

Lower San Joaquin River Committee – The Lower San Joaquin River (LSJR) Committee and its subcontractors reviewed salinity criteria, guidelines, and water quality goals in previous Beneficial Use Source studies commissioned by CV-SALTS. Beneficial Uses included water quality criteria for the protection of municipal drinking water, irrigation supply water, stock watering, and aquatic life. In addition, the Committee and subcontractors identified almonds as the most sensitive crop grown in the LSJR basin. Through the use of the Hoffman model (Hoffman, G. J. 2010. Salt Tolerance of Crops in the Southern Sacramento-San Joaquin Delta), an EC range of 1.01 to 1.55 micro Siemens per centimeter ($\mu\text{S}/\text{cm}$) was identified for consideration of salinity WQO for the LSJR. The LSJR Committee is in the process of comparing potential objectives with historical water quality data and modeled salt loading anticipated in the future under various implementation alternatives. Status: Based on the Committee timeline, a Basin Plan Amendment proposing salt and boron water quality objectives and an implementation program for the LSJR is planned for Board consideration in April 2016.

Implementation Planning

The Economic Impacts of Central Valley Salinity - The purpose of this study was to measure the economic impacts of increasing salinity in the Central Valley out to the year 2030. To conduct the analysis, the project team assumed that there would be no change in current salt management policies; as such, the findings from the analysis represented the economic impacts associated with taking no action. The study was conducted on an aggregate valley-wide basis that averaged salinity effects and costs. Based on estimates of increasing levels of salinity under existing conditions, the study estimated the direct economic effects on industry, residential, food processing, confined animal operations, and irrigated agricultural production in the Central Valley using different physical and economic models. Status: Project was completed in 2009.

Strategic Salt Accumulation Land and Transport Study (SSALTS) - CV-SALTS is implementing a study to identify the range of viable Central Valley alternatives for salt disposal (taking into account regulatory, institutional, economic, and technological issues) to provide input for consideration during development of the Salt/Nutrient Management Plan (SNMP) for the Central Valley. Potential alternatives for salt disposal range from expanded use of existing salt disposal areas, establishment of new salt disposal areas within the Central Valley, export or transport of salt out of the Central Valley, or some combination of the above. The findings from this study will provide input to policymakers regarding where opportunities exist to dispose of salt over the long term in a sustainable manner. In addition, the findings will provide important input to the development of the SNMP under Phases 2 and 3 of Conceptual Model, and provide information to support development of the Basin Plan Amendment to adopt a Central Valley SNMP. Status: Project was initiated in December 2012. Phase 1, which focused on an evaluation of current salt disposal practices at selected study areas, was completed in December 2013. Phase 2, which concentrated on the development of potential future salt disposal/treatment alternatives for the Central Valley, was completed in September 2014. Phase 3 is evaluating the potential salt disposal/treatment alternatives identified in Phase 2 to develop implementation measures and a phased implementation strategy for inclusion in the SNMP. This final phase is planned for completion in the first quarter of 2015.

More Information on Projects and Current Activities at:

www.cvsalinity.org