CV-SALTS Summary Accomplishments and Next Steps

In February 2012, the stakeholder lead Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative updated its strategy and workplan for developing a Central Valley-wide Salt and Nitrate Management Plan (SNMP). The workplan identified several needed policy decisions as well as the technical work necessary to inform both the policies and potential implementation alternatives. 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. Four California Environmental Quality Act (CEQA) Scoping meetings were held during October 2013, to solicit comments on potential components of a Central Valley SNMP. Additional outreach includes annual updates to the State Water Board and annual workshops for the Central Valley Water Board.

The following section identifies completed, ongoing and upcoming activities. Figure 1, Figure 2 and Table 1, provide the overall project timeline, the activities and timeline of key technical components, and the budget for the effort, respectively. Attachment A summarizes the major technical projects.

Policy Discussions

Completed

- ✓ Application of Secondary MCLs to protect MUN
- ✓ Conceptual regulatory framework for protection of AGR
- ✓ Principles for calculating background water quality and assimilative capacity
- ✓ Management Zone Concept
- ✓ Potential alternative compliance strategies
- ✓ Description of existing regulations and policies that determine salt and nitrate management—benefits and limitations

Ongoing

- Further delineation of surface water bodies and/or groundwater basins to increase regulatory flexibility and facilitate management zone implementation
- Decision tree for interpreting narrative AGR water quality objective
- Surface water and groundwater distinctions related to protection of AGR
- Appropriate application of Sources of Drinking Water Policy (88-63)
- Water recycling and stormwater recharge/use goals and objectives
- Maximum benefit guidance
- Drought considerations

Technical Efforts

Completed

- ✓ 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;
- ✓ 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;
- ✓ 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) compiled data; source/fate; initial background and trend analysis for 22 analyses zones; and
- ✓ Phase 1 Strategic Salt Accumulation and Land Transport Study (SSALTS) characterization of existing salt management strategies.

<u>Ongoing</u>

- Management zone based evaluation of appropriate salinity water quality objectives to protect irrigated agriculture;
- Phase II Conceptual Model: refine calculations for background, assimilative capacity and trend; focused management zone study
- SSALTS Phase 2: Development of alternatives for in-valley, out-of-valley, and combination salt management strategies;
- 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 in a portion of the unconfined aquifer within the Tulare Lake Bed; and
  - Lower San Joaquin River salinity and boron water quality objectives and implementation program.

✓ <u>Upcoming</u>

- Phase III Conceptual Model: monitoring plan, preliminary draft technical SNMP; environmental and economic analysis of alternatives;
- SSALTS Phase 3: Evaluation of salt management alternative strategies developed in Phase 2;
- Early implementation project to provide safe drinking water for disadvantaged community; and
- Draft SNMP

Summarized CV-SALTS Workplan Schedule

Revised 11/1/13

Draft SNMP To Regional Board → *Final SNMP →* *BPA →*

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

Figure 2. CV-SALTS Technical Project Timeline: 2012 - 2016

Technical Area	Primary Activities	SNMP Support	2012	2013	2014	2015	2016
Conceptual Model Development	Initial Conceptual Model	• Source identification • Assimilative capacity • Loading estimates					Prepare Final SNMP
	Phase 2	• Source and loading refinement • Background water quality/ assimilative capacity calculation methods • Management zone study					
	Phase 3	• Antidegradation analysis • Monitoring plan • Economics analysis					
Data Development	GIS – Phase 2	• Baseline database					
	Agriculture Zone Mapping	• AGR implementation tools					
Beneficial Use Studies	Tulare Lake Bed MUN Archetype	• MUN implementation tools					
	MUN Beneficial Use in Agriculturally Dominated Water Bodies Archetype	• MUN implementation tools					
Water Quality Objectives	Salinity-related Effects on Agricultural Irrigation Uses	• Evaluation of science behind establishment of salinity related objectives					
	Salinity Effects on MUN-related Uses of Water						
	Stock Watering Study						
	Aquatic Life Study						
Implementation Planning	Strategic Salt Accumulation Land and Transport Study (SSALTS)	• SNMP implementation measures to manage salt on a sustainable basis					
	Post- SSALTS Implementation Planning						

Budget Table 1.
CV-SALTS Programmatic Budget, Fund Source and Contract Status
Amended Approved 7/9/13

	2012 Approved Workplan	Contracted Amount	Current Estimate	CAA Obligation	Projected Available Balance	Total Funding	CVSC Obligation	Stake holders & Grants
					$5,765,000			
SJVDA Contracts Administrative Oversight*	$0	$401,262	$401,262	$401,262	$5,363,738	$401,262		
Program Management and Development					$5,363,738	$0		
Program Mgt/Facilitation thru 2/11 to 1/13	$600,000	$667,756	$667,756	$667,756	$4,695,982	$667,756		
Program Mgt. and Facilitation (3/13 to 3/16)	$600,000	$600,000	$600,000	$0	$4,695,982	$600,000	$600,000	
Maintaining mtg minutes and website	$160,000		$110,000	$80,000	$4,615,982	$110,000	$30,000	
Prior Implementation LWA Pilot Salt Study			$585,000		$4,615,982	$585,000	$585,000	
Prior Implementation & future Outreach Efforts	$900,000		$50,000	$50,000	$4,565,982	$50,000		
Basin Planning Support	$90,000	$104,789	$104,789	$104,789	$4,461,193	$104,789		
Policy Discussions on BU and WQO 2/13 -1/15	$140,000	$75,000	$215,000	$75,000	$4,386,193	$215,000	$140,000	
Technical Project Management	$500,000		$982,713	$0	$4,386,193	$0		
EKI Technical Project Management (closed)		$111,915	$111,915	$111,915	$4,274,278	$111,915		
LSJR Interim Committee Mgr. (thru 09/2012)		$50,000	$32,000	$32,000	$4,242,278	$32,000		
CV-SALTS CDM Smith TPM thru 10/31/13		$296,098	$296,098	$296,098	$3,946,180	$296,098		
CV-SALTS CDM Smith TPM thru 10/31/15 **			$264,000	$0	$3,946,180	$264,000	$264,000	
LSJR Committee Manager*		$213,085	$278,700	$278,700	$3,667,480	$278,700		
Conceptual Model					$3,667,480			
--Phase I -approach, data, model (completed)	$200,000	$473,918	$495,918	$495,918	$3,171,562	$495,918		
Phase II ($575K)* Estimated cost and topics					$3,171,562			
--Prioritization & Refine Model from Phase 1	$150,000	$25,000	$50,000	$50,000	$3,121,562	$50,000		
--Potential Implementation Archetypes	$100,000		$150,000	$150,000	$2,971,562	$150,000		
--Background WQ Assimilative Capacity	$100,000		$125,000	$125,000	$2,846,562	$125,000		
--Effectiveness/Sustainability Demonstration	$150,000		$125,000	$125,000	$2,721,562	$125,000		
--Prepare CV SNMP Element Documentation	$200,000		$125,000	$125,000	$2,596,562	$125,000		
Phase III ($500K)* Estimated cost and topics					$2,596,562			
-- Surveillance and Implementation §13242	$100,000		$100,000	$100,000	$2,496,562	$100,000		
--Conduct Economic Analysis	$300,000		$300,000	$300,000	$2,196,562	$300,000		
--Perform Antidegradation Analysis	$125,000		$100,000	$100,000	$2,096,562	$100,000		
Technical Studies					$2,096,562			
BUOS Part I (completed)	$0	$49,982	$49,982	$49,982	$2,046,580	$49,982		
BUOS Update with GIS Layers	$50,000	$100,004	$100,004	$100,004	$1,946,576	$100,004		
Ag Water Quality Zoning Map	$100,000	$120,000	$240,000	$120,000	$1,826,576	$240,000	$55,000	$65,000
Stock Watering*	$29,000	$29,000	$29,000	$0	$1,826,576	$29,000		$29,000
Aquatic Life		$31,500	$31,500	$31,500	$1,795,076	$31,500		
Groundwater Archetype (Tulare)	$600,000	$100,000	$300,000	$100,000	$1,695,076	$300,000		$200,000
MUN POTW Archetype	$1,000,000	$300,000	$300,000	$110,000	$1,585,076	$300,000	$75,000	$115,000
--Water Quality Testing Subtask completed *		$45,099	$45,099	$45,099	$1,539,977	$45,099		***
Lower San Joaquin River Salt & Boron WQO	$765,000	$765,000	$765,000	$765,000	$774,977	$765,000		
Implementation Planning					$774,977			
SSALTS Phase 1	$335,000	$345,000	$345,000	$345,000	$429,977	$345,000		
SSALTS & Implementation Planning/Refine MA	$350,000		$100,000	$100,000	$329,977	$100,000		
Effective MP evaluation	$215,000		$348,377	$0	$329,977	$348,377		$348,377
Economically Disadvantaged Communities	$55,000				$329,977			
Documentation Basin Plan Amendment					$329,977			
CEQA Equivalent (SED) & Basin Plan Staff Report	$430,000		$400,000	$300,000	$29,977	$400,000	$100,000	
Final SNMP Documentation and changes (16/17)	$75,000		$104,977	$29,977	$0	$104,977	$75,000	
Initial Implementation (not shown here)					$0			
Potential Final Balance:	**$8,419,000**	**$4,904,408**	**$8,446,377**	**$5,765,000**	**$0**	**$8,446,377**	**$1,924,000**	**$757,377**

Notes/Legend

* *Scope/Cost Not Included in February 2012 workplan for this task*

** *TPM paid by CVSC in 2014-15*

*** *Stakeholder funding from MUN POTW participants $60K and up to $55K from CVSC member direct contributions plus up to $75K CVSC contribution*

Gray text indicated completed task or project

Area subject to future outside CV-SALTS approvals

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 with completion of all tasks expected in October 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 (to be completed in October 2013). This project will build off the findings of the ICM to begin development of a draft SNMP for the Central Valley. Work on this phase is expected to be initiated in October 2013. Scope of work elements are expected to include refinements to the analyses completed under the ICM Project, 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 is planned for initiation October 2013 with completion expected in June 2014.

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 after June 2014.

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; planned for completion in October 2013.

GIS Services – Agricultural Zone Mapping - CV-SALTS has initiated 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 to be incorporated into the CV-SALTS geodatabase include agricultural-related jurisdictional boundaries, soil characteristics, irrigation supply sources, water quality, historic and current cropping patterns, and other data as appropriate. These data layers will be 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 is currently planned to occur in two phases. Phase 1 deliverables include (a) data development and preparation of GIS map layers; (b) identification of up to 25 CSZs for the Central Valley; and (c) test of the proposed methodology to determine the applied water sensitivity threshold (AWST) in one of the CSZs. Phase 2 will be the continuation of the effort to determine AWSTs for the remaining delineated CSZs. Prior to initiation of Phase 2, the findings from Phase 1, including the proposed methodology to determine AWSTs, will be evaluated with stakeholders to ensure the procedures for defining CSZs and AWSTs are aligned with CV-SALTS policy development. Status: Project implemented February 2013; Phase 1 completion is expected in Fall 2013; Phase 2 schedule is to be determined.

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. 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 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 a MUN use on a groundwater body. Status: Project initiated in September 2012; completion expected in in fall 2014.

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 is implementing 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 is researching 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 will provide technical recommendations for adoption of salinity-related water quality objectives to protect aquatic life. Status: Project initiated in December 2012; completion expected in Fall 2013

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 LSJR Committee was established in 2010 as a subcommittee of the CV-SALTS Initiative. Operating as a subcommittee of the CV-SALTS Executive Committee, the LSJR Committee is developing recommendations for updated salt and boron objectives, and an implementation plan to support those objectives. Members of the committee are stakeholders in the LSJR Watershed with an interest in the management of salt. Committee members represent municipalities, irrigated agriculture, food processors, irrigation districts, and state and federal agencies. The committee has completed a review of beneficial uses for the portion of the LSJR between the Merced River and Vernalis and is currently evaluating alternative water quality objectives that would be protective of municipal and domestic supply, irrigated agriculture, stock watering and aquatic life. The current workplan anticipates a proposed Basin Plan Amendment during 2015.

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. Phases 1, 2 and 3 of the SSALTS Project are expected to be complete in October 2013, January 2013, and May 2014, respectively.

More Information on Projects and Current Activities at:

www.cvsalinity.org