SB88 Monitoring Method
and Alternative Compliance Plan:
A field-level approach to remotely sensed water use estimation in the Sacramento-San Joaquin Delta

The Freshwater Trust®

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SB-88 Alternative Compliance Plan

- <u>Five-year plan</u> to develop and validate a new measurement method for determining water diversion in the Delta

- Technologic and hydrologic barriers to the application of conventional measuring devices, data collection equipment, and telemetry

- Goals are two-fold:

  1. fulfill reporting requirements for participants

  2. advance the science of consumptive use estimations through automation, refinement, and comparison of existing methodologies

ACP Participants

- Recruitment of participants is on-going

- Currently:

  65 water right holders

  162 licenses and statements

  183 diversions
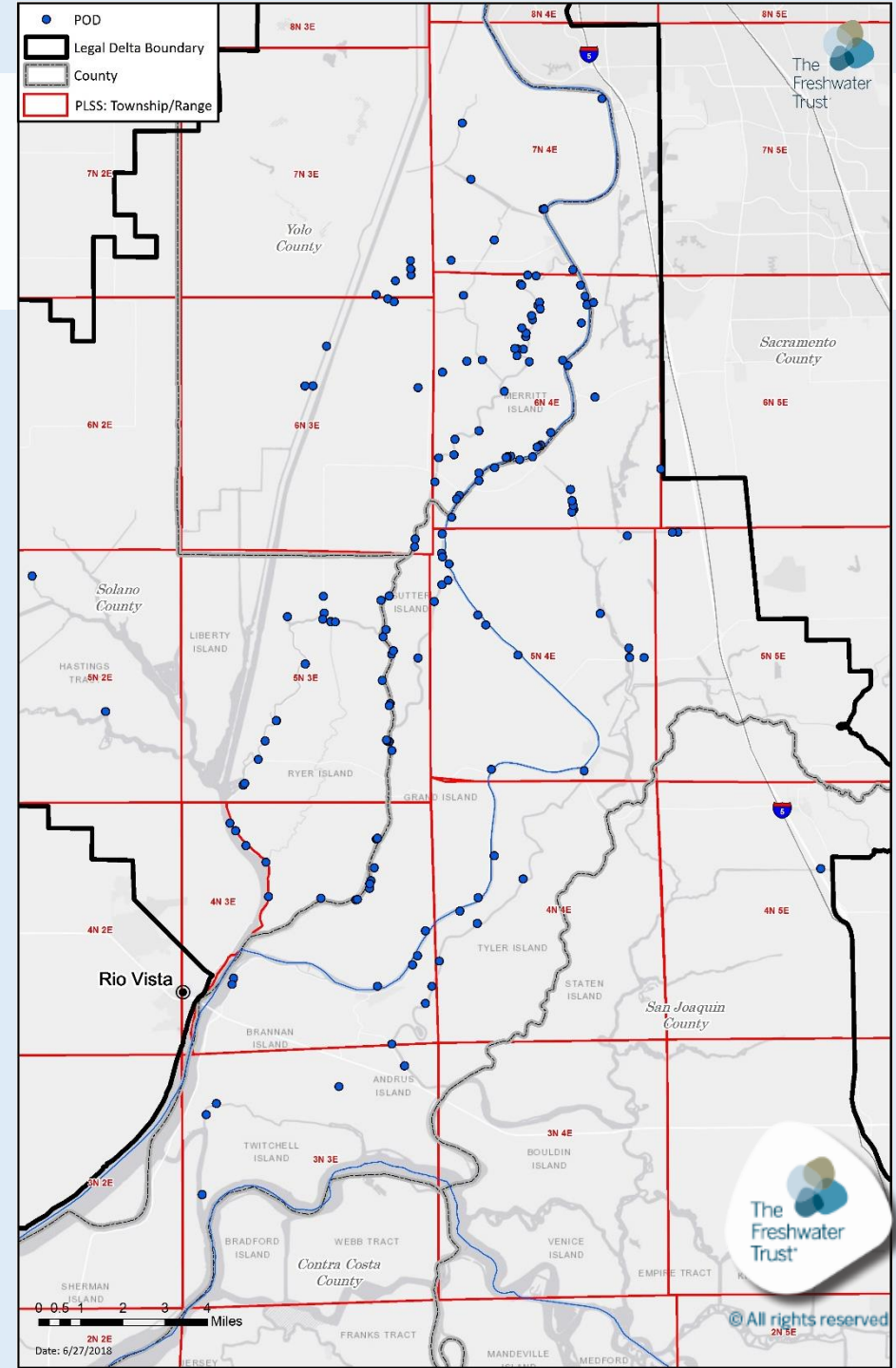
Data Collection

- Crops – acreages and rotations (including cover cropping)

- Irrigation methods and schedules per field

- Points of use for each point of diversion

- Sources:

  - Participant-supplied

  - Publicly available

  - Remotely sensed

Field-Level Water Use Modeling

Reporting

- Batch reporting to SWRCB anticipated in future years

- 2017 reporting reflects automated CUP+ output

- Field-level results aggregated to water rights

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE FOR 2017

Primary Owner:
Statement Number: S0
Date Submitted: 06/25/2018

1. Water is used under
2. Year diversion commenced

Riparian Claim
Pre-1914 Claim
1899

Irrigation

3. Purpose of Use

	Multiple Crops	Irrigated Crops	
Alfalfa	No	Area Irrigated (Acres)	
		460	

Primary Irrigation Method
Sprinkler

4. Changes in Method of Diversion

C1. Are you using any water diverted under this right for the cultivation of cannabis? No

Special Use Categories

5-6. Maximum Rate of Diversion for each Month and Amount of Water Diverted and Used

Month	Rate of diversion	Amount directly diverted (Acre-Feet)	Amount diverted or collected to storage (Acre-Feet)	Amount beneficially used (Acre-Feet)
January				
February		0		
March		0	0	0
April		0	0	0
May		224.52	0	0
June		405	0	0
July		438.09	0	144.85
August		512.36	0	261.29
September		449.82	0	282.64
October		338.52	0	330.55
November		233.86	0	290.21
December		69.87	0	218.4
Total		0	0	150.88
Type of Diversion	Direct Diversion Only	2672.04	0	45.08
Comments			0	0
				1723.9

6d. Water transfered
Water Transfers
6e. Quantity transfered (Acre-Feet)
6f. Dates which transfer occurred

No

/ to /

(1) Irrigation End Date
YYYY-MM-DD or N/A

(2) Crop 2
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Other:

Research Questions

- How do results of field-level, management-based ET models compare to one another? (CUP vs SIMETAW)

- How do ET model results compare to results of other measurement methods, such as meters?

- How can estimated water diversion be refined to account for factors beyond consumptive use, such as conveyance, irrigation efficiencies, etc.?

- Can remotely sensed crop, irrigation, and management data be used for model inputs?

- What is the best workflow to accommodate data collection, water use estimation, and reporting?

Jan 2017 – June 2018
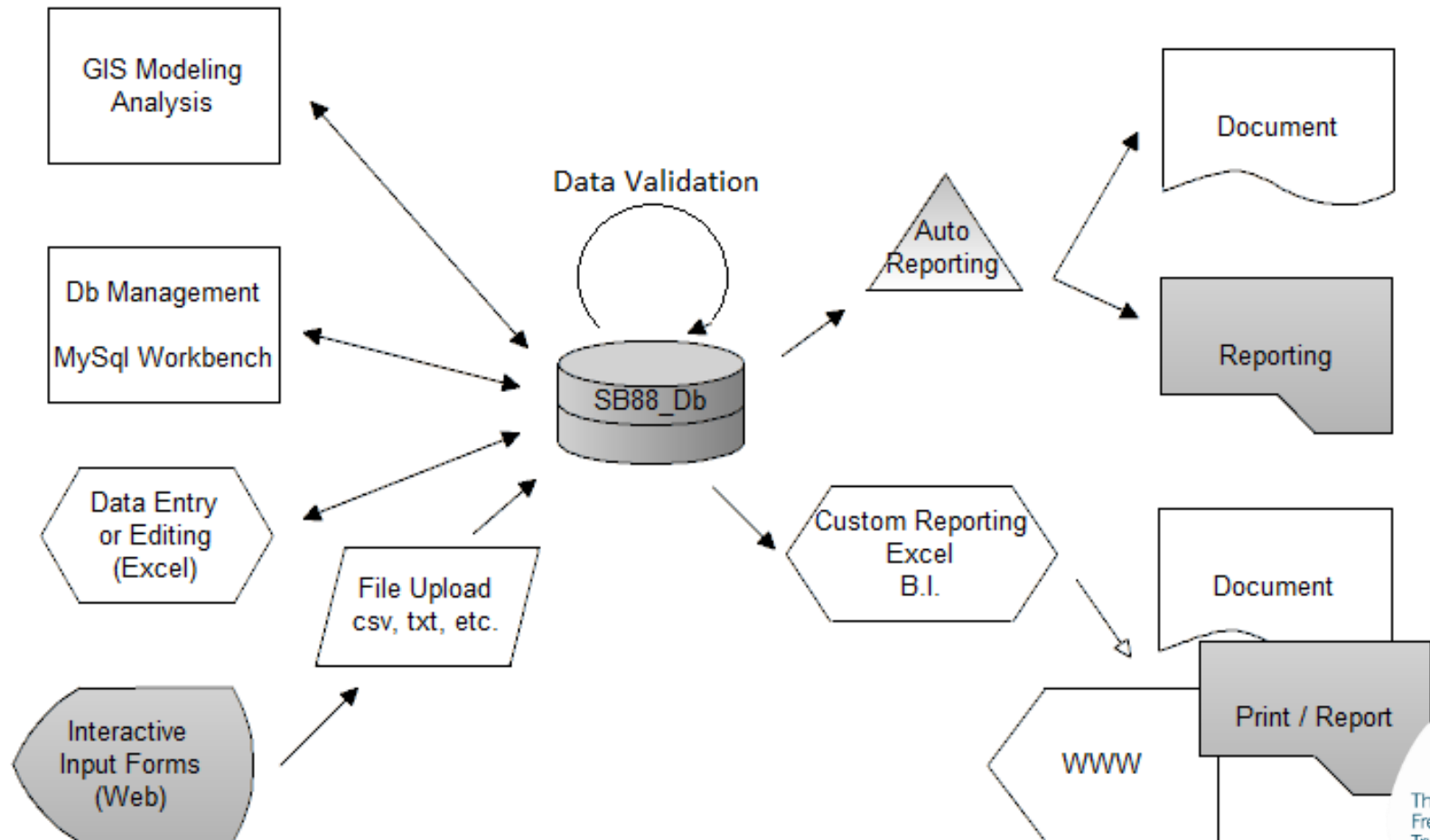
Data Flow Diagram (Draft)

Workflow Overview

- Delineate agricultural fields in GIS using satellite imagery

- Store additional data in DB associated with each field (remotely sensed sources, participant-supplied data, etc.)

- Pull daily reference ET and precipitation data into database from CIMIS

- Associate fields with water rights and diversions in DB for reporting

- Run model for all fields in R to get results and data validation report

Database

Next Steps: ET Model Comparison

- Compare ET model results

- Field-level models that take into account management practices

- CUP+, ITRC Metric, and CALSIMETAW

Next Steps: Methods Comparison

- Metered pumps and siphons

- The Nature Conservancy

- Accuracy issues

- Relate trends to crop and management practices for additional model parameters
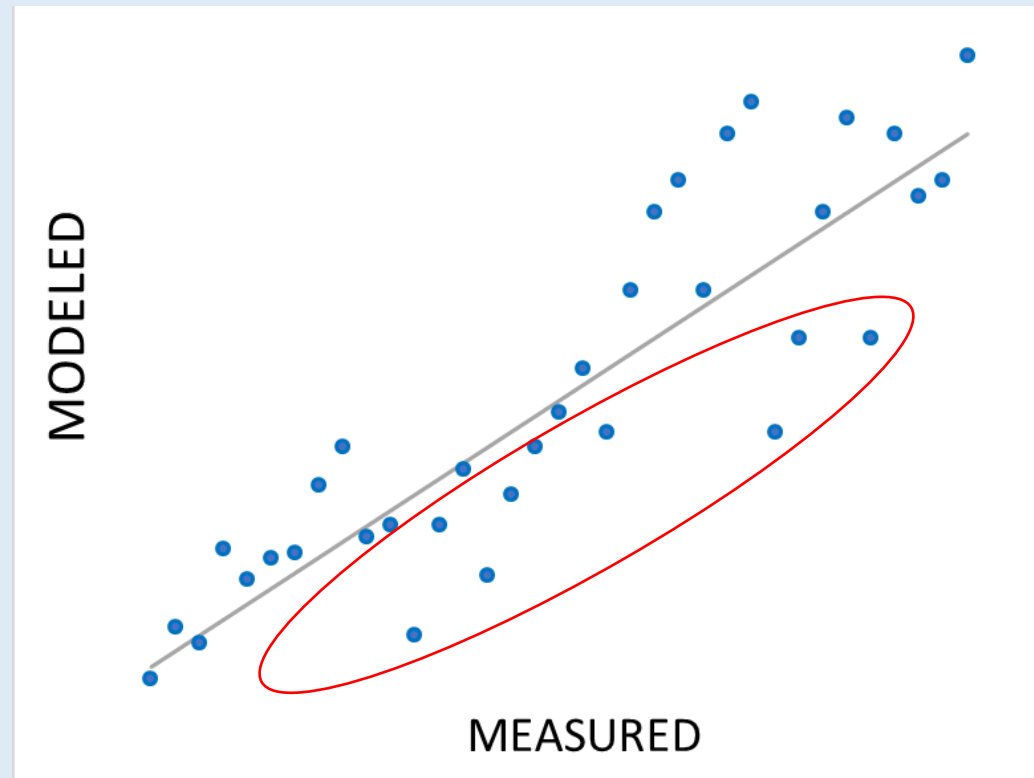
Next Steps: Water Budgets

- Whole island data, including return flows back to river

- Help to understand water diverted rather than ET

- Seepage, runoff, conveyance loss, infiltration, etc.

Precipitation

Evaporation Evapotranspiration

Runoff Irrigation

Soil Infiltration

Water table

Groundwater aquifer

Confining bed
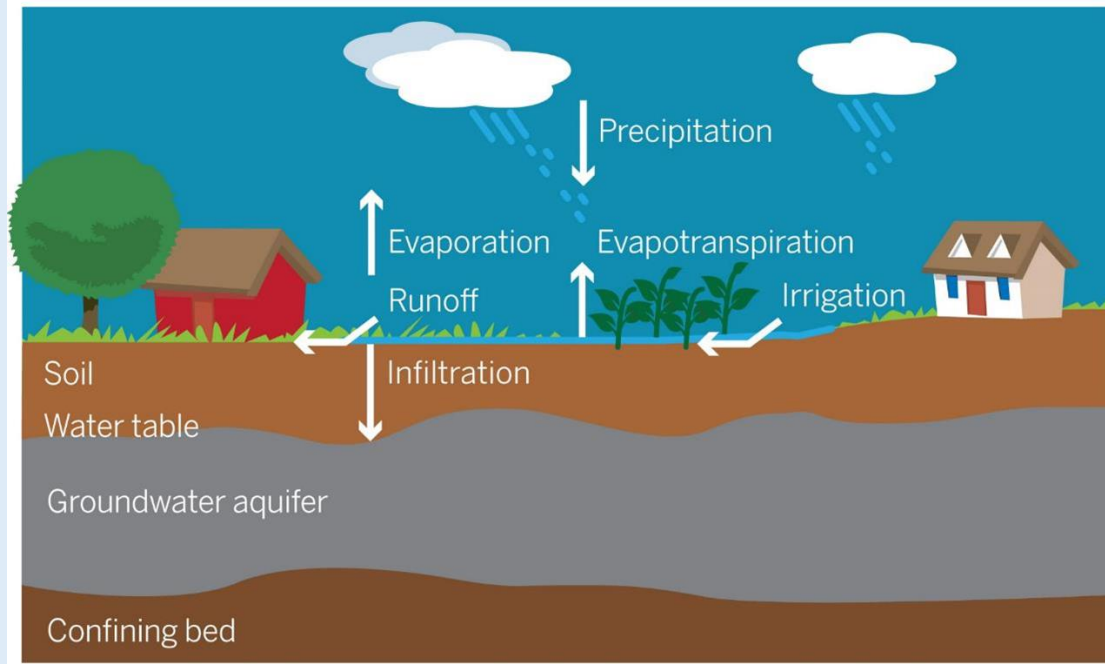
Next Steps – Remotely-sensed data

- Use of machine learning and neural networks:

  - Irrigation type & intensity

  - Crop rotation, orchard age

  - Cover crop use & intensity

  - Conveyance/Drainage network

- POD, POU, and water right association through eWRIMS database and tax-lot records
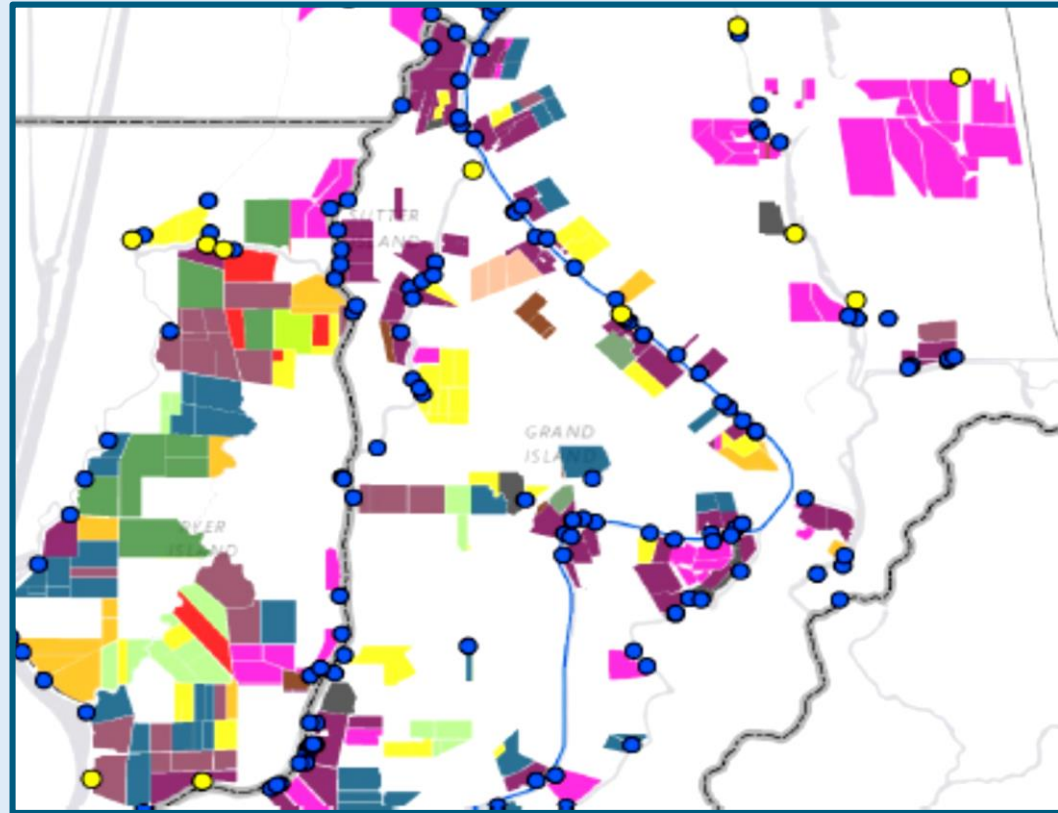
TFT and the Delta

- TFT is creating a decision-support tool to show how agricultural management practices can contribute to meeting surface water and groundwater goals

- Optimal distribution of agricultural management practices, while maintaining or improving production and flexibility for farmers

- Understand how management practices on a single field contribute to meeting these targets

- Watershed assessment that involves spatially explicit cost-benefit analysis, modeling, and land use optimization

- Maintain and restore health of Delta surface- and groundwater-dependent ecosystems

StreamBank®

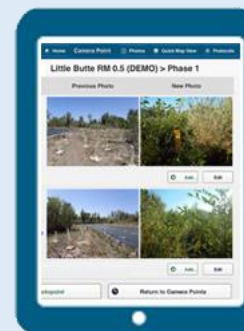| Analysis & prioritization	Implementation	Tracking

BasinScout™

DIET
Dynamic Implementation Environment Tool

Monitoring App

Tracking Tool

Questions & Discussion