2017 Annual Report of the Prado Basin Habitat Sustainability Committee

Prado Basin Habitat Sustainability Committee Meeting

May 9, 2018

WEI
WILDERMUTH ENVIRONMENTAL, INC.

CHINO BASIN WATERMASTER
Partners in Basin Management

Inland Empire UTILITIES AGENCY

Agenda

1. Background
2. Review of the draft 2017 Annual Report for the PBHSC
3. Next steps

Annual Report – Table of Contents

- Section 1 – Background and Objectives
- Section 2 – Monitoring, Data Collection, and Methods
- Section 3 – Results and Interpretations
  - 3.1 – Trends in Riparian Habitat Extent and Quality
  - 3.2 – Groundwater and Its Relationship to the Riparian Habitat
  - 3.3 – Climate and Its Relationship to the Riparian Habitat
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- Section 4 – Conclusions and Recommendations
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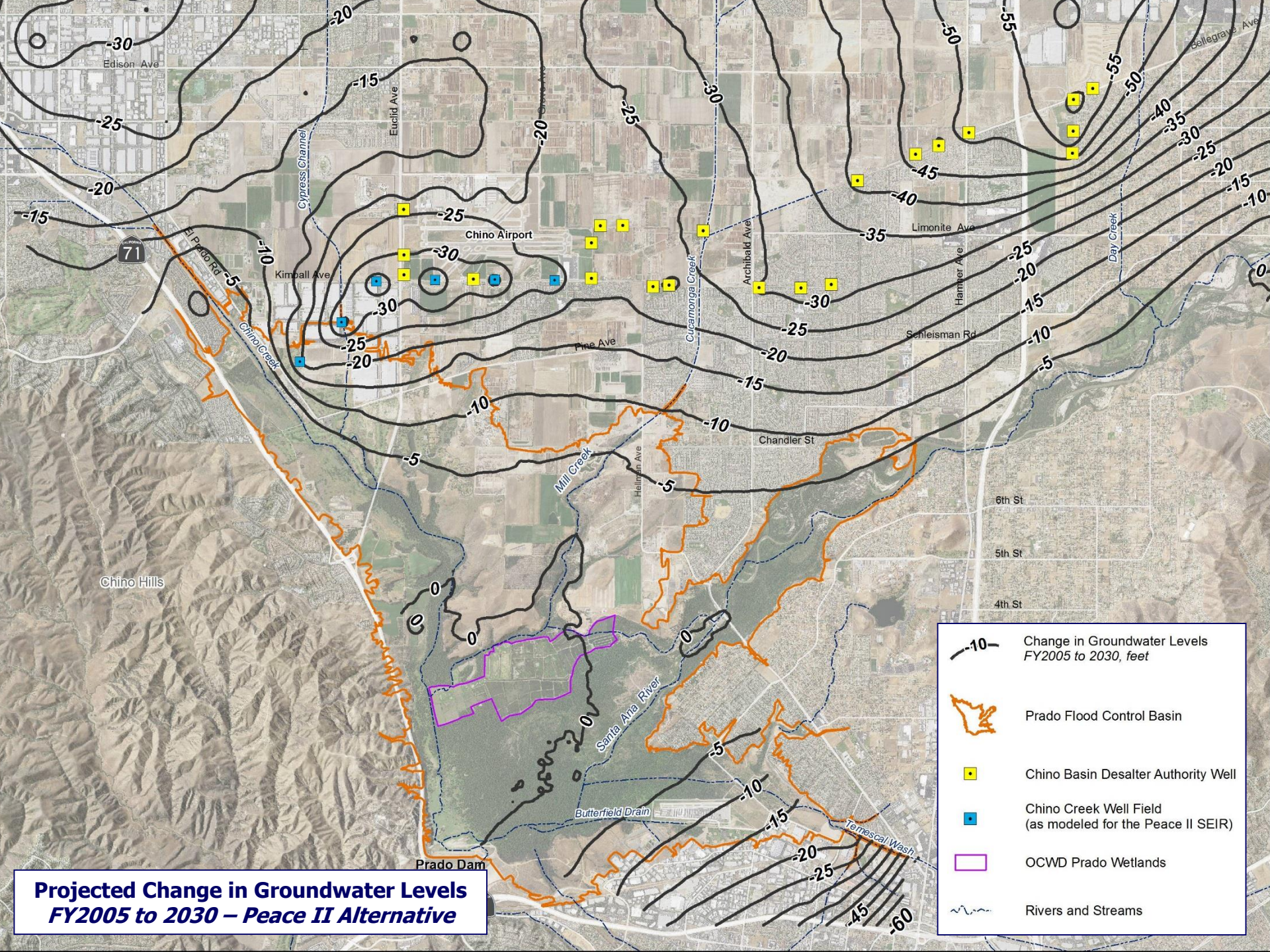
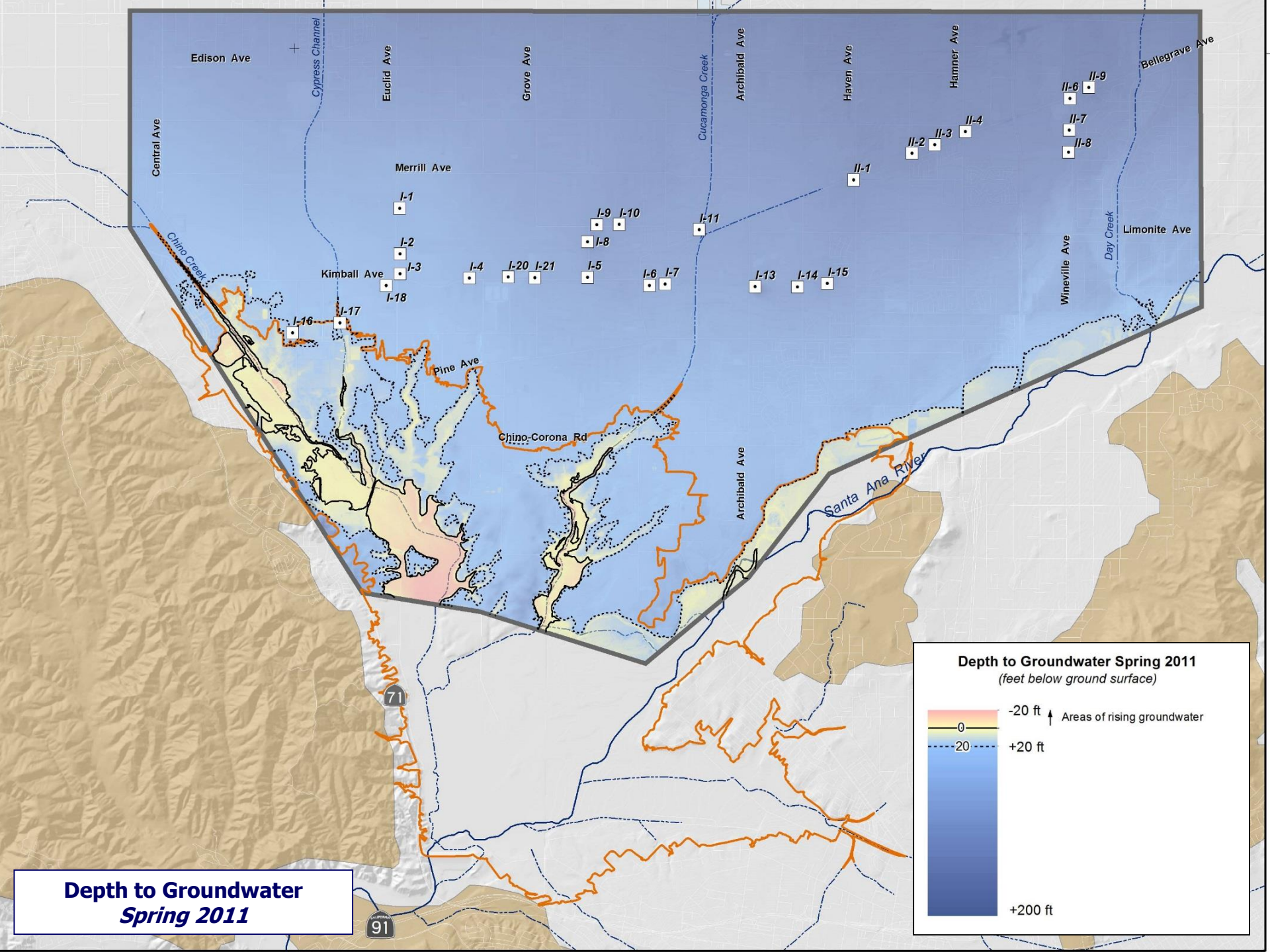
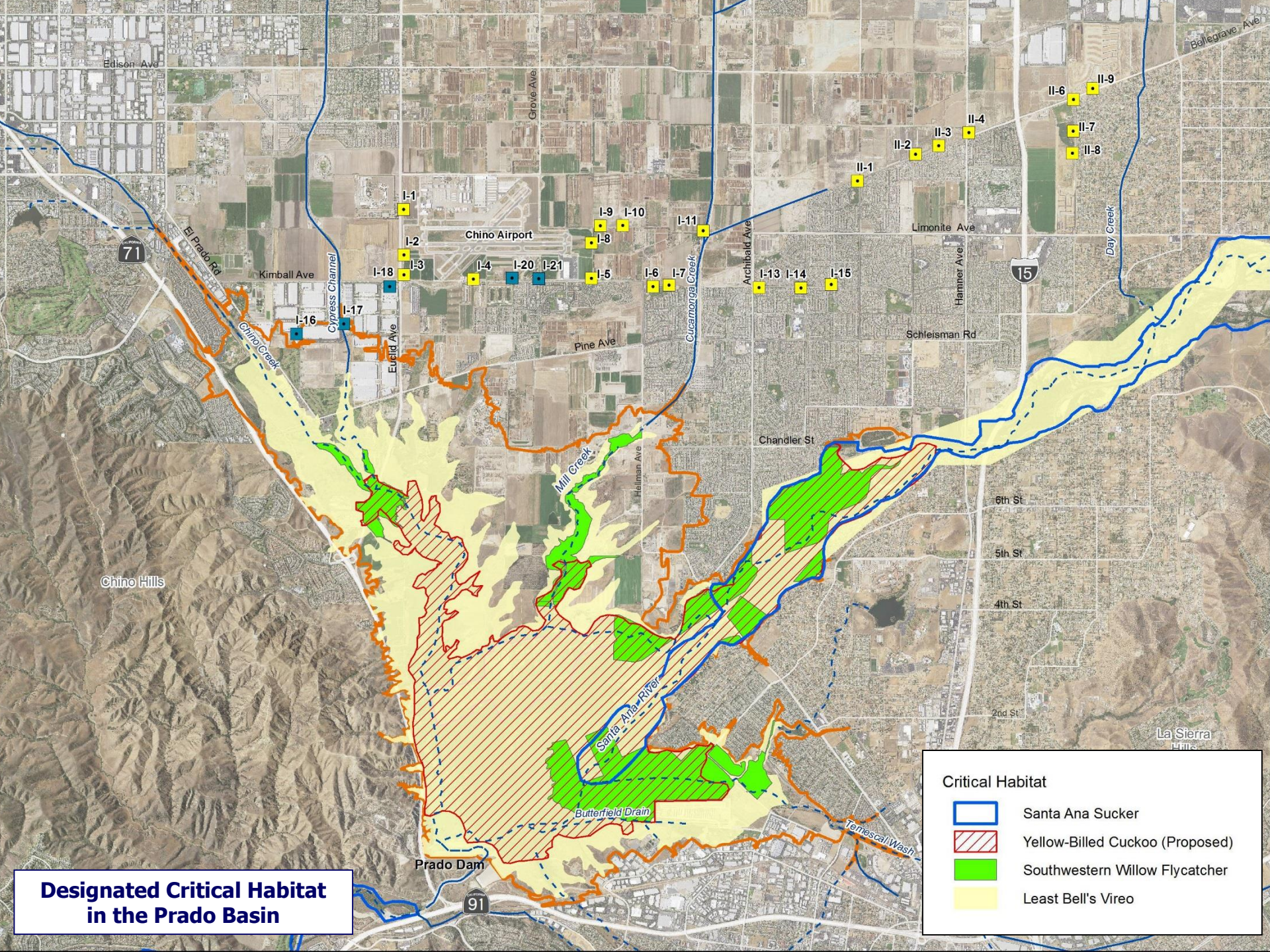
- Section 5 – References

Potential Stressors

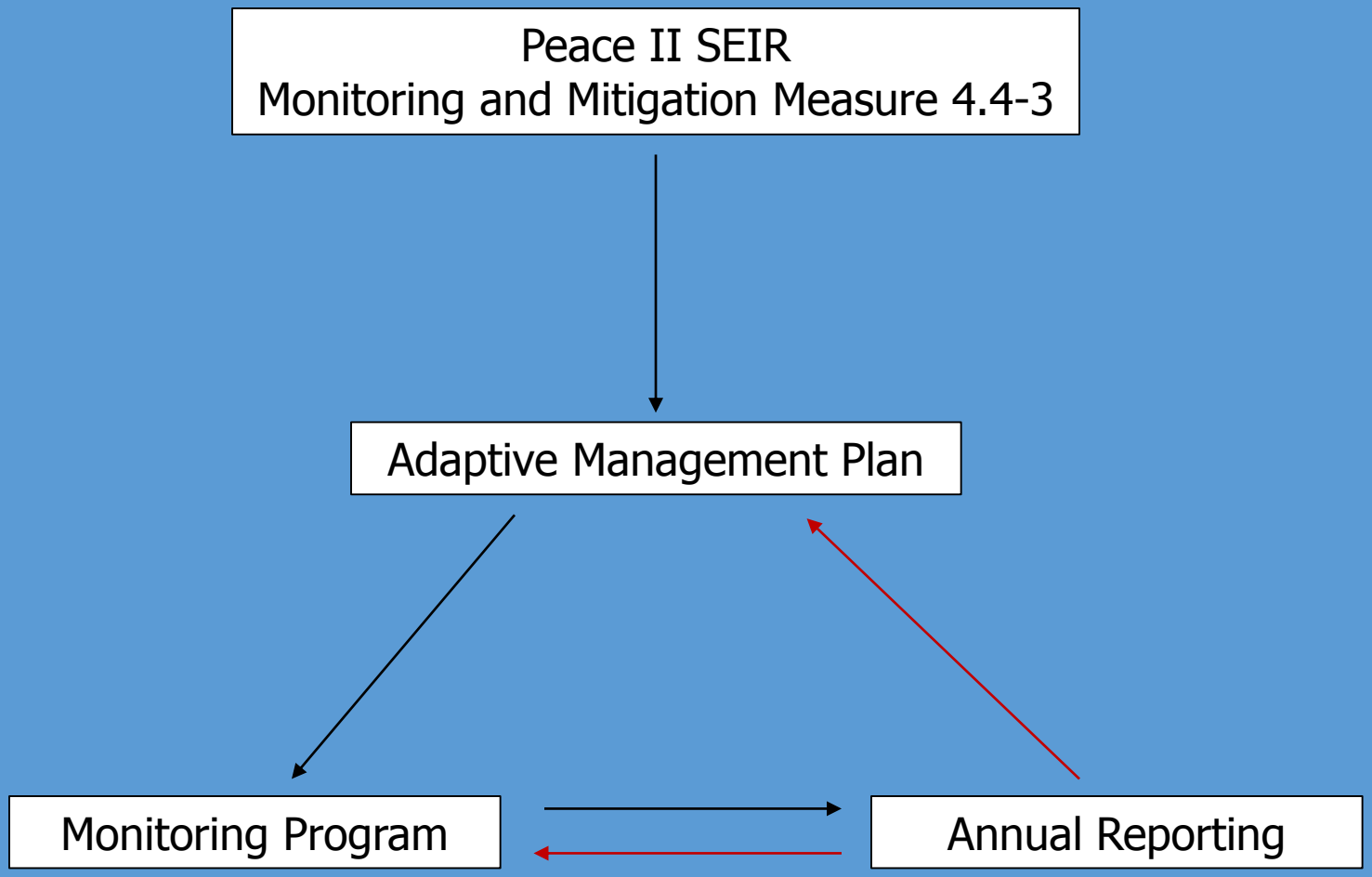


Projected Change in Groundwater Levels
FY2005 to 2030 – Peace II Alternative


Edison Ave
Cypress Channel
Euclid Ave
Grove Ave
Cucamonga Creek
Archibald Ave
Haven Ave
Hamner Ave
Bellegrave Ave
Central Ave
Merrill Ave
Limonite Ave
Day Creek
Wineville Ave
Chino Creek
Kimball Ave
Pine Ave
Chino-Corona Rd
Archibald Ave
Santa Ana River
I-1
I-2
I-3
I-4
I-5
I-6
I-7
I-8
I-9
I-10
I-11
I-13
I-14
I-15
I-16
I-17
I-18
I-20
I-21
II-1
II-2
II-3
II-4
II-6
II-7
II-8
II-9
71
91
Depth to Groundwater Spring 2011
(feet below ground surface)
-20 ft
0
20
+20 ft
+200 ft
Areas of rising groundwater
Depth to Groundwater
Spring 2011



Designated Critical Habitat in the Prado Basin


Peace II SEIR
Monitoring and Mitigation Measure 4.4-3
Adaptive Management Plan
Monitoring Program
Annual Reporting

Annual Report – Table of Contents

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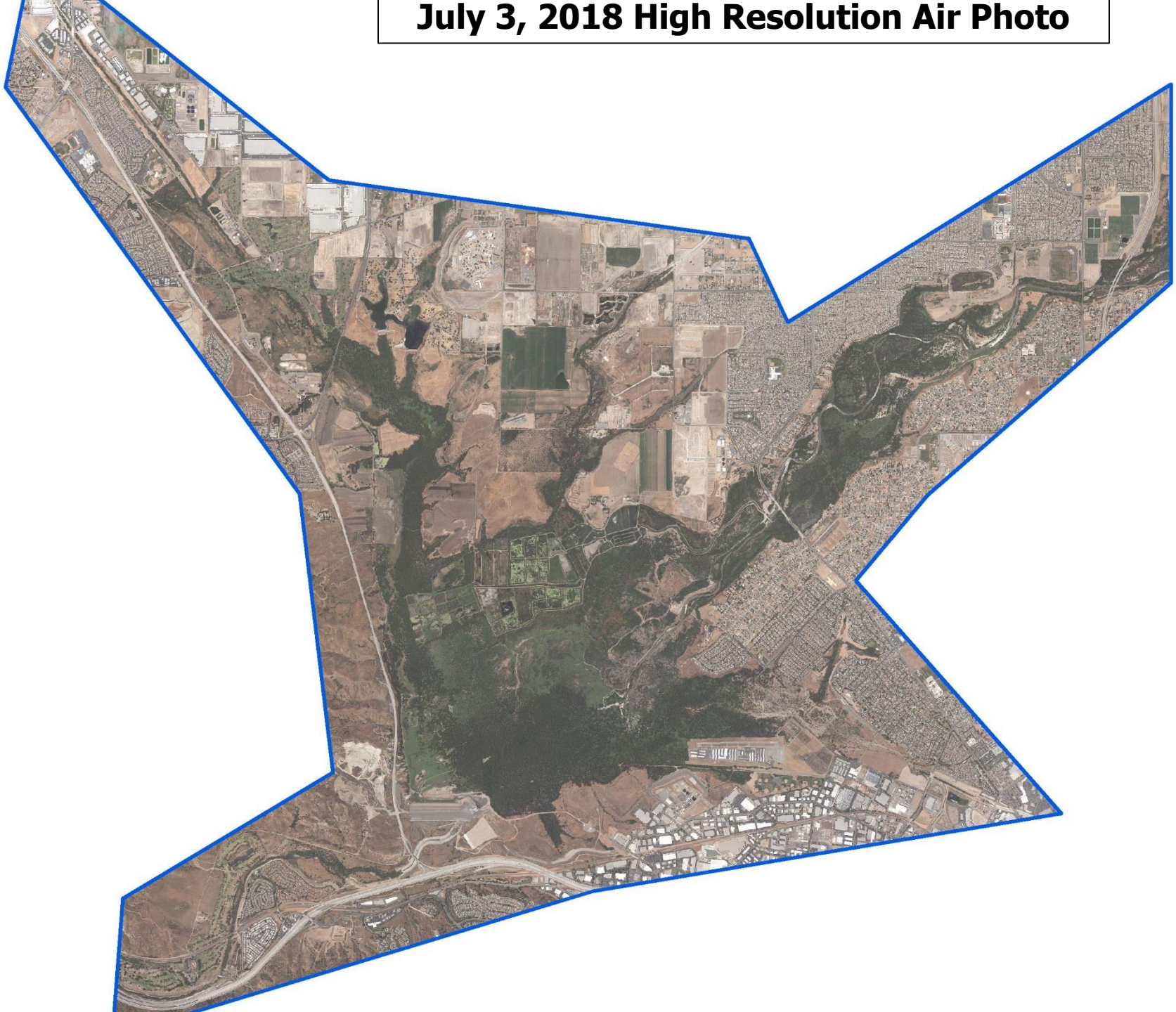
Potential Stressors

Riparian Habitat Monitoring Program

- Objective: Monitor the extent and quality of the riparian habitat
  - Pre- and post-Peace II implementation
  - Ongoing

- Two Types of Assessment:
  - Regional Assessment
    - Interpretations of air photos
    - Remote sensing data → NDVI derived from Landsat satellite imagery
  - Site Specific Assessment → "Ground-truth" of regional assessment
    - Vegetation Surveys (USBR)

July 3, 2018 High Resolution Air Photo



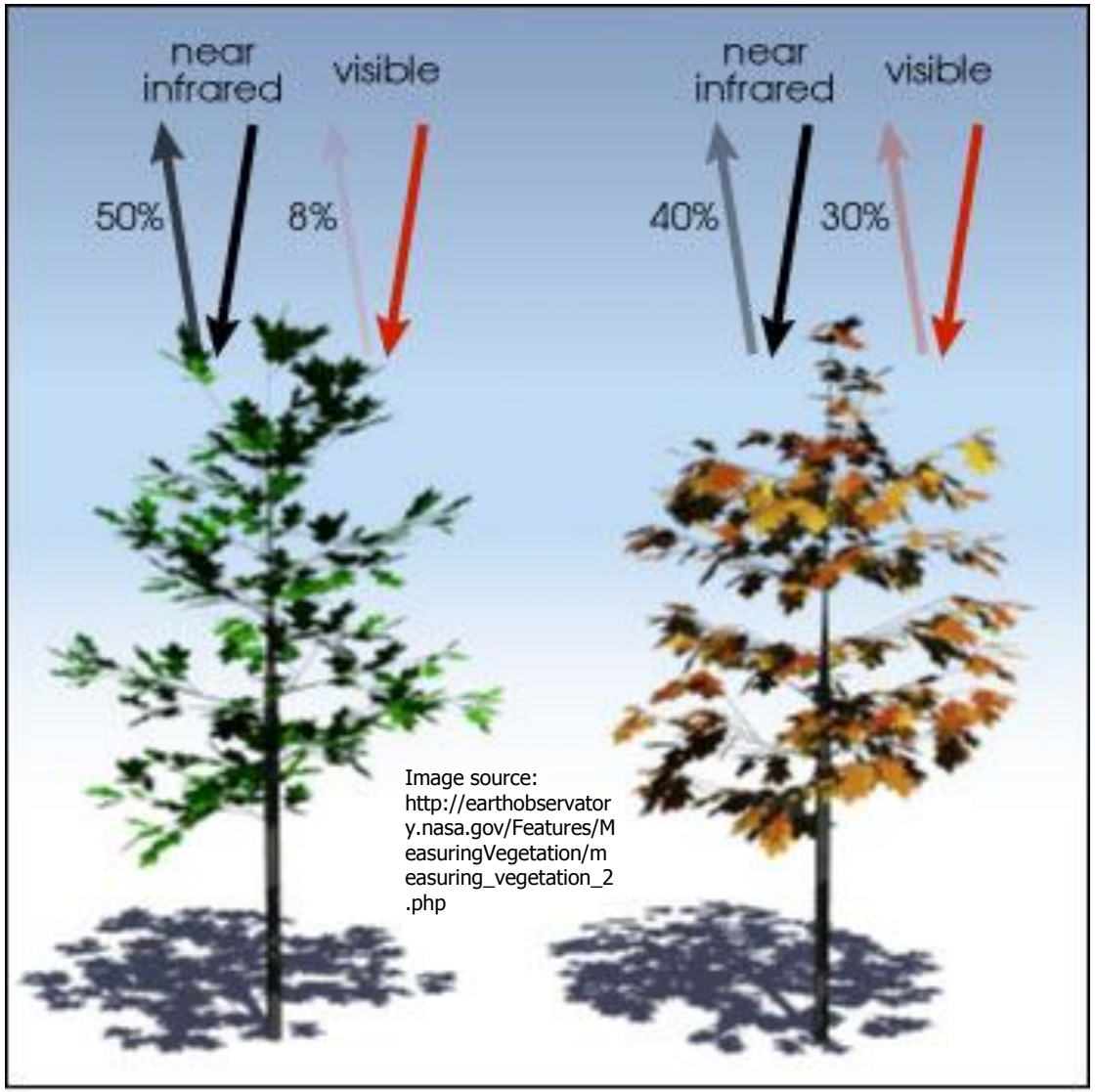
Normalized Difference Vegetation Index (NDVI)

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

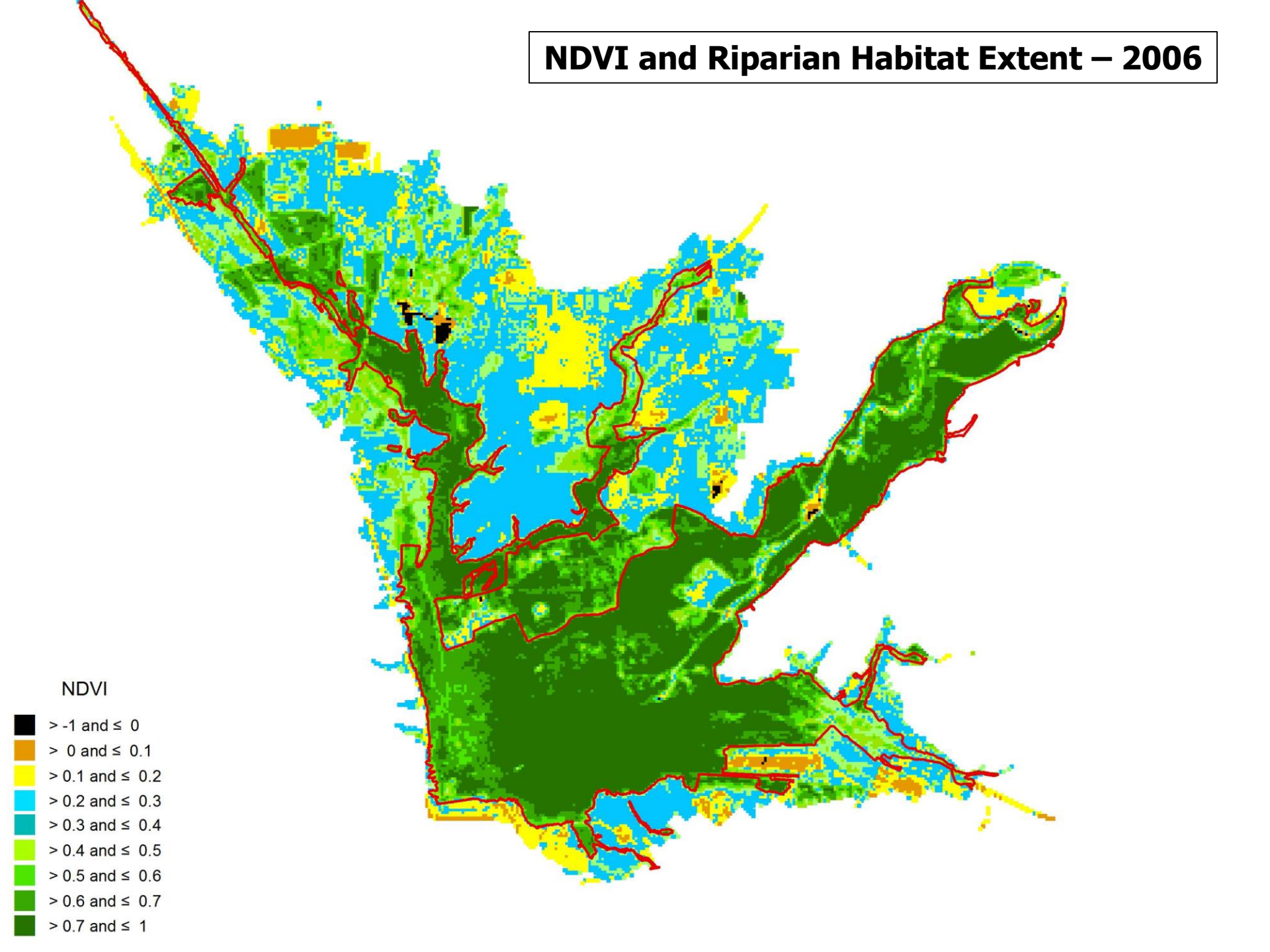
Calculated based on ratio of the visible light and near-infrared light reflected from plant.

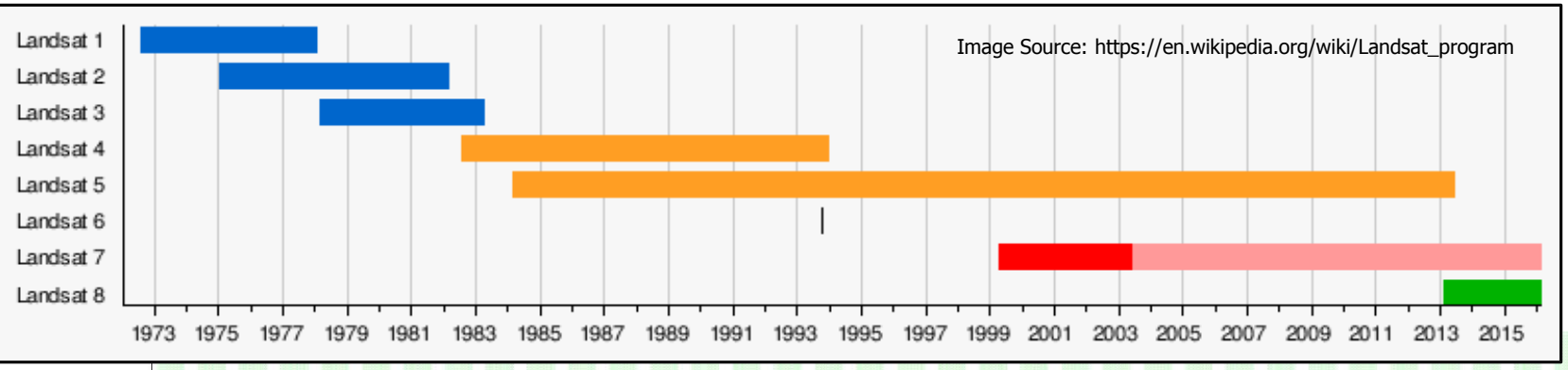
Numerical indicator of the extent and quality of vegetation because it is correlated with photosynthesis and plant productivity.

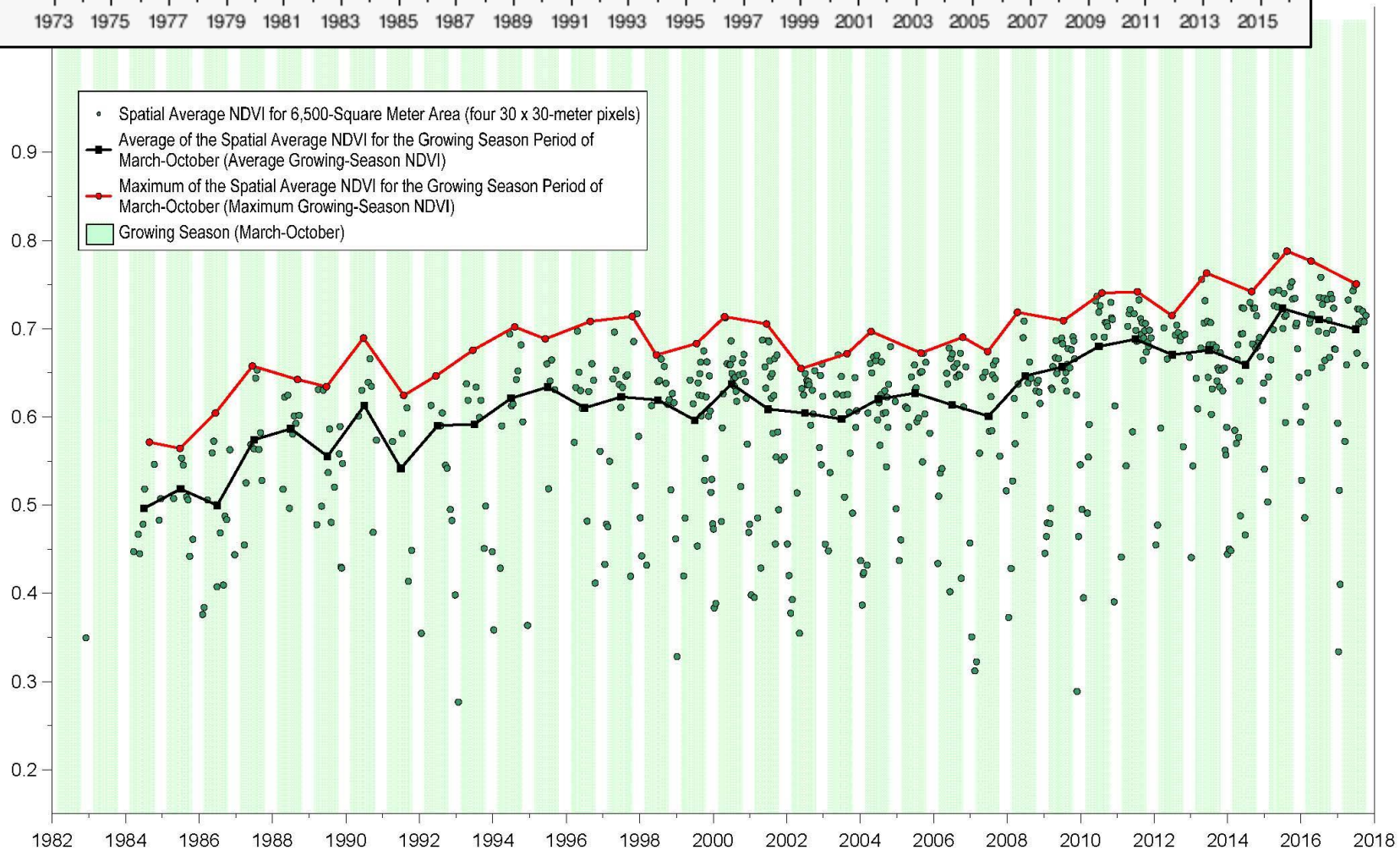
Available since 1980s - Can be used to assess the temporal and spatial changes in vegetation for the entire Prado Basin

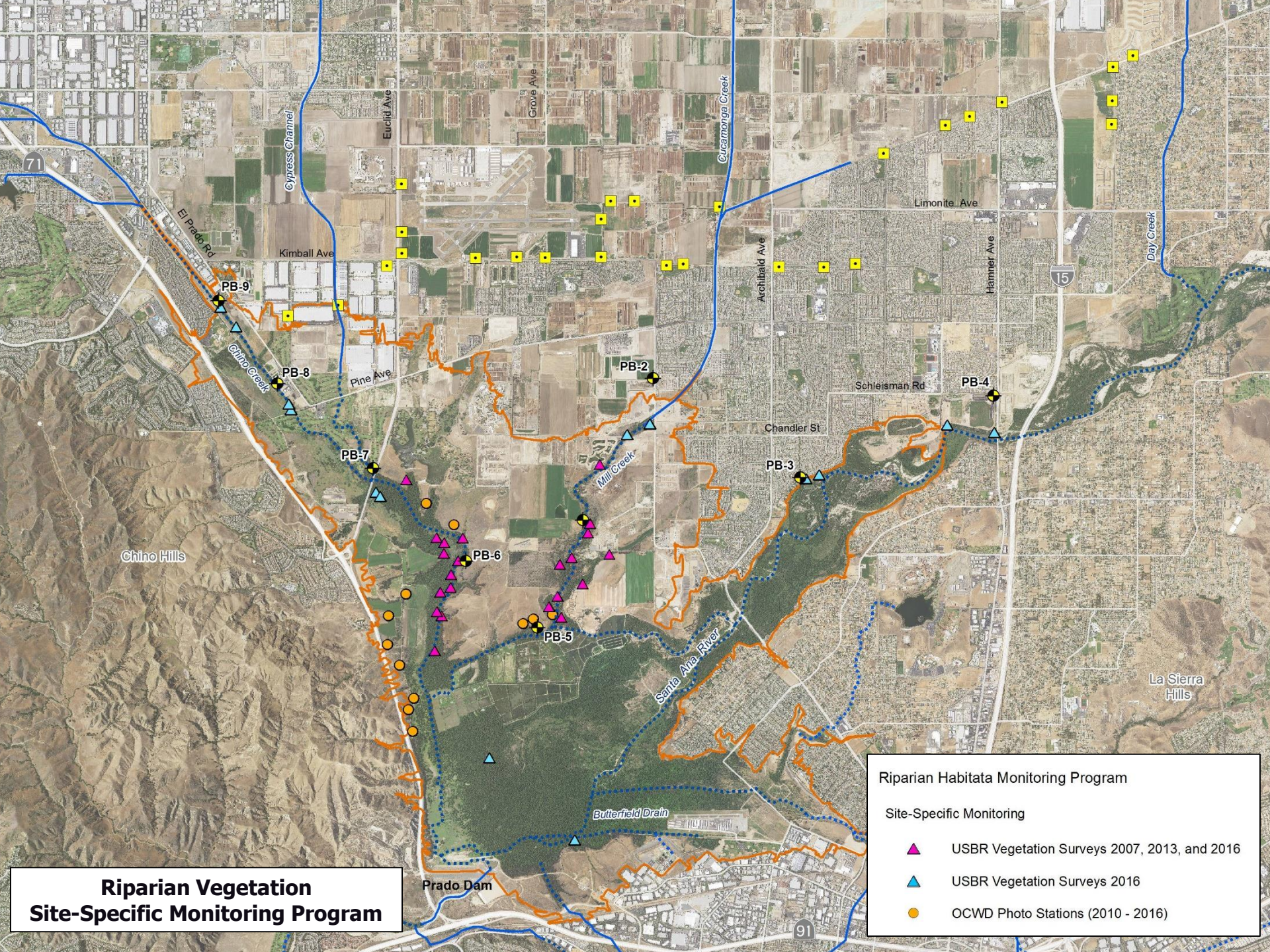


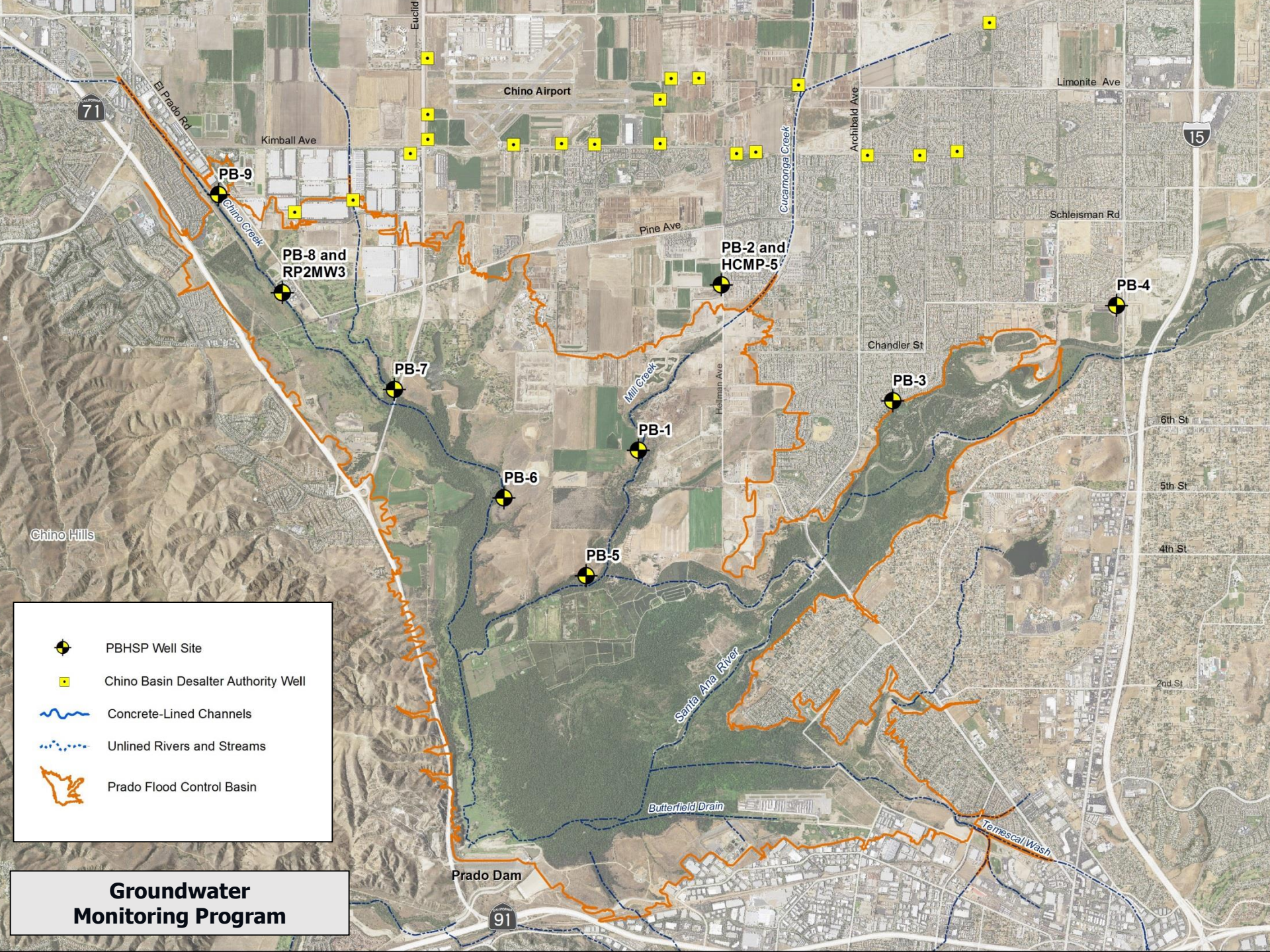
NDVI and Riparian Habitat Extent – 2006

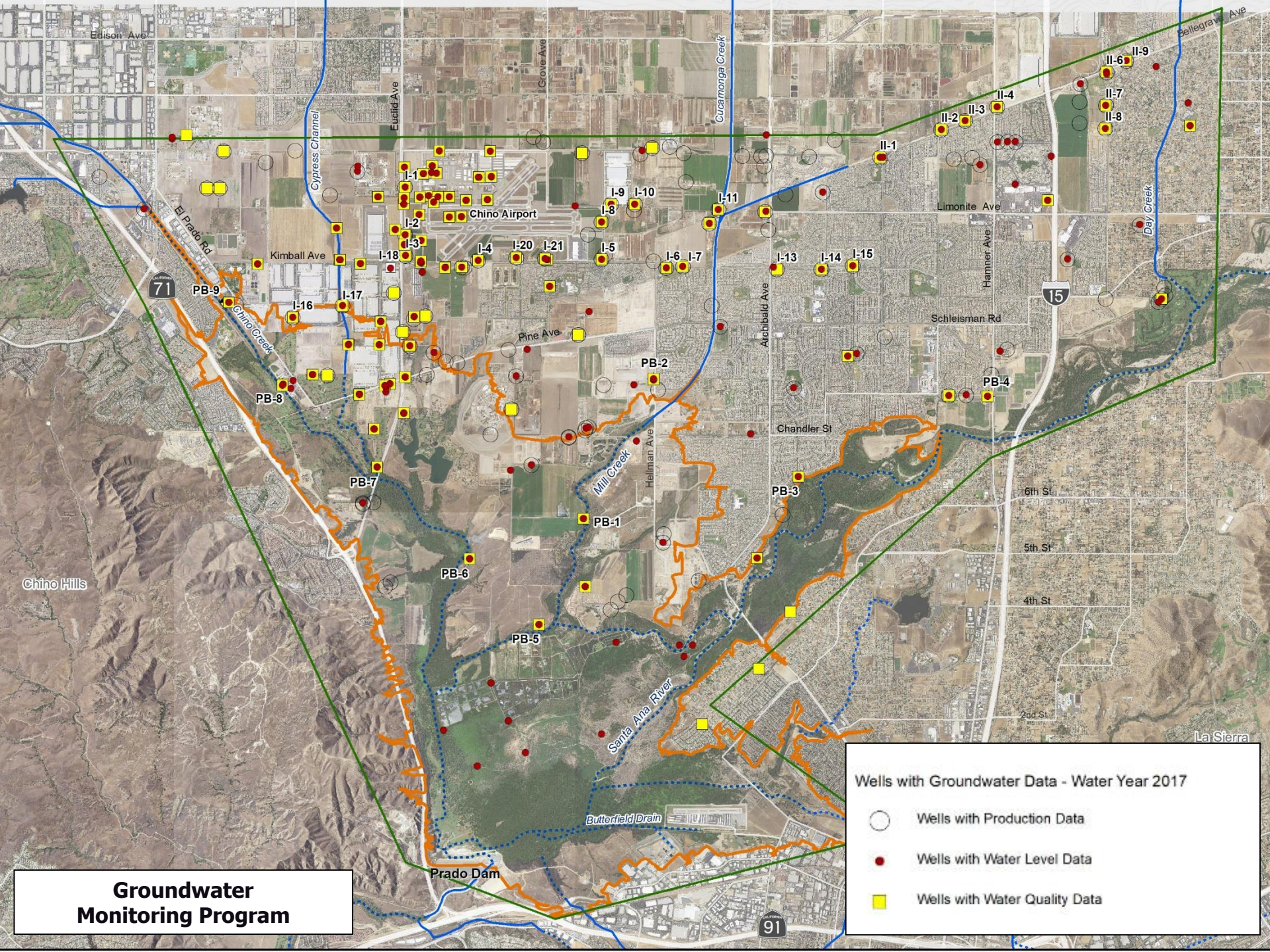



Landsat 1
Landsat 2
Landsat 3
Landsat 4
Landsat 5
Landsat 6
Landsat 7
Landsat 8
1973 1975 1977 1979 1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015
Image Source: https://en.wikipedia.org/wiki/Landsat_program


Spatial Average NDVI for 6,500-Square Meter Area (four 30 x 30-meter pixels)
Average of the Spatial Average NDVI for the Growing Season Period of March-October (Average Growing-Season NDVI)
Maximum of the Spatial Average NDVI for the Growing Season Period of March-October (Maximum Growing-Season NDVI)
Growing Season (March-October)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018


Riparian Vegetation
Site-Specific Monitoring Program
Riparian Habitata Monitoring Program
Site-Specific Monitoring
USBR Vegetation Surveys 2007, 2013, and 2016
USBR Vegetation Surveys 2016
OCWD Photo Stations (2010 - 2016)
PB-9
PB-8
PB-7
PB-6
PB-5
PB-2
PB-4
PB-3
Cypress Channel
Euclid Ave
Grove Ave
Cucamonga Creek
Archibald Ave
Hamner Ave
Day Creek
El Prado Rd
Kimball Ave
Chino Creek
Pine Ave
Schleisman Rd
Chandler St
Limonite Ave
Mill Creek
Santa Ana River
Butterfield Drain
Chino Hills
La Sierra Hills
Prado Dam
71
15
91


PB-9
PB-8 and RP2MW3
PB-7
PB-6
PB-5
PB-1
PB-2 and HCMP-5
PB-3
PB-4
Chino Airport
Kimball Ave
El Prado Rd
Chino Creek
Pine Ave
Euclid
Cucamonga Creek
Archibald Ave
Limonite Ave
Schleisman Rd
Chandler St
Hellman Ave
Mill Creek
6th St
5th St
4th St
2nd St
Chino Hills
Santa Ana River
Butterfield Drain
Temescal Wash
Prado Dam
71
15
91
PBHSP Well Site
Chino Basin Desalter Authority Well
Concrete-Lined Channels
Unlined Rivers and Streams
Prado Flood Control Basin
Groundwater Monitoring Program


Edison Ave
Euclid Ave
Grove Ave
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Bellegrave Ave
Cypress Channel
El Prado Rd
Kimball Ave
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Limonite Ave
Day Creek
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Chandler St
Hellman Ave
Mill Creek
Chino Creek
6th St
5th St
4th St
2nd St
La Sierra
Chino Hills
Santa Ana River
Butterfield Drain
Prado Dam
71
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91
I-1
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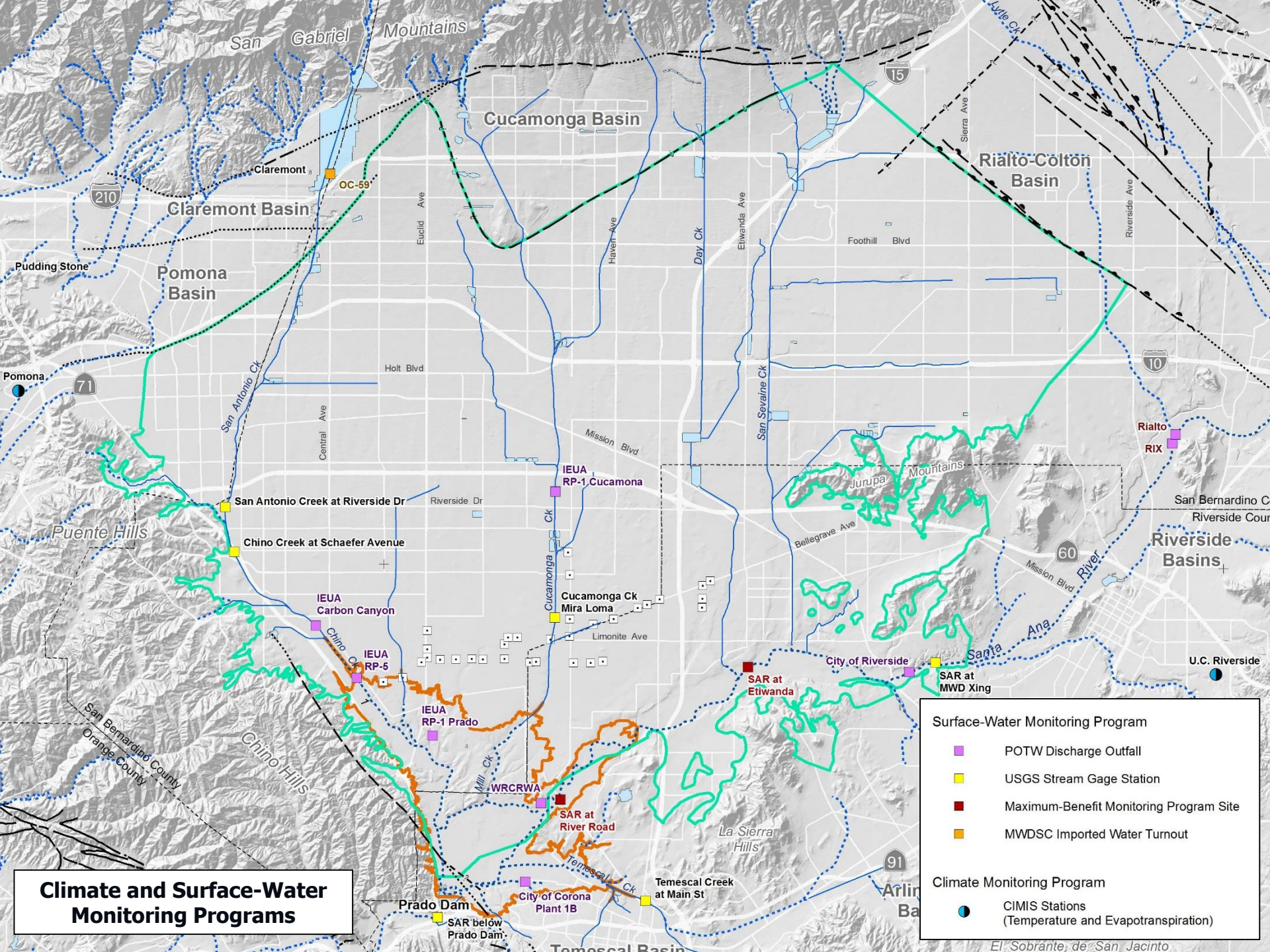
II-7
II-8
II-9
PB-1
PB-2
PB-3
PB-4
PB-5
PB-6
PB-7
PB-8
PB-9
Wells with Groundwater Data - Water Year 2017
Wells with Production Data
Wells with Water Level Data
Wells with Water Quality Data
Groundwater Monitoring Program



Climate and Surface-Water Monitoring Programs

New Monitoring Data and Methods in 2017

- Riparian Habitat Monitoring Program
  - High-resolution air photo
  - NDVI for 2017 and some historical data
  - Performed bias correction to Landsat 8 data
  - Statistically analyzed long-term trends in NDVI
    →Mann-Kendall Trend Test (Appendix B)

- Groundwater, Surface Water, and Climate Monitoring Program
  - No change in monitoring programs from previous year
  - Collected 2017 data
  - Analyzed groundwater surface water interactions
  - Analyze surface water/climate for the growing-season period

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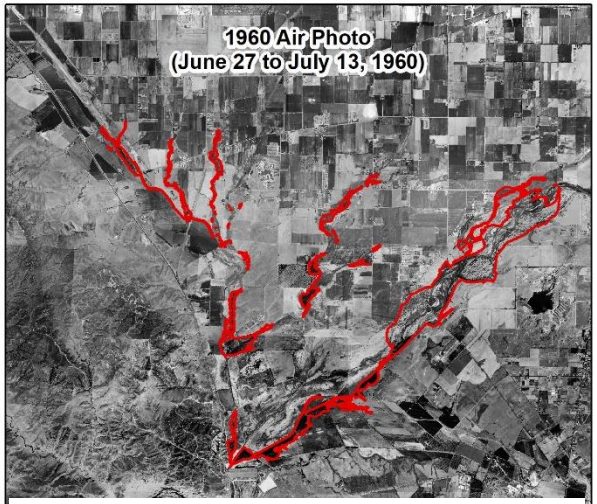
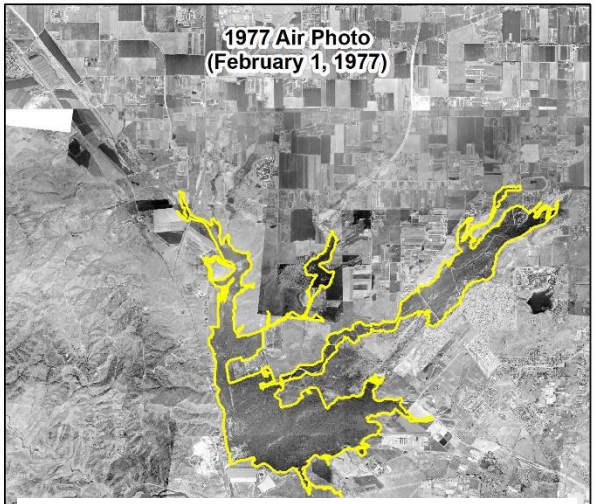
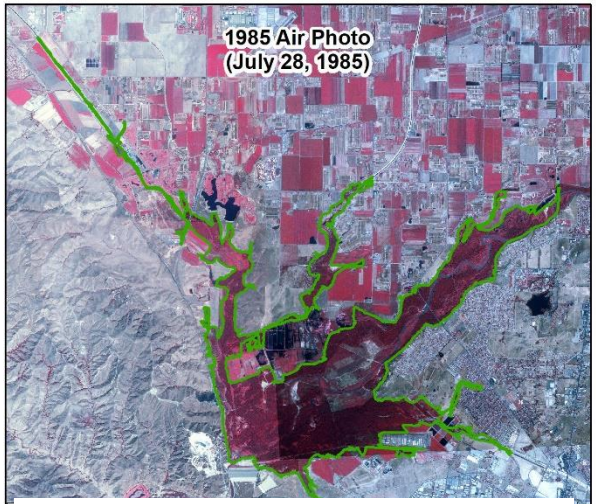


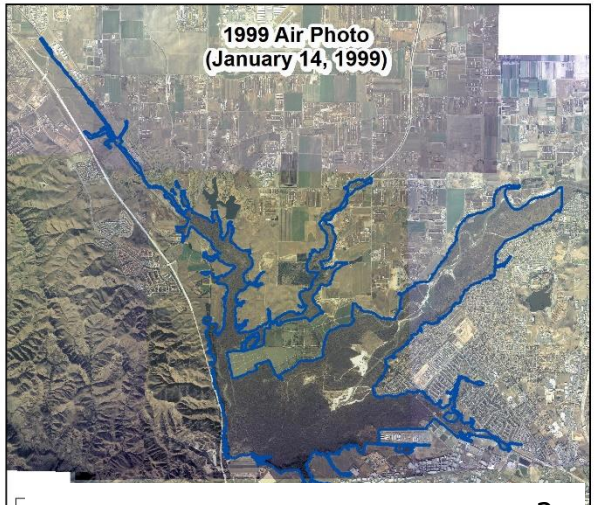
Extent 1960 = 1.85 mi^2



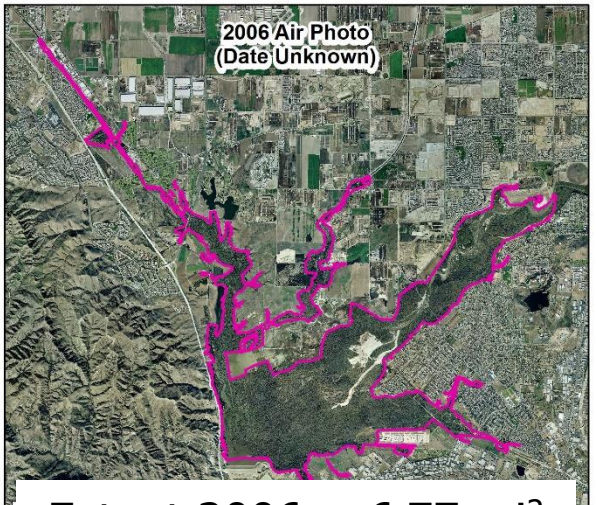
Extent 1977 = 4.35 mi^2



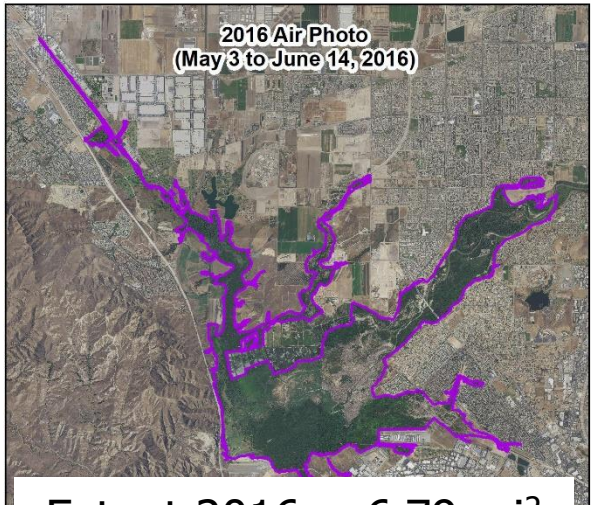
Extent 1985 = 6.16 mi^2



Extent 1999 = 6.69 mi^2



Extent 2006 = 6.77 mi^2



Extent 2016 = 6.79 mi^2

Prepared by:
WEI
Wildermuth Environmental, Inc.

Author: VMW
Date: 3/20/2018
File: 2017_Figure 3-1a_AirPhotos_VegExtent

0 1 2 Miles
0 1 2 3 KM

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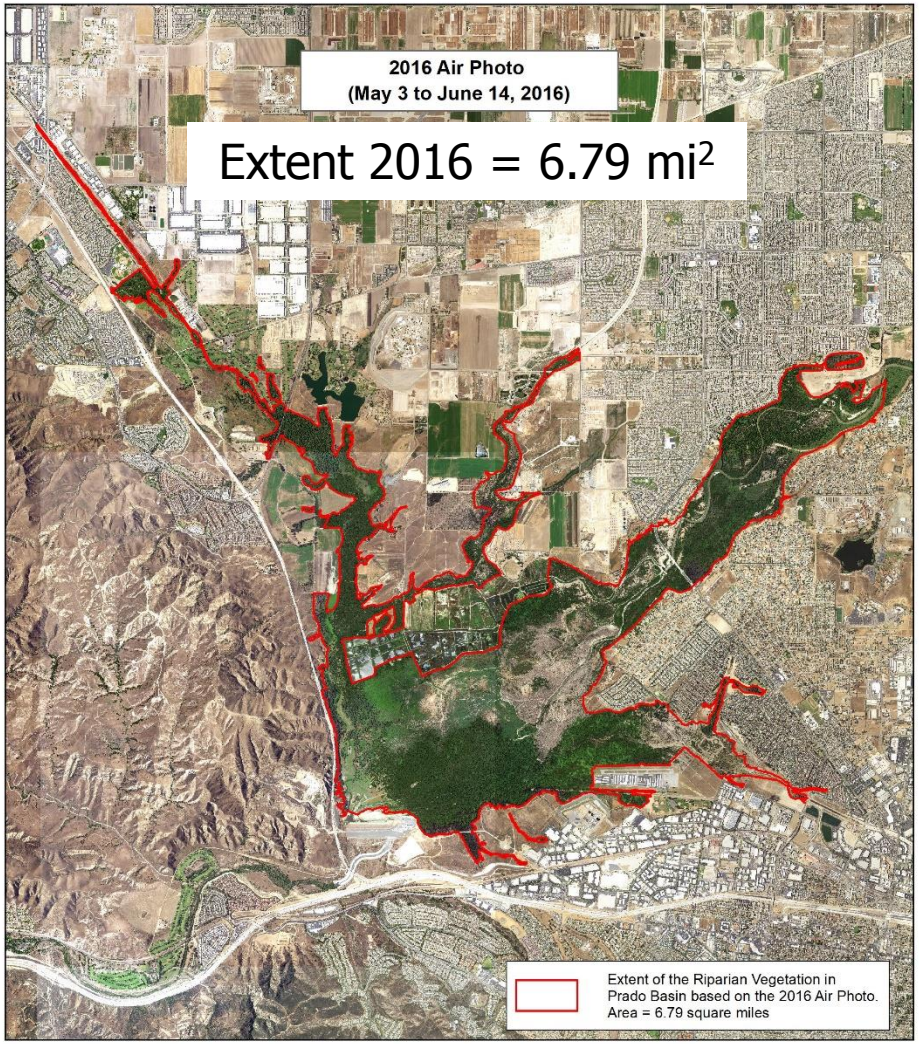
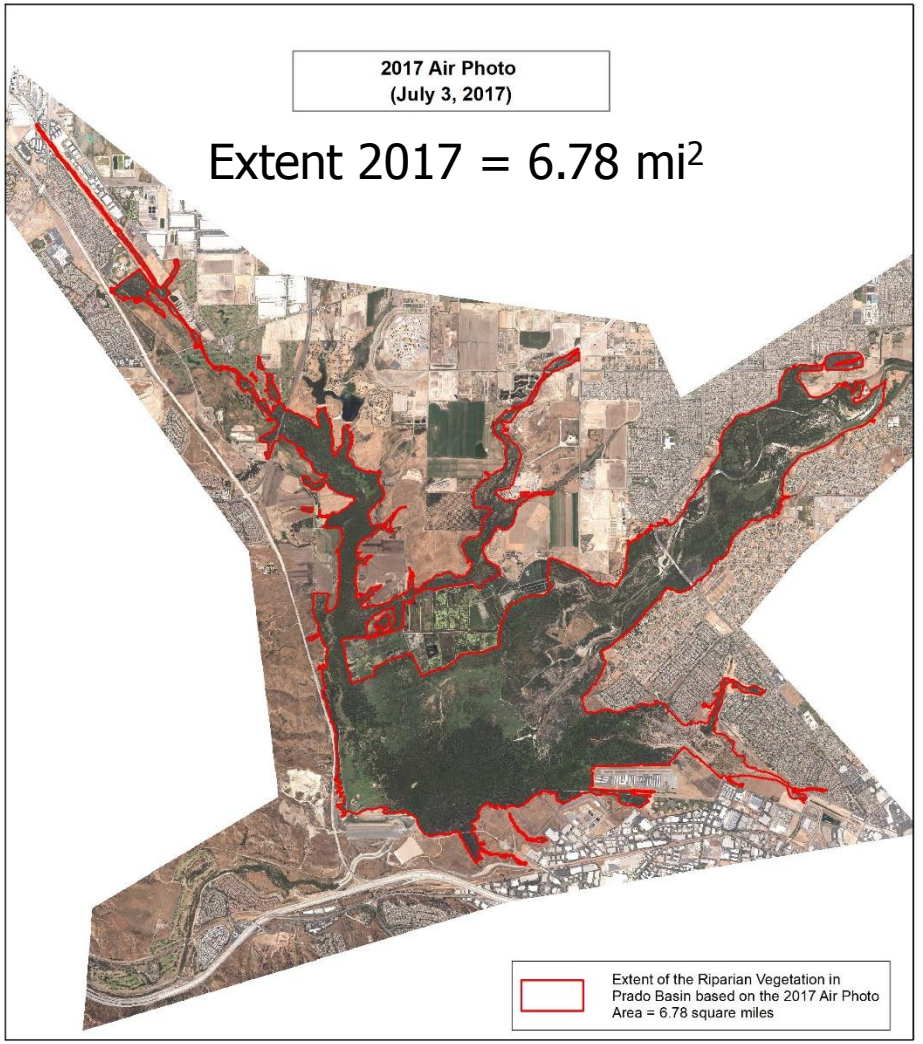
Prado Basin Habitat Sustainability Committee

Historical Air Photos and Extent of Riparian Vegetation
1960 to 2016

Figure 3-1a





Prepared by:
WEI
Wildermuth Environmental, Inc.

Author: SO
Date: 4/5/2018
File: 2017_Figure 3-1b_2016 and 2017 Air Photos

0 1 2 Miles
0 1 2 3 KM

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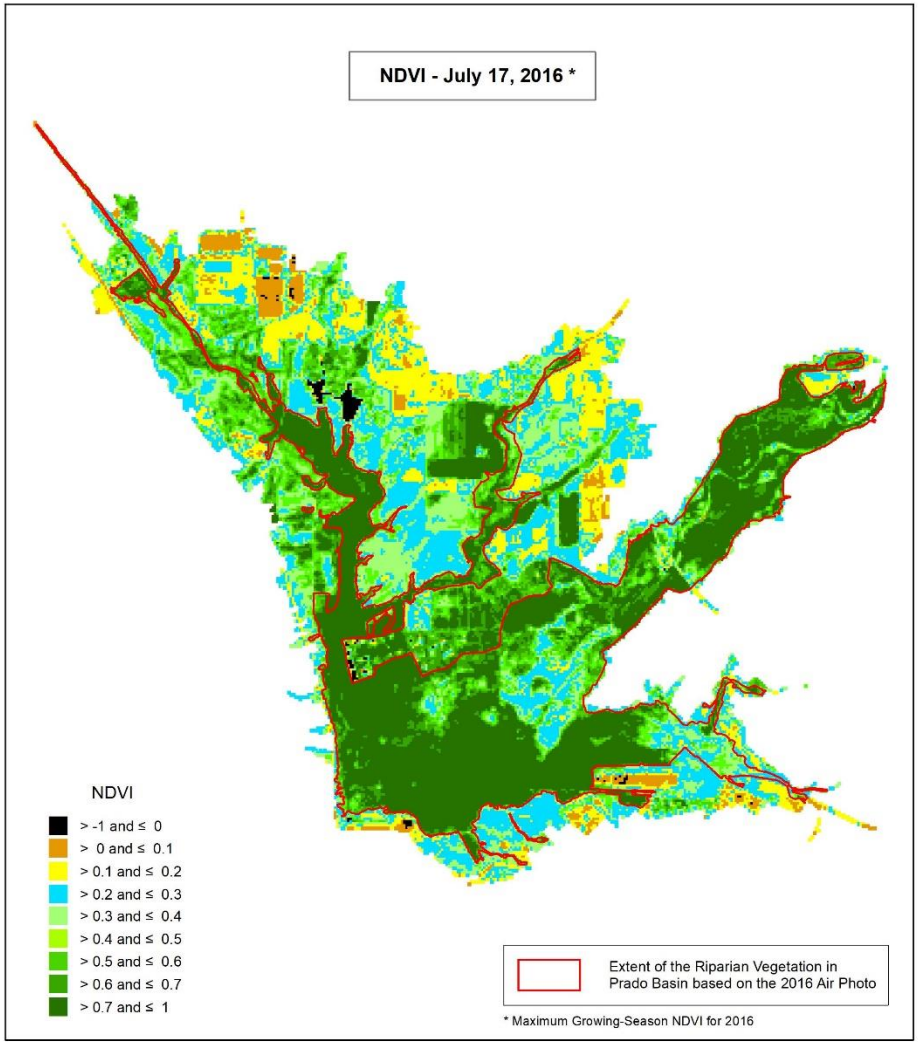
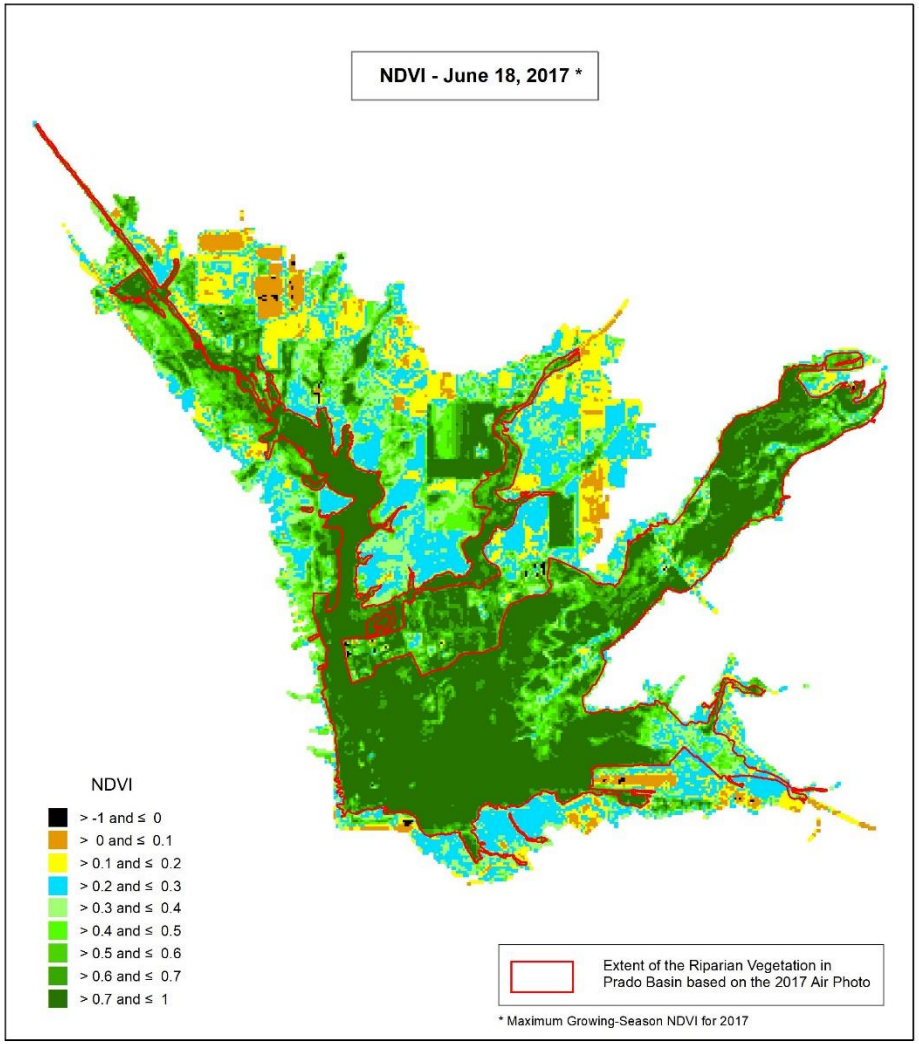
Prado Basin Habitat Sustainability Committee

Air Photos and Extent of the Riparian Vegetation
2016 and 2017

Figure 3-1b





Prepared by:
WEI
Wildermuth Environmental, Inc.

Author: RT
Date: 4/18/2018
File: 2017_Figure 3-3_2016_2017_NDVI

0 1 2 Miles
0 1 2 3 KM

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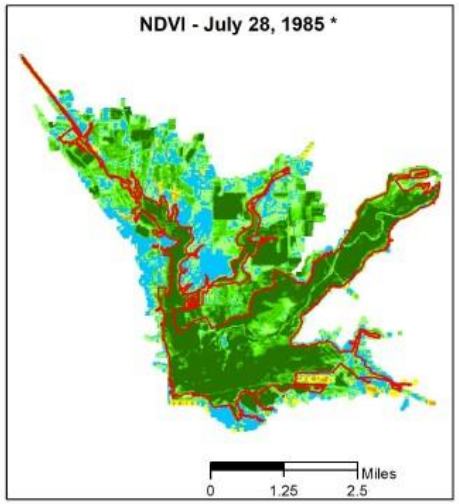
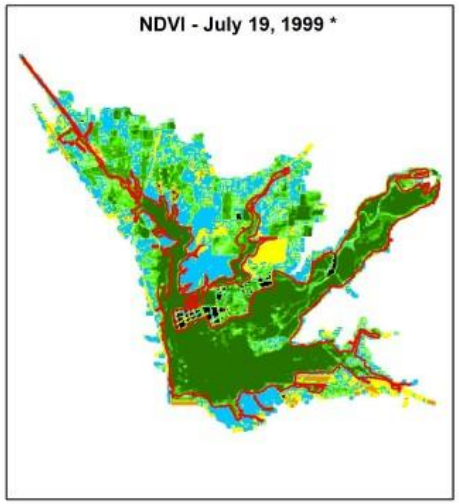
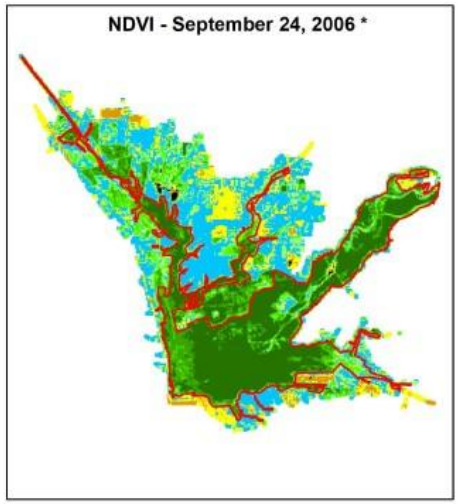
Prado Basin Habitat Sustainability Committee

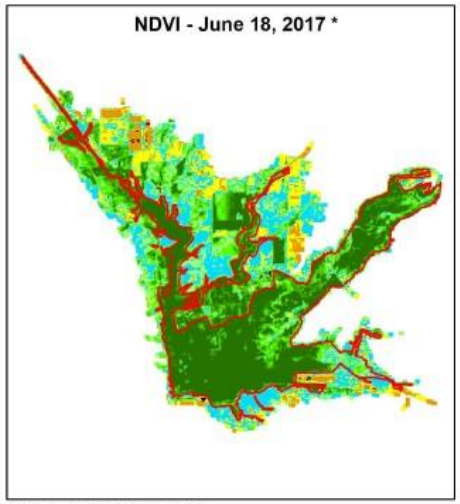
Spatial NDVI of the Prado Basin
2016 and 2017

Figure 3-3









* 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

2017 Extent of Riparian Vegetation in Prado Basin

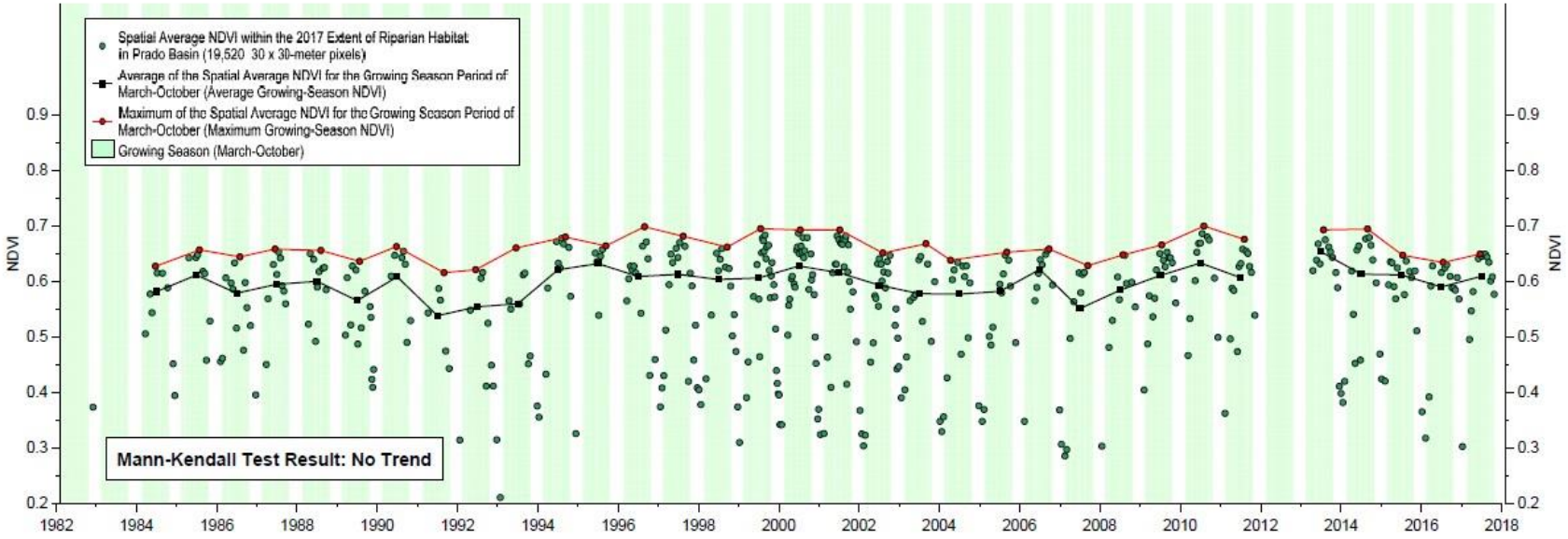
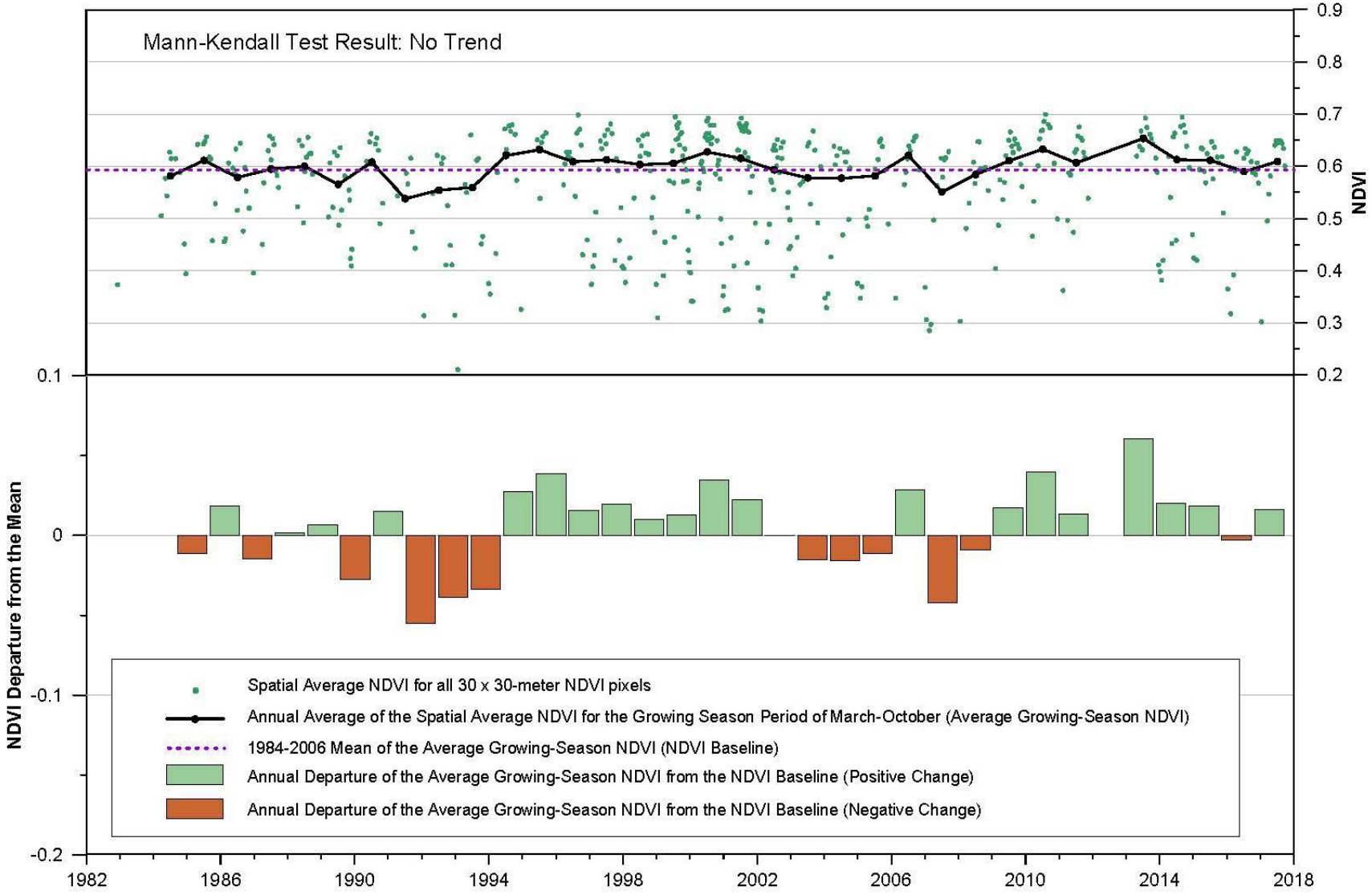
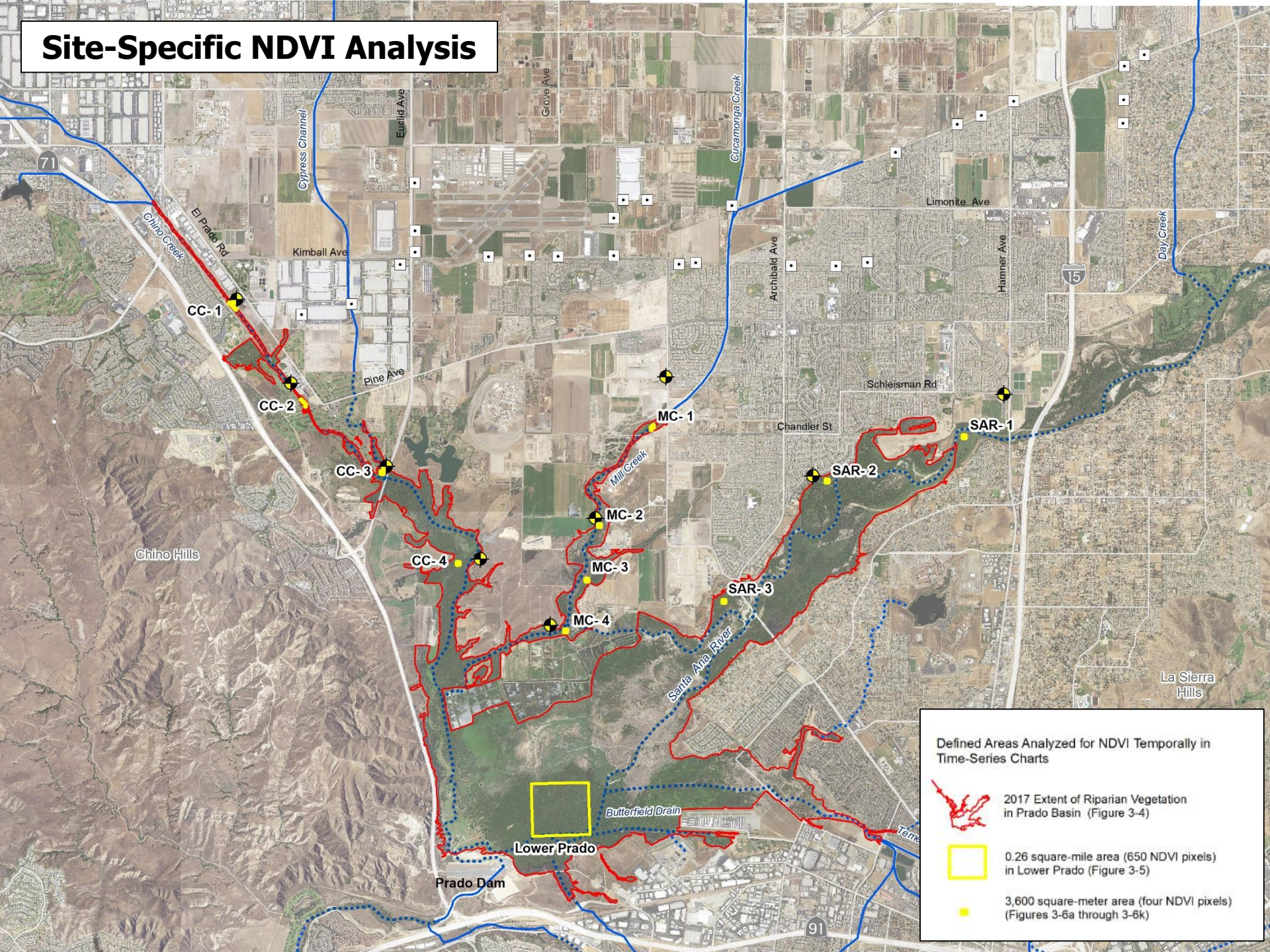


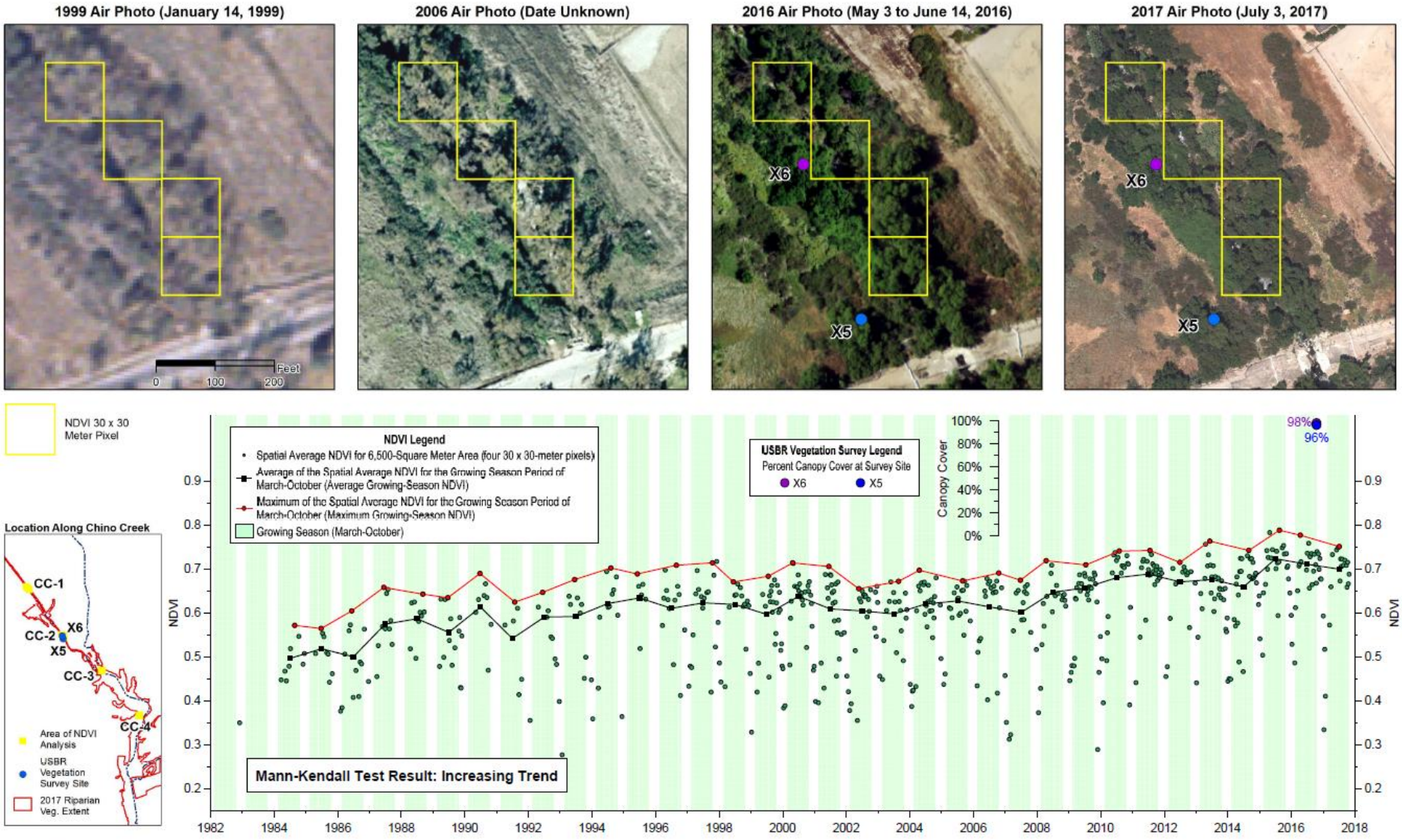
Figure 3-7a
Trend Analysis of Growing Season NDVI for the 2017 Extent of the Riparian Vegetation - 1984-2017



Site-Specific NDVI Analysis



NDVI Analysis – CC-2



Prepared by:
WEI
Author: RT
Date: 20171122
Filename: NDVI_CC-2_Airphoto.grf

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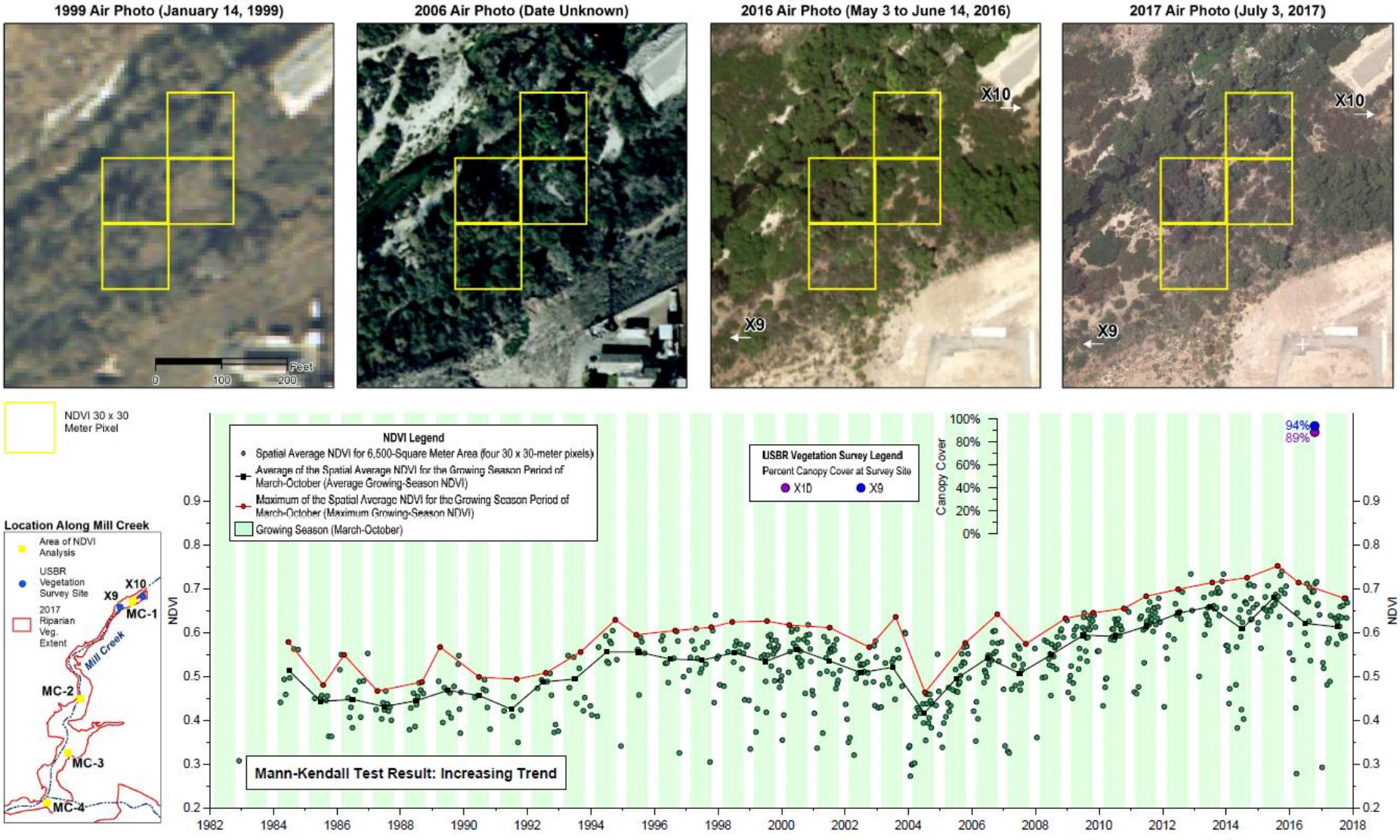
Time Series of NDVI and Air Photos
CC-2 Area for 1984 to 2017
Figure 3-6b

NDVI Analysis – MC-1



Prepared by: WEI Wildermuth Environmental, Inc.

Author: RT
Date: 20171122
Filename: NDVI_MC-1_AirPhoto.grf

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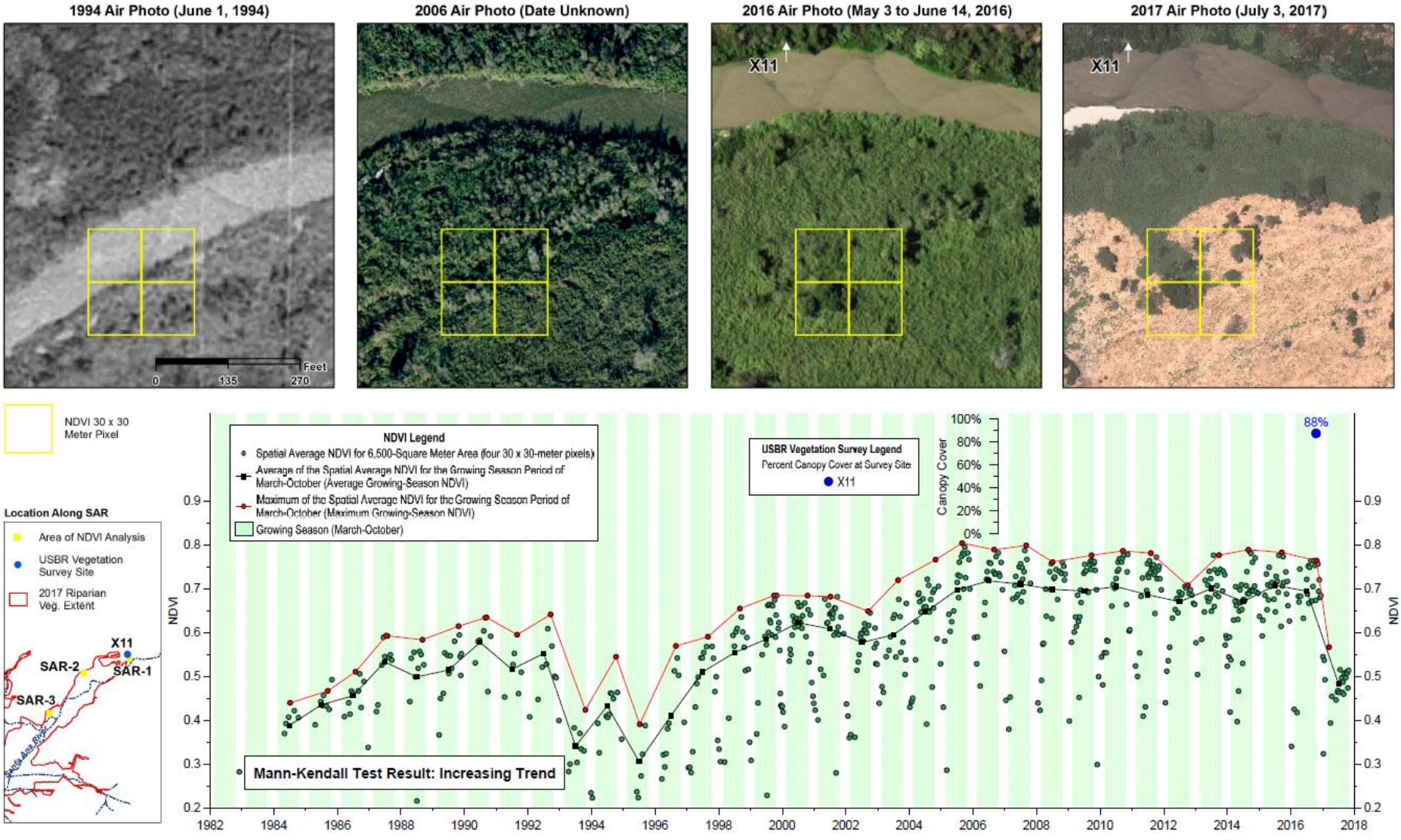
Prado Basin Habitat Sustainability Committee

Time Series of NDVI and Air Photos
MC-1 Area for 1984-2017

Figure 3-6e

NDVI Analysis – SAR-1



Prepared by: WEI Wildermuth Environmental, Inc.

Author: RT
Date: 20171122
Filename: NDVI_SAR-1_AirPhoto.grf

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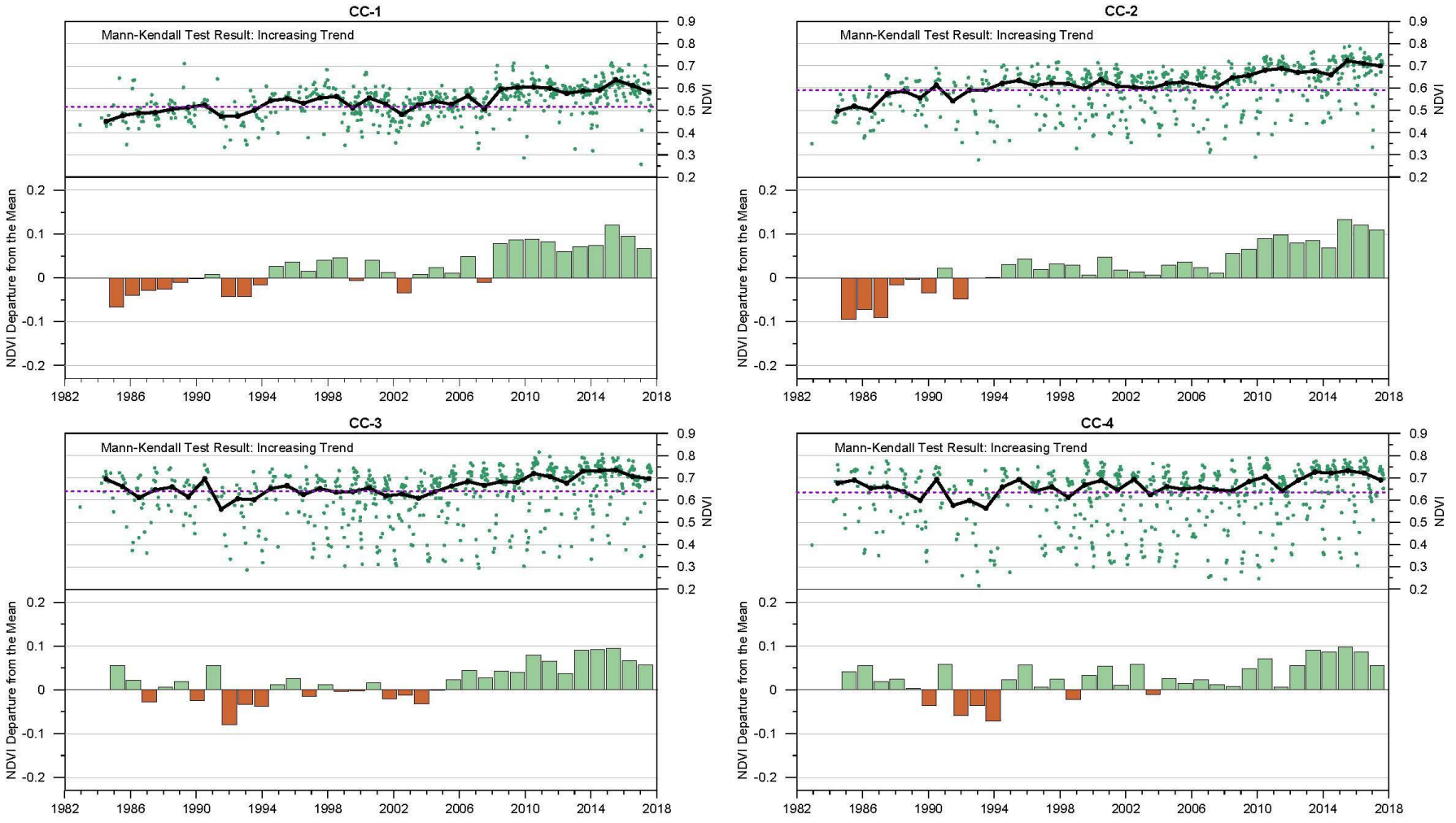
Time Series of NDVI and Air Photos
SAR-1 Area for 1984 to 2017

Figure 3-6i

NDVI Trend Analysis – Chino Creek Areas



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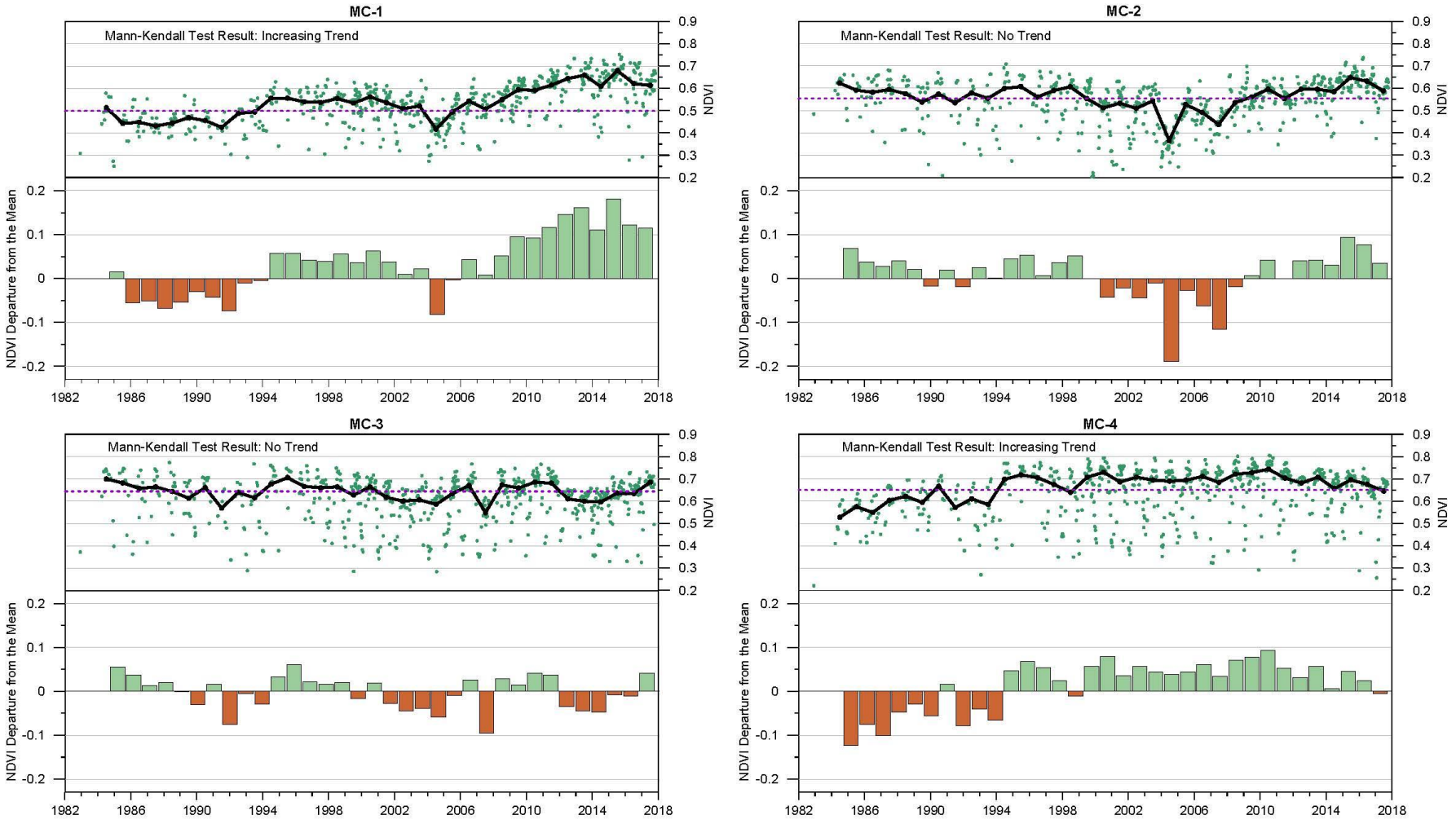
Trend Analysis of Growing Season NDVI
Chino Creek Area for 1984-2017

Figure 3-7b

NDVI Trend Analysis – Mill Creek Areas



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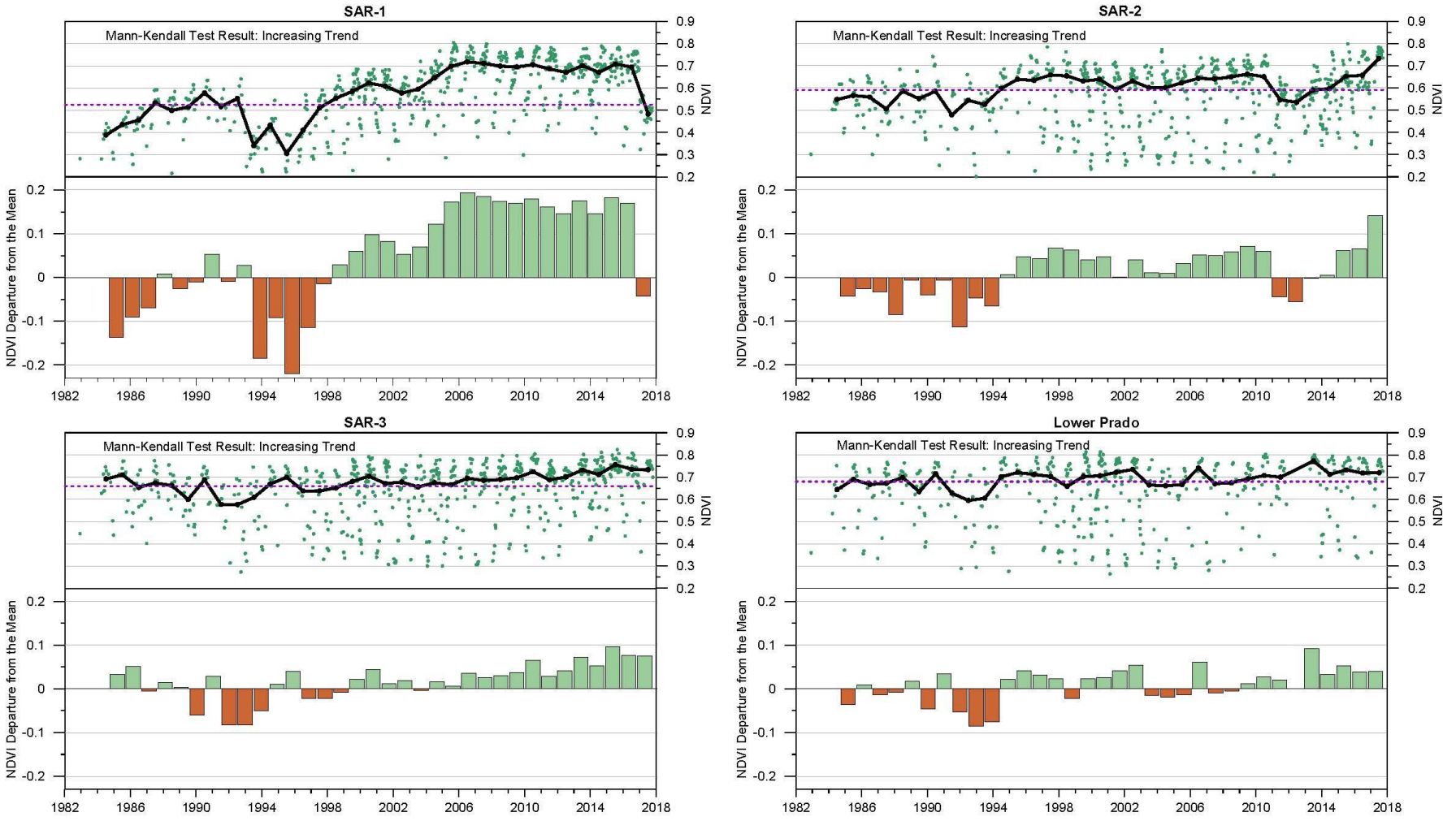
2017 Annual Report
Prado Basin Habitat Sustainability Committee

Trend Analysis of Growing-Season NDVI
Mill Creek Area for 1984-2017

Figure 3-7c

NDVI Trend Analysis – Santa Ana River Areas



Spatial Average of NDVI for all 30 x 30-meter NDVI pixels

Annual Average of the Spatial Average NDVI for the Growing Season Period of March-October (Average Growing-Season NDVI)

1984-2006 Mean of the Average Growing-Season NDVI (NDVI Baseline)

Annual Depature from the Average Growing-Season NDVI from the Baseline NDVI (Positive Change)

Annual Depature from the Average Growing-Season NDVI from the Baseline NDVI (Positive Change)

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Trend Analysis of Growing-Season NDVI
Santa Ana River Area for 1984-2017

Figure 3-7d

Characterization of Short Term Changes and Long-Term Trends in NDVI

Defined Area	Figure Number	Short-Term Changes from 1984 - 2015			Recent Short-Term Changes from 2015 - 2017			Long-Term Trend in NDVI 1984-2017 [1]
		Average Annual Change in NDVI	Largest Annual Increase in NDVI	Largest Annual Decrease in NDVI	2015 - 2016	2016 - 2017	2015 - 2017	
2017 Rip Veg Extent	3-4	0.024	0.061	-0.070	-0.022	0.019	-0.003	No Trend
Lower Prado	3-5	0.034	0.097	-0.087	-0.014	0.001	-0.013	Increasing
CC-1	3-6a	0.025	0.089	-0.058	-0.026	-0.027	-0.053	Increasing
CC-2	3-6b	0.025	0.074	0.071	-0.013	-0.011	-0.023	Increasing
CC-3	3-6c	0.030	0.136	-0.081	-0.028	-0.010	-0.038	Increasing
CC-4	3-6d	0.038	0.095	0.116	-0.010	-0.031	-0.042	Increasing
MC-1	3-6e	0.032	0.078	-0.104	-0.059	-0.008	-0.067	Increasing
MC-2	3-6f	0.043	0.162	-0.179	-0.017	-0.042	-0.060	No Trend
MC-3	3-6g	0.037	0.125	-0.122	-0.002	-0.051	0.049	No Trend
MC-4	3-6h	0.035	0.113	-0.095	-0.020	-0.030	-0.050	Increasing
SAR-1	3-6i	0.047	0.105	-0.212	-0.013	-0.212	-0.225	Increasing
SAR-2	3-6j	0.033	0.080	-0.107	0.004	0.076	0.080	Increasing
SAR-3	3-6k	0.030	0.089	-0.111	-0.021	-0.001	-0.022	Increasing

[1] - Determined from Mann-Kendall statistcal trend test. See Appendix B for a description of the Mann-Kendall test.

Conclusions and Recommendations

Riparian Habitat Monitoring Program

Conclusions:

- No trend in degradation contemporaneous with Peace II implementation
- For several areas, NDVI decreased from 2015-2017:
  - These declines are within the range of the long-term annual variability
  - Visual inspection of the air photos on these figures do not show evidence of degradation of the riparian vegetation, except for SAR-1

Recommendations:

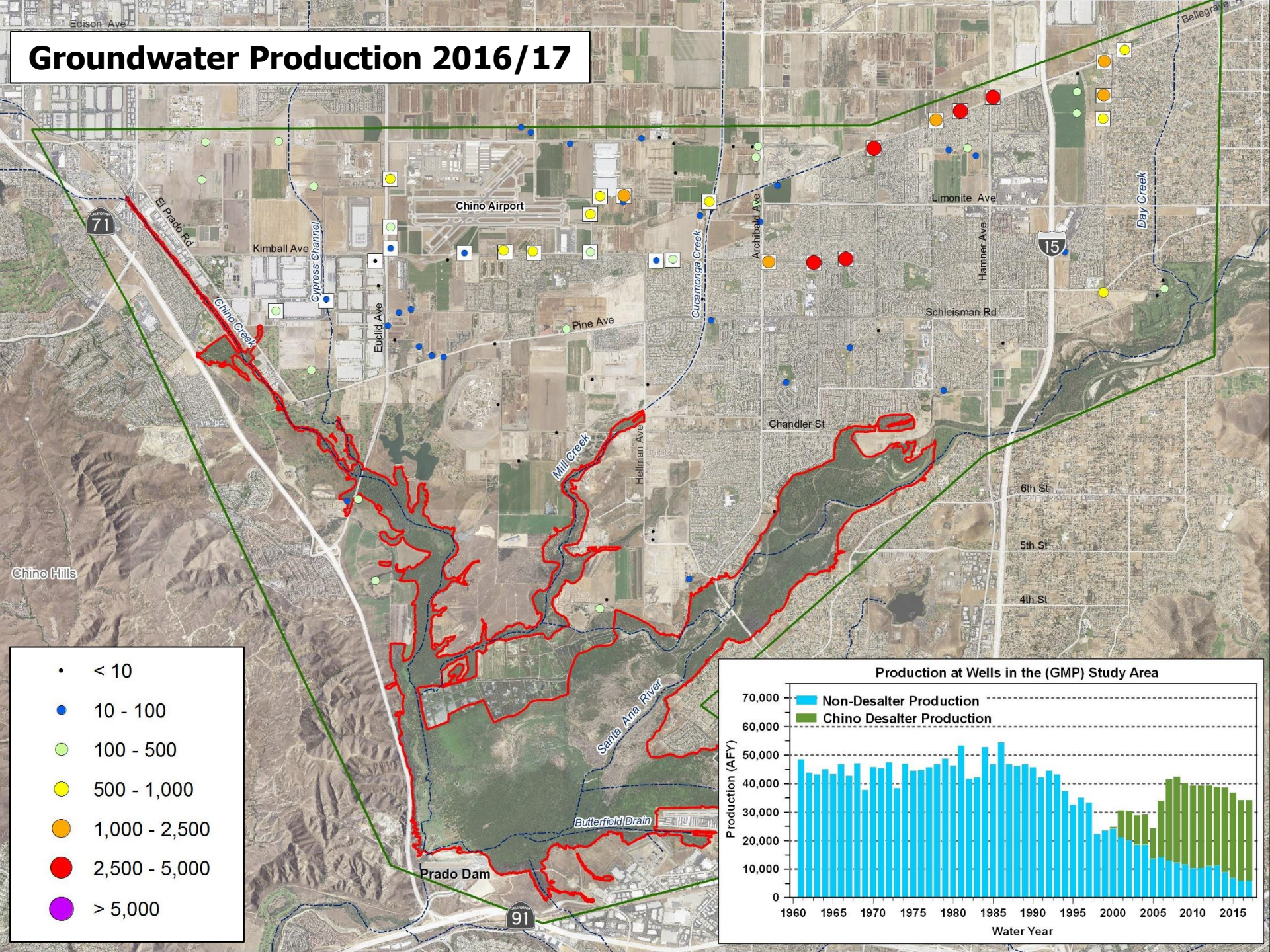
- Acquire and analyze high-resolution air photo and NDVI for 2018
- Analyze NDVI in additional site-specific areas
- Perform a Mann-Kendall Test on the NDVI for other specific intervals of time
- Conduct site visit to SAR-1
- Recruit a biological expert
  - Review and refine vegetation survey methods
  - Design 2019 vegetation surveys

Annual Report – Table of Contents

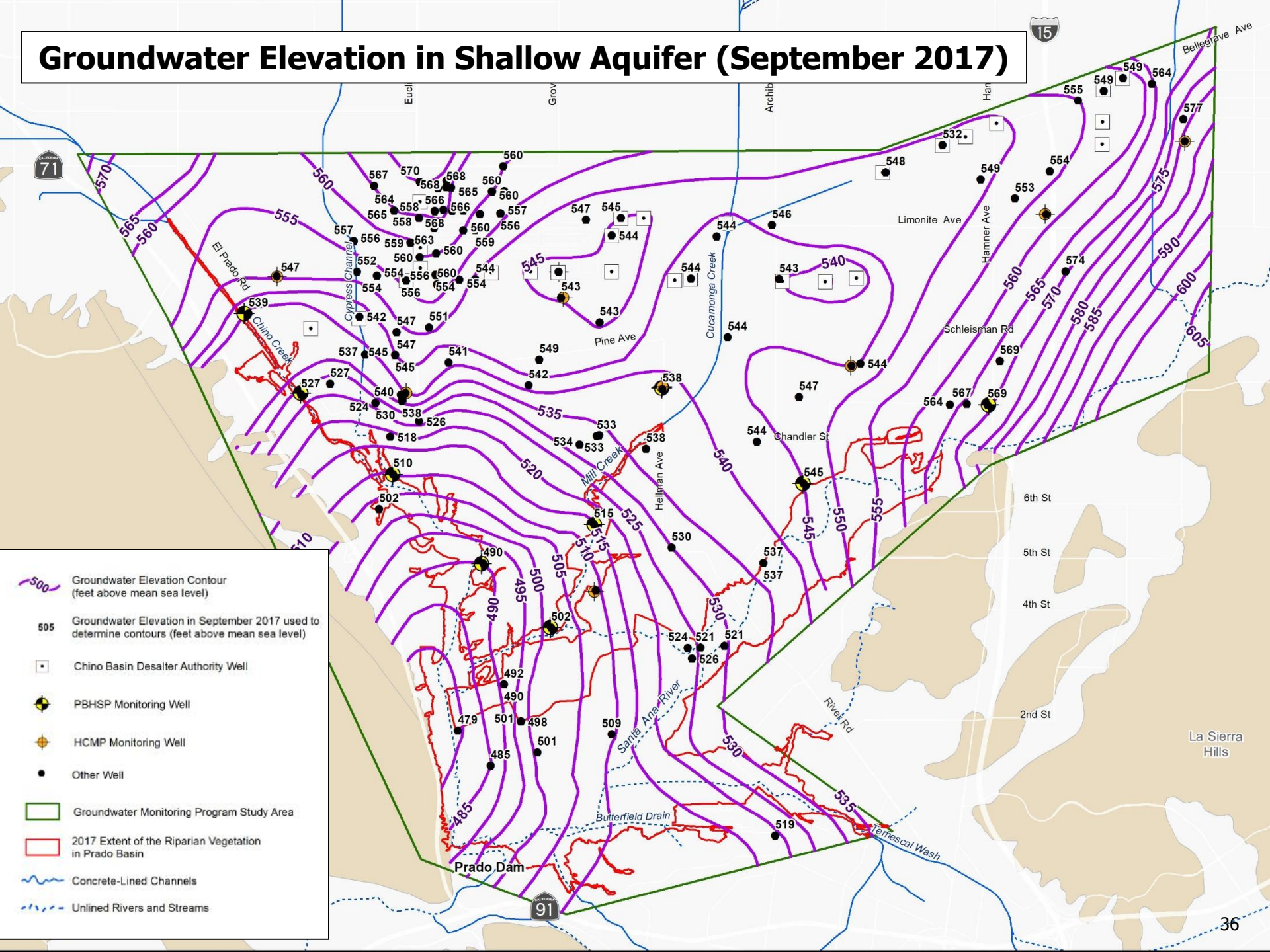
- Section 1 – Background and Objectives
- Section 2 – Monitoring, Data Collection, and Methods
- Section 3 – Results and Interpretations
  - 3.1 – Trends in Riparian Habitat Extent and Quality
  - 3.2 – **Groundwater and Its Relationship to the Riparian Habitat**
  - 3.3 – Climate and Its Relationship to the Riparian Habitat
  - 3.4 – Surface Water and Its Relationship to the Riparian Habitat
  - 3.5 – Other Factors and Their Relationship to the Riparian Habitat
  - 3.6 – Analysis of Prospective Loss of Riparian Habitat
- Section 4 – Conclusions and Recommendations
  - 4.1 – Main Conclusions and Recommendations
  - 4.2 – Recommended Mitigation Measures and/or Adjustments to the AM
  - 4.3 - Recommended PBHSP for Fiscal Year 2018/19
- Section 5 – References

Potential Stressors

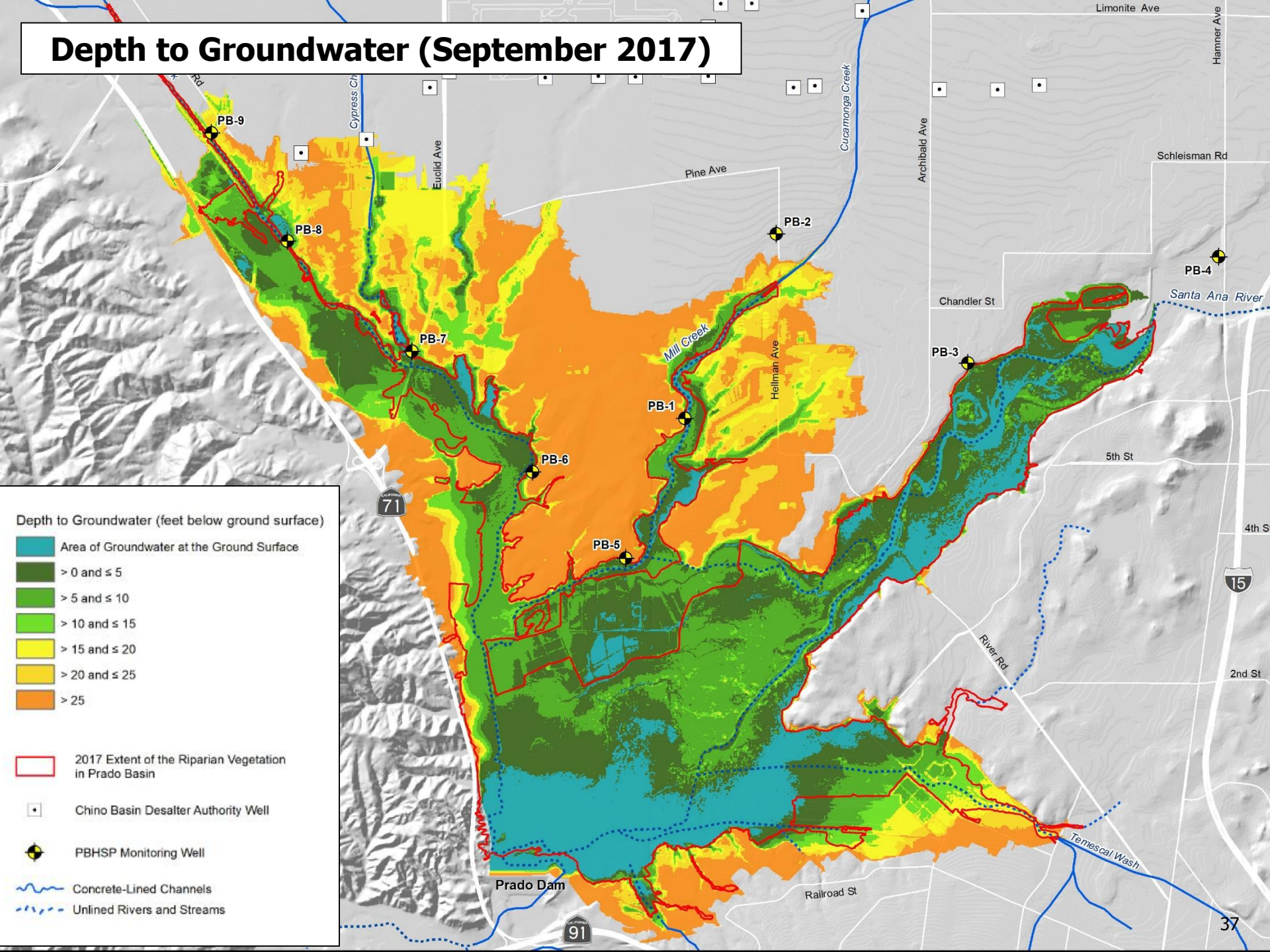
Groundwater Production 2016/17



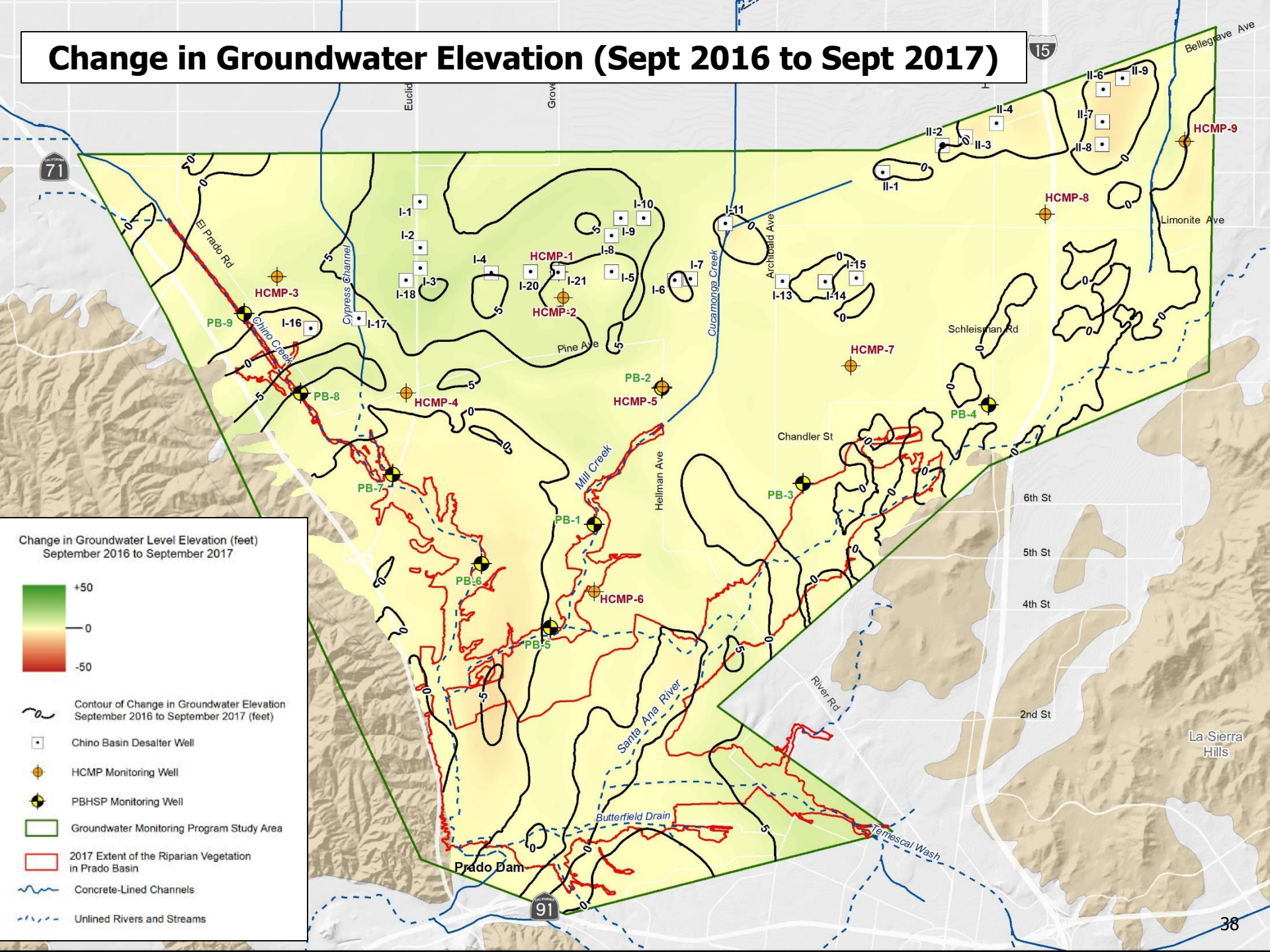
Groundwater Elevation in Shallow Aquifer (September 2017)



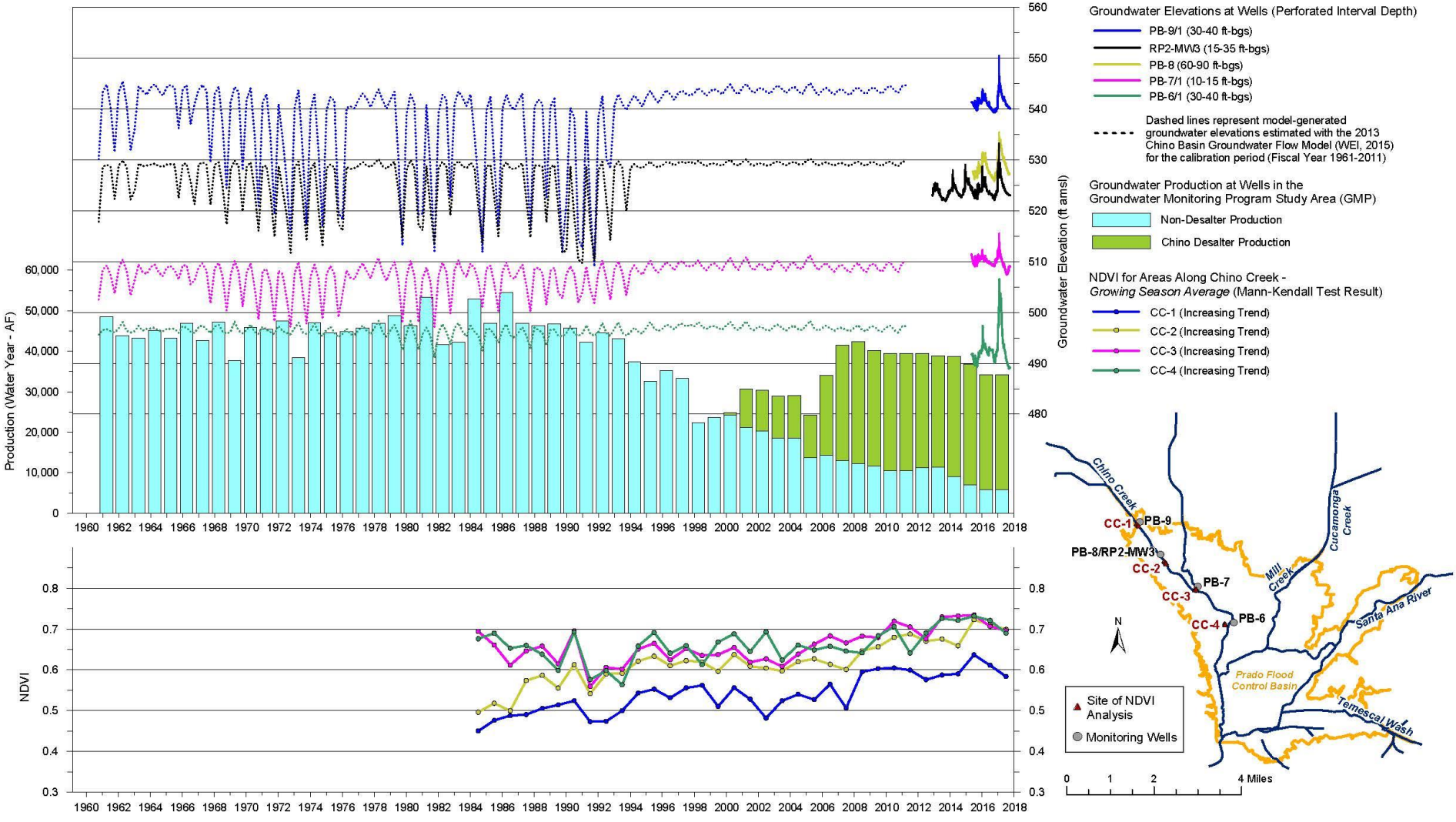
Depth to Groundwater (September 2017)



Change in Groundwater Elevation (Sept 2016 to Sept 2017)



Production, Groundwater Levels, NDVI – Chino Creek



Prepared by:

WEI Wildermuth Environmental Inc.

Author: RT
Date: 20170404
Filename: Prod_GWLs_ChinoCreek.grf

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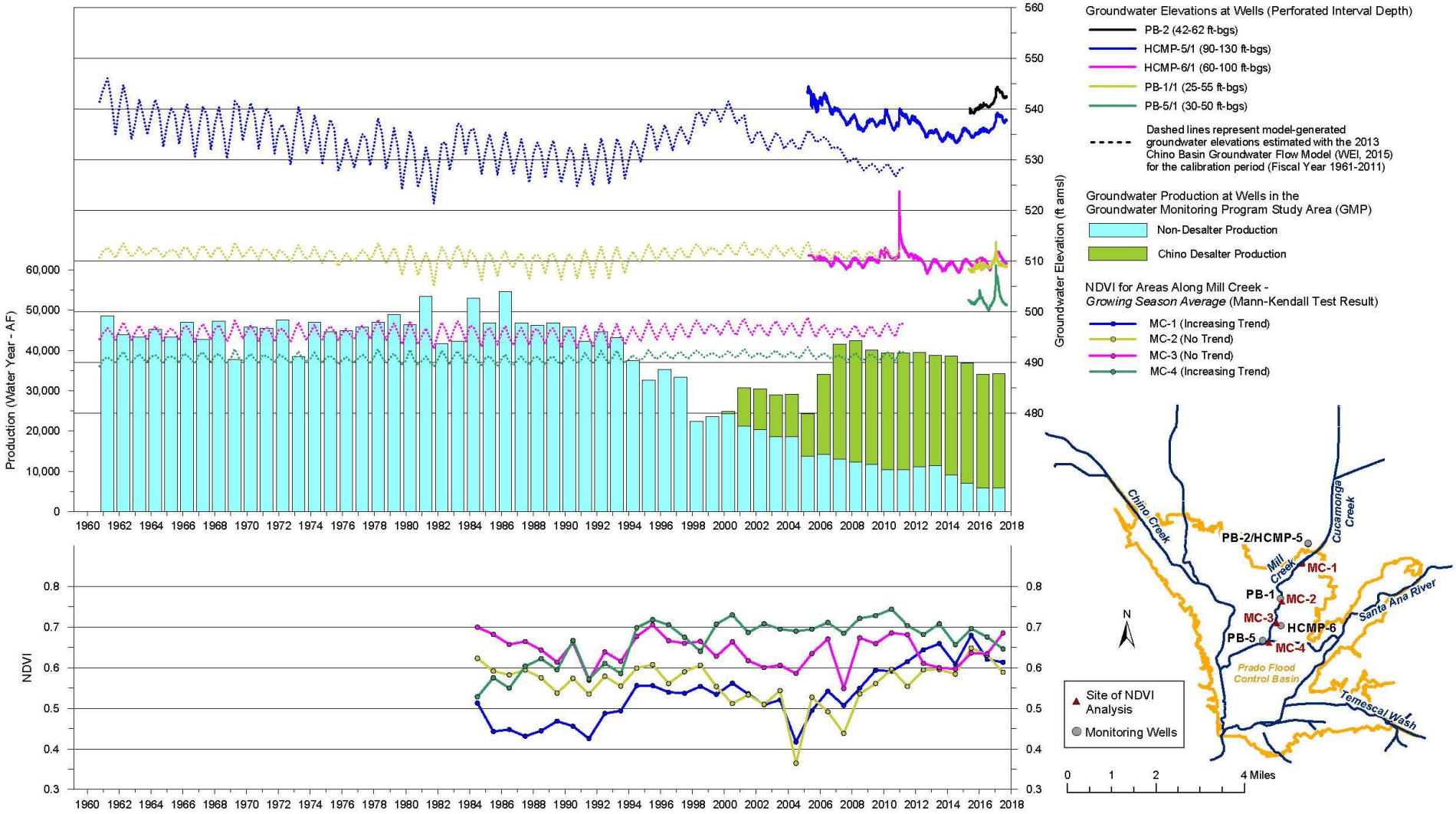
Groundwater Production and Groundwater Levels versus NDVI
Chino Creek Area for 1960-2017

Figure 3-12a

Production, Groundwater Levels, NDVI – Mill Creek



Prepared by:

WEI Wildermuth Environmental, Inc.

Author: RT
Date: 20170329
Filename: Flows_WLs_MillCreek.grf

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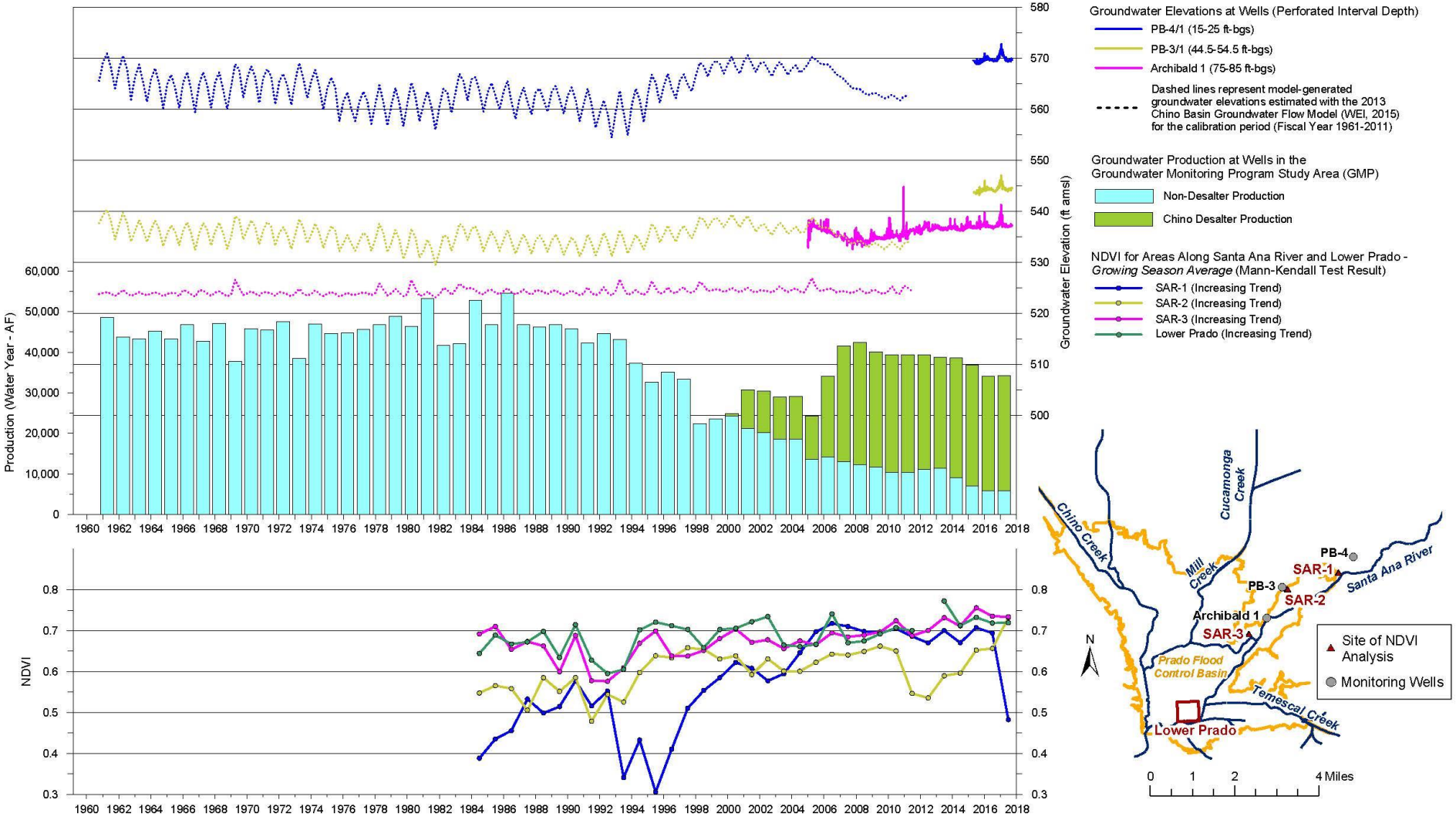
Groundwater Production and Groundwater Levels versus NDVI
Mill Creek Area for 1960-2017

Figure 3-12b

Production, Groundwater Levels, NDVI – Santa Ana River



Prepared by:

WEI Wildermuth Environmental, Inc.

Author: RT
Date: 20170404
Filename: Prod_GWLs_SAR.grf

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Groundwater Production and Groundwater Levels versus NDVI
Santa Ana River and Lower Prado Area for 1960-2017

Figure 3-12c

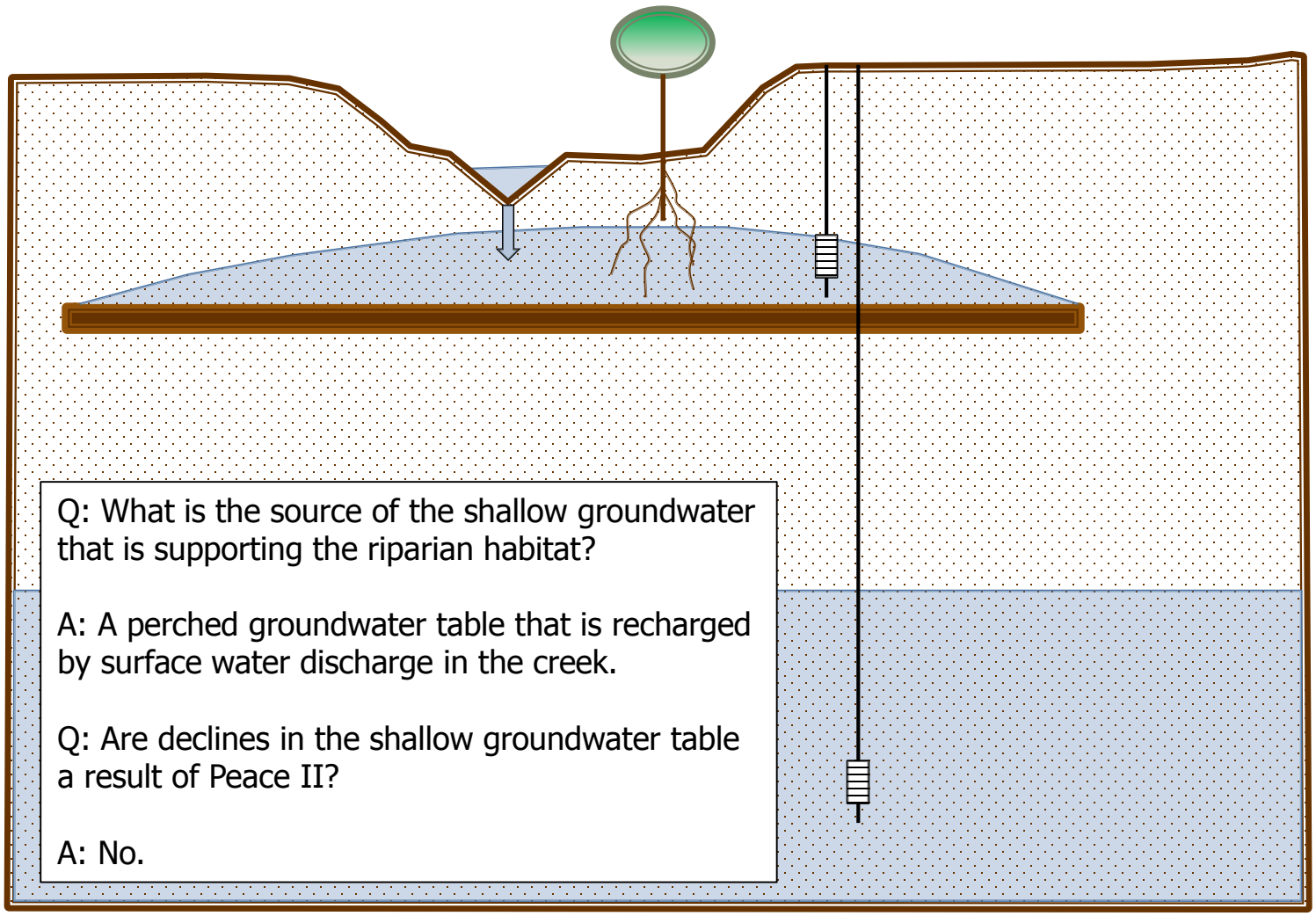
Conclusions and Recommendations

Groundwater vs. Riparian Habitat

- With exception of two locations, groundwater levels have remained stable across the Prado Basin and appear unaffected by Peace II implementation

- Two exceptions: northern reaches of Mill Creek and SAR
  - +/- 10 feet of groundwater level change since early 1990s
  - No observed degradation of riparian habitat that appears related to changes in groundwater levels

- Recommendations:
  - Continue monitoring program with no change in scope

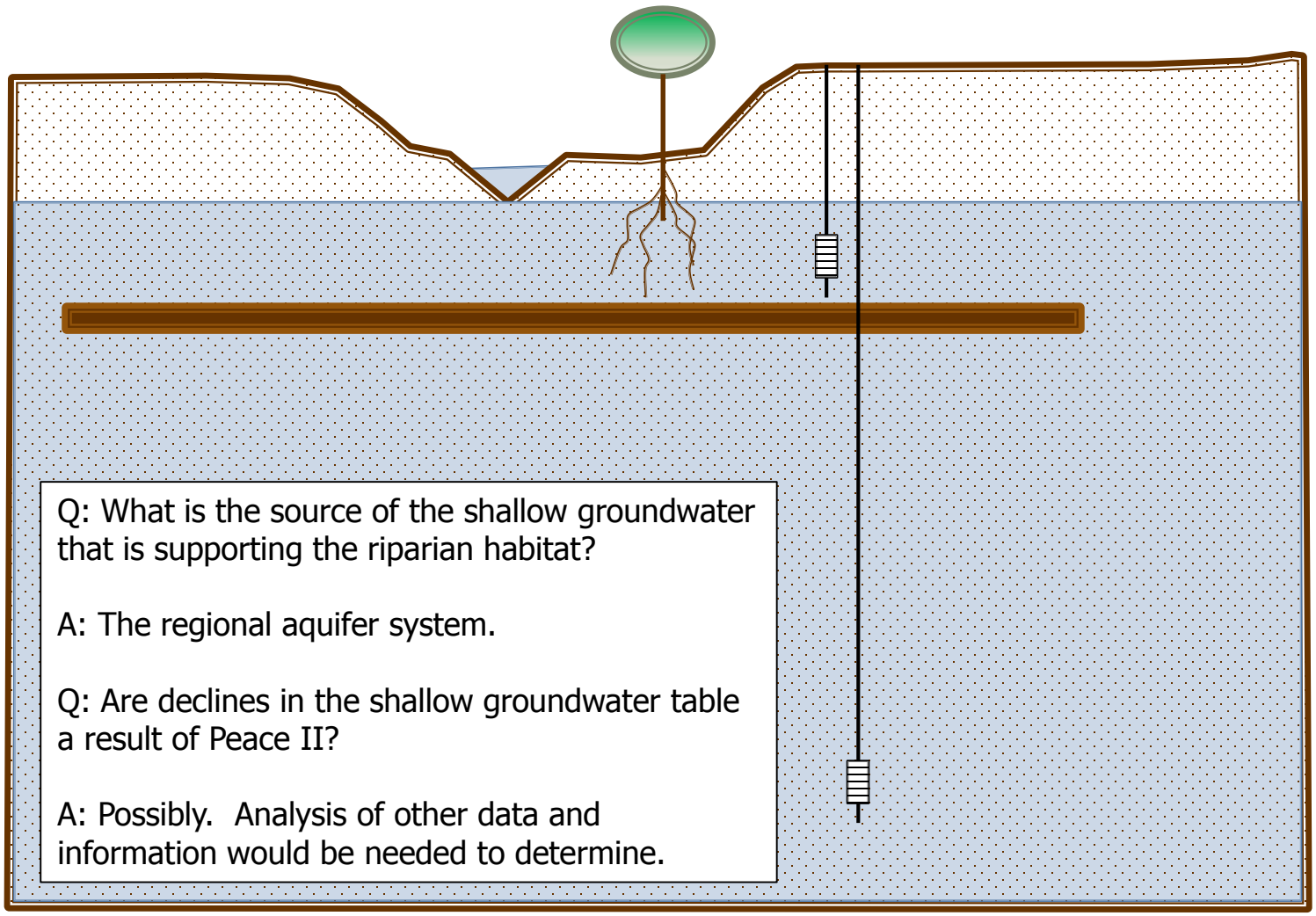


Q: What is the source of the shallow groundwater that is supporting the riparian habitat?

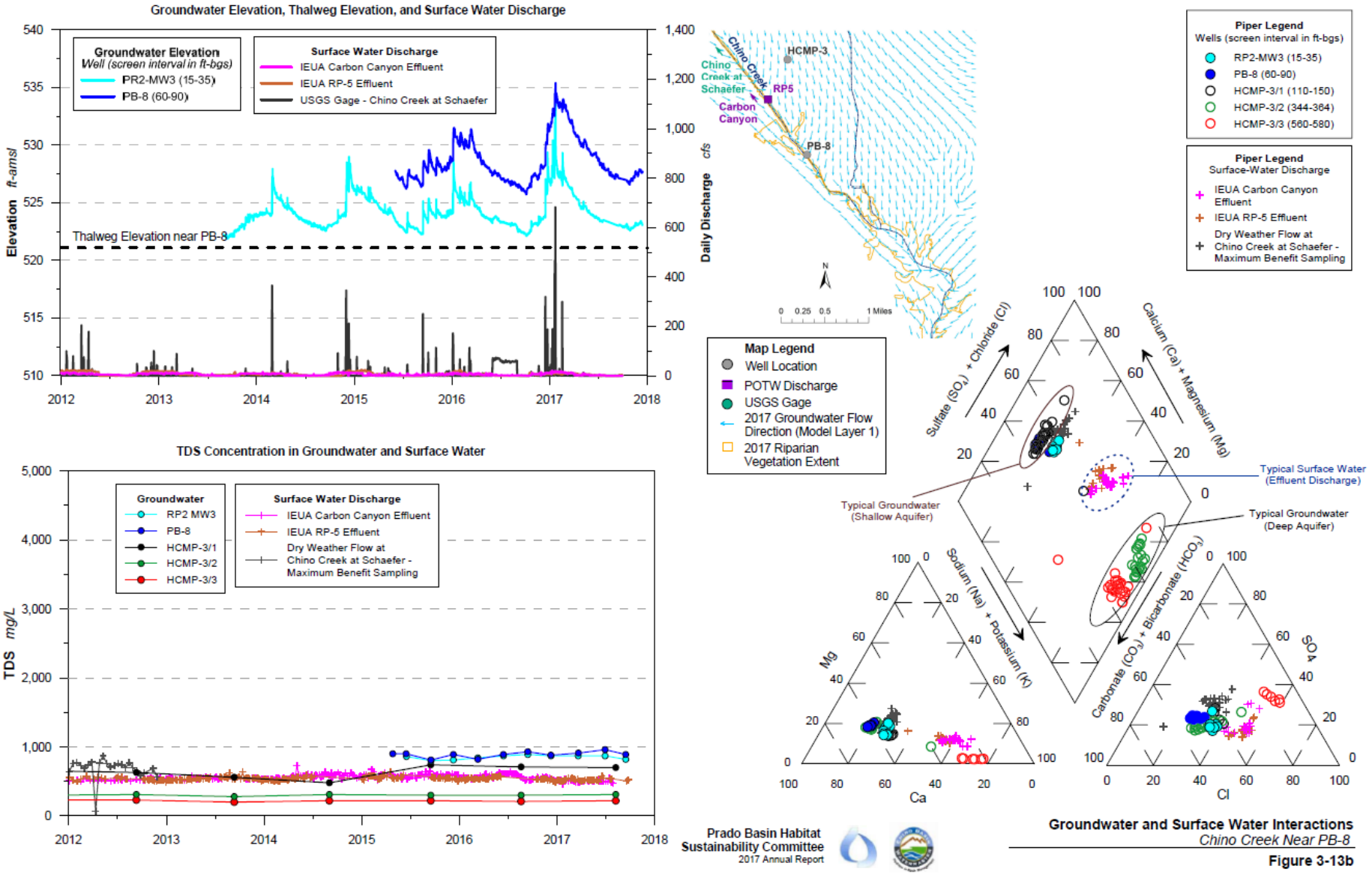
A: A perched groundwater table that is recharged by surface water discharge in the creek.

Q: Are declines in the shallow groundwater table a result of Peace II?

A: No.


Q: What is the source of the shallow groundwater that is supporting the riparian habitat?
A: The regional aquifer system.
Q: Are declines in the shallow groundwater table a result of Peace II?
A: Possibly. Analysis of other data and information would be needed to determine.

Groundwater Surface Water Interaction – PB-8 Chino Creek



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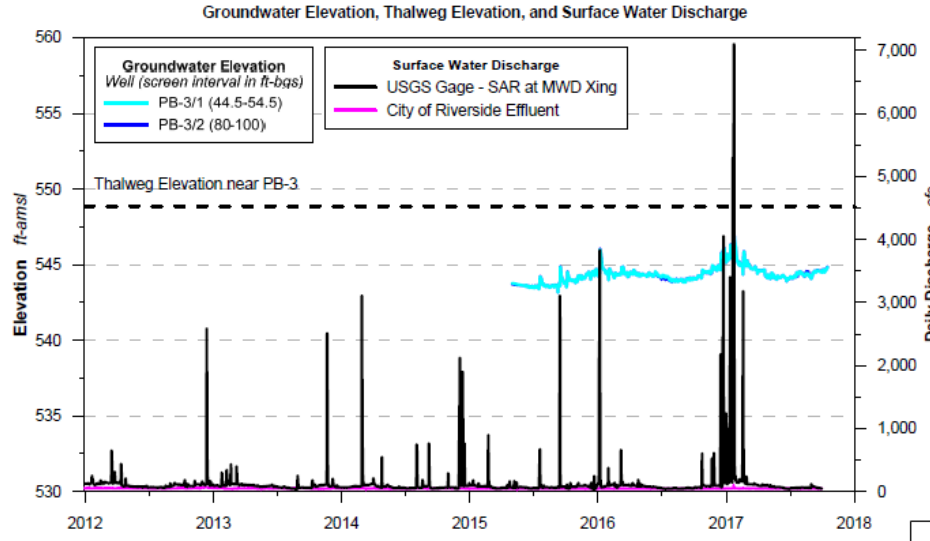
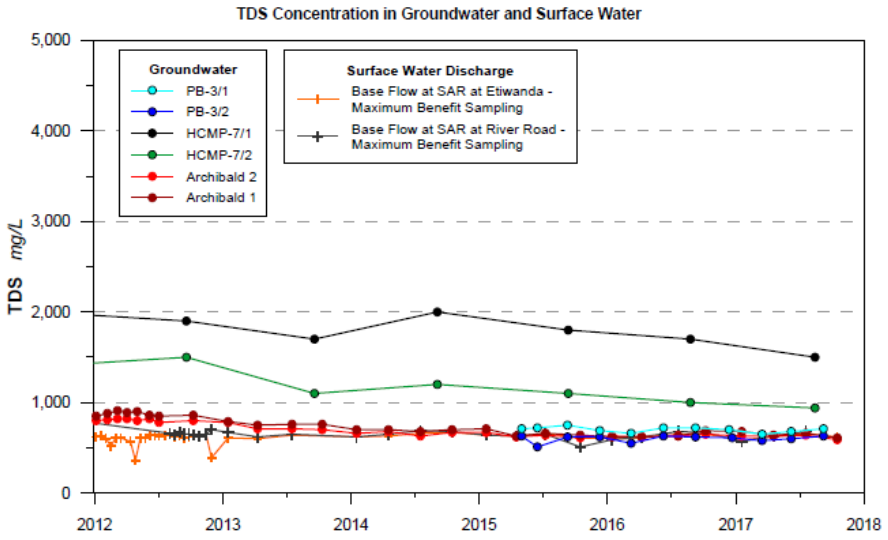
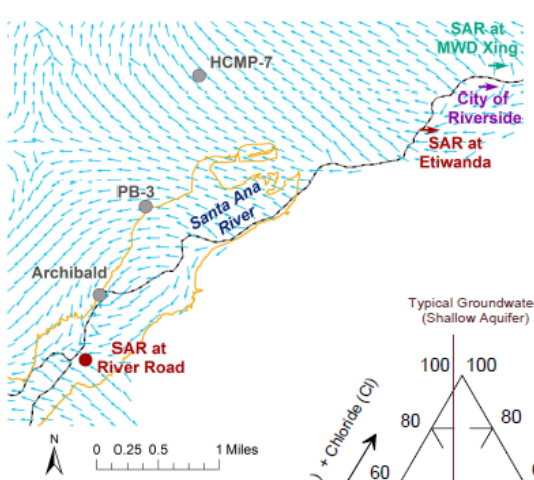
Groundwater and Surface Water Interactions
Chino Creek Near PB-8

Figure 3-13b

Groundwater Surface Water Interaction – PB-3 Santa Ana River



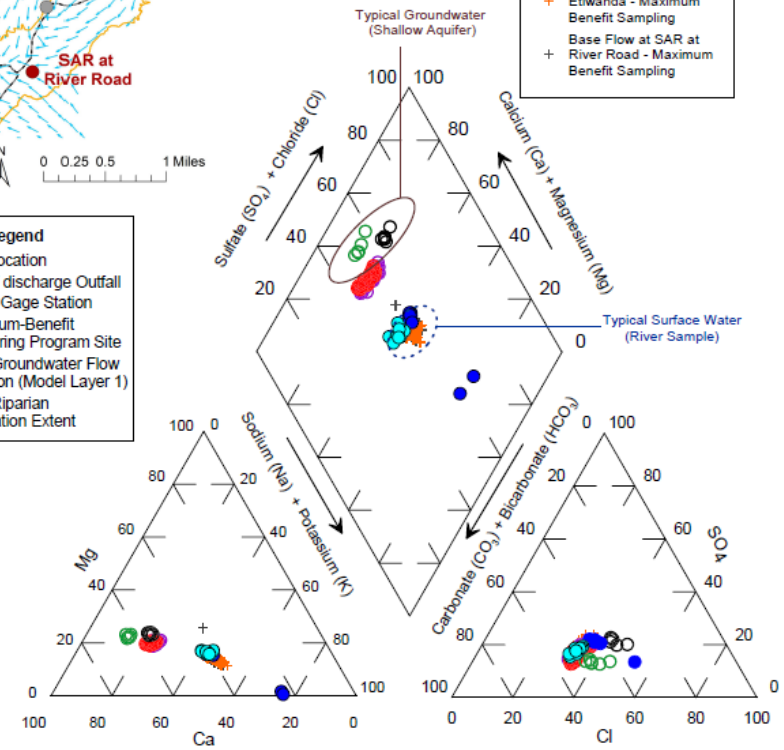




Map Legend
- Well Location
- POTW discharge Outfall
- USGS Gage Station
- Maximum-Benefit Monitoring Program Site
- 2017 Groundwater Flow Direction (Model Layer 1)
- 2017 Riparian Vegetation Extent

Piper Legend
Wells (screen interval in ft-bgs)
- PB-3/1 (44.5-54.5)
- PB-3/2 (80-100)
- HCMP-7/1 (70-110)
- HCMP-7/2 (200-220)
- Archibald 2 (40-50)
- Archibald 1 (75-85)

Piper Legend
Surface-Water Discharge
- Base Flow at SAR at Etiwanda - Maximum Benefit Sampling
- Base Flow at SAR at River Road - Maximum Benefit Sampling



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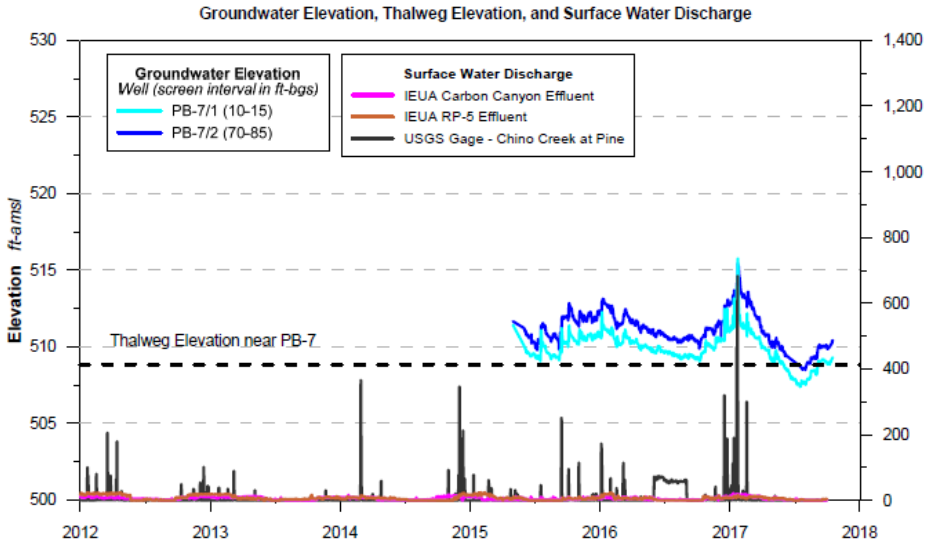
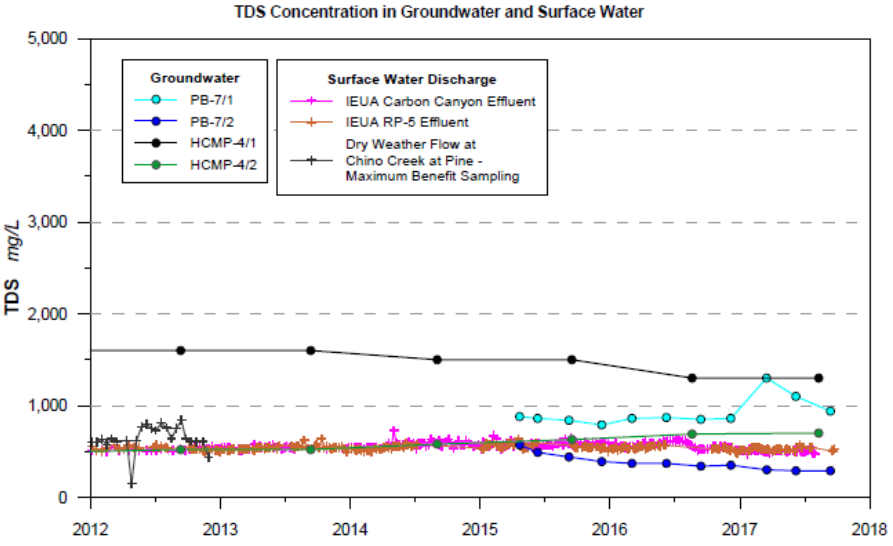
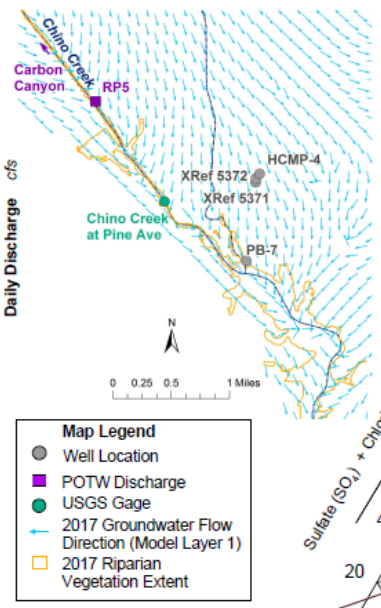
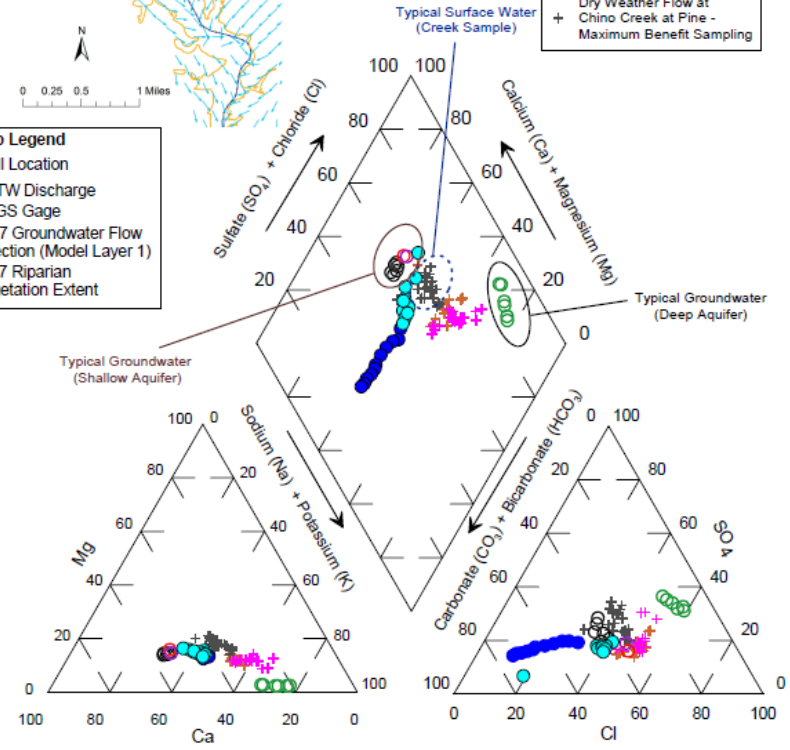
Groundwater and Surface Water Interactions
Santa Ana River Near PB-3
Figure 3-13i

Groundwater Surface Water Interaction – PB-7 Chino Creek









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Groundwater and Surface Water Interactions
Chino Creek Near PB-7

Figure 3-13c

Conclusions and Recommendations

Groundwater and Surface Water Interaction

- Northern reaches of Mill Creek and the SAR are “losing reaches” characterized by streambed recharge
- Most other areas along Chino Creek and Mill Creek are “gaining reaches” characterized by groundwater discharge
- However, at most locations in Prado Basin, groundwater/surface-water interactions are complex and there appears to be multiple and transient source waters that feed the shallow groundwater
- Recommendations:
  - Additional monitoring and testing to better characterize the source waters and the groundwater/surface-water interactions
    - High-frequency water-quality monitoring of EC and temperature at the wells and the surface water just upstream from the wells
    - Quarterly sampling and analysis of general minerals at the wells and surface-water site

Annual Report – Table of Contents

- Section 1 – Background and Objectives
- Section 2 – Monitoring, Data Collection, and Methods
- Section 3 – Results and Interpretations
  - 3.1 – Trends in Riparian Habitat Extent and Quality
  - 3.2 – Groundwater and Its Relationship to the Riparian Habitat
  - **3.3 – Climate and Its Relationship to the Riparian Habitat**
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  - **3.6 – Analysis of Prospective Loss of Riparian Habitat**
- Section 4 – Conclusions and Recommendations
  - 4.1 – Main Conclusions and Recommendations
  - 4.2 – Recommended Mitigation Measures and/or Adjustments to the AM
  - 4.3 - Recommended PBHSP for Fiscal Year 2018/19
- Section 5 – References

Potential Stressors

Figure 3-14
Annual Precipitation in the Chino Basin - Water Years 1896-2017

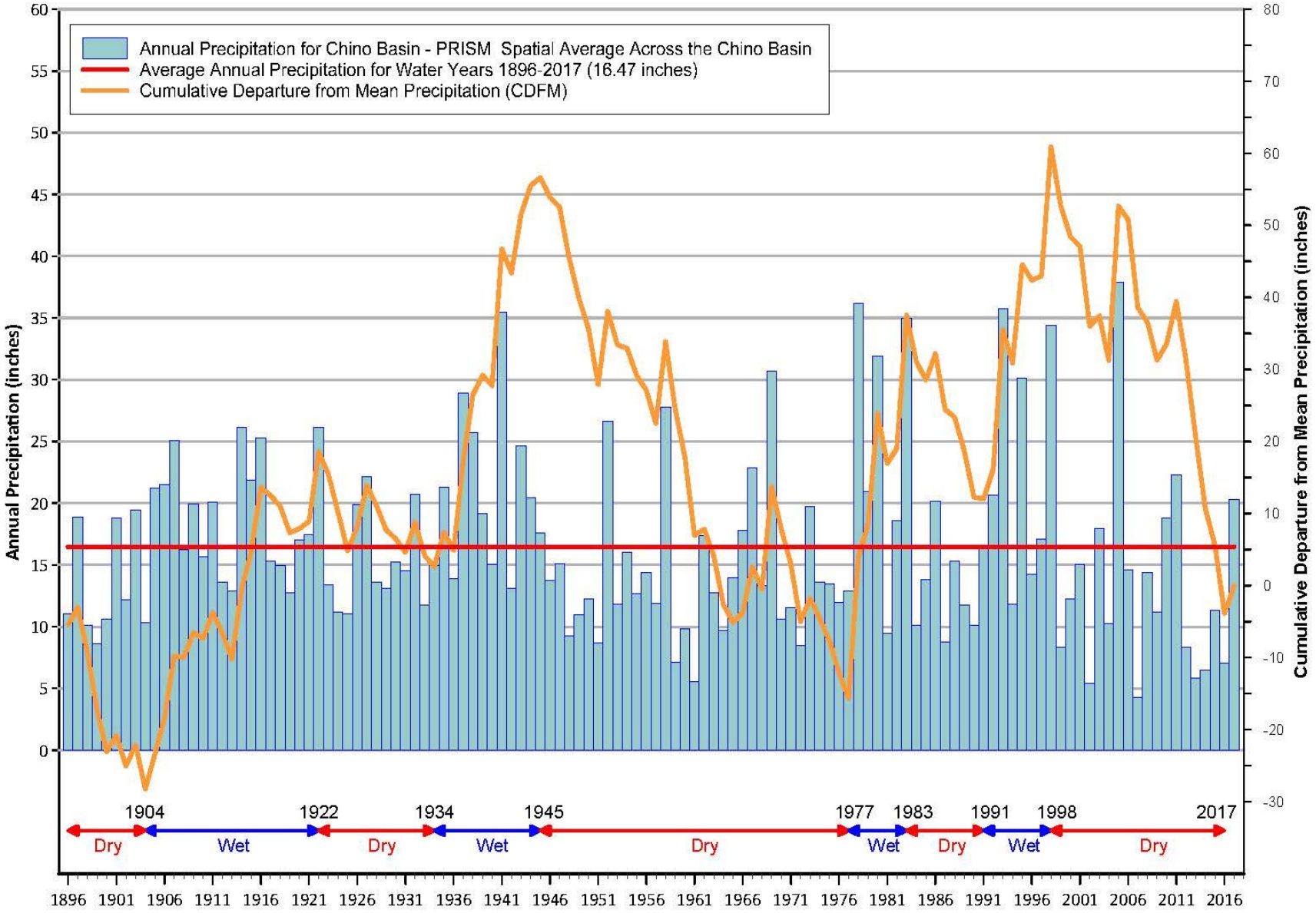
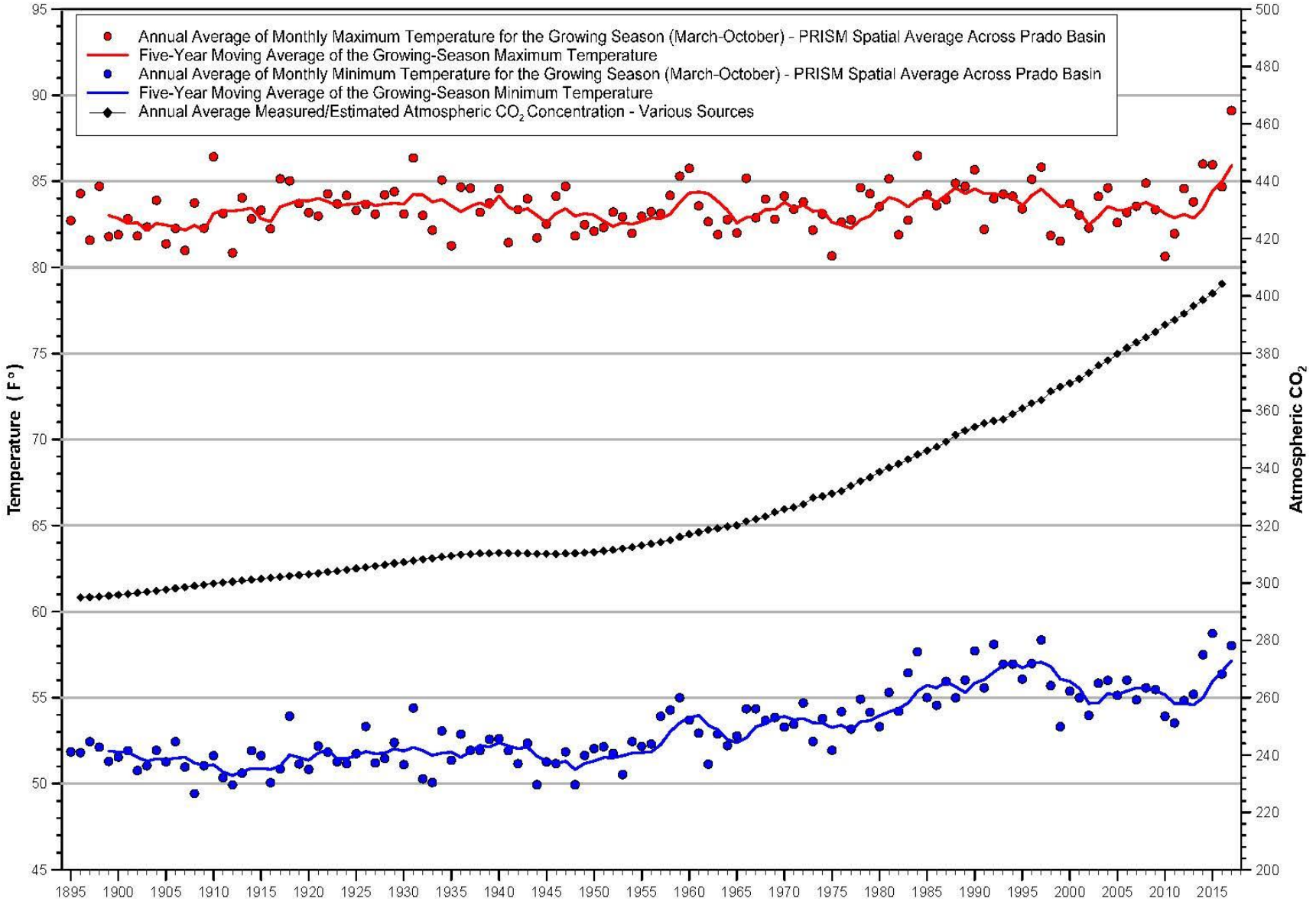
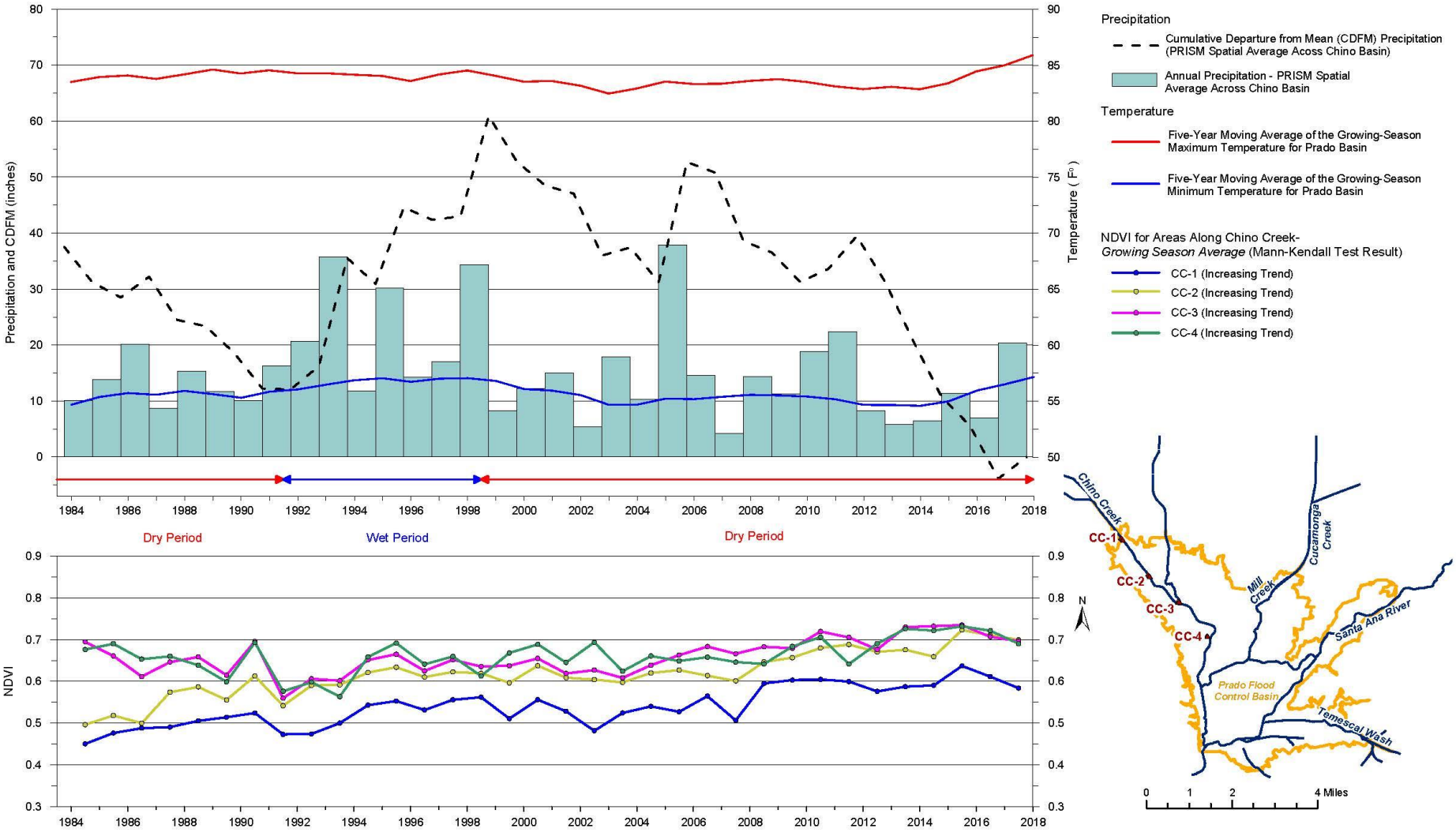


Figure 3-15a
Maximum and Minimum Temperature in Prado Basin - 1895-2017



Climate and NDVI – Chino Creek



Prepared by:
WEI Wildermuth Environmental, Inc.

Author: RT
Date: 20180110
Filename: CDFM_Temp_NDVI_ChinoCreek.grf

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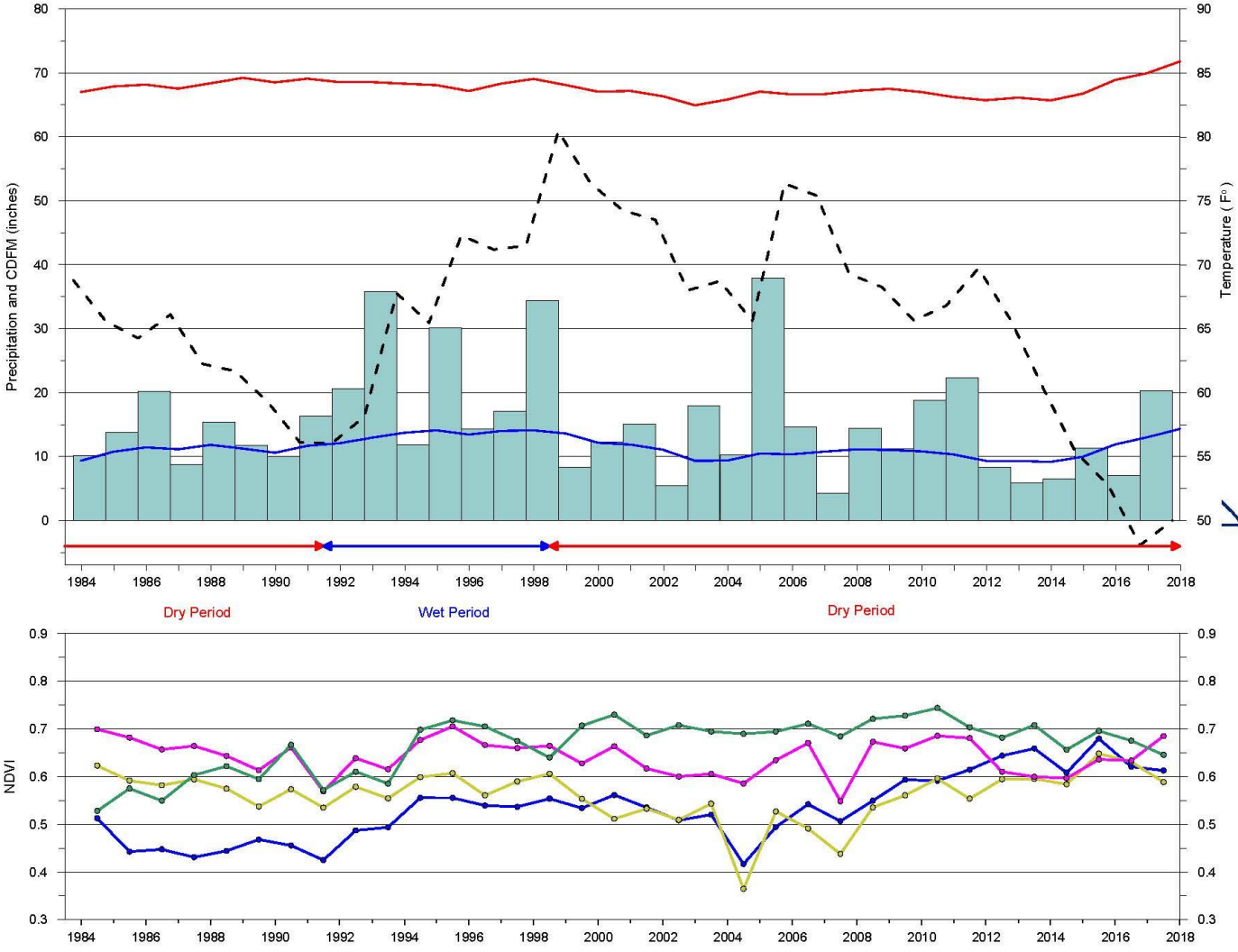
Climate versus NDVI
Chino Creek Area for 1984-2017

Figure 3-16a

Climate and NDVI – Mill Creek



Precipitation

Cumulative Departure from Mean (CDFM) Precipitation (PRISM Spatial Average Acoss Chino Basin)

Annual Precipitation - PRISM Spatial Average Across Chino Basin

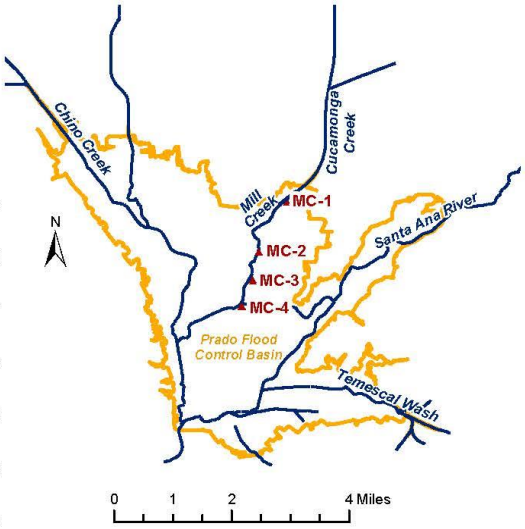
Temperature

Five-Year Moving Average of the Growing-Season Maximum Temperature for Prado Basin

Five-Year Moving Average of the Growing-Season Minimum Temperature for Prado Basin

NDVI for Areas Along Mill Creek-
Growing Season Average (Mann-Kendall Test Result)

- MC-1 (Increasing Trend)
- MC-2 (No Trend)
- MC-3 (No Trend)
- MC-4 (Increasing Trend)



Prepared by:

WEI Wildermuth Environmental, Inc.

Author: RT
Date: 20180110
Filename: CDFM_Temp_NDVI_ChinoCreek.grf

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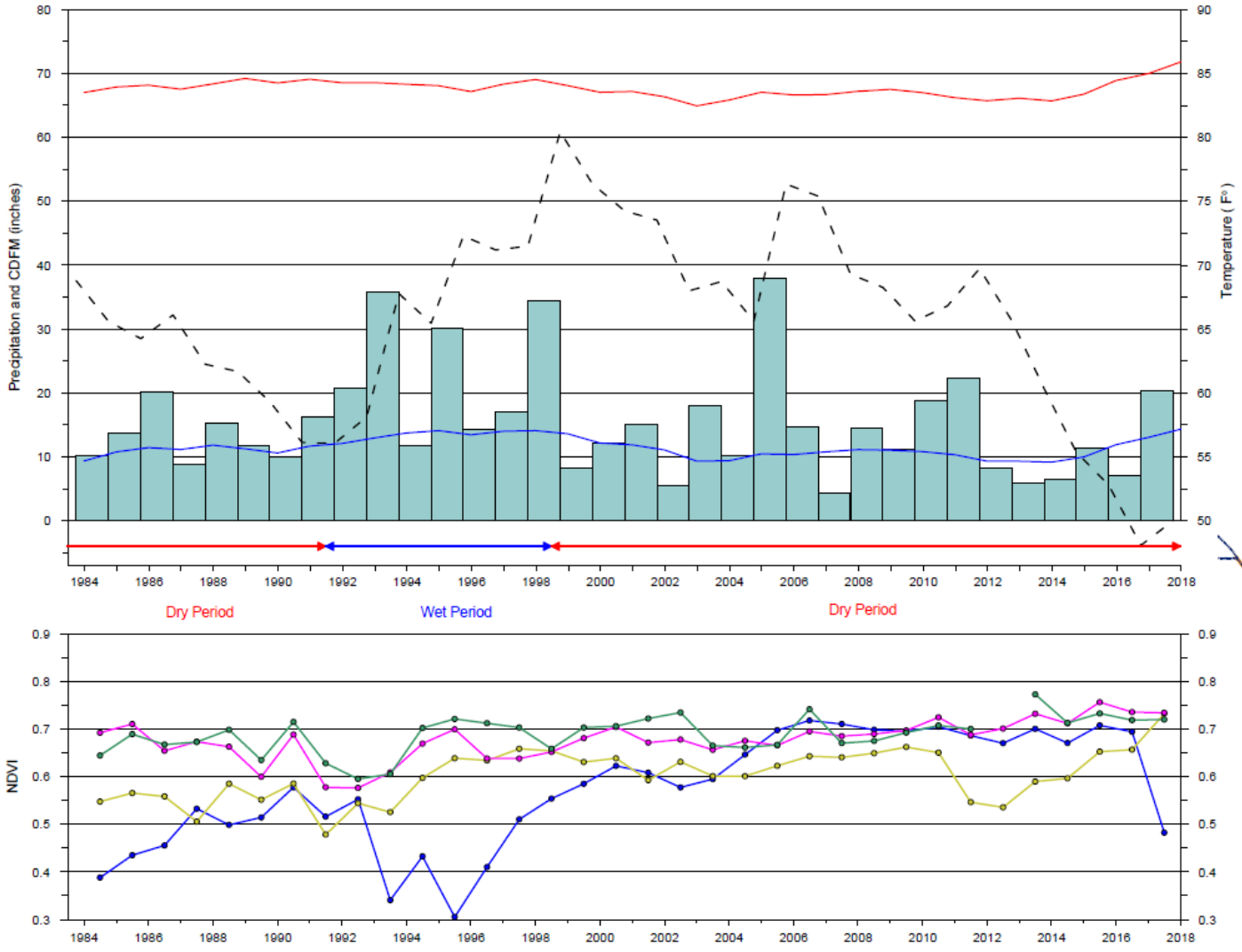
Climate versus NDVI
Mill Creek Area for 1984-2017

Figure 3-16b

Climate and NDVI – Santa Ana River



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: RT
Date: 20180110
Filename: CDFM_Temp_NDVI_ChinoCreek.grf

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Prado Basin Habitat Sustainability Committee

Climate versus NDVI
Santa Ana River and Lower Prado Area for 1984-2017

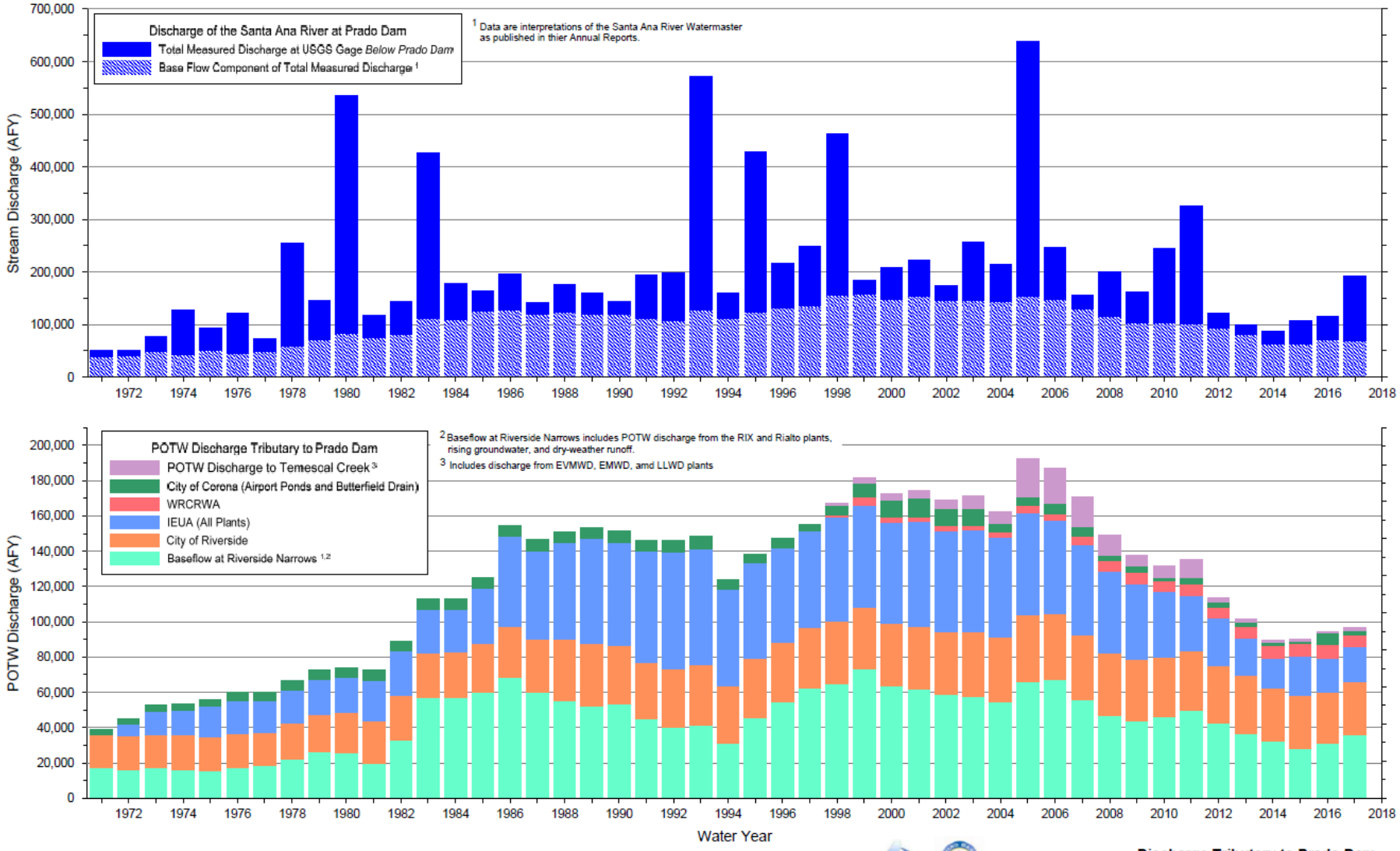
Figure 3-16c

Conclusions and Recommendations

Climate vs. Riparian Habitat

- The quality of the riparian habitat show no long-term trend in degradation that correlates with the dry period from 1999 to 2017
  - → Source waters other than precipitation and storm flow are more important for consumptive use by riparian vegetation, such as base flow and shallow groundwater.
- The quality of the riparian habitat (NDVI) show no consistent long-term relationships with fluctuations in growing-season temperatures.
- The recent decreases in NDVI observed from 2015-2017 at several areas occurred during the recent warming trend in the minimum and maximum temperatures in Prado Basin, and at the end of the current 18-year dry period.
  - → Continued monitoring and analysis is required to determine the relationship between recent trends in temperature with the recent trends in the quality of the riparian habitat
- Recommendation:
  - Continue monitoring program with no change in scope

Trends in Surface Water Tributary to Prado Dam



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: RT
Date: 20180215
Filename: 2017_Fig3-13_SW Discharge.grf

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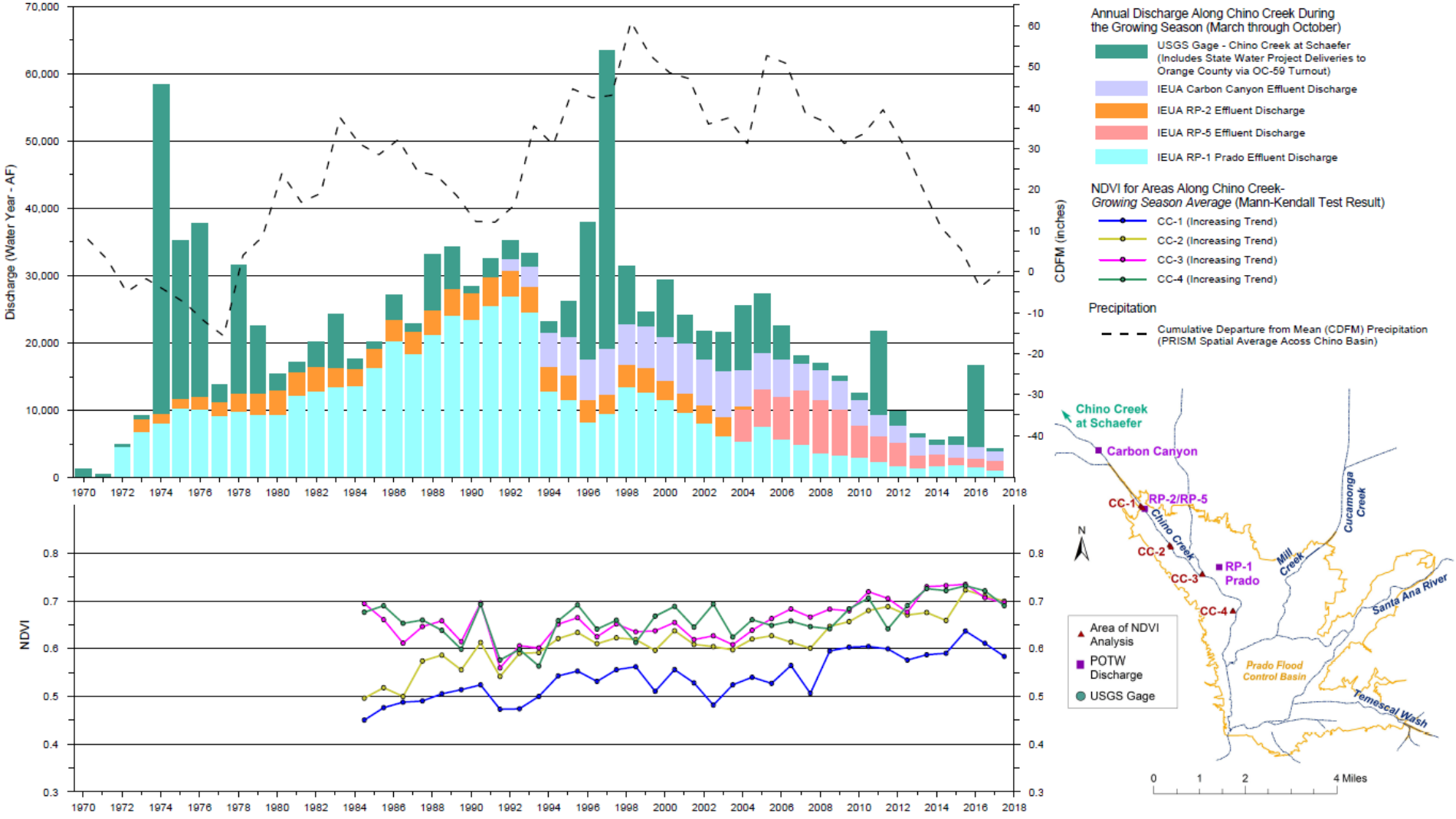
Prado Basin Habitat Sustainability Committee

Discharge Tributary to Prado Dam
Water Year 1960-2017

Figure 3-17

Surface Water and NDVI – Chino Creek



Prepared by:

WEI Wildermuth Environmental, Inc.

Author: RT
Date: 20170410
Filename: SW Discharge_NDVI_Chino Creek.grf

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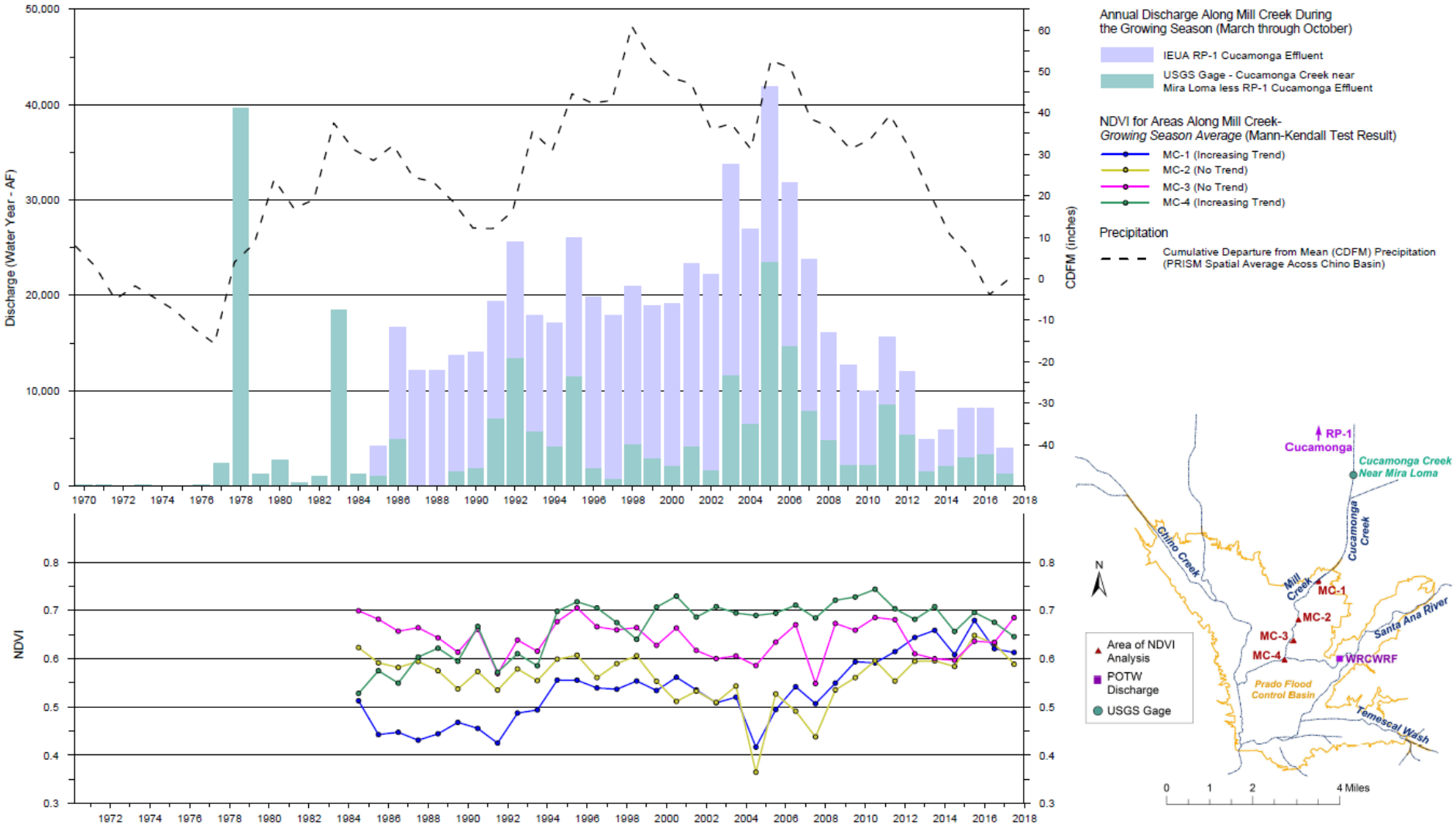
Surface-Water Discharge versus NDVI
Chino Creek Area for 1971-2017

Figure 3-18a

Surface Water and NDVI – Mill Creek



Prepared by:

WEI Wildermuth Environmental, Inc.

Author: RT
Date: 20170410
Filename: SW Discharge_NDVI_Mill Creek.grf

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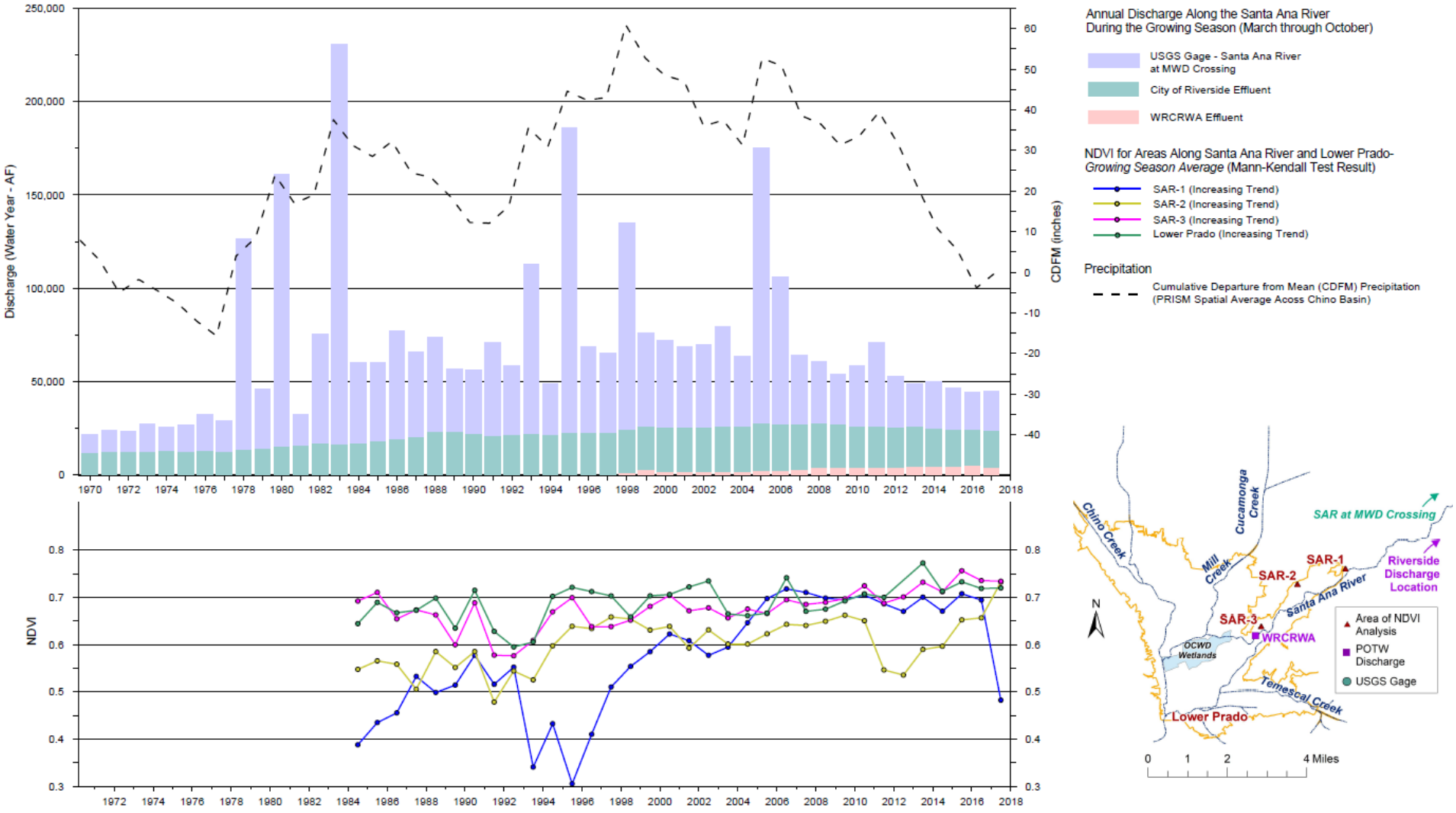
Surface-Water Discharge versus NDVI
Mill Creek Area for 1971-2017

Figure 3-18b

Surface Water and NDVI – Santa Ana River



Prepared by:
WEI
Author: RT
Date: 20170410
Filename: SW Discharge_NDVI_SAR and LP.grf

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Surface-Water Discharge versus NDVI
Santa Ana River and Lower Prado Area for 1971-2017

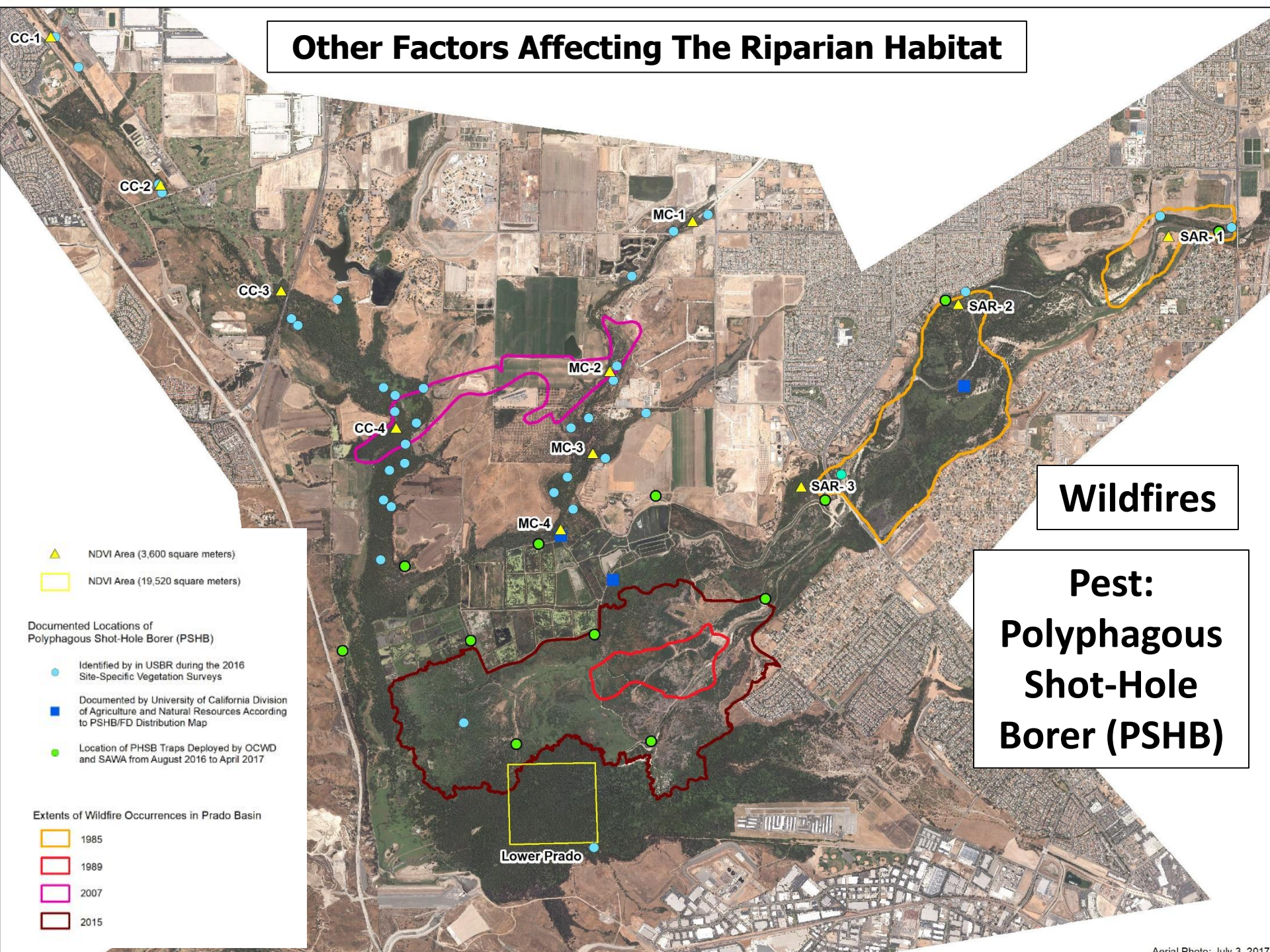
Figure 3-18c

Conclusions and Recommendations

Surface-Water Discharge vs. Riparian Habitat

- Discharge in the SAR and its tributaries has declined since 2005
  - → Dry conditions and reductions in POTW discharge
- The quality of riparian habitat (NDVI) has shown no consistent relationship or declining trend that coincides with declines in growing-season stream discharge, and may have improved slightly during the Peace II Agreement period.
- The recent decreases in NDVI observed from 2015-2017 at several areas occurred when the growing-season discharge for both Chino Creek and Mill Creek decreased from 2015 to 2017, and the growing-season discharge remained stable in the SAR.
  - → Continued monitoring and analysis is required to determine the relationship between recent trends in surface water discharge with the recent trends in the quality of the riparian habitat
- Recommendation:
  - Continue monitoring program with no change in scope

Other Factors Affecting The Riparian Habitat



Wildfires

Pest: Polyphagous Shot-Hole Borer (PSHB)

Aerial Photo: July 3, 2017

Conclusions and Recommendations

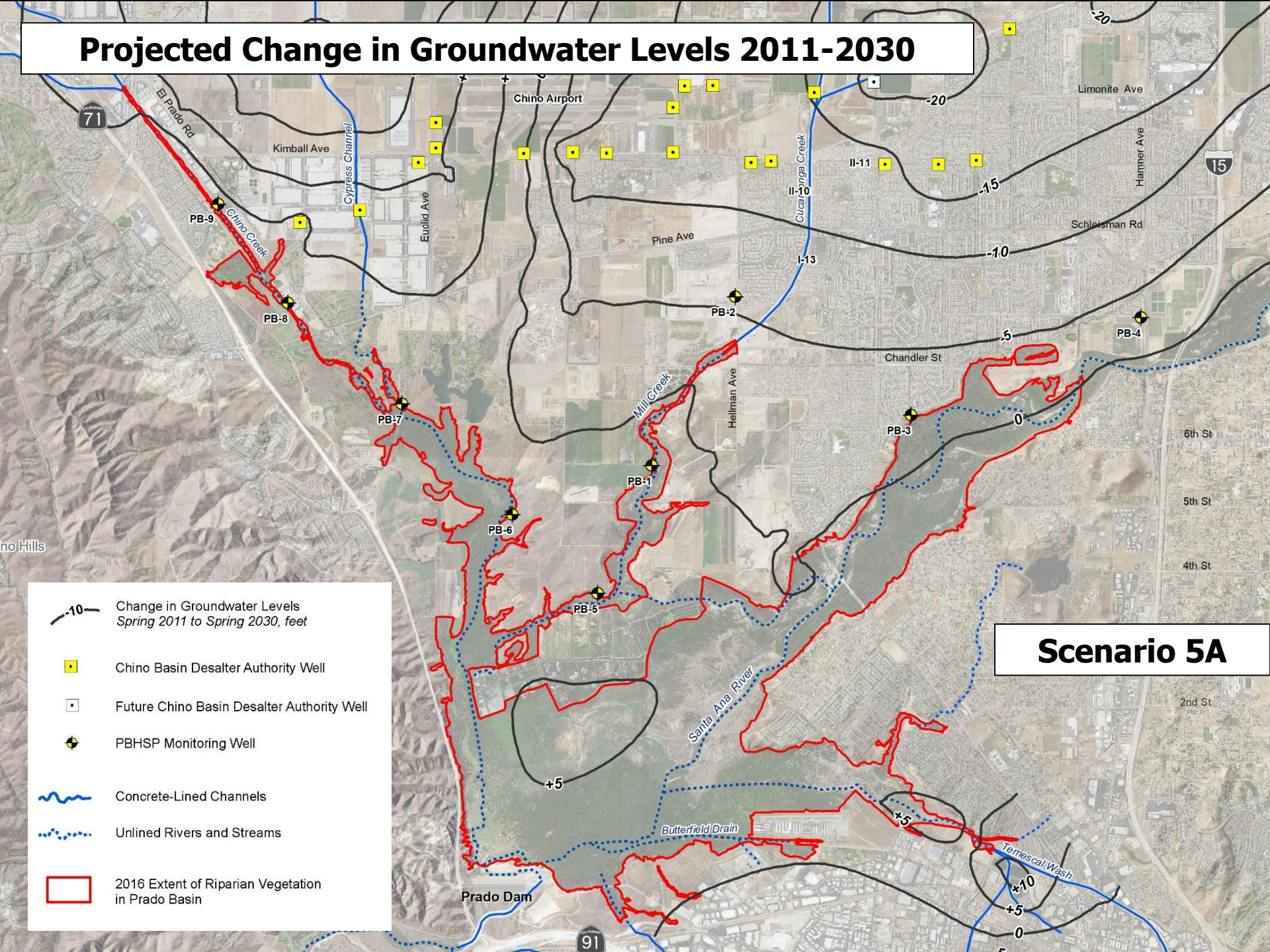
Other Factors vs. Riparian Habitat

- Other factors that have can have adverse impacts on the riparian habitat.
  - Wildfire
  - Pests → PSHB (beetle)

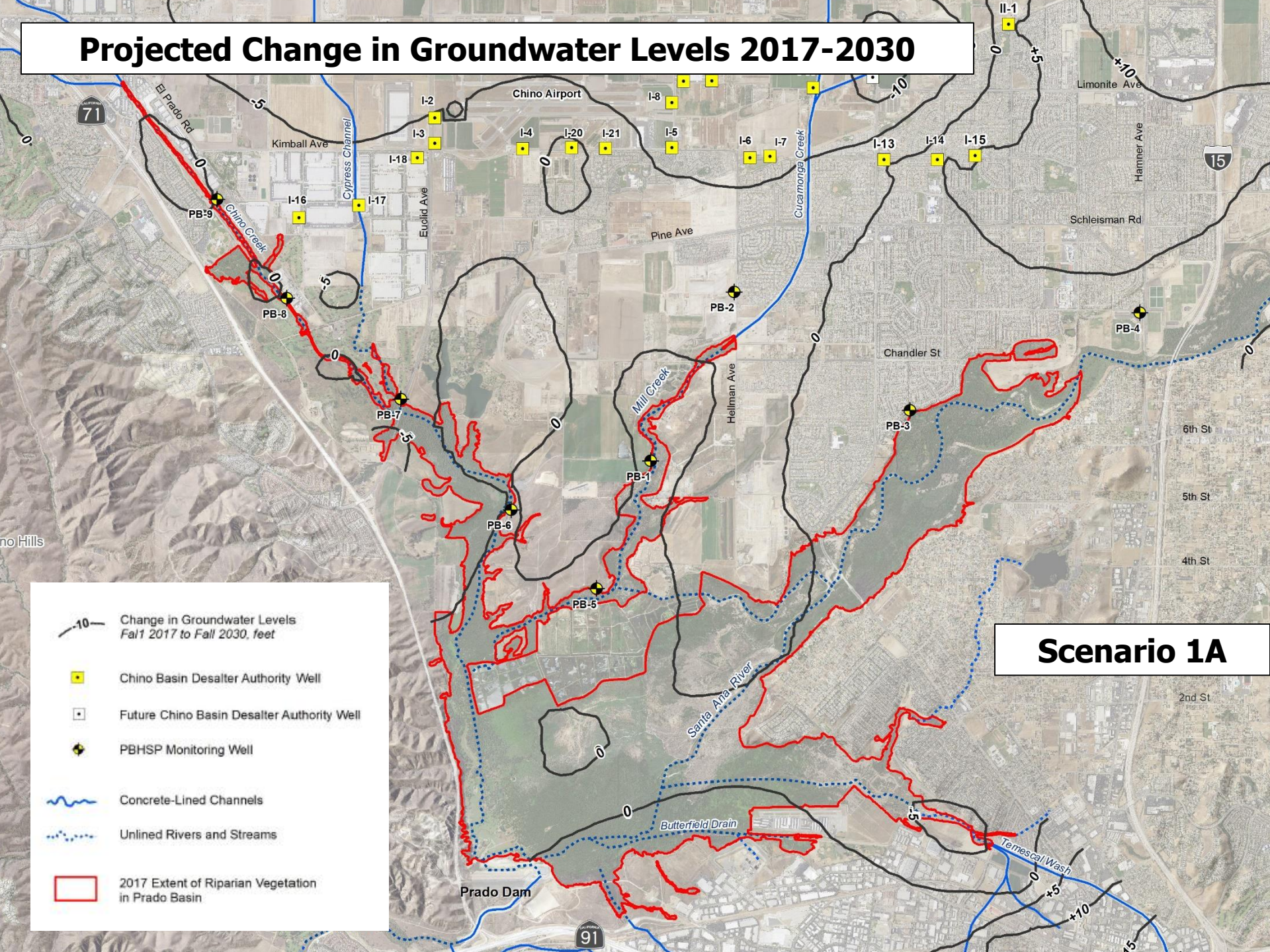
- The 2016 USBR surveys were the first site-specific surveys that documented the presence and abundance of the PSHB for the PBHSP, and it is too early to suggest that the PSHB has caused a decrease in NDVI.

- Recommendations:
  - Continue monitoring program
  - The PSHB should be monitored for and documented in future field vegetation surveys

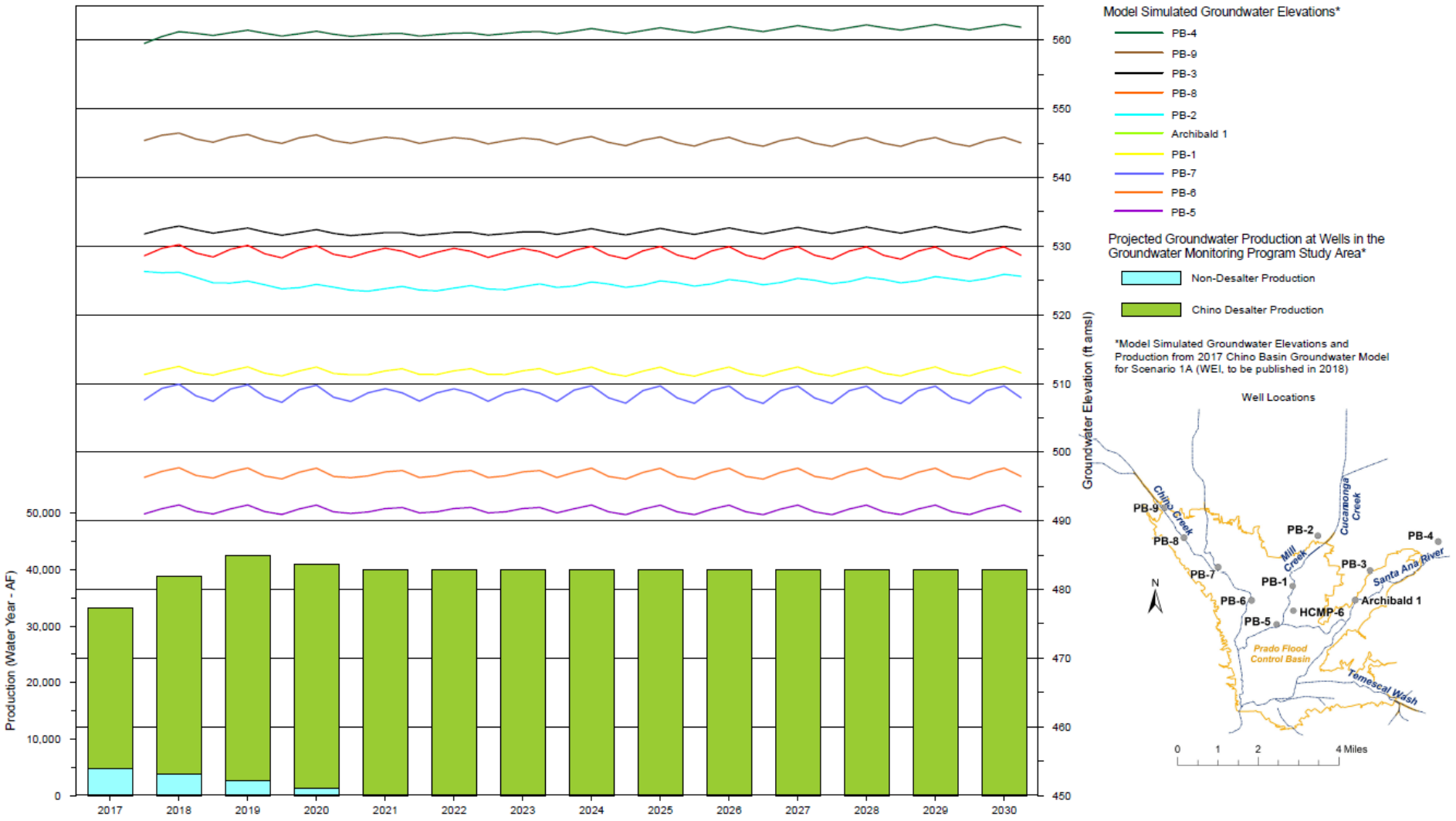
Projected Change in Groundwater Levels 2011-2030



Projected Change in Groundwater Levels 2017-2030



Projected Change in Groundwater Production and Levels 2017-2030



Prepared by:

WEI

Author: RT
Date: 20160601
Filename: Projected_PROD_GWE_2012-2030.grf

2017 Annual Report
Prado Basin Habitat Sustainability Committee

Projected Groundwater Production and Groundwater Levels
2017-2030

Figure 3-22

Conclusions and Recommendations

Analysis of Prospective Loss of Riparian Habitat

- Projected changes is groundwater levels are predicted to remain steady across most of the Prado Basin area through 2030: There are minor changes (up to -2 feet) predicted to occur along the very north portions of Mill Creek and Chino Creek.

- There are no areas for prospective loss of riparian habitat

- Recommendations:
  - Continue monitoring of groundwater levels
  - Utilize an updated Chino Basin groundwater-flow model to project groundwater-level changes to characterize areas of prospective loss of riparian habitat

Annual Report – Table of Contents

- Section 1 – Background and Objectives
- Section 2 – Monitoring, Data Collection, and Methods
- Section 3 – Results and Interpretations
  - 3.1 – Trends in Riparian Habitat Extent and Quality
  - 3.2 – Groundwater and Its Relationship to the Riparian Habitat
  - 3.3 – Climate and Its Relationship to the Riparian Habitat
  - 3.4 – Surface Water and Its Relationship to the Riparian Habitat
  - 3.5 – Other Factors and Their Relationship to the Riparian Habitat
  - 3.6 – Analysis of Prospective Loss of Riparian Habitat
- **Section 4 – Conclusions and Recommendations**
  - 4.1 – Main Conclusions and Recommendations
  - 4.2 – Recommended Mitigation Measures and/or Adjustments to the AM
  - 4.3 - Recommended PBHSP for Fiscal Year 2018/19
- Section 5 – References

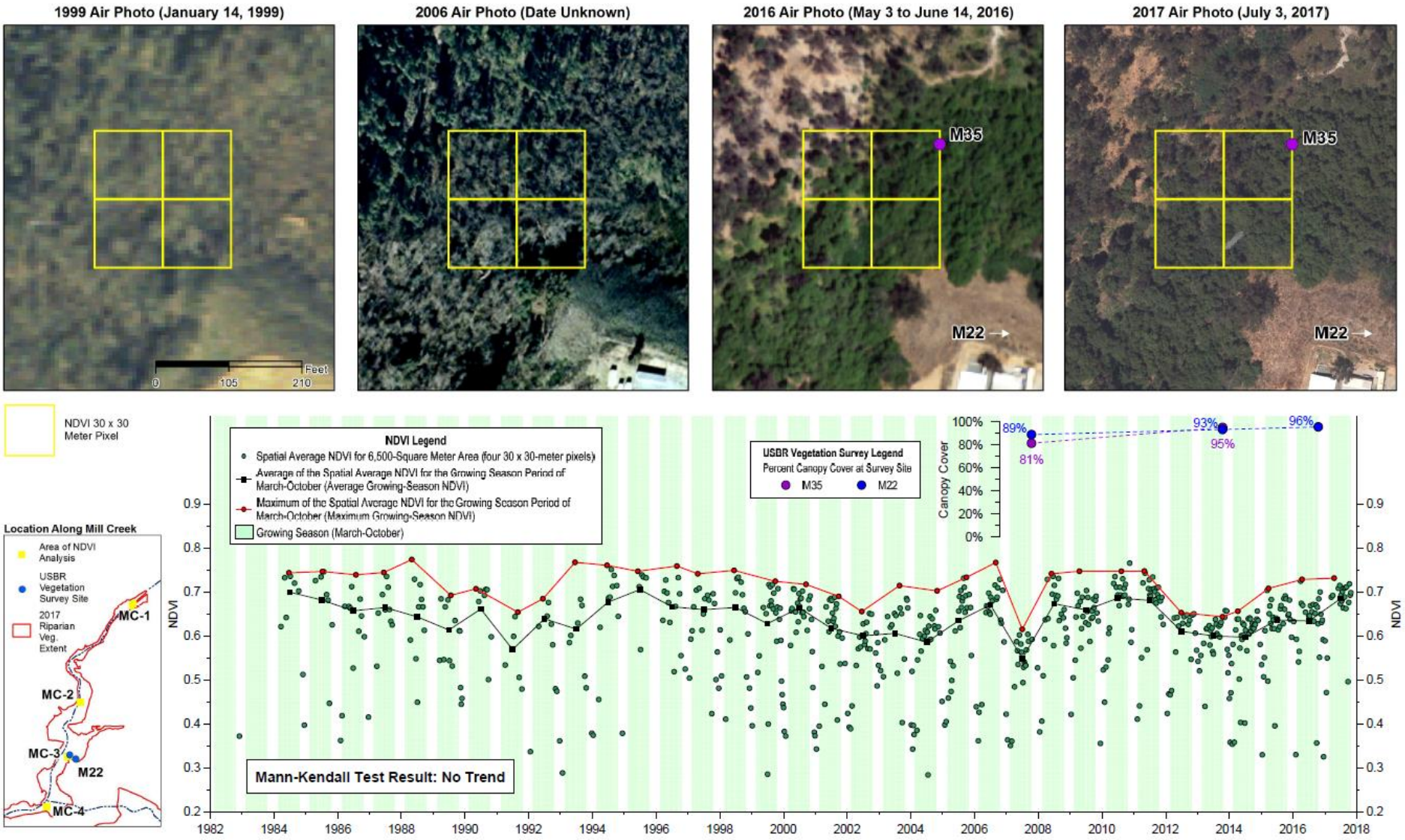
Potential Stressors

Next Steps

- May 2018 – The FY 2018/19 Recommended Scope and Budget for the PBHSP is being considered for approval by Watermaster/IEUA.
- May 23, 2018 – PBHSC members submit comments and suggested revisions on the Draft 2017 Annual Report.
- June 7, 2018 – Final 2017 Annual Report
- July 1, 2018 – Next fiscal year monitoring program begins

Questions ?

NDVI Analysis – MC-3



Prepared by: WEI Wildrose Environmental, Inc.

Author: RT
Date: 20171122
Filename: NDVI_MC-3_Airphoto.grf

2017 Annual Report
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Time Series of NDVI and Air Photos
MC-3 Area for 1984 to 2017

Figure 3-6g