

***Presentation to***  
**DWR GIS Day Meeting**

**The Delta Habitat Conservation  
& Conveyance Program's  
GIS Initiative**

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**DHCCP GIS Coordinator**

***Thursday, November 19, 2009***

# The DHCCP GIS Initiative

- What is the Delta Habitat Conservation and Conveyance Program (DHCCP) and the Bay Delta Conservation Plan (BDCP).
- What role does it play in the DWR GIS Enterprise System.
- How DHCCP uses GIS to support the development of engineering designs for conveyance and restoration while analyzing alternatives presented by the Bay Delta Conservation Program (BDCP) EIR/EIS process.

## Program Purpose

The Delta Habitat Conservation and Conveyance Program (DHCCP) is a partnership between the California Department of Water Resources and the Bureau of Reclamation to evaluate the ecosystem restoration and water conveyance alternatives identified by the BDCP. DHCCP activities include an environmental review of the BDCP. The DHCCP will advance the preferred alternative for water conveyance facilities and habitat restoration.

It has been recognized by the Program's Managers that a geospatial information system (GIS) approach is the most effective for management and analysis of the various datasets involved in these studies.

# EIR/EIS Environmental Review Process

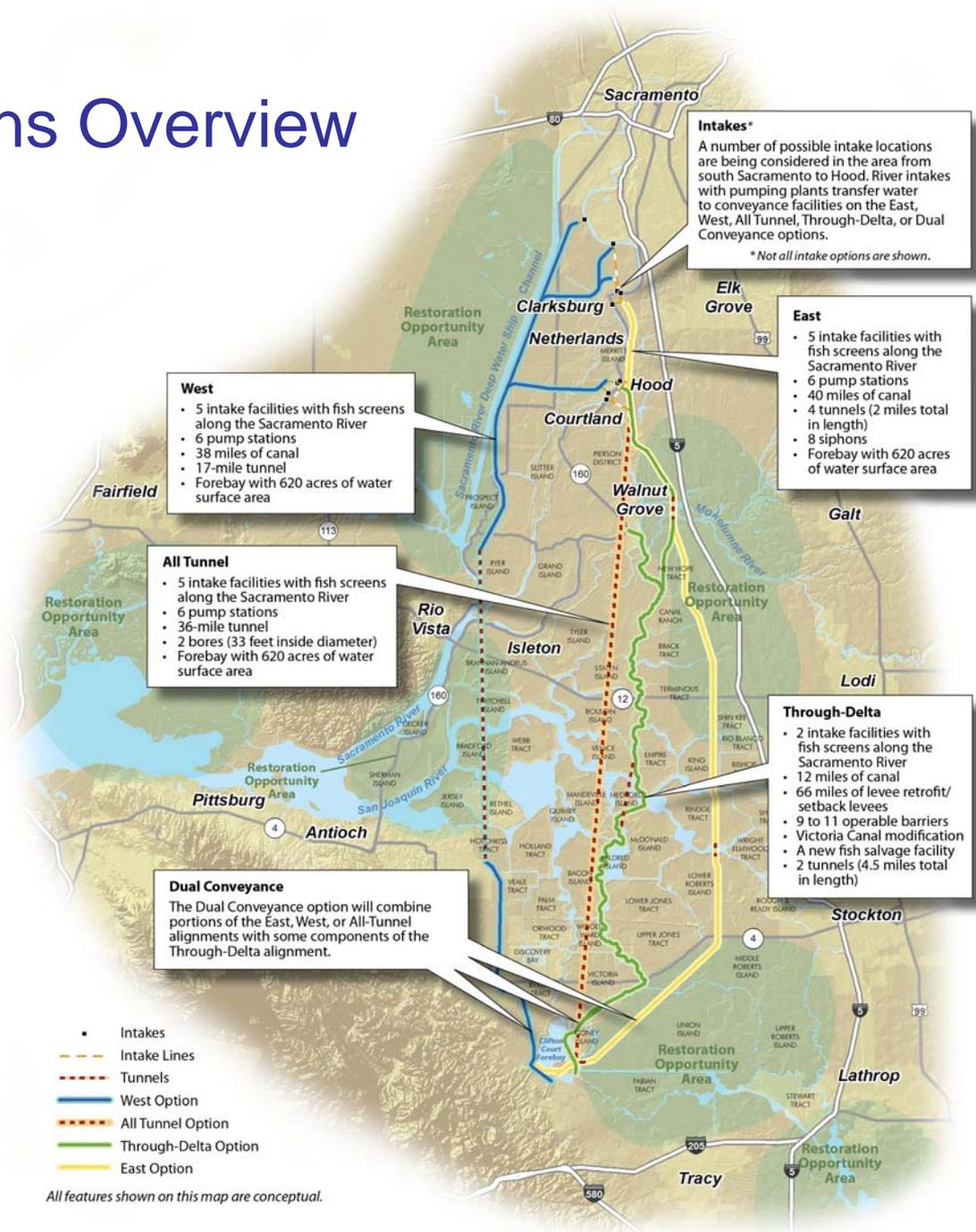
Potential habitat restoration and water supply conveyance options included in the BDCP will be assessed as part of an Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) under the DHCCP.

The EIR/EIS will:

- Fulfill the requirements of the :
  - California Environmental Quality Act (CEQA)
  - National Environmental Policy Act (NEPA)
- Analyze the environmental effects of the proposed action and the alternatives
- Support future regulatory actions or approval

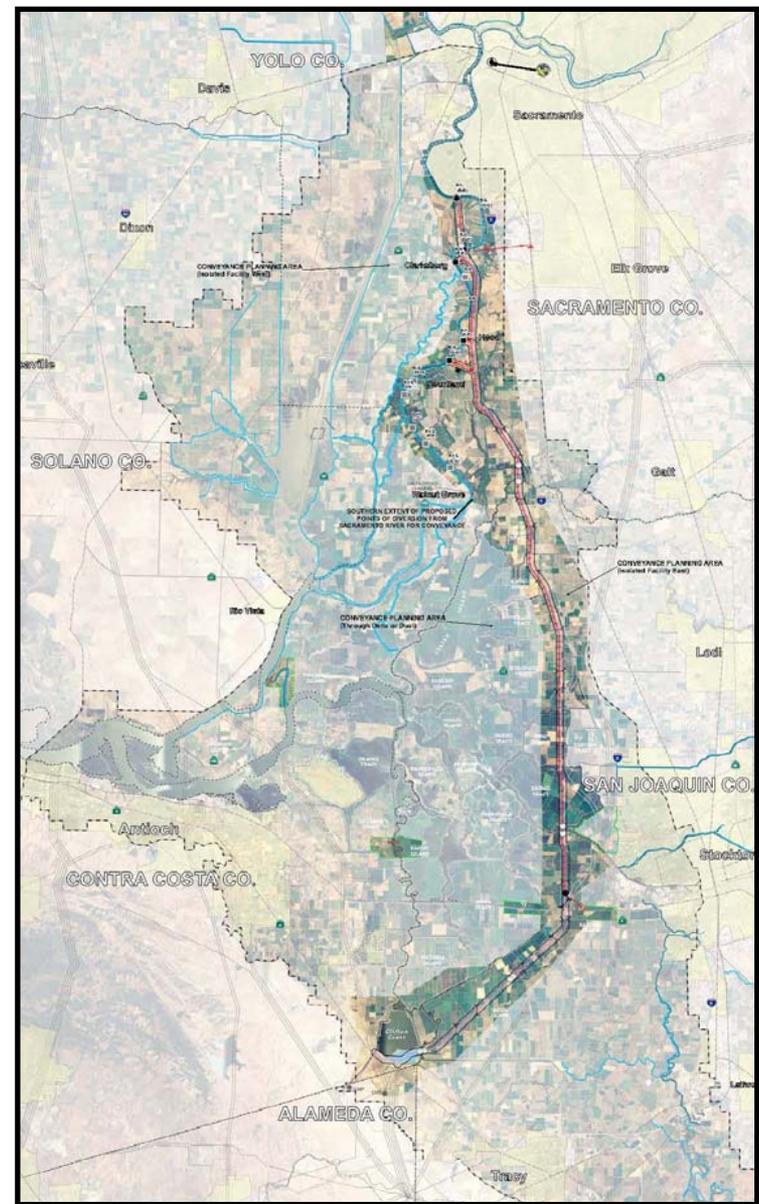
# Conveyance Options Overview

- Dual Conveyance System
- Isolated Conveyance Facility (Eastern/Western Alignments/All Tunnel alignments/All Tunnel alignments)
- Through-Delta (armoring the Delta)



# Eastern Alignment Option

- 40 miles of canals
- 4 short tunnels
- 8 siphons
- 620-acre forebay
- 5 intake facilities with fish screens along the Sacramento River
- 6 pump stations



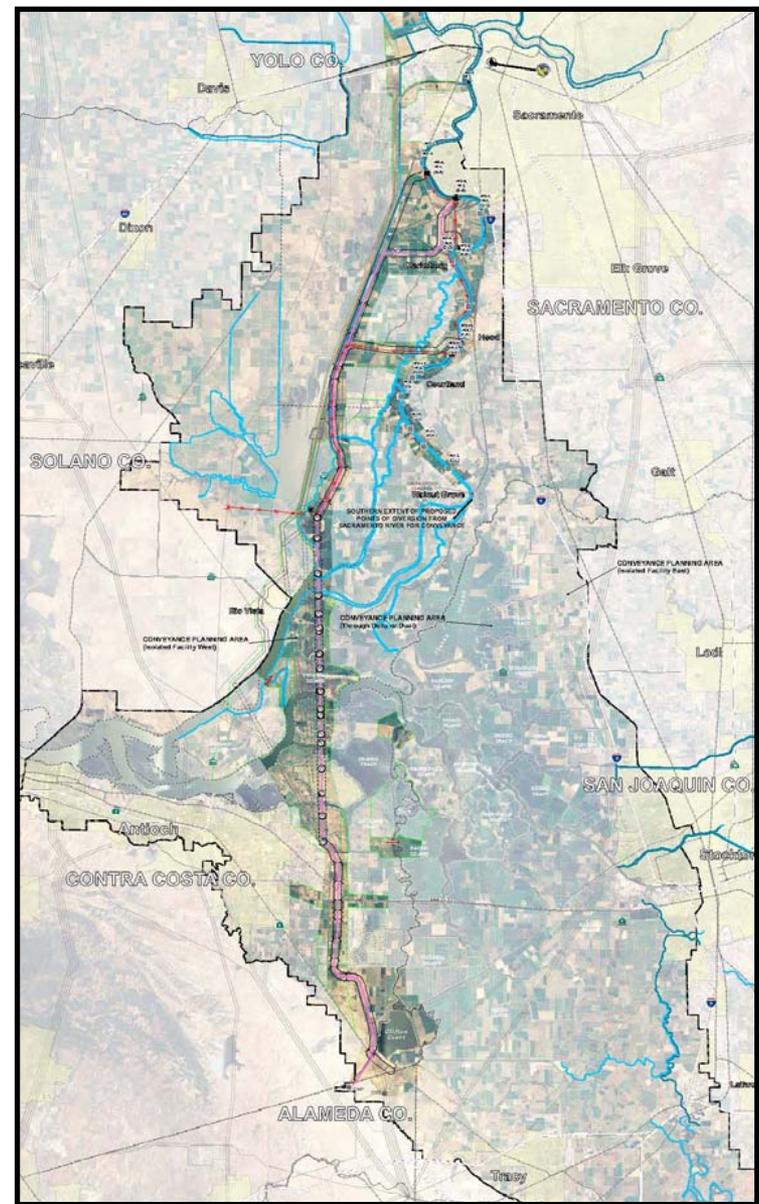
**Delta Habitat Conservation and Conveyance Program**  
*Advancing the Bay Delta Conservation Plan*



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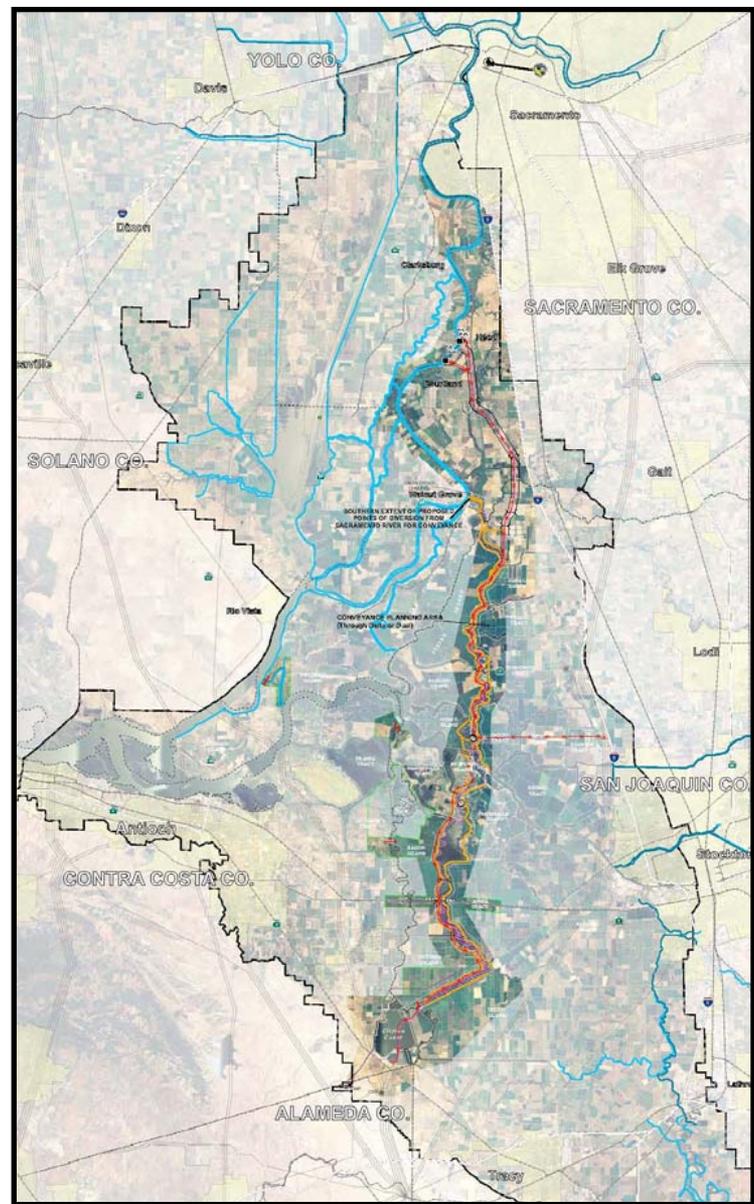
# Western Alignment Option

- 38 miles of canals
- 17 miles of tunnels
- 12 siphons
- 620-acre forebay
- 5 intake facilities along the Sacramento River
- 6 pump stations



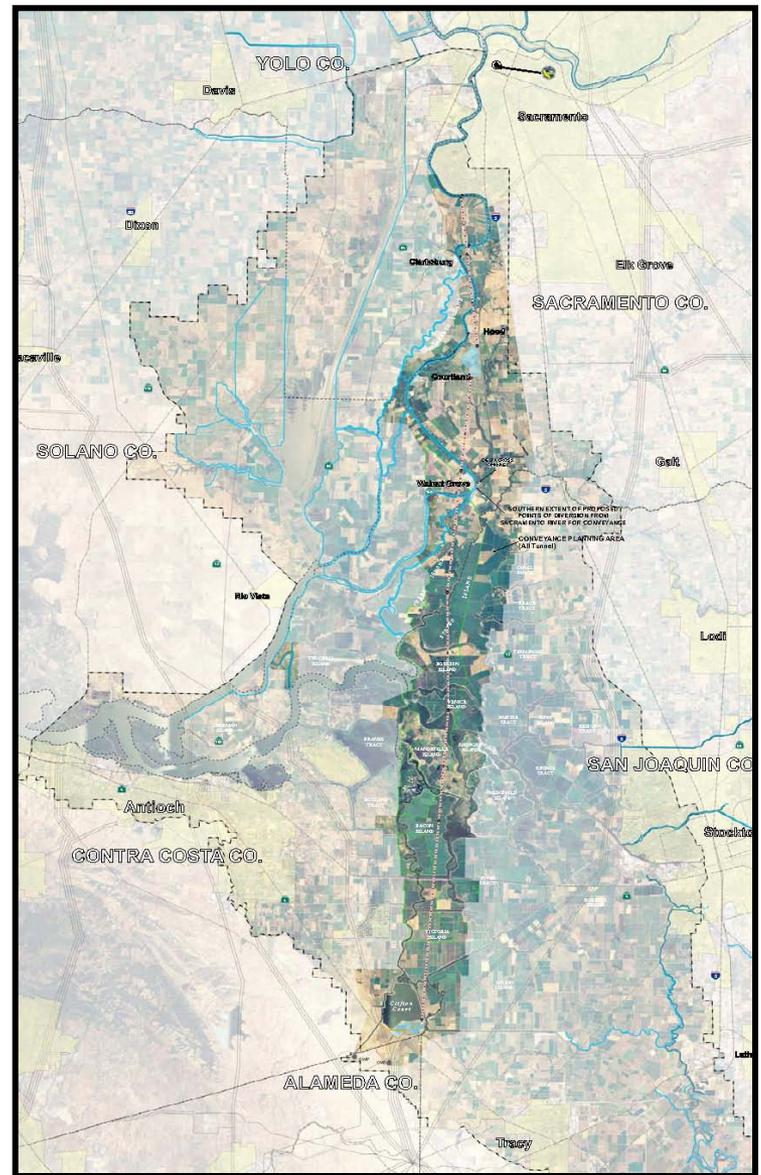
# Through-Delta Conveyance Option

- 12 miles of canals
- 2 tunnels
- 2 intake facilities along the Sacramento River
- 66 miles of levee retrofit/setback levees
- 9 to 11 operable barriers
- Victoria Canal modification
- New fish salvage facility



# All-Tunnel Option

- Approximately 36 miles of tunnel (2 bores, 33' inside diameter)
- 5 intake facilities along the Sacramento River
- 6 pump stations



# The DHCCP GIS Initiative and the DWR GIS Enterprise System

July 15, 2008

- My first day on the DHCCP Project
- The DHCCP Kick-off meeting
- The DWR GIS Enterprise kick-off meeting
  - No software
  - No GIS system architecture in place
  - No rolls & responsibilities established
  - No DWR GIS standards
  - No training program
  - Limited decentralized data
  - Very limited metadata

# DWR ESRI Enterprise License Agreement



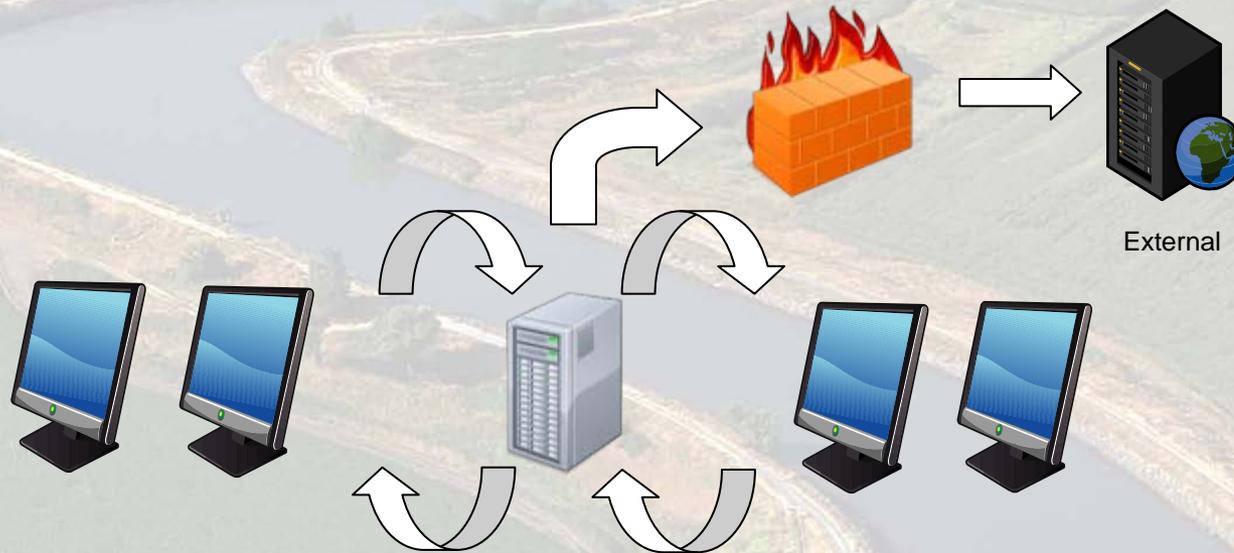
November 2008

The DWR secured an Enterprise License Agreement (ELA) for ESRI software. With this agreement in place, DWR divisions no longer have to procure software seats separately, but instead are able to deploy GIS desktop applications throughout their respective units as needed.

# DWR Enterprise GIS System Architecture Design

September 2008

Working with the Division of Technology Services (DTS) staff the DHCCP is in the process of implementing the necessary enterprise solution that utilizes a centralized ArcSDE/Oracle data server as a resource for Intranet and Internet applications.



# DWR Enterprise GIS System Architecture Design

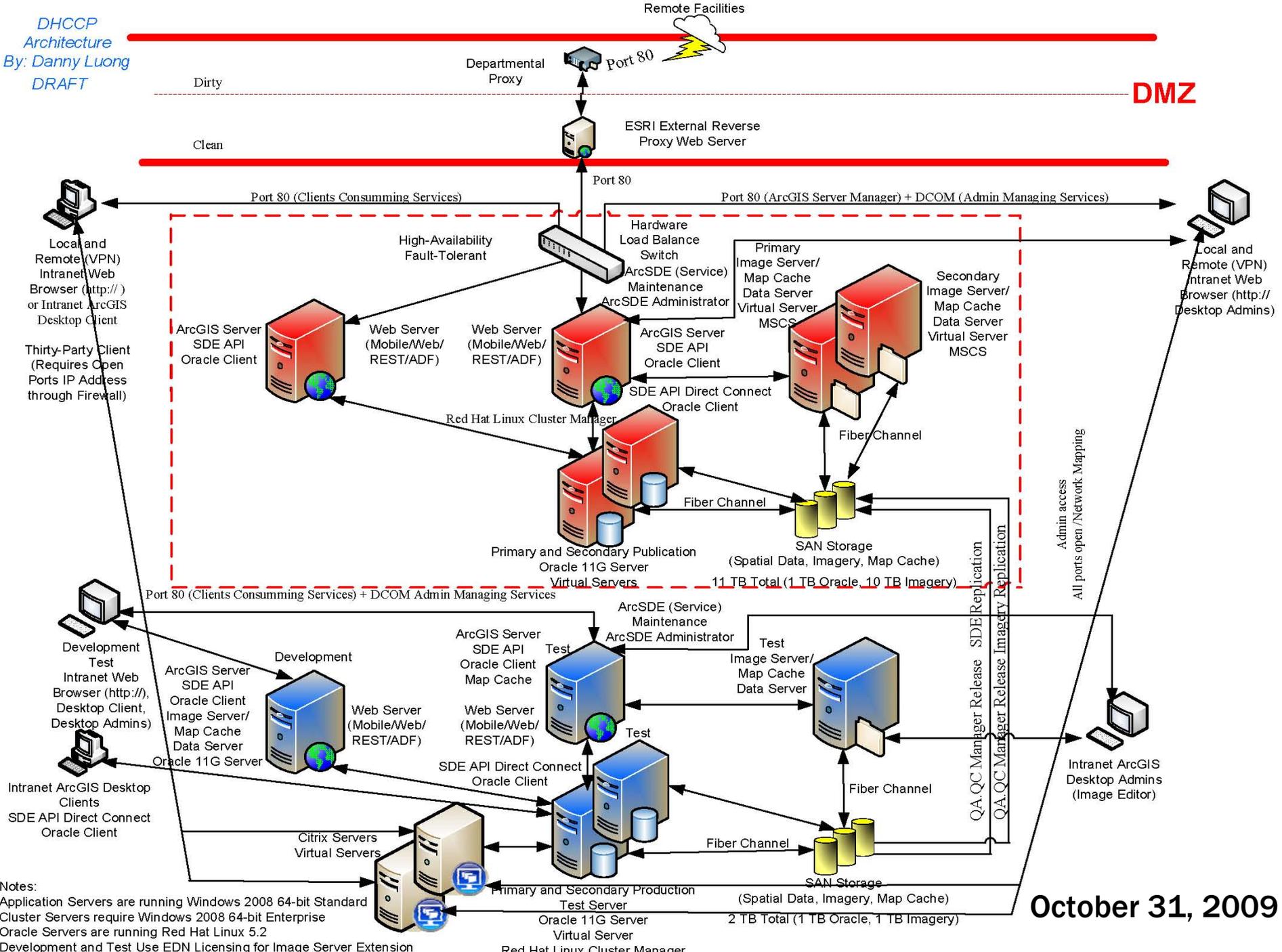
June 2009

DWR hosted an ESRI Workshop to evaluate their current desktop GIS application performance, server infrastructure, and system availability needs.

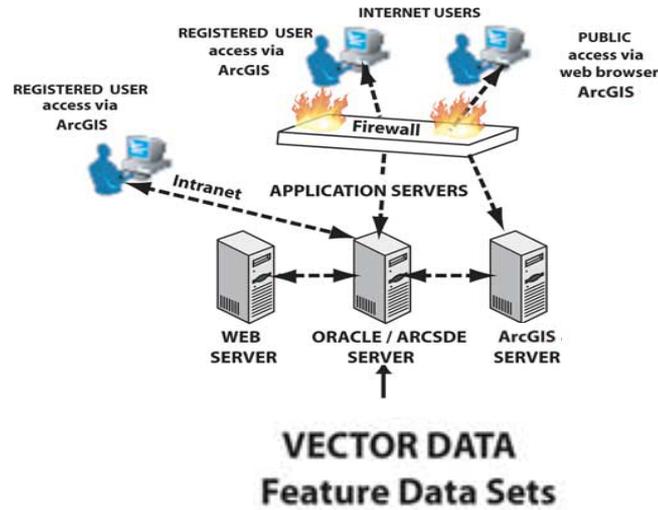
The objective is to expand GIS usage by providing enterprise operations throughout the agency by establishing intranet/Internet Web applications.

July 2009

**California Department of Water Resources  
Enterprise GIS System Architecture Design**



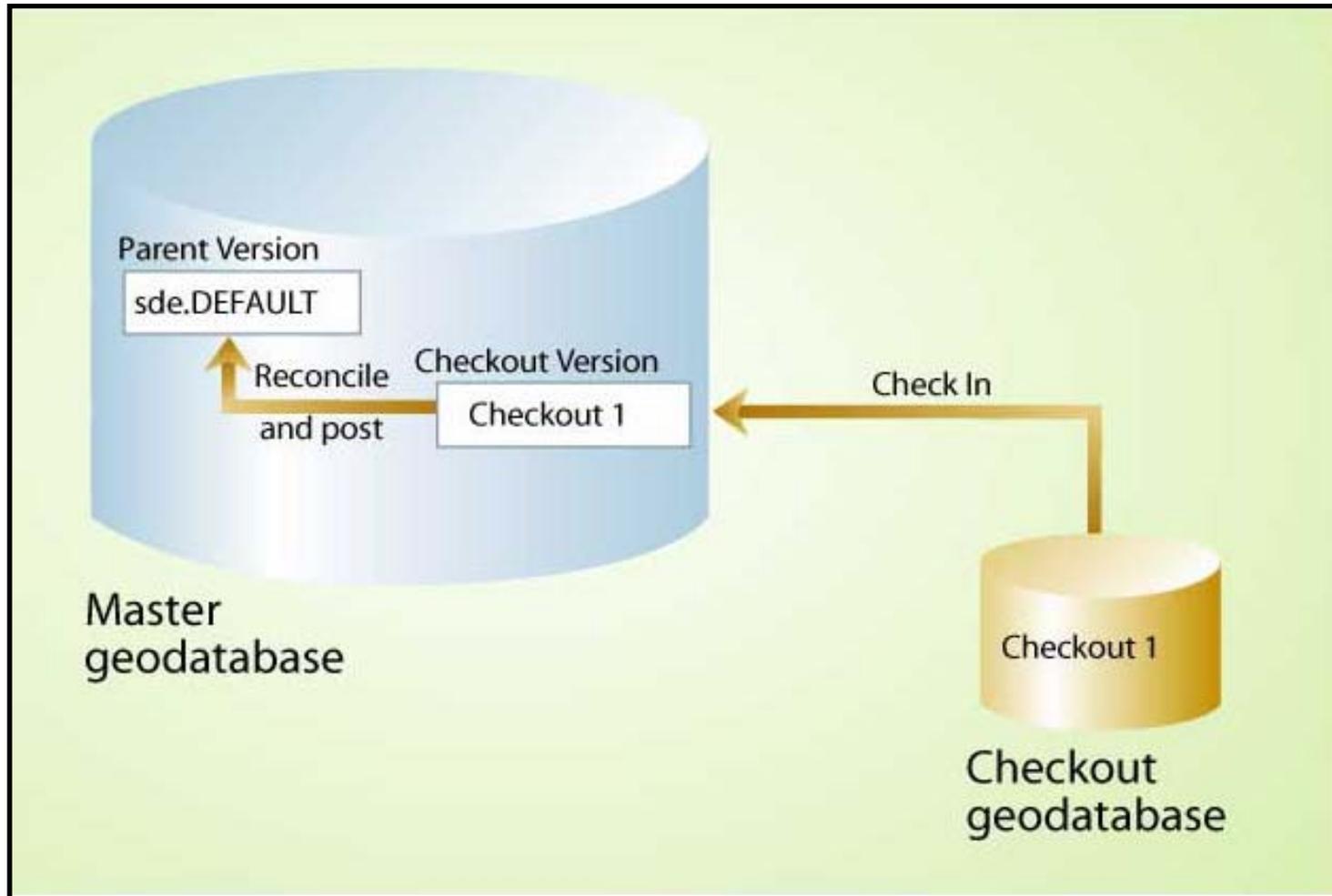
# Geodatabase Management



DWR ENTERPRISE: Imagery Basemap Cadastral Geotechnical Field Survey

DHCCP PROJECT: Engineering EIR-EIS Restoration

# Geodatabase Management



# Cadastral GIS

The Cadastral geodatabase falls under the Geodetic Branch and Delta Engineering Branch of DWR. The primary purpose of the Cadastral geodatabase is to provide a service to the Real Estate and Cadastral groups of DWR, and to retain and access any data pertaining to cadastral records, real estate records, easements and restrictions on any section of land or water within the State of California. The data will be available for use on any DWR projects, including the DHCCP.

# Temporary Entry Permit Maps & Processes

- In order to conduct the necessary biological, cultural, and geotechnical surveys, DWR needs to enter public and private property to conduct land surveys that will allow us to develop thorough and accurate environmental studies.
- A Temporary Entry Permit is an agreement between DWR and a landowner, whereby a landowner grants permission to DWR to enter upon their property to perform the listed studies.

# The GIS Application for the TEP Process

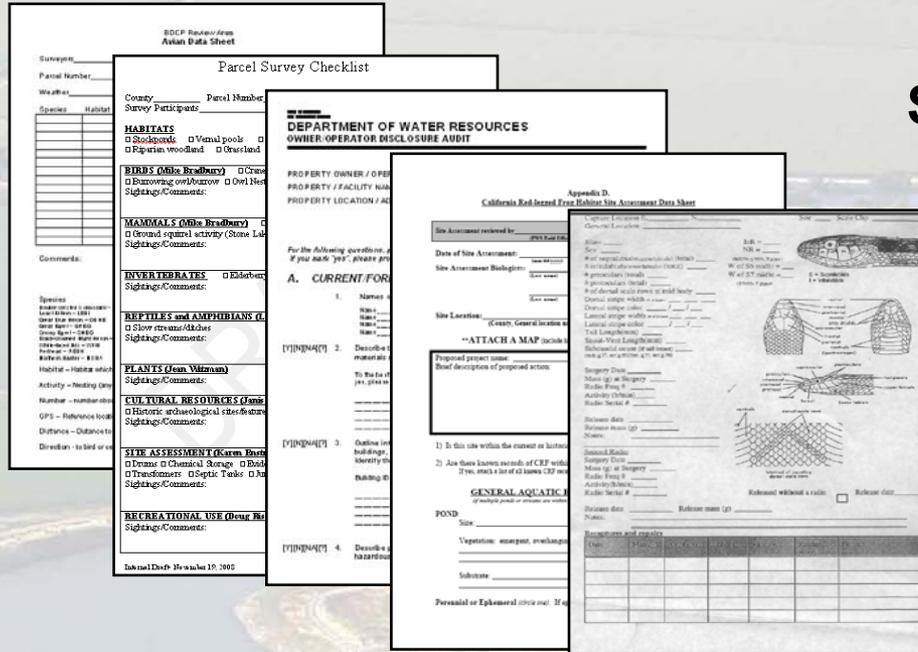
- August 1, 2008: 2000+ Land Owner Exhibits
- Parcels from 5 counties
- Each different format
- Tied into single geodatabase
- Evaluation of TEP required for:
  - Bat, Amphibian, Avian, Mammal
  - Botany
  - Geotechnical Borings
  - Engineering Exploration
- Weekly update

## Surveys to Support the Environmental Analyses

- Land surveys are necessary to develop thorough and accurate environmental studies
- Field surveys started in spring 2009
  - Environmental Surveys
  - Geological/Geotechnical Studies
  - Cultural/Archeological Studies
  - Geodetic Surveys
  - Phase 1, Endangered Species Surveys



# Survey Datasheets

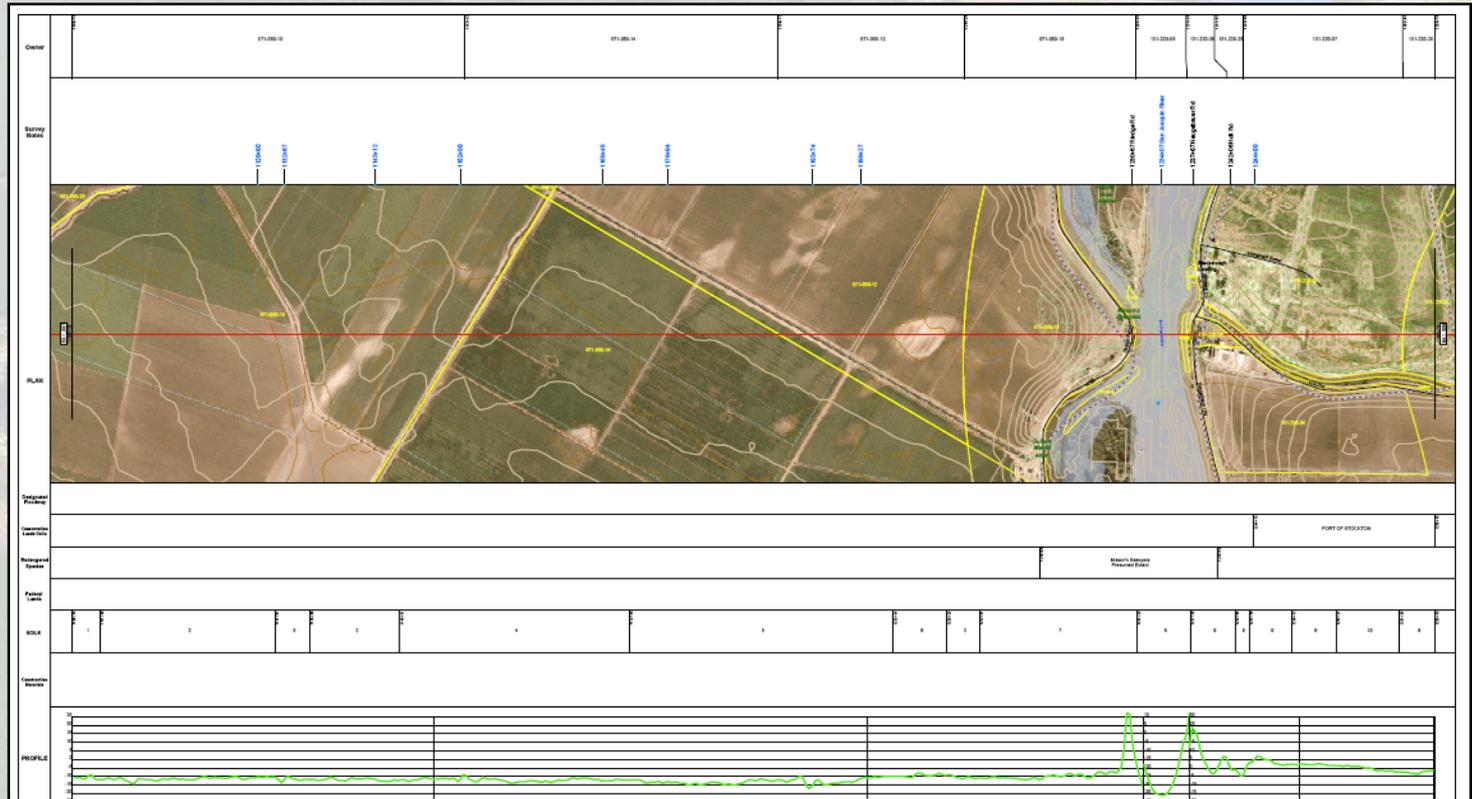


- **Mobile Technology**
  - **Trimble GPS handhelds**
    - ArcPad & Forms
    - Digitizing geographic data
    - Stores record keeping information
  - **Photos and survey notes**

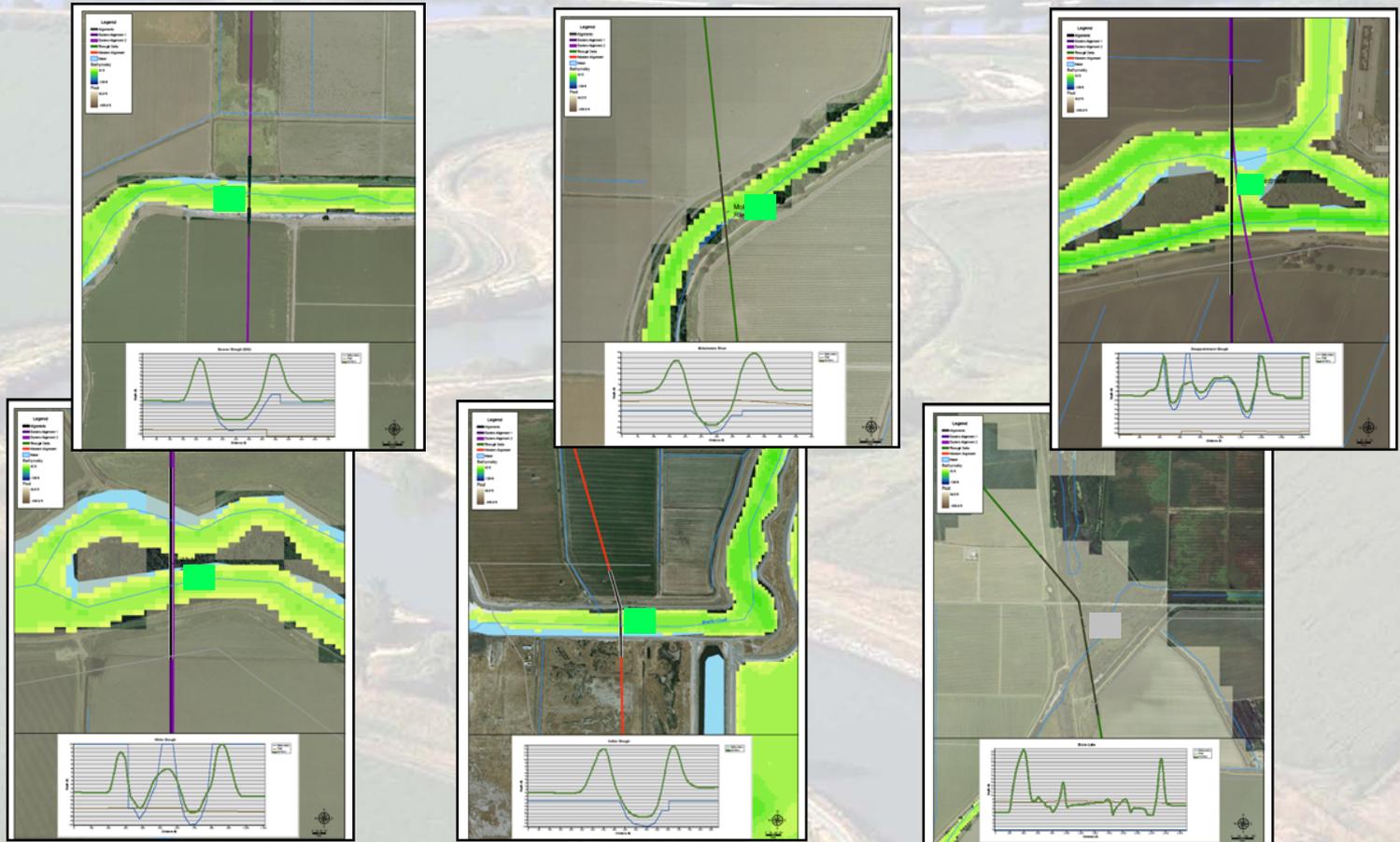
# Field Survey GIS

- **Scheduling geodatabase**
  - **Incorporates numerous aspects**
    - **Number of days surveyors will visit a parcel**
    - **Environmental surveyor teams coordination**
    - **Ties together different survey groups**
    - **Keeps track of survey season windows**
  - **Organizes and stores for record-keeping**
    - **Accessed to which parcel on what day**
      - **Two week requirement to notify land owners**
    - **Which parcel were visited for how many days**
      - **“Temporary Entry Permits” last three years, limited to 60 nonconsecutive days of survey work.**

# Alignment Sheet Generation – Plan & Profile



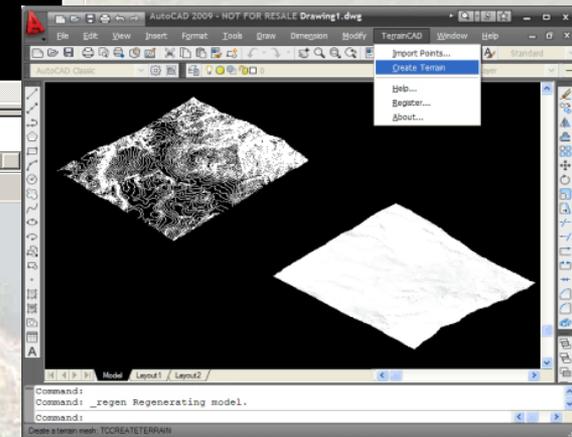
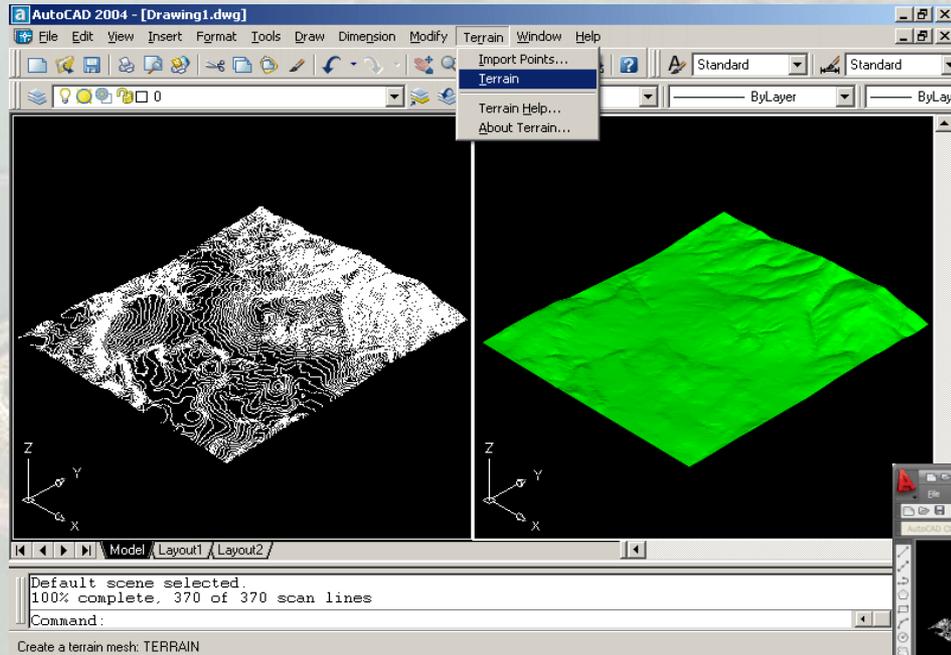
# Slough Cross Sections



# GIS to CAD Surfaces

Data originated in GIS, using DEM, contours were converted into surface and export into CAD for:

- Siphons
- Operable Barriers
- Intake Locations



# Fish Data & Graphs

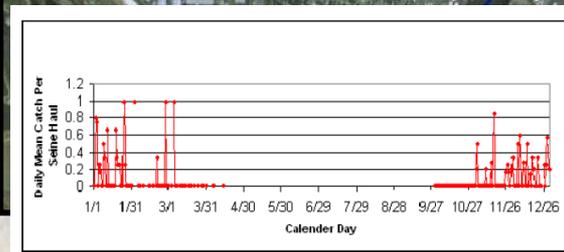
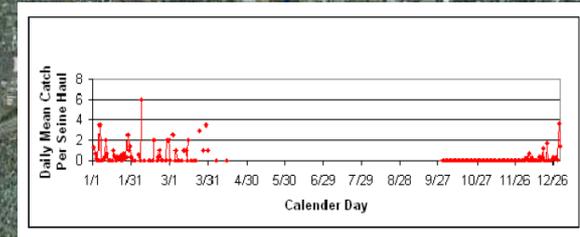
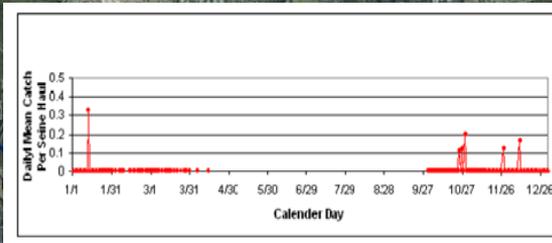
**Identify**

Identify from: <Top-most layer>

FWS Fish Sample Location: Location: 6,263,322.377 2,405,964.363 Feet

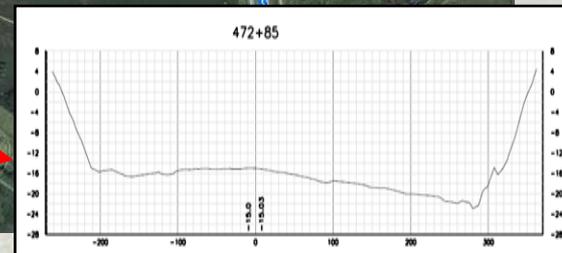
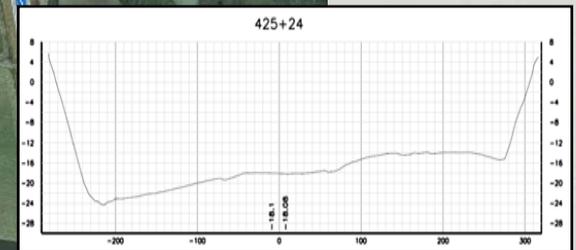
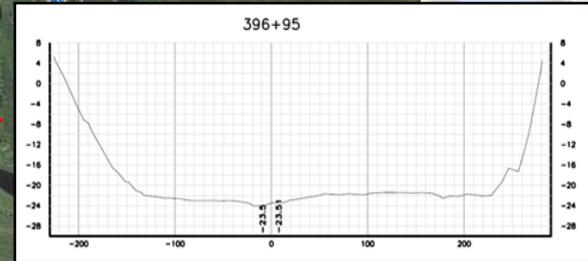
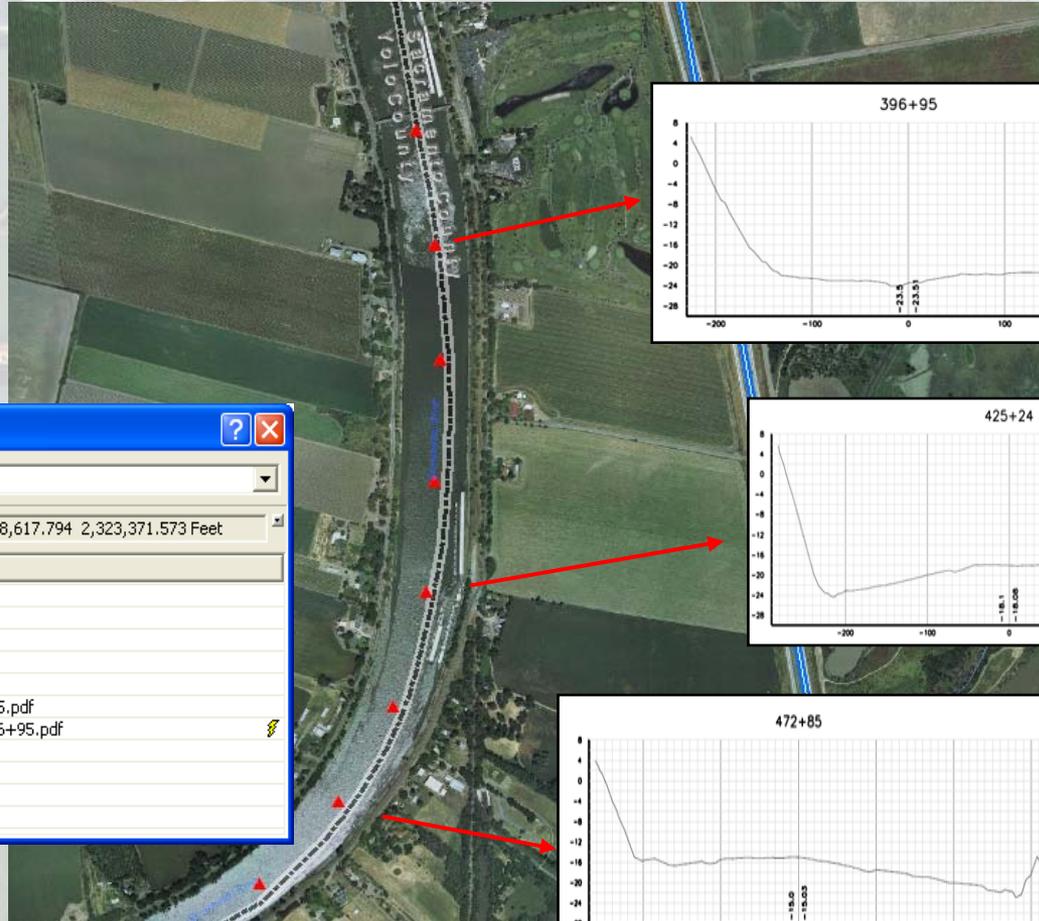
Field	Value
OBJECTID	1
SHAPE	Point
Location	
DeltaSmeltAdult	pdf/DeltaSmeltAdult_SandCove.pdf
DeltaSmeltJuv	pdf/DeltaSmeltJuv_SandCove.pdf
Steelhead	pdf/SteelheadJuv_SandCove.pdf
SpringRunChinook	pdf/SpringRunChinookJuv_SandCove.pdf
FallRunChinook	pdf/FallRunChinookJuv_SandCove.pdf
LateFallRunChinook	pdf/LateFallRunChinookJuv_SandCove.pdf
WinterRunChinook	pdf/WinterRunChinookJuv_SandCove.pdf
SplittailAdult	pdf/SplittailAdult_SandCove.pdf
SplittailJuv	pdf/SplittailJuv_SandCove.pdf

Identified 1 feature



- Click DWR fish sampling locations
- Pop-up multiple charts & graphs from one location

# River Cross Sections – Data Management



**Identify** ? X

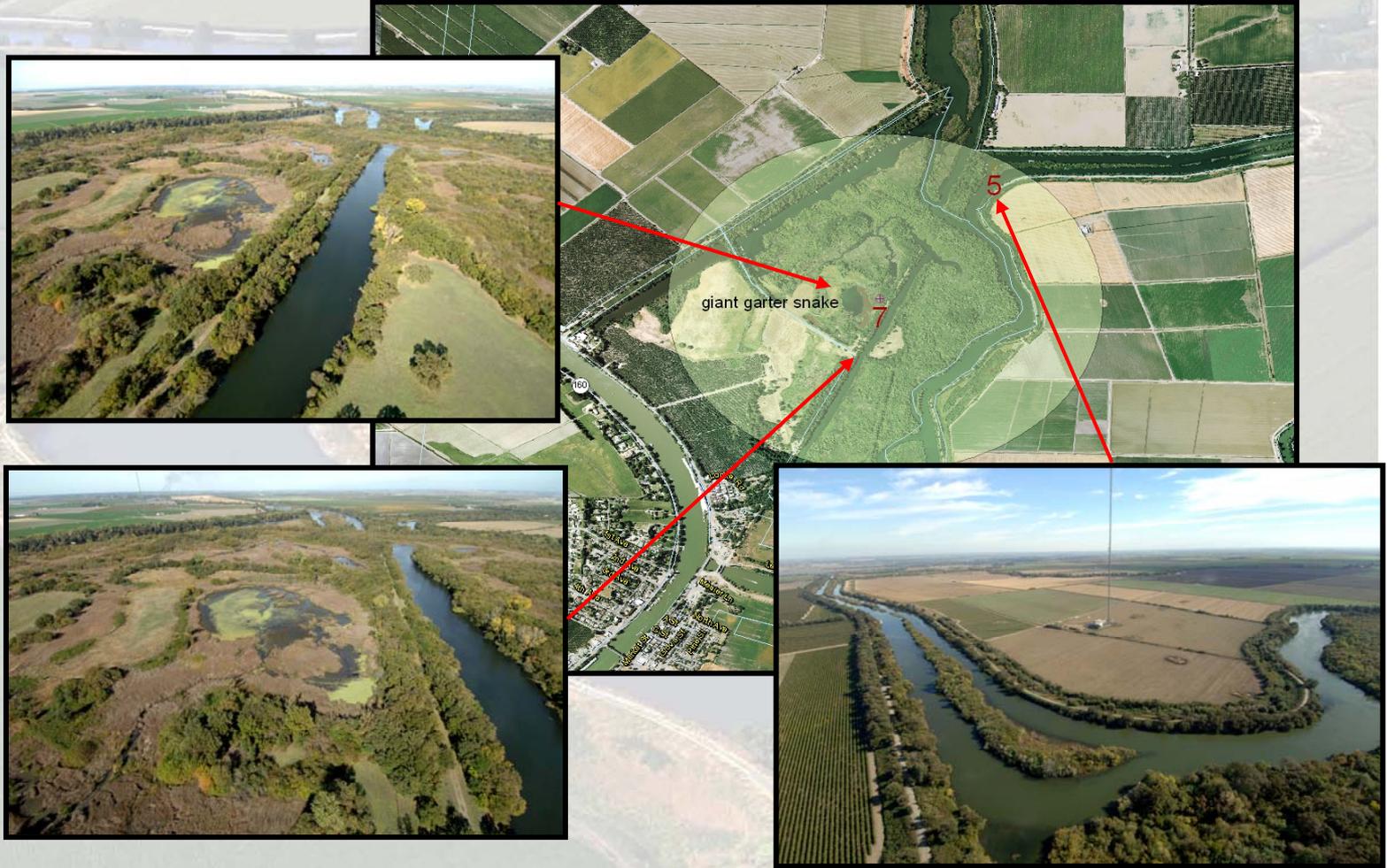
Identify from: <Top-most layer>

- [-] CrossSections
- [-] Sacramento River

Location: 6,268,617.794 2,323,371.573 Feet

Field	Value
OBJECTID	12
River	
Sta1	396
Sta2	95
Distance	39695
file	396+95.pdf
link	pdf/396+95.pdf <span style="float: right;">⚡</span>
Shape	Point

# DHCCP Flight Plan – Photo Storage



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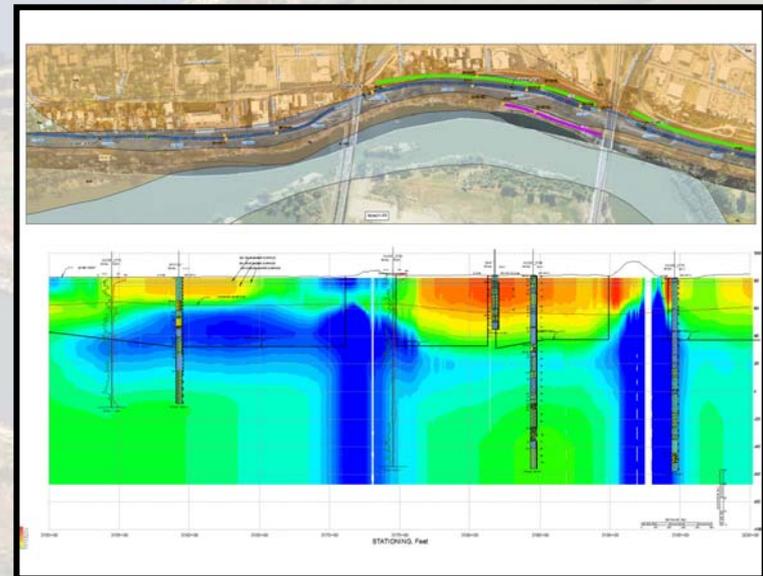


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# Geotechnical GIS

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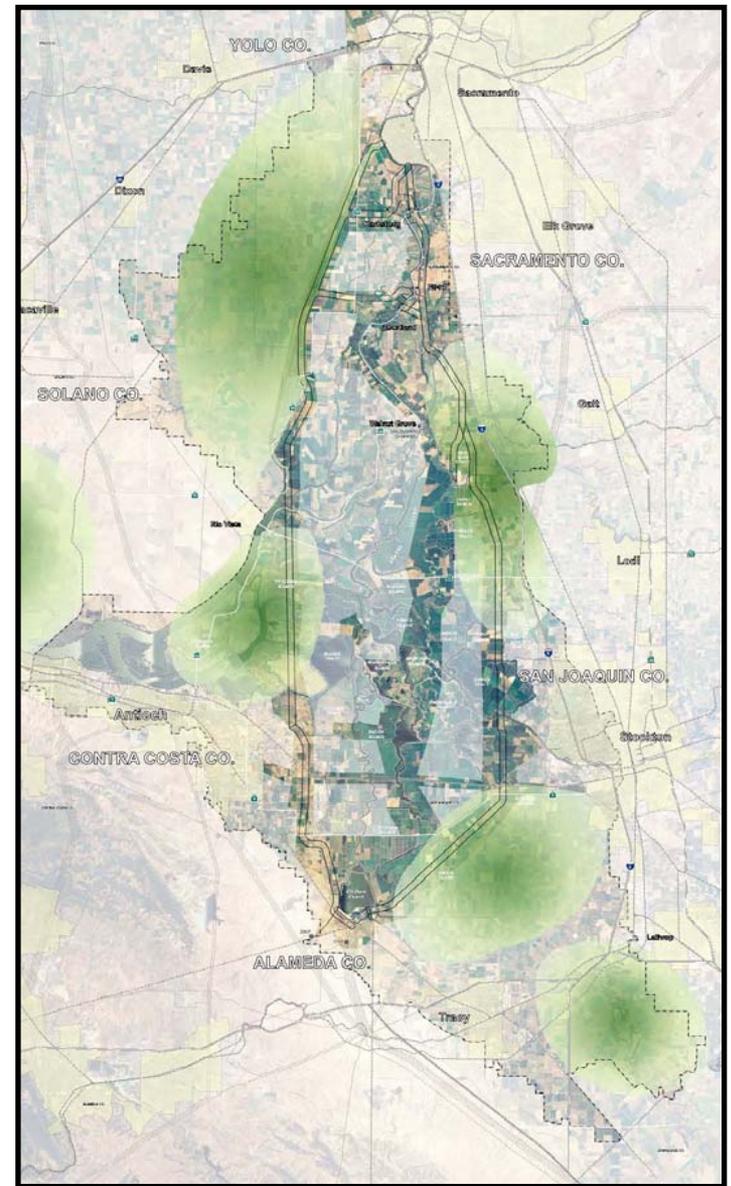
Collecting,  
Validating,  
and  
Managing  
Subsurface Data



# Restoration Opportunity Areas

The objective for Restoration Opportunity Area (ROA) project development is to prepare site-specific habitat restoration information for inclusion into the Admin Draft EIR-EIS.

- The BDCP Steering Committee is developing proposed restoration measures
- DHCCP is developing near-term restoration actions



# DHCCP GIS Training

November 2008 – January 2009

In order for DHCCP to maintain the GIS information, DWR resource personnel and staff participated in a GIS training program to meet the needs of the program, ranging from high level system administration and geodatabase development / versioning to lower level view & query applications.

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# DHCCP GIS Training

## **Building Geodatabases**

- (3) Division of Engineering
- (4) Division of Environmental Services
- (1) Division of Technology Services
- (3) DHCCP

## **Introduction to the Multi-user Geodatabase**

- (3) Division of Engineering
- (4) Division of Environmental Services
- (1) Division of Technology Services
- (3) DHCCP

## **Managing Editing Workflows in a Multiuser Geodatabase**

- (4) Division of Engineering
- (2) Division of Technology Services
- (1) Division of Environmental Services
- (1) DHCCP

## **Data Management in a Multiuser Geodatabase**

- (4) Division of Engineering
- (3) Division of Environmental Services
- (1) DHCCP

## **Geodatabase Design Concepts**

- (4) Division of Engineering
- (3) Division of Environmental Services
- (2) DHCCP

## **ArcGIS Server**

- (2) DHCCP

# Questions?

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