East Bay Plain Subbasin

Groundwater Sustainability Plan Development

Stakeholder Communications & Engagement Meeting

August 16, 2021

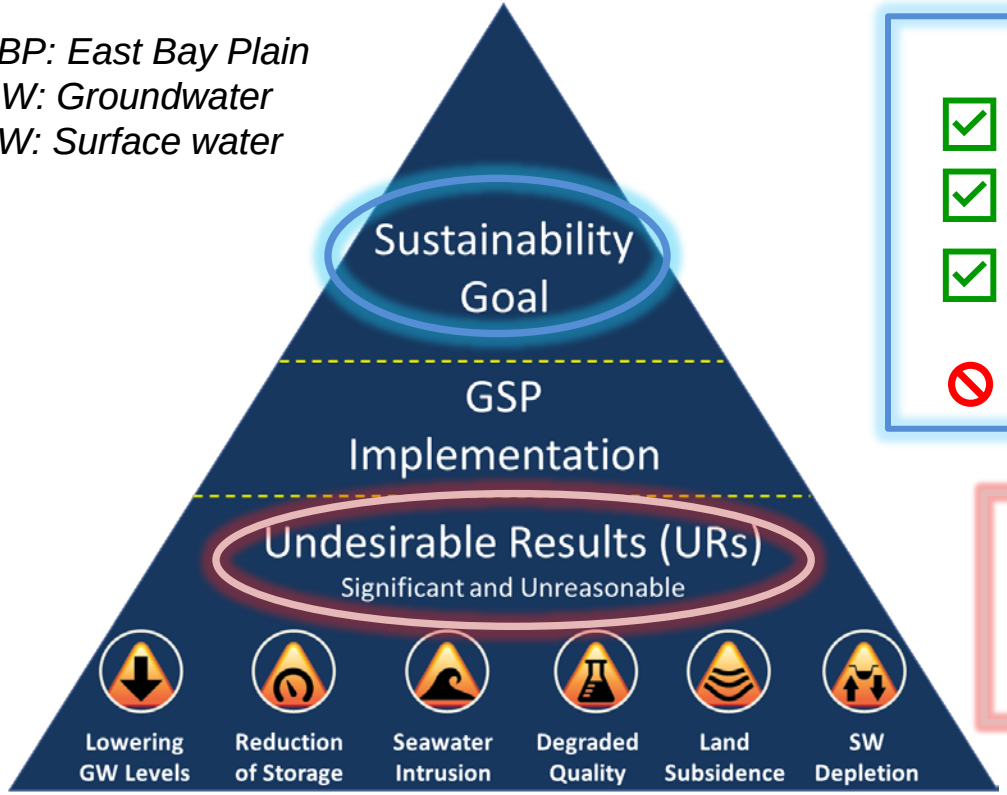
Agenda

- **Sustainable Management Criteria (SMC) Evaluation**
- **Future Scenario**
- **Proposed Implementation Activities**
- **Schedule Update**
- **Next Steps**

GSP: Groundwater Sustainability Plan

SMC Evaluation

EBP: East Bay Plain
GW: Groundwater
SW: Surface water



Achieved in 20 years

- ☑ Manage & protect the East Bay Plain Subbasin
- ☑ Collect data to support science-based decisions
- ☑ Evaluate new opportunities for sustainable groundwater beneficial uses
- ⊘ Avoid undesirable results

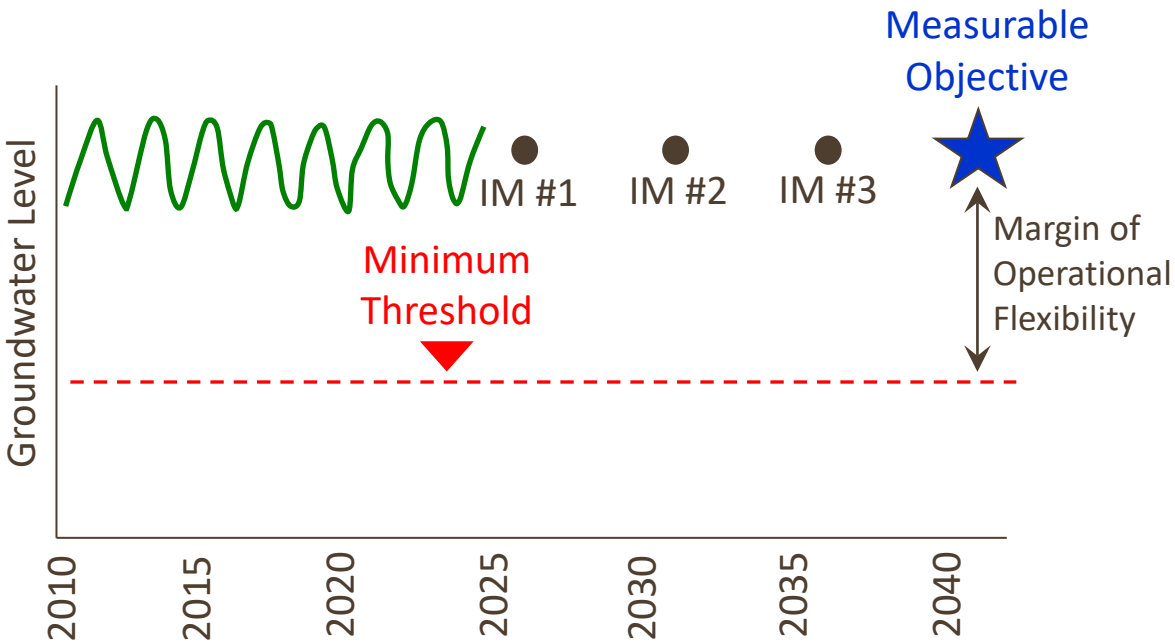
Sustainable Management Criteria (SMC)

Metrics defining when URs occur and when sustainability goal is maintained/ achieved

Key Takeaways

1. SGMA requires that the GSAs consider 6 sustainability indicators in the GSPs
2. Interim SMC criteria for each indicator were developed with stakeholder input and using best available science & data with the caveat that major data gaps need to be addressed

SMC Evaluation



Minimum threshold (MT): Value that defines when undesirable results occur

Measurable objectives (MO): Measurable target to maintain/achieve sustainability goal

Interim milestone (IM): Target value in increments of 5 years

Data gaps were a challenge to developing SMCs
Using term: “interim”

SMC Evaluation

Chronic Lowering of Groundwater Levels

Undesirable Results	Effects on beneficial users or uses	Data Gaps
• Declining GW levels unrelated to drought resulting in water supply wells no longer providing enough GW for beneficial uses or users	• Reduction in well capacity • Impacts to GDEs	• Limited historical groundwater level data • Limited wells in the North • Limited data on GDEs

Interim Criteria for URs

- 25% of Spring RMS well levels < MT
- 2 consecutive Spring measurements (March) in non-drought years

- 25% is at the lower end of a reasonable range from 20 to 50% and provides a balance to avoid URs
- Spring water levels less influenced by localized pumping

SMC Evaluation

Chronic Lowering of Groundwater Levels

Interim MTs	Justification
Shallow Aquifer 50 feet below ground surface	• Based on minimum well seal depth requirement for water supply and industrial wells
Intermediate / Deep Aquifer -50 feet mean sea level (MSL)	• Allows for sufficient available drawdown in deeper wells to maintain their capacity
GDEs 7.5 feet below baseline conditions in shallow wells	• 30-foot max rooting depth for most plants used per TNC guidance • 25% of maximum rooting depth

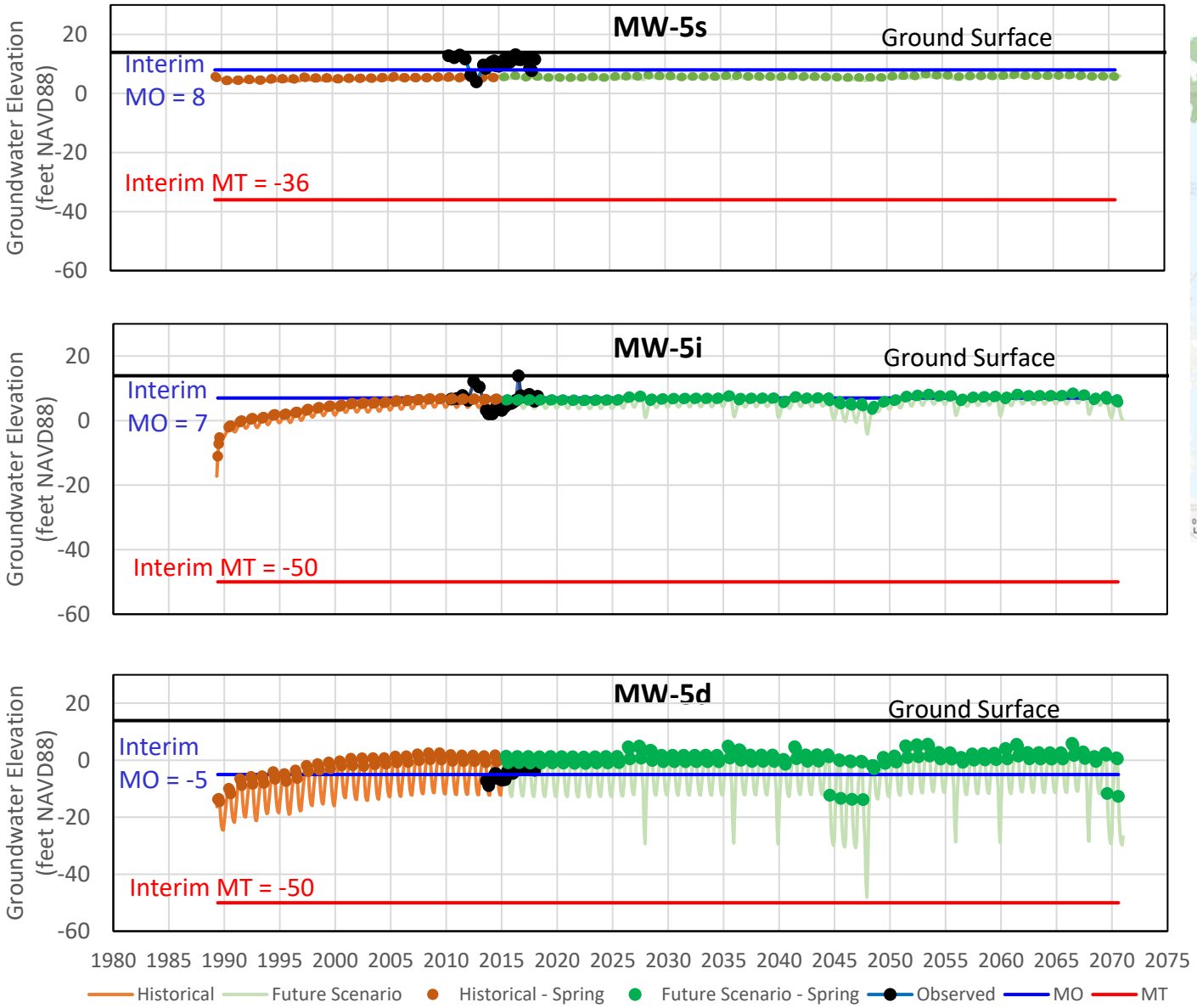
Interim MO and IMs

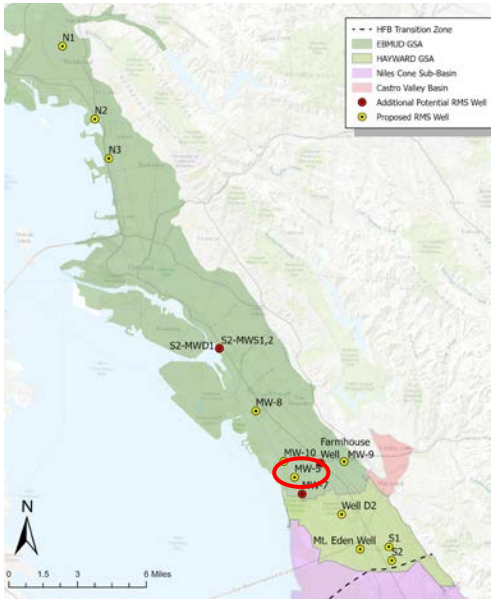
- Average of historical data, when recent data (<10 years) is available
- If no data or recent data is unavailable, groundwater model results are used

TNC = The Nature Conservancy

SMC Evaluation

Chronic Lowering of Groundwater Levels





Spring = March, April, May
MO = Measurable Objectives
MT = Minimum Threshold
s = Shallow Aquifer Zone
i = Intermediate Aquifer Zone
d = Deep Aquifer Zone

SMC Evaluation

Reduction in Groundwater Storage

Undesirable Results	Effects on beneficial users or uses	Data Gaps
• Excessive regional GW pumping that results in significant and unreasonable long-term reduction in groundwater storage	• Reduction in well capacity	• Lack of direct measurements of pumping

Interim Criteria for URs

- Average annual subbasin pumping exceeds sustainable yield for 5-year period
- 5 years balances short-term extreme needs while not allowing for long-term overpumping

SMC Evaluation

Reduction in Groundwater Storage

Interim MT

12,500 AFY over 5-year period

Justification

- Initial sustainable yield estimate
- Estimated 2 MAF of excess storage in EBP Subbasin

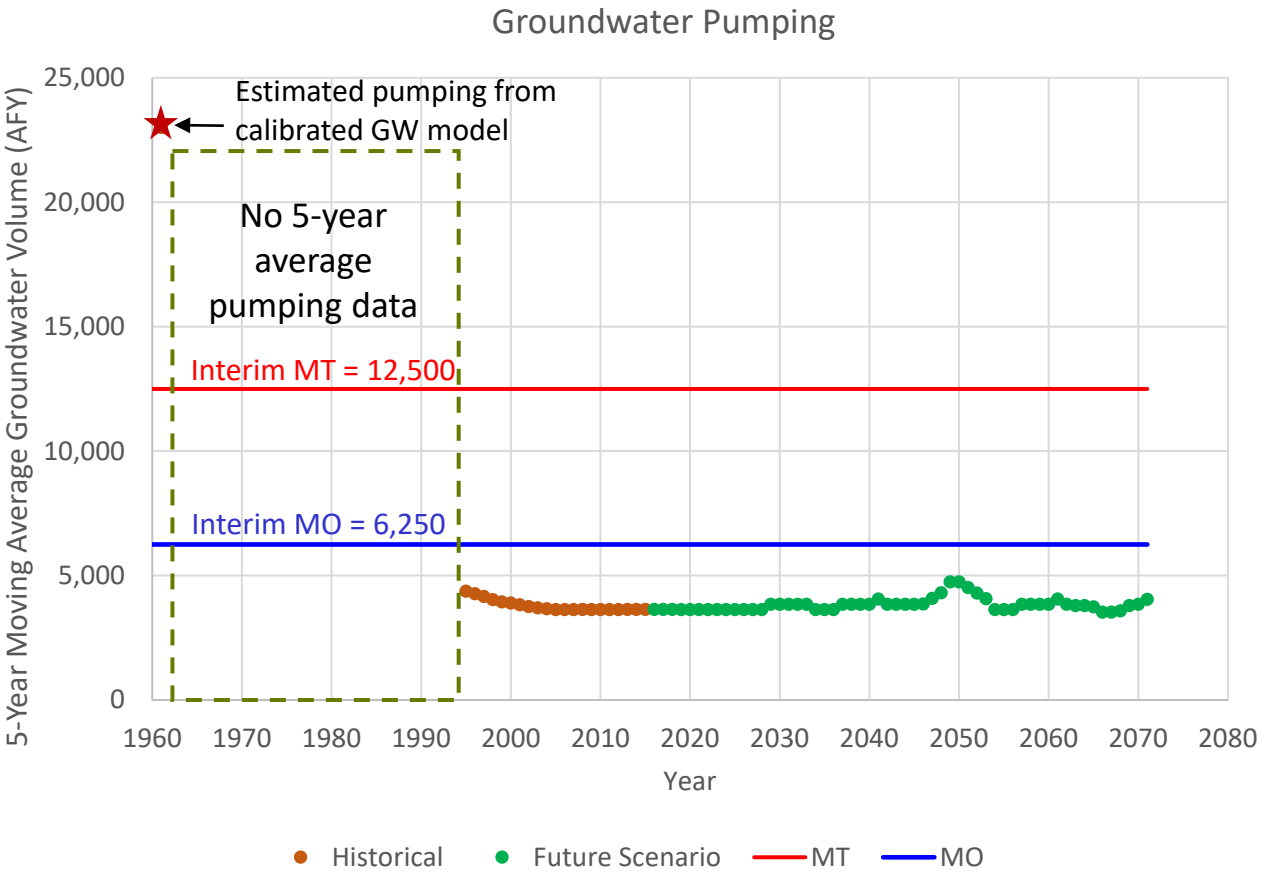
Interim MO and IMs

- Reasonable range would be 20 to 50% less than MT
- Use 50% to be conservative = 6,250 AFY

MAF = Million acre-feet

SMC Evaluation

Reduction in Groundwater Storage



SMC Evaluation

Seawater Intrusion

Undesirable Results	Effects on beneficial users or uses	Data Gaps
• Migration of saline Bay water into existing fresh water aquifers that are or could be developed for water supply	• Precludes beneficial use for drinking water	• Lack of chloride measurements and shallow wells near Bay margin

Interim Criteria for URs

- GW levels in Water Table Aquifer Zone (upper 50 feet) used as a proxy
- GW elevations exceed MSL near the Bay margin
- Segmented into the north and south

- Water Table Aquifer is the only aquifer connected to the Bay with significant clay layers below
- Seawater intrusion is not expected if shallow GW levels are maintained above MSL

SMC Evaluation

Seawater Intrusion

Interim MT

- 25% increase in onshore area between the 5 ft MSL contour line and Bay margin
- 25% increase in chloride concentration in sentinel wells

Justification

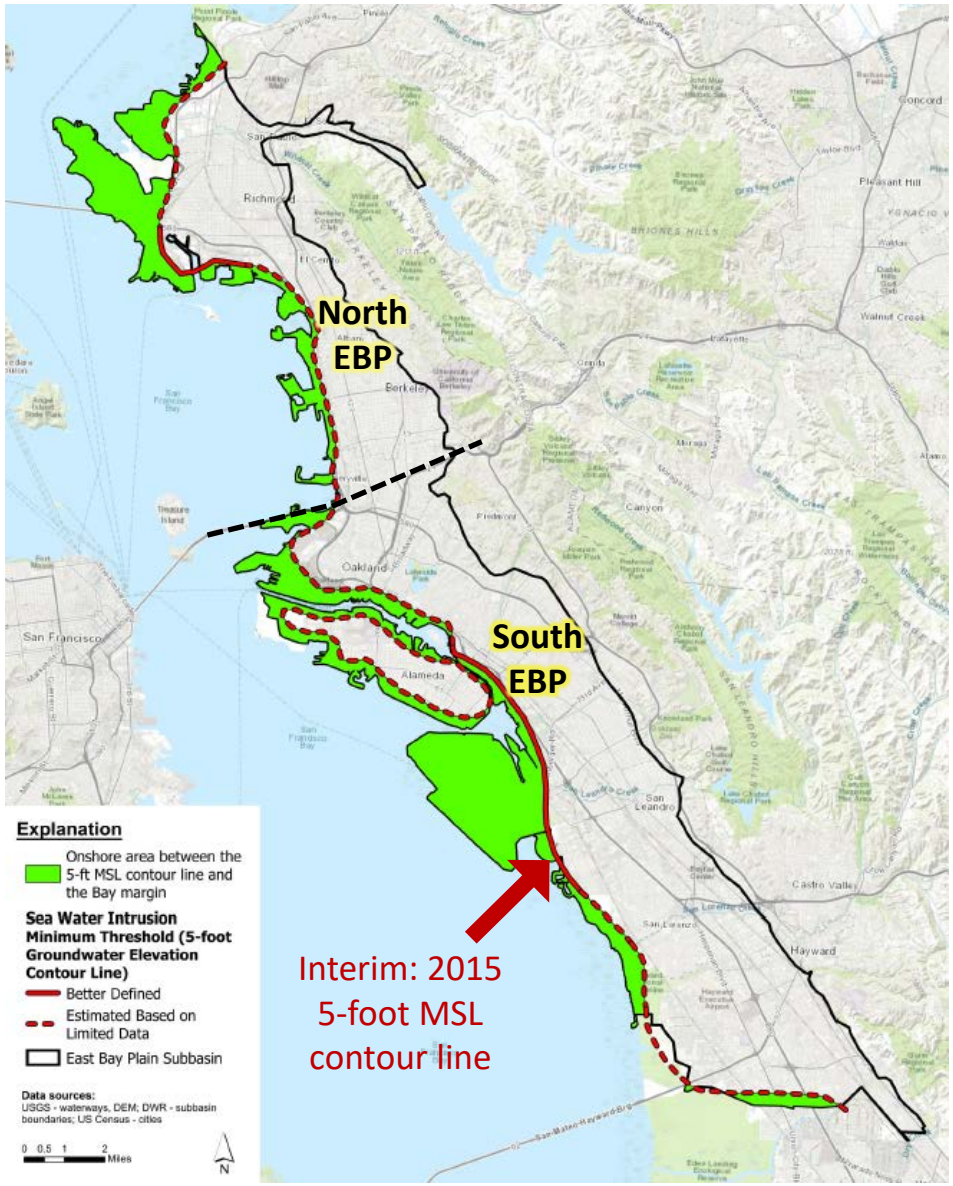
- 25% is at the lower end of a reasonable range from 20 to 50%
- Consistent with number of wells that fall west of 5-foot contour line

Interim MO and IMs

- Position of 5-foot MSL contour line based on 2015 Spring GW levels

SMC Evaluation

Seawater Intrusion



SMC Evaluation

Degradation of Water Quality

Undesirable Results	Effects on beneficial users or uses	Data Gaps
• Significant and unreasonable degradation of GW quality caused by GSA projects and management actions	• Precludes beneficial use for drinking water	• Lack of historical concentration data to establish baseline concentrations

Interim Criteria for URs

- Exceedance of MCL or 20% of baseline for key constituents: TDS, chloride, nitrate, arsenic
- 25% of RMS wells exceed MT

SMC Evaluation

Degradation of Water Quality

Interim MT

- MCLs:
  TDS – 500 mg/L
  Chloride – 250 mg/L
  Nitrate – 10 mg/L
  Arsenic – 10 ug/L
- If baseline concentration already exceeds MCL, assign 20% increase from baseline

Justification

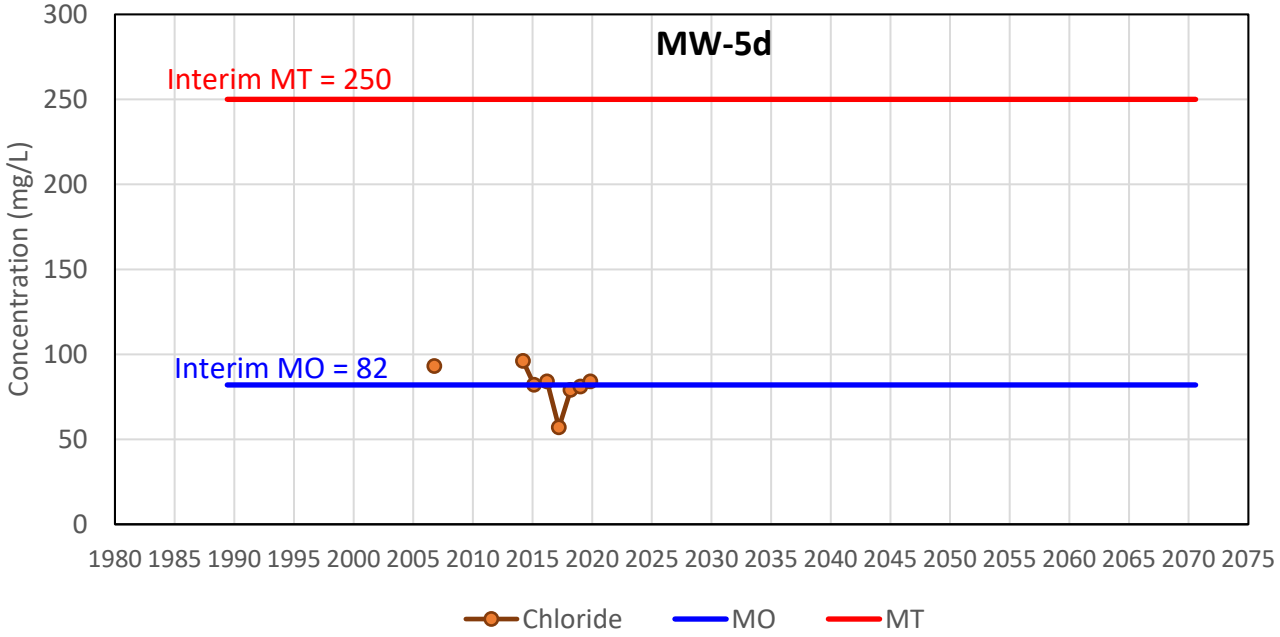
- GW quality is generally acceptable if below an established MCL
- 20% increase is based on evaluation of 3 potential sources of fluctuations:
  (1) analytical lab methods
  (2) sampling methods
  (3) variability in GW system

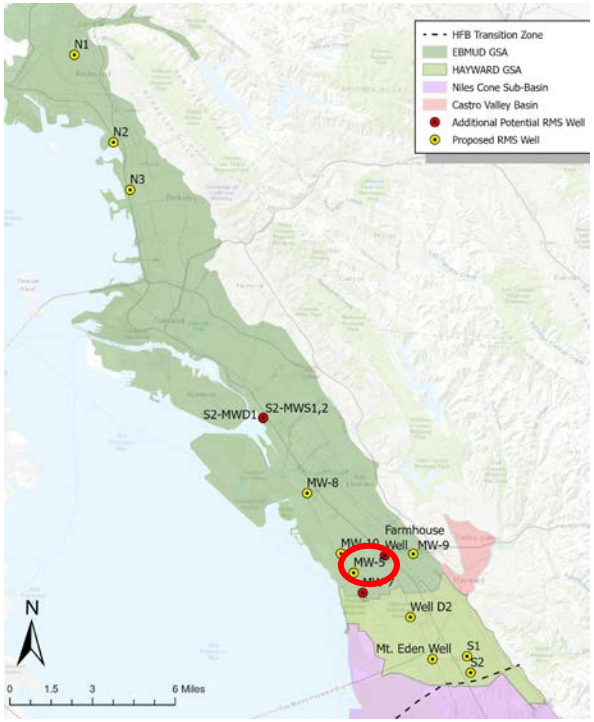
Interim MO and IMs

- Average baseline concentrations where data is available

SMC Evaluation

Degradation of Water Quality





MO = Measurable Objectives
MT = Minimum Threshold
d = Deep Aquifer Zone

SMC Evaluation

Land Subsidence

Undesirable Results	Effects on beneficial users or uses	Data Gaps
• Inelastic subsidence due to excessive GW groundwater pumping that causes damage at a regional scale to public infrastructure critical for public health and safety	• Damage to critical public infrastructure such as levees, flood control channels, water supply aqueducts	• Subsidence has only been directly measured in the EBP Subbasin using the extensometers near EBMUD's Bayside well

Interim Criteria for URs

- GW levels used as a proxy; based on historical Spring lows
- Better data for historical Spring water levels compared to Fall
- 25% of RMS wells fall below MT for two consecutive non-drought years
- Intermediate / Deep Aquifer only; subsidence not expected in Shallow Aquifer

SMC Evaluation

Land Subsidence

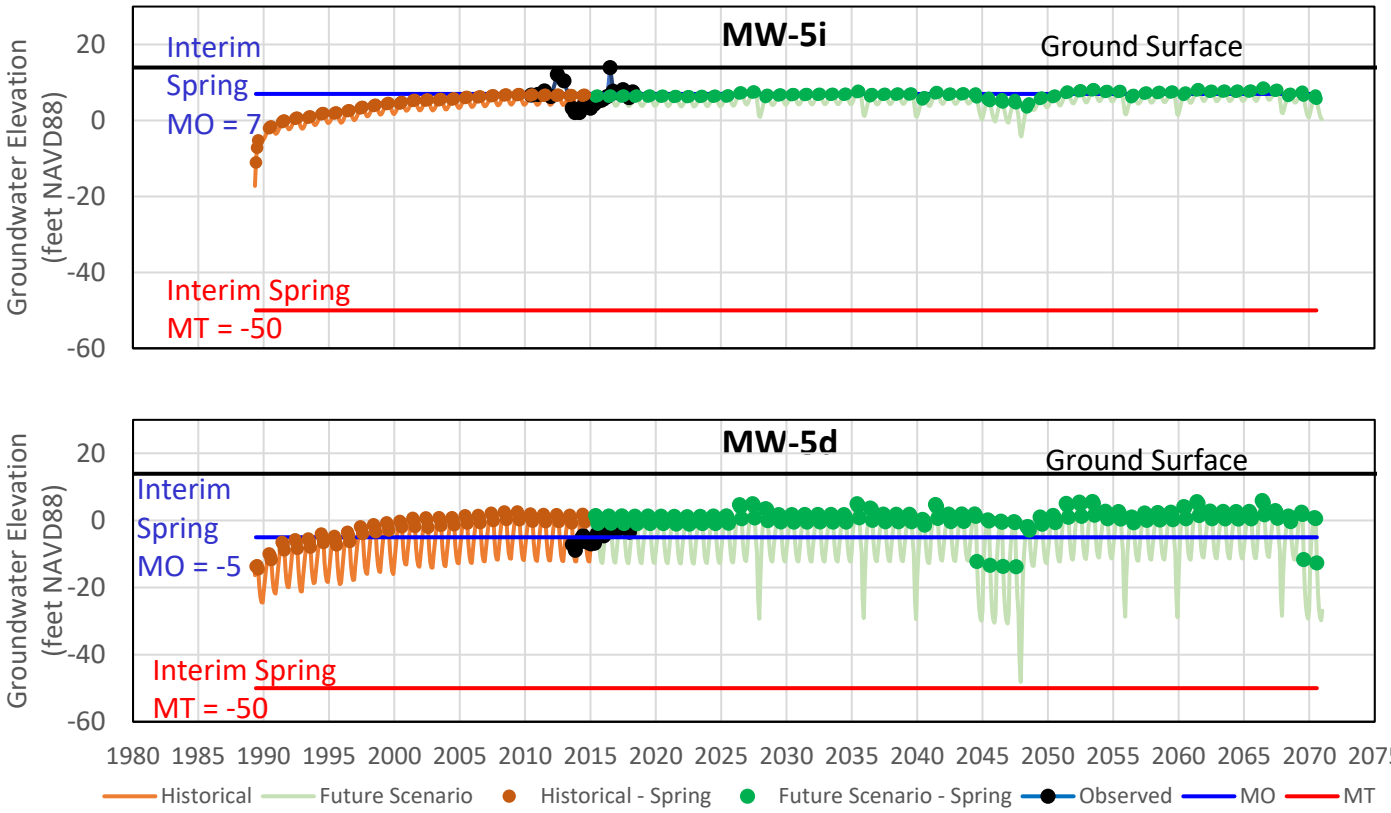
Interim MT	Justification
South EBP -50 feet MSL (Spring)	• Observed / modeled historical lows in Intermediate and Deep Aquifer Zones
North EBP -20 feet MSL (Spring)	• Observed historical low for one well in Intermediate Zone • Water levels and narrative from Richmond wellfield pumping

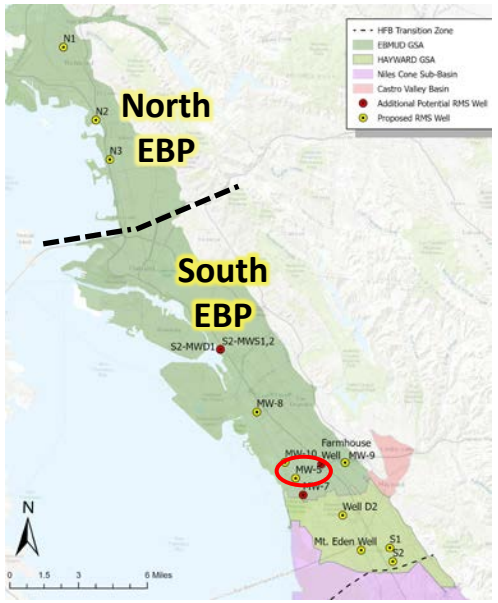
Interim MO and IMs

- Average spring groundwater levels in intermediate and deep aquifers when recent data (<10 years) is available
- If data is unavailable, groundwater model results are used

MSL = Mean sea level

SMC Evaluation
Land Subsidence





Spring = March, April, May
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SMC Evaluation

Surface Water Depletion

Undesirable Results	Effects on beneficial users or uses	Data Gaps
• Increase in streamflow depletion rate that results in significant and unreasonable effects to potential beneficial uses/users	• Insufficient water for beneficial uses/users such as for aquatic species and GDEs	• Limited to no data on streamflow and stream-aquifer interconnection for major streams

Interim Criteria for URs

- ***Shallow*** GW levels near major streams used as a proxy
- 50% of RMS wells fall below MT for two consecutive non-drought years
- 50% is reasonable because of small number of shallow RMS wells near streams

SMC Evaluation

Surface Water Depletion

Interim MT

2 feet below MO

Justification

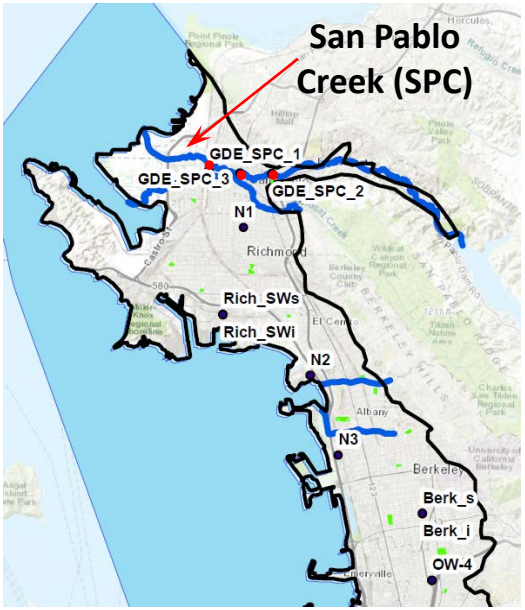
- Based on GW model runs
- Difference between baseline conditions and sustainability (pumping at 3,600 AFY versus 12,500AFY)
- Shallow GW levels decreased between 0 – 1.8 feet

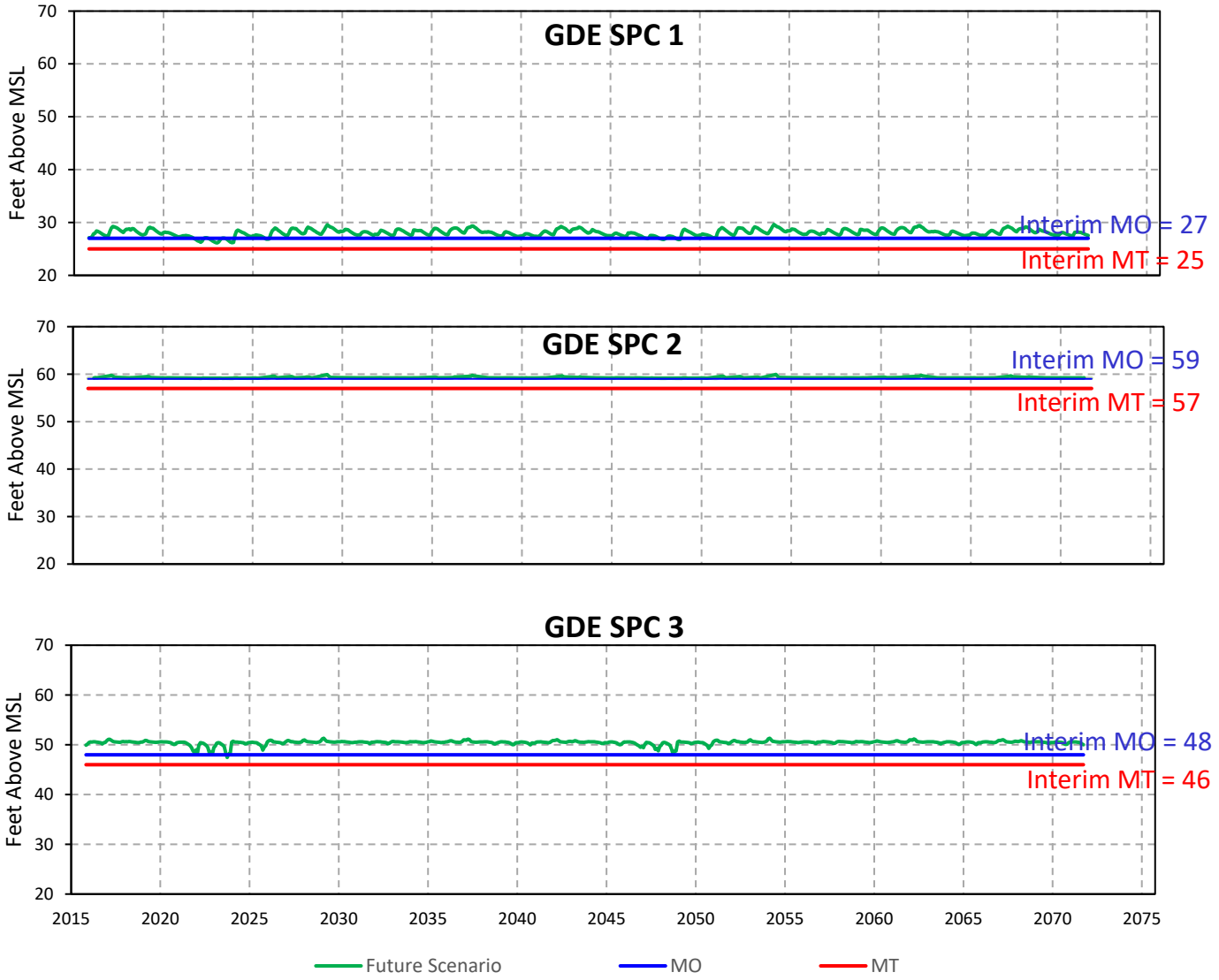
Interim MO and IMs

- Low end of model-derived range of GW level fluctuations

SMC Evaluation

Surface Water Depletion





MO = Measurable Objectives
MT = Minimum Threshold

Future Scenario

Followed DWR SGMA guidelines

2022 → **50 Years** → **2071**

Historical pumping

Consistent with land use plans

Climate change & sea level rise

Projects that are reasonably expected to occur

EBMUD Bayside Phase I

Hayward Emergency Wells

- Pumping from the projects results in short term drawdown that is not expected to produce undesirable results
- No change in stream connectivity or decrease in streamflow

Proposed Implementation Activities

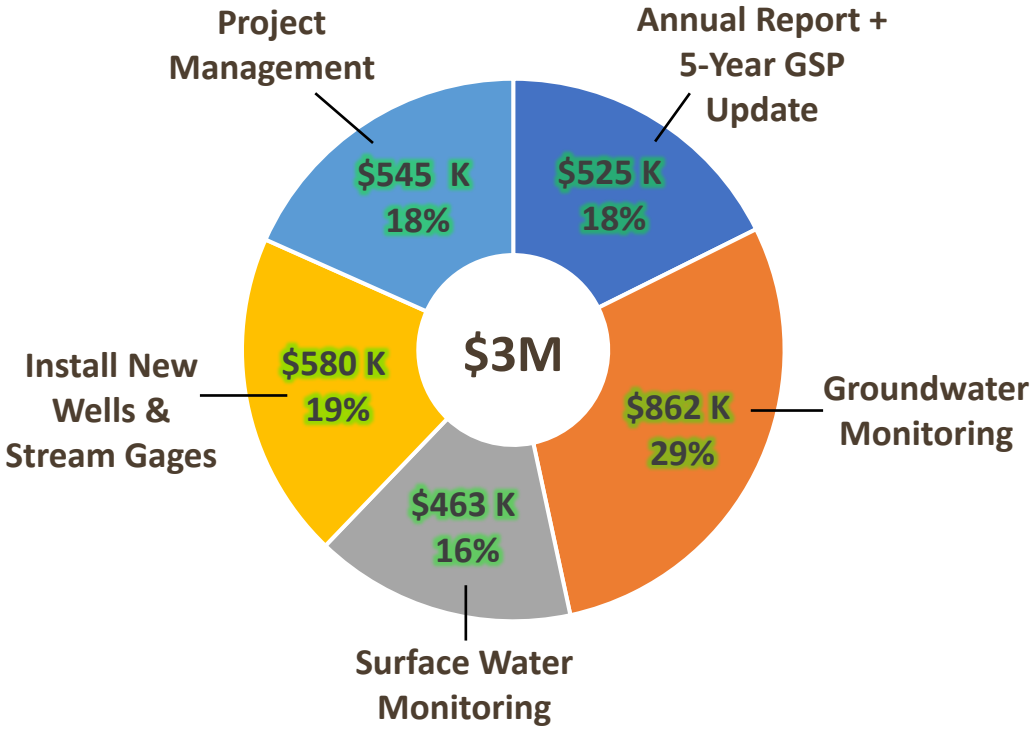
- **Annual reports and 5-year GSP updates**

- **Groundwater Monitoring**
  - Groundwater level & quality
  - Install additional monitoring wells
  - Land subsidence - extensometer
  - Data management system

- **Surface Water Monitoring**
  - Streamflow measurements
  - Install stream gages
  - Isotopic sampling
  - Habitat survey

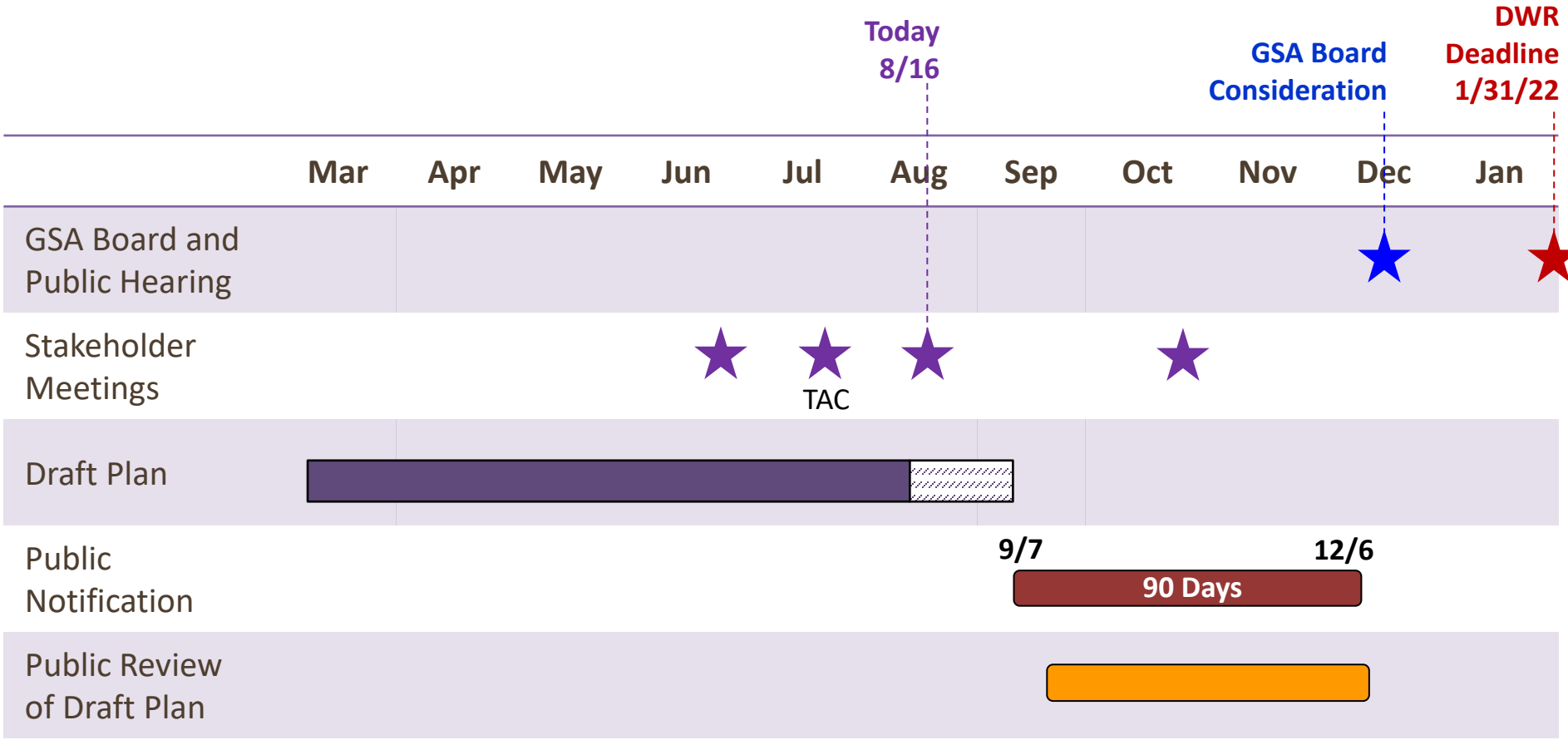
Proposed Implementation Activities

Estimated 5-Year Costs



Costs are still being refined

Schedule Update



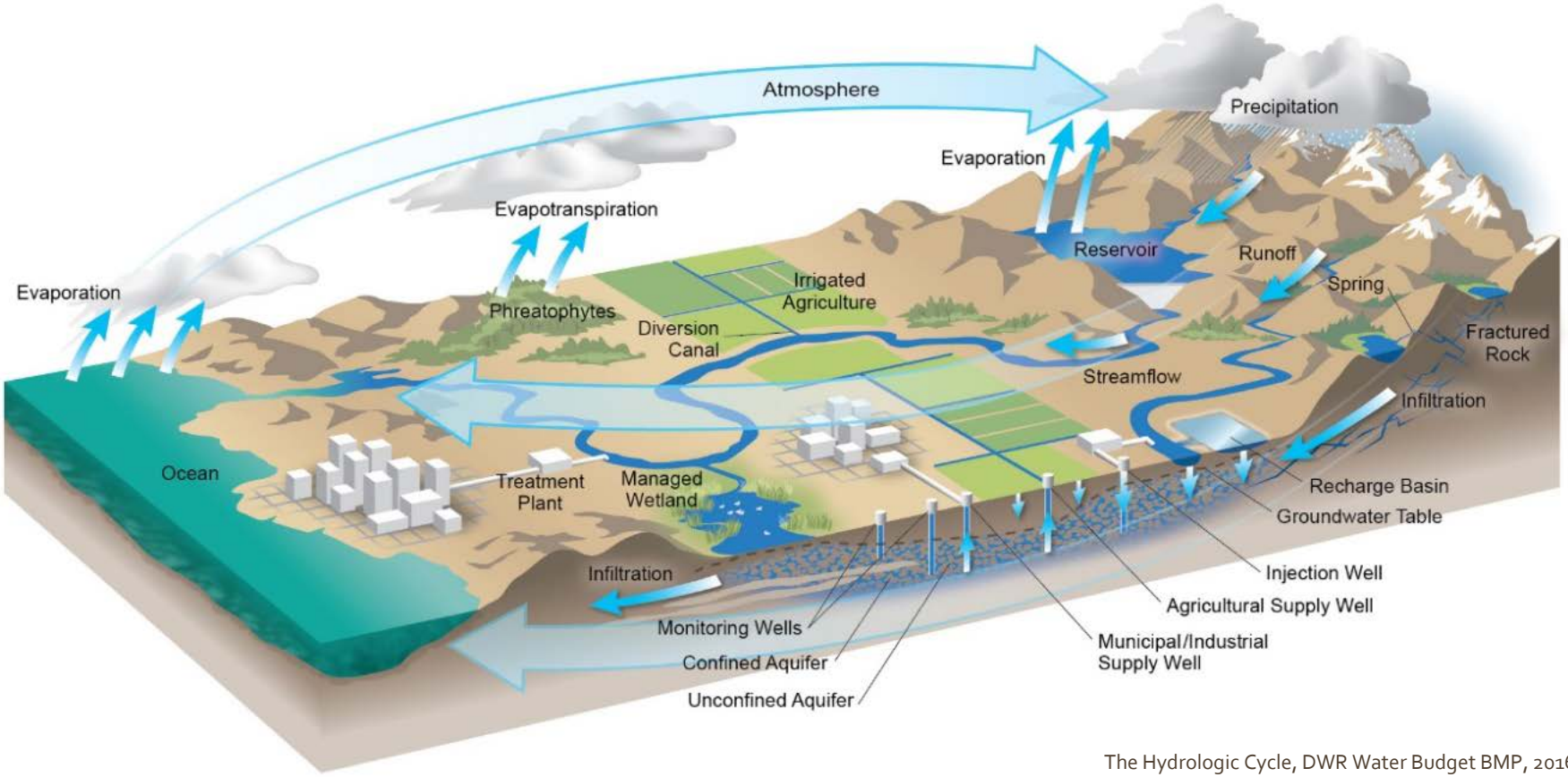
Next Steps

- **Continue drafting the Plan**
  - Draft GSP for public review expected in mid September

- **Future meeting**
  - Stakeholder C&E Meeting: October 20

C&E: Communication & Engagement

Questions



The Hydrologic Cycle, DWR Water Budget BMP, 2016