Comprehensive Agreement No. 1

Ninth Annual Report

FY22
(July 1, 2021 – June 30, 2022)

BIG CHINO SUB-BASIN
WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Prepared by:

CITY OF PRESCOTT
ARIZONA

PRESCOTT VALLEY

SRP®

Final Draft 10/12/2022

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Introduction

The ninth annual report documents the progress of the Monitoring and Modeling Committees (Committees) established by Comprehensive Agreement #1 (CA#1). Since late 2012, the Committees have worked to implement the Data Collection and Monitoring Plan (DCMP) for the purposes of developing an improved numerical groundwater flow model of the Big Chino Sub-basin as described in the exhibits attached to CA#1 (City Contract No. 2013-058). These efforts to date have included the installation of monitoring equipment to generate the groundwater and surface water data sets necessary for an improved groundwater flow model and to establish long-term hydrologic records, as well as provide information for future adaptive management approaches in the basin.

Groundwater modeling work commenced with Golder Associates Inc. (WSP Golder) in February 2017, and this project is outlined in City Contract No. 2017-246 and its amendments. This portion of the project has been as intensive as the monitoring contracts. The modeling project activities represent much of the work that has been completed by the three Parties within the past fiscal year. This year's annual report provides more detail on how the modeling contract has evolved over time and discusses the status of the CA#1 project. This report is comprised of the following sections:

- project background,
- Fiscal Year 2022 (FY22) accomplishments,
- financial summaries, and
- updates on monitoring and modeling activities required to fully execute CA#1 objectives.

Background

At a joint meeting on September 19, 2012, the Councils for the City of Prescott and the Town of Prescott Valley unanimously approved a comprehensive water monitoring and groundwater modeling agreement with Salt River Project and Salt River Valley Water Users' Association (SRP) regarding the City's Big Chino Water Ranch Project. The CA#1 agreement was authorized by SRP's Board on September 10, 2012.

CA#1 evolved over two years of discussions among Prescott, Prescott Valley, and SRP ("the Parties") to implement a plan consistent with the February 11, 2010, Agreement in Principle (AIP), City Contract No. 2010-128. The AIP resolved longstanding differences pertaining to water rights in the Big Chino sub-basin, set forth a framework for future agreements, and ended litigation

between the Parties regarding plans to pump groundwater from the Big Chino Sub-basin as authorized by Arizona state law.

CA#1 set forth a program for enhanced water monitoring and modeling of groundwater flows in the Big Chino, confirmed rights to water arising from within the Prescott Active Management Area, and achieved a mutual agreement by all the Parties not to challenge those rights. CA#1 is a long-term commitment to construct, implement, and maintain the monitoring and modeling program, with the Parties sharing in the long-term cost.

The goals of the DCMP (City Contract No. 2013-058, Exhibit 4) are to:

- Improve the understanding of the hydrologic relationship between groundwater and surface water in the Upper Verde River area.
- Act as an early warning system for the Upper Verde Springs.
- Collect data that may be used to distinguish groundwater pumping from the Big Chino Water Ranch from the impacts of groundwater pumping by others, and natural system variability.
- Develop the ability to relate regional groundwater and surface water observations to future groundwater model calibration and verification.
- Determine if additional data are needed.
- Provide data for development of a numerical groundwater flow model.

The primary objective of the numerical groundwater flow model is to, "...develop a multilayered numerical groundwater flow model of the Big Chino sub-basin and surrounding area that can inform resource managers about potential effects of groundwater pumping on the potentiometric surface, evapotranspiration, stream baseflow, and spring discharge" (Source: City Contract No. 2013-058, Exhibit 3). Further, the specific objectives are as follows:

- Test the validity of alternative conceptual flow-system models using iterative recalibration of a specified region in the Northern Arizona Regional Groundwater Flow Model.
- Define and collect the hydrogeologic data needed to discern between ambiguous conceptual models tested during the first objective.
- Conduct a model-based analysis of stream and spring discharge depletion that may result from groundwater pumping at identified locations and specified amounts in the Big Chino sub-basin and from changes in climate conditions.
- Determine the proportional impacts to groundwater levels and discharge to surface water sources caused by various sources of pumping in the Big Chino sub-basin.
- Use the model to select three or more locations for monitoring wells that could be used in conjunction with the model, as alert or action indicators for alternative management of groundwater resources in the sub-basin.

Note these objectives were part of the original CA1, Exhibit 3 where the USGS would be the lead investigator. The work was ultimately completed through a competitive process where WSP Golder was selected.

Summary of FY22 Accomplishments

Meetings

- Monthly meetings of the Monitoring and Modeling Committees continued. Further, those monthly meetings frequently included WSP Golder, and the Specialized Technical Consultants (STCs), (i.e., LRE Water and Matrix New World Engineering) to discuss progress-to-date on the various hydrologic conceptual models, and their corresponding draft numerical models.
- From April 2022 through June 2022, and into FY23, meetings increased substantially to discuss questions and concerns about the work products that were being developed by both WSP Golder and the STCs.
    - The Parties prepared a letter dated May 23, 2022, "RE: Draft Report – Big Chino Sub-Basin Groundwater Model Report, Yavapai County, Arizona" It contained contract concerns and the STCs comments.
    - WSP Golder responded to the May 23, 2022, letter suggesting "listening sessions" which were to be led by WSP Golder's Principal, Practice Leader, Dr. Nicole DeNovio. Those occurred June 21,2022, June 24, 2022, and July 8, 2022.
    - From the listening sessions, WSP Golder prepared and submitted to the CA#1 Parties the document, "Responses to Comments and Path Forward, Big Chino Sub-Basin Groundwater Flow Model" dated August 11, 2022.
    - The Parties, with their STCs, reviewed the August 11, 2022, document and two additional meetings were held on August 26, 2022, and August 29, 2022. The Parties then provided concerns related to the "path-forward" in a table format where each WSP Golder Proposed Change was listed and a corresponding column of Short Notes For Discussion (STC recommendations) explained how those proposed changes were viewed.
    - Additional work will extend into FY23
- During this FY, the Parties agreed to schedule a meeting of the CA#1 Principals (City Manager, Town Manager, and SRP Water Rights and Contract Manager); however, due to the concerns related to the model, the Principals' updates and discussion of next steps were postponed until there was agreement on how the modeling project would proceed.

- During this FY SRP's committee representative Greg Kornrumph retired (December 2021) and was replaced by Adam Smith. Prescott Valley's committee representative John Munderloh retired (April 2022) and was replaced by Neil Wadsworth.

Executed Documents or Coordinated Activities

- City Contract No. 2022-154 was executed June 23, 2022. This contract was with SRP for Ephemeral Streamflow monitoring and replaced City Contract No. 2014-001 and its amendments.
- USGS JFA #22ZFJFA00411900 was executed on January 13, 2022. This was a contract with the USGS for the continuation of the Williamson Valley Wash streamflow gage (station number 09502800)
- City of Prescott and Town of Prescott Valley updated contracts with Matrix New World Engineering, and SRP with LRE Water for support on model scenario development and subsequent scenario runs.

Public Information

- City of Prescott website https://www.prescott-az.gov/water-sewer/water-management/big-chino-water-ranch-project/
- Town of Prescott Valley website https://www.prescottvalley-az.gov/241/Big-Chino-Water-Ranch
- SRP website https://www.watershedconnection.com/projects/big-chino.aspx that includes an overview of the CA#1 Monitoring and Modeling program and Flowtography, https://www.watershedconnection.com/projects/flowtography.aspx

Reports Completed

- Big Chino Sub-basin Water Monitoring Project, July 1, 2021 – June 30, 2022 (**Appendix I**)

Financial Summary

In accordance with CA#1, the Parties fund the project with annual contributions to an account managed by the City of Prescott. All monies had been paid into this project as of FY19. It is important to be aware that the municipalities and SRP do not have the same fiscal calendars. It was agreed at the beginning of this project (2011) it would operate on a July 1st to June 30th timeframe. Further, SRP adjusted their contributions to increase their portion of the funding in the earlier years of the project, but their project contribution total was unchanged.

The overall monitoring project account balance and FY22 expenditures as of June 30, 2022, were $911,206.82 and $95,366.20, respectively. Similarly, the overall modeling project account balance and FY22 expenditures as of June 30, 2022, were $101,168.34 and $186.979.50, respectively. It is important to note most remaining CA#1 funds now reside in the monitoring portion of the budget, as the modeling funds have been used, but the modeling budget can be infused with the funds remaining within the monitoring budget. These overall project funds have encumbrances with ongoing contracts, but those encumbrances are not reflected above nor in the values shown in **Table 1**. A detail of expenditures for FY22 only is shown in **Table 1**.

Table 1 – Contract Expenditures in FY22

Contractor Name, Number	Description	Amount
SRP, Contract No. 2022-154[1] (formerly 2014-001, 001A1, and 001A2)	New Stream Gages (Flowtography and weather equipment)	$47,273.95
SRP, Contract No. 2022-154[1] (formerly 2014-001)	Existing Stream Gage (Headwaters)	$0
SRP, Contract No. 2022-154[1] (formerly 2014-001)	Existing Monitor Well (Gipe)	$229.73
USGS, 2014-160A4[2]	Water Levels, Gravity, and SW Gauging (WV)	$47,683.10
ADWR IGA Contract No. 2020-136	Installation of monitoring equipment and data collection	$179.42
	Monitoring Total	**$ 95,366.20**
Golder Associates, Contract No. 2017-246, 246A1, 246A2, and 246A3[3]	Modeling Contract	$186,979.50
	Modeling Total	**$ 186,979.50**
	Combined Total	**$282,345.70**

Note: these expenditures are broken down by the original financial accounts structure that identified costs by the descriptions shown.

1 On June 23, 2022, the City and SRP executed a new agreement that maintained equipment sites that will now become longer-term data collection points. Some equipment will be phased out including the Gipe well that was removed from the monitoring network due to becoming inaccessible.

2 Work was completed under Contract 2014-160A4. On January 13, 2022, the USGS and City entered a new IGA for ongoing operation of the Williamson Valley Wash gauge (station number 09502800) for one-year, October 1, 2022, to September 30, 2023.

3 As a footnote for the future, this contract's work was to be completed by July 15, 2022. During May and June 2022, the Parties and WSP Golder with the STCs were in numerous meetings to address the groundwater model. Dr. Nicole DeNovio, WSP Golder water section principal engaged with the Parties and STCs to address questions and concerns that the Parties had with the model.

The initial timeframe for contributions has expired. As a result of overall project savings, funds are available for ongoing expenses in the near term, subject to the Parties consensus for use. Future contributions may be necessary if additional work is planned and approved by the CA#1 Parties.

Monitoring Project – Equipment

Since the commencement of the project, the Parties and their STCs have worked with ADWR, USGS, Yavapai County Flood Control District, and others to develop a network of monitoring equipment in the Big Chino Sub-basin. This equipment, and the resulting data inventory, supports the development and testing of the groundwater flow model.

No new equipment was installed in FY22. Existing data collection types are listed below, and their basic details are shown in maps, figures, and tables in the appendices.

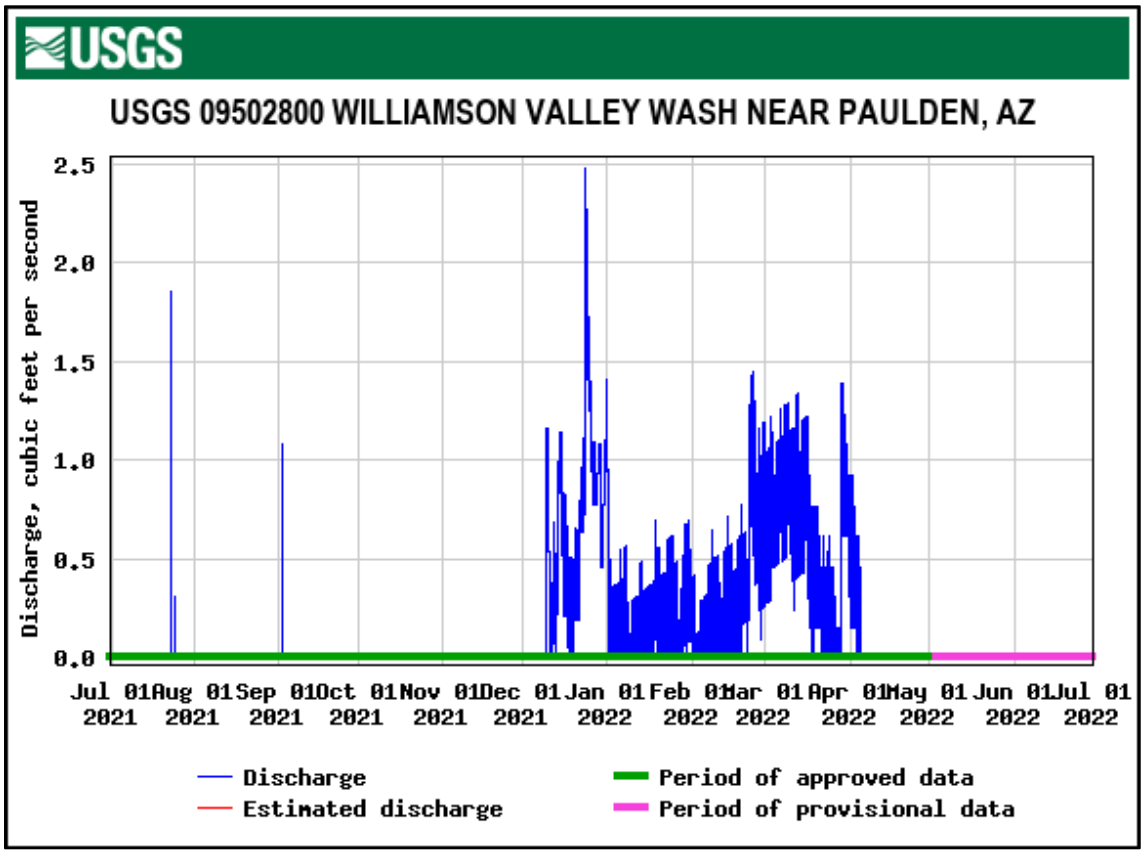
- Streamflow Monitoring – See **Appendix I** for SRP's Big Chino Sub-Basin Water Monitoring Project, July 1, 2021 – June 30, 2022, Annual Report for CA1 Monitoring Committee. Additional references are made to this report's equipment in **Appendices II and III, Figures 4-6**.
- Groundwater Level Monitoring – See **Appendix II** for tabular information and **Appendix III, Figures 1-3** for figures showing location and basic data
- Weather Monitoring – See **Appendix II** for tabular information and **Appendix III, Figures 7-8** for figures showing locations and basic data
- Crop Survey and Estimated Crop Water Use – See **Appendix III, Figures 9-1 to 9-5**.

Monitoring Project – Analytical Results and Data Collected

The results of data collection and data interpretation efforts are provided in separate reports and databases produced and managed by each responsible agency, as detailed below. One of the duties of the CA#1 Monitoring Committee is to coordinate and monitor these data collection and reporting efforts to produce results that are useful for the groundwater modeling and monitoring purposes outlined in CA#1. A brief explanation of active contracts or in-kind efforts are documented below.

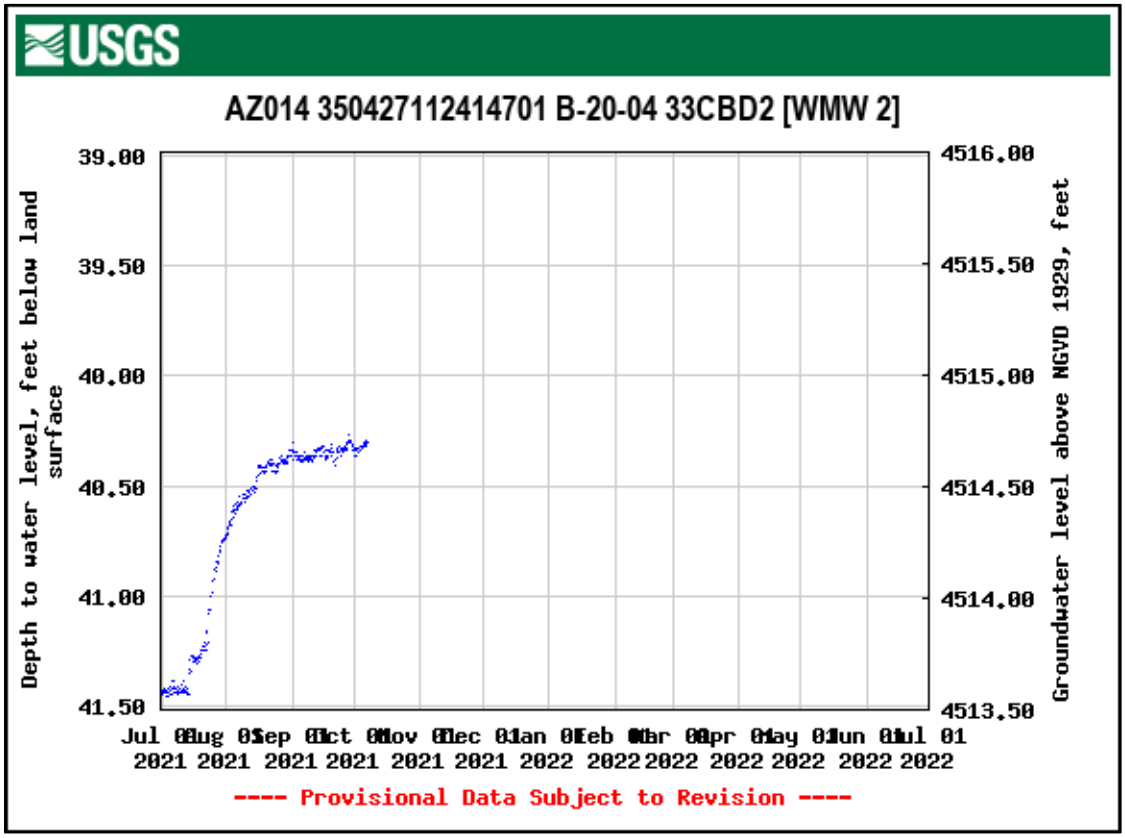
<u>Groundwater Monitoring</u> – Groundwater level monitoring efforts continued to be completed both under contract with the CA#1 program (USGS Contract No. 2014-160A4 – yet ended 7/30/2021, and ADWR IGA Contract No. 2020-136 which remains in effect), and through traditional water level monitoring efforts (index lines and basin sweeps) by the Arizona Department of Water Resources.

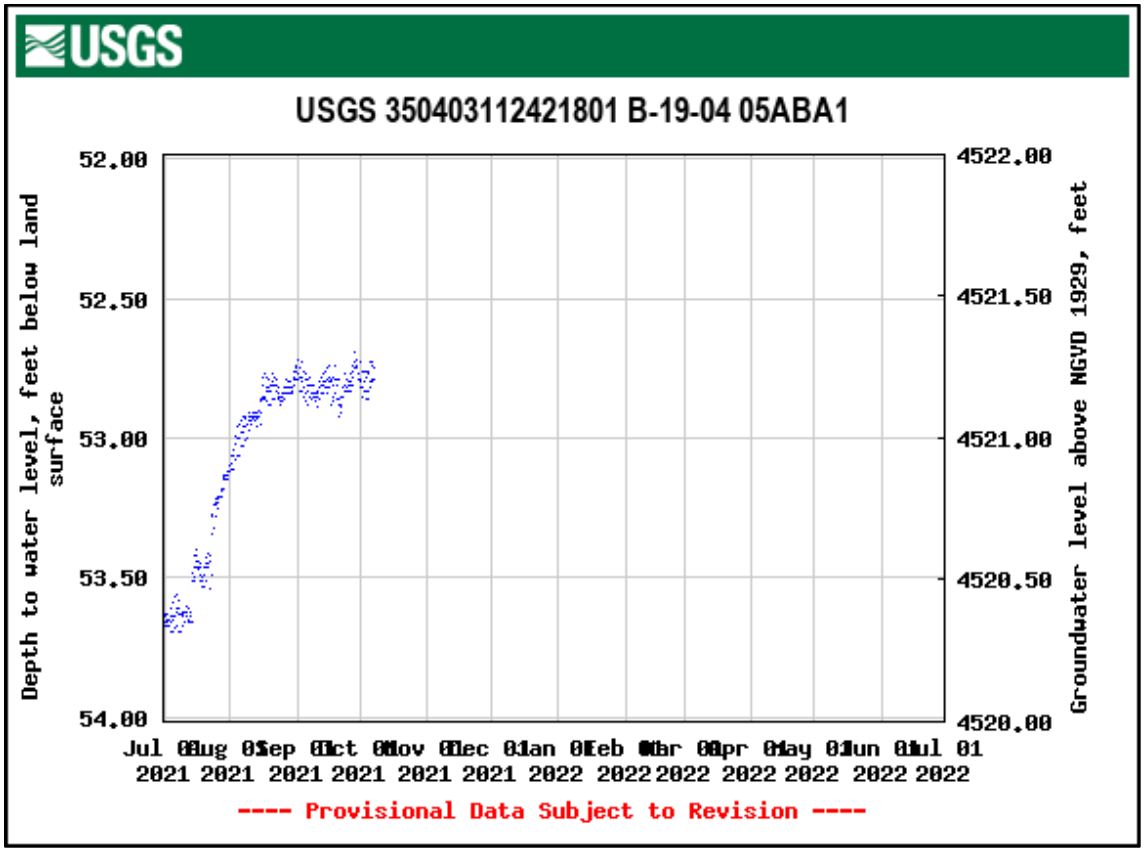
- Efforts by USGS: From July 1, 2021, through June 30, 2022, the U.S. Geological Survey operated one stream gaging station on Williamson Valley Wash near Paulden, AZ (JFA renewed) and three continuous groundwater-level monitoring stations (contract ended 7/30/2021). Data for the Williamson Valley Wash near Paulden, AZ gauge is shown in the chart below.



The three monitoring wells are located on the Big Chino Water Ranch (USGS stations 350232112404901(WMW-3), 350427112414701 (WMW-2), 350403112421801 (TW-1/55-905230). These wells will be measured in the future by ADWR. Their USGS hydrographs for this FY are shown below.


USGS
AZ014 350232112404901 B-19-04 10CCB2 [WMW 3]
Depth to water level, feet below land surface
10.00
10.50
11.00
11.50
12.00
12.50
Groundwater level above NGVD 1929, feet
4521.00
4520.50
4520.00
4519.50
4519.00
4518.50
Jul 01 2021
Sep 01 2021
Nov 01 2021
Jan 01 2022
Mar 01 2022
May 01 2022
Jul 01 2022
---- Provisional Data Subject to Revision ----


USGS
AZ014 350427112414701 B-20-04 33CBD2 [WMW 2]
Depth to water level, feet below land surface
39.00
39.50
40.00
40.50
41.00
41.50
Groundwater level above NGVD 1929, feet
4516.00
4515.50
4515.00
4514.50
4514.00
4513.50
Jul 01 2021
Aug 01 2021
Sep 01 2021
Oct 01 2021
Nov 01 2021
Dec 01 2021
Jan 01 2022
Feb 01 2022
Mar 01 2022
Apr 01 2022
May 01 2022
Jun 01 2022
Jul 01 2022
---- Provisional Data Subject to Revision ----



- Efforts by ADWR

  The State routinely collects water levels in the project area as part of their Basic Data program on an annual basis at select wells (Index lines) and basin-wide sweeps that are generally scheduled every five (5) years. The last "sweep" of the Big Chino Sub-basin occurred during February through May 2022. The Parties entered an IGA with ADWR (City Contract No. 2020-136) for well monitoring assistance at the new monitor wells that were drilled as part of CA#1 (generally identified with "MW-4b to 4g").

Streamflow Monitoring - efforts in the Big Chino Sub-basin are conducted by SRP Aquifer Management and Data Analytics, and USGS under contract with the CA#1 project. The USGS also maintains other stream gauges in the area, but those efforts are outside of the CA#1 contract. Further, flow stage data is collected by Yavapai County Flood Control District (YCFCD) for their flood warning purposes, and several new locations were installed that were deemed beneficial to both YCFCD and CA#1 needs. The Parties appreciated that YCFCD assumed the cost of these gauges.

- Efforts by SRP

  SRP Aquifer Management and Data Analytics collects streamflow data and other information at ten (10) locations in the Big Chino Sub-basin under the previously noted

contract with the Parties. During July 2021-June 2022, flows were observed at all locations. The complete FY22 report is attached as **Appendix I**. The annual hydrographs are in **Appendix III, Figures 4-6**.

- Efforts by USGS
  The USGS operates several stream gauges in the Big Sub-basin. The Williamson Valley Wash near Paulden, AZ gauge (station number 09502800) is funded through the CA#1 program, and the Verde River near Paulden, AZ gauge (station number 09503700) is funded through a separate program with SRP, the USFS, and the USGS. In 2017, USGS installed the Big Chino Wash at Paulden, AZ gauge (station number 09502830) which is entirely funded by the USGS. Streamflow records for these sites are maintained by the USGS in their online database, https://waterdata.usgs.gov/az/nwis/current/?type=flow

  Site locations for the first two gauges are shown on **Appendix III, Figure 4**.

- Efforts by YCFCD
  YCFCD collects flow stage data at four (4) locations in the Big Chino Sub-basin: Ashfork Draw at I-40 (ID 3868), Partridge Creek at I-40 (ID 3873), Big Chino Wash at Highway 89 (ID 3828), and Walnut Creek at Walnut Creek Bridge (ID not available). The CA#1 Committee and SRP Aquifer Management and Data Analytics evaluated these sites for their usefulness in converting flood stage data into streamflow records. Of the listed sites only the Walnut Creek Bridge stage data has been used for calculating streamflow. In FY22, the Walnut Creek site had significant channel alterations which will require the radar sensor to be relocated to a new location on the bridge (personal communication with M. Massis on 9/15/2022).

Climate and Weather Monitoring – The CA#1 Parties reference other agencies that collect and make climate assessments. Those are listed in **Appendix II, Climate Monitoring, Publicly Accessible Repositories for Climate Data**. Efforts to track specific weather stations, both installed with CA#1 funds or in partnerships with other agencies, are listed in **Appendix II, Climate Monitoring, Existing Weather Stations in the Big Chino Sub-basin**. These weather stations are also shown in **Appendix III, Figures 7-8**. During FY22 the accumulated precipitation in the CA#1 study area ranged from approximately 8 inches to 24 inches.

Crop Surveys and Estimated Crop Water Use – The USGS and ADWR have had a longstanding contract to conduct crop surveys in what ADWR determines to be critical basins for observation. The Big Chino Sub-basin is not a location that is monitored every year. As such, the USGS, in contract with SRP, conducts crop surveys in the Big Chino Sub-basin. The results for 2021 are shown in **Table 2** and illustrated in **Appendix III, Figures 9-1 through 9-5**. Each year the CA1

Parties seek the compiled data for inclusion in their annual report. The basic conclusions that can be drawn from 2021 data include:

- Approximately 30% of the irrigable lands that were surveyed were being irrigated in 2021 (1,004 acres cropped).
- Approximately 1,768 acre-feet was calculated based on consumptive use to irrigate this year's cropping pattern.
- Approximately 1.8 acre-feet was used per crop acre.

Table 2 – 2021 Crop Survey (Acres Irrigated)

Crops	Upper Big Chino	Paulden	Walnut Creek	Williamson	Turkey Canyon	Total
ALFALFA	0	0	19	14	9	42
GRASS	0	55	12	470	0	537
GRAIN	0	0	0	16	0	16
PASTURE	0	0	71	235	0	306
SOD	0	61	0	0	0	61
VEGETABLE	0	42	0	0	0	42
Total Crop Acres	**0**	**158**	**102**	**735**	**9**	**1004**
No Crop Evident	**1169**	**343**	**149**	**583**	**91**	**2335**
Calculated Consumptive Use (acre-feet)	**0**	**254**	**151**	**1322**	**41**	**1768**

Modeling Project

Groundwater flow modeling was identified in Exhibit 5 of the CA#1 contract to be an intensive 3-year, $1.2 M effort to develop a defensible computerized groundwater flow model of the Big Chino Sub-basin. In early 2017, the City Contract No. 2017-246 with WSP Golder was executed.

The contract and its amendments are listed in **Table 3**. Original cost estimates were generated based on 2007 costs which remained in place when the CA#1 contract was executed in 2012, and increased costs have been addressed in subsequent contract amendments, which are also shown in **Table 3**. Other conditions for the amendments include greater than expected volume of data sets, extended completion dates for monitoring contracts, increased review, increased coordination between WSP Golder and the STCs, and challenges related to attempting to develop and test three (3) conceptual models.

Table 3 – Contracts and Associated Costs of the CA1 Project

Contract No.	Date Executed	Amount	Completion Date
2017-246	2/28/2017	$1,149,300.00	3/31/2020
2017-246A1	12/5/2019	$277,460.00	12/31/2020
2017-246A2	1/5/2021	$0	9/22/2021
2017-246A3	7/1/2021	$241,959.00	7/15/2022
2017-246A4	7/20/2021	$0	8/30/2022
2017-246A5	9/8/2022	$0	4/30/2023
Final Cost		**$1,668,719.00**	**Anticipated FY23**

During the last two months of FY 2022 (May and June), the Parties, STCs and WSP Golder were engaged in an ongoing conversation about how the three conceptual numerical models fit with observations in the Big Chino Sub-basin and Upper Verde headwaters area. Comments were provided by the Parties and STCs on May 23, 2022. Golder followed up with listening sessions that were facilitated by Dr. Nicole DeNovio (Water Principal, Practice Leader) during which the Parties and STCs clarified their initial comments on the model and report draft. Dr. DeNovio spent the time discussing comments and sharing ideas on how to better address the STCs' comments on the numerical model.

It is important to note that these listening sessions occurred late in FY22 and early in FY23, as it was initially expected by all Parties that the modeling would have been completed near the end of FY22 (July 15, 2022). However, as of the date of this report, the contract was in the process of being amended for a fourth time and the completion date was to be extended. There is an anticipated modeling project end date of fall 2023. Details will be formalized in contract amendment 6 when WSP Golder provides their updated proposal, and it is accepted and formalized through a City Contract Allowance Authorization.

Conclusions

Activities for the FY22 project year continued to focus on development of the groundwater flow model, and the newly amended timeline for completion of the Big Chino Sub-Basin model is the end of FY23. The reasons for this extension centered around the STC's concerns about the groundwater models as drafted in June 2022. As of the date of this annual report, the contract with WSP Golder has just been extended (City Contract No. 2017-246A5) to April 30, 2023, as informed by WSP Golder's August 11, 2022, Responses to Comments and Path Forward

document. Parts of this contract continued to be under negotiation as of the date of this annual report.

New and continuing monitoring aspects of this project will be revisited in the coming fiscal year. All monitoring contracts are in order and operating as planned as of the date of this report.

The project's financial position remains strong and cost savings measures continue to be assessed and taken when possible. Communication among the Parties, with their STCs, and with the relevant, contracted agencies (e.g., ADWR, USGS, etc.) will continue as planned or as needs arise.

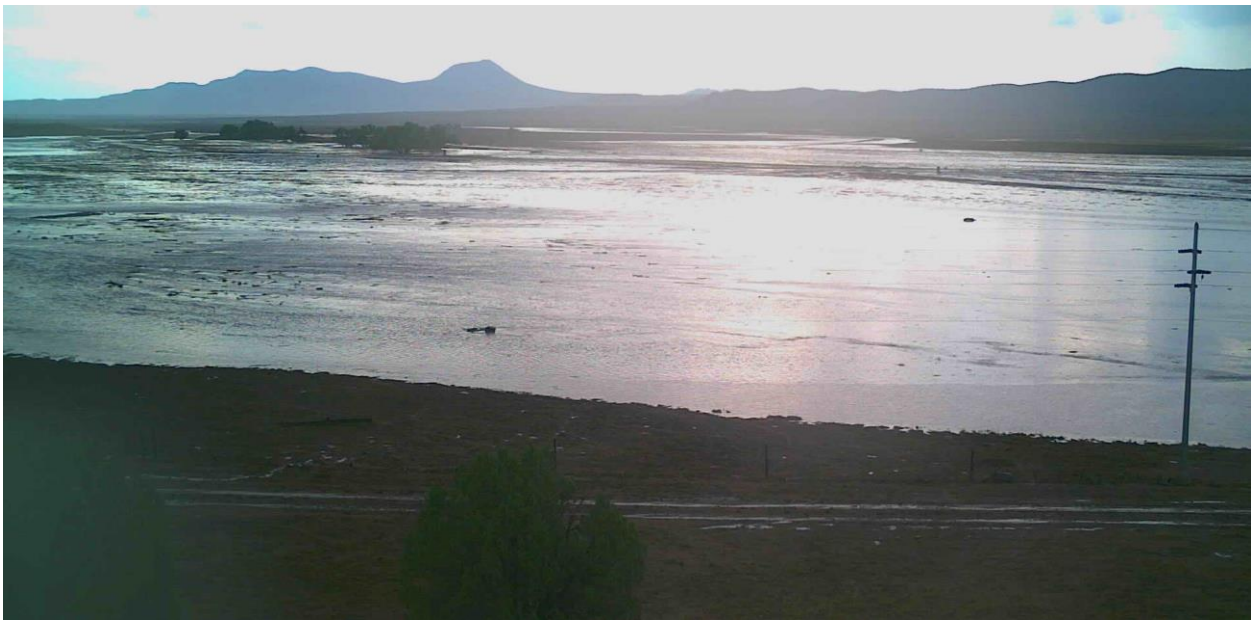
Future work includes finalization of the amended WSP Golder contract, and the other existing contracts noted in this document. As the model comes to completion, the Parties will begin planning for model scenario development and execution. The Parties technical representatives plan to reestablish a timetable and the documents for presentation to the CA#1 Principals.

APPENDIX I

Big Chino Sub-Basin Water Monitoring Project,

July 1, 2021 – June 30, 2022

Annual Report



BIG CHINO SUB-BASIN WATER MONITORING PROJECT

July 1, 2021 – June 30, 2022 Annual Report for CA1 Monitoring Committee

Prepared by SRP Aquifer Management and Data Analytics

September 1, 2022

CONTENTS

INTRODUCTION

This report has been developed for the CA1 Monitoring Committee as part of the Big Chino Sub-Basin Water Monitoring Project (City Contract No. 2022-154, A1, and A2) in collaboration with the City of Prescott, Town of Prescott Valley, and Salt River Project (SRP).

A summary of flow events observed during the 2022 monitoring period (July 1, 2021, through June 30, 2022) are contained within this report.

SEASONAL FLOW SUMMARY

For this report, the 2022 annual reporting period refers to July 1, 2021, through June 30, 2022.

Surface water flow was observed at each SRP Flowtography® site during the 2022 annual reporting period. The flow event start date, an estimate of the magnitude of the flow, and the locations where surface water flow was observed are shown in Table 1 and Figure 1.

Overview of the estimated flow observed in the sub-basin during the 2022 reporting period:

- Flow was observed at all sites within the Sub-basin
- There were ten (10) flow events, the most at any site, at Upper Big Chino Wash. Pine Creek was next with nine (9) flow events (see Table 1, Footnote 6).
- The site with the fewest observed flow events was Williamson Valley Wash at XU Ranch, with two (2) observable flow events.
- Two sites experienced flow larger than their rating, Upper Big Chino Wash and Lower Big Chino Wash.
    - Two (2) flow events at Lower Big Chino Wash exceeded its rating.
    - Two (2) flow events at Upper Big Chino Wash exceeded its rating.
- The highest flow event occurred at Upper Big Chino Wash on July 21, 2022, with an estimated flow volume of 856 AF.
- Upper Big Chino Wash is also the site that had the largest total estimated flow volume for the reporting period at 1,123 AF.
- Lower Walnut Creek at Charney Property is the site that had the least total estimated flow volume for the reporting period at 5 AF.

Table 1. Big Chino Sub-basin July 1, 2021 - June 30, 2022, Flow Event Summaries Including the Estimated Total Acre-Feet (AF)

Start Date[1]	Upper Big Chino Wash (UBCW)	Big Chino Wash below Partridge Creek (BCWPC)[2]	Partridge Creek[3]	Pine Creek (PC)	Upper Walnut Creek at Bridge (UWCB)[4]	Lower Walnut Creek at Charney Property (LWCCP)	Williamson Valley Wash at XU Ranch (WVWXU)	Lower Williamson Valley Wash (LWVW)	Lower Big Chino Wash (LBCW)	Sullivan Dam (SD)[5]
7/8/2021	1									
7/10/2021						< 1				
7/13/2021		150	150							
7/14/2021	158					< 1				
7/15/2021									187	Yes
7/16/2021	21					2				Yes
7/20/2021				25						
7/21/2021	861[6]			61						
7/22/2021				14					325	Yes
7/23/2021				2		< 1				Yes
7/24/2021				4		3	< 1			Yes
7/25/2021	9									Yes
7/26/2021	62									Yes
7/30/2021	< 1									
8/1/2021	< 1									
8/2/2021									70	Yes
8/10/2021				2				5	308	Yes
8/11/2021								9		Yes
8/12/2021							18	2		Yes
8/15/2021				3						Yes
8/31/2021					Yes			2		
9/2/2021				1						
10/11/2021					Yes	< 1				
6/29/2022	11			3						
TOTAL AF	**1,123**	**150**	**150**	**115**	**0**	**5**	**18**	**18**	**890**	**0**

[1] Flow events may start just prior to date indicated or continue into the following day.

[2] UBCW flows may be included in these numbers as the BCWPC gauge is located 1.2 miles downstream. Also note that the camera and event gauge failed after the 7/13/2021 flow event after flows from the 7/14/2021 flow event at UBCW made their way downstream.

[3] These flows were derived by subtracting the UBCW contribution from the flows at BCWPC. These are estimated flows, as there is no monitoring equipment located directly on the Partridge Creek channel itself.

[4] If 'Yes' is noted, increased flow was observed in the channel.

[5] Sullivan Dam spill crest is not rated for discharge measurement estimates. If 'Yes' is noted, spill was observed over the crest of the dam.

[6] This flow estimate includes flow for two separate flow events that occurred on the same day.

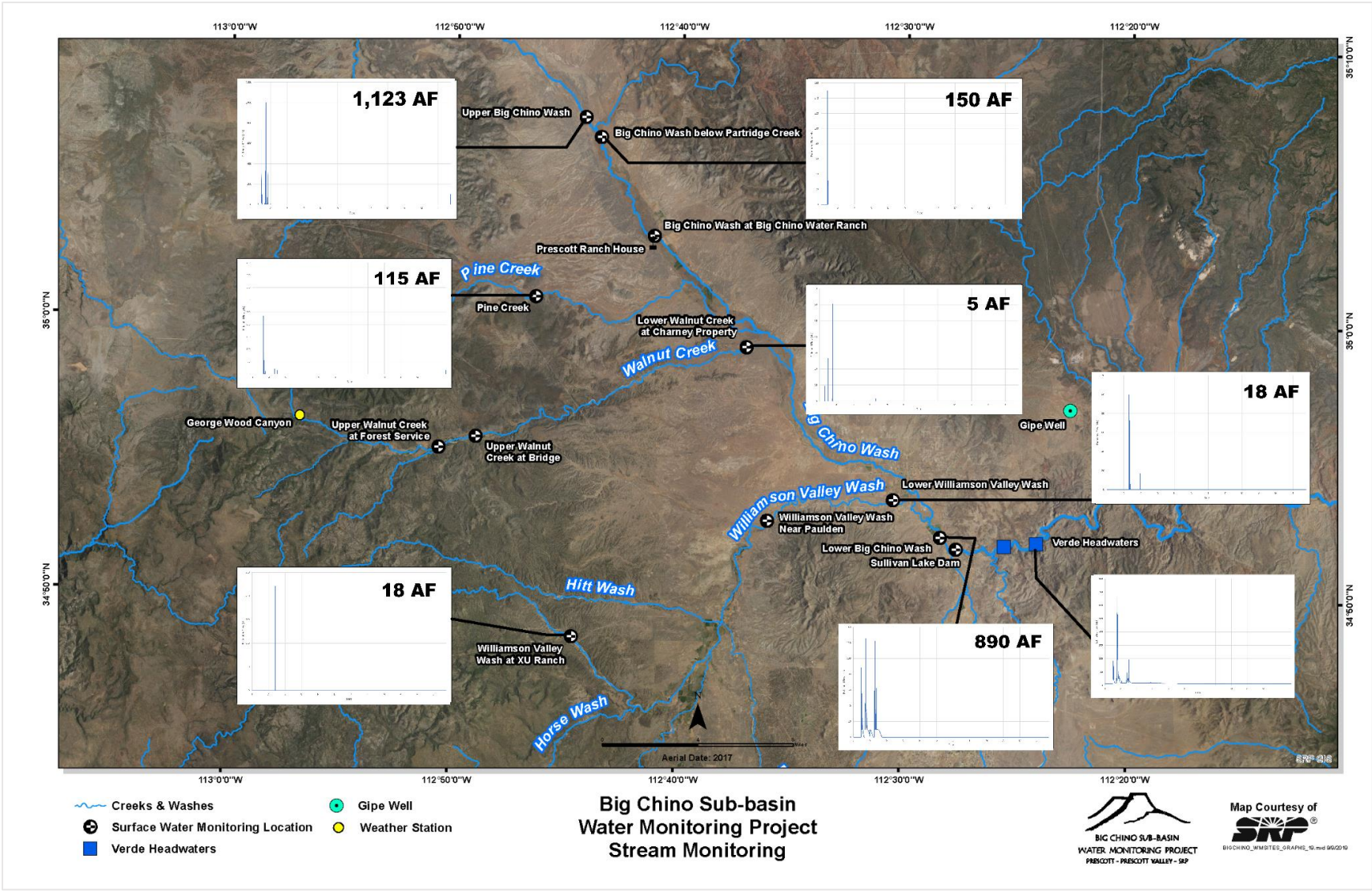


Figure 1. Big Chino Sub-Basin Map

LOCATION SUMMARIES

UPPER BIG CHINO WASH (UBCW)

Ten (10) events with measurable flow were observed at UBCW during the 2022 annual monitoring period. The flow event starting on 7/21/2021 was the longest lasting at 75.25 hours, had the peak discharge of an estimated 1,076 cubic feet per second (cfs) all flow events observed during the 2022 reporting period at all sites, and exceeded the channel rating. The volume of flow for that single event is estimated at 856 AF, 76% of the total flow observed at the site for the reporting period. Flow event data including duration and estimated flow volume for the annual reporting period are outlined in Table 2 and Figures 2-4.

Table 2. UBCW July 1, 2021 - June 30, 2022, Flow Events

Start Date	Start Time[7]	Duration (hours)[8]	Peak Stage (feet)	Peak Discharge (cfs)[9]	Total Volume (AF)
7/8/2021	5:00	33.50	0.62	9	1
7/14/2021	13:30	39.5	6	743*	158
7/16/2021	15:00	15.25	1.5	100	21
7/21/2021	0:00	14.5	0.7	13	5
7/21/2021	19:00	75.25	7	1076*	856
7/25/2021	21:00	15	1.3	68	9
7/26/2021	20:00	17.75	3	532	62
7/30/2021	12:00	7.75	0.5	5	< 1
8/1/2021	9:00	10	0.5	483	< 1
6/29/2022	19:00	14.5	1.5	100	11
Total		243.00			1123

The UBCW was visited a total of four (4) times during the 2022 reporting period. In addition to routine quarterly maintenance and data collection, the following adjustments were made at the site:

- Straightened event gage. Due to the sediment transported during flow events and occasional bovine activity near the gage
- Replaced both site batteries.
- Added a post style event gage for redundancy.

[7] Start times are approximate and actual start time are within ±15 minutes of the noted time. Events may also continue into the following day(s).
[8] Flow event duration is based on discharge calculated using the existing rating.
[9] Where there is an *, the flow exceeded the rating for the channel.

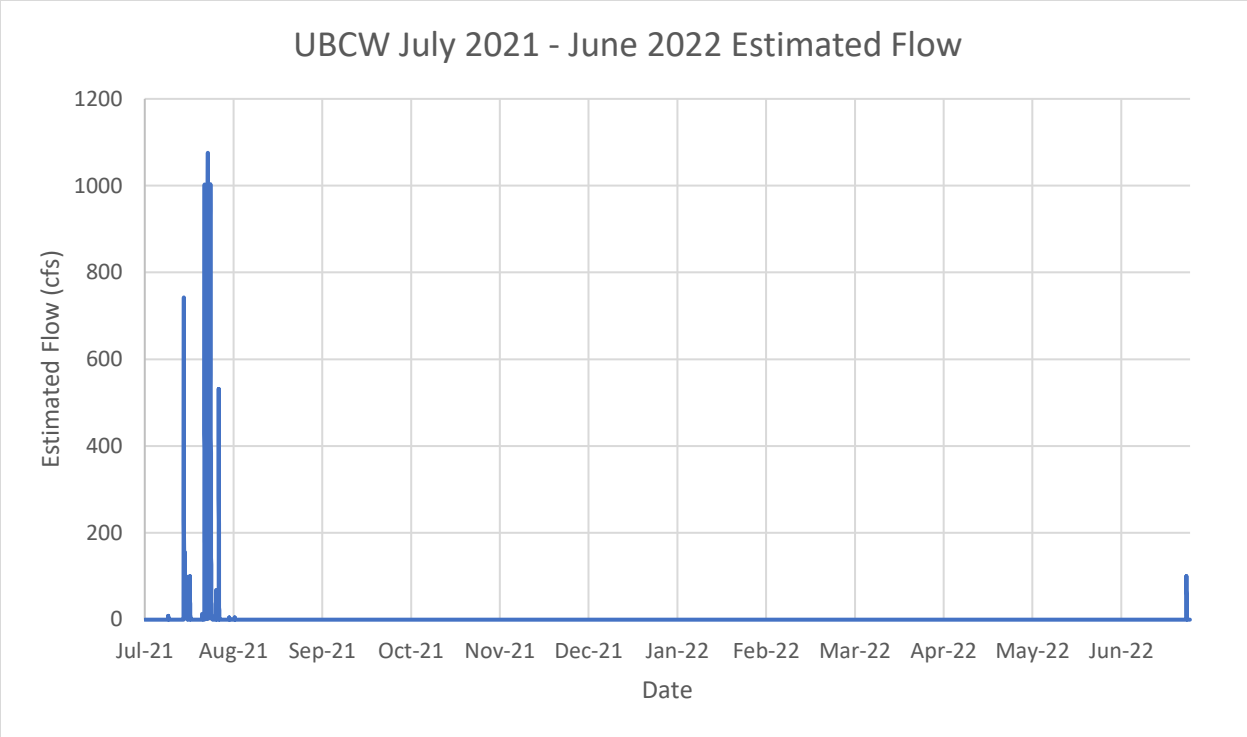


Figure 2. UBCW July 1, 2021 - June 30, 2022 Annual Flow Events

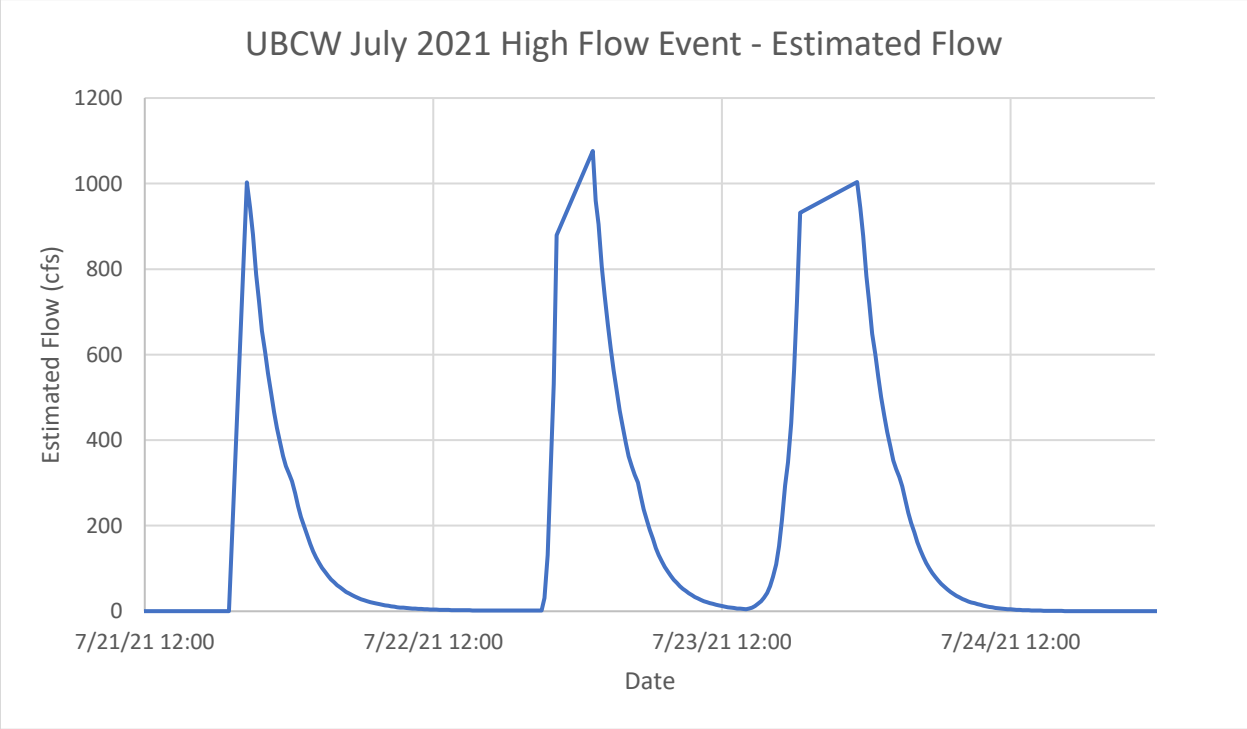


Figure 3. UBCW July 2021 High Flow Event

UBCW at the start of the 2022 reporting period.

UBCW at the end of the 2022 reporting period.

UBCW at the peak of the July 21, 2021, Flow Event.

Figure 4. UBCW Image Data

BIG CHINO WASH BELOW PARTRIDGE CREEK (BCWPC)

One (1) event with measurable flow was observed at BCWPC during the 2022 annual monitoring period. On July 14, 2021, a flow event damaged the in-stream event gage and pressure transducer and out of stream camera. Data for the site is unavailable for the remainder of the reporting period. Once Contract No. 2022-154 was executed, this site was transitioned to a camera only site on April 20, 2022. Flow event data including duration and estimated flow volume for the annual reporting period are outlined in Table 3 and Figures 5-7.

Table 3. BCWPC July 1, 2021 - June 30, 2022, Flow Events

Start Date	Start Time[10]	Duration (hours)[11]	Peak Stage (feet)	Peak Discharge (cfs)[12]	Total Volume (AF)
7/13/2021	1:45	35	4.01	150*	150
6/29/2022	19:30	28.5	n/a	n/a	n/a
Total		66.5			150

The BCWPC was visited a total of four (4) times during the 2022 reporting period. In addition to routine quarterly maintenance and data collection, the following adjustments were made at the site:

- Replaced damaged camera with new assembly
- Removed event gage and transducers and returned site to normal conditions

[10] Start times are approximate and actual start time are within ±15 minutes of the noted time. Events may also continue into the following day(s).
[11] Flow event duration is based on discharge calculated using the existing rating.
[12] Where there is an *, flow exceeded the rating for the channel.

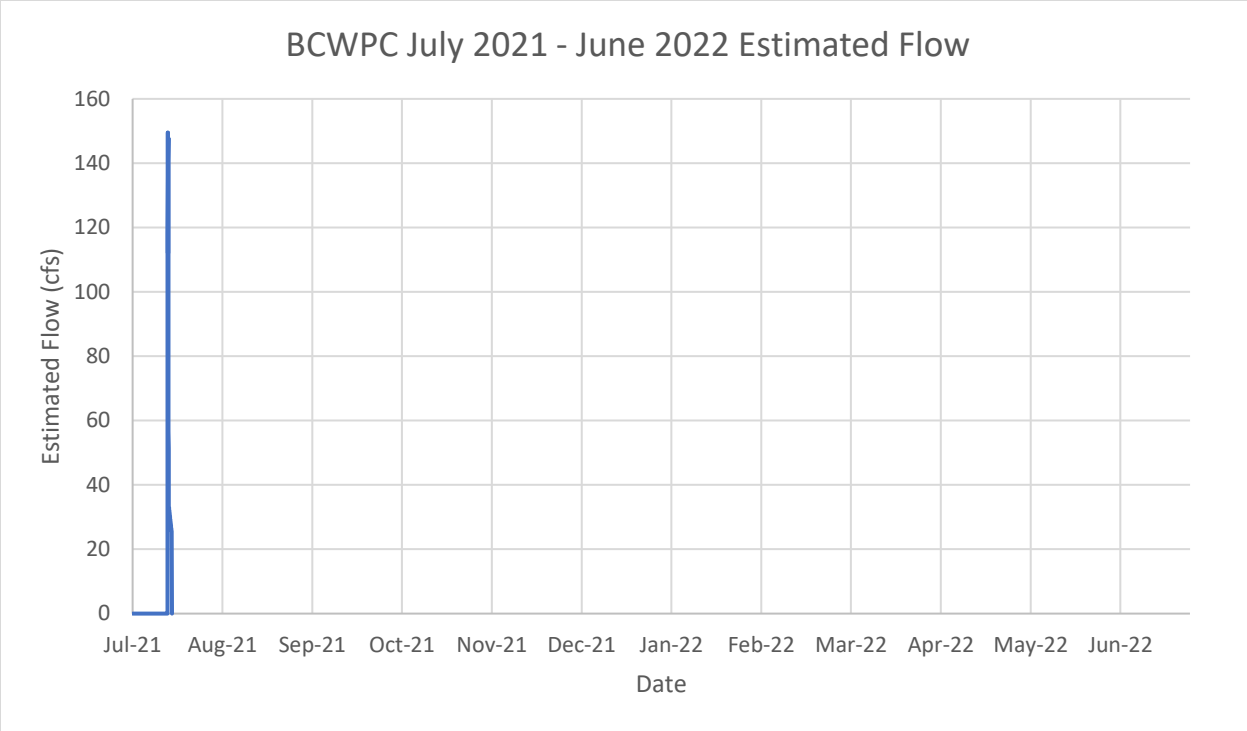


Figure 5. BCWPC July 1, 2021 - June 30, 2022, Annual Flow Events

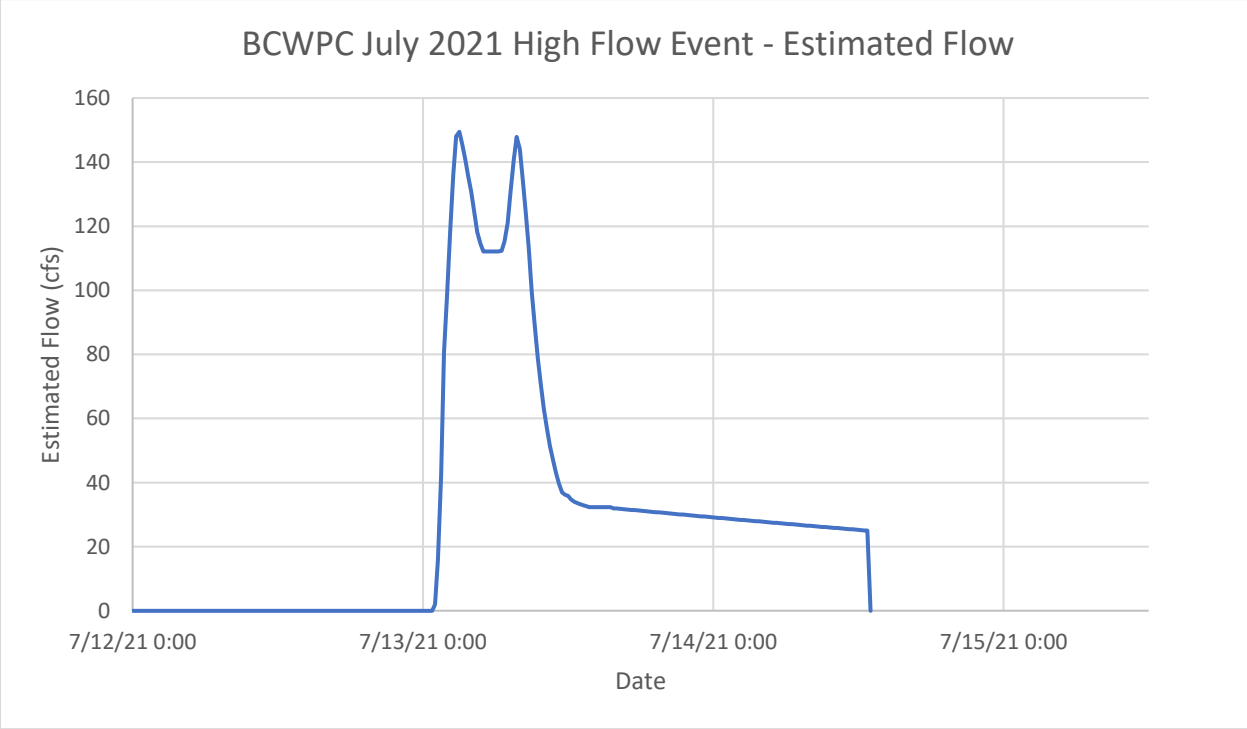


Figure 6. BCWPC July 2021 High Flow Event

BCWPC at the start of the reporting period

BCWPC at the end of the reporting period.

Last image of the July 14, 2021 Flow Event

BCWPC at the start of the June 29, 2022 Flow Event

Figure 7. BCWPC Image Data

BIG CHINO WATER RANCH (BCWR)

Precipitation was observed in the images at BCWR on six (6) days during the 2021 annual monitoring period. Due to a camera malfunction, images between the middle of October and beginning of March were corrupted. Snow accumulation was visible on two (2) of those days. None of the observed events resulted in water pooling at the surface. Snow accumulation was observed on one (1) day in the reporting period, February 23, 2022. BCWR site images for the annual reporting period can be seen in Figure 8 below.

The BCWR location was visited a total of four (4) times during the 2022 annual reporting period. All site visits were for routine maintenance and image data collection.

BCWR at the start of the 2022 reporting period.

BCWR at the end of the 2022 reporting period.

BCWR Flooding on July 14, 2021

BCWR Flooding on July 23, 2021

BCWR Start of Greenup on July 30, 2021

BCWR Greenup in August 2021

BCWR Snow Accumulation on February 23, 2022

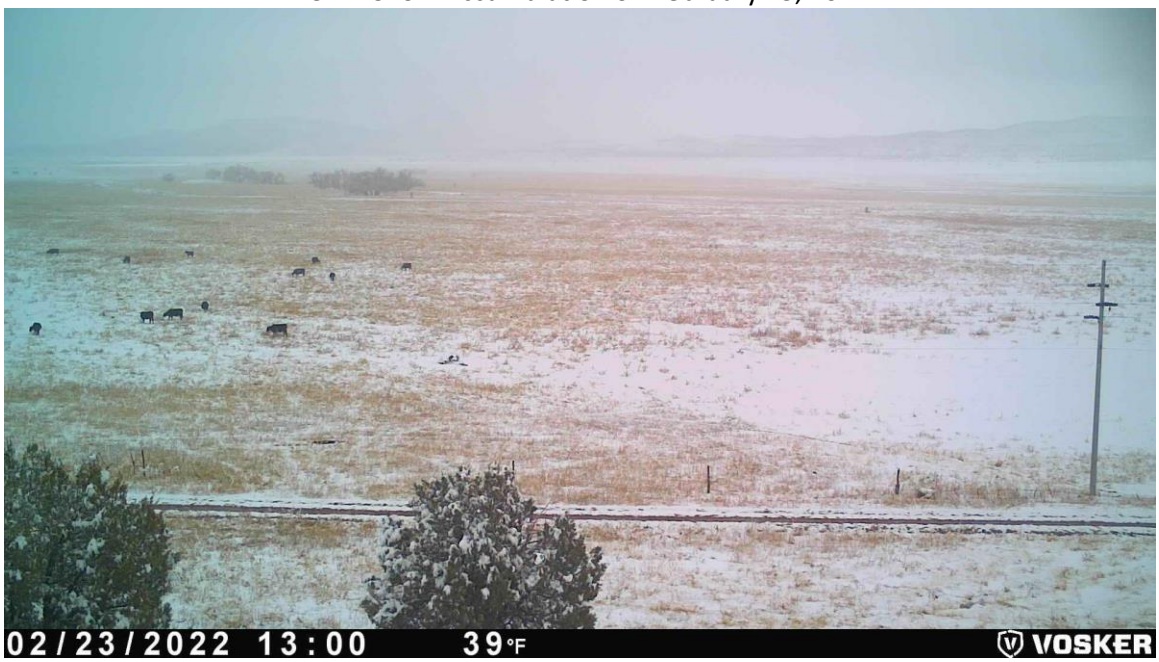


Figure 8. BCWR Image Data

PINE CREEK (PC)

Nine (9) events with measurable flow were observed at PC during the annual monitoring period. The flow event on July 21, 2021 was the longest lasting at 12.5 hours, had the peak discharge of 414 cfs, and highest total estimated flow volume, 61 AF, of all flow events observed at the site. The total estimated flow volume for that single flow event represented 53% of the total flow volume at PC for the reporting period. Flow event data including duration and estimated flow volume for the annual reporting period are outlined in Table 4 and Figures 9-11.

Table 4. PC July 1, 2021 – June 30, 2022Flow Events

Start Date	Start Time[13]	Duration (hours)[14]	Peak Stage (feet)	Peak Discharge (cfs)	Total Volume (AF)
7/20/2021	14:30	9.50	2	235	25
7/21/2021	14:30	12.50	3	414	61
7/22/2021	15:30	11.00	1	56	14
7/23/2021	18:30	6.25	0.5	15	2
7/24/2021	19:30	9.00	0.45	12	4
8/10/2021	16:30	6.5	0.6	21	2
8/15/2021	23:30	12	0.5	15	3
9/2/2021	21:30	3.75	0.4	10	1
6/29/2021	19:30	5.75	0.5	15	3
Total		76.25			115.00

The PC was visited a total of four (4) times during the 2022 reporting period. All site visits to the site were for routine maintenance and data collection.

[13] Start times are approximate and actual start times are within ±15 minutes of the noted time. Events may also continue into the following day(s).

[14] Flow event duration is based on discharge calculated using the existing rating.

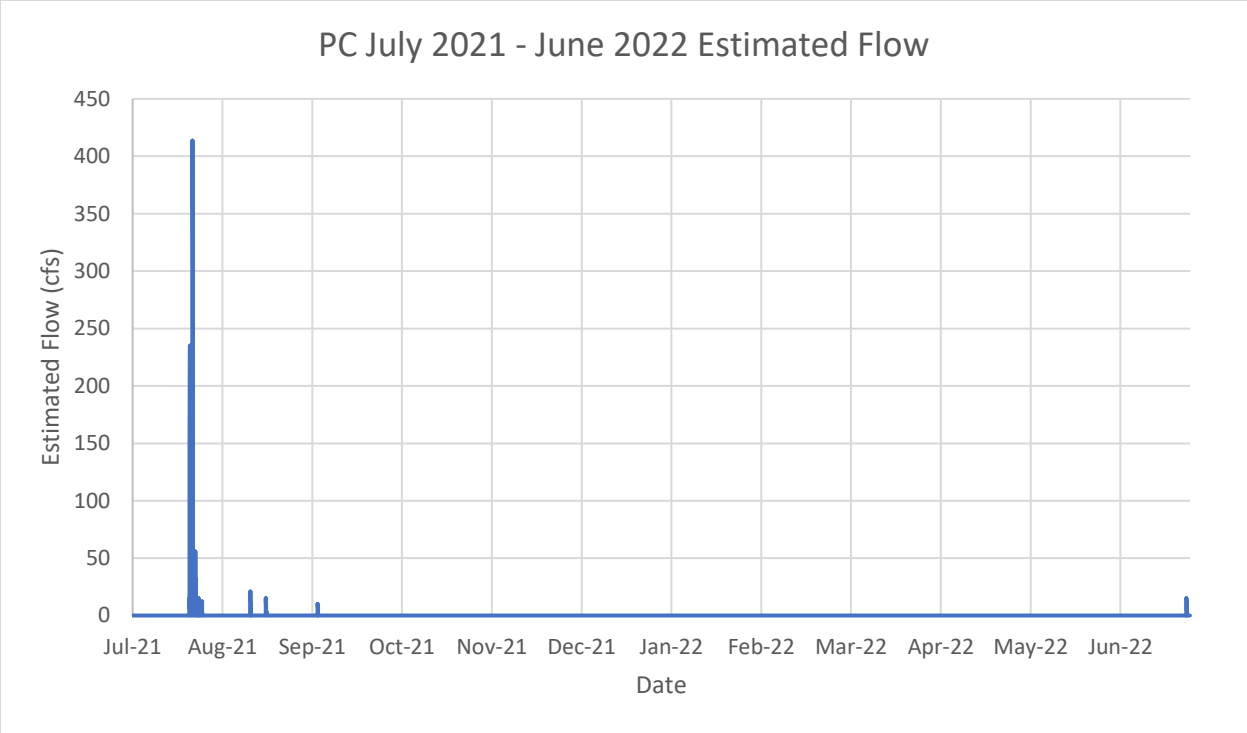


Figure 9. PC July 1, 2021 - June 30, 2022 Annual Flow Events

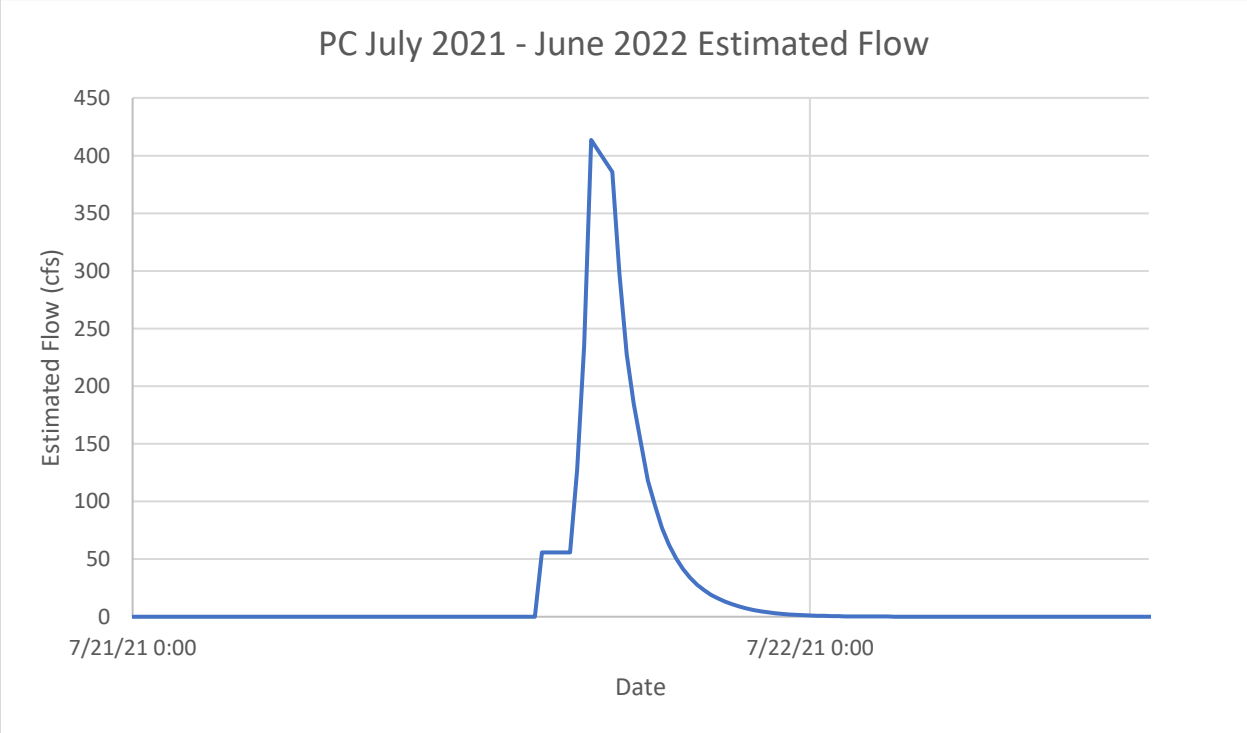


Figure 10. PC July 2021 High Flow Event

PC at the start of the 2022 reporting period.

PC at the end of the 2022 reporting period.

PC at the peak of the July 2021 High Flow Event

Figure 11. PC Image Data

GEORGE WOOD CANYON (GWC)

The GWC weather station collected precipitation, barometric pressure, air temperature, wind direction, peak gust, relative humidity, wind speed, and SRP Snowtography™ images of snow depth during the 2022 annual reporting period. Per the request of the CA#1 Monitoring Committee, the GWC site was removed on the last site visit June 7, 2022, and the site was returned to normal conditions.

Seven (7) snow accumulation events were observed during the 2022 reporting period. Only one (1) event exceeded 0.1' of snow accumulation (see Table 5). The longest lasting event started on February 23, 2022, with snow visible for less than 3 days and a peak depth of approximately 0.6 feet.

GWC Snow accumulation and weather station data for the 2022 reporting period are outlined in Table 5 and Figures 12-20 Some observations made during the reporting period:

- 23.36" of precipitation was observed during the 2022 reporting period. (Compare this to 8.51" for the previous year)

Table 5. GWC July 2021 - June 2022 Snow Accumulation Events

Start Date	End Date[15]	Snow Visible	Peak Snow Depth
12/15/2021	12/15/2021	<1 day	<0.1 feet
12/28/2021	12/29/2021	<2 day	<0.1 feet
1/22/2022	1/22/2022	<1 day	<0.1 feet
2/16/2022	2/16/2022	<1 day	<0.1 feet
2/23/2022	2/25/2022	< 3 days	0.6 feet
3/5/2022	3/6/2022	<1 day	0.1 feet
3/10/2022	3/11/2022	<1 day	0.1 feet
Totals		**< 10 days**	**< 1.0 feet**

The GWC was visited a total of four (4) times during the 2022 reporting period. All site visits to the site were for routine maintenance and data collection except the last visit on June 7, 2022, which was to complete the removal of all site equipment in accordance with Contract No. 2022-154.

[15] Snow may be visible in shaded areas after this date.

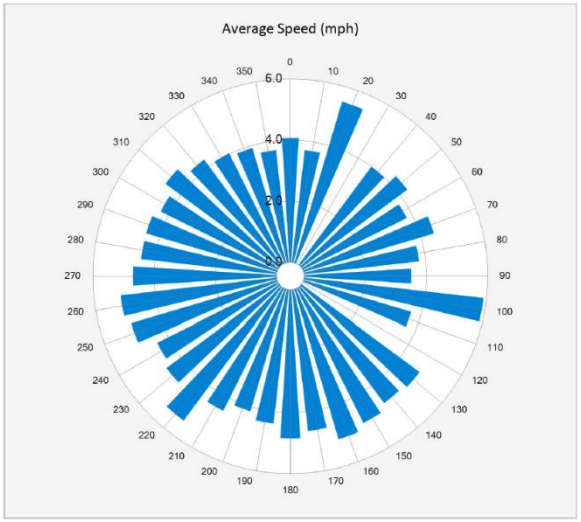


Figure 12. GWC Average Speed Wind Rose

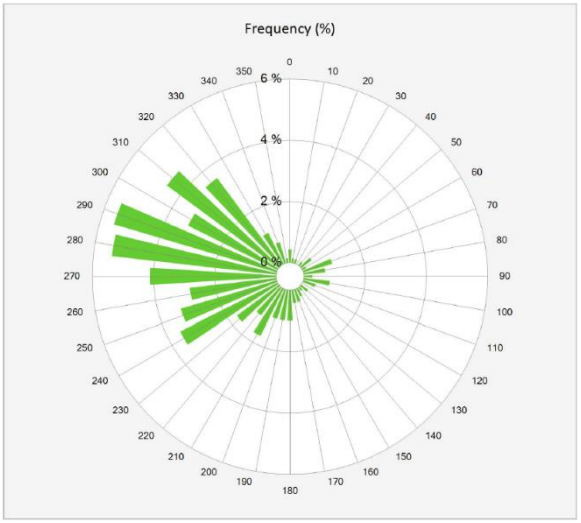


Figure 13. GWC Frequency Wind Rose

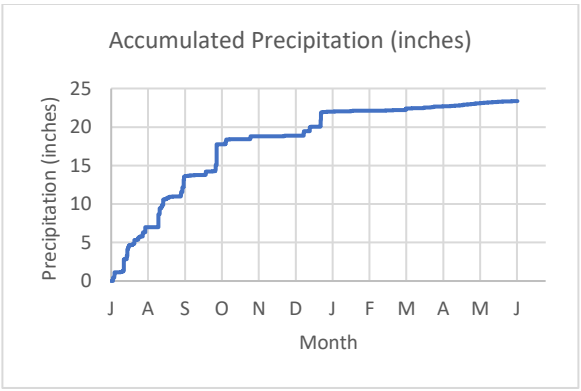


Figure 14. GWC July 1, 2021 - June 30, 2022 Accumulated Precipitation

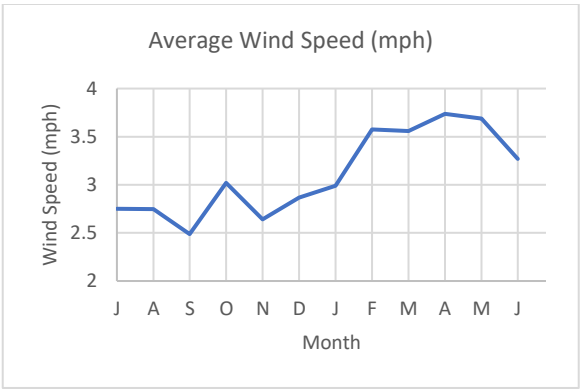


Figure 15. GWC July 1, 2021 - June 30, 2022 Average Wind Speed

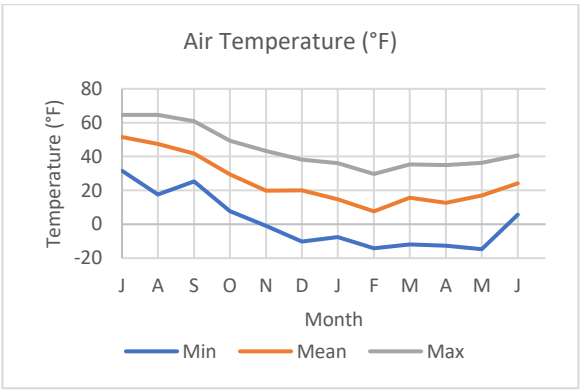


Figure 16. GWC July 1, 2021 - June 30, 2022 Air Temperature

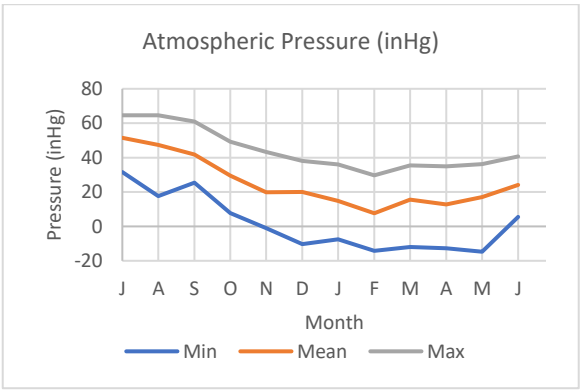


Figure 17. GWC July 1, 2021 - June 30, 2022 Atmospheric Pressure

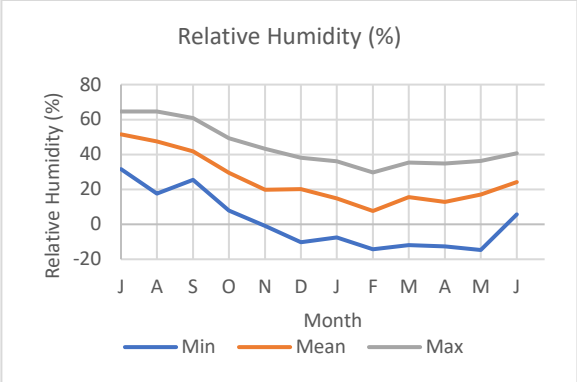


Figure 18. GWC July 1, 2021 - June 30, 2022 Relative Humidity

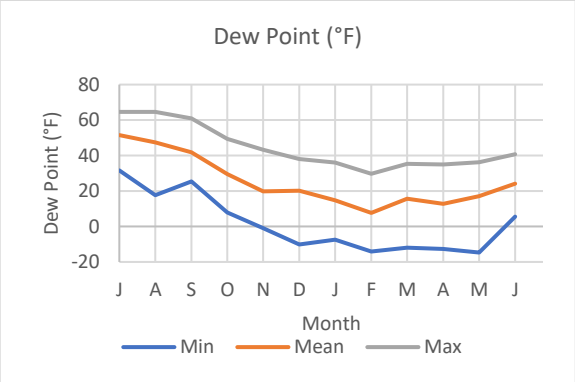


Figure 19. GWC July 1, 2021 - June 30, 2022 Dew Point

GWC at the start of the 2022 reporting period.

Snow Accumulation Event on 12/29/2021

GWC site after the removal of monitoring equipment

Figure 20. GWC Image Data and Images of site removal

UPPER WALNUT CREEK AT FOREST SERVICE (UWCFS)

There are no estimates of actual flow at this site following the removal of the flume on December 22, 2016. The images are used to visually assess wet and dry conditions. However, the CA#1 Monitoring Committee decided around May 2021 to discontinue monitoring at this site. On the first site visit of the annual reporting period on July 13, 2021, the site was fully removed and returned to original conditions (see Figure 21).

UWCFS at the start of the monitoring period.

UWCFS before camera removal.

Figure 21. UWCFS Image Data

UPPER WALNUT CREEK AT BRIDGE (UWCB)

Surface water was visible occasionally during the 2022 annual monitoring period, see Figure 22 below.

The UWCB was visited a total of four (4) times during the 2022 reporting period. All site visits to the site were for routine maintenance and data collection.

UWCB at the start of the 2022 reporting period.

UWCB at the end of the reporting period.

Flow event observed on September 27, 2021

Flow event observed on December 24, 2021

Snow Accumulation on February 23, 2022

Figure 22. UWCB Image Data

LOWER WALNUT CREEK AT CHARNEY PROPERTY (LWCCP)

Six (6) events with measurable flow were observed at LWCCP during the 2022 annual reporting period. The flow event on July 16, 2021, was the longest lasting with a duration of 3 hours. The flow event starting on July 24, 2021, had the highest peak discharge at 60 cfs and the largest total estimated flow volume at 3 AF. Flow event data including duration and estimated flow volume for the annual reporting period are outlined in Table 6 and Figures 23-25.

Table 6. LWCCP July 2021 - June 2022 Flow Events

Start Date	Start Time[16]	Duration (hours)[17]	Peak Stage (feet)	Peak Discharge (cfs)	Total Volume (AF)
7/10/2021	16:00	0.75	0.5	9	< 1
7/14/2021	16:00	0.25	0.25	2	< 1
7/16/2021	15:00	3.00	0.75	27	2
7/23/2021	21:00	0.25	0.25	2	< 1
7/24/2021	20:00	2.00	0.9	60	3
10/11/2021	22:30	0.25	0.25	2	< 1
Total		6.50			5

The LWCCP was visited a total of four (4) times during the 2022 reporting period. In addition to routine quarterly maintenance and data collection, the following adjustments were made at the site:

- Replaced site batteries
- Straightened the event gage

[16] Start times are approximate and actual start times are within ±15 minutes of the noted time. Events may also continue into the following day(s).

[17] Flow event duration is based on discharge calculated using the existing rating.

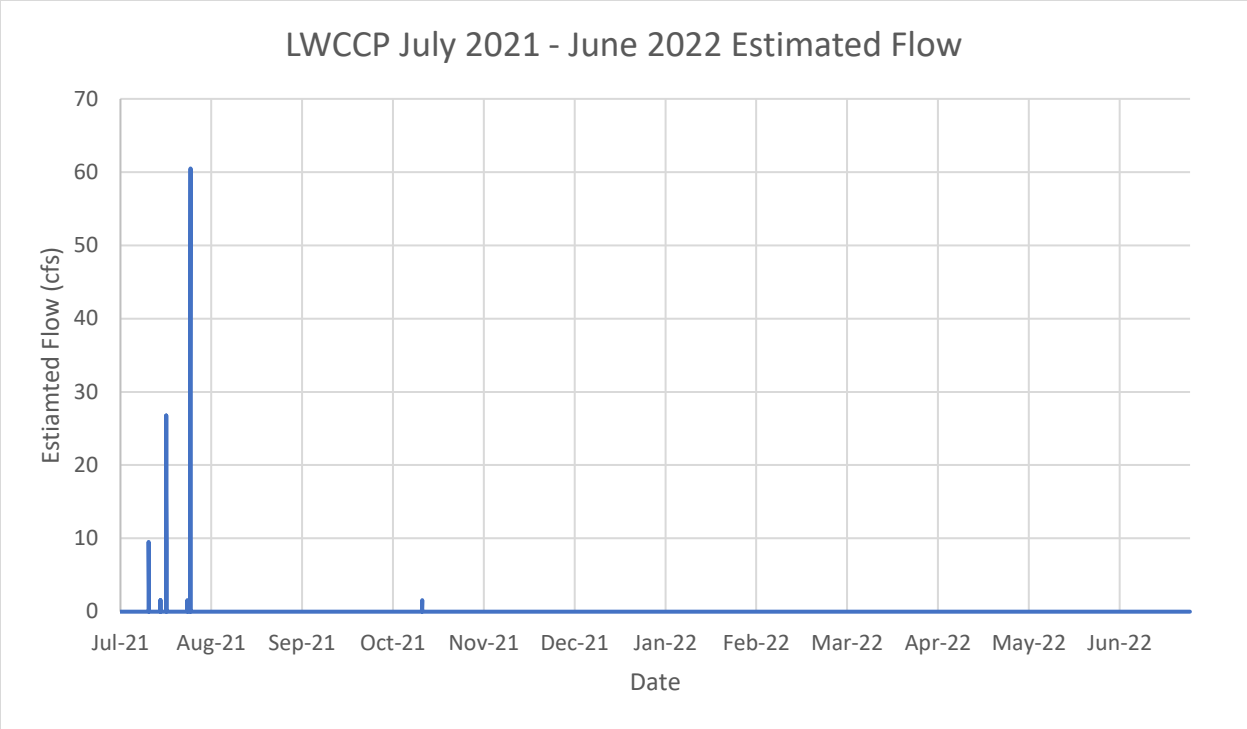


Figure 23. LWCCP July 1, 2021 - June 30, 2022 Annual Flow Events

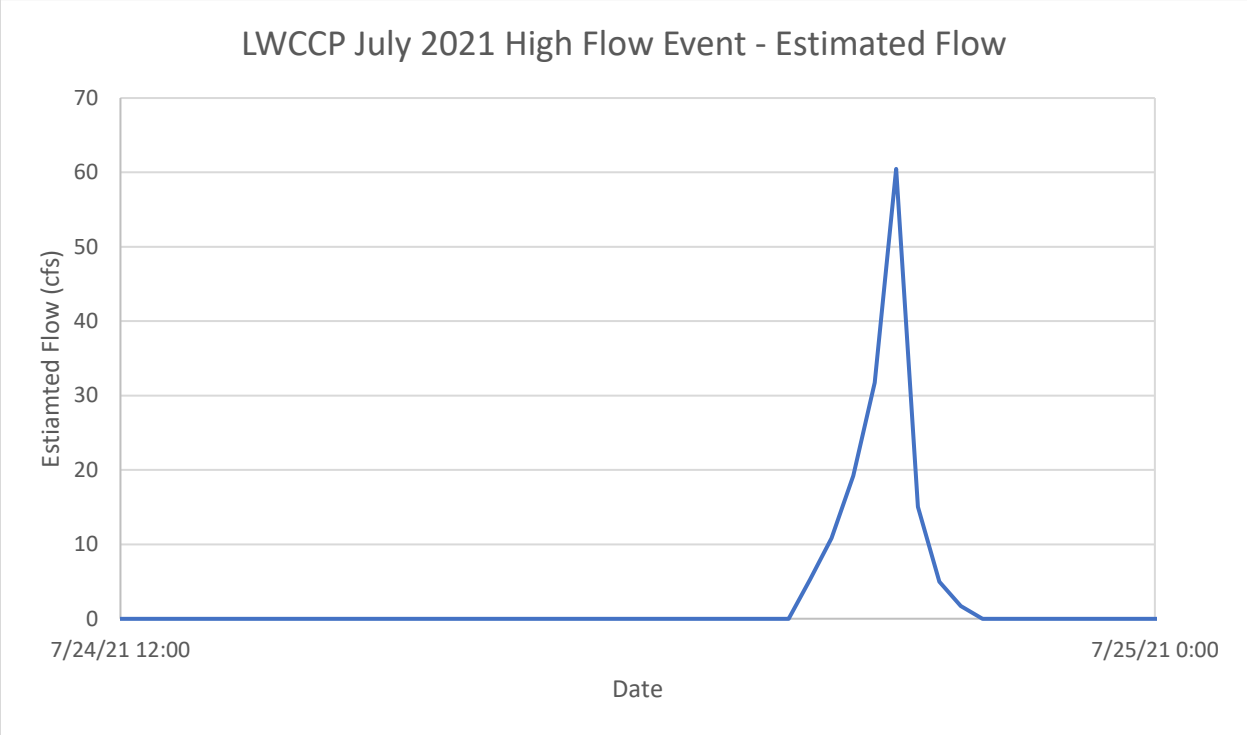


Figure 24. LWCCP July High Flow Event

LWCCP at the start of the 2022 reporting period.

LWCCP at the end of the 2022 reporting period.

LWCCP during the peak of the August 24, 2021 flow event.

Figure 25. LWCCP Image Data

WILLIAMSON VALLEY WASH AT XU RANCH (WVWXU)

Two (2) events with measurable flow were observed at WVWXU during the 2022 annual reporting period. The event starting on August 12, 2021, was the longest lasting at 3.75 hours, the event with the highest peak discharge of 221 cfs, and the largest total estimated flow volume of 18 AF. The total estimated flow volume of the other flow event was less than 1 AF with a total estimated flow at the site for the entire period of 18 AF. Flow event data including duration and estimated flow volume for the annual reporting period are outlined in Table 7 and Figures 26-28.

Table 7. WVWXU July 2021 - June 2022 Flow Events

Start Date	Start Time[18]	Duration (hours)[19]	Peak Stage (feet)	Peak Discharge (cfs)	Total Volume (AF)
7/24/2021	19:30	0.25	0.25	1	< 1
8/12/2021	19:30	3.75	1.4	221	18
Total		4.00			18

The WVWXU was visited a total of four (4) times during the 2022 reporting period. In addition to routine quarterly maintenance and data collection, the following adjustments were made at the site:

- Replaced site batteries
- Replaced the upstream pressure transducer

[18] Start times are approximate and actual start time are within ±15 minutes of the noted time. Events may also continue into the following day(s)

[19] Flow event duration is based on discharge calculated using the existing rating.

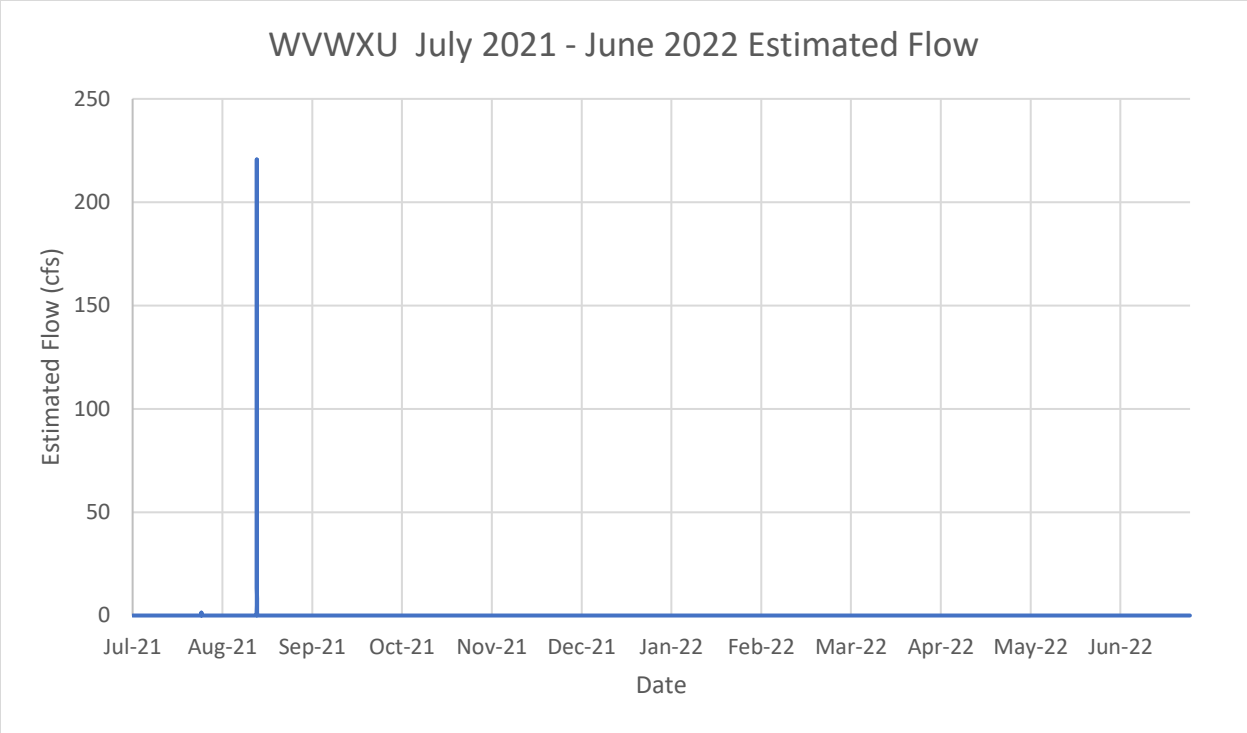


Figure 26. WVWXU July 1, 2021 - June 30, 2022, Annual Flow Events

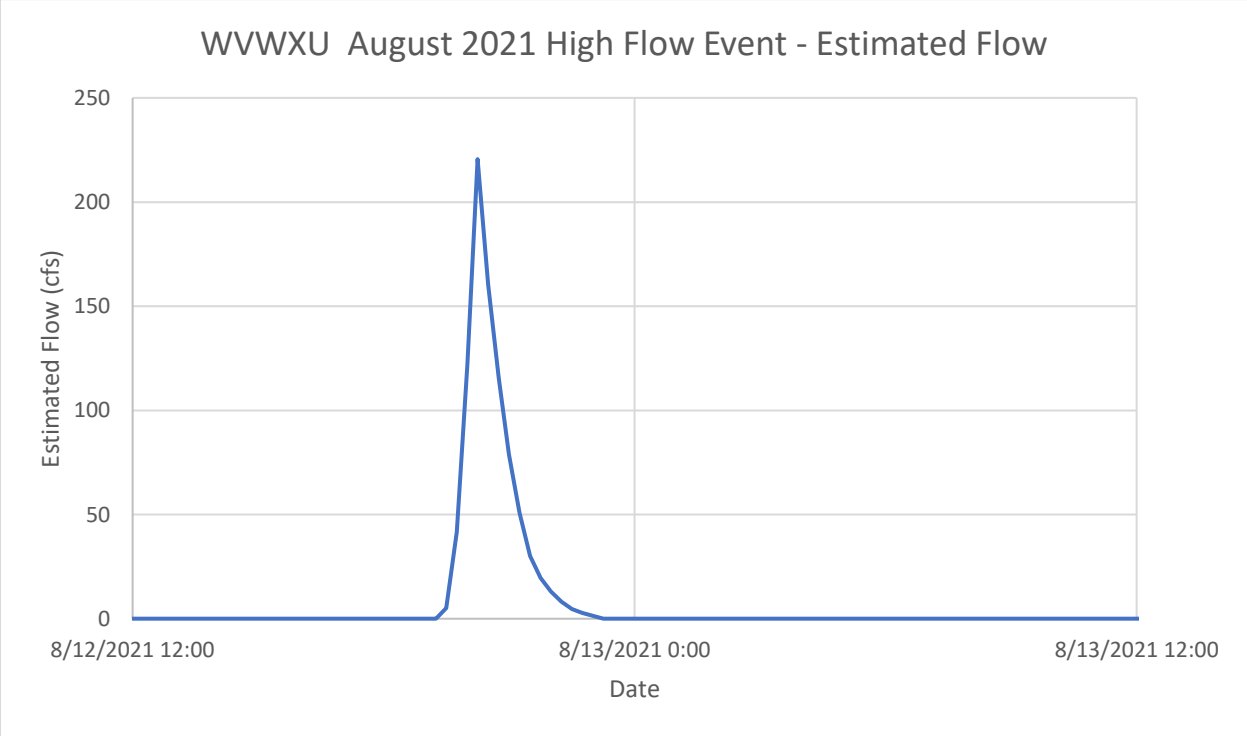


Figure 27. WVWXU August 2021 High Flow Event

WVWXU at start of 2022 reporting period.

WVWXU at end of 2022 reporting period.

WVWXU during peak flow event on August 12, 2021

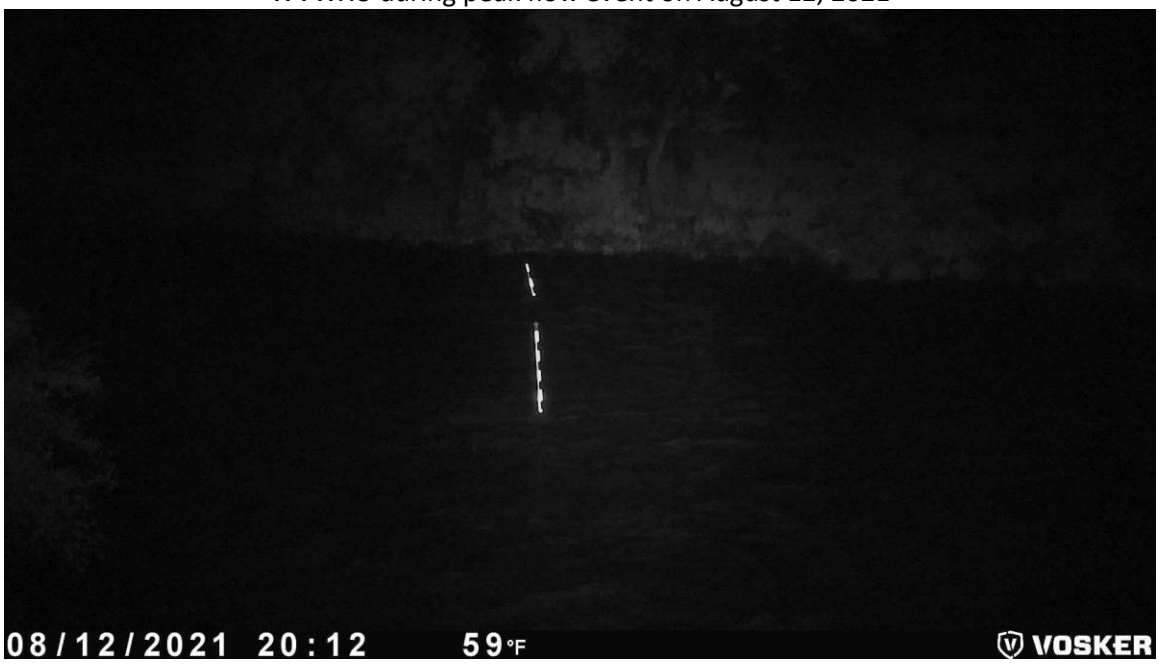


Figure 28. WVWXU Image Data

LOWER WILLIAMSON VALLEY WASH (LWVW)

Four (4) events with measurable flow were observed at the LWVW during the 2022 annual reporting period. The flow event starting on August 10, 2021, had the largest peak discharge of 100 cfs. The flow event starting on August 11, 2021, had the largest total estimated flow volume of 9 AF. The flow event on August 12, 2021, was the longest lasting with a duration of 6.5 hours. A total estimated flow volume of 18 AF was observed at the site for the duration of the reporting period. Flow event data including duration and estimated flow volume for the annual reporting period are outlined in Table 8 and Figures 29-31.

Table 8. LWVW July 2021 - June 2022 Flow Events

Start Date	Start Time[20]	Duration (hours)[21]	Peak Stage (feet)	Peak Discharge (cfs)	Total Volume (AF)
8/10/2021	15:30	5.25	1.5	100	5
8/11/2021	15:00	5.75	1.35	73	9
8/12/2021	16:45	6.50	0.5	6	2
8/31/2021	0:00	3.50	0.1	17	2
Total		21.00			18

The LWVW was visited a total of four (4) times during the 2022 reporting period. In addition to routine quarterly maintenance and data collection, the following adjustments were made at the site:

- Removed and replaced pressure transducer

[20] Start times are approximate and actual start time are within ±15 minutes of the noted time. Events may also continue into the following day(s).

[21] Flow event duration is based on discharge calculated using the existing rating.

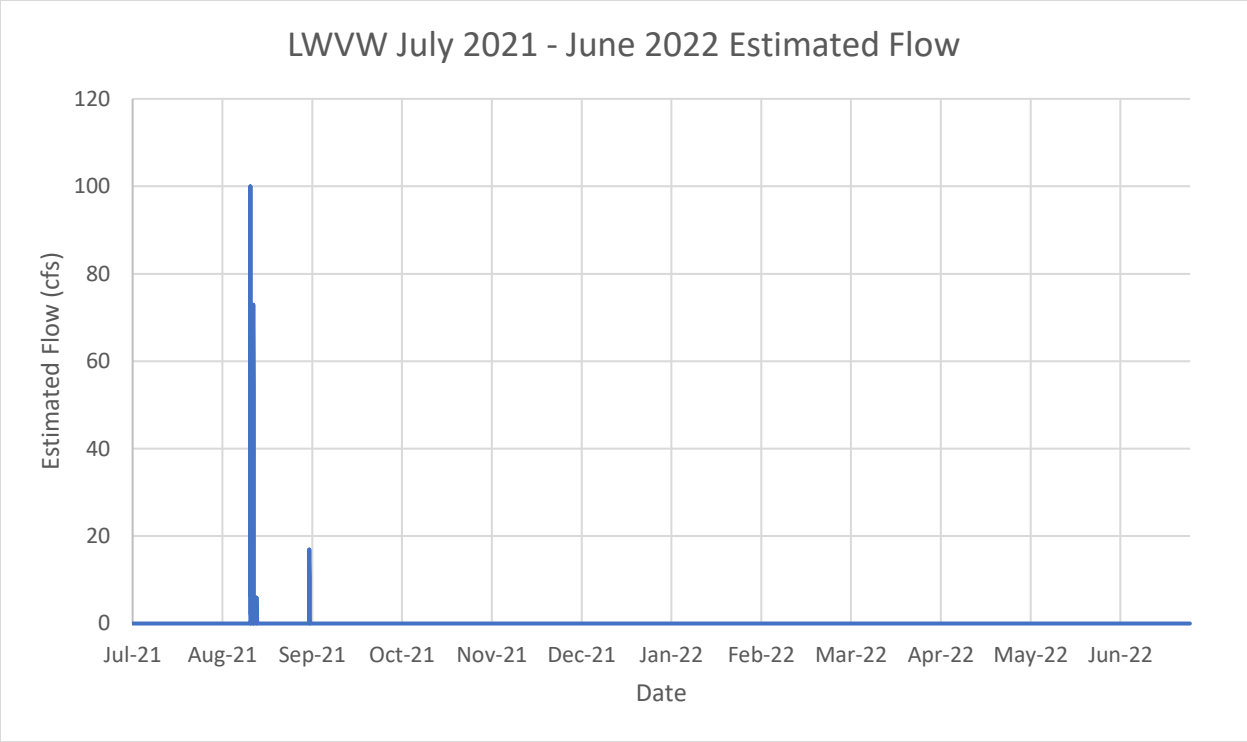


Figure 29. LWVW July 1, 2021 - June 30, 2022, Annual Flow Events

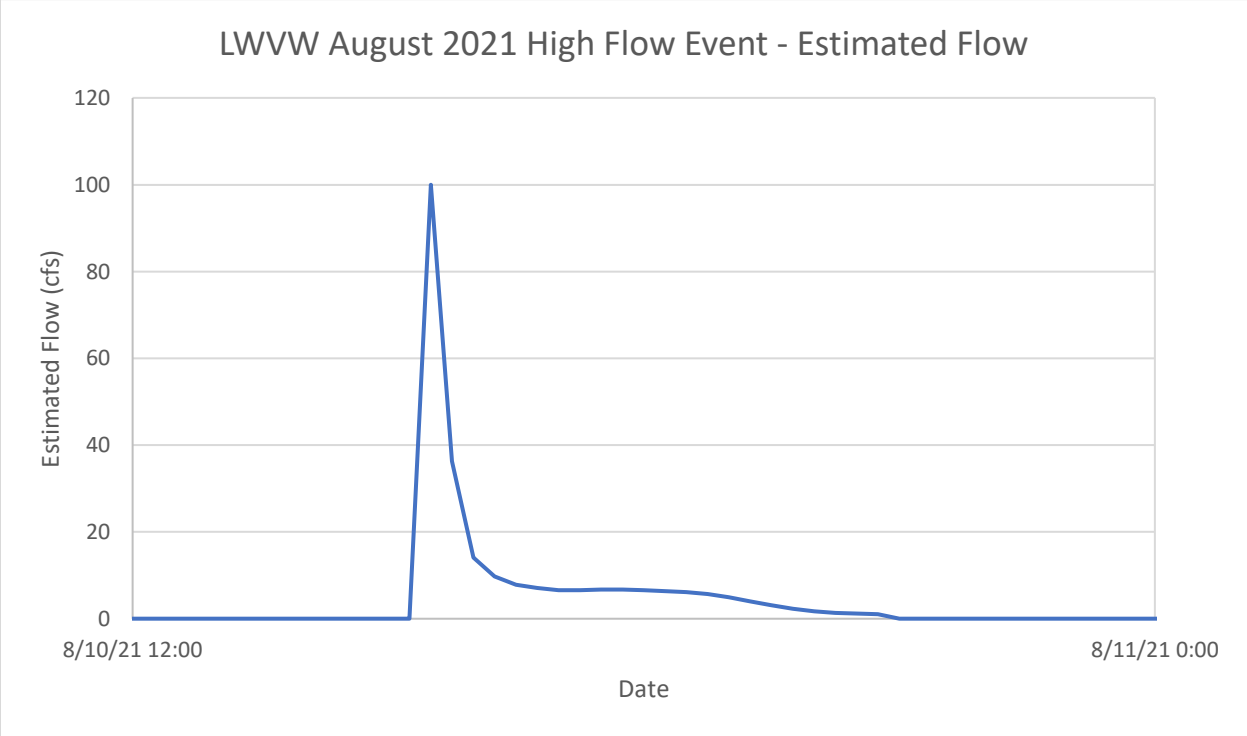


Figure 30. LWVW August 2021 High Flow Event

LWVW at the start of the 2022 reporting period.

LWVW at the end of the 2022 reporting period.

LWVW during peak flow event on August 11, 2021

Figure 31. LWVW Image Data

LOWER BIG CHINO WASH (LBCW)

Four (4) events with measurable flow were observed at LBCW during the 2022 annual reporting period. The flow event starting on July 22, 2021, had the highest peak discharge of 125 cfs and the highest overall total estimated flow volume of 325 AF. The flow event starting on August 10, 2021, was the longest lasting at 356.25 hours. These two flow events exceeded the channel rating, and volume is not calculated about the site rating. It is important to note that due the changes in channel elevation downstream of this gage, water can pool at this site if there is enough flow. The rating for this site accommodates for some of this pooling, but these flow volumes below are estimates. Flow event data including duration and estimated flow volume for the annual reporting period are outlined in Table 9 and Figures 32-34 below.

Table 9. LBCW July 2021 - June 2022 Flow Events

Start Date	Start Time[22]	Duration (hours)[23]	Peak Stage (feet)	Peak Discharge (cfs)[24]	Total Volume (AF)
7/15/2021	9:00	135.00	3.5	88	187
7/22/2021	9:45	263.25	5.19	125*	325
8/2/2021	9:15	154.25	2.18	10	70
8/10/2021	13:45	356.25	4.44	122*	308
Total		908.75			890

The LBCW was visited a total of four (4) times during the 2022 reporting period. In addition to quarterly maintenance and data collection, the following adjustments were made at the site:

- Replaced site batteries

[22] Start times are approximate and actual start time are within ±15 minutes of the noted time. Events may also continue into the following day(s).
[23] Flow event duration is based on discharge calculated using the existing rating.
[24] Where there is an *, flow exceeded the rating for the channel.

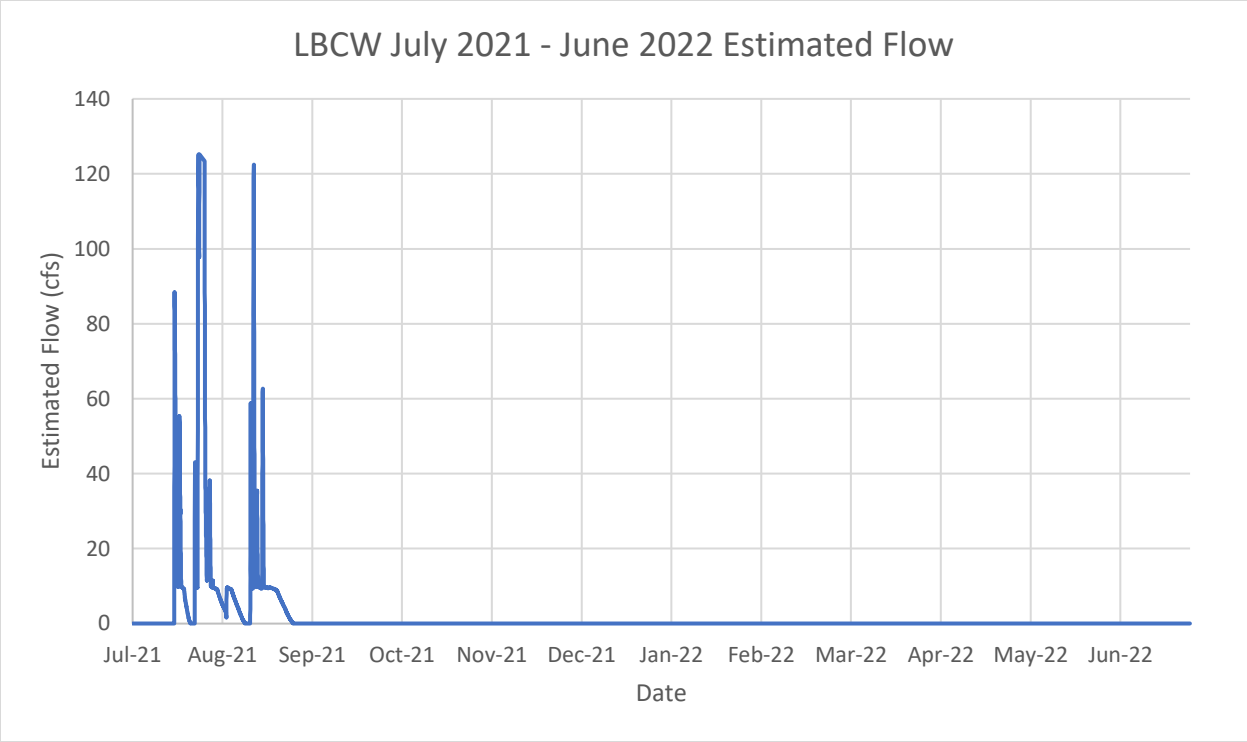


Figure 32. LBCW July 1, 2021 - June 30, 2022, Annual Flow Events

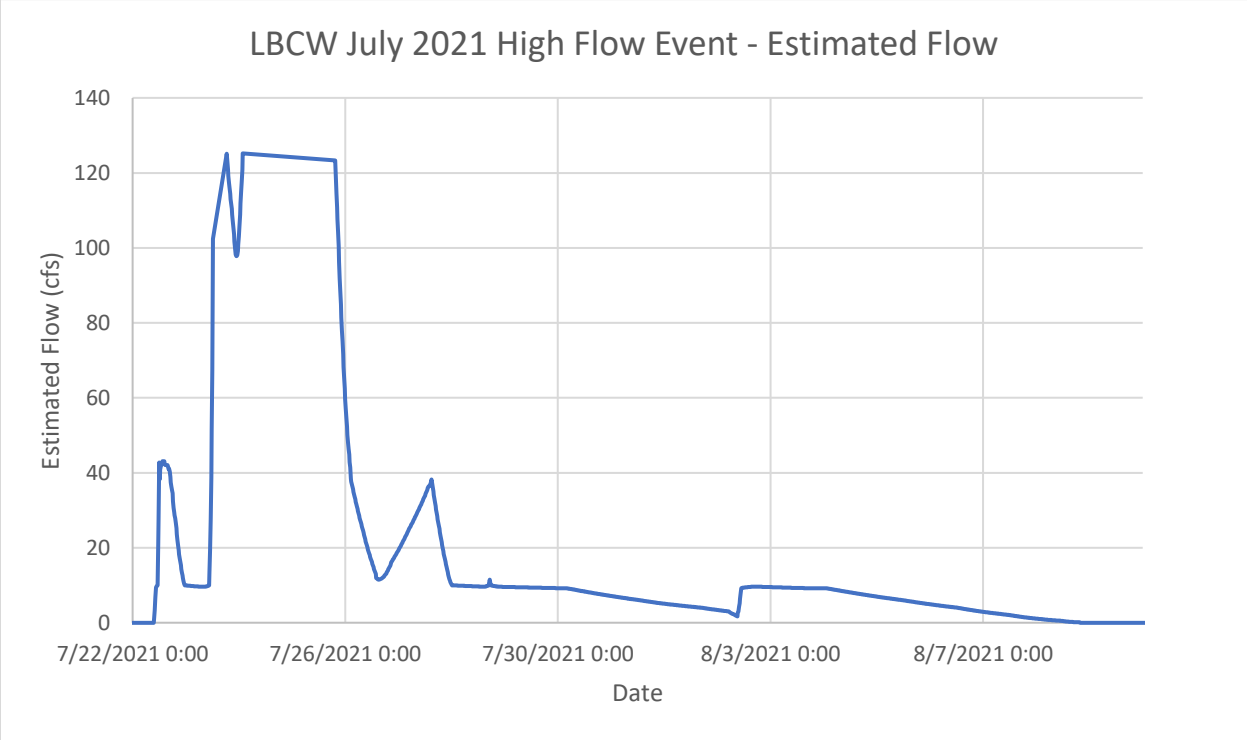
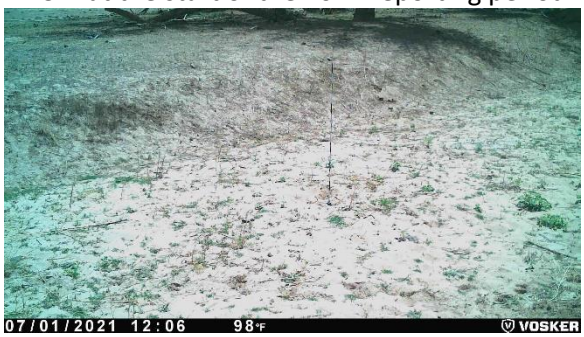


Figure 33. LBCW July High Flow Event

LBCW at the start of the 2022 reporting period.



LBCW at the end of the 2022 reporting period.

SD during peak flow of the July 22, 2021, flow event.

Figure 34. LBCW Image Data

SULLIVAN DAM (SD)

Five (5) events were observed at Sullivan Dam during the annual reporting period. All observed events were related to monsoon precipitation events. Peak stage of 1.24' was observed on July 24, 2021. SD flow event duration and peak stage observed information is outlined in Table 10 below.

Table 10. SD July 2021 - June 2022 Event Data

Start Date	Start Time[25]	Duration (hours)[26]	Peak Stage (feet)
7/15/2021	13:45	76	0.64'
7/22/2021	12:30	185	1.25'
8/2/2021	14:45	29	0.10'
8/10/2021	17:30	14	0.29'
8/11/2021	15:00	196	0.25'

The SD site was visited a total of four (4) times during the 2022 reporting period. In addition to routine maintenance and data collection, the following adjustments were made at the site:

- Removed the third camera at the site per Contract No. 2022-154
- Replaced site batteries
- Added a new KPSI transducer to the event gage

[25] Start times are approximate and actual start time is within ±15 minutes of the noted time. Events may also continue into the following day(s).

[26] Event duration is based on flow observed spilling over the crest in conjunction with the event gage image data and transducer data.

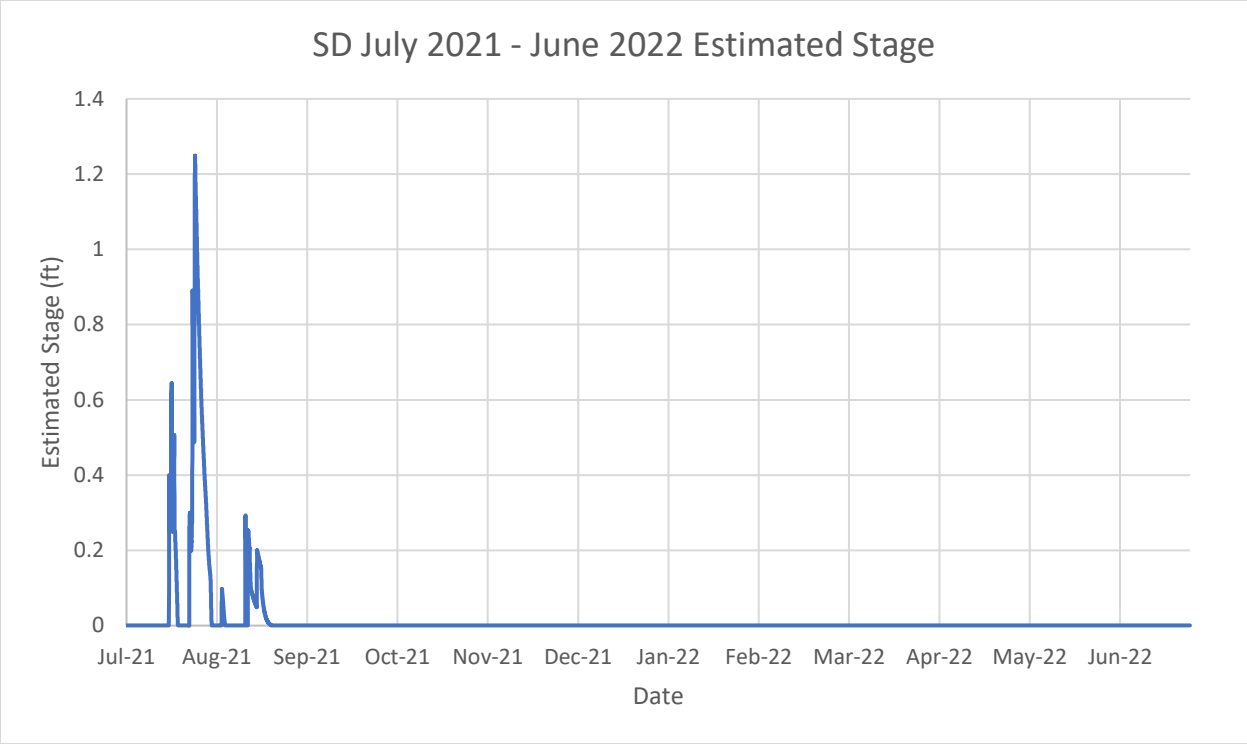


Figure 35. SD July 2021 - June 2022 Estimated Stage Over Spill Crest Data

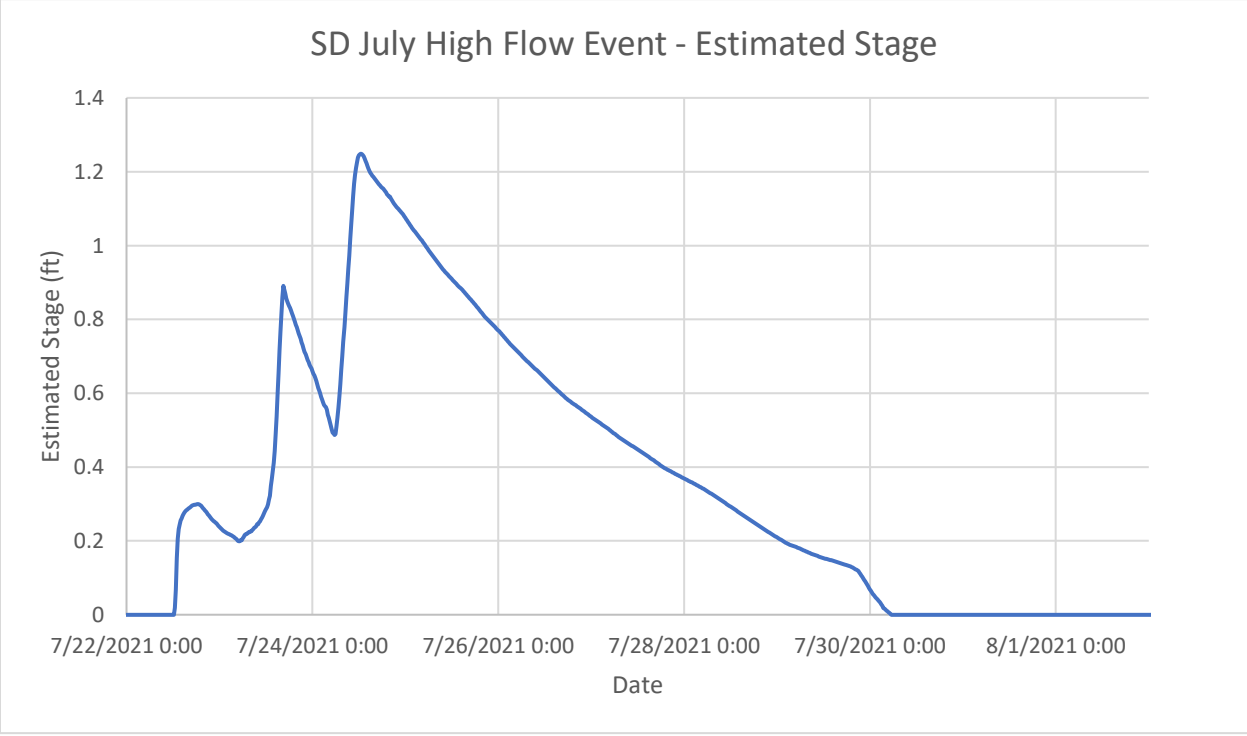


Figure 36. SD July 2021 High Flow Event - Estimated Stage

SD at the start of the 2022 reporting period.

SD at the end of the 2022 reporting period.

SD at the peak of the July 24, 2021, event.

Figure 37. SD Image Data

VERDE HEADWATERS AT CAMPBELL RANCH (VHCR)

Five (5) flow events were observed at VHCR during the 2022 annual monitoring period (for this site and report, a flow event was defined as exceeding a flow rate of over 20 cfs). VHCR flow events for the annual reporting period are outlined in Table 11 and Figures 38-40.

The USGS Verde River near Paulden, AZ stream gage is approximately 6 river miles downstream of VHCR. Flow events observed at VHCR were also observed at the USGS gage (see Table 11 and Figure 41 below).

Table 11. VHCR and Verde River near Paulden, AZ USGS July 2021 - June 2022 Peak Flow Event Data

Start Date	VHCR	USGS Verde River near Paulden, AZ
7/16/2021	181 cfs	715.00 cfs
7/22/2021	660 cfs	5,670.00 cfs
8/11/2021	134 cfs	330.00 cfs
8/15/2021	192 cfs	515.00 cfs
9/27/2021	22 cfs	82.20 cfs

The VHCR was visited a total of five (5) times during the 2022 reporting period. All visits to the site were for routine maintenance and data collection.

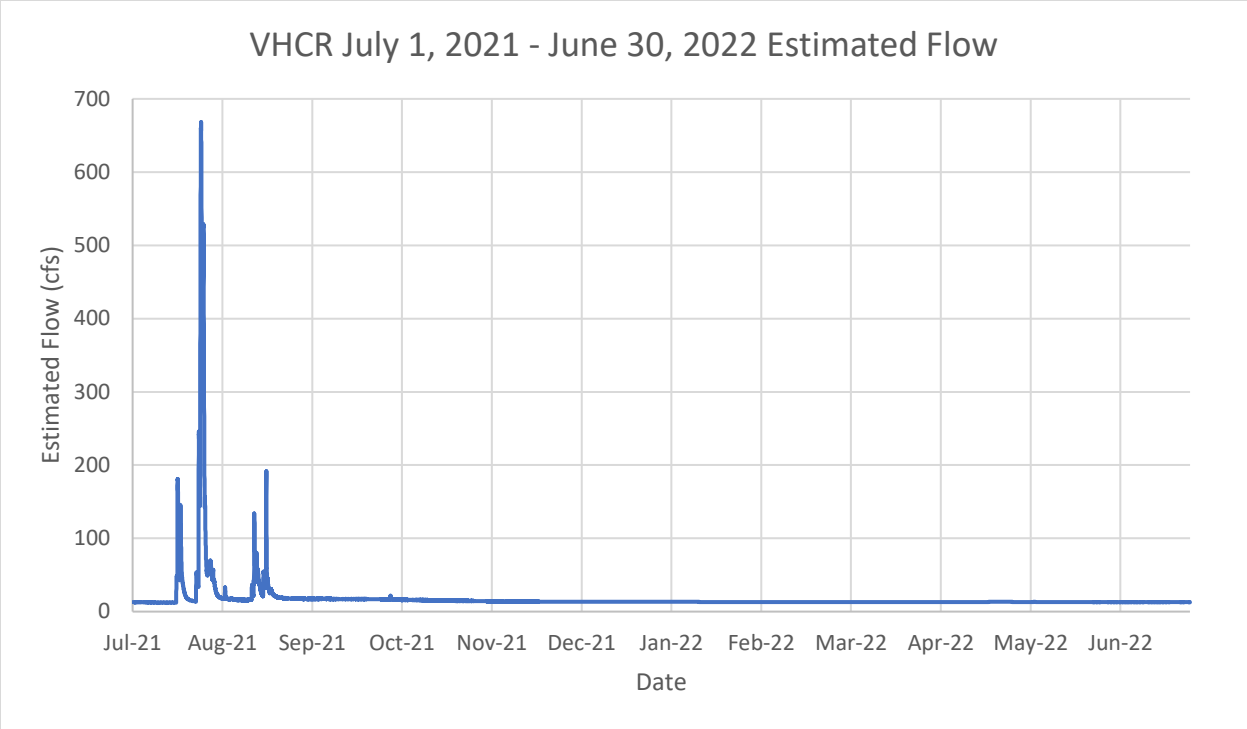


Figure 38. VHCR July 2021 - June 2022 Annual Flow Events[27]

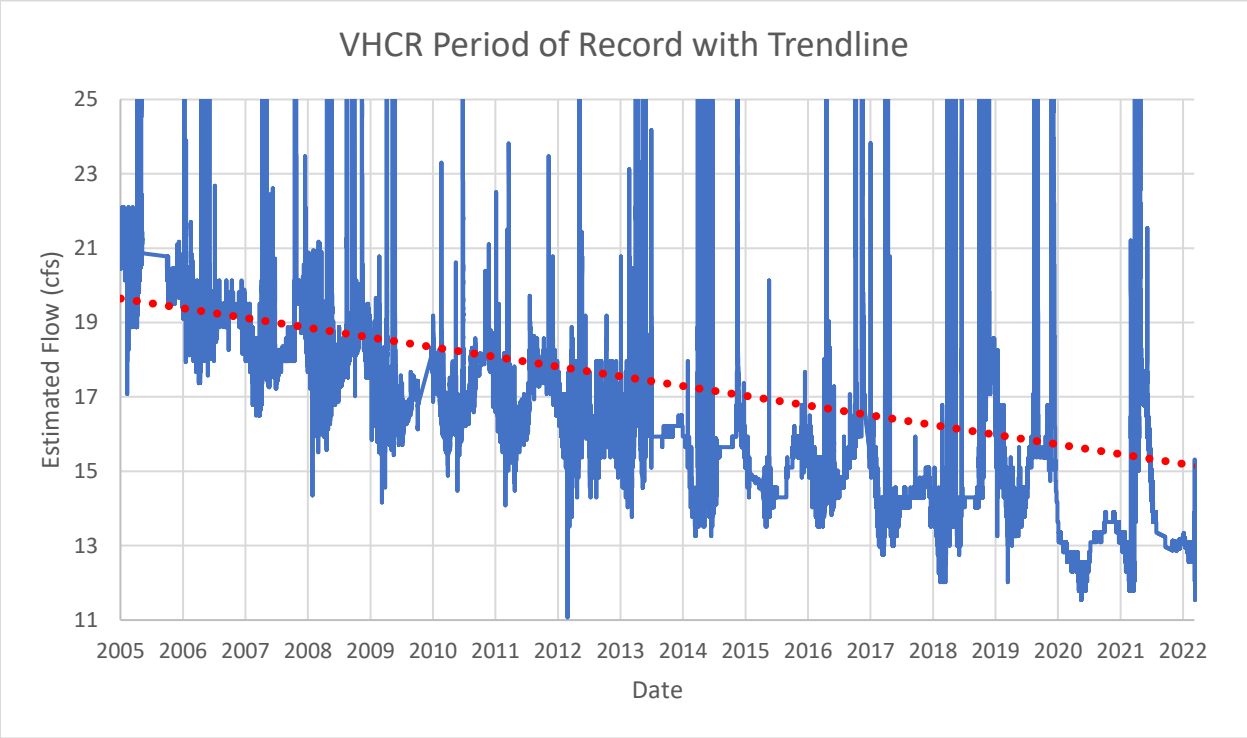


Figure 39. VHCR Period of Record with Trendline

[27] Discharge greater than 100 cfs exceeds the site rating and is an estimate.

VHCR at the start of the 2022 reporting period.

VHCR at the end of the 2022 reporting period.

VHCR during its peak event on July 24, 2021

Figure 40. VHCR Site Images

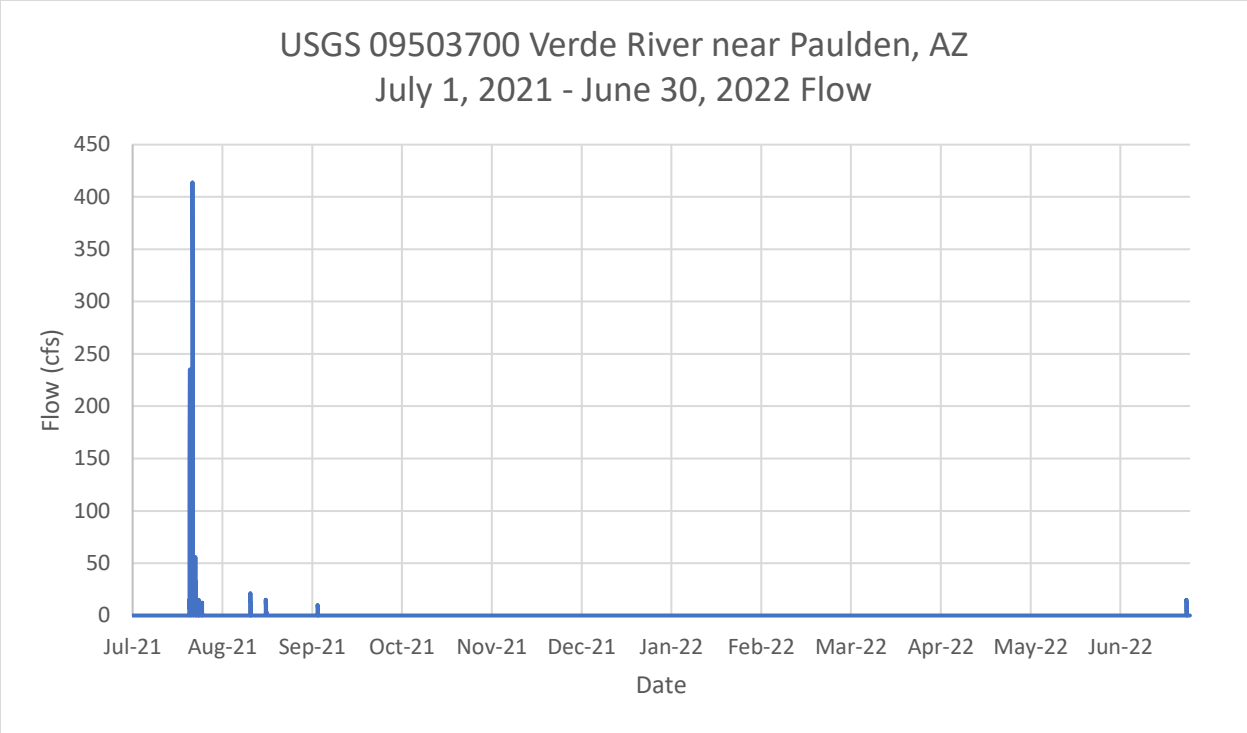


Figure 41. USGS Verde River near Paulden, AZ July 2021 - June 2022 Flow Events

GIPE WELL (GW)

As instructed by the CA#1 monitoring committee to cease monitoring at this site, SRP staff stopped data collection and site visits to Gipe Well in May 2021. This decision came as the cost to rehabilitate the well outweighed the ongoing data collection. Further, newly drilled monitoring wells (MW-4 series) were in place and data was being checked.

SUMMARY

- Flow was observed at all Flowtography® sites within the sub-basin for the reporting period.
- All, but one, flow events observed were due to monsoon related precipitation events.
- There were twenty-three (23) days with observable flow.
- The largest estimated total flow volume for a single flow event was observed at UBCW with a total estimated flow volume of 856 AF. Peak discharge during this flow event was 1,076 cfs.
- A total of 23.36” of precipitation was observed at GWC.
- Water spilled over Sullivan Dam for a total of 500 hours or 21 days.
- The total estimated flow volume observed in the sub-basin at all sites combined for the reporting period was approximately 2,970 AF.
- SRP Water Measurement continues to maintain the sites and process pressure transducer and SRP Flowtography® images collected at monitoring locations.
- The data presented in this report are provisional in nature and is reflective of the best available data at the time this report was prepared.

APPENDIX II

Summaries of Data Collection Equipment

Established Monitoring Efforts

Groundwater Level Monitoring

Well Name	ADWR 55 number	Land Owner	Cadastral	Depth (ft bgs)	Perforated Interval (ft bgs)	Water Level (ft bgs)	Data Repository
MW-4b1	228266	USDA Forest Service	B(18-01) 28BCD	460	340-460	320	GWSI
MW-4b2	228265	USDA Forest Service	B(18-01) 19 ADC	520	420-520	400	GWSI
MW-4b3	228262	Arizona State Land Department	B(18-01) 31 CCD	480	380-480	360	GWSI
MW-4d	228472	Arizona State Land Department	B(17-02) 11ABA	450	280-340 (LCS); 330-450 (PVC)	310	GWSI
MW-4e	228263	Arizona State Land Department	B(17-02) 12CBD	340	240-340	225	GWSI
MW-4g	921236	Southwest Land & Cattle LLC (dba K Larson)	B(18-03) 26ACC	1400	1000-1400	142	GWSI
BMW-2	921256	Kieckhefer, J.I.	B(18-04) 01ABD	2000	1600-2000	180	GWSI
Glidden	631886	USDA Forest Service	B(18-01) 27ABD	230	150-219	192.4	GWSI
HR-2	527679	Civitan Foundation	B(17-02) E02DCA	500	Not cased	328.3	GWSI
MW-4f.1 (Patton)[1]	803378	Southwest Land and Cattle Co.	B(18-03) 26BDD	92	25 to 60 and 80 to 90	15.5 to 18.3	GWSI
MW-4f.2 (Johnson)[1]	557247	Southwest Land and Cattle Co.	B(18-03) 26BDB1	320	37 to 320	119.4 to 141.8	GWSI

Well Name	ADWR 55 number	Land Owner	Cadastral	Depth (ft bgs)	Perforated Interval (ft bgs)	Water Level (ft bgs)	Data Repository
WMW-1(Pump 7)[2]	624116	City of Prescott	B(20-04) 19CBA	600	unk	66.2 to 103	GWSI
WMW-2 (200' N of Pump 3)[2]	210660	City of Prescott	B(20-04) 33CBD2	100-160 and 310-400	0-420	30	NWIS and GWSI
WMW-3 (1000' SE of Pump 12)[2]	210659	City of Prescott	B(19-04) 10CCB2	670	614-654	14 to 29	NWIS and GWSI
BMW-3	905773	Kieckhefer	B(18-04) 01ACA2	1000' casing	499-999	155 (2008)	GWSI
BMW-1 (previously named BH-1)[2]	200027	Kieckhefer	B(18-04) 11ACC	490	290-490	315.6 (2007)	GWSI
BCMW-1	211839	City of Prescott	B(18-04) 25AAA2	737	300-620	261.2 (2008)	GWSI
Gipe Well	511557	Gipe	B(18-01) 17AAA	620	540-620	419 to 425	GWSI and SRP DB
Paulden South (PZ3)[3]	524078	City of Prescott	B-17-02S 04DCB3	170	130-170	108 (2019)	GWSI

[1]Southwest Groundwater Consultants, January 4, 2017

[2]Southwest Groundwater Consultant, December 23, 2004

[3]Not shown in Appendix III, Maps and Figures

Stream flow Monitoring

Stream flow Monitoring Sites Funded By/Established Under CA#1

Name	Completion Date	Comments
Verde Headwaters at Campbell Ranch	4/2005	https://streamflow.watershedconnection.com/?location=Campbell%20Ranch&project=
Williamson Valley Wash Near Paulden, AZ	1965-1985 2002-Current	USGS Gage 09502800
Big Chino Wash below Partridge Creek	6/26/2014	SRP
Lower Big Chino Wash	5/21/2014	SRP
Lower Walnut Creek at Charney Property	6/10/2014	SRP
Lower Williamson Valley Wash	5/22/2014	SRP
Pine Creek	5/19/2014	SRP
Upper Big Chino Wash	1/16/2014	SRP
Upper Walnut Creek at Forest Service	10/1/2014	SRP - Displaced and removed
Williamson Valley Wash at XU Ranch	6/12/2014	SRP
Upper Walnut Creek at Bridge	6/26/2014	SRP -Camera only
Upper Walnut Creek at Bridge	6/05/2015	Yavapai County Flood Control District radar stage gage
Big Chino Water Ranch	8/26/2015	SRP -Camera only, basin conditions
Sullivan Dam	5/25/2016	SRP -Stage gage/transducer installed 10/12/2017

Climate Monitoring

Publicly Accessible Repositories for Climate Data

Agency Name	Data Portal
YCFCD	https://yavapaiaz.gov/ycflood/
USGS Arizona	http://waterdata.usgs.gov/az/nwis/rt
NWS-HADS - Camp Wood – CPWA3 - Ashfork – ASFA3	https://hads.ncep.noaa.gov/ https://hads.ncep.noaa.gov//cgi-bin/hads/interactiveDisplays/displayMetaData.pl?table=dcp&nesdis_id=CE2280DC https://hads.ncep.noaa.gov//cgi-bin/hads/interactiveDisplays/displayMetaData.pl?table=dcp&nesdis_id=F001D610
Historic Climatic Data	http://www.wrcc.dri.edu/summary/climsmaz.html

Existing Weather Stations in the Big Chino Sub-basin[1]

Station Name	Responsible Agency	Data Collected
Granite Basin	YCFCD	Precipitation
Walnut Creek	YCFCD	Precipitation/Stage
Big Chino Wash @ SR 89	YCFCD	Precipitation/Stage
CYFD @ Outer Loop Rd	YCFCD	Precipitation
Hyde Mountain	YCFCD	Precipitation
Williamson Valley FD	YCFCD	Precipitation
Seligman Airport	YCFCD	Precipitation/Weather
Ash Fork Draw @ I-40	YCFCD	Precipitation/Stage
Partridge Creek @ I-40	YCFCD	Precipitation/Stage
Crookton	YCFCD	Precipitation
Big Chino Water Ranch	YCFCD	Precipitation/Weather
Williamson Valley Wash near Paulden, AZ	USGS	Precipitation/Stage/Flow
Verde River @ Perkinsville	USGS	Precipitation/Stage/Flow
Camp Wood nr Bagdad CPWA3	National Weather Service	Precipitation
Ashfork 12 NW ASFA3	National Weather Service	Precipitation
Limestone Canyon	YCFCD	Precipitation
Verde River near Paulden, AZ	USGS	Precipitation/Stage/Flow
George Wood Canyon	SRP	Precipitation/Weather

[1] Not all the weather stations are included in Appendix III Figures.

APPENDIX III

Figures

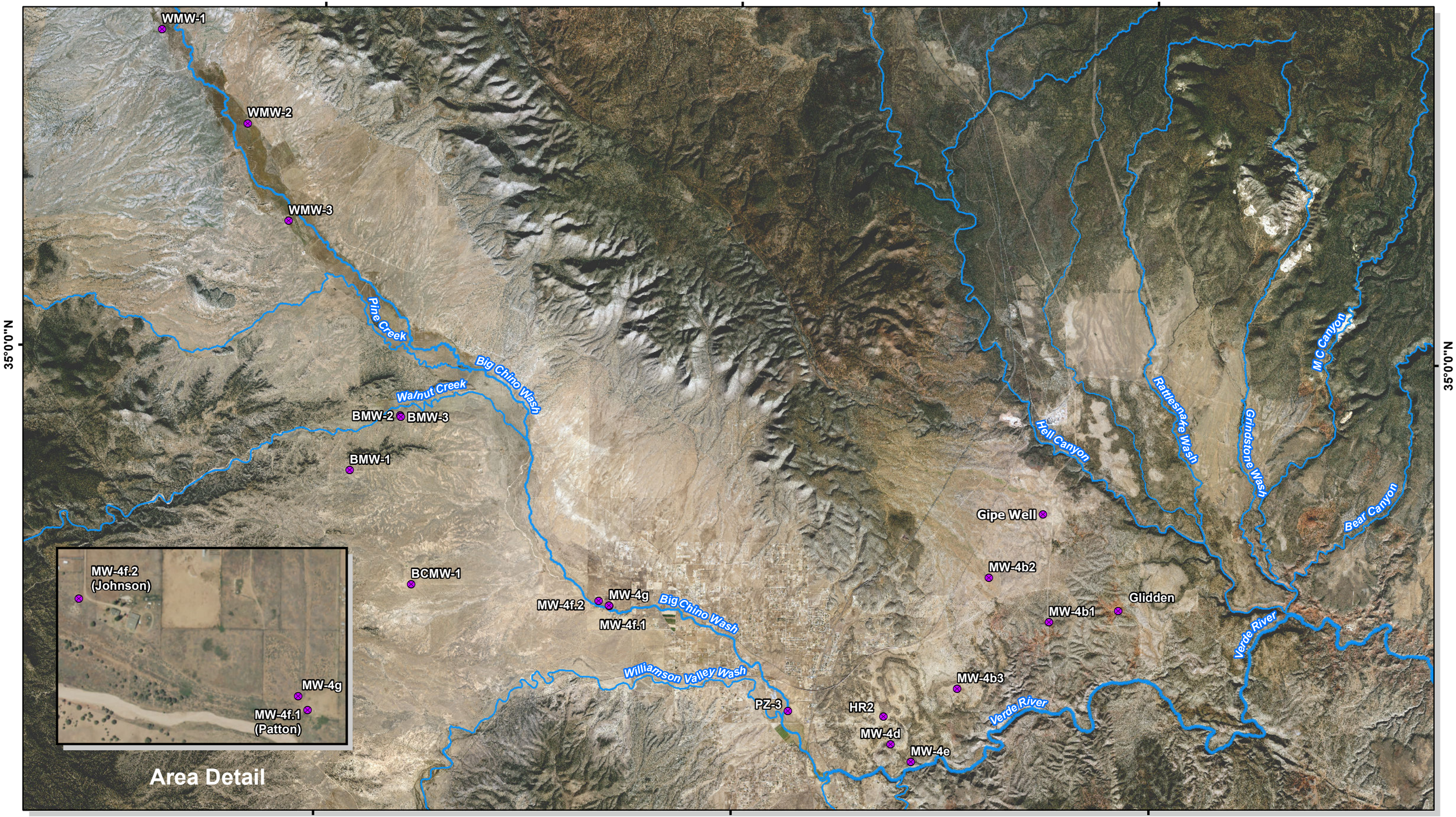


Figure 1
Big Chino Sub-basin Groundwater Monitoring

BIG CHINO SUB-BASIN WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Map Courtesy of SRP®

BIGCHINO_FIG1_22.mxd
9/30/2022

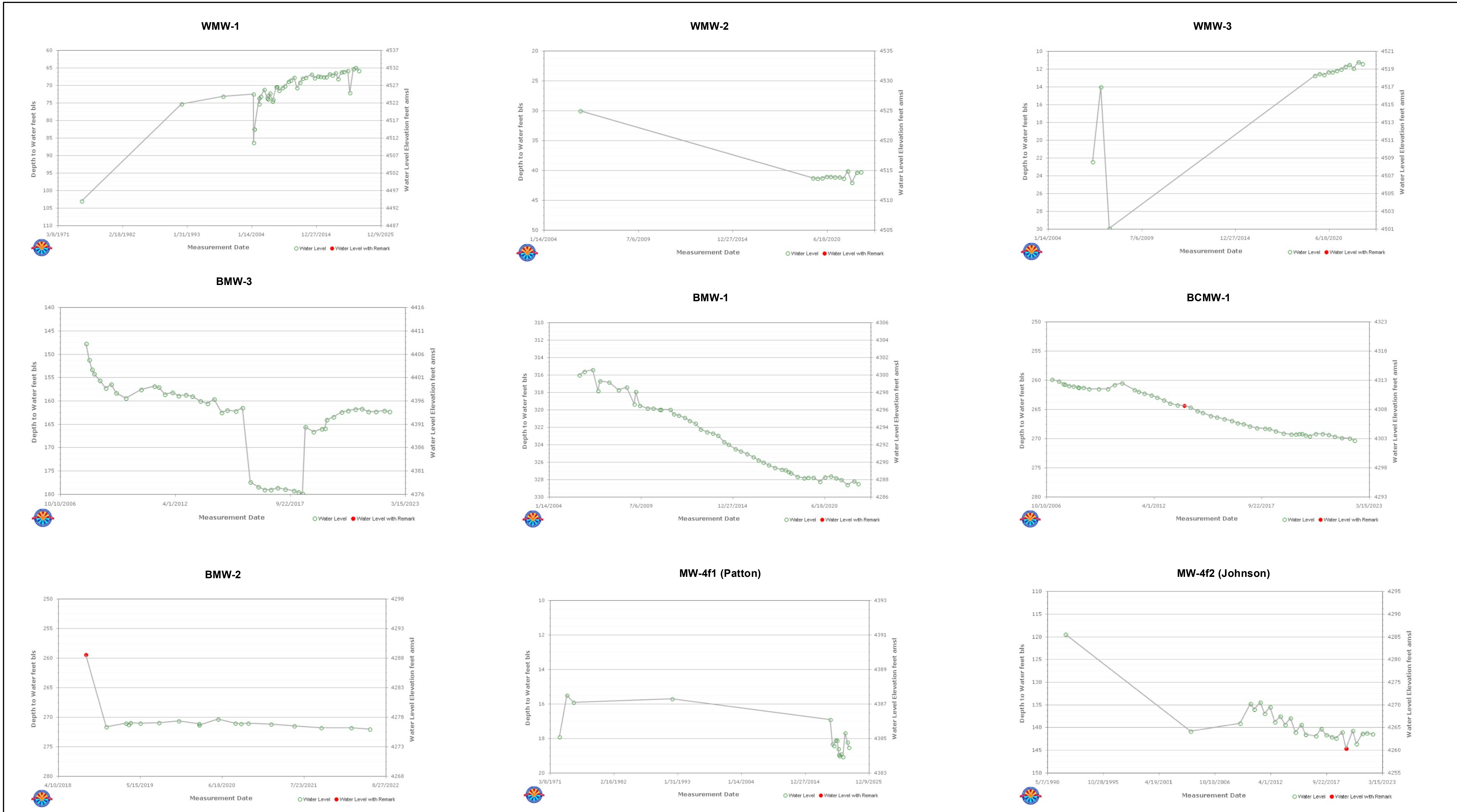
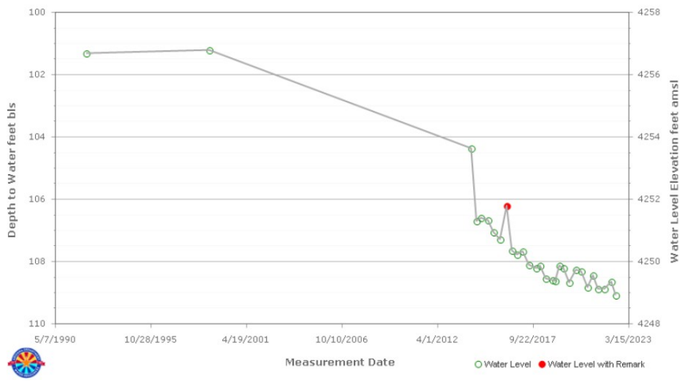


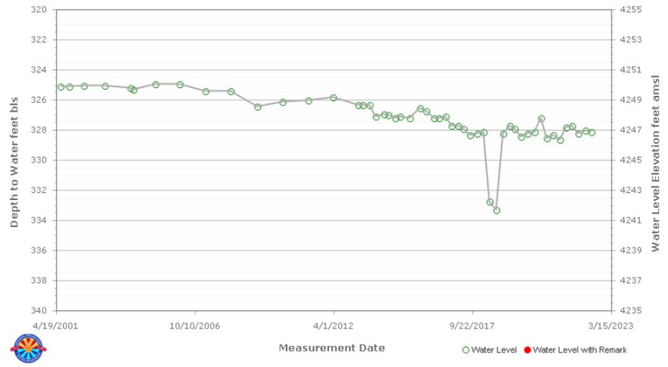
Figure 2
Big Chino Sub-basin Well Hydrographs

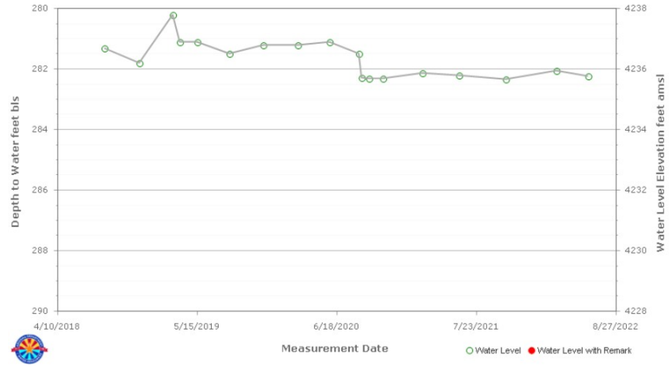
BIG CHINO SUB-BASIN
WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

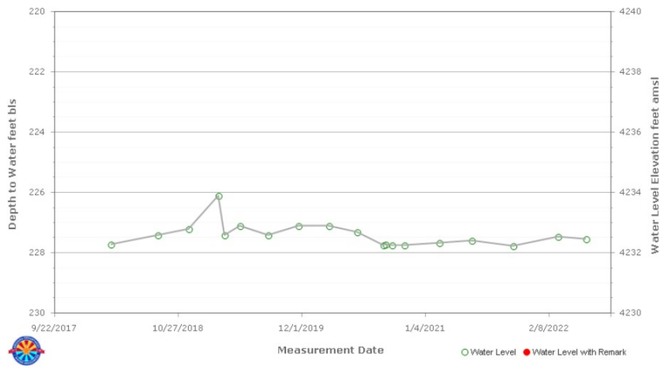
Map Courtesy of SRP®

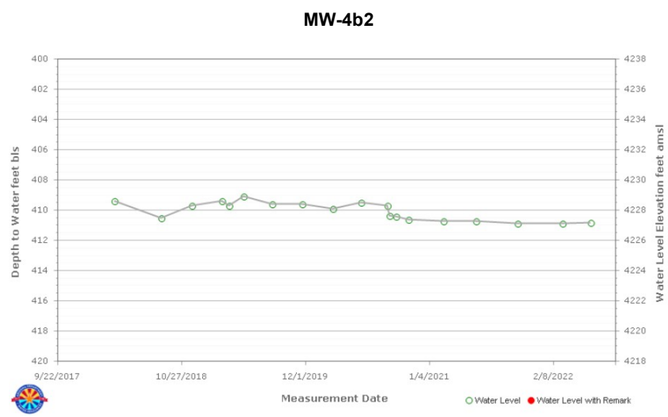
BIGCHINO_FIG2_22.mxd 9/30/2022

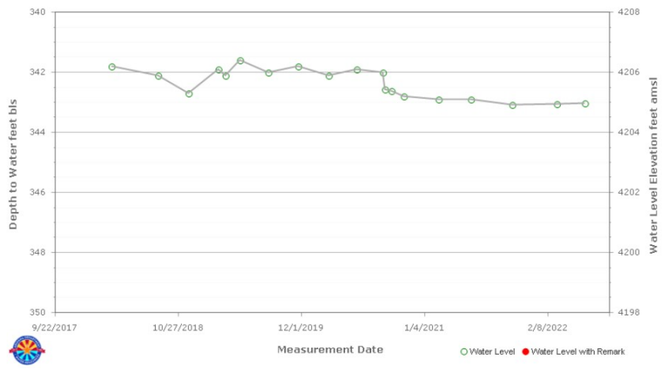


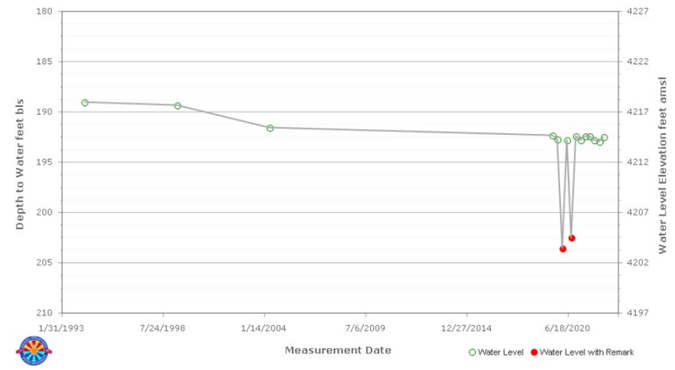












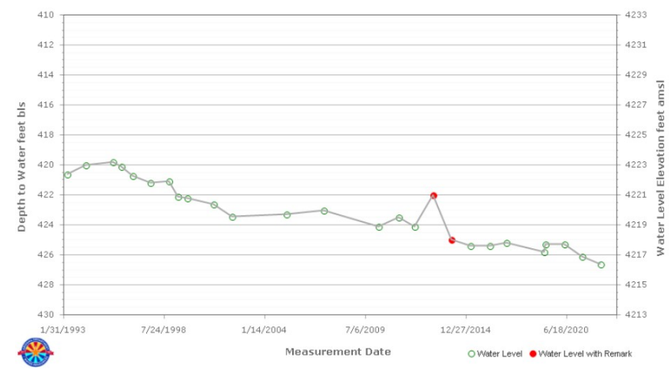


Figure 3
Big Chino Sub-basin Well Hydrographs

BIG CHINO SUB-BASIN
WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Map Courtesy of SRP®

BIGCHINO_FIG3_22.mxd 9/30/2022

Figure 4

Big Chino Sub-basin - Surface Water Monitoring

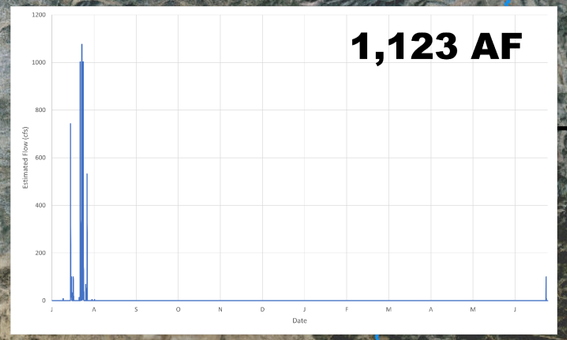
(existing SRP flowtography, camera only sites, existing USGS sites, and Verde Headwaters)

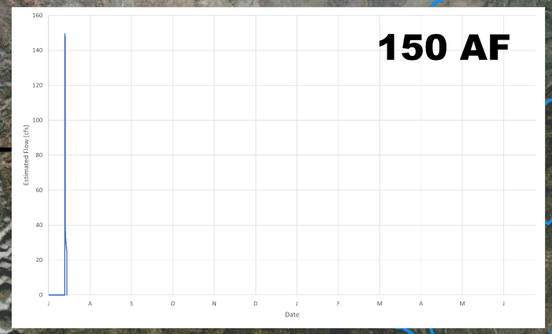
BIG CHINO SUB-BASIN
WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

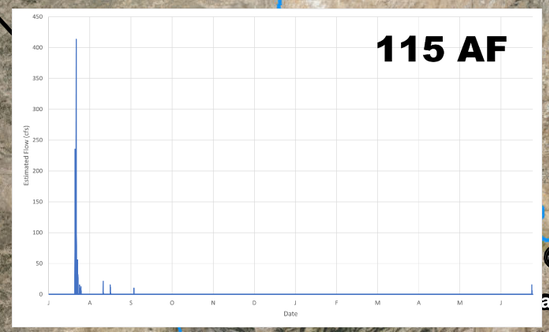
Map Courtesy of SRP®

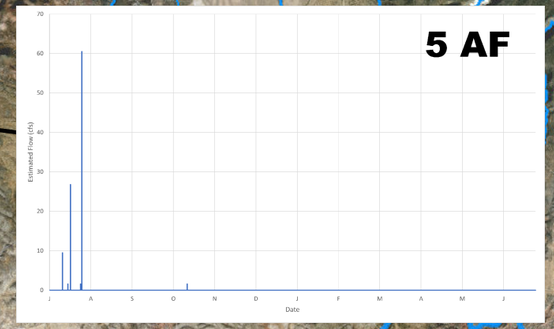
BIGCHINO_FIG4_22.mxd 9/30/2022

113°0'0"W
112°50'0"W
112°40'0"W
112°30'0"W
112°20'0"W
35°10'0"N
35°0'0"N
34°50'0"N









Upper Big Chino Wash
Big Chino Wash below Partridge Creek
Big Chino Water Ranch (camera only)
Big Chino Wash
Pine Creek
Pine Creek
Lower Walnut Creek at Charney Property
Walnut Creek
Upper Walnut Creek at Bridge
Upper Walnut Creek at Forest Service
Hitt Wash
Williamson Valley Wash at XU Ranch
Horse Wash
Verde Headwaters at Campbell Ranch (low-flow gage)

Aerial Date: 2021

Creeks & Washes
SRP Surface Water Monitoring Location
SRP Verde Headwaters Gage

N
0 3.5 7 Miles

Figure 5
Big Chino Sub-basin - Surface Water Monitoring Northern Hydrographs

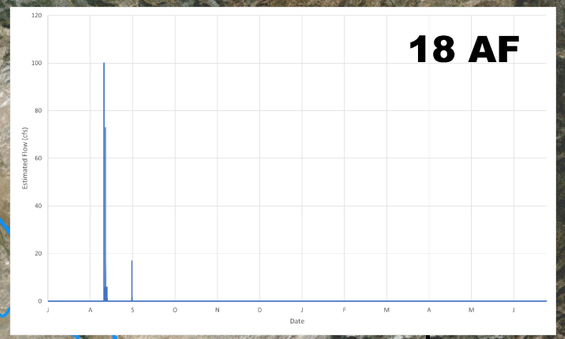
BIG CHINO SUB-BASIN WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

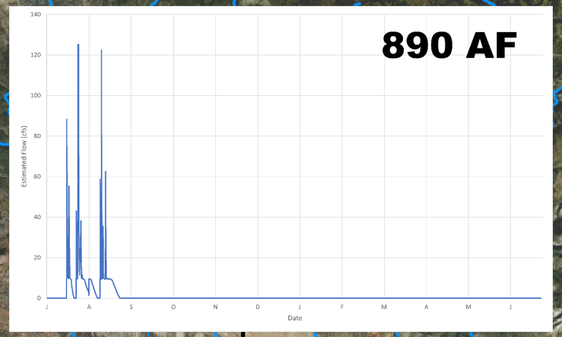
Map Courtesy of SRP®

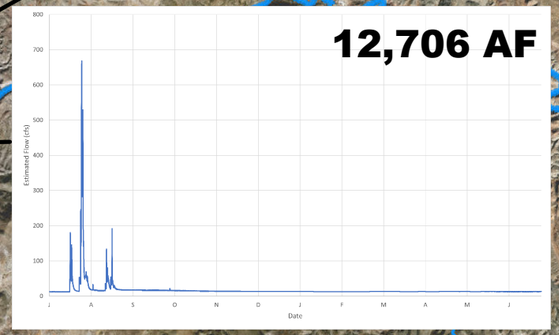
BIGCHINO_FIG5_22.mxd
9/30/2022

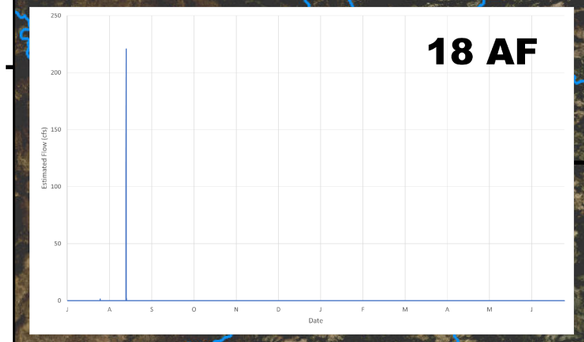
113°0'0"W
112°50'0"W
112°40'0"W
112°30'0"W
112°20'0"W
112°10'0"W
35°10'0"N
35°0'0"N
34°50'0"N

Upper Big Chino Wash
Big Chino Wash below Partridge Creek
Big Chino Water Ranch (camera only)
Pine Creek
Pine Creek
Lower Walnut Creek at Charney Property
Walnut Creek
Big Chino Wash
Upper Walnut Creek at Bridge
Upper Walnut Creek at Forest Service
Lower Williamson Valley Wash
Williamson Valley Wash
Lower Big Chino Wash
Sullivan Dam
Verde Headwaters at Campbell Ranch (low-flow gage)
Hitt Wash
Williamson Valley Wash at XU Ranch
Horse Wash









Aerial Date: 2021

Creeks & Washes
SRP Surface Water Monitoring Location
SRP Verde Headwaters

N
0 3.5 7 Miles

Figure 6
Big Chino Sub-basin - Surface Water Monitoring Southern Hydrographs

BIG CHINO SUB-BASIN WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Map Courtesy of SRP®

BIGCHINO_FIG6_22.mxd
9/30/2022

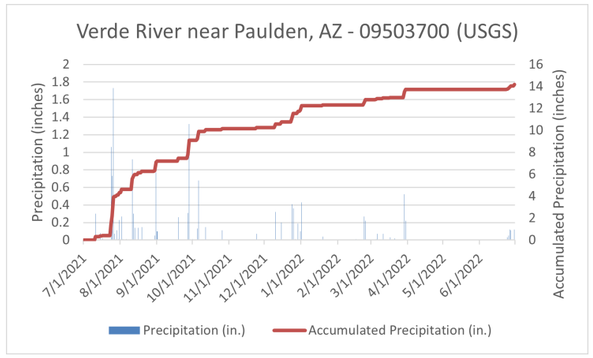
113°0'0"W
112°50'0"W
112°40'0"W
112°30'0"W
112°20'0"W
112°10'0"W
35°0'0"N
34°50'0"N
Big Chino Water Ranch
Limestone Canyon
Pine Creek
George Wood Canyon
Walnut Creek
Walnut Creek
Big Chino Wash
Williamson Valley Wash
Williamson Valley Wash Near Paulden, AZ
Big Chino Wash
Verde River Near Paulden, AZ
Hyde Mountain
Hitt Wash
Camp Wood nr Bagdad CPWA3
Mint Wash
Williamson Valley FD
Horse Wash
CYFD @ Outer Loop Rd
Aerial Date: 2021
Yavapai County Flood Control District Weather Station
National Weather Service Hydrometeorological Automated Data System Station
USGS Weather Station
SRP Weather Station
0 3.5 7 Miles
N

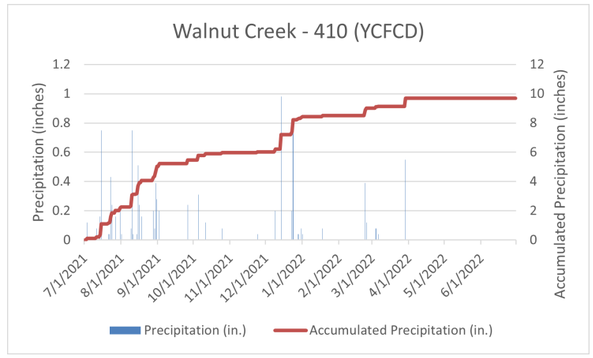
Figure 7
Big Chino Sub-basin Area Weather Stations

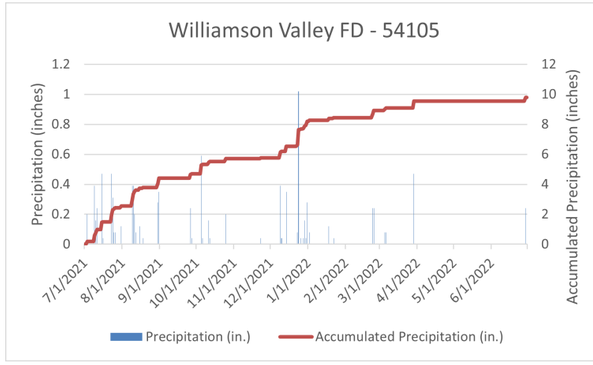
BIG CHINO SUB-BASIN WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

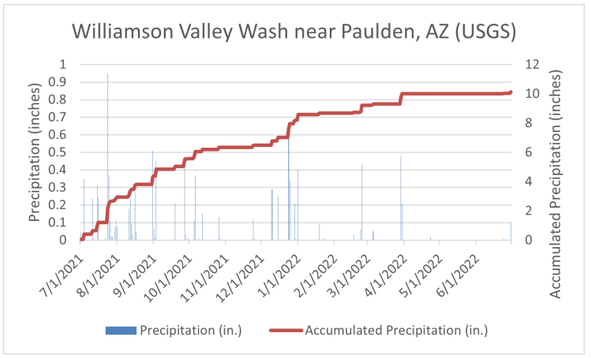
Map Courtesy of SRP®

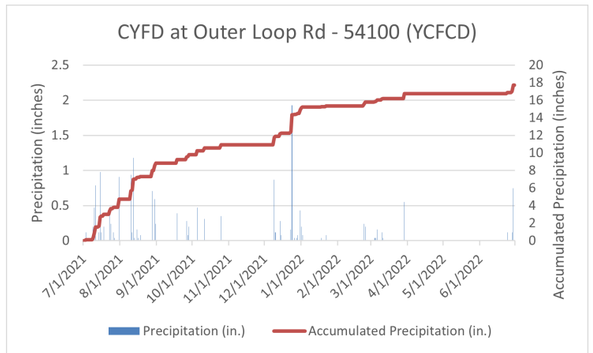
BIGCHINO_FIG7_22.mxd
9/30/2022

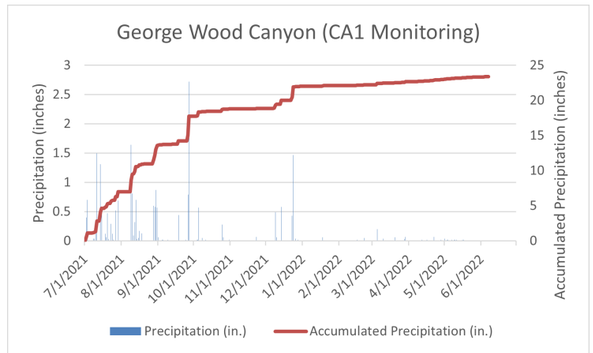


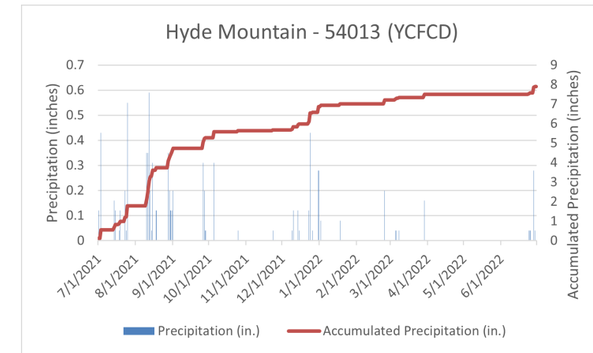


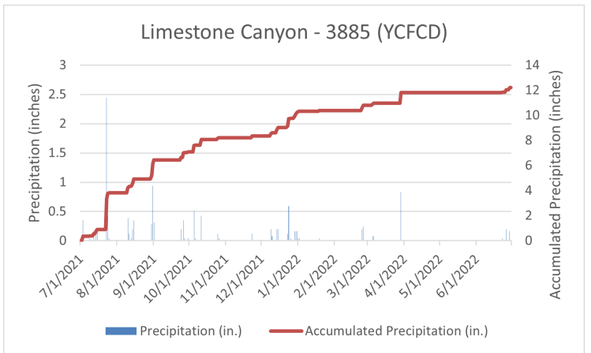


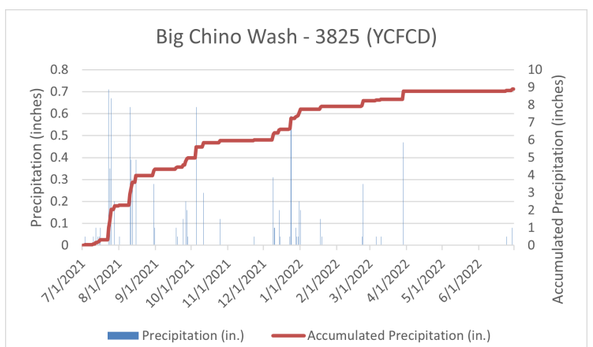


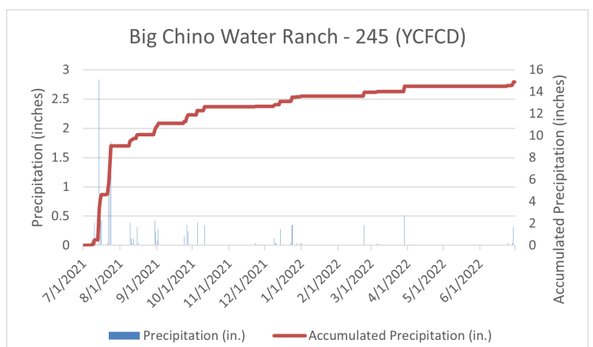












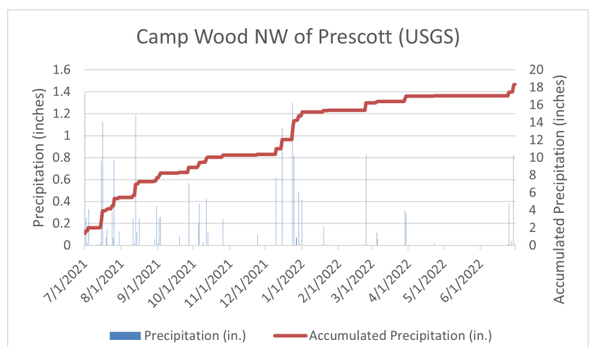


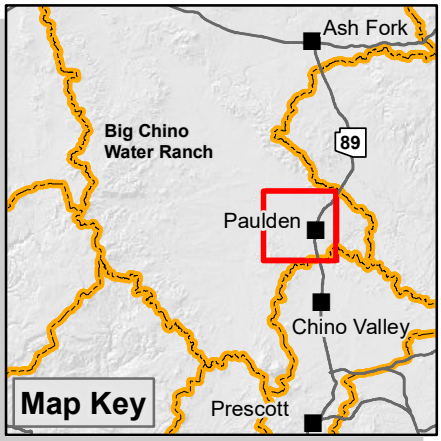
Figure 8
Big Chino Sub-basin Area
Weather Station Data (2022)

BIG CHINO SUB-BASIN
WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Map Courtesy of SRP®

BIGCHINO_FIG8_22.mxd 9/30/2022

Figure 9-1: Big Chino Crop Survey 2021 at Paulden



112°30'0"W

Big Chino Wash

Williamson Valley Wash

89

Verde River

34°50'0"N

BIG CHINO

LITTLE CHINO

0 1 2 Miles

N

112°30'0"W

Alfalfa
Grain
Grass
Pasture
Sod
Vegetable
No Crop Evident (Abandoned/Fallow)
Groundwater Sub-basin (ADWR)

BIG CHINO SUB-BASIN WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Map Courtesy of SRP

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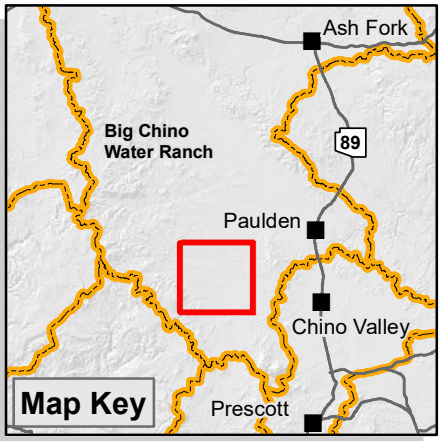
Figure 9-2: Big Chino Crop Survey 2021 at Williamson Valley



112°40'0"W

34°50'0"N

Hitt Wash

Williamson Valley Wash

Mint Wash

Horse Wash

Strickland Wash

0 1 2 Miles

N

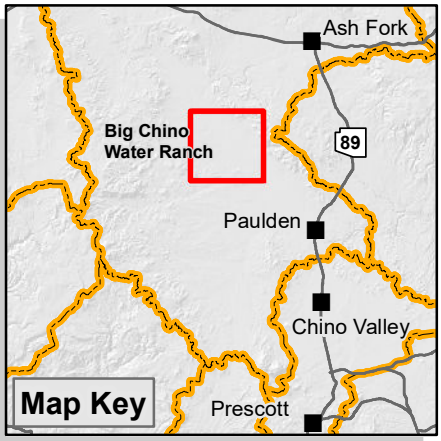
Alfalfa
Grain
Grass
Pasture
Sod
Vegetable
No Crop Evident (Abandoned/Fallow)
Groundwater Sub-basin (ADWR)

BIG CHINO SUB-BASIN
WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Map Courtesy of SRP

BIGCHINO_CROPSURVEY_22.mxd 9/30/2022

Figure 9-3: Big Chino Crop Survey 2021 at Upper Big Chino



112°40'0"W

35°0'0"N

Big Chino Wash

Pine Creek

Walnut Creek

0 1 2 Miles

N

Alfalfa
Grain
Grass
Pasture
Sod
Vegetable
No Crop Evident (Abandoned/Fallow)
Groundwater Sub-basin (ADWR)

BIG CHINO SUB-BASIN WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Map Courtesy of SRP

BIGCHINO_CROPSURVEY_22.mxd 9/30/2022

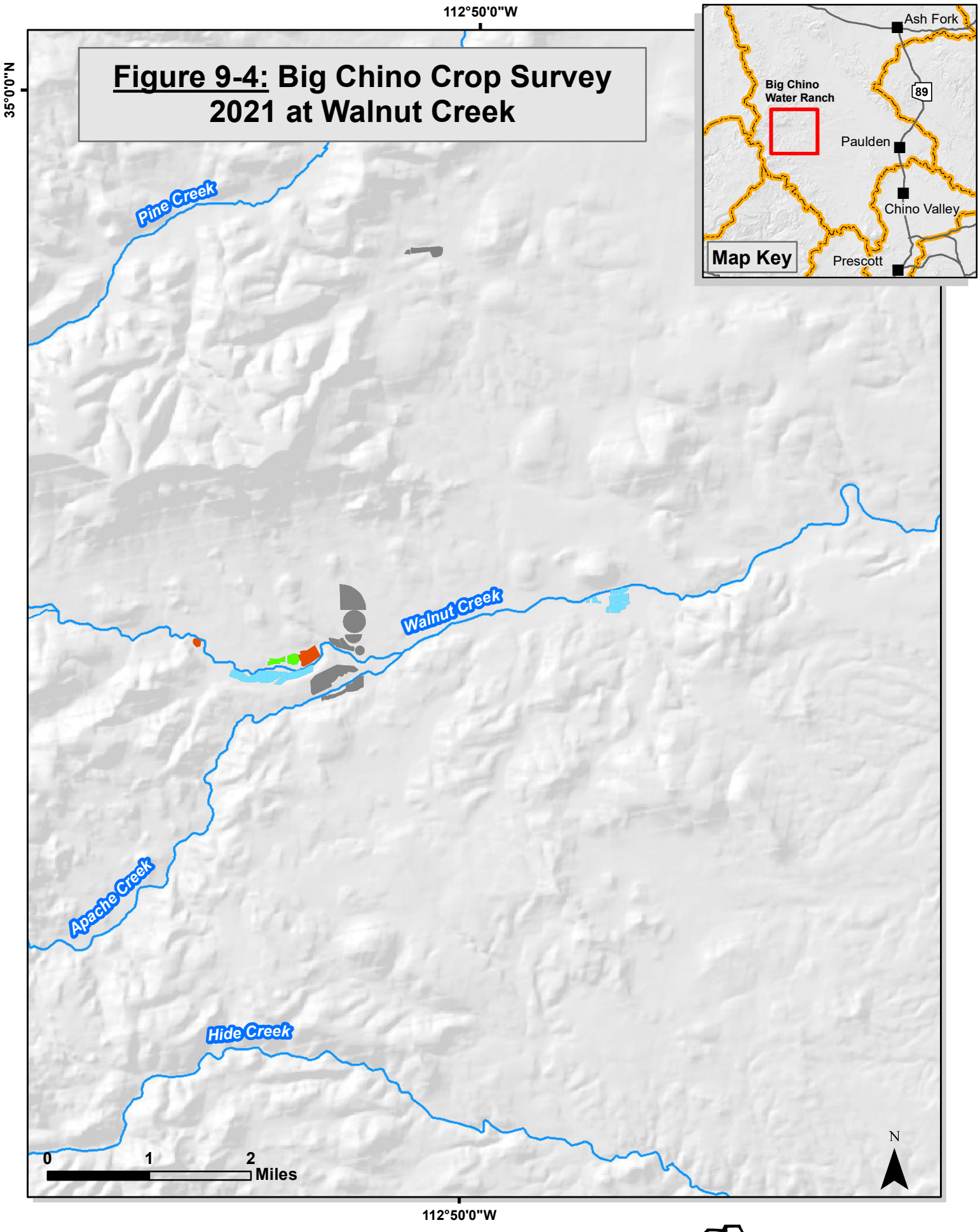
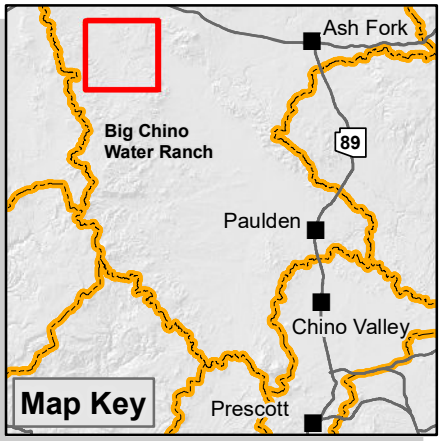


Figure 9-4: Big Chino Crop Survey 2021 at Walnut Creek
112°50'0"W
35°0'0"N
Pine Creek
Walnut Creek
Apache Creek
Hide Creek
Big Chino Water Ranch
Ash Fork
89
Paulden
Chino Valley
Prescott
Map Key
0
1
2
Miles
N
Alfalfa
Grain
Grass
Pasture
Sod
Vegetable
No Crop Evident (Abandoned/Fallow)
Groundwater Sub-basin (ADWR)
BIG CHINO SUB-BASIN WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP
Map Courtesy of
SRP
BIGCHINO_CROPSURVEY_22.mxd 9/30/2022

Figure 9-5: Big Chino Crop Survey 2021 at Turkey Canyon



Big Chino Wash

Turkey Canyon

Big Chino Wash

35°10'0"N

35°10'0"N

112°50'0"W

0 1 2 Miles

N

Alfalfa
Grain
Grass
Pasture
Sod
Vegetable
No Crop Evident (Abandoned/Fallow)
Groundwater Sub-basin (ADWR)

BIG CHINO SUB-BASIN
WATER MONITORING PROJECT
PRESCOTT - PRESCOTT VALLEY - SRP

Map Courtesy of SRP

BIGCHINO_CROPSURVEY_22.mxd 9/30/2022