# Appendix C.1 - Stormwater Monitoring Plan for the Pocatello Urbanized Area NPDES Phase II Stormwater Permit Version 1.0, dated June 2020

This Appendix added 12/15/2020.

# Stormwater Monitoring Plan
# for the Pocatello Urbanized Area
# NPDES Phase II Stormwater Permit

**Prepared by:**
City of Pocatello
Science & Environment Division

**In cooperation with:**
City of Chubbuck
Bannock County
Idaho Transportation Department
Idaho State University

Version 1.0
June 2020

# NPDES MS4 Monitoring Plan Approvals

Prepared by Jenna Dohman, Environmental Technician, City of Pocatello
and
Rebecca Hale, Director of the Socio-Eco-Hydrology Lab, ISU

Hannah Sanger, Stormwater Permit Manager
City of Pocatello

________________________________________ Date July 1, 2020

# Table of Contents



## List of Tables



## List of Figures

# Acronyms

| | |
|---|---|
| BMP | Best Management Practice |
| CFR | Code of Federal Regulations |
| EPA | Environmental Protection Agency |
| IDEQ | Idaho Department of Environmental Quality |
| ISU | Idaho State University |
| ITD | Idaho Transportation Department, District 5 |
| MS4 | Municipal Separate Storm Sewer System |
| NPDES | National Pollutant Discharge Elimination System |
| PUA | Pocatello Urbanized Area |
| QA | Quality Assurance |
| QAPP | Quality Assurance Project Plan |
| QC | Quality Control |
| SSC | Suspended Sediment Concentration |

## Section 1

# Introduction

As part of its National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit (Permit) requirements, the Pocatello Urbanized Area (PUA) is required to develop and implement a stormwater monitoring program. The PUA, under the provisions of the federal stormwater permit, consists of portions of the City of Pocatello, City of Chubbuck, Bannock County, District 5 of the Idaho Transportation Department (ITD), and Idaho State University (ISU). These entities are collectively called the Permittees. Specific stormwater monitoring requirements and objectives are defined in Part 4.2 and Part 6.2 of the NPDES MS4 Permit (Permit Number IDS-028053).

The City of Pocatello will develop and oversee the stormwater monitoring program on behalf of the Permittees. A monitoring agreement between the City of Pocatello and the Socio-Eco-Hydrology Research lab at ISU outlines the implementation of the monitoring and assessment activities that will be conducted by ISU to satisfy the Permit requirements. The City will also implement additional monitoring activities itself as questions and needs arise.

The purpose of this monitoring plan is to address the monitoring component of the NPDES MS4s Permit requirements. The City has developed the monitoring plan and overall monitoring strategy based on the stormwater monitoring objectives defined in the Permit. Conducting monitoring activities as described in this plan will allow the City to evaluate pollutant sources, characterize stormwater discharges, evaluate receiving water trends (when sufficient data have been collected over many years), and identify effects of MS4 discharges on receiving waters. Additionally, the monitoring activities will provide the Permittees with information to support incremental and overall stormwater program modifications and adjustments.

## Section 2

# Stormwater Monitoring Objectives

The Permit defines the minimum monitoring expectations for the PUA's MS4 program. The Permit states that the Permittees must quantify pollutant loadings from the MS4 and, no later than two years from the effective date of this Permit, develop a monitoring plan that includes the quality assurance requirements defined in Part 6.2.6.

The City must develop and implement a monitoring program to:

- Evaluate the effectiveness of identified BMPs
- Estimate the pollutant loading currently discharged from the MS4s
- Assess the effectiveness and adequacy of control measures implemented through this Permit

This monitoring plan is focused on meeting these stormwater monitoring objectives.

## Section 3

# Stormwater Monitoring

According to the Permit, the field monitoring program must include the following:

- **Representative Sampling** – Samples, measurements, and/or assessments conducted in compliance with this Permit must be representative of the nature of the monitored discharge or activity. Sampling will be focused on representing MS4 discharges to the waters of the U.S. (WOTUS) as well as characterizing the effectiveness of BMPs in reducing targeted pollutants of concern.
- **Monitoring procedures** – Sample collection, preservation, and analysis must be conducted according to sufficiently sensitive methods/test procedures approved under 40 CFR Part 136. Where an approved 40 CFR Part 136 method doesn't exist, and other test procedures have not been specified, any available method may be used after approval from EPA and IDEQ.
- **Quantify Pollutant Loadings** – For monitoring activities associated with this monitoring plan, the Permittees must identify the location, sample type, parameters, and frequency of samples, as well as develop a Quality Assurance Project Plan (Permit Part 6.2.6), and submit all data collected in the annual report submitted to EPA.

## 3.1 Monitoring Parameters

The Permittees must meet the monitoring requirements listed in Parts 4.2 and 6.2 of the Permit, which at a minimum includes monitoring sediment loadings from the MS4 to the Portneuf River. Additionally, the Permittees must meet the monitoring requirements listed within DEQ's 401 certification, which includes assessing the pollutants removed by two stormwater wetlands.

To accomplish this, flow/stage will be monitored simultaneously with turbidity and sediment concentrations to better understand dynamics in two stormwater wetlands as well as one major drainage in the PUA (see Table 3-1 for monitoring frequency). Additionally, the Permittees intend to conduct investigative studies to monitor other stormwater parameters, per Table 3-1. Monitoring activities are further described in Section 3.3.2.

**Table 3-1**. Monitoring parameters, frequency, and type.

| Parameter | Monitoring Frequency | Sample Type |
|---|---|---|
| Suspended Sediment | Intermittent[1] | Grab |
| Turbidity | 5-10 minutes | Continuous |
| Stage (to estimate flow) | 5-10 minutes | Continuous |
| Flow Presence | 5-15 minutes | Continuous |
| *E. coli* | Intermittent[2] | Grab |
| Conductivity | 5-10 minutes | Continuous |
| Total Phosphorus | Intermittent[1] | Grab |
| Chloride | Intermittent[1] | Grab |

[1]Samples will be collected during regular site visits as well as during storm and snowmelt events. Frequency of sampling will depend on variability in flow, but the goal is to collect ~50 samples at each monitoring site.
[2]*E. coli (Escherichia coli)* sources will be tracked on an investigative basis as needed.

**Suspended Sediment Concentration** – Excess sediment in rivers and streams causes many ecological issues, which include destroying habitat and disrupting the food chain. High sediment levels are observed in the Portneuf River between Marsh Creek and Batiste Road. Springs that flow into the river between Batiste Road and Siphon Road help to dilute the sediment concentration in the river. Sources of sediment in the river include soil erosion from agriculture and construction, streambank erosion due to channel straightening and incision, and stormwater runoff.

**Turbidity** – This is the measure of relative clarity of a liquid. More turbid water is less clear due to particles such as sand, clay, silt, organic matter, algae, and other microscopic organisms. Turbidity is correlated with suspended sediment concentration (SSC), and thus large sediment loads in the Portneuf River lead to high turbidity levels. The sources and related issues are similar to suspended sediment.

**Flow** – Flows have a large impact on the type and magnitude of water quality issues in rivers. Runoff from large storms can carry a significant amount of sediment into storm drains and river systems, which increases measures of suspended sediment and turbidity. To aid in the quantification of pollutant load estimates, flow will be measured simultaneously with turbidity. During the summer, low water levels in the Portneuf River cause low levels of dissolved oxygen, high temperatures, and high bacteria levels.

**Flow Presence** – In locations where flow measurement is not feasible and flow is not continuous throughout the year, flow presence sensors will be installed to provide information on when locations have flowing water (and can transport pollutants) and when they are dry. This will help describe the functions of some stormwater wetlands, as well as describe when upland gullies have surface flow and connect to Pocatello Creek and the Portneuf River.

***E. coli*** - *E. coli* are a type of bacteria that are found in the environment, foods, and intestines of people and animals. Although most strains of *E. coli* are harmless, some can make people sick.

Monitoring efforts in the Portneuf River have found levels of *E. coli* which exceed the Water Quality Standard in the reaches in and below the concrete channel in Pocatello (IDAPA 58.01.02). Pigeons roosting in the outfalls of the concrete channel are one identified source of *E. coli*, and other potential sources include failing septic tanks, livestock and dog waste in stormwater runoff, and irrigation return flows.

**Conductivity** – Conductivity measures the ability of water to pass electrical flow, which is positively related to the concentration of ions in the water. These ions include inorganic dissolved solids such as chloride, nitrate, sulfate, phosphate, and sodium. Natural sources include local rocks and soils. Water temperature also influences conductivity. In the PUA, man-made sources include agricultural & residential runoff, as well as runoff from roads which contain road salts and metals.

**Total Phosphorus** – High phosphorus levels can cause excessive growth of algae and other aquatic plants. This decreases the amount of dissolved oxygen and negatively impacts the survival of aquatic life. Phosphorus levels are high in the Portneuf River. Sources include discharges from wastewater treatment facilities and fertilizer plants, contaminated groundwater, agricultural runoff, and stormwater runoff. Overapplication of fertilizer and natural decay of vegetation are the primary sources within agricultural and stormwater runoff.

**Chloride** – Road salts are used in the PUA to deice roads in the winter. This salt can runoff during storm events or infiltrate into groundwater and flow to surface waters as stormwater. No biological processes remove chloride, and high chloride levels are harmful to aquatic life.

Many of these constituents of concerns are connected. For example, suspended sediment, turbidity, and phosphorus are positively correlated. Also, the amount of flow itself also acts as a key control on sediment, nutrients, and bacteria.

## 3.2 Site Locations and Monitoring Descriptions

Sites for this monitoring plan were chosen that enable 1) monitoring of sediment loads from major drainages in the PUA MS4; and 2) quantitative monitoring of sediment retention by the two major stormwater wetlands (Sacajawea Park and First Avenue wetlands). Additionally, investigative monitoring (without specific sites) will be used to improve understanding of 3) intermittent flows in upland drainages within the PUA; 4) *E. coli* sources in the PUA that are not an illicit discharge (e.g. pigeon waste or irrigation return flows); and 5) nutrient and salt inputs from stormwater.

### 3.2.1 Permit Required Monitoring

The following studies will be conducted to satisfy Permit requirements to quantify sediment loadings from the MS4 into the Portneuf River, and to assess the pollutants removed by two constructed wetlands.

<u>The Sacajawea and Rainey Park Drainages and Wetlands (Sacajawea and 1st Ave Wetlands, respectively)</u>

*Goal:*

1. *To create accurate sediment budgets for each stormwater wetland to better understand their effectiveness and inform maintenance practices.*
2. *To quantify sediment loads within the Sacajawea drainage (which is entirely captured by the Sacajawea Park wetland) and the Rainey Park drainage (which the City hopes to divert to a stormwater retention facility in the future).*

Creating accurate sediment budgets for the two stormwater wetlands is challenging for reasons unique to each wetland. At Sacajawea Park, the outlet that discharges runoff to the Portneuf River has an upward slope. The First Avenue wetland is also designed so that discharge from the wetland is rare. Both wetlands also have multiple inlets, with one inlet from the major contributing area and one to two smaller inlets that drain adjacent streets.

The Sacajawea wetland will be monitored in three locations. Inputs to the wetland will be measured upstream of the outfall to the wetland, (Site 1). Turbidity and water-level loggers will be installed at the outlet of the Sacajawea Park wetland (Site 2). Manning's equation will be used to estimate flow from stage (water level) to allow for continuous flow monitoring. Flow from this site may be discharged to the river or stored in a remnant oxbow. While this location will not enable the quantification of loads to the Portneuf River, it will enable an estimation of sediment retention in the wetland itself. A flow presence/absence sensor (Site A) will be installed where the wetland discharges to the Portneuf River.

The First Ave wetland will be monitored for turbidity and flow at Rainey Park (Site 6, downstream of the wetland), and presence/absence sensors will be placed at the wetland inlet and outlet (Sites B and C).

Grab samples of suspended sediment will be collected during site visits to establish relationships between turbidity and suspended sediment concentrations at each site. The monitoring data collected at Sites 1, 2, and 6 will also provide information on sediment and flow carried in the Sacajawea Drainage and the Rainey Park drainage.

<u>Land Use on Pocatello Creek</u>

*Goal: To quantify sediment loads to the Portneuf from Pocatello Creek, and partition loads between background, urban and agricultural sources.*

Pocatello Creek is the major urban tributary to the Portneuf River. Three sets of sensors (turbidity and stage) will be installed along Pocatello Creek (Sites 3-5) to partition loads between urban stormwater sources, agricultural return flow (Hiline Canal, Sites 7-9), and sources from upstream of the urban area (Pocatello Creek, Site 5). Grab samples of suspended sediment and manual discharge measurements will also be conducted to develop a robust relationship with the continuous sensor data.

### 3.2.2 Investigative Studies

The following studies will be conducted in addition to the Permit-required monitoring. These studies are more exploratory in nature, and may not have a set location or frequency of sampling.

Salts and Nutrients

*Goal: To quantify salt and nutrient inputs from stormwater to WOTUS.*

This study will be conducted to track seasonal inputs of salts and nutrients to WOTUS from three drainages in the PUA – Sacajawea, Rainey Park, and Pocatello Creek. At each of the nine monitoring stations (Figure 3-1), a continuous conductivity logger will be installed. Grab samples for total phosphorus and chloride will be collected during regular site visits as well as during storm and snowmelt events.

Drainage Impact Study

*Goal: To monitor when different drainages contribute flow to WOTUS to better understand where pollutants originate.*

A drainage impact study will be conducted in conjunction with the Pocatello Creek monitoring study. Flow presence loggers will be installed in drainages throughout the PUA to monitor when various areas are contributing flow. This will enable more precise identification of sources of sediment and flow in the urban area. These sites will include major tributaries to Pocatello Creek and Trail Creek (on the west bench). Due to the limited number of flow presence loggers, the location of these flow presence loggers will change, depending on questions of interest.

E. coli Source Tracing

*Goal: To determine and eliminate the point sources of E. Coli to the Portneuf River.*

Past sampling efforts by the IDEQ, ISU Biologists, and the City of Pocatello have indicated that some areas of the Portneuf River have levels of *E. coli* above Water Quality Standards (IDAPA 58.01.02)*, most likely* as a result of stormwater and irrigation return flow inputs (not illicit discharges). Future sampling efforts to pinpoint the sources of these *E. coli* issues will be conducted on an investigative basis, with the locations and frequency of sampling evolving over time.

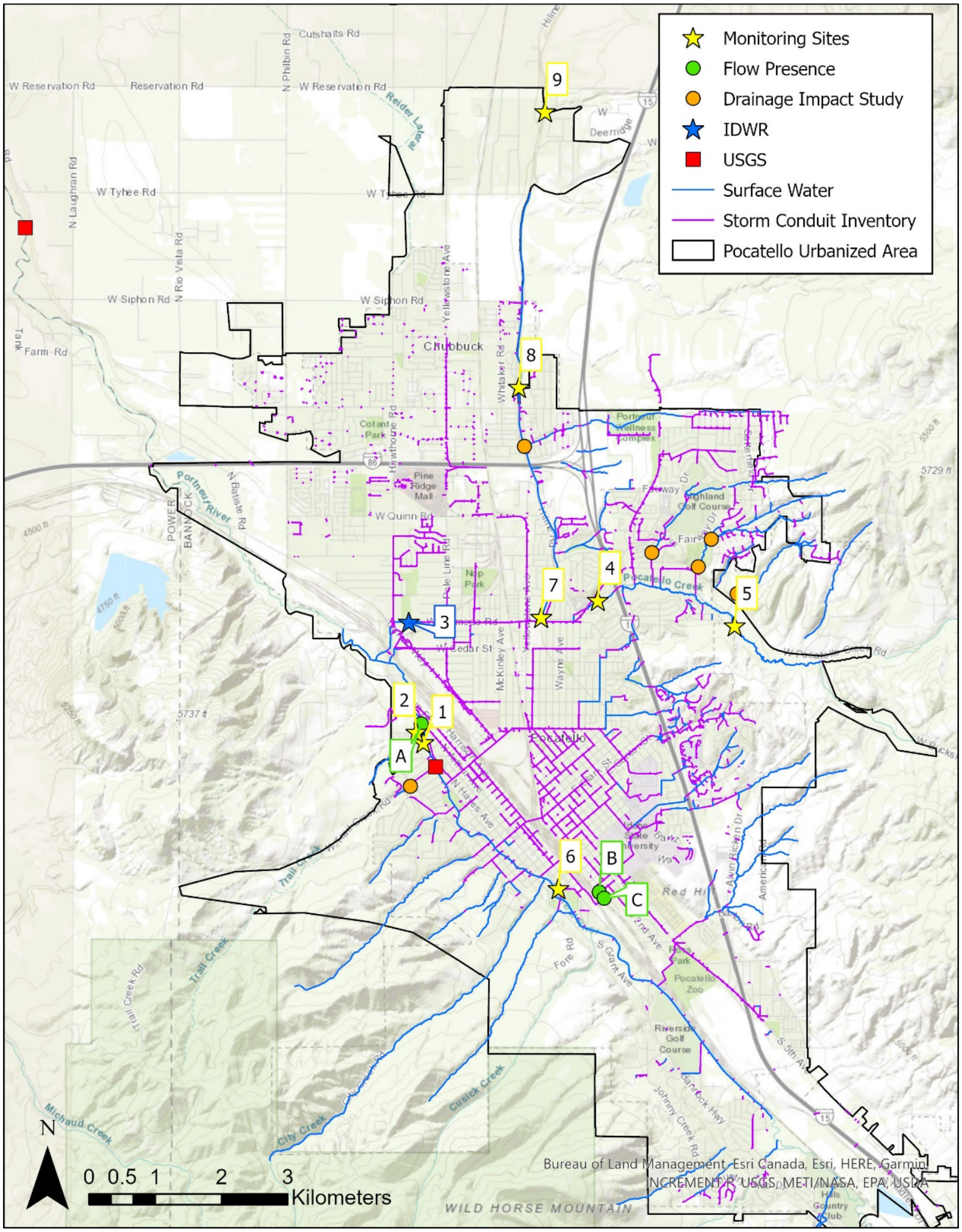



**Figure 3-1.** Proposed monitoring locations. At monitoring sites (stars), turbidity, conductivity, and discharge are measured continuously and grab samples for analyses of suspended sediment, total phosphorus and chloride are collected. At site 3 (blue star), discharge is monitored by the IDWR and at locations with a red square, discharge is monitored by the USGS. Flow presence sites (circles) are locations where only the presence of flow is monitored. The green circles are permanent flow presence sites. The orange circles are tentative flow presence sites that are part of the investigative drainage impact study and thus locations will change throughout the study period.

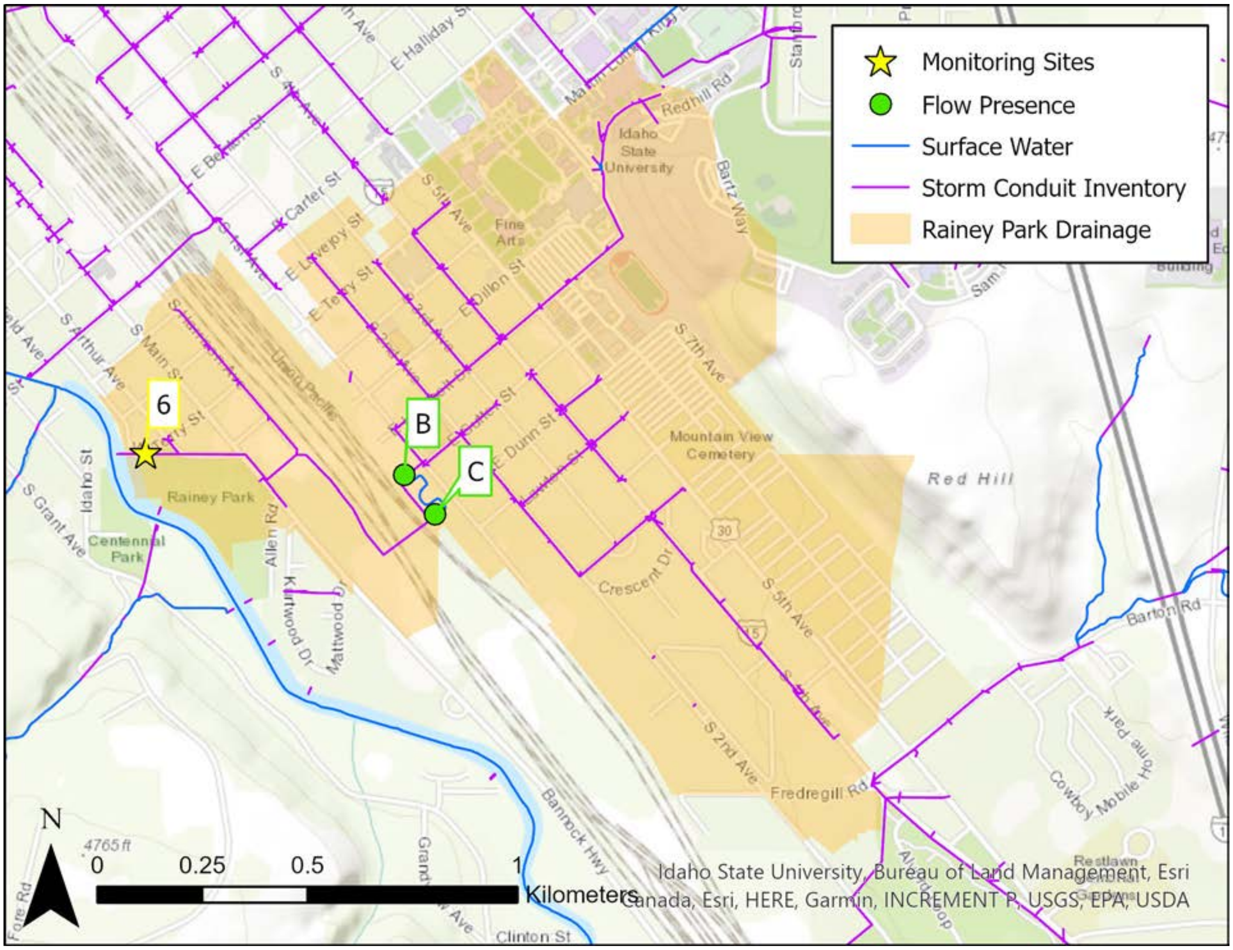



**Figure 3-2.** Rainey Park Drainage. Stormwater flows from the south side of Idaho State University through a residential and small commercial area on the valley floor before entering the First Avenue stormwater wetland. Any stormwater exiting the wetland is piped through Rainey Park into the Portneuf River without further treatment.

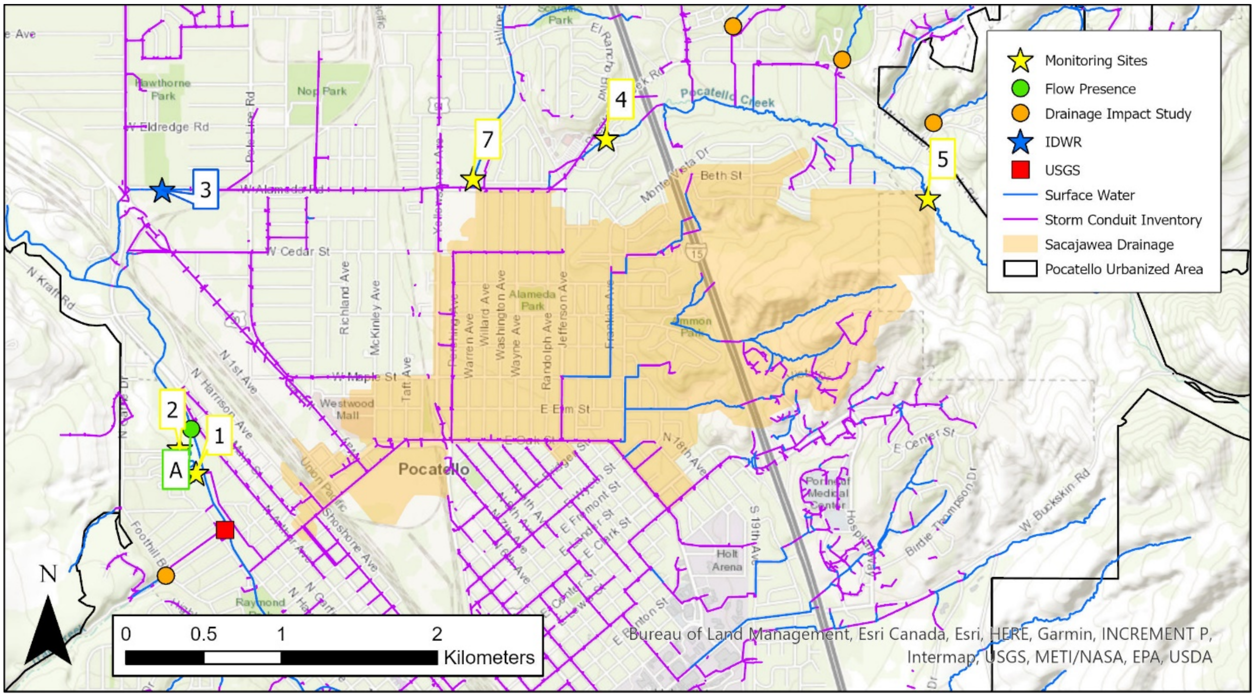



**Figure 3-3.** Sacajawea Drainage. Stormwater drains from the east bench through commercial and residential areas on the valley floor before entering the Sacajawea stormwater wetland. Stormwater exiting the wetland is generally stored in a remnant oxbow, but may be discharged to the Portneuf River during large events or when river flows are above flood stage.

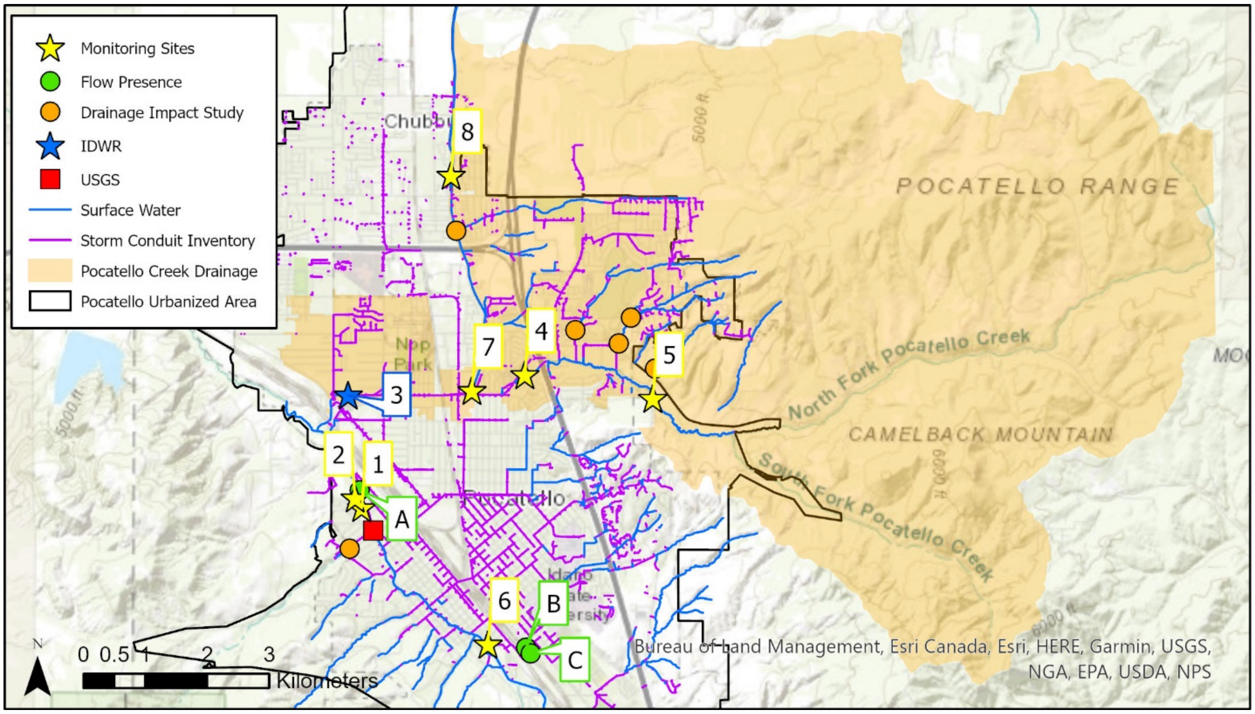



**Figure 3-4.** Pocatello Creek Drainage. Stormwater drains from residential neighborhoods on the east bench and through mixed commercial and residential areas on the valley floor into Pocatello Creek. An irrigation canal (Hiline) also flows into Pocatello Creek. Much of the downstream half of Pocatello Creek is piped underground, ultimately daylighting after running under Highway 30 before flowing into the Portneuf River.

**Table 3-2.** Monitoring locations.

| Site ID | Site Name | Sampling Parameters | Latitude North | Longitude West |
|---|---|---|---|---|
| 1 | Sacajawea Park Wetland Inlet | Flow, Turbidity, SSC, TP, Cl | 42.874944 | -112.470396 |
| 2 | Sacajawea Park Wetland Outlet | Flow, Turbidity, SSC, TP, Cl | 42.876345 | -112.471696 |
| 3 | Pocatello Creek at Ferguson Plumbing | Flow, Turbidity, SSC, TP, Cl | 42.891312 | -112.473148 |
| 4 | Pocatello Creek at Fire Station | Flow, Turbidity, SSC, TP, Cl | 42.894353 | -112.438223 |
| 5 | Pocatello Creek at Pocatello Creek Rd | Flow, Turbidity, SSC, TP, Cl | 42.891157 | -112.413084 |
| 6 | Rainey Park | Flow, Turbidity, SSC, TP, Cl | 42.855167 | -112.445335 |
| *7 | Hiline Canal | Flow, Turbidity, SSC, TP, Cl | 42.892022 | -112.448688 |
| *8 | Hiline Canal at Chubbuck Road | Flow, Turbidity, SSC, TP, Cl | 42.923286 | -112.452952 |
| *9 | Hiline Canal at Sage Hollow | Flow, Turbidity, SSC, TP, Cl | 42.960749 | -112.448287 |
| A | Sacajawea Park River Outlet | Flow Presence | 42.87750 | -112.47080 |
| B | First Ave Wetland Inlet | Flow Presence | 42.85472 | -112.43780 |
| C | First Ave Wetland Outlet | Flow Presence | 42.85389 | -112.43690 |

TP=Total Phosphorus, Cl = Chloride, SSC = Suspended sediment concentration
*Irrigation season only.

## 3.3 Sample Collection Methods

### 3.3.1 Continuous Sampling

Turbidity, stage, flow presence, and conductivity are all sampled continuously using sensors.

PME cyclops data loggers will be installed at the monitoring locations in Figure 3-1 to measure turbidity using Turner Designs turbidity fluorometers. Sensors will be installed within PVC housing. A conductivity logger (HOBOware U24) will also be attached to the PVC housing. At storm sewer locations, sensor housing will be weighted with chains and tethered to the manhole cover to allow installation and retrieval of sensors without manhole entry. This installation approach has been tested at one location (Sacajawea inlet drain). At surface water sites, sensors will be anchored to the stream bottom using rebar.

Sensors will be visited at least every two weeks for routine maintenance (removal of debris, cleaning, data download) unless flow conditions warrant a change in frequency (i.e., decreased frequency during dry stream conditions and increased frequency during high flow events). Sensors will be calibrated in lab before initial deployment, and QC checks will be conducted during every biweekly site visit. If QC checks warrant it, sensors will be recalibrated prior to redeployment.

Site-specific SSC-turbidity relationships will be developed and used to estimate continuous sediment concentration data for each site over the duration of the project.

Stage data will be collected by the City of Pocatello at storm sewer locations (Rainey Park and Sacajawea inlet) using a Hach FL900 Flow Meter. These data will be used to calculate continuous discharge. The Socio-Eco-Hydrology lab will use HOBOware U20 water-level loggers to measure stage (water level) at surface water locations. Where possible, sensors will be installed in engineered structures (culverts) to facilitate the estimation of discharge from stage. This will be especially important for sites that only flow during runoff events, since it will not be possible to measure discharge at these locations. At perennial sites (Pocatello Creek) and the Hiline canal (which is not perennial but does maintain stable flow conditions), manual discharge measurements will be made during a range of conditions. This will be done using either an acoustic doppler velocimeter or by dilution gaging, depending on conditions. These manual measurements will be used to generate empirical stage-discharge relationships for each site. Loggers will be calibrated and deployed in surface water sites (Pocatello Creek sites 4 and 6, Hiline canal sites 7-9, and the Sacajawea outlet site 2). A seventh logger will be installed out of the stream adjacent to one of the stream locations to measure barometric pressure and correct stage data. Flow is measured by the Idaho Department of Water Resources at the Pocatello Creek Ferguson Plumbing site. Flow presence and absence will be measured using adapted HOBOware pendant loggers (UA-002) installed directly on top of the stream bed. All logger maintenance and data download will follow the same schedule as above.

#### 3.3.2 Grab Samples

Suspended sediment, total phosphorus, chloride and *E. coli* will be collected as grab samples.

Grab samples for suspended sediment concentration, total phosphorus, and chloride will be collected during regular field visits as well as during storm and snowmelt events (storm sampling will provide the only field calibration samples for storm sewer pipes). The goal is to collect 50 grab samples at each site to establish robust relationships between sensor turbidity and suspended sediment concentrations (SSC), turbidity and total phosphorus, and conductivity and chloride.

*E. coli* samples will be collected during summer low flows when *E. coli* levels in the river are higher. At a minimum, these samples will be collected in duplicate.

Grab samples will be collected directly into the appropriate sample container in flowing water (no eddies or backwaters). Each sample container will then be capped, labeled (time, date, and site name), and stored in a cooler on ice. Suspended sediment, total phosphorus, and *E. coli* samples will then be taken to the City of Pocatello Water Pollution Control Laboratory. Grab samples for chloride will be filtered at ISU and sent to the Environmental Analytical Laboratory at Brigham Young University for analysis. Detailed grab sample collection procedures and analytical procedures are outlined in the PUA's Quality Assurance Project Plan (QAPP). Key features of that plan include:

- Establishment of data quality objectives
- Written standard operating procedures for field and laboratory tasks
- Routine instrument calibration and equipment maintenance
- Field quality assurance/quality control (QA/QC) samples for monitoring data quality
- Sample Chain-of-Custody procedures and forms
- Use of standard analytical procedures
- Data management and validation

### 3.3.3 QA/QC Procedures

Field QA/QC

Field duplicates will be collected for 10% of the grab samples (and for all *E. coli* samples). A field duplicate is a second sample collected at the same time and in the same manner as the first sample. Field duplicate pairs provide information about the repeatability of sampling and analysis. For this project, field duplicates will be partially "blind," i.e. they will be assigned arbitrary sample names and collection times, making it more difficult for the laboratory to identify the duplicate pairs.

QC checks will be conducted for all sondes and loggers during each biweekly visit, and recalibrations will occur quarterly, or as needed based on QC checks. More information about these protocols can be found in PUA's QAPP. For perennial sites, a handheld YSI or extra sonde will be used to verify sensor calibration in the field. For storm sewer sites, sensors will be brought back to the lab and calibration will be tested using standard solutions. If discrepancies are observed, sensors will be recalibrated.

For more details on QA/QC procedures and calibration methods, see the PUA's QAPP.

Lab QA/QC

Laboratory analysis for suspended sediment, total phosphorus and *E. coli* will be conducted by the City of Pocatello Water Pollution Control Lab. See WPC's Laboratory Quality Assurance Plans for more information on their protocols. Chloride will be analyzed at the Environmental Analytical Laboratory at Brigham Young University. More information about this lab can be found in the PUA's QAPP. The City of Pocatello has also contracted with Energy Laboratories, Inc. and IAS Envirochem in the past for water quality samples, and may use them for various analyses for samples generated from this monitoring plan. See each respective lab's QA Plan for more information on their procedure.

## Section 4

# Monitoring Documentation and Record Keeping

Detailed information about logger removals, field calibrations and removal of any debris will be documented electronically to explain any data anomalies that may arise. Data will be QA/QC'd and stored according to best practices in data management. All raw and processed sensor data will be stored on a Box drive at Idaho State University (ISU) that is backed up on ISU's servers. A workflow for data processing will be developed including sensor drift correction (if needed, sensor maintenance will be adjusted to minimize sensor drift) and outlier identification. See the PUA's QAPP for more information on data management and storage.

Datasets will include processed sensor data as well as derived datasets from field measurements for each site. These will include: high frequency suspended sediment concentrations, high frequency stage (and the calculated discharge), and high frequency suspended sediment loads. Additional data collected through the nutrients and salt study, drainage impact study, and *E. coli* monitoring will also be compiled. Data collected will be submitted to EPA in the Annual Report, and made available to EPA and DEQ upon request. Data from the storm sewer system and the associated riverine system will be published on the Permittees' website (stormwater.pocatello.us) once long-term data are screened and verified.

## Section 5

# Schedule of Activities

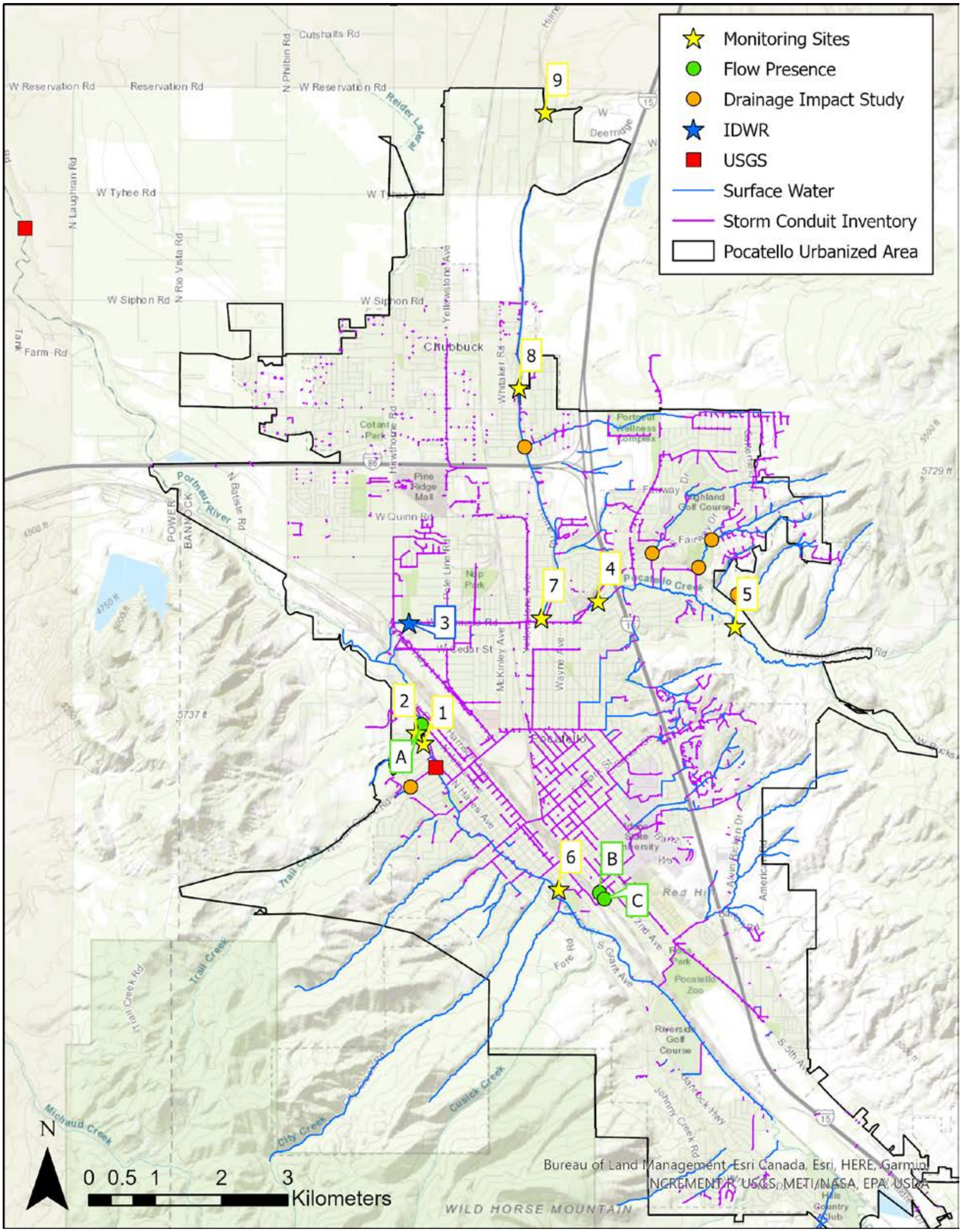
**Summer-Fall 2020**: Purchase and install sensor suites in all locations.

**2020-2023**: Biweekly sensor maintenance and collection of grab samples.

**2020-2023:** Data analyzed annually for trends and to inform changes to the monitoring plan. QA/QC's data and work summary prepared for inclusion in the Annual Report to the EPA (submitted by December 1 of each year).

Regular meetings between the ISU Socio-Eco-Hydrology lab and City staff will be used for informal feedback on implementation of the monitoring plan.

The Final Monitoring Report (submitted to EPA by April 3rd, 2024) will contain assessments of stormwater treatment facilities (wetlands), including the volume of sediment removal, recommendations for maintenance frequency, and analysis of spatiotemporal trends between sites. It will include raw data, as well as a visual and narrative summary of the data interpretation, any QA issues, and a narrative discussion on comparing this data with any historical information as appropriate.


Monitoring Sites
Flow Presence
Drainage Impact Study
IDWR
USGS
Surface Water
Storm Conduit Inventory
Pocatello Urbanized Area
1
2
3
4
5
6
7
8
9
A
B
C
N
0 0.5 1 2 3
Kilometers
Bureau of Land Management, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA
Chubbuck
Pocatello
WILD HORSE MOUNTAIN

## References

City of Nampa Stormwater Division. 2013. NPDES MS4 Monitoring Plan. https://www.cityofnampa.us/DocumentCenter/View/2069/Nampa-MS4-Monitoring-Plan-Rev11?bidId=

City of Pocatello. 2017. Existing Conditions: Water Quality and Habitat. https://pocatello.maps.arcgis.com/apps/MapJournal/index.html?appid=12359a4ff8384be0b4437846ee373301

City of Pocatello. 2019. Laboratory Quality Assurance Plan for City of Pocatello Water Pollution Control Department, City of Pocatello, Idaho.

City of Pocatello. 2020. Quality Assurance Project Plan for the Pocatello Urbanized Area NPDES Phase II Stormwater Permit Water Quality Monitoring.

Energy Laboratories, Inc. 2019. Quality Assurance Manual Energy Laboratories – Billings, MT. Revision 2019.03.

Hale, R.L., and City of Pocatello 2020. ISU Socio-eco-hydrology lab stormwater monitoring for the City of Pocatello - Scope of Work.

IAS-Envirochem, 2019. Quality Assurance Plan.

Idaho Administrative Code. Department of Environmental Quality. Water Quality Standards. IDAPA 58.01.02