Ojai Basin Groundwater Management Agency Meeting
May 27, 2021
3:00 pm
Zoom Conferencing Meeting
Agenda Package

Ojai Basin Groundwater Management Agency
A Special District of the State of California

AGENDA
Ojai Basin Groundwater Management Agency
Meeting of May 27, 2021
Meeting Time 3:00 pm
Zoom Teleconference Meeting

Phone: (805) 640-1207 **Web site**: obgma.com
Email address: obgma@aol.com

"Note: Due to staffing and facility availability on Thursday, May 27, 2021, **OBGMA will hold its regular board meeting at 3:00 p.m.**, not the normally scheduled time of 5:00 p.m."

Pursuant to Governor Newsom's Executive Order N-25-20, Board Members of the Ojai Basin Groundwater Management Agency will participate in this meeting via a teleconference from separate locations.

In the interest of maintaining appropriate social distancing, this meeting will be available through:

For Public Call In Participation:

1. Zoom Dial In Information: 1-669-900-9128, Meeting ID: 827 5712 7464, Password: 218792.

For Public Viewing

2. The OBGMA.com Website;
3. City of Ojai YouTube Channel at: https://www.youtube.com/channel/UC3DhCB5Z1DynNC7n8qcNeDQ/live (2 Minute delay of transmission)
4. In Ojai, CA: Spectrum Channel 10.

Public Comments: Members of the public who Call In may provide public comment. Please wait until the Board Chair ask if any members of the public wish to comment. This will provide for orderly participation during the meeting.

Members of the public may also submit written public comments in advance via e-mail no later than 12:00 p.m. on the day of the meeting. Public comment e-mails should be sent to OBGMA@aol.com.

1. CALL TO ORDER AND ROLL CALL

2. PLEDGE OF ALLEGIANCE

3. DIRECTOR ANNOUNCEMENTS/REPORTS/COMMENTS

- Mutuals:
- Ojai Water Conservation District:
- City of Ojai:
- Casitas Municipal Water District – Lake Level
- Community Facilities District - CMWD Ojai Service Area:

4. GENERAL MANAGER COMMENTS

5. BASIN STATUS REPORTS

- Current Status of Basin: Input, Output and Storage

6. PUBLIC COMMENTS ON ITEMS NOT APPEARING ON THE AGENDA

The board will receive comments from the public at this time. Other than for emergency items, no action can be taken during this period. Matters raised at this time may be briefly discussed by the board and will generally be referred to staff and/or placed on a subsequent agenda.

7. CONSENT ITEMS: Directors may pull an item off of consent items for discussion and action.

a. Approve the Minutes of April 29, 2021.

8. ACTION ITEMS:

a. Treasurer's Report for April 2021

Board to Review and Approve.

b. Nested Monitoring Well Project Update

Board to receive project update and provide direction on next steps presented by Kear Groundwater.

c. Groundwater Sustainability Plan – Groundwater Model Update

Board to receive update from Dudek, provide feedback and direction on the information presented.

9. Information Items

10. ADJOURNMENT: The next regular board meeting is scheduled for **June 24, 2021**, **3:00pm**, by Zoom conferencing. Details for providing public comment and or observation of the meeting will be posted with the agenda 72 hours prior to the meeting.

OBGMA

Budget Actuals FYTD 20/21

	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21
Beginning Bank Balance							
Checking	47,006.96	52,469.04	96,212.19	20,379.37	26,924.00	49,559.94	44,220.17
Savings	104,956.62	134,956.62	134,956.62	164,976.02	124,976.02	124,976.02	124,992.91
	151,963.58	**187,425.66**	**231,168.81**	**185,355.39**	**151,900.02**	**174,535.96**	**169,213.08**
Income							
Returned Check Charges	-	-	-	-	-	-	
GSP Extraction Fees	25,256.20	25,953.90	2,517.85	15,957.60	20,958.27	1,579.90	22,266.93
Well Head Fee	3,965.00	4,095.00	585.00	3,900.00	4,485.00	650.00	6,606.36
Interest Charges	-	3.75	1.25	2.50	6.25	-	-
Recordation Fee	250.00	245.00	25.00	250.00	265.00	35.00	417.05
Extraction Charges	17,490.85	17,936.79	1,763.75	11,269.53	14,587.27	1,150.00	15,830.42
Short Payments	(60.34)	(536.51)	(39.50)	(32.98)	(194.35)	(240.50)	-
Savings Acct Interest	-	-	19.40	-	-	16.89	-
Total Income	**46,901.71**	**47,697.93**	**4,872.75**	**31,346.65**	**40,107.44**	**3,191.29**	**45,120.76**
Expense							
Print Advertising	-	-	-	-	-	-	-
Printing and Reproduction	-	-	-	-	-	-	130.83
Liability Insurance	2,131.00	-	-	-	-	-	-
Postage and Delivery	247.97	-	17.99	110.98	17.99	117.99	17.99
Bank Service Charges	3.00	-	-	-	9.99	-	-
Workers Comp Ins	-	-	-	-	-	-	663.46
Office Supplies	150.15	-	-	-	21.61	899.99	94.36
Payroll Expenses	1,453.27	1,243.36	1,130.32	1,285.25	1,417.06	1,680.71	1,647.75
Professional Fees	4,957.60	1,902.13	47,752.00	3,755.50	15,043.96	4,406.25	10,103.50
Rent	800.00	800.00	800.00	800.00	892.00	892.00	892.00
Telecommunications	131.15	129.96	25.00	129.27	284.78	242.02	242.02
Total Expense	**9,874.14**	**4,075.45**	**49,725.31**	**6,081.00**	**17,687.39**	**8,238.96**	**13,791.91**
Net Ordinary Income	**37,027.57**	**43,622.48**	**(44,852.56)**	**25,265.65**	**22,420.05**	**(5,047.67)**	**31,328.85**
Grant Activity							
WCB Grant Income	-	-	-	-	-	-	-
WCB (WS) Expenses	-	-	-	-	-	-	-
GSP Expenses	1,130.00	-	1,260.00	58,361.75	125.00	567.00	17,808.75
	(1,130.00)	**-**	**(1,260.00)**	**(58,361.75)**	**(125.00)**	**(567.00)**	**(17,808.75)**
Net Income							
Other Adjustments							
Deposit for Bldg Key	-	-	-	-	-	-	-
Transfer to Savings	30,000.00	-	70,000.00	-	-	-	-
Transfer From Savings	-	-	40,000.00	40,000.00	-	-	-
Deposit Adj from Bank	(0.50)	(82.50)	-	-	-	-	-
Payroll Tax Liab Paymts	(753.15)	-	-	(627.57)	-	-	(752.20)
Payroll Liab on hold	254.16	200.27	173.14	218.80	241.61	291.79	285.51
Customer Overpayments	64.00	2.90	43.50	49.50	99.28	-	143.83
Voided Checks	-	-	-	-	-	-	-
Refund- Work Comp Ins	-	-	-	-	-	-	111.55
Customer Credits Applied	-	-	-	-	-	-	(1,648.42)
Refund to Customer	-	-	-	-	-	-	(12,775.33)
Missing deposit item	-	-	82.50	-	-	-	-
Net Adjusted Net Income							
Ending Bank Balance							
Checking	52,469.04	96,212.19	20,379.37	26,924.00	49,559.94	44,220.17	43,105.21
Savings	134,956.62	134,956.62	164,976.02	124,976.02	124,976.02	124,992.91	124,992.91
	187,425.66	**231,168.81**	**185,355.39**	**151,900.02**	**174,535.96**	**169,213.08**	**168,098.12**

OBGMA

Budget Actuals FYTD 20/21

	YTD
Beginning Bank Balance	
Checking	
Savings	
Income	
Returned Check Charges	-
GSP Extraction Fees	*114,490.65*
Well Head Fee	*24,286.36*
Interest Charges	*13.75*
Recordation Fee	*1,487.05*
Extraction Charges	*80,028.61*
Short Payments	*(1,104.18)*
Savings Acct Interest	*36.29*
Total Income	***219,238.53***
Expense	
Print Advertising	-
Printing and Reproduction	*130.83*
Liability Insurance	*2,131.00*
Postage and Delivery	*530.91*
Bank Service Charges	*12.99*
Workers Comp Ins	*663.46*
Office Supplies	*1,166.11*
Payroll Expenses	*9,857.72*
Professional Fees	*87,920.94*
Rent	*5,876.00*
Telecommunications	*1,184.20*
Total Expense	109,474.16
Net Ordinary Income	109,764.37
Grant Activity	
WCB Grant Income	-
WCB (WS) Expenses	-
GSP Expenses	*79,252.50*
	(79,252.50)
Net Income	***30,511.87***
Other Adjustments	
Deposit for Bldg Key	
Transfer to Savings	
Transfer From Savings	
Deposit Adj from Bank	
Payroll Tax Liab Paymts	
Payroll Liab on hold	
Customer Overpayments	
Voided Checks	
Refund- Work Comp Ins	
Customer Credits Applied	
Refund to Customer	
Missing deposit item	
Net Adjusted Net Income	
Ending Bank Balance	
Checking	
Savings	

OBGMA

Cash Flow

April 2021

Beginning Cash Balance April 1, 2021	
Bank of the Sierra-Checking	44,220.17
Bank of the Serra-Savings	124,992.91
	169,213.08
Inflows	
GSP Extraction	22,266.93
Well Head Fee	6,606.36
Recordation Fee	417.05
Extraction Charges	15,830.42
	45,120.76
Inflows Adjustments	
Over Payments	143.83
Credits Applied	(1,648.42)
Workers Comp Audit Refund	111.55
	(1,393.04)
Net Inflows	43,727.72
Outflows	
Internet	42.80
Postage and Delivery	17.99
Printing and Reproduction	130.83
Insurance	663.46
Office Supplies	94.36
Payroll Expenses	1,362.24
Payroll Liabilities Paid	752.20
Bookkeeping	463.75
Hydrogeologist	8,421.00
Legal Fees	1,218.75
Rent	892.00
Telephone	199.22
Refund of Customer Over Payment	12,775.33
GSP-Dudek Project Mgmt	17,808.75
	44,842.68
Ending Cash Balance April 30, 2021	
Bank of the Sierra-Checking	43,105.21
Bank of the Serra-Savings	124,992.91
	168,098.12
Net Change in Cash Position for April 2021	(1,114.96)

OBGMA
Disbursements Register
April 2020

Date	Num	Name	Description	Amount
04/12/2021	3286	State Compensation Insurance	Voided Check	0.00
04/22/2021	3287	Dudek	Professional Fees	-17,808.75
04/30/2021	3288	417 Bryant Circle LLC	Rent	-800.00
04/30/2021	3289	Condor Self Storage	Storage Rent	-92.00
04/30/2021	3290	Hollister & Brace, Attorneys at Law	Professional Fees	-1,218.75
04/30/2021	3291	Kear Groundwater	Professional Fees	-8,421.00
04/30/2021	3292	M J Saltis Bookkeeping	Professional Fees	-463.75
04/30/2021	3293	Roberta Barbee	Cell Phone Reimbursement	-25.00
04/30/2021	3294	Barbee, Roberta J	Payroll	-1,362.24
04/30/2021	3295	San Antonio Creek Ranch:San Antonio Creek RanchG04	Refund of Overpayment	-12,775.33
04/22/2021	e	Employment Development Department	Payroll Liabilities	-53.94
04/22/2021	e	Employment Development Department	Payroll Liabilities	-63.84
04/22/2021	e	IRS	Payroll Liabilities	-610.48
04/22/2021	e	IRS	Payroll Liabilities	-23.94
04/05/2021	e	AT&T	Telephone	-174.22
04/12/2021	e	State Compensation Insurance	Worker's Comp Insurance	-519.80
04/12/2021	e	State Compensation Insurance	Worker's Comp Insurance	-143.66
04/30/2021	e	AT&T Uverse	Internet	-42.80
04/02/2021	e	Ojai Business Center	Printing and Reproduction	-130.83
04/26/2021	e	Staples	Office Supplies	-94.36
04/26/2021	e	Stamps.com	Postage and Delivery	-17.99

Total April 2021 Disbursements **$ (44,842.68)**

OBGMA EXTRACTION CHARGES BY PERIOD

2018/2019 Water Year

October/November/December 2018 (2019/1) ($25/acre foot)

2019/1	Acre Feet	Charges	Well Head	Recordation	Total Rec'd
Agriculture	500.00	$12,800.72			
Dom/Land	63.48	$1,688.63			
Muni/Indus	28.25	$706.25			
CMWD	320.70	$8,017.50			
Totals	**912.43**	**$23,213.10**	**$9,165.00**	**$690.00**	**$33,068.10**

January/February/March 2019 (2019/2) ($25/acre foot)

2019/2	Acre Feet	Charges	Well Head	Recordation	Total Rec'd
Agriculture	104.54	$2,965.06			
Dom/Land	71.07	$1,693.83			
Muni/Indus	10.66	$278.75			
CMWD	236.40	$5,910.00			
Totals	**422.67**	**$10,847.64**	**$10,400.00**	**$720.00**	**$21,967.64**

April/May/June 2019 (2019/3) ($25/acre foot)

2019/3	Acre Feet	Charges	Well Head	Recordation	Total Rec'd
Agriculture	668.57	$16,201.23			
Dom/Land	212.60	$3,857.05			
Muni/Indus	20.60	$515.01			
CMWD	410.90	$10,272.50			
Totals	**1312.67**	**$30,845.79**	**$9,620.00**	**$725.00**	**$41,190.79**

July/August/September 2019 (2019/4) ($25/acre foot)

2019/4	Acre Feet	Charges	Well Head	Recordation	Total Rec'd
Agriculture	1264.16	$22,385.38			
Dom/Land	132.86	$3,475.73			
Muni/Indus	39.06	$976.67			
CMWD	524.10	$13,102.50			
Totals	**1960.18**	**$39,940.28**	**$10,270.00**	**$755.00**	**$50,965.28**

Total for water YTD 10/1/18 - 9/30/19

Acre Feet	Charges	Well Head Fee	Recordation Fee	Total Rec'd
4607.95	$104,846.81	$39,455.00	$2,890.00	$147,191.81

Corrected Total

2019/2020 Water Year

October/November/December 2019 (2020/1) ($25/acre foot)

2020/1	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	423.89	$10,619.24				
Dom/Land	84.35	$2,327.39				
Muni/Indus	23.22	$579.92				
CMWD	378.10	$9,450.00				
Totals	**909.56**	**$22,976.55**	**$9,620.00**	**$730.00**	**$0.00**	**$33,326.55**

Jan/Feb/Mar 2020 (2/2020) ($25/acre foot)

2020/2	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	418.80	$10,537.28				
Dom/Land	84.39	$2,176.19				
Muni/Indus	7.34	$183.50				
CMWD	264.80	$6,620.00				
Totals	**775.33**	**$19,516.97**	**$9,880.00**	**$710.00**	**$0.00**	**$30,106.97**

April/May/June (3/2020) ($25/acre foot)

2020/3	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	695.81	$17,529.84				
Dom/Land	89.76	$2,244.06				
Muni/Indus	15.06	$376.59				
CMWD	337.80	$8,445.00				
Totals	**1138.43**	**$28,595.49**	**$9,360.00**	**$570.00**	**$41,206.18**	**$79,731.67**

July/August/September 2020 (2020-4) ($25/acre foot)

2020/4	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	977.93	$24,448.20				
Dom/Land	155.52	$3,888.19				
Muni/Indus	19.00	$476.00				
CMWD	359.00	$8,975.00				
Totals	**1511.45**	**$37,787.39**	**$9,100.00**	**$560.00**	**$54,541.95**	**$101,989.34**

Total for water YTD 10/1/19- 9/30/20

Acre Feet	Charges	Well Head Fee	Recordation Fee	GSP Fees	Total Rec'd
4334.77	$ 108,876.40	$ 37,960.00	$ 2,570.00	$ 95,748.13	$ 245,154.53

OBGMA EXTRACTION CHARGES BY PERIOD

2020/2021 Water Year

October/November/December 2020 (2021/1) ($25/acre foot)

2020/1	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	832.57	$15,828.24				
Dom/Land	57.11	$1,633.42				
Muni/Indus						
CMWD	339.50	$8,487.50				
Totals	1229.18	$25,949.16	$8,580.00	$520.00	$37,154.15	$72,203.31

Jan/Feb/Mar 2021 (2/2021) ($25/acre foot)

2020/2	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	392.37	$9,955.90				
Dom/Land	18.51	$521.19				
Muni/Indus						
CMWD	241.30	$16,509.59				
Totals	652.18	$26,986.68	$7,345.00	$460.00	$23,209.40	$58,001.08

April/May/June (3/2021) ($25/acre foot)

2020/3	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture						
Dom/Land						
Muni/Indus						
CMWD						
Totals	0.00	$0.00				$0.00

July/August/September 2020 (2020-4) ($25/acre foot)

2020/4	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture						
Dom/Land						
Muni/Indus						
CMWD						
Totals	0.00	$0.00				$0.00

Total for water YTD 10/1/20- 9/30/21

Acre Feet	Charges	Well Head Fee	Recordation Fee	GSP Fees	Total Rec'd
1881.36	$52,935.84	$ 15,925.00	$ 980.00	$ 60,363.55	##########

OBGMA EXTRACTION CHARGES BY PERIOD

2018/2019 Water Year

October/November/December 2018 (2019/1)

($25/acre foot)

2019/1	Acre Feet	Charges	Well Head	Recordation	Total Rec'd
Agriculture	511.70	$12,697.97			
Dom/Land	40.19	$1,106.38			
Muni/Indus	16.30	$407.50			
CMWD	320.70	$8,017.50			
Totals	**888.89**	**$22,229.35**	**$9,165.00**	**$690.00**	**$32,973.24**

January/February/March 2019 (2019/2)

($25/acre foot)

2019/2	Acre Feet	Charges	Well Head	Recordation	Total Rec'd
Agriculture	89.62	$2,592.05			
Dom/Land	35.06	$782.33			
Muni/Indus	1.01	$37.50			
CMWD	236.40	$5,910.00			
Totals	**362.09**	**$9,321.88**	**$9,230.00**	**$665.00**	**$19,216.88**

April/May/June 2019 (2019/3)

($25/acre foot)

2019/3	Acre Feet	Charges	Well Head	Recordation	Total Rec'd
Agriculture	668.57	$16,201.23			
Dom/Land	212.60	$3,869.55			
Muni/Indus	20.60	$515.01			
CMWD	410.90	$10,272.50			
Totals	**1312.67**	**$30,858.29**	**$9,620.00**	**$725.00**	**$41,203.29**

July/August/September 2019 (2019/4)

($25/acre foot)

2019/4	Acre Feet	Charges	Well Head	Recordation	Total Rec'd
Agriculture	1264.16	$22,385.38			
Dom/Land	132.86	$3,475.73			
Muni/Indus	39.06	$976.67			
CMWD	524.10	$13,102.50			
Totals	**1960.18**	**$39,940.28**	**$10,270.00**	**$755.00**	**$50,965.28**

Total for water YTD 10/1/18 - 9/30/19

Acre Feet	Charges	Well Head Fee	Recordation Fee	Total Rec'd
2489.97	$62,409.52	$28,015.00	$2,080.00	$93,393.41

2019/2020 Water Year

October/November/December 2019 (2020/1)

($25/acre foot)

2020/1	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	423.89	$10,631.74				
Dom/Land	84.35	$2,327.39				
Muni/Indus	23.22	$579.92				
CMWD	378.10	$9,450.00				
Totals	**909.56**	**$22,989.05**	**$9,620.00**	**$730.00**	**$0.00**	**$33,339.05**

Jan/Feb/Mar 2020 (2/2020)

($25/acre foot)

2020/2	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	419.30	$10,549.78				
Dom/Land	84.39	$2,176.19				
Muni/Indus	7.34	$183.50				
CMWD	264.80	$6,620.00				
Totals	**775.83**	**$19,529.47**	**$9,880.00**	**$710.00**	**$0.00**	**$30,119.47**

April/May/June (3/2020)

($25/acre foot)

2020/3	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	694.81	$17,504.84				
Dom/Land	88.18	$2,204.56				
Muni/Indus	0.00	$0.00				
CMWD	337.80	$8,445.00				
Totals	**1120.79**	**$28,154.40**	**$8,970.00**	**$545.00**	**$40,590.50**	**$78,259.90**

July/August/September 2020 (2020-4)

($25/acre foot)

2020/4	Acre Feet	Charges	Well Head	Recordation	GSP Fees	Total Rec'd
Agriculture	908.88	$22,721.95				
Dom/Land	136.03	$3,400.94				
Muni/Indus	0.00	$0.00				
CMWD	359.00	$8,975.00				
Totals	**1403.91**	**$35,097.89**	**$7,865.00**	**$495.00**	**$50,759.07**	**$94,216.96**

Total for water YTD 10/1/19- 9/30/20

Acre Feet	Charges	Well Head Fee	Recordation Fee	GSP Fees	Total Rec'd
4210.09	105770.81	36335.00	2480.00	91349.57	235935.38

OBGMA

WCB Grant Budget Update
April 2021

		Actual to Date		Budget		Balance
WCB Grant Income		5,607.00		150,600.00		(144,993.00)
	$	5,607.00	$	150,600.00	$	(144,993.00)
WCB Grant Expenses						
1 Task- Project Mgmt		3,238.75		5,200.00		(1,961.25)
2 Task- Water Mgmt Framewk		-		2,000.00		(2,000.00)
3 Task- Plans/Permits/Due D		8,510.00		138,400.00		(129,890.00)
4 Task- Reg Agency Guidance		-		-		-
5 Task- Education & Outreach		-		5,000.00		(5,000.00)
	$	11,748.75	$	150,600.00	$	(138,851.25)
WCB Grant Cost Share Expenses	$	3,135.00	$	29,400.00	$	(26,265.00)
Total Cost of Project	$	14,883.75	$	180,000.00	$	(165,116.25)
Net Cost of Project to Date	**$**	**9,276.75**				

*****Retention of $623.00 Held by WCB on 1st Progress Invoice**
*****Expenses recorded through 04/30/21**

Updated Ojai Model Review

Trey Driscoll <tdriscoll@dudek.com> Mon, May 17, 2021 at 2:52 PM
To: John Mundy <jmundyconsultingllc@gmail.com>, "KEAR GROUNDWATER (JORDAN@KEARGROUNDWATER.COM)" <JORDAN@keargroundwater.com>
Cc: "Richard H. Hajas" <hajas@sbcglobal.net>, Trevor Jones <tjones@dudek.com>, Devin Pritchard-Peterson <dpritchard-peterson@dudek.com>

John and Jordan,

Attached is Updated Review of the Ojai Basin Groundwater Model including updated water budgets extracted from the Ojai Basin Groundwater Model (OBGM) that reflect a correction to the water budget analyses presented by Dudek in March and April, 2021.

Following the March water budget presentation to the GMA board, Dudek met with Daniel B. Stephens & Associates (DBS&A) modelers to discuss the water budget results. The DBS&A modelers noted that the model files submitted to Dudek contained two separate output files with water budget information: (1) a version of the water budgets stored in a binary format (OBGMA.cbb), and (2) a version of the water budgets stored in the general output text file (OBMGA.out). DBS&A noted that the OBGM writes rates of groundwater recharge and discharge at the end of each quarterly stress period in the OBMGA.cbb file and writes cumulative volumes of recharge and discharge at the end of each quarterly stress period to the OBGMA.out file. When initially developing the water budgets for presentation to the GMA, Dudek used results written to the OBGMA.cbb file and converted these rates to volumetric inflows and outflows using each stress period duration.

DBS&A noted that the rates of groundwater inflow and outflow change at the sub-quarterly time scale. These sub-quarterly changes are reflected in the cumulative water budget components written to the OBGMA.out file and not in the components written to the OBGMA.cbb file. DBS&A suggested using results in the OBGMA.out to extract water budgets for the GSP preparation.

Dudek has reanalyzed the OBGMA results using the approach suggested by DBS&A. These results are shown in Figures 1 and 2 of the attached Updated Review of the Ojai

Basin Groundwater Model. The corrected water budgets indicate that cumulative change in storage in the Basin closely follows observed groundwater elevations and supports use of the model for preparation of the Groundwater Sustainability Plan.

Dudek is planning on presenting updated water budgets to the OBGMA at the regular board meeting on Thursday, May 27, 2021. Draft slides are attached for your review and comment. We anticipate that we will also presenting preliminary findings on potential Groundwater Dependent Ecosystems (GDEs) for the May Board meeting. We will send over draft slides for potential GDEs shortly for review and comment prior to the Board meeting.

Let us know if you have any questions or require further discussion.

Cheers,
Trey

TREY DRISCOLL, PG #8511, CHG #936

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2 attachments

Updated Ojai Model Review Memo_2021.05.17.pdf
2677K

Draft Water Budget Slides_2021.05.27.pdf
1816K

OJAI BASIN
Groundwater Management Agency

DRAFT WORKPRODUCT

Groundwater Sustainability Plan for the Ojai Valley Basin

Updated Water Budgets

OBGMA Board Meeting
May 27, 2021

DUDEK

Agenda

Water Budget

1. Review of previous model analysis
2. Presentation of new model result analysis and water budgets

Source: Ventura County Watershed Protection District 2016

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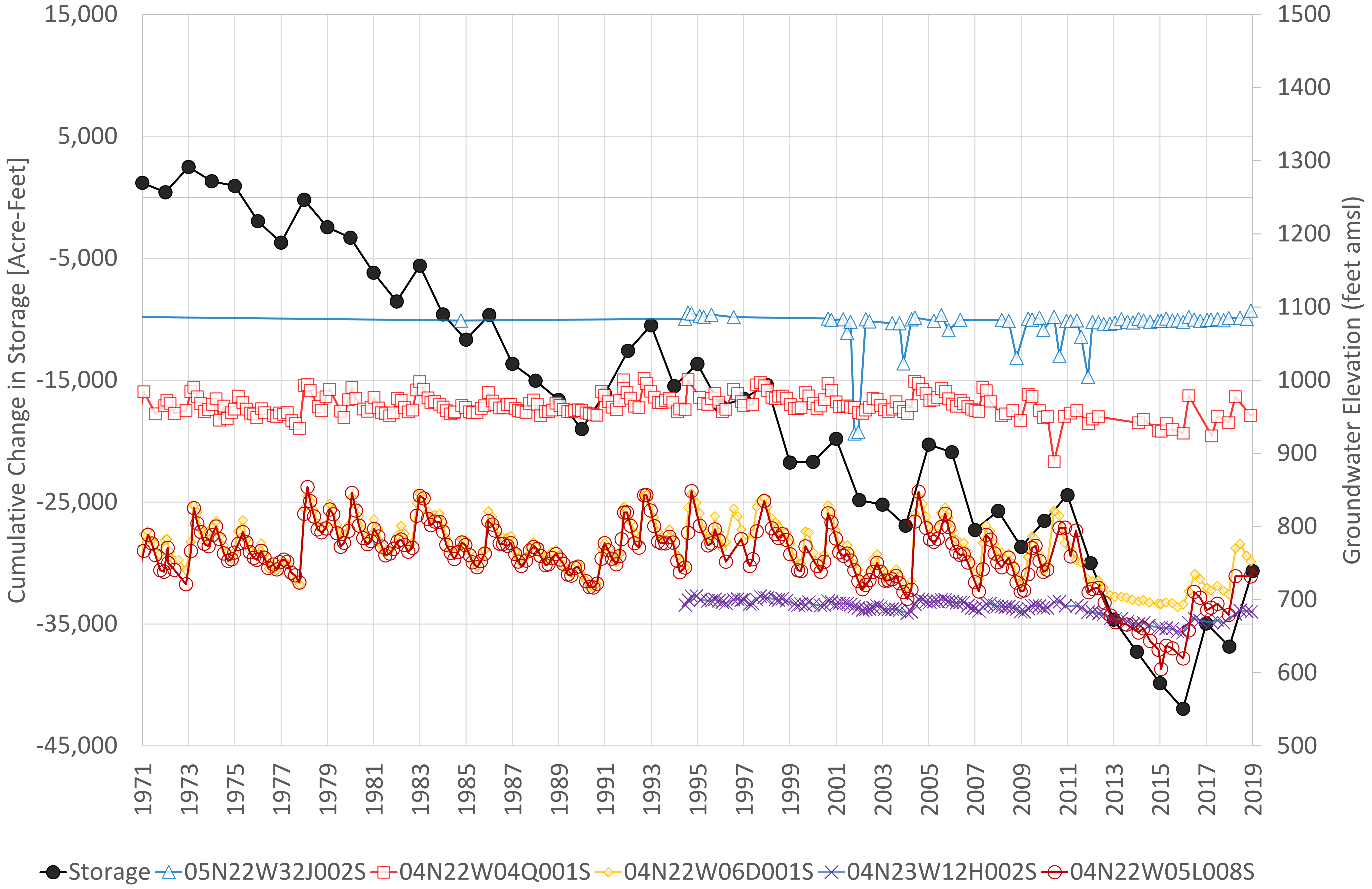
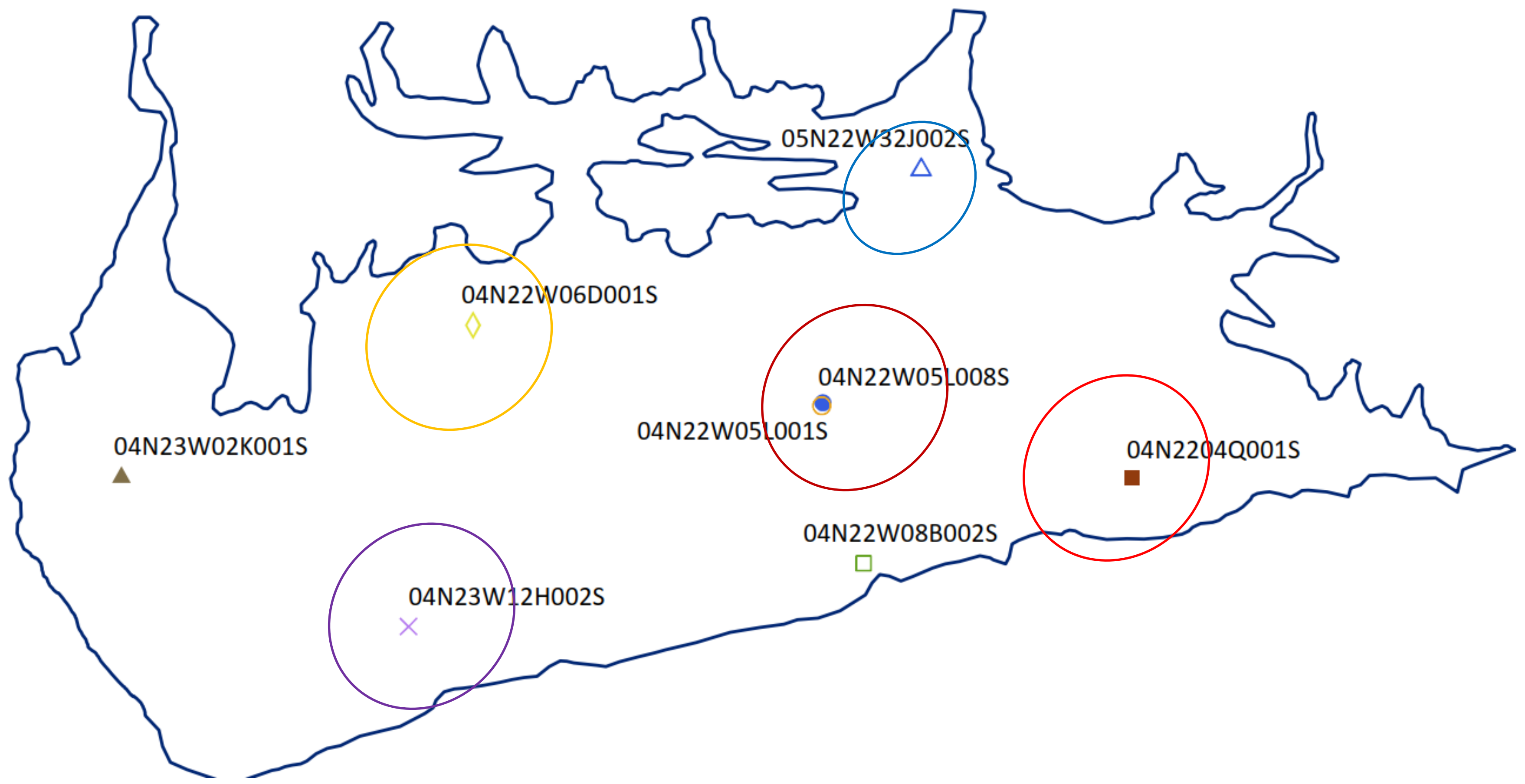
Original Assessment of Modeled Water Budget





- Original Analysis by Dudek: Storage decline ~625 AFY
- March 07, 2021
  - Dudek met with DBS&A to discuss model results
  - **DBS&A suggested the use of a different output file to generate model water budgets**

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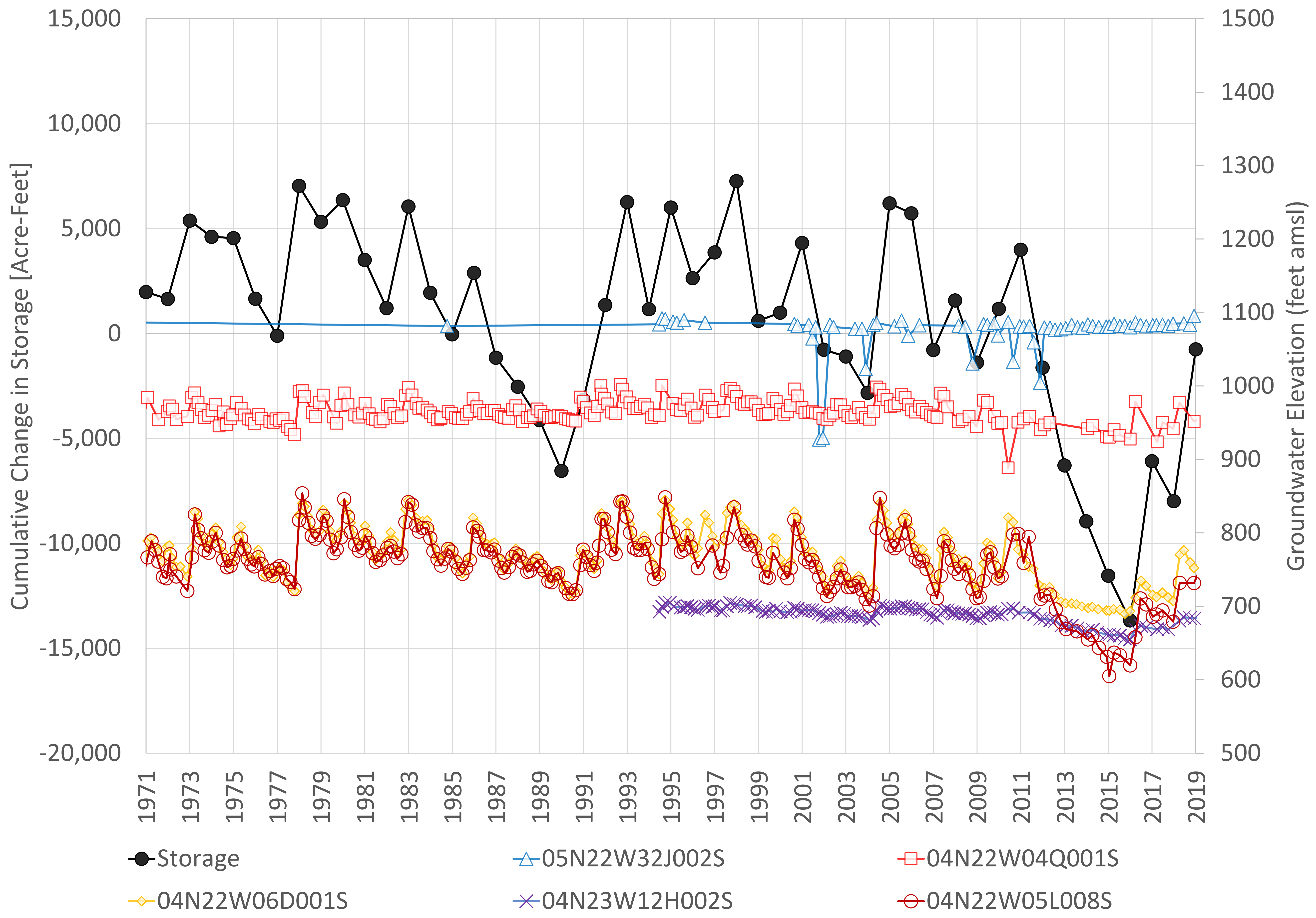
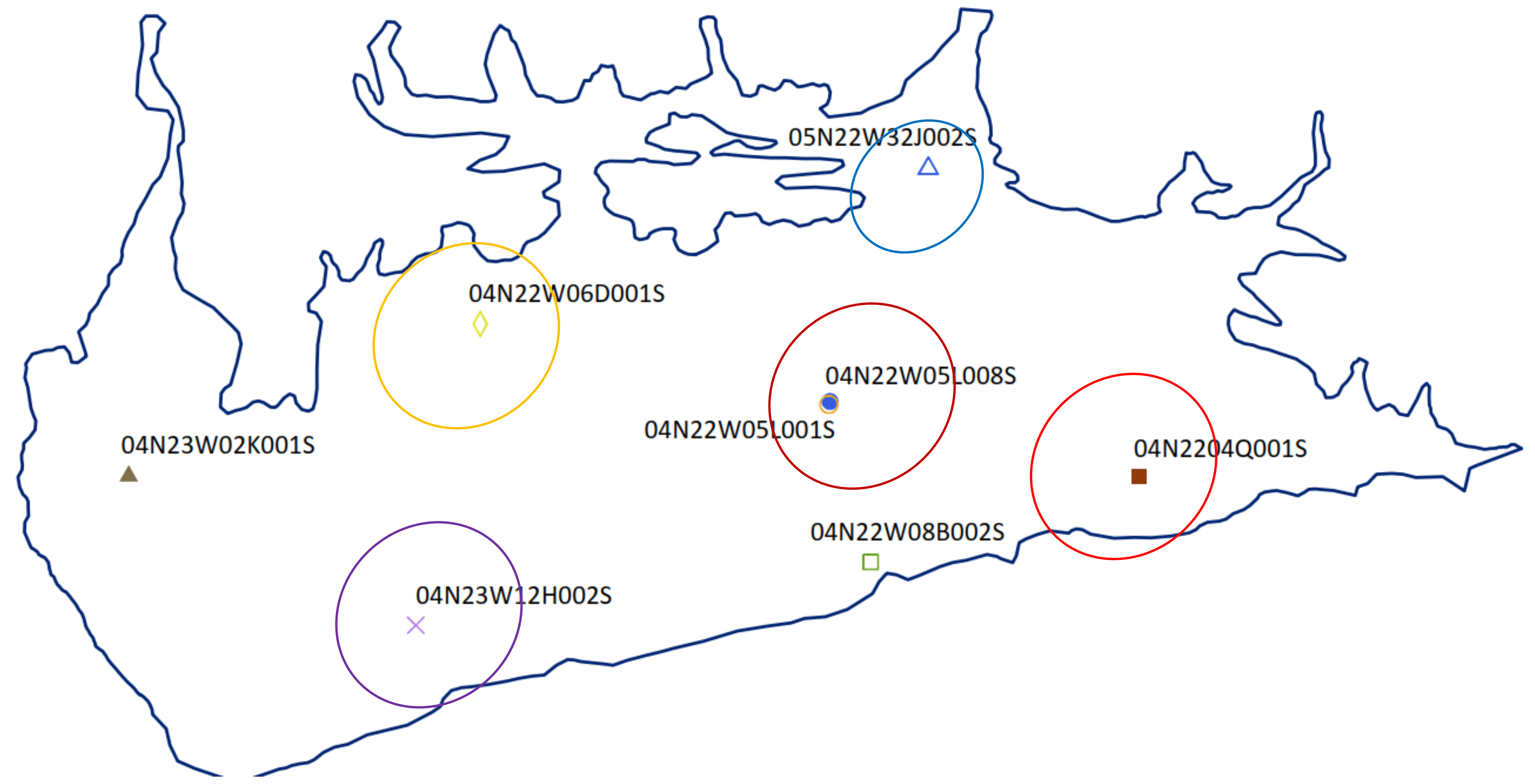
Revised Assessment of Modeled Water Budget





- Updated Analysis: Average annual change in storage ~-15 AFY
  - Within the model uncertainty,
  - Model simulates basin as being "in balance"
- Cumulative change in storage reflects measured groundwater elevations

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Recharge and Discharge: Modeled Processes and output resolution

DRAFT WORKPRODUCT

Inflows

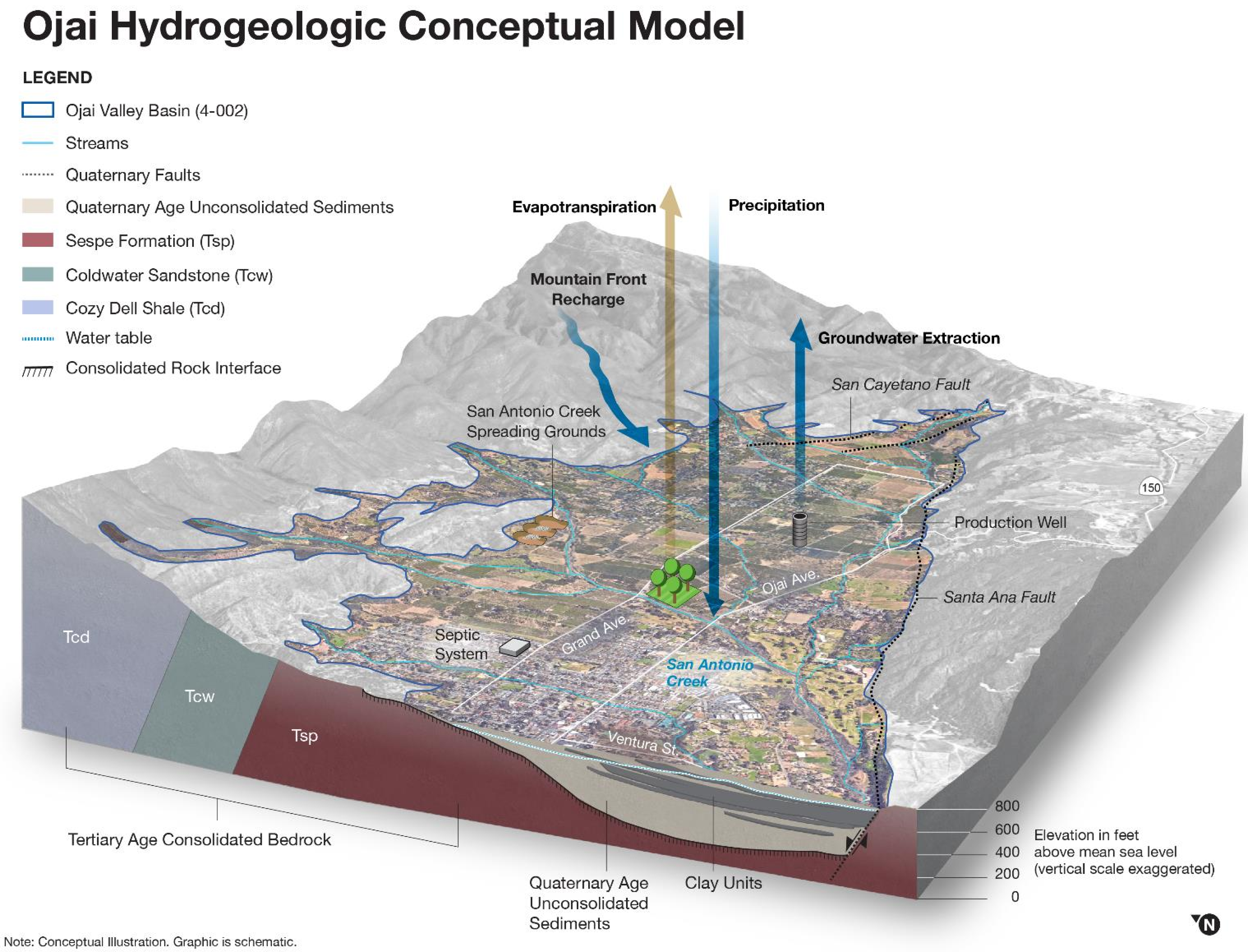
- Recharge:
  - Precipitation
  - Irrigation return flows
- Mountain Front Recharge:
  - Mountain front
  - Tsp, Tcw, Tcd
- Non-native:
  - SCAG
  - Septic, Wastewater treatment

Outflows

- Extractions
- Groundwater discharges to streams:
  - Presumed all discharges occur along the San Antonio Creek
- Underflows to Upper Ventura River Subbasin
- Evapotranspiration

$$\sum \boldsymbol{Inflows} - \sum \boldsymbol{Outflows} =$$

Change in Groundwater in Storage



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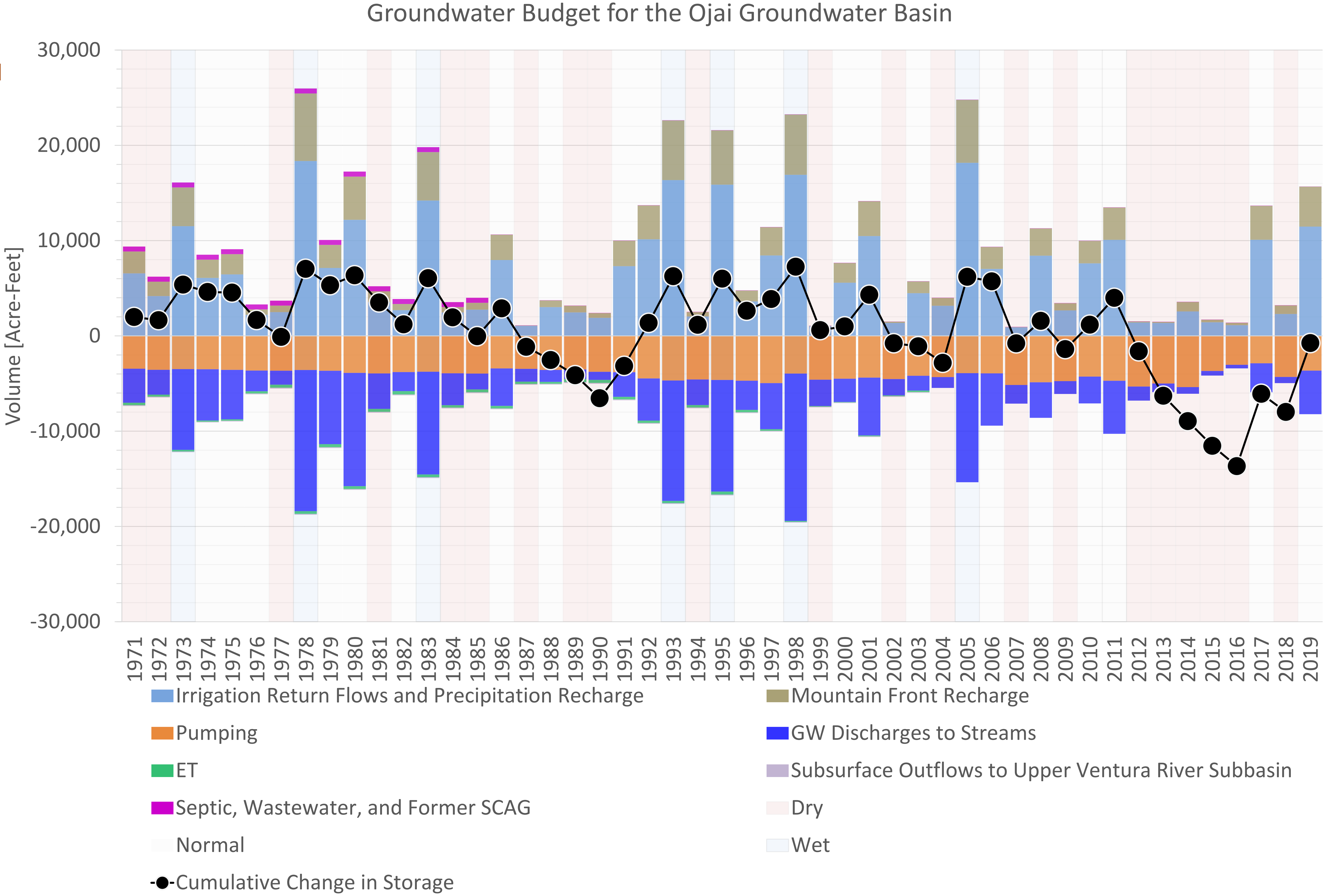
Historical and Current Condition Water Budget

$$\sum \mathit{Inflows} - \sum \mathit{Outflows} =$$

$$\mathit{Change\ in\ Groundwater\ in\ Storage}$$

- Water Budget extracted from the OBGM results file provided by DBS&A
- Groundwater conditions respond to climate
  - Increases in storage driven by increased natural recharge (precipitation and mountain front recharge)
  - Consecutive periods of dry water years leads to a reduction in storage, and generally corresponds to reduced discharges to San Antonio Creek



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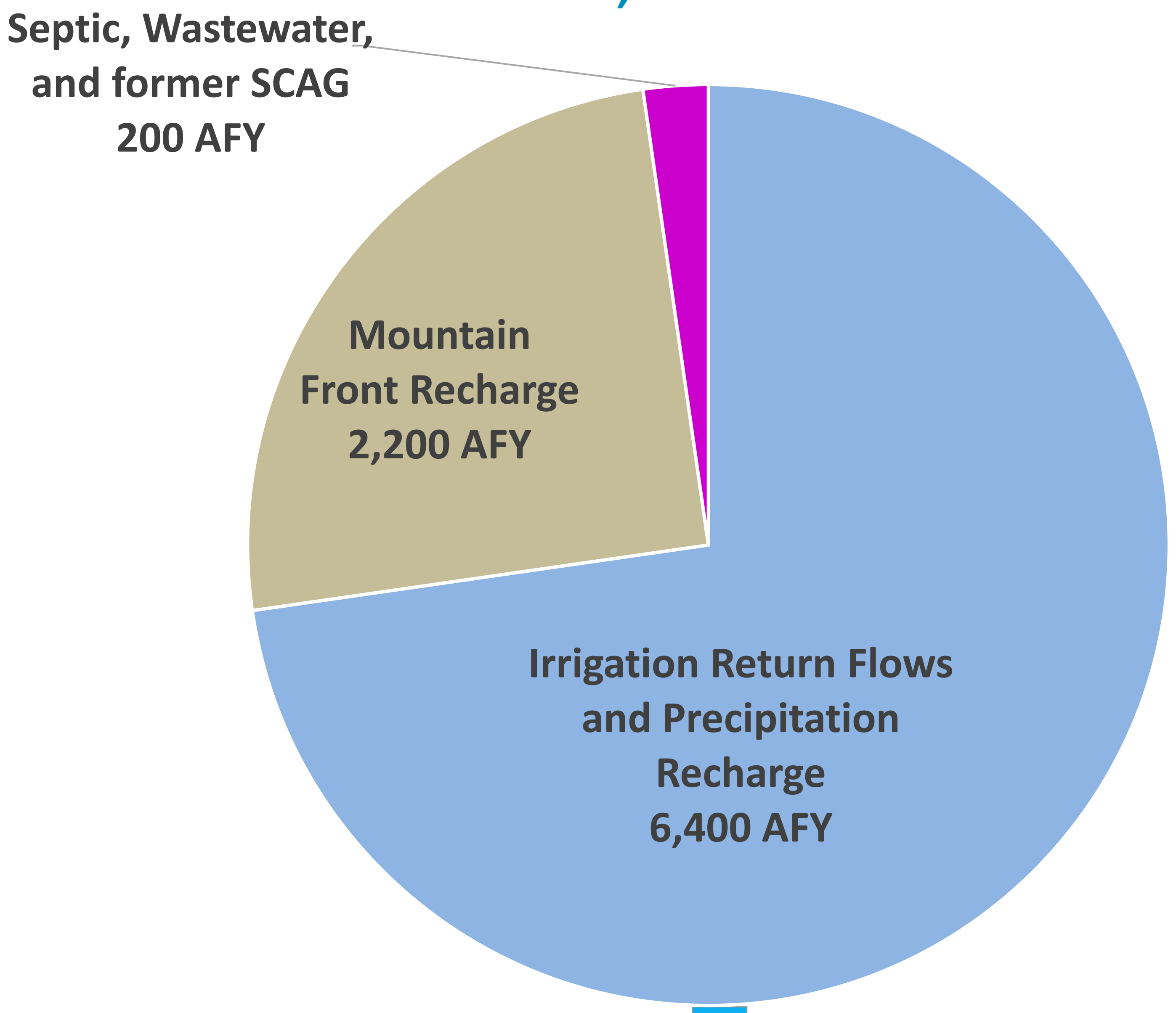
Average Annual Components of Basin Water Budget

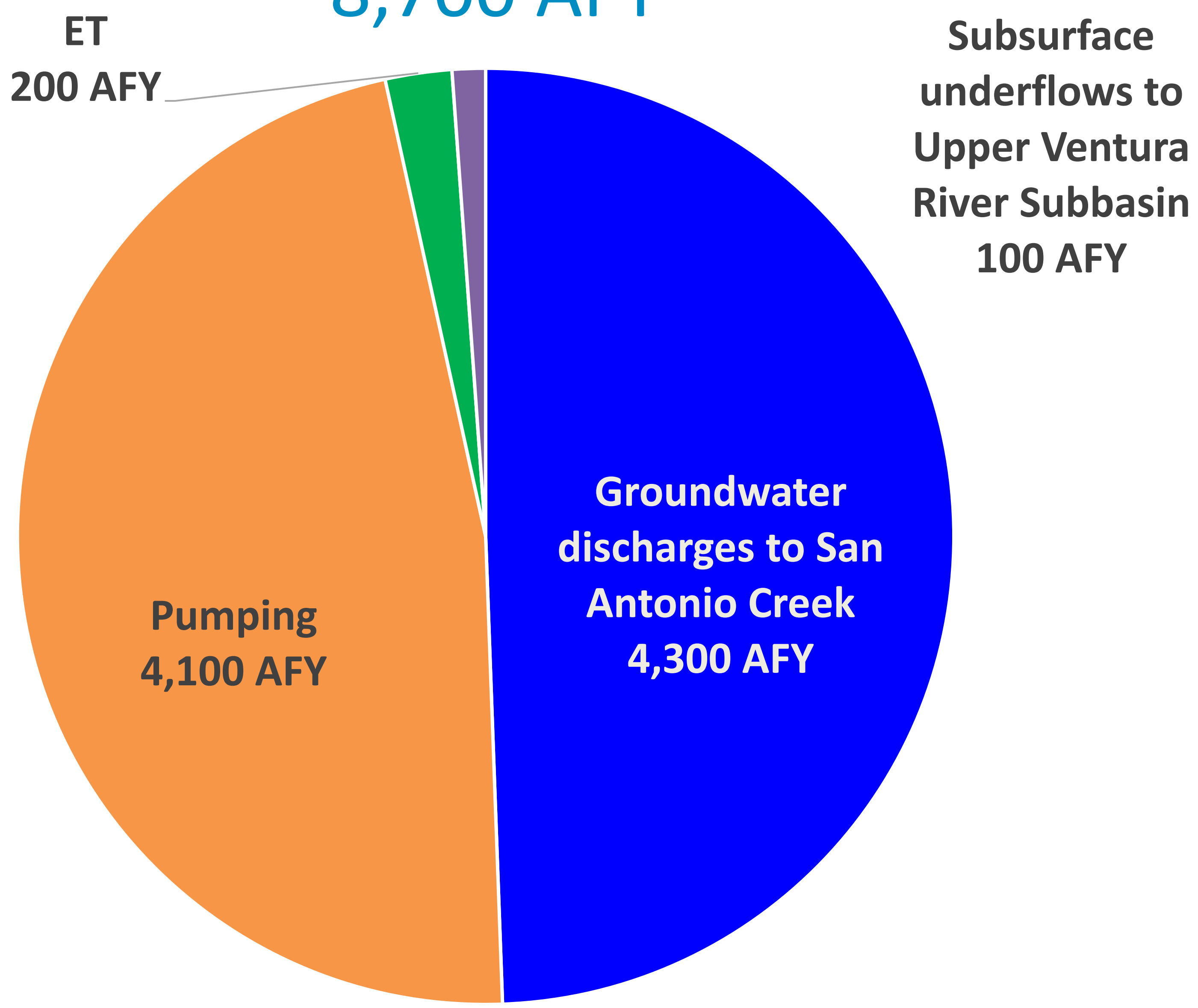
Average Annual Outflows

8,700 AFY



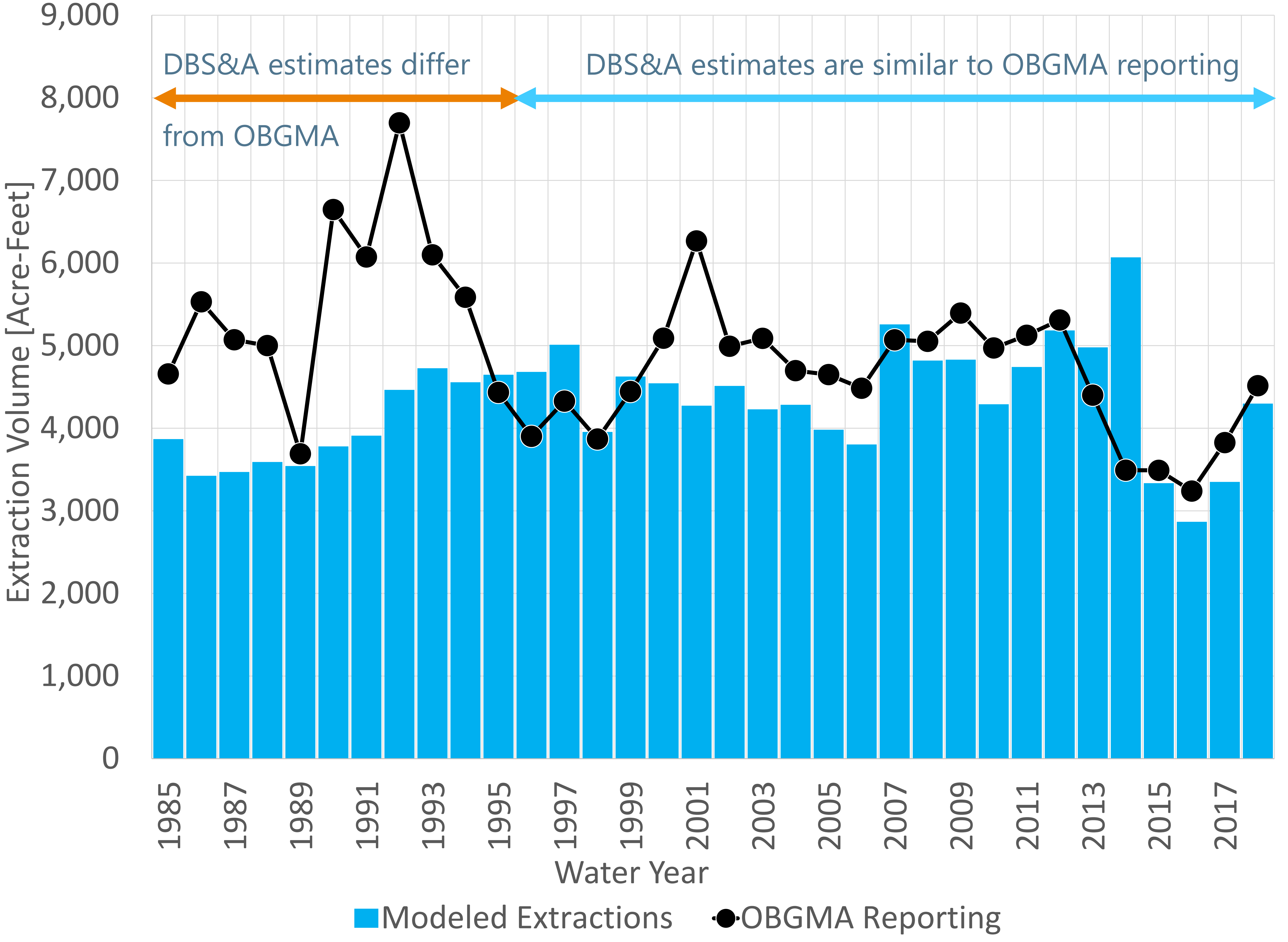
Average Annual Inflows

8,700 AFY



No cumulative change in groundwater in storage between water year 1971-2019

Comparison of simulated and reported/estimated production



- Modeled Extractions: ~4,100 AFY
- Reported/Estimated: ~4,900 AFY
- Largest differences prior to 1993
  - Model underestimates by ~1,700 AFY
- 2014 production rate ~ 2,600 AF higher than production reported by OBGMA

QUESTIONS?

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UPDATED MEMORANDUM

To:	John Mundy, Ojai Basin Groundwater Management Agency
From:	Trey Driscoll, Trevor Jones
Subject:	Updated Review of the Ojai Basin Groundwater Model
Date:	May 17, 2021
cc:	Jordan Kear, Kear Groundwater
Attachment(s):	Figures 1–4

As part of preparation of the Ojai Valley Basin Groundwater Sustainability Plan (GSP), Dudek has reviewed Daniel B. Stephens & Associates (DBS&A) model documentation, model files, and simulation results for the Ojai Basin Groundwater Model (OBGM). Documents reviewed include the initial report on model development, *Groundwater Model Development, Ojai Basin, Ventura County, California* (DBS&A 2011), along with two subsequent memorandums related to model updates (DBS&A 2014 and 2020). Dudek presented an initial assessment of the OBGM following preliminary analyses of the numerical model results in a Technical Memorandum dated October 2, 2020. Following the submission of the October 2020 memorandum, Dudek has collaborated with DBS&A to clarify interpretations model structure, assumptions, and results. This memorandum provides a reassessment of the OBGM and discusses suitability of the OBGM for use in the Ojai Valley Groundwater Basin (Basin) GSP.

1 Model Background

The OBGM was initially developed between 2009 and 2011 by DBS&A for the Ojai Basin Groundwater Management Agency (OBGMA; DBS&A 2011). Updates to the OBGM, which included extending the model simulation to include additional data and refining and improving the model calibration, were completed in 2014 and again in 2020 (DBS&A 2014 and 2020). The OBGM is comprised of two models: a watershed model constructed using the Distributed Parameter Watershed Model Code (DPWM) and a groundwater model that was constructed using the MODFLOW-SURFACT groundwater modeling code. Outputs of recharge from the DPWM watershed model, which uses climate inputs to estimate recharge from precipitation and resulting runoff, are used as recharge inputs to the groundwater model. The groundwater model is then used to estimate groundwater flow and elevation that occur as a result of recharge and groundwater extraction within the Basin.

1.1 Watershed Model

Surface water processes related to the DPWM, including precipitation runoff, streamflow, and recharge from precipitation and streams, is simulated to estimate recharge to the Basin. The DPWM is a bucket-type soil-water-balance model that uses inputs such as precipitation, evapotranspiration, geology, soils, and vegetation cover to estimate runoff and water percolation through the soil column on a basin-wide scale. The model consists of a uniform grid with cells that are 200-feet by 200-feet. The watershed model extends beyond the boundaries of the groundwater model in order to incorporate the entire watershed area upstream of the Basin. In order to accurately model the watershed response to precipitation events, the model uses a daily time step.

The DPWM is designed to estimate the natural recharge that occurs in the Basin for use as an input to the groundwater modeling code. The two model grids are overlaid such that output from the DPWM can be applied directly to the underlying cell in the groundwater modeling code. In order to convert the daily data from the DPWM for use in the groundwater modeling code, the total recharge for each quarter from the DPWM output is divided by the number of days in each quarter to get an average daily recharge rate for the quarter. Output from the DPWM shows that most of the recharge in the Basin occurs in alluvial fans at the heads at the Basin boundaries, and within stream channels within the Basin. In the most recent model update, the DPWM was updated to allow for the calculation of recharge from irrigation return flows.

Since the stream gages within the Basin do not provide sufficient data for model calibration, recharge values from the DPWM are not calibrated to actual measured values.

1.2 Groundwater Model

1.2.1 Model Dimensions

The boundary of the groundwater component of the OBGM coincides with the approximate boundary of the alluvial aquifer, which covers approximately 6,000 acres. As with the DPWM, the OBGM cells are 200-foot by 200-foot. The groundwater model grid is made up of 109 rows and 190 columns. The groundwater model has 10 layers, with even-numbered layers representing aquifer layers and odd numbered layers, except for layer 1, representing semi-confining layers (DBS&A 2011). Layer 1 represents surface alluvial fan deposits and is unsaturated throughout much of the model. The model has quarterly stress periods from April 1970 through September 2019.

1.2.2 Aquifer Properties

Hydraulic conductivity and aquifer storage values are assigned to aquifer units based on aquifer test results. For aquifer layers (Layers 1, 2, 4, 6, 8, and 10), horizontal hydraulic conductivity values range from 1 ft/day to 150 ft/day, with the highest hydraulic conductivity values being assigned to alluvial fan deposits near the Basin boundaries. Most layers have two hydraulic conductivity zones, with layer 2 having three conductivity zones. Hydraulic conductivity for semi-confining layers (Layers 3, 5, 7, and 9), have a uniform value of 0.1 ft/day. Vertical hydraulic conductivity is set to one-tenth of horizontal hydraulic conductivity for all cells. Specific yield for most of the layers is set at 0.03, with some areas of specific yield of 0.10 in layers 1 and 2 in alluvial fan deposits near Basin margins. Specific storage is set to 1×10^{-6} for aquifer layers and 1×10^{-7} for semi confining layers. Aquifer properties are based on and consistent with aquifer testing performed in the Basin (Kear 2005).

1.2.3 Boundary Conditions

1.2.3.1 Recharge

In addition to inputs for precipitation and irrigation return flows, the model includes recharge from spreading basins and septic systems. Surface water from San Antonio Creek was diverted to spreading basins in the northern part of the Basin between 1949 and 1985. There are no records of the precise amounts of water that were used for spreading in these spreading basins. DBS&A estimated that approximately 500 acre-feet per year of water was spread in these spreading basins, and this amount of water was applied to the area of the spreading basins in the model during the first and second quarter of each year between 1970 and 1985 (DBS&A 2011).

Septic system recharge to groundwater was estimated using the Ventura County Individual Sewage Disposal System Applications/Permits database. Using this database, DBS&A was able to identify 16 individual septic systems within the model boundary and a septic system at the Thacher School (DBS&A 2011). Recharge from septic systems was applied at the areas within the model representing the location of these 17 systems and averaged approximately 20 AFY. Data from Ventura County Watershed Protection District indicates that as many as 780 parcels in the Basin may rely on septic systems for wastewater disposal.

1.2.3.2 Groundwater Extraction

Groundwater extraction data from wells within the model boundary were determined from the OBGMA database. Extraction records were available for 172 wells within the model boundary. These were assumed to be the only active extraction wells within the Basin, so pumping may be underestimated as a result (see Section 2). Pumping volumes are reported to the OBGMA every six months. Six month pumping volumes were converted to quarterly pumping volumes by applying a conversion factor based on the estimated percentage of evapotranspiration that occurs in each quarter. Groundwater extraction records were only available starting in the year 1996. For years prior to 1996, the average quarterly extraction at each well was applied to corresponding quarters, with average values being reduced by 25% in the years 1986 through 1991 based on reports of reduced groundwater extractions during this period. Extrapolated extraction rates were applied to each well as far back as the year of well construction, or until the beginning of the model simulation period in April 1970.

1.2.3.3 Groundwater Discharge to Streams

Stream channels within the model domain are simulated using the MODFLOW drain package. In the drain package, when groundwater rises above the drain elevation, groundwater discharge to the drain is calculated based on the difference in head between groundwater and the elevation of the drain, the conductivity of the drain, and the drain dimensions (length, width, and thickness of the drain bed). All drain cells within the model have a uniform width of 10 feet, a uniform length of 283 feet, a uniform bed thickness of 1 foot, and a uniform conductivity of 26.1 ft/day. The elevation of each drain was set as 5 feet below the average land surface of the cell where the drain is located.

1.2.3.4 Groundwater exchange between the alluvial aquifer and bedrock

The model simulates groundwater flow between the alluvial aquifer units and underlying bedrock using the general head boundary package. The general head boundary package computes flow based on the difference in head between groundwater in the cell and head at the boundary, the boundary width, and the hydraulic conductivity of the boundary. All general head boundary cells have the boundary set 500 feet from the cell, with a boundary width of 200 feet, and a hydraulic conductivity of 1×10^{-4} ft/day. The head of the general head boundary is set equal to the estimated bedrock/alluvium contact.

1.2.4 Model Calibration

The model was calibrated using groundwater observations from 18 wells within the Basin. DBS&A selected calibration wells that were screened exclusively in the alluvial aquifer and had a multi-year record of groundwater elevation measurements. Wells were assigned to model layers based on well screen intervals, and calibration wells could be screened across multiple layers. Only values of hydraulic conductivity, specific yield, and specific storage were adjusted during model calibration. Other values, including groundwater extraction, recharge, and evapotranspiration were held constant at the values that were estimated during model calibration. All of the calibration wells used are extraction wells.

Model calibration was evaluated by DBS&A using the mean error, the mean absolute error, and the root mean square error. The mean error for the 2020 recalibration of the model was -11.26 feet, indicating that, on average, simulated groundwater elevations are around 11 feet higher than observed groundwater elevations (DBS&A 2020). The mean absolute error was 20.88 feet, and the root mean square error was 26.8 feet (DBS&A 2020). The scaled root mean square error, which is often used as an indicator of how good the model calibration is, was 4.6 percent for the most recent calibration (DBS&A 2020). A value of less than 10 percent for the scaled root mean square error is generally considered acceptable for model calibration (Rumbaugh and Rumbaugh 2005).

As part of their initial model calibration process, DBS&A also identified areas of model uncertainty and conducted a sensitivity analysis. DBS&A noted that the model did a poor job of capturing shorter term fluctuations (on the order of weeks to months) in observed groundwater elevation data. This was attributed to the fact that the model has quarterly stress periods (i.e., it is only calculating groundwater elevations on a quarterly basis), as well as the fact that all of the calibration wells are extraction wells, and groundwater elevations collected in those wells could be impacted by pumping events at the wells (DBS&A 2011). DBS&A also noted that estimates of recharge from precipitation and streamflow are uncalibrated due to a lack of streamflow data within the model domain, and that extraction data were estimated between 1970 and 1996 (DBS&A 2011). The sensitivity analysis conducted by DBS&A concluded that the model was most sensitive to changes in recharge from precipitation and irrigation, hydraulic conductivity of aquifer units, and specific yield of all layers.

2 Analysis of Model Results and Recommendations

The use of a numerical model for the purposes of preparing and analyzing water budgets, though not required, is a central part of preparation of a GSP. Guidance from the Department of Water Resources on the use of numerical models states that models must include publicly available documentation and that models built should be based on the best available data and calibrated against site-specific field data (DWR 2016). Documentation for the OBGM is readily available on the OBGMA website. While DBS&A had to make significant assumptions about inputs to the system to complete the model, it appears that they reviewed and used all of the available data to the extent possible. In this regard, the model meets the standards for use in the development of water budgets for the GSP.

2.1 OBGM Water Budgets

DBS&A provided Dudek with the OBGM output files for preparation and development of water budgets for the Ojai GSP. Water budgets simulated by the OBGM were written to the MODFLOW list file as cumulative inflow and outflow volumes each quarterly stress period simulated in the OBGM. Dudek prepared water budgets from the OBGM MODFLOW list file by extracting cumulative inflow and outflow components at the end of each stress period and converting the cumulative volumes into a volumetric change over a single stress period.

Figure 1 graphically displays the water budget for the Ojai Basin extracted from the OBGM. Sources of groundwater recharge simulated by the OBGM and written to the OBGM output file include: (i) precipitation and irrigation return flow recharge[1], (ii) mountain front recharge and underflows from the consolidated rocks underlying the Basin, and (iii) recharge from septic system and wastewater treatment plant discharges and spreading at the former San Antonio Creek Spreading grounds. Sources of groundwater discharge simulated by the OBGM and written to the OBGM output file include: (i) groundwater extractions, (ii) groundwater discharges to streams, and (iii) subsurface underflows through the alluvium that connects the Ojai Basin and Upper Ventura River Subbasin. Annual changes in groundwater in storage were calculated by computing the difference between total annual recharge and discharge from the Basin. The annual change in storage values were then summed to generate a cumulative change in storage curve for the Basin (black line with markers, Figure 1).

The OBGM indicates that the largest sources of recharge to the Basin are precipitation and irrigation return flows. Combined, these sources contribute over 70% of the average annual recharge to the Basin. These sources of recharge are climatically driven and highly variable. For example, in water year 1978, a wet water year where precipitation was 233% of the historical average[2], the OBGM estimates that recharge from precipitation and irrigation return flows was approximately 18,400 AF. Conversely, in water year 2007, a dry year where precipitation was 36% of the historical average, the OBGM estimates that recharge from precipitation and irrigation return flow was approximately 900 AF.

The OBGM indicates that the two prominent sources of groundwater discharge from the Basin are discharges to the San Antonio Creek and groundwater extractions. Results from the OBGM indicate that approximately 4,300 AF of groundwater discharges to the San Antonio Creek annually and approximately 4,100 AF is extracted from the Basin annually for municipal, agricultural, and domestic supply. Similar to precipitation and irrigation return flows, the OBGM indicates that groundwater discharges to the San Antonio Creek are highly variable and climatically dependent. In water year 1978, the OBGM simulates approximately 14,800 AF of discharge to San Antonio Creek, while in water year 2007, the OBGM estimates that approximately 1,900 AF of discharge to San Antonio Creek. Groundwater extractions in the model increased from an average of approximately 3,500 AFY in the 1970s to a maximum of approximately 5,300 in 2014.

Results from the OBGM indicate that groundwater in storage is driven climatic variability and largely controlled by irrigation return flow and precipitation. For example, during the drought extending from water year 1984 through 1990, recharge from precipitation and irrigation return flows average approximately 3,200 AFY (50% of historical average) and groundwater in storage declined by approximately 12,000 AF. This period was followed by four normal and wet water years, where recharge from precipitation and irrigation return flows averaged approximately 8,900 AFY (140% of historical average). The average annual recharge rate of 8,900 AFY during this period resulted in a cumulative increase in storage over the same period of approximately 12,000 AF, effectively restoring the basin to the pre 1984-drought conditions.

The cumulative change in storage estimates extracted from the simulation are in good agreement with groundwater elevations measured throughout the Basin. Figure 2 shows the cumulative change in groundwater storage

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[1] Estimates of precipitation recharge and irrigation return flow recharge are computed by the DPWM and aggregated into a single recharge value, which is then input into the MODFLOW model. This aggregation is computed outside of the MODFLOW model and Dudek was not provided this data for preparation of the GSP. Because irrigation return flows are dependent on climatic conditions (DBS&A, 2011), the relative contribution of irrigation return flows and precipitation in a given water year is not readily discernible and cannot be decoupled using the input and output files provided to Dudek for preparation of the GSP.
[2] Based on data collected at NOAA precipitation measurement station USC00046399.

simulated by the OBGM and groundwater elevations measured at key wells in the Basin throughout the simulation period. The cumulative change in storage curve closely follows the trends observed at wells 04N22W05L008S (Elrod Well) and 04N22W06D001S, which are located in the major pumping centers of the Basin.

The OBGM simulates a maximum cumulative increase in storage of approximately 7,000 AF in water year 1978 and maximum cumulative loss in storage of approximately 13,700 AF in water year 2016. Water year 2016 was a dry water year that coincided with a prolonged drought, where precipitation in the prior five water years averaged 50% of the historical average. Over the 49-year simulation period, the OBGM simulates a total cumulative decline in storage of 800 AF, which equates to an average annual decline in storage of approximately 15 AFY. This simulated decline of 15 AFY is within model uncertainty (see discussion of pumping in Section 2.2).

2.2 Assessment of model inputs and recommendations

As noted in the sections above, significant assumptions were made to generate inputs to the groundwater model. Specifically, assumptions were needed to generate inputs for natural recharge and groundwater extraction, which are the main inflows and outflows of water to the groundwater basin. Recharge was generated using the DPWM model, which Dudek has not yet received and therefore cannot comment on the construction of the surface water model. In general, however, it seems that the best available data were used to create the DPWM model. However, the lack of streamflow data within the Basin is a significant data gap and makes it difficult to determine the accuracy of DPWM estimations of recharge. This data gap should be acknowledged in preparation of the GSP.

DBS&A also acknowledges in their reports that modeled extractions may underestimate groundwater extraction from the Basin. OBGMA maintains records of private well extractions dating back to 1993 and municipal well extractions dating back to 1985. Groundwater extraction reporting by private wells was not required in the Basin prior to 1993; accordingly, the OBGMA has historically developed estimates of private well extractions from the Basin for the period from 1985 through 1993 using data characterizing land use, crop watering requirements, climate, and imported water supplies (OBGMA, 2011). Initial reporting of private and municipal well extractions dating back to 1985 were presented in the 2010 Annual Report (OBGMA, 2011). The 2010 Annual Report was published over the same period that the OBGM was developed.

DBS&A used extraction data where available during the development and update of the OBGM but assumed that no extraction occurred outside of the information reported to the OBGMA. In addition, DBS&A note that groundwater extraction data was not available during model development prior to 1996. To generate estimates of extractions from active wells during the period from 1970-1993, DBS&A assigned quarterly production rates at each well equal to the average reported quarterly production rate (DBS&A, 2011). Table 1 summarizes the modeled groundwater extractions and reported/estimated groundwater extraction for calendar years 1985 through 2018.

Table 1. Comparison of modeled and reported pumping in the Ojai Basin

Calendar Year	Modeled Extractions	OBGMA Reporting	Difference
	Units Reported in Acre-feet		
1985	3,868	4,657	789
1986	3,424	5,530	2,106
1987	3,470	5,071	1,601
1988	3,591	5,000	1,409
1989	3,543	3,690	147
1990	3,780	6,647	2,867
1991	3,910	6,073	2,163
1992	4,465	7,697	3,232
1993	4,726	6,099	1,373
1994	4,556	5,585	1,029
1995	4,648	4,433	-215
1996	4,682	3,902	-780
1997	5,011	4,328	-683
1998	3,955	3,869	-86
1999	4,627	4,444	-183
2000	4,544	5,090	546
2001	4,273	6,267	1,994
2002	4,513	4,992	479
2003	4,229	5,088	859
2004	4,284	4,697	413
2005	3,982	4,649	667
2006	3,804	4,484	680
2007	5,257	5,070	-187
2008	4,819	5,052	233
2009	4,830	5,394	564
2010	4,290	4,971	681
2011	4,741	5,125	384
2012	5,184	5,310	126
2013	4,979	4,400	-579
2014	6,069	3,492	-2,577
2015	3,335	3,490	155
2016	2,867	3,239	372
2017	3,351	3,826	475
2018	4,298	4,515	217
1985-2018 Average	4,113	4,888	596

Over this 34-year period, groundwater extractions from the DBS&A model averaged approximately 4,100 AFY, which is approximately 600 AFY less than the extractions reported to, or estimated by, the OBGMA. The largest discrepancies in the two databases occur prior to 1993, where the OBGM simulated extractions are approximately 1,700 AFY less than estimates generated by OBGMA over this 9-year period. In 2014, the OGBM overestimated groundwater extractions by approximately 2,600 AF.

In addition to examining the assumptions used in the generation of model inputs, Dudek also examined local climate data to determine if the period of model simulation (1970 to 2019) was representative of long-term climate conditions within the Basin. In order to do this, Dudek examined two long-term precipitation records that were available for the Basin—one from the Ojai station (Station No. USC00046399) monitored by the National Oceanic and Atmospheric Administration (NOAA), and another at the Thacher School (Station No. 059) monitored by the Ventura County Water Protection District (VCWPD). The NOAA station has a period of record from 1905 to present and is placed at 745 feet elevation. The Thacher School station has a period of record from 1915 to present and is placed at 1,440 feet elevation. Water year precipitation for each station, along with the cumulative departure from the mean precipitation, are presented in Figures 3 and 4 below. The average annual precipitation at the NOAA station for the entire period is approximately 20.58 inches, while the average annual precipitation at the Thacher School station is approximately 21.41 inches. For both stations, the average precipitation from 1970 to 2019 (the model simulation period) was roughly equal to the long-term average annual precipitation.

Examination of the cumulative departure curve at both stations shows that the model simulation period includes multiple wet (increasing cumulative departure curve) and dry (decreasing cumulative departure curve) climate cycles. The cumulative departure curve for the NOAA station starts and ends around the same value, suggesting climate variations are near average conditions over the model period. At the Thacher School station, which is located at a higher elevation, the model starts at the very end of a dry period (low point on the cumulative departure curve), and ends at a higher point, suggesting that the model period was somewhat wetter than the long term average. This suggests that that the model period is reasonably representative of the long term climate conditions of the basin, but that it could potentially overestimate recharge at higher elevations when compared to long term climate averages.

SGMA also requires the evaluation of future Basin conditions that take into account climate change. SGMA requires this evaluation to take place over a 50-year future period. Data for climate inputs are taken from a historical base period, and climate change factors provided by DWR are applied to this historical data to generate future climate data for model input. Given that the model simulation period already covers 50-years, relatively few adjustments will need to be made to the model to use it for the simulation of future scenarios. Climate data will need to be secured for a 50-year base period, which could be either the current model simulation period (1979 to 2019) or some other historical period specified by the OBGMA. Data will then be adjusted per DWR requirements and used in the DPWM to generate estimated future recharge values for input to the OBGM. The DPWM model files would need to be received by Dudek in order to complete this task.

The OBGM is an appropriate tool for the analysis of historical and future water budgets to fulfill the requirements of SGMA. While the model has significant assumptions and data gaps, these appear to largely be the result of a lack of data. While the data gaps should be acknowledged and analyzed in the GSP, they do not appear to be significant enough to disqualify the use of the OBGM model in GSP preparation.

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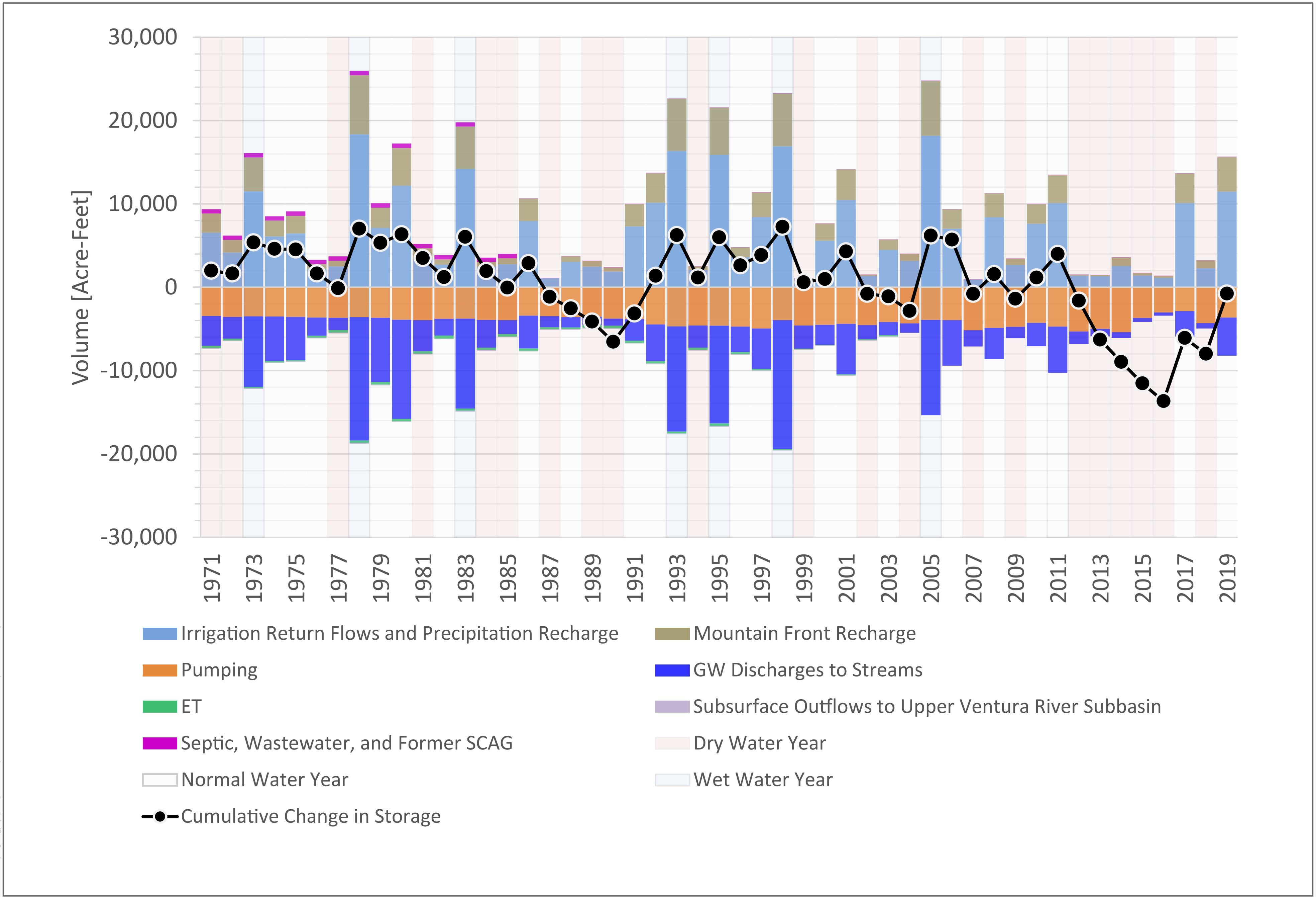
Attachments

Figures 1–4



Source: Daniel B. Stephens & Associates (DBS&A)

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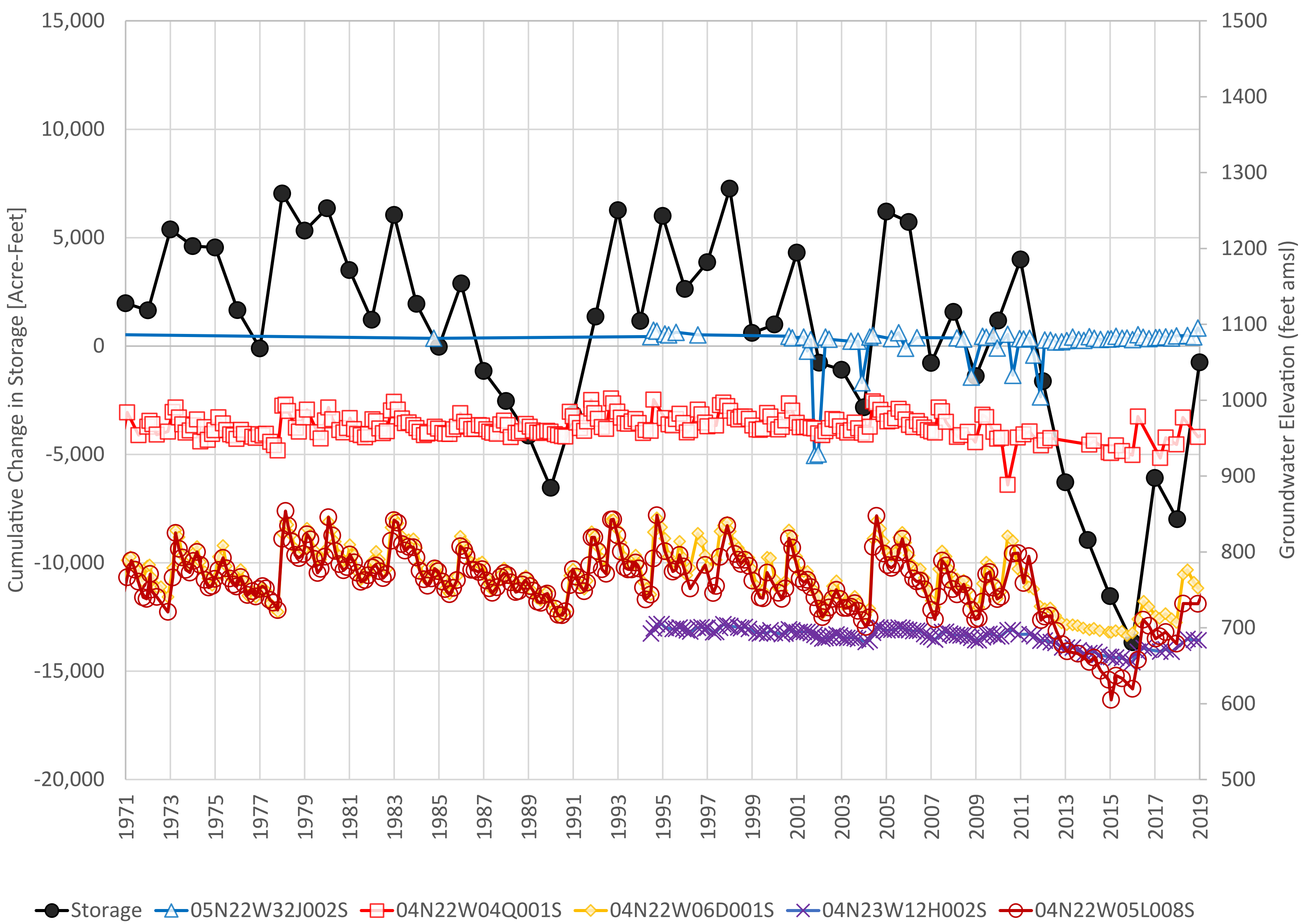
FIGURE 1

Groundwater Budget for the Ojai Groundwater Basin

Ojai Basin Groundwater Sustainability Plan



Source: Daniel B. Stephens & Associates (DBS&A), CASGEM, VCWPD

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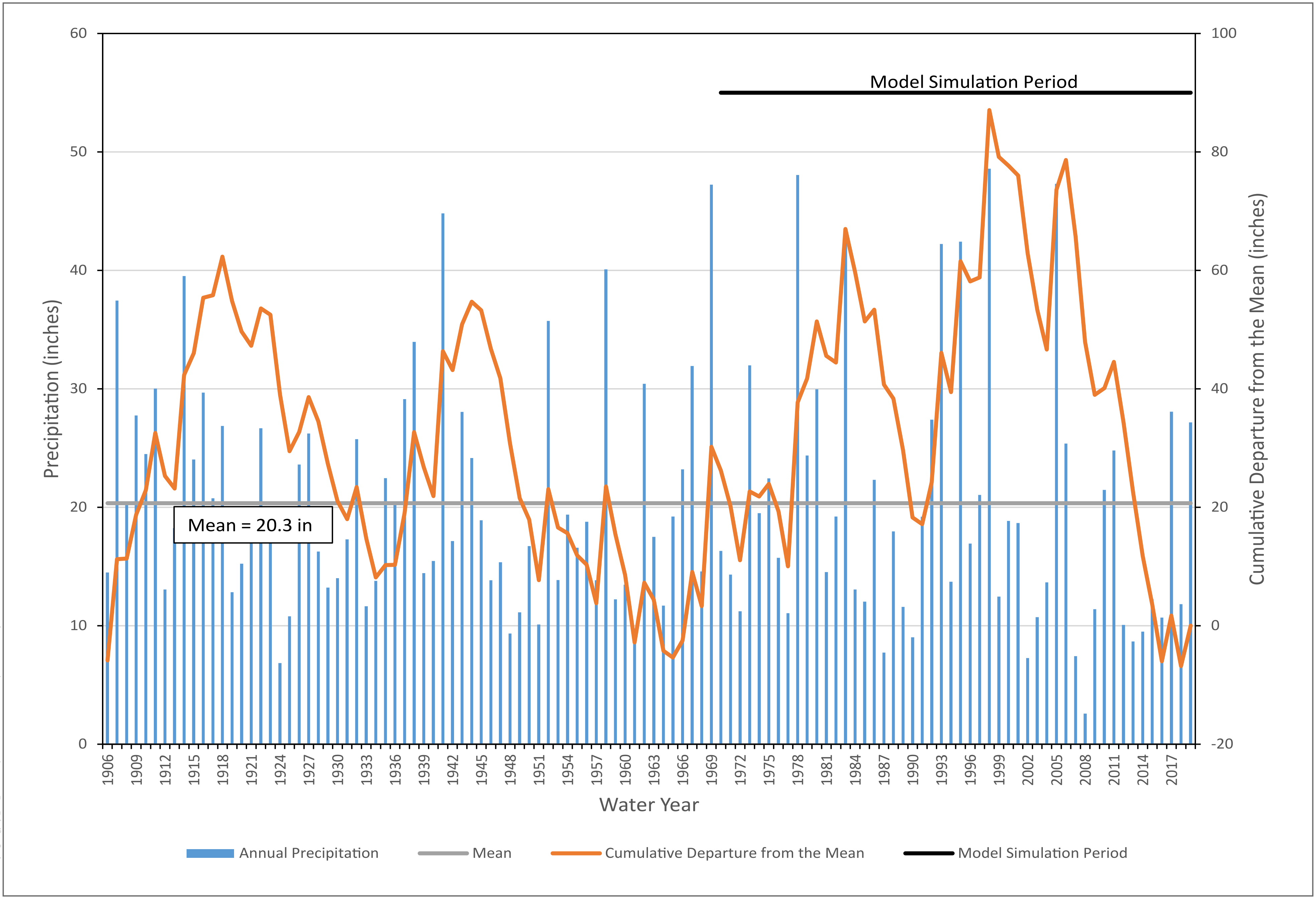
FIGURE 2

Cumulative Change in Storage Simulated by the OBGM and Groundwater Elevations Measured Across the Basin

Ojai Basin Groundwater Sustainability Plan



Source: NOAA

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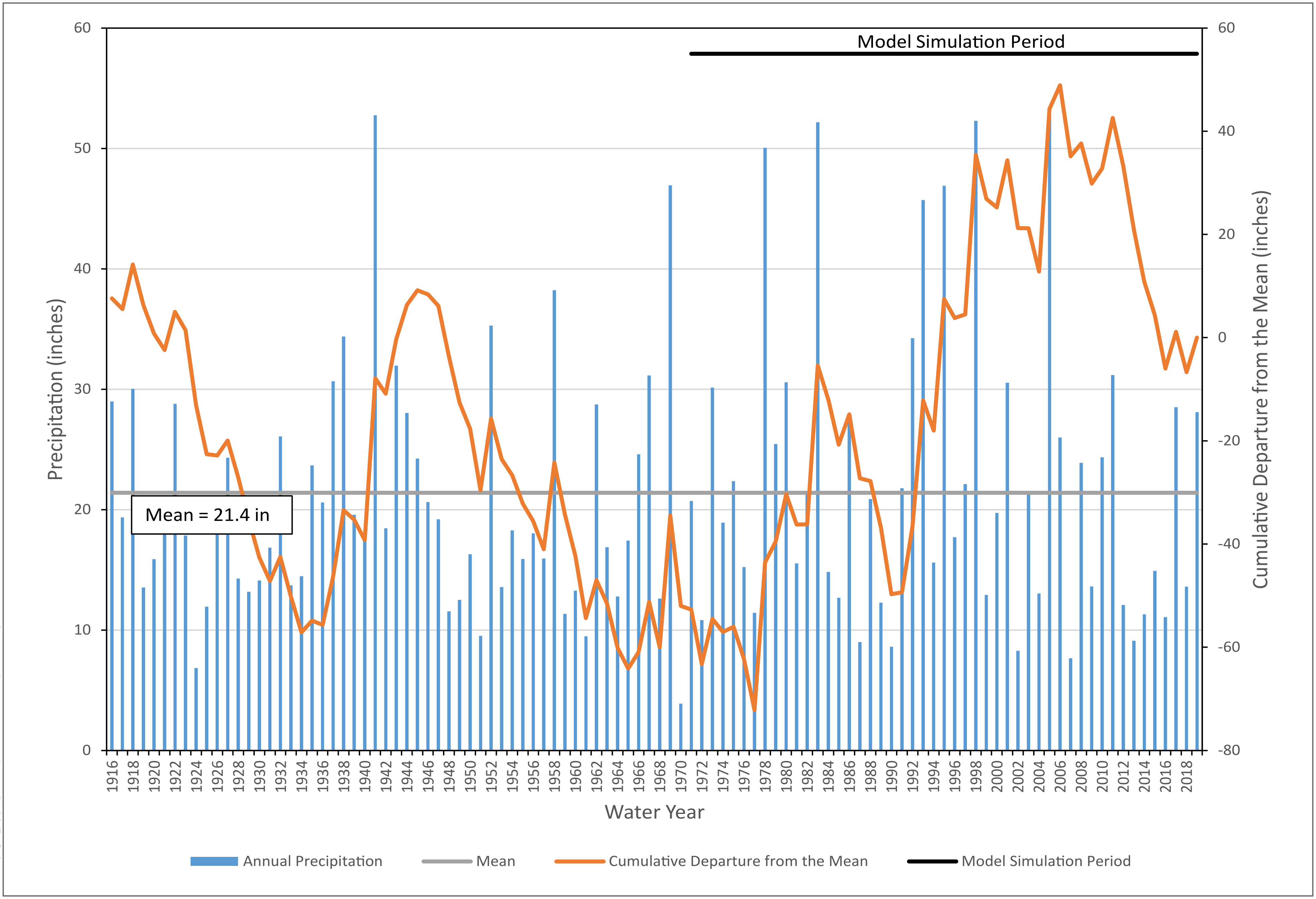
FIGURE 3

Water Year Precipitation and Cumulative Departure from the Mean for the Ojai NOAA Station



Source: NOAA

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FIGURE 4

Water Year Precipitation and Cumulative Departure from the Mean for the Thatcher School Station

Ojai Basin Groundwater Sustainability Plan