



Sustainable Conservation

**Reconnecting Headwaters with
Floodplains in a Managed Way**

Headwaters to Groundwater Symposium

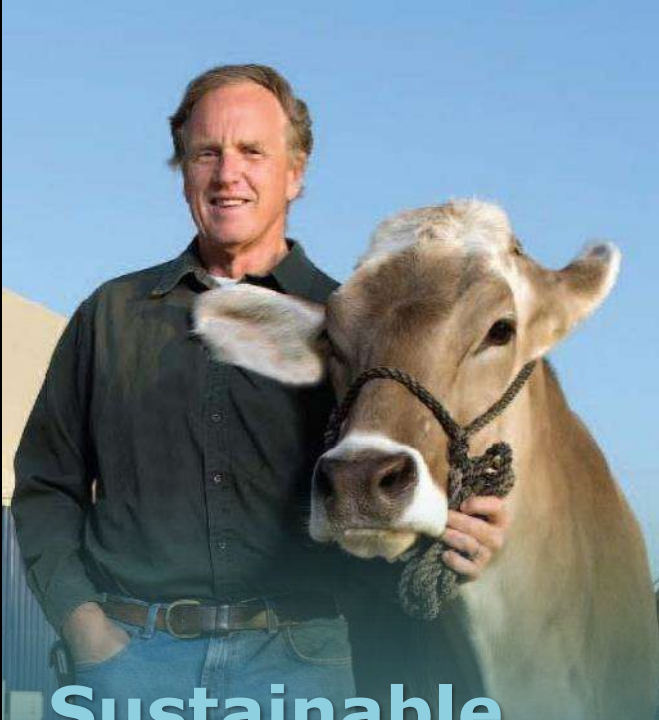
October 12, 2017



Agenda

- 1. Background**
- 2. Contributing factors to GW Overdraft in SJV.**
- 3. Problems created by Severe Overdraft.**
- 4. Different forms of recharge.**
- 5. Optimizing SGMA planning:
Groundwater Recharge Assessment Tool**

Sustainable Conservation helps California thrive by uniting people to solve the toughest challenges facing our land, air, and water.

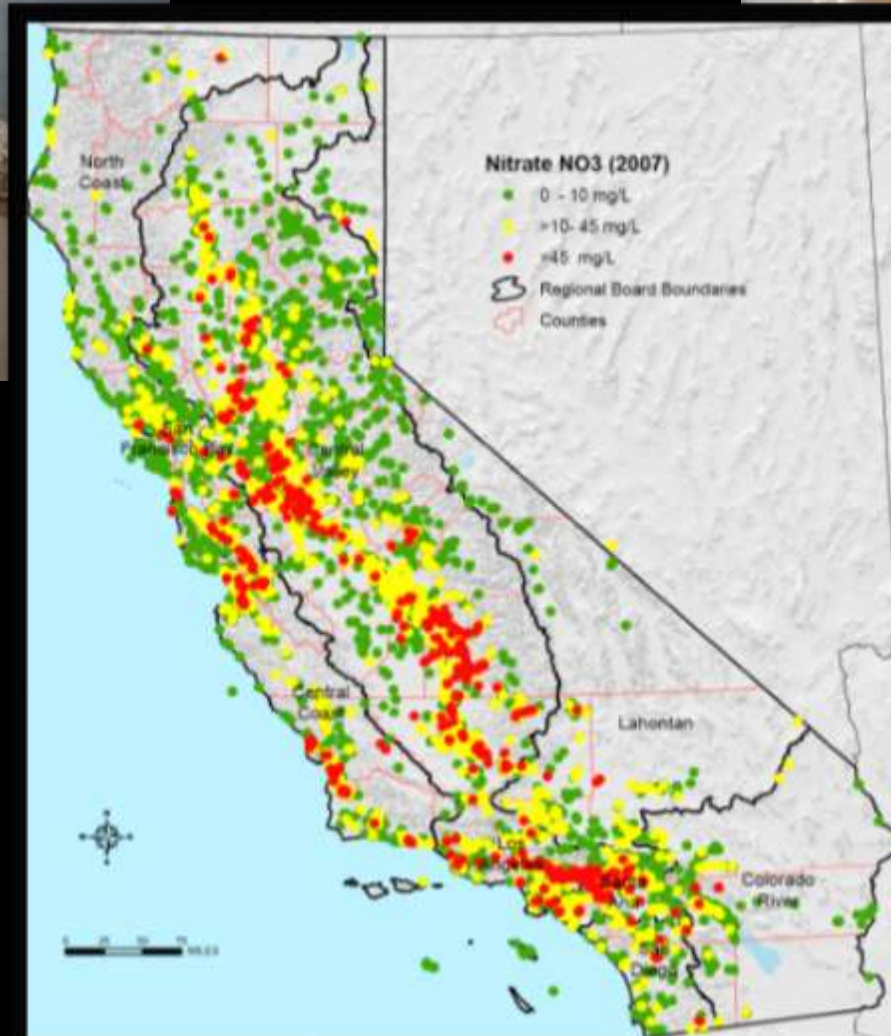


Contributing Factors





**Problems
created by
severe
Overdraft**



Different Forms of Recharge

Dedicated basin

On-farm



\$124 - 250/Acre Foot



\$40 - 107/Acre foot

SGMA Planning Needs



1. **Where** is recharge best done? **When**?
2. **How much** surface water can we capture?
3. What would it **cost**?
4. **How much of our groundwater overdraft** can be addressed by increasing recharge?

Groundwater Recharge Assessment Tool

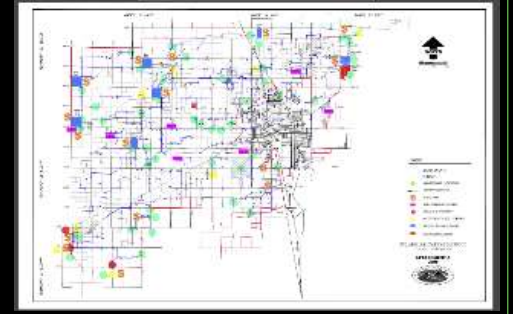
Water Available for Recharge



- Surface water availability
- Excess flood flows
- Water rights

Conveyance

- Conveyance infrastructure
- Delivery capacity to fields



Site Suitability

- Recharge suitability: slope, soil type, clay layers, underlying geology, depth to groundwater
- Crop and land use suitability

On-Farm and Fallow Recharge

- Infiltration-percolation potential (crop compatibility calendar)



Dedicated Basins

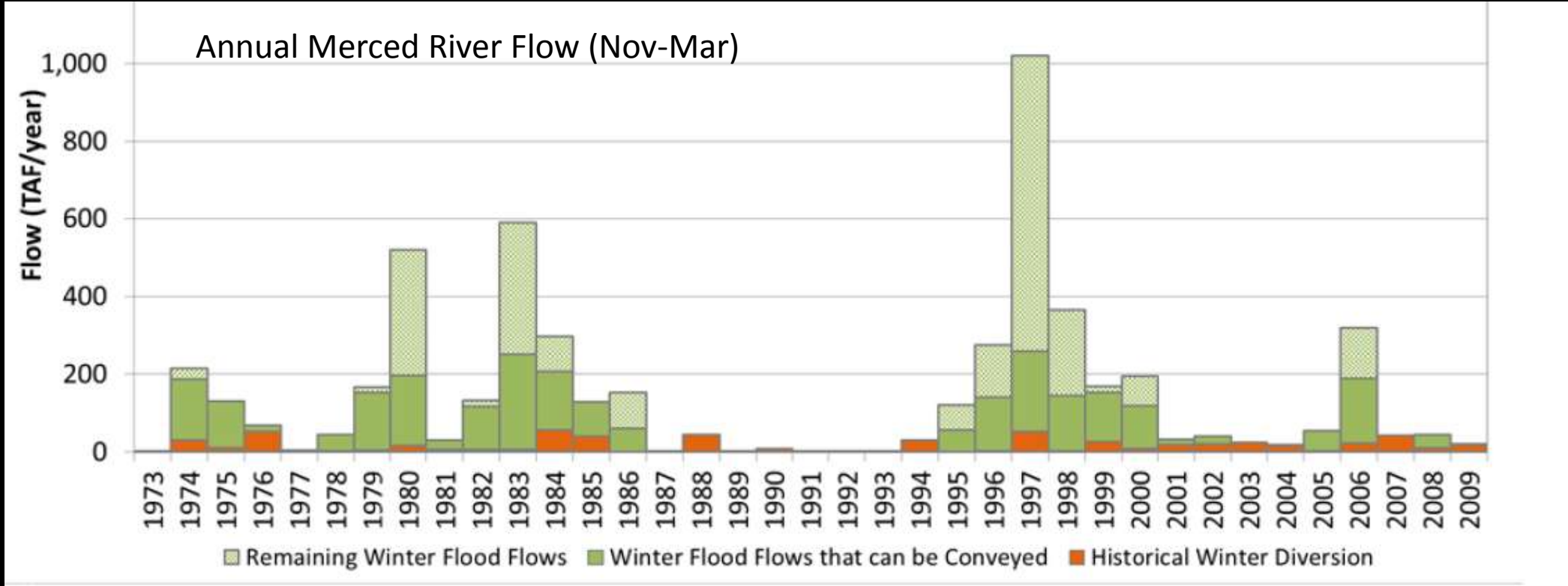
- Percolation rate of existing dedicated recharge basins



Recharge Benefit/Cost Analysis

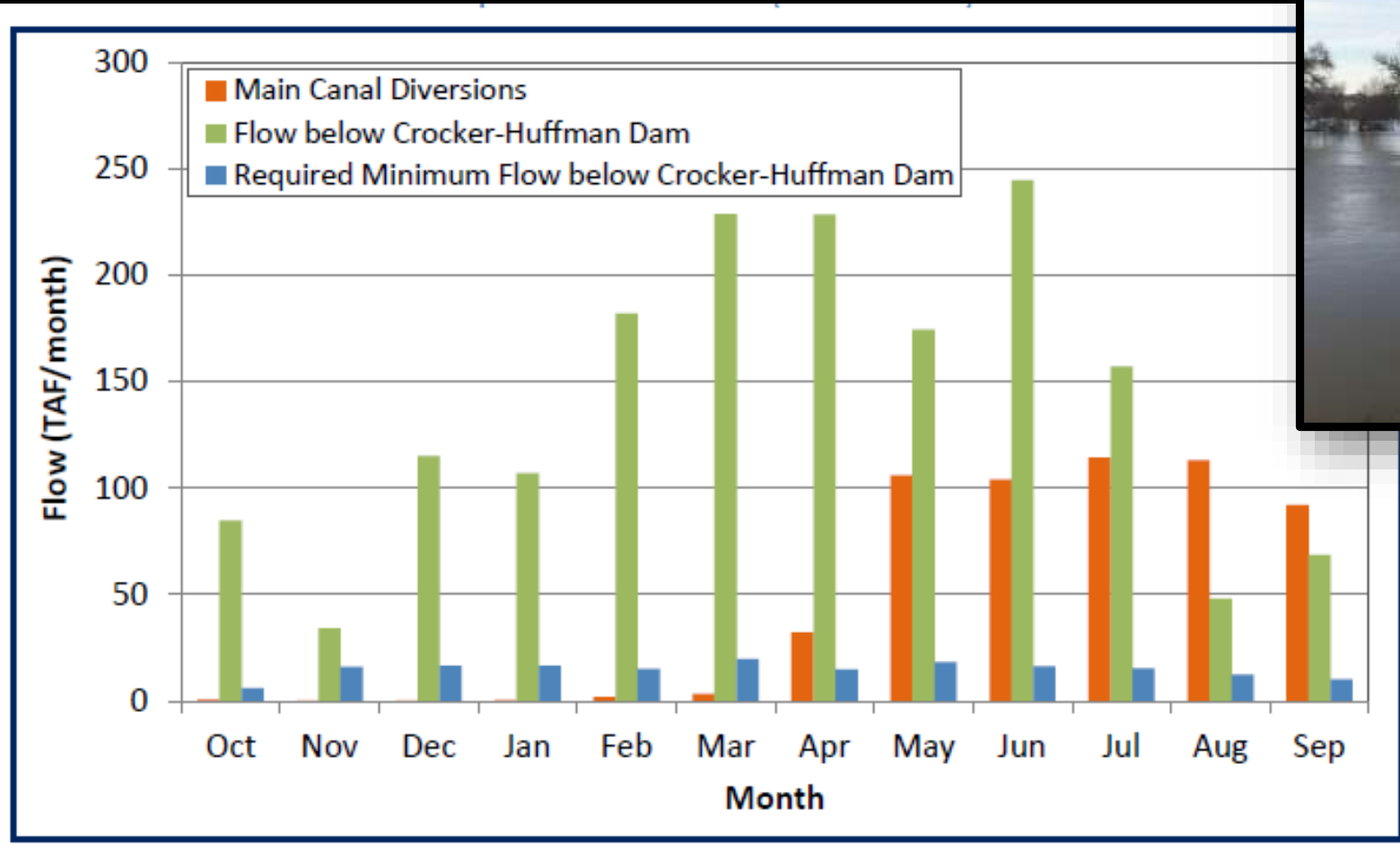
- Relative cost per acre foot (\$/acre foot)
- Increased groundwater recharge

Conveyance Delivery Limitations



RMC 2015

Water Available for Recharge – Predicting Weekly Flows



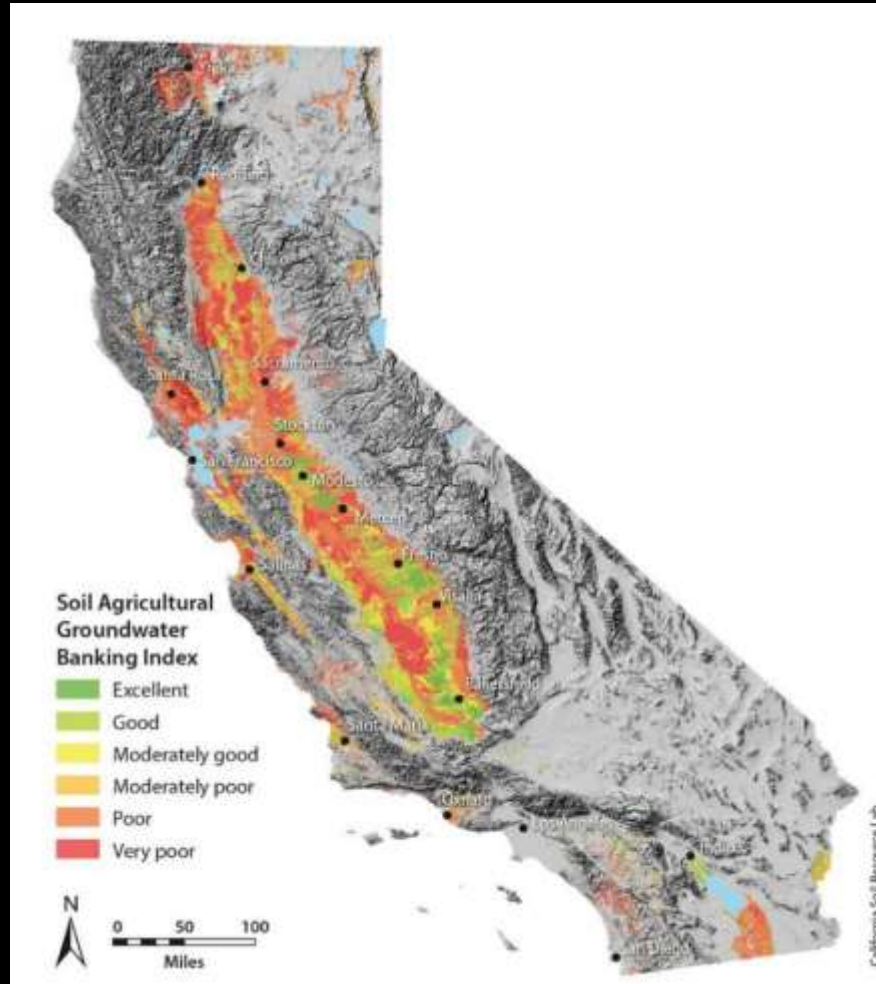
San Joaquin River 2017

Monthly Wet Year Merced River Flow (Nov-Mar)

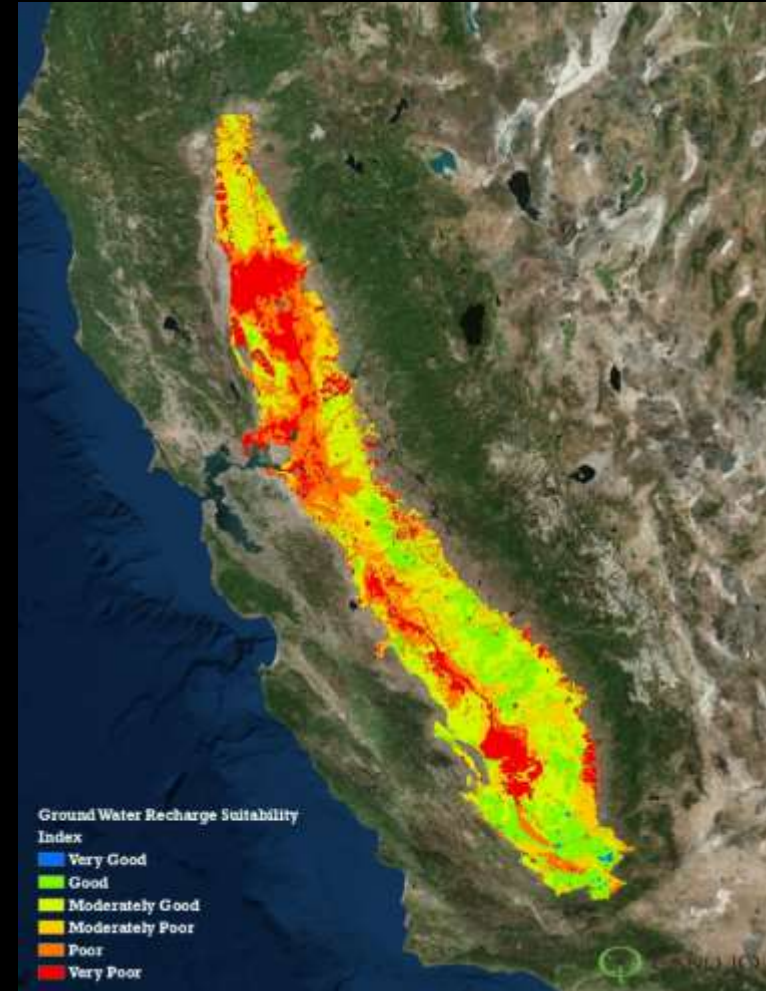
RMC 2015

Recharge Suitability Indexes

Weighted indexes of slope, soil type, clay layers, underlying geology, depth to groundwater



UC Davis SAGBI



Land IQ Recharge Suitability Index

Crop Compatibility Calendar



- Weekly capacity of crops to receive water in excess of crop demand
- Best available data based on farmer and field agronomist experience
- Assumes well drained soils
- Available for grapes, alfalfa, walnuts, almonds, pistachios

GRAT cloud-based access



SCENARIOS

next >>

Legend

Welcome to the
Groundwater Recharge Assessment Tool

SELECT AN IRRIGATION DISTRICT



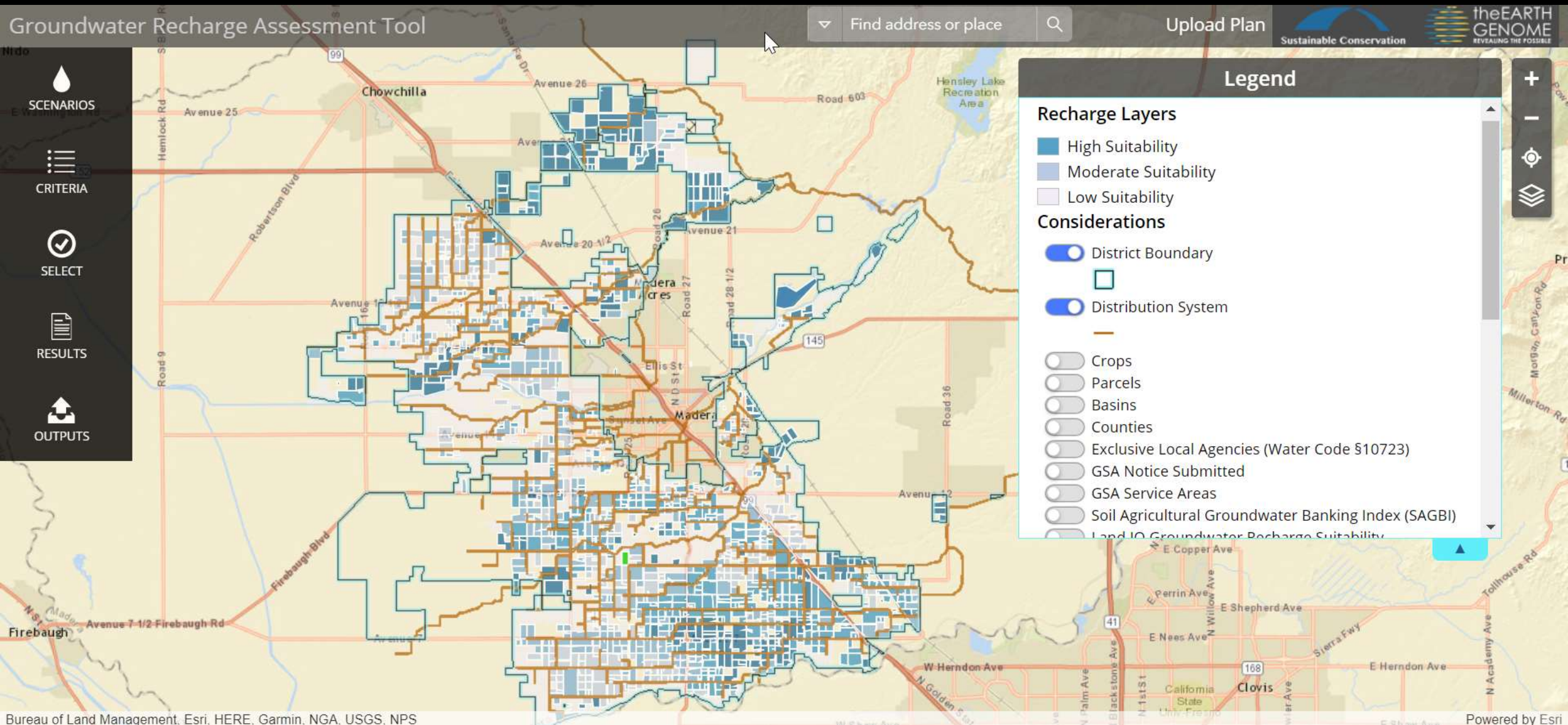
Username

Password

[Forgot Password?](#)

SUBMIT

Individual fields ranked by Recharge Potential



Scenarios: Water Availability

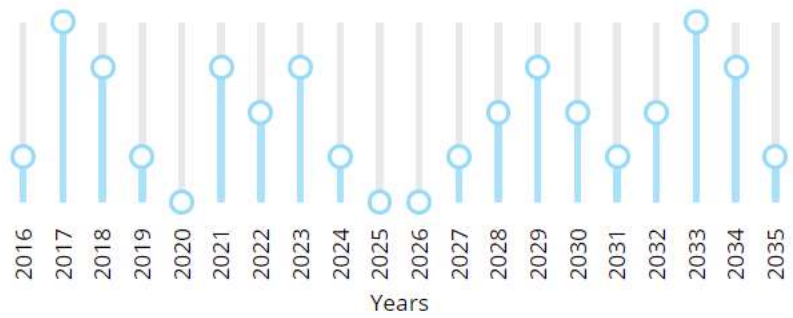


SCENARIOS

next >>

Set Water Availability

edit



Wet: 150,000 AF
Above Normal: 120,000 AF
Below Normal: 80,000 AF
Dry: 30,000 AF
Critical: 0 AF
Start Year: 2016

Select Recharge Type

De-select all



On-Farm Recharge



Fallow Recharge



Existing Dedicated

Select Crops for On-Farm Recharge

De-select all

Madera



Almonds

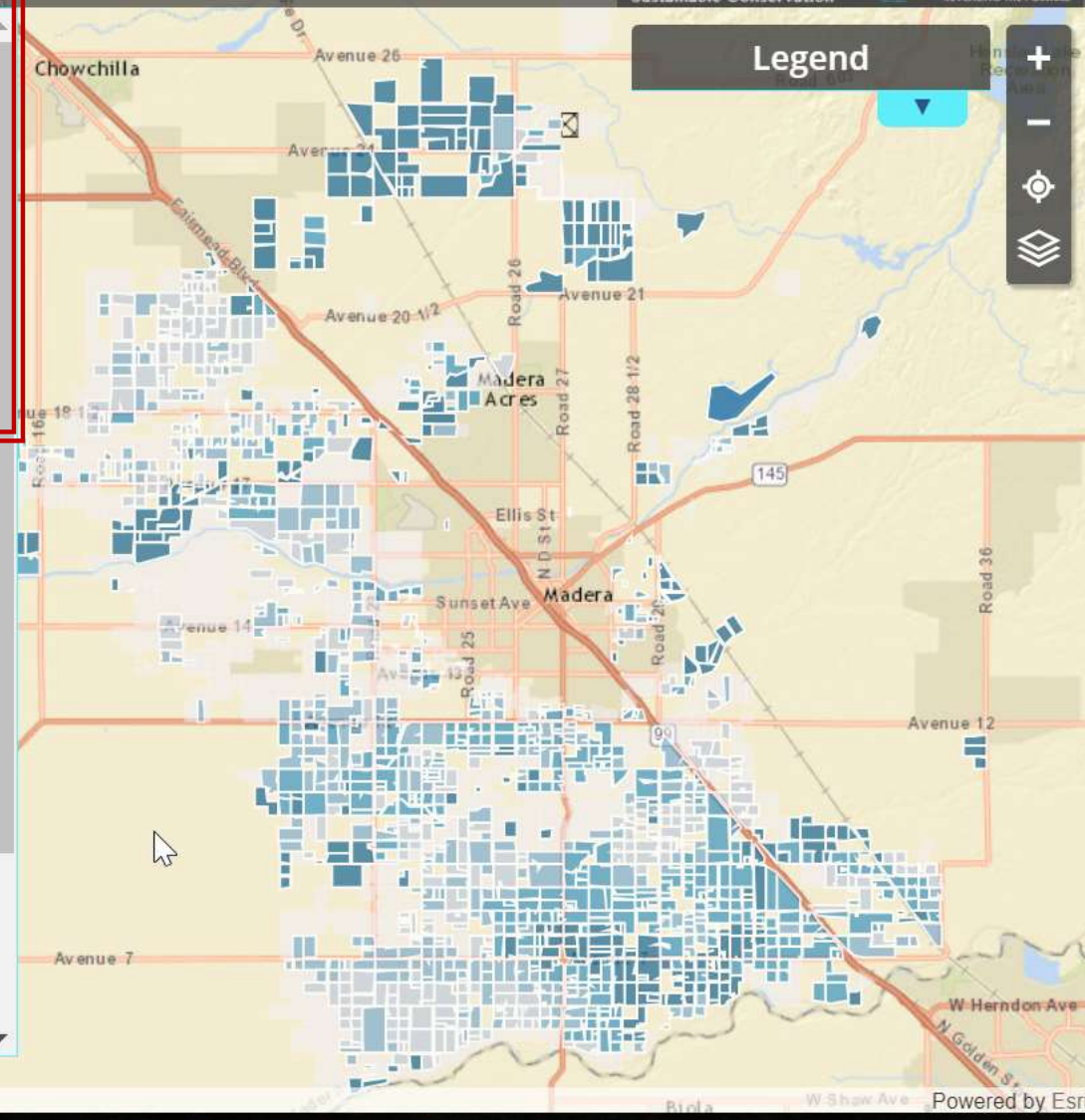


Walnuts



Alfalfa

Legend



Select Sites: Recharge Quantities and Costs

- SCENARIOS
- CRITERIA
- SITES
- RESULTS
- OUTPUTS

Recharge Target for Wettest Year

Volume, AF
100,000

Total Recharge: **111,005 AF**

Site Contribution to Recharge: **83,721 AF**

Recharge from Canal Seepage: **27,284 AF**

Cost
\$1,000,000

Annual Cost for Wettest Year: **\$6,882,367**

Potential Recharge Sites
All Best

700 SITES SELECTED

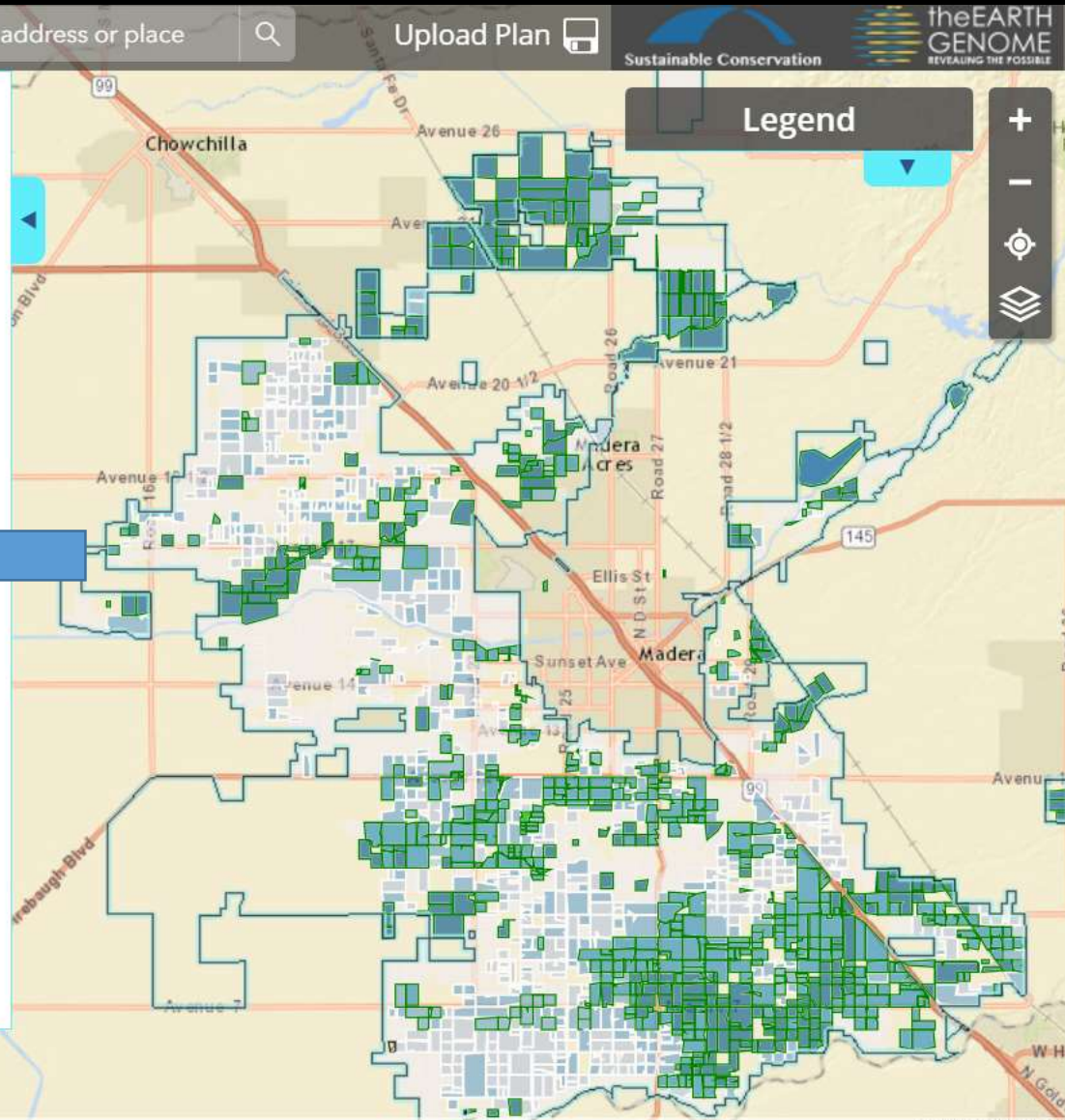
Site	Method
2526	Dedicated Recharge auto
2496	Dedicated Recharge auto
2495	Dedicated Recharge auto
2494	Dedicated Recharge auto
2493	Dedicated Recharge auto
2492	Dedicated Recharge auto
2491	Dedicated Recharge auto
1841	Walnuts auto
866	Walnuts auto
1973	Walnuts auto
1974	Walnuts auto

Recharge Type

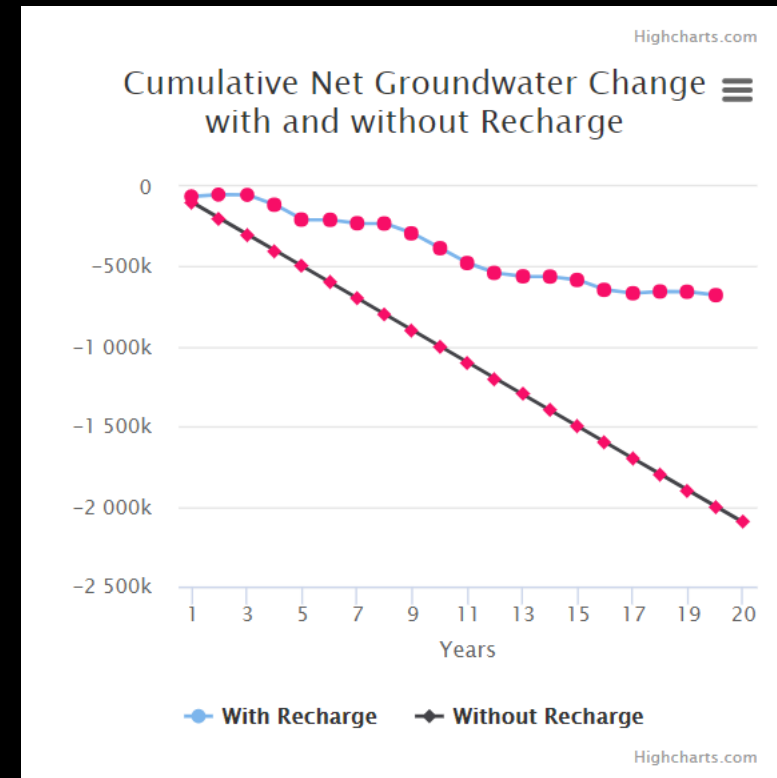
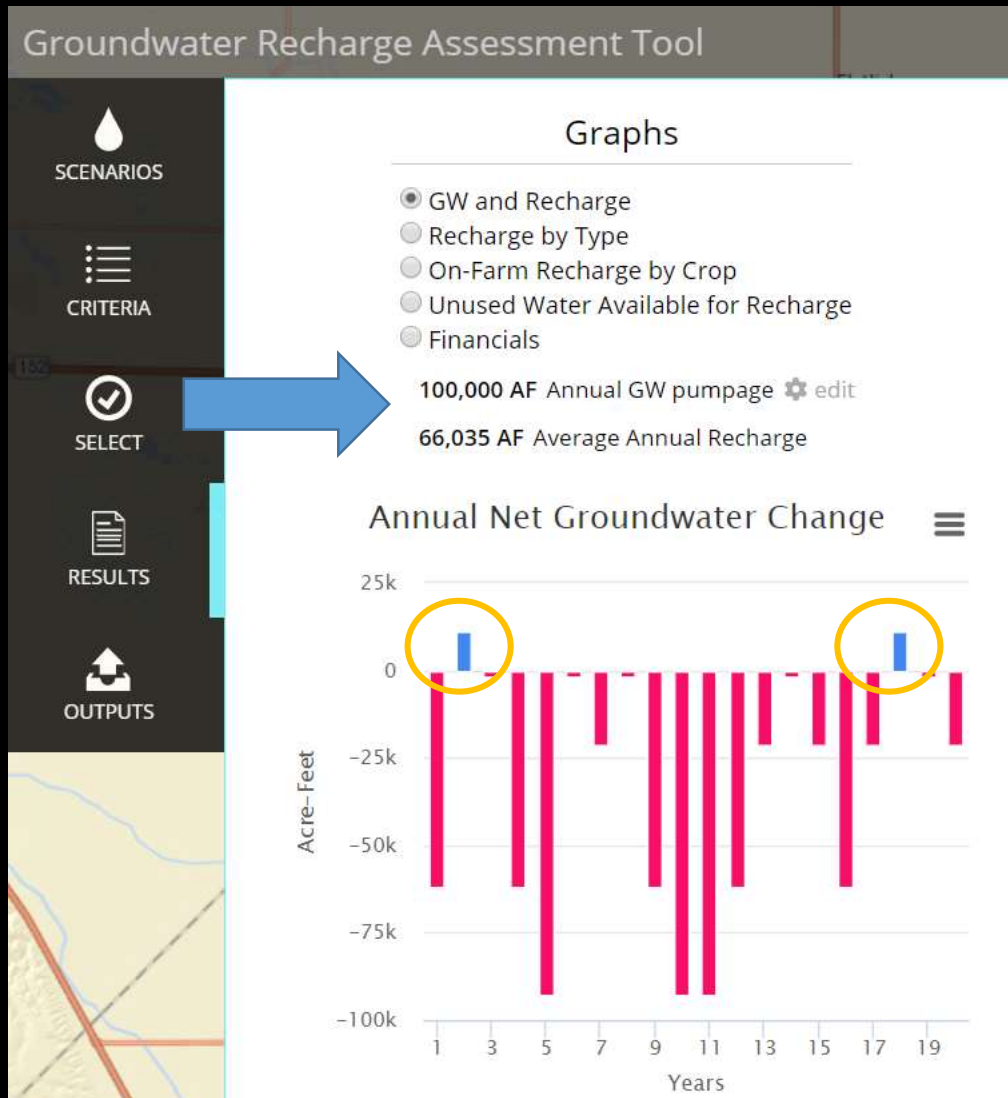
Site: 1841

Site Details

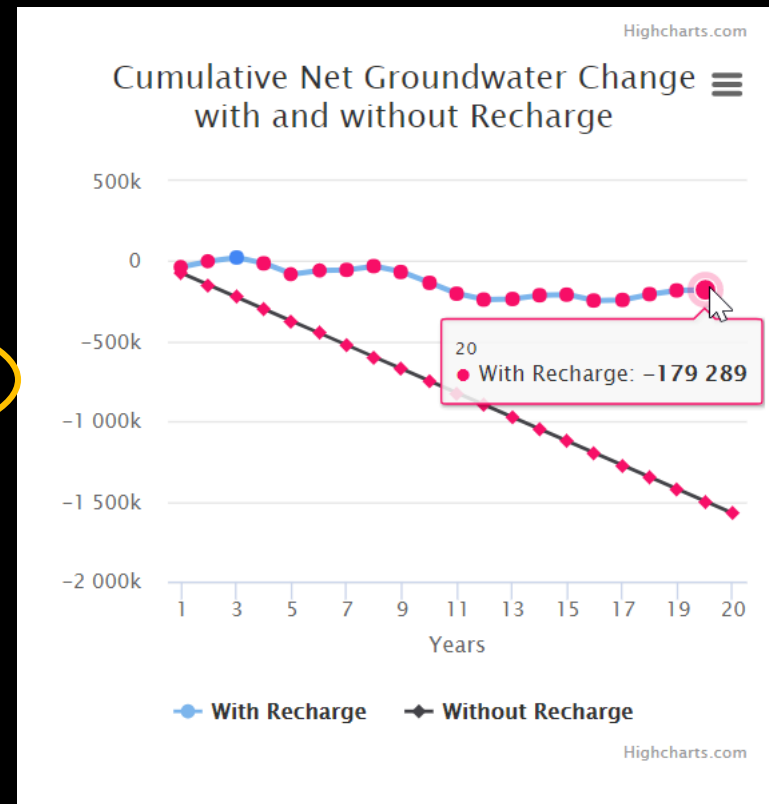
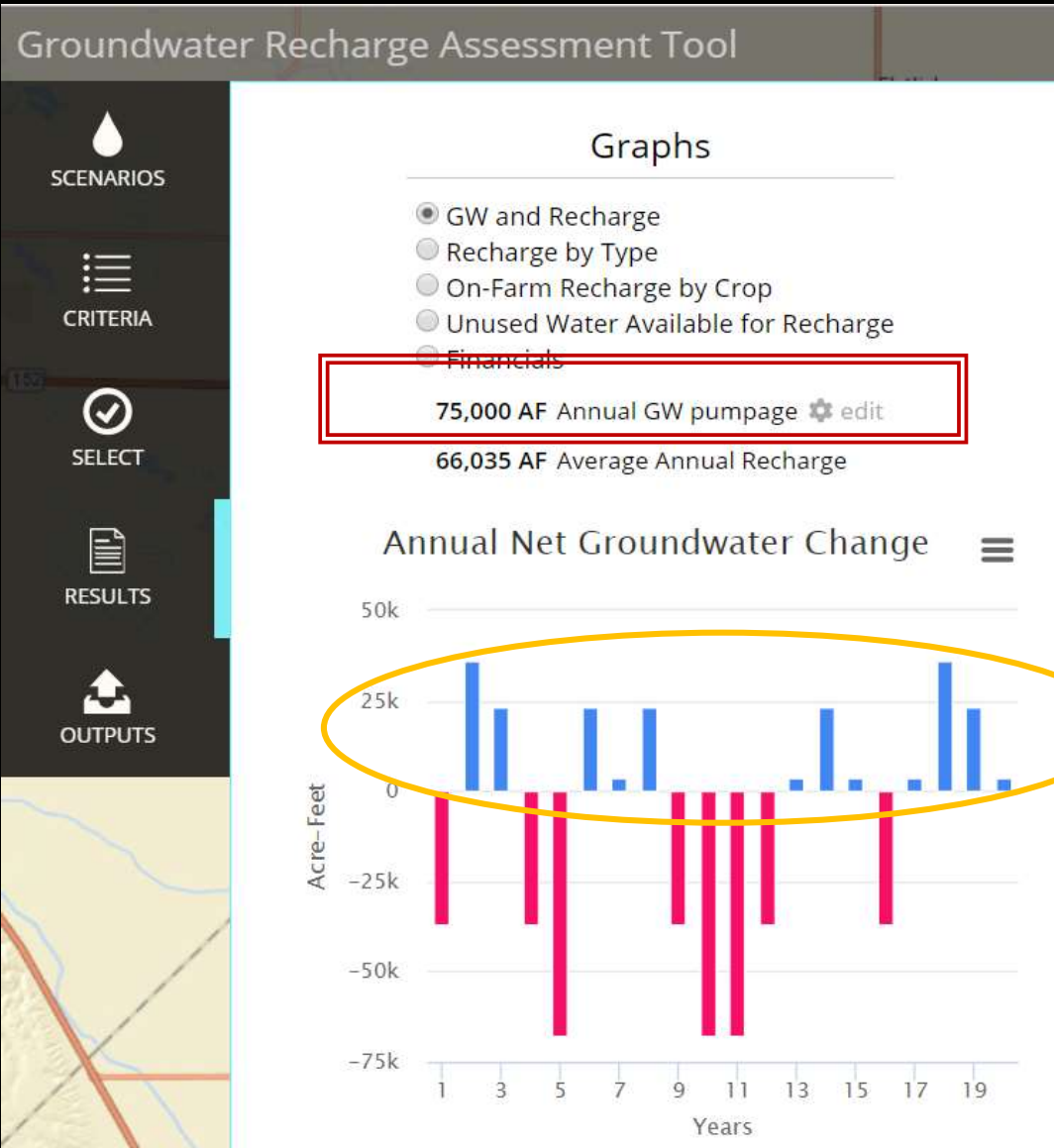
Crop: Walnuts
Acres: 63
Permittee: RIO DEL SOL, MADERA RANCH
Parcel #: 047190028000
Cost: \$8,064
Average AF of Recharge: 209 AF



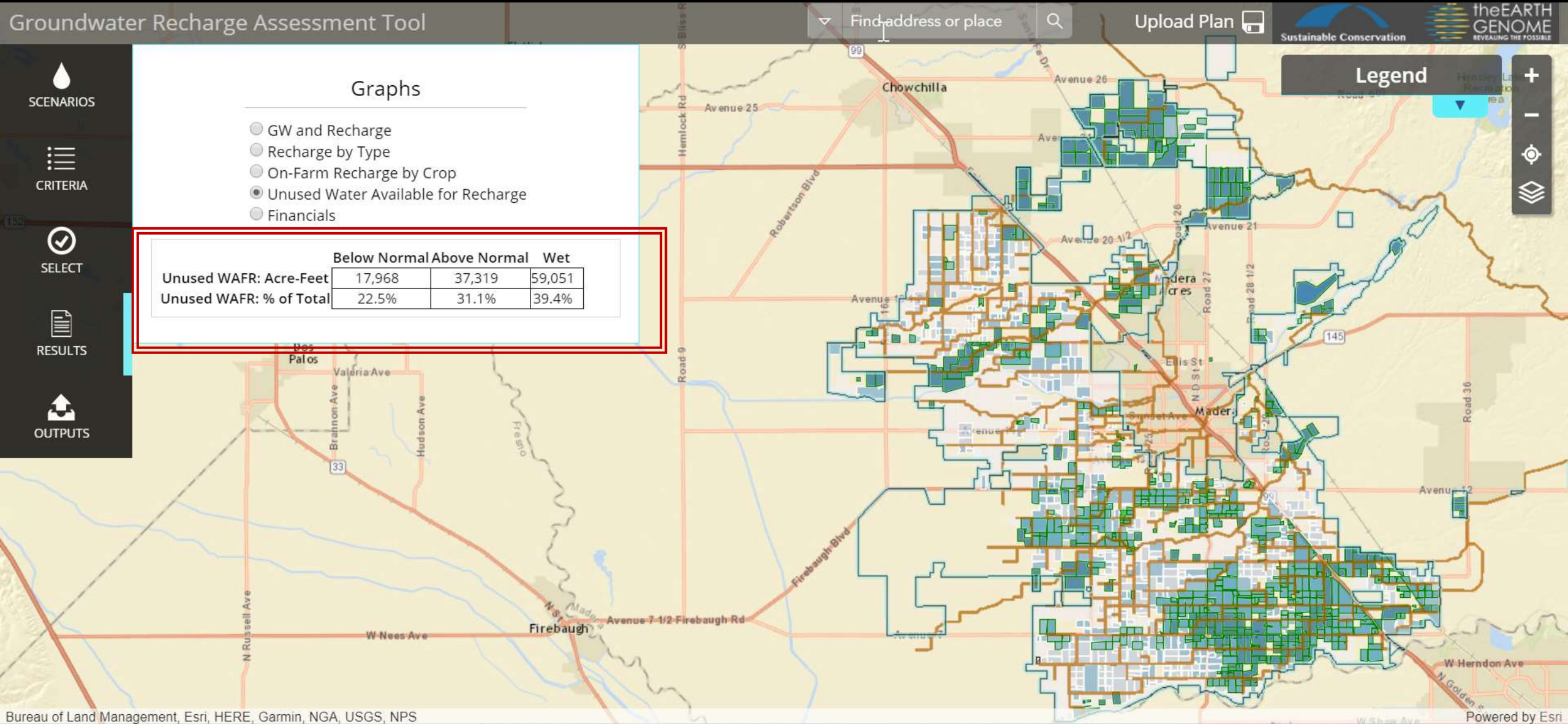
Results: Net Groundwater Change



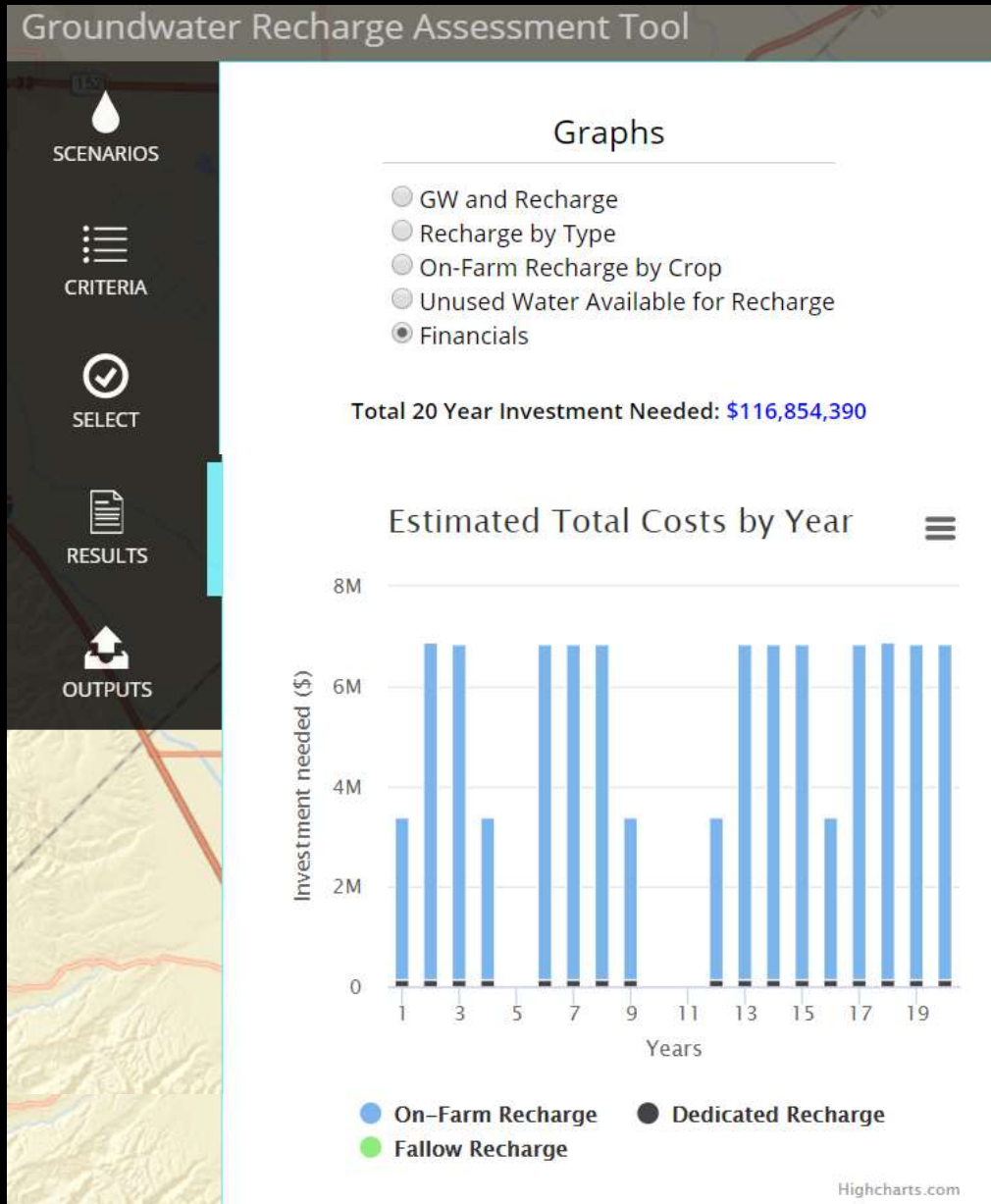
Results: Net Groundwater Change with pumping restrictions



Results: Unused Water Available for Recharge



Results: Investment Cost by Year and Total



For further information

suscon.org/GRAT/

Joe Choperena

jchoperena@suscon.org

