San Pasqual Valley Groundwater Basin Sustainable Groundwater Management Act Technical Peer Review Meeting

Special Meeting on Groundwater Modeling

December 17, 2020

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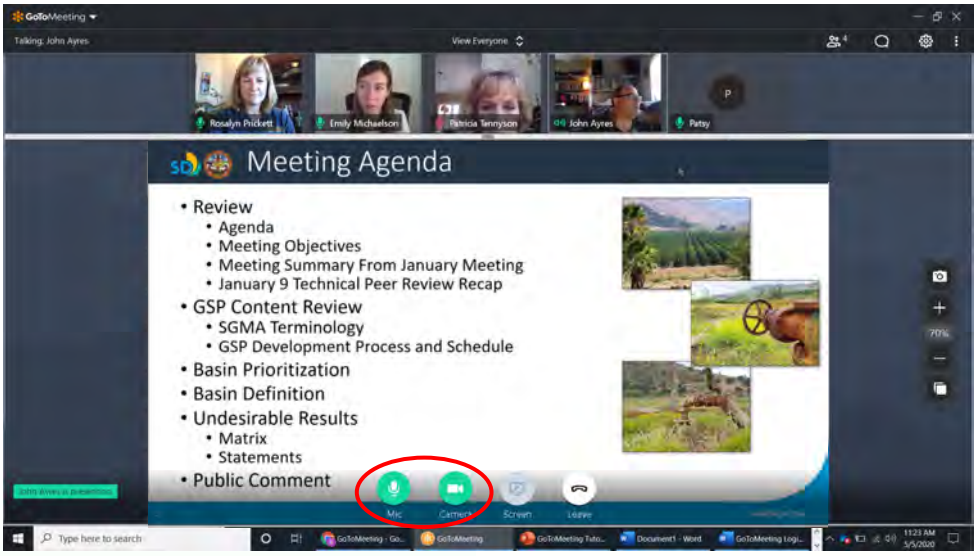
GoToMeeting – Quick How To

- 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

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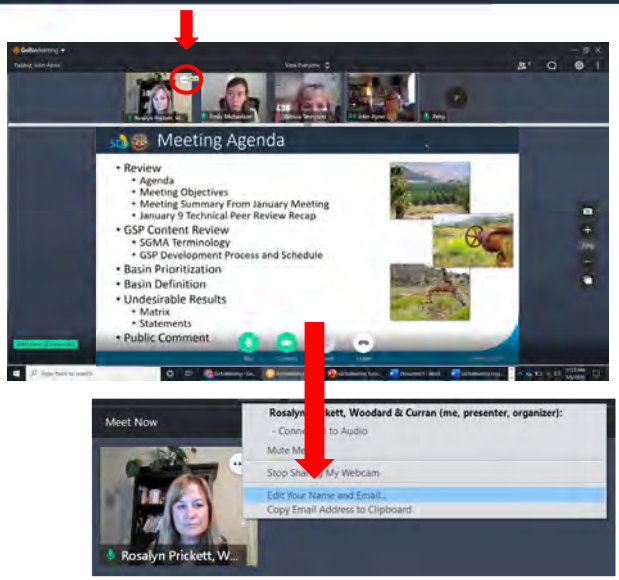
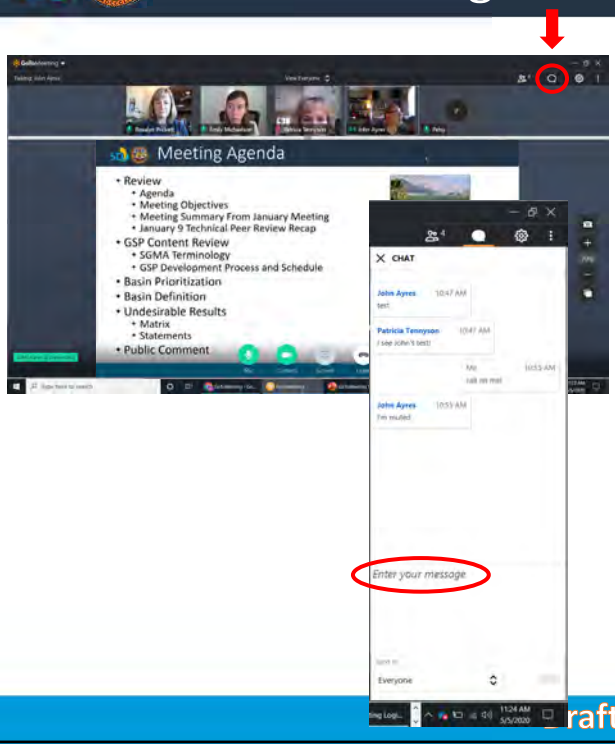
GoToMeeting – Please Enter Your Name



- Please identify yourself with your full name and organization
- Hover over your photo and click on the 3 dots, then *Edit Your Name and Email*
  - TPR members – please include "TPR – Name, Entity"
  - AC members – please include "AC – Name, Entity"
  - All other participants – please include "Name, Entity"

3

GoToMeeting – How to Comment



- Our facilitator will mute everyone at the beginning of the meeting
- Let us know you have a comment or question by clicking the **Chat** icon in the top right
  - Click on *Enter your message*, type your name and organization and hit SEND
- Wait until our facilitator calls on you:
  - Our facilitator will unmute you to relay your question or comment
  - Please also check your phone/computer to make sure you're not muted there too

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San Pasqual Valley GSP
Technical Peer Review Meeting

REVIEW

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Meeting Agenda

1. Roll Call & Introductions
2. Review
   - Agenda
   - Meeting Objectives
   - Meeting Summary
   - Comments Received
   - Public Comment Format
3. Groundwater Model Update
   - Intended Uses of Model
   - Model Construction Overview
   - Historical Model Approach and Selected Results
   - Projection Model Approach and Selected Results
   - Advisory Committee Comments
4. Public Comments
5. Next Steps & Closing Remarks

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Meeting Objectives and Summary

- Meeting Objectives
  - Share and discuss modeling approach, progress, and updates
  - Identify any "fatal flaws" in modeling approach and application
    - TPR comments on today's PPT requested by 12:00pm on Weds 12/23/2020
- Meeting Summary
  - See Handout 1

Updated Public Comment Format

- Public comments will be summarized in the meeting summary
- Public comment will take place at the conclusion of all TPR discussion
- To speak during public comment, input your name and organization in the **Chat**
- Any TPR or AC member's responses to public comment or other comments/concerns should be e-mailed to Sandra Carlson (please do not reply all)

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TPR COMMENT REVIEW

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TPR Comments Received–Overview

- Consultant Team assembled all model-related comments and provided written responses in Handout 2
- Sandra Carlson provided Handout 2 via email
  - 1st version provided on 11/30/2020
  - 2nd version provided on 12/14/2020 to address additional modeling comments received after 11/30/2020
- Are there any follow-up questions?

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TPR COMMENT REVIEW
AC COMMENTS

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GROUNDWATER MODEL UPDATE

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Groundwater Model Update – Intended Model Uses

- Support developing surface water (SW) & groundwater (GW) budgets
- Support evaluating Sustainable Management Criteria
- Help evaluate potential Projects & Management Actions
- Help identify and prioritize data gaps
- Support refinement of monitoring networks used during GSP implementation

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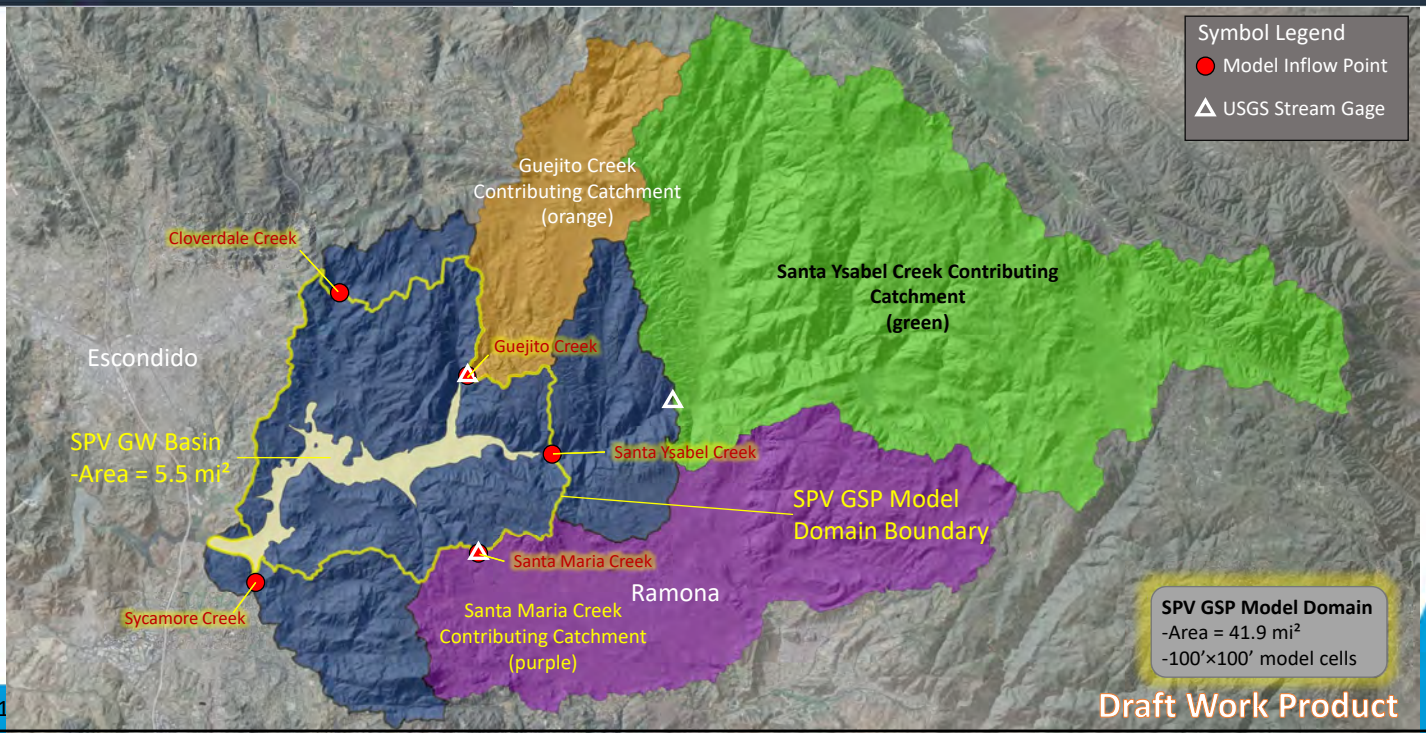
Groundwater Model Update – Model Construction Overview

Areal Characteristics of Model Domain



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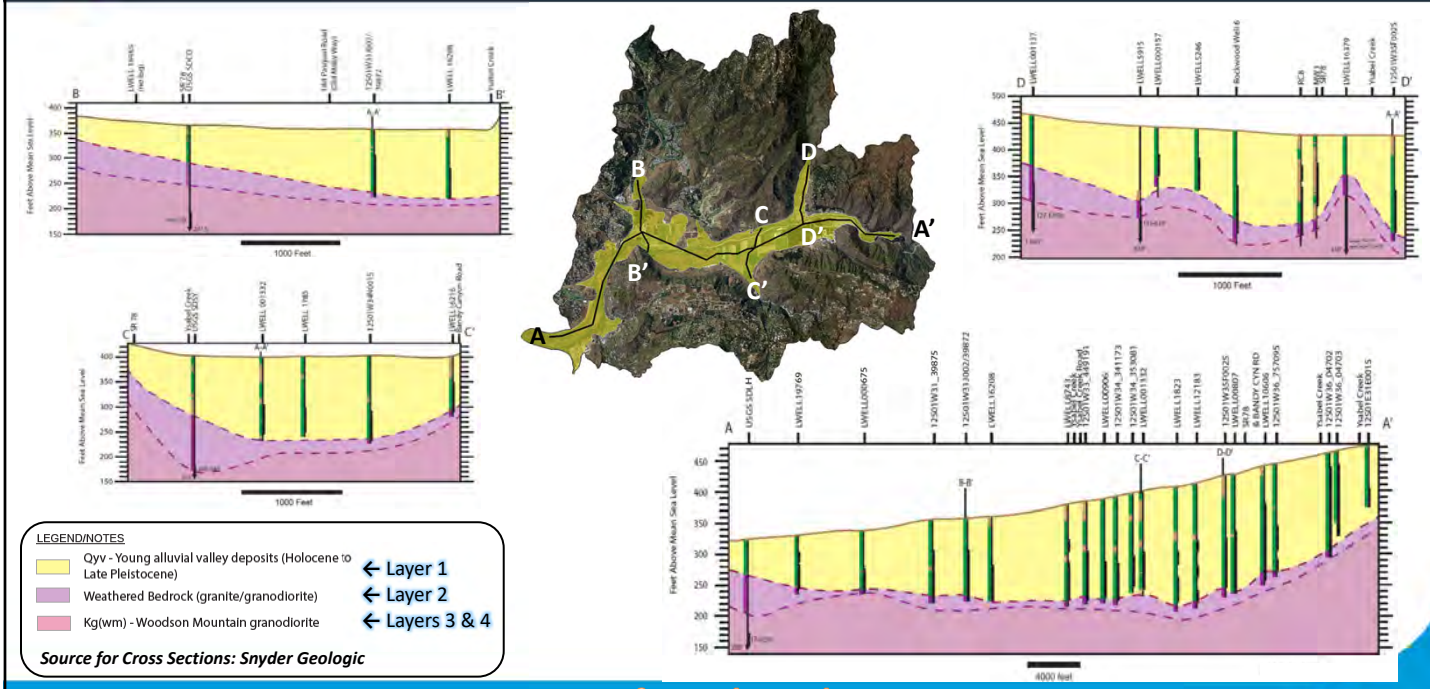
Groundwater Model Update – Model Construction Overview

Vertical Characteristics of Model Domain



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Groundwater Model Update – Model Construction Overview

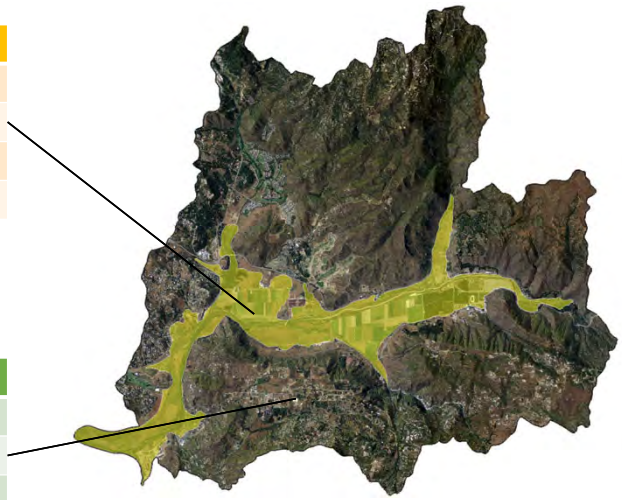
Vertical Characteristics of Model Domain (cont)

Inside of SPV GW Basin (yellow area in image)

Layer	Generalized Description	Thickness (ft)
1	Alluvium	36 to 190
2	Residuum	6 to 110
3	Indurated/Fractured Rock	150
4	Indurated/Fractured Rock	1,416

Outside of SPV GW Basin

Layer	Generalized Description	Thickness (ft)
1	Alluvium; Residuum; Indurated/Fractured Rock	75 to 100
2	Residuum; Indurated/Fractured Rock	20 to 30
3	Indurated/Fractured Rock	150
4	Indurated/Fractured Rock	1,416



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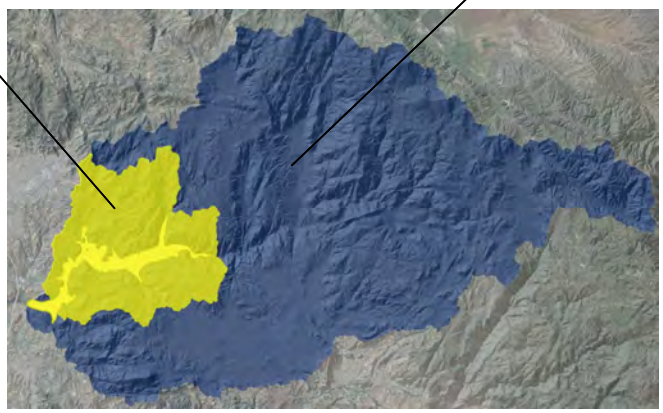
Groundwater Model Update – Model Construction Overview

Selected Model Codes

Use One-Water Hydrologic Flow Model (One-Water) code within the SPV GSP Model domain

Use Basin Characterization Model (BCM) to compute stream and GW inflows to SPV GSP Model domain from contributing catchments



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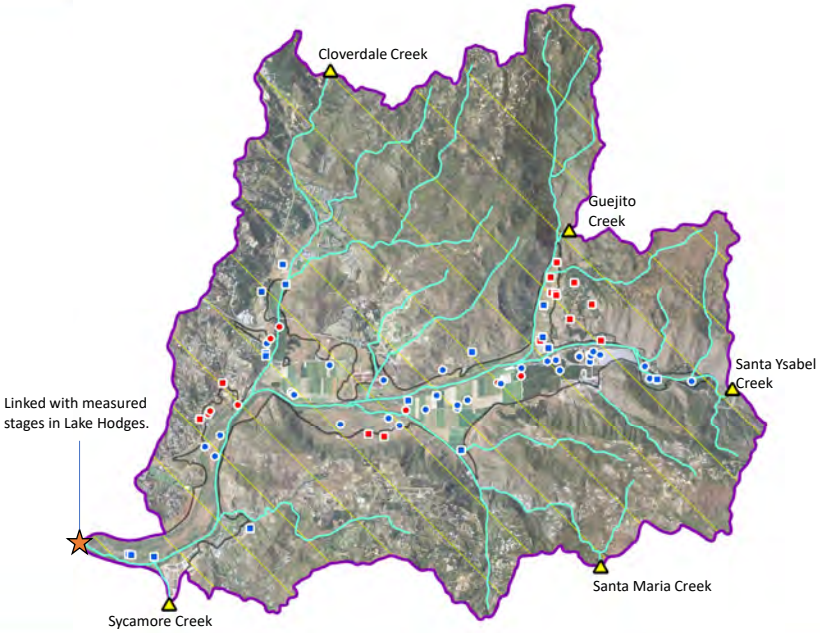
Groundwater Model Update – Historical Model Approach

Boundary Conditions for Historical Simulations (2005–2019)



Boundary Condition Categories

Specified Flux
- -Precipitation and Surface Evapotranspiration (FMP)
- -Alluvium/Residuum GW Pumping (FMP) (more reliable well construction)
- -Alluvium/Residuum GW Pumping (FMP) (less reliable well construction)
- -Bedrock GW Pumping (FMP) (more reliable well construction)
- -Bedrock GW Pumping (FMP) (less reliable well construction)
- -Stream Inflows (SFR)

Head-Dependent Flux
- -Subsurface Evapotranspiration (FMP)
- -Streams (SFR)
- -Subsurface Exchange (GHB)

No Flow
- -Located Along Model Domain Boundary in All Model Layers and at the Bottom of Model Layer 4

Farm Process (FMP) computes applied water demand based on the deficit after accounting for precipitation and GW uptake (yellow hatched area).

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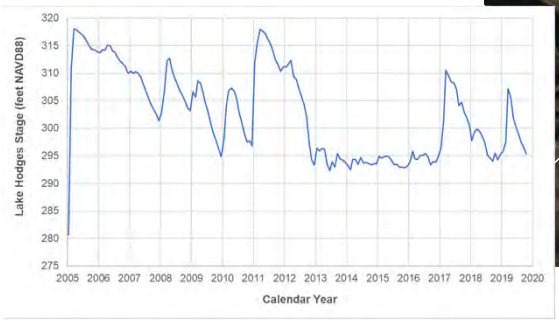
Groundwater Model Update – Historical Model Approach

GHB Boundary Condition for Historical Simulations (2005–2019)



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Groundwater Model Update – Historical Model Approach

Parameter Assumptions for Historical Simulations (2005–2019)

Parameter	Basis for Initial Values
Surface Parameters	
• Topography	• 10-meter Digital Elevation Model (DEM) datasets
• Stream Channel Features	• 10-meter DEM datasets, Mays (1996), & Google Earth
• Water Infrastructure	• SNMP (CH2M 2014), consultant team, and stakeholder input
• Soils	• SNMP (CH2M 2014), NRCS SSURGO values, & One-Water (USGS 2020)
• Land Use and Vegetation	• SNMP (CH2M 2014), LandIQ, & Google Earth
Subsurface Parameters	
• Hydraulic Conductivity	• SNMP (CH2M 2014), Freeze and Cherry (1979), Rockwood Canyon aquifer tests (RCS 2015), Bandy Canyon EIR (Ogden 1992), & professional judgment
• Groundwater Storage	• Freeze and Cherry (1979) & professional judgment

SNMP = Salt and Nutrient Management Plan
NRCS = National Resources Conservation Service
SSURGO = Soil Survey Geographic Database
EIR = Environmental Impact Report

Groundwater (Freeze and Cherry 1979)
Water Resources Handbook (Mays 1996)
One-Water = One Water Hydrologic Flow Model (USGS 2020)

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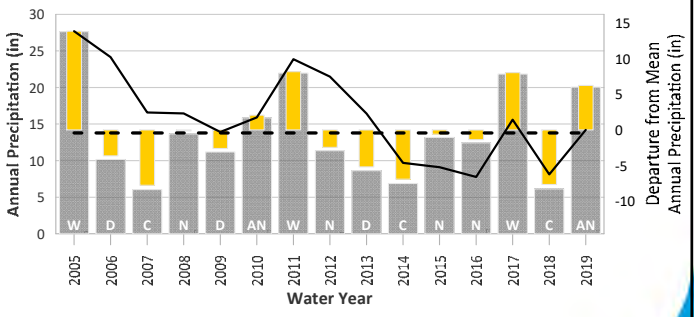
Groundwater Model Update – Historical Model Approach
Calibration Period (2005–2019)

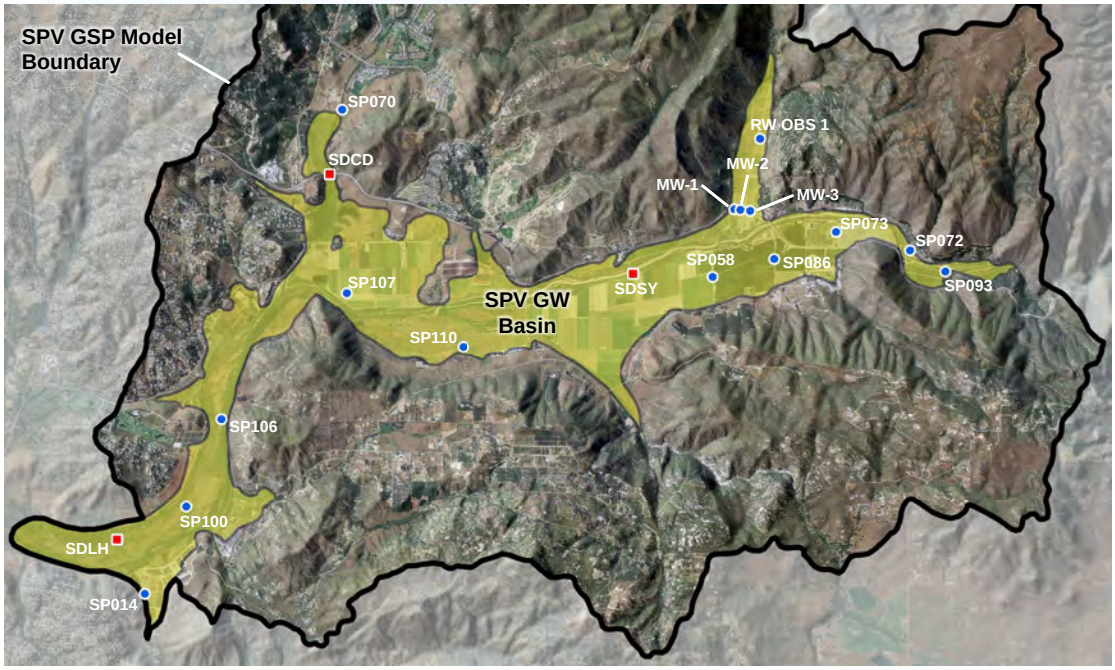
- GSP Regs require a calibration period of at least the most recent 10 years
- We selected a 15-year calibration period from 2005–2019 with monthly stress periods
  - Good representation of the five WY indices
  - Land & water use & other model input data are less reliable or not available prior to 2005
  - Mean annual precip (MAP) ≈ 14 in/yr
    - 2005–2019 MAP = 13.8 in
    - 1980–2019 MAP = 14.6 in
  - 2005–2019 period has reasonable balance of wet, normal, & dry conditions for calibration

Water Years	W	AN	N	D	C
2010–2019	2	2	3	1	2
2005–2019	3	2	4	3	3
1980–2019	8	8	8	8	8



Note: Time periods in slides use a water-year (WY) convention as opposed to a calendar-year convention, unless otherwise noted.

Groundwater Model Update – Historical Model Approach
Calibration Target Locations

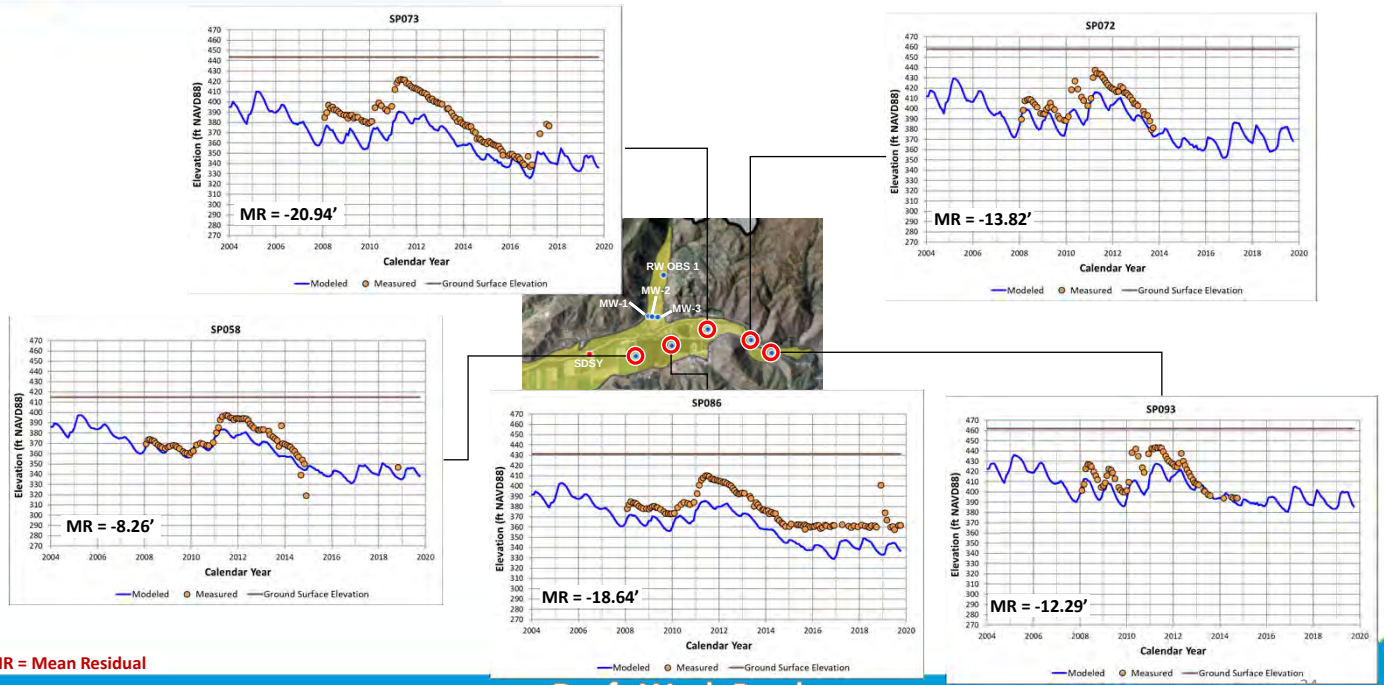


Calibration Target
- Single-completion Target Well Location (count=15)
- Multi-completion Target Well Location (count=3)

Groundwater Model Update – Historical Model Approach
Calibration Targets

- Quantitative calibration targets
  - Heads measured at 15 single-completion monitoring well locations and three multi-completion monitoring well locations
  - Calibration statistics computed using industry standards
- Qualitative calibration targets
  - Vertical head difference (VHD) targets, computed from GW-level measurements at three multi-completion monitoring well locations
  - General GW flow patterns
  - Locations of streamflow
  - Comparison of modeled estimates of ag supply and demand

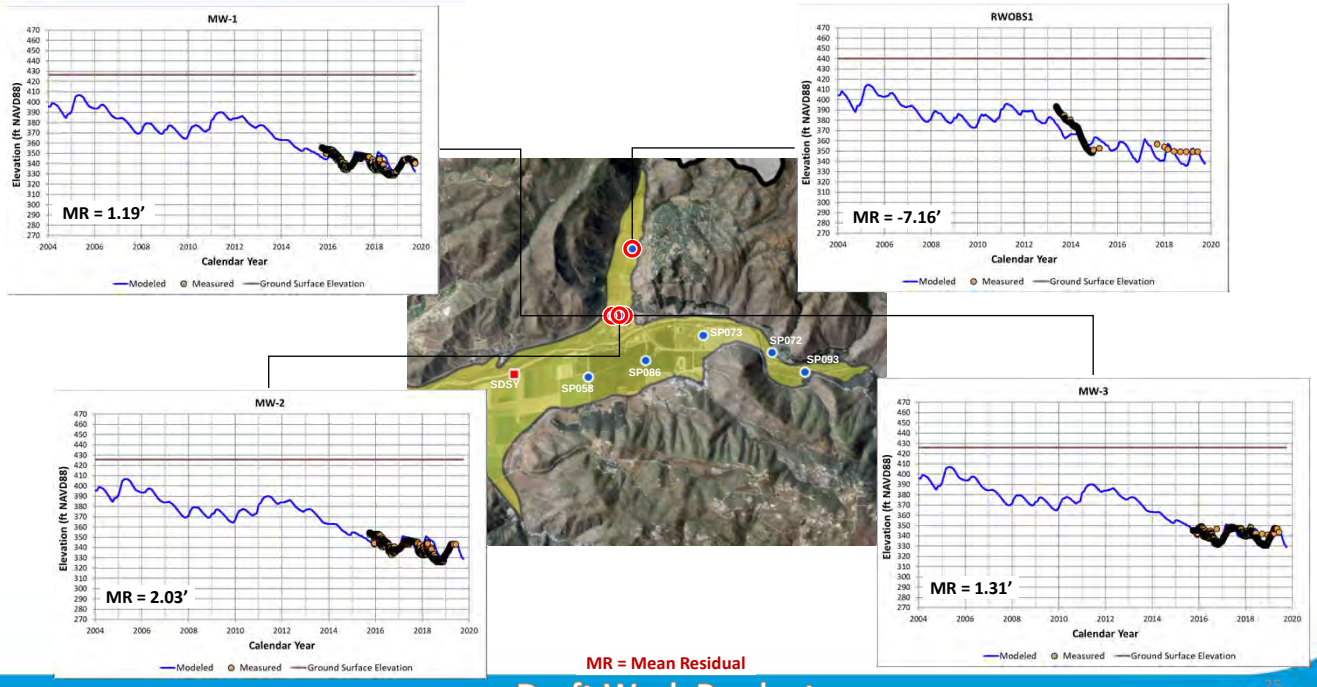
Groundwater Model Update – Historical Model Results
Example Head Hydrograph Targets – East San Pasqual Valley



MR = Mean Residual

Groundwater Model Update – Historical Model Results

Example Head Hydrograph Targets – Rockwood Canyon



MR = Mean Residual

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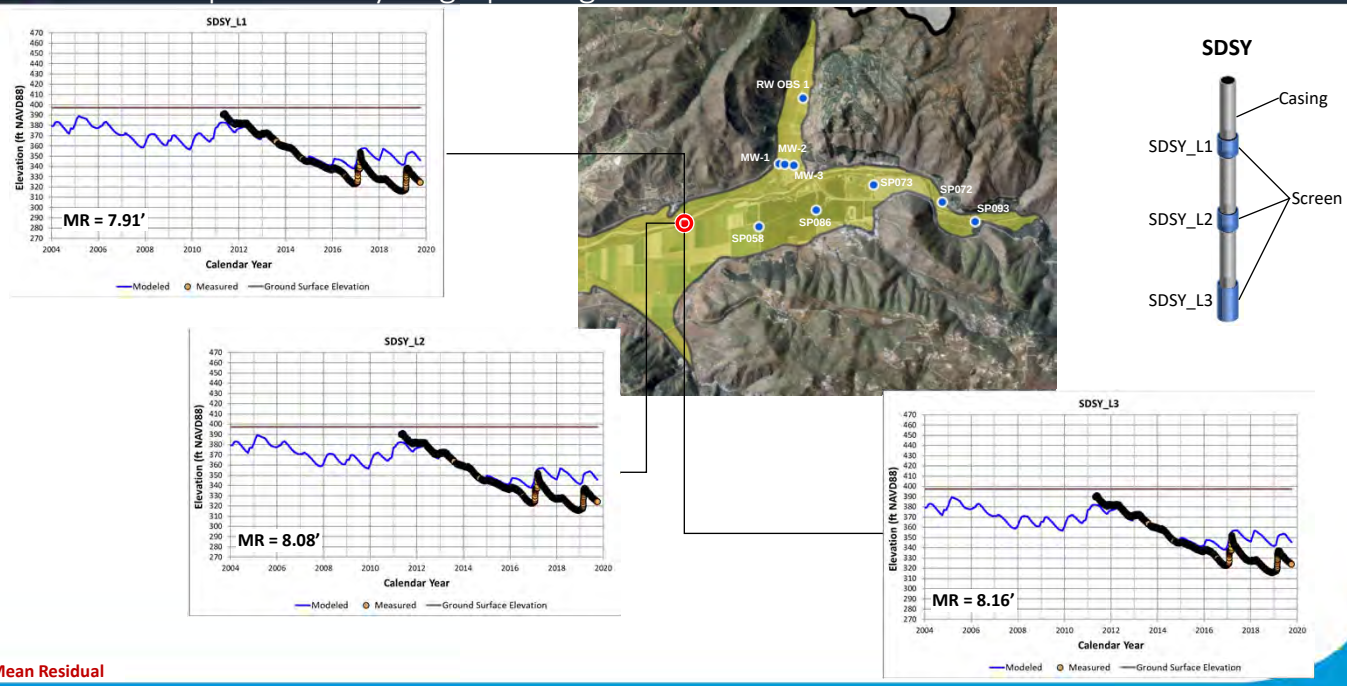
Groundwater Model Update – Historical Model Results

Example Head Hydrograph Targets – SDSY



MR = Mean Residual

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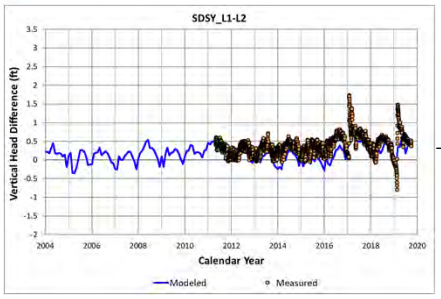
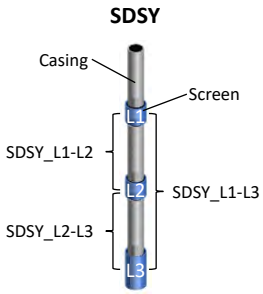
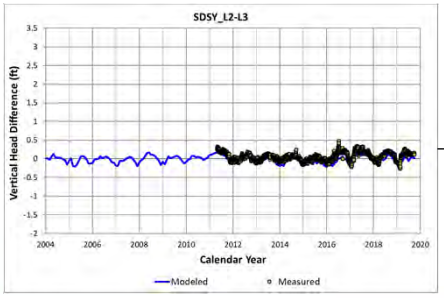
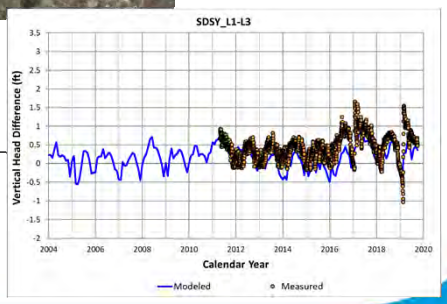
Groundwater Model Update – Historical Model Results

Example Vertical Head Difference (VHD) Hydrograph Targets – SDSY









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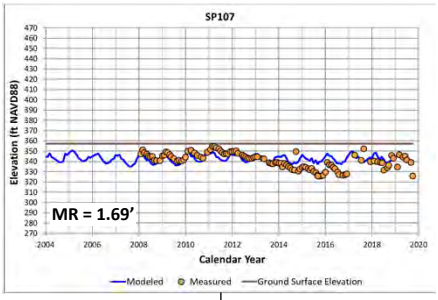
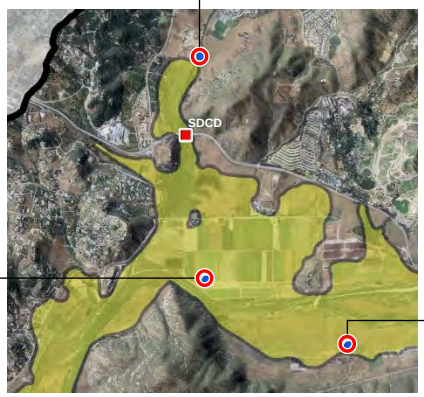
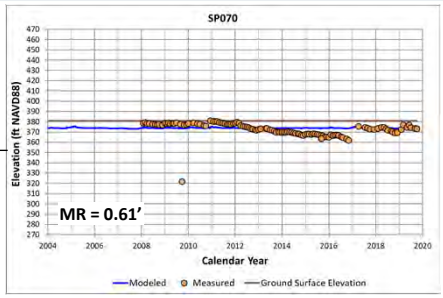
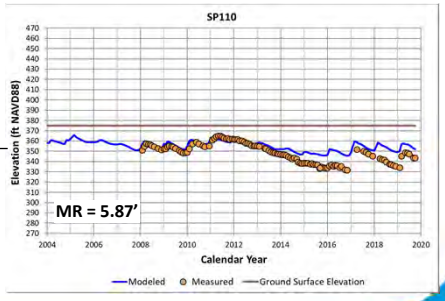
Groundwater Model Update – Historical Model Results

Example Head Hydrograph Targets – West San Pasqual Valley & Cloverdale Canyon









MR = Mean Residual

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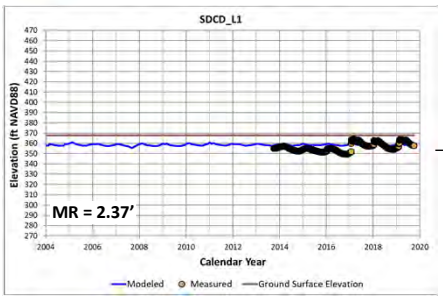
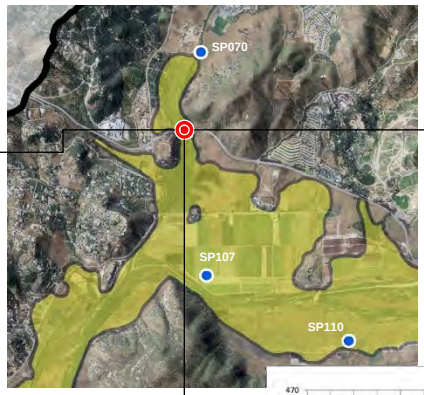
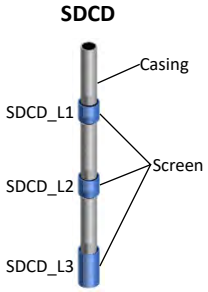
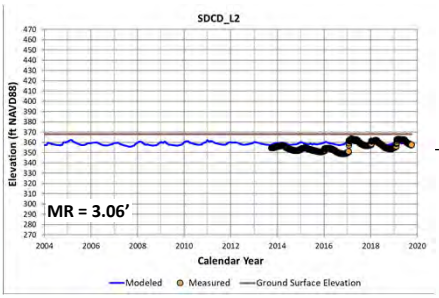
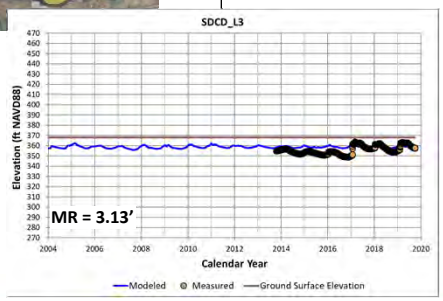
Groundwater Model Update – Historical Model Results
Example Head Hydrograph Targets – SDCD











MR = Mean Residual

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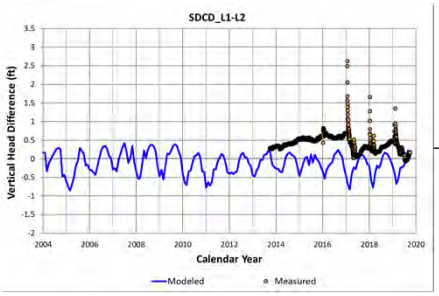
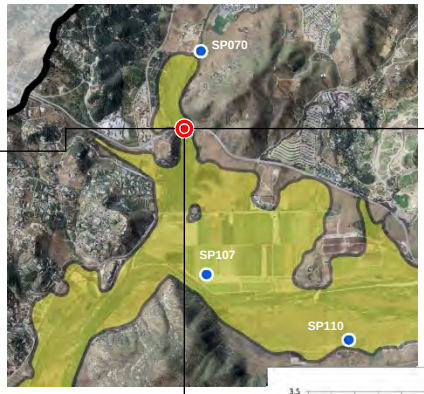
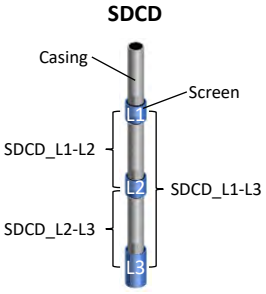
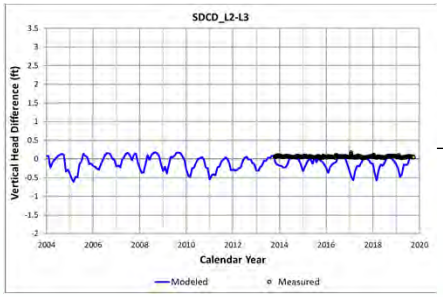
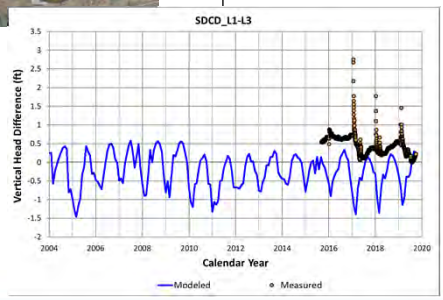
Groundwater Model Update – Historical Model Results
Example Vertical Head Difference (VHD) Hydrograph Targets – SDCD











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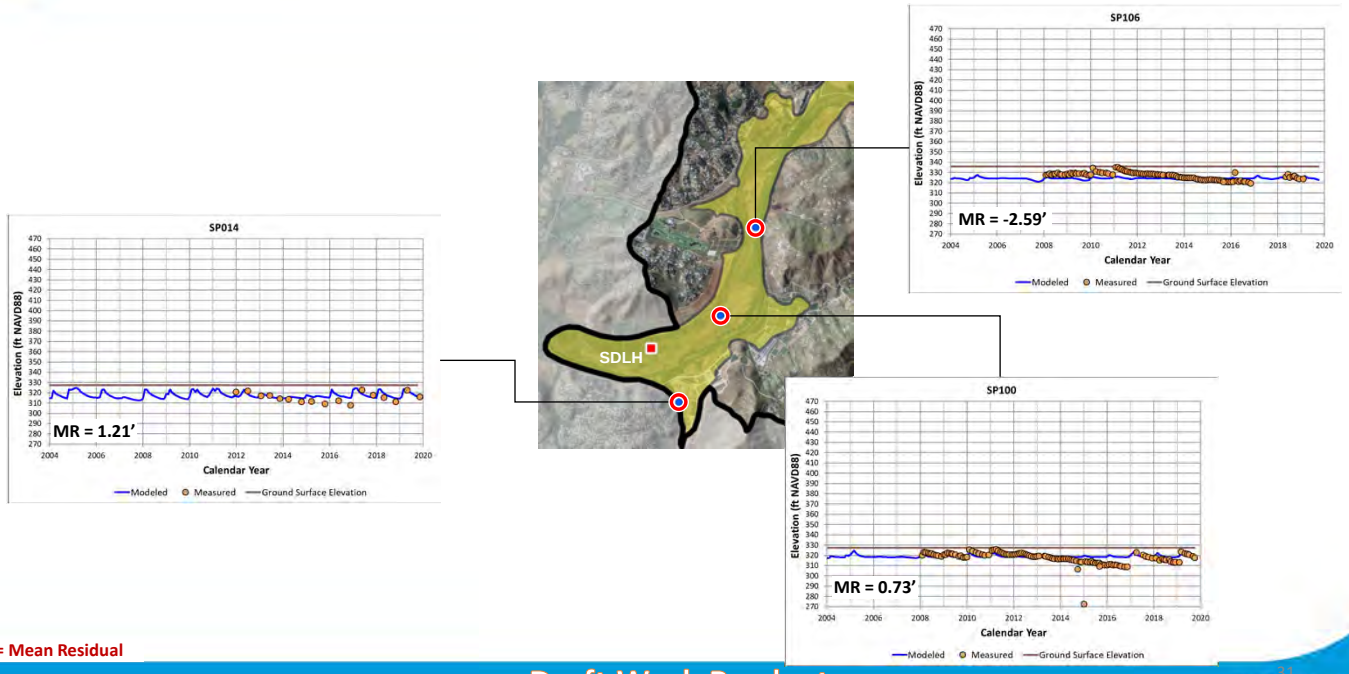
Groundwater Model Update – Historical Model Results

Example Head Hydrograph Targets – Narrows and Downgradient Area



MR = Mean Residual

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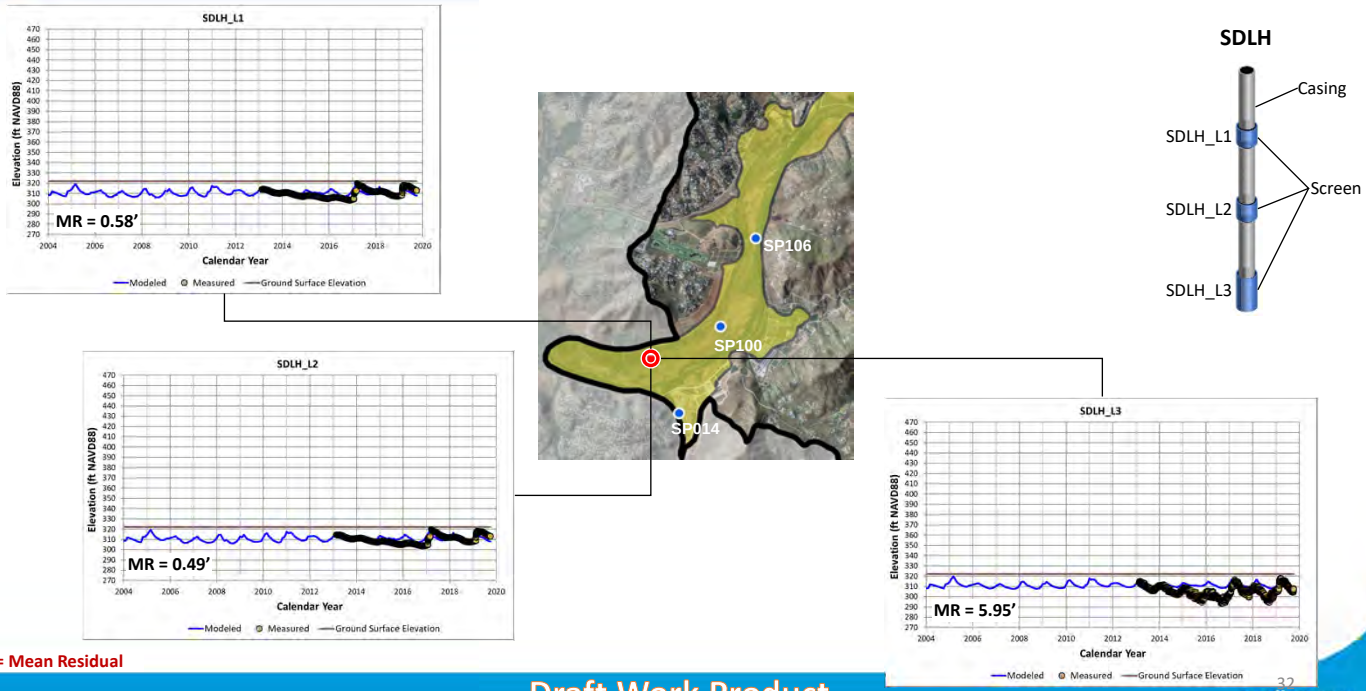
Groundwater Model Update – Historical Model Results

Example Head Hydrograph Targets – SDLH



MR = Mean Residual

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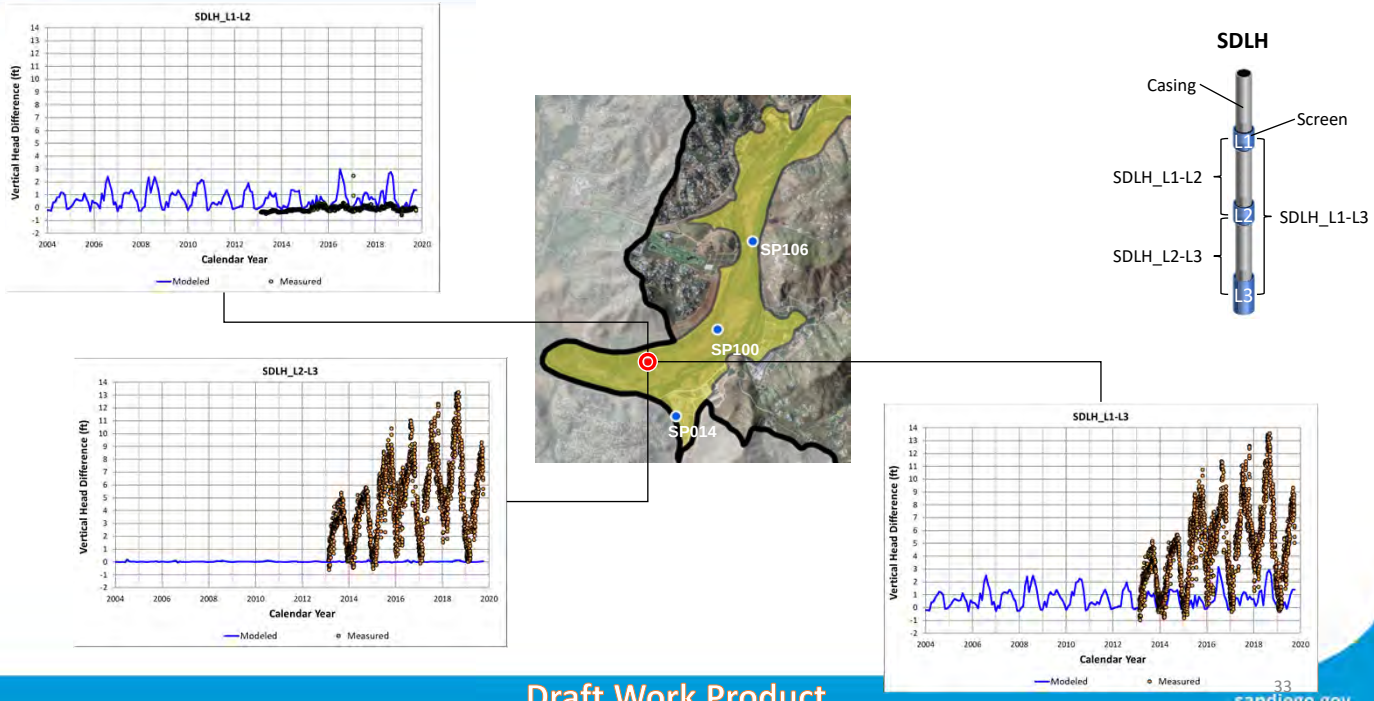
Groundwater Model Update – Historical Model Results

Example Vertical Head Difference (VHD) Hydrograph Targets – SDLH



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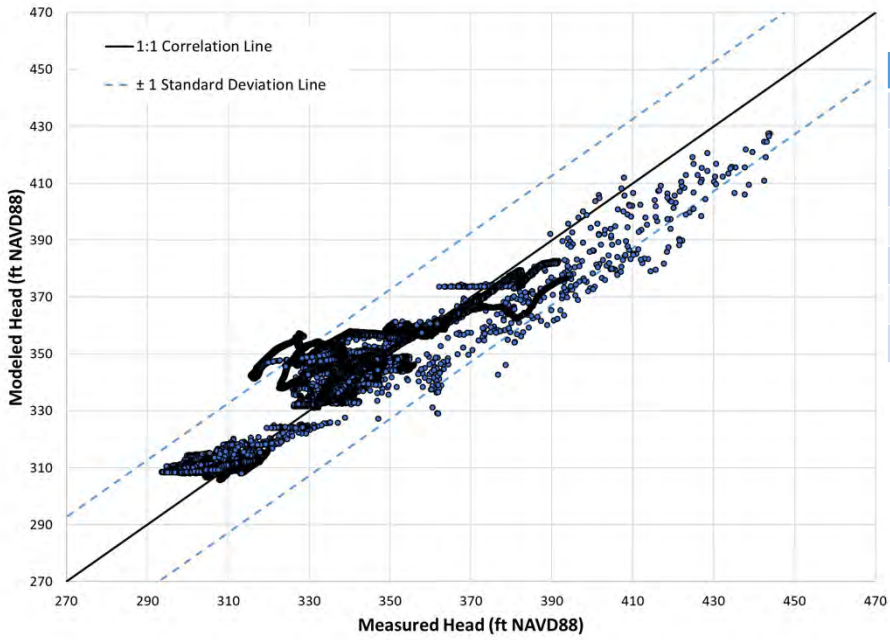
Groundwater Model Update – Historical Model Results

Scatterplot Showing All Results for Head Target Locations and Times



Calibration Statistic	Value	Unit
Mean Residual	3.68	feet
Standard Deviation	22.74	feet
Root Mean Squared Residual (RMSR)	9.40	feet
Range of Measured Heads (Range)	150.35	feet
RMSR/Range	6.25	%
R^2	0.87	---
Number of Points	28,119	---

Residual = Modeled head minus measured head

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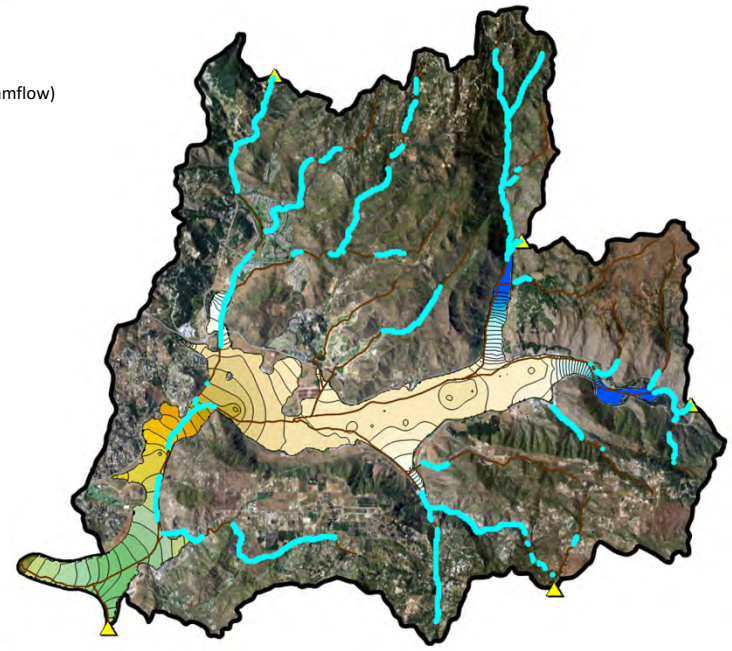
Groundwater Model Update – Historical Model Results

Example Groundwater-level Contour Map in SPV GW Basin

Legend

- SPV GSP Model Boundary
- SPV Groundwater Basin
- Modeled Stream Channel (blue = streamflow)
- Modeled Stream Inflow Location

May-2016 (Normal) Conditions



Modeled GW Elevation (feet NAVD88)

Contour Interval = 2 feet

396
390
384
378
372
366
360
354
348
342
336
330
324
318
312
306
300

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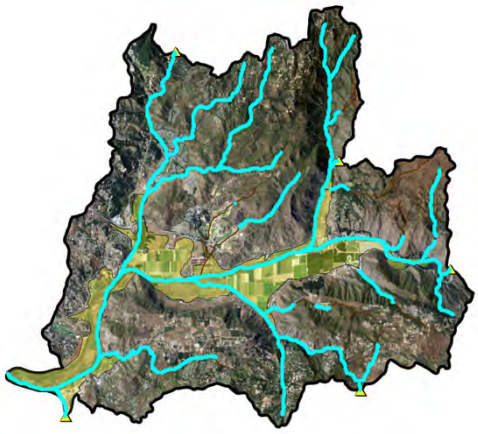
Groundwater Model Update – Historical Model Results

Example Locations of Streamflow

Legend

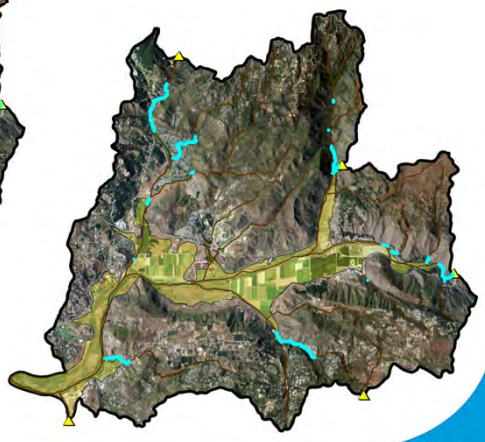
- SPV GSP Model Boundary
- SPV Groundwater Basin
- Modeled Stream Channel (blue = streamflow)
- Modeled Stream Inflow Location

Feb-2019 (Wet)



May-2016 (Normal)

Aug-2006 (Critically Dry)



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Groundwater Model Update – Historical Model Results

Consumptive Use Approach for Historical Simulations (2005–2019)

Historical Model
(2005–2019)

Year	Consumptive Use Dataset	ET_{REF} Needed?
2005	CalETa Direct	No
2006	CalETa Kc	Yes
2007	CalETa Kc	Yes
2008	CalETa Kc	Yes
2009	CalETa Kc	Yes
2010	CalETa Direct	No
2011	CalETa Direct	No
2012	CalETa Direct	No
2013	CalETa Direct	No
2014	CalETa Direct	No
2015	CalETa Direct	No
2016	CalETa Direct	No
2017	CalETa Direct	No
2018	CalETa Kc	Yes
2019	CalETa Direct	No

Landsat 5, 7, and 8

CIMIS #153

$$CU = CalETa = Kc \times ET_{REF}$$

Model Input Variable

Variables
CU = Crop Consumptive Use
CalETa = Actual Crop Evapotranspiration
Kc = Crop Coefficient
ET_{REF} = Reference Evapotranspiration

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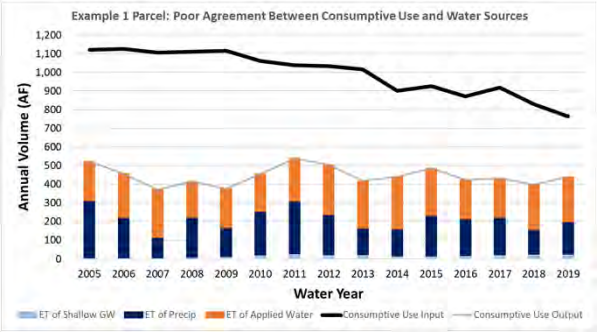
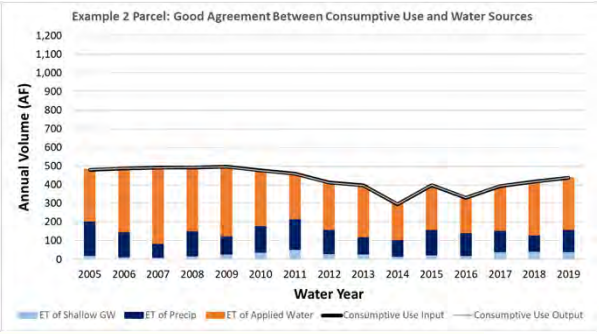
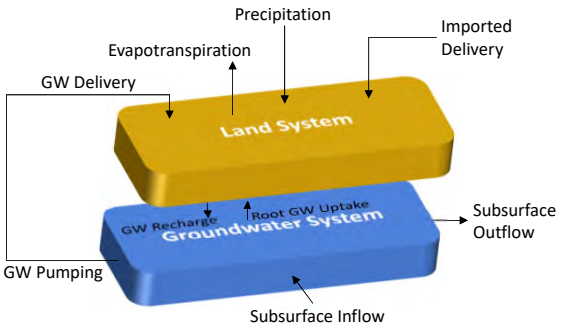
Groundwater Model Update – Historical Model Results

Example Plots of Ag Supply and Demand Used During Calibration







Hierarchy of water supply in One-Water Code

-Root GW uptake (ET of Shallow GW)

-Precipitation (ET of Precip)

-Delivered Applied Water (ET of Applied Water)

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Groundwater Model Update – Historical Model Results
Current Status of SFR Calibration Parameters

Stream	Channel Width (feet)	Streambed Hydraulic Conductivity (ft/d)	Streambed Hydraulic Conductivity (cm/s)	Manning's n
Santa Ysabel Creek	50 to 150	0.1	3.5×10^{-5}	0.035 to 0.05
San Dieguito River	40 to 100	10	3.5×10^{-3}	0.05 to 0.08
Guejito Creek	15 to 40	0.1 to 1	3.5×10^{-5} to 3.5×10^{-4}	0.05 to 0.08
Cloverdale Creek	20 to 60	1 to 10	3.5×10^{-4} to 3.5×10^{-3}	0.05 to 0.08
Santa Maria Creek	15 to 80	0.1 to 1	3.5×10^{-5} to 3.5×10^{-4}	0.035 to 0.08
Sycamore Creek	40	1	3.5×10^{-4}	0.08
Other Creeks	15 to 100	1	3.5×10^{-4}	0.03 to 0.08

All streams have rectangular channel geometries with a streambed thickness of 1 foot.
ft/d = feet per day
cm/s = centimeters per second

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Groundwater Model Update – Historical Model Results
Current Status of Crop Calibration Parameters

Crop	Irrigated?	Rooting Depth (in)	Irrigation Method	Irrigation Efficiency
Truck Crops	Y	36	Sprinkler	0.75
Nursery	Y	24	Sprinkler	0.75
Avocado	Y	40	Drip	0.80
Citrus	Y	48	Drip	0.80
Grapevines	Y	60	Drip	0.80
Turfgrass	Y	30	Sprinkler	0.75
Winter Forage	N	36	None	1.00
Summer Forage	Y	36	Flood	0.65
Golf Course	Y	36	Sprinkler	0.75
Feedlot	Y	36	Flood	0.65
Rural Landscape	Y	36	Sprinkler	0.75
Urban Landscape	Y	36	Sprinkler	0.75
Riparian	N	72	None	1.00
Greenhouse	Y	24	Drip	0.80
Native Shrub	N	72	None	1.00

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Groundwater Model Update – Historical Model Results

Current Status of Aquifer Calibration Parameters within SPV GW Basin

Layer	Generalized Description	K_h Range (K_h Geomean) (ft/d)	K_h Range (K_h Geomean) (cm/s)	K_h:K_v Range (K_h:K_v Geomean) (---)	Specific Yield (---)	Specific Storage (ft^{-1})
1	Alluvium	37.5 to 100.0 (62.7)	1.3×10^{-2} to 3.5×10^{-2} (2.2×10^{-2})	10 to 100 (36)	0.10	1×10^{-6}
2	Residuum	3.8 to 10 (6.2)	1.3×10^{-3} to 3.5×10^{-3} (2.2×10^{-3})	0.01 to 100 (23)	0.05	1×10^{-6}
3	Indurated/Fractured Rock	0.004 to 6.5 (0.02)	1.4×10^{-6} to 2.3×10^{-3} (7.7×10^{-6})	0.01 (0.01)	Not Applicable	1×10^{-7}
4	Indurated/Fractured Rock	0.004 (0.004)	1.4×10^{-6} (1.4×10^{-6})	0.01 (0.01)	Not Applicable	1×10^{-7}

Geomean = geometric mean
K_h = horizontal hydraulic conductivity
K_v = vertical hydraulic conductivity
K_h:K_v = vertical anisotropy
ft/d = feet per day
cm/s = centimeters per second
ft^{-1} = per foot

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Projection Model Approach

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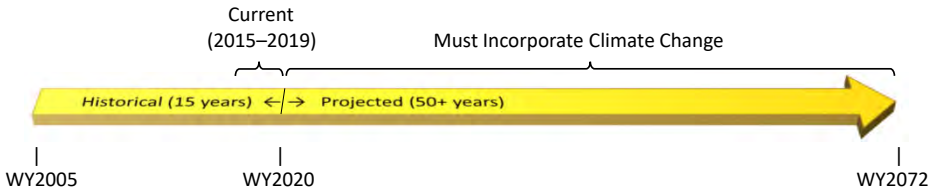
Groundwater Model Update – Projection Model Approach
Projection Period: 2020 thru 2071 (2020–2071)

- GSP Regs require a projection period of at least 50 years from 2022 thru 2071



- We include 2020 and 2021 projections to have a continuous projection simulation thru 2071
- Continue with monthly stress periods

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Groundwater Model Update – Projection Model Approach
Parameter Assumptions for Projection Simulations (2020–2071)

Parameter	Basis for Values
Surface Parameters	
• Topography	• Unchanged from historical model
• Stream Channel Features	• Unchanged from historical model
• Water Infrastructure	• 2020 conditions based on stakeholder input
• Soils	• Unchanged from historical model
• Land Use and Vegetation	• 2018 land use • 2018 computed Kc values from 2017 & 2019 CalETa datasets
Subsurface Parameters	
• Hydraulic Conductivity	• Unchanged from historical model
• Groundwater Storage	• Unchanged from historical model

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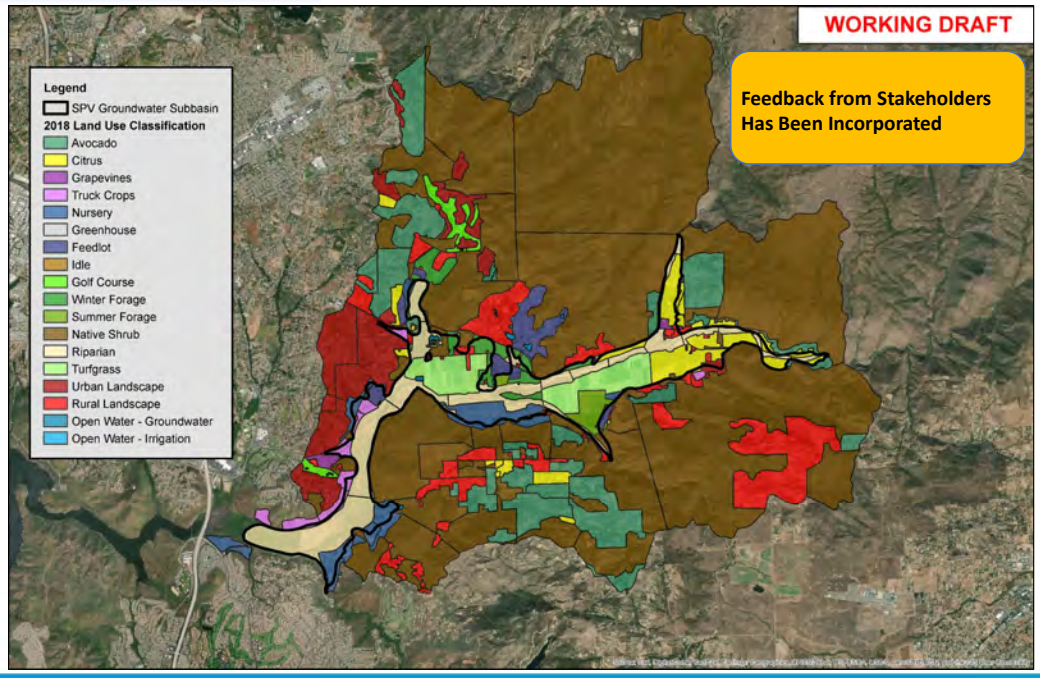
Groundwater Model Update – Projection Model Approach

2018 Land Use Will be Used for Projection Simulations (2020–2071)



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Groundwater Model Update – Projection Model Approach

Consumptive Use for Projection Simulations (2020–2071)

Historical Model
(2005–2019)

Year	Consumptive Use Dataset	ET_{REF} Needed?
2005	CalETa Direct	No
2006	CalETa Kc	Yes
2007	CalETa Kc	Yes
2008	CalETa Kc	Yes
2009	CalETa Kc	Yes
2010	CalETa Direct	No
2011	CalETa Direct	No
2012	CalETa Direct	No
2013	CalETa Direct	No
2014	CalETa Direct	No
2015	CalETa Direct	No
2016	CalETa Direct	No
2017	CalETa Direct	No
2018	CalETa Kc	Yes
2019	CalETa Direct	No

Landsat 5, 7, and 8

$$CU = CalETa = Kc \times ET_{REF}$$

Model Input Variable

Projection Model
(2020–2071)
Based on Global Climate Model via Basin Characterization Model

Variables
CU = Crop Consumptive Use
CalETa = Actual Crop Evapotranspiration
Kc = Crop Coefficient
ET_{REF} = Reference Evapotranspiration

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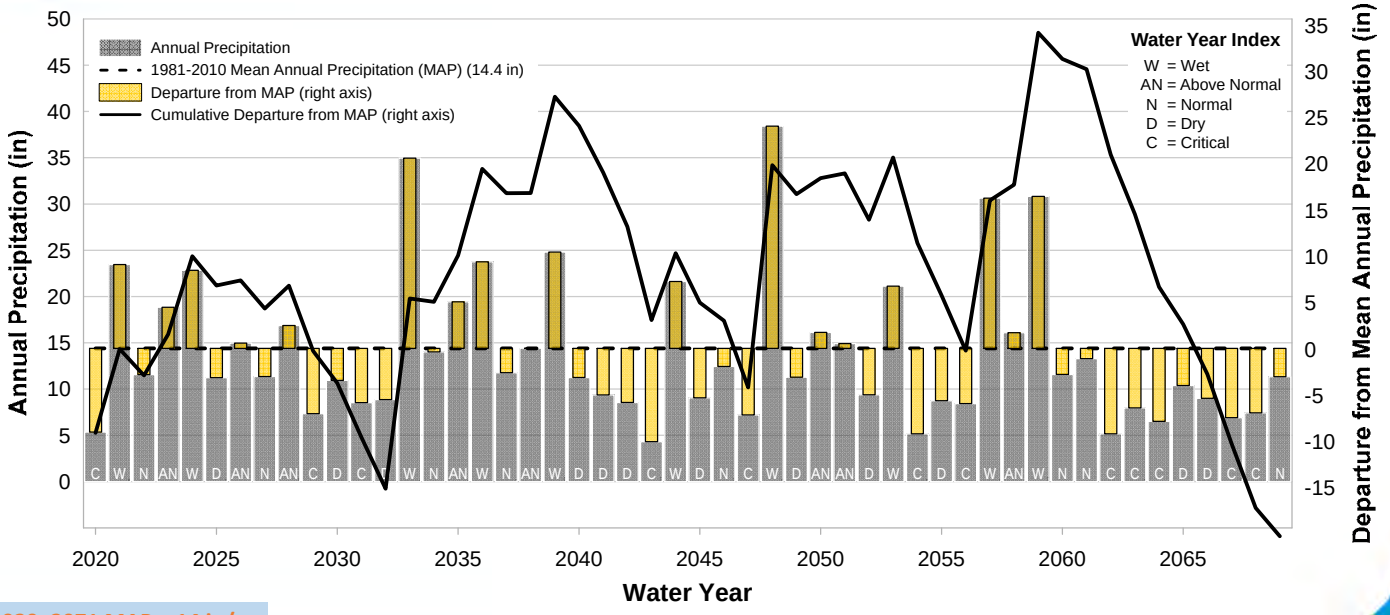
Groundwater Model Update – Projection Model Approach

Projected Precipitation Under *HadGEM2-ES RCP 8.5* Conditions in SPV GSP Model



2020–2071 MAP = 14 in/yr

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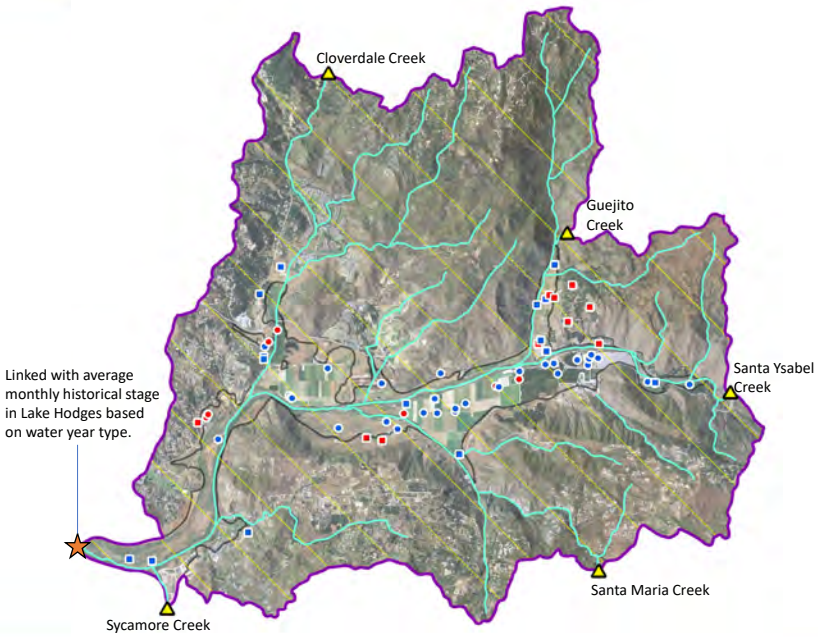
Groundwater Model Update – Projection Model Approach

Boundary Conditions for Projection Simulations (2020–2071)



Boundary Condition Categories

Specified Flux
- -Precipitation and Surface Evapotranspiration (FMP)
- -Alluvium/Residuum GW Pumping (FMP) (more reliable well construction)
- -Alluvium/Residuum GW Pumping (FMP) (less reliable well construction)
- -Bedrock GW Pumping (FMP) (more reliable well construction)
- -Bedrock GW Pumping (FMP) (less reliable well construction)
- -Stream Inflows (SFR)

Head-Dependent Flux
- -Subsurface Evapotranspiration (FMP)
- -Streams (SFR)
- -Subsurface Exchange (GHB)

No Flow
- -Located Along Model Domain Boundary in All Model Layers and at the Bottom of Model Layer 4

Farm Process (FMP) computes applied water demand based on the deficit after accounting for precipitation and GW uptake (yellow hatched area).

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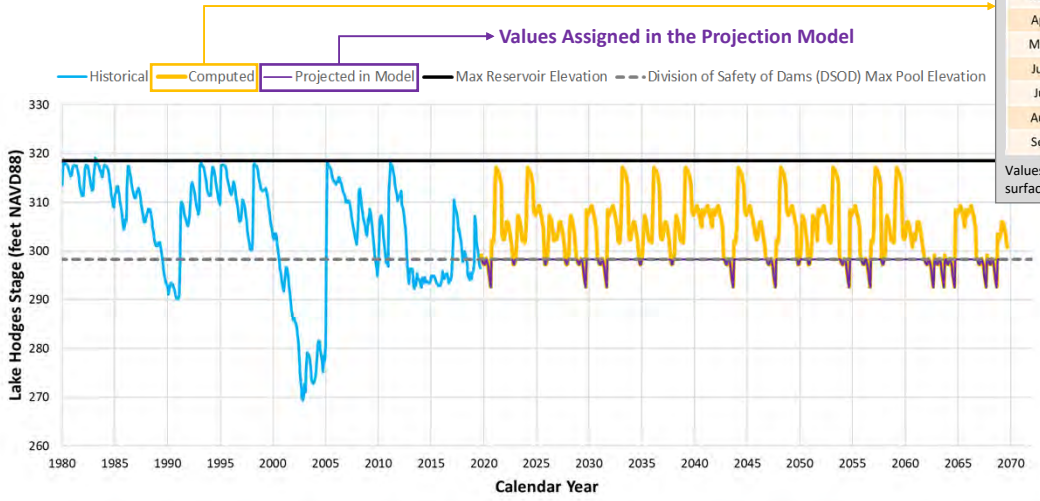
Groundwater Model Update – Projection Model Approach

Lake Hodges Stage Projections (2020–2071)

Month	Wet	Above Normal	Normal	Dry	Critically Dry
Oct	302	298	303	308	299
Nov	302	297	303	308	298
Dec	302	297	302	307	298
Jan	304	298	303	308	297
Feb	313	300	304	308	297
Mar	317	304	306	309	298
Apr	317	307	306	309	298
May	316	307	306	309	298
Jun	316	306	305	308	297
Jul	316	305	303	307	295
Aug	314	303	302	306	294
Sep	314	302	301	305	293

Values represent average monthly 1980–2019 Lake Hodges water surface elevations by water year type in units of feet NAVD88.



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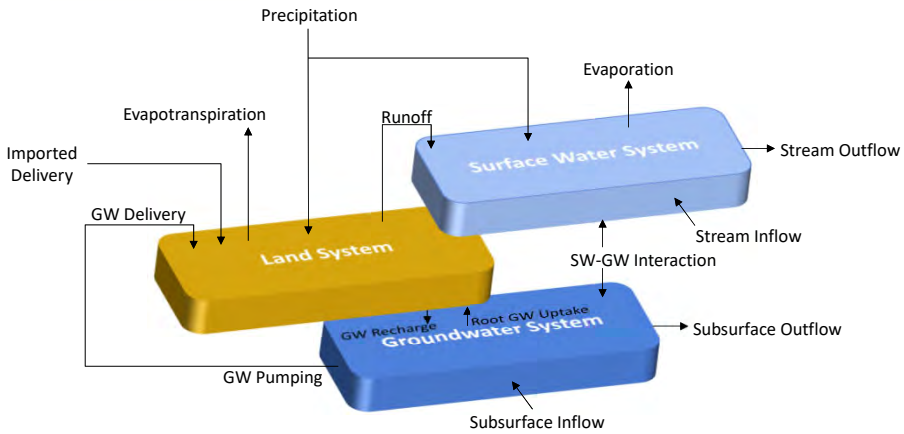
Groundwater Model Update – Water Budget Approach

Current Status of Water Budgets within SPV GW Basin



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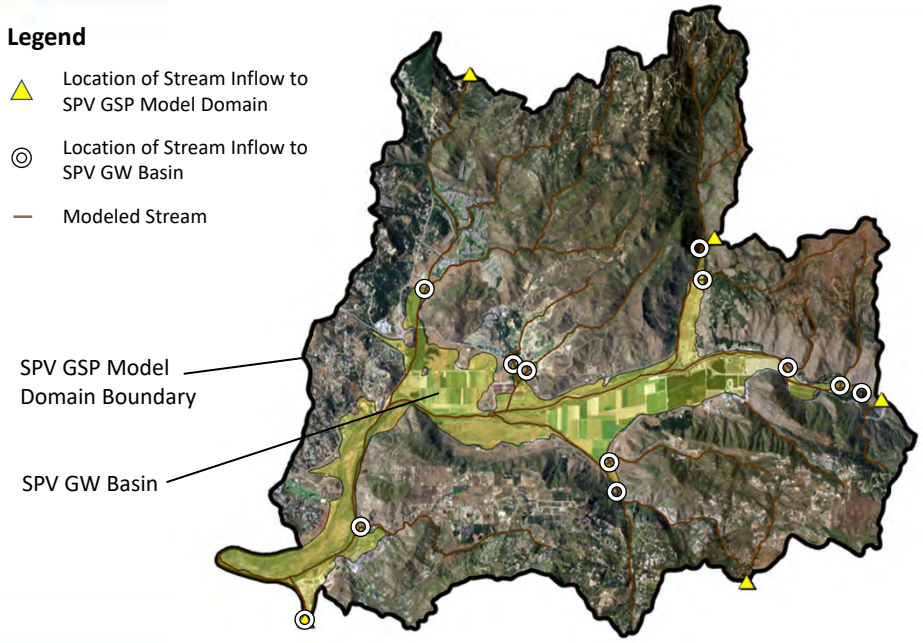
Groundwater Model Update – Water Budget Approach

SPV GW Basin Water Budget Area



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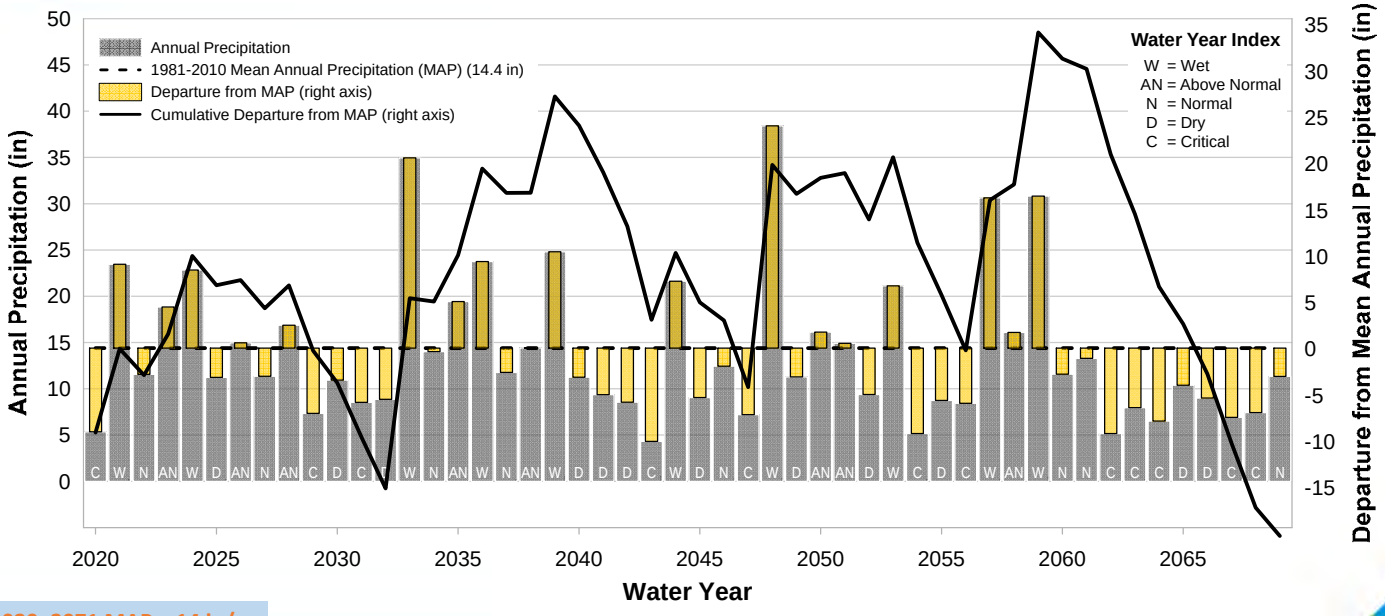
Groundwater Model Update – Water Budget Approach

Projected Precipitation Under *HadGEM2-ES RCP 8.5* Conditions in SPV GSP Model



2020–2071 MAP = 14 in/yr

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San Pasqual Valley GSP
Technical Peer Review Meeting

GROUNDWATER MODEL UPDATE
AC COMMENTS

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The City of SAN DIEGO

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San Pasqual Valley GSP
Technical Peer Review Meeting

FINAL THOUGHTS BY TPR

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San Pasqual Valley GSP
Technical Peer Review Meeting

PUBLIC COMMENT

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San Pasqual Valley GSP
Technical Peer Review Meeting

NEXT STEPS & CLOSING REMARKS

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Next Meeting

- TPR comments to be sent to Sandra Carlson (carlsons@sandiego.gov)
  Requested by 12:00pm on Wednesday 12/23/2020
- Next TPR meeting:
  Thursday, January 14, 2021, 9-11:30am
- Public notices

https://www.sandiegocounty.gov/content/sdc/pds/SGMA/san-pasqual-valley.html

For additional information, please contact:

Sandra Carlson at (619) 533-4235
carlsons@sandiego.gov

Thank You!

Additional Information

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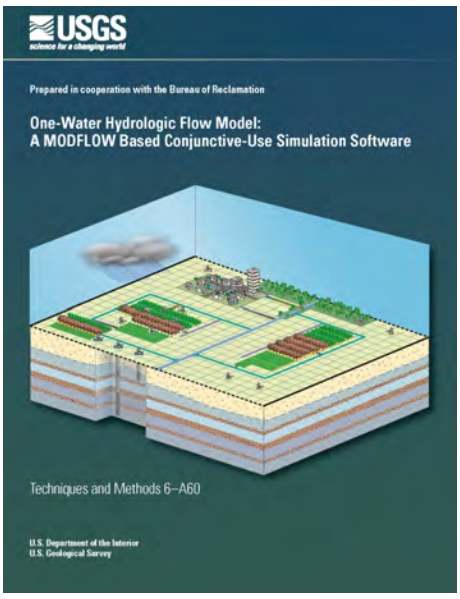
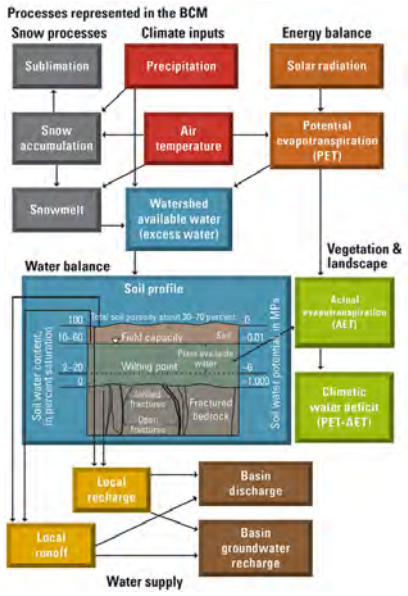
Groundwater Model Code Graphics
Slide from October 2020 TPR Meeting

USGS One-Water Hydrologic Flow Model



USGS Basin Characterization Model (BCM)



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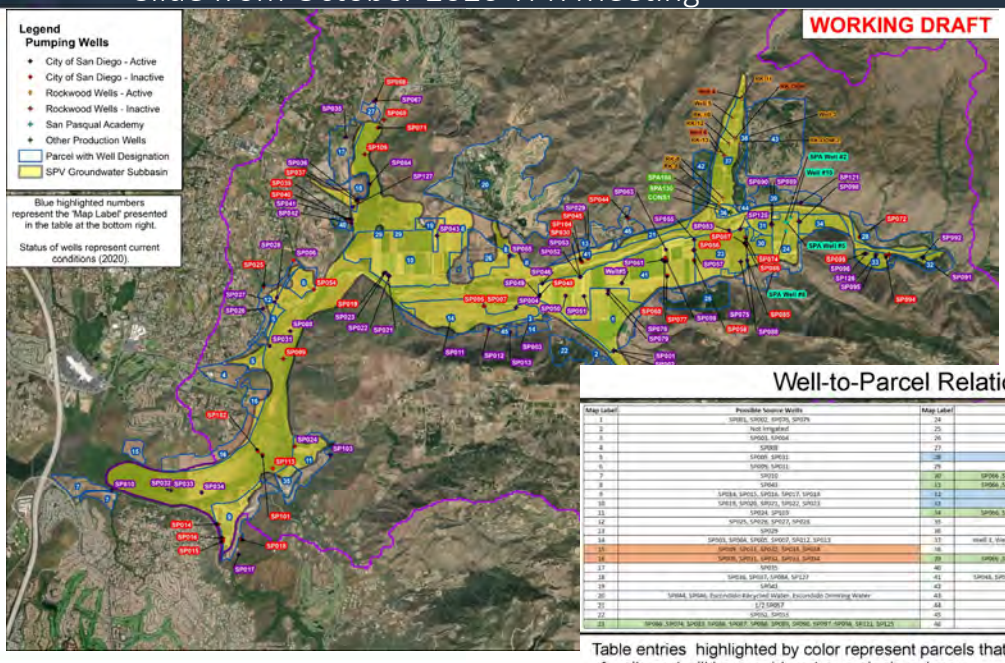
Well-to-Parcel Map Example
Slide from October 2020 TPR Meeting



Feedback from Stakeholders Has Been Incorporated

Well-to-Parcel Relationship

Map Label	Possible Source Wells	Map Label	Possible Source Wells
1	SP001, SP002, SP035, SP039	24	SPA002, SPA003, SPA006, SPA010
2	Not Irrigated	25	SP061, SP063, SP063
3	SP003, SP004	26	SP011, SP067,
4	SP008	27	SP057, SP058, SP065, SP071
5	SP005, SP011	28	SP072, SP091, SP092, SP093, SP094, SP095, SP096, SP097, SP098, SP099, SP136
6	SP009, SP011	29	SP066, SP127
7	SP010	30	SP064, SP074, SP083, SP090, SP087, SP088, SP085, SP090, SP092, SP098, SP121, SP123
8	SP041	31	SP064, SP074, SP083, SP084, SP087, SP088, SP085, SP090, SP097, SP098, SP121, SP123
9	SP034, SP051, SP016, SP017, SP018	32	SP072, SP091, SP092, SP093, SP094, SP095, SP096, SP099, SP126
10	SP019, SP020, SP021, SP022, SP023	33	SP077, SP091, SP092, SP093, SP094, SP095, SP096, SP099, SP139
11	SP024, SP025	34	SP064, SP074, SP083, SP084, SP087, SP088, SP085, SP090, SP097, SP098, SP121, SP125
12	SP025, SP026, SP027, SP028	35	Not Irrigated
13	SP029	36	SPA108, SPA136, CONS3
14	SP003, SP004, SP005, SP007, SP012, SP013	37	Well 1, Well 4, Well 5, Well 6, Rk-4, Rk-5, Rk-11, Rk-12, Rk-13, Rk-ZCM, Rk-SHM 1
15	SP009, SP014, SP032, SP034, SP038	38	Not Irrigated
16	SP030, SP031, SP033, SP044, SP054	39	SP066, SP074, SP083, SP084, SP087, SP088, SP085, SP090, SP097, SP098, SP121, SP125
17	SP035	40	SP035, SP040, SP041, SP042
18	SP036, SP037, SP084, SP127	41	SP040, SP045, SP050, SP051, SP053, SP054, 1/2 SP057, SP058, SP059, SP062, SP077, Well#6
19	SP043	42	Well 1, Well 4, Well 5, Well 6
20	SP044, SP046, Fairmont Recycled Water, Escondido Drinking Water	43	Not Irrigated
21	1/2 SP057	44	Not Irrigated
22	SP052, SP053	45	SP019
23	SP064, SP074, SP083, SP084, SP087, SP088, SP085, SP090, SP097, SP098, SP121, SP125	46	Not Irrigated

Table entries highlighted by color represent parcels that receive water from the same set of wells and will be considered as a single polygon.

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Partial List of Pumping Well Status Assignments
Slide from October 2020 TPR Meeting

Status of Pumping Well by Water Year - Blue = Active; Gray = Inactive

Well ID	Entity	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Current (2020) and Future Conditions
SP001	Konyn																
SP002	Konyn																
SP003	Konyn/ Suncoast																
SP004	Konyn/ Suncoast																
SP005	Konyn/ Suncoast																
SP006	Wilkens Nursery																
SP007	Konyn/ Suncoast																
SP008	City/ Orfila																
SP009	Brammer																
SP010	Jancic																
SP011	Konyn																
SP012	Konyn/ Suncoast																
SP013	Konyn/ Suncoast																
SP014	Pinery																
SP015	Pinery																
SP016	Pinery																
SP017	Pinery																
SP018	Pinery																
SP019	AmSod																
SP020	City																
SP021	AmSod																
SP022	AmSod																
SP023	AmSod																
SP024	Evergreen Nursery																
SP025	Three C																
SP026	Three C																
SP027	Three C																
SP028	Three C																
SP029	State of CA																
SP031	Brammer																
SP032	Brammer																
SP033	Brammer																
SP034	Brammer																
SP035	Lindshield																
SP036	Lindshield																
SP037	Lindshield																
SP039	Lindshield																
SP040	Lindshield																

Feedback from City Staff Has Been Incorporated

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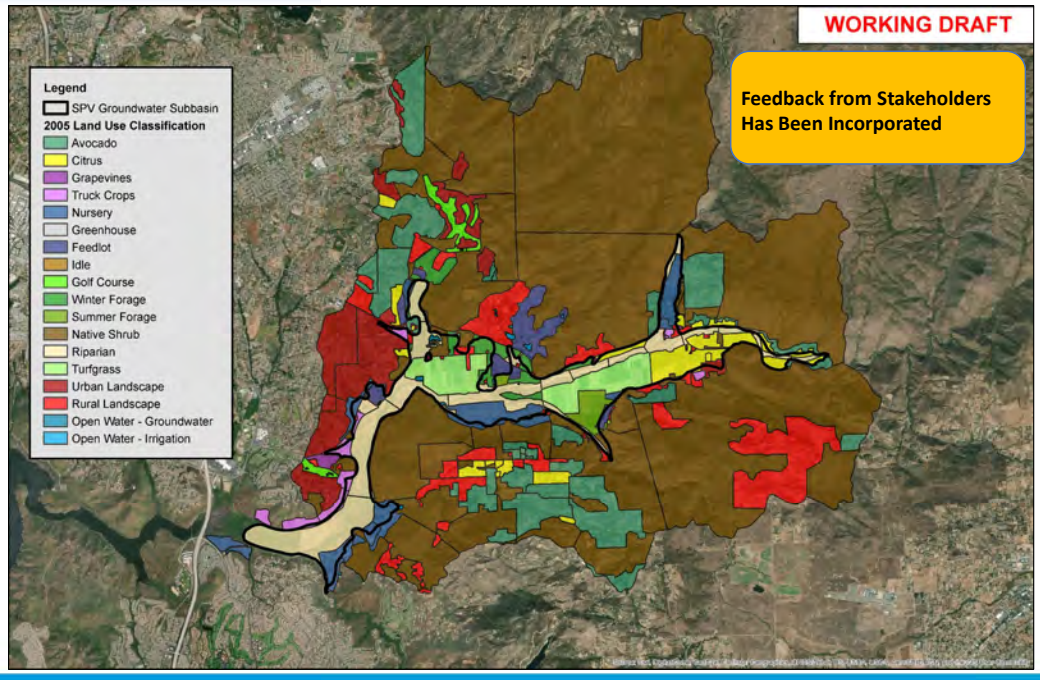
2005 Land Use

Slide from October 2020 TPR Meeting



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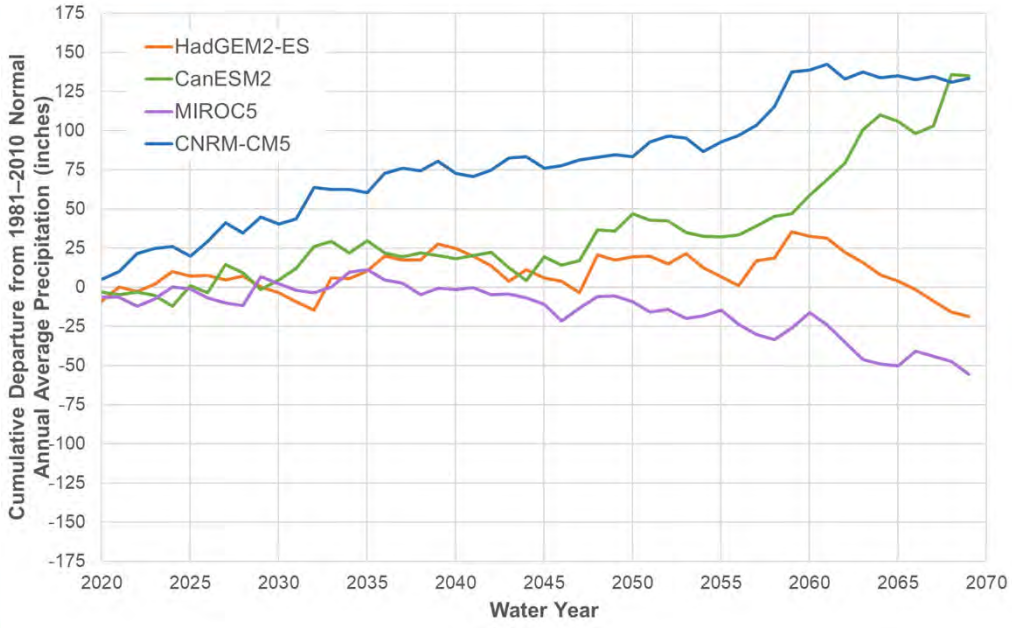
Global Climate Model Cumulative Departures of Precipitation

Originally Presented in Handout 2 of the October 2020 TPR Meeting



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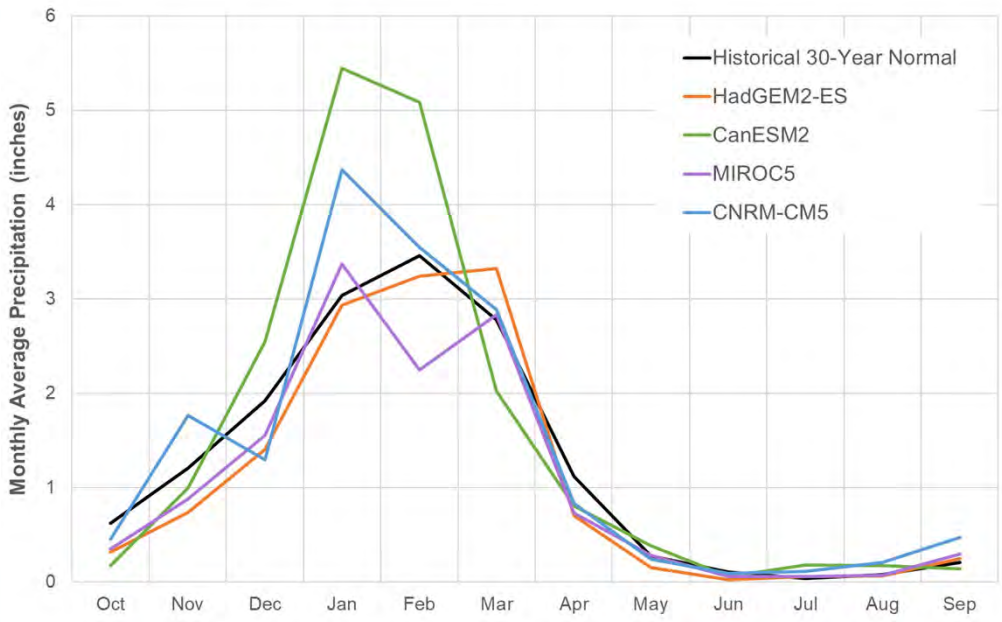
Monthly Average Global Climate Model Precipitation

Originally Presented in Handout 2 of the October 2020 TPR Meeting



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