Bay/Delta & Tributaries Database Project

- **Provide background on Bay/Delta and Tributaries Database Project**
  - **Describe a distributed data management system**
- **Discuss local data management systems**
  - **Example SWAMP system**
- **Discuss enterprise applications**
- **Discuss future development**
- **Answer questions**

BDAT

Sponsors/Participants

CALIFORNIA BAY-DELTA AUTHORITY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

CALIFORNIA DEPARTMENT FISH&GAME

DEPARTMENT OF WATER RESOURCES STATE OF CALIFORNIA

DWR · USBR · USFWS · SWRCB · DFG · USEPA · USACE · NMFS · USGS

Interagency Ecological Program

COOPERATIVE ECOLOGICAL INVESTIGATIONS SINCE 1970

STATE WATER RESOURCES CONTROL BOARD

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION

U.S. FISH & WILDLIFE SERVICE

Background/Distributed Data Management System

Background/Enterprise Data System BDAT

- Requires coordination/cooperation between agencies and stakeholders
- Is a product of monitoring & modeling efforts
  - These data now need to be combined with other data and made accessible rapidly
- Requires implementation of known technology

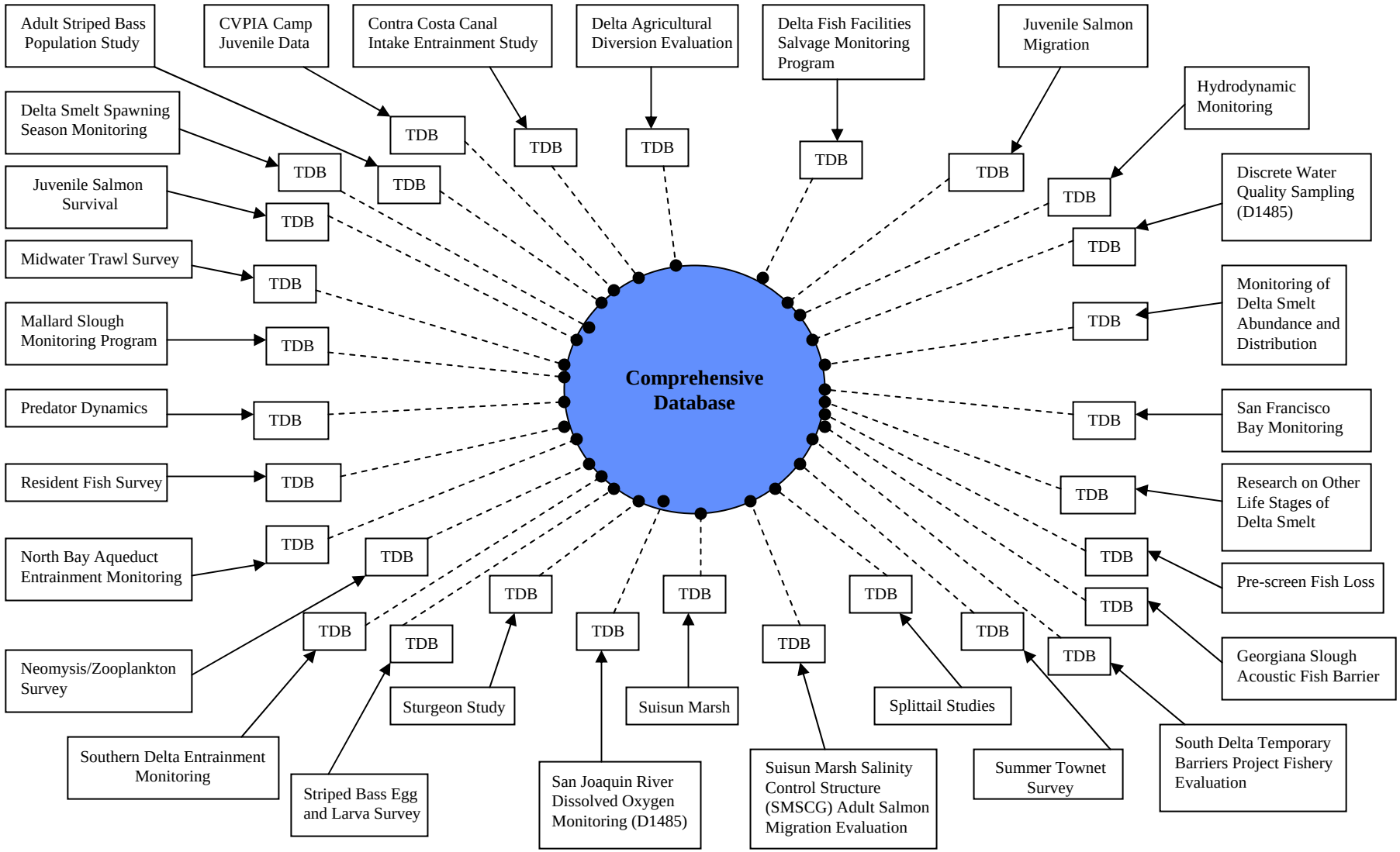
Background/What Does an Enterprise Data System Do?

- Provides access to a multitude of monitoring program data from many individual entities
  - Provides data for predictive tools such as models
  - Provides data for project operations
  - Provides data for adaptive management
  - Provides a system to distribute GIS and model output
  - Provides data on mitigation devices (fish screens/barriers etc.)
  - Etc

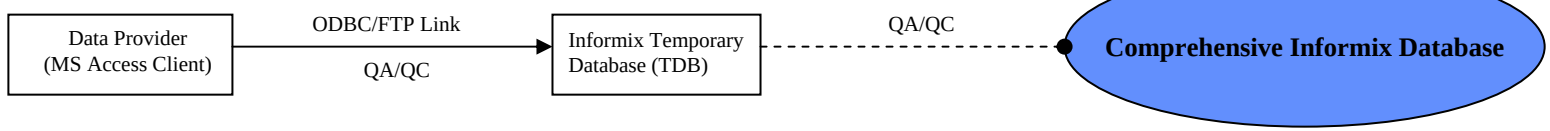
Background/Enterprise Data System

- System includes a local database component that provides local management and control of data
  - Local databases are usually developed in MS Access
- Local data are then loaded/synchronized into the comprehensive database using standard naming conventions, units, coordinates, etc

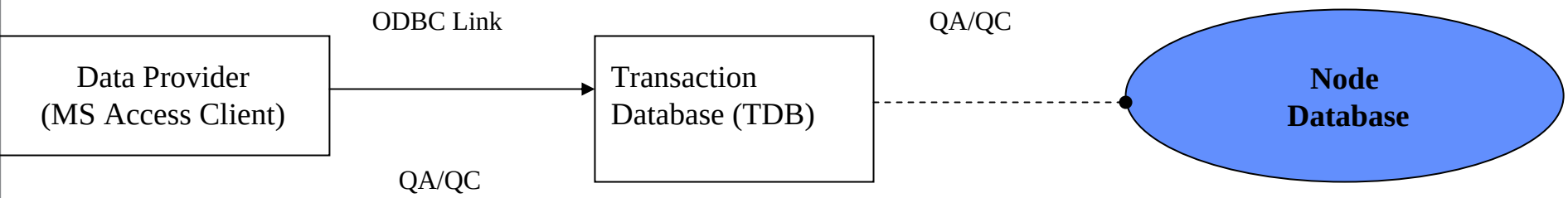
Data Flow Characteristics: RDBMS Alternative



KEY:



Cooperative Data Management System



Background/Distributed Data Management System

Background/Local Database

- Provides a data-entry utility so data can be entered into the PC and comprehensive database
- Provides a PC database for the group who collects the data
- Provides infrastructure for transferring data from the data provider to the comprehensive database

Background/Local Databases

- **The local database is used to meet certain criteria that are needed to make this project successful**
  - Data needs to be made accessible to the system
  - Data entry needs to be dynamic, quick and easy
  - The system needs to support a large diverse volume of data
  - Data providers need to have the tools necessary to participate in an enterprise system

Demonstration of a local Database SWAMP System

Demonstration of a local database

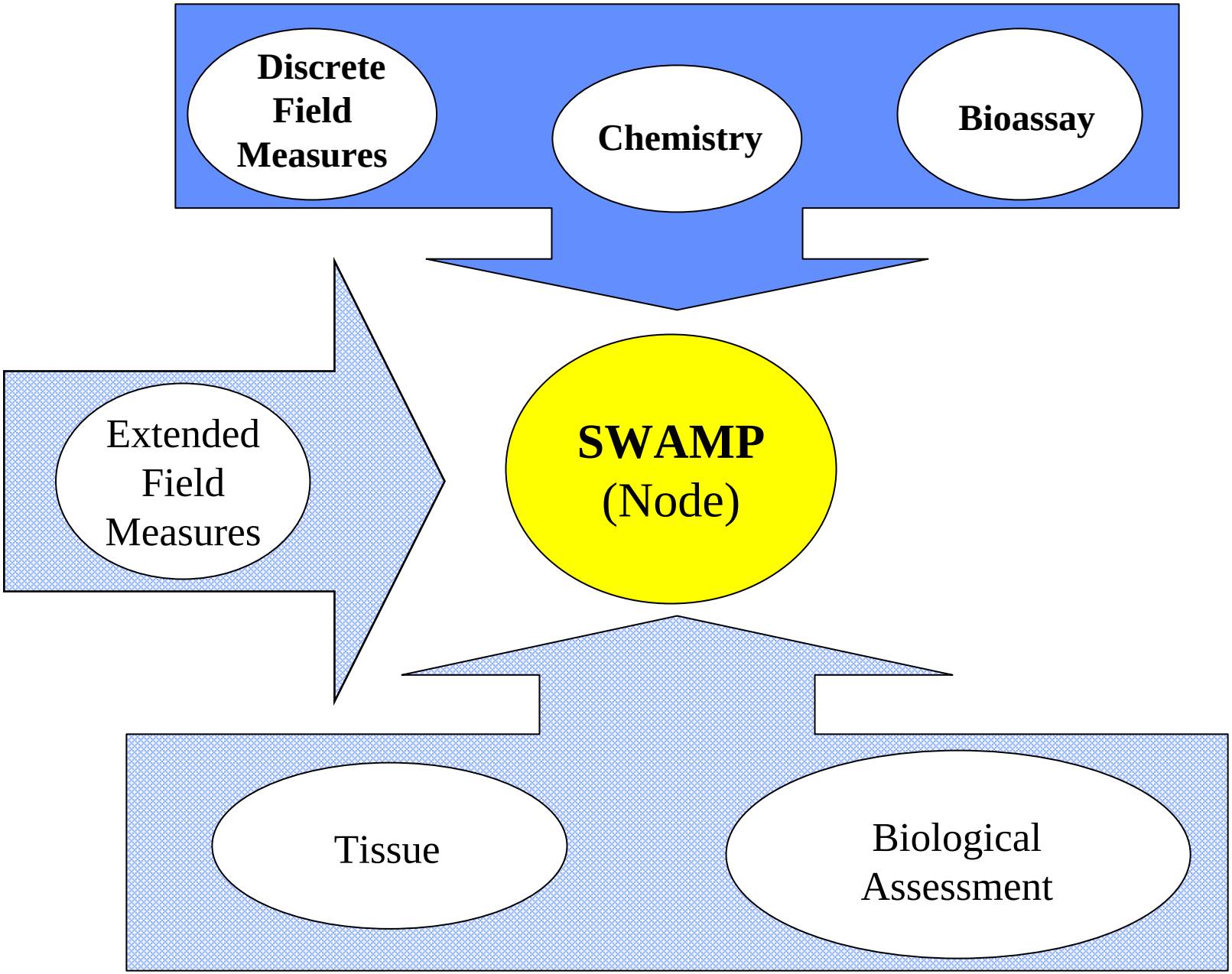
"SWAMP" Client

- Surface Water Ambient Monitoring Program

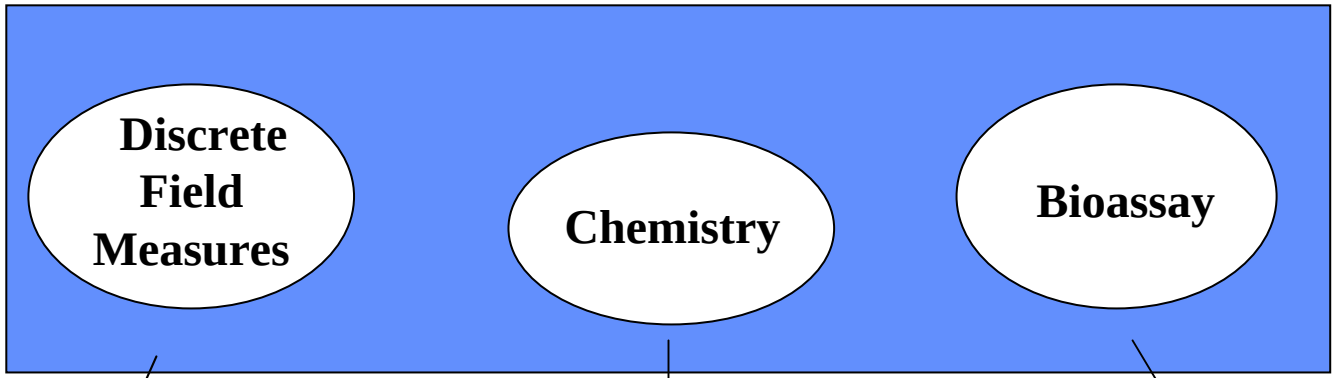
  Regional Watershed Assessments

  - 9 Regional Water Quality Control Boards
  - No existing "silver bullet" database
  - Build on existing structures
  - Use Access-based System; Replication Technology in Use by Dept Water Resources

SWAMP "Big Picture"



Data Types



Kit or Probe Measurements
Multiple Depths
w/ Associated Equipment, etc
w/ Associated Lat/Longs

Analytical Chemistry
Sediment & Water
Multiple Depths
w/ Associated QA Data
w/ Associated Equipment, etc
w/ Associated Lat/Longs

Bacteria Indicators

Replicate Bioassay Data
Sediment & Water
Multiple Endpoints
w/ Associated Lat/Longs

Summary Test Results from Labs

VAMP Water Quality Database

Edit View Insert Format Records Tools Window Help

Type a question for help

Main Menu

SWAMP

Datasets

Entry

Permanent

Event Type

FieldDescription

Add / Edit

Database

Commit

Export

Exit

Lookup Tables

Stations

View / Edit

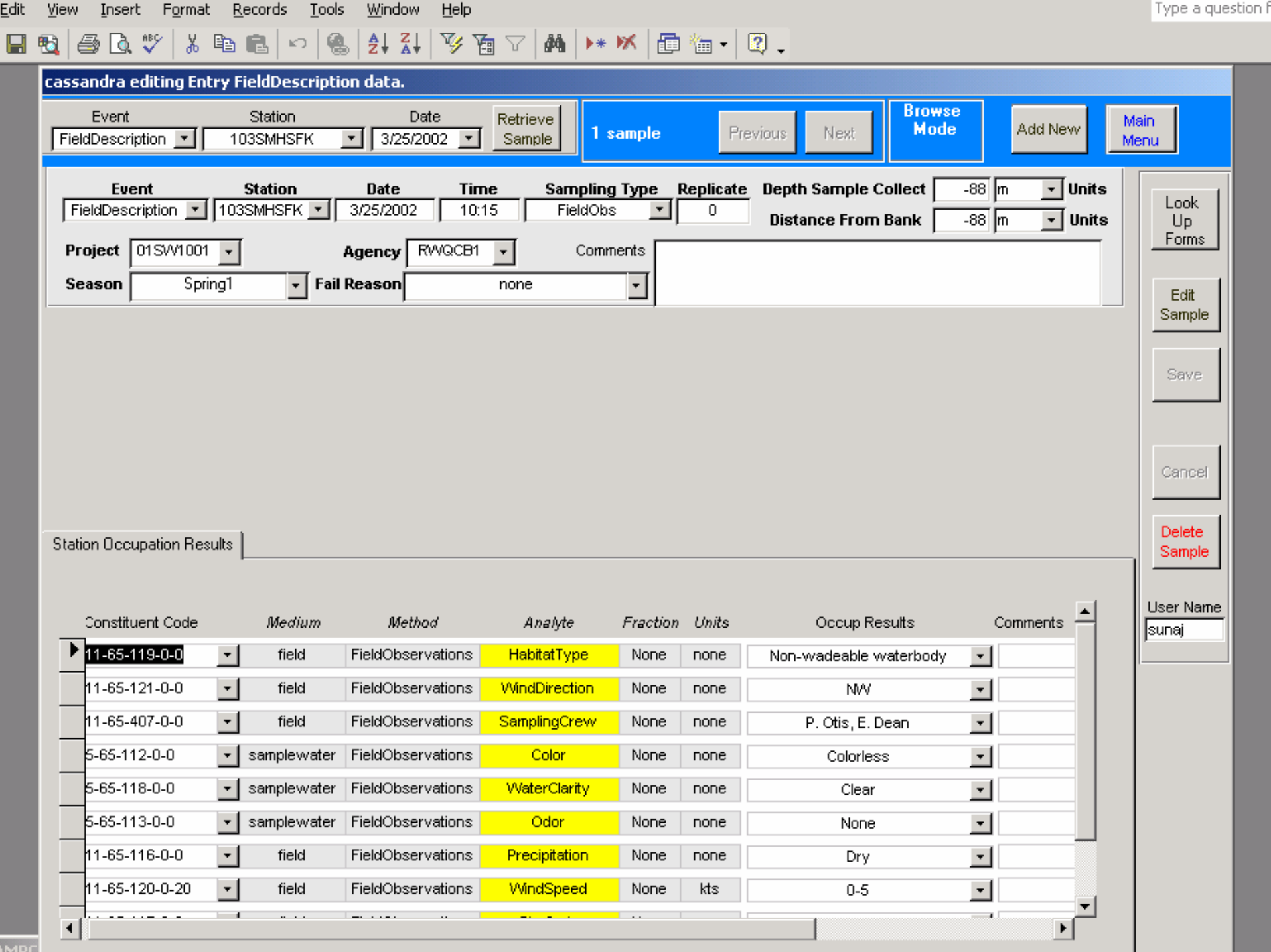
Print

Reports

Export logs

Preview

WAMPCode...


Edit View Insert Format Records Tools Window Help
Type a question f
cassandra editing Entry FieldDescription data.
Event
FieldDescription
Station
103SMHSFK
Date
3/25/2002
Retrieve Sample
1 sample
Previous
Next
Browse Mode
Add New
Main Menu
Event
FieldDescription
Station
103SMHSFK
Date
3/25/2002
Time
10:15
Sampling Type
FieldObs
Replicate
0
Depth Sample Collect
-88
m
Units
Distance From Bank
-88
m
Units
Project
01SWI001
Agency
RWQCB1
Comments
Season
Spring1
Fail Reason
none
Look Up Forms
Edit Sample
Save
Cancel
Delete Sample
User Name
sunaj
Station Occupation Results
Constituent Code
Medium
Method
Analyte
Fraction
Units
Occup Results
Comments
11-65-119-0-0
field
FieldObservations
HabitatType
None
none
Non-wadeable waterbody
11-65-121-0-0
field
FieldObservations
WindDirection
None
none
NW
11-65-407-0-0
field
FieldObservations
SamplingCrew
None
none
P. Otis, E. Dean
5-65-112-0-0
samplewater
FieldObservations
Color
None
none
Colorless
5-65-118-0-0
samplewater
FieldObservations
WaterClarity
None
none
Clear
5-65-113-0-0
samplewater
FieldObservations
Odor
None
none
None
11-65-116-0-0
field
FieldObservations
Precipitation
None
none
Dry
11-65-120-0-20
field
FieldObservations
WindSpeed
None
kts
0-5

Responsibilities of Local SWAMP Database Manager

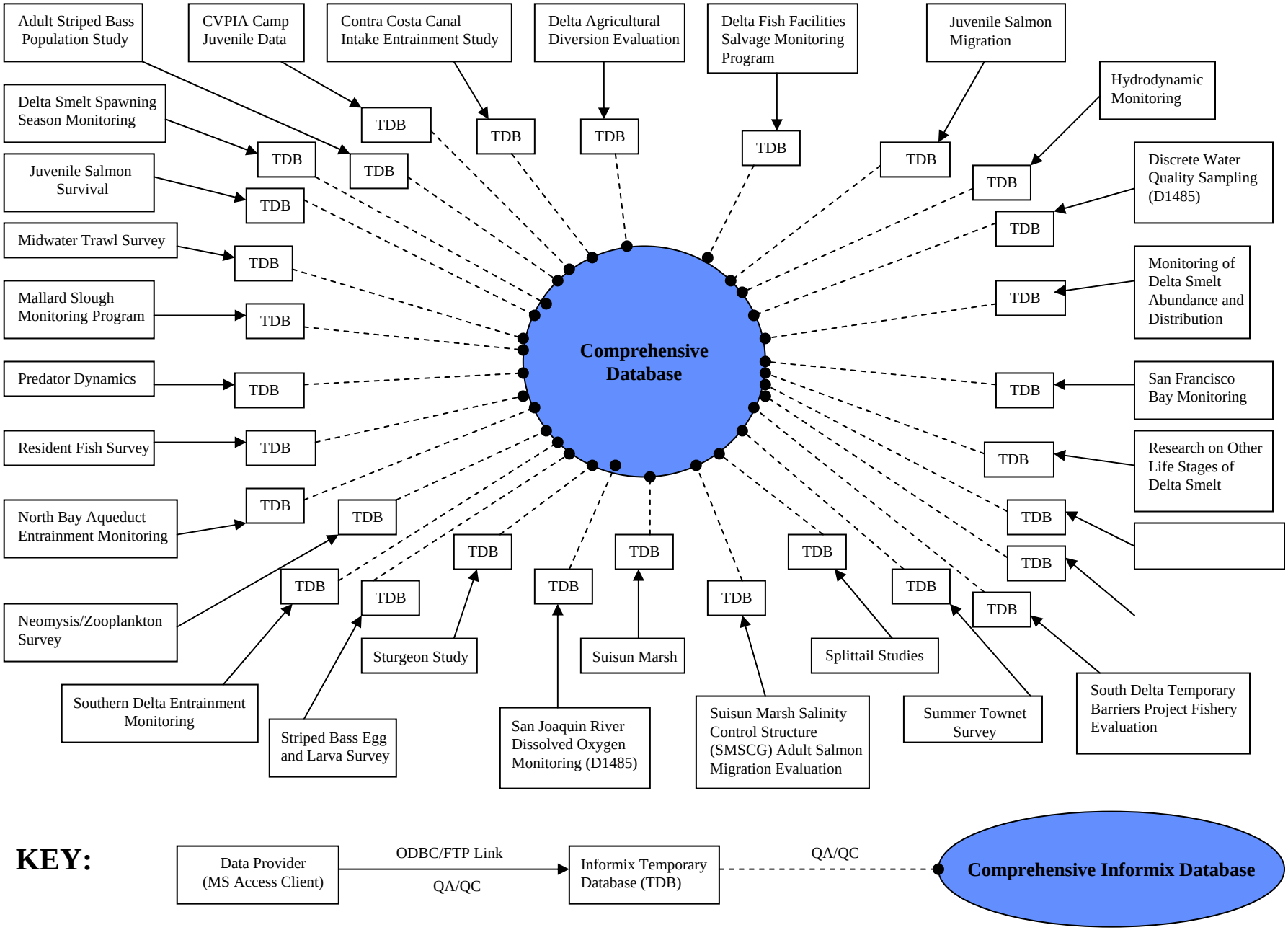
- Customize Local Database w/DWR
- Training/Facilitate Data Entry
  - Field Data
  - Analytical Data
- Quality Assurance of the database
  - Completeness
  - Consistency
  - Anomalies
- Data Output
  - Data Owners-Regional Boards
  - QA Officers
  - Public Access

Background/Enterprise Data System

- Data management is conducted locally
- Data are available locally
- Changes in the local database are reflected in the comprehensive database
- IT staff provide technical assistance that benefit both the data provider and comprehensive database project
- Historic data can be incorporated
- Require maintenance

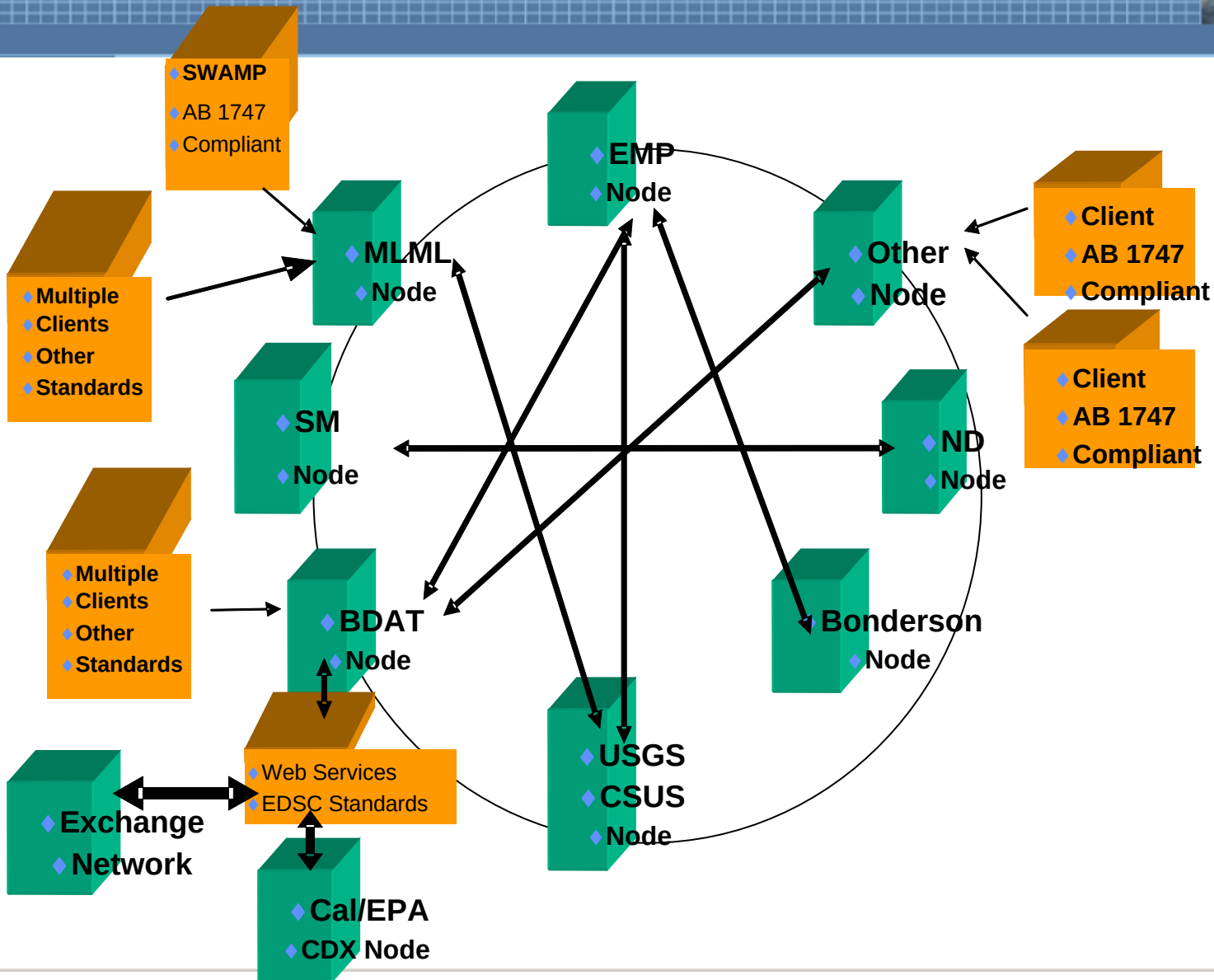
Background-Standards

- For Projects using funds from Prop 13, 40 or 50 we will be using the standards required under AB 1747 or “SWAMP Standards”
- All data shared through BDAT/ CEDEN will be mapped to the EDSC Standards.
- CERES will be doing the metadata Cataloging for BDAT/CEDEN
- Part of the coordinated effort between Resource and Cal/EPA Agencies to manage, integrate and share environmental data.


Adult Striped Bass Population Study
CVPIA Camp Juvenile Data
Contra Costa Canal Intake Entrainment Study
Delta Agricultural Diversion Evaluation
Delta Fish Facilities Salvage Monitoring Program
Juvenile Salmon Migration
Hydrodynamic Monitoring
Delta Smelt Spawning Season Monitoring
Juvenile Salmon Survival
Midwater Trawl Survey
Mallard Slough Monitoring Program
Predator Dynamics
Resident Fish Survey
North Bay Aqueduct Entrainment Monitoring
Neomysis/Zooplankton Survey
Southern Delta Entrainment Monitoring
Striped Bass Egg and Larva Survey
Sturgeon Study
San Joaquin River Dissolved Oxygen Monitoring (D1485)
Suisun Marsh
Suisun Marsh Salinity Control Structure (SMSCG) Adult Salmon Migration Evaluation
Splittail Studies
Summer Townet Survey
South Delta Temporary Barriers Project Fishery Evaluation
Discrete Water Quality Sampling (D1485)
Monitoring of Delta Smelt Abundance and Distribution
San Francisco Bay Monitoring
Research on Other Life Stages of Delta Smelt
TDB
Comprehensive Database
KEY:
Data Provider (MS Access Client)
ODBC/FTP Link
QA/QC
Informix Temporary Database (TDB)
QA/QC
Comprehensive Informix Database

Cooperative Data Management System

C
E
D
E
N



Background/Enterprise Data System

- Relational Database
  - Relates divers types of information, including GIS, from multiple agencies, stakeholder groups.
  - Data are combined using common naming conventions, units, datum, etc
  - Saves data users time by providing these data in a readily accessible format
  - Data can be distributed to remote applications
  - The system keeps track of changes in data

Background/Enterprise Data System

- Infrastructure model is fully scaleable
- System combines the best features of a distributed and comprehensive data management system
  - Data can be queried, with referential integrity, by scientists and applications
  - Data management is conducted by those who collect the data

Other Enterprise Applications

* Web Interface
* V-plotter developed for time-series data
* CALFED
* CVPIA/CAMP
* Modeling
* Datamon
* GR
* Spring Run
* etc

pring Run Report 2000 (Draft)

ta Presented from 08/01/2000

Interagency Ecological Program
COOPERATIVE ECOLOGICAL INVESTIGATIONS SINCE 1970

Spring Run
Spring Run Pivot 70mm to 300mm
Spring Water Quality
Tag Data

/ / Beginning date (mm/dd/yyyy) default : 01/01/1999
/ / Ending date (mm/dd/yyyy) default : 12/31/current year

ubmit

Feedback Welcome!
Mail to IEP folks & logged for review

Disclaimer & Privacy Notice
California Department of Water Resources

Comments or Suggestions
It's NOT to IEP. It's to the main office of Department of Water Resources

Visitor Statistics

Chat Bulletin!
Experimental

View Feedback
DWR CD-ESO subnet access only

E-mail to Web Admin
Things about Web tech

FAX: (916) 227-7554
Environmental Services Office
Department of Water Resources

Backgrounds are random, as in Stress Relief

[Acronyms] [Disclaimer] [Help]

Revised, Thu 4-6-'00 US PDT

Spring Run Report 2000 (Draft)

mple te	Area Sampled	Gear Name	Fish Less Than or Equal 70mm	Fish Greater Than 70mm	Sample Effort	Comments
/31/2001	Butte Creek at Parrot Phalen Dam	Diversion Trap	0.0	0.0	25.5	Weather was clear. . . Debris light.
/30/2001	Butte Creek at Parrot Phalen Dam	Diversion Trap	0.0	0.0	22.3	Weather was clear. . . Debris medium
/29/2001	Butte Creek at Parrot Phalen Dam	Diversion Trap	0.0	0.0	22.3	Weather was clear. . . Debris light.
/28/2001	Butte Creek at Parrot Phalen Dam	Diversion Trap	0.0	0.0	26.5	Weather was clear. . . Debris light.
/27/2001	Butte Creek at Parrot Phalen Dam	Diversion Trap	0.0	0.0	20.5	Weather was clear. . . Debris light.
/27/2001	Butte Creek at Parrot Phalen Dam	Rotary Screw Trap	0.0	0.0	23.3	Weather was clear. . CONE NOT FISHING UPON ARRIVAL Debris light.
/26/2001	Butte Creek at Parrot Phalen Dam	Diversion Trap	0.0	0.0	29.0	Weather was clear. . . Debris light.
	Butte Creek at	Rotary				

Feedback Welcome!
Mail to IEP folks & logged for review

Disclaimer & Privacy Notice
California Department of Water Resources

Comments or Suggestions
It's NOT to IEP. It's to the main office of Department of Water Resources

Visitor Statistics

Chat Bulletin!
Experimental

View Feedback
DWR CD-ESO subnet access only

E-mail to Web Admin
Things about Web tech

FAX: (916) 227-7554
Environmental Services Office
Department of Water Resources

Backgrounds are random, as in Stress Relief

[Acronyms] [Disclaimer] [Help]

Revised, Thu 4-6-'00 US PDT

CALFED

San Joaquin River Dissolved Oxygen Study

Start Your Query Here (Select from one of the data types below)

Biological Queries

- Phytoplankton (Under Constructions!)

Non-Biological Queries

- Basic Water Quality Measurements
- Hydrodynamic Measurements
- Pesticides
- Anions
- Nutrients
- Metals
- Organic Compounds
- Pathogens
- Miscellaneous Lab Analysis (EC, PH, TDS, etc.)

General Instructions

Vista Plotter: R:\temprealtime\real-time\webscript\run2001-05-21\AB\scenarioAvsB.sty

File Edit Actions Help

- IEP Realtime Data
  - SJR @ Antioch(RSAN007/8)
  - SJR @ Andreas(RSAN032)
  - Middle R @ Middle R(rmid015_1/2)
  - Middle R @ Tracy Blvd(rmid027)
  - Cache Sl nr N. end of Hastings Cut(slcch016)
  - Rock Sl at CCC Intake(slrck005)
  - Delta Mendota Canal(chdmc004)
  - Middle River @ Borden Hwy(rmid023)
  - Old R and Holland Cut @ Little Mandeville Is(rold014)
  - Old R @ Bacon Island(rold024)
  - Sacramento R @ Port Chicago(rsac064)
  - Sacramento R @ Collinsville(rsac081)
  - Sacramento R NW of Emmaton(rsac092)
  - Sacramento R @ Rio Vista(rsac101)
  - Sacramento R @ Greens Landing(rsac139)
  - SJR @ Jersey Point(rsan018)
  - South Fork Mokelumne @ Staten Island(rsmkl008)
  - Chadbourne Slough @ Sunrise Club(slcbn002)
  - Dutch Slough nr Farrar Park Bridge(sldut009)
  - Goodyear Slough @ Morrow Island(slgyr003)
  - Montezuma Slough @ Beldons(slmzu011)
  - Suisun Slough @ Volanti Slough(slsus012)
  - Contra Costa Canal @ Pumping Plant 1(chccc006)
  - Old R nr DMC(ds)(rold046)
  - Old R @ Head(rold074)
  - Grant Line Canal @ Tracy Blvd Bridge(chgrl009)
  - Old R nr DMC(us)(rold047)
  - Old R @ Tracy Blvd(rold059)
  - Piper Sl @ Bethel Is(slppr003)
  - Sacramento R @ Mallard
  - SJR nr Prisoners Point
  - Sac R above DCC(rsac128)
  - Sac R below Georgiana
  - Rim Flows(need fixin)

Initialization and Definitions

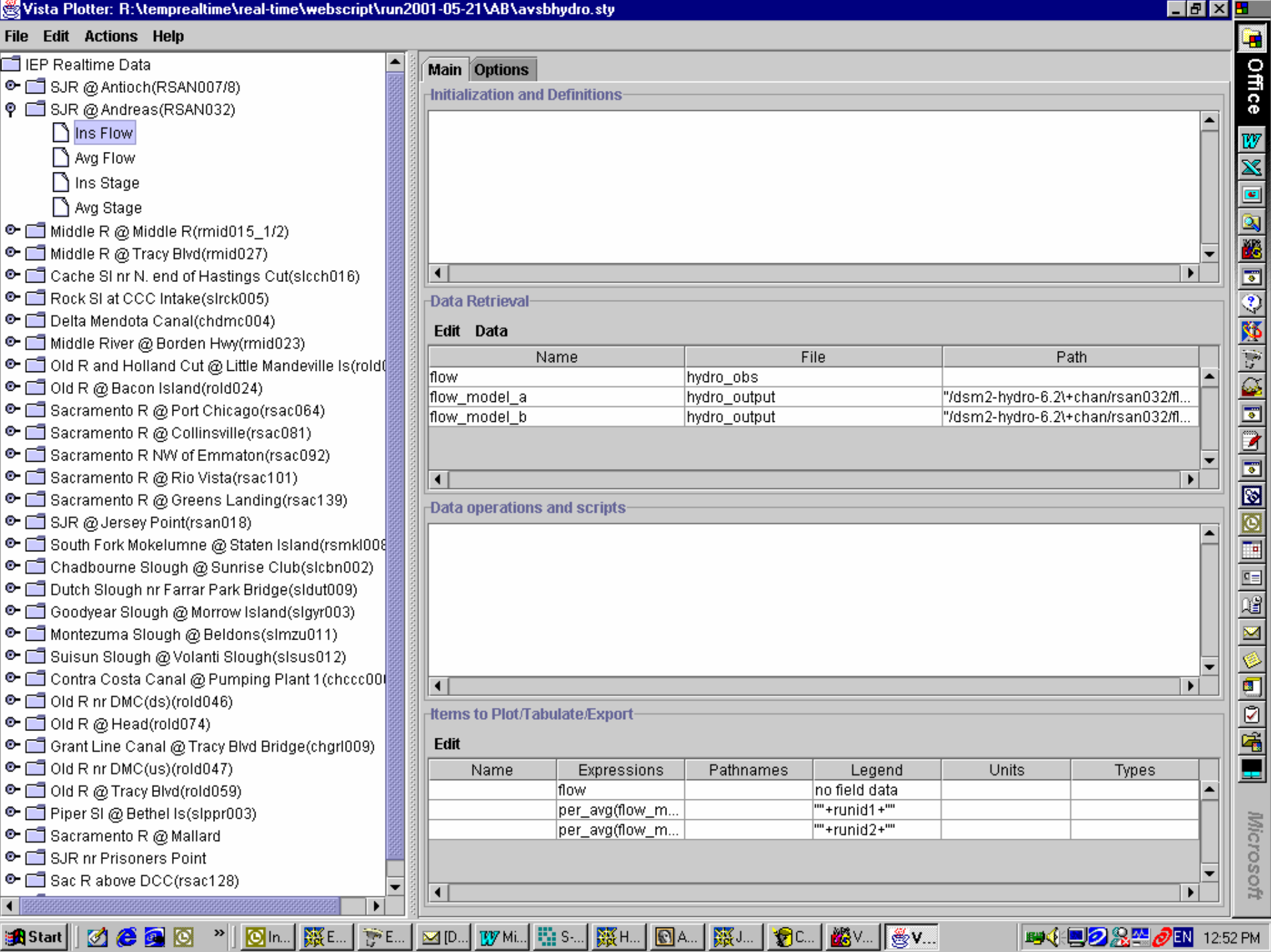
```
today = time('30apr2001 0100')
ti = str(today-'7days') +'- ' + str(today+'32days')
# Note: will encounter an out of memory error if forecast twindow is two or more months

iep_address = 'iep.water.ca.gov::/export/home/www/htdocs/dss/db/'
hydro_obs = iep_address + 'hydro.dss'
qual_obs = iep_address + 'quality.dss'
#qual_output = 'd:/real-time/webscript/run2000-08-22/Ab/qualout-20000822dcc.dss'
hydro_output = 'd:/real-time/webscript/run2001-04-30/Ab/hydout-apr3001.dss'

#edit the variable pathnames as needed for each run
runhyd1="\+A"
runid1="with partial(only boat ramp installed) GLC barrier through end of May"
#runec1="\+B\+FROM-ALL"

runhyd2="\+B"
runid2="partial GLC barrier oper. until May 7, thereafter, normal oper.  through May"
#runec2="\+C\+FROM-ALL"
```

Start In... E... E... [D... Mi... S-... V... V... H... A... J... C... EN 12:19 PM

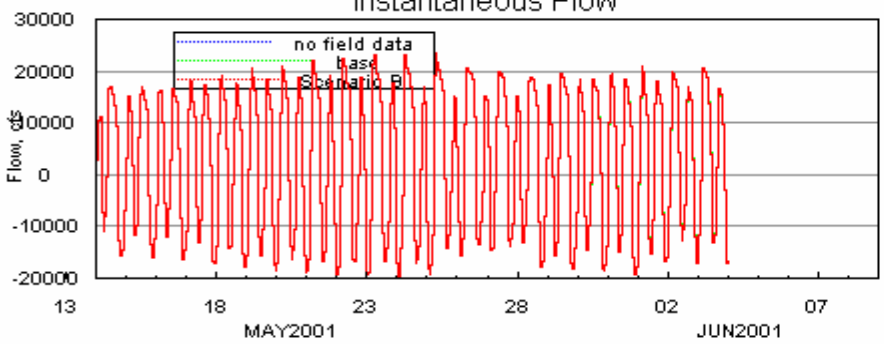

Vista Plotter: R:\temprealtime\real-time\webscript\run2001-05-21\AB\avsbhydro.sty
File Edit Actions Help
IEP Realtime Data
SJR @ Antioch(RSAN007/8)
SJR @ Andreas(RSAN032)
Ins Flow
Avg Flow
Ins Stage
Avg Stage
Middle R @ Middle R(rmid015_1/2)
Middle R @ Tracy Blvd(rmid027)
Cache Sl nr N. end of Hastings Cut(slcch016)
Rock Sl at CCC Intake(slrck005)
Delta Mendota Canal(chdmc004)
Middle River @ Borden Hwy(rmid023)
Old R and Holland Cut @ Little Mandeville Is(rold
Old R @ Bacon Island(rold024)
Sacramento R @ Port Chicago(rsac064)
Sacramento R @ Collinsville(rsac081)
Sacramento R NW of Emmaton(rsac092)
Sacramento R @ Rio Vista(rsac101)
Sacramento R @ Greens Landing(rsac139)
SJR @ Jersey Point(rsan018)
South Fork Mokelumne @ Staten Island(rsmkl008
Chadbourne Slough @ Sunrise Club(slcbn002)
Dutch Slough nr Farrar Park Bridge(sldut009)
Goodyear Slough @ Morrow Island(slgyr003)
Montezuma Slough @ Beldons(slmzu011)
Suisun Slough @ Volanti Slough(slsus012)
Contra Costa Canal @ Pumping Plant 1(chccc00
Old R nr DMC(ds)(rold046)
Old R @ Head(rold074)
Grant Line Canal @ Tracy Blvd Bridge(chgrl009)
Old R nr DMC(us)(rold047)
Old R @ Tracy Blvd(rold059)
Piper Sl @ Bethel Is(slppr003)
Sacramento R @ Mallard
SJR nr Prisoners Point
Sac R above DCC(rsac128)
Main
Options
Initialization and Definitions
Data Retrieval
Edit Data
Name
File
Path
flow
hydro_obs
flow_model_a
hydro_output
"/dsm2-hydro-6.2\+chan/rsan032/fl...
flow_model_b
hydro_output
"/dsm2-hydro-6.2\+chan/rsan032/fl...
Data operations and scripts
Items to Plot/Tabulate/Export
Edit
Name
Expressions
Pathnames
Legend
Units
Types
flow
no field data
per_avg(flow_m...
""+runid1+""
per_avg(flow_m...
""+runid2+""
Office
Microsoft
Start
12:52 PM

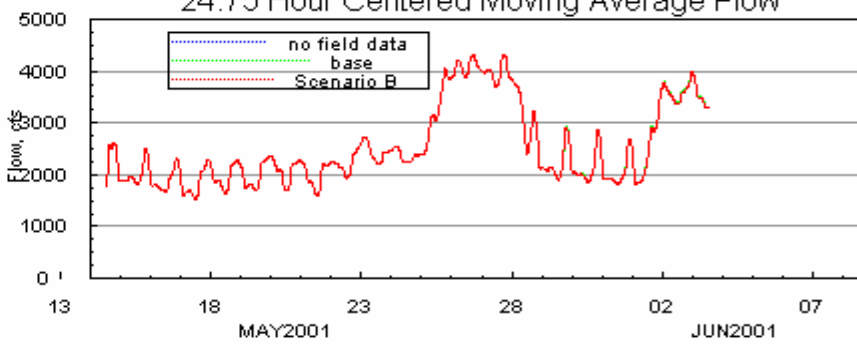
graph#2

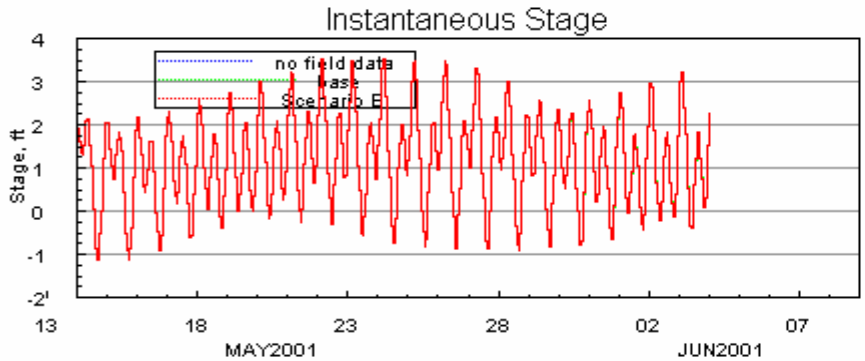
Graph Display

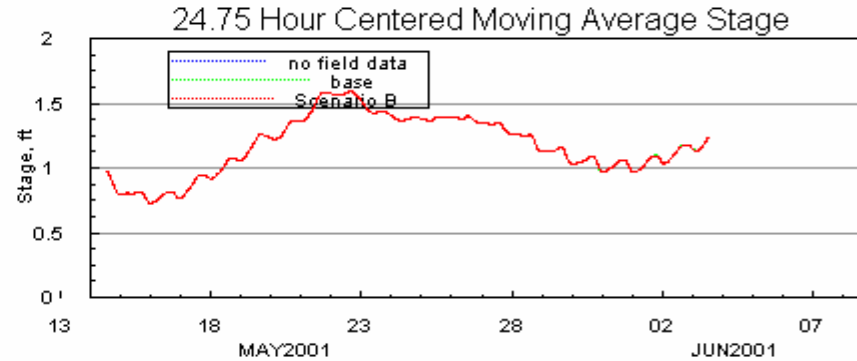
Zoom Out Paging

DWR O&M Realtime DSM2 Model Results for SJR @ Andreas (RSAN032)









Start

Real Time Forecast Results for 2001-05-29, Scenario A vs Scenario B - Netscape

File Edit View Go Communicator Help Send

Back Forward Reload Home Search Netscape Print Security Stop

Bookmarks Location: http://www.iep.water.ca.gov/cgi-bin/dsm2pwt/realtime/individual_run_results.pl What's Related

Employee Self-S Interagency Eco Environmental S Directory listi Home Page Generated Docum Java(TM) 2 SDK [SYSTRAN] Internet Lookup

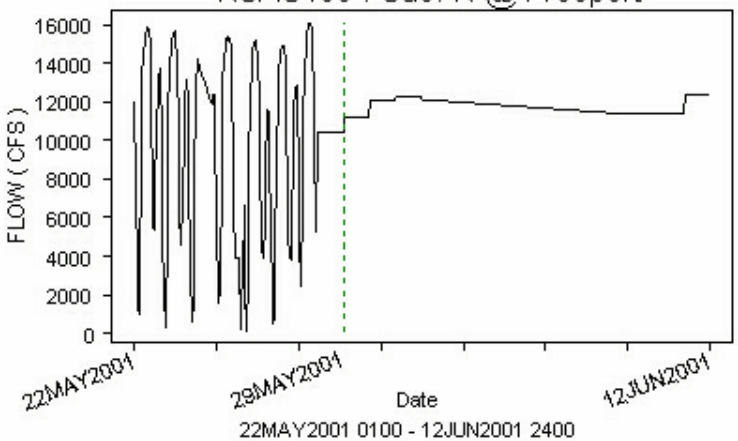
Real Time Forecast Results for
2001-05-29, Scenario A vs Scenario B

DWR Operations and Maintenance
Operations Control Office

Run Description
Download All Plots
Download html file

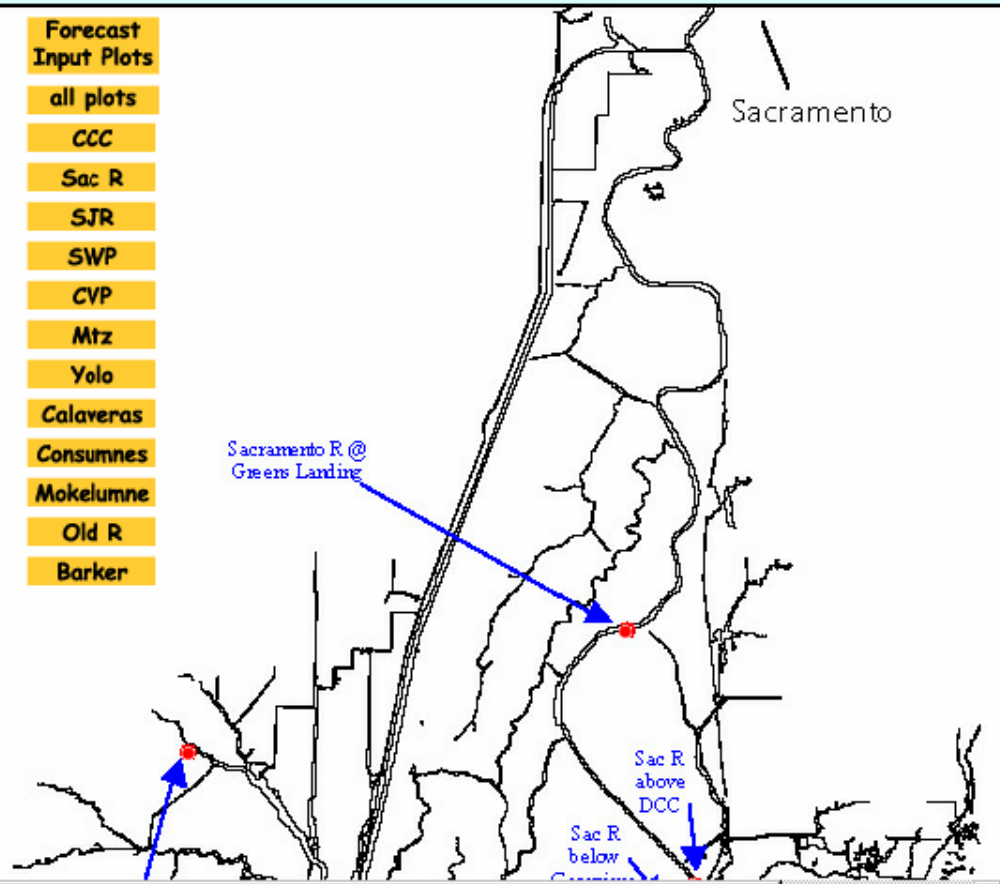
Forecast Input Legend
- End of historical data
- Forecast Date
- First Scenario
- Second Scenario

RSAC155 : Sac. R @ Freeport



22MAY2001 0100 - 12JUN2001 2400

Forecast Input Plots
- all plots
- CCC
- Sac R
- SJR
- SWP
- CVP
- Mtz
- Yolo
- Calaveras
- Consumnes
- Mokelumne
- Old R
- Barker



Document: Done

Start realti... Excit... CNN... Capit... PC-X... telnet Emacs RE: ... S-PL... Re... EN 3:40 PM

Background/Data Currently Loaded

- CVPIA/CAMP Fisheries & Basic WQ data
  - DFG Region 4-Tuolomne & Merced River
  - SPCA-Stanislaus River
  - EBMUD-Mokelumne River
  - DWR-Feather River
  - USFWS Red Bluff- Battle & Clear Creek
  - DFG GCID-GCID

Background/Data Currently Loaded

- IEP
  - UCD Suisun Marsh Studies -Suisun Marsh Monitoring
  - USGS Hydrologic Monitoring Studies
  - DWR Continuous Monitoring Data
  - DFG Bay-Studies (In Progress)
  - Program enhancements associated with the POD

Background/Data Currently Loaded

- IEP
  - USFWS Stockton-Juvenile Monitoring
  - DFG Summer Townet Survey
  - DFG Fall Midwater Trawl
  - DWR Yolo Bypass Monitoring
  - Mysids Zooplankton (In Process)
  - EMP WQ, Phytoplankton, Continuous & Benthic

Background/Data Currently Loaded

- SWAMP
  - Water Quality
  - Field Monitoring
  - Toxicity
  - Bioassessment (In Process)
  - Continuous Monitoring (In Process)

BDAT

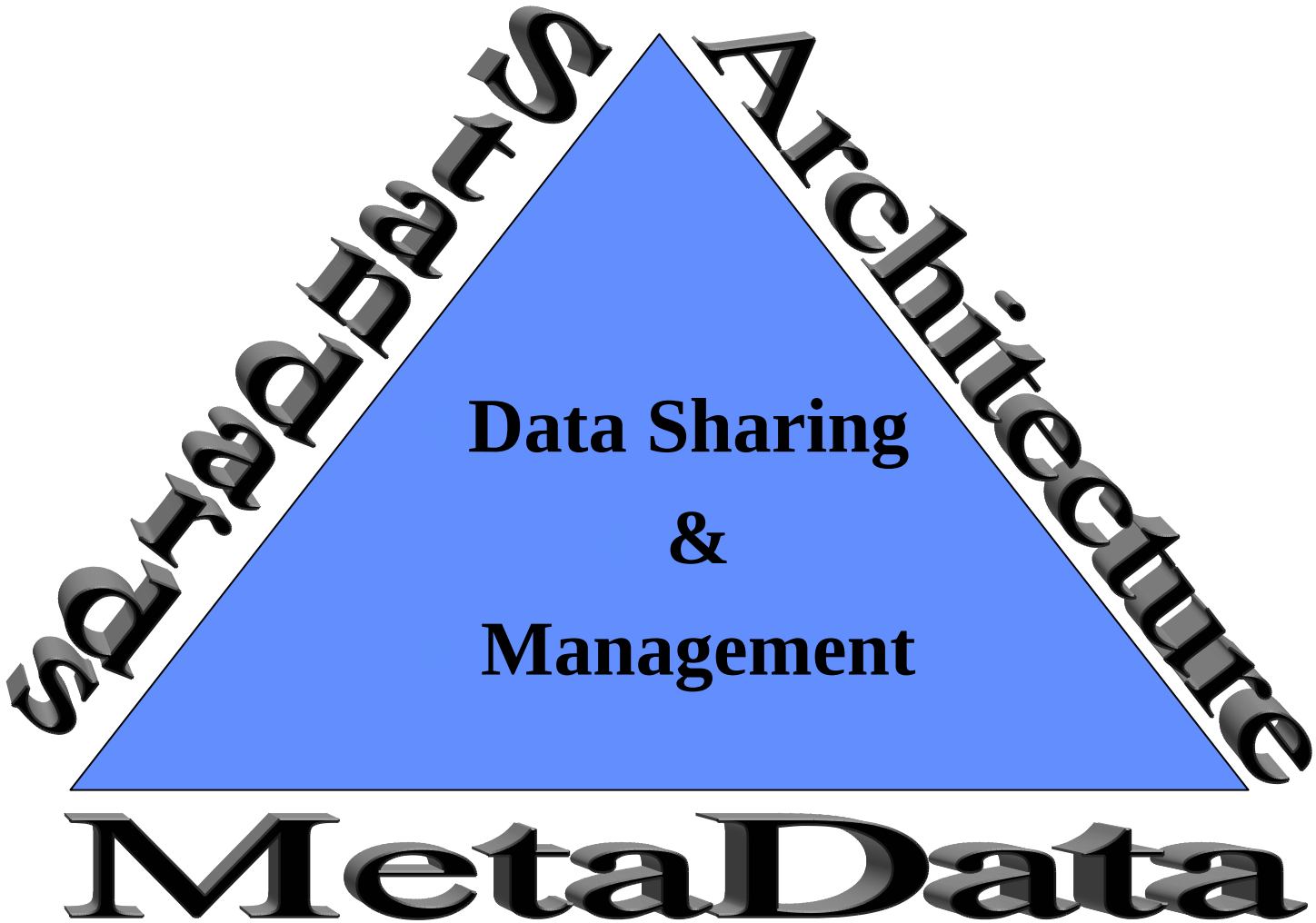
Current/Activities

- Data Loading-Client Development
- Adding new local databases into the network
  - Ag Waiver Region 5
  - Bio-assessment
  - Developing alternative mechanisms for data loading

Current Projects Exchange Network

- Developed list of priority datasets.
- Working with EPA Region 10 and Sate of Oregon on implementing WQ XML Schema.
- Working with NOAA Fisheries and StreamNet on population XML schema.
- Implementing CDX WQ node.
- Starting work on local database development

Future Activities
Standards for Biological Metrics



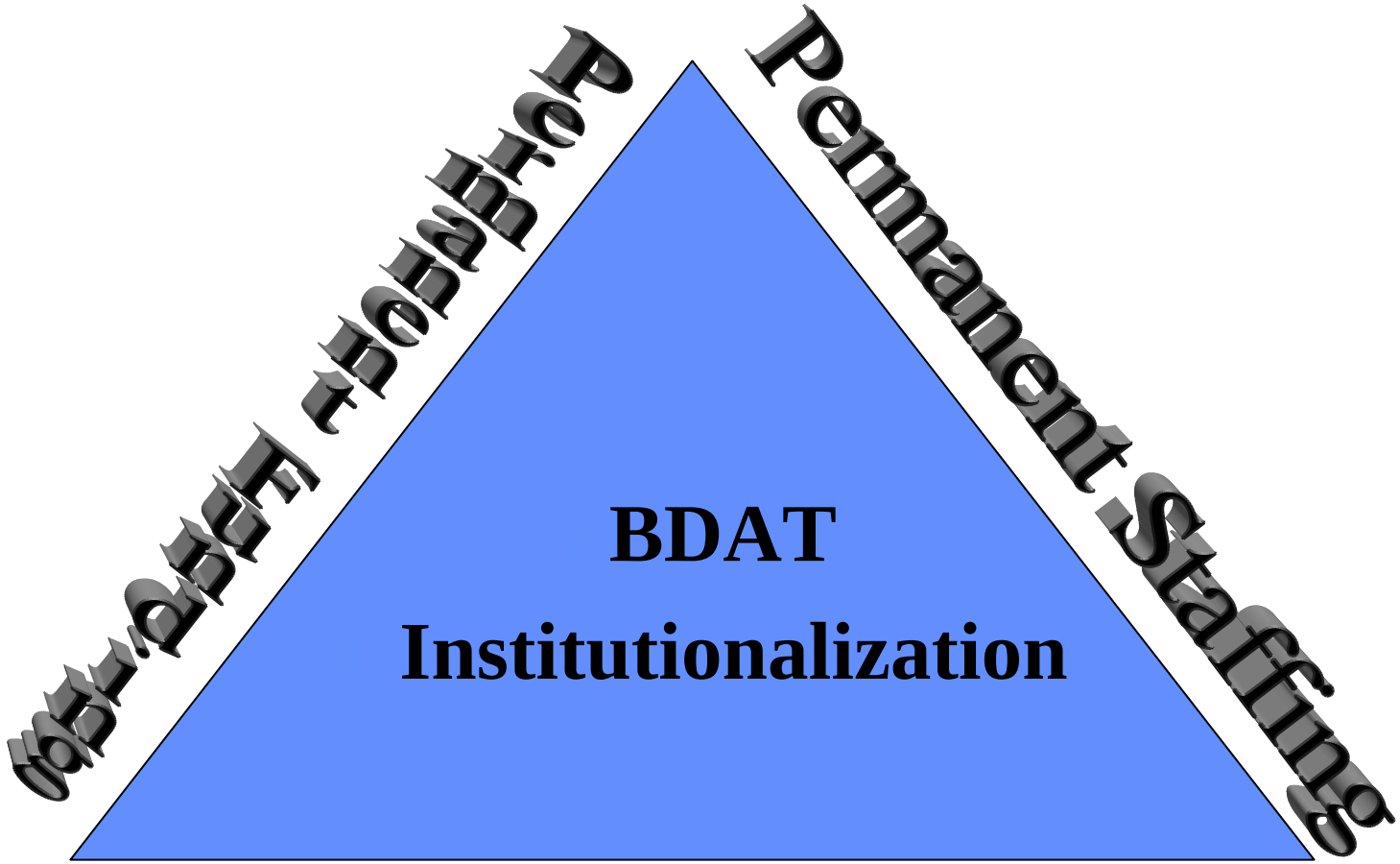
Future Activities Watersheds

- Work with local watersheds, primarily in CVWQB Region 5 on implementation of monitoring programs
  - Implementation of adult anadromous fish databases
  - Implementation of non-point monitoring data

Future Activities Watersheds

- Work with local watersheds, primarily in CVWQCB (Region 5) on implementation of monitoring programs
  - Implementation of adult anadromous fish databases
  - Implementation of non-point monitoring data

Future Activities
BDAT Institutionalization



Bay Delta and Tributaries Project - BDAT - Microsoft Internet Explorer provided by DWR - DES

File Edit View Favorites Tools Help

Cooperative Data Management System

DBIMap:Field Measurements - Microsoft Internet Explorer provided by DWR - DES

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://sarabande.water.ca.gov:8000/~bdtdb/imgsvr/field_dwr_new_L1.html

Field Measurements Results

Query parameters:

- Project
- Station
- Matrix
- Method
- Analyte
- SampleDate

Type the first few letters of the word:

Oxygen-Dissolved
Oxygen-Saturation-Dissolved
Salinity-
Secchi-
Specific Conductance-
Turbidity-
Water Temperature-
Weather Observations-
Wind Direction-
Wind Velocity-

Refresh Analyte...
Select every Analyte...
Clear every Analyte...
Select all data...
Keyword Search

Selection | Advanced

```
=================== Criteria ========================
Project:            Select All
Station:            Select All
Matrix:             Select All
Method:             Select All
Analyte:            Secchi-
                    Turbidity-
SampleDate:         Between 1961-10-18 and 2200-01-12
```

Format: Text File
Display Limit: 2000
SQL Advanced... Count
Hide Map Retrieve

Use SHIFT-mouse click to select range. Use CTRL-mouse click to select multiple items.

0%

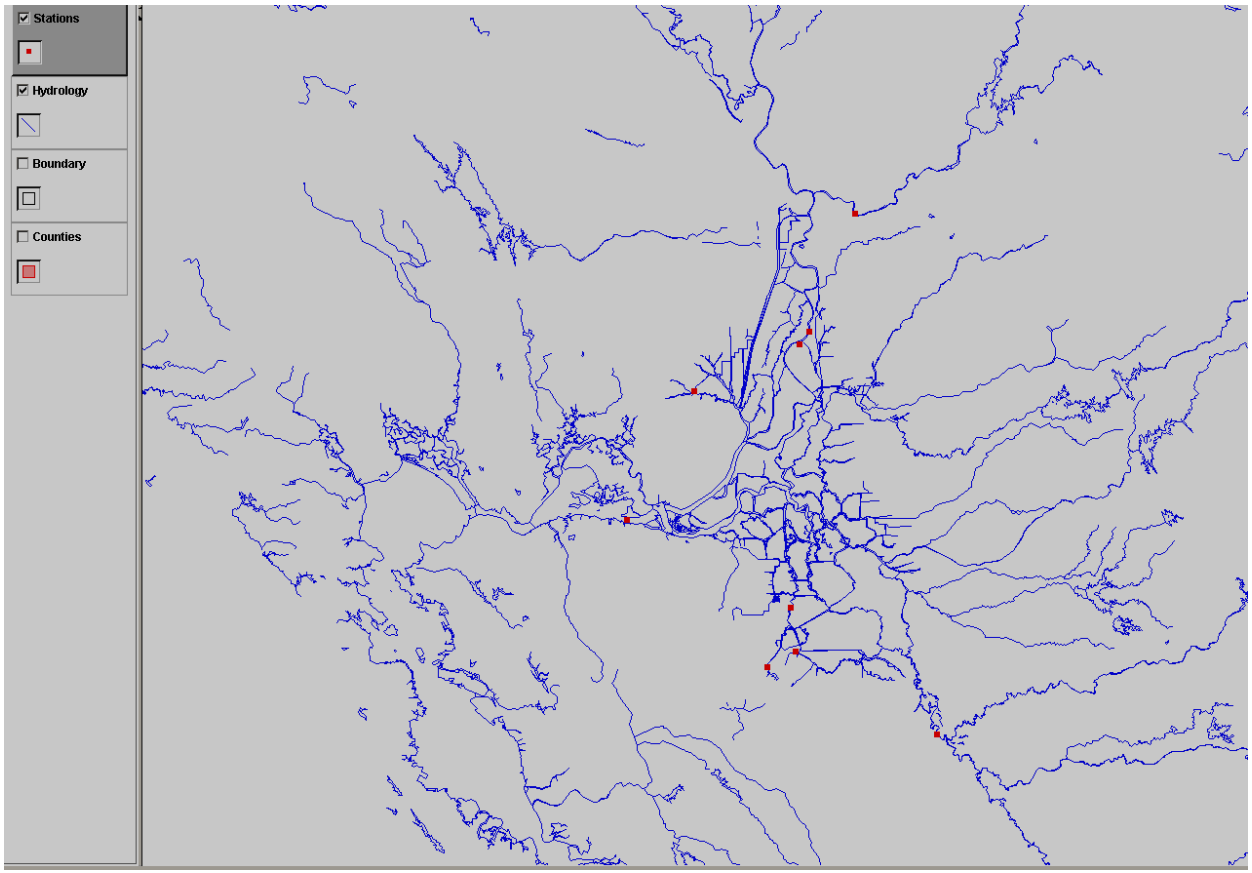
[Main | Help]

Bay Delta and Tributaries Project - BDAT - Microsoft Internet Explorer provided by DWR - DES

File Edit View Favorites Tools Help

BDAT

Cooperative Data Management System

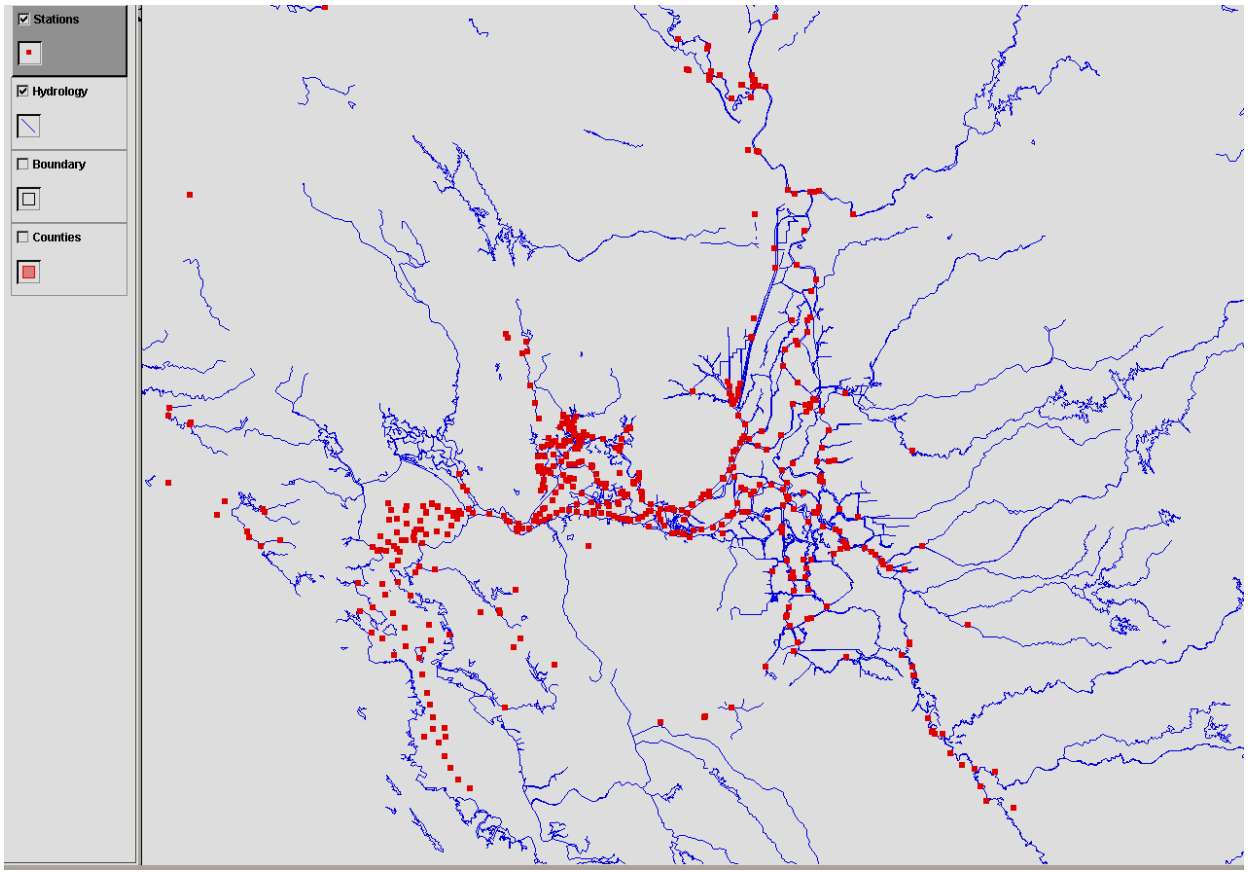


Bay Delta and Tributaries Project - BDAT - Microsoft Internet Explorer provided by DWR - DES

File Edit View Favorites Tools Help

BDAT

Cooperative Data Management System



Conclusion

- The Bay/Delta and Tributaries data system has been implemented.
  - This system is a comprehensive source of biological, water quality and hydrodynamics information for the Estuary, its watersheds and other regions of the State

Conclusion

- Questions?