Butte Subbasin Advisory Board

Sustainable Management Criteria

Projects and Management Actions

February 25, 2021

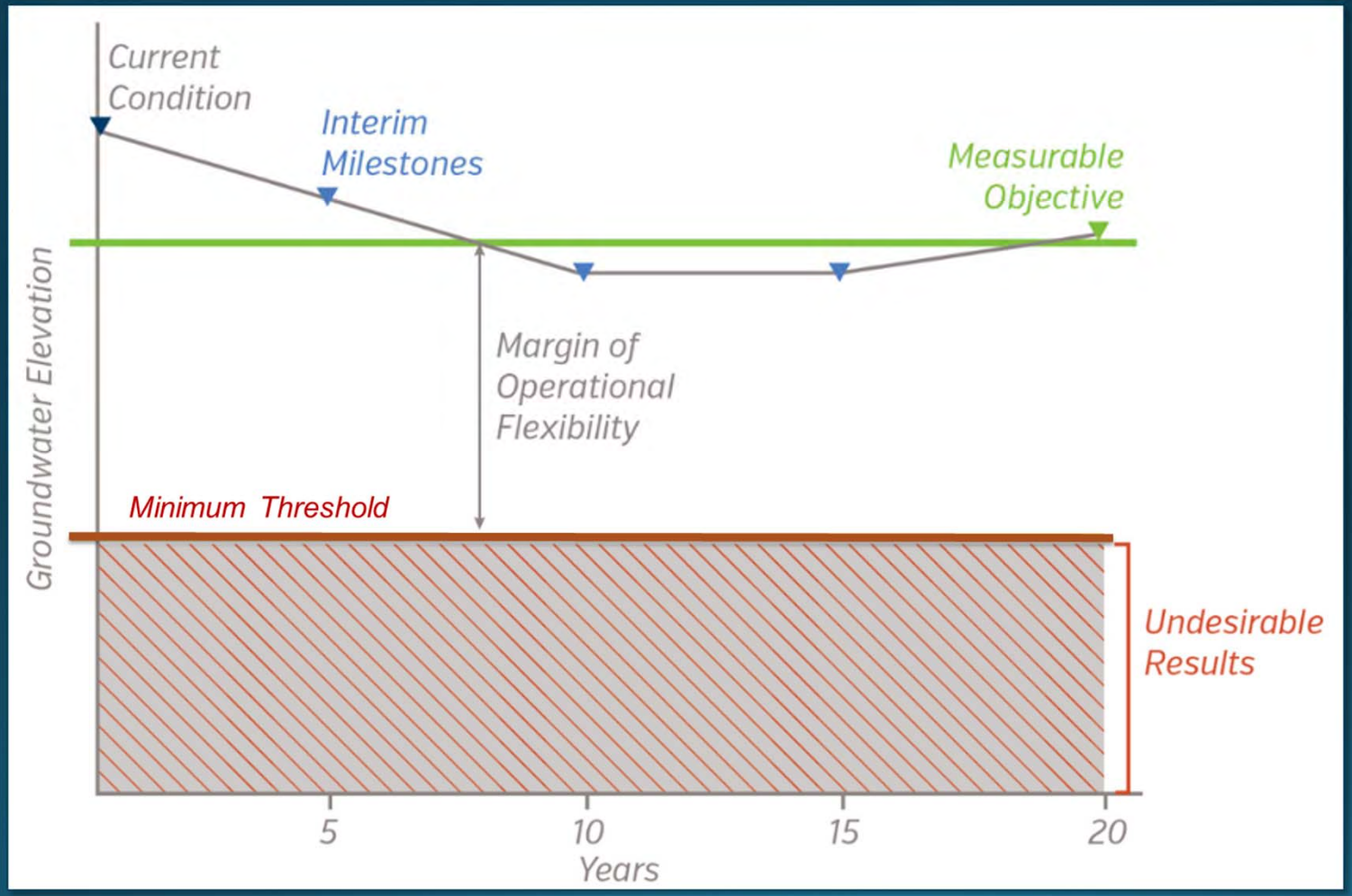
Overview

- Sustainable Management Criteria
  - Approaches to Develop Minimum Thresholds (MTs) and Measurable Objectives
- Projects and Management Actions
  - Ideas Received to Date and Additional Ideas
  - Screening/Ranking Criteria

Sustainability Management Criteria (SMC)

- Sustainability Goal and Undesirable Results Statements (Qualitative)
- Quantitative Criteria by Monitoring Site
  - Minimum Thresholds (MTs)
    - Combination of MT exceedances for % of sites over defined time period define an Undesirable Result (UR)
  - Measurable Objectives (MOs)
    - Target for long-term subbasin management above an MT
  - Interim Milestones (IMs)
    - Track 5-year progress towards managing to MOs

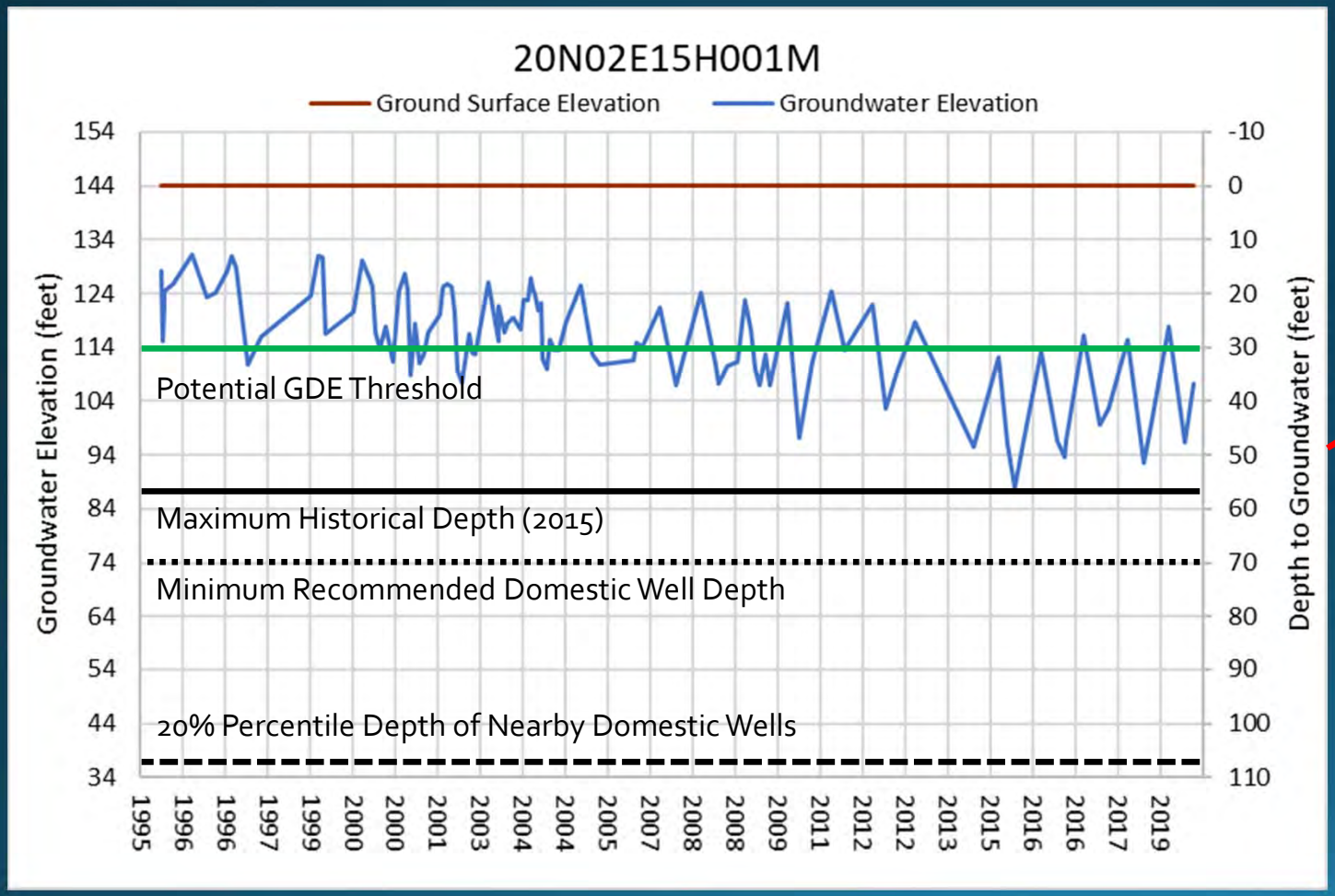
Quantitative SMC Example (Groundwater Levels)



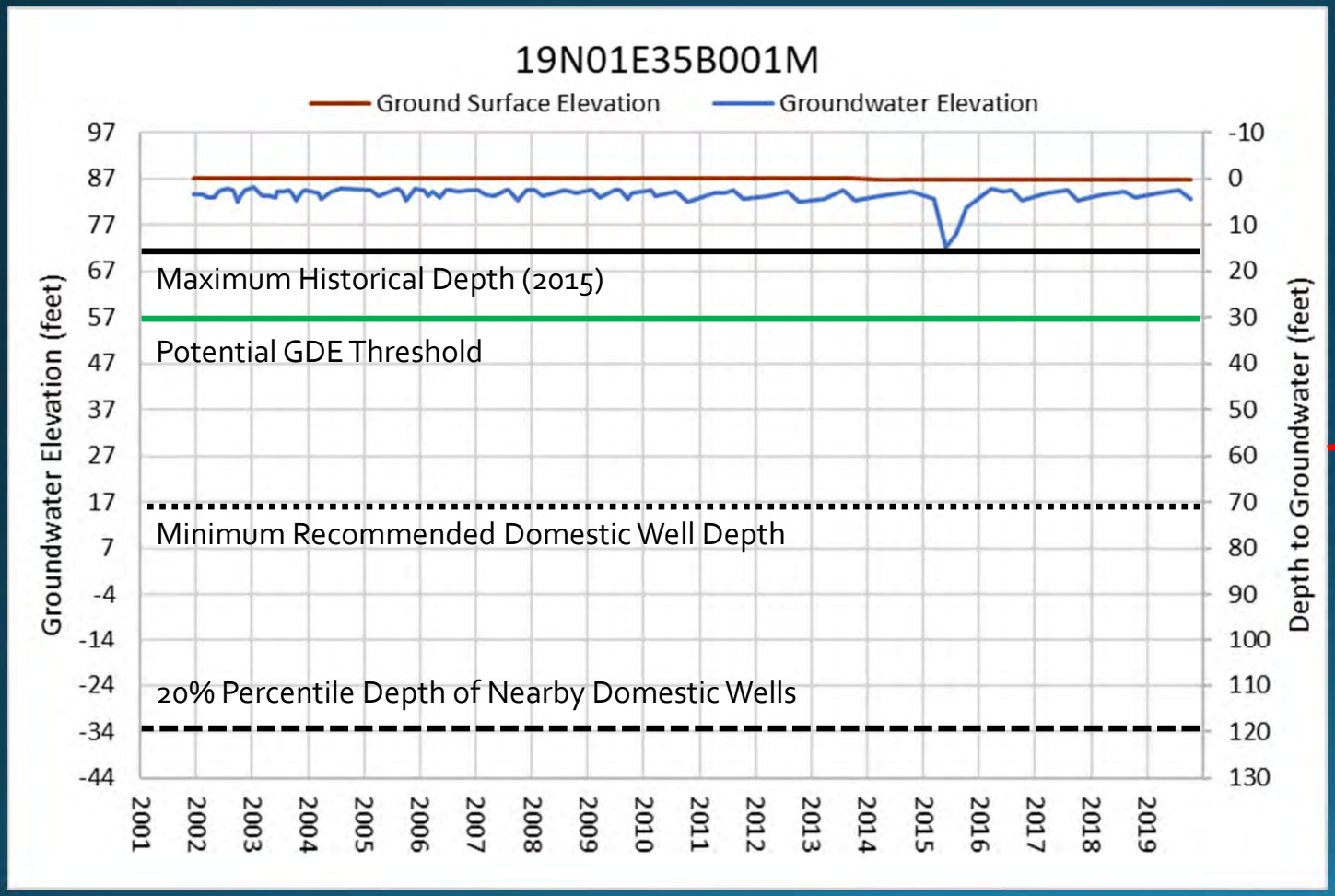
MTs for Groundwater Levels

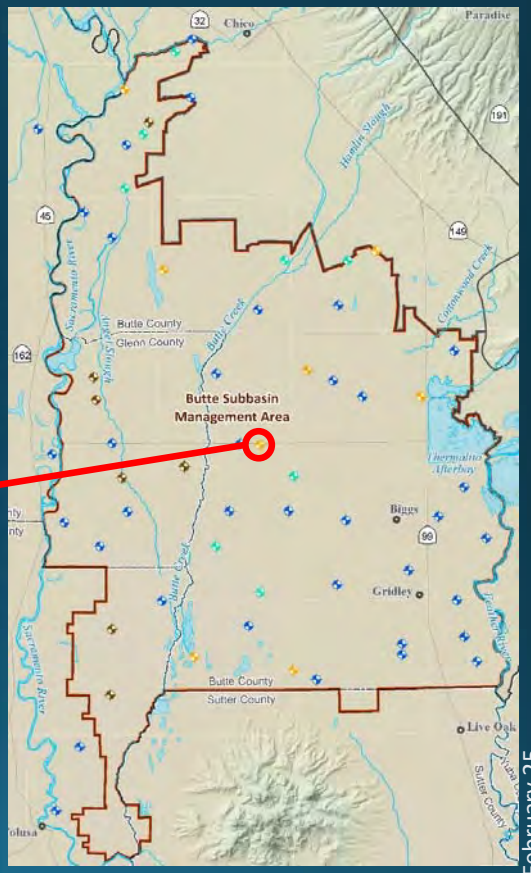
- WHERE? Developed Uniquely for Each Representative Monitoring Well
- WHY? Potential Significant and Unreasonable Conditions
  - Dewatering of Domestic Wells
  - Increased Pumping Costs
  - Impacts to Groundwater Dependent Ecosystems (GDEs)
- WHAT? Supporting Information
  - Depths of Nearby Wells
  - Historical Observed Water Levels
  - Nearby Potential GDEs
- HOW? Approach
  - Consider Combination of Factors for Each Site
  - Consider Additional Monitoring to Assess Impacts to Potential GDEs

Example Hydrograph: North Basin



Example Hydrograph: Middle Basin





Discussion

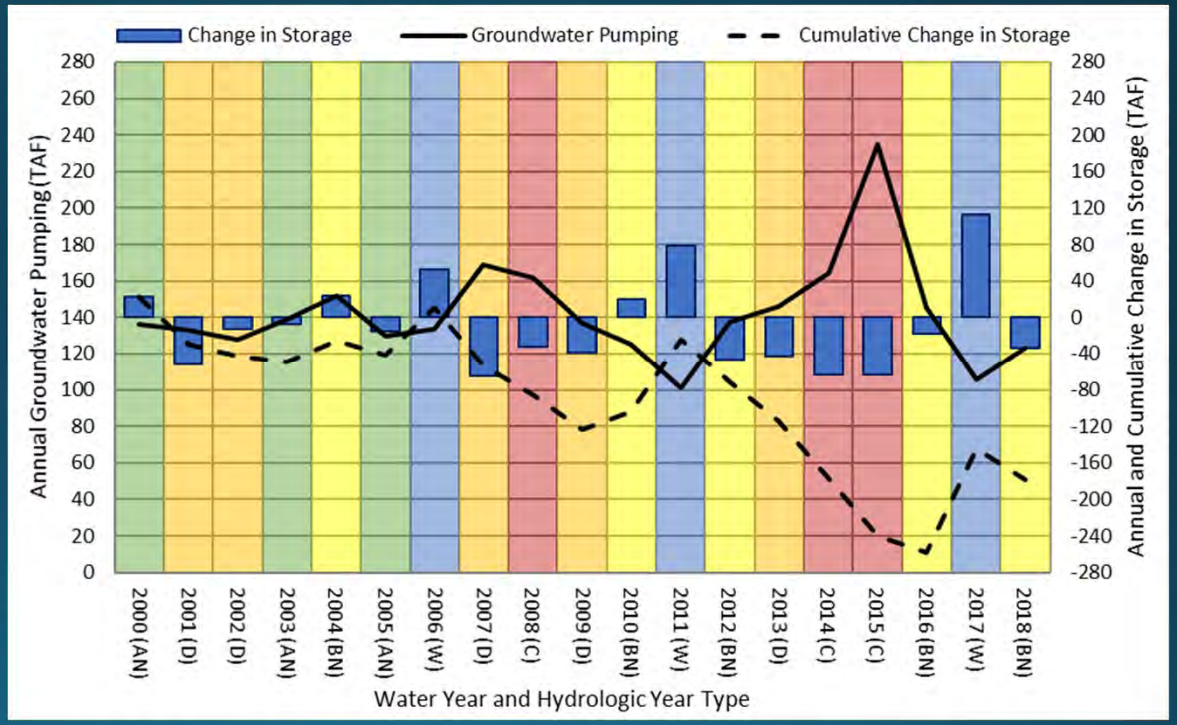
- Additional Potential Significant and Unreasonable Conditions?
- Suggestions for Approaches to Establishing MTs and MOs?

MTs and MOs for Groundwater Storage

- WHERE? Estimated for Basin as a Whole
- WHY? Potential Significant and Unreasonable Conditions
  - Dewatering of Fresh Groundwater Aquifer
- WHAT? Considerations
  - Estimated ~30 Million Acre-Feet Freshwater in Storage
  - Unable to Monitor Storage Directly
  - Protection of Water Levels Expected to Avoid Undesirable Results in Storage
- HOW? Approach
  - Use Water Levels as Proxy for Storage

Groundwater Storage

- Estimated Based on Observed Groundwater Levels and Estimated Aquifer Parameters
- Supported by Butte Basin Groundwater Model



https://www.buttebasingroundwater.org/s/Draft-Butte-Basin-Setting-and-Monitoring-Networks_200820-corrected.pdf

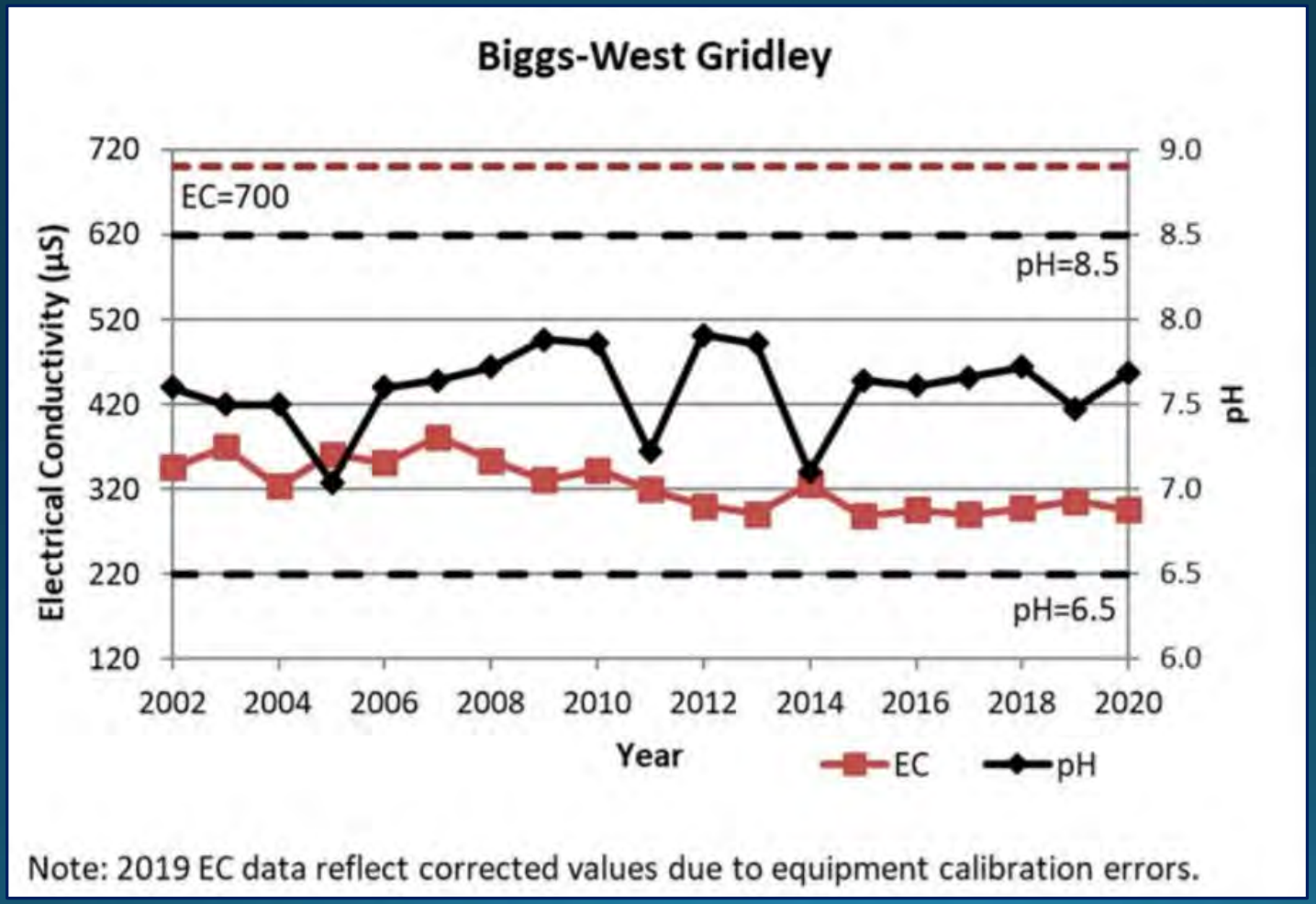
Discussion

- Additional Potential Significant and Unreasonable Conditions?
- Suggestions for Approaches to Establishing MTs and MOs?

MTs and MOs for Groundwater Quality

- WHERE? Developed Uniquely for Each Representative Monitoring Well
- WHY? Potential Significant and Unreasonable Conditions
  - Adverse Impacts of Groundwater Management to Drinking Water
  - Adverse Impacts of Groundwater Management to Crops
- WHAT? Primary Constituent of Concern is Salinity
  - Maximum Contaminant Levels (MCLs) for Drinking Water
  - Crop Tolerance to Avoid Yield Loss
  - Historical Observations
- HOW? Approach
  - Establish MTs and MOs Based on MCLs, Crop Tolerance, and Historical Conditions
  - Consider Incorporating Additional Sites into Network

Butte County Trend Monitoring: Biggs-West Gridley



Note: 2019 EC data reflect corrected values due to equipment calibration errors.

Discussion

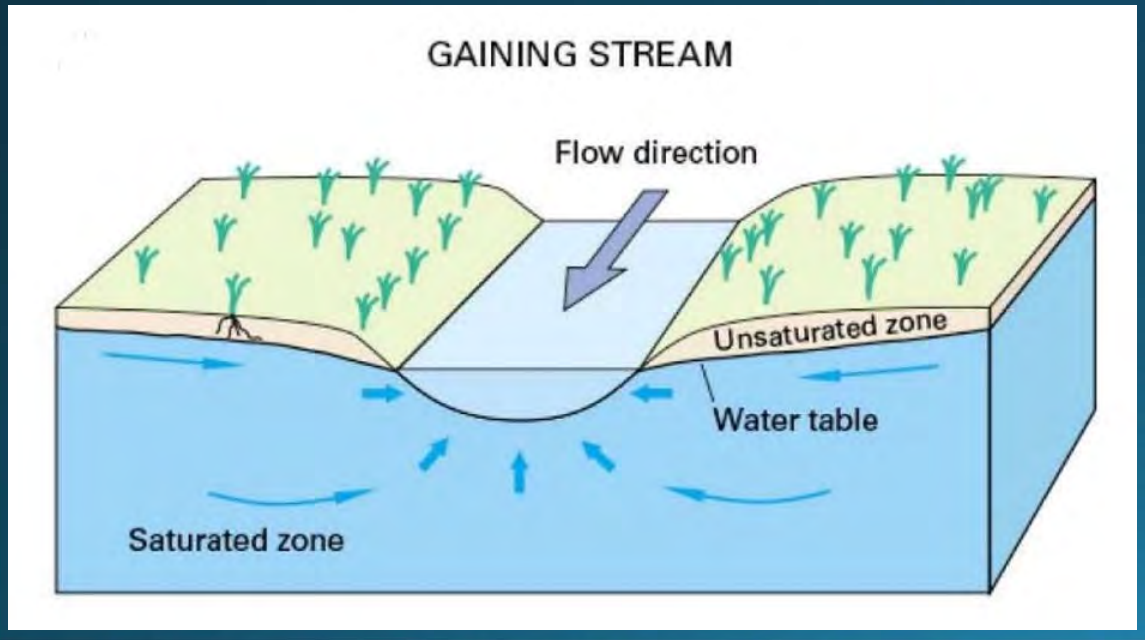
- Additional Potential Significant and Unreasonable Conditions?
- Suggestions for Approaches to Establishing MTs and MOs?

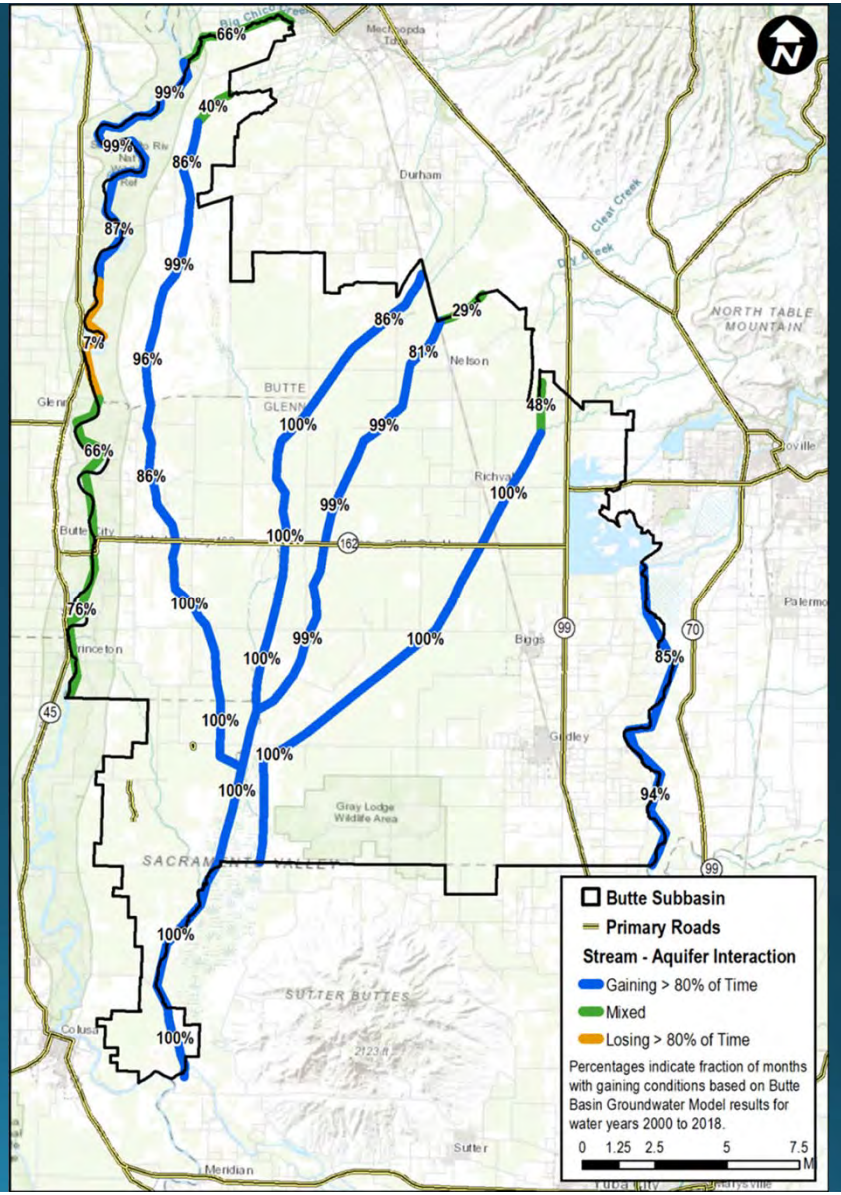
MTs and MOs for Surface Water Depletions

- WHERE? Estimated by Model and Using Available Monitoring Data
- WHY? Potential Significant and Unreasonable Conditions
  - Adverse Impacts to Beneficial Uses of Surface Water
- WHAT? Reductions in Streamflow Due to Additional Pumping
- HOW? Approach
  - Evaluate Potential Depletions Relative to Current Conditions
  - Identify and Evaluate Existing Stream Gages and Monitoring Wells
  - Incorporate Management Action into 2022 GSP to Provide for Additional Monitoring over Time
  - Evaluate Stream Impacts Based on Groundwater Level MTs and MOs

Current Understanding

- Streams Gaining from Groundwater Based on Water Budget Results
- Potential for Reduced Gains in Future Due to Increased Groundwater Demands





Discussion

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- Suggestions for Approaches to Establishing MTs and MOs?

MT and MO Approach Summary

- Adequate for Initial GSP Implementation
- Potential Refinements During Development of Sustainable Management Criteria
- Potential Additional Refinements During GSP Implementation

Additional Discussion

Projects and Management Actions (PMAs)

- "Toolbox" of Activities to Avoid or Address Sustainability Concerns
  - Incorporate Projects that Could Be Implemented As Needed
  - Incorporate Management Actions to Fill Data Gaps
- Developed at Planning Level for Inclusion in GSP
- Based on Projects from Agricultural Water Management Plans (AWMPs), Urban Water Management Plans (UWMPs), Other Past Studies, Local Submittals, etc.
- Descriptions Refined to Meet GSP Requirements

Without Project Water Budget Baselines

- Water Budget Baseline Scenarios
  - Current Conditions
  - 2030 Climate Change
  - 2070 Climate Change
- Summary of Baseline Results (Current vs. 2070)
  - Increased Pumping ~47 Thousand Acre-Feet per Year
  - Decreased Groundwater Storage ~2 Thousand Acre-Feet per Year
  - Balance Made Up Primarily from Decreased Gains to Streams
- Current Observations
  - Water Budgets are Subject to Uncertainty
  - Need to Define Locally What is Considered “Significant and Unreasonable” to Set MTs and MOs
  - Conduct Monitoring to Assess over Time

PMA Ideas Received

- 21 Ideas Received To Date
- Projects
  - Distribution System Modernization
  - Diversion Improvements
  - Dual Source Irrigation Systems
- Management Actions
  - Improved Surface Water Outflow Measurement
  - Groundwater Monitoring Wells
- Additional Ideas
  - Groundwater Dependent Ecosystem (GDE) Monitoring
  - Additional Stream Gages and Paired Shallow Monitoring Wells
  - Expanded Groundwater Quality Monitoring in Areas of Concern

DRAFT PMA Evaluation Criteria

- Used to Better Characterize Potential PMAs
- Criteria/Considerations
  - Initial and Ongoing Costs
  - Benefits Relative to Sustainability Indicators
  - Other Benefits / Potential Impacts
  - Status of Development (e.g. concept, feasibility, designed, shovel-ready)
  - Legal Authority; Administrative, Permitting, and Regulatory Compliance Requirements
  - Stakeholder Acceptance

Discussion

- Solicitation of Additional Ideas
  - PMA Web Form (https://docs.google.com/forms/d/e/1FAIpQLSckXN4TfhI-A7Giwc9-aDnqeXybIXrMxeN9Ft0a9SVzGJXGLA/viewform)
  - Deadline for Submittals?
- Incorporation into GSP
  - Refine Descriptions and Supporting Information for Submitted PMAs
  - Develop Descriptions and Supporting Information for Additional Ideas
  - Develop Summaries for PMA Chapter of GSP

Discussion