



Aquatic Groundwater Dependent Ecosystems Field Trip

November 30, 2023

Foster Park and Confluence Aquatic
Habitat Areas





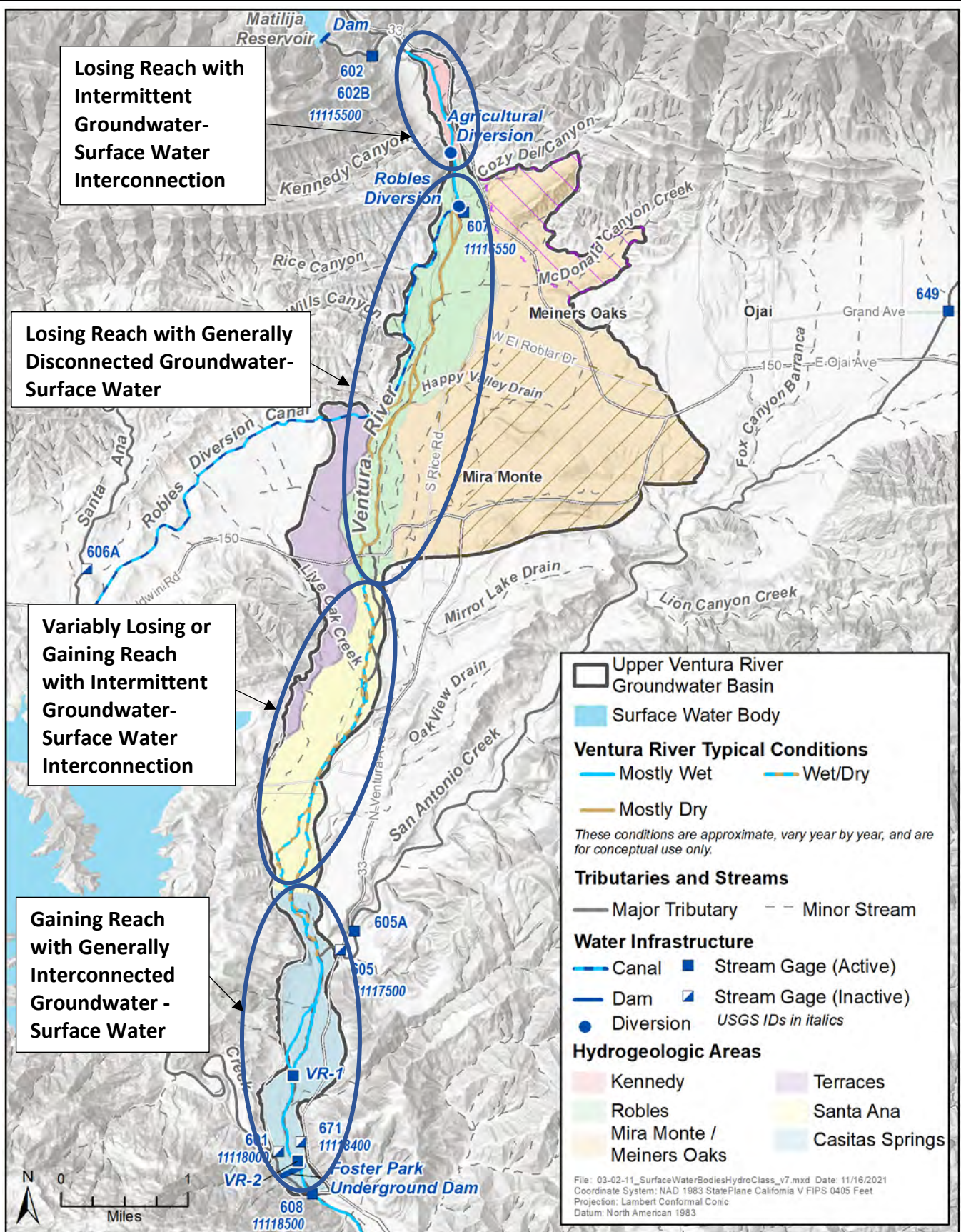
Agenda



1. Agenda Review and Logistics
2. SGMA and GSP Background
3. Overview of Aquatic GDE monitoring program elements
4. Hike to a monitoring area
5. Show and tell at Foster Park Aquatic GDE Habitat Area
6. Drive to Confluence Aquatic GDE Habitat Area
7. Show and tell Confluence Aquatic GDE Habitat Area
8. Q&A and Closing

Introduction and Background

- **Sustainable Groundwater Management Act (SGMA)**
 - Groundwater Sustainability Plan (GSP)
 - Sustainably manage groundwater resources and avoid undesirable results for the benefit of beneficial users
 - Prevent undesirable results for six sustainability indicators
- **GDEs are a beneficial user of groundwater and interconnected surface water**
 - Riparian GDEs identified and considered in the groundwater level sustainability indicator
 - Aquatic GDEs identified and considered in the depletion of interconnected surface water (ISW) sustainability indicator
 - Two Aquatic GDE areas identified as Foster Park and Confluence.
 - Foster Park Aquatic GDE: Sustainability criteria included in GSP to prevent undesirable result of significant stress or mortality to steelhead caused by groundwater extraction
 - Sustainable management criteria based on a 2012 study - goal of monitoring is to determine if sustainable management criteria prevent the undesirable result
 - Confluence Aquatic GDE: Goal of monitoring is to determine if sustainability criteria are needed.



Data Source: USGS, 2016a; VCWPD, 2020.

Figure 3.2-11 Surface Water Bodies – Hydrologic Conditions.

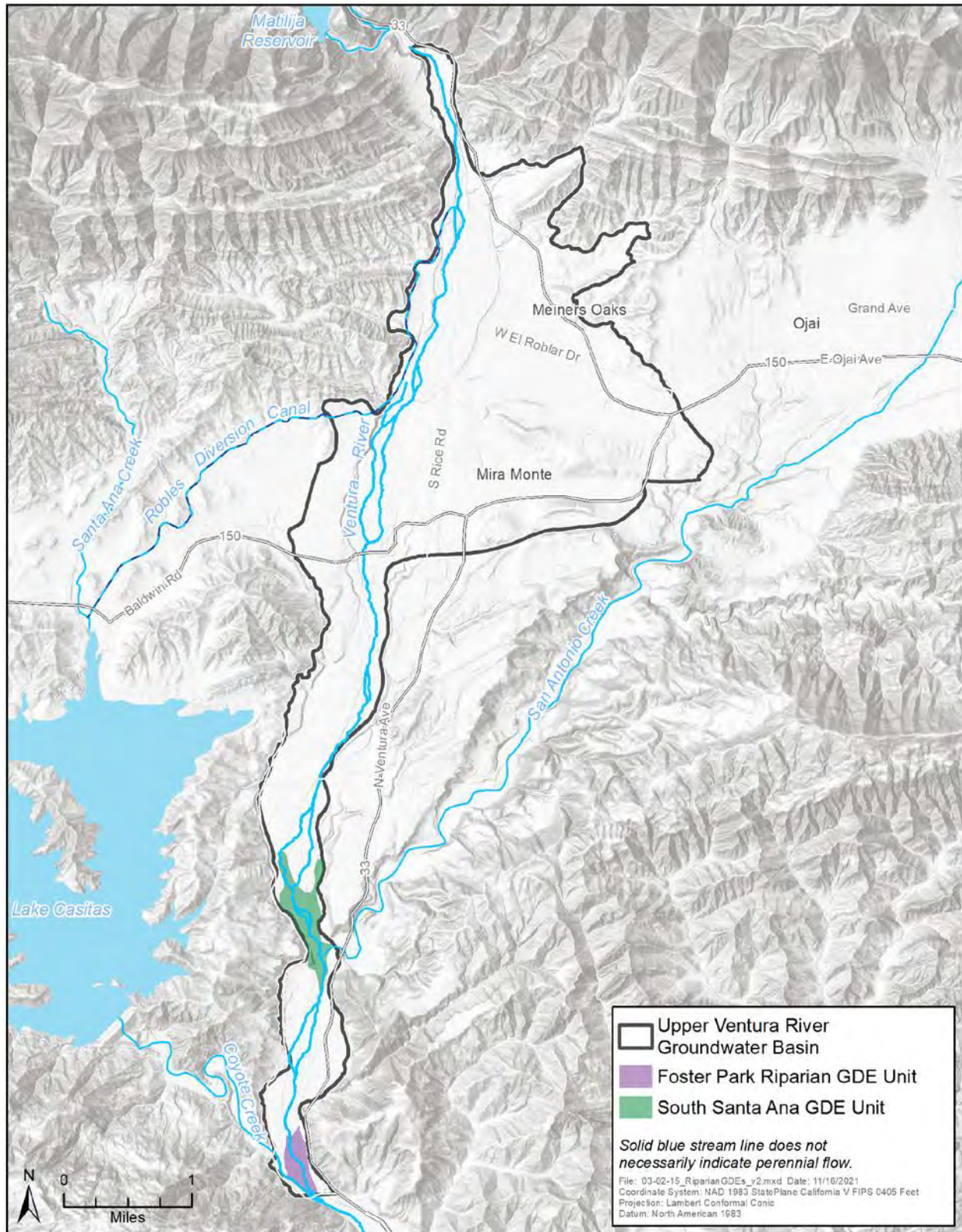
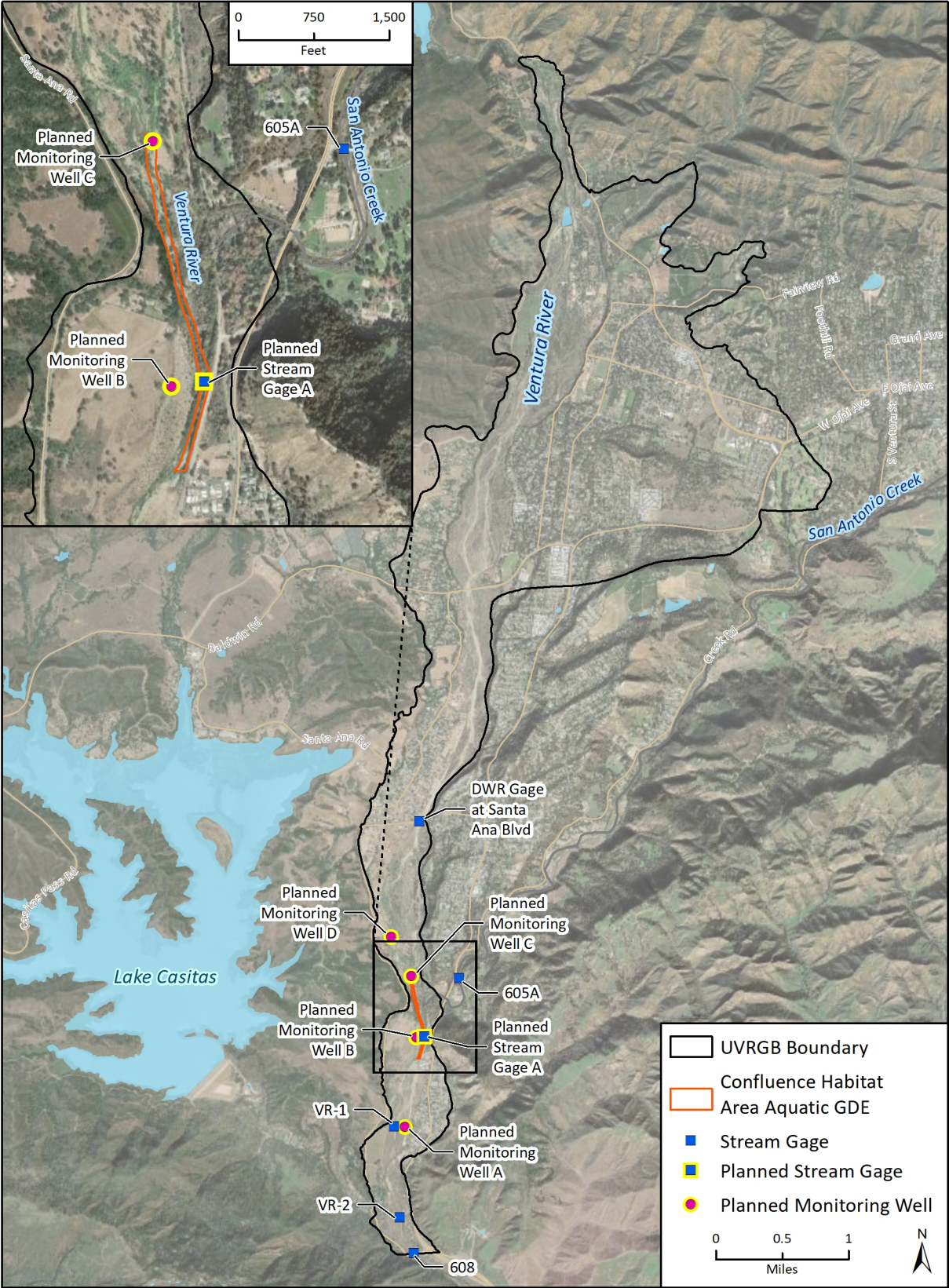


Figure 3.2-15 UVRGB Riparian GDE Map.



Ventura R NR Ventura - 11118500

November 29, 2022 - November 29, 2023

Discharge, cubic feet per second



Introduction and Background – Pre/Post 2023 Storm Season

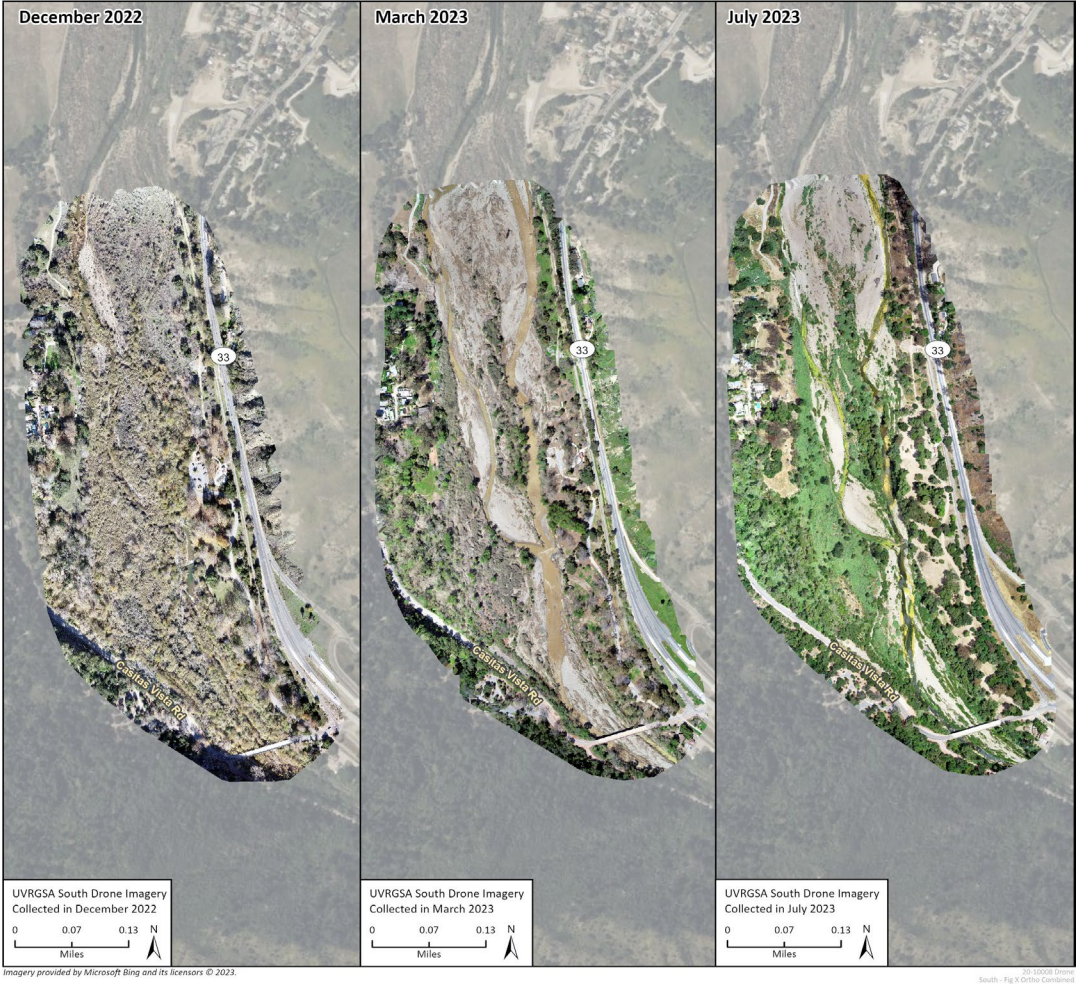


Foster Park Aquatic GDE December 2022: river channel is defined



Foster Park Aquatic GDE January 2023: river channel is expanded beyond defined channel and riparian vegetation is scoured away

Introduction and Background – Pre/Post 2023 Storm Season



Foster Park Aquatic GDE December 2022, March 2023, and July 2023: the defined river channel has been reset and the river now features braided channels with large portions of riparian vegetation scoured away



Overview of Monitoring Program Elements – Ongoing



Program Name	Description of Data Collection/ Study	Schedule	Notes
Groundwater Level Monitoring	Continuous groundwater level data logging currently in 5 wells and compilation of data collected by others in 3 additional wells	Continuous data collection, data are downloaded and archived on a semi-annual basis in May/June and September/October	The GSP proposes five additional wells into the network. Three of these wells will provide data directly upstream, downstream, and within the Confluence Aquatic Habitat Area. These additional wells will help to address data gaps identified in the GSP.
Streamflow Monitoring	Continuous streamflow monitoring at two proposed locations within the Basin.	Continuous data collection, data will be downloaded periodically. Gages will be maintained seasonally during baseflow recession period and dry season.	The GSP proposes two UVRGA-maintained baseflow gages, at the Camino Cielo Road crossing and within the Confluence Aquatic Habitat Area (Planned Stream Gage A, Figure 1).
Visual Stream Monitoring	Monitor the extent of surface water flows, map wet and dry reaches	Monthly for winter months and increased during late spring-to-Fall period	Informs analysis of how seasonal conditions influence streamflow and when various reaches within the Basin (and the Confluence Area) are typically dry.
Riparian GDE Monitoring	Desktop assessment of NDVI/NDMI values for riparian vegetation within GDEs, and assessment of relationship between these indices and groundwater levels	Annual desktop assessment	Assessment follows protocols outlined by The Nature Conservancy for evaluating riparian vegetative health within GDEs (The Nature Conservancy 2018).

Overview of Monitoring Program Elements – Aquatic GDE Specific

Monitoring Component	Data Collected	Purpose	Schedule	Locations	References/Protocols
Initial Habitat Mapping	Map aquatic mesohabitats in the Confluence Aquatic Habitat Area Aquatic GDE	Will provide in-depth information on existing habitats within the GDE and allow for identification of specific mesohabitats to monitor	Once at beginning of the program (likely during Fall 2022)	Entire Confluence Aquatic Habitat Area Aquatic GDE (approximately 3,450 feet in length)	California Salmonid Stream Habitat Restoration Manual (Flosi et al. 2010)
Fish Stranding and Mortality Surveys (Confluence only)	Document any observed fish stranding and/or mortality that might occur as streamflow recedes. The extent of wetted and dry portions of the river will also be documented.	Will provide important information on steelhead migration habitat within the GDE, as well as fine scale data on when and how streamflow recedes within this area following varying climatic conditions and modeled ISW depletion estimates.	Monthly to weekly during dry season, as streamflow recedes	Designated monitoring locations at important riffles within the Confluence Aquatic Habitat Area Aquatic GDE	Pedestrian Bank Surveys
Routine Habitat Suitability and Snorkel Surveys	Survey HSI parameters, including sediment type, riparian vegetation/cover, water depth, and various in-stream structure, as well as all species observed, within predetermined pools, riffles, and glides. Steelhead presence/absence will be documented during snorkel surveys. Fish stranding/mortality will also be documented.	Will provide in-depth information on existing conditions and allow for assessment of habitat suitability for steelhead, CRLF, and other aquatic organisms. Conditions can be quantified and compared with streamflow, as well as climatic data and modeled ISW depletion.	At least four times per year (once during winter and at least three times during summer/fall)	Designated monitoring locations (e.g., pools, riffles, glides) within the Confluence Aquatic Habitat Area Aquatic GDE	SS HSI (Normandeau Associates, Inc. 2015, Padre Associates, Inc. 2013) California Salmonid Stream Habitat Restoration Manual (Flosi et al. 2010) Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005) NWFS and CDFW Integration of Steelhead Viability Monitoring, Recovery Plans and Fisheries Management in the Southern Coastal Area (Boughton et al. 2022)

¹. Los Angeles Regional Water Quality Control Board

². U.S. Geological Survey

Overview of Monitoring Program Elements – Aquatic GDE Specific

Monitoring Component	Data Collected	Purpose	Schedule	Locations	References/Protocols
Water Quality and Flow Monitoring	Water level, DO, pH, temperature	Will provide continuous flow and water quality data that can then be correlated with streamflow, as well as climatic data and modeled ISW depletion.	Continuous data collection, data downloaded during each field visit	One designated location within the Confluence Aquatic Habitat Area Aquatic GDE	LARWQCB ¹ Basin Plan (2014), USGS ² standards for stream gauge installation, UVRGA Monitoring and Data Collection Protocols (2018)
Aerial Photography	Aerial images	Will provide a visual time series of overall conditions within the GDE and allow for comparison of conditions over time and during different hydrologic and climatic conditions	At least four times per year, concurrent with habitat suitability surveys	Aerial photographs will be taken of the upper, middle, and lower portions of the Habitat Area Aquatic GDE	General photography and FAA rules
Repeat Ground Photography	Photographs of instream and riparian habitat from fixed locations	Will provide a visual time series for each monitoring location that will allow for comparison of habitat conditions over time and during different hydrologic and climatic conditions	At least four times per year, concurrent with habitat suitability surveys	Photographs will be taken from fixed locations at each mesohabitat that is monitored during the habitat suitability surveys	General photography

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Overview of Monitoring Program Elements – Initial Habitat Mapping



Entire Aquatic GDE is surveyed to map mesohabitats (e.g., pools, riffles, glides) to provide in-depth information on existing habitats within the GDE and allow for identification of specific routine monitoring locations.

Mapping occurred at the beginning of the monitoring program to identify ongoing routine monitoring locations and occurs following large flooding events that cause significant morphologic shifts (which occurred in Winter 2023).

Overview of Monitoring Program Elements – Fish Stranding and Mortality Surveys (Confluence, only)



Performed monthly to weekly (depending on conditions) to document any observed fish stranding and/or mortality that might occur as streamflow recedes and potential habitat isolation occurs.

The surveys are conducted as pedestrian walking surveys and provide information on steelhead migration and refuge habitat within the GDE, as well as fine scale data on when and how streamflow recedes within this area following varying climatic conditions.

Overview of Monitoring Program Elements – Routine Habitat Suitability and Snorkel Surveys



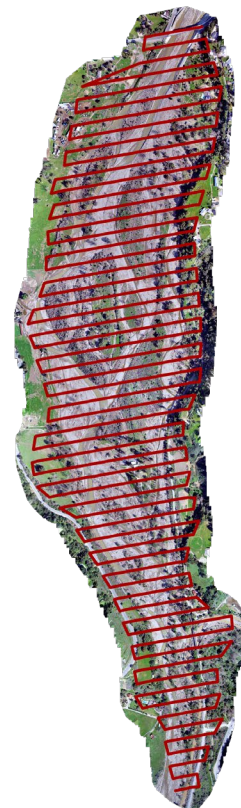
Routine surveys to monitor habitat suitability parameters within predetermined pools, riffles, and glides. Steelhead presence/absence is documented during snorkel surveys, as well as fish stranding/mortality. Surveys are conducted four times per year at designated monitoring locations identified in habitat mapping to provide in-depth information on existing conditions and allow for assessment of habitat suitability for steelhead, CRLF, and other aquatic organisms.

Overview of Monitoring Program Elements – Water Quality and Flow Monitoring



Continuous water level, dissolved oxygen, pH, and temperature are measured with data loggers, and instantaneous discharge measurements and channel cross sections are collected routinely to provide continuous level, flow, and water quality data. Two monitoring locations are established for each Aquatic GDE (Foster Park Aquatic GDE uses the USGS stream gage).

Overview of Monitoring Program Elements – Aerial Photography



Aerial orthoimagery and directional photos are collected using a drone flown by a licensed pilot at each Aquatic GDE to provide a visual time series of overall conditions and allow for comparison of conditions over time and during different hydrologic and climatic conditions.

Pre-flight plans are developed for the drone to follow a specific path to allow for the stitching of the high-resolution orthomosaic imagery.

Overview of Monitoring Program Elements – Repeat Ground Photography



Ground photos are collected of instream and riparian habitat from fixed locations at each mesohabitat that is monitored during the habitat suitability surveys.

This repeat photography provides a visual time series for each monitoring location for comparison of habitat conditions over time and during different hydrologic and climatic conditions.