

# 2023

## CARLSBAD WATERSHED MANAGEMENT AREA

## STREAM BIOASSESSMENT

## MONITORING PROGRAM

**Prepared For:**

**Carlsbad Watershed Management Area Responsible Agencies:**

City of San Marcos  
City of Carlsbad  
City of Encinitas  
City of Escondido  
City of Oceanside  
City of Solana Beach  
City of Vista  
County of San Diego



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## Acronyms and Abbreviations

AFDM	ash free dry mass
ASCI	Algae Stream Condition Index
Basin Plan	San Diego Regional Water Quality Control Plan by watershed for the San Diego Region
BMI	benthic macroinvertebrates
CCC	criterion continuous concentration
CRAM	California Rapid Assessment Method
CSCI	California Stream Condition Index
EcoAnalysts	EcoAnalysts, Inc.
IBI	Index of Biotic Integrity
PHAB	physical habitat
Physis	Physis Environmental Laboratories, Inc.
QAPP	Quality Assurance Project Plan
Rhithron	Rhithron Associates, Inc.
SAFIT	Southwest Association of Freshwater Invertebrate Taxonomists
San Diego Water Board	San Diego Regional Water Quality Control Board
SCCWRP	Southern California Coastal Water Research Project
SMC	Stormwater Monitoring Coalition
SOP	Standard Operating Procedures
SWAMP	Surface Water Ambient Monitoring Program
TKN	total Kjeldahl nitrogen
TSS	total suspended solids
USEPA	United States Environmental Protection Agency
WESTON	Weston Solutions, Inc.
WMA	Watershed Management Area

## Units of Measure

FNU	Formazin Nephelometric Unit
g	gram(s)
km	kilometer
m	meter
mg/L	milligram per liter
NTU	nephelometric turbidity unit
ppt	parts per thousand
µS/cm	microSiemens per centimeter
%	percent

## **1 BACKGROUND & INTRODUCTION**

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The Responsible Agencies of the Carlsbad Watershed Management Area (WMA) contracted Weston Solutions, Inc. (WESTON®) to conduct Stormwater Monitoring Coalition (SMC) regional monitoring during the 2023 monitoring year. Participation in the SMC regional monitoring program is required by San Diego Regional Water Quality Control Board (San Diego Water Board) Order No. R9-2013-0001, as amended by Order Nos. R9-2015-0001 and R9-2015-0100.

In 2009 the SMC began monitoring stream condition using multiple ecological indicators to assess the biological health of streams in southern California's coastal watersheds. The first 5-year survey (2009-2013) documented the condition of perennial, wadeable streams in the region and established a baseline for monitoring regional trends. In 2021, the third iteration of the 5-year SMC Workplan was initiated to continue to build off the initial surveys with some additional key modifications. Details of this program can be found in the *SMC Bioassessment Survey of the Stormwater Monitoring Coalition, Workplan for Years 2021 through 2025, Version 3.0* (SMC Workplan) (Southern California Coastal Water Research Project [SCCWRP]), 2023. The 2021-2025 SMC Workplan retains both probabilistic (condition) and trend site monitoring (with some modifications) as well as some new study elements. The new SMC Workplan has further divided the trend study to include two separate trend strata (panel 1 and panel 2 trend sites). Panel 1 trend sites are to be sampled once during the course of the five-year Workplan, and panel 2 sites are to be sample three to four times during this period. New special study elements include causal analysis, targeted site monitoring, wet-dry mapping, and modified channels (Project 5.3). Details associated with the 2021- 2025 SMC Workplan are available at:

[1174\\_SMCBioassessmentWorkplan.pdf \(sccwrp.org\)](https://www.sccwrp.org/1174_SMCBioassessmentWorkplan.pdf).

SMC sites were selected according to protocols identified in the SMC Workplan ([SCCWRP], 2023). The SMC program divides the County of San Diego into four separate regional strata. The Carlsbad WMA (HU: 904) is located in the SMC Central San Diego strata, together with the San Dieguito (HU: 905) and portions of the Los Peñasquitos (HU: 906) watersheds. The current SMC Workplan requires that a total of four monitoring sites are monitored annually in each of four strata in San Diego County. Per the SMC Workplan the condition and trend sites are randomly selected from the SMC sample draw list within each stratum, without regard to specific watershed location. For the 2023 monitoring season one SMC Central strata condition site was identified within the Carlsbad WMA, 904M21800 (Loma Alta Creek in the City of Oceanside) as well as one Panel 2 Trend site, SMC00537 (Escondido Creek near the Community of Olivenhain). The two remaining SMC Central sites were located in HU 905 and 906.

Monitoring was conducted in accordance with the SMC Workplan and included the following components:

- benthic macroinvertebrate (BMI) sample collection and identification
- diatom sample collection and identification
- water quality chemistry sample collection and analysis
- physical habitat (PHAB) assessment
- physical riparian habitat assessment (California Rapid Assessment Method (CRAM))

## **2 MONITORING METHODS**

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### **2.1 Monitoring Locations**

Two SMC sites were monitored within the Carlsbad WMA during the 2023 index period, the condition site 904M21800 and the panel 2 trend site SMC00537. The condition site 904M21800 is located on Loma Alta Creek within the City of Oceanside. This site lies downstream of both commercial and residential land development and represents developed land use (Table 2-1, Figure 2-3). The panel 2 trend site SMC00537 is located on Escondido Creek in the community of Olivenhain. This site is located within residential/spaced rural residential land use and also represents developed land use (Table 2-1, Figure 2-3). Each site features a natural bottom channel (Figure 2-1, Figure 2-2 ). The Escondido Creek watershed is much larger than that of Loma Alta Creek.

**Table 2-1. 2023 Carlsbad WMA Stream Bioassessment Monitoring Locations**

Site Code	Water Body	Date Sampled	Latitude	Longitude
<b>SMC Condition Site</b>				
904M21800	Loma Alta Creek	6/28/2023	33.19992	-117.33419
<b>SMC Trend Site</b>				
SMC00537	Escondido Creek	6/27/2023	33.04847	-117.22562



**Figure 2-1. 904M21800-  
Loma Alta Creek, in  
Oceanside**



**Figure 2-2. SMC00537-Escondido Creek near Olivenhain**

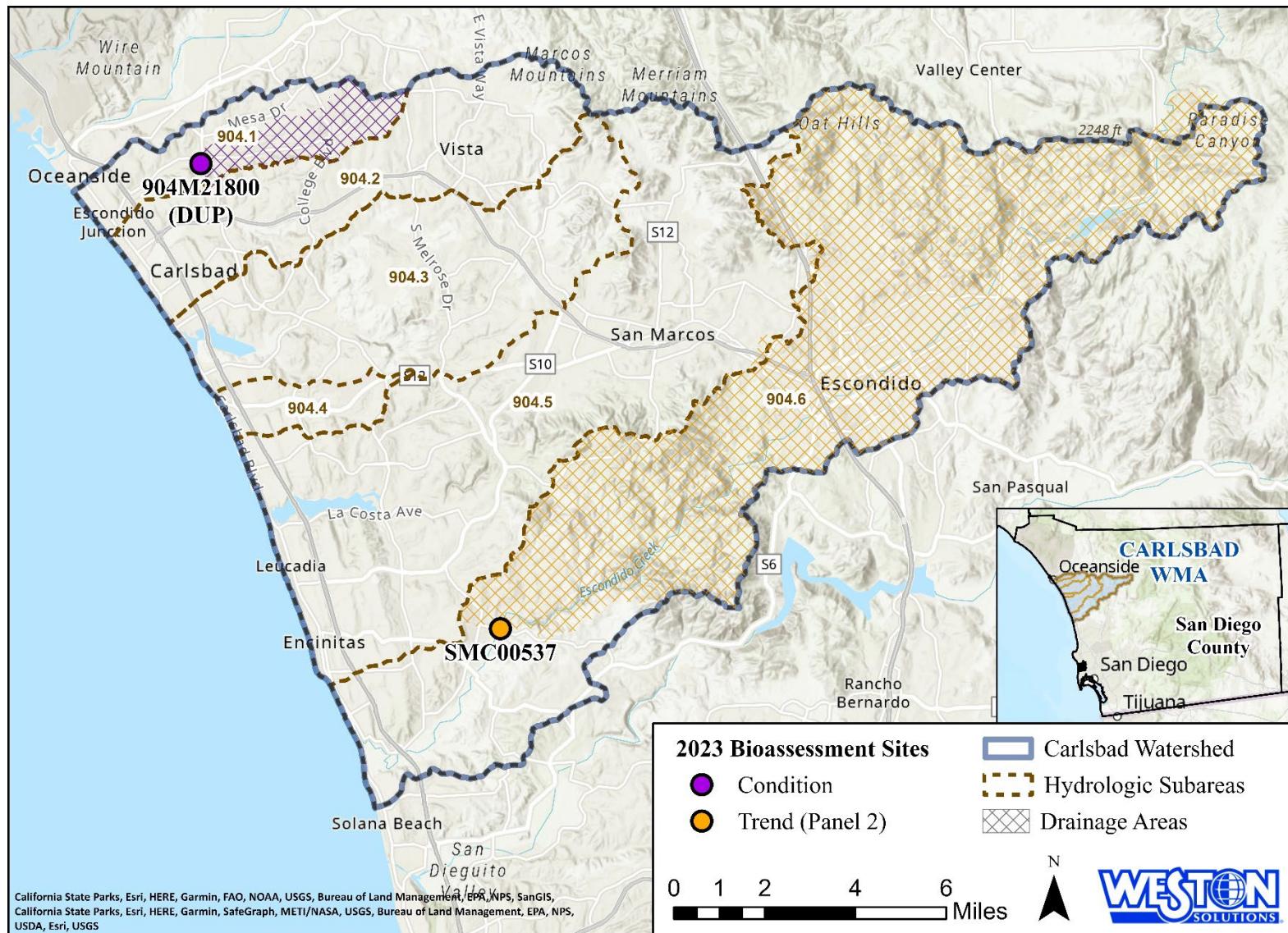


Figure 2-3. Carlsbad WMA Stream Bioassessment Monitoring Sites, 2023

## **2.2 Sample Collection**

Samples were collected and assessments performed according to the SMC Workplan (SCCWRP, 2023), and the Surface Water Ambient Monitoring Program (SWAMP) Quality Assurance Project Plan ([QAPP], SWAMP, 2019.). Sampling methods are summarized in the following sections, detailed procedural information may be obtained from the documents referenced above. Quality assurance/quality control results are summarized in Attachment 4A.

### **2.2.1 Benthic Macroinvertebrates**

BMI samples were collected at the monitoring location from 11 evenly spaced 15-meter transects (transects are labeled alphabetically, A through K). Sampling was conducted from downstream to upstream and photographed at Transects A, F and K. Once a sampling transect was established, BMI were collected using a 1-foot-wide, 0.5-millimeter (mm) mesh D-frame kick-net and each sample point consisted of a one square foot ( $\text{ft}^2$ ) area. Each sample was collected upstream of the net by disrupting the substrate and scrubbing the cobble and boulders so that organisms were dislodged and swept into the net by the current or by hand sweeping. In areas with little or no current, the substrate was disturbed, and the net was swept back and forth to capture the organisms. The samples were collected in a repeating alternating margin-center-margin pattern (at 25 percent [%], 50% and 75% of the transect width). Sample material was transferred from the kick-net to 1-quart jars, preserved with 95% ethanol, and returned to WESTON's benthic laboratory for processing. After processing samples were shipped to EcoAnalysts, Inc. (EcoAnalysts) for BMI sorting and taxonomic identification.

### **2.2.2 Benthic Algae**

Benthic algae samples were collected at each transect. The samples were collected in a repeating alternating margin-center-margin pattern (at 25%, 50% and 75% of the transect width) 0.25-meters upstream of where the BMI sample was collected. A sample was collected at each of the 11 transects using one of three different collection devices depending on substrate type (e.g., cobble, boulder, or sand) (for specific devices and collection methods, refer to Ode et al., 2016) and composited into one sample container. Each composite sample was split up for several analyses including diatom taxonomy, ash-free dry mass (AFDM), and chlorophyll-a.

Diatom samples were placed in a 50 milliliter (mL) conical tube and preserved with a final sample concentration of 1% non-buffered formalin. Soft bodied samples were placed in a 50 mL conical tube and preserved with a final sample concentration of 2% glutaraldehyde. The diatom samples were submitted to Rhithron Associates, Inc. (Rhithron) for taxonomic identification. Per the SMC Workplan soft bodied algae samples are no longer collected as part of the standard suite of SMC analytes

AFDM and chlorophyll-a samples were processed in the field by filtering 25 mL of sample water through a 47 mm glass fiber filter. Filters were placed in foil, frozen for preservation, and delivered to Physis Environmental Laboratories, Inc. (Physis) for analysis.

### **2.2.3 Physical Habitat**

The SWAMP PHAB assessment protocol was conducted at the site at the same 11 transects where BMI samples were collected. Detailed measures were taken at each transect including, but not limited to, substrate size, riparian vegetation, human influences, and in-stream habitat features. A subset of the PHAB measures were also assessed at inter-transects 7.5 meters apart. Data collected at each site for the SWAMP

PHAB were entered into the SWAMP Access database. Copies of the SWAMP PHAB field data sheets are provided in Attachment 4B.

The California Rapid Assessment Method (CRAM, Collins, 2013) for Riverine Wetlands protocol for assessing riverine wetland conditions was conducted and CRAM data was submitted electronically to the statewide CRAM database (<https://www.cramwetlands.org/>), per the SMC Workplan. CRAM incorporates a broader landscape scope than the SWAMP PHAB assessment and yields a single score for a site. Copies of the CRAM field data sheets are presented in Attachment 4B.

Additional assessments were also completed including a channel engineering checklist, an invasive vertebrate checklist, a hydrologic state checklist, a hydromodification screening assessment, and a trash assessment. Checklists for the SMC were submitted to SCCWRP using standard SMC data templates and following the SMC Program data submission guidelines.

## **2.2.4 Water Quality**

In situ physical water quality measurements were taken at the monitoring site using a YSI EXO3 multiparameter water quality meter. Measurements included water temperature, pH, specific conductance, salinity, dissolved oxygen, and turbidity.

A water quality grab sample was collected at the site and was sent to Weck Laboratories, Inc. (Weck) for analysis of ammonia-N, nitrate as N, nitrite as N (or Nitrate + Nitrite as N), total Kjeldahl nitrogen (TKN), total nitrogen (calculation), orthophosphate, total phosphorus, alkalinity (as  $\text{CaCO}_3$ ), total hardness (as  $\text{CaCO}_3$ ), chloride, calcium, sulfate, magnesium, sodium, chemical oxygen demand (COD) and total suspended solids (TSS). One field duplicate and one field blank were collected during the course of the 2022 survey.

## **2.3 Laboratory Methods**

### **2.3.1 Benthic Macroinvertebrates**

BMI samples were sorted in accordance with the SWAMP Standard Operating Procedures (SOP) for Laboratory Processing and Identification of Benthic Macroinvertebrates in California (Woodard, 2012) by EcoAnalysts, Inc. After sorting samples were analyzed for taxonomic analysis at EcoAnalysts, Inc. All organisms were identified to standard taxonomic Level II as specified in the *Southwest Association of Freshwater Invertebrate Taxonomists (SAFIT) List of Freshwater Invertebrate Taxa* (Richards and Rogers, 2011), in which insects are identified to species level when possible, and Chironomidae are identified to genus level. Taxonomic data are provided in Attachment 4C.

### **2.3.2 Benthic Algae**

Diatom algae samples were delivered to Rhithron for processing and identification using SMC approved methods (Stancheva et al., 2015). Diatom algal identifications were made using standard taxonomic references. Soft-bodied algae was delivered to SCCWRP for archive purposes per the SMC Workplan.

### **2.3.3 Water Quality**

Water quality samples were delivered to Weck for analysis of general chemistry and nutrients and to Physis for analysis of AFDM and chlorophyll-a (Table 2-2). Laboratory reports are provided in Attachment 4C.

**Table 2-2. Water Quality Laboratory Methods**

Analyte Name	Analysis Method	Laboratory
<b>General Chemistry</b>		
Alkalinity as CaCO <sub>3</sub>	SM 2320 B	Weck Laboratories, Inc.
Calcium	EPA 200.7	
Chloride	EPA 300.0	
Hardness as CaCO <sub>3</sub>	EPA 200.7	
Magnesium	EPA 200.7	
Sodium	EPA 200.7	
Sulfate	EPA 300.0	
Chemical oxygen demand (COD)	EPA 410.4	
Total Suspended Solids	SM 2540 D	
<b>Nutrients</b>		
Ammonia as N	EPA 350.1	Weck Laboratories, Inc
Nitrate + Nitrite as N	EPA 353.2	
Nitrate as N	EPA 353.2	
Nitrite as N	EPA 353.2	
Nitrogen, Total Kjeldahl	EPA 351.2	
Nitrogen, Total	Calculation	
Orthophosphate as P	EPA 365.3	
Phosphorus, Total as P	EPA 200.7	
<b>Algae</b>		
Ash free dry mass (AFDM)	SM 10300 C	Physis Analytical, Inc.
chlorophyll-a	SM 10300 C	

### **3 RESULTS AND DISCUSSION**

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The California Stream Condition Index (CSCI) score was calculated for the monitored sites (Mazor et al., 2016a) along with the corresponding CSCI condition category (Table 3-1). A CSCI score of greater than or equal to 0.92 indicates the condition of a stream is Likely Intact; a score of 0.91 to 0.79 indicates the stream condition is Possibly Altered; 0.78 to 0.63 the condition is Likely Altered; and a score of 0.62 to 0.00 indicates the stream condition is Very Likely Altered.

The CSCI score for station 904M21800 was calculated at 0.71, in the CSCI condition category of Likely Altered. The duplicate sample 904M21800-DUP scored 0.74, also in the condition class of Likely Altered. The CSCI score for station SMC00537 was 0.42, in the condition class of Very Likely Altered. Biological assemblage samples (such as BMI samples) tend to exhibit greater variability in replicate (duplicate) samples than conventional chemical analysis. This is largely a function of the inherent variability associated with the reproducibility of capturing living organisms in the natural environment. The CSCI scoring tool considers this variability. CSCI metrics are provided in Attachment 4C.

A CRAM score was also calculated for each monitoring station (Table 3-1). The CRAM score describes the capacity of the assessed wetland to perform wetland functions relative to a reference condition (with little to no anthropogenic disturbance). A low score indicates a low capacity to provide beneficial wetland functions. The calculated CRAM score of 58 for Station 904M21800 indicates moderate-quality riparian habitat, which may be supportive of beneficial wetland functions. The calculated CRAM score at SMC00537 was 76, also indicating relatively high-quality riparian habitat.

**Table 3-1. CSCI and CRAM Scores for Carlsbad WMA 2023 Bioassessment Monitoring Sites**

Water Body	Station Code	Sample Date	Lined or Unlined Channel	CSCI Score*	CSCI Condition Category*	CRAM Score**
Loma Alta Creek	904M21800	6/28/2023	Unlined	0.71	Likely Altered	58
Loma Alta Creek	904M21800-DUP	6/28/2023	Unlined	0.74	Likely Altered	NS
Escondido Creek	SMC00537	6/27/2023	Unlined	0.42	Very Likely Altered	76

\* CSCI scoring range: ≥ 0.92 = Likely Intact; 0.91 to 0.79 = Possibly Altered; 0.78 to 0.63 = Likely Altered; 0.62 to 0.00 = Very Likely Altered

\*\*CRAM score range: <50 = low, 50-75 = moderate, >75 = high

NS – Not Sampled

Benthic algae analyses in California have seen considerable progress in the last several years. This improved understanding of regional freshwater algal communities has contributed to the development of the Algal Stream Condition Index (ASCI, [Theroux, et al. 2020.]) The ASCI represents a further refinement of the previous regional algal IBI scoring tools; notably the ASCI has statewide applicability as well as includes a larger set of reference sites with which to calibrate the scoring tool. Reference sites are a group of sites that have been determined to have minimal anthropogenic disturbance. Similar to the CSCI, the ASCI has a scoring range of 0-1.0, with scores calculated relative to the statewide pool of non-disturbed reference sites. The ASCI diatom index has been broken into the following algal community condition classes: likely

intact (>0.94), possibly altered (<0.94 to 0.86), likely altered (<0.86 to 0.75), and very likely altered (<0.75). An ASCI diatom index score of 0.86 correlates to the 10<sup>th</sup> percentile of reference sites, a score below 0.86 implies a deviation from reference quality conditions.

Results for the diatom ASCI scores are presented in Table 3-2. The diatom ASCI score for 904M21800 was 0.72 with an ASCI condition class of Very Likely Altered. The duplicate sample, 904M21800-DUP, scored 0.71, corresponding to the condition class of Very Likely Altered. The diatom ASCI score for SMC00537 was 0.53 with an ASCI condition class of Very Likely Altered.

**Table 3-2. ASCI Scores for Carlsbad WMA 2023 Bioassessment Monitoring Sites**

Algal Stream Condition Index	Loma Alta Creek		Escondido Creek
	904.1		904.62
	904M21800	904M21800-DUP	SMC00537
	6/28/2023	6/28/2023	6/27/2023
	Diatom ASCI	0.72	0.71

\*Diatom ASCI of 0.86 is the statistical boundary between reference and non-reference condition.

\* ASCI scoring range:  $\geq 0.94$  = Likely Intact; <0.94 to 0.86 = Possibly Altered; <0.86 to 0.75 = Likely Altered; <0.75 = Very Likely Altered. A diatom ASCI of >0.86 is the statistical boundary between reference and non-reference condition.

Physical habitat and water quality (sonde) measurements are presented in Table 3-3.

**Table 3-3. Physical Habitat Results for Carlsbad WMA Bioassessment Monitoring Sites. June 2023.**

Physical Habitat	Loma Alta Creek	Escondido Creek
	904.1	904.61
	904M21800	SMC00537
	6/28/2023	6/27/2023
	Elevation (feet)	74
CRAM Physical Habitat Score*	58	76
Canopy Cover (% of reach)	81.7%	82.5%
Macroalgal Cover (% of reach)	2.9%	1.9%
Substrate Composition		
Fines	1.0%	0.0%
Sand	48.6%	26.7%
Gravel	14.3%	21.0%
Cobble	0.0%	8.6%
Boulder	0.0%	0.0%
Roots	19.0%	18.1%
Wood	7.6%	6.7%
Consolidated Sediment	9.5%	19.0%
Bedrock	0.0%	0.0%
Concrete	0.0%	0.0%

<b>Physical Habitat</b>	<b>Loma Alta Creek</b>	<b>Escondido Creek</b>
	<b>904.1</b>	<b>904.61</b>
	<b>904M21800</b>	<b>SMC00537</b>
	<b>6/28/2023</b>	<b>6/27/2023</b>
<b>Water Quality</b>		
Temperature (C)	19.00	19.75
pH (units)	7.76	8.01
Specific Conductance ( $\mu\text{S}/\text{cm}$ )	4081	2347
Salinity (ppt)	2.17	1.12
Dissolved Oxygen (mg/L)	6.53	7.86
Turbidity (NTU)	1.44	2.26

CRAM score is 25-100; <50 = low, 50-75 = moderate, >75 = high

Water quality chemistry data are presented in Table 3-4 and laboratory reports are provided in Attachment 4C. Data were compared to applicable water quality benchmarks. Shaded results in Table 3-4 indicate results do not meet the water quality benchmark.

Water quality chemistry at station 904M21800 indicated that all of the analytes were below the respective water quality benchmark, although specific conductivity, chloride, total hardness, and sodium values were high (Table 3-4, Attachment 4C). Results from the first SMC five-year report suggest elevated chloride concentrations were found to be a common condition across the region (Mazor, 2015). The report found chloride concentrations were frequently above biologically relevant thresholds at many coastal watersheds in southern California, suggesting a localized, and possibly geological source.

Water quality chemistry at SMC00537 indicated that chloride, sulfate, and total nitrogen were above the respective water quality benchmarks (Table 3-4, Attachment 4C). Results from the first SMC five-year report suggest elevated sulfate concentrations were found to be a common condition across the region (Mazor, 2015). The report found that 45% of stream-miles in southern California exceeded biologically relevant thresholds for sulfates (250mg/L). The SMC five-year report demonstrated a strong association between elevated total nitrogen concentrations and poor biological condition (as measured by the CSCI and the ASCI). The report found that 40% of streams in the southern California region were above the water quality benchmark of 1.0 mg/L. Total nitrogen at SMC00537 (4.34 mg/L) was above the water quality benchmark, as well as what the SMC five-year report described as the biologically relevant threshold of 0.37mg/L. These biologically relevant thresholds were determined based on analysis of the statewide set of reference sites.

**Table 3-4. Analytical Water Quality Chemistry Result for Carlsbad WMA 2023 Bioassessment**

Analyte	Units	Water Quality Benchmark	Benchmark Reference	Loma Alta Creek	Escondido Creek
				904.1	904.61
				904M21800	SMC00537
				6/28/2023	6/27/2023
<b>Physical Chemistry</b>					
Dissolved Oxygen	mg/L	< 5.0 (a) / <6.0 (a)	Basin Plan	6.53	7.86
pH	pH units	6.5-8.5	Basin Plan	7.76	8.01
Salinity	ppt			2.17	1.21
Specific Conductivity	µS/cm			4081	2347
Turbidity	FNU	20	Basin Plan	1.44	2.26
Water Temperature	Celsius			19.00	19.75
<b>Periphyton</b>					
Ash-Free Dry Weight	g/m <sup>2</sup>			66	164
Chlorophyll a	mg/m <sup>2</sup>			12.1	18.2
<b>General Chemistry</b>					
Alkalinity as CaCO <sub>3</sub>	mg/L			330	260
Chemical Oxygen Demand	mg/L			32	16
Chloride	mg/L	250 (a)	Basin Plan	1100	380
Sulfate	mg/L	250 (a)	Basin Plan	260	450
Total Hardness as CaCO <sub>3</sub>	mg/L			990	638
Total Suspended Solids	mg/L			10	6
<b>Nutrients</b>					
Ammonia as N	mg/L	(b)	USEPA Freshwater Criteria	0.026J	0.033J
Nitrate + Nitrite as N	mg/L	10 (c)	Basin Plan	0.073	3.9
Nitrate as N	mg/L			0.073J	3.9
Nitrite as N	mg/L	1 (c)	Basin Plan	<0.042	<0.042
Orthophosphate as P	mg/L			0.076	0.065
Total Kjeldahl Nitrogen	mg/L			0.44	0.44
Total Nitrogen	mg/L	1 (a)	Basin Plan	0.513	4.34
Total Phosphorus	mg/L	0.1 (a)	Basin Plan	0.096	0.078
<b>Trace Metals</b>					
Calcium	mg/L			262	117
Magnesium	mg/L			81.6	83.8
Sodium	mg/L			420	230

< - Results less than the method detection limit. Shaded results do not meet water quality benchmarks.

(a) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before May 17, 2016) and may vary by hydrologic area.

(b) Water Quality Benchmark is based on the criterion continuous concentration (CCC) using water temperature and pH as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.

(c) Water Quality Benchmark is based on the MUN beneficial uses as described in the Basin Plan, 1994 (with amendments effective on or before May 17, 2016).

J - Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

The biological community index scores at site 904M21800 indicate that the BMI community is Likely Altered (CSCI score of 0.71) while the diatom community appears degraded (ASCI score of 0.72, Very Likely Altered). A number of studies have demonstrated that the BMI community responds strongly to physical habitat and hydrologic-regime related stressors, whereas the algal community responds to nutrient and water chemistry related stressors (Theroux, 2020, Mazor, 2015). A CRAM score of 58 indicates that some measures of physical habitat at 904M21800 are of moderate quality. The lowest scoring CRAM attribute sub-score was related to limited habitat buffer due to the site proximity to urban development. SWAMP physical habitat assessment measures indicate the stream is limited in flow habitat diversity, composed primarily of glides and pool habitat with few riffles. While all of the water quality analytes were below their respective benchmarks specific conductivity, chloride, total hardness, and sodium values were relatively high (Table 3-4). Station 904M21800 scored poorly for three of the six diatom ASCI sub metrics indicating an abundance of diatom taxa tolerant to disturbance, taxa tolerant of eutrophic conditions, and taxa tolerant to increased salinity environments (Attachment 5-C).

The biological community index scores at site SMC00537 indicate that both the BMI and diatom algal communities are Very Likely Altered (CSCI score of 0.42, ASCI score of 0.53). The physical habitat at SMC00537 is of relatively high quality as indicated by the CRAM score of 76, however the stream bed is of low gradient and riparian buffer community is of limited width and habitat quality. Specific conductivity, chloride, sulfate, and total nitrogen values at SMC00537 were elevated (Table 3-4). Specific conductivity is a measurement of the ability of water to conduct electricity where dissolved ions (i.e., Na<sup>+</sup>, Ca<sup>+2</sup>, SO<sub>4</sub><sup>-2</sup>, etc.) serve as the conductor (Clean Water Team [CWT] Fact Sheet-3.1.3.0(EC)V2e, 2004). As such, specific conductance is related to TDS content. Although the effect of elevated TDS on BMI is variable among different taxa and not well understood, a number of studies have demonstrated a correlation between changes in conductivity/TDS and both altered BMI (Minshall and Minshall, 1978) and algal communities (Leland and Porter, 2000). Results from the first SMC five-year report suggested that elevated TDS is a condition common to the entire region, affecting 76% of stream miles in southern California (Mazor, 2015). Station SMC00537 scored poorly for five of the six diatom ASCI sub metrics indicating an abundance of diatom taxa tolerant to disturbance, taxa tolerant of eutrophic conditions, and taxa tolerant to increased salinity environments (Attachment 5-C).

## 4 REFERENCES

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## **ATTACHMENT 4A**

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### **SMC Quality Assurance/Quality Control Summary**

# QUALITY ASSURANCE SUMMARY FOR SMC CHEMISTRY RESULTS

## 2022-2023

### Quality Assurance / Quality Control Results

The process of quality assurance (QA) / quality control (QC) has the following two components:

**Quality Assurance**—The system used to verify that the entire process is operating within acceptable limits.

**Quality Control**—The mechanisms established to measure non-conforming method performance.

The Surface Water Ambient Monitoring Program (SWAMP) Data Quality Objectives (DQOs) are used in this QA/QC assessment. If a SWAMP DQO was not available, the analytical laboratory's QA/QC DQOs were applied (Table 1).

**Table 1. Data Quality Objectives for Field and Laboratory Measurements**

Group	Parameter	Accuracy	Precision <sup>1</sup>
<b>Water Samples</b>			
Physical Chemistry	Temperature, conductivity, pH, dissolved oxygen, and turbidity	Calibration Standards (3–5 Standards over the expected range of sample target analyte concentration)	NA
Nutrients	Ammonia as N, Nitrate as N, Nitrite as N, Total Kjeldahl Nitrogen, Orthophosphate as P	Laboratory control sample within 90 to 110% of true value. Matrix spike and/or matrix spike duplicate within 80 to 120% of true value	Laboratory duplicate, field duplicate, or matrix spike/matrix spike duplicate < 25% RPD
	Total Phosphorus <sup>2</sup> ,	Laboratory control sample within 75 to 125% of true value. Matrix spike and/or matrix spike duplicate within 75 to 125% of true value.	Laboratory duplicate, field duplicate, or matrix spike/matrix spike duplicate < 25% RPD
Total Metals	Calcium, Magnesium, Sodium	Laboratory control sample within 75 to 125% of true value. Matrix spike and/or matrix spike duplicate within 75 to 125% of true value.	Laboratory duplicate, field duplicate, or matrix spike/matrix spike duplicate < 25% RPD
General Chemistry	Alkalinity, Chemical Oxygen Demand, Chloride, Sulfate	Laboratory control sample within 80 to 120% of true value. Matrix spike and/or matrix spike duplicate within 80 to 120% of true value.	Laboratory duplicate, field duplicate, or matrix spike/matrix spike duplicate < 25% RPD

**Table 1. Data Quality Objectives for Field and Laboratory Measurements**

Group	Parameter	Accuracy	Precision <sup>1</sup>
	Total Suspended Solids	No SWAMP DQO; use laboratory specified control limits	Laboratory duplicate or field duplicate < 25% RPD
	Total Hardness <sup>3</sup>	Laboratory control sample within 75 to 125% of true value. Matrix spike and/or matrix spike duplicate within 75 to 125% of true value.	Laboratory duplicate, field duplicate, or matrix spike/matrix spike duplicate < 25% RPD
<b>Biological Samples</b>			
Periphyton	Ash-Free Dry Weight, Chlorophyll a	NA	Laboratory duplicate, or field duplicate < 25% RPD
Benthic Macroinvertebrate	Taxonomic Identification	90% taxonomic accuracy	90% recount error

NA - Not applicable, RPD – relative percent difference; RL – reporting limit

<sup>1</sup> RPD <25% not applicable if native concentration of either sample is less than the RL

<sup>2</sup> The DQOs for total phosphorus vary based on the method used for analysis. Samples analyzed with EPA 365.3 will follow the DQOs for nutrients; samples analyzed by EPA 200.7 will follow the DQOs for metals.

<sup>3</sup> Total Hardness calculated from non-target analytes (total calcium and total magnesium); therefore, DQOs for metals were applied.

Generally, analytical results were within the corresponding project and/or laboratory QA/QC acceptance range and limits. A summary of DQOs, QA procedures and QC findings, qualifications, and exceptions for the water chemistry results for the contaminants of concern are presented categorically by analyte group in the following sections. A completeness check of monitoring sample collection and QA/QC are provided in Table 2 and Table 3. This assessment compares the number of samples, field duplicates and field blanks collected for the program against the number required by the program. It does not consider accuracy or precision of the data. The laboratory batch identifications (ID) that are associated with each laboratory report number are provided in Table 4. The summary of QC samples analyzed per batch ID and lab by QC type is presented in Table 5. Accuracy and precision are addressed by sample in Tables 6-9. Data qualifiers (if necessary) are also provided in Tables 6-9.

### Completeness

Completion of monitoring sample collection in comparison to project requirements is provided in Table 2. The DQO for monitoring sample completion is 90%. Completion of monitoring QA/QC sample collection in comparison to project requirements is provided in Table 3. The DQO for field blanks and field duplicates is 5% of the total number of samples collected for the project. For this project, one field blank and one field duplicate were required.

**Table 2. Monitoring Sample Collection Completeness**

Parameter	Total Samples Required	Total Samples Collected	% Collection Completeness
<b>Water Samples</b>			
Ammonia as N	1	1	100
Nitrate as N	1	1	100
Nitrite as N	1	1	100
Total Kjeldahl Nitrogen	1	1	100
Total Nitrogen*	1	1	100
Orthophosphate as P	1	1	100
Total Phosphorus	1	1	100
Alkalinity	1	1	100
Chemical Oxygen Demand	1	1	100
Chloride	1	1	100
Sulfate	1	1	100
Total Suspended Solids	1	1	100
Total Hardness**	1	1	100
Calcium	1	1	100
Magnesium	1	1	100
Sodium	1	1	100
<b>Biological Samples</b>			
Ash Free Dry Weight	1	1	100
Chlorophyll a	1	1	100
Algae Taxonomy	1	1	100
Benthic Macroinvertebrate	1	1	100

\*Total Nitrogen calculated from Nitrate as N, Nitrite as N, Total Kjeldahl Nitrogen

\*\*Total Hardness calculated from Total Calcium and Total Magnesium

**Table 3. QA/QC Sample Collection Completeness**

Parameter	# Field Duplicate Required	# Field Duplicate Collected	#Field Blank Required	#Field Blank Collected	% Collection Completeness
<b>Water Samples</b>					
Ammonia as N	1	1	1	1	100
Nitrate as N	1	1	1	1	100
Nitrite as N	1	1	1	1	100
Total Kjeldahl Nitrogen	1	1	1	1	100
Total Nitrogen*	1	1	1	1	100
Orthophosphate as P	1	1	1	1	100
Total Phosphorus	1	1	1	1	100
Alkalinity	1	1	1	1	100
Chemical Oxygen Demand	1	1	1	1	100
Chloride	1	1	1	1	100
Sulfate	1	1	1	1	100
Total Suspended Solids	1	1	1	1	100
Total Hardness**	1	1	1	1	100
Calcium	1	1	1	1	100
Magnesium	1	1	1	1	100

**Table 3. QA/QC Sample Collection Completeness**

Parameter	# Field Duplicate Required	# Field Duplicate Collected	#Field Blank Required	#Field Blank Collected	% Collection Completeness
Sodium	1	1	1	1	100
<b>Biological Samples</b>					
Ash-Free Dry Weight	1	1	NR	NR	100
Chlorophyll a	1	1	NR	NR	100
Algae Taxonomy	1	1	NR	NR	100
Benthic Macroinvertebrate	1	1	NR	NR	100

\*Total Nitrogen calculated from Nitrate as N, Nitrite as N, and Total Kjeldahl Nitrogen

\*\*Total Hardness calculated from Total Calcium and Total Magnesium

### Holding Times

All samples were analyzed within method recommended holding times.

### Blanks

Laboratory contamination associated with sample processing was assessed through the analysis of procedural or method blanks on a minimum frequency of one per batch or matrix type. Procedural blanks were processed and handled identically to a sample including the addition of the same reagents, contact with the same type of vessels, and processed with the same procedure. All method blank results were below the reporting limit (RL), as either a non-detect or an estimated concentration below the RL (i.e., a J flag).

Field contamination associated with sample collection was evaluated using field blank samples. All parameters measured in field blanks were non-detect.

### Reporting Limits (RLs)

The following non-detect results and results detected above the method detection limit but below the RL (qualified with a “J” flag) were above the target reporting limits:

- Calcium
  - Target Reporting Limit: 0.1 mg/L
  - Actual Reporting Limit: 0.5 mg/L
  - Sample ID: FB-06272023 (June 27, 2023)
- Magnesium
  - Target Reporting Limit: 0.1 mg/L
  - Actual Reporting Limit: 0.5 mg/L
  - Sample ID: FB-06272023 (June 27, 2023)
- Nitrate + Nitrite as N
  - Target Reporting Limit: 0.1 mg/L
  - Actual Reporting Limit: 0.2 mg/L
  - Sample ID: FB-06272023 (June 27, 2023)

- Nitrate as N
  - Target Reporting Limit: 0.1 mg/L
  - Actual Reporting Limit: 0.2 mg/L
  - Sample ID: FB-06272023 (June 27, 2023), 904M21800 (June 28, 2023)

## Accuracy

A QC summary of the accuracy of laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) results, and matrix spike (MS) and/or matrix spike duplicate (MSD) results are presented in Tables 6-7.

All LCS and/or LCSD results for project samples met accuracy acceptability limits.

The MS/MSD for project samples met the accuracy acceptability requirements for all parameters with the following exception:

- The MS and/or MSD recovery did not meet the accuracy control limits for the following sample. This analyte was qualified with a CT which indicates that the QC criteria was not met due to a high level of analyte concentration.
  - Calcium and sodium: Sample ID 904M21800 (June 28, 2023)

## Precision

A QC summary of the precision results of LCS and/or LCSDs, MS and/or MSDs, lab duplicates, and field duplicates are presented in Tables 6-9.

All LCS/LCSD, MS/MSD, and laboratory duplicate results for project samples met the precision acceptability limits.

The precision between the field duplicate pairs met the project criteria for all project samples with the following exception:

- 904M21800 (June 28, 2023)
  - Chlorophyll-a had a RPD of 25.9%
  - Total suspended solids had a RPD of 26.1%
  - Nitrate + Nitrite as N had a RPD of 180.2%
  - Total nitrogen had a RPD of 112.0%

**Table 4. Summary of Batch Identifications and Associated Laboratory Report Numbers**

<b>Batch ID</b>	<b>Laboratory Report No.</b>	<b>Laboratory</b>	<b>Group</b>	<b>Method</b>
Physis_C-71082_B_AFDM	2206003-007	Physis Environmental Laboratories, Inc.	Periphyton	SM 10300 C
Physis_C-72109_B_ChlorA	2206003-007	Physis Environmental Laboratories, Inc.	Periphyton	SM 10300 C
WKL_CALC230717_W	3F28072	Weck Laboratories, Inc.	General Chemistry	SM 2340 B
WKL_CALC230717_W	3F29020	Weck Laboratories, Inc.	General Chemistry	SM 2340 B
WKL_W3F2430_W	3F28072	Weck Laboratories, Inc.	Nutrients	EPA 353.2
WKL_W3F2453_W	3F28072	Weck Laboratories, Inc.	Nutrients	EPA 365.1
WKL_W3F2487_W	3F28072	Weck Laboratories, Inc.	General Chemistry	SM 2540 D
WKL_W3F2501_W	3F29020	Weck Laboratories, Inc.	Nutrients	EPA 353.2
WKL_W3F2542_W	3F29020	Weck Laboratories, Inc.	Nutrients	EPA 365.1
WKL_W3F2594_W	3F29020	Weck Laboratories, Inc.	General Chemistry	SM 2540 D
WKL_W3G0126_W	3F28072	Weck Laboratories, Inc.	General Chemistry	EPA 300.0
WKL_W3G0126_W	3F29020	Weck Laboratories, Inc.	General Chemistry	EPA 300.0
WKL_W3G0745_W	3F28072	Weck Laboratories, Inc.	General Chemistry	SM 2320 B
WKL_W3G0745_W	3F29020	Weck Laboratories, Inc.	General Chemistry	SM 2320 B
WKL_W3G0759_W	3F28072	Weck Laboratories, Inc.	Nutrients	EPA 200.7
WKL_W3G0759_W	3F28072	Weck Laboratories, Inc.	Total Metals	EPA 200.7
WKL_W3G0759_W	3F29020	Weck Laboratories, Inc.	Nutrients	EPA 200.7
WKL_W3G0759_W	3F29020	Weck Laboratories, Inc.	Total Metals	EPA 200.7
WKL_W3G0772_W	3F28072	Weck Laboratories, Inc.	General Chemistry	SM 2320 B
WKL_W3G0825_W	3F28072	Weck Laboratories, Inc.	General Chemistry	EPA 410.4
WKL_W3G1007_W	3F28072	Weck Laboratories, Inc.	General Chemistry	EPA 410.4
WKL_W3G1007_W	3F29020	Weck Laboratories, Inc.	General Chemistry	EPA 410.4
WKL_W3G1099_W	3F28072	Weck Laboratories, Inc.	Nutrients	EPA 351.2
WKL_W3G1150_W	3F28072	Weck Laboratories, Inc.	Nutrients	EPA 350.1
WKL_W3G1151_W	3F29020	Weck Laboratories, Inc.	Nutrients	EPA 350.1
WKL_W3G1531_W	3F29020	Weck Laboratories, Inc.	Nutrients	EPA 351.2
WS_3F28072_NO2_NO3	3F28072	Weston Solutions, Inc.	Nutrients	Calculated
WS_3F28072_TN	3F28072	Weston Solutions, Inc.	Nutrients	Calculated
WS_3F29020_NO2_NO3	3F29020	Weston Solutions, Inc.	Nutrients	Calculated
WS_3F29020_TN	3F29020	Weston Solutions, Inc.	Nutrients	Calculated

**Table 5. Summary of Quality Control Samples Analyzed for 2022-2023 SMC Chemistry Results**

Batch ID	Laboratory	Group	Method	Fraction	Blank	Lab Duplicate	Lab Control Spike	Lab Control Spike Duplicate	Matrix Spike	Matrix Spike Dup
Physis_C-71082_B_AFDM	Physis Environmental Laboratories, Inc.	Periphyton	SM 10300 C	Particulate	1					
Physis_C-72109_B_ChlorA	Physis Environmental Laboratories, Inc.	Periphyton	SM 10300 C	Particulate	1	1	1			
WKL_W3F2430_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	Total	1	1		1	1	1
WKL_W3F2453_W	Weck Laboratories, Inc.	Nutrients	EPA 365.1	Total	1	1			1	1
WKL_W3F2487_W	Weck Laboratories, Inc.	General Chemistry	SM 2540 D	Total	1	1		2		
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	Total	1	1		1	2	2
WKL_W3F2542_W	Weck Laboratories, Inc.	Nutrients	EPA 365.1	Total	1	1			1	1
WKL_W3F2594_W	Weck Laboratories, Inc.	General Chemistry	SM 2540 D	Total	1	1		2		
WKL_W3G0126_W	Weck Laboratories, Inc.	General Chemistry	EPA 300.0	Total	1	1			2	2
WKL_W3G0745_W	Weck Laboratories, Inc.	General Chemistry	SM 2320 B	Total	1	1		1		
WKL_W3G0759_W	Weck Laboratories, Inc.	Nutrients	EPA 200.7	Total	1	1		1	2	2
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	Total	1	1		1	2	2
WKL_W3G0772_W	Weck Laboratories, Inc.	General Chemistry	SM 2320 B	Total	1	2		1		
WKL_W3G0825_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	Total	1	1		1	2	2
WKL_W3G1007_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	Total	1	1		1	1	1

**Table 5. Summary of Quality Control Samples Analyzed for 2022-2023 SMC Chemistry Results**

Batch ID	Laboratory	Group	Method	Fraction	Blank	Lab Duplicate	Lab Control Spike	Lab Control Spike Duplicate	Matrix Spike	Matrix Spike Dup
WKL_W3G1099_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	Total	2	2		1	2	2
WKL_W3G1150_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	Total	2	2		1	2	2
WKL_W3G1151_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	Total	2	2		1	2	2
WKL_W3G1531_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	Total	2	2		1	2	2

Table 6. Summary of Accuracy and Precision of Laboratory Control Sample and/or Laboratory Control Sample Duplicate

Batch ID	Laboratory	Group	Method	Sample ID	Sample Date	Parameter	Fraction	LCS (% Recovery)	LCSD (% Recovery)	Accuracy Limit (%)	Accuracy Accept	RPD*	Precision Limit (%)	Precision Accept	Qualifier
Physis_C-72109_B_ChlorA	Physis Environmental Laboratories, Inc.	Periphyton	SM 10300 C	LABQA	23-Jul-23	Chlorophyll a	Particulate	75	77	70-130%	Pass	3	30	Pass	None
WKL_W3F2430_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	W3F2430	28-Jun-23	Nitrate as N	Total	103	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3F2430_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	W3F2430	28-Jun-23	Nitrite as N	Total	101	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3F2453_W	Weck Laboratories, Inc.	Nutrients	EPA 365.1	W3F2453	28-Jun-23	OrthoPhosphate as P	Total	96	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3F2487_W	Weck Laboratories, Inc.	General Chemistry	SM 2540 D	W3F2487	29-Jun-23	Total Suspended Solids	Total	97	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	W3F2501	29-Jun-23	Nitrate as N	Total	103	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	W3F2501	29-Jun-23	Nitrite as N	Total	99	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3F2542_W	Weck Laboratories, Inc.	Nutrients	EPA 365.1	W3F2542	29-Jun-23	OrthoPhosphate as P	Total	104	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3F2594_W	Weck Laboratories, Inc.	General Chemistry	SM 2540 D	W3F2594	30-Jun-23	Total Suspended Solids	Total	103	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3G0126_W	Weck Laboratories, Inc.	General Chemistry	EPA 300.0	W3G0126	5-Jul-23	Chloride	Total	101	NA	80-120%	Pass	NA	NA	NA	None
WKL_W3G0126_W	Weck Laboratories, Inc.	General Chemistry	EPA 300.0	W3G0126	5-Jul-23	Sulfate	Total	100	NA	80-120%	Pass	NA	NA	NA	None
WKL_W3G0745_W	Weck Laboratories, Inc.	General Chemistry	SM 2320 B	W3G0745	11-Jul-23	Alkalinity as CaCO <sub>3</sub>	Total	104	NA	80-120%	Pass	NA	NA	NA	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Nutrients	EPA 200.7	W3G0759	11-Jul-23	Phosphorus as P	Total	102	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	W3G0759	11-Jul-23	Calcium	Total	93	NA	75-125%	Pass	NA	NA	NA	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	W3G0759	11-Jul-23	Magnesium	Total	91	NA	75-125%	Pass	NA	NA	NA	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	W3G0759	11-Jul-23	Sodium	Total	94	NA	75-125%	Pass	NA	NA	NA	None
WKL_W3G0772_W	Weck Laboratories, Inc.	General Chemistry	SM 2320 B	W3G0772	11-Jul-23	Alkalinity as CaCO <sub>3</sub>	Total	98	NA	80-120%	Pass	NA	NA	NA	None
WKL_W3G0772_W	Weck Laboratories, Inc.	General Chemistry	SM 2320 B	W3G0772	11-Jul-23	Alkalinity as CaCO <sub>3</sub>	Total	99	NA	80-120%	Pass	NA	NA	NA	None
WKL_W3G0825_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	W3G0825	12-Jul-23	COD	Total	105	NA	80-120%	Pass	NA	NA	NA	None
WKL_W3G1007_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	W3G1007	13-Jul-23	COD	Total	103	NA	80-120%	Pass	NA	NA	NA	None
WKL_W3G1099_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	W3G1099	14-Jul-23	Nitrogen, Total Kjeldahl	Total	94	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3G1099_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	W3G1099	14-Jul-23	Nitrogen, Total Kjeldahl	Total	95	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3G1150_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	W3G1150	17-Jul-23	Ammonia as N	Total	99	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3G1151_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	W3G1151	17-Jul-23	Ammonia as N	Total	99	NA	90-110%	Pass	NA	NA	NA	None

**Table 6. Summary of Accuracy and Precision of Laboratory Control Sample and/or Laboratory Control Sample Duplicate**

Batch ID	Laboratory	Group	Method	Sample ID	Sample Date	Parameter	Fraction	LCS (% Recovery)	LCSD (% Recovery)	Accuracy Limit (%)	Accuracy Accept	RPD*	Precision Limit (%)	Precision Accept	Qualifier
WKL_W3G1151_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	W3G1151	17-Jul-23	Ammonia as N	Total	101	NA	90-110%	Pass	NA	NA	NA	None
WKL_W3G1531_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	W3G1531	20-Jul-23	Nitrogen, Total Kjeldahl	Total	96	NA	90-110%	Pass	NA	NA	NA	None

\* RPD - relative percent difference. Laboratory calculated value.

NA - Not applicable

**Table 7. Summary of Accuracy and Precision of Matrix Spike and/or Matrix Spike Duplicate**

<b>Batch ID</b>	<b>Laboratory</b>	<b>Group</b>	<b>Method</b>	<b>Sample ID</b>	<b>Sample Date</b>	<b>Parameter</b>	<b>Fraction</b>	<b>MS (% Recovery)</b>	<b>MSD (% Recovery)</b>	<b>Accuracy Limit (%)</b>	<b>Accuracy Accept</b>	<b>RPD**</b>	<b>Precision Limit (%)</b>	<b>Precision Accept</b>	<b>Qualifier</b>
WKL_W3F2430_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	3E09010-11*	1-Jan-50	Nitrate as N	Total	103	104	90-110%	Pass	0.3	20	Pass	QAX
WKL_W3F2430_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	3E09010-11*	1-Jan-50	Nitrite as N	Total	102	102	90-110%	Pass	0	20	Pass	QAX
WKL_W3F2453_W	Weck Laboratories, Inc.	Nutrients	EPA 365.1	SMC00537	27-Jun-23	OrthoPhosphate as P	Total	94	102	90-110%	Pass	5	20	Pass	None
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	3F28086-06*	1-Jan-50	Nitrate as N	Total	103	103	90-110%	Pass	0	20	Pass	QAX
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	3F28086-06*	1-Jan-50	Nitrite as N	Total	101	101	90-110%	Pass	0	20	Pass	QAX
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	3F28086-07*	1-Jan-50	Nitrate as N	Total	104	104	90-110%	Pass	0	20	Pass	QAX
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	3F28086-07*	1-Jan-50	Nitrite as N	Total	99	99	90-110%	Pass	0.3	20	Pass	QAX
WKL_W3F2542_W	Weck Laboratories, Inc.	Nutrients	EPA 365.1	904M21800	28-Jun-23	OrthoPhosphate as P	Total	102	100	90-110%	Pass	0.7	20	Pass	None
WKL_W3G0126_W	Weck Laboratories, Inc.	General Chemistry	EPA 300.0	3F28003-02*	1-Jan-50	Chloride	Total	84	82	80-120%	Pass	0.4	25	Pass	D,QAX
WKL_W3G0126_W	Weck Laboratories, Inc.	General Chemistry	EPA 300.0	3F28003-02*	1-Jan-50	Sulfate	Total	101	100	80-120%	Pass	0.5	25	Pass	D,QAX
WKL_W3G0126_W	Weck Laboratories, Inc.	General Chemistry	EPA 300.0	3F28128-02*	1-Jan-50	Chloride	Total	97	98	80-120%	Pass	0.2	25	Pass	D,QAX
WKL_W3G0126_W	Weck Laboratories, Inc.	General Chemistry	EPA 300.0	3F28128-02*	1-Jan-50	Sulfate	Total	102	102	80-120%	Pass	0.3	25	Pass	D,QAX
WKL_W3G0759_W	Weck Laboratories, Inc.	Nutrients	EPA 200.7	904M21800	28-Jun-23	Phosphorus as P	Total	103	102	90-110%	Pass	0.7	25	Pass	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Nutrients	EPA 200.7	SMC00537	27-Jun-23	Phosphorus as P	Total	102	102	90-110%	Pass	0.3	25	Pass	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	904M21800	28-Jun-23	Calcium	Total	77	70	75-125%	Fail	1	25	Pass	CT
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	904M21800	28-Jun-23	Magnesium	Total	87	84	75-125%	Pass	0.9	25	Pass	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	904M21800	28-Jun-23	Sodium	Total	36	24	75-125%	Fail	1	25	Pass	CT
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	SMC00537	27-Jun-23	Calcium	Total	88	87	75-125%	Pass	0.3	25	Pass	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	SMC00537	27-Jun-23	Magnesium	Total	88	88	75-125%	Pass	0.1	25	Pass	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	SMC00537	27-Jun-23	Sodium	Total	91	88	75-125%	Pass	0.5	25	Pass	None
WKL_W3G0825_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	3F23018-05*	1-Jan-50	COD	Total	99	104	80-120%	Pass	4	15	Pass	D,QAX
WKL_W3G0825_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	3F23076-01*	1-Jan-50	COD	Total	91	106	80-120%	Pass	14	15	Pass	D,QAX
WKL_W3G1007_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	3G05124-01*	1-Jan-50	COD	Total	96	98	80-120%	Pass	2	15	Pass	D,QAX
WKL_W3G1099_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	3F28004-07*	1-Jan-50	Nitrogen, Total Kjeldahl	Total	91	91	90-110%	Pass	0.1	10	Pass	QAX
WKL_W3G1099_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	FB-06272023	27-Jun-23	Nitrogen, Total Kjeldahl	Total	96	93	90-110%	Pass	3	10	Pass	None

**Table 7. Summary of Accuracy and Precision of Matrix Spike and/or Matrix Spike Duplicate**

Batch ID	Laboratory	Group	Method	Sample ID	Sample Date	Parameter	Fraction	MS (% Recovery)	MSD (% Recovery)	Accuracy Limit (%)	Accuracy Accept	RPD**	Precision Limit (%)	Precision Accept	Qualifier
WKL_W3G1150_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	3G05087-02*	1-Jan-50	Ammonia as N	Total	99	100	90-110%	Pass	0.7	15	Pass	QAX
WKL_W3G1150_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	FB-06272023	27-Jun-23	Ammonia as N	Total	100	101	90-110%	Pass	1	15	Pass	None
WKL_W3G1151_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	3F29117-04*	1-Jan-50	Ammonia as N	Total	105	105	90-110%	Pass	0.2	15	Pass	QAX
WKL_W3G1151_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	3F30017-04*	1-Jan-50	Ammonia as N	Total	95	99	90-110%	Pass	0.9	15	Pass	QAX
WKL_W3G1531_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	3F29004-05*	1-Jan-50	Nitrogen, Total Kjeldahl	Total	116	137	90-110%	Fail	4	10	Pass	CT,QAX
WKL_W3G1531_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	3F29118-03*	1-Jan-50	Nitrogen, Total Kjeldahl	Total	96	92	90-110%	Pass	4	10	Pass	QAX

\* Indicates the QC was assessed using a non project related sample.

\*\* RPD - relative percent difference. Laboratory calculated value.

Glossary of Quality Assurance/Quality Control Flags

CT - QC criteria not met due to high level of analyte concentration

D - Analytes analyzed at a secondary dilution

QAX - The native sample for the MS/MSD or duplicate is not included in the batch reported

**Table 8. Summary of Laboratory Duplicates**

Batch ID	Laboratory	Group	Method	Sample ID	Sample Date	Parameter	Fraction	Original Result	Original Units	Lab Dup Result	Lab Dup Units	RPD**	Precision Limit (%)	Precision Accept	Lab Dup Qualifier
WKL_W3F2430_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	SMC00537	27-Jun-23	Nitrate as N	Total	3.93	mg/L	3.91	mg/L	0.5	20	Pass	None
WKL_W3F2430_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	SMC00537	27-Jun-23	Nitrite as N	Total	ND	mg/L	ND	mg/L	NR	20	Pass	None
WKL_W3F2487_W	Weck Laboratories, Inc.	General Chemistry	SM 2540 D	3F27013-01*	1-Jan-50	Total Suspended Solids	Total	36.5	mg/L	34	mg/L	7	25	Pass	QAX
WKL_W3F2487_W	Weck Laboratories, Inc.	General Chemistry	SM 2540 D	3F28004-30*	1-Jan-50	Total Suspended Solids	Total	21.1	mg/L	23.3	mg/L	10	25	Pass	QAX
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	3F29004-05*	1-Jan-50	Nitrate as N	Total	4.92	mg/L	4.92	mg/L	0.04	20	Pass	QAX
WKL_W3F2501_W	Weck Laboratories, Inc.	Nutrients	EPA 353.2	3F29004-05*	1-Jan-50	Nitrite as N	Total	0.299	mg/L	0.301	mg/L	0.7	20	Pass	QAX
WKL_W3F2594_W	Weck Laboratories, Inc.	General Chemistry	SM 2540 D	3F27101-03*	1-Jan-50	Total Suspended Solids	Total	38.8	mg/L	40	mg/L	3	25	Pass	QAX
WKL_W3F2594_W	Weck Laboratories, Inc.	General Chemistry	SM 2540 D	3F29004-03*	1-Jan-50	Total Suspended Solids	Total	15.6	mg/L	14.9	mg/L	5	25	Pass	QAX
WKL_W3G0745_W	Weck Laboratories, Inc.	General Chemistry	SM 2320 B	3E09010-03*	1-Jan-50	Alkalinity as CaCO <sub>3</sub>	Total	221	mg/L	241	mg/L	8	15	Pass	QAX
WKL_W3G0759_W	Weck Laboratories, Inc.	Nutrients	EPA 200.7	FB-06272023	27-Jun-23	Phosphorus as P	Total	ND	mg/L	ND	mg/L	NR	25	Pass	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	FB-06272023	27-Jun-23	Calcium	Total	ND	mg/L	ND	mg/L	NR	25	Pass	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	FB-06272023	27-Jun-23	Magnesium	Total	ND	mg/L	ND	mg/L	NR	25	Pass	None
WKL_W3G0759_W	Weck Laboratories, Inc.	Total Metals	EPA 200.7	FB-06272023	27-Jun-23	Sodium	Total	ND	mg/L	ND	mg/L	NR	25	Pass	None
WKL_W3G0772_W	Weck Laboratories, Inc.	General Chemistry	SM 2320 B	3F28004-13*	1-Jan-50	Alkalinity as CaCO <sub>3</sub>	Total	ND	mg/L	ND	mg/L	NR	15	Pass	QAX
WKL_W3G0825_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	3F26028-01*	1-Jan-50	COD	Total	742	mg/L	792	mg/L	6	15	Pass	D,QAX
WKL_W3G1007_W	Weck Laboratories, Inc.	General Chemistry	EPA 410.4	904M21800	28-Jun-23	COD	Total	31.7	mg/L	34.3	mg/L	8	15	Pass	None
WKL_W3G1099_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	SMC00537	27-Jun-23	Nitrogen, Total Kjeldahl	Total	0.444	mg/L	0.445	mg/L	0.1	10	Pass	None
WKL_W3G1150_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	SMC00537	27-Jun-23	Ammonia as N	Total	0.0329	mg/L	0.0317	mg/L	4	15	Pass	J
WKL_W3G1151_W	Weck Laboratories, Inc.	Nutrients	EPA 350.1	904M21800	28-Jun-23	Ammonia as N	Total	0.0259	mg/L	0.0255	mg/L	1	15	Pass	J
WKL_W3G1531_W	Weck Laboratories, Inc.	Nutrients	EPA 351.2	904M21800	28-Jun-23	Nitrogen, Total Kjeldahl	Total	0.441	mg/L	0.448	mg/L	2	10	Pass	None

\* Indicates the QC was assessed using a non project related sample.

\*\* RPD - relative percent difference. Laboratory calculated value.

ND - Not detected

NR - Not reported

*Glossary of Quality Assurance/Quality Control Flags*

D - Analytes analyzed at a secondary dilution

J - Estimated value

QAX - When the native sample for the MS/MSD or DUP is not included in the batch reported

**Table 9. Summary of Field Duplicates**

Laboratory	Group	Method	Parameter	Fraction	Sample ID	Sample Date	Original Result	Original Units	Field Dup Sample ID	Field Dup Results	Field Dup Units	RPD *	Precision Limit (%)	Precision Accept
Physis Environmental Laboratories, Inc.	Periphyton	SM 10300 C	AFDM_Algae	Particulate	904M21800	28-Jun-23	66	g/m2	904M21800-DUP	79	g/m2	17.93	25	Pass
Physis Environmental Laboratories, Inc.	Periphyton	SM 10300 C	Chlorophyll a	Particulate	904M21800	28-Jun-23	12.1	mg/m2	904M21800-DUP	15.7	mg/m2	25.9	25	Fail
Weck Laboratories, Inc.	General Chemistry	SM 2320 B	Alkalinity as CaCO <sub>3</sub>	Total	904M21800	28-Jun-23	330	mg/L	904M21800-DUP	340	mg/L	2.99	25	Pass
Weck Laboratories, Inc.	General Chemistry	EPA 410.4	COD	Total	904M21800	28-Jun-23	32	mg/L	904M21800-DUP	37	mg/L	14.49	25	Pass
Weck Laboratories, Inc.	General Chemistry	EPA 300.0	Chloride	Total	904M21800	28-Jun-23	1100	mg/L	904M21800-DUP	1100	mg/L	0	25	Pass
Weck Laboratories, Inc.	General Chemistry	SM 2340 B	Hardness as CaCO <sub>3</sub>	Total	904M21800	28-Jun-23	990	mg/L	904M21800-DUP	979	mg/L	1.12	25	Pass
Weck Laboratories, Inc.	General Chemistry	EPA 300.0	Sulfate	Total	904M21800	28-Jun-23	260	mg/L	904M21800-DUP	260	mg/L	0	25	Pass
Weck Laboratories, Inc.	General Chemistry	SM 2540 D	Total Suspended Solids	Total	904M21800	28-Jun-23	10	mg/L	904M21800-DUP	13	mg/L	26.09	25	Fail
Weck Laboratories, Inc.	Nutrients	EPA 350.1	Ammonia as N	Total	904M21800	28-Jun-23	0.026J	mg/L	904M21800-DUP	0.022J	mg/L	NC	25	Pass
Weck Laboratories, Inc.	Nutrients	EPA 353.2	Nitrate as N	Total	904M21800	28-Jun-23	0.073J	mg/L	904M21800-DUP	1.4	mg/L	NC	25	Pass
Weck Laboratories, Inc.	Nutrients	EPA 353.2	Nitrite as N	Total	904M21800	28-Jun-23	ND	mg/L	904M21800-DUP	ND	mg/L	NC	25	Pass
Weck Laboratories, Inc.	Nutrients	EPA 351.2	Nitrogen, Total Kjeldahl	Total	904M21800	28-Jun-23	0.44	mg/L	904M21800-DUP	0.42	mg/L	4.65	25	Pass
Weck Laboratories, Inc.	Nutrients	EPA 365.1	OrthoPhosphate as P	Total	904M21800	28-Jun-23	0.076	mg/L	904M21800-DUP	0.087	mg/L	13.5	25	Pass
Weck Laboratories, Inc.	Nutrients	EPA 200.7	Phosphorus as P	Total	904M21800	28-Jun-23	0.096	mg/L	904M21800-DUP	0.096	mg/L	0	25	Pass
Weck Laboratories, Inc.	Total Metals	EPA 200.7	Calcium	Total	904M21800	28-Jun-23	262	mg/L	904M21800-DUP	259	mg/L	1.15	25	Pass
Weck Laboratories, Inc.	Total Metals	EPA 200.7	Magnesium	Total	904M21800	28-Jun-23	81.6	mg/L	904M21800-DUP	80.7	mg/L	1.11	25	Pass
Weck Laboratories, Inc.	Total Metals	EPA 200.7	Sodium	Total	904M21800	28-Jun-23	420	mg/L	904M21800-DUP	420	mg/L	0	25	Pass
Weston Solutions, Inc.	Nutrients	Calculated	Nitrate + Nitrite as N	Total	904M21800	28-Jun-23	0.073	mg/L	904M21800-DUP	1.4	mg/L	180.2	25	Fail
Weston Solutions, Inc.	Nutrients	Calculated	Nitrogen, Total	Total	904M21800	28-Jun-23	0.513	mg/L	904M21800-DUP	1.82	mg/L	112	25	Fail

\* RPD calculated using the original result and field result reported from the laboratory

NC - Not calculated.

ND - Not detected.

Glossary of Quality Assurance/Quality Control Flags

J - Estimated value

## **ATTACHMENT 4B**

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### **Field Data Sheets**

## SWAMP Stream Habitat Characterization Form

## FULL VERSION

Revision Date: April 01<sup>st</sup>, 2022

REACH DOCUMENTATION					Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15 m Alternate Reach Length (wetted width >10 m) = 250 m Distance between transects = 25 m										
Project Name: CARLSBAD WMA SMC-2023					Date:	6/28/2023		Sample Collection Time:		0815					
Stream Name: Loma Alta Creek					Site Name/ Description: <i>LAC, 10m downstream of El Camino Real</i>										
Site Code: 904M21800					Crew Members: DO/KC										
Latitude (actual – decimal degrees): °N <i>33.19992</i>					datum:	NAD83									
Longitude (actual – decimal degrees): °W <i>-117.33419</i>					other:	GPS Device: <i>Garmin GPSmap 76Cx</i>									
AMBIENT WATER QUALITY MEASUREMENTS					* Turbidity, silica, oxygen saturation, and air temp are optional; calibration date required on page 24								Actual Reach Length (m) (see reach length guidelines at top of form)		
Water Temp (Deg C)	pH	Alkalinity (mg/L)			Turbidity (ntu)*			Oxygen Sat. (%)*			<i>150m</i>				
<i>19.003°C</i>	<i>7.76</i>				<i>1.44 NTU</i>			<i>71.5%</i>			Explanation:				
Dissolved O <sup>2</sup> (mg/L)	Specific Conduct (μS/cm)	Salinity (ppt)			Silica (mg/L)*			Air Temp (Deg C)*			<i>6.53 mg/L 408 μS/cm 2.17 ppt 65°F</i>				
DISCHARGE MEASUREMENTS					check if discharge measurements not possible (explain in field notes section)										
1 <sup>st</sup> measurement = left bank (looking downstream)					cal. date	Transect Width (m): <i>1.7m</i>		BUOYANT OBJECT METHOD (use ONLY if velocity area method not possible)							
VELOCITY AREA METHOD (preferred)					<i>6.2.223</i>			Float 1    Float 2    Float 3							
Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)	Distance (m)								
1 0	0	0	11				Float Time (sec)								
2 25	6	0.03	12				Float Reach Cross Section								
3 50	8	0.06	13				width (m) depth(cm)								
4 75	16	0.11	14				Upper Section								
5 100	16	0.13	15				Middle Section								
6 125	14	0.06	16				Lower Section								
7 150	8	0.02	17				Width								
8 175	0	0	18				Depth 1								
9			19				Depth 2								
10			20				Depth 3								
								Depth 4							
								Depth 5							
NOTABLE FIELD CONDITIONS (check one box per topic)															
Evidence of recent rainfall (enough to increase surface runoff)							NO	<input checked="" type="checkbox"/>	minimal			>10% flow increase			
Evidence of fires in reach or immediately upstream (<500 m)							NO	<input checked="" type="checkbox"/>	< 1 year			< 5 years			
Dominant landuse/ landcover in area surrounding reach							Agriculture			Forest		Rangeland			
							Urban/ Industrial	<input checked="" type="checkbox"/>	Suburb/Town			Other			
Site is affected by recent scouring event							NO	<input checked="" type="checkbox"/>	YES						
Channel Engineered							NO	<input checked="" type="checkbox"/>	YES	<input checked="" type="checkbox"/>					
ADDITIONAL COBBLE EMBEDDEDNESS MEASURES (carry over from transect forms if needed to attain target count of 25; measure in %)	1	2	3	4	5	6	7	8	9	10	11	12	13		
	14	15	16	17	18	19	20	21	22	23	24	25			

*few no cobbles in reach*

Site Code: 904M21800		Date: 6/28/2023		<b>SLOPE and BEARING FORM (transect based - for Full PHAB only)</b>					<input checked="" type="checkbox"/> AUTOLEVEL <input type="checkbox"/> CLINOMETER <input type="checkbox"/> HANDLEVEL <input type="checkbox"/> OTHER													
Starting Transect	<b>MAIN SEGMENT</b> (record percent of inter-transect distance in each segment if supplemental segments are used)					<b>SUPPLEMENTAL SEGMENT</b> (record percent of inter-transect distance in each segment if supplemental segments are used)																
	Stadia rod measurements	Slope (%) or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements	Slope or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)												
		cm <input type="checkbox"/> % <input type="checkbox"/>					cm <input type="checkbox"/> % <input type="checkbox"/>															
K																						
J		10	1	248	1																	
I		2		238																		
H		25		247																		
G		7		266																		
F		6		260																		
E		3		261																		
D		23		211																		
C		2		269																		
B		0		265																		
A		0	15m	254	100%																	
additional calculation area																						
<b>ADDITIONAL HABITAT CHARACTERIZATION</b>						<input type="checkbox"/> High Gradient			<input checked="" type="checkbox"/> Low Gradient													
Parameter		Optimal		Suboptimal		Marginal			Poor													
Epifaunal Substrate/Cover		Greater than 70% of substrate favorable for epifaunal colonization and fish cover (50% for low-gradient streams); mix of submerged logs, undercut banks, cobble or other stable habitat		40-70% mix of stable habitat (30-50% for low-gradient streams); well-suited for full colonization potential		20-40% mix of stable habitat (10-30% in low-gradient streams); substrate frequently disturbed or removed			Less than 20% stable habitat (10% in low-gradient streams); lack of habitat is obvious; substrate unstable or lacking													
Score:		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Sediment Deposition		Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition (<20% in low-gradient streams)		Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected (20-50% in low-gradient streams)		Moderate deposition of new gravel, sand, or fine sediment on bars; 30-50% of the bottom affected (50-80% in low-gradient streams)			Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently (>80% in low-gradient streams)													
Score:		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Channel Alteration		Channelization or dredging absent or minimal; stream with normal pattern		Some channelization present, (e.g., bridge abutments); evidence of past channelization (>20yrs) may be present but recent channelization not present		Channelization may be extensive: embankments or shoring structures present on both banks; 40 to 80% of stream reach disrupted			Banks shored with gabion or cement; Over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely													
Score:		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

1.01, 2.02, 15.3

UB = 1.0m, 55  
RB = 1.0m, 35°

## SWAMP Stream Habitat Characterization Form

FULL VERSION

Revision Date: April 01<sup>st</sup>, 2022

Site Code: 904M21800	Site Name:	Date: 6/28/2023
Wetted Width (m): 5.1	Bankfull Width (m): 7.6	Bankfull Height (m): 0.27 Dry Channel <input type="checkbox"/> Transect A

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	0T		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		7.4	SA		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		7.2	SA		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		3.5	SA		P A D	1	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	WD		P A D	1	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

DT = Rock

<b>RIPARIAN VEGETATION</b> (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)	<b>INSTREAM HABITAT COMPLEXITY</b> (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	<b>DENSIOMETER READINGS (0-17)</b> count covered dots
<b>Vegetation Class</b>	<b>Left Bank</b>		<b>Right Bank</b>		
<b>Upper Canopy (&gt;5 m high)</b>					
Trees and saplings >5 m high	0	1	2	3	4
<b>Lower Canopy (0.5 m-5 m high)</b>					
All vegetation 0.5 m to 5 m	0	1	2	3	4
<b>Ground Cover (&lt;0.5 m high)</b>					
Woody shrubs & saplings <0.5 m	0	1	2	3	4
Herbs/ grasses	0	1	2	3	4
Barren, bare soil/ duff	0	1	2	3	4
Filamentous Algae	0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang. Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

<b>HUMAN INFLUENCE</b> (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)		
Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0		0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

254°

0cm	15m
<b>TAKE PHOTOGRAPHS</b> (check box if taken & record photo code)	
Downstream (optional)	
Upstream (required)	

## Inter-Transect: AB

Wetted Width (m): 4.7

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	H		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		69	SVA		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		64	I		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		59	SVA		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	OT		P A D	2	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)									
	If inter-transect is dry, do not fill out Inter-Transect Substrates section.									

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	10
Pool	90
Dry	

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m): 3.3

Bankfull Width (m): 5.8

Bankfull Height (m): 0.28

Dry Channel 

Transect B

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	HP		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		113	FN		P A D	3	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		107	SA		P A D	3	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		90	SA		P A D	1	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm;
Right Bank		0	OT		P A D	1	P A D	P A D	P A D	UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

OT=Root

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 3 = Heavy (40-75%)				1 = Sparse (<10%) 4 = Very Heavy (>75%)											
Vegetation Class		Left Bank		Right Bank													
Upper Canopy (>5 m high)																	
Trees and saplings >5 m high																	
0	1	2	3	4	0	1	2	3	4								
Lower Canopy (0.5 m - 5 m high)																	
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3								
Ground Cover (<0.5 m high)																	
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3								
Herbs/ grasses	0	1	2	3	4	0	1	2	3								
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3								

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)	0 = Absent (0%)	1 = Sparse (<10%)	2 = Moderate (10-40%)	3 = Heavy (40-75%)	4 = Very Heavy (>75%)
Filamentous Algae	0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang. Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIOMETER READINGS (0-17) count covered dots	Center Left	14
Center Upstream		17
Center Right		17
Center Downstream		14
Optional		
Left Bank		
Right Bank		

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)			
	Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P	
Buildings	P C B 0	Y N	0 B C P	
Pavement/ Cleared Lot	P C B 0		0 B C P	
Road/ Railroad	P C B 0	Y N	0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P	
Landfill/ Trash	P C B 0	Y N	0 B C P	
Park/ Lawn	P C B 0		0 B C P	
Row Crop	P C B 0		0 B C P	
Pasture/ Range	P C B 0		0 B C P	
Logging Operations	P C B 0		0 B C P	
Mining Activity	P C B 0	Y N	0 B C P	
Vegetation Management	P C B 0		0 B C P	
Ridges/ Abutments	P C B 0	Y N	0 B C P	
Orchards/ Vineyards	P C B 0		0 B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

265°

0 cm

15m

## Inter-Transect: BC

Wetted Width (m): 3.2

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	DT		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy;
Left Center		78	SX		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Center		85	SX		P A D	3	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm;
Right Center		99	SX		P A D	UD	P A D	P A D	P A D	UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
Right Bank		16	HP		P A D	1	P A D	P A D	P A D	D = Dry, not assessed
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If Inter-transect is dry, do not fill out Inter-Transect Substrates section.										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	15
Pool	85
Dry	

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m): 2.7

Bankfull Width (m): 4.2

Bankfull Height (m): 0.35

Dry Channel 

Transect C

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embedded	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	0t		P A D	2	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		104	SX		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		110	SX		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		35	WD		P A D	2	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	SX		P A D	0	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

at ~ root

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Vegetation Class	Left Bank	Right Bank
Upper Canopy (>5 m high)		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4
Lower Canopy (0.5 m-5 m high)		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4
Ground Cover (<0.5 m high)		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots
Center Left
Center Upstream
Center Right
Center Downstream
Optional
Left Bank
Right Bank

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; If Y for an analyte, do not assess banks)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0		0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

BANK STABILITY			
(score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

269°  
2cm  
15m

## Inter-Transect: CD

Wetted Width (m): 3.5

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		7	HP		P A D	2	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy;
Left Center		72	SA		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Center		73	SA		P A D	3	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm;
Right Center		77	SA		P A D	2	P A D	P A D	P A D	UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
Right Bank		0	OT		P A D	0	P A D	P A D	P A D	D = Dry, not assessed
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If inter-transect is dry, do not fill out Inter-Transect Substrates section.										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	10
Pool	DP
Dry	

*OT/lot*

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m):

1.6

Bankfull Width (m):

6.0

Bankfull Height (m):

0.29

Dry Channel 

Transect D

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	OT		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		40	36		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		43	8		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		33	5A		P A D	1	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		7	OT		P A D	1	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

DT - float

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Vegetation Class	Left Bank	Right Bank	
Upper Canopy (>5 m high)			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	
Lower Canopy (0.5 m-5 m high)			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	
Ground Cover (<0.5 m high)			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

## DENSIOMETER READINGS (0-17) count covered dots

Center Left	15
Center Upstream	15
Center Right	13
Center Downstream	14
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)			
	Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P	
Buildings	P C B 0	Y N	0 B C P	
Pavement/ Cleared Lot	P C B 0		0 B C P	
Road/ Railroad	P C B 0	Y N	0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P	
Landfill/ Trash	P C B 0	Y N	0 B C P	
Park/ Lawn	P C B 0		0 B C P	
Row Crop	P C B 0		0 B C P	
Pasture/ Range	P C B 0		0 B C P	
Logging Operations	P C B 0		0 B C P	
Mining Activity	P C B 0	Y N	0 B C P	
Vegetation Management	P C B 0		0 B C P	
Bridges/ Abutments	P C B 0	Y N	0 B C P	
Orchards/ Vineyards	P C B 0		0 B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

21°

23 cm  
15m

## Inter-Transect: DE

Wetted Width (m): 1.7

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	ST		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		30	XL		P A D	UD	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		35	WD		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Right Center		24	XL		P A D	1	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	OK		P A D	1	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)									
	If inter-transect is dry, do not fill out Inter-Transect Substrates section.									

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	5
Run	
Glide	60
Pool	35
Dry	

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m): 17

Bankfull Width (m): 5.9

Bankfull Height (m): 0.00

Dry Channel 

Transect E

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SA		P A D	Z	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		0	SA		P A D	O	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		3	WD		P A D	Z	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		16	SA		P A D	Z	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	SA		P A D	O	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)			
Vegetation Class	Left Bank	Right Bank			
Upper Canopy (>5 m high)					
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4			
Lower Canopy (0.5 m-5 m high)					
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4			
Ground Cover (<0.5 m high)					
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4			
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4			
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4			

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4	
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4	
Boulders	0 1 2 3 4	
Woody Debris >0.3 m	0 1 2 3 4	
Woody Debris <0.3 m	0 1 2 3 4	
Undercut Banks	0 1 2 3 4	
Overhang. Vegetation	0 1 2 3 4	
Live Tree Roots	0 1 2 3 4	
Artificial Structures	0 1 2 3 4	

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	14
Center Upstream	15
Center Right	14
Center Downstream	15
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)		0 = Not Present; B = On Bank; C = Between Bank & 10 m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)			
		Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P		
Buildings	P C B 0	Y N	0 B C P		
Pavement/ Cleared Lot	P C B 0		0 B C P		
Road/ Railroad	P C B 0	Y N	0 B C P		
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P		
Landfill/ Trash	P C B 0	Y N	0 B C P		
Park/ Lawn	P C B 0		0 B C P		
Row Crop	P C B 0		0 B C P		
Pasture/ Range	P C B 0		0 B C P		
Cattle Operations	P C B 0		0 B C P		
Mining Activity	P C B 0	Y N	0 B C P		
Vegetation Management	P C B 0		0 B C P		
Bridges/ Abutments	P C B 0	Y N	0 B C P		
Orchards/ Vineyards	P C B 0		0 B C P		

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

261°

3cm  
15m

## Inter-Transect: EF

Wetted Width (m): 3.6

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	HQ		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		36	SAT		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		41	SAT		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		23	SAT		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm;
Right Bank		0	SI		P A D	0	P A D	P A D	P A D	UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If Inter-transect Is dry, do not fill out Inter-Transect Substrates section.

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	95
Pool	5
Dry	

0.62, 1.24, 12.5

## SWAMP Stream Habitat Characterization Form

FULL VERSION

Revision Date: April 01st, 2022

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m):

1.9

Bankfull Width (m):

4.8

Bankfull Height (m):

0.30

Dry Channel 

Transect F

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	OT		P A D		P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy;
Left Center		15	WD		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Center		23	10		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Center		32	17		P A D	2	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
Right Bank		22	SA		P A D	1	P A D	P A D	P A D	D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

OT = Root

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 3 = Heavy (40-75%)				1 = Sparse (<10%) 4 = Very Heavy (>75%)					
Vegetation Class		Left Bank		Right Bank							
Upper Canopy (>5 m high)											
Trees and saplings >5 m high		0	1	2	3	4	0	1	2	3	4
Lower Canopy (0.5 m - 5 m high)											
All vegetation 0.5 m to 5 m		0	1	2	3	4	0	1	2	3	4
Ground Cover (<0.5 m high)											
Woody shrubs & saplings <0.5 m		0	1	2	3	4	0	1	2	3	4
Herbs/ grasses		0	1	2	3	4	0	1	2	3	4
Barren, bare soil/ duff		0	1	2	3	4	0	1	2	3	4

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)					
Filamentous Algae	0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation	0	1	2	3	4
Boulders	0	1	2	3	4
Woody Debris >0.3 m	0	1	2	3	4
Woody Debris <0.3 m	0	1	2	3	4
Undercut Banks	0	1	2	3	4
Overhang. Vegetation	0	1	2	3	4
Live Tree Roots	0	1	2	3	4
Artificial Structures	0	1	2	3	4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	17
Center Upstream	17
Center Right	16
Center Downstream	17
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; If Y for an analyte, do not assess banks)					
	Left Bank		Channel		Right Bank	
Walls/ Rip-rap/ Dams	P	C	B	0	Y N	0 B C P
Buildings	P	C	B	0	Y N	0 B C P
Pavement/ Cleared Lot	P	C	B	0		0 B C P
Road/ Railroad	P	C	B	0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P	C	B	0	Y N	0 B C P
Landfill/ Trash	P	C	B	0	Y N	0 B C P
Park/ Lawn	P	C	B	0		0 B C P
Row Crop	P	C	B	0		0 B C P
Pasture/ Range	P	C	B	0		0 B C P
Hunting Operations	P	C	B	0		0 B C P
Mining Activity	P	C	B	0	Y N	0 B C P
Vegetation Management	P	C	B	0		0 B C P
Bridges/ Abutments	P	C	B	0	Y N	0 B C P
Orchards/ Vineyards	P	C	B	0		0 B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable
260°			
6cm			
15M			
TAKE PHOTOGRAPHS (check box if taken & record photo code)			
Downstream (required)			
Upstream (required)			

## Inter-Transect: FG

Wetted Width (m): 3.5

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SD		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		23	SA		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		34	36		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		37	SA		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	OT		P A D	1	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If Inter-transect is dry, do not fill out Inter-Transect Substrates section.

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	5
Run	
Glide	90
Pool	5
Dry	

OT = Root

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m): 4.1

Bankfull Width (m): 9.1

Bankfull Height (m): 0.30

Dry Channel 

Transect G

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	HP		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		13	SA		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		3	OT		P A D	1	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		7	OT		P A D	2	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	OT		P A D	1	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

5-8 foot

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 3 = Heavy (40-75%)				1 = Sparse (<10%) 4 = Very Heavy (>75%)				2 = Moderate (10-40%)			
Vegetation Class		Left Bank		Right Bank									
Upper Canopy (>5 m high)													
Trees and saplings >5 m high		0	1	2	3	4	0	1	2	3	4		
Lower Canopy (0.5 m-5 m high)													
All vegetation 0.5 m to 5 m		0	1	2	3	4	0	1	2	3	4		
Ground Cover (<0.5 m high)													
Woody shrubs & saplings <0.5 m		0	1	2	3	4	0	1	2	3	4		
Herbs/ grasses		0	1	2	3	4	0	1	2	3	4		
Barren, bare soil/ duff		0	1	2	3	4	0	1	2	3	4		

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)		0 = Absent (0%)	1 = Sparse (<10%)	2 = Moderate (10-40%)	3 = Heavy (40-75%)	4 = Very Heavy (>75%)	DENSIOMETER READINGS (0-17) count covered dots	
Filamentous Algae		0	1	2	3	4	Center Left	17
Aquatic Macrophytes/ Emergent Vegetation		0	1	2	3	4	Center Upstream	16
Boulders		0	1	2	3	4	Center Right	14
Woody Debris >0.3 m		0	1	2	3	4	Center Downstream	14
Woody Debris <0.3 m		0	1	2	3	4	Optional	
Undercut Banks		0	1	2	3	4	Left Bank	
Overhang. Vegetation		0	1	2	3	4	Right Bank	
Live Tree Roots		0	1	2	3	4		
Artificial Structures		0	1	2	3	4		

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)		0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; If Y for an analyte, do not assess banks)									
		Left Bank		Channel		Right Bank					
Walls/ Rip-rap/ Dams		P	C	B	0	Y	N	0	B	C	P
Buildings		P	C	B	0	Y	N	0	B	C	P
Pavement/ Cleared Lot		P	C	B	0			0	B	C	P
Road/ Railroad		P	C	B	0	Y	N	0	B	C	P
Pipes (Inlet/ Outlet)		P	C	B	0	Y	N	0	B	C	P
Landfill/ Trash		R	C	B	0	Y	N	0	B	C	P
Park/ Lawn		P	C	B	0			0	B	C	P
Row Crop		P	C	B	0			0	B	C	P
Pasture/ Range		P	C	B	0			0	B	C	P
Grazing Operations		P	C	B	0			0	B	C	P
Mining Activity		P	C	B	0	Y	N	0	B	C	P
Vegetation Management		P	C	B	0			0	B	C	P
Bridges/ Abutments		P	C	B	0	Y	N	0	B	C	P
Orchards/ Vineyards		P	C	B	0			0	B	C	P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

266°

70m  
15m

## Inter-Transect: GH

Wetted Width (m): 4.8

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SX		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy;
Left Center		9	SX		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Center		10	12		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm;
Right Center		6	SX		P A D	2	P A D	P A D	P A D	UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
Right Bank		0	SX		P A D	2	P A D	P A D	P A D	D = Dry, not assessed
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If inter-transect is dry, do not fill out Inter-Transect Substrates section.										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	15
Run	
Glide	75
Pool	10
Dry	

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m): 2.5

Bankfull Width (m): 7.5

Bankfull Height (m): 0.26

Dry Channel 

Transect H

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		D	DT		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center		4	DT		P A D	2	P A D	P A D	P A D	
Center		0	WD		P A D	1	P A D	P A D	P A D	
Right Center		12	WD		P A D	2	P A D	P A D	P A D	
Right Bank		0	SA		P A D	0	P A D	P A D	P A D	

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

DT = Dark

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 3 = Heavy (40-75%)				1 = Sparse (<10%) 4 = Very Heavy (>75%)											
Vegetation Class		Left Bank		Right Bank													
Upper Canopy (>5 m high)																	
Trees and saplings >5 m high																	
0	1	2	3	4	0	1	2	3	4								
Lower Canopy (0.5 m - 5 m high)																	
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4							
Ground Cover (<0.5 m high)																	
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4							
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4							
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4							

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				
Filamentous Algae		0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation		0	1	2	3	4
Boulders		0	1	2	3	4
Woody Debris >0.3 m		0	1	2	3	4
Woody Debris <0.3 m		0	1	2	3	4
Undercut Banks		0	1	2	3	4
Overhang. Vegetation		0	1	2	3	4
Live Tree Roots		0	1	2	3	4
Artificial Structures		0	1	2	3	4

DENSIMETER READINGS (0-17) count covered dots			
Center Left		13	
Center Upstream		15	
Center Right		15	
Center Downstream		10	
Optional			
Left Bank			
Right Bank			

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; If Y for an analyte, do not assess banks)			
	Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P	
Buildings	P C B 0	Y N	0 B C P	
Pavement/ Cleared Lot	P C B 0		0 B C P	
Road/ Railroad	P C B 0	Y N	0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P	
Landfill/ Trash	P C B 0	Y N	0 B C P	
Park/ Lawn	P C B 0		0 B C P	
Row Crop	P C B 0		0 B C P	
Pasture/ Range	P C B 0		0 B C P	
Hogging Operations	P C B 0		0 B C P	
Mining Activity	P C B 0	Y N	0 B C P	
Vegetation Management	P C B 0		0 B C P	
Bridges/ Abutments	P C B 0	Y N	0 B C P	
Orchards/ Vineyards	P C B 0		0 B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

247°

25cm

15m

## Inter-Transect: HI

Wetted Width (m): 5.3

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	WD			P A D	2	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy;
Left Center	7	SA			P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Center	13	SA			P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm;
Right Center	12	7			P A D	2	P A D	P A D	P A D	UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
Right Bank	0	SA			P A D	0	P A D	P A D	P A D	D = Dry, not assessed
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If inter-transect is dry, do not fill out Inter-Transect Substrates section.										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	100
Pool	
Dry	

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m):

4.4

Bankfull Width (m):

11.5

Bankfull Height (m):

0.15

Dry Channel 

Transect I

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SAX		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		42	SAX		P A D	1	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		53	SAX		P A D	3	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		42	SAX		P A D	2	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	SAX		P A D	0	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
<b>Vegetation Class</b>	<b>Left Bank</b>	<b>Right Bank</b>
Upper Canopy (>5 m high)		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4
Lower Canopy (0.5 m - 5 m high)		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4
Ground Cover (<0.5 m high)		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIMETER READINGS (0-17) count covered dots
Center Left 9
Center Upstream 3
Center Right 12
Center Downstream 14
Optional
Left Bank
Right Bank

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)
Left Bank	Channel
Right Bank	
Walls/ Rip-rap/ Dams	P C B 0 Y N 0 B C P
Buildings	P C B 0 Y N 0 B C P
Pavement/ Cleared Lot	P C B 0 0 B C P
Road/ Railroad	P C B 0 Y N 0 B C P
Pipes (Inlet/ Outlet)	P C B 0 Y N 0 B C P
Landfill/ Trash	P C B 0 Y N 0 B C P
Park/ Lawn	P C B 0 0 B C P
Row Crop	P C B 0 0 B C P
Pasture/ Range	P C B 0 0 B C P
Jogging Operations	P C B 0 0 B C P
Mining Activity	P C B 0 Y N 0 B C P
Vegetation Management	P C B 0 0 B C P
Bridges/ Abutments	P C B 0 Y N 0 B C P
Orchards/ Vineyards	P C B 0 0 B C P

BANK STABILITY			
(score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

238°  
20m  
15m

## Inter-Transect: IJ

Wetted Width (m): 3.6

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SP		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		27	SP		P A D	1	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		47	10		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Right Center		50	20		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	SP		P A D	1	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If inter-transect is dry, do not fill out Inter-Transect Substrates section.										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	75
Pool	25
Dry	

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m): 3.0

Bankfull Width (m): 8.5

Bankfull Height (m): 0.20

Dry Channel 

Transect J

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SA		P A D	0	P A D	P A D	C B A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		27	SA		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		31	12		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		8	SA		P A D	1	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	HP		P A D	2	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 3 = Heavy (40-75%)				1 = Sparse (<10%) 4 = Very Heavy (>75%)			
Vegetation Class		Left Bank		Right Bank					
Upper Canopy (>5 m high)									
Trees and saplings >5 m high		0 1 0 3 4		0 1 2 3 4					
Lower Canopy (0.5 m-5 m high)									
All vegetation 0.5 m to 5 m		0 1 2 3 4		0 1 2 3 4					
Ground Cover (<0.5 m high)									
Woody shrubs & saplings <0.5 m		0 1 2 3 4		0 1 2 3 4					
Herbs/ grasses		0 1 2 3 4		0 1 2 3 4					
Barren, bare soil/ duff		0 1 2 3 4		0 1 2 3 4					

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				DENSIOMETER READINGS (0-17) count covered dots	
Filamentous Algae		0	1	2	3	4	Center Left 9
Aquatic Macrophytes/ Emergent Vegetation		0	1	2	3	4	Center Upstream 15
Boulders		0	1	2	3	4	Center Right 12
Woody Debris >0.3 m		0	1	2	3	4	Center Downstream 11
Woody Debris <0.3 m		0	1	2	3	4	Optional
Undercut Banks		0	1	2	3	4	Left Bank
Overhang. Vegetation		0	1	2	3	4	Right Bank
Live Tree Roots		0	1	2	3	4	
Artificial Structures		0	1	2	3	4	

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)			
	Left Bank		Channel	Right Bank
Walls/ Rip-rap/ Dams	P	C	B	0
Buildings	P	C	B	0
Pavement/ Cleared Lot	P	C	B	0
Road/ Railroad	P	C	B	0
Pipes (Inlet/ Outlet)	P	C	B	0
Landfill/ Trash	P	C	B	0
Park/ Lawn	P	C	B	0
Row Crop	P	C	B	0
Pasture/ Range	P	C	B	0
Logging Operations	P	C	B	0
Mining Activity	P	C	B	0
Vegetation Management	P	C	B	0
Bridges/ Abutments	P	C	B	0
Orchards/ Vineyards	P	C	B	0

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

243°  
10cm  
15m

## Inter-Transect: JK

Wetted Width (m): 2.2

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SA		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		23	24		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		19	18		P A D	1	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Right Center		42	SA		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	SA		P A D	1	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If Inter-transect is dry, do not fill out Inter-Transect Substrates section.									

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	10
Run	
Glide	65
Pool	25
Dry	

Site Code: 904M21800

Site Name:

Date: 6/28/2023

Wetted Width (m):

2.7

Bankfull Width (m):

7.0

Bankfull Height (m):

Dry Channel 

Transect K

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		5	SA		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		96	25		P A D		P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		98	41		P A D		P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		70	40		P A D		P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	OT		P A D	1	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										U = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

OT = Raa

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)				DENSIOMETER READINGS (0-17) count covered dots				
Vegetation Class	Left Bank	Right Bank	Filamentous Algae	Aquatic Macrophytes/ Emergent Vegetation	Boulders	Woody Debris >0.3 m	Undercut Banks	Overhang. Vegetation	Live Tree Roots	Artificial Structures
Upper Canopy (>5 m high)										
Trees and saplings >5 m high	0	1	2	3	4	0	1	2	3	4
Lower Canopy (0.5 m-5 m high)										
All vegetation 0.5 m to 5 m	0	1	2	3	4	0	1	2	3	4
Ground Cover (<0.5 m high)										
Woody shrubs & saplings <0.5 m	0	1	2	3	4	0	1	2	3	4
Herbs/ grasses	0	1	2	3	4	0	1	2	3	4
Barren, bare soil/ duff	0	1	2	3	4	0	1	2	3	4

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
	Left Bank	Channel	Right Bank	eroded
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P	stable
Buildings	P C B 0	Y N	0 B C P	stable
Pavement/ Cleared Lot	P C B 0		0 B C P	
Road/ Railroad	P C B 0	Y N	0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P	
Landfill/ Trash	P C B 0	Y N	0 B C P	
Park/ Lawn	P C B 0		0 B C P	
Row Crop	P C B 0		0 B C P	
Pasture/ Range	P C B 0		0 B C P	
Jogging Operations	P C B 0		0 B C P	
Mining Activity	P C B 0	Y N	0 B C P	
Vegetation Management	P C B 0		0 B C P	
Bridges/ Abutments	P C B 0	Y N	0 B C P	
Orchards/ Vineyards	P C B 0		0 B C P	

TAKE PHOTOGRAPHS (check box if taken & record photo code)	
Downstream (required)	<input checked="" type="checkbox"/>
Upstream (optional)	<input checked="" type="checkbox"/>

Site Code: 904M21800		Date: 6/28/2023				Analyte	Equipment & Calibration Date	
BENTHIC INVERTEBRATE SAMPLES						pH	Cal date: 6/2/23	
Collection Method (indicate standard or margin-center-margin)			Rep.	# Transects Sampled	# Jars	Wat temp	Cal date: / /	
RWB (standard)	RWB (MCM)	TRC	1	11	161	dissolved oxygen	Cal date: / /	
RWB (standard)	RWB (MCM)	TRC	2	11	161	oxygen sat	Cal date: / /	
RWB (standard)	RWB (MCM)	TRC				specific cond	Cal date: / /	
RWB (standard)	RWB (MCM)	TRC				Salinity	Cal date: / /	
<b>Field Notes/ Comments:</b> Was macroalgae (e.g., filamentous algae) collected in the composite algae sample? Yes /No If YES, how many of the 11 transect samples contained macroalgae? _____ If YES, what was the original size of the macroalgae cylinder roll before sectioning into ¼ and ¾ pieces? _____ mm length x _____ mm diameter						Alkalinity	Cal date: / /	
						Turbidity	Cal date: / /	
						Silica	Cal date: / /	
						Velocity	Cal date: / /	
ALGAE SAMPLES						Water and Sediment Chemistry Samples		
Collection Method (circle one or write new method if applicable)		SWAMP EMAP	SWAMP EMAP	SWAMP EMAP	SWAMP EMAP			
Collection Device (sum # of transects per device)		Rep. 1	Rep. 2	Rep.	Rep.	Check if a WATER chemistry grab sample was collected (nutrients, SSC, etc.) <input checked="" type="checkbox"/>		
Rubber Delimiter (area=12.6cm <sup>2</sup> )		—	—			Check if a DUPLICATE WATER chemistry grab sample was collected <input checked="" type="checkbox"/>		
PVC Delimiter (area=12.6cm <sup>2</sup> )		11	10			Check if a SEDIMENT chemistry sample was collected <input type="checkbox"/>		
Syringe Scrubber (area=5.3cm <sup>2</sup> )		—	—			Check if a DUPLICATE SED chemistry sample was collected <input type="checkbox"/>		
Other area=		—	—			Sed Coll Device: SCOOP CORE GRAB Material: Stainless Steel Polyethylene Polycarbonate Other		
Number of transects sampled (0-11)		11	11			Sediment Collection Depth (cm): 2 or 5		
Composite Volume (mL)		460 mL	450 mL			Create Lab Collection records for each checked box for integrated and grab water chemistry samples		
Assemblage ID volume (diatoms) (50 mL tube)		40 mL	40 mL			Area Sampled = 8.6 cm <sup>2</sup> DUP = 1313 cm <sup>2</sup>		
Assemblage ID volume (soft algae) (50 mL tube)		—	—					
Check if Qualitative Algae sample was collected with soft algae/diatom sample (required even if macroalgae not visible)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Check if a water chem. integrated sample was collected (chl, AFDM)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Chlorophyll a volume use GF/F filter (25 mL (preferred volume))		25 mL	25 mL					
Ash Free Dry Mass use GF/F filter (AFDM) volume (25 mL (preferred vol))		25 mL	25					
ADDITIONAL PHOTOGRAPHS								
Description	Photo Code		Description		Photo Code			

Flow Habitat Type	DESCRIPTION
Cascades	Short, high gradient drop in stream bed elevation often accompanied by boulders and considerable turbulence
Falls	High gradient drop in elevation of the stream bed associated with an abrupt change in the bedrock
Rapids	Sections of stream with swiftly flowing water and considerable surface turbulence. Rapids tend to have larger substrate sizes than riffles
Riffles	Shallow sections where the water flows over coarse stream bed particles that create mild to moderate surface turbulence; (< 0.5 m deep, > 0.3 m/s).
Runs	Long, relatively straight, low-gradient sections without flow obstructions. The stream bed is typically even and the water flows faster than it does in a pool; (> 0.5 m deep, > 0.3 m/s). A step-run is a series of runs separated by short riffles or flow obstructions that cause discontinuous breaks in slope
Glides	A section of stream with little or no turbulence, but faster velocity than pools; (< 0.5 m deep, < 0.3 m/s)
Pools	A reach of stream that is characterized by deep, low-velocity water and a smooth surface; (> 0.5 m deep, < 0.3 m/s)

Size Class Code	Size Class Range	Size Class Description	Common Size Reference
RS	> 4 m	bedrock, smooth	larger than a car
RR	> 4 m	bedrock, rough	larger than a car
XB	1 - 4 m	boulder, large	meter stick to car
SB	25 cm - 1.0 m	boulder, small	basketball to meter stick
CB	64 - 250 mm	cobble	tennis ball to basketball
GC	16 - 64 mm	gravel, coarse	marble to tennis ball
GF	2 – 16 mm	gravel, fine	ladybug to marble
SA	0.06 – 2 mm	sand	gritty to ladybug
FN	< 0.06 mm	fines	not gritty
HP	< 0.06 mm	hardpan (consolidated fines)	
WD	NA	wood	
RC	NA	concrete/asphalt	
OT	NA	other	

**BANK STABILITY**

Although this measure of the degree of erosive potential is subjective, it can provide clues to the erosive potential of the banks within the reach. Assign the category whose description best fits the conditions in the area between the wetted channel and bankfull channel (see figure below)

Eroded	Banks show obvious signs of erosion from the current or previous water year; banks are usually bare or nearly bare
Vulnerable	Banks have some vegetative protection (usually annual growth), but not enough to prevent erosion during flooding
Stable	Bank vegetation has well-developed roots that protect banks from erosion; alternately, bedrock or artificial structures (e.g., concrete/ rip-rap) prevent bank erosion

**CPOM/ COBBLE EMBEDDEDNESS**

**CPOM:** Record presence (P) or absence (A) of coarse particulate organic matter (>1.0 mm particles) within 1 cm of each substrate particle; if point is dry, record Dry (D)

**Cobble Embeddedness:** Visually estimate % embedded by fine particles (record to nearest 5%)

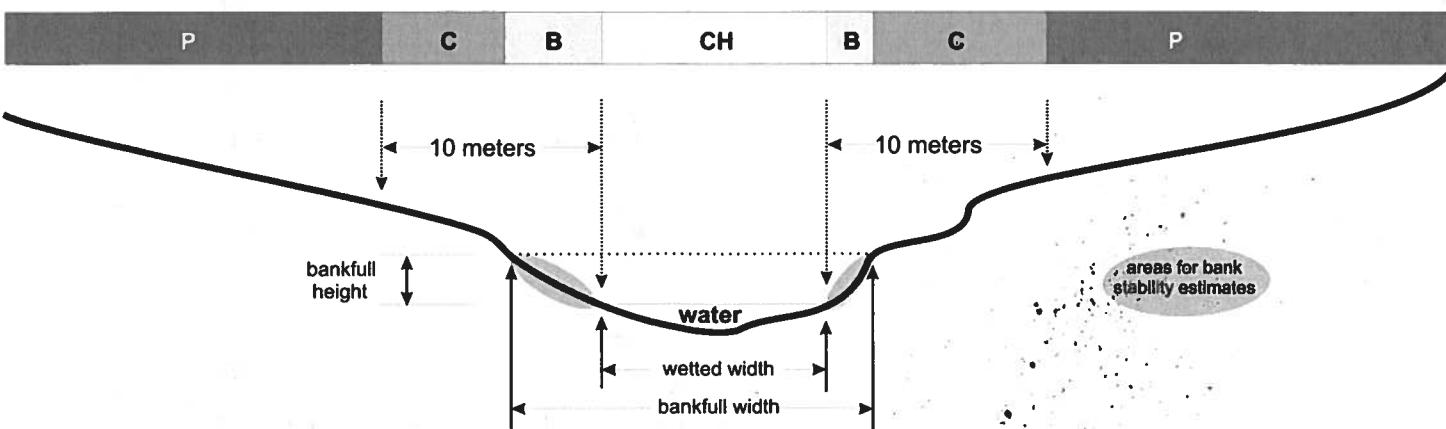
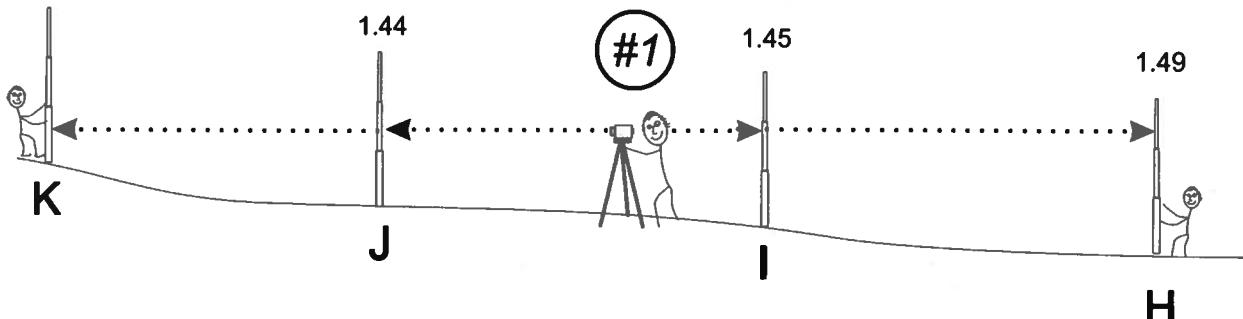


Figure 1. Cross-sectional diagram of stream transect indicating regions for assessing human influence measures:

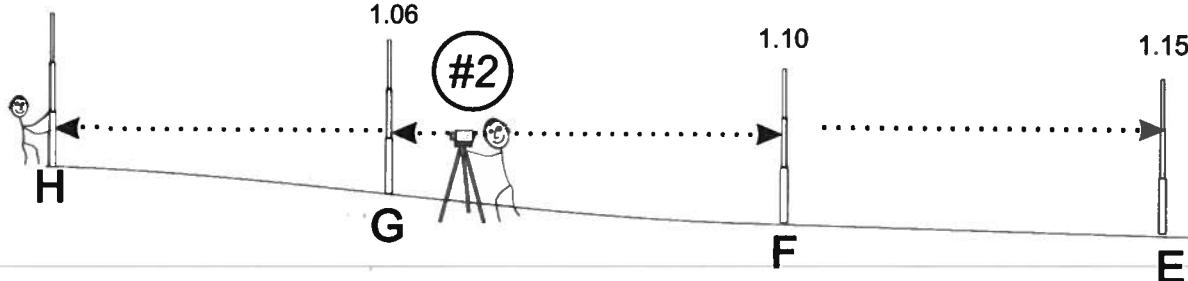
- The measurement zone extends 5 meters upstream and 5 meters downstream of each transect
- Record one category for each bank and for the wetted channel (3 values possible)
- In reaches with wide banks, region "C" may be entirely overlapped by region "B"; in these cases, circle "B"
- Region "P" extends from 10 meters to the distance that can be seen from the channel, but not greater than 50 m

SLOPE and BEARING FORM							EXAMPLE				AUTOLEVEL CLINOMETER HANDLEVEL	X
Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)						
	Stadia rod measurements		Slope (%) or Elevation Difference cm <input checked="" type="checkbox"/> % <input type="checkbox"/>	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements		Slope or Elevation Difference cm <input type="checkbox"/> % <input checked="" type="checkbox"/>	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)
K	1.41											
J	1.44	3	15	140	100							
I	1.45	1	15	145	100							
H	1.49	1.03	4	150	100							
G		1.06	3	15	143	100						
F		1.10	4	15	187	100						
E		1.15	5	15	195	100						

1.41



1.03



1. Level the autolevel at Position #1
2. Place base of stadia rod at water level every time
3. Sight to stadia rod at Transect K, then Transect J
4. Rotate scope and sight to Transects I and H.
5. Move level to Position #2 and re-level

6. Re-sight to stadia rod at Transect H, then Transect G
7. Rotate scope and sight to Transects F and E

*Note: Sites will vary in the number of separate level positions needed to survey the reach.*

ECPARL 9386

JNLR

## Assessment of hydrologic states

Site: 904M21800Lat: 33.19992 Long: -117.33419 Date: 6/28/2023Observer(s): DO/KC

**Flow habitats:** Estimate the percent cover of each habitat type across the entire reach, to within 5%. Definitions follow Ode (2007). Total must equal 100%.

	Cascades	Rapids	Riffles	Runs	Glides	Pools	Dry
% of reach	—	—	5	—	55	40	—

Select the hydrologic state that most closely matches the dominant state of the reach:

State (check one)	Description, indicators
<input type="checkbox"/> Hyperrheic (flooding)	Water may be above banks and turbid or carrying suspended particles. Movement of streambed particles may occur.
<input checked="" type="checkbox"/> Eurheic (baseflow)	Water always below banks (if banks are evident). Discharge is high enough to allow access to most of the stream bed. Many different flow microhabitats may be evident (e.g., riffles, pools, runs, glides). Gravels will generally be stable on the streambed.
<input type="checkbox"/> Oligorheic (limited flow)	Discharge is low but sufficient to connect pools and other aquatic habitats through small rivulets. Surface water is more or less continuous throughout reach. Riffles are scarce.
<input type="checkbox"/> Arheic (disconnected pools)	Discharge is close to zero, may not be visibly evident. Pools may be abundant, but may be disconnected. This state may not exist in sandy streams with rapid groundwater infiltration or in concrete channels.
<input type="checkbox"/> Hyporehic (subsurface water)	Most of the stream bed is devoid of surface water, although substrate may remain wet enough to support active hyporheic life. Terrestrial fauna may be common on the stream bed. This state may not exist in concrete or bedrock channels
<input type="checkbox"/> Edaphic (dry)	The entire stream bed is devoid of surface water, and the substrate (if present) is too dry to support active hyporheic life (although dessication-resistant life stages may be present). Soil moisture in the streambed is not discernibly greater than in nearby soils above the banks.

Take a photo to document conditions (at transects A, F, and K, if possible).

Notes:



Station Code: 904M21800Date: 6/28/2023Observers: DO/KC**Determination based on:**

Site visit     Aerial imagery     Other: \_\_\_\_\_

**CHANNEL CHARACTERISTICS**Channel type:  Natural (*skip to Grade Control Features*)     Engineered**Width of structure at base:**

100+ m     50 to 100 m     10 to 50 m     5 to 10 m     < 5 m     NA

**Shape:**

Rectangular     Trapezoidal     V-ditch     Natural     Other: \_\_\_\_\_

**Right Bank**

Earthen bare     Rock     Grouted rock     Concrete     Vegetated /Natural

Other: \_\_\_\_\_

**Left Bank**

Earthen bare     Rock     Grouted rock     Concrete     Vegetated /Natural

Other: \_\_\_\_\_

**Bottom**

Soft/Natural     Rock     Grouted rock     Concrete     Other: \_\_\_\_\_

**Evidence of vegetation removal:**  No     Yes, *within past month*     Yes, *not within past month*

**LOW-FLOW FEATURES (Engineered channels only)**

Low-flow channel:  Present     Absent     Not determined

Width of low-flow channel:  5+ m     1 to 5 m     < 1 m

**GRADE CONTROL FEATURES (crossings, check dams, weirs, etc.)**

Grade control features:  Present     Absent

Location of grade control features (*check all that apply; skip if none are present*):

Within reach     Within 10 m upstream     Within 10 m downstream

## HYDROMOD PHAB MODULE

StationCode: 904M21800

SampleDate: 6/28/2023

Observer(s): DO/KC

Latitude: 33.19992 Longitude: 117.58419 Datum: NAD83

Is the channel fully armored (banks and streambed), with engineered elements in good condition? Y/N O

If "Yes", stop; other elements will be filled in automatically. If "No", continue filling out the worksheet.

GIS Metrics: Fill out "NR" if not available at the time of data submission.

Area (A): \_\_\_\_\_ square miles

Precipitation (P): \_\_\_\_\_ inches per year

Valley slope (Sv): \_\_\_\_\_ m/m

Valley width (Wv): \_\_\_\_\_ m

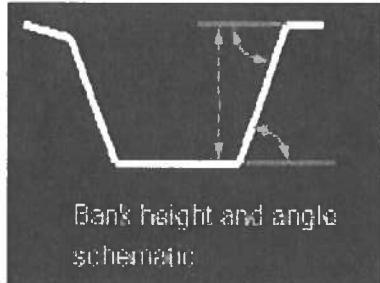
### Field measurements

Pebble Count: Reported via PHAB data

submission Risk for Mass Wasting:

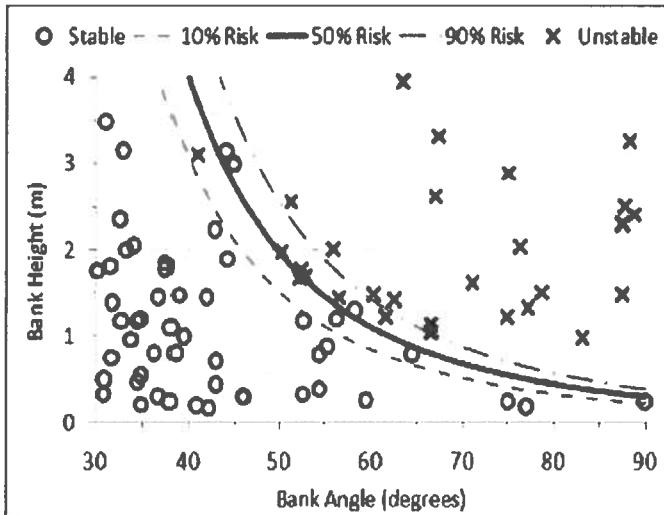
Measure bank angle in the field (recommend at A, F, and K but pick the "best" locations):

Transect:	Right bank	Left Bank
Transect <del>A</del>	<u>35°</u>	<u>35°</u>
Transect <del>F</del>	<u>35</u>	<u>30</u>
Transect <del>K</del>	<u>30</u>	<u>30</u>



Bank Height:

Transect	Right bank	Left Bank
Transect <del>A</del>	<u>1.0</u>	<u>1.0</u>
Transect <del>F</del>	<u>1.0</u>	<u>1.0</u>
Transect <del>K</del>	<u>1.0</u>	<u>1.0</u>



## Vertical Susceptibility

Primary state of streambed (pick 1; if unsure, assume "Intermediate"):

- A. Labile, dominated by sand or fine gravel.
- B. Intermediate: Dominated by cobbles and gravels, or hardpan of uncertain strength.
- C. Coarse/Armored/Resistant: Dominated by boulders and large cobbles, continuous concrete, or continuous resistant bedrock.

If "Intermediate", fill out "Armoring potential" and "Grade control":

### Armoring potential (pick 1)

- A. Coarse gravels and cobbles tightly packed; Sands and fines <5% of surface material
- B. Intermediate or hardpan of uncertain resistance
- C. Coarse gravels and cobbles loosely packed; sands and fines >25% of surface material

### Grade control (pick 1)

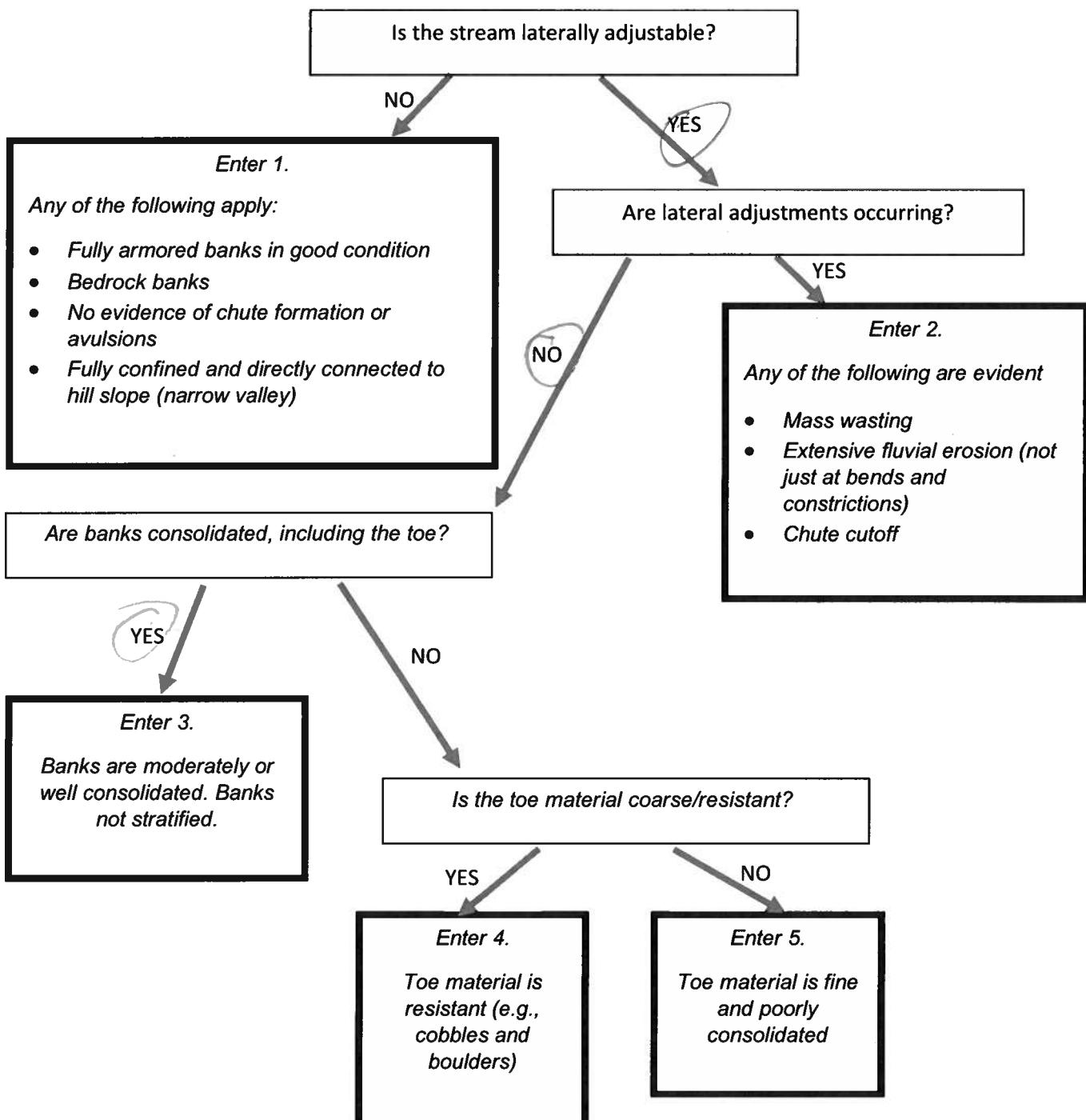
- A. Effective grade controls less than 50 m apart. No signs of failure or mass wasting. Geologic controls are resistant igneous or metamorphic rock (or hardpan with demonstrable strength as indicated by boring/hammer test/appropriate inspections)
- B. Intermediate spacing of grade control, potential evidence of failure, or hardpan with uncertain resistance
- C. Grade control absent, spaced > 100 m, or clear evidence of ineffectiveness, such as: head-cutting > 30 cm, active mass wasting, exposed bridge pilings, undermined culverts/structures.

## Lateral Susceptibility

Enter the most appropriate number to describe the reach. Refer to the flow chart on the next page.

Left bank state: 3

Right bank state: 3



## Vertebrate Observation Reporting Form

StationCode: 904M21800Sample date: 6/28/2023 Observer(s):DO/KC \_\_\_\_\_Check if none of these were observed: 

AMPHIBIANS	Larvae			Juvenile/Adult			Notes
	1 to 10	11 to 50	>50	1 to 10	11 to 50	>50	
Bullfrog <i>Lithobates catesbeianus</i>							
African clawed frog <i>Xenopus laevis</i>							
Other amphibian							

REPTILES	Juvenile/Adult			Notes
	1 to 10	11 to 50	>50	
Sliders				
<i>Trachemys</i> spp				
Other reptile				

INVERTEBRATES	Juvenile/Adult			Notes
	1 to 10	11 to 50	>50	
Swamp red crayfish <i>Procambarus clarkia</i>				
Signal crayfish <i>Pacifastacus leniusculus</i>				
Other invert				

Isbad WMA SMC-2023

904M21800

6/28/2023

FISH	Juvenile/Adult			Notes
	1 to 10	11 to 50	>50	
Mosquito fish <i>Gambusia affinis</i>		X		
Bullhead catfish <i>Ameiurus sp</i>				
Largemouth bass <i>Micropterus almooides</i>				
Smallmouth bass <i>Micropterus dolomieu</i>				
Carp <i>Cyprinus carpio</i>				
Goldfish <i>Carassius auratus</i>				
Bluegill <i>Lepomis macrochirus</i>				
Pumpkinseed sunfish <i>Lepomis gibbosus</i>				
Red-eared sunfish <i>Lepomis microlophus</i>				
Green sunfish <i>Lepomis cyanellus</i>				
Other fish				

CARLSBAD 9386

## Basic Information Sheet: Riverine Wetlands

<b>Assessment Area Name:</b> 904M21800	
<b>Project Name:</b> CARLSBAD WMA SMC-2023	
<b>Assessment Area ID #:</b>	
<b>Project ID #:</b>	<b>Date:</b> 6/28/2023
<b>Assessment Team Members for This AA:</b> DO/KC	
<b>Average Bankfull Width:</b>	
<b>Approximate Length of AA</b> (10 times bankfull width, min 100 m, max 200 m):	
<b>Upstream Point Latitude:</b>	<b>Longitude:</b>
<b>Downstream Point Latitude:</b> 33.19992	<b>Longitude:</b> -117.33419
<b>Wetland Sub-type:</b> <input checked="" type="checkbox"/> Confined <input type="checkbox"/> Non-confined	
<b>AA Category:</b> <input type="checkbox"/> Restoration <input type="checkbox"/> Mitigation <input type="checkbox"/> Impacted <input type="checkbox"/> Ambient <input type="checkbox"/> Reference <input type="checkbox"/> Training <input checked="" type="checkbox"/> Other: SPUR	
<b>Did the river/stream have flowing water at the time of the assessment?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>What is the apparent hydrologic flow regime of the reach you are assessing?</b> The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. <i>Perennial</i> streams conduct water all year long, whereas <i>ephemeral</i> streams conduct water only during and immediately following precipitation events. <i>Intermittent</i> streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source. <input checked="" type="checkbox"/> perennial <input type="checkbox"/> intermittent <input type="checkbox"/> ephemeral	

**Photo Identification Numbers and Description:**

	<b>Photo ID No.</b>	<b>Description</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Datum</b>
1	A	Upstream			
2	E	Middle Left			
3		Middle Right			
4	K	Downstream			
5					
6					
7					
8					
9					
10					

**Site Location Description:**

Loma Alta Creek, 110m d/s of El Camino Real

**Comments:**

# Scoring Sheet: Riverine Wetlands

ecm  
B 9386

AA Name: 904M21800			Date: 6/28/2023
<b>Attribute 1: Buffer and Landscape Context (pp. 11-19)</b>			<b>Comments</b>
Stream Corridor Continuity (D)		Alpha.	Numeric
		D	3
Buffer:			
Buffer submetric A: Percent of AA with Buffer	Alpha.	Numeric	
	D	3	
Buffer submetric B: Average Buffer Width	Alpha.	Numeric	
	D	3	
Buffer submetric C: Buffer Condition	Alpha.	Numeric	
	D	3	
<b>Raw Attribute Score = D + [C x (A x B)<sup>1/2</sup>]<sup>1/2</sup></b>			<b>Final Attribute Score = (Raw Score/24) x 100</b>
			25
<b>Attribute 2: Hydrology (pp. 20-26)</b>			
Water Source		Alpha.	Numeric
		C	6
Channel Stability		B	9
Hydrologic Connectivity		A	12
<b>Raw Attribute Score = sum of numeric scores</b>			<b>Final Attribute Score = (Raw Score/36) x 100</b>
			75
<b>Attribute 3: Physical Structure (pp. 27-33)</b>			
Structural Patch Richness		Alpha.	Numeric
		B	9
Topographic Complexity		C	6
<b>Raw Attribute Score = sum of numeric scores</b>			<b>Final Attribute Score = (Raw Score/24) x 100</b>
			62.5
<b>Attribute 4: Biotic Structure (pp. 34-41)</b>			
Plant Community Composition (based on sub-metrics A-C)			
Plant Community submetric A: Number of plant layers	Alpha.	Numeric	
	A	12	
Plant Community submetric B: Number of Co-dominant species	Alpha.	Numeric	
	C	6	
Plant Community submetric C: Percent Invasion	Alpha.	Numeric	
	A	12	
Plant Community Composition Metric (numeric average of submetrics A-C)			10
Horizontal Interspersion			B 9
Vertical Biotic Structure			C 6
<b>Raw Attribute Score = sum of numeric scores</b>			<b>Final Attribute Score = (Raw Score/36) x 100</b>
			69.4
<b>Overall AA Score (average of four final Attribute Scores)</b>			50

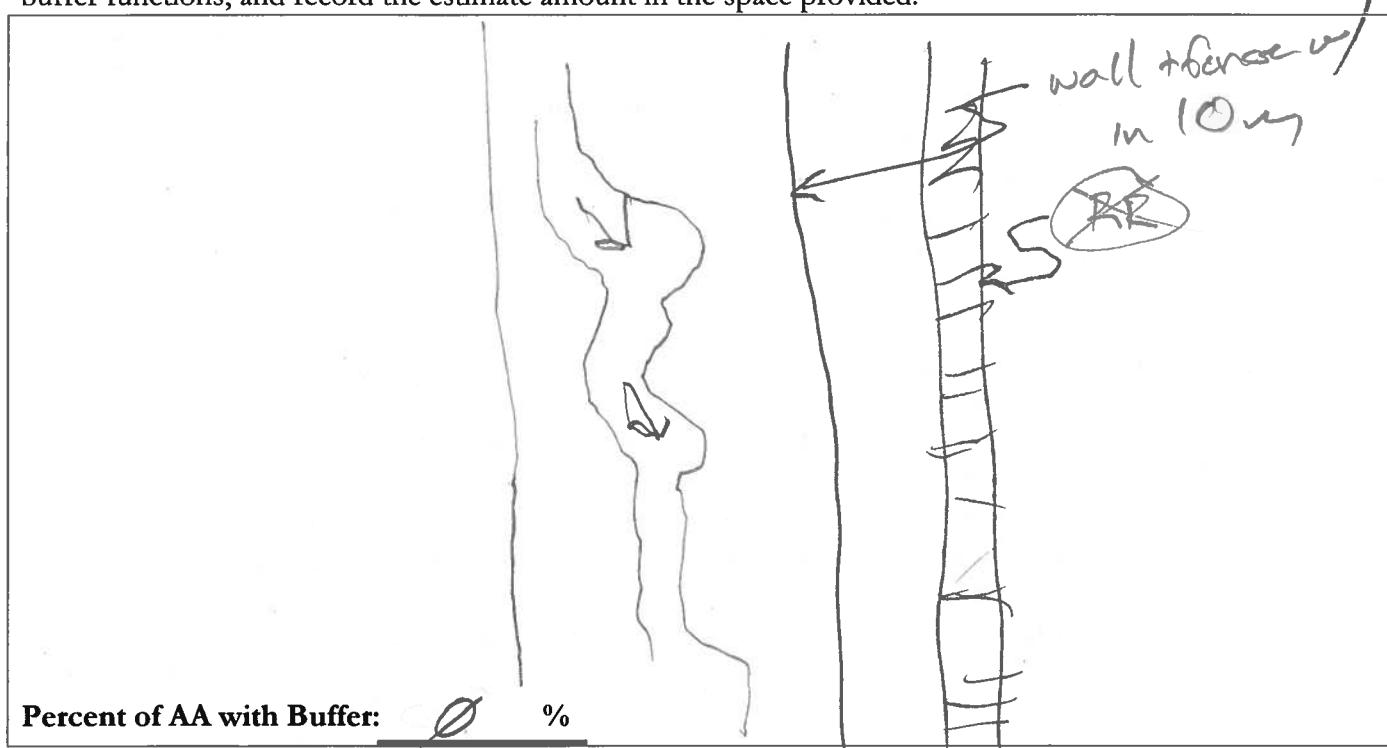
## Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	500	1	500
2	50	2	
3		3	
4		4	
5		5	
Upstream Total Length	500	Downstream Total Length	500

G water

### Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.



### Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	0m
B	
C	
D	
E	
F	
G	
H	
<b>Average Buffer Width</b> <b>*Round to the nearest integer*</b>	<input type="text"/>

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	<p><input checked="" type="checkbox"/> The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA.</p> <p><input type="checkbox"/> Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it.</p> <p><input checked="" type="checkbox"/> There is leaf litter, thatch, or wrack in most pools (if pools are present).</p> <p><input checked="" type="checkbox"/> The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area.</p> <p><input type="checkbox"/> There is little or no active undercutting or burial of riparian vegetation.</p> <p><input type="checkbox"/> If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation.</p> <p><input type="checkbox"/> Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar).</p> <p><input type="checkbox"/> There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA</p> <p><input type="checkbox"/> The larger bed material supports abundant mosses or periphyton.</p>
Indicators of Active Degradation	<p><input checked="" type="checkbox"/> The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs.</p> <p><input type="checkbox"/> There are abundant bank slides or slumps.</p> <p><input checked="" type="checkbox"/> The lower banks are uniformly scoured and not vegetated.</p> <p><input checked="" type="checkbox"/> Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel.</p> <p><input type="checkbox"/> An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation.</p> <p><input type="checkbox"/> The channel bed appears scoured to bedrock or dense clay.</p> <p><input type="checkbox"/> Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided).</p> <p><input type="checkbox"/> The channel has one or more knickpoints indicating headward erosion of the bed.</p>
Indicators of Active Aggradation	<p><input type="checkbox"/> There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year.</p> <p><input checked="" type="checkbox"/> There are partially buried living tree trunks or shrubs along the banks.</p> <p><input type="checkbox"/> The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced.</p> <p><input type="checkbox"/> There are partially buried, or sediment-choked, culverts.</p> <p><input checked="" type="checkbox"/> Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour.</p> <p><input type="checkbox"/> There are avulsion channels on the floodplain or adjacent valley floor.</p>
Overall	<b>I Equilibrium</b> <b>IDegradation</b> <b>I Aggradation</b>

Bwl some Agg<sup>x</sup> def

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections →	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	7.6	4.8	7.0
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	1.01	0.62	1.23
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	2.02	1.24	2.46
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	15.3	12.5	15.5
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	2.01	2.60	2.21
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.			
				2.3



### Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine with patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

\*Please refer to the CRAM Photo Dictionary at [www.cramwetlands.org](http://www.cramwetlands.org) for photos of each of the following patch types.

<b>STRUCTURAL PATCH TYPE (circle for presence)</b>	Riverine (Non-confined)	Riverine (Confined)
<b>Minimum Patch Size</b>	<b>3 m<sup>2</sup></b>	<b>3 m<sup>2</sup></b>
Abundant wrackline or organic debris in channel, on floodplain	1	1
Bank slumps or undercut banks in channels or along shoreline	1	1
Cobbles and/or Boulders	1	1
Debris jams	1	1
Filamentous macroalgae or algal mats	1	1
Large woody debris	1	1
Pannes or pools on floodplain	1	N/A
Plant hummocks and/or sediment mounds	1	1
Point bars and in-channel bars	1	1
Pools or depressions in channels (wet or dry channels)	1	1
Riffles or rapids (wet or dry channels)	1	1
Secondary channels on floodplains or along shorelines	1	N/A
Standing snags (at least 3 m tall)	1	1
Submerged vegetation	1	N/A
Swales on floodplain or along shoreline	1	N/A
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	1	1
Vegetated islands (mostly above high-water)	1	N/A
<b>Total Possible</b>	<b>17</b>	<b>12</b>
<b>No. Observed Patch Types (enter here and use in Table 14 below)</b>	8	6

## Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

Profile 1



Profile 2



Profile 3



C  
bank, ↙ more drop

## **Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands**

(A dominant species represents  $\geq 10\%$  *relative cover*)

## Special Note:

\* Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		1 <i>Sarcocornia</i> 2	N
2 <i>Baccharis</i>	N	3 <i>Schoenoplectus</i> 4 <i>Typha</i> lat	N
Very Tall (>3.0 m)	Invasive?	Total number of co-dominant species for all layers combined (enter here and use in Table 18)	
5 <i>Salix</i> las	N		
		Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)	

4.5 · 0/5

## Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.

 <i>B-</i>	<b>Assigned zones:</b> 1) <i>Salix</i> 2) <i>VV - Teks</i> 3) <i>M - Scapus</i> 4) 5) 6)
---	--

### Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	<input checked="" type="radio"/> No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
non-confined riverine	confined riverine	seasonal estuarine		
perennial saline estuarine	perennial non-saline estuarine	wet meadow		
lacustrine	seep or spring	playa		

*75 w/ 1 layer*  
*25 w/ 2*

### Stressor Checklist Worksheet

<b>HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)</b>	<b>Present</b>	<b>Significant negative effect on AA</b>
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)	\	
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)	\	
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
<b>Comments</b>		

<b>PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)</b>	<b>Present</b>	<b>Significant negative effect on AA</b>
Filling or dumping of sediment or soils (N/A for restoration areas)		
Grading/ compaction (N/A for restoration areas)		
Plowing/Discing (N/A for restoration areas)		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management	\	
Excessive sediment or organic debris from watershed	\	
Excessive runoff from watershed	\	
Nutrient impaired (PS or Non-PS pollution)	\	
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)	\	
Trash or refuse		\
<b>Comments</b>		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation	/	
Predation and habitat destruction by non-native vertebrates (e.g., <i>Virginia opossum</i> and domestic predators, such as feral pets)	/	
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer	/	
<b>Comments</b>		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial	/	
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor	/	
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
<b>Comments</b>		

SRC

## Riverine Trash Assessment

### General Site Information

Station ID:	904M21800	Date:	6/28/2023
Start Time:	1050	End Time:	1105
Start Latitude:	33.19992	Start Longitude:	-117.33419
End Latitude:		End Longitude:	
Field Crew:	DQ/KC		
River/Site Description:	Loma Alta Creek		Watershed: Loma Alta
Access:			
Left Bank (circle one):	Easy	Moderate	Hard
Right Bank (circle one):	Easy	Moderate	Hard
Channel Type (Check all that apply):			
<input checked="" type="checkbox"/> Natural	<input type="checkbox"/> Earthen	<input type="checkbox"/> Concrete	<input type="checkbox"/> Rip Rap <input type="checkbox"/> Other
Type of Site:	<input checked="" type="checkbox"/> Probabilistic	<input type="checkbox"/> Targeted	Is stream flowing? Yes / No

### Assessment Area

Reach Length	30	ft / m	Circle one:
Wetted Width	Transect A 5.1	Transect B 3.3	Transect C 2.7
Bankfull Width	Transect A 7.6	Transect B 5.8	Transect C 4.2
Assessment Width	Transect A 2.5	Transect B 2.5	Transect C 1.5

Trash picked-up during assessment? Yes / No

### Stormwater Outfalls/Encampments

Number of stormwater outfalls in the assessment area >18" in diameter

18-24"	25-36"	37-48"	>48"
--------	--------	--------	------

Trash at Outfalls? Yes / No

Amount of Trash Present (number of pieces): 0 <10 <50 <100 >100  
(circle one)

Homeless encampment within 200 meters of assessment area? Yes / No

### Comments/Notes

## Visual Assessment - Trash Condition and Pathways

	Trash Condition Category			
	Low	Moderate	High	Very High
Description	<ul style="list-style-type: none"> <li>Effectively no or very little trash</li> <li>On first glance, little or no trash is visible</li> <li>Little or no trash is evident when streambed and stream banks are closely examined for litter and debris</li> <li>One individual could easily remove all trash observed within 10 minutes (100ft AA*) or 30 minutes (300ft AA)</li> </ul>	<ul style="list-style-type: none"> <li>Predominantly free of trash except for a few littered areas</li> <li>On first glance, trash is evident in low levels</li> <li>After close inspection, small levels of trash are evident in stream bank and/or streambed.</li> <li>On average, all trash could be removed by two individuals within 10 to 20 minutes (100ft AA) or 30 minutes to one hour (300ft AA)</li> <li>Approximately 2-3 times more trash than the low condition category</li> </ul>	<ul style="list-style-type: none"> <li>Predominantly littered except for a few clean areas</li> <li>Trash is evident upon first glance in moderate levels along streambed and banks</li> <li>Evidence of site being used by people: scattered cans, bottles, food wrappers, plastic bags etc.</li> <li>On average, would take a more organized effort (more than 2 people, but less than 5) to remove all trash from the area. Removal of trash would take 10 to 30 mins (100ft AA) or 30 mins to 2 hours (300ft AA)</li> <li>Approximately 2-6 times more trash than the moderate condition category</li> </ul>	<ul style="list-style-type: none"> <li>Trash is continuously seen throughout the assessment area</li> <li>Trash is distracts the eye on first glance</li> <li>Substantial levels of litter and debris in streambed and banks</li> <li>Evidence of site being used frequently by people (e.g., many cans, bottles, food wrappers, plastic bags, clothing; piles of garbage and debris)</li> <li>On average, would take a large number of people (more than 5) during an organized effort to remove all trash from the area. Removal of all trash would take &gt;40 minutes (100ft AA) or &gt; 2 hours (300ft AA)</li> <li>Approximately &gt;2 times more trash than the high condition category</li> </ul>
Site Score (30 meter)	1    2    3	4    5    6	7    8    9	10    11    12
Site Score (100 meter)	1    2    3	4    5    6	7    8    9	10    11    12
<b>Photo Documentation</b>				
<b>Segment</b>	<b>Location</b>	<b>Photograph ID</b>		
Bottom (A)	Upstream			
Middle (B)	Upstream			
	Downstream			
Top (C)	Downstream			
Other Photos	Misc. 1			
	Misc. 2			
	Misc. 3			

\* AA = Assessment Area

Plastic	Tally Marks	Total	Biodegradable	Tally Marks	Total
Bag - reusable			Food Waste		
Bag - single use	M M M M	11	Paper/ cardboard		
Bag Pieces*	M M	4	Yard Waste/Leaf piles*		
Balloons - Latex			Biodegradable Other		
Balloons - Mylar					
Beverage Bottles			Biohazard	Tally Marks	Total
Bottles		4	Condoms		
Chip Bags	M M	5	Dead Animals		
Cigar Tips			Human Waste/Diapers/TP		
Cigarette Butts			Latex Gloves		
Cigarette - Electronic		1	Mask – Single Use		
Container Cap/Pieces			Mask – Cloth		
Cups	M	2	Medical waste		
Foam Cups		1	Pet Waste		
Foam Food Containers			Biohazard Other		
Foam Other Containers			Construction	Tally Marks	Total
Foam Pieces/Balls/Pellets/Peanuts*	M M M M	11	Bricks		
Foam Plate			Concrete/Asphalt		
Hard Plastic Container			Fabricated Wood		
Hard Plastic Pieces			Rebar		
Lid	M	2	Construction Other		
Lighters		1	Glass	Tally Marks	Total
Pens/Markers			Glass Bottles		
Pipe	M	2	Glass Pieces*		
Plates			Glass Other		
Straw Wrapper			Metal	Tally Marks	Total
Single Use Container			Aluminum Foil pieces*		1
Soft Plastic Pieces*		1	Aluminum or Steel Cans		1
Straw/Stirrer			Auto Parts		
Tarp	M		Batteries - Alkaline		
Tobacco Wrapper/Pieces		5	Batteries - Lithium		
Trash Bag			Metal Bottle Caps		
Wrapper/Wrapper Pieces*			Metal Pipe/Bar Segments		1
6-Pack Holder			Nails, Screws, Bolts, etc.		
Plastic Other			Spray Paint Cans		
Fabric and Cloth	Tally Marks	Total	Wire (barb, chicken, etc.)		
Natural (Cotton, Wool)			Metal Other		
Shoes		1	Miscellaneous	Tally Marks	Total
Synthetic Fabric	M M	6	Ceramic Pots/Shards		
Tent/Sleeping Bag			E-waste		
Fabric Other			Foam rubber		
Large Marks	Tally	Total	Hose/Hose pieces		
Furniture/Appliances			Rubber/Rubber pieces		
Garbage Bags of Trash			Sports Balls		
Shopping Carts		1	Waxed Paper Cups/Plates		
Tires		1	Misc. Other		
Large Other					

\*These items may be binned if abundance  
is greater than 10 pieces as follows: M = 11-  
100 pieces  
H = > 101 pieces

GRAND TOTAL:

3

95

78

## SWAMP Stream Habitat Characterization Form

## FULL VERSION

Revision Date: April 01<sup>st</sup>, 2022

## REACH DOCUMENTATION

Standard Reach Length (wetted width ≤ 10 m) = 150 m Distance between transects = 15m  
 Alternate Reach Length (wetted width >10 m) = 250 m Distance between transects = 25 m

Project Name: CARLSBAD WMA SMC-2023

Date: 6/27/2023

Sample Collection Time: 0820

Stream Name: Escondido Creek

Site Name/ Description:

EC ~300m vs of El Camino del Norte

Site Code: SMC00537

Crew Members: DO/KC

Latitude (actual – decimal degrees): °N

datum:  
NAD83

Longitude (actual – decimal degrees): °W

other: GPS Device:

Garmin GPSmap 76Cx

## AMBIENT WATER QUALITY MEASUREMENTS

\* Turbidity, silica, oxygen saturation, and air temp are optional; calibration date required on page 24

Water Temp (Deg C)

pH

Alkalinity (mg/L)

Turbidity (ntu)\*

Oxygen Sat. (%)\*

19.750

8.01

2.26 FNU

86.6%

Dissolved O<sup>2</sup> (mg/L)

Specific Conduct (µS/cm)

Salinity (ppt)

Silica (mg/L)\*

Air Temp (Deg C)\*

7.86 mg/L

2347.6

1.21 ppt

20°F

## DISCHARGE MEASUREMENTS

check if discharge measurements not possible  
(explain in field notes section)

1<sup>st</sup> measurement = left bank (looking downstream)

## VELOCITY AREA METHOD (preferred)

cal. date

6.2.23

Transect Width

(m): 3.3

BUOYANT OBJECT METHOD (use ONLY if velocity area method not possible)

	Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Distance from Left Bank (cm)	Depth (cm)	Velocity (ft/sec)		Float 1	Float 2	Float 3
1	0	0	0	11							
	Distance (m)				Distance (m)						
2	50	35	0.55	12							
3	100	46	0.99	13							
4	160	48	0.76	14							
5	200	42	0.73	15							
6	250	42	0.65	16							
7	300	8	0.51	17							
8	330	0	0	18							
9				19							
10				20							

## NOTABLE FIELD CONDITIONS (check one box per topic)

Evidence of recent rainfall (enough to increase surface runoff)	NO <input checked="" type="checkbox"/>	minimal	>10% flow increase
Evidence of fires in reach or immediately upstream (<500 m)	NO <input checked="" type="checkbox"/>	< 1 year	< 5 years
Dominant landuse/ landcover in area surrounding reach	Agriculture	Forest	Rangeland
	Urban/ Industrial	Suburb/Town <input checked="" type="checkbox"/>	Other
Site is affected by recent scouring event	NO <input checked="" type="checkbox"/>	YES	
Channel Engineered	NO <input checked="" type="checkbox"/>	YES	

ADDITIONAL COBBLE EMBEDDEDNESS MEASURES (carry over from transect forms if needed to attain target count of 25; measure in %)	1	2	3	4	5	6	7	8	9	10	11	12	13
	0	0	35	10	0	10	0	65	20	35	10	0	0
	14	15	16	17	18	19	20	21	22	23	24	25	
	10	5	0	0	50								

Site Code: SMC00537		Date: 6/27/2023		SLOPE and BEARING FORM (transect based - for Full PHAB only)					AUTOLEVEL CLINOMETER HANDLEVEL OTHER												
Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)															
	Stadia rod measurements	Slope (%) or Elevation Difference cm <input type="checkbox"/> % <input type="checkbox"/>	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements	Slope or Elevation Difference cm <input type="checkbox"/> % <input type="checkbox"/>	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)											
K																					
J		10	1	102	1																
I		1		11																	
H		6		163																	
G		2		183																	
F		1		181																	
E		0		178																	
D		1		172																	
C		4		179																	
B		32		166																	
A		1cm	10m	194	100%																
additional calculation area																					
ADDITIONAL HABITAT CHARACTERIZATION						High Gradient <input type="checkbox"/>			Low Gradient <input checked="" type="checkbox"/>												
Parameter	Optimal			Suboptimal			Marginal			Poor											
Epifaunal Substrate/Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover (50% for low-gradient streams); mix of submerged logs, undercut banks, cobble or other stable habitat			40-70% mix of stable habitat (30-50% for low-gradient streams); well-suited for full colonization potential			20-40% mix of stable habitat (10-30% in low-gradient streams); substrate frequently disturbed or removed			Less than 20% stable habitat (10% in low-gradient streams); lack of habitat is obvious; substrate unstable or lacking											
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition (<20% in low-gradient streams)			Some new increase in bar formation, mostly from gravel, sand, or fine sediment; 5-30% of the bottom affected (20-50% in low-gradient streams)			Moderate deposition of new gravel, sand, or fine sediment on bars; 30-50% of the bottom affected (50-80% in low-gradient streams)			Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently (>80% in low-gradient streams)											
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern			Some channelization present, (e.g., bridge abutments); evidence of past channelization (>20yrs) may be present but recent channelization not present			Channelization may be extensive: embankments or shoring structures present on both banks; 40 to 80% of stream reach disrupted			Banks shored with gabion or cement; Over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely											
Score:	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

1.04, 2.08, 26.5

LB = 1.0 m, 00  
RB = 1.5 m, 25°

## SWAMP Stream Habitat Characterization Form

FULL VERSION

Revision Date: April 01<sup>st</sup>, 2022

Site Code: SMC00537

Site Name:

Date: 6/27/2023

Wetted Width (m): 6.3

Bankfull Width (m): 7.8

Bankfull Height (m): 0.32

Dry Channel 

Transect A

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	HP		P A D	1	P A D	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center	32	WD		P A D	1	P A D	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center	49	20		P A D	2	P A D	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	72	SA		P A D	2	P A D	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank	0	WD		P A D	1	P A D	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
<b>Vegetation Class</b>	<b>Left Bank</b>	<b>Right Bank</b>
<b>Upper Canopy (&gt;5 m high)</b>		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4
<b>Lower Canopy (0.5 m-5 m high)</b>		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4
<b>Ground Cover (&lt;0.5 m high)</b>		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	15
Center Upstream	14
Center Right	17
Center Downstream	16
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)		
	Left Bank	Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P
Buildings	P C B 0	Y N	0 B C P
Pavement/ Cleared Lot	P C B 0		0 B C P
Road/ Railroad	P C B 0	Y N	0 B C P
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P
Landfill/ Trash	P C B 0	Y N	0 B C P
Park/ Lawn	P C B 0		0 B C P
Row Crop	P C B 0		0 B C P
Pasture/ Range	P C B 0		0 B C P
Logging Operations	P C B 0		0 B C P
Mining Activity	P C B 0	Y N	0 B C P
Vegetation Management	P C B 0		0 B C P
Bridges/ Abutments	P C B 0	Y N	0 B C P
Orchards/ Vineyards	P C B 0		0 B C P

194°

1cm  
10m

**TAKE PHOTOGRAPHS**  
 (check box if taken & record photo code)

Downstream (optional)

Upstream (required)

## Inter-Transect: AB

Wetted Width (m): 8.9

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SA		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		42	OT		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		63	SA		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Right Center		88	SA		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		14	WD		P A D	1	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If inter-transect is dry, do not fill out Inter-Transect Substrates section.									

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	45
Pool	55
Dry	

Site Code: SMC00537	Site Name:	Date: 6/27/2023
Wetted Width (m): 8.5	Bankfull Width (m): 10.5	Bankfull Height (m): 0.42 Dry Channel <input type="checkbox"/> Transect B

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	HP		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		107	SAT		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		45	SAT		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		112	18		P A D	2	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	OT		P A D	0	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

OT=Root

<b>RIPARIAN VEGETATION</b> (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	<b>INSTREAM HABITAT COMPLEXITY</b> (5 m u/s, 5 m d/s)	<b>DENSIOMETER READINGS (0-17)</b> count covered dots
<b>Vegetation Class</b>	<b>Left Bank</b>	<b>Right Bank</b>	
<b>Upper Canopy (&gt;5 m high)</b>			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Center Left 15
<b>Lower Canopy (0.5 m - 5 m high)</b>			
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Center Upstream 15
<b>Ground Cover (&lt;0.5 m high)</b>			
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Center Right 16
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Center Downstream 17
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Optional
Left Bank			Left Bank
Right Bank			Right Bank

<b>HUMAN INFLUENCE</b> (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)				
	<b>Left Bank</b>	<b>Channel</b>	<b>Right Bank</b>		
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P		
Buildings	P C B 0	Y N	0 B C P		
Pavement/ Cleared Lot	P C B 0		0 B C P		
Road/ Railroad	P C B 0	Y N	0 B C P		
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P		
Landfill/ Trash	P C B 0	Y N	0 B C P		
Park/ Lawn	P C B 0		0 B C P		
Row Crop	P C B 0		0 B C P		
Pasture/ Range	P C B 0		0 B C P		
Logging Operations	P C B 0		0 B C P		
Mining Activity	P C B 0	Y N	0 B C P		
Vegetation Management	P C B 0		0 B C P		
Ridges/ Abutments	P C B 0	Y N	0 B C P		
Orchards/ Vineyards	P C B 0		0 B C P		

<b>BANK STABILITY</b> (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
<b>Left Bank</b>	eroded	vulnerable	stable
<b>Right Bank</b>	eroded	vulnerable	stable

166°  
32cm  
10m

## Inter-Transect: BC

Wetted Width (m): 9.0

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	OT		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		99	SA		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		89	SP		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Right Center		41	WD		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	OT		P A D	0	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If inter-transect is dry, do not fill out Inter-Transect Substrates section.

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	5
Rapid	
Riffle	10
Run	
Glide	15
Pool	60
Dry	

Site Code: SMC00537	Site Name:	Date: 6/27/2023
Wetted Width (m): 6.3	Bankfull Width (m): 14.5	Bankfull Height (m): 0.35 Dry Channel <input type="checkbox"/> Transect C

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SA		P A D	2	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		12	OT		P A D	1	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		7	SA		P A D	0	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		6	OT		P A D	2	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	46		P A D	2	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

OT - Root

<b>RIPARIAN VEGETATION</b> (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)	<b>INSTREAM HABITAT COMPLEXITY</b> (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	<b>DENSIOMETER READINGS (0-17)</b> count covered dots
<b>Vegetation Class</b>		<b>Left Bank</b>	<b>Right Bank</b>		
<b>Upper Canopy (&gt;5 m high)</b>					
Trees and saplings >5 m high	0 1 (2) 3 4	0 1 2 3 (4)	Filamentous Algae	0 (1) 2 3 4	Center Left 8
<b>Lower Canopy (0.5 m-5 m high)</b>					
All vegetation 0.5 m to 5 m	0 1 (2) 3 4	0 1 2 (3) 4	Aquatic Macrophytes/ Emergent Vegetation	0 (1) 2 3 4	Center Upstream 3
<b>Ground Cover (&lt;0.5 m high)</b>					
Woody shrubs & saplings <0.5 m	0 1 (2) 3 4	0 (1) 2 3 4	Boulders	0 (1) 2 3 4	Center Right 16
Herbs/ grasses	0 1 2 (3) 4	0 1 2 (3) 4	Woody Debris >0.3 m	0 (1) 2 3 4	Center Downstream 15
Barren, bare soil/ duff	0 1 (2) 3 4	0 1 (2) 3 4	Undercut Banks	0 (1) 2 3 4	Optional
			Overhang. Vegetation	0 (1) 2 3 4	Left Bank
			Live Tree Roots	0 (1) 2 3 4	Right Bank
			Artificial Structures	0 (1) 2 3 4	

<b>HUMAN INFLUENCE</b> (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)					
	<b>Left Bank</b>	<b>Channel</b>	<b>Right Bank</b>			
Walls/ Rip-rap/ Dams	P C B 0	Y N	0	B C P	eroded	vulnerable
Buildings	P C B 0	Y N	0	B C P	eroded	vulnerable
Pavement/ Cleared Lot	P C B 0		0	B C P		
Road/ Railroad	P C B 0	Y N	0	B C P		
Pipes (Inlet/ Outlet)	P C B 0	Y N	0	B C P		
Landfill/ Trash	P C B 0	(Y) N	0	B C P		
Park/ Lawn	P C B 0		0	B C P		
Row Crop	P C B 0		0	B C P		
Pasture/ Range	P C B 0		0	B C P		
Logging Operations	P C B 0		0	B C P		
Mining Activity	P C B 0	Y N	0	B C P		
Vegetation Management	P C B 0		0	B C P		
Bridges/ Abutments	P C B 0	Y N	0	B C P		
Orchards/ Vineyards	P C B 0		0	B C P		

<b>BANK STABILITY</b> (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
<b>Left Bank</b>	eroded	vulnerable	stable
<b>Right Bank</b>	eroded	vulnerable	stable

179°

4 cm  
10 m

## Inter-Transect: CD

Wetted Width (m): 7.4

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SP		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		42	HP		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		45	38		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Right Center		43	10		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	05		P A D	0	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If inter-transect is dry, do not fill out Inter-Transect Substrates section.

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	10
Run	
Glide	45
Pool	45
Dry	

of " rock

Site Code: SMC00537

Site Name:

Date: 6/27/2023

Wetted Width (m): 7.6

Bankfull Width (m): 12.6

Bankfull Height (m): 0.37

Dry Channel 

Transect D

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	HP		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		38	HP		P A D	0	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		78	77	10	P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		109	SA		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm; 5 = >20mm;
Right Bank		0	OT		P A D	0	P A D	P A D	P A D	UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
**If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.**

OT - root

<b>RIPARIAN VEGETATION</b> (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)	<b>INSTREAM HABITAT COMPLEXITY</b> (5 m u/s, 5 m d/s)	<b>DENSIOMETER READINGS (0-17)</b> count covered dots
<b>Vegetation Class</b>	<b>Left Bank</b>	<b>Right Bank</b>	
<b>Upper Canopy (&gt;5 m high)</b>			
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4	Center Left 11
<b>Lower Canopy (0.5 m - 5 m high)</b>			Center Upstream 6
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4	Center Right 10
<b>Ground Cover (&lt;0.5 m high)</b>			Center Downstream 9
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4	Optional
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4	Left Bank
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4	Right Bank

<b>HUMAN INFLUENCE</b> (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; If Y for an analyte, do not assess banks)				
	<b>Left Bank</b>				
Walls/ Rip-rap/ Dams	P	C	B	0	Y N
Buildings	P	C	B	0	Y N
Pavement/ Cleared Lot	P	C	B	0	
Road/ Railroad	P	C	B	0	Y N
Pipes (Inlet/ Outlet)	P	C	B	0	Y N
Landfill/ Trash	P	C	B	0	Y N
Park/ Lawn	P	C	B	0	
Row Crop	P	C	B	0	
Pasture/ Range	P	C	B	0	
Logging Operations	P	C	B	0	
Mining Activity	P	C	B	0	Y N
Vegetation Management	P	C	B	0	
Bridges/ Abutments	P	C	B	0	Y N
Orchards/ Vineyards	P	C	B	0	

<b>BANK STABILITY</b> (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
<b>Left Bank</b>	eroded	vulnerable	stable
<b>Right Bank</b>	eroded	vulnerable	stable

172°

1cm  
10m

## Inter-Transect: DE

Wetted Width (m): 8.1

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		13	4L		P A D	UD	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		52	Hf		P A D	UD	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		65	Hf		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		62	105	90	P A D	1	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	OT		P A D	1	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If Inter-transect is dry, do not fill out Inter-Transect Substrates section.

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	35
Pool	65
Dry	

Site Code: SMC00537

Site Name:

Date: 6/27/2023

Wetted Width (m): 7.7

Bankfull Width (m): 10.7

Bankfull Height (m): 0.40

Dry Channel 

Transect E

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SA		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		36	HP		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		55	HP		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		52	SA		P A D	2	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	OT		P A D	1	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

OT = Root

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 3 = Heavy (40-75%)				1 = Sparse (<10%) 4 = Very Heavy (>75%)			
Vegetation Class	Left Bank	Right Bank							
Upper Canopy (>5 m high)									
Trees and saplings >5 m high	0 1 2 3 4	0	1	2	3 4				
Lower Canopy (0.5 m-5 m high)									
All vegetation 0.5 m to 5 m	0 1 2 3 4	0	1	2	3 4				
Ground Cover (<0.5 m high)									
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0	1	2	3 4				
Herbs/ grasses	0 1 2 3 4	0	1	2	3 4				
Barren, bare soil/ duff	0 1 2 3 4	0	1	2	3 4				

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)		0 = Absent (0%)	1 = Sparse (<10%)	2 = Moderate (10-40%)	3 = Heavy (40-75%)	4 = Very Heavy (>75%)
Filamentous Algae		0	1	2	3	4
Aquatic Macrophytes/ Emergent Vegetation		0	1	2	3	4
Boulders		0	1	2	3	4
Woody Debris >0.3 m		0	1	2	3	4
Woody Debris <0.3 m		0	1	2	3	4
Undercut Banks		0	1	2	3	4
Overhang. Vegetation		0	1	2	3	4
Live Tree Roots		0	1	2	3	4
Artificial Structures		0	1	2	3	4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	13
Center Upstream	17
Center Right	17
Center Downstream	7
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)		0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)			
		Left Bank	Channel	Right Bank	
Walls/ Rip-rap/ Dams		P C B 0	Y N	0	B C P
Buildings		P C B 0	Y N	0	B C P
Pavement/ Cleared Lot		P C B 0		0	B C P
Road/ Railroad		P C B 0	Y N	0	B C P
Pipes (Inlet/ Outlet)		P C B 0	Y N	0	B C P
Landfill/ Trash		P C B 0	Y N	0	B C P
Park/ Lawn		P C B 0		0	B C P
Row Crop		P C B 0		0	B C P
Pasture/ Range		P C B 0		0	B C P
Clogging Operations		P C B 0		0	B C P
Mining Activity		P C B 0	Y N	0	B C P
Vegetation Management		P C B 0		0	B C P
Bridges/ Abutments		P C B 0	Y N	0	B C P
Orchards/ Vineyards		P C B 0		0	B C P

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

170°

Ocm  
70m

## Inter-Transect: EF

Wetted Width (m): 7.0

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	WD		P A D	Z	P A D	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center	25	HP		P A D	Z	P A D	P A D	P A D	P A D	
Center	93	36		P A D	Z	P A D	P A D	P A D	P A D	
Right Center	38	SA		P A D	Z	P A D	P A D	P A D	P A D	
Right Bank	0	ST		P A D	O	P A D	P A D	P A D	P A D	
Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If Inter-transect is dry, do not fill out Inter-Transect Substrates section.										

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	45
Pool	15
Dry	

1.41, 2.82, 30 m

## SWAMP Stream Habitat Characterization Form

FULL VERSION

Revision Date: April 01<sup>st</sup>, 2022

Site Code: SMC00537

Site Name:

Date: 6/27/2023

Wetted Width (m): 6.7

Bankfull Width (m): 10.1

Bankfull Height (m): 0.47

Dry Channel 

Transect F

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	OT		P A D	2	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy;
Left Center		94	SA		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Center		89	12		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Center		78	SA		P A D	2	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
Right Bank		0	SA		P A D	0	P A D	P A D	P A D	D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)

If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

OT = Root

<b>RIPARIAN VEGETATION</b> (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 3 = Heavy (40-75%) 1 = Sparse (<10%) 4 = Very Heavy (>75%) 2 = Moderate (10-40%)				<b>INSTREAM HABITAT COMPLEXITY</b> (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)				<b>DENSIOMETER READINGS (0-17)</b> count covered dots
	<b>Vegetation Class</b>		<b>Left Bank</b>	<b>Right Bank</b>						
<b>Upper Canopy (&gt;5 m high)</b>										
Trees and saplings >5 m high	0	1	2	3 (4)	0	1	2	3 (4)	Filamentous Algae	0 1 2 3 4
<b>Lower Canopy (0.5 m-5 m high)</b>										
All vegetation 0.5 m to 5 m	0	1	2	3 4	0	1	2	3 4	Aquatic Macrophytes/ Emergent Vegetation	0 2 3 4
<b>Ground Cover (&lt;0.5 m high)</b>										
Woody shrubs & saplings <0.5 m	0	1	2	3 4	0	1	2	3 4	Boulders	0 1 2 3 4
Herbs/ grasses	0	1	2	3 4	0	1	2	3 4	Woody Debris >0.3 m	0 2 3 4
Barren, bare soil/ duff	0	1	2	3 4	0	1	2	3 4	Woody Debris <0.3 m	0 2 3 4
									Undercut Banks	0 1 2 3 4
									Overhang. Vegetation	0 1 2 3 4
									Live Tree Roots	0 1 2 3 4
									Artificial Structures	0 1 2 3 4

<b>HUMAN INFLUENCE</b> (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; If Y for an analyte, do not assess banks)				
	<b>Left Bank</b>	<b>Channel</b>	<b>Right Bank</b>		
Walls/ Rip-rap/ Dams	P C B 0	Y N	0	B C P	
Buildings	P C B 0	Y N	0	B C P	
Pavement/ Cleared Lot	P C B 0		0	B C P	
Road/ Railroad	P C B 0	Y N	0	B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N	0	B C P	
Landfill/ Trash	P C B 0	Y N	0	B C P	
Park/ Lawn	P C B 0		0	B C P	
Row Crop	P C B 0		0	B C P	
Pasture/ Range	P C B 0		0	B C P	
Logging Operations	P C B 0		0	B C P	
Mining Activity	P C B 0	Y N	0	B C P	
Vegetation Management	P C B 0		0	B C P	
Bridges/ Abutments	P C B 0	Y N	0	B C P	
Orchards/ Vineyards	P C B 0		0	B C P	

<b>BANK STABILITY</b> (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
<b>Left Bank</b>	eroded	vulnerable	stable
<b>Right Bank</b>	eroded	vulnerable	stable

181°  
1cm  
10m

**TAKE PHOTOGRAPHS**  
(check box if taken &  
record photo code)

Downstream (required)

Upstream (required)

## Inter-Transect: FG

Wetted Width (m): 3.8

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	HP		P A D	2	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		76	SA		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		75	27		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Right Center		52	WD		P A D	1	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	OT		P A D	1	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If Inter-transect is dry, do not fill out Inter-Transect Substrates section.									

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	15
Pool	85
Dry	

Site Code: SMC00537

Site Name:

Date: 6/27/2023

Wetted Width (m): 4.0

Bankfull Width (m): 8.0

Bankfull Height (m): 0.49

Dry Channel 

Transect G

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	SA		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy; 1 = Present but not visible, Feels slimy; 2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail. 3 = 1-5mm; 4 = 5-20mm; 5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed
Left Center		106	SA		P A D	2	P A D	P A D	P A D	
Center		109	SA		P A D	2	P A D	P A D	P A D	
Right Center		115	B		P A D	2	P A D	P A D	P A D	
Right Bank		0	HP		P A D	0	P A D	P A D	P A D	
										Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)		0 = Absent (0%) 3 = Heavy (40-75%)				1 = Sparse (<10%) 4 = Very Heavy (>75%)			
Vegetation Class		Left Bank		Right Bank					
Upper Canopy (>5 m high)									
Trees and saplings >5 m high		0 1 (2) 3 4		0 1 2 (3) 4					
Lower Canopy (0.5 m-5 m high)									
All vegetation 0.5 m to 5 m		0 (1) 2 3 4		0 1 2 (3) 4					
Ground Cover (<0.5 m high)									
Woody shrubs & saplings <0.5 m		0 (1) 2 3 4		0 1 (2) 3 4					
Herbs/ grasses		0 1 2 3 (4)		0 1 2 (3) 4					
Barren, bare soil/ duff		0 (1) 2 3 4		0 (1) 2 3 4					

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)		0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)			
Filamentous Algae		0	1	2	3 4
Aquatic Macrophytes/ Emergent Vegetation		0	1	2	3 4
Boulders		0	1	2	3 4
Woody Debris >0.3 m		0	1	2	3 4
Woody Debris <0.3 m		0	1	2	3 4
Undercut Banks		0	1	2	3 4
Overhang. Vegetation		0	1	2	3 4
Live Tree Roots		0	1	2	3 4
Artificial Structures		0	1	2	3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	6
Center Upstream	4
Center Right	12
Center Downstream	14
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)			
	Left Bank		Channel	Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0 B C P	
Buildings	P C B 0	Y N	0 B C P	
Pavement/ Cleared Lot	P C B 0		0 B C P	
Road/ Railroad	P C B 0	Y N	0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y N	0 B C P	
Landfill/ Trash	P C B 0	Y N	0 B C P	
Park/ Lawn	P C B 0		0 B C P	
Row Crop	P C B 0		0 B C P	
Pasture/ Range	P C B 0		0 B C P	
Logging Operations	P C B 0		0 B C P	
Mining Activity	P C B 0	Y N	0 B C P	
Vegetation Management	P C B 0		0 B C P	
Bridges/ Abutments	P C B 0	Y N	0 B C P	
Orchards/ Vineyards	P C B 0		0 B C P	

BANK STABILITY (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

183

2 cm/10m

## Inter-Transect: GH

Wetted Width (m): 3.6

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		10	HQ		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		80	HQ		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		112	SPS		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		104	SP		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	DT		P A D	1	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code). D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If inter-transect is dry, do not fill out Inter-Transect Substrates section.

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	
Run	
Glide	15
Pool	65
Dry	

OT-Raw

Site Code: SMC00537

Site Name:

Date: 6/27/2023

Wetted Width (m): 5.2

Bankfull Width (m): 7.2

Bankfull Height (m): 0.65

Dry Channel 

Transect H

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	H		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		6.6	S A		P A D	1	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		5.5	32		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		4.3	S A		P A D	1	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	S A		P A D	0	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

<b>RIPARIAN VEGETATION</b> (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
<b>Vegetation Class</b>	<b>Left Bank</b>	<b>Right Bank</b>
Upper Canopy (>5 m high)		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4
Lower Canopy (0.5 m-5 m high)		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4
Ground Cover (<0.5 m high)		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4

<b>INSTREAM HABITAT COMPLEXITY</b> (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

<b>DENSIOMETER READINGS (0-17)</b> count covered dots
Center Left 16
Center Upstream 13
Center Right 9
Center Downstream 17
Optional
Left Bank
Right Bank

<b>HUMAN INFLUENCE</b> (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; If Y for an analyte, do not assess banks)
Left Bank	Channel
Walls/ Rip-rap/ Dams	P C B 0 Y N 0 B C P
Buildings	P C B 0 Y N 0 B C P
Pavement/ Cleared Lot	P C B 0 0 0 B C P
Road/ Railroad	P C B 0 Y N 0 B C P
Pipes (Inlet/ Outlet)	P C B 0 Y N 0 B C P
Landfill/ Trash	P C B 0 Y N 0 B C P
Park/ Lawn	P C B 0 0 B C P
Row Crop	P C B 0 0 B C P
Pasture/ Range	P C B 0 0 B C P
Logging Operations	P C B 0 0 B C P
Mining Activity	P C B 0 Y N 0 B C P
Vegetation Management	P C B 0 0 B C P
Bridges/ Abutments	P C B 0 Y N 0 B C P
Orchards/ Vineyards	P C B 0 0 B C P

<b>BANK STABILITY</b> (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)
Left Bank eroded vulnerable stable
Right Bank eroded vulnerable stable

163°

6cm  
10m

## Inter-Transect: HI

Wetted Width (m): 2.9

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	OT		P A D	2	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		59	HR		P A D	UD	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		49	35		P A D	1	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scrapping leaves visible trail.
Right Center		19	47		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	69	15	P A D	2	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If inter-transect is dry, do not fill out Inter-Transect Substrates section.									

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	30
Run	
Glide	45
Pool	25
Dry	

Site Code: SMC00537	Site Name:	Date: 6/27/2023
Wetted Width (m): 5.3	Bankfull Width (m): 8.7	Bankfull Height (m): 0.65

Dry Channel 

Transect I

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embedded	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank	0	SA		P A D	O	P A D	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center	14	83	O	P A D	Z	P A D	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center	12	39		P A D	Z	P A D	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center	19	40		P A D	1	P A D	P A D	P A D	P A D	3 = 1-5mm;
Right Bank	0	9		P A D	Z	P A D	P A D	P A D	P A D	4 = 5-20mm;
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)									UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.									D = Dry, not assessed

<b>RIPARIAN VEGETATION</b> (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
<b>Vegetation Class</b>	<b>Left Bank</b>	<b>Right Bank</b>
<b>Upper Canopy (&gt;5 m high)</b>		
Trees and saplings >5 m high	0 1 (2) 3 4	0 (1) 2 3 4
<b>Lower Canopy (0.5 m-5 m high)</b>		
All vegetation 0.5 m to 5 m	0 1 2 (3) 4	0 1 2 (3) 4
<b>Ground Cover (&lt;0.5 m high)</b>		
Woody shrubs & saplings <0.5 m	0 (1) 2 3 4	0 (1) (2) 3 4
Herbs/ grasses	0 1 2 3 (4)	0 1 2 (3) 4
Barren, bare soil/ duff	0 (1) 2 3 4	0 (1) 2 3 4

<b>INSTREAM HABITAT COMPLEXITY</b> (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 (1) 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 (1) 2 3 4
Boulders	(1) 1 2 3 4
Woody Debris >0.3 m	(1) 1 2 3 4
Woody Debris <0.3 m	0 (1) 2 3 4
Undercut Banks	0 (1) 2 3 4
Overhang. Vegetation	0 1 2 (3) 4
Live Tree Roots	0 (1) 2 3 4
Artificial Structures	(1) 1 2 3 4

<b>DENSIOMETER READINGS (0-17)</b> count covered dots	
Center Left	17
Center Upstream	17
Center Right	17
Center Downstream	17
Optional	
Left Bank	
Right Bank	

<b>HUMAN INFLUENCE</b> (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)
Walls/ Rip-rap/ Dams	P C B 0 Y N 0 B C P
Buildings	P C B 0 Y N 0 B C P
Pavement/ Cleared Lot	P C B 0 0 B C P
Road/ Railroad	P C B 0 Y N 0 B C P
Pipes (Inlet/ Outlet)	P C B 0 Y N 0 B C P
Landfill/ Trash	P C B 0 Y N 0 B C P
Park/ Lawn	P C B 0 0 B C P
Row Crop	P C B 0 0 B C P
Pasture/ Range	P C B 0 0 B C P
Logging Operations	P C B 0 0 B C P
Mining Activity	P C B 0 Y N 0 B C P
Vegetation Management	P C B 0 0 B C P
Bridges/ Abutments	P C B 0 Y N 0 B C P
Orchards/ Vineyards	P C B 0 0 B C P

<b>BANK STABILITY</b> (score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

111<sup>b</sup>9cm  
10m

## Inter-Transect: IJ

Wetted Width (m): 3.4

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	OT		P A D	1	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		32	66	10	P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		44	18		P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		40	HP		P A D	0	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		0	35		P A D	0	P A D	P A D	P A D	5 = >20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If inter-transect is dry, do not fill out Inter-Transect Substrates section.									

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	25
Run	
Glide	70
Pool	5
Dry	

OT = Root

Site Code: SMC00537

Site Name:

Date: 6/27/2023

Wetted Width (m): 3.0

Bankfull Width (m): 6.5

Bankfull Height (m): 0.78

Dry Channel 

Transect J

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	0T		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		43	52		P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		40	92	0	P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		42	54		P A D	2	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	0T		P A D	0	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

DT-3foot

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
<b>Vegetation Class</b>	<b>Left Bank</b>	<b>Right Bank</b>
<b>Upper Canopy (&gt;5 m high)</b>		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4
<b>Lower Canopy (0.5 m-5 m high)</b>		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4
<b>Ground Cover (&lt;0.5 m high)</b>		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots
Center Left
Center Upstream
Center Right
Center Downstream
Optional
Left Bank
Right Bank

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; if Y for an analyte, do not assess banks)				
	Left Bank		Channel		Right Bank
Walls/ Rip-rap/ Dams	P C B 0	Y N	0	B C P	
Buildings	P C B 0	Y N	0	B C P	
Pavement/ Cleared Lot	P C B 0		0	B C P	
Road/ Railroad	P C B 0	Y	N	0 B C P	
Pipes (Inlet/ Outlet)	P C B 0	Y	N	0 B C P	
Landfill/ Trash	P C B 0	Y	N	0 B C P	
Park/ Lawn	P C B 0		0	B C P	
Row Crop	P C B 0		0	B C P	
Pasture/ Range	P C B 0		0	B C P	
Logging Operations	P C B 0		0	B C P	
Mining Activity	P C B 0	Y	N	0 B C P	
Vegetation Management	P C B 0		0	B C P	
Bridges/ Abutments	P C B 0	Y	N	0 B C P	
Orchards/ Vineyards	P C B 0		0	B C P	

BANK STABILITY			
(score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

1020

10cm  
10m

## Inter-Transect: JK

Wetted Width (m): 4.1

Dry Channel 

## Inter-Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/ size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	WD		P A D	0	P A D	P A D	P A D	0 = No microalgae present, Feels rough, not slimy;
Left Center		46	70	20	P A D	2	P A D	P A D	P A D	1 = Present but not visible, Feels slimy;
Center		45	39		P A D	1	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		57	12		P A D	2	P A D	P A D	P A D	3 = 1-5mm; 4 = 5-20mm;
Right Bank		14	HP		P A D	1	P A D	P A D	P A D	5 =>20mm; UD = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
	Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred) If Inter-transect is dry, do not fill out Inter-Transect Substrates section.									D = Dry, not assessed

FLOW HABITATS (% between transects, total=100%)	
Channel Type	%
Cascade/ Falls	
Rapid	
Riffle	30
Run	
Glide	45
Pool	25
Dry	

0.78 1.56 26.0

## SWAMP Stream Habitat Characterization Form

LB = 1.5m, 2  
RB = 1.5m, 2

FULL VERSION

Revision Date: April 01<sup>st</sup>, 2022

Site Code: SMC00537

Site Name:

Date: 6/27/2023

Wetted Width (m): 3.5

Bankfull Width (m): 8.9

Bankfull Height (m): 0.55

Dry Channel 

Transect K

## Transect Substrates

Position	Dist from LB (m)	Depth (cm)	mm/size class	% Cobble Embed.	CPOM	Microalgae Thickness Code	Macroalgae Attached	Macroalgae Unattached	Macrophytes	Microalgae Thickness Codes
Left Bank		0	HP		P A D	0	P A D	P A D	P A D	0 = No microalgae present, feels rough, not slimy;
Left Center		20	110	0	P A D	2	P A D	P A D	P A D	1 = Present but not visible, feels slimy;
Center		23	80	5	P A D	2	P A D	P A D	P A D	2 = Present and visible but <1mm; Rubbing fingers on surface produces a brownish tint on them, scraping leaves visible trail.
Right Center		14	60		P A D	2	P A D	P A D	P A D	3 = 1-5mm;
Right Bank		0	OT		B A D	0	P A D	P A D	P A D	4 = 5-20mm;
										5 = >20mm;
										U = Cannot determine if microalgae present, substrate too small or covered with silt (formerly Z code).
										D = Dry, not assessed

Note: Substrate sizes can be recorded either as direct measures of the median axis of each particle or one of the size class categories listed on the supplemental page (direct measurements preferred)  
If transect is dry, do not fill out Transect Substrates or Instream Habitat Complexity sections.

OT = Root

RIPARIAN VEGETATION (facing downstream, 5 m u/s, 5 m d/s, 10 m from wetted width)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%)	3 = Heavy (40-75%) 4 = Very Heavy (>75%)
<b>Vegetation Class</b>	<b>Left Bank</b>	<b>Right Bank</b>
Upper Canopy (>5 m high)		
Trees and saplings >5 m high	0 1 2 3 4	0 1 2 3 4
Lower Canopy (0.5 m-5 m high)		
All vegetation 0.5 m to 5 m	0 1 2 3 4	0 1 2 3 4
Ground Cover (<0.5 m high)		
Woody shrubs & saplings <0.5 m	0 1 2 3 4	0 1 2 3 4
Herbs/ grasses	0 1 2 3 4	0 1 2 3 4
Barren, bare soil/ duff	0 1 2 3 4	0 1 2 3 4

INSTREAM HABITAT COMPLEXITY (5 m u/s, 5 m d/s)	0 = Absent (0%) 1 = Sparse (<10%) 2 = Moderate (10-40%) 3 = Heavy (40-75%) 4 = Very Heavy (>75%)
Filamentous Algae	0 1 2 3 4
Aquatic Macrophytes/ Emergent Vegetation	0 1 2 3 4
Boulders	0 1 2 3 4
Woody Debris >0.3 m	0 1 2 3 4
Woody Debris <0.3 m	0 1 2 3 4
Undercut Banks	0 1 2 3 4
Overhang. Vegetation	0 1 2 3 4
Live Tree Roots	0 1 2 3 4
Artificial Structures	0 1 2 3 4

DENSIOMETER READINGS (0-17) count covered dots	
Center Left	7
Center Upstream	7
Center Right	
Center Downstream	
Optional	
Left Bank	
Right Bank	

HUMAN INFLUENCE (circle only the closest to wetted channel; assess 5 m u/s, 5 m d/s)	0 = Not Present; B = On Bank; C = Between Bank & 10m from Channel; P = >10m+<50m from Channel; Channel (record Yes or No; If Y for an analyte, do not assess banks)
Walls/ Rip-rap/ Dams	P C B 0 Y N 0 B C P
Buildings	P C B 0 Y N 0 B C P
Pavement/ Cleared Lot	P C B 0 0 B C P
Road/ Railroad	P C B 0 Y N 0 B C P
Pipes (Inlet/ Outlet)	P C B 0 Y N 0 B C P
Landfill/ Trash	P C B 0 Y N 0 B C P
Park/ Lawn	P C B 0 0 B C P
Row Crop	P C B 0 0 B C P
Pasture/ Range	P C B 0 0 B C P
Logging Operations	P C B 0 0 B C P
Mining Activity	P C B 0 Y N 0 B C P
Vegetation Management	P C B 0 0 B C P
Bridges/ Abutments	P C B 0 Y N 0 B C P
Orchards/ Vineyards	P C B 0 0 B C P

BANK STABILITY			
(score zone 5m upstream and 5m downstream of transect between bankfull - wetted width)			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

**TAKE PHOTOGRAPHS**  
(check box if taken & record photo code)

Downstream (required) Upstream (optional)

15 EXO 3 RFW 27656

Site Code: SMC00537		Date: 6/27/2023			Analyte	Equipment & Calibration Date	
<b>BENTHIC INVERTEBRATE SAMPLES</b>					pH	Cal date: 6/27/23	
<b>Collection Method</b> (indicate standard or margin-center-margin)			Rep.	# Transects Sampled	Wat temp	Cal date: / /	
RWB (standard)	RWB (MCM)	TRC	1	11	dissolved oxygen	Cal date: / /	
RWB (standard)	RWB (MCM)	TRC	2		oxygen sat	Cal date: / /	
RWB (standard)	RWB (MCM)	TRC			specific cond	Cal date: / /	
RWB (standard)	RWB (MCM)	TRC			Salinity	Cal date: / /	
<b>Field Notes/ Comments:</b> Was macroalgae (e.g., filamentous algae) collected in the composite algae sample? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If YES, how many of the 11 transect samples contained macroalgae? <u>11</u> If YES, what was the original size of the macroalgae cylinder roll before sectioning into ¼ and ¾ pieces? _____ mm length x _____ mm diameter							
<b>ALGAE SAMPLES</b>					Alkalinity	Cal date: / /	
<b>Collection Method</b> (circle one or write new method if applicable)		SWAMP EMAP	SWAMP EMAP	SWAMP EMAP	Turbidity	Cal date: 6/27/23	
<b>Collection Device</b> (sum # of transects per device)		Rep. 1	Rep. 2	Rep.	Silica	Cal date: / /	
Rubber Delimiter (area=12.6cm <sup>2</sup> )		1			Velocity	Cal date: 6/27/23	
PVC Delimiter (area=12.6cm <sup>2</sup> )		9					
Syringe Scrubber (area=5.3cm <sup>2</sup> )		—					
Other area=		—					
Number of transects sampled (0-11)		11					
Composite Volume (mL)		525 mL					
Assemblage ID volume (diatoms) (50 mL tube)		40 mL					
Assemblage ID volume (soft algae) (50 mL tube)		—					
Check if Qualitative Algae sample was collected with soft algae/diatom sample (required even if macroalgae not visible)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sed Coll Depth (cm): 2 or 5	
Check if a water chem. integrated sample was collected (chl, AFDM)		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Create Lab Collection records for each checked box for integrated and grab water chemistry samples	
Chlorophyll a volume use GF/F filter (25 mL (preferred volume))		25 mL				Ash Sampled 138.6 cm <sup>3</sup>	
Ash Free Dry Mass use GF/F filter (AFDM) volume (25 mL (preferred vol))		25 mL					
<b>ADDITIONAL PHOTOGRAPHS</b>							
Description	Photo Code	Description			Photo Code		

Flow Habitat Type	DESCRIPTION
Cascades	Short, high gradient drop in stream bed elevation often accompanied by boulders and considerable turbulence
Falls	High gradient drop in elevation of the stream bed associated with an abrupt change in the bedrock
Rapids	Sections of stream with swiftly flowing water and considerable surface turbulence. Rapids tend to have larger substrate sizes than riffles
Riffles	Shallow sections where the water flows over coarse stream bed particles that create mild to moderate surface turbulence; (< 0.5 m deep, > 0.3 m/s).
Runs	Long, relatively straight, low-gradient sections without flow obstructions. The stream bed is typically even and the water flows faster than it does in a pool; (> 0.5 m deep, > 0.3 m/s). A step-run is a series of runs separated by short riffles or flow obstructions that cause discontinuous breaks in slope
Glides	A section of stream with little or no turbulence, but faster velocity than pools; (< 0.5 m deep, < 0.3 m/s)
Pools	A reach of stream that is characterized by deep, low-velocity water and a smooth surface; (> 0.5 m deep, < 0.3 m/s)

Size Class Code	Size Class Range	Size Class Description	Common Size Reference
RS	> 4 m	bedrock, smooth	larger than a car
RR	> 4 m	bedrock, rough	larger than a car
XB	1 - 4 m	boulder, large	meter stick to car
SB	25 cm - 1.0 m	boulder, small	basketball to meter stick
CB	64 - 250 mm	cobble	tennis ball to basketball
GC	16 - 64 mm	gravel, coarse	marble to tennis ball
GF	2 – 16 mm	gravel, fine	ladybug to marble
SA	0.06 – 2 mm	sand	gritty to ladybug
FN	< 0.06 mm	fines	not gritty
HP	< 0.06 mm	hardpan (consolidated fines)	
WD	NA	wood	
RC	NA	concrete/asphalt	
OT	NA	other	

**BANK STABILITY**

Although this measure of the degree of erosive potential is subjective, it can provide clues to the erosive potential of the banks within the reach. Assign the category whose description best fits the conditions in the area between the wetted channel and bankfull channel (see figure below)

Eroded	Banks show obvious signs of erosion from the current or previous water year; banks are usually bare or nearly bare
Vulnerable	Banks have some vegetative protection (usually annual growth), but not enough to prevent erosion during flooding
Stable	Bank vegetation has well-developed roots that protect banks from erosion; alternately, bedrock or artificial structures (e.g., concrete/ rip-rap) prevent bank erosion

**CPOM/ COBBLE EMBEDDEDNESS**

**CPOM:** Record presence (P) or absence (A) of coarse particulate organic matter (>1.0 mm particles) within 1 cm of each substrate particle; if point is dry, record Dry (D)

**Cobble Embeddedness:** Visually estimate % embedded by fine particles (record to nearest 5%)

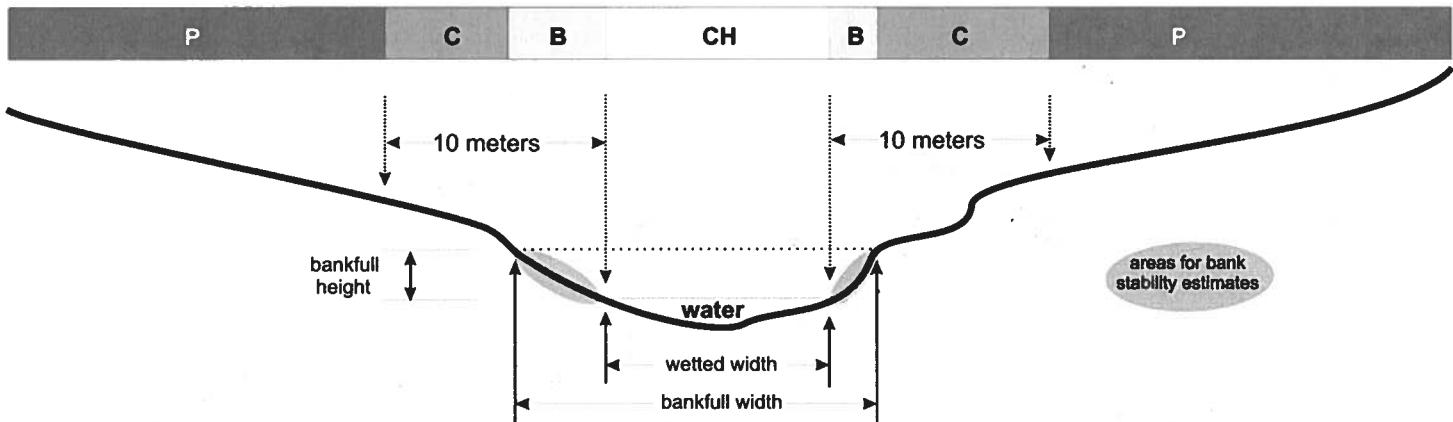


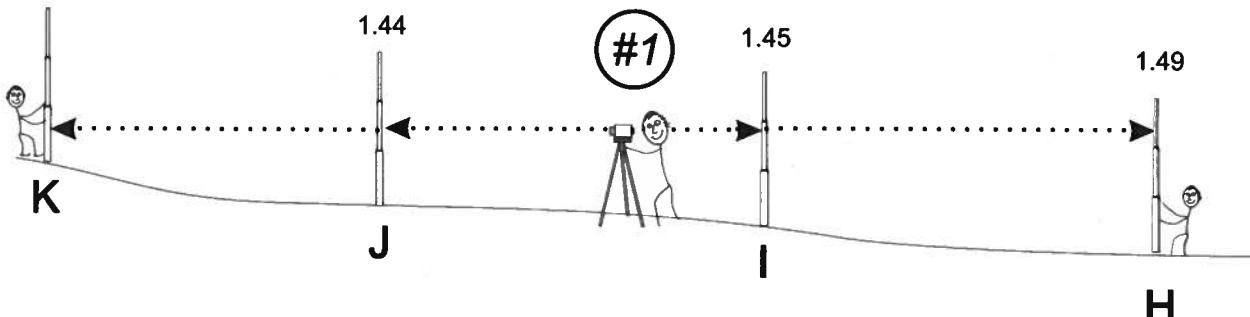
Figure 1. Cross-sectional diagram of stream transect indicating regions for assessing human influence measures:

- The measurement zone extends 5 meters upstream and 5 meters downstream of each transect
- Record one category for each bank and for the wetted channel (3 values possible)
- In reaches with wide banks, region "C" may be entirely overlapped by region "B"; in these cases, circle "B"
- Region "P" extends from 10 meters to the distance that can be seen from the channel, but not greater than 50 m

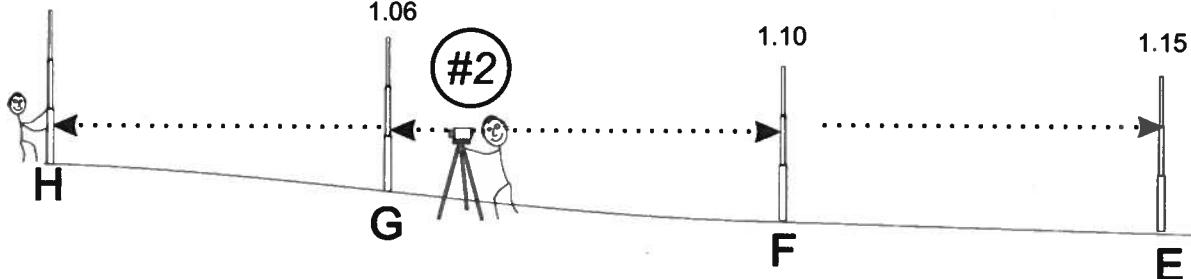
**EXAMPLE**
**AUTOLEVEL**  
**CLINOMETER**  
**HANDLEVEL**
**X****SLOPE and BEARING FORM**

Starting Transect	MAIN SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					SUPPLEMENTAL SEGMENT (record percent of inter-transect distance in each segment if supplemental segments are used)					
	Stadia rod measurements		Slope (%) or Elevation Difference	Segment Length (m)	Bearing (0°-359°)	Percent of Total Length (%)	Stadia rod measurements		Slope or Elevation Difference	Segment Length (m)	Bearing (0°-359°)
	cm	%	<input type="checkbox"/>				cm	%	<input type="checkbox"/>		
K	1.41										
J	1.44		3	15	140	100					
I	1.45		1	15	145	100					
H	1.49	1.03	4	15	150	100					
G		1.06	3	15	143	100					
F		1.10	4	15	187	100					
E		1.15	5	15	195	100					

1.41



1.03



1. Level the autolevel at Position #1
2. Place base of stadia rod at water level every time
3. Sight to stadia rod at Transect K, then Transect J
4. Rotate scope and sight to Transects I and H.
5. Move level to Position #2 and re-level

6. Re-sight to stadia rod at Transect H, then Transect G
7. Rotate scope and sight to Transects F and E

*Note: Sites will vary in the number of separate level positions needed to survey the reach.*

ECOML 9385  
SMC

## Assessment of hydrologic states

Site: SMC00537

Lat: 33.04847 Long: -117.22562 Date: 6/27/2023

Observer(s): DO/KC

Flow habitats: Estimate the percent cover of each habitat type across the entire reach, to within 5%. Definitions follow Ode (2007). Total must equal 100%.

	Cascades	Rapids	Riffles	Runs	Glides	Pools	Dry
% of reach	—	—	15	—	40	45	—

Select the hydrologic state that most closely matches the dominant state of the reach:

State (check one)	Description, indicators
<input type="checkbox"/> Hyperrheic (flooding)	Water may be above banks and turbid or carrying suspended particles. Movement of streambed particles may occur.
<input checked="" type="checkbox"/> Eurheic (baseflow)	Water always below banks (if banks are evident). Discharge is high enough to allow access to most of the stream bed. Many different flow microhabitats may be evident (e.g., riffles, pools, runs, glides). Gravels will generally be stable on the streambed.
<input type="checkbox"/> Oligorheic (limited flow)	Discharge is low but sufficient to connect pools and other aquatic habitats through small rivulets. Surface water is more or less continuous throughout reach. Riffles are scarce.
<input type="checkbox"/> Arheic (disconnected pools)	Discharge is close to zero, may not be visibly evident. Pools may be abundant, but may be disconnected. This state may not exist in sandy streams with rapid groundwater infiltration or in concrete channels.
<input type="checkbox"/> Hyporehic (subsurface water)	Most of the stream bed is devoid of surface water, although substrate may remain wet enough to support active hyporheic life. Terrestrial fauna may be common on the stream bed. This state may not exist in concrete or bedrock channels
<input type="checkbox"/> Edaphic (dry)	The entire stream bed is devoid of surface water, and the substrate (if present) is too dry to support active hyporheic life (although dessication-resistant life stages may be present). Soil moisture in the streambed is not discernibly greater than in nearby soils above the banks.

Take a photo to document conditions (at transects A, F, and K, if possible).

Notes:



SNC

StationCode: SMC00537Date: 6/27/2023Observers: DO/KC

Determination based on:

 Site visit       Aerial imagery       Other: \_\_\_\_\_CHANNEL CHARACTERISTICSChannel type:  Natural (*skip to Grade Control Features*)       Engineered

Width of structure at base:

 100+ m       50 to 100 m       10 to 50 m       5 to 10 m       < 5 m       NA

Shape:

 Rectangular       Trapezoidal       V-ditch       Natural       Other: \_\_\_\_\_*Right Bank* Earthen bare       Rock       Grouted rock       Concrete       Vegetated /Natural Other: \_\_\_\_\_*Left Bank* Earthen bare       Rock       Grouted rock       Concrete       Vegetated /Natural Other: \_\_\_\_\_*Bottom* Soft/Natural       Rock       Grouted rock       Concrete       Other: \_\_\_\_\_Evidence of vegetation removal:  No       Yes, within past month       Yes, not within past monthLOW-FLOW FEATURES (Engineered channels only)Low-flow channel:  Present       Absent       Not determinedWidth of low-flow channel:  5+ m       1 to 5 m       < 1 mGRADE CONTROL FEATURES (crossings, check dams, weirs, etc.)Grade control features:  Present       AbsentLocation of grade control features (*check all that apply; skip if none are present*): Within reach       Within 10 m upstream       Within 10 m downstream

JMC

## HYDROMOD PHAB MODULE

StationCode: SMC00537SampleDate: 6/27/2023Observer(s): DO/KCLatitude: 33.64847Longitude: -107.22562 Datum: NAD83

Is the channel fully armored (banks and streambed), with engineered elements in good condition? Y/N (circle)

If "Yes", stop; other elements will be filled in automatically. If "No", continue filling out the worksheet.

GIS Metrics: Fill out "NR" if not available at the time of data submission.

Area (A): \_\_\_\_\_ square miles

Precipitation (P): \_\_\_\_\_ inches per year

Valley slope (Sv): \_\_\_\_\_ m/m

Valley width (Wv): \_\_\_\_\_ m

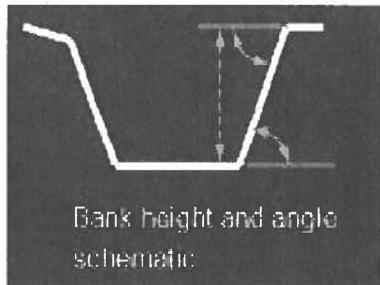
### Field measurements

Pebble Count: Reported via PHAB data

Submission Risk for Mass Wasting:

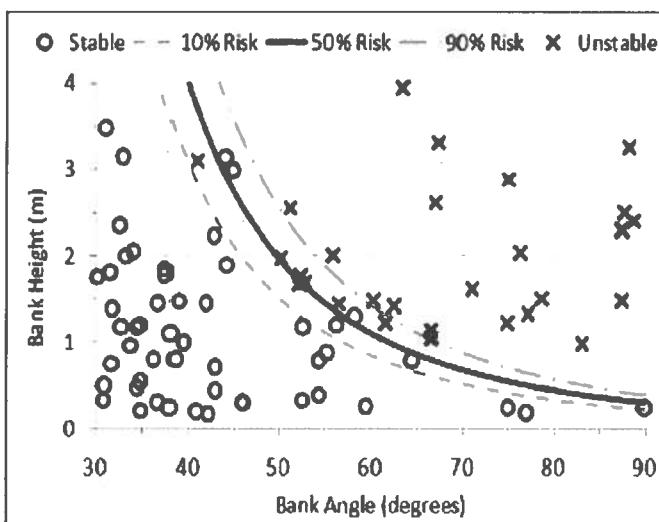
Measure bank angle in the field (recommend at A, F, and K but pick the "best" locations):

Transect:	Right bank	Left Bank
Transect A	25	25
Transect F	25	25
Transect K	25	25



Bank Height:

Transect	Right bank	Left Bank
Transect A	1.5	1.5
Transect F	1.5	1.5
Transect K	1.5	1.5



## Vertical Susceptibility

Primary state of streambed (pick 1; if unsure, assume "Intermediate"):

- A. Labile, dominated by sand or fine gravel.
- B. Intermediate: Dominated by cobbles and gravels, or hardpan of uncertain strength.
- C. Coarse/Armored/Resistant: Dominated by boulders and large cobbles, continuous concrete, or continuous resistant bedrock.

If "Intermediate", fill out "Armoring potential" and "Grade control":

Armoring potential (pick 1)

- A. Coarse gravels and cobbles tightly packed; Sands and fines <5% of surface material
- B. Intermediate or hardpan of uncertain resistance
- C. Coarse gravels and cobbles loosely packed; sands and fines >25% of surface material

Grade control (pick 1)

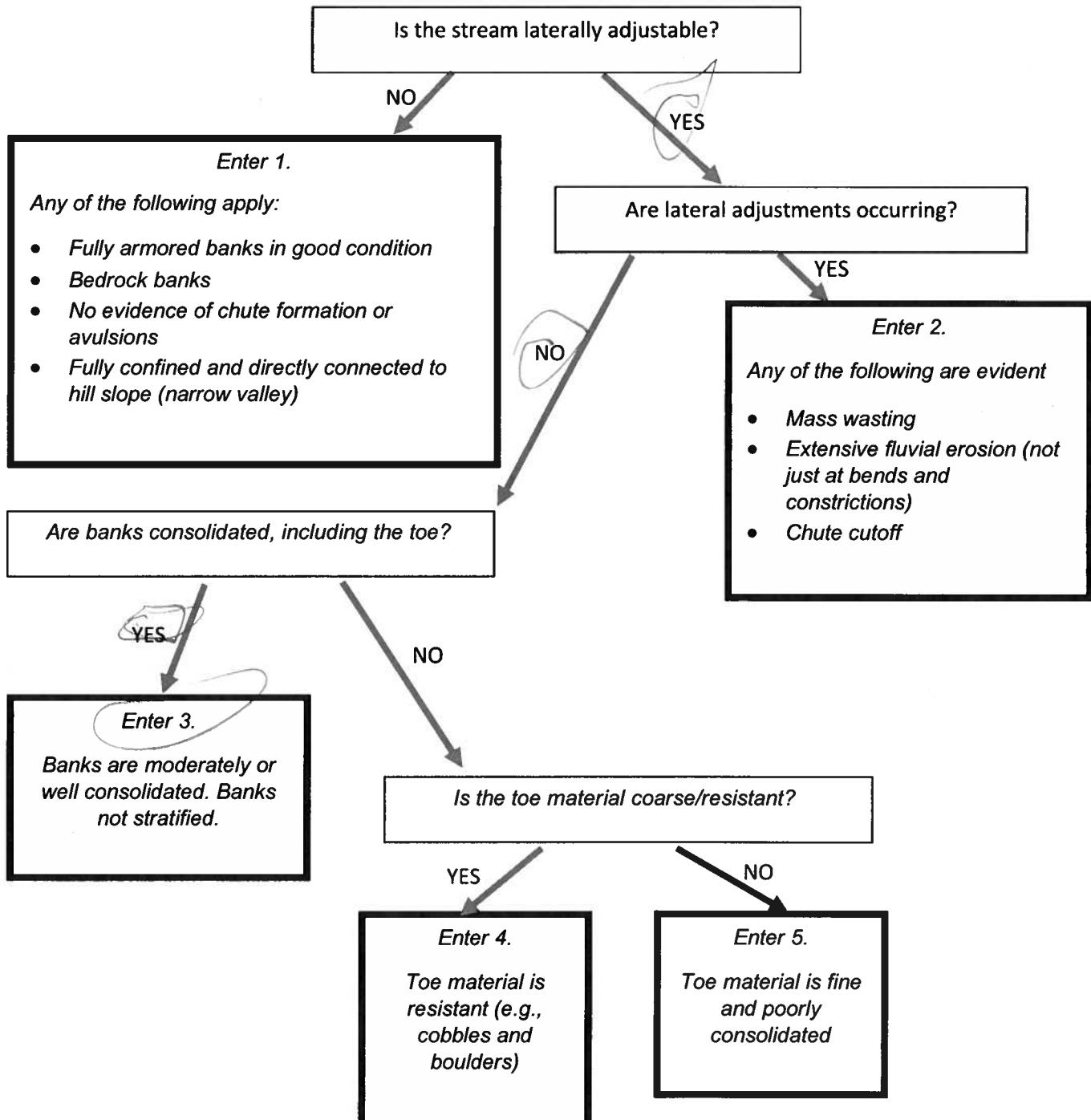
- A. Effective grade controls less than 50 m apart. No signs of failure or mass wasting. Geologic controls are resistant igneous or metamorphic rock (or hardpan with demonstrable strength as indicated by boring/hammer test/appropriate inspections)
- B. Intermediate spacing of grade control, potential evidence of failure, or hardpan with uncertain resistance
- C. Grade control absent, spaced > 100 m, or clear evidence of ineffectiveness, such as: head-cutting > 30 cm, active mass wasting, exposed bridge pilings, undermined culverts/structures.

## Lateral Susceptibility

Enter the most appropriate number to describe the reach. Refer to the flow chart on the next page.

Left bank state: 3

Right bank state: 3



Carlsbad WMA SMC-2023

SMC00537

6/27/2023

Vertebrate Observation Reporting Form

StationCode: SMC00537

Sample date: 6/27/2023 Observer(s):DO/KC \_\_\_\_\_

Check if none of these were observed:

AMPHIBIANS	Larvae			Juvenile/Adult		
	1 to 10	11 to 50	>50	1 to 10	11 to 50	>50
Bullfrog <i>Lithobates catesbeianus</i>						
African clawed frog <i>Xenopus laevis</i>						
Other amphibian						

REPTILES	Juvenile/Adult		
	1 to 10	11 to 50	>50
Sliders			
<i>Trachemys</i> spp			
Other reptile			

INVERTEBRATES	Juvenile/Adult		
	1 to 10	11 to 50	>50
Swamp red crayfish <i>Procambarus clarkia</i>	X		
Signal crayfish <i>Pacifastacus leniusculus</i>			
Other invert			

bad WMA SMC-2023

SMC00537

6/27/2023

# Basic Information Sheet: Riverine Wetlands

CARL 9385

<b>Assessment Area Name:</b> SMC00537					
<b>Project Name:</b> CARLSBAD WMA SMC-2023					
<b>Assessment Area ID #:</b>					
<b>Project ID #:</b>	<b>Date:</b> 6/27/2023				
<b>Assessment Team Members for This AA:</b>					
DO/KC					
<b>Average Bankfull Width:</b>					
<b>Approximate Length of AA</b> (10 times bankfull width, min 100 m, max 200 m):					
<b>Upstream Point Latitude:</b>	<b>Longitude:</b>				
<b>Downstream Point Latitude:</b> 33.048417	<b>Longitude:</b> -117.22562				
<b>Wetland Sub-type:</b>					
<input type="checkbox"/> Confined	<input checked="" type="checkbox"/> Non-confined				
<b>AA Category:</b>					
<input type="checkbox"/> Restoration	<input type="checkbox"/> Mitigation	<input type="checkbox"/> Impacted	<input type="checkbox"/> Ambient	<input type="checkbox"/> Reference	<input type="checkbox"/> Training
<input checked="" type="checkbox"/> Other: SMC					
<b>Did the river/stream have flowing water at the time of the assessment?</b> <input checked="" type="checkbox"/> yes <input type="checkbox"/> no					
<b>What is the apparent hydrologic flow regime of the reach you are assessing?</b>					
The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. <i>Perennial</i> streams conduct water all year long, whereas <i>ephemeral</i> streams conduct water only during and immediately following precipitation events. <i>Intermittent</i> streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.					
<input checked="" type="checkbox"/> perennial	<input type="checkbox"/> intermittent	<input type="checkbox"/> ephemeral			

FISH	Juvenile/Adult			Notes
	1 to 10	11 to 50	>50	
Mosquito fish <i>Gambusia affinis</i>				
Bullhead catfish <i>Ameiurus sp</i>				
Largemouth bass <i>Micropterus salmoides</i>	X			
Smallmouth bass <i>Micropterus dolomieu</i>				
Carp				
Cyprinus carpio				
Goldfish				
<i>Carassius auratus</i>				
Bluegill <i>Lepomis macrochirus</i>				
Pumpkinseed sunfish <i>Lepomis gibbosus</i>				
Red-eared sunfish <i>Lepomis microlophus</i>	X			
Green sunfish <i>Lepomis cyanellus</i>				
Other fish				

## Scoring Sheet: Riverine Wetlands

AA Name: SMC00537	Date: 6/27/2023	
<b>Attribute 1: Buffer and Landscape Context (pp. 11-19)</b>		Comments
Stream Corridor Continuity (D)	Alpha.	Numeric
	A	12
Buffer:		
Buffer submetric A: Percent of AA with Buffer	Alpha.	Numeric
	A	12
Buffer submetric B: Average Buffer Width	D	3
Buffer submetric C: Buffer Condition	B	9
<b>Raw Attribute Score = <math>D + [C \times (A \times B)^{1/2}]^{1/2}</math></b>	19.35	
		<b>Final Attribute Score = <math>(\text{Raw Score}/24) \times 100</math></b>
<b>Attribute 2: Hydrology (pp. 20-26)</b>		80.62
Water Source	Alpha.	Numeric
	C	6
Channel Stability	B	9
Hydrologic Connectivity	A	12
<b>Raw Attribute Score = sum of numeric scores</b>	27	
		<b>Final Attribute Score = <math>(\text{Raw Score}/36) \times 100</math></b>
<b>Attribute 3: Physical Structure (pp. 27-33)</b>		75
Structural Patch Richness	Alpha.	Numeric
	B	9
Topographic Complexity	B	9
<b>Raw Attribute Score = sum of numeric scores</b>	18	
		<b>Final Attribute Score = <math>(\text{Raw Score}/24) \times 100</math></b>
<b>Attribute 4: Biotic Structure (pp. 34-41)</b>		75
Plant Community Composition (based on sub-metrics A-C)		
Plant Community submetric A: Number of plant layers	Alpha.	Numeric
	A	12
Plant Community submetric B: Number of Co-dominant species	C	6
Plant Community submetric C: Percent Invasion	B	9
<b>Plant Community Composition Metric (numeric average of submetrics A-C)</b>	9	
Horizontal Interspersion	B	9
Vertical Biotic Structure	B	9
<b>Raw Attribute Score = sum of numeric scores</b>	27	
		<b>Final Attribute Score = <math>(\text{Raw Score}/36) \times 100</math></b>
<b>Overall AA Score (average of four final Attribute Scores)</b>		76

**Photo Identification Numbers and Description:**

	Photo ID No.	Description	Latitude	Longitude	Datum
1	A	Upstream			
2	F	Middle Left			
3		Middle Right			
4	K	Downstream			
5					
6					
7					
8					
9					
10					

**Site Location Description:**

Escondido Creek, ~300m upstream of El Camino del Norte

**Comments:**

## Worksheet for Stream Corridor Continuity Metric for Riverine Wetlands

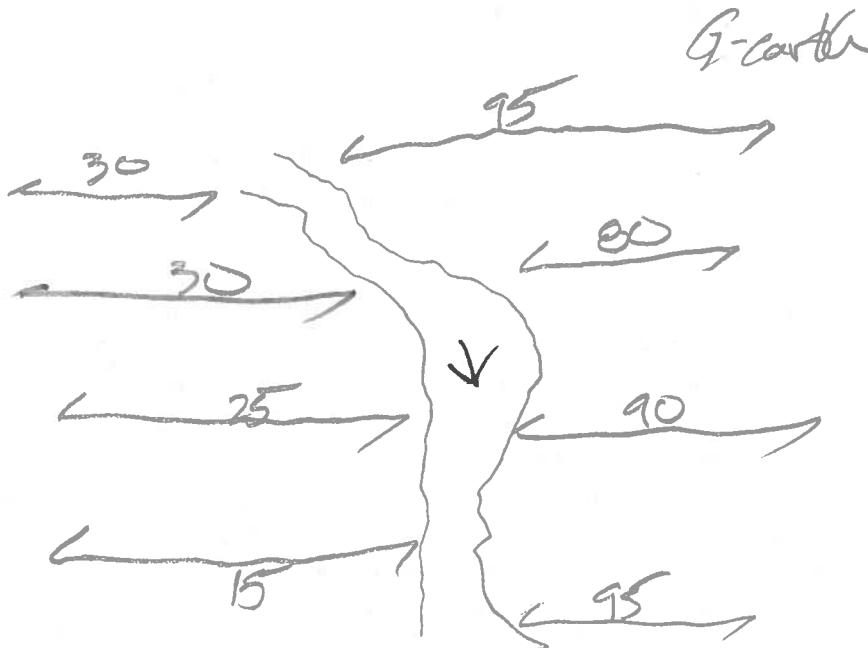
Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1	0	1	17
2		2	12
3		3	
4		4	
5		5	
Upstream Total Length	0	Downstream Total Length	31

G earth

A

### Percent of AA with Buffer Worksheet

In the space provided below make a quick sketch of the AA, or perform the assessment directly on the aerial imagery; indicate where buffer is present, estimate the percentage of the AA perimeter providing buffer functions, and record the estimate amount in the space provided.



Percent of AA with Buffer: 100 %

A

### Worksheet for calculating average buffer width of AA

Line	Buffer Width (m)
A	95
B	90
C	80
D	95
E	15
F	25
G	30
H	30
<b>Average Buffer Width *Round to the nearest integer*</b>	<b>58</b>

D

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	<input type="checkbox"/> The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. <input type="checkbox"/> Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. <input type="checkbox"/> There is leaf litter, thatch, or wrack in most pools (if pools are present). <input checked="" type="checkbox"/> The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. <input type="checkbox"/> There is little or no active undercutting or burial of riparian vegetation. <input type="checkbox"/> If mid-channel bars and/or point bars are present, they are not densely vegetated with perennial vegetation. <input checked="" type="checkbox"/> Channel bars consist of well-sorted bed material (smaller grain size on the top and downstream end of the bar, larger grain size along the margins and upstream end of the bar). <input checked="" type="checkbox"/> There are channel pools, the spacing between pools tends to be regular and the bed is not planar throughout the AA <input type="checkbox"/> The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	<input checked="" type="checkbox"/> The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. <input type="checkbox"/> There are abundant bank slides or slumps. <input type="checkbox"/> The lower banks are uniformly scoured and not vegetated. <input checked="" type="checkbox"/> Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. <input type="checkbox"/> An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. <input checked="" type="checkbox"/> The channel bed appears scoured to bedrock or dense clay. <input type="checkbox"/> Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). <input type="checkbox"/> The channel has one or more knickpoints indicating headward erosion of the bed.
Indicators of Active Aggradation	<input type="checkbox"/> There is an active floodplain with fresh splays of coarse sediment (sand and larger that is not vegetated) deposited in the current or previous year. <input checked="" type="checkbox"/> There are partially buried living tree trunks or shrubs along the banks. <input type="checkbox"/> The bed is planar (flat or uniform gradient) overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. <input type="checkbox"/> There are partially buried, or sediment-choked, culverts. <input type="checkbox"/> Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. <input type="checkbox"/> There are avulsion channels on the floodplain or adjacent valley floor.
Overall	<b>I Equilibrium</b> <input checked="" type="checkbox"/> <b>IDegradation</b> <b>I Aggradation</b>

B-LC some dry

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate midpoints along straight riffles or glides, away from deep pools or meander bends. An attempt should be made to place them at the top, middle, and bottom of the AA.

Steps	Replicate Cross-sections →	TOP	MID	BOT
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	7.8	10.1	8.9
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	1.04	1.41	0.78
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	2.08	2.82	1.56
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	26.5	30	26.0
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	340	297	292
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections. Enter the average result here and use it in Table 13a or 13b.	3.1		

A

### Structural Patch Type Worksheet for Riverine wetlands

Circle each type of patch that is observed in the AA and enter the total number of observed patches in Table below. In the case of riverine wetlands, their status as confined or non-confined must first be determined (see page 6) to determine which patches are expected in the system (indicated by a "1" in the table below). Any feature onsite should only be counted once as a patch type. If a feature appears to meet the definition of more than one patch type (i.e. swale and secondary channel) the practitioner should choose which patch type best illustrates the feature. Not all features at a site will be patch types.

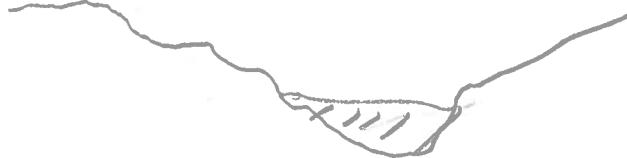
\*Please refer to the CRAM Photo Dictionary at [www.cramwetlands.org](http://www.cramwetlands.org) for photos of each of the following patch types.

<b>STRUCTURAL PATCH TYPE (circle for presence)</b>	<b>Riverine (Non-confined)</b>	<b>Riverine (Confined)</b>
<b>Minimum Patch Size</b>	<b>3 m<sup>2</sup></b>	<b>3 m<sup>2</sup></b>
Abundant wrackline or organic debris in channel, on floodplain	1	1
Bank slumps or undercut banks in channels or along shoreline	1	1
Cobbles and/or Boulders	1	1
Debris jams	1	1
Filamentous macroalgae or algal mats	1	1
Large woody debris	1	1
Pannes or pools on floodplain	1	N/A
Plant hummocks and/or sediment mounds	1	1
Point bars and in-channel bars	1	1
Pools or depressions in channels (wet or dry channels)	1	1
Riffles or rapids (wet or dry channels)	1	1
Secondary channels on floodplains or along shorelines	1	N/A
Standing snags (at least 3 m tall)	1	1
Submerged vegetation	1	N/A
Swales on floodplain or along shoreline	1	N/A
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	1	1
Vegetated islands (mostly above high-water)	1	N/A
<b>Total Possible</b>	<b>17</b>	<b>12</b>
<b>No. Observed Patch Types (enter here and use in Table 14 below)</b>	<b>9</b>	

## Worksheet for AA Topographic Complexity

At three locations along the AA, make a sketch of the profile of the stream from the AA boundary down to its deepest area then back out to the other AA boundary. Try to capture the benches and the intervening micro-topographic relief. To maintain consistency, make drawings at each of the stream hydrologic connectivity measurements, always facing downstream. Include the water level, an arrow at the bankfull contour, and label the benches. Based on these sketches and the profiles in Figure 10, choose a description in Table 16 that best describes the overall topographic complexity of the AA.

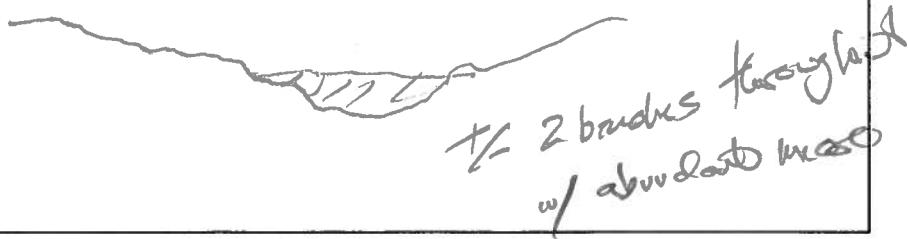
Profile 1



Profile 2



Profile 3



**Plant Community Metric Worksheet: Co-dominant species richness for Riverine wetlands**  
**(A dominant species represents  $\geq 10\%$  relative cover)**

Special Note:

\* Combine the counts of co-dominant species from all layers to identify the total species count. Each plant species is only counted once when calculating the Number of Co-dominant Species and Percent Invasion submetric scores, regardless of the numbers of layers in which it occurs.

Floating or Canopy-forming (non-confined only)	Invasive?	Short (<0.5 m)	Invasive?
		1 Anagallis 2 Scirpus 3 Leersia	N
Medium (0.5-1.5 m)	Invasive?	Tall (1.5-3.0 m)	Invasive?
4 Pipewort 5 Sedge FID	Y	6 Salix lac	
Very Tall (>3.0 m)	Invasive?	Total number of co-dominant species for all layers combined (enter here and use in Table 18)	Percent Invasion *Round to the nearest integer* (enter here and use in Table 18)
7 Salix lac 8 Phragmites	N Y	8	25%

4.8 3/8

A, C-B

## Horizontal Interspersion Worksheet.

Use the spaces below to make a quick sketch of the AA in plan view, outlining the major plant zones (this should take no longer than 10 minutes). Assign the zones names and record them on the right. Based on the sketch, choose a single profile from Figure 12 that best represents the AA overall.

	<b>Assigned zones:</b> 1) SA - Salix 2) G - <i>Acacia</i> / <i>Succulents</i> 3) S - Mixed <i>Conium</i> / <i>Ajowan</i> 4) 5) 6)
--	---

### Worksheet for Wetland disturbances and conversions

Has a major disturbance occurred at this wetland?	Yes	<input checked="" type="radio"/> No		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type?	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

B >50% w/ 2 layers

<= 25 w/ 3

### Stressor Checklist Worksheet

<b>HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)</b>	<b>Present</b>	<b>Significant negative effect on AA</b>
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)	∅	
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
<b>Comments</b>		

<b>PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)</b>	<b>Present</b>	<b>Significant negative effect on AA</b>
Filling or dumping of sediment or soils ( <b>N/A for restoration areas</b> )		
Grading/ compaction ( <b>N/A for restoration areas</b> )		
Plowing/Discing ( <b>N/A for restoration areas</b> )		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
<b>Comments</b>		

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., <i>Virginia opossum</i> and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer		
<b>Comments</b>		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
<b>Comments</b>		

## Riverine Trash Assessment

## **General Site Information**

Station ID:	SMC00537	Date:	6/27/2023
Start Time:	1045	End Time:	1100
Start Latitude:	33.04847	Start Longitude:	-112.22562
End Latitude:		End Longitude:	
Field Crew:	NO/LC	<input type="checkbox"/> Other _____	
River/Site Description:		Escondido Creek	Watershed:
Access:			
Left Bank (circle one): Easy Moderate Hard		Right Bank (circle one): Easy Moderate Hard	
Channel Type (Check all that apply):			
<input type="checkbox"/> Natural	<input type="checkbox"/> Earthen	<input type="checkbox"/> Concrete	<input type="checkbox"/> Rip Rap <input type="checkbox"/> Other
Type of Site:	<input type="checkbox"/> Probabilistic	<input checked="" type="checkbox"/> Targeted	Is stream flowing? Yes <input checked="" type="checkbox"/> No

## **Assessment Area**

Reach Length \_\_\_\_\_ 30 ft / m Circle one:  
Wetted Width Transect A \_\_\_\_\_ Transect B \_\_\_\_\_ Transect C \_\_\_\_\_ ft / m  
Bankfull Width Transect A \_\_\_\_\_ Transect B \_\_\_\_\_ Transect C \_\_\_\_\_ ft / m  
Assessment Width Transect A \_\_\_\_\_ Transect B \_\_\_\_\_ Transect C \_\_\_\_\_ ft / m

**Trash picked-up during assessment? Yes / No**

## **Stormwater Outfalls/Encampments**

Number of stormwater outfalls in the assessment area >18" in diameter

 18-24" \_\_\_\_\_ 25-36" \_\_\_\_\_ 37-48" \_\_\_\_\_ >48" \_\_\_\_\_

Trash at Outfalls? N/A Yes / No  
Amount of Trash Present (number of pieces): <10 <50 <100 >100  
(circle one)

Homeless encampment within 200 meters of assessment area? Yes / No

### **Comments/Notes**

Plastic	Tally Marks	Total	Biodegradable	Tally Marks	Total
Bag - reusable			Food Waste		
Bag - single use			Paper/ cardboard		
Bag Pieces*		1	Yard Waste/Leaf piles*		
Balloons - Latex			Biodegradable Other		
Balloons - Mylar					
Beverage Bottles					
Biohazard	Tally Marks	Total			
Bottles			Condoms		
Chip Bags			Dead Animals		
Cigar Tips			Human Waste/Diapers/TP		
Cigarette Butts			Latex Gloves		
Cigarette - Electronic			Mask – Single Use		
Container Cap/Pieces			Mask – Cloth		
Cups			Medical waste		
Foam Cups			Pet Waste		
Foam Food Containers			Biohazard Other		
Foam Other Containers					
Foam Pieces/Balls/Pellets/Peanuts*			Construction	Tally Marks	Total
Foam Plate			Bricks		
Hard Plastic Container			Concrete/Asphalt		
Hard Plastic Pieces			Fabricated Wood	1	1
Lid			Rebar		
Lighters			Construction Other		
Pens/Markers					
Pipe	1	1	Glass	Tally Marks	Total
Plates			Glass Bottles		
Straw Wrapper			Glass Pieces*		
Single Use Container			Glass Other		
Soft Plastic Pieces*			Metal	Tally Marks	Total
Straw/Stirrer			Aluminum Foil pieces*		
Tarp			Aluminum or Steel Cans		
Tobacco Wrapper/Pieces			Auto Parts		
Trash Bag			Batteries - Alkaline		
Wrapper/Wrapper Pieces*			Batteries - Lithium		
6-Pack Holder			Metal Bottle Caps		
Plastic Other			Metal Pipe/Bar Segments		
<b>Fabric and Cloth</b>	<b>Tally Marks</b>	<b>Total</b>	Nails, Screws, Bolts, etc.		
Natural (Cotton, Wool)			Spray Paint Cans		
Shoes			Wire (barb, chicken, etc.)		
Synthetic Fabric			Metal Other		
Tent/Sleeping Bag			Miscellaneous	Tally Marks	Total
Fabric Other			Ceramic Pots/Shards		
<b>Large Marks</b>	<b>Tally</b>	<b>Total</b>	E-waste		
Furniture/Appliances			Foam rubber		
Garbage Bags of Trash			Hose/Hose pieces		
Shopping Carts			Rubber/Rubber pieces		
Tires			Sports Balls		
Large Other			Waxed Paper Cups/Plates.		
			Misc. Other		

\*These items may be binned if abundance  
is greater than 10 pieces as follows: M = 11-  
100 pieces  
H => 101 pieces

GRAND TOTAL:

2

2

4

## Visual Assessment - Trash Condition and Pathways

	Trash Condition Category			
	Low	Moderate	High	Very High
Description	<ul style="list-style-type: none"> <li>Effectively no or very little trash</li> <li>On first glance, little or no trash is visible</li> <li>Little or no trash is evident when streambed and stream banks are closely examined for litter and debris</li> </ul> <p>• One individual could easily remove all trash observed within 10 minutes (100ft AA*) or 30 minutes (300ft AA)</p>	<ul style="list-style-type: none"> <li>Predominantly free of trash except for a few littered areas</li> <li>On first glance, trash is evident in low levels</li> <li>After close inspection, small levels of trash are evident in stream bank and/or streambed.</li> </ul> <p>• On average, all trash could be removed by two individuals within 10 to 20 minutes (100ft AA) or 30 minutes to one hour (300ft AA)</p> <p>• Approximately 2-3 times more trash than the low condition category</p>	<ul style="list-style-type: none"> <li>Predominantly littered except for a few clean areas</li> <li>Trash is evident upon first glance in moderate levels along streambed and banks</li> <li>Evidence of site being used by people: scattered cans, bottles, food wrappers, plastic bags etc.</li> <li>On average, would take a more organized effort (more than 2 people, but less than 5) to remove all trash from the area. Removal of trash would take 10 to 30 mins (100ft AA) or 30 mins to 2 hours (300ft AA)</li> <li>Approximately 2-6 times more trash than the moderate condition category</li> </ul>	<ul style="list-style-type: none"> <li>Trash is continuously seen throughout the assessment area</li> <li>Trash is distracts the eye on first glance</li> <li>Substantial levels of litter and debris in streambed and banks</li> <li>Evidence of site being used frequently by people (e.g., many cans, bottles, food wrappers, plastic bags, clothing; piles of garbage and debris)</li> <li>On average, would take a large number of people (more than 5) during an organized effort to remove all trash from the area. Removal of all trash would take &gt;40 minutes (100ft AA) or &gt; 2 hours (300ft AA)</li> <li>Approximately &gt;2 times more trash than the high condition category</li> </ul>
Site Score (30 meter)	1    2    3	4    5    6	7    8    9	10    11    12
Site Score (100 meter)	1    2    3	4    5    6	7    8    9	10    11    12

### Photo Documentation

Segment	Location	Photograph ID
Bottom (A)	Upstream	
Middle (B)	Upstream	
	Downstream	
Top (C)	Downstream	
Other Photos	Misc. 1	
	Misc. 2	
	Misc. 3	

\* AA = Assessment Area

## **ATTACHMENT 4C**

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### **Laboratory Reports and Data Tables**

**\*Data Tables and Laboratory Electronic Data**

**Deliverables Provided in Separate Microsoft Excel Files**



WEEK WQ Clean

5817 Dryden Place • Carlsbad, CA 92008 • (760) 795-6900, FAX 931-1580  
 2300 Clayton Road, Ste 900 • Concord, CA 94520 • (925) 948-2600, FAX 948-2601

# CHAIN OF CUSTODY

No 42120

3F20072

DATE 27 JUNE 2023 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER

Carlsbad WMA SMC - 2023

PROJECT MANAGER / CONTACT

Michelle Mattson

CLIENT

Weston

ADDRESS

See Above

PHONE / FAX / EMAIL

" "

SITE ID (Location)

SAMPLE ID

DATE

TIME

MATRIX

SMC00537

6-27-23 0820

FW

Plume

6

X

FB-06272023

1300

FW

6

X

CONTAINER TYPE / VOLUME

TOTAL NUMBER OF CONTAINER

See Attached List

ANALYSIS/TEST REQUESTED

PRESERVED HOW

SAMPLE TEMP. (°C) UPON RECEIPT

FOR WESTON USE ONLY

WESTON LAB ID

ice, never,  
44°C  
22

Sample Matrix Codes: FW=fresh water GW=ground water SLT=salt water SW=storm water WW=waste water

SED=sediment A=air BIO=bioologic SS=soil T=tissue O=other (specify) \_\_\_\_\_

Container Code: G=glass P=plastic B=bags O=other \_\_\_\_\_

Shipped By:  Courier  UPS  FedEx  USPS  Client drop off  Other \_\_\_\_\_

Turnaround Time:  2-day  5-day  7-day  10-day  14-day  Standard  Other \_\_\_\_\_

Reporting Requirements:  PDF  FAX  Hard Copy  Email  Other \_\_\_\_\_

SAMPLED BY: PRINT

Damon Owen

Kyle Clouston

SIGNATURE

D-O

COMMENTS / SPECIAL INSTRUCTIONS

orthoplankton as P filtered in field 2.6°C 7/28/23

## RELINQUISHED BY

Print Name	Signature	Firm	Date/Time	Print Name	Signature	Firm	Date/Time
1. Damon Owen	Damon Owen	Weston	6-28-23/9:49	2. Damon	Damon	Weston	6-27-23/11:18
3.		Science	6-28-23 9:49	4.	JAMIE-JONATHAN	Weston	6-27-23 11:18
5.				6.	JAMIE-JONATHAN	Weston	6-27-23 11:18



Check  
WIECK WQ Clean

- 5817 Dryden Place • Carlsbad, CA 92008 • (760) 795-6900, FAX 931-1580  
 2300 Clayton Road, Ste 900 • Concord, CA 94520 • (925) 948-2600, FAX 948-2601

# CHAIN OF CUSTODY

No 42120

32892

DATE 27 JUN 2023 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER

Carlsbad WMA SMC - 2023

PROJECT MANAGER / CONTACT

Michelle Mattson

CLIENT

Weston

ADDRESS

See Above

PHONE / FAX / EMAIL

" "

SITE ID (Location)

SAMPLE ID

DATE

TIME

MATRIX

CONTAINER TYPE / VOLUME

TOTAL NUMBER OF CONTAINER

ANALYSIS/TEST REQUESTED

FOR WESTON USE ONLY

IT

Be Attached lot

PRESERVED HOW  
100% Metal, 100% Plastic

SAMPLE TEMP. (°C)  
UPON RECEIPT

WESTON LAB ID

SMC 00537

6-27-23 0820

FW

Plastics

6

X

FB - 06272023

12 1300

FW

Plastics

6

X

Sample Matrix Codes: FW=fresh water GW=ground water SLT=salt water SW=storm water WW=waste water

SED=sediment A=air BIO=bioologic SS=soil T=tissue O=other (specify)

Container Code: G=glass P=plastic B=bags O=other

Shipped By:  Courier  UPS  FedEx  USPS  Client drop off  Other

Turnaround Time:  2-day  5-day  7-day  10-day  14-day  Standard  Other

Reporting Requirements:  PDF  EDD  Hard Copy  Email  Other

SAMPLED BY: PRINT

Dawn Owen  
Kris Clinton

SIGNATURE

Dawn Owen  
Kris Clinton

COMMENTS / SPECIAL INSTRUCTIONS

orthophotographs as P followed in field 2.6' 11/81

RELINQUISHED BY

RECEIVED BY

Print Name	Signature	Firm	Date/Time	Print Name	Signature	Firm	Date/Time
1. Dawn Owen	Dawn Owen	Weston	6-27-23 0919	2. Dawn Owen	Dawn Owen	Weston	6-27-23 0919
3.				4. Dawn Owen	Dawn Owen	Weston	6-27-23 0919
5.				6.			

3FZ8072

SMC Water Analytes 2022-Weck			
Constituent	Method	RL	Units
Ammonia (as N)	SM 4500 NH3H	0.1	mg/L
Total Kjeldahl Nitrogen	EPA 351.2	0.1	mg/L
Nitrogen, Nitrite (as N)	SM 4500 NO2 B	0.1	mg/L
Nitrogen, Nitrate (as N)	EPA 300.0	0.1	mg/L
Orthophosphate (as P)	SM 4500 P E	0.1	mg/L
Phosphorus, total (as P)	EPA 200.7	0.02	mg/L
Alkalinity as CaCO <sub>3</sub>	SM2320 B	1	mg/L
Chloride	EPA 300.0	1	mg/L
Sulfate	EPA 375.2	TBD	mg/L
Suspended Solids, Total (TSS)	SM 2540 D	0.5	mg/L
Hardness as CaCO <sub>3</sub>	EPA 200.7	0.5	mg/L
Magnesium	EPA 200.7	0.5	mg/L
Sodium	EPA 200.7	0.5	mg/L
Calcium	EPA 200.7	0.1	mg/L
COD	USEPA 410.4	5	mg/L



WECK LABORATORIES, INC.

# Sample Receipt Checklist

Weck WKO: 3F28072WKO Logged by: Jaime GomezSamples Checked by: Jaime GomezDate/Time Received: 06/28/23 @ 11:18# of Samples: 02Delivered by: RMS

	Task	Yes	No	N/A	Comments
COC	COC present at receipt?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	COC matches sample labels?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Project Manager notified about COC discrepancy?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Receipt Information	Sample Temperature		2.6 °C		
	Samples received on ice?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Ice Type (Blue/Wet)		WET		
	All samples intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Samples in proper containers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Sufficient sample volume?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Samples intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Received within holding time?	<input type="checkbox"/>	<input type="checkbox"/>		
	Project Manager notified about receipt info?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Sample Preservation Verification?	Sample labels checked for correct preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	VOC Headspace: (No) none, If Yes (see comment) 524.2, 524.3, 624.1, 8260, 1666 P/T, LUFT	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> <6mm/Pea Size?
	pH verified upon receipt?				pH paper Lot#
	Metals <2; H <sub>2</sub> SO <sub>4</sub> pres tests <2; 522<4; TOC <2; 508.1, 525.2<2, 6710B<2, 608.3 5-9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Free Chlorine Tested <0.1 (Organics Analyses)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Cl Test Strip Lot#
	O&G pH <2 verified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	pH paper Lot#
	pH adjusted for O&G	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	pH Reading: Acid Lot#: Amt added:
Project Manager notified about sample preservation?		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

PM Comments

Sample Receipt Checklist Completed by:

Signature: Jaime GomezDate: 06/28/23

# Certificate of Analysis

FINAL REPORT

**Work Orders:** 3F28072

**Report Date:** 8/04/2023

**Received Date:** 06/28/2023

**Project:** CoSD Carlsbad SMC 2023

**Turnaround Time:** Normal

**Phones:** (760) 795-6984

**Fax:** (760) 931-1580

**Attn:** Michelle Mattson

**P.O. #:**

**Client:** Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

**Billing Code:**

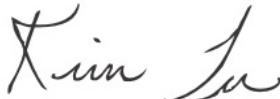
DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • ISO17025 ANAB #L2457.01 • LACSD #10143

*This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.*

Dear Michelle Mattson,

Enclosed are the results of analyses for samples received 6/28/23 with the Chain-of-Custody document. The samples were received in good condition, at 2.6 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

**Reviewed by:**



Kim G. Tu  
Project Manager





WECK LABORATORIES, INC.

Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

# Certificate of Analysis

FINAL REPORT

**Project Number:** CoSD Carlsbad SMC 2023

**Reported:**

08/04/2023 22:01

**Project Manager:** Michelle Mattson

## Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SMC00537	Damon Owen / Kyle C.	3F28072-01	Water	06/27/23 08:20	
FB-06272023	Damon Owen / Kyle C.	3F28072-02	Water	06/27/23 13:00	



WECK LABORATORIES, INC.

Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

## Certificate of Analysis

FINAL REPORT

Project Number: CoSD Carlsbad SMC 2023  
Project Manager: Michelle Mattson

Reported:  
08/04/2023 22:01

## Sample Results

Sample: SMC00537 Sampled: 06/27/23 8:20 by Damon Owen / Kyle C.  
3F28072-01 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
<b>Anions by IC, EPA Method 300.0</b>							
<b>Method:</b> EPA 300.0			<b>Instr:</b> LC12				
<b>Batch ID:</b> W3G0126	<b>Preparation:</b> _NONE (LC)		<b>Prepared:</b> 07/05/23 11:00				<b>Analyst:</b> CAM
<b>Chloride, Total</b>	<b>380</b>	1.9	5.0	mg/l	10	07/06/23	<b>M-05</b>
<b>Sulfate as SO4</b>	<b>450</b>	2.4	5.0	mg/l	10	07/06/23	<b>M-05</b>
<b>Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods</b>							
<b>Method:</b> EPA 350.1			<b>Instr:</b> AA06				
<b>Batch ID:</b> W3G1150	<b>Preparation:</b> _NONE (WETCHEM)		<b>Prepared:</b> 07/17/23 09:48				<b>Analyst:</b> YMT
<b>Ammonia as N</b>	<b>0.033</b>	0.017	0.10	mg/l	1	07/21/23	<b>J</b>
<b>Method:</b> EPA 351.2			<b>Instr:</b> AA06				
<b>Batch ID:</b> W3G1099	<b>Preparation:</b> _NONE (WETCHEM)		<b>Prepared:</b> 07/14/23 15:08				<b>Analyst:</b> YMT
<b>TKN</b>	<b>0.44</b>	0.065	0.10	mg/l	1	07/18/23	
<b>Method:</b> EPA 353.2			<b>Instr:</b> AA01				
<b>Batch ID:</b> W3F2430	<b>Preparation:</b> _NONE (WETCHEM)		<b>Prepared:</b> 06/28/23 15:46				<b>Analyst:</b> ymt
<b>Nitrate as N</b>	<b>3.9</b>	0.040	0.20	mg/l	1	06/28/23 16:47	
<b>Nitrite as N</b>	<b>ND</b>	0.042	0.10	mg/l	1	06/28/23 16:47	
<b>Method:</b> EPA 365.3			<b>Instr:</b> UVVIS04				
<b>Batch ID:</b> W3F2453	<b>Preparation:</b> _NONE (WETCHEM)		<b>Prepared:</b> 06/28/23 19:06				<b>Analyst:</b> cpt
<b>o-Phosphate as P</b>	<b>0.065</b>	0.0071	0.010	mg/l	1	06/28/23 19:27	
<b>Method:</b> EPA 410.4			<b>Instr:</b> UVVIS04				
<b>Batch ID:</b> W3G1007	<b>Preparation:</b> _NONE (WETCHEM)		<b>Prepared:</b> 07/13/23 14:04				<b>Analyst:</b> cpt
<b>Chemical Oxygen Demand</b>	<b>16</b>	2.9	5.0	mg/l	1	07/14/23	
<b>Method:</b> SM 2320B			<b>Instr:</b> AA02				
<b>Batch ID:</b> W3G0745	<b>Preparation:</b> _NONE (WETCHEM)		<b>Prepared:</b> 07/11/23 14:55				<b>Analyst:</b> mes
<b>Alkalinity as CaCO3</b>	<b>260</b>	1.9	5.0	mg/l	1	07/11/23	
<b>Method:</b> SM 2540D			<b>Instr:</b> OVEN15				
<b>Batch ID:</b> W3F2487	<b>Preparation:</b> _NONE (WETCHEM)		<b>Prepared:</b> 06/29/23 09:43				<b>Analyst:</b> mes
<b>Total Suspended Solids</b>	<b>6</b>	1	1	mg/l	1	06/29/23	
<b>Metals by EPA 200 Series Methods</b>							
<b>Method:</b> Calculation			<b>Instr:</b> [CALC]				
<b>Batch ID:</b> [CALC]	<b>Preparation:</b> [CALC]		<b>Prepared:</b> 07/11/23 16:38				<b>Analyst:</b> kvm
<b>Hardness as CaCO3, Total</b>	<b>638</b>	0.344	3.31	mg/l	1	07/17/23	
<b>Method:</b> EPA 200.7			<b>Instr:</b> ICP03				
<b>Batch ID:</b> W3G0759	<b>Preparation:</b> EPA 200.2		<b>Prepared:</b> 07/11/23 16:38				<b>Analyst:</b> kvm
<b>Calcium, Total</b>	<b>117</b>	0.0736	0.500	mg/l	1	07/17/23	
<b>Magnesium, Total</b>	<b>83.8</b>	0.0390	0.500	mg/l	1	07/17/23	
<b>Phosphorus, Total</b>	<b>0.078</b>	0.018	0.050	mg/l	1	07/17/23	
<b>Sodium, Total</b>	<b>230</b>	0.52	1.0	mg/l	1	07/17/23	

3F28072

Page 3 of 10



WECK LABORATORIES, INC.

Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

## Certificate of Analysis

FINAL REPORT

Project Number: CoSD Carlsbad SMC 2023

Reported:

08/04/2023 22:01

Project Manager: Michelle Mattson

(Continued)

## Sample Results

Sample: FB-06272023

Sampled: 06/27/23 13:00 by Damon Owen / Kyle C.

3F28072-02 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
<b>Anions by IC, EPA Method 300.0</b>							
<b>Method:</b> EPA 300.0							
<b>Batch ID:</b> W3G0126	<b>Preparation:</b> _NONE (LC)						
<b>Chloride, Total</b>	<b>0.22</b>	0.19	0.50	mg/l	1	07/06/23	J
Sulfate as SO <sub>4</sub>	ND	0.24	0.50	mg/l	1	07/06/23	
<b>Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods</b>							
<b>Method:</b> EPA 350.1							
<b>Batch ID:</b> W3G1150	<b>Preparation:</b> _NONE (WETCHEM)						
Ammonia as N	ND	0.017	0.10	mg/l	1	07/21/23	
<b>Method:</b> EPA 351.2							
<b>Batch ID:</b> W3G1099	<b>Preparation:</b> _NONE (WETCHEM)						
TKN	ND	0.065	0.10	mg/l	1	07/18/23	
<b>Method:</b> EPA 353.2							
<b>Batch ID:</b> W3F2430	<b>Preparation:</b> _NONE (WETCHEM)						
Nitrate as N	ND	0.040	0.20	mg/l	1	06/28/23 16:49	
Nitrite as N	ND	0.042	0.10	mg/l	1	06/28/23 16:49	
<b>Method:</b> EPA 365.3							
<b>Batch ID:</b> W3F2453	<b>Preparation:</b> _NONE (WETCHEM)						
<b>o-Phosphate as P</b>	<b>0.017</b>	0.0071	0.010	mg/l	1	06/28/23 19:29	
<b>Method:</b> EPA 410.4							
<b>Batch ID:</b> W3G0825	<b>Preparation:</b> _NONE (WETCHEM)						
<b>Chemical Oxygen Demand</b>	<b>21</b>	2.9	5.0	mg/l	1	07/12/23	
<b>Method:</b> SM 2320B							
<b>Batch ID:</b> W3G0772	<b>Preparation:</b> _NONE (WETCHEM)						
<b>Alkalinity as CaCO<sub>3</sub></b>	<b>2.0</b>	1.9	5.0	mg/l	1	07/11/23	J
<b>Method:</b> SM 2540D							
<b>Batch ID:</b> W3F2487	<b>Preparation:</b> _NONE (WETCHEM)						
Total Suspended Solids	ND	1	1	mg/l	1	06/29/23	
<b>Metals by EPA 200 Series Methods</b>							
<b>Method:</b> Calculation							
<b>Batch ID:</b> [CALC]	<b>Preparation:</b> [CALC]						
Hardness as CaCO <sub>3</sub> , Total	ND	0.344	3.31	mg/l	1	07/17/23	
<b>Method:</b> EPA 200.7							
<b>Batch ID:</b> W3G0759	<b>Preparation:</b> EPA 200.2						
Calcium, Total	ND	0.0736	0.500	mg/l	1	07/17/23	
Magnesium, Total	ND	0.0390	0.500	mg/l	1	07/17/23	
Phosphorus, Total	ND	0.018	0.050	mg/l	1	07/17/23	
Sodium, Total	ND	0.52	1.0	mg/l	1	07/17/23	

3F28072

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Weston Solutions, Inc. - Carlsbad  
 5817 Dryden Place, Suite 101  
 Carlsbad, CA 92008

**Project Number:** CoSD Carlsbad SMC 2023  
**Project Manager:** Michelle Mattson

**Reported:**  
 08/04/2023 22:01

## Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3G0126 - EPA 300.0</b>											
<b>Blank (W3G0126-BLK1)</b>											
Chloride, Total	ND	0.19	0.50	mg/l							
Sulfate as SO4	ND	0.24	0.50	mg/l							
<b>LCS (W3G0126-BS1)</b>											
Chloride, Total	20.3	0.19	0.50	mg/l	20.0		101	80-120		25	
Sulfate as SO4	19.9	0.24	0.50	mg/l	20.0		100	80-120		25	
<b>Matrix Spike (W3G0126-MS1)</b>											
Chloride, Total	6840	19	50	mg/l	2000	5160	84	80-120		25	
Sulfate as SO4	3420	24	50	mg/l	2000	1400	101	80-120		25	
<b>Matrix Spike (W3G0126-MS2)</b>											
Chloride, Total	4080	19	50	mg/l	2000	2140	97	80-120		25	
Sulfate as SO4	2430	24	50	mg/l	2000	392	102	80-120		25	
<b>Matrix Spike Dup (W3G0126-MSD1)</b>											
Chloride, Total	6810	19	50	mg/l	2000	5160	82	80-120	0.4	25	
Sulfate as SO4	3410	24	50	mg/l	2000	1400	100	80-120	0.5	25	
<b>Matrix Spike Dup (W3G0126-MSD2)</b>											
Chloride, Total	4090	19	50	mg/l	2000	2140	98	80-120	0.2	25	
Sulfate as SO4	2440	24	50	mg/l	2000	392	102	80-120	0.3	25	

Weston Solutions, Inc. - Carlsbad  
 5817 Dryden Place, Suite 101  
 Carlsbad, CA 92008

**Project Number:** CoSD Carlsbad SMC 2023

**Reported:**

08/04/2023 22:01

**Project Manager:** Michelle Mattson

(Continued)

## Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier				
<b>Batch: W3F2430 - EPA 353.2</b>															
<b>Blank (W3F2430-BLK1)</b>															
Nitrate as N	ND	0.040	0.20	mg/l	<b>Prepared &amp; Analyzed: 06/28/23</b>										
Nitrite as N	ND	0.042	0.10	mg/l											
<b>LCS (W3F2430-BS1)</b>															
Nitrate as N	1.03	0.040	0.20	mg/l	1.00		103	90-110							
Nitrite as N	1.01	0.042	0.10	mg/l	1.00		101	90-110							
<b>Duplicate (W3F2430-DUP1)</b>															
Nitrate as N	3.91	0.040	0.20	mg/l	<b>Source: 3F28072-01</b>				3.93	0.5	20				
Nitrite as N	ND	0.042	0.10	mg/l					ND		20				
<b>Matrix Spike (W3F2430-MS1)</b>															
Nitrate as N	3.55	0.040	0.20	mg/l	2.00	1.49	103	90-110							
Nitrite as N	1.02	0.042	0.10	mg/l	1.00	ND	102	90-110							
<b>Matrix Spike Dup (W3F2430-MSD1)</b>															
Nitrate as N	3.56	0.040	0.20	mg/l	2.00	1.49	104	90-110	0.3	20					
Nitrite as N	1.02	0.042	0.10	mg/l	1.00	ND	102	90-110	0	20					
<b>Batch: W3F2453 - EPA 365.3</b>															
<b>Blank (W3F2453-BLK1)</b>															
o-Phosphate as P	ND	0.0071	0.010	mg/l	<b>Prepared &amp; Analyzed: 06/28/23</b>										
<b>LCS (W3F2453-BS1)</b>															
o-Phosphate as P	0.193	0.0071	0.010	mg/l	0.200		96	90-110		20					
<b>Matrix Spike (W3F2453-MS1)</b>															
o-Phosphate as P	0.254	0.0071	0.010	mg/l	0.200	0.0650	94	90-110		20					
<b>Matrix Spike Dup (W3F2453-MSD1)</b>															
o-Phosphate as P	0.268	0.0071	0.010	mg/l	0.200	0.0650	102	90-110	5	20					
<b>Batch: W3F2487 - SM 2540D</b>															
<b>Blank (W3F2487-BLK1)</b>															
Total Suspended Solids	ND	1	1	mg/l	<b>Prepared &amp; Analyzed: 06/29/23</b>										
<b>LCS (W3F2487-BS1)</b>															
Total Suspended Solids	50.7	1	1	mg/l	52.5		97	90-110							
<b>Duplicate (W3F2487-DUP1)</b>															
Total Suspended Solids	34.0	1	1	mg/l	<b>Source: 3F27013-01</b>				36.5	7	10				
<b>Duplicate (W3F2487-DUP2)</b>															
Total Suspended Solids	23.3	1	1	mg/l	<b>Source: 3F28004-30</b>				21.1	10	10				
<b>Batch: W3G0745 - SM 2320B</b>															
<b>Blank (W3G0745-BLK1)</b>															
Alkalinity as CaCO <sub>3</sub>	2.74	1.9	5.0	mg/l	<b>Prepared &amp; Analyzed: 07/11/23</b>										
<b>LCS (W3G0745-BS1)</b>															
Alkalinity as CaCO <sub>3</sub>	260	1.9	5.0	mg/l	250		104	94-108							

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**Project Number:** CoSD Carlsbad SMC 2023

**Reported:**

08/04/2023 22:01

**Project Manager:** Michelle Mattson

(Continued)

## Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3G0745 - SM 2320B (Continued)</b>											
Duplicate (W3G0745-DUP1)	Source: 3E09010-03					Prepared & Analyzed: 07/11/23					
Alkalinity as CaCO <sub>3</sub>	241	1.9	5.0	mg/l		221			8	15	
<b>Batch: W3G0772 - SM 2320B</b>											
Blank (W3G0772-BLK1)						Prepared & Analyzed: 07/11/23					
Alkalinity as CaCO <sub>3</sub>	ND	1.9	5.0	mg/l							
LCS (W3G0772-BS1)						Prepared & Analyzed: 07/11/23					
Alkalinity as CaCO <sub>3</sub>	245	1.9	5.0	mg/l		250		98	94-108		
LCS (W3G0772-BS2)						Prepared & Analyzed: 07/11/23					
Alkalinity as CaCO <sub>3</sub>	49.7	1.9	5.0	mg/l		50.0		99	94-108		
Duplicate (W3G0772-DUP1)	Source: 3F28004-13					Prepared & Analyzed: 07/11/23					
Alkalinity as CaCO <sub>3</sub>	ND	1.9	5.0	mg/l				ND		15	
<b>Batch: W3G0825 - EPA 410.4</b>											
Blank (W3G0825-BLK1)						Prepared & Analyzed: 07/12/23					
Chemical Oxygen Demand	ND	2.9	5.0	mg/l							
LCS (W3G0825-BS1)						Prepared & Analyzed: 07/12/23					
Chemical Oxygen Demand	1050	2.9	5.0	mg/l		1000		105	90-110		
Duplicate (W3G0825-DUP1)	Source: 3F26028-01					Prepared & Analyzed: 07/12/23					
Chemical Oxygen Demand	792	5.8	10	mg/l				742		6	15
Matrix Spike (W3G0825-MS1)	Source: 3F23076-01					Prepared & Analyzed: 07/12/23					
Chemical Oxygen Demand	199	12	20	mg/l		200		16.7	91	90-110	
Matrix Spike (W3G0825-MS2)	Source: 3F23018-05					Prepared & Analyzed: 07/12/23					
Chemical Oxygen Demand	2200	12	20	mg/l		2000		209	99	90-110	
Matrix Spike Dup (W3G0825-MSD1)	Source: 3F23076-01					Prepared & Analyzed: 07/12/23					
Chemical Oxygen Demand	228	12	20	mg/l		200		16.7	106	90-110	14
Matrix Spike Dup (W3G0825-MSD2)	Source: 3F23018-05					Prepared & Analyzed: 07/12/23					
Chemical Oxygen Demand	2290	12	20	mg/l		2000		209	104	90-110	4
<b>Batch: W3G1007 - EPA 410.4</b>											
Blank (W3G1007-BLK1)						Prepared: 07/13/23 Analyzed: 07/14/23					
Chemical Oxygen Demand	ND	2.9	5.0	mg/l							
LCS (W3G1007-BS1)						Prepared: 07/13/23 Analyzed: 07/14/23					
Chemical Oxygen Demand	103	2.9	5.0	mg/l		100		103	90-110		
Duplicate (W3G1007-DUP1)	Source: 3F29020-01					Prepared: 07/13/23 Analyzed: 07/14/23					
Chemical Oxygen Demand	34.3	2.9	5.0	mg/l				31.7		8	15
Matrix Spike (W3G1007-MS1)	Source: 3G05124-01					Prepared: 07/13/23 Analyzed: 07/14/23					
Chemical Oxygen Demand	214	12	20	mg/l		200		22.7	96	90-110	
Matrix Spike Dup (W3G1007-MSD1)	Source: 3G05124-01					Prepared: 07/13/23 Analyzed: 07/14/23					
Chemical Oxygen Demand	219	12	20	mg/l		200		22.7	98	90-110	2
<b>Batch: W3G1099 - EPA 351.2</b>											



# Certificate of Analysis

FINAL REPORT

Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

Project Number: CoSD Carlsbad SMC 2023

Reported:

08/04/2023 22:01

Project Manager: Michelle Mattson

## Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3G1099 - EPA 351.2 (Continued)</b>											
<b>Blank (W3G1099-BLK1)</b>											
TKN	ND	0.065	0.10	mg/l							
<b>Blank (W3G1099-BLK2)</b>											
TKN	ND	0.065	0.10	mg/l							
<b>LCS (W3G1099-BS1)</b>											
TKN	0.948	0.065	0.10	mg/l	1.00		95	90-110			
<b>LCS (W3G1099-BS2)</b>											
TKN	0.944	0.065	0.10	mg/l	1.00		94	90-110			
<b>Duplicate (W3G1099-DUP1)</b>											
TKN	0.445	0.065	0.10	mg/l		0.444			0.1	10	
<b>Matrix Spike (W3G1099-MS1)</b>											
TKN	0.991	0.065	0.10	mg/l	1.00	0.0768	91	90-110			
<b>Matrix Spike (W3G1099-MS2)</b>											
TKN	0.957	0.065	0.10	mg/l	1.00	ND	96	90-110			
<b>Matrix Spike Dup (W3G1099-MSD1)</b>											
TKN	0.990	0.065	0.10	mg/l	1.00	0.0768	91	90-110	0.1	10	
<b>Matrix Spike Dup (W3G1099-MSD2)</b>											
TKN	0.930	0.065	0.10	mg/l	1.00	ND	93	90-110	3	10	
<b>Batch: W3G1150 - EPA 350.1</b>											
<b>Blank (W3G1150-BLK1)</b>											
Ammonia as N	ND	0.017	0.10	mg/l							
<b>Blank (W3G1150-BLK2)</b>											
Ammonia as N	ND	0.017	0.10	mg/l							
<b>LCS (W3G1150-BS1)</b>											
Ammonia as N	0.246	0.017	0.10	mg/l	0.250		99	90-110			
<b>LCS (W3G1150-BS2)</b>											
Ammonia as N	0.248	0.017	0.10	mg/l	0.250		99	90-110			
<b>Duplicate (W3G1150-DUP1)</b>											
Ammonia as N	0.0317	0.017	0.10	mg/l		0.0329			4	15	J
<b>Matrix Spike (W3G1150-MS1)</b>											
Ammonia as N	0.250	0.017	0.10	mg/l	0.250	ND	100	90-110			
<b>Matrix Spike (W3G1150-MS2)</b>											
Ammonia as N	0.286	0.017	0.10	mg/l	0.250	0.0370	99	90-110			
<b>Matrix Spike Dup (W3G1150-MSD1)</b>											
Ammonia as N	0.254	0.017	0.10	mg/l	0.250	ND	101	90-110	1	15	
<b>Matrix Spike Dup (W3G1150-MSD2)</b>											
Ammonia as N	0.288	0.017	0.10	mg/l	0.250	0.0370	100	90-110	0.7	15	



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# Certificate of Analysis

FINAL REPORT

Project Number: CoSD Carlsbad SMC 2023

Reported:

08/04/2023 22:01

Project Manager: Michelle Mattson

(Continued)

## Quality Control Results

Metals by EPA 200 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3G0759 - EPA 200.7</b>											
<b>Blank (W3G0759-BLK1)</b>											
Calcium, Total	ND	0.0736	0.500	mg/l							
Magnesium, Total	ND	0.0390	0.500	mg/l							
Phosphorus, Total	ND	0.018	0.050	mg/l							
Sodium, Total	ND	0.52	1.0	mg/l							
<b>LCS (W3G0759-BS1)</b>											
Calcium, Total	46.8	0.0736	0.500	mg/l	50.2	93	75-125				25
Magnesium, Total	45.9	0.0390	0.500	mg/l	50.2	91	75-125				25
Phosphorus, Total	2.03	0.018	0.050	mg/l	2.00	102	90-110				25
Sodium, Total	47.4	0.52	1.0	mg/l	50.2	94	75-125				25
<b>Duplicate (W3G0759-DUP1)</b>											
Calcium, Total	ND	0.0736	0.500	mg/l		ND					25
Magnesium, Total	ND	0.0390	0.500	mg/l		ND					25
Phosphorus, Total	ND	0.018	0.050	mg/l		ND					25
Sodium, Total	ND	0.52	1.0	mg/l		ND					25
<b>Matrix Spike (W3G0759-MS1)</b>											
Calcium, Total	300	0.0736	0.500	mg/l	50.2	262	77	75-125			25
Magnesium, Total	125	0.0390	0.500	mg/l	50.2	81.6	87	75-125			25
Phosphorus, Total	2.15	0.018	0.050	mg/l	2.00	0.0962	103	90-110			25
Sodium, Total	443	0.52	1.0	mg/l	50.2	425	36	75-125			25
<b>Matrix Spike (W3G0759-MS2)</b>											
Calcium, Total	161	0.0736	0.500	mg/l	50.2	117	88	75-125			25
Magnesium, Total	128	0.0390	0.500	mg/l	50.2	83.8	88	75-125			25
Phosphorus, Total	2.12	0.018	0.050	mg/l	2.00	0.0778	102	90-110			25
Sodium, Total	278	0.52	1.0	mg/l	50.2	233	91	75-125			25
<b>Matrix Spike Dup (W3G0759-MSD1)</b>											
Calcium, Total	297	0.0736	0.500	mg/l	50.2	262	70	75-125	1	25	MS-02
Magnesium, Total	124	0.0390	0.500	mg/l	50.2	81.6	84	75-125	0.9	25	
Phosphorus, Total	2.13	0.018	0.050	mg/l	2.00	0.0962	102	90-110	0.7	25	
Sodium, Total	437	0.52	1.0	mg/l	50.2	425	24	75-125	1	25	MS-02
<b>Matrix Spike Dup (W3G0759-MSD2)</b>											
Calcium, Total	161	0.0736	0.500	mg/l	50.2	117	87	75-125	0.3	25	
Magnesium, Total	128	0.0390	0.500	mg/l	50.2	83.8	88	75-125	0.1	25	
Phosphorus, Total	2.12	0.018	0.050	mg/l	2.00	0.0778	102	90-110	0.3	25	
Sodium, Total	277	0.52	1.0	mg/l	50.2	233	88	75-125	0.5	25	



WECK LABORATORIES, INC.

Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

# Certificate of Analysis

FINAL REPORT

**Project Number:** CoSD Carlsbad SMC 2023

**Reported:**

08/04/2023 22:01

**Project Manager:** Michelle Mattson

## Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
M-05	Due to the nature of matrix interferences, sample was diluted prior to analysis. The MDL and MRL were raised due to the dilution.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
%REC	Percent Recovery
Dil	Dilution
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

The logo for Weston Solutions features the word "WESTON" in a bold, outlined font. A globe graphic is integrated into the letter "O". Below "WESTON" is the word "SOLUTIONS" in a smaller, bold, sans-serif font. Above the entire logo, the handwritten signature "C'bael" is written in cursive script.

WICK WQ Chay

2433 Impala Drive • Carlsbad, CA 92010 • (760) 795-6900, FAX 931-1580  
 1440 Broadway, Ste. 910 • Oakland, CA 94612 • (510) 808-0302, FAX 891-9710

1480  
**CHAIN OF CUSTODY**

3F29020  
PAGE 1 OF 1

DATE 28 JUNE 2023 PAGE 1 OF 1

**Sample Matrix Codes:** FW=fresh water GW=ground water SLT=salt water SW=storm water WW=waste water

SED=sediment A=air BIO=biologic SS=soil T=tissue O=other (specify) \_\_\_\_\_

**Container Code:** G=glass P=plastic B=bags O=other

**Shipped By:**  Courier  UPS  FedEx  USPS  Client drop off  Other

**Turnaround Time:**  2-day  5-day  7-day  10-day  14-day  Standard  Other

**Reporting Requirements:**  PDF  EDD  Hard Copy  Email  Other

SAMPLED BY: PRINT SIGNATURE

Damon Over  
Male 20-11-1

Kyle Cleveland

**SIGNATURE**

D. O.

**COMMENTS / SPECIAL INSTRUCTION**

COMMENTS / SPECIAL INSTRUCTIONS  
orthophosphate as P filtered in batch

RELINQUISHED BY

Print Name	Signature	Firm	Date/Time	Print Name	Signature	Firm	Date/Time
1. Damon Owen	Damon Owen	Westen	6-29-23 07:55				
2.							
3. Damon	Damon	Westen	6-29-23 7:59				
4. Damon	Damon		6-29-23 -9:28 AM	Peyton	5-6-2023	Westen	6/29/23 09:28
5.							
6.							

Cback



WEEK WQ Clean

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## CHAIN OF CUSTODY

3P 29020

DATE 28 JUNE 2023 PAGE 1 OF 1

PROJECT NAME / SURVEY / PROJECT NUMBER

Carlsbad WMA SMC - 2023

PROJECT MANAGER / CONTACT

Michelle Mattson

COMPANY / CLIENT

Weston

ADDRESS

See Above

PHONE / FAX / EMAIL

111-111-1111

SITE ID (Location)

SAMPLE ID

DATE

TIME

MATRIX

904M21B00

6-28-23 0815

FW

Plumros

6

904M21B00-DUP

↓ ↓ ↓ ↓

6

CONTAINER TYPE / VOLUME  
See Attached ListTOTAL NUMBER OF  
CONTAINER

ANALYSIS/TEST REQUESTED

PRESERVED  
HOW

100% H2SO4

HNO3

HCl

FOR WESTON USE ONLY

SAMPLE  
TEMP. (°C)  
UPON  
RECEIPT

WESTON LAB ID

Sample Matrix Codes: FW=fresh water GW=ground water SLT=salt water SW=storm water WW=waste water

SED=sediment A=air BIO=biologic SS=soil T=tissue O=other (specify) \_\_\_\_\_

Container Code: G=glass P=plastic B=bags O=other \_\_\_\_\_

Shipped By:  Courier  UPS  FedEx  USPS  Client drop off  Other \_\_\_\_\_Turnaround Time:  2-day  5-day  7-day  10-day  14-day  Standard  Other \_\_\_\_\_Reporting Requirements:  PDF  EDD  Hard Copy  Email  Other \_\_\_\_\_

SAMPLED BY:

PRINT

Damon Owen

Kyle Cloutier

SIGNATURE

COMMENTS / SPECIAL INSTRUCTIONS

orthophosphate as P filtered in field

## RELINQUISHED BY

Print Name	Signature	Firm	Date/Time	Print Name	Signature	Firm	Date/Time
1. Damon Owen		Weston	6-29-23 07:55				
2.							
3.		Weston	6-29-23 7:59				
4.			6-29-23 09:25 PM	Ray C		Weston	6-29-23 09:25
5.							
6.							

3/29/20

SMC Water Analytes 2022-Weck			
Constituent	Method	RL	Units
Ammonia (as N)	SM 4500 NH3H	0.1	mg/L
Total Kjeldahl Nitrogen	EPA 351.2	0.1	mg/L
Nitrogen, Nitrite (as N)	SM 4500 NO2 B	0.1	mg/L
Nitrogen, Nitrate (as N)	EPA 300.0	0.1	mg/L
Orthophosphate (as P)	SM 4500 P E	0.1	mg/L
Phosphorus, total (as P)	EPA 200.7	0.02	mg/L
Alkalinity as CaCO <sub>3</sub>	SM2320 B	1	mg/L
Chloride	EPA 300.0	1	mg/L
Sulfate	EPA 375.2	TBD	mg/L
Suspended Solids, Total (TSS)	SM 2540 D	0.5	mg/L
Hardness as CaCO <sub>3</sub>	EPA 200.7	0.5	mg/L
Magnesium	EPA 200.7	0.5	mg/L
Sodium	EPA 200.7	0.5	mg/L
Calcium	EPA 200.7	0.1	mg/L
COD	USEPA 410.4	5	mg/L



WECK LABORATORIES, INC.

# Sample Receipt Checklist

Weck WKO: **3F29020**

WKO Logged by: **Rey Edrosa**

Samples Checked by: **Rey Edrosa**

Date/Time Received: **06/29/23 @ 09:28**

# of Samples: **02**

Delivered by: **RMS**

	Task	Yes	No	N/A	Comments
COC	COC present at receipt?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	COC properly completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	COC matches sample labels?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Receipt Information	Project Manager notified?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Sample Temperature		5.6°C		
	Samples received on ice?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Ice Type (Blue/Wet)		Wet		
	All samples intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Samples in proper containers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Sufficient sample volume?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Received within holding time?	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	Project Manager notified?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Sample labels checked for correct preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sample Preservation Verification?	VOC Headspace: (No) none, If Yes (See comment) 524.2, 524.3, 624.1, 8260, 1666 P/T, LUFT	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> <6mm/Pea size?
	pH verified upon receipt? Metals <2; H2SO4 pres tests <2; 522<4; TOC <2; 508.1, 525.2<2; 6710B<2; 608.3 5-9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> pH paper Lot#
	Free Chlorine Tested <0.1 (Organics Analyses)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> Cl Test Strip Lot#
	O&G pH <2 verified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> pH paper Lot#
	pH adjusted for O&G	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> pH Reading: Acid Lot# Amt added:
PM Comments	Project Manager notified?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

PM Comments

Sample Receipt Checklist Prepared by:

Signature: Rey Edrosa

Date: 06/29/2023

# Certificate of Analysis

FINAL REPORT

**Work Orders:** 3F29020

**Report Date:** 8/04/2023

**Received Date:** 06/29/2023

**Project:** CoSD Carlsbad SMC 2023

**Turnaround Time:** Normal

**Phones:** (760) 795-6984

**Fax:** (760) 931-1580

**Attn:** Michelle Mattson

**P.O. #:**

**Client:** Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

**Billing Code:**

DoD-ELAP ANAB #ADE-2882 • DoD-ISO ANAB # • ELAP-CA #1132 • EPA-UCMR #CA00211 • ISO17025 ANAB #L2457.01 • LACSD  
#10143

*This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.*

Dear Michelle Mattson,

Enclosed are the results of analyses for samples received 6/29/23 with the Chain-of-Custody document. The samples were received in good condition, at 5.6 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

**Reviewed by:**



Kim G. Tu  
Project Manager





WECK LABORATORIES, INC.

Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

# Certificate of Analysis

FINAL REPORT

**Project Number:** CoSD Carlsbad SMC 2023

**Reported:**

08/04/2023 21:58

**Project Manager:** Michelle Mattson

## Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
904M21800	Damon Owen / Kyle C.	3F29020-01	Water	06/28/23 08:15	
904M21800-DUP	Damon Owen / Kyle C.	3F29020-02	Water	06/28/23 08:15	



# Certificate of Analysis

FINAL REPORT

Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

Project Number: CoSD Carlsbad SMC 2023

Reported:

08/04/2023 21:58

Project Manager: Michelle Mattson

## Sample Results

Sample: 904M21800 Sampled: 06/28/23 8:15 by Damon Owen / Kyle C.  
3F29020-01 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
<b>Anions by IC, EPA Method 300.0</b>							
Method: EPA 300.0			Instr: LC12				
Batch ID: W3G0126	Preparation: _NONE (LC)		Prepared: 07/05/23 11:00				Analyst: CAM
Chloride, Total	1100	1.9	5.0	mg/l	10	07/06/23	M-05
Sulfate as SO4	260	2.4	5.0	mg/l	10	07/06/23	M-05
<b>Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods</b>							
Method: EPA 350.1			Instr: AA06				
Batch ID: W3G1151	Preparation: _NONE (WETCHEM)		Prepared: 07/17/23 09:53				Analyst: YMT
Ammonia as N	0.026	0.017	0.10	mg/l	1	07/26/23	J
Method: EPA 351.2			Instr: AA06				
Batch ID: W3G1531	Preparation: _NONE (WETCHEM)		Prepared: 07/20/23 09:40				Analyst: YMT
TKN	0.44	0.065	0.10	mg/l	1	07/26/23	
Method: EPA 353.2			Instr: AA01				
Batch ID: W3F2501	Preparation: _NONE (WETCHEM)		Prepared: 06/29/23 10:38				Analyst: ymt
Nitrate as N	0.073	0.040	0.20	mg/l	1	06/29/23 14:36	J
Nitrite as N	ND	0.042	0.10	mg/l	1	06/29/23 14:36	
Method: EPA 365.3			Instr: UVVIS04				
Batch ID: W3F2542	Preparation: _NONE (WETCHEM)		Prepared: 06/29/23 17:28				Analyst: rsc
o-Phosphate as P	0.076	0.0071	0.010	mg/l	1	06/29/23 18:22	
Method: EPA 410.4			Instr: UVVIS04				
Batch ID: W3G1007	Preparation: _NONE (WETCHEM)		Prepared: 07/13/23 14:04				Analyst: cpt
Chemical Oxygen Demand	32	2.9	5.0	mg/l	1	07/14/23	
Method: SM 2320B			Instr: AA02				
Batch ID: W3G0745	Preparation: _NONE (WETCHEM)		Prepared: 07/11/23 14:55				Analyst: mes
Alkalinity as CaCO3	330	1.9	5.0	mg/l	1	07/11/23	
Method: SM 2540D			Instr: OVEN15				
Batch ID: W3F2594	Preparation: _NONE (WETCHEM)		Prepared: 06/30/23 09:56				Analyst: mes
Total Suspended Solids	10	1	1	mg/l	1	06/30/23	
<b>Metals by EPA 200 Series Methods</b>							
Method: Calculation			Instr: [CALC]				
Batch ID: [CALC]	Preparation: [CALC]		Prepared: 07/11/23 16:38				Analyst: kvm
Hardness as CaCO3, Total	990	0.344	3.31	mg/l	1	07/17/23	
Method: EPA 200.7			Instr: ICP03				
Batch ID: W3G0759	Preparation: EPA 200.2		Prepared: 07/11/23 16:38				Analyst: kvm
Calcium, Total	262	0.0736	0.500	mg/l	1	07/17/23	
Magnesium, Total	81.6	0.0390	0.500	mg/l	1	07/17/23	
Phosphorus, Total	0.096	0.018	0.050	mg/l	1	07/17/23	
Sodium, Total	420	1.0	2.0	mg/l	2	07/17/23	



Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

# Certificate of Analysis

FINAL REPORT

Project Number: CoSD Carlsbad SMC 2023  
Project Manager: Michelle Mattson

Reported:  
08/04/2023 21:58

## Sample Results

(Continued)

Sample: 904M21800-DUP  
3F29020-02 (Water) Sampled: 06/28/23 8:15 by Damon Owen / Kyle C.

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
<b>Anions by IC, EPA Method 300.0</b>							
Method: EPA 300.0			Instr: LC12				
Batch ID: W3G0126	Preparation: _NONE (LC)		Prepared: 07/05/23 11:00				Analyst: CAM
Chloride, Total	1100	1.9	5.0	mg/l	10	07/06/23	M-05
Sulfate as SO4	260	2.4	5.0	mg/l	10	07/06/23	M-05
<b>Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods</b>							
Method: EPA 350.1			Instr: AA06				
Batch ID: W3G1151	Preparation: _NONE (WETCHEM)		Prepared: 07/17/23 09:53				Analyst: YMT
Ammonia as N	0.022	0.017	0.10	mg/l	1	07/26/23	J
Method: EPA 351.2			Instr: AA06				
Batch ID: W3G1531	Preparation: _NONE (WETCHEM)		Prepared: 07/20/23 09:40				Analyst: YMT
TKN	0.42	0.065	0.10	mg/l	1	07/26/23	
Method: EPA 353.2			Instr: AA01				
Batch ID: W3F2501	Preparation: _NONE (WETCHEM)		Prepared: 06/29/23 10:38				Analyst: ymt
Nitrate as N	1.4	0.040	0.20	mg/l	1	06/29/23 14:37	
Nitrite as N	ND	0.042	0.10	mg/l	1	06/29/23 14:37	
Method: EPA 365.3			Instr: UVVIS04				
Batch ID: W3F2542	Preparation: _NONE (WETCHEM)		Prepared: 06/29/23 17:28				Analyst: rsc
o-Phosphate as P	0.087	0.0071	0.010	mg/l	1	06/29/23 18:25	
Method: EPA 410.4			Instr: UVVIS04				
Batch ID: W3G1007	Preparation: _NONE (WETCHEM)		Prepared: 07/13/23 14:04				Analyst: cpt
Chemical Oxygen Demand	37	2.9	5.0	mg/l	1	07/14/23	
Method: SM 2320B			Instr: AA02				
Batch ID: W3G0745	Preparation: _NONE (WETCHEM)		Prepared: 07/11/23 14:55				Analyst: mes
Alkalinity as CaCO3	340	1.9	5.0	mg/l	1	07/11/23	
Method: SM 2540D			Instr: OVEN15				
Batch ID: W3F2594	Preparation: _NONE (WETCHEM)		Prepared: 06/30/23 09:56				Analyst: mes
Total Suspended Solids	13	1	1	mg/l	1	06/30/23	
<b>Metals by EPA 200 Series Methods</b>							
Method: Calculation			Instr: [CALC]				
Batch ID: [CALC]	Preparation: [CALC]		Prepared: 07/11/23 16:38				Analyst: kvm
Hardness as CaCO3, Total	979	0.344	3.31	mg/l	1	07/17/23	
Method: EPA 200.7			Instr: ICP03				
Batch ID: W3G0759	Preparation: EPA 200.2		Prepared: 07/11/23 16:38				Analyst: kvm
Calcium, Total	259	0.0736	0.500	mg/l	1	07/17/23	
Magnesium, Total	80.7	0.0390	0.500	mg/l	1	07/17/23	
Phosphorus, Total	0.096	0.018	0.050	mg/l	1	07/17/23	
Sodium, Total	420	1.0	2.0	mg/l	2	07/17/23	

Weston Solutions, Inc. - Carlsbad  
 5817 Dryden Place, Suite 101  
 Carlsbad, CA 92008

**Project Number:** CoSD Carlsbad SMC 2023  
**Project Manager:** Michelle Mattson

**Reported:**  
 08/04/2023 21:58

## Quality Control Results

Anions by IC, EPA Method 300.0

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3G0126 - EPA 300.0</b>											
<b>Blank (W3G0126-BLK1)</b>											
Chloride, Total	ND	0.19	0.50	mg/l							
Sulfate as SO4	ND	0.24	0.50	mg/l							
<b>LCS (W3G0126-BS1)</b>											
Chloride, Total	20.3	0.19	0.50	mg/l	20.0		101	80-120		25	
Sulfate as SO4	19.9	0.24	0.50	mg/l	20.0		100	80-120		25	
<b>Matrix Spike (W3G0126-MS1)</b>											
Chloride, Total	6840	19	50	mg/l	2000	5160	84	80-120		25	
Sulfate as SO4	3420	24	50	mg/l	2000	1400	101	80-120		25	
<b>Matrix Spike (W3G0126-MS2)</b>											
Chloride, Total	4080	19	50	mg/l	2000	2140	97	80-120		25	
Sulfate as SO4	2430	24	50	mg/l	2000	392	102	80-120		25	
<b>Matrix Spike Dup (W3G0126-MSD1)</b>											
Chloride, Total	6810	19	50	mg/l	2000	5160	82	80-120	0.4	25	
Sulfate as SO4	3410	24	50	mg/l	2000	1400	100	80-120	0.5	25	
<b>Matrix Spike Dup (W3G0126-MSD2)</b>											
Chloride, Total	4090	19	50	mg/l	2000	2140	98	80-120	0.2	25	
Sulfate as SO4	2440	24	50	mg/l	2000	392	102	80-120	0.3	25	

Weston Solutions, Inc. - Carlsbad  
 5817 Dryden Place, Suite 101  
 Carlsbad, CA 92008

Project Number: CoSD Carlsbad SMC 2023

Reported:

08/04/2023 21:58

Project Manager: Michelle Mattson

(Continued)

## Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3F2501 - EPA 353.2</b>											
<b>Blank (W3F2501-BLK1)</b>											
Nitrate as N	ND	0.040	0.20	mg/l		<b>Prepared &amp; Analyzed: 06/29/23</b>					
Nitrite as N	ND	0.042	0.10	mg/l							
<b>LCS (W3F2501-BS1)</b>											
Nitrate as N	1.03	0.040	0.20	mg/l	1.00		103	90-110			
Nitrite as N	0.993	0.042	0.10	mg/l	1.00		99	90-110			
<b>Duplicate (W3F2501-DUP1)</b>											
Nitrate as N	4.92	0.040	0.20	mg/l		4.92			0.04	20	
Nitrite as N	0.301	0.042	0.10	mg/l		0.299			0.7	20	
<b>Matrix Spike (W3F2501-MS1)</b>											
Nitrate as N	3.20	0.040	0.20	mg/l	2.00	1.14	103	90-110			
Nitrite as N	1.01	0.042	0.10	mg/l	1.00	ND	101	90-110			
<b>Matrix Spike (W3F2501-MS2)</b>											
Nitrate as N	3.79	0.040	0.20	mg/l	2.00	1.70	104	90-110			
Nitrite as N	0.993	0.042	0.10	mg/l	1.00	ND	99	90-110			
<b>Matrix Spike Dup (W3F2501-MSD1)</b>											
Nitrate as N	3.20	0.040	0.20	mg/l	2.00	1.14	103	90-110	0	20	
Nitrite as N	1.01	0.042	0.10	mg/l	1.00	ND	101	90-110	0	20	
<b>Matrix Spike Dup (W3F2501-MSD2)</b>											
Nitrate as N	3.79	0.040	0.20	mg/l	2.00	1.70	104	90-110	0	20	
Nitrite as N	0.990	0.042	0.10	mg/l	1.00	ND	99	90-110	0.3	20	
<b>Batch: W3F2542 - EPA 365.3</b>											
<b>Blank (W3F2542-BLK1)</b>											
o-Phosphate as P	ND	0.0071	0.010	mg/l		<b>Prepared &amp; Analyzed: 06/29/23</b>					
<b>LCS (W3F2542-BS1)</b>											
o-Phosphate as P	0.208	0.0071	0.010	mg/l	0.200		104	90-110		20	
<b>Matrix Spike (W3F2542-MS1)</b>											
o-Phosphate as P	0.279	0.0071	0.010	mg/l	0.200	0.0760	102	90-110		20	
<b>Matrix Spike Dup (W3F2542-MSD1)</b>											
o-Phosphate as P	0.277	0.0071	0.010	mg/l	0.200	0.0760	100	90-110	0.7	20	
<b>Batch: W3F2594 - SM 2540D</b>											
<b>Blank (W3F2594-BLK1)</b>											
Total Suspended Solids	ND	1	1	mg/l		<b>Prepared &amp; Analyzed: 06/30/23</b>					
<b>LCS (W3F2594-BS1)</b>											
Total Suspended Solids	51.6	1	1	mg/l	50.2		103	90-110			
<b>Duplicate (W3F2594-DUP1)</b>											
Total Suspended Solids	40.0	1	1	mg/l	38.8				3	10	
<b>Duplicate (W3F2594-DUP2)</b>											
Total Suspended Solids	14.9	1	1	mg/l	15.6				5	10	



# Certificate of Analysis

FINAL REPORT

Weston Solutions, Inc. - Carlsbad  
5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

Project Number: CoSD Carlsbad SMC 2023

Reported:

08/04/2023 21:58

Project Manager: Michelle Mattson

(Continued)

## Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3F2594 - SM 2540D (Continued)</b>											
Duplicate (W3F2594-DUP2)      Source: 3F29004-03      Prepared & Analyzed: 06/30/23											
<b>Batch: W3G0745 - SM 2320B</b>											
Blank (W3G0745-BLK1) Alkalinity as CaCO <sub>3</sub> 2.74      1.9      5.0      mg/l      Prepared & Analyzed: 07/11/23											
LCS (W3G0745-BS1) Alkalinity as CaCO <sub>3</sub> 260      1.9      5.0      mg/l      250      104      94-108      Prepared & Analyzed: 07/11/23											
Duplicate (W3G0745-DUP1)      Source: 3E09010-03      Prepared & Analyzed: 07/11/23 Alkalinity as CaCO <sub>3</sub> 241      1.9      5.0      mg/l      221      8      15											
<b>Batch: W3G1007 - EPA 410.4</b>											
Blank (W3G1007-BLK1) Chemical Oxygen Demand      ND      2.9      5.0      mg/l      Prepared: 07/13/23 Analyzed: 07/14/23											
LCS (W3G1007-BS1) Chemical Oxygen Demand      103      2.9      5.0      mg/l      100      103      90-110      Prepared: 07/13/23 Analyzed: 07/14/23											
Duplicate (W3G1007-DUP1)      Source: 3F29020-01      Prepared: 07/13/23 Analyzed: 07/14/23 Chemical Oxygen Demand      34.3      2.9      5.0      mg/l      31.7      8      15											
Matrix Spike (W3G1007-MS1)      Source: 3G05124-01      Prepared: 07/13/23 Analyzed: 07/14/23 Chemical Oxygen Demand      214      12      20      mg/l      200      22.7      96      90-110											
Matrix Spike Dup (W3G1007-MSD1)      Source: 3G05124-01      Prepared: 07/13/23 Analyzed: 07/14/23 Chemical Oxygen Demand      219      12      20      mg/l      200      22.7      98      90-110      2      15											
<b>Batch: W3G1151 - EPA 350.1</b>											
Blank (W3G1151-BLK1) Ammonia as N      ND      0.017      0.10      mg/l      Prepared: 07/17/23 Analyzed: 07/26/23											
Blank (W3G1151-BLK2) Ammonia as N      ND      0.017      0.10      mg/l      Prepared: 07/17/23 Analyzed: 07/26/23											
LCS (W3G1151-BS1) Ammonia as N      0.253      0.017      0.10      mg/l      0.250      101      90-110      Prepared: 07/17/23 Analyzed: 07/26/23											
LCS (W3G1151-BS2) Ammonia as N      0.248      0.017      0.10      mg/l      0.250      99      90-110      Prepared: 07/17/23 Analyzed: 07/26/23											
Duplicate (W3G1151-DUP1)      Source: 3F29020-01      Prepared: 07/17/23 Analyzed: 07/26/23 Ammonia as N      0.0255      0.017      0.10      mg/l      0.0259      1      15      J											
Matrix Spike (W3G1151-MS1)      Source: 3F29117-04      Prepared: 07/17/23 Analyzed: 07/26/23 Ammonia as N      0.263      0.017      0.10      mg/l      0.250      ND      105      90-110											
Matrix Spike (W3G1151-MS2)      Source: 3F30017-04      Prepared: 07/17/23 Analyzed: 07/26/23 Ammonia as N      1.22      0.017      0.10      mg/l      0.250      0.982      95      90-110											
Matrix Spike Dup (W3G1151-MSD1)      Source: 3F29117-04      Prepared: 07/17/23 Analyzed: 07/26/23 Ammonia as N      0.263      0.017      0.10      mg/l      0.250      ND      105      90-110      0.2      15											
Matrix Spike Dup (W3G1151-MSD2)      Source: 3F30017-04      Prepared: 07/17/23 Analyzed: 07/26/23 Ammonia as N      1.23      0.017      0.10      mg/l      0.250      0.982      99      90-110      0.9      15											

Weston Solutions, Inc. - Carlsbad  
 5817 Dryden Place, Suite 101  
 Carlsbad, CA 92008

**Project Number:** CoSD Carlsbad SMC 2023

**Reported:**

08/04/2023 21:58

**Project Manager:** Michelle Mattson



## Quality Control Results

(Continued)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3G1531 - EPA 351.2</b>											
<b>Blank (W3G1531-BLK1)</b>						<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	ND	0.065	0.10	mg/l							
<b>Blank (W3G1531-BLK2)</b>						<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	ND	0.065	0.10	mg/l							
<b>LCS (W3G1531-BS1)</b>						<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	0.960	0.065	0.10	mg/l	1.00		96	90-110			
<b>LCS (W3G1531-BS2)</b>						<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	0.960	0.065	0.10	mg/l	1.00		96	90-110			
<b>Duplicate (W3G1531-DUP1)</b>		<b>Source: 3F29020-01</b>				<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	0.448	0.065	0.10	mg/l		0.441			2	10	
<b>Matrix Spike (W3G1531-MS1)</b>		<b>Source: 3F29004-05</b>				<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	4.47	0.065	0.10	mg/l	1.00	3.31	116	90-110			<b>MS-02</b>
<b>Matrix Spike (W3G1531-MS2)</b>		<b>Source: 3F29118-03</b>				<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	0.959	0.065	0.10	mg/l	1.00	ND	96	90-110			
<b>Matrix Spike Dup (W3G1531-MSD1)</b>		<b>Source: 3F29004-05</b>				<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	4.67	0.065	0.10	mg/l	1.00	3.31	137	90-110	4	10	<b>MS-02</b>
<b>Matrix Spike Dup (W3G1531-MSD2)</b>		<b>Source: 3F29118-03</b>				<b>Prepared: 07/20/23 Analyzed: 07/26/23</b>					
TKN	0.921	0.065	0.10	mg/l	1.00	ND	92	90-110	4	10	



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# Certificate of Analysis

FINAL REPORT

Project Number: CoSD Carlsbad SMC 2023

Reported:

08/04/2023 21:58

Project Manager: Michelle Mattson

(Continued)

## Quality Control Results

Metals by EPA 200 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
<b>Batch: W3G0759 - EPA 200.7</b>											
<b>Blank (W3G0759-BLK1)</b>											
Calcium, Total	ND	0.0736	0.500	mg/l							
Magnesium, Total	ND	0.0390	0.500	mg/l							
Phosphorus, Total	ND	0.018	0.050	mg/l							
Sodium, Total	ND	0.52	1.0	mg/l							
<b>LCS (W3G0759-BS1)</b>											
Calcium, Total	46.8	0.0736	0.500	mg/l	50.2	93	75-125			25	
Magnesium, Total	45.9	0.0390	0.500	mg/l	50.2	91	75-125			25	
Phosphorus, Total	2.03	0.018	0.050	mg/l	2.00	102	90-110			25	
Sodium, Total	47.4	0.52	1.0	mg/l	50.2	94	75-125			25	
<b>Duplicate (W3G0759-DUP1)</b>											
Calcium, Total	ND	0.0736	0.500	mg/l		ND				25	
Magnesium, Total	ND	0.0390	0.500	mg/l		ND				25	
Phosphorus, Total	ND	0.018	0.050	mg/l		ND				25	
Sodium, Total	ND	0.52	1.0	mg/l		ND				25	
<b>Matrix Spike (W3G0759-MS1)</b>											
Calcium, Total	300	0.0736	0.500	mg/l	50.2	262	77	75-125		25	
Magnesium, Total	125	0.0390	0.500	mg/l	50.2	81.6	87	75-125		25	
Phosphorus, Total	2.15	0.018	0.050	mg/l	2.00	0.0962	103	90-110		25	
Sodium, Total	443	0.52	1.0	mg/l	50.2	425	36	75-125		25	MS-02
<b>Matrix Spike (W3G0759-MS2)</b>											
Calcium, Total	161	0.0736	0.500	mg/l	50.2	117	88	75-125		25	
Magnesium, Total	128	0.0390	0.500	mg/l	50.2	83.8	88	75-125		25	
Phosphorus, Total	2.12	0.018	0.050	mg/l	2.00	0.0778	102	90-110		25	
Sodium, Total	278	0.52	1.0	mg/l	50.2	233	91	75-125		25	
<b>Matrix Spike Dup (W3G0759-MSD1)</b>											
Calcium, Total	297	0.0736	0.500	mg/l	50.2	262	70	75-125	1	25	MS-02
Magnesium, Total	124	0.0390	0.500	mg/l	50.2	81.6	84	75-125	0.9	25	
Phosphorus, Total	2.13	0.018	0.050	mg/l	2.00	0.0962	102	90-110	0.7	25	
Sodium, Total	437	0.52	1.0	mg/l	50.2	425	24	75-125	1	25	MS-02
<b>Matrix Spike Dup (W3G0759-MSD2)</b>											
Calcium, Total	161	0.0736	0.500	mg/l	50.2	117	87	75-125	0.3	25	
Magnesium, Total	128	0.0390	0.500	mg/l	50.2	83.8	88	75-125	0.1	25	
Phosphorus, Total	2.12	0.018	0.050	mg/l	2.00	0.0778	102	90-110	0.3	25	
Sodium, Total	277	0.52	1.0	mg/l	50.2	233	88	75-125	0.5	25	



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5817 Dryden Place, Suite 101  
Carlsbad, CA 92008

# Certificate of Analysis

FINAL REPORT

**Project Number:** CoSD Carlsbad SMC 2023

**Reported:**

08/04/2023 21:58

**Project Manager:** Michelle Mattson

## Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
M-05	Due to the nature of matrix interferences, sample was diluted prior to analysis. The MDL and MRL were raised due to the dilution.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
%REC	Percent Recovery
Dil	Dilution
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.



August 09, 2023

Michelle Mattson  
Weston Solutions, Inc.  
5817 Dryden Place  
Carlsbad, CA 92008-

Project Name: Carlsbad WMA SMC - 2023  
Physis Project ID: 2206003-007

Dear Michelle,

Enclosed are the analytical results for samples submitted to PHYSIS Environmental Laboratories, Inc. (PHYSIS) on 7/7/2023. A total of 3 samples were received for analysis in accordance with the attached chain of custody (COC). Per the COC, the samples were analyzed for:

Conventional
Chlorophyll-a (mg/m <sup>2</sup> ) by SM 10300 C
Algal Biomass Determination by Ash-free Dry Weight by SM 10300 C

Analytical results in this report apply only to samples submitted to PHYSIS in accordance with the COC and are intended to be considered in their entirety.

Please feel free to contact me at any time with any questions. PHYSIS appreciates the opportunity to provide you with our analytical and support services.

Regards,

  
Misty Mercier  
714 602-5320  
Extension 202  
[mistymercier@physislabs.com](mailto:mistymercier@physislabs.com)



## PROJECT SAMPLE LIST

Weston Solutions, Inc.

PHYSIS Project ID: 2206003-007

Carlsbad WMA SMC - 2023

Total Samples: 3

PHYSIS ID	Sample ID	Description	Date	Time	Matrix	Sample Type
108027	SMC00537		6/27/2023	8:20	Biologic	Not Specified
108028	904M21800		6/28/2023	8:15	Biologic	Not Specified
108029	904M21800-DUP		6/28/2023	8:15	Biologic	Not Specified



## ABBREVIATIONS and ACRONYMS

Abbreviation	Description
QM	Quality Manual
QA	Quality Assurance
QC	Quality Control
MDL	method detection limit
RL	reporting limit
R1	project sample
R2	project sample replicate
MS1	matrix spike
MS2	matrix spike replicate
B1	procedural blank
B2	procedural blank replicate
BS1	blank spike
BS2	blank spike replicate
LCS1	laboratory control spike
LCS2	laboratory control spike replicate
LCM1	laboratory control material
LCM2	laboratory control material replicate
CRM1	certified reference material
CRM2	certified reference material replicate
RPD	relative percent difference
LMW	low molecular weight
HMW	high molecular weight

## QUALITY ASSURANCE SUMMARY

**LABORATORY BATCH:** Physis' QM defines a laboratory batch as a group of 20 or fewer project samples of similar matrix, processed together under the same conditions and with the same reagents. QC samples are associated with each batch and were used to assess the validity of the sample analyses.

**PROCEDURAL BLANK:** Laboratory contamination introduced during method use is assessed through the preparation and analysis of procedural blanks is provided at a minimum frequency of one per batch.

**ACCURACY:** Accuracy of analytical measurements is the degree of closeness based on percent recovery calculations between measured values and the actual or true value and includes a combination of reproducibility error and systematic bias due to sampling and analytical operations. Accuracy of the project data was indicated by analysis of MS, BS, LCS, LCM, CRM, and/or surrogate spikes on a minimum frequency of one per batch. Physis' QM requires that 95% of the target compounds greater than 10 times the MDL be within the specified acceptance limits.

**PRECISION:** Precision is the agreement among a set of replicate measurements without assumption of knowledge of the true value and is based on RPD calculations between repeated values. Precision of the project data was determined by analysis of replicate MS<sub>1</sub>/MS<sub>2</sub>, BS<sub>1</sub>/BS<sub>2</sub>, LCS<sub>1</sub>/LCS<sub>2</sub>, LCM<sub>1</sub>/LCM<sub>2</sub>, CRM<sub>1</sub>/CRM<sub>2</sub>, surrogate spikes and/or replicate project sample analysis (R<sub>1</sub>/R<sub>2</sub>) on a minimum frequency of one per batch. Physis' QM requires that for 95% of the compounds greater than 10 times the MDL, the percent RPD should be within the specified acceptance range.

**BLANK SPIKES:** BS is the introduction of a known concentration of analyte into the procedural blank. BS demonstrates performance of the preparation and analytical methods on a clean matrix void of potential matrix related interferences. The BS is performed in laboratory deionized water, making these recoveries a better indicator of the efficiency of the laboratory method per se.

**MATRIX SPIKES:** MS is the introduction of a known concentration of analyte into a sample. MS samples demonstrate the effect a particular project sample matrix has on the accuracy of a measurement. Individually, MS samples also indicate the bias of analytical measurements due to chemical interferences inherent in the specific project sample spiked. Intrinsic target analyte concentration in the specific project sample can also significantly impact MS recovery.

**CERTIFIED REFERENCE MATERIALS:** CRMs are materials of various matrices for which analytical information has been determined and certified by a recognized authority. These are used to provide a quantitative assessment of the accuracy of an analytical method. CRMs provide evidence that the laboratory preparation and analysis produces results that are comparable to those obtained by an independent organization.

**LABORATORY CONTROL MATERIAL:** LCM is provided because a suitable natural seawater CRM is not available and can be used to indicate accuracy of the method. Physis' internal LCM is seawater collected at ~800 meters in the Southern California San Pedro Basin and can be used as a reference for background concentrations in clean, natural seawater for comparison to project samples.

**LABORATORY CONTROL SPIKES:** LCS is the introduction of a known concentration of analyte into Physis' LCM. LCS samples were employed to assess the effect the seawater matrix has on the accuracy of a measurement. LCS also indicate the bias of this method due to chemical interferences inherent in the seawater matrix. Intrinsic LCM concentration can also significantly impact LCS recovery.

**SURROGATES:** A surrogate is a pure analyte unlikely to be found in any project sample, behaves similarly to



the target analyte and most often used with organic analytical procedures. Surrogates are added in known concentration to all samples and are measured to indicate overall efficiency of the method including processing and analyses.

**HOLDING TIME:** Method recommended holding times are the length of time a project sample can be stored under specific conditions after collection and prior to analysis without significantly affecting the analyte's concentration. Holding times can be extended if preservation techniques are employed to reduce biodegradation, volatilization, oxidation, sorption, precipitation, and other physical and chemical processes.

**SAMPLE STORAGE/RETENTION:** In order to maintain chemical integrity prior to analysis, all samples submitted to Physis are refrigerated (liquids) or frozen (solids) upon receipt unless otherwise recommended by applicable methods. Solid samples are retained for 1 year from collection while liquid samples are retained until method recommended holding times elapse.

**TOTAL/DISSOLVED FRACTION:** In some instances, the results for the dissolved fraction may be higher than the total fraction for a particular analyte (e.g. trace metals). This is typically caused by the analytical variation for each result and indicates that the target analyte is primarily in the dissolved phase, within the sample.

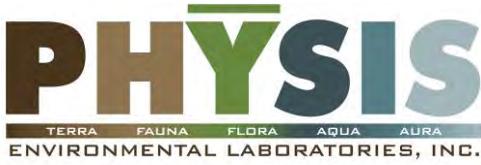


## PHYSIS QUALIFIER CODES

CODE	DEFINITION
#	see Case Narrative
ND	analyte not detected at or above the MDL
B	analyte was detected in the procedural blank greater than 10 times the MDL
E	analyte concentration exceeds the upper limit of the linear calibration range, reported value is estimated
H	sample received and/or analyzed past the recommended holding time
J	analyte was detected at a concentration below the RL and above the MDL, reported value is estimated
N	insufficient sample, analysis could not be performed
M	analyte was outside the specified accuracy and/or precision acceptance limits due to matrix interference. The associated B/BS were within limits, therefore the sample data was reported without further clarification
SH	analyte concentration in the project sample exceeded the spike concentration, therefore accuracy and/or precision acceptance limits do not apply
SL	analyte results were lower than 10 times the MDL, therefore accuracy and/or precision acceptance limits do not apply
NH	project sample was heterogeneous and sample homogeneity could not be readily achieved using routine laboratory practices, therefore accuracy and/or precision acceptance limits do not apply
Q	analyte was outside the specified QAPP acceptance limits for precision and/or accuracy but within Physis derived acceptance limits, therefore the sample data was reported without further clarification
R	Physis' QM allows for 5% of the target compounds greater than 10 times the MDL to be outside the specified acceptance limits for precision and/or accuracy. This is often due to random error and does not indicate any significant problems with the analysis of these project samples

# PANALYTICALS REPORT

# Innovative Solutions for Nature



Innovative Solutions for Nature

PHYSIS Project ID: 2206003-007

Client: Weston Solutions, Inc.

Project: Carlsbad WMA SMC - 2023

## Conventionals

ANALYTE	Method	Units	RESULT	DF	MDL	RL	Fraction	QA CODE	Batch ID	Date Processed	Date Analyzed
Sample ID: 108027-R1	SMC00537		Matrix: Biologic				Sampled:	27-Jun-23	8:20	Received:	07-Jul-23
Ash-Free Dry Weight	SM 10300 C	mg/m2	164000	1	10	50	NA	C-71082		10-Jul-23	10-Jul-23
Chlorophyll-a	SM 10300 C	mg/m2	18.2	1	1	2	NA	C-72109		23-Jul-23	23-Jul-23
Sample ID: 108028-R1	904M21800		Matrix: Biologic				Sampled:	28-Jun-23	8:15	Received:	07-Jul-23
Ash-Free Dry Weight	SM 10300 C	mg/m2	66000	1	10	50	NA	C-71082		10-Jul-23	10-Jul-23
Chlorophyll-a	SM 10300 C	mg/m2	12.1	1	1	2	NA	C-72109		23-Jul-23	23-Jul-23
Sample ID: 108029-R1	904M21800-DUP		Matrix: Biologic				Sampled:	28-Jun-23	8:15	Received:	07-Jul-23
Ash-Free Dry Weight	SM 10300 C	mg/m2	79000	1	10	50	NA	C-71082		10-Jul-23	10-Jul-23
Chlorophyll-a	SM 10300 C	mg/m2	15.7	1	1	2	NA	C-72109		23-Jul-23	23-Jul-23

# QUALITY CONTROL REPORT

TERRA      F      AQUA      AURA  
ENVIRONMENTAL LABORATORIES, INC.

*Innovative Solutions for Nature*



PHYSIS Project ID: 2206003-007

Client: Weston Solutions, Inc.

Project: Carlsbad WMA SMC - 2023

## Conventionals

## QUALITY CONTROL REPORT

SAMPLE ID	BATCH ID	RESULT	DF	MDL	RL	UNITS	SPIKE LEVEL	SOURCE RESULT	ACCURACY %	PRECISION %	QA CODE
<b>Ash-Free Dry Weight</b>		<b>Method: SM 10300 C</b>			<b>Fraction: NA</b>			<b>Prepared: 10-Jul-23</b>		<b>Analyzed: 10-Jul-23</b>	
108026-B1	QAQC Procedural Blank	C-71082	ND	1	10	50	mg/m <sup>2</sup>				
<b>Chlorophyll-a</b>		<b>Method: SM 10300 C</b>			<b>Fraction: NA</b>			<b>Prepared: 23-Jul-23</b>		<b>Analyzed: 23-Jul-23</b>	
108026-B1	QAQC Procedural Blank	C-72109	ND	1	1	2	mg/m <sup>2</sup>				
108026-BS1	QAQC Procedural Blank	C-72109	33.1	1	1	2	mg/m <sup>2</sup>	44.3	0	75	70 - 130% PASS
108026-BS2	QAQC Procedural Blank	C-72109	34.2	1	1	2	mg/m <sup>2</sup>	44.3	0	77	70 - 130% PASS
									3	30	PASS

# P CHAIN OF S

## CUSTODY

TERRA      ECOLOGICAL      AURA  
ENVIRONMENTAL LABORATORIES, INC.

Innovative Solutions for Nature





Project Iteration ID: 2206003-007  
Client Name: Weston Solutions, Inc.  
Project Name: Carlsbad WMA SMC - 2023  
COC Page Number: 2 of 2  
Bottle Label Color: NA

## Sample Receipt Summary

### Receiving Info

1. Initials Received By: yc
2. Date Received: 7/7/23
3. Time Received: 1440
4. Client Name: Weston

5. Courier Information: (Please circle)

- Client       UPS       Area Fast       DRS
- FedEx       GSO/GLS       Ontrac       PAMS
- PHYSIS Driver:

i. Start Time: \_\_\_\_\_

iii. Total Mileage: \_\_\_\_\_

ii. End Time: \_\_\_\_\_

iv. Number of Pickups: \_\_\_\_\_

6. Container Information: (Please put the # of containers or circle none)

- Cooler       Styrofoam Cooler       Boxes       None
- Carboy(s)       Carboy Trash Can(s)       Carboy Cap(s)       Other \_\_\_\_\_

7. What type of ice was used: (Please circle any that apply)

- Wet Ice       Blue Ice       Dry Ice       Water       None

8. Randomly Selected Samples Temperature (°C): -5.4

Used I/R Thermometer # 1-2

### Inspection Info

1. Initials Inspected By: ej

Sample Integrity Upon Receipt:

1. COC(s) included and completely filled out.....  Yes /  No
2. All sample containers arrived intact.....  Yes /  No
3. All samples listed on COC(s) are present.....  Yes /  No
4. Information on containers consistent with information on COC(s).....  Yes /  No
5. Correct containers and volume for all analyses indicated.....  Yes /  No
6. All samples received within method holding time.....  Yes /  No
7. Correct preservation used for all analyses indicated.....  Yes /  No
8. Name of sampler included on COC(s).....  Yes /  No

Notes: