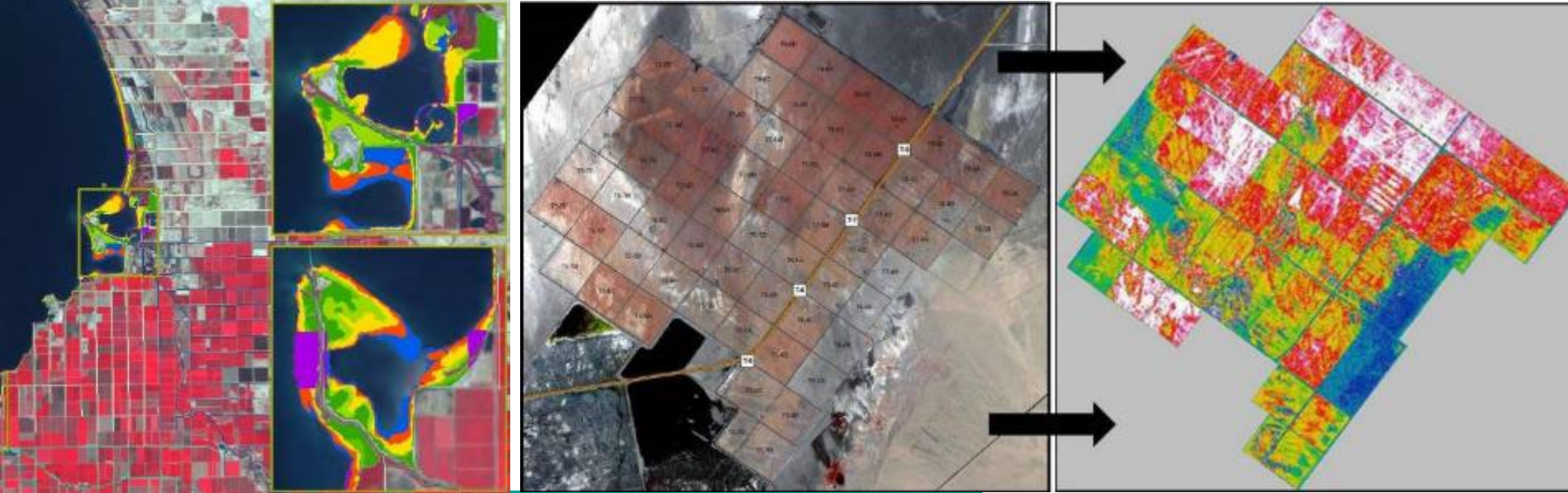




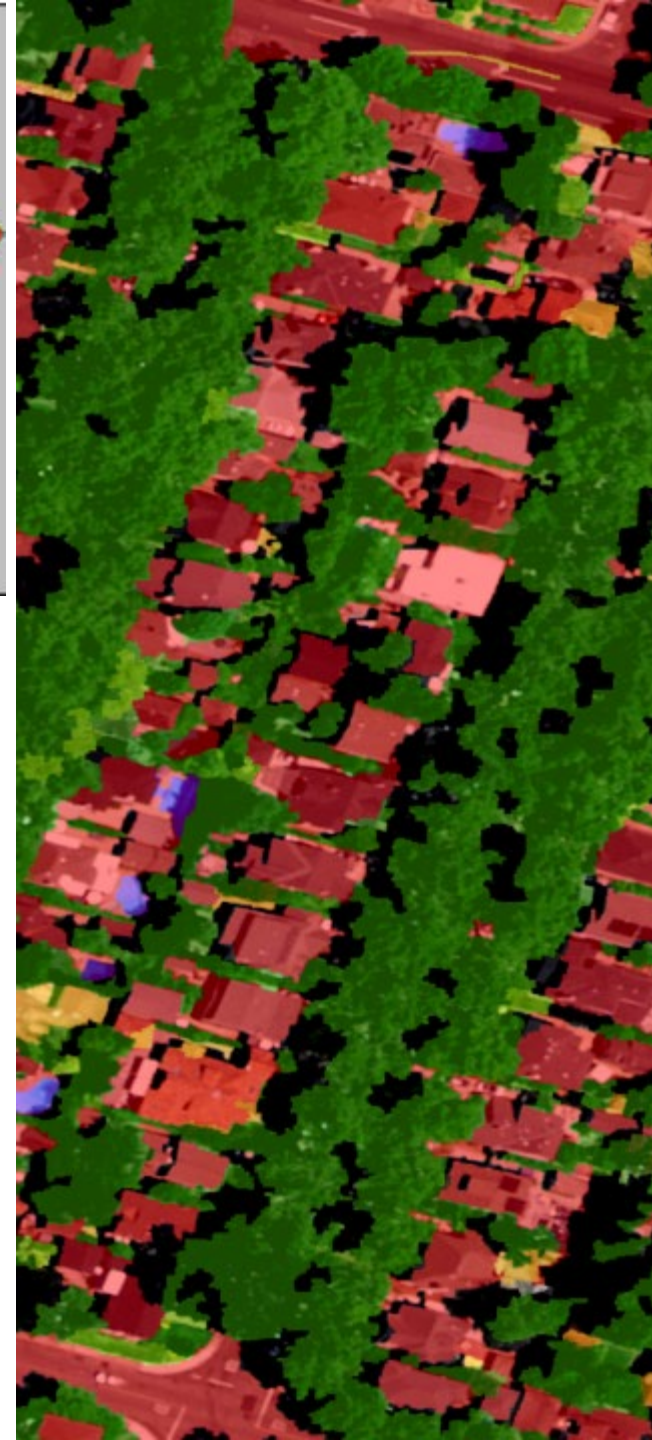
Using Spatial Data To Optimize Agricultural Groundwater Management

ACWA SPRING CONFERENCE



May 6, 2026
Sacramento, CA

Stephanie
Tillman



OUTLINE

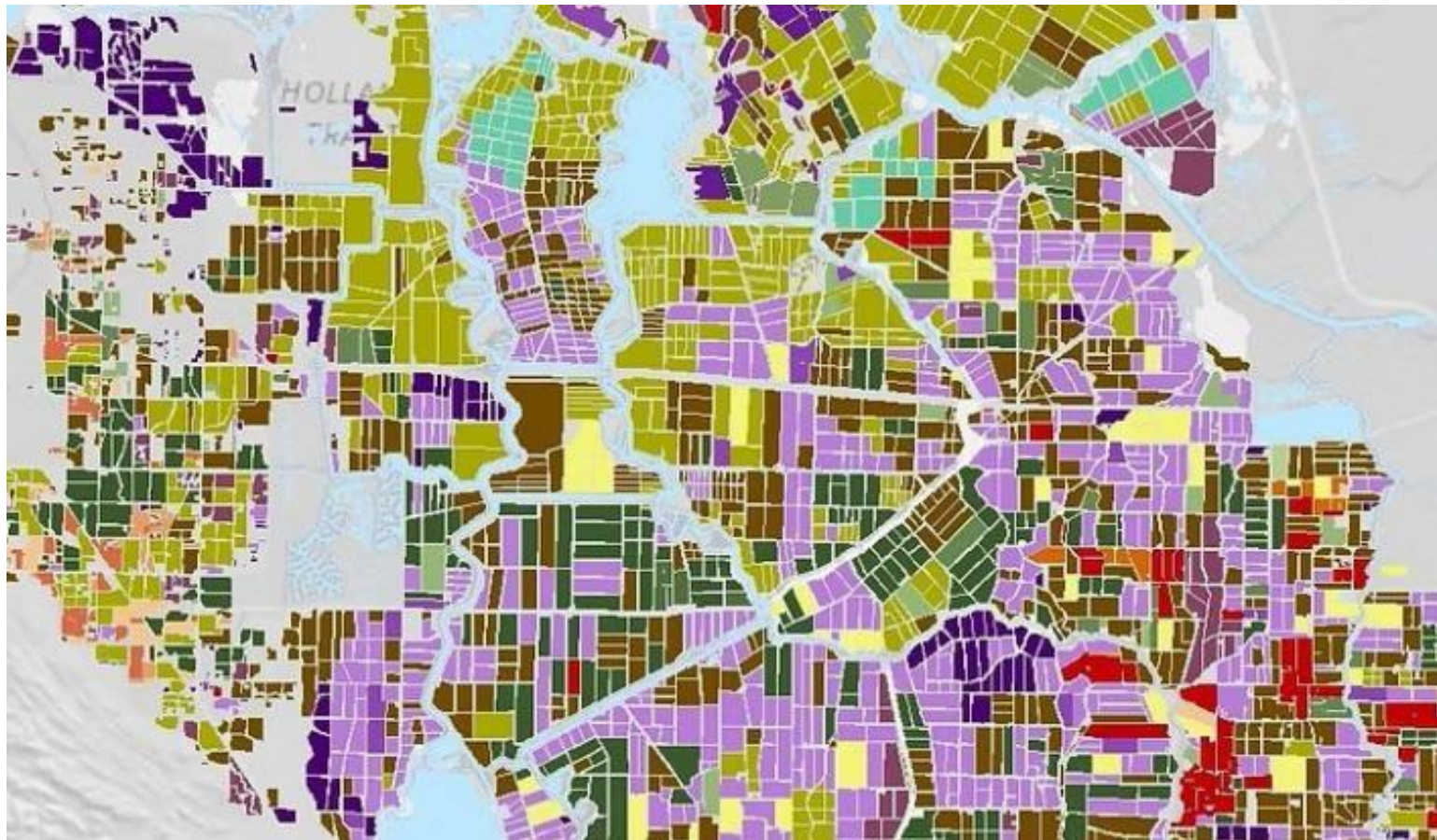
- Introduction to Land IQ
- Spatial Data
- GSP Implementation Applications
- SGMA Related Applications

LAND IQ

Combine land science with remote geospatial analysis and web development to support informed decision-making with high quality data, analysis and tools.



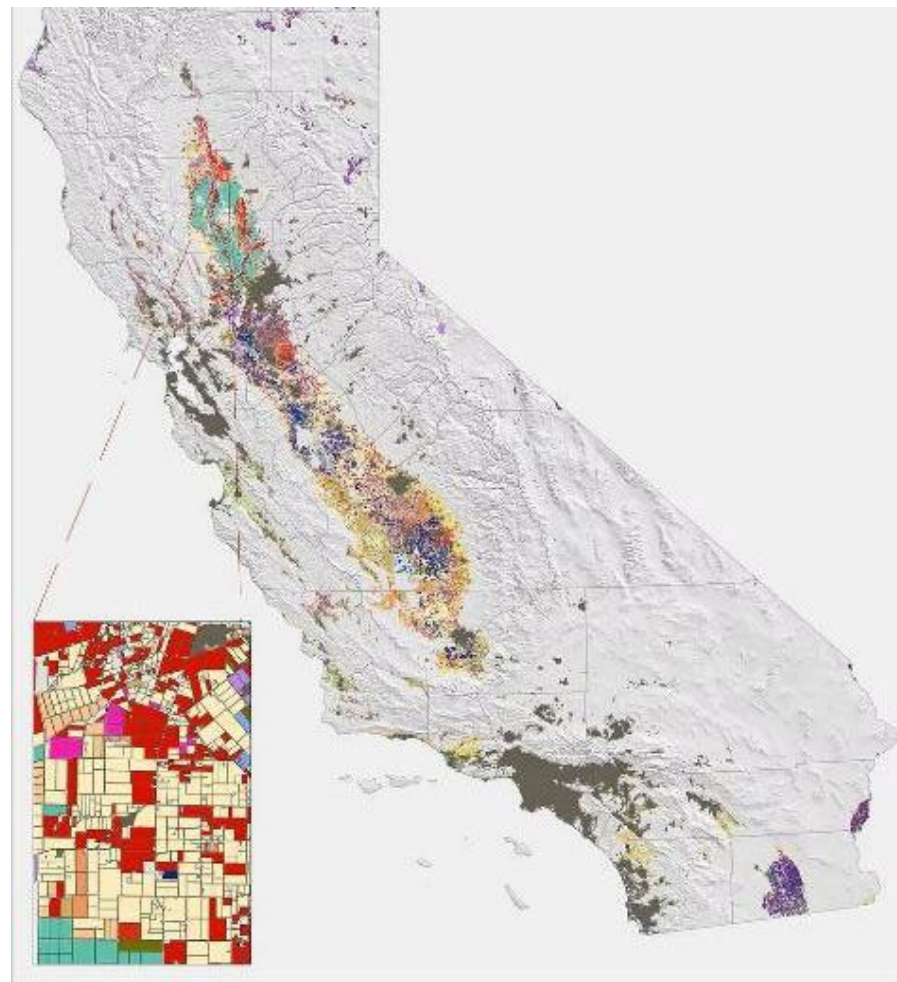
SPATIAL DATA



We generate spatial data for land use mapping, ET estimation, and water supply reliability.

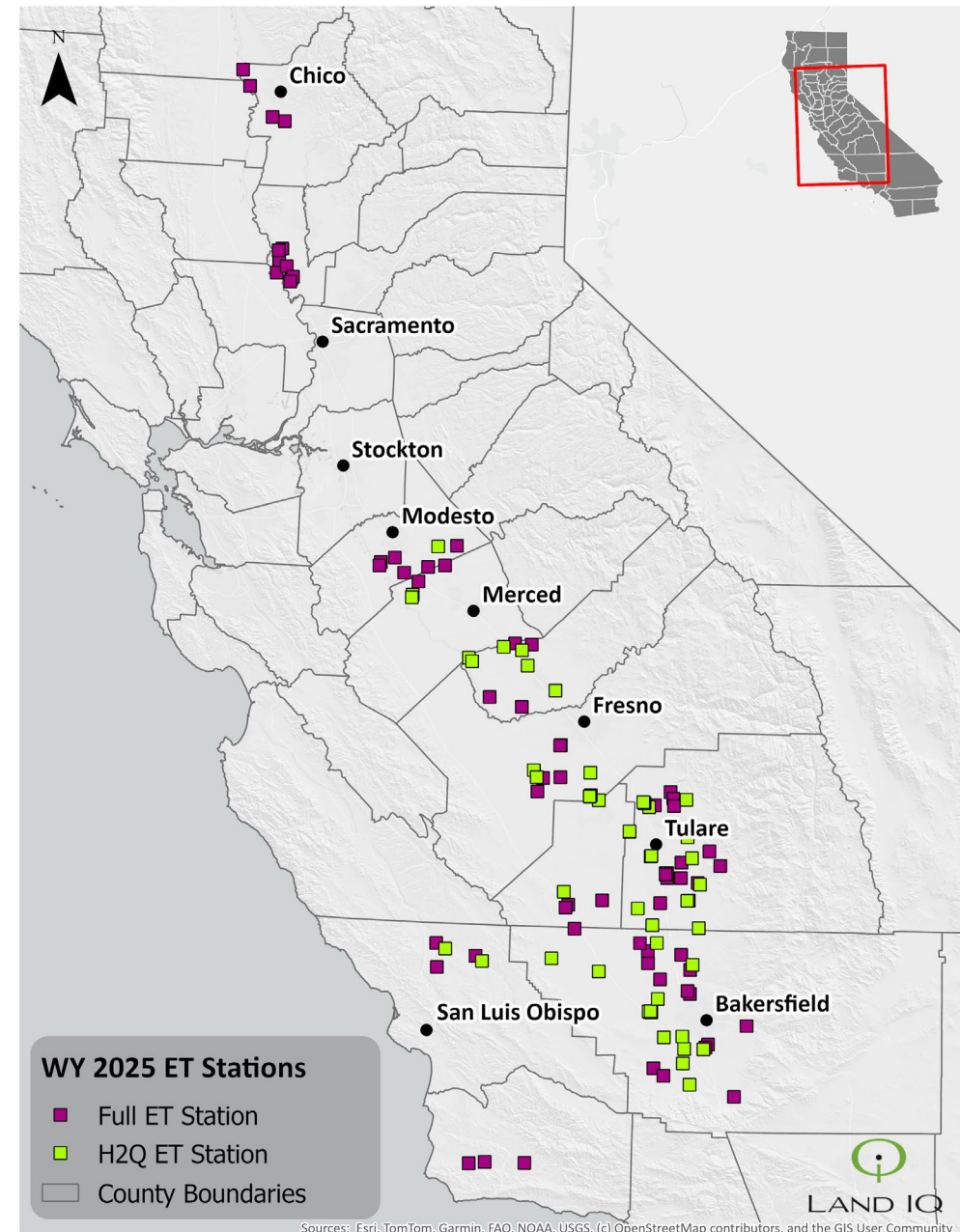
LAND USE MAPPING

We map all crops in every agriculturally managed field every year using remote sensing and ground truthing.



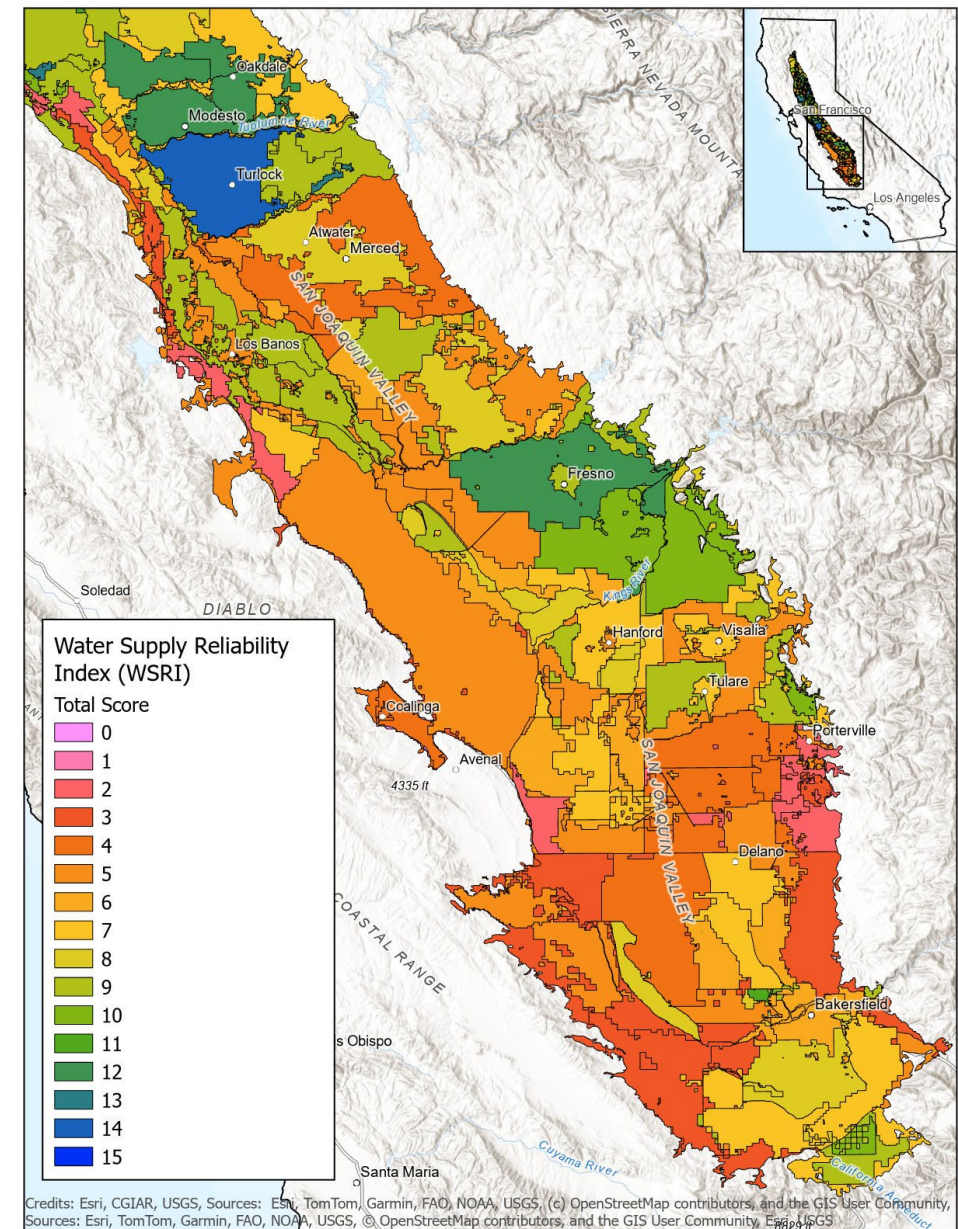
CONSUMPTIVE USE (ET)

We estimate ET on over 3M ac monthly, by field, using remote sensing and ground truthing.



WATER SUPPLY RELIABILITY INDEX

We combine publicly available datasets to find the relative reliability of surface water and groundwater.

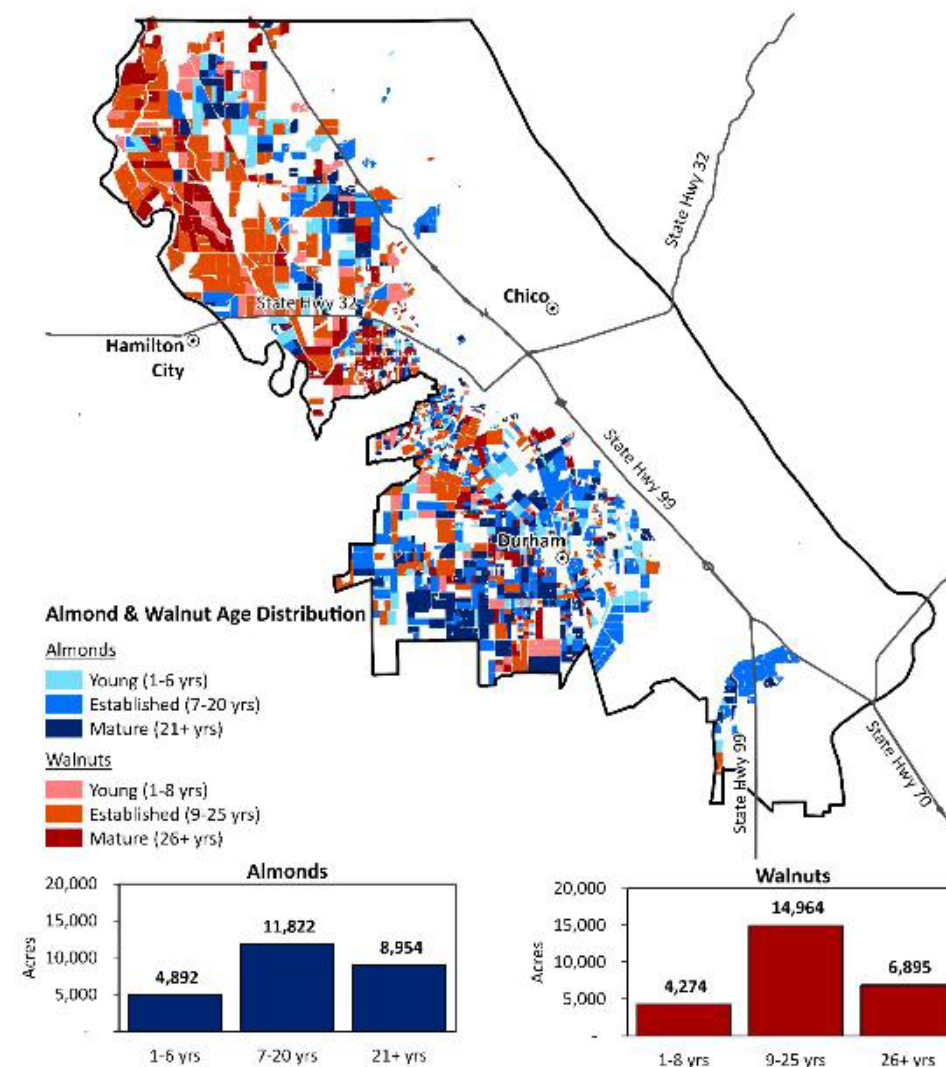


GSP IMPLEMENTATION

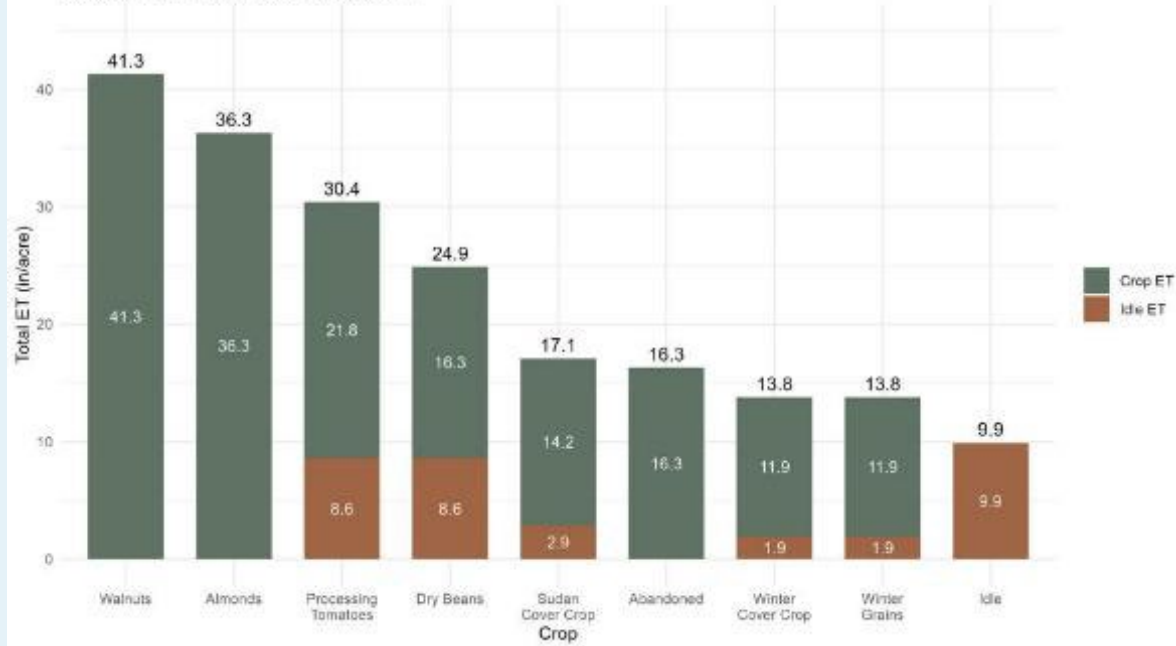


VINA SUBBASIN DEMAND REDUCTION STRATEGIES

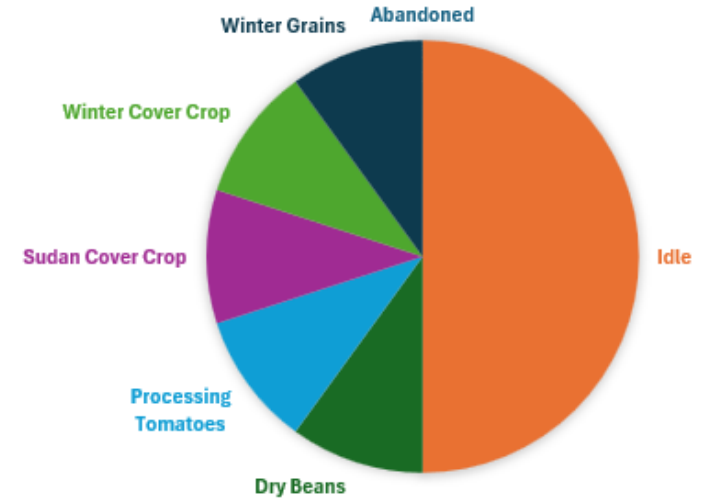
- Extend Orchard Replacement Pilot Study
- Precision Irrigation Pilot Study



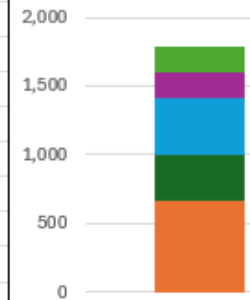
Mean ET by Crop Type January-October
Based on 2025 ET within the Vina Subbasin



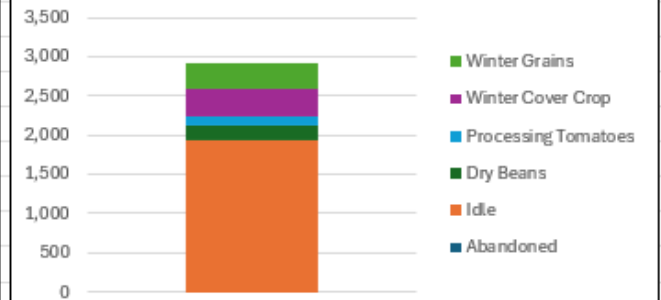
FALLOW LAND UTILIZATION



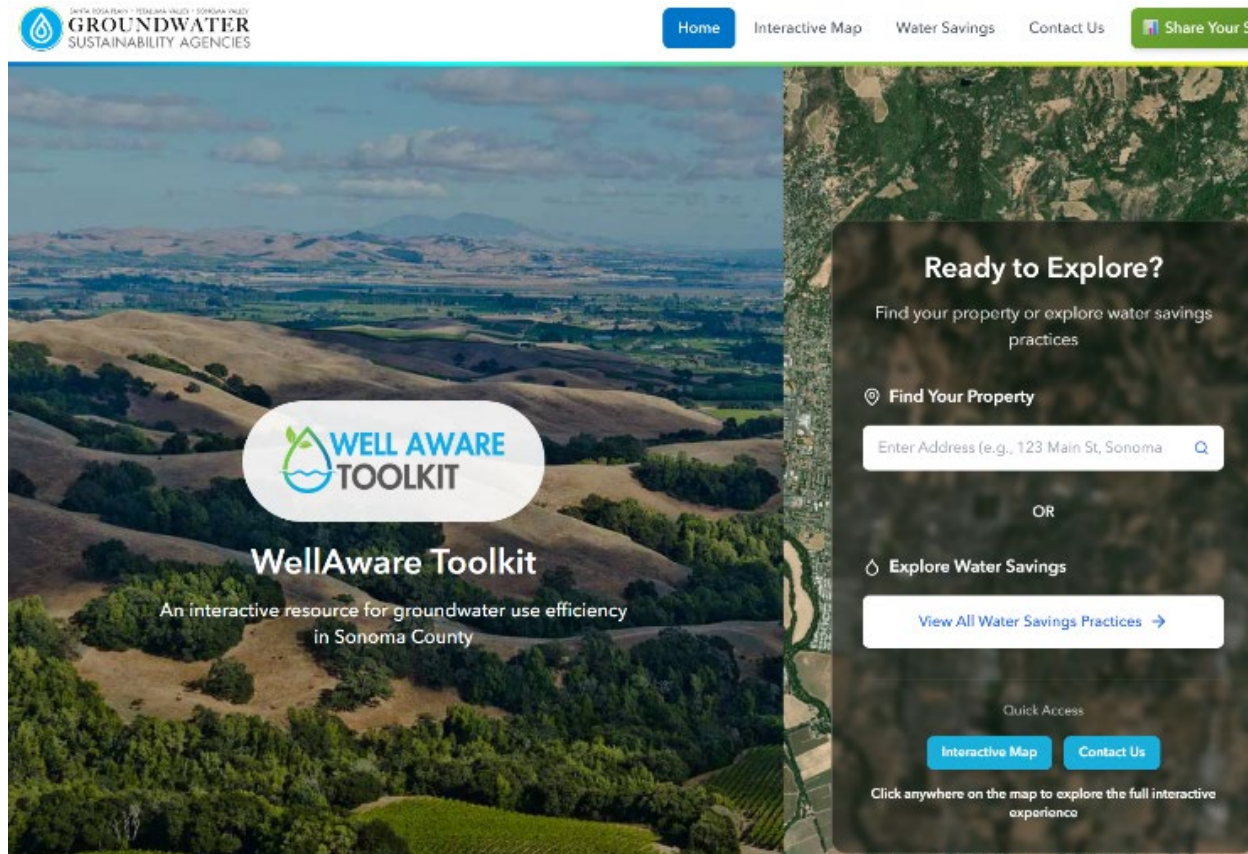
Overall Use ET (ac-ft)



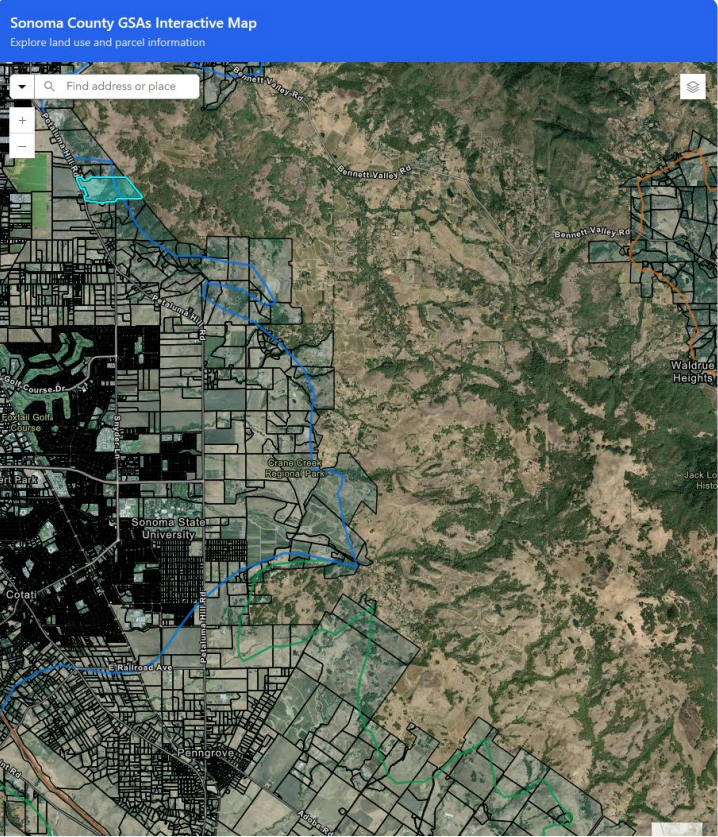
Savings vs Orchard Et (ac-ft)



SONOMA COUNTY GSAS – WATER USE EFFICIENCY WEB TOOL



Using crop map, water demand analysis on ag and semi-ag land use, and web development to identify and provide water use efficiency measures to public.



Parcel Dashboard: APN 044-250-014

LAND USE BREAKDOWN

Residential
0.5 acres
[Explore Water Savings](#)

Vineyards
15.6 acres
[Explore Water Savings](#)

PARCEL STATISTICS (AS OF 2023)

PARCEL ACREAGE
95.3
Total Acres

IRRIGATED ACREAGE
16.1
Irrigated acres

LIVING UNITS
3
Residential units

WATER SOURCES

Groundwater ☒ Surface Water ☐ Recycled Water ☐

1 known water source(s)

PARCEL ENVIRONMENTAL FACTORS

PLANTING ZONE
USDA Hardiness
9b

ELEVATION
Above Sea Level
426 ft

SOIL COMPOSITION
6 soil types identified

PERCENT OF PARCEL

WATER STORAGE
Available water storage (AWS) (0-60")

Vineyards

Explore how to align groundwater conservation goals with wine quality and vine health expectations

Groundwater Usage

9,233 acre-ft/year

Based on 20,266 irrigated acres in the 3 Sonoma County GSAs

Percent of Irrigated Acres by Land Use

74.7%

Relative to total acres in the 3 Sonoma County GSAs

Percent of Total Groundwater Used by Land Use

41.7%

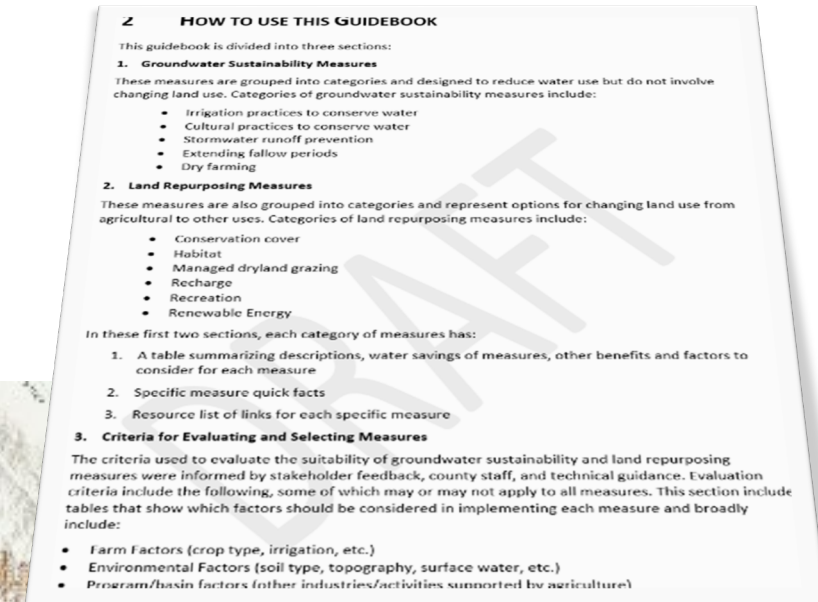
Relative to total use in the 3 Sonoma County GSAs

[Find Information](#)

[Get Help](#)

[Explore Funding](#)

PASO ROBLES GROUNDWATER BASIN – MULTI BENEFIT IRRIGATED LAND REPURPOSING PROGRAM



SANTA YNEZ RIVER VALLEY GROUNDWATER BASIN – WATER USE EFFICIENCY STRATEGIES PLAN





Staff with local knowledge implementing water use efficiency strategies on winegrape and vegetable sites using

- ET data
- temperature inversion monitoring
- soil moisture sensors
- applied water monitoring
- CropManage

SGMA-RELATED DATA APPLICATIONS



BORREGO VALLEY GROUNDWATER BASIN – RETIRED FARMLAND REHABILITATION STRATEGIES



Farmland Rehabilitation Study

FUNDING

California Department of Water Resources

PARTNERS

Borrego Springs Watermaster
Borrego Valley landowners
University of California, Irvine
West Yost
Land IQ



LEARNING FROM NATURE

By studying the range of conditions in which native plants grow on existing fallowed farmlands and in natural habitats, ecologists can test practices that mimic those conditions on newly fallowed farmlands. The most effective ones will be used to convert farmlands to ecologically healthy areas that will contribute to human wellness and recreation.

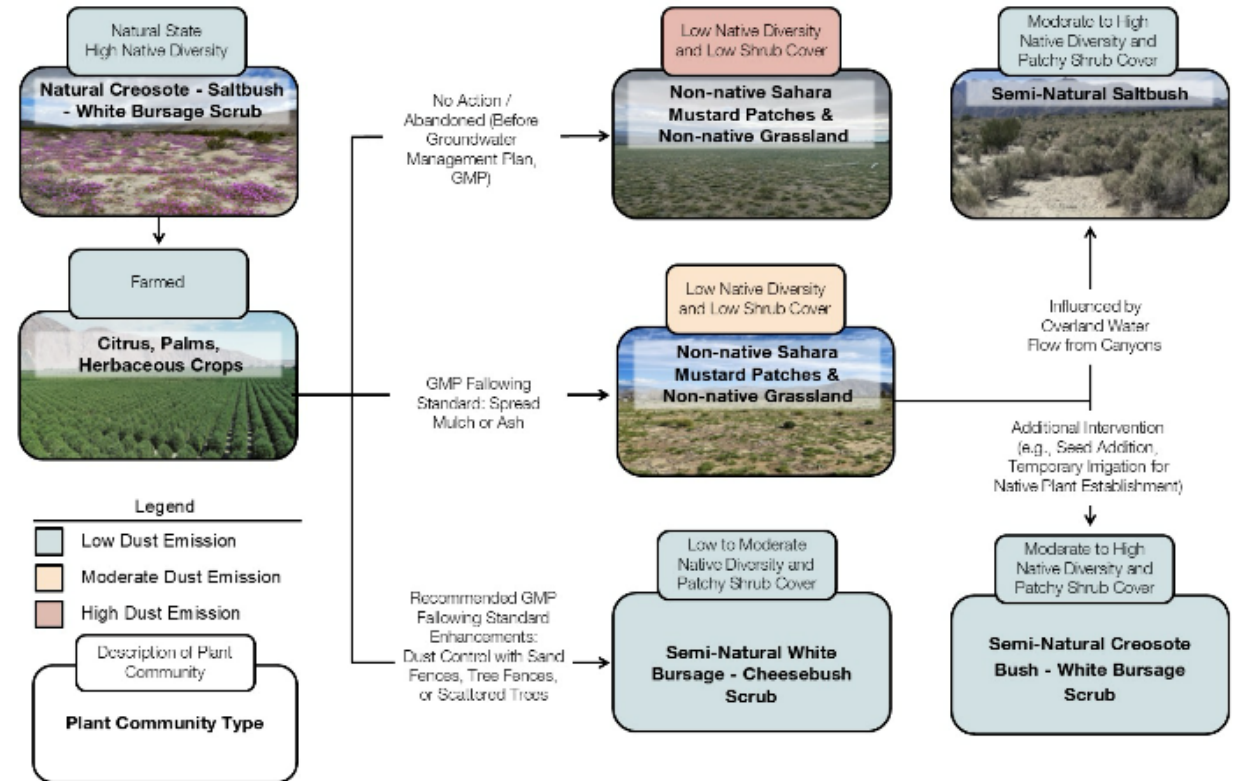
<https://borregospringswatermaster.com/environmental-working-group/>

REDUCING WATER USE RESPONSIBLY

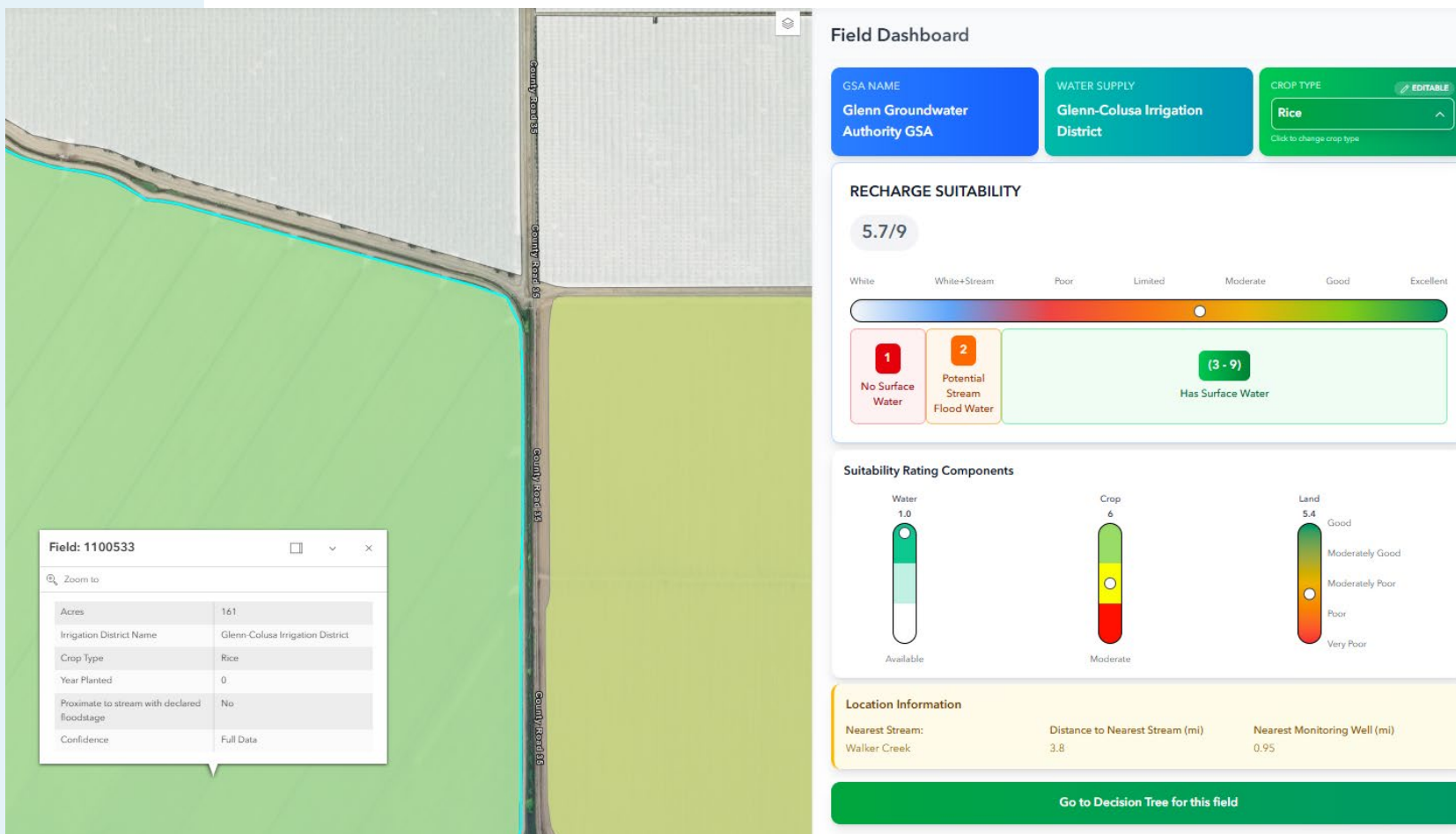
To comply with the Groundwater Management Plan, agricultural lands are being fallowed to reduce water use. Converting agricultural land poses risks to soil and environmental health as well as creating the potential for visual blight. Developing methods to prevent soil erosion and promote native species recovery will help prevent invasive species, windblown dust, and will encourage the recovery of native plant communities.



State and Transition Model

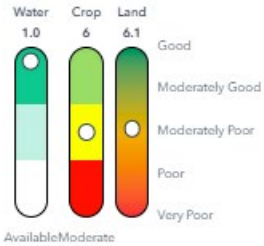


GLENN COUNTY RCD RECHARGE READY WEB TOOL



Users select a field and view its recharge suitability based on soil and sub-surface features, crop type, and water supply.

Current Recharge
Suitability Rating: 6.1/9



Step 1 / 6 of Assessment

< Back to Map

< Previous Step

Start Over

Recharge Suitability

The recharge suitability score is a combination of the water, crop and land suitability scores of this field. The individual scores for these suitability components indicate why this field may or may not be suitable for recharge.

Check your field's rating on the Map page and refer to the

[Land IQ Recharge Suitability Index in the Handbook](#). Note: If your field's Confidence is 'Needs Evaluation', the Land Score may be incomplete and the overall score is based only on the Water and Crop Scores. Refer to the Handbook for more details.

Recharge Suitability

Fields with recharge index values 6 and below likely have some limitations for recharge due to land, soil or water supply. Refer to the [Land IQ Recharge Suitability Index in the Handbook](#).

Water rating & Creek Proximity Adjustment Each field was assigned a 1 or a 0 depending on its location within or outside of a district that supplies surface water. This approach was based on the assumption that all areas within irrigation districts are served with surface water. Certain fields were assessed for their proximity to Hambright, Stony, Walker, Willow, and Wilson Creeks by assigning a score of 2 instead of 1 to any field whose centroid lies on a parcel within 300 meters of a creek, even if the field itself is farther away, to ensure a more inclusive approach and avoid giving different scores to fields on the same parcel.

Crop rating of 9 indicates the crop is well suited to recharge. A rating of 6 indicates that managed recharge is possible with some limitations. A crop rating of 3 indicates that the crop is not suited for recharge. Changing crops from a crop with a rating of 3 to a crop with a rating of 6 or 9 will change the overall recharge suitability index value unless the field is in a groundwater only area.

Land rating below six likely indicates that soil characteristics, depth to groundwater, impeding sub-surface layers, or other hydrogeologic factors may not be well suited to managed recharge. Land ratings are based on inherent characteristics and do not change over time or with different practices.

Recharge suitability index values below 3 indicate that there is no reliable source of water for managed recharge. While recharge may be possible on fields with an index value of 2 from flood waters, an index value of 1 indicates that recharge is not feasible because of water supply limitations even though the field may have land and/or crops suitable for managed recharge. Fields with scores of 1 or 2 may have good scores for land and crop suitability but have a low overall recharge suitability scores because of water supply.

→ Next Component

Decision Tree

1. Recharge Suitability
2. Water Supply
3. Irrigation Method
4. Water Distribution and Control
5. Pesticide Management
6. Nutrient Management



Groundwater Recharge Handbook

Comprehensive reference documentation for agricultural groundwater recharge practices

This handbook includes information related to the on-farm recharge topics introduced in the [Decision Tree](#). You can get to this information from links in the Decision Tree, or you can select information you are interested in by clicking on the drop-down menus below and on the left side of this page.

[Go Back](#)

Handbook Sections

Recharge Matrix

Water Supply

Water Distribution and Control

Pesticide Management

Nutrient Management

Crops

References

Recharge Matrix

- Surface Water Score

>
- Crop Score

>
- Land Score

>
- Land and Crop Component Matrix

>
- Creek Proximity Adjustment

>
- Output Range of Values

>

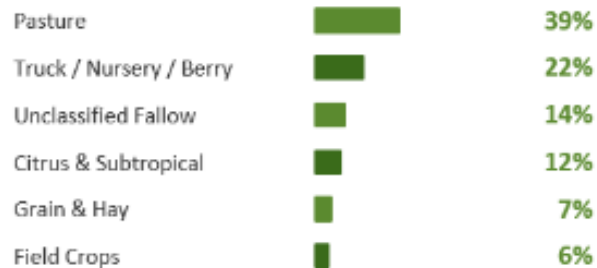
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS AG AND NATURAL LANDS ECONOMIC EVALUATION

Agricultural Lands of the SCAG Region — At a Glance



Ag lands contribute an estimated 784,457 crop acres, 2.39M grazing acres, and ~\$265M in annual groundwater recharge value across the SCAG region

CROP & IMPORTANT FARMLAND

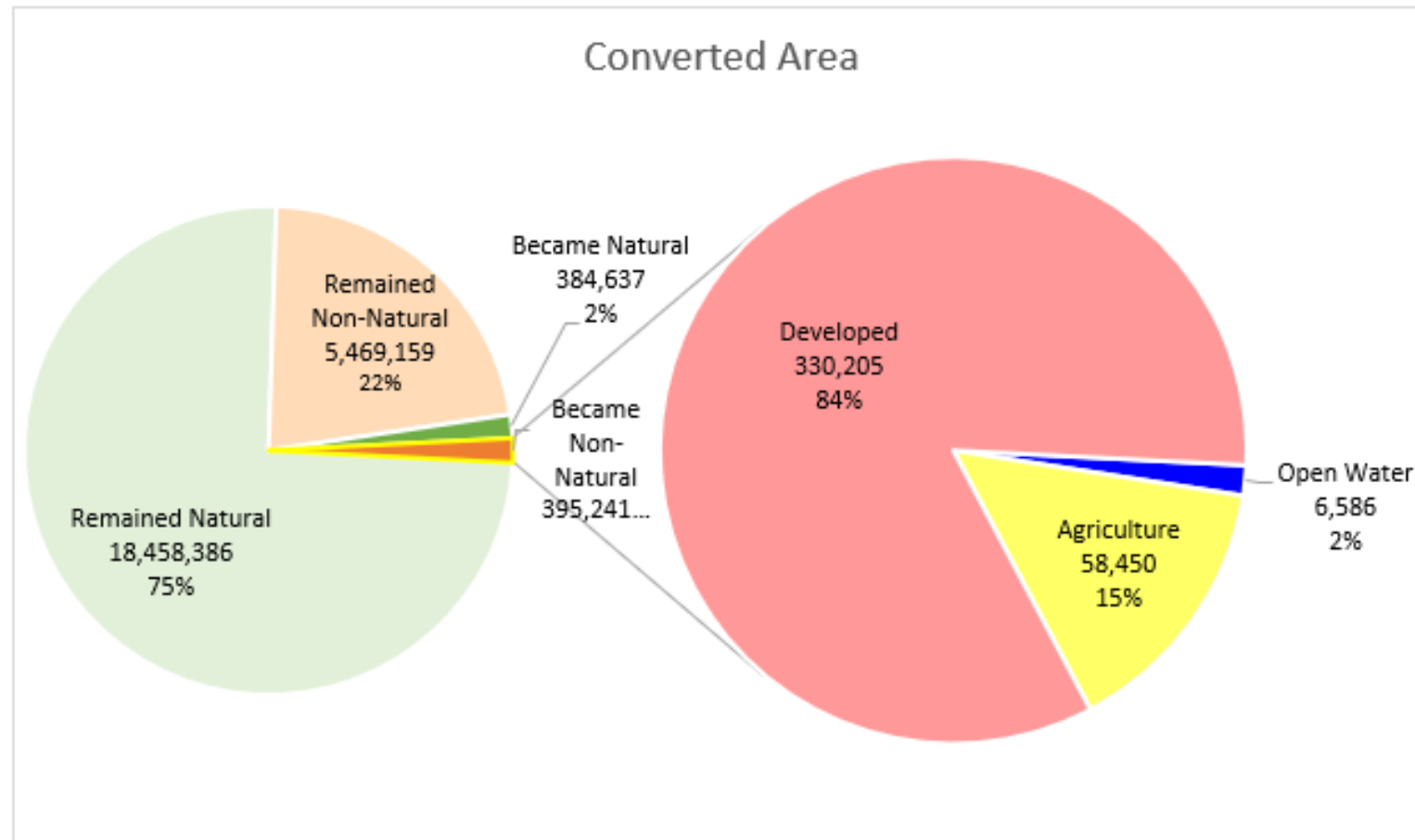


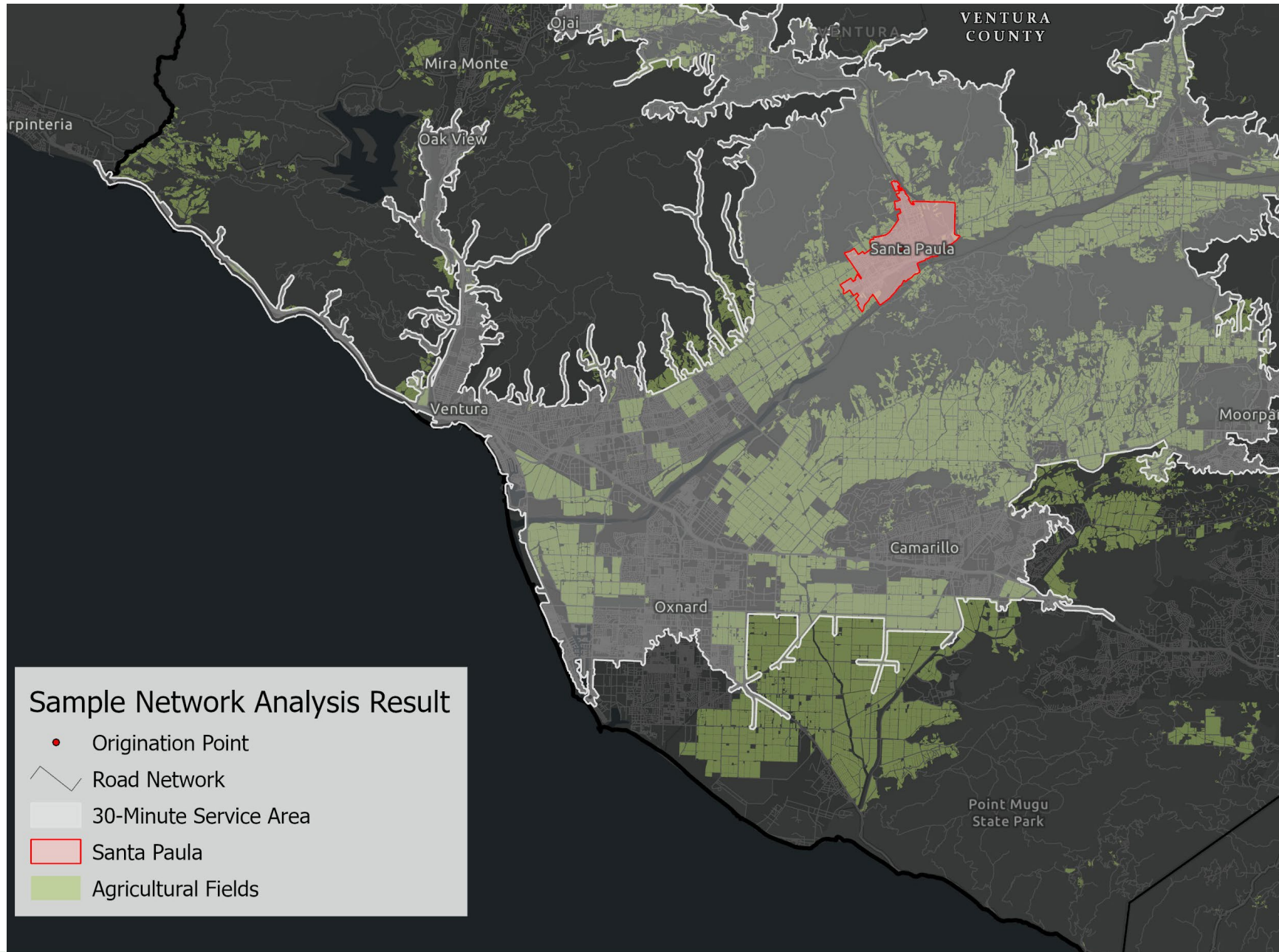
Imperial Co. = 56% of all cropland · Prime Farmland: 376K ac (34%)

GROUNDWATER RECHARGE BY COUNTY

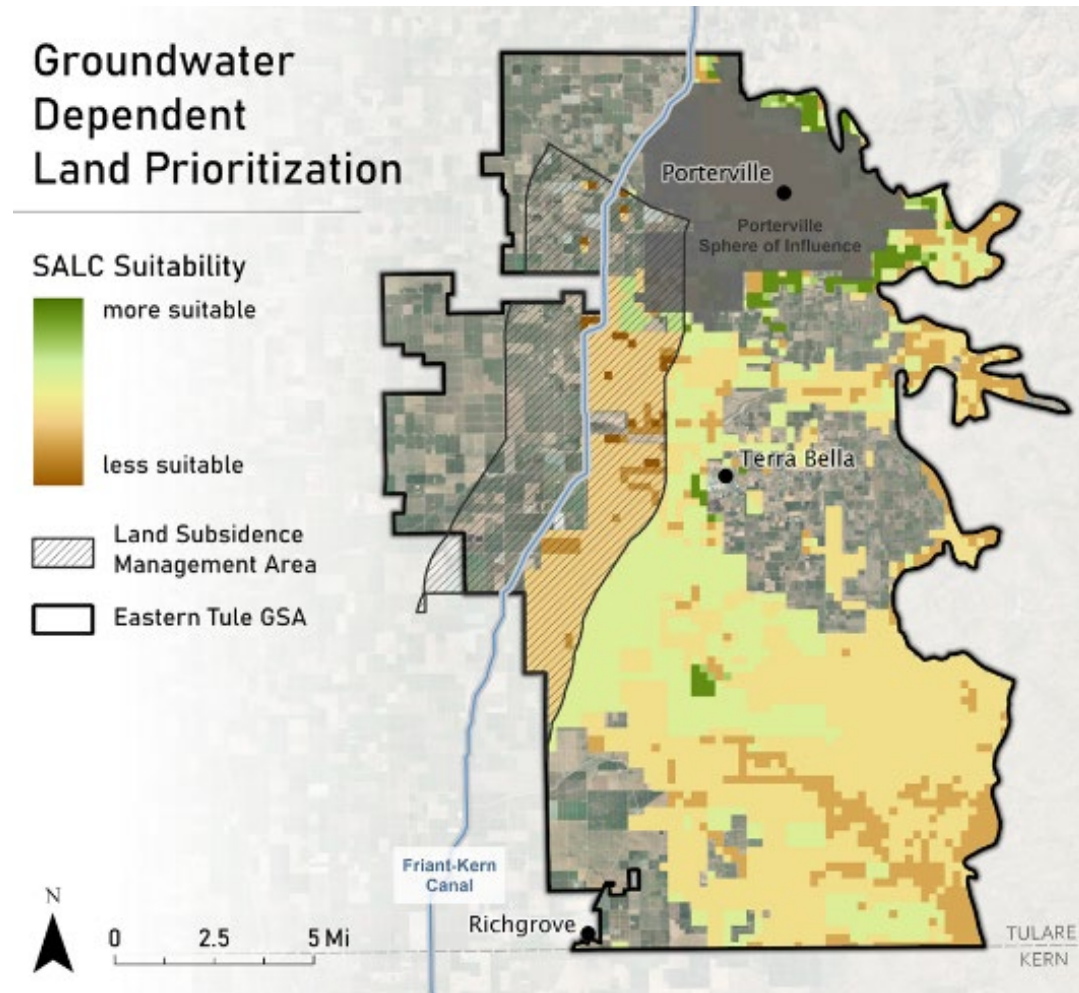


Total region recharge: ~\$265M/yr · 33% of cropland has high SAGBI potential

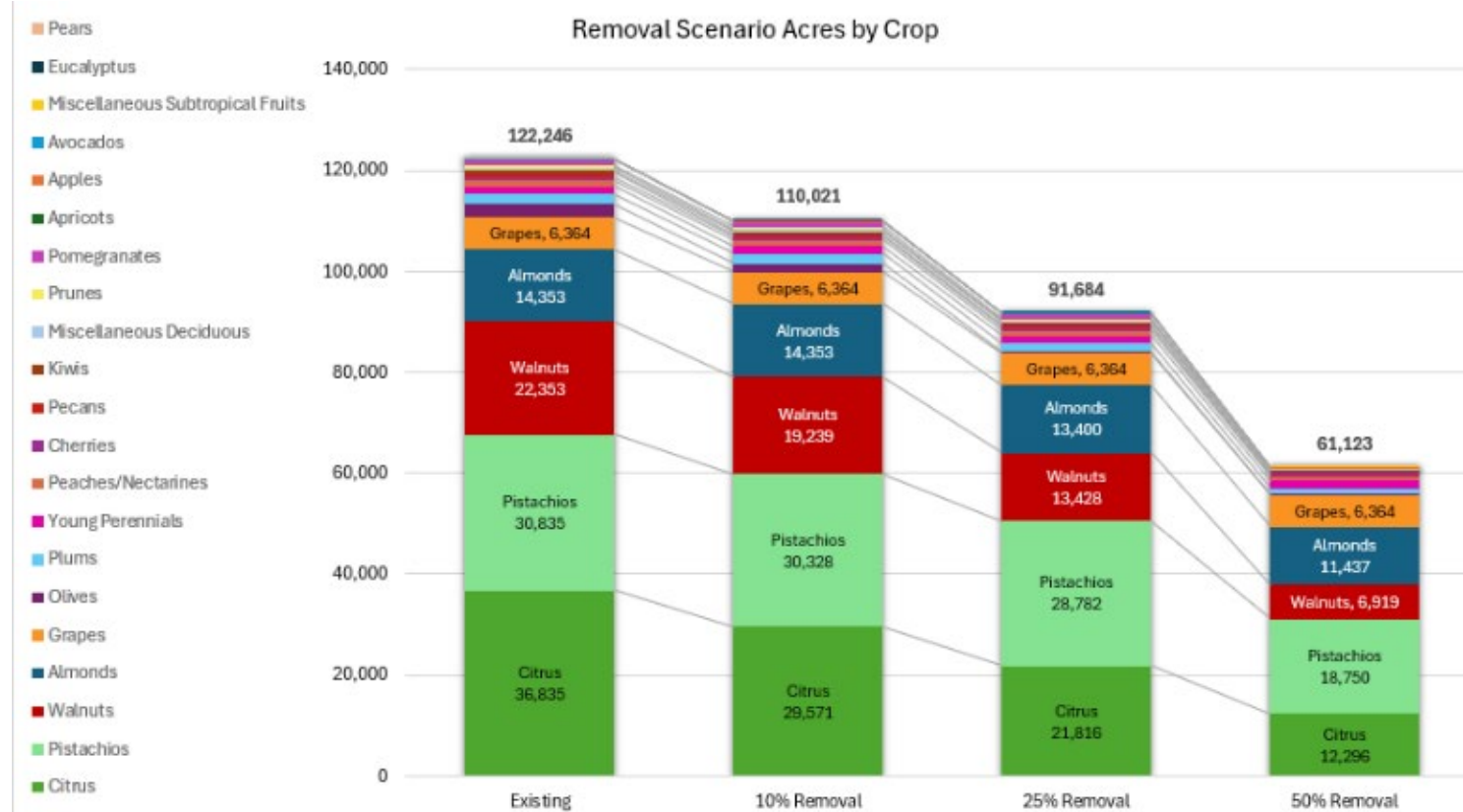




TULARE COUNTY – SALC SUSTAINABILITY EVALUATION, EASEMENT DEVELOPMENT AND CONSERVATION PLAN



TULARE COUNTY – LAND USE CHANGE ANALYSIS AND PROJECTIONS





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