Cambria Sustainable Water Facility
Adaptive Management Plan
Annual Report
2020

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Table of Contents

1.0 INTRODUCTION

This annual report is per requirements contained within the Cambria Sustainable Water Facility Project, Adaptive Management Plan (AMP) for the Cambria Community Services District (CCSD; Michael Baker International 2017a). The AMP requires annual reporting of surveys that were completed to analyze potential impacts to sensitive biological resources from the operation of the Sustainable Water Facility (SWF). The SWF is currently not in operation, therefore data collected for this annual report will form baseline conditions for possible future SWF operations. The annual report covers the period from March to December 2020.

AMP monitoring requires hydrological and biological monitoring, including California Rapid Assessment Method (CRAM) surveys, special status species surveys, and instream and riparian habitat monitoring. This report provides the methods, results, and discussion of the AMP monitoring per AMP requirements.

Future AMP reports will include additional hydrological analysis based on CCSD hydrological studies. From these hydrological studies AMP thresholds, monitoring measures, and performance standards will be updated. The SWF has not been in operation, so the AMP water budget for the SWF is not discussed in this monitoring report.

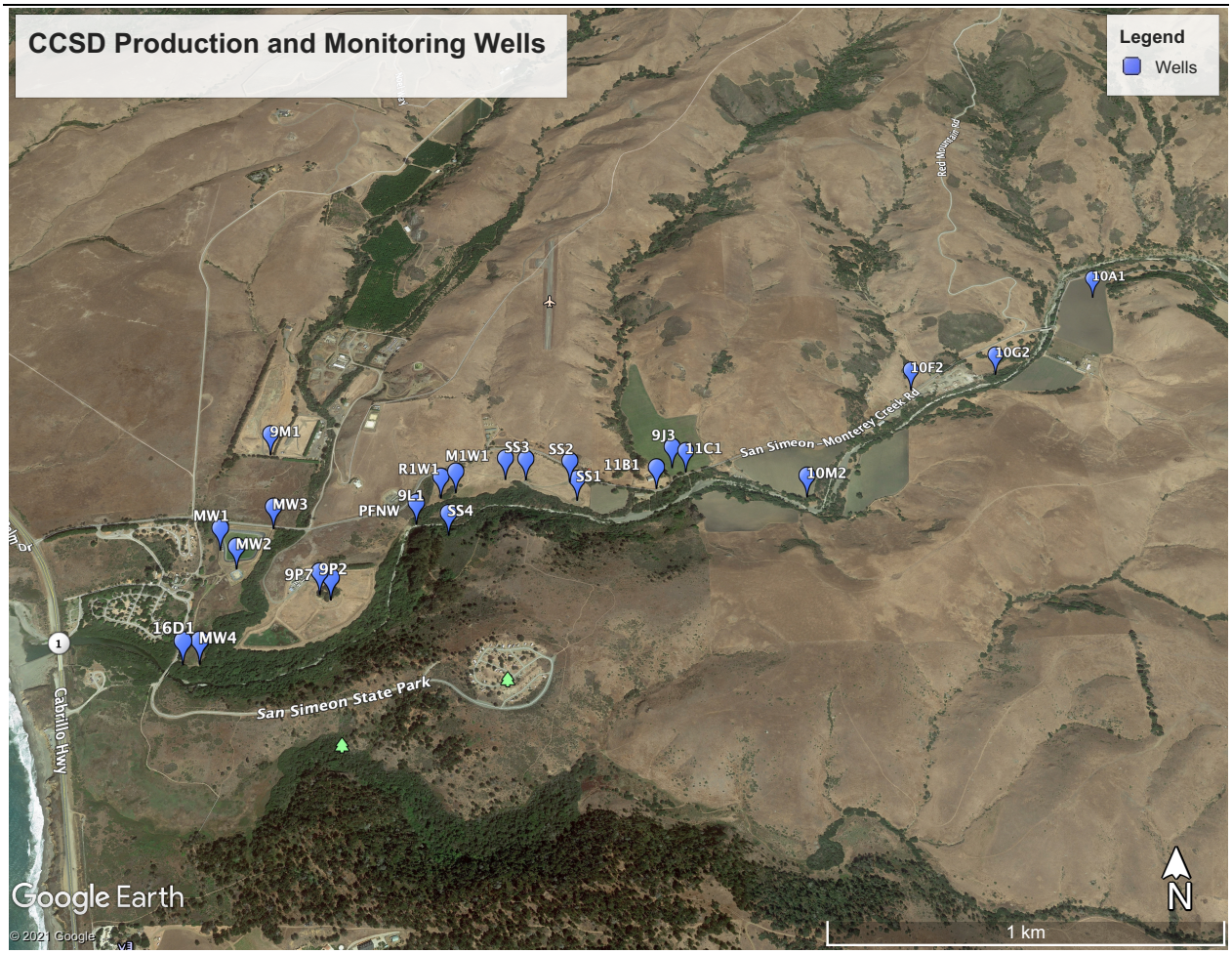
2.0 METHODS

2.1 Groundwater Monitoring

CCSD employees take well readings either bimonthly or monthly from: 16D1, MW4, MW1, MW2, MW3, 9M1, 9P2, 9P7, 9L1, RIW1, SS4, MIW, SS3, SS2, SS1, 11B1, 11C1, PFNW, 10A1, 10G2, 10G1, 10F2, 10M2, 9J3, lagoon, shown below.

SS1, SS2, and SS3 are CCSD production wells and 16D1, MW4, MW1, MW2, MW3, SS4, M1W1, 11B1, 11C1, 10A1, 10G2, 10G1, 10F are monitoring wells. 9P2 and 9P7 are currently monitoring wells but can provide gradient controls. 9L1 was an irrigation well but is currently a monitoring well. R1W1 and 10M2 were built for the SWF and are currently monitoring wells. Additional monitoring wells include SS4 and Lagoon that are located on State Parks property and 9M1 that is located on private property. PFNW (Palmer Flats New Well) is a USGS monitoring well and 9J3 is a domestic use well.

CCSD is currently installing four piezometers between well 9P7 and 16D1 for additional hydrological analysis. Once available this data will be incorporated into future AMP monitoring reports.



2.2 Groundwater Quality Monitoring

Semiannually, CCSD performs water quality analysis at wells SS3, SS4, 9P7, 16Dl, and 9N2 for nitrate/nitrogen, total dissolved solids, sodium, chloride, sulfate, boron, and pH. Additional water quality monitoring is required for SWF mitigation water per the RWQCB's General NPDES Permit for low threat discharges. Due to the nonoperation of the SWF this analysis is not performed at this time. Once the SWF is in operation, this data will be included in future reports.

2.3 Biological Monitoring

CRAM Surveys

The California Rapid Assessment Method was completed at Van Gordon Creek and San Simeon Creek. CRAM surveys evaluate wetland conditions based on landscape setting, hydrology, physical structure, and biological structure. CRAM surveys were completed on San Simeon Creek in 2005, 2007, and 2015. Each annual survey was compared with previous surveys to evaluate habitat conditions.

Special Status Species Surveys

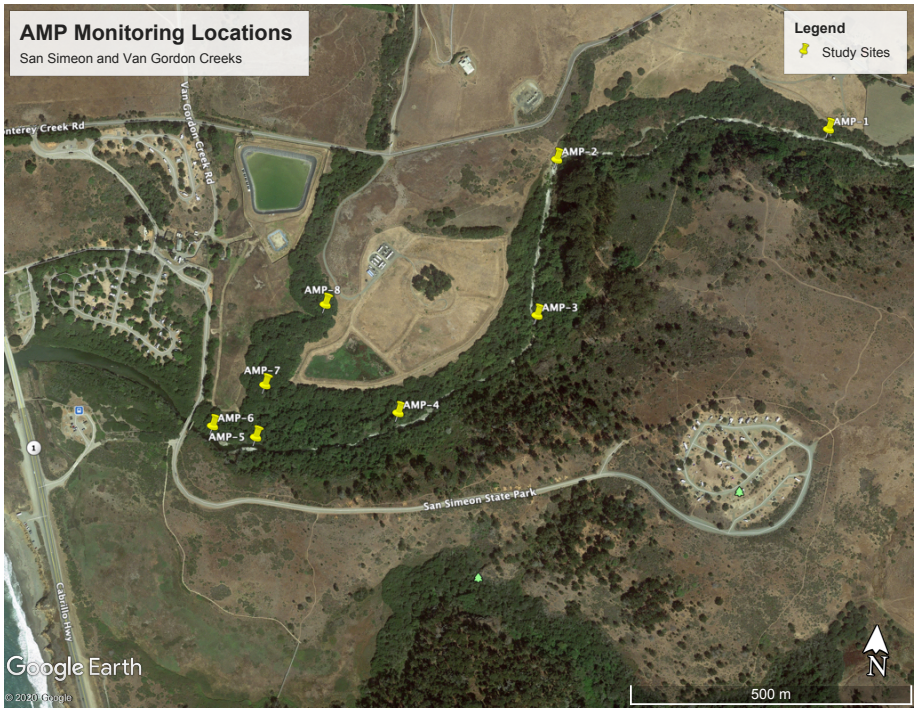
Per AMP guidelines non-protocol level, visual surveys for California red-legged frogs (*Rana draytonii*), tidewater gobies (*Eucyclogobius newberryi*), and south-central California coast steelhead Distinct Population Segment (DPS) were completed. There were two California red-legged frog surveys, once during the breeding season and once during the nonbreeding season and two tidewater goby surveys, once in the early summer and once during the early fall. One steelhead trout survey was completed in the summer. Species surveys for this report were for baseline species data and include a discussion of the species distribution and habitat requirements. Future AMP monitoring will include additional surveys during the appropriate survey periods.

Prior to the fieldwork, Cindy Cleveland conducted a review of documents concerning the study area and the surrounding areas, including a search of the California Natural Diversity Database (CDFW 2020a and CDFW 2020b). Other resources utilized for this summary report included various State and Federal regulations and aerial photographs.

The daytime surveys consisted of walking around the study area to characterize the habitat, assess site conditions, and prepare for the nighttime survey. The nighttime surveys consisted of walking upstream, using 400-800 lumen adjustable flashlights and 8 X 40 binoculars, while scanning for eyeshine and identifying all amphibians observed.

Instream and Riparian Habitat Monitoring

Per methods described in the AMP, biological surveys were conducted twice a month at 7 survey sites to collect habitat, vegetation, hydrological, water quality and species information. Survey sites and data collection methods are described below. See survey location map, below.



Survey Sites

As identified in the AMP, survey sites are located on CCSD property on San Simeon Creek and Van Gordon Creek. The survey sites are described below by site number, creek, access description, site description, and GPS coordinates.

Location	Creek	Access Description	Site Description	GPS
Site 1	San Simeon	Well field	Trail by SS-1	35°36'0.23"N 121° 6'33.42"W
Site 2	San Simeon	Trail behind MW-4 behind Van Gordon Reservoir	Below rock pool, approx. 0.4 miles upstream of Van Gordon confluence	35°35'57.55"N 121° 6'53.39"W
Site 3	San Simeon	Trail behind MW-4 behind Van Gordon Reservoir	Draw a line from 9P7 along road to the creek	35°35'48.09"N 121° 6'54.29"W
Site 4	San Simeon	Trail behind MW-4 behind Van Gordon Reservoir	Low flow channel in summer	35°35'41.88"N 121° 7'4.04"W
Site 5	San Simeon	Trail behind MW-4 behind Van Gordon Reservoir	Upstream of Van Gordon confluence	35°35'40.00"N 121° 7'14.25"W
Site 6	San Simeon	No Access on State Parks property	Downstream of Van Gordon confluence	
Site 7	Van Gordon	Trail behind MW-4 behind Van Gordon Reservoir	Upstream from trail before debris jam	35°35'43.10"N 121° 7'13.85"W
Site 8	Van Gordon	Inside locked gate of the AWTP	Down trail through riparian	35°35'48.06"N 35°35'48.06"N

Survey Conditions

Survey condition data includes survey times, weather, time and stage of high and low tides, if the sandbar is breached, and water levels for the San Simeon Creek County of San Luis Obispo Sensor 718, that records stage data near the well field.

Habitat

At each site, instream habitat data was collected for stream type (run, riffle, pool), instream cover type (large woody debris, small woody debris, bedrock, rootwad), substrate type (cobble, gravel, silt), percentage of substrate embeddedness, and estimated percentage of algae on the surface and subsurface.

Vegetation

At each site, vegetation was measured with percentage estimates of instream and overhead cover and soil moisture levels within riparian forests on both banks was taken with a General soil moisture meter. For both stream banks, riparian widths were measured with aerial photographs and ground verifications.

Hydrology

At each site, maximum wetted width and depth were measured with a stadia rod and average depth was calculated from 4 depth readings across the wetted width. Stream flow was measured with a Global Water Flow Probe.

Surface Water Quality

At each site, water quality was assessed using a YSI ProSolo ODO/CT optical meter to measure temperature in Fahrenheit, dissolved oxygen in parts per million (ppm), total dissolved solids in milligrams per liter (mg/L), and salinity in parts per trillion (ppt).

9P7 Soil Moisture

9P7 soil moisture was measured using a General soil moisture meter at cardinal points N, S, E, W of the 9P7 concrete pad. A photo of 9P7 and the surrounding trees was taken.

Species

Species observed during data collection were documented at each survey site. Types and abundance of non-native species was documented.

Photo Points

At each survey site, photos were taken with an iPhone 11 Pro Max using the 0.5 lens. The photos were taken from the center of the stream in four directions: upstream, right bank,

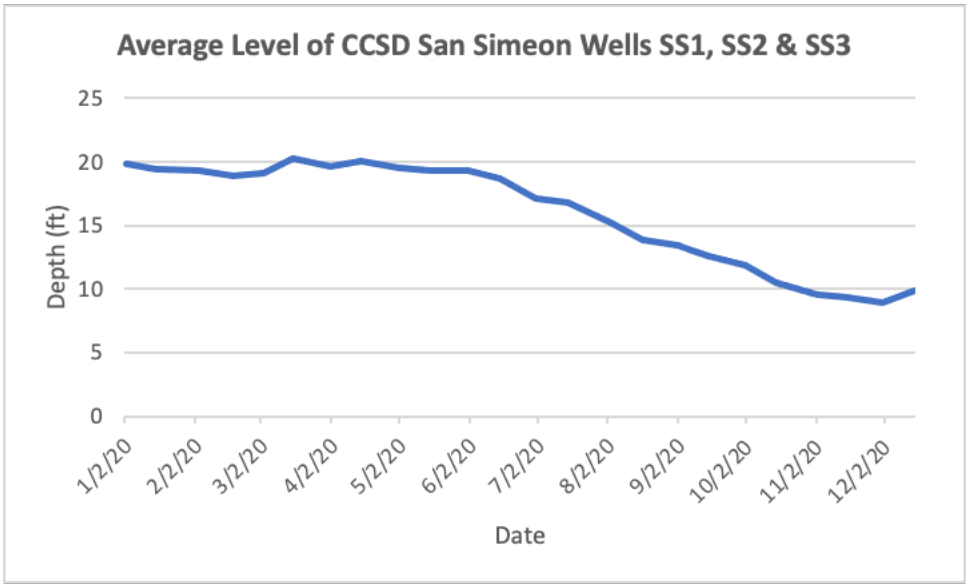
downstream, left bank. Aerial photographs were taken with a Mavic 2 Pro using Litchi Waypoint to preprogramed GPS points. These photos were used to determine if there were any changes in vegetation composition or health.

There were two additional video and still photo locations for stream flow analysis: PS-1, the San Simeon Creek bridge on Van Gordon Creek Road and PS-2, the San Simeon Creek bridge on Highway 1.

3.0 RESULTS

3.1 Groundwater Monitoring

CCSD production well data is presented below for average depth (in feet) for 2020. Well levels will be used for baseline data.



3.2 CRAM Surveys

A Van Gordon Creek CRAM survey was completed on July 28, 2020. Van Gordon Creek is a riverine non-confined system which had an Index Score of 69. A 2015 CRAM survey on Van Gordon Creek had an Index Score of 66. A comparison of the two CRAM surveys shows minor variations in scoring of the attributes which contributed to the different scores. There does not appear to be any significant changes on Van Gordon Creek between the 2015 to 2020 surveys.

A San Simeon Creek CRAM survey was completed, approximately one mile upstream from the creek mouth, on August 16, 2020. San Simeon Creek is a riverine non-confined system which had an Index Score of 78. A 2015 CRAM survey on lower San Simeon Creek had an Index Score of 81. A comparison of the two CRAM surveys shows a slight decrease in structural patch richness and number of co-dominant species from 2015 to 2020 even though these variations are minor they could be due to an increase in invasive plant species. It may also be due to uncertainty of the exact location of the 2015 survey.

Historical CRAM surveys showed similar indexes to the 2020 survey. In 2005, a San Simeon CRAM survey had an Index Score of 84 and in 2007 an Index Score of 83. These surveys were completed at the confluence of Van Gordon Creek and San Simeon Creek approximately 0.65 miles downstream from the 2020 survey.

3.3 Special Status Species Surveys

Non-protocol level, visual surveys for California red-legged frogs, tidewater gobies, and steelhead trout were completed. The California red-legged frog surveys were completed under Cindy Cleveland's U.S. Fish and Wildlife California red-legged frog 10(a)(1)(a) Recovery Permit TE71222B-1 that expires on 08.03.2025. All three species were observed during the surveys.

California red-legged frogs

On March 18, 2020 and October 11, 2020 Cindy Cleveland and Paul Cleveland conducted daytime and nighttime California red-legged frog surveys following the protocol contained within the "Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog" (USFWS 2005). The surveys were conducted within the study area that extended from the mouth of Van Gordon Creek upstream for approximately 900 feet, see map below.

Species background

Federally listed California red-legged frogs are the largest native frog in the western United States (USFSW 2010). Historically, California red-legged frogs occurred in California and Baja California from sea level to approximately 5,000 feet (USFWS 2010). The lower abdomen and underside of the hind legs are usually red or pink in color and they have prominent dorsal folds (USFWS 2000).

Over their range, breeding for the California red-legged frog takes place from late November to late April, however, timing can vary depending rainfall which influences breeding behaviors (USFWS 2000, Ford et al. 2013). Males usually show up at breeding pools two to four weeks ahead of females and commence vocalizations (USFWS 2010). Egg masses are laid in areas in areas of still water among emergent vegetation, twigs, or other structures (USFWS 2010, Ford et al. 2013). Eggs hatch in 6-14 days and tadpoles metamorphose in 3.5-7 months (USFWS 2010). Juveniles usually move to shallow portions of the breeding area or to nearby areas with water (Ford et al. 2013). Adult California red-legged frog may disperse from breeding sites at any time of the year and some move to dry season refuges after breeding (USFWS 2010, Ford et al. 2013).

California red-legged frogs occur in both aquatic and terrestrial habitats within 1 to 2 miles of breeding sites. Habitat for the California red-legged frog includes still or slow-moving water in ponds, reservoirs, marshes, streams, and other permanent bodies of water and the surrounding upland habitats (USFWS 2000). California red-legged frogs can forage, shelter, and use cover in almost any habitat that is moist and cool during the summer; this includes upland habitats containing mammal burrows, logs, and manmade structures such as culverts (USFWS 2010). California red-legged frog water quality requirements can widely vary (Ford et al. 2013). Water temperatures for egg laying are usually less than 60.8° Fahrenheit (Cook 1997). Embryos are tolerant of stream water temperatures between 48 and 70° Fahrenheit (USFWS 2000). Adult frogs prefer water temperature above 60° Fahrenheit but are common at 50° Fahrenheit (Ford et al. 2013). The authors have seen high numbers of CRLFs in estuarine and streams when surface water temperatures approaching 80° Fahrenheit, although there were likely nearby areas with cooler water temperatures. California red-legged frogs are sensitive to high salinity. Salinity over 4.5 ppt has been shown to kill egg and levels at 7.0 ppt cause larvae to die (USFWS 2000). The maximum salinity tolerance is 9 ppt for adults (Cook 1997). Turbidity ranges for California red-legged frogs are 0.9 NTU to 326 NTU, dissolved oxygen ranges are 0-24.5 mg/L, nitrate ranges from 0-4.0 mg/L (Ford et al. 2013).

Water depth influences water temperatures and predator avoidance. California red-legged frogs need areas of deep water (usually deeper than one yard) for predator avoidance. The authors have observed adults in very shallow pool habitats but they were the deepest areas of water at a site and as the water gets shallower the juveniles are observed.

Species Status and Distribution

California red-legged frogs are listed as federally threatened species and a California Department of Fish and Wildlife California species of special concern. The entire study area is located in California red-legged frog critical habitat (USFWS 2020).
According to the California Natural Diversity Database (CNDDB) there are multiple occurrences of the California red-legged frog in and around the study area. In 1992 and 1993 federal researchers completed 26 California red-legged frog surveys in San Simeon Creek and Lagoon (Rathbun et al., 1993). They observed 379 California red-legged frogs with 125 frogs under <60 mm and 254 frogs >60 mm. During the 1992 and 1993 surveys, adult California red-legged frogs and tadpoles were also observed in Van Gordon Creek (Rathbun et al. 1993).

In 1997, Cindy Cleveland observed adult California red-legged frogs in San Simeon Lagoon. In 2014, RBF Consulting, A Michael Baker International Company, completed two mark-recapture night surveys in San Simeon Lagoon and Creek with a total of 53 observed California red-legged frogs (RBF Consulting 2015). In 2015, Cleveland Biological, LLC found 15 juvenile and adult California red-legged frogs in lower San Simeon Creek (Cleveland Biological, LLC 2015). California red-legged frogs are also known to occur in watersheds that are within two miles of the study area: Pico Creek (Cindy Cleveland pers. ob.), Leffingwell Creek and Santa Rosa Creek (RBF 2015).

Survey Results

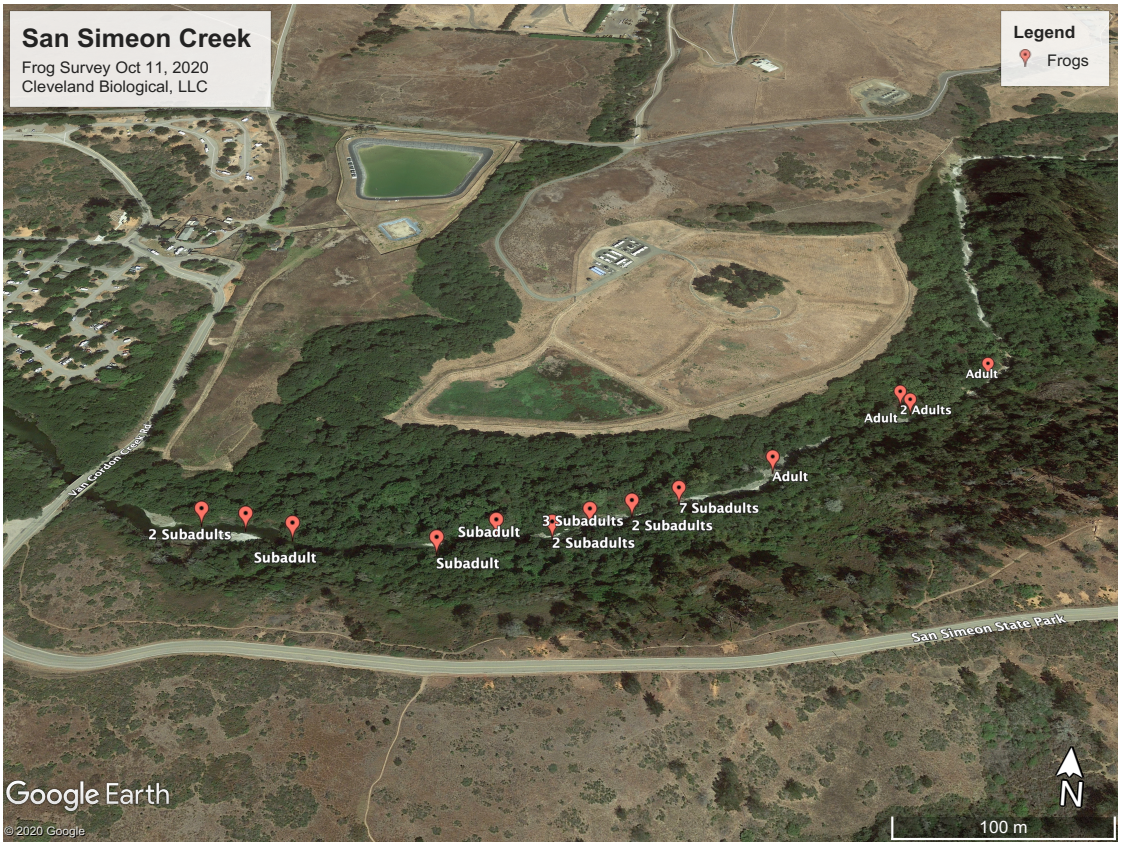
The study area is located at 35°35'44"N/121°07'27"W, with agricultural uses to the north, San Simeon State Park to the south and west, and the onsite CCSD percolations ponds and wells on the northeast and east. Beyond San Simeon State Park and CCSD property are rolling hills that support livestock, agricultural crops and native habitats. San Simeon Creek is mostly unconsolidated alluvium underlain by bedrock (USGS 1998). The banks of San Simeon Creek are lined with Central Coast Arroyo Willow Riparian Forest dominated by dense stands of arroyo willow (*Salix lasiolepis*).

San Simeon Creek is mostly arroyo willow and red willow, with an understory of common nettle, California blackberry, mugwort, western poison oak, some American black nightshade, red osier dogwood, and abundant hemlock and non-native Cape ivy or German ivy. There is also a healthy population of Western sycamores. The survey area has good habitat quality for California red-legged frogs, with some naturally formed deep pools. The pool habitat is created from willow tree rootwads and the creek being allowed to meander. There is not an abundance of emergent vegetation, however, this is not because the system is out of balance.

There were two surveys, March 18, 2020 and October 11, 2020. The surveys were from the mouth of Van Gordon Creek upstream for approximately 3,000 feet. The March 18, 2020 daytime survey was from 10:30 to 13:00. No California red-legged frogs were observed during

the daytime survey. The nighttime survey was completed at least one hour after sunset between the hours of 19:30 and 23:00. The moon phase was 32%, water temperature was 58 degrees Fahrenheit, humidity was 84%, and the wind was from the west and very light. The survey conditions were clear and calm. The stream flow was approximately 10 cfs with no algae and unembedded substrates. The deepest pool was approximately 5 feet with an average stream depth of 2 feet. Six adult California red-legged frogs were observed during the night survey and two other frog "plops" were heard but the species was not identified (see map below). No bullfrog "squawk" was heard when the unidentified frogs jumped, but based on professional experience, we find that bullfrogs often do not squawk when they jump into cover. One California red-legged frog advertisement call, with ending growls, was observed and recorded at night. The frog was sitting on a branch over a deep pool near the confluence of Van Gordon and San Simeon Creeks.

The October 11, 2020 daytime survey was from 10:00 am to 12:00. The air temperature was 80 Fahrenheit. One "plop" was heard during the day survey. The night survey was from 19:30 to 22:00 with an air temperature of 64 degrees Fahrenheit. The moon phase was 35%, water temperature was 59 degrees Fahrenheit, humidity was 73%, and the wind was from the northeast and very light. The survey conditions were clear and warm. The stream flow was approximately 0.1 cfs with filamentous green algae and unembedded substrates. The deepest pool was approximately 1.4 feet with an average stream depth of 0.7 feet. Five adult and 20 subadult California red-legged frogs were observed, see map below.



Steelhead Trout and Tidewater Gobies

On May 25, August 30, and October 11, 2020 Cindy Cleveland and Paul Cleveland conducted steelhead trout and tidewater goby surveys were conducted within the study area located on Van Gordon Creek and San Simeon Creek. The visual surveys consisted of walking around the study area to characterize the habitat, assess site conditions, and record visually observed fish species.

Study Area

The study area is located at 35°35'44"N/121°07'27"W, with agricultural uses to the north, San Simeon State Park to the south and west, and onsite CCSD percolations ponds and wells on the northeast and east. Beyond San Simeon State Park and CCSD properties are rolling hills that support livestock, agricultural crops and native habitats. San Simeon Creek is mostly unconsolidated alluvium underlain by bedrock (USGS 1998). The banks of San Simeon Creek are lined with Central Coast Arroyo Willow Riparian Forest dominated by dense stands of arroyo willow. San Simeon Creek is approximately 35 square miles with two main forks, the north fork and the south fork.

Steelhead trout

Species background

Steelhead Trout are listed as a Federally threatened species under the Endangered Species Act. Steelhead trout were originally listed on January 5, 2006 and the listing was updated on April

14, 2014 (NOAA 2015). The study area is located in steelhead trout critical habitat and San Simeon Creek steelhead trout are within the south-central California coast steelhead DPS (NOAA 2015).

Steelhead trout are silvery-white on the underside with a heavily speckled body and a pink to red stripe along their sides (NOAA 2015). Adult female steelhead trout prepare a redd (or nest) in a stream and may deposit eggs in 4 to 5 'nesting pockets' within a single redd. Steelhead trout are hatched in cool, fast running streams, some stay in fresh water while others move to marine habitats (NOAA 2015). The fish that stay in fresh water are called rainbow trout; the fish that migrate to the ocean are called steelhead trout. Steelhead trout are usually larger than rainbow trout. Juvenile steelhead may spend up to 7 years in freshwater before migrating to the ocean for up to 3 years before migrating back to freshwater to spawn (NOAA 2015). Young trout feed primarily on zooplankton and adults feed on aquatic and terrestrial insects, mollusks, crustaceans, fish eggs, and other small fishes (NOAA 2015).

Optimal conditions for steelhead trout in San Simeon Creek are believed to be salinity of less than 10 parts per thousand (ppt), water temperatures below 72 degrees Fahrenheit, and dissolved oxygen of greater than 5 parts per million (ppm) (CCSD 2017). Steelhead trout can live in dissolved oxygens habitats with 1-2 ppm, however, this is usually for only short periods of time as described in the AMP, "typically only in the morning when temperature is low and DO is at its lowest due to overnight algal respiration. Algae conduct photosynthesis during the day when the sun is out, consuming carbon dioxide and producing high amounts of oxygen. At night the opposite trend occurs with photorespiration: algae consume and can nearly deplete oxygen while simultaneously producing high levels of carbon dioxide, thus leading to substantially lower DO levels overnight and into early morning. Steelhead ecology is such that these temporary nightly drops in DO are tolerable because the temperature is generally cooler and metabolic rate is reduced; as water temperature increases over the course of the day, fish metabolic rates increase (generally doubling with each 10°C increase in water temperature) and they require more oxygen. It is estimated that steelhead would be able to survive for only 15-30 minutes with 1-2 ppm DO" (CCSD 2017 pg. 26).

Steelhead Trout Historical Distribution

Titus provides a detailed history of steelhead trout in San Simeon Creek which is summarized below (Titus et al. 2010). California Department of Fish and Game (CDFG, now Fish and Wildlife) surveyed San Simeon Creek in the 1930's and found that spawning grounds for steelhead were common except in the upper areas [upper area not defined]. The middle and lower portions of San Simeon dried up in late summer over several years, which resulted in a loss of rearing habitat. In 1932 the creek was stocked with 10,000 juvenile steelhead trout and in 1933 with 8,000 juvenile steelhead trout. During 1948 CDFG surveys they found abundant spawning substrates and juveniles (approximately 160-250 trout/100 meters) and a bedrock barrier approximately 5.3 miles from the mouth. San Simeon Creek was planted with hatchery trout

again from 1947-1950. Surveys in the 1960-1970s showed high quality spawning gravels but had limited steelhead trout populations. They theorize that steelhead trout populations could have been impacted from upstream gravel mining operations and a historic mercury mine. Surveys in the 1980-1990s found lower numbers of steelhead and noted the impacts to steelhead from upstream gravel mining and diminished creek flows.

In 1990 to 2002 steelhead trout were rescued by scientists and volunteers and held in a pond on Van Gordon Creek for the summer (Alley 2004, CEMAR 2020). In 1992 and 1993 researchers surveyed San Simeon Creek for steelhead trout (Rathbun et al. 1993). They found one juvenile steelhead trout in San Simeon Lagoon and one juvenile in lower San Simeon Creek. They speculate that the low number of steelhead trout in the lagoon may have been related to dissolved oxygen levels that were below 5.0 ppm (Rathbun et al. 1993). They also observed exotic brown bullhead catfish that may have washed down from a stock pond, located on an upstream side drainage. In a 2004 Alley and Associates summarized fish surveys they completed from 1994 to 2003 for San Simeon Creek and found an increase in steelhead trout population in relation to streamflows (Alley 2004).

Tidewater Goby

Tidewater gobies are listed as a Federally threatened species under the Endangered Species Act. Tidewater gobies were originally listed as endangered on March 7, 1994; however, this listing was reclassified as threatened on March 13, 2014. The study area is located in tidewater goby critical habitat (USFWS 2013, USFWS 2020).

Species background

The tidewater goby is found in year-round California coastal lagoons, estuaries, and marshes (USFWS 2015). They are most often found at the bottom of estuarine slow water habitats that are less than 6 feet in depth, but often move upstream into freshwater streams (USFWS 2013). They have been documented in slack freshwater habitats 5 miles upstream from San Antonio lagoon in Santa Barbara County (USFWS 2015). Tidewater gobies can be flushed into marine habitats during seasonal breaching of sandbars, but may not survive for long periods in the marine environment (USFWS 2015).

Tidewater gobies prefer a sandy substrate for breeding and may have a wide tolerance for salinity, oxygenation, and temperature, especially over short time periods or seasonally (USFWS 2015). Sandbars influence tidewater goby populations by providing a barrier, and lower salinities, between marine and freshwater habitats (USFWS 2013). Artificial breaching of a sandbar limits tidewater goby habitats by increasing the salinity and decreasing ponded areas. Natural breaching of the sandbar usually occurs during the winter when tidewater goby breeding is at a low point in the lifecycle (USFWS 2013). Freshwater distribution is influenced by salinity, stream gradients, and barriers.

The tidewater goby is a small, elongate, fish with large pectoral fins, that rarely exceeds 2 inches in length (USFWS 2015). Population sizes vary from a few fish to thousands of individuals. Reproduction peaks in spring and late summer but may occur year-round. Reproduction begins with a male goby digging a 10 to 20 centimeters nesting burrow in the substrate, while the female goby lays 300 to 500 eggs (USFWS 2015). Spawning water temperatures range between 48 and 77 degrees Fahrenheit and salinity ranges between 1 and 30 ppt; but gobies can live with higher salinities (USFWS 2013).

Tidewater Goby Historical Distribution

Surveys completed in 1993 by a federal researcher found tidewater gobies in San Simeon lagoon and 500 meters upstream (Rathbun et al. 1993). During the surveys, tidewater goby numbers peaked during the summer months after reproducing in the lagoon. Twelve monthly surveys found 7,962 juvenile (< 31 mm) and 3,573 adult gobies (>31 mm). In 2014, San Simeon Lagoon was seined to monitor tidewater goby populations and nine seine hauls resulted in 1,002 tidewater gobies (Alley 2015).

Field Survey Results

The May 25, 2020 survey was from 10:30 to 13:45. The high tide of 3.32 feet was at 14:13; the sandbar was not breached. The air temperature was 68 degrees Fahrenheit at the beginning of survey and 72 degrees Fahrenheit at the end of the survey. The skies were clear for the entire survey. The water temperature was 63 degrees Fahrenheit at the Van Gordon and San Simeon Creek confluence and 70 degrees Fahrenheit near end of the survey by the SS1 well. The surveyed habitats were a mix of pools, runs, and riffles with mostly cobble and gravel substrates. The substrate embeddedness was on average 50%, there was no surface algae at any survey site and some subsurface algae near the Van Gordon and San Simeon Creek confluence; there was filamentous algae in between survey sites. The instream cover on average was 15% and overhead cover on average was 15%. The maximum depth was 2.1 feet, average depth was 1.0 feet, and flow ranged from 0.1 to 0.3 ft/sec. Dissolved oxygen ranged from 7.7 to 10.1 ppm, total dissolved solids ranged from 357 to 555 mg/L, and salinity ranged from 0.27 to 0.42 ppt.

Five steelhead trout, approximately 5” to 6” inches, were observed between sites 1 and 2 (near the SS1 well). Steelhead trout redds were observed throughout the survey area at pool-tail crests. Long strands of filamentous algae between survey sites did not allow for a redd count. Several schools of small three-spined stickleback (*Gasterosteus aculeatus*) were observed throughout the study area. No tidewater gobies were observed during this survey, however, tidewater gobies have been observed within the survey area during monitoring surveys.
The August 30, 2020 survey was from 0:800 to 13:00. The high tide of 4.38 feet was at 10:40; the sandbar was not breached. The air temperature was 62 degrees Fahrenheit, with overcast skies for the entire survey. The water temperature was 62.6 degrees Fahrenheit at the Van Gordon and San Simeon Creek confluence and 60.8 degrees Fahrenheit where the streamflow

ended near the middle of the survey area. The surveyed habitats were a mix of pools, runs, and riffles with mostly cobble and gravel substrates. The substrate embeddedness was on average 50%, there was no surface algae at any survey site and almost 100% subsurface algae near the Van Gordon and San Simeon Creek confluence; there was filamentous algae in between survey sites. The instream cover on average was 15% and overhead cover on average was 15%. The maximum depth was 1.4 feet, average depth was 0.6 feet, and flow was 0.1 ft/sec. Dissolved oxygen ranged from 2.08 to 2.47 ppm, total dissolved solids ranged from 444 to 778 mg/L, and salinity ranged from 0.34 to 0.6 ppt.

Five steelhead trout, approximately 6-8" inches in length were observed upstream of site 2 (near the end of the survey area). The trout appeared to have a fungal lesions; water quality data taken at the pool during the survey were, water temperature 59.3 degrees Fahrenheit, dissolved oxygen 1.95ppm, total dissolved solids 367 mg/L, and salinity was 0.27 ppt. Many three-spined sticklebacks were observed throughout the study area. No tidewater gobies were observed.

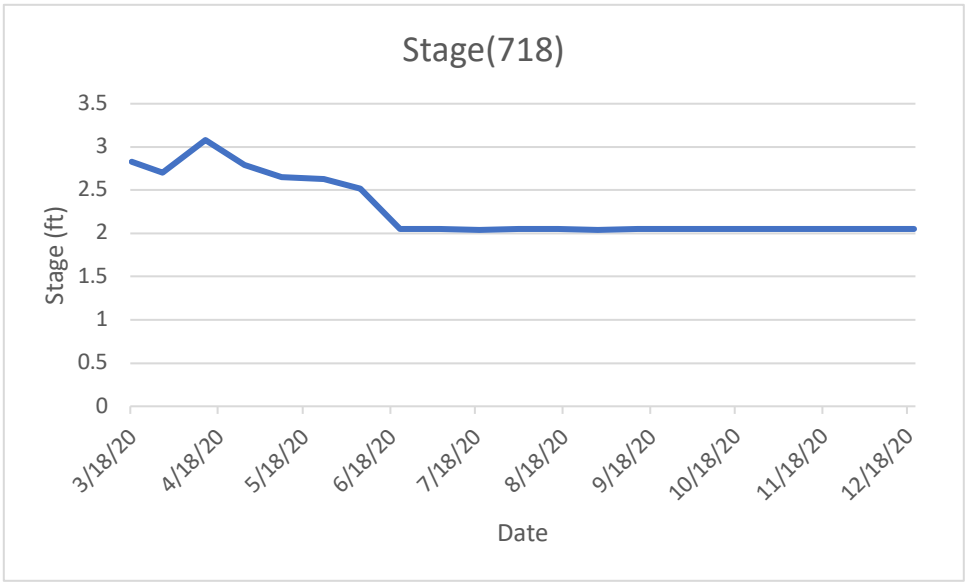
CDFW was contacted for a possible fish rescue for the trout in the aforementioned pool and on September 4, 2020 Cindy Cleveland, D. Baldwin (CDFW), and D. Michniuk (CDFW) performed a site survey at the pool. Approximately 3 trout that were 6" in length and 5 trout under 3" in length were observed in the pool and the fungal infection was observed. After a discussion in the field, it was decided to leave the fish in the pool.

The October 11, 2020 survey was from 0:900 to 13:00. The high tide of 3.98 feet was at 07:51; the sandbar was not breached. The air temperature was 68 degrees Fahrenheit at the beginning of survey and was 80 degrees Fahrenheit at the end of the survey. The skies were clear for the entire survey. The water temperature was 63.5 degrees Fahrenheit at the Van Gordon and San Simeon Creek confluence and 60.9 degrees Fahrenheit where the streamflow ended near the middle of the survey area. The surveyed habitats were a mix of pools, runs, and riffles with mostly cobble and gravel substrates. The substrate embeddedness was on average 50%, there was no surface algae at any survey site and almost 100% subsurface algae over the entire survey area. The instream cover on average was 15% and overhead cover on average was 15%. The maximum depth was 1.1 feet, average depth was 0.5 feet, and flow was 0.1 ft/sec. Dissolved oxygen ranged from 2.52 to 4.35 ppm, total dissolved solids ranged from 461 to 700 mg/L, and salinity ranged from 0.35 to 0.54 ppt. Observed fish include many stickleback, one 8" steelhead trout, and one 4" prickly sculpin, see map below.

3.4 Instream and Riparian Habitat Monitoring

Survey Conditions

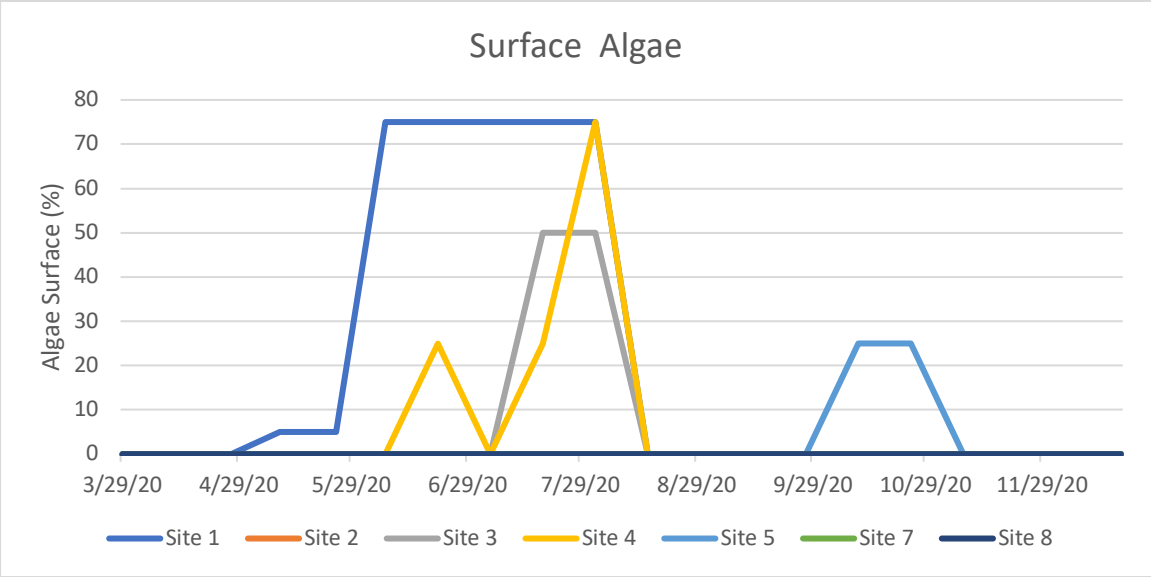
The sandbar was breached until the May 25, 2020 survey when it stayed closed till the end of the year. San Simeon Creek County of San Luis Obispo Sensor 718 water level is presented in the graph below.

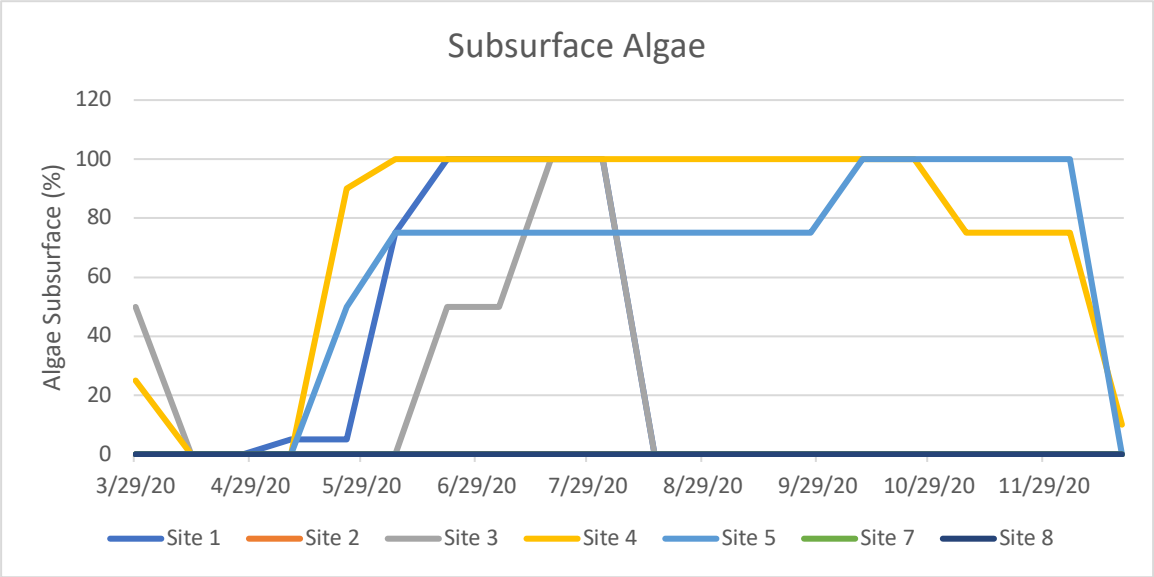


Habitat

For each survey site, there were minor instream habitat changes throughout the year. Below is a summary of what typically occurred at each site. Surface and subsurface algae percentages for each survey site are also presented.

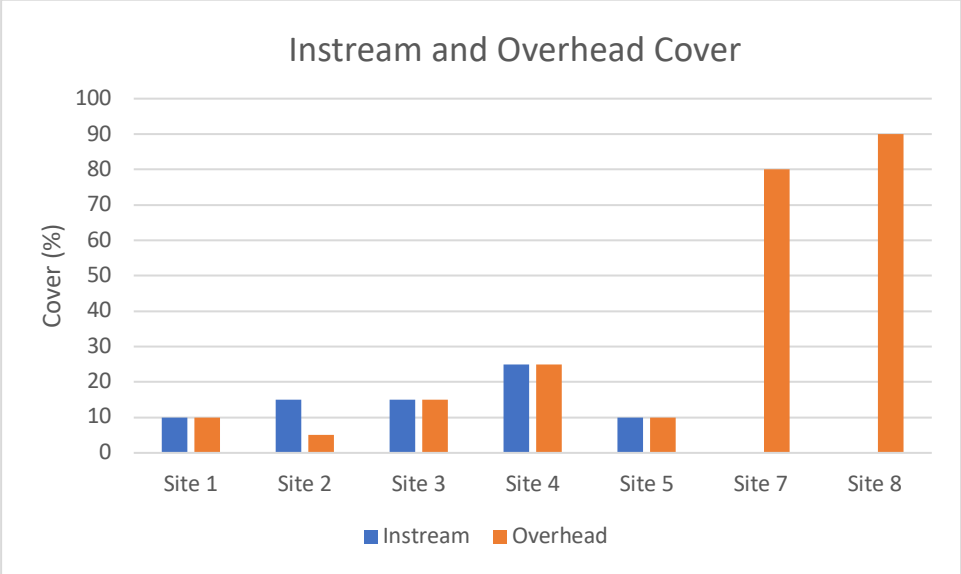
	Stream Type	Instream Cover Type	Substrate Type	Substrate Embeddedness (%)
Site 1	Pool	Small woody debris	Cobble, silt	85
Site 2	Riffle	Riparian vegetation	Cobble, gravel	25
Site 3	Pool	Large woody debris	Cobble, gravel	50 - 100
Site 4	Run	Large & small woody debris	Cobble, gravel	25 - 75
Site 5	Run	Riparian vegetation	Cobble, silt	50 - 90
Site 7	Riffle	None	Gravel, silt	75
Site 8	Run	None	Cobble, gravel	75

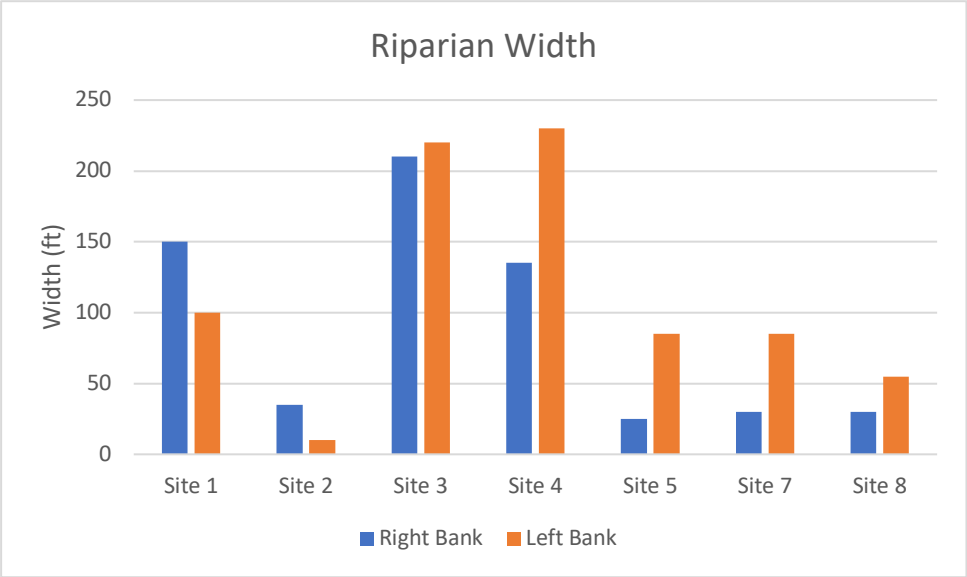


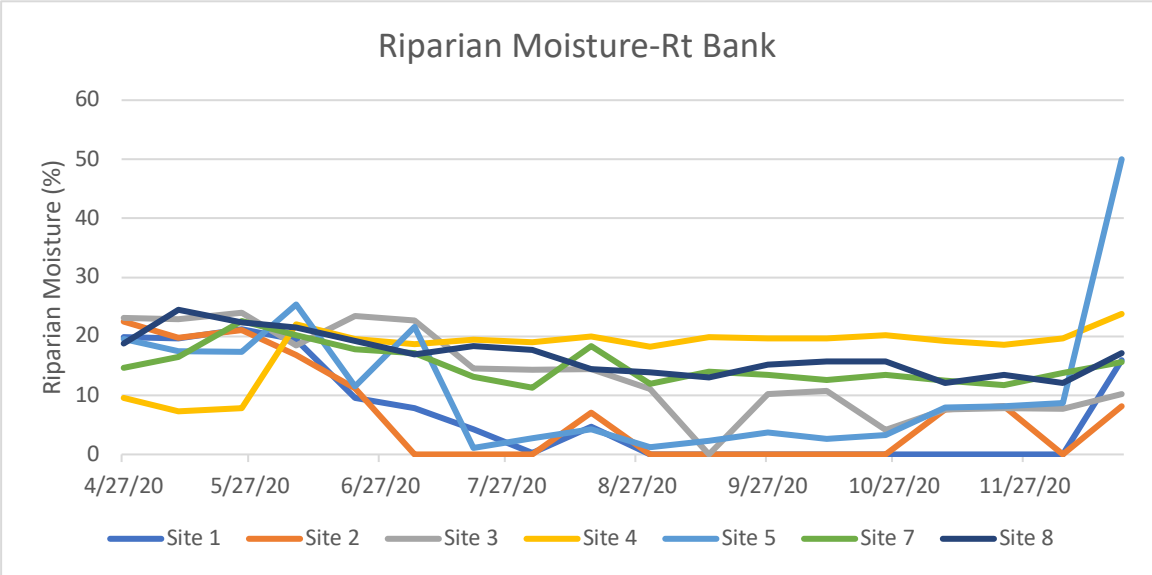


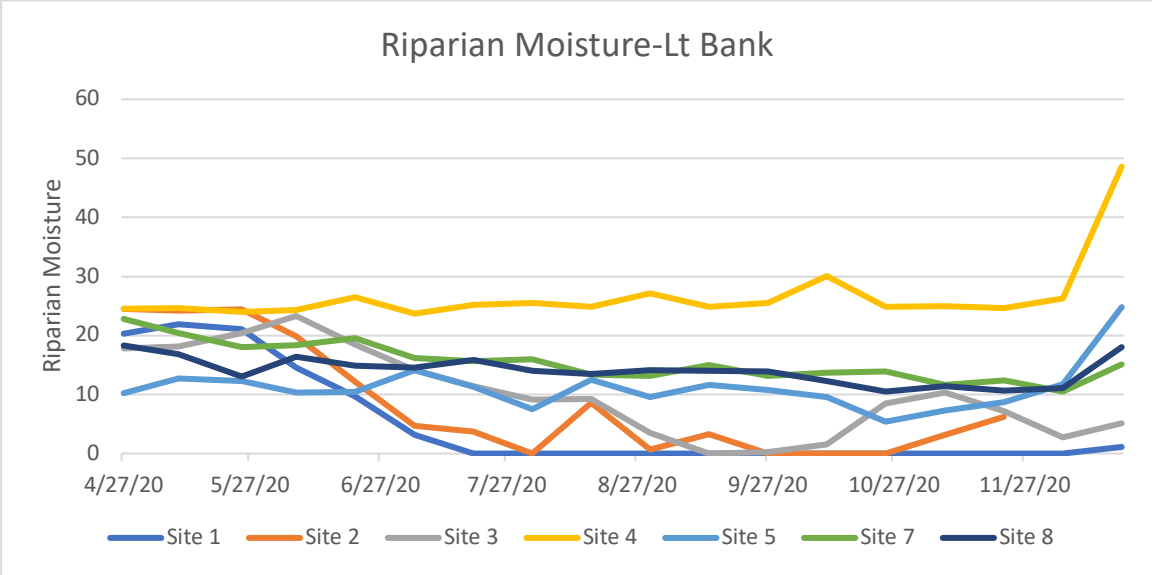
Vegetation

Graphs below present data on instream and overhead cover, riparian width, and riparian moisture. Cover and riparian width did not change during the year. Riparian moisture changed often – sometimes the change was due to weather, but the readings would also vary if measurements were taken within inches of each other; the usefulness of this data is in question. Aerial photos of riparian vegetation were analyzed with no significant changes.




Riparian Width
250
200
150
100
50
0
Width (ft)
Site 1
Site 2
Site 3
Site 4
Site 5
Site 7
Site 8
Right Bank
Left Bank

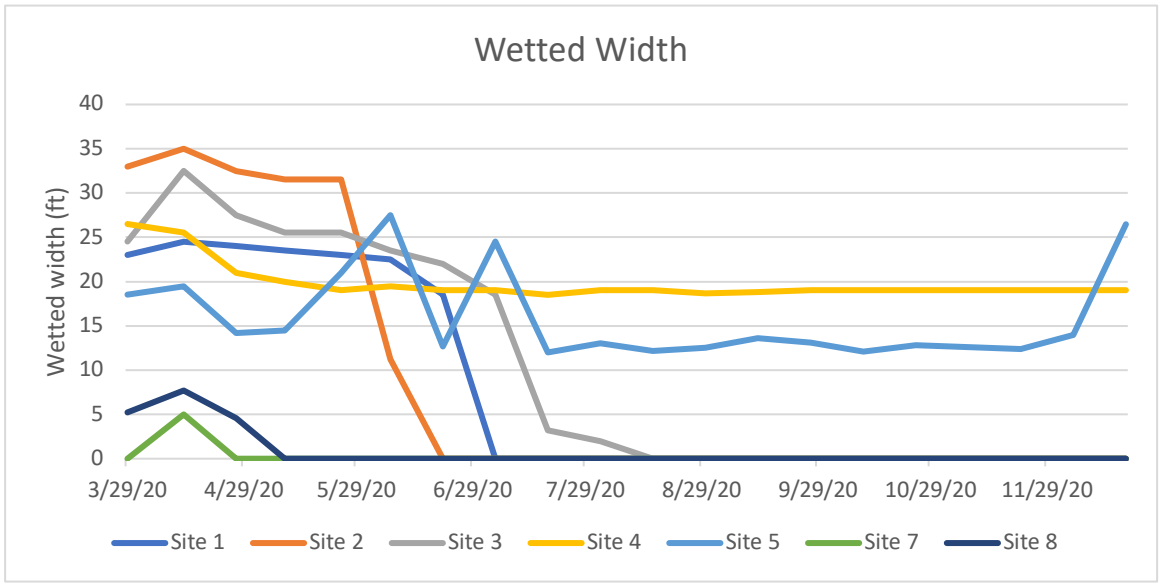

Riparian Moisture-Rt Bank
60
50
40
30
20
10
0
Riparian Moisture (%)
4/27/20
5/27/20
6/27/20
7/27/20
8/27/20
9/27/20
10/27/20
11/27/20
Site 1
Site 2
Site 3
Site 4
Site 5
Site 7
Site 8

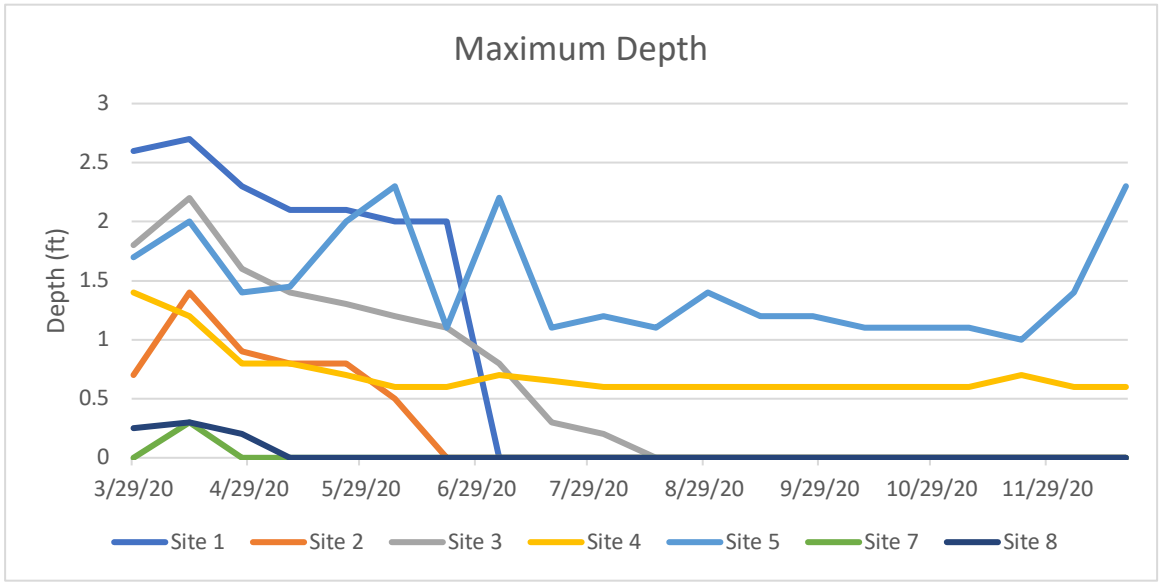

Riparian Moisture-Lt Bank
60
50
40
30
20
10
0
Riparian Moisture
4/27/20
5/27/20
6/27/20
7/27/20
8/27/20
9/27/20
10/27/20
11/27/20
Site 1
Site 2
Site 3
Site 4
Site 5
Site 7
Site 8

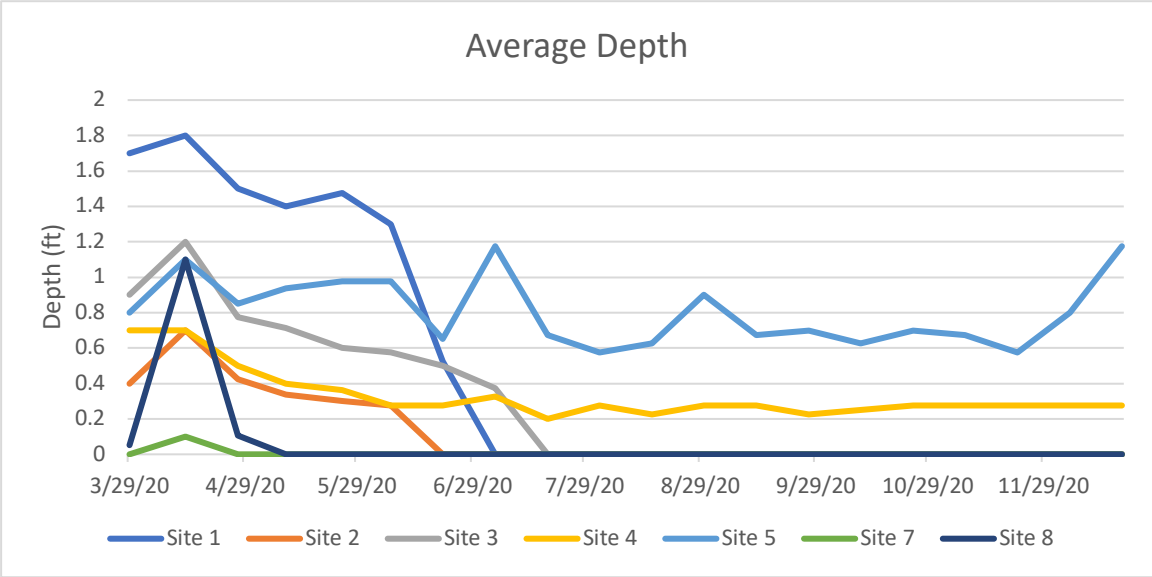
Hydrology

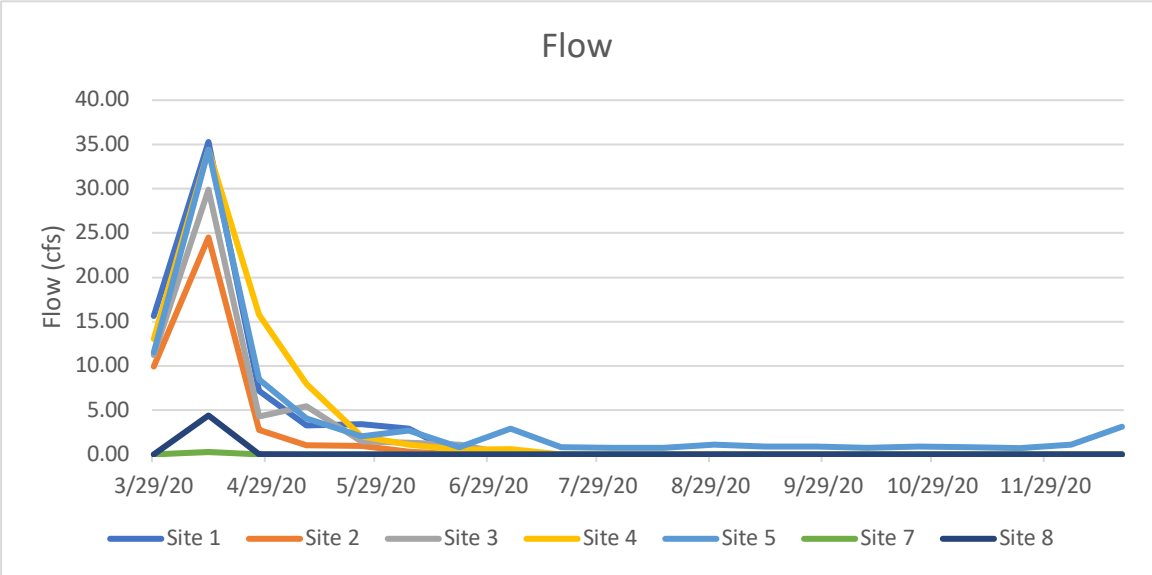
Wetted width, maximum depth, and average depth were consistent at Sites 4 and 5; other survey sites went dry in the following order from first to last: Site 7, 8, 2, 1, 3.

Flow was usually very low at Sites 4 and 5. Other survey sites followed the same pattern as above and had little to no flow long before they completely dried up.





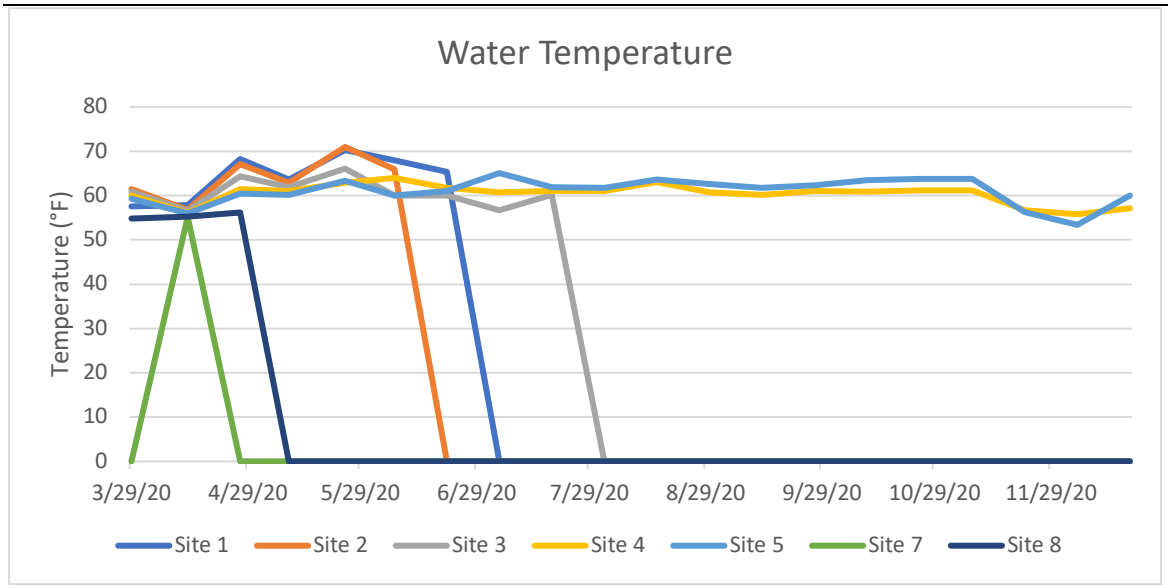


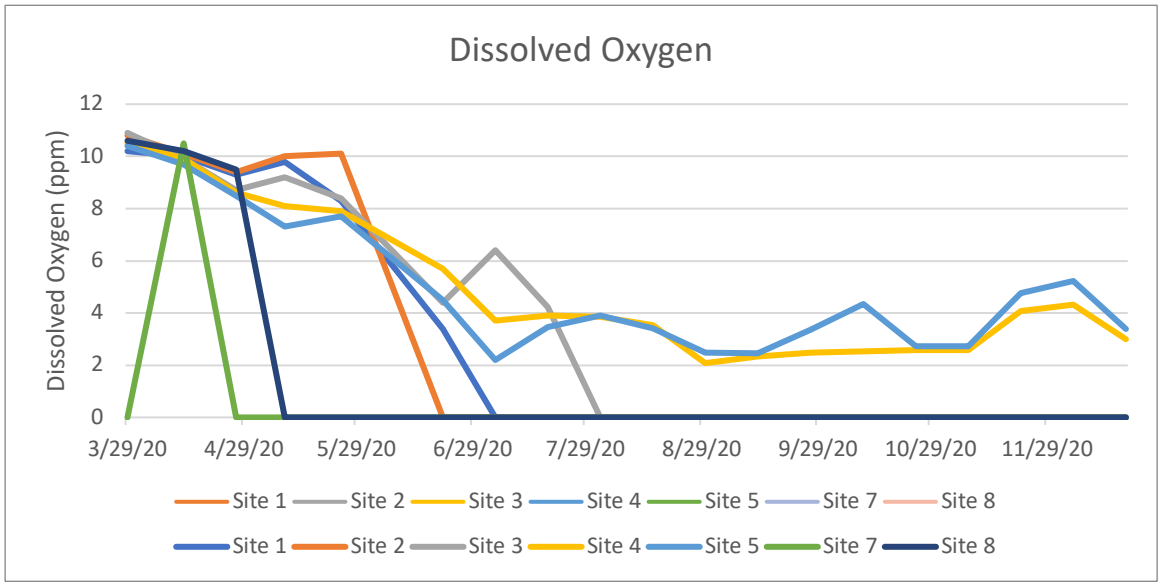


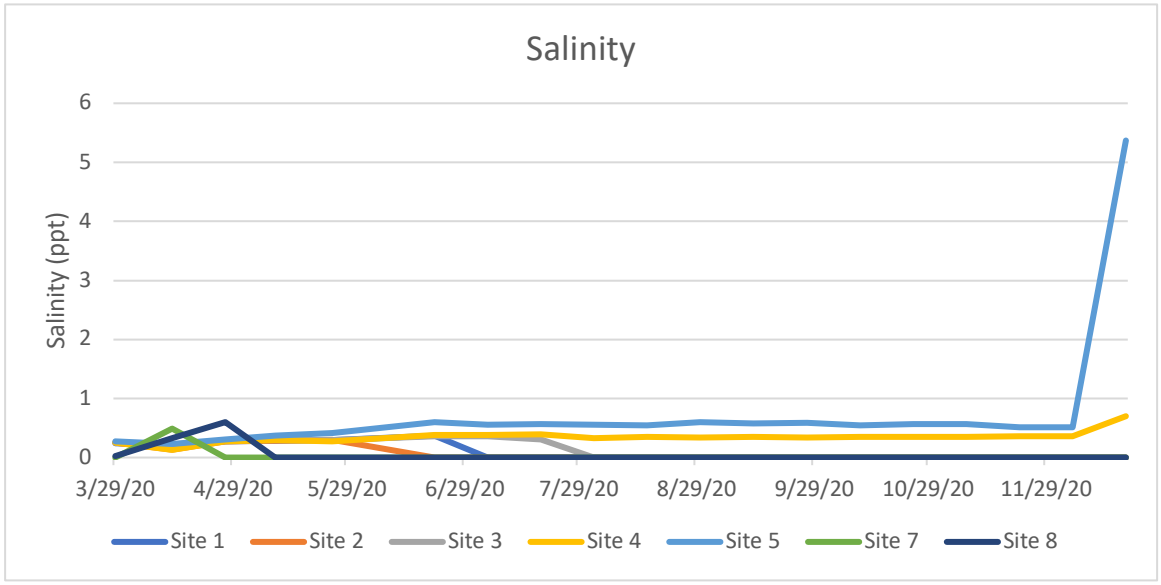
Surface Water Quality

Water temperature at Sites 4 and 5 ranged from 50.2 to 65.1 °F. Other sites were similar until the temperature increased as the sites dried up. Dissolved oxygen at Sites 4 and 5 ranged from 2.2 to 10.5 ppm. Dissolved oxygen typically decreases when temperature increases. It can also decrease with a reduction in flow. Salinity usually ranged from 0.2 to 0.6 ppt. Towards the end of the year at Site 5 it began to increase and reached a level 5.37 ppt, probably a result of tidal influence and a closed sandbar.

Water temperatures were within range for the listed species. Dissolved oxygen levels dipped below optimal habitat requirements during the summer for steelhead trout. Salinity was also within range for the listed species, except for Site 5 on the last reading that was influenced by tides and the closed sandbar.

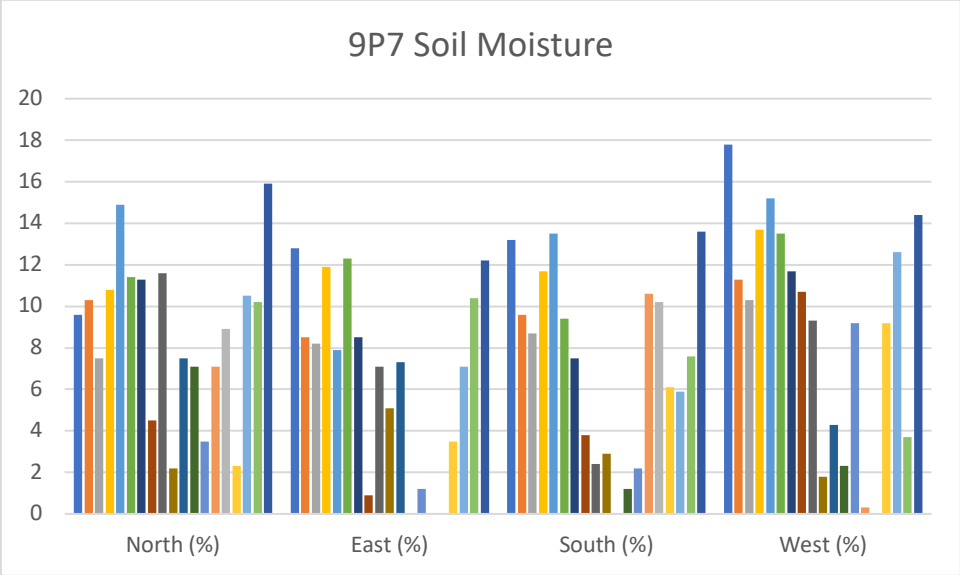

Water Temperature
Temperature (°F)
80
70
60
50
40
30
20
10
0
3/29/20
4/29/20
5/29/20
6/29/20
7/29/20
8/29/20
9/29/20
10/29/20
11/29/20
Site 1
Site 2
Site 3
Site 4
Site 5
Site 7
Site 8


Dissolved Oxygen
Dissolved Oxygen (ppm)
12
10
8
6
4
2
0
3/29/20
4/29/20
5/29/20
6/29/20
7/29/20
8/29/20
9/29/20
10/29/20
11/29/20
Site 1
Site 2
Site 3
Site 4
Site 5
Site 7
Site 8
Site 1
Site 2
Site 3
Site 4
Site 5
Site 7
Site 8


Salinity
Salinity (ppt)
6
5
4
3
2
1
0
3/29/20
4/29/20
5/29/20
6/29/20
7/29/20
8/29/20
9/29/20
10/29/20
11/29/20
Site 1
Site 2
Site 3
Site 4
Site 5
Site 7
Site 8

9P7 Soil Moisture

Soil moisture at the 9P7 well is presented in the graph below. As with other soil moisture measurements, the usefulness of this data is in question. The maximum moisture reading is 50%.



Sensitive Species

Observed sensitive species include Monterey pine (*Pinus radiata*) at the percolation ponds. Photographs of this stand show there has been no change. Monarch butterflies (*Danaus plexippus*) have been observed in small numbers throughout the survey area; no change in the population size has been noted. Adult southwestern pond turtles (*Actinemys pallida*) were observed at the confluence of San Simeon and Van Gordon Creeks and one juvenile was found near Site 1; no change in the population size has been noted. A white-tailed kite (*Elanus leucurus*) was observed hunting over grasslands located to the west of Van Gordon Creek.

Observed non-native plant species within the survey area includes: sweetclover (*Melilotus albus*), rumex (*rumex* sp.), common mustard (*Brassica rapa*), tree tobacco (*Nicotina glauca*), thistle (*carduus* sp.), fennel (*Foeniculum vulgare*), cape ivy (*Delairea odorata*), garden nasturtium (*Tropaeolum majus*), arrowweed (*Pluchea sericea*), canarygrass (*Phalaris canariensis*), bromus, poison hemlock (*Conium maculatum*), vinca (*Vinca major*), minor amounts of castor bean (*Ricinus communis*). Non-native vegetation at each survey sites includes cape ivy. There has been no change in the amount of non-native plants at each survey site.

4.0 DISCUSSION

A fall 2021 ground water study will provide the hydrological information needed to establish the relationship between the groundwater, surface water, and San Simeon Lagoon. This hydrological study will also provide the data to set thresholds for an evaluation of adaptive

management measures and/or investigation for the operation of the AMP so there will be no adverse impacts to any sensitive species.

Baseline monitoring shows no unexpected habitat or species changes. Baseline data will continue to be collected and analyzed. The survey area supports high quality habitat for listed species.

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