BMO Threshold Development and Recharge Mapping: Project Update

Sacramento Central Groundwater Authority

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Presenter:

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Complex Challenges | Innovative Solutions

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from the
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Agenda

- Background and Need
- Project Update
  - Groundwater Elevation BMO Threshold Development
- Next Steps

Agenda

- **Background and Need**
- Project Update
  - Groundwater Elevation BMO Threshold Development
- Next Steps

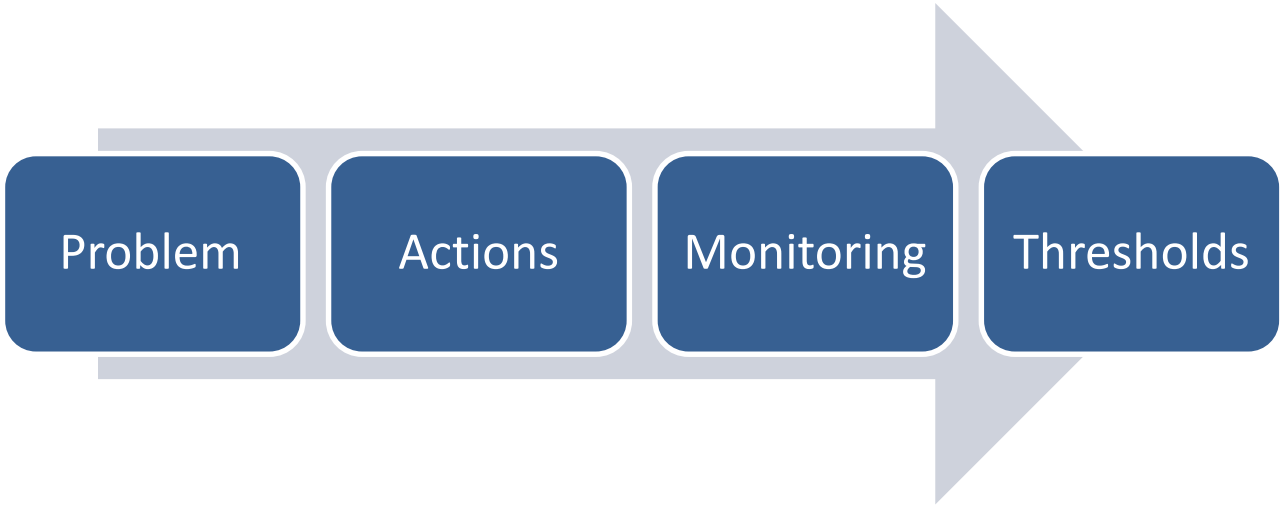
Project Background

- Two Major Components
  - **Groundwater Elevation BMO Threshold Development**
  - Recharge Mapping

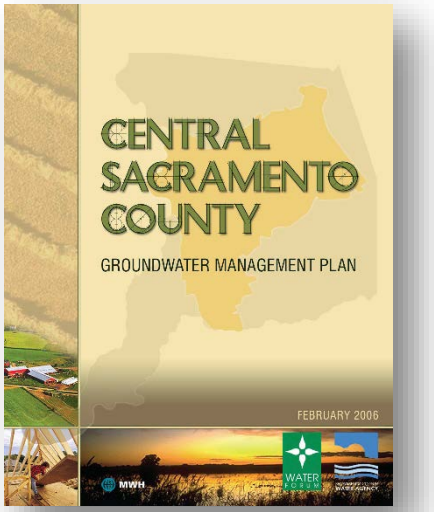
Background - BMOs

1. Maintain a long-term average groundwater extraction rate of 273,000 AF/year.
2. Establish specific minimum groundwater elevations within all areas of the basin consistent with the Water Forum “Solution.”
3. Protect against any potential inelastic land surface subsidence.
4. Protect against any adverse impacts to surface water flows.
5. Develop specific water quality objectives for several constituents of concern.

BMO Threshold Development



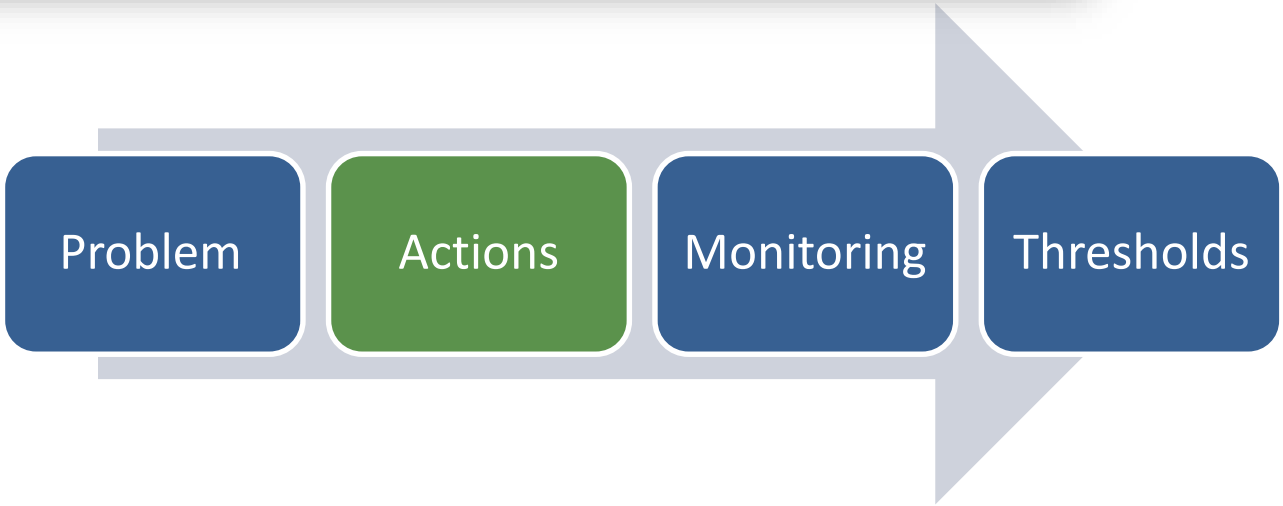
BMO Threshold Development



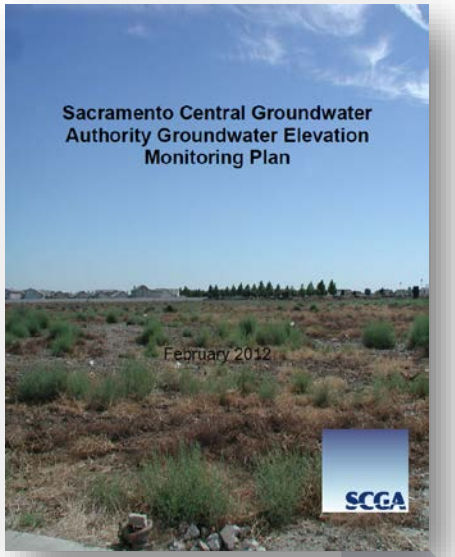
Problem → Actions → Monitoring → Thresholds

BMO Threshold Development

Monitoring Action	Trigger Points	Recommended Action
BMO No. 2. Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum "solution."		
A monitoring methodology to meet specific objectives in managing groundwater levels requires a systematic, repeatable, and scientific approach. The objective of this monitoring program is to take measurements from selected monitoring wells that have sufficient construction and hydrogeologic data. Wells will be assigned to represent the polygon areas defined in **Appendix B**, and may be grouped within the basin in areas that are sufficiently distinct in	Trigger Point 1. A 25 to 50 percent encroachment into the designated bandwidth of a polygon.	Alert stage that informs the basin governance body and the overlying groundwater extractor(s) that a specific polygon area is being compromised. Activation of this trigger will take place only after the cause of the condition is thoroughly investigated.
	Trigger Point 2. A 50 to 75 percent encroachment into the designated bandwidth of a polygon.	In the event groundwater level measurements hit Trigger Point 2 without first initiating Trigger Point 1, the recommended actions of Trigger Point 1 still apply. Additionally, this stage initiates a requirement to collect a fee to secure supplemental water supplies or to reduce pumping in a predefined area(s).



BMO Threshold Development



Problem → Actions → Monitoring → Thresholds

BMO Threshold Development

Appendix B

Summary of the development of Basin Management Objective #2 (Maintain specific groundwater elevations within all areas of the Central Basin consistent with the Water Forum solution).

Agenda

- Background and Need
- **Project Update**
  - **Groundwater Elevation BMO Threshold Development**
- Next Steps

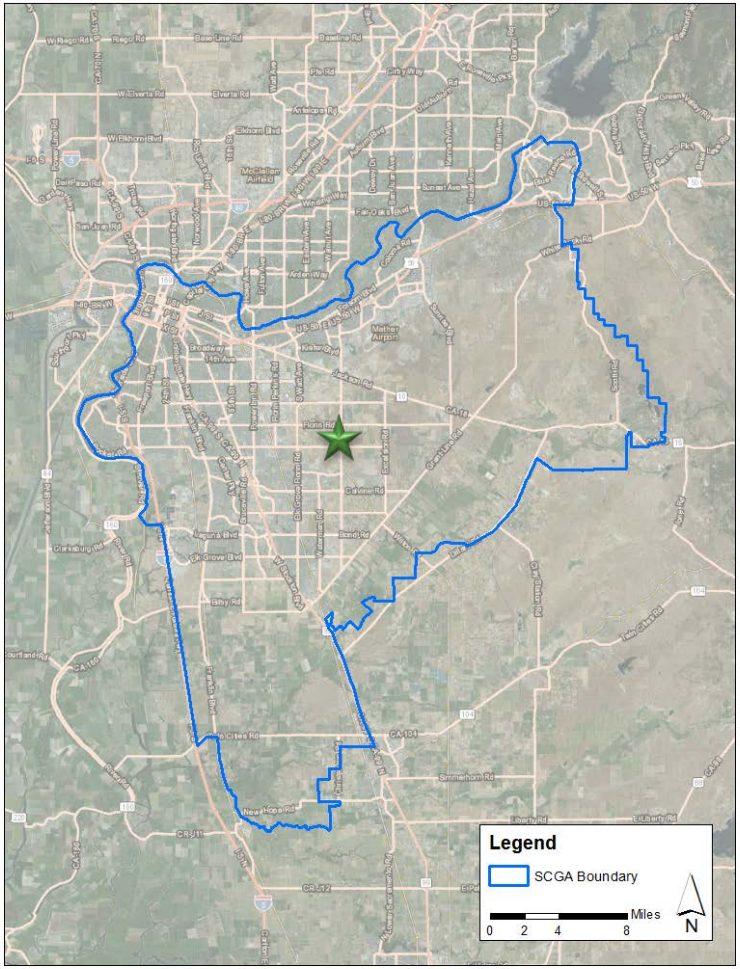
BMO Threshold Development

Activities – Incorporate CASGEM effort into Appendix B methodology and GWMP trigger actions

- Group polygons into management zones
- Quantify bandwidths and identify CASGEM well(s) for monitoring

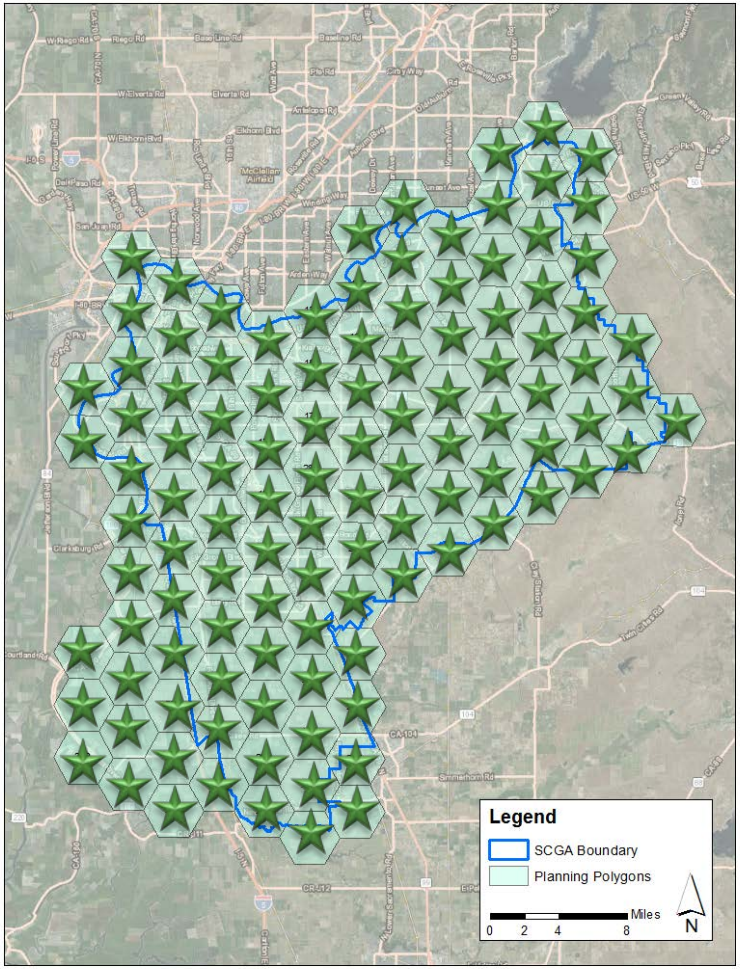
BMO Threshold Development

- Why not just one well in the middle?
- Future problems may be more localized
  - Differences in hydrology
  - Differences in water use



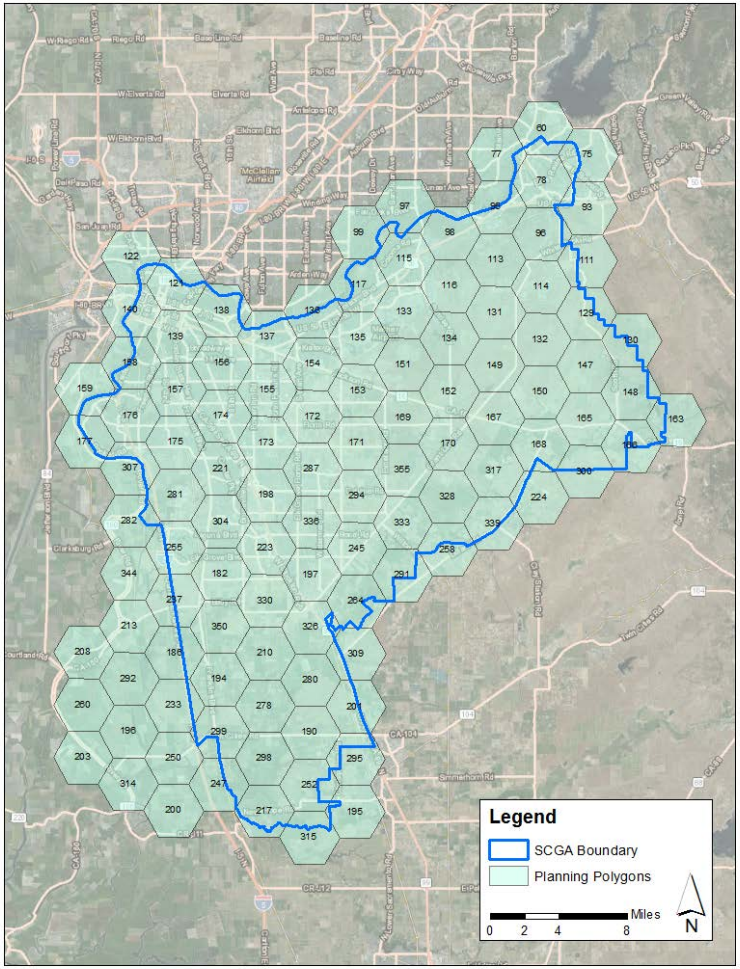
BMO Threshold Development

- Why not one well in each polygon?
- Not enough wells
- Expensive to monitor and report



BMO Threshold Development

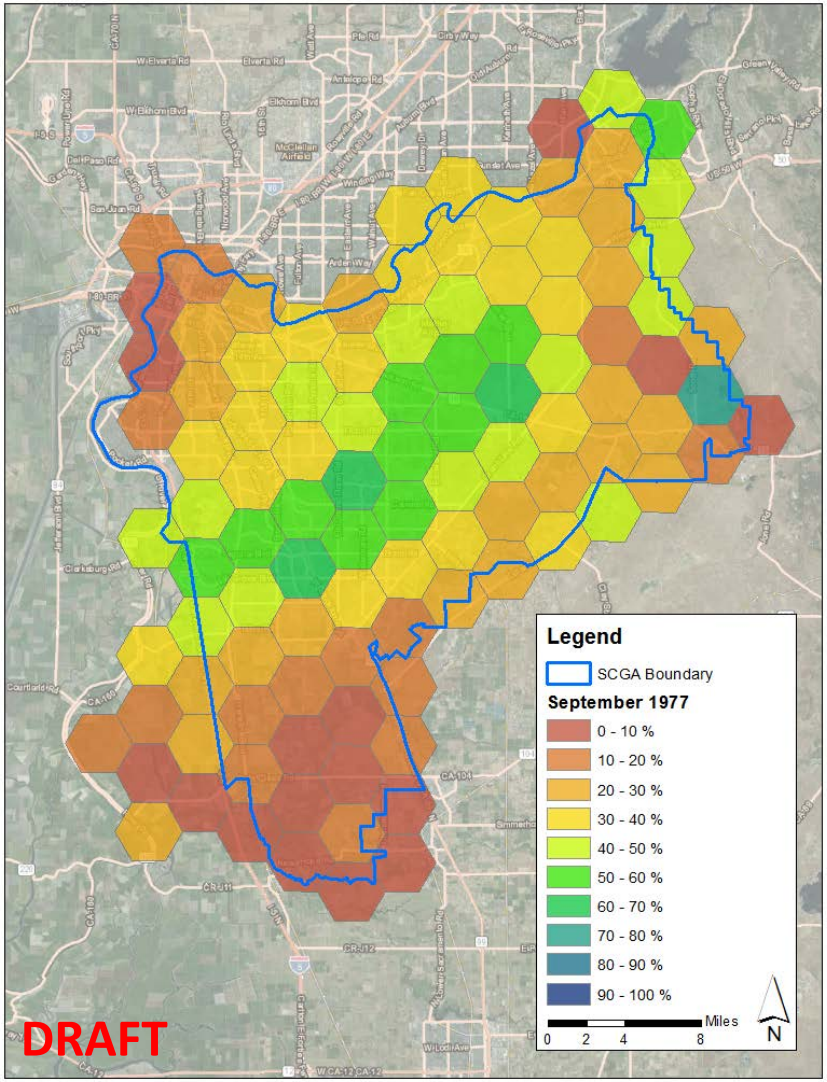
- Identify groupings of areas that behave similarly
- Utilize updated SacIWRM Future Conditions Baseline



Groundwater Elevation BMO Threshold Development Model Update Completed

- Updated Future Conditions Baseline
  - Revised urban footprint based on General Plans and other available planning documents
    - Added Folsom Plan Area and Cordova Hills
  - Revised non-urban water demands using CropScape
  - Revised urban water demands and supplies using UWMP/WSMP

BMO Threshold Development
Hydrologic Response – Timing – 1977 Hydrology



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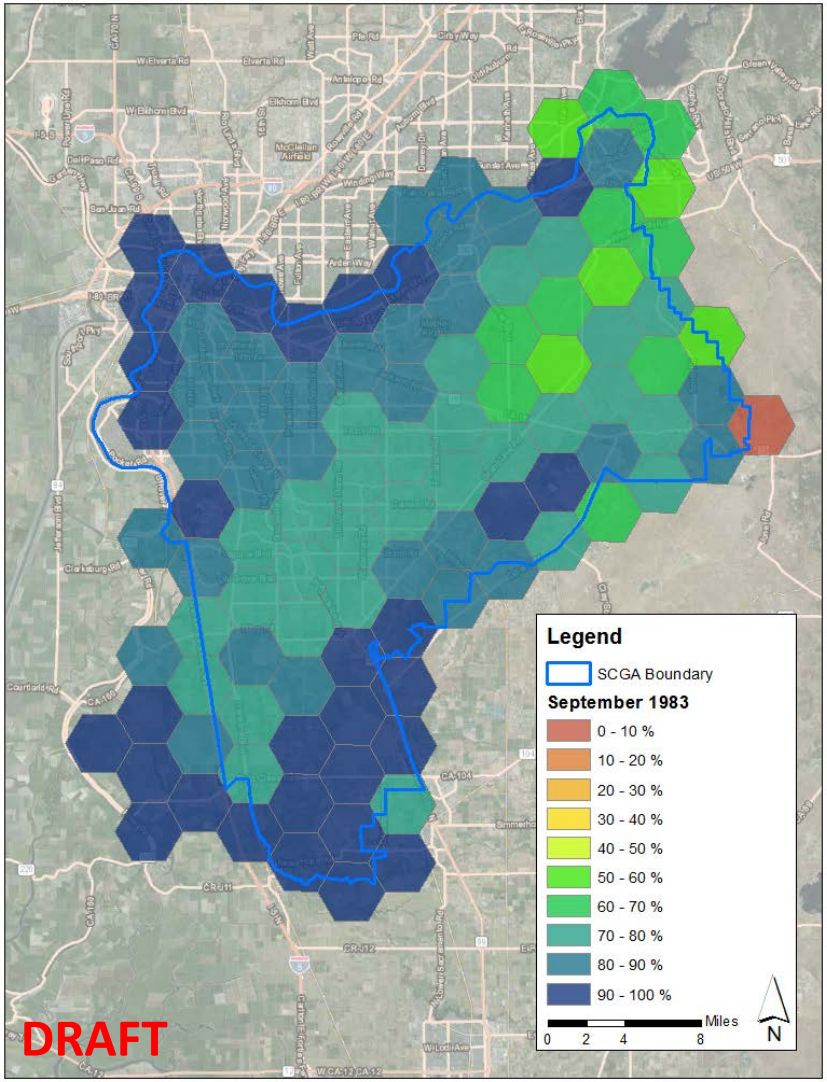
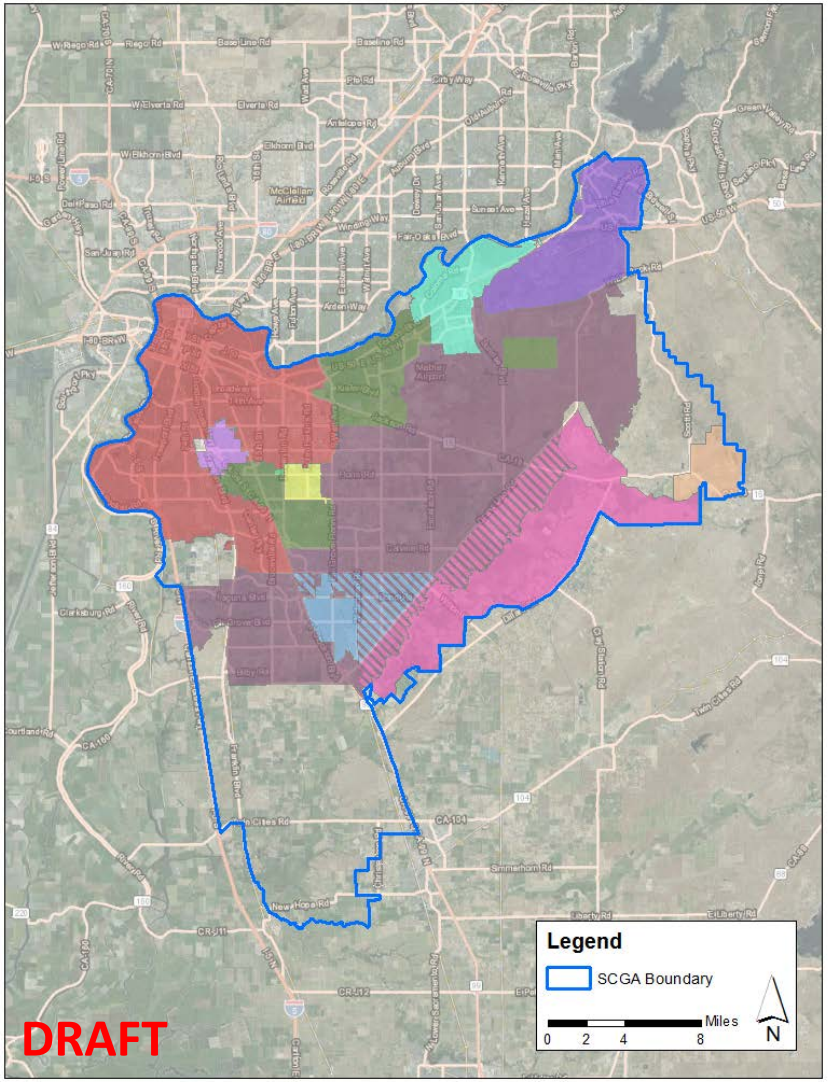
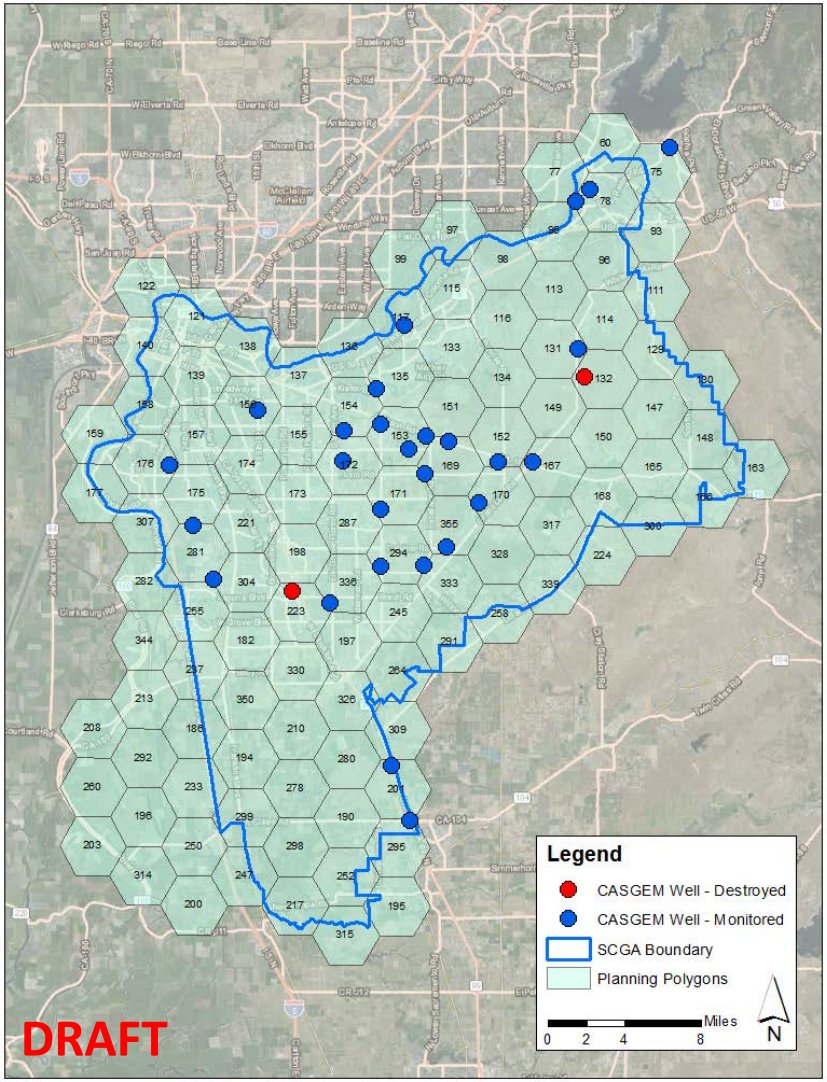
BMO Threshold Development
Hydrologic Response – Timing – 1983 Hydrology



BMO Threshold Development
Hydrologic Response – Land and Water Use



BMO Threshold Development
Hydrologic Response – Available Monitoring



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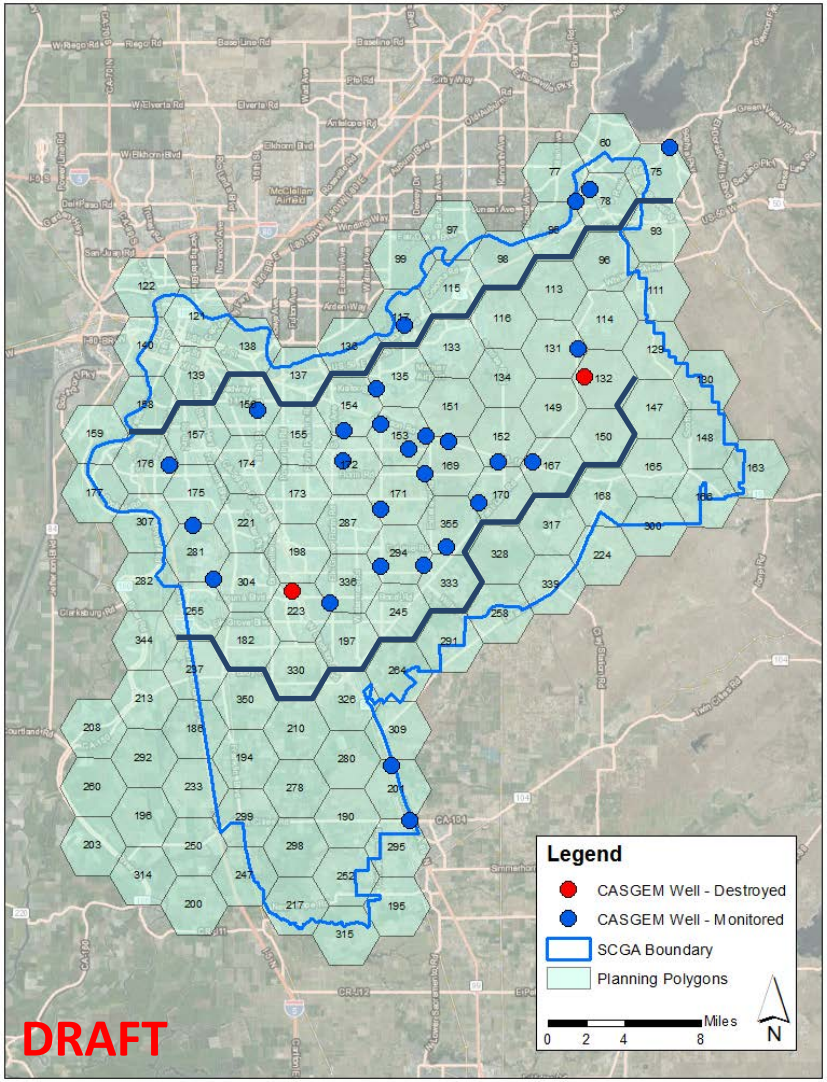

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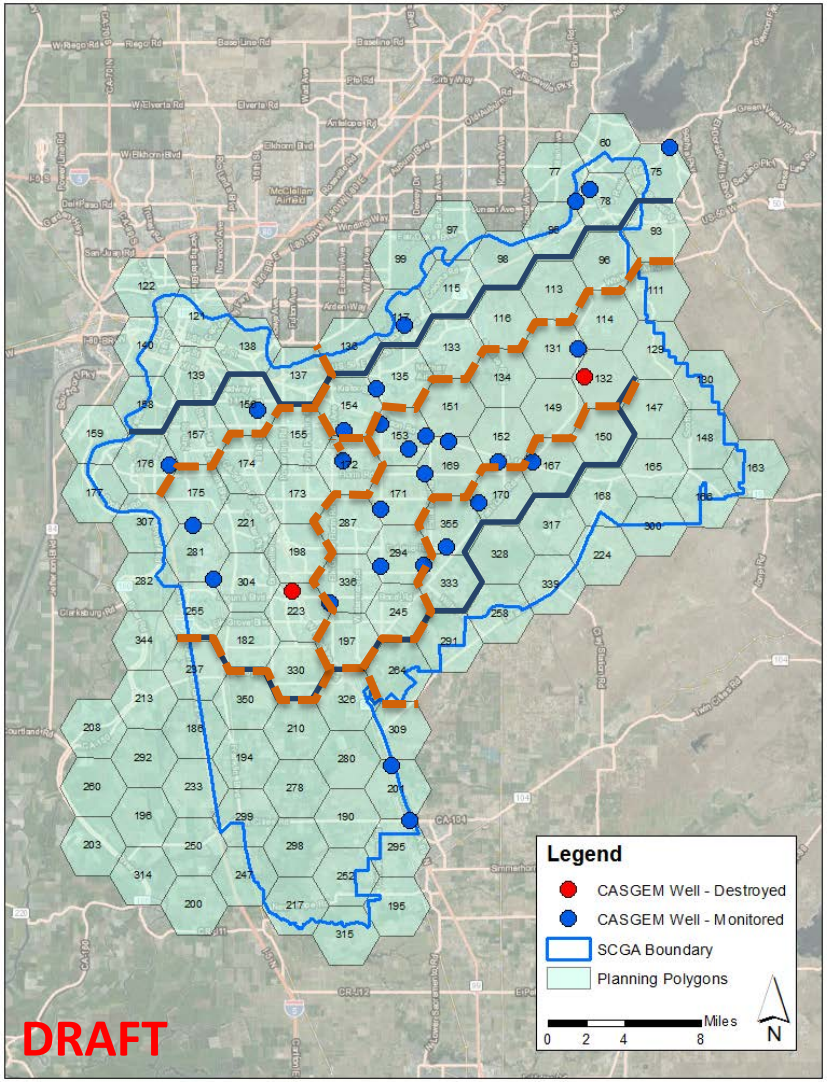

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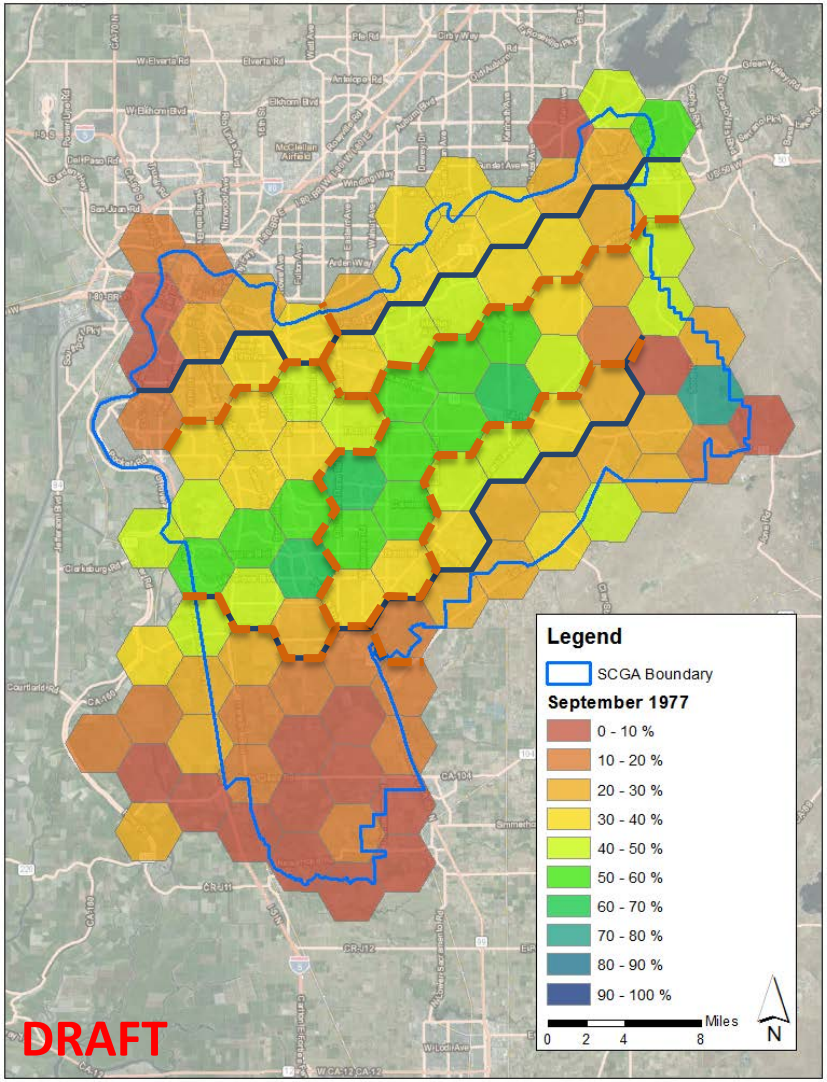

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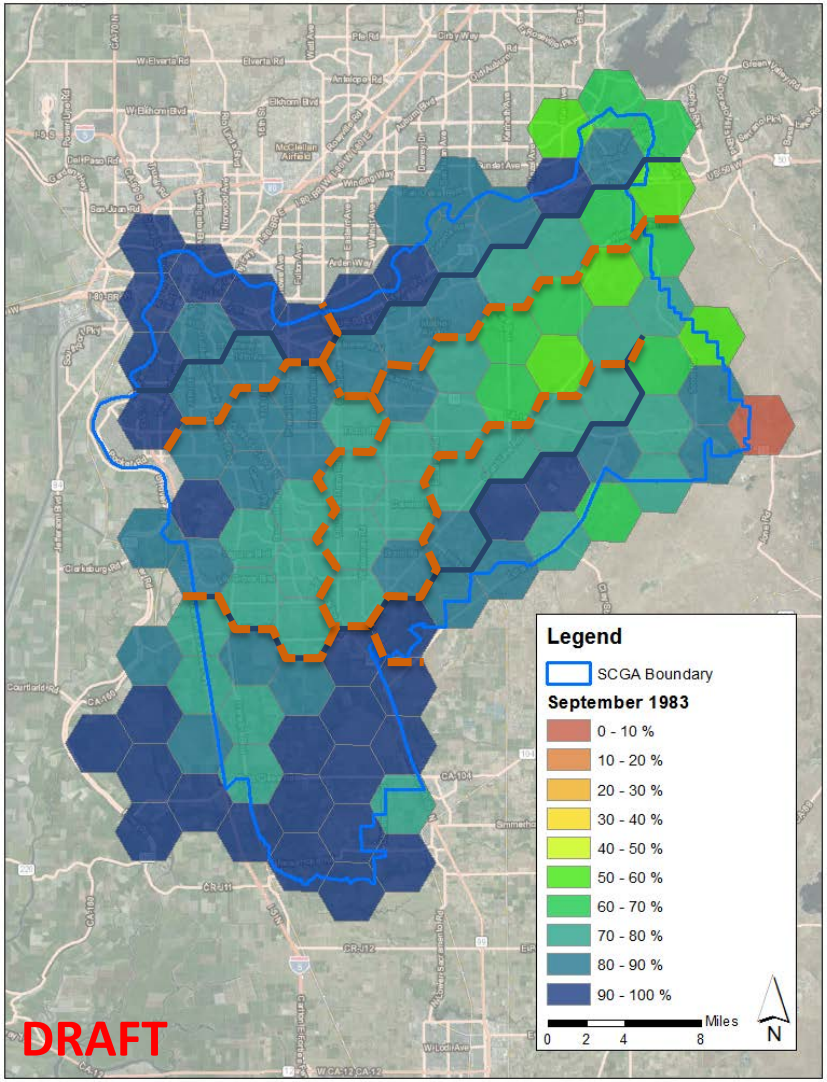

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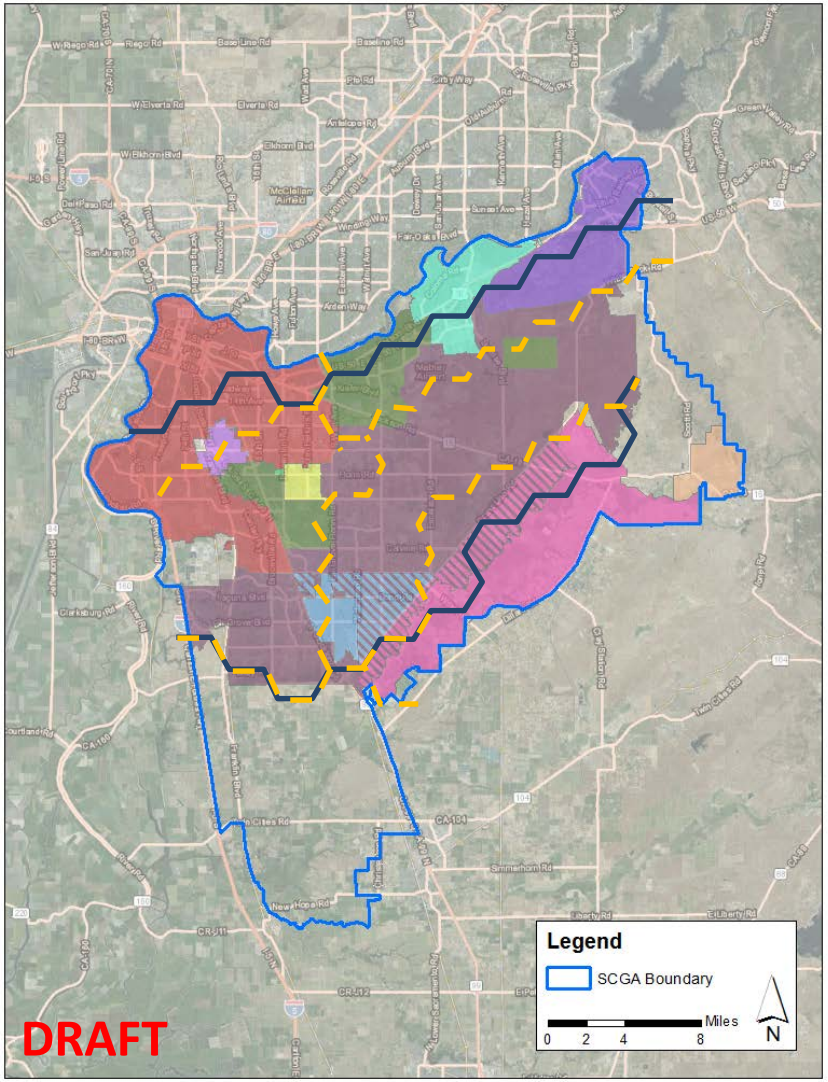
BMO Threshold Development
Hydrologic Response – Land and Water Use



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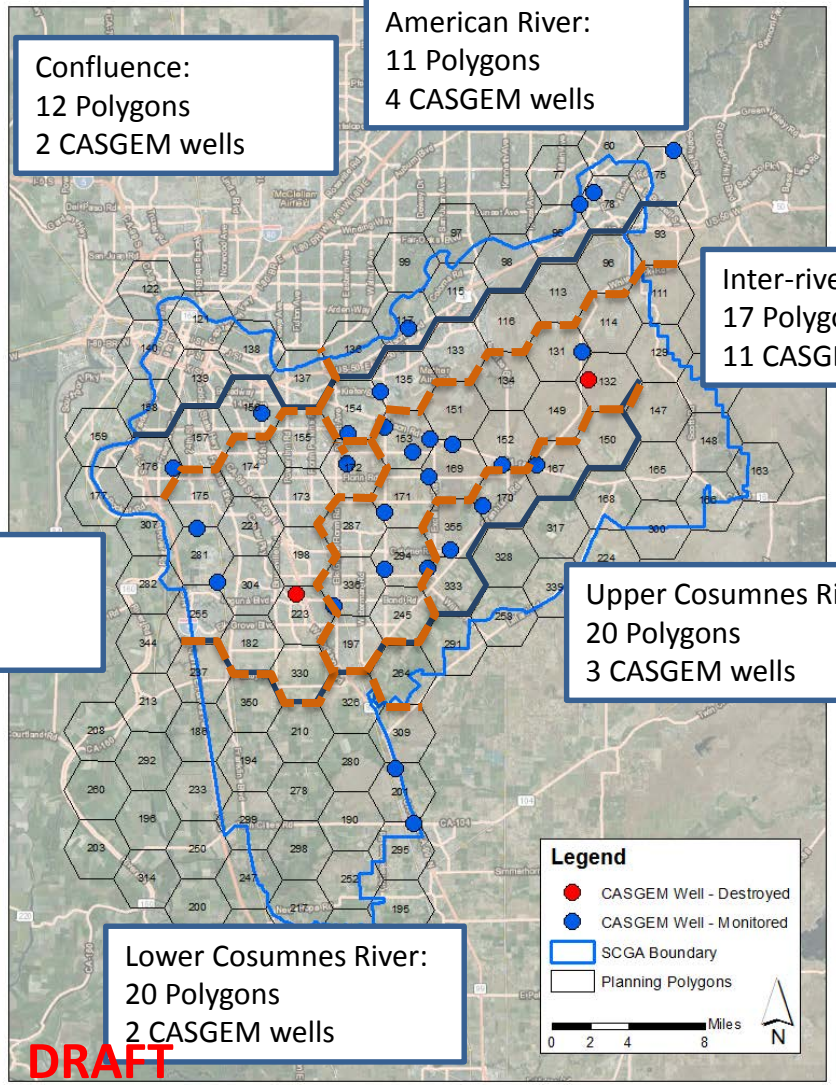
BMO Threshold Development Proposed



Confluence:
12 Polygons
2 CASGEM wells

American River:
11 Polygons
4 CASGEM wells

Inter-riverine:
17 Polygons
11 CASGEM wells

Sacramento River:
15 Polygons
3 CASGEM wells

Upper Cosumnes River:
20 Polygons
3 CASGEM wells

Lower Cosumnes River:
20 Polygons
2 CASGEM wells

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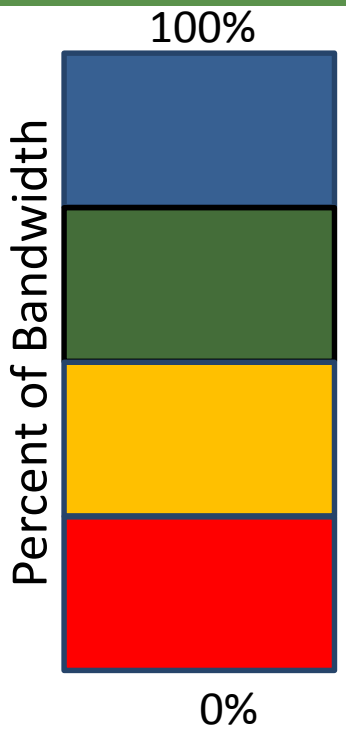
BMO Threshold Development – Well Selection

- Few wells meet criteria presented in GMP:
  - 1977 - 2003
  - Semiannual
  - No gaps exceeding 1 year
- CASGEM wells incorporated as the most representative of basin conditions
- Historical well data analyzed for applicability

BMO Threshold Development
Well Selection - Applicability

- Thresholds based on future conditions baseline
- Future conditions have generally higher groundwater elevations
- Need to avoid penalizing future benefits yet to be realized

GMP Trigger Levels



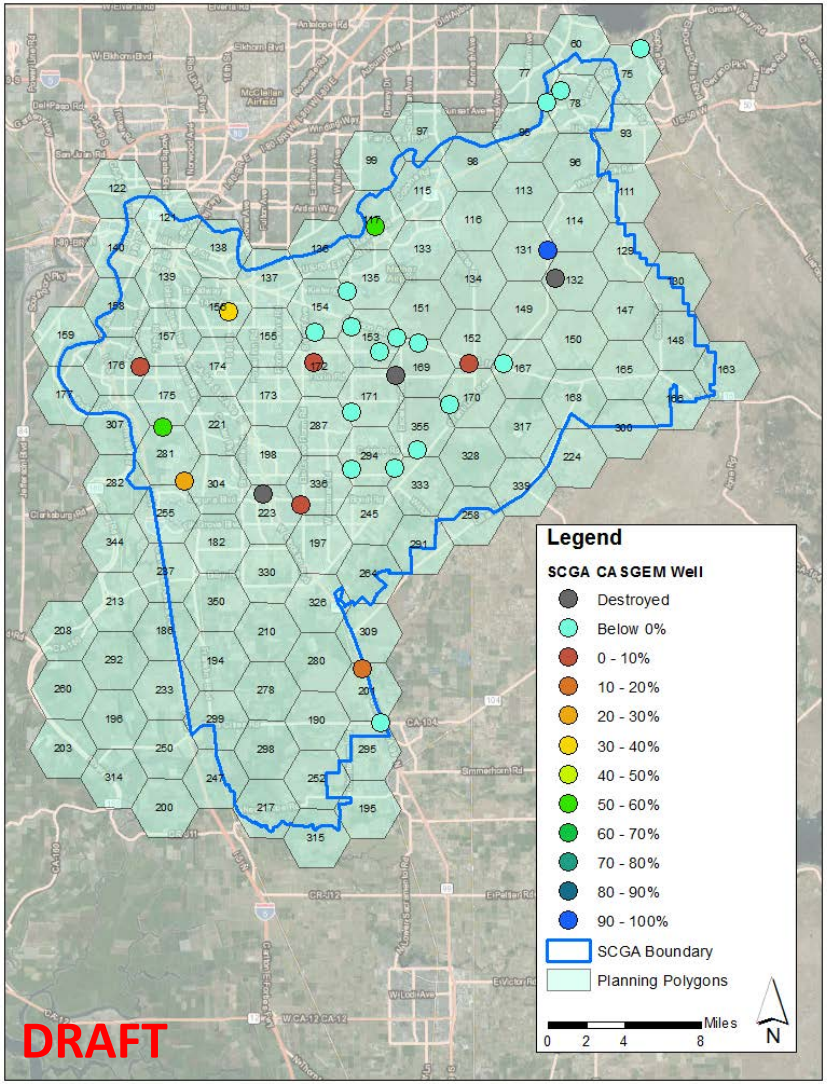
Trigger Point 1: 25 - 50% Encroachment
Notification

Trigger Point 2: 50 - 75% Encroachment
Initiate fee for supplemental water supplies or to reduce pumping

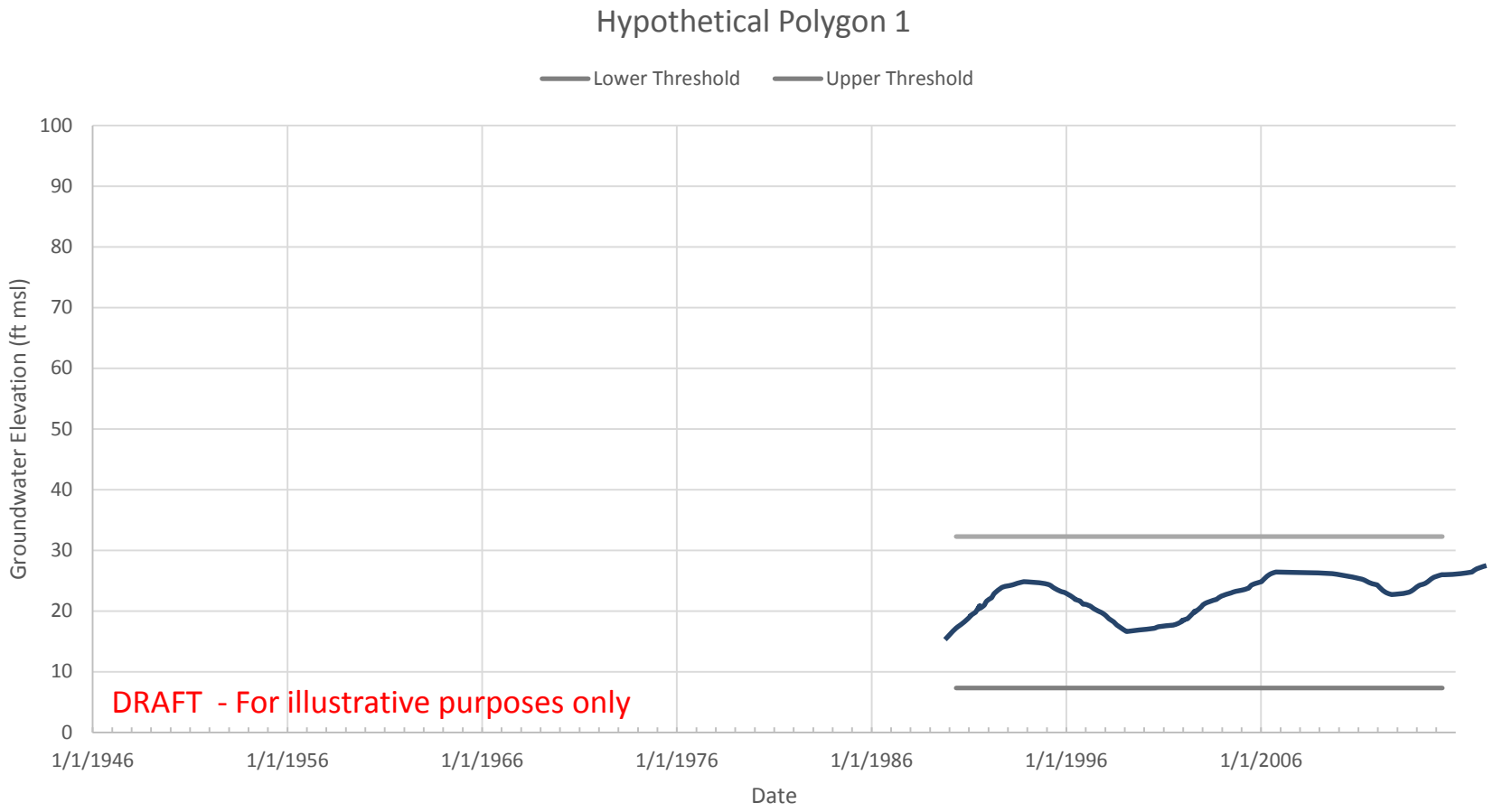
Trigger Point 3: 75 - 100% Encroachment
Identify and notify affected well owners. Levy assessments.

Trigger Point 4: >100% Encroachment
Change the model-based thresholds **or** find and construct infrastructure for supplemental water supplies. Assess fees to cover costs.

BMO Threshold Development
Well Selection - Applicability



Unique Well Characteristics and Differences from Future Conditions Have Management Implications



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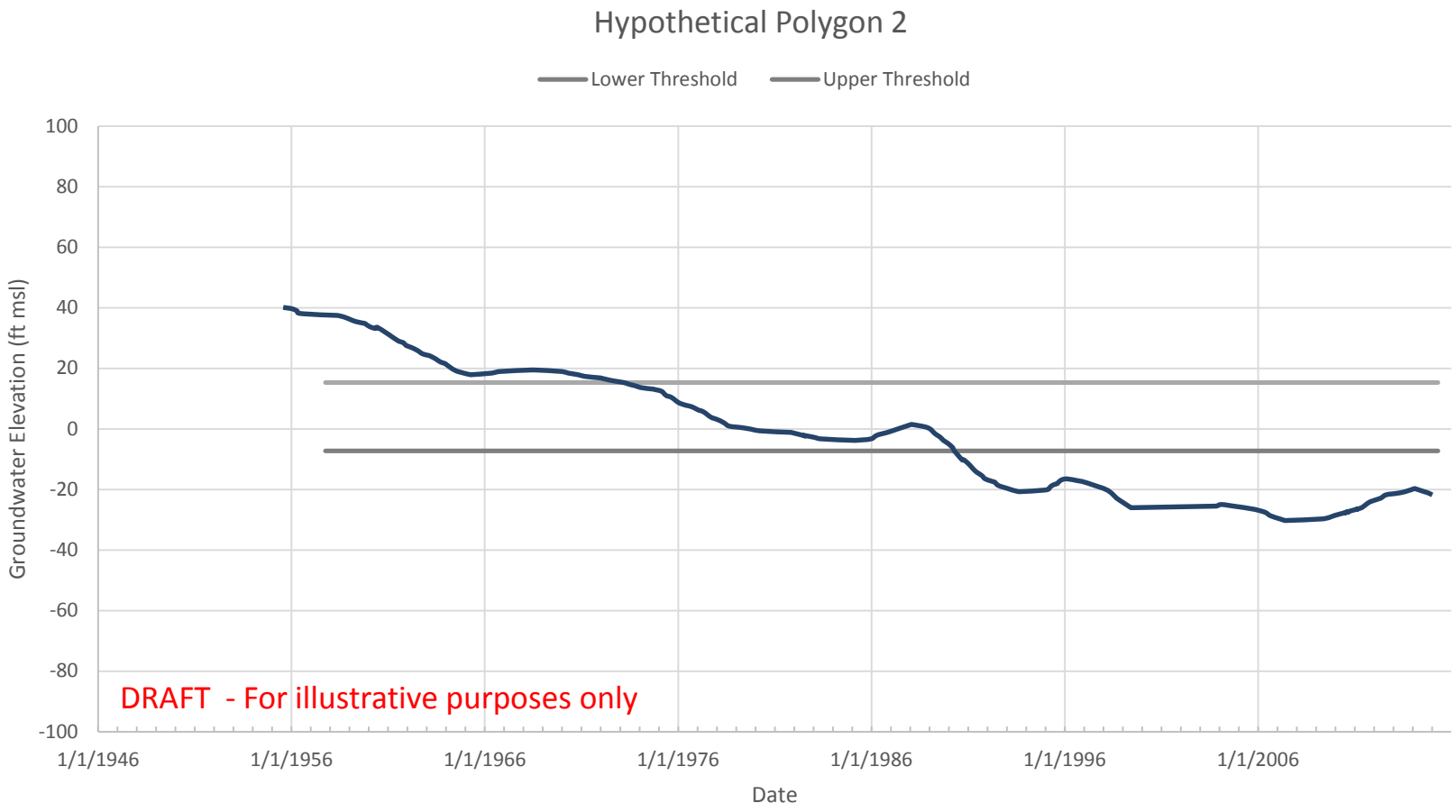


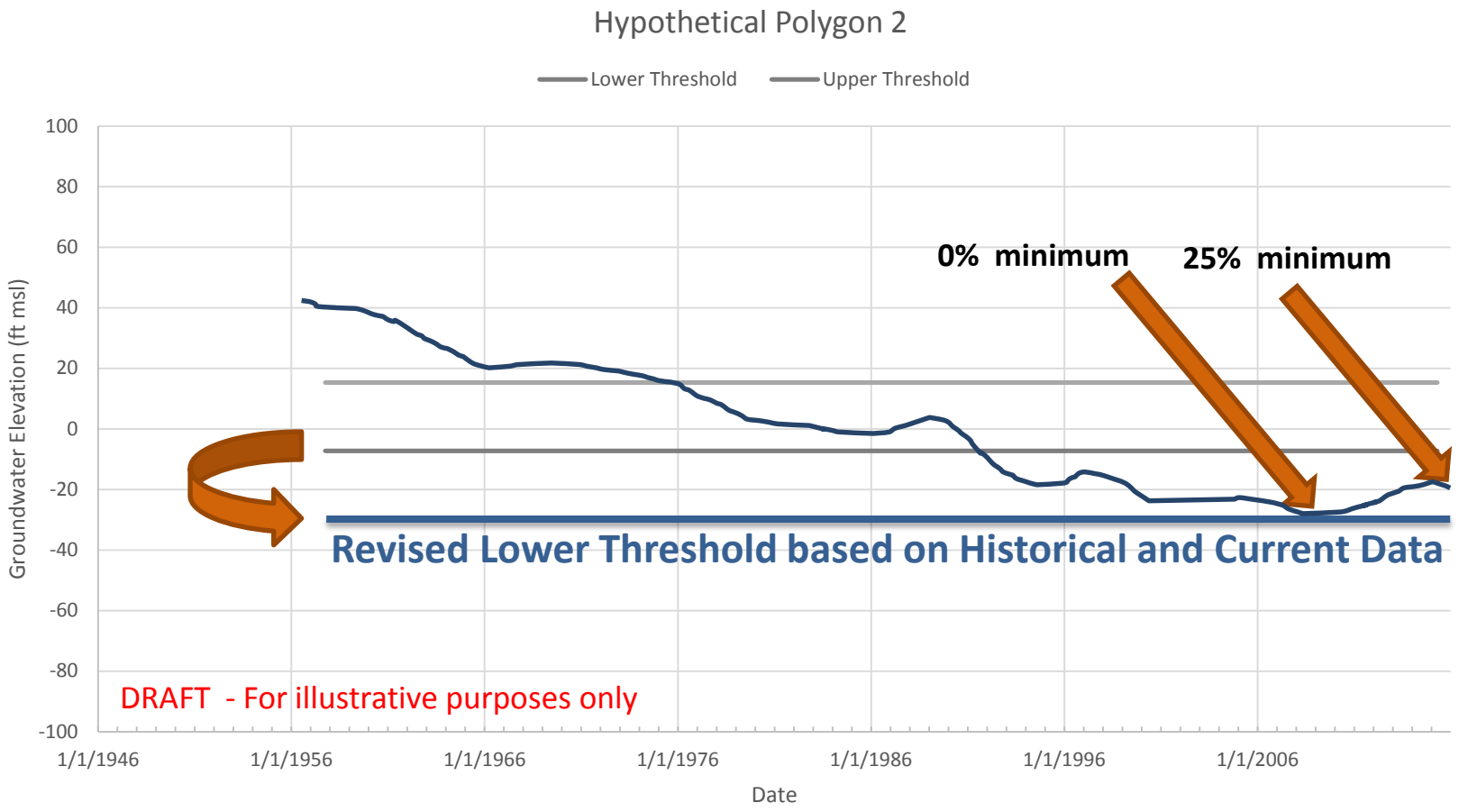
Recommendations

- Investigate incorporating additional information into bandwidths
  - Current and historical data
  - Physically based thresholds
- Recognize Vineyard SWTP as an existing Trigger Action yet to be fully realized

Recommendations – Current and Historical Data

- **Historical groundwater elevations:** adjust bandwidth to incorporate all historical data within the 100 - 0% range.
  - Justification – Historical conditions considered appropriate without requiring acquisition of supplemental water supplies and constructing infrastructure
- **Current groundwater elevations:** Adjust lower threshold so well is within the 100 - 25% range.
  - Justification – Existing conditions considered appropriate without levying assessments

Revised Lower Threshold based on Historical and Current Data

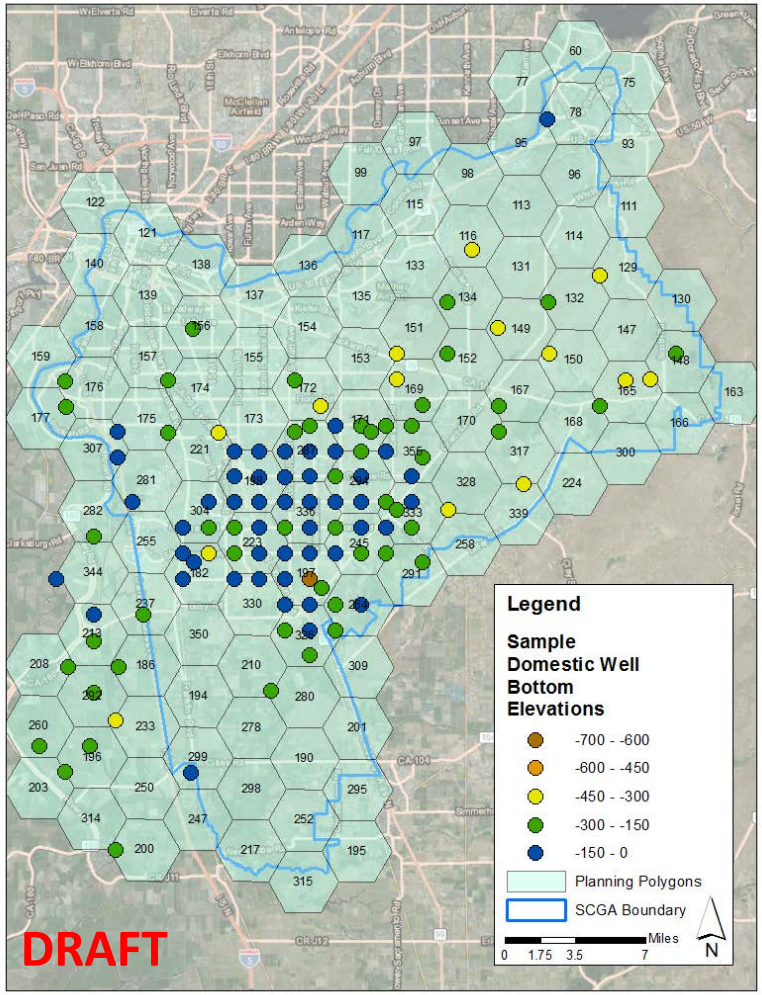


Recommendations – Physical Data

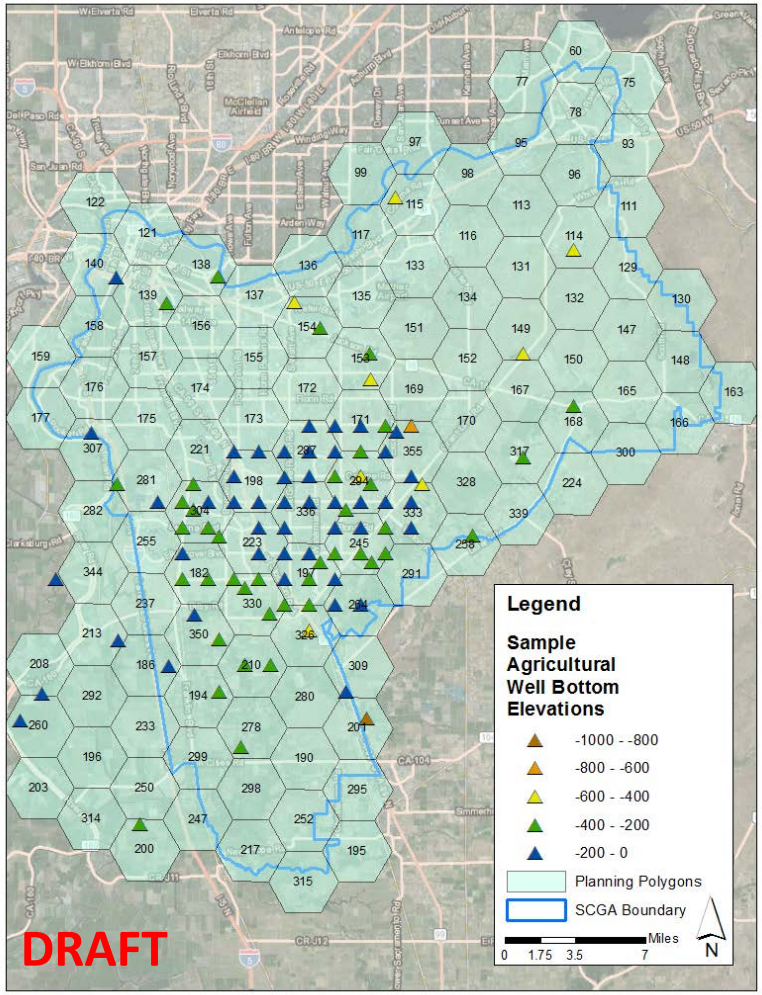
Available physical thresholds

- Depth of private wells
- Historical conditions near rivers

Recommendations – Physical Data
Available Private Domestic Well Depths



Recommendations – Physical Data
Available Agricultural Irrigation Well Depths



Next Steps

- Incorporate additional information into bandwidths
- Share revisions with SCGA staff
- Present revisions to Board as part of September 9, 2015 board meeting
- Present information in a draft and final TM
- Implement BMOs under GWMP or GSP

Contact Information

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