Board of Directors Meeting
Thursday, November 19, 2026, 4:00 p.m.
City of Fillmore City Hall Council Chambers
250 Central Avenue, Fillmore, CA 93015

To participate in the Board of Directors meeting via Zoom, please access:
https://us02web.zoom.us/j/85480305580?pwd=ZnFBWGhtVU05dXd3REFkM255c0h6UT09
Meeting ID: **854 8030 5580** Password: **FPBGSA**

To hear just the audio portion of the meeting, phone into:
Toll-free number: **877 853 5247** Meeting ID: **854 8030 5580**

AGENDA

1. CALL TO ORDER

1A Pledge of Allegiance

1B Directors Roll Call

1C Public Comments

Fillmore and Piru Basins Groundwater Sustainability Agency (Agency) will accept public comment concerning agenda items at the time the item is considered and on any non-agenda item within the jurisdiction of the Board during the agendized Public Comment period. No action will be taken by the Board on any non-agenda item. In accordance with Government Code § 54954.3(b)(1), public comment will be limited to three (3) minutes per speaker per issue.

1D Approval of Agenda

Motion

2. SEATING OF NEW DIRECTOR

2A Appointment of Piru Basin Stakeholder Director

Motion

The Member Directors will consider confirming Hayden McIntyre as the Piru Basin Pumper Stakeholder Director, as nominated by the Piru Basin Pumpers Association.

3. UPDATES

3A Director Announcements/Board Communications:

Oral Reports from the Board.

Fillmore Pumpers Association Stakeholder Director Update

Piru Pumpers Association Stakeholder Director Update

Environmental Stakeholder Director Update

City of Fillmore Member Director Update

United Water Conservation District Member Director Update

County of Ventura Member Director Update

3B Executive Director Update
Information Item
The Executive Director will provide an informational update on Agency activities since the previous Board of Directors meeting of September 17, 2026.

3C Legal Counsel Update
Information Item
Legal Counsel will provide an informational update on Agency's legal issues and concerns since the previous Board of Directors meeting of September 17, 2026.

3D GSP Consultant Update
Information Item
Representatives from Daniel B Stephens & Associates will provide an informational update on the Agency's groundwater sustainability planning activities since the previous Board of Directors meeting of September 17, 2026.

4. CONSENT CALENDAR

All matters listed under the Consent Calendar are considered routine by the Board and will be enacted by one motion. There will be no separate discussion of these items unless a Board member pulls an item from the Calendar. Pulled items will be discussed and acted on separately by the Board. Members of the public who want to comment on a Consent Calendar item should do so under Public Comments. (ROLL CALL VOTE REQUIRED)

4A Approval of Minutes
The Board will consider approving the Minutes from the Board of Directors meeting of September 17, 2026.

4B Approval of Warrants
The Board will consider approving payment of outstanding vendor invoices, as well as those paid during the period that the Board did not meet:

DBS&A	$53,503.75
UWCD	11,936.47
Aleshire & Wynder LLP	2,107.40

October Warrants

DBS&A	$67,054.00
UWCD	8,757.37
Superior Printing	585.96
Aleshire & Wynder LLP	462.60

4C Monthly Financial Report
The Board will receive the monthly financial report for the Fillmore and Piru Basins Groundwater Sustainability Agency.

5. MOTION ITEMS

5A Fiscal Year 2025-2026 Financial Report

Motion

The Board will receive the Fiscal Year 2025-2026 Financial Report and provide comments and direction.

5B Subsidence Technical Memorandum

Motion

The Board will consider approving the Agency's amended Subsidence Technical Memorandum and associated amended Sustainable Management Criteria for Subsidence.

5C Executive Director

Motion

The Board will consider approving Agreement 2026-11-19-AAE with Anthony A. Emmert for as-needed management, planning and regulatory compliance services as executive director.

6. FUTURE ITEMS

7. ADJOURNMENT

The Board will adjourn to the next **Regular Board Meeting on Thursday, December 17, 2026,** or call of the Chair.

Materials, which are non-exempt public records and are provided to the Board of Directors to be used in consideration of the above agenda items, including any documents provided subsequent to the publishing of this agenda, are available for inspection at UWCD's offices at 1701 N. Lombard Street in Oxnard during normal business hours.

The Americans with Disabilities Act provides that no qualified individual with a disability shall be excluded from participation in, or denied the benefits of, the District's services, programs or activities because of any disability. If you need special assistance to participate in this meeting, or if you require agenda materials in an alternative format, please contact the UWCD Office at (805) 525-4431 or the City of Fillmore at (805) 524- 1500. Notification of at least 48 hours prior to the meeting will enable the District to make appropriate arrangements

Approved: Kelly Long
Board Chair Kelly Long

Posted: (date) November 16, 2026 (time) 2:00 p.m. (attest) Eva Ibarra
At: https://www.FPBGSA.org

Posted: (date) November 16, 2026 (time) 2:05 p.m. (attest) Eva Ibarra
At: https://www.facebook.com/FPBGSA

Posted: (date) November 16, 2026 (time) 2:10 p.m. (attest) Eva Ibarra
At: UWCD, 1701 N. Lombard Street, Oxnard

Posted: (date) November 16, 2026 (time) 2:15 p.m. (attest) Ana Cendejas
At: Fillmore City Hall, 250 Central Avenue, Fillmore, CA

Item No. **2A Motion Item**

DATE: November 13, 2026 (for November 19, 2026, meeting)

TO: Board of Directors

FROM: Anthony A. Emmert, Executive Director

SUBJECT: **Appointment of Piru Basin Pumper Stakeholder Director**

RECCOMENDATION:

The Member Directors will consider confirming Hayden McIntyre as the Piru Basin Pumper Stakeholder Director, as nominated by the Piru Basin Pumpers Association.

DISCUSSION:

Director Brian Hauss informed the Agency that his employment with Nuveen ended in September 2026, therefore he would no longer meet the requirements of a Stakeholder Director, as per the Agency's Joint Exercise of Powers Agreement, Article 6, Section 6.2, leaving a vacancy on the Agency Board of Directors. Section 6.2 requires that

> Stakeholder Directors shall be an individual, or a duly authorized representative of an entity or individual, that either: (i) owns land from which groundwater was produced from the Fillmore or Piru Basin, respectively, for beneficial uses within the year preceding the Stakeholder Director's appointment to the Board; (ii) is a party to an unexpired contract entitling the individual or entity to produce groundwater from land overlying the Fillmore or Piru Basins, respectively, that is owned by another party to the contract and groundwater has been produced pursuant to such contract within the year preceding the Stakeholder Director's appointment to the Board; or (iii) is a mutual water company that produces and serves groundwater form the Fillmore or Piru Basin, respectively, to its shareholders. For the Environmental Stakeholder Director, the Stakeholder Director shall be an active member of a nonprofit, 501(c)(3) organization which has an adopted budget and, at the sole discretion of the Member Directors, meets the following requirements: (i) is currently active within lands overlying the Fillmore Basin or Piru Basin, or both; and (ii) has a mission that advances, or is furthered by, groundwater sustainability.

Subsequent to Director Hauss becoming ineligible, the Piru Basin Pumpers Association considered qualified candidates and has nominated Hayden McIntyre for Agency consideration to serve as the Piru Basin Pumper Stakeholder Director (see Attachment 1) for the balance of the two-year term (expires June 30, 2028).

As per the Agency Joint Exercise of Powers Agreement, Article 6, Section 6.4.4, the Member Directors shall consider, and if acceptable, approve (by a simple majority vote) the Piru Basin Stakeholder Director nominated by the Piru Basin Pumpers Association.

FISCAL IMPACT:

There are no fiscal impacts.

ATTACHMENTS

Attachement 1 – Letter of Nomination from Piru Basin Pumpers Association

Proposed Motion: Confirm Hayden McIntyre as the Piru Basin Stakeholder Director.

1st: Director_____ 2nd Director _____

Voice/Roll call vote:

Director Garnica: Director Kimball: Director Long:

Board of Directors Meeting
Thursday, September 17, 2026, at 4:00 p.m.
MINUTES

Directors in Attendance
Director John Garnica
Director Debbie Jackson
Director Gordon Kimbal
Director Kelly Long (virtual)
Director Candice Meneghin

Directors Absent
Director Hauss

Staff in Attendance
Anthony Emmert, executive director
Steve O'Neill, legal counsel
Eva Ibarra, clerk of the board
Patrick O'Connell, senior hydrogeologist (virtual)
Zachary Plummer, IT staff

Public in Attendance
Mohammed Ahmed, UWCD (virtual)
Karina Calderon, UWCD (virtual)
Sara Guzman (virtual)
Rachel Laenen, Kimball Ranches – El Hogar (virtual)
Michael Miller (virtual)
Tony Morgan, DBS&A (virtual)
Todd Umstot, DBS&A (virtual)

1. CALL TO ORDER
Director Garnica called the meeting to order at 4:00 p.m.

1A Pledge of Allegiance
Director Meneghin led the participants in reciting the Pledge of Allegiance.

1B Directors Roll Call
The Clerk called the roll. (Garnica, Jackson, Kimball, Long, and Meneghin) 5 Directors were present. Director Hauss was absent.

1C Public Comments
Director Garnica asked if there were any comments or questions from the public. None were offered.

1D Approval of Agenda
Motion
Director Garnica asked if there were any changes to the agenda. Executive Director Anthony Emmert responded with no and Director Garnica then asked for a motion.

Motion to approve the agenda, Director Jackson; Second, Director Meneghin.

Voice vote: 5 ayes (Garnica, Jackson, Kimball, Long and Meneghin) none opposed. Motion carries 5/0/1.

2. UPDATES

2A Director Announcements/Board Communications:

Oral Reports from the Board.

Fillmore Pumpers Association Stakeholder Director Update
Director Jackson had no update.

Piru Pumpers Association Stakeholder Director Update
Director Hauss was absent.

Environmental Stakeholder Director Update
Director Meneghin reported Friends of the Santa Clara River (FoSCR) presented to the Santa Clara River Watershed Committee its water resiliency planning effort and discussed opportunities for collaboration. She also shared information about their coastal cleanup events held at Johnson Drive in Ventura, Piru, and Santa Clarita. She also noted that FoSCR had met with Los Angeles County Supervisors, regarding Five Point and Chiquita Canyon Landfill.

City of Fillmore Member Director Update
Director Garnica reported that the City is still working on the above groundwork for its new Well #10.

United Water Conservation District Member Director Update
Director Kimball reported with a heavy heart, that the United Board President passed away this week. He reported that releases from Santa Felicia Dam for groundwater recharge are ongoing and that the Piru and Fillmore Subbasins are nearly full. He also noted that approximately 100,000 acre-feet (AF) have been recharged to the Oxnard Plain during the current water year ending September 30, 2026. He concluded his update by stating that United is preparing for runoff for the upcoming rainy season.

County of Ventura Member Director Update
Director Long reported the County is preparing for winter rains.

2B Executive Director Update

Information Item

The Executive Director provided an informational update on Agency activities since the previous Board of Directors meeting of August 20, 2026. Mr. Emmert noted that on August 17, he met with representatives from the Regional Water Quality Control Board,

Santa Clara Valley Water, Los Angeles County Waterworks, and FivePoint to advocate for improved monitoring. He also reported that the Agency's Piru Basin Stakeholder Director resigned from his position with Nuveen, making him ineligible to continue serving as a director for the Piru Basin Pumpers. He concluded by noting that the December 2025 storm, declared a disaster by Governor Newsom, caused significant damage to properties in the Piru and Fillmore Basins. He shared that on September 17, 2026, CalOES representatives held several meetings with Ventura County agencies

regarding their requests for state reimbursement for storm-related damages.

2C Legal Counsel Update
Information Item
Legal Counsel had no update on Agency's legal issues and concerns since the previous Board of Directors meeting of August 20, 2026.

2D GSP Consultant Update
Information Item
Representatives from Daniel B Stephens & Associates provided an informational update on the Agency's groundwater sustainability planning activities since the previous Board of Directors meeting of August 20, 2026 (see slides).

3. CONSENT CALENDAR

All matters listed under the Consent Calendar are considered routine by the Board and will be enacted by one motion. There will be no separate discussion of these items unless a Board member pulls an item from the Calendar. Pulled items will be discussed and acted on separately by the Board. Members of the public who want to comment on a Consent Calendar item should do so under Public Comments. (ROLL CALL VOTE REQUIRED)

3A Approval of Minutes
The Board approved the Minutes from the Board of Directors meeting of August 20, 2026.

3B Approval of Warrants
The Board approved payment of outstanding vendor invoices, as well as those paid during the period that the Board did not meet:

DBS&A	$20,659.50
UWCD	$11,107.00
Stillwater Sciences	$ 93.00
CV Strategies	$ 1,223.52

3C Monthly Financial Report
The Board received the monthly financial report for the Fillmore and Piru Basins Groundwater Sustainability Agency.

Motion to approve Consent Calendar, Director Kimball; Second, Director Jackson. Voice vote: 5 ayes (Garnica, Jackson, Kimball, Long and Meneghin) none opposed. Motion carries 5/0/1.

4. MOTION ITEMS

4A Subsidence Technical Memorandum
Motion
The Board received a presentation from Daniel B. Stephens & Associates on the Agency's updated Subsidence Technical Memorandum and provided comments and directions. Director Kimball offered recommendations regarding the appropriate timing and process for conducting MT.

Motion to approve, Director Long; Second, Director Meneghin. Voice vote: 5 ayes

(Garnica, Jackson, Kimball, Long and Meneghin) none opposed. Motion carries 5/0/1.

4B Potential Agency Projects for Consideration for Proposition 4 Funding

Motion

The Board received a presentation from Daniel B. Stephens & Associates and staff on potential Agency projects, programs, plans and studies for consideration for potential Proposition 4 funding and provided comments and direction.

Motion to receive and file, Director Jackson; Second, Director Garnica. Voice vote: 5 ayes (Garnica, Jackson, Kimball, Long and Meneghin) none opposed. Motion carries 5/0/1.

4C Executive Director Transition

Motion

The Board will consider alternatives for the Executive Director position and provide comments and direction. The Board requested that additional information be presented at the next Board meeting to support their decision.

5. FUTURE ITEMS

None

6. ADJOURNMENT

Director Long adjourned the meeting at 6:17 p.m., to the next Board Meeting on Thursday, October 15, 2026, or call of the chair.

I certify that the above is true and correct copy of the minutes of the Fillmore and Piru Basins Groundwater Sustainability Agency's Board of Directors Regular Meeting of September 17, 2026.

ATTEST: _____
Kelly Long, Chair, FPBGSA Board of Directors

ATTEST: _____
Eva Ibarra, Clerk of the Board



Board of Directors Meeting
17 September 2026
Item 2D GSP Consultant Update

Fillmore and Piru Basins
Groundwater Sustainability Agency

MAJOR ACTIVITIES

- **FY26-27 Task Activities**
  - **Preliminary drafts in progress:**
    - Periodic Evaluations
    - Land Subsidence Technical Memorandum (Agenda Item 4A)
    - Domestic Well Drought Vulnerability Evaluation
  - **Prospective Prop 4 Grant Projects (Agenda Item 4B)**
  - **Tentative Project Timeline through Jan 2027**

QUESTIONS?







Board of Directors Meeting
17 September 2026
Item 4A Subsidence Update

Fillmore and Piru Basins
Groundwater Sustainability Agency

OVERVIEW

- **Updated Subsidence Technical Memorandum**
  - Replaces previous version (2023, 2021)
  - Multiple DWR consultation calls to review our technical approach and the Sustainable Management Criteria (SMCs)
- **General Outline**
  - Review of existing subsidence factors: hydrocarbon extractions, basin tectonics
  - Previous investigations: USGS, DWR, Ventura County, DBS&A
  - Techniques for assessing / monitoring subsidence: GW modeling, geodetic surveys, extensometers, InSAR data, critical water levels

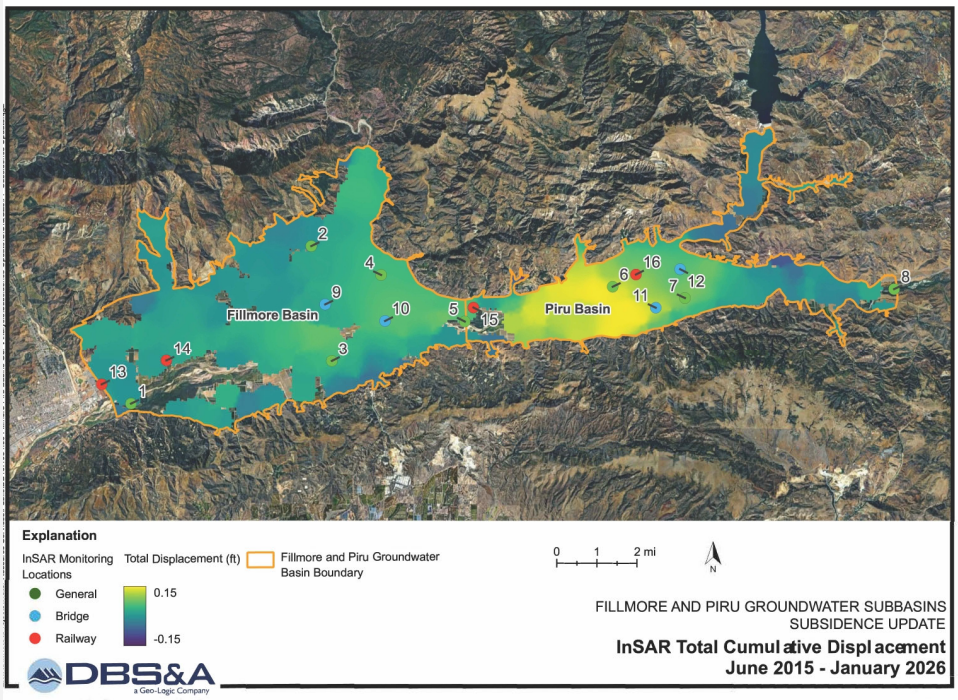
OVERVIEW

- **Currently Active Subsidence Evaluation**
  - Geodetic data - no evidence of downward land movement
  - InSAR data - no evidence of inelastic downward land movement
    - Reservoir releases influence InSAR data - elastic land movement

OVERVIEW

Important Board of Director input

- **Sustainable Management Criteria**
  - **Significant and Unreasonable Impacts**
  - **Potentially Impacted Infrastructure**
  - **Undesirable Results - how much subsidence is too much**
  - **Minimum Threshold**
  - **Measurable Objectives**
  - **Interim Milestones**
- **Subsidence Monitoring Program**
  - **InSAR data**
  - **GW levels**
  - **Mitigative Actions**



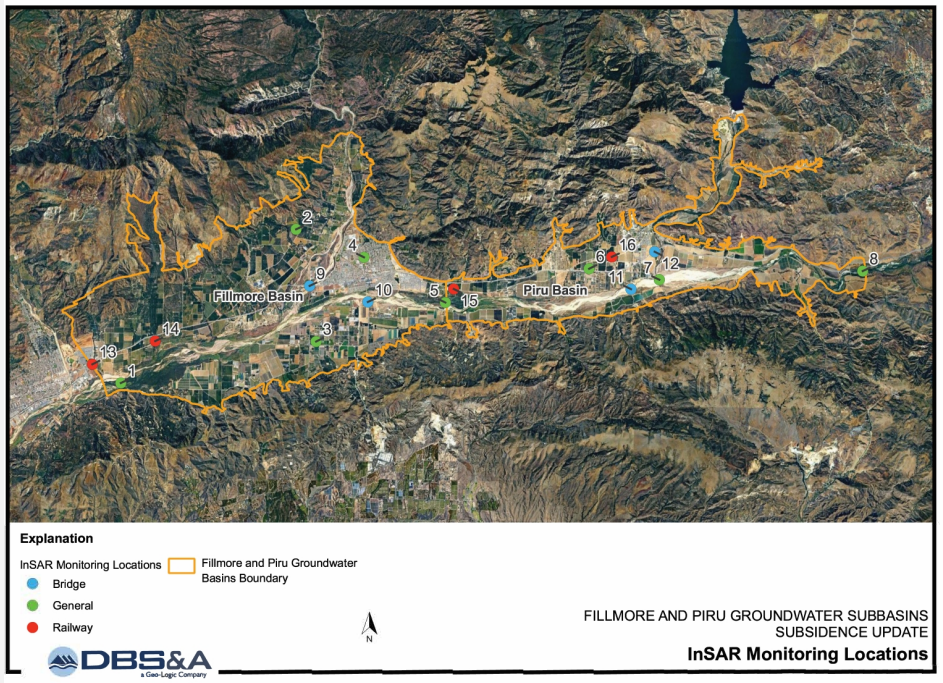
InSAR data does indicate elastic land movement

InSAR data does not indicate active land subsidence

Bridges (4)

Railway (4)

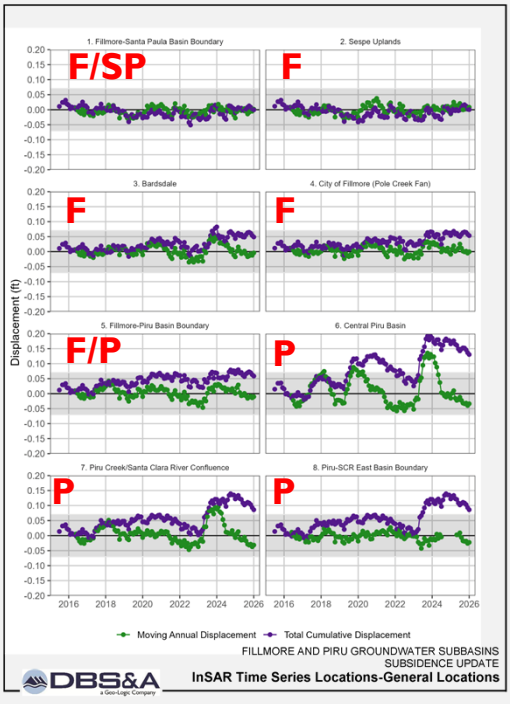
General (8)



Bridges (4)

Railway (4)

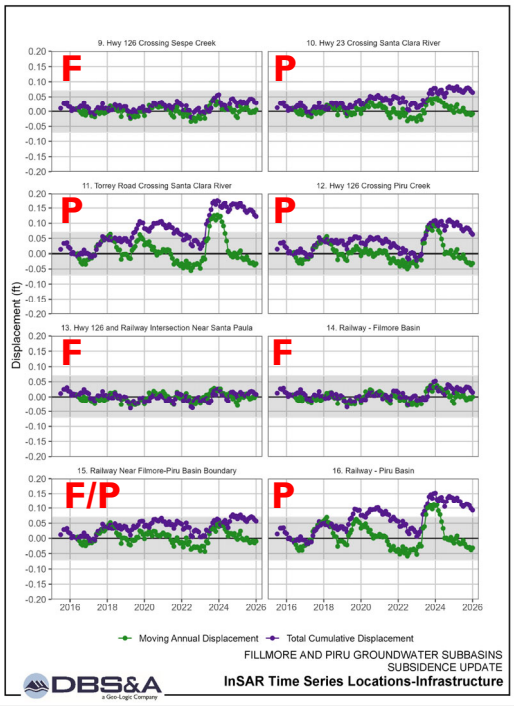
General (8)



InSAR data mostly within resolution of technology

InSAR data does <u>not</u> indicate active land subsidence

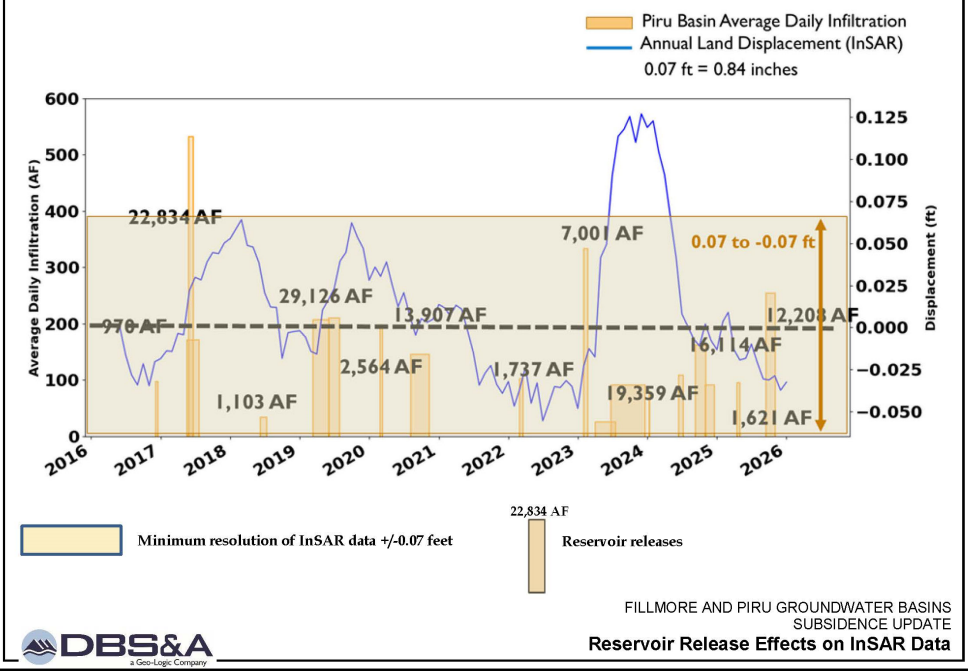
InSAR data does indicate elastic land movement



UPSTREAM RESERVOIR RELEASES

Release Origin	startDate	endDate	Release duration, days	Reservoir Volume Released, AF	Estimated Infiltration, AF			Estimated Infiltration, AF			Average Daily Infiltration, AF		
					Castaic Lagoon	Castaic Creek	Castaic Basin	Fillmore	Piru	Other	Fillmore	Piru	Other
Santa Felicia Dam	12/6/2016	12/16/2016	10	970	0	0	0	0	970	0	0.00	97.00	0.00
Castaic Dam	5/17/2017	7/21/2017	65	14,917	0	0	3783	0	11134	0	0.00	171.29	0.00
Santa Felicia Dam	5/29/2017	6/20/2017	22	15,300	0	0	0	2000	11700	1600	90.91	531.82	72.73
Santa Felicia Dam	6/8/2018	7/11/2018	33	1,103	0	0	0	0	1103	0	0.00	33.42	0.00
Castaic Dam	3/12/2019	6/4/2019	84	18,972	495	1127	0	0	17350	0	0.00	206.55	0.00
Santa Felicia Dam	6/3/2019	7/29/2019	56	39,444	0	0	0	5800	11776	21868	103.57	210.29	390.50
Santa Felicia Dam	2/26/2020	3/10/2020	13	7,516	0	0	0	2701	2564	2251	207.77	197.23	173.15
Castaic Dam	4/16/2020	5/22/2020	36	6,800	0	0	0	0	0	6800	0.00	0.00	188.89
Santa Felicia Dam	8/7/2020	11/11/2020	96	33,421	0	0	0	6902	13907	12612	71.90	144.86	131.38
Castaic Dam	3/2/2022	3/19/2022	17	2,711	751	223	0	0	1737	0	0.00	102.18	0.00
Castaic Dam	2/1/2023	2/22/2023	21	10,545	0	0	2,995	0	7001	0	0.00	333.36	0.00
Castaic Dam	4/3/2023	7/19/2023	107	52,483	0	0	0	0	2639	0	0.00	24.67	0.00
Santa Felicia Dam	6/23/2023	12/19/2023	179	61,858	0	0	0	0	16323	0	0.00	91.19	0.00
Castaic Dam	1/10/2024	1/15/2024	5	974	0	0	577	0	397	0	0.00	79.40	0.00
Castaic Dam	3/22/2024	3/28/2024	6	397	0	0	0	0	0	0	0.00	0.00	0.00
Castaic Dam	4/3/2024	4/30/2024	27	1,141	0	0	555	0	0	0	0.00	0.00	0.00
Santa Felicia Dam	6/12/2024	7/8/2024	26	6,754	0	0	0	536	2822	0	20.62	108.54	0.00
Santa Felicia Dam	9/10/2024	11/4/2024	55	33,903	0	0	0	1111	8919	0	20.20	162.16	0.00
Castaic Dam	11/1/2024	12/19/2024	48	6,359	0	0	1643	368	4373	0	7.67	91.10	0.00
Castaic Dam	4/15/2025	5/2/2025	17	2,025	0	0	404	0	1621	0	0.00	95.35	0.00
Santa Felicia Dam	9/15/2025	11/2/2025	48	27,450	0	0	0	1361	12208	0	28.35	254.34	0.00

Castaic Lake & Santa Felicia Dam Reservoir Releases



Reservoir releases correlate with elastic land movement

InSAR data occasionally exceeds technology resolution for upward land movement

SUSTAINABLE MANAGEMENT CRITERIA

SMC Development guided by the following:

- DWR's (2026) final guidance on this topic
- Explicit recommendations from DWR (2025a [page 42], 2025b [page 40-41]) that ". . . the GSA establish conservative minimum thresholds (e.g., close to InSAR measurement error) to avoid future land subsidence. . ."
- DWR staff's recommendation to set the MT at the InSAR value equivalent to the minimum negative land displacement
- DWR's (2025a and 2025b) recognition that, for both the Fillmore and Piru subbasins, the 2024 GSPs provide sufficient information to show that groundwater pumping has not historically caused land subsidence and that relatively stable groundwater levels make near term subsidence unlikely

SUSTAINABLE MANAGEMENT CRITERIA

➢ **Significant and Unreasonable Impacts - Subsidence**

- Potentially Impacted Infrastructure
- Undesirable Results
- Minimum Threshold
- Measurable Objectives
- Interim Milestones

IMPORTANT

These are new definitions that will carry forward into future Amendments to the GSPs.

Infrastructure or Land Use Type	Infrastructure	Infrastructure Type Present in Fillmore or Piru Subbasin	Evidence of Subsidence	Example Potential Impacts of Subsidence
Cities and Communities	▪ Property drainage ▪ Power systems ▪ Municipal water systems ▪ Sewer systems	Yes	No	▪ Physical damage ▪ Reduced service reliability ▪ Increased maintenance
Pipelines and Other Utilities	▪ Natural gas ▪ Water ▪ Underground cables and overhead powerline utilities	Yes	No	▪ Cracking or joint failure ▪ Overpressurization ▪ Reduced capacity ▪ Pinch-points and un-alignment of transmission poles, towers, and lines
Railroads	▪ Private rail ▪ High-speed rail	Yes	No	▪ Track deformation, instability, or loss of use during flooding ▪ Safety hazards
Roads	▪ Drainage systems ▪ Highways ▪ Bridges	Yes	No	▪ Surface cracking ▪ Drainage failure ▪ Structural instability ▪ Loss of use due to flooding
Canals	▪ State canals ▪ Federal canals ▪ Local canals	No	No	▪ Reduced conveyance, freeboard ▪ Lining damage ▪ Altered slope ▪ Erosion and sedimentation of unlined channels
Flood Control & Drainage	Federal, state, and local flood facilities (e.g., levees, bypasses, and dams)	No	No	▪ Loss of grade ▪ Structural failure ▪ Reduced flood capacity ▪ Levee overtopping or breach
Pumping Facilities	Domestic, agricultural, and public supply wells	Yes	No	▪ Casing collapse ▪ Reduced capacity ▪ Operational inefficiencies ▪ Sand and gravel damaging pump bowls

POTENTIALLY IMPACTED INFRASTRUCTURE

What types of infrastructure could be impacted by subsidence?

What types of impacts could subsidence cause?

Does the infrastructure type exist in the subbasins?

Is there evidence of subsidence for any of the infrastructure types?

UNDESIRABLE RESULTS

- **How much subsidence is too much?** → **Engineering codes / design guidance / project-specific differential settlement tolerances**
- **California Building Code** → **Does not prescribe specific "inches" limits / leaves decision to geotechnical & structural design team**
- **Differential Settlement Tolerances** → **Railroads / Highway Bridges / Hospitals / Schools**

DIFFERENTIAL SETTLEMENT TOLERANCES

InSAR resolution	± feet	± inches	± millimeters
	0.07	0.84	21.336
Railroads			
Track differential		0.375	9.525
Ballasted track		0.75	19.05
Vertical deflection		0.25	6.35
Highway Bridges			
Differential settlement- multispan		0.5	12.7
Differential settlement- single span		2	50.8
Grade separation		1	25.4
Freeways			
Approach slabs		2	50.8
Ride quality		1	25.4
Hospitals			
Building foundations		0.5	12.7
Schools			
Building foundations		0.5	12.7
Differential span settlement		3	76.2

InSAR data suitable for monitoring potential impacts to some infrastructure types

MINIMUM THRESHOLD

- An MT is the quantified condition at which effects become significant and unreasonable.
- DWR (2026) recommends setting the subsidence MT as close as reasonably practicable to the measurable limit of the InSAR monitoring method.
- The minimum displacement reliably resolved by InSAR is larger than the differential-settlement tolerance of several infrastructure types.
  - InSAR therefore cannot serve as the sole predictor of potential damage to those facilities.
- The proposed minimum threshold combines the InSAR screening value with persistence, cumulative movement, and infrastructure exposure, while recognizing the cyclic elastic movement.

MINIMUM THRESHOLD

The MT is defined using the following tiered evaluation process:

1. InSAR data show annual land surface declines greater than the resolution of the technology (-0.07 foot/-0.84 inch) continuing through the next winter
2. InSAR data show cumulative land surface declines that exceed the differential subsidence tolerances for more than one infrastructure category through the next ~~three~~ winters
3. Infrastructure is located within the land parcels experiencing conditions 1 and 2 above
4. If conditions 1 through 3 are satisfied, then the MT is considered exceeded and impacts are considered significant and unreasonable.

MEASURABLE OBJECTIVES

- The MO is to maintain the subbasin-wide average long-term vertical land-surface movement within the ±0.07-foot InSAR measurement range. This represents no reliably detectable downward movement at the basin scale.
- Upward movement greater than 0.07 foot that is associated with reservoir releases and subsequent elastic rebound also satisfies the MO.

INTERIM MILESTONES

IMs are used to assess the progress of the GSA in reaching the MO for each subbasin. At this time, the GSA has not established IMs for the following reasons:

- The subbasins currently meet the MO and are expected to continue meeting it.
- The MT has not been exceeded.
- There is no detectable trend in land surface movement suggesting that MT exceedances are imminent.

MONITORING PROGRAM

Use the available InSAR data and groundwater level datasets for each subbasin

- InSAR data - review with Annual Report preparation.
- Groundwater levels - if InSAR data shows downward land movement >=-0.07 ft
  - Compare water levels to estimated historical low water levels that would suggest inelastic subsidence could be occurring.
  - If WLs approach historical lows, then perform further analyses to determine cause of water level declines - GW extractions? / Drought? / Both?

MITIGATIVE ACTIONS

- MT exceedances trigger further investigation.
- Coordination with entities the operate infrastructure within the affected area and evaluation of appropriate site-specific monitoring or mitigation measures.

NEXT STEPS

- Address questions / comments from Directors or stakeholders tonight
- Receive any additional questions / comments from Directors or stakeholders NLT 25Sept2026 at 4:00pm - questions / comments submitted to Clerk of Board (Clerk@fpbgsa.org). Use comment spreadsheet to make categorizing the comments/questions more efficient.
- Comments/questions will be responded to and the responses included as an appendix to the subsidence tech memo.
- DRAFT FINAL version for Board's adoption consideration at 15Oct26 meeting.

QUESTIONS?







Board of Directors Meeting

17 September 2026

Item 4B Potential Agency Projects - Proposition 4 Funding

Fillmore and Piru Basins
Groundwater Sustainability Agency

BREAKDOWN OF PROP 4 CLIMATE BOND FUNDING

Chapter	Allocation	Committed[1]	Balance[2]
Ch. 2 Safe Drinking Water, Drought, Flood, and Water Resilience	$3,771,502,000	$2,092,225,000	$1,679,277,000
Ch. 3 Wildfire and Forest Resilience	$1,488,747,000	$956,149,000	$532,598,000
Ch. 4 Coastal Resilience	$1,190,997,000	$419,149,000	$771,848,000
Ch. 5 Extreme Heat Mitigation	$446,625,000	$370,022,000	$76,603,000
Ch. 6 Protect Biodiversity and Accelerating Nature-Based Climate Solutions	$1,190,999,000	$613,971,000	$577,028,000
Ch. 7 Climate Smart, Sustainable, and Resilient Farms, Ranches, and Working Lands	$297,753,000	$251,777,000	$45,976,000
Ch. 8 Park Creation and Outdoor Access	$694,751,000	$516,930,000	$177,821,000
Ch. 9 Clean Air	$843,626,000	$612,409,000	$231,217,000
Ch. 10 Statewide Bond Costs	$75,000,000	$21,989,000	$53,011,000
	$10,000,000,000	**$5,854,621,000**	**$4,145,379,000**

(1) "Committed" represents dollar amounts proposed to the Legislature or authorized through the state budget process for programs or projects. (229 projects)

(2) "Balance" represents dollar amounts available for new budget appropriations

DWR UPDATES

- **Prop 4 Grants**
  - ✓**~$403.25M for Sustainable Groundwater**
    - **SGM Implementation Grants - ~$320M**
      - **Draft Guidelines for SGM Implemention Grants - late Sept**
      - **Public comment on Draft Guidelines - Late Oct/Early Nov**
  - ✓**Two phase application process**
    - **Concept Proposal - Spring 2027 - prequalify projects**
    - **Full Proposal - Summer/Fall 2027**

QUESTIONS?



Check Detail Report

Date	Transaction type	Num	Name	Amount
Citizens Business Bank				
29754				
11/05/2026	Bill Payment (Check)	11344	Aleshire & Wynder LLP	-2,107.40
11/05/2026	Bill Payment (Check)	11344	Aleshire & Wynder LLP	-2,107.40
Total for 29754				**-$4,214.80**
29755				
11/05/2026	Bill Payment (Check)	11345	United Water Conservation District	-11,936.47
11/05/2026	Bill Payment (Check)	11345	United Water Conservation District	-11,936.47
Total for 29755				**-$23,872.94**
29756				
11/05/2026	Bill Payment (Check)	11346	Daniel B Stephens & Associates, Inc.	-53,503.75
11/05/2026	Bill Payment (Check)	11346	Daniel B Stephens & Associates, Inc.	-53,503.75
Total for 29756				**-$107,007.50**
Total for Citizens Business Bank				**-$135,095.24**

ITEM NO. **4C Consent Item**

DATE: November 12, 2026 (for November 19, 2026, meeting)

TO: Board of Directors

VIA: Anthony A. Emmert, Executive Director

FROM: United Water Conservation District Finance

SUBJECT: **Monthly Financial Report**

SUMMARY

The Board will receive the monthly financial reports for the Fillmore and Piru Basins Groundwater Sustainability Agency (Agency).

BACKGROUND

United Water Conservation District accounting staff has prepared financial reports based on the Agency revenue and expenses for the month of October 2026.

FISCAL IMPACT

None

ATTACHMENTS:

Attachment A – October 31, 2026, Profit and Loss Budget Performance

Attachment B – October 31, 2026, Balance Sheet

Fillmore and Piru Basins, GSA

Budget vs. Actuals: FY_2026_2027 - FY27 P&L

July - October, 2026

	JUL - SEP, 2026		OCT 2026		TOTAL	
	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET
Income						
40001 Groundwater Extraction Charge		0.00	-398.84	0.00	$ -398.84	$0.00
47000 Other Revenue					$0.00	$0.00
47001 Late Fees	1,456.35		7,484.41		$8,940.76	$0.00
Total 47000 Other Revenue	**1,456.35**		**7,484.41**		**$8,940.76**	**$0.00**
Total Income	**$1,456.35**	**$0.00**	**$7,085.57**	**$0.00**	**$8,541.92**	**$0.00**
GROSS PROFIT	**$1,456.35**	**$0.00**	**$7,085.57**	**$0.00**	**$8,541.92**	**$0.00**
Expenses						
52200 Professional Services					$0.00	$0.00
52240 Prof Svcs - IT Consulting		2,000.01		666.67	$0.00	$2,666.68
52250 Prof Svcs - Planning & Implementation					$0.00	$0.00
52252 Prof Svcs - GSP Consultant					$0.00	$0.00
5225A Professional Services Monitoring & Reporting					$0.00	$0.00
5225A - A1 Monitoring Equipment		1,250.01		416.67	$0.00	$1,666.68
5225A - A2 Routine Reporting	490.50	8,550.00		2,850.00	$490.50	$11,400.00
5225A - A3 Groundwater and Surface Water Data Gaps	4,481.28	13,514.01	1,834.71	4,504.67	$6,315.99	$18,018.68
5225A - A4 Biological Data Gaps	4,066.00	26,328.00	258.20	8,776.00	$4,324.20	$35,104.00
Total 5225A Professional Services Monitoring & Reporting	**9,037.78**	**49,642.02**	**2,092.91**	**16,547.34**	**$11,130.69**	**$66,189.36**
5225B Prof. Services- Shallow Well Vulnerability					$0.00	$0.00
5225B - B1 Data Gathering & Vulnerability Analysis	15,298.36	16,169.49	7,602.51	5,389.83	$22,900.87	$21,559.32
Total 5225B Prof. Services- Shallow Well Vulnerability	**15,298.36**	**16,169.49**	**7,602.51**	**5,389.83**	**$22,900.87**	**$21,559.32**
5225C Prof. Services - Cienega Drought Project					$0.00	$0.00
5225C - C2 Planning, Design, Permitting		6,221.01		2,073.67	$0.00	$8,294.68
5225C - C4 Alternative Analysis		5,670.00		1,890.00	$0.00	$7,560.00
Total 5225C Prof. Services - Cienega Drought Project		**11,891.01**		**3,963.67**	**$0.00**	**$15,854.68**
5225D Prof. Services - GSP Updates					$0.00	$0.00
5225D - D1 GW & SW Modeling	3,416.98	45,698.76	1,750.30	15,232.92	$5,167.28	$60,931.68
5225D - D2 Periodic Performance Evals. 5-Yr	52,905.00	37,406.76	32,421.00	12,468.92	$85,326.00	$49,875.68
5225D - D3 GSPs Amendment			458.76		$458.76	$0.00
5225D - D4 GSPs Subsidence	11,556.00	15,865.50	8,899.00	5,288.50	$20,455.00	$21,154.00
5225D - D5 GSPs Interconnected Surface Water		5,580.00		1,860.00	$0.00	$7,440.00
Total 5225D Prof. Services - GSP Updates	**67,877.98**	**104,551.02**	**43,529.06**	**34,850.34**	**$111,407.04**	**$139,401.36**
5225E Prof. Svcs.- General Programs Support & Dvlpmt					$0.00	$0.00
5225E - E3 Gen. Programs Support	7,660.85	15,320.01	5,990.33	5,106.67	$13,651.18	$20,426.68
5225E - E4 Prop. 218 Process		8,750.01		2,916.67	$0.00	$11,666.68
5225E - E5 Chiquita Canyon Landfill Incident		4,235.01		1,411.67	$0.00	$5,646.68
Total 5225E Prof. Svcs.- General Programs Support & Dvlpmt	**7,660.85**	**28,305.03**	**5,990.33**	**9,435.01**	**$13,651.18**	**$37,740.04**
Total 52252 Prof Svcs - GSP Consultant	**99,874.97**	**210,558.57**	**59,214.81**	**70,186.19**	**$159,089.78**	**$280,744.76**
Total 52250 Prof Svcs - Planning & Implementation	**99,874.97**	**210,558.57**	**59,214.81**	**70,186.19**	**$159,089.78**	**$280,744.76**
52270 Prof Svcs - Accounting	1,704.11	15,999.99	1,620.74	5,333.33	$3,324.85	$21,333.32
52275 Prof Svcs - Admin/Clerk of Bd	572.02	1,500.00	612.90	500.00	$1,184.92	$2,000.00
52280 Prof Svcs - Executive Director	5,390.42	10,250.01	3,899.46	3,416.67	$9,289.88	$13,666.68
52290 Prof Svcs - Other		24.99		8.33	$0.00	$33.32
Total 52200 Professional Services	**107,541.52**	**240,333.57**	**65,347.91**	**80,111.19**	**$172,889.43**	**$320,444.76**
52500 Legal Fees					$0.00	$0.00
52501 Legal Counsel	462.60	7,500.00	2,107.40	2,500.00	$2,570.00	$10,000.00
Total 52500 Legal Fees	**462.60**	**7,500.00**	**2,107.40**	**2,500.00**	**$2,570.00**	**$10,000.00**
53000 Office Expenses					$0.00	$0.00
53010 Public Information		249.99		83.33	$0.00	$333.32
53020 Office Supplies	621.71	249.99	15.25	83.33	$636.96	$333.32
53026 Postage & Mailing	93.60	249.99	41.34	83.33	$134.94	$333.32

Fillmore and Piru Basins, GSA

Budget vs. Actuals: FY_2026_2027 - FY27 P&L

July - October, 2026

	JUL - SEP, 2026		OCT 2026		TOTAL	
	ACTUAL	BUDGET	ACTUAL	BUDGET	ACTUAL	BUDGET
53060 Computer Software		750.00		250.00	$0.00	$1,000.00
53110 Travel & Training		249.99	35.72	83.33	$35.72	$333.32
Total 53000 Office Expenses	**715.31**	**1,749.96**	**92.31**	**583.32**	**$807.62**	**$2,333.28**
53500 Insurance					$0.00	$0.00
53510 Liability Insurance		750.00		250.00	$0.00	$1,000.00
Total 53500 Insurance		**750.00**		**250.00**	**$0.00**	**$1,000.00**
Total Expenses	**$108,719.43**	**$250,333.53**	**$67,547.62**	**$83,444.51**	**$176,267.05**	**$333,778.04**
NET OPERATING INCOME	**$ -107,263.08**	**$ -250,333.53**	**$ -60,462.05**	**$ -83,444.51**	**$ -167,725.13**	**$ -333,778.04**
Other Expenses						
Depreciation	2,574.99	2,574.99	858.33	858.33	$3,433.32	$3,433.32
Total Other Expenses	**$2,574.99**	**$2,574.99**	**$858.33**	**$858.33**	**$3,433.32**	**$3,433.32**
NET OTHER INCOME	**$ -2,574.99**	**$ -2,574.99**	**$ -858.33**	**$ -858.33**	**$ -3,433.32**	**$ -3,433.32**
NET INCOME	**$ -109,838.07**	**$ -252,908.52**	**$ -61,320.38**	**$ -84,302.84**	**$ -171,158.45**	**$ -337,211.36**

Fillmore and Piru Basins, GSA

Balance Sheet

As of Oct 31, 2026

	Total
Assets	
Current Assets	
Bank Accounts	
10100 Citizens Business Bank	1,048,466.23
10200 LAIF Investment	750,000.00
Total Bank Accounts	**$1,798,466.23**
Accounts Receivable	
11000 Accounts Receivable	347,440.59
Total Accounts Receivable	**$347,440.59**
Other Current Assets	
12000 Undeposited Funds	0.00
12900 Clearing Account	0.00
Total Other Current Assets	**$0.00**
Total Current Assets	**$2,145,906.82**
Fixed Assets	
Fillmore Piru Monitoring Wells (4 Wells)	$515,000.00
Accumulated Depreciation - Monitoring Wells (4 Wells)	-34,333.20
Total for Fillmore Piru Monitoring Wells (4 Wells)	**$480,666.80**
Total Fixed Assets	**$480,666.80**
Total Assets	**$2,626,573.62**
Liabilities and Equity	
Liabilities	
Current Liabilities	
Accounts Payable	
20000 Accounts Payable	67,547.62
Total Accounts Payable	**$67,547.62**
Other Current Liabilities	
California Department of Tax and Fee Administration Payable	0.00
Out Of Scope Agency Payable	0.00
Total Other Current Liabilities	**$0.00**
Total Current Liabilities	**$67,547.62**
Total Liabilities	**$67,547.62**
Equity	
30000 Opening Balance Equity	515,000.00
32000 Retained Earnings	2,215,184.45
Net Income	-171,158.45
Total Equity	**$2,559,026.00**
Total Liabilities and Equity	**$2,626,573.62**

Fillmore and Piru Basins Groundwater Sustainability Agency

Item No. **5A Motion Item**

DATE: November 2, 2026 (for November 19, 2026, meeting)

TO: Board of Directors

VIA: Anthony A. Emmert, Executive Director

FROM: United Water Conservation District Finance

SUBJECT: Fiscal Year 2025-2026 Financial Report

RECOMMENDED ACTION

The Board will receive the year-end financial reports for Fiscal Year 2025-2026 and provide comments and direction.

BACKGROUND

United Water Conservation District accounting staff have prepared unaudited financial reports based on the Agency's revenue and expenses for the Fiscal Year (FY) 2025-2026. The FY 2025-2026 budget was adopted by the Board of Directors on June 19, 2025. There were no mid-year adjustments to the approved budget.

FISCAL IMPACT

None.

ATTACHMENTS

A FY 2025-2026 Profit and Loss Statement – Final
B Fiscal Year 2025-2026 Balance Sheet – Final
C Fiscal Year 2025-2026 Cash Flow Sheet – Final

Proposed Motion: Receive and file financial reports for Fiscal Year 2025-2026.

1st Director_____ 2nd Director _____

Voice/Roll call vote:

Director Garnica:	Director Jackson:	Director Kimball:
Director Long:	Director McIntyre:	Director Meneghin:

Fillmore and Piru Basins, GSA

Budget vs. Actuals: FY_ 2025_2026 - FY26 P&L

July 2025 - June 2026

	TOTAL	
	ACTUAL	BUDGET
Income		
40001 Groundwater Extraction Charge	589,071.90	679,668.18
41000 Grant Revenue		
41001 State Grants	0.00	
Total 41000 Grant Revenue	**0.00**	
47000 Other Revenue		
47001 Late Fees	31,574.96	
Total 47000 Other Revenue	**31,574.96**	
Total Income	**$620,646.86**	**$679,668.18**
GROSS PROFIT	**$620,646.86**	**$679,668.18**
Expenses		
52200 Professional Services		
52240 Prof Svcs - IT Consulting	6,895.10	19,000.00
52250 Prof Svcs - Planning & Implementation		
52252 Prof Svcs - GSP Consultant		
5225A Professional Services Monitoring & Reporting		
5225A - A1 Monitoring Equipment	3,860.08	4,000.00
5225A - A2 Routine Reporting	27,949.53	33,000.00
5225A - A3 Groundwater and Surface Water Data Gaps	28,811.90	50,000.00
5225A - A4 Biological Data Gaps	65,880.62	102,000.00
Total 5225A Professional Services Monitoring & Reporting	**126,502.13**	**189,000.00**
5225B Prof. Services- Shallow Well Vulnerability		
5225B - B1 Data Gathering & Vulnerability Analysis	37,799.15	80,000.00
Total 5225B Prof. Services- Shallow Well Vulnerability	**37,799.15**	**80,000.00**
5225C Prof. Services - Cienega Drought Project		
5225C - C2 Planning, Design, Permitting	748.64	75,000.00
5225C - C3 Grant Applications	317.00	35,000.00
Total 5225C Prof. Services - Cienega Drought Project	**1,065.64**	**110,000.00**
5225D Prof. Services - GSP Updates		
5225D - D1 GW & SW Modeling	145,023.08	110,000.00
5225D - D2 Periodic Performance Evals. 5-Yr	15,533.00	130,100.00
5225D - D3 GSPs Amendment	23,125.97	176,500.00
Total 5225D Prof. Services - GSP Updates	**183,682.05**	**416,600.00**
5225E Prof. Svcs.- General Programs Support & Dvlpmt		
5225E - E1 Well Permit Review Program Development	124.15	
5225E - E3 Gen. Programs Support	29,226.95	90,000.00
5225E - E4 Prop. 218 Process		35,000.00
Total 5225E Prof. Svcs.- General Programs Support & Dvlpmt	**29,351.10**	**125,000.00**
Total 52252 Prof Svcs - GSP Consultant	**378,400.07**	**920,600.00**
Total 52250 Prof Svcs - Planning & Implementation	**378,400.07**	**920,600.00**
52270 Prof Svcs - Accounting	62,419.42	38,500.00

Fillmore and Piru Basins, GSA

Budget vs. Actuals: FY_ 2025_2026 - FY26 P&L

July 2025 - June 2026

	TOTAL	
	ACTUAL	BUDGET
52275 Prof Svcs - Admin/Clerk of Bd	7,517.35	12,000.00
52280 Prof Svcs - Executive Director	48,546.88	60,100.00
52290 Prof Svcs - Other	310.38	250.00
Total 52200 Professional Services	**504,089.20**	**1,050,450.00**
52500 Legal Fees		
52501 Legal Counsel	8,184.00	30,000.00
Total 52500 Legal Fees	**8,184.00**	**30,000.00**
53000 Office Expenses		
53010 Public Information	432.00	1,000.00
53020 Office Supplies	581.00	1,000.00
53026 Postage & Mailing	835.36	1,000.00
53060 Computer Software	5,095.17	
53110 Travel & Training	260.82	1,000.00
Total 53000 Office Expenses	**7,204.35**	**4,000.00**
53500 Insurance		
53510 Liability Insurance	2,512.42	2,611.79
Total 53500 Insurance	**2,512.42**	**2,611.79**
80000 AR Write-Offs - Bad Debt Exp.	53,112.99	
Total Expenses	**$575,102.96**	**$1,087,061.79**
NET OPERATING INCOME	**$45,543.90**	**$ -407,393.61**
Other Expenses		
Depreciation	10,299.96	10,299.96
Total Other Expenses	**$10,299.96**	**$10,299.96**
NET OTHER INCOME	**$ -10,299.96**	**$ -10,299.96**
NET INCOME	**$35,243.94**	**$ -417,693.57**

Fillmore and Piru Basins, GSA

Balance Sheet

As of Jun 30, 2026

	Total
Assets	
Current Assets	
Bank Accounts	
10100 Citizens Business Bank	1,799,724.74
Total for Bank Accounts	**$1,799,724.74**
Accounts Receivable	
11000 Accounts Receivable	602,594.85
Total for Accounts Receivable	**$602,594.85**
Other Current Assets	
12000 Undeposited Funds	0.00
12900 Clearing Account	0.00
Total for Other Current Assets	**$0.00**
Total for Current Assets	**$2,402,319.59**
Fixed Assets	
Fillmore Piru Monitoring Wells (4 Wells)	$515,000.00
Accumulated Depreciation - Monitoring Wells (4 Wells)	-30,899.88
Total for Fillmore Piru Monitoring Wells (4 Wells)	**$484,100.12**
Total for Fixed Assets	**$484,100.12**
Total for Assets	**$2,886,419.71**
Liabilities and Equity	
Liabilities	
Current Liabilities	
Accounts Payable	
20000 Accounts Payable	156,235.26
Total for Accounts Payable	**$156,235.26**
Other Current Liabilities	
California Department of Tax and Fee Administration Payable	0.00
Out Of Scope Agency Payable	0.00
Total for Other Current Liabilities	**$0.00**
Total for Current Liabilities	**$156,235.26**
Total for Liabilities	**$156,235.26**
Equity	
30000 Opening Balance Equity	515,000.00
32000 Retained Earnings	2,179,940.51
Net Income	35,243.94
Total for Equity	**$2,730,184.45**
Total for Liabilities and Equity	**$2,886,419.71**

Fillmore and Piru Basins
Groundwater Sustainability Agency

Item 4A - Attachment C

FY 25-26 Cash Flow		
Beginning Balance 6/30/25	$	1,682,468.97
Cash Revenue	$	614,418.79
Cash Expenses	$	(497,163.02)
Ending Balance 6/30/26	$	1,799,724.74

Item No. **5B Motion Item**

DATE: October 9, 2026 (for November 19, 2026, meeting)

TO: Board of Directors

FROM: Anthony A. Emmert, Executive Director

SUBJECT: **Subsidence Technical Memorandum**

RECCOMENDATION:

The Board will consider approving the Agency's amended Subsidence Technical Memorandum and associated amended Sustainable Management Criteria for Subsidence.

DISCUSSION:

The Fillmore and Piru Basins Groundwater Sustainability Agency (Agency) adopted Groundwater Sustainability Plans (GSPs) for the Fillmore subbasin and the Piru subbasin in December 2021. The GSPs included a *Land Subsidence Evaluation Technical Memorandum* (Subsidence TM) as Appendix F of each GSP. In 2024, the Agency submitted amended GSPs but did not modify its Subsidence TM. In 2025, the California Department of Water Resources (DWR) issued several Recommended Corrective Actions (RCAs) to the Agency, including a recommendation on its approach to land subsidence. In 2026, DWR issued the final *Land Subsidence Best Management Practices*, which provided further guidance regarding land subsidence.

Subsequently, the Agency consulted with DWR about incorporating DWR's RCAs and best management practices into its evaluation and management of subsidence. This consultation helped the Agency shape its evaluation approach for these subbasins, which have no documented history of subsidence. The Agency then developed a new *Subsidence Technical Memorandum for the Fillmore and Piru Subbasins*. When adopted, it will replace the original 2021 GSPs Appendix F.

Staff distributed the draft document to stakeholders on September 10, 2026, along with a comments matrix to facilitate organized feedback to the Agency's consultant team, with comments due to the Agency Clerk by September 25, 2026. During the September 17, 2026, regular Board meeting, Daniel B. Stephens & Associates provided the Board and stakeholders with an overview presentation and received comments and feedback from the Board and stakeholders. The consultant team and staff reviewed and considered comments received and prepared a final draft document (See Attachment A). Staff recommends that the Board consider adopting the amended document and amended Sustainable Management Criteria for Subsidence.

FISCAL IMPACT:

There are sufficient funds included in the Agency's Fiscal Year 2026-2027 Budget to cover the proposed work.

ATTACHMENTS

Attachment 1 – Subsidence Technical Memorandum for the Fillmore and Piru Subbasins
Attachment 2 – Comments Matrix

Proposed Motion: Approve the Agency's amended Subsidence Technical Memorandum and associated amended Sustainable Management Criteria for Subsidence.

1st: Director_____ 2nd Director _____

Voice/Roll call vote:

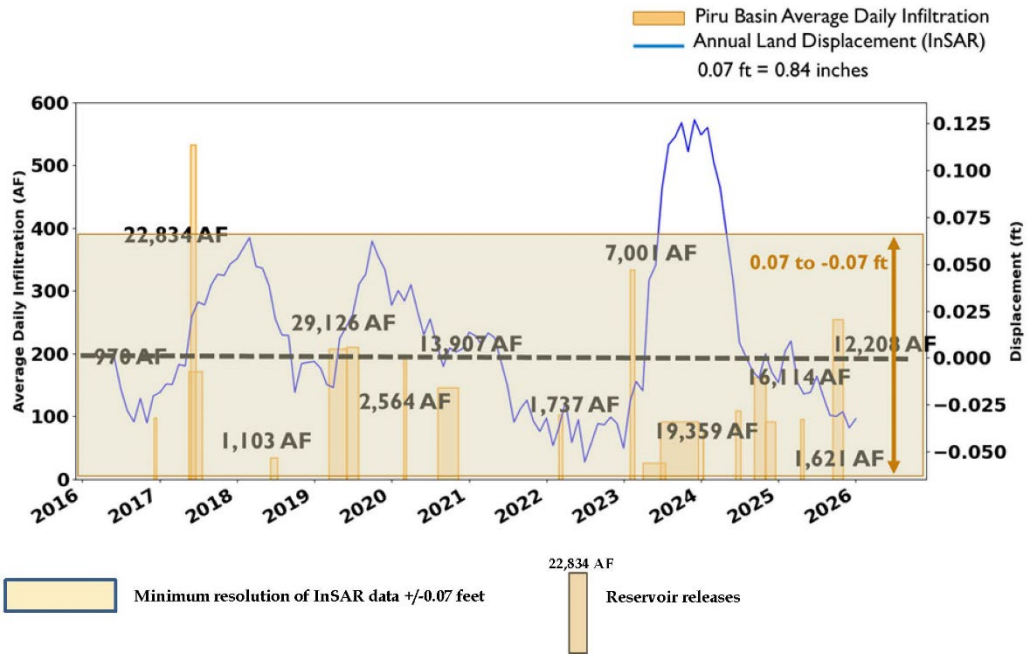
Director Garnica:	Director Jackson:	Director Kimball:
Director Long:	Director McIntyre:	Director Meneghin:

Draft Final

Subsidence Technical Memorandum
Fillmore and Piru Subbasins

Prepared for

Fillmore and Piru Basins Groundwater Sustainability Agency



Prepared by

DBS&A a Geo-Logic Company

www.dbstephens.com

0126.1040

October 9, 2026

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A Response to Comments

Limitations of Investigation

This investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by experienced geologists and hydrogeologists practicing in this or similar locations. No warranty, expressed or implied, is made as to the conclusions and professional advice included within this report. The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they are due to natural processes or the work of people on this or adjacent properties. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside of our control. Therefore, this report is subject to review and revision as changed conditions are identified.

List of Acronyms and Abbreviations

AREMA	American Railway Engineering and Maintenance-of-Way Association
CalGEM	Geologic Energy Management Division (formerly DOGGR)
Caltrans	California Department of Transportation
CBC	California Building Code
CGPS	continuous global positioning system
DBS&A	Daniel B. Stephens & Associates, Inc.
DOGGR	Division of Oil, Gas, and Geothermal Resources (reorganized as CalGEM)
DWR	[California] Department of Water Resources
FPBGSA	Fillmore and Piru Basins Groundwater Sustainability Agency (also called GSA or Agency)
FRA	Federal Railroad Administration
ft/yr	feet per year
GPS	global positioning system
GSP	groundwater sustainability plan
IM	interim milestone
InSAR	interferometric synthetic aperture radar
mm/yr	millimeters per year
MO	measurable objective
MT	minimum threshold
NGS	National Geodetic Survey
OSHPD	Office of Statewide Health Planning and Development [California]
SGMA	Sustainable Groundwater Management Act
SMC	Sustainable Management Criteria
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
UWCD	United Water Conservation District

Foreword

The Fillmore and Piru Basins Groundwater Sustainability Agency (FPBGSA or Agency) adopted Groundwater Sustainability Plans (GSPs) for both the Fillmore and Piru Basins in December 2021. The GSPs included a *Land Subsidence Evaluation Technical Memorandum* as Appendix F. Appendix F was not modified with the resubmittal of the GSPs in 2024.

Since the 2024 resubmittal of the GSPs, the Agency has consulted with the California Department of Water Resources (DWR) about incorporating the Recommended Corrective Actions (DWR, 2025a, 2025b) and the evaluation process described in DWR's Final Land Subsidence Best Management Practices (DWR, 2026) into an expanded treatment of subsidence. This consultation helped shape an evaluation approach for these subbasins with no documented history of significant subsidence.

This document is intended to completely replace the original Appendix F from the 2021 GSPs. Because this document is a total revision of the original technical memorandum, DWR concurred with the Agency's recommendation that a red-lined version of the original document was not necessary. ***This new technical memorandum supersedes the earlier version.***

1. Introduction

Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this updated Fillmore and Piru Groundwater Subbasins Land Subsidence Evaluation Technical Memorandum for the Fillmore and Piru Basins Groundwater Sustainability Agency (FPBGSA or Agency) and is under contract to assist with the preparation of their Periodic Evaluations and Amended GSPs for the two subbasins. Although the Sustainable Groundwater Management Act (SGMA) requires separate plans to be prepared for each subbasin, Fillmore and Piru subbasins are hydrogeologically connected and have historically been managed and monitored together. The FPBGSA Board of Directors has memorialized in Resolution 2021-05 their intent to continue this precedent and to manage these subbasins together. In keeping with this historical precedent, this technical memorandum has been prepared to cover both subbasins. This document includes references to appendices in the GSPs to provide supplemental information on several topics.

SGMA identifies land subsidence as one of six sustainability indicators. This technical memorandum summarizes the physical processes that cause inelastic subsidence, reviews previous investigations and current geodetic and interferometric synthetic aperture radar (InSAR) data, and evaluates the susceptibility of both subbasins to future subsidence. DBS&A (2021, 2023) provide the Agency's earlier analyses of the subsidence indicator.

Responses to the stakeholder comments on the draft updated Subsidence Technical Memorandum (insert date) are provided in Appendix A.

This evaluation addresses two primary questions: (1) Is subsidence currently occurring in the subbasins and (2) Is subsidence likely to occur in the future? The evaluation process is summarized in Figure 1-1.

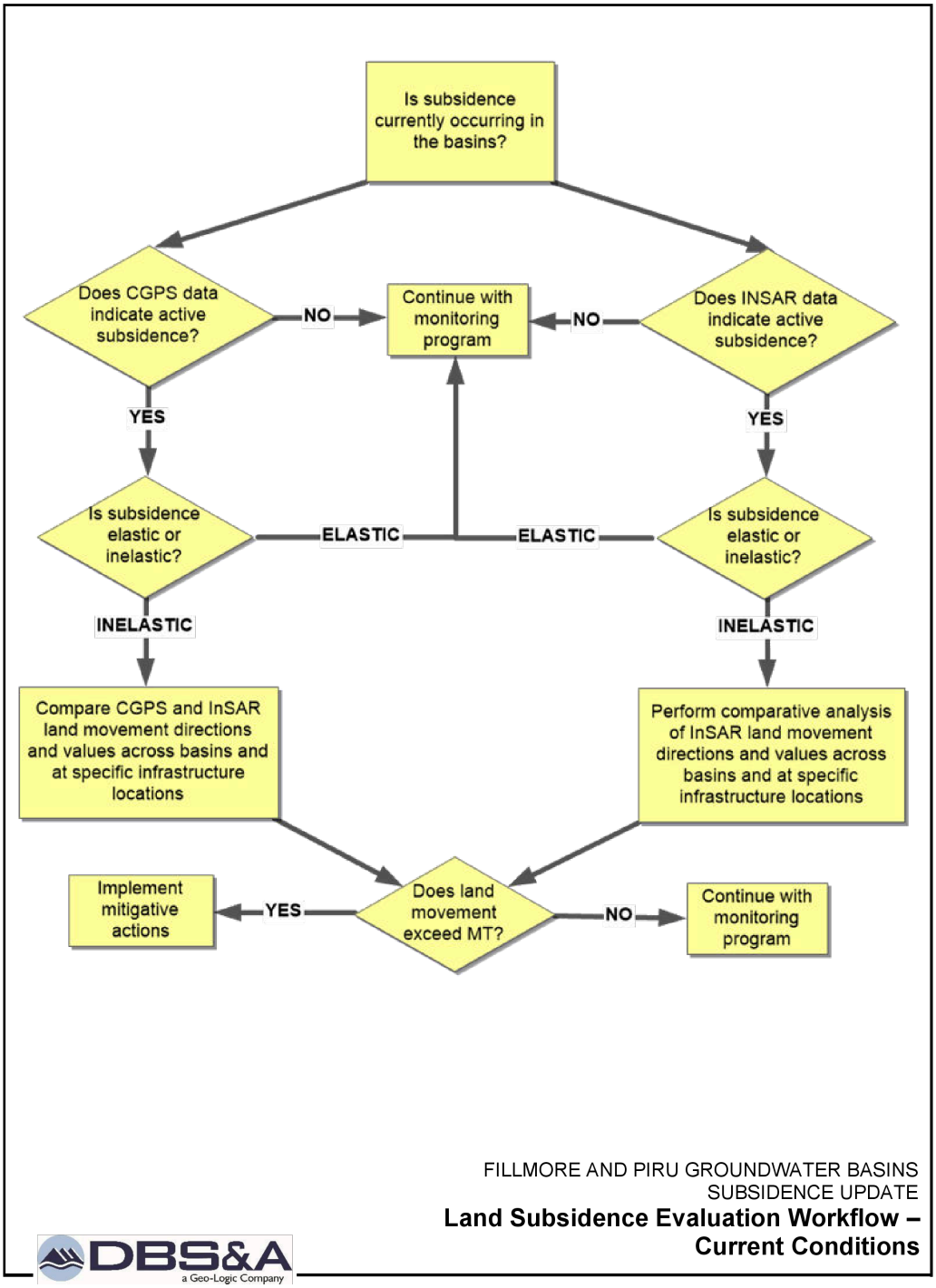

Figure 1-1. Land Subsidence Evaluation Workflow – Current Conditions

2. Background

Land subsidence caused by groundwater or hydrocarbon extraction has been documented in many parts of California. When fluid withdrawal lowers pore pressure, more of the overlying weight is transferred to the sediment framework. Fine-grained sediments can compact under this increased effective stress, reducing both land-surface elevation and aquifer storage. If the land surface recovers as groundwater levels rise, the movement is elastic. If it does not recover, the movement is inelastic and the lost storage is essentially permanent. Poland (1984), Poland and Davis (1969), and the U.S. Geological Survey (USGS) (1999, 2016) provide detailed discussions of these processes. SGMA focuses on inelastic subsidence because it can permanently reduce groundwater storage and damage infrastructure.

Hanson (1995) identified three potential causes of land-surface movement in Ventura County: groundwater extraction, hydrocarbon extraction, and tectonic movement. The GSPs describe the long-term increase in groundwater pumping from the late 1800s through the late 1980s. This section briefly addresses tectonic movement and nearby hydrocarbon production, but the remainder of the technical memorandum focuses on subsidence associated with groundwater-level decline.

2.1 Hydrocarbon Extraction

Hydrocarbon extraction has occurred in Ventura County for many decades; however, no extraction-related subsidence has been documented within the subbasins. Figure 2-1 shows oil and gas wells listed by the California Geologic Energy Management Division (CalGEM, formerly DOGGR). Most active production occurs outside the subbasins in surrounding mountain areas. A few active wells in the Bardsdale and Shiells Canyon Oil Fields are less than 0.25 mile inside the southeastern Fillmore subbasin boundary, and three active Holser Oil Field wells are just inside the Piru subbasin boundary in Holser Canyon. No subsidence has been reported in association with these wells or with nearby oil fields.

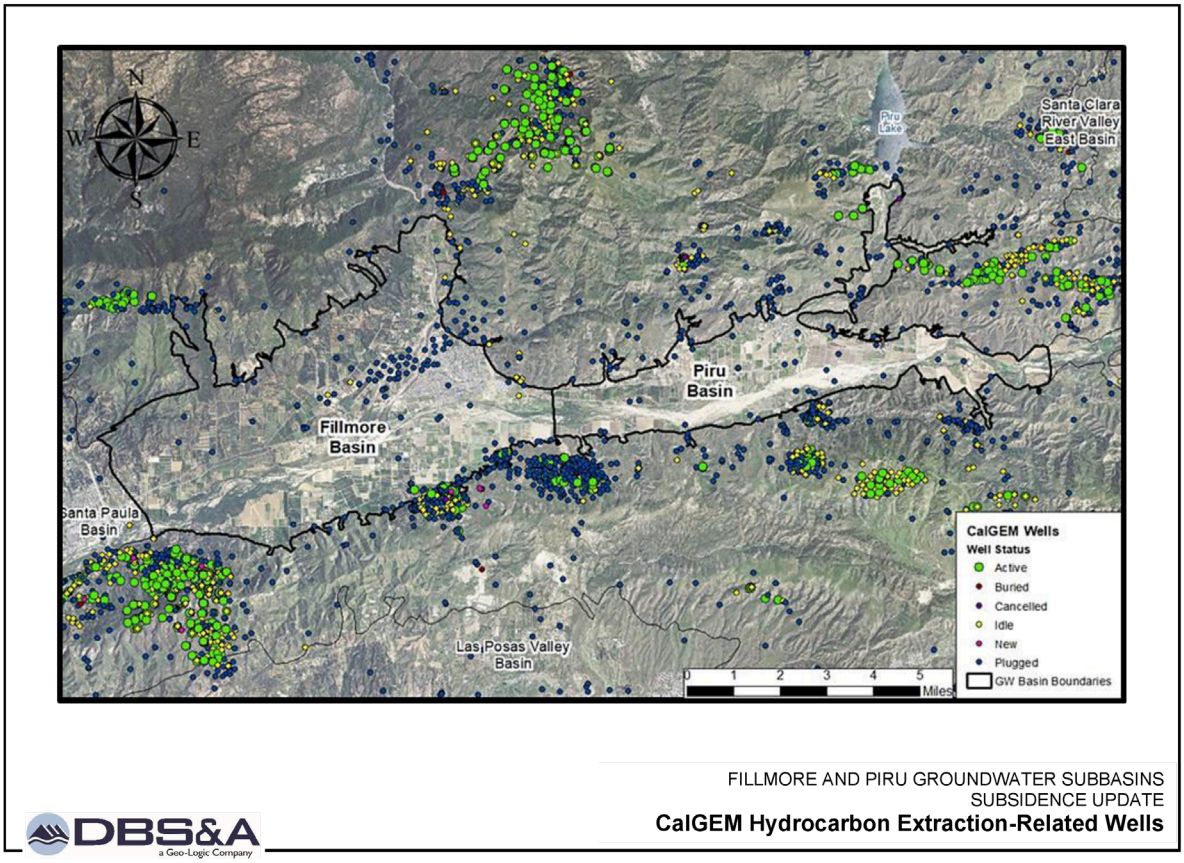

Figure 2-1. Fillmore and Piru subbasins area map showing CalGEM hydrocarbon extraction-related wells

2.2 Basin Tectonics

The subbasins are part of the tectonically active Transverse Ranges, where crustal shortening and rapid uplift rates have occurred for millions of years. Orme (1998) reports a broad range of 0.05 to 9 millimeters per year (mm/yr) of long-term uplift for the coastal Transverse Ranges region. The subbasins consist of varying thicknesses of alluvium underlain primarily by the San Pedro Formation synclinal fold. Studies have estimated maximum dip-displacement values for the north basin-bounding San Cayetano reverse fault and south basin-bounding Oak Ridge fault of 8.8 mm/yr (about 0.03 feet per year [ft/yr]) (Rockwell, 1988) and 12.5 mm/yr (about 0.04 ft/yr) (Yeats, 1988), respectively. Not only is the region's topography vertically affected by gradual long-term tectonic shifts, but the area is prone to earthquakes, which can cause sudden land movements.

2.3 Technical Approach

The evaluation of subsidence for the Fillmore and Piru subbasins in this document is based on a review of the following lines of evidence:

- Previous investigations and reports
- Geodetic surveys
- InSAR data
- Infrastructure vulnerability to differential subsidence

3. Previous Investigations

Previous investigations evaluated subsidence potential using groundwater models, leveling surveys, global positioning system (GPS), InSAR, and groundwater-level trends. Collectively, these studies indicate small modeled or measured vertical movement and no verified infrastructure impacts. The principal findings and limitations are summarized in Table 3-1.

Table 3-1. Previous Subsidence Evaluations

Study / Investigator	Fillmore Subbasin	Piru Subbasin	Comments
USGS, 1996	Maximum subsidence of 0.03 foot (8 mm, 0.6 mm/yr) near City of Fillmore	maximum subsidence zone up to 0.05 foot (15 mm, ~1 mm/yr) around the Town of Piru	1975-1989 study period; groundwater flow model simulations – no field verification
Hanson et al., 2003	Maximum value of just over 0.1 foot (0.00098 ft/yr) of subsidence	0.25 feet (0.0024 ft/yr) in the eastern portion of Piru Subbasin	1891 to 1993 study period; groundwater flow model simulations – no field verification
Ventura County, 2013 and 2020	Lies within subsidence hazard zone	Lies within subsidence hazard zone	No technical analyses conducted.
DWR, 2014	Low potential	Insufficient data	
DBS&A, 2023 - InSAR	Less than ±0.05 ft	Generally, less than ±0.05 foot except during periods of artificial recharge, then up to +0.14 foot of rebound in Piru subbasin	June 2015–Sept 2019 study period

Study / Investigator	Fillmore Subbasin	Piru Subbasin	Comments
2070 Climate Change Modeling by UWCD	No subsidence anticipated	No subsidence anticipated	1986 to 2096 model time frame

Subsidence susceptibility depends primarily on two factors:

- Hydrostratigraphy, particularly the presence and thickness of fine-grained sediments
- Whether groundwater levels fall, or are projected to fall, below historical lows (i.e., preconsolidation heads) in the future

Both conditions generally must be present before inelastic subsidence can occur. Site-specific subsidence monitoring data (e.g., extensometer or tiltmeter) can be used, if available, to augment the hydrostratigraphic setting and water level datasets and develop a subsidence susceptibility ranking for the subbasins, as summarized in Table 3-2.

Table 3-2. Inelastic Subsidence Potential

Subbasin	Hydro-stratigraphic Setting Susceptibility	Chronic Declines in Groundwater Levels	Geodetic/ Extensometer/ Tiltmeter Evidence of Subsidence	InSAR Evidence of Subsidence	Subsidence Susceptibility Ranking
Fillmore	Low to Moderate	No	No	No	Low
Piru	Low	No	No	No	Low

Source: DBS&A, 2021, Appendix F

The Fillmore subbasin has low to moderate hydrostratigraphic susceptibility because its western portion contains more fine-grained alluvial sediment than its eastern portion. The Piru subbasin has low hydrostratigraphic susceptibility because it is dominated by coarse-grained deposits. When these conditions are considered with groundwater-level, geodetic, and InSAR data, both subbasins receive an overall low subsidence-susceptibility ranking.

3.1 Groundwater Modeling

Hanson et al. (2003) used a numerical groundwater-flow and subsidence model to estimate historical subsidence in coastal Ventura County from 1891 through 1993. Model-derived subsidence is not a direct field measurement; it is calculated from simulated groundwater-level changes and assumed geomechanical properties, with selected benchmarks on the South Oxnard Plain used for calibration. The model attributed most regional subsidence to the late-1920s drought and increased agricultural pumping after the 1950s. The largest modeled values were approximately 3 feet on the South Oxnard Plain and 5 feet in Las Posas Valley. By comparison, modeled subsidence was just over 0.1 foot in the Fillmore subbasin and just over 0.25 foot in the eastern Piru subbasin over the 1891-1993 simulation period.

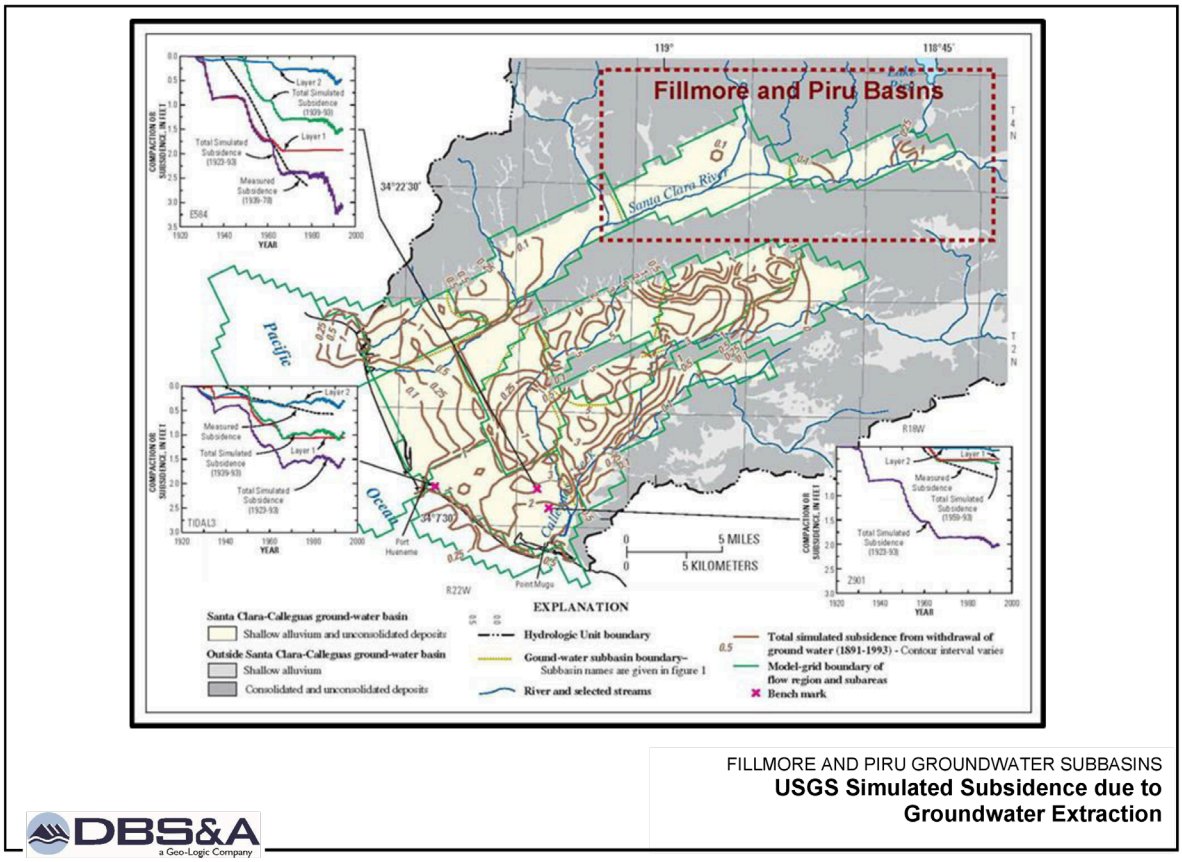

Figure 3-1. Simulated subsidence in the Santa Clara-Calleguas groundwater subbasin due to groundwater withdrawal from 1891 to 1993. Modified from Hanson et al. (2003)

Borchers (2014) summarizes results from the Hanson et al. (2003) study, and focuses on areas of more significant subsidence (i.e., Oxnard Plain, Las Posas Valley, and South Pleasant Valley subbasins).

3.2 Geodetic Surveys

UNAVCO operates continuous global positioning system (CGPS) stations that measure three-dimensional ground position at frequent intervals. Four stations within 5 miles of the subbasins have records beginning in 1999 or 2000. Because all four stations are installed in bedrock outside the alluvial subbasins, their vertical movement primarily reflects regional tectonic or monument motion rather than compaction of the groundwater basin sediments.

Figure 3-2 shows locations of these CGPS stations, along with UNAVCO time-series graphs displaying measured land displacement relative to the first measurement of each station. Data displayed in the time-series graphs are referenced to the North American tectonic plate (NAM14) reference frame. Outliers with a standard deviation greater than 20 mm (about 0.8 inch) were removed by UNAVCO. Long-term general vertical movement rate trends were determined by applying a line of best fit to each station's entire measured time frame of data. Three of the four CGPS stations surrounding Fillmore subbasin (KBRC, SOMT, and FMVT) are all set in weathered or poorly lithified sedimentary bedrock (UNAVCO) and show a long-term trend of approximately 0.003 mm/yr (0.000009 ft/yr) of downward vertical movement since December 2000. Just south of Lake Piru, CGPS station SFDM set in bedrock (UNAVCO) indicates a linear trend of 0.001 mm/yr (0.000003 ft/yr) of upward vertical movement since 1999. Looking on a smaller timescale, the four stations show similar seasonal upward and downward movement trends.

Following the 1994 Northridge earthquake (magnitude 6.7), USGS (1996) conducted a study to assess and restore geodetic infrastructure affected or damaged by land elevation changes caused by the earthquake. A geophysical model of permanent ground deformation, based on the geodetic infrastructure movement, was developed and benchmarks that differed by ±1.2 inches (3 centimeters [cm]) from the model were considered anomalous (suggesting needed replacement). The model required non-tectonic deformation (i.e., subsidence due to groundwater withdrawal) to be removed from measured elevation changes to infer deformation solely due to tectonic activity. Therefore, at least three pre-seismic surveys made between 1971 and 1989 were used to subtract the elevation changes from the 1994 measurements. The

National Geodetic Survey (NGS) conducted leveling surveys along routes in areas affected by the earthquake, including routes cutting through the Fillmore and Piru subbasins (Figure 3-3).

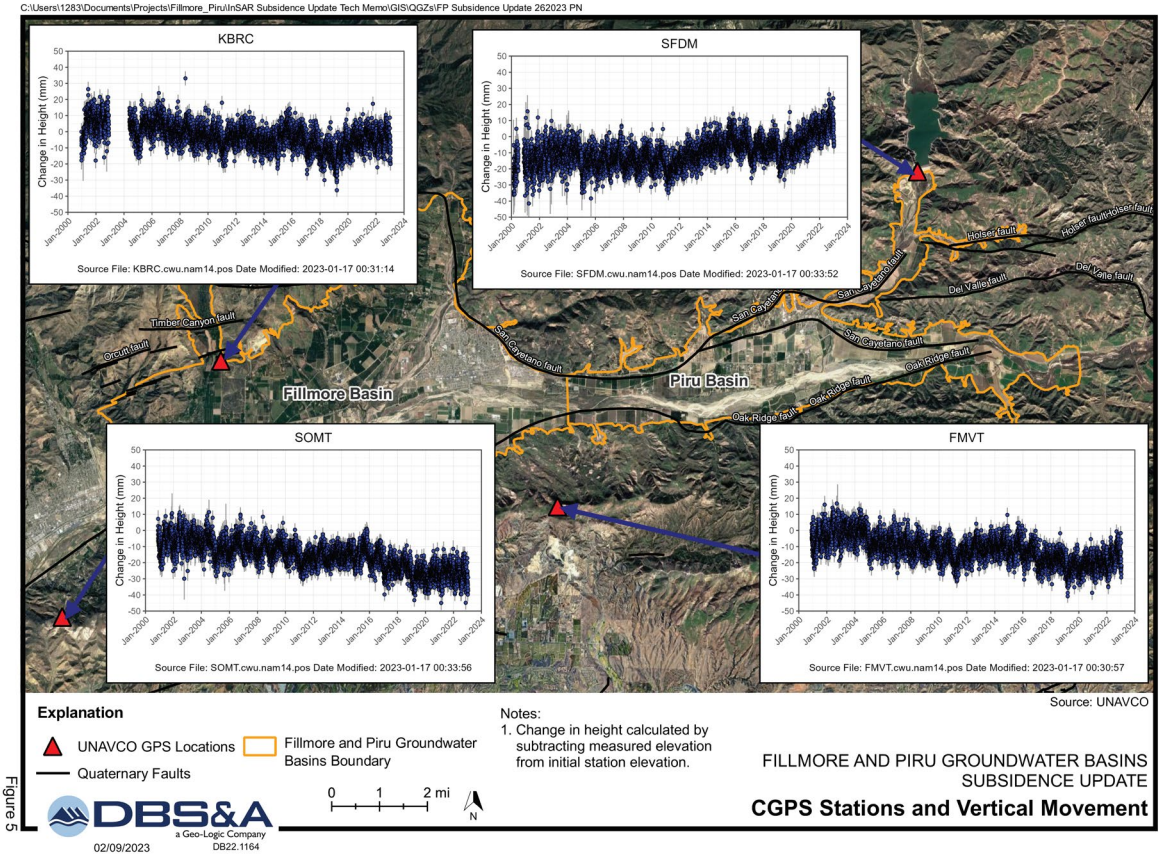

Figure 3-2. Map showing CGPS locations and vertical movement time-series data provided by UNAVCO (DBS&A, 2023)

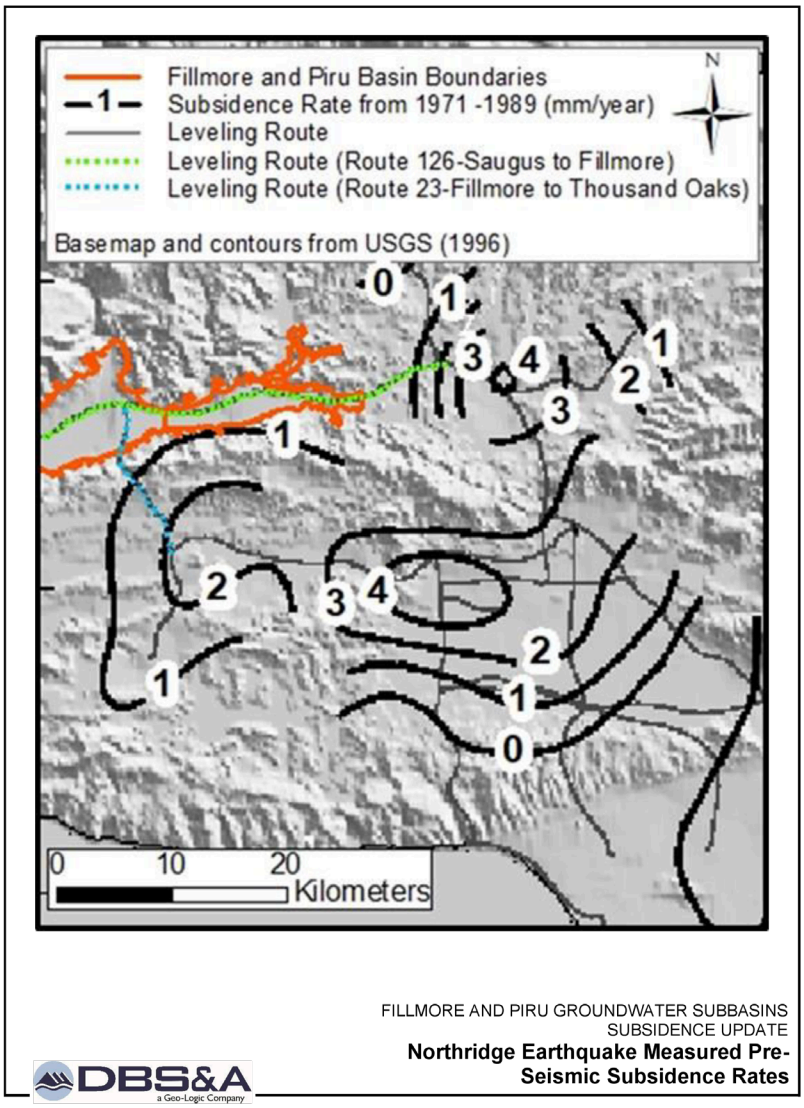

Figure 3-3. USGS (1996) 1994 Northridge Earthquake report NGS leveling routes and contours of measured pre-seismic subsidence rates (mm/yr) from 1971 to 1989

Figure 3-3 includes subsidence rate contours that USGS produced from the 1971 to 1989 pre-seismic surveys covering the Los Angeles Basin. Based on these contours, average subsidence rates in the Fillmore and Piru Subbasins were under 1 mm/yr (0.003 ft/yr) from 1971 to 1989. A comparison of 1975 and 1989 leveling surveys (pre-1994 Northridge earthquake) taken along Route 126 (Los Angeles Avenue) from Saugus to Fillmore determined 15 mm (0.05 foot) of

cumulative subsidence over the 14-year period, with maximum subsidence of 60 mm (0.2 foot) occurring between the 1975 and 1978 surveys. The area of maximum subsidence was 20 km (12.4 miles) wide and centered around the Town of Piru. The rebound in ground elevation following 1978 could have been due to groundwater recharge or a systematic error in the 1978 survey. A survey along Route 23 (Moorpark Freeway) from Fillmore to Thousand Oaks determined a maximum subsidence of 8 mm (0.03 foot) at Fillmore between 1975 and 1989.

The final modeled coseismic uplift extent related to the 1994 Northridge earthquake is shown in Figure 3-4. Within the subbasins, only the very eastern portion of the Piru subbasin showed tectonic deformation related to the earthquake and fell within the 0 to 10 cm (less than 0.3 foot) zone of the coseismic uplift contours modeled by USGS.

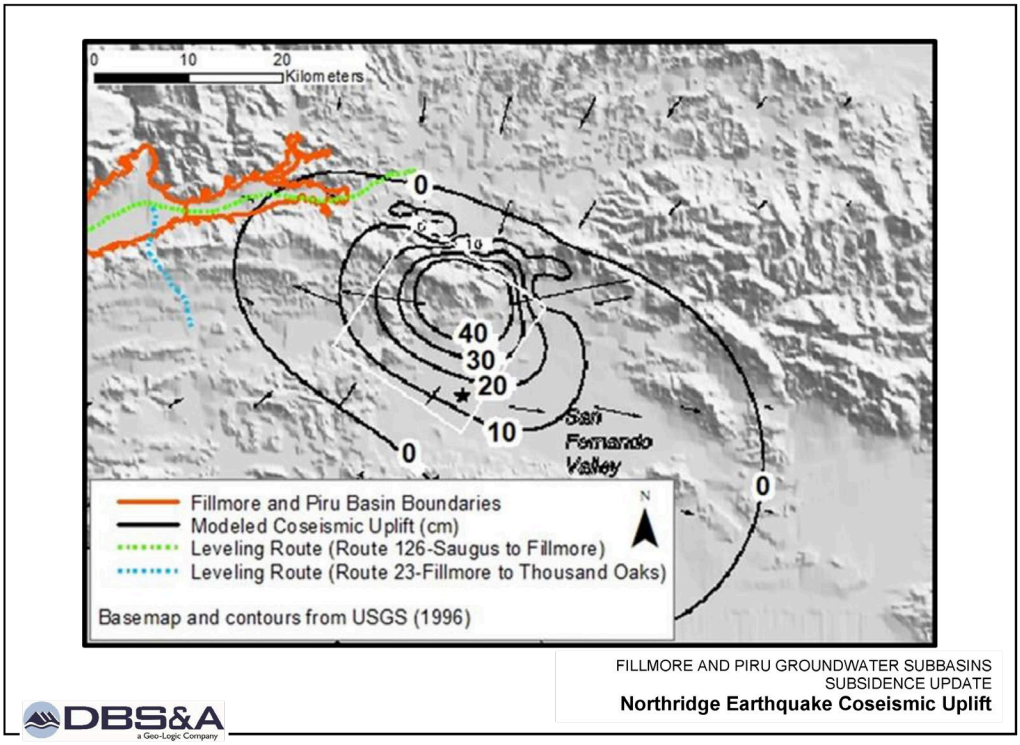

Figure 3-4. USGS (1996) 1994 Northridge Earthquake report modeled coseismic uplift

3.3 Extensometers

There are no known extensometers located in either subbasin (SGMA Data Viewer – Land Subsidence – accessed August 13, 2025).

3.4 InSAR Data

DBS&A's 2023 evaluation used DWR-provided InSAR data to assess land-surface movement in the Fillmore and Piru subbasins. InSAR measures total surface displacement, including both elastic and inelastic movement. The method does not, by itself, distinguish among groundwater extraction, hydrocarbon production, tectonic activity, or other causes of movement.

Eight points within the subbasins were chosen for vertical displacement time-series analysis based on special geographical characteristics and/or hydrogeological setting (e.g., likelihood of the area having significant thicknesses of fine-grained sediment, presence or absence of rising groundwater elevations, and general depths-to-groundwater). Locations of these points are shown in Figure 3-5 and described as follows:

1. Fillmore-Santa Paula Subbasin Boundary
2. Sespe Uplands
3. Bardsdale
4. City of Fillmore (Pole Creek Fan)
5. Fillmore-Piru Subbasin Boundary
6. Central Piru Subbasin
7. Piru Creek/Santa Clara River Confluence

Piru-SCR East Subbasin Boundary

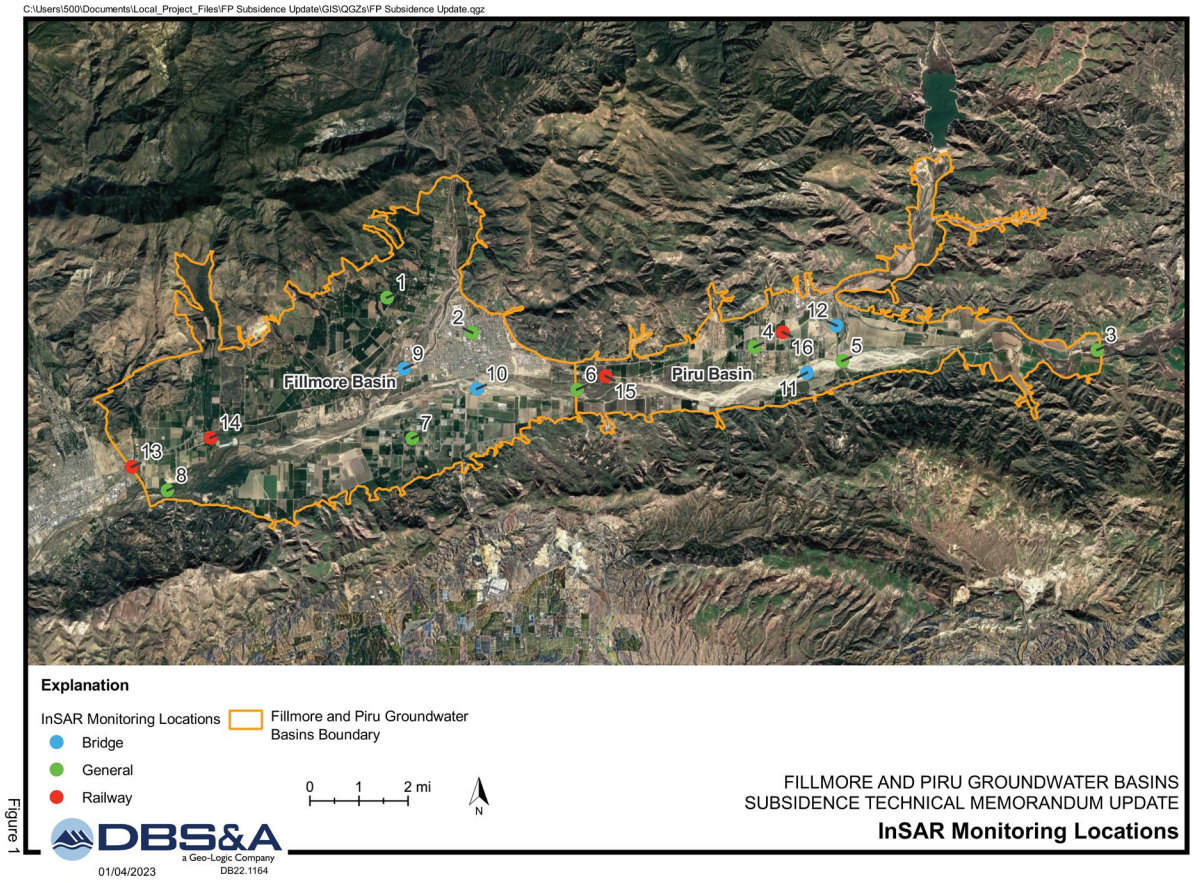

Figure 3-5. InSAR monitoring locations (DBS&A, 2023)

Eight additional points within the subbasin were chosen for vertical displacement time-series analysis at specific infrastructure locations (e.g., railways and bridges), as these locations would be most impacted by subsidence. In addition, these new locations were generally selected to be in close proximity to pumping centers. Infrastructure monitoring locations are shown in Figure 3-5 and described below:

1. Hwy 126 Crossing Sespe Creek
2. Hwy 23 Crossing Santa Clara River
3. Torrey Road Crossing Santa Clara River
4. Hwy 126 Crossing Piru Creek
5. Hwy 126 and Railway Intersection Near Santa Paula

6. Railway - Fillmore Subbasin
7. Railway - Near Fillmore-Piru Subbasin Boundary

Railway - Piru Subbasin

DWR provided monthly InSAR results as cumulative displacement since June 13, 2015 and as moving 12-month displacement. At the selected monitoring locations, most measurements were within the reported ±0.07-foot resolution range and did not show sustained downward movement. Locations 6, 11, and 16 in central Piru instead showed upward movement during 2020 and 2021, consistent with elastic rebound. No related infrastructure impacts were reported at these locations.

Total observed cumulative subsidence for the Fillmore and Piru subbasins from June 13, 2015 to October 1, 2022 is shown in Figure 3-6. All cumulative subsidence values fell within the InSAR measurement error of ±0.07 foot; therefore, no significant changes in land-surface elevation have been observed. This is consistent with the interpretation of the InSAR time-series data.

The upward movement in the Piru subbasin was temporally associated with releases from Santa Felicia and Castaic Dams. Locations 6 and 16 reached maximum cumulative upward displacements of approximately 1.5 inches and 1.2 inches, respectively, following large releases in 2019 and 2020. Locations 6, 11, and 16 show similar annual and cumulative displacement patterns.

Because most measurements fall within the reported uncertainty range, the apparent short-term response should be interpreted cautiously. Nevertheless, annual displacement at several Piru locations increases soon after reservoir releases and begins to decline within approximately 2 to 3 months after the releases end.

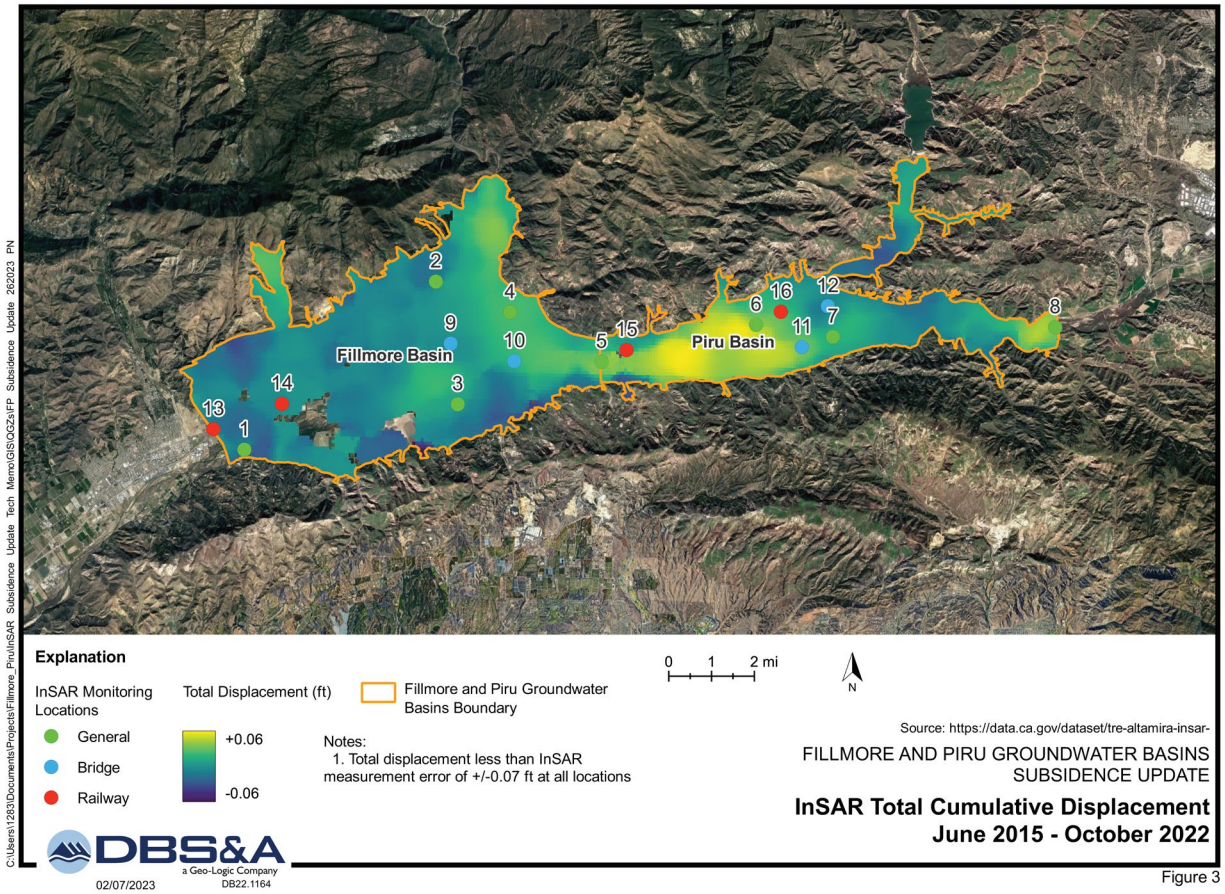

Figure 3-6. InSAR total cumulative displacement (DBS&A, 2023)

3.5 Critical Groundwater Levels (from DBS&A, 2021, Appendix F)

Historical studies describe past conditions but do not, by themselves, establish future risk. This evaluation therefore uses simulated future groundwater levels as a screening tool. Subsidence potential depends on the distribution, thickness, and compressibility of fine-grained sediments, the magnitude and duration of groundwater-level decline, and whether groundwater levels fall below the preconsolidation head. Because the preconsolidation head has not been measured directly, estimated historical low groundwater levels are used as a screening proxy. The United Water Conservation District (UWCD) groundwater-flow model (UWCD, 2021) simulated conditions from 1986 through 2096 under the central-tendency 2070 climate-change scenario.

Simulated groundwater elevations at selected wells were then compared with estimated historical lows (Figure 3-7).

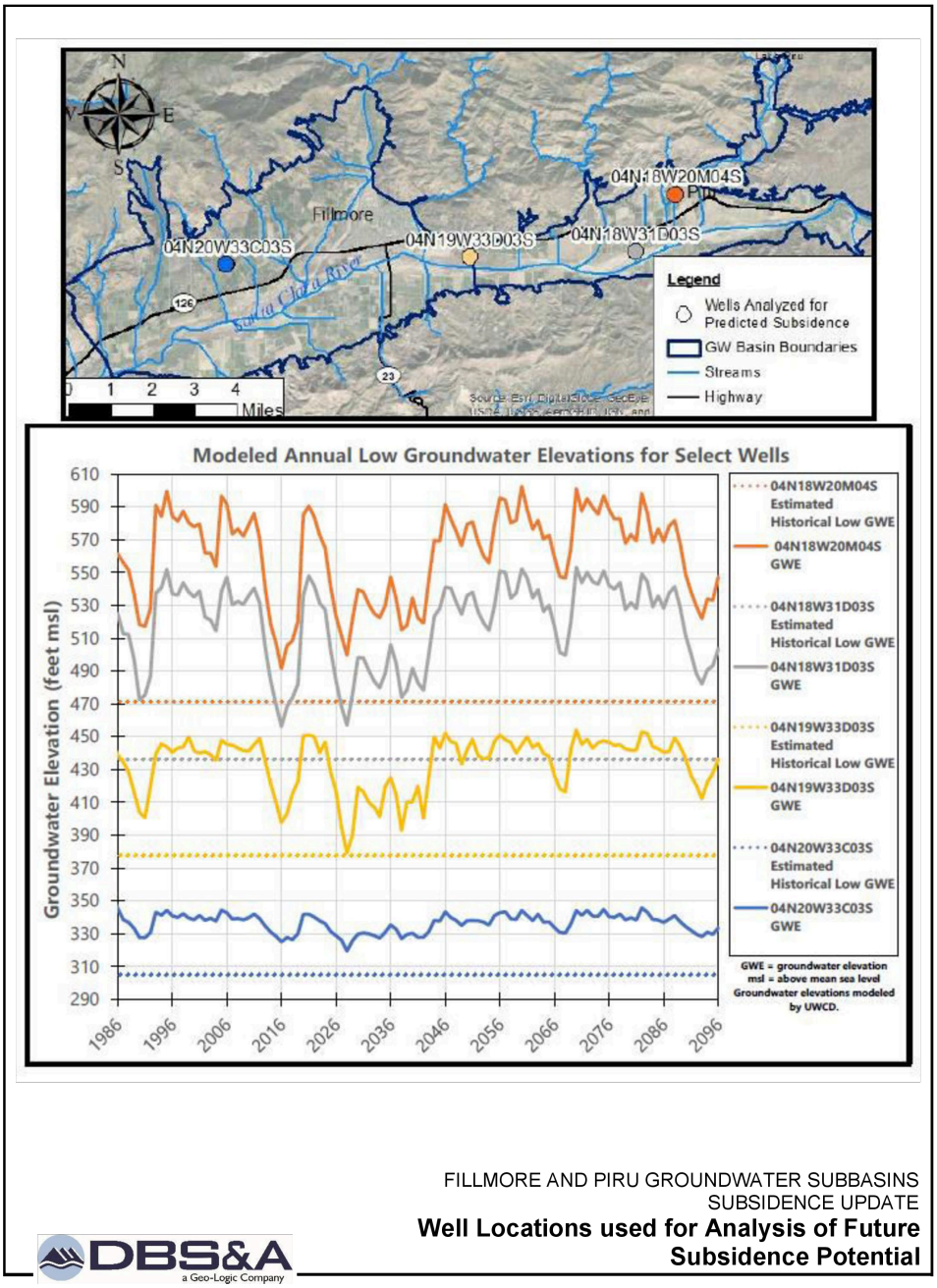

Figure 3-7. Well locations used for analysis of future subsidence potential (DBS&A, 2023)

Simulated annual low water levels for the four example wells for the available model time frame were used for the evaluation. To account for maximum historical lows anticipated prior to the modeled time frame, the historical low water level was estimated to be 20 feet lower than the modeled 2016 drought water level. This historical low estimate was based on review of wells with long-term water level records (e.g., back to the 1940s), which showed that early drought levels generally measured about 20 feet lower than the measured 2016 drought low water levels.

Comparing the 2070 climate-change simulation with estimated historical lows identifies where future groundwater levels could approach conditions associated with subsidence. At nearly all wells with known construction details, projected future groundwater elevations remain above the estimated historical lows. This result indicates that inelastic subsidence is unlikely in either subbasin under the modeled climate and pumping scenario.

The water levels near the boundary between the Fillmore and Piru subbasins are typically some of the shallowest in the subbasins and the 2070CF modeled water levels are predicted to be less than 10 feet above the estimated historical low in this area. In general, the differences between the estimated historical low water level and the 2070CF modeled low water levels increase to the east and west away from the Fillmore-Piru subbasin boundary.

3.6 Ventura County General Plan

The 2013 Ventura County General Plan Hazards Appendix (Ventura County, 2013) maps a subsidence-hazard zone along the Santa Clara River Valley that includes both subbasins. The zone is based on figures from the 1973 Hazards Appendix and has not been updated with newer geodetic data. The General Plan states that sediment loading and groundwater-level decline could contribute to hydrocompaction and increase flooding potential on lower lands, including the Oxnard Plain. Hydrocompaction and groundwater-extraction subsidence are related but distinct processes. The 2040 General Plan Environmental Impact Report (Ventura County, 2020) similarly identifies the Santa Clara River Valley, Oxnard Plain, and Las Posas Valley as areas with potential subsidence risk.

3.7 California Department of Water Resources

In 2014, California Department of Water Resources (DWR) prepared a document summarizing recent, historical, and estimated future subsidence potential for groundwater subbasins included in DWR Bulletin 118 (DWR, 2014). The purpose of the document was to provide screening-level

information with respect to subsidence. DWR lists the Fillmore subbasin with *low* potential for future subsidence. The ranking was determined from less than 10 percent of wells with long-term water-level trends (well records longer than 10 years) with current water levels (2008-2014) at or below historical low spring levels and one active continuous GPS monitoring station (see Geodetic Surveys) that showed 0.03 foot of maximum decrease in ground elevation. The Piru subbasin had insufficient data to establish a subsidence ranking.

4. Currently Active Subsidence Evaluation

No active groundwater-related subsidence has been documented in either the Fillmore or Piru subbasin. The GSA and other governmental entities also have not received anecdotal reports of land movement associated with groundwater or other resource extraction.

The Agency monitors the readily available datasets for any indications that subsidence may be occurring or conducive conditions exist within the subbasins. Those datasets include the following:

- Geodetic data: Limited datasets in bedrock areas outside of the basin alluvial fill
- InSAR data: As provided by DWR
- Reservoir releases: Effect of reservoir releases on land surface movement

Additional discussion of the ongoing subsidence monitoring program is presented in Section 6.

4.1 Geodetic Data

Figure 4-1 shows locations of CGPS stations near the Fillmore and Piru subbasins, along with the updated time-series graphs displaying measured land displacement relative to the first measurement of each station. This figure is an updated version from DBS&A (2023). Data displayed in the time-series graphs are referenced to the North American tectonic plate (NAM14) reference frame. Long-term general vertical movement rate trends were determined by applying a line of best fit to each station's entire measured time frame of data.

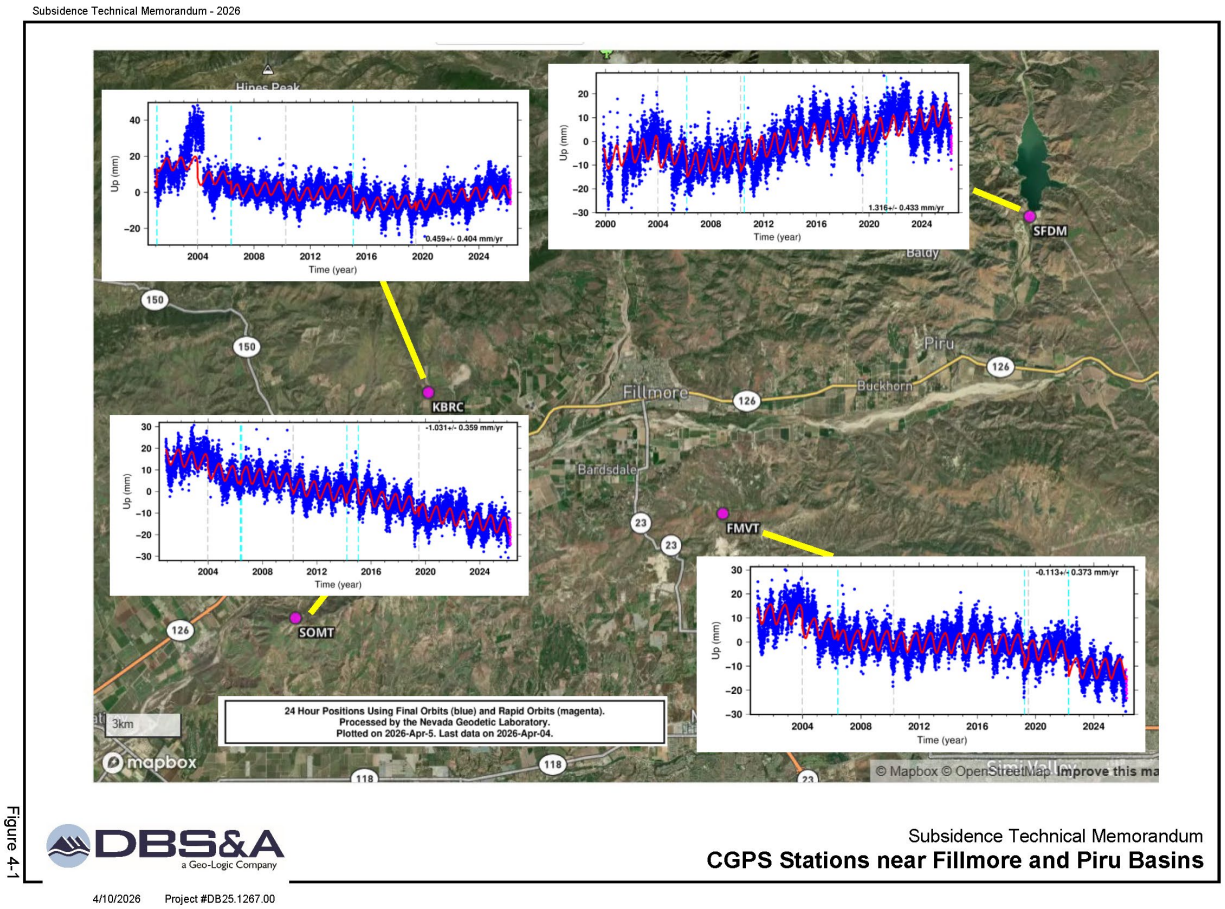

Figure 4-1

Figure 4-1. CGPS stations near Fillmore and Piru subbasins

Three of the four CGPS stations surrounding Fillmore subbasin (KBRC, SOMT, and FMVT) are all set in weathered or poorly lithified sedimentary bedrock (UNAVCO) with CGPS station SFDM set in bedrock (UNAVCO).

Table 4-1. CGPS Long-Term Vertical Movement

CGPS Station	Vertical Movement Trend
KBRC	0.459 ± 0.404 mm/yr
SOMT	-1.031 ± 0.359 mm/yr
FMVT	-0.113 ± 0.373 mm/yr
SFDM	1.313 ± 0.433 mm/yr

None of the four trend estimates demonstrates a clear subsidence signal at the monitored bedrock sites.

4.2 InSAR Data

The State of California has sponsored the collection and processing of InSAR data across many basins in California including the Fillmore and Piru subbasins. DWR makes these data available on the California Natural Resources Agency Open Data Portal and the SGMA Data Viewer.

The DBS&A (2023) technical memorandum established the InSAR evaluation approach summarized in Section 3. This section applies the same approach to the updated dataset.

Eight points within the subbasins were chosen for vertical displacement time-series analysis based on special geographical characteristics and/or hydrogeological setting (e.g., likelihood of the area having significant thicknesses of fine-grained sediment, presence or absence of rising groundwater elevations, and general depths-to-groundwater). Locations of these points are shown in Figure 4-2 and described below:

1. Fillmore-Santa Paula Subbasin Boundary
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3. Bardsdale
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Piru-SCR East Subbasin Boundary

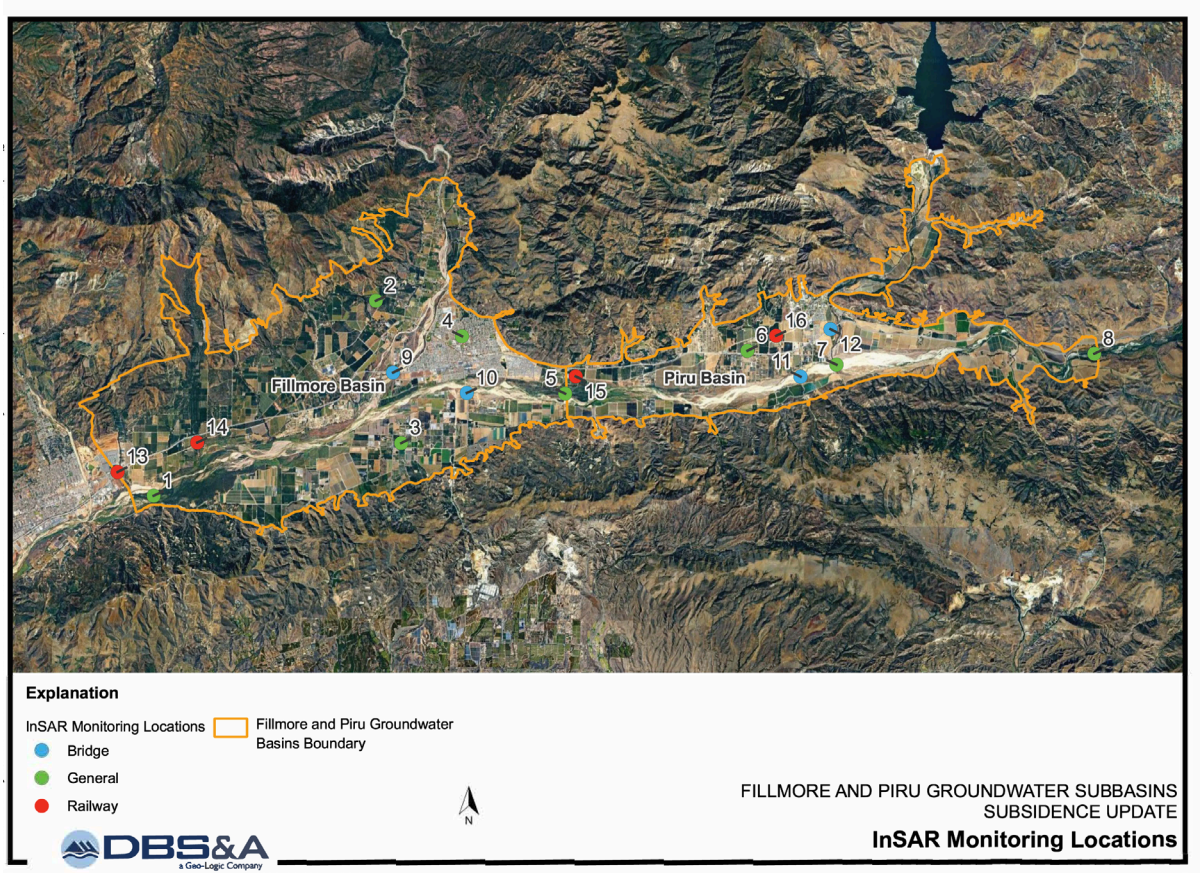

Figure 4-2. InSAR monitoring locations

Eight additional points within the subbasin were chosen for vertical displacement time-series analysis at specific infrastructure locations (e.g., railways and bridges), as these locations would be most impacted by subsidence. In addition, these new locations were generally selected to be in close proximity to pumping centers. Infrastructure monitoring locations are shown in Figure 4-2 and described below:

1. Hwy 126 Crossing Sespe Creek
2. Hwy 23 Crossing Santa Clara River
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4. Hwy 126 Crossing Piru Creek
5. Hwy 126 and Railway Intersection Near Santa Paula

6. Railway - Fillmore Subbasin
7. Railway - Near Fillmore-Piru Subbasin Boundary

Railway - Piru Subbasin

DWR provides monthly InSAR results as cumulative displacement since June 13, 2015 and as moving 12-month displacement. Figures 4-3 and 4-4 show the selected monitoring locations. Most measured displacement remains within the reported ±0.07-foot resolution range and does not show sustained downward movement. Locations 6, 11, and 16 in central Piru instead show periods of upward movement consistent with elastic rebound. No related infrastructure impacts have been reported at these locations.

Figure 4-5 shows cumulative vertical displacement in the Fillmore and Piru subbasins from June 13, 2015 through January 2026. The data do not show sustained downward movement beyond 0.07 foot. Several Piru locations show upward movement associated with periods of higher groundwater levels. The record therefore does not indicate ongoing inelastic subsidence.

Upward movement in the Piru subbasin is temporally associated with releases from Santa Felicia and Castaic Dams (Figure 4-6). Locations 6 and 16 reached maximum cumulative upward displacements of approximately 1.5 inches and 1.2 inches, respectively, after large releases in 2019 and 2020. Locations 6, 11, and 16 show similar annual and cumulative displacement patterns.

Because most measurements fall within the reported resolution range, the apparent short-term response should be interpreted cautiously. Nevertheless, annual displacement at several Piru locations increases soon after reservoir releases and begins to decline within approximately 2 to 3 months after the releases end (Figure 4-6).

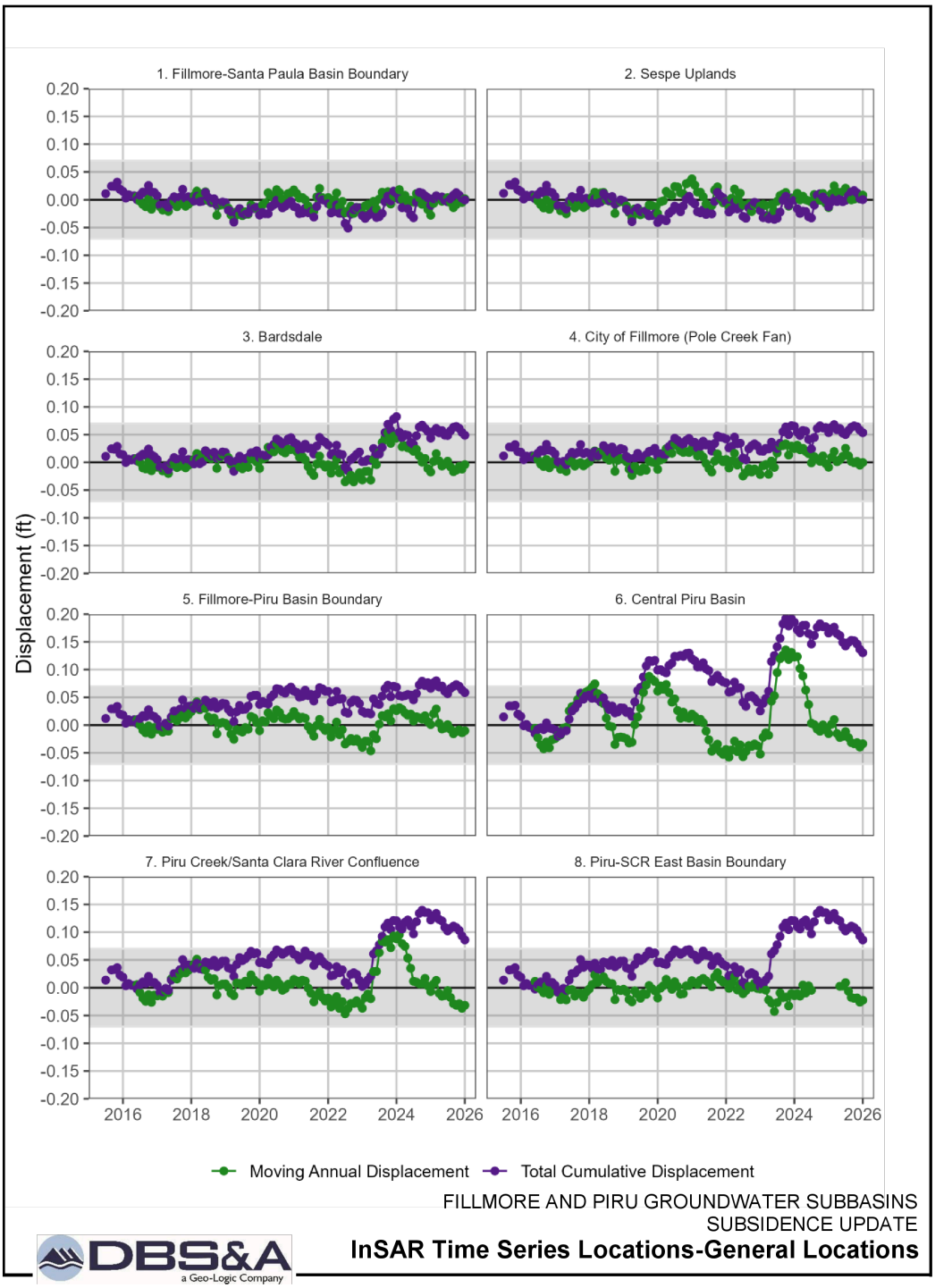

Figure 4-3. InSAR time-series locations, general locations

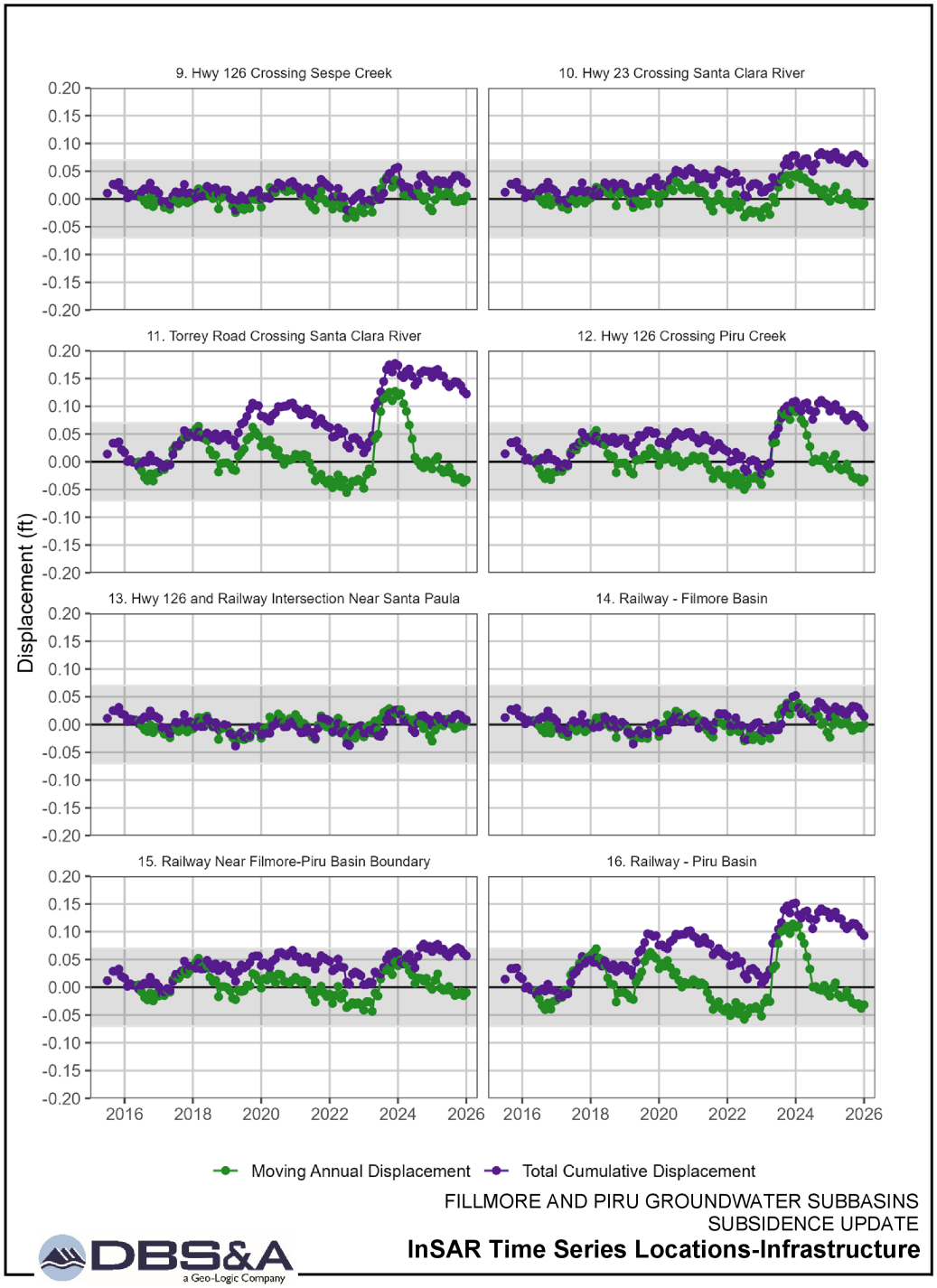

Figure 4-4. InSAR time-series locations, infrastructure

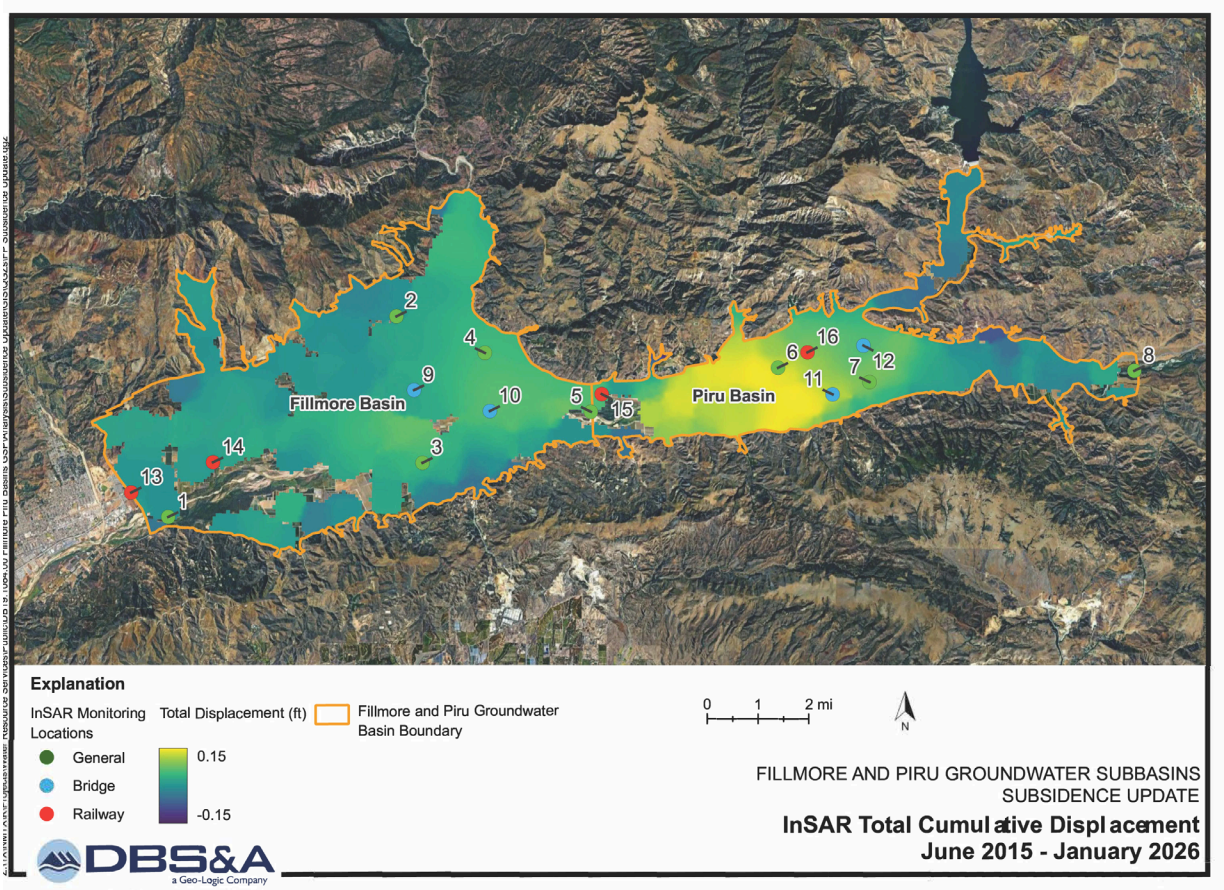

Figure 4-5. InSAR total cumulative displacement

Figures 4-3 and 4-4 show cyclic land-surface movement, with most annual displacement remaining within the ±0.07-foot measurement range. The clearest exception is upward movement in the Piru subbasin during periods of elevated groundwater levels, where annual displacement approaches 0.15 foot. The subsequent decline remains above the –0.07-foot screening level and is consistent with elastic, rather than permanent, deformation.

Reservoir releases from Santa Felicia and Castaic Dams (Table 4-2) produce rapid, observable groundwater-level responses, particularly in the Piru subbasin. Figure 4-6 shows a similar timing in the InSAR record. Land-surface elevation rises during and shortly after the releases, then declines over the following weeks or months as groundwater levels recede. This pattern is consistent with an elastic aquifer response.

Table 4-2. Reservoir Releases Upstream of Fillmore and Piru Subbasins

					Estimated Infiltration, AF			Estimated Infiltration, AF			Average Daily Infiltration, AF		
Release Origin	startDate	endDate	Release duration, days	Reservoir Volume Released, AF	Castaic Lagoon	Castaic Creek	Castaic Basin	Fillmore	Piru	Other	Fillmore	Piru	Other
Santa Felicia Dam	12/6/2016	12/16/2016	10	970	0	0	0	0	970	0	0.00	97.00	0.00
Castaic Dam	5/17/2017	7/21/2017	65	14,917	0	0	3783	0	11134	0	0.00	171.29	0.00
Santa Felicia Dam	5/29/2017	6/20/2017	22	15,300	0	0	0	2000	11700	1600	90.91	531.82	72.73
Santa Felicia Dam	6/8/2018	7/11/2018	33	1,103	0	0	0	0	1103	0	0.00	33.42	0.00
Castaic Dam	3/12/2019	6/4/2019	84	18,972	495	1127	0	0	17350	0	0.00	206.55	0.00
Santa Felicia Dam	6/3/2019	7/29/2019	56	39,444	0	0	0	5800	11776	21868	103.57	210.29	390.50
Santa Felicia Dam	2/26/2020	3/10/2020	13	7,516	0	0	0	2701	2564	2251	207.77	197.23	173.15
Castaic Dam	4/16/2020	5/22/2020	36	6,800	0	0	0	0	0	6800	0.00	0.00	188.89
Santa Felicia Dam	8/7/2020	11/11/2020	96	33,421	0	0	0	6902	13907	12612	71.90	144.86	131.38
Castaic Dam	3/2/2022	3/19/2022	17	2,711	751	223	0	0	1737	0	0.00	102.18	0.00
Castaic Dam	2/1/2023	2/22/2023	21	10,545	0	0	2,995	0	7001	0	0.00	333.36	0.00
Castaic Dam	4/3/2023	7/19/2023	107	52,483	0	0	0	0	2639	0	0.00	24.67	0.00
Santa Felicia Dam	6/23/2023	12/19/2023	179	61,858	0	0	0	0	16323	0	0.00	91.19	0.00
Castaic Dam	1/10/2024	1/15/2024	5	974	0	0	577	0	397	0	0.00	79.40	0.00
Castaic Dam	3/22/2024	3/28/2024	6	397	0	0	0	0	0	0	0.00	0.00	0.00
Castaic Dam	4/3/2024	4/30/2024	27	1,141	0	0	555	0	0	0	0.00	0.00	0.00
Santa Felicia Dam	6/12/2024	7/8/2024	26	6,754	0	0	0	536	2822	0	20.62	108.54	0.00
Santa Felicia Dam	9/10/2024	11/4/2024	55	33,903	0	0	0	1111	8919	0	20.20	162.16	0.00
Castaic Dam	11/1/2024	12/19/2024	48	6,359	0	0	1643	368	4373	0	7.67	91.10	0.00
Castaic Dam	4/15/2025	5/2/2025	17	2,025	0	0	404	0	1621	0	0.00	95.35	0.00
Santa Felicia Dam	9/15/2025	11/2/2025	48	27,450	0	0	0	1361	12208	0	28.35	254.34	0.00

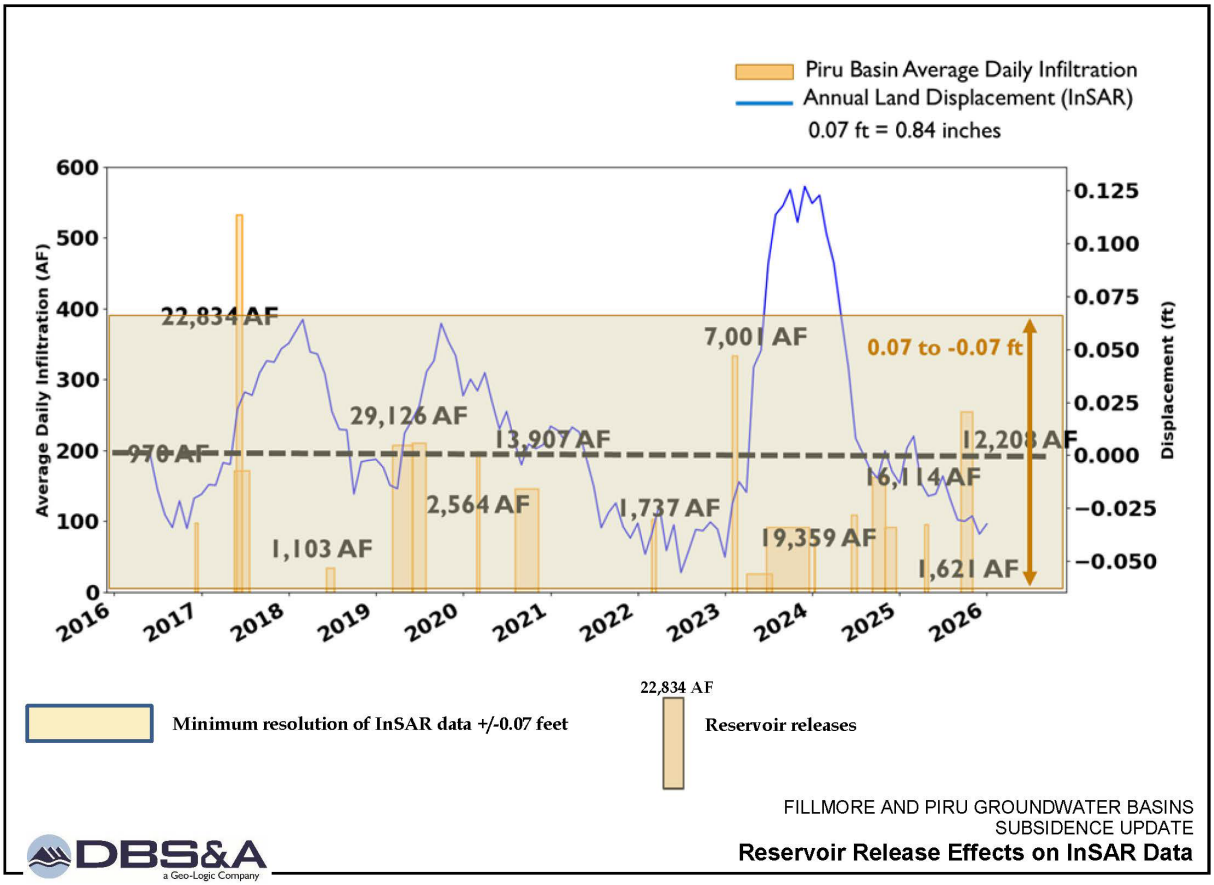

Figure 4-6. InSAR vertical displacement and reservoir releases

5. Sustainable Management Criteria

The revised Sustainable Management Criteria (SMC) framework translates the technical evidence into three SGMA management tools. The measurable objective (MO) describes the desired condition. The minimum threshold (MT) identifies conditions considered significant and unreasonable. Interim milestones (IMs) measure progress. Development of this framework was guided by the following:

- DWR's (2026) final guidance on this topic

- Explicit recommendations from DWR (2025a [page 42], 2025b [page 40-41]) that ". . . the GSA establish conservative minimum thresholds (e.g., close to InSAR measurement error) to avoid future land subsidence. . ."
- DWR staff's recommendation to set the MT at the InSAR value equivalent to the minimum negative land displacement
- DWR's (2025a and 2025b) recognition that, for both the Fillmore and Piru subbasins, the 2024 GSPs provide sufficient information to show that groundwater pumping has not historically caused land subsidence and that relatively stable groundwater levels make near-term subsidence unlikely

5.1 Significant and Unreasonable Impacts

For the Fillmore and Piru subbasins, the Agency considers groundwater-related land subsidence significant and unreasonable when its rate, cumulative extent, or differential pattern substantially interferes with, or presents a credible risk of substantially interfering with, surface land uses or property interests. Potential effects include impaired operation or integrity of roads, bridges, railways, water and wastewater systems, other pipelines, production wells, and drainage facilities, as well as resulting effects on the land uses they serve. The Agency has identified the land uses and facilities potentially affected at each monitoring location and will evaluate the potential infrastructure affects using the location, extent, and persistence of land surface movement, the facility's function, and available information from its owner or operator (if needed).

Subsidence caused by groundwater pumping has not been documented as an impact in either subbasin. The minimum thresholds are therefore intended to identify possible subsidence onset early. An annual or cumulative InSAR value more negative than −0.07 foot constitutes an MT exceedance under Section 5.2, regardless of whether infrastructure is present at the monitoring location. An exceedance is recorded and evaluated, but it does not, by itself, establish a significant and unreasonable effect.

The Agency will document that exceedance and its explanation. Conversely, credible evidence of continuing groundwater-related lowering that threatens an identified land use or facility warrants action before damage occurs. A monitoring location does not need a paired groundwater well for this evaluation.

For these subbasins, significant and unreasonable impacts are evaluated by considering whether differential land movement could damage infrastructure and impair its beneficial use. Agricultural land generally is less sensitive to small vertical movements than roads, bridges, railways, pipelines, wells, and buildings. The MT is therefore designed to identify persistent inelastic movement.

5.1.1 Potentially Impacted Infrastructure

There are several categories of infrastructure present in the Fillmore and Piru subbasins. Table 5-1 summarizes those types of infrastructure, potential impacts of subsidence, and whether evidence of historical or ongoing subsidence is found in the subbasins. No evidence of impacts due to subsidence has been reported for any infrastructure category.

Table 5-1. List of Infrastructure Types and Potential Impacts of Subsidence (modified from DWR, 2025)

Infrastructure or Land Use Type	Infrastructure	Infrastructure Type Present in Fillmore or Piru Subbasin	Evidence of Subsidence	Example Potential Impacts of Subsidence
Cities and Communities	▪ Property drainage ▪ Power systems ▪ Municipal water systems ▪ Sewer systems	Yes	No	▪ Physical damage ▪ Reduced service reliability ▪ Increased maintenance
Pipelines and Other Utilities	▪ Natural gas ▪ Water ▪ Underground cables and overhead powerline utilities	Yes	No	▪ Cracking or joint failure ▪ Overpressurization ▪ Reduced capacity ▪ Pinch-points and un-alignment of transmission poles, towers, and lines
Railroads	▪ Private rail ▪ High-speed rail	Yes	No	▪ Track deformation, instability, or loss of use during flooding ▪ Safety hazards
Roads	▪ Drainage systems ▪ Highways ▪ Bridges	Yes	No	▪ Surface cracking ▪ Drainage failure ▪ Structural instability ▪ Loss of use due to flooding
Canals	▪ State canals ▪ Federal canals ▪ Local canals	No	No	▪ Reduced conveyance, freeboard ▪ Lining damage ▪ Altered slope ▪ Erosion and sedimentation of unlined channels
Flood Control & Drainage	Federal, state, and local flood facilities (e.g., levees, bypasses, and dams)	No	No	▪ Loss of grade ▪ Structural failure ▪ Reduced flood capacity ▪ Levee overtopping or breach
Pumping Facilities	Domestic, agricultural, and public supply wells	Yes	No	▪ Casing collapse ▪ Reduced capacity ▪ Operational inefficiencies ▪ Sand and gravel damaging pump bowls

5.1.2 Undesirable Results

Table 5-1 lists the potential infrastructure impacts of vertical land movement. Their severity can be evaluated using engineering codes, design guidance, and project-specific differential-settlement tolerances. No current or historical subsidence impacts have been documented in either subbasin.

5.1.2.1 California Building Code

The California Building Code (CBC, Title 24, Part 2) does not prescribe specific "inch-per-foot" limits for different structure types. Instead it requires geotechnical and structural design teams to:

- Evaluate expected total and differential settlements in the geotechnical investigation report
- Include those expected settlement values on the construction documents
- Design foundations so that differential settlement is "minimized"
- Note certain very light or non-structural elements that are exempt

The CBC makes the project-specific geotechnical investigation and structural design teams responsible for:

- Quantifying what total and differential settlement they expect
- Calling out those values in the construction documents
- Designing foundations so that "differential settlement is minimized" in a way that is appropriate to the risk category and occupancy

In the absence of general CBC guidance, industry-specific guidelines or standard practice documents are the likely sources of information on subsidence tolerances.

5.1.2.2 Differential Subsidence Tolerances

Infrastructure built on compressible sediments must accommodate some differential settlement. The following sections summarize reported guidance values, in millimeters and inches, for several major infrastructure types:

- Railroads
  - *Track differential settlement:* California high-speed rail guidelines limit *residual* differential settlement after track installation to ≤⅜ inch (≈9.5 mm) over a 62-foot chord for non-ballasted (slab) track, and ≤¾ inch (≈19 mm) for ballasted track (Caltrans, 2011).

Residual uniform settlement should be <1.125 inches (ballasted track) and <0.625 inch for non-ballasted track (Caltrans, 2011). If expected settlement exceeds these limits, ground improvement or changing to a viaduct is recommended (Caltrans, 2011). For high-speed Classes 6 through 9, the corresponding 62-foot-chord limit is 1 inch for Classes 6 through 8 and 0.75 inch for Class 9 (FRA, 2026a and 2026b). Additional limits apply over 31- and 124-foot chords. The important qualification is that these are regulatory defect limits, not recommended design or subsidence-monitoring thresholds. The Federal Railroad Administration (FRA) specifically expects railroads to correct developing geometry conditions before they reach the applicable limit.

FRA (2026a and 2026b) permits a maximum vertical-profile deviation ranging from 1.25 to 3 inches for conventional Class 1 through Class 5 track, measured at the midpoint of a 62-foot chord. Because these values represent regulatory defect limits, a lower project-specific monitoring or action threshold should be established in consultation with the railroad owner. A value of 1 inch of measured profile deviation should be used as a conservative investigation trigger, not as the definition of track failure.

- *Track vertical deflection (stiffness):* The American Railway Engineering and Maintenance-of-Way Association (AREMA) (as cited by FRA) recommends that track support deflection under load be between ⅛ inch and ¼ inch (≈3 to 6 mm) (AREMA, 2011). Excessive subsidence that softens the track support (deflection >¼ inch) or stiffens it (<⅛ inch) can increase stresses and is undesirable.

- Highway Bridges
  - *Differential settlement between supports:* Caltrans geotechnical practice limits differential footing settlement on bridges to ½ inch (12.7 mm) between adjacent supports for multi-span or diaphragm-abutment bridges, and up to 2 inches (50.8 mm) for single-span bridges with seat abutments (Caltrans, 2021). These are essentially the maximum tolerable differences; beyond ~0.5 inch, bridges are evaluated for additional stresses.
  - *Grade separation design limits:* State standards often express tolerable settlement per span. For example, Washington State guidance limits total settlement to 1 inch over 100 feet and differential to 0.75 inch (19 mm) per 100 feet within a bridge structure (AASHTO, 2018). The Arizona Department of Transportation similarly advises limiting foundation settlement to 0.75 inch (~19 mm) per 100 feet of span, with any settlement >4 inches requiring special approval (AASHTO, 2018). (Equivalently, this is ~0.0025 of span length.) In practice, Caltrans/AASHTO design includes a settlement allowance (e.g.,

if an overpass is predicted to settle >1.0 inch, the vertical clearance is increased accordingly) (Caltrans, 2011 and 2019).

- Freeways
  - *Pavement and approach slabs:* For freeway embankments and approach slabs, designers use criteria similar to short-span bridges. Caltrans practice for approach slabs (seat abutment) is the same 2-inch (50-mm) limit noted above (Caltrans, 2011 and 2019). More generally, highway agencies aim to keep roadway grade changes very small. For example, Arizona's guidelines (used for interstate/freeway approaches) repeat the 0.75 inch per 100 feet limit from bridge guidance (AASHTO, 2018). Settlements on the order of a few centimeters (tens of mm) over a highway span are considered the threshold of concern; above this, smoothing or repair is needed.
  - *Ride quality:* Although not a formal "tolerance," AASHTO/Caltrans design standards require smooth vertical alignment. In practice, any differential settlement that produces a bump exceeding about 1 inch over a short distance is usually deemed unacceptable for freeway ride quality (requiring grinding or milling). (By comparison, highway design vertical curves typically accommodate grade changes up to a few percent over tens of meters; subsidence beyond those limits will violate design).
- Hospitals (Essential Facilities)
  - *Building foundations:* Hospitals (Risk Category IV) must tolerate very small differential settlement. U.S. Army Corps of Engineers (USACE) guidance (applicable to buildings) states that differential settlement should not usually exceed ½ inch (12.7 mm) in buildings, otherwise cracking and structural damage may occur (USACE, 1990). Essential facilities often assume even tighter performance (essentially near-zero differential movement). In California, hospital design follows Office of Statewide Health Planning and Development (OSHPD) standards, which in turn reference USASCE/CBC settlement criteria (see below). In effect, hospitals are designed so that long-term subsidence induces negligible stress.
- Schools (Occupancy Category II)
  - *Building foundations:* Schools and normal buildings are generally allowed slightly more movement than hospitals, but still small. The same USACE guideline applies to typical buildings: keep differential settlement <0.5 inch (12.7 mm) (USACE, 1990). Although not necessarily interchangeable, CBC relies on USASCE 7 seismic provisions for deformation

limits; for example, USASCE 7 Table 12.13-3 implies differential thresholds on the order of 1 percent of span (e.g., ≈3 inches for a 25-foot span). In practice, designers aim for differential settlement of a few tens of millimeters at most. (By contrast, total settlement of an entire school may be somewhat larger if uniform and well supported.)

The minimum displacement reliably resolved by InSAR is larger than the differential-settlement tolerance of several infrastructure types (Table 5-2). InSAR therefore cannot serve as the sole predictor of potential damage to those facilities. The proposed minimum threshold (Section 5.2) combines the InSAR screening value with persistence, cumulative movement, and infrastructure exposure, while recognizing the cyclic elastic movement described in Section 4.2.

5.1.2.3 Definition - Significant and Unreasonable Impacts

Significant and unreasonable impacts are defined as follows:

The evaluation will consider the resolution and spatial pattern of the InSAR measurements, the cumulative displacement from the fixed reference, the duration of the change, known reservoir releases, and any evidence of effects on land uses or infrastructure. In particular, an annual decline that represents a return from temporary elastic uplift can exceed the annual MT without establishing net land-surface lowering or substantial interference.

Definition-Significant and Unreasonable Results

Subsidence impacts are considered significant and unreasonable when:

1. InSAR data show annual land surface declines greater than the resolution of the technology (-0.07 foot/-0.84 inch) that continue through the next spring;
2. InSAR data show cumulative land surface declines that exceed the differential subsidence tolerances for an infrastructure category (Table 5-2) that continue through the next spring;
3. Infrastructure (Table 5-2) is located within the land parcels experiencing conditions 1 and 2 above;
4. Infrastructure identified in #3 are experiencing or are anticipated to experience subsidence-induced structural issues; and
5. If conditions 1 through 4 are satisfied, then the impacts are considered significant and unreasonable.

5.2 Minimum Threshold

DWR (2026) recommends setting the subsidence MT as close as reasonably practicable to the resolution of the InSAR monitoring method. During basin-specific consultation, DWR staff advised using more than 0.07 foot of downward land-surface movement, the stated InSAR resolution, as the MT for both subbasins.

The MT is defined as follows:

Minimum threshold. At each designated InSAR monitoring location, the land-subsidence MT is exceeded when **either** (1) DWR's cumulative vertical displacement relative to its June 13, 2015 reference is more negative than **−0.07 foot**, **or** (2) DWR's moving 12-month vertical displacement is more negative than **−0.07 foot over 12 months** relative to its June 13, 2015 reference value. If an exceedance of either value is recorded, the InSAR data will be evaluated for data quality, cause, spatial extent, and potential effects. An MT exceedance does not, by itself, establish that an undesirable result has occurred.

The GSA has assumed that the DWR will continue to provide the InSAR data at no cost to the GSA. Should the InSAR data become unavailable from DWR (or another no-cost alternative), the GSA will revisit the MT definition and may adjust its definition.

Table 5-2. InSAR Resolution Compared to Infrastructure Differential Subsidence Tolerances

InSAR resolution	± feet 0.07	± inches 0.84	± millimeters 21.336	Guidance/1
Railroads				
Track differential		0.375	9.525	P
Ballasted track		0.75	19.05	P
Vertical deflection		0.25	6.35	I
Highway Bridges				
Differential settlement- multispan		0.5	12.7	S
Differential settlement- single span		2	50.8	S
Grade separation		1	25.4	S
Freeways				
Approach slabs		2	50.8	P, S
Ride quality		1	25.4	S, I
Hospitals				
Building foundations		0.5	12.7	F, S
Schools				
Building foundations		0.5	12.7	F
Differential span settlement		3	76.2	F

1 – F=Federal, S=State, P=Project-Specific, I=Industry group guidelines

5.3 Measurable Objectives

The MO is to maintain the subbasin-wide long-term vertical land-surface movement within the ±0.07-foot InSAR measurement range. This represents no reliably detectable downward movement at the basin scale. Upward movement greater than 0.07 foot that is associated with reservoir releases and subsequent elastic rebound also satisfies the MO.

5.4 Interim Milestones

IMs are used to assess the progress of the GSA in reaching the MO for each subbasin. At this time, the GSA has not established IMs for the following reasons:

- The subbasins currently meet the MO and are expected to continue meeting it.
- The MT has not been exceeded.

- There is no detectable trend in land surface movement suggesting that MT exceedances are imminent.

6. Subsidence Monitoring Program

The GSA's subsidence monitoring program uses the available InSAR and groundwater-level datasets for each subbasin.

6.1 InSAR Data

The GSA will review the InSAR dataset annually as part of each Annual Report preparation analysis. The report will state whether each subbasin meets the MO and whether the MT has been approached or exceeded.

6.2 Groundwater Levels

If annual InSAR data show more than 0.07 foot of downward land-surface movement, the GSA will review groundwater levels and other potential causes in the affected area. Groundwater levels below the estimated historical lows used as proxies for preconsolidation heads would provide supporting evidence that conditions are conducive to inelastic compaction.

If declining water levels become pronounced in the subbasins and are approaching the historical lows, the Agency will explore the causal factors for the water-level declines. These factors fall into two major categories: groundwater extractions or drought, or a combination of the two. The findings will be documented in the Annual Report.

6.3 Mitigative Actions

MT exceedances will trigger further investigation by the GSA, including coordination with entities that operate infrastructure within the affected area and evaluation of appropriate site-specific monitoring or mitigation measures.

The Fillmore and Piru subbasins are located in a seismically active area. Land surface movement associated with tectonic activity could influence the land movement recorded in the InSAR data. The GSA will review the seismicity data near each subbasin and determine if that data set records tectonic events of a sufficient magnitude to potentially influence the InSAR data. The

geodetic data from the existing monitoring sites near the subbasins will also be reviewed to substantiate the magnitude of bedrock movement outside of, but near, the subbasins.

7. Conclusions

Current evidence does not indicate significant and unreasonable inelastic subsidence caused by groundwater pumping in either subbasin. Historical groundwater model estimates were small and unverified. Pre-1989 leveling averaged less than 1 mm/yr and nearby bedrock CGPS stations show no clear long-term signal of land surface decline. DWR InSAR data for June 2015 through January 2026 show no sustained downward movement beyond 0.07 foot. Alternatively, the InSAR data suggest a cyclic pattern of rising and declining land surface that occurs within the measurement resolution of this technology. After reservoir releases or heavy, prolonged precipitation periods, the upward cyclic movement in central Piru is consistent with elastic reservoir-release response. No related infrastructure damage has been reported.

Future susceptibility also is low. Neither subbasin shows chronic groundwater-level decline, and projected lows under the 2070 climate-change scenario generally remain above estimated historical lows used as proxies for preconsolidation heads. The smallest margin occurs near the subbasin boundary, where some projected lows are less than 10 feet above the proxy.

The proposed SMC provide a conservative detection and response framework. The MO is movement within the effective InSAR range, and the MT adds persistence and infrastructure exposure. Available data indicate that the MO is being achieved, so interim milestones are not warranted. Because InSAR resolution is coarser than some infrastructure tolerances, its appropriate use is as a basin-scale trigger, not as sole evidence of significant and unreasonable impacts.

DBS&A recommends the following next steps:

- Continue annual review of basin-wide and point displacement and comparisons of groundwater levels with estimated historical lows. More than 0.07 foot of annual downward movement should trigger data-quality review and cause assessment, confirmation of persistent inelastic movement, and coordination with infrastructure operators.
- If movement persists or infrastructure may be affected, work with infrastructure operators to add field inspection and site-specific monitoring.
- Document the MO, MT, investigations, and management responses in the Annual Reports.

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Appendix A

Response to Comments

DBS&A
a Geo-Logic Company

Review Comments
DRAFT 2026 Subsidence Technical Memorandum

Comment ID	Commentor	Technical or Editorial Comment	Topic	Page Number	Section ID	Quoted Text	Comment	Response
CN-1 (commentor initials and comment number)	Commentor Name	General Technical, General Editorial, Technical, Editorial, etc.	Simple description of comment topic	Page number as it appears in document	Section number with as much detaill as possible, including paragraph and line whenever practicle	*Text from document in italics for identification*	Comment with as much detail as possible/necessary.	
Directors-1	Directors	General Technical	MT definition	33	5.2	*"...continuing through the next winter"*	change to "...continuing through the next spring"	Text adjusted accordingly in Section 5.2 Minimum Threshold
Directors-2	Directors	General Technical	MT definition	33	5.2	*"...for three consecutive winters"*	change to "...continuing through the next spring"	Text adjusted accordingly in Section 5.2 Minimum Threshold
Directors-3	Directors	General Editorial	Information sources	34	Table 5-2	*NA*	add a column to indicate whether the tolerances are from Federal, State, Project-specific, or Industry sources	Additional column for Source added to Table 5-2
Directors-4	Directors	General Technical	Mitigative Actions	35	6.3	*NA*	add text to indicate that existing geodetic data will be reviewed to help determine if land movement is from a tectonic source	Text added to Section 6.3 Mitigative Actions
Directors-5	Directors	General Technical	MT definition	33	5.2	*NA*	add text to indicate that GSA assumes DWR will continue to supply InSAR data at no cost - GSA will reevaluate MT definition is InSAR data are not available at no cost	Text added to Section 5.2 Minimum Threshold
UWCD-1	M. Ahmed	Technical	Impact thresholds	33	5.2	*Not provided*	0.07-ft InSAR criterion: I would clearly distinguish the DWR-reported InSAR accuracy (~0.067/0.07 ft) from a management or impact threshold. The value is more appropriately used as a data screening/investigation criterion rather than as an infrastructure-impact threshold	We agree with your statement that the ~0.07 ft minimum resolution of the InSAR data set is most appropriately used as a data screening criterion. DWR has directed the Agency that the MT should be set at the InSAR minimum resolution (~-0.07ft). This implies that significant and unreasonable impacts are occurring if the MT is exceeded. The proposed MT language in Section 5.2 attempt to frame the use of the InSAR minimum resolution value as only one of the required factors needed to exceed the MT. This relegates the InSAR value to a screening criterion instead of a finite threshold.
UWCD-2	M. Ahmed	Technical	Differential settlement		5.1	*Not provided*	Differential settlement: InSAR vertical displacement should not be directly compared with infrastructure differential-settlement tolerances. Differential settlement depends on both displacement (ΔS) and horizontal distance (L) (e.g., differential settlement = ΔS/L)	We agree with your statement that differental settlement does not necessariliy equate to the ground movement measured by the InSAR data. DWR has previously commented that the Agency should quantify the metrics used in the establishment of MTs for subsidence. Unfortunately, differential settlement tolerances are more commonly specified in design guidance documents. If the MT is exceeded when applying the criterion in Section 5.2, then the mitigative actions (Section 6.3) come into play and further site-specfic monitoring, evaluation, or mitigation are implemented. Assessments of the differential v. vertical displacement would be appropriate in the mitigative phase.
UWCD-3	M. Ahmed	Technical	MT definition	33	5.2	*Not provided*	· Infrastructure criteria: I would reconsider requiring impacts to more than one infrastructure category before the MT is exceeded. A significant impact on a single facility or infrastructure system could potentially constitute an undesirable result.	Agreed. This language has been modified.
UWCD-4	M. Ahmed	Technical	Subbasin-wide averaging		5.3	*Not provided*	Subbasin-wide averaging: A subbasin-wide average may mask localized subsidence because uplift or stable areas can offset localized downward displacement. I would evaluate localized deformation separately	Agreed. The term "average" has been removed.
UWCD-5	M. Ahmed	Technical	InSAR resolution				Values below 0.07 ft: I would avoid interpreting displacement within ±0.07 ft as “no subsidence.” It would be more appropriate to state that the displacement is within or near the reported accuracy of the InSAR dataset	Agreed
UWCD-6	M. Ahmed	Technical	Uplift/recharge relationship				· Piru uplift/recharge relationship: The apparent relationship between reservoir releases, groundwater-level recovery, and uplift is reasonable, but quantitative correlation/lag analysis could strengthen this interpretation.	Agreed. Since subsidence is not a documented within these subbasins and is not anticipated to be an issue in the future, a more quantitative lag analysis was not performed. This analysis could be performed in the future if conditions change.
UWCD-7	M. Ahmed	Technical	InSAR resolution				· Terminology: I would use a consistent terminology for the 0.07-ft value. The memo currently refers to it as uncertainty, resolution, measurement limit, and measurable limit, although these terms have different technical meanings.	We have standardized the terminology for the InSAR measurements throughout the document.

Fillmore and Piru Basins Groundwater Sustainability Agency

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DRAFT 2026 Subsidence Technical Memorandum

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Item No. **5C Motion Item**

DATE: November 12, 2026 (for November 19, 2026, meeting)

TO: Board of Directors

FROM: Anthony A. Emmert, Executive Director

SUBJECT: **Executive Director**

RECCOMENDATION:

The Board will consider approving Agreement 2026-11-19-AAE with Anthony A. Emmert for as-needed management, planning and regulatory compliance services as executive director.

DISCUSSION:

The proposed Agreement 2026-11-19-AAE will provide the Agency with as-needed management, planning, and regulatory compliance services as executive director, to meet the Agency's primary objective of compliance with the Sustainable Groundwater Management Act in an efficient and cost-effective manner. The proposed work includes: developing and implementing the Agency's work plan, budget and funding; preparing for and managing the Agency's public meetings; minimizing the Agency's risk; procuring and managing the Agency's consultant team; and representing the Agency with regulatory agencies. The proposed agreement term is three years.

FISCAL IMPACT:

The Agency's Fiscal Year 2026-2027 Budget is sufficient to cover the proposed agreement for as-needed services, as the proposed hourly fee is approximately the same as the hourly fee currently being charged by United Water Conservation District.

ATTACHMENTS

Attachement 1 – Agreement 2026-11-19-AAE

Proposed Motion: Approve Agreement 2026-11-19-AAE with Anthony A. Emmert for as-needed management, planning and regulatory compliance services as executive director.

1st: Director_____ 2nd Director _____

Voice/Roll call vote:

Director Garnica:	Director Jackson:	Director Kimball:
Director Long:	Director McIntyre:	Director Meneghin:

PROFESSIONAL SERVICES AGREEMENT NO. 2026-11-19-AAE
between
Fillmore and Piru Basins Groundwater Sustainability Agency
and
Anthony A. Emmert
for
Management Services

The Fillmore and Piru Basins Groundwater Sustainability Agency, herein "AGENCY", and Anthony A. Emmert, herein "CONSULTANT", agree as follows:

SECTION 1 - PURPOSE

Under this Agreement, the CONSULTANT shall provide management, planning, and regulatory compliance services as executive director for implementation of the AGENCY's groundwater sustainability plans on an as-needed basis.

SECTION 2 - SCOPE OF SERVICES

The CONSULTANT shall, in good workmanlike and professional manner and at its own expense, furnish all of the technical, administrative, professional and other labor, all supplies and materials, equipment, printing, vehicles, transportation, office space and facilities necessary to perform and complete the work and provide the services as set forth in Exhibit "A" of this Agreement.

SECTION 3 - TERM

The term of this Agreement shall be for a period of three years, commencing on November7, 2026, and concluding November 7, 2029.

SECTION 4 - ACCEPTANCE

This Agreement constitutes the AGENCY offer to the CONSULTANT. Unless the CONSULTANT notifies the AGENCY, in writing to the contrary, the commencement of performance required by this offer shall be conclusive evidence of the CONSULTANT'S approval of, and consent to the terms and conditions of this Agreement herein contained.

SECTION 5 - TERMINATION

(a) The AGENCY may terminate or cancel this Agreement, in whole or in part, without liability to the AGENCY, if CONSULTANT fails to perform in accordance with the requirements of Section 2 – Scope of Services of this Agreement, or in the event of a substantial breach of any of the other terms or conditions hereof.

(b) The AGENCY may also terminate this Agreement, in whole or in part, even though CONSULTANT is not in default hereunder and no breach hereof has occurred, by notice in writing at any time. Such notice shall state the extent and effective date of termination and upon the receipt by CONSULTANT of such notice, CONSULTANT will, as and to the extent prescribed by the AGENCY, stop work under the Agreement and placement of further purchase orders or subcontracts hereunder, terminate work under purchase order and subcontracts outstanding hereunder, and take any necessary action to protect property in the CONSULTANT'S possession in which the AGENCY, has or may acquire an interest.

(c) CONSULTANT may terminate this Agreement and cease providing services at any time, with or without cause, by giving AGENCY 30 days' prior written notice. Consultant is not required to state a reason for termination. During the notice period, CONSULTANT will use reasonable efforts to provide the services and, at AGENCY's request, to transition work in progress in an orderly manner.

AGENCY shall pay CONSULTANT for all services performed and all approved, reimbursable expenses incurred through the date of termination, whether or not invoiced as of that date. For services billed on an hourly basis, payment will be based on hours worked at the rates in this Agreement.

CONSULTANT will submit a final invoice within [thirty (30)] days after the date of termination. AGENCY shall pay the final invoice within [thirty (30)] days of receipt, consistent with the payment terms of this Agreement. Termination under this Section does not relieve AGENCY of any payment obligation that accrued before the Termination Date. CONSULTANT'S termination under this Section will not constitute a breach of this Agreement and will not subject CONSULTANT to any liability, penalty, or forfeiture of fees earned.

SECTION 6 – AGREEMENT ADMINISTRATION

The Project Manager is the AGENCY'S designated representative responsible for the administration of this Agreement. The Project Manager for this Agreement is:

Kelly Long, Board Chair

SECTION 7 - CONSIDERATION

The AGENCY shall compensate the CONSULTANT on a time-and-material basis at the rates and in the amounts shown in Exhibit "B". Total payments shall not exceed budgeted amounts for executive director services.

SECTION 8 -BILLING

(a) CONSULTANT'S invoices shall be submitted on a monthly basis for the previous month's services.

(b) CONSULTANT shall submit an itemized invoice that includes:

(1) Date or period of service.

(2) A complete description of the services performed.

(3) AGENCY'S Agreement number.

(4) The name of the AGENCY'S Project Manager.

(5) CONSULTANT'S remittance address.

(6) Name and phone number of CONSULTANT'S accounts receivable representative.

(c) When applicable, CONSULTANT'S invoice shall be accompanied by support documentation sufficient to validate the charges for each invoice item.

(d) CONSULTANT shall submit invoices to the following address:

Fillmore and Piru Basins Groundwater Sustainability Agency
1701 North Lombard Street
Oxnard, CA 93030

(e) Incomplete invoices will be returned to the CONSULTANT.

(f) AGENCY'S payment terms are Net 30 days after receipt of invoice.

SECTION 9 - NOTICES

Notices required or permitted shall be given by personal delivery or by first class mail, postage prepaid, or facsimile transmission.

To: CONSULTANT
Anthony A. Emmert
5387 Vernon Street
Ventura, CA 93003

To: AGENCY
Board Chair
C/o Clerk of the Board
Fillmore and Piru Basins Groundwater Sustainability Agency
1701 North Lombard Street
Oxnard, CA 93003

SECTION 10 - OWNERSHIP OF DATA, REPORTS, AND DOCUMENTS

The CONSULTANT shall deliver to the Clerk of the Board notes of surveys made, all reports of tests made, studies, reports, plans, a copy of electronic and digital files, and other materials and documents which shall be the property of the AGENCY. The CONSULTANT is released from responsibility to third parties for the use by AGENCY of data, reports, and documents on other projects. The CONSULTANT may retain copies of such documents for its own use. The AGENCY may use or reuse the materials prepared by CONSULTANT without additional compensation to CONSULTANT.

SECTION 11 - CONFIDENTIALITY

Except as required by law, CONSULTANT will not disclose or cause their respective officers, directors, employees, representatives, agents, advisors, or subconsultants to disclose or use any of the content of negotiations or Confidential Information furnished, or otherwise permitted for review, by one party to the other in connection with the proposed transactions. For purposes of this paragraph, “Confidential Information” means information supplied by one party to the other, except information which is part of public record.

SECTION 12 - FORCE MAJEURE

Any prevention, delay, nonperformance or stoppage due to any of the following causes shall excuse nonperformance for a period equal to the duration of the force

majeure event. The causes referred to above are strikes, walkouts, labor disputes, failure of power, irresistible superhuman cause, acts of public enemies of the State or United States, riots, insurrections, civil commotion, governmental restrictions or regulations or controls (except those reasonably foreseeable in connection with the uses contemplated by this Agreement), casualties not contemplated by insurance provisions of this agreement, or other causes beyond the reasonable control of the party obligated to perform.

SECTION 13 - INDEMNIFICATION

CONSULTANT shall hold harmless, defend at its own expense, and indemnify AGENCY, its officers, employees, and agents against any and all liability, claims, losses, damages, or expenses, including reasonable attorneys' fees, arising from all negligent or reckless acts or omissions, or acts of willful misconduct of CONSULTANT or its officers, agents, or employees in rendering services under this agreement; excluding, however, such liability, claims, losses, damages, or expenses arising solely from AGENCY'S active negligence or willful acts.

SECTION 14 - INSURANCE REQUIREMENTS

(a) The CONSULTANT shall procure and maintain, for the duration of the contract insurance against claims for injuries to persons or damages to property arising from or in connection with the performance of the work hereunder by the CONSULTANT, officers, agents, employees, or volunteers.

(b) The CONSULTANT shall provide the following coverages:

(1) Commercial General Liability insurance written on an occurrence basis (Insurance Service Office ("ISO") policy form CG 00 01 or insurer's equivalent) in the amount of $1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. The insurance policy shall be amended to provide that the general aggregate limit shall apply separately to the work under this contract or the general aggregate shall be twice the required per occurrence limit.

(2) Business Automobile Liability insurance insuring all owned, non-owned and hired automobiles - coverage code 1 "any auto" (Insurance Service Office policy form CA 0001 or insurer's equivalent) in the amount of $1,000,000 combined single limit per accident for bodily injury and property damage.

(c) The required limits for the insurance policies required above may be satisfied by a combination of a primary policy and an excess or umbrella policy.

(d) The insurance policies required above shall contain or be endorsed to contain the following specific provisions:

(1) Commercial General Liability - The AGENCY and its Board Members, officers, employees, agents and volunteers are added as additional insureds. Additional insured endorsements shall provide coverage at least as broad as Commercial General Liability ISO form CG 20 10 11 85. If ISO form CG 20 10 11 85 is not provided, then ISO form CG 20 10 XX XX [latest version] may be provided but must be accompanied by ISO form CG 20 37 XX XX [latest version]).

(2) The CONSULTANT'S insurance shall be primary insurance as respects the AGENCY, its Board Members, officers, employees, agents and volunteers and any insurance or self-insurance maintained by the AGENCY shall be excess of the CONSULTANT'S insurance and shall not contribute to it.

(3) Any failure to comply with the claim reporting provisions of the policies or any breach of a policy warranty shall not affect coverage under the policy provided to the AGENCY, its Board Members, officers, employees, agents and volunteers.

(4) The policies shall contain a waiver of transfer rights of recovery ("waiver of subrogation") against the AGENCY, its Board Members, officers, employees, agents and volunteers for any claims arising out of the work of the CONSULTANT.

(5) The policies may provide coverage which contains deductible or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to the AGENCY under such policies. The CONSULTANT shall be solely responsible for deductible and/or self-insured retention and the AGENCY, at its option, may require the CONSULTANT to secure the payment of such deductible or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit. The insurance policies that contain deductibles or self-insured retentions in excess of $25,000 per occurrence shall not be acceptable without the prior approval of the AGENCY.

(6) Prior to start of work under the contract, the CONSULTANT shall file with the AGENCY evidence of insurance as required above from an insurer or insurers certifying to the required coverage. The coverage shall be evidenced on an ACORD Certificate of Insurance form (latest version) and be signed by an authorized representative of the insurer(s). A copy of ISO form CG 20 10 11 85 (or ISO form CG 20 10 XX XX [latest version] accompanied by ISO form CG 20 37 XX XX [latest version]) required in above shall be attached to the Certificate of Insurance at the time that it is filed with the AGENCY. Should the required coverage be furnished under more than one policy of insurance, the CONSULTANT may submit as many certificates of insurance as needed to provide the

required amounts. The AGENCY reserves the right to require certified complete copies of any insurance coverage required by this contract but the receipt of such policy or policies shall not confer responsibility upon the AGENCY as to sufficiency of coverage.

(7) All Coverages:

(i) Each policy required in this Section shall contain a policy cancellation clause that provides that the policy shall not be canceled or otherwise terminated by the insurer or the CONSULTANT or reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the AGENCY, Attention: Project Manager.

(e) All insurance required by this contract shall be placed with insurers licensed by the State of California to transact insurance business of the types required herein. Each insurer shall have a current AM Best rating of not less than A:VII unless prior approval is secured from the AGENCY as to the use of such insurer.

(f) The CONSULTANT shall include all subconsultants as insureds under its policies or shall furnish separate certificates and endorsements for each sub-consultant and sub-supplier.

(g) All coverages for sub-consultants shall be subject to all of the requirements stated herein. The CONSULTANT shall maintain evidence of compliance with the insurance requirements by the sub-consultants at the job site and make them available for review by the AGENCY.

(h) CONSULTANT shall submit all required insurance documentation identified herein to AGENCY not later than seven (7) calendar days from the initial receipt of this agreement for signature.

SECTION 15 – RIGHT TO AUDIT

Following execution of this Agreement and for a period of three years following the completion of performance, AGENCY shall have the right to audit the CONSULTANT'S invoices and all supporting documentation generated in performance of this agreement.

SECTION 16 - ATTORNEY'S FEES

If any action is instituted to enforce this Agreement, the prevailing party shall be reimbursed all reasonable attorneys' fees, costs of collection, as well as any other costs and expenses incurred in connection with the enforcement effort.

SECTION 17 - ASSIGNMENT

CONSULTANT shall not assign, sell, or otherwise transfer any obligation or interest in this Agreement without the specific written consent of the AGENCY.

SECTION 18 - INDEPENDENT CONSULTANT

The CONSULTANT is an independent CONSULTANT and not an employee of the AGENCY. Nothing in this Agreement is intended to create any other relationship between the Parties. CONSULTANT shall be wholly responsible for the payment of CONSULTANT's own federal, state and local income and withholding taxes with respect to CONSULTANT's compensation hereunder. CONSULTANT shall have no claim against Client for vacation pay, sick leave, retirement, health, or any other employee benefits of any kind. CONSULTANT may represent, perform services for, or be employed by such additional, clients, persons, or companies as CONSULTANT sees fit.

SECTION 19 - APPLICABLE LAW

This Agreement shall be construed in accordance with and governed by the laws of the State of California.

SECTION 21 - SUBSTITUTION OF SUBCONSULTANTS

There may be occasion, during the course of this engagement, to substitute or introduce a new subconsultant in order to satisfy the requirements for a specific task request. Introduction of substitute or new subconsultants will be allowed, but, is subject to the express written approval of the AGENCY. Such approval shall not be unreasonably withheld.

SECTION 22 - INTEGRATION

This Agreement represents the entire understanding of the parties. No prior oral or written understanding shall be of any force or effect with respect to those matters covered by this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the date of the latest signature below.

APPROVED:

Fillmore & Piru Basins Groundwater Sustainability Agency

By:_____ Date _____
Kelly Long, Board Chair

APPROVED AS TO FORM:

By: _____ Date _____
Aleshire and Wynder
District Counsel

APPROVED:

CONSULTANT

By: _____ Date 11 Nov 2026
Anthony A. Emmert

EXHIBIT A
Scope of Services

CONSULTANT shall provide as-needed management, planning and regulatory compliance services as executive director, to meet the Agency's primary objective of compliance with the Sustainable Groundwater Management Act in an efficient and effective manner. The work includes: developing and implementing the Agency's work plan, budget and funding; preparing for and managing the Agency's public meetings in compliance with the Brown Act; minimizing the Agency's risk; procuring and managing the Agency's consultant team; and representing the Agency with regulatory agencies.

EXHIBIT B
Consulting Fees

Professional Services:	$230 per hour
Vehicle Mileage:	IRS Rate
Expenses:	Direct Cost

EXHIBIT C
Insurance

CONSULTANT shall provide the following insurance as per Section 14:

Type of Insurance	Limits (Combined, Single)
Commercial General Liability	$1,000,000 Per Occurrence
Business Auto Liability	$1,000,000

Insurance shall name Agency and its officers, employees, and volunteers as additionally insured on the commercial general liability policy.