

## Agriculture Zone Mapping Project

**Project Description:** GIS development/analysis project to create map layers of agricultural-related data to support development and implementation of water quality objectives (WQOs) to protect waters used for agricultural irrigation. Data layers to be incorporated include agricultural-related jurisdictional boundaries, soil characteristics, irrigation supply water sources/quality, current cropping patterns, and other data as appropriate. Data layers will be used to identify potential Crop Sensitivity Zones (CSZs) based on distinctly different cropping patterns, climatic conditions and water supply. CSZ characteristics will be used to develop the dry year maximum tolerable irrigation water salinity (MTIS) concentration within each CSZ. The MTIS for each CSZ provides the basis for establishment of a regional approach to setting WQOs to protect the agricultural irrigation use.

**Project Execution/Deliverables:** This project will consist of two phases: (1) Phase 1 develops the CSZs and pilot tests the methodology for determining the MTIS; (2) Phase 2 applies the MTIS methodology to all CSZs.

- Phase 1 Deliverables (expected completion dates)
  - Data collection/research and creation of GIS map layers (July 1)
  - Delineation of up to 25 CSZs based on cropping patterns, irrigation water management/quality, soils, and climatic conditions (July 1 with demonstration of mapping technique to gather input by May 15)
  - Test of the methodology to define the MTIS for a dry year for one CSZ (July 15)
- Phase 2 Deliverables (expected completion dates)
  - Implement the selected methodology to determine the MTIS dry year values for all CSZs delineated in Phase 1 (September 16 – based on current scope of work)

The Phase 2 scope of work may require revision based on the findings from Phase 1 and stakeholder input.

### Project Benefits

- Establishes technical basis for replacing existing one-size fits all WQO currently applied to discharge permits to protect irrigated agriculture.
- Creates regulatory basis for establishing region-specific WQOs to protect irrigated crops based on existing cropping patterns.
- Replaces current regulatory approach that seeks to protect all potential crops in all areas at all times.
- Removes potential for a minor, infrequently grown crop to drive the basis for establishment of WQOs to protect irrigated agriculture.
- Provides opportunity for stakeholders to have a say in the CSZs delineated and ground-truth the existing cropping information.
- Provides opportunity for stakeholders to participate in the development of AGR policy with hard data to illustrate agricultural irrigation water quality needs for their respective areas of interest. For example, see attached Figure 1 (AGR policy strawman discussed at the November 8, 2012 Executive Committee).
- Sets the stage for additional zone refinement – project establishes up to 25 CSZ, each with a determined MTIS; methodology could be used to further refine a CSZ to recognize more unique situations within the zone.
- Provides framework for future updates to the Basin Plan to recognize changing crop patterns, salt tolerances of specific varieties of crops. and technical capabilities with regards to salt management.

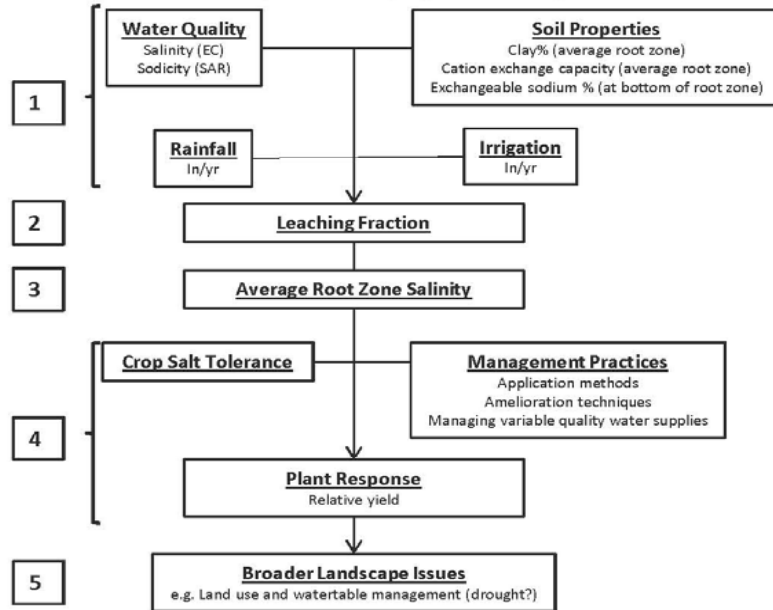
### Project Costs

- Phase 1 - \$121,060. Under contract; already funded by CV-SALTS.
- Phase 2 – Current funding request is \$118,935; this budget request assumes no changes to the existing Phase 2 scope of work. This assumption will need to be evaluated based on the findings from Phase 1.

## **Funding Options**

- Opportunity for CVSC or AG members of CVSC to participate in funding
  - Funding up to the \$120K is needed
  - Funding with clear contracting language allows additional control of Phase II
  - Original budget shows funding for Program Management and Admin potential for funding from that CVSC budgeted cost
  - Special project request to CVSC entities
- Reduce CAA funding to other efforts a minimum of \$25K is needed
  - Potential reductions in economics or other late tasks
  - May require backfill funding from CVSC

Figure 4.2.1. Flow diagram for evaluating salinity and sodicity impacts of irrigation water (Appendix from Australia and New Zealand Salinity Related Water Quality Guidelines for Irrigation)



1. Identify the soil properties, water quality, climate (rainfall) and management (irrigation application rates) practices for the site (*management zone*) in question
2. Estimate the leaching fraction under the proposed irrigation regime. . .
3. Estimate the new average root zone salinity. . .
4. Estimate relative plant yield (although note that the impact of salinity and sodicity can be modified by management practices as discussed later. . .
5. Consider salinity and sodicity problems within the framework of broader catchment issues such as regional watertables, groundwater pollution and surface water quality. Watertable salinity develops in response to excess water and salts accumulating in sensitive parts of the landscape. Excess water can percolate to groundwaters as a result of changing climatic patterns (e.g. frequency and duration of rainfall events), land use or land management (including irrigation). Before an irrigation scheme is developed, the planning process should include investigation of the regional hydrogeology to avoid development of watertable salinity. The guidelines given here concentrate on localized effects of irrigation, but broader salinity issues should not be ignored. . .

#### Potential Policy Statements

- The AGR beneficial use will be considered reasonably protected if salinity water quality concentrations meet the objectives identified in Table X for the given management zone. (*from AGR Zone study*)
- To develop site specific objectives, the process outlined in Figure 4.2.1 will be utilized with the following defaults unless technical data justifies reasonable alternatives:
  - Average annual rainfall and irrigation amounts will be calculated for the available period of record but not less than 20-years.
  - A 15% leaching fraction.
  - Crops evaluated will represent 95% of the commercial acreage over the previous 20 years and those anticipated to be commercially viable at current average EC concentrations.
    - Commercially-viable crops are those that gross more than \$1,000/year.
    - A commercially-viable crop has comprised more than 5% of the cultivated land within the area under review in any year during the previous 20-years or is likely to do so in the next 10-yrs given current planting trends.
  - No more than 5% yield reduction in any single year for the most salt sensitive of the crops evaluated.
  - Use of the Hoffman model (ref) or equivalent to calculate EC objectives  
*For Groundwater. . . (Tim's discussion)*
- For areas outside of management zones identified in Table X and in absence of site-specific data to the contrary, EC levels less than 700 uS/cm are presumed to reasonably protect AGR. (*or Tim's table?*)
- Where annual average water quality (irrigation season since 1968) documents lower salinity than the established water quality objective to protect AGR, the state antidegradation policy shall apply.
- An exception (waiver) to established EC or SAR limits for the protection of AGR beneficial uses may be made when affected landowners request use of the water and thereby accept any potential risk to crop production on their lands. The exception will only be granted in association with an irrigation management plan that provides reasonable assurance that the lower quality water will be confined to the targeted lands and not impact other applicable beneficial uses within the target area or downstream.

Drought??

Figure 1. Potential application of results from Agricultural Zone Map project (policy strawman from November 8, 2012 Executive Committee Policy meeting). For example, the first primary bullet in the right-hand column references "Table X" which could be equivalent to the MTIS values determined for each of the CSZs. If a discharger wanted to develop a site-specific objective, the second primary bullet in the right-hand column reserves that opportunity. Finally, if no MTIS value is defined for an area, then the third primary bullet provides a default EC value - representing the status quo without the Agricultural Zone Map product.