NOTICE OF MEETING

Thursday, June 19, 2025

9:00 a.m. – Advisory Committee Meeting

CHINO BASIN WATERMASTER
ADVISORY COMMITTEE MEETING
9:00 a.m. – June 19, 2025
Mr. Eduardo Espinoza, Chair
Mr. Brian Geye, Vice-Chair
Mr. Jeff Pierson, Second Vice-Chair
At The Offices Of
Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

(Meeting can also be taken remotely via Zoom at this link)

AGENDA

CALL TO ORDER

ROLL CALL

AGENDA – ADDITIONS/REORDER

SAFETY MINUTE

I. CONSENT CALENDAR

All matters listed under the Consent Calendar are considered to be routine and non-controversial and will be acted upon by one motion in the form listed below. There will be no separate discussion on these items prior to voting unless any members, staff, or the public requests specific items be discussed and/or removed from the Consent Calendar for separate action.

A. MINUTES
Approve as presented:
Minutes of the Advisory Committee Meeting held on May 15, 2025 *(Page 1)*

B. FINANCIAL REPORTS
Receive and file as presented:
Monthly Financial Report for the Period Ended April 30, 2025 *(Page 5)*

C. APPLICATION: WATER TRANSACTION – 1,000 AF SANTA ANA RIVER WATER COMPANY TO FONTANA WATER COMPANY *(Page 21)*
Provide advice and assistance to the Watermaster Board on the proposed transaction.

II. BUSINESS ITEMS

A. 2024 ANNUAL REPORT OF THE PRADO BASIN HABITAT SUSTAINABILITY PROGRAM *(Page 28)*
Recommend to the Watermaster Board to receive and file as presented.

B. TURNER BASINS 5-10 PROJECT DESCRIPTION AND INITIAL CONCEPT PLAN *(Page 212)*
Provide advice and assistance to the Watermaster Board.

III. REPORTS/UPDATES

A. WATERMASTER LEGAL COUNSEL

1. June 13, 2025, Court Hearing (Appropriative Pool Motion for Costs and Fees; Watermaster Motion for Receipt and Filing of Semi-Annual OBMP Status Report 2024-2; IEUA Motion for Costs and Fees; Watermaster Motion for Extension of Time to Complete Safe Yield Evaluation)
2. Court of Appeal Consolidated Cases No. E080457 and E082127 (City of Ontario appeal re: Fiscal Year 2021-22 and 2022-23 Assessment Packages)
3. Inland Empire Utilities Agency, et al. v. LS-Fontana LLC (C.D. Cal Cases Nos.: 5:25-cv-00809, 5:25-cv-01159)

B. ENGINEER

1. None

C. GENERAL MANAGER

1. West Yost Associates, Inc. Fiscal Year 2025/26 Rate Schedule
2. July Meeting Schedule
3. Update on Peer Review Engagement Proposals
4. Chino Basin Watermaster Guidance Documents
5. Transition to Teams phones
6. Other

D. INLAND EMPIRE UTILITIES AGENCY *(Page 217)*

1. Metropolitan Water District Activities Report (Written)
2. Water Supply Conditions (Written)
3. State and Federal Legislative Reports (Written)

E. OTHER METROPOLITAN MEMBER AGENCY REPORTS

IV. INFORMATION

A. RECHARGE INVESTIGATION AND PROJECTS COMMITTEE (PROJECT 23a STATUS) *(Page 243)*

B. CHINO BASIN DAY *(Page 244)*

V. COMMITTEE MEMBER COMMENTS

VI. OTHER BUSINESS

VII. CONFIDENTIAL SESSION - POSSIBLE ACTION

A Confidential Session may be held during the Advisory Committee meeting for the purpose of discussion and possible action.

VIII. FUTURE MEETINGS AT WATERMASTER

06/19/25	Thu	9:00 a.m.	Advisory Committee
06/26/25	Thu	9:30 a.m.	Watermaster Orientation*
06/26/25	Thu	11:00 a.m.	Watermaster Board
07/10/25	Thu	9:00 a.m.	Appropriative Pool Committee
07/10/25	Thu	11:00 a.m.	Non-Agricultural Pool Committee
07/10/25	Thu	1:30 p.m.	Agricultural Pool Committee
07/17/25	Thu	9:00 a.m.	Advisory Committee
07/17/25	Thu	9:30 a.m.	Recharge Investigations and Projects Committee (RIPComm)
07/24/25	Thu	9:30 a.m.	Watermaster Orientation*
07/24/25	Thu	11:00 a.m.	Watermaster Board

* The Watermaster Orientation series is held in person only with no remote access.

ADJOURNMENT

DRAFT MINUTES
CHINO BASIN WATERMASTER
ADVISORY COMMITTEE MEETING
May 15, 2025

The Advisory Committee meeting was held at the Chino Basin Watermaster offices located at 9641 San Bernardino Road, Rancho Cucamonga, CA, and via Zoom (conference call and web meeting) on May 15, 2025.

ADVISORY COMMITTEE MEMBERS PRESENT

- **APPROPRIATIVE POOL COMMITTEE MEMBERS PRESENT AT WATERMASTER**

Eduardo Espinoza, **Chair** (for John Bosler)	Cucamonga Valley Water District
Ron Craig	City of Chino Hills
Chad Nishida for Courtney Jones	City of Ontario
Chris Diggs	City of Pomona
Nicole deMoet	City of Upland
Megan Sims for Cris Fealy	Fontana Water Company
Justin Castruita for Josh Swift	Fontana Union Water Company
Nicole deMoet	West End Consolidated Water Company

- **APPROPRIATIVE POOL COMMITTEE MEMBERS PRESENT ON ZOOM**

Ben Orosco	City of Chino
Chris Berch	Jurupa Community Services District
Brian Lee	San Antonio Water Company

- **NON-AGRICULTURAL POOL COMMITTEE MEMBERS PRESENT AT WATERMASTER**

Brian Geye, **Vice-Chair**	California Speedway Corporation

- **NON-AGRICULTURAL POOL COMMITTEE MEMBERS PRESENT ON ZOOM**

Alexis Mascarinas	City of Ontario (Non-Ag)

- **AGRICULTURAL POOL COMMITTEE MEMBERS PRESENT AT WATERMASTER**

Jeff Pierson, **Second Vice-Chair**	Crops
Jimmy Medrano	State of California

- **AGRICULTURAL POOL COMMITTEE MEMBERS PRESENT ON ZOOM**

Bob Feenstra	Dairy
Gino Filippi	Crops
Imelda Cadigal	State of California
Lewis Callahan	State of California

- **MUNICIPAL REPRESENTATIVE PRESENT ON ZOOM**

Laura Roughton	Western Municipal Water District

WATERMASTER BOARD MEMBERS PRESENT AT WATERMASTER

Marty Zvirbulis	Fontana Water Company

WATERMASTER BOARD MEMBERS PRESENT ON ZOOM

Bill Velto	City of Upland
Mike Gardner	Western Municipal Water District

WATERMASTER STAFF PRESENT

Todd Corbin	General Manager
Edgar Tellez Foster	Water Resources Mgmt. & Planning Director
Anna Nelson	Director of Administration

Justin Nakano	Water Resources Technical Manager
Frank Yoo	Data Services and Judgment Reporting Manager
Daniela Uriarte	Senior Accountant
Ruby Favela Quintero	Executive Assistant
Kirk Richard Dolar	Administrative Analyst
Alonso Jurado	Water Resources Associate
Erik Vides	Field Operations Specialist

WATERMASTER CONSULTANTS PRESENT AT WATERMASTER

Brad Herrema	Brownstein Hyatt Farber Schreck, LLP
Andy Malone	West Yost

WATERMASTER CONSULTANTS PRESENT ON ZOOM

Garrett Rapp	West Yost
Lucy Hedley	West Yost

OTHERS PRESENT AT WATERMASTER

Amanda Coker	Cucamonga Valley Water District
Josh Swift	Fontana Union Water Company

OTHERS PRESENT ON ZOOM

Hye Jin Lee	City of Chino
Melissa Cansino	City of Pomona
Jiwon Seung	Cucamonga Valley Water District
Aimee Zhao	Inland Empire Utilities Agency
Stephanie Reimer	Monte Vista Irrigation Company
Brian Lee	San Antonio Water Company
Rick Rees	WSP USA
Jake Loukeh	Western Municipal Water District

CALL TO ORDER
Chair Espinoza called the Advisory Committee meeting to order at 9:00 a.m.

ROLL CALL
(00:00:12) Ms. Nelson conducted the roll call and announced that a quorum was present.

AGENDA – ADDITIONS/REORDER
None

SAFETY MINUTE
(00:02:28) Mr. Corbin reminded everyone they should review their company safety of policies and procedures. The concept of "If you see something, say something," is important. Please report any safety concerns you may encounter at Watermaster.

I. CONSENT CALENDAR

All matters listed under the Consent Calendar are considered to be routine and non-controversial and will be acted upon by one motion in the form listed below. There will be no separate discussion on these items prior to voting unless any members, staff, or the public requests specific items be discussed and/or removed from the Consent Calendar for separate action.

A. MINUTES

Approve as presented:
Minutes of the Advisory Committee Meeting held on April 17, 2025

B. FINANCIAL REPORTS
Receive and file as presented:
Monthly Financial Report for the Period Ended March 31, 2025

(00:03:32)
Motion by Mr. Chris Diggs, seconded by Second Vice-Chair Jeff Pierson, there being no dissent, the motion was deemed passed unanimously among those present.
Moved to approve the Consent Calendar as presented.

II. BUSINESS ITEMS

A. WATERMASTER FISCAL YEAR 2025/26 PROPOSED BUDGET
Approve the Watermaster Fiscal Year 2025/26 Proposed Budget as presented.

(00:04:05) Mr. Corbin gave a report and presentation. A discussion ensued.

(00:20:17)
Motion by Mr. Ron Craig, seconded by Ms. Hye Jin Lee, there being no dissent, the motion was deemed passed unanimously among those present.
Moved to approve Business Item II.A. as presented.

B. CONSIDERATION OF THE SCOPE OF WORK FOR THE PEER REVIEW ENGAGEMENT OF THE 2025 SAFE YIELD REEVALUATION TECHNICAL RESULTS
Provide advice and assistance to Watermaster on the Scope of Work for the Peer Review engagement of the 2025 Safe Yield Reevaluation Technical Results as presented.

(00:21:03) Mr. Corbin gave a report and presentation. The Committee expressed support to move this item to the Watermaster Board. A discussion ensued.

III. REPORTS/UPDATES

A. WATERMASTER LEGAL COUNSEL
1. June 13, 2025, Court Hearing (Appropriative Pool Motion for Costs and Fees; Watermaster Motion for Receipt and Filing of Semi-Annual OBMP Status Report 2024-2; IEUA Motion for Costs and Fees; Watermaster Motion for Extension of Time to Complete Safe Yield Evaluation)
2. Court of Appeal Consolidated Cases No. E080457 and E082127 (City of Ontario appeal re: Fiscal Year 2021-22 and 2022-23 Assessment Packages)
3. Inland Empire Utilities Agency, et al v. LS-Fontana LLC (San Bernardino Superior Court); Inland Empire Utilities Agency et al v. LS-Fontana LLC (C.D. Cal Case No.: 5:25-cv-00809)

(00:27:33) Mr. Herrema gave a report.

B. ENGINEER
1. Annual Report and Meeting for the PBHSP
2. State of the Basin Report

(00:29:47) Mr. Malone gave a report on Items 1 and 2.

C. GENERAL MANAGER
1. Other

(00:31:02) Mr. Corbin stated that he had nothing new to report since the Pools meetings last week and is happy to answer any questions.

D. INLAND EMPIRE UTILITIES AGENCY

1. Metropolitan Water District Activities Report (Written)
2. Water Supply Conditions (Written)
3. State and Federal Legislative Reports (Written)

No oral report was given.

E. OTHER METROPOLITAN MEMBER AGENCY REPORTS

None

IV. INFORMATION

A. RECHARGE INVESTIGATION AND PROJECTS COMMITTEE (PROJECT 23a STATUS)

This was an informational item, and no oral report was given.

V. COMMITTEE MEMBER COMMENTS

None

VI. OTHER BUSINESS

None

VII. CONFIDENTIAL SESSION - POSSIBLE ACTION

A Confidential Session may be held during the Advisory Committee meeting for the purpose of discussion and possible action.

None

ADJOURNMENT

Chair Espinoza adjourned the Advisory Committee meeting at 9:33 a.m.

Secretary: ___________________________

Approved: ___________________________

CHINO BASIN WATERMASTER
9641 San Bernardino Road, Rancho Cucamonga, CA 91730
909.484.3888 www.cbwm.org

STAFF REPORT

DATE: June 2025

TO: Watermaster Committees & Board

SUBJECT: Monthly Financial Reports (For the Reporting Period Ended April 30, 2025)
(Consent Calendar Item I.B.)

Issue: Record of Monthly Financial Reports for the reporting period ended April 30, 2025 [Normal Course of Business]

Recommendation: Receive and file Monthly Financial Reports for the reporting period ended April 30, 2025 as presented.

Financial Impact: None

ACTIONS:
Appropriative Pool – June 12, 2025 [Final]: Received and filed.
Non-Agricultural Pool – June 12, 2025 [Final]: Received and filed without approval.
Agricultural Pool – June 12, 2025 [Final]: Received and filed.
Advisory Committee – June 19, 2025 [Recommended]: Receive and file.
Watermaster Board – June 26, 2025 [Recommended]: Receive and file.

BACKGROUND

A monthly reporting packet is provided to keep all members apprised of Watermaster revenues, expenditures, and other financial activities. Monthly reports include the following:

1. Cash Disbursements – Summarized report of all payments made during the reporting month.
2. Credit Card Expense Detail – Detail report of all credit card activity during the reporting month.
3. Combining Schedule of Revenues, Expenses & Changes in Net Assets – Detail report of all revenue and expense activity for the fiscal YTD, summarized by pool category.
4. Treasurer's Report – Summary of Watermaster investments holdings and anticipated earnings as of month end.
5. Budget to Actual Report – Detail report of actual revenue and expense activity, shown for reporting month and YTD, comparatively to the adopted budget.
6. Monthly Variance Report & Supplemental Schedules – Supporting schedule providing explanation for major budget variances. Also provides several additional tables detailing pool fund balance, salaries expense, legal expense, and engineering expense.

DISCUSSION

Detailed explanations of major variances and other additional information can be found on the "Monthly Variance Report & Supplemental Schedules."

Watermaster staff will provide additional explanations or respond to any questions on these reports during the meetings as requested.

ATTACHMENT

1. Monthly Financial Reports (April 30, 2025)

ATTACHMENT 1

Chino Basin Watermaster
Cash Disbursements
April 2025

Date	Number	Vendor Name	Description	Amount
04/01/2025	25381	CUCAMONGA VALLEY WATER DISTRICT - UTILITY	Utilities: Water	$ (376.28)
04/01/2025	25382	ESRI	Yearly software and maintenance enterprise agreement	(5,300.00)
04/01/2025	25383	GREAT AMERICA LEASING CORP.	February copy machine lease	(1,527.81)
04/01/2025	25384	IN-SITU, INC.	Water level supplies for desalter facilities	(4,490.56)
04/01/2025	25385	PETTY CASH	Petty cash replenishment	(314.18)
04/01/2025	25386	SAN BERNARDINO COUNTY - DEPT. AIRPORTS	April rent for extensometer site	(190.98)
04/01/2025	25387	SOCALGAS	Utilities: Gas	(172.69)
04/01/2025	25388	STANDARD INSURANCE CO.	April life and disability coverage	(996.23)
04/01/2025	25389	VC3, INC.	March IT services	(4,925.91)
04/01/2025	25390	VERIZON WIRELESS	Internet services for extensometer site	(38.01)
04/01/2025	25391	VISION SERVICE PLAN	April vision insurance coverage	(108.39)
04/03/2025	25392	EIDE BAILLY LLP	January accounting consulting services	(420.00)
04/03/2025	25393	WEST YOST	February engineering services	(149,910.15)
04/04/2025	25394	JOHN J. SCHATZ	December AP legal services	(8,453.00)
04/07/2025	ACH4/7/25	CALPERS	April medical insurance premiums	(18,210.85)
04/10/2025	25395	EGOSCUE LAW GROUP, INC.	March OAP legal services	(15,900.00)
04/14/2025	25396	BAY ALARM COMPANY	May security alarm monitoring service	(188.00)
04/14/2025	25397	BOWCOCK, ROBERT		(500.00)
04/14/2025	25398	ELIE, STEVEN		(375.00)
04/14/2025	25399	FRONTIER COMMUNICATIONS	Landline connection for Bay Alarm system	(154.06)
04/14/2025	25400	GEYE, BRIAN		(250.00)
04/14/2025	25401	HUITSING, JOHN		(375.00)
04/14/2025	25402	LEWIS BRISBOIS BISGAARD & SMITH LLP	March ONAP legal services	(2,915.00)
04/14/2025	25403	RAUCH COMMUNICATION CONSULTANTS, INC.	Final installment for annual report	(1,508.75)
04/14/2025	25404	SOUTHERN CALIFORNIA EDISON	Utilities: Electric	(140.83)
04/14/2025	25405	STATE COMPENSATION INSURANCE FUND	FY 25 worker's compensation insurance	(2,264.91)
04/14/2025	25406	VANGUARD CLEANING SYSTEMS	April janitorial service and March electrostatic spraying	(1,220.00)
04/14/2025	25407	VELTO, BILL		(750.00)
04/14/2025	25408	ZVIRBULIS, MARTIN		(375.00)
04/16/2025	25409	CALIFORNIA BANK & TRUST	Account ending 6198 - See detail attached	(8,872.68)
04/16/2025	25410	ACP PUBLICATIONS & MARKETING	Name plates for D. Uriarte and M. Zvirubulis	(279.07)
04/16/2025	25411	ACWA JOINT POWERS INSURANCE AUTHORITY	May life insurance	(274.43)
04/16/2025	25412	BURRTEC WASTE INDUSTRIES, INC.	Utilities: Waste	(168.62)
04/16/2025	25413	CORELOGIC INFORMATION SOLUTIONS	March geographic package services	(125.00)
04/16/2025	25414	CUCAMONGA VALLEY WATER DISTRICT	May lease	(11,902.91)
04/16/2025	25415	DE HAAN, HENRY		(375.00)
04/16/2025	25417	PITNEY BOWES GLOBAL FINANCIAL SVCS.	Quarterly postage meter lease	(454.87)
04/16/2025	25418	RUBEN LLAMAS		(125.00)
04/16/2025	25419	SOUTHERN CA EDISON	Utilities: Electric	(1,383.85)
04/16/2025	25420	SPECTRUM ENTERPRISE	April internet services	(1,173.60)
04/16/2025	25421	VC3, INC.	Firewall server installation hardware and labor	(8,342.50)
04/16/2025	25422	VERIZON WIRELESS	Internet services for Field Ops tablets	(239.16)
04/16/2025	25423	FILIPPI, GINO		(500.00)
04/28/2025	25424	EIDE BAILLY LLP	April accounting consulting services	(525.00)
04/28/2025	25425	GREAT AMERICA LEASING CORP.	March copy machine lease	(1,527.81)
04/28/2025	25426	IN-SITU, INC.	Water quality meter annual maintenance	(1,451.40)
04/28/2025	25427	INLAND EMPIRE UTILITIES AGENCY	FY 24/25 Q3 Groundwater recharge O&M and FY 23/24 cost share	(508,254.92)
04/28/2025	25428	READY REFRESH	Office water dispenser April lease and deliveries	(116.92)
04/28/2025	25429	SOCALGAS	Utilities: Gas	(124.21)
04/28/2025	25430	STANDARD INSURANCE CO.	May life and disability coverage	(1,040.35)
04/28/2025	25431	VC3, INC.	Adobe subscription for Teams and virtual host warranty renewal	(3,295.94)
04/28/2025	25432	VERIZON WIRELESS	Internet services for extensometer site	(38.01)
04/28/2025	25433	WELL TEC SERVICES	New meter installation and calibration	(54,062.50)
04/28/2025	25434	WESTERN MUNICIPAL WATER DISTRICT		(375.00)
04/28/2025	25435	BROWNSTEIN HYATT FARBER SCHRECK	February legal services	(103,401.26)
04/28/2025	25436	EMPLOYMENTOR, INC.	January-April legal consultation and risk management training	(4,437.50)
04/28/2025	ACH4/28/25	PUBLIC EMPLOYEES' RETIREMENT SYSTEM	Annual Unfunded Accrued Liability-Plan 3299	(12,164.17)
04/28/2025	ACH4/28/25	PUBLIC EMPLOYEES' RETIREMENT SYSTEM	Annual Unfunded Accrued Liability-Plan 27239	(172.92)
			Total for Month $	**(947,556.19)**

Chino Basin Watermaster
Credit Card Expense Detail
April 2025

Date	Number	Description	Expense Account	Amount
04/16/2025	25409	**CALIFORNIA BANK & TRUST**		
		Amazon - Amazon Web Services - February 2025	6056 · Website Services	(287.92)
		Panera Bread - OPS Meeting	6141.1 · Meeting Supplies	(70.90)
		Microsoft Software - Mapping and visualization software subscription	6054 · Computer Software	(15.00)
		REV Subscription - Speech to text transcription services	6112 · Subscriptions/Publications	(29.99)
		Kalaveras - Lunch meeting - T. Corbin, S. Elie	6141.1 · Meeting Supplies	(56.41)
		Kara Korner - Administative meeting - T. Corbin, M. Zvirbulis	6141.1 · Meeting Supplies	(26.01)
		The Back Alley - Lunch meeting - T. Corbin, B. Bowcock	6141.1 · Meeting Supplies	(47.09)
		Kara Korner - Lunch meeting - T. Corbin, B. Kuhn	6141.1 · Meeting Supplies	(24.99)
		Amazon - Toner cartridge	6031.7 · General Office Supplies	(295.69)
		Engrave N' Embroider - Front door CBWM decal	6031.7 · General Office Supplies	(66.08)
		Mind Tools - Leadership and Management Learning Solutions - March 2025	6031.7 · General Office Supplies	(25.75)
		Costco - Meeting snacks and drinks	6312 · Board Meeting Expenses	(183.41)
		Costco - Office supplies	6031.7 · General Office Supplies	(82.06)
		Amazon - Headset	6031.7 · General Office Supplies	(19.40)
		BambooHR - HRIS and Timekeeping System	6061.2 · HRIS System	(230.14)
		Amazon - Get well soon gift card for Ruby	6031.7 · General Office Supplies	(40.00)
		BlueHost - Monthly Software Renewal - Standard VPN Server with cPanel	6056 · Website Services	(91.99)
		Dell Technologies - Laptop and dock station	6055 · Computer Hardware	(2,331.31)
		FromYouFlowers - Get well flowers for Ruby	6031.7 · General Office Supplies	(90.86)
		Mezzaterranean - Board meeting lunch 03/27/2025	6312 · Board Meeting Expenses	(322.00)
		Society for Human Resource Management - 2025 Annual Expo - A. Nelson	6191 · Conferences - General	(3,590.00)
		Society for Human Resource Management - 2025 Annual Expo - Lodging - A. Nelson	6191 · Conferences - General	(366.44)
		Weathertech - F-150 Lighting floor liner	6179 · Vehicle Purchase(s)	(293.13)
		Marriott Burbank Airport - CalPERS HR Benefits Conference - Lodging - A. Nelson	6191 · Conferences - General	(253.81)
		Amazon - Replacement speakers	6031.7 · General Office Supplies	(32.30)
			Total for Month	**$ (8,872.68)**

Chino Basin Watermaster
Combining Schedule of Revenues, Expenses & Changes in Net Assets
For the Period of July 1, 2024 through April 30, 2025
(Unaudited)

				POOL ADMINISTRATION & SPECIAL PROJECTS					
	JUDGMENT ADMIN.	OPTIMUM BASIN MGMT.	TOTAL JUDGMENT ADMIN & OBMP	AP POOL	OAP POOL	ONAP POOL	GROUND WATER REPLENISH.	GRAND TOTALS	ADOPTED BUDGET 2024-2025 WITH CARRYOVER
Administrative Revenues:									
Administrative Assessments	$ 9,834,155	$ -	$ 9,834,155	$ 99,200	$ -	$ 31,000	$ -	$ 9,964,355	$ 9,833,780
Interest Revenue	-	384,234	384,234	16,457	52,253	2,777	4,018	459,739	478,500
Groundwater Replenishment	-	-	-	-	-	-	(87,377)	(87,377)	-
Mutual Agency Project Revenue	191,073	-	191,073	-	-	-	-	191,073	191,070
Miscellaneous Income	1,468	-	1,468	-	-	-	-	1,468	-
Total Administrative Revenues	**10,026,695**	**384,234**	**10,410,930**	**115,657**	**52,253**	**33,777**	**(83,358)**	**10,529,258**	**10,503,350**
Administrative & Project Expenditures:									
Watermaster Administration	2,542,860	-	2,542,860	-	-	-	-	2,542,860	2,528,540
Watermaster Board-Advisory Committee	227,619	-	227,619	-	-	-	-	227,619	422,420
Optimum Basin Mgmt Administration	-	770,002	770,002	-	-	-	-	770,002	1,437,940
OBMP Project Costs	-	3,799,096	3,799,096	-	-	-	-	3,799,096	4,971,020
Pool Legal Services	-	-	-	82,722	127,800	12,859	-	223,381	-
Pool Meeting Compensation	-	-	-	-	18,875	4,750	-	23,625	-
Pool Special Projects	-	-	-	-	9,454	-	-	9,454	-
Pool Administration	-	-	-	-	-	-	-	-	370,660
Debt Service	-	955,086	955,086	-	-	-	-	955,086	772,770
Agricultural Expense Transfer [1]	-	-	-	156,129	(156,129)	-	-	-	-
Replenishment Water Assessments	-	-	-	-	-	-	54,425	54,425	180,234
Total Administrative Expenses	**2,770,480**	**5,524,184**	**8,294,664**	**238,851**	**-**	**17,609**	**54,425**	**8,605,549**	**10,683,584**
Net Ordinary Income	**7,256,216**	**(5,139,950)**	**2,116,266**	**(123,194)**	**52,253**	**16,168**	**(137,783)**	**1,923,709**	**(180,234)**
Other Income/(Expense)									
Refund-Recharge Debt Service	-	-	-	-	-	-	-	-	-
Carryover Budget*	-	-	-	-	-	-	-	-	454,875
Net Other Income/(Expense)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**454,875**
Net Transfers To/(From) Reserves	**$ 7,256,216**	**$ (5,139,950)**	**$ 2,116,266**	**$ (123,194)**	**$ 52,253**	**$ 16,168**	**$ (137,783)**	**$ 1,923,709**	**$ 274,640**
Net Assets, July 1, 2024			8,794,214	555,405	1,404,964	65,733	180,234	11,000,551	
Refund-Excess Operating Reserves			-					-	
Net Assets, End of Period			**10,910,480**	**432,211**	**1,457,217**	**81,901**	**42,451**	**12,924,260**	
Pool Assessments Outstanding				(86,315)	(586,852)	-			
Payments received in FY 25 for prior year assessments				231,381	-	-			
Pool Fund Balance				$ 577,276	$ 870,365	$ 81,901			

[1] Fund balance transfer as agreed to in the Peace Agreement.

*Carryover budget will be updated once the refund for excess operating reserves has been finalized.

Chino Basin Watermaster
Treasurer's Report
April 2025

	Type	Monthly Yield	Cost	Market	% Total
Cash & Investments					
Local Agency Investment Fund (LAIF) *	Investment	4.28%	$ 665,832	$ 666,398	4.5%
CA CLASS Prime Fund **	Investment	4.39%	13,087,117	$ 13,086,802	88.4%
Bank of America	Checking		1,056,327	1,056,327	7.1%
Bank of America	Payroll		-	-	0.0%
Total Cash & Investments			**$ 14,809,276**	**$ 14,809,526**	**100.0%**

* The LAIF Market Value factor is updated quarterly in September, December, March, and June.

** The CLASS Prime Fund Net Asset Value factor is updated monthly.

Certification

I certify that (1) all investment actions executed since the last report have been made in full compliance with Chino Basin Watermaster's Investment Policy, and (2) Funds on hand are sufficient to meet all foreseen and planned administrative and project expenditures for the next six months.

Anna Nelson, Director of Administration

Prepared By:
Daniela Uriarte, Senior Accountant

Chino Basin Watermaster
Budget to Actual
For the Period July 1, 2024 to April 30, 2025
(Unaudited)

		April 2024	YTD Actual	FY 25 Adopted Budget with Carryover	$ Over / (Under) Budget	% of Budget
1	**Administration Revenue**					
2	Local Agency Subsidies	$ -	$ 191,073	$ 191,070	$ 3	100%
3	Admin Assessments-Appropriative Pool	-	9,497,193	9,521,030	(23,837)	100%
4	Admin Assessments-Non-Ag Pool	-	336,962	312,750	24,212	108%
5	**Total Administration Revenue**	**-**	**10,025,228**	**10,024,850**	**378**	**100%**
6	**Other Revenue**					
7	Appropriative Pool-Replenishment	-	(103,383)	-	(103,383)	N/A
8	Non-Ag Pool-Replenishment	-	16,006	-	16,006	N/A
9	Interest Income	48,268	384,234	478,500	(94,266)	80%
10	Miscellaneous Income	-	1,468	-	1,468	N/A
11	Carryover Budget	-	-	454,875	(454,875)	0%
12	**Total Other Revenue**	**48,268**	**298,325**	**933,375**	**(635,050)**	**32%**
13	**Total Revenue**	**48,268**	**10,323,553**	**10,958,225**	**(634,672)**	**94%**
14	**Judgment Administration Expense**					
15	Judgment Administration	46,862	367,664	721,010	(353,346)	51%
16	Admin. Salary/Benefit Costs	75,981	1,002,053	1,032,120	(30,067)	97%
17	Office Building Expense	17,416	197,295	234,470	(37,175)	84%
18	Office Supplies & Equip.	2,174	24,414	46,760	(22,346)	52%
19	Postage & Printing Costs	1,528	19,196	32,950	(13,754)	58%
20	Information Services	10,379	120,633	232,530	(111,897)	52%
21	Contract Services	1,385	48,023	111,460	(63,437)	43%
22	Watermaster Legal Services	48,097	687,302	414,060	273,242	166%
23	Insurance	-	38,572	50,950	(12,378)	76%
24	Dues and Subscriptions	30	19,792	25,900	(6,108)	76%
25	Watermaster Administrative Expenses	499	8,053	9,630	(1,577)	84%
26	Field Supplies	229	2,228	3,200	(972)	70%
27	Travel & Transportation	2,411	85,983	104,960	(18,977)	82%
28	Training, Conferences, Seminars	4,565	21,697	49,370	(27,673)	44%
29	Advisory Committee Expenses	7,850	43,663	134,130	(90,467)	33%
30	Watermaster Board Expenses	22,835	183,956	288,290	(104,334)	64%
31	ONAP - WM & Administration	2,586	34,276	120,940	(86,664)	28%
32	OAP - WM & Administration	4,129	49,225	124,220	(74,995)	40%
33	Appropriative Pool- WM & Administration	10,784	119,270	125,500	(6,230)	95%
34	Allocated G&A Expenditures	(32,737)	(302,816)	(540,830)	238,014	56%
35	**Total Judgment Administration Expense**	**227,003**	**2,770,480**	**3,321,620**	**(551,140)**	**83%**
36	**Optimum Basin Management Plan (OBMP)**					
37	Optimum Basin Management Plan	113,084	770,002	1,437,940	(667,938)	54%
38	Groundwater Level Monitoring	46,802	384,862	585,050	(200,188)	66%
39	Program Element (PE)2- Comp Recharge	525,753	1,544,811	1,774,300	(229,489)	87%
40	PE3&5-Water Supply/Desalte	47,058	90,521	122,010	(31,489)	74%
41	PE4- Management Plan	66,836	356,793	412,400	(55,607)	87%
42	PE6&7-CoopEfforts/SaltMgmt	89,231	632,515	669,380	(36,865)	94%
43	PE8&9-StorageMgmt/Conj Use	102,784	486,778	867,050	(380,272)	56%
44	Recharge Improvements	-	955,086	772,770	182,316	124%
45	Administration Expenses Allocated-OBMP	10,310	107,776	232,750	(124,975)	46%
46	Administration Expenses Allocated-PE 1-9	22,427	195,040	308,080	(113,040)	63%
47	**Total OBMP Expense**	**1,024,285**	**5,524,184**	**7,181,730**	**(1,657,546)**	**77%**
48	**Other Expense**					
49	Groundwater Replenishment	-	54,425	180,234	(125,810)	30%
50	Other Expenses	-	-	-	-	N/A
51	**Total Other Expense**	**-**	**54,425**	**180,234**	**(125,810)**	**30%**
52	**Total Expenses**	**1,251,288**	**8,349,089**	**10,683,584**	**(2,334,496)**	**78%**
53	**Increase / (Decrease) to Reserves**	**$ (1,203,020)**	**$ 1,974,464**	**$ 274,640**	**$ 1,699,824**	

Chino Basin Watermaster
Monthly Variance Report & Supplemental Schedules
For the period July 1, 2024 to April 30, 2025
(Unaudited)

Budget to Actual

The Budget to Actual report summarizes the operating and non-operating revenues and expenses of Chino Basin Watermaster for the fiscal year-to-date (YTD). Columns are included for current monthly and YTD activity shown comparatively to the FY 25 adopted budget. The final two columns indicate the amount over or under budget, and the YTD percentage of total budget used. As of April 30th, the target budget percentage is generally 83%.

Revenues

Lines 1-5 Administration Revenue – Includes local agency subsidies and administrative assessment for the Appropriative, Agricultural and Non-Agricultural Pools. Below is a summary of notable account variances at month end:

- Line 2 Local Agency Subsidies includes the annual Dy Year Yield (DYY) administrative fee received. This account is at 100% of budget due to the timing of payment.
- Line 3-4 Administrative Assessments for the Appropriative and Non-Agricultural Pools include annual assessment invoices issued in November of each year. The Non-Agricultural Pool line is over budget due to changes in actual versus projected production.

Lines 6-12 Other Revenue – Includes Pool replenishment assessments, interest income, miscellaneous income, and carryover budget from prior years.

Expenses

Lines 14-35 Judgment Administration Expense – Includes Watermaster general administrative expenses, contract services, insurance, office and other administrative expenses. Below is a summary of notable account variances at month end:

- Line 16 Admin Salary/Benefit Costs includes wages and benefits for Watermaster administrative staff. The account is at 97% of budget due to vacation and severance payouts done in July.
- Line 22 Watermaster Legal Services includes outside legal counsel expenses. The account is over budget due to personnel matters not anticipated in the budget.
- Line 27 Travel & Transportation includes travel and transportation costs related to Watermaster business, not related to conferences and seminars, vehicle fuel, repairs and maintenance, and vehicle purchases. The account is at 80% of budget due to the timing of the new field vehicle purchase.

Lines 36-47 Optimum Basin Management Plan (OBMP) Expense – Includes legal, engineering, groundwater level monitoring, allocated administrative expenses, and other expenses.

Lines 48-51 Other Expense – Includes groundwater replenishment, settlement expenses, and various refunds as appropriate.

Chino Basin Watermaster

Monthly Variance Report & Supplemental Schedules
For the period July 1, 2024 to April 30, 2025
(Unaudited)

Pool Services Fund Accounting

Each Pool has a fund account created to pay their own legal service invoices. The legal services invoices are funded and paid using the fund accounts (8467 for the Overlying Agricultural Pool (OAP), 8567 for the Overlying Non-Agricultural Pool (ONAP), and 8367 for the Appropriate Pool (AP)). Along with the legal services fund account for the OAP (8467), the OAP also has two other fund accounts for Ag Pool Meeting Attendance expenses (8470), and Special Projects expenses (8471). The ONAP also has a meeting compensation fund account (8511). Additionally, the OAP has a reserve fund that is held by Watermaster and spent at the direction of the OAP. The AP also has account 8368 relating to the Tom Harder contract. These fund accounts are replenished at the direction of each Pool, and the legal service invoices are approved by the Pool leadership and when paid by Watermaster, are deducted from the existing fund account balances. If the fund account for any pool reaches zero, no further payments can be paid from the fund and a replenishment action must be initiated by the Pool.

The following tables detail the fund balance accounts as of April 30, 2025 (continued next page):

Fund Balance For Non-Agricultural Pool **Account 8567 - Legal Services**	
Beginning Balance July 1, 2024:	$ 63,483.09
Additions:	
Interest Earnings	2,776.63
Payments received on ONAP Assessment invoices issued 11/26/24	25,000.00
Subtotal Additions:	27,776.63
Reductions:	
Invoices paid July 2024 - April 2025	(12,859.00)
Subtotal Reductions:	(12,859.00)
Available Fund Balance as of Apr. 30, 2025	**$ 78,400.72**

Fund Balance For Appropriative Pool **Account 8367 - Legal Services**	
Beginning Balance July 1, 2024:	$ (9,472.87)
Additions:	
Interest Earnings	16,456.90
Payments received on AP Assessment invoices issued 11/18/21	27,343.35
Payments received on AP Assessment invoices issued 4/21/22	39,013.34
Payments received on AP Assessment invoices issued 10/14/22	70,478.86
Payments received on AP Assessment invoices issued 4/19/23	26,262.54
Payments received on AP Assessment invoices issued 10/30/23	68,282.61
Payments received on AP Assessment invoices issued 11/26/24	67,701.53
Payments received for appeal legal expenses 2/28/25	31,498.58
Subtotal Additions:	347,037.71
Reductions:	
Invoices paid July 2024 - April 2025	(82,722.38)
Subtotal Reductions:	(82,722.38)
Available Fund Balance as of Apr. 30, 2025	**$ 254,842.46**

Fund Balance For Non-Agricultural Pool **Account 8511 - Meeting Compensation**	
Beginning Balance July 1, 2024:	$ 2,250.00
Additions:	
Payments received on ONAP Assessment invoices issued 11/26/24	6,000.00
Subtotal Additions:	6,000.00
Reductions:	
Compensation paid July 2024 - April 2025	(4,750.00)
Subtotal Reductions:	(4,750.00)
Available Fund Balance as of Apr. 30, 2025	**$ 3,500.00**

Fund Balance For Appropriative Pool **Account 8368 - Tom Harder Contract**	
Beginning Balance July 1, 2024:	$ 20,577.61
Additions:	
Subtotal Additions:	-
Reductions:	
Invoices paid July 2024 - April 2025	-
Subtotal Reductions:	-
Available Fund Balance as of Apr. 30, 2025	**$ 20,577.61**

Pool Services Fund Accounting – Cont.

Fund Balance for Agricultural Pool
Account 8467 - Legal Services (Held by AP)

Beginning Balance July 1, 2024*:	$	388,647.51
Reductions:		
Invoices paid July 2024 - April 2025		(127,800.00)
Subtotal Reductions:		(127,800.00)
Available Fund Balance as of Apr. 30, 2025	**$**	**260,847.51**

*Balance includes payments received totaling $262,832.38 for Settlement Agreement outstanding invoices issued Apr. 15, 2022 and Jun. 17, 2022.

Agricultural Pool Reserve Funds
As shown on the Combining Schedules

Beginning Balance July 1, 2024*:	$	818,112.17
Additions:		
YTD Interest earned on Ag Pool Funds FY 25		52,252.64
Transfer of Funds from AP to Special Fund for Legal Service Invoices		127,800.00
Total Additions:		180,052.64
Reductions:		
Legal service invoices paid July 2024 - April 2025		(127,800.00)
Subtotal Reductions:		(127,800.00)
Agricultural Pool Reserve Funds Balance as of Apr. 30, 2025:	**$**	**870,364.81**

*Balance includes payments of $102,245.10 and $42,025.61 received in FY 24 for outstanding invoices issued Sep. 9, 2022 and Apr. 20, 2023 for Ag Pool legal services, respectively.

Fund Balance For Agricultural Pool
Account 8470 - Meeting Compensation (Held by AP)

Beginning Balance July 1, 2024:	$	17,694.65
Additions:		
Budget Transfers[1]		30,000.00
Subtotal Additions:		30,000.00
Reductions:		
Compensation paid July 2024 - April 2025		(18,875.00)
Subtotal Reductions:		(18,875.00)
Available Fund Balance as of Apr. 30, 2025	**$**	**28,819.65**

[1] Transfer scheduled in April 16, 2025 per communication with OAP legal counsel.

Fund Balance For Agricultural Pool
Account 8471 - Special Projects (Held by AP)

Beginning Balance July 1, 2024:	$	51,643.00
Reductions:		
Invoices paid July 2024 - April 2025		(9,454.00)
Budget Transfers[1]		(30,000.00)
Subtotal Reductions:		(39,454.00)
Available Fund Balance as of Apr. 30, 2025	**$**	**12,189.00**

[1] Transfer scheduled in April 16, 2025 per communication with OAP legal counsel.

Chino Basin Watermaster
Monthly Variance Report & Supplemental Schedules
For the period July 1, 2024 to April 30, 2025
(Unaudited)

Watermaster Salary Expenses

The following table details the Year-To-Date (YTD) Actual Watermaster burdened salary costs compared to the FY 25 adopted budget. The "$ Over Budget" and the "% of Budget" columns are a comparison of the YTD actual to the annual budget. As of April 30th, the target budget percentage is generally 83%.

	Year to Date Actual	FY 24-25 Budget	$ Over / (Under) Budget	% of Budget
WM Salary Expense				
5901.1 · Judgment Admin - Doc. Review	50,624	93,860	(43,236)	53.9%
5901.3 · Judgment Admin - Field Work	1,716	11,860	(10,144)	14.5%
5901.5 · Judgment Admin - General	9,440	81,090	(71,650)	11.6%
5901.7 · Judgment Admin - Meeting	31,996	39,710	(7,714)	80.6%
5901.9 · Judgment Admin - Reporting	3,557	13,890	(10,333)	25.6%
5910 · Judgment Admin - Court Coord./Attendance	7,464	16,970	(9,506)	44.0%
5911 · Judgment Admin - Exhibit G	1,588	6,400	(4,812)	24.8%
5921 · Judgment Admin - Production Monitoring	1,002	5,440	(4,438)	18.4%
5931 · Judgment Admin - Recharge Applications	2,318	-	2,318	100.0%
5941 · Judgment Admin - Reporting	1,648	2,140	(492)	77.0%
5951 · Judgment Admin - Rules & Regs	1,682	11,260	(9,578)	14.9%
5961 · Judgment Admin - Safe Yield	46,485	9,510	36,975	488.8%
5971 · Judgment Admin - Storage Agreements	6,427	13,000	(6,573)	49.4%
5981 · Judgment Admin - Water Accounting/Database	75,884	108,290	(32,406)	70.1%
5991 · Judgment Admin - Water Transactions	4,703	5,330	(627)	88.2%
6011.11 · WM Staff - Overtime	6,786	18,000	(11,214)	37.7%
6011.10 · Admin - Accounting	184,438	278,330	(93,892)	66.3%
6011.15 · Admin - Building Admin	48,305	31,200	17,105	154.8%
6011.20 · Admin - Conference/Seminars	34,015	58,530	(24,516)	58.1%
6011.25 · Admin - Document Review	38,079	2,620	35,459	1453.4%
6011.50 · Admin - General	256,068	362,560	(106,492)	70.6%
6011.60 · Admin - HR	96,882	50,450	46,432	192.0%
6011.70 · Admin - IT	68,519	34,070	34,449	201.1%
6011.80 · Admin - Meeting	85,549	39,760	45,789	215.2%
6011.90 · Admin - Team Building	19,750	41,550	(21,800)	47.5%
6011.95 · Admin - Training (Give/Receive)	27,422	64,160	(36,738)	42.7%
6017· Temporary Services	24,229	26,040	(1,811)	93.0%
6201 · Advisory Committee	23,167	82,850	(59,683)	28.0%
6301 · Watermaster Board	73,855	83,910	(10,056)	88.0%
8301 · Appropriative Pool	91,324	67,280	24,044	135.7%
8401 · Agricultural Pool	26,326	66,000	(39,674)	39.9%
8501 · Non-Agricultural Pool	16,176	62,710	(46,534)	25.8%
6901.1 · OBMP - Document Review	25,991	95,290	(69,299)	27.3%
6901.3 · OBMP - Field Work	1,153	50,870	(49,717)	2.3%
6901.5 · OBMP - General	84,202	81,120	3,082	103.8%
6901.7 · OBMP - Meeting	29,573	80,360	(50,787)	36.8%
6901.9 · OBMP - Reporting	9,188	11,040	(1,852)	83.2%
7104.1 · PE1 - Monitoring Program	163,506	275,490	(111,984)	59.4%
7201 · PE2 - Comprehensive Recharge	64,278	71,750	(7,472)	89.6%
7301 · PE3&5 - Water Supply/Desalter	934	9,510	(8,576)	9.8%
7301.1 · PE5 - Reg. Supply Water Prgm.	840	9,510	(8,671)	8.8%
7401 · PE4 - MZ1 Subsidence Mgmt. Plan	1,759	14,040	(12,281)	12.5%
7501 · PE6 - Coop. Programs/Salt Mgmt.	9,876	9,510	366	103.9%
7501.1 · PE 7 - Salt Nutrient Mgmt. Plan	6,753	9,510	(2,757)	71.0%
7601 · PE8&9 - Storage Mgmt./Recovery	23,804	22,520	1,284	105.7%
Subtotal WM Staff Costs	**1,790,844**	**2,529,290**	**(738,446)**	**71%**
60184.1 · Administrative Leave	-	6,550	(6,550)	0.0%
60185 · Vacation	99,087	90,280	8,807	109.8%
60185.1 · Comp Time	8,069	-	8,069	100.0%
60186 · Sick Leave	39,009	79,450	(40,441)	49.1%
60187 · Holidays	79,737	99,330	(19,593)	80.3%
Subtotal WM Paid Leaves	**225,903**	**275,610**	**(49,707)**	**82%**
Total WM Salary Costs	**2,016,747**	**2,804,900**	**(788,153)**	**71.9%**

Engineering

The following table details the Year-To-Date (YTD) Actual Engineering costs compared to the FY 24 adopted budget. The "$ Over Budget" and the "% of Budget" columns are a comparison of the YTD actual to the annual budget. As of April 30th, the target budget percentage is generally 83%.

	Year to Date Actual	FY 24-25 Budget	$ Over / (Under) Budget	% of Budget
Engineering Services Costs				
5901.8 · Judgment Admin - Meetings-Engineering Services	$ -	$ 37,066	$ (37,066)	0.0%
5906.71 · Judgment Admin - Data Requests-CBWM Staff	45,580	101,048	(55,468)	45.1%
5906.72 · Judgment Admin - Data Requests-Non-CBWM Staff	38,411	37,008	1,403	103.8%
5925 · Judgment Admin - Ag Production & Estimation	22,992	31,096	(8,104)	73.9%
5935 · Judgment Admin - Mat'l Physical Injury Requests	1,488	39,452	(37,965)	3.8%
5945 · Judgment Admin - WM Annual Report Preparation	12,659	16,924	(4,266)	74.8%
5965 · Judgment Admin - Support Data Collection & Mgmt Process	-	39,659	(39,659)	0.0%
6206 · Advisory Committee Meetings-WY Staff	9,042	23,510	(14,468)	38.5%
6306 · Watermaster Board Meetings-WY Staff	21,633	23,510	(1,877)	92.0%
8306 · Appropriative Pool Meetings-WY Staff	16,767	23,510	(6,743)	71.3%
8406 · Agricultural Pool Meetings-WY Staff	11,720	23,510	(11,790)	49.9%
8506 · Non-Agricultural Pool Meetings-WY Staff	6,921	23,510	(16,589)	29.4%
6901.8 · OBMP - Meetings-WY Staff	39,449	37,066	2,383	106.4%
6901.95 · OBMP - Reporting-WY Staff	56,567	62,606	(6,039)	90.4%
6906 · OBMP Engineering Services - Other	59,079	51,440	7,639	114.8%
6906.1 · OBMP Watermaster Model Update	6,552	67,596	(61,044)	9.7%
6906.21 · State of the Basin Report	131,212	195,188	(63,977)	67.2%
7104.3 · Grdwtr Level-Engineering	184,319	254,627	(70,308)	72.4%
7104.8 · Grdwtr Level-Contracted Services	12,992	26,174	(13,183)	49.6%
7104.9 · Grdwtr Level-Capital Equipment	4,896	17,000	(12,104)	28.8%
7202 · PE2-Comp Recharge-Engineering Services	13,340	23,496	(10,156)	56.8%
7202.2 · PE2-Comp Recharge-Engineering Services	150,467	75,944	74,523	198.1%
7302 · PE3&5-PBHSP Monitoring Program	80,402	73,305	7,097	109.7%
7303 · PE3&5-Engineering - Other	3,855	16,180	(12,325)	23.8%
7306 · PE3&5-Engineering - Outside Professionals	-	6,500	(6,500)	0.0%
7402 · PE4-Engineering	209,680	281,239	(71,559)	74.6%
7402.10 · PE4-Northwest MZ1 Area Project	83,007	16,656	66,351	498.4%
7403 · PE4-Eng. Services-Contracted Services-InSar	27,677	39,600	(11,924)	69.9%
7406 · PE4-Engineering Services-Outside Professionals	28,346	38,600	(10,254)	73.4%
7408 · PE4-Engineering Services-Network Equipment	2,963	17,553	(14,590)	16.9%
7502 · PE6&7-Engineering	288,333	398,309	(109,976)	72.4%
7505 · PE6&7-Laboratory Services	48,482	61,242	(12,761)	79.2%
7510 · PE6&7-IEUA Salinity Mgmt. Plan	20,880	-	20,880	100.0%
7511 · PE6&7-SAWBMP Task Force-50% IEUA	3,577	27,067	(23,491)	13.2%
7517 · Surface Water Monitoring Plan-Chino Creek - 50% IEUA	24,140	33,574	(9,434)	71.9%
7520 · Preparation of Water Quality Mgmt. Plan	2,783	130,164	(127,381)	2.1%
7610 · PE8&9-Support 2020 Mgmt. Plan	-	32,584	(32,584)	0.0%
7614 · PE8&9-Support Imp. Safe Yield Court Order	462,974	768,963	(305,989)	60.2%
7615 · PE8&9-Develop 2025 Storage Plan	-	42,632	(42,632)	0.0%
Total Engineering Services Costs	**$ 2,133,182**	**$ 3,215,108**	**$ (1,081,926)**	**66.3%**

Legal

The following table details the YTD Brownstein Hyatt Farber Schreck (BHFS) expenses and costs compared to the FY 24 adopted budget. The "$ Over Budget" and the "% of Budget" columns are a comparison of the YTD actual to the annual budget. As of April 30th, the target budget percentage is generally 83%.

	Year to Date Actual	FY 24-25 Budget	$ Over / (Under) Budget	% of Budget
6070 · Watermaster Legal Services				
6071 · BHFS Legal - Court Coordination	$ 243,918	$ 144,040	$ 99,878	169.3%
6072 · BHFS Legal - Rules & Regulations	5,308	10,495	(5,187)	50.6%
6073 · BHFS Legal - Personnel Matters	295,602	28,150	267,452	1050.1%
6074 · BHFS Legal - Interagency Issues	-	40,536	(40,536)	0.0%
6077 · BHFS Legal - Party Status Maintenance	-	13,590	(13,590)	0.0%
6078 · BHFS Legal - Miscellaneous (Note 1)	142,474	177,240	(34,766)	80.4%
Total 6070 · Watermaster Legal Services	**687,302**	**414,051**	**273,251**	**166.0%**
6275 · BHFS Legal - Advisory Committee	11,454	27,764	(16,310)	41.3%
6375 · BHFS Legal - Board Meeting	58,886	88,704	(29,818)	66.4%
6375.1 · BHFS Legal - Board Workshop(s)	-	29,215	(29,215)	0.0%
8375 · BHFS Legal - Appropriative Pool	11,179	34,705	(23,526)	32.2%
8475 · BHFS Legal - Agricultural Pool	11,179	34,705	(23,526)	32.2%
8575 · BHFS Legal - Non-Ag Pool	11,179	34,705	(23,526)	32.2%
Total BHFS Legal Services	**103,877**	**249,798**	**(145,921)**	**41.6%**
6907.3 · WM Legal Counsel				
6907.31 · Archibald South Plume	-	12,565	(12,565)	0.0%
6907.32 · Chino Airport Plume	-	12,565	(12,565)	0.0%
6907.33 · Desalter/Hydraulic Control	-	38,680	(38,680)	0.0%
6907.34 · Santa Ana River Water Rights	1,972	21,405	(19,433)	9.2%
6907.36 · Santa Ana River Habitat	-	31,280	(31,280)	0.0%
6907.38 · Reg. Water Quality Cntrl Board	5,280	63,200	(57,920)	8.4%
6907.39 · Recharge Master Plan	87,479	14,270	73,209	613.0%
6907.41 · Prado Basin Habitat Sustainability	1,902	10,290	(8,389)	18.5%
6907.44 · SGMA Compliance	1,294	10,290	(8,996)	12.6%
6907.45 · OBMP Update	14,497	177,240	(162,743)	8.2%
6907.47 · 2020 Safe Yield Reset	76,390	80,190	(3,800)	95.3%
6907.48 · Ely Basin Investigation	5,633	64,890	(59,257)	8.7%
6907.49 · San Sevaine Basin Discharge	80,664	110,080	(29,416)	73.3%
6907.90 · WM Legal Counsel - Unanticipated	-	38,885	(38,885)	0.0%
Total 6907 · WM Legal Counsel	**275,110**	**685,830**	**(410,720)**	**40.1%**
Total Brownstein, Hyatt, Farber, Schreck Costs	**$ 1,066,290**	**$ 1,349,679**	**$ (283,389)**	**79.0%**

Optimum Basin Management Plan (OBMP)

The following table details the Year-To-Date (YTD) Actual OBMP costs compared to the FY 24 adopted budget. The "$ Over Budget" and the "% of Budget" columns are a comparison of the YTD actual to the annual budget. As of April 30th, the target budget percentage is generally 83%.

	Year to Date Actual	FY 24-25 Budget	$ Over / (Under) Budget	% of Budget
6900 · Optimum Basin Mgmt Plan				
6901.1 · OBMP - Document Review-WM Staff	$ 25,991	$ 95,294	$ (69,303)	27.3%
6901.3 · OBMP - Field Work-WM Staff	1,153	50,870	(49,717)	2.3%
6901.5 · OBMP - General-WM Staff	84,202	81,120	3,082	103.8%
6901.7 · OBMP - Meeting-WM Staff	29,573	80,360	(50,787)	36.8%
6901.8 · OBMP - Meeting-West Yost	39,449	37,066	2,383	106.4%
6901.9 · OBMP - Reporting-WM Staff	9,188	11,040	(1,852)	83.2%
6901.95 · OBMP - Reporting-West Yost	56,567	62,606	(6,039)	90.4%
Total 6901 · OBMP WM and West Yost Staff	**246,123**	**418,356**	**(172,233)**	**58.8%**
6903 · OBMP - SAWPA				
6903 · OBMP - SAWPA Group	15,984	15,990	(6)	100.0%
Total 6903 · OBMP - SAWPA	**15,984**	**15,990**	**(6)**	**100.0%**
6906 · OBMP Engineering Services				
6906.1 · OBMP - Watermaster Model Update	6,552	67,596	(61,044)	9.7%
6906.21 · State of the Basin Report	131,212	195,188	(63,977)	67.2%
6906 · OBMP Engineering Services - Other	59,079	51,440	7,639	114.8%
Total 6906 · OBMP Engineering Services	**196,842**	**314,224**	**(117,382)**	**62.6%**
6907 · OBMP Legal Fees				
6907.31 · Archibald South Plume	-	12,565	(12,565)	0.0%
6907.32 · Chino Airport Plume	-	12,565	(12,565)	0.0%
6907.33 · Desalter/Hydraulic Control	-	38,680	(38,680)	0.0%
6907.34 · Santa Ana River Water Rights	1,972	21,405	(19,433)	9.2%
6907.36 · Santa Ana River Habitat	-	31,280	(31,280)	0.0%
6907.38 · Reg. Water Quality Cntrl Board	5,280	63,200	(57,920)	8.4%
6907.39 · Recharge Master Plan	87,479	14,270	73,209	613.0%
6907.41 · Prado Basin Habitat Sustainability	1,902	10,290	(8,389)	18.5%
6907.44 · SGMA Compliance	1,294	10,290	(8,996)	12.6%
6907.45 · OBMP Update	14,497	177,240	(162,743)	8.2%
6907.47 · 2020 Safe Yield Reset	76,390	80,190	(3,800)	95.3%
6907.48 · Ely Basin Investigation	5,633	64,890	(59,257)	8.7%
6907.49 · San Sevaine Basin Discharge	80,664	110,080	(29,416)	73.3%
6907.90 · WM Legal Counsel - Unanticipated	-	38,885	(38,885)	0.0%
Total 6907 · OBMP Legal Fees	**275,110**	**685,830**	**(410,720)**	**40.1%**
6909 · OBMP Other Expenses				
6909.6 · OBMP Expenses - Miscellaneous	-	-	-	0.0%
Total 6909 · OBMP Other Expenses	**2,172**	**3,540**	**(1,368)**	**61.4%**
Total 6900 · Optimum Basin Mgmt Plan	**$ 736,231**	**$ 1,437,940**	**$ (701,709)**	**51.2%**

Judgment Administration

The following table details the Year-To-Date (YTD) Actual Judgment Administration costs compared to the FY 24 adopted budget. The "$ Over Budget" and the "% of Budget" columns are a comparison of the YTD actual to the annual budget. As of April 30th, the target budget percentage is generally 83%.

	Year to Date Actual	FY 24-25 Budget	$ Over / (Under) Budget	% of Budget
5901 · Admin-WM Staff				
5901.1 · Admin-Doc. Review-WM Staff	$ 50,624	$ 93,860	$ (43,236)	53.9%
5901.3 · Admin-Field Work-WM Staff	1,716	11,860	(10,144)	14.5%
5901.5 · Admin-General-WM Staff	9,440	81,090	(71,650)	11.6%
5901.7 · Admin-Meeting-WM Staff	31,996	39,710	(7,714)	80.6%
5901.8 · Admin-Meeting - West Yost	-	37,066	(37,066)	0.0%
5901.9 · Admin-Reporting-WM Staff	3,557	13,890	(10,333)	25.6%
Total 5901 · Admin-WM Staff	**97,333**	**277,476**	**(180,143)**	**35.1%**
5900 · Judgment Admin Other Expenses				
5906.71 · Admin-Data Req-CBWM Staff	45,580	101,048	(55,468)	45.1%
5906.72 · Admin-Data Req-Non CBWM Staff	38,411	37,008	1,403	103.8%
5910 · Court Coordination/Attend-WM	7,464	16,970	(9,506)	44.0%
5911 · Exhibit G-WM Staff	1,588	6,400	(4,812)	24.8%
5921 · Production Monitoring-WM Staff	1,002	5,440	(4,438)	18.4%
5925 · Ag Prod & Estimation-West Yost	22,992	31,096	(8,104)	73.9%
5931 · Recharge Applications-WM Staff	2,318	-	2,318	100.0%
5935 · Admin-Mat'l Phy Inj Requests	1,488	39,459	(37,972)	3.8%
5941 · Reporting-WM Staff	1,648	2,140	(492)	77.0%
5945 · WM Annual Report Prep-West Yost	12,659	16,924	(4,266)	74.8%
5951 · Rules & Regs-WM Staff	1,682	11,260	(9,578)	14.9%
5961 · Safe Yield-WM Staff	46,485	9,510	36,975	488.8%
5965 · Support Data Collect-West Yost	-	39,659	(39,659)	0.0%
5971 · Storage Agreements-WM Staff	6,427	13,000	(6,573)	49.4%
5981 · Water Acct/Database-WM Staff	75,884	108,290	(32,406)	70.1%
5991 · Water Transactions-WM Staff	4,703	5,330	(627)	88.2%
Total 5900 · Judgment Admin Other Expenses	**270,330**	**443,534**	**(173,204)**	**60.9%**
Total 5900 · Judgment Administration	**$ 367,664**	**$ 721,010**	**$ (353,346)**	**51.0%**

"Carry Over" Funding:

During the month of July 2023, the "Carry Over" funding was calculated. The Total "Carry Over" funding amount of $2,277,561.54 has been posted to the general ledger accounts. The total amount consisted of $870,226.24 from Engineering Services, $816,709.78 from Capital Improvement Projects, $464,627.66 from OBMP Activities, $111,461.18 from Pool Funding Accounts, and $14,536.68 from Administration Services. More detailed information is provided in the table below.

Carry Over Budget Detail - FY 23/24

Description	Amount	Account	Fiscal Year	Type
Other Office Equipment - Boardroom Upgrades	$ 10,037.93	6038	FY 2020/21	ADMIN
Board Workshop Expenses - Misc.	4,498.75	6375.2	FY 2021/22	ADMIN
Meter Installation - New Meter Installation	175,400.00	7540	FY 2018/19	OBMP
Meter Installation - Calibration and Testing	181,650.00	7545	FY 2018/19	OBMP
2022 OBMP Update - Dodson & Asso.	107,577.66	6908.1	FY 2022/23	OBMP
Watermaster Model Update	34,206.75	5906.1	FY 2022/23	ENG
Groundwater Level Monitoring Program	2,700.00	7104.3	FY 2022/23	ENG
PE2 - Comprehensive Recharge - Eng. Services	27,943.64	7202.2	FY 2020/21	ENG
PE2 - Comprehensive Recharge - Eng. Services	18,441.85	7202.2	FY 2021/22	ENG
PE2 - Comprehensive Recharge - Eng. Services	72,788.26	7202.2	FY 2022/23	ENG
SB88-Specs-Ensure Compliance-50% IEUA	54,012.38	7208	FY 2020/21	ENG
OBMP - 2023 RMPU	60,000.00	7210	FY 2022/23	ENG
Integrated Model - Meetings - 50% IEUA Costs	24,617.63	7220	FY 2021/22	ENG
PBHSP - Monitoring, Data Analysis, Reporting	21,000.00	7302	FY 2022/23	ENG
OBMP - Engineering Services	65,208.75	7402	FY 2022/23	ENG
PE4 - Northwest MZ-1 Area Project	23,805.91	7402.1	FY 2021/22	ENG
PE4 - Northwest MZ-1 Area Project	126,194.09	7402.1	FY 2022/23	ENG
PE4/MZ-1: InSAR - Outside Pro	85,000.00	7403	FY 2022/23	ENG
Ground Level Monitoring - Capital Equipment	5,000.00	7408	FY 2022/23	ENG
PE6-7: Coop Efforts/Salt Management:	40,000.00	7502	FY 2022/23	ENG
Groundwater Quality Monitoring Program	16,194.00	7505	FY 2022/23	ENG
Hydraulic Control Mitigation Plan Update-50% IEUA	9,687.25	7508	FY 2021/22	ENG
Hydraulic Control Mitigation Plan Update-50% IEUA	1,016.00	7508	FY 2022/23	ENG
IEUA - Update Recycle Water Permit - Salinity	19,752.23	7510	FY 2021/22	ENG
PE8&9 - Support Imp. 2020 Storage Mgmt. Plan	42,657.50	7610	FY 2020/21	ENG
Support Implementation of the Safe Yield Court Order:	120,000.00	7614	FY 2022/23	ENG
Upper Santa Ana River HCP (TO #7)	15,062.88	7690.7	FY 2014/15	PROJ
Upper Santa Ana River HCP (TO #7)	5,000.00	7690.7	FY 2015/16	PROJ
Lower Day Basin RMPU (TO #2)	238,646.90	7690.8	FY 2016/17	PROJ
Jurupa Basin Berm & Trash Boom	358,000.00	7690.23	FY 2022/23	PROJ
Funds on Hold for Projects/Refund	200,000.00	7690.9	FY 2017/18	PROJ
Agricultural Pool - Legal Services	41,675.63	8467	FY 2022/23	AP
Agricultural Pool - Mtg. Attendance Compensation	950.98	8470	FY 2022/23	OAP
Agricultural Pool - Special Project Funding	10,993.67	8471	FY 2021/22	OAP
Non-Agricultural Pool - Meeting Compensation	875.00	8511	FY 2022/23	ONAP
Non-Agricultural Pool - Legal Services	56,965.90	8567	FY 2022/23	ONAP
Balance at 7/31/23	**$ 2,277,561.54**			

CHINO BASIN WATERMASTER
9641 San Bernardino Road, Rancho Cucamonga, CA 91730
909.484.3888 www.cbwm.org

STAFF REPORT

DATE: June 19, 2025

TO: Advisory Committee Members

SUBJECT: Application: Water Transaction – Santa Ana River Water Company to Fontana Water Company (Consent Calendar Item I.C.)

Issue: The Purchase of 1,000 acre-feet of water from Santa Ana River Water Company by Fontana Water Company. This purchase is made from Santa Ana River Water Company's Annual Production Right. [Within WM Duties and Powers]

Recommendation: Provide advice and assistance to the Watermaster Board on the proposed transaction.

Financial Impact: None.

ACTIONS:
Appropriative Pool – May 8, 2025 [Final]: Provided advice and assistance.
Non-Agricultural Pool – May 8, 2025 [Final]: Provided advice and assistance.
Agricultural Pool – May 8, 2025 [Final]: Provided advice and assistance.
Advisory Committee – June 19, 2025 [Recommended]: Advice and assistance.
Watermaster Board – June 26, 2025 [Recommended]: Approval.

BACKGROUND

On July 13, 2000, the Court approved the Peace Agreement, the Implementation Plan, and the goals and objectives identified in the OBMP Phase I Report and ordered Watermaster to proceed in a manner consistent with the Peace Agreement. Under the Peace Agreement, Watermaster approval is required for applications to store, recapture, recharge, or transfer water, as well as for applications for credits or reimbursements, and storage and recovery programs.

Where there is no Material Physical Injury, Watermaster must approve the transaction. Where the request for Watermaster approval is submitted by a Party to the Judgment, there is a rebuttable presumption, under the Peace Agreement, that most of the transactions do not result in Material Physical Injury to a Party to the Judgment or the Basin (Storage and Recovery Programs do not have this presumption).

The date of this application is April 14, 2025. Notice of the transaction along with the materials submitted by the requestors was transmitted to stakeholders electronically on May 2, 2025.

DISCUSSION

Beyond confirmation of the source of the water to be transferred (Annual Production Right, Supplemental Water, or Excess Carryover), Watermaster will evaluate the eventual disposition of the transferred water (e.g. production, storage, etc.) at the end of the production year and account for the same consistent with the Watermaster Guidance Documents.

Water transactions occur each year and are included as production by the respective entity (if produced) in any relevant analysis conducted by West Yost pursuant to the Peace Agreement and the Rules & Regulations. There is no indication that additional analysis regarding this transaction is necessary at this time. As part of the OBMP Implementation Plan, measurement of groundwater levels and ground level changes are ongoing, and based on current data, there is no indication that the proposed water transaction will cause Material Physical Injury to a Party to the Judgment, or to the Basin.

Pursuant to the Rules & Regulations, “The Application shall not be considered by the Advisory Committee until at least twenty-one (21) days after the last of the three Pool Committee meetings to consider the matter.” Therefore, this application will be presented to the Advisory Committee and Watermaster Board in the month of June 2025.

At the Pool Committee meetings held on May 8, 2025, the Appropriative and Overlying (Agricultural) Pools unanimously recommended Advisory Committee to recommend to the Watermaster Board to approve the proposed transaction; the Overlying (Non-Agricultural) Pool unanimously recommended its representatives to support at Advisory Committee and Watermaster Board subject to changes they deem appropriate.

ATTACHMENTS
1. Consolidated Forms 3, 4, & 5
2. Notice Forms

ATTACHMENT 1

Consolidated Forms 3, 4 & 5

CONSOLIDATED WATER TRANSFER FORMS:
FORM 3: APPLICATION FOR SALE OR TRANSFER OF RIGHT TO PRODUCE WATER FROM STORAGE
FORM 4: APPLICATION OR AMENDMENT TO APPLICATION TO RECAPTURE WATER IN STORAGE
FORM 5: APPLICATION TO TRANSFER ANNUAL PRODUCTION RIGHT OR SAFE YIELD

FISCAL YEAR 20 24 - 20 25

DATE REQUESTED: 4/14/2025 AMOUNT REQUESTED: 1,000.00 Acre-Feet

TRANSFER FROM (SELLER / TRANSFEROR):	TRANSFER TO (BUYER / TRANSFEREE):
Santa Ana River Water Company	Fontana Water Company
Name of Party	Name of Party
10530 54th Street	15966 Arrow Route
Street Address	Street Address
Jurupa Valley CA 91752	Fontana CA. 92335
City State Zip Code	City State Zip Code
(951) 685-6503	(909) 822-2201
Telephone	Telephone
	(909) 823-5046
Facsimile	Facsimile

Have any other transfers been approved by Watermaster between these parties covering the same fiscal year? Yes ☐ No ☒

PURPOSE OF TRANSFER:

- ☐ Pump when other sources of supply are curtailed
- ☒ Pump to meet current or future demand over and above production right
- ☐ Pump as necessary to stabilize future assessment amounts
- ☐ Other, explain ______

WATER IS TO BE TRANSFERRED FROM:

- ☐ Annual Production Right (Appropriative Pool) or Operating Safe Yield (Non-Agricultural Pool)
- ☐ Storage
- ☒ Annual Production Right / Operating Safe Yield first, then any additional from Storage
- ☐ Other, explain ______

WATER IS TO BE TRANSFERRED TO:

- ☒ Annual Production Right / Operating Safe Yield (common)
- ☐ Storage (rare)
- ☐ Other, explain ______

IS THE 85/15 RULE EXPECTED TO APPLY? (If yes, all answers below must be "yes.") Yes ☒ No ☐

Is the Buyer an 85/15 Party? Yes ☒ No ☐

Is the purpose of the transfer to meet a current demand over and above production right? Yes ☒ No ☐

Is the water being placed into the Buyer's Annual Account? Yes ☒ No ☐

IF WATER IS TO BE TRANSFERRED FROM STORAGE:

Varies	2024-2025
Projected Rate of Recapture	Projected Duration of Recapture

METHOD OF RECAPTURE (e.g. pumping, exchange, etc.):

Pumping

PLACE OF USE OF WATER TO BE RECAPTURED:

Chino Basin Management Zone 3

LOCATION OF RECAPTURE FACILITIES (IF DIFFERENT FROM REGULAR PRODUCTION FACILITIES):

N/A

WATER QUALITY AND WATER LEVELS

Are the Parties aware of any water quality issues that exist in the area? Yes ☒ No ☐

If yes, please explain:

In 2024, perchlorate and nitrate levels ranged as high as 5.2 ppb and 8.6 ppm respectively.

What are the existing water levels in the areas that are likely to be affected?

Static Water Levels ranging from 317 feet (bgs) to 677 feet (bgs) as of February 2025.

MATERIAL PHYSICAL INJURY

Are any of the recapture wells located within Management Zone 1? Yes ☐ No ☒

Is the Applicant aware of any potential Material Physical Injury to a party to the Judgment or the Basin that may be caused by the action covered by the application? Yes ☐ No ☒

If yes, what are the proposed mitigation measures, if any, that might reasonably be imposed to ensure that the action does not result in Material Physical Injury to a party to the Judgment or the Basin?

N/A

SAID TRANSFER SHALL BE CONDITIONED UPON:

(1) Transferee shall exercise said right on behalf of Transferor under the terms of the Judgment, the Peace Agreement, the Peace II Agreement, and the Management Zone 1 Subsidence Management Plan for the period described above. The first water produced in any year shall be that produced pursuant to carry-over rights defined in the Judgment. After production of its carry-over rights, if any, the next (or first if no carry-over rights) water produced by Transferee from the Chino Basin shall be that produced hereunder.

(2) Transferee shall put all waters utilized pursuant to said Transfer to reasonable beneficial use.

(3) Transferee shall pay all Watermaster assessments on account of the water production hereby Transferred.

(4) Any Transferee not already a party must Intervene and become a party to the Judgment.

ADDITIONAL INFORMATION ATTACHED Yes ☐ No ☒

Seller / Transferor Representative Signature

John Lopez, General Manager

Seller / Transferor Representative Name (Printed)

Buyer / Transferee Representative Signature

Martin Zvirbulis, Vice President - Water Resources

Buyer / Transferee Representative Name (Printed)

TO BE COMPLETED BY WATERMASTER STAFF:

DATE OF WATERMASTER NOTICE: May 2, 2025

DATE OF APPROVAL FROM APPROPRIATIVE POOL: May 8, 2025

DATE OF APPROVAL FROM NON-AGRICULTURAL POOL: May 8, 2025

DATE OF APPROVAL FROM AGRICULTURAL POOL: May 8, 2025

HEARING DATE, IF ANY: N/A

DATE OF ADVISORY COMMITTEE APPROVAL: ________________

DATE OF BOARD APPROVAL: ________________

CHINO BASIN WATERMASTER

NOTICE

OF

APPLICATION(S)

RECEIVED FOR

TRANSFER OF WATER

Date of Notice:

May 2, 2025

This notice is to advise interested persons that the attached application(s) will come before the Watermaster Board on or after 30 days from the date of this notice.

APPLICATION FOR TRANSFER OF WATER

The attached staff report will be included in the meeting package at the time the transfer begins the Watermaster process.

NOTICE OF APPLICATION(S) RECEIVED

Date of Application: **April 14, 2025** Date of this notice: **May 02, 2025**

Please take notice that the following Application has been received by Watermaster:

- Notice of Sale or Transfer – The purchase of 1,000 acre-feet of water from Santa Ana River Water Company by Fontana Water Company. This purchase is made from Santa Ana River Water Company's Annual Production Right.

This ***Application*** will first be considered by each of the respective pool committees on the following dates:

Appropriative Pool:	May 08, 2025
Non-Agricultural Pool:	May 08, 2025
Agricultural Pool:	May 08, 2025

This ***Application*** will be scheduled for consideration by the Advisory Committee ***no earlier than thirty days from the date of this notice and a minimum of twenty-one calendar days*** after the last pool committee reviews it***.***

After consideration by the Advisory Committee, the ***Application*** will be considered by the Board.

Unless the ***Application*** is amended, as ***Contests*** must be submitted a minimum of fourteen (14) days prior to the Advisory Committee's consideration of an ***Application,*** parties to the Judgment may file ***Contests*** to the ***Application*** with Watermaster ***within seven calendar days*** of when the last pool committee considers it. Any ***Contest*** must be in writing and state the basis of the ***Contest***.

Watermaster address:

Chino Basin Watermaster
9641 San Bernardino Road
Rancho Cucamonga, CA 91730

Tel: (909) 484-3888
Web: www.cbwm.org
watertransactions@cbwm.org

CHINO BASIN WATERMASTER

9641 San Bernardino Road, Rancho Cucamonga, CA 91730
909.484.3888   www.cbwm.org

STAFF REPORT

DATE: June 19, 2025

TO: Advisory Committee

SUBJECT: 2024 Annual Report of the Prado Basin Habitat Sustainability Program (Business Item II.A.)

Issue: Pursuant to the monitoring and mitigation requirements of the Peace II Subsequent Environmental Impact Report, the Prado Basin Habitat Sustainability Committee must prepare an Annual Report. The Committee presents its 9th Annual Report for Water Year 2024. [Within WM Duties and Powers]

Recommendation: Recommend the Watermaster Board to receive and file the report, as presented.

Financial Impact: None.

ACTIONS:
Appropriative Pool – June 12, 2025 [Final]: Provided advice and assistance
Non-Agricultural Pool – June 12, 2025 [Final]: Provided advice and assistance..
Agricultural Pool – June 12, 2025 [Final]: Provided advice and assistance..
Advisory Committee – June 19, 2025 [Recommended]: Advice and assistance.
Watermaster Board – June 26, 2025 [Recommended]: Adopt by Receive and file.

BACKGROUND

The Prado Flood Control Basin (Prado Basin) is located in the southernmost, downgradient portion of the Chino Groundwater Basin (Chino Basin). Surface-water flow within the middle Santa Ana River (SAR) and its tributaries discharge into and through the Prado Basin behind Prado Dam, the main flood-control facility on the middle SAR. The US Army Corps of Engineers, in coordination with the Orange County Water District (OCWD), regulates releases from Prado Dam for the purposes of flood control and groundwater recharge in Orange County. The SAR and its tributaries are unlined across the Prado Basin, which allows for groundwater/surface-water interaction. Depth to groundwater is relatively shallow in the Prado Basin area, where groundwater losses can occur via evapotranspiration by riparian vegetation and rising-groundwater outflow to the SAR and its tributaries.

The surface-water impoundments behind Prado Dam and the shallow groundwater have created within Prado Basin the largest riparian forest in Southern California. The riparian forest provides critical habitat for various threatened and endangered species including the Least Bell's vireo, Southwestern willow flycatcher, and the Santa Ana sucker.

To further implement the goals and objectives of the Chino Basin Optimum Basin Management Program (OBMP), the Chino Basin Watermaster (Watermaster) executed the Peace II Agreement in 2007. The primary features of the Peace II Agreement are expansion of pumping at the Chino Basin Desalter wells and Basin Re-operation for the attainment of Hydraulic Control of the Chino Basin. Hydraulic Control is defined as the elimination of groundwater discharge from the Chino-North Groundwater Management Zone (GMZ) to the Prado Basin, or its reduction to *de minimis* quantities (i.e., less than 1,000 acre-feet per year [afy]). Hydraulic Control ensures that the water management activities in the Chino-North GMZ will not impair the beneficial uses designated for the SAR downstream of Prado Dam. Basin Re-operation means the increase in controlled overdraft of the Chino Basin, as defined in the Judgment, from 200,000 acre-ft (af) over the period of 1978 through 2017 to 600,000 af through 2030. Both Chino Basin Desalter expansion and Basin Re-operation are required to achieve Hydraulic Control. Hydraulic Control was achieved in 2016 and will be maintained through Chino Desalter well pumping of 40,000 afy, and the completion of Basin Re-operation.

At the time of its consideration, OCWD expressed concern that one of the potential impacts of the Peace II Agreement activities described above would be the lowering of groundwater levels (drawdown) in the Prado Basin area, which might impact the riparian habitat that is dependent upon groundwater. To address the potential drawdown and its impact on the riparian habitat, the monitoring and mitigation requirements in the Peace II Subsequent Environmental Impact Report (SEIR) calls for the development and implementation of an adaptive management program for the Prado Basin habitat:

Biological Resources/Land Use & Planning—Section 4.4-3 of the Peace II SEIR
The Chino Basin Stakeholders are committed to ensuring that the Peace II Agreement actions will not significantly adversely impact the Prado Basin riparian habitat. This includes the riparian portions of Chino and Mill Creek's between the terminus of hard lined channels and Prado Basin proper.

The available modeling data in the SEIR indicates that Peace II Agreement implementation will not cause significant adverse effects on the Prado Basin riparian habitat. However, the following contingency measure will be implemented to ensure that the Prado Basin riparian habitat will not incur unforeseeable significant adverse effects, due to implementation of Peace II. IEUA, Watermaster, OCWD and individual stakeholders, that choose to participate, will jointly fund and develop an adaptive management program that will include, but not be limited to:

- *monitoring riparian habitat quality and extent;*
- *investigating and identifying essential factors to long-term sustainability of Prado Basin riparian habitat*
- *identification of specific parameters that can be monitored to measure potential effects of Peace II Agreement implementation effects on Prado Basin; and*
- *identification of water management options to minimize the Peace II Agreement effects on Prado Basin*

This adaptive management program will be prepared as a contingency to define available management actions by Prado Basin stakeholders to address unforeseeable significant adverse impacts, as well as to contribute to the long-term sustainability of the Prado Basin riparian habitat.

The above effort will be implemented under the supervision of a newly formed Prado Basin Habitat Sustainability Committee. This Committee will include representatives from all interested parties and will be convened by the Watermaster and IEUA. Annual reports will be prepared and will include recommendations for ongoing monitoring and any adaptive management actions required to mitigate any measured loss or prospective loss of riparian habitat that may be attributable to the Peace II Agreement. As determined by Watermaster and IEUA, significant adverse impacts to riparian habitat that are attributable to the Peace II Agreement will be mitigated.

Pursuant to these monitoring and mitigation requirements of the Peace II SEIR, the Inland Empire Utilities Agency (IEUA) and the Watermaster convened the Prado Basin Habitat Sustainability Committee (PBHSC) to develop the Prado Basin Habitat Sustainability Program (PBHSP). The PBHSP is an adaptive management program to ensure that the riparian habitat in the Prado Basin will not incur unforeseeable significant adverse effects due to implementation of the Peace II Agreement. Annual reports are prepared to document monitoring and modeling activities, the analysis and interpretation of the monitoring and modeling results, and any recommendations for changes to the PBHSP.

DISCUSSION

The Annual Report for Water Year 2024 is the ninth annual report prepared by the Watermaster and IEUA for the PBHSP. It documents the collection, analysis, and interpretations of the data and information generated by the PBHSP through October 31, 2024, and is organized into the following sections:

Section 1 – Background and Objectives This section describes the background and objectives of the PBHSP and the Annual Report.

Section 2 – Monitoring, Data Collection, and Methods This section describes the collection of recent monitoring data, and the groundwater-modeling activities performed during Water Year 2024 for the PBHSP.

Section 3 – Results and Interpretations This section describes the results and interpretations that were derived from the information, data, and groundwater-modeling.

Section 4 – Conclusions and Recommendations This section summarizes the main conclusions derived from the PBHSC through the prior water year and describes the recommended activities for the subsequent fiscal year as a proposed scope-of-work, schedule, and budget.

Section 5 – References This section lists the publications cited in the report.

The draft Annual Report for Water Year 2024 was published and distributed on May 1, 2025. Watermaster and IEUA presented the draft report to members of the PBHSC at a meeting on May 14, 2025. A four-week comment period was provided; comments were received and responded to in Appendix D of the Annual Report.

The main interpretations and findings of the PBHSP Annual Report for Water Year 2024 are:

- Based on the NDVI time series analysis, NDVI spatial change maps, and aerial photos, the quality (greenness) of the riparian habitat vegetation either decreased or remained stable across most of the Prado Basin from 2023 to 2024. All observed decreases in vegetation greenness were relatively minor and within range of historical one-year changes. These decreases occurred during a time of stable or increasing groundwater levels and above-average precipitation for Water Year 2024, although precipitation was less than the previous year.
- There were two notable areas of decreases in greenness observed in the Prado Basin between 2023 and 2024, which were likely caused by reduced growth of perennial vegetation due to lower precipitation compared to the previous year, as well as some scouring along the edges of the creeks and river from the previous wet year. None of the reductions in greenness were related to declining groundwater levels during the period of Peace II Agreement implementation.
- From 2023-2024, groundwater levels at the PBHSP monitoring wells along Chino Creek, Mill Creek, and the Santa Ana River in the Prado Basin remained stable and changed less than one foot at most wells.
- From 2016-2024, groundwater levels throughout most of the riparian vegetation extent in reaches of Chino Creek, Mill Creek and SAR changed less than 5 feet, but there are some notable areas of change:
    - The northern portion of Mill Creek just south of monitoring well PB-2 saw groundwater levels decline by about eight feet from 2016-2022, likely due to increased pumping at the Chino Desalter well to the north. During 2023 and 2024, groundwater levels increased by about four feet in this area, for a net change in groundwater levels of minus four feet since 2016 During Water Year 2024, groundwater levels remained mostly stable and the depth to groundwater is at an estimated depth of 10-15ft-bgs. Recent observations of the air photos in 2024 have noted a decline in the greenness of the riparian vegetation in this northern area of Mill Creek reach.
    - At the northernmost reach of Mill Creek near PB-2, additional declines in groundwater levels in the area could result in adverse impacts to the riparian habitat.
    - Groundwater levels at the northern reach of Chino Creek increased by about ten feet from 2016-2024, likely due to decreased pumping in the area.
    - Groundwater-level declines in the northern reach of the SAR near PB-3 are not a concern for the riparian vegetation because the depth to groundwater in this area is shallow (4 to 8ft-bgs) and is supported by SAR recharge.
- PBHSP monitoring and reporting should continue to monitor the extent and quality of the riparian habitat and the factors that can influence it as it has been conducted through Water Year 2024. The additional monitoring in the northernmost reach of Mill Creek set up in 2022 should continue as well. While the overall threat to riparian vegetation health has decreased following an increase in groundwater levels from 2023 to 2024 and reduced production at the CDA wells, it remains important to monitor any potential impacts to the extent and quality of the riparian habitat that could be caused by the lowering of groundwater levels in this area. Vegetation surveys will be conducted during WY 2025 and will be tailored to focus on the northern portion of Mill Creek to verify and document current vegetation conditions relative to those of the recent past. Any recommended enhancements to the monitoring program based on the vegetation surveys can be reviewed and incorporated by the PBHSC as appropriate.
- The high-frequency monitoring for groundwater elevation, temperature and EC at each pair of PBHSP monitoring wells and nearby surface water field measurements, initiated in 2023, should continue to better characterize groundwater/surface water interactions.

Once adopted by the Watermaster Board, a copy of the Annual Report of the Prado Basin Habitat Sustainability Program Water Year 2024 will be received and filed.

At the June 12, 2025 Pool Committee meetings, the three Pools unanimously recommended the Watermaster Board to receive and file.

ATTACHMENTS
1. Annual Report of the Prado Basin Habitat Sustainability Program Water Year 2024

Annual Report of the Prado Basin Habitat Sustainability Program Water Year 2024

PREPARED FOR

Chino Basin Watermaster and
Inland Empire Utilities Agency

PREPARED BY

Annual Report of the Prado Basin Habitat Sustainability Committee
Water Year 2024

Prepared for

Chino Basin Watermaster and Inland Empire Utilities Agency

Project No. 941-80-24-16

Project Manager: Lucy Hedley	06/05/2025 Date
Project Manager: Veva Weamer	06/05/2025 Date
QA/QC Review: Andy Malone	06/05/2025 Date

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FINAL REPORT | JUNE 2025

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LIST OF ACRONYMS AND ABBREVIATIONS

ACOE	Army Corps of Engineers
af	Acre-Feet
afy	Acre-Feet Per Year
AMP	Adaptive Management Plan
Annual Report	Annual Report of The Prado Basin Habitat Sustainability Committee
CAL FIRE	California Department of Forestry and Fire Protection
CBMWD	Chino Basin Municipal Water District
CBWM	Chino Basin Watermaster
CCWF	Chino Creek Well Field
CDA	Chino Basin Desalter Authority
CDFM	cumulative departure from the mean
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
Chino Basin	Chino Groundwater Basin
DBH	Diameter at Breast Height
EC	Electrical Conductivity
EIR	Environmental Impact Report
EROS	Earth Resources Observation and Science
ESPA	Center Science Processing Architecture
FD	Fusarium Dieback
ft-amsl	Feet Above Mean Sea Level
ft-bgs	Feet Below Ground Surface
FRAP	Fire And Resource Assessment Program
GIS	Geographic Information System
GMP	Groundwater Monitoring Program
GMZ	Groundwater Management Zone
HCMP	Hydraulic Control Monitoring Program
IEUA	Inland Empire Utilities Agency
In/yr	Inches Per Year
LEDAPS	Landsat Ecosystem Disturbance Adaptive Processing System

mi^2	Square Miles
MWD	Metropolitan Water District of Southern California
NDVI	Normalized Difference Vegetation Index
NASA	National Aeronautics and Space Administration
NEXRAD	Next Generation Radar
OBMP	Optimum Basin Management Program
OC-59	The OCWD's Imported Water Turnout Tributary to Prado Basin
OCWD	Orange County Water District
Parties	Parties to The Chino Basin Judgment
PBHSC	Prado Basin Habitat Sustainability Committee
PBHSP	Prado Basin Habitat Sustainability Program
PBMZ	Prado Basin Management Zone
POTWs	Publicly Owned Treatment Works
ppm	Parts Per Million
Prado Basin	Prado Basin Management Zone
PSHB	Polyphagous Shot Hole Borer - *Euwallacea Fornicates*
QA/QC	Quality Assurance and Quality Control
RHMP	Riparian Habitat Monitoring Program
SAWA	Santa Ana Watershed Association
SAR	Santa Ana River
SARWM	Santa Ana River Watermaster
SEIR	Subsequent Environmental Impact Report
SWMP	Surface-Water Monitoring Program
TDS	total dissolved solids
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
USDA	United State Department of Agriculture
USFWS	United States Fish and Wildlife Service
VOCs	Volatile Organic Compounds
Watermaster	Chino Basin Watermaster
WEI	Wildermuth Environmental Inc.
WRCRWA	Western Riverside County Regional Wastewater Authority
WY	Water Year

1.0 BACKGROUND AND OBJECTIVES

This *Annual Report of the Prado Basin Habitat Sustainability Program for Water Year 2024* (Annual Report) was prepared on behalf of the Prado Basin Habitat Sustainability Committee (PBHSC), convened by the Inland Empire Utilities Agency (IEUA) and the Chino Basin Watermaster (Watermaster) pursuant to the mitigation monitoring and reporting requirements of the Peace II Subsequent Environmental Impact Report (SEIR) (Tom Dodson, 2010).

This introductory section provides background on the general hydrologic setting of the Prado Basin Management Zone (Prado Basin); the Chino Basin Judgment; the Optimum Basin Management Program (OBMP), its Programmatic Environmental Impact Report (EIR) and the Peace Agreement; the Peace II Agreement and its SEIR; and the formation of the PBHSC and the development of the adaptive management plan (AMP) for the Prado Basin Habitat Sustainability Program (PBHSP).

1.1 Prado Basin

The Prado Basin is the flood control area behind Prado Dam, which was constructed in 1941 as the major flood-control facility within the Santa Ana River (SAR) Watershed. The U.S. Army Corps of Engineers (ACOE) regulates releases of water from Prado Dam for both purposes of flood control and groundwater recharge in Orange County Groundwater Management Zone (GMZ). Releases of water temporarily held in storage in the Prado Basin for groundwater recharge in Orange County is coordinated with the Orange County Water District (OCWD). Figure 1-1 shows the location of the Prado Basin in the southern portion of the Chino Groundwater Basin (Chino Basin). The Prado Basin boundary shown on Figure 1-1 is the Prado Basin Management Zone (PBMZ) boundary as defined in the Water Quality Control Plan for the Santa Ana River Basin ([Basin Plan] Santa Ana Regional Water Quality Control Board [Santa Ana Water Board], 2016), which approximately follows the 566 feet above mean sea level (ft-amsl) elevation contour behind Prado Dam.

Approximately 4,300 acres of riparian habitat have developed within the Prado Basin, creating the largest riparian habitat in Southern California. Portions of the riparian habitat have been designated as critical habitat to several endangered or threatened species. Figure 1-2 shows the locations of the critical habitat, as defined by the U.S. Fish and Wildlife Service (USFWS). Most of the riparian habitat in Prado Basin is designated as critical habitat for one or multiple species, including the Santa Ana Sucker, the Southwestern Willow Flycatcher, and the Least Bell's Vireo.

The SAR flows through the Prado Basin from east to west. The tributaries of the SAR that flow into the Prado Basin include San Antonio/Chino, Cucamonga/Mill, and Temescal Creeks. The major components of flow within the SAR and its tributaries are runoff from precipitation, discharge of tertiary-treated effluent from wastewater treatment plants, rising groundwater, and dry-weather runoff.[1]

[1] Dry-weather runoff consists of excess irrigation runoff, purging of wells, dewatering discharges, etc.

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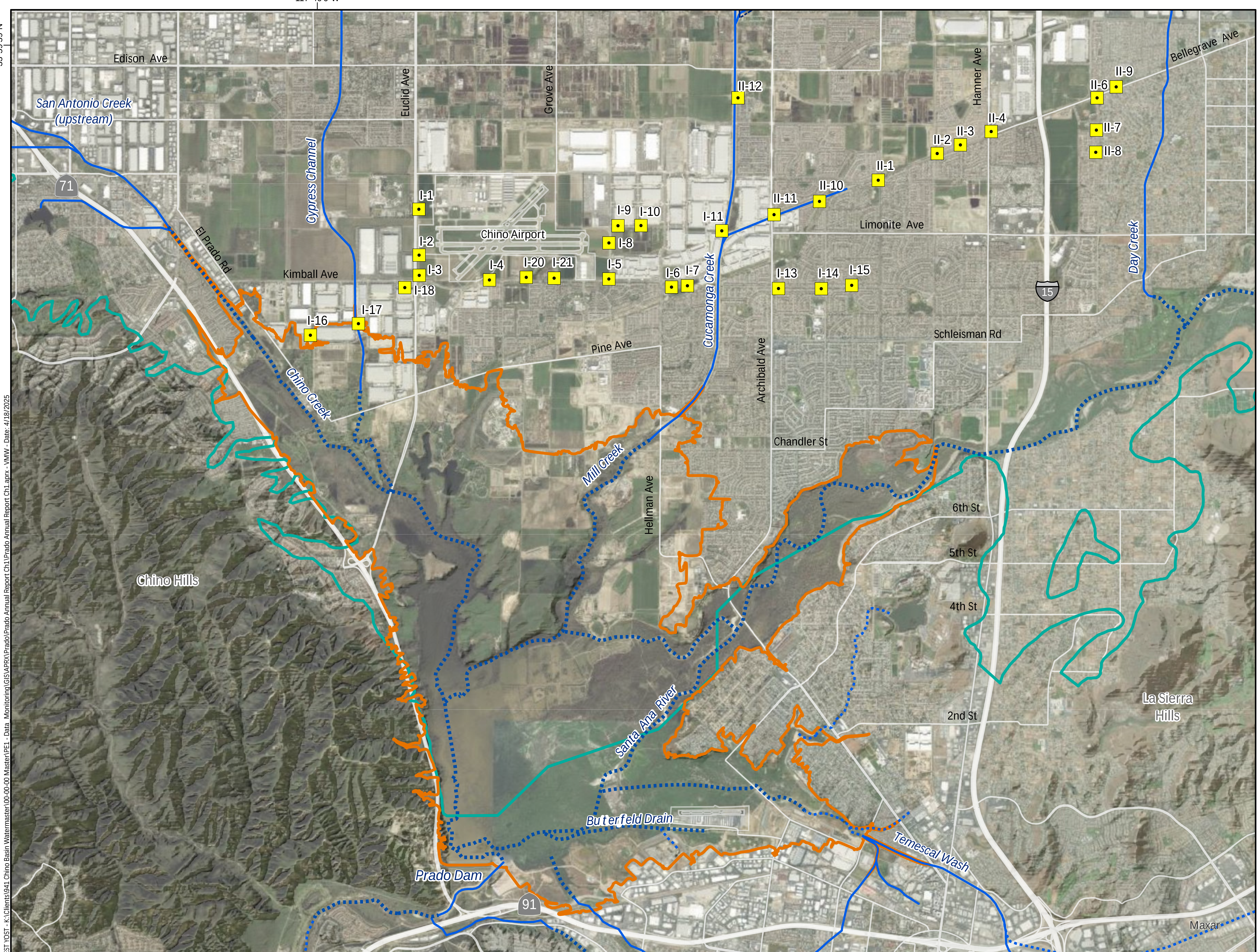
33°59'59"N



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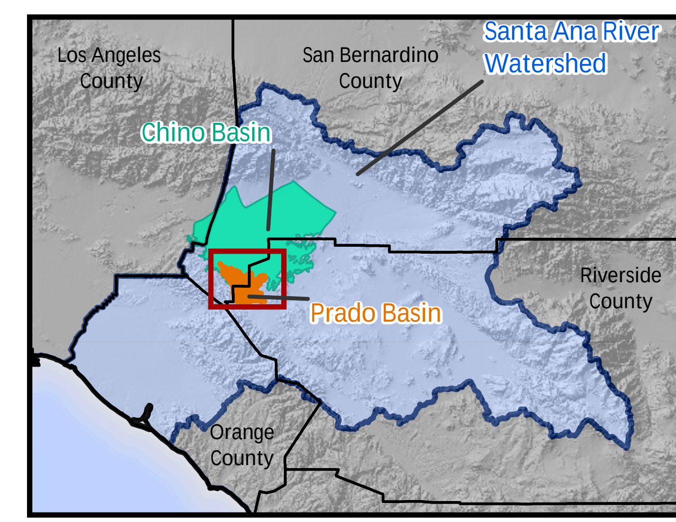
Prado Basin - The Prado Basin Management Zone (PBMZ) defned in the Santa Ana Region Basin Plan (Santa Ana Water Board, 2016), which approximately follows the 566 feet above mean sea level elevaton contour in the food control area behind Prado Dam.

Hydrologic Boundary of the Chino Groundwater Basin (Chino Basin)

Concrete-Lined Channels

Unlined Rivers and Streams

Chino Desalter Well



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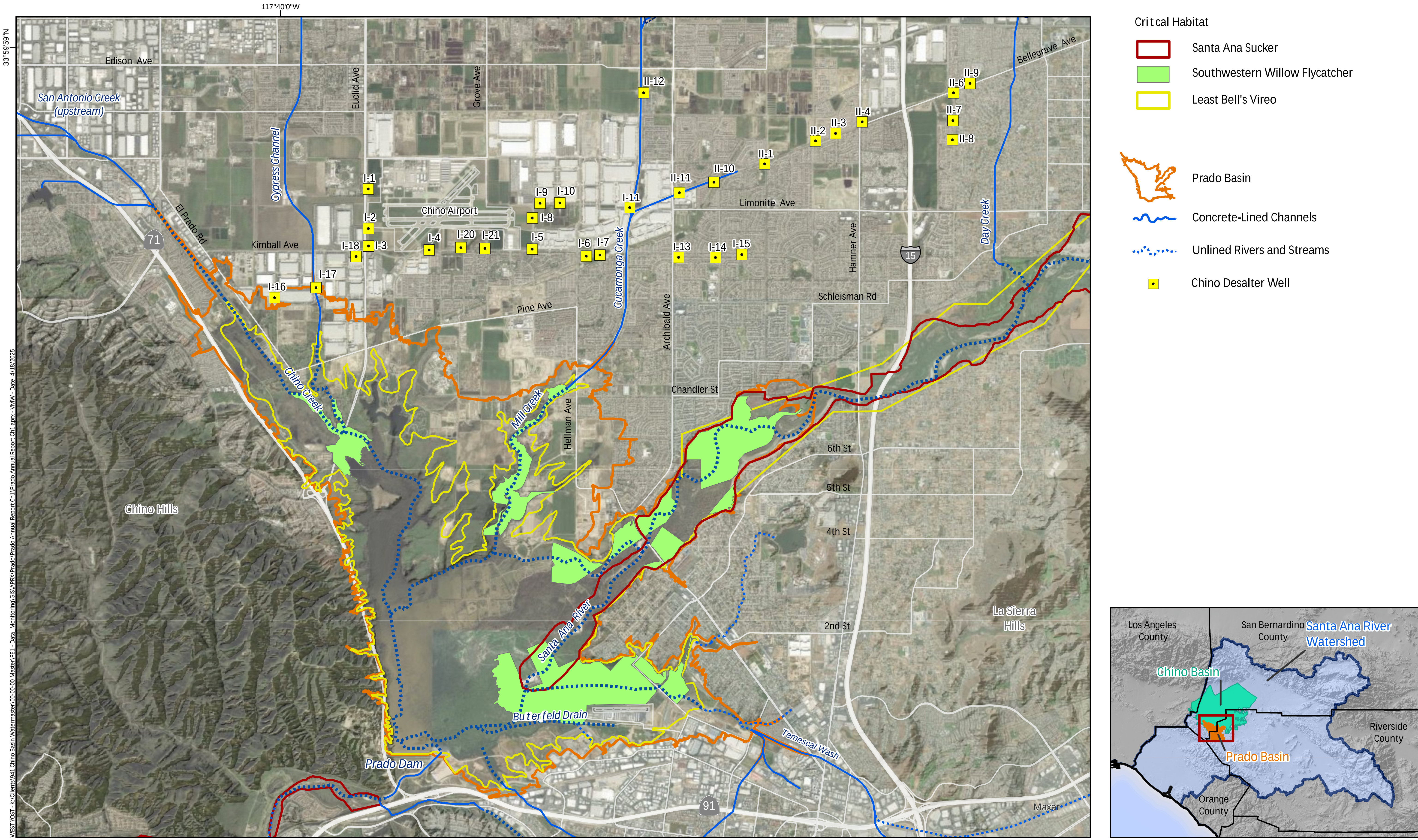
Prado Basin Habitat Sustainability Committee
2024 Annual Report

Prado Basin Area

Figure 1-1



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2024 Annual Report

Critcal Habitat for Endangered or Threatened Species in the Prado Basin Area

Figure 1-2

The Prado Basin is a hydrologically complex region of the lower Chino Basin. Groundwater in the Chino Basin generally flows from the forebay regions in the north towards the Prado Basin in the south. Depth to groundwater is relatively shallow in the Prado Basin area, and the SAR and its tributaries are unlined across the Prado Basin, which allows for groundwater/surface-water interaction. Groundwater outflows in the Prado Basin occur via evapotranspiration by riparian vegetation and rising-groundwater discharge to the SAR and its tributaries.

To the north of the Prado Basin, the Chino Basin Desalter Authority (CDA) owns and operates the Chino Desalter well field. Figure 1-1 shows the locations of Chino Desalter wells. The well field pumps groundwater with high concentrations of total dissolved solids (TDS) and nitrate. The CDA treats the groundwater at two regional facilities using reverse osmosis, ion exchange, and blending to produce a potable water supply for the region. CDA operations are fundamental to achieving many of the management goals outlined in the OBMP and both Peace Agreements, which are discussed below. The CDA facilities were expanded in 2021 and 2023 with additional treatment processes of air stripping and granulated activated carbon to treat for volatile organic compounds (VOCs) associated with the South Archibald plume and Chino Airport plume, respectively.

1.2 Chino Basin Judgment, OBMP, and Peace Agreement

A 1978 Judgment entered in the Superior Court of the State of California for the County of San Bernardino (Chino Basin Municipal Water District vs. City of Chino et al.) established pumping and storage rights in the Chino Basin. The Judgment established Watermaster to oversee the implementation of the Judgment and provided Watermaster with the discretionary authority to develop an OBMP to maximize the beneficial use of the Chino Basin. The OBMP was developed by Watermaster and the parties to the Judgment (Parties) in the late 1990s (Wildermuth Environmental Inc. [WEI], 1999). The OBMP maps a strategy to enhance the yield of the Chino Basin and provide reliable high-quality water supplies for the development expected to occur in the region. The goals of the OBMP are to enhance basin water supplies, to protect and enhance water quality, to enhance the management of the Basin, and to equitably finance the OBMP.

In 2000, the Parties executed the Peace Agreement (Watermaster, 2000), which documented their intent to implement the OBMP. The Peace Agreement included an OBMP Implementation Plan which outlined the time frame for implementing tasks and projects in accordance with the Peace Agreement and the OBMP. The OBMP Implementation Plan is a comprehensive, long-range water-management plan for the Chino Basin and includes: the use of recycled water for direct reuse and artificial recharge, the capture of increased quantities of high-quality storm-water runoff, the recharge of imported water when TDS concentrations are low, the desalting of poor-quality groundwater in impaired areas of the basin via the Chino Basin Desalters, the support of regulatory efforts to improve water quality in the basin, subsidence management, storage management, and the implementation of management activities to reduce the discharge of high-TDS/high-nitrate groundwater to the SAR, thus ensuring the protection of downstream beneficial uses in the Orange County GMZ.

The Chino Basin Municipal Water District (CBMWD) was the plaintiff in the legal action that resulted in the Judgment. The CBMWD was formed in 1950 to supply supplemental, imported water purchased from the Metropolitan Water District of Southern California (MWD) to the Chino Basin. On July 1, 1998, the CBMWD changed its name to the IEUA and expanded its role to become the regional supplier of recycled water for most of the Chino Basin. For OBMP implementation, the IEUA has served as the lead agency for compliance with the California Environmental Quality Act (CEQA). A Program Environmental Impact Report for the OBMP (SCH#2000041047) was certified by the IEUA in July 2000 (Tom Dodson, 2000).

1.3 The Peace II Agreement and its Subsequent EIR

To further implement the goals and objectives of the OBMP, the Parties executed the Peace II Agreement in 2007, which modified the OBMP Implementation Plan (Watermaster, 2007). The two main activities of the Peace II Agreement are: (i) increasing the controlled overdraft of the Chino Basin, as defined in the Judgment,[2] by 400,000 acre-feet (af) through 2030 (re-operation), and (ii) refining the planned expansion of the Chino Basin Desalters facilities to increase groundwater pumping from about 30,000 to 40,000 acre-feet per year (afy). Re-operation is allocated specifically to offset the production of the Chino Basin Desalters. Both re-operation and desalter expansion contribute to the attainment of "hydraulic control" of groundwater outflow from the Chino Basin to the SAR. The attainment and maintenance of hydraulic control is a requirement of Watermaster and the IEUA, as defined in the Basin Plan (Santa Ana Water Board, 2016). Hydraulic control ensures that the water management activities in the Chino Basin will not impair the beneficial uses designated for SAR water quality downstream of Prado Dam.

The expansion of the Chino Basin Desalters, described in the Peace II Agreement, was accomplished, in part, by the construction and operation of the Chino Creek Well Field (CCWF) in the southwest portion of Chino Basin (see Figure 1-3). During Peace II Agreement planning, the estimated capacity of the CCWF was about 5,000 to 7,700 afy (WEI, 2007). The CCWF wells were constructed in 2011-2012, and their actual capacity is about 1,500 afy.

In 2010, the IEUA certified the Peace II SEIR (Tom Dodson, 2010) to evaluate the environmental impacts that could result from implementing the Peace II Agreement. One of the potential impacts evaluated was the possible lowering of groundwater levels (drawdown) in the Prado Basin area, which could impact riparian vegetation that is dependent upon shallow groundwater. In order to assess this potential impact, Watermaster used its 2007 groundwater model to predict the extent and magnitude of the drawdown associated with the implementation of the Peace II Agreement, using the planned capacity of 7,700 afy[3] of the CCWF (WEI, 2007). Figure 1-3 (modified from Figure 4.4-10 from the Peace II SEIR) shows the 2007 model-predicted drawdown in the Prado Basin area for the period of 2005 to 2030. The 2007 model predictions showed drawdown of less than five feet by 2030 throughout the riparian habitat areas and less than 10 feet along the northern portion of Prado Basin near the northern reaches of Chino Creek, Mill Creek, and the SAR.[4]

Although this modeling work indicated that implementing the Peace II Agreement would not cause significant adverse effects on Prado Basin riparian habitat, a contingency measure to address the potential for drawdown of groundwater levels and its impact on riparian vegetation was included in the Peace II SEIR as Mitigation Measure 4.4-3 (Biological Resources/Land Use & Planning section of the Mitigation Monitoring and Reporting Program).

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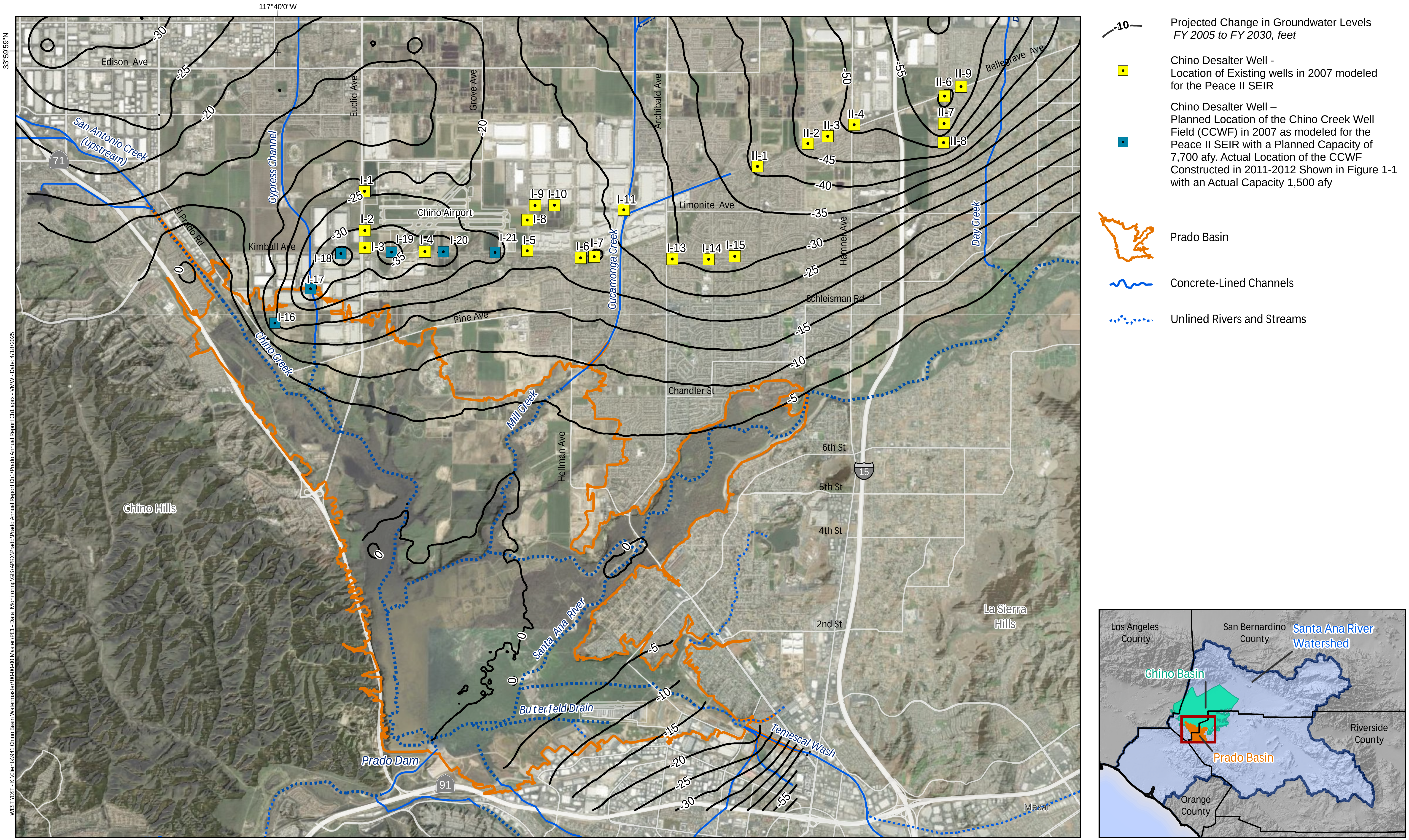
[2] The Judgment established 200,000 af of controlled overdraft over the period of 1978 to 2017. Re-operation increases the controlled overdraft to 600,000 af through 2030.

[3] The CCWF wells were constructed in 2011-2012 and their actual capacity is about 1,500 afy, not the 7,700 afy used as the planning assumption for this modeling work in 2007 for the Peace II SEIR. The PBHSP includes the use of Watermaster's most recent groundwater model update and planning data (including actual capacity of the CCWF) to evaluate potential impacts to groundwater levels from the implementation of the Peace II Agreement and identify areas of prospective loss of riparian habitat. This updated modeling work is described in Section 3.7.

[4] The primary area that would be influenced by the Peace II Agreement implementation is the upper portion of Prado Basin. The Temescal Wash area is outside of the Chino Basin hydrologic boundary and is not an area of influence of potential impacts of groundwater levels from pumping at the Chino Desalter well field and implementation of the Peace II Agreement.



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2024 Annual Report

Projected Change in Groundwater Levels
FY 2005 to 2030 - Peace II Alternative

Figure 1-3

Mitigation Measure 4.4-3 was developed to ensure that the riparian habitat would not incur unforeseeable significant adverse effects from the Peace II implementation and to contribute to the long-term sustainability of the riparian habitat. Mitigation Measure 4.4-3 calls for:

- Watermaster, the IEUA, the OCWD, and other stakeholders that choose to participate to jointly fund the development of an adaptive management program to monitor the extent and quality of the Prado Basin riparian habitat and investigate and identify essential factors to its long-term sustainability.
- Watermaster and the IEUA to convene the PBHSC, comprised of representatives from all interested parties to implement the adaptive management program.
- The PBHSC to prepare annual reports pursuant to the adaptive management program. Annual reports are to include recommendations for ongoing monitoring and any adaptive management actions required to mitigate any measured or prospective loss of riparian habitat resulting from Peace II activities.

1.4 Adaptive Management Plan for the PBHSP

Pursuant to Mitigation Measure 4.4-3 in the SEIR, Watermaster and the IEUA convened four meetings of the PBHSC, starting in late-2012, to develop the adaptive management plan for the PBHSP and facilitate its implementation. Watermaster and the IEUA adopted the final 2016 Adaptive Management Plan for the Prado Basin Habitat Sustainability Program (AMP) in August 2016 (WEI, 2016). The AMP was designed to answer the following questions to satisfy the monitoring and mitigation requirements of the Peace II SEIR:

1. What are the factors that can potentially affect the extent and quality of the riparian habitat?
2. What is a consistent, quantifiable definition of "riparian habitat quality", including metrics and measurement criteria?
3. What has been the historical extent and quality of the riparian habitat in the Prado Basin?
4. How has the extent and quality of the riparian habitat changed during implementation of Peace II?
5. How have groundwater levels and quality, surface-water discharge, weather, and climate changed over time? What were the causes of the changes? And, did those changes result in an adverse impact to riparian habitat in the Prado Basin?
6. Are there other factors besides groundwater levels, surface-water discharge, weather, and climate that affect riparian habitat in the Prado Basin? What are those factors? And, did they (or do they) result in an adverse impact to riparian habitat in the Prado Basin?
7. Are the factors that result in an adverse impact to riparian habitat in the Prado Basin related to Peace II implementation?
8. Are there areas of prospective loss of riparian habitat that may be attributable to the Peace II Agreement?
9. What are the potential mitigation actions that can be implemented if Peace II implementation results in an adverse impact to the riparian habitat?

The AMP outlines a process for monitoring, modeling, and annual reporting to answer and address the questions listed above. Appendix A to the AMP is the initial monitoring program: *2016 Monitoring Program for the Prado Basin Habitat Sustainability Program*. Annual reports are intended to document monitoring and modeling activities, the analysis and interpretation of the monitoring and modeling results, and recommendations for changes to the PBHSP, which may include monitoring, modeling, and/or mitigation, if deemed necessary. Any future mitigation measures that are deemed necessary will be developed jointly by Watermaster and the IEUA.

1.5 Annual Report Organization

This Annual Report for water year (WY) 2024 is the ninth annual report of the PBHSC; it documents the collection, analysis, and interpretations of the data and information generated by the PSHSP through October 31, 2024[5]. The remainder of this report is organized as follows:

Section 2.0 – Monitoring, Data Collection, and Methods. This section describes the collection of historical information and recent monitoring data and describes the groundwater-modeling activities performed during WY 2024 for the PBHSP.

Section 3.0 – Results and Interpretations. This section describes the results and interpretations that were derived from the information, data, and groundwater-modeling.

Section 4.0 – Conclusions and Recommendations. This section summarizes the main conclusions derived from the PBHSP through 2024 and describes the recommended activities for the subsequent fiscal year as a proposed scope-of-work, schedule, and budget.

Section 5.0 – References. This section lists the publications cited in the report.

[5] Includes the WY 2024 Period of October 1, 2023 to September 30, 2024 and the month of October 2024 cover the entire growing season period.

2.0 MONITORING, DATA COLLECTION, AND METHODS

The PBHSP was designed, in part, to answer Question 1 from the AMP:

- What are the factors that can potentially affect the extent and quality of the riparian habitat?

The main hydrologic factors that can potentially affect the extent and quality of the riparian habitat in the Prado Basin include, but are not limited to, groundwater levels, surface-water discharge, weather events, and long-term climate. As such, the PBHSP includes integrated monitoring and analysis programs for riparian habitat, groundwater, surface water, climate, and other potential factors (e.g., wildfire, pests, etc.).

Since the implementation of the AMP in WY 2016, data collection efforts include the compilation of historical data through present. The period of data available for each data type varies, but all span both pre- and post-Peace II Agreement implementation. Data collection efforts for all historical data were described in the first two annual reports for WY 2016 and WY 2017. Data collection efforts for subsequent water years have focused on recent water year monitoring data. All data collected and compiled for this effort were uploaded to Watermaster's centralized relational database, HydroDaVE^{SM}, and used in the analyses.

This section describes the collection of recent monitoring data during WY 2024 and the groundwater-modeling activities performed for the PBHSP.

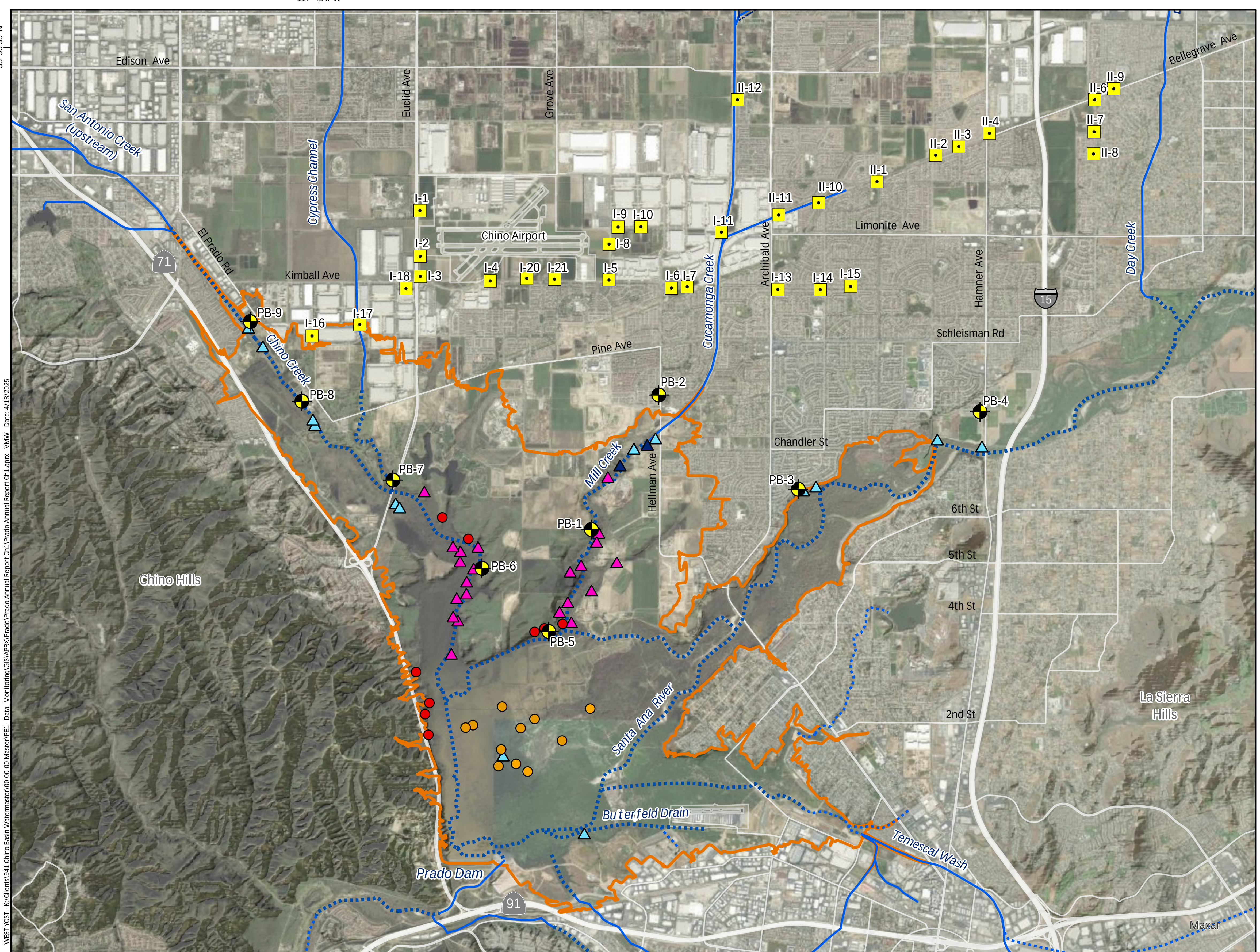
2.1 Riparian Habitat Monitoring

The objective of the Riparian Habitat Monitoring Program (RHMP) is to collect data to help answer questions 2, 3, and 4 from the AMP:

- What is a consistent quantifiable definition of "riparian habitat quality", including metrics and measurement criteria?
- What has been the historical extent and quality of the riparian habitat in the Prado Basin?
- How has the extent and quality of the riparian habitat changed during the implementation of Peace II?

To answer these questions, the RHMP includes time-series data and information on the extent and quality of riparian habitat in the Prado Basin over a historical period, including both pre- and post-Peace II implementation.

Figure 2-1 displays the features of the RHMP. Two types of monitoring and assessment are performed: regional and site-specific. Regional monitoring and assessment are appropriate because the main potential stress to the riparian habitat associated with Peace II activities is the regional drawdown of groundwater levels. The intent of site-specific monitoring and assessment is to verify and complement the results of regional monitoring.



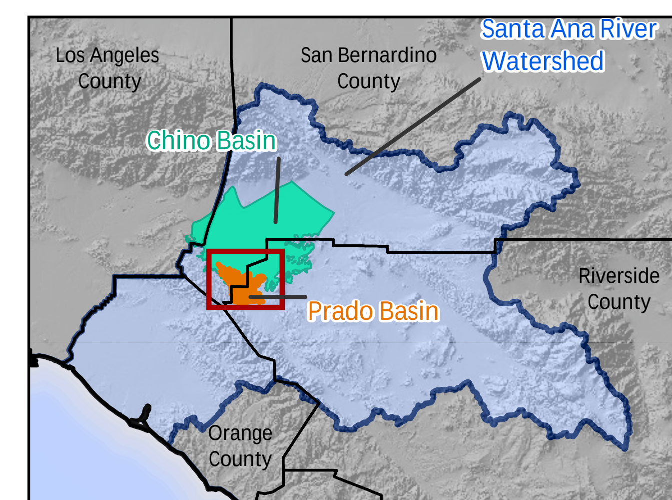
Riparian Habitat Monitoring Program

USBR Site-Specifc Monitoring

- USBR Vegetaton Survey Site established in 2007
- USBR Vegetaton Survey Site added in 2016
- USBR Vegetaton Survey Site added in 2022

OCWD Site-Specifc Monitoring

- Understory Photo Statons
- Canopy Photo Statons
- PBHSP Monitoring Well
- Prado Basin
- Concrete-Lined Channels
- Unlined Rivers and Streams
- Chino Desalter Well



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Prado Basin Sustainability Commi t ee
2024 Annual Report

Riparian Habitat Monitoring Program

Figure 2-1

2.1.1 Regional Monitoring of Riparian Habitat

Regional monitoring and assessment of the riparian habitat is performed by mapping the extent and quality of riparian habitat over time using: 1) multi-spectral remote-sensing data and 2) air photos.

2.1.1.1 Multi-Spectral Remote Sensing Data

The Normalized Difference Vegetation Index (NDVI), derived from remote sensing measurements by Landsat Program satellites, is used to assess the extent and quality of the riparian vegetation in the Prado Basin over a long-term historical period. NDVI is a commonly used numerical indicator of vegetation health that can be calculated from satellite remote-sensing measurements (Ke et al., 2015; Xue, J. and Su, B., 2017). NDVI is calculated from visible and near-infrared radiation reflected by vegetation and is an index of greenness correlated with photosynthesis that can be used to assess spatial and temporal changes in the distribution and productivity of vegetation (Pettorelli, 2013). Areas where the NDVI is higher have greener vegetation than areas where NDVI is lower, indicating areas where the overall vegetation is healthy.

Although NDVI does not provide species-specific vegetation information, the regional scale of NDVI makes it an appropriate "first indicator" of regional changes in the extent and quality of riparian vegetation. Additionally, there are NDVI data for the entire extent of the Prado Basin dating from the early 1980s to present, which provide a historical characterization of the spatial extent and quality of the riparian vegetation prior to and after the implementation of Peace II activities (2007).

A limitation of NDVI data is that it is a composite view of plant species diversity, form, structure, density, and vigor. As such, changes in NDVI may be caused by various changes in riparian habitat (Markon et al., 1995; Markon and Peterson, 2002). In other words, NDVI does not provide a complete picture of how and why vegetative changes are occurring; it simply indicates a change in vegetation. These changes can then be ground-truthed using other types of monitoring. Appendix A provides background information on NDVI, further explains why NDVI was chosen as an analytical tool for the PBHSP, discusses additional advantages and limitations of NDVI, and describes how NDVI estimates were used for the PBHSP.

For the current reporting period, NDVI estimates were collected from the United States Geological Survey (USGS) using the Earth Resources Observation and Science (EROS) Center Science Processing Architecture (ESPA) On Demand Interface[6] (USGS, 2017b) over the period of November 2023 through October 2024 to span the entire growing-season period (March-October 2024). To obtain complete spatial coverage of the Prado Basin area, NDVI estimates were requested for all Landsat scenes for Path 040, Rows 036 and 037 from the Landsat 8 and Landsat 9 satellites. The NDVI were processed and uploaded to Watermaster's centralized relational database, HydroDaVE^{SM}, which includes tools to manage, review, and extract NDVI estimates. The frequency of NDVI estimates from the Landsat 8 and 9 satellites is once every eight days. However, not all NDVI estimates are useable due to disturbances that can be caused by cloud cover, unfavorable atmospheric conditions, or satellite equipment malfunction. NDVI estimates were reviewed for these disturbances and excluded from analysis if they were determined erroneous due to these disturbances. Appendix A describes how the NDVI estimates were collected, reviewed, and assembled for the PBHSP.

[6] ESPA USGS

2.1.1.2 Collection and Analysis of Air Photos

Georeferenced air photos are used to visually characterize the spatial extent and quality of the riparian habitat in the Prado Basin. The air photos also serve as an independent check on interpretations of NDVI, which involves visual comparison of the extent and density of the riparian habitat (as shown in the air photos) to the NDVI maps. For ongoing monitoring, a high-resolution (3-inch pixel) image of the visible spectrum for the entire Prado Basin is acquired during the middle of the growing season, typically in July.

For the current reporting period, the acquisition of the 2024 air photo included a custom flight that was performed by Tetra Tech on July 1, 2024. The cost to acquire the 2024 air photo was shared with the OCWD. This was the eighth annual high-resolution air photo acquired for the PBHSP and cost-shared with the OCWD.

2.1.2 Site-Specific Monitoring of Riparian Habitat

The objective of the site-specific monitoring of riparian habitat is to collect data that can be used to ground-truth the interpretations derived from the regional monitoring and assessment of the riparian habitat (Pettorelli, 2013). Prior to the implementation of the AMP, site-specific monitoring performed in the Prado Basin included vegetation surveys performed by the United States Bureau of Reclamation (USBR) in 2007 and 2013 (USBR, 2008b; 2015). Since the implementation of the AMP, the USBR conducted vegetation surveys for the PBHSP in 2016, 2019, and 2022. The USBR vegetation surveys performed in 2016 and 2019 consist of 37 sites, including 23 previously established sites surveyed in 2007 and 2013, and 14 new sites established in 2016 primarily located near the PBHSP monitoring wells. The USBR vegetation surveys conducted in 2022 encompassed 39 sites, including the 37 previously established sites surveyed in 2016 and 2019, and two additional sites in the upper portion of Mill Creek to increase the monitoring is an area where there has been some observed drawdown of groundwater levels since the PBHSP monitoring began. The OCWD also performs site-specific monitoring in the southern portion of Prado Basin to monitor for effects of the operation of Prado Dam on riparian habitat. OCWD site-specific monitoring includes seasonal monitoring at nine canopy photo stations located along the edge of Prado Basin and at 11 understory photo stations within different surface elevations of the inundation zone behind the dam. The most recent annual report prepared by OCWD on the results of this monitoring is the *Prado Basin Water Conservation and Habitat Assessment 2023-2024* report (OCWD, 2025).

Figure 2-1 shows the locations of the USBR vegetation surveys and the OCWD photo monitoring sites.

2.2 Factors that Potentially Affect the Riparian Habitat

The main factors that can potentially affect riparian habitat in Prado Basin include but are not limited to groundwater levels, surface-water discharge, weather/climate, wildfires, and pests. This section describes the methods employed to collect and analyze information on these factors to help answer questions 5, 6, and 7 from the AMP:

- How have groundwater levels and quality, surface-water discharge, weather, and climate changed over time? What were the causes of the changes? And did those changes result in an adverse impact to riparian habitat in the Prado Basin?
- Are there other factors besides groundwater levels, surface-water discharge, weather, and climate that affect riparian habitat in the Prado Basin? What are those factors? And did they (or do they) result in an adverse impact to riparian habitat in the Prado Basin?

- Are the factors that result in an adverse impact to riparian habitat in the Prado Basin related to Peace II implementation?

2.2.1 Groundwater Monitoring Program

A primary result of implementation of the Peace II Agreement is the lowering of groundwater levels (drawdown) in the southern portion of Chino Basin. Hence, drawdown is a factor that is potentially related to Peace II implementation and could adversely impact riparian habitat.

The Groundwater Monitoring Program (GMP) includes the collection of three types of data: groundwater production, groundwater level, and groundwater quality. Watermaster has been implementing a groundwater monitoring program across the entire Chino Basin to support various basin management initiatives and activities, and all data within Watermaster's centralized relational database are available to the GMP.

In 2015, Watermaster's groundwater monitoring network was expanded specifically for the PBHSP, with the construction of 16 new monitoring wells at nine sites located along the fringes of the riparian habitat and between the riparian habitat and the CDA well field. These wells, along with two existing monitoring wells, HCMP-5/1 and RP2-MW3, are specifically monitored for the PBHSP and are called the "PBHSP monitoring wells".

Figure 2-2 shows the extent of the study area for which the GMP data are compiled and used for the PBHSP. The area covers the Prado Basin and the upgradient areas to the north that encompass the Chino Desalter well field. Figure 2-2 also shows the wells in the study area where groundwater data were available in WY 2024.

2.2.1.1 Groundwater Production

Groundwater production influences groundwater levels and groundwater-flow patterns. Groundwater-production data are analyzed together with groundwater-level data to characterize the influence of groundwater production on groundwater levels. Groundwater-production data are also used as an input to the Chino Basin groundwater-flow model to evaluate past and future conditions in the Chino Basin, which, for the PBHSP, supports the analysis of prospective losses of riparian habitat (see Section 2.3).

Watermaster collects quarterly groundwater-production data for all active production wells within the Chino Basin. The data are checked for quality assurance and quality control (QA/QC) and uploaded to Watermaster's centralized relational database. The active production wells within the study area include CDA wells and privately owned wells used for agricultural, dairy, or domestic purposes.

During WY 2024, Watermaster collected groundwater-production data at about 80 wells in the GMP study area.

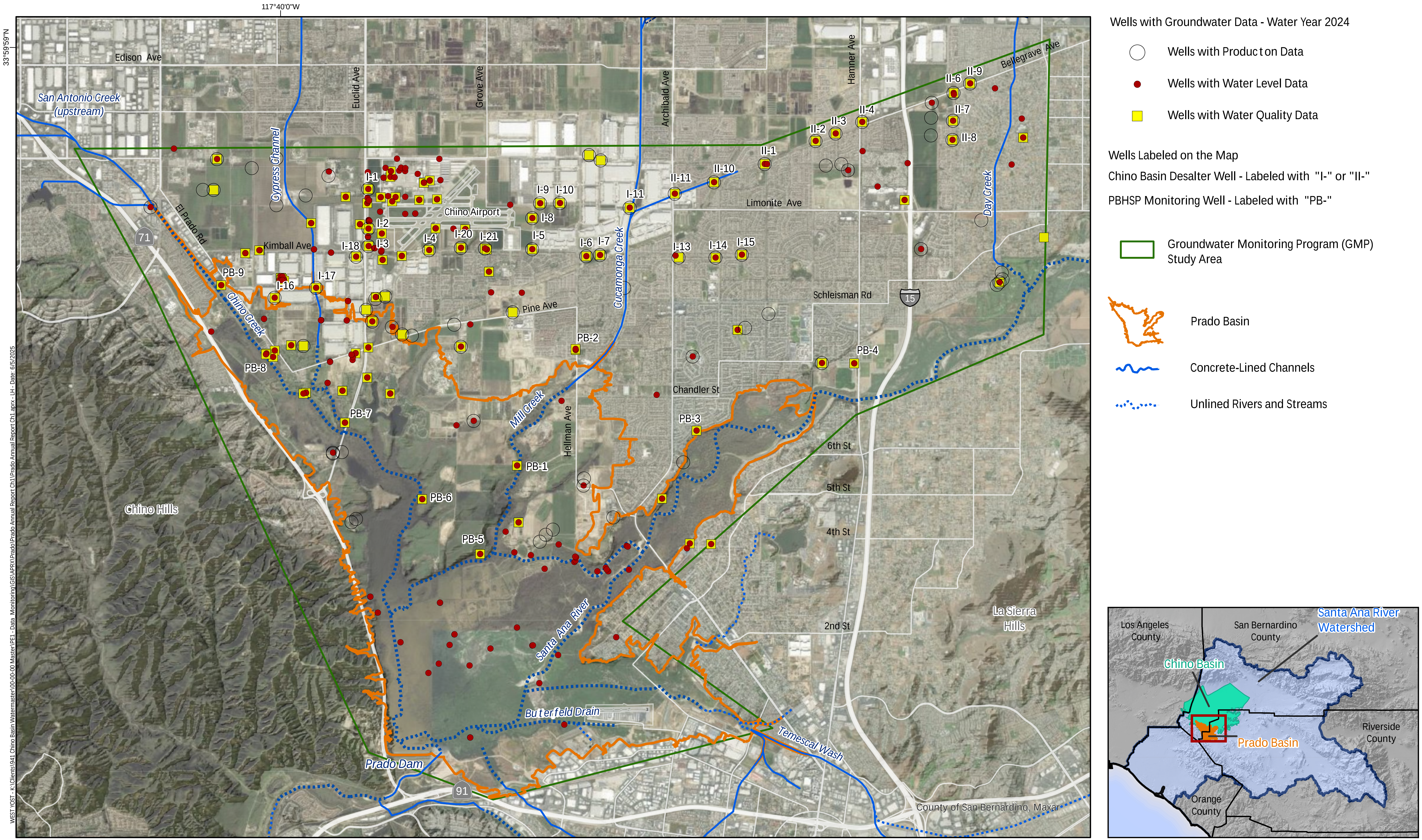
2.2.1.2 Groundwater Level

Monitoring groundwater levels in the Prado Basin is a key component of the PBHSP, as the potential for declining groundwater levels related to Peace II implementation could be a factor that adversely impacts riparian habitat. Groundwater-level data are analyzed together with production data to characterize how groundwater levels have changed over time in the GMP study area and to explore the relationship(s) to any observed changes that occurred in the extent and quality of the riparian habitat. Groundwater-level and production data are also used as input to the Chino Basin groundwater-flow model to evaluate past and future conditions in the Chino Basin, which, for the PBHSP, supports the analysis of prospective losses of riparian habitat (see Section 2.3). Groundwater level data are also used with other data to evaluate groundwater/surface water interactions (see Section 3.3).

Watermaster collects groundwater-level data at various frequencies at wells in the GMP study area to support various groundwater-management initiatives. The data are checked for QA/QC and uploaded to Watermaster's centralized relational database.

During WY 2024, Watermaster collected groundwater-level data from 278 wells in the study area (see Figure 2-2). Approximately 106 wells are CDA wells, dedicated monitoring wells, or private wells that are monitored by Watermaster using manual methods once per month or with pressure transducers that record water levels once every 15 minutes. At the remaining 172 wells, water levels were measured by well owners at varying frequencies and provided to Watermaster. Since May 2015, groundwater-levels at the 18 PBHSP monitoring wells have been measured with pressure transducers that record water levels once every 15 minutes.

In June 2024, Guida Surveying Inc. conducted professional surveys to measure the thalweg elevations in the adjacent water bodies near the PBHSP monitoring wells (Chino Creek, Mill Creek or SAR). The thalweg elevations were referenced to the same elevation datum as the monitoring wells, which allows for comparison of all elevation data. The groundwater elevations in PBHSP monitoring wells can be compared to the thalweg elevation of the nearby surface water body to help characterize groundwater/surface-water interactions within the GMP study area and determine if the shallow groundwater supporting the riparian vegetation is supported by the groundwater and/or the surface water.



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2024 Annual Report

Groundwater Monitoring Program

Figure 2-2

2.2.1.3 Groundwater Quality

Water-quality data can be used to understand the various potential sources of shallow groundwater in the Prado Basin. Groundwater-quality data are compared to surface-water-quality data to characterize groundwater/surface-water interactions in the Prado Basin and assess the importance of those interactions to the extent and quality of the riparian habitat.

Watermaster collects groundwater-quality data from wells in the GMP study area to support various groundwater-management initiatives. These data are checked for QA/QC and uploaded to Watermaster's centralized relational database. During WY 2024, groundwater-quality data were collected from 162 wells in the study area (see Figure 2-2). Of these wells, 56 wells are dedicated monitoring wells or private wells sampled by Watermaster either using transducers that record high-frequency data, or grab samples collected quarterly, annually, or triennially (every three years). The remaining 106 were sampled by the well owners at varying frequencies.

Watermaster has performed groundwater-quality sampling at the PBHSP monitoring wells since they were constructed in 2015. The groundwater-quality monitoring has been tailored to discern the groundwater/surface-water interactions important to the sustainability of the riparian habitat. Currently Watermaster conducts triennial water-quality sampling at the 18 PBHSP monitoring wells as part of their basin-wide water-quality monitoring to support various groundwater-management initiatives. The most recent water-quality sampling event occurred during September 2024 and the next triennial monitoring event will occur in summer of 2027.

In FY 2023/24 Watermaster began to collect and analyze high-frequency (15 minute) temperature and specific conductance (EC) readings using the transducers at the PBHSP monitoring wells. This high-frequency temperature and EC monitoring at all the PBHSP monitoring wells is a recommendation in the WY 2022 Annual Report and a replacement of a pilot monitoring program that was conducted at four of the wells from FY 2018/19 to FY 2022/23 to study groundwater/surface-water interactions (see section 4.1 of 2022 Annual Report, West Yost, 2023). High-frequency temperature data was already being measured by transducers in the 18 PBHSP monitoring wells. Additionally, high-frequency EC data was already being measured by the transducers in four of these wells. As transducers are replaced, they are upgraded to models that measure and record high-frequency EC data along with temperature and groundwater levels. In FY 2024/25 two transducers were replaced and currently there are twelve PBHSP monitoring wells with transducers that measure EC in addition to temperature and water level.

During FY 2024/25, the high-frequency temperature and EC data at the PBHSP monitoring sites were downloaded, processed, checked for QA/QC, and uploaded to Watermaster's relational database on a quarterly basis.

2.2.2 Surface-Water Monitoring Program

Surface-water discharge in the Prado Basin is another factor that can influence the extent and quality of riparian habitat and can influence groundwater levels. Surface-water discharge data are evaluated for the PBHSP to characterize historical and current trends in the discharge of the SAR and its tributaries in the Prado Basin, and to explore the relationship(s) to any observed changes that occur in the extent and quality of the riparian habitat. Surface-water discharge data are also used as input to the Chino Basin groundwater-flow model to evaluate past and future conditions in the Chino Basin, which for the PBHSP, supports the analysis of prospective losses of riparian habitat (see Section 2.3). Surface-water quality data is compared to groundwater-quality data to characterize groundwater/surface-water interactions in the Prado Basin and the importance of those interactions to the extent and quality of the riparian habitat. Figure 2-3 shows the location of the surface-water monitoring sites used in the PBHSP.

The surface-water monitoring program for the PBHSP involves collecting existing, publicly available surface-water discharge and quality data from sites within or tributary to the Prado Basin. These sites include discharge locations for publicly owned treatment works (POTWs), USGS stream gaging stations, Watermaster and the IEUA Maximum-Benefit Monitoring Program surface-water-quality monitoring sites, and ACOE's storage levels and inflow to Prado Dam. All surface-water discharge and quality data were collected for WY 2024, checked for QA/QC, and uploaded to Watermaster's relational database.

In FY 2023/24, Watermaster began to collect surface-water field measurements of temperature and EC at four sites located near PBHSP monitoring wells along Chino Creek and Mill Creek. This monitoring is done in coordination with high-frequency groundwater measurements of temperature and EC described above in the Groundwater Quality Section to study groundwater/surface-water interactions. Data were checked for QA/QC and uploaded to Watermaster's relational database.

2.2.3 Climatic Monitoring Program

Climate is another factor that can influence the extent and quality of riparian habitat and can influence groundwater levels. Climatic data are evaluated for the PBHSP to characterize how the climate has changed over time in the study area and to explore the relationship(s) to any observed changes that occurred in the extent and quality of the riparian habitat. Climatic data are also used for the Chino Basin groundwater-flow model to evaluate past and future conditions in the Chino Basin, which for the PBHSP, supports the analysis of prospective losses of riparian habitat (see Section 2.3).

The climatic monitoring program for the PBHSP involves collecting existing, publicly available spatially gridded climate datasets for precipitation and temperature in the vicinity of the Prado Basin. These climate datasets include Next-Generation Radar (NEXRAD) and the PRISM Climate Group. Figure 2-3 shows the location of the areas where the grided climate data is extracted from PRISM and NEXRAD to estimate a spatial average for precipitation and temperature for the PBHSP. The Chino Basin boundary is used to extract the spatially gridded data for precipitation, and the Prado Basin boundary is used to extract the spatially gridded data for maximum and minimum temperature. Climatic data are collected annually and uploaded to Watermaster's relational database.

2.2.4 Other Factors That Can Affect Riparian Habitat

The AMP recognizes that there are potential factors other than groundwater, surface water, and climate that can affect riparian habitat in the Prado Basin. These factors include, but are not limited to, wildfire, disease, pests, and invasive species. To the extent necessary and possible, data and information on these factors are collected and analyzed to explore relationships to changes in the extent and quality of the riparian habitat.

In WY 2016, during the analysis for the first Annual Report, two specific factors were identified as potential impacts to the riparian habitat in the Prado Basin: wildfires and an invasive pest known as the Polyphagous Shot-Hole Borer (Euwallacea fornicates; PSHB hereafter). In WY 2018, the removal of the non-native invasive weed Arundo donax (Arundo) was identified as another factor that could potentially impact the riparian habitat in the Prado Basin. The following describes the information that was collected for these three factors and how they are used to explore for relationships to changes that have occurred in the extent and quality of riparian habitat.

2.2.4.1 Wildfires

Wildfires occur periodically in the Prado Basin and can reduce the extent and quality of riparian habitat. For the PBHSP, the occurrence and locations of wildfires are used to help understand and explain the trends observed in the extent and quality of the riparian vegetation.

To map the extent of any wildfires that have occurred in the study area, fire-perimeter data were collected from the Fire and Resource Assessment Program (FRAP) of the California Department of Forestry and Fire Protection (CAL FIRE).[7]

For the current reporting period, wildfire data were obtained from the FRAP database for the Prado Basin region for calendar year 2023.[8]

2.2.4.2 Polyphagous Shot-Hole Borer (PSHB)

The PSHB is a beetle that burrows into trees, introducing a fungus (*Fusarium euwallacea*) into the tree bark that spreads the disease Fusarium Dieback (FD).[9,10] FD destroys the food and water conducting systems of the tree, eventually causing stress and tree mortality. The PSHB was first discovered in Southern California in 2003 and has been recorded to have caused branch die-back and tree mortality for various tree specimens throughout the Southern California region (USDA, 2013). Since 2016, the PSHB is an identified pest within the Prado Basin that has the potential to negatively impact riparian habitat vegetation (USBR, 2016; Palenscar, K., personal communication, 2016; McPherson, D., personal communication, 2016).

Information on the PSHB occurrence in the Prado Basin has been obtained during the USBR vegetation surveys of riparian habitat in the Prado Basin for the PBHSP during 2016, 2019, and 2022; from the University of California, United States Department of Agriculture (USDA) and Natural Resources' online PSHB/FD Distribution Map[11]; and from the OCWD's PSHB trap deployment and monitoring. For the PBHSP, the occurrences of the PSHB in the Prado Basin are used to help understand and explain the trends observed in the extent and quality of the riparian vegetation.

For the current reporting period, there was no data collected on the PSHB occurrence in Prado Basin. The most recent data collected was in 2022 during the USBR vegetation surveys.

[7] Frap.fire.ca.gov

[8] Data for the previous year is available each year in April.

[9] UCANR.edu

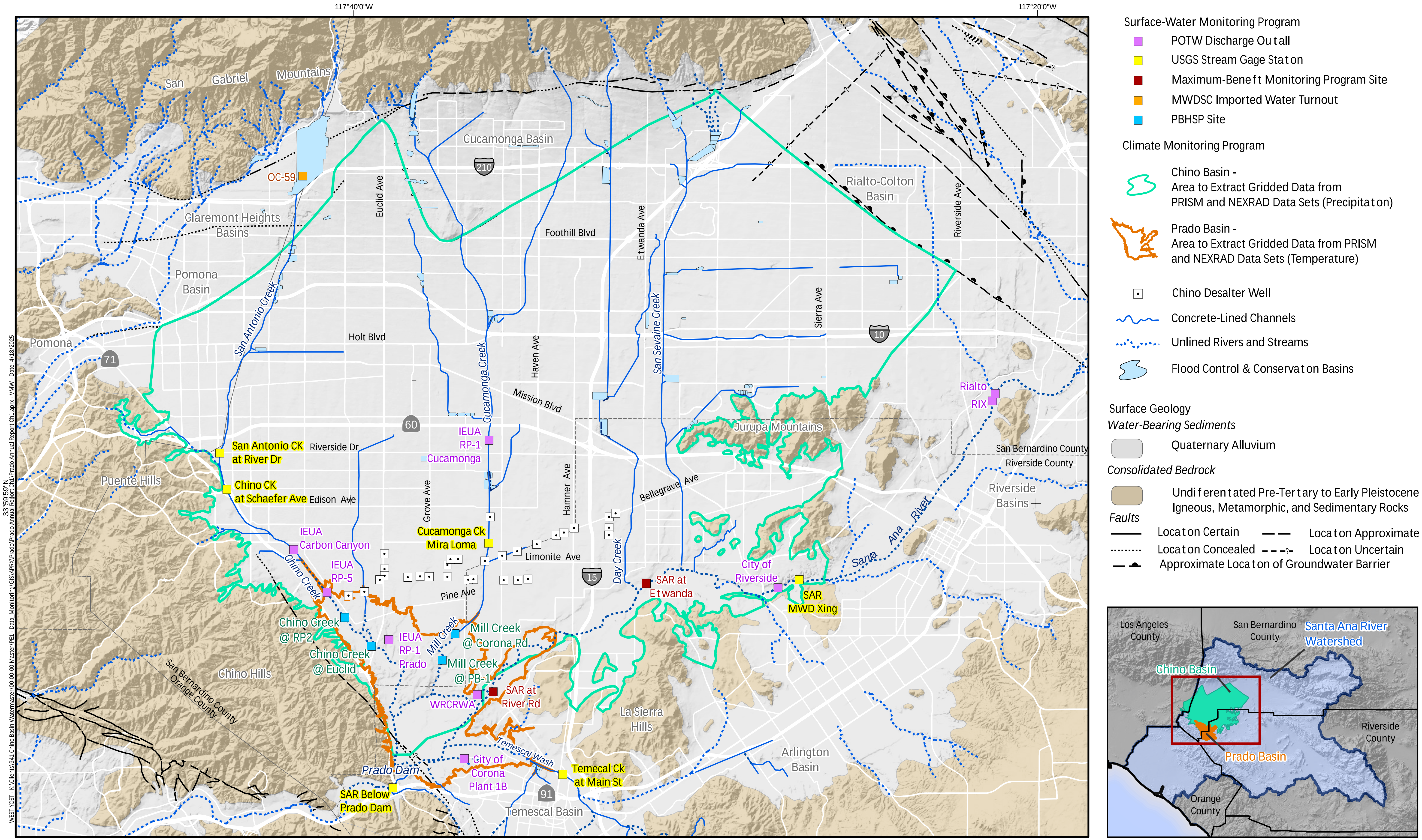
[10] Cisr.Ucr.Edu

[11] Ucanr.edu

2.2.4.3 Arundo Removal

Non-native Arundo is prominent throughout riparian habitat in the Prado Basin. Arundo consumes significantly more water than native plants, can out-compete native vegetation, and is flammable in nature, increasing the risk of wildfire. Several stakeholders in the SAR watershed are actively removing Arundo from the riparian habitat to restore native habitat and support the recovery of the threatened and endangered species, such as the Least Bell's Vireo and Santa Ana Sucker. For the PBHSP, tracking the occurrence and locations of these habitat restoration activities that include the removal of Arundo can help understand and explain trends in the extent and quality of the riparian habitat. The OCWD, Santa Ana Watershed Association (SAWA), and Santa Ana Watershed Project Authority (SAWPA), in coordination with others, are the main entities in the watershed that implement habitat restoration programs that include removing Arundo.

In WY 2024, information on recent Arundo removal and management activities in the Prado Basin were collected to track these programs and explore potential connections between these activities and observed trends in the extent and quality of riparian habitat. This effort involved coordinating with the OCWD and SAWA to obtain information on the location and timing of these programs.



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2024 Annual Report

Surface Water and Climate
Monitoring Programs

Figure 2-3

2.3 Prospective Loss of Riparian Habitat

Monitoring and mitigation requirement 4.4-3 in the Peace II SEIR calls for annual reporting for the PBHSP, that will include recommendations for ongoing monitoring and any adaptive management actions required to mitigate any measured loss or **prospective loss** of riparian habitat that may be attributable to the Peace II Agreement (emphasis added). The meaning of "prospective loss" in this context is "future potential losses" of riparian habitat. Predictive modeling of groundwater levels can be used to answer Question 8 from the AMP:

- Are there areas of prospective loss of riparian habitat that may be attributable to the Peace II Agreement?

Watermaster's most recent groundwater-modeling results are used to evaluate forecasted groundwater-level changes within the Prado Basin under current and projected conditions in the Basin, including, but not limited to, plans for pumping, storm-water recharge, and supplemental water recharge. To perform this evaluation, the predictive model results of groundwater levels are mapped and analyzed to identify areas (if any) where groundwater levels are projected to decline to depths that may negatively impact riparian habitat in the Prado Basin.

Watermaster's most recent groundwater model projections are from the simulation of planning scenario "2020 SYR1" for the 2020 recalculation of Safe Yield using the updated Chino Basin groundwater-flow model (WEI, 2020). Section 3.7 of this Annual Report uses this most recent projection to characterize future groundwater-level conditions in the GMP study area and analyze prospective loss. The Chino Basin groundwater-flow model is currently being updated and used to project conditions for the 2025 Safe Yield Reset, and new model projections will be included in the WY 2025 Annual Report.

3.0 RESULTS AND INTERPRETATIONS

3.1 Trends in Riparian Habitat Extent and Quality

This section describes the analysis and interpretation of the monitoring data and groundwater-modeling results for the PBHSP. Analyzed data span various historical periods, based on data availability, and include both pre- and post-Peace II Agreement implementation (2007).

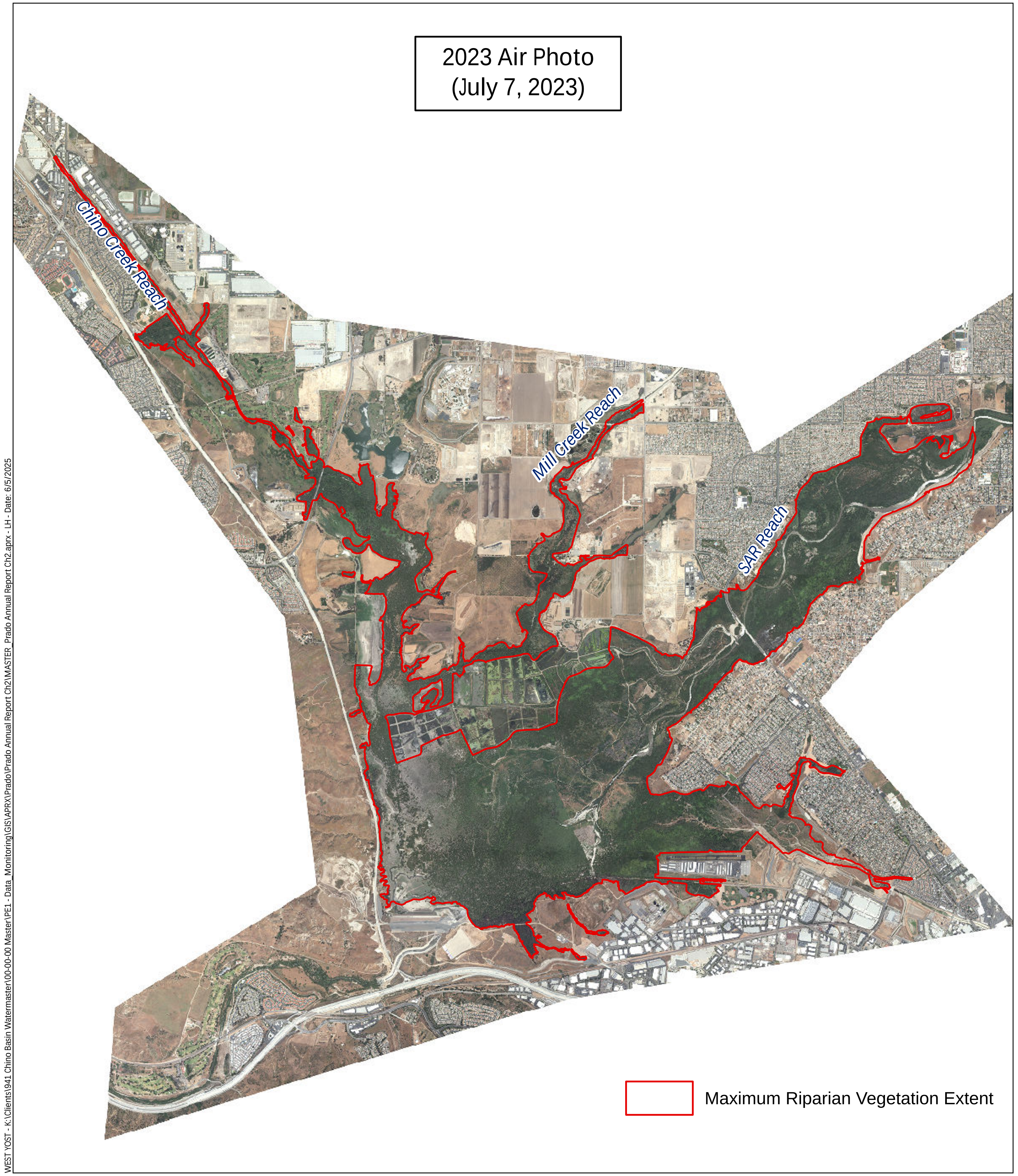
More specifically, this section describes the trends in the extent and quality of the riparian habitat, describes the trends in factors that can impact the riparian habitat, and evaluates potential cause-and-effect relationships—particularly any cause-and-effect relationships that may be associated with Peace II implementation. The factors that can potentially impact the extent and quality of the riparian habitat include changes in groundwater levels, surface-water discharge, climate, and other factors, such as pests, wildfires, and habitat management activities. Declining groundwater levels is the primary factor that is potentially related to Peace II implementation and could adversely impact the riparian habitat.

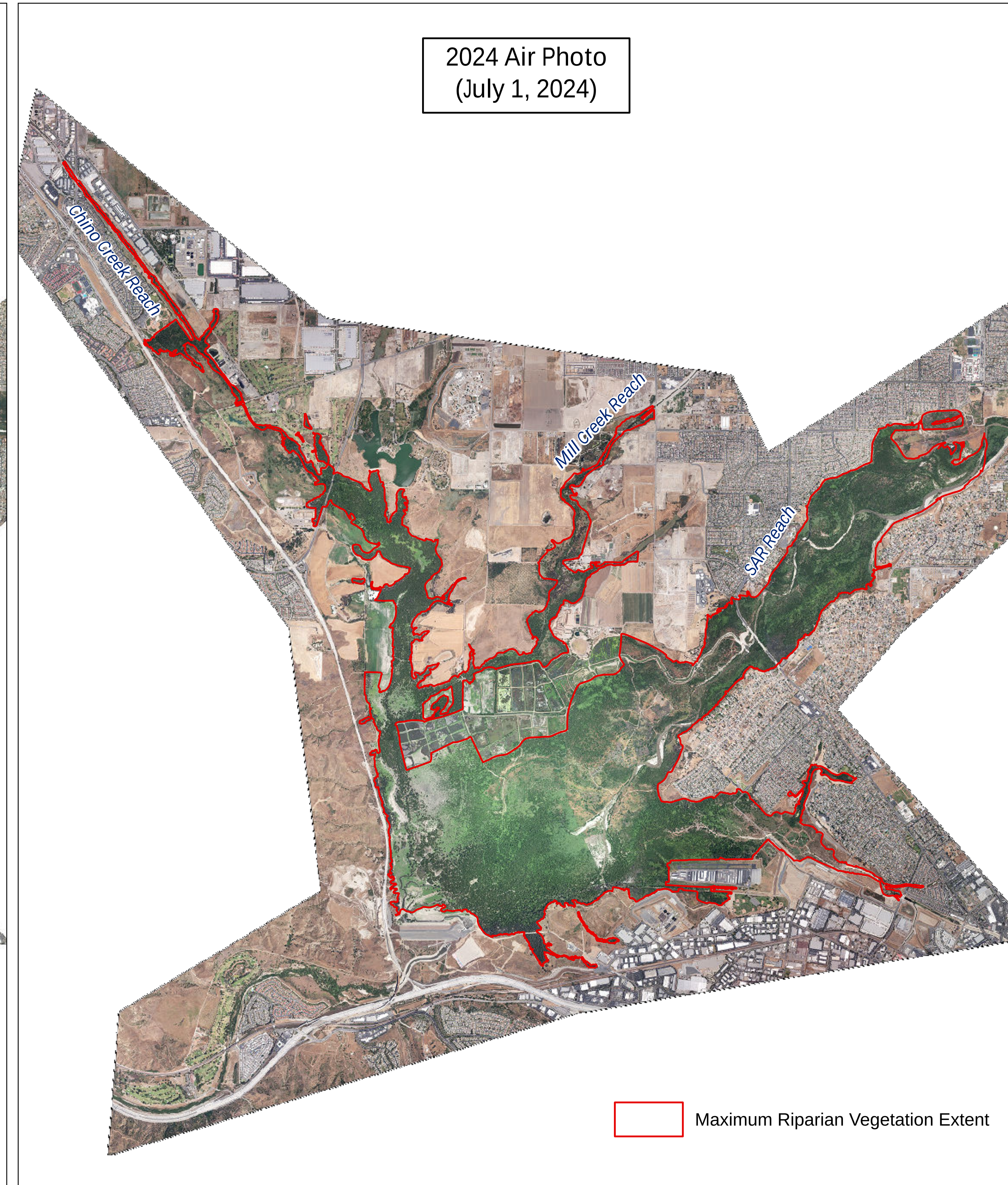
This section also includes a review of Watermaster's most recent predictive Chino Basin groundwater modeling results to identify areas of potential future declines in groundwater levels that could impact the riparian habitat.

3.1.1 Extent of the Riparian Habitat

The annual reports for the first four years of the PBHSP included an analysis of the riparian vegetation using historical air photos to map the density and extent of the vegetation in the Prado Basin (WEI, 2017; 2018; 2019; 2020). In general, these analyses concluded that from 1960 to 1999 the mapped extent of the riparian habitat increased from about 1.8 to 6.7 square miles (mi^2) and its vegetated density increased. The 1999 mapped extent is considered the maximum extent of the riparian habitat in the Prado Basin and has since remained relatively constant in the Prado Basin along the Chino Creek, Mill Creek, and SAR reaches in the Prado Basin.[12] The maximum extent of the riparian vegetation in Prado Basin is shown on Figure 3-1a which compares the air photos that were acquired for the PBHSP in July 2023 and July 2024. Both air photos are high resolution (3-inch pixels) which allow for a side-by-side visual comparison of riparian vegetation extent and quality in 2023 and 2024. There are no significant differences in these air photos that show a change to the extent of the riparian habitat in the Prado Basin along the Chino Creek, Mill Creek, and SAR reaches in the Prado Basin. The maximum extent of the riparian habitat in the Prado Basin will be the area used to evaluate the NDVI spatially and temporally to characterize changes in the quality of entire riparian habitat extent over the last year and over the 1984 to 2024 period (Sections 3.1.2.1 and 3.1.2.2).

[12] Since 1999 there has been a decrease to the extent and density of the riparian vegetation along the Temescal Wash in the southeastern portion of Prado Basin. This area is outside the Chino Basin hydrologic boundary and is not an area of influence of potential impacts of Peace II implementation on groundwater levels.





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Air Photos and Extent of the Riparian Vegeta t on
2023 and 2024

Figure 3-1a

Figure 3-1b compares the 2024 air photo and the mapped extent of the riparian habitat to the NDVI estimates for the Prado Basin area on a date that corresponds to the maximum of the spatial average of NDVI during the growing season for 2024.[13] Generally, the following ranges in NDVI during the growing season correspond to these land cover types:

- < 0: Water
- 0 - 0.29: Non-vegetated surfaces, such as urbanized land cover and barren land
- 0.3 - 1.0: Vegetated land cover: higher NDVI values indicate greater photosynthetic activity

Three main observations and interpretations are derived from this figure:

- The majority of the Prado Basin riparian vegetation areas have NDVI estimates of about 0.3 to 0.9 during the growing season. Active agricultural lands in the Prado Basin region can also have NDVI values of a similar range during the growing season.
- The NDVI estimates support the delineation of the extent of the riparian habitat as drawn from the air photos.
- The consistency of NDVI values to land cover observed in the air photo indicates that the processing of NDVI estimates for this study were performed accurately, which supports subsequent analyses and interpretations.

3.1.2 Quality of the Riparian Habitat

As discussed, and referenced in Section 2.0, NDVI is an indicator of the photosynthetic activity of vegetation and therefore can be used to interpret the health or "quality" of the riparian vegetation. In this section, NDVI is spatially and temporally analyzed in maps and time-series charts for defined areas throughout Prado Basin to characterize changes in the quality of riparian habitat over the period 1984 to 2024.

3.1.2.1 Spatial Analysis of NDVI

Figure 3-2 compares maps of NDVI across the entire Prado Basin area for 2023 and 2024 on the dates that correspond to the maximum growing-season NDVI for the year as a spatial average across the entire extent of the riparian vegetation. Figure 3-3 is a map of change in NDVI from 2023 to 2024 that was prepared by subtracting the 2023 NDVI map from the 2024 NDVI map on Figure 3-2. These figures identify areas that may have experienced a change in the quality of riparian habitat from 2023 to 2024:

- About half of the riparian vegetation extent area showed no change in NDVI from 2023 to 2024.
- NDVI decreased and increased in scattered patches in the riparian vegetation throughout the Prado Basin.
- The notable patches of increase in NDVI are behind Prado Dam and in the middle portion of Chino Creek northwest of the OCWD wetlands.
- The notable patches of decrease in NDVI are located in the lower area of Prado Basin along the SAR and below the OCWD wetlands.

These spatial changes in NDVI will be analyzed along with the factors that can impact riparian habitat in Sections 3.2 through 3.6 of this report.

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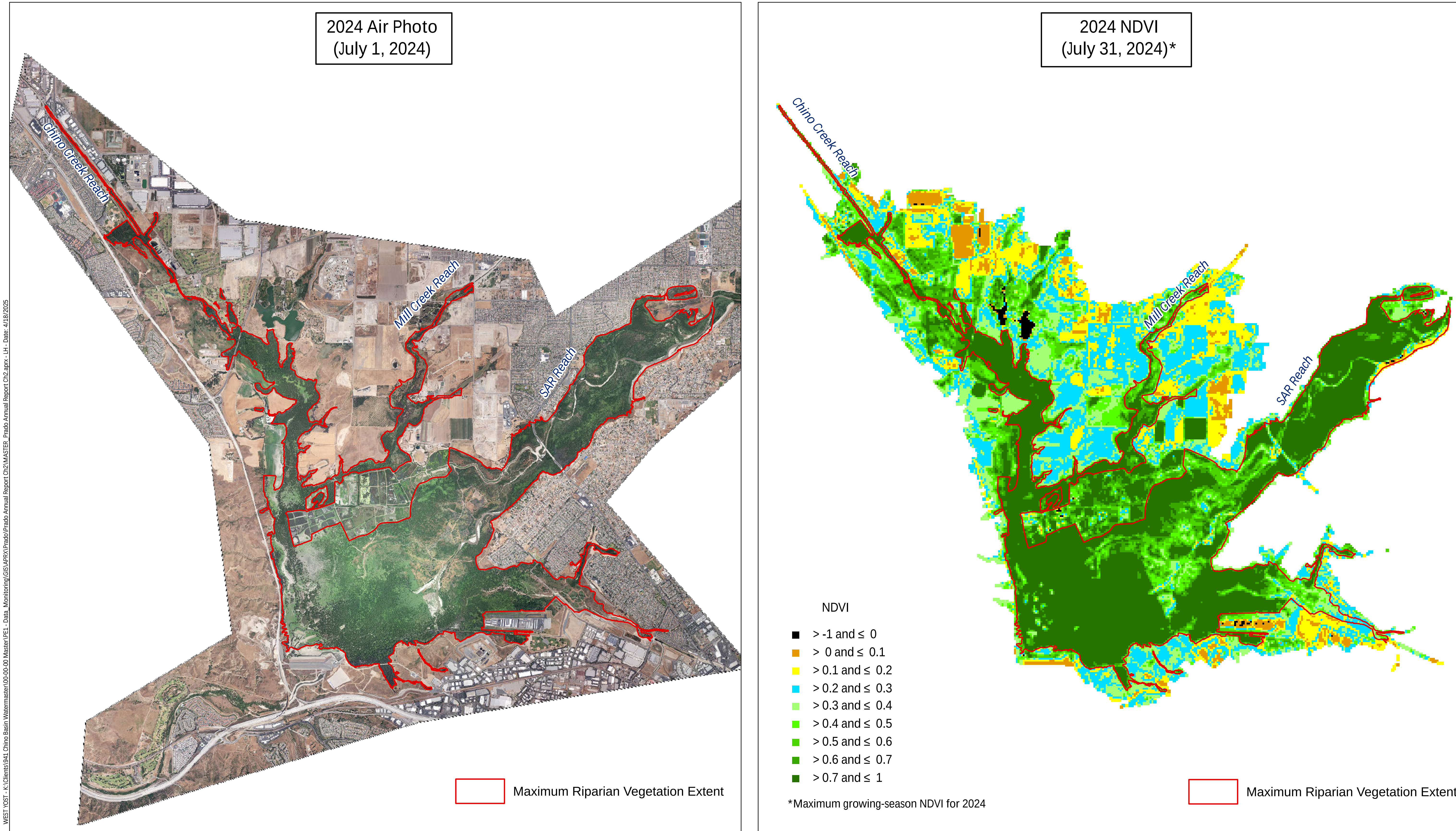
[13] The growing season for the Prado Basin riparian vegetation is from March through October (Merkel, 2007; USBR, 2008). The maximum NDVI for the 2024 growing season occurred on July 31, 2024.



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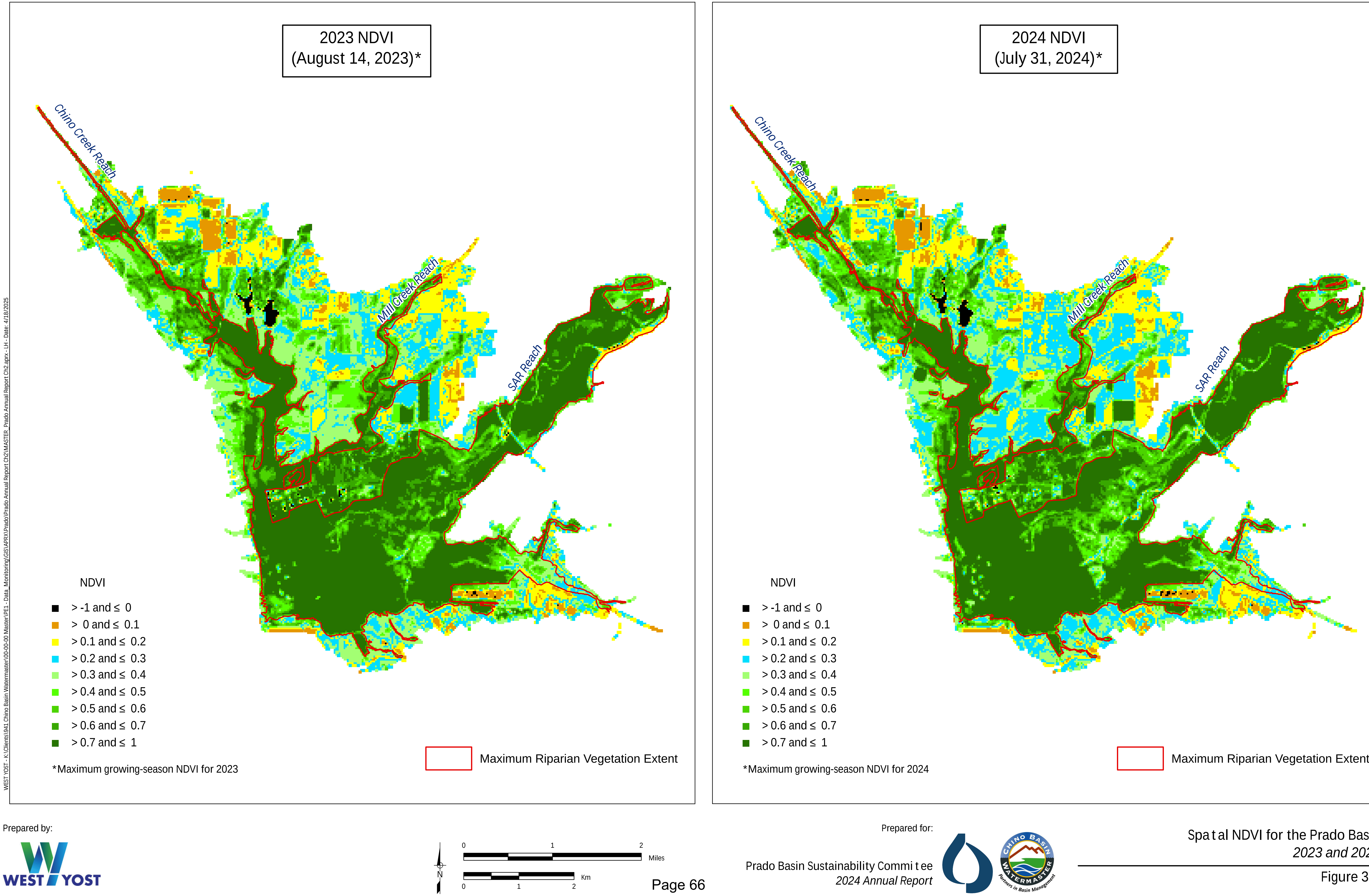
2024 Annual Report

Air Photo and Spatial NDVI for the Prado Basin
2024

Figure 3-1b



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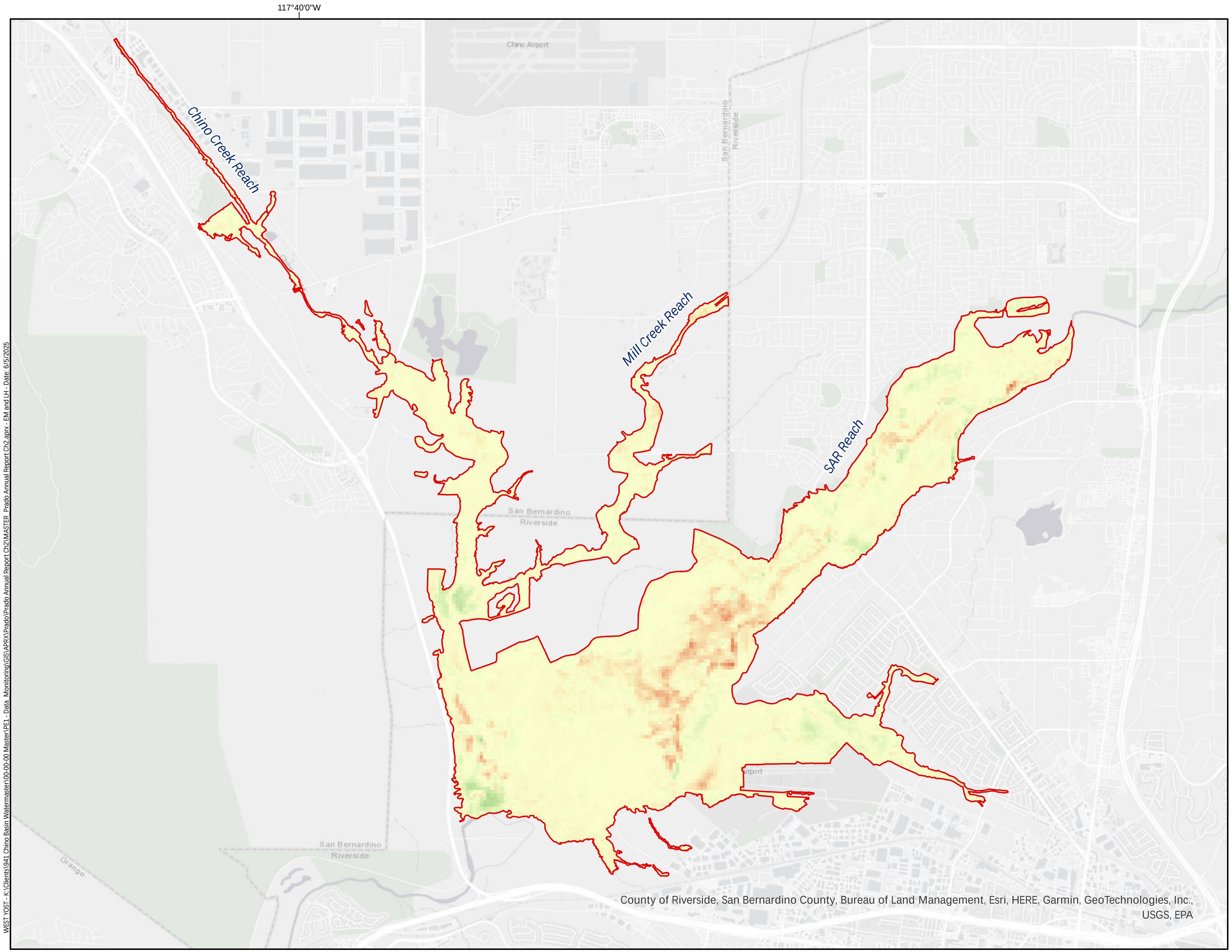
2024 Annual Report

Spatial NDVI for the Prado Basin
2023 and 2024

Figure 3-2

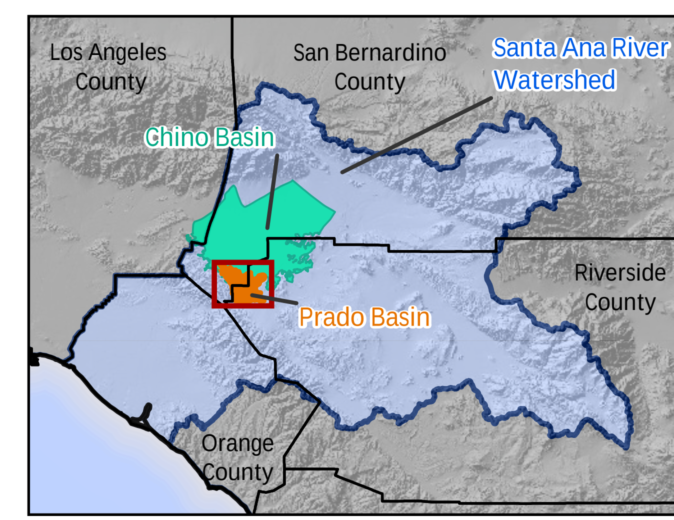


Change in Maximum Growing-Season NDVI Values
2023 to 2024

1.0 Increase

-1.0 Decrease

Maximum Riparian Vegetation Extent in Prado Basin



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2024 Annual Report

Spatial Change in NDVI for the Prado Basin
2023 to 2024

Figure 3-3

3.1.2.2 Temporal Analysis of NDVI

NDVI pixels[14] within defined areas throughout the Prado Basin were spatially averaged and temporally analyzed in time-series charts. The defined areas include four large and 14 small areas within Prado Basin and are shown in Figure 3-4. The large areas include the extent of the riparian habitat in the entire Prado Basin (6.8 mi^2 - 19,520 NDVI pixels), the upper portion of Chino Creek (0.74 mi^2 - 2,134 NDVI pixels), the entire Mill Creek reach (0.26 mi^2 - 759 NDVI pixels), and the upper portion of Mill Creek (0.03 mi^2 – 92 NDVI pixels). The small areas are located along the northern reaches of the Prado Basin riparian habitat near the PBHSP monitoring wells and a USBR vegetation survey site (10-meter radius plot). All the small areas are one NDVI pixel (30 x 30-meter pixel – 900 square meters).[15]

Figures 3-5, 3-6, 3-7a, 3-7b, and 3-8a through 3-8n are time-series charts of the NDVI for each defined area, illustrating changes in the riparian habitat quality over time. These figures characterize long- and short-term changes in NDVI in specific areas, providing context for interpreting trends and changes during Peace II implementation. Each figure shows two datasets that illustrate trends in the NDVI estimates:

- **Spatial Average NDVI (green dots)**. Spatial Average NDVI are the spatial average of the NDVI pixels within the defined area. These data characterize the seasonal and long-term trends in NDVI for each defined area. The NDVI exhibits an oscillatory pattern caused by seasonal changes in the riparian habitat. The NDVI time-series are typical for a deciduous forest, where NDVI values are higher in the growing season from March through October and lower in the dormant season from November through February when plants and trees shed their leaves.
- **Average Growing-Season NDVI (black dots and black curve).** The Average Growing-Season NDVI is the annual average of the Spatial Average NDVI for each growing season from March through October. This curve shows the annual changes and long-term trends in the NDVI for the growing season. This metric is used to analyze year-to-year changes and long-term trends in NDVI.

NDVI maps or air photos are included on the time-series charts for spatial reference and as a visual check on the interpretations derived from the time-series charts. The air photos are for 2021, 2022, 2023, and 2024, showing the last four years using the high-resolution air photos collected for the PBHSP.

To statistically characterize long-term trends in NDVI, the Mann-Kendall statistical trend test (Mann-Kendall test) was performed on the Average Growing-Season NDVI for all defined areas over the following three periods:

- 1984 to 2024: the entire period of record
- 1984 to 2006: period prior to Peace II Agreement implementation
- 2007 to 2024: period subsequent to Peace II Agreement implementation

The Mann-Kendall test utilizes a ranking formula to statistically analyze if there is an increasing trend, decreasing trend, or no trend in the NDVI. Appendix B describes the Mann-Kendall test methods and results. The final Mann-Kendall test results for the Average Growing-Season NDVI are shown on each time-series chart and are summarized in Table 3-1.

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[14] Each NDVI pixel is approximately 30 x 30 meters.

[15] In previous annual reports, these small areas were four NDVI pixels in this same general area. During WY 2020, these areas were modified to one NDVI pixel that aligned with the USBR vegetation survey so that the field vegetation survey data can better correlate with the NDVI time-series data.

Table 3-1. Mann-Kendall Test Results of the Average-Growing Season NDVI Trends for Defined Areas in the Prado Basin

Defined Area	Figure Number	Mann Kendal Test Result[(a)] Period of Record 1984-2024	Prior to Peace II 1984-2006	Post Peace II 2007-2024
Riparian Vegetation Extent	3-5	No Trend	No Trend	No Trend
Chino Creek	3-6	Increasing	Increasing	Increasing
Mill Creek	3-7a	No Trend	Decreasing	Increasing
Upper Mill Creek	3-7b	Increasing	No Trend	Increasing
CC-1	3-8a	Increasing	Increasing	Increasing
CC-2	3-8b	Increasing	Increasing	Increasing
CC-3	3-8c	Increasing	Increasing	Increasing
CC-4	3-8d	Increasing	No Trend	Increasing
MC-1	3-8e	Increasing	Increasing	Increasing
MC-2	3-8f	No Trend	No Trend	Increasing
MC-3	3-8g	Increasing	No Trend	Increasing
MC-4	3-8h	Increasing	No Trend	No Trend
MC-5	3-8i	No Trend	No Trend	Increasing
MC-6	3-8j	Increasing	No Trend	Increasing
SAR-1	3-8k	No Trend	No Trend	Increasing
SAR-2	3-8l	Increasing	Decreasing	Increasing
SAR-3	3-8m	Increasing	No Trend	Increasing
LP	3-8n	No Trend	Increasing	No Trend

(a) See Appendix B for a description of the Mann-Kendall statistical trend test and results.

To characterize the short-term trends in NDVI, Table 3-2 summarizes the one-year change in the Average Growing-Season NDVI from 2023 to 2024 at the 18 defined areas and compares to the changes and variability in Average Growing-Season NDVI over the historical period of 1984 to 2023 at each area. During WY 2024, there were slight decreasing trends in the NDVI from 2023 to 2024 at most of the areas: 13 areas decreased; two areas showed no trend; and three areas increased. These one-year changes in the Average Growing-Season NDVI are all minor and within the range of long-term annual variability of the NDVI at each area.

Table 3-2. Characterization of Variability in the Average-Growing Season NDVI for Defined Areas in the Prado Basin

Defined Area	Figure Number	Historical NDVI Statistics 1984-2023		One-Year Change in NDVI from 2023-2024
		Average One-Year Change in NDVI (Absolute Value)	Maximum One-Year Change in NDVI (Absolute Value)	
Riparian Vegetation Extent	3-5	0.03	0.08	0.00
Chino Creek	3-6	0.02	0.09	-0.02
Mill Creek	3-7a	0.04	0.11	-0.02
Upper Mill Creek	3-7b	0.03	0.12	-0.05
CC-1	3-8a	0.03	0.08	0.01
CC-2	3-8b	0.03	0.11	-0.02
CC-3	3-8c	0.03	0.12	-0.02
CC-4	3-8d	0.03	0.09	-0.01
MC-1	3-8e	0.04	0.12	-0.02
MC-2	3-8f	0.06	0.18	-0.07
MC-3	3-8g	0.03	0.13	0.00
MC-4	3-8h	0.03	0.12	-0.02
MC-5	3-8i	0.04	0.12	-0.07
MC-6	3-8j	0.05	0.22	-0.02
SAR-1	3-8k	0.06	0.48	0.01
SAR-2	3-8l	0.04	0.13	-0.01
SAR-3	3-8m	0.02	0.10	-0.03
LP	3-8n	0.06	0.21	0.05

3.1.2.3 Temporal Analysis of NDVI in Prado Basin

Figure 3-5 is a time-series chart from 1984 to 2024 of the spatial average of all 19,520 NDVI pixels that are within the maximum delineated extent of the riparian habitat in the Prado Basin.[16] The intent of the time series is to characterize the trends in NDVI for the Prado Basin as a whole, which is used as a basis of comparison to the trends in the NDVI for each of the smaller defined areas shown in subsequent figures. Instead of air photos like the time-series chart in Figures 3-6, 3-7a, 3-7b, and 3-8a through 3-8n, Figure 3-5 includes NDVI maps from 2021, 2022, 2023, and 2024, to visually compare to the NDVI time series.

Figure 3-5 and Tables 3-1 and 3-2 show that the Average Growing-Season NDVI for the entire Prado Basin varies from year-to-year by no more than 0.08 with no apparent long-term trends. The Mann-Kendall test result on the Average Growing-Season NDVI indicates "no trend" over the 1984 to 2024 period, "no trend" over the 1984 to 2006 period, and "no trend" over the 2007 to 2024 period.

[16] The maximum extent of the riparian habitat in the Prado Basin is based on 1999 conditions and has been relatively stable since in the Chino Creek, Mill Creek, and SAR reaches, and has been verified by inspection of the 2017 to 2024 high-resolution air photos.

From 2023 to 2024, the Average Growing-Season NDVI remained the same, and within the historical range of the annual Average Growing-Season NDVI variability for the extent of the riparian vegetation.

This time-series analysis of NDVI suggests that the riparian habitat in Prado Basin, analyzed as a whole, has not experienced statistically significant declines in NDVI in the recent water year, nor during the post-Peace II Agreement period from 2007 to 2024.

3.1.2.4 Temporal Analysis of NDVI within Large Areas along Chino Creek and Mill Creek

Figures 3-6, 3-7a, and 3-7b are time-series charts from 1984 to 2024 of the spatial average for NDVI pixels within large areas of riparian habitat located along the reaches of Chino Creek, Mill Creek, and Upper Mill Creek, respectively. These charts characterize trends and changes in NDVI for these northern reaches of the riparian habitat in the Prado Basin and provide a basis for comparison to the NDVI trends and changes for each of the smaller defined areas.

Chino Creek

Figure 3-6 is an NDVI time-series chart for 1984 to 2024 of the spatial average of all 2,134 NDVI pixels along the upper portion of Chino Creek in the Prado Basin. This reach of Chino Creek is susceptible to impacts from declining groundwater levels associated with Peace II implementation.

Figure 3-6 and Tables 3-1 and 3-2 show that over the period of record, the Average Growing-Season NDVI varied from year-to-year by no more than 0.09 with a long-term increasing trend. The Mann-Kendall test result on the Average Growing-Season NDVI indicates an “increasing trend” over the 1984 to 2024 period, an “increasing trend” over the 1984 to 2006 period, and an “increasing trend” over the 2007 to 2024 period.

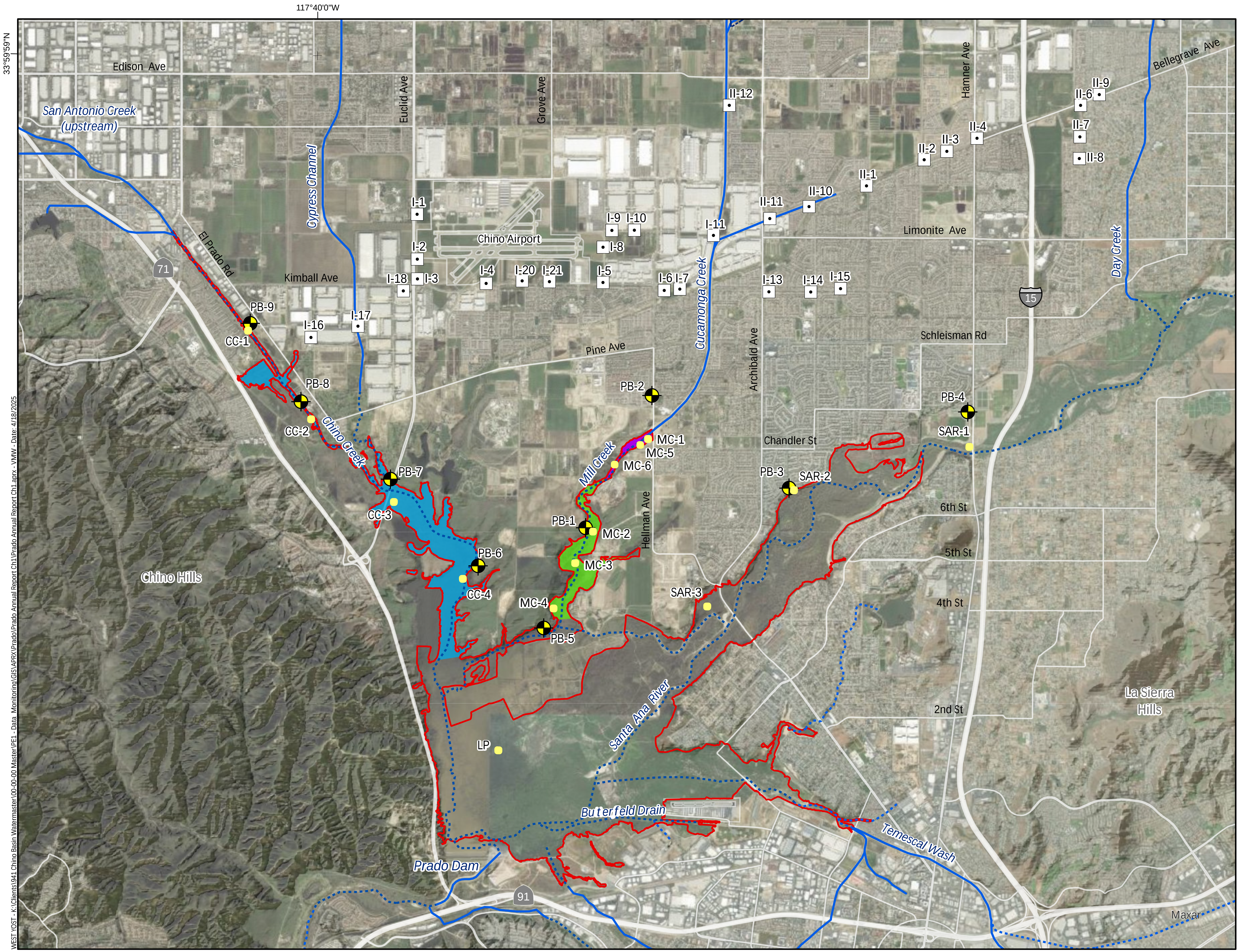
From 2023 to 2024, the Average Growing-Season NDVI decreased by 0.02, which is the same as the historical average one-year change in NDVI and therefore, within the historical range of variability for the annual Average Growing-Season NDVI. Visual inspection of the 2023 and 2024 air photos do not show significant changes in the riparian vegetation along Chino Creek.

Mill Creek

Figure 3-7a and Figure 3-7b are NDVI time-series charts for 1984-2024 of the spatial average for two areas of Mill Creek: the entire reach of Mill Creek in the Prado Basin (759 NDVI pixels) and the upper portion of Mill Creek (92 NDVI pixels). The Upper Mill Creek area is more susceptible to impacts from declining groundwater levels associated with Peace II implementation and was added for the analysis of NDVI time-series in the 2022 Annual Report.

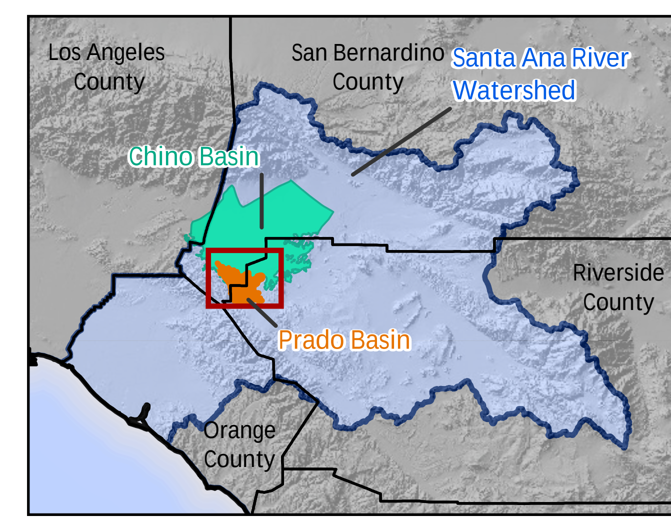
Figure 3-7a and Tables 3-1 and 3-2 show that for the entire Mill Creek extent, the Average Growing-Season NDVI varied from year-to-year by no more than 0.11 over the period of record. The Mann-Kendall test result on the Average Growing-Season NDVI indicates “no trend” over the 1984 to 2024 period, “decreasing trend” over the 1984 to 2006 period, and “increasing” over the 2007 to 2024 period. From 2023 to 2024, the Average Growing-Season NDVI decreased by 0.02 which is within the historical range of the annual Average Growing-Season NDVI variability for the entire Mill Creek and less than the average one-year change in NDVI observed over the historical period. Review of the 2023 and 2024 air photos of Mill Creek area show a decrease in green vegetation throughout this area from 2023 to 2024.

Figure 3-7b and Tables 3-1 and 3-2 show that for the upper Mill Creek reach, the Average Growing-Season NDVI varied from year-to-year by no more than 0.12 over the period of record. The Mann-Kendall test result on the Average Growing-Season NDVI indicates an “increasing trend” over the 1984 to 2024 period, “no trend” over the 1984 to 2006 period, and an “increasing trend” over the 2007 to 2024 period. From 2023 to 2024, the Average Growing-Season NDVI decreased by 0.05 which is within the historical range of the annual Average Growing-Season NDVI variability for the Upper Mill Creek area, but slightly greater than the average one-year change in NDVI observed over the historical period. Comparison of the 2023 and 2024 air photos show a decrease in vegetation in this area from 2023 to 2024.



Defned Area Analyzed for NDVI Temporally in Time-Series Chart

- 6.8 square-mile area (19,520 pixels) Riparian Vegetat on Extent (Figure 3-5)
- 0.74 square-mile area (2,134 NDVI pixels) in Chino Creek (Figure 3-6)
- 0.26 square-mile area (759 NDVI pixels) in Mill Creek, inclusive of 0.03 square-mile area in (92 NDVI pixels) Upper Mill Creek area in purple (Figures 3-7a and 3-7b)
- 30 x 30-meter area (one NDVI pixel) (Figures 3-8a through 3-8n)
- PBHSP Monitoring Well Site
- Chino Desalter Well
- Concrete-Lined Channels
- Unlined Rivers and Streams



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0 1 2 Miles

0 1 2 Km

N

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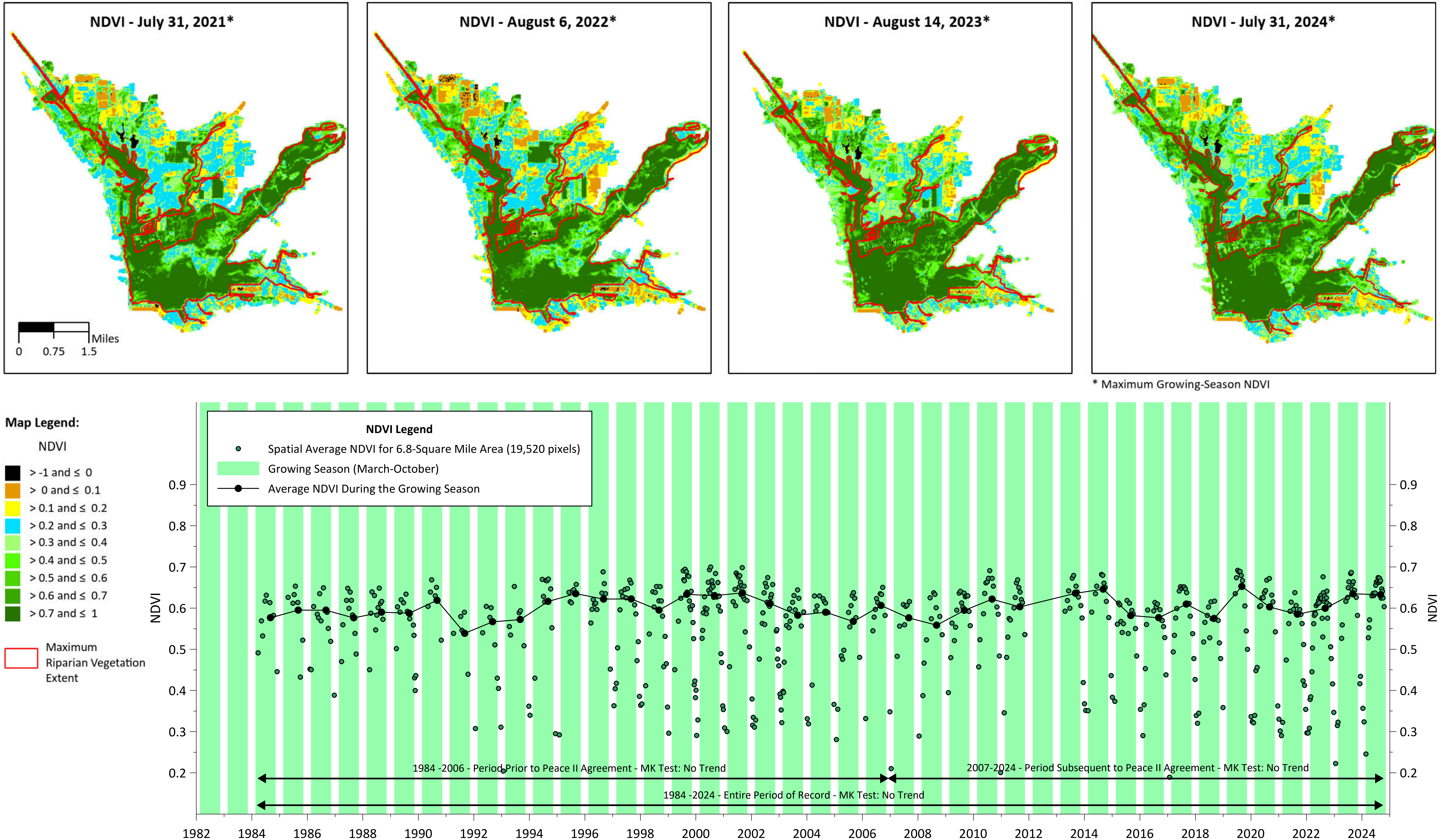
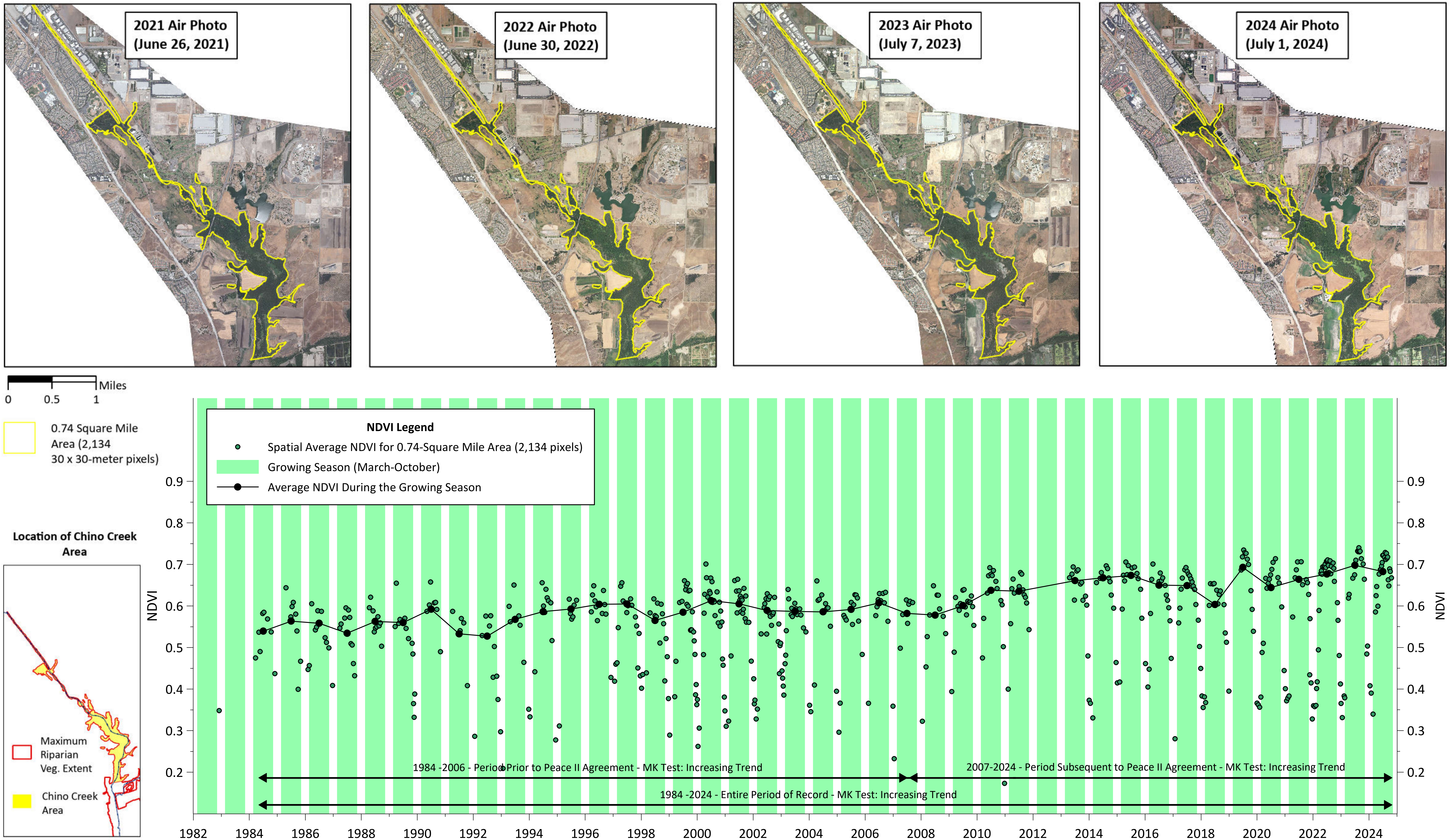
2024 Annual Report

Areas for Analysis of NDVI Time Series

Figure 3-4


NDVI - July 31, 2021*
NDVI - August 6, 2022*
NDVI - August 14, 2023*
NDVI - July 31, 2024*
Miles
0 0.75 1.5
* Maximum Growing-Season NDVI
Map Legend:
NDVI
> -1 and ≤ 0
> 0 and ≤ 0.1
> 0.1 and ≤ 0.2
> 0.2 and ≤ 0.3
> 0.3 and ≤ 0.4
> 0.4 and ≤ 0.5
> 0.5 and ≤ 0.6
> 0.6 and ≤ 0.7
> 0.7 and ≤ 1
Maximum Riparian Vegetation Extent
NDVI Legend
Spatial Average NDVI for 6.8-Square Mile Area (19,520 pixels)
Growing Season (March-October)
Average NDVI During the Growing Season
1984 -2006 - Period Prior to Peace II Agreement - MK Test: No Trend
2007-2024 - Period Subsequent to Peace II Agreement - MK Test: No Trend
1984 -2024 - Entire Period of Record - MK Test: No Trend
NDVI
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024



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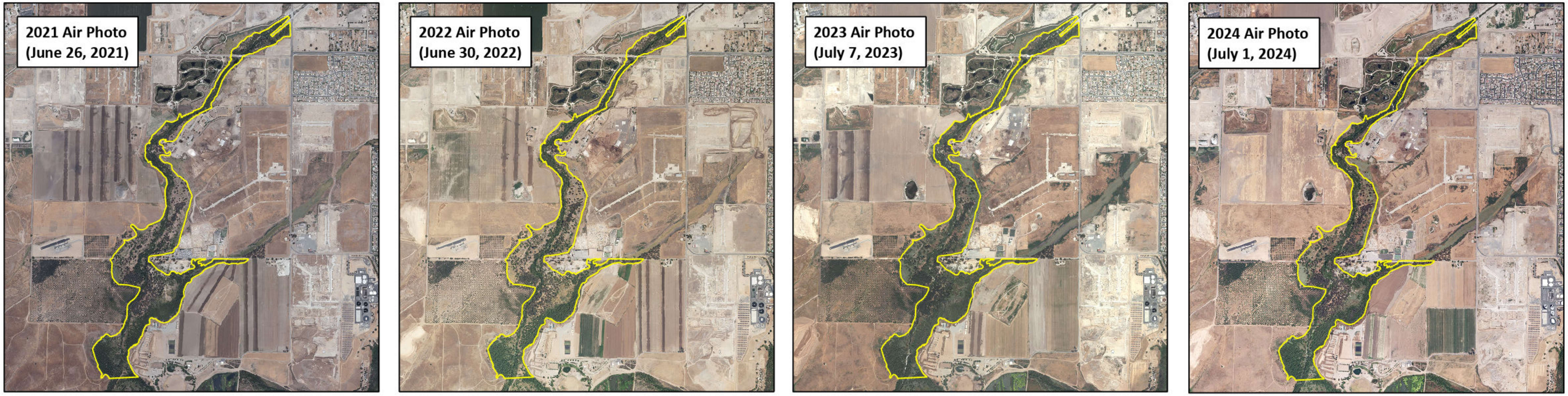
Time Series of NDVI and Air Photos
Along Chino Creek Area for 1984 to 2024

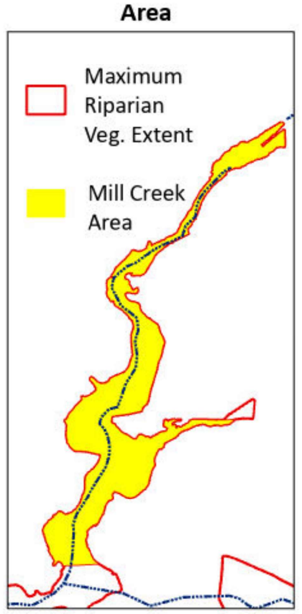
Figure 3-6

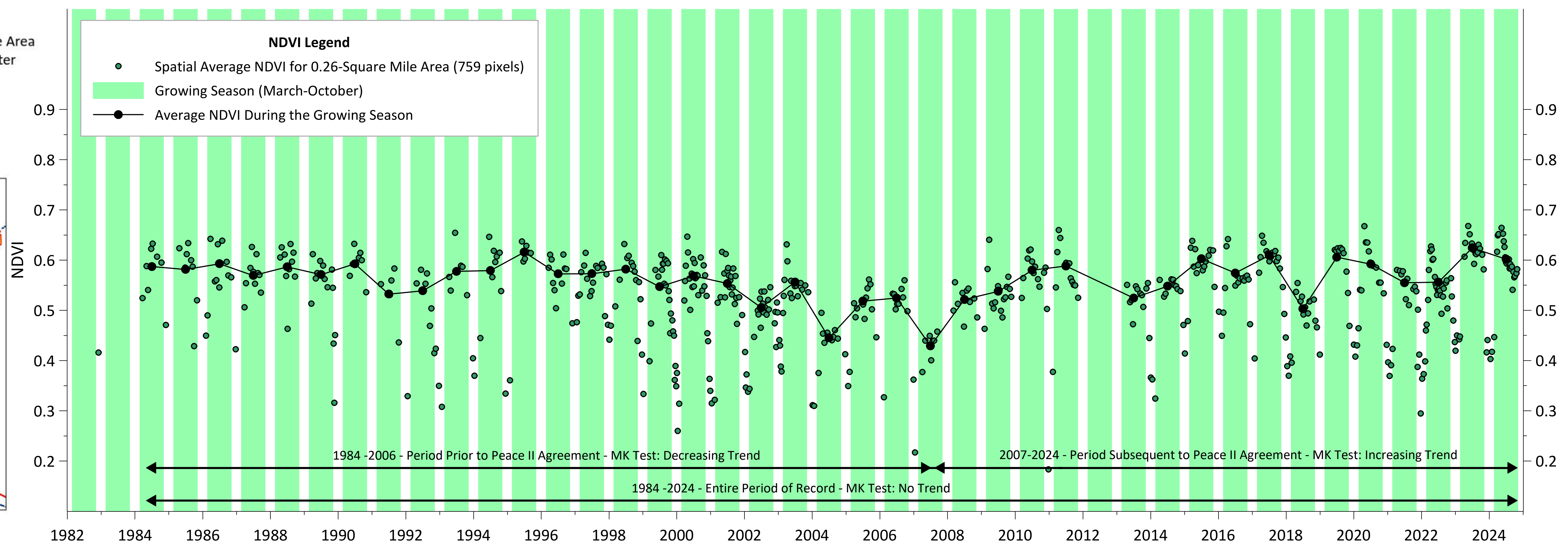


0 0.5 1 Miles

0.26 Square Mile Area (759 30 x 30-meter pixels)

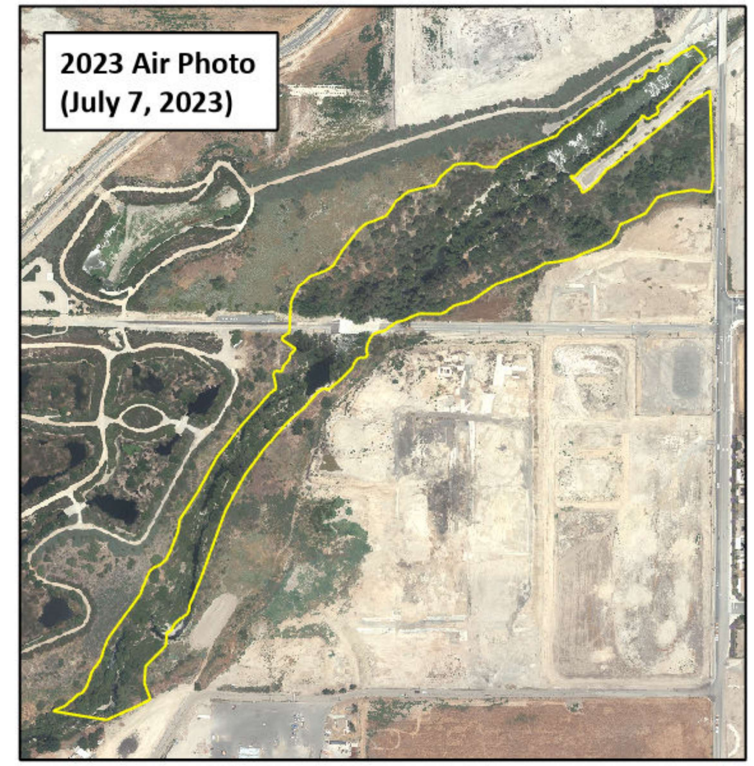
Location of Mill Creek Area





Time Series of NDVI and Air Photos
Along Mill Creek Area for 1984 to 2024

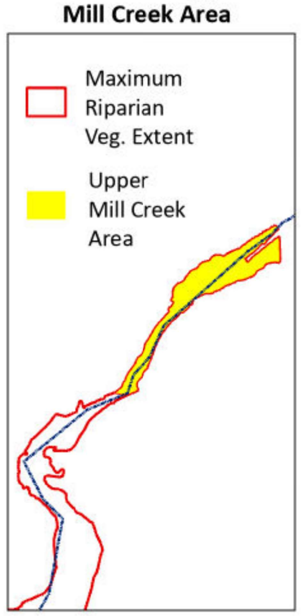
Figure 3-7a

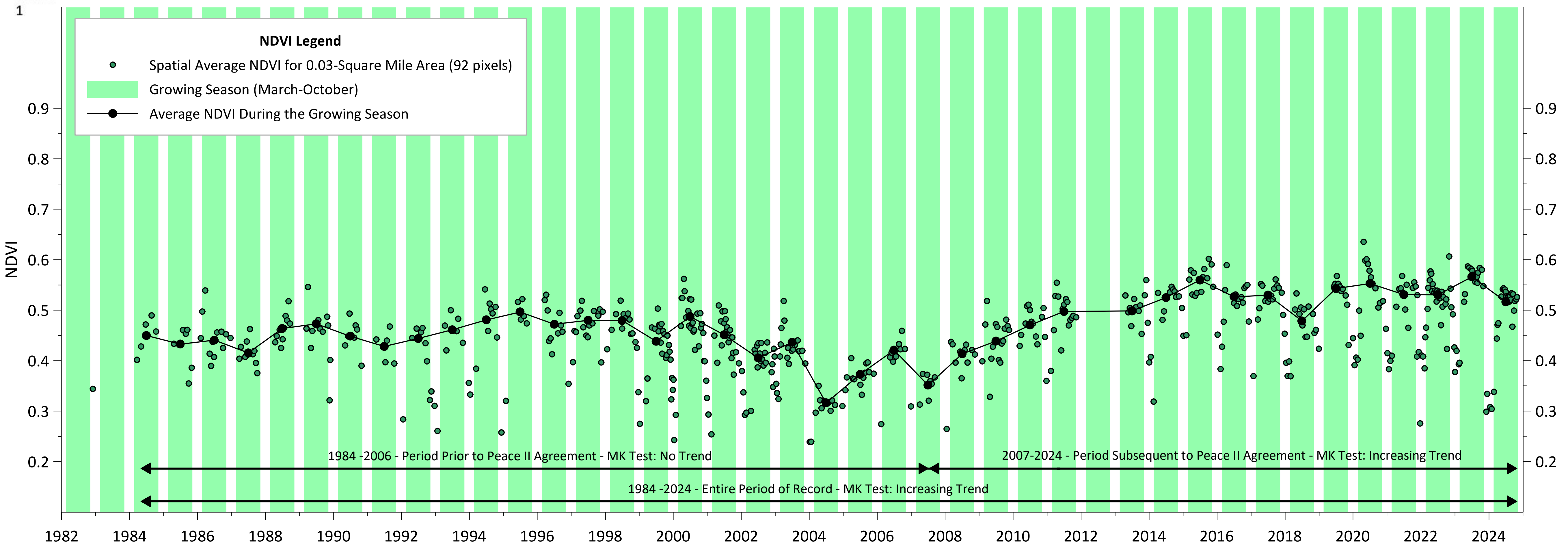


0 0.5 1 Miles

0.03 Square Mile Area (92 30 x 30-meter pixels)

Location of Upper Mill Creek Area





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Time Series of NDVI and Air Photos
Along Upper Mill Creek Area for 1984 to 2024

Figure 3-7b

3.1.2.5 Temporal Analysis of NDVI within Small Areas along Chino Creek, Mill Creek, and the Santa Ana River

Figures 3-8a through 3-8n are time-series charts of the NDVI for one NDVI pixel for the small defined areas located along Chino Creek, Mill Creek, and the SAR near the PBHSP monitoring wells from 1984 to 2024. These areas are located near a PBHSP monitoring well site to facilitate the comparison of changes in groundwater levels versus changes in the riparian habitat. Additionally, these small areas align with a 10-meter radius plot where vegetation surveys are conducted every three years allowing comparison of the field measurements with the NDVI.

The purpose of these charts is to characterize long-term trends and short-term changes in NDVI for smaller areas primarily located along the northern stream reaches of the Prado Basin riparian habitat—areas that are most susceptible to potential impacts from declining groundwater levels associated with Peace II implementation and provide a basis for comparison to the NDVI trends and changes for each of the larger defined areas.

Chino Creek **(Figures 3-8a to 3-8d)**. Four vegetated areas were analyzed along Chino Creek: CC-1, CC-2, CC-3, and CC-4 (see Figure 3-4 for locations). These figures, and Tables 3-1 and 3-2, show that over the period of record the Average Growing-Season NDVI varied from year-to-year by up to 0.12 with no long-term declining trends. For all four areas, the Mann-Kendall test result on the Average Growing-Season NDVI indicates an “increasing trend” over the 1984 to 2024 period, “no trend” or “increasing trend” over the 1984 to 2006 period, and an “increasing trend” over the 2007 to 2024 period.

For these four areas along Chino Creek, the Average Growing-Season NDVI from 2023 to 2024 increased slightly at one area in the upper reach (CC-1) and decreased slightly for the 3 sites in the middle Chino Creek reach. At all the areas, these one-year changes in the Average Growing-Season NDVI are relatively minor and within the historical ranges of one-year NDVI variability (see Table 3-2). Visual inspection of the 2023 and 2024 air photos do not show significant changes in the riparian vegetation at these four areas.

The overall trend in the Average Growing-Season NDVI align with the percent canopy cover measurements from the vegetation surveys for all the areas along Chino Creek.

Mill Creek **(Figures 3-8e to 3-8j).** Six vegetated areas were analyzed along Mill Creek just south of the CDA well field: MC-1, MC-2, MC-3, MC-4, MC-5, and MC-6 (see Figure 3-4 for locations). The MC-5 and MC-6 areas were incorporated starting with the 2022 Annual Report. These areas correspond to two new 10-meter radius plots added during the 2022 field vegetation surveys. This addition aims to enhance monitoring in a region where there has been observed drawdown of groundwater levels since the commencement of PBHSP monitoring. These figures, and Tables 3-1 and 3-2, show that over the period of record the Average Growing-Season NDVI varied year-to-year by up to 0.22 with no long-term declining trends. For all six areas, the Mann-Kendall test result on the Average Growing-Season NDVI indicates an “increasing trend” or “no trend” for the 1984 to 2024 period, an “increasing trend” or “no trend” for the 1984 to 2006 period, and an “increasing trend” or “no trend” for the 2007 to 2024 period.

The Average Growing-Season NDVI from 2023 to 2024 decreased in five of the six areas and remained unchanged for one area (MC-3). At the five areas where NDVI decreased, the one-year decrease remained within the historical ranges of one-year NDVI variability (see Table 3-2), however, the decreases at MC-2 and MC-5 are greater than the average one-year change in NDVI observed over the historical period. Visual inspection of the 2023 and 2024 air photos for MC-2 and MC-5 reveals notable changes in the riparian vegetation, including reductions in coverage and browning of the vegetation.

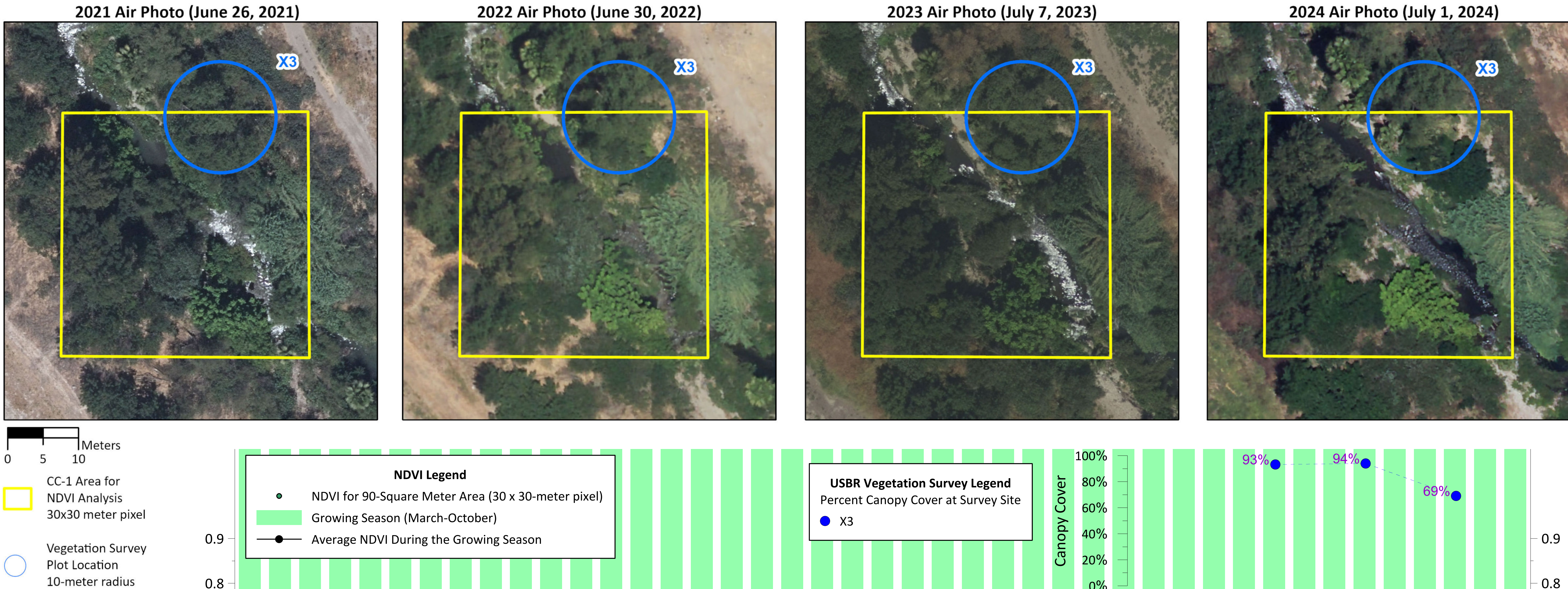
The overall trend in the Average Growing-Season NDVI align with the percent canopy cover measurements from the vegetation surveys for all the areas along Mill Creek.

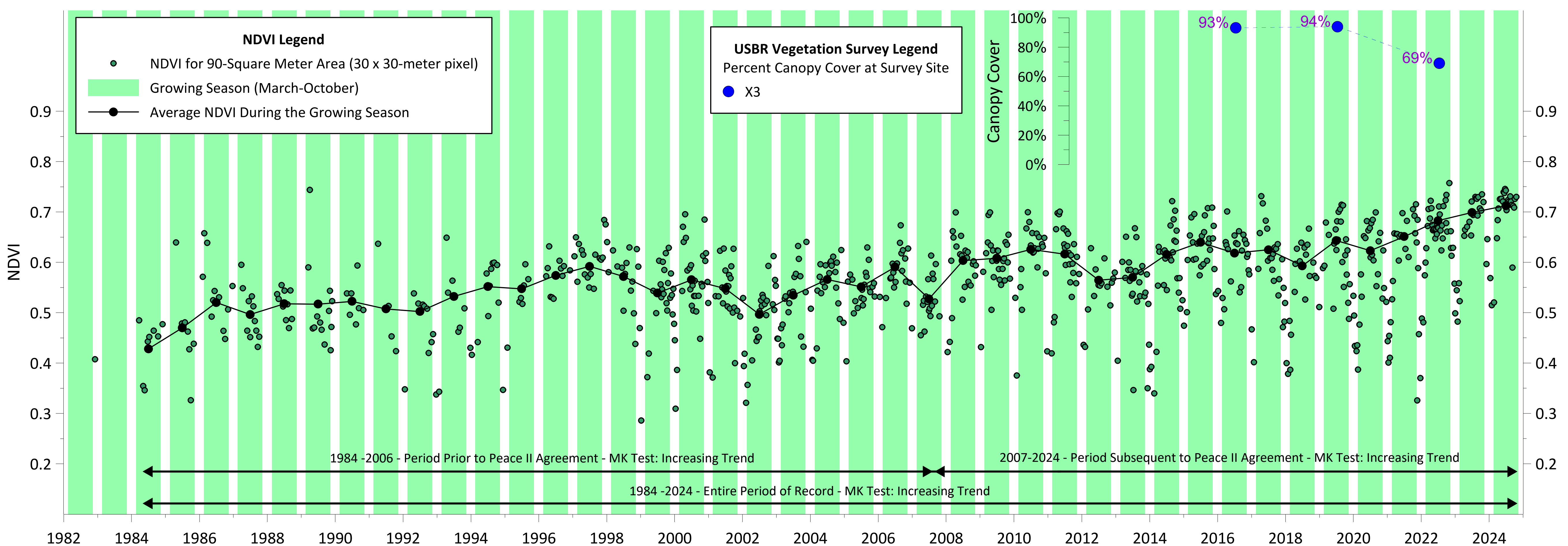
Santa Ana River **(Figures 3-8k to 3-8n).** Four vegetated areas were analyzed along the floodplain of the SAR: SAR-1, SAR-2, SAR-3, and LP (see Figure 3-4 for locations). These figures, and Tables 3-1 and 3-2, show that over the period of record the Average Growing-Season NDVI varied by up to 0.48 from year-to-year. For all four areas, the Mann-Kendall test result on the Average Growing-Season NDVI indicates an “increasing trend” or “no trend” for the 1984 to 2024 period, an “increasing trend”, “no trend” or “decreasing trend” for the 1984 to 2006 period, and an “increasing trend” or “no trend” for the 2007 to 2024 period.

The Average Growing-Season NDVI from 2023 to 2024 decreased at two of the sites (SAR-2 and SAR-3) and increased at two of the sites (SAR-1 and LP). These one-year changes in the Average Growing-Season NDVI are relatively minor and within the historical ranges of one-year NDVI variability (see Table 3-2), although the decrease in Average Growing-Season NDVI from 2023 to 2024 at SAR-3 was slightly greater than the average one-year change in NDVI over the historical period. Visual inspection of the 2023 and 2024 air photos do not show significant changes in the riparian vegetation at the SAR-1, SAR-2, SAR-3, and LP areas.

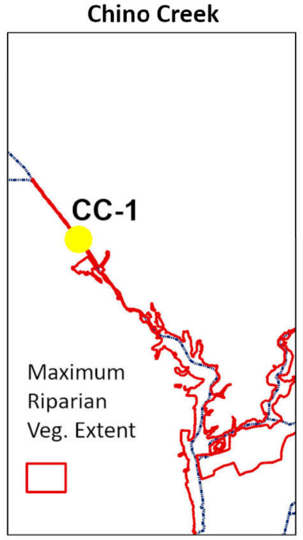
The overall trend in the Average Growing-Season NDVI align with the percent canopy cover measurements from the vegetation surveys for two areas (SAR-1 and SAR-3). The trend in the Average Growing-Season NDVI compared to the trend in the percent canopy cover measurements in 2022 do not align for the other two areas (SAR-2 and LP):

- At the X13 plot within SAR-2, there were multiple dead trees noted in 2022 due to grapevine competition (reduced canopy cover to 46%). The NDVI did not show a related decrease, likely due to the greenness of the grapevines.
- At the X1 plot within LP, there was an increase in dead trees noted in 2022 due to a fire in December 2020 (reduced canopy cover to 19%). The NDVI decreased in 2021 as a result of the fire and began to rebound in 2022. The NDVI increase in 2022 is likely from the rebound in the green perennial ground cover and not from the regrowth of trees.





Location Along Chino Creek



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Time Series of NDVI and Air Photos
CC-1 Area for 1984 to 2024

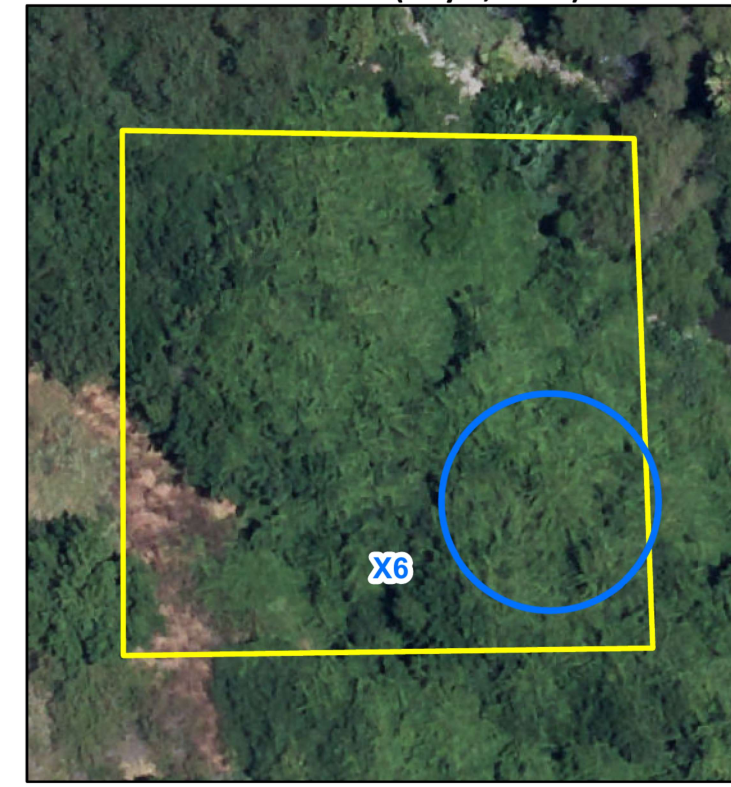
Figure 3-8a

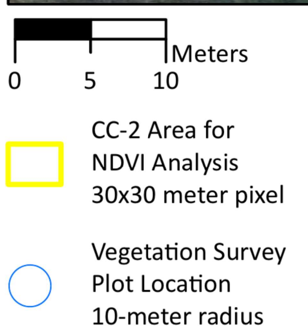
2021 Air Photo (June 26, 2021)

2022 Air Photo (June 30, 2022)

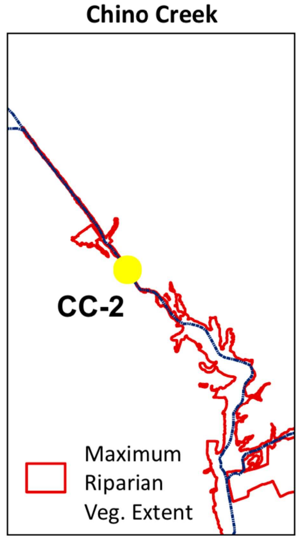
2023 Air Photo (July 7, 2023)

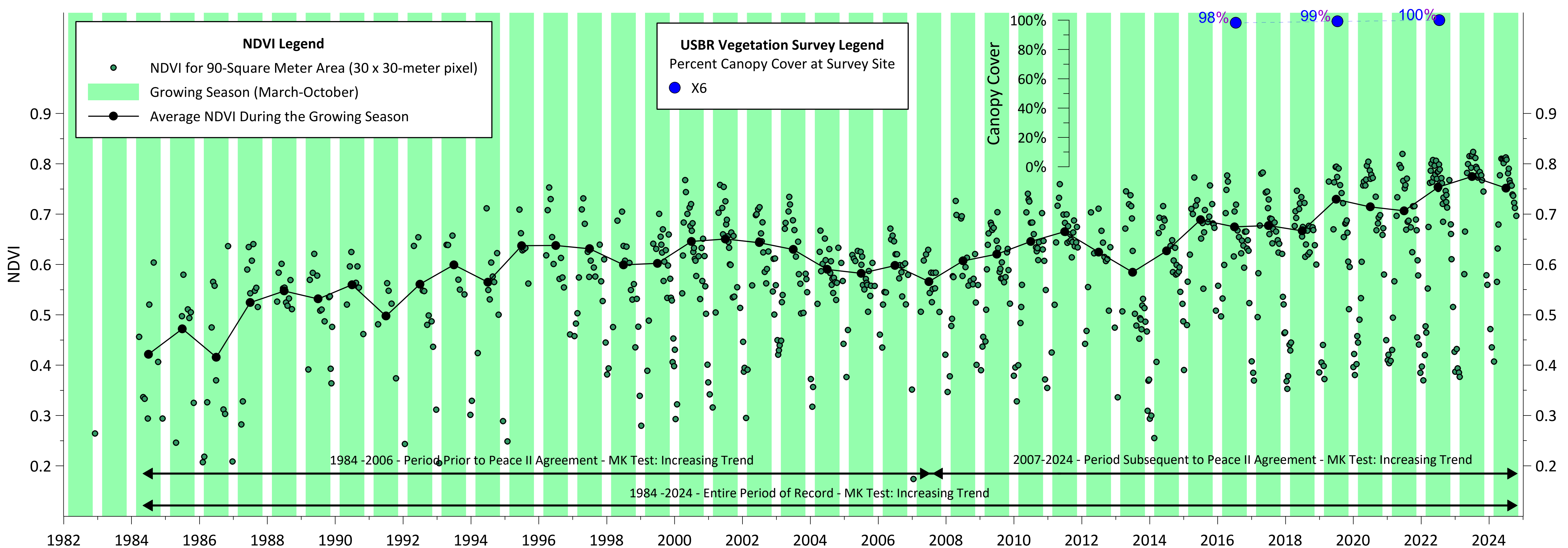
2024 Air Photo (July 1, 2024)





Location Along Chino Creek





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2024 Annual Report

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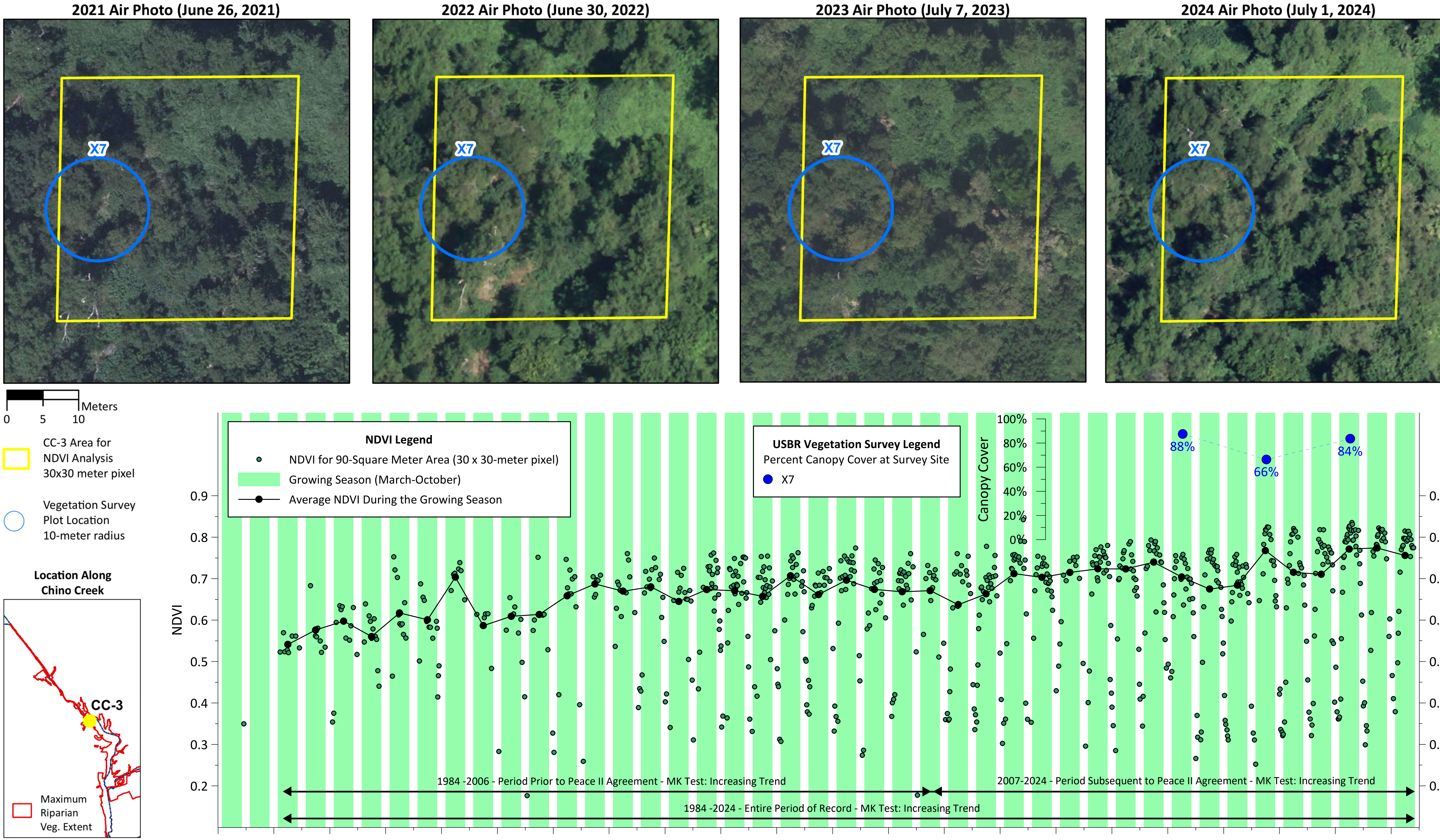
Time Series of NDVI and Air Photos
CC-2 Area for 1984 to 2024

Figure 3-8b



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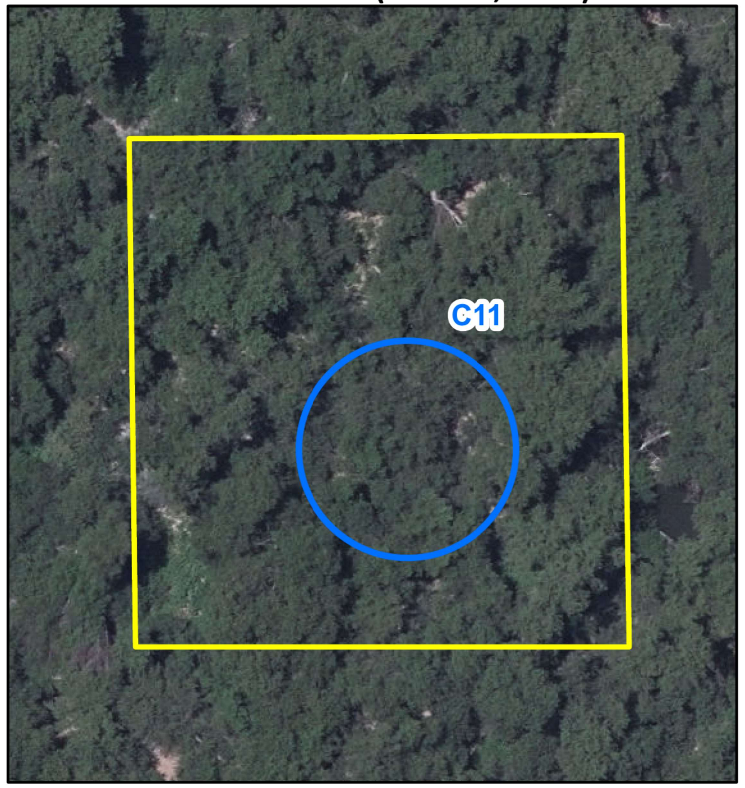
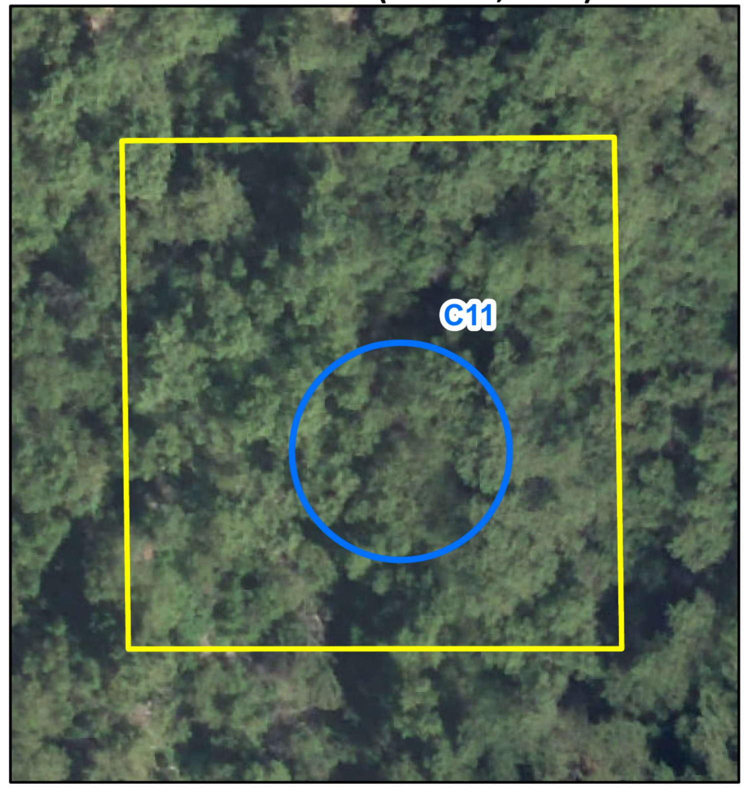
Time Series of NDVI and Air Photos
CC-3 Area for 1984 to 2024

Figure 3-8c

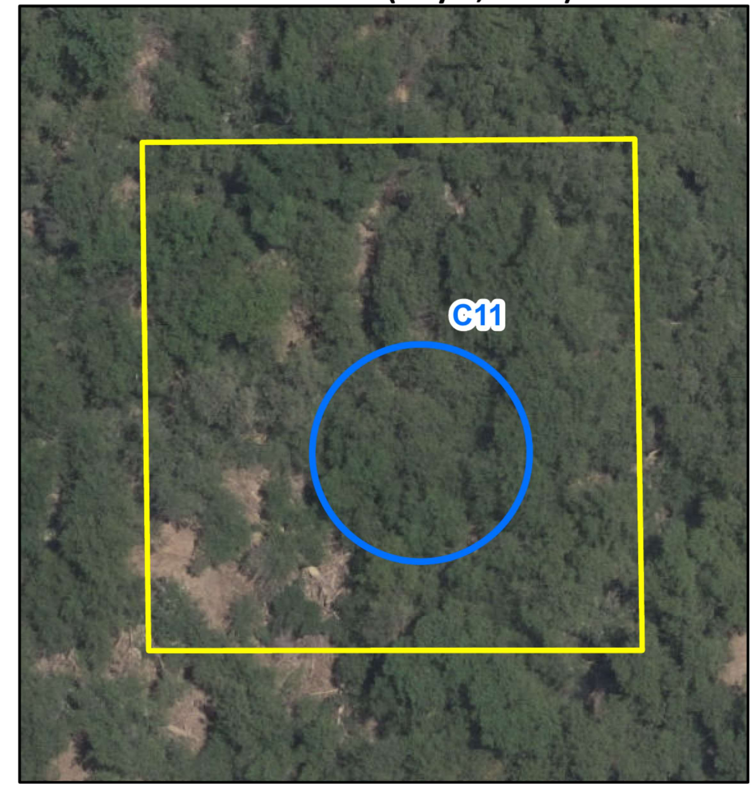
2021 Air Photo (June 26, 2021)



2022 Air Photo (June 30, 2022)



2023 Air Photo (July 7, 2023)



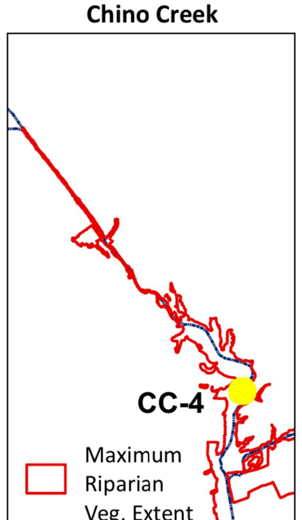
2024 Air Photo (July 1, 2024)

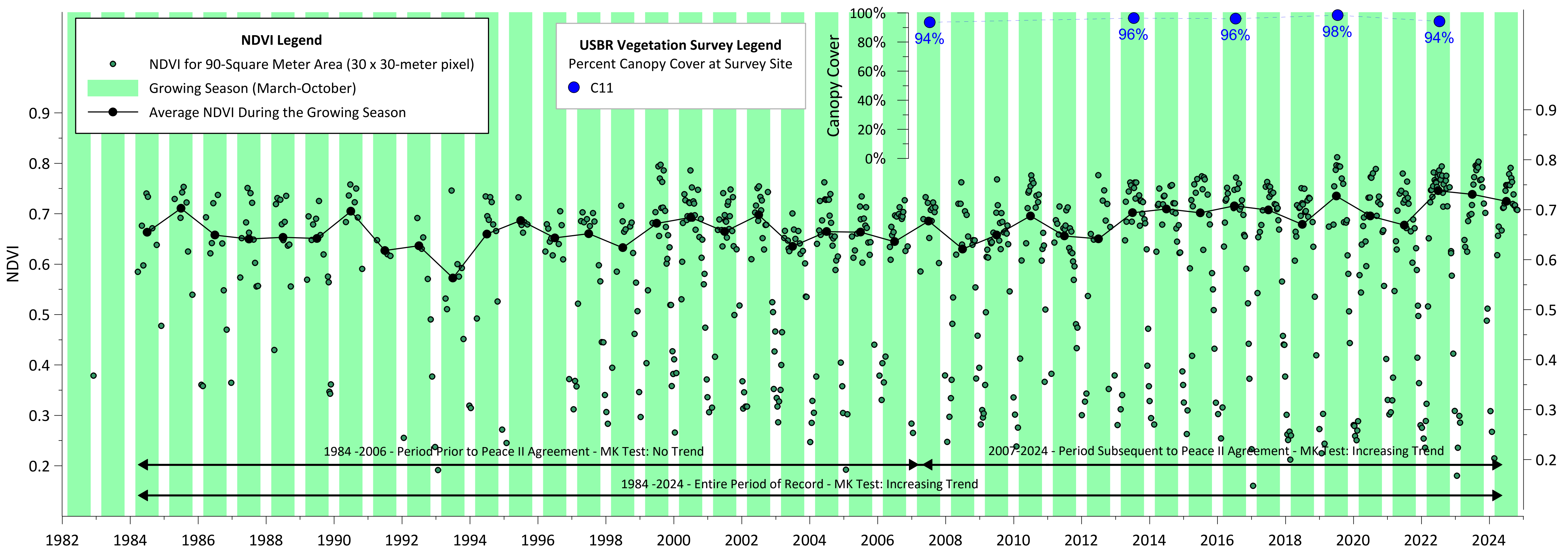
Meters
0 5 10

CC-4 Area for NDVI Analysis 30x30 meter pixel

Vegetation Survey Plot Location 10-meter radius

Location Along Chino Creek





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Time Series of NDVI and Air Photos
CC-4 Area for 1984 to 2024

Figure 3-8d

2021 Air Photo (June 26, 2021)

2022 Air Photo (June 30, 2022)

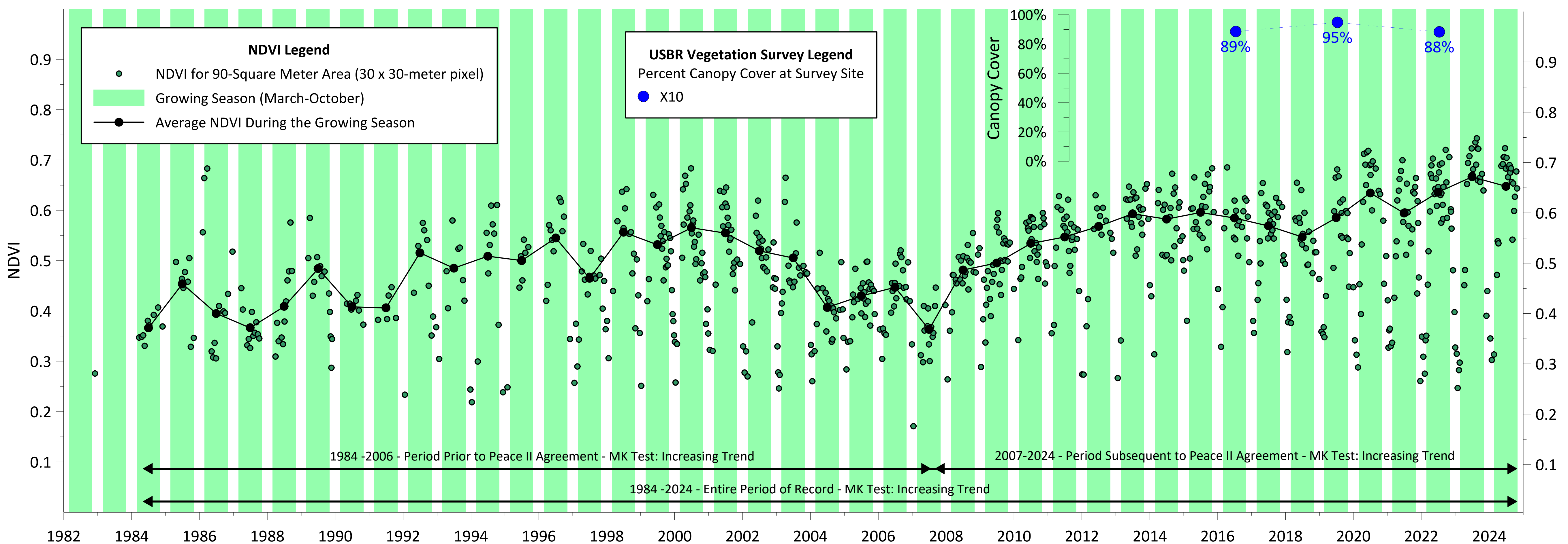
2023 Air Photo (July 7, 2023)

2024 Air Photo (July 1, 2024)

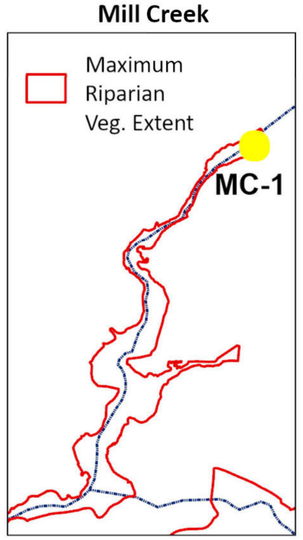
0 5 10 Meters

MC-1 Area for NDVI Analysis 30x30 meter pixel

Vegetation Survey Plot Location 10-meter radius



Location Along Mill Creek



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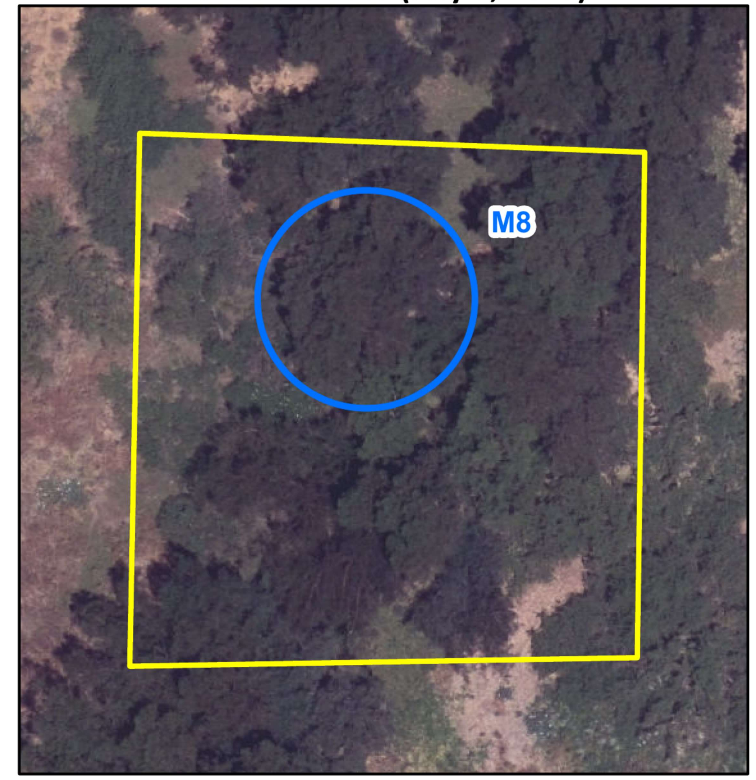
Time Series of NDVI and Air Photos
MC-1 Area for 1984 to 2024

Figure 3-8e

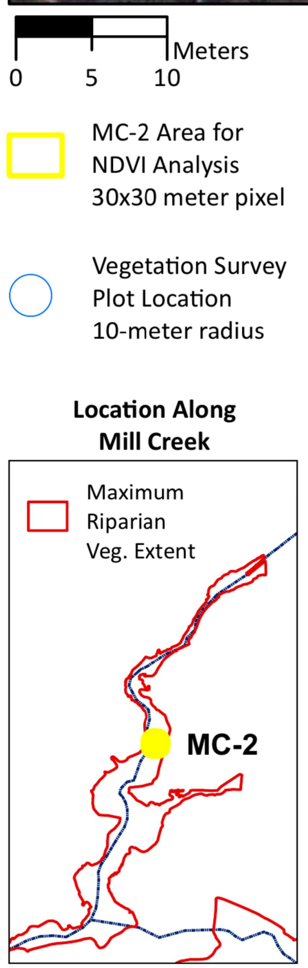
2021 Air Photo (June 26, 2021)

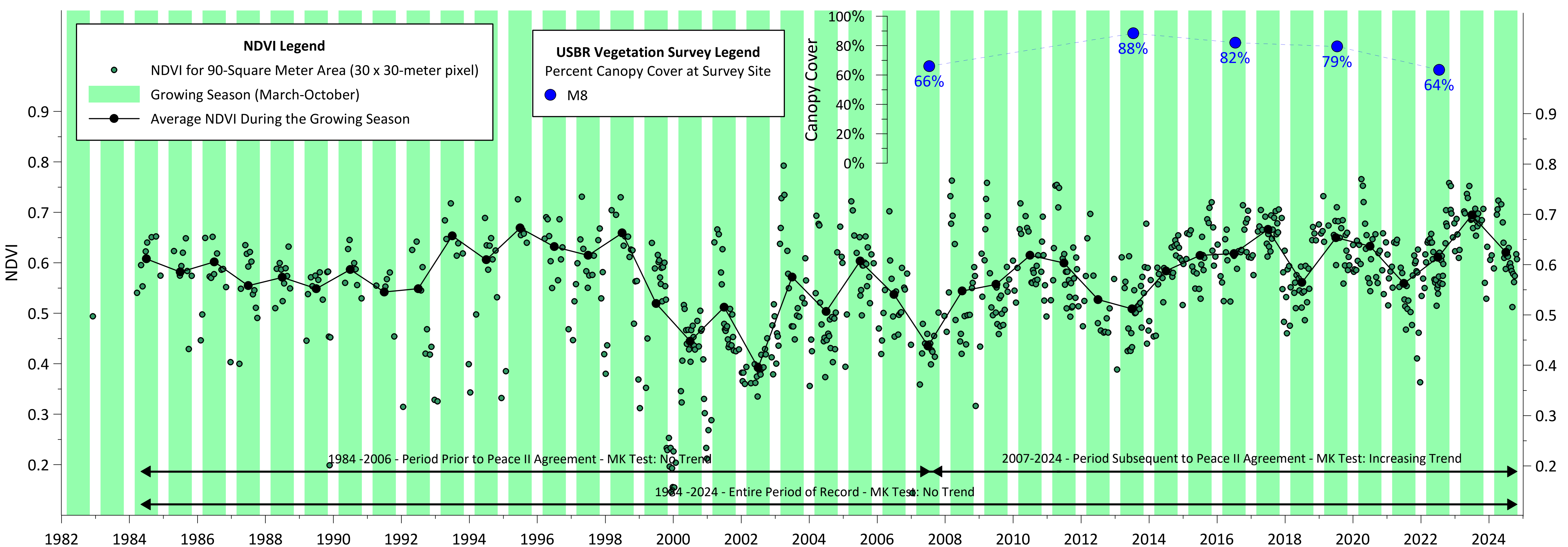
2022 Air Photo (June 30, 2022)

2023 Air Photo (July 7, 2023)



2024 Air Photo (July 1, 2024)





Time Series of NDVI and Air Photos

MC-2 Area for 1984 to 2024

Figure 3-8f

2021 Air Photo (June 26, 2021)

2022 Air Photo (June 30, 2022)

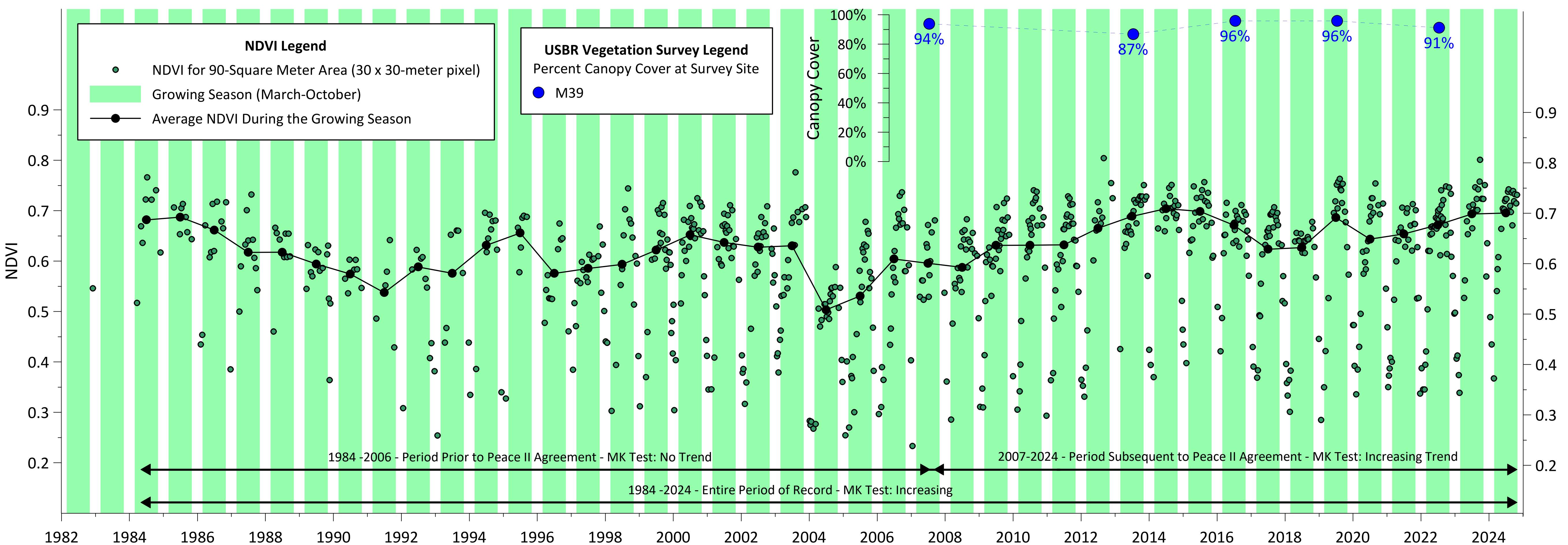
2023 Air Photo (July 7, 2023)

2024 Air Photo (July 1, 2024)

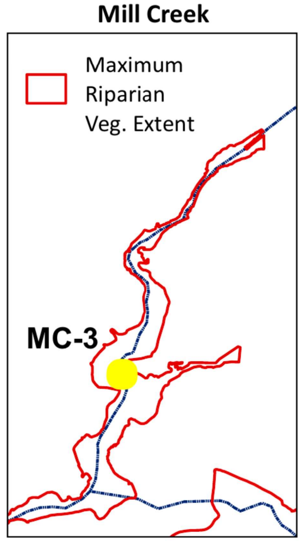
Meters
0 5 10

MC-3 Area for NDVI Analysis 30x30 meter pixel

Vegetation Survey Plot Location 10-meter radius



Location Along Mill Creek



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Time Series of NDVI and Air Photos
MC-3 Area for 1984 to 2024

Figure 3-8g

2021 Air Photo (June 26, 2021)

2022 Air Photo (June 30, 2022)

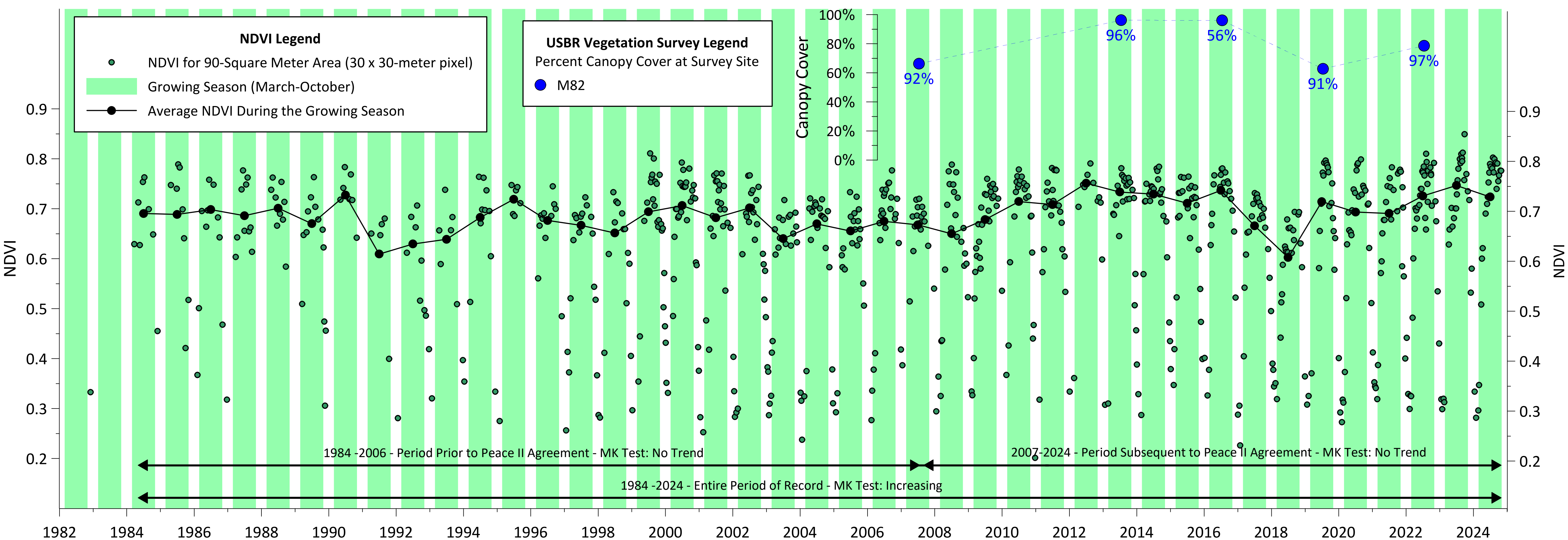
2023 Air Photo (July 7, 2023)

2024 Air Photo (July 1, 2024)

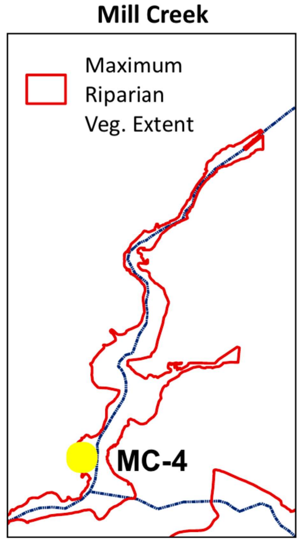
Meters
0 5 10

MC-4 Area for NDVI Analysis 30x30 meter pixel

Vegetation Survey Plot Location 10-meter radius



Location Along Mill Creek



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Time Series of NDVI and Air Photos
MC-4 Area for 1984 to 2024

Figure 3-8h

2021 Air Photo (June 26, 2021)

2022 Air Photo (June 30, 2022)

2023 Air Photo (July 7, 2023)

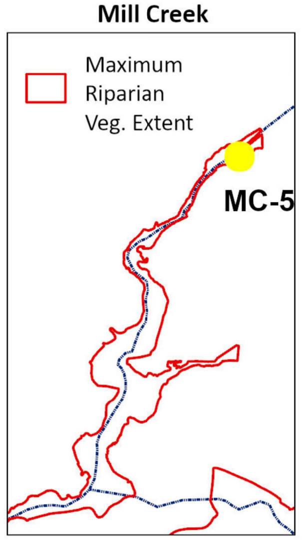
2024 Air Photo (July 1, 2024)

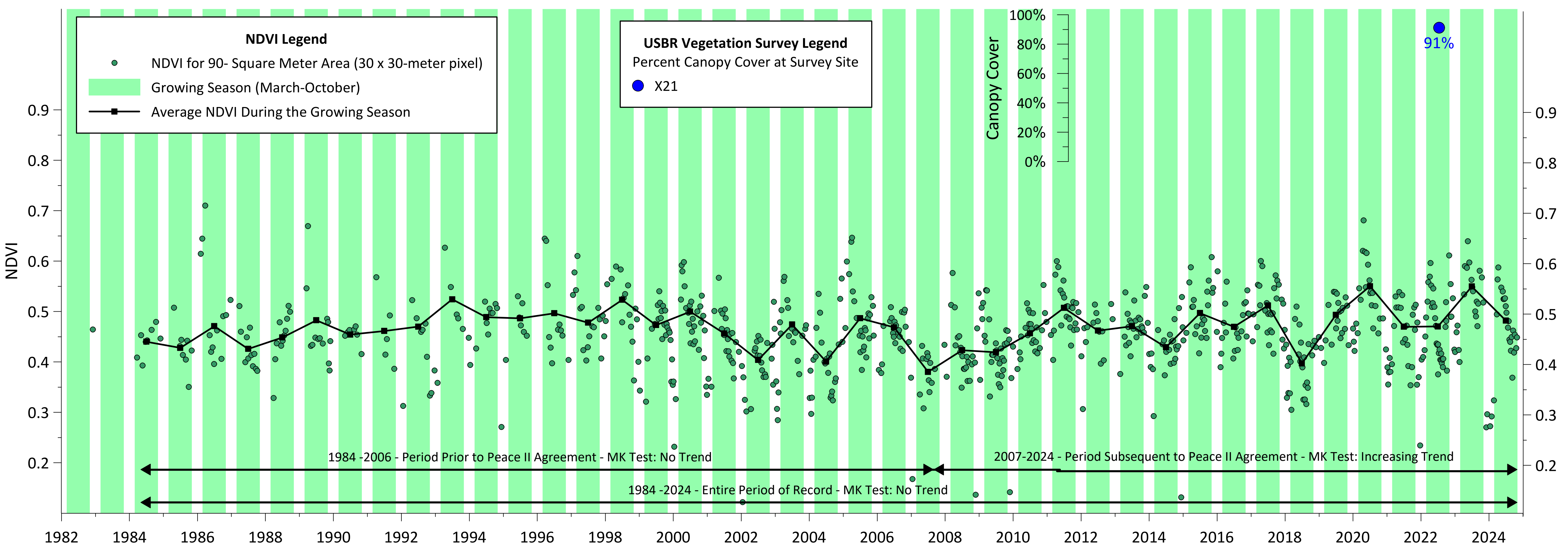
Meters
0 5 10

MC-5 Area for NDVI Analysis 30x30 meter pixel

Vegetation Survey Plot Location 10-meter radius

Location Along Mill Creek





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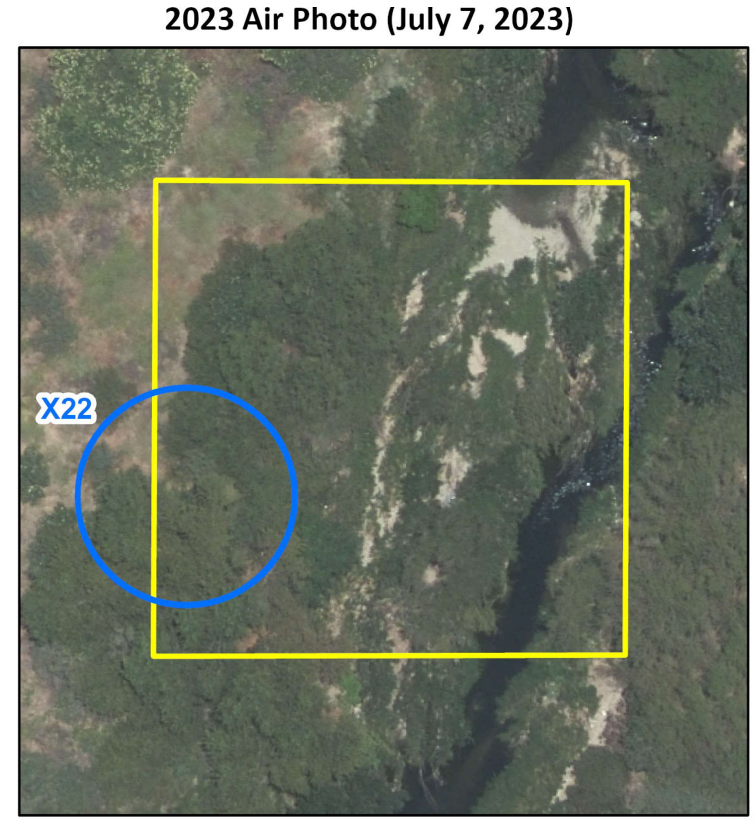
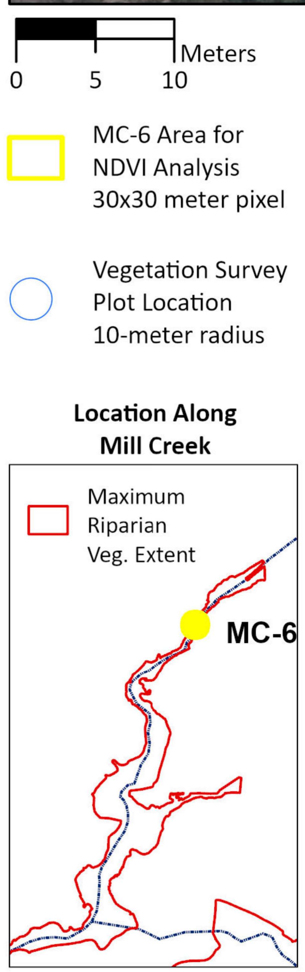
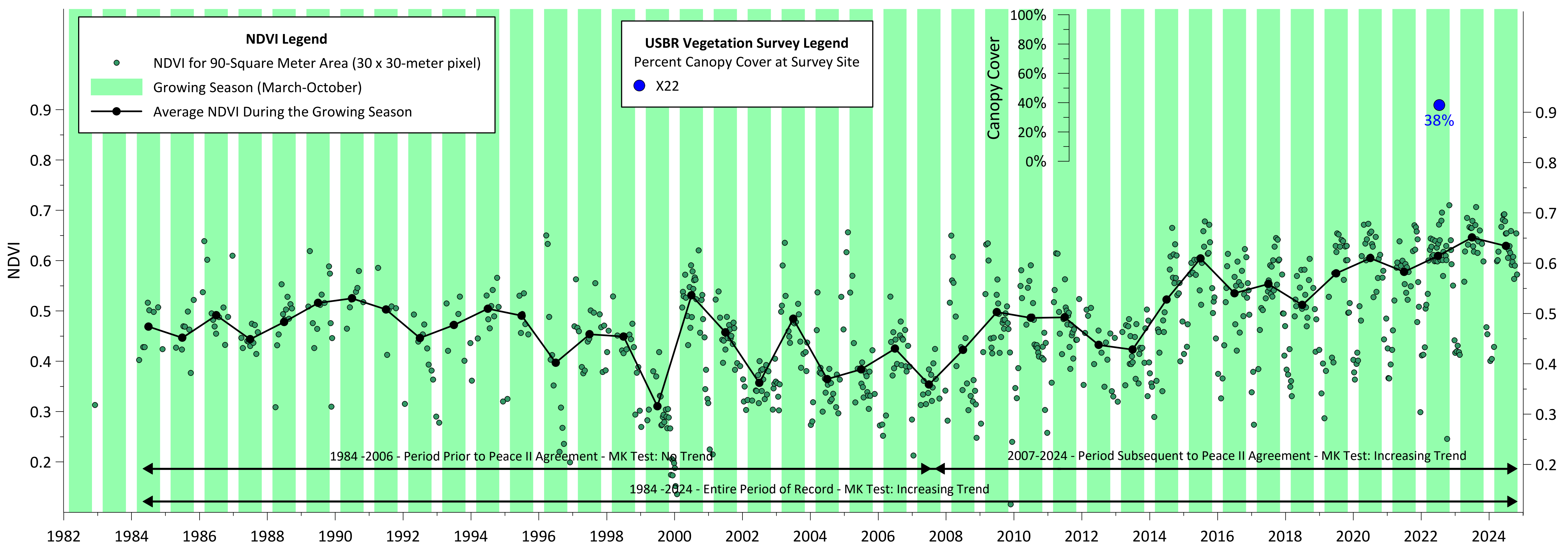
Time Series of NDVI and Air Photos
MC-5 Area for 1984 to 2024

Figure 3-8i







Time Series of NDVI and Air Photos

MC-6 Area for 1984 to 2024

Figure 3-8j

2021 Air Photo (June 26, 2021)

2022 Air Photo (June 30, 2022)

2023 Air Photo (July 7, 2023)

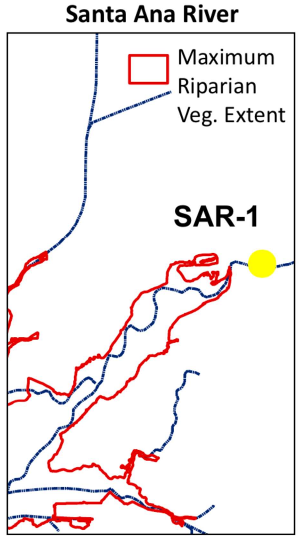
2024 Air Photo (July 1, 2024)

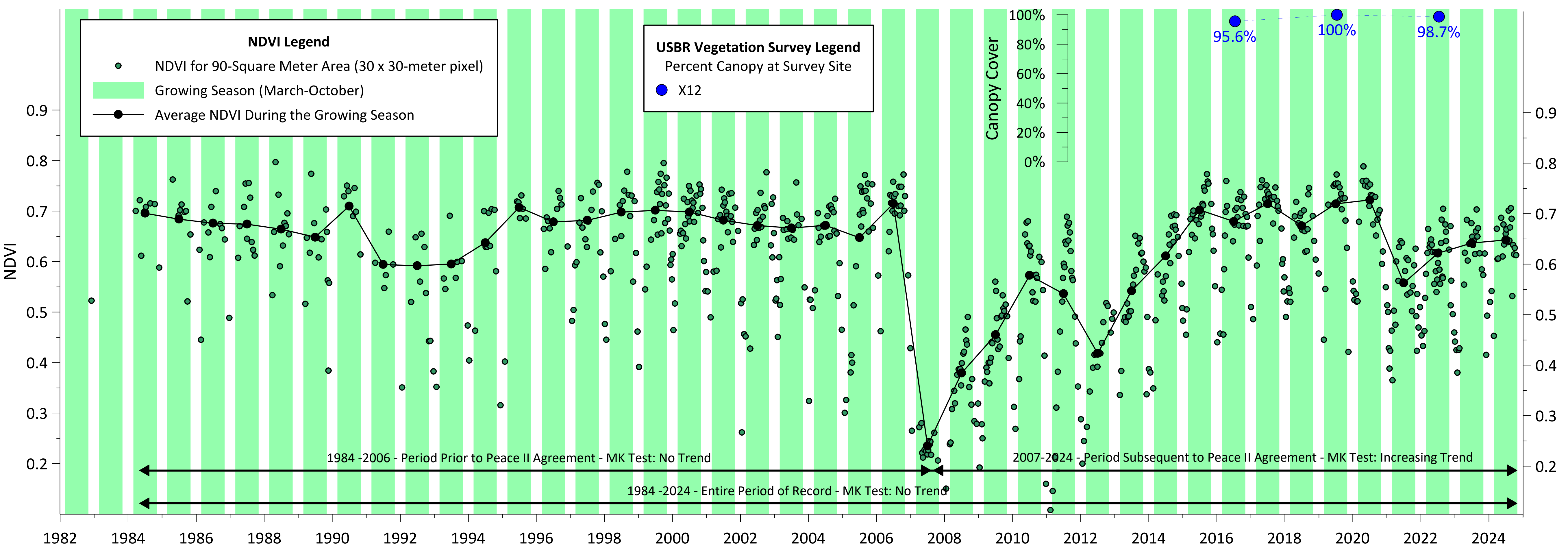
Meters
0 5 10

SAR-1 Area for NDVI Analysis 30x30 meter pixel

Vegetation Survey Plot Location 10-meter radius

Location Along Santa Ana River





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Time Series of NDVI and Air Photos
SAR-1 Area for 1984 to 2024

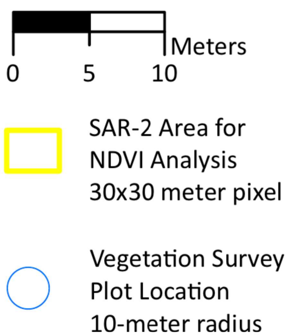
Figure 3-8k

2021 Air Photo (June 26, 2021)

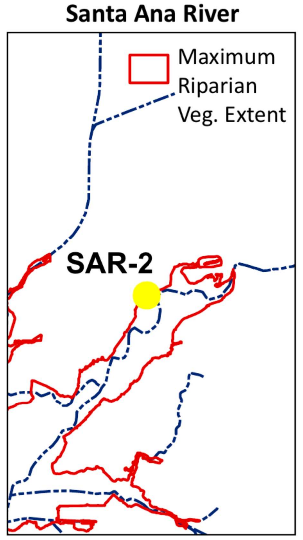
2022 Air Photo (June 30, 2022)

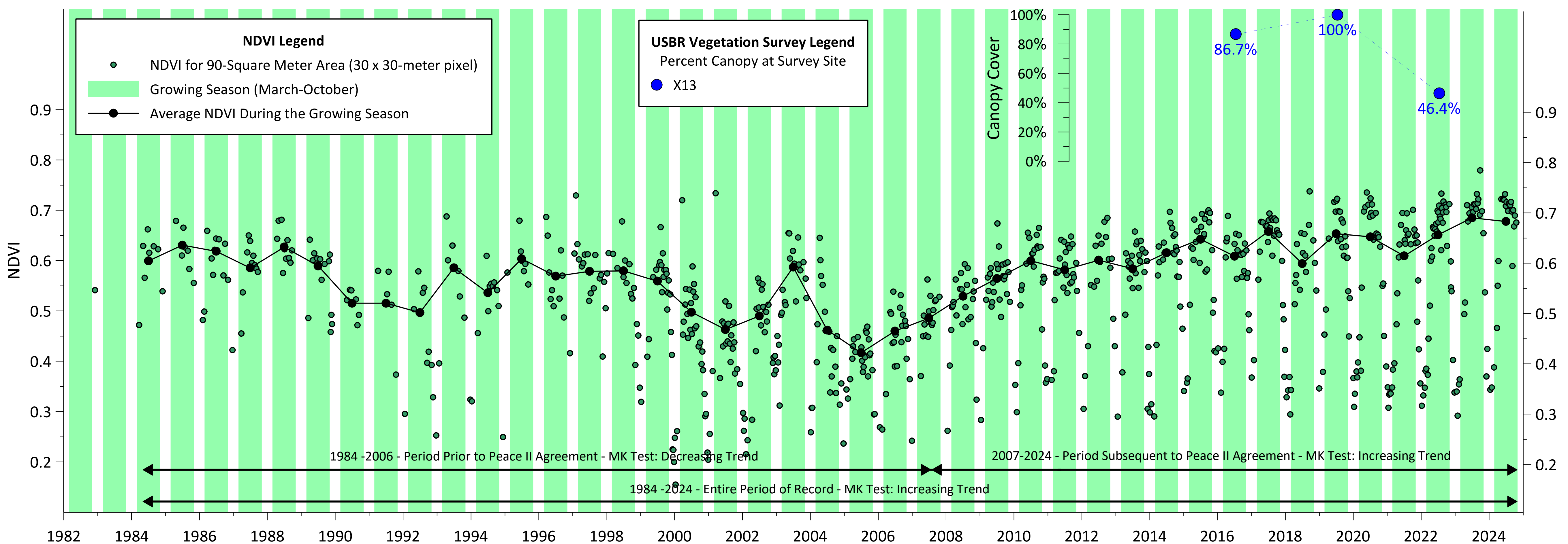
2023 Air Photo (July 7, 2023)

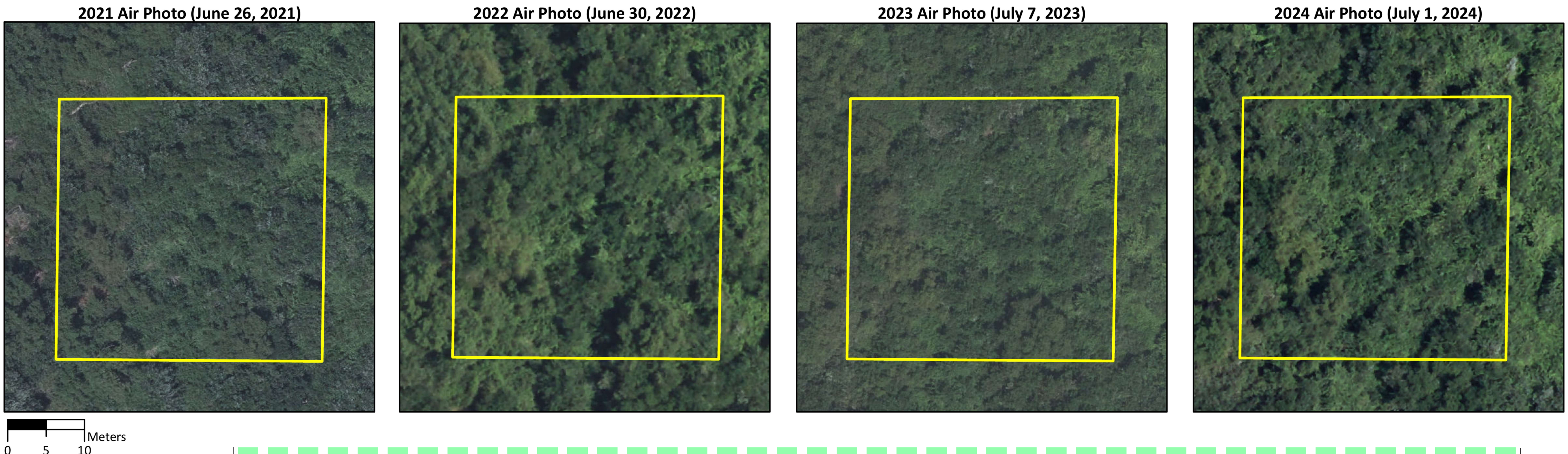
2024 Air Photo (July 1, 2024)

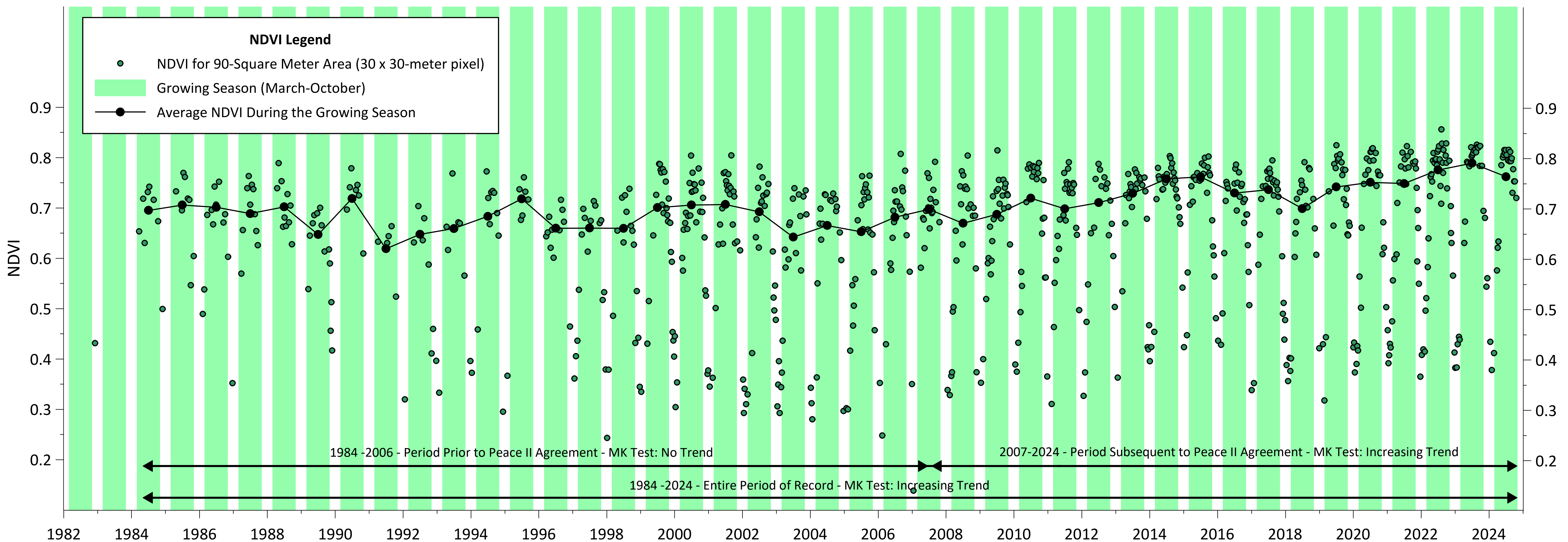


Location Along Santa Ana River

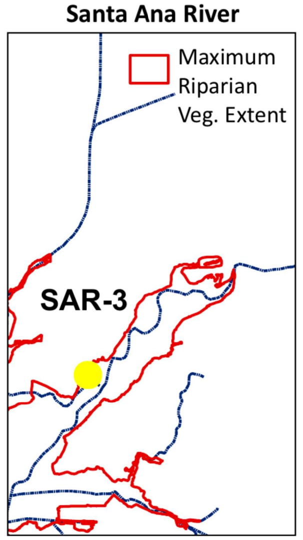








Location Along Santa Ana River



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Time Series of NDVI and Air Photos
SAR-3 Area for 1984 to 2024

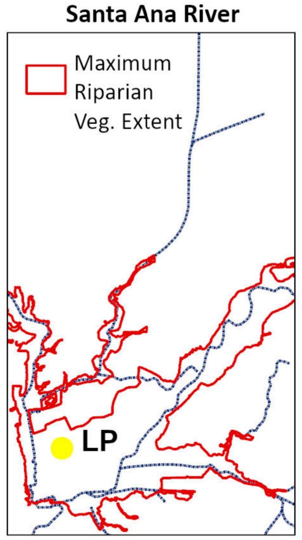
Figure 3-8m

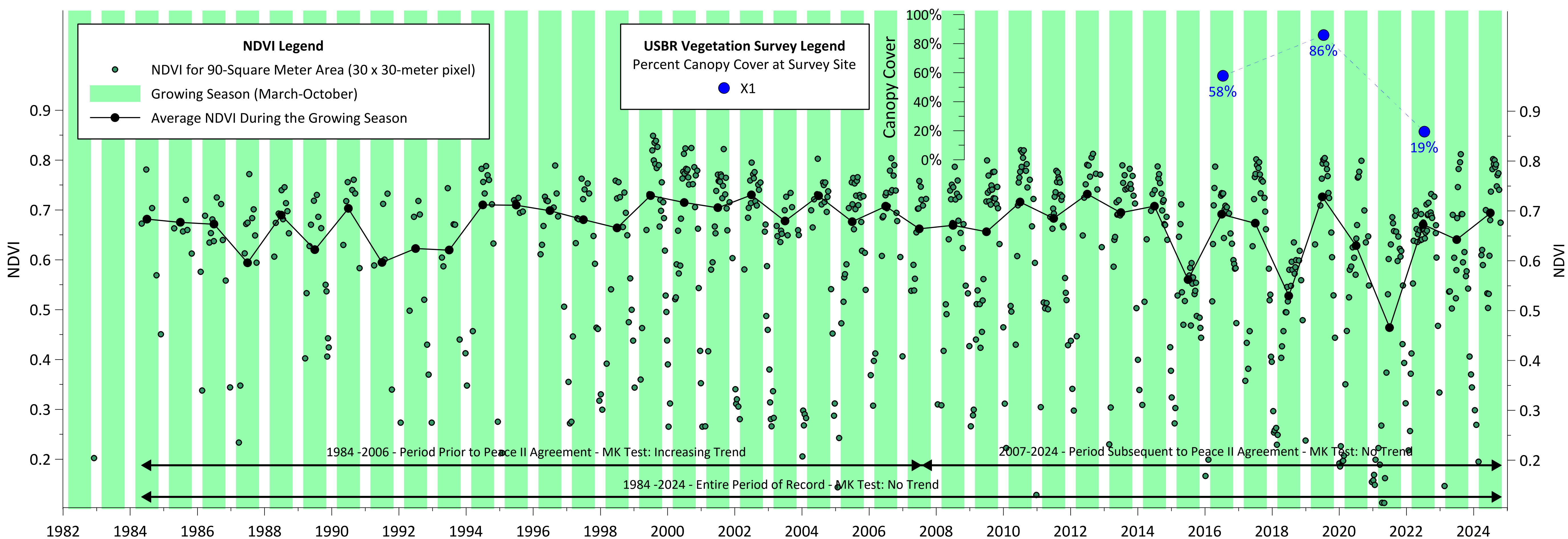
2021 Air Photo (June 26, 2021) | 2022 Air Photo (June 30, 2022) | 2023 Air Photo (July 7, 2023) | 2024 Air Photo (July 1, 2024)

LP Area for NDVI Analysis 30x30 meter pixel

Vegetation Survey Plot Location 10-meter radius

Location Along Santa Ana River





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Time Series of NDVI and Air Photos
LP Area for 1984 to 2024

Figure 3-8n

3.1.3 Analysis of Vegetation Surveys

Vegetation surveys are performed for the PBHSP once every three years. The most recent vegetation survey was performed in 2022 by the USBR and was a continuation of the surveys performed in 2007, 2013, 2016, and 2019. During the 2022 vegetation surveys 39 sites were monitored, including two new sites in the northern portion of Mill Creek. Preliminary findings and results from the 2022 vegetation surveys were published in a final report in June 2023, which is included as Appendix C to this Annual Report.

Table 3-3 summarizes the following for all sites surveyed in 2007, 2013, 2016, 2019, and 2022: the percent canopy cover; percent live, dead, and stressed trees; and percent trees with the presence of the invasive pest PSHB observed. The measurements of percent canopy cover from the USBR vegetation surveys are the most appropriate measured data for ground-truthing the NDVI. The USBR indicates that "the observed canopy cover can be compared to NDVI data for each plot to provide a measure of ground truthing" (USBR, 2023). Percent canopy cover is a measurement of the percentage of the ground surface area that is directly covered by the vertical projections of tree crowns (USDA, 1999). Although there is no direct quantitative relationship between percent canopy cover and NDVI, percent canopy cover is a metric of the areal density of the vegetation that is reflecting visible and near-infrared light and therefore can be used for comparison with the NDVI analysis. The percent canopy cover at the survey location (10-meter radius plot) within the small areas of NDVI analysis (30x30-meter pixel) in Figures 3-8a through 3-8n are charted with the NDVI time-series data. For the areas on Figures 3-8a through 3-8n, the percent canopy cover measurements show variability over the years and no clear increasing or decreasing trends. For most of the areas the trends in the NDVI time-series data align with the percent canopy cover measurements. There are a few notable exceptions for the areas along the SAR which are described in Section 3.1.2.1.4.

Table 3-3 shows that in 2022 the mean percent canopy cover was 81 percent along Chino Creek, 76 percent along Mill Creek, and 73 percent along the SAR; this was a slight increase along Mill Creek from 2019, and slight decrease along Chino Creek and the SAR from 2019.

As shown in Table 3-3, the USBR vegetation surveys in 2016, 2019, and 2022 included the documentation of the presence of the invasive pest—the PSHB. Overall, the number of sites with the presence of the PSHB noted in 2016 (30) decreased in 2019 (7) and 2022 (11). In 2022, the percentage of tress with the PSHB observed along each stream reach was 5 percent along Chino Creek sites, 11 percent along Mill Creek, and 2 percent along the SAR. The vegetation surveys provide a measurement of the change in riparian habitat health from 2016 to 2022 for those survey locations impacted by the PSHB. This is discussed in further detail in Section 3.6.2.

Table 3-3. Summary of USBR Vegetation Surveys in 2007, 2013, 2016, 2019, and 2022 in the Prado Basin - Canopy Cover, Tree Condition, and Occurrence of Polyphagous Shot-Hole Borer

Site	Canopy Cover (%) [1]						Tree Condition (% trees surveyed per plot) [2]																		Polyphagous Shot-Hole Borer [3]						
							Not Stressed (Live)						Stressed						Dead												
	2007	2013	2016	2019	2022	Change 2019- 2022	2007	2013	2016	2019	2022	Change 2019- 2022	2007	2013	2016	2019	2022	Change 2019- 2022	2007	2013	2016	2019	2022	Change 2019- 2022	Present in 2016	% of Trees in 2016	Present in 2019	% of Trees in 2019	Present in 2022	% of Trees in 2022	% Change from 2019 to 2022
Chino Creek Sites																															
Chino 3	59%	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Chino 3B	NM	97%	96%	96%	100%	4%	NM	100%	0%	33%	43%	10%	NM	0%	100%	44%	43%	-1%	NM	0%	0%	22%	14%	-8%	no	0%	no	0%	no	0%	0%
Chino 4	80%	94%	98%	84%	86%	2%	NM	100%	7%	55%	63%	8%	NM	0%	80%	40%	5%	-35%	NM	0%	13%	5%	32%	27%	no	0%	no	0%	no	0%	0%
Chino 9	92%	96%	95%	96%	99%	3%	NM	100%	0%	23%	50%	27%	NM	0%	100%	59%	33%	-26%	NM	0%	0%	18%	17%	-1%	no	0%	no	0%	no	0%	0%
Chino 11	94%	96%	96%	98%	94%	-4%	NM	100%	50%	69%	73%	4%	NM	0%	42%	0%	9%	9%	NM	0%	8%	31%	18%	-13%	no	0%	no	0%	no	0%	0%
Chino 16	46%	61%	81%	52%	27%	-25%	NM	NM	27%	50%	50%	0%	NM	NM	64%	50%	29%	-21%	NM	NM	9%	0%	21%	21%	no	0%	no	0%	no	0%	0%
Chino 18	38%	87%	90%	77%	81%	4%	NM	100%	7%	15%	100%	85%	NM	0%	67%	69%	0%	-69%	NM	0%	27%	15%	0%	-15%	yes	40%	no	0%	no	0%	0%
Chino 21	98%	94%	88%	17%	4%	-13%	NM	100%	0%	73%	75%	2%	NM	0%	100%	0%	0%	0%	NM	0%	0%	27%	25%	-2%	yes	17%	no	0%	no	0%	0%
Chino 24	93%	93%	98%	94%	99%	5%	NM	100%	6%	32%	64%	32%	NM	0%	94%	56%	27%	-29%	NM	0%	0%	12%	9%	-3%	yes	6%	no	0%	no	0%	0%
Chino 30	79%	88%	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Chino 30B	NM	NM	89%	74%	98%	24%	NM		0%	20%	50%	30%	NM	NM	89%	50%	25%	-25%	NM	NM	11%	30%	25%	-5%	yes	100%	no	0%	no	0%	0%
Chino 31	82%	93%	97%	91%	98%	7%	NM	100%	7%	4%	68%	64%	NM	0%	93%	72%	16%	-56%	NM	0%	0%	24%	16%	-8%	yes	7%	no	0%	yes	11%	11%
Chino 34	96%	97%	89%	75%	91%	16%	NM	100%	0%	33%	0%	-33%	NM	0%	67%	33%	100%	67%	NM	0%	33%	33%	0%	-33%	no	0%	no	0%	no	0%	0%
Chino 78	95%	98%	87%	98%	95%	-3%	NM	100%	0%	45%	33%	-12%	NM	0%	80%	55%	42%	-13%	NM	0%	20%	0%	25%	25%	yes	80%	no	0%	no	0%	0%
Chino 81	92%	0%	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Chino 85	89%	0%	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Chino X3	NM	NM	93%	94%	69%	-25%	NM	NM	25%	83%	100%	17%	NM	NM	75%	17%	0%	-17%	NM	NM	0%	0%	0%	0%	no	0%	no	0%	no	0%	0%
Chino X4	NM	NM	92%	94%	45%	-49%	NM	NM	0%	43%	40%	-3%	NM	NM	100%	14%	60%	46%	NM	NM	0%	43%	0%	-43%	yes	100%	yes	71%	yes	40%	-31%
Chino X5	NM	NM	96%	95%	96%	1%	NM	NM	75%	89%	78%	-11%	NM	NM	25%	11%	22%	11%	NM	NM	0%	0%	0%	0%	yes	25%	no	0%	no	0%	0%
Chino X6	NM	NM	98%	99%	100%	1%	NM	NM	87%	47%	50%	3%	NM	NM	13%	47%	29%	-18%	NM	NM	0%	7%	21%	14%	yes	13%	no	0%	no	0%	0%
Chino X7	NM	NM	88%	66%	84%	18%	NM	NM	0%	43%	33%	-10%	NM	NM	70%	43%	67%	24%	NM	NM	30%	14%	0%	-14%	yes	70%	no	0%	yes	33%	33%
Chino X8	NM	NM	85%	99%	100%	1%	NM	NM	0%	71%	39%	-32%	NM	NM	62%	24%	33%	9%	NM	NM	38%	6%	28%	22%	yes	46%	yes	6%	yes	6%	0%
Average	**81%**	**78%**	**92%**	**83%**	**81%**	**-2%**	**--**	**100%**	**16%**	**46%**	**56%**	**10%**	**--**	**0%**	**73%**	**38%**	**30%**	**-8%**	**--**	**0%**	**11%**	**16%**	**14%**	**-2%**	**--**	**28%**	**--**	**4%**	**--**	**5%**	**1%**
Mill Creek Sites																															
Mill 1	40%	0%	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Mill 3	8%	13%	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Mill 4	38%	6%	0%	0%	0%	0%	NM	0%	0%	100%	0%	-100%	NM	63%	50%	0%	50%	50%	NM	37%	50%	0%	50%	50%	yes	50%	no	0%	YES	50%	50%
Mill 8	66%	88%	82%	79%	64%	-15%	NM	33%	33%	0%	0%	0%	NM	67%	0%	50%	100%	50%	NM	0%	67%	50%	0%	-50%	yes	33%	no	0%	NO	0%	0%
Mill 11	75%	80%	NM	NM	NM	--	NM	90%	NM	NM	NM	--	NM	0%	NM	NM	NM	--	NM	10%	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Mill 18	62%	68%	78%	90%	98%	8%	NM	100%	38%	10%	40%	30%	NM	0%	38%	80%	30%	-50%	NM	0%	25%	10%	30%	20%	yes	38%	no	0%	YES	10%	10%
Mill 22	89%	93%	96%	93%	94%	1%	NM	86%	0%	43%	0%	-43%	NM	0%	79%	43%	67%	24%	NM	14%	21%	14%	33%	19%	yes	64%	no	0%	YES	50%	50%
Mill 30	63%	63%	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Mill 35	81%	95%	NM	NM	NM	--	NM	100%	NM	NM	NM	--	NM	0%	NM	NM	NM	--	NM	0%	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Mill 39	94%	87%	96%	96%	91%	-5%	NM	92%	0%	13%	33%	20%	NM	0%	67%	63%	33%	-30%	NM	8%	33%	25%	33%	8%	yes	44%	yes	38%	NO	0%	-38%
Mill 60	76%	90%	83%	51%	45%	-6%	NM	86%	0%	0%	11%	11%	NM	0%	93%	69%	67%	-2%	NM	14%	7%	31%	22%	-9%	yes	29%	no	0%	NO	0%	0%
Mill 62	66%	96%	96%	63%	79%	16%	NM	100%	0%	6%	40%	34%	NM	0%	94%	25%	20%	-5%	NM	0%	6%	69%	40%	-29%	yes	94%	yes	25%	YES	20%	-5%
Mill 63	70%	97%	78%	43%	100%	57%	NM	100%	0%	15%	0%	-15%	NM	0%	68%	23%	0%	-23%	NM	0%	32%	62%	100%	38%	yes	41%	yes	23%	NO	0%	-23%
Mill 67	75%	95%	NM	NM	NM	--	NM	100%	NM	NM	NM	--	NM	0%	NM	NM	NM	--	NM	0%	NM	NM	NM	--	NM	NM	NM	NM	NM	NM	--
Mill 69	92%	84%	75%	98%	70%	-28%	NM	90%	0%	67%	83%	16%	NM	0%	64%	0%	17%	17%	NM	10%	36%	33%	0%	-33%	yes	64%	yes	22%	NO	0%	-22%
Mill 82	92%	96%	56%	91%	97%	6%	NM	100%	0%	69%	55%	-14%	NM	0%	75%	15%	27%	12%	NM	0%	25%	15%	18%	3%	yes	25%	yes	8%	NO	0%	-8%
Mill 101	90%	94%	83%	88%	94%	6%	NM	96%	0%	26%	57%	31%	NM	0%	87%	48%	30%	-18%	NM	4%	13%	26%	13%	-13%	yes	83%	no	0%	YES	4%	4%
Mill X9	NM	NM	94%	94%	94%	0%	NM	NM	70%	42%	50%	8%	NM	NM	30%	58%	50%	-8%	NM	NM	0%	0%	0%	0%	yes	10%	no	0%	YES	8%	8%
Mill X10	NM	NM	89%	95%	88%	-7%	NM	NM	0%	70%	73%	3%	NM	NM	50%	30%	18%	-12%	NM	NM	50%	0%	9%	9%	yes	50%	no	0%	YES	18%	18%
Mill X21	NM	NM	NM	NM	91%	--	NM	NM	NM	NM	80%	--	NM	NM	NM	NM	20%	--	NM	NM	NM	NM	0%	--	NM	NM	NM	NM	NO	0%	--
Mill X22	NM	NM	NM	NM	38%	--	NM	NM	NM	NM	78%	--	NM	NM	NM	NM	22%	--	NM	NM	NM	NM	0%	--	NM	NM	NM	NM	NO	0%	--
Average	**69%**	**73%**	**77%**	**75%**	**76%**	**1%**	**--**	**84%**	**11%**	**35%**	**40%**	**4%**	**--**	**9%**	**61%**	**39%**	**37%**	**-2%**	**--**	**7%**	**28%**	**26%**	**23%**	**-2%**	**--**	**48%**	**--**	**9%**	**--**	**11%**	**2%**
Santa Ana River Sites																															
SAR X1	NM	NM	58%	86%	19%	-67%	NM	NM	76%	75%	44%	-31%	NM	NM	5%	13%	0%	-13%	NM	NM	19%	13%	56%	43%	yes	3%	no	0%	NO	0%	0%
SAR X2	NM	NM	93%	79%	79%	0%	NM	NM	11%	60%	33%	-27%	NM	NM	89%	30%	61%	31%	NM	NM	0%	10%	6%	-4%	yes	17%	no	0%	YES	11%	11%
SAR X11	NM	NM	88%	94%	95%	1%	NM	NM	27%	44%	67%	23%	NM	NM	64%	11%	17%	6%	NM	NM	9%	44%	17%	-27%	yes	82%	no	0%	NO	0%	0%
SAR X12	NM	NM	96%	100%	99%	-1%	NM	NM	9%	44%	53%	9%	NM	NM	91%	44%	0%	-44%	NM	NM	0%	13%	47%	34%	yes	91%	no	0%	NO	0%	0%
SAR X13	NM	NM	87%	100%	46%	-54%	NM	NM	0%	17%	20%	3%	NM	NM	67%	67%	0%	-67%	NM	NM	33%	17%	80%	63%	yes	67%	no	0%	NO	0%	0%
SAR X14	NM	NM	88%	97%	97%	0%	NM	NM	0%	75%	50%	-25%	NM	NM	100%	25%	0%	-25%	NM	NM	0%	0%	50%	50%	yes	100%	no	0%	NO	0%	0%
Average	**-**	**-**	**85%**	**93%**	**73%**	**-20%**	**-**	**-**	**21%**	**53%**	**45%**	**-8%**	**-**	**-**	**69%**	**32%**	**13%**	**-19%**	**-**	**-**	**10%**	**16%**	**42%**	**26%**	**-**	**60%**	**-**	**0%**	**-**	**2%**	2%
Average all Sites	**75%**	**76%**	**86%**	**82%**	**78%**	**-4%**	**-**	**91%**	**15%**	**43%**	**48%**	**5%**	**-**	**5%**	**68%**	**37%**	**30%**	**-7%**	**-**	**4%**	**17%**	**19%**	**22%**	**4%**	**-**	**40%**	**-**	**5%**	**-**	**7%**	**1%**

Notes:

NM - Not Measured

1- Canopy cover is a measurement of the percentage of a ground area directly covered by vertical projections of tree crowns. In the field, canopy cover is measured using a spherical densiometer standing five meters from the center of the plot in the four cardinal directions (north, south, east, west). Canopy Cover percent herein is the average of the four measurements.

2- Tree condition is a qualitative measurement of the health of the tree. Trees were assessed and classified as "live," "stressed," or "dead". The percentage of each classification per plot is shown here.

3- In 2016 and 2019 trees were assessed for the presence of polyphagous shot-hole borers (PSHB). If a tree showed signs of the beetle it was noted. The percent of trees in each plot that showed signs of beetle infestation was then calculated.

3.1.4 Summary

The extent of the riparian habitat in the Prado Basin has been delineated from air photos and maps of NDVI. The extent increased from about 1.85 mi^2 in 1960 to about 6.7 mi^2 by 1999 and has remained relatively constant through 2024 along the Chino Creek, Mill Creek, and SAR reaches.

The quality of riparian habitat has been characterized through the analysis of air photos, maps of NDVI, and time-series charts of NDVI for large and small areas located throughout the Prado Basin:

- The NDVI change map shows mostly no change with some patches of NDVI increases and decreases throughout the riparian vegetation in the Prado Basin. Notable increases in the NDVI spatially are observed along the middle portion of Chino Creek northwest of the OCWD wetlands and just above Prado Dam. Notable decreases in the NDVI spatially are observed along the SAR and below the OCWD wetlands in lower Prado Basin, and the lower portion of Chino Creek behind Prado Dam.
- The analysis of NDVI time series indicate that over the last year from 2023 to 2024, there was no change in the greenness of the riparian vegetation across the Prado Basin when analyzed as a whole. However, there were decreases in the greenness along the Chino Creek, Mill Creek and Upper Mill Creek reaches when analyzed as a whole. These decreases fall within the historical ranges of one-year NDVI variability for these areas, except for the Upper Mill Creek area where the decrease is notable because it is slightly more than the average one-year change over the historical period.

  The NDVI time series at the 14 small defined areas indicate that over the last year from 2023 to 2024, most areas experienced a decrease in greenness, while four areas showed a slight increase or stable trend. At all areas, these one-year changes in the Average Growing-Season NDVI are within the historical ranges of one-year NDVI variability presented in Table 3-2. However, at the MC-2, MC-5, and SAR-3 areas, where NDVI decreased the most from 2023 to 2024, the decreases are greater than the average one-year change in NDVI observed over the historical period.
- The visual inspection of the 2023 and 2024 air photos reveals no significant changes in the riparian vegetation along Chino Creek and the SAR reaches. However, the air photos indicate a decrease in green vegetation along Mill Creek from 2023 to 2024. In some of these areas along Mill Creek (MC-2, MC-5, and Upper Mill Creek) the air photos show notable changes in the vegetation, including reductions in coverage and browning.
- The Mann-Kendall test result on the Average Growing-Season NDVI for the post Peace II Agreement period from 2007 to 2024 indicates an “increasing trend” or “no trend” for the Prado Basin riparian vegetation as a whole and all the other areas analyzed through the Prado Basin.

The remainder of Section 3.0 describes the factors that can affect the riparian habitat, how these factors have changed over time, and how the changes in these factors may explain the changes that are being observed in the riparian habitat described above.

3.2 Groundwater and Its Relationship to Riparian Habitat

Peace II Agreement implementation was projected to change groundwater pumping patterns and reduce groundwater replenishment through 2030, both of which would change groundwater levels in the Chino Basin. These groundwater level changes caused by Peace II Agreement implementation and other unrelated water management activities[17] have the potential to impact the extent and quality of Prado Basin riparian habitat.

This section characterizes the history of groundwater pumping and changes in groundwater levels in the GMP study area and compares this history to the trends in the extent and quality of the riparian habitat described in Section 3.1.

3.2.1 Groundwater Pumping

Table 3-4 lists the groundwater pumping estimates for the GMP study area for WY 1961 to 2024.[18] Figure 3-9 is a map that illustrates the spatial distribution of groundwater pumping from wells within the GMP study area for WY 2024. This figure includes a bar chart of the annual groundwater pumping in the GMP study area (from Table 3-4 below). Figure 3-9 illustrates the following history of groundwater pumping within the GMP study area:

- From 1961 to 1990, groundwater pumping averaged about 45,900 afy. Pumping mainly occurred at private domestic and agricultural wells distributed throughout the area.
- From 1991 to 1999, groundwater pumping steadily declined, primarily due to conversions of agricultural land uses to urban. By WY 1999, groundwater pumping was estimated to be about 23,600 afy, about 49 percent less than average annual pumping from 1961 to 1990.
- From 2000 to 2024, CDA pumping commenced and increased to replace the declining agricultural groundwater pumping, as envisioned in the OBMP/Peace Agreement and Peace II Agreement. In WY 2024, total groundwater pumping in the GMP study area was about 40,600 afy—an increase of about 72 percent from 1999.
- From WY 2016 to WY 2020, the annual CDA pumping increased by about 12,000 afy and in mid-2020 the CDA pumping reached its intended pumping rate of 40,000 afy to maintain hydraulic control of the Chino Basin.
- In WY 2024, the CDA pumping maintained its intended pumping rate of 40,000 afy. The total CDA pumping in the GMP study area was 37,002 af because the CDA well II-12 that came online in August 2021 is outside of the GMP study area. Total CDA pumping in WY 2024 was 40,396 af.

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[17] Other water management activities unrelated to Peace II Agreement implementation include changes in wastewater discharge to the SAR due to conservation, recycling, and drought response; increases in storm water diverted and recharged; increases in recycled water recharge; management of groundwater in storage; and the implementation of the Dry-Year Yield Program with MWD.

[18] Production for years prior to WY 2001 were estimated in the calibration of the 2013 Chino Basin groundwater model (WEI, 2015). Production estimates for WY 2001 and thereafter are based on metered production data and water-duty estimates compiled by Watermaster.

Table 3-4. Annual Groundwater Pumping in the Groundwater Monitoring Program Study Area

Water Year	Non-CDA Pumping, afy[(a)]	CDA Pumping, afy	Total Pumping, afy[(a)]
1961	48,577	0	48,577
1962	43,811	0	43,811
1963	43,293	0	43,293
1964	45,170	0	45,170
1965	43,294	0	43,294
1966	46,891	0	46,891
1967	42,709	0	42,709
1968	47,180	0	47,180
1969	37,754	0	37,754
1970	45,849	0	45,849
1971	45,492	0	45,492
1972	47,541	0	47,541
1973	38,427	0	38,427
1974	47,014	0	47,014
1975	44,606	0	44,606
1976	44,847	0	44,847
1977	45,710	0	45,710
1978	46,881	0	46,881
1979	48,829	0	48,829
1980	46,402	0	46,402
1981	53,326	0	53,326
1982	41,719	0	41,719
1983	42,200	0	42,200
1984	52,877	0	52,877
1985	46,876	0	46,876
1986	54,501	0	54,501
1987	46,875	0	46,875
1988	46,277	0	46,277
1989	46,835	0	46,835
1990	45,732	0	45,732
1991	42,266	0	42,266
1992	44,617	0	44,617
1993	43,186	0	43,186
1994	37,390	0	37,390
1995	32,604	0	32,604
1996	35,200	0	35,200

Table 3-4. Annual Groundwater Pumping in the Groundwater Monitoring Program Study Area

Water Year	Non-CDA Pumping, afy[(a)]	CDA Pumping, afy	Total Pumping, afy[(a)]
1997	33,340	0	33,340
1998	22,366	0	22,366
1999	23,632	0	23,632
2000	24,299	523	24,822
2001	21,249	9,470	30,719
2002	20,271	10,173	30,445
2003	18,600	10,322	28,922
2004	18,606	10,480	29,086
2005	13,695	10,595	24,290
2006	14,261	19,819	34,079
2007	12,988	28,529	41,517
2008	12,293	30,116	42,409
2009	11,694	28,456	40,150
2010	10,452	28,964	39,416
2011	10,460	28,941	39,401
2012	11,193	28,230	39,423
2013	11,433	27,380	38,813
2014	9,059	29,626	38,685
2015	6,985	29,877	36,862
2016	5,900	28,249	34,148
2017	5,899	28,351	34,250
2018	7,504	29,191	36,695
2019	5,348	32,004	37,352
2020	5,875	37,973	43,848
2021	6,155	40,501[(b)]	46,656
2022	6,066	38,277[(c)]	44,342
2023	4,462	36,687[(d)]	41,149
2024	3,597	37,002[(e)]	40,598
Average: 1961-1990	45,917	0	45,917
Average: 1991-1999	34,956	0	34,956
Average: 2000-2024	11,134	25,589	36,723

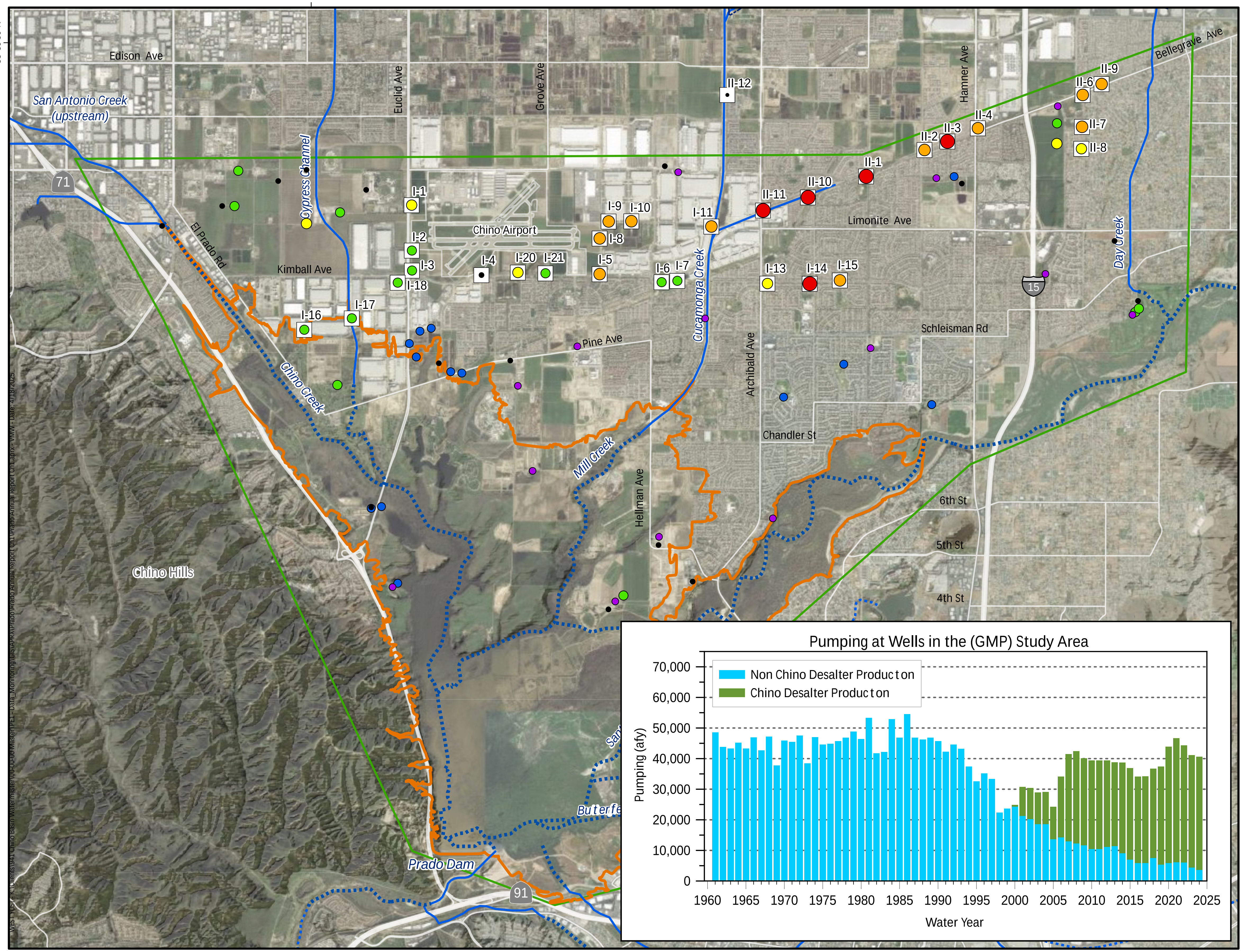
(a) Prior to WY 2001 production is estimated with the calibrated 2013 Chino Basin groundwater model (WEI, 2015).

(b) Total CDA production in WY 2021 was 40,649 af; active CDA well II-12 is outside of the GMP study area and not included in the total annual pumping for the GMP study area.

(c) Total CDA production in WY 2022 was 40,684 af; active CDA well II-12 is outside of the GMP study area and not included in the total annual pumping for the GMP study area.

(d) Total CDA production in WY 2023 was 39,814 af; active CDA well II-12 is outside of the GMP study area and not included in the total annual pumping for the GMP study area.

(e) Total CDA production in WY 2024 was 40,396 af; active CDA well II-12 is outside of the GMP study area and not included in the total annual pumping for the GMP study area.



Groundwater Pumping in the GMP Study Area
Water Year 2024 (af)

- 0
- > 0.1 - 10
- > 10 - 100
- > 100 - 500
- > 500 - 1,000
- > 1,000 - 2,500
- > 2,500 - 5,000

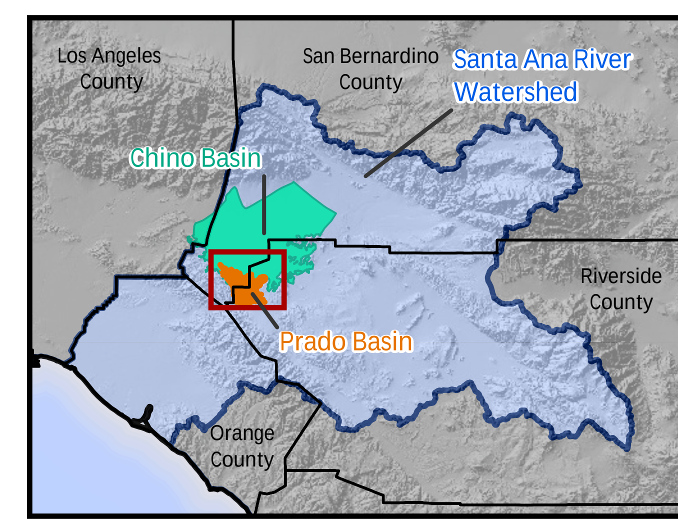
Chino Desalter Well

Groundwater Monitoring Program (GMP) Study Area

Prado Basin Management Zone (Prado Basin)

Concrete-Lined Channels

Unlined Rivers and Streams



Prepared by:

WEST YOOST

0 1 2 Miles
0 1 2 Km

Prepared for:

Prado Basin Sustainability Committee
2024 Annual Report

Groundwater Pumping
Water Year 2024

Figure 3-9

3.2.2 Groundwater Levels

Figures 3-10a and 3-10b are groundwater-elevation contour maps of the GMP study area for the shallow aquifer system in September 2016 (first Annual Report condition) and September 2024 (current condition).[19] The contours were created from rasterized surfaces of groundwater elevations that were created from measured groundwater elevations at wells. The raster of groundwater elevation for September 2016 was subtracted from the raster of groundwater elevation for September 2024 to create a raster of change in groundwater elevation from 2016 to 2024 (Figure 3-11).

Figure 3-11 shows that with a few exceptions, groundwater levels changed by about +/- 5 feet across most of the GMP study area from 2016 to 2024. The greatest areas of change occurred in the northern portion of the GMP study area near the Chino Desalter well field. Groundwater levels declined by about 10 feet around the upper central portion of the Chino Desalter well field north of Mill Creek (Wells I-8, I-9, and I-10) and increased by about 20 feet near the northern reach of Chino Creek at the Chino Desalter well field (Wells I-16 and I-17).

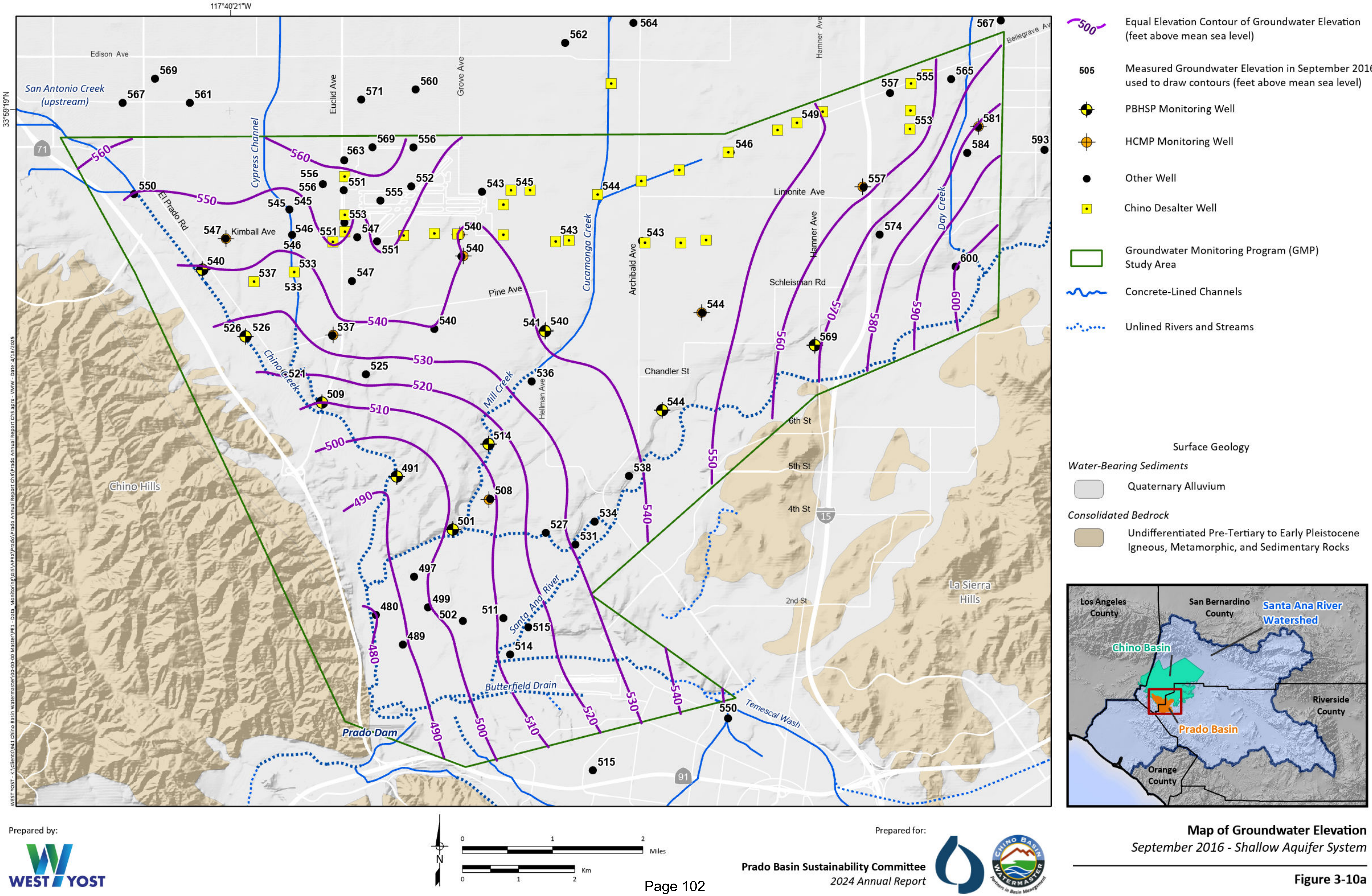
Since the PBHSP began in 2016, the largest groundwater levels declines observed have occurred in the riparian vegetation areas in the northern reach of Mill Creek (just south of PB-2). From 2016 to 2024 groundwater levels declined about 2.5 feet in this area. At well PB-2 just to the north of Mill Creek, groundwater levels declined by about four feet since 2016. This north portion of Mill Creek is where previous Annual Reports have observed the most declines in groundwater levels in the riparian vegetation area (West Yost 2022; 2023; 2024) and is part of the regional pumping depression expanding around the Chino Desalter well field to the north. Over this last year, groundwater levels increased about one foot in this area, continuing to increase from the historical low levels in the 2022 (West Yost 2023; 2024). Additionally, there is a small area in the southern portion of Prado Basin in the OCWD wetlands where groundwater levels have declined 5 feet from 2016 to 2024. Groundwater level changes in this area are unlikely to be influenced by the implementation of the Peace II Agreement.

Since 2016, groundwater levels have increased the most within the extent of the riparian vegetation area along northern Chino Creek. From 2016 to 2024, groundwater levels increased by about 10 feet in this area. Section 3.2.3 describes a decrease in pumping in the area near Chino Creek.

Figure 3-12 is a map of depth-to-groundwater in September 2024. It was created by subtracting a one-meter horizontal resolution 2020 digital-elevation model (DEM)[20] of the ground surface from the raster of groundwater elevation for September 2024. An outline of the Prado Basin riparian habitat extent is superimposed on the depth-to-groundwater raster. With few exceptions, the riparian habitat generally overlies areas where the depth-to-groundwater is less than 15 feet below the ground surface (ft-bgs). The shallow groundwater could exit the Prado Basin via rising groundwater discharge to the SAR and its tributaries and/or evapotranspiration by the riparian vegetation.

[19] Historical groundwater elevation data for the Prado Basin are scarce due to a lack of wells and/or monitoring. As such, the discussion and interpretation of measured groundwater elevations focuses on the GMP's period of record.

[20] The 2020 DEM is from LiDAR data collected of the Prado Basin and along the SAR during July 2020 when Watermaster, IEUA, OCWD, and San Bernadino Valley Water District collaborated and cost-shared the collection of the 2022 air photo of the Prado Basin.



Prepared by:

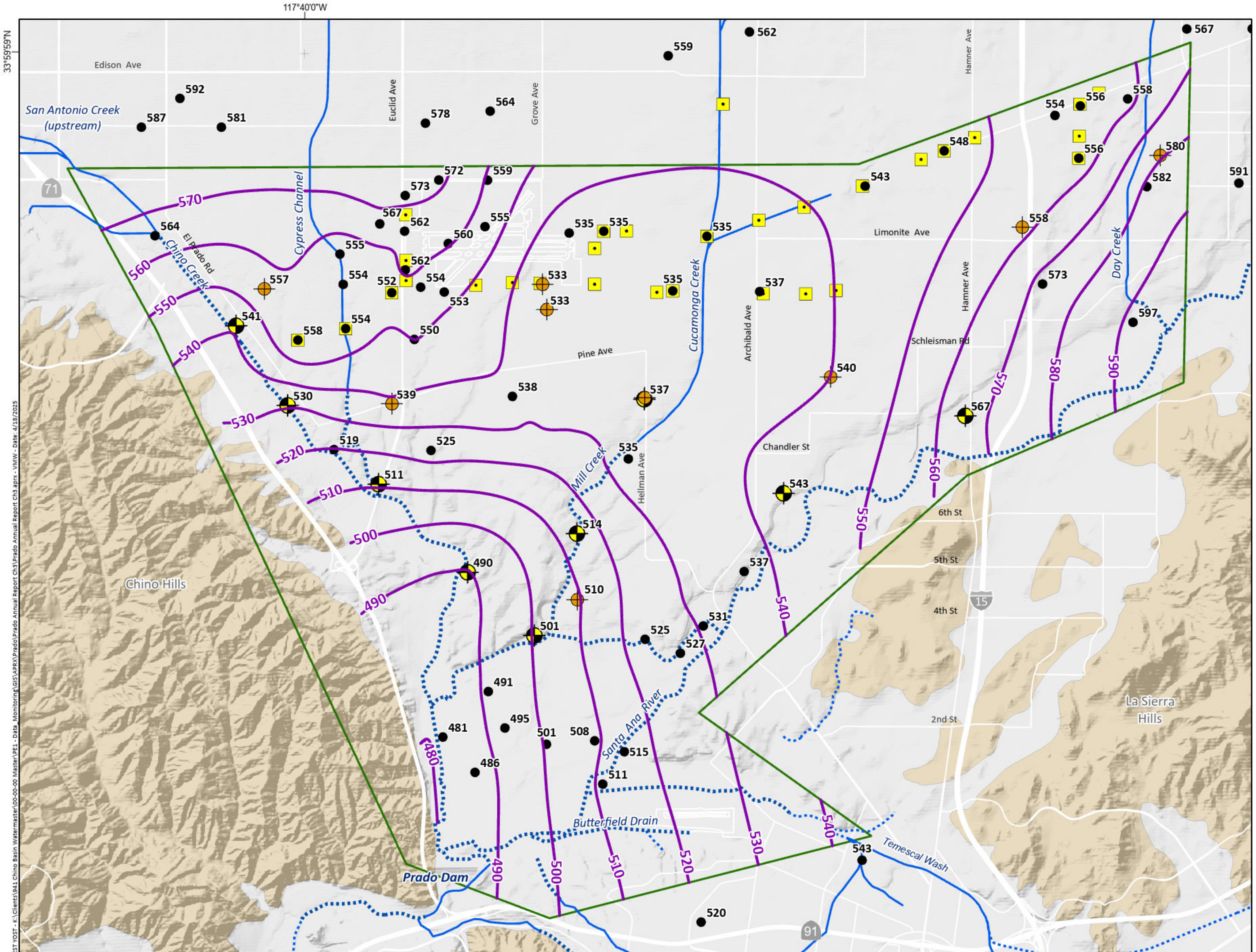
WEST YOST

Prepared for:

Prado Basin Sustainability Committee
2024 Annual Report

Map of Groundwater Elevation
September 2016 - Shallow Aquifer System

Figure 3-10a



Equal Elevation Contour of Groundwater Elevation (feet above mean sea level)

505 Measured Groundwater Elevation in September 2024 used to draw contours (feet above mean sea level)

PBHSP Monitoring Well

HCMP Monitoring Well

Other Well

Chino Desalter Well

Groundwater Monitoring Program (GMP) Study Area

Concrete-Lined Channels

Unlined Rivers and Streams

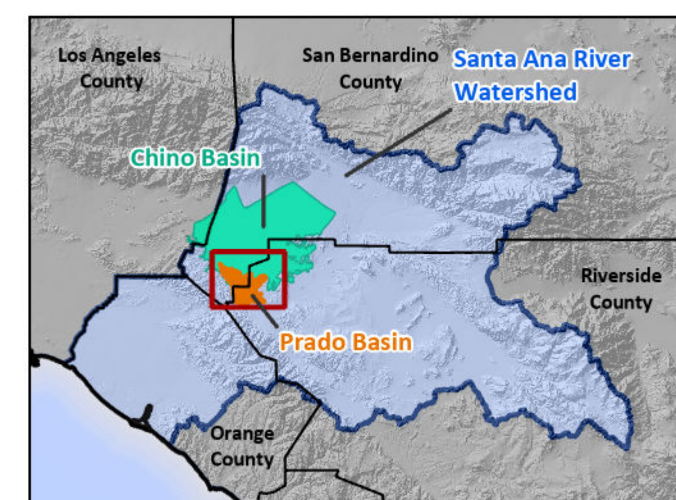
Surface Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks



Prepared by:

WEST YOST

0 1 2 Miles

0 1 2 Km

Prepared for:

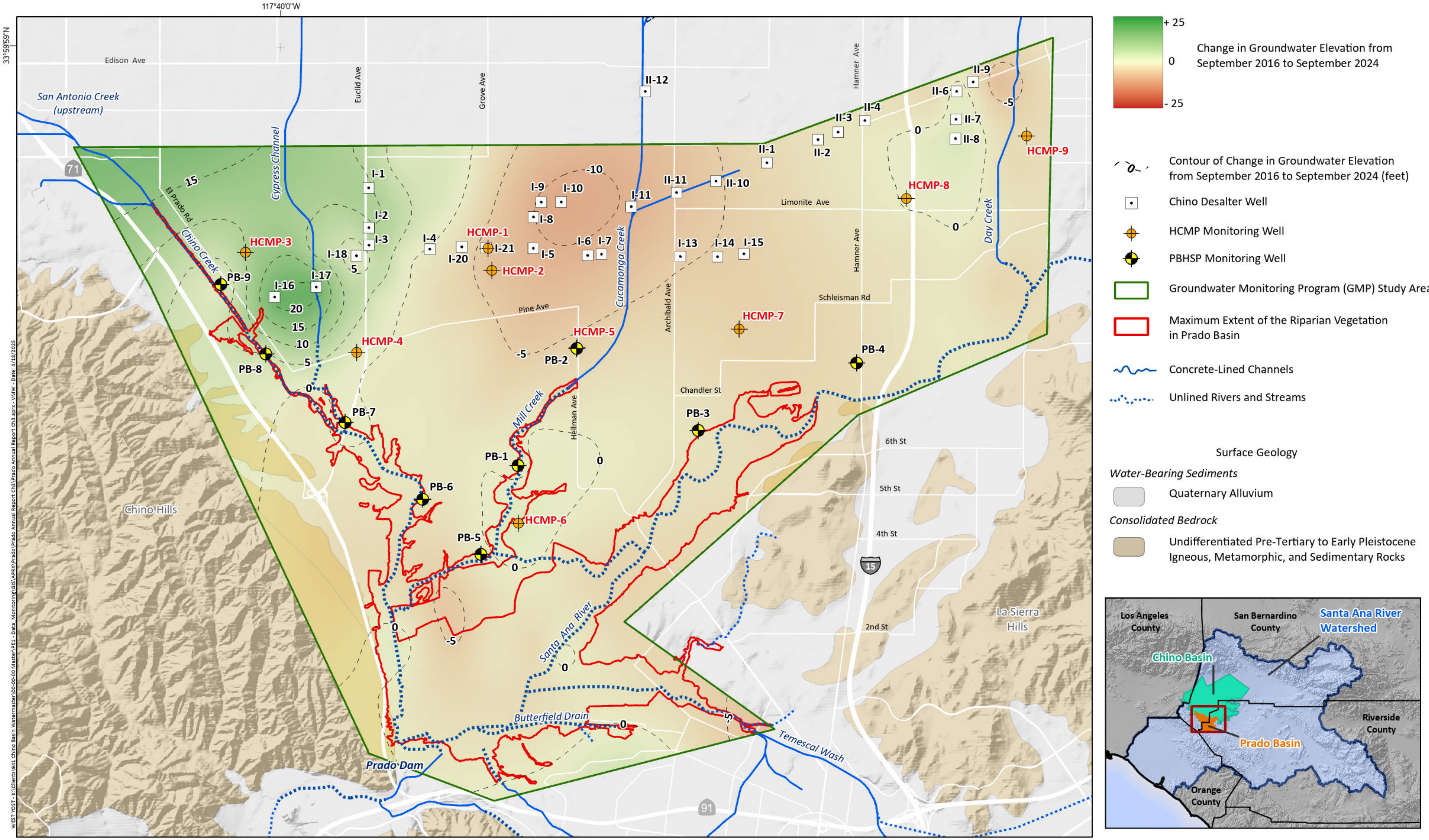
Prado Basin Sustainability Committee

2024 Annual Report

Map of Groundwater Elevation

September 2024 - Shallow Aquifer System

Figure 3-10b



Prepared by:

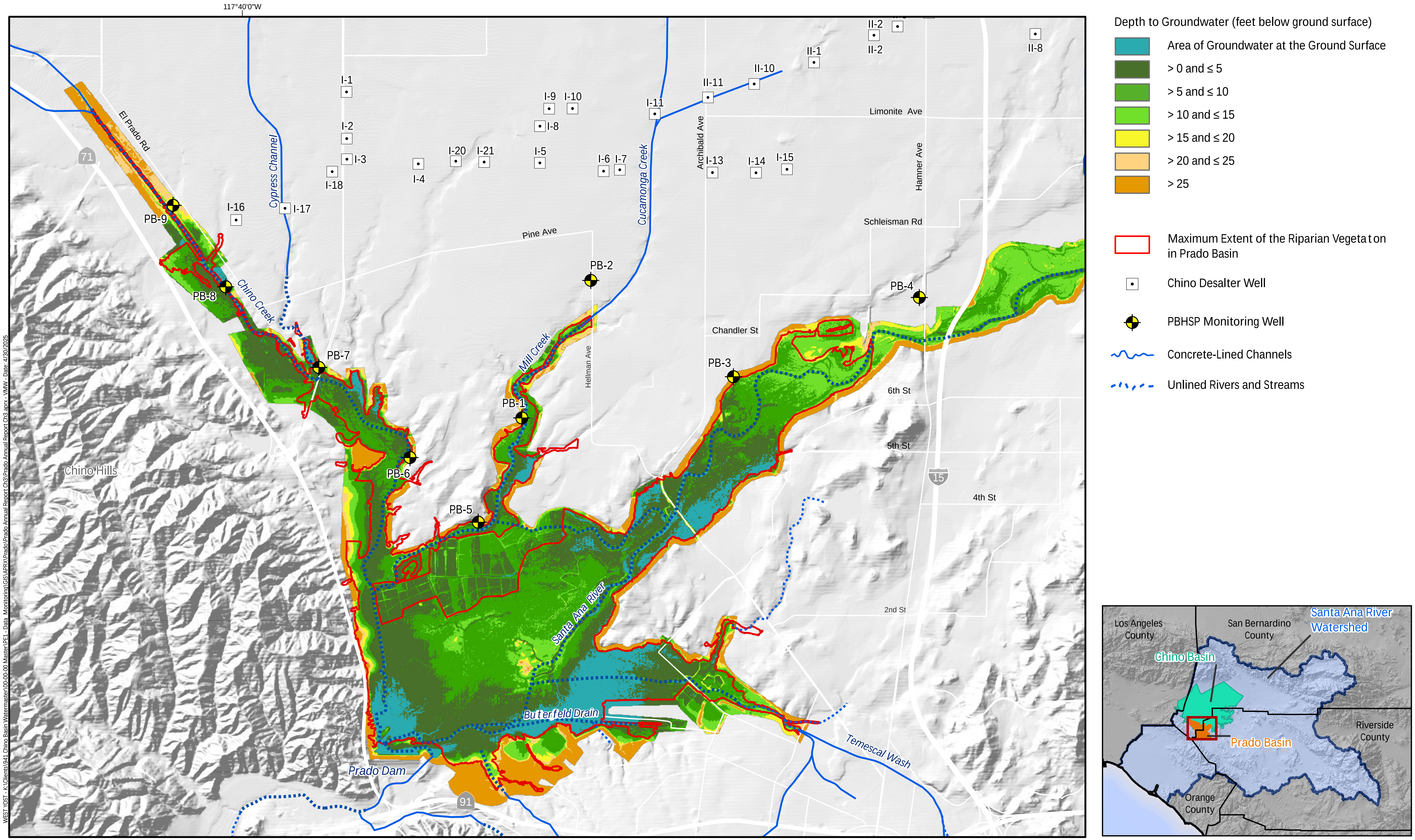
WEST YOST

Prepared for:

Prado Basin Sustainability Committee
2024 Annual Report

Change in Groundwater Elevation
September 2016 to September 2024

Figure 3-11



Prepared by:

WEST YOST

0 1 2 Miles

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Prepared for:

Prado Basin Sustainability Committee
2024 Annual Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Depth to Groundwater
September 2024

Figure 3-12

3.2.3 Groundwater Levels Compared to NDVI

Figures 3-13a through 3-13c are time-series charts that compare long-term trends in groundwater pumping and groundwater elevations to the trends in the quality of the riparian vegetation as indicated by the NDVI for three reaches in the Prado Basin: Chino Creek, Mill Creek, and the SAR. The period of analysis for these charts is 1984 to 2024—the period of NDVI availability. The upper chart in these figures compares changes in groundwater levels for each respective area to long-term trends in groundwater pumping within the respective regions of the GMP study area (Chino Creek, Mill Creek, and SAR). The annual groundwater pumping for wells within the respective regions is presented as a stacked bar chart, differentiating between Chino Desalter wells and non-Chino Desalter wells. Model-generated groundwater-elevation estimates for 1984 to 2018 were extracted from Watermaster's 2020 calibration of its groundwater-flow model at the monitoring well locations (WEI, 2020). The more recent groundwater-elevation data shown on these charts were measured at monitoring wells constructed by Watermaster and the IEUA to support the Hydraulic Control Monitoring Program (HCMP) (beginning in 2005) and the PBHSP (beginning in 2015). Where the measured and model-estimated groundwater elevations overlap in time, the model-estimated elevations mimic the seasonal fluctuations and longer-term trends of the measured elevations, typically differing by no more than 10 feet. This alignment supports the use of these model-estimated groundwater elevations in this analysis to evaluate historic trends prior to the availability of actual water level measurements.

The lower chart in Figures 3-13a through 3-13c displays the time series of the Average Growing-Season NDVI for the defined areas (discussed in Section 3.1) along Chino Creek, Mill Creek, and the SAR. For reference, the Mann-Kendall test results for trends in the Average Growing-Season NDVI for 1984 to 2024, 1984 to 2006, and 2007 to 2024 are shown in the legend.

The NDVI observations and interpretations below focus on recent changes in Average Growing-Season NDVI (Section 3.1) and whether observed groundwater level trends may be contributing to recent NDVI changes.

Chino Creek (Figure 3-13a). During the late 1990s, groundwater levels along Chino Creek increased, particularly along the north reach of Chino Creek, where groundwater levels increased by over 30 feet. The increase in groundwater levels was most likely due to reduced pumping in the area. Since 2000, groundwater levels have remained relatively stable, even as Chino Basin Desalter pumping commenced and increased at CDA wells I-I, I-2, I-3, I-4, I-16, I-17, and I-18 to the north of Chino Creek (see inset map on Figure 3-13a). From 2017 to 2023, pumping at these Chino Desalter wells was at historically low volumes, contributing to a decrease in pumping in this area.

From 2015-2024, the measured groundwater levels at the PBHSP monitoring wells along Chino Creek show an increasing trend along the northern portion of Chino Creek (PB-9/1, PB-8, and RP2-MW3) and stable trend along the central reach, (PB-7/1 and PB-6/1). Groundwater levels fluctuate seasonally, in some cases by more than 15 feet, under the seasonal stresses of pumping and recharge. During the winter months of WY 2017, 2019, 2023, and 2024, groundwater levels at the PBHSP monitoring wells increased to their highest recorded levels, likely in response to the recharge of stormwater discharge in unlined creeks and the associated surface-water reservoir that ponds behind Prado Dam. Over the last year (September 2023 to September 2024) groundwater levels stayed about the same along the upper northern reach of Chino Creek (PB-9/1), decreased by less than one foot along the lower northern reach (PB-8, and RP3-MW3), stayed about the same (PB-7/1), or decreased by about 1 foot (PB-6/1) in the middle reach of Chino Creek.

The Average Growing-Season NDVI and the air photo analyses along Chino Creek show that changes in the vegetation were relatively minor during 2023 to 2024 (discussed in Section 3.1), and the NDVI increased slightly at the northern-most reach of the Creek (CC-1) and decreased slightly at the other three areas. Hence, the main observations and conclusions for the period of 2023 to 2024 for the Chino Creek reach are that overall, groundwater levels remained stable or slightly decreased and the riparian vegetation did not change significantly.

Mill Creek. ***(Figure 3-13b).*** During the 1990s, groundwater levels along Mill Creek increased, particularly along the north reach of Mill Creek where groundwater levels increased by about 10 feet, most likely due to reduced agricultural pumping in the area. Since 2000, groundwater levels along the north reach of Mill Creek have declined by up to 15 feet. The decline in groundwater levels was most likely due to the onset and progressive increase in Chino Basin Desalter pumping at CDA wells I-5, I-6, I-7, I-8, I-9, I-10, I-11, I-13, I-14, I-20, I-21, and II-11 to the north of Mill Creek (see inset map on Figure 3-13b). Since 2017, total pumping at these Chino Desalter wells has progressively increased, reaching a historically high volume in 2021 and slightly declining after, contributing to the overall increase in the total pumping in this region.

From 2015 to 2024, the measured groundwater levels at the PBHSP monitoring wells along Mill Creek show an overall decreasing trend in the northern and central portion of Mill Creek (PB-2 and HCMP-5/1, and PB-1/2) with groundwater levels decreasing from 2015 to 2022 and then increasing from 2022 to 2024. These decreases and increases in groundwater levels follow the same trends as groundwater pumping observed in this area. From 2015 to 2024, the measured groundwater elevations in the southern reach of Mill Creek show a slight increasing trend of about 1 foot (HCMP-6/1) and a stable trend (PB-5/1).

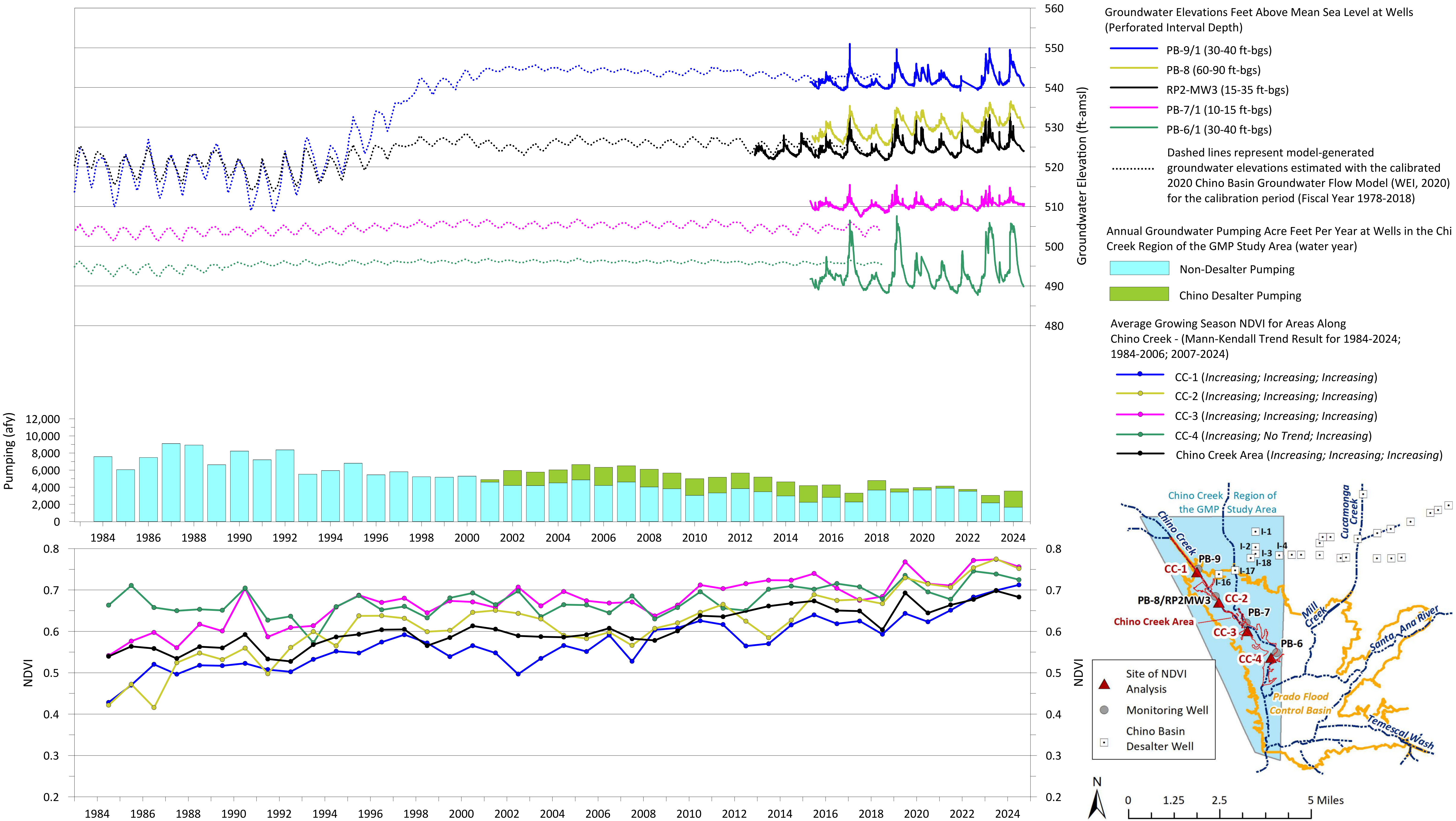
Groundwater levels fluctuate seasonally, in some cases up to 10 feet, under the seasonal stresses of pumping and recharge. During the winter months in WY 2017, WY 2019, WY 2023, and WY 2024, groundwater levels at most of the PBHSP monitoring wells increased to their highest recorded levels, likely in response to the recharge of stormwater discharge in unlined creeks. Over this past year from September 2023 to September 2024, groundwater levels increased about a foot in the northern portion of Mill Creek (PB-2 and HCMP-5/1), remained stable in the central portion (PB-1/2) and decreased about a foot at the southern portion (HCMP-6/1 and PB-5/1).

The Average Growing-Season NDVI analyses along Mill Creek show that changes in the vegetation were relatively minor during 2023 to 2024 (discussed in Section 3.1), with NDVI decreasing at all the areas, except for MC-3 in the central-southern reach of Mill Creek. The greatest decreases in NDVI were in the northern (MC-5) and central (MC-2) reaches of Mill Creek, and the air photos for these areas show notable browning and reductions in the riparian vegetation. Hence, the main observations and conclusions for the period of 2023 to 2024 for the Mill Creek reach are that groundwater level trends fluctuated up to +/- one foot or remained stable, and there are notable changes in riparian vegetation in some areas.

Santa Ana River (***Figure 3-13c***). During the 1990s, the groundwater levels along SAR increased in response to a decline in pumping from 1990 to 2000. These responses were greatest along the eastern portion of SAR where they increased up to five feet. Since 2000, groundwater levels have declined by a similar magnitude along the eastern portion of the SAR due to the onset and progressive increase in Chino Basin Desalter pumping at CDA wells I-13, I-14, I-15, and II-1 through II-11 to the north of the SAR (see inset map on Figure 3-13c), while groundwater levels slightly increased along the western portion of the SAR near the Archibald well. Since 2018, total pumping at these Chino Desalter wells progressively increased to a historically high volume in 2021, declining only slightly since, contributing to the increase in the total pumping observed in this area.

From 2015 to 2024, the measured groundwater levels at the PBHSP monitoring wells show a slight decreasing trend along the northeastern portion near PB-4/1, a stable trend along the northern portion near PB-3/1 following a decreasing trend between 2019 and 2022, and an increasing trend along the southwestern portion near the Archibald 1. The decreases in groundwater levels in the northeastern portion of the SAR area (near PB-4/1) are likely due to the increase in pumping observed in this area. Groundwater levels fluctuate seasonally, in some cases by up to seven feet under the seasonal stresses of pumping and recharge. Over the last year, from September 2023 to September 2024, groundwater levels at the monitoring wells along the SAR remained stable along the northeastern and northern portions (PB-4/1 and PB-3/1) and decreased by about 2 feet along the western portion (Archibald 1).

The Average Growing-Season NDVI and air photo analyses along the SAR show that changes in the vegetation were relatively minor from 2023 to 2024 (discussed in Section 3.1) and the NDVI increased slightly at SAR-1 and LP and decreased slightly at SAR-2 and SAR-3. Hence, the main observations and conclusions for the period of 2023 to 2024 for the SAR reach are that groundwater levels remained stable or decreased, and the riparian vegetation did not change significantly.



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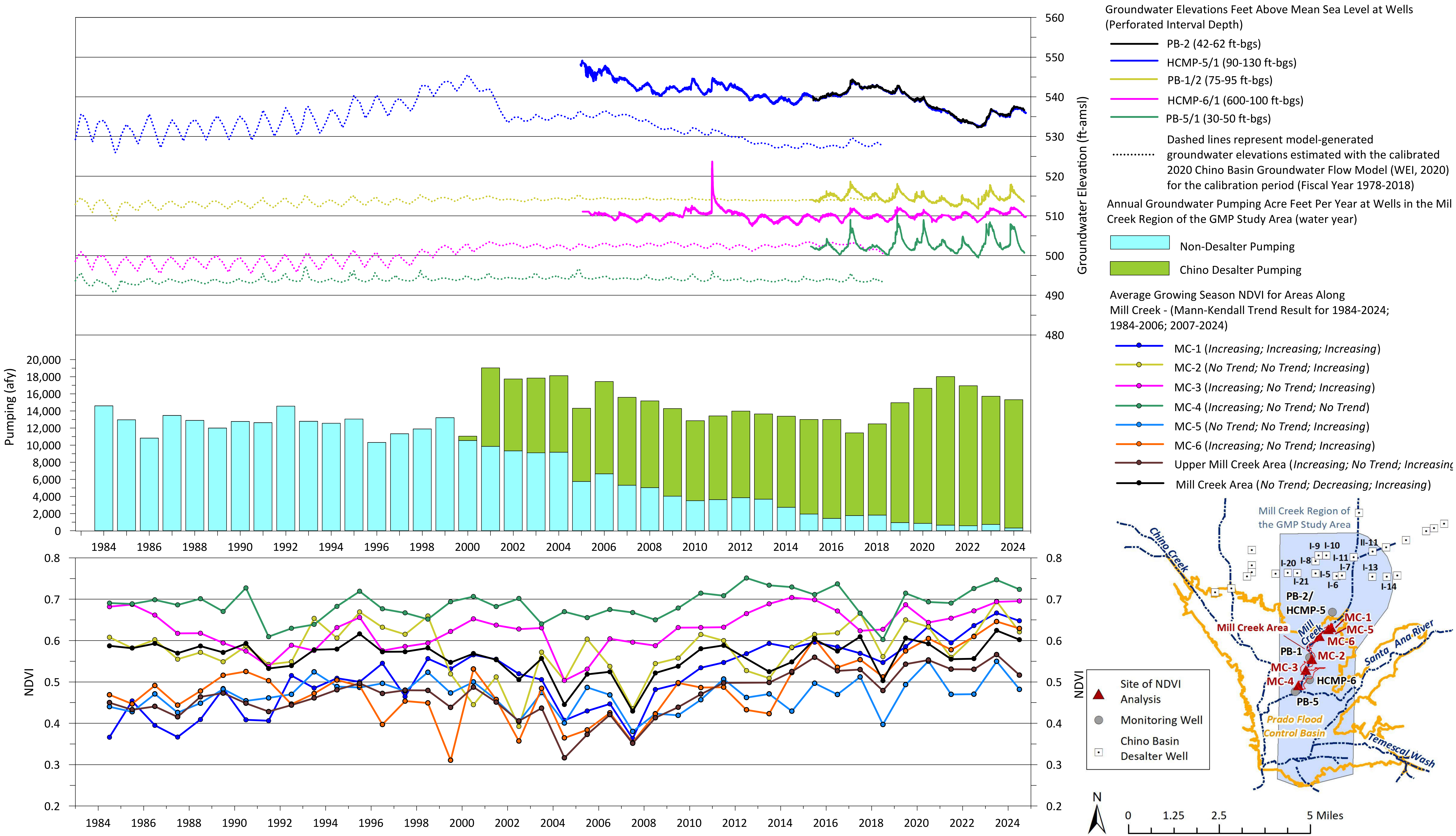
Prepared for:

Prado Basin Habitat Sustainability Committee
2024 Annual Report

Groundwater Levels and Production versus NDVI
Chino Creek Area for 1984-2024

Figure 3-13a



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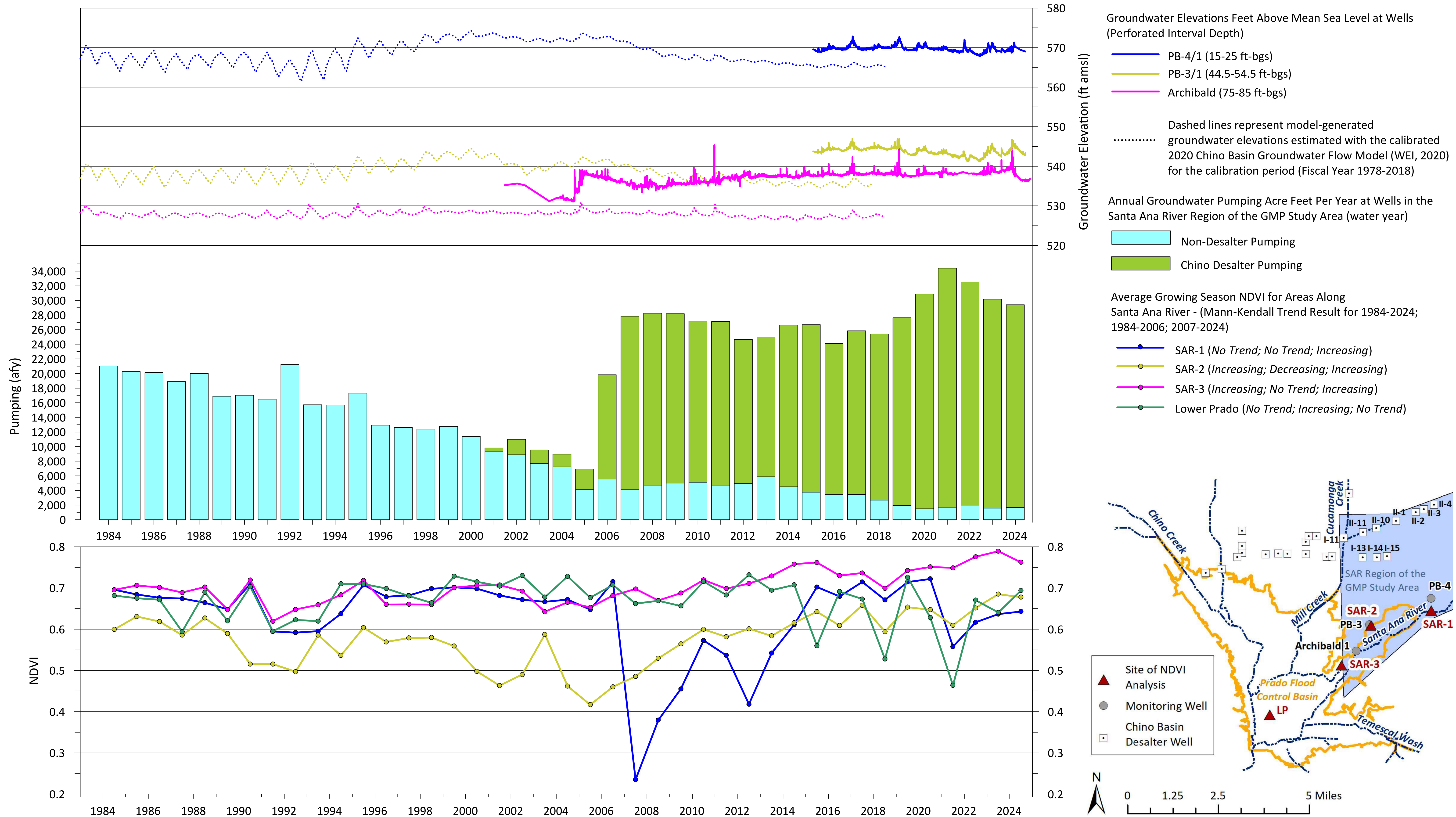
Groundwater Levels and Production versus NDVI
Mill Creek Area for 1984-2024

Figure 3-13b



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WEST YOST Water. Engineered

Prepared for:

Prado Basin Habitat Sustainability Committee
2024 Annual Report

Groundwater Levels and Production versus NDVI
Santa Ana River Area for 1984-2024

Figure 3-13c

3.2.4 Summary

The following observations and interpretations were derived from the analysis of groundwater pumping, groundwater levels, and NDVI:

- From 1961 to 1990, groundwater pumping from private domestic and agricultural wells in the study area averaged about 45,900 afy. From 1991 to 1999, groundwater pumping steadily declined to about 23,600 afy primarily due to conversions from agricultural to urban land uses. In 2000, CDA pumping commenced to replace the declining agricultural production and by 2018, groundwater pumping in the study area was about 37,000 afy. Since WY 2019, total groundwater pumping in the study area increased almost 10,000 afy due to increased CDA pumping to reach its intended pumping rate of 40,000 afy. In WY 2024, there was 40,598 af total groundwater pumping in the GMP study area; 37,002 af of this was CDA pumping.
- Since groundwater-level measurements commenced at the PBHSP monitoring wells in 2015, there have been some increasing and decreasing trends in groundwater levels observed in the riparian vegetation area along the reaches of Chino Creek, Mill Creek, and SAR. From September 2016 to September 2024, groundwater levels have changed less than +/-5 feet throughout most of the extent. Historically, groundwater levels have declined the most along the northern portion of Mill Creek, just south of the PB-2 monitoring well, where levels decreased by eight feet from 2015 to 2022 likely due to increased pumping at the Chino Desalter wells to the north. Since 2022 groundwater levels have increased in this area over four feet likely due to above average precipitation and streamflow in 2023 and 2024, and reduced pumping in this area. From 2015 to 2024, groundwater levels increased the most in the northern reach of Chino Creek where groundwater levels have increased about 10 feet due to decreased pumping.
- Over the past year from 2023 to 2024 groundwater levels generally remained stable with groundwater levels changing up to +/- one foot at most of the PBHSP wells near the riparian vegetation along the reaches of Chino Creek, Mill Creek, and SAR. In Section 3.1, the analysis of air photos and NDVI for the riparian habitat indicates that the riparian vegetation did not change significantly in any of the areas, and there was a slight decrease in NDVI at most of the sites as groundwater levels remained stable or slightly changed.

3.3 Analysis of Groundwater/Surface-Water Interactions

One of the objectives of the PBHSP is to identify factors that contribute to the long-term sustainability of Prado Basin riparian habitat. The depth to groundwater analysis shown in Figure 3-12 indicates that the riparian vegetation exists in areas of shallow groundwater, where groundwater levels are typically 15 ft-bgs or less, and that the riparian vegetation is likely dependent, at least in part, upon the shallow groundwater. There have been multiple studies for the PBHSP on the groundwater/surface-water interactions in the Prado Basin to determine the source of shallow groundwater that is available for consumptive use by the riparian vegetation, and that may be important to the long-term sustainability of the riparian habitat.

3.3.1 Past Monitoring of Groundwater/Surface-Water Interactions:

Historical monitoring of groundwater/surface-water interactions for the PBHSP include:

- From FY 2015 to FY 2018 quarterly groundwater samples were collected from the 18 PBHSP monitoring wells and analyzed at a minimum for general minerals. The general mineral chemistry data collected was analyzed along with groundwater-level data, model-generated groundwater-flow directions, and surface-water quality and flow data to help characterize groundwater/surface-water interactions in the Prado Basin and determine the source of the shallow groundwater.
- The Annual Reports for WY 2017 and WY 2018 (Section 3.3) included a comprehensive analysis to understand the sources of the shallow groundwater in the Prado Basin (WEI, 2018; 2019). The analysis included using surface-water discharge and quality, groundwater quality, groundwater levels, and groundwater modeling as multiple lines of evidence to analyze the groundwater/surface-water interactions at the nine PBHSP well locations—along the fringes of the riparian habitat and adjacent to Chino Creek, Mill Creek, and the SAR. In general, the analysis concluded that the SAR and northern portion of Mill Creek are losing reaches, characterized by streambed recharge. Most other areas along Chino and Mill Creeks are gaining reaches, characterized by groundwater discharge. That said, at most locations in the Prado Basin, there appear to be multiple and transient sources that feed the shallow groundwater, and the groundwater/surface-water interactions are complex. Additional monitoring was recommended to better characterize the sources of shallow groundwater and groundwater/surface-water interactions.
- From FY 2018 to FY 2023 a pilot monitoring program was conducted to determine if the high-frequency data enhances and better reveals the interpretation of groundwater/surface-water interactions previously studied for the PBHSP. The pilot monitoring program included the installation of transducers that record EC, temperature, and water levels at 15-minute intervals at two locations in Chino Creek and the same high-frequency monitoring at four nearby monitoring wells (PB-7 and PB-8 clusters). Additionally, during the first two years of the pilot monitoring program, surface-water and groundwater-quality samples were collected to support the high-frequency data.
- The Annual Report for WY 2022 included an analysis of the pilot monitoring program data (West Yost, 2023). The analysis concluded that that the high-frequency monitoring of EC and temperature at shallow monitoring wells can reveal the source waters that recharge shallow groundwater. Additionally, the high-frequency monitoring of groundwater-level elevations, surface-water stage, and thalweg elevations can also reveal the source waters that recharge shallow groundwater. We also learned from the pilot monitoring program that it is difficult to collect high-frequency data in the surface water because the transducers are oftentimes lost during large storm events and the transducers become clogged with mud which compromises the accuracy of the data. The WY 2022 report included recommendations to discontinue the pilot monitoring program and, in its place, use the high-frequency monitoring of EC, temperature, and water level for each pair of PBHSP monitoring wells, most of which was already being collected, and collect quarterly field measurements for EC and temperature of the surface water flowing in the streams adjacent to the monitoring wells.

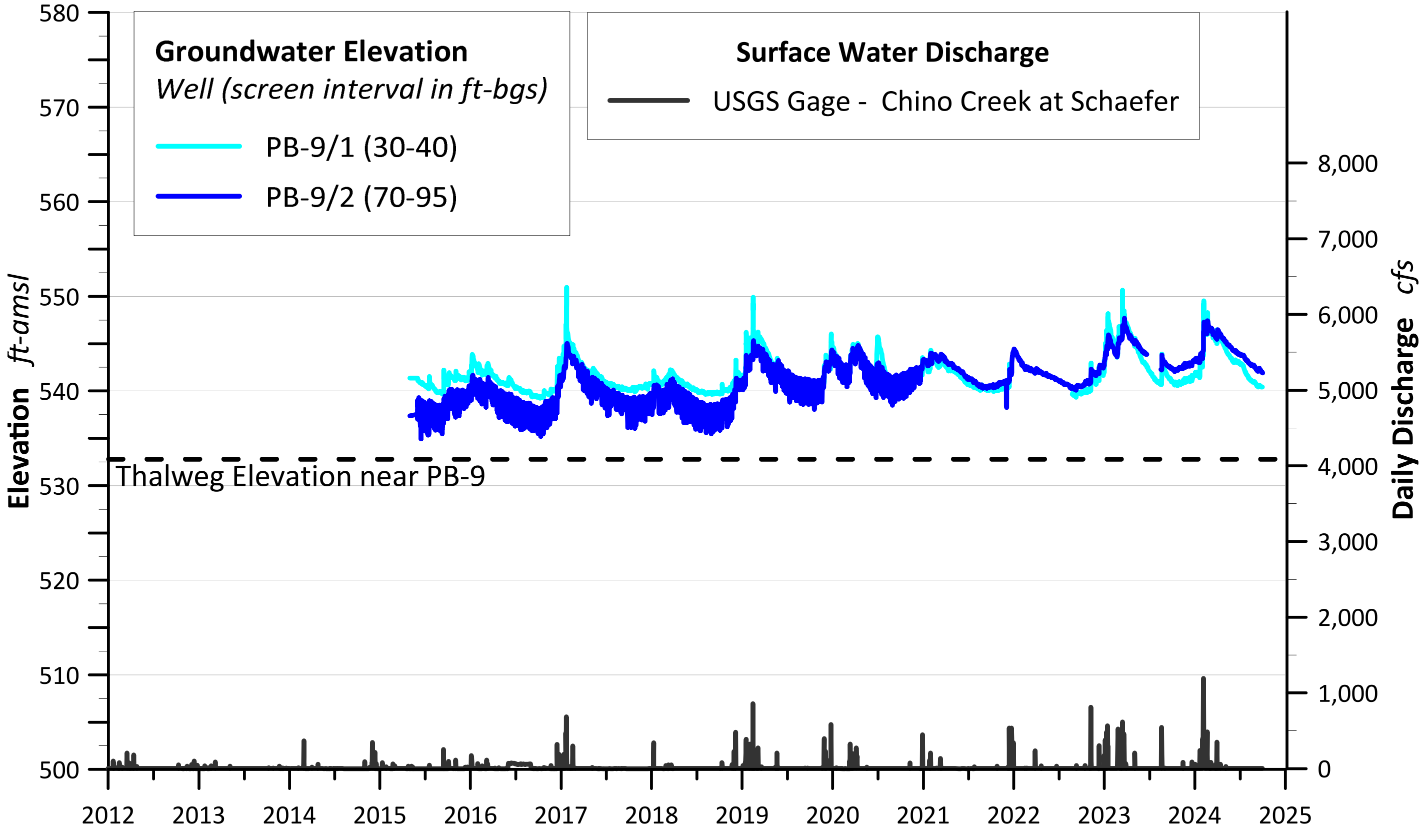
3.3.2 Current Monitoring for Groundwater/Surface-Water Interactions

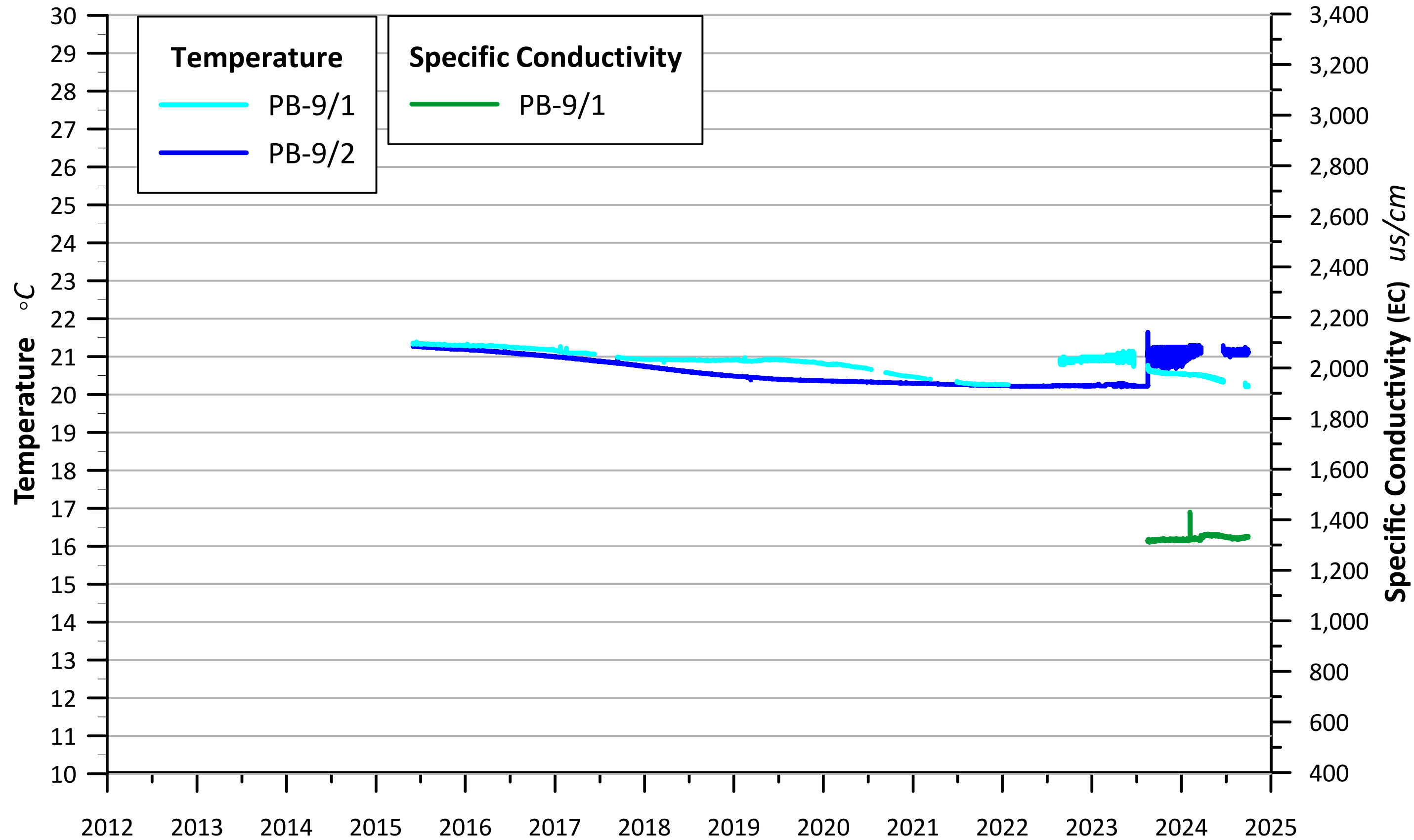
In 2023, monitoring of groundwater/surface-water interactions was initiated based on recommendations in the WY 2022 Annual Report following the analysis of the pilot monitoring program. This monitoring included: (i) compiling, processing, and uploading to the database the high-frequency temperature data which was already being collected at all the PBSHP monitoring wells since 2015; (ii) establishing the locations of surface-water sites near the PBHSP monitoring wells to collect field measurements of EC and temperature, and initiating quarterly measurements; and (iii) replacing transducers at the PBHSP monitoring wells as needed with transducers that measure EC in addition to temperature and level readings (now ten wells have transducer that measure EC). As described in Section 3.2, this monitoring continued in 2024.

In June 2024, professional elevation surveys were conducted of the thalweg elevations of the adjacent water bodies to all PBHSP monitoring wells. The thalweg elevation can be compared to the groundwater elevations in PBHSP monitoring wells to help characterize groundwater/surface-water interactions within the GMP study area and determine if the shallow groundwater supporting the riparian vegetation is supported by the groundwater and/or the surface water. The thalweg elevations were surveyed using the same datum as the PBHSP monitoring wells. Figures 3-14a through 3-14i are time series charts that display the high-frequency monitoring data at each PBHSP monitoring well location located along the fringes of the riparian habitat, adjacent to Chino Creek, Mill Creek, and the SAR. These figures will use this data to help further discern groundwater/surface water interactions. Each figure contains the following:

- The upper chart is a time series of the high-frequency groundwater elevations at the PBHSP monitoring wells at each location and the surface water discharge in the adjacent stream to the monitoring wells. The groundwater elevation time-series for the shallow and deep PBHSP monitoring wells are charted with the thalweg elevation of the adjacent creek or river. The thalweg elevations are from surveys performed in June 2024 by Guida Geospatial Solutions Inc. Thalweg elevations are compared to the groundwater elevations to determine the potential for groundwater discharge or streambed recharge along the specific stream reaches, and daily surface-water discharge data are charted and compared with groundwater elevations to characterize the relationship between surface-water discharge and groundwater levels.
- The lower chart is a time series of high-frequency temperature and EC at the PBHSP monitoring wells at each location with the surface-water field measurements of EC and temperature.

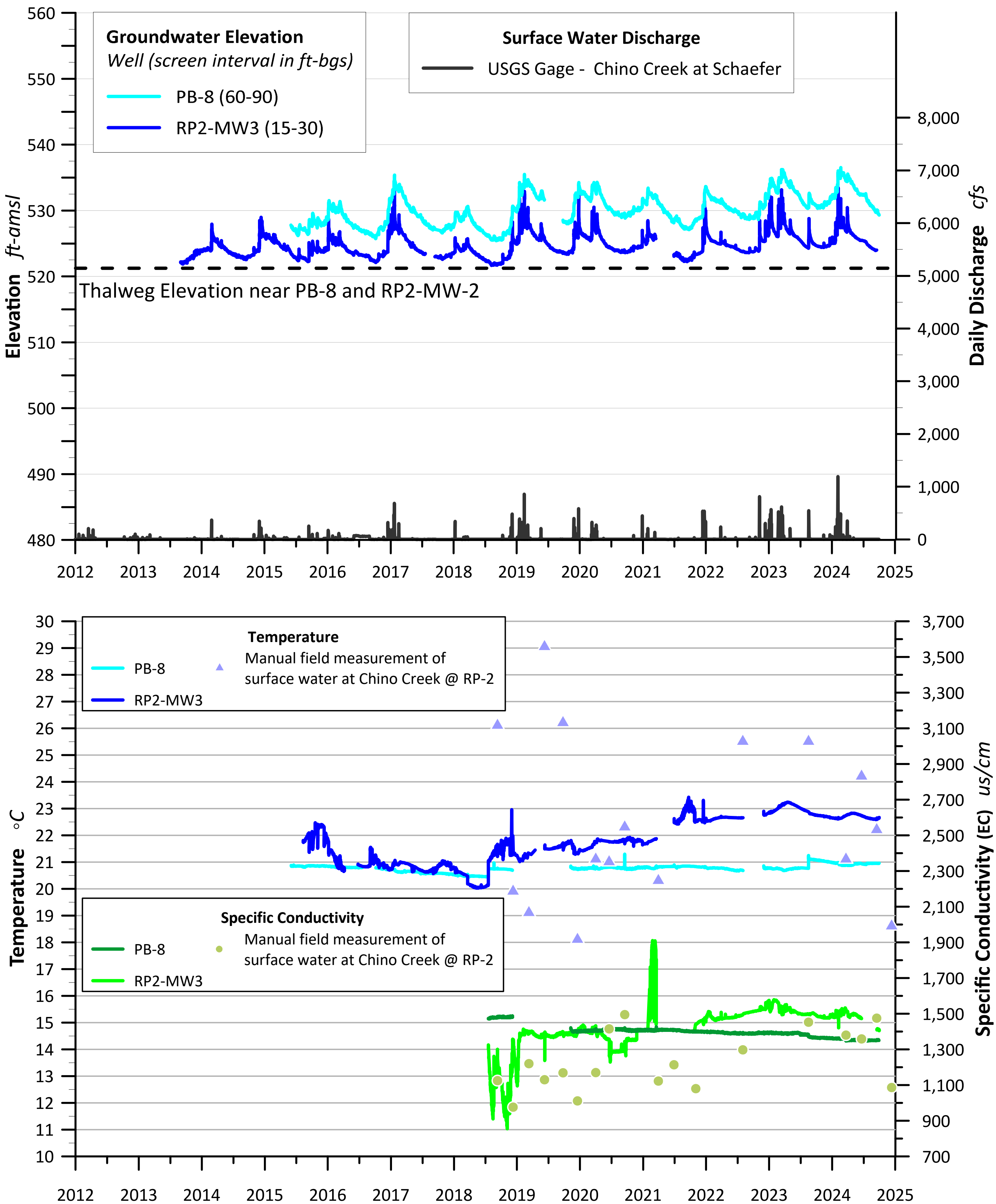
The high-frequency monitoring data and the surveyed thalweg elevations in Figures 3-14a through 3-14i was intended to better reveal the interpretation of groundwater/surface-water interactions previously studied for the PBHSP that used the general mineral chemistry data collected at the PBHSP wells. Table 3-5 summarizes the analysis of groundwater/surface-water interactions based on the data presented in Figures 3-14a through 3-14i. Table 3-5 also includes the interpretation from the original groundwater/surface-water interactions analysis presented in the Annual Reports for WY 2017 and WY 2018 (Section 3.3) that used multiple lines of evidence, including the general mineral chemistry data to analyze the groundwater/surface-water interactions at the nine PBHSP well locations (WEI, 2018; 2019). In general, the analysis concludes similar analysis from the 2017 to 2018 Annual Reports that the SAR from PB-4 to PB-3 and Mill Creek near PB-2 are losing reaches, characterized by streambed recharge. Most other areas along Chino Creek and Mill Creek are gaining reaches, characterized by groundwater discharge.





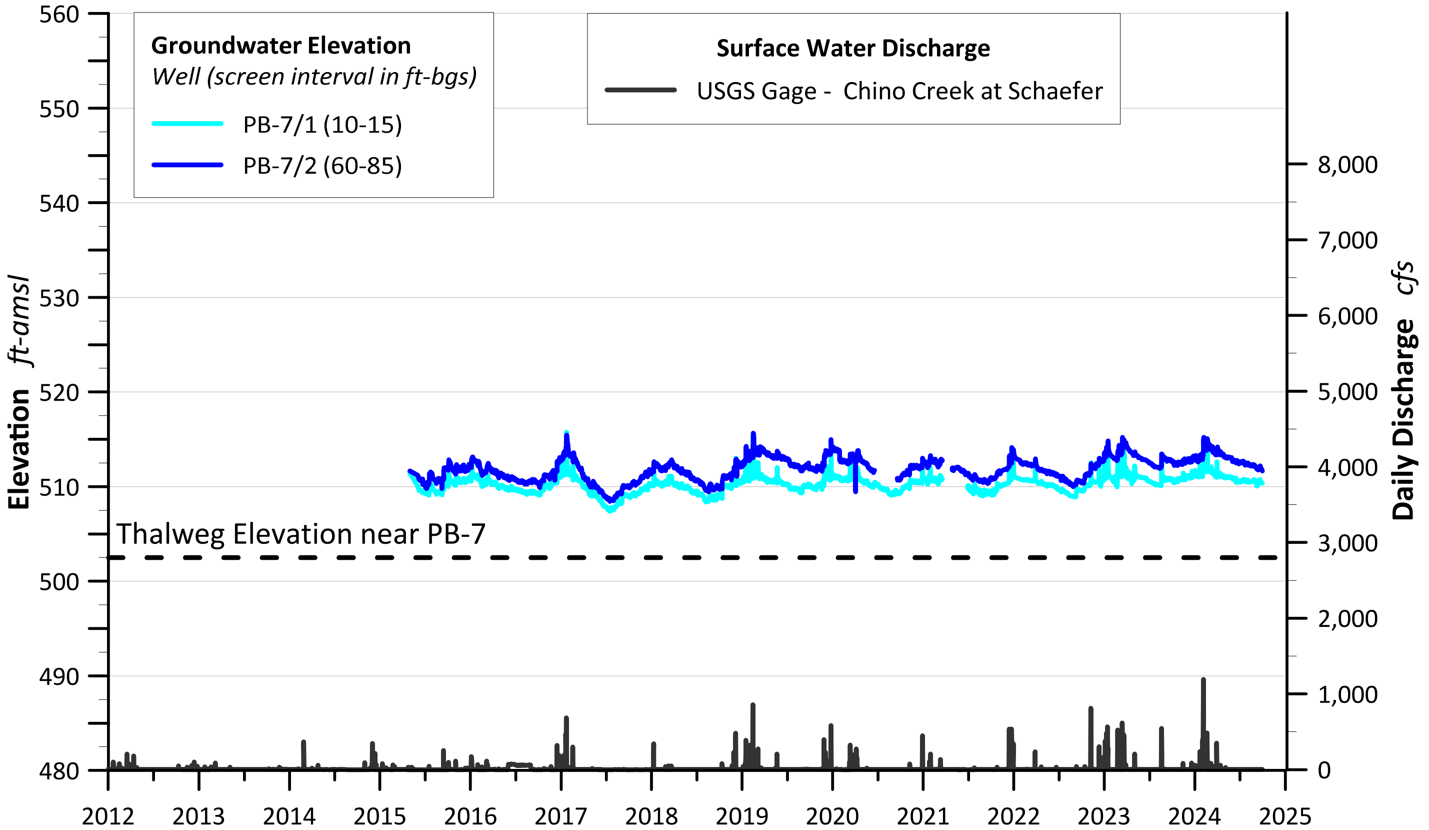
Monitoring to Characterize Groundwater and Surface-Water Interactions
PB-9 Near Chino Creek

Figure 3-14a

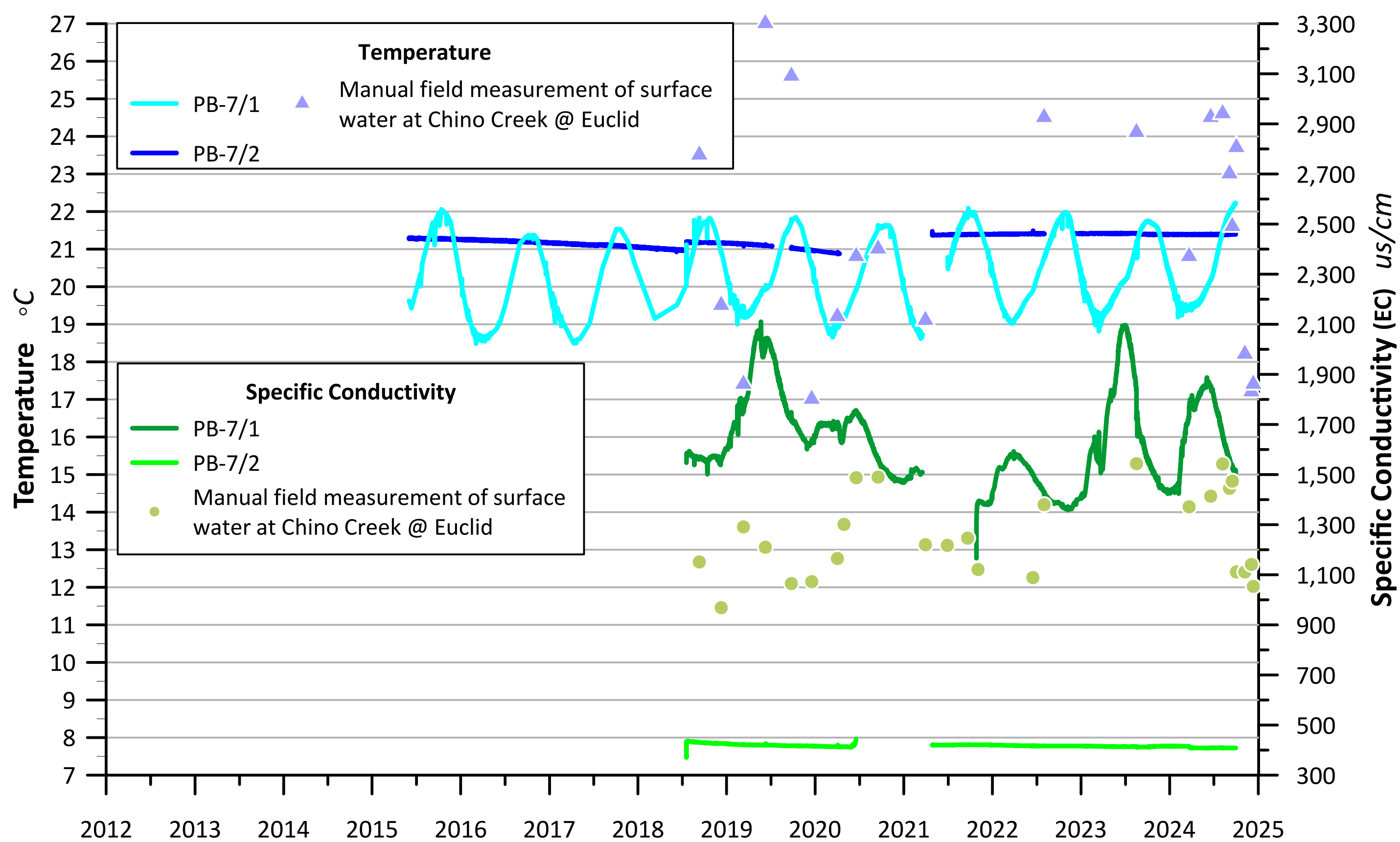


Monitoring to Characterize Groundwater and Surface-Water Interactions
PB-8 and RP2-MW3 Near Chino Creek

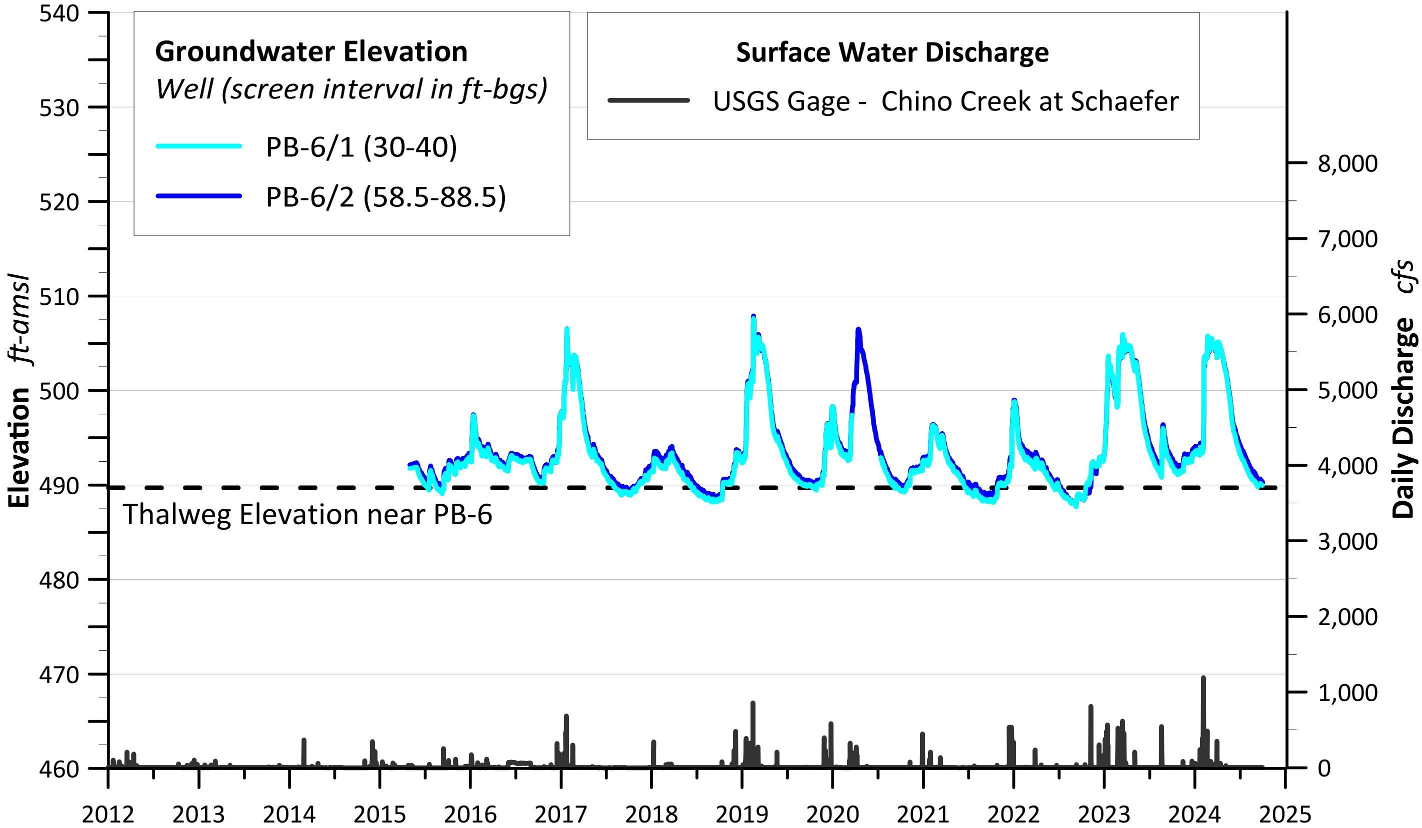
Figure 3-14b

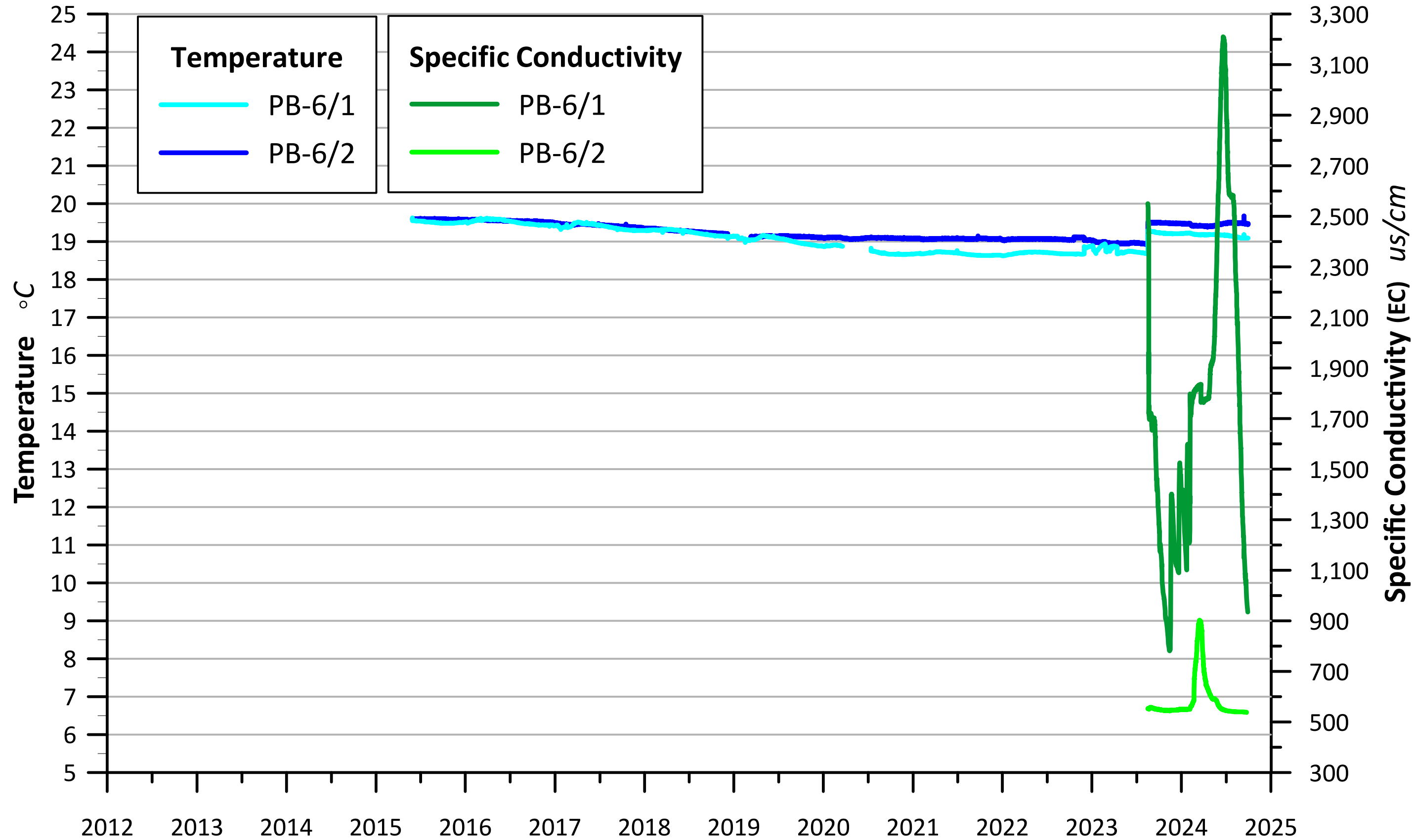


Groundwater Elevation
Well (screen interval in ft-bgs)
PB-7/1 (10-15)
PB-7/2 (60-85)
Surface Water Discharge
USGS Gage - Chino Creek at Schaefer
Thalweg Elevation near PB-7
Elevation ft-amsl
Daily Discharge cfs
560
550
540
530
520
510
500
490
480
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025



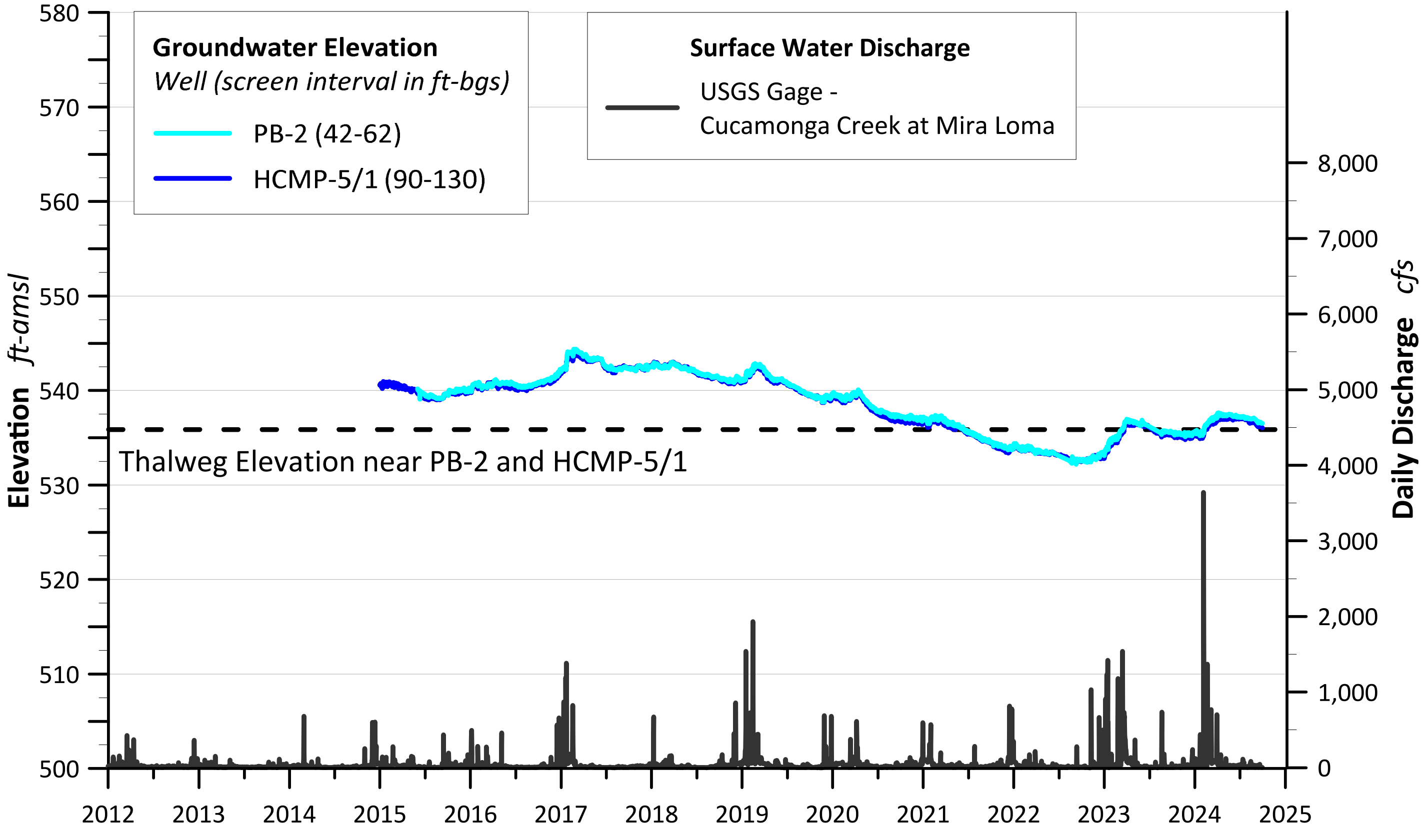
Temperature
PB-7/1
PB-7/2
Manual field measurement of surface water at Chino Creek @ Euclid
Specific Conductivity
PB-7/1
PB-7/2
Manual field measurement of surface water at Chino Creek @ Euclid
Temperature °C
Specific Conductivity (EC) us/cm
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
3,300
3,100
2,900
2,700
2,500
2,300
2,100
1,900
1,700
1,500
1,300
1,100
900
700
500
300
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025

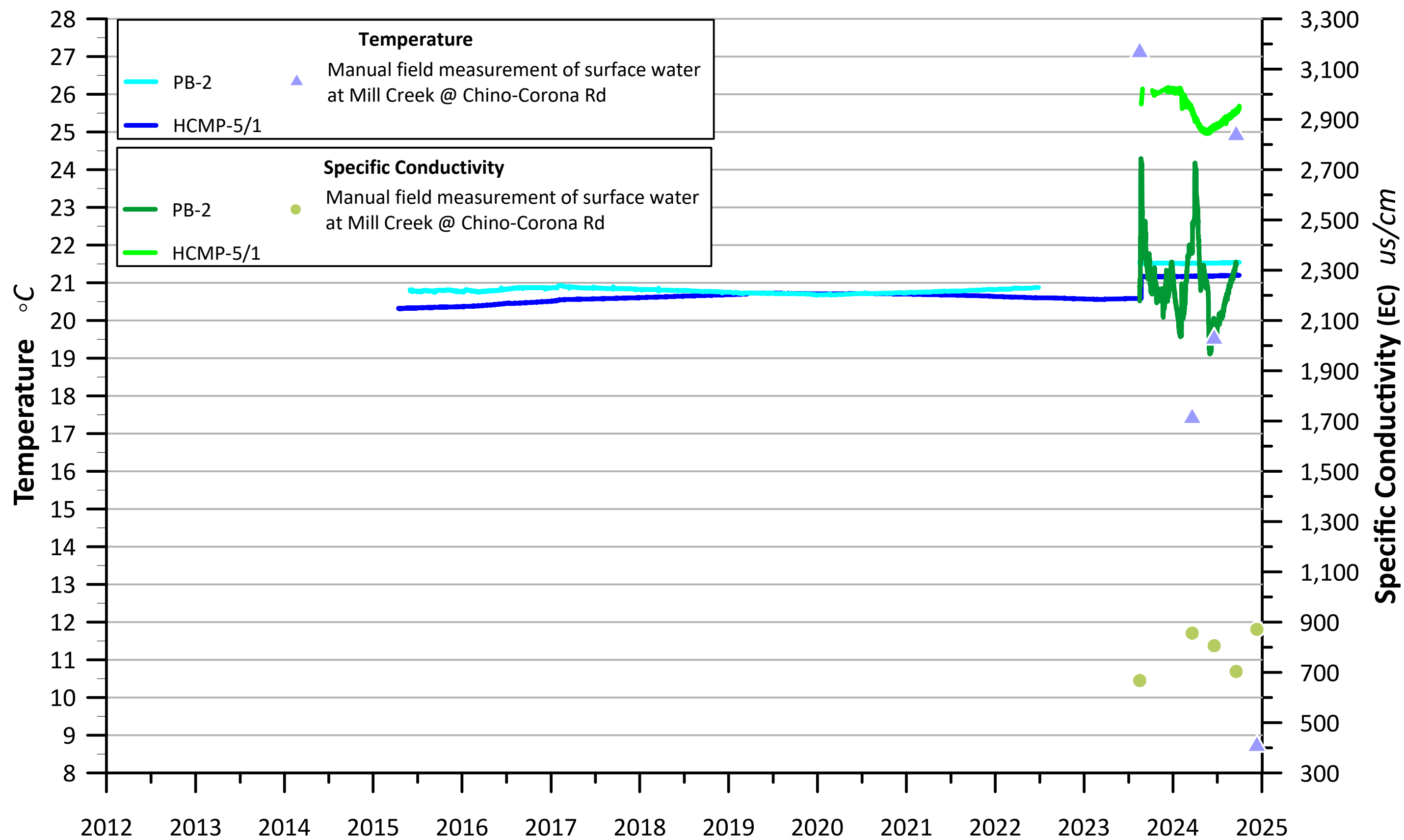




Monitoring to Characterize Groundwater and Surface-Water Interactions
PB-6 Near Chino Creek

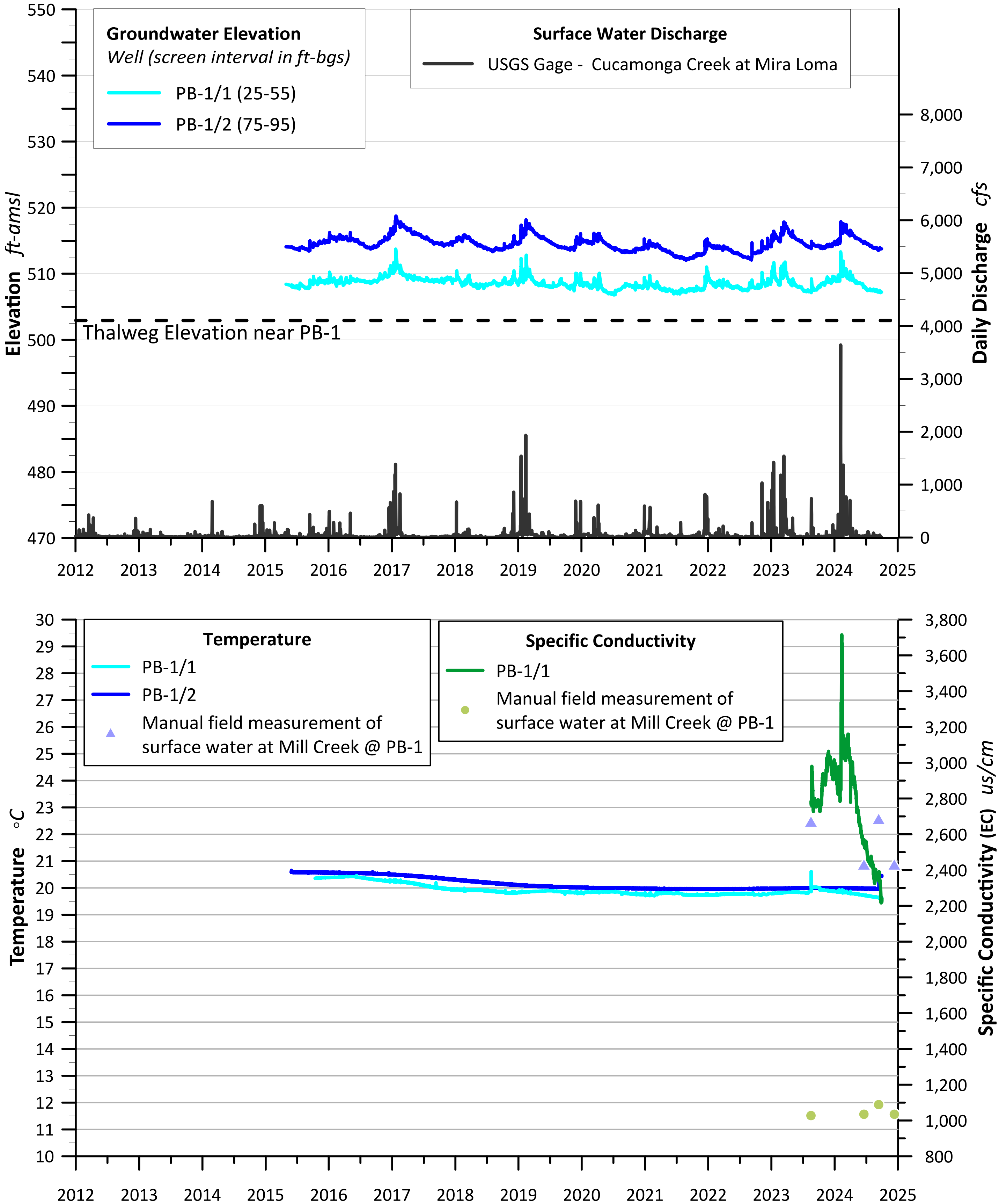
Figure 3-14d





Monitoring to Characterize Groundwater and Surface-Water Interactions
PB-2 and HCMP-5/1 Near Mill Creek

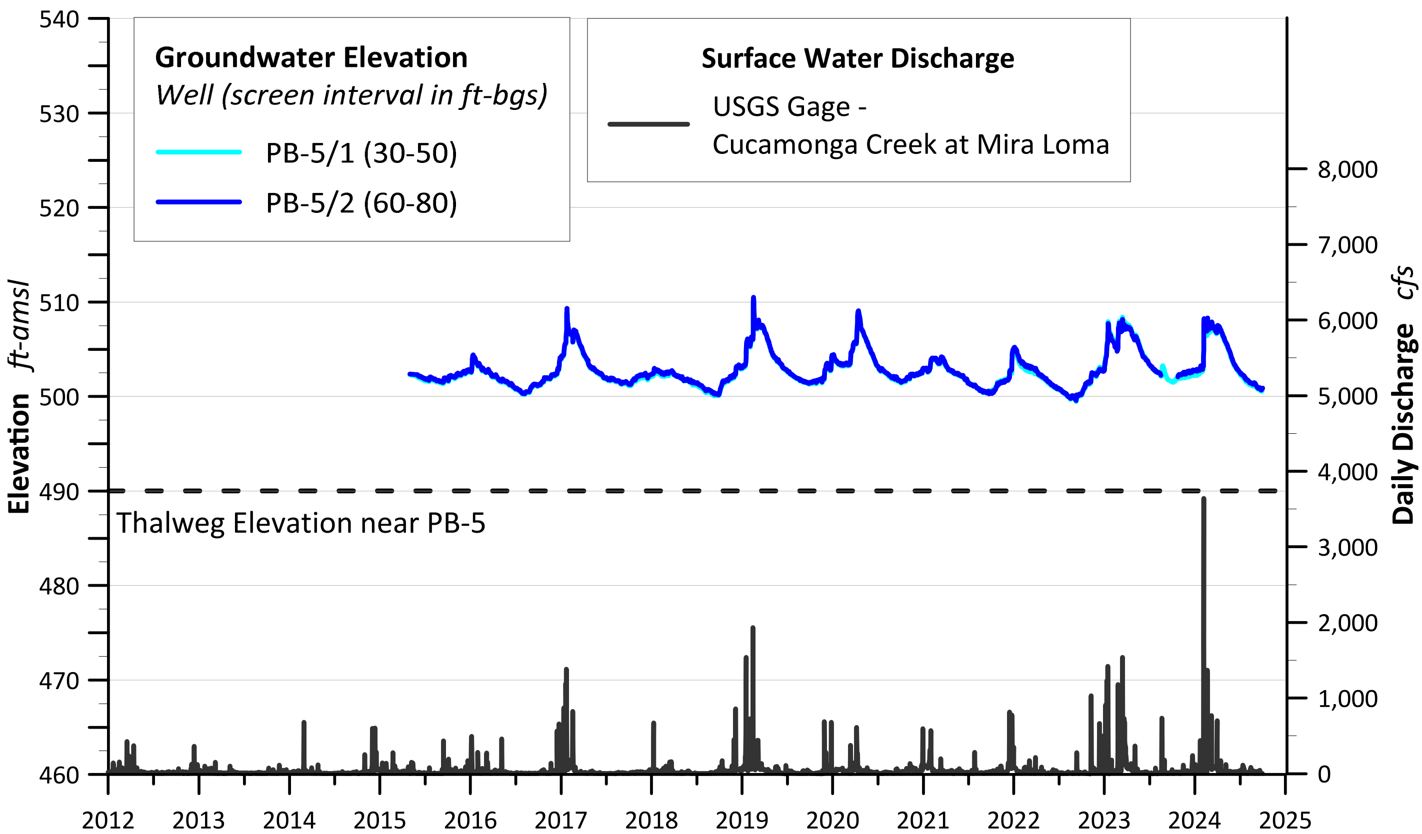
Figure 3-14e

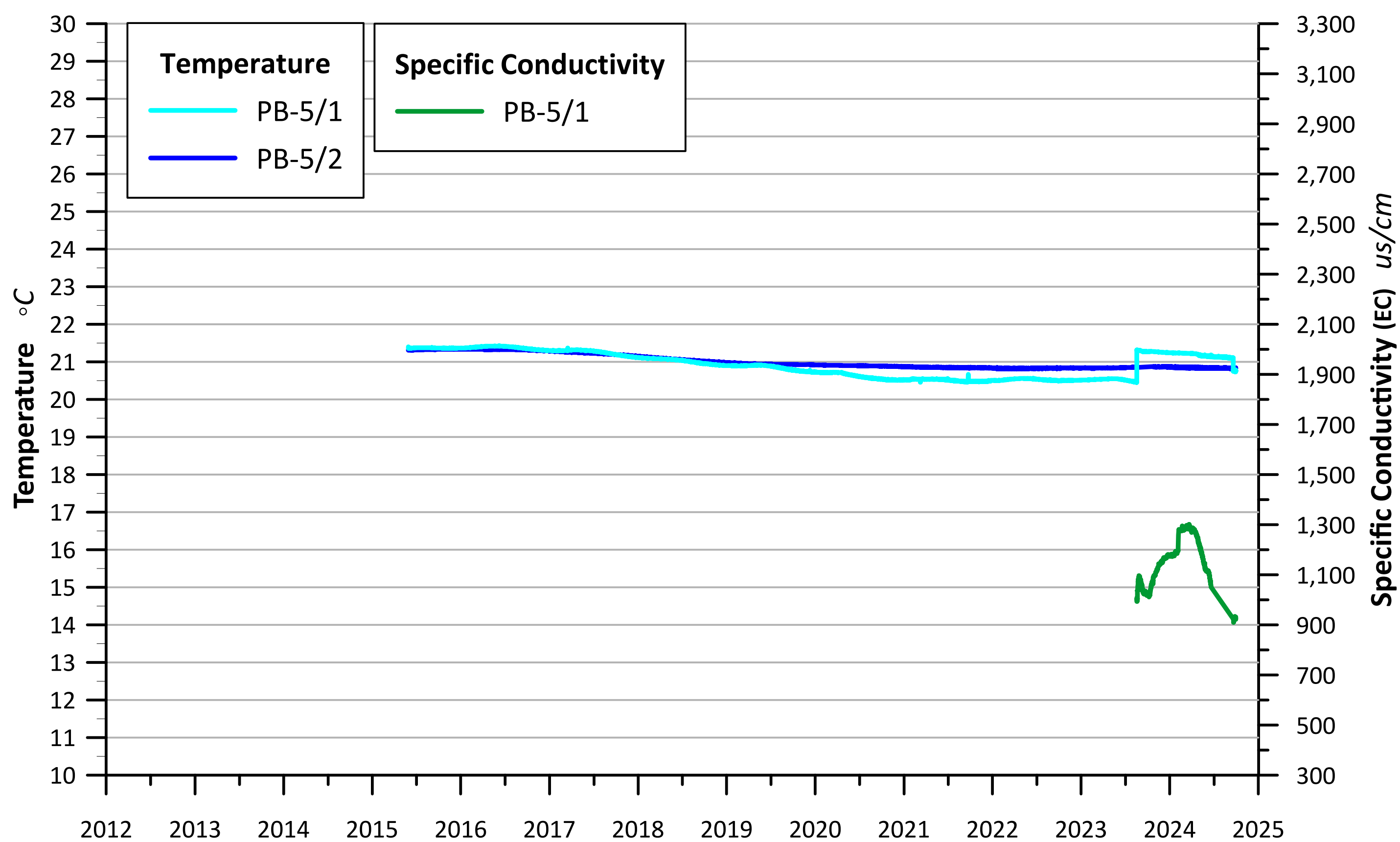


Monitoring to Characterize Groundwater and Surface-Water Interactions

PB-1 Near Mill Creek

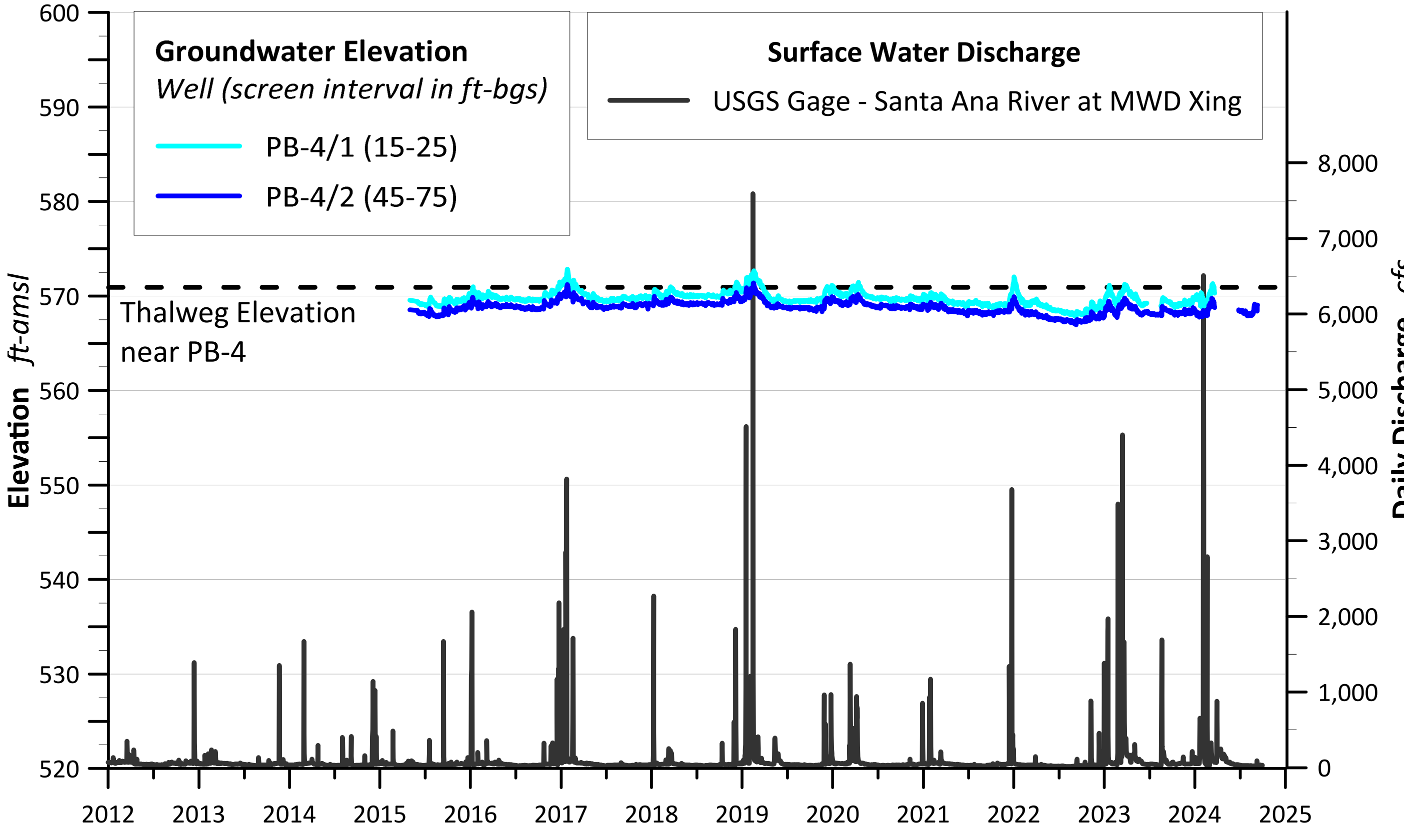
Figure 3-14f



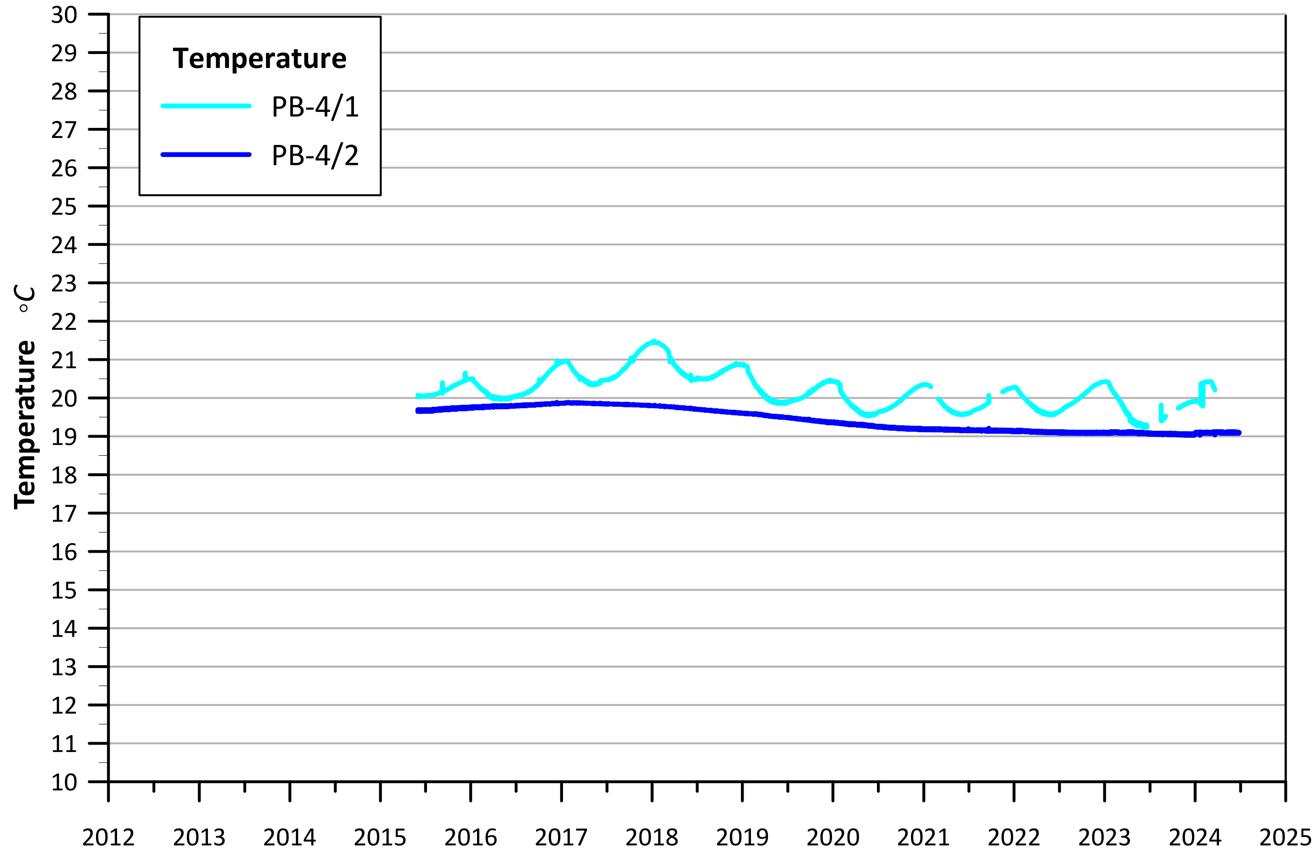


Monitoring to Characterize Groundwater and Surface-Water Interactions
PB-5 Near Mill Creek

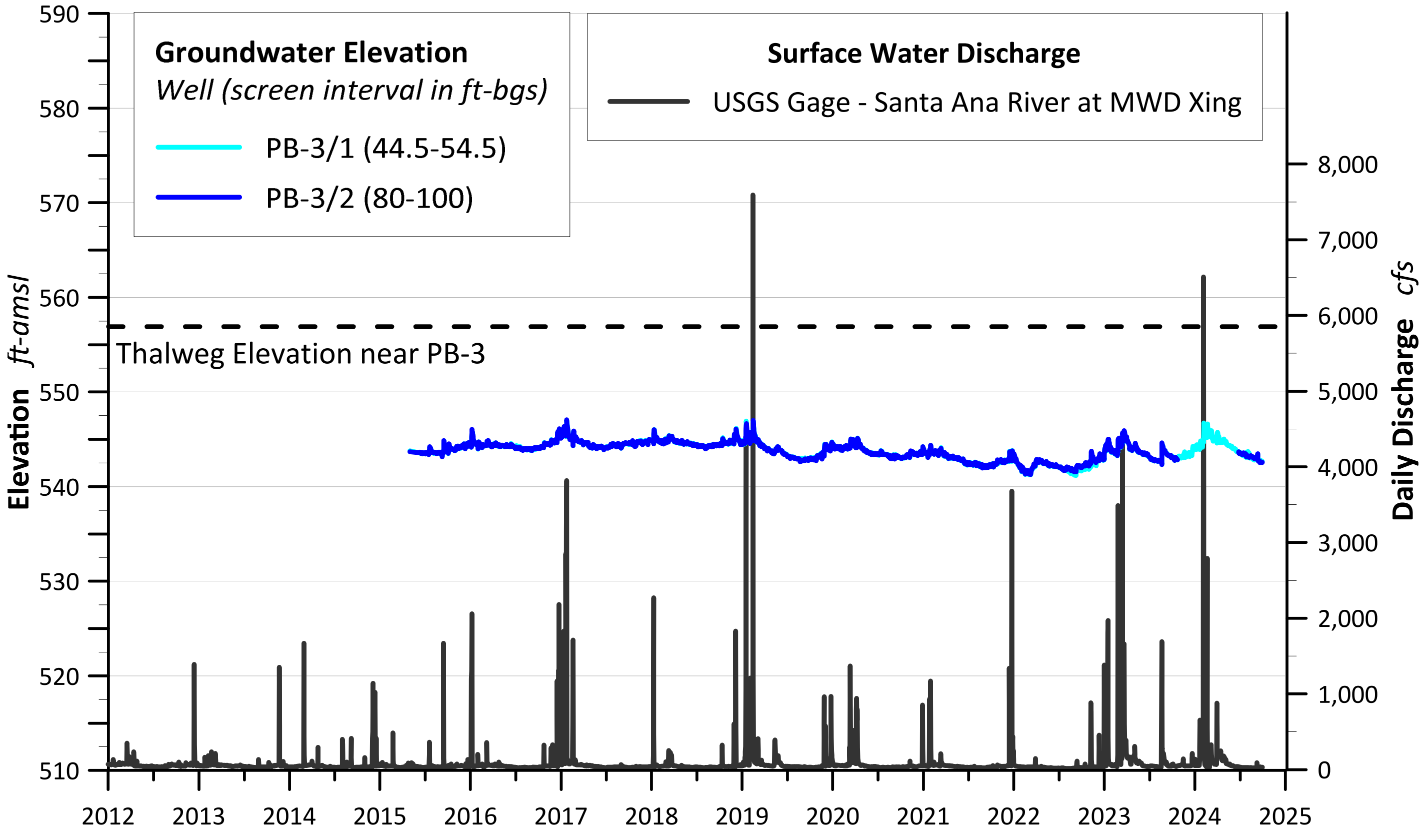
Figure 3-14g

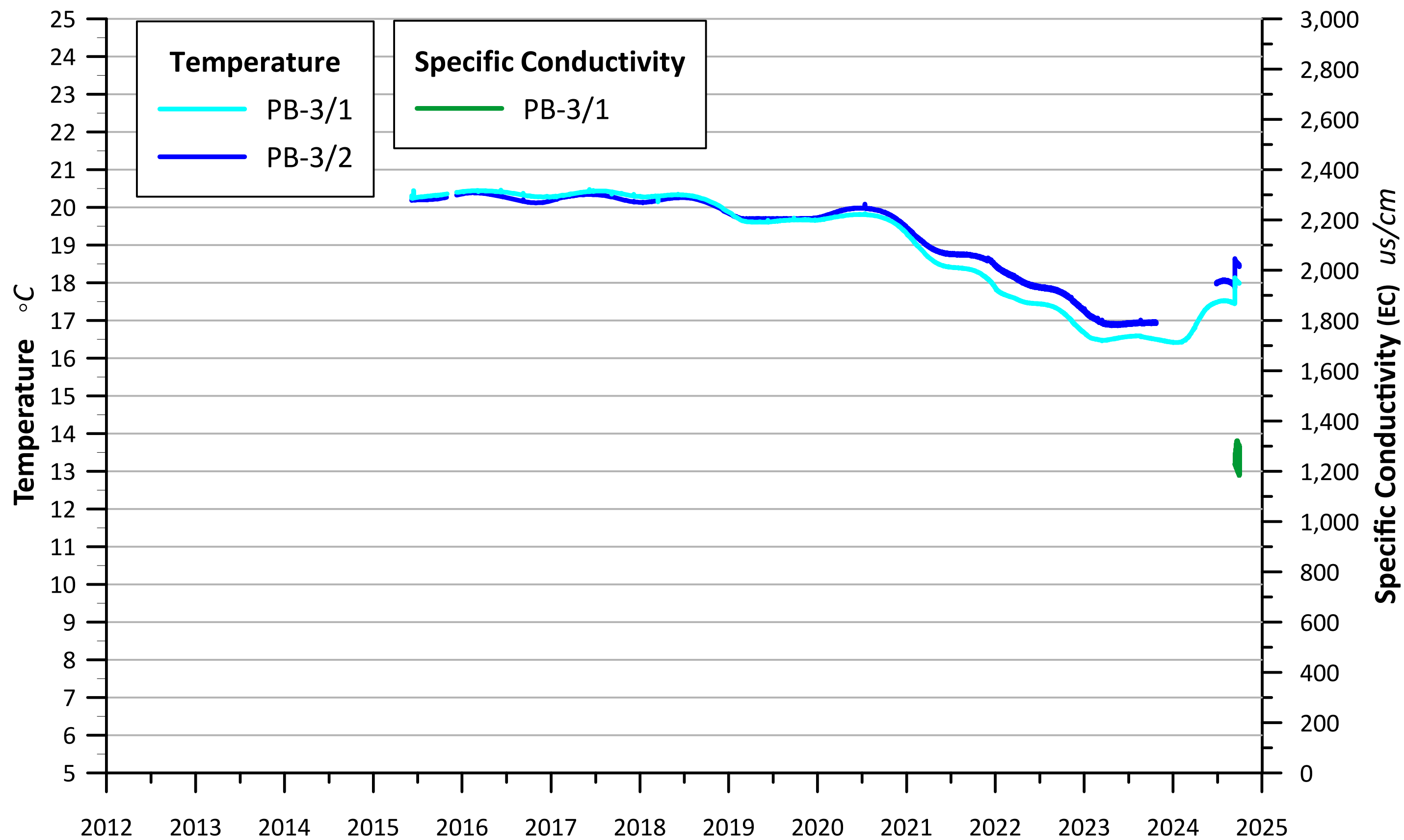


Groundwater Elevation
Well (screen interval in ft-bgs)
PB-4/1 (15-25)
PB-4/2 (45-75)
Surface Water Discharge
USGS Gage - Santa Ana River at MWD Xing
Thalweg Elevation near PB-4
Elevation ft-amsl
Daily Discharge cfs
600
590
580
570
560
550
540
530
520
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025



Temperature
PB-4/1
PB-4/2
Temperature °C
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025





Monitoring to Characterize Groundwater and Surface-Water Interactions
PB-3 Near Santa Ana River

Figure 3-14i

Table 3-5. Analysis of Groundwater/Surface-Water Interactions in the Prado Basin

Location Figure No.	Overall Interpretation	Interpretation from the 2017 and 2018 Annual Reports	Lines of Evidence in Figures 3-14a through 3-14i			
			Groundwater Levels vs. Thalweg Elevations	Groundwater Levels vs. Surface Water Discharge	High-Frequency Temperature Data	High-Frequency EC Data
PB-9 @Chino Creek Figure 3-14a	**Rising Groundwater (Gaining Reach)**	Chino Creek at PB-9 appears to be an area of groundwater discharge with instances of streambed recharge when groundwater levels decline below the thalweg. The likely primary sources of shallow groundwater in this area are a perched aquifer, the shallow regional aquifer system, and local return flows from precipitation and applied water. There are some indications that streambed recharge contributes to shallow groundwater, especially during stormwater discharge events and when groundwater levels in the shallow regional aquifer system decline below the thalweg.	From 2015-2021 groundwater elevations at the deeper screened well PB-9/2 are higher than then the groundwater elevation of the shallow screened well (PB-9/1), indicating an upward hydraulic gradient. This reverses after 2021 when nearby pumping that impacts the PB-9/2 appears to stop. The groundwater elevations at both wells always remain above thalweg elevation, both of which indicate that this is an area of rising groundwater.	Water levels in both monitoring wells increase during and immediately after periods of stormwater discharge in Chino Creek, suggesting that stormwater discharge is a source of recharge to shallow groundwater.	Both monitoring wells exhibit a relatively constant time series of temperature data, indicating that the groundwater is likely being recharged by the regional groundwater	EC data is has been collected in the shallow well (PB-9/1) since mid-2023. The EC data will be evaluated at another time
PB-8 @ Chino Creek Figure 3-14b	**Rising Groundwater (Gaining Reach)**	Chino Creek at PB-8 appears to be an area of groundwater discharge. The likely primary sources of the shallow groundwater in this area are the shallow regional aquifer system and local return flows from precipitation and applied water. There are some indications that streambed recharge contributes to the shallow groundwater, especially during stormwater discharge events.	Groundwater elevations at the deeper screened well PB-8 are higher than then the groundwater elevation of the shallow screened well (RP2-MW3), indicating an upward hydraulic gradient, and the groundwater elevations at both wells always remain above thalweg elevation, both of which indicate that this is an area of rising groundwater.	Water levels in both monitoring wells increase during and immediately after periods of stormwater discharge in Chino Creek, suggesting that stormwater discharge is a source of recharge to shallow groundwater.	The shallow monitoring well (RP2-MW3) exhibits temperature data with gradual upward trend over time, indicating that the groundwater is likely being recharged by the regional groundwater. The deeper well (PB-8) exhibits a relatively constant time series of temperature data, also indicating that the groundwater is likely being recharged by the regional groundwater, but from a slightly different source.	The shallow monitoring well (RP2-MW3) exhibits EC data with gradual upward trend over time, indicating that the groundwater is likely being recharged by the regional groundwater. The deeper well (PB-8) exhibits a relatively constant EC of temperature data, also indicating that the groundwater is likely being recharged by the regional groundwater, but from a slightly different source.
PB-7 @ Chino Creek Figure 3-14c	**Rising Groundwater (Gaining Reach)**	Chino Creek at PB-7 appears to be an area of groundwater discharge. The likely primary source of the shallow groundwater in this area is the shallow regional aquifer system. However, the groundwater/surface-water interactions in this area appear to be complex with multiple and transient sources of water that are tributary to the PB-7 wells.	Groundwater elevations at the deeper screened well (PB-7/2) are slightly higher than then the groundwater elevation of the shallow screened well (PB-7/1), indicating an upward hydraulic gradient, and the groundwater elevations at both wells always remain above thalweg elevation—both of which indicate that this is an area of rising groundwater.	Water levels in both monitoring wells increase during and immediately after periods of stormwater discharge in Chino Creek and the formation of a reservoir behind Prado Dam, suggesting that stormwater discharge is a source of recharge to shallow groundwater.	The temperature data for the shallow well (PB-7/1) shows a seasonal sinusoidal pattern between 18 and 22 degrees C, which indicates that the shallow well is under the influence of surface water recharge. The temperature at the deeper well (PB-7/2) remains relatively constant, which indicates that it is not under the influence of surface water recharge.	The EC at the shallow well (PB-7/1) shows a seasonal sinusoidal pattern, like the temperature data, which indicates the shallow well is under the influence of surface water recharge.
PB-6 @ Chino Creek Figure 3-14d	**Rising Groundwater (Gaining Reach)**	Chino Creek at PB-6 appears to be an area of both groundwater discharge and streambed recharge. The likely sources of the shallow groundwater in this area are the shallow regional aquifer system and streambed recharge. However, the groundwater/surface-water interactions in this area appear to be complex with multiple and transient sources of water that are tributary to the PB-6 wells.	Groundwater elevations at the both PB-6 wells are the same. The groundwater elevations are typically above the thalweg elevation, indicating this is an area of rising groundwater. However, there some years there are brief periods during the late summer/early fall where they fall below the thalweg. This indicates that there are short periods where the surface water is likely recharging the shallow groundwater.	Water levels in both monitoring wells increase during and immediately after periods of stormwater discharge in Chino Creek and the formation of a reservoir behind Prado Dam, suggesting that stormwater discharge is a source of recharge to shallow groundwater.	Both monitoring wells exhibit a relatively constant time series of temperature data with a slow declining trend, indicating that the groundwater is likely being recharged by the regional groundwater	EC data is has been collected in the both wells since mid-2023. The EC data will be evaluated at another time
PB-2 @ Mill Creek Figure 3-14e	**Streambed Infiltration (Losing Reach)**	Mill Creek to the south of PB-2 appears to be an area of streambed recharge. However, the primary source of the shallow groundwater near PB-2 appears to be return flows from precipitation and applied water.	Groundwater elevations at the shallow screened well (PB-2) and deeper screened well (HCMP-5/1) are the same. From 2015 to 2021 the groundwater elevations at the wells are above the thalweg elevation, indicating this is an area of rising groundwater. After 2021, as groundwater levels declined the groundwater elevations are typically below the thalweg, indicating an area where the surface water is likely recharging the shallow groundwater.	Water levels in both monitoring wells increase during and immediately after periods of stormwater discharge in Mill Creek, suggesting that stormwater discharge in Mill Creek is a source of recharge to shallow groundwater.	Both monitoring wells exhibit a relatively constant time series of temperature data, with slight decreasing trends, indicating that the groundwater is likely being recharged by the regional groundwater.	EC data is has been collected in the both wells since mid-2023. The EC data will be evaluated at another time
PB-1 @ Mill Creek Figure 3-14f	**Rising Groundwater (Gaining Reach)**	Mill Creek at PB-1 appears to be an area of groundwater discharge. The primary source of the shallow groundwater at PB-1 appears to be a complex mixture of the shallow regional aquifer system that is fed, in part, by streambed recharge in upstream areas of Mill Creek. The groundwater/surface-water interactions in this area appear to be complex with multiple sources of water that are tributary to the PB-1 wells.	Groundwater elevations at the deeper screened well (PB-1/2) are slightly higher than then the groundwater elevation of the shallow screened well (PB-1/1), indicating an upward hydraulic gradient, and the groundwater elevations at both wells always remain above thalweg elevation—both of which indicate that this is an area of rising groundwater.	Water levels in both monitoring wells increase during and immediately after periods of stormwater discharge in Mill Creek, suggesting that stormwater discharge is a source of recharge to shallow groundwater.	Both monitoring wells exhibit a relatively constant time series of temperature data with a slow declining trend, indicating that the groundwater is likely being recharged by the regional groundwater.	EC data is has been collected in the shallow well (PB-1/1) since mid-2023. The EC data will be evaluated at another time
PB-5 @ Mill Creek Figure 3-14g	**Rising Groundwater (Gaining Reach)**	Mill Creek at PB-5 appears to be an area of groundwater discharge. The likely source of shallow groundwater at PB-5 is a complex mixture of: (i) streambed recharge of effluent discharge in upstream areas of Mill Creek, the SAR, and the diversion channel that conveys WRCRWA effluent to the OCWD Wetlands, and (ii) rising groundwater discharge.	Groundwater elevations at the shallow screened well (PB-5/1) and deeper screened well (PB-5/2) are the same. The groundwater elevations at the wells are typically above the thalweg elevation, indicating this is an area of rising groundwater.	Water levels in both monitoring wells increase during and immediately after periods of stormwater discharge in Mill Creek, suggesting that stormwater discharge is a source of recharge to shallow groundwater.	Both monitoring wells exhibit a relatively constant time series of temperature data with a slow declining trend, indicating that the groundwater is likely being recharged by the regional groundwater.	EC data is has been collected in the shallow well (PB-1/1) since mid-2023. The EC data will be evaluated at another time
PB-4 @ SAR Figure 3-14h	**Streambed Infiltration (Losing Reach)**	The SAR at PB-4 is primarily an area of streambed recharge. The primary source of shallow groundwater at PB-4 is streambed recharge of the SAR, and at times, there appears to be some influence of the shallow regional aquifer system and/or local return flows of precipitation and applied water.	Groundwater elevations at both PB-4 wells are below the thalweg elevation, which indicates that this is an area of streambed recharge during the period of record.	Water levels in both monitoring wells increase slightly during and immediately after periods of stormwater discharge in the SAR, suggesting that stormwater discharge is a source of recharge to shallow groundwater.	The temperature data for the shallow well (PB-4/1) shows a seasonal sinusoidal pattern between 19 and 22 degrees C, which indicates that the shallow well is under the influence of surface water recharge. The temperature at the deeper well (PB-4/2) remains relatively constant with a slow declining trend, which indicates that it is not under the influence of surface water recharge, and groundwater is likely being recharged by the regional groundwater.	No EC data is being collected at both wells
PB-3 @ SAR Figure 3-14i	**Streambed Infiltration (Losing Reach)**	The SAR at PB-3 is an area of streambed recharge. The primary source of shallow groundwater at PB-3 is SAR streambed recharge.	Groundwater elevations at both PB-3 wells are below the thalweg elevation, indicating that this is an area of streambed recharge during the period of record.	Water levels in both monitoring wells increase slightly during and immediately after periods of stormwater discharge in the SAR, suggesting that stormwater discharge is a source of recharge to shallow groundwater.	The temperature data for both wells shows a seasonal sinusoidal pattern with a long term declining trend from 2021 to 2024, which indicates that the shallow well is under the influence of surface water recharge and some other changing condition after 2021.	EC data is has been collected in the shallow well (PB-3/1) since mid-2024. The EC data will be evaluated at another time

3.4 Climate and Its Relationship to the Riparian Habitat

Precipitation and temperature are climatic factors that can affect the extent and quality of riparian habitat. Precipitation can provide a source of water for consumptive use by the riparian vegetation via the direct infiltration of precipitation and runoff, which increases soil moisture that can be directly used by the vegetation, or by maintaining groundwater levels underlying the vegetation for its subsequent use. Temperatures affect the rate of plant growth and productivity. Both factors are unrelated to the implementation of the Peace II Agreement. This section characterizes the time series of precipitation and temperature in the Prado Basin area and compares that time series to trends in the quality of the riparian habitat, as indicated by NDVI, to help determine if these factors have influenced the riparian habitat in the Prado Basin.

3.4.1 Precipitation

Figure 3-15 is a time-series chart that shows annual precipitation estimates within the Chino Basin for WY 1896 to 2024. These estimates were computed as a spatial average across the Chino Basin using rasterized data from the PRISM Climatic Group (an 800-meter by 800-meter grid). The long-term average annual precipitation in the Chino Basin is 16.3 inches per year (in/yr). The chart includes a cumulative departure from mean (CDFM) precipitation curve, which characterizes the occurrence and magnitude of wet and dry periods: positive sloping segments (trending upward to the right) indicate wet periods, and negative sloping segments (trending downward to the right) indicate dry periods.

Review of the CDFM precipitation curve indicates that the Chino Basin experienced several prolonged wet and dry periods from WY 1896 to 2024. Typically, dry periods are longer in duration than wet periods. The longest dry period occurred between 1946 through 1977 (32 years). The current dry period is a 26-year period, starting in WY 1999, and includes the Peace/Peace II Agreement period (2001 through 2024). Over the 129-year record, about 40 percent of the years had precipitation greater than the average, and 60 percent had below average precipitation. In the 24-year period since the Peace Agreement was implemented, about 33 percent of the years had precipitation greater than the average, and 67 percent had below average precipitation. Precipitation in WY 2024 was 20.72 inches, which is:

- 4.39 inches above the long-term average
- about 26 percent less than the previous WY 2022 (28.12 inches)
- the fourth highest annual precipitation over the last 20 years
- In the 22nd percentile for wettest years over the 128-year record.

3.4.2 Temperature

Maximum and minimum temperatures during the growing season are the temperature metrics used in this analysis because plant growth and development are dependent upon the temperatures surrounding the plant (Hatfield and Prueger, 2015). Maximum temperatures during the growing season directly influence photosynthesis, evapotranspiration, and breaking of the dormancy of vegetation (Pettorelli, 2015). Minimum temperatures affect nighttime plant respiration rates and can potentially have an effect on plant growth that occurs during the day (Hatfiled et al., 2011). Hence, both temperature metrics can influence NDVI. All species of plants have a range of maximum and minimum temperatures necessary for growth (Hatfield and Prueger, 2015). Climate change is more likely to increase minimum temperatures while maximum temperatures are affected more by local conditions (Knowles et al., 2006; Alfaro et al., 2006).

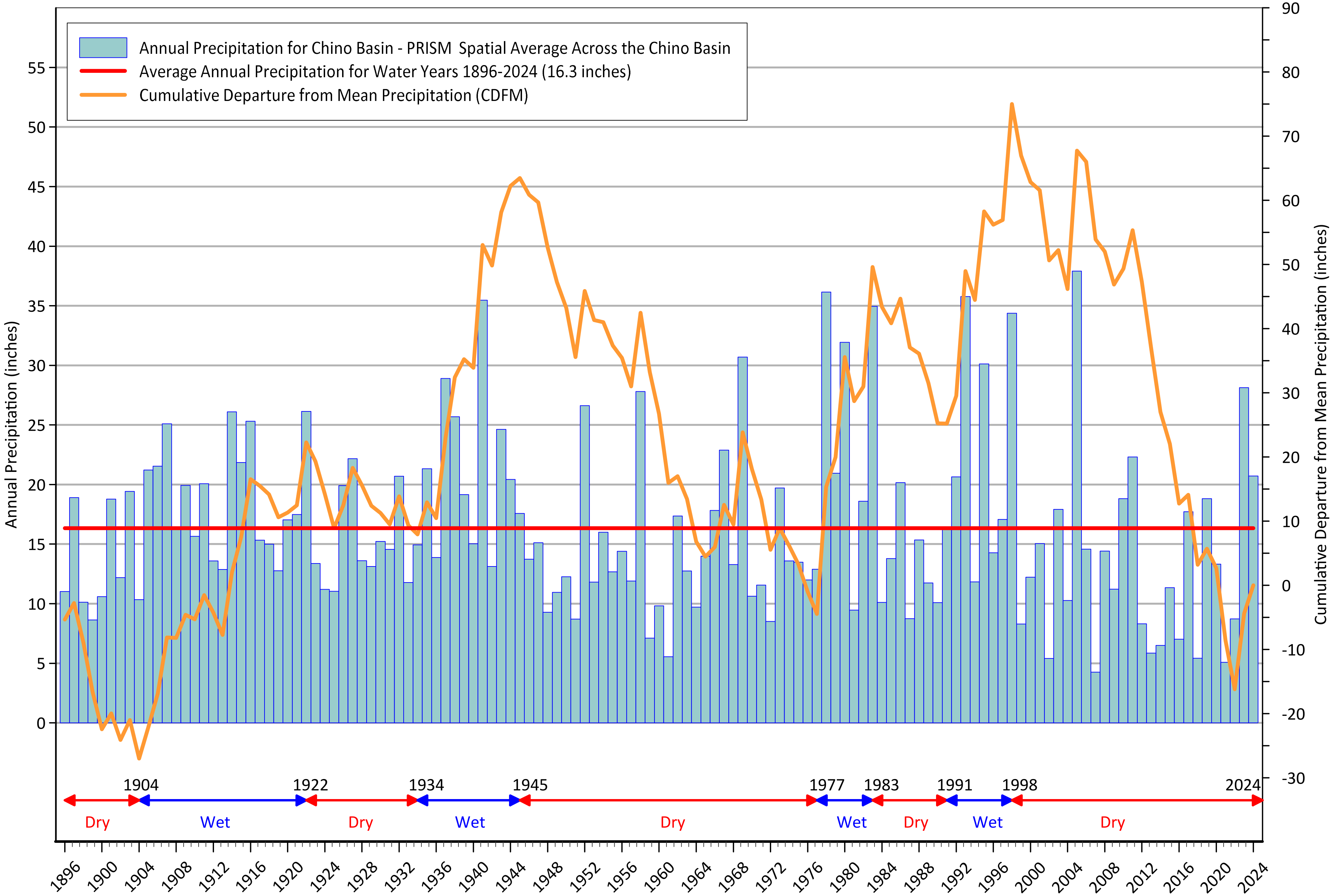
Figure 3-16 is a time-series chart that shows the average maximum and minimum Prado Basin temperatures for the growing-season months of March through October from 1896 to 2024 (growing-season maximum and minimum temperatures). These temperature estimates were computed as a spatial average across the Prado Basin using rasterized data from the PRISM Climatic Group (an 800-meter by 800-meter grid) of monthly maximum and minimum temperature estimates. This chart also shows the five-year moving average of the growing-season maximum and minimum temperatures for the Prado Basin. The five-year moving average is a smoothing technique used to reveal trends over time.

This chart also shows a complete record of atmospheric carbon dioxide (CO_2) concentrations assembled from multiple sources:

- Values prior to 1959 were estimated from an analysis of the Law Dome DE08 and DE08-2 ice cores in Antarctica. (Acquired from the Carbon Dioxide Information Analysis Center, http://cdiac.ornl.gov/trends/co2/lawdome.html. Accessed on June 6, 2017).
- Values after 1959 are from measured CO2 concentration data at the Mauna Loa Observatory in Hawaii. (Acquired from the National Oceanic and Atmospheric Association's Earth Systems Research Laboratory, https://www.esrl.noaa.gov/gmd/ ccgg/trends/full.html. Accessed on April 2, 2025.

The time history of atmospheric CO_2 concentrations shows a slight increasing trend from about 290 parts per million (ppm) in the late 1890s to about 310 ppm in 1950. After 1950, the CO_2 concentration shows an amplified consistent increasing trend and exceeds 400 ppm by 2015.

From 1896 to 2024, the growing-season maximum temperature fluctuates between 80 degrees Fahrenheit (°F) to 87°F and has a slight increasing trend. From 1896 to 2024, the growing-season minimum temperature fluctuates between 49°F to 59°F and has a prominent increasing trend starting in 1950 of about 5°F through 2024. This increasing trend in the growing-season minimum temperature beginning 1950 appears to correlate with the increase in atmospheric CO_2 concentrations. The five-year moving averages of both the growing-season minimum and maximum temperatures display a decreasing trend over the last six-year period since 2018 when it had the highest values over the entire period of record. In 2024, the growing-season minimum and maximum temperatures and the five-year moving averages all increased from the previous period. The average growing-season minimum temperature was 56°F and the average growing-season maximum temperature was 84°F.



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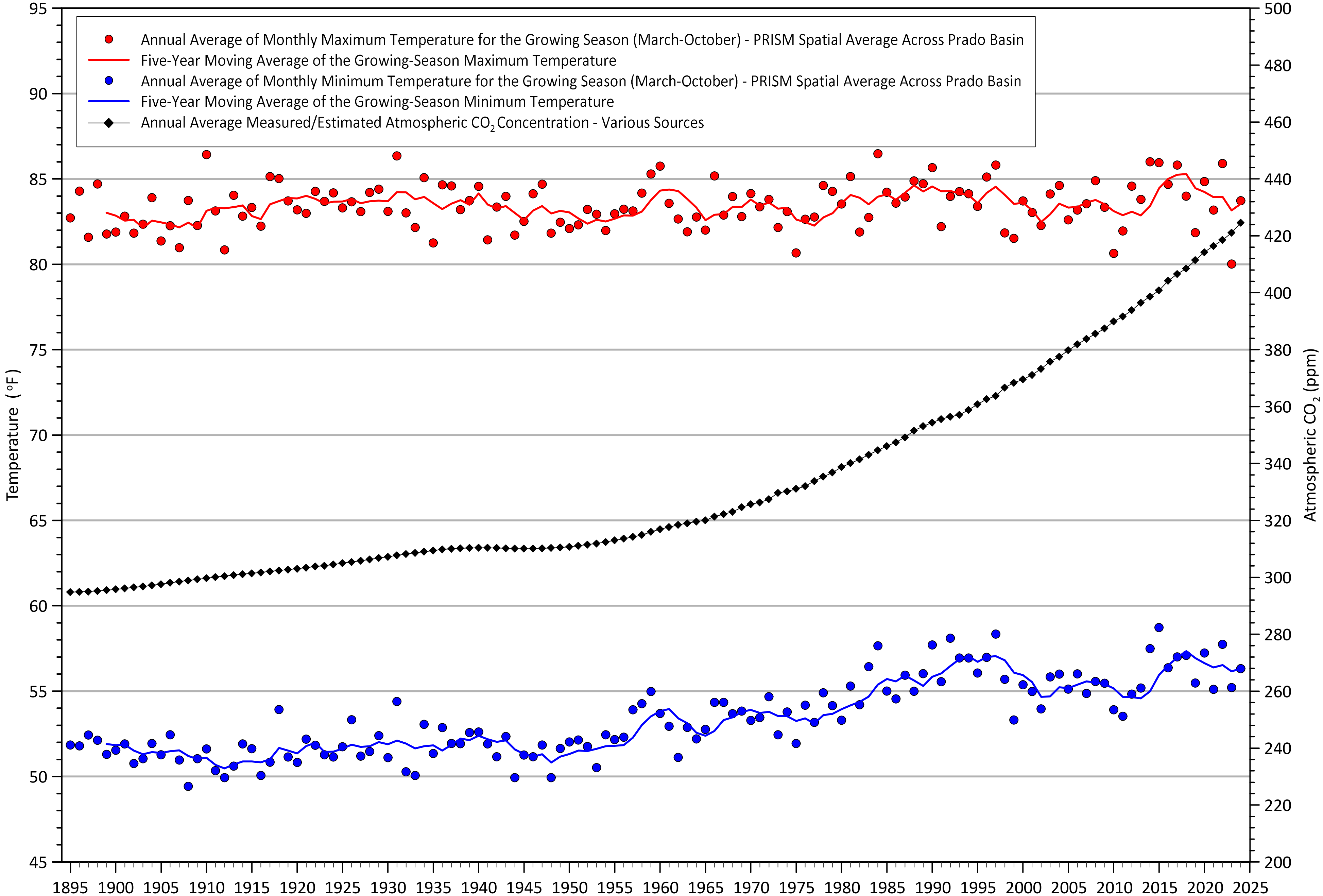
2024 Annual Report

Annual Precipitation in the Chino Basin
Water Year 1986 - 2024

Figure 3-15



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2024 Annual Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Maximum and Minimum Temperature in Prado Basin
1895-2024

Figure 3-16

3.4.3 Climate Compared to NDVI

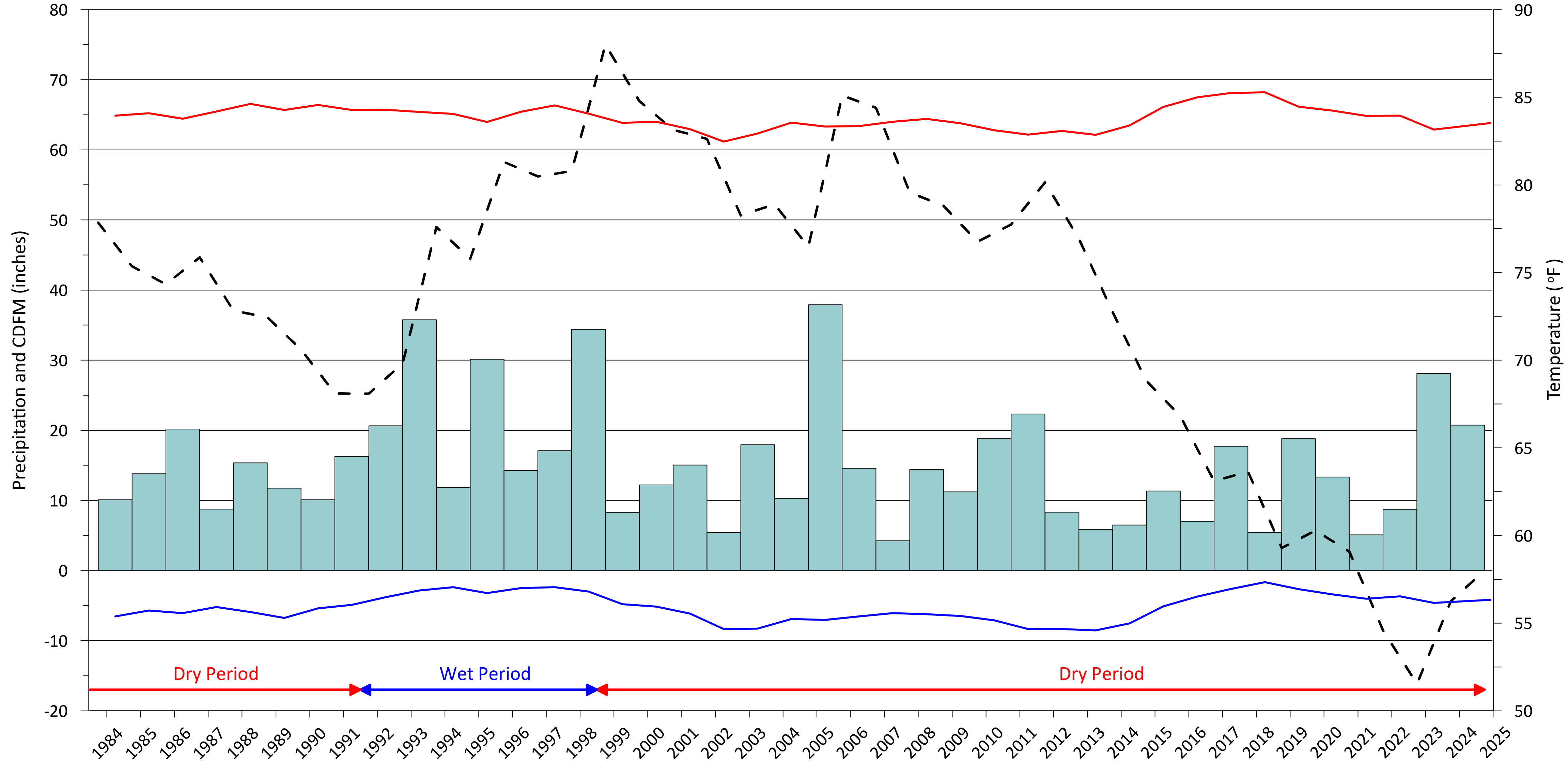
Figures 3-17a through 3-17c are time-series charts that compare long-term trends in precipitation and temperature to trends in the quality of the riparian vegetation, as indicated by NDVI, for three reaches in the Prado Basin: Chino Creek, Mill Creek, and the SAR. The period of analysis is 1984-2024—the period of NDVI availability. The upper chart on the figures displays the time series of annual precipitation in Chino Basin, the CDFM precipitation curve, and the five-year moving average for the growing-season maximum and minimum temperatures in the Prado Basin. The lower chart displays the time series of the Average Growing-Season NDVI for the defined areas discussed in Section 3.1 along Chino Creek, Mill Creek, and the SAR. For reference, the Mann-Kendall test results for trends in the Average Growing-Season NDVI for 1984-2024, 1984-2006, and 2007-2024 are shown in the legend.

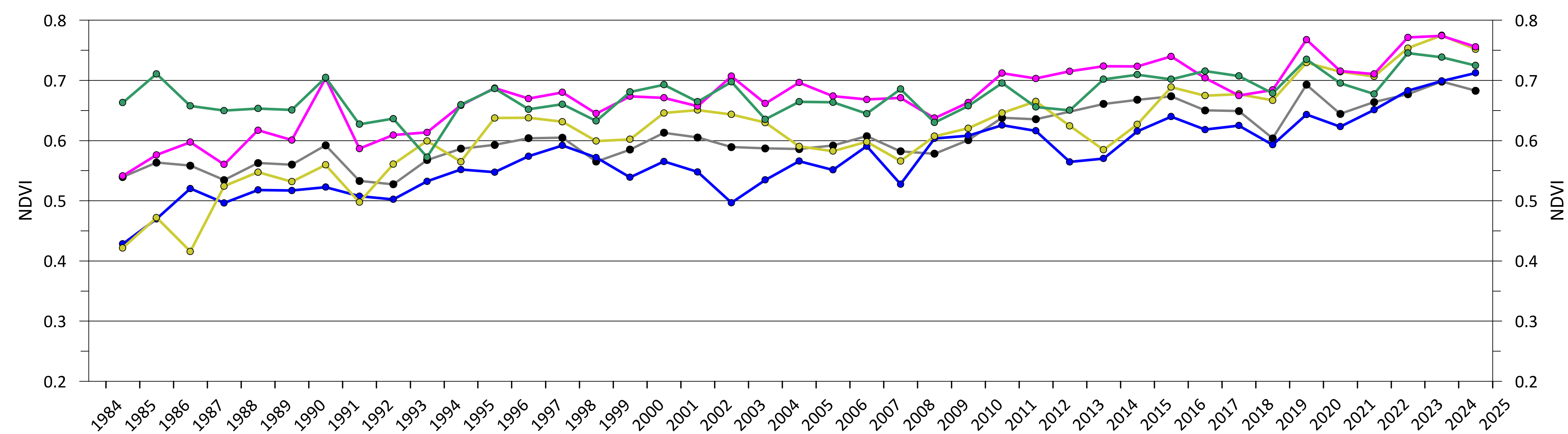
The observations and interpretations below are focused on recent changes in Average Growing-Season NDVI during 2024 described in Section 3.1 and whether observed trends in temperature and precipitation may be contributing to recent increases in NDVI.

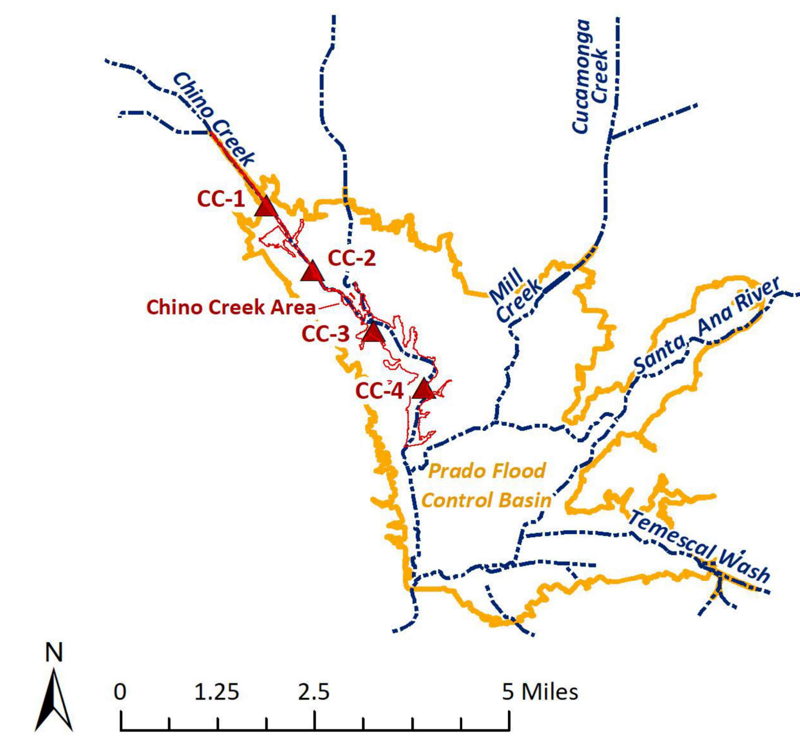
Chino Creek (Figure 3-17a). From 2023 to 2024, the Average Growing-Season NDVI for the whole Chino Creek area decreased slightly. Average Growing-Season NDVI increased for the northern-most area along Chino Creek (CC-1) and decreased for the other areas (CC-2, CC-3, and CC-4). For all these areas, the one-year change in NDVI was relatively minor and within the historical range of one-year NDVI variability (see Table 3-2). These recent changes in NDVI and vegetation occurred during a year in which precipitation was above average but less than the prior year. The slightly drier conditions compared to the record wet conditions in 2023 could be a contributing cause of the slight decreases in the NDVI along Chino Creek. Hence, the main observations and conclusions for the 2023 to 2024 period indicate above average wet conditions, with no significant changes in the riparian vegetation along Chino Creek.

Mill Creek (Figure 3-17b). From 2023 to 2024, the Average Growing-Season NDVI decreased across the entire Mill Creek area and Upper Mill Creek area. NDVI also decreased in five of the six small areas, with the exception of MC-3 where it remained unchanged. At all the areas, the one-year NDVI changes are within their historical ranges of the one-year NDVI variability (see Table 3-2), however the changes at MC-5 and MC-2 are greater than the average one-year change in NDVI observed over the historical period, and air photos confirm reduced vegetation. These recent changes in NDVI and vegetation occurred during a year in which precipitation was above average but less than the prior year. Hence, the main observations and conclusions for the 2023 to 2024 period indicate above-average wet conditions, with some notable changes in the riparian vegetation along Mill Creek.

Santa Ana River (Figure 3-17c). From 2023 to 2024, the Average Growing-Season NDVI decreased at two of the sites along the SAR (SAR-1 and SAR-2) and increased at two sites (SAR-3 and LP). For all these areas, the one-year NDVI changes were relatively minor and within the historical ranges of one-year NDVI variability (see Table 3-2). These recent changes in NDVI and vegetation occurred during a year in which precipitation was above average but less than the prior year. The slight increase in NDVI for the LP area is likely because the area was flooded during the early part of the growing season in 2023 and not in 2024. Hence, the main observations and conclusions for the 2023 to 2024 period indicate above average wet conditions, with no significant changes in the riparian vegetation along the SAR.







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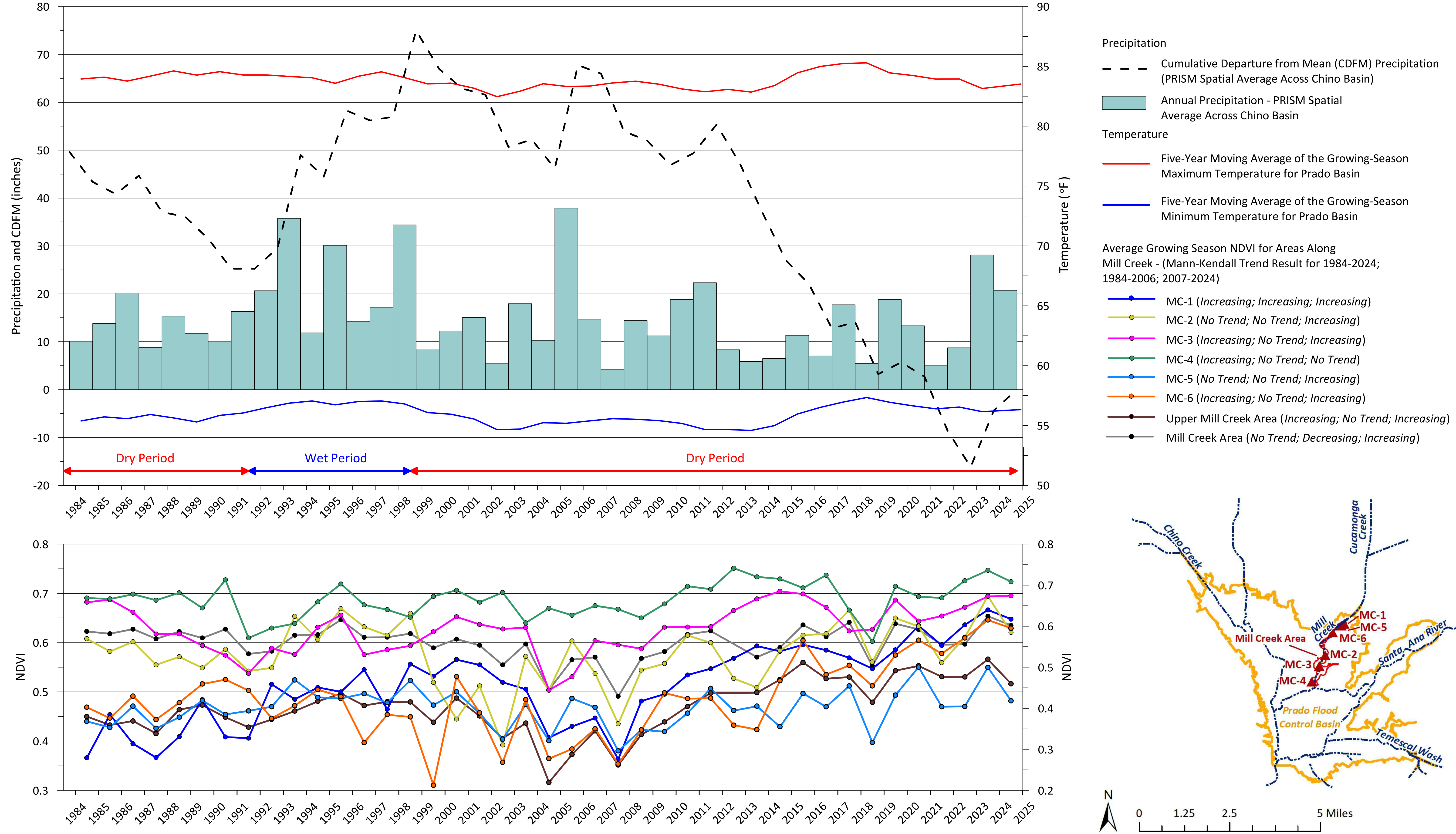
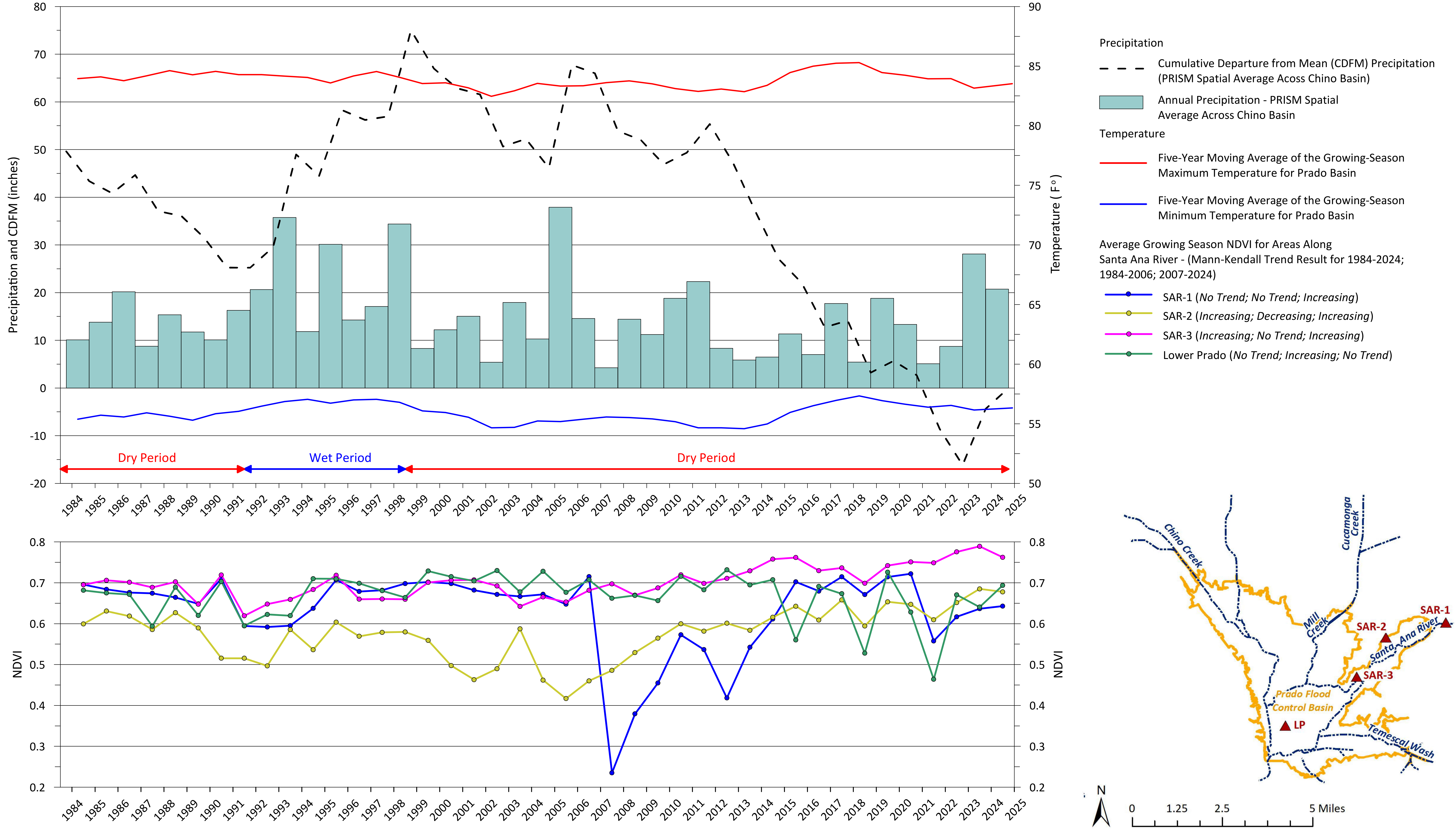
Climate verus NDVI
Chino Creek Area for 1984-2024

Figure 3-17a



Climate verus NDVI
Mill Creek Area for 1984-2024

Figure 3-17b



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Climate verus NDVI
Santa Ana River and Lower Prado Area for 1984-2024

Figure 3-17c

3.5 Stream Discharge and Its Relationship to the Riparian Habitat

Stream discharge in the SAR and its tributaries that flow through the Prado Basin is a factor that can affect the extent and quality of Prado Basin riparian habitat. Stream discharge can recharge the groundwater system along losing stream reaches and supply water through the groundwater system to riparian vegetation. Stream discharge is also important to fauna living within the stream system. Flooding events and flood-control/water-conservation operations at Prado Dam can scour and inundate areas of the riparian habitat and potentially cause adverse impacts.

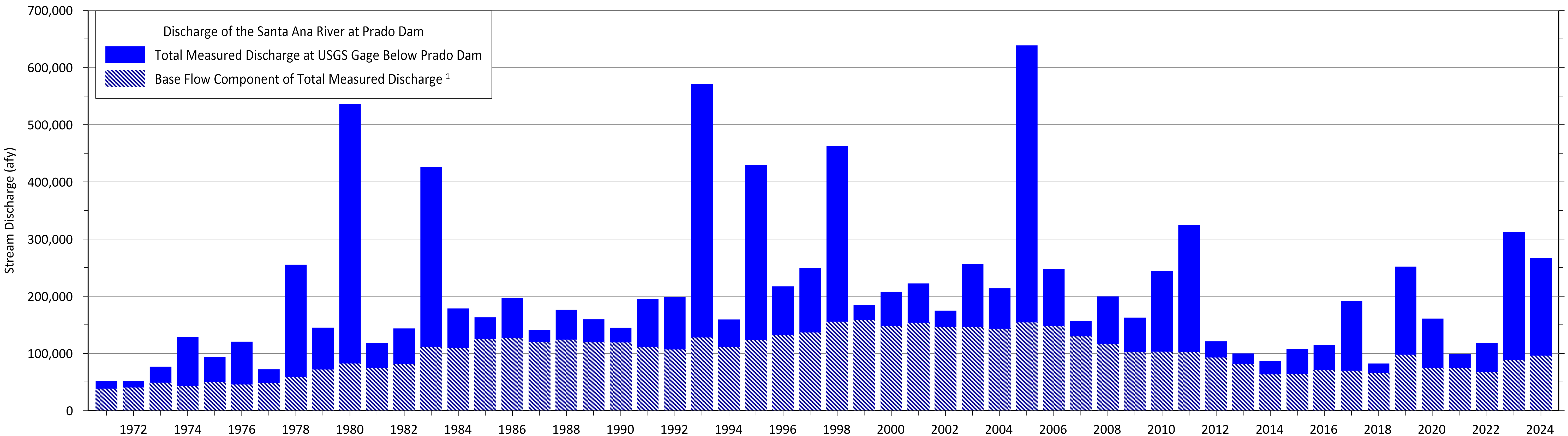
This section characterizes the time series of stream discharge within the Prado Basin and compares that time series to trends in the extent and quality of the riparian habitat, as indicated by NDVI, to help determine whether changes in stream discharge have influenced the riparian habitat in the Prado Basin.

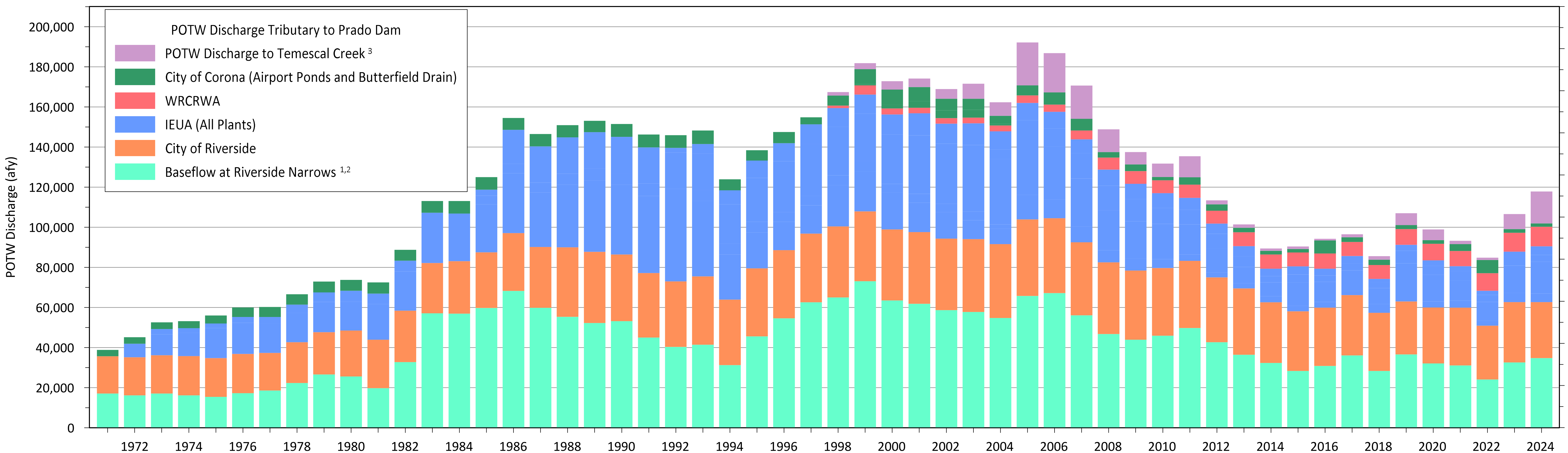
3.5.1 Stream Discharge

There are three primary components of stream discharge in the SAR and its tributaries: storm discharge, non-tributary discharge, and base-flow discharge. Storm discharge is rainfall runoff. Non-tributary discharge typically originates from outside the watershed, such as imported water discharged from the OC-59 turnout on San Antonio Creek. Base-flow discharge, as used herein and by the Santa Ana River Watermaster (SARWM), includes tertiary-treated wastewater discharge from POTWs, rising groundwater, and dry-weather runoff. Figure 3-18 includes time-series charts that summarize important annual discharges within the upper SAR watershed that are tributary to Prado Dam from water years 1971 to 2024 (SARWM, 2025). The upper chart on Figure 3-18 characterizes the annual outflow from the Prado Basin as total measured SAR discharge at USGS gage *SAR at below Prado Dam* and shows the base-flow component of the total measured discharge as estimated by the SARWM. This chart shows that base-flow discharge declined from about 154,000 afy in 2005 to an average of about 80,300 afy over the recent five-year period 2020-2024. The decline in base-flow discharge is primarily related to declines in POTW effluent discharges that are tributary to Prado Basin. In WY 2024, the total discharge at below Prado Dam decreased from the previous year while the total baseflow discharge increased:

- **Total Discharge at below Prado Dam in WY 2024**. Total discharge in WY 2024 was about 267,150 af, which is about 114,560 afy more than the average over the previous ten years (2014 to 2023), and a 45,120 afy decrease from WY 2023. It is the ninth highest total discharge over the entire time period of record from 1971 to 2024.
- **Base-Flow Discharge at below Prado Dam in WY 2024**. Base-flow discharge was about 96,000 afy, which is about 22,300 afy more than the average over the previous ten years (2014 to 2023), and about 6,900 afy more than WY 2023.

The lower chart on Figure 3-18 shows the combined POTW discharges that are tributary, at least in part, to Prado Dam. The POTW discharges are the primary component of the baseflow discharge. The POTW discharges declined from a high of about 192,200 afy in 2005 to an average of about 100,270 afy for the last five years (2020-2024). The reduction in POTW effluent discharge since 2005 can be attributed to several factors: the increased use of recycled-water, a decline in water use due to the economic recession that began in 2008, and the implementation of emergency water-conservation measures during the 2012 drought and thereafter. In WY 2024, POTW discharge was about 117,800 afy, which is about 23,140 afy more than the average POTW discharge over the previous ten years (2014-2023), and about 11,240 afy more than POTW discharge in WY 2023.





[1] Data are interpretations of the Santa Ana River Watermaster as published in thier Annual Reports.

[2] Baseflow at Riverside Narrows primarily includes POTW discharge from RIX and Rialto Plants; and can also include rising groundwater, dry weather flow

[3] Includes discharge from EVMWD, EMWD, and LLWD plants

3.5.2 Stream Discharge Compared to NDVI

Figures 3-19a through 3-19c are time-series charts that compare long-term trends in stream discharge to trends in the quality of the riparian vegetation, as indicated by NDVI, for three reaches in Prado Basin: Chino Creek, Mill Creek, and the SAR. The period of analysis for these charts is 1984 to 2024, the period of NDVI availability. The upper chart on the figures displays the annual volumes of measured discharge to each stream during the growing season (March to October), including measurements at USGS gaging stations located upstream of the Prado Basin, and POTW discharges.[21] The lower chart displays the time series of the Average Growing-Season NDVI for defined areas, as discussed in Section 3.1, along Chino Creek, Mill Creek, and the SAR. For reference, the Mann-Kendall test results for trends in the Average Growing-Season NDVI for 1984 to 2024, 1984 to 2006, and 2007 to 2024 are shown in the legend.

The observations and interpretations below are focused on the recent (2024) changes in Average Growing-Season NDVI, as described in Section 3.1, and whether observed trends in surface-water discharge may be contributing to recent changes in NDVI.

Chino Creek (Figure 3-19a). Chino Creek is a concrete-lined, flood-control channel that transitions into an unlined stream channel at the Prado Basin boundary and flows south into the SAR behind Prado Dam (see Figure 2-3). The upper chart on Figure 3-19a shows discharge in Chino Creek during the growing season, including: measured discharge at USGS gage *Chino Creek at Schaefer* and the POTW discharges downstream of the USGS gage, including discharges from the IEUA Carbon Canyon, RP-2, RP-5, and RP-1 plants. Measured discharge at *Chino Creek at Schaefer*[22] includes storm-water and dry-weather runoff in the concrete-lined channel upstream of the IEUA discharge locations. Discharges not characterized in this figure are storm-water runoff, dry-weather runoff, and rising-groundwater discharge downstream of the *Chino Creek at Schaefer* gage. From 1984 to 2024, discharge in Chino Creek during the growing season progressively increased through 1999 and then decreased. The decreasing trend in growing-season discharge since about 1999 was caused by dry climatic conditions, water conservation in response to drought, and decreases in effluent discharge from the IEUA plants. During the previous ten-year period from 2014 to 2023, growing-season discharge in Chino Creek averaged about 8,200 afy. In 2024, growing-season discharge was about 8,900 afy, which is about 700 af more than the average growing-season discharge for the previous ten years (2014-2023) and about 4,300 af less than growing-season discharge in 2023, which was a notably wetter year.

From 2023 to 2024, the Average Growing-Season NDVI for the whole Chino Creek area decreased. Average Growing-Season NDVI increased for the northern-most area along Chino Creek (CC-1) and decreased slightly for the rest of the areas (CC-2, CC-3, and CC-4). For all these areas, the one-year changes in NDVI were relatively minor and within the historical ranges of one-year NDVI variability (see Table 3-2). These recent changes in NDVI occurred during a year of above average discharge. The main observations and conclusions for the 2024 period are that there were higher discharge conditions in Chino Creek and the riparian vegetation did not change significantly along Chino Creek.

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[21] These charts do not describe other hydrologic processes that affect surface-water discharge within the Prado Basin, including evaporation, evapotranspiration, the infiltration of water along unlined stream segments, and rising groundwater discharge.

[22] Historically until 2016 this also included imported water discharge from the OC-59 turnout.

Mill Creek (Figure 3-19b). Cucamonga Creek is a concrete-lined flood-control channel that transitions into an unlined stream channel at the Prado Basin boundary, where its name changes to Mill Creek (see Figure 2-3). The upper chart on Figure 3-19b shows discharge in Mill Creek during the growing season, including: POTW effluent discharge from the IEUA RP-1 plant to Cucamonga Creek, and measured discharge downstream at the USGS gage *Cucamonga Creek near Mira Loma* (less the RP-1 discharge). The measured discharge at *Cucamonga Creek near Mira Loma* (less the RP-1 discharge) is representative of storm-water and dry-weather runoff in Cucamonga Creek upstream of this gaging station. Discharges not characterized on this figure are storm-water runoff, dry-weather runoff, and rising-groundwater discharge downstream of the *Cucamonga Creek near Mira Loma* gage.

Also shown on the upper chart is the volume of flow during the growing season that is estimated to be in the upper portion of Mill Creek excluding the surface water diverted to the Mill Creek Wetlands. The Mill Creek Wetlands began diverting water from Mill Creek just north of where Mill Creek begins in 2016 (see inset map for location of Mill Creek Wetlands). Water from the Mill Creek Wetlands re-enters Mill Creek just downstream of the MC-6 area; hence the volume of water in the upper portion of Mill Creek near the MC-1, MC-5, and MC-6 areas is less than the total flow represented in the bar chart. Since 2016, water diverted to the Mill Creek Wetlands during the growing-season has ranged from 13 percent to 42 percent of the total flow. Therefore, the growing-season discharge in the northernmost region of Mill Creek near the MC-1, MC-5, and MC-6 areas is on average about 27 percent less than the discharge in Mill Creek south of the Mill Creek Wetlands.

From 1984 to 2024, growing-season discharge in Mill Creek progressively increased through 2004 and then decreased. The decreasing trend in growing-season discharge since about 2004 was caused by dry climatic conditions, water conservation in response to drought conditions after 2012, and the decrease in effluent discharge from the IEUA RP-1 plant. In 2024, growing-season discharge was about 19,050 afy, which is about 7,620 af more than the average growing-season discharge for the previous ten years (2014-2023) and about 12,720 af less than growing-season discharge in 2023, which was a notably wetter year. The above-average growing-season discharge is attributed to increased stormwater flow from above-average precipitation in WY 2024. In 2024 the growing-season discharge in the Upper portion of Mill Creek between the diversion and the outlet for the Mill Creek Wetlands was about 16,000 afy[23].

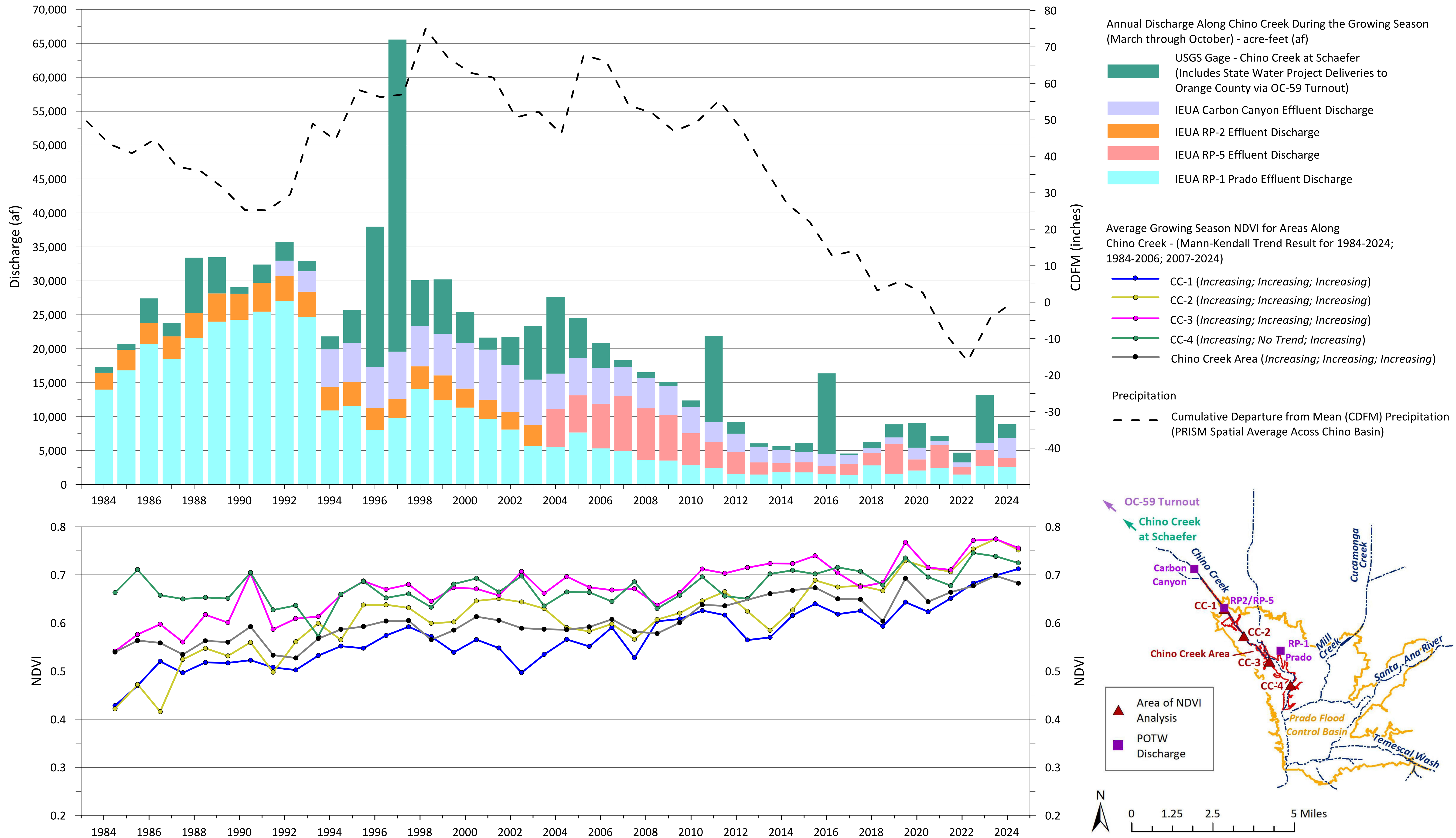
From 2023 to 2024, the Average Growing-Season NDVI decreased across the entire Mill Creek area and Upper Mill Creek area. NDVI also decreased in five of the six small areas, with the exception of MC-3 where it remained unchanged. At all the areas, the one-year NDVI changes are within their historical ranges of the one-year NDVI variability (see Table 3-2), however the changes at MC-5 and MC-2 are greater than the average one-year change in NDVI observed over the historical period, and air photos confirm reduced vegetation. These recent changes in NDVI occurred during a year of above-average discharge in Mill Creek. Hence, the main observations and conclusions for the 2024 period are that there were higher discharge conditions in Mill Creek and there were some notable changes in the riparian vegetation along Mill Creek.

[23] The City of Ontario measures the water diverted to the Mill Creek Wetlands every month using flow meters located at the two culverts where water is diverted. Due to equipment malfunction no monthly flow data was available from July 2023 to August 2024. During these months, flow was estimated as 28% (average historical percentage diverted during the growing season from 2016 to 2022) of the total monthly discharge measured at the USGS gage *Cucamonga Creek near Mira Loma*.

Santa Ana River (Figure 3-19c). The SAR is an unlined stream channel from the Riverside Narrows to Prado Dam—its entire reach across the Chino Basin (see Figure 2-3). The upper chart on Figure 3-19c shows the annual growing-season discharge at the USGS gage *SAR at MWD Crossing* (Riverside Narrows) and the annual growing-season discharges to the SAR downstream of the Riverside Narrows, including POTW effluent from the City of Riverside's Regional Water Quality Control Plant and the Western Riverside County Regional Wastewater Authority (WRCRWA) plant that is conveyed in an unlined channel (along with a portion of SAR discharge) to the OCWD Wetlands. The measured discharge at the *SAR at MWD Crossing* gage represents storm-water runoff and base-flow discharge in the SAR upstream of the gaging station at the Riverside Narrows. The base-flow discharge includes POTW discharge from the RIX and Rialto treatment plants, dry-weather runoff, and rising groundwater. Discharges not characterized on this figure are storm-water runoff, dry-weather runoff, and rising-groundwater discharge downstream of the *SAR at MWD Crossing* gage.

From 1984 to 2005, growing-season discharge in the SAR averaged about 81,940 afy with episodic increases in storm-water discharge during wet years. Since 2012, growing-season discharge in the SAR gradually declined and averaged about 46,500 afy from 2013 to 2022. The decreasing trend in growing-season discharge was caused by dry climatic conditions, water conservation in response to drought, and decreasing base flow at the Riverside Narrows. In 2023, an exceptionally wet year resulted in the growing-season discharge in the SAR being more than twice the average from 2013 to 2022. In 2024, the growing-season discharge in the SAR was about 59,180 af, which is about 7,820 af more than the average growing-season discharge for the previous ten years (2014-2023) and about 38,160 af less than the growing season discharge in 2023, which was a notably wetter year.

From 2023 to 2024, the Average Growing-Season NDVI decreased at two of the sites (SAR-2 and SAR-3) and increased at two of the sites (SAR-1 and LP). For all these areas, the one-year NDVI changes were relatively minor and within the historical ranges of one-year NDVI variability (see Table 3-2). These recent changes occurred during a year of above-average discharge conditions in the SAR. Hence, the main observations and conclusions for the 2024 period are that there were higher discharge conditions in the SAR and the riparian vegetation did not change significantly along the SAR.



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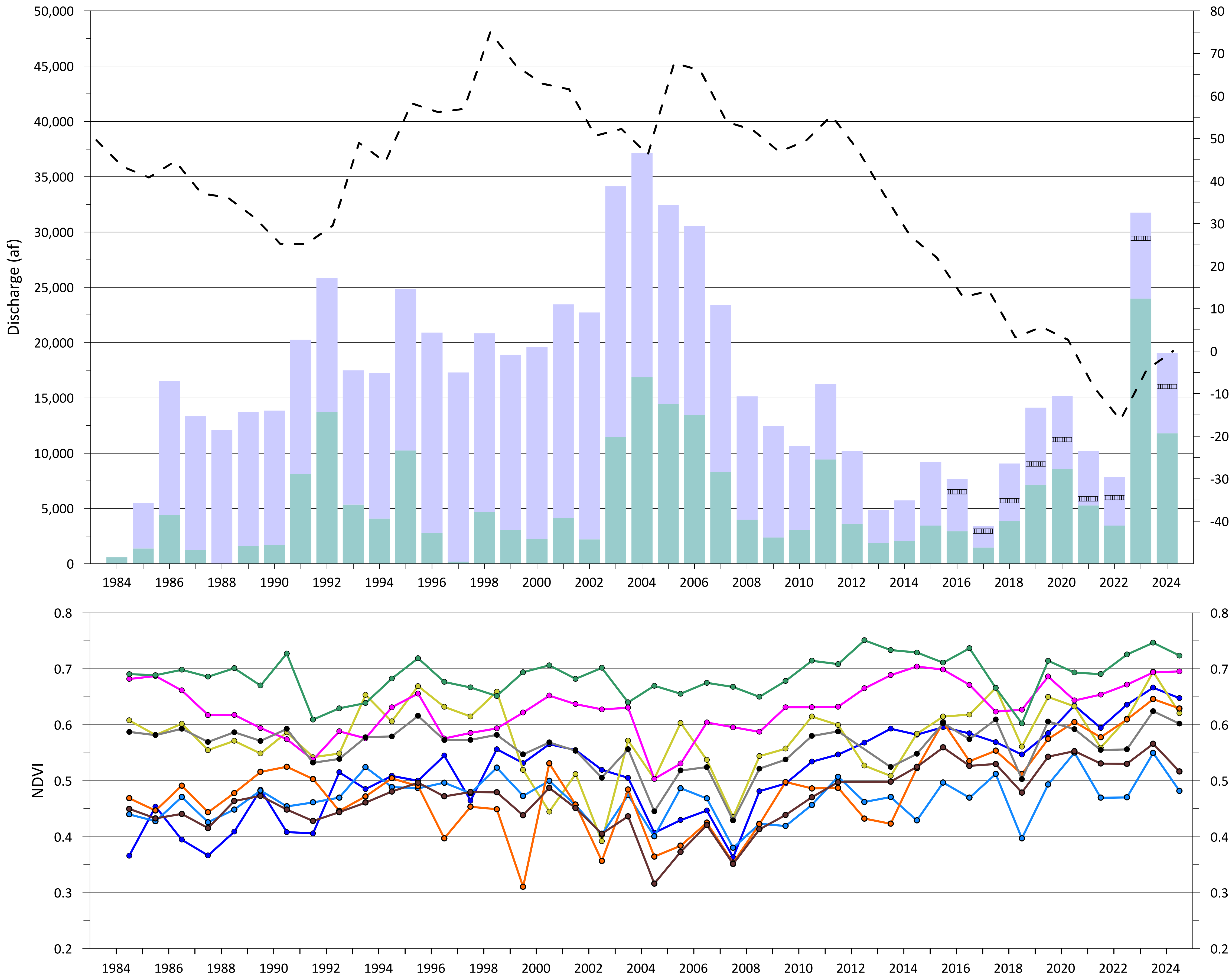
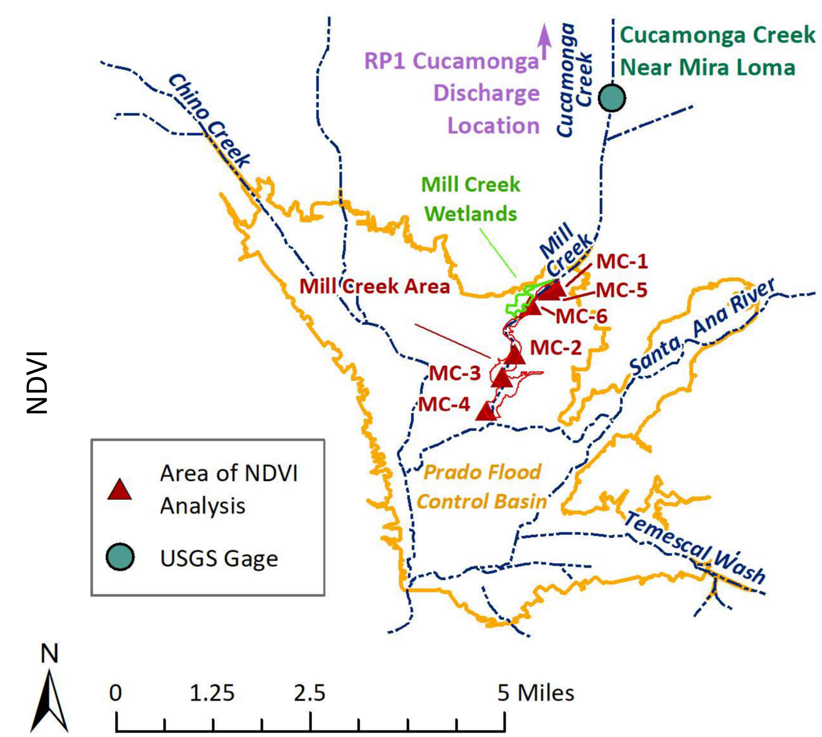
Surface-Water Discharge versus NDVI
Chino Creek Area for 1984-2024

Figure 3-19a





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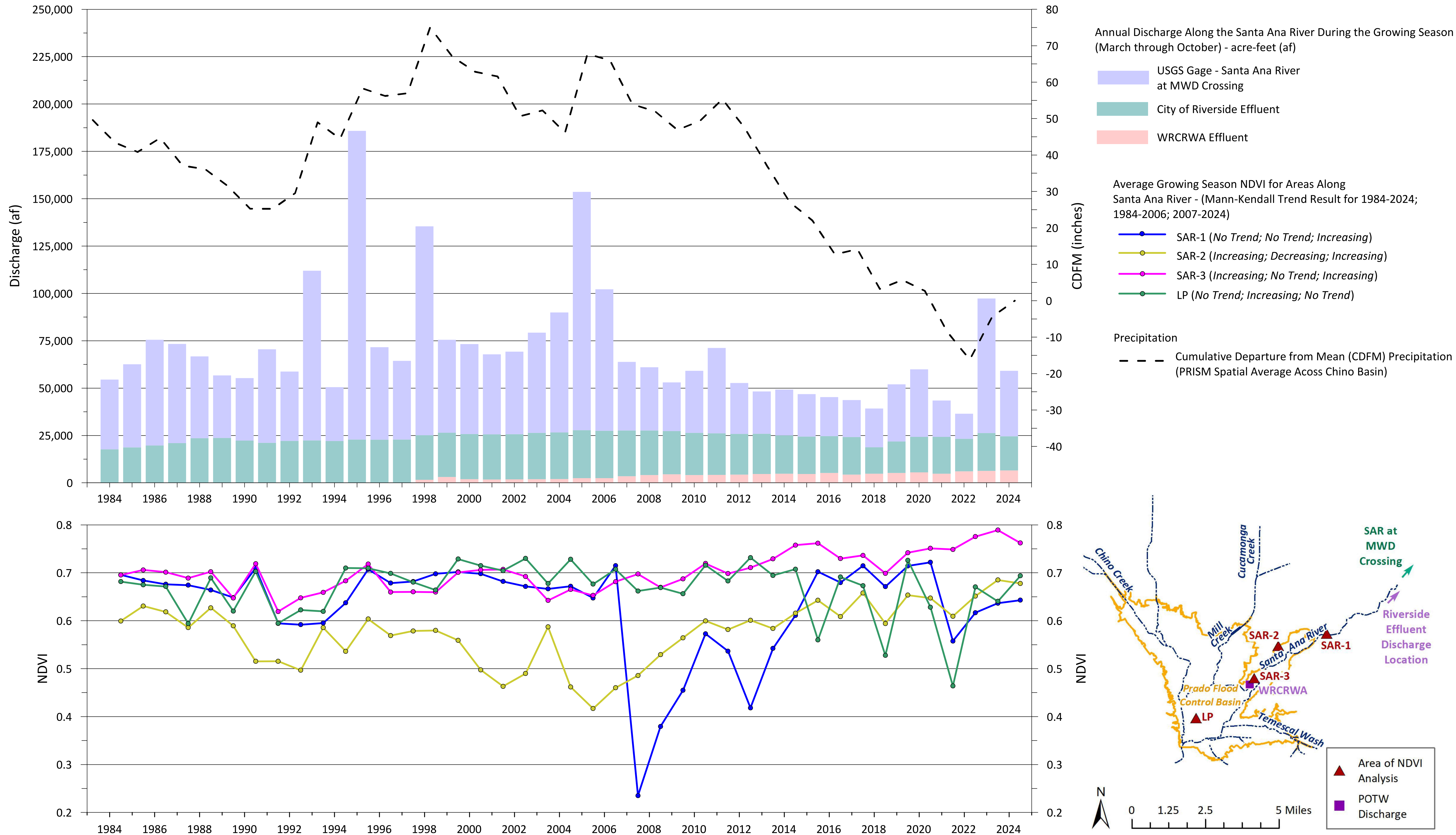
Surface-Water Discharge versus NDVI
Mill Creek Area for 1984-2024

Figure 3-19b



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Surface-Water Discharge versus NDVI
Santa Ana River and LP Area for 1984-2024

Figure 3-19c

3.6 Other Factors and Their Relationships to Riparian Habitat

Other factors that can affect the extent and quality of riparian habitat in the Prado Basin analyzed in this Annual Report include wildfire, Arundo management, pests, and development/construction. These factors are unrelated to Peace II Agreement implementation.

This section characterizes what is known about these factors and compares them to trends in the extent and quality of the riparian habitat to determine their impacts, as characterized by the NDVI.

3.6.1 Wildfire

Available wildfire perimeter data from the FRAP database[24] were compiled within the Prado Basin extent for the period of 1950-2023.[25] The FRAP database shows that wildfires occurred in the Prado Basin in 1985, 1989, 2007, 2015, 2018, and 2020. Figure 3-20a shows the spatial extent of these wildfires, mapped over the 2024 air photo. The most recent wildfire was in December 2020 along the southern portion of the Prado Basin.

Figure 3-20b shows the spatial extent of the most recent wildfires in 2015, 2018, and 2020, overlying a side-by-side of the change map of NDVI from 2023 to 2024 and the 2024 air photo for the majority of Prado Basin area. The locations of the wildfires in 2015 and 2020 align with several of the notable patches of NDVI decreases shown on the NDVI change map, and areas of less vegetated land cover along the Santa Ana River in the air photo. The NDVI decreases are likely not caused from these historic fires since there has been observed vegetation regrowth since these fires as documented in previous Annual Reports (WEI, 2020; West Yost, 2022).

Figures 3-21a through 3-21c are time-series charts that explore the relationship between other factors that can impact riparian vegetation and NDVI for three reaches in the Prado Basin: Chino Creek, Mill Creek, and the SAR. The figures show the Average Growing-Season NDVI for 16 defined areas of riparian habitat discussed in Section 3.1 and shown in Figures 3-6, 3-7a, 3-7b, and 3-8a through 3-8n. Wildfire occurrences, annotated by year, are shown on the charts if their extent intersects with the extent of the defined area of NDVI analysis. Previous Annual Reports have described that the NDVI time series for the entire riparian vegetation extent (Figure 3-5) and other impacted defined areas indicated NDVI declines after the 2015, 2018, and 2020 fires, followed by increases in some of these areas as the vegetation started to regrow (WEI, 2019; 2020; West Yost, 2021; 2022).

3.6.2 Arundo Removal

The OCWD and SAWA[26] are the main entities that implement habitat restoration programs, including the removal and management of Arundo in the SAR watershed for the promotion of native habitat for endangered or threatened species. The OCWD and SAWA sometimes work collaboratively with each other on these programs and with other stakeholders in the watershed, such as the Santa Ana Watershed Project

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[24] Link (Website for California Department of Forestry and Fire Protection's Fire and Resource Assessment Program).

[25] Data is updated in late April for the previous year; 2024 data were not available for this annual report.

[26] SAWA is a non-profit agency with a five-member board, consisting of one member from the OCWD and the remaining from four resource conservation districts (RCDs) in the watershed, including the Riverside-Corona RCD, Temecula-Elsinore-Anza RCD, San Jacinto RCD, and Inland Empire RCD.

Authority (SAWPA), the USFWS, California Department of Fish and Wildlife (CDFW), and the ACOE. There are many ongoing programs throughout the Prado Basin for the management and maintenance of riparian habitat that include the management of Arundo. SAWA publishes an annual report on the status of all habitat restoration projects they are involved with in the watershed (SAWA, 2020).

Figures 3-22a and 3-22b show the locations of known areas where habitat restoration activities have occurred recently in the Prado Basin. These locations and activities may not be inclusive of all current activities in the Prado Basin, but are the known locations identified and the information collected for the PBHSP:

- Various locations where SAWA has led the removal and management of Arundo growth along the SAR between 2016 and 2022 (areas outlined in cyan, purple, navy, coral, and yellow).
- 400 acres where the OCWD has been controlling the regrowth of Arundo within the perimeter of the 2015 wildfire (area outlined in dark red).
- 287-acres where the ACOE has historically removed and managed Arundo growth, including a 26.5-acre area where ACOE removed Arundo between May 2022 and June 2023 (area outlined in green).
- 255 acres where SAWA has been controlling the regrowth of Arundo from 2023 to 2024 (area outlined in light blue).

Figure 3-22b shows the locations of these known areas where habitat restoration activities have occurred, overlying a side-by-side of the change map of NDVI from 2023 to 2024, and the 2024 air photo. With a few exceptions, the locations of these habitat restoration activities generally do not align with areas of notable NDVI decreases or increases in the change map, or areas of brown land cover in the air photo. In the areas where SAWA and OCWD have been controlling the regrowth of Arundo since 2015, as well as in the 287-acre area managed by the ACOE, the decreases in NDVI may be in part related to these habitat restoration activities. And in the areas in the northern reach of the SAR, the increases in NDVI could be from re-growth of native vegetation.

3.6.3 Polyphagous Shot Hole Borer

PSHB, from the group known as ambrosia beetles, is a relatively new pest in Southern California. PSHB burrows into trees and introduces fungi that assists in establishing colonies. Infection caused by the fungi can cause a dark stain surrounding the entry holes, discolored bark, leaf discoloration and wilting, and die-off of entire branches or trees.

In spring 2016, OCWD biologists observed die-off of riparian trees in patches throughout the Prado Basin, especially arroyo and black willows, and confirmed that the cause was from PSHB (ACOE and OCWD, 2017; OCWD 2020). Although PSHB arrived prior to 2016, this was the first notable die off in the Prado Basin. Since 2016, OCWD biologists have noted that the presence of PSHB began widespread throughout the Prado Basin and reduced tree canopy cover, but tree mortality remained confined to small local patches (Zembal, R., personal communication, 2018). OCWD biologists observed that the affected trees that had not died were showing signs of severe infestation, exhibiting branch failure, significant staining, and crown sprouting after the upper branches had died back. (ACOE and OCWD, 2017). In infected trees, crown sprouting allows some of the trees to persist, but the PSHB have been observed to attack the recently emerged limbs once they grow to two to three inches in diameter, causing the sprouting to be temporary. The die back and crown sprouting has resulted in a reduction of canopy in many areas (OCWD, 2020). Canopy loss in heavily infested areas may allow faster-growing invasive non-native species to colonize and out-compete native trees and shrubs in the understory (OCWD, 2020).

In 2016 and 2017, OCWD biologists in the Prado Basin worked with the University of California, Riverside, the USFWS, and SAWA to actively monitor the occurrence and impact of PSHB within Prado Basin riparian habitat. These agencies conducted studies on how to potentially protect certain areas of the Prado Basin from PSHB using attractants and deterrents; however, there were too many trees to effectively protect the entire forest (Zembal, R., personal communication, 2018). Traps were placed throughout the lower portion of Prado Basin and along the SAR by the OCWD and SAWA. The total number of PSHB beetles trapped at each location between August 2016 and April 2017 ranged from seven to 2,092.

Figure 3-22a shows the locations where the presence of PSHB has been documented within the Prado Basin from 2016 to 2022 by: PSHB traps deployed by the OCWD and SAWA between August 2016 and April 2017; and the USBR vegetation surveys performed in 2016, 2019, and 2022.

Table 3-3 summarizes the presence of the PSHB during the 2016, 2019, and 2022 USBR vegetation surveys at all the sites surveyed. During the 2016 USBR vegetation surveys, the presence of the PSHB was identified at 30 of the 37 survey sites. At these sites, all the trees identified with the presence of PSHB were noted as “stressed,” except one which was noted as “dead.” The 2016 USBR surveys were the first site-specific surveys that documented the presence and abundance of PSHB for the PBHSP. During the 2019 USBR vegetation surveys, the presence of the PSHB was identified at only seven of the 30 sites that were originally identified with PSHB presence in 2016 and were only at sites along Chino and Mill Creeks. The reduced presence of the PSHB from 2016 to 2019 correlated to less stressed trees at each of the survey sites; however, the PSHB had an adverse impact from 2016 to 2019, as evidenced by the increased percentage of dead trees and some reductions in percent canopy cover at the survey sites (see Table 3-3).

During the 2022 USBR vegetation surveys, the presence of the PSHB was identified 11 of the 30 sites that were identified with PSHB presence in 2016 and/or 2019. The presence of the PSHB does not correlate to a trend in the increase of stressed or dead tress at the affected sites from 2019 to 2022.

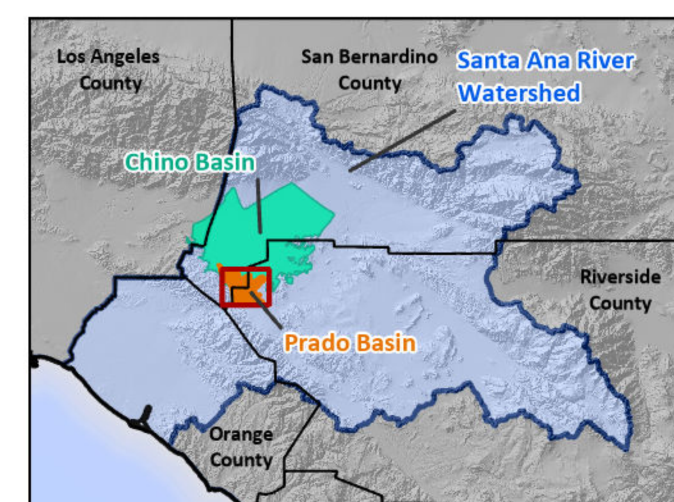
Figures 3-21a through 3-21c are time-series charts that explore the relationship between PSHB occurrence and NDVI for three reaches in Prado Basin: Chino Creek, Mill Creek, and the SAR. These figures show the Average Growing-Season NDVI for the defined areas of riparian habitat discussed in Section 3.1 and shown in Figures 3-6, 3-7a, 3-7 b, and 3-8a through 3-8n. For each defined area, the percentage of infected trees within each survey site that is within the area are plotted on the charts. At all the sites within the small areas where the PSHB was first noted in 2016, the percentage of trees impacted decreased or stayed the same from 2016 to 2019 (many to zero percent). With few exceptions, at most of the sites within the small areas the percentage of trees impacted remained stable or decreased from 2019 to 2022 (many to zero percent). These exceptions are site X7 at CC-3 along Chino Creek where the percentage increased from 0 to 33 and site X10 at MC-1 along Mill Creek where the percentage increased from 0 to 18; however, the NDVI at both areas is showing an increasing trend from 2019 to 2022, indicating that the presence of the PSHB in 2022 is likely not causing a notable negative impact in these areas.

3.6.4 Miscellaneous Factors

Figure 3-3 highlights notable patches of NDVI increases and decreases from 2023 to 2024. These changes have not been correlated with the factors known to impact vegetation described in this Annual Report, including groundwater levels. The notable patches of NDVI changes are primarily along the SAR in the lower Prado Basin and behind the Prado Dam along Chino Creek. These are areas in the lower portion of Prado Basin where changes in the riparian vegetation are unlikely to be influenced by the implementation of the Peace II Agreement. These are vegetated areas in the Prado Basin that are dominated by perennial growth that respond to variations in precipitation over wet and dry years. As described in Section 3.4, although WY 2024 was an above-average wet year, it was not as wet as WY 2023. The lower precipitation in WY 2024 impacted the amount of perennial growth compared to WY 2023, which results in decreases in NDVI in these patches along the SAR and behind Prado Dam. Additionally, the 2023 and 2024 air photos in Figure 3-1a show changes in the green vegetation cover in these areas.

In addition to changes in the perennial plant growth affecting the NDVI of the riparian vegetation there are other factors related to the significant wet year in WY 2023 that also impacted the change in NDVI from 2023 to 2024:

- Some of the notable patches of NDVI decreases along the SAR and Chino Creek are due to scouring along edges of the creeks and river during the significant increases in surface water discharge in WY 2023. This impact was described in the 2023 Annual Report. Observation of the 2024 air photo shows these areas as bare light brown land.
- The notable NDVI increases behind Prado Dam and in the middle portion of Chino Creek are due to the extended period of seasonal inundation during water conservation efforts. The significant wet year in WY 2023 resulted in a prolonged conservation pool behind Prado Dam, disrupting the growth of perennial grasses and shrubs in these areas. Comparison of the 2023 and 2024 air photos reveals these areas as bare, gray/brown land in 2023, replaced by bright green land cover of perennial grasses and shrubs in 2024.



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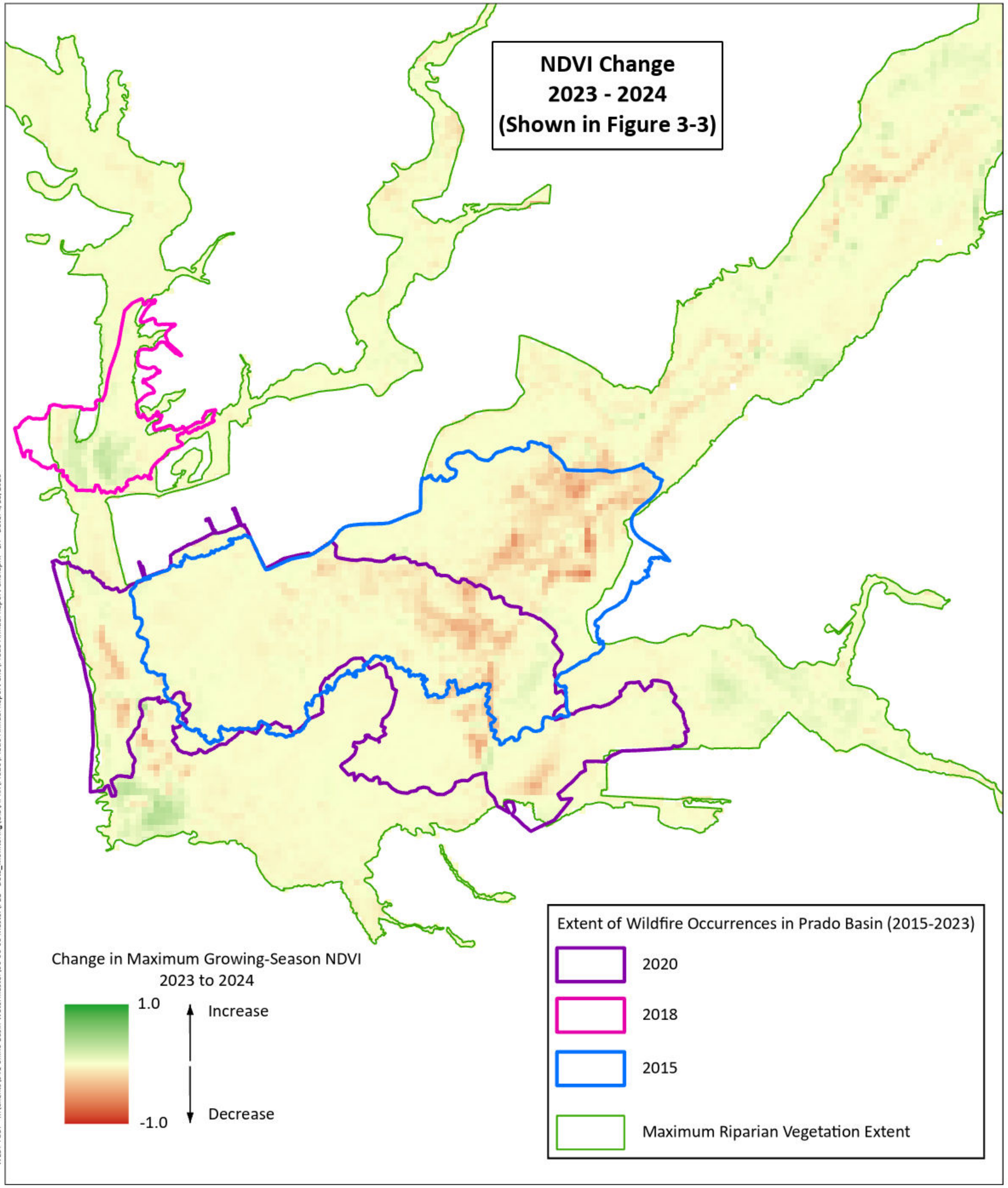
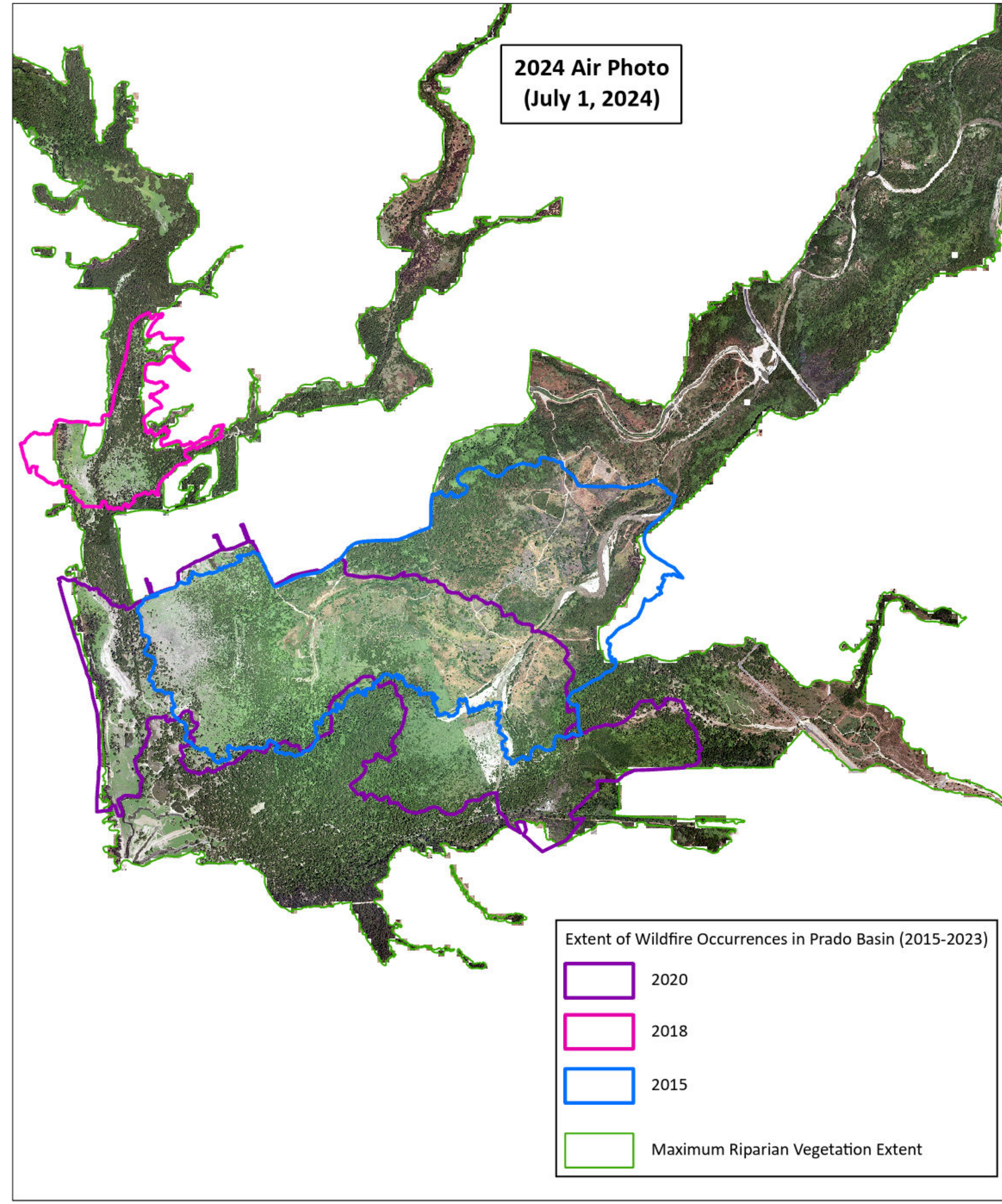
Location Map of Other Factors That Can Affect Riparian Habitat
Wildfire

Figure 3-20a





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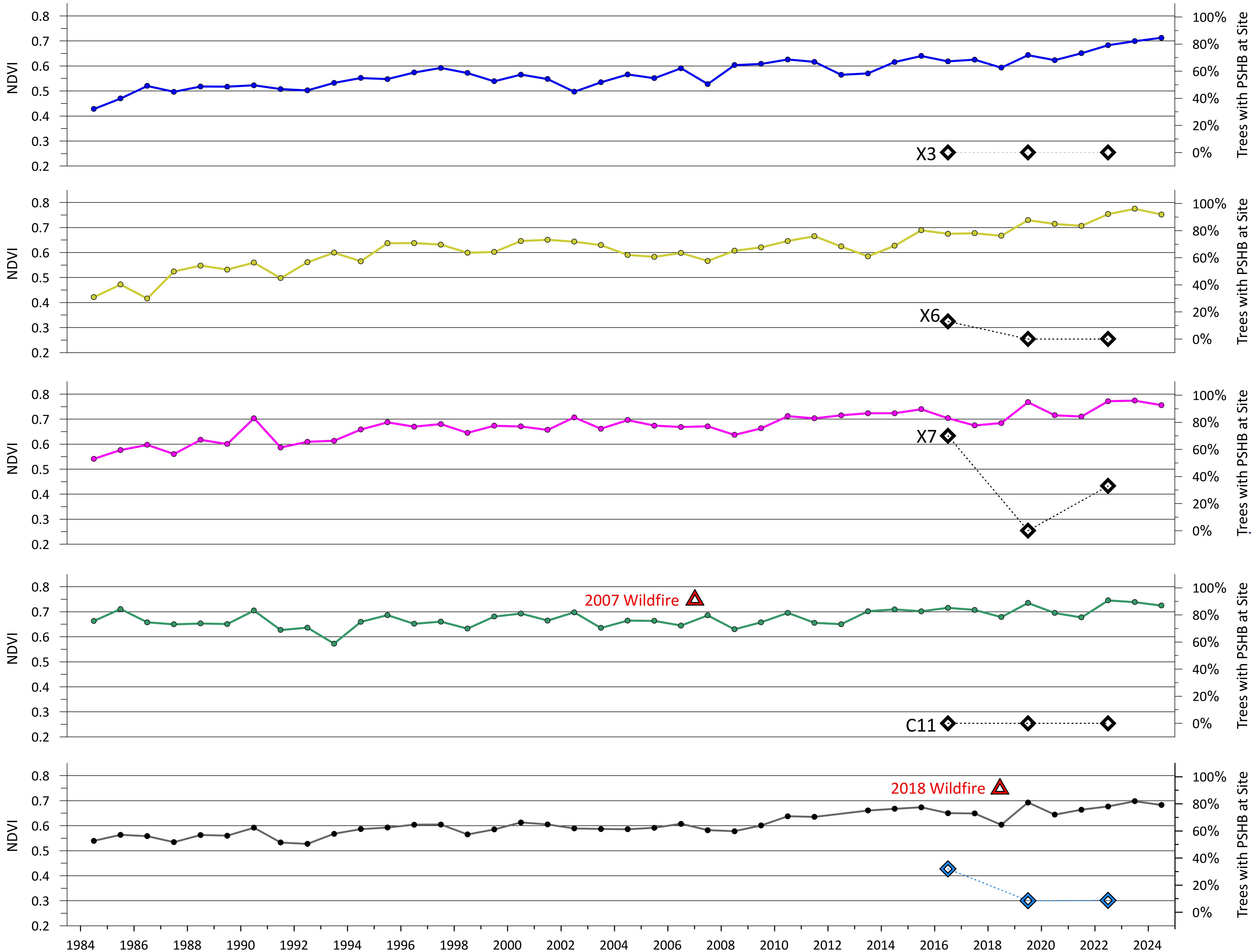
Spatial NDVI Change 2023-2024 and 2024 Air Photo with Prado Basin Wildfires in 2015, 2018, and 2020

Figure 3-20b

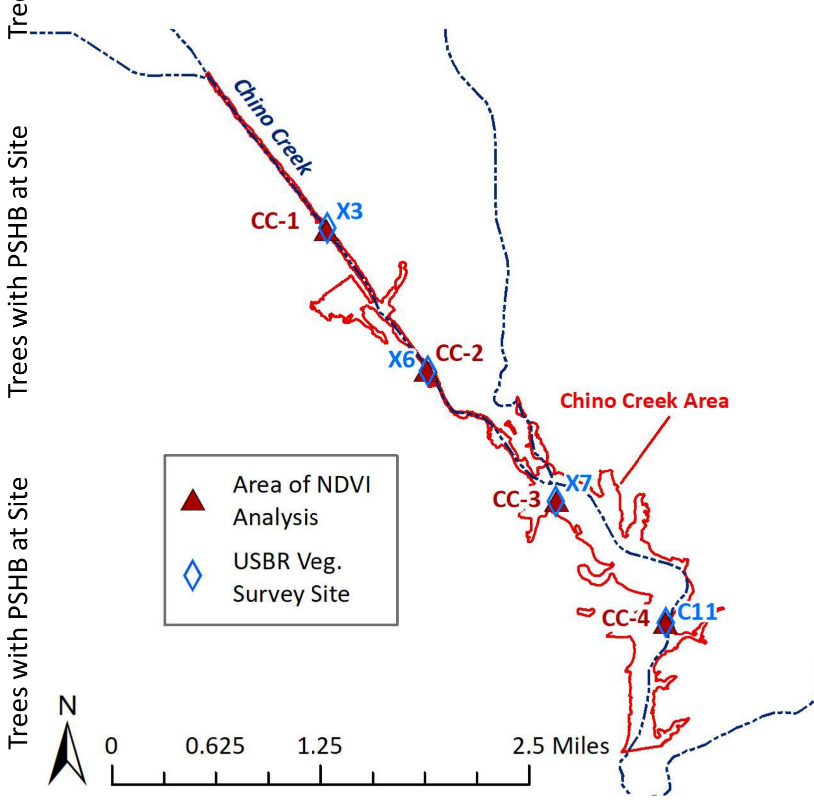


Average Growing Season NDVI for Areas Along Chino Creek - (Mann-Kendall Trend Result for 1984-2024; 1984-2006; 2007-2024)

- CC-1 (*Increasing; Increasing; Increasing*)
- CC-2 (*Increasing; Increasing; Increasing*)
- CC-3 (*Increasing; Increasing; Increasing*)
- CC-4 (*Increasing; No Trend; Increasing*)
- Chino Creek Area (*Increasing; Increasing; Increasing*)

Other Factors

- USBR vegetation survey sites in the areas that were surveyed in 2016, 2019, and 2022 for the presence of the Polyphagous Shot Hole Borer (PSHB) - plotted by percentage of trees impacted at each site.
- Percentage of trees with the PSHB noted for all surveyed sites within the Chino Creek area
- Occurence of Wildfire in NDVI Area



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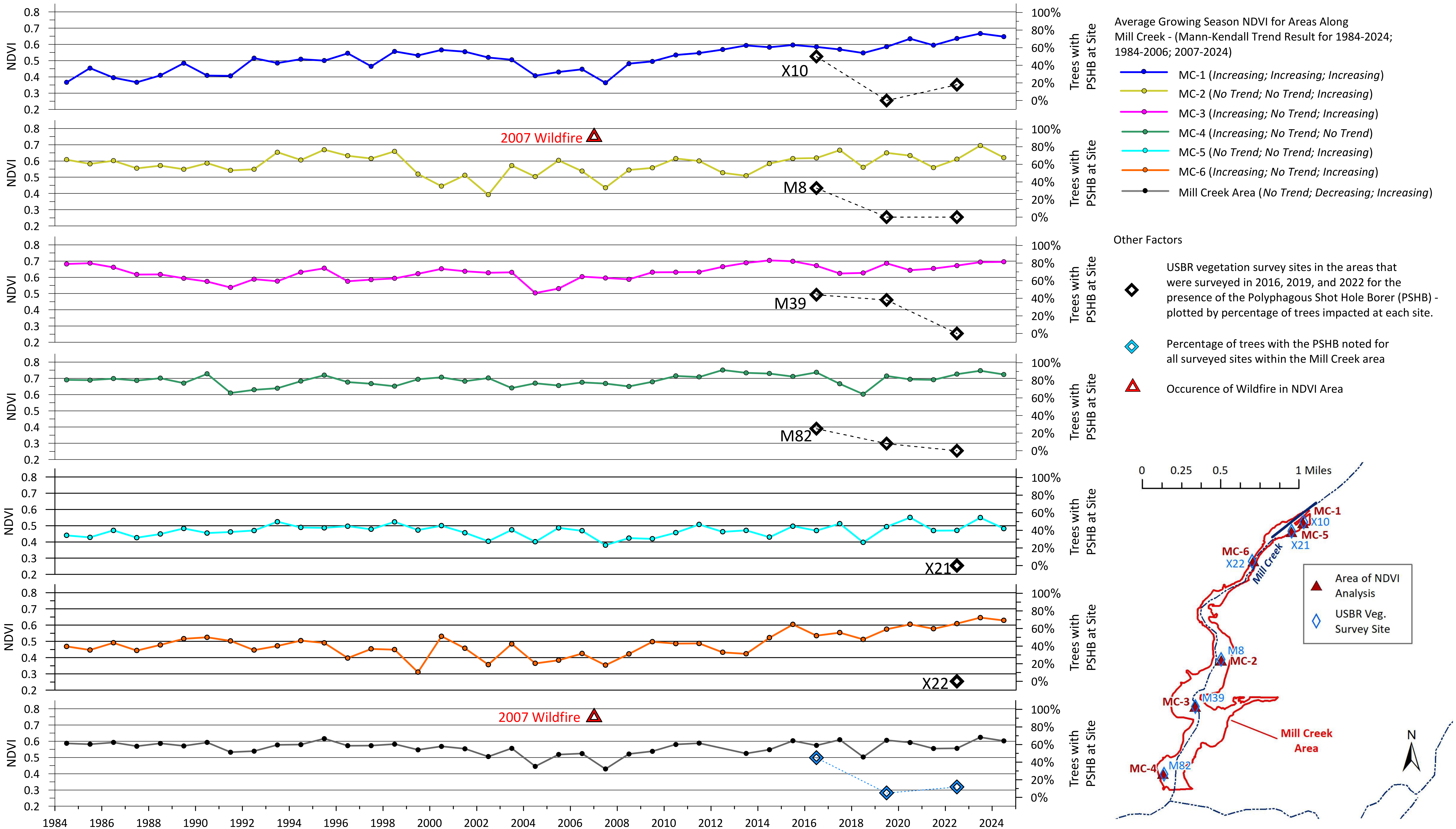
Other Factors that Affect Riparian Habitat verus NDVI
Chino Creek Area for 1984-2024

Figure 3-21a



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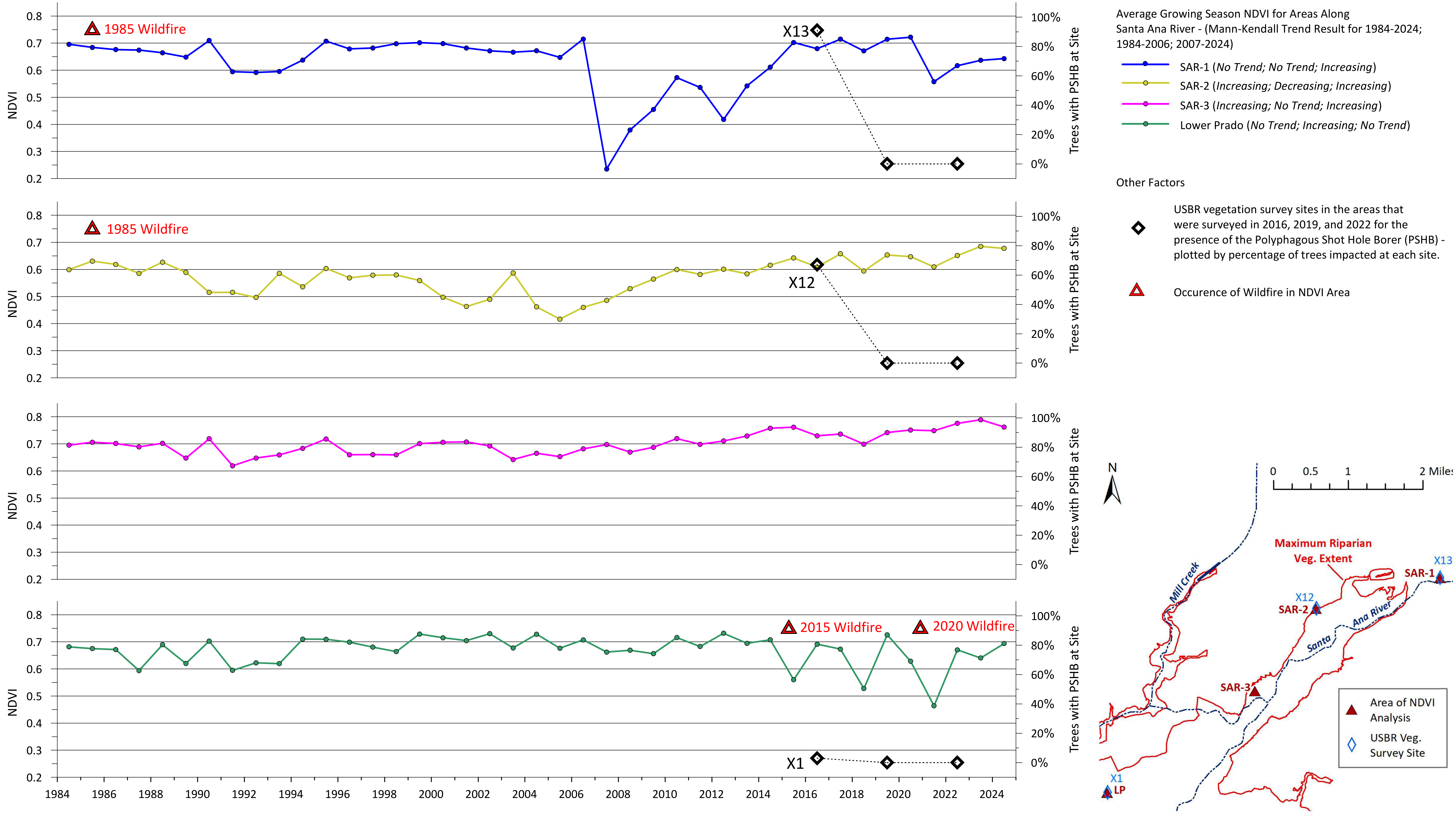
Other Factors that Affect Riparian Habitat verus NDVI
Mill Creek Area for 1984-2024

Figure 3-21b



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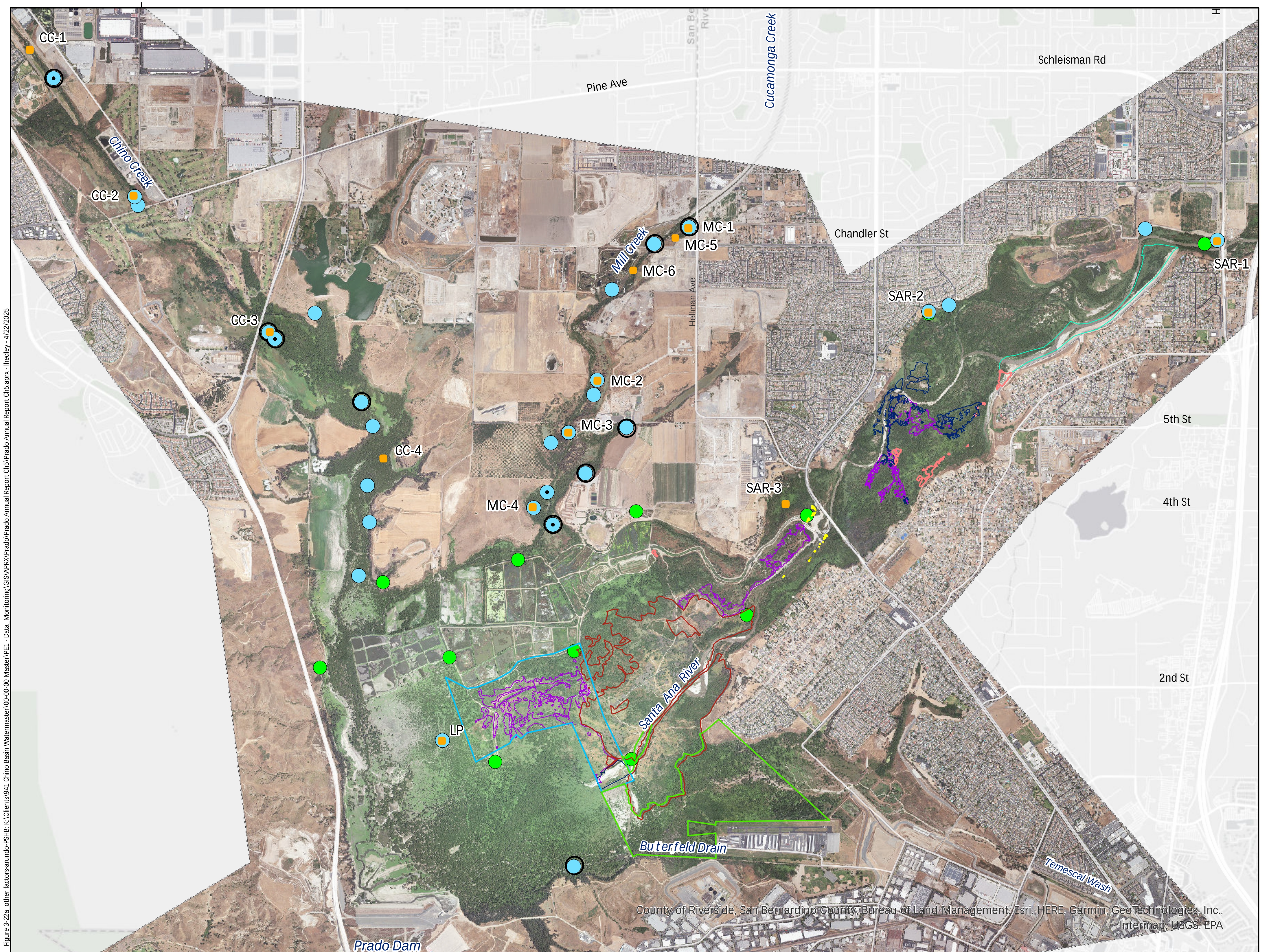
Other Factors that Affect Riparian Habitat verus NDVI
Santa Ana River and Lower Prado Area for 1984-2024

Figure 3-21c



2023 - 2024 Area of SAWA Arundo Maintenance/ Treatment for Prior Arundo Removal*

Area of SAWA Arundo Removal

- 2022
- 2021
- 2020
- 2019
- 2016 - 2018

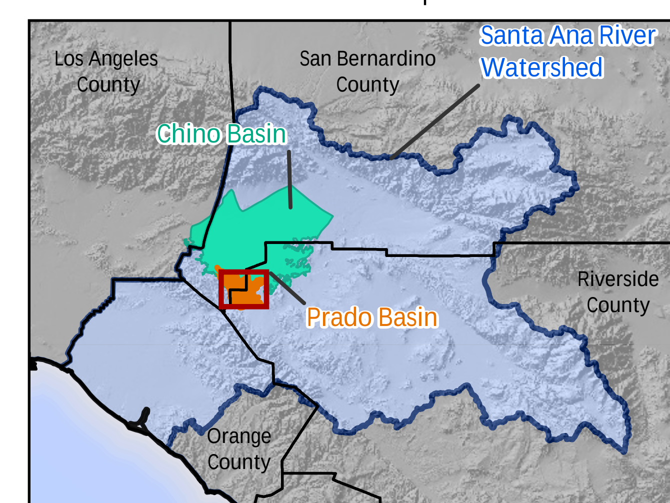
Area of Other Arundo Management

- Control of Arundo Regrowth by OCWD within the Perimeter of 2015 Wildfre
- ACOE Arundo Mitgaton Site - Parcel 2

Documented Locatons of Polyphagous Shot-Hole Borer (PSHB)

- Identfed by USBR during the 2016 Site-Specifc Vegetaton Surveys
- Identfed by USBR during the 2019 Site-Specifc Vegetaton Surveys
- Identfed by USBR during the 2022 Site-Specifc Vegetaton Surveys
- Locaton of PSHB Traps Deployed by OCWD and SAWA from August 2016 to April 2017
- Small Defned Area Analyzed for NDVI Time Series - 1 NDVI pixel (30 x 30-meters)

*No new Arundo removal has been performed since 2022



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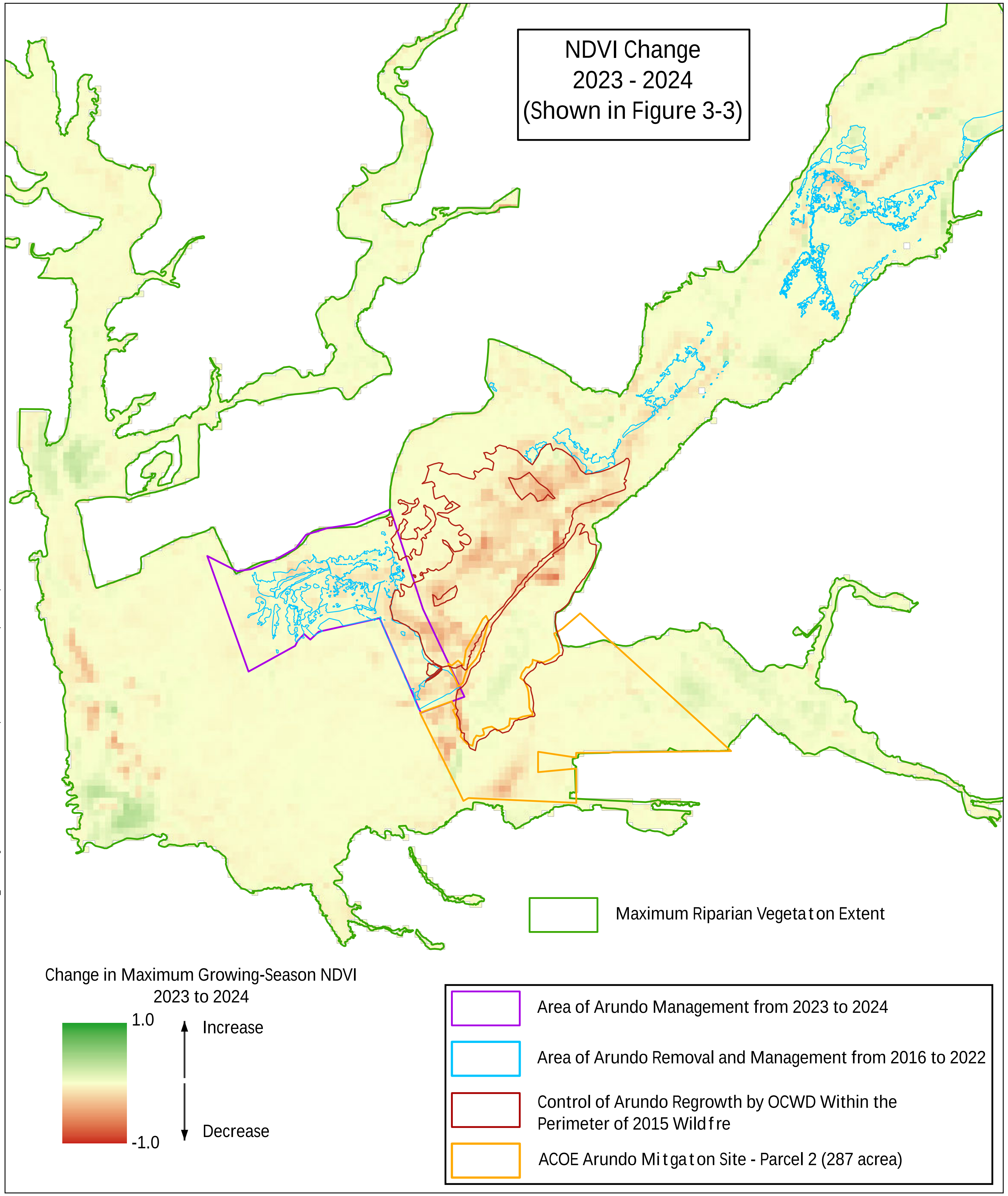
Locaton Map of Other Factors That Can Afect Riparian Habitat
Arundo and PSHB

Figure 3-22a



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Spatial NDVI Change 2023-2024 and 2024 Air Photo with Prado Basin Arundo Removal and Management
2016-2024

Figure 3-22b

3.7 Analysis of Prospective Loss of Riparian Habitat

The meaning of "prospective loss" of riparian habitat in this context is the "future potential loss" of riparian habitat. Watermaster's most recent (2020) predictive modeling results[27] were used to identify areas of prospective loss of riparian habitat that may be attributable to the Peace II Agreement by projecting future groundwater-level conditions in the Prado Basin area through 2030. To perform this evaluation, the predictive model results were mapped and charted to identify areas, if any, where groundwater levels are projected to decline to depths that may adversely impact the riparian habitat in the Prado Basin.

Figure 3-23 is a map that shows the 2020 model-predicted change in groundwater levels in the Prado Basin area over the period of 2018-2030 from the planning scenario used to recalculate the Safe Yield of the Chino Basin in 2020 using Watermaster's updated groundwater-flow model (WEI, 2020). The map shows that groundwater levels are predicted to remain steady across most of the Prado Basin area through 2030. The stability in groundwater levels is explained in part by projected declines in groundwater production from private wells in the area, the IEUA's delivery of treated recycled water to this area for direct uses (such as outdoor irrigation), and the fact that most of the Chino Basin Desalter production will occur to the north and northeast. Figure 3-24 shows that the most likely area where groundwater levels are projected to decline by 2030 is the northern portions of Mill Creek and the SAR.

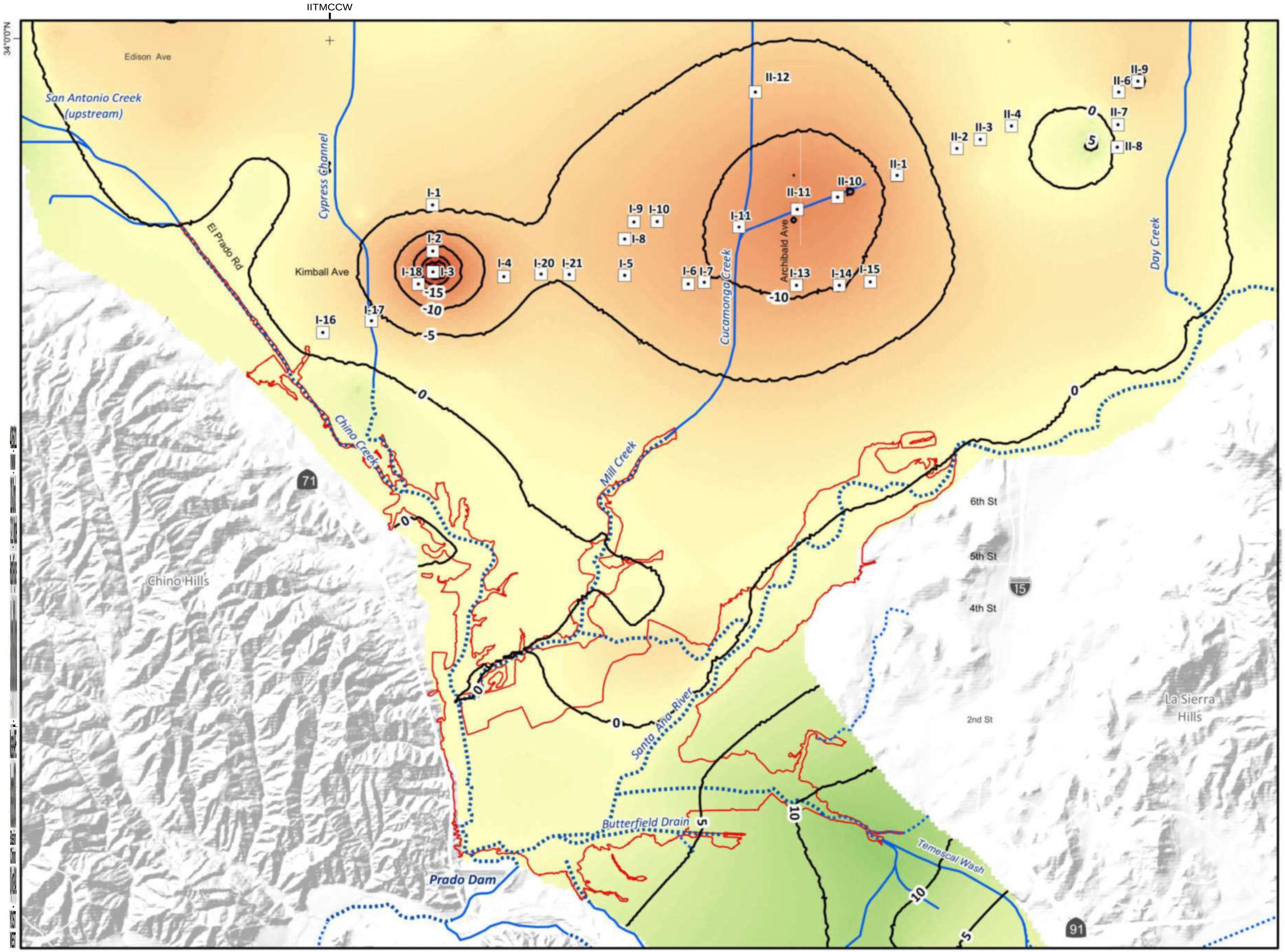
Figure 3-24 is a time-series chart of the 2020 model-predicted groundwater levels at the PBHSP monitoring wells for the period of 2018 to 2030. These wells are strategically located adjacent to the riparian habitat south of the Chino Desalter well field to understand the potential impacts of Peace II implementation on groundwater levels and the riparian habitat. The chart shows:

- Groundwater levels are projected to fluctuate seasonally at all PBHSP monitoring wells by about one to two feet.
- Groundwater-level trends are projected to remain stable at most of the PBHSP monitoring wells through the duration of the Peace II Agreement (through 2030).
- At two of the PBHSP monitoring wells, groundwater levels are projected to experience declines of about one to three feet from 2018 to 2030, which may represent a threat for prospective loss of riparian habitat:
    - **PB-2 above the northern reach of Mill Creek.** The 2020 model predicts a decline in groundwater levels at PB-2 of about three feet from 2018 to 2030. Figure 3-11 shows that groundwater levels declined at PB-2 by about 4.5 feet from 2018 to 2024, which is greater than the decline predicted by the model through 2030. Additionally, groundwater levels have declined by about 2.5 feet through 2024 in the riparian vegetation extent along Mill Creek just to the south. Figure 3-12 shows that the current (Fall 2024) depth-to-groundwater where the riparian vegetation is growing along the northernmost reaches of Mill Creek ranges from about 10-15 ft-bgs. Hence, if the groundwater levels

[27] The predicted groundwater level changes through 2030 were made with the 2020 Chino Valley Model (CVM) for Scenario 2020 SYR1 for Layer 1 of the aquifer. The results of this model scenario were used to recalculate the 2020 Safe Yield of the Chino Basin (WEI, 2020). Scenario SYR1 is based on the water demands and water supply plans provided by the Watermaster parties, Chino Basin parties' planning assumptions on pumping groundwater and conducting recharge operations, planning hydrology that incorporates climate change impacts on precipitation and ET0, and assumptions regarding cultural conditions and future replenishment.

continue to decline along Mill Creek, then it could result in adverse impacts to the riparian habitat in this area.

- **PB-3 along the northern portion of the SAR.** The 2020 model predicts a decline in groundwater levels at PB-3 of about one foot from 2018 to 2030. Figure 3-13c shows that groundwater levels declined at PB-3 by about 1.5 feet, from 2018 to 2024, which is slightly greater than the decline predicted by the model through 2030. Figure 3-12 shows that the current (Fall 2024) depth-to-groundwater where the riparian vegetation is growing along the northernmost reaches of the SAR ranges from 6-11 ft-bgs. If groundwater levels continue to decline at similar or higher rate through 2030, then it could result in a depth to groundwater greater than 15 ft-bgs and adverse impacts to the riparian habitat in this area. However, the groundwater-level declines in this northern reach of the SAR near PB-3 are not a concern for the riparian vegetation at this time because the depth to groundwater in this area is shallow (6 to 11 ft-bgs) and is supported by SAR recharge.



Contours of Model-Predicted Change in Groundwater Levels for Layer 1*
July 2018 to July 2030, feet

Hydraulic Head Change (ft) *July 2018 to July 2030*

30 — Increase

0

-30 — Decrease

Chino Desalter Well

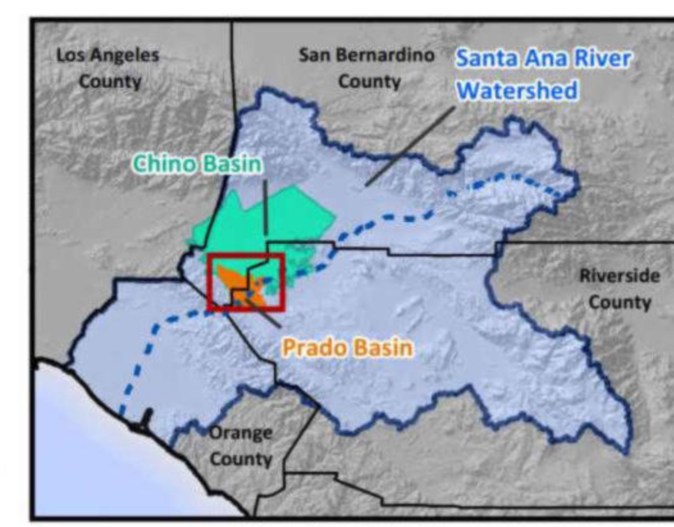
PBHSP Monitoring Well Site

Riparian Vegetation Extent in Prado Basin

Concrete-Lined Channels

Unlined Rivers and Streams

* Model Predicted Change in Groundwater Levels from the planning scenario 2020 SYR1 for the recalclation of Safe Yield using the updated Chino Valley Model (WEI, 2020)



Prepared by:

WEST# YOST
Water. Engineered.

0 1 2 Miles
0 1 2 Km

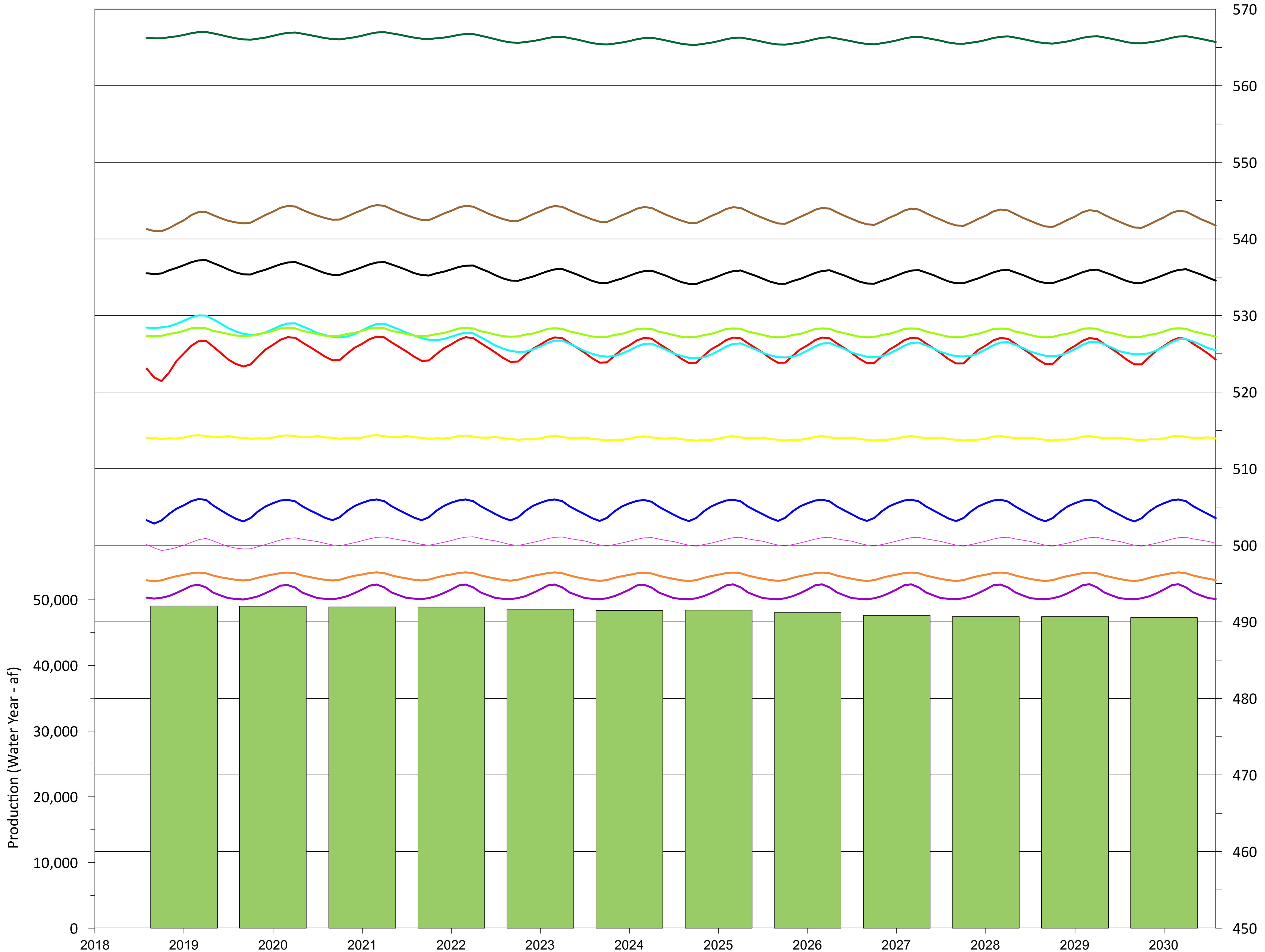
Chino Basin Watermaster and Inland Empire Utilities Agency
2024 Annual Report of the Prado Basin Habitat Sustainability Committee

Prepared for:

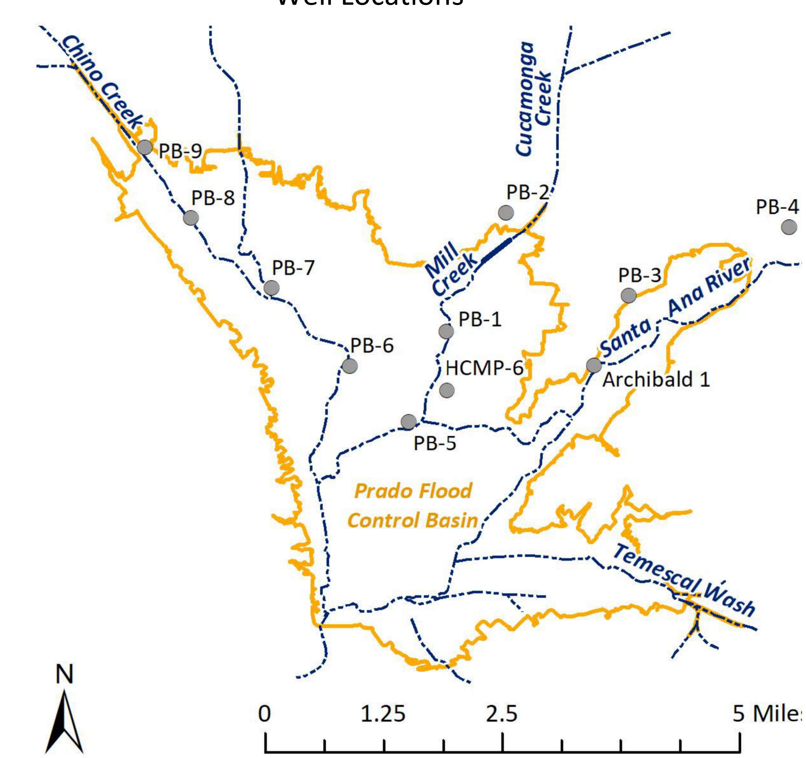
6

Predicted Change in Groundwater Level
2018 to 2030 - Scenario 2020 SYR1

Figure 3-23



Well Locations



Predicted Change in Groundwater Levels

2018 to 2030 - Scenario 2020 SYR1

Figure 3-24

4.0 CONCLUSIONS AND RECOMMENDATIONS

The monitoring and mitigation requirements in the Peace II SEIR call for annual reporting for the PBHSP. Annual reports include recommendations for ongoing monitoring and any adaptive management actions required to mitigate any measured loss or prospective loss of riparian habitat that may be attributable to the Peace II Agreement.

The following describes the main conclusions of this annual report and provides recommendations for future monitoring, reporting, and mitigation, if any.

4.1 Main Conclusions and Recommendations

4.1.1 Conclusions

The main conclusions of the PBHSC Annual Report for WY 2024 are:

- Based on the analysis of NDVI time series and air photos, the quality (greenness) of the riparian habitat vegetation decreased or remained the same across most of the Prado Basin from 2023 to 2024. All the observed decreases were relatively minor and within the range of one-year changes observed historically. However, some of these decreases were notable because they were slightly greater than the average one-year change in NDVI observed over the historical period. Air photos also reveal notable changes in the vegetation in three of these areas (MC-2, MC-5 and Upper Mill Creek), including reductions in coverage and browning. These decreases occurred during a period of cooler-than-average temperatures, stable or increasing groundwater levels, and above-average precipitation and stream discharge in WY 2024. However, the conditions were warmer and dryer in WY 2024 compared to the previous WY 2023.
- Based on the analysis of NDVI spatial change maps and air photos, there were two notable areas of decreases in greenness observed in the Prado Basin between 2023 and 2024: (i) along the SAR in the lower portion of Prado Basin; and (ii) along the lower portion of Chino Creek behind Prado Dam. These decreases were likely caused by reduced growth of perennial vegetation due to lower precipitation compared to the previous year, as well as some scouring along the edges of the creeks and river from the previous wet year. None of the reductions in greenness were related to declining groundwater levels during the period of Peace II Agreement implementation.
- Over this past year from 2023 to 2024, groundwater levels at the PBHSP monitoring wells along Chino Creek, Mill Creek and the SAR in the Prado Basin remained stable or showed slight changes of +/- 1 foot. These changes were likely due to another wet year and increased stream discharge, although it was not as wet as the previous year.
- Since groundwater-level measurements commenced at the PBHSP monitoring wells in 2015, there have been some increasing and decreasing trends in groundwater levels observed along the reaches of Chino Creek, Mill Creek, and SAR. From September 2016 to September 2024, groundwater levels throughout most of riparian vegetation extent have changed less than +/- 5 feet. There are some notable areas of change:
  - Groundwater levels have declined the most in the northern portion of Mill Creek just south of the PB-2 monitoring well. From 2016 to 2022 groundwater levels declined by about eight feet likely due to increased pumping at the CDA wells to the north. During

2023 and 2024, groundwater levels increased by about four feet in this area, for a net change in groundwater levels of -4 feet since 2016. Recent observations of the air photos in 2024 have noted a decline in the greenness of the riparian vegetation in this northern area of Mill Creek reach.

— In the northern reach of Chino Creek, groundwater levels increased by about ten feet from 2016 to 2024. These increases in groundwater levels were likely due to decreased groundwater pumping in the area.

- The depth to groundwater in the northernmost reach of Mill Creek where the groundwater levels have declined the most (near PB-2) is estimated at 10-15 ft-bgs in WY 2024. Future declines in groundwater levels in this area could result in adverse impacts to the riparian habitat.

4.1.2 Recommendations

Based on the conclusions above, the PBHSP monitoring and reporting should continue to monitor and assess the extent and quality of the riparian habitat and the factors that can influence it, as has been done through WY 2024. As described above, there were declines in groundwater levels from 2016 to 2022 beneath the northern portion of Mill Creek; however, over the last two years, groundwater levels have recovered about halfway from their lowest observed levels in 2022. During the period of the lowest groundwater levels in 2022, there were no observed negative impacts on the riparian vegetation in this area. However, over this past year, there were some observed declines in the greenness of the riparian vegetation in this area. Factors that could have resulted in these changes were assessed as part of this analysis and no direct cause was identified. Therefore, we recommend additional focused monitoring along northern Mill Creek in WY 2025, as described below.

The triennial vegetation surveys scheduled for the summer of 2025 should be tailored to focus on the northern portion of Mill Creek and should include new or expanded sites to get a more comprehensive understanding of what is happening on the ground. In addition to gathering the measurements that have been acquired by the vegetation surveys in the past, the biologists conducting the surveys should also provide a professional opinion on: (i) any observed changes in vegetation structure and composition, (ii) potential causes of the change, and (iii) recommendations for additional monitoring or studies. This information will help verify and document the current vegetation conditions relative to conditions in the recent past and is crucial for assessing any potential impact on the extent and quality of the riparian habitat that could be caused by the lowering of groundwater levels in this area. Since the PBHSP is an adaptive management plan, any recommended enhancements to the monitoring program based on the vegetation surveys can be reviewed and incorporated by the PBHSC as appropriate. If mitigation measures are deemed necessary, the results of the PBHSP will provide guidance for their development.

4.2 Recommended Mitigation Measures and/or Adjustments to the AMP

This annual report has documented some preliminary observations in the degradation in the quality of riparian habitat along Mill Creek. As described in the recommendations, this preliminary assessment warrants further monitoring and evaluation to confirm the degradation and determine if it is contemporaneous with decreasing groundwater levels during the implementation of the Peace II Agreement. No mitigation measures or adjustments to the AMP are proposed currently. However, continued monitoring could inform appropriate mitigation measures if deemed necessary in future annual reports.

4.3 Recommended PBHSP for Fiscal Year 2025/26

Based on preliminary analysis of the PBHSP data for WY 2024, a draft *Technical Memorandum Recommended Scope and Budget of the Prado Basin Habitat Sustainability for FY 2025/26* was submitted to the PBSHC on March 12, 2025. On March 19, 2025, Watermaster's Engineer presented the recommended scope and budget for FY 2025/26 to the PBHSC for consideration. There were no changes recommended by the PBHSC on the proposed FY 2025/26 scope of work, and a final scope of work and budget was submitted to the PBHSC and will go through the Watermaster and the IEUA FY 2025/26 budgeting process in May and June of 2025. The scope of work for the PBHSP for FY 2025/26 is shown in Table 4-1 as a line-item cost estimate.

The following describes the scope of work by major task for the PBHSP for FY 2025/26:

Task 1. Groundwater Monitoring Program

The monitoring of groundwater levels in the Prado Basin is a key component of the PBHSP because declining groundwater levels could be a factor related to Peace II implementation that adversely impacts riparian vegetation. Sixteen monitoring wells were installed specifically for the PBHSP in 2015. These wells, plus monitoring wells HCMP-5/1 and RP2-MW3, are monitored for groundwater levels. The eighteen monitoring wells are equipped with integrated pressure-transducers/data-loggers (hereafter referred to as transducers) that measure and record water-level measurements and temperature readings every fifteen minutes. At twelve of the eighteen wells, the transducers also collect high frequency measurements of EC. The inclusion of the high-frequency temperature and EC data was a recommendation resulting from the evaluation of the pilot monitoring program in the Annual Report for WY 2022, as discussed in Task 2, and will be used to evaluate groundwater/surface water interactions. As transducers require replacements at the end of their useful life, they will be replaced with transducers that measure EC. During 2024, elevation surveys of the thalweg in creeks adjacent to the monitoring well sites were performed, which will enhance the assessment of surface/groundwater interactions using the high-frequency data collected by the transducers.

This task includes quarterly field visits to all eighteen PBHSP monitoring wells to download the data from the transducers, and the processing, checking, and uploading of the water level, temperature, and EC data to the PBHSP database. The scope of this task is the same as the previous fiscal year.

Task 2. Surface-Water Monitoring Program

Surface-water data from the Santa Ana River and the tributaries that cross Prado Basin are used to evaluate groundwater/surface-water interactions and their importance to the impact on groundwater levels and riparian habitat, and to characterize the influence of surface-water discharge on the riparian habitat.

From FY 2018/19 to FY 2022/23, a pilot monitoring program was conducted to determine if high-frequency data enhances and better reveals the interpretation of groundwater/surface-water interactions previously studied for the PBHSP. The pilot monitoring program included the installation of transducers that record EC, temperature, and water levels at 15-minute intervals at two locations in Chino Creek and the same high-frequency monitoring at four nearby monitoring wells (PB-7 and PB-8 clusters). Additionally, during the first two years of the pilot monitoring program, surface water and groundwater-quality samples were collected to support the high-frequency data.

Key conclusions from the analysis of the pilot monitoring program data in the Annual Report for WY 2022 were that the pilot program could be discontinued and, in its place: conduct high-frequency monitoring of EC, temperature, and water level for each pair of PBHSP monitoring wells (Task 1), most of which was already being collected, and collect quarterly field measurements for EC and temperature of the surface water flowing in the streams adjacent to the monitoring wells (Task 2.1).

Task 2.1 is to collect field measurements of temperature and EC at four surface water sites in Chino Creek and Mill Creek near the PB-1, PB-2, PB-7, and PB-8 wells and to process and upload the data to the database. The addition of the manual surface water measurements was new last fiscal year and was another monitoring recommendation in the Annual Report for WY 2022 in place of the pilot monitoring program. The continued collection of this data will further support the analyses of groundwater/surface water interactions. The effort to collect, process, and upload the manual measurements is minimal since it can be done during the quarterly field visits to the monitoring wells to download the transducer data. The scope of this sub task is consistent with the work performed for the previous fiscal year.

Task 2.2 includes the annual collection of the surface water data from four publicly-available data sets which include: the USGS daily discharge measurements at six sites along the Santa Ana River and its tributaries; daily discharge and water-quality data from POTWs that are tributary to Prado Basin; ACOE daily measurements of reservoir elevation and releases from the reservoir at Prado Dam; and Watermaster's quarterly surface-water-quality monitoring at two sites along the Santa Ana River. The USGS, POTW, and ACOE data for WY 2025 will be collected, processed, checked, and uploaded to the PBHSP database. This sub task does not include the processing, checking, and uploading of the Watermaster-collected quarterly water quality data on the Santa Ana River data, which is performed under a Watermaster task for the Maximum Benefit Monitoring Program. The scope of this sub task is consistent with the work performed for the previous fiscal year.

Task 3. Climate Monitoring Program

Climatic data are evaluated in the vicinity of the Prado Basin to characterize trends and to determine if these trends contribute to impacts on the riparian habitat. The climate monitoring program utilizes two types of publicly available, spatially-gridded datasets. Task 3 includes the annual collection of these spatially-gridded datasets for WY 2025 (October 2024 – September 2025), and the checking and uploading of the data to the PBHSP database. The scope of this task is consistent with the work performed for the previous fiscal year.

Task 4. Riparian Habitat Monitoring Program

Monitoring the extent and quality of the riparian habitat in the Prado Basin is a fundamental component of the PBHSP to characterize how the riparian habitat changes over time. To characterize the impacts of Peace II implementation on the riparian habitat (if any) it is necessary to understand the long-term historical trends of its extent and quality, and the factors that have affected it. The current riparian habitat monitoring program consists of both regional and site-specific components. The proposed riparian habitat monitoring program for FY 2025/26 is described in the subsections below.

Regional Monitoring:

The regional monitoring of riparian habitat is performed via two independent methods that complement each other: mapping and analysis of the riparian habitat using (i) air photos and (ii) the normalized distribution vegetation index (NDVI) derived from the Landsat remote-sensing program. Tasks 4.1, 4.2, and 4.3 are for the collection and compilation of the regional monitoring data, including:

- Perform a custom flight (via outside professional services) to acquire a high-resolution air photo (three-inch pixel) of the Prado Basin during summer 2025. The cost for the air photo is shared with OCWD.
- Catalog and review in ArcGIS the extent of the riparian vegetation in the 2025 high-resolution air photo in of the Prado Basin
- Collect, review, and upload the Landsat NDVI data through the 2025 growing season.

Site-Specific Monitoring:

The site-specific monitoring of the riparian habitat consists of periodic field surveys of the riparian vegetation at selected locations. These surveys provide an independent measurement of vegetation quality that can be used to "ground truth" the regional monitoring of the riparian habitat, as well as the occurrence of the PSHB, a pest that is known to increase tree mortality in the Prado Basin. The USBR along with the OCWD[28] has conducted field surveys once every three years since 2007 at 31-39 sites. The most recent triennial field survey was conducted in the summer of 2022 and included two new sites along the northern portion of Mill Creek to increase monitoring at this location where there is potential for impacts to the riparian habitat from the observed decline in groundwater levels.

Task 4.4 involves conducting the next field surveys during the summer of 2025. The methodology for the 2025 field vegetation surveys is proposed to be modified from the previous survey as follows:

- Expand monitoring at a few sites along northern Mill Creek, where groundwater levels were historically low in 2022, and where there are now notable decreases in the vegetation greenness indicated by the NDVI and air photo in 2024. Expanded monitoring may involve adding additional survey plots or increasing the plot size in these areas of concern. The objective is to gather more data and information to verify the notable changes observed from the regional monitoring. This will aid in analyzing the potential causes of vegetation health declines, such as delayed response to groundwater level declines or invasive species. This data will be important in determining whether mitigation efforts will be needed in the future.
- Reduce the number of sites where the monitoring is performed. In the 2022 vegetation survey, 39 sites were monitored, most of which have triennial data starting from either 2007 or 2016. There is an opportunity to focus on key representative areas where field data are important for verifying regional assessment monitoring and where the Peace II implementation has potential impact riparian vegetation. There is potential to reduce the number of sites monitored by about 35-40 percent.

Currently, there is some uncertainty regarding the USBR's ability to conduct the vegetation surveys in the summer of 2025 as they have done in previous years. The USBR, a federal agency, is now subject to new polices and laws that restrict work-related travel. If the USBR is unable to perform the surveys, an external

[28] OCWD staff provides assistance to the USBR in the field as in-kind services.

biological consultant will be contracted to carry out the work, with the USBR providing background information and training.

The cost to perform the field vegetation surveys is estimated as $50,000 based on the 2022 expenses. The final cost will be refined and finalized as the methodology and scope are updated, and once the biological consultant for the 2025 surveys is determined.

Task 5. Prepare Annual Report of the PBHSC

This task involves the analysis of all data sets collected by the PBHSP through WY 2025, including the data collected in Tasks 1 through 4 and for other as-needed factors that can impact the riparian habitat, such as wildfires, habitat mitigation programs, or construction/development in the basin. The results and interpretations generated from the data analysis will be documented in the *Annual Report for Prado Basin Habitat Sustainability Committee for Water Year 2025*. This task includes the effort to prepare an administrative draft report for Watermaster and IEUA staff review, a draft report for the review by the PBHSC, and a final report including comments and responses. A PBHSC meeting will be conducted in May 2026 to review the draft report and facilitate comments on the report. The scope of this task is consistent with the work performed for the previous fiscal year.

Task 6. Project Management and Administration

This task includes the effort to prepare the PBHSP scope, schedule, and budget for the subsequent fiscal year. A draft *Technical Memorandum Recommended Scope and Budget of the Prado Basin Habitat Sustainability Program for FY 2026/27* will be submitted to the PBHSC in February/March 2026. A PBHSC meeting will be conducted in March 2026 to review the draft recommended scope and budget and facilitate comments. Also included in this task is project administration, including management of staffing and monthly financial reporting. The scope of this task is consistent with the work performed for the previous fiscal year.

Table 4-1. Work Breakdown Structure and Cost Estimate
Prado Basin Habitat Sustainability Program - Fiscal Year 2025/26

	Task Description	No. of sites	Labor Total		Other Costs, dollars				Notes	Totals, dollars			
			Person Days	Total, dollars	Travel	Equipment Rental	Outside Pro	Total		Recommended Budget 2025/26	Budget Prior FY 2024/25	IEUA Share 2025/26	CBWM Share 2025/26
Task 1. Groundwater Monitoring Program			**19.6**	**$33,177**				**$1,150**		**$34,327**	**$32,164**	-	**$34,327**
1.1	Download Transducer Data from PBHSP Wells (Quarterly)	18	11.0	$16,637	$950	$200		$1,150		$17,787	$16,759		
1.2	Process, Check and Upload Water Level, Temperature, and EC Transducer Data from PBHSP Wells (Quarterly)	18	8.6	$16,539				$0		$16,539	$15,405		
Task 2. Surface Water Monitoring Program			**5**	**$9,202**				**$200**		**$9,402**	**$8,044**	-	**$9,402**
2.1	Collect , Process, and Upload Field Measurements of Temperature and EC at Four Surface Water Sites (Quarterly)	4	3.5	$6,208		$200		$200		$6,408	$4,876		
2.2	Collect, Check, and Upload Surface Water Discharge and Quality Data from POTWs, USGS; and Dam Level Data from the ACOE (Annual)		1.8	$2,994				$0		$2,994	$3,168		
Task 3. Climate Monitoring Program			**1.4**	**$2,953**				**$250**		**$3,203**	**$2,846**	**$1,602**	**$1,602**
3.1	Collect, Check, and Upload Climatic Data (Annual)		1.4	$2,953			$250	$250		$3,203	$2,846		
Task 4. Riparian Habitat Monitoring Program			**16.5**	**$34,714**				**$63,000**		**$97,714**	**$40,648**	**$48,857**	**$48,857**
4.1	Perform a Custom Flight to Acquire a High-Resolution 2025 Air Photo of the Prado Basin		1.5	$3,432			$13,000	$13,000	(a)	$16,432	$16,060		
4.2	Catalog, and Review the Extent of the Riparian Vegetation in the 2025 Air Photo of the Prado Basin		2.5	$5,596				$0		$5,596	$5,432		
4.3	Collect, Check, and Upload 2025 Landsat NDVI Data to the PBHSP Database		9.3	$18,146				$0		$18,146	$19,156		
4.4	Conduct the Field Vegetation Monitoring for 2025		3.3	$7,540			$50,000	$50,000		$57,540			
Task 5. Prepare Annual Report of the PBHSC			**46.5**	**$93,209**				**$120**		**$93,329**	**$94,054**	**$46,664**	**$46,664**
5.1	Analyze Data and Prepare Admin Draft Report for CBWM/IEUA		35.3	$68,212				$0		$68,212	$68,762		
5.2	Incorporate CBWM/IEUA Comments and Prepare Draft Report: Submit Draft Report to PBHSC		3.5	$7,271				$0		$7,271	$8,720		
5.3	Meet with PBHSC to Review Draft Report		5.0	$11,690	$120			$120		$11,810	$10,480		
5.4	Incorporate PBHSC Comments and Finalize Report		2.8	$6,036				$0		$6,036	$6,092		
Task 6. Project Management and Administration			**10.1**	**$24,218**				**$120**		**$24,338**	**$22,062**	**$12,169**	**$12,169**
6.1	Prepare Scope and Budget for FY 2025/26		3.3	$7,340				$0		$7,340	$7,502		
6.2	Meet with PBHSC to Review Scope and Budget for FY 2025/26		3.3	$7,748	$120			$120		$7,868	$7,312		
6.3	Project Administration and Financial Reporting		3.6	$9,130				$0		$9,130	$7,248		
	Totals		**99**	**$197,472**	**$1,190**	**$400**	**$63,250**	**$64,840**		**$262,312**	**$199,818**	**$109,292**	**$153,020**

(a) This is half of the cost for the outside professional. OCWD will pay the other half.

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Appendix A

NDVI

A.1 BACKGROUND

Multi-spectral remote-sensing measurements of the Earth's surface from satellites are a verifiable means of deriving complete spatial coverage of environmental information. Remote-sensing measurements have been collected in a consistent manner over time. They are updated regularly and can be analyzed retrospectively, which has made these measurements useful in various types of ecological and environmental monitoring, including vegetation monitoring (USDA, 1996; Schidt and Karnieli, 2000; Campbell, 2007; Lillesand et al., 2008; Xie et al., 2008; Jones and Vaughnan, 2010).

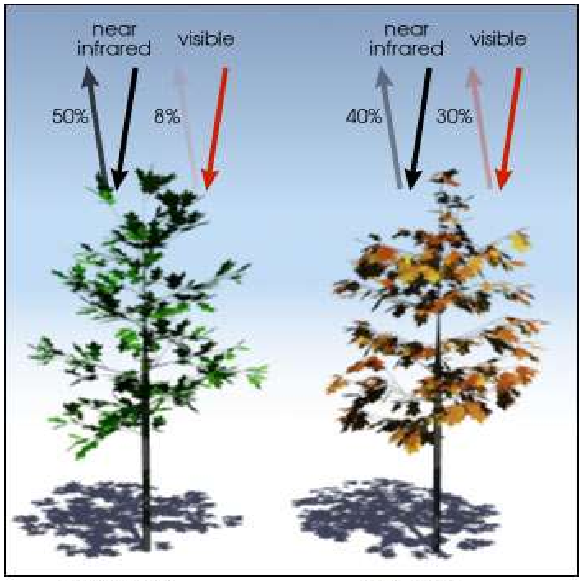
Remote sensing-based methods of vegetation monitoring commonly use vegetation indices that can be calculated from the wavelengths of light absorbed and reflected by vegetation (Jensen, 2007). NDVI, or the normalized difference vegetation index, is a widely used numerical indicator of vegetation extent and quality that is calculated from remote-sensing measurements (Ke et al., 2015; Xue,J and Su, B., 2017). Moreover, NDVI is an index of greenness correlated with photosynthesis and can be used to assess temporal and spatial changes in the distribution, productivity, and dynamics of vegetation (Pettorelli, 2013). NDVI is calculated from visible and near-infrared radiation reflected by vegetation using the following formula:

$$NDVI = \frac{(NIR - VIS)}{NIR + VIS}$$

Where: **NIR** = the spectral reflectance of near infrared radiation
VIS = the spectral reflectance of visible (red) radiation

During photosynthesis, healthy vegetation absorbs incoming visible light and reflects a large portion of near-infrared radiation. Unhealthy or dormant vegetation absorbs less visible light and reflects less near--infrared radiation. The figure[1] illustrates NDVI:

[1] Nasa.gov



$$\frac{(0.50 - 0.08)}{(0.50 + 0.08)} = 0.72 \qquad \frac{(0.4 - 0.30)}{(0.4 + 0.30)} = 0.14$$

Near-infrared radiation and visible light spectral reflectance are both expressed as ratios of the reflected radiation over the incoming radiation (values between 0 and 1); therefore, NDVI estimates range between -1.0 and 1.0. Negative NDVI estimates correspond to standing water, and low positive values (0 to 0.1) correspond to non-vegetated areas, such as barren rock and sand, snow, and water. NDVI estimates ranging from 0.1 to 1.0 correspond to vegetated areas, with very low-end estimates indicating sparse, unhealthy, or dormant vegetation, and increasing estimates towards 0.9 indicating higher amounts of dense, healthy green vegetation.

Advantages and Limitations.

NDVI was chosen as a method for characterizing and monitoring the riparian habitat for the PBHSP for the following reasons:

- Peace II activities could cause regional changes in groundwater levels, which potentially could result in regional impacts to the riparian habitat that is dependent on shallow groundwater. The regional scale of NDVI makes it an appropriate “first indicator” of regional changes in the extent and quality of riparian vegetation. And, it has been widely used in the past to support similar environmental monitoring and management programs (Peters et al., 2002; Pinzon et al., 2004; Wang et al., 2004; Weiss et al., 2004; Intera, 2014; Verbesselt et al, 2010; Gandhi et al., 2015).
- There is a long time-series of historical NDVI (early 1980s to present) that spatially covers the entire Prado Basin. These datasets can be used to characterize the history of the spatial extent and quality of the riparian vegetation prior to and after the implementation of Peace II activities (2007).
- In the future, it is likely that multi-spectral remote sensing will continue to collect the commonly measured spectral bands that are used to calculate NDVI (red and near-infrared) and that these data will be available for use as part of the PBHSP at a low cost.

Like most monitoring tools, NDVI has its limitations, which can reduce its reliability and usefulness. Important examples include:

- Cloud cover, water vapor, and atmospheric contaminants can lead to false decreases in NDVI estimates compared to clear days (Tanre et al., 1992; Achard and Estreguil, 1995; Chen et al., 2004; Hird and McDermid, 2009).
- Satellite degradation, sensor errors, and data transmission errors can lead to false NDVI estimates (James and Kalluri, 1994).
- Changes in soil moisture can lead to changes in NDVI estimates that are not necessarily related to changes in vegetation (Pettorelli, 2013).
- NDVI is a composite view of plant species diversity, form, structure, density, and vigor. As such, changes in NDVI may be caused by various changes in riparian habitat (Markon et al., 1995; Markon and Peterson, 2002). In other words, NDVI does not provide a complete picture of how and why vegetative changes are occurring; it simply indicates a change in vegetation.
- In densely vegetated areas, NDVI estimates have been shown to plateau during the growing season, indicating that NDVI can underestimate the green biomass in densely vegetated areas (Tucker et al., 1986).

These limitations demand that NDVI data be screened and filtered to identify or remove errors and noise. To reduce or eliminate noise, processing algorithms can be applied to "smooth" the time-series data and reveal patterns of change over time. For example, a smoothing technique applied in this report was the averaging of all NDVI from the growing season months. The average values are then plotted on time-series charts to display long-term trends in growing season vegetation quality.

The limitations also demand that NDVI not be interpreted in isolation. Interpretations of NDVI (vegetative changes) should be (i) verified with other georeferenced datasets, such as air photos and field vegetation surveys, and (ii) explained by comparison to datasets of causal factors of vegetative changes, such as water availability.

A.2 LANDSAT PROGRAM AND NDVI

The USGS and the National Aeronautics and Space Administration (NASA) jointly manage the Landsat Program[2], a series of Earth-observing satellite missions that began in 1972 with sensors that observe the Earth's surface and transmit information to ground stations that receive and process multi-spectral, remote-sensing data. Landsat satellites use technology that collects scenes of remote sensing measurements at the same time and location on the Earth's surface at a temporal frequency of about every two weeks. Landsat remote sensing measurements (Landsat imagery) is acquired in scenes that are approximately 106 by 115 miles. Landsat imagery is the only data source with more than thirty-years of continuous records of global land surface conditions at a spatial resolution of tens of meters (Tuck et al., 2004). Landsat imagery is among the most widely used satellite imagery in ecology and conservation studies (Pettorelli, 2013), and the data have been available for no cost since about 2010.

The United States Geological Survey (USGS), in compliance with the Global Climate Observing System[3], produces spectral indices products from Landsat imagery to support land surface change studies, which includes NDVI from 1982 to present (USGS, 2016). The USGS uses remote sensing imagery from the Landsat satellites—*Landsat 4, Landsat 5, Landsat 7, Landsat 8, and Landsat 9* (*Landsat 4, 5, 7, 8, and 9*)—

[2] Nasa.gov

[3] Global Climate Observing System Link

to generate NDVI estimates of the Earth's surface at a 30 x 30-meter pixel resolution. To apply the necessary atmospheric corrections and generate a surface reflectance product, the USGS uses a specialized software called Landsat Ecosystem Disturbance Adaptive Processing System (LEDAPS) to post-process the Landsat imagery (USGS 2015; 2017a). This surface reflectance product is then used to determine NDVI, among the other spectral indices. The spectral indices products are available for the USGS Landsat Collection 2 Level-2.[4]

A.3 Collection, Review, and Analysis of NDVI for the PBHSP

Collection

NDVI from the Landsat imagery for the period 1982 to 2024 were collected from the USGS, using the Earth Resources Observation and Science (EROS) Center Science Processing Architecture (ESPA) On Demand Interface[5] (USGS 2017b). The interface requires a bulk request in the form of a text file list of specific Landsat scenes using the Landsat scene identifier ID.[6] To obtain complete spatial coverage of the Prado Basin area, NDVI was requested for all Landsat scenes for Path 040, Rows 036 and 037.[7] Table 1 below summarizes the Landsat satellites and periods for which NDVI was obtained to produce a near-continuous NDVI record.

Table 1. Landsat Satellites

Satellite	Instrument	Launched	Ended	Period of NDVI Data Obtained from USGS
Landsat 4	Thematic Mapper	July 16, 1982	December 14, 1993	1982 - 1983
Landsat 5	Thematic Mapper	March 1, 1984	June 5, 2013	1984 - 2011
Landsat 7	Enhanced Thematic Mapper Plus	April 15, 1999	January 19, 2024	1999 - 2023
Landsat 8	Operational Land Imager	February 11, 2013	Still active	2013 - 2024
Landsat 9	Operational Land Imager 2 and Thermal Infrared Sensor 2	September 27, 2021	Still active	2021-2024

[4] Prior to 2022, this program utilized NDVI from the USGS Landsat Collection 1 Level-1, but that collection has been discontinued by the USGS. In 2022, NDVI from the entire period of record from 1984 to 2022 was obtained and uploaded to the project database to have a consistent record of NDVI from the same collection so that there are no changes in the NDVI analyzed in time series that were attributable to the difference in the spectral indices products from different Landsat Collections over time .
[5] USGS Link

[6] Landsat imagery is captured in scenes that are about 106 by 114 miles. Each Landsat scene has a unique scene ID based on the specific Landsat satellite, Landsat path number, Landsat row number, and date the image was collected.

[7] The Prado Basin is in an area of the Landsat path 040 that straddles Rows 036 and 037. Landsat scenes from Path 040 Row 036 and Path 040 Row 037 overlap each other throughout most of the Prado Basin region, but both are required to obtain complete spatial coverage of the Prado Basin.

NDVI from scenes produced from the *Landsat 4*, *5, 7, 8, and 9* satellites were obtained from the USGS for the period 1982 through 2024. The source and frequency of availability of NDVI from the USGS varies over the period of record:

- From 1982 to 1989, NDVI is from Landsat 4 and 5 and is patchy, ranging from a frequency of eight days to one year.
- From 1990 to 1999, NDVI is from Landsat 5 at a frequency of about 16 days.
- From 1999 to 2011, NDVI is from Landsat 5 and 7 at a frequency of seven to eight days.
- In 2012, NDVI is from Landsat 7 at a frequency of 14 to 16 days.
- From 2013 to 2023, NDVI is from Landsat 7 and 8 at a frequency of seven to eight days.
- From 2021 to 2023, NDVI is from Landsat 7, 8, and 9 at a frequency of one to eight days.
- Since January 2024, NDVI is from Landsat 8 and 9 at a frequency of seven to eight days.

NDVI were cataloged, processed, and uploaded into HydroDaVE^{SM}, a database management software that manages gridded datasets and features tools for viewing and extracting data.[8] There is some overlap of NVDI data in areas where there is NVDI from Landsat scenes from Rows 036 and 037. HydroDaVE has the ability to compute a stacked average for Landsat scenes from Rows 036 and 037 for each NDVI pixel they overlay[9] when viewing and extracting NDVI data.

Review

Spatial NDVI were reviewed for disturbances that can be caused by cloud cover, unfavorable atmospheric conditions, or satellite equipment malfunction. In HydroDaVE^{SM}, maps were prepared of spatial NDVI for the entire Prado Basin region for each date. The maps were reviewed and documented to identify specific dates for exclusion due to cloud cover or other disturbances. Erroneous NDVI estimates were discernable because NDVI patterns of permanent landscape features were distorted and/or NDVI estimates were clearly not consistent with estimates typically observed for a particular area both seasonally and over time. On average, about 31 percent of the NDVI were identified as erroneous and excluded from the analysis. Most of which were rejected because of cloud coverage, which was further verified by referencing and viewing the specific Landsat scene on the USGS *EarthExplorer* website.[10]

After excluding erroneous NDVI estimates, there was one date for 1982, and there were no dates for 1983; as such, the time-series data discussed throughout Section 3 of the report include NDVI estimates for 1984 to 2024.

NDVI estimates derived from *Landsat 7* satellite imagery from mid-2003 to 2023 were further reviewed date-by-date for the occurrence of spatial data gaps, resulting from the failure of the Scan Line Corrector (SLC) on the *Landsat 7* satellite, which accounts for the satellite's forward motion. SLC failure results in data gaps along scan line paths of variable widths and occurrences. An estimated 22 percent of any given

[8] Hydrodave Link

[9] Not all dates will have Landsat scenes for both Rows 036 and 037 if cloud cover was greater than 20 percent in one of them; Landsat scenes with a percent cloud cover greater than 20 percent were not obtained from the USGS for this study.

[10] Earthexplorer Link

Landsat 7 scene is lost because of SLC failure; however, the imagery acquired between these gaps is valid and useable for analysis.[11] All NDVI estimates derived from *Landsat 7* satellite imagery from 2003 to 2023 were evaluated spatially date-by-date to determine if the valid portion of the data covers the defined areas of interest used for the temporal analysis of NDVI in the time series discussed in Section 3 of this report. Date-by-date analysis is necessary because the spatial position and size of the data gaps from the *Landsat 7* satellite vary for each date. Generally, areas of interest for NDVI analysis that are larger than about 400 square meters cannot use any NDVI determined from *Landsat 7* satellite imagery because it would include data gaps within the area; while areas of interest less than 400 square meters can use NDVI determined from the *Landsat 7* satellite imagery if the data gap area is not within the area of interest. During 2012, the *Landsat 7* satellite was the only Landsat satellite collecting data. Therefore, there are no data for the areas of interest larger than 400 square meters during 2012. After the launch of the *Landsat 9* satellite in 2022, there were several dates without spatial data gaps from the *Landsat 7* satellite.

[11] Landsat Link

Analyses of Time-series Data

HydroDaVE^{SM} contains features to calculate and extract a spatial average NDVI for a designated area and time period. The NDVI spatial average for each available date is plotted in time-series charts to analyze seasonal and temporal changes for a defined area. Time-series charts of NDVI for various areas in the Prado Basin are first introduced in Section 3.1 of this report.

When viewing time-series charts of NDVI for the period of record, it should be noted that a methodological factor that can affect observed NDVI trends is the difference between the technology of the *Landsat 4, 5, and 7* satellites, and the *Landsat 8 and 9* satellites. The *Landsat 4, 5, and 7* satellites use thematic mapper technology to scan the land surface, whereas *Landsat 8* and *Landsat 9* use operational land imager sensors. It has been well documented that the NDVI estimates obtained from the operational land imager sensors used on the *Landsat 8 and 9* satellites generate slightly higher index values for vegetated land cover (Xu and Guo 2014; She et al., 2015). In order to analyze the time-series of NDVI derived across all Landsat satellites for the period of record, a bias-correction factor of -0.05, derived from literature review (Li et al., 2014; Flood, 2014: and Ke et al., 2015), was used to transform all Landsat 8 and 9 NDVI estimates such that all historical NDVI estimates could be analyzed collectively (Roy et al., 2016). The *Landsat 9* satellite was launched into orbit in 2022, and from 2022 to 2023, NDVI was available from *Landsat 7, 8, and 9* satellites. During 2023, data was collected from both the *Landsat 8 and 9* satellites on some of the same dates. On these dates, only NDVI from the *Landsat 9* satellite was used. The *Landsat 7* satellite stopped collecting data in January 2024 and since then, NDVI has been available from *Landsat 8 and 9* satellites.

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Appendix B

Mann-Kendall Analysis of NDVI

B.1 Introduction

The Mann-Kendall statistical trend test (Mann-Kendall test) was performed on the average growing-season NDVI metrics (NDVI) for the period of 1984 to 2024 for all 18 areas where NDVI are analyzed for the *Annual Report of the Prado Basin Habitat Sustainability Committee Water Year 2024*. The Mann-Kendall test was utilized to evaluate whether the average growing-season NDVI increased, decreased, or remained stable over time.

B.2 Methods

The Mann-Kendall test is a non-parametric statistical trend test. It is analogous to parametric trend testing such as regression (linear regression) except the data do not need to have a particular probability distribution (normal) and be accurately described by a particular measure of centrally tendency (mean, standard deviation, etc.) (Helsel and Hirsch, 2002).

To perform the test, the NDVI values are ordered chronologically and the signs (+/–) are recorded for all of the possible differences between a given NDVI value and every NDVI value that preceded it in the time series. The Mann-Kendall test statistic **S** is defined as the number of positive differences (+) minus the number of negative differences (–). From **S** and the number of NDVI values, **n**, the **τ** coefficient (analogous to the **r** correlation coefficient in linear associations) is then calculated. The **τ** coefficient represents the strength of the monotonic relationship between time and NVDI values with a possible range of -1 to 1. A perfect positive trend would yield a **τ** coefficient equal to 1, and a perfect negative trend would yield a **τ** coefficient equal to -1.

The Mann-Kendall test utilizes the null hypothesis that there is no trend. If the **S** test statistic and **τ** coefficient are significantly different than zero, the null hypothesis is rejected, and a trend exists. The level of statistical significance is expressed as a p-value between 0 and 1. The smaller the p-value the stronger the evidence that the null hypothesis should be rejected. In this study, a p-value of less than or equal to 0.05 was used to determine if a trend existed. In summary, the three possible outcomes of the test are

- Increasing trend (p-value ≤ 0.05, $\tau > 0$)
- No trend (p-value > 0.05)
- Decreasing trend (p-value ≤ 0.05, $\tau < 0$)

B.4 Data Analysis and Results

The Mann-Kendall **S** test statistic, **τ** coefficient and p-value were computed for average-growing season NDVI from 1984 to 2024 for the 18 areas in Prado Basin, using the python package *pyMann-Kendall* (Hussain, 2019). Tables B-1 through B-3 list the results of the Mann-Kendall test for the three time periods of interest: 1984 through 2024 (entire period of record); 1984 through 2006 (period prior to the Peace II Agreement); and 2007 through 2024 (period after the Peace II Agreement implementation).

Table B-1. 1984 to 2024

Area	n (number of NDVI values)	S Test Statistic	τ coefficient	p-value	Trend
Riparion Vegetation Extent	40	118	0.15	1.73E-01	No Trend
Chino Creek Area	40	522	0.67	1.28E-09	Increasing
Mill Creek Area	40	-18	-0.02	8.43E-01	No Trend
Upper Mill Creek Area	40	310	0.40	3.18E-04	Increasing
CC-1	41	596	0.73	2.34E-11	Increasing
CC-2	41	550	0.67	6.99E-10	Increasing
CC-3	41	542	0.66	1.23E-09	Increasing
CC-4	41	306	0.37	6.13E-04	Increasing
MC-1	41	508	0.62	1.24E-08	Increasing
MC-2	41	102	0.12	2.57E-01	No Trend
MC-3	41	264	0.32	3.14E-03	Increasing
MC-4	41	184	0.22	3.98E-02	Increasing
MC-5	41	112	0.14	2.12E-01	No Trend
MC-6	41	266	0.32	2.92E-03	Increasing
SAR-1	41	-80	-0.10	3.75E-01	No Trend
SAR-2	41	214	0.26	1.67E-02	Increasing
SAR-3	41	394	0.48	1.01E-05	Increasing
LP	41	-10	-0.01	9.19E-01	No Trend

Table B-2. 1984 to 2006

Area	n (number of NDVI values)	S Test Statistic	τ coefficient	p-value	Trend
Riparion Vegetation Extent	23	45	0.18	2.45E-01	No Trend
Chino Creek Area	23	123	0.49	1.27E-03	Increasing
Mill Creek Area	23	-119	-0.47	1.83E-03	Decreasing
Upper Mill Creek Area	23	-29	-0.11	4.60E-01	No Trend
CC-1	23	129	0.51	7.23E-04	Increasing
CC-2	23	141	0.56	2.18E-04	Increasing
CC-3	23	135	0.53	4.02E-04	Increasing
CC-4	23	5	0.02	9.16E-01	No Trend
MC-1	23	89	0.35	2.01E-02	Increasing
MC-2	23	-55	-0.22	1.54E-01	No Trend
MC-3	23	-51	-0.20	1.87E-01	No Trend
MC-4	23	-35	-0.14	3.69E-01	No Trend
MC-5	23	41	0.16	2.91E-01	No Trend
MC-6	23	-65	-0.26	9.10E-02	No Trend
SAR-1	23	11	0.04	7.92E-01	No Trend
SAR-2	23	-139	-0.55	2.68E-04	Decreasing
SAR-3	23	-25	-0.10	5.26E-01	No Trend
LP	23	85	0.34	2.65E-02	Increasing

Table B-3. 2007 to 2024

Area	n (number of NDVI values)	S Test Statistic	τ coefficient	p-value	Trend
Riparion Vegetation Extent	17	30	0.22	2.32E-01	No Trend
Chino Creek Area	17	80	0.59	1.14E-03	Increasing
Mill Creek Area	17	58	0.43	1.89E-02	Increasing
Upper Mill Creek Area	17	84	0.62	6.29E-04	Increasing
CC-1	18	99	0.65	2.06E-04	Increasing
CC-2	18	113	0.74	2.21E-05	Increasing
CC-3	18	79	0.52	3.13E-03	Increasing
CC-4	18	71	0.46	8.01E-03	Increasing
MC-1	18	115	0.75	1.57E-05	Increasing
MC-2	18	71	0.46	8.01E-03	Increasing
MC-3	18	65	0.42	1.53E-02	Increasing
MC-4	18	27	0.18	3.25E-01	No Trend
MC-5	18	67	0.44	1.24E-02	Increasing
MC-6	18	115	0.75	1.57E-05	Increasing
SAR-1	18	81	0.53	2.44E-03	Increasing
SAR-2	18	109	0.71	4.30E-05	Increasing
SAR-3	18	105	0.69	8.17E-05	Increasing
LP	18	-21	-0.14	4.49E-01	No Trend

B.5 References

Helsel, D.R., and Hirsch R.M. 2002. *Statistical Methods in Water Resources*. Techniques of Water Resource Investigations of the United States Geological Survey, Book, 4 Hydrological Analysis and Interpretation. September 2002.

Hussain et al. 2019. *Journal of Open Source Software*. pyMannKendall: a python package for non parametric Mann Kendall family of trend tests. 4(39), 1556, https://doi.org/10.21105/joss.01556

Appendix C

Draft 2022 Prado Basin Vegetation Survey Report

United States Department of the Interior

BUREAU OF RECLAMATION
P.O. Box 25007
Denver, CO 80225-0007

IN REPLY REFER TO:
86-68560
1.3.11

VIA ELECTRONIC MAIL ONLY

Memorandum

To: Leslie Cleveland, Water Resources Manager
Southern California Area Office (SCAO-7200)

From: Aaron Murphy, Ecologist
Hydraulic Investigations and Laboratory Services (86-68560)

Subject: Prado Basin Vegetation Survey

Please find attached the final report for the Prado Basin Vegetation Survey (EcoLab-LCP23-2023-03). This memorandum documents the vegetation surveys and data analysis conducted in the Prado Basin, CA in October 2022. These surveys were done to support the Inland Empire Utilities Agency (IEUA) and Chino Basin Watermaster at the request of the Southern California Area Office (SCAO). Any questions about the surveys or memorandum should be addressed to Aaron Murphy at 303-445-2157 (amurphy@usbr.gov) or Scott O'Meara at 303-445-2216 (someara@usbr.gov).

Attachment

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Prado Basin Vegetation Survey – October 2022

Riverside and San Bernardino Counties, California
Chino Basin Watermaster and Inland Empire Utilities Agency
Prado Basin Habitat Sustainability Program

Mission Statements

The Department of the Interior (DOI) conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Prado Basin Vegetation Survey – October 2022

Riverside and San Bernardino Counties, California
Chino Basin Watermaster and Inland Empire Utilities Agency
Prado Basin Habitat Sustainability Program

Technical Service Center
Hydraulic Investigations and Laboratory Services
Ecological Research Laboratory

EcoLab-LCP23-2023-03

Aaron Murphy, Ecologist
Scott O'Meara, Botanist

Cover Photo: Misty morning at the Orange County Water District office. (Reclamation/Aaron Murphy)

Contents

Introduction

The United States Bureau of Reclamation (Reclamation) has been monitoring riparian vegetation within the Prado Flood Control Basin (Prado Basin) since 2003 to support the Inland Empire Utilities Agency (IEUA) and Chino Basin Watermaster (Watermaster). This report details vegetation monitoring surveys conducted in October 2022 by Reclamations' Technical Service Center. Similar vegetation monitoring surveys were conducted by Reclamation in 2007, 2013, 2016, and 2019.

The IEUA, Watermaster, and the Orange County Water District (OCWD) are concerned about the quality of water flowing into the Santa Ana River. In the southern Chino Basin, as agricultural/dairy land uses are converted to urban, there is more water recycled and reused, both of which result in less groundwater pumping and the potential for poor quality groundwater to become rising groundwater to the Santa Ana River. Groundwater pumping by a regional municipal well field across the southern Chino Basin was proposed in the Watermaster's Optimum Basin Management Program to control groundwater levels in southern Chino Basin, including the Prado Basin, and to limit rising groundwater and its water-quality impacts to the Santa Ana River and downstream beneficial users.

In the Prado Basin, riparian habitat could be impacted by decreasing groundwater levels caused by the groundwater pumping plan. Riparian habitats are an ecologically important part of the landscape. They contain higher levels of species richness than other habitats and are essential to promoting regional biodiversity. Conservation of the riparian habitat of the Prado Basin is important to IEUA, Watermaster, OCWD, Reclamation, and other entities involved in water and habitat conservation.

Riparian habitat along Mill and Chino Creeks, and in the Prado Basin, is dominated by native plants, including: Goodding's willow (*Salix gooddingii*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), sandbar willow (*Salix hindsiana*), Fremont cottonwood (*Populus fremontii*), and black cottonwood (*Populus trichocarpa*). Riparian species are generally phreatophytic, meaning they must maintain root contact with water. A decrease in groundwater elevation could negatively affect recruitment, density, and vigor of existing trees.

The riparian area in the Prado Basin is also breeding habitat for two endangered songbirds, Least Bell's Vireo (*Vireo bellii pusillus*) and Southwestern Willow Flycatcher (*Empidonax trailii extimus*), as well as for the Yellow-billed Cuckoo (*Coccyzus americanus*), a threatened species. An active and successful management program has made this area vital to the recovery of the Least Bell's Vireo.

Study Area

There are approximately 6,000 acres of riparian vegetation in the Prado Basin (Figure 1). This constitutes the largest riparian area of willow woodlands in Southern California, and it is home to rare, threatened, and endangered species. One endangered songbird, the Least Bell's Vireo (Vireo bellii pusillus) builds nests within dense riparian shrubs. This species is a California state and federally listed endangered species, and the Prado Basin is designated as critical habitat. In addition to ecological concerns, the Prado Basin is important for flood control, water storage, and water quality improvement.

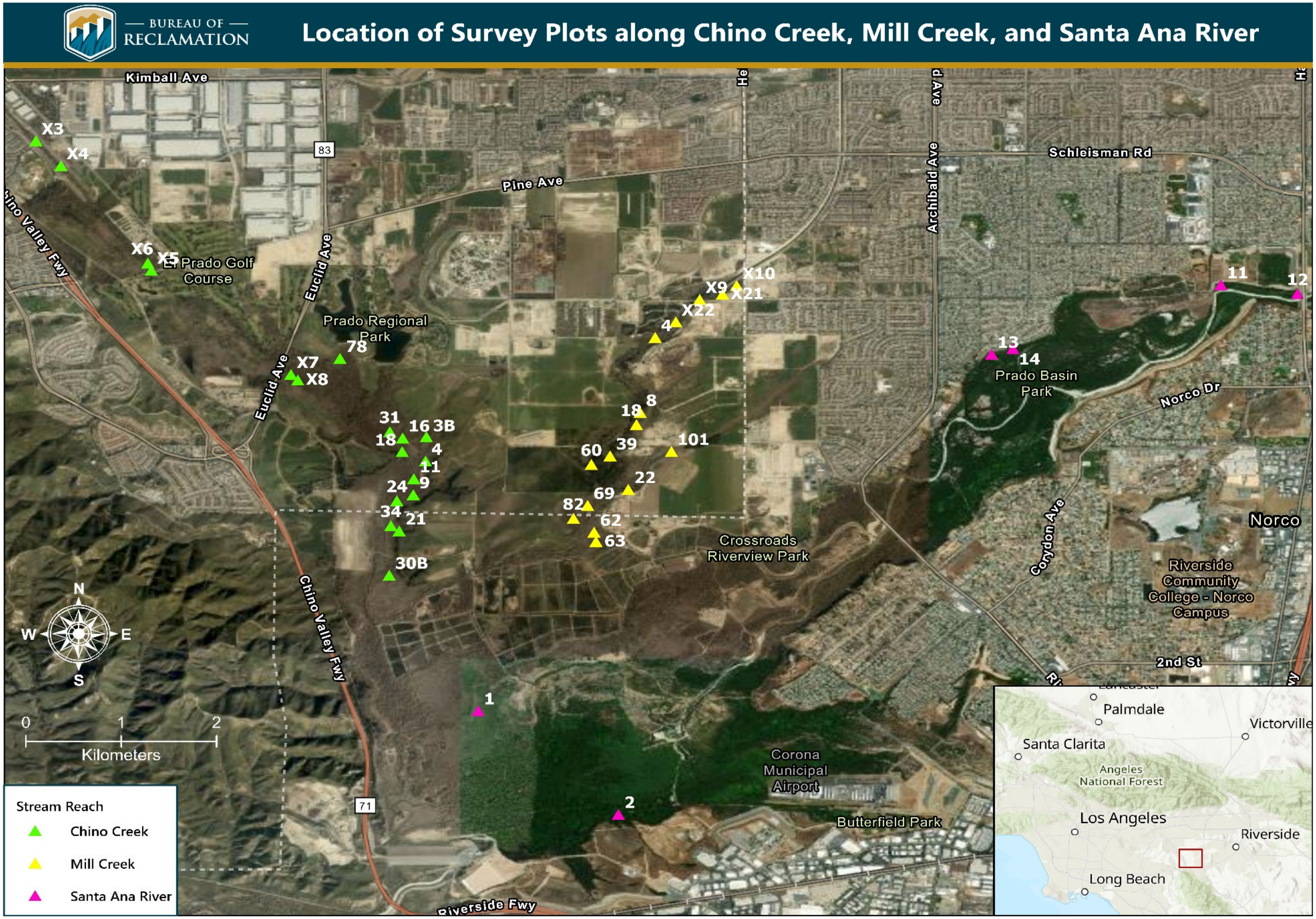

Figure 1. Map of Prado Basin study area with locations of 2022 survey plots.

Methods

The field sampling protocol developed in 2003 has been modified over time to achieve overall study goals with the available resources.

Monitoring History Performed by Reclamation in Prado Basin for IEUA/Watermaster

- *June 2003* - Mill Creek was chosen as the study area and Chino Creek was chosen as the control area for vegetation monitoring based on analysis of a depth-to-water hydraulic model by Wildermuth Environmental Inc. (WEI).
- *November 2003* - Aerial photographs were taken of the entire Prado Basin, including the riparian areas along Mill Creek, Chino Creek, the Santa Ana River, and Temescal Creek.
    - Aerial photographs were used to delineate riparian areas into cover types. Wetland and deep-water habitats were mapped and classified according to the United State Fish and Wildlife Service (USFWS) wetland hierarchical classification system (Cowardin et al, 1979).
- *March 2004* - Pilot data were collected at Mill Creek (18 plots) and Chino Creek (15 plots) to determine necessary sample size and sampling methodology.
- *October 2007* - Permanent plots were established at locations near the 2004 pilot locations and marked with t-posts. A sampling methodology was established; vegetation data were collected and trees were tagged.
- *October 2013* – The monitoring protocol was adjusted. Herbaceous vegetation was excluded as it was deemed less relatable to groundwater and too labor intensive to monitor. Variable radius plots were established at each monitoring site and vegetation data were collected.
- *October 2016* - Additional permanent plots were established at 14 locations adjacent to shallow monitoring wells along Mill Creek, Chino Creek, and the Santa Ana River. Data were collected at 37 permanent plots (23 survey previously and 14 new) using the 2013 monitoring protocol.
- *September 2019* – The 37 permanent plots surveyed in 2016 were surveyed using the 2013/2016 protocol. No new plots were established, but additional trees were tagged and recorded (Figure 1).
- *October 2022* – The 37 permanent plots surveyed in 2019 were surveyed along with two additional plots established along Mill Creek bringing the total number of plots to 39 (Figure 1). The monitoring protocol was modified to eliminate the collection of tree diameter at breast height, tree height, and lowest leaf height since these variables were not used in the assessment of riparian health.

Initial Monitoring (2003 & 2007)

The original monitoring plan used a fixed area sampling method to measure species composition, density, and basal area. Nested variable quadrats based on vegetation layer were used at each sampling point. Live and dead trees, saplings, shrubs, and seedlings were counted by species within their respective quadrat sizes.

For overstory species, diameter at breast height (DBH), height, and/or stem diameter 30 cm above the ground for shrubs, were measured. Canopy cover was estimated using four spherical densiometer measurements per plot, 5 meters from the plot center in each of the four cardinal directions. Photo points were also taken from the center of the quadrat in each of the four cardinal directions. In 2007, plots were permanently marked with t-posts and trees were tagged in order to conduct identical measurements over time.

Modified Monitoring (2013, 2016, & 2019)

From 2013 to 2019 monitoring was conducted at the locations established in 2007. An additional 14 plots were established in 2016: 6 on Chino Creek (18 total plots), 2 on Mill Creek (13 total plots), and 6 on the Santa Ana River (6 total plots). This brought the basin study total to 37 monitoring plots across three stream reaches.

Shrubs and saplings (DBH <8 cm) were the only component of the understory monitored. Herbaceous vegetation was excluded after 2007 as it was deemed less relatable to groundwater and is more labor intensive to monitor. Within the plots, the DBH was measured for each sapling, or Diameter at Root Collar (DRC) for shrubs. Shrub stems branching below 10 cm counted as individual stems, and downed trees were not counted. Species, height, and distance/azimuth from the center point were also recorded for each plant.

Trees with DBH >8 cm were monitored within variable radius plots: 5 or 10 meters to contain approximately 10 trees. Each tree within the plot was identified to species and was visually assessed for the presence of shot-hole borer (*Euwallacea* sp.) and for health condition (Live/Dead/Stressed). Tree measurements included DBH, total height and low-crown height (Crown Ratio), and percent canopy cover. Canopy cover was estimated using four spherical densiometer measurements per plot, 5 meters from the plot center in each of the four cardinal directions.

For each variable (DBH, height, percent canopy cover, basal area, stem density, and crown ratio), the average value was derived for each plot surveyed during each survey year. The percentage of Live/Dead/Stressed trees was calculated. Species composition was evaluated at the site level. The presence of shot-hole borer was also evaluated.

Current Monitoring (2022)

Monitoring was conducted at the 37 locations established between 2007 - 2016. Two additional plots were established along the northern part of Mill Creek (Figure 1).

Understory Sampling

Shrubs and saplings (trees with DBH <8 cm) are the only component of the understory monitored. Herbaceous vegetation was excluded after 2007 as it was deemed less relatable to groundwater and is more labor intensive to monitor. Saplings and shrubs were assessed for health condition (Live/Dead/Stressed) and identified to species level. Shrubs often have multiple stems that branch below 10 cm above the ground and the number of stems was counted. Downed trees were not counted.

Overstory Sampling

Trees with DBH >8 cm are monitored within variable radius plots. Plots were designed to have radii of 5 or 10 meters and to contain approximately 10 trees. The radius of the plot is held constant across sampling years regardless of changes to tree count. Each tree within the plot was identified to species and was visually assessed for the presence of shot-hole borer (*Euwallacea* sp.). Adult beetles burrow exit holes through the bark and the damage takes on a "shotgun blast" appearance.

Each tree was assessed for health condition (Live/Dead/Stressed). The Stressed condition was applied to trees that had dead sections or other visible damage, but that were clearly still alive. Canopy cover was recorded using four spherical densiometer measurements per plot, approximately 1 meter from the plot center in each of the four cardinal directions.

Plot Photos

Photographs were taken in each of the cardinal directions from the center of the plot. Photos are not included in this report due to file size, but will be provided to West Yost on behalf of Watermaster/IEUA.

Data Analysis

For each plot the percentage of Live/Dead/Stressed trees was calculated, along with the percent infested by shot-hole borer. The average percent canopy cover and number of trees per hectare was also calculated for each plot. Species composition was evaluated at the stream reach level.

Results

This section presents results from surveys conducted in 2022 along the three stream reaches, Chino Creek, Mill Creek, and Santa Ana River. A summary of measured and calculated variables for each plot can be found in Attachment 1.

Canopy Cover

Mean canopy cover exceeded 70% at all 3 steam reaches in 2022 (Table 1). Mean canopy cover along Chino Creek (81.5%) was higher than along Mill Creek (76.2%) and the Santa Ana River (72.7%). All measurements of mean canopy cover per plot can be found in Attachment 1.

Table 1. Mean (standard error), maximum, and minimum canopy cover found at the plot level within each stream reach, Prado Basin 2022.

	Chino Creek	Mill Creek	Santa Ana River
Mean Cover	81.5% (6.6)	76.2% (7.9)	72.7% (13.4)
Maximum Cover	100%	100%	98.7%
Minimum Cover	4.2%	0.0%	19.3%

Shrubs

Mule fat (*Baccharis salicifolia*), Mexican elderberry (*Sambucus mexicana*), and tree tobacco (*Nicotiana glauca*) shrubs were found in four plots along Mill Creek (Table 2). No shrubs were observed within the surveyed plots along Chino Creek or Santa Ana River.

Table 2. Summary of shrub coverage at Mill Creek survey plots, Prado Basin 2022.

Mill Creek Plot	Species	Total Stems
8	*Sambucus mexicana*	10
X9	*Baccharis salicifolia*	13
X22	*Baccharis salicifolia*	8
X22	*Nicotiana glauca*	3
62	*Baccharis salicifolia*	7

Saplings

Saplings (DBH < 8cm) were found along Chino Creek (80 total saplings observed), Mill Creek (23), and the Santa Ana River (8) in 2022. In addition to common riparian species such as Goodding's and arroyo willow, sapling species included: boxelder (*Acer negundo*), velvet ash (*Fraxinus velutina*), sycamore (*Platanus* sp.), eucalyptus (*Eucalyptus* sp.), and tree-of-heaven (*Ailanthus altissima*).

Eucalyptus are non-native trees that can form monotypic groves and outcompete native species. Five eucalyptus saplings were found in Plot 18 along Chino Creek in 2019 and all were still living in 2022. There are currently no tagged eucalyptus trees within Plot 18.

Tree-of-heaven is a clonal invasive species that forms dense thickets and is designated a moderate threat by the California Invasive Plant Council (CAL-IPC). One tree-of-heaven sapling was observed in Plot 10 along Mill Creek. There are no tagged tree-of-heaven trees in Plot 10. However, additional tree-of-heaven saplings were observed outside the plot radius.

The highest densities of saplings were found along Chino Creek (Table 3). In Plot 21, all tagged trees were burned during the Euclid Fire (June 2018) and Gooding's willow saplings have re- sprouted near dead remnants. In Plot 1 (Santa Ana River), a fire burned all tagged trees in 2021 and several Gooding's willow saplings have emerged in the plot.

Overstory Trees

Goodding's willow was the most abundant overstory species found in all stream reaches (Table 4). Other species observed included velvet ash, Fremont cottonwood, arroyo and red willow, boxelder, sycamore, tree-of-heaven, and eucalyptus.

Table 3. Mean (standard error) values for density (saplings/ha) of live saplings. Percentages of Live(L)/Dead (D)/Stressed (S) saplings and species at each stream reach, Prado Basin 2022.

Metrics	Chino Creek	Mill Creek	Santa Ana River
Density (saplings/ha)	259.9 (65.2)	72.2 (30.2)	42.4 (26.8)
Sapling Health			
Live	60.0%	65.2%	66.7%
Dead	21.3%	17.4%	0.0%
Stressed	18.8%	17.4%	33.3%
Species Composition			
Goodding's willow	68.8%	87.0%	100.0%
Arroyo willow	10.0%	-	-
Boxelder	11.3%	-	-
Eucalyptus	6.3%	-	-
Velvet ash	3.8%	4.3%	-
Sycamore	-	4.3%	-
Tree-of-heaven	-	4.3%	-

Table 4. Percentages of Live/Dead/Stressed overstory trees and species composition found at each stream reach, Prado Basin 2022.

Tree Health	Chino Creek	Mill Creek	Santa Ana River
Live	58.3%	47.7%	46.0%
Dead	16.6%	18.9%	26.5%
Stressed	25.1%	33.3%	27.4%
Species Composition			
Goodding's willow	76.8%	95.5%	74.3%
Velvet ash	9.5%	1.8%	-
Arroyo willow	5.2%	-	13.3%
Boxelder	4.7%	-	-
Eucalyptus	2.4%	-	4.4%
Red willow	1.4%	-	-
Sycamore	-	0.9%	-
Tree-of-heaven	-	0.9%	-
Fremont cottonwood	-	0.9%	8.0%

The proportion of live, dead, and stressed trees on each plot was highly variable throughout the Prado Basin in 2022. At the stream reach level, Chino Creek had the highest percentage of live trees and lowest percentage of dead trees (Figure 2). More than 25% of trees at all locations were classified as stressed. The highest percentage of dead trees (26.5%) was found in the Santa Ana River area. The plots in the Santa Ana stream reach have been impacted by fire (Plot 1) and extensive grape vine infestations (Plot 2 and Plot 13) since the 2019 surveys.

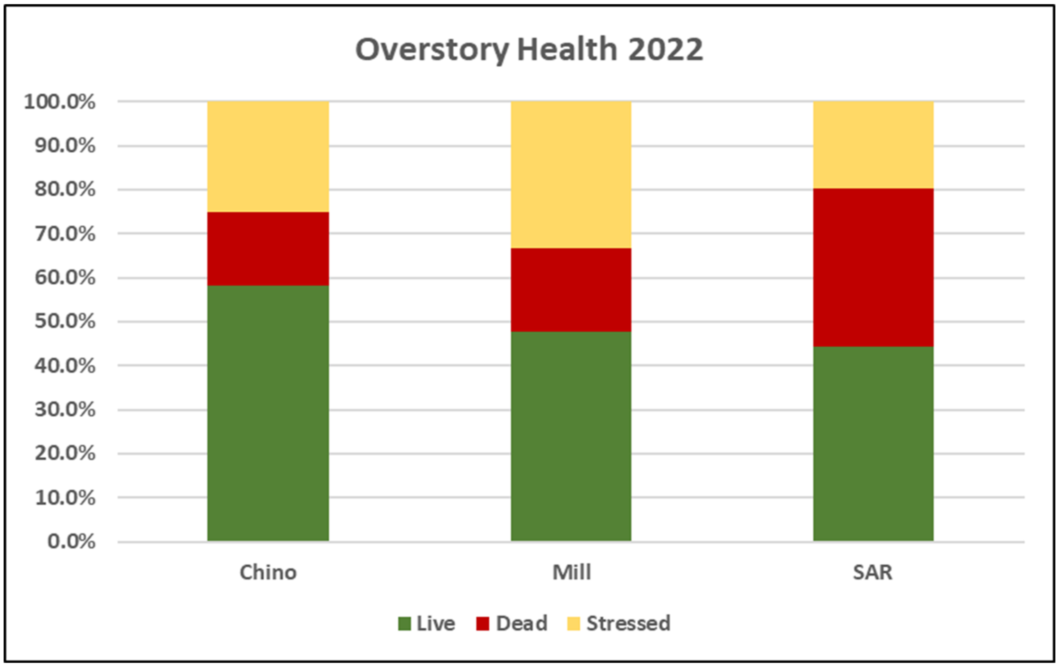

Figure 2. Percentages of Live, Dead, and Stressed trees at each site, Prado Basin 2022.

The health of live and stressed trees was assessed to compare changes from 2016 to 2019 with changes from 2019 to 2022 (Figure 3). Live trees changed at the same percentage in both time periods. Among stressed trees, 49% changed from stressed to live between 2019 and 2022. This was higher than the 29% change from 2016 to 2019.

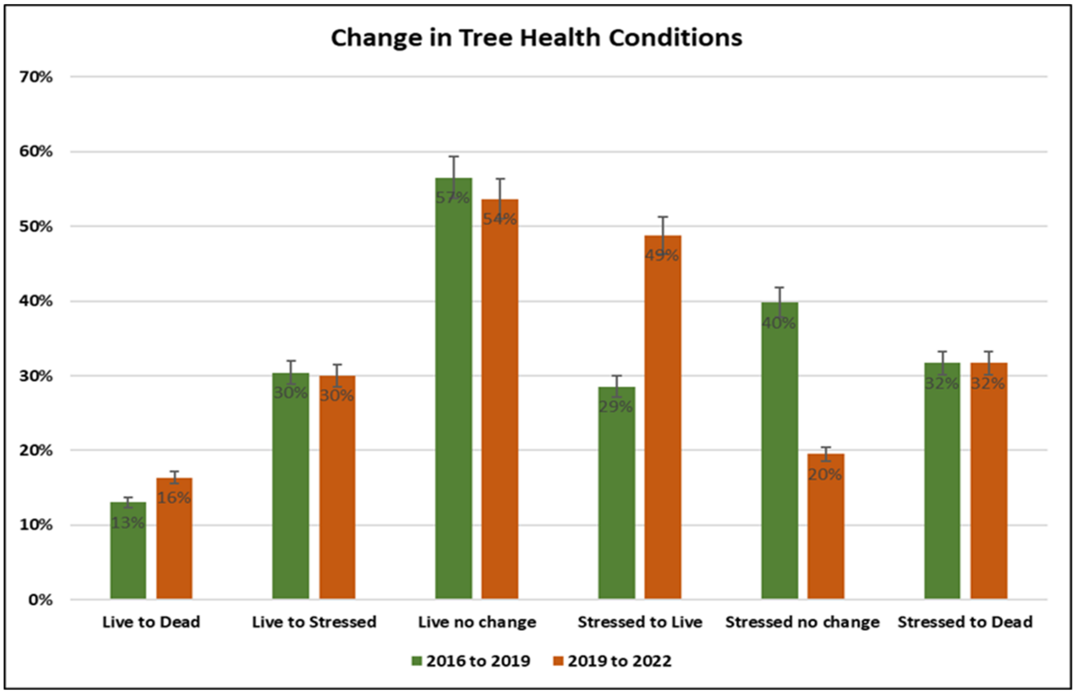

Figure 3. Changes in health conditions for live and stressed trees between 2016 and 2022. Shown with standard error bars.

Shot-Hole Borer

The shot-hole borer is a burrowing beetle found on a wide range of host plants, that spreads fungal pathogens within the vascular system. The beetles are known to prefer healthy trees and were first documented in the vegetation surveys in 2016.

The presence of shot-hole borer was noted in plots along all stream reaches (Table 5). Shot-hole borer was documented as present if there was obvious damage to the tree. Evidence of shot-hole borer damage was found on live (3), stressed (15), and dead (1) trees and in Gooding's willow, velvet ash, arroyo willow, and boxelder. No saplings were found with shot-hole borer damage.

Table 5. Percentage of trees with shot-hole borer observations at each stream reach in Prado Basin.

Shot-hole Borer	Chino Creek	Mill Creek	Santa Ana River
2016	28.1%	56.5%	44.2%
2019	2.5%	9.2%	0.0%
2022	3.3%	9.0%	1.8%

Temporal Comparison

Changes in overstory health between 2019 and 2022 were evaluated for all stream reaches. At Chino Creek and Mill Creek the percentage of live, unstressed trees increased by 12-13%, while the percentage along the Santa Ana River decreased by 9% (Figure 4). The percentage of dead trees in the Santa Ana River reach increased by 20%. Much of the increase in dead trees in the Santa Ana

River plots could be explained by the impacts of a fire at Plot 1 and grapevine competition in Plots 2 and 13. Extensive grapevine was observed wrapped around trees in Plots 2 and 13 during the 2022 surveys. Grapevine can damage trees by breaking off tree tops or limbs and by reducing the sunlight that reaches leaves.

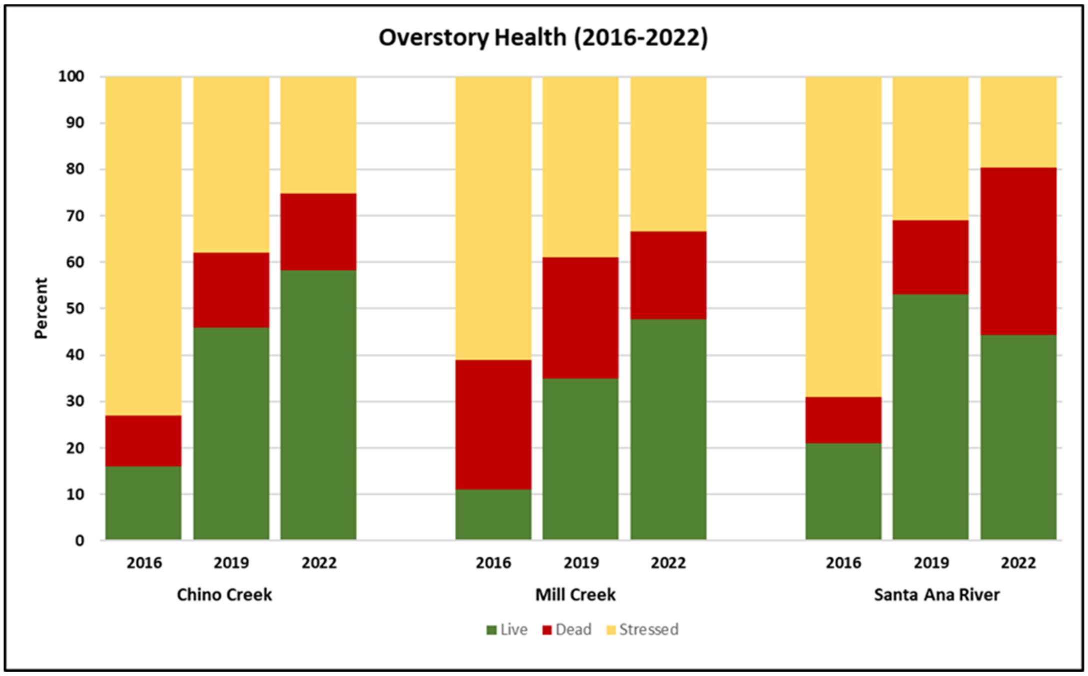

Figure 4. Overstory health from 2016 to 2022 along Chino Creek, Mill Creek, and the Santa Ana River.

Canopy cover is an estimate of how much of the ground is covered by overstory vegetation. Differences in cover between sampling years are to be expected due to natural variation and climatic changes. Fire, flood, or extreme weather events can also impact the canopy cover particularly at the plot level. There have been no meaningful changes to mean canopy cover along Chino Creek or Mill Creek since 2013 (Figure 5). Mean canopy cover in the Santa Ana River plots decreased by 20% from 2019 to 2022, primarily because of losses at Plot 1 (fire) and Plot 13 (grapevine competition).

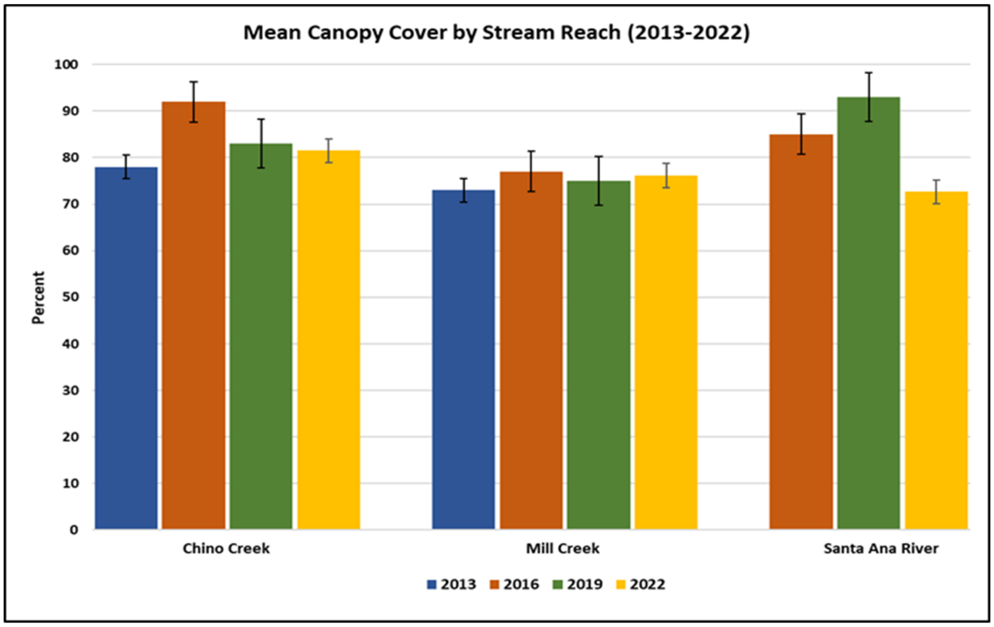

Figure 5. Mean canopy cover and standard error bars from 2013 to 2022 along Chino Creek, Mill Creek, and the Santa Ana River.

Changes to sapling recruitment were also evaluated. From 2019 to 2022 changes to sapling density along all three stream reaches were minimal (Figure 6).

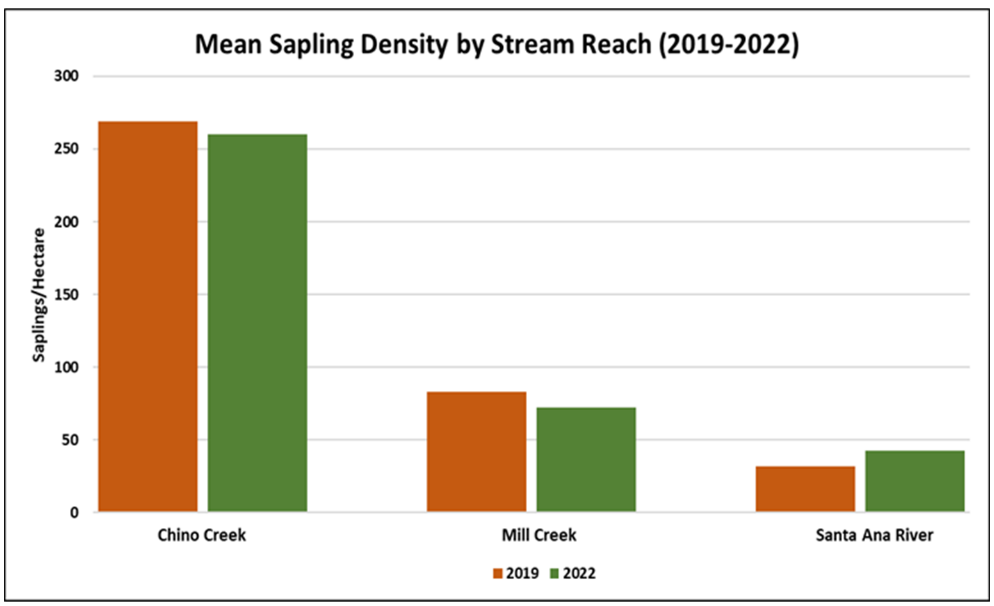

Figure 6. Mean sapling density from 2019 to 2022 along Chino Creek, Mill Creek, and the Santa Ana River.

Discussion

The riparian zone in the Prado Basin is highly variable and dynamic. Vegetation along all three stream reaches is affected by flood, wind, and fire events, as well as variations in precipitation and growing seasons. The presence of the invasive polyphagous shot-hole borer may further confuse potential stream reach effects. Trees in all reaches have fallen and re-sprouted, often with multiple stems, further confounding the analysis. Due to these variables, as well as the modifications to the monitoring protocol over time, it is difficult to derive long-term trends or conclusions.

Remotely sensed imagery allows for a more complete interpretation of riparian health. The monitoring conducted during this study was limited to 39 small plots spread throughout a 4,300-acre riparian zone. NDVI for the entire Prado Basin can provide a more complete overview of changes and identify potential trouble spots. The most effective use of the field monitoring data in Prado Basin may be to validate the remote sensing data, which is better suited for a full-scale analysis of the Prado Basin at a more frequent time interval.

The observed canopy cover can be compared to NDVI data for each plot to provide a measure of ground truthing. Canopy cover across all stream reaches was compared for 2013 to 2022 (Figure 5). The mean canopy cover percentage for Chino Creek and Mill Creek plots has remained relatively consistent. Canopy cover in the Santa Ana River plots was reduced by 20% in 2022, primarily due to losses from a fire in Plot 1 and grapevine competition in Plots 2 and 13.

Based on the field surveys, overstory health improved along Chino Creek and Mill Creek from 2019 to 2022 but slightly declined along the Santa Ana River (Figure 4). The percentage of dead trees along the Santa Ana River increased in 2022, due to a fire in Plot 1 and grapevine competition in Plots 2 and 13. The increase in live, unstressed trees along Chino and Mill Creeks was somewhat surprising given the drought conditions of the last several years. Changes to sapling recruitment could also indicate potential problems with the riparian habitat. However, there was no change in sapling density along any stream reach from 2019 to 2022 (Figure 6).

A simple analysis was conducted to compare how live and stressed trees changed between 2016 to 2019 and from 2019 to 2022 (Figure 3). Live trees changed to stressed or dead at approximately the same percentage during both time periods. The same percentage of stressed trees changed to dead during both time periods, but the percentage of stressed trees that changed to live was greater from 2019 to 2022. The percentage of trees infested with shot-hole borer along each stream reach remained consistent from 2019 to 2022 (Table 5).

Environmental monitoring programs should be regularly reevaluated to ensure the best available tools are being used. Remotely sensed NDVI data may provide a more complete picture of the health of the riparian vegetation than ground-based surveys and was used by Watermaster and IEUA for the Prado Basin Habitat Suitability Program to monitor during the 2019 surveys. Uncrewed aerial systems (UAS) can carry a variety of sensors and could provide data on canopy cover, canopy height, and other overstory parameters (Cromwell et al 2021, Jin et al 2020, Miraki & Sohrabi 2022,). The complex habitat and extensive tree cover in the Prado Basin would likely limit the ability of UAS to exactly duplicate the current ground truthing, but could cover a much larger area in a shorter amount of time. Assessing the canopy cover over permanent sites from above, instead of below, should be possible using UAS and simple RGB sensors. Either satellite or UAS remote sensing would provide data over a much larger area than targeted, ground based surveys.

Acknowledgements

We would like to thank the staff of the OCWD for their help in conducting the Prado Basin vegetation monitoring. Their expertise and assistance were essential to completing the survey.

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Attachment 1. Plot Summary Data

SITE	PLOT	COVER (%)	LIVE (%)	STRESSED (%)	DEAD (%)	SHB PRESENT	SHB (%)	TREES PER HECTARE
CHINO	4	86	63	5	32	NO	0	637
CHINO	9	99	50	33	17	NO	0	764
CHINO	11	94	73	9	18	NO	0	382
CHINO	16	27	50	29	21	NO	0	573
CHINO	18	81	100	0	0	NO	0	1401
CHINO	21	4	75	0	25	NO	0	1019
CHINO	24	99	64	27	9	NO	0	891
CHINO	31	98	68	16	16	YES	11	700
CHINO	34	91	0	100	0	NO	0	764
CHINO	78	95	33	42	25	NO	0	541
CHINO	30B	98	50	25	25	NO	0	1273
CHINO	3B	100	43	43	14	NO	0	1273
CHINO	X3	69	100	0	0	NO	0	891
CHINO	X4	45	40	60	0	YES	40	1019
CHINO	X5	96	78	22	0	NO	0	1401
CHINO	X6	100	50	29	21	NO	0	2292
CHINO	X7	84	33	67	0	YES	33	318
CHINO	X8	100	39	33	28	YES	6	3056
MILL	4	0	0	50	50	YES	50	95
MILL	8	64	0	100	0	NO	0	509
MILL	X9	94	50	50	0	YES	8	2292
MILL	X10	88	73	18	9	YES	18	1655
MILL	18	98	40	30	30	YES	10	414
MILL	22	94	0	67	33	YES	50	1273
MILL	39	91	33	33	33	NO	0	255
MILL	60	45	11	67	22	NO	0	477
MILL	62	79	40	20	40	YES	20	764
MILL	63	100	0	0	100	NO	0	159
MILL	69	70	83	17	0	NO	0	223
MILL	82	97	55	27	18	NO	0	446
MILL	101	94	57	30	13	YES	4	955
MILL	X21	91	80	20	0	NO	0	191
MILL	X22	38	78	22	0	NO	0	350
SAR	1	19	44	0	56	NO	0	286
SAR	2	79	33	61	6	YES	11	923
SAR	11	95	67	17	17	NO	0	891
SAR	12	99	53	0	47	NO	0	1910
SAR	13	46	20	0	80	NO	0	637
SAR	14	97	50	0	50	NO	0	1019

Attachment 2. 2022 Data Collection

In 2022, paper data sheets were replaced with forms created in ESRI's ArcGIS FieldMaps application. This reduced the amount of paper used and allowed the data collected to be uploaded to ArcGIS Online almost instantly. This method worked as expected and no issues were encountered.

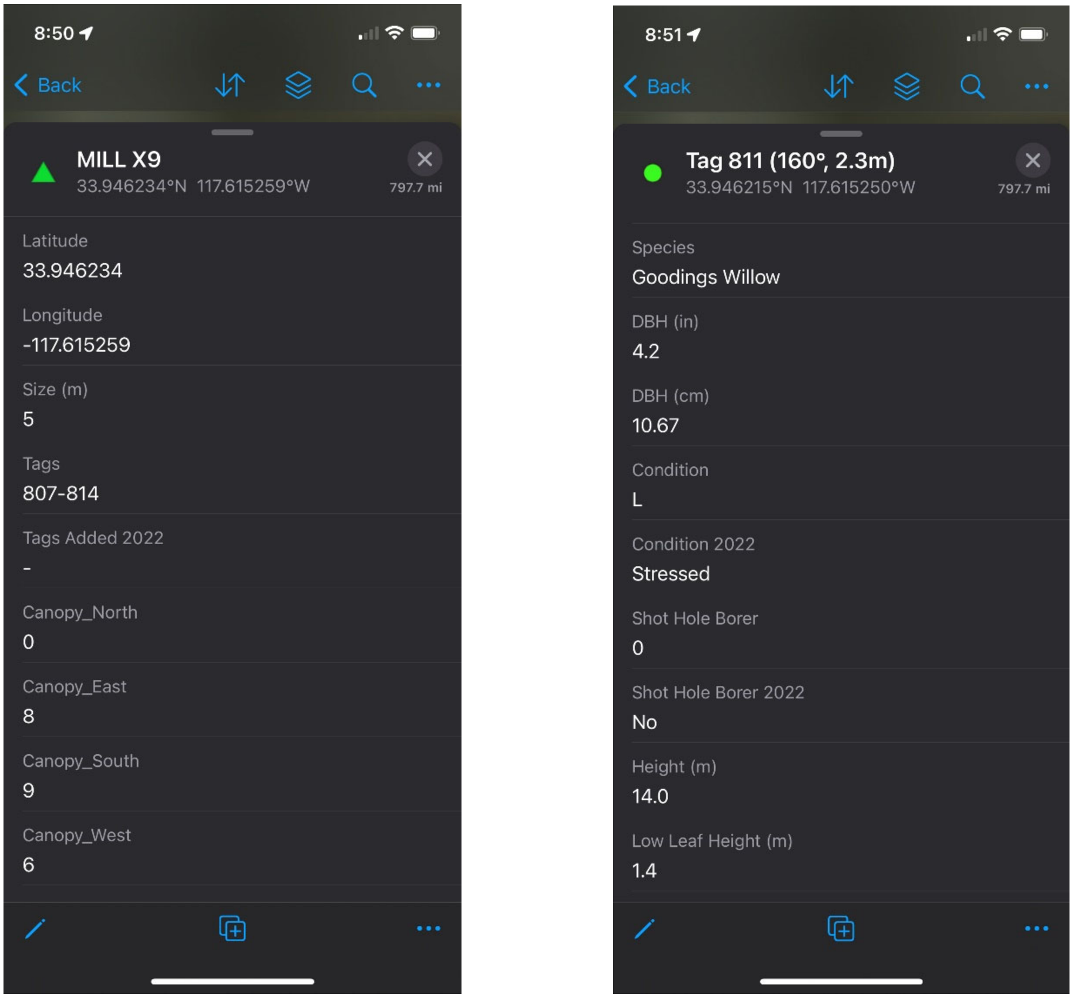

Figure 1. Images of the field collection app in FieldMaps. The screenshot on the left is the form used to collect canopy cover at each plot center and save photographs. The screenshot on the right is the form used to collect individual tree data.

Appendix D

Response to Draft Annual Report of the Prado Basin Habitat Sustainability Program for Water Year 2024

ORANGE COUNTY WATER DISTRICT (SHERYL PARSONS AND KEVIN O'TOOLE)

Kevin and I have reviewed the Prado Basin Habitat Sustainability Committee annual report and wanted to share the following questions and comments for your consideration:

Comment 1 – Applicability and Overreliance on NDVI for Habitat Health Assessment

"A limitation of NDVI data is that it is a composite view of plant species diversity, form, structure, density, and vigor. As such, changes in NDVI may be caused by various changes in riparian habitat (Markon et al., 1995; Markon and Peterson, 2002). In other words, NDVI does not provide a complete picture of how and why vegetative changes are occurring; it simply indicates a change in vegetation." PDF – page 21. It remains unclear how NDVI relates specifically to riparian habitat. Would habitat conversion from riparian to xeric plans species show up in NDVI. If so, how? Have other aerial image derived products been considered, (e.g. NDMI or vegetation type mapping)? Should an alternative monitoring approach be used instead of NDVI, if effects on specifically riparian vegetation, not just vegetation as a whole, can't be identified via NDVI?

Response:

As stated in the report, NDVI is not species-specific and therefore, does not distinguish riparian habitat from other vegetation, such as xeric species; however, the regional scale of NDVI makes it an appropriate 'first indicator' of regional changes in the extent and quality of the vegetation.

NDVI is considered the standard index for vegetation health and is among the most widely used satellite imagery in ecology and conservation studies (Pettorelli, 2013). It was selected for the Prado Basin Habitat Sustainability Program (PBHSP) based on peer-reviewed studies and recommendations from outside experts. Additionally, NDVI data derived from Landsat imagery, is available to download for no cost from the USGS. Landsat imagery is the only data source with more than thirty-years of continuous records of global land surface conditions at a spatial resolution of tens of meters and is, therefore, the best dataset for comparing vegetation before and after implementation of the Peace II agreement. Appendix A of the report provides more background information on NDVI and discusses additional advantages and limitations of NDVI.

In addition to NDVI, the PBHSP has considered other spectral indices derived from Landsat imagery such as the Normalized Difference Moisture Index (NDMI), as a potential complementary indicator of vegetation health. Recently, the use of NDMI for monitoring vegetation health has become more popular and is often used in conjunction with NDVI to assess vegetation health. An advantage of NDMI is that it measures the moisture content and can allow an earlier indication of the negative impacts of drought or declining groundwater levels on vegetation, likely before changes in NDVI or greenness in the vegetation are observed.

The PBHSP includes the collection of additional riparian habitat data—such as aerial photographs and triennial field vegetation surveys—which are used to validate, compare, and augment the NDVI interpretations. These vegetation surveys document the shrub and tree species present at the monitoring sites.

The analysis presented in this 2024 Annual Report provides the first indication of a potential decline in vegetation greenness within the Mill Creek reach, an area that has experienced declining groundwater levels. The PBHSP is designed to adapt based on findings and interpretations. For instance, if results suggest that vegetation health is being impacted by declining groundwater levels—potentially linked to the Peace II Agreement—then additional tools such as NDMI or enhanced species mapping using aerial imagery could be incorporated into the monitoring framework.

As outlined in the response to Comment #2 below, the vegetation surveys scheduled for this summer will help verify and document any observed impacts. These findings will inform recommendations for future studies or monitoring efforts necessary to understand the extent and causes of vegetation changes, if appropriate.

Comment 2 – Concerns Over Observed Declines and Lack of Response on Mill Creek

"Groundwater levels have declined the most in the northern portion of Mill Creek just south of the PB-2 monitoring well. From 2016 to 2022 groundwater levels declined by about eight feet likely due to increased pumping at the CDA wells to the north. During 2023 and 2024, groundwater levels increased by about four feet in this area, for a net change in groundwater levels of -4 feet since 2016. Recent observations of the air photos in 2024 have noted a decline in the greenness of the riparian vegetation in this northern area of Mill Creek reach." PDF- page 127-128

"The depth to groundwater in the northernmost reach of Mill Creek where the groundwater levels have declined the most (near PB-2) is estimated at 10-15 ft-bgs in WY 2024. Future declines in groundwater levels in this area could result in adverse impacts to the riparian habitat." – PDF page 128

Based on the decrease in water level attributed to the CDA, which are larger than what the model predicted, and observed declines in NDVI and vegetation brownness in the upper Mill Creek area, it does not seem appropriate to continue to monitor with a "business as usual" approach. The lack of response or recommendation for increased monitoring in this area begs the question - "what magnitude or frequency of observed impact would trigger an increase in monitoring and/or modification to the operation of the CDA". Recommend describing and quantifying what the triggers for increased monitoring are and what options could be considered as well as a plan for modifying CDA operation or what mitigation options could be if significant impacts were observed and attributed to the CDA.

For example, the 2022 USBR vegetation survey added two sites in the upper portion of Mill Creek to increase monitoring in the area of observed drawdown. Since vegetation decline has been identified in this area, are additional survey sites being considered to increase monitoring? However, additional monitoring may not be sufficient as a course of action – operational changes and/or mitigation should be discussed.

Response:

The declines in groundwater levels of 8 feet observed between 2016 and 2021 occurred at a well just to the north of riparian habitat in the northern portion of Mill Creek. From 2021 to 2024 groundwater levels increased by 4 feet for a net decline of 4 feet at this location. The Annual Reports for 2021, 2022, and 2023 documented no impact to the riparian habitat in this northern portion of Mill Creek that was occurring during these declines in groundwater levels. And the NDVI time series show an increasing trend or no trend in between 2021 and 2023.

The decreases in NDVI observed in 2024 at the northern Mill Creek were all within the historical variability of NDVI change, meaning that in the past NDVI decreased or increased from one year to the next more than it did from 2023 to 2024. Additionally, the Mann-Kendall trend analysis showed that there are no long-term declining trends in NDVI at any of these areas along Mill Creek, including the post-Peace II Agreement period of 2007 to 2024. However, it was observed that there were a few sites along Mill Creek with notable changes in NDVI (greater than the average year-to-year change) and some browning of the vegetation in the air photos. Factors that could have resulted in these changes were assessed as part of the 2024 analysis and no direct cause was identified; and groundwater levels either increased or remained steady in these areas.

The triennial vegetation surveys for 2025 are scheduled for this summer and will help verify and document current vegetation conditions relative to the recent past. To further assess the change in vegetation observed in 2024 from the air photos, the vegetation surveys will be tailored to focus on these areas. This may include adding additional sites or expanding the boundaries of existing sites to get a more comprehensive understanding of what is happening on the ground. In addition to gathering data of % live/stressed/dead trees and the species composition, the biologists conducting the surveys will be asked to provide their professional opinion on any observed changes in vegetation structure and composition, potential causes of the change, and recommendations for additional monitoring or studies. As the PBHSP operates under an adaptive management framework, recommended enhancements to the monitoring and mitigation program can be reviewed and incorporated by the Committee as needed.

Mitigation measures to address observed declines in vegetation can only be developed once the cause of these changes is identified. However, since groundwater levels along Mill Creek have increased since reaching their lowest levels in 2022, and production at the CDA wells has decreased over the same period, an initial level of mitigation is already taking place. Additional recommendations for mitigation will depend on the results of the 2025 vegetation surveys.

Section 4.1.2 Recommendations of the report has been updated to the following to incorporate the information about the 2025 vegetation surveys above and the PBHSP:

"Based on the conclusions above, the PBHSP monitoring and reporting should continue to monitor and assess the extent and quality of the riparian habitat and the factors that can influence it, as has been done through WY 2024. As described above, there were declines in groundwater levels from 2016 to 2022 beneath the northern portion of Mill Creek; however, over the last two years, groundwater levels have recovered about halfway from their lowest observed levels in 2022. During the period of the lowest groundwater levels in 2022, there were no observed negative impacts on the riparian vegetation in this area. However, over this past year, there were some observed declines in the greenness of the riparian vegetation in this area. Factors that could have resulted in these changes were assessed as part of this analysis and no direct cause was identified. Therefore, we recommend additional focused monitoring along northern Mill Creek in WY 2025, as described below.

The triennial vegetation surveys scheduled for the summer of 2025 should be tailored to focus on the northern portion of Mill Creek and should include new or expanded sites to get a more comprehensive understanding of what is happening on the ground. In addition to gathering the measurements that have been acquired by the vegetation surveys in the past, the biologists conducting the surveys should also provide a professional opinion on: (i) any observed changes in vegetation structure and composition, (ii) potential causes of the change, and (iii) recommendations for additional monitoring or studies. This information will help verify and document the current vegetation conditions relative to conditions in the recent past and is crucial for assessing any potential impact on the extent and quality of the riparian habitat that could be caused by the lowering of groundwater levels in this area. Since the PBHSP is an adaptive management plan, any recommended enhancements to the monitoring program based on the vegetation surveys can be reviewed and incorporated by the PBHSC as appropriate. If mitigation measures are deemed necessary, the results of the PBHSP will provide guidance for their development.*"*

Comment 3 – Clarification on OCWD monitoring well data usage in 2024 Report

It is OCWD's understanding that the Chino Valley Model (CVM) was last updated in 2020 and per the report, it is undergoing an update in 2025. It is therefore assumed the OCWD monitoring wells that were installed in 2020 and 2021 are not included in the CVM outputs contained in the 2024 PBHSC Report, but it was unclear if they are considered in the interpretation of data and results - please clarify. If they are not being used then we suggest that they not be included geographically in figures as this would be misleading (Figures 2-2, 3-10a and 3-10b). Similarly, if they are being used to determine changes in groundwater elevation, they should be included in Figures 3-11 and 3-12.

Will the model update incorporate lithology and other geologic data from construction of new monitoring wells to expand and improve the CVM deeper in Prado Basin or will only water levels be used to evaluate the accuracy of the model update? Suggest that an evaluation and comparison be provided to show how CVM update benefits from additional data in and around Prado Basin.

If long-term trends indicated decreases in water level attributed to the desalters and there are observed decreases in vegetation NDVI and brownness, recommend performing a focused report on specifically on Mill Creek to evaluate long-term GW trends vs. year-over-year and surface water flows vs. GW levels.

Response:

Yes, the CVM was last updated in 2020 and the 2025 update is nearing completion. The OCWD monitoring wells are not part of the CVM outputs presented in the 2024 PBHSC Report. This is because the report focuses on changes in groundwater levels across the entire Prado Basin area, as predicted by the model from 2018 (end of the model calibration period) to 2030 (end of the Peace II Agreement); this is shown in Figure 3-23 of the Annual Report. Wells are not included in "CVM output." Rather, the model-predicted groundwater levels (output) is provided as a raster aligned with the model grid. However, model-generated groundwater-elevation estimates within a model grid cell can be extracted and viewed as a time series for a model grid cell aligned with a well location. This is shown in Figure 3-14 of the Annual Report for the PBHSP monitoring wells.

Groundwater-level monitoring data at the OCWD monitoring wells in the southern portion of Prado Basin are being collected by the Watermaster annually and utilized for the analysis of groundwater levels for the PBHSP. Figure 2-2 shows wells in the study area where groundwater-level data were collected in water year 2024 and includes the OCWD monitoring wells in the Prado Basin. Monitoring data at some of the OCWD monitoring wells in the Prado Basin are used to prepare the analysis of historical (2016) and current groundwater elevation contours for the PBHSP Study Area. These wells are shown on Figures 3-10a and 3-10b and are labeled by the groundwater-elevation measurement at the well that was used to generate the groundwater-elevation contours. The groundwater-elevation contours in Figure 3-10a and 3-10b are then used to generate the change in groundwater levels for the monitoring period in Figure 3-11. It is important to keep the OCWD monitoring wells on these maps/figures because they show the OCWD wells where data were collected in the last year (Figure 2-2) and used to generate groundwater-elevation contours (Figures 3-10a and 3-10b) and subsequently used generate the net change in groundwater levels over the monitoring period. Figure 3-11 shows the net change in groundwater elevations over the monitoring period (2016-2024), but does not include the well locations because they are already shown in Figures 3-10a and 3-10b and they would cover up the color-ramp symbology of the change in groundwater levels.

The wells shown in Figures 3-10a and 3-10b represent key monitoring locations where data are collected annually to generate groundwater-elevation contours and assess net changes in groundwater levels. Over the past year, three OCWD monitoring wells (PD9/1, PD10/1, and PD12/1) were removed from the key well network due to inconsistent measurements and limited data availability. Additionally, the reference point elevations for these wells had not been professionally surveyed and were instead estimated using a digital elevation model (DEM), resulting in groundwater elevation measurements that were not reliably comparable to those from other wells in the area.

Since the draft Annual Report was prepared, these OCWD wells have been professionally surveyed, and the updated reference point elevations are now being used to calculate groundwater elevations. Further coordination with OCWD field staff at the Prado Basin office revealed that these wells are, in fact, being measured monthly; however, the data had not been included in the dataset provided to the Watermaster. With the updated elevation data and more frequent measurements, these three OCWD wells are expected to be reinstated in the key well network for next year’s groundwater elevation contouring.

As part of the 2025 model update, Watermaster conducted a comprehensive inventory of well data collected since 2018, the cutoff date for the 2020 model. This effort resulted in approximately 80 new well logs, including 33 located in the Prado Basin area, 23 of which are owned by OCWD. Watermaster carefully analyzed the new well logs and incorporated hydrogeologic data into the 2025 model update where appropriate. This data was used to (1) update the layer elevations and thicknesses in the model to improve representation of the basin's hydrostratigraphy and (2) improve the understanding and spatial characterization of aquifer property distributions and values.

In addition to the well data, the 2025 model update also includes (1) updates to the streambed elevations and cross-section geometry of the Santa Ana River and (2) a finer delineation of the riparian habitats to support improved evapotranspiration calculations.

The calibration well network in the 2025 model has also been expanded in Prado. While the 2020 model featured nine calibration wells in Prado, the 2025 update includes twelve, five of which are owned by OCWD. This expanded network provides improved spatial coverage within the region.

Sections 3.2.3 and 3.5.2 have comprehensive figures that compare long-term trends in groundwater pumping/ groundwater elevations and surface water to the trends in the quality of the riparian vegetation as indicated by the NDVI for Mill Creek reach. Most of the focused discussion is on the recent changes and whether observed trends in groundwater levels and surface water may be contributing to them. Future reports can include further evaluation on long-term groundwater trends and surface water flows.

CHINO BASIN WATERMASTER

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STAFF REPORT

DATE: June 19, 2025

TO: Advisory Committee Members

SUBJECT: Turner Basins 5-10 Project Description and Initial Concept Plan (Business item II.B.)

Issue: To provide advice and assistance to the Watermaster Board in consideration of an opportunity to preserve existing recharge benefits and enhance recharge in Management Zone 2 by developing Turner Basins 5-10. [Discretionary Function]

Recommendation: Provide advice and assistance to the Watermaster Board in consideration of preparing a project description and initial concept plan for Turner Basins 5-10 Recharge Project or other alternative(s) as determined.

Financial Impact: The estimated cost to develop the project description and initial concept plan is $55,000, which can be funded through a carryover of unexpended funds from fiscal year 2024/25.

ACTIONS:

Appropriative Pool – June 12, 2025 [Final]: Provided advice and assistance
Non-Agricultural Pool – June 12, 2025 [Final]: Provided advice and assistance
Agricultural Pool – June 12, 2025 [Final]: Provided advice and assistance
Advisory Committee – June 19, 2025 [Recommended]: Provide advice and assistance
Watermaster Board – June 26, 2025 [Recommended]: Support recommendation

BACKGROUND

The Turner Basins parcels are owned and under the jurisdiction of the San Bernardino County Flood Control District (SBCFCD). They form an integral component of the Recharge Program as outlined in the Recharge Master Plan. Originally conceived as flood control infrastructure, the basins have evolved over time to serve dual purposes, including significant groundwater recharge activities. These multi-functional basins are strategically located to capture and utilize various water sources, thereby contributing to the region's water sustainability efforts.

Turner Basins 1 through 4 are situated within the City of Ontario, specifically southwest of the intersection of 4th Street and Archibald Avenue. Turner Basin 1 primarily receives stormwater from the Cucamonga Creek Channel and can also accommodate storm, recycled, or imported water from the Deer Creek Channel. This basin's outflow feeds directly into Turner Basin 2, creating a seamless network of water management. Meanwhile, Turner Basins 3 and 4 collect water from local street drains and similarly integrate storm, recycled, or imported water sourced from the Deer Creek Channel.

In contrast, Turner Basins 5 through 10, located on the eastern side of Archibald Avenue at the northern end of Cucamonga-Guasti Regional Park, fulfill a slightly different role within the system. Turner Basins 5 and 8 currently receive local runoff and storm flows directed from the Deer Creek Channel. Notably, Basin 5 discharges into an unlined channel that facilitates water flow beneath Archibald Avenue into Turner Basin 4. However, Turner Basins 6 and 7 serve as recreational fishing lakes within Guasti Regional Park and are not utilized for groundwater recharge purposes.

Over the years, Turner Basins 1 through 4 have seen significant investments aimed at enhancing the region’s water capture and infiltration capacity. These efforts have been instrumental in establishing the basins as a reliable resource for the region's water recharge initiatives. The infrastructure developments within these basins can be categorized into two major phases, reflecting the evolution of their functionality and capacity.

2003–2005 Developments:

- Construction of a rubber dam and control building for the Cucamonga Creek Diversion to Turner 1 area.
- Installation of telemetry systems, including a radio tower, to facilitate remote monitoring and control.
- Implementation of pipelines and telemastered control valves to enable efficient water transfer from Turner Basin 1 to Turner Basin 2.
- Level sensors to monitor water levels accurately.
- Development of a Deer Creek diversion structure to channel water into Turner Basins 1 and 4.
- Decommissioning of an Ontario potable well to optimize water usage for recharge purposes.
- Integration of a recycled water turnout into the Deer Creek Channel.
- Provision for imported water exclusively for Turner Recharge operations.
- Deployment of lysimeters and monitoring wells to assess water infiltration and quality.

2005–Present Developments:

- Expansion to include cells 4B and 4C within Turner Basin 4 for increased water storage and management.
- Installation of SolarBee circulation pumps to enhance water movement and quality.
- Construction of a diversion structure to manage overflow from Guasti Regional Park.
- Development of a diversion structure to direct Deer Creek flows into Turner Basins 8, 5, and 4.

From 2005 through 2024, Turner Basins 3 and 4 collectively contributed approximately 5% of the total stormwater recharge, 3.6% of recycled water recharge, and 0.4% of imported water recharge. These figures underscore their critical role in the region's water management strategy, highlighting both their utility and potential for further development. The integration of these basins within the Recharge Program not only exemplifies strategic water management but also serves as a model for sustainable practices that balance environmental stewardship with community needs.

The table below details the water recharged in each basin by type, underscoring the significance of the Turner system for Watermaster's recharge program.

	FYs 05-25		
	SW	IW	RW
College Hts	0.6%	13.4%	0.0%
Upland	4.2%	10.1%	0.0%
Montclair	9.0%	38.5%	0.0%
Brooks	4.1%	2.2%	8.8%
8TH	9.4%	1.4%	11.5%
Ely	12.5%	0.4%	9.8%
Grove	3.0%	0.0%	0.0%
Turner 1&2	9.2%	0.7%	3.5%
Turner 3&4	5.0%	0.4%	3.6%
Lower Day	4.3%	7.4%	0.0%
Etiwanda	2.8%	4.8%	0.0%
Victoria	4.2%	0.9%	8.2%
San Sevaine	8.4%	13.9%	6.5%
Hickory	3.2%	2.0%	7.1%
Banana	2.2%	0.6%	8.2%
Jurupa	2.2%	0.7%	0.0%
RP3	8.8%	2.2%	28.8%
Declez	6.7%	0.2%	4.0%

	FYs 05-25 (AF)		
	SW	IW	RW
College Hts	1257.8	33369.2	0.0
Upland	8101.3	25329.3	0.0
Montclair	17613.9	96254.5	0.0
Brooks	8004.2	5589.4	18608.9
8TH	18320.8	3460.1	24413.0
Ely	24434.4	1080.7	20774.0
Grove	5870.1	0.0	0.0
Turner 1&2	18005.2	1783.4	7393.5
Turner 3&4	9750.0	995.2	7600.2
Lower Day	8361.7	18538.3	0.0
Etiwanda	5513.5	11874.0	0.0
Victoria	8155.5	2291.8	17428.5
San Sevaine	16332.8	34777.3	13792.2
Hickory	6416.5	4985.6	14988.4
Banana	4372.0	1519.3	17372.1
Jurupa	4238.3	1762.2	0.1
RP3	17122.2	5574.6	60928.2
Declez	13123.7	607.6	8373.1
Annual Average	10833.0	13877.4	11759.6

(SW – Storm water, IW – Imported Water, RW-Recycled Water)

DISCUSSION

The San Bernardino County Flood Control District (SBCFCD) has recently expressed interest in the utilization in the future of the Turner Basins for development purposes other than being a part of the regional Recharge Program. This interest stems from the County's assessment that the basins, along with other similar facilities, are no longer deemed essential for primary flood control purposes of protection life and property throughout the region. Consequently, the County is exploring the possibility of repurposing these basins for alternative uses. The 4-Party Agreement between the County, Watermaster, IEUA and Chino Basin Water Conservation District which governs the operations of the facilities expires in 2032.

Watermaster staff seeks advice and assistance from the parties, committees and Watermaster Board for direction on the potential loss of safe yield from repurposing Turner basins 3-4 and exploring opportunities to mitigate lost recharge in basins 3-4 and enhance recharge through basins 5-10 if feasible. One proposal under consideration involves conducting a detailed evaluation of Turner Basins 5 through 10. Currently, Basins 5 and 8 receive local runoff and stormwater flows originating from the Deer Creek Channel. Turner Basin 5 discharges into an unlined channel that conveys flow beneath Archibald Avenue before entering

Turner Basin 4. Meanwhile, Basins 6 and 7 serve as recreational fishing lakes within Guasti Regional Park and are not presently utilized for groundwater recharge but could in the future.

In 2019, the infiltration rates for Turner Basins 5 and 8 were found to be approximately 0.2 feet per day, compared to the higher infiltration rates of approximately 0.5 feet per day observed in Turner Basins 1 through 4. While these variations may suggest differing geological conditions below each basin, the surface area of Turner Basins 5 and 8 is comparable to that of Turner Basins 3 and 4, hinting at similar potential benefits for storage capacity if further investments are made.

To advance this initiative, an estimated budget of $55,000 has been proposed by West Yost to prepare a comprehensive project description, assess recharge benefits through model simulations, draft a technical memorandum, and provide project management services. Funding for this effort may be sourced from carryover funds or by reallocating resources within Program Element 2 of the West Yost budget, as approved during the May 2025 Board meeting. The proposed analysis aims to determine the feasibility of repurposing these basins for optimized water management and alternative applications, aligning with the County's long-term strategic objectives and the need to maintain adequate groundwater recharge facilities to support the growing communities throughout the region.

At the June 12, 2025 Pool meetings, the item was presented and the recommendation to develop an Initial Concept plan was unanimously approved and move to the Advisory Committee for further advice and assistance.

ATTACHMENT
1. Turner Basins Map

Figure 1: Turner Basin Configuration and Numbering

Google Earth Photo from March 2023

CHINO BASIN WATERMASTER

ADVISORY COMMITTEE

June 19, 2025

INLAND EMPIRE UTILITIES AGENCY REPORTS

The following items are provided for receive and file.

- Metropolitan Water District Activities Report
- Water Supply Conditions
- State and Federal Legislative Reports

IEUA's Summary on Metropolitan Water District of Southern California (MWD) Board Activities

Submitted June 2025

For More Information Contact:

Eddie Lin

elin@ieua.org

909.993.1740

See www.MWDh2o.com for the latest information from MWD and tune into livestream broadcasts of meetings.

MWD Authorizes General Manager Selection Process

On May 27th, the MWD Board of Directors approved a motion to begin the General Manager selection process. An executive recruiter will complete the initial inquiry, with selected candidates presented to the full board for consideration and interviews. The full board will select the incoming General Manager, who is expected to be appointed in August or September 2025.

MWD and San Diego County Water Authority (SDCWA) Complete Settlement

On May 30th, MWD announced a settlement agreement with SDCWA, after longstanding litigation. The settlement consists of a Settlement Agreement and an amended and restated Exchange Agreement that changes the pricing terms to a fixed amount with a neutral escalator, rather than one tied to MWD's rates. The new price term starts January 1, 2026, at $671 per acre foot, with an annual consumer price index escalator that is based on water and sewerage infrastructure cost nationally. SDCWA will make a fixed payment to MWD for 227,000 acre-feet of exchange water deliveries annually at the fixed price and will now have increased flexibility for scheduling exchange water deliveries as well as providing water to the rest of MWD's service area.

MWD Approves Colorado River Aqueduct Transformers Replacement

On March 10th, the MWD Board of Directors awarded $131 million contract to Siemens Energy Inc. to furnish 35 high voltage power transformers, which makes up a majority of the total replacement project's cost of $149.2 million. The facilities were originally constructed in 1939, and recent bushing leaks forced a Colorado River Aquaduct (CRA) low flow period. Replacing the infrastructure will increase CRA delivery reliability, with construction scheduled for completion in 2037.

MWD Board Receives Update on Sites Reservoir Project

On May 27th, the MWD Board of Directors heard an update on the Sites Reservoir Project (Sites). Sites received an incidental take permit from California Fish & Wildlife in October 2024, is holding ongoing water rights hearings with the State Water Resources Control Board, and expects federal approvals in late 2025. Participating agencies would receive a capacity share of the inflow to Sites until storage is full. Sites releases would be based on capacity share rather than priority. Currently, MWD is participating in sites with a 300,000 AF share, roughly 22% of available storage. MWD still has time to finalize their participation level, as additional potential partners have expressed interest.

Sites Reservoir Location – Sitesproject.org

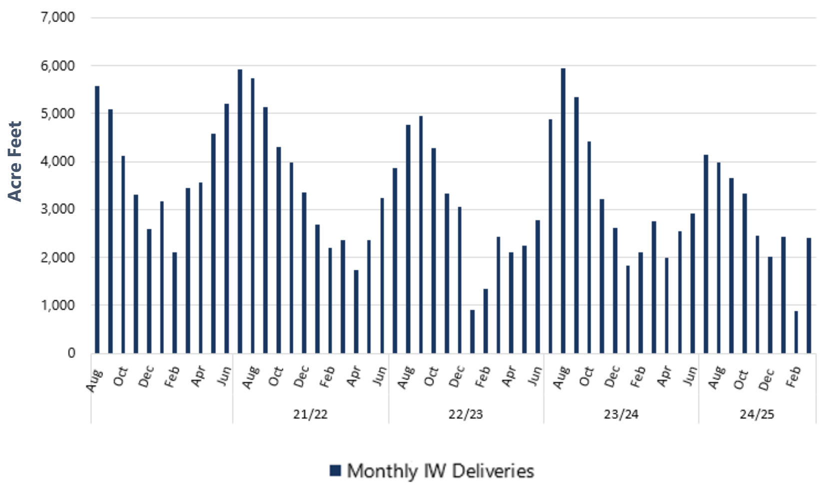
Inland Empire Utilities Agency
A MUNICIPAL WATER DISTRICT

GENERAL MANAGER'S REPORT

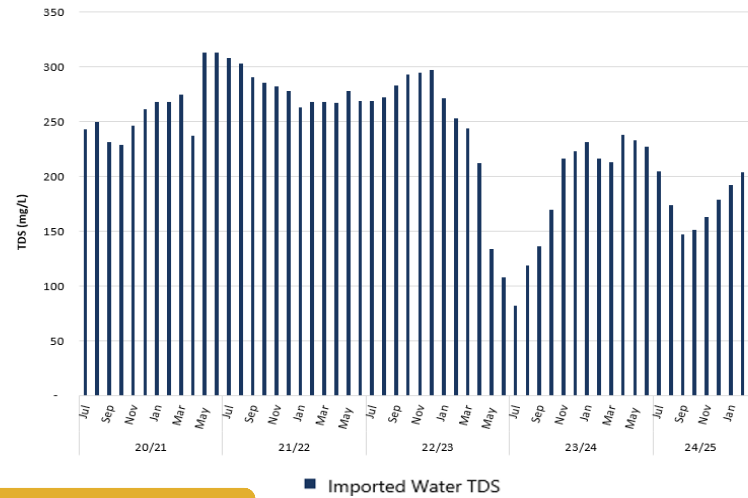
MAY 2025

Imported Water

Full Service Imported Water Deliveries Summary (FY 2020/21 to 2024/25)

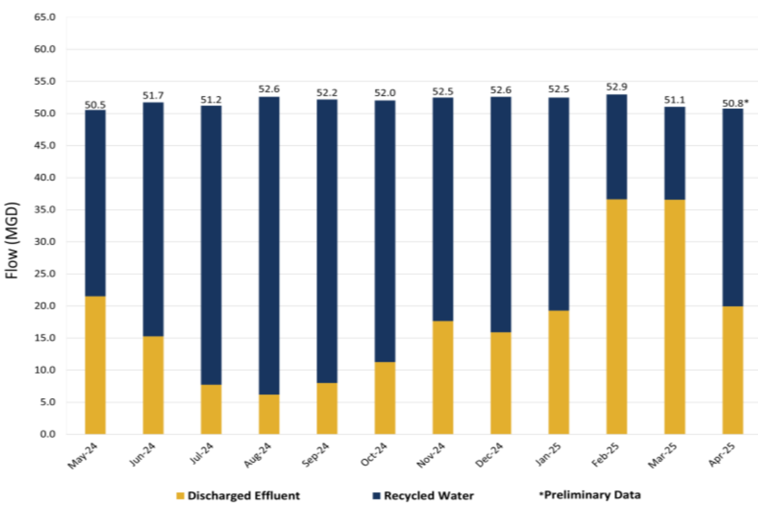


Imported Water TDS Summary (FY 2020/21 to 2024/25)

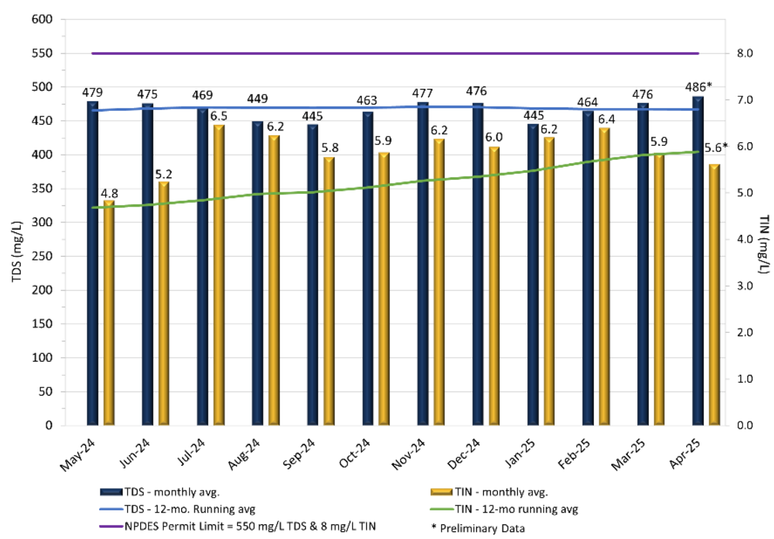


Recycled Water

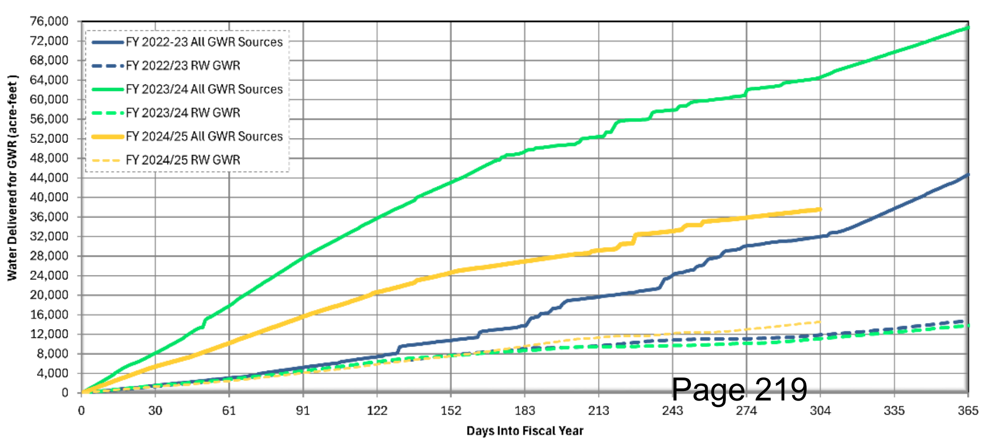
Discharged Effluent & Recycled



Agency-Wide Effluent TDS & TIN



Groundwater Recharge



APRIL 2025 NOTES:

- Total stormwater and dry weather flow recharged is preliminarily estimated at 149.1 acre-feet.
- Recycled water delivered for recharge totaled 1,510.5 acre-feet.
- There was no Imported water recharged in the Chino basin from MWD
- Chino Basin Watermaster will remove 1.5% for evaporation losses from delivered supplemental water sources (imported water and recycled water).
- Considering evaporation losses, total recharge is preliminarily estimated at 1,596.2 acre-feet.

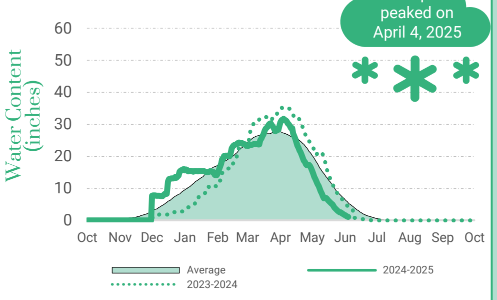
The Metropolitan Water District of Southern California's
Water Supply Conditions Report (WSCR)

https://www.mwdh2o.com/WSCR

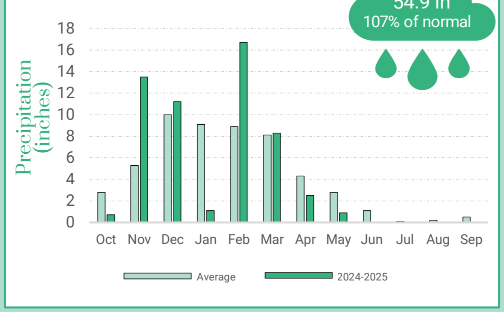
Water Year 2024-2025
As of: 06/04/2025

State Water Project

Northern Sierra Snow

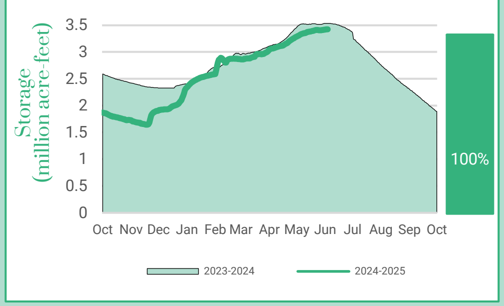


8 Station Index Rain



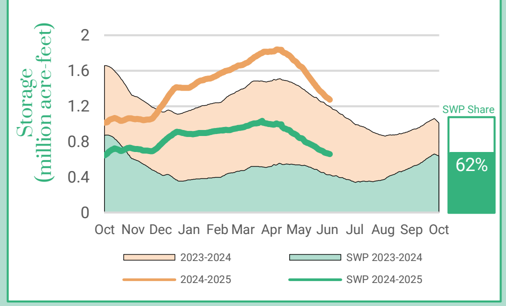
Lake Oroville

(Capacity: 3.42 million acre-feet)
Current Storage: 3.42 MAF



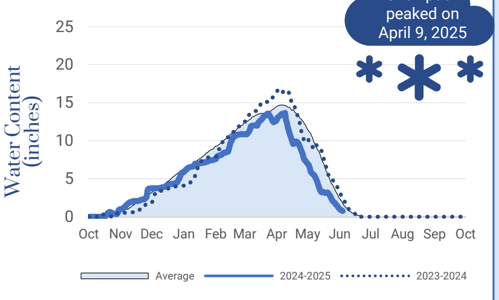
San Luis Reservoir

(Capacity: 2.04 million acre-feet)
Current SWP Storage: 659 TAF

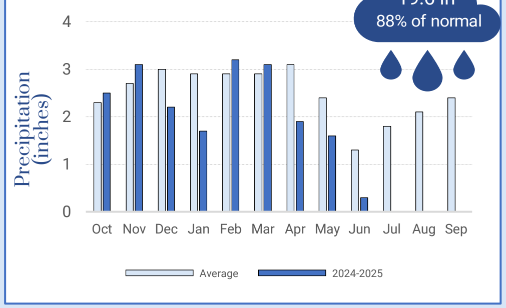


Colorado River

Colorado River Basin Snow

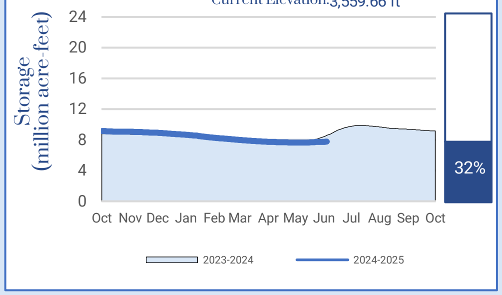


Colorado River Basin Rain



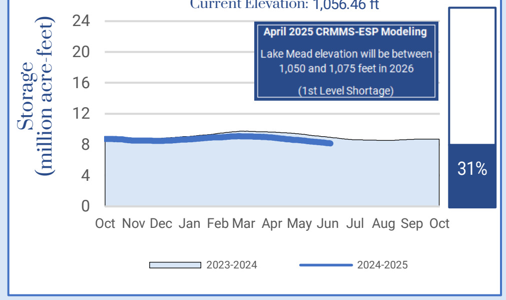
Lake Powell

(Capacity: 24.3 million acre-feet)
Current Storage: 7.76 MAF
Current Elevation: 3,559.66 ft



Lake Mead

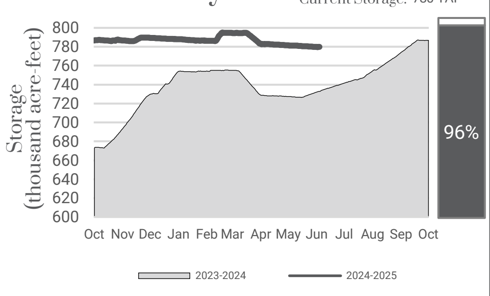
(Capacity: 26.2 million acre-feet)
Current Storage: 8.16 MAF
Current Elevation: 1,056.46 ft



Metropolitan

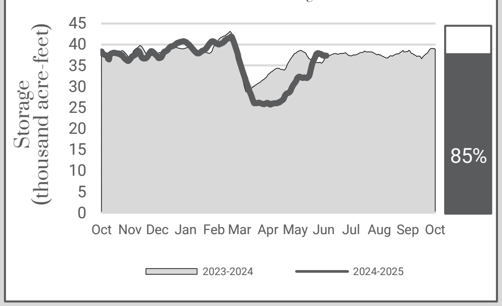
Diamond Valley Lake

(Capacity: 810,000 acre-feet)
Current Storage: 780 TAF



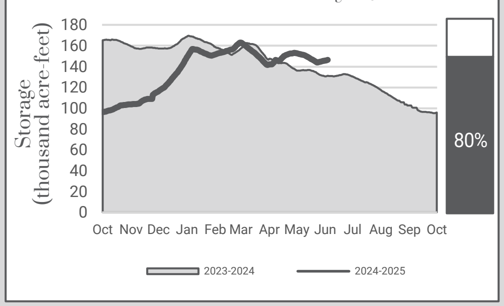
Lake Skinner

(Capacity: 44,000 acre-feet)
Current Storage: 37 TAF



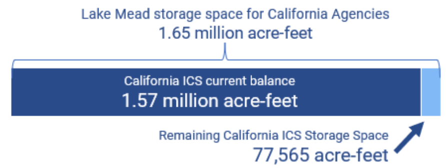
Lake Mathews

(Capacity: 182,000 acre-feet)
Current Storage: 146 TAF



Intentionally Created Surplus (ICS)

Water stored in Lake Mead by California agencies



Values for 2024 include Metropolitan's 1.58 million acre-feet and Imperial Irrigation District's 82,842 acre-feet of Interntionally Created Surplus. Not all the ICS requested counts towards the California limit.
The ICS storage is included on the total Lake Mead storage chart.

This report contains information from various federal, state, and local agencies.
The Metropolitan Water District of Southern California cannot guarantee the accuracy or completeness of this information.
Readers should refer to the relevant state, federal, and local agencies for additional or for the most up to date water supply information.
Questions? Email: MFerreira at mwdh2o.com

May 28, 2025

To: Inland Empire Utilities Agency

From: Michael Boccadoro
Beth Olhasso

RE: May Report

Overview:
Snow is melting much more quickly than normal this year. While runoff is making its way into storage, the rapid melt is problematic because reservoirs are already at capacity, so there is little space to put the extra water north of the Delta. Limited pumping is keeping the water from reaching San Luis Reservoir. Lake Oroville is sitting at 100 percent capacity, 122 percent of normal; Lake Shasta is sitting at 92 percent of capacity, 111 percent of average; while San Luis Reservoir is at just 69 percent of capacity, 94 percent average for this time of year.

After several years of stakeholder discussions, the State Water Resources Control Board has approved updates to the scoring criteria for the Clean Water State Revolving Fund. There is concern that the changes, which go into effect for the 2026-27 funding year, could make it harder for large projects to make the Fundable List. One positive change to the scoring includes recycled water projects receiving 8 points, a one-point increase.

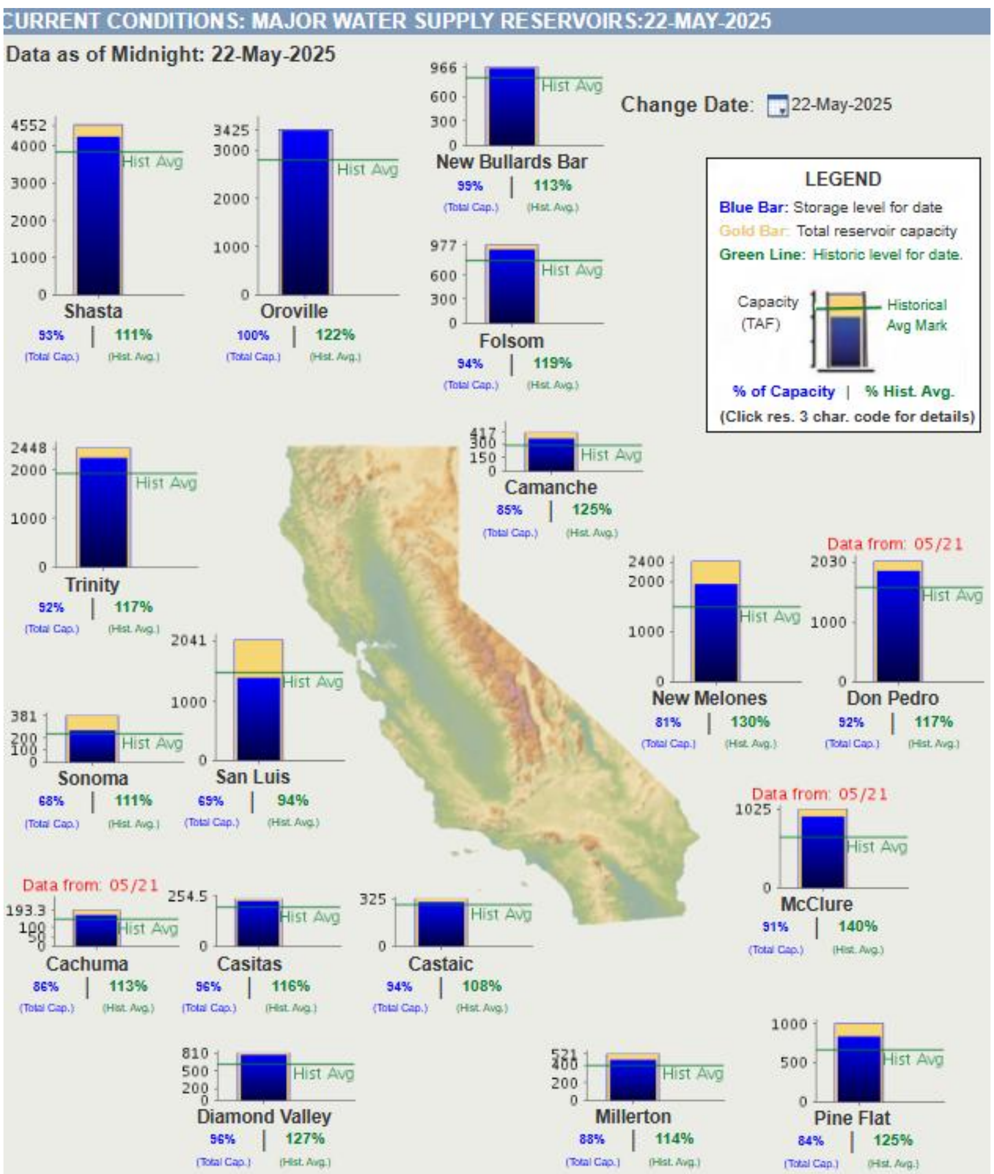
As part of his May Revise, the Governor has released a Trailer Bill aimed at helping remove some barriers to the Delta Conveyance Project. Among the changes, the Governor is proposing for expedited judicial review of CEQA challenges. The proposal saw swift condemnation from in-Delta interests. The State Water Contractors are moving to shore-up support for the proposal. The Governor hopes the Trailer Bill will be adopted by the end of June.

The May Revise was full of unwelcome news, with a $12 billion budget shortfall. The bleak fiscal outlook is forcing some difficult cuts to many parts of state government. Throughout the winter and early spring, budget sub committees met weekly to hear and discuss important parts of the state budget. The details of implementing Proposition 4, concerns over the Governor's "vacant positions sweep" and reversion/swap of General Funds for Bond Funds have all been discussed in Budget Committees. Discussions now mostly move behind closed doors as leadership crafts the final budget proposal ahead of the June 15 deadline for passage.

May saw the policy committee deadline and the fiscal deadline come and go. Close to 800 bills total have advanced to the floor of their respective house. Legislation to establish an emergency MCL, legislation to regulate intentionally added PFAS and legislation to establish a PFAS mitigation fund have all managed to advance. Recycled water legislation is moving through committee with no opposition but CSDA's bill to help ease the Advanced Clean Fleets regulations for local government was held in the Senate Appropriations Committee.

Inland Empire Utilities Agency
Status Report – May 2025

Water Supply Conditions
Reservoirs remain full as the snowpack runs down from the Sierras. Water managers are a bit concerned because the snowpack is melting more rapidly than normal. The statewide snowpack is at 32 percent of normal for this date and 13 percent of the April 1 average. Just one month ago, the snowpack was at 72 percent normal and 63 percent of the April 1 average. Reservoirs are full, and with the state pumps operating at less than half capacity, much of the extra water is getting lost to the ocean. Lake Oroville is sitting at 122 percent of average and at 100 percent capacity; Shasta is at 111 percent of average, 92 percent capacity; and San Luis Reservoir is at just 94 percent of average, and 69 percent capacity.



2

SWRCB Approves New Scoring Criteria for State Revolving Fund

After several years of stakeholder discussions the State Water Resources Control Board approved amendments to the Clean and Drinking Water State Revolving Funds Policy document. Notable changes include:

- New Affordability Score- focus on projects directly benefiting a disadvantaged community
- An extra point for recycled water projects
- Points if an applicant will self-select to meet federal requirements (ie, Build America, Buy America)
- Readiness Score

State Board members and staff agreed that it is hard to tell how these amendments will affect which projects make it onto the "Fundable List." WateReuse CA and CASA expressed concern that the amendments would keep large projects off of the list in favor of smaller projects in disadvantaged communities. This would be particularly problematic for the SRF, because the loan program benefits from the good credit of the larger agencies to help the State Board's own bond rating. For this reason, State Board members agreed that if the new scoring criteria radically alters what type of projects are getting funded, quick changes will be undertaken.

The scoring criteria will go into effect for the 2026-27 Fiscal Year, with applications due at the end of December 2025. The first Intended Use Plan with the new scoring criteria in place won't be released until June of 2026.

The health of the program is also threatened because of proposed cuts by the Trump Administration. The proposed budget notes that states should rely on funds "revolving back" without new injections of cash from the federal government. While California has a healthy program, this would be a major blow.

Delta Conveyance Budget Trailer Bill Proposal

As part of his "May Revise" of the 2025-26 budget, Governor Newsom released a proposal to help streamline the Delta Conveyance Project (DCP). The Governor's proposal would streamline the project by:

- **Simplifying permitting.** The proposal would simplify permitting for the project by eliminating certain deadlines from existing State Water Project water rights permits — recognizing that the State Water Project should continue serving Californians' water needs indefinitely. The proposal would also strengthen enforcement of the Water Board's existing rules for permit protests.
- **Confirming funding authority**. The proposal confirms that the Department of Water Resources has the authority to issue bonds for the cost of the DCP, to be repaid by participating public water agencies.
- **Preventing unnecessary litigation delays**. The proposal narrows and streamlines judicial review of future challenges to the Delta Conveyance Project, building on models that have served other large public works projects.
- **Supporting construction.** The proposal streamlines the authority to acquire land, supporting ultimate construction of the Delta Conveyance Project.

The in-Delta legislators and advocates have come out in very strong opposition to the proposal. The State Water Contractors and MWD have started organizing Southern California water agencies to support the proposal. IEUA staff is participating in a coalition to rally Inland Empire interests to support the proposal and lobby legislators.

The Newsom Administration is hoping to pass the trailer bill with the budget in June, but it could linger into the summer.

Budget Sub Committees Update

The Governor released his "May Revise" 2025-26 State Budget. The budget accounts for a $12 billion deficit though spending cuts and fund shifts. Both the Senate and Assembly budget sub committees on resources met just once to discuss the revised proposal. A budget must be passed by June 15, though there will likely be revisions to the final budget before the start of the fiscal year on July 1.

"Vacant Positions" Sweep:

In the 2024-25 Budget, the Governor decreed that departments could not fill vacant positions so as to eliminate 6,500 state jobs and saving $1.2 billion. Concern arose when it started to look like some of the vacant positions are "fee based". Fee based positions are generally used to help process permits, among other things.

WCA has been working with ACWA and other associations to highlight the concern that it appears some of the positions being "swept" are not general fund positions. The CA Department of Finance noted that the sweeps were "agnostic as to fund source," but that the sweeps could reduce fees.

CASA, ACWA, CMUA and WateReuse sent a letter to the budget committees noting that cutting fee based positions is not something the associations can support. The positions these fees frequently fund are staff positions at the state and regional boards to timely process permit applications. Reductions of staff in these areas will only serve to slow down an already slow process.

The Department of Finance finally released a 250 page document detailing which positions were cut. The biggest losses look to be 35 positions at DWR which formulate the CA Water Plan and 32 positions at the SWRCB which process permits through the Waste Discharge Permit Fund.

Proposition 4 Implementation

Concern over the Governor scaling back Prop 4 allocations from water categories to throttle up allocations in fire categories did not materialize with the Governor's May Revise. The Governor's proposal largely maintains the allocations proposed in January, which is welcome news. Negotiations between the Governor and the Legislature will continue on Prop 4 allocations.

Additionally, past bonds have exempt bond fund programs from having to comply with the Administrative Procedures Act (APA), allowing programs to get up and running quickly.

Proposition 4 made no such exemption. The Administration has proposed this exemption be made in the budget process. Legislators seem keen on this idea, at least for existing programs.

General Fund Reversions

In an attempt to balance the budget, the Governor proposed to "swap" some general funds with bond funds. For example, the proposed budget would "revert" $51 million in water recycling funds that were allocated in the 2024-25 budget because they are also proposing $153 million in bond funds. Members of the budget sub committees have been clashing rather fiercely with the Department of Finance, who is defending the Governor's budget proposal. Finance continues to argue that because the bond didn't say that they couldn't "swap," there shouldn't be a problem. Legislators have strongly articulated that this is a "bait and switch" that will result in lack of confidence from voters. This topic will continue to be discussed as the budget gets finalized with leadership.

Legislative Update

The policy committee deadline and the fiscal committee deadline have both passed and the action is now on the floor of each house. The House of Origin deadline is June 6. The Assembly has about 450 bills on the floor while the Senate has about 315.

Low-Income Rate Assistance: Several bills have been introduced to establish low-income rate assistance programs at all retail water agencies.

AB 532 (Ransom) is CA Municipal Utilities Agencies proposal to establish voluntary LIRA programs. The measure passed the Environmental Safety and Toxic Materials Committee and Utilities and Energy Committee and is on the Assembly Floor.

SB 350 (Durazo) is the environmental justice community bill to mandate LIRA programs at water and wastewater agencies. SB 350 passed out of the Environmental Quality Committee, and the Energy, Utilities and Communications Committee but was held in the Senate Appropriations Committee, failing to advance.

Water Supply: California Municipal Utilities Association and Western Municipal Water District have reintroduced SB 366 (Caballero), their legislation to add new requirements into the CA Water Plan to set volumetric targets for new water supply as **SB 72 (Caballero)**. They believe they have removed the concerns of the SWRCB, which was the stated reason the bill was vetoed last session. The bill passed the Senate Natural Resources and Water Committee and is on the Senate floor.

Recycled Water: WateReuse CA has introduced **SB 31 (McNerney)** to make some long-overdue updates to Title 22 of the CA Code of Regulations. IEUA staff has been instrumental in helping develop the legislation that would, among other things, codify how an "unauthorized discharge" of recycled water is treated by Regional Boards. The bill passed out of the Senate Natural Resources and Water Committee on 3/25 and passed the Senate Environmental Quality Committee on April 30 unanimously. The bill is now on the Senate Floor.

PFAS: The CA Association of Sanitation Agencies has reintroduced their PFAS source control bill that would ban the use of any intentionally added PFAS to products, **SB 682 (Allen)**. The bill hit a roadblock last year with the CA Manufacturers and Technology Association who worked to load costs into the bill to get it held in Appropriations Committee. The bill passed out of both the Senate Environmental Quality Committee on April 2 and Senate Health on April 30 and is on the Senate Floor.

Additionally, ACWA and the League of CA Cities have introduced **SB 454 (McNerney)** that would establish a PFAS mitigation fund. Though the bill does not yet have a funding source, it passed the Senate Environmental Quality Committee on April 2 and is awaiting action on the Senate floor.

SB 394 (Allen) is ACWA and Las Virgenes MWD's bill to increase penalties for water theft from fire hydrants. The bill passed out of the Senate Local Government and Judiciary Committees unanimously and is on the Senate floor awaiting action.

SB 496 (Hurtado) is CSDA's bill that would create a more robust process for exemptions from Advanced Clean Fleets rules in instances when trucks are not commercially available. Additionally, it would recognize some utility vehicles are critical in emergencies, and should not have to transition to electric. The bill passed the Senate Transportation and Environmental Quality committees but was held in the Senate Appropriations committee.

Inland Empire Utilities Agency, a Municipal Water District Federal Update

May 28, 2025

House Passes Budget Reconciliation Bill, Heads to Senate

On May 22, the House narrowly passed the *One Big Beautiful Bill Act* (**H.R. 1**), a budget reconciliation bill that represents the cornerstone of President Trump and congressional Republicans' legislative agenda, by a 215-214 vote. All Democrats opposed the bill, joined by two Republicans—Reps. Warren Davidson (OH) and Thomas Massie (KY)—who cited concerns over the federal deficit. Two GOP members missed the vote, and one voted "present."

The legislation combines tax, spending, and policy proposals across a wide range of federal programs. Among other provisions, the bill includes the following:

- Extends provisions of the 2017 tax law and make additional changes to the federal tax code, including adjustments to the state and local tax (SALT) deduction cap and enhancements to the Low-Income Housing Tax Credit;
- Provides significant increases in funding for defense and homeland security;
- Restructures Medicaid and federal education programs;
- Reduces non-defense discretionary spending, particularly across green energy, environmental, and social services programs; and
- Provides new funding for agricultural producers and rural infrastructure with farm labor reforms.

The bill now heads to the Senate, where Republican leaders are expected to make revisions. They must also navigate the Byrd Rule, which restricts the types of provisions that can be included in budget reconciliation bills when considered on the Senate floor.

President Trump Releases Fiscal Year 2026 "Skinny" Budget Proposal

On May 2, the White House released President Trump's Fiscal Year (FY) 2026 "skinny" budget proposal, outlining the Administration's top funding priorities ahead of a more detailed request expected in the coming weeks. The **46-page document** proposes an overall 22.6% reduction in non-defense discretionary spending. The plan calls for a 13% increase in defense spending and a 65% increase for the Department of Homeland Security. The proposal also outlines intentions to revise or eliminate various federal programs and agencies' activities that the Administration views as outside core federal responsibilities or inconsistent with its priorities.

This budget proposal serves as a starting point for the FY 2026 appropriations process. As with all presidential budgets, the proposal is nonbinding; Congress ultimately determines final funding levels through the annual appropriations process.

Fiscal Year 2026 Appropriations Update

House Appropriations Committee Chair Tom Cole (R-OK) announced the following markup schedule for all twelve FY 2026 appropriations bills:

FY26 Appropriations Bill	House Subcommittee Markup Date	House Full Committee Markup Date
Agriculture-Rural Development-FDA	June 5	June 11
Commerce-Justice-Science	July 14	July 17
Defense	June 10	June 13
Energy-Water Development	July 7	July 10
Financial Services-General Government	June 23	June 26
Homeland Security	June 9	June 12
Interior-Environment	June 23	June 26
Labor-HHS	July 21	July 24
Legislative Branch	June 24	June 27
MilCon-VA	June 5	June 10
State-Foreign Operations	June 24	June 27
Transportation-HUD	July 7	July 10

Additionally, House Members submitted their fifteen Community Project Funding requests to the House Appropriations Committee for consideration in the appropriations bills. Members are required to post their requests on their websites by June 13.

EPA Announces Update to PFAS Drinking Water Regulations

On May 14, EPA announced it will maintain the existing National Primary Drinking Water Regulations for PFOA and PFOS—standards finalized in 2024—while extending compliance deadlines by two years, from 2029 to 2031. The agency also launched the PFAS OUTreach Initiative (PFAS OUT) to support small and rural water systems with technical assistance, resources, and outreach. Additionally, EPA signaled its intent to rescind and reconsider the regulatory determinations for four other PFAS chemicals—PFHxS, PFNA, GenX, and PFBS—citing a need to ensure the Safe Drinking Water Act process is followed. This reconsideration includes the Hazard Index approach used to regulate these substances as a mixture. EPA emphasized its support for passive receivers such as public water systems by delaying implementation timelines, enhancing coordination, and holding polluters accountable through forthcoming effluent limitations guidelines. A proposed rule to formalize the new compliance timeline is expected this fall, with a final rule anticipated in spring 2026.

LEGISLATIVE ACTIVITY

Congress Votes to Repeal California's Vehicle Emissions Waivers. The House and Senate have passed three resolutions (**H. J. Res. 87**, **88**, and **89**) to rescind EPA waivers previously granted to the State of California under the *Clean Air Act*. These waivers allowed the State to implement stricter emissions standards for passenger cars and heavy-duty trucks, including mandates for zero-emission vehicles. President Trump is expected to sign these joint resolutions. The resolutions were advanced under the *Congressional Review Act* (CRA), despite objections from the Senate parliamentarian and the Government Accountability Office, both of which questioned the legality of using the CRA in this context.

House Advances Repeal of Endangered Species Listing for California Fish. On May 1, the House voted 216-195 to pass **H. J. Res. 78**, a *Congressional Review Act* resolution to overturn the U.S. Fish and Wildlife Service's rule listing the longfin smelt—a fish native to California's Bay-Delta region—as an endangered species. The measure now awaits further consideration in the Senate.

Senate Confirms MacGregor as Deputy Interior Secretary. On May 14, the Senate voted 53-40 to confirm Katharine MacGregor as Deputy Secretary of the Department of the Interior. MacGregor previously held the same position during the final year of the first Trump Administration and had earlier served as deputy chief of staff to then-Interior Secretary David Bernhardt. After leaving the administration, she worked as vice president of environmental services at NextEra Energy.

Senate Confirms Donahue as EPA General Counsel. On May 15, the Senate voted 51-46 to confirm Sean Donahue as General Counsel of the Environmental Protection Agency (EPA). Donahue will serve as the agency's chief legal advisor. Donahue previously served at EPA from 2018 to 2021 and most recently worked in environmental compliance at a solar energy company.

House Committee Leaders Release Draft Bill to Overhaul FEMA. On May 8, House Transportation and Infrastructure Committee Chair Sam Graves (R-MO) and Ranking Member Rick Larsen (D-WA) released a **discussion draft** of legislation to reform the Federal Emergency Management Agency (FEMA). The proposal would restore FEMA as an independent, cabinet-level agency and streamline federal disaster assistance programs. Key proposed provisions include expedited project-based grants for recovery, simplified survivor applications, permitting reforms, and incentives for state-led mitigation investments. The draft also would direct FEMA to close longstanding disaster declarations, improve interagency coordination, and enhance transparency and accountability in disaster aid. The Committee is seeking stakeholder feedback prior to bill introduction and any formal legislative action.

House Democrats Introduce Bill to Enforce Congressional Control Over Federal Spending. On May 15, Representatives Sam Liccardo (D-CA), Dave Min (D-CA), and Eugene Vindman (D-VA) introduced the *Protecting Our Constitution and Communities Act* (**H.R. 3454**), a bill designed to strengthen enforcement of the *Impoundment Control Act (ICA) of 1974*. The legislation would enable individuals, states, and local governments to take legal action if they are harmed by executive branch officials unlawfully withholding congressionally appropriated funds. It would also impose accountability measures on officials who knowingly violate the ICA, including personal liability and the loss of immunity protections. This bill has been referred to the House Budget and Rules Committees for further consideration.

Senators Introduce Bipartisan Bill to Expand Water Infrastructure Financing. Senators John Curtis (R-UT) and Mark Kelly (D-AZ) introduced the *Restoring WIFIA Eligibility* Act (**S. 1760**), a bipartisan bill to expand access to federal water infrastructure loans under the WIFIA program. The legislation would ensure projects with federal cost-sharing remain eligible for WIFIA assistance if led by non-federal entities and repaid with non-federal funds. Companion legislation (**H.R. 3035**) was introduced by Reps. Jim Costa (D-CA) and Dan Newhouse (R-WA).

CONGRESSIONAL LETTERS

Lawmakers Urge DHS to Reinstate FEMA's BRIC Program. On May 13, Rep. Chuck Edwards (R-NC) led a bipartisan, bicameral **letter** urging Homeland Security Secretary Kristi Noem and FEMA leadership to reinstate the Building Resilient Infrastructure and Communities (BRIC) program. The letter, co-led by Senators Thom Tillis (R-NC), Patty Murray (D-WA), Lisa Murkowski (R-AK), and Chris Van Hollen (D-MD) and Representatives Sylvia Garcia (D-TX), Brian Fitzpatrick (R-PA), and Ed Case (D-HI), highlights BRIC's role in reducing disaster recovery costs and protecting infrastructure. They called on DHS and FEMA to work with Congress to improve grant accessibility and ensure funding continues to support mitigation and preparedness nationwide.

FEDERAL FUNDING AWARDS

EPA Awards Brownfields Grants to Clean Up Communities. On May 16, EPA **announced** the award of $267 million in grants to help communities assess, clean up, and redevelop brownfield sites. The funding includes approximately $121.8 million for 148 Brownfield Assessment Grant recipients, $88.2 million for 51 Cleanup Grant recipients, and $15 million for 15 Revolving Loan Fund (RLF) grantees. An additional $42 million was awarded in supplemental RLF grants to 34 high-performing recipients to continue cleanup efforts.

EPA Announces FY 2025 SUDC Grant Allotments. The EPA has **released** nearly $25 million in FY 2025 grant funding through the Assistance for Small, Underserved, and Disadvantaged Communities (SUDC) Program, authorized by the *Safe Drinking Water Act*. This program supports water infrastructure improvements and help small communities comply with federal drinking water standards. An additional $2.8 million was designated for regional efforts serving American Indian and Alaska Native communities. EPA has waived the 10% cost-share requirement for all applicants.

FEDERAL AGENCY ACTIONS AND PERSONNEL CHANGES

President Trump Signs Order on Federal Scientific Standards. On May 23, President Trump signed an **executive order** directing federal agencies to revise how they conduct, use, and communicate scientific research. Citing a loss of public trust during the COVID-19 pandemic and concerns over climate and fisheries policy, the order mandates a review of all Biden-era actions for compliance. The order emphasizes transparency, reproducibility, and peer review, and prohibits reliance on “highly unlikely” or “overly precautionary” assumptions unless required by law. Agencies must revise internal policies and report back within 60 days following new guidance from the White House Office of Science and Technology Policy.

Federal Agencies Issue Joint Guidance on Reducing Cyber Risks to Operational Technology. On May 6, the Cybersecurity and Infrastructure Security Agency (CISA), in coordination with the FBI, EPA, and DOE, released **guidance** to help critical infrastructure operators reduce cyber threats to operational technology (OT) systems. The guidance follows increasing cyber incidents targeting industrial control systems and emphasizes the importance of collaboration with system integrators and vendors to prevent misconfigurations.

EPA Seeks Nominations for Reconstituted Science Advisory Boards. EPA Administrator Lee Zeldin **announced** the agency is accepting nominations for the Science Advisory Board and Clean Air Scientific Advisory Committee, which are tasked with providing independent scientific advice to the Administrator on the science that underlies agency rulemaking. EPA stated it will conduct a rigorous review of all nominations, with final selections based on scientific expertise across a range of disciplines.

Acting FEMA Administrator Fired Following Congressional Testimony. On May 8, Acting FEMA Administrator Cameron Hamilton was dismissed following testimony at a House Appropriations Committee hearing in which he opposed the Trump Administration’s proposal to eliminate the agency. Hamilton has been replaced by David Richardson, who previously led the Department of Homeland Security’s Countering Weapons of Mass Destruction Office.

Interior Seeks Input on Regulatory Reform. The Department of the Interior (DOI) has published a **Request for Information** (RFI) seeking public input on existing regulations that could be modified or repealed to reduce regulatory burdens while continuing to meet statutory obligations. The RFI follows recent executive orders from President Trump focused on unleashing American energy, promoting lawful and efficient regulation, and reducing costs associated with compliance. DOI is specifically requesting input from entities affected by its regulations on how to streamline, update, or eliminate rules that may be outdated, overly complex, or inconsistent with the Administration's policy directives. Comments are due by June 20.

##

IEUA Bill List 5.28.2025

Note: *bills in italics are not moving in 2025*

Bills With Positions

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
AB 259	**Rubio, Blanca, D**	Open meetings: local agencies: teleconferences.	04/21/2025	05/14/2025 - Referred to Coms. on L. GOV. and JUD.	05/14/2025 - Senate L. GOV.		This bill would extend the alternative teleconferencing procedures until January 1, 2030. (Based on 04/21/2025 text)	Three Valleys MWD and CSDA Sponsor SUPPORT
AB 339	**Ortega, D**	Local public employee organizations: notice requirements.	05/23/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Assembly THIRD READING	***05/29/25 #365 A-THIRD READING FILE - ASSEMBLY BILLS***	This bill would require the governing body of a public agency, and boards and commissions designated by law or by the governing body of a public agency, to give the recognized employee organization no less than 120 days' written notice before issuing a request for proposals, request for quotes, or renewing or extending an existing contract to perform services that are within the scope of work of the job classifications represented by the recognized employee organization. The bill would require the notice to include specified information, including the anticipated duration of the contract. The bill would also require the public agency, if an emergency or other exigent circumstance prevents the public agency from providing the written notice described above, to provide as much advance notice as is practicable under the circumstances. (Based on 05/23/2025 text)	OPPOSE

Bills With Positions

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
AB 514	***Petrie-Norris, D***	*Water: emergency water supplies.*	*05/01/2025*	*05/22/2025 - Failed Deadline pursuant to Rule 61(a)(5). (Last location was APPR. SUSPENSE FILE on 5/14/2025)(May be acted upon Jan 2026)*	*05/22/2025 - Assembly 2 YEAR*		*Would declare that it is the established policy of the state to encourage, but not mandate, the development of emergency water supplies by both local and regional water suppliers, as defined, and to support their use during times of drought or unplanned service or supply disruption, as provided. (Based on 05/01/2025 text)*	*IRWD Sponsor* *SUPPORT*
AB 523	**Irwin, D**	Metropolitan water districts: proxy vote authorizations.	05/05/2025	05/21/2025 - Referred to Com. on L. GOV.	05/21/2025 - Senate L. GOV.		Under the Metropolitan Water District Act, the board of a metropolitan water district is required to consist of at least one representative from each member public agency, as prescribed. This bill would, until January 1, 2030, authorize a representative of a member public agency that is entitled to designate or appoint only one representative to the board of directors to assign a proxy vote authorization to a representative of another member public agency to be exercised when the assigning representative is unable to attend a meeting or meetings of the board, as provided. (Based on 05/05/2025 text)	Eastern MWD Sponsor SUPPORT
AB 532	**Ransom, D**	Water rate assistance program.	05/23/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Assembly THIRD READING	***05/29/25 #381 A-THIRD READING FILE - ASSEMBLY BILLS***	The Low Income Household Water Assistance Program was only operative until March 31, 2024. This bill would repeal the above-described requirements related to the Low Income Household Water Assistance Program. (Based on 05/23/2025 text)	CMUA Sponsor SUPPORT

Bills With Positions

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
AB 580	**Wallis, R**	Surface mining: Metropolitan Water District of Southern California.	03/26/2025	05/23/2025 - Read third time. Passed. Ordered to the Senate. (Ayes 71. Noes 0.) In Senate. Read first time. To Com. on RLS. for assignment.	05/23/2025 - Senate RLS.		Current law authorizes the Metropolitan Water District of Southern California (MWD) to prepare a master reclamation plan, as provided, that identifies each individual surface mining operation in specified counties and satisfies all reclamation plan requirements for each individual surface mining site. Existing law repeals the provisions authorizing the preparation and approval of the master reclamation plan for the MWD on January 1, 2026. This bill would extend the operation of those provisions until January 1, 2051. (Based on 03/26/2025 text)	MWD Sponsored Bill SUPPORT

Bills With Positions								
Measure	**Author**	**Topic**	**Last Amend**	**Status**	**Location**	**Calendar**	**Brief Summary**	**Notes**
AB 794	**Gabriel, D**	California Safe Drinking Water Act: emergency regulations.	04/10/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Assembly THIRD READING	***05/29/25 #202 A-THIRD READING FILE - ASSEMBLY BILLS***	This bill would provide that the authority of the state board to adopt an emergency regulation pursuant to these provisions includes the authority to adopt requirements of a specified federal regulation that was in effect on January 19, 2025, regardless of whether the requirements were repealed or amended to be less stringent. The bill would prohibit an emergency regulation adopted pursuant to these provisions from implementing less stringent drinking water standards, as provided, and would authorize the regulation to include monitoring requirements that are more stringent than the requirements of the federal regulation. The bill would prohibit maximum contaminant levels and compliance dates for maximum contaminant levels adopted as part of an emergency regulation from being more stringent than the maximum contaminant levels and compliance dates of a regulation promulgated pursuant to the federal act. (Based on 04/10/2025 text)	OPPOSE UNLESS AMENDED
AB 810	***Irwin, D***	*Local government: internet websites and email addresses.*	*04/10/2025*	*05/22/2025 - Failed Deadline pursuant to Rule 61(a)(5). (Last location was APPR. SUSPENSE FILE on 5/7/2025)(May be acted upon Jan 2026)*	*05/22/2025 - Assembly 2 YEAR*		*Current law requires that a local agency that maintains an internet website for use by the public to ensure that the internet website uses a ".gov" top-level domain or a ".ca.gov" second-level domain no later than January 1, 2029. The bill would also require a special district, joint powers authority, or other political subdivision to comply with similar domain requirements no later than January 1, 2031. (Based on 04/10/2025 text)*	*OPPOSE*

Bills With Positions

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
SB 31	**McNerney, D**	Water quality: recycled water.	05/12/2025	05/27/2025 - Ordered to special consent calendar.	05/27/2025 - Senate CONSENT CALENDAR	***05/28/25 #342 S-SPECIAL CONSENT CALENDAR NO. 09***	This bill would, for the purposes of the above provision, redefine "recycled water" and provide that water discharged from a decorative body of water during storm events is not to be considered an unauthorized discharge if recycled water was used to restore levels due to evaporation. (Based on 05/12/2025 text)	WateReuse Sponsored Bill SUPPORT
SB 72	**Caballero, D**	The California Water Plan: long-term supply targets.	04/10/2025	05/23/2025 - From committee: Do pass. (Ayes 5. Noes 0.) (May 23). Read second time. Ordered to third reading.	05/23/2025 - Senate THIRD READING	***05/28/25 #119 S-SENATE BILLS - THIRD READING FILE***	The bill would require "The California Water Plan." to include specified components, including a discussion of the estimated costs, benefits, and impacts of any project type or action that is recommended by the department within the plan that could help achieve the water supply targets. (Based on 04/10/2025 text)	CMUA and Western MWD Bill. SUPPORT
SB 239	**Arreguín, D**	Open meetings: teleconferencing: subsidiary body.	04/07/2025	05/08/2025 - Read second time. Ordered to third reading.	05/08/2025 - Senate THIRD READING	***05/28/25 #65 S-SENATE BILLS - THIRD READING FILE***	This bill would authorize a subsidiary body, as defined, to use alternative teleconferencing provisions and would impose requirements for notice, agenda, and public participation, as prescribed. The bill would require the subsidiary body to post the agenda at each physical meeting location designated by the subsidiary body, as specified. The bill would require the members of the subsidiary body to visibly appear on camera during the open portion of a meeting that is publicly accessible via the internet or other online platform, as specified. (Based on 04/07/2025 text)	SUPPORT

Bills With Positions

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
SB 350	***Durazo, D***	*Water Rate Assistance Program.*	*05/07/2025*	*05/22/2025 - Failed Deadline pursuant to Rule 61(a)(5). (Last location was APPR. SUSPENSE FILE on 5/12/2025)(May be acted upon Jan 2026)*	*05/22/2025 - Senate 2 YEAR*		*Would establish the Water Rate Assistance Program. As part of the program, the bill would establish the Water Rate Assistance Fund in the State Treasury (Based on 05/07/2025 text)*	*Environmental justice community bill.* *OPPOSE UNLESS AMENDED*
SB 394	**Allen, D**	Water theft: fire hydrants.		05/27/2025 - Read third time. Passed. (Ayes 39. Noes 0.) Ordered to the Assembly.	05/27/2025 - Assembly DESK		This bill would add to the list of acts for which a utility may bring a civil cause of action under these circumstances to include tampering with a fire hydrant, fire hydrant meter, or fire detector check, or diverting water, or causing water to be diverted, from a fire hydrant with knowledge of, or reason to believe, that the diversion or unauthorized connection existed at the time of use for nonfirefighting purposes or without authorization from the appropriate water system or fire department. (Based on 02/14/2025 text)	Las Virgenes and ACWA sponsored SUPPORT
SB 496	***Hurtado, D***	*Advanced Clean Fleets Regulation: appeals advisory committee: exemptions.*	*04/07/2025*	*05/22/2025 - Failed Deadline pursuant to Rule 61(a)(5). (Last location was APPR. SUSPENSE FILE on 5/5/2025)(May be acted upon Jan 2026)*	*05/22/2025 - Senate 2 YEAR*		*This bill would require the state board to establish the Advanced Clean Fleets Regulation Appeals Advisory Committee by an unspecified date for purposes of reviewing appeals of denied requests for exemptions from the requirements of the Advanced Clean Fleets Regulation. (Based on 04/07/2025 text)*	*CSDA and other local gov sponsored bill* *SUPPORT*

Bills With Positions

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
SB 601	**Allen, D**	Water: waste discharge.	05/23/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Senate THIRD READING	*05/28/25 #291 S-SENATE BILLS - THIRD READING FILE*	This bill would delete the limitation on the state board's authorization, and instead would authorize the state board to adopt water quality control plans for any waters of the state, which would include nexus waters, which the bill would define as all waters of the state that are not also navigable, except as specified. The bill would require any water quality standard applicable to nexus waters, which was submitted to, and approved by, or is awaiting approval by, the United States Environmental Protection Agency or the state board as of January 19, 2025, to remain in effect, except where the state board, regional board, or United States Environmental Protection Agency adopts a more stringent standard. The bill would require the state board and regional boards to include nexus waters in all processes pursuant to the federal Clean Water Act, including, but not limited to, the California Integrated Report and the establishment of total maximum daily loads, as specified. (Based on 05/23/2025 text)	Coastkeeper sponsor OPPOSE
SB 682	**Allen, D**	Environmental health: product safety: perfluoroalkyl and polyfluoroalkyl substances.	05/23/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Senate THIRD READING	*05/28/25 #309 S-SENATE BILLS - THIRD READING FILE*	. This bill would, on and after January 1, 2027, prohibit a person from distributing, selling, or offering for sale a cleaning product, cookware, dental floss, juvenile product, food packaging, or ski wax, as provided, that contains intentionally added PFAS, as defined, except for previously used products and as otherwise preempted by federal law. (Based on 05/23/2025 text)	CASA Sponsored SUPPORT

Watch Bills

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
AB 823	**Boerner, D**	Solid waste: plastic microbeads: plastic glitter.	05/23/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Assembly THIRD READING	***05/29/25 #407 A-THIRD READING FILE - ASSEMBLY BILLS***	This bill would, on and after January 1, 2029, prohibit a person from selling, offering for sale, distributing, or offering for promotional purposes in this state a personal care product containing plastic glitter, or a personal care product in a non-rinse-off product or a cleaning product containing one ppm or more by weight of plastic microbeads that are used as an abrasive, as specified. The bill would authorize, until January 1, 2030, a person to continue to sell, offer for sale, distribute, or offer for promotional purposes in this state an existing stock of personal care products containing plastic glitter, as specified. By adding these prohibitions to the Plastic Microbeads Nuisance Prevention Law, the bill would impose the civil penalty for violations of these prohibitions. (Based on 05/23/2025 text)	
SB 74	**Seyarto, R**	Office of Land Use and Climate Innovation: Infrastructure Gap-Fund Program.	04/07/2025	05/27/2025 - Ordered to special consent calendar.	05/27/2025 - Senate CONSENT CALENDAR	***05/28/25 #349 S-SPECIAL CONSENT CALENDAR NO. 09***	The bill would authorize the office to provide funding for up to 20% of a project's additional projected cost, as defined, after the project has started construction, subject to specified conditions, including, among other things, that the local agency has allocated existing local tax revenue for at least 45% of the initially budgeted total cost of the infrastructure project. When applying to the program, the bill would require the local agency to demonstrate challenges with completing the project on time and on budget and how the infrastructure project helps meet state and local goals, as specified. (Based on 04/07/2025 text)	

Watch Bills

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
SB 224	**Hurtado, D**	Department of Water Resources: water supply forecasting.	05/23/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Senate THIRD READING	*05/28/25 #235 S-SENATE BILLS -THIRD READING FILE*	This bill would require the department, on or before January 1, 2027, to adopt a new water supply forecasting model and procedures that better address the effects of climate change and implement a formal policy and procedures for documenting the department's operational plans and the department's rationale for its operating procedures, including the department's rationale for water releases from reservoirs. (Based on 05/23/2025 text)	
SB 279	**McNerney, D**	Solid waste: compostable materials.	05/23/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Senate THIRD READING	*05/28/25 #245 S-SENATE BILLS -THIRD READING FILE*	This bill would require that the total amount of feedstock and compost onsite at any one time not exceed 500 cubic yards instead of the 100 cubic yards and 750 square feet in the regulations. The bill would also require the composting of agricultural materials and residues that are from a large-scale biomass management event at an agricultural facility that does not otherwise operate as a solid waste facility to be an excluded activity, as specified. This bill contains other related provisions and other existing laws. (Based on 05/23/2025 text)	
SB 317	**Hurtado, D**	Wastewater surveillance.	04/28/2025	05/27/2025 - Ordered to special consent calendar.	05/27/2025 - Senate CONSENT CALENDAR	*05/28/25 #364 S-SPECIAL CONSENT CALENDAR NO. 09*	Would require the State Department of Public Health, in consultation with participating wastewater treatment facilities, local health departments, and other subject matter experts, to maintain the Cal-SuWers network of monitoring programs to test for pathogens, toxins, and other public health indicators in wastewater. The bill would require participation in the Cal-SuWers network from local health departments and wastewater treatment facilities to be voluntary. (Based on 04/28/2025 text)	

Watch Bills

Measure	Author	Topic	Last Amend	Status	Location	Calendar	Brief Summary	Notes
SB 431	**Arreguín, D**	Assault and battery: public utility employees and essential infrastructure workers.	05/23/2025	05/27/2025 - Read second time. Ordered to third reading.	05/27/2025 - Senate THIRD READING	***05/28/25 #261 S-SENATE BILLS -THIRD READING FILE***	This bill would make an assault or battery committed against an employee of a public utility or other worker engaged in essential infrastructure work, as defined, punishable by imprisonment in a county jail not exceeding one year, by a fine not exceeding $2,000, or by both that fine and imprisonment. (Based on 05/23/2025 text)	
SB 654	**Stern, D**	California Environmental Protection Agency: contract: registry: greenhouse gas emissions that result from the water-energy nexus.		05/22/2025 - Failed Deadline pursuant to Rule 61(a)(5). (Last location was APPR. SUSPENSE FILE on 4/21/2025)(May be acted upon Jan 2026)	05/22/2025 - Senate 2 YEAR		The California Environmental Protection Agency is required to oversee the development of a registry for greenhouse gas emissions that result from the water-energy nexus using the best available data. Current law provides that participation in the registry is voluntary and open to any entity conducting business in the state. Existing law authorizes the agency to enter into a contract with a qualified nonprofit organization to do specified things, including to recruit broad participation in the registry from all economic sectors and regions of the state. Current law limits the term of the term of the contract to 3 years, except as provided. This bill would instead require the agency to oversee the administration of the above-described registry and would authorize the agency to enter into a new contract, limited to a term of 3 years and with a total budget of $2,000,000, to do specified things, including to recruit broad participation in the registry from all economic sectors and regions of the state to meet the different needs of water users throughout the state by various means, as provided. (Based on 02/20/2025 text)	

Project Status: Wineville/Jurupa/RP3 Basin Improvements

Budget:

- Authorized capital budget: $28,846,016

Available Funding:

- $15.4 M in SRF Loan at 0.55%
- $10.8 M is State and Federal Grants

Cost Summary:

- Actual Cost as of June 6, 2025: **$ 26,736,992**
- Remaining Budget: **$ 2,109,024**

Progress:

- Construction Contract with MNR is 95% completed (June 2025)
- Overall construction is 85% completed (March 2026)

Completed scope items

- Rubber dam system at Wineville Basin's spillway
- Control slide gates within Wineville Basin
- Basin grading for a new pump station at Wineville
- Power, controls, and communication systems at Wineville
- 2-miles of 30-Inch Pipeline passing through Fontana and Ontario.
- Stormwater diversion to Jurupa Basin.

Remaining scope items:

- Testing of SCADA and Communication Systems
- Purchase pumps for Wineville Basin and Jurupa Basin
- Install and test the new pumps

Updates:

- Addressing seismic modifications to Jurupa Pum
- Issued purchase order for Pumps
- Requesting additional SRF funds
- See updated progress schedule

TASK	PROGRESS	START	END
Prepare Solicitation Documents		**06-Jun-24**	**11-Nov-24**
Draft Documents	100%	06-Jun-24	22-Aug-24
Review Documents	100%	23-Aug-24	28-Aug-24
Finalize Documents	100%	29-Aug-24	11-Nov-24
Request for Qualification of Pump Suppliers		**19-Nov-24**	**14-Jan-25**
Enter into PlanetBids	100%	19-Nov-24	19-Nov-24
Solicitation (Q&A Period)	100%	20-Nov-24	12-Dec-24
Final Week of Solicitation for RFQ	100%	16-Dec-24	19-Dec-24
Close Solicitation for RFQ (milestone)	100%	19-Dec-24	19-Dec-24
Review Responses to the RFQ	100%	20-Dec-24	13-Jan-25
Notify Prequalified Suppliers (milestone)	100%	14-Jan-25	14-Jan-25
Request for Proposal of Prequalified Suppliers		**14-Jan-25**	**21-May-25**
Prequalified Supplier Draft Initial Submittal and Pricing	100%	14-Jan-25	13-Feb-25
Receive Initial Submittal (milestone)	100%	13-Feb-25	13-Feb-25
Review Initial Submittal	100%	13-Feb-25	27-Feb-25
Prequalified Supplier Draft Final Submittal	100%	28-Feb-25	21-Mar-25
Receive Final Submittal (milestone)	100%	21-Mar-25	21-Mar-25
IEUA Reviews Final Submittal to Decide Pump Supplier	100%	24-Mar-25	07-Apr-25
Board of Directors' Authorization of Purchase Order (milestone)	100%	21-May-25	21-May-25
Pump Fabrication/Installation/Testing/Close-out		**22-May-25**	**19-Feb-26**
Finalized Pump Submittals	38%	22-May-25	20-Jun-25
Fabrication (22 weeks)	7%	22-May-25	23-Oct-25
Delivery	0%	23-Oct-25	06-Nov-25
Installation	0%	06-Nov-25	05-Jan-26
Testing	0%	05-Jan-26	05-Feb-26
Close Out	0%	05-Feb-26	19-Feb-26

Outlet Control Gate/Rubber Dam System

Control/Pump Station Building

Chino Basin Day

Regional Board Offices/Hybrid

3737 Main Street Suite 500, Riverside, CA (5th Floor Conference Room)

May 27, 2025

8:30 AM to 12:00 PM

Teams Link: **Join the meeting now**

Dial in by phone

+1 669-238-0793,,6106325# United States, San Jose

Find a local number

Phone conference ID: 610 632 5#

Agenda

- Introductions
- Discussion with Regional Board:
  - Stormwater MS4
  - Recycled Water Release Reporting
  - Reach 3 Special Study
  - PFAS Activities
- Shared Updates (IEUA, CDA, CBWM):
  - Water Quality Scenario Planning
  - Chino Basin Program
  - Basin Plan Amendment
  - Chino Creek 1B
  - CDA Operations Update
    - South Archibald Plume
    - Chino Airport Plume
  - Update of Septic to Sewer Study
  - MWD Update
    - Diamond Valley Lake (DVL) to Rialto
- Future Updates:
  - Safe Yield Update
  - California Institute for Men (CIM) Sewage Flows