Napa County

1195 THIRD STREET
SUITE 310
NAPA, CA 94559

Agenda

Thursday, December 11, 2025

1:30 PM

Board of Supervisors Chambers
1195 Third Street, Third Floor

Groundwater Technical Advisory Group

Albert Filipelli (Chair)
Monica Cooper
Julie Chambon
Miguel Garcia (Vice-Chair)
Mathias Kondolf

Brian D. Bordona, Secretary - Director
Chris Apallas, County Counsel
Jamison Crosby, Natural Resources Conservation Manager
Brendan McGovern, Principal Planner
Nick Fetherston, Planner II
Alexandria Quackenbush, Meeting Clerk
Angie Ramirez Vega, Meeting Clerk
Aime Ramos, Meeting Clerk

How to Watch or Listen to the Napa County Groundwater Technical Advisory Group Meetings

The Napa County Groundwater Technical Advisory Group will continue to meet the 2nd Thursday of each month. There will be no regular meeting in January, May, June or October. August 19, 2025 will be a special-joint meeting of the GTAG & GSA.

The Groundwater Technical Advisory Group meets at 1195 Third Street, Suite 310, Napa, California 94559. The meeting room is wheelchair accessible. Assistive listening devices and interpreters are available through the clerk of the Groundwater Technical Advisory Group. Requests for disability related modifications or accommodations, aids or services may be made to the Clerk of the Groundwater Technical Advisory Group's office no less than 72 hours prior to the meeting date by contacting (707) 253-4417 or meetingclerk@countyofnapa.org.

The Groundwater Technical Advisory Group realizes that not all County residents have the same ways to stay engaged, so several alternatives are offered. Remote Zoom participation for members of the public is provided for convenience only. In the event that the Zoom connection malfunctions for any reason, the Groundwater Technical Advisory Group reserves the right to conduct the meeting without remote access.

Please watch or listen to the Groundwater Technical Advisory Group meeting in one of the following ways:

1. Attend in-person at the Board of Supervisors Chambers, 1195 Third Street, Napa, Third Floor.
2. Watch on Zoom using the attendee link: https://countyofnapa.zoom.us/j/89426085834. Make sure the browser is up-to-date.
3. Listen on Zoom by calling 1-669-900-6833 (Meeting ID: 894-2608-5834).

If you are unable to attend the meeting in person and wish to submit a general public comment or a comment on a specific agenda item, please do the following:

1. Email your comment to meetingclerk@countyofnapa.org. Emails will not be read aloud but will still become part of the public record and shared with the Groundwater Technical Advisory Group.
2. Use the Zoom attendee link: https://Countyofnapa.zoom.us/j/89426085834. Make sure the browser is up-to-date. When the Chair calls for the item on which you wish to speak, click "raise hand". Please limit your remarks to three minutes.
3. Call the Zoom phone number: 1-669-900-6833. (Meeting ID: 894-2608-5834). When the Chair calls for the item on which you wish to speak, press *9 to raise hand. Please limit your remarks to three minutes.

   Please note that phone numbers in their entirety will be visible online while speakers are speaking

For more information, please contact us via telephone at (707) 253-4417 or send an email to meetingclerk@countyofnapa.org.

ANY MEMBER OF THE AUDIENCE DESIRING TO ADDRESS THE COMMITTEE:

ON A MATTER ON THE AGENDA
Please proceed to the podium when the matter is called and, after receiving recognition from the Chair, give your name and your comments or questions. In order that all interested parties have an opportunity to speak, please be brief and limit your comments to the specific subject under discussion. Time limitations shall be at the discretion of the Chair or Committee, but is generally limited to three minutes.

ON A MATTER NOT ON THE AGENDA
Public comment is an opportunity for members of the public to speak on items that are not on the agenda but are within the subject matter jurisdiction of the Committee. Public comment is limited to three minutes per speaker, subject to the discretion of the Chair. Comments should be brief and focused, and speakers should be respectful of one another who may have different opinions. Please remember this meeting is being recorded and broadcasted live via ZOOM. The County will not tolerate profanity, hate speech, abusive language, or threats. Also, while public input is appreciated, the Brown Act prohibits the Committee from taking any action on matters raised during public comment that are not on the agenda.

1. CALL TO ORDER; ROLL CALL

2. PUBLIC COMMENTS AND RECOMMENDATIONS
(The Committee invites comments and recommendations from the public concerning issues relevant to the charge of the Technical Advisory Group. Anyone who wishes to speak to the Technical Advisory Group on such a matter, if it is not on the agenda, may do so at this time. At the discretion of the Chair, individuals will be limited to a three-minute presentation. No action will be taken by the Technical Advisory Group as a result of any item presented at this time.)

3. APPROVAL OF MINUTES

A. The Secretary of the committee requests approval of the minutes from the September 11, 2025 TAG meeting. **25-2008**

Attachments: Draft Minutes

4. REPORTS AND ANNOUNCEMENTS

5. ADMINISTRATIVE ITEMS

A. Elect officers (Chair and Vice-Chair) for 2026 for the Technical Advisory Group (TAG). **25-2005**

B. In this item the Technical Advisory Group (TAG) will review the proposed draft 2026 TAG meeting calendar for discussion and decision. The calendar proposes a schedule of meetings and topics for 2026 TAG Meetings. **25-1984**

Attachments: 2026 Draft TAG Regular Meeting Schedule

C. The TAG will receive an update on the use of satellite and land-based remote sensing data for analysis of evapotranspiration and information that can be used to refine vineyard water use estimates for Napa Valley Subbasin integrated hydrologic modeling purposes. **25-2018**

Attachments: GRAPEX Presentation

D. Andrew Fisher, Professor at University of Santa Cruz, and Lisa Lurie, Executive Director of the Resource Conservation District of Santa Cruz County will make a presentation to the TAG on an innovative groundwater sustainability approach being implemented by the Pajaro Valley Groundwater Management Agency that incentivizes growers to capture and infiltrate surplus stormwater. **25-2019**

Attachments: RENEM Briefing Sheet
RENEM Presentation

E. Technical Advisory Group (TAG) members will receive a presentation on Project 1 of GSP Implementation: Managed Aquifer Recharge, including an update on the feasibility study underway. The TAG will also receive an update on current vineyard fallowing in Napa Valley. This is intended to spur discussion, questions, and provide feedback to staff and participants. **25-2017**

Attachments: GPR Implementation and Recharge Feasibility Scenario Development Presentation

6. FUTURE AGENDA ITEMS

7. ADJOURNMENT

I HEREBY CERTIFY THAT THE AGENDA FOR THE ABOVE STATED MEETING WAS POSTED AT A LOCATION FREELY ACCESSIBLE TO MEMBERS OF THE PUBLIC AT THE NAPA COUNTY ADMINISTRATIVE BUILDING, 1195 THIRD STREET, NAPA, CALIFORNIA ON 12/8/2025 BY 11:30 AM. A HARDCOPY SIGNED VERSION OF THE CERTIFICATE IS ON FILE WITH THE COMMITTEE CLERK AND AVAILABLE FOR PUBLIC INSPECTION.

AIME RAMOS (By e-signature)
Aime Ramos, Committee Clerk

Napa County

Board Agenda Letter

1195 THIRD STREET
SUITE 310
NAPA, CA 94559
www.napacounty.gov

Main: (707) 253-4580

Groundwater Technical Advisory Group **Agenda Date:** 12/11/2025 **File ID #:** 25-2008

TO: Technical Advisory Group for the Napa County Groundwater Sustainability Agency

FROM: Brian Bordona - Director of Planning, Building and Environmental Services

REPORT BY: Jamison Crosby, Natural Resources Conservation Manager

SUBJECT: TAG Minutes from September 11, 2025

RECOMMENDATION

The Secretary of the committee requests approval of the minutes from the September 11, 2025 TAG meeting.

ENVIRONMENTAL IMPACT

ENVIRONMENTAL DETERMINATION: The proposed action is not a project as defined by 14 California Code of Regulations 15378 (State CEQA Guidelines) and therefore CEQA is not applicable.

BACKGROUND AND DISCUSSION

The TAG held its twenty-fifth meeting on September 11, 2025. Minutes were prepared and are ready for the committee's approval.

Meeting Minutes

Technical Advisory Group

Julie Chambon
Monica Cooper
Albert Filipelli *(Chair)*
Miguel Garcia *(Vice-Chair)*
Mathias Kondolf

Brian D. Bordona, Director
Chris Apallas, County Counsel
Jamison Crosby, Natural Resources Manager
Brendan McGovern, Principal Planner
Nick Fetherston, Planner II
Alexandria Quackenbush, Meeting Clerk
Angie Ramirez-Vega, Meeting Clerk
Aime Ramos, Meeting Clerk

Thursday, September 11, 2025	**1:30 PM**	**Board of Supervisors Chambers 1195 Third Street, Third Floor**

1. CALL TO ORDER / ROLL CALL

Group Members Present: Chair Albert Filipelli, Matt Kondolf, Miguel Garcia, Monica Cooper, Julie Chambon

2. PUBLIC COMMENTS AND RECOMMENDATIONS

No public comments were heard.

3. APPROVAL OF MINUTES

Motion by Member Garcia to approve minutes for the April 10, 2025, meeting as presented, seconded by Chair Filipelli.
Vote: Carried 4-0-1
Yes: Cooper, Garcia, Filipelli, Kondolf
No: N/A
Abstain: Chambon

4. REPORTS AND ANNOUNCEMENTS

Member Garcia mentioned he is in contact with Sustainable Conservation to support the development of a best management practices guide, including information on on-farm recharge in vineyards.
Jamison Crosby made the announcements below:

- Napa County is the recipient of a grant from the Department of Water Resources.
- Napa County was invited to make a presentation at the Groundwater Resources Association 8th Annual Western Groundwater Congress.
- The next planned TAG meeting is November 13th and a tentative meeting on December 11th.
- Staff will confer with Chair and Vice-Chair regarding the meeting calendar for the

year 2026.

Brendan McGovern announced that in mid-October he and Nick Fetherston will be going out to collect static well measurements at the 126 voluntary groundwater wells that exist around the county and in the subbasin.

5. ADMINISTRATIVE ITEMS

A. Technical Advisory Group (TAG) members will receive an update on Napa Valley Subbasin Groundwater Sustainability Plan (GSP) implementation progress.
Vicki Kretsinger (LSCE) and Duncan MacEwan (ERA) each presented.
Vice-Chair Garcia initiated a discussion.
Chair Filipelli opened public comment, three public comments were heard.
Chair Filipelli closed public comment.
Nick Newcomb (LSCE) presented.
Member Chambon initiated a discussion.
Chair Filipelli opened public comment, one public comment was heard.
Chair Filipelli closed public comment.
Christian Braudrick (Stillwater) presented.
Chair Filipelli opened the floor for discussion.
Chair Filipelli opened public comment, one public comment was heard.
Chair Filipelli closed public comment.
Tori Laird (ERA) presented.
Vice-Chair Garcia initiated a discussion.
Chair Filipelli opened public comment, one public comment was heard.

6. FUTURE AGENDA ITEMS

Jamison Crosby reminded members of the next meeting scheduled for November 13, 2025 and the December 11th tentative meeting.

7. ADJOURNMENT

Meeting adjourned at 4:07pm.

_____

AIME RAMOS, Meeting Clerk

Napa County

Board Agenda Letter

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Groundwater Technical Advisory Group **Agenda Date:** 12/11/2025 **File ID #:** 25-2005

TO: Technical Advisory Group for the Napa County Groundwater Sustainability Agency

FROM: Brian Bordona - Director, Planning, Building and Environmental Services

REPORT BY: Jamison Crosby - Natural Resources Conservation Manager

SUBJECT: Election of Officers (Chair and Vice-Chair) for 2026

RECOMMENDATION

Elect officers (Chair and Vice-Chair) for 2026 for the Technical Advisory Group (TAG).

BACKGROUND AND DISCUSSION

As stated in the Bylaws, at the first organizational meeting and annually thereafter, the membership of TAG shall elect a Chair and Vice-Chair from among themselves. This election will be for officers to begin serving in 2026.

As stated in the Bylaws, the Chair and Vice-Chair shall serve one (1) calendar year or until their successors are elected and assume office. If the office of the Chair becomes vacant during the term, the Vice-Chair shall become Chair. Vacancy in the office of Vice-Chair during the term shall be filled by election to serve for the remainder of the term.

As stated in the Bylaws, the duties of the Chair and Vice-Chair include:

1. The Chair, or the Vice Chair in the absence of the Chair, shall act as the presiding officer of the TAG and in that capacity shall preserve order and decorum, decide questions of order subject to being overruled by a two-thirds vote and perform such other duties as are required by the TAG.
2. The Chair shall have all the rights and duties enjoyed by any other member of the TAG, including the right to make and second motions.
3. "…any regularly scheduled meeting of the TAG may be canceled by majority vote or, if there is not a quorum, be adjourned by the Chair or Secretary…"
4. A special meeting may be called at any time by the Chair or upon the request of a majority of the members of the TAG…
5. Regarding public comment on unagendized items, the time limit is three (3) minutes per speaker. In the event total public comment exceeds ten (10) minutes, the Chair may, in the Chair's discretion, continue public comment on the unagendized items to the end of the meeting.

6. The Chair recognizes any person desiring to address the TAG and may, in the interests of facilitating the business of the TAG, set in advance of the presentation of testimony reasonable time limits for oral presentations.
7. A roll call vote may be required in voting upon any motion of the TAG at the discretion of the Chair.
8. Not in the bylaws, Secretary will consult with the Chair about content of TAG meeting agendas.

Previous TAG Chair and Vice-Chair by year:

- 2022/2023: Miguel Garcia (Chair) and Julie Chambon (Vice-Chair)
- 2023/2024: Julie Chambon (Chair) and Monica Cooper (Vice-Chair)
- 2024/2025: Albert Filipelli (Chair) and Monica Cooper (Vice-Chair)
- 2025/2026: Albert Filipelli (Chair) and Miguel Garcia (Vice-Chair)

Procedure

Staff introduces the item.

Questions and answers with the TAG.

Public comments.

ENVIRONMENTAL IMPACT

ENVIRONMENTAL DETERMINATION: The proposed action is not a project as defined by 14 California Code of Regulations 15378 (State CEQA Guidelines) and therefore CEQA is not applicable.

Napa County

Board Agenda Letter

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Groundwater Technical Advisory Group **Agenda Date:** 12/11/2025 **File ID #:** 25-1984

TO: Technical Advisory Group for the Napa County Groundwater Sustainability Agency

FROM: Brian D. Bordona, Director of Planning, Building and Environmental Services

REPORT BY: Jamison Crosby, Natural Resources Conservation Manager

SUBJECT: Proposed 2026 Technical Advisory Group Calendar

RECOMMENDATION

In this item the Technical Advisory Group (TAG) will review the proposed draft 2026 TAG meeting calendar for discussion and decision. The calendar proposes a schedule of meetings and topics for 2026 TAG Meetings.

BACKGROUND AND DISCUSSION

In 2026, GSA staff propose the TAG continue to meet on the 2nd Thursday of every month from 1:30 to 5pm, with no meetings to be held on January 8th, February 12th, May 7th, June 11th, July 9th, August 13th, October 8th, and December 10th.

Procedure
Staff introduces.
Questions and answers with the TAG.
Public comments.

ENVIRONMENTAL IMPACT

ENVIRONMENTAL DETERMINATION: The proposed action is not a project as defined by 14 California Code of Regulations 15378 (State CEQA Guidelines) and therefore CEQA is not applicable.

SUPPORTING DOCUMENTS

A. Proposed 2026 TAG Calendar

2026 Meeting Schedule
Technical Advisory Group

A Tradition of Stewardship
A Commitment to Service

January

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

July

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

September

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

October

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

December

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Regular Technical Advisory Group meetings are held on the 2nd Thursday of the month as scheduled
Board of Supervisors Chambers, 1195 Third Street, Suite 305, Napa CA 94559

Regular TAG Meeting

County Holidays

2026 Meeting Schedule
Technical Advisory Group

March 12, 2026
April 9, 2026
September 10, 2026
November 12, 2026

Regular Technical Advisory Group meetings are held on the 2nd Thursday of the month as scheduled.

Board of Supervisors Chambers, 1195 Third Street, Suite 305, Napa CA 94559

Napa County

Board Agenda Letter

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Main: (707) 253-4580

Groundwater Technical Advisory Group **Agenda Date:** 12/11/2025 **File ID #:** 25-2018

TO: Technical Advisory Group for the Napa County Groundwater Sustainability Agency

FROM: Brian D. Bordona, Director of Planning, Building and Environmental Services

REPORT BY: Jamison Crosby, Natural Resources Conservation Manager

SUBJECT: Presentation on GRAPEX Project and Application of Multi-Scale Remote Sensing Evapotranspiration Toolkit for Mapping Crop Water Use and Crop Stress for Improved Irrigation

RECOMMENDATION

The TAG will receive an update on the use of satellite and land-based remote sensing data for analysis of evapotranspiration and information that can be used to refine vineyard water use estimates for Napa Valley Subbasin integrated hydrologic modeling purposes.

Procedure
Staff introduces.
Questions and answers with the TAG.
Public comments.

BACKGROUND AND DISCUSSION

Remotely-sensed evapotranspiration (ET) estimates informed the development of the Napa Valley Integrated Hydrologic Model (NVIHM) for the Groundwater Sustainability Plan (GSP). These estimates used data from 2014 to develop crop coefficients for black and white grapes in Napa Valley. As previously presented to the TAG, the total water use, as measured by ET, varies across the Napa Valley Subbasin. The initial crop coefficients developed during GSP development provided the foundation for determining applied water requirements, for both surface and groundwater, for irrigated acreages within the NVIHM. Refining the estimates of applied water is a priority during GSP implementation. Since the initial NVIHM development, multiple data sources, including local sensors as well as remotely sensed data, are being used to update modeled ET.

Field measurements of ET using surface renewal methods by Tule Technologies were presented at the October 2022 TAG meeting. The measured data provides daily, field-scale measurements of ET. As previously discussed with the TAG, the use of local data is necessary to refine crop coefficients in Napa County. An overview of remotely sensed ET measurement technologies, OpenET, was presented at the November 2022 TAG meeting. OpenET is an online platform that uses the best available science and publicly available data to provide satellite -based ET estimates. OpenET has been used in multiple applications across the Western US as well as for multiple Groundwater Sustainability Agencies (GSA) within California.

Outreach to Napa County vineyard managers and other users of Tule Technologies sensors began in Spring 2023 led by the Napa County Resource Conservation District (RCD). To date, data from 17 volunteered sensors have been obtained from the region. A comparison of field-measured ET with remotely-sensed ET is being conducted at these locations.

Extensive analyses of remotely-sensed data and the development of tools to support vineyard water management have been underway for over a decade as the core mission of GRAPEX (Grape Remote sensing Atmospheric Profile and Evapotranspiration eXperiment). GRAPEX is a highly collaborative and interdisciplinary experiment, which involves USDA-Agricultural Research Service (ARS) scientists, industry, and university researchers. The large scope of GRAPEX research has allowed the development of new measurement and remote sensing tools and techniques to quantify vine evapotranspiration, moisture status, and stress, with the goal of improving precision irrigation management in California vineyards.

Through the support of a NASA Applied Sciences grant as well as continued support from USDA and grower partners, GRAPEX validation sites have expanded and include the coastal growing region in Sonoma County and Madera/Fresno Counties. This expansion resulted in a significant north-south climate gradient, different vine varieties, soil properties, topography, trellis systems, canopy size, water requirements, and management practices. GRAPEX efforts combine in-situ and remotely-sensed data to investigate the effects of canopy structure and row orientation on energy and moisture exchange processes within and above the vine canopy. A critical component of GRAPEX has been to work closely and collaboratively with scientists at commercial partners to ensure that both the experimental data being collected and the models and tools being developed can address critical operational needs.

Andrew McElrone, a Research Plant Physiologist with USDA-ARS, an Adjunct Professor in the Department of Viticulture and Enology at UC Davis, and collaborator and co-lead on the GRAPEX research, will provide a presentation to the TAG on GRAPEX findings to date, continuing research efforts, and opportunities to coordinate with the GSP team to utilize remotely-sensed and ground-based data to enhance crop water use estimates represented in NVIHM.

ENVIRONMENTAL IMPACT

ENVIRONMENTAL DETERMINATION: The proposed action is not a project as defined by 14 California Code of Regulations 15378 (State CEQA Guidelines) and therefore CEQA is not applicable.

SUPPORTING DOCUMENTS

A. Presentation on GRAPEX Project and Application of Multi-Scale Remote Sensing Evapotranspiration Toolkit for Mapping Crop Water Use and Crop Stress for Improved Irrigation Scheduling and Water Management in Vineyards (Andrew McElrone, December 2025)

Tools for measuring vineyard ET

Napa Valley GSA TAG Meeting

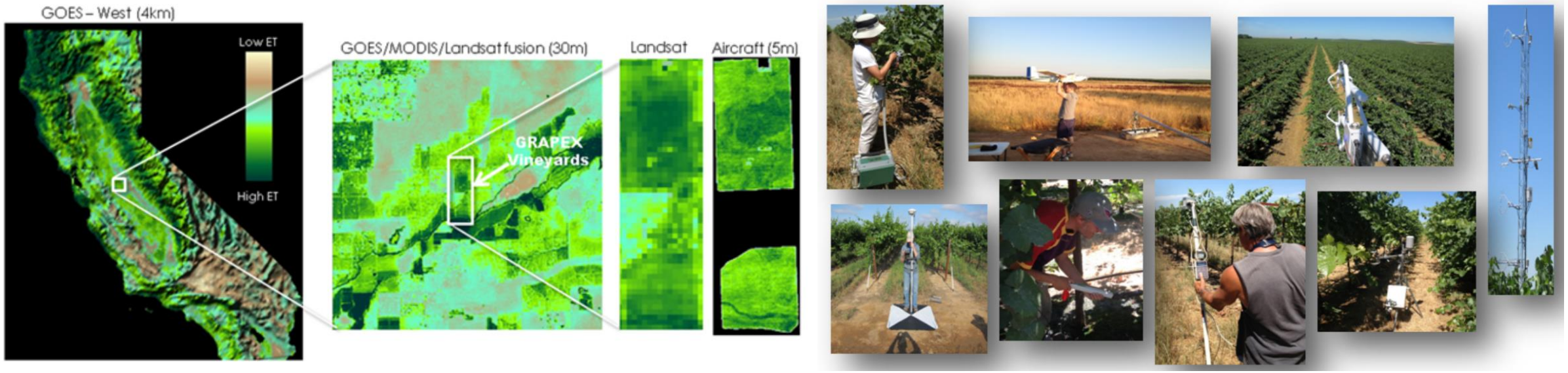
December 2025

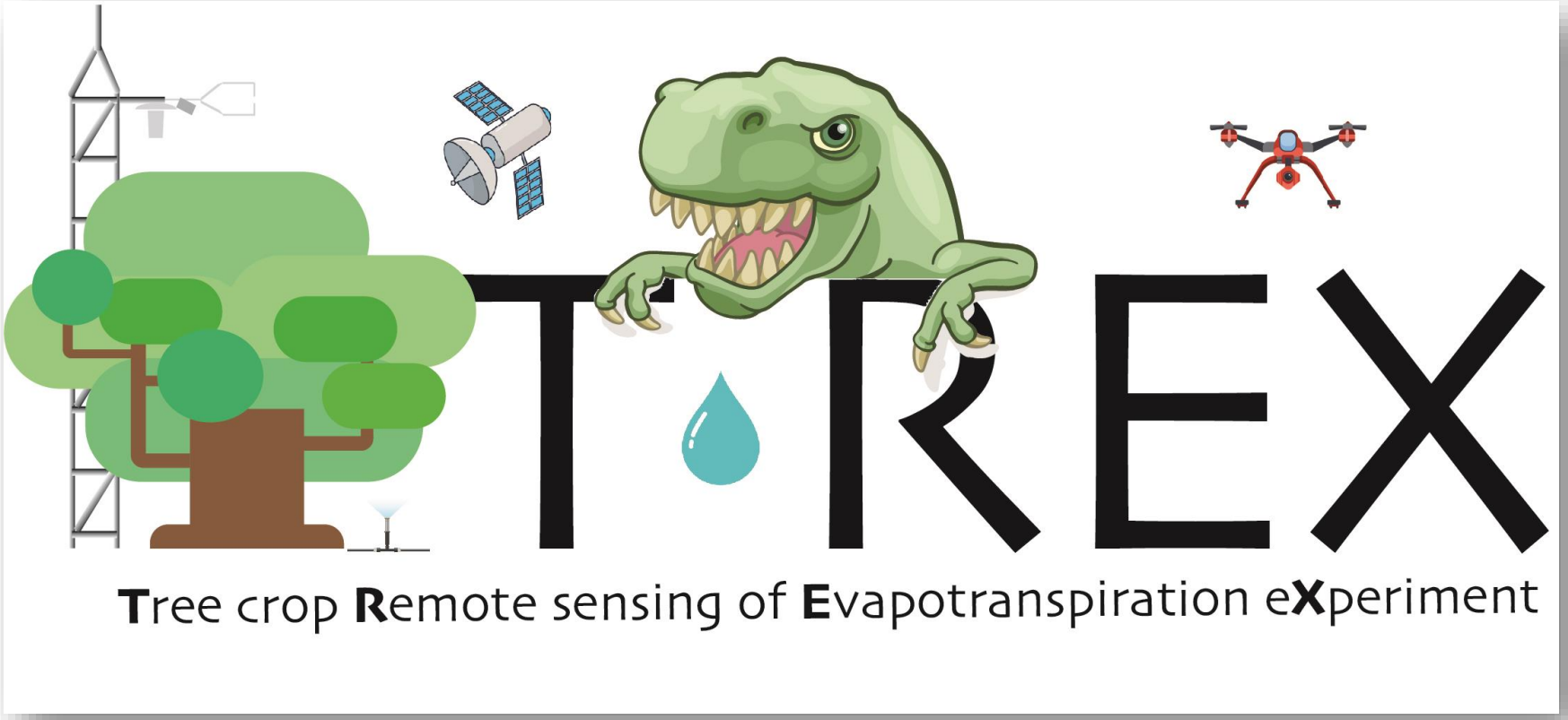
Andrew McElrone

USDA @ UC DAVIS UNIVERSITY OF CALIFORNIA

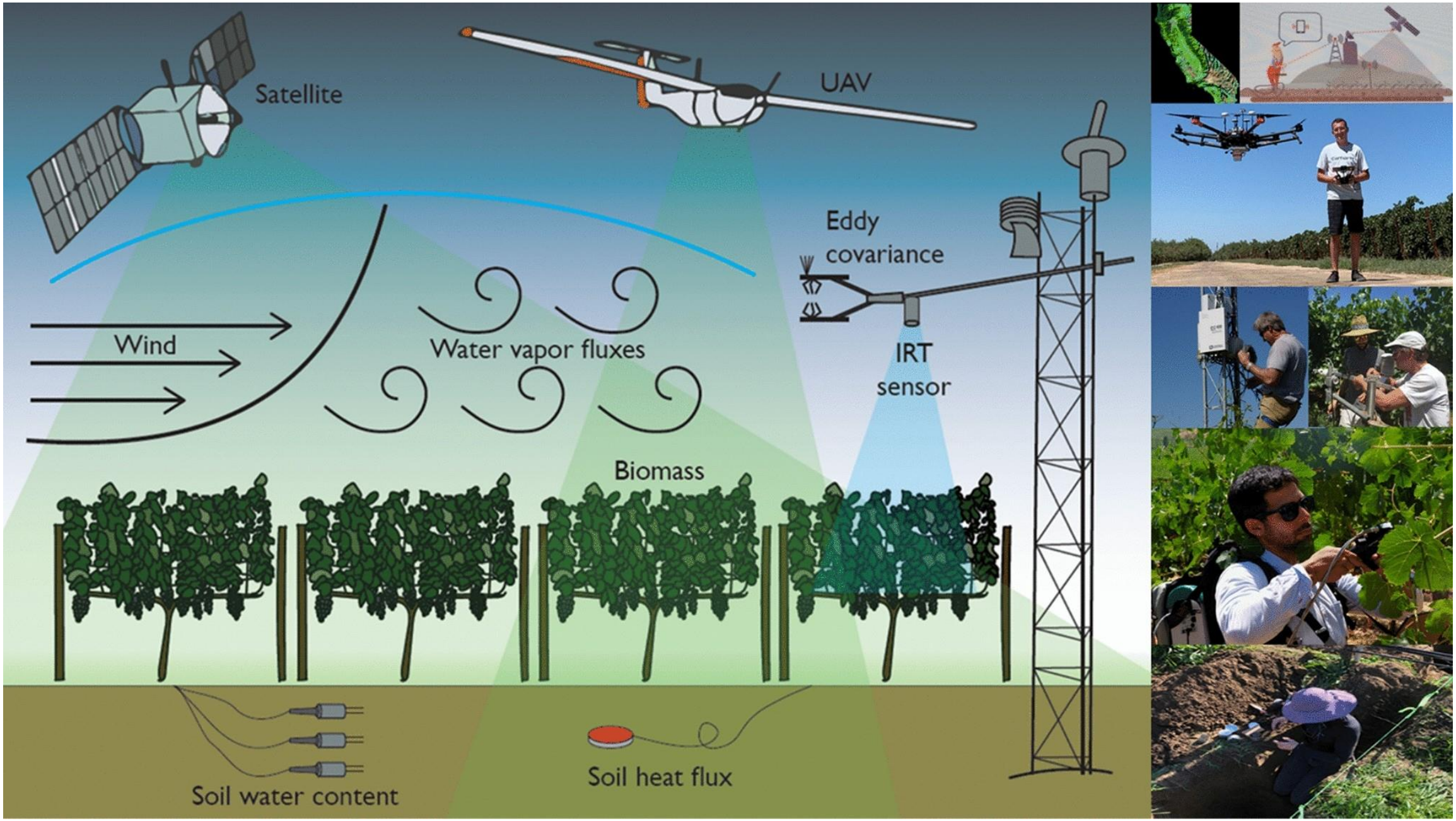
Grape Remote sensing Atmospheric Profile & Evapotranspiration eXperiment

Refine and apply a multi-scale remote sensing ET toolkit for mapping crop water use and stress for improved irrigation management in California

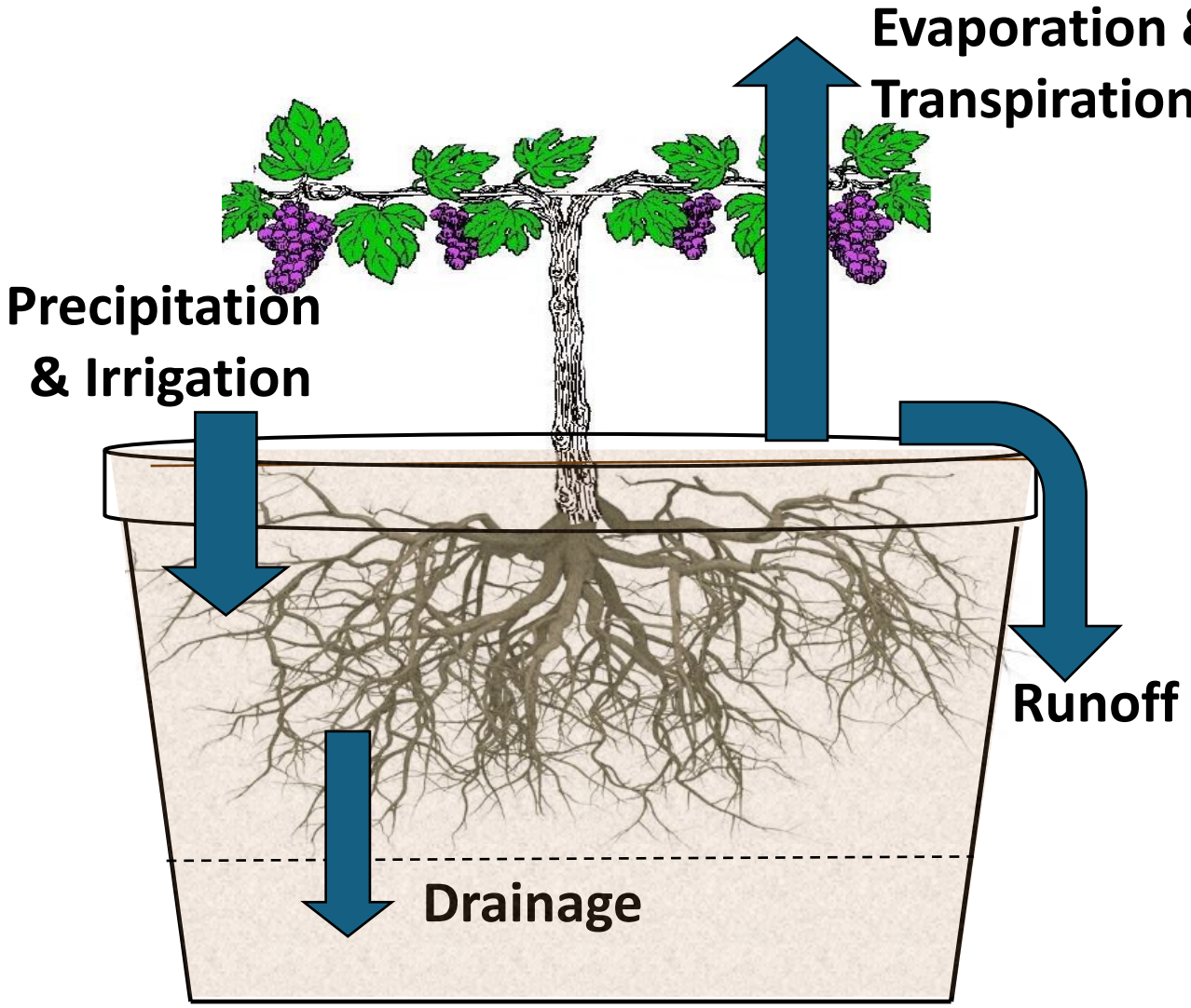




Almonds, Pistachios, Olives, Table Grapes

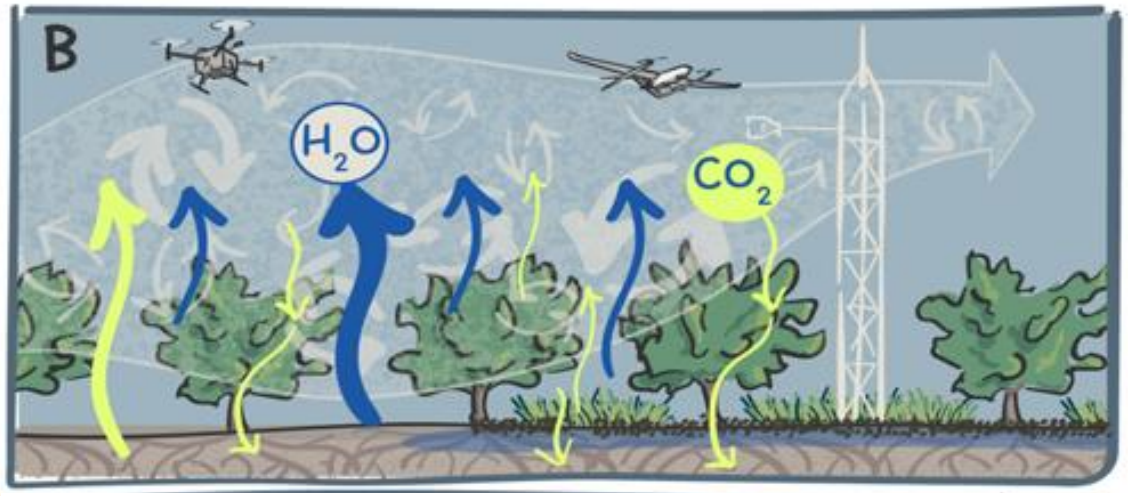

Satellite
UAV
Eddy
covariance
IRT
sensor
Wind
Water vapor fluxes
Biomass
Soil water content
Soil heat flux

Vineyard Water Balance



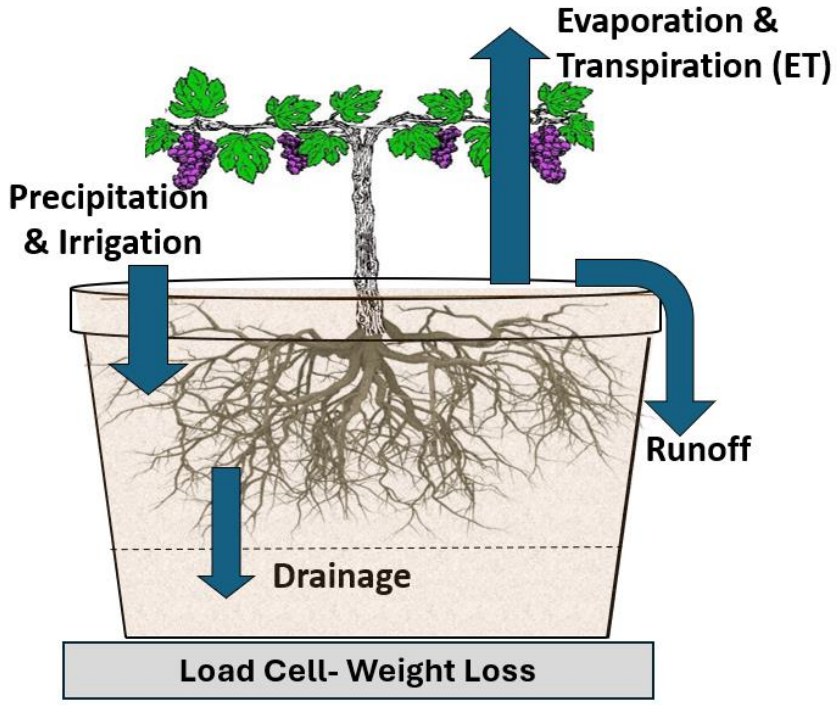
Factors Impacting Water Use

- Evaporative demand
- Growth stage of vines
- Presence of a cover crop
- Canopy Size/Trellis type
- Row/Vine spacing
- Vineyard slope and aspect
- Vine health
- Hard pan
- Rooting depth
- Soil type



Lots of ways to measure/estimate ET:

- Soil Water Balance
- Weighing Lysimeters
- Calculated ET- CIMIS
- Measured Directly- Eddy Covariance
- Energy Balance Residual
  - Ground-based & Remotely Sensed
  - Measured vs. Modelled
  - Advection & Closure Issues



California Irrigation Management Information System (CIMIS)

$$ET_c = K_c * ET_o$$

Grapevine evapotranspiration

Crop coefficient

Reference ET (well-watered model grass)

$$K_c = ET_c / ET_o$$

Obtained from vines in weighing lysimeter

Kearney Agricultural Center
Univ. of California- Parlier CA

"…assumes a disease-free plant grown under optimum soil water and nutrient conditions…"

Doorenbos and Pruitt, 1977

California Irrigation Management Information System (CIMIS)

$$ET_c = K_c * ET_o * K_s$$

- ET_c: Grapevine evapotranspiration
- K_c: Crop coefficient
- ET_o: Reference ET (well-watered model grass)
- K_s: Stress coefficient

$$K_c = ET_c / ET_o$$

Obtained from vines in weighing lysimeter

Kearney Agricultural Center
Univ. of California- Parlier CA

Issues:

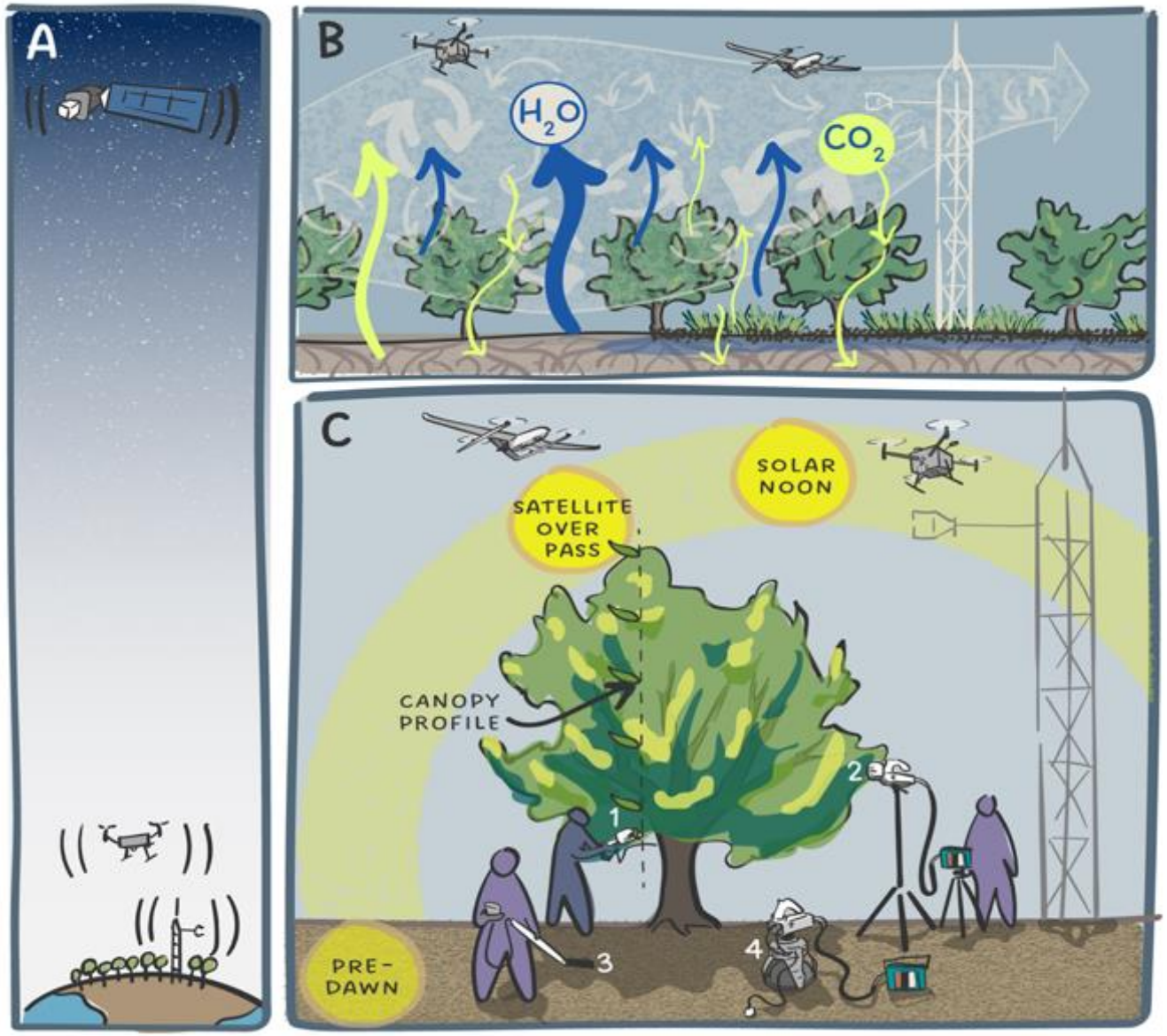
- CIMIS stations often not well maintained
- Located far from target field
- K_c is difficult to determine
- Translated from two “potted” vines

Oakville CIMIS Station

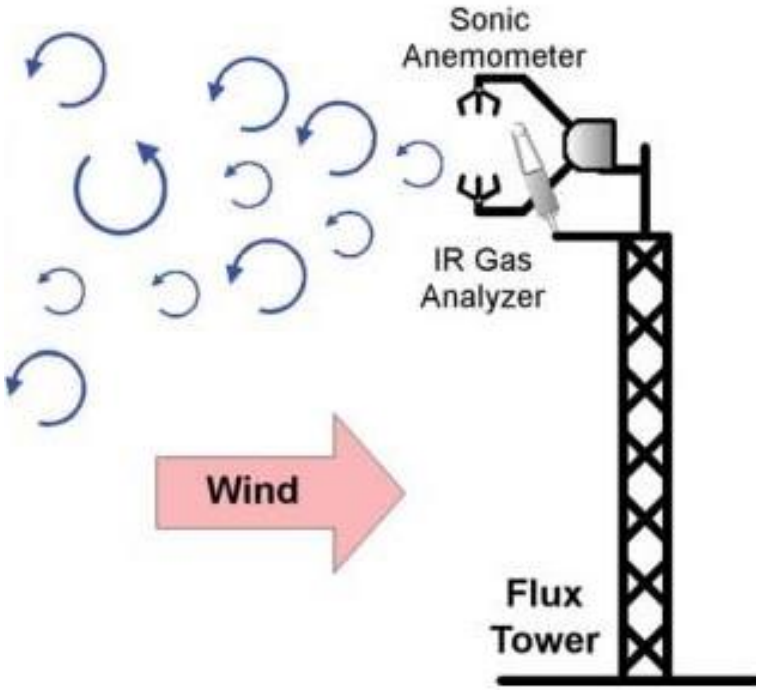
10/30/2020

8/30/2023

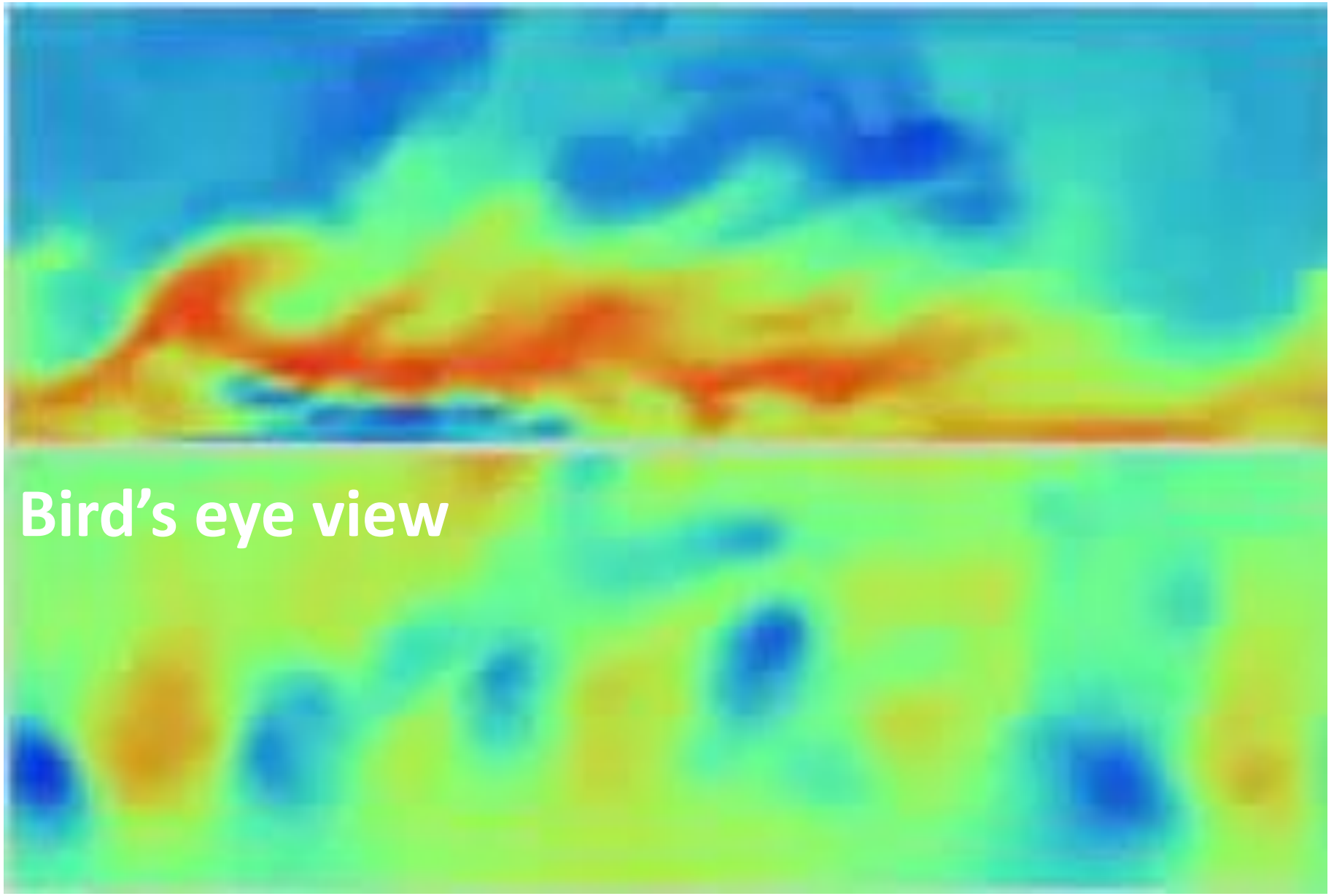
2/29/2024



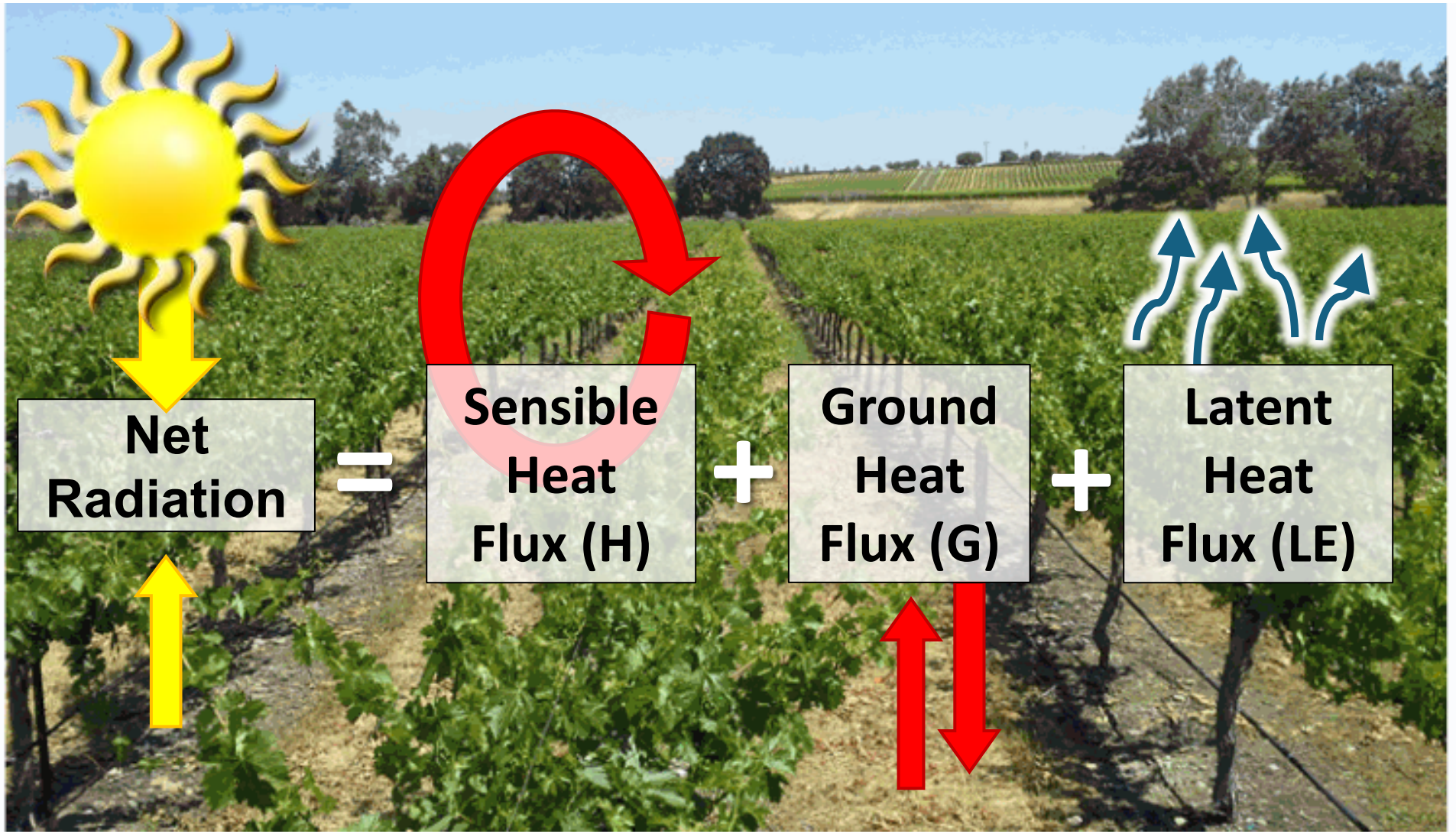
Turbulent fluxes measured directly with Eddy Covariance



- "Gold standard" but some uncertainty
- Ideal= large, flat, homogeneous
- Dynamic footprint
  - dependent on wind & stability
- Advection (i.e. additional heat)
  -hot dry grassland next to wet cool crop


Bird’s eye view

Thermal Energy Balance Approaches to Quantify ET



Partitioning the energy at the crop surface

Available Energy

Energy Balance Residual= Net Radiation – G – H – LE

Turbulent Fluxes

Correction methods for EBR (i.e. Bowen ratio- H/LE)

Irrigation Science (2022) 40:445–461
https://doi.org/10.1007/s00271-022-00783-1

Evapotranspiration uncertainty at micrometeorological scales: the impact of the eddy covariance energy imbalance and correction methods

N. Bambach[1] · W. Kustas[2] · J. Alfieri[2] · J. Prueger[3] · L. Hipps[4] · L. McKee[2] · S. J. Castro[5] · J. Volk[6] · M. M. Alsina[7] · A. J. McElrone[5,8]

Table 1 Summary description of micrometeorological methodological approaches for daily *ET* estimates

Methodological approach	Abbreviated name	Equation	Description
Eddy covariance *ET*	ET_{EC}	Equation 2	Sum of eddy covariance *ET* flux
Eddy covariance daytime *ET*	$ET_{EC\text{-}DT}$	Equation 3	Sum of daytime eddy covariance ET flux (nighttime fluxes excluded)
Eddy covariance *ET* corrected by *EBR* partitioned based on B_o	$ET_{B\text{-}SD}$	Equation 5	Sum of eddy covariance *ET* fluxes corrected by *EBR* partitioned based on B_o at each AP
Eddy covariance daytime *ET* corrected by *EBR* partitioned based on B_o	$ET_{B\text{-}SD\text{-}DT}$	Equation 6	Sum of daytime eddy covariance *ET* fluxes corrected by *EBR* partitioned based on B_o at each AP
Eddy covariance *ET* corrected by mean *EBR* partitioned based on B_o	$ET_{B\text{-}D}$	Equation 7	Sum of eddy covariance *ET* fluxes corrected by *EBR* partitioned based on a daily mean B_o
Eddy covariance daytime *ET* corrected by mean *EBR* partitioned based on B_o	$ET_{B\text{-}D\text{-}DT}$	Equation 8	Sum of daytime eddy covariance *ET* fluxes corrected by *EBR* partitioned based on a daily mean B_o
Eddy covariance daytime *ET* corrected by *EBR* partitioned based on a moving median B_o	$ET_{B\text{-}SD\text{-}MM}$	Equation 9	Sum of eddy covariance *ET* fluxes corrected by *EBR* partitioned based on a B_o derived as a centered ± 15 days moving median
Energy balance residual *ET*	ET_{EB}	Equation 10	Sum of energy balance residual ET
Energy balance residual *ET*	$ET_{EB\text{-}DT}$	Equation 11	Sum of daytime energy balance residual *ET*

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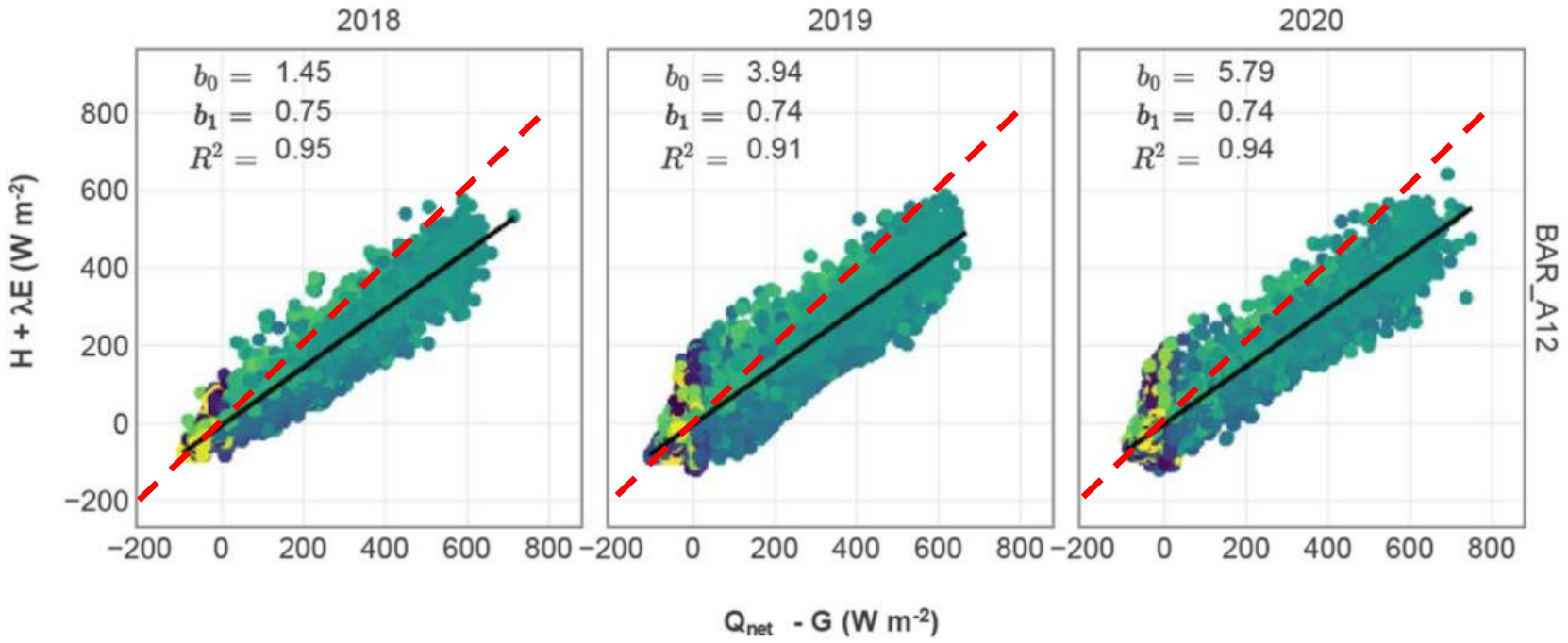
Location map?



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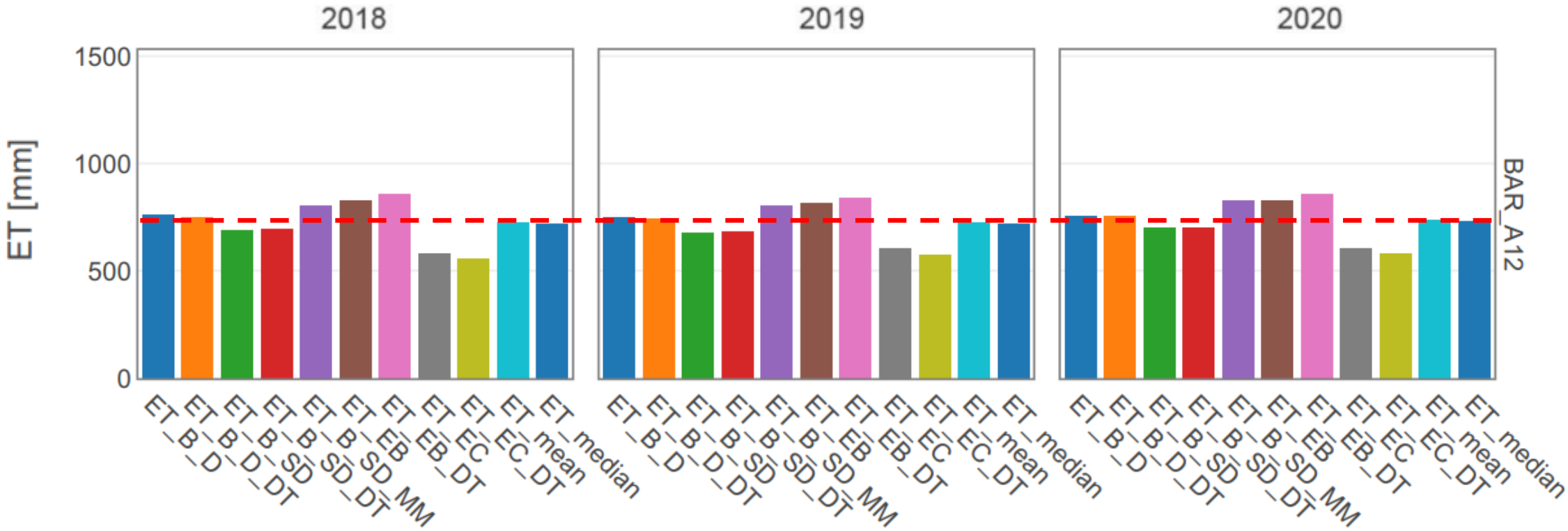

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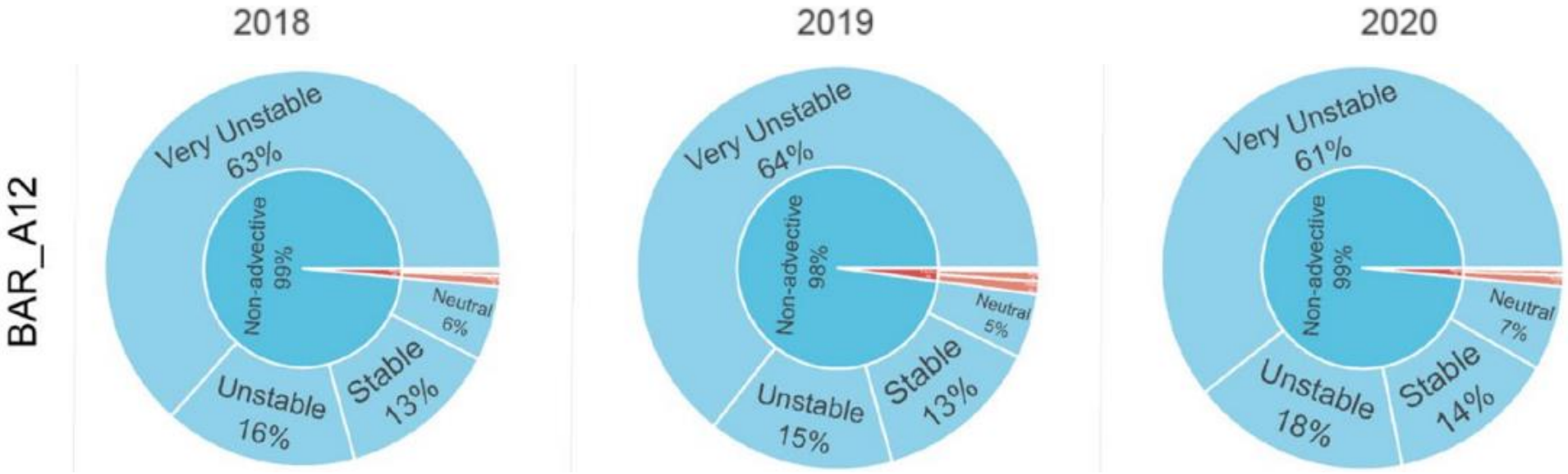
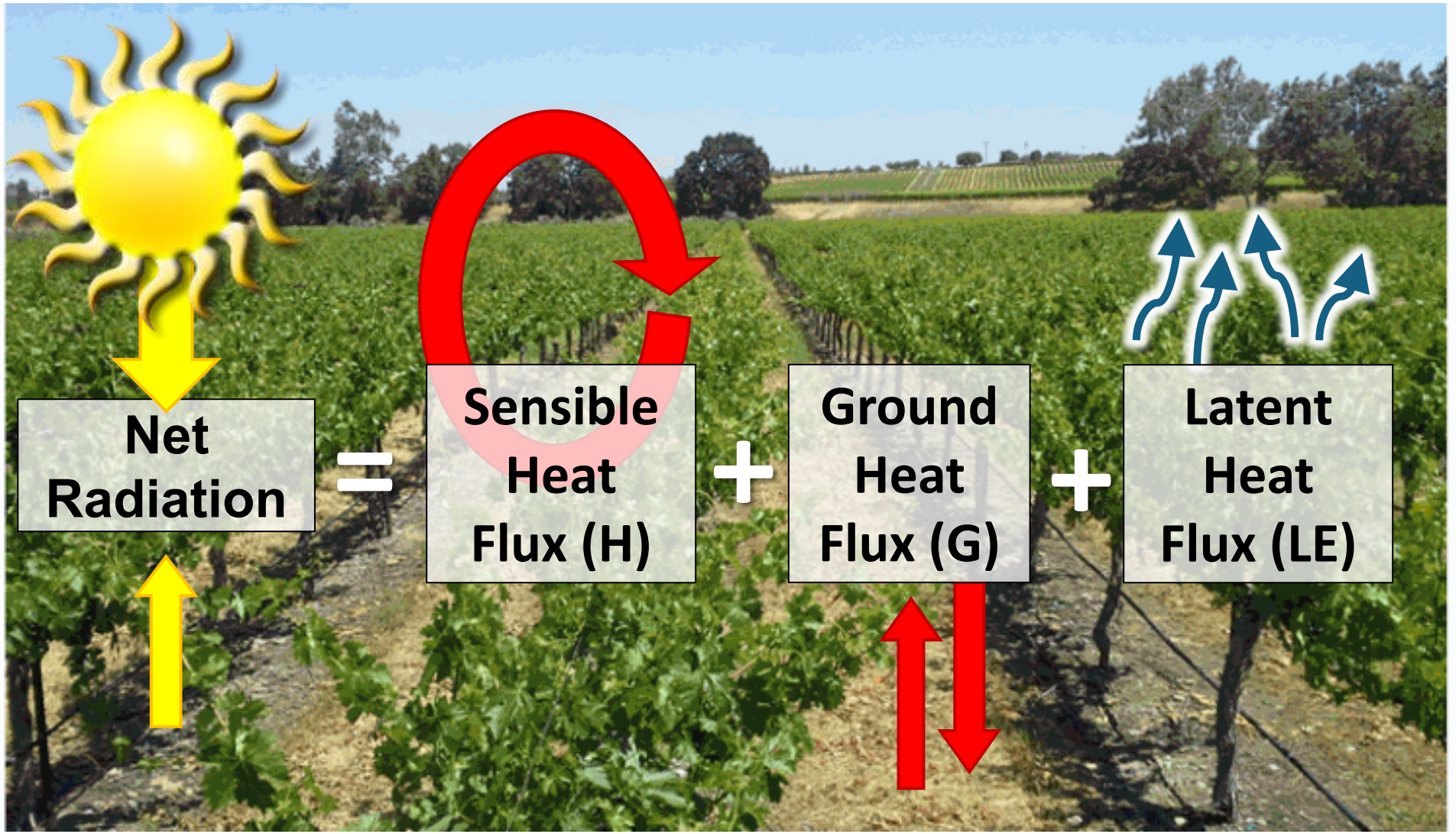
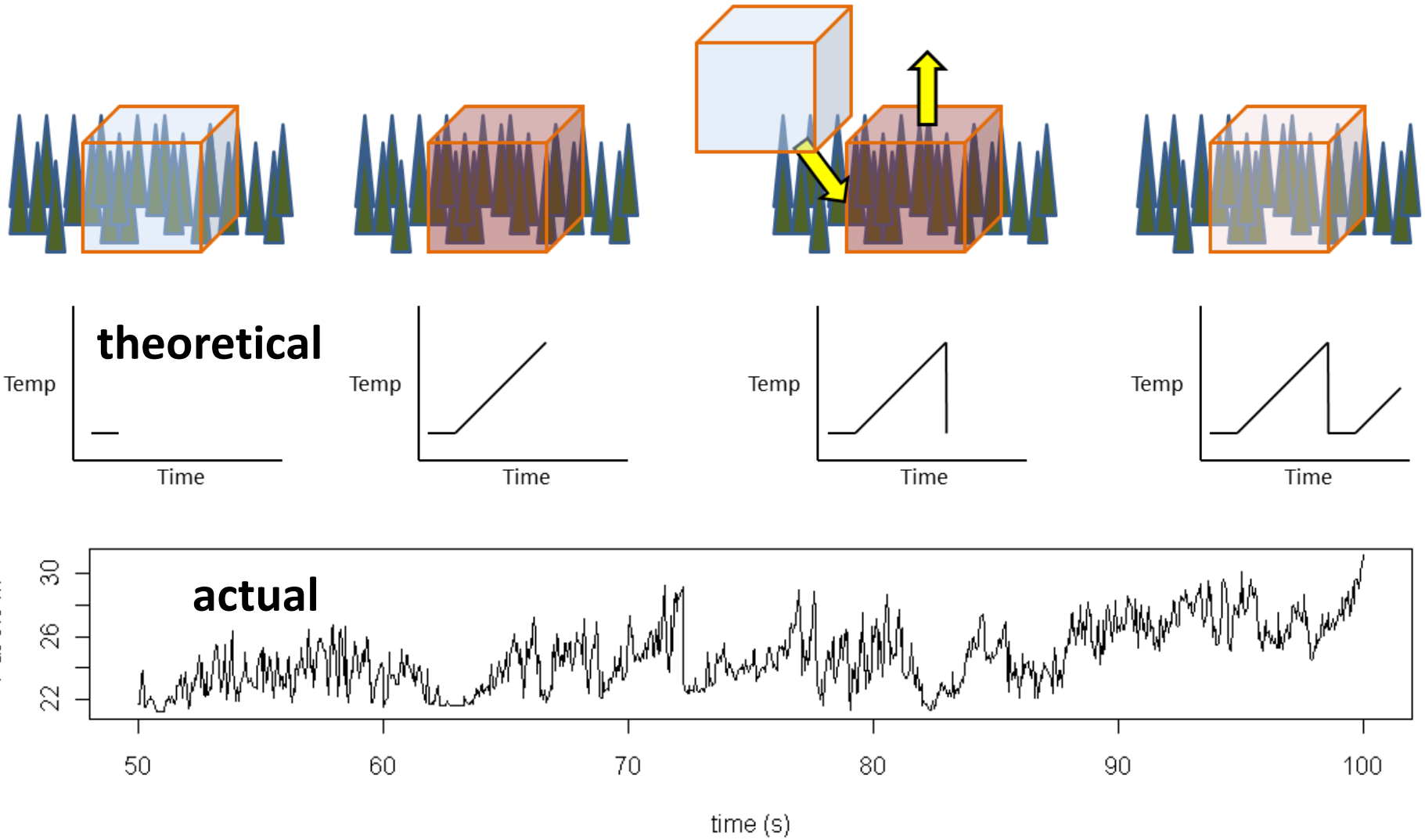


Thermal Energy Balance Approaches to Quantify ET



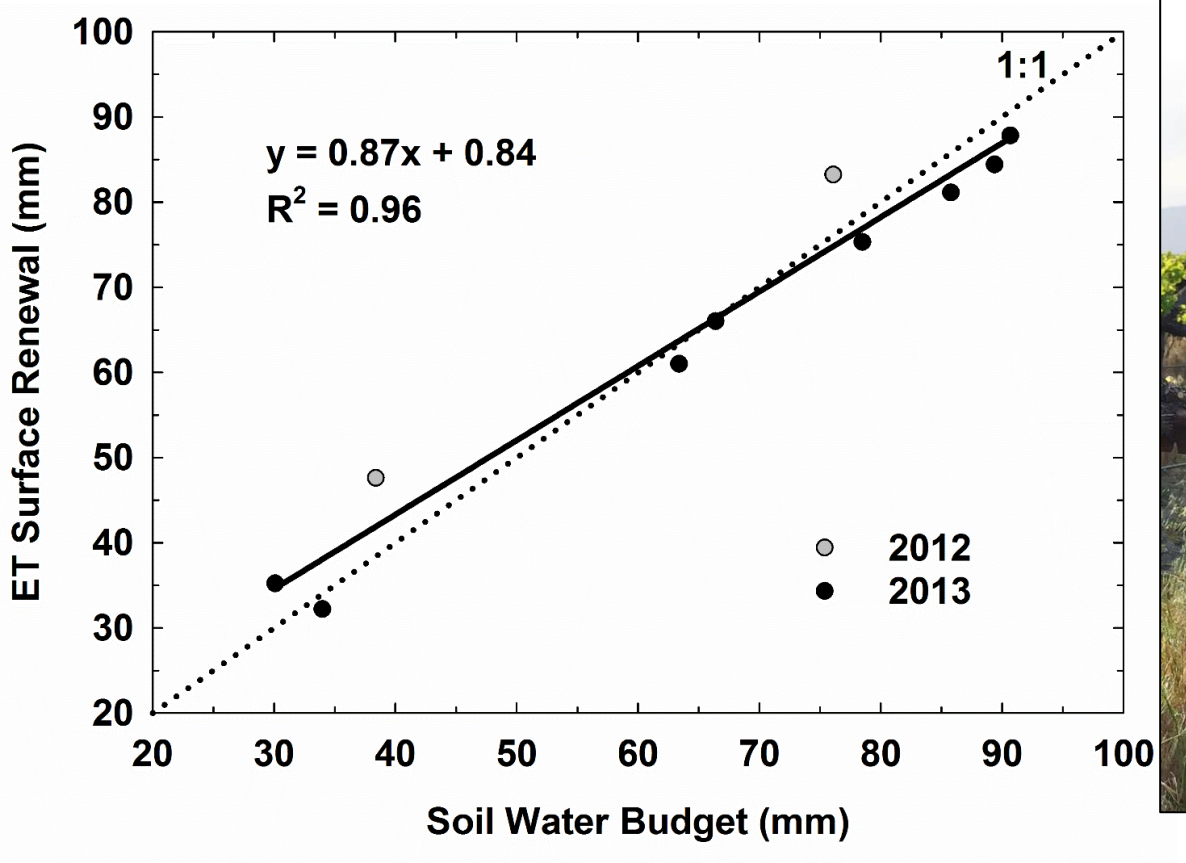
Partitioning the energy at the crop surface

Surface Renewal- Theory vs. Reality

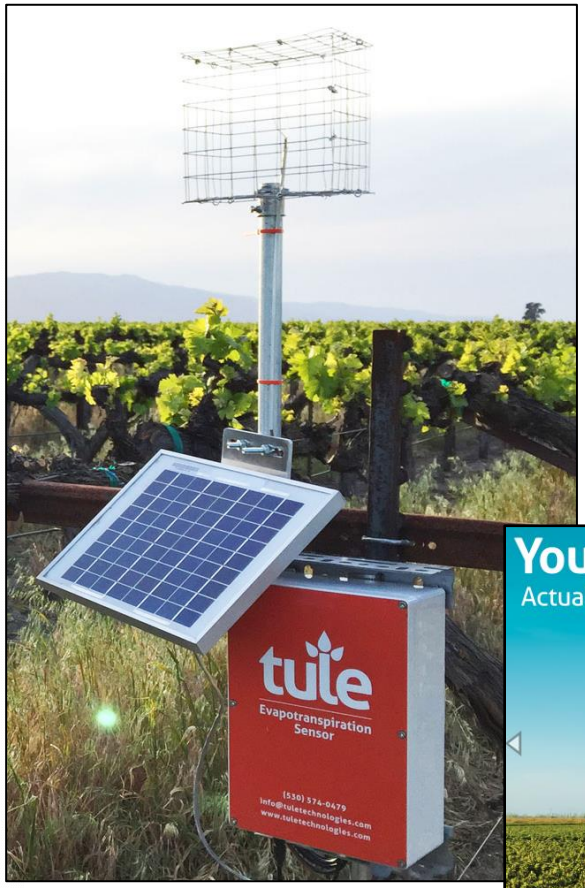


Successfully removed the need to calibrate against expensive research grade system (Shapland et al. 2012a,b, 2014)

New Surface Renewal System:
A reliable & automated ET measurement system



~$10,000-$100,000

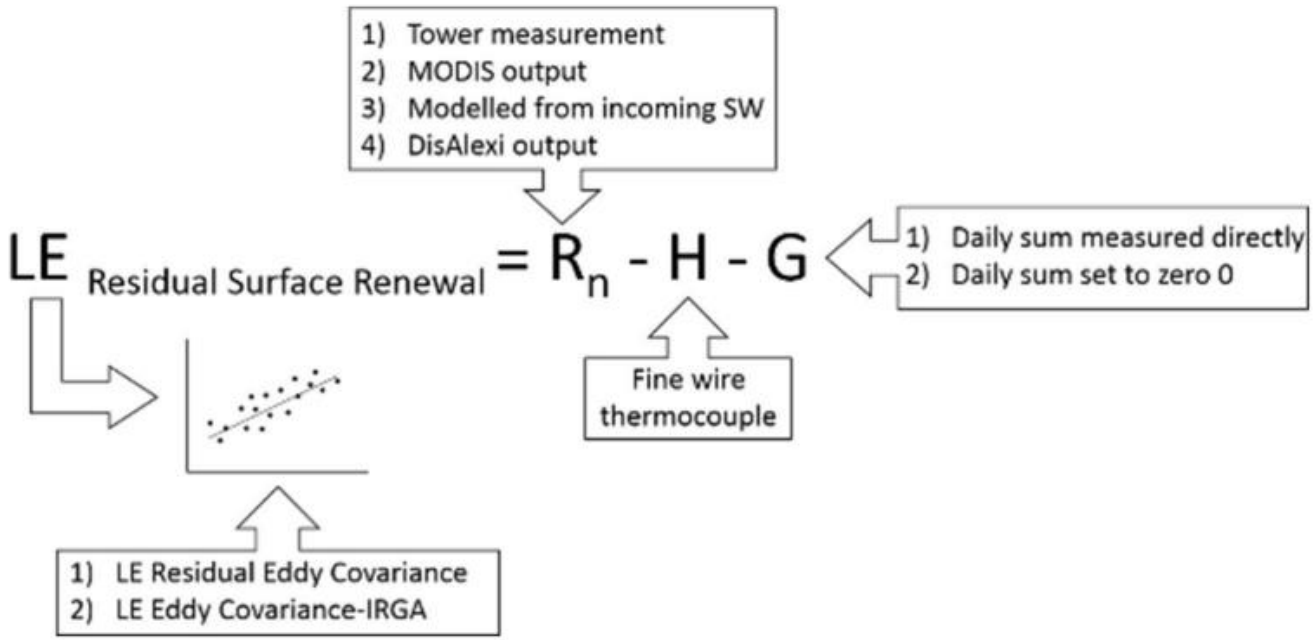


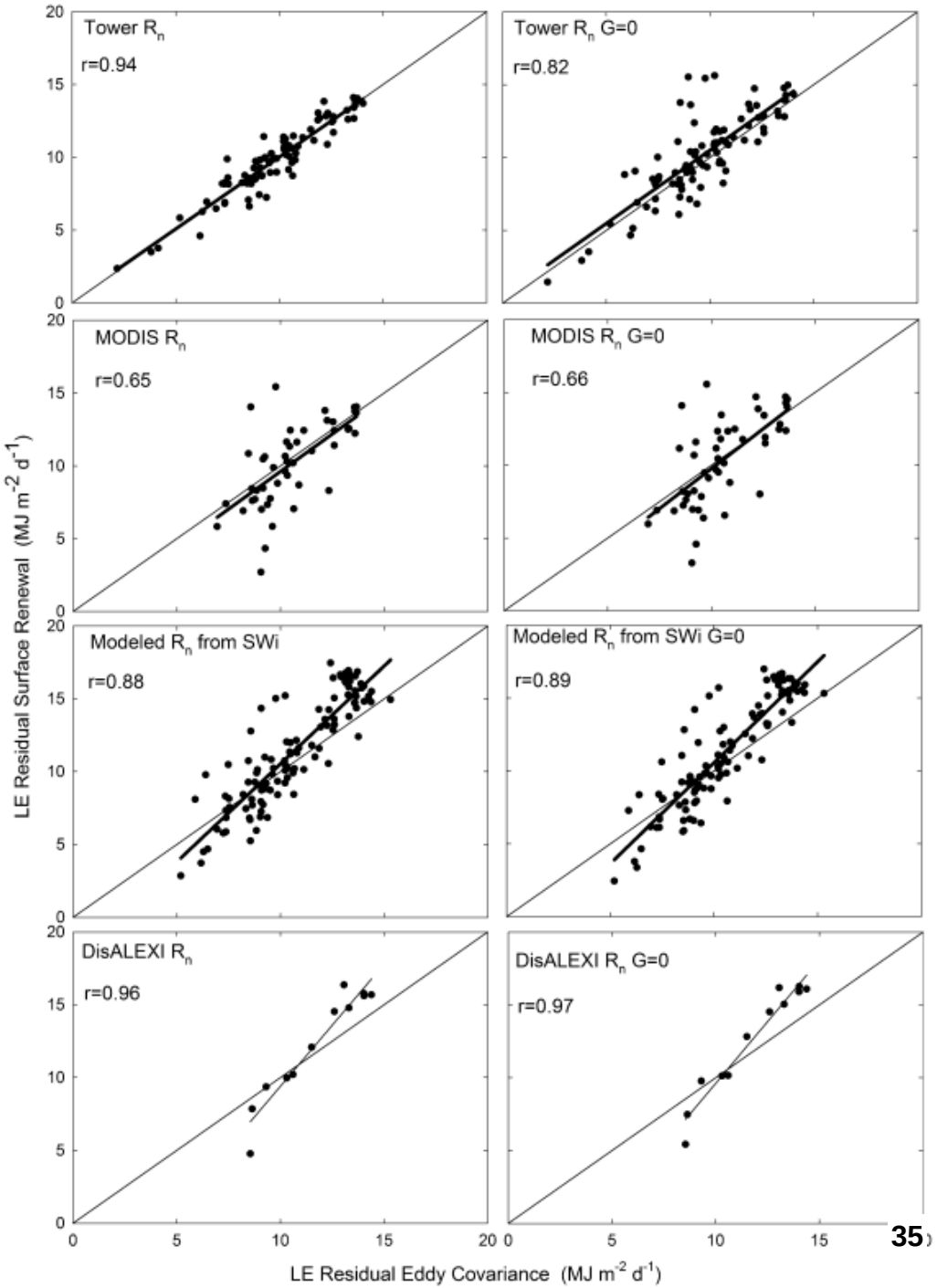
New Commercial System (Tule Technologies)
Joint patent between USDA & UC Davis

Irrigation Science (2019) 37:333–343
https://doi.org/10.1007/s00271-018-00618-y

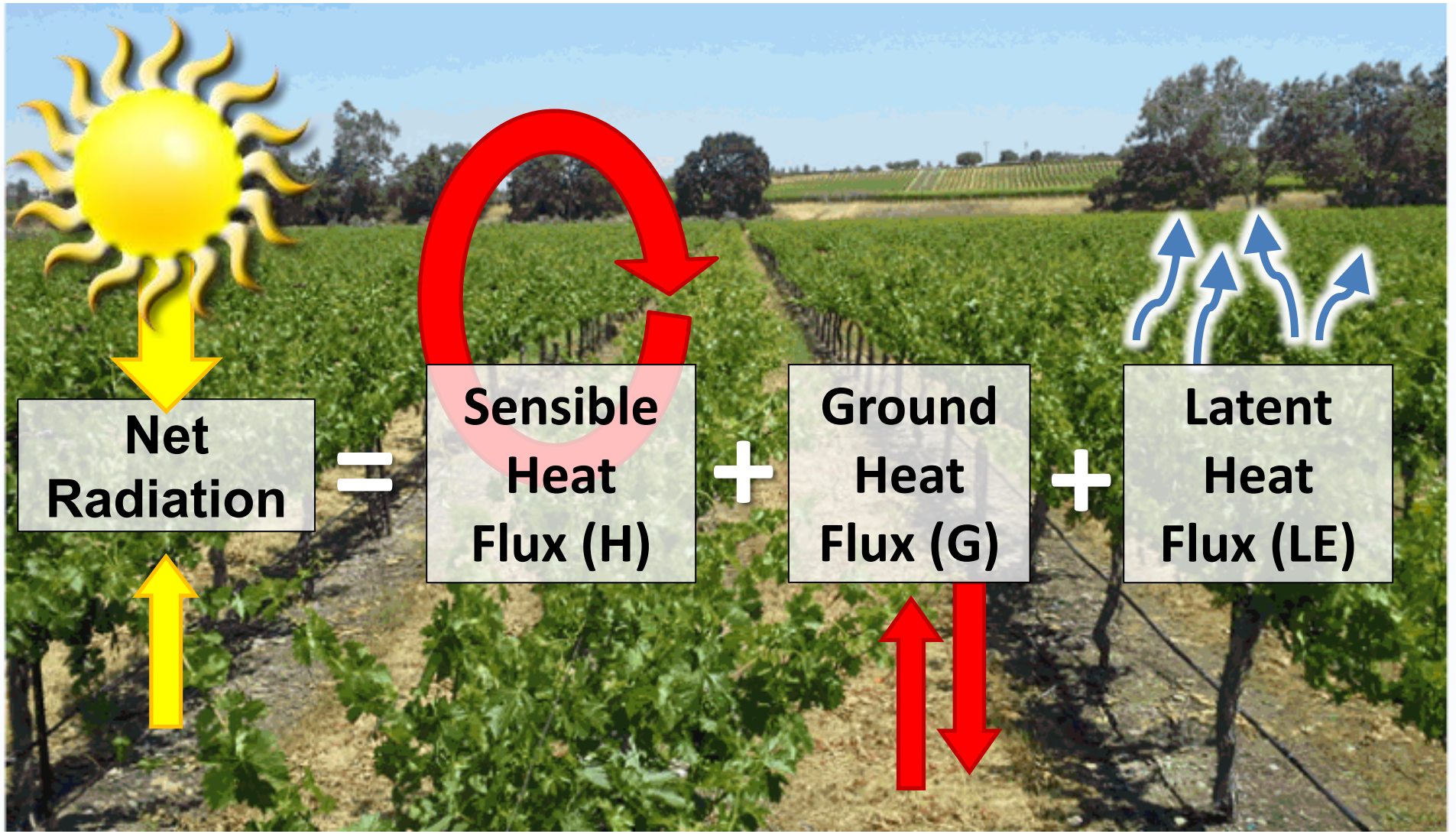
Comparison of vineyard evapotranspiration estimates from surface renewal using measured and modelled energy balance components in the GRAPEX project

Christopher K. Parry[1] · William P. Kustas[2] · Kyle R. Knipper[2] · Martha C. Anderson[2] · Joseph G. Alfieri[2] · John H. Prueger[3] · Andrew J. McElrone[1,4]



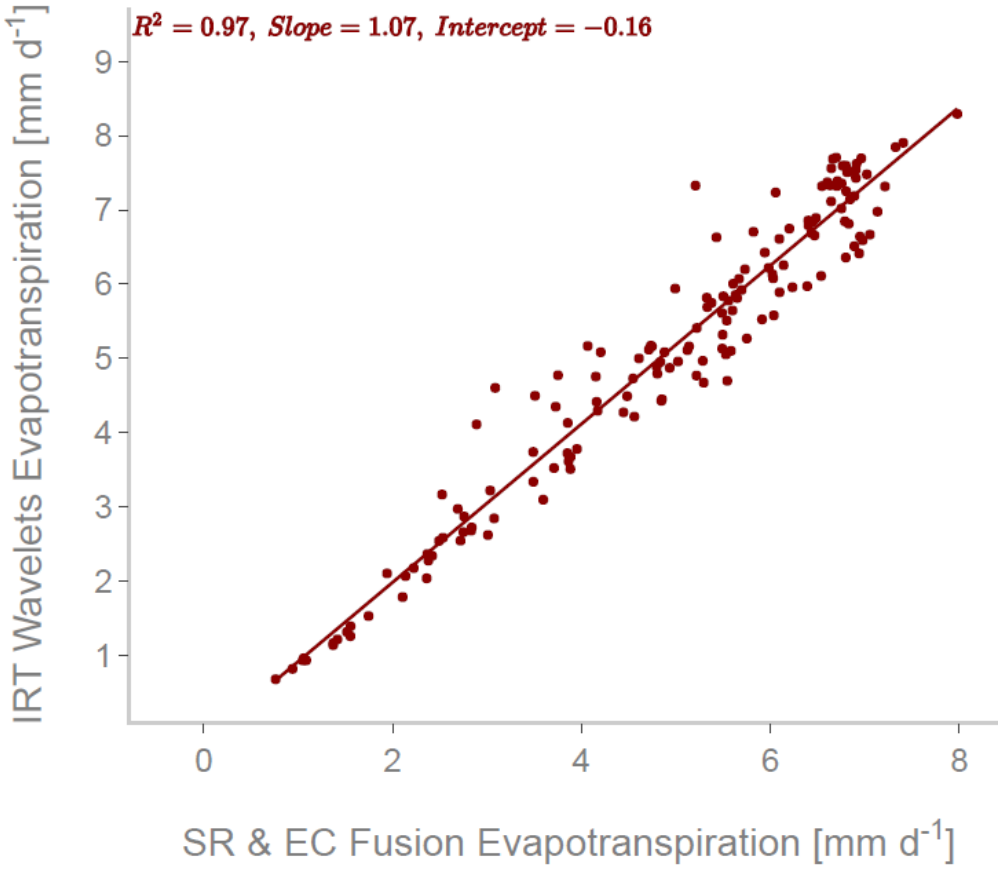


Thermal Energy Balance Approaches to Quantify ET



Partitioning the energy at the crop surface

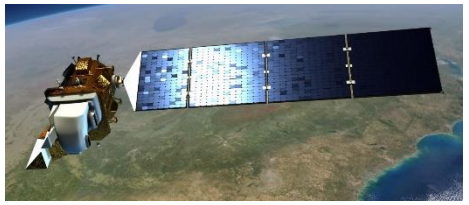
New IRT Wavelet method to estimate crop water use

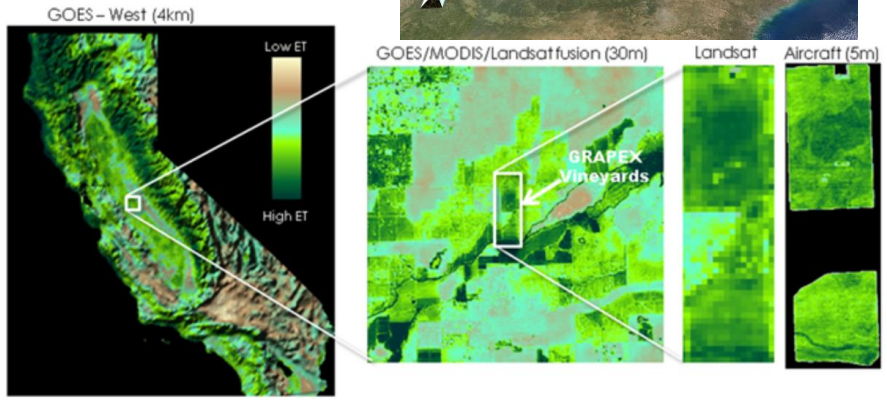


Developing tools to facilitate grower adoption of this technique- citizen science model

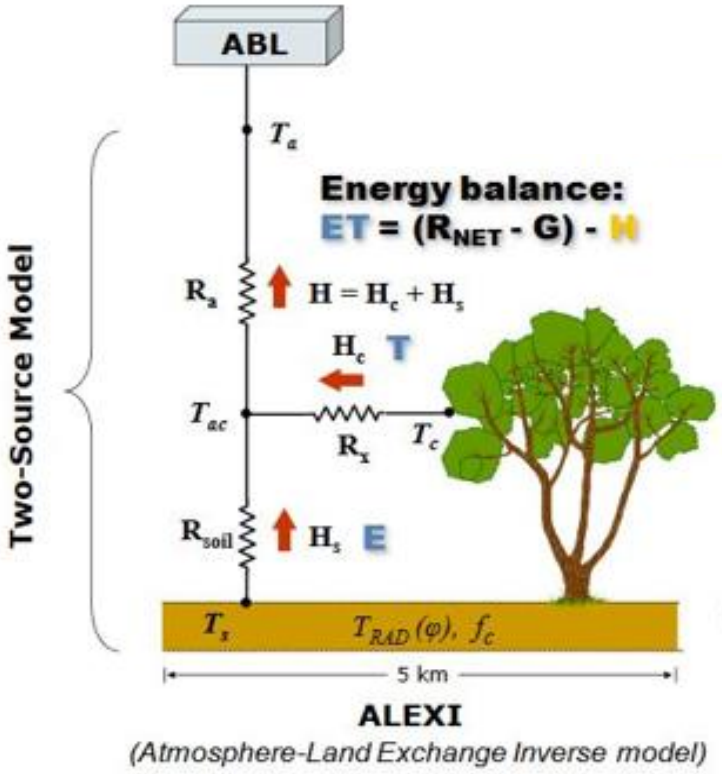
Grape Remote sensing Atmospheric Profile & Evapotranspiration eXperiment

grapex





Two Source Energy Balance



ALEXI

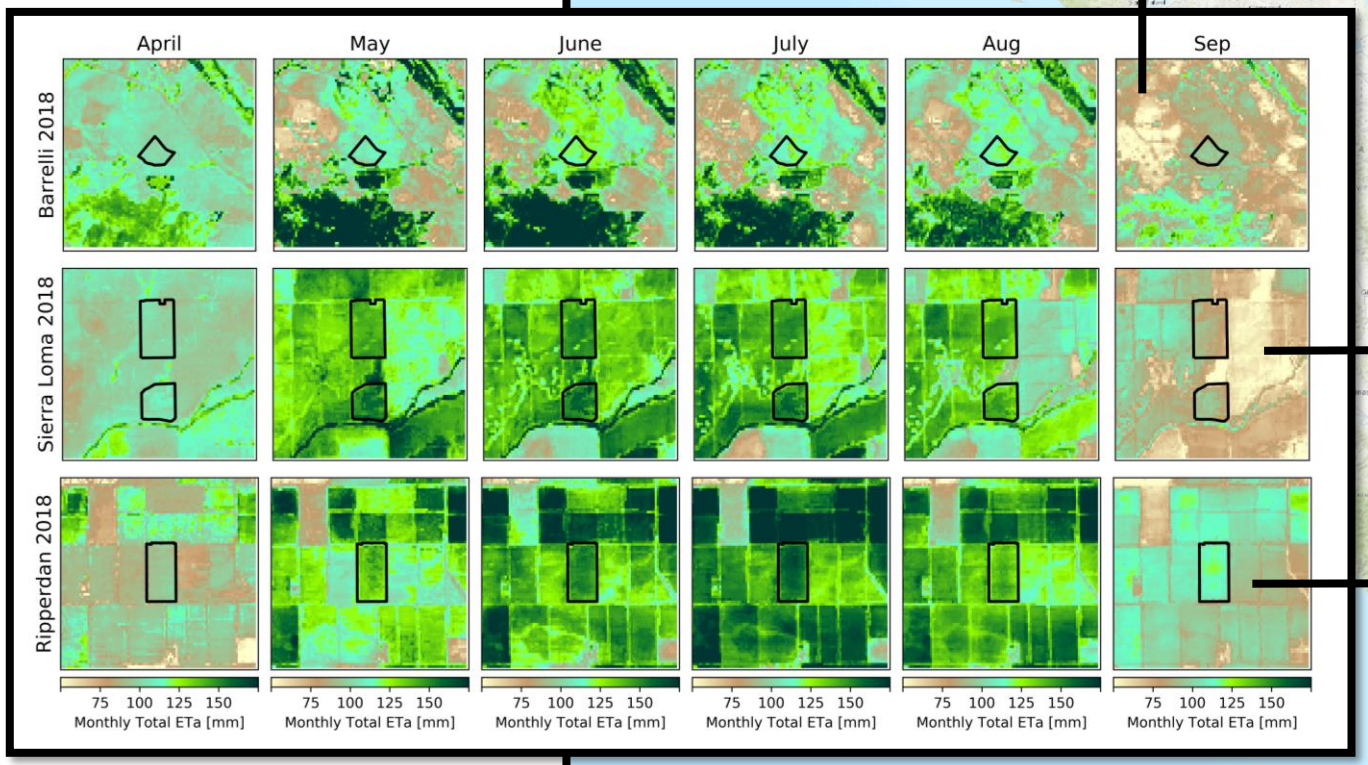
(Atmosphere-Land Exchange Inverse model)

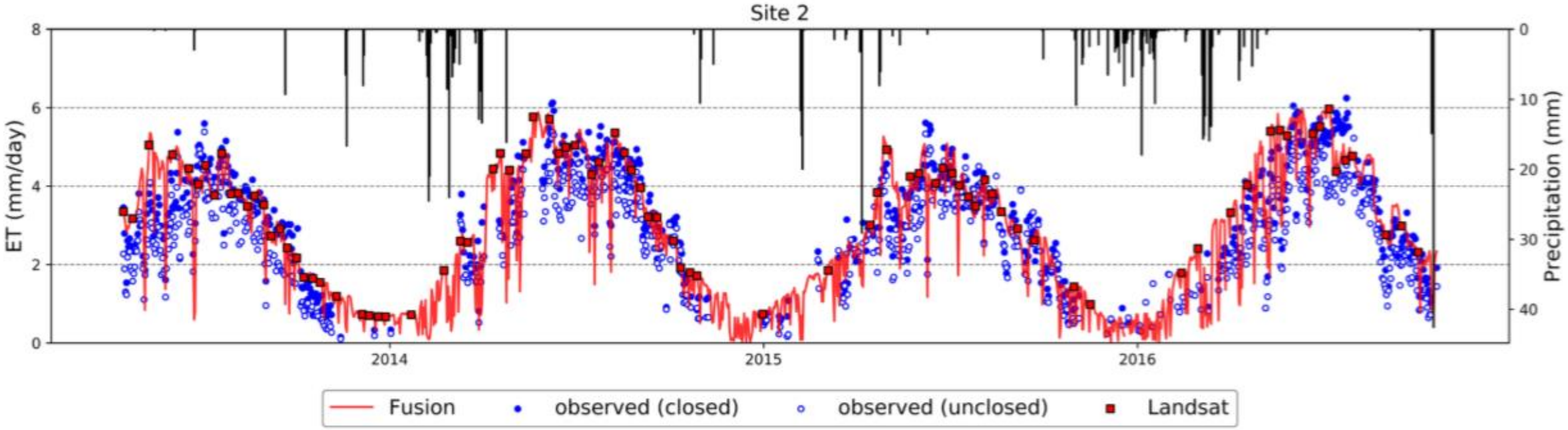
Monitor various vineyards

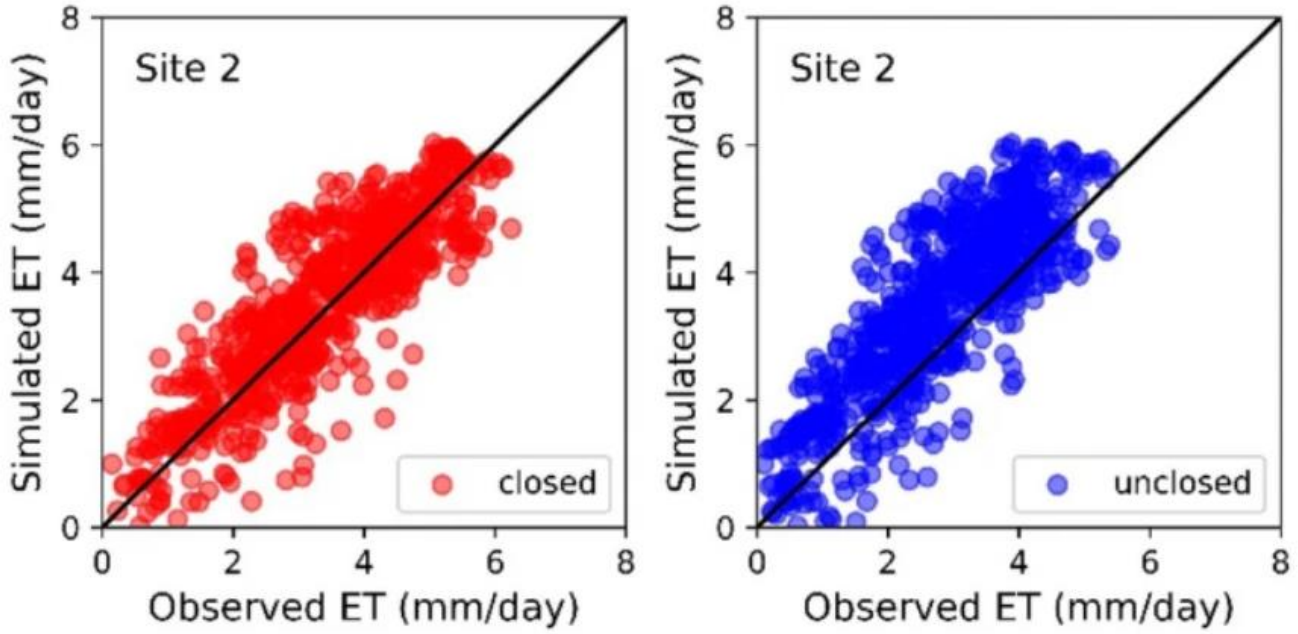
Test variations in:

Climate, Vine Type, Trellis Design…

GRAPEX







Sierra Loma- Lodi

Knipper *et al*. 2019 *Irrigation Science*

Unpublished Data Discussion

Napa County

Board Agenda Letter

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NAPA, CA 94559
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Main: (707) 253-4580

Groundwater Technical Advisory Group **Agenda Date:** 12/11/2025 **File ID #:** 25-2019

TO: Technical Advisory Group for the Napa County Groundwater Sustainability Agency

FROM: Brian D. Bordona, Director of Planning, Building and Environmental Services

REPORT BY: Jamison Crosby, Natural Resources Conservation Manager

SUBJECT: Presentation on Pajaro Valley Recharge Net Metering Program

RECOMMENDATION

Andrew Fisher, Professor at University of Santa Cruz, and Lisa Lurie, Executive Director of the Resource Conservation District of Santa Cruz County will make a presentation to the TAG on an innovative groundwater sustainability approach being implemented by the Pajaro Valley Groundwater Management Agency that incentivizes growers to capture and infiltrate surplus stormwater.

Procedure
Staff introduces.
Questions and answers with the TAG.
Public comments.

BACKGROUND AND DISCUSSION

Recharge Net Metering (ReNeM) is a community-based water management program that incentivizes growers to capture and infiltrate excess stormwater into the ground, replenishing depleted aquifers. It offers a sustainable and scalable approach to helping address water scarcity and enhance water security in agricultural regions. ReNeM is a partnership of the Pajaro Valley Water Management Agency, the Resource Conservation District of Santa Cruz County, and researchers from University of California Santa Cruz, together with landowners and growers of the Pajaro Valley. More information is provided in the attached program summary sheet.

ENVIRONMENTAL IMPACT

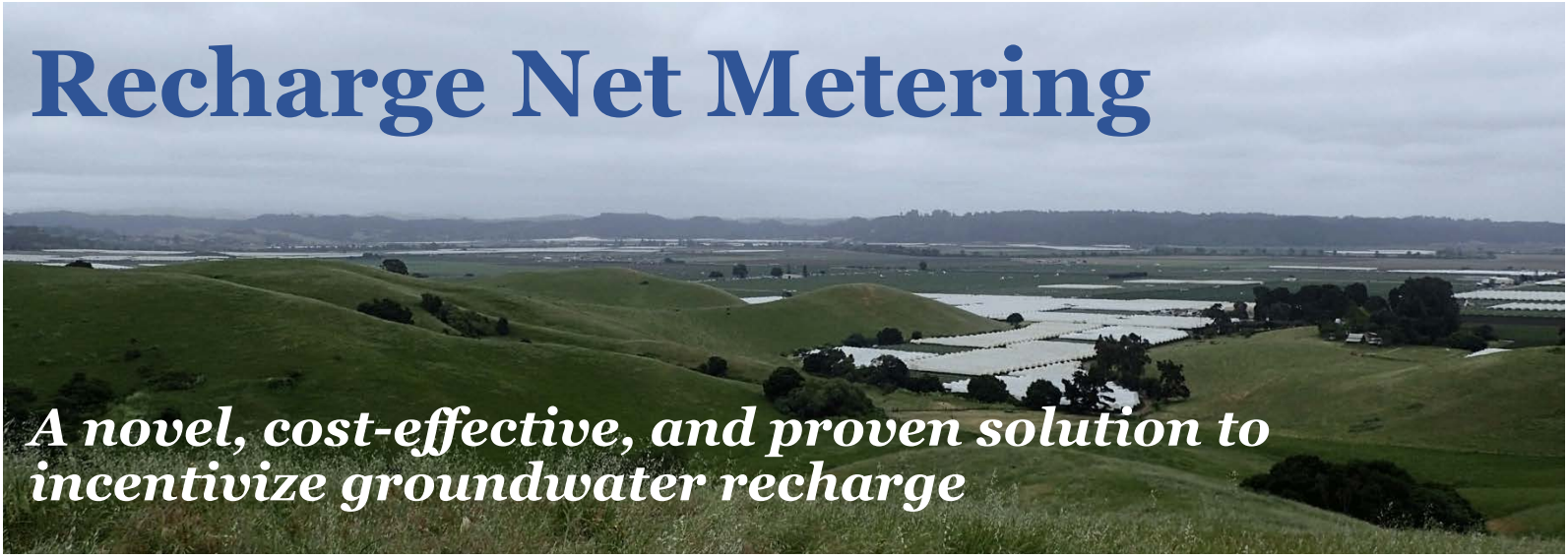
ENVIRONMENTAL DETERMINATION: The proposed action is not a project as defined by 14 California Code of Regulations 15378 (State CEQA Guidelines) and therefore CEQA is not applicable.

SUPPORTING DOCUMENTS

A. Presentation on Pajaro Valley Recharge Net Metering Program (Andrew Fisher, Professor at University of Santa Cruz, and Lisa Lurie, Executive Director of the Resource Conservation District of Santa Cruz County, December 2025)

B. Recharge Net Metering Briefing Sheet

Recharge Net Metering



A novel, cost-effective, and proven solution to incentivize groundwater recharge

California faces a profound groundwater crisis

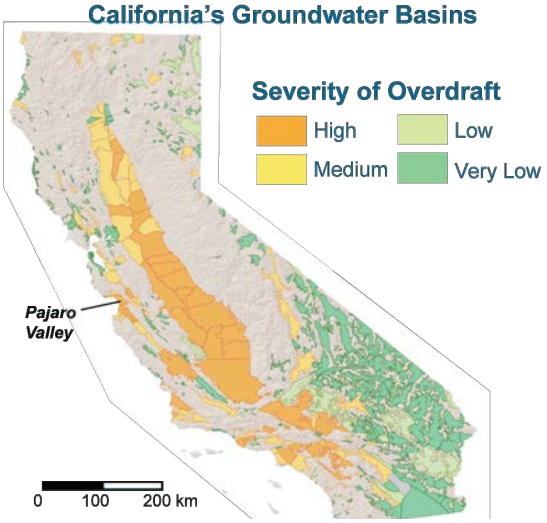
Decades of *excess pumping*, changes in *land use*, *extreme rainfall* events, and *weather whiplash* have pushed water resources to their limits. ***California needs solutions.***

Statewide: Groundwater meets 40% of fresh-water demand
Some basins: Groundwater is 90%+ of fresh-water supply
85% of California's residents rely on groundwater

Groundwater depletion causes many problems:

- **Decreased resilience during dry periods**
- **Environmental degradation**
- **Saltwater intrusion in coastal basins**
- **Land subsidence/loss of storage**
- **Impaired water quality**
- **Loss of local control/state intervention**

Groundwater is being depleted



Many of California's groundwater basins are "critically overdrafted," meaning that continued practices will cause overdraft-related environmental, social, and/or economic problems (SGMA).

The Sustainable Groundwater Management Act (SGMA, 2014) requires that local Groundwater Sustainability Agencies (GSAs) develop and implement holistic groundwater management plans. Basins and agencies have until ~2040 to show results – *many GSAs plan to increase groundwater recharge, but progress has been limited*.

Groundwater agencies, communities, and resource stewards are searching for solutions that balance local realities with the need for long-term sustainability of groundwater supply and quality.

The Pajaro Valley and the promise of "Recharge Net Metering" (ReNeM)

Located on California's central coast, the Pajaro Valley relies on groundwater to support diverse and high-value agriculture, including: berries, vegetables, tree fruits, and flowers. The region's isolated coastal aquifers, limited storage, and lack of snowpack and major rivers required that Pajaro Valley adapt and innovate to meet groundwater challenges. ***Recharge Net Metering (ReNeM) was invented here***.

> *"ReNeM empowers landowners and tenants to collect excess stormwater runoff during wet periods. This water is infiltrated into the ground, restoring lost hydrologic services and replenishing aquifers. ReNeM participants receive a rebate on water fees based on the amount of water they infiltrate. Performance is assessed by an objective team."*

Recharge Net Metering: How it Works

How does ReNeM work?

1 Managed aquifer recharge systems are designed and installed on selected properties

Projects use basins and other features to route and infiltrate excess surface water.

2 Water is infiltrated, benefits are measured

The ReNeM team measures and account for flows.

3 Participants receive credits / rebates on their water bills

Payments are performance based, offsetting costs for land use, maintenance/operation

---

Bokariza Ranch project

Drainage area ~180 acres
Infiltration basin ~4 acres
Infiltrated ~100 af/yr since WY15

Kelly Thompson project

Drainage area ~1,300 acres
Infiltration basin ~4 acres
Infiltrated ~160 af/yr since WY20

What makes ReNeM a novel solution to groundwater overdraft?

- **Cost-effective compared to alternatives, complementary to other management.**
- **Adaptable and scalable, can be modified, expanded to fit local need.**
- **Encourages community participation and engagement with broad benefits.**
- **Alignment interests among stakeholders, partners, aquatic systems.**
- **Extensive demand and need: locally, regionally, statewide.**

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

UCSC Hydrogeology — THE UNIVERSITY OF CALIFORNIA — 1868 — "Endeavor to persevere..."

Might ReNeM be part of your basin's solution for groundwater management? Our team is glad to provide more information: llurie@rcdsantacruz.org, afisher@ucsc.edu

Recharge Net Metering (RENEM)

A Cost-Effective Incentive System To Enhance Groundwater Recharge

Lisa Lurie | RCD Santa Cruz County
Andy Fisher | UC Santa Cruz

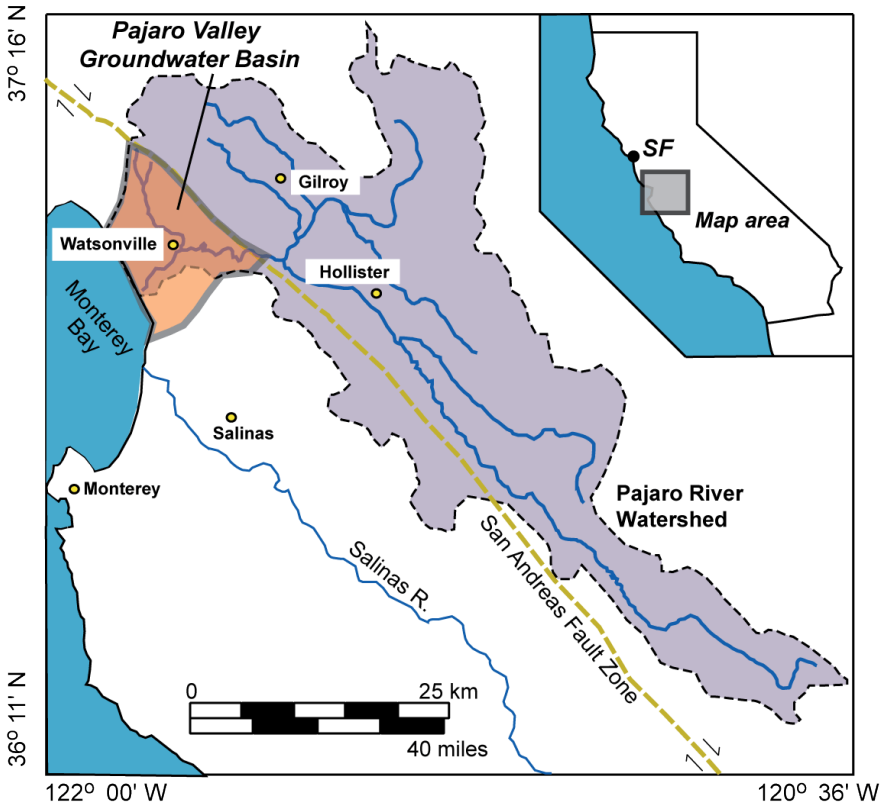
RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

UCSC Hydrogeology — THE UNIVERSITY OF CALIFORNIA — 1868 — "Endeavor to persevere..."

Pajaro Valley Water Management Agency

ReNeM | *Invented And Proven In The Pajaro Valley*

Pajaro Valley, like many other regions, faces a groundwater deficit.



- PVGB, lower PR basin, mostly Santa Cruz and northern Monterey Counties
- Primary freshwater resource is **groundwater**
- PVWMA (PV Water, 1984): special act district
- PV Water serves ~70,000 acres, ~30,000 irrigated

Major crops:
Strawberries, cane berries, table crops, organic (30%)

Pumping: *~55,000 ac-ft/yr*

Overdraft: *averages ~12,000 ac-ft/yr*

→$1B farm revenue

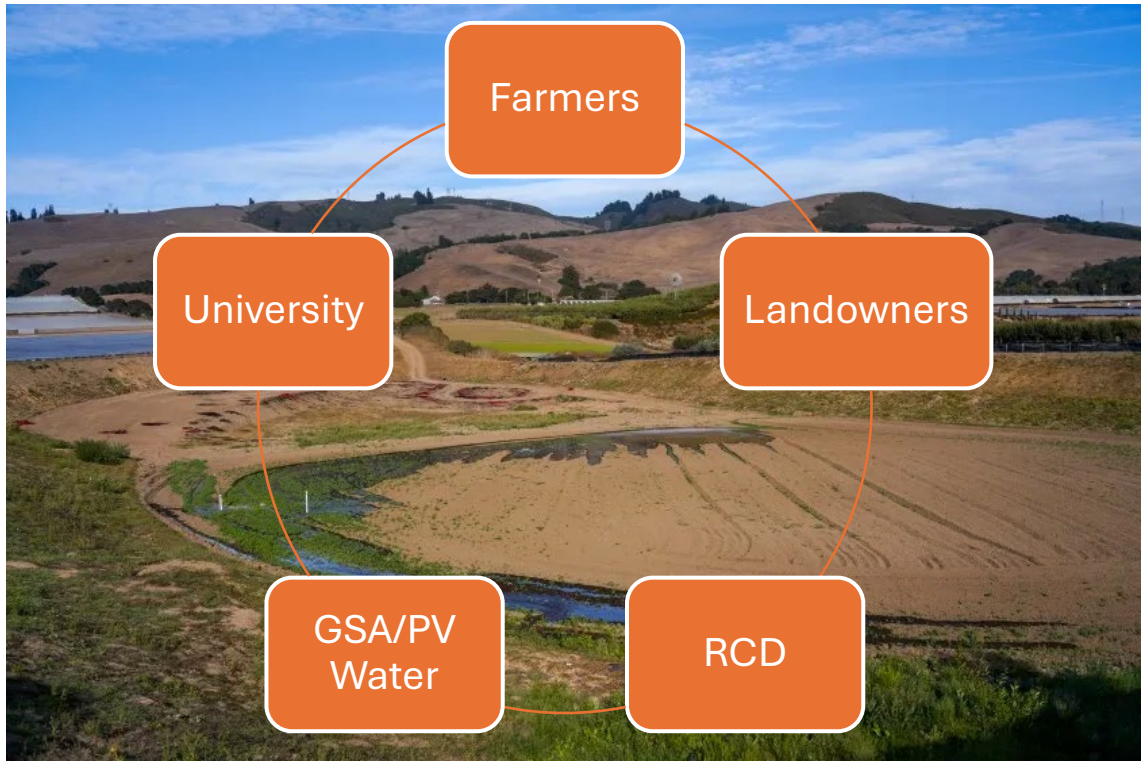
Groundwater sustainability plan includes conservation, improved efficiency, recharge*

* many water agencies want to expand recharge

ReNeM | *Origins*

ReNeM is the result of farmers/landowner's effort to resolve groundwater issues, reinforcing its collaborative, voluntary and community led nature.

- **Recharge** emerges from community dialogue as promising solution for increased groundwater supply.
- Project proponents pitch **ReNeM payment** as percentage of cost of water
- Landowners **volunteer access to property**, host infiltration system
- Success from **creative thought process**, **scientific backing**, neutral third party, **community support**, and **open-minded water agency**



Voluntary | Collaborative | Community Led | Science based

ReNeM | *How It Works In the Pajaro Valley*

ReNeM program participants receive payments in the form of pumping fee rebates, based on the measured volume of water their projects infiltrate each year.

Kelly Thompson Infiltration System & Instruments[1]

1 Recharge systems are designed and installed on selected properties

These systems can use basins, trenches, or active fields to infiltrate excess surface water.

2 Water infiltrates & is metered

ReNeM operators measure and account for flows, determining how much water the project infiltrates.

3 Participant receives credits or rebates on their water bill

Rebates are based on the volume of water infiltrated.

Benefits to the basin and stakeholders

- Sustainable water supply
- Community collaboration
- Financial incentive for recharge
- Improved Water Quality
- Meet SGMA requirements
- Decreased land subsidence/salt water intrusion

4 Source: [1] ReNeM Implemented Project

ReNeM | *How It Works In the Pajaro Valley*

The RCDSCC and UCSC share leadership in several activities, from technical analysis to administrative/project management, all enabling the implementation of the project and guaranteeing its success.

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

Planning

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

Construction & Maintenance

UCSC Hydrogeology

Monitoring & Reporting

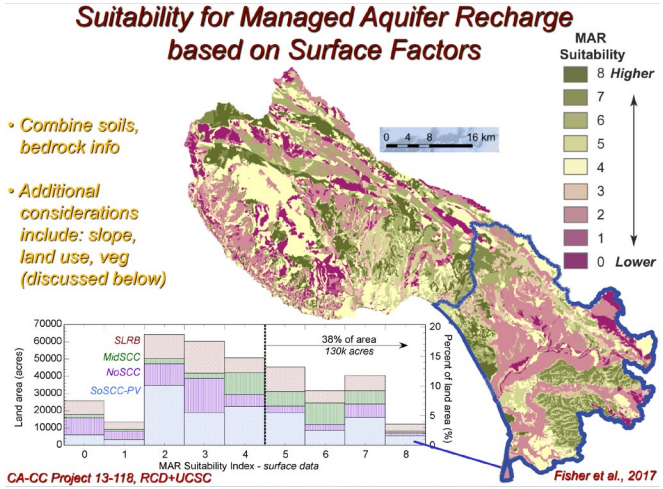
ReNeM | *How It Works In the Pajaro Valley - Planning*

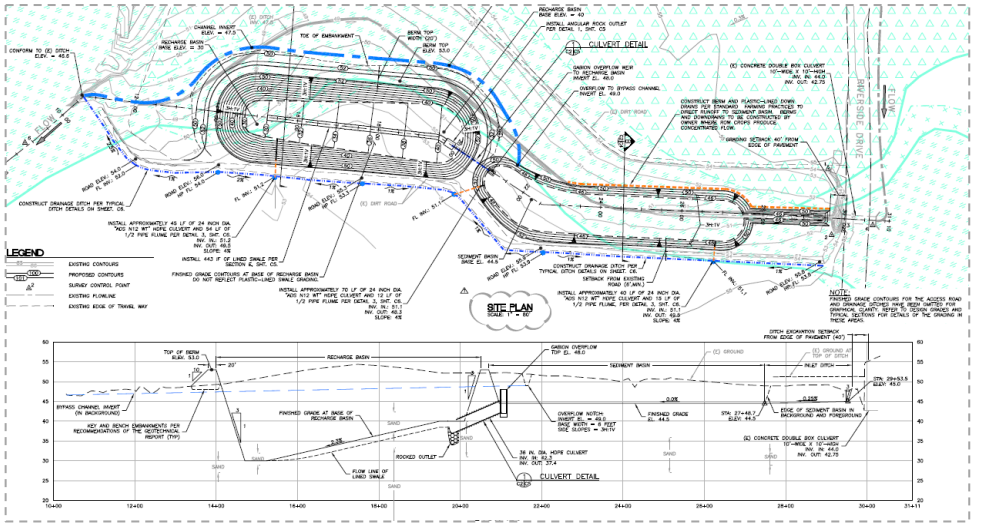
Planning

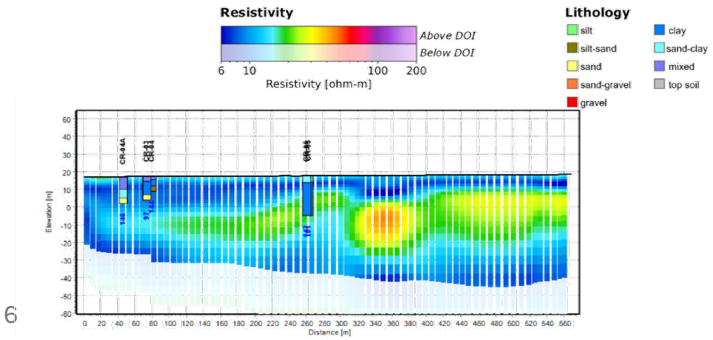
Site Assessment & Characterization

- Regional suitability assessment
- Testing of subsurface geology for reasonableness of basin placement*
- Drainage analysis for water source
- Willing landowner/tenant

Fundraising/ Grant writing | **Project Design** | **Permitting** | **Agreements**







*tTEM; Cone Penetration Tests (CPT)

ReNeM | *How It Works In the Pajaro Valley*

The RCDSCC and UCSC share leadership in several activities, from technical analysis to administrative/project management, all enabling the implementation of the project and guaranteeing its success.

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

Construction & Maintenance

ReNeM | *How It Works In the Pajaro Valley*

The RCDSCC and UCSC share leadership in several activities, from technical analysis to administrative/project management, all enabling the implementation of the project and guaranteeing its success.

RESOURCE CONSERVATION DISTRICT OF SANTA CRUZ COUNTY

Construction & Maintenance

Construction
- Contracting
- Oversight

Adaptive Management

Maintenance

ReNeM | *How It Works In the Pajaro Valley*

RCDSCC and UCSC share leadership in several activities, from technical analysis to administrative/project management, all enabling the implementation of the project and guaranteeing its success.

Monitoring & Reporting

ReNeM | *How It Works In the Pajaro Valley*

The RCDSCC and UCSC share leadership in several activities, from technical analysis to administrative/project management, all enabling the implementation of the project and guaranteeing its success.

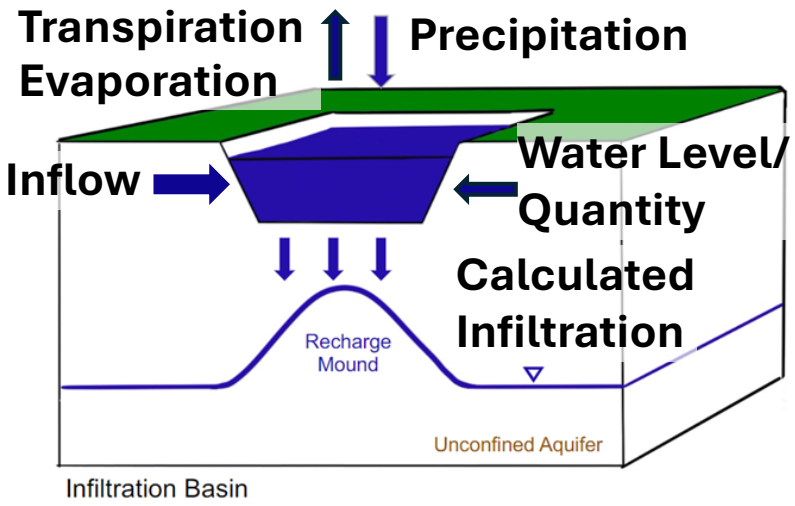
Monitoring & Reporting

Basins equipped each season with sensors, sampling systems

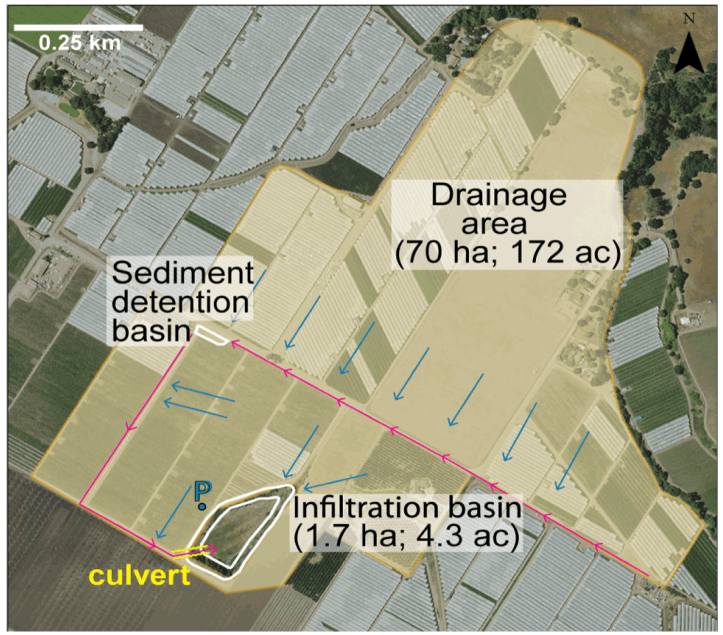
Measurements include:
- Pressure for water level
- Evapotranspiration
- Precipitation

Calculations run and reported

Rebate $$$ = 50% x net infiltration x pumping fee



- Drainage area is distinct from farmed area
- Larger drainage area generates more runoff → more potential for ReNeM (infiltration) benefit
- Flows are measured to determine benefit by the RCD–UCSC team (*third-party certifier*)
- Agency and participants *agree ahead of time* to accept TPC data and calculations



ReNeM | *Initial Projects*

*Since WY2017, three pilot ReNeM projects have demonstrated **efficacy** and all projects to date have infiltrated **better water quality** than ambient groundwater*

- PV Water removed "pilot" designation in 2021, goal = 1,000 af/yr of infiltration (~10% of PV 'overdraft')

ReNeM pilot projects	Bokariza Ranch	Storrs Vineyard/Winery	Kelly Thompson Ranch
Infiltration basin size (ac)	**4**	**0.6**	**4**
ReNeM project since	WY17	WY22	WY20
Cost to design/build (US$)	100k	100k	750k
Average benefit (ac-ft/ yr)	104	5-10	160
Cumulative benefit (ac-ft)	728	10-20	639

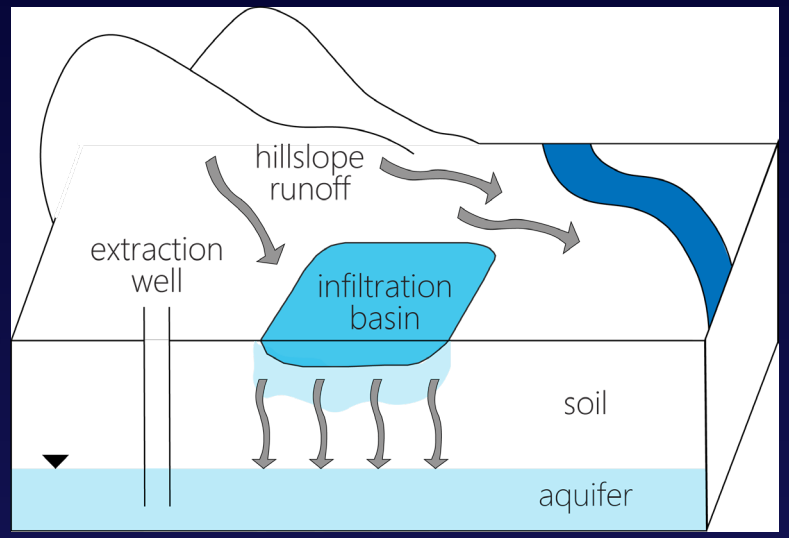
Pre-existing/modified

Built from scratch!

12 Source: ReNeM Implemented Project; Figures as of 2023

Stormwater as a Source for MAR

Low-impact development (LID)



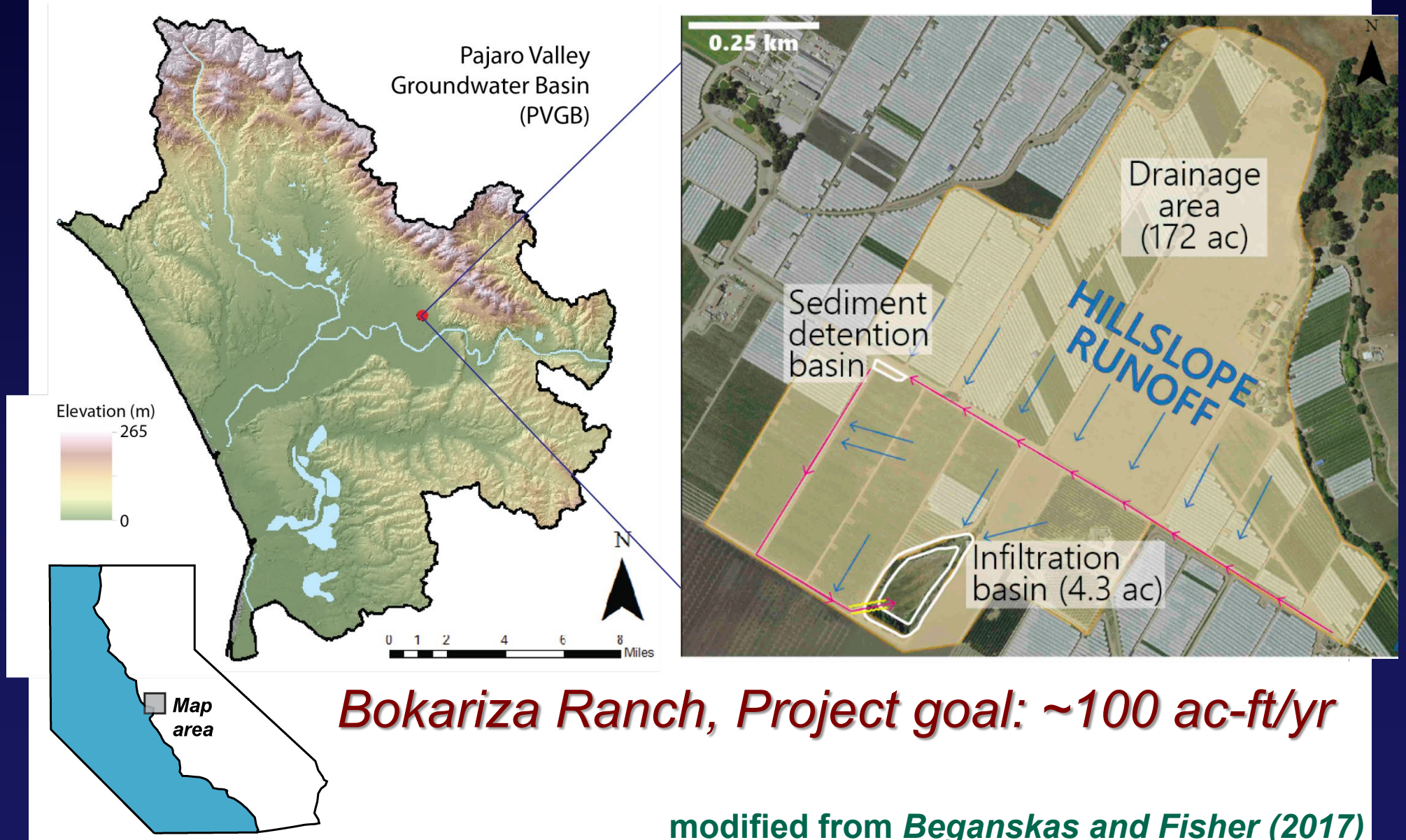
Regional spreading grounds

1-10 af/yr per site

10^4-10^5 af/yr per program

100 - 1,000 af/yr per site

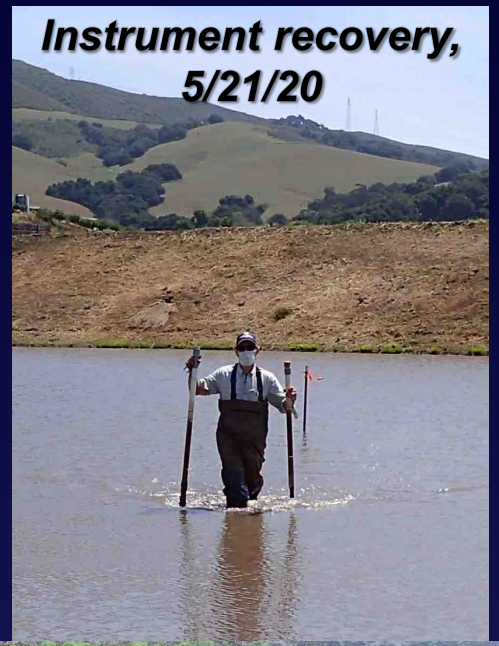
Managed Aquifer Recharge with Stormwater (Stormwater-MAR)



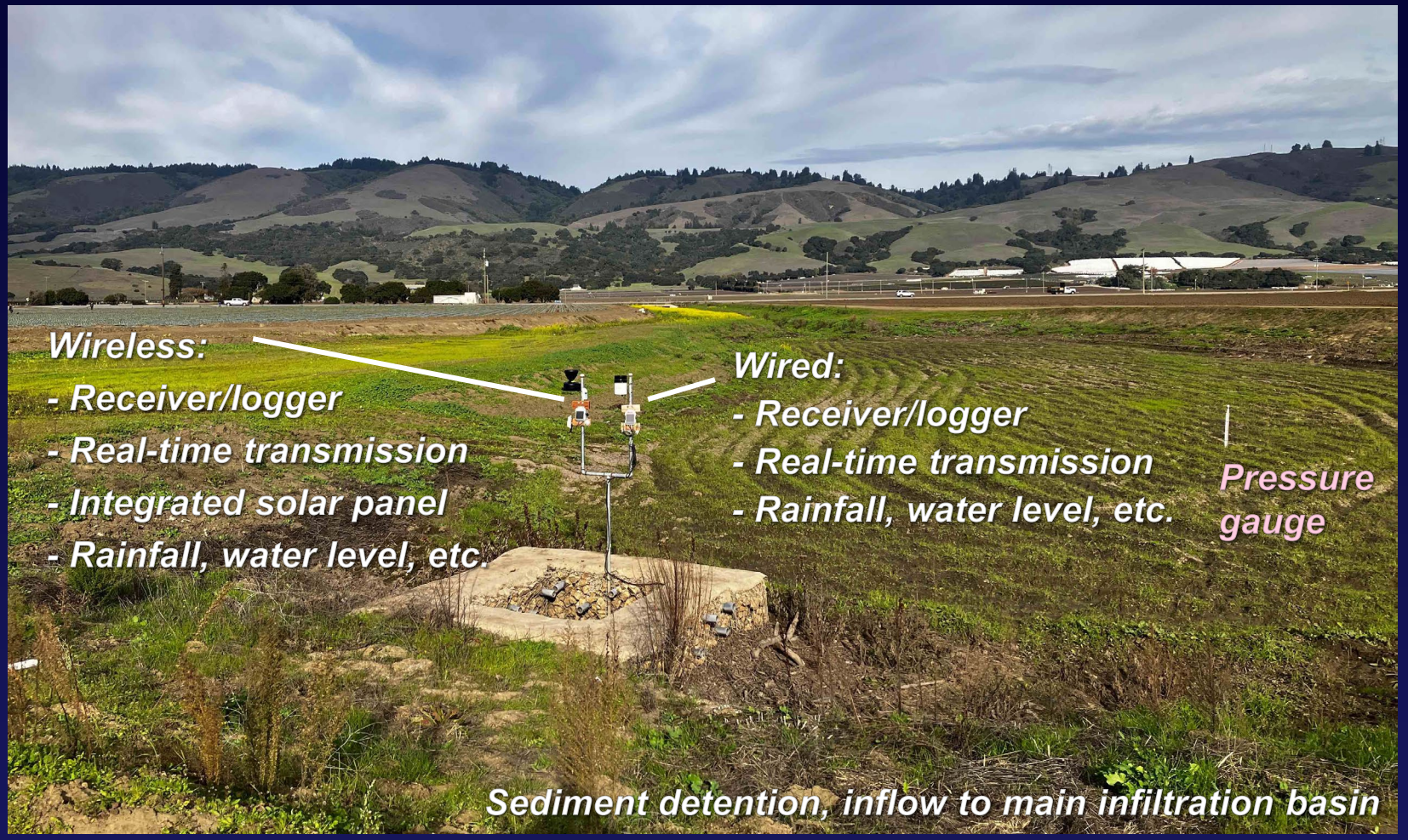
Bokariza Ranch, Project goal: ~100 ac-ft/yr

modified from *Beganskas and Fisher (2017)*

Bokariza Ranch: WY20

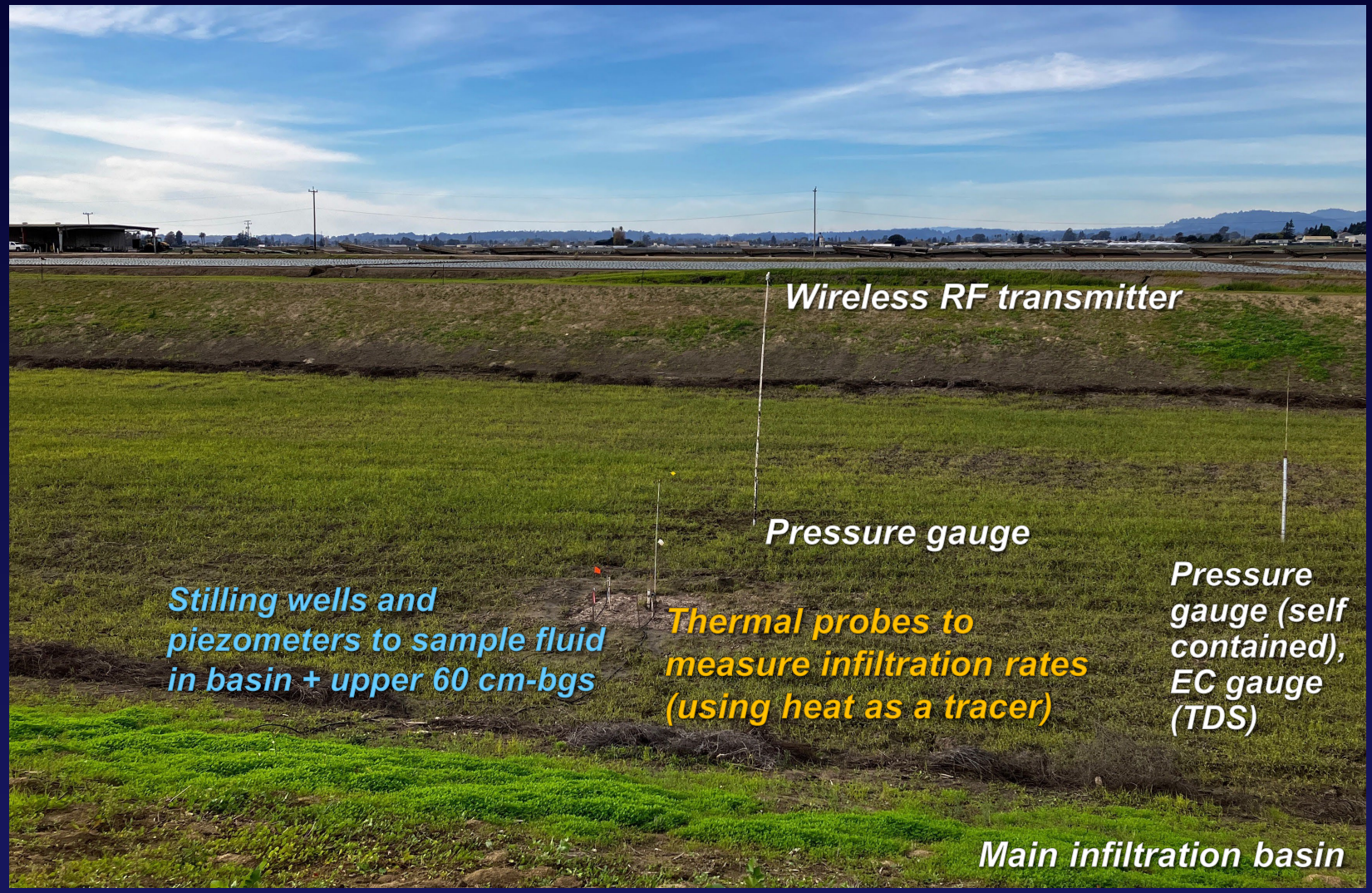


Wireless sensors deployed in 2025



Deployed 12/3/25, for test of reliability, power usage, etc. along with more conventional (wired) system

Wireless sensors deployed in 2025



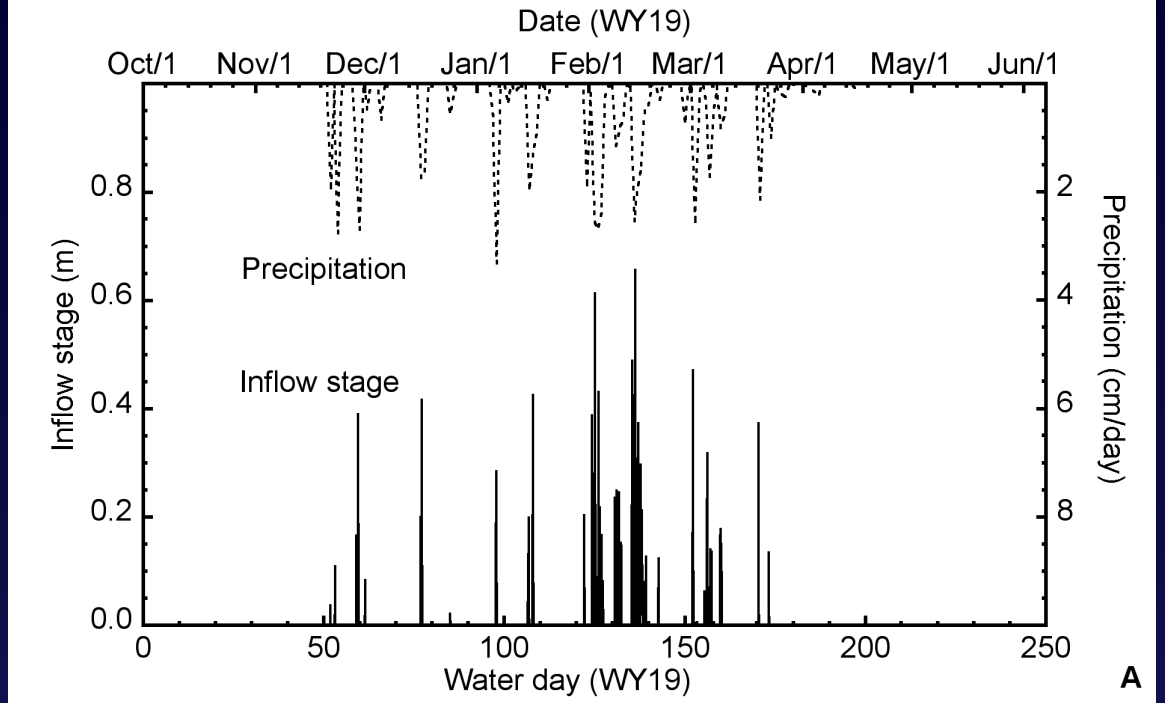
Deployed 12/3/25, for test of reliability, power usage, etc. along with more conventional (wired) system

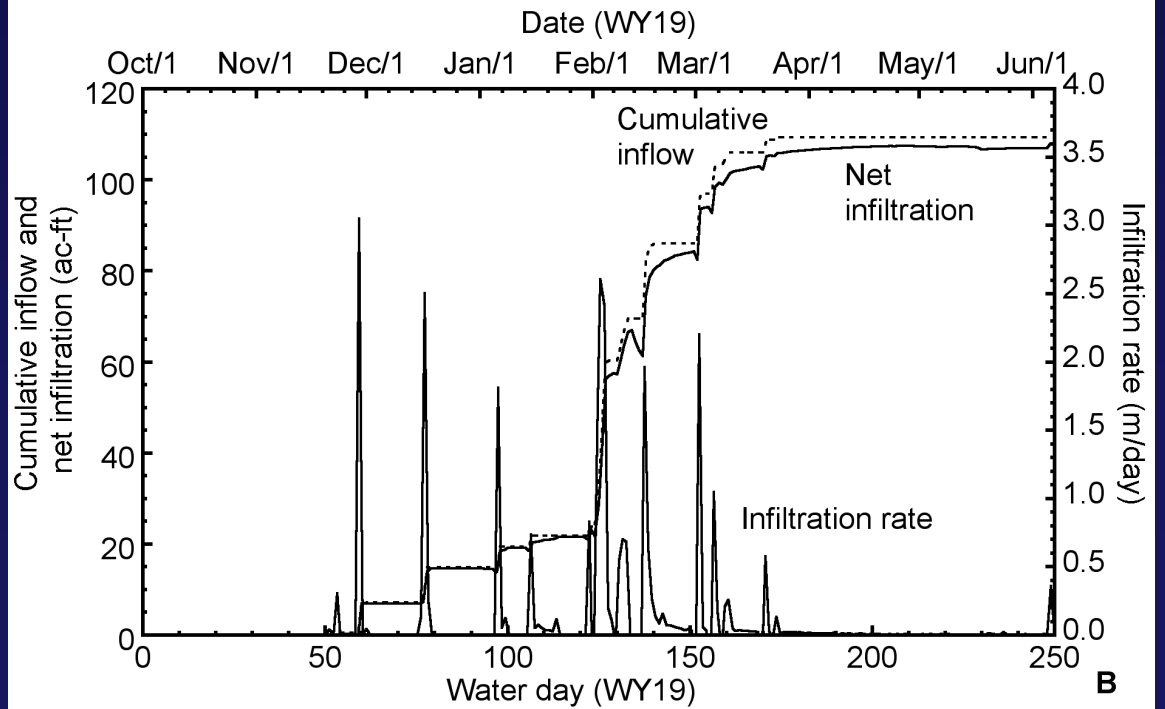
Bokariza Ranch: Water Balance

$$I_V = Q_{\text{inflow}} + P - Evap - \Delta S$$

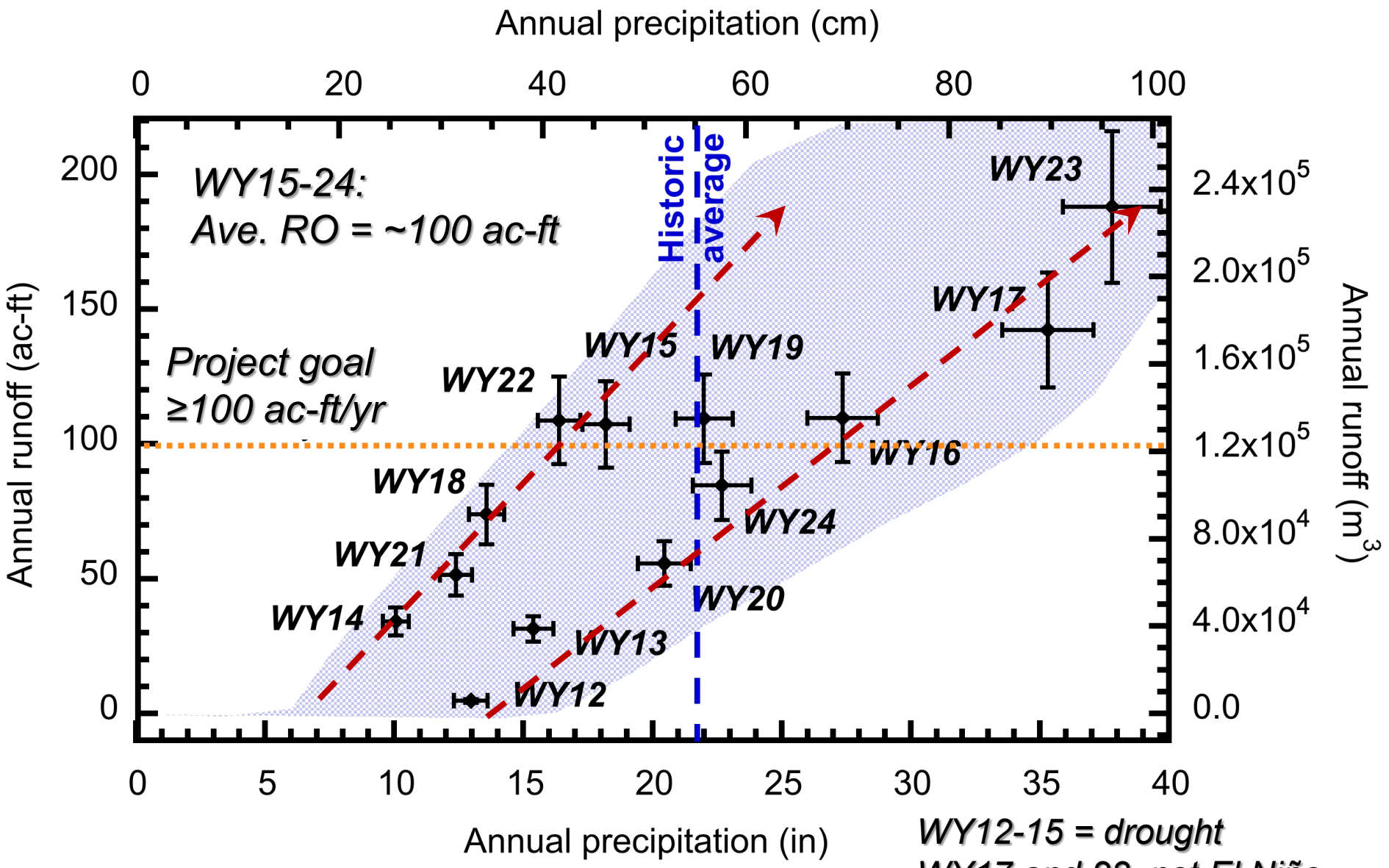
I_V = infiltration (volume)
Q_{inflow} = runoff in
P = rain on basin
$Evap$ = evaporation
ΔS = change in basin storage (volume)

- Example from WY19: Net infiltration ≈107 ac-ft





Bokariza Ranch: 13 Years of Infiltration and Recharge

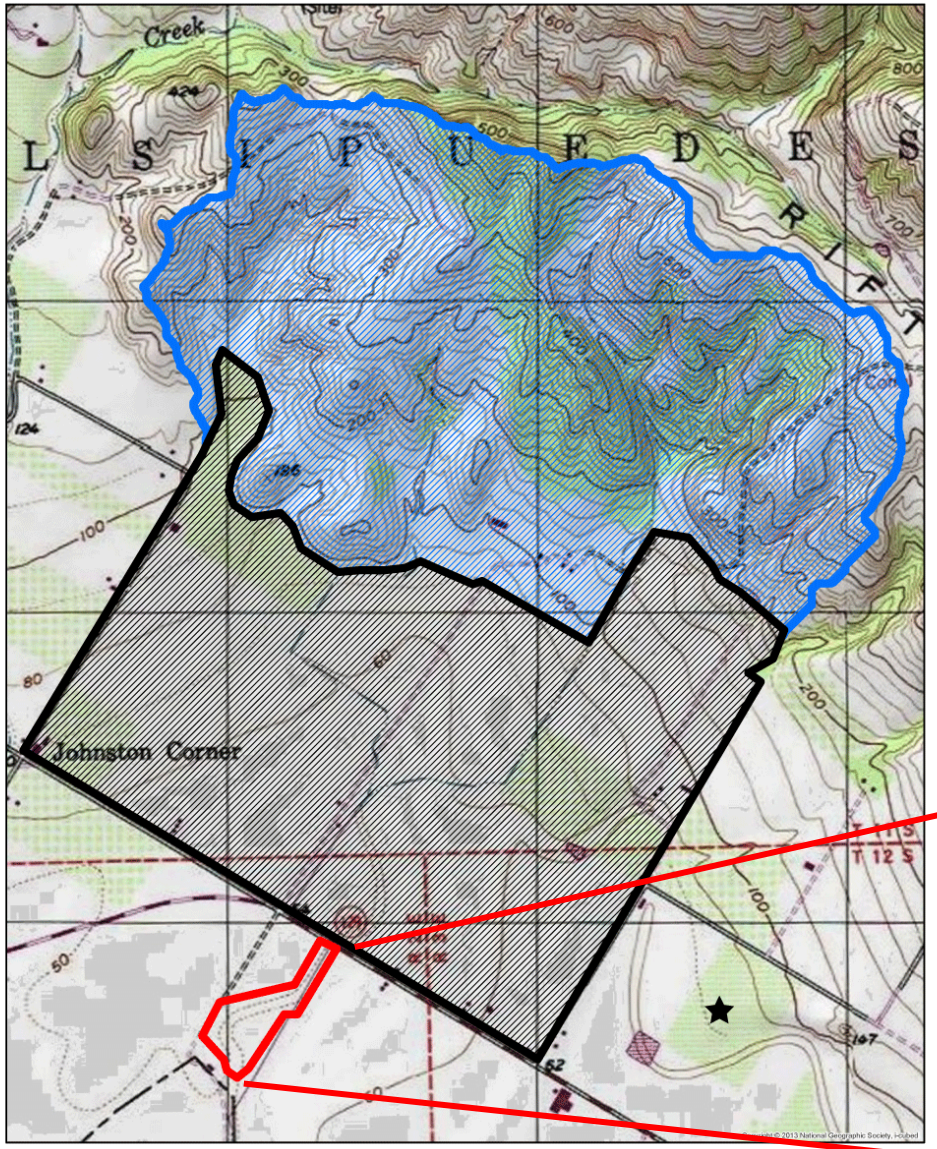


WY12-15 = drought
WY17 and 23, not El Niño
WY18 and WY21, pretty dry

Modified and updated from
Beganskas and Fisher (2017), Serrano et al. (*in prep.*)

Kelly-Thompson Ranch

- *Working ranch and rangeland*
- *>1300 acres draining into ~15 acres*
- *Infiltrating and improving stormwater*



Locations and areas (approximate)

Developed (620 acres)

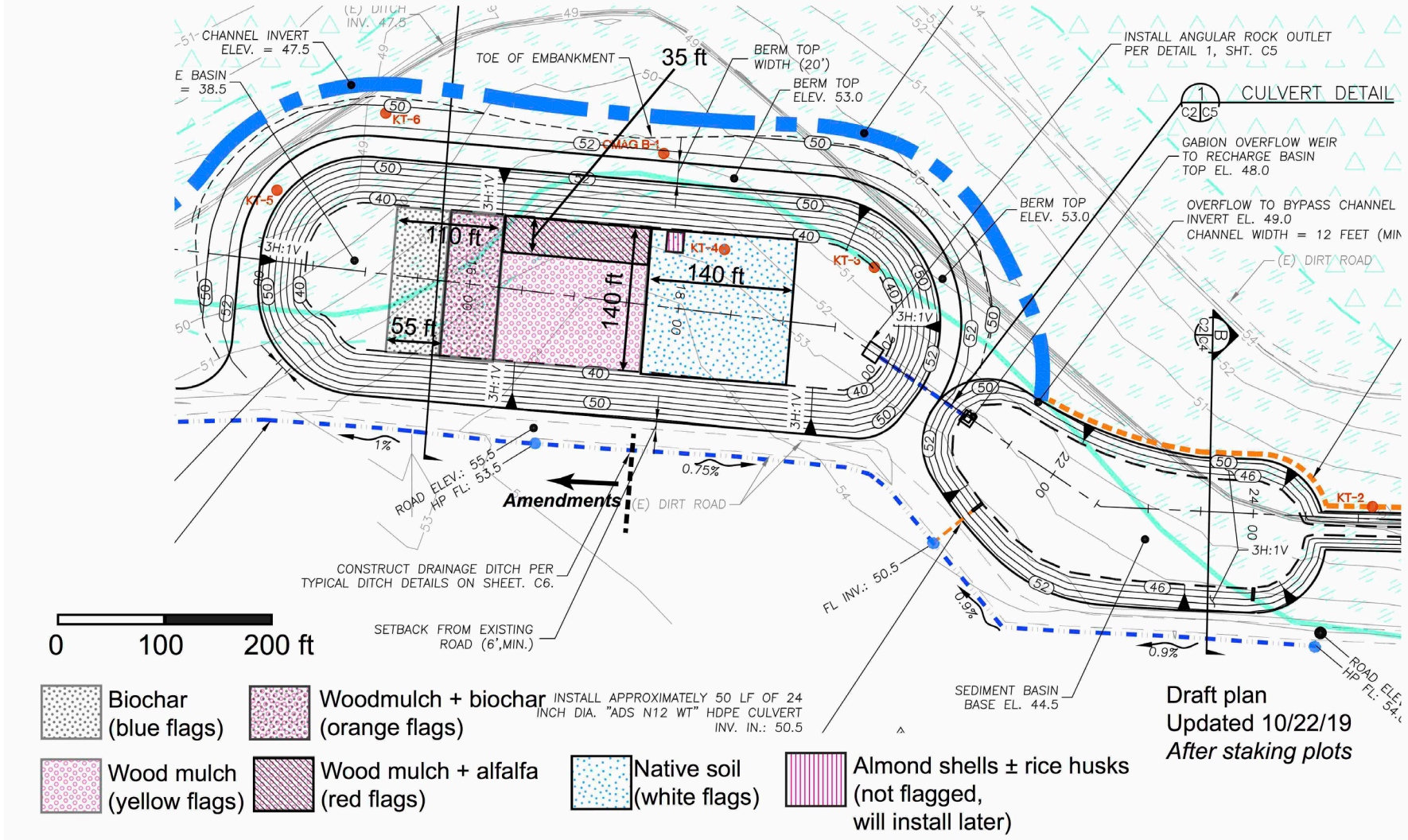
Undeveloped/less developed (700 acres)

Potential infiltration area

Nearby infiltration project

Stormwater infiltration system location

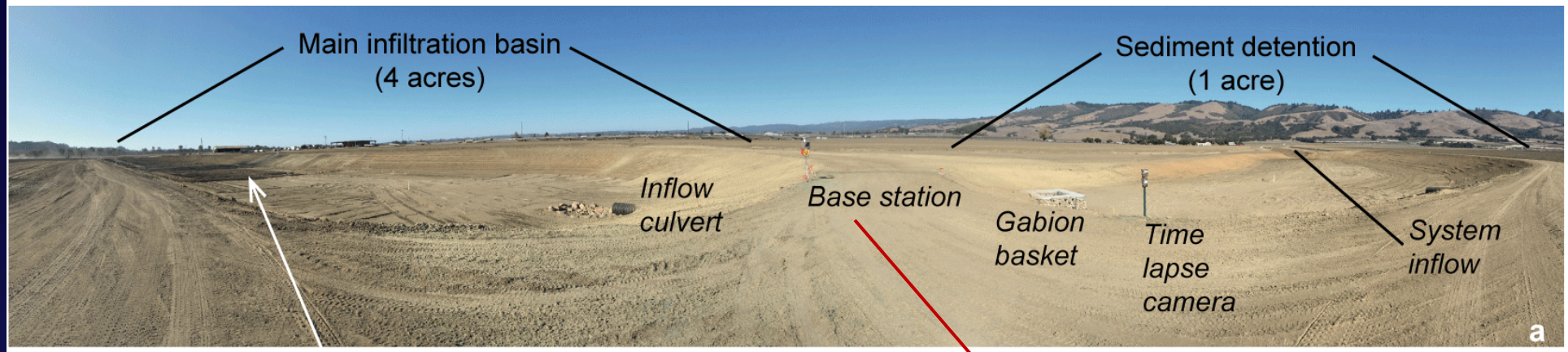
Kelly-Thompson Ranch

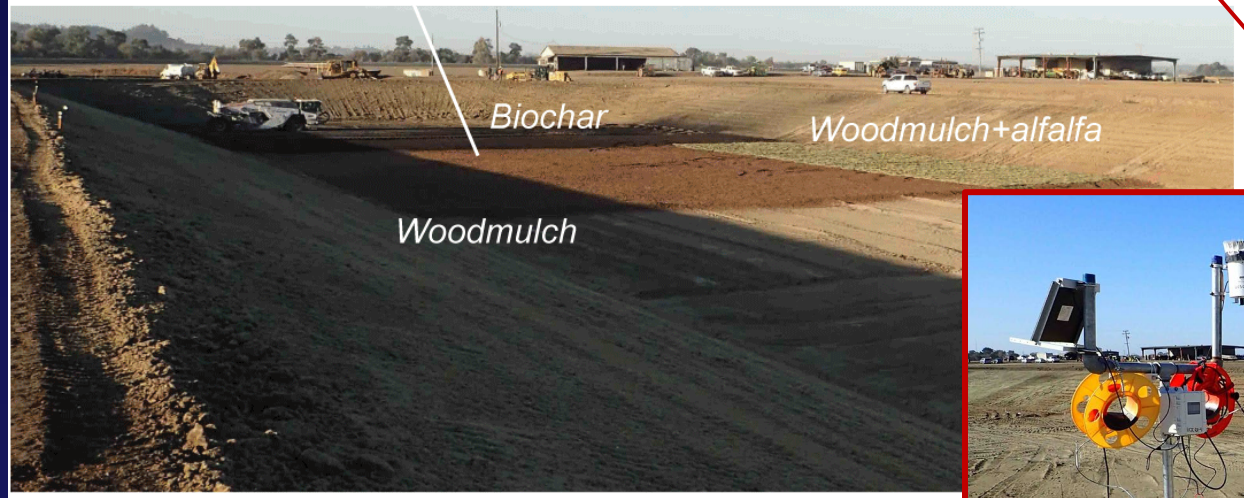


Carbon-rich soil amendments

Kelly-Thompson Ranch

Under construction





Adding carbon-rich soil amendments

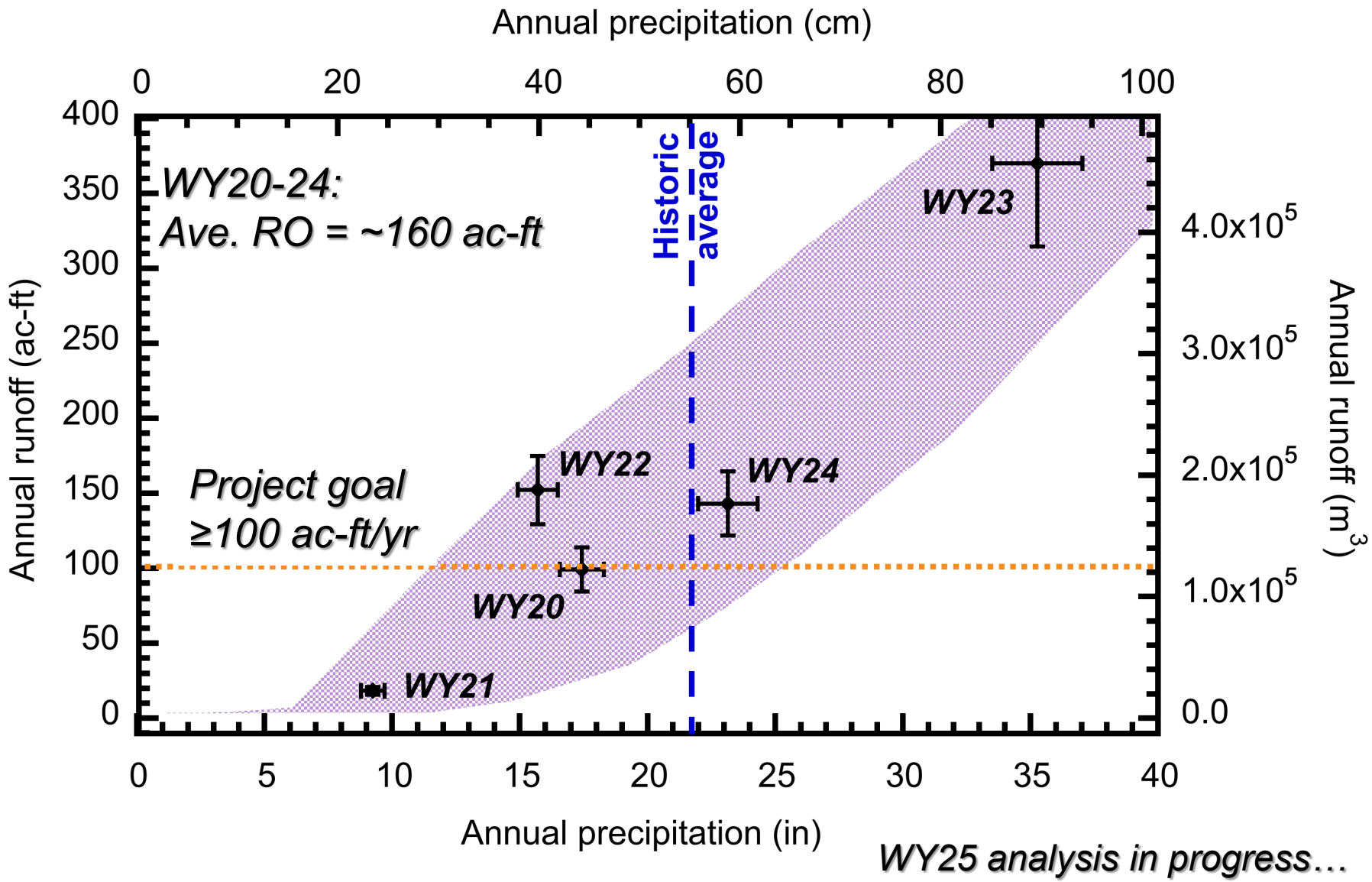
Full-scale, field validation of improvements to water quality

Infiltration basin in operation

- ~160 ac-ft/yr of net infiltration benefit in WY20-24
- Improvements to water quality during infiltration

Serrano et al. (2025 - *in review*)

Kelly Thompson Ranch: 5 Years of Infiltration and Recharge



Serrano et al. (*in prep.*)

ReNeM | *Cost Effective*

In the Pajaro Valley, ***cost-benefit considerations*** *for ReNeM are* ***favorable*** *compared to alternative water sources…****ReNeM*** *is also* ***highly complementary to demand management*** *(in many GSPs)*

nature water
Article
https://doi.org/10.1038/s44221-023-00141-1

Recharge net metering (ReNeM) is a novel, cost-effective management strategy to incentivize groundwater recharge

Received: 27 December 2022
Accepted: 7 September 2023

Molly Bruce[1], Luke Sherman[2], Ellen Bruno[3], Andrew T. Fisher[4] & Michael Kiparsky[1]

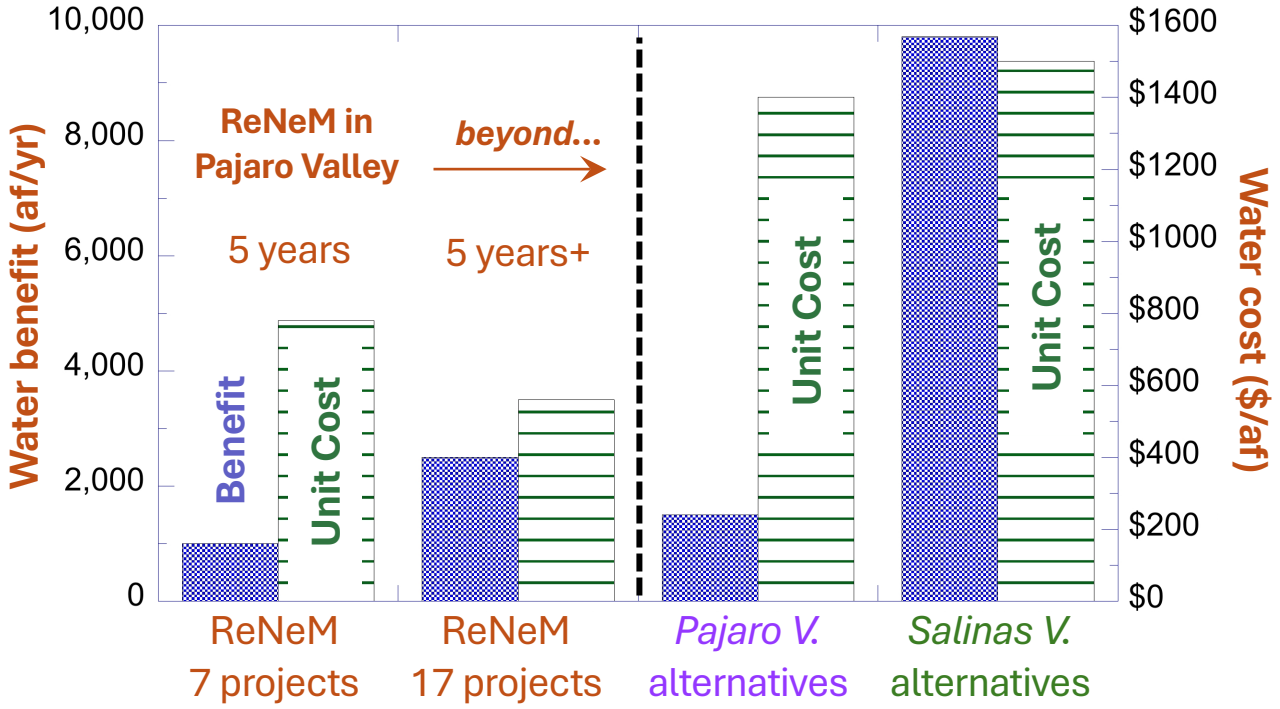
News & views
Managed aquifer recharge
https://doi.org/10.1038/s44221-023-00140-2

Financial incentives can leverage existing infrastructure to replenish groundwater

Melissa M. Rohde

Paying private landowners to increase infiltration on their land is a cost-effective strategy to offset groundwater depletion.

*ReNeM costs compared**



* ***Rounded***, based only on cost of water. ***Both ReNeM and alternatives may have more benefits***, e.g., improve water quality, reduce SW intrusion

ReNeM | *Adaptability At Its Core*

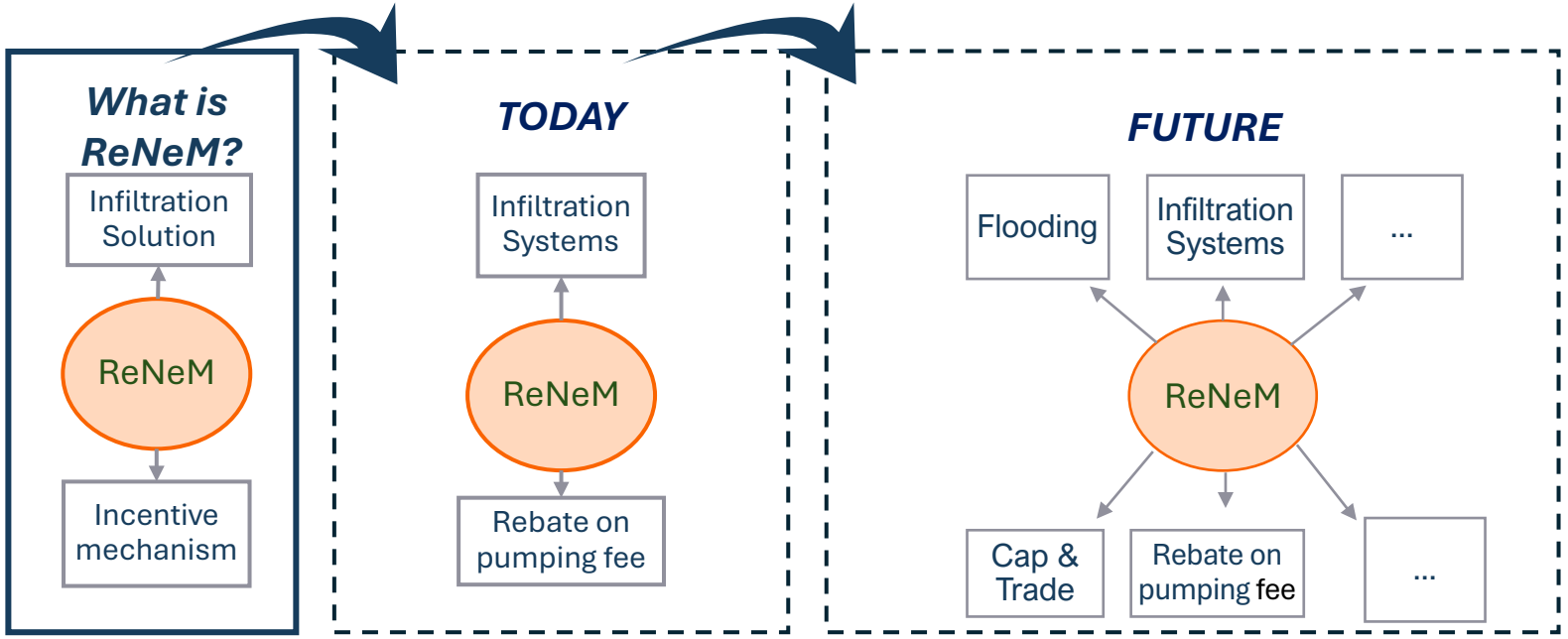
*Besides its proven cost-effectiveness, the structure of ReNeM - including its partners, infiltration solutions, and incentives - is **flexible** and can be **adapted** to different context.*

GOVERNANCE

The proposed structure serves as a framework. Roles may vary based on existing organizations, power dynamics, and project stages.

INFILTRATION SOLUTION AND INCENTIVES

ReNeM can compensate participants based on measured infiltration through the most suitable practices for each project site (e.g. infiltration basins, field flooding, levee setbacks, cover crops, etc.)



[1] Participants include landowners and tenant farme

ReNeM | *Adaptability At Its Core*

Existing ReNeM

Distributed Stormwater Collection

Extended ReNeM

Flood MAR

Extended ReNeM

Recharge in Levee Setbacks

Extended ReNeM

Recharge in built environments

Extended ReNeM

Alternate/cover cropping

ReNeM | *Adaptability At Its Core*

*The **adaptability** of ReNeM is an important attribute of the program, specially when looking into Groundwater Sustainability Agencies' (GSAs) needs on developing projects to bring basins into balance.* ***Recharge is popular!***

GSAs across CA are struggling to identify and advance projects to balance groundwater budgets.		**ReNeM addresses multiple challenges that GSAs face, can help to meet SGMA obligations.**
Skeptical community	→	Increases GW supply, engages community
Unsure of site suitability	→	Regional and specific site assessments
Unclear project costs and benefits	→	Costs are known/knowable, participants agree to terms up front
Variable financial and legal concerns	→	Program can be tailored to local conditions, costs, requirements
Lack access to private land	→	Incentives for recharge on all kinds of land
Groundwater/Recharge Challenges		***ReNeM Solutions***

ReNeM | *Planning For The Future*

*ReNeM's successes to date highlight the opportunity for further scaling. Developing a **ReNeM Program** will enable a transition from **opportunistic to strategic expansion**.*

Where We Are Now

SUCCESSFUL RENEM PROJECTS IN PAJARO VALLEY

- Cost effective
- Adaptable and Flexible to different needs
- Parties outside the PV expressed interest in deploying a ReNeM-type program in their areas

Where We Are Going

ACHIEVE SCALE WITHIN THE PAJARO VALLEY

- Establish additional recharge basins within the Pajaro Valley - deliver ~10% of groundwater shortfall.
- Test other ReNeM implementation concepts, such as FloodMAR and/or recharge within Levee Setbacks

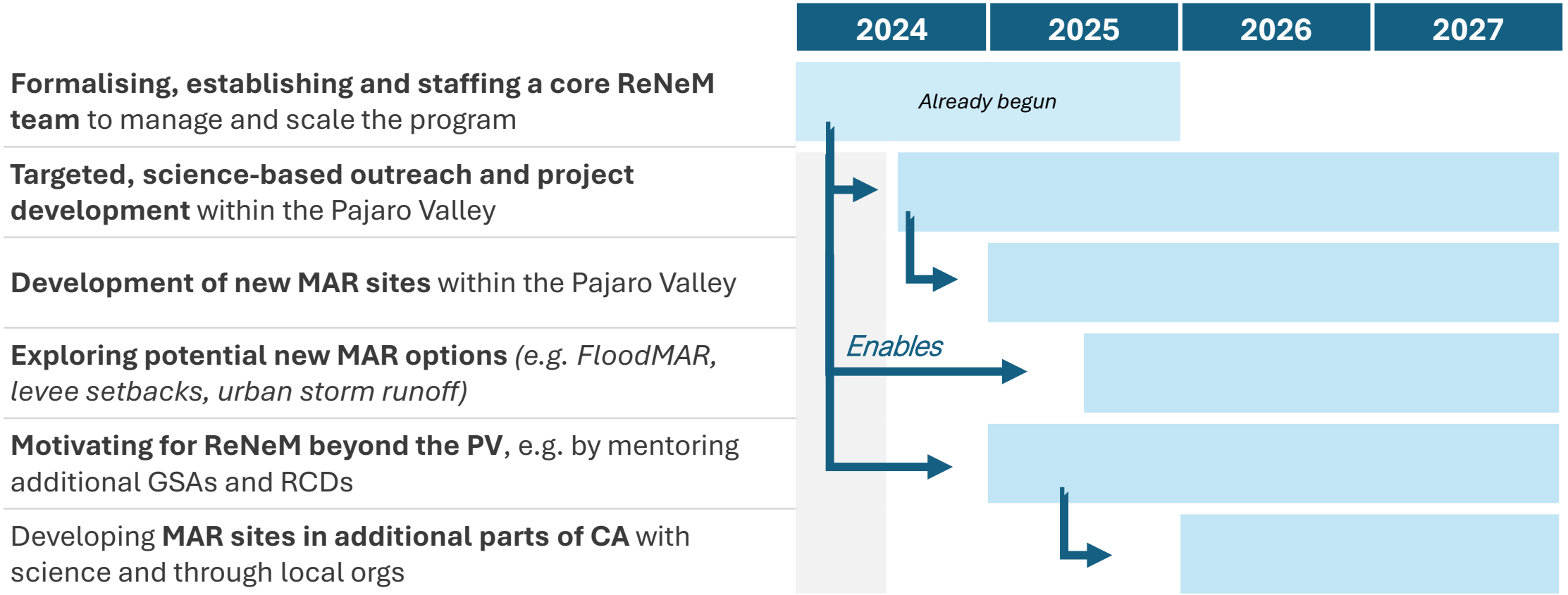
IMPLEMENTATION BEYOND THE PAJARO VALLEY

- Establish processes;
- Build staff capacity: mentor, guide and support the adoption of ReNeM across California;
- Help GSAs and communities achieve their sustainability goals.

Program Development enables projects' scalability

ReNeM | Roadmap

Near-term priorities are to establish and staff a core team and continue targeted project outreach. 2026 will involve further site development in the Pajaro Valley, and intentional mentoring of GSAs and RCDs outside the Valley.



ReNeM | A flexible, practical, proven incentive-based solution

ReNeM addresses needs, creates opportunities, builds partnerships, generates value.

Cost-effective and complementary (*augments other activities*)

Adaptable and scalable (*different approaches will work in other basins*)

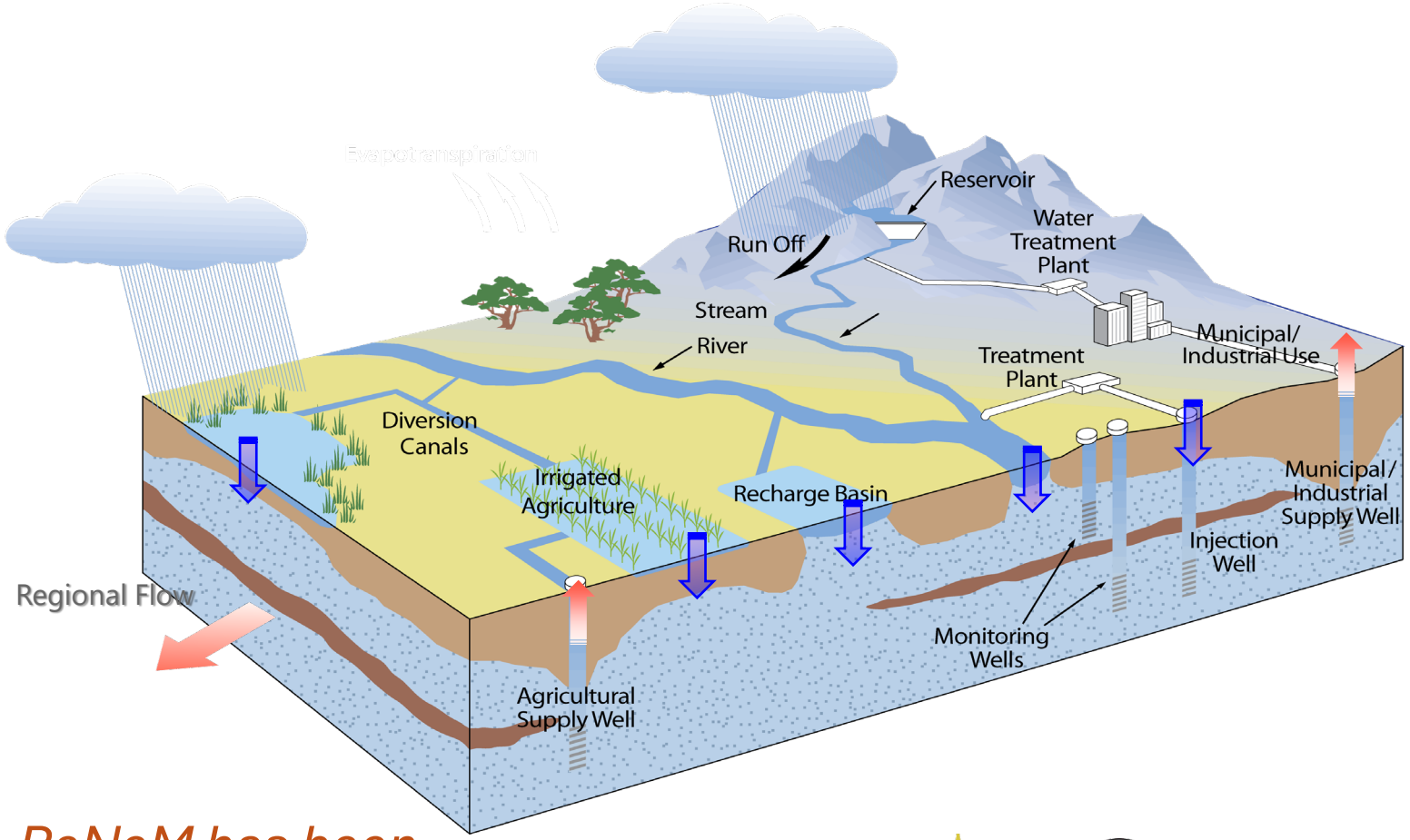
Encourages community participation and engagement

Aligns individual and organizations (*creates collaboration*)
GSAs, RCDs, Land Trusts, Open Space Authorities, cities, tenants and landowners

There is great need and considerable interest

Thank you for your time!

Thank you to many project partners…



Want To Further Engage? Feel Free To Contact us!

Inquiries welcome!

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State of California Coastal Conservancy
GORDON AND BETTY MOORE FOUNDATION
USDA NIFA
Pajaro Valley Water Management Agency
United States Environmental Protection Agency
California Department of Conservation

Napa County

Board Agenda Letter

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Groundwater Technical Advisory Group **Agenda Date:** 12/11/2025 **File ID #:** 25-2017

TO: Technical Advisory Group for the Napa County Groundwater Sustainability Agency

FROM: Brian D. Bordona, Director of Planning, Building and Environmental Services

REPORT BY: Jamison Crosby, Natural Resources Conservation Manager

SUBJECT: Napa Valley Subbasin: GPR Implementation and GSP Project #1: Managed Aquifer Recharge

RECOMMENDATION

Technical Advisory Group (TAG) members will receive a presentation on Project 1 of GSP Implementation: Managed Aquifer Recharge, including an update on the feasibility study underway. The TAG will also receive an update on current vineyard fallowing in Napa Valley. This is intended to spur discussion, questions, and provide feedback to staff and participants.

Procedure
Staff introduces.
Questions and answers with the TAG.
Public comments.

BACKGROUND AND DISCUSSION

The Napa County Groundwater Sustainability Agency (NCGSA) is implementing the Water Conservation (WC) and Groundwater Pumping Reduction (GPR) Workplans (March 2024). The WC Workplan identified a suite of water conservation practices and the GPR Workplan developed an implementation plan to achieve measurable groundwater pumping reductions and overall water savings in the Napa Valley Subbasin (Subbasin). GPR implementation includes a voluntary, incentive-driven program for growers and other water users/industries in the Subbasin to adopt and expand water conservation practices. Mandatory measures are also included if voluntary incentive-driven programs are insufficient.

An overview of current vineyard replants and idle land will be presented to the TAG. Current wine industry market conditions have prompted shifts in planting and replanting in the Subbasin following the 2024 and 2025 harvests, which may influence the adoption of an extended vineyard replant program and potential recharge sites (see below). An analysis was performed of current winegrape market conditions impacting growers' decisions and to document vineyards that have come out of production in 2025.

Napa Valley Subbasin Groundwater Sustainability Plan (GSP) implementation also includes GSP Project #1: Managed Aquifer Recharge. Preliminary work has been done to evaluate on-farm practices to increase infiltration (recharge) and prepare a recharge feasibility study. The TAG will receive an update on the planned

content of the recharge feasibility study, current vineyard removals in the Subbasin, and the development of recharge-related modeling scenarios.

The recharge feasibility study is a preliminary assessment of potential recharge opportunities, including technical and economic considerations associated with each opportunity. Since the last meeting, the technical team has defined and updated potential project scenarios to reflect new opportunities uncovered through outreach and discussion. This process has also clarified the characteristics of locations suitable for recharge, refined the data required to develop these scenarios, and informed potential groundwater modeling. The current analysis includes preliminary parcel screening used to identify potential sites for each scenario.

Questions for TAG Discussion
Different data sources and information are being used to develop these projects and analyses.

- Do TAG members have any questions, insights, or considerations to improve and refine the development of this work?

ENVIRONMENTAL IMPACT

ENVIRONMENTAL DETERMINATION: The proposed action is not a project as defined by 14 California Code of Regulations 15378 (State CEQA Guidelines) and therefore CEQA is not applicable.

SUPPORTING DOCUMENTS

A. ERA Economics and LSCE PowerPoint Presentation: GPR Implementation and GSP Project #1: Recharge Feasibility Scenario Development, December 2025

Napa Valley Subbasin
Groundwater Pumping Reduction Workplan Update and Recharge Feasibility Study

Napa County GSA TAG Meeting

December 11, 2025

LSCE ERA Economics
Environment • Resources • Agriculture

Overview

1. GSP **Management Actions 1 and 2**: WC and GPR Implementation
2. Extended Replant and Vineyard Removals
3. GSP **Project 1**: Managed Aquifer Recharge
4. Recharge Feasibility Study
5. Next Steps

GPR Workplan Implementation

Guiding Framework:

- Focus on voluntary actions that achieve groundwater benefits for the Subbasin
- Assess the costs and benefits of alternative actions and focus on those that are most cost-effective
- Leverage existing programs and opportunities to generate value from a suite of voluntary actions
- Include adaptive management to adjust the program as data and sustainability indicators evolve
- Mandatory measures if voluntary programs do not achieve measurable reductions in groundwater pumping (e.g., mandatory metering/reporting)

Groundwater Pumping Reduction **10%**

Groundwater Replenishment/ Other GSP Projects

Program Components & Voluntary Actions

(Individual Choice to Participate in Some or All)

GSA & Stakeholders	MA1: Water Conservation MA2: GW Pumping Reduction	P1: Aquifer Recharge	P2: Expand Recycled Water Use
Education & Outreach	Urban & Rural Conservation	Soil Health/ Cover Crops	Landscape Irrigation
Local Certification Partnerships	Best Management Practices (e.g., irrigation efficiency)	Best Management Practices (e.g., increase infiltration)	Best Management Practices (e.g., onsite treatment & resuse)
Conservation Incentives	Apply Technologies	Retain On-farm Stormwater	Vineyard Irrigation
Water Use Data; Benchmarking	Water Use Tracking	Capture/Reuse Tile Drain Stormwater	Dry Farm Supplemental Water Source
Agriculture Innovations & Influencers	Conservation Initiatives	Stormwater Storage/ In Lieu Use	Recycled Water Storage/ In Lieu Use
Conservation Nudging	Extended Time to Vineyard Replanting	Winter Recharge	Fallow Acreage Recharge

Sustainability Goal Achieved through Collective Community Actions?

YES — **Local Control**
Continue Voluntary Efforts

NO — **State Control**
Mandatory Measures

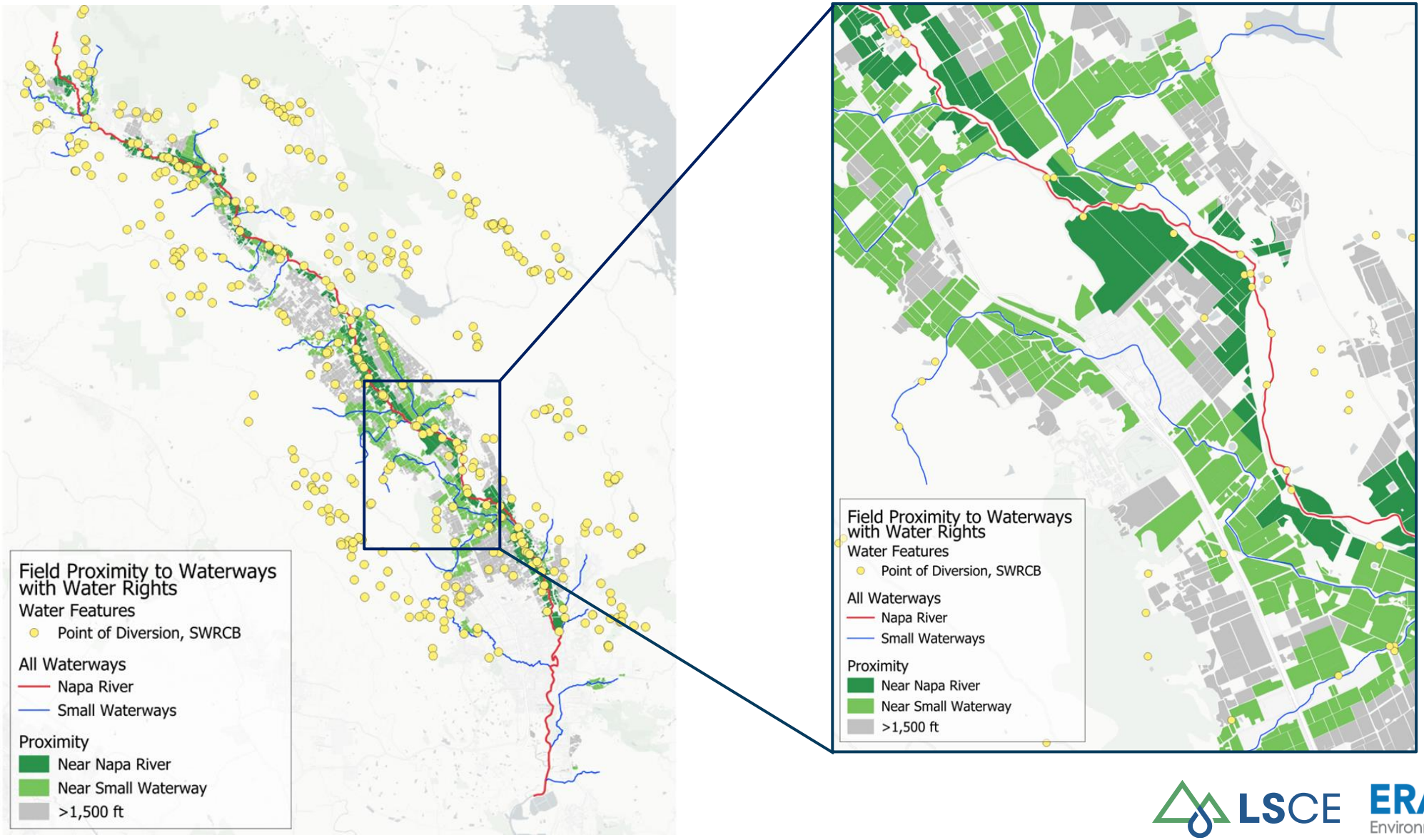
EXTENDED VINEYARD REPLANT CONCEPT
2025 VINEYARD REMOVALS

Extended Vineyard Replant Program Concept

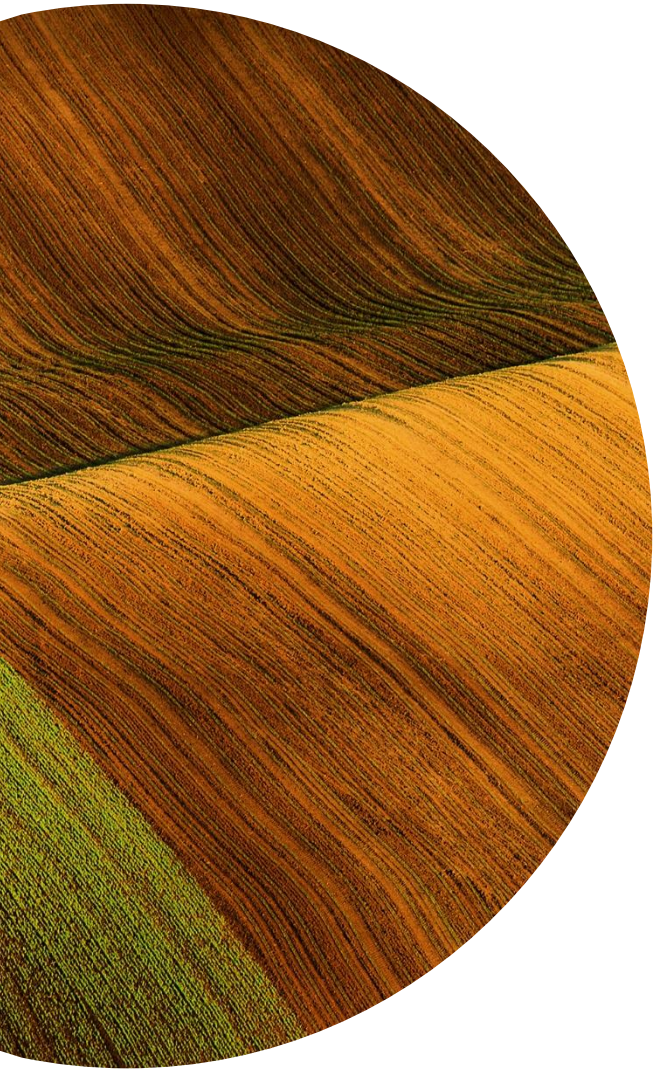
Program Concept Overview

- Voluntary program with incentive offered to increase duration of idle/fallow between removal and replanting
  - Water savings as replants are shifted
- Explore in combination with other practices to increase benefits (Recharge Scenario 1)
- Considerations
  - ISW and GDE
  - Market conditions
  - "Mothballing" is a similar potential concept

Extended Replant Lands Analysis: Overview



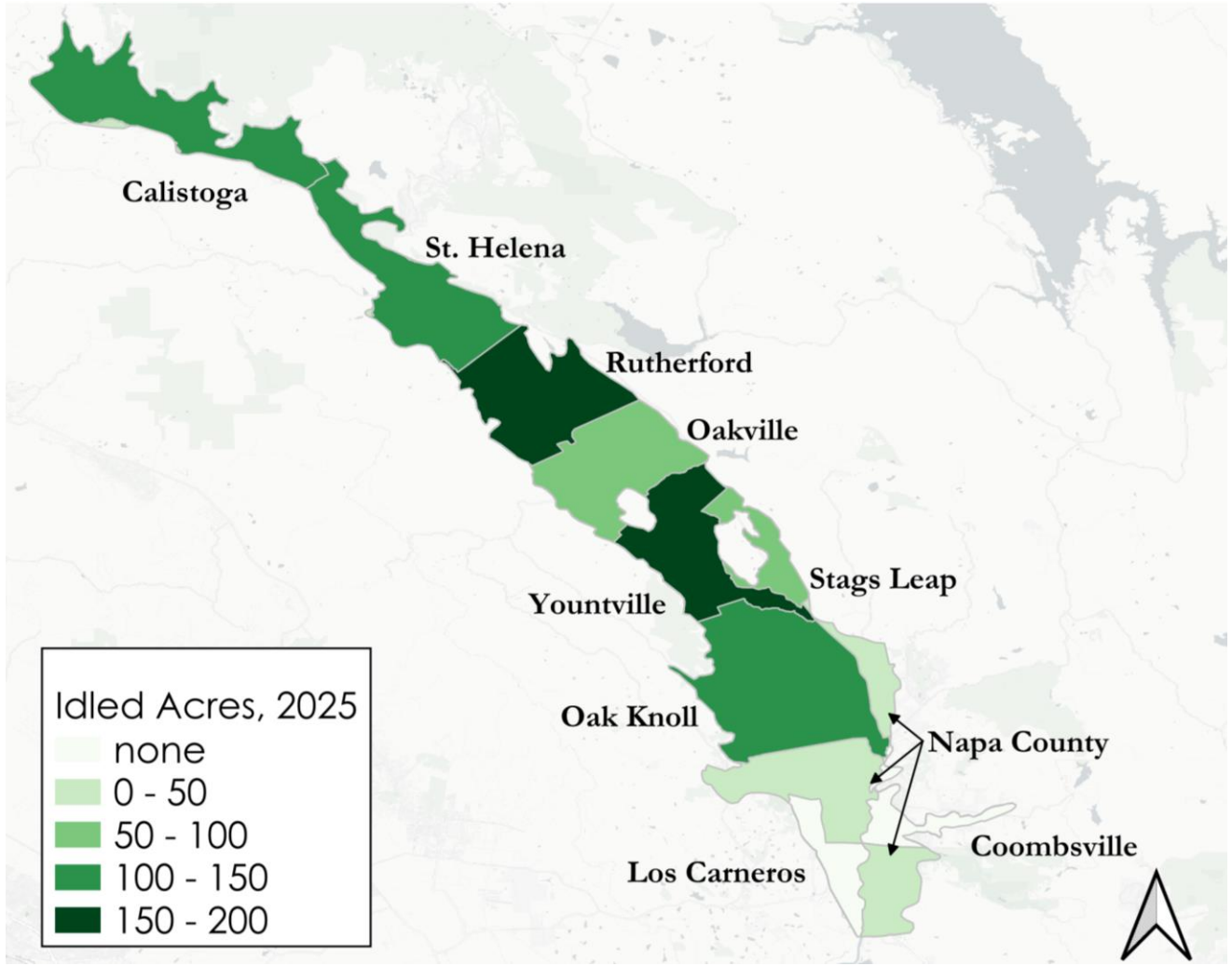
2025 Vineyard Removals



Overview

- Wine market conditions
- How are growers adapting?
  - Maintain, replant, removal, switch crops, mothball, abandon, or sell
- Evaluate replants and removals in 2025
  - Assessor data, ET evaluation, NDVI, satellite imagery visual analysis

2025 Vineyard Removals



Preliminary Estimates

- 101 fields totaling 912 acres within the Subbasin (in full or part) in 2025
- Does not include replants in 2023 and 2024 that are still idle
- Replants as of September on 13 fields and 72 acres

GSP PROJECT #1: MANAGED AQUIFER RECHARGE

Recharge Investigation

Study Overview

- Increase groundwater recharge
  - Target SGMA benefits (e.g., ISW and GDE)
  - Application of BMPs (e.g., stormwater retention)
  - Link to other GPR programs (extending replant, certification, other water conservation practices)
- Assessment of recharge opportunities
  - Technical (water supply, land use, infrastructure needs)
  - Economic (costs, benefits, return on investment, comparison to other PMAs)
  - Financial (funding mechanism)

Working Draft TOC

1. Overview
2. Recharge Opportunities
   - Recharge Scenarios (Four Scenarios)
3. Technical and Legal
   - Water Rights for Recharge
   - Existing Water Right Utilization in Subbasin
   - Obtaining New Water Right
   - On-Farm Infrastructure and Management Considerations
   - GSP and Effects on ISW/GDE and Other SMC
   - Environmental
4. Economic Feasibility
   - Capital and O&MR Costs
   - Economic Benefits and Benefit-Cost Assessment
5. Financial Feasibility
   - Cost Recovery and Funding Strategy
   - Recharge Crediting Concept
6. Summary
7. References

Recharge Feasibility Study

Preliminary Activities: Feasibility Study

- Analysis underway across multiple components, including economic, technical, and financial
- Ongoing grower discussions for existing activities, feasibility, infrastructure, costs, existing experience and knowledge
- Launching modeling and analyses

Recharge Scenarios

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Name	Extended Replant Recharge	Direct On-Farm Recharge	Pumping Reduction Recharge	Multibenefit Recharge
Description	Increase recharge on idle vineyard	On-farm recharge that may include Ag-MAR or basins	Use existing pond or reservoir for storage to reduce pumping	Recharge on lands near significant streams
Duration	< 5 years	Longer	Annual	Longer/permanent
Capital	Limited to standard replanting work, light earthwork/berms	Flood-MAR or recharge basins	Limited	Earthwork and infrastructure
Water Right Pathway	Temporary underground storage	Temporary underground storage	Existing rights	Temporary underground storage
Administration	GSA or individuals	GSA	Individuals	GSA

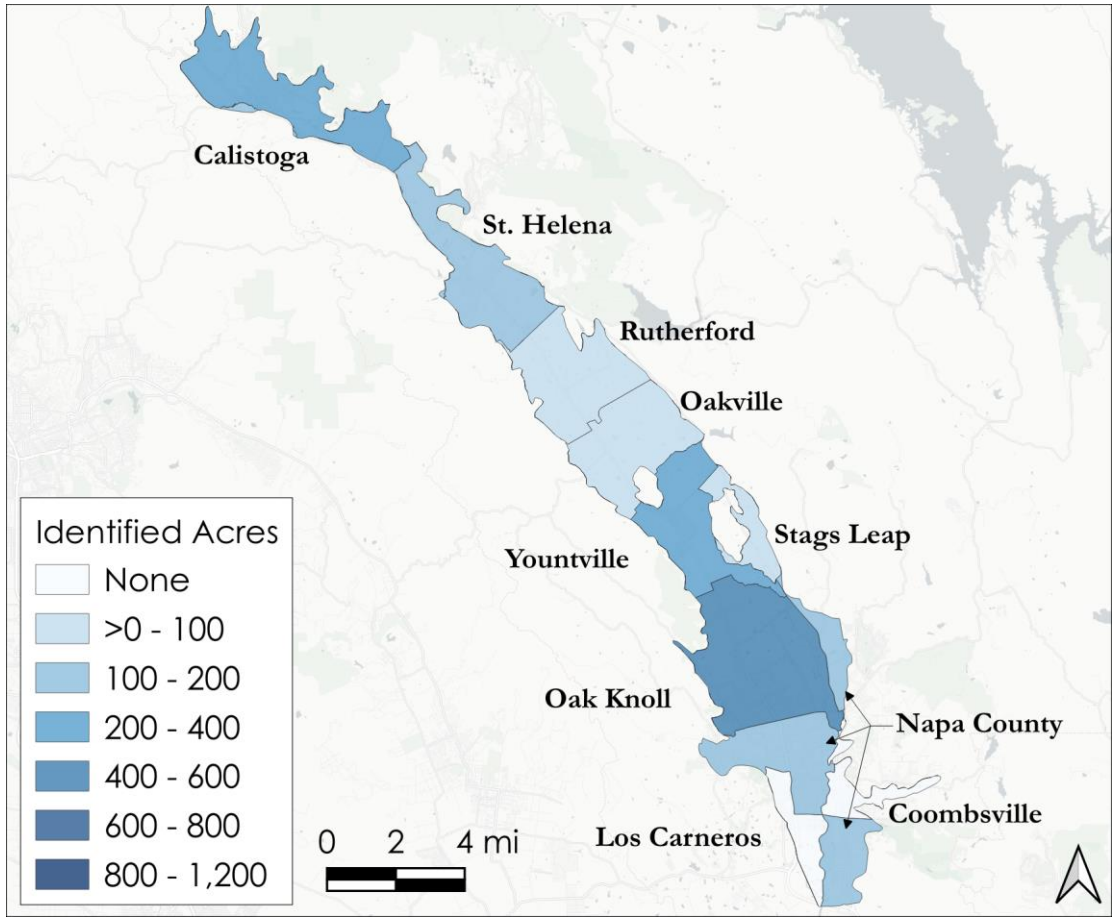
Scenario 1

Extended Vineyard Replant

Preliminary Spatial Screening

- Has at least one field on the parcel that is
  - Older than 25 years old
- Has **POD** on parcel

APNs	Vineyard Acres	PODs
55	1,556	66



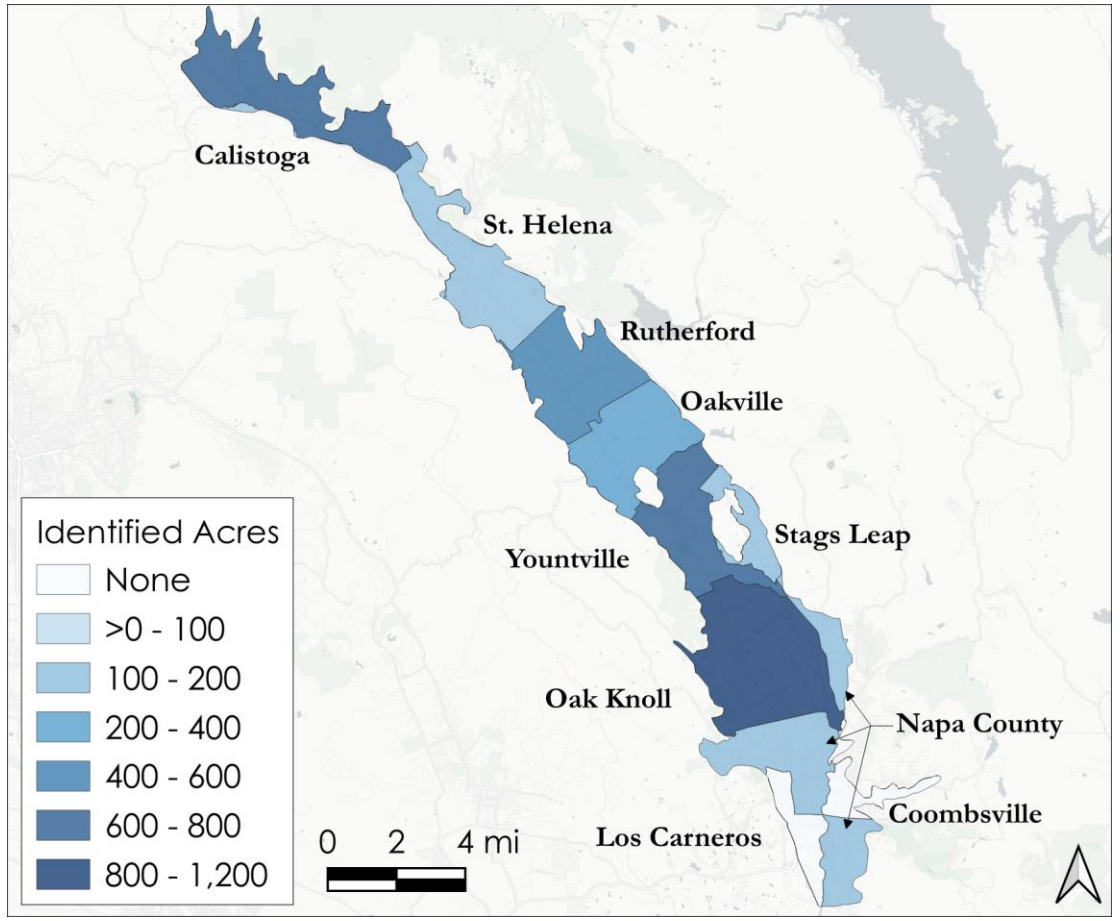
Scenario 2

Direct On-Farm Recharge

Preliminary Spatial Screening

- Has **POD** on parcel

APNs	Vineyard Acres	PODs
106	3,665	138



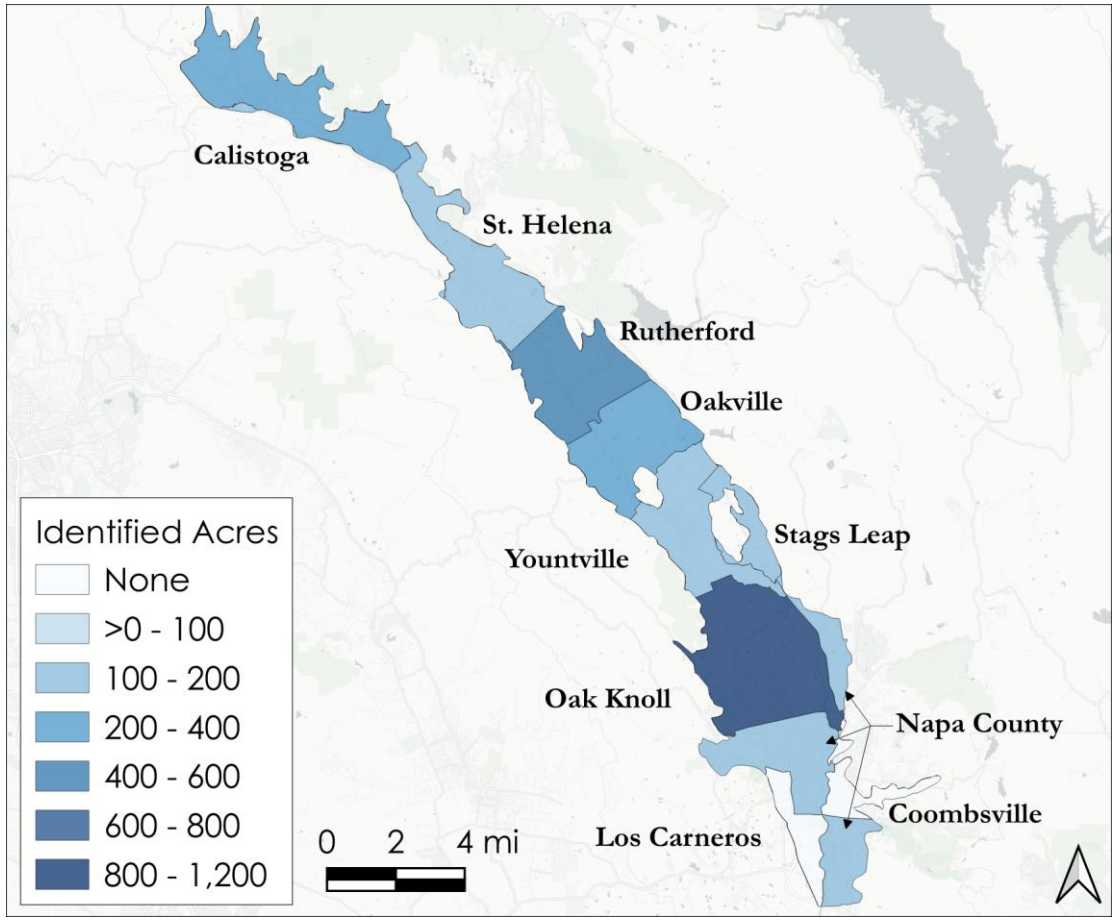
Scenario 3

Pumping Reduction

Preliminary Spatial Screening

- Has **POD** on parcel *and*
- Has **pond or reservoir** on parcel

APNs	Vineyard Acres	PODs	Ponds
66	2,322	87	75



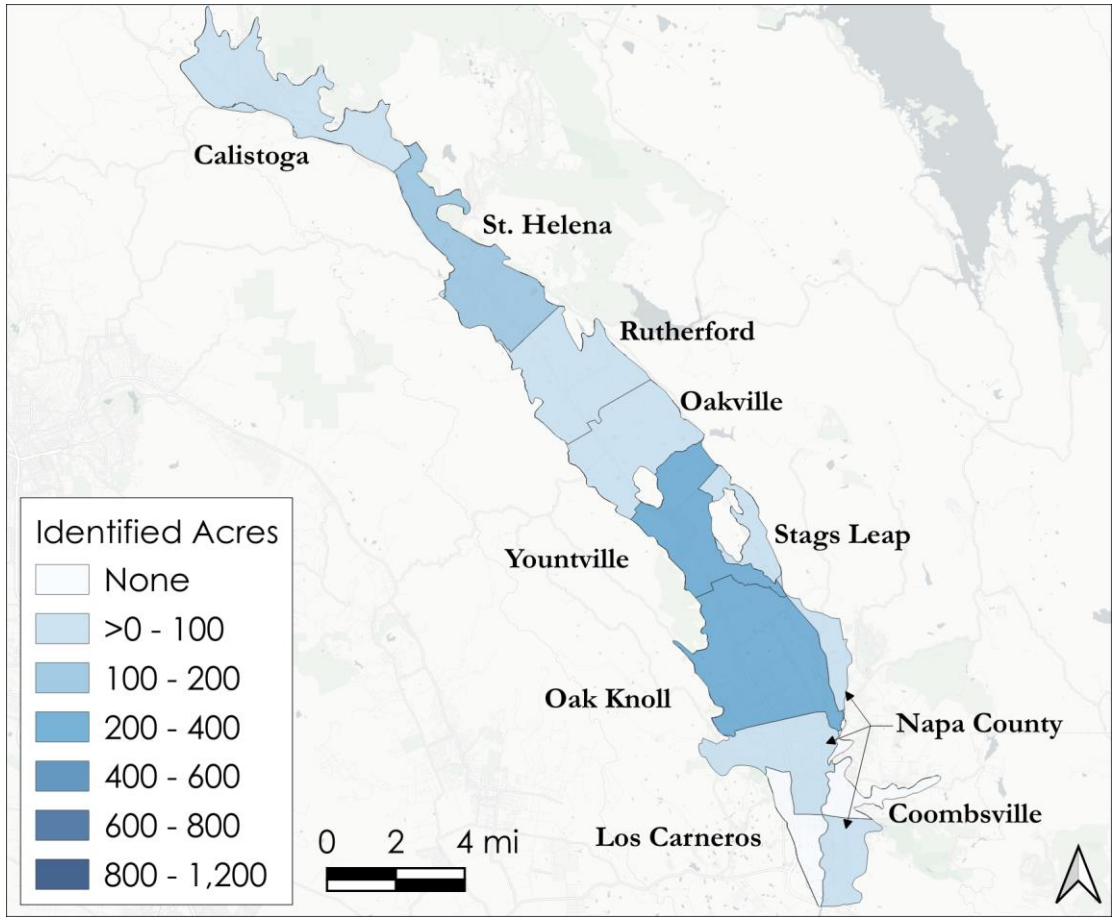
Scenario 4

Recharge Basins &/or Multipurpose

Preliminary Spatial Screening

- Has at least one **field** on the parcel that is
  - Within 1,500 feet of a significant stream
  - Older than 25 years old
- Has **POD** on parcel

APNs	Vineyard Acres	PODs
34	1,041	43



RECHARGE FEASIBILITY STUDY: WATER RIGHTS CONSIDERATIONS AND MODEL SCENARIO DEVELOPMENT

Water Rights Considerations

- Existing water rights cannot be augmented to include **new** use
- Managed Aquifer Recharge falls under "**temporary underground storage**" for a later beneficial use – **new water right**
- Pumping reduction falls under a "**direct diversion**" water right for irrigation – **existing water right**
- The type of water right determines the pathway for securing a permit to divert under the State Water Resources Control Board

Direct Diversion for Irrigation – Landowners (Pumping Reduction)

- Securing new or augmented water right for direct diversion for irrigation is **difficult, expensive and time-consuming**.

  – These water rights are currently held by **individual landowners**

- Most feasible pathway is to identify and leverage **underutilized** existing water rights to increase temporary surface storage for irrigation "in-lieu" of groundwater pumping
- Change how existing water rights are utilized to optimize groundwater conditions and low-flows

Temporary Underground Storage - GSA (Managed Aquifer Recharge)

- Securing new (temporary) permit for underground storage can be easy through streamlined processing
- Water right is for **temporary underground storage**
- Beneficial use can be existing pumping[1] for irrigation, domestic, municipal or increase in summer/fall instream flows
- Water rights held by the GSA (county) and administered through landowner partnerships using existing points of diversion
- Need to demonstrate water availability and subject to North Coast Instream Flow Policy (2014)

1. Other PMAs still target a total reduction in pumping to achieve sustainability goal

Scenario 1, 2 & 4

Modeling Managed Aquifer Recharge

Existing Modeling

- Existing NVIHM can be leveraged to estimate water availability – we have modeled estimate of flow in every significant stream

Preliminary Modeling

- Test feasibility – recharge rates, water table impacts on vineyards, preliminary assessment of locations and potential volumes
- Evaluate benefits on SMCs and low flows

Water Rights Application Support

- Demonstrate beneficial use (e.g. in-stream benefits, groundwater pumping) and support water accounting plan (required in water rights application)

Scenario 3

Modeling Pumping Reductions

Existing Modeling

- Existing NVIHM model is currently being utilized by SWRCB in their decision-making support model to better simulate flows to evaluate water rights
- Existing NVIHM can be leveraged to estimate water availability – determine when and where is there "excess" flow

Preliminary Modeling

- Model can be used to simulate the net increase in diversion and on-farm storage
- Model can be used to simulate different diversion and use scenarios of existing water rights (timing and amount) to increase low-flows
- Evaluate the reduction in calculated groundwater pumping and quantify benefits to SMCs and low-flows

Discussion

Different data sources and information are being used to develop these projects and analyses.

- ***Do you have any questions, insights, or considerations to improve and refine the development of this work?***

Next Steps

Recharge Investigation

- Evaluate water rights
- Preliminary modeling
- Pursue partnerships