

## Objectives

Kennedy/Jenks participates in CV-SALTS technical advisory committee and at the executive committee level. We understand the goal of the CV-SALTS initiative, to address salinity, including nitrates, throughout the region in a comprehensive, consistent and sustainable manner. CV-SALTS has a clear road map to develop a comprehensive Central Valley Salinity Management Plan. Part of the process is a literature review for water quality criteria relating to beneficial uses to establish a range of potential objectives. To reach this end, gathering literature, policies, and scientific support for current water quality objectives related to the conditions in the Central Valley is key for success. Kennedy/Jenks will provide review of basin plans, state, national, and international policy review related to salt and nutrients as well as oversight of project and production of final product and collaborating with The CV-SALTS Technical Working Group on specific issues. As the literature related to water quality criteria, the beneficial uses of WILD, BIOL, COLD, and WARM, and livestock drinking water are collected into a single repository, the team can move forward to analyze and evaluate the data, to recommend a range of water quality objectives for salinity and nitrate for protection of water bodies.

## Scope of Work

The purpose of this project is to develop a range of criteria that is applicable to the Central Valley for the beneficial uses of wildlife habitat (WILD), cold freshwater habitat (COLD), warm fresh water habitat (WARM), the preservation of biological habitats of special significance (BIOL), and agricultural supply (AGR). The data and literature will describe total dissolved solids (TDS), specific conductance (EC), sodium (Na), chloride (Cl), sulfate (SO<sub>4</sub>), calcium (Ca), magnesium (Mg), Boron (B), nitrogen species and phosphorus species where the literature is available.

### **Definition of Beneficial Uses Requested in the RFP**

Beneficial Use	Description
Wildlife Habitat (WILD)	Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.
Warm Freshwater Habitat (WARM)	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Cold Freshwater Habitat (COLD)	Uses of water that support cold water ecosystems, including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Preservation of Biological Habitats of Special Significance. (BIOL)	Uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves.
Agricultural Supply (AGR)	Uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

## **PROJECT 2: EVALUATION OF ANIMAL DRINKING WATER QUALITY CRITERIA FOR SALINITY AND BORON**

The purpose of this project is to develop a range of criteria that is applicable to the Central Valley for livestock drinking water which is represented as one element of the Agricultural Supply (AGR) beneficial use. The data and literature will describe total dissolved solids (TDS), specific conductance (EC), sodium (Na), chloride (Cl), sulfate (SO<sub>4</sub>), calcium (Ca), magnesium (Mg), Boron (B), nitrogen species and phosphorus species where the literature is available. As noted in the RFP, criteria for molybdenum, which has been developed by the CVRWQCB will be excluded from this analysis.

### **Task 1: Review CRWB Basin Plans and Policies**

The focus of this task is to describe the water quality criteria for livestock drinking water which represents one description within the AGR beneficial use from the nine Regional Water Boards. Numerical and narrative objectives will be reported in a tabular format for each on the nine boards. Information on narrative objectives that have been translated into numerical objectives through site specific assessments will be described and the documentation referenced as described in task 7. A maximum of three of the most applicable narrative translations will be briefly described and Kennedy/Jenks will work collaboratively with RWQCB staff and CV-SALTS to identify the most applicable site specific assessments for this task.

#### **Deliverable:**

A draft technical memorandum will be prepared summarizing the narrative and numerical objectives collected for each Basin Plans and indicator site assessments for translated narrative objectives and distributed to the Technical Work Group. This deliverable will ultimately be one section in a comprehensive final technical memorandum and presentation

### **Task 2: Review Procedures, Policies, and Guidance Used by other CA Agencies**

The focus of this task is to identify the procedures that the California Department of Food and Agriculture and the University of California have developed for establishing livestock drinking water guidelines. Interviews of the appropriate staff will be conducted to determine the scope of data or literature available within these two entities. Scientists at UC Davis have been identified with expertise in this field and will serve as the starting point for identifying guidelines established within the UC system. Publications from the UC Cooperative Extension Service such as Drinking Water Guidelines for Dairy Animals will be sought and used as basis for this task. An internet search of the CDFA will be conducted and the appropriate staff will be contacted if deemed necessary for additional information. Water Quality Specialists with the Agriculture and Environmental Stewardship Division will provide a starting point for the appropriate staff within CDFA.

#### **Deliverable:**

A draft table will be prepared summarizing the guidelines for aquatic life and water quality criteria for salinity and nutrients and will be distributed to the Technical Work Group. This deliverable

will ultimately be one section in a comprehensive final technical memorandum and presentation.

### **Task 3: Review Procedures, Policies, and Guidelines Used by the US EPA**

The focus of this task is to identify and review documents by the US EPA, that have been published related to salt, boron, nutrients, and livestock drinking water. Literature related directly to the Central Valley will be sought where available however, literature from other regions will predominantly be presented. Authors for the various agency publications may be contacted for further information when data gaps arise. Some examples of the literature reviewed will include:

*Wildlife Exposures Handbook*- US EPA

*A Field-Based Aquatic Life Benchmark for Conductivity in Appalachian Streams*- US EPA

US Environmental Protection Agency. 1976. *Quality Criteria for Water*. (Red Book).

*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*.

USFW Water Quality Issues web page and documentation

*Stormwater Runoff TMDL for Aquatic Life*- USGS

#### **Deliverable:**

A draft section will be prepared summarizing the guidelines for aquatic life and water quality criteria for salinity and nutrients and will be distributed to the Technical Work Group. This deliverable will ultimately be one section in a comprehensive final technical memorandum and presentation.

### **Tasks 4: Identify Water Quality Criteria, Goals, Guidelines or Policies Adopted by Other States and Tasks 5: Identify Water Quality Goals or Policies Adopted by Other Countries or International Organizations**

The purpose of these tasks is to assemble existing water quality criteria assigned to livestock drinking water listed under the AGR beneficial use and the status of current scientific study related to these criteria. The focus of this task will identify water quality criteria, policies, guidelines or goals for the constituents listed in the RFP from state, national and international guidance documents and studies.

Water quality criteria, guidance, policies and goals for livestock drinking water will be obtained from a number of sources and from reference collected during the literature review performed during the BUO Phase I study. Kennedy/Jenks and UC Davis will work collaboratively with the CV-SALTS Technical Work Group to identify the states in which state extension specialists or appropriate researcher will be contacted. At a minimum, the following states will be included in the survey: Colorado, Nebraska, and Arizona. These states will serve as a starting point for the literature review and policies of water quality criteria related to livestock drinking water.

Various countries throughout the world are dealing with salinity issues. Australia is heavily impacted by salinity issues due to drought conditions or merely a lack of supply and thus represents salinity management at an international level. Of the international countries, Australia has been the most

progressive and prolific with salinity and nutrient publications. Water quality criteria and policies as they related to livestock drinking water will be summarized for salinity, specific salt ions, boron and nutrient species. Australia provides a starting point for international standards on water quality criteria. Additionally international organizations including the Food and Agricultural Organization will be reviewed for information regarding criteria and guidelines. The appropriate personnel will be contacted if additional information is needed. The following documents will include but not exclusive are:

- Water Quality for Livestock and Poultry – United Nations Food and Agriculture Organization  
*Livestock watering. In: South African Water Quality Guidelines, Volume 4: Agricultural Use. 1993.*
- An extension to and further refinement of a water quality guideline index system for livestock watering Volume 2: Poultry productions systems. Report to the Water Research Commission. 2000.*
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality: Volume 3 - Primary Industries - Rationale and Background Information.*

The water quality results of the literature search will be compiled into tables by constituent and policies will be described by state, organization, or agency.

**Deliverable:**

A draft section will be prepared summarizing the guidelines for livestock drinking water criteria for salinity and nutrients. The present status of the scientific basis of these criteria from state, national, and international perspectives will be provided with the summary distributed to the Technical Work Group. This deliverable will ultimately be one section in a comprehensive final technical memorandum and presentation.

**Task 6: Conduct a Review of Water Quality Criteria Available in Peer Reviewed Articles**

This task's objective is to conduct an extensive literature search for peer reviewed literature. Peer reviewed literature, animal nutrition textbooks, and National Research Council Books (publications of the National Academy of Sciences) related to animal dietary requirements will be reviewed to identify existing scientific information available to develop criteria for animal drinking water quality for the following constituents of concern: Dissolved Minerals Total Dissolved Solids (TDS), Specific Conductance (EC), Sodium (Na), Chloride (Cl), Sulfate (SO<sub>4</sub>), Calcium (Ca), Magnesium (Mg), Trace Elements Boron (B), Nitrogen species (total, total Kjeldahl, organic, nitrate, nitrite, ammonia) and Phosphorus species (total, dissolved). The literature review will use previous work completed by the Central Valley Regional Water Quality Board as the basis and starting point for the literature review. The two completed reviews include: **Salinity: A Literature Summary For Developing Water Quality Objectives** (2000) by Harley H. Davis and **Boron: A Literature Summary For Developing Water Quality Objectives** (1999) by Harley Davis. Primary animal species will be cattle, dairy cattle, sheep and goats, swine, and poultry (broilers, layers, turkeys) and horses. The University of California has access to numerous academic journals not available through a simple web search. In addition to databases, the University researchers have compiled extensive literature related to salt, boron, and

nutrients throughout their years of experience. This task will leverage the literature that has been previously collected by these experts to maximize the amount of literature gathered.

Dr. Meyer and Dr. Robinson will contact other experts in the field when data gaps are identified for information when needed. If no additional literature is found through this process then the data gap will be reported in the memorandum. In addition, Kennedy/Jenks will provide the University with information previous collected as part of the Phase I Beneficial Use and Objective Study and other work performed in the Central Valley related to permitting.

The matrix on the next page describes the extent of the livestock and constituents that will be included in the literature search. A table of findings will be created to summarize findings with constituents representing rows and species representing columns. The constituents listed represent the information requested per table 1 of the RFP. Differences in the tolerance for the various cattle operations such as dairy or beef will be identified and differences in the tolerance of young animals and adult animals will be identified and cited if the literature exists.

**Deliverable:**

A draft section will be prepared summarizing the guidelines for livestock drinking water criteria for salinity and nutrients and will be distributed to the Technical Work Group. This deliverable will ultimately be one section in a comprehensive final technical memorandum and presentation.

**Task 7: Prepare a Complete Reference List of All Documents Considered**

A comprehensive database of all references reviewed will be compiled and cited appropriately whether the reference is from the scientific literature or internet site.

**Deliverable:**

A comprehensive reference list and the article or report will be compiled for all literature reviewed regardless of whether the information was included in the final analysis. A CD containing all the information electronically will be delivered to the Technical Work Group.

**Task 8: Develop a Range of Potential Water Quality Goals and Policies**

This task will focus on analyzing information obtained in tasks 1-6 to develop a range of water quality criteria that are potentially applicable to the Central Valley. We have worked with our Central Valley clients to obtain permits required by the Central Valley RWQCB, as well as in accordance with the State Implementation Plan and specific requirements in the Basin Plan for the Sacramento River and San Joaquin River Basins. Through meetings with CVRWQCB and series of scientifically based written requests and comments to our drafts, we will be able to identify potentially applicable water criteria.

**Deliverable:**

This deliverable will be included in the final technical memorandum and presentation. A draft technical memorandum will be distributed electronically amongst the Technical Work Group for review and comments. At this time all comments will be incorporated to the final version along with each section.

## **Task 9: Project Management, QA/QC and Meetings**

### **Task 9.1: Project Management**

Excellent project management and our ability to provide a well-qualified team are essential to providing high quality services at the right time within budget. The primary objectives of the project management task are to: 1) provide close coordination among the CV-SALTS Technical Work Group and Kennedy/Jenks team and other involved parties; 2) ensure that project schedule and budget are met; 3) document project activities (progress reports and meetings); and 4) ensure that project work and deliverables meet quality objectives.

Kennedy/Jenks has developed effective project management methods and planning tools over the course of thousands of projects. These proven techniques, familiar to our proposed team, provide the mechanisms for coordination of team efforts, quality control, and adherence to the project scope, schedule, and budget. Key program elements designed for successful, timely completion of the assignment meeting or exceeding client expectations include:

Project Memorandum

Budget Management

Communication

Project Status Report

Quality Assurance/ Quality Control (QA/QC)

The project management process includes the preparation of an initial project memorandum distributed to all project team members. This memorandum shall describe the goals, scope, task breakdown and assignment of responsibilities, the budgeted hours for each task, and the schedule. Consultant shall implement careful coordination and tracking of performance and schedule throughout task execution. Kennedy/Jenks' Project Management Portal will provide our project manager with budget status at a glance; both business and project managers review regularly. This tool provides visual guides for identifying problem areas through exception metrics. These metrics include financial data is summarized at a contract and project level, allowing for drilldown to detailed transactions for fees, budgets, and costs.

We will prepare monthly project status reports for the San Joaquin Valley Drainage Authority. The Kennedy/Jenks Project Manager, Dr. Leila Khatib, will provide project status reports that briefly document the status of ongoing work with the sections submitted to the Technical Work Group including:

A budget summary with amount billed the previous month, the total billings to date, and the percentage of budget remaining for each task

An updated percentage of each task completed

A list of any outstanding action items

Identification of any problems that are impacting data quality, the budget, or schedule plus proposed solutions to those problems

This regular communication assists in maintaining adherence to the schedule requirements and allowing for "course correction", if needed, in a timely manner.

**Task 9.2: Quality Assurance/Quality Control**

Quality Assurance/Quality Control (QA/QC) shall be integrated into the project management system from project inception. Consultant shall use the multi-discipline resources of the team to provide an independent internal review of the field investigations, studies, specifications, and reports before submitting them.

**Task 9.3: Progress Reports/Meetings**

We focus on communicating effectively both internally and with the CV-SALTS Technical Work Group throughout each phase of the project. Communicating with the CV-SALTS Technical Work Group to obtain available information, develop criteria for the evaluation of alternatives, to understand operational practices and preferences influencing alternative selection, and to verify needs are being met is a critical part of successful project management. We will be available by e-mail and telephone for consultation throughout the project.

We have budgeted two formal meetings and one conference call between the Kennedy/Jenks Project Team and the CV-SALTS Technical Work Group and committee members. These include:

One initial Kickoff Meeting

One Conference Call

Final Presentation of Technical Memorandum

**Deliverables:**

Progress Reports in Microsoft Word and PDF formats

Monthly Invoices in PDF format