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### Technical Memorandum Task 1 – Phase 1

### Identification of Beneficial Use – A Geodatabase

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Prepared for

Central Valley Salinity  
Alternatives for Long Term  
Sustainability Initiative

Under contract to:

San Joaquin Valley Drainage  
Authority  
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# Table of Contents

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<i>List of Tables</i> .....	<i>ii</i>
<i>List of Figures</i> .....	<i>ii</i>
Section 1: Introduction .....	1-1
1.1 Base Map Features .....	1-1
1.1.1 General Base Map .....	1-1
1.1.2 Boundaries .....	1-2
1.1.3 Hydrology .....	1-3
1.2 Beneficial Use Study Features .....	1-4
1.2.1 Streams, Rivers and Lakes (Linear features and Water Body features) .....	1-4
1.2.2 Groundwater .....	1-4
1.2.3 Bay Area Basin Plan .....	1-5
1.2.4 Permit Location .....	1-5
Section 2: Data Gaps .....	2-6

## List of Tables

---

- 1 Description of attributes for surface water
- 2 Description of attributes for groundwater
- 3 Water bodies not mapped in the GIS viewer (“Data Gap”)

## List of Figures

---

- 1 Land use map legend from Cal-Atlas Geospatial Clearinghouse
- 2 Data Gaps

## Section 1: Introduction

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The purpose of Task 1 - Identification of Existing and Potential Beneficial Uses in the Central Valley is to identify and document, using Geographic Information System (GIS) mapping layers, the beneficial use categories assigned to surface and ground waters within the Central Valley (the region covered by the Central Valley Regional Water Quality Control Board). This technical memorandum summarizes a seed-effort that provides a well thought out and structured geodatabase in support of future data gathering efforts.

The geodatabase and mapping exercise is in support of CV-SALTS road map toward the development of a comprehensive Central Valley Salinity and Nutrient Management Plan. The maps and information attributed to surface water and groundwater features will assist in studying beneficial uses with an increasing knowledge base mainly made up of salinity and nitrate water quality data. To reach this end, gathering data and developing a Geographic Information System of beneficial use and water quality data are key milestones in developing a baseline to move forward in analyzing and evaluating the data. The GIS layers will be populated with current water quality objects associated with a particular beneficial use for the Central Valley. State, National, and International water quality objectives will be researched and reported when applicable. The GIS will also include a user friendly interface that is arranged in scale from a macro-base- map and telescoping into individual hydrographic features that will be eventually classified with beneficial use-attribution in the geodatabase. The following is a discussion of the geodatabase contents discussed as map features.

### 1.1 Base Map Features

Base map features are primarily intended as back-drop information to assist the spatial analyses of land use and beneficial use in this project. The Kennedy/Jenks Team has incorporated much infrastructure and landuse information as budget allows.

#### 1.1.1 General Base Map

The general base map was composed on statewide land use and California counties. Land use is represented state wide and is only displayed within study area. Land use maps were acquired from the Cal-Atlas Geospatial Clearinghouse. The legend and description is in the figure below (figure 1). The county maps represent the counties in the Central Valley and the map was generated by Geographic Data Technology, Inc., ESRI.

Figure 1: Land use map legend from Cal-Atlas Geospatial Clearinghouse



### 1.1.2 Boundaries

The boundaries base map represents the following data: CV-SALTS study area, Central Valley Water Resources Control Board (Region 5), the Delta region, Integrated Regional Water Management Regions (IRWM), Public and Private Water Districts US Bureau of Reclamation (USBR), Department of Water Resources (DWR) Regions, and Bulletin 118 Groundwater Basins.

**CV-SALTS Study Area and Region 5-** The CV-SALTS study area boundaries encompass the jurisdiction of the CV-RWQCB (Region 5). The boundaries for CV-SALTS and Region 5 were generated by Teale GIS Solutions Group.

**Delta-** The Delta Region is a separate layer on the GIS viewer. The CV-SALTS BUO subcommittee decided not to truncate the Delta region at the boundary of the CV-SALTS study area but to include the outside portion part of the study. The Delta map was acquired from California DWR and was published on 6/7/2001.

**IRWM Regions (11/23/2009) -** IRWM regions represents the boundaries as of 23 November 2009 adopted by the DWR. The boundaries represent a cooperative effort to manage water resources in a region. The map was obtained from the California DWR website.

**Water Districts Public (USBR) and Water Districts Private (USBR) -** Public and private water district maps represent the boundaries of the service areas. Private Water District boundaries are areas where private contracts provide water to the district in California. The public district boundaries are areas where state contracts provide water to the district in California. The district boundaries database is cooperatively shared between the USBR, Mid-Pacific regional office

(MP), MPGIS Service Center and the California DWR. The USBR maintains this database with the voluntary assistance of the State Water Districts. This database allows the USBR and DWR to display and analyze this information.

The source of the data was from the USBR in coordination with the California DWR and was published in March 2003.

**DWR Regions-** DWR Regions represents the North Central, Northern, South Central, and Southern hydrologic regions.

**Bulletin 118 Groundwater Basins-** Bulletin 118 was used to map the ground water of the Sacramento River Basin, San Joaquin River Basin, and Tulare Lake Basin. For this phase of the BUO work the ground water has not been stratified by depth and groundwater basins were considered a single unit regardless of features. Each basin is assigned a number which shows on the map.

### 1.1.3 Hydrology

**Hydrologic Units (California Water)** - Hydrologic units delineate water bodies at the watershed level representing the various drainage basins and are assigned by USGS. The information was acquired from California Spatial Information Library and was published on 11/18/2004.

**Hydrologic Area (California Water)** - The California Interagency Watershed Map of 1999 is the State of California's working definition of watershed boundaries. Calwater is a hybrid, a spatial cross-reference for use in local, State, and federal information communities. Calwater described California watersheds, beginning with the division of the State's 101 million acres into ten Hydrologic Regions. Each Hydrologic Regions is progressively subdivided into six smaller, nested levels: the Hydrologic Unit, Hydrologic Area, hydrologic Sub-Area, Super Planning Watershed, and Planning Watershed. The information was acquired from California Spatial Information Library and was published on 11/18/2004.

**National Hydrography Data (NHD) Streams and NHD Lakes (Surface Water)** - NHD data is geodata from the USGS National Hydrography Dataset. The data comprise surface water bodies including lakes, ponds, streams, rivers, canals, and oceans.

**Points of diversion (Surface Water)** - Points of Diversion (PODs) are locations where water is being drawn from a water source such as a stream or river. The point locations in this feature class were derived by extracting the best known location information from the POD table from the WRIMS database supplied by the California State Water Resources Control Board.

**303d Impaired Streams and 303d Impaired Water Bodies (Surface Water)** - The 303d list is part of the Clean Water Act Section 303(d) in which waters do not meet water quality standards even after pollution control technologies have been installed at point sources. The locations and geodata is part of the State Water Resources Control Board.

## 1.2 Beneficial Use Study Features

### 1.2.1 Streams, Rivers and Lakes (Linear features and Water Body features)

The beneficial use information was obtained from the Sacramento River/San Joaquin River Basin plan and the Tulare Lake Basin Plan. The beneficial use from Sacramento River/San Joaquin River Basin plan was applied to the NHD flow line shapefile based on Figure II-1 of the basin plan. The beneficial use from the Tulare Lake Basin plan was applied the shapefile based on the Stream description of Table II-1 and II-2 of the basin plan. Streams or river tributary to the main river would receive the same beneficial use information as the main river based on the tributary rule.

Linear features on this map consist of surface water streams, rivers, creeks, and canals. The information regarding this water body can be accessed by the identify tool on the viewer. The viewer provides information and details. The water quality objectives were obtained from the Sacramento River/San Joaquin River Basin plan and the Tulare Lake Basin Plan. A description of the information provided is below.

Table 1: Description of attributes for surface water

<b>GIS Layer</b>	<b>Description</b>
ID	Specific unique number assigned to a water body for GIS references
GNIS Name	Name of water body as given per the Geographic Names Information System National Hydrography Dataset.
Guidance Source	Source of the assignment of the water quality objectives: either Tributary Rule or Basin Plan
Type	Type of water body
River system	The river system in which the water body drains.
Name	Name of water body as assigned by the basin plan
Hydrologic unit	Drainage unit as assigned by basin plan.
Basin Plan	The basin plan that assigned the water quality objectives.
Water Quality Guidance	Water quality objectives as assigned by the basin plan
Water Quality Criteria	Water quality standards as assigned by a regulation

### 1.2.2 Groundwater

Groundwater basins in the Central Valley were mapped by California Interagency Watershed Mapping Committee. A description of the information provided is below. The water quality objectives were obtained from the Sacramento River/San Joaquin River Basin plan and the Tulare Lake Basin Plan. Detailed Analysis Unit (DAU) codes were provided in the Tulare Lake Basin Plan and were assigned for water bodies in the Sacramento River/San Joaquin River Basin.

Table 2: Description of attributes for groundwater

<b>Layer</b>	<b>Description</b>
ID	Specific unique number assigned to a water body for GIS references
DAU code	Detailed Analysis Unit as assigned by basin plan
DAU name	Name of groundwater basin as assigned by CalWater
Name	“Groundwater” since no specific name is provided in the basin plan
Basin plan	The basin plan that assigned the water quality objectives.

### 1.2.3 Bay Area Basin Plan

This contains information about water quality objectives in the Delta. The specific intake locations have been mapped and supporting information is associated with the shapefiles. The detailed information originated from the San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan.

### 1.2.4 Permit Location

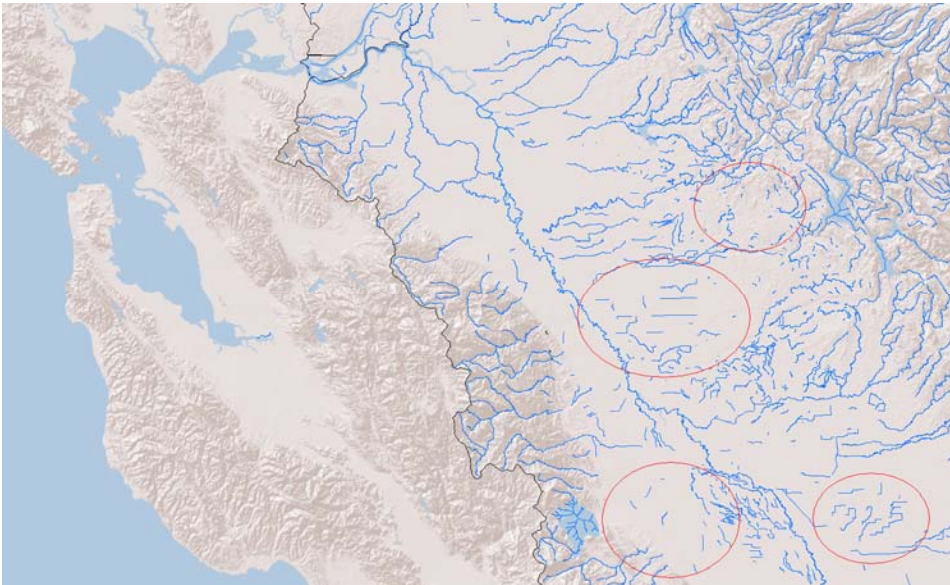
This contains information about water quality limits, effluent limits, and application limits of specific constituents within the study area. Region 5 proposed a list of representative NPDES permits. The specific discharge locations have been mapped and supporting information is associated with the shapefiles.



## Section 2: Data Gaps

A few of the NHD flow line shapefile were fragmented. This made the application of the tributary rule more laborious (work in progress) and near impossible (oval outlines in Figure 3). Assumptions were made about the connectivity of the surface water features. The assumptions were noted for the associated features under the attribute “Note”.

Figure 1 Data Gaps



Another connectivity issue (data gap) is whether or not culverts existed at certain location. The shapefile connects/breaks at every line intersection. Therefore, the application of the tributary rule may not apply if culverts exist at the line intersections. To resolve the problem, we would have to obtain a shapefile of existing culverts and evaluate at each location whether or not the beneficial use information should apply to tributary rivers or streams. This process is ongoing within available budget.

Table 3: Water bodies not mapped in the GIS viewer (“Data Gap”)

Water Body	Reason
Sutter Bypass	Unable to locate feature in the NHD shapefile.
Desolation Valley Lakes	Unable to locate feature in the NHD shapefile.
Sources to Nashville Reservoir	Unable to locate feature in the NHD shapefile.
Nashville Reservoir	Unable to locate feature in the NHD shapefile.
Other lakes and reservoirs in San Joaquin R. Basin	Other lakes and reservoir with the associated beneficial uses are not populated because there are roughly 43,120 other water body features in the shapefile.

<b>Water Body</b>	<b>Reason</b>
Wetland Water Supply Channels	Uncertain what features would constitute wetland water supply channels.