

Date: January 3, 2016  
To: WRA Executive Committee  
From: Tim O'Halloran  
Subject: SGMA activities update

The following SGMA related activities have taken place recently, or will be taking place in the near future.

1. Groundwater Sustainability Agency (GSA) Development
  - a. Center for Collaborative Policy work
    - i. Weekly check-in program management meetings scheduled for Tuesdays at 1:30 pm. Call-in number available. Special meetings will be set up with the Steering Committee as needed.
    - ii. 90-day work plan drafted. To be reviewed by Steering Committee.
    - iii. Guiding principles drafted for Colusa County, and to be adapted for Yolo.
    - iv. Reviewed and commented on adjacent counties letter.
  - b. Basin Boundary Adjustment planning
    - i. Letter to adjacent counties drafted. Being reviewed by Farm Bureau. Meetings being held with adjacent counties to encourage them to do the same, or at least not oppose Yolo's.
    - ii. Phone call to discuss concept held with LAND (North Delta) representative to discuss Basin Adjustment proposal (December 9<sup>th</sup>). Also, a discussion was held with RD999 representative regarding the proposal (December 17<sup>th</sup>).
  - c. Basin Boundary adjustment regulations being reviewed in anticipation of Submittal to state DWR. Submittals being accepted as of January 1, 2016 through March 2016.
  - d. Dave Ceppos confirmed for January WRA Board meeting presentation.
2. Local efforts and Outreach
  - a. Irrigated land program presentations to over 280 landowners throughout Yolo County. Presented information on SGMA in December meetings (Four meetings held December 15<sup>th</sup> through 17<sup>th</sup>.)
  - b. Maps showing GSA potential options being developed.
  - c. Yolo groundwater website online (public being encouraged to sign-up. 11 sign-ups and 471 hits to date)
  - d. Sacramento Valley Water Managers SGMA meeting (December 14<sup>th</sup>)
  - e. List of contacts to be developed.
3. Groundwater Sustainability Plan (GSP)
  - a. WEAP Model presentation at January WRA Board meeting (Dave Purkey confirmed).
  - b. PAP meeting (December 8<sup>th</sup>) and follow-up one-on-one with Dave Gutierrez (December 29<sup>th</sup>) to explain concerns.
  - c. Subsidence monitoring planned for spring 2016.
  - d. Stanford proposal to compare previous subsidence results with satellite imagery received.
4. Temporary SWRCB permit for high-water diversions (winter water) to enhance groundwater recharge being pursued by YCFCWCD.
5. Storm Water Grant Program being investigated.

December XX, 2015

Dear Colusa/Glenn/Sacramento/Solano County:

The 2014 Sustainable Groundwater Management Act (SGMA) requires the formation of Groundwater Sustainability Agencies (GSAs), which must develop Groundwater Sustainability Plans (GSPs) in the State's medium and high priority groundwater basins and subbasins. The SGMA also established a process for local agencies to request that DWR revise the boundaries of a groundwater basin or subbasin and establish new subbasins. This process is commonly referred to as a Basin Boundary Adjustment.

In close coordination with and the support of the County of Yolo, the Water Resources Association of Yolo County (WRA) and the Yolo County Farm Bureau (FB) have been actively engaging the public on the implementation of SGMA. To that end, WRA and FB have applied for and received DWR local assistance support to engage neutral facilitation services of the Sacramento State, Center for Collaborative Policy (CCP) to support the GSA initiation process.

Overlapping the schedule to convene and launch one or more GSAs is the tight timeline to address Basin Boundary Adjustments. Within Yolo County, three Bulletin 118 groundwater subbasins cross County boundaries and overlap with your counties as well. Since the Basin Boundary Adjustment Regulations are now in effect, we are informing all parties in adjoining counties about our current thinking regarding applying for a boundary adjustment so that you may provide us your feedback. We recognize that no boundary is going to work perfectly for everyone and that there are advantages and disadvantages to each decision. We also want to make it clear that we are open and willing to receive your input and alternative suggestions.

Many members of the WRA and the leadership of the FB feel that the most functional and efficient basin boundary for the subbasins overlapping Yolo County would be to simply use the existing County geopolitical borders to define the GSA and GSP boundaries (which has been acknowledged as an acceptable approach by DWR). This model has the following advantages because it:

- 1) Utilizes the existing WRA-based water resource planning governance structure;
- 2) Preserves the existing rights and authorities of the WRA's member agencies, including land use authorities of the County and Cities;
- 3) Ensures the interests of private well owners are considered;
- 4) Serves as the California Statewide Groundwater Elevation Monitoring (CASGEM) Monitoring Entity;
- 5) Incorporates the Yolo County Water Resources Information Database (WRID) monitoring network;
- 6) Utilizes the Integrated Groundwater and Surface water Model (IGSM), Integrated Water Flow Model (IWF), and Water Evaluation And Planning system (WEAP) surface and groundwater models; and
- 7) Advances the subsidence monitoring network that has served Yolo County for the past 15 years.

The main disadvantage to this boundary model is that, without refinement, it could place some existing special districts into two different GSP planning zones. We believe that adjustments could be made to minimize or eliminate these circumstances.

This is the current thinking of the leadership. This remains a conceptual model that is open to your input. We believe it is important to get the process started as DWR's Basin Boundary Modification Initial Notification submission period has initiated and the Basin Boundary Modification Request submission opens January 1, 2016.

Please contact \_\_\_\_\_ with any questions or concerns.

**90-Day Plan**  
**Yolo County Sustainable Groundwater Management Act Implementation**  
December 2015 – February 2016

- I. Late November/Mid December: Background Research and Preparation for Initial Meetings
  - a. Review County GMP planning and past efforts
  - b. Acquire broad set of available SGMA outreach materials and identify opportunities for tailoring information to address local setting
  - c. Discuss preliminary outreach approach and identify target dates
  
- II. Early January – Mid January: Interviews with Proposed GSAs / Media Strategy
  - a. Discuss governance options and methods to transition WRA into a GSA eligible agency.
  - b. Implement a media strategy to publicize targeted outreach events and broadscale public meeting.
  - c. Prepare draft and final guiding principles
  - d. Conduct on-site interviews with proposed GSA representatives to discuss:
    - CCP facilitation support role on project
    - Expectations / Roles and Responsibilities being a GSA
    - Implications of SB13
  
- III. Early January - Mid February: Organize and Facilitate First Public Meetings
  - a. Prepare for targeted stakeholder meetings
  - b. Prepare for first public meeting
    - Develop education and outreach materials
    - Develop agenda and facilitation strategy
    - Conduct targeted outreach to promote meetings
  
- IV. Mid - Late February: Organize and Facilitate Governance Meeting

**Colusa SGMA Implementation Guiding Principles**

The following are preliminary proposed principles that may be used as messaging statements for upcoming SGMA meetings, media outreach, stakeholder discussions, and similar.

1. The Sustainable Groundwater Management Act (SGMA) is a new law. It will affect all citizens of the County of Colusa (County). It offers beneficial opportunities to achieve sustainable groundwater conditions in a manner that will support our vital agricultural economy, other industries, and domestic and public water uses: Sustainable water supply = sustainable agricultural economy.
2. Sacramento River surface water supplies are increasingly uncertain due to competing demands. County citizens need to improve water certainty on things we can control and manage. SGMA provides for local management of groundwater in a way that surface water management can't achieve.
3. The County is committed to represent the common and unique interests of groundwater users located outside of other Groundwater Sustainability Agency (GSA) eligible agency boundaries.
4. The County has worked closely for decades with managers of local water agencies and knows them to be exceptional water leaders and partners. The County expects these water leaders to fill a similar role implementing SGMA.
5. The County supports a partnered approach to form and participate in a GSA. The County does not expect or advocate being the sole leader of any GSA within the county boundaries.
6. The County believes that a partnered approach to groundwater management is in the best interest of citizens because
  - a. The County and other GSA eligible public agencies are mutually responsible for our common groundwater resources.
  - b. GSA formation and the long term management of the GSA will have extensive and lasting financial costs for all water users.
  - c. Preparation and implementation of one or more Groundwater Sustainability Plans (GSP) will also have extensive and lasting financial costs.
  - d. Pooling financial and in-kind resources between the County and other GSA eligible agencies will improve the efficiency of SGMA implementation as we capitalize on skills and strengths of various partners.
7. The County wants to be part of a partnership that implements SGMA the right way, ensures that we are regional and Statewide leaders, and keeps our citizens ahead of the curve on groundwater management policies. To support this, the County pursued in-kind facilitation support from the Department of Water Resources (DWR), initiated a county-wide groundwater assessment, pursued a recent groundwater planning grant through the Water Bond, and is committed to share these resources with SGMA partners and affected citizens.
8. The County is committed to work collaboratively with groundwater managers and users in neighboring counties and water agencies, and with neighboring surface water users and suppliers.
9. Groundwater impacts throughout the County and region are not equal. There are portions of the County that have water level and water availability challenges. There are portions of the County that do not experience such challenges. Sustainability solutions will need to reflect these differences.
10. The proposed Sites Reservoir will provide local water supplies. These supplies should be integrated into a water management system that includes local groundwater recharge and use. This system will increase the value of the reservoir, the eligibility of storage funding, and regional water resiliency.

# Proposed Geophysics Research in Yolo County

Stanford University

December 10, 2015

Stakeholders in Yolo County have expressed ongoing concern about the potential impacts of subsidence related to groundwater withdrawals in their area. In order to better understand subsidence in Yolo County, a network of surveyed GPS stations was established in 1999, and then re-surveyed in 2002, 2005, and 2008 (D'Onfrio and Frame, 2003, 2006, 2008). Over time, some stations were added to the network and a few stations were moved or dropped for logistical reasons, but overall these data provided a reasonable indication of subsidence in Yolo County, and served as a template and model for DWR to expand a monitoring project throughout the Sacramento Valley (Yolo County Water Resources Association website: [http://www.yolowra.org/projects\\_subsidence.html](http://www.yolowra.org/projects_subsidence.html)).

While these data are useful and important, there are several potential drawbacks to utilizing this GPS station network. These concerns include the fact that re-surveying these stations requires time, money, and effort, and therefore has not been completed more frequently than every few years. In fact, after the round of measurements in 2008, no subsequent measurements of this station network have been made in Yolo County. Additionally, the spatial resolution of any estimated subsidence is limited by the density of the GPS stations within the county, which may obscure relationships between subsidence and specific patterns of surface/groundwater use or geologic features.

In 2014, a project was proposed to the California Department of Water Resources by Michelle Sneed with the USGS, with the objectives to “(1) determine the location, extent, and magnitude of changes in land-surface elevation in the Sacramento Valley for various periods during 1992–2010 using persistent scatterer Interferometric Synthetic Aperture Radar (InSAR) methods, continuous Global Positioning System (GPS) data, and extensometer data; and (2) improve the understanding of groundwater conditions and land subsidence.” This study would have covered the entire Sacramento Valley, including Yolo County, but unfortunately was not funded.

As part of the Environmental Venture Project (EVP) grant from the Stanford Woods Institute for the Environment, our research team is interested in assessing the impacts on local stakeholders of improved information regarding groundwater. Specifically, there is interest in assessing how the utilization of geophysical techniques to provide new or improved information might impact attitudes, decisions, and communications in regards to management of groundwater and implementation of the Sustainable Groundwater Management Act (SGMA).

Under this EVP grant, we propose to conduct a study of applications of InSAR in Yolo County, with the following specific objectives:

- Estimate total subsidence in Yolo County from InSAR data from 2002-2005, 2005-2008, and 2008-2012. These total subsidence estimates will be compared to similar estimated derived from the ground-based GPS surveys to assess any potential benefits or differences.
- Characterize any seasonal surface deformation signal(s) observed in Yolo County, including magnitude, timing, and spatial distribution (The GPS sampling was only once during each of the measured years, so did not capture seasonal variation.)
- Compare observed surface deformation patterns to known geologic features
- Compare observed surface deformation patterns to both spatial and temporal patterns of estimated water use, including irrigation and groundwater pumping
- Provide a comprehensive summary of results, conclusions, and recommendations

A measurable deformation signal is anticipated, both due to the magnitude of deformation indicated by the ground-based GPS surveys and based on recent InSAR analysis by Farr et al. (2015).

It is anticipated that Stanford will cover the cost of obtaining, processing, and analyzing InSAR data, as well as obtaining and analyzing any publically available geologic and well data. Assistance from the Yolo County Water Resources Association and/or the Yolo County Flood Control & Water Conservation District will be essential in providing information about estimated water usage, local specialized knowledge of geology, hydrology, and hydrogeology, and any information about water wells and water distribution networks in Yolo County that is not otherwise available to the public. Access to the Yolo County Water Resources Information Database has already been granted, providing access to water level and certain water quality data for monitored wells, however Stanford will specifically request that the WRA provide Stanford with any and all of the following, if available, within Yolo County:

- Well files
- Drillers logs
- Wireline logs (elogs, etc.)
- Estimates and/or measurements of groundwater pumping
- Estimates and/or measurements of irrigation
- Estimates and/or measurements of infiltration along the canal network
- Record of water distribution via the canal network
- Estimates and/or surveys of land use
- GIS coverages

We anticipate, for the duration of the project, that Stanford staff/researchers will meet with YCFCWCD and/or WRA personnel one day per month. We also would request occasional consultation by phone/email with technical staff if any questions or other issues arise.

As discussed previously, this project also includes a social science component, focused primarily on assessing how the use of geophysical techniques impacts stakeholders' views on groundwater conditions and policy options. Assuming we go forward with this InSAR analysis, a brief summary of the anticipated social science work will also be sent for your approval, describing specifically what will be involved. The time commitment on the part of YCFCWCD staff and WRA members for this component of the project would be very small, likely consisting of short interviews and/or completion of surveys. Participation in this social science study is critical to our interests at Stanford, and would be necessary for us to move forward with the InSAR study.

The results of this InSAR study will be made available to stakeholders by way of two presentations and a final summary report. We anticipate presenting preliminary results specific to patterns of measured subsidence in the first presentation, with a later presentation including interpretation of these patterns in relation to patterns of groundwater use and geology. A final summary report, incorporating any feedback obtained after the presentations, will follow. We anticipate completing the initial InSAR analyses during the first half of 2016, with presentations likely occurring in the late summer/autumn of 2016 and the final report made available by the end of 2016.

Ultimately, the intention of this project is to help the stakeholders of Yolo County better understand:

- Magnitude, timing, and spatial distribution of subsidence within Yolo County
- Potential relationships between observed subsidence and use/management of water and groundwater resources
- How InSAR may be used as a technique to monitor and assess subsidence, and how this technique may compliment and/or improve upon traditional techniques based on surveying GPS stations

We look forward to a productive collaboration on this project.

The following figures are attached:

1) Wells available from DWR for Yolo County with water level measurements in the study timeframe, 2) Active wells in the Yolo County Flood Control & Water Conservation District database, 3) Availability of InSAR data for Yolo county for different satellite platforms during the study period, 4) Cumulative subsidence estimates from 1999-2005 based on the ground-based GPS network (D'Onofrio and Frame, 2006), and 5) InSAR estimate of cumulative subsidence in the Yolo County area from 2006-2010 (Farr et al., 2015).

References:

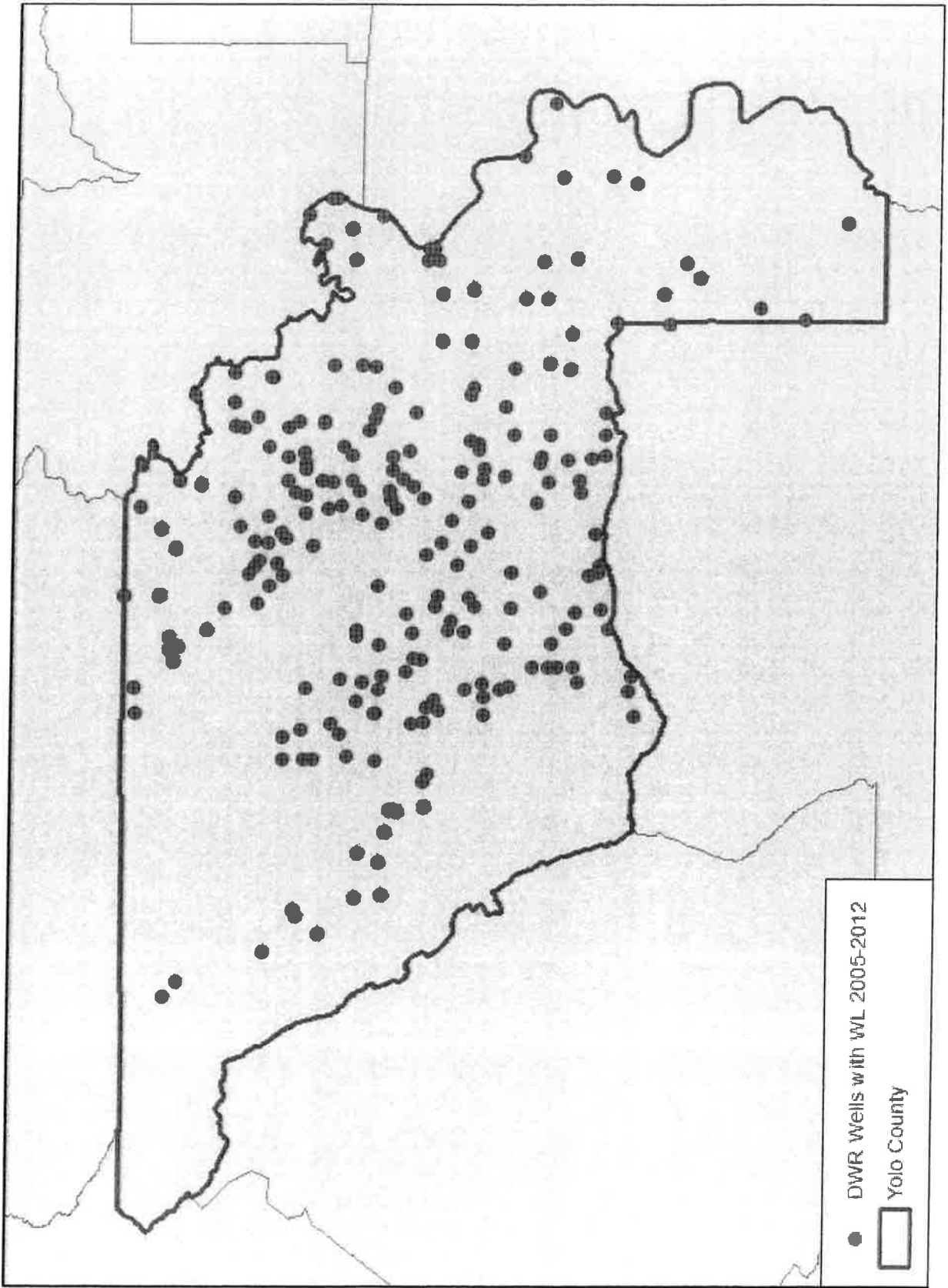
D'Onofrio, D., Frame, J., 2003, The Yolo County GPS subsidence network: Recommendations and continued monitoring, Yolo County Water Resources Association technical report, [http://www.yolowra.org/projects/YSN2002\\_Final\\_Report.pdf](http://www.yolowra.org/projects/YSN2002_Final_Report.pdf).

D'Onofrio, D., Frame, J., 2006, The Yolo County GPS subsidence network: Recommendations and continued monitoring, Yolo County Water Resources Association technical report, <http://www.yolowra.org/projects/YSN2005%20Final%20Report.pdf>.

D'Onofrio, D., Frame, J., 2008, 2008 DWR/USBR Sacramento Valley Subsidence Project: Project Report, Yolo County Water Resources Association technical report, <http://www.yolowra.org/projects/DWR-USBR%20Sac%20Valley%20Subsidence%20Report%202008.pdf>.

Farr, T.G., Jones, C., Liu Z., 2015, Progress Report: Subsidence in the Central Valley, California, Jet Propulsion Laboratory technical report, [http://water.ca.gov/groundwater/docs/NASA\\_REPORT.pdf](http://water.ca.gov/groundwater/docs/NASA_REPORT.pdf).





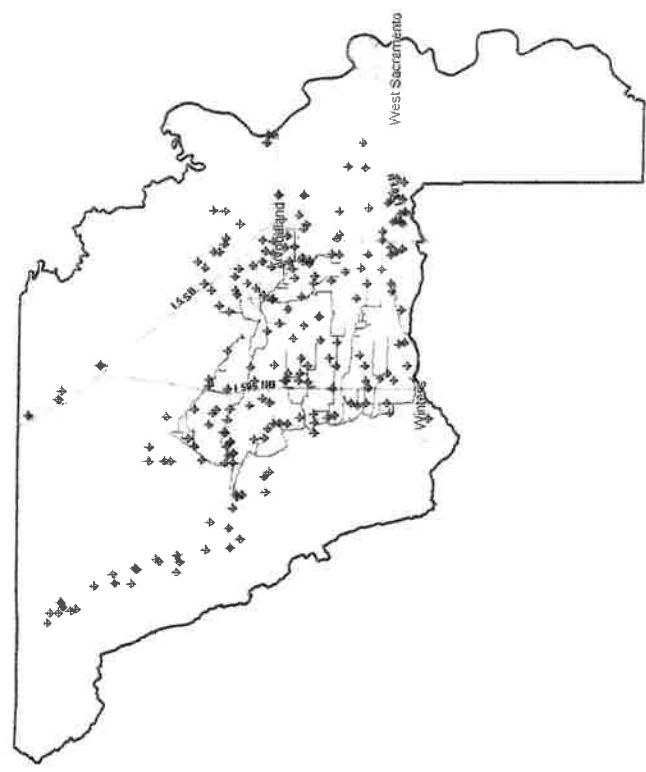
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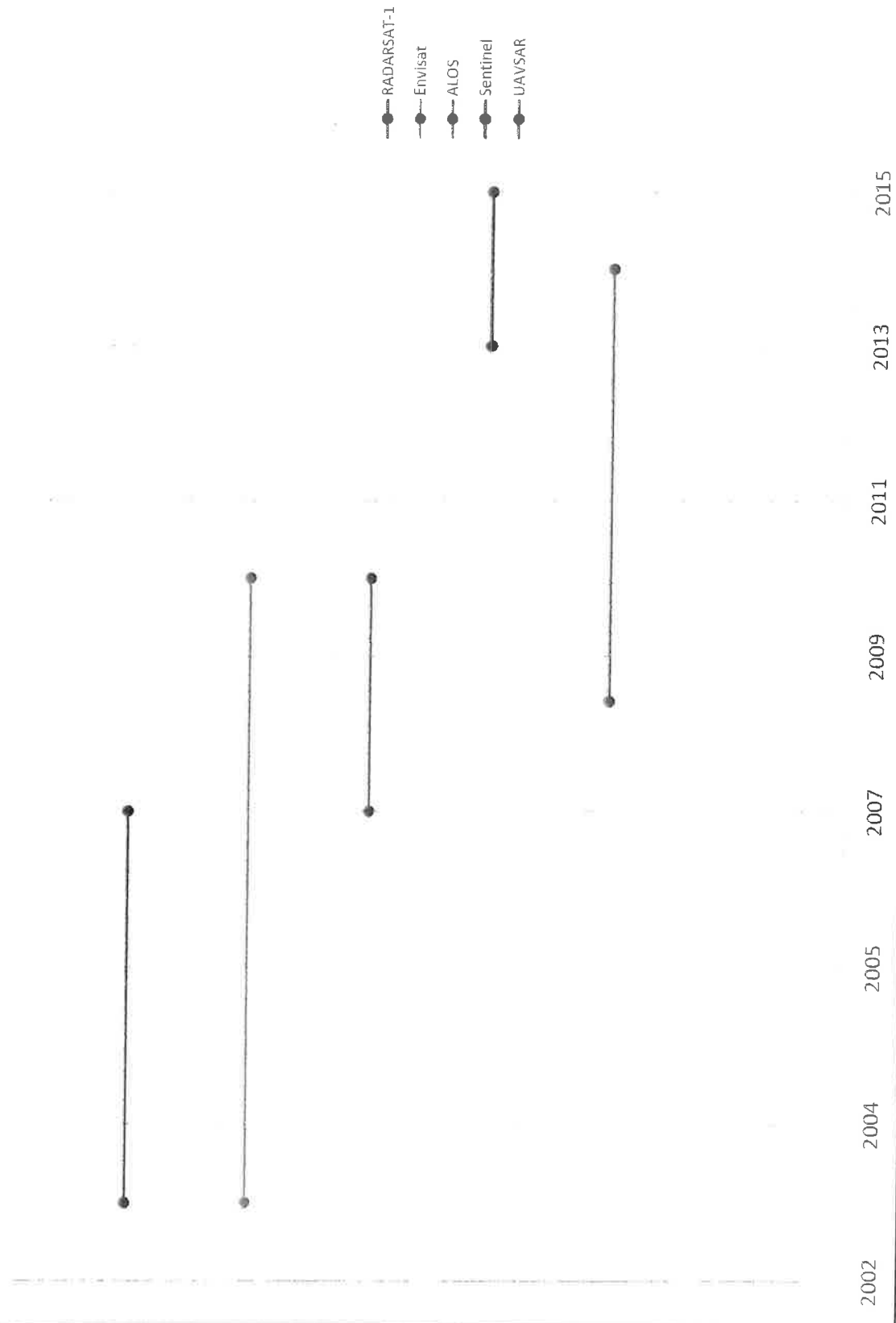


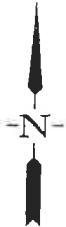
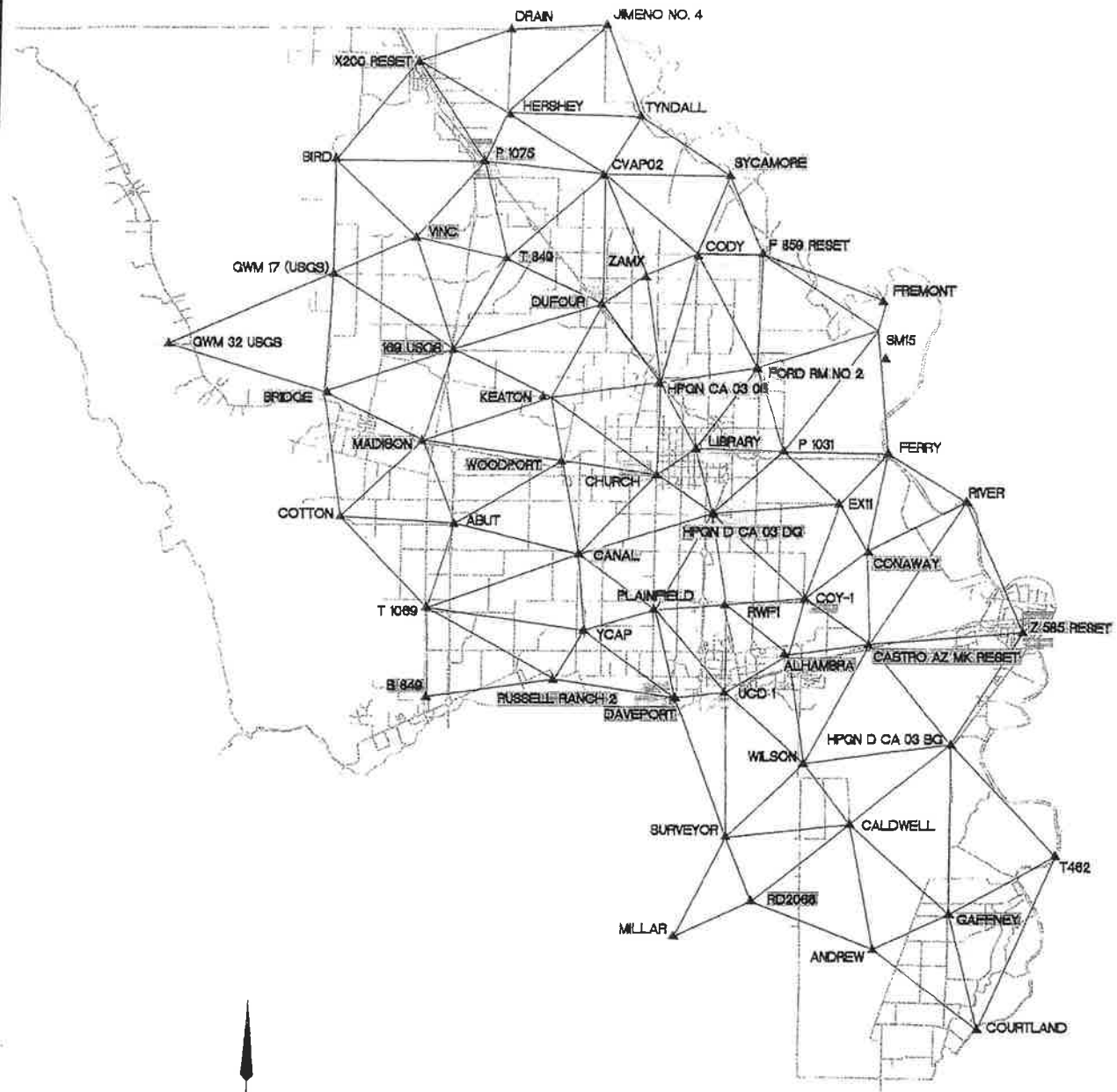
Layers

- Surface Sample Locations
- Basin
- CCRMP
- Active Wells
- Yolo County
- Yuba County
- Canals
- Sloughs
- Highways
- County Roads
- Cities
- UC Davis
- Actlba



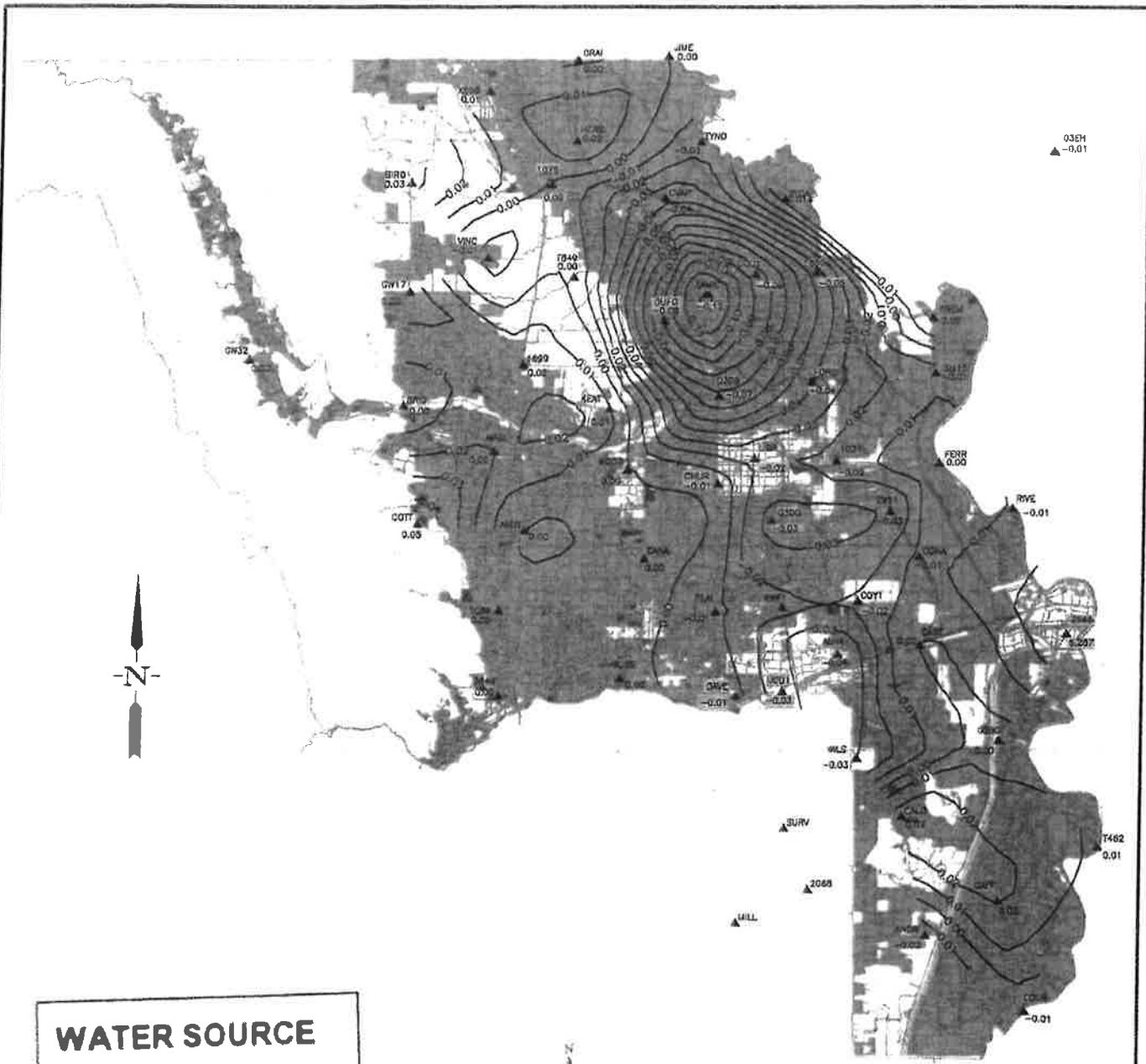
# SAR Data Availability for Yolo County Study Area









**FRAME SURVEYING & MAPPING**  
 809 A Street Davis, CA 95618  
 (530) 758-8584 (TEL) (530) 758-8201 (FAX)  
 1280-039D

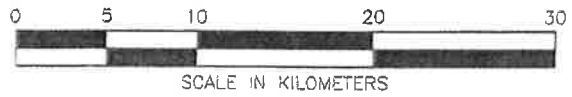
**APPENDIX D**  
 YOLO SUBSIDENCE NETWORK  
 LOCAL NETWORK DIAGRAM  
 FEBRUARY, 2006 SCALE: 1" = 10KM



**WATER SOURCE**

-  Surface Water
-  Mixed SW and GW
-  Groundwater
-  Unknown Source

WATER SOURCE IMAGE: DWR 1997



**IF**  
**SLM**

**FRAME SURVEYING & MAPPING**  
 809 A Street, Davis, CA 95618  
 (530) 756-8684 (TEL) (530) 756-8201 (FAX)  
 1280-038D

**APPENDIX C**  
 CUMULATIVE SUBSIDENCE, 1999 - 2005  
 SOURCE: CSRC ELLIPSOID HEIGHT DATA  
 FEBRUARY, 2006 SCALE: 1" = 10KM

**PALSAR Subsidence Map**

December 2006 - May 2010

