Data for Salinity Management
Short Summary of Limitations, Gaps, and Recommendations
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LIMITATIONS

- Study focus was changed from database development (a working data model) to metadata collection. As a result of the redirect scope of work, the collection of metadata is not meant to be comprehensive. However, we believe that the majority of existing data were covered.
- Only publicly accessible major databases and information were examined. This initial broad-brush approach requires future fine tuning and more detailed examination.
- Proprietary data, such as well log data collected by USGS with permission from DWR, were not included. To include them, special permission and arrangement must be sought.
- Bureau of Reclamation's water quality data with respect to conveyance, transfer and diversions are available only by special requests. However, *EC* and *TDS* can be obtained online through IEP.
- Non-digitized and unorganized data (for example, local consultant reports) were not examined.
- More specialized research type data were not considered. Although they may be relevant to salinity management. For example, these may include ground water ages, trace element, and isotope data.
- There are duplications, and inconsistencies of data definitions and descriptions among databases (for example, STORET's *Salinity* data is derived from EC, while *TDS* is reported as sum of constituent ions). Analytical methods may also be different.
- Some data sources, e.g. IEP, SWAMP, are still in the process of development. Thus, most recently updated information, if not officially published, may not be included in the study.

NOTICEABLE GAPS

- Spatial gaps exist. For example, in general, there are more analytical data available in the San Joaquin Valley than in the Sacramento Valley. For example, DWR Water Data Library queries did not return any data for Alpine, Amador, Madera, Mariposa, Calaveras, El Dorado, San Benito, Napa, Tulare, Tuolumne.
- Temporal gaps exist. For example, quality assurance/quality control information is not consistent. It depends on the original source of the data. STORET has no quality indicators. NWIS and NAWQA have lab protocol information, sampling methods, etc. DWR does have QA/QC info, analytical methods, etc, but these are not available for data collected before 1998.

- Spatial resolution is limited and location formats are not uniformly reported. For example, data locations may be reported as at/long, street address, county, or station number.

- There is little or no data on the flow of salt through the import/export of food and produce. However, food imports/exports may be estimated from agriculture reports (periodically published every 4 years).
- Data on biosolid waste imports are incomplete.
- Data on dairy locations and operations are obtainable. However, other confined animals such as poultry, horses, and other ranch animals are not readily available and have not been examined.
- Industrial discharge, such as production of oil field brines has not been not covered.
- Only community/municipal waste systems are reported. Discharge from individual septic systems to ground water must be estimated based on local hydrogeologic conditions. A spatial statistical methodology should be developed.
- Data on the use of fertilizers (nitrate, sulfate) are based on sale figures in each county. Location of application is non-specific and therefore, the data set has very low spatial resolution.

RECOMMENDATIONS

Data collection

- Reconcile differences among data sources. Integrate available data into a single data repository.

- Fill gaps as much as possible with the rest of data sources from unpublished, obscure, local reports.

- Develop statistical methodology to fill data gaps when data are not available or do not exist.

- Search additional data, such as food import and export data, waste generation statistics.

- Develop and maintain integrated salinity database by assembling data from different sources.

Development of Management Tools

An Integrated Salinity Management model should include:

1. Salinity data model which should be based on GIS applications and spatial analytical techniques

2. Local and regional fate and transport model for salts
3. Hydrological model for the entire valley, including ground water and surface water flow and water balance.
4. Mass balance model linking hydrological model, which includes salt reservoirs, salt transport, with water quality and salt balance of the entire region
5. Management model that includes economics, optimization, remediation, scenario analysis, and salt disposal.