

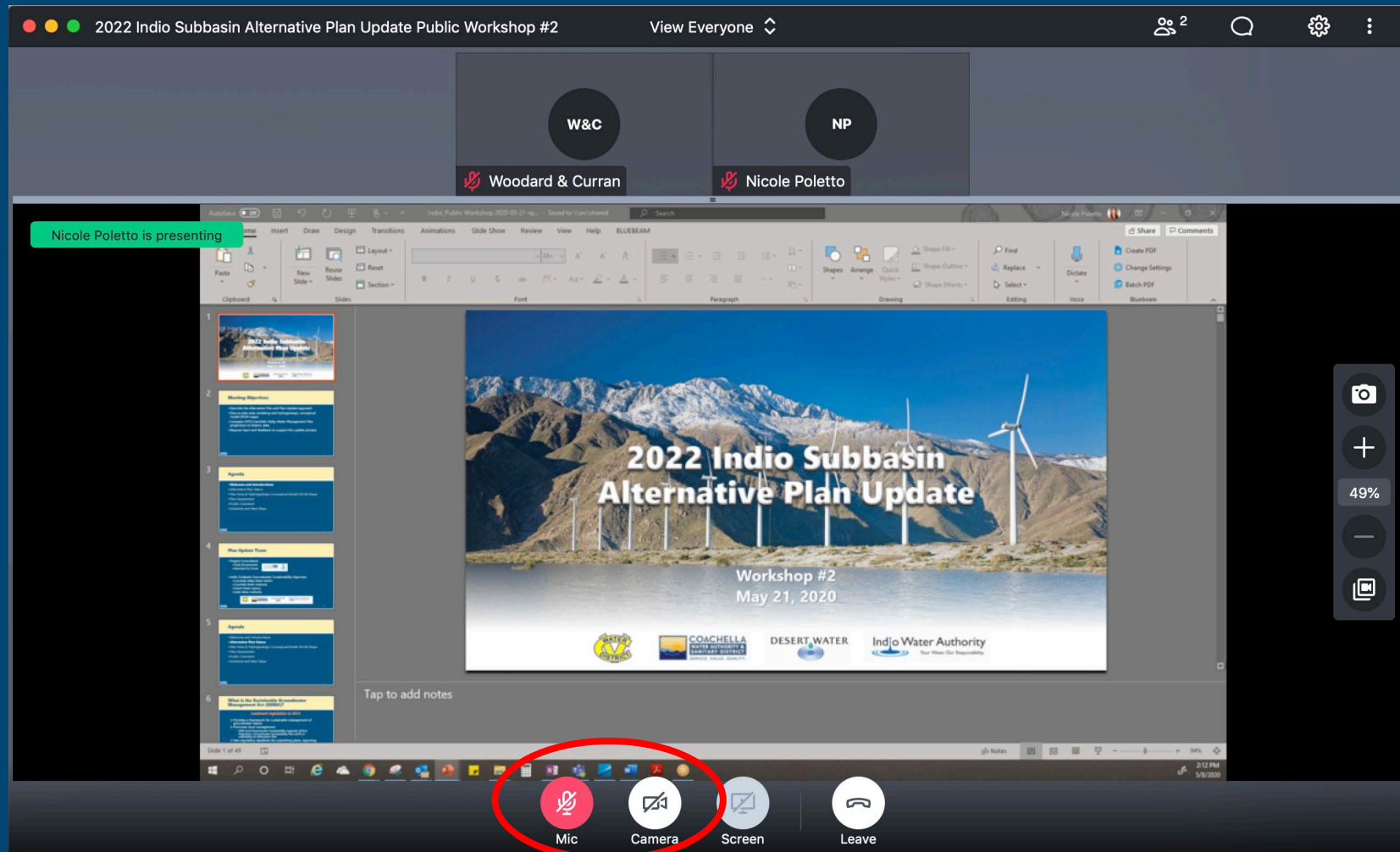
2022 Indio Subbasin Alternative Plan Update

Workshop #6
August 26, 2021



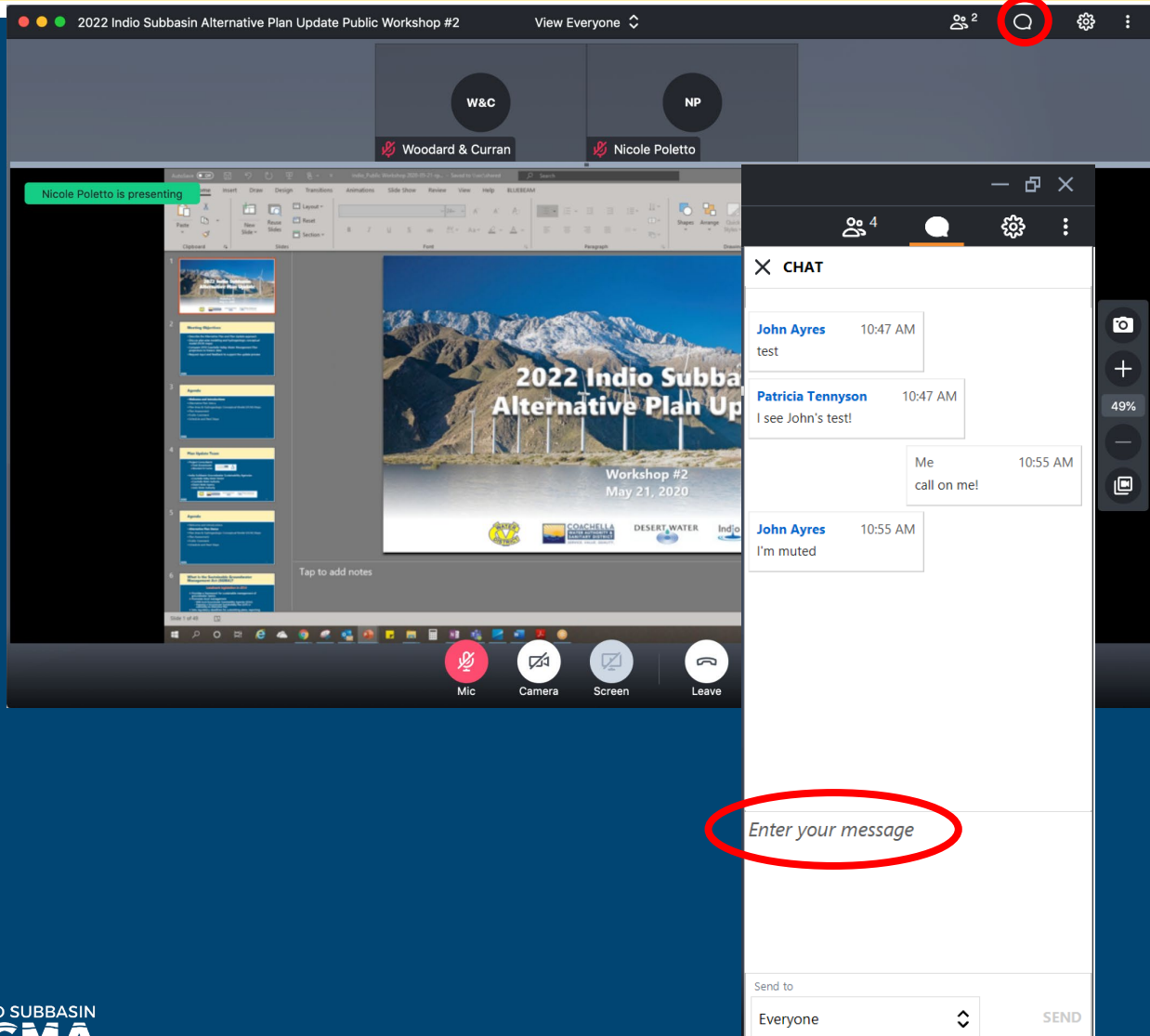
GoToMeeting – Quick How To

- Your screen should look like this:



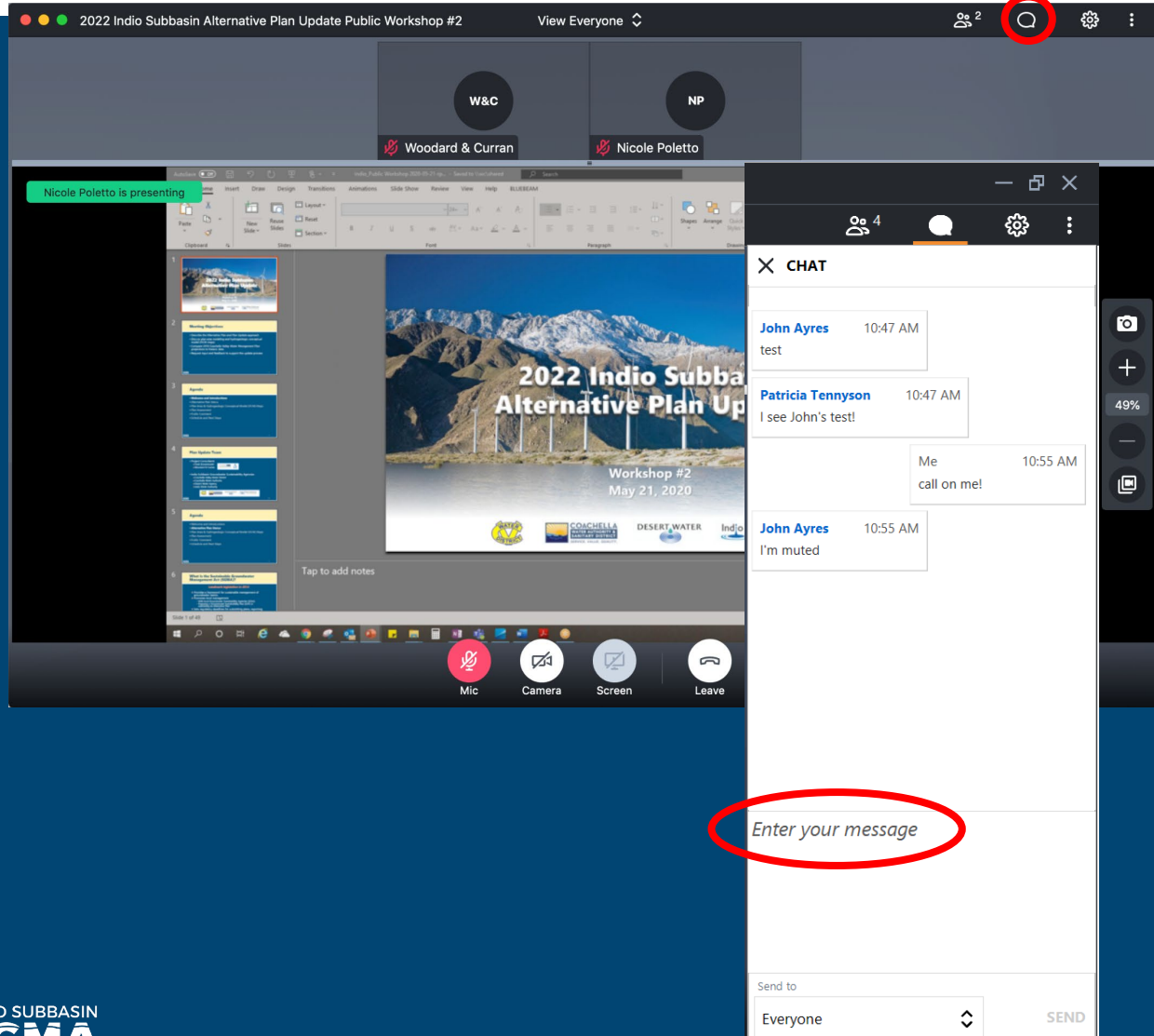
- Turn on/off your Mic (mute) and Camera (video) using the controls along the bottom
- During the meeting, you may need to wiggle your mouse to make the controls appear
- For Callers: use *6 to unmute on the phone

GoToMeeting – How to Ask a Question



- Our organizer will mute everyone at the beginning of the meeting
- Let us know you have a question by clicking the **Chat** icon in the top right
 - ❖ Click on *Enter your message*, type your message and hit SEND
- Once we receive your Chat, we will call on you and answer your question
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Meeting Objectives

- Provide overview and status of the Alternative Plan Update
- Discuss proposed Projects and Management Actions included in the Plan scenarios
- Present on groundwater modeling for Plan Scenarios and simulation results
- Request input and feedback to support the Plan Update

Agenda

- **Welcome and Introductions**
- Alternative Plan Status
- Groundwater Model
- Plan Scenarios & Projects and Management Actions
- Simulation Results
- Public Comment
- Get Involved

Plan Update Team

- Project Consultants

- ❖ Todd Groundwater
- ❖ Woodard & Curran



- Indio Subbasin Groundwater Sustainability Agencies

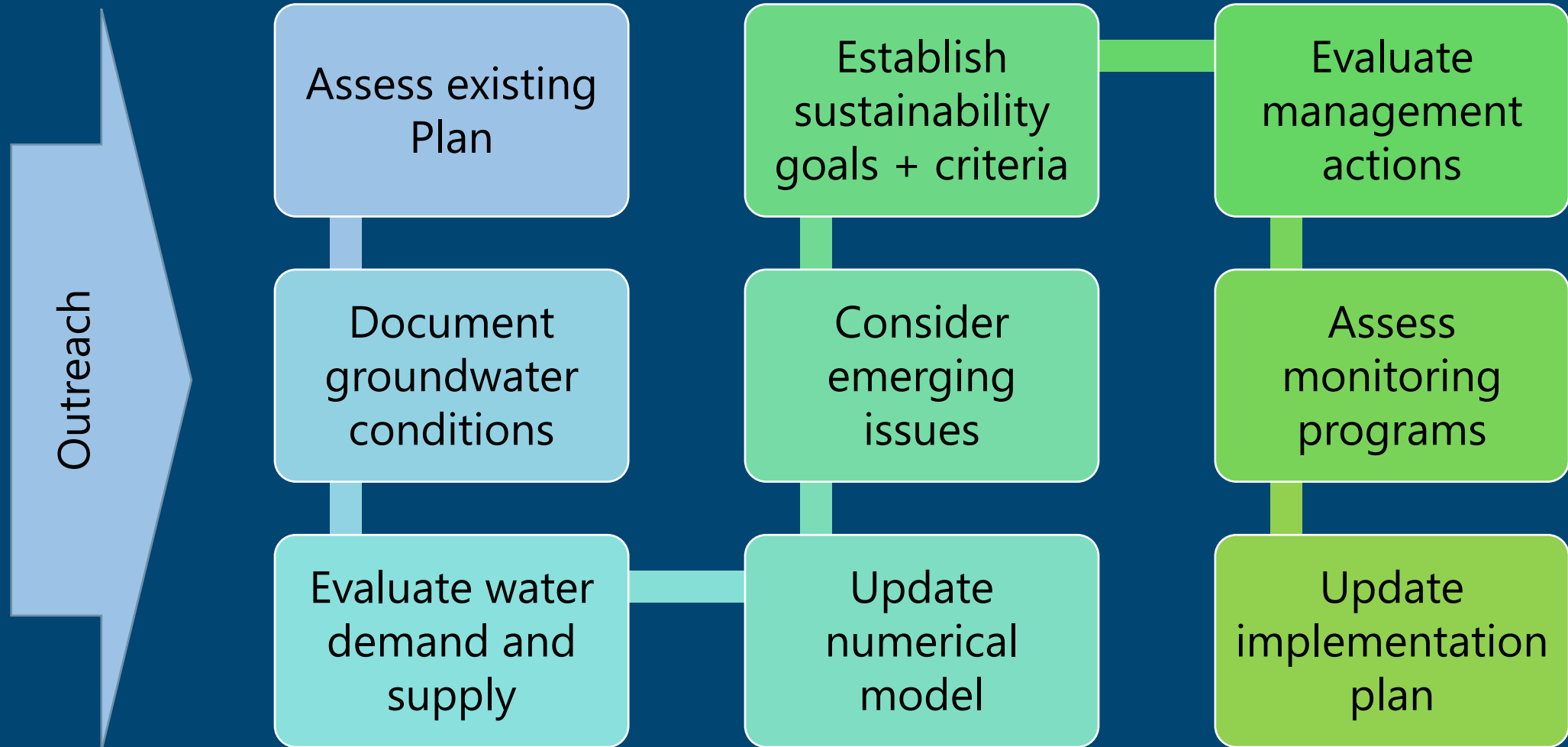
- ❖ Coachella Valley Water District
- ❖ Coachella Water Authority
- ❖ Desert Water Agency
- ❖ Indio Water Authority



Agenda

- Welcome and Introductions
- **Alternative Plan Status**
- Groundwater Model
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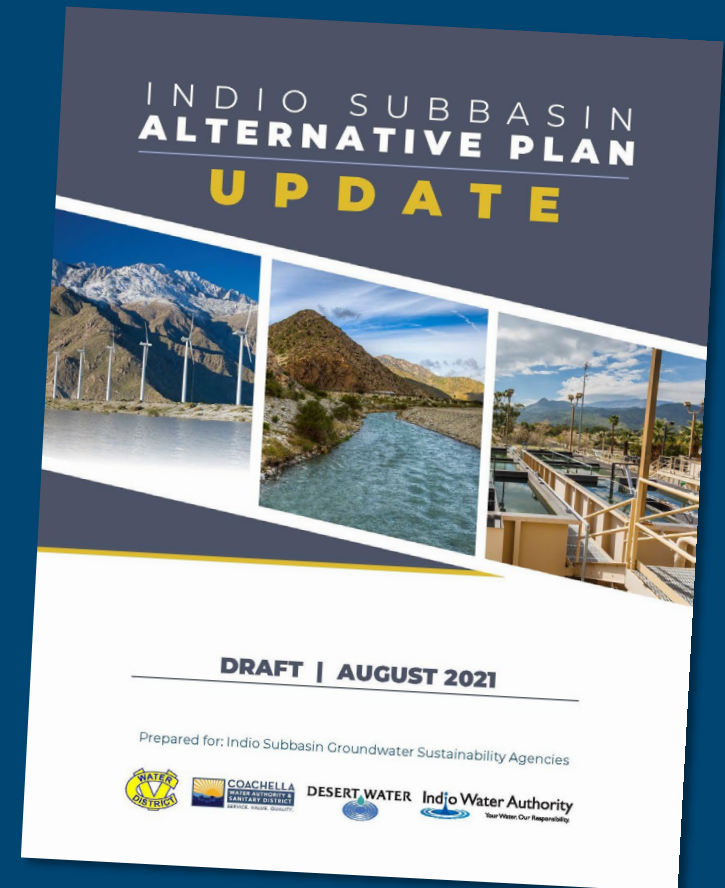
Status of Alternative Plan Update



Status of Alternative Plan Update

Outline of 2022 Alternative Plan Update presents a progression of work

1. Introduction
2. Plan Area
3. Hydrogeologic Conceptual Model
4. Groundwater Conditions
5. Demand Projections
6. Water Supply
7. Numerical Model and Plan Scenarios
8. Regulatory and Policy Issues
9. Sustainable Management
10. Monitoring Program
11. Projects and Management Actions
12. Plan Evaluation and Implementation



Plan Goals and Objectives

Plan Goal:

- to reliably meet current and future water demands in a cost-effective and sustainable manner

Sustainability Goal:

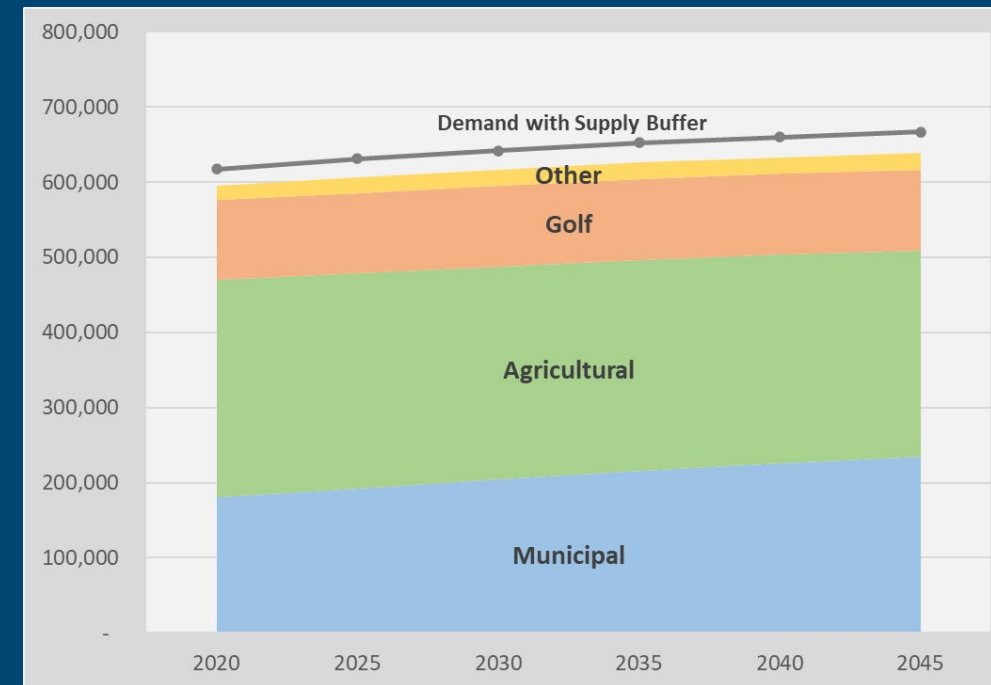
- *to maintain a locally managed, economically viable, sustainable groundwater resource for existing and future beneficial uses in the Indio Subbasin by managing groundwater to avoid the occurrence of undesirable results*

Plan Goals and Objectives

Objectives:

1. Meet current and future water demands with 10 percent supply buffer
2. Avoid chronic groundwater overdraft
3. Manage and protect water quality
4. Collaborate with tribes, state and federal agencies on shared objectives
5. Manage future costs
6. Minimize adverse environmental impacts
7. Reduce vulnerability to climate change and drought impacts

Total Projected Water Demands

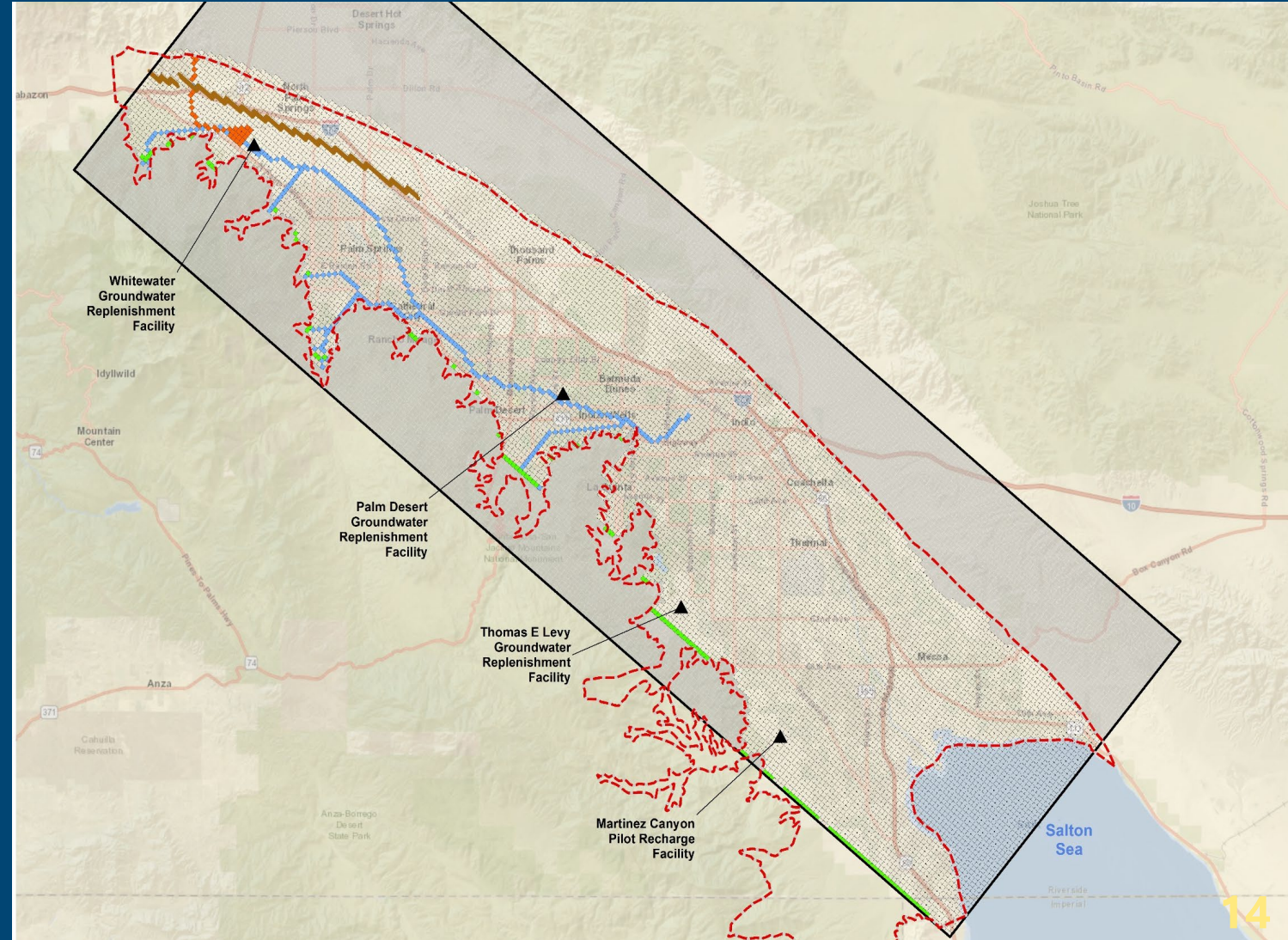


Agenda

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- **Groundwater Model**
- Plan Scenarios & Projects and Management Actions
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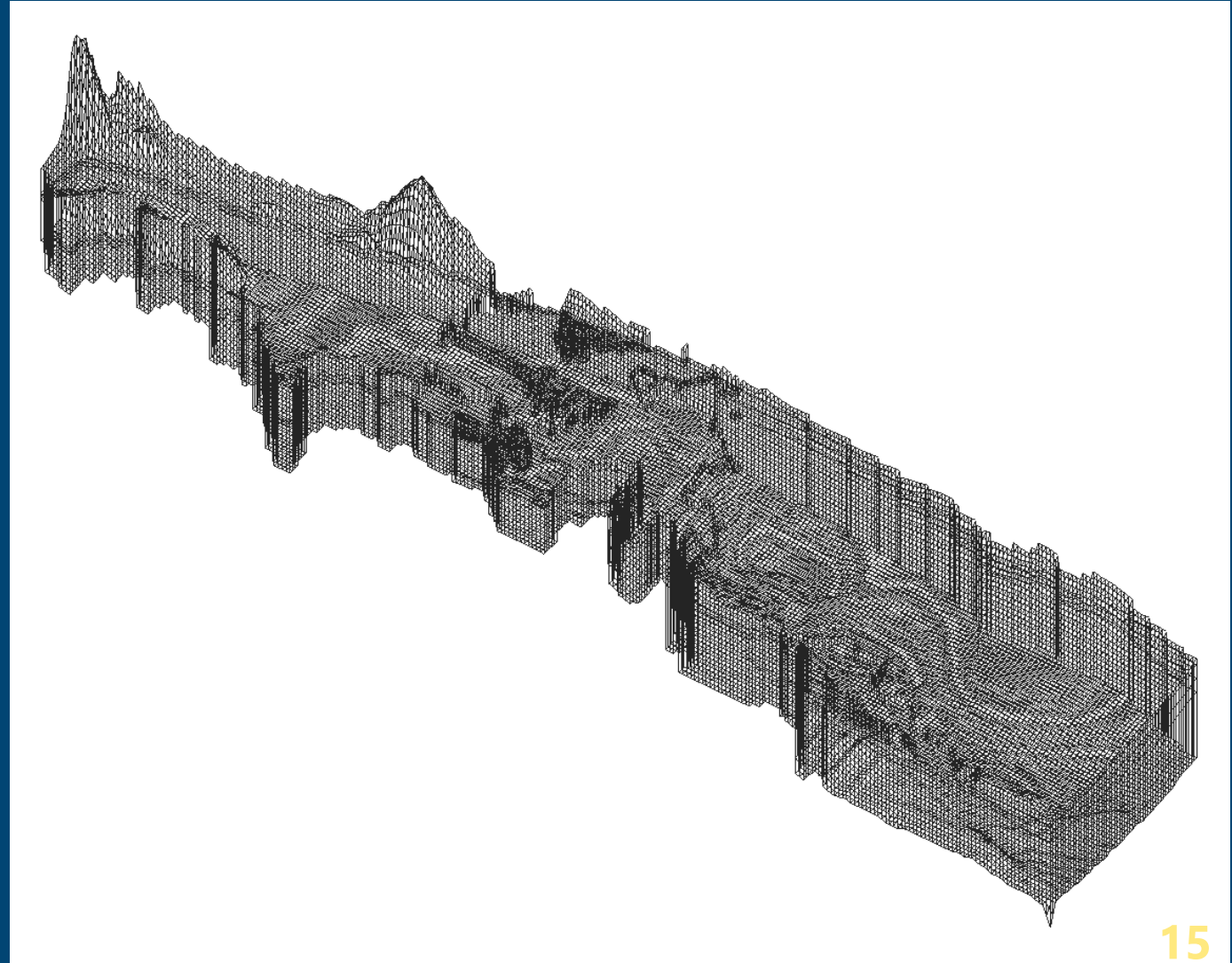
Indio Subbasin Groundwater Model

- Model originally developed in the 1990's
- Historical Simulation Period of 1936-1996
- Updated for 2010 CVWMP to simulate 1997-2008



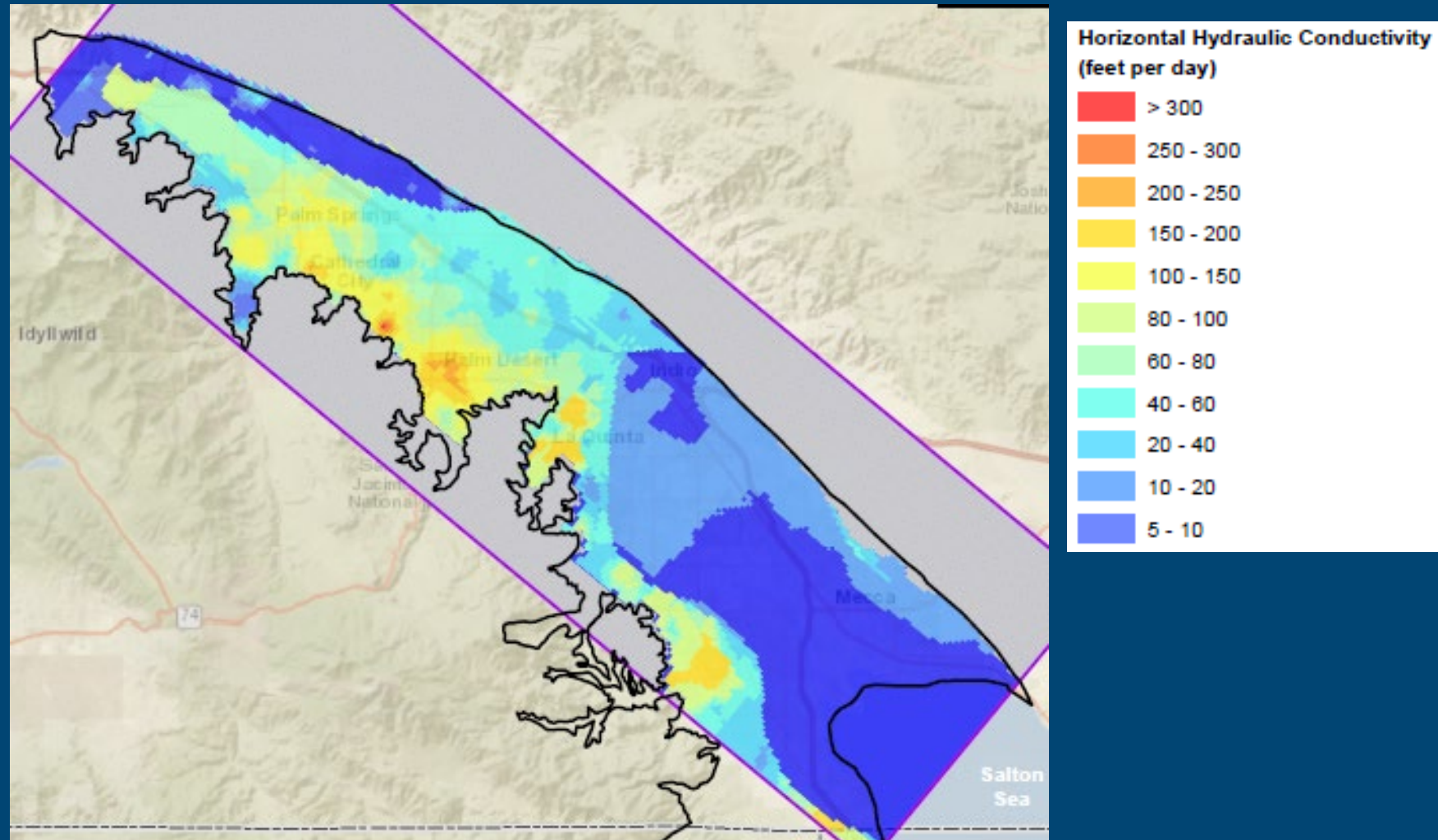
Indio Subbasin Groundwater Model

- Uses USGS MODFLOW program
- 3-Dimensional grid of 1,000 ft x 1,000 ft model cells
- 270 rows, 86 columns, and 4 layers
- Groundwater elevation and flow amounts over time calculated at each cell



Model Features

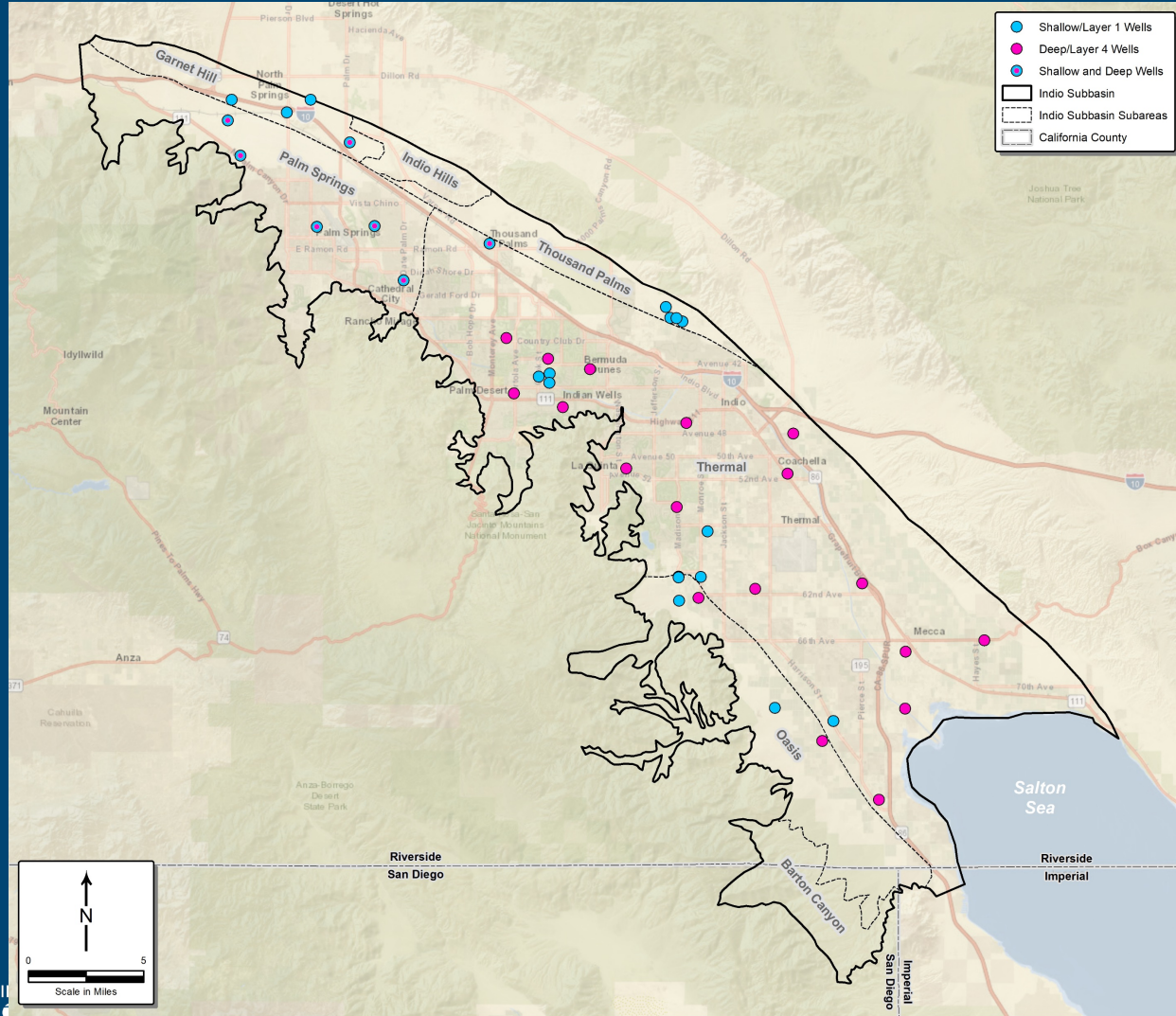
- Shallow and Deep Aquifers
- Variable Aquifer Properties
- Inflow from Mission Creek and San Geronio Pass Subbasins
- Simulates Fault Barriers, Drains, Evapotranspiration, and Salton Sea



Alternative Plan Model Updates

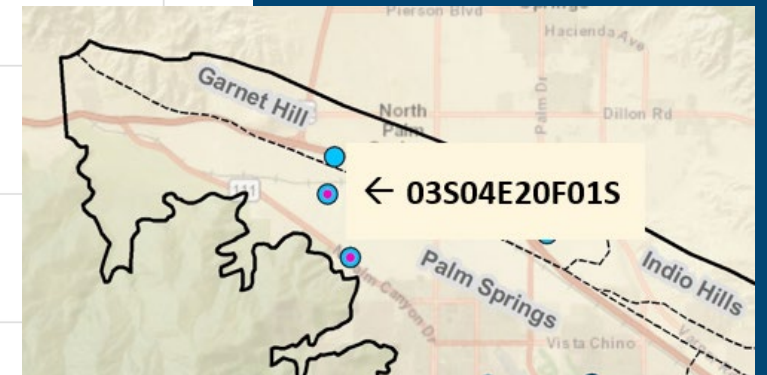
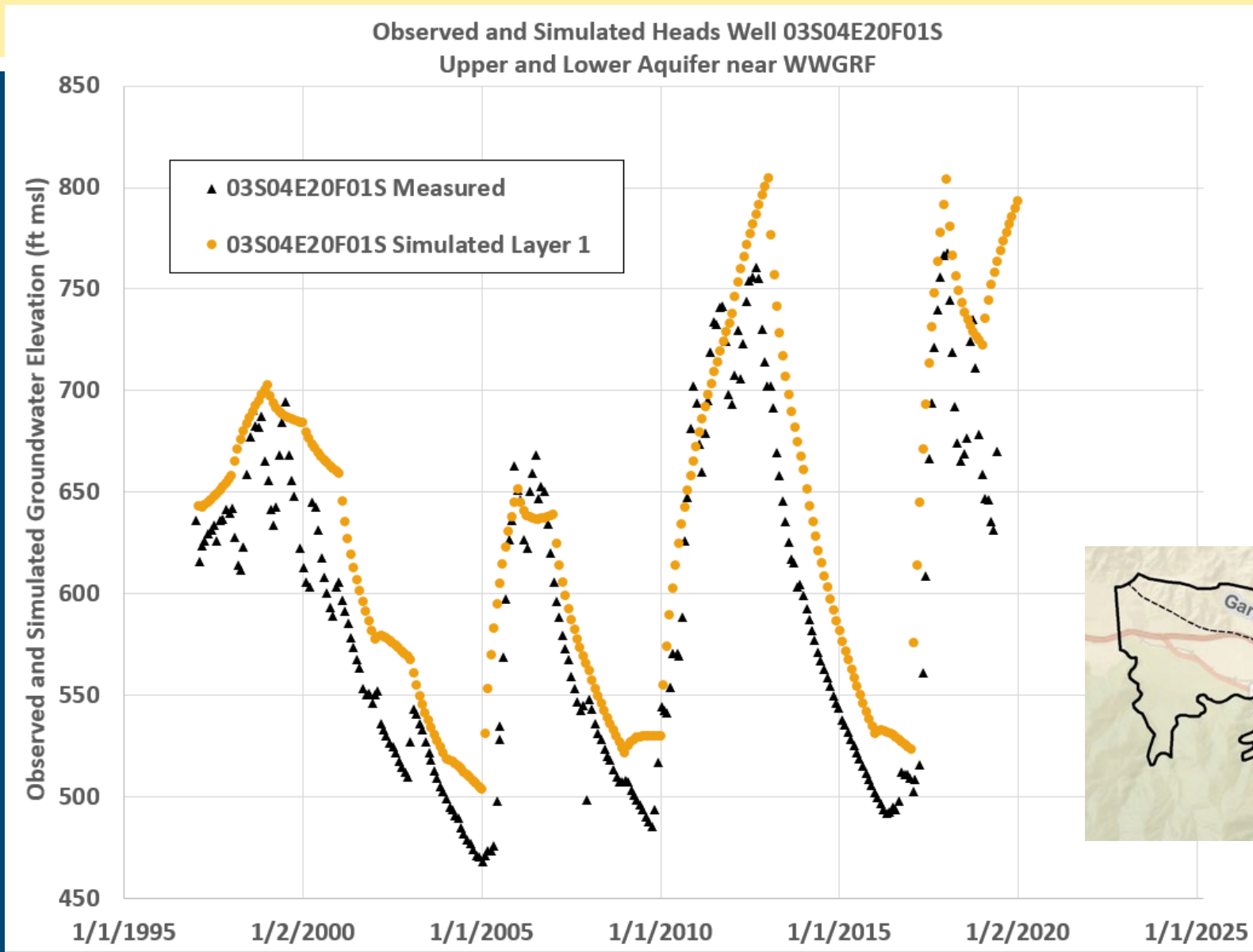
- Extended simulation period through 2019
- Updated 2009-2019 Recharge and Pumping
 - ❖ Mountain Front and Stream Channel Recharge
 - ❖ Artificial Recharge
 - ❖ Wastewater Discharges
 - ❖ Return Flows (Municipal, Agricultural, Golf)
 - ❖ Groundwater Pumping
- Updated Salton Sea Elevations (1997-2019)
- Used more-accurate Land Surface Elevations and Sea Bathymetry
- Corrected 1997-2008 Inputs in Garnet Hill Subarea
- Updated Subsurface Inflow Boundary Conditions from Adjacent Subbasins

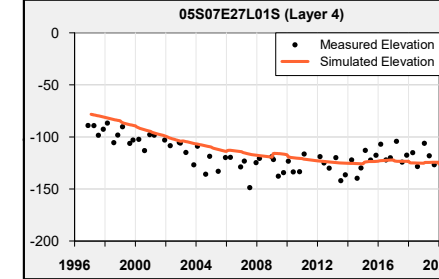
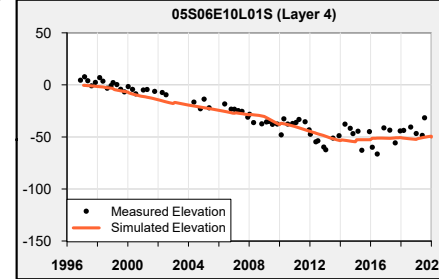
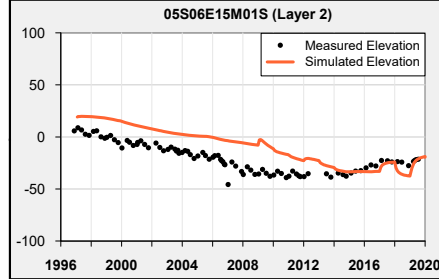
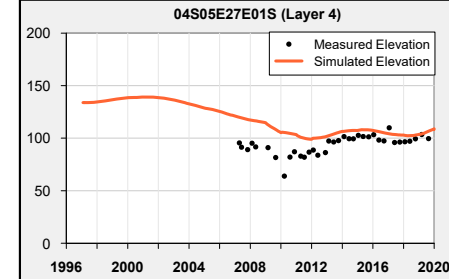
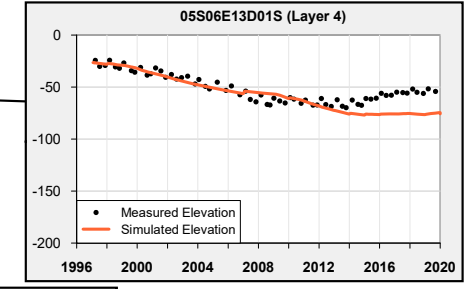
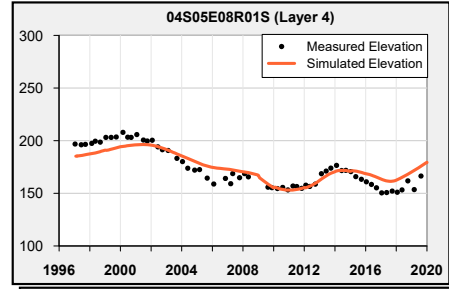
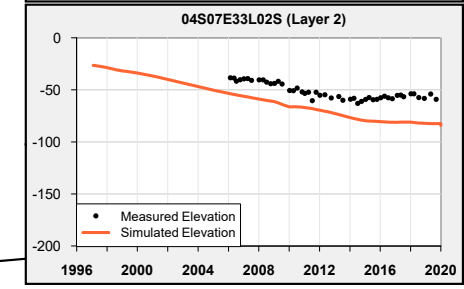
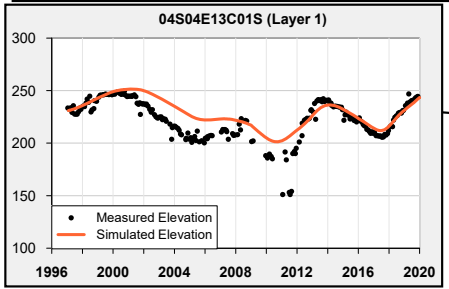
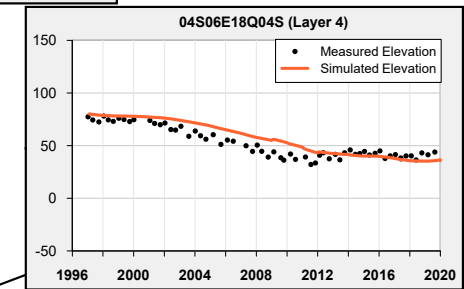
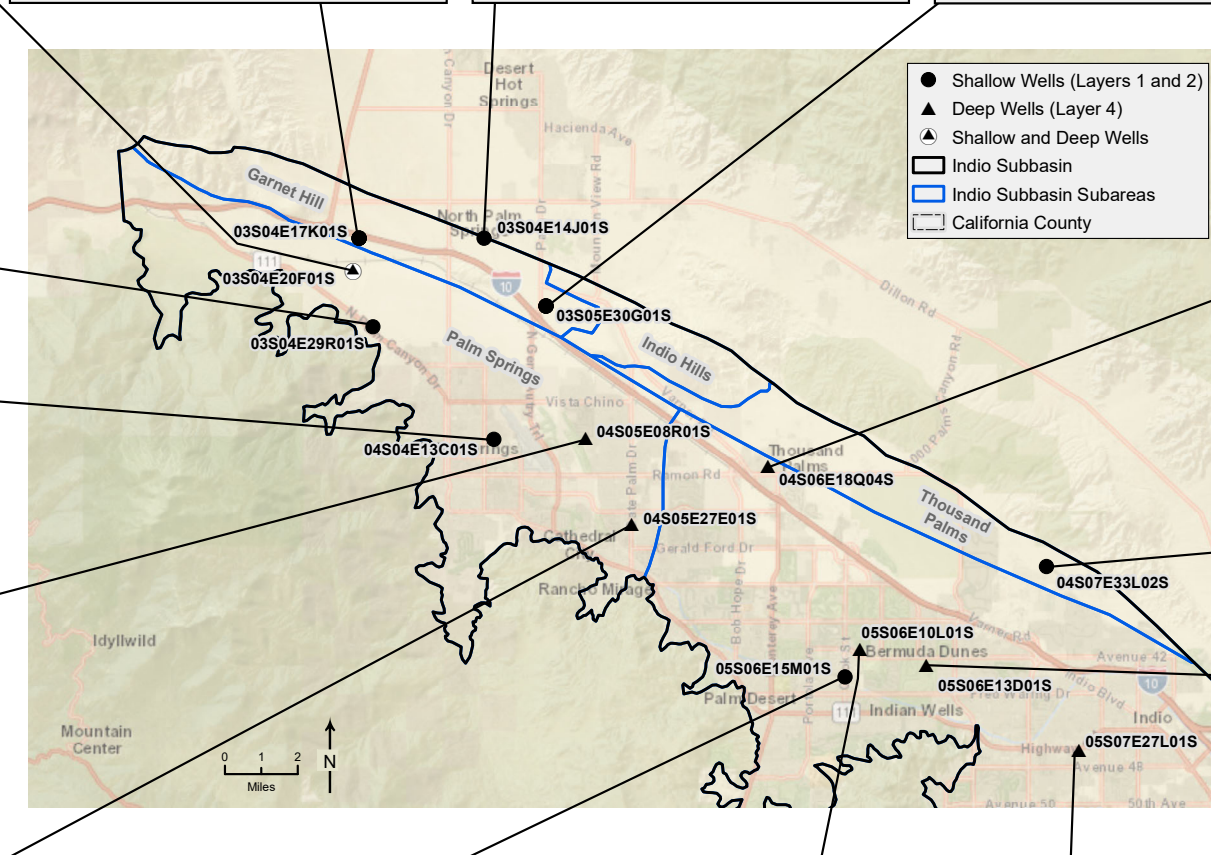
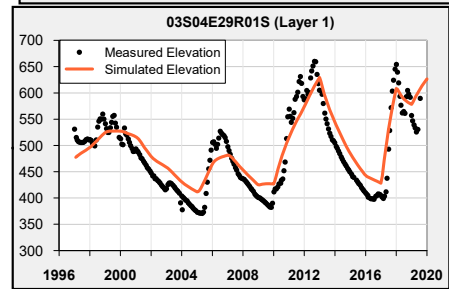
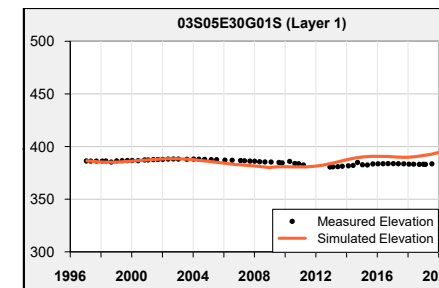
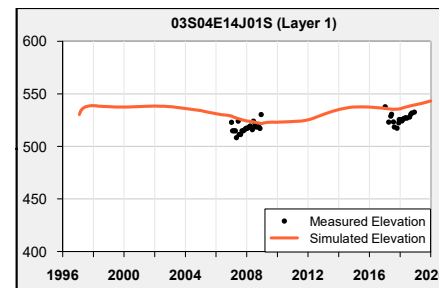
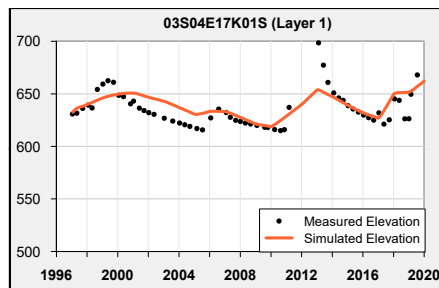
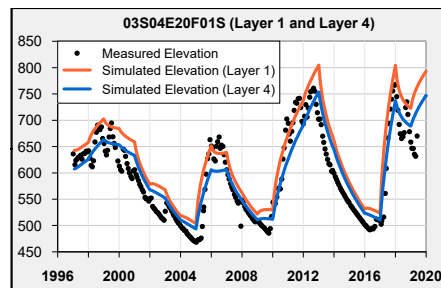
Numerical Model Assessment

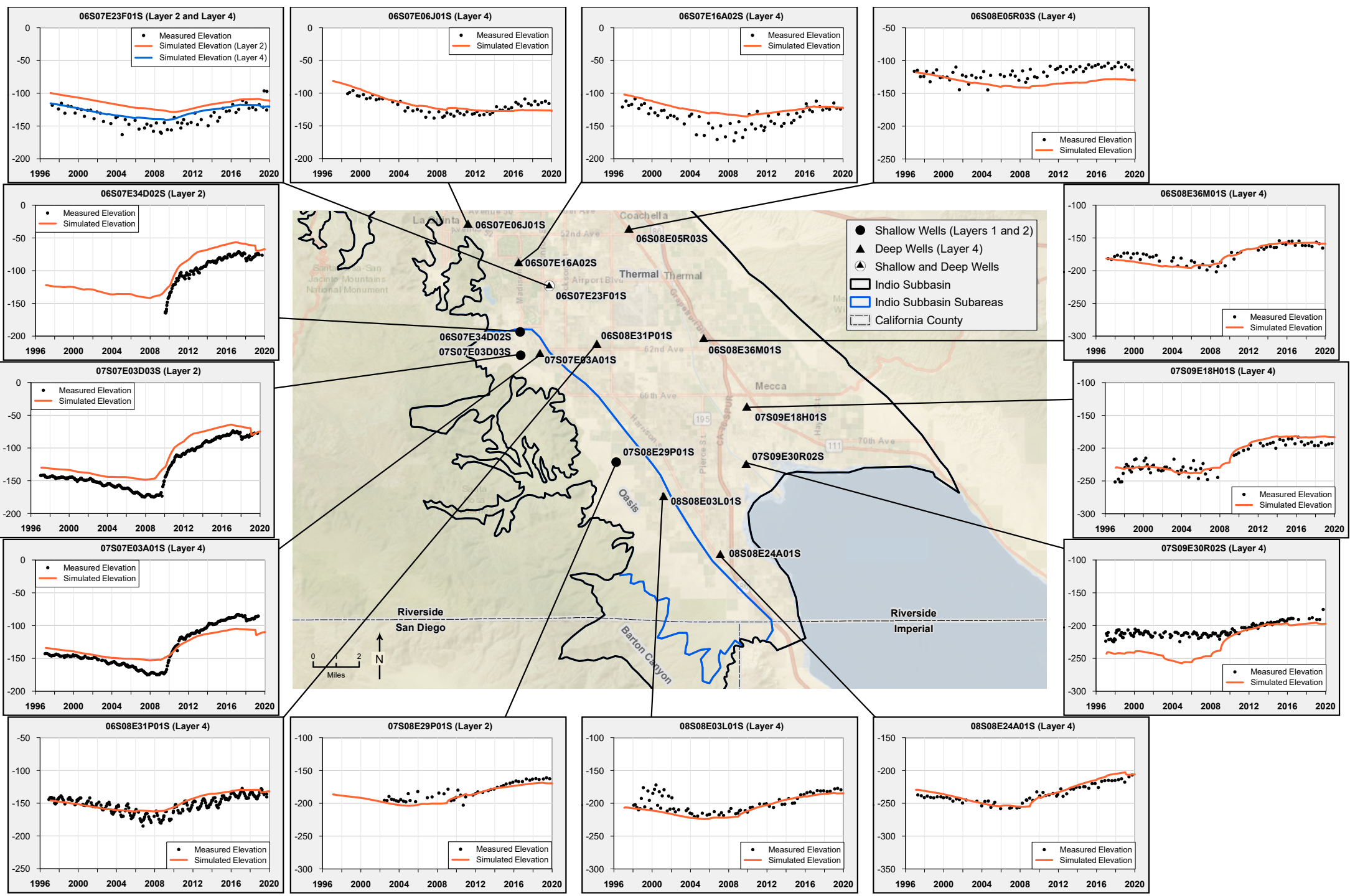


- Evaluated match between measured vs. simulated groundwater level in 20 shallow and 26 deep wells
- Measured vs. simulated drain flow rates also used to assess calibration

Measured vs. Simulated – Well 03S04E20F01S







Model Update Summary

- Historical model accurately simulates shallow and deep groundwater levels in all areas of the Subbasin
- Can be used to predict future water level and storage changes under different inflow and outflow scenarios
- Model provides forecasts of future drain flows, Salton Sea interactions, and other water budget conditions



Questions?

Agenda

- Welcome and Introductions
- Alternative Plan Status
- Groundwater Model
- **Plan Scenarios & Projects and Management Actions**
- Simulation Results
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Plan Scenarios

No New Projects = Baseline

Existing supplies & facilities, no new projects

Baseline w/Climate Change

Existing supplies & facilities limited by climate changes

Five-Year Plan w/Climate Change

5-Yr CIP supplies and facilities limited by climate changes

Future Projects w/Climate Change

All planned supplies & facilities limited by climate changes

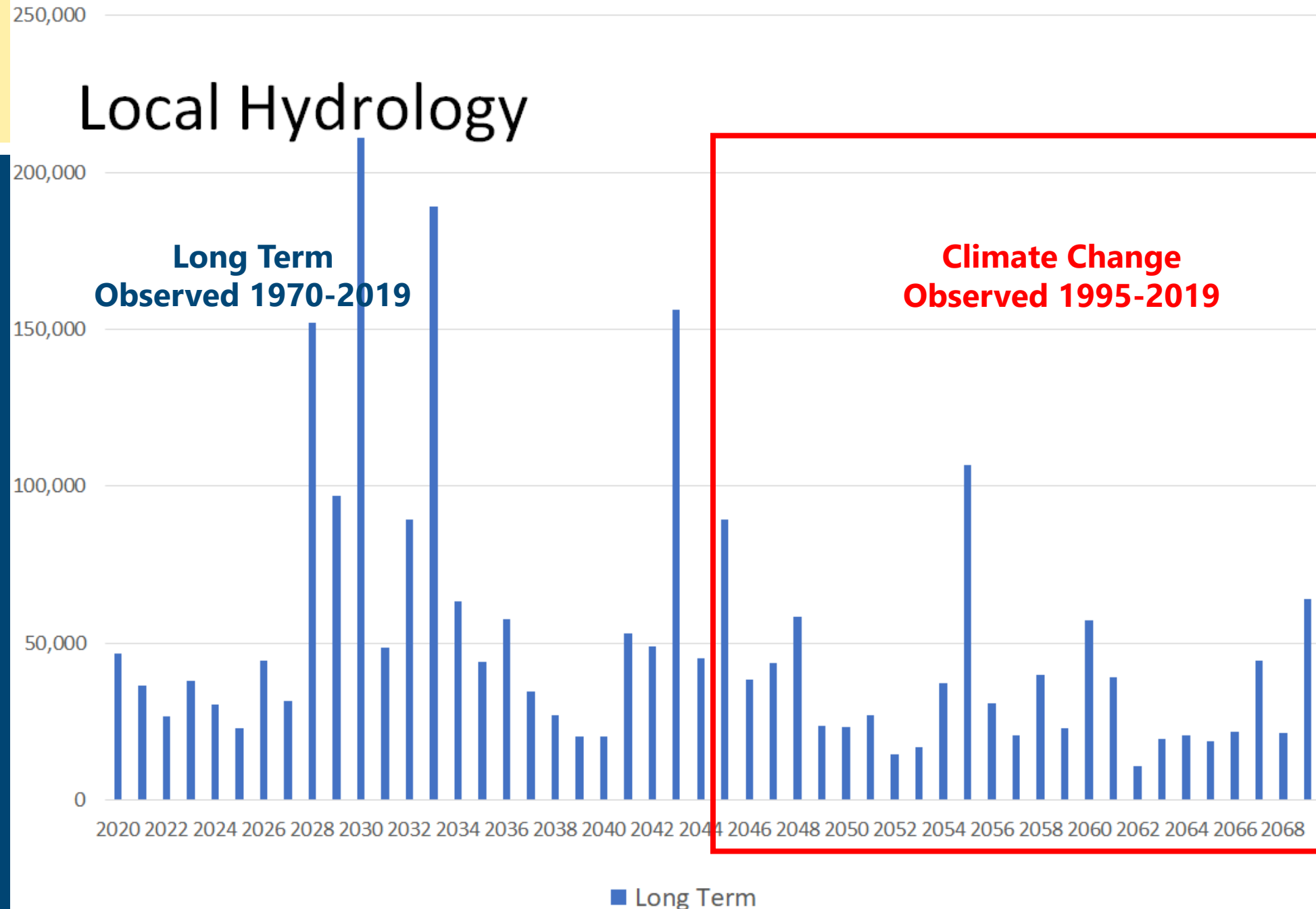
Expanded Agriculture w/Climate Change

Expanded agricultural demands and all future supplies & facilities, limited by climate changes

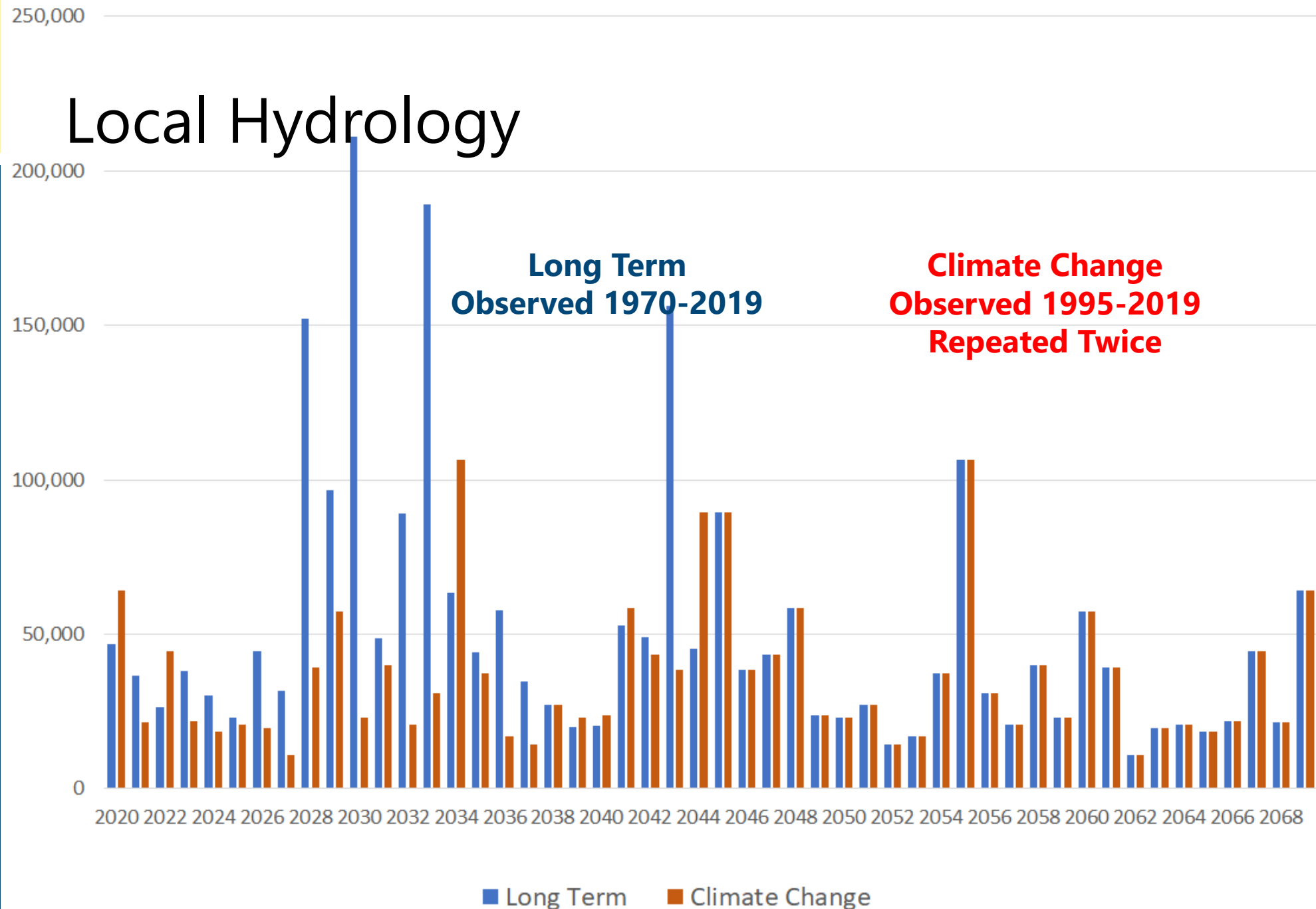
Climate Change Assumptions

- Model simulates 50-year future period
- The future scenarios incorporate recent (drier) patterns
- For local inflow (Mountain Front and Stream Flow)
 - ❖ Baseline uses long term-hydrology and previously estimated annual recharge volumes (repeated historical conditions 1970-2019)
 - ❖ Climate change scenarios use repeated historical conditions only for period 1995-2019 that include multiple droughts
 - Drought period repeated twice, first in reverse and then forward
- Availability of imported water for direct delivery and groundwater replenishment also reduced

Local Hydrology



Local Hydrology



Projects and Management Actions - Priorities

- GSAs established the following priorities in selection of PMAs:
 - ❖ Fully use available Colorado River water supplies
 - ❖ Support improvement of the long-term reliability of SWP supplies, including participation in the Delta Conveyance Facility (DCF)
 - ❖ Develop recycled water as a reliable local water supply
 - ❖ Secure supplemental supplies
 - ❖ Manage groundwater storage and surface water conjunctively to provide storage reserves for resilient response to drought and for supply reliability
 - ❖ Increase water-use efficiency across all sectors
 - ❖ Participate in development of CV-SNMP to address salt and nutrient management in the Subbasin

Projects and Management Actions

Water Conservation

- 1: Urban Water Conservation
- 2: Golf Water Conservation
- 3: Agricultural Water Conservation

Water Supply Development

- 4: Increased Surface Water Diversion
- 5: Delta Conveyance Facility
- 6: Lake Perris Seepage
- 7: Sites Reservoir
- 8: Future Supplemental Water Acquisitions
- 9: EVRA Potable Reuse

Source Substitution & Replenishment

- 10: Mid-Valley Pipeline Direct Customers
- 11: East Golf Expansion
- 12: Oasis Distribution System
- 13: WRP-10 Recycled Water Delivery
- 14: WRP-10 Tertiary Expansion
- 15: Canal Water Pump Station Upgrade
- 16: WRP-7 Recycled Water Delivery
- 17: WRP-4 Tertiary Expansion & Delivery
- 18: DWA WRP Recycled Water Delivery
- 19: PD-GRF Phase 2 Expansion
- 20: TEL-GRF Expansion
- 21: WWR-GRF Operation

Water Quality Protection

- 22: Eliminate Wastewater Percolation
- 23: Wellhead Treatment
- 24: Small Water System Consolidations
- 25: Septic to Sewer Conversions
- 26: CV-SNMP GW Monitoring Program Workplan
- 27: CV-SNMP Development Workplan
- 28: Colorado River Salinity Forum
- 29: Source Water Protection

Baseline (No New Projects) & Baseline w/Climate Change

Water Conservation

1: Urban Water Conservation

2: Golf Water Conservation

3: Agricultural Water Conservation

4: Increased Surface Water Diversion

21: WWR-GRF Operation

Water Supply Development

Source Substitution & Replenishment

Water Quality Protection

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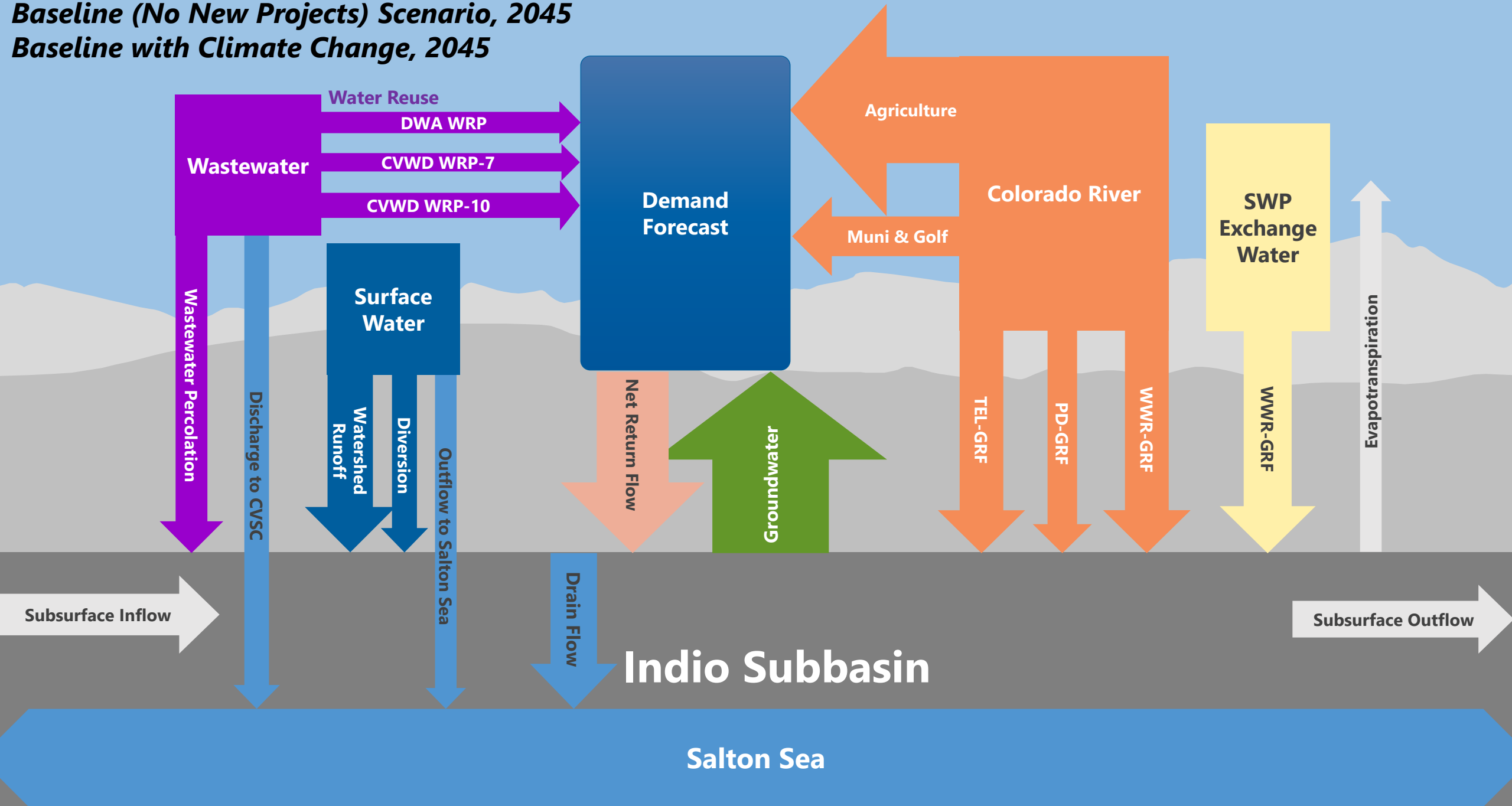
26: CV-SNMP GW Monitoring Program Workplan

27: CV-SNMP Development Workplan

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Indio Subbasin
Baseline (No New Projects) Scenario, 2045
Baseline with Climate Change, 2045



Five-Year Plan with Climate Change

Water Conservation

1: Urban Water Conservation

2: Golf Water Conservation

3: Agricultural Water Conservation

4: Increased Surface Water Diversion

11: East Golf Expansion

12: Oasis Distribution System

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Water Supply Development

Source Substitution & Replenishment

Water Quality Protection

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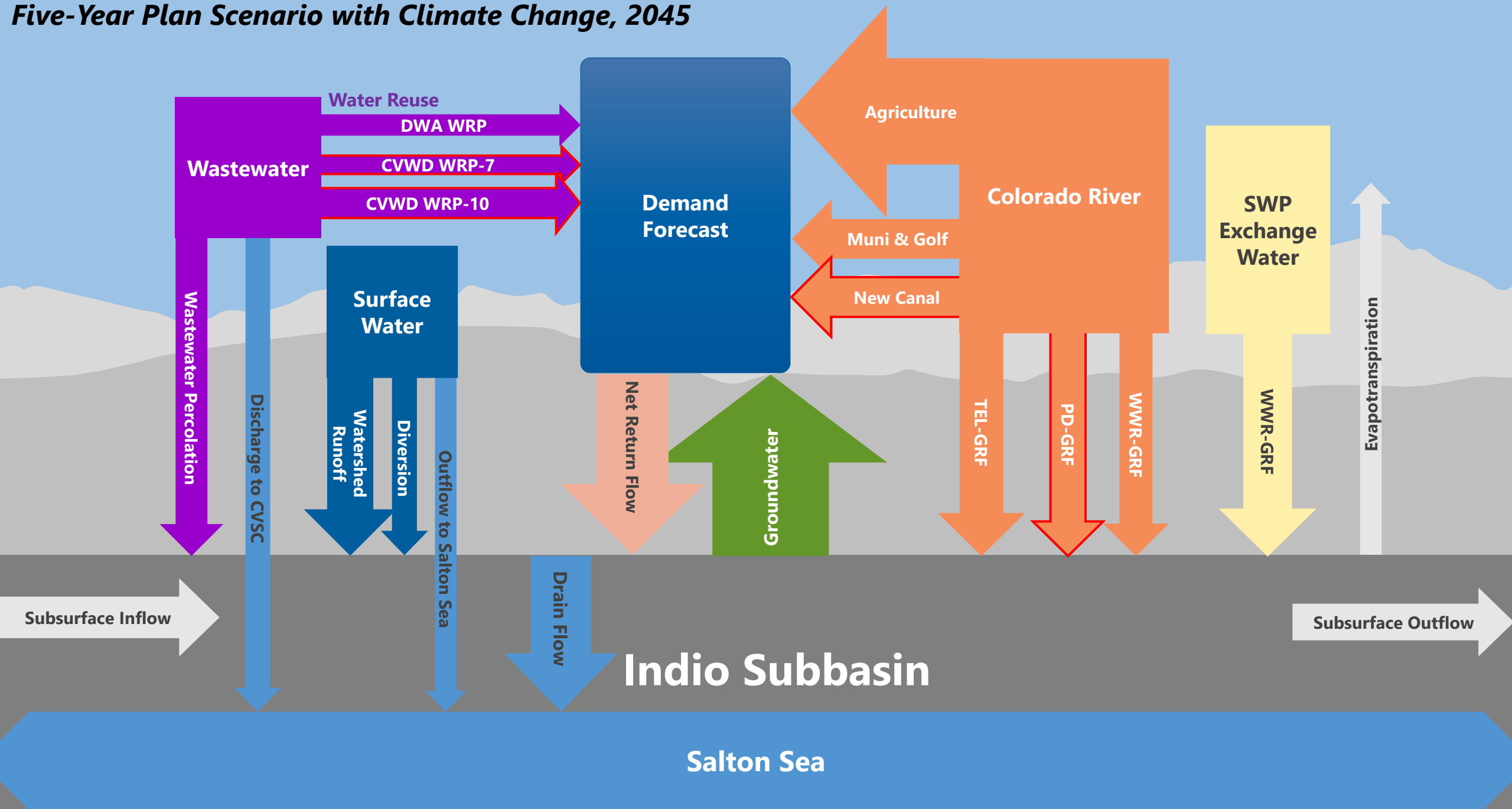
26: CV-SNMP GW Monitoring Program Workplan

27: CV-SNMP Development Workplan

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Indio Subbasin
Five-Year Plan Scenario with Climate Change, 2045



Future Projects with Climate Change & Expanded Agriculture with Climate Change

Water Conservation

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- 2: Golf Water Conservation
- 3: Agricultural Water Conservation
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- 7: Sites Reservoir
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Water Supply Development

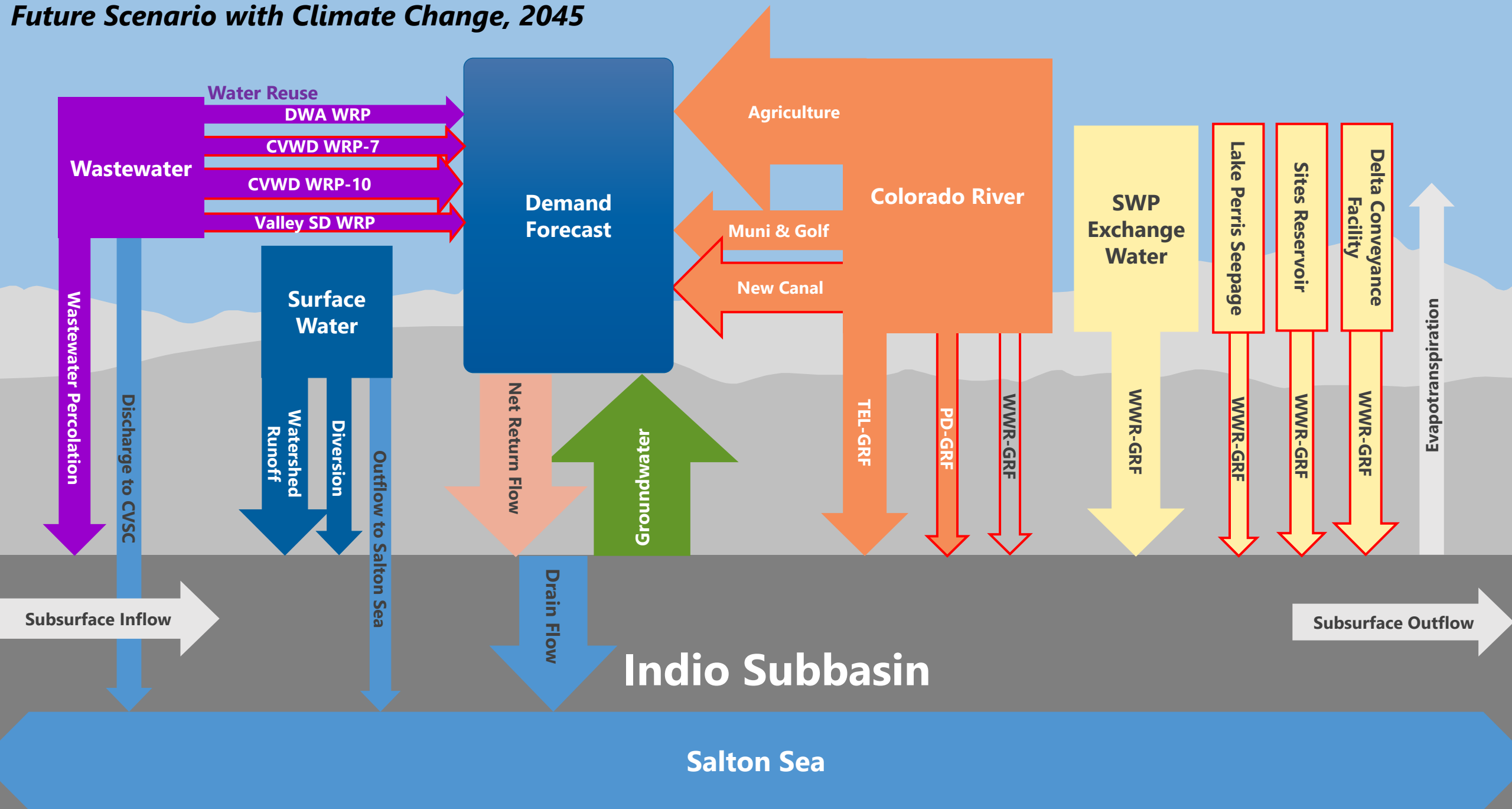
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Source Substitution & Replenishment

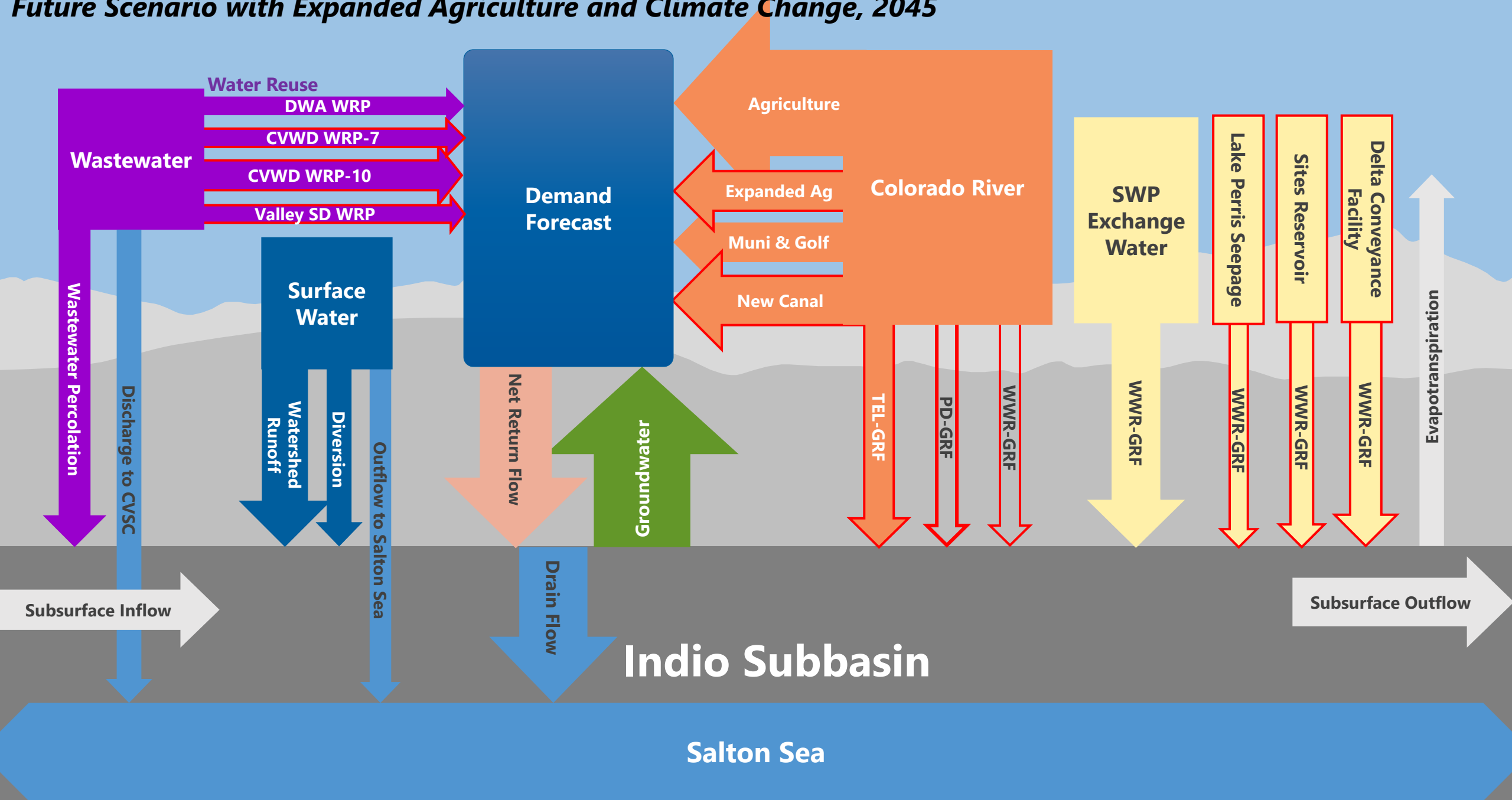
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Water Quality Protection

Indio Subbasin
Future Scenario with Climate Change, 2045



Indio Subbasin
Future Scenario with Expanded Agriculture and Climate Change, 2045





Questions?

Agenda

- **Welcome and Introductions**
- Alternative Plan Status
- Groundwater Model
- Plan Scenarios & Projects and Management Actions
- **Simulation Results**
- Public Comment
- Get Involved

Simulation Results

No New Projects = Baseline

Baseline w/Climate Change

- Baseline assumes no new projects
- Not realistic because additional projects already planned
- Provides a comparison of future conditions with and without climate change/drought

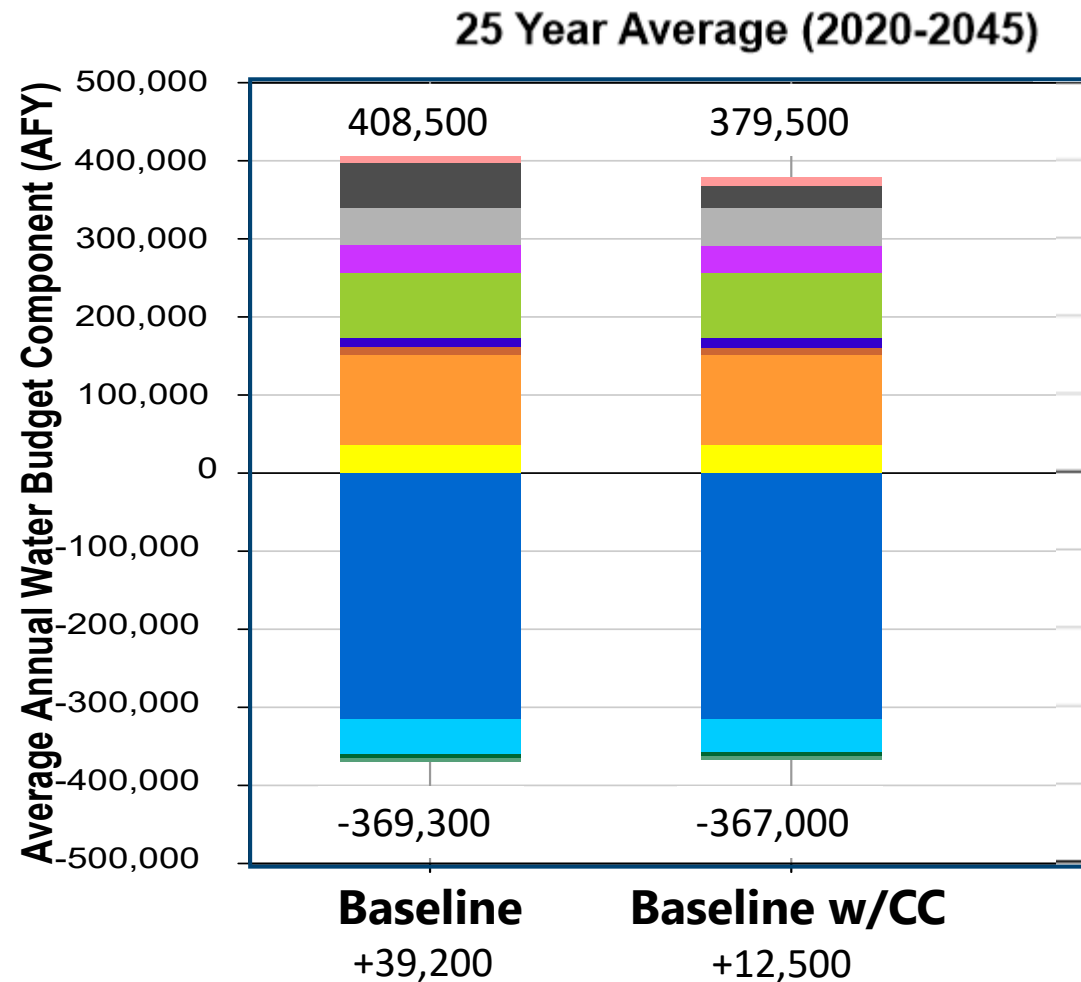
Five-Year Plan w/Climate Change

Future Projects w/Climate Change

Expanded Agriculture w/Climate Change

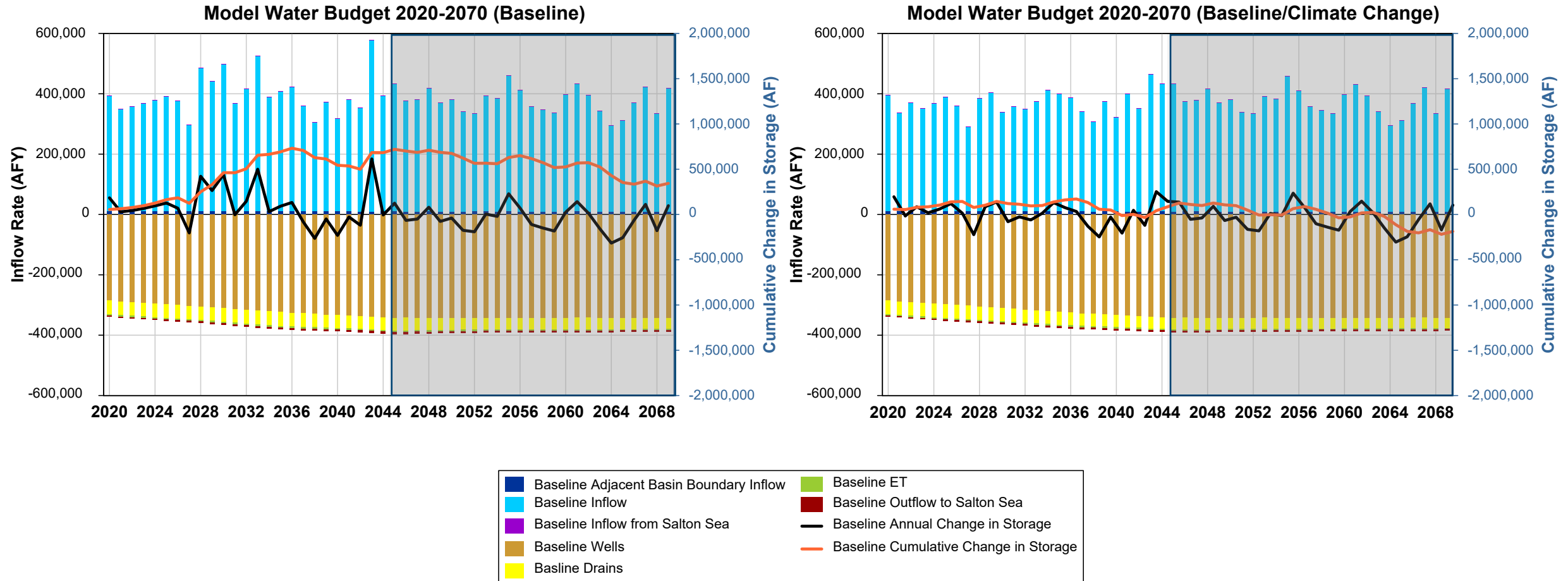
Future Scenario Water Budgets

Baseline and Baseline with Climate Change

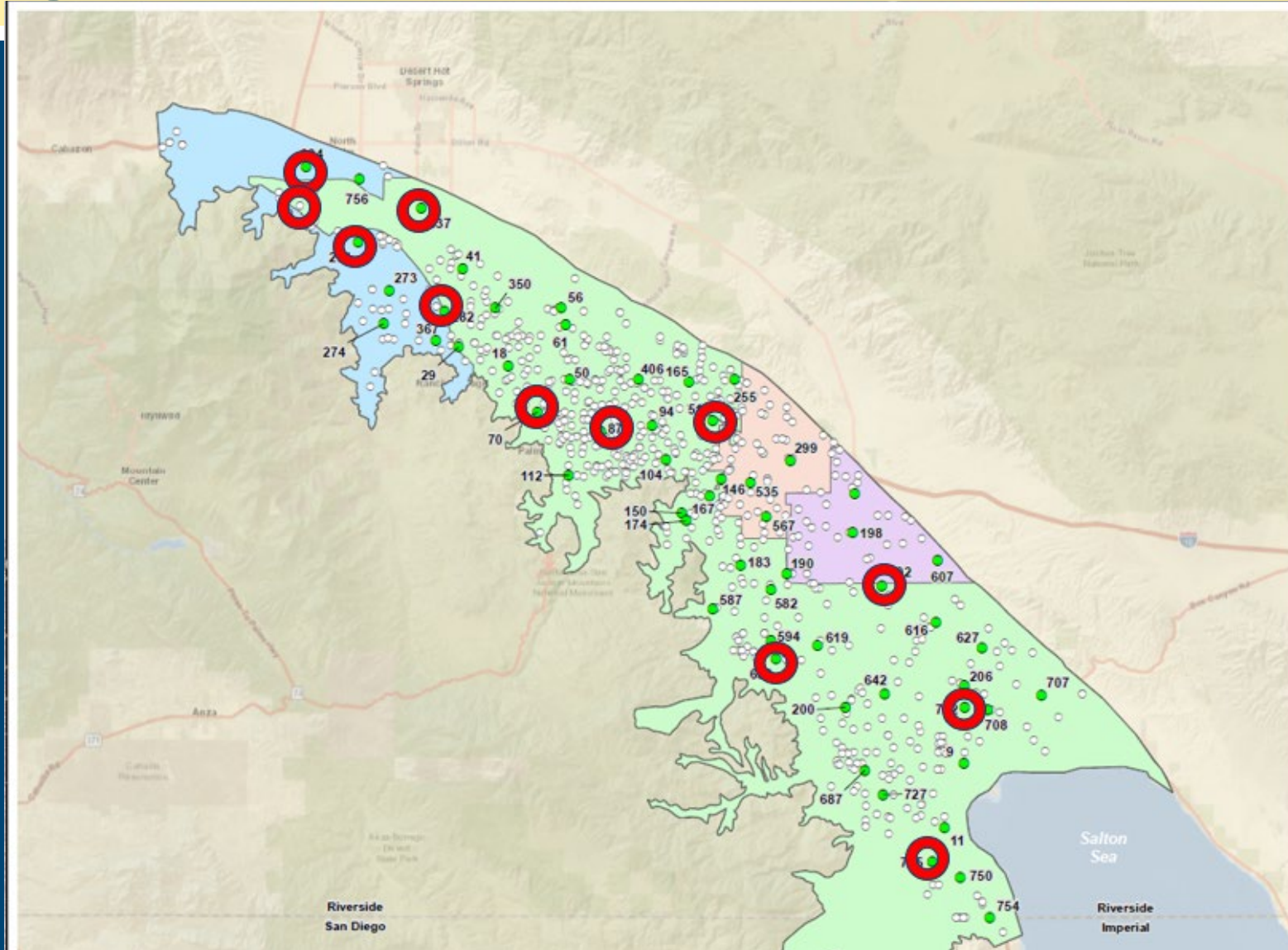


- TEL
- WWR
- PD AR
- EVRA Reuse
- Wastewater
- Ag Return Flow
- Golf Course Return Flow
- Municipal Return Flow
- Natural Infiltration (less diversions)
- Subsurface Inflow
- Pumping
- Drains
- Outflow to SS
- ET

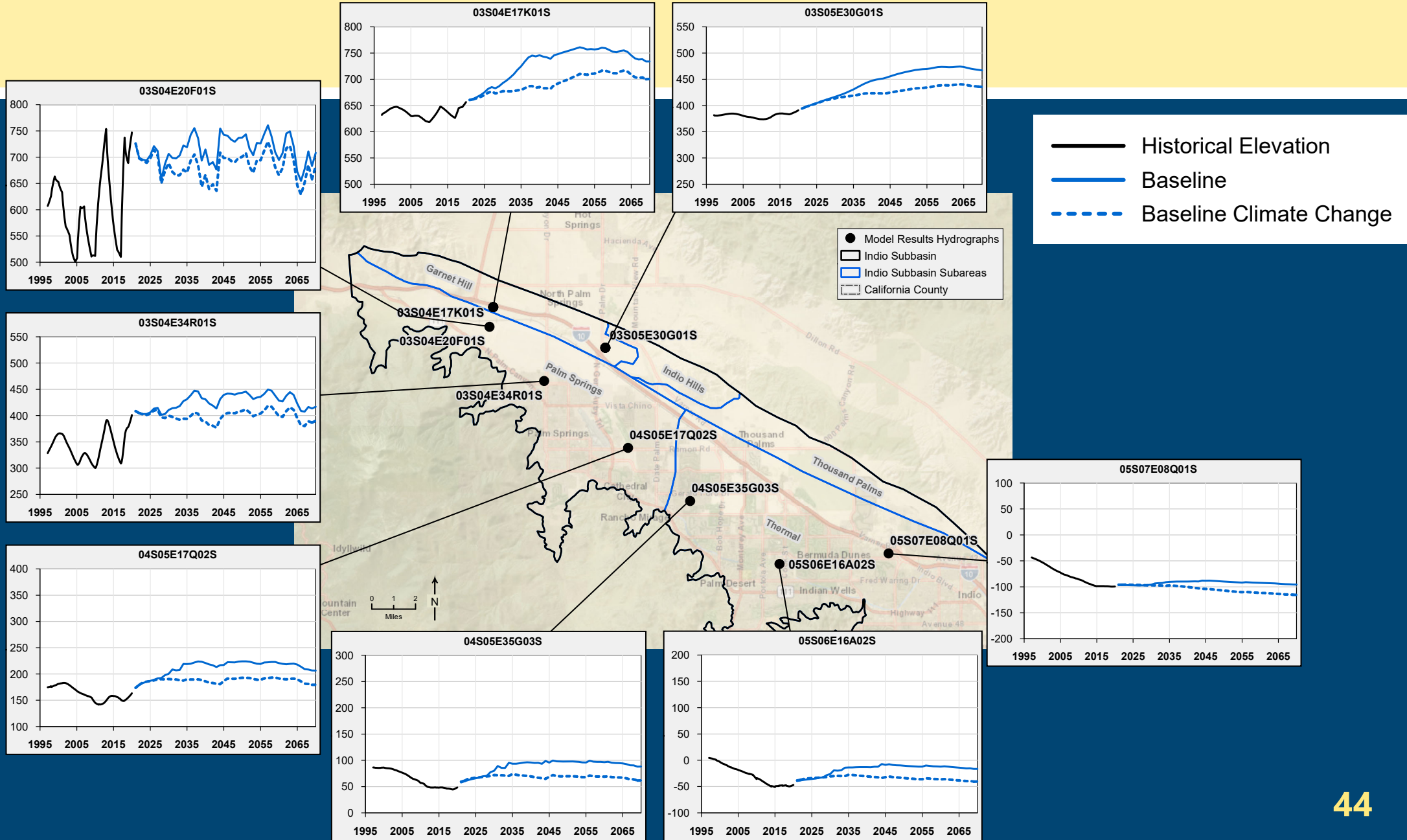
Future Water Budgets Baseline with and without Climate Change



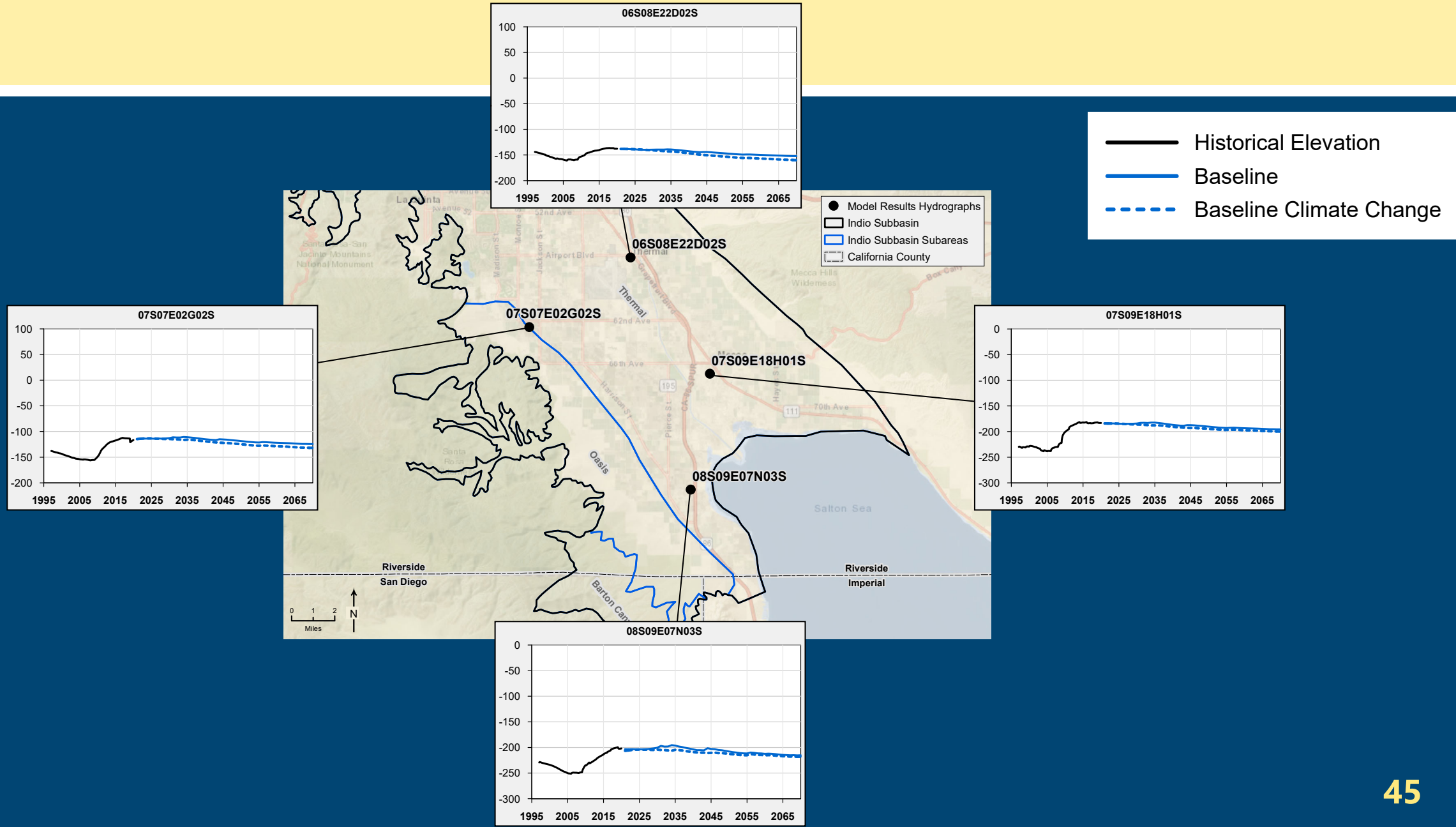
Future Groundwater Levels Hydrograph Wells



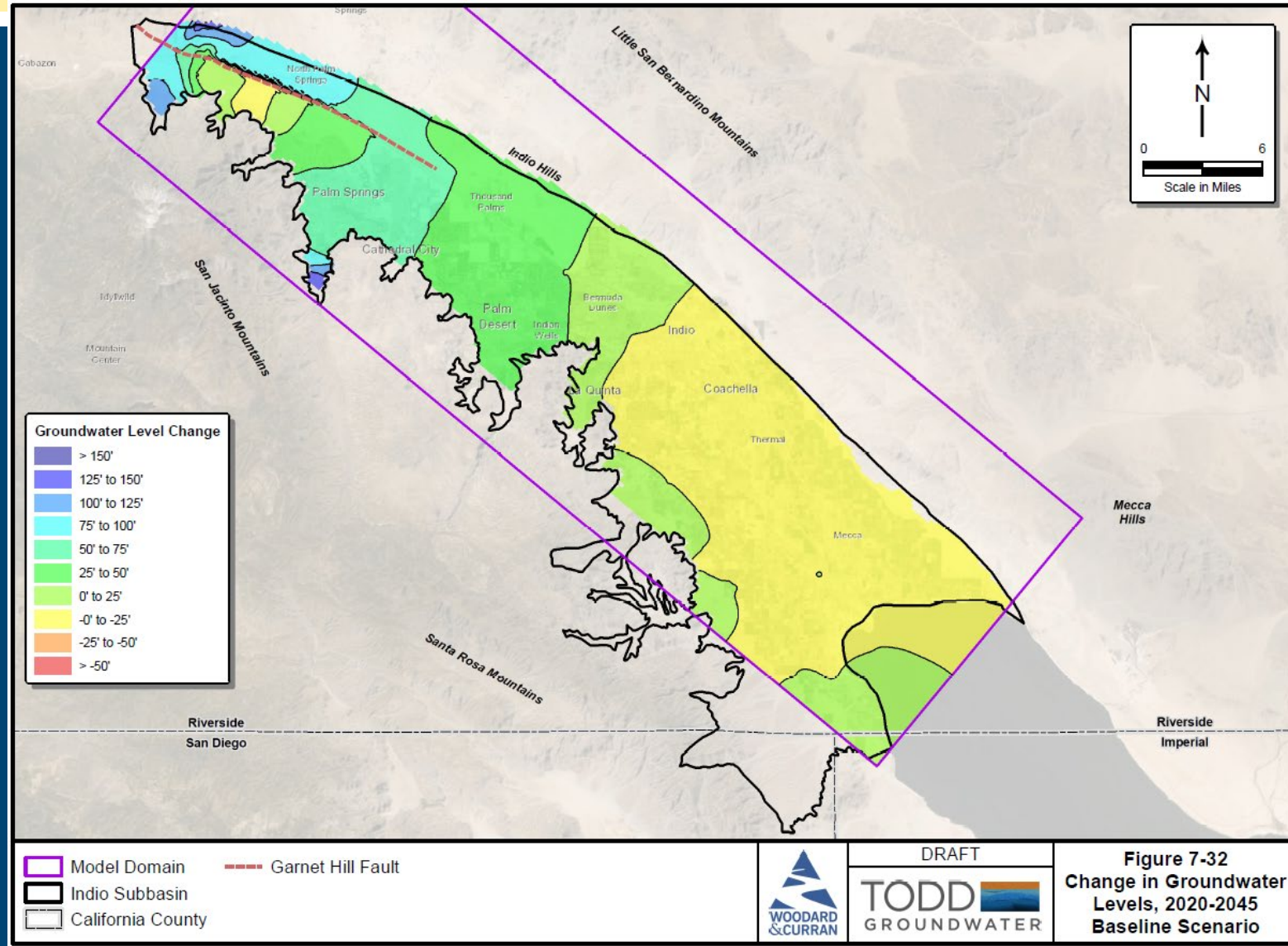
Future Groundwater Levels



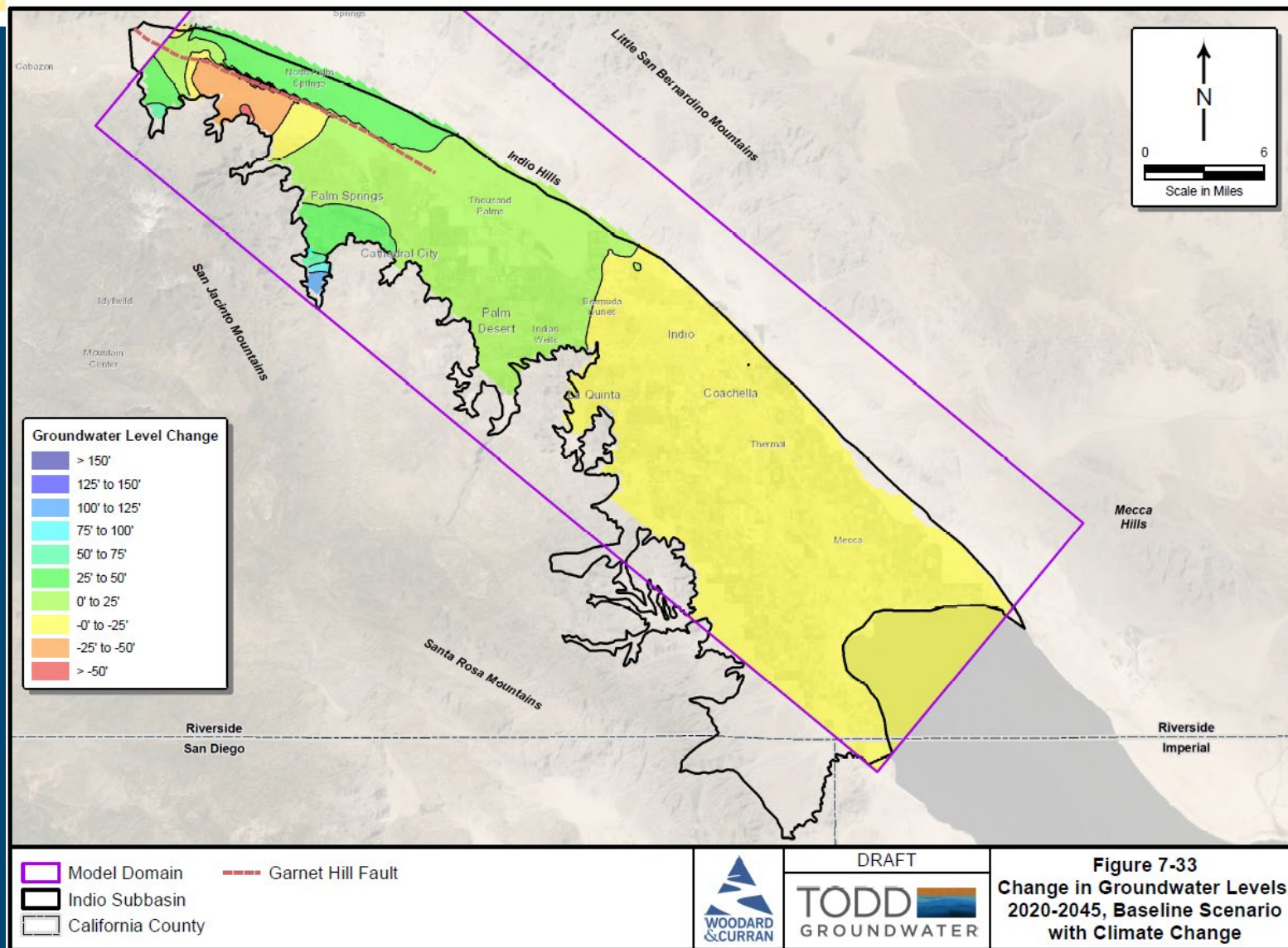
Future Groundwater Levels



Future Change in Groundwater Levels 2020-2045, Baseline Scenario



Future Change in Groundwater Levels 2020-2045, Baseline with Climate Change Scenario



Effects of Climate Change on Baseline

- Baseline (No New Projects) could be sustainable except for climate change
- Only change here is climate change-uncertain and beyond local control
- Baseline with Climate Change scenario indicates depletion of storage
- Local simulated declines in groundwater levels

A photograph of a wind farm with several turbines in the foreground, set against a backdrop of rugged, rocky mountains. The entire image is overlaid with a semi-transparent blue filter. The word "Questions?" is centered in white text.

Questions?

Simulation Results

No New Projects = Baseline

Baseline w/Climate Change

Five-Year Plan w/Climate Change

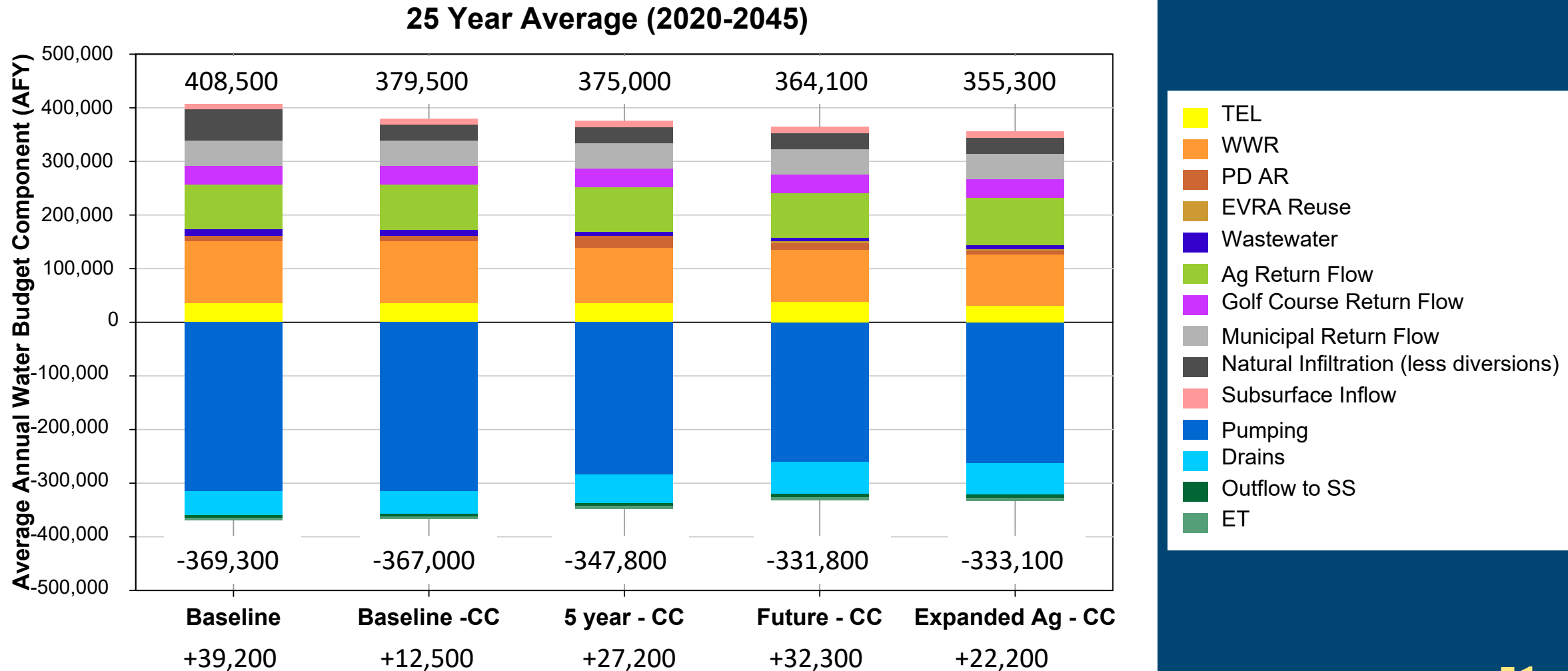
Future Projects w/Climate Change

Expanded Agriculture w/Climate Change

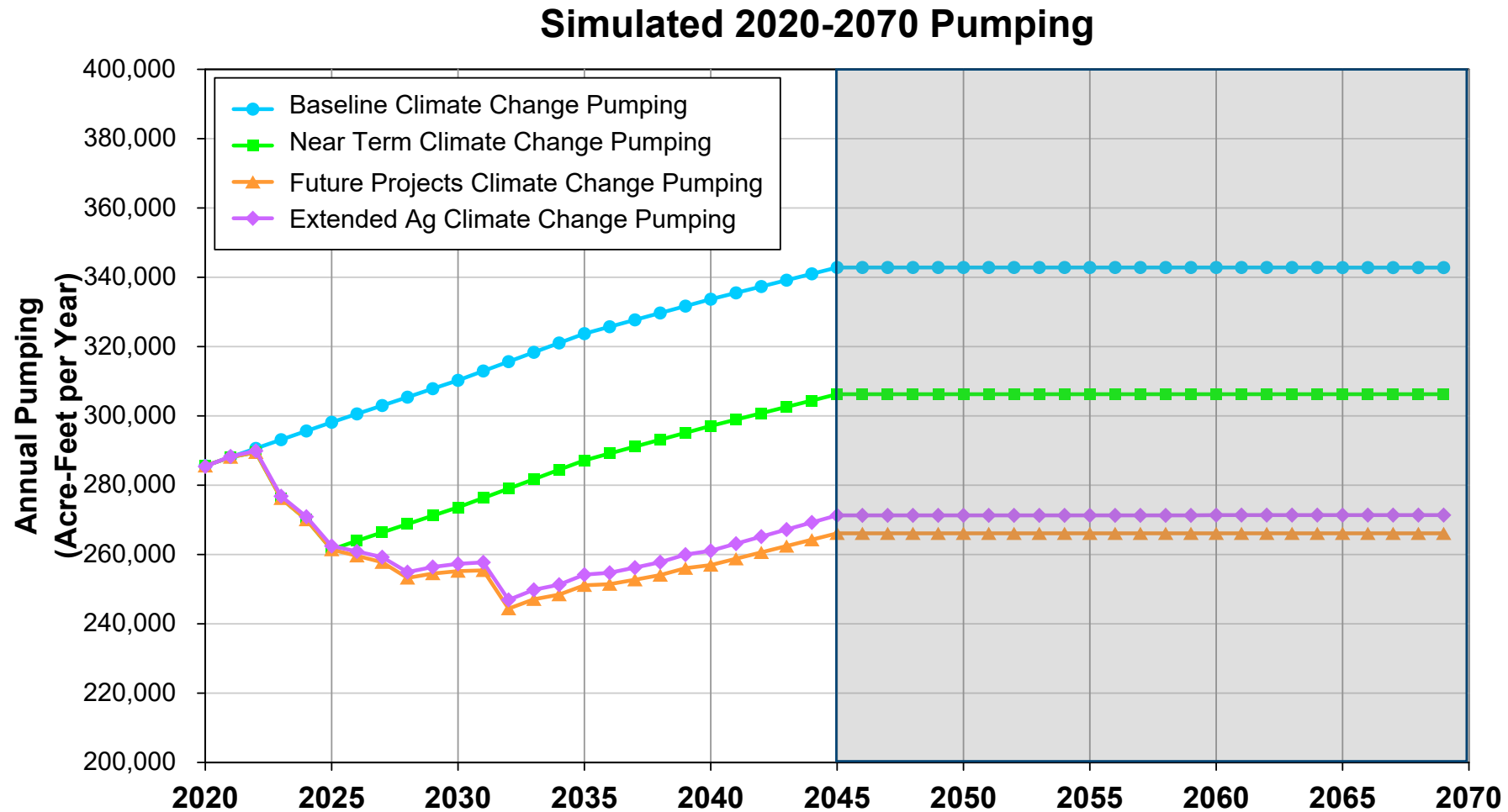
- Simulations of additional scenarios with five-year CIP projects, future projects, and expanded agriculture
- Additional scenarios include climate change/drought

Future Scenario Water Budgets

Baseline and 4 Climate Change Scenarios

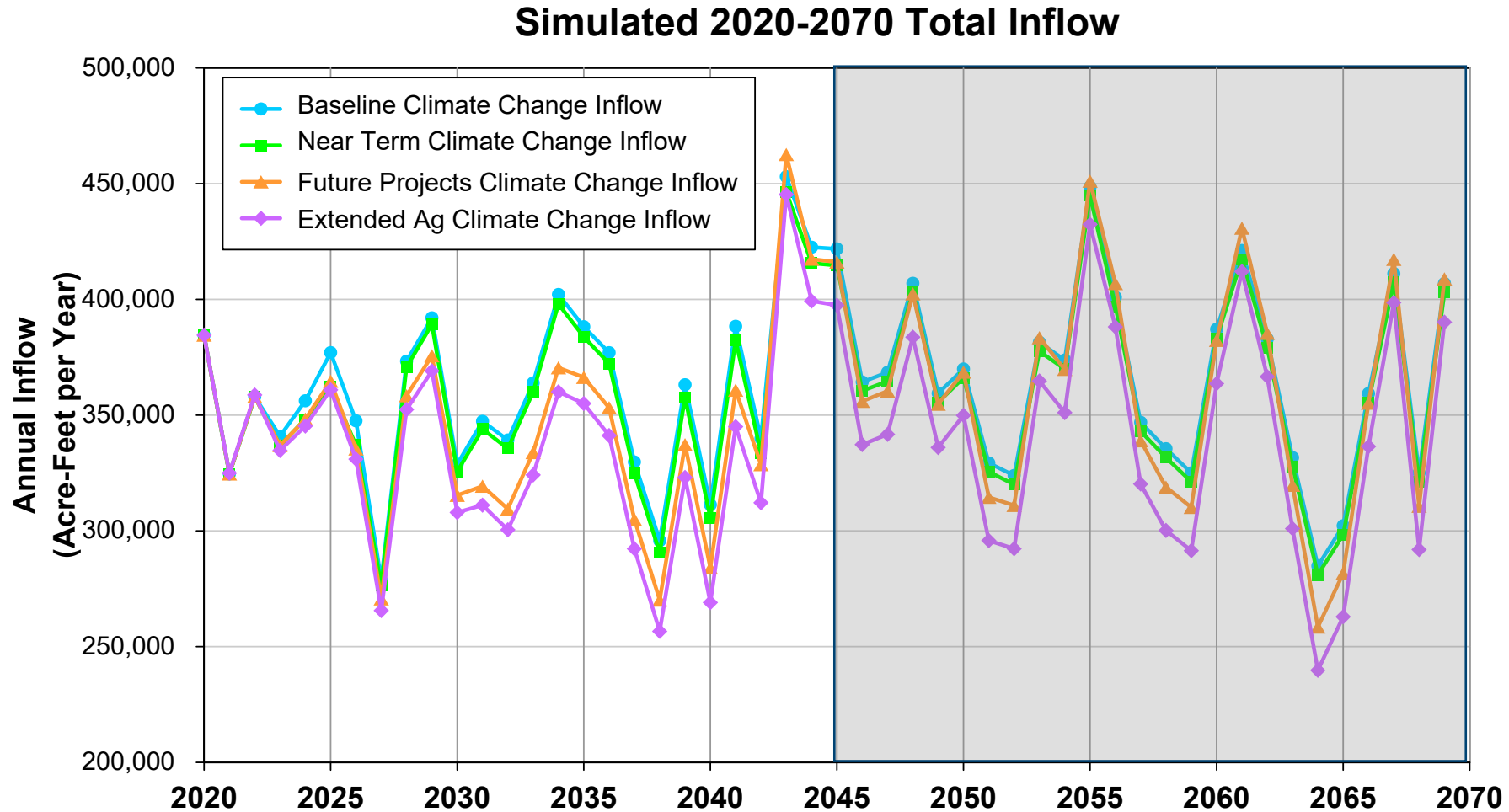


Future Pumping 4 Climate Change Scenarios

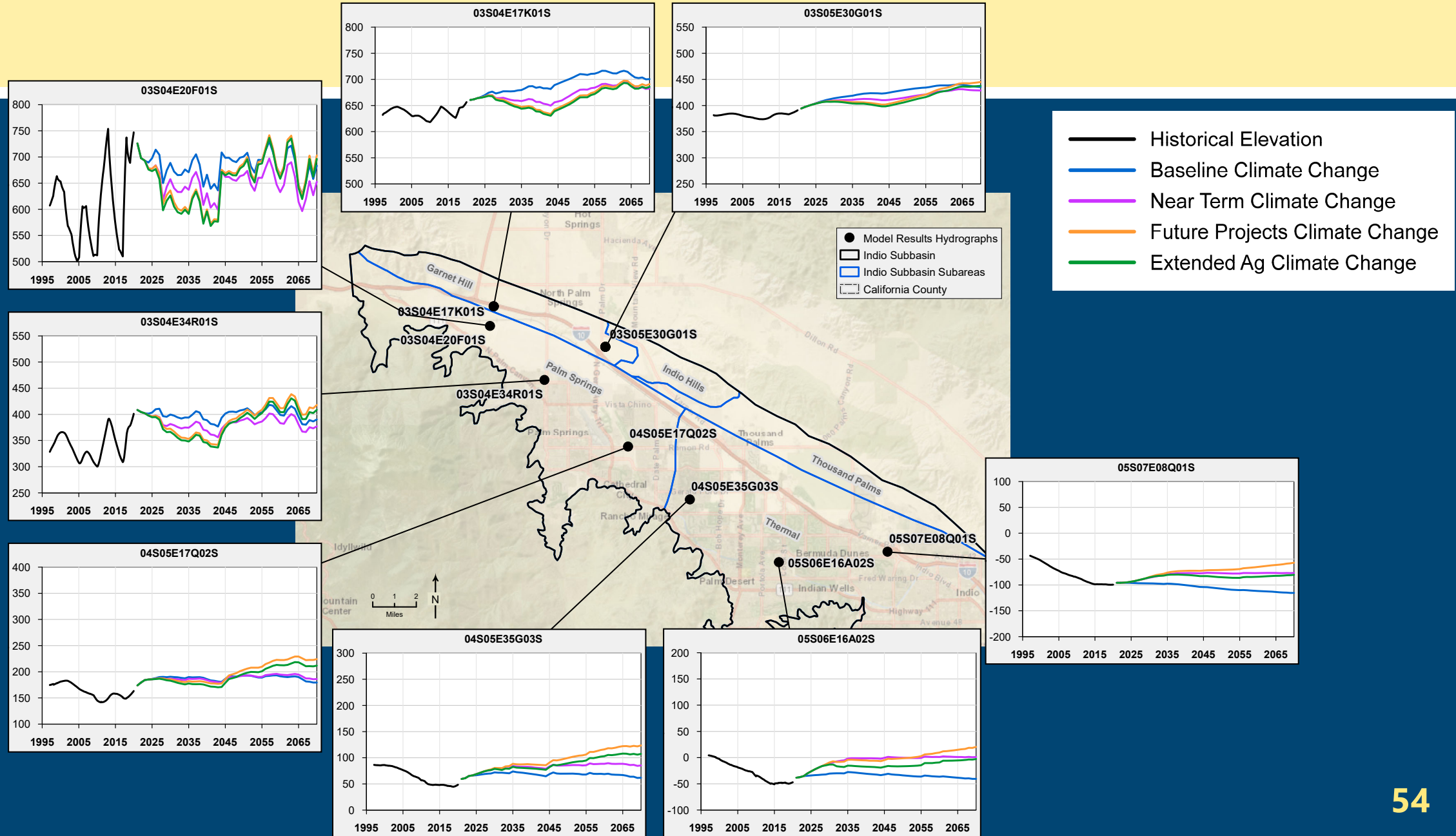


Future Inflows

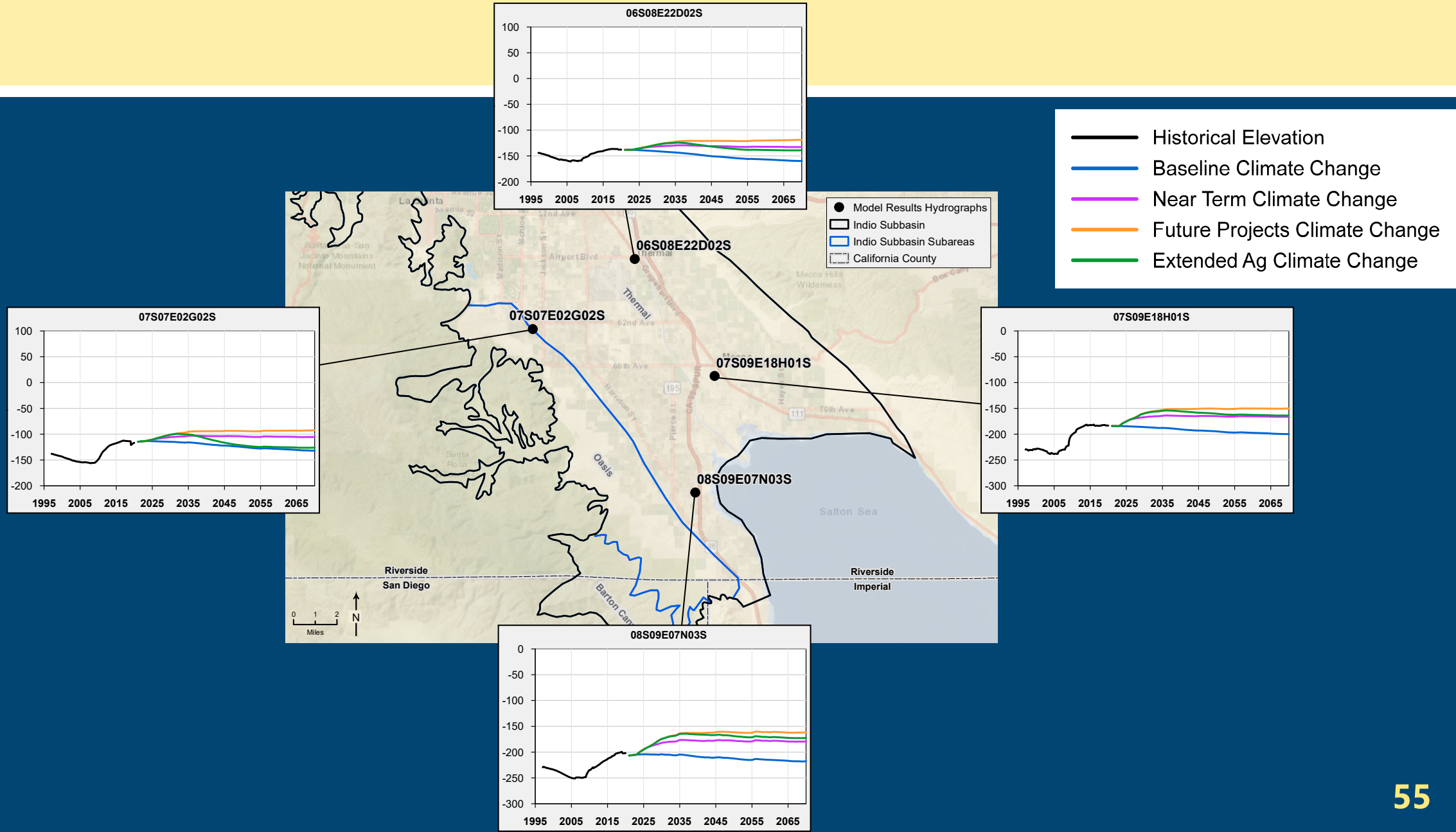
4 Climate Change Scenarios



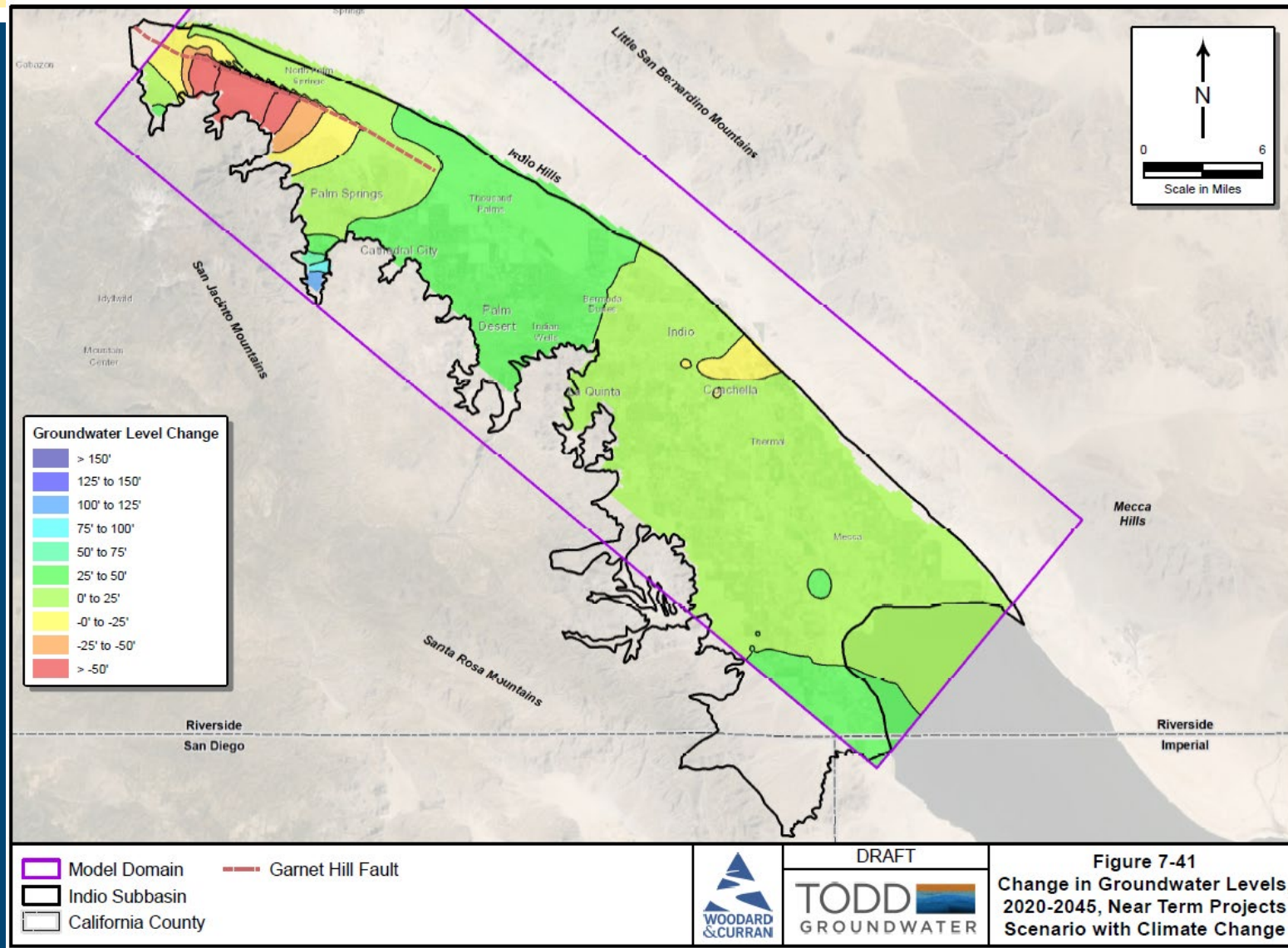
Future Groundwater Levels



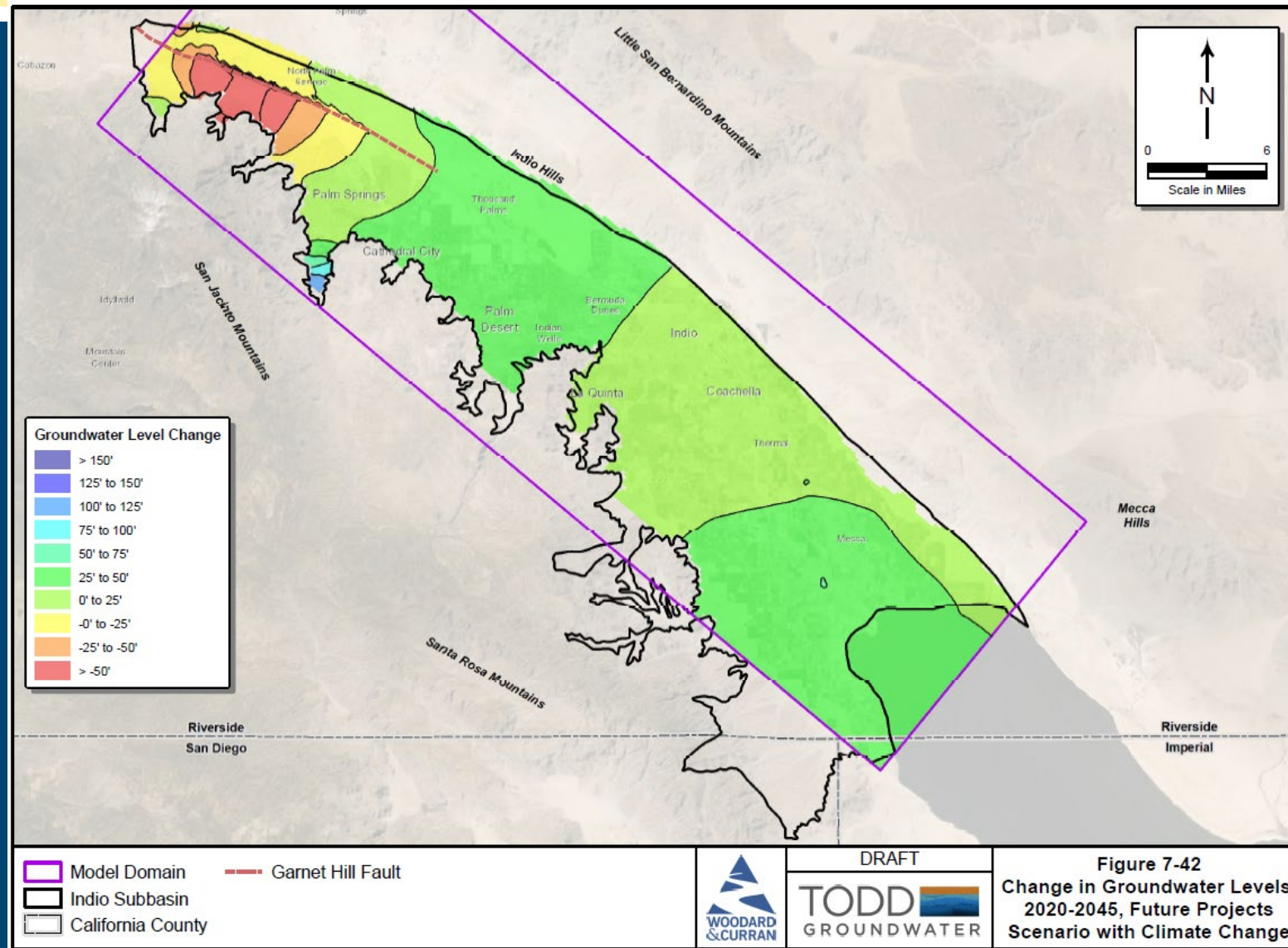
Future Groundwater Levels



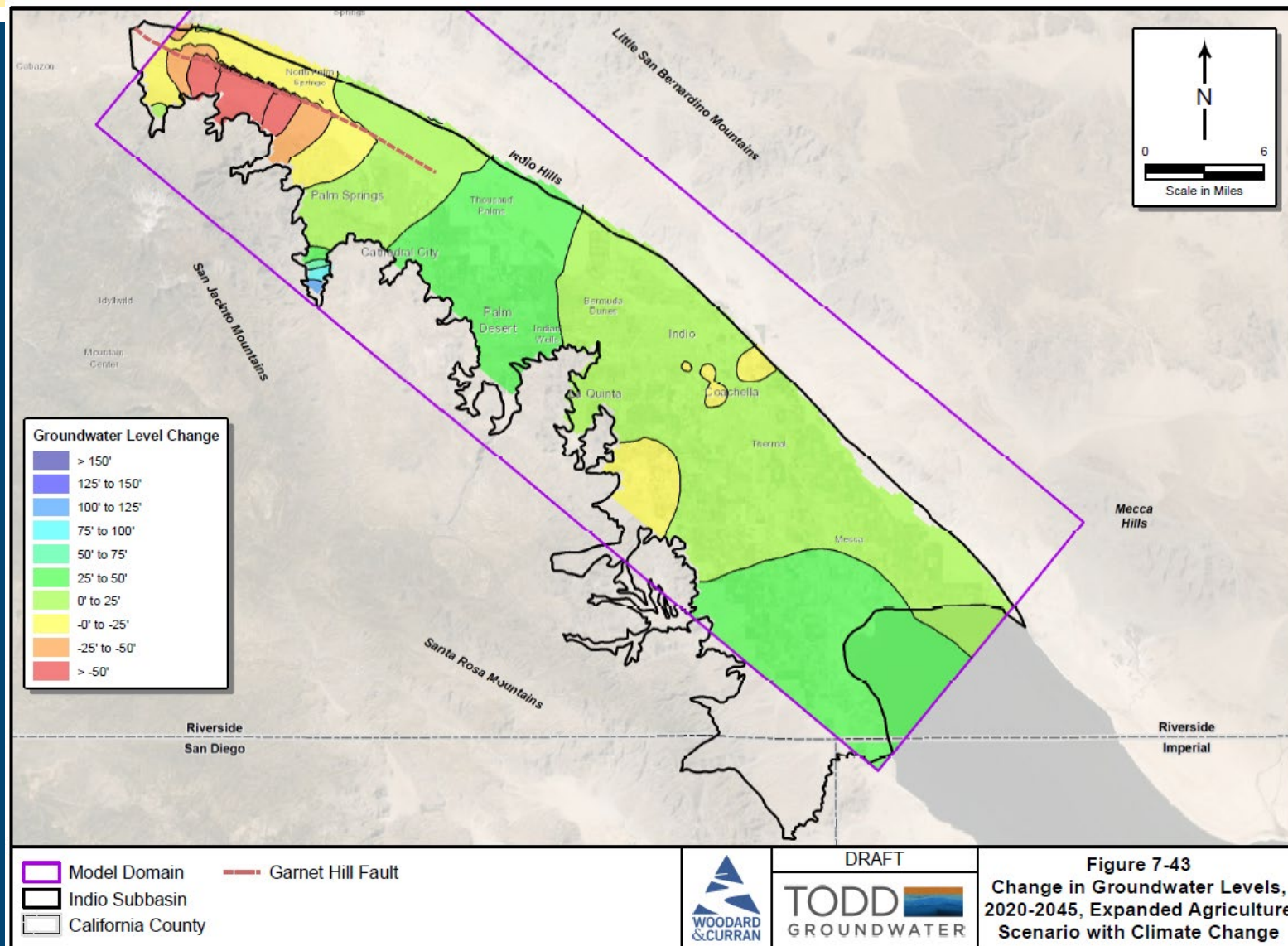
Future Change in Groundwater Levels 2020-2045, 5-Year Projects with Climate Change



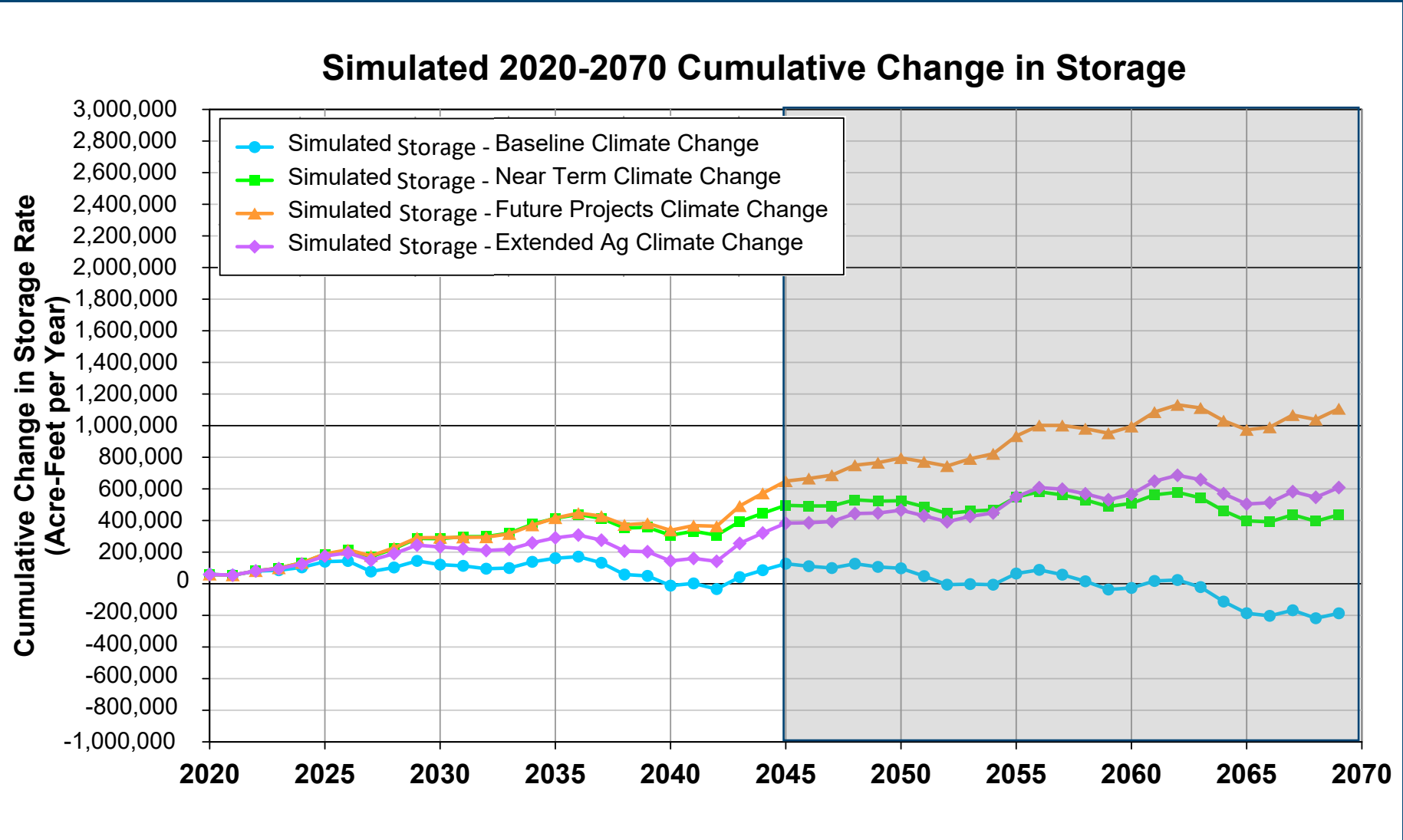
Future Change in Groundwater Levels 2020-2045, Future Projects with Climate Change



Future Change in Groundwater Levels 2020-2045, Expanded Agriculture with Climate Change

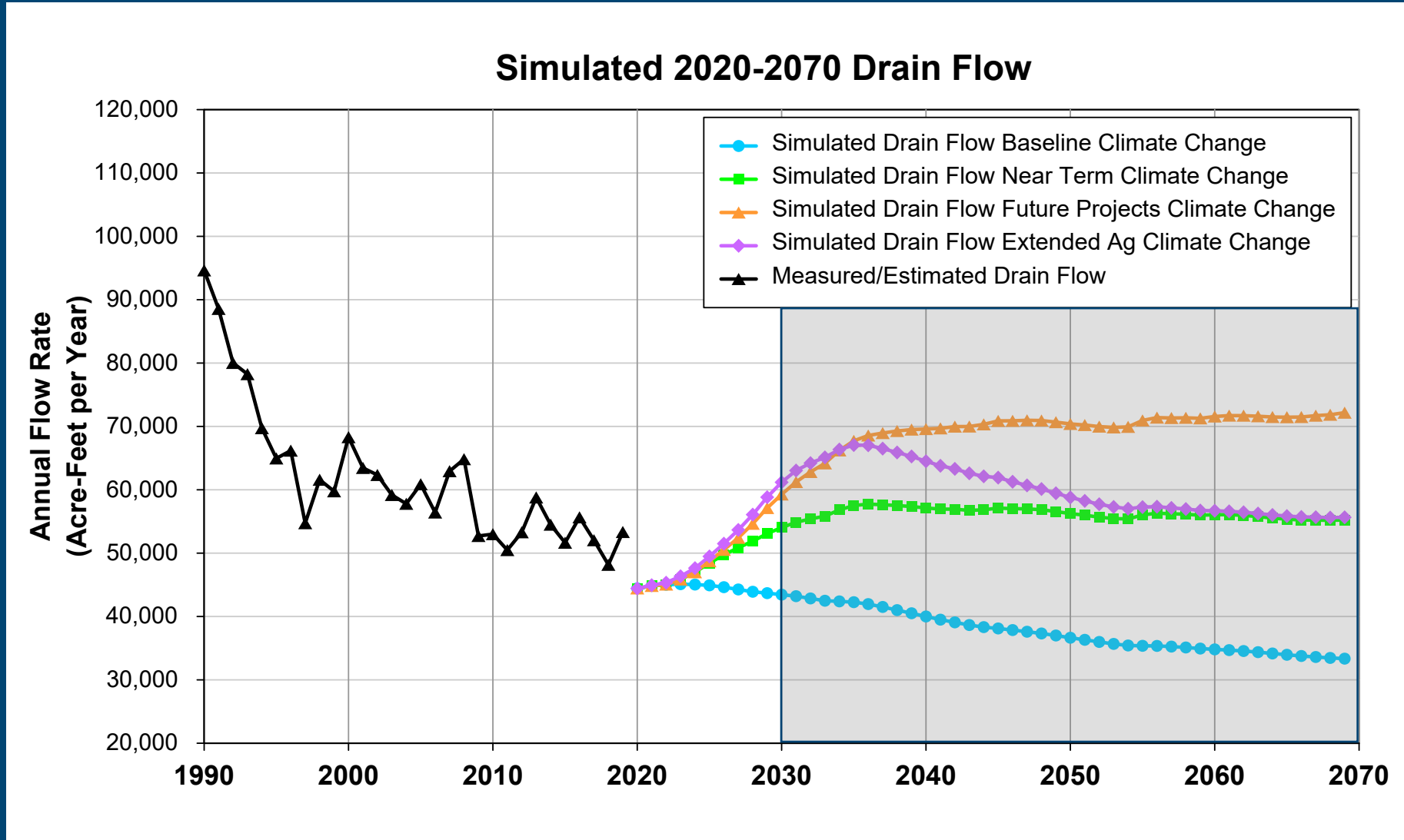


Cumulative Change in Storage 4 Climate Change Scenarios

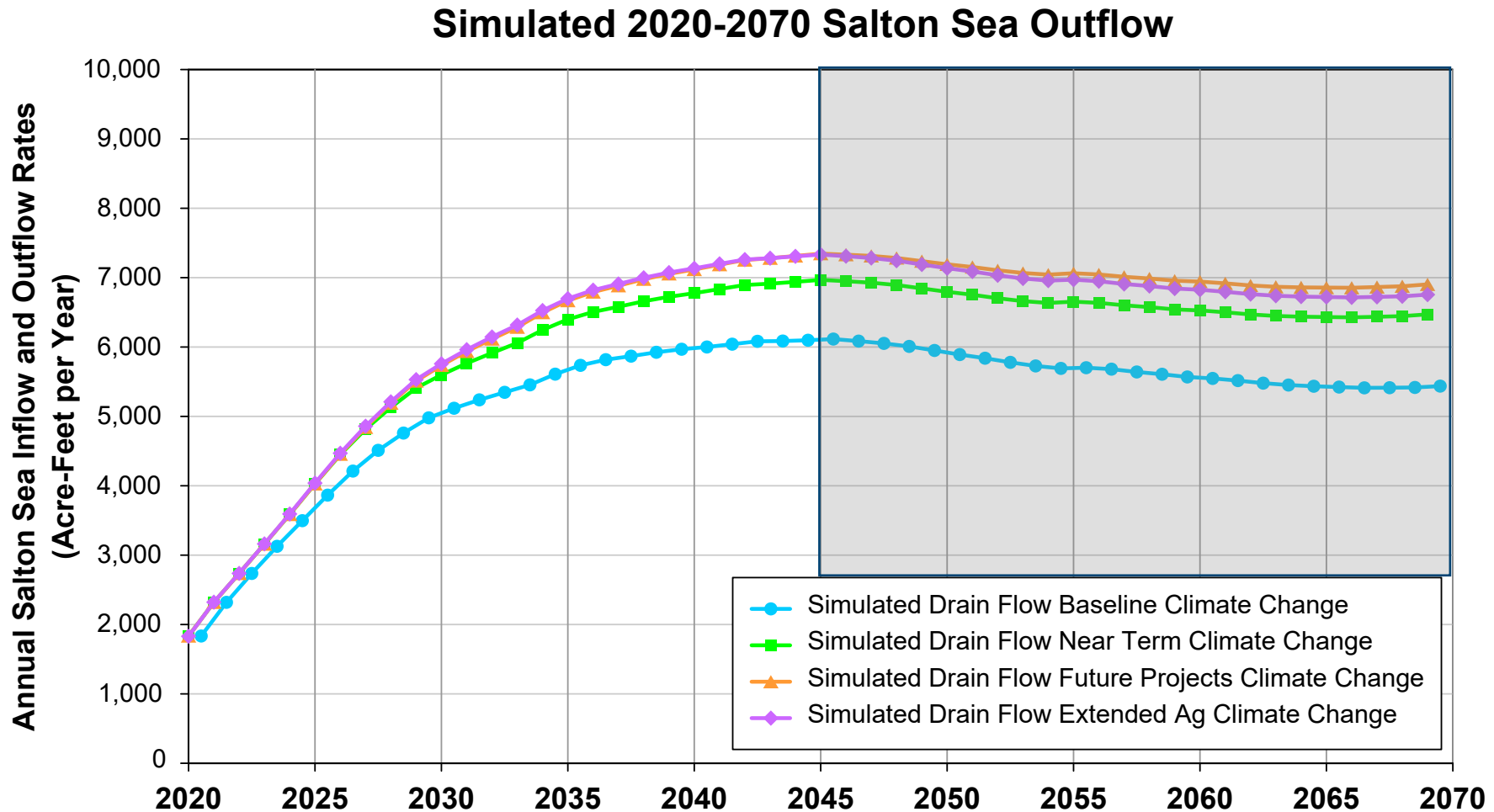


Future Drain Flows

4 Climate Change Scenarios



Future Groundwater Outflow to Salton Sea 4 Climate Change Scenarios



Future Scenario Simulation Results

- Scenarios indicate:
 - ❖ Cumulative decline in storage for Baseline with Climate Change
 - ❖ Cumulative increases in storage for all others
 - ❖ Drain flows decline for Baseline with Climate Change and increase for others
 - ❖ Seawater intrusion is not a problem in any scenario
- **New Five-Year Plan PMAs are needed for supply-demand balance**
- **Future PMAs are needed for reliability in face of climate change and uncertainties in demand past 25-year planning horizon**

Agenda

- Welcome and Introductions
- Alternative Plan Status
- Groundwater Model
- Plan Scenarios & Projects and Management Actions
- Simulation Results
- **Public Comment**
- Get Involved



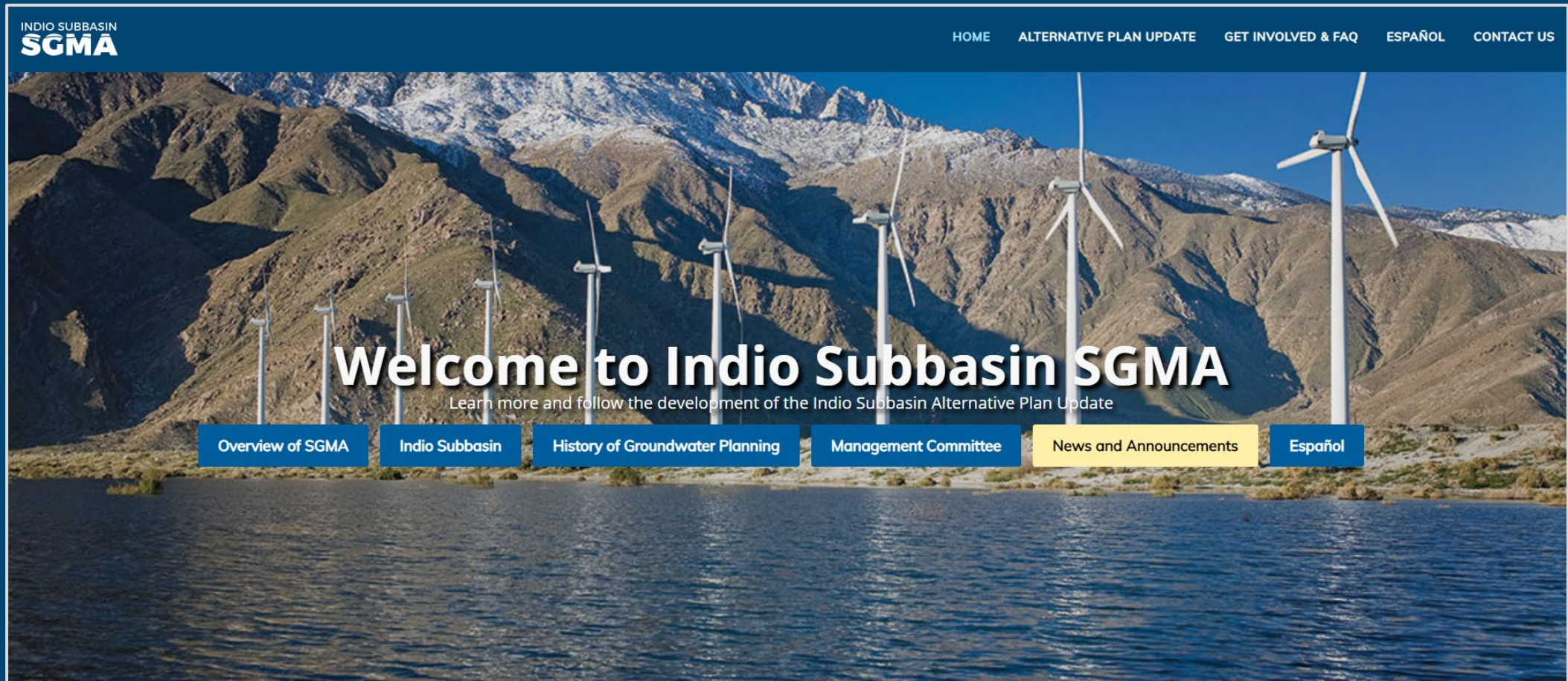
Public Comment

Input and feedback are welcomed
For Callers – you may need to press *6 to unmute

Agenda

- Welcome and Introductions
- Alternative Plan Status
- Groundwater Model
- Plan Scenarios & Projects and Management Actions
- Simulation Results
- Public Comment
- **Get Involved**

Get Involved – Visit our Website



Get Involved – Visit our Website


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We will never share your information with anyone.

Get Involved – Final Workshop



**Wednesday
October 13, 2021**



2:00 – 4:00 PM



Location: TBD



For additional information,
please contact:

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