

Data Gap Management for a Large and a Small Dataset



GRA Annual Meeting
October 3, 2017

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What is a Data Gap?

GSPs must document uncertainty

A Data Gap is a “Known Unknown”

Can be conceptual or numeric



How do we manage them?

1. Identification: Gaps can be missing data or data that doesn't meet requirements.

2. Managing gaps may involve trade-offs.



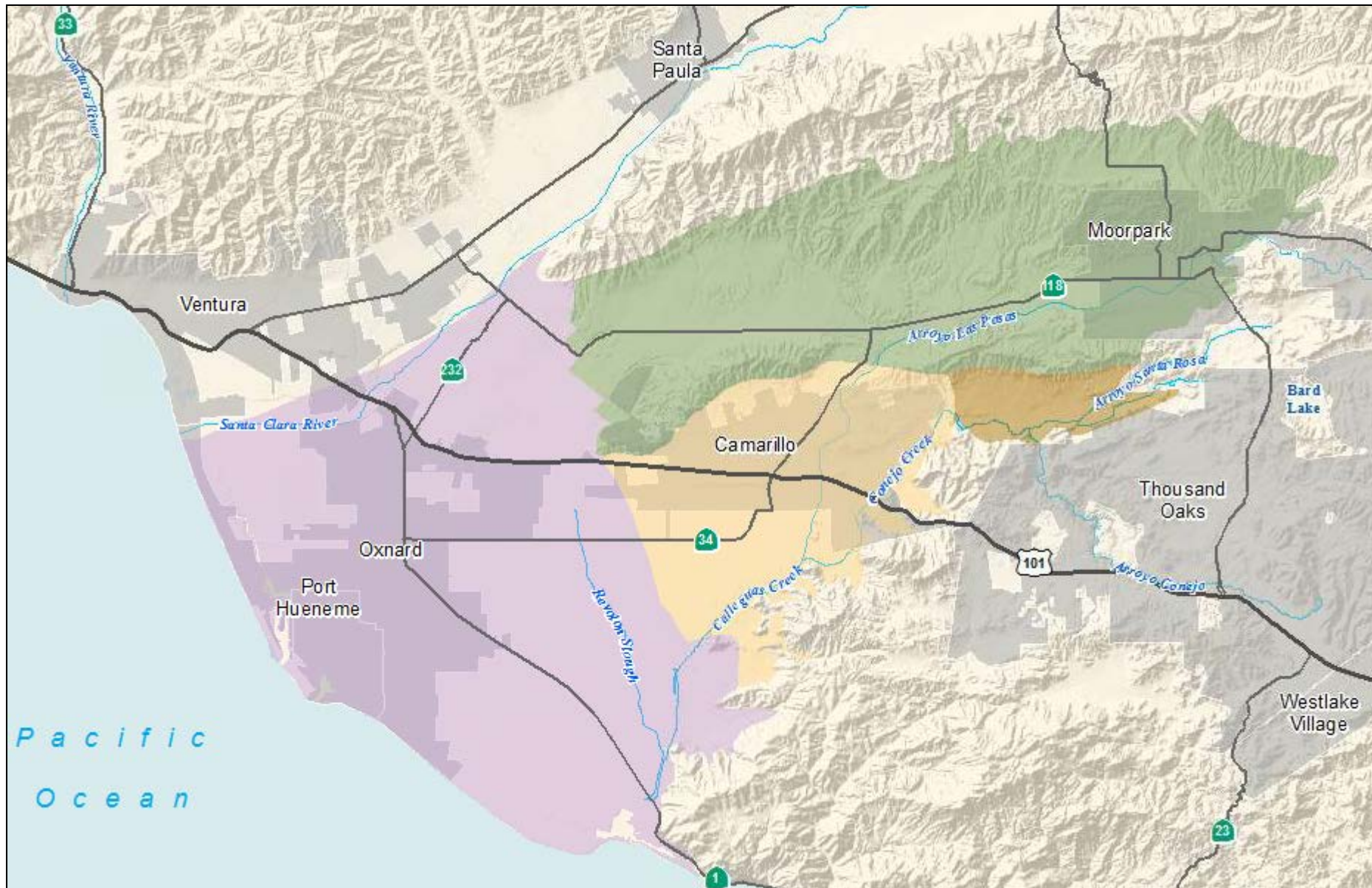
Case Study



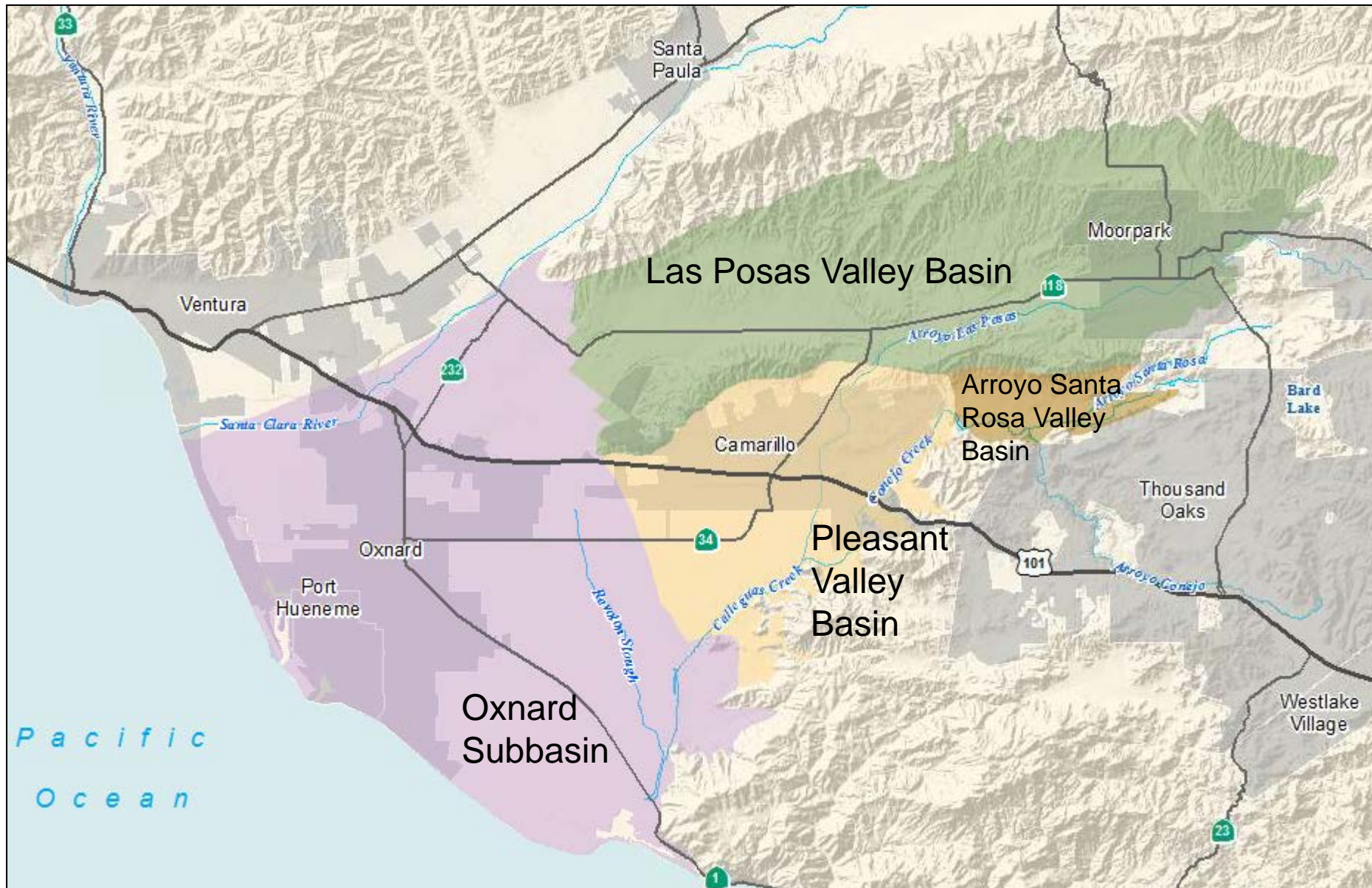
**Water elevation
contour maps**

DUDEK

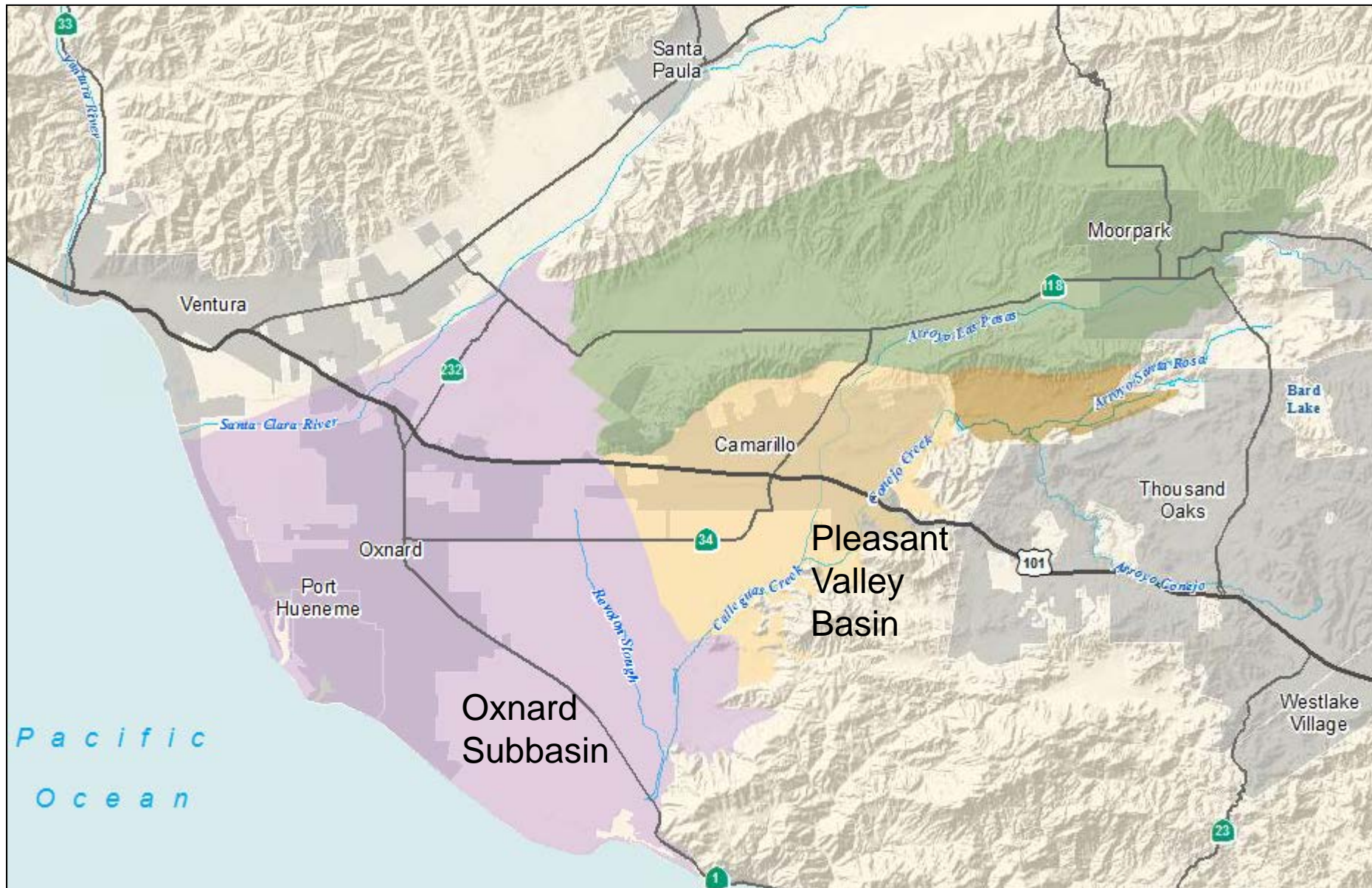
Case Study: FCGMA



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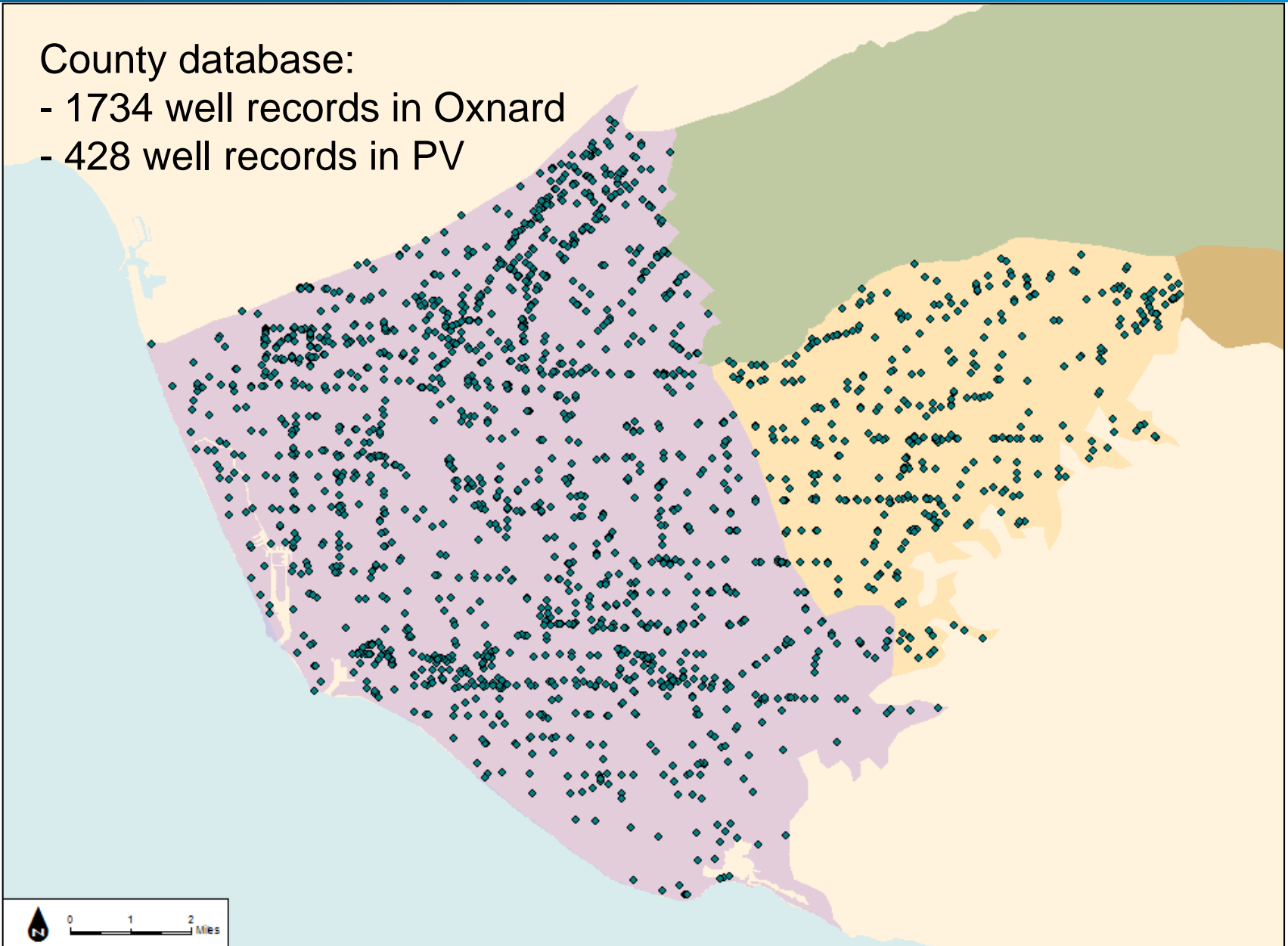
Identify Gaps

- **Assess existing and legacy data**
- **Apply regulatory requirements**

Case Study: large dataset

County database:

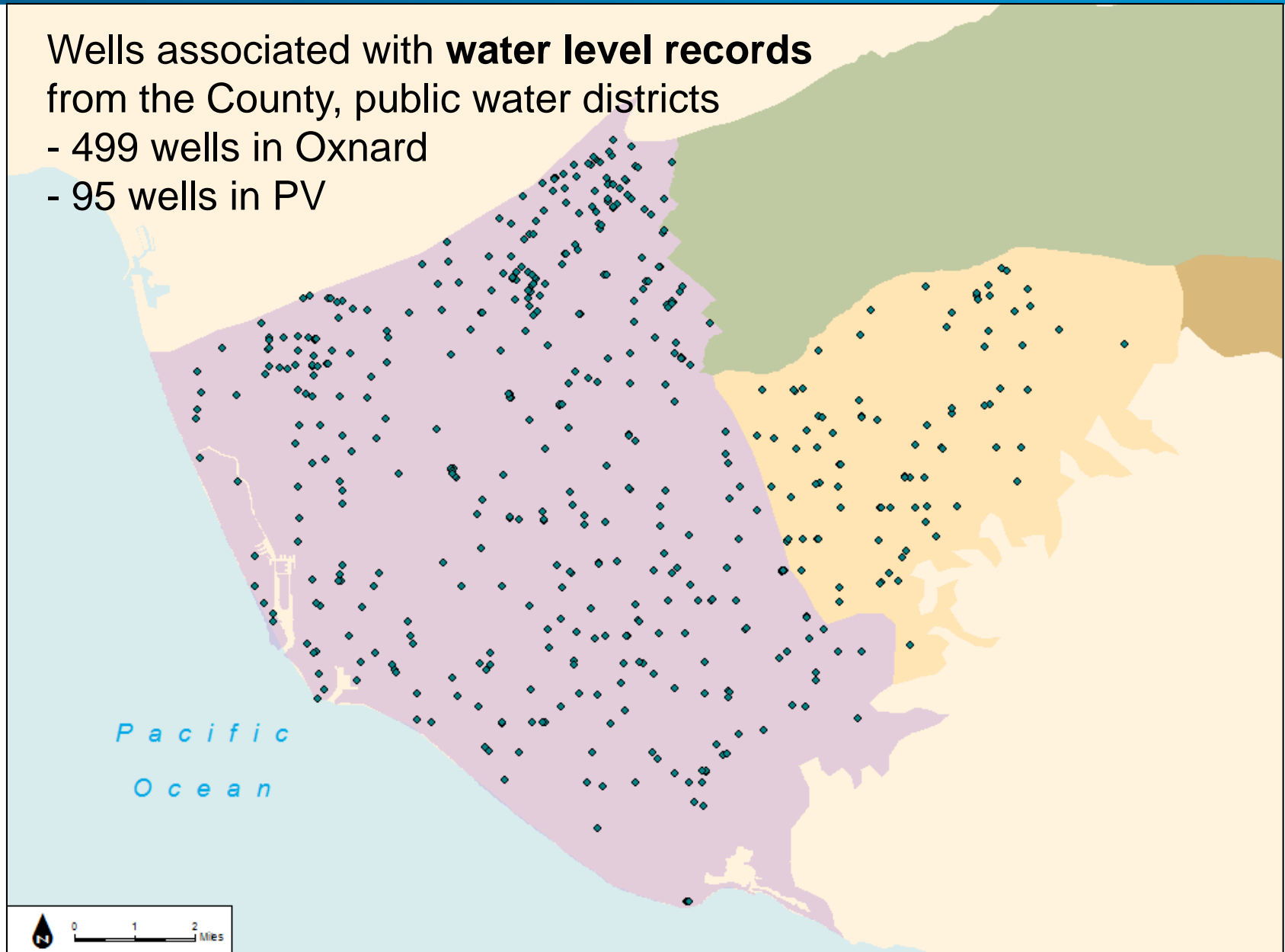
- 1734 well records in Oxnard
- 428 well records in PV



Case Study: large dataset

Wells associated with **water level records**
from the County, public water districts

- 499 wells in Oxnard
- 95 wells in PV



Regulations and guidance

Regulatory language:

“ § 354.16 (a)

Groundwater elevation data demonstrating flow directions, **lateral and vertical gradients**, and regional pumping patterns, including:

(1) Groundwater elevation contour maps depicting ... the current **seasonal high and seasonal low** for **each principal aquifer** within the basin.”

- GSP Emergency Regulations

Guidance:

“Groundwater elevation data... should approximate conditions at a discrete period in time. Therefore, all groundwater levels in a basin should be collected within **as short a time as possible, preferably within a 1 to 2 week period.**” - Monitoring Protocols BMP

“Groundwater level data must be sufficient to produce **seasonal maps**... Groundwater levels will be collected during the **middle of October and March** for comparative reporting purposes.”

- Monitoring Networks BMP

Regulations and guidance

Regulatory language:

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Groundwater elevation data demonstrating flow direction **1** **lateral and vertical gradients**, and regional pumping patterns, including:

(1) Groundwater elevation contour maps depicting **2** ... the current **seasonal high and seasonal low** for **each principal aquifer** **3** in the basin.”

- GSP Emergency Regulations

Guidance:

“Groundwater elevation data... should approximate conditions at a discrete period in time. Therefore, all groundwater levels in a basin should be collected within **as short a time as possible, preferably within a 1 to 2 week period.**” - Monitoring Protocols BMP **4**

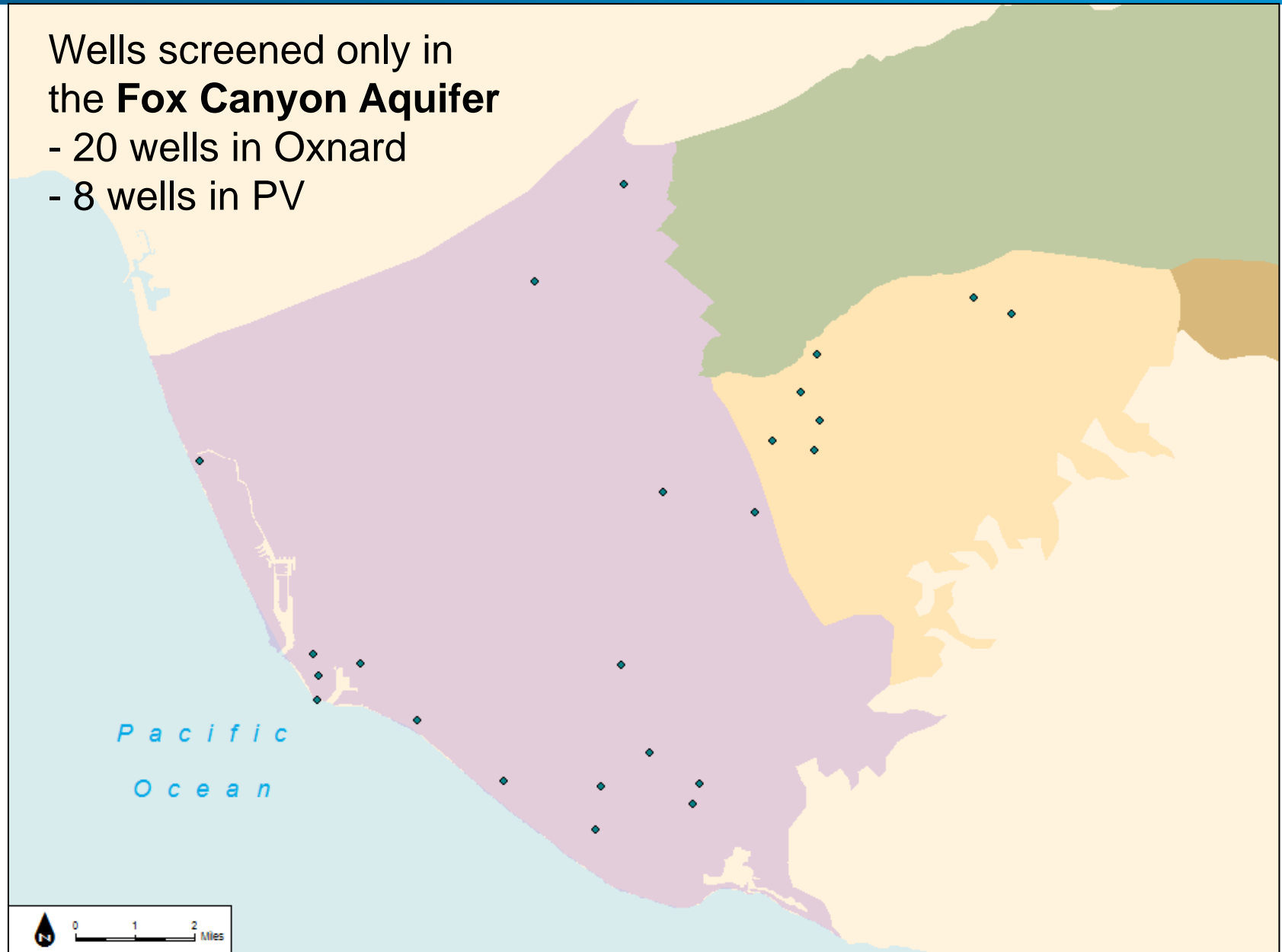
“Groundwater level data must be sufficient to produce seasonal maps... Groundwater levels will be collected during the **middle of October and March** for comparative reporting purposes.” **5**

- Monitoring Networks BMP

Contour maps

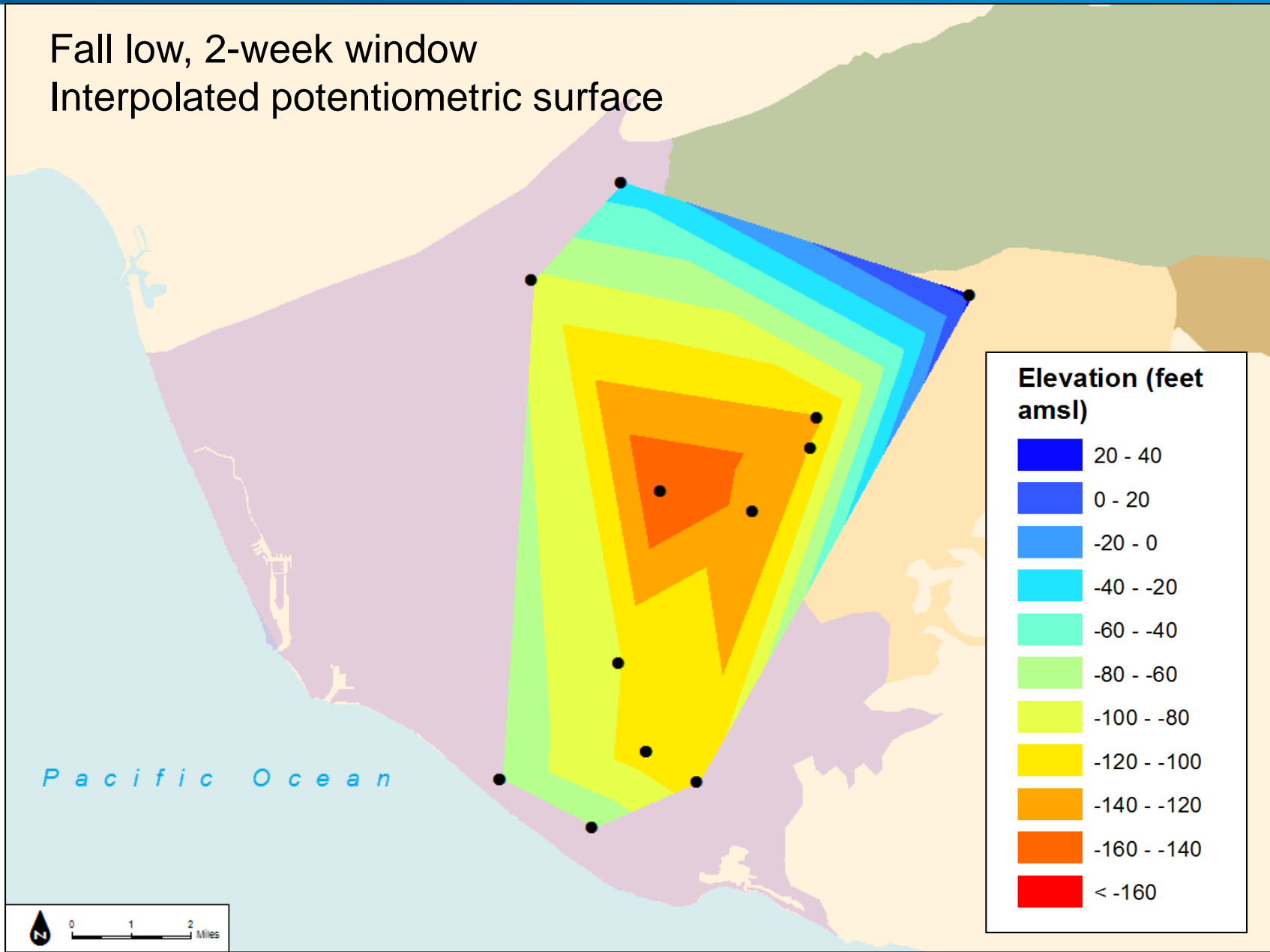
Wells screened only in
the **Fox Canyon Aquifer**

- 20 wells in Oxnard
- 8 wells in PV



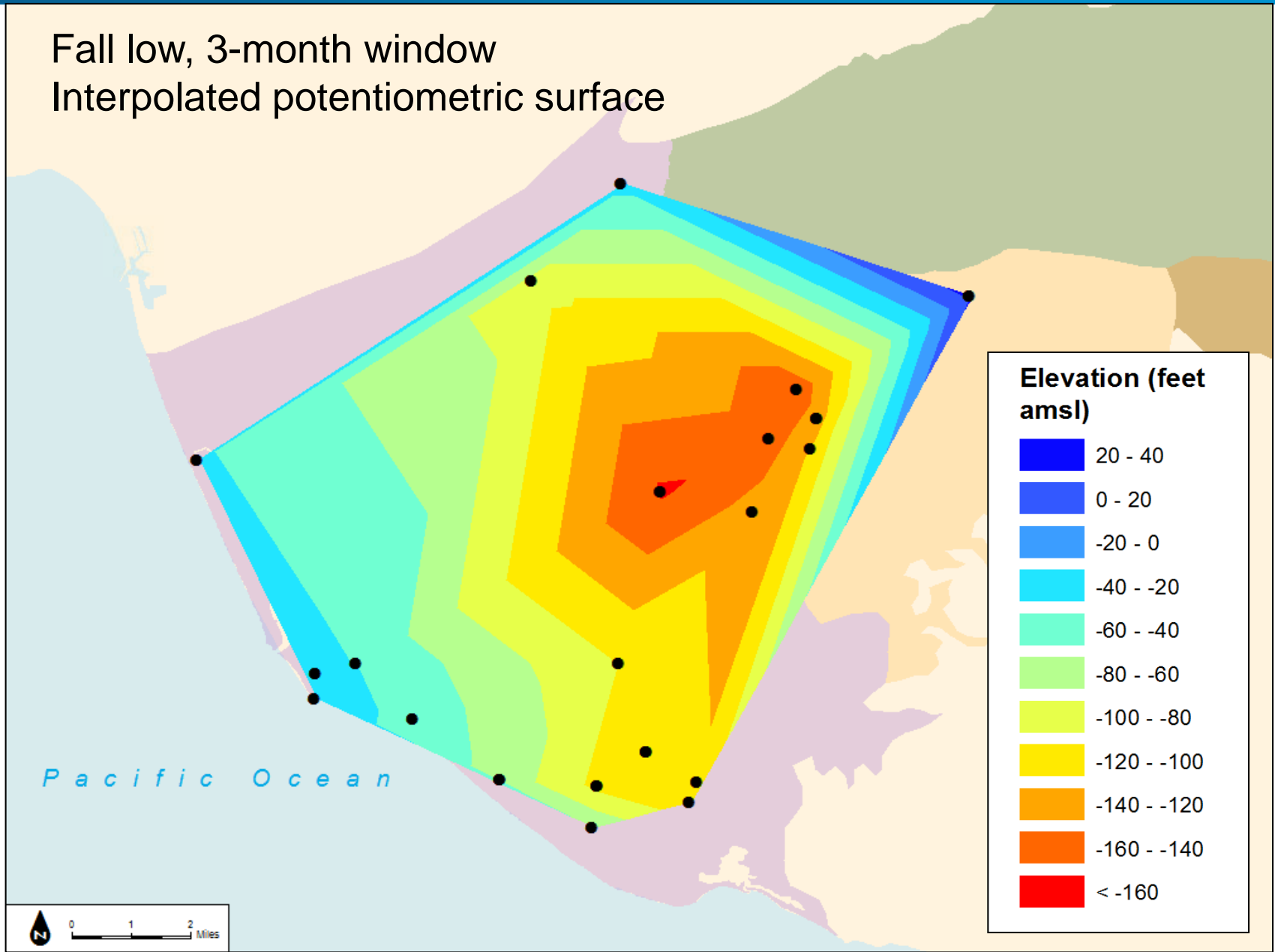
Contour maps

Fall low, 2-week window
Interpolated potentiometric surface



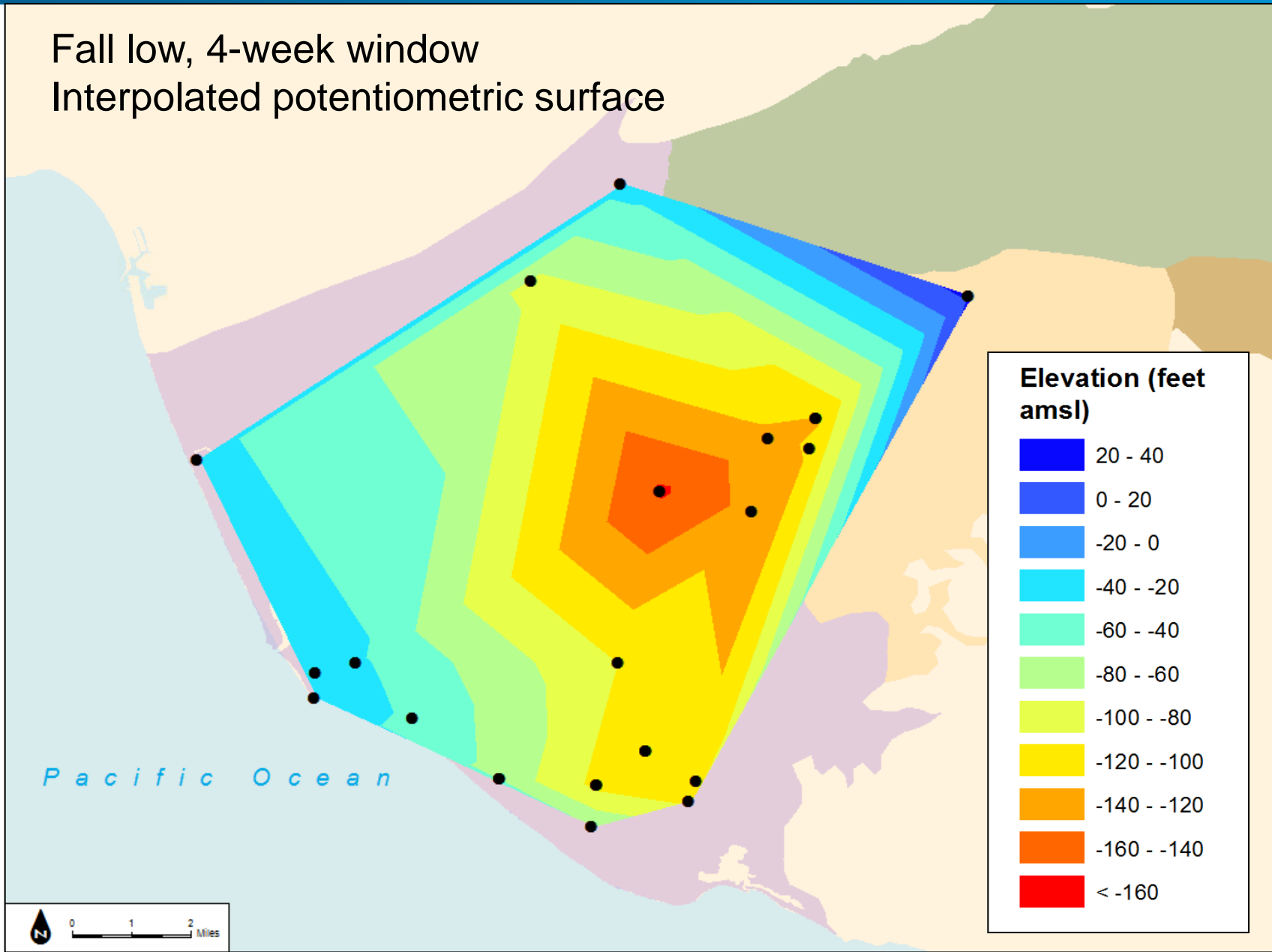
Contour maps

Fall low, 3-month window
Interpolated potentiometric surface



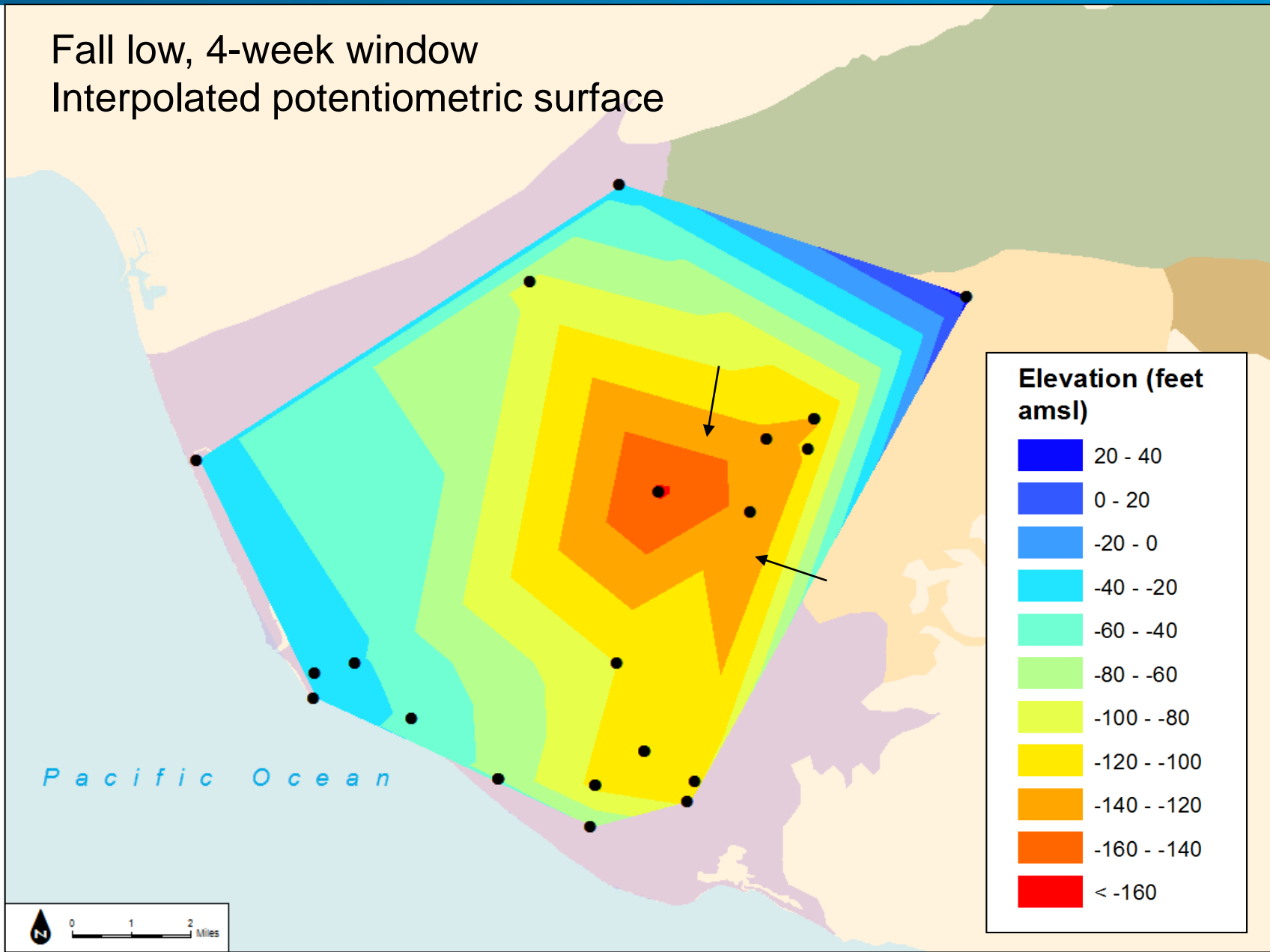
Contour maps

Fall low, 4-week window
Interpolated potentiometric surface



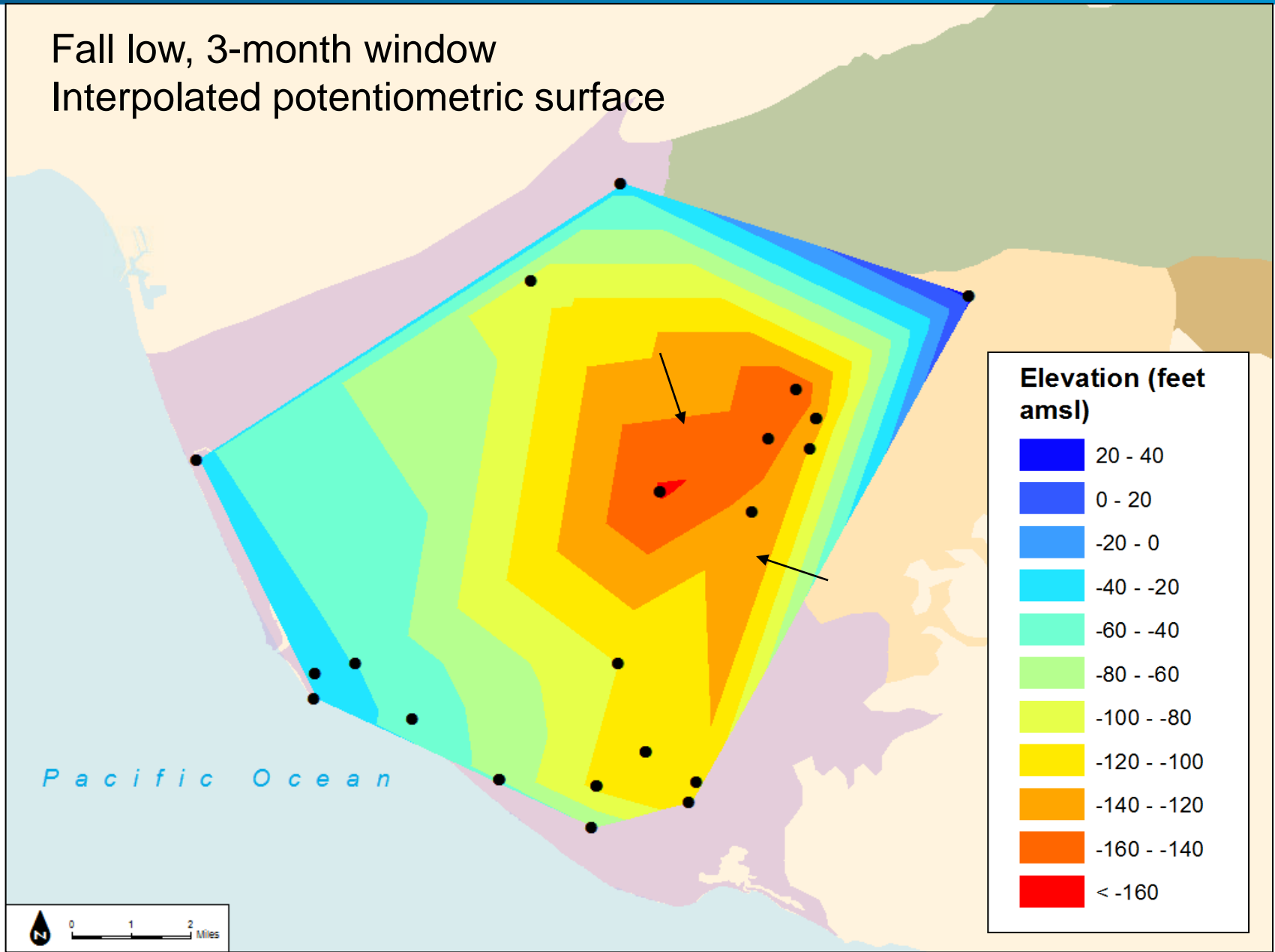
Contour maps

Fall low, 4-week window
Interpolated potentiometric surface



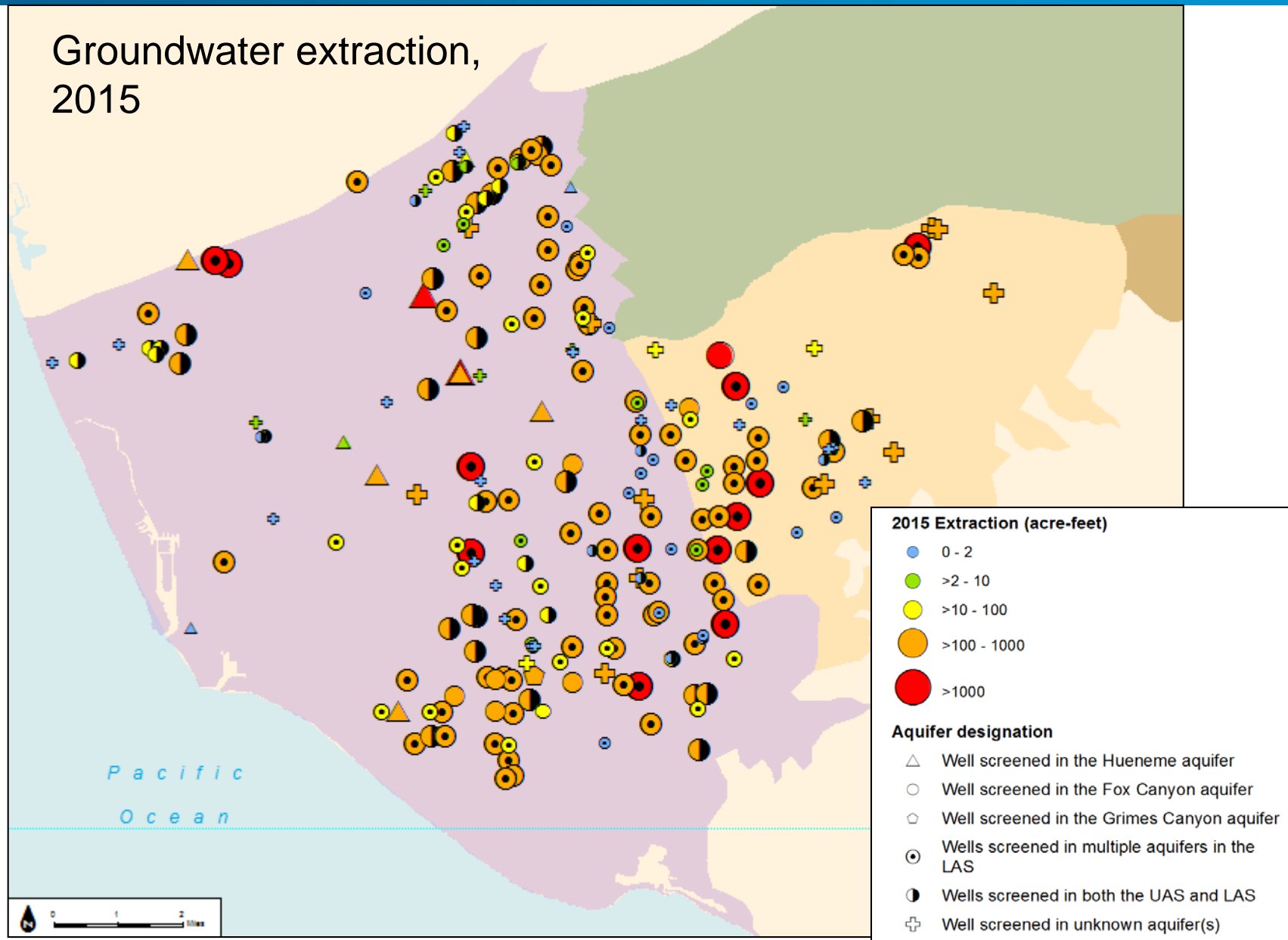
Contour maps

Fall low, 3-month window
Interpolated potentiometric surface



Pumping

Groundwater extraction,
2015



Lessons learned: identifying gaps

- New requirements and objectives may produce new data gaps
- Early, holistic assessment of data resources is recommended

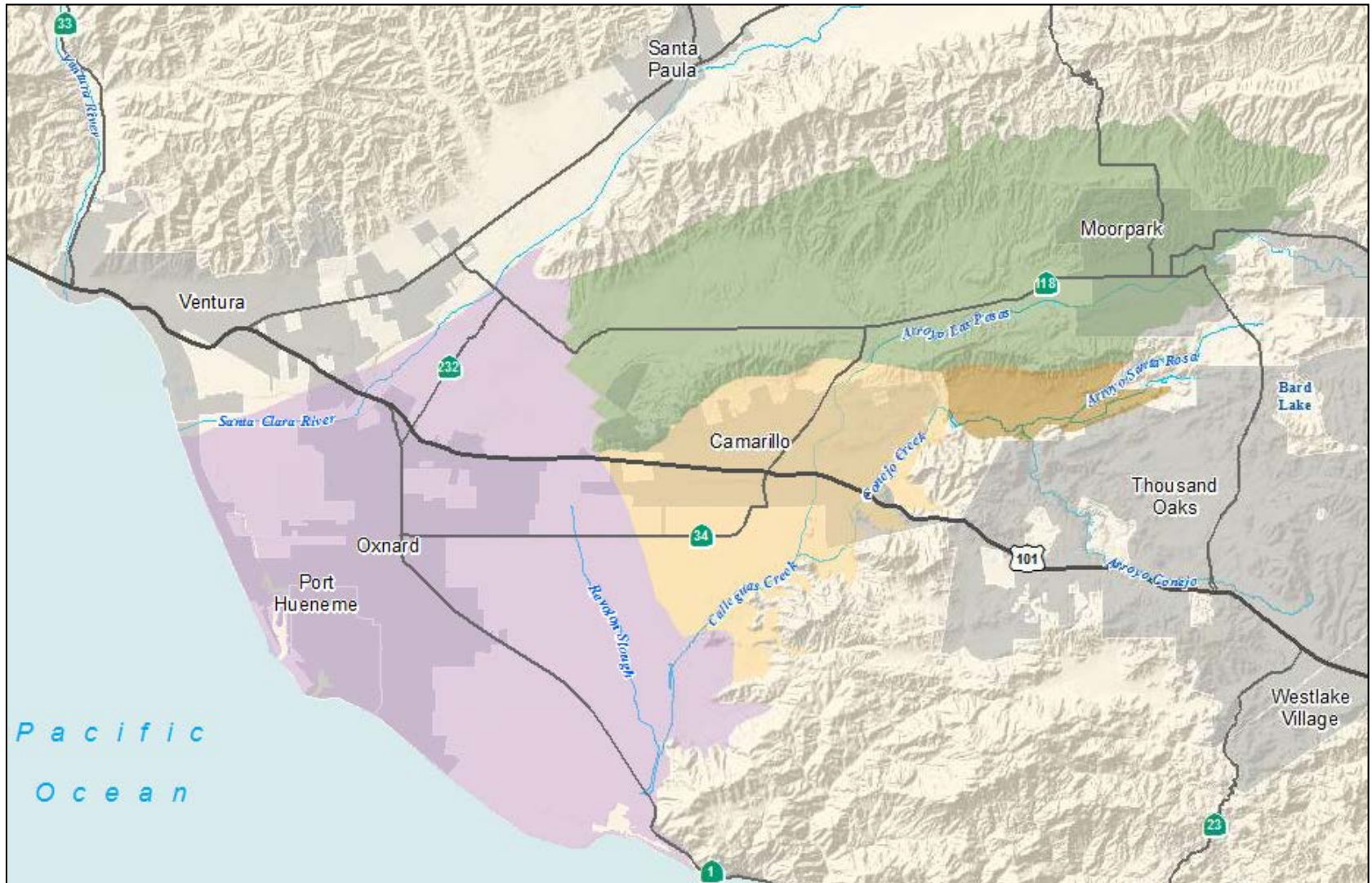
Lessons learned: managing trade-offs

- Case study trade-off:
 - Increasing time window tends to increase spatial coverage.
 - But it also reduces reliability of hydraulic gradients, and prompts additional choices about which water level measurements to use in contouring.
- This trade-off could be called a temporal data gap.
 - It could be managed in the future by coordinating monitoring schedules between multiple agencies to ensure WLs collected within a 2-week window.

More considerations

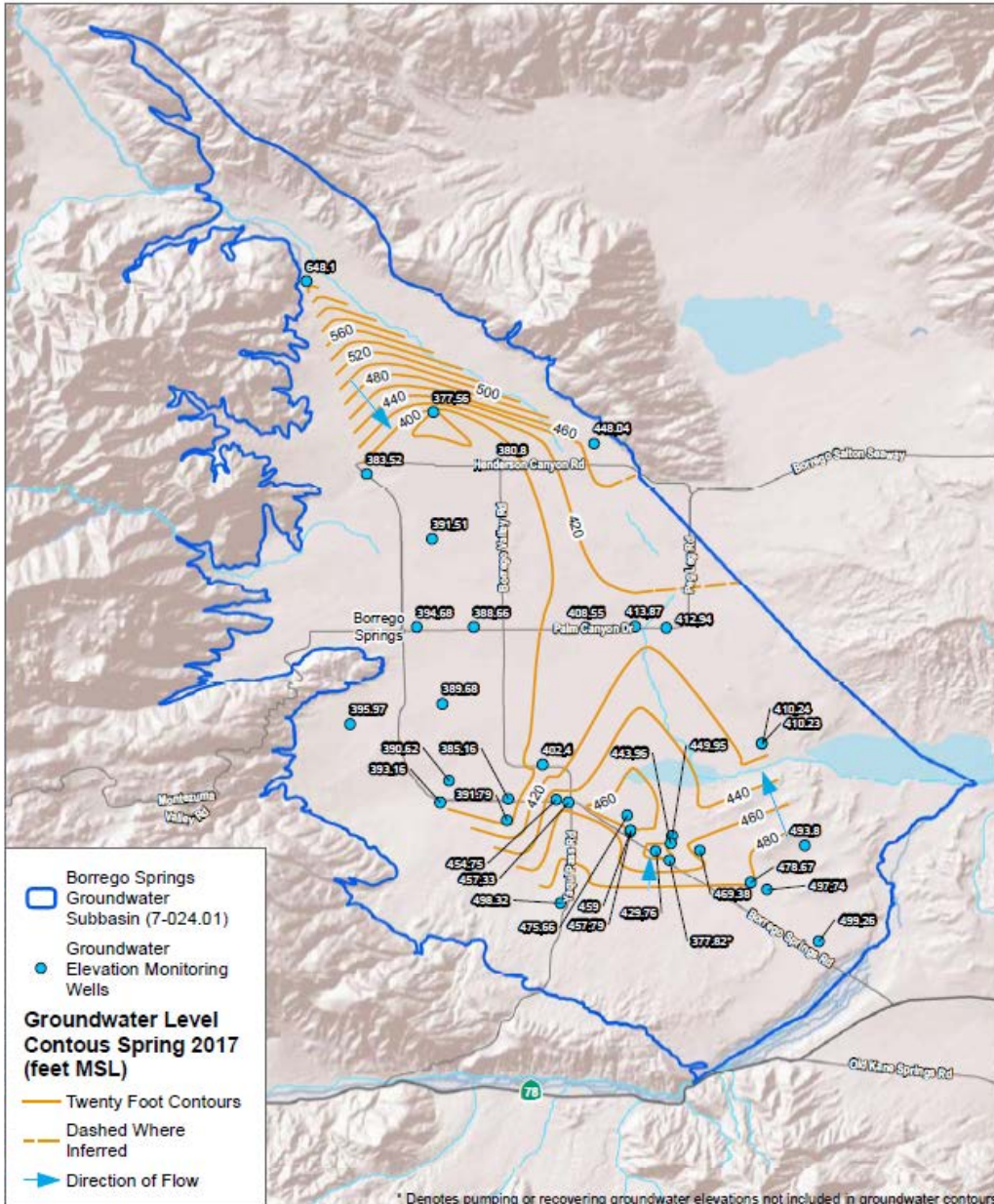
- Lateral gradients may impact calculations of groundwater flow
- Not all water elevation data are created equal
 - Static versus unrecovered water levels
 - Transducer data
- Some data gaps are unfillable (e.g., cannot eliminate production wells screened in multiple aquifers)

Questions



Case Study 2: smaller dataset

- The basin can be treated as one water-bearing unit
- Concerted effort to collect measurements at all known wells in Spring 2017



Case Study 2: smaller dataset

