Sustainable Groundwater Management Act
GSP Preparation

Madera Subbasin

Technical Workshop and Coordination Committee Meeting

2:00 p.m. to 4:00 p.m., August 7, 2019
Madera County Government Center
Board of Supervisors Chambers

Madera, CA

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Agenda

- Chapter 1: Introduction (SGMA Requirements)
- Chapter 2: Plan Area and Basin Setting
- Chapter 3: Sustainable Management Criteria
- Chapter 4: Projects and Management Actions
- Chapter 5: Implementation Plan
- Additional Questions/Discussion Next Steps

DWR Grant funding

- GSP
- Additional monitoring wells

Presented Previously

- Technical workshop, 5/24/2018
- Technical workshop, 6/25/2018
- Groundwater workshop, 8/2/2018
- Technical workshop, 10/18/2018
- Coordination committee, 3/21/2019
- Technical workshop, 4/25/2019
- Technical workshop, 5/29/2019

Chapter 1: Introduction

Presented Previously

- Technical workshop, 5/24/2018
- Technical workshop, 6/25/2018
- Groundwater workshop, 8/2/2018
- Technical workshop, 10/18/2018
- Coordination committee, 3/21/2019
- Technical workshop, 4/25/2019
- Technical workshop, 5/29/2019

SGMA Requirements

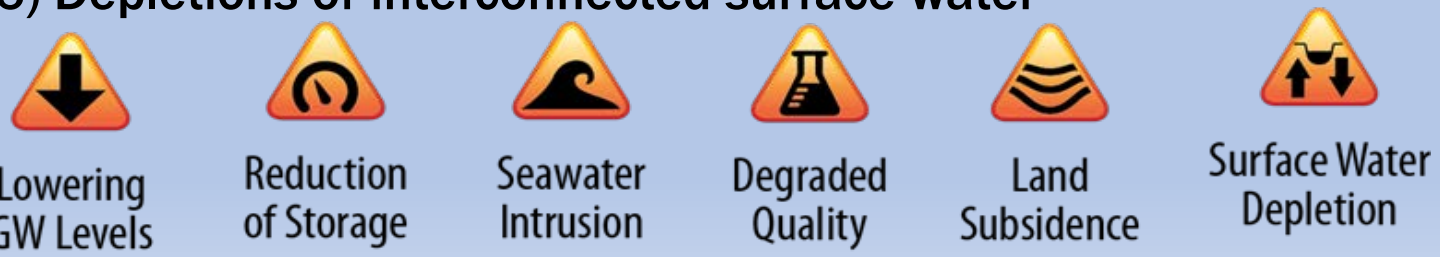
- Adopt and submit a Groundwater Sustainability Plan (GSP) by January 31, 2020
- "Sustainable groundwater management" must be occurring by 2040 for the entire subbasin
  - Today through 2039 – focus on implementation, with "undesirable results" likely to continue
  - 2040 and beyond must be sustainable, with no "undesirable results"

SGMA Requirements (cont.)

- "*Sustainable groundwater management*" means the management and use of groundwater in a manner that can be maintained…without causing undesirable results. [*CWC §10721(v)*]

SGMA Requirements (cont.)

- Where "*Undesirable Results*" means one or more of the following effects caused by groundwater conditions occurring throughout the basin [*CWC §10721(x)*]:
  - (1) Chronic lowering of groundwater levels
  - (2) Significant and unreasonable reduction of groundwater storage
  - (3) Significant and unreasonable seawater intrusion
  - (4) Significant and unreasonable degraded water quality
  - (5) Significant and unreasonable land subsidence
  - (6) Depletions of interconnected surface water



Chapter 2: Plan Area and Basin Setting

Presented Previously

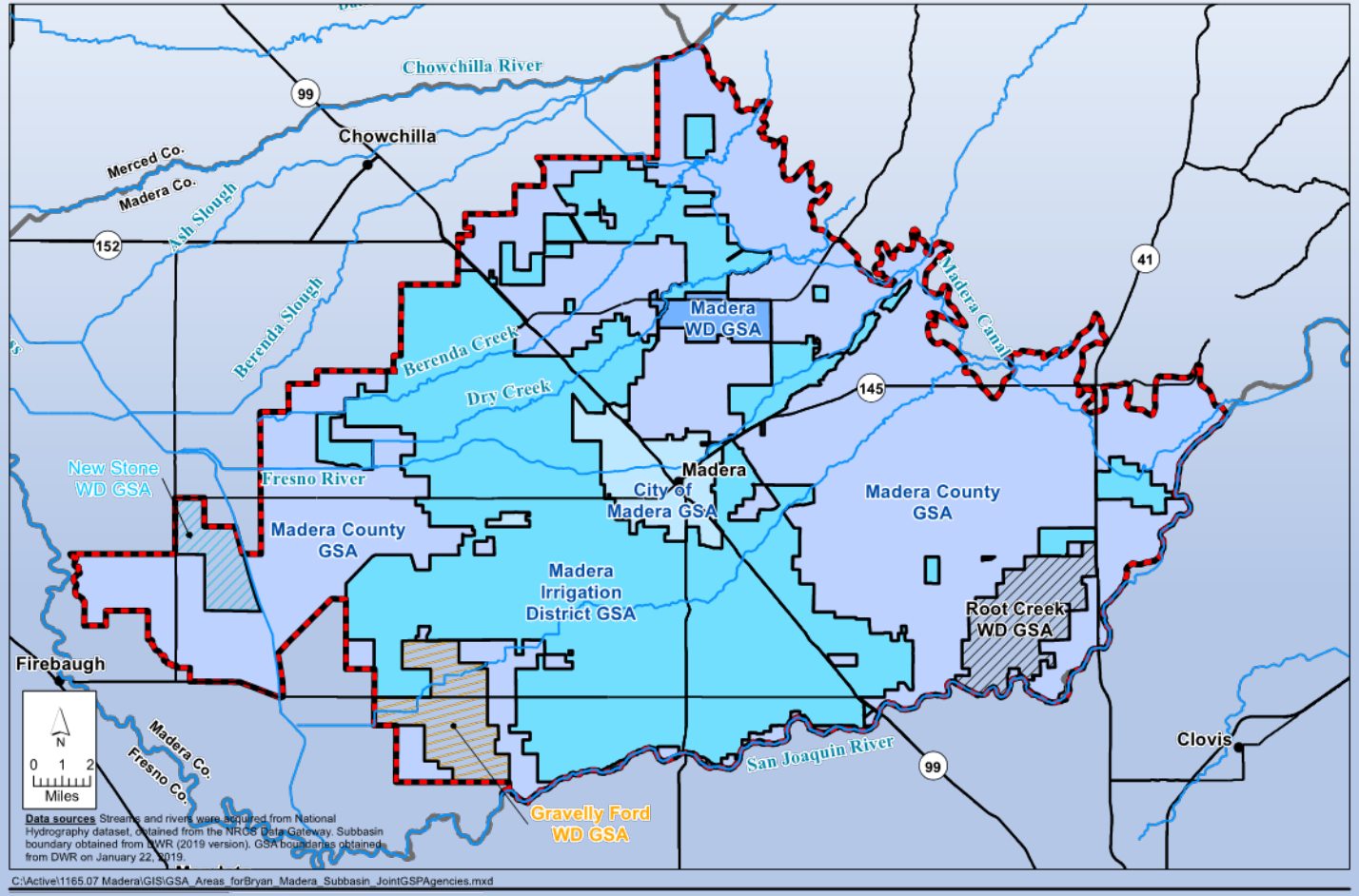
- SGMA workshop, 8/2/2018
- Technical workshop, 10/18/2018
- Technical workshop, 5/29/2019

Madera Subbasin GSA and GSP Overview

- Seven (7) GSAs
  - Madera County GSA
  - Madera Irrigation District GSA
  - City of Madera GSA
  - Madera Water District GSA
  - Gravelly Ford Water District GSA
  - Root Creek Water District GSA
  - New Stone Water District GSA
- Four (4) GSPs

Groundwater Sustainability Plan (GSP)	Groundwater Sustainability Agency (GSA)
Joint Madera Subbasin GSP	Madera County GSA Madera Irrigation District GSA City of Madera GSA Madera Water District GSA
Gravelly Ford GSP	Gravelly Ford Water District GSA
Root Creek GSP	Root Creek Water District GSA
New Stone GSP	New Stone Water District GSA

Madera Subbasin GSA Map

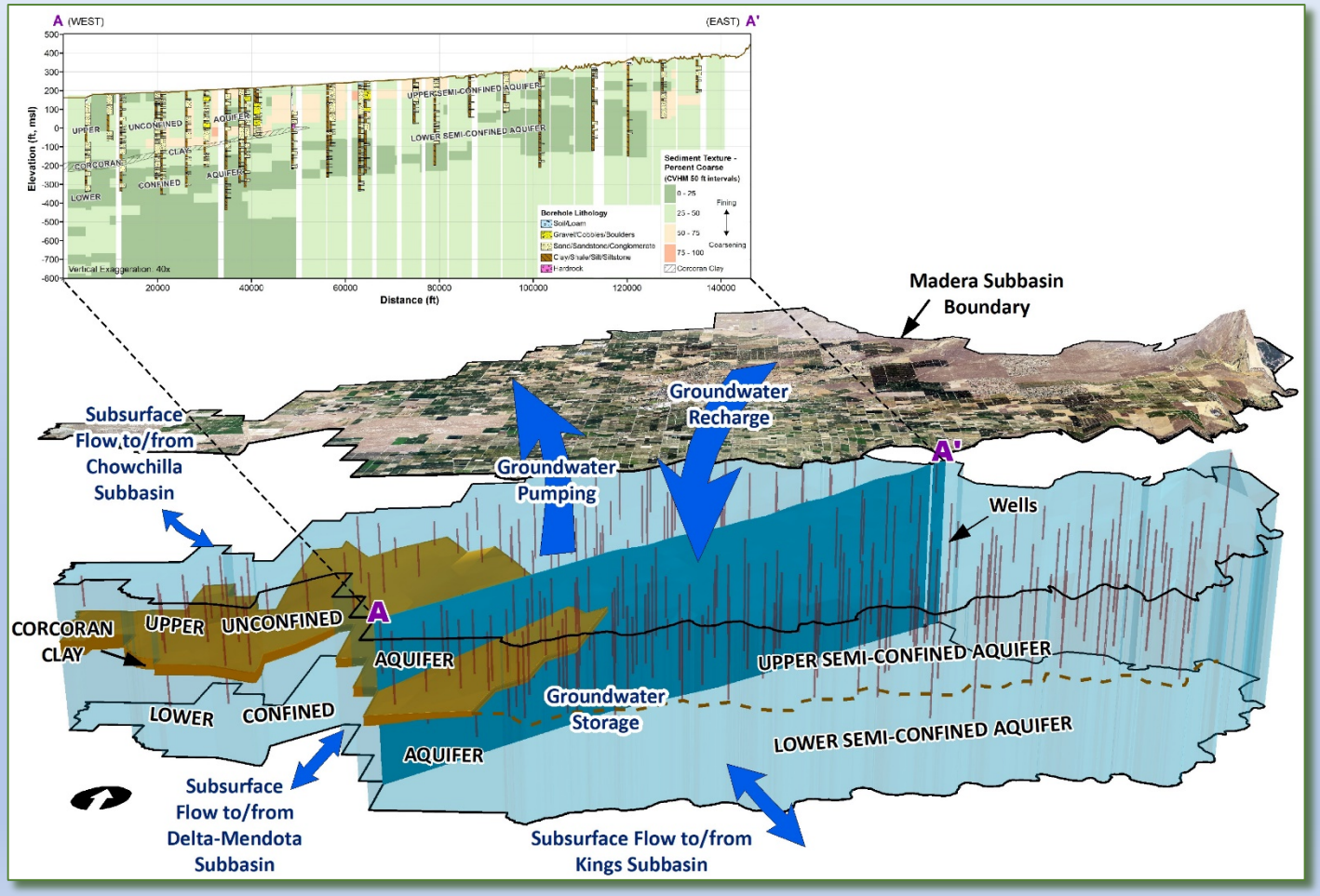


- Total area ~ 348,000 ac
- Irrigated (2015) ~ 216,000 ac

Joint GSP (area without cross hatching)

- Total area ~ 326,000 ac
- Irrigated (2015) ~ 197,000 ac

Hydrogeologic Conceptual Model to represent the Madera Subbasin



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Madera Subbasin

- Hydrogeologic Conceptual Model (HCM)
  - Surficial Soils
  - Subsurface Geology
    - Lateral and Vertical Extent of Subbasin
    - Stratigraphy
  - Aquifer Properties
- Groundwater Conditions
  - Water Levels/Storage Change
  - Subsidence
  - Water Quality
  - Groundwater-Surface Water Interaction

Madera Subbasin "consumptive use"
[a.k.a. Evapotranspiration of Applied Water (ETAW)]

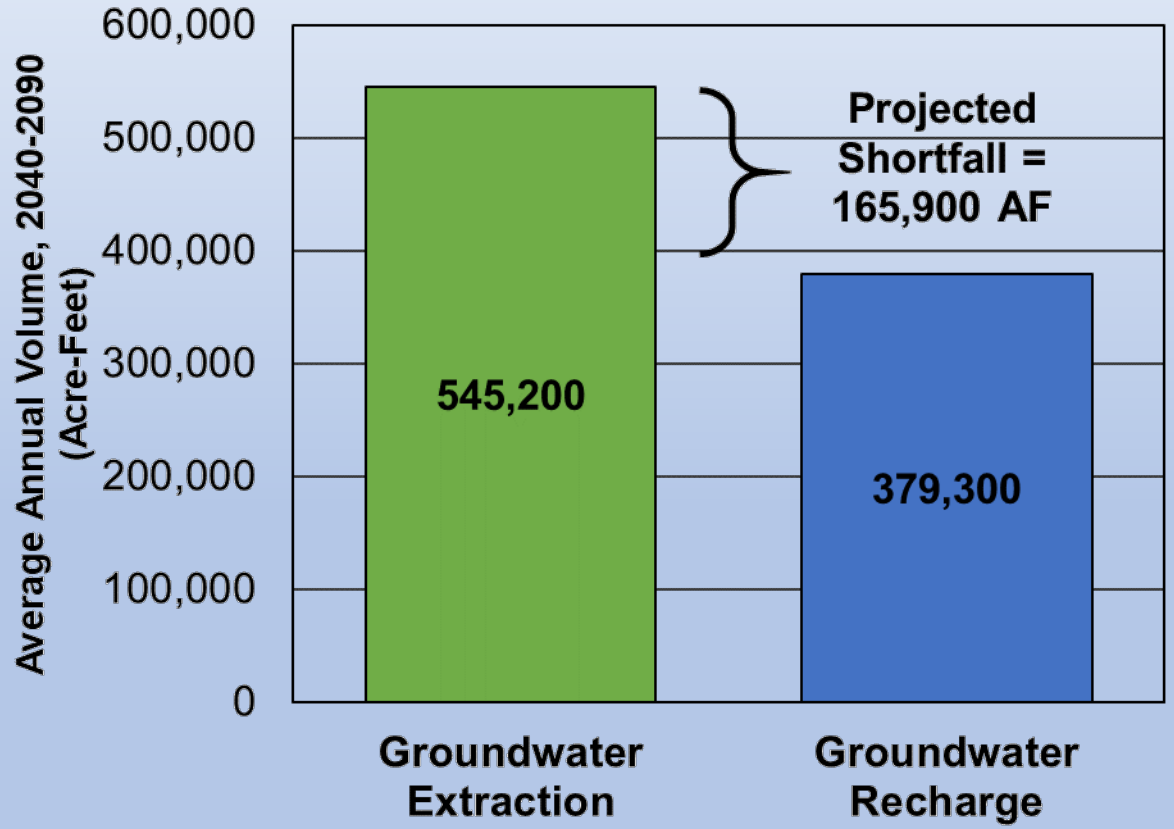
- Irrigated ag dominates
- Significant shift in crop types
- Average ETAW has increased
  - 1989 = 1.75 af/ac
  - 2015 = 2.13 af/ac
- Urban use is minor
  - City of Madera ~ 4,500 af/yr
  - Rural residential ~ 18,200 af/yr

Land Use	Crop Area (acres)	
	1989	2015
Citrus and Subtropical	6,071	4,512
Corn	5,266	6,963
Grain and Hay Crops	5,548	9,118
Grapes	69,562	67,489
Idle	32,783	4,198
Miscellaneous Field, Truck, Decid.	27,480	12,943
Almonds	21,797	75,006
Pistachios	14,169	27,189
Walnuts	1,180	1,157
Pasture and Alfalfa	30,069	7,581
Total	**213,924**	**216,158**

Madera Subbasin Water Sources to Meet ETAW

- Surface water brought into subbasin
  - Significant MID contracts and rights
  - Other GSA water rights/contracts
  - Other riparian and appropriative rights
  - Periodic diversion of flood flows
  - Portion routinely seeps/percolates to groundwater
- Groundwater in subbasin
  - Native groundwater from percolating rainfall and storm water seepage
  - Previously seeped and percolated surface water

Simplified Groundwater Condition No Action 2040-2090



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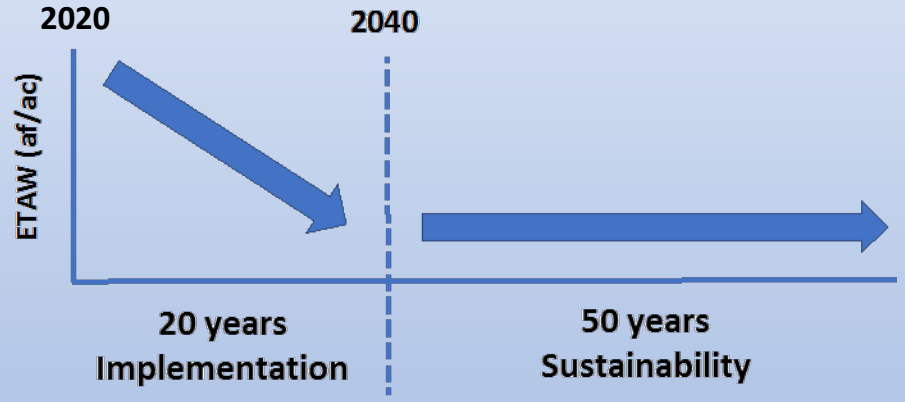
Plan for Meeting the Shortfall

- Recharge projects
- Incremental reduction from current consumptive use
- Continued use of stored groundwater (lowering levels) during project implementation period
- Use GW model to estimate future



Chapter 3: Sustainable Management Criteria

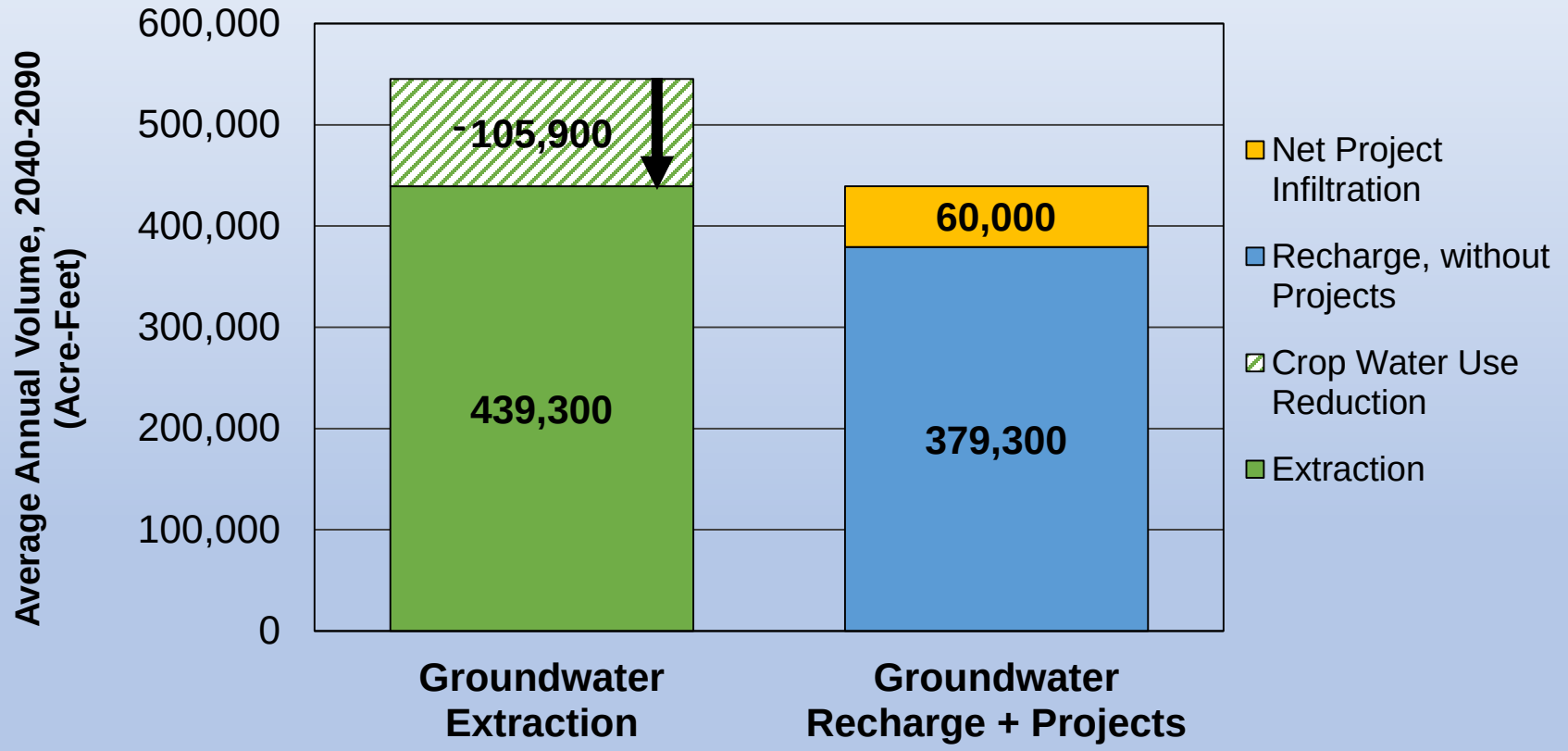
Presented Previously

- Technical workshop, 5/29/2019

Sustainability Goal: Three Aspects

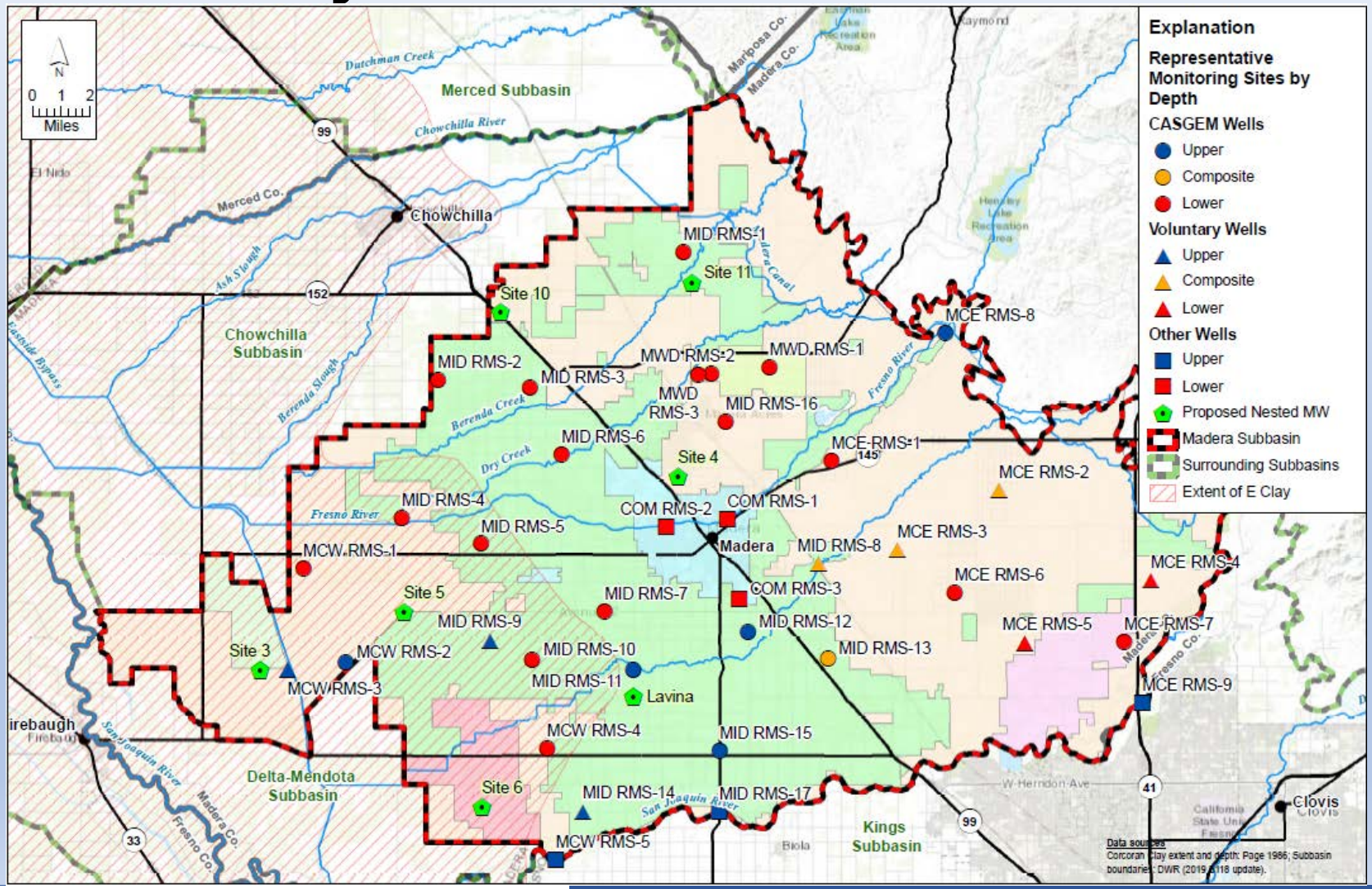
- Implement projects and management actions through 2040 to reach sustainability
- Groundwater system inflows approximately equal outflows over a 50-year (2040-2090) representative hydrology time period
- No undesirable results estimated to occur during 50-year representative time period

Simplified Groundwater Condition With Projects (2040-2090)



Crop Water Use Reduction Program: Madera County GSA 90,000 af. Remaining crop water use reduction due to permanent recharge basins replacing irrigated area.

Monitoring Network: CASGEM, Voluntary and Other Wells



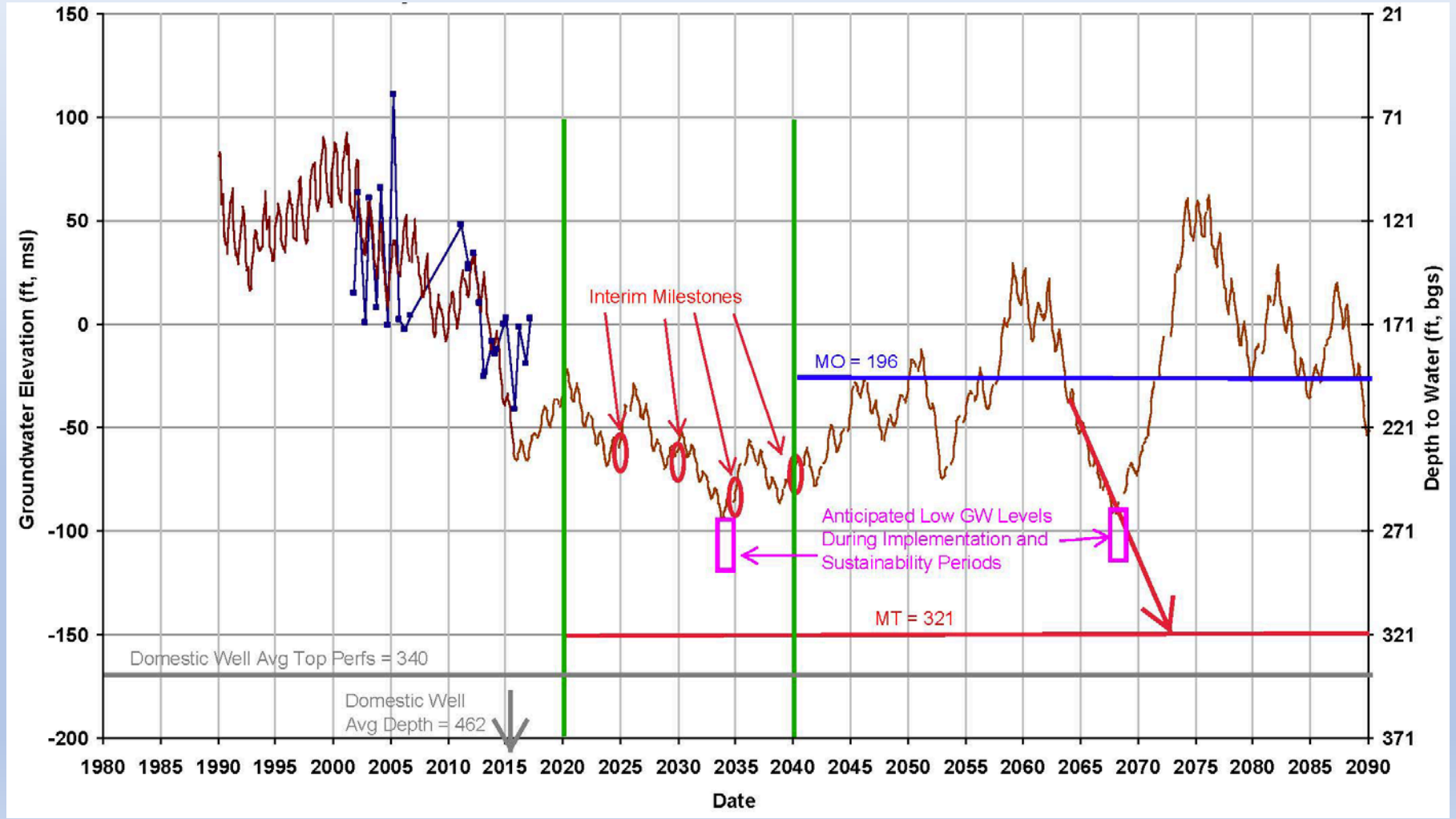
Definition of Undesirable Results

- Define for each sustainability indicator
- Wells in the monitoring network
- Exceedance of Groundwater Level Minimum Threshold to yield undesirable result will be defined by:
  - Two consecutive fall measurements below Minimum Threshold, and
  - 30 percent of wells (the same wells) below Minimum Threshold

Setting Minimum Thresholds for Groundwater Levels

- Primary factors considered:
  - Existing beneficial uses
    - Drinking water (private wells, small community, etc.)
    - Irrigation
    - Environment
  - Human right to water (AB 685)
  - Importance of agriculture to County economy
- GSAs recognize inter-connection of these factors
- GSAs need time to transition and complete projects and actions – which will lower groundwater levels during implementation
- Planned mitigation for impacts can address concerns of lowered groundwater levels during implementation

Setting Minimum Thresholds (MTs) for Groundwater Levels: Example Hydrograph



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GSAs are considering a mitigation program for impacted drinking water wells

- 2020 to 2021 details developed with stakeholder input
- Possible mitigation actions
  - Replace/lower existing well
  - Connect to community water system
- Possible types of support
  - Low interest loans
  - Grants
- Likely will require well owners to sign up for program

Setting Minimum Threshold for Reduction in Groundwater Storage

- The proposed Minimum Threshold is no long-term reduction in groundwater storage volume during the sustainability period
- Reduction in groundwater storage volume will be quantified based on measured groundwater levels in monitoring network wells

Setting Minimum Thresholds for Groundwater Quality

- MCL = Maximum Contaminant Level
- Applicable drinking water standards (e.g., MCL) will serve as Minimum Thresholds for key constituents (e.g., nitrate, arsenic, Total Dissolved Solids (TDS)):
  - Nitrate = 10 mg/L (as nitrogen) (or, if greater, existing level)
  - Arsenic = 10 ug/L (or, if greater, existing level)
  - TDS = 1,000 mg/L (or, if greater, existing level)
- MCLs are standards set by U.S. EPA and the State for drinking water quality
- MCLs are allowable limits for public water systems under Safe Drinking Water Act
- Setting GW level MTs above depth of reduced sediments helps reduce likelihood of arsenic exceedances

Setting Minimum Thresholds for Surface Water Depletion

1) Surface water depletion a function of surface water levels/flow and groundwater levels;
2) GW levels far below subbasin streams except portions of San Joaquin River (SJR);
3) Available data indicate GW levels below SJR channel bottom are relatively shallow in some places but still disconnected as of 2015;
4) MTs will not be set for surface water depletion

Screening of Potential GDEs

1) Certain vegetation is dependent on shallow depths to groundwater;
2) Rooting depth for vegetation species present in shallow GW areas being evaluated;
3) GW levels within 30 feet of ground surface are a consideration for initial screening of potential GDEs;
4) Occur in three areas: Fresno River/Madera Canal: SJR below Friant Dam; SJR along southern basin boundary.

Setting Measurable Objectives

1) GW Levels – Average of modeled monthly GW levels from 2040 to 2090 (see next slide);
2) GW Storage – Use GW level Measurable Objectives;
3) Land Subsidence – Use GW level Measurable Objectives;
4) GW Quality – Current constituent concentrations;
5) Surface Water Depletion – Not applicable;
6) Sea Water Intrusion – Not applicable

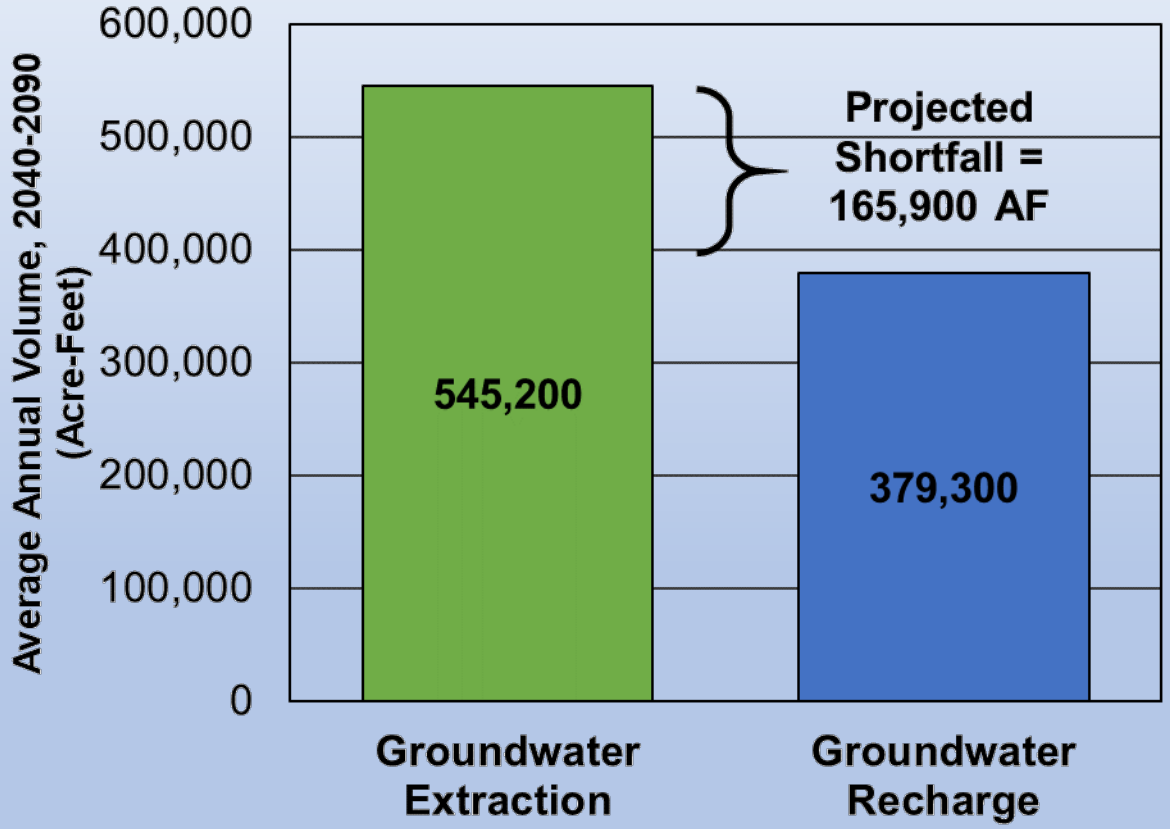
Measurable Objective: GW Levels

Chapter 4. Projects and Management Actions

Presented Previously

- Technical workshop, 10/18/2018
- Technical workshop, 5/29/2019

Simplified Groundwater Condition No Action 2040-2090



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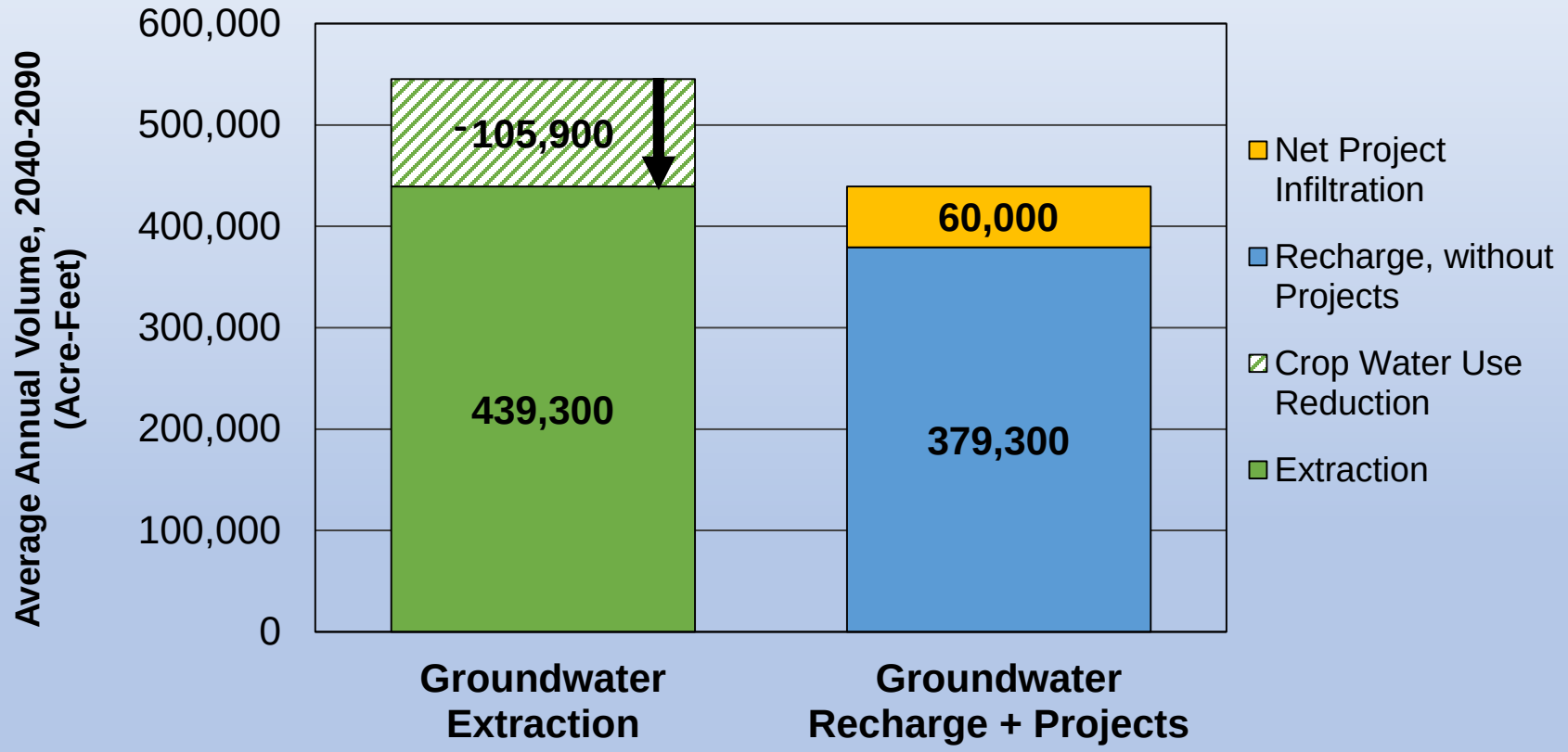
What is being planned to close this deficit by 2040?

- Water Supply Projects/Programs
  - Augment supplies
    - Flood flows (limited) (Fresno River and Chowchilla Bypass)
    - Purchase from others
  - Build recharge projects
    - On-farm recharge
    - Dedicated Recharge Basins
  - Participate with others:
    - GSAs work cooperatively where feasible

What is being planned to close this deficit by 2040?

- Demand Management (Madera County GSA)
  - Create conservation easements
  - Establish groundwater allocations
  - Create market for allocations
  - Charge extraction fees
  - Temporary continued use of existing stored groundwater
  - Establish potential mitigation for dry domestic wells

Simplified Groundwater Condition With Projects (2040-2090)



Crop Water Use Reduction Program: Madera County GSA 90,000 af. Remaining crop water use reduction due to permanent recharge basins replacing irrigated area.

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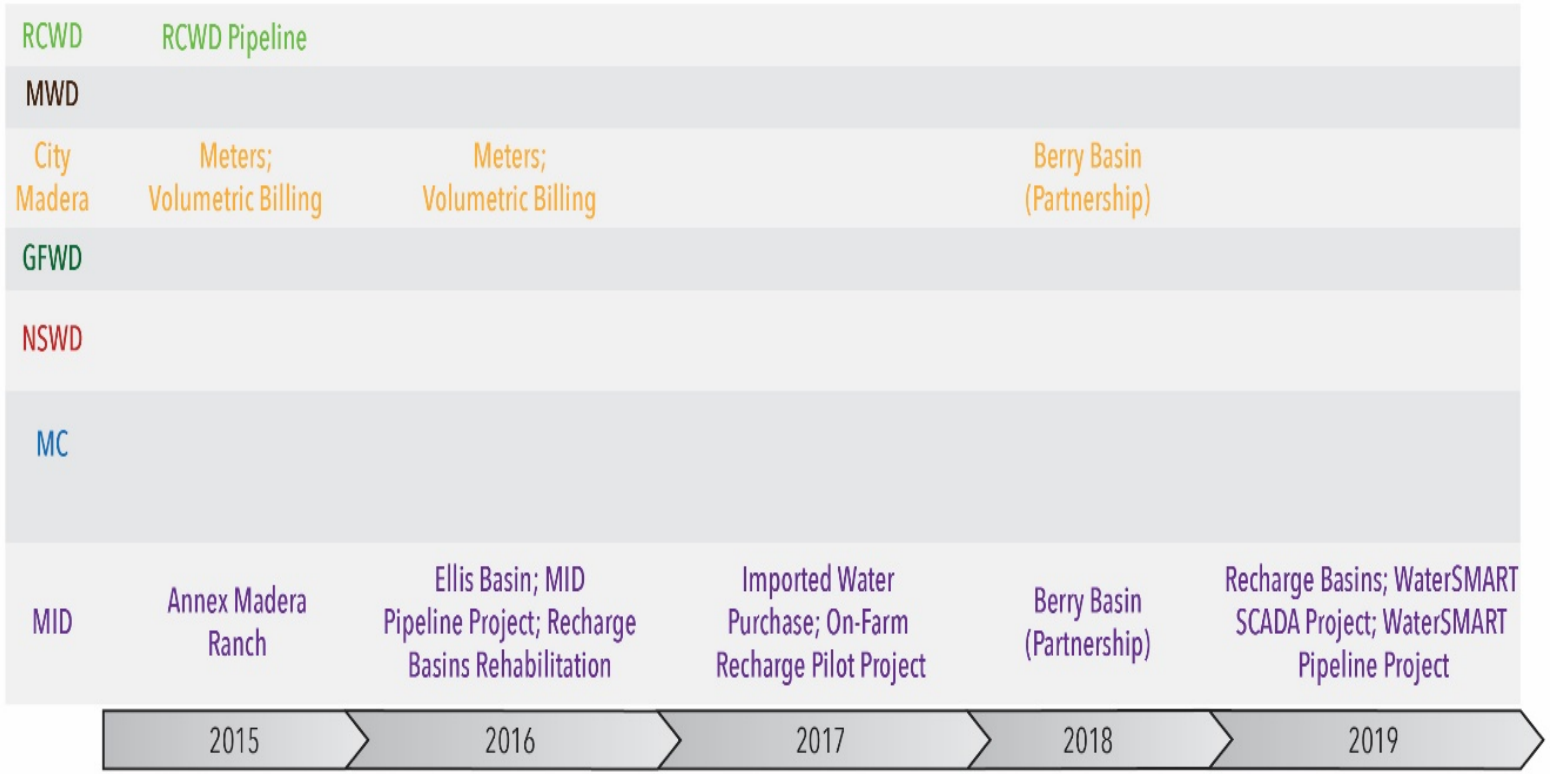
Chapter 5. Implementation Plan

Madera Subbasin Implementation Completed Projects (2015-2019)



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Madera Subbasin Implementation Project Schedule (2020 - 2040)

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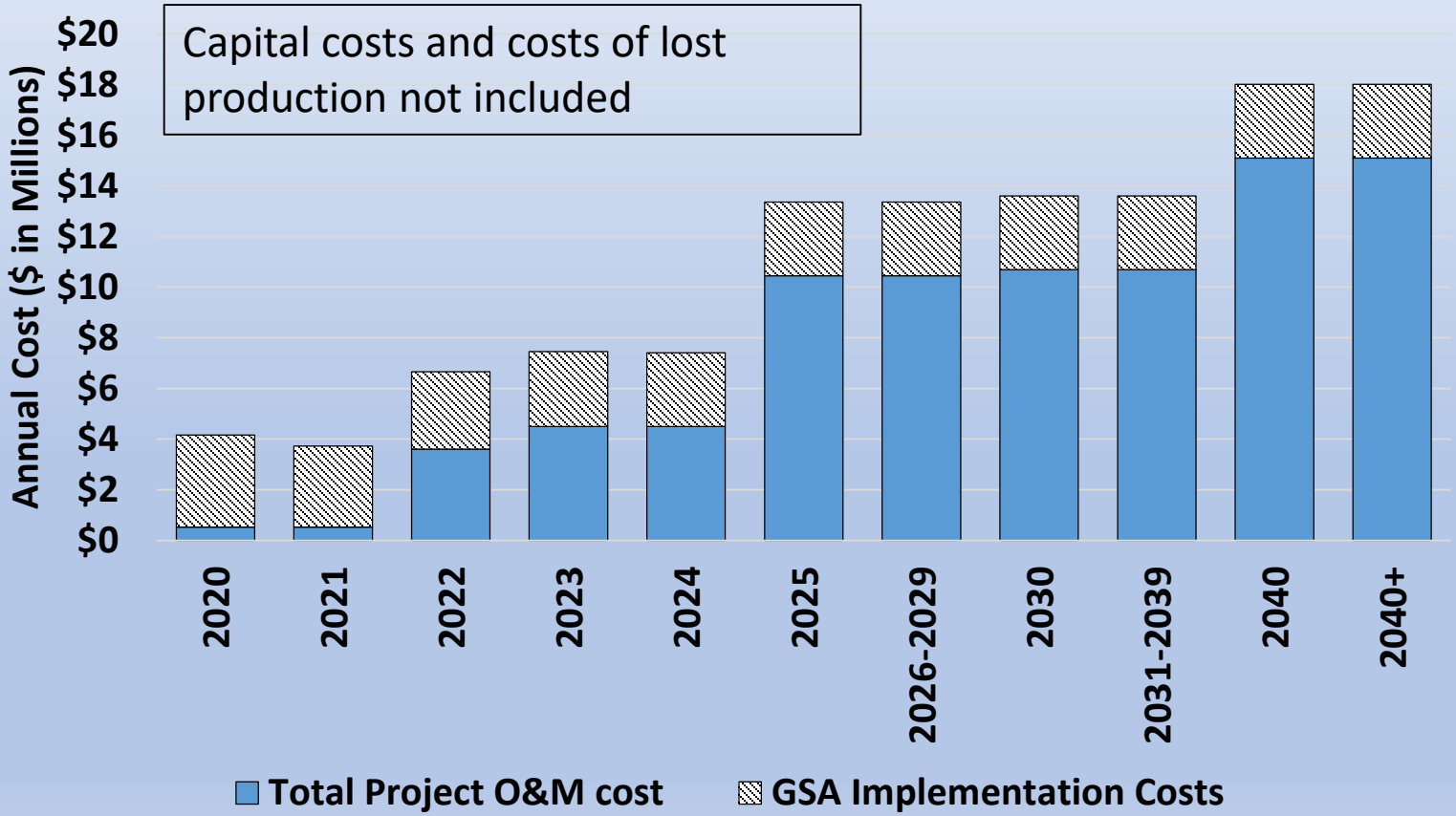
Madera Subbasin Estimated Annual Costs (in current dollars) for Project O&M and GSA Implementation



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Annual Reporting

Provide basic information and technical information including:

- Groundwater elevation data from monitoring wells
- Hydrographs of groundwater elevations
- Total groundwater extractions for the prior year
- Surface water supply used in the prior year, including for groundwater recharge or other in-lieu uses
- Change in groundwater storage
- Progress towards implementing the GSP

Data Management System

- USGS and USACE station data
- DWR-compiled data (WDL and CDEC)
- Weather Data
  - (CIMIS station data)
  - (NCEI (NOAA) station data)
- eWRIMS
- GIS
- Others

Feedback on Plan

- Form to provide comments available on web site
- October 22, 2019 coordination committee meeting from 6 to 8 pm
- Monthly GSA board meetings
  - Madera County — September 3
  - City of Madera — September 4
  - MID — September 10
  - MWD — September 11

GSP Next Steps

- Release draft GSP for public review (Today)
- Receive public comments on draft GSP (through early November 2019)
- Revise and respond to comments (November 2019)
- GSAs adopt GSP (December 2019)
- GSP Submitted to DWR by Jan 31, 2020
- DWR public comment period (60 days)
- DWR evaluates plan
- DWR approves plan

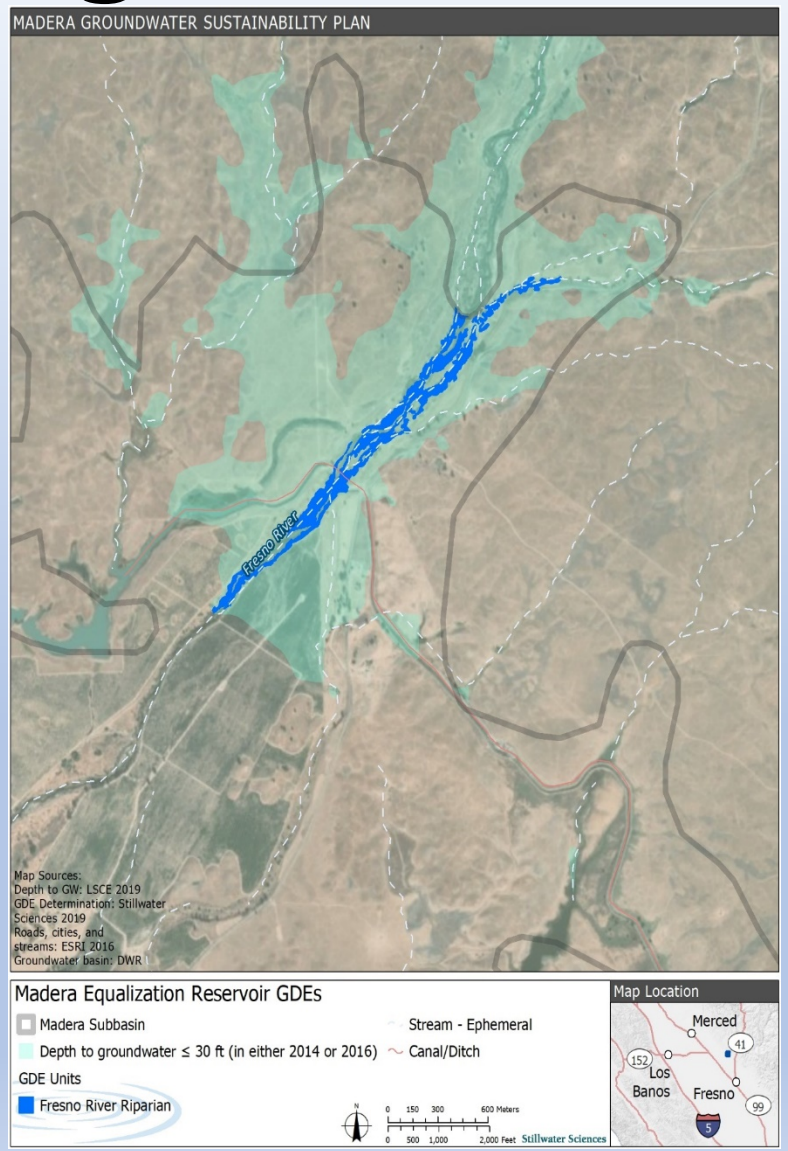
Ongoing GSP Activities

- Installing new monitoring wells
- DMS Request for Proposals
- Coordination agreement
- Start work on annual report (due April 1, 2020)

Questions

Extra Slides

Screening of Potential GDEs



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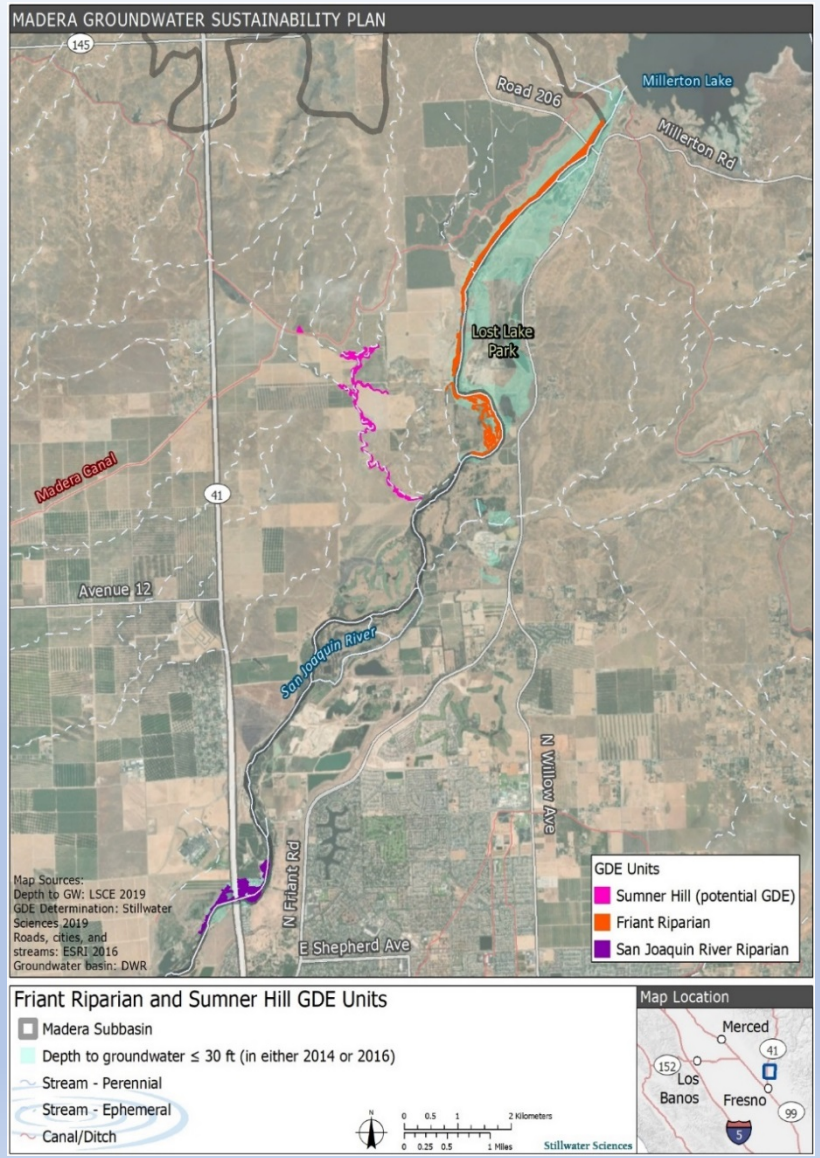
Screening of Potential GDEs



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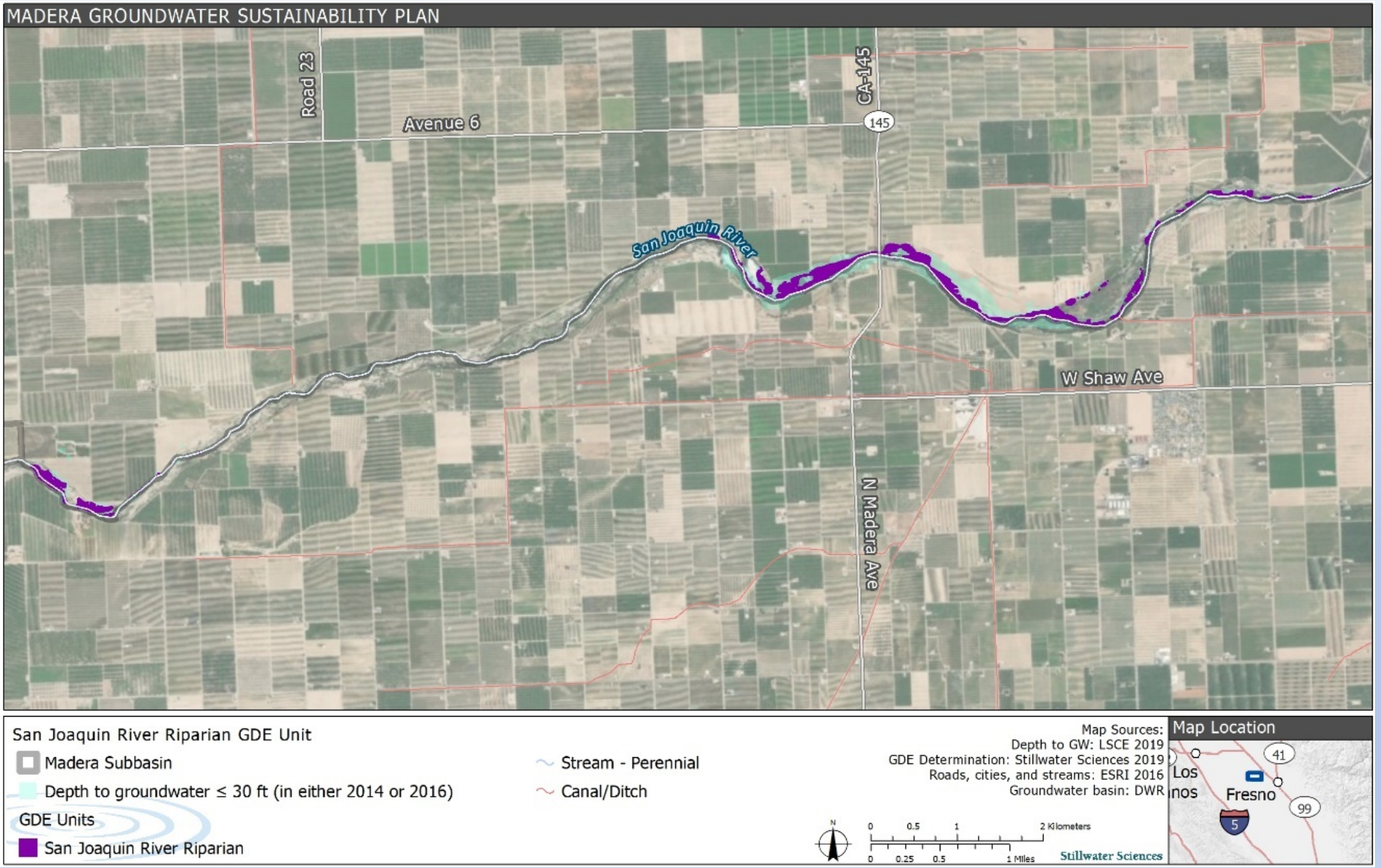

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