CONFEDERATED SALISH AND KOOTENAI TRIBES
NATURAL RESOURCES DEPARTMENT
DIVISION OF ENVIRONMENTAL PROTECTION

QUALITY ASSURANCE PROJECT PLAN
For Wetland Program Development Grant: CWA Section 104(b)(1)
Version 1.1

A People of Vision

Prepared for: U.S. Environmental Protection Agency, Region 8

Prepared by: Confederated Salish and Kootenai Tribes
Division of Environmental Protection
2023

Updated: FY 2023
6/14/2023

A1: APPROVAL PAGE

CONFEDERATED SALISH AND KOOTENAI TRIBES
NATURAL RESOURCES DEPARTMENT
DIVISION OF ENVIRONMENTAL PROTECTION
CWA SECTION 104(b) MONITORING AND ASSESSMENT OF WETLAND AND RIPARIAN AREAS ON THE FLATHEAD INDIAN RESERVATION

QAPP Operating Period: Up to five years from date of EPA Regional Quality Assurance Manager's signature, with annual reviews and in the absence of changes to technical or data quality objectives.

CONFEDERATED SALISH AND KOOTENAI TRIBES

Blair Libby Digitally signed by Blair Libby Date: 2023.06.22 08:30:25 -06'00'

Blair Libby — Date
Wetland Program Manager

Willie Keenan — Date
Quality Assurance Officer

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Richard Janssen — Date
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U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 8

Benjamin Carlson — Date
EPA Region 8 Tribal Program Manager

Mary Goldade — Date
EPA Region 8 Regional Quality Assurance Manager

OVERVIEW

This Quality Assurance Project Plan (QAPP) replaces earlier versions of the Confederated Salish and Kootenai Tribes' (CSKT) Wetland Program QAPPs done under CWA 104(b)(3) and 106. The plan builds from the Program's 2022 EPA- approved QAPP.

The QAPP is applicable over the FY2023 period to address future environmental monitoring as described in the CSKT Wetland Program Plan (WPP 2021-2025). All current fiscal year information will be updated annually in the appendices. Annual reviews to the monitoring plan, based on work plan objectives and modifications to monitoring activities, will be submitted to EPA for review. At the end of each sampling season a review of the QAPP will be done. If substantive elements of the plan change over the FY23, an updated Crosswalk will be prepared to document changes to the QAPP for review and approval by EPA. If there are no major changes, a crosswalk documenting the changes will not be submitted. If a new funding source or grant is awarded, this will require a new QAPP, built on past efforts. The CSKT Wetlands Conservation Program (hereafter referred to as the program) collects environmental data for a range of uses and utilizes a range of data resources collected or developed by other entities. The program is also required to prioritize monitoring activities and complete work over multi-year periods. Considering this, the scope of the QAPP is comprehensive. It is the base quality assurance platform for all program monitoring and it applies for a five-year period with an annual review process.

Current methodologies (FY23) and Standard Operating Procedures are attached. EPA will submit new or updated Standard Operating Procedures (SOP) that are developed in the FY 23 period for review and approval.

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SECTION A3: DISTRIBUTION LIST

Within the Confederated Salish and Kootenai Tribes, the following staff positions will receive copies of the Wetland Program QAPP:

- Willie Keenan, Division of Environmental Protection Manager and Quality Assurance Manager
- Chauncey Means, Nonpoint Source Program Manager and supervisor to the Wetlands Program Coordinator
- Blair Libby, Wetland Conservation Plan Coordinator
- Rusty Sydnor, CSKT Wetland/ Riparian Restoration specialist. Acting field botanist for the Wetland Program

Contractors:

- Dennis Lichtenberg, NWI Photo interpretation, field assistance, and mapping
- Sarah Flynn, Geum Environmental Consulting

Within the U.S. Environmental Protection Agency Region 8, the following positions will receive copies of the Section 106 / Wetland QAPP:

- Ben Carlson, EPA Region 8 Tribal Program Manager
- Troy Hill, EPA Region 8 Quality Assurance Branch
- Mary Goldade, EPA Region 8 Regional Quality Assurance Manager

SECTION A4: PROJECT ORGANIZATION

The Division of Environmental Protection is located within the Natural Resources Department of the Confederated Salish and Kootenai Tribes (Appendix A). The Division maintains primary responsibility to develop, implement and maintain Clean Water Act (CWA) Section 106 Wetland activities. Responsibilities and roles of relevant staff within the Division of Environmental Protection and other Tribal programs follow:

- Willie Keenan, Division of Environmental Protection Manager: Initiate long-range planning for all water quality related program. Serves as the Quality Assurance Manager, and is independent from the data-generating unit.
- Chauncey Means, Water Quality Administrator: Supervisor to the Wetland Conservation Plan Coordinator. Oversees development and implementation of wetlands conservation plans, and all activities within them.
- Blair Libby, Wetland Conservation Plan Coordinator. Evaluates existing Wetland Conservation Program and is responsible for securing funding for wetland protection, restoration and enhancement projects. Develops objectives for the implementation of the Wetlands Conservation Plan while incorporating a five-year strategic Wetland Program Plan (WPP 2021 – 2025). Develops, implements and assesses the watershed wetland monitoring and assessment objectives. Conducts field reviews and completes comments for proposed housing sub-divisions, timber sales, irrigation projects and weed control projects that impact wetland quality or quantity. The Wetland Coordinator is responsible for maintaining the wetland program QAPP and distributing it to individuals on the

Distribution List (Sec. A3). The Wetland Coordinator is independent from contract labs or other entities hired to generate data.

- Rusty Sydnor – CSKT Wetland/ Riparian Restoration specialist. Acting field botanist for the Wetland Program. Accompanies the Wetland Coordinator to each assessment area (AA) and compiles plant species lists and coverage data for each site. The Botanist will use the plant list to estimate coverage for each species within the site, and will make note of noxious weeds (and coverage). The botanist will compile this data into charts and graphs, submitting it to the report writer in the fall of each active field season.

Contractors:

- Sarah Flynn, Geum Environmental Consulting. Completes MWAM at 20 sites in Camas watershed. Compiles and uses existing data to analyze trends of wetland function and plant communities. Conducts GIS-based analysis of Reservation to determine restoration suitability.
- Dennis Lichtenberg, NWI mapping, photo interpretation, data management and field assistance. Utilizes a stratified sampling method to help select the monitoring and assessment sites in each watershed. Completes MWAM at each of the 20 sites in LFHR watershed. Determines changes in wetland size, extent, and type for the watershed of interest by comparing against earlier NWI maps, aerial photos, and previous data collected by CSKT.
- Flathead Lake Biological Station *(minor contract, <$5,000).* Analyzes carbon content of soil samples that are collected by Erin Bell and CSKT Wetlands Program staff.
- Erin Bell, SKC student researcher *(volunteer).* Co-designs wetland soil carbon study, collects samples, performs post-laboratory data analysis, and communicates study results to CSKT.

CSKT Organization chart with relevant staff in appendix A.

SECTION A5: PROBLEM BACKGROUND

The Salish, Kootenai, and Qlispe peoples of the Flathead Indian Reservation value wetland habitats. Historically, we protected these sites and frequented them to gather plants and animals to support both our physical and spiritual needs. Indeed, the original place names for some of these sites have played a key role in contemporary restoration. Our ancestors often assigned names for sites based upon their spiritual and aesthetic importance as well as their function. Today our traditional ecological knowledge and our languages combine to inform our current and future monitoring, management, and conservation efforts.

The Flathead Indian Reservation (FIR) in western Montana has a population of around 28,000 and covers approximately 1.3 million acres. Although much of the reservation is rural, development pressures from highway construction and suburban sprawl from nearby cities are a constant threat to FIR's wetlands and riparian areas. Some of the most significant impacts on the FIR's wetland resources are farming (through wetland drainage

for agriculture and increased nutrient loads), ranching (through over-grazing and cattle impacts to wetland structure), and development. Climate change poses a significant threat to wetlands through changes in hydrological regimes. In 2010, the NRDC listed Montana as one of the states most vulnerable to water supply shortages due to climate change. The Nature Conservancy cites declining snowpack, early snowmelt, and higher water temperatures as specific stressors to Montana's wetland ecosystems. Adaptive planning on the Flathead Indian Reservation is necessary to reduce these impacts in the short and long term.

The Tribes received funding from EPA under the Clean Water Act Section 104 (b)(3) Wetlands Protection Program in 1992. This enabled them to conduct a National Wetland Inventory (NWI) in 1993, providing baseline information about the quality and quantity of wetland resources on the reservation at that time. It also helped them develop the CSKT Wetlands Conservation Strategy in 1995. This strategy was an initial framework to help Tribal, Federal, State, and private entities involved in wetland regulation or management on the Flathead Indian Reservation to work in a more coordinated and efficient manner. In 1999, the program developed the 'Wetlands Conservation Plan (WCP) for the Flathead Indian Reservation, Montana'. The WCP sets short-term and long-term goals. The interim goal is to halt the loss of the remaining wetlands and riparian areas, and to halt the decline in wetland and riparian quality. The long-term goal is to increase the acreage of wetlands and riparian areas and improve the quality of the resources. These remain the broad goals of the program.

Since 2004, the wetland program has been conducting wetland monitoring and assessment in one of each of the reservation's seven watersheds every year that the program secured funding, for a total of 13 completed watershed-level Site Assessments. Five of the watersheds have now been assessed twice (see Appendix B). Through data analysis and land-use/land cover change mapping, comparing images from 1993 to present, the program has identified negative changes to wetland quality and quantity in just this short period. As outlined in the Wetland Program Plan (WPP) for 2021-2025 (Appendix C), the program will begin strategizing ways to utilize information collected since 2004 to work toward the long-term goal of increasing acreage of wetlands and riparian areas and improving the quality of the resources.

Regulatory information, applicable criteria, and action limits relevant to the Program are identified in Appendix C.

SECTION A6: PROJECT DESCRIPTION

This Quality Assurance Project Plan (QAPP) provides guidance to the CSKT Wetland Conservation Program on all activities in the current, approved WPP (Appendix C) and current workplan (Appendix G). Specific projects will be developed and documented with survey, sampling methods, assessment methods, Standard Operating Plans (SOPs) and data quality objectives and handling.

To address the problems of wetland loss or degradation discussed above, the Tribes have adopted a watershed approach to wetlands conservation. The Reservation is divided into seven watersheds or sub-basins, all flowing into Flathead Lake or the Lower Flathead River (Appendix B).

There are four core components (tasks) of the program work each year:

1. **Watershed-based Wetland Monitoring and Assessment.** The program monitors and/or assesses at least 20 wetland sites in one of the seven watersheds each year, sampled on a rotating basis (Appendix B). The primary product created will be a Wetland Site Assessment and Monitoring report for each watershed.
2. **Land cover change analyses and mapping** to determine changes in wetland size, extent, and type for a subsample of the watershed of interest.
3. **Mapping of noxious weeds**. Previous work has focused on knotweed and tamarisk, potential invaders of riparian habitat. The wetland program will be responsive to new invaders as well and develop strategies to document weeds as they arrive and/or spread on the FIR. The product will be a map that informs tribal resource managers and other partners the extent of noxious weeds and how rapidly they are expanding, helping inform management decisions (Appendix B). Specific weeds being mapped will change as new species become problematic on reservation lands.
4. **Wetland and riparian training, education, and outreach activities**. The program will continue promotion of wetland conservation activities through effective training, education, and outreach to relevant parties, such as the public, schools, tribal departments, and area non-profits. Education and outreach materials will draw heavily on the results of the Tribes' previous wetland monitoring and assessment work. Product will be a report of the number of people reached annually and dates of presentations.

Additional short-term projects will be reflected in Appendices F and G. However, the **wetland soil carbon analysis project (short-term project)** will also be referenced throughout this document, due to its specific data quality control needs. No data had been collected on Flathead Indian Reservation wetland soil carbon content until a small-scale Salish Kootenai College student project that took place in Summer 2021. Erin Bell, an SKC Student Researcher and CSKT Wetlands Program Volunteer, co-designed a study with CSKT Wetlands staff to build off that earlier study. Comparing the soil carbon content in three historic wetlands and three recently created wetlands will help give CSKT staff a better understanding of how to better compensate for wetland losses and what climate change mitigation services are offered by our wetland resources. This project contracts with the nearby University of Montana Flathead Lake Biological Station for analysis and includes an educational component.

Table 1: Generic annual timeline for the Wetland Program

Task	Schedule	Description

1. Watershed-Based Wetland Monitoring and Assessment	May - June	o Selection of assessment sites o Compilation of assessment site maps
	June	o Field Coordination
	July-September	o Field Data Collection
	September	o Accuracy and verification of field data
	October	o Compilation of raw data
	Nov - Feb	o Plant species tabulation and verification o Raw data conversion into tables and graphs o Compilation of collected data o Writing of individual WL site assessments
	March- May	o Editing , formatting and compilation into final comprehensive report
	September	o Final report and Electronic Data Deliverable (EDD) provided to CSKT and EPA
2. Land cover change analyses and mapping	Oct-Nov	A representative sub-sample will be selected within the given watershed
	Jan-May	An acreage change table will be produced
	Jan-May	A map of the sub-sample will be produced
3. Identification and point layer mapping of noxious weeds	Sept - August	o Ongoing monitoring by reservation resource personal. GIS Point layer data added to database as discovered.
	Winter	o Training for identification of noxious weeds
4. Education and Outreach	Fall	o Lake Honoring: presentations to grades 9-12 on wetlands, watersheds, and effects of climate change
	Spring	o River Honoring: presentations to grades K-8 on wetlands, watersheds, and effects of climate change

	As requested	o Presentations to school groups, local, regional or national conferences, and tribal trainings

Current Wetlands Projects
See Appendix F

Geographical locations to be studied:
See Appendix B

Resource and Time Constraints:
Program resources always limit the number of sites assessed each year. Since conducting a comprehensive wetland assessment in each watershed is not realistic, the program has developed a stratified sampling method for site selection that accounts for numerous variables and provides a representative sample across a given watershed. Snow, late or heavy runoff, and fire seasons limit the field season for data collection in Western Montana. Variations in timing for sample collection, data review, and report compilation due to weather, site access, travel constraints, or other unpredictable hindrances will be documented by the Wetland Coordinator and reported to the project manager.

Resource and time constraints specific this time period: see Appendix F

SECTION A7: QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

Performance Criteria, Action Limits, Detection Limits and Acceptance Criteria Purpose

Our data quality objectives and criteria describe quality specifications at two levels:

- At the level of the decision or study question, and
- At the level of the measurements used to support the decision or study question.

Included Information:
The results of the systematic planning process used to plan and design the study that is the subject of the QA Project Plan are documented (or referenced) as part of this element. The outputs from the Agency's recommended systematic planning process, the Data Quality Objectives (DQO) Process, are ideally suited to addressing the first component of this element. The DQO process results in the full set of specifications needed to support the qualitative and quantitative design of a data collection effort.

The primary performance and acceptance criteria for this program are expressed in terms of data quality indicators. The principal indicators of data quality are precision, bias, accuracy, representativeness, comparability, completeness and sensitivity. Other acceptance criteria may be established on a case-by-case basis as needed. These will be documented in the project file, sampling plan, or inspector's report.

Accuracy is a measure of the overall agreement of a measurement to a known value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations. Accuracy is expressed in terms of precision and bias.

The Tribe will optimize the accuracy of field measurements by using repeatable field practices following standard operating procedures, ensuring that field instruments and equipment are calibrated and maintained according to the manufacturer's instructions and by following the manufacturer's instructions for operation of the equipment.

Table 2: Survey Parameters, References, and Accuracy Standards

Parameter	Reference	Accuracy
Plant Communities	Hansen and others	Species
Elevation	Altimeter	+/- 5m
GPS/UTM Coordinate	GPS Unit	+/- 5m
MDT Montana Wetland Assessment Form	MDT – Montana Wetland Assessment method (Berglund 2008), Appendix D	
Wetland Mapping including the LLWW	Tiner 1997b,	
Site vegetation, soils and hydrology	U.S. Fish and Wildlife Service Classification System (Cowardin, 1979)	
Type of Wetland: Riverine, Slope, Depressional, Flat, and Fringe	Hydrogeomorphic Wetland Classification System, NRCS, USDA (2008)	
Soil carbon analysis (laboratory)	Flathead Lake Biological Stations uses EPA Method 440.0 (Zimmerman et al. 1997).	Method detection limit (MDL) of particulate carbon is 1300 mg/kg for a sample weight of 10.00 mg.

Soil sample collection (field method)	Multiple studies, including Nayak et al. 2019; Owers et al. 2020; Smith et al. 2020; Billings et al. 2021.

Precision

Precision is a measure of agreement among repeated measurements of the same property under identical, or substantially similar, conditions; calculated as either the range or as the standard deviation. Precision may also be expressed as a percentage of the mean of the measurements, such as relative range or relative standard deviation (coefficient of variation). We will use the same analytical instrument(s), staff, and methods across all AA's. We will use the same method to make repeated measurements of the same sample via collections made by our Wetland Coordinator, botanist, and/or contractors.

Precision of analytical results can be affected by numerous sources of variability within the field and office environments. Variabilities include personal judgement on MDT assessment form, data processing, and data analysis. Precision is normally reported in terms of standard deviation, but since the number of measurements is usually small for this program, it will frequently be reported as relative percent difference.

For the wetland soil carbon project, precision was addressed by using the same staff, field and lab instruments, and methods for data collection. Multiple samples were taken at each sampling location, then homogenized by wetland "zone" into a single analyzed sample. See Section B2 for more information.

FLBS uses a Laboratory Fortified Blank (LFB) during analysis. The LFB contains a known (previously measured) analyte, and is analyzed exactly like a sample. Its purpose is to determine whether the method is in control, and whether the laboratory is capable of making accurate and precise measurements. Acceptable limits are in the 85-115% range, and any analysis outside of that range requires problem identification and resolution.

Field Precision

Precision will be determined in the field by collecting at least one field duplicate assessment form per week to compare results and minimize staff error.

Bias

Bias is the systematic or persistent distortion of a measurement process that causes error in one direction (i.e., the expected sample measurement is different from the sample's true value). To reduce bias, the program will maintain a collection of reference materials:

- pressed plants that provide examples of commonly confused species
- reference wetland species
- invasive species

Additionally, to reduce bias in assessment area selection, staff will utilize the stratified sampling method and select pre-determined back-ups sites as described in Section B.1 'site selection'. This eliminates the need to find new assessment sites if external factors prevent access to any of the sites once staff are in the field.

For wetland soil carbon project, sampling location bias was addressed by numbering points of equal distance at the wetland edge, then using a random number generator to select a portion of those points to draw transect lines for sample collection. See Section B2 for more information.

Representativeness

Representativeness is a qualitative measure of the degree to which data accurately and precisely represents the following:

- a characteristic of a population
- parameter variations at a sampling point
- a process condition, or
- an environmental condition

Representativeness evaluates whether measurements are made and physical samples are collected in such a manner that the resulting data appropriately reflect the environment or condition being measured and studied.

Representativeness of data will be established and maintained by documenting procedures designed to provide environmentally representative data. The following will be documented:

- sampling design,
- number of measurements,
- sample size or volume,
- sampling time represented by the sampling effort

Adherence to SOPs for field sampling and laboratory analysis will help to ensure the representativeness of the data. Acceptable performance of the procedures will be verified with quality control samples that will be collected systematically to provide a measure of the accuracy, precision, and bias of the environmental data, and to identify problems associated with sampling, processing, or analysis.

For the wetland soil carbon project, three sites were chosen in each of the two wetland categories (created and historic), with similar attributes, hydrology, and site history that were characteristic of the wetlands in that area. Within each depressional wetland pond, three concentric rings were mapped. Our aim was to represent the heterogeneity of each wetland overall, with each ring representing a relatively homogenous zone within the heterogeneous wetland. Samples were then collected in these three zones. See Section B2 for more information.

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system. It is calculated as a ratio of the amount of valid or usable data collected to the amounts of valid or usable data planned. The data quality objective for completeness for this QAPP is 85%. This may be changed for specific events. For example, a higher completeness target may be required if fewer samples are collected in a monitoring event. If more samples are collected, the sampling design is more robust and the completeness objective may be lowered. Lesser completeness results will be evaluated for their effect on data and project decision making during data validation.

Percent completeness is calculated using the following equation:

$$\%C = V/T \times 100,$$

Where:

V = number of planned measurements determined valid and
T = total number of measurements.

For the wetland soil carbon project, completeness was considered in maximizing the number of samples given funding and time constraints. To that end, staff and volunteers seek to collect high-quality data. Staff visually inspected samples and noted field conditions for each sampling day.

Comparability

Comparability is a qualitative measure of the extent to which data can be compared between sample locations or periods of time within a sampling program, or between discrete sampling programs. Comparability is a critical data quality objective that ties directly to program-specific objectives. Comparability within an inspection is maintained by using the same protocols throughout the program, including those described in this QAPP. Documentation of the planning, implementation and assessment phases of the project also provides additional information to evaluate the comparability of data.

To preserve data comparability for monitoring site, staff make every attempt to visit the site during the same month data was previously collected, if not the same week. This increases the comparability of plant communities observed.

For the wetland soil carbon project, we collected all 120 samples over a short period of time to ensure that vegetation changes, water levels, irrigation inflows, and other factors were not outsized variables. This increases the comparability of soil carbon samples.

Method sensitivity

Sensitivity relates to the capability of a method or instrument to discriminate between measurement responses representing different levels of the variable of interest such as:

- Plant species present
- Cover vegetation

Methods and instruments used must be sufficiently sensitive so that a comparison to the regulatory or action limit is possible (for example, determine if the measured level of a

constituent is above or below a value or if the constituent of concern is present or absent). Additionally, the results obtained must also provide a sufficient degree of certitude that the measurement value is representative of the sample being measured. The Wetland Coordinator will ensure on a case-by-case basis that the sensitivity of any laboratory or field analytical method and instrument will be sufficient for meeting project objectives by evaluating quantitation limits or via visual inspection. Laboratory and other project data will be assessed by the Tribe as described in section D.

Table 3: Survey Parameters, Standards or References, and Techniques

□	Site Name
□	GPS Location
□	Written Description
□	Site map
□	Watershed map
□	Species Lists and Percent cover
□	Assessment Date
□	Wetland Classification
□	Wetland Function (based on field observation)
□	Plant Communities
□	Summary table of function and score
□	Location
□	Changes in Plant Community Composition and Structure, Size, Relative Abundance
□	Graphs of Plant Species
□	Description

For the wetland soil carbon project, a sampling method for pingo scar wetland types and created (artificial) depressional ponds was developed by referencing the most relevant, recent, peer-reviewed literature. Research authors, Salish Kootenai College professors, and CSKT staff biologists were also consulted before data collection began. This study's collection methods were therefore based on the best methods available.

Flathead Lake Biological Station follows the EPA Method 440.0 protocol for soil carbon analysis, which includes strict parameters for instrument sensitivity. Their instrument, the Exeter Analytical CE-440 Elemental Analyzer, has analytical sensitivity of less than 1 microgram.

SECTION A8: TRAINING REQUIREMENTS

Training/ certifications and who provides them

Training is an important component of the Wetland Conservation Program; however, no specialized or certification-based training is required to conduct the activities in the WPP. Various forms of training and conferences have been pursued in the past, and will form the basis for future training:

- U.S. EPA-sponsored training opportunities provide significant background for wetland issues as well as opportunities to meet and learn from regional and Tribal wetland managers.
- The Montana Department of Transportation (MDT) periodically provides training on the application of the Montana Wetland Assessment Method, a rapid wetland assessment tool used by the CSKT and other entities in MT.
- Non-profits, institutes and universities provide formal and informal opportunities to gain understanding and skills relevant to wetland conservation. For example, the Wetland Training Institute provides technical training and certification in wetland delineation and plant identification while the non-profit Association of State Wetland Managers (ASWM) provides regular informal trainings through webinars and online resources.
- Staff within the Tribes provide field training for staff within their programs.
- Salish Kootenai College professors offered wetland soil carbon sampling procedure training for volunteer Erin Bell.

Training documentation
Training documentation will be maintained in personnel files.

Personnel responsible for assuring training/certification are satisfied
Willie Keenan, Division of Environmental Protection Manager and Quality Assurance Manager.

Current fiscal year anticipated trainings
see Appendix F

SECTION A9: DOCUMENTATION AND RECORDS

Report format and data report package information
The Wetlands Conservation Program Coordinator and a contractor will compile a formal assessment and monitoring report for each watershed sampled. Each report includes, at minimum: an introduction, a map of the watershed with all of the assessment areas (AAs) labelled, methods (wetland classification system, plant communities, relative abundance graphs and species lists), and wetland functions. Each sampling season, 15 sites will be assessed and 5 will be monitored, for a total of 20 AAs in each watershed.

For each AA, the report will document:

- Map of site location within watershed
- Site Name in a standardized format
- Assessment Date
- Observers
- Location (GPS)
- Size
- Description

- Photographs
- Wetland Classification
- Plant Communities
- Changes in Plant Community Composition and Structure (Monitoring sites only)
- Relative Abundance Graphs of Plant Species Distribution
- Species Lists and Percent Cover (table)
- Wetland Functions
- Summary table of function and score

Project documents, records, and electronic files
Other project documents and files produced will be field forms of raw data (MDT Montana Wetland Assessment Forms- see appendix D), land-use/ land-cover change maps, nexus mapping, digital photographs, and conversion of raw data into tables and graphs. Grant applications, budgets and grant reports will be produced as needed.

Project information storage and back up plans
All reports and other files listed above will be stored as hard copies and digitally. Internally, CSKT stores program hard copies in the Wetlands Program filing system and with CSKT's Office of Contracts and Grants, which keeps files for 3 years after the completion of the grant. Additionally, EPA Tribal Grants Program retains project information for 10 years after grant completion. All reports and other files listed above will also be stored electronically in various locations: on the Tribal Natural Resources Department shared server, on Max.gov, and periodically backed up on an external hard-drive.

Dissemination of the QA Project Plan
The Wetlands Conservation Coordinator will distribute an electronic copy of the QAPP to the people/positions indicated in section A3. The coordinator is responsible for maintaining the official approved QAPP, and documenting and distributing any QAPP changes.

B. DATA GENERATION/ACQUISITION

SECTION B1: SAMPLING PROCESS DESIGN

Design strategy and type/total number of sample types

Each sampling season, twenty wetland sites within one watershed of the Flathead Indian Reservation (Appendix B) are selected to be assessed, ensuring a broad sampling scope and accessibility. Within a three-month summer field season, the Wetland Coordinator and other staff will survey a 1-acre area of all 20 wetlands, called the assessment area, or AA. A sampling of these sites will be reassessed in future years to compare the results over time. The AAs will be identified by Hydrogeomorphic class (HGM): Riverine, Depressional, Slope, Mineral Soil Flats, Organic Soil Flats, or Lacustrine Fringe. Water Regimes will be identified as: Permanent/ Perennial, Seasonal/ Intermittent, or Temporary/ Ephemeral.

Wetland classes will be described using both the HGM Classification (Smith and others 1995) and the United States Fish and Wildlife Service system (Cowardin 1979). Recognizing the need to better describe wetlands from the abiotic standpoint, the USFWS developed a set of hydro geomorphic-type descriptors as dichotomous keys that would be more compatible with its system. These keys bridge the gap between the habitat classification and the HGM system by providing descriptors for landscape position, landform, water flow path and water body type (LLWW; Tiner 1997b), important for producing enhanced characterizations of wetlands and deep-water habitats. The program was able to make better use of NWI data when additional descriptors (e.g., abiotic and landscape features) were added to the NWI database. Thus, watershed-based preliminary assessments of wetland functions could be performed. This new information also permits more detailed characterizations of wetlands for reports and for developing scientific studies and lists of potential reference wetland sites. The plant communities will be described according to Hansen and others (1995). The Montana Department of Transportation (MDT) Montana Wetland Assessment Method (Berglund 2008) will be used to evaluate wetland function at each site (Appendix D).

Site identification

Of the twenty AA's in a given watershed each field season, staff will revisit five (5) previously monitored sites and fifteen (15) newly selected wetland sites for vegetation and wetland assessment surveys. Selected wetlands will represent the full range of human disturbance, ownership, and wetland types found in the watershed, including compensatory mitigation sites when present. There are multiple steps to select sites, leading to a stratified sampling of the watershed.

For assessment site selection (15 sites and 2 backup locations), staff will:

1. Cut the 2005 NWI layer to the watershed boundary
2. Quantify the acreage of NWI cover classes: Shore, Aquatic bed, Emergent, Scrub Shrub, and Forested
3. Create a table of wetland acreage using Hydro Geomorphic Classes: Depressional, Riverine, Lacustrine Fringe and Slope

4. Select sites to represent diverse vegetative cover classes and HGM regimes within the watershed

For monitoring site selection (5 sites and 1 or 2 backup locations), staff will follow steps 1-4 above, and have confidence they can find the previously surveyed location. Methods to identify and locate previously assessed sites include using (when available) GPS location, referencing previously used maps or site descriptions, analyzing aerial images, and/or comparing site photos. Sometimes all of the above tools are utilized.

Field surveys will be sequenced to occur during appropriate flowering periods and hydrologic regimes for each sampling site. This will ensure that habitat or community types are correctly identified. Sites that occur on grazing allotments will be surveyed before the site is grazed whenever possible. If a site has been grazed to the point that vegetation and site characteristics cannot be accurately determined, an alternate site with similar attributes will be selected. The survey schedule will be developed to maximize efficiency and minimize staff travel time.

For the wetland soil carbon project, the three *created* sites were chosen due to their similar proximity, irrigation factor, age, and design. The three *time immemorial* sites were chosen for their similar undisturbed history, proximity, permanent standing water, and pingo scar geology.

Site access

Because roughly 40% of the Reservation is privately owned, some survey sites will be on private land. Landowner permission will be obtained prior to surveying the site. Alternate sites with similar characteristics will be identified for sampling in case access is denied or the site is inaccessible.

There are also unpredictable factors that may make sites inaccessible, such as changing road conditions and wildfire or other weather hazards. To account for site inaccessibility, the program will have identified and mapped 2 backup sites for assessment and 1-2 backup sites for monitoring prior to the field season. Staff will assess those sites instead. In the case that more than three sites have become inaccessible during the course of the field season, staff will follow the steps listed above to select new AA's.

For the wetland soil carbon project, all sites were on CSKT land. Sites were also chosen on a basis of feasible site access, including proximity to roads.

Project activity schedule

Table 4: Generic sampling activity schedule

Month	Sites
May	Select assessment sites

June	Compile assessment site maps and prepare for field season
July	Assess low elevation wetlands
August	Assess mid-elevation wetlands
September	Assess high elevation wetlands

For the wetland soil carbon project, all samples were taken over a short time period in September 2022 to reduce the variability in rainfall, temperature, plant growth, and other factors that could change rapidly and/or suddenly over the sampling time frame.

Critical and informational data

The Program will consider hydrologic and indicator plant species data as critical for both wetland delineation as well as an assessment of wetland health, function, and/or recovery. The program considers information from the MDT Montana Wetland Assessment form critical to monitoring and assessing sites for reasons of comparability, completeness, and accuracy. Ecological attributes assessed in this method are: landscape context, hydrology, biotic structure, and wetland functions (threatened and endangered use, species of concern, flood attenuation, nutrient removal, water storage, uniqueness, and recreational potential). The Montana Wetland Assessment Method also includes a checklist of potential wetland disturbances that allows for exploration of possible relationships between assessment scores and particular stressors. Identification of invasive plant species will also be considered critical, initiating inter-departmental communication and planning for invasive plant removal or reduction efforts where possible.

Informational data will be limited to general descriptors of the wetlands.

Sources of variability

Key sources of variability in the program's data sets over time has been technological advancements and updates to the MDT Montana Wetland Assessment Method.

Technological advancements, such as improved aerial imagery and mapping devices, have revealed some discrepancies between older and newer data. Where these discrepancies exist, staff will document a change in technology to explain the variability in the final report. If the discrepancy is large enough to cause future confusion, the program will create dated addendums to past reports that reflect the technological advancements and clarify errors.

The MDT Wetland Assessment Method was updated in 2008, causing some scoring changes in monitoring sites from one assessment event to the next. If it can be determined that a score change over time can accurately be attributed to a change in scoring methodology, the cause will be documented in the final report. This will eliminate any false conclusions that the AA is changing on the ground.

Sources of variability in our field season may include but are not limited to changes in weather conditions during sampling and limitations to sites due to accessibility problems.

For the wetland soil carbon project, limited funding and time allowed only three *created* and three *time immemorial* wetlands to be studied. Each site has some variability, including hydrologic connection, vegetation, date of creation, degradation history, irrigation, and more. These variables were expected for this small pilot study and were unavoidable.

SECTION B2: SAMPLING METHODS

Sampling SOP's
All program SOP's are in Appendix E.

The program will sample all AA's using the MDT Montana Wetland Assessment Method (2008). All surveys will be taken in the sample period window from July to September. This time affords the best hydrologic conditions for access and plant identification. The botanist does not need the flowering season to properly identify the wetland species in the selected sites. The Wetland Coordinator will maintain a schedule consistent with prior years to facilitate data comparisons.

The botanist will note all the native and exotic species, floristic quality, guild composition, community composition, and vegetation structure. If the botanist is unable to identify a species, a plant sample will be collected and preserved, to be properly identified at the contracted botanist's lab.

Hydrology data will include a degree of saturation, degree of inundation, and types of hydrologic alteration.

Program staff will take photos at all AAs along with notes to ensure proper headings and comparability across assessment seasons. An example note is, 'View looking north.' At least two photos of two different headings will be used for the final report.

The time it should take for any given site will vary depending on driving time and how close the site is to a road but for the sampling itself it should take no longer than a few hours.

No sites will be merged for any reason. These sites need to be compared to past and future samples.

For the wetland soil carbon project, the sampling method was designed after recent, similar, peer-reviewed studies, keeping in mind the limitations of funding and time for this pilot project.

Sample collection
No soil or water samples will be collected. Some plants may be collected for proper identification and verification against reference plants, but they will not be sent to a lab or stored beyond the period of identification.

For the wetland soil carbon project:

At each site, three concentric circles were loosely delineated (figure 1). This included an outer ring (A), a middle ring (B), and an inner circle (C). At each site, the inner area, C, was delineated by standing water. Areas A and B were differentiated by bare soil and observable vegetation change. Our aim was to represent the heterogeneity of each wetland overall, with each ring representing a relatively homogenous zone within the heterogeneous wetland.

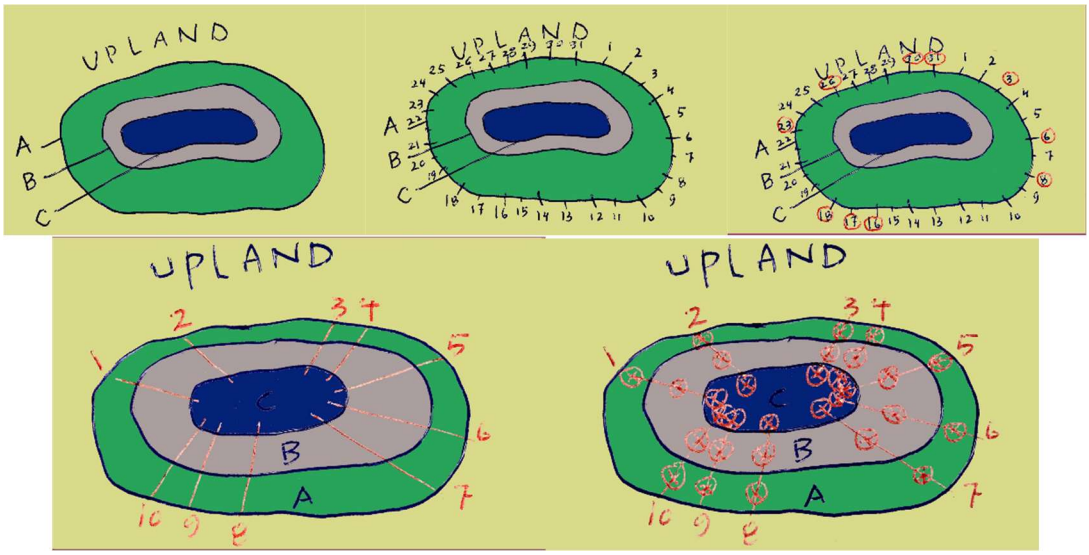


Figure 1: Process to select samples. Top left, initial delineation into 3 homogenous groups within each site. Top middle, dividing and numbering outer area edge. Top right, random selection of 10 edge points. Bottom left, for each selected edge point, horizontal transect lines drawn from outer edge to center area. Bottom right, along each transect line, a 20 cm core was drawn from area A, B, and C.

Our next step was to randomize our outer points. Dividing wetlands into the aforementioned concentric circles was a means of stratification. In order to add randomization into our methodology, we numbered relevant edges sequentially,

estimating equivalent distance between each point (Figure 1). We then randomized selection of ten edge numbers. The selected ten numbers functioned as our outer transect line points.

From each outer point, we established horizontal transect lines, crossing from point A, through point B, into point C. A core was gathered from each area (A, B, C) (Figure 1). Our innermost point, C, was gathered, about 1.5 meters in from the standing water line, at the time of collection, rather than a central point in the standing water. This was for reasons of timing, safety, and access.

For each core, we divided them into two depth classes, 0 -10 cm and 10 - 20 cm (Figure 2). In effect, this meant that from each transect line, we would gather a core from area A and divide it into two depths, a core from area B and divide it into two depths, and a core from area C and divide it into two depths.

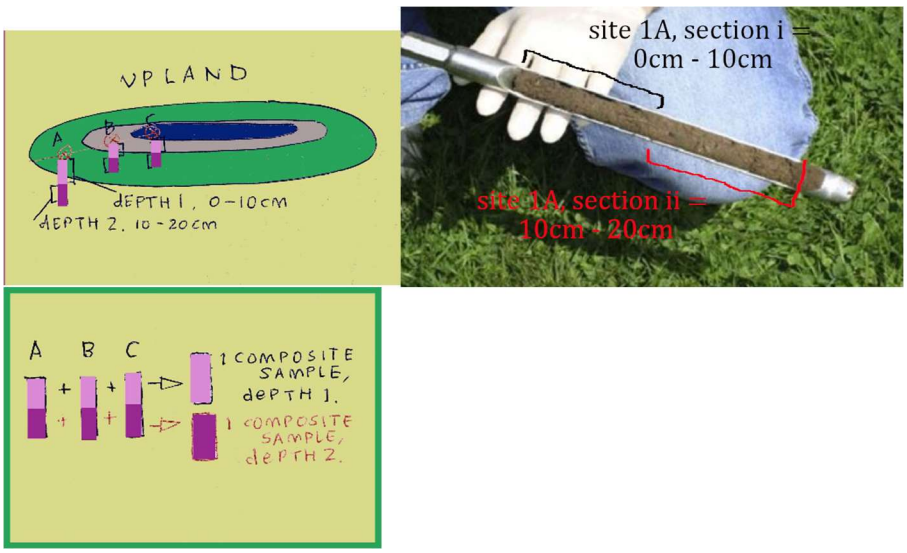


Figure 2: Left, process of gathering each core with a tool length of 20 cm, then dividing each core into two depth classes, depth 1 and depth 2.

For each depth layer, a composite sample was created. We mixed the first depth class of area A, area B, and area C (Figure 2). This created one composite sample for depth class one. We mixed the second depth class cores from area A, area B, and area C. This created one composite sample for depth class two. At each wetland, we gathered 10 composite samples from depth class one, and 10 composite samples from depth class two.

In total, our work created 120 composite samples:

- 30 composite samples from *time immemorial* wetlands at a soil depth of 0 - 10 cm
- 30 composite samples from *time immemorial* wetlands at a soil depth of 10 - 20 cm
- 30 composite samples from *created* wetlands at a soil depth of 0 - 10 cm
- 30 composite samples from *created* wetlands at a soil depth of 10 - 20 cm

In-situ Monitoring
N/A

Continuous monitoring
N/A

Sample homogenization, etc.
For wetland soil carbon project, each core was homogenized via an electric grinder. Grinding time was minimal. Only 20 g of soil was needed from each core. The remaining core soil was set aside for further analysis. Each core was dried in a conventional home oven for approximately 12 hours at 60 degrees Celsius (until stable weight was achieved), and ground separately in a FLBS-provided soil grinder for less than 30 seconds each. Relevant composite groups were gathered and sieved together, at 2 mm. These three cores were then mixed by hand for final homogenization and poured into respective lab vials.

Volunteer Erin Bell used a Taylor digital scale with 0.001 gram precision to measure dry mass of samples during oven drying process. The FLBS elemental analyzer uses only 10 mg of the homogenized sediment, weighed to the nearest 0.001 mg with an ultra-micro balance, then deposited into a precombusted aluminum capsule. The top of the aluminum capsule is crimped with Teflon-coated flat-tipped forceps and placed into a precombusted nickel sleeve before analysis.

Sample containers and volumes
Since no water or soil samples will be taken there will be no need for containers to hold the samples. However, a percentage of plants will be collected and pressed. Staff will make every effort to collect a minimum number of plants. Any unidentifiable plants will be collected as long as there are more than 50 individuals present and they are not suspected to be rare or threatened. Plants will return to the office in the plant press for use of a microscope and/or for reference to our herbarium specimens to aid in the proper identification and/or verification of plant species. (https://anpc.ab.ca/wp-content/uploads/2015/01/researchers_students.pdf)

Lab vials were provided by Flathead Lake Biological Station for the wetland soil carbon project.

Sample preservation
No samples will be preserved since the contracted botanist will be on site. However, the Coordinator will QC the botanist's records with reference species lists in field guides and/or pressed plant references to ensure that determinations to the species level are consistent and stable.

Decontamination procedures
Program staff will spray all boots, equipment, and vehicle tires between AA's with bleach-water to prevent the transport of invasive species seeds/larvae from one site to another. Additionally, when mud is present, staff will employ a combination of physical removal of mud with a stiff bristle brush and soaking waders and tools in Virkon Aquatic for 20 minutes to allay the risk of transporting New Zealand Mud Snails. Proper cleaning of all tools and key catalogs will also prevent contamination.

Equipment and support facilities
Tools required for site assessment are listed in section B6. The Wetland Coordinator and botanist will be responsible for maintaining all the tools needed to properly identify plants and assess the selected sites.

Actions to take when problems occur
If any problems may occur, the site will be put on hold until the problem is resolved. It is the responsibility of the wetland coordinator to monitor field staff and document problems that occur in the field. If corrective action is required, the coordinator will take appropriate action as per CSKT policy, document the action taken, and inform their direct supervisor of problem(s), person(s) involved, and corrective actions taken.

SECTION B3: SAMPLE HANDLING AND CUSTODY

In accordance with the MDT Wetland Rapid Assessment Method, no samples will be collected at AA's, so sample handling and custody do not apply.

For wetland soil carbon project, vials were stored indoors in an air-tight container with SKC volunteer Erin Bell until transport to Flathead Lake Biological Station. This process was repeated for all samples. Once samples arrived at Flathead Lake Biological Station, communication and updates were sent via email between laboratory staff, volunteer, and coordinator. Samples were disposed of after laboratory analysis.

SECTION B4: ANALYTICAL METHODS REQUIREMENTS

Analytical SOP's:
The wetland coordinator will be using the Montana Department of Transportation's Wetland Assessment Method in monitoring wetlands.

For wetland soil carbon project, FLBS follows the EPA Method 440.0, which is identified in the paper, "Determination of Carbon and Nitrogen in Sediments and Particulates of Estuarine/Coastal Waters Using Elemental Analysis" (Zimmerman et al. 1997).

Equipment and Instrumentation Needed
Necessary field equipment is listed in section B6.

For wetland soil carbon project, FLBS used an Exeter Analytical CE-440 Elemental Analyzer.

Method Performance Criteria
Three key criteria which are considered when specifying an analytical method are (1) method comparability with historic or other data sets, (2) detection limits achievable with a given method, as compared to the detection level needed to obtain meaningful results and (3) requirements of regulatory or non-regulatory programs which govern water quality standards and wetlands.

Procedures to Follow if Failure Occurs
If an assessment is not completed in a site visit, the wetland coordinator will revisit the site the following day or schedule an appropriate time to complete the task. If any problems occur, the site will be put on hold until the problem is resolved. It is the responsibility of the wetland coordinator to monitor staff and document problems that occur. If corrective action is required, the coordinator will take appropriate action as per CSKT policy, document the action taken, and inform their direct supervisor of problem(s), person(s) involved, and corrective actions taken.

Sample Disposal Procedures
Pressed plants will be disposed of in a plastic bag. The same disposal procedure was used for leftover soil samples at FLBS.

Laboratory Turn Around Times
Do not use a laboratory for MWAM assessments.

For wetland soil carbon project, soil carbon content was not time-sensitive, so FLBS held the samples for the fall of 2022 and into winter of 2023. Updates were sent via email to coordinator and volunteer.

Method Validation and SOPs for nonstandard methods
Within the same week the assessment occurred, the wetland coordinator and the contractors will bring assessment sheets back to the office to verify their completeness and accuracy before scanning forms onto the shared Tribal server for later analysis. After this process is complete for all 20 AA's, the Wetland Coordinator will share data sheets with staff and/or contractors that will be tabulating field data, analyzing data, creating maps, assessing land-cover change and writing the final report.

SECTION B5: QUALITY CONTROL REQUIREMENTS

Quality Control Measures:
Since the wetland program does not collect samples, sampling QC measures will not apply, i.e. no blank, spike, or duplicate samples will be collected.

To ensure quality control, the wetland coordinator, any contractors, and the professional botanist will fill out the field sheets together to make sure the data is accurate. Within the

same week the assessment occurred, the wetland coordinator and the contractors will bring assessment sheets back to the office to verify their completeness and accuracy. Common and scientific names for the species are standardized using the *Montana Plant Field Guide* managed by the Montana Natural Heritage Program. Staff will then scan forms onto the shared Tribal server for later analysis. After this process is complete for all 20 AA's, the Wetland Coordinator will share data sheets with staff and/or contractors that will be tabulating field data, analyzing data, creating maps, assessing land-cover change and writing the final report.

Corrective action steps may employ use of field audits or training updates. All corrective action steps will be documented by the project Quality Assurance officer.

For the wetland soil carbon project, no field blanks, nor duplicates, were collected, due to time and funding constraints. However, FLBS uses two laboratory duplicates (aliquots of the same sample taken in the laboratory) that are analyzed separately with identical procedures. Analyses of LD1 and LD2 indicate precision associated with laboratory procedures, but not with sample collection, preservation, or storage procedures. They also analyze a Lab Fortified Blank, described in QAPP Section A7.

Exceeding control limits:
FLBS takes corrective actions whenever known samples are analyzed beyond acceptable ranges or limits, and proceeds once the problem is identified and resolved.

Procedures for Calculating QC Statistics:
To prevent any bias, samples will be taken stratified randomly around the wetlands. The botanist and wetland coordinator will be on-site together. Before leaving an AA, they will compare data on the field sheets to rectify discrepancies and prevent sampling errors. If the assessment form is not complete, the data cannot be used and the site must be reassessed.

SECTION B6: INSTRUMENT MAINTENANCE REQUIREMENTS

Maintenance of field and lab equipment
Field equipment is listed on Table 5 below. Tools will be cleaned after each site to prevent any transport of invasive species (see Section B2 for decontamination protocol). Boots will be cleaned and hung up to dry after each site is surveyed. Electronic equipment will be stored in protective cases until they need to be used to prevent damage. Updates will be installed monthly to ensure high functionality while in the field.

Table 5: Field equipment

Equipment	Personal Gear
Site folders	Knee boots
Clipboards	Waders
Datasheets	Bug spray
MDT Wetland Assessment method	Hat
Old assessment report	Sunglasses

Plant manuals	Lunch
Pencils	Water
GPS and batteries	Cell phone
Camera and batteries	
Soil probe	
Site maps	
Zip lock bags	
Sharpie	
Spare Batteries	
Invasive species guide	
Soil guide	
iPad	

For wetland soil carbon project, coordinator and volunteer used a 2mm soil sieve, plastic lab vials, a 20cm soil coring hand tool, plastic gloves and bags, and a conventional home oven. PPE, including waders, was also used during sampling.

Testing Criteria
Before any samples are taken, the wetland coordinator will inspect the field equipment to make sure it is clean and that no contaminants are being spread.

Availability and Location of Spare Parts
The Program will store additional equipment and spare parts in the program office located at 301 S. Main Street in Polson, MT. Spare parts include but are not limited to:

Batteries for camera and GPS
Decontamination equipment (bleach etc.)
Field Guides

Spare parts to be stored in the program vehicle include:

Batteries
Chargers
Extra assessment sheets

Procedures for Equipment Inspection
All equipment will be inspected prior to a site visit, immediately after performing a site evaluation, and at the end of the sampling day. An inventory of all equipment will also be performed prior to the onset of the assessment season and again at its conclusion.

Individuals Responsible for inspection and maintenance
The Wetland Coordinator is responsible for testing all equipment belonging to the Program. The contracted Botanist is similarly responsible for testing all items needed during his/her field investigations. The Program Coordinator will assume responsibility for inventorying, storing and maintaining all equipment outside of the assessment season.

Corrective Actions
The Wetland Coordinator is responsible for determining and executing all corrective actions associated with equipment malfunction or other issues that may arise. The Coordinator will document all corrective actions taken, the date, and an explanation for the actions and store this information within the program files.

SECTION B7: INSTRUMENT CALIBRATION AND FREQUENCY

Equipment, tools, and instruments that need calibration
The GPS unit is the only field item that needs calibration (to correct datum).

FLBS follows manufacturer's installation and temperature stabilization procedures, including daily calibration procedures before sample analysis begins. The lab establishes a single response factor (RF) for C by analyzing a weighed portion of the calibration standard (acetanilide). The mass of calibration standard should provide a response within 20% of the response expected for the samples being analyzed. Following a formula outlined in EPA Method 440.0, the lab establishes a calibration curve.

Calibration schedule
Date and time functions will be checked on the camera. The GPS instrument is calibrated each time it is used and/or when the batteries are changed. Elemental analyzer is calibrated before each use.

Resolution of Deficiencies
The Wetland Coordinator will resolve any problems with equipment calibration or deficiencies prior to the sampling date. If issues arise during the field assessment, the Coordinator will note the problem on field forms and utilize the GPS or camera feature on the program iPad. Upon return to the office, the coordinator will fill in missing information to the best of their ability and perform a calibration or get parts needed before the next assessment.

For wetland soil carbon project, laboratory staff will resolve deficiencies in-house or with instrument company's warranty.

SECTION B8: INSPECTION REQUIREMENTS FOR SUPPLIES

For wetland soil carbon project, vials are obtained from the Flathead Lake Biological Station and are visually inspected prior to sampling. See QAPP Section B3 for more information.

SECTION B9: USE OF EXISTING DATA

Data Sources
This section refers to information which is required, but is not directly collected through the CSKT monitoring program. The primary types of information sources which will be used to supplement CSKT wetland programs are: 1) Level I GIS data managed by the

U.S. Geological Survey, 2) National Wetlands Inventory (NWI) data managed by the U.S. Fish and Wildlife Service, 3) National Agriculture Imagery Program (NAIP) aerial imagery, managed by the USDA's Farm Service Agency (FSA), 4) aerial photos from 1934 and 1979 agricultural surveying on the Reservation, and 5) plant data from the Montana Natural Heritage Program.

Intended Use of Information
The program will utilize GIS, NWI and NAIP resources in the planning stages to select assessment sites that meet the program's diverse assessment requirements. These data sources will also be used in the post-field phase to create land-use/land-cover change maps as well as to help identify wetland nexus potential.

Specifically, land cover change maps are developed by selecting 8,500 acre squares that are representative of the watershed (based on relative frequency of wetland types). Then, 1982 aerial imagery is scanned into a jpg format, imported into ArcGIS, then georeferenced to the 2019 imagery. Habitats are then interpreted using the Cowardin and Anderson classification methods (wetland and upland types). Maps are reviewed meticulously to confirm habitat types, then differences between imagery is calculated and displayed in a spreadsheet. This procedure is mostly completed by the GIS Contractor.

Data from the Montana Natural Heritage Program will be used to document whether plants are a species of concern and to find the Coefficient of Conservatism value (c-value) of plants in each AA.

Acceptance Criteria
Data from these government agencies are considered very reliable, and are only assessed for quality if significant outliers are detected. Under the Information Quality Act (2002) government-wide guidelines were issued to government agencies pertaining to data and maximizing the quality, objectivity, utility, and integrity of information. The wetlands program will accept all data that follow these guidelines.

Key Resources
These data sources will be accessed through the internet at https://www.fws.gov/wetlands/; https://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/naip-imagery/; and http://fieldguide.mt.gov/. GIS data will be accessed by the Tribes' GIS specialists, using ArcGIS software.

Limits to Validity
Wetland program limits to validity extend to government agencies observing the Information Quality Act guidelines and non-government sources of information to be peer-reviewed. Any perceived variances in mapped and on-the-ground reality will be documented in the field notes and provided to the CSKT GIS staff.

SECTION B10: DATA MANAGEMENT

Data Management Scheme
The flow of data collection and management is summarized in the following table.

Table 6: Overall flow for data management procedures

	Sample process step	*Tracking tool*	*Primary Responsibility*
↓	Preparation for sampling	Supply inspections, field collection check list, equipment calibration, notebook	Wetland Coordinator
	Field data collection	Field forms, AA files in protected file case, ipad with Collector application (online data storage)	Wetland Coordinator
	Data review and validation	QC checks on all field forms, plant species lists, scientific names, C-ratings, and re-tabulation of final function and value summary and overall rating	Contractor
	Corrective action (if required)	Corrective action reporting	Wetland Coordinator
	Data entry and management	Data management form	Contractor and Wetland Coordinator

Data Archival and Retrieval
Data will be archived in a comprehensive Microsoft Access Database by the contractor and Wetland Coordinator. A series of instructions for manual data entry, written by the contractor, are available for reference. Original field forms will be kept in the Wetland Coordinator's program files, sorted by year and AA. The contractor will manage electronic copies of field forms, which will remain available upon request by the program. Data will also be backed up to external hard drive. Retrieval from databases consists of correctly logging into the system and downloading the needed data.

Summaries, tables and graphs of the data will be stored by both the Wetland Coordinator on the shared tribal server as well as by the contractor onto a hard drive. The contractor will submit a final report to CSKT. The Wetland Coordinator will send the final report to the EPA regional officer as well as submit it electronically to max.gov. Ultimately, the wetland program coordinator is responsible for overseeing data management.

Hardware/Software Configurations
CSKT Information Technology (IT) Department is responsible for all hardware and software configurations for the Wetlands program. All installations and/or updates of programs must first be approved by the IT department before they occur. All problems with wetland program hardware or software files are reported to the IT department for repair.

The wetland soil carbon project did not use checklists or forms for this pilot study.

C. ASSESSMENT OVERSIGHT

SECTION C1: ASSESSMENT AND RESPONSE ACTIONS

Number, Frequency and Type of Assessment
One element of program assessment is annual performance reviews for all staff by their direct supervisor. Performance reviews will be stored in the employee's personnel file at the Tribal Personnel Office, available to the employee, their direct supervisor, and their division manager. Another element of program assessment is cross-referencing of data collection by at least two staff. Often, this occurs in the field. At each stage of the data collection and management process, a staff person not primarily responsible for a given task will review another staff person's work. For example, when the botanist compiles plant species lists and turns them over to the contractor, the contractor will review all lists to ensure accuracy and completeness. When the final report is compiled, it will be critically reviewed by the Wetland Coordinator and the contractor before being submitted to the EPA as a final draft.

Individuals Responsible for Conducting Assessments
The Project QA Officer will have primary responsibility to track assessment program performance and conduct field audits.

How and To Whom Assessment Information Will Be Reported
The Division of Environmental Protection Manager or Program Manager may initiate an assessment program audit at any time. Additionally, the EPA Project Manager or EPA QA Officer may conduct an oversight audit of field procedures at any time.

Corrective Actions
If corrective actions are required, they will be documented through a corrective action report. Corrective action measures will include target quality control assessments, audits, training updates, or solicited external review from a peer organization. The CSKT Environmental Division Manager is responsible for corrective actions.

SECTION C2: REPORTS TO MANAGEMENT

Assessment and interpretation reports are generally prepared at the conclusion of a project or at infrequent intervals. Periodic updates are provided in biannual reports to EPA and quarterly reports to CSKT. The Wetland Program Coordinator is responsible for preparing project reports and assessments.

The Coordinator was in frequent contact with the SKC Volunteer researcher during the wetland soil carbon project. Final research paper written by volunteer is forthcoming and will be edited by coordinator. Results will be shared with CSKT Natural Resources Department staff and CSKT Tribal Council.

D. DATA VALIDATION AND USABILITY

SECTION D1: DATA REVIEW, VERIFICATION, AND VALIDATION

To determine validity and to meet data quality objectives, data are reviewed on a continual basis: by a second staff during field collection, as they are entered into databases from field forms, and in the final report from our contractor. If field forms are found to be incomplete upon return to the office, field staff will be asked to review the forms and fill in missing data where possible. If the mistake is found more than a week later than the assessment occurred, the data will be considered incomplete and will not be used in a final report. If time and scheduling allows, staff can reassess that AA to complete the field sheet or use one of the backup AA locations for final reporting. The coordinator is responsible for the preparation of semi-annual and final EPA project reports that include reviewed data. Additionally, the reports list the components within the Tribes' Wetland QAPP and applicable components of the Water Quality Monitoring QAPP, and evaluate whether the procedures were implemented properly.

For the wetland soil carbon project, data collection by SKC volunteer was observed by Wetland Coordinator, CSKT staff biologists, and SKC professors to help ensure correct methods. As the volunteer collected data and processed samples, the Wetland Coordinator was in frequent contact. FLBS uses a high-level analyzer and staff are trained in quality control procedures regularly. Interpreting laboratory data included statistical significance testing (Tukey's Honest Significant Difference Test) and group conversation regarding all potential variables that might affect soil carbon content. Final report to be reviewed by CSKT, SKC, and EPA.

SECTION D2: VERIFICATION AND VALIDATION METHODS

Data verification and validation methods
Data will be validated and verified using data quality objectives acceptance criteria and assessment approaches (defined in Section A7).

Person responsible
The Wetland Coordinator and Botanist will be responsible for the verification that all vegetation is properly identified and validated data is properly placed on the MDT field sheets. The Project QA officer will have primary responsibility to validate data. The Wetlands Program Coordinator will be responsible for using the validated data in semi-annual and final project EPA reports.

Issue resolution process
The Wetland Coordinator will review the MDT field sheets after the assessment is complete to ensure accurate data transcription and consistency through the full assessment process. The Wetland Coordinator will give the reviewed data to program contractor for statistical analysis to evaluate data consistency and identify outlier information.

Checklists, Forms, and Calculations
The Program will follow all methods for wetland evaluation, data handling, data analysis and form completion. A checklist will not be used.

SECTION D3: RECONCILIATION WITH DATA QUALITY OBJECTIVES

Procedures to evaluate data uncertainty
Data are reconciled with data quality objectives using procedures outlined in Section A7. Field notes and supporting documentation are reviewed to identify if anomalous sampling conditions were encountered. Both climatic and hydrologic data are recorded, making it possible to determine whether sampling conditions may have influenced the data collected.

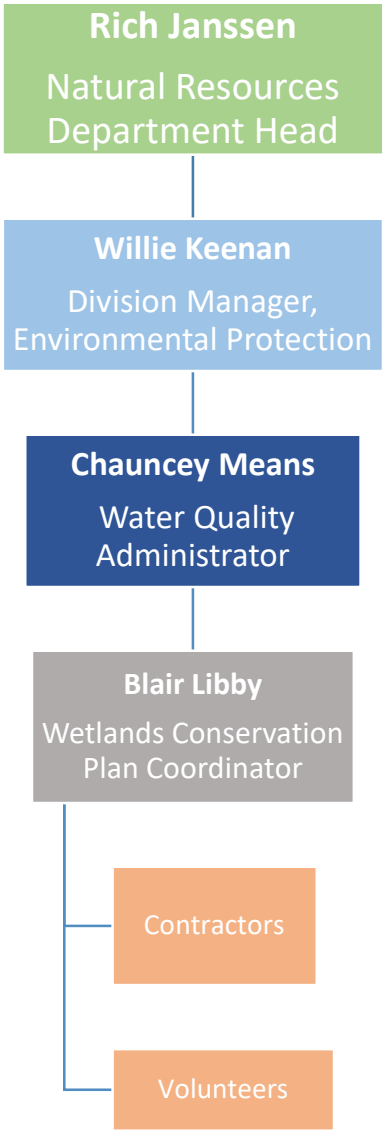
Reporting data limitations to users
Outlier information is examined to determine if external factors, such as changing land uses, contributed to the unusual readings or if the data is flawed. Outlier information will be identified by comparing it to assessments from previous years and taking note of any major discrepancies, such as a complete change in land-cover or a massive invasion of non-native species. Data can be expected to show a small increase or decrease in wetland acreage and quality. Only when a range of assessment tools are exhausted will a set of data be considered non-valid and not incorporated into a final watershed assessment report.

For the wetland soil carbon project, this small pilot study was designed to gain an initial understanding of how CSKT could begin to compare wetland soils in the various types of wetlands on the Reservation – including human-made and naturally occurring. CSKT staff also embarked on this project to encourage Salish Kootenai College collaboration and raise awareness of the importance of our wetlands' carbon sequestration value. The short timeline and limited funding (to keep the analysis as a "minor contract" under $5,000 and the SKC researcher volunteering her time) significantly limited the variables that could be tested and accounted for. While these limitations are discussed in depth in the forthcoming research paper written by the SKC volunteer, we will use these limitations to encourage CSKT to invest more time, staff, and funding to this important but little-understood ecosystem service.

APPENDICES

APPENDIX A. CSKT Personnel and Organization

CSKT staff directly involved in the FY22-24 WPDG:

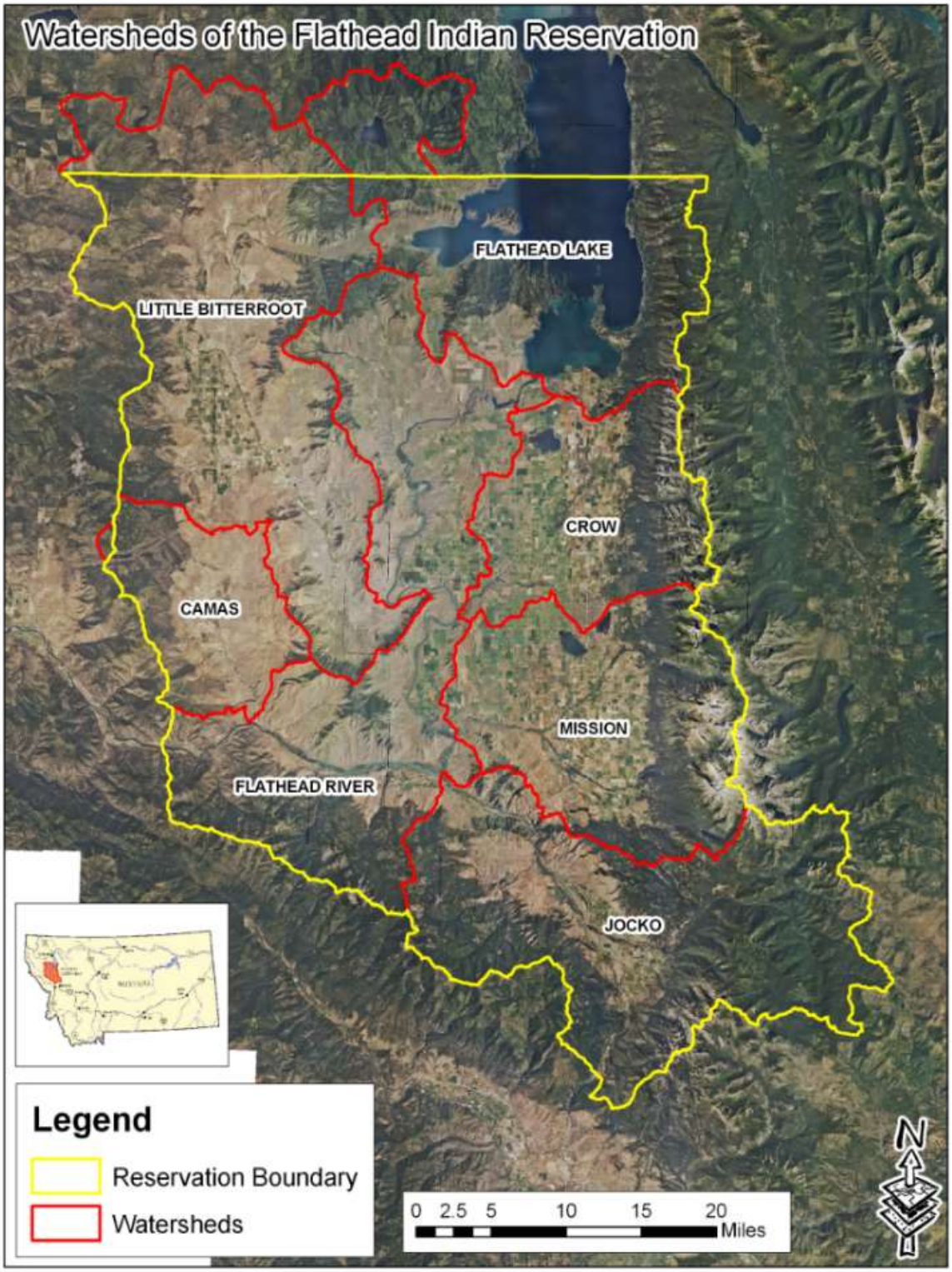


APPENDIX B. Previous Wetland Program Projects

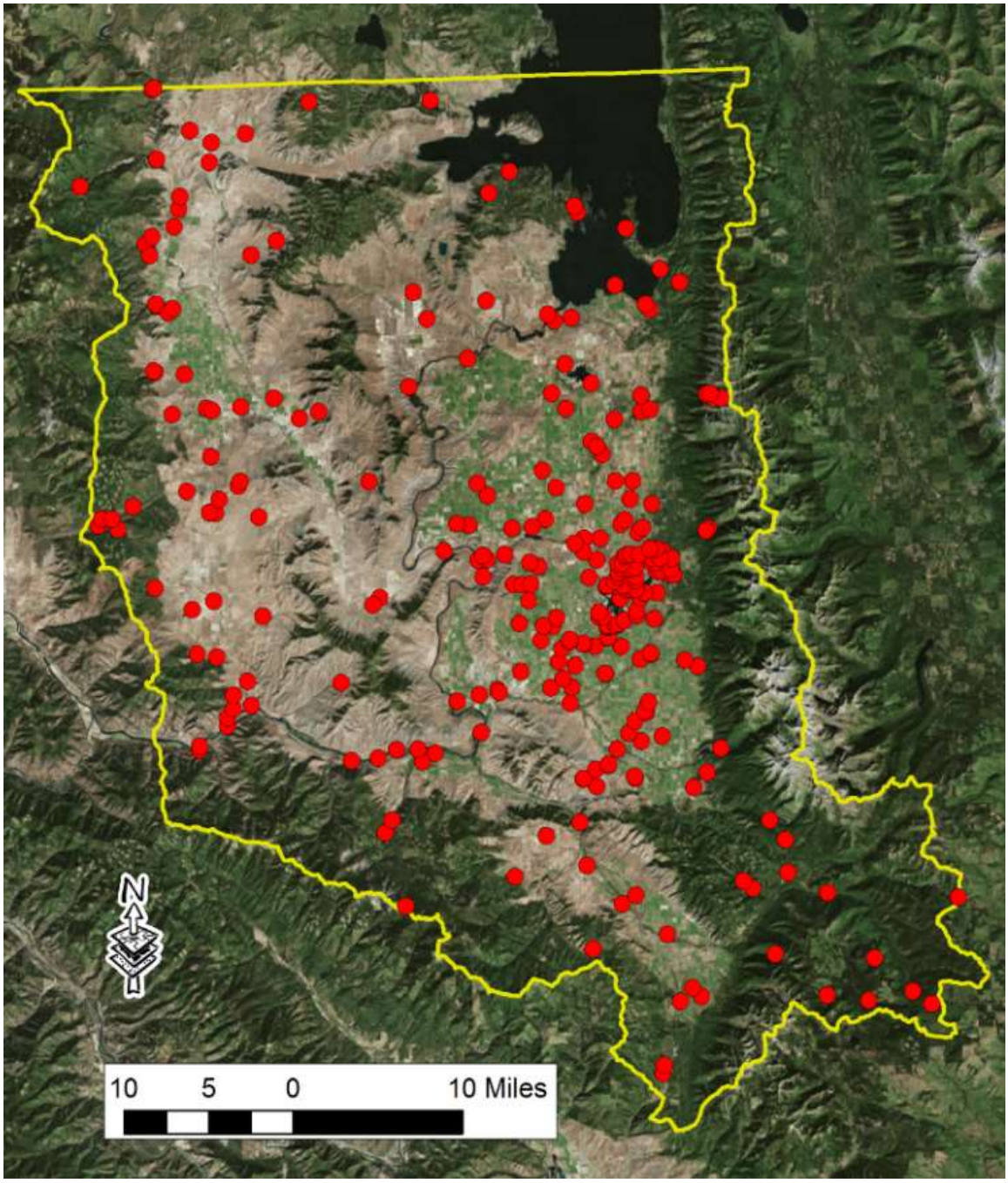
Overview of previous monitoring and assessment work:

1993: NWI accuracy assessment surveys (130), primarily in the Crow and Mission Watersheds.
2004: Mission Watershed (20 sites)
2005: Little Bitterroot Watershed (20 sites)
2006: Crow Watershed (21 sites)
2007: Flathead Lake Watershed (13 sites)
2008: Jocko Watershed (20 sites)
2009: Lower Flathead River Watershed (19 sites)
2010: Camas Watershed (18 sites)
2011: No funding
2012: Mission Watershed (20 sites). Land cover report completed for Mission Watershed.
2013: Little Bitterroot Watershed (20 sites)
2014: No funding
2015: No funding
2016: 5 monitoring sites in each watershed of the Reservation (35 total)
2017: Crow Watershed (20 sites)
2018: Flathead Lake Watershed (20 sites)
2020: Jocko River Watershed (20 sites)
2021: Started biennial monitoring and assessment (planning only)
2022: Lower Flathead River and Camas watersheds (20 sites in each watershed – 40 total)

Seven Watersheds of the Flathead Indian Reservation:



Previous monitoring and assessment sites:

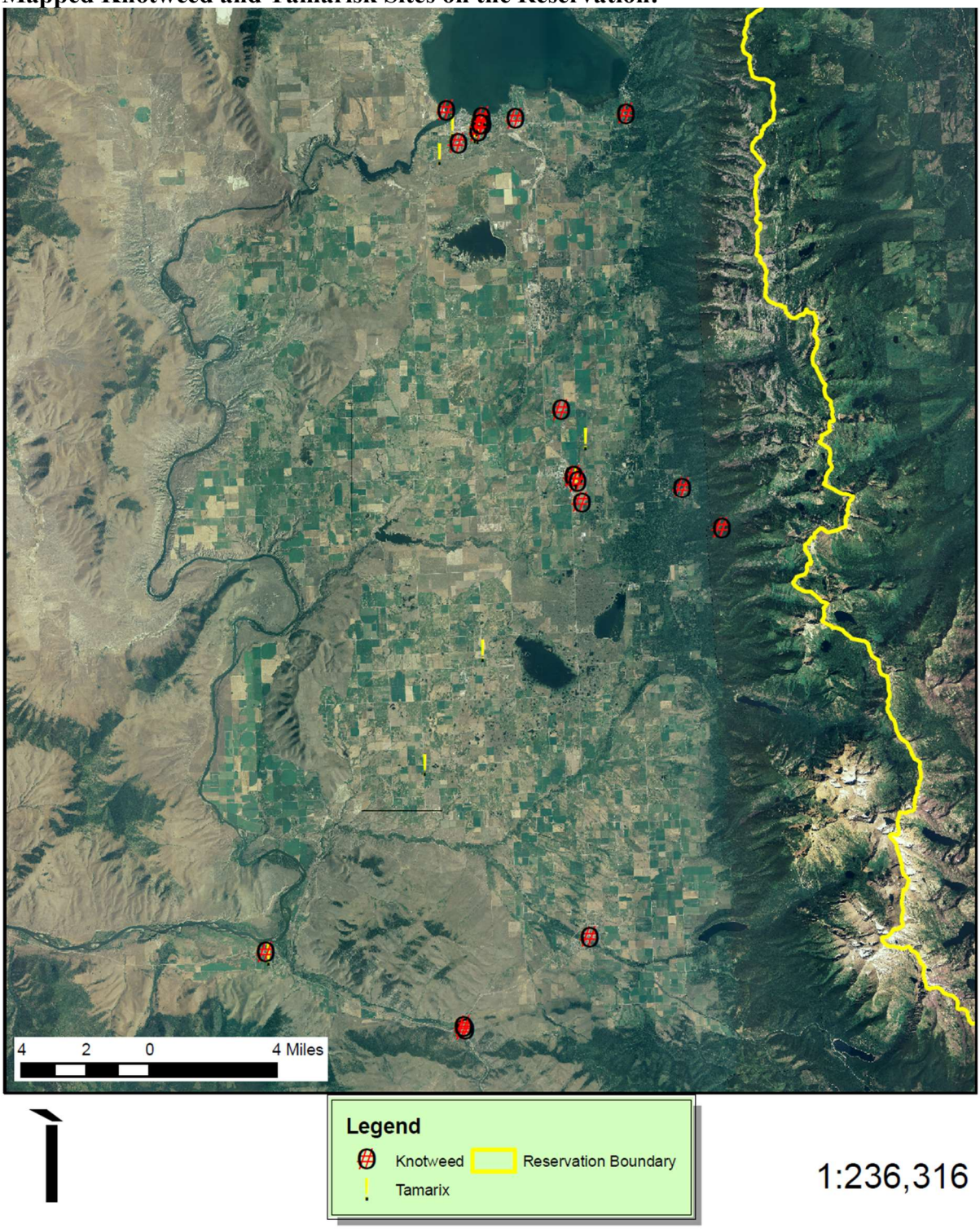


Wetland soil carbon project sites:

"Time immemorial" wetlands (outlined in blue), in the Kicking Horse WPA south of Ronan, MT

"Created" wetlands (outlined in blue), south of Charlo, MT

Mapped Knotweed and Tamarisk Sites on the Reservation:



APPENDIX C. Wetland Program Plan 2021-2025

A People of Vision

Fiscal Year 2021-2025
CSKT Wetland Program Plan (WPP)

Submitted to Toney Ott and Diana Hammer, EPA
Date: February 27, 2020

Confederated Salish & Kootenai Tribes
Division of Environmental Protection
Natural Resources Department
PO Box 278
Pablo, MT 59855

Overall goal statement and time frame for Plan:

The Confederated Salish and Kootenai Tribes (CSKT) *Wetlands Conservation Plan for the Flathead Indian Reservation, Montana* (1999) was the basis for developing the Wetland Conservation Program (the Program). The 1999 plan provides direction to Tribal Programs for the protection and restoration of wetlands and riparian areas on the Flathead Indian Reservation

and guided program development over the next five years as presented in this Wetland Program Plan (WPP 2021-2025). Combined, the Wetland Conservation Plan and the current WPP provide the framework for linking and coordinating Tribal programs with wetland or wetland related duties so all function together as a comprehensive wetland protection and restoration program. In addition, the wetland program will continue to develop its monitoring efforts and other elements of its work, as reflected in this document.

CSKT's *Wetlands Conservation Plan* sets both an interim goal and a long-term goal for the wetland and riparian resources of the Flathead Indian Reservation (Figure 1).

> The **interim goal** is to halt the loss ("no net loss") of the remaining wetlands and riparian areas and halt the decline in wetland and riparian quality.
>
> The **long term goal** is to increase the acreage of wetlands and riparian areas and improve the quality of the resources.

These goals will be accomplished by implementing EPA's Core Elements Framework:

1. **Monitoring and Assessment**
2. **Regulatory Activities Including 401 Certification, if required**
3. **Voluntary Restoration and Protection**
4. **Water Quality Standards for Wetlands**

The interim and long term goals are a synthesis of Tribal goals for wetlands and riparian lands articulated in prior plans, strategies, ordinances, consent decrees, environmental standards, and best management practices (BMP) as stated in the *Wetlands Conservation Plan for the Flathead Indian Reservation, Montana* (1999).

The wetland program will use this information to:

- improve understanding of baseline wetland condition
- continue to develop benchmarks for wetlands restoration or protection
- inform development of wetland-specific water quality standards
- inform best methods to implement wetland-specific water quality standards
- continue to build core elements of the Tribes' WLCP
- prioritize wetland restoration and protection activities

The CSKT plans to continue to reach for these goals by monitoring and assessing Flathead Indian Reservation aquatic resources over the next five years.

CSKT is currently using the MDT Montana Wetland Assessment Method to collect data (Berglund and McEldowney 2008). A future consideration to improve and enhance documentation is customizing the method to include additional comment sections. CSKT may consider adding components documenting cultural use and significance; however, this important cultural component is solely dependent upon the prior approval of the Salish Pend d 'Oreille Cultural Committee (SPCC), the Kootenai Cultural Committee (KCC), and the CSKT Tribal Preservation Department (TPD).

HISTORICAL ACCOMPLISHMENTS

One of the priorities of the Wetland Conservation Program, as outlined in the *Wetlands Conservation Plan for the Flathead Indian Reservation, Montana* (1999)**,** and the CSKT Wetland Conservation Strategy, is the mitigation of impacts to wetlands from development. For example, CSKT Natural Resources Department has worked with the Montana Department of Transportation (MDT) and US Army Corps of Engineers to mitigate impacts from highway construction on the reservation. The CSKT developed and managed a wetland ecosystem restoration preserve called Finley Flats to mitigate for unavoidable impacts to wetlands resulting from the reconstruction of Highway 93. CSKT and MDT have also worked together to identify project sites for MDT-managed mitigation properties, in which CSKT plays a vital role in project design and oversight. The Tribes continue to hold not only MDT, but all developers, accountable for unavoidable impacts to wetlands.

In 2004, the CSKT Wetland Conservation Program (WLCP) began monitoring and assessing a representative subsample of wetlands within the seven watersheds of the Flathead Indian Reservation. The monitoring and assessment of wetland conditions and functions is ongoing.

The following is a list of the CSKT Watershed Wetland Assessments completed to date.

1. 2004 Mission Creek 20 sites
2. 2005 Little Bitterroot River 20 sites
3. 2006 Crow Creek 21 sites
4. 2007 Flathead Lake 13 sites
5. 2008 Jocko River 20 sites
6. 2009 Lower Flathead River 19 sites
7. 2010 Camas 18 sites
8. 2012 Mission Watershed 20 sites
9. 2013 Little Bitterroot Watershed 20 sites
10. 2016 Reservation-wide assessments 35 sites*
11. 2017 Crow Watershed 20 sites
12. 2018 Flathead Lake Watershed 20 sites
13. 2020 Jocko Watershed-pending 20 sites expected

*Note: no wetland funding in 2011, 2014, 2015 so no wetland monitoring occurred. In 2016, CSKT did not receive funding, but completed a Reservation-wide Wetland Assessment, assessing 5 sites from each watershed through the Water Quality Program.

Past CSKT Wetland Conservation Program products include:

- Watershed-based wetland monitoring and assessment reports
- GIS-linked project tracking tools to share with other stakeholders
- An assessment of National Wetlands Inventory (NWI) and hydrologic connectivity characteristics
- Invasive species mapping
- Land-use and land-cover change analyses and mapping

- Continuing work on Aquatic Invasive Species, climate change, and other broad issues that impact wetland resources
- Continued work on education materials for use in outreach activities

All products and outputs/deliverables are submitted digitally to the EPA and available in print upon request.

The Confederated Salish and Kootenai Tribes have two ordinances that legally protect wetland resources on the reservation. The Shoreline Protection Program is responsible for administering the Shoreline Protection Ordinance 64A (revised) and the Aquatic Lands Conservation Ordinance 87A. Those ordinances can be found at here: http://csktnrd.org/ep/shoreline-protection. The purpose of the Shoreline Protection Ordinance is to "conserve and protect Flathead Lake and all navigable waters within the Flathead Reservation." The purpose of the Aquatic Lands Conservation Ordinance is to "prevent the degradation of Reservation waters and aquatic lands by regulating construction or installation of projects upon aquatic lands whenever such projects may cause erosion, sedimentation, or other disturbances adversely affecting the quality of Reservation waters and aquatic lands."

The CSKT are approved for treatment in a manner similar to a state (TAS) to manage their CWA Section 303 Water Quality Standards Program and CWA Section 401 Water Quality Certification Program under Tribal Water Quality Management Ordinance (89a). Water quality criteria, designated uses, and an anti-degradation policy are all included in the Confederated Tribes' water quality standards. The CSKT's water quality standards were challenged by the State of Montana, the Supreme Court ruled in favor of EPA, holding that the CSKT's TAS was appropriately determined.

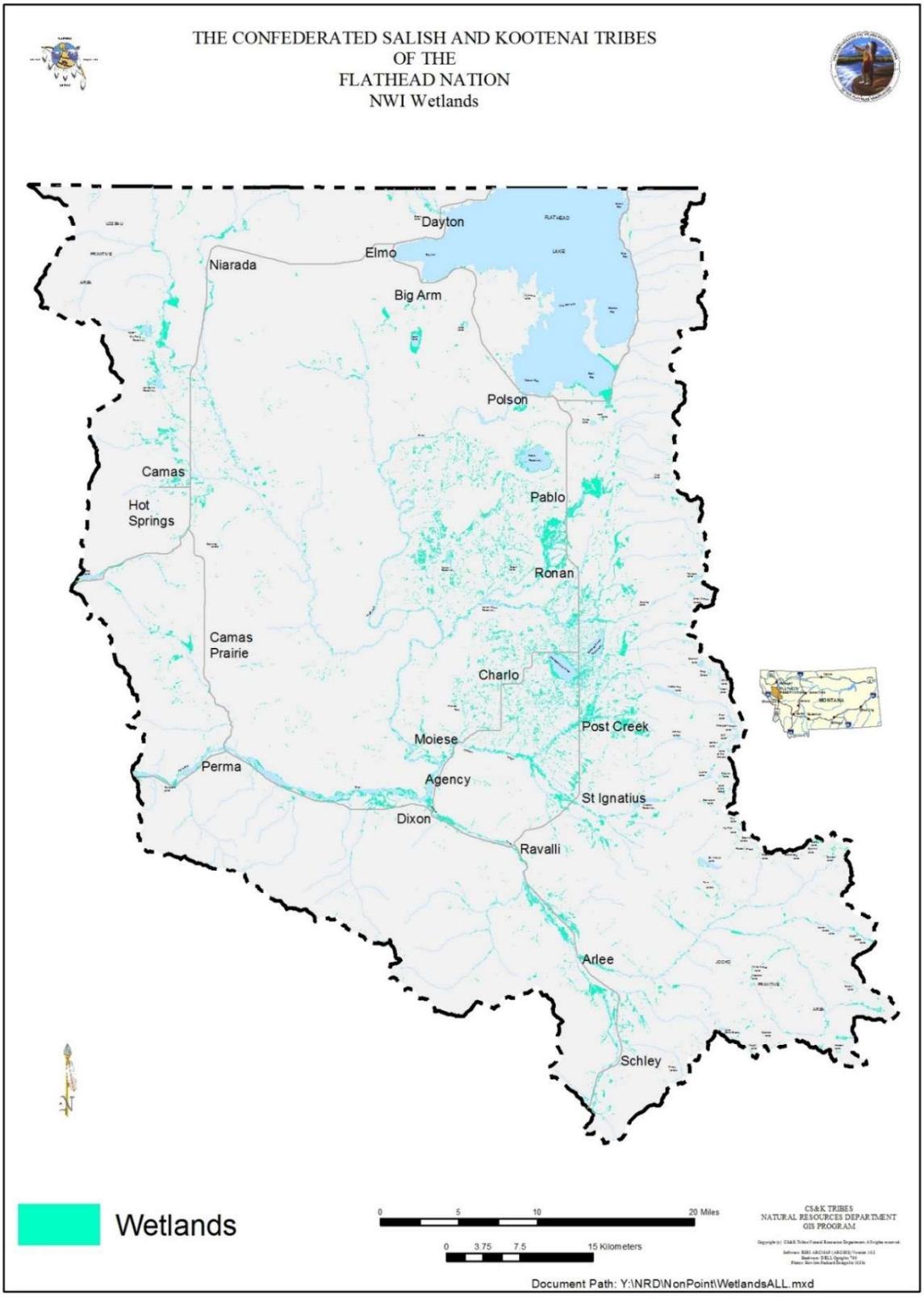


Figure 1. Map of Flathead Indian Reservation Wetlands

CSKT Wetland Program Plan timeline (2021-2025)

		Primary Program Activities					Special Projects		
		Monitoring & Assessment	WQS for Wetlands	Weed mapping	Education & Outreach	Mapping	Misc.	Watershed Planning	
Tribal WPDG grant period	2021	Jocko Watershed: Analyze and report; Lower Flathead Watershed: Assess and Monitor	Review EPA Wetland WQS Template; Draft strategy for developing WQS for wetlands	Plant ID training; data collection; mapping	Annual activities ongoing. See text.	Present completed Jocko land cover change maps; Analyze and map land cover change in LFHR Watershed	Complete CSKT herbarium	Create GIS-based survey and long-form interview questions about aquatic resources, risks, and needs of each watershed	Regional WPDG grant period
	2022	Lower Flathead River: Analyze and report	Review other Tribes' WQS for Wetlands	Data collection and mapping	Annual activities ongoing	Present completed LFHR maps	Create a Wetland story map	Survey CSKT resource professionals and interview key experts	
Tribal WPDG grant period	2023	Camas Watershed: Assess and Monitor	Assess CSKT data gaps for WQS for wetlands	Data collection and mapping	Annual activities ongoing	Analyze and map land cover change in Camas Watershed	Present Wetland story map	Compile report outlining resources, risk and needs of each watershed	
	2024	Camas Watershed: Analyze and report	Draft WQS for wetlands for legal review	Data collection, mapping, and planning	Annual activities ongoing	Present completed Camas maps	Update NWI	Create a CSKT Aquatic Resources Story Map and present to CSKT decision-makers	
Tribal WPDG grant period	2025	Mission Watershed: Assess and Monitor		Data collection, mapping, and planning	Annual activities ongoing	Analyze and map land cover change in Mission Watershed	Update NWI	Make CSKT story map available to resource professionals as an educational tool	Regional WPDG grant period
	2026								

CSKT Wetland Program Plan (WPP 2021-2025)

Action and activities supporting overall goal:

YEAR ONE (2021)

***all actions and activities dependent upon grant funding**

Primary Program Action: **Wetland Monitoring and Assessment**

- Jocko River Watershed (last year of a two-year project)

Activities:

- Plant species tabulation and verification
- Raw data conversion into tables and graphs
- Compilation of collected data
- Writing of individual wetland site assessments
- Editing, formatting and compilation into final report
- Final Jocko River Watershed Wetland Monitoring and Assessment Report and Electronic Data Deliverable (EDD) provided to CSKT and EPA

- Lower Flathead River Watershed (first year of project)

Activities:

- Assess 15 new wetlands and monitor 5 recurring wetlands within watershed
- Quantification, classification and functional assessment of all selected wetlands, a representative sub-sample of the watershed

Primary Program Action: Research Water Quality Standards (WQS) for wetlands

Activities:

- Review EPA Wetland WQS Template
- Draft a strategy for developing CSKT WQS for wetlands

Primary Program Action: Identify and map noxious wetland weeds

Activities:

- Natural Resource personnel trained in noxious weed identification and use of Collector for ArcGIS, a mobile data collection, app as needed. QAPP protocols will be in place before data collection begins.
- Natural Resource personnel document noxious weeds using the Collector app
- Data from Collector app added as an accessible GIS layer to Tribal maps annually
- Tribal weeds working group convenes

Primary Program Action: Promote sound wetland conservation activities through effective wetland and riparian education and outreach activities

Activities:

- River Honoring presentations to grades 4-5
- Presentations at reservation schools or to local non-profits, as requested
- Assist with local conservation events, such as Lake Honoring, Earth Day, and the Mussel Walk, as requested

Primary Program Action: Mapping

Activities (Jocko): Land cover change analyses and mapping

- Present completed Jocko River Watershed land-cover change maps to local organizations, schools, and programs as requested

Activities (LFHR): Land cover change analyses and mapping

- Analyze and compare current and previous aerial imagery of the Lower Flathead River watershed
- Prepare a map and an acreage change table depicting land-cover changes over time in a subsample of the watershed
- Present completed land-cover change maps to local organizations, schools, and programs as requested

Primary Program Action: Program Management

Activities:

- Continue to integrate wetlands monitoring strategy into existing water quality and non-point source monitoring efforts
- Develop QAPPs, SOPs and any monitoring plans necessary to evaluate the quality and quantity of Reservation wetlands
- Project-specific reviews of regulated activities involving wetlands, i.e. ALCO, U.S. Army Corps of Engineers (USACE). The Wetland Conservation Program Coordinator will work with the Water Quality Regularity specialist on wetland projects and to seek ways to improve 401 certifications involving wetland projects.
- Purchase, maintain, and upgrade necessary equipment
- Implement the Tribes' Wetlands Conservation Plan
- Include the CSKT Climate Change Strategic Plan and CSKT Aquatic Invasive Species (AIS) Plan into wetland activities on the Reservation

Action (Special Projects): Complete tribal herbarium project to document and preserve local plant specimens (2nd year of project)

Activities:

- Hire an intern to file CSKT plant specimens in the herbarium and create a database with all the plants
- Share database with Salish and Kootenai College
- Make database and herbarium available to CSKT staff as reference materials

Action (Special Projects): Watershed Strategic Planning

Activities:

- Create a GIS-based survey to collect data from CSKT resource professionals about aquatic resources, risk factors, and needs in each of the seven watersheds on the reservation
- Create a list of questions to ask key informants (long-term resource experts) about aquatic resources, risk factors, and needs in each of the seven watersheds on the reservation

YEAR TWO (2022)

***all actions and activities dependent upon grant funding**

Primary Program Action: **Wetland Monitoring and Assessment**

- Lower Flathead River Watershed (second year of project)

Activities:

- Plant species tabulation and verification
- Raw data conversion into tables and graphs
- Compilation of collected data
- Writing of individual WL site assessment reports
- Editing, formatting and compilation into final report
- Final Lower Flathead River Watershed Wetland Monitoring and Assessment Report and Electronic Data Deliverable (EDD) provided to CSKT and EPA

Primary Program Action: Research Water Quality Standards (WQS) for wetlands

Activities:

- Review other Tribes' Wetland Water Quality Standards

Primary Program Action: Identify and map noxious wetland weeds

Activities:

- Natural Resource personnel trained in noxious weed identification and use of Collector app as needed
- Natural Resource personnel document noxious weeds using the Collector app throughout the reservation
- Data from Collector app added as an accessible GIS layer to Tribal maps annually
- Tribal weeds working group convenes

Primary Program Action: Promote sound wetland conservation activities through effective wetland and riparian education and outreach activities

Activities:

- River Honoring presentations to grades 4-5
- Presentations at reservation schools or to local non-profits, as requested
- Assist with local conservation events, such as Lake Honoring, Earth Day, and the Mussel Walk, as requested

Primary Program Action: Mapping

Activities: Land cover change analyses and mapping
- Present completed Lower Flathead River Watershed land-cover change maps to local organizations, schools, and programs as requested

Primary Program Action: Program Management

Activities:
- Annual review of CSKT Wetland Program Plan (WPP) and provide revisions as needed
- Continue to integrate wetlands monitoring strategy into existing water quality and non-point source monitoring efforts
- Develop QAPPs, SOPs and any monitoring plans necessary to evaluate the quality and quantity of Reservation wetlands
- Project-specific reviews of regulated activities involving wetlands, i.e. ALCO, U.S. Army Corps of Engineers (USACE)
- Purchase, maintain, and upgrade necessary equipment
- Implement the Tribes' Wetlands Conservation Plan
- Include the CSKT Climate Change Strategic Plan and CSKT Aquatic Invasive Species (AIS) Plan into wetland activities on the Reservation

Action (Special Projects): Watershed Strategic Planning

Activities:
- Distribute a GIS-based survey to CSKT resource professionals about aquatic resources, risk factors, and needs in each of the seven watersheds on the reservation
- Conduct and record interviews with key informants (long-term resource experts) about aquatic resources, risk factors, and needs in each of the seven watersheds on the reservation

Action (Special Projects): CSKT Wetlands Conservation story map

Activities:
- Utilizing ArcGIS and CSKT data, create a conservation success story map relating to wetland resources throughout the reservation

YEAR THREE (2023)

***all actions and activities dependent upon grant funding**

Primary Program Action: **Wetland Monitoring and Assessment**
- Camas Watershed (first year of project)

Activities:
- Assess 15 new wetlands and monitor 5 recurring wetlands within watershed.
- Quantification, classification and functional assessment of all selected wetlands, a representative sub-sample of the watershed.

Primary Program Action: Research Water Quality Standards (WQS) for wetlands

Activities:

- Assess CSKT data gaps for WQS for Wetlands

Primary Program Action: Identify and map noxious wetland weeds

Activities:

- Natural Resource personnel trained in noxious weed identification and use of Collector app as needed
- Natural Resource personnel document noxious weeds using the Collector app throughout the reservation
- Data from Collector app added as an accessible GIS layer to Tribal maps annually
- Tribal weeds working group convenes

Primary Program Action: Promote sound wetland conservation activities through effective wetland and riparian education and outreach activities

Activities:

- River Honoring presentations to grades 4-5
- Presentations at reservation schools or to local non-profits, as requested
- Assist with local conservation events, such as Lake Honoring, Earth Day, and the Mussel Walk, as requested

Primary Program Action: Mapping

Activities: Land cover change analyses and mapping

- Analyze and compare current and previous aerial imagery of the Camas watershed
- Prepare a map and an acreage change table depicting land-cover changes over time in a subsample of the watershed
- Present completed land-cover change maps to local organizations, schools, and programs as requested

Primary Program Action: Program Management

Activities:

- Annual review of CSKT Wetland Program Plan (WPP) and provide revisions as needed
- Continue to integrate wetlands monitoring strategy into existing water quality and non-point source monitoring efforts
- Develop QAPPs, SOPs and any monitoring plans necessary to evaluate the quality and quantity of Reservation wetlands
- Project-specific reviews of regulated activities involving wetlands, i.e. ALCO, U.S. Army Corps of Engineers (USACE)
- Purchase, maintain, and upgrade necessary equipment
- Implement the Tribes' Wetlands Conservation Plan
- Include the CSKT Climate Change Strategic Plan and CSKT Aquatic Invasive Species (AIS) Plan into wetland activities on the Reservation

Action (Special Projects): Watershed Strategic Planning

Activities:

- Compile data from the GIS-based survey and key informant interviews about aquatic resources, risk factors, and needs in each of the seven watersheds on the reservation
- Produce a report that will be made available to all CSKT resource experts as an aid in planning, decision-making, and restoration efforts

Action (Special Projects): CSKT Wetlands Conservation story map

Activities:

- Present the conservation success story map relating to wetland resources throughout the reservation to the public as an educational tool

YEAR FOUR (2024): all actions and activities dependent upon grant funding

Primary Program Action: **Wetland Monitoring and Assessment**

- Camas Watershed (second year of project)

Activities:

- Plant species tabulation and verification
- Raw data conversion into tables and graphs
- Compilation of collected data
- Writing of individual WL site assessment reports
- Editing, formatting and compilation into final report
- Final Lower Flathead River Watershed Wetland Monitoring and Assessment Report and Electronic Data Deliverable (EDD) provided to CSKT and EPA

Primary Program Action: Research Water Quality Standards (WQS) for wetlands

Activities:

- Draft WQS for wetlands for legal review

Primary Program Action: Identify and map noxious wetland weeds

Activities:

- Natural Resource personnel trained in noxious weed identification and use of Collector app as needed
- Natural Resource personnel document noxious weeds using the Collector app throughout the reservation
- Data from Collector app added as an accessible GIS layer to Tribal maps annually
- Tribal weeds working group convenes to plan for invasive species control

Primary Program Action: Promote sound wetland conservation activities through effective wetland and riparian education and outreach activities

Activities:

- River Honoring presentations to grades 4-5

- Presentations at reservation schools or to local non-profits, as requested
- Assist with local conservation events, such as Lake Honoring, Earth Day, and the Mussel Walk, as requested

Primary Program Action: Mapping

Activities: Land cover change analyses and mapping

- Present completed land-cover change maps to local organizations, schools, and programs as requested

Primary Program Action: Program Management

Activities:

- Annual review of CSKT Wetland Program Plan (WPP) and provide revisions as needed
- Continue to integrate wetlands monitoring strategy into existing water quality and non-point source monitoring efforts
- Develop QAPPs, SOPs and any monitoring plans necessary to evaluate the quality and quantity of Reservation wetlands
- Project-specific reviews of regulated activities involving wetlands, i.e. ALCO, U.S. Army Corps of Engineers (USACE). The Wetland Conservation Program Coordinator will work with the Water Quality Regularity specialist on wetland projects and to seek ways to improve 401 certifications involving wetland projects
- Purchase, maintain, and upgrade necessary equipment
- Implement the Tribes' Wetlands Conservation Plan
- Include the CSKT Climate Change Strategic Plan and CSKT Aquatic Invasive Species (AIS) Plan into wetland activities on the Reservation

Action (Special Projects):

Activities: Create a CSKT Aquatic Resources Story Map

- Based on data collected from the strategic watershed planning process, create a story of restoration or conservation successes as well as future needs of each watershed
- Present story map to CSKT natural resources professionals, Tribal Council, and other decision-makers

Action (Special Projects): Update NWI

Activities: Update NWI for the Flathead Indian Reservation

- Acquire imagery of the Flathead Indian Reservation (FIR) that is compliant with the Federal Geographic Data Committee (FGDC), Wetland Mapping Standards.
- Contact the Fish and Wildlife Service (FWS) Wetlands Mapping Team to insure proper NWI Geodatabase (gdb) setup and procedures.
- Build a mxd with 2005 NWI, Hydric Soils, aerial imagery and other ancillary data layers.

- Create a gdb that will include wetland and riparian areas as polygonal or linier features and set topological rules.
- Edit the NWI on a quad by quad basis, including areas beyond the FIR boundary to include entire quads.
- Validate topology while editing.
- Ground truth questionable areas as the mapping progresses.

YEAR FIVE (2025)

***all actions and activities dependent upon grant funding**

Primary Program Action: **Wetland Monitoring and Assessment**

- Mission Watershed (first year of project)

Activities:

- Assess 15 new wetlands and monitor 5 recurring wetlands within watershed.
- Quantification, classification and functional assessment of all selected wetlands, a representative sub-sample of the watershed.

Primary Program Action: Water Quality Standards (WQS) for wetlands

Activities:

- Dependent on legal review and guidance of Tribal Council

Primary Program Action: Identify and map noxious wetland weeds

Activities:

- Natural Resource personnel trained in noxious weed identification and use of Collector app as needed
- Natural Resource personnel document noxious weeds using the Collector app throughout the reservation
- Data from Collector app added as an accessible GIS layer to Tribal maps annually
- Tribal weeds working group convenes to plan for invasive species control

Primary Program Action: Promote sound wetland conservation activities through effective wetland and riparian education and outreach activities

Activities:

- River Honoring presentations to grades 4-5
- Presentations at reservation schools or to local non-profits, as requested
- Make CSKT Natural Resources Story map available to Tribal staff for presenting to the public

Primary Program Action: Mapping

Activities: Land cover change analyses and mapping

- Analyze and compare current and previous aerial imagery of the Mission watershed

- Prepare a map and an acreage change table depicting land-cover changes over time in a subsample of the watershed
- Present completed land-cover change maps to local organizations, schools, and programs as requested

Primary Program Action: Program Management

Activities:

- Annual review of CSKT Wetland Program Plan (WPP) and provide revisions as needed
- Continue to integrate wetlands monitoring strategy into existing water quality and non-point source monitoring efforts
- Develop QAPPs, SOPs and any monitoring plans necessary to evaluate the quality and quantity of Reservation wetlands
- Project-specific reviews of regulated activities involving wetlands, i.e. ALCO, U.S. Army Corps of Engineers (USACE). The Wetland Conservation Program Coordinator will work with the Water Quality Regularity specialist on wetland projects and to seek ways to improve 401 certifications involving wetland projects
- Purchase, maintain, and upgrade necessary equipment
- Implement the Tribes' Wetlands Conservation Plan
- Include the CSKT Climate Change Strategic Plan and CSKT Aquatic Invasive Species (AIS) Plan into wetland activities on the Reservation

Action (Special Projects): Update NWI

Activities: Update NWI for the Flathead Indian Reservation, year 2 of project

- Conduct QA/QC activities and run FWS Wetlands Data Verification tools on each quad.
- Make corrections and check ties between quad boundaries.
- Find an outside party such as Montana Natural Heritage Program (MNHP) or the National Wetlands Research Center to review and QC the wetland mapping.
- Make final corrections
- Apply LLWW attributes
- Complete layer metadata explaining the product and procedures.
- Submit final NWI product to the CSKT GIS Program, FWS and the MNHP for their databases.

References:

Berglund, J. and R. McEldowney. 2008. MDT Montana wetland assessment method. Prepared for the Montana Department of Transportation.

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Confederated Salish & Kootenai Tribes (CSKT) Website. Page: Kootenai Culture Committee. Available at: http://csktribes.org/history-and-culture/kootenai-culture-committee

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APPENDIX D. Field Forms

Figure 1: MDT Montana Wetland Assessment Form

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project Name:_____ **2. MDT Project #:** _____ **Control #:**_____

3. Evaluation Date: Mo.____ Day____Yr.____ **4. Evaluator(s):**_____ **5 . Wetlands/Site #(s):**_____

6. Wetland Location(s): i. Legal: T ____ N or S; R ____ E or W; S _____ ; T ____ N or S; R ____ E or W; S _____ ;
ii. Approx. Stationing or Mileposts:_____
iii. Watershed: _____ **Watershed Name, County:**_____

7. a. Evaluating Agency: _____;
b. Purpose of Evaluation:
1.____Wetlands potentially affected by MDT project
2.____ Mitigation wetlands; pre-construction
3.____ Mitigation wetlands; post-construction
4.____ Other _____

8. Wetland size: (total acres) _____ (visually estimated)
_____ (measured, e.g. by GPS [if applies])

9. Assessment area (AA): (acres, see instructions on determining AA) _____ (visually estimated)
_____ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA

Abbreviations: (*see manual for definitions*)
HGM Classes: Riverine **(R)**, Depressional **(D)**, Slope **(S)**, Mineral Soil Flats **(MSF)**, Organic Soil Flats **(OSF)**, Lacustrine Fringe **(LF)**;
Cowardin Classes: Rock Bottom **(RB)**, Unconsolidated bottom **(UB)**, Aquatic Bed **(AB)**, Unconsolidated Shore **(US)**, Moss-lichen Wetland **(ML)**, Emergent Wetland **(EM)**, Scrub-Shrub Wetland **(SS)**, Forested Wetland **(FO)**
Modifiers: Excavated **(E)**, Impounded **(I)**, Diked **(D)**, Partly Drained **(PD)**, Farmed **(F)**, Artificial **(A)**
Water Regimes: Permanent / Perennial **(PP)**, Seasonal / Intermittent **(SI)**, Temporary / Ephemeral **(TE)**

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)
(Circle one) Unknown Rare Common Abundant

12. General condition of AA:
i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species **(ANVS)** lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.):

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species:

iii. Provide brief descriptive summary of AA and surrounding land use/habitat:

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
≥3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	←NO	YES→	L
1 class, monoculture (1 species comprises ≥90% of total cover)	L	NA	NA	NA

Comments:

1

Figure 1: MDT Montana Wetland Assessment Form

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D	S
Secondary habitat (**list species**)	D	S
Incidental habitat (**list species**)	D	S
No usable habitat		S

ii. **Rating** (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	.1L	0L

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D	S
Secondary habitat (**list species**)	D	S
Incidental habitat (**list species**)	D	S
No usable habitat		S

ii. **Rating** (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
- __ observations of abundant wildlife #s or high species diversity (during any period)
- __ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ presence of extremely limiting habitat features not available in the surrounding area
- __ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):
- __ few or no wildlife observations during peak use periods
- __ little to no wildlife sign
- __ sparse adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
- __ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- __ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ adequate adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, circle appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. **Rating** (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments:

2

Figure 1: MDT Montana Wetland Assessment Form

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then circle **NA** here and proceed to 14E.)

Type of Fishery: Cold Water (**CW**)____ Warm Water (**WW**)____ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (NOTE: Modified score cannot exceed 1 or be less than 0.1)

*a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity **or** is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support, **or** do aquatic nuisance plant or animal species (see **Appendix E**) occur in fish habitat?* **Y N** *If yes, reduce score in **i** above by 0.1:*_____

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? **Y N** *If yes, add 0.1 to the adjusted score in **i** or **iia** above:*_____

iii. Final Score and Rating: _____ **Comments:**

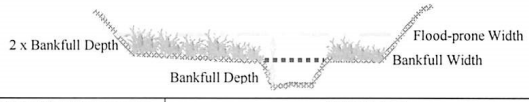
14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle **NA** here and proceed to 14F.)

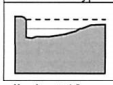
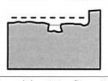
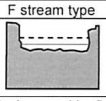
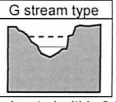
i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Entrenchment ratio (ER) estimation – see User's Manual for additional guidance. Entrenchment ratio = (flood-prone width)/(bankfull width)
Flood-prone width = estimated horizontal projection of where 2 x maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____
Flood-prone width *Bankfull width* *Entrenchment ratio (ER)*



Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (circle)? **Y N Comments:**

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

3

Figure 1: MDT Montana Wetland Assessment Form

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, circle **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	.3L	.2L
T/E/ A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating **(NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB):** Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y N** *If yes, add 0.1 to the score in ii above and adjust rating accordingly:*_____

iv. Final Score and Rating: _____ **Comments:**

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators
- ____ The AA is a slope wetland
- ____ Springs or seeps are known or observed
- ____ Vegetation growing during dormant season/drought
- ____ Wetland occurs at the toe of a natural slope
- ____ Seeps are present at the wetland edge
- ____ AA permanently flooded during drought periods
- ____ Wetland contains an outlet, but no inlet
- ____ Shallow water table and the site is saturated to the surface
- ____ Other:_____

ii. Recharge Indicators
- ____ Permeable substrate present without underlying impeding layer
- ____ Wetland contains inlet but no outlet
- ____ Stream is a known 'losing' stream; discharge volume decreases
- ____ Other:_____

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Figure 1: MDT Montana Wetland Assessment Form

iii. **Rating** (use the information from i and ii above and the table below to arrive at [circle] the functional points and rating)

Criteria	Duration of saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	N/A			

Comments:

14K. Uniqueness:

i. **Rating** (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. **Is the AA a known or potential rec./ed. site:** (circle) **Y N** (if 'Yes' continue with the evaluation; if 'No' then circle **NA** here and proceed to the overall summary and rating page)

ii. **Check categories that apply to the AA:** ___ Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___Other

iii. **Rating** (use the matrix below to arrive at [circle] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

General Site Notes

Figure 1: MDT Montana Wetland Assessment Form

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S):_____

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat			1		
B. MT Natural Heritage Program Species Habitat			1		
C. General Wildlife Habitat			1		
D. General Fish Habitat					
E. Flood Attenuation					
F. Short and Long Term Surface Water Storage					
G. Sediment/Nutrient/Toxicant Removal					
H. Sediment/Shoreline Stabilization					
I. Production Export/Food Chain Support			1		
J. Groundwater Discharge/Recharge					
K. Uniqueness			1		
L. Recreation/Education Potential (bonus points)			NA		
Totals:					
Percent of Possible Score			%		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
___ Score of 1 functional point for Uniqueness; **or**
___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
___ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
___ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish Habitat; **or**
___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
___ Score of .9 functional point for Uniqueness; **or**
___ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
___ "Low" rating for Uniqueness; **and**
___ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
___ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING: (circle appropriate category based on the criteria outlined above) I II III IV

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Figure 2: Plant Field Checklist Sheet

MDT Montana Wetland Assessment Form 2008, Supplemental Plant Inventory

Watershed: _____ Site Name: _____ Date: _____ Evaluators: _____ Page___ of ____

Additional notes on back of sheet: **Y / N** **Total number of plant species within AA:_____**

Scientific Name:	Common Name:	Six -letter Code:	% Cover:*	Status: **	C of C:***	Cultural:
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
*% Cover: **T, P, ___%**	**Status: N = Native, E = Exotic, I = Invasive, U = Unknown	***Coefficients of Conservatism: office				

APPENDIX E. Standard Operating Procedures (SOP's)

Figure 3: Photo Point Monitoring SOP

Photo Point Monitoring

STRENGTHS

Photo point monitoring:

- *Uses readily available equipment.*
- *Is an effective communication tool for public education.*
- *Is a method of providing landscape context for a study area.*
- *Is a standardized evaluation procedure for comparing multiple locations.*
- *Is a method to document rates of change.*

LIMITATIONS

- *Only limited quantitative data can be obtained.*
- *Bias in photo point placement may occur.*
- *It may be difficult to use in dense vegetation.*
- *Photo points can be lost or obscured over time.*
- *Some weeds may be difficult to distinguish from the surrounding vegetation.*

IMPORTANT

Clearly document objectives and the monitoring protocol because the person who establishes the photo points often is not the person who does the repeat photography.

AUTHOR

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Summary

Photo point monitoring is an easy and inexpensive, yet effective, method of monitoring vegetation and ecosystem change (figure 1). It consists of repeat photography of an area of interest over a period of time, with photographs taken from the same location and with the same field of view as the original photo. With appropriate site marking and documentation, photos can be precisely replicated by different people many years apart.

Major Steps

1. Define the objective.
2. Select and establish photo and camera points.
3. Photograph the scene or subject.
4. Organize and file the data.

Define the Objective

A well defined objective is key to successful photo point monitoring. Photo points may be established for a variety of reasons such as evaluating the efficacy of management activities, assessing the ecological impact of a weed infestation, or determining whether management objectives are being met. Different objectives will generally require different photo points. Therefore, to obtain relevant and accurate information, the objective for monitoring must be carefully considered and defined *before* establishing photo points.

QUICK LOOK

Objective:
This document outlines how to use photo point monitoring in weed management. For a more detailed discussion of methodology, analysis techniques, and other applications of photo point monitoring, refer to the *Photo Point Monitoring Handbook* (Hall 2002).

Cost:

Low — Moderate — High

Expertise:

Low — Moderate — High

Figure 1—Photo point monitoring of a leafy spurge infestation before (A) and after (B) the introduction of copper leafy spurge flea beetles. *(Photos adapted from Norman E. Rees, USDA ARS, www.forestryimages.org)*

A Weed Manager's Guide to Remote Sensing and GIS — Mapping & Monitoring

RSAC

Figure 3: Photo Point Monitoring SOP

Photo Point Monitoring

Select and Establish Photo and Camera Points

A photo point is an established location that defines the orientation of a camera located at a camera point (figure 2). Care should be taken when establishing photo and camera points to ensure that the points chosen address the objectives. The following steps outline items for consideration and procedures for establishing photo points in areas selected for monitoring.

CAUTION

Once a photo point is established, it cannot be changed — use care in choosing locations and subjects for monitoring.

1. **Identify photo points.** Within selected monitoring areas, identify elements in the landscape that are most critical to document in order to achieve the project objectives. General photography can be used to document a whole scene. Topic photography, on the other hand, narrows the target from a scene to specific elements (subjects) in the landscape. Ensure that enough photo points are established to adequately document changes that are expected to occur.

TIP—CAMERA PTS.

Select camera points from which multiple photo points can be photographed.

2. **Establish camera points.** Based on the project objective, establish camera points for each photo point. Pay particular attention to the distance between the photo and camera points to ensure that the photographs will adequately document the scene or subject and the expected changes.

3. **Mark photo and camera points.** Photo and camera points should be permanently marked so they can be relocated in the future. Metal fenceposts work well for this purpose. However, if fenceposts are obtrusive or otherwise undesirable, steel rebar driven flush with the ground can be used instead. A metal detector may be needed to relocate rebar markers. Measure the distance and direction from camera points to photo points. Obtaining coordinates of

CAUTION

If a particular photo point is photographed from more than one camera point, the distance between the photo point and all camera points must be the same.

Figure 2—Photo point monitoring site showing photo points (S and W), and camera points (1 and 3), marked by fenceposts. (Adapted from Hall 2002.)

TIP

If photo and camera points are close together, place the camera point to the north of the photo point to avoid shadowing while photographing the photo point.

Figure 3: Photo Point Monitoring SOP

Photo Point Monitoring

IMPORTANT

When recording directions, indicate whether they are magnetic or true degrees.

TIP

Photo points can be established along a transect to obtain more quantitative information. See the Photo Point Monitoring Handbook *(Hall 2002), or* Ground Based Photographic Monitoring *(Hall 2001) for additional information.*

the points using a global positioning system (GPS) unit can aid in relocating them in the future.

4. **Identify a witness site.** A witness site is (preferably) an immovable object in the monitoring area that can be easily identified when returning to the area. It serves as a reference to quickly locate the monitoring area and also as a reference point from which the camera and photo points can be located. Measure the distance and direction from the witness site to the camera points, photo points, or both. It is helpful to attach a permanent identification tag to the witness site with the distance and direction to the photo and/or camera points inscribed on the tag.

5. **Assign identification numbers.** Assign identification numbers to all photo and camera points.

6. **Record pertinent site information.** Record pertinent information about the monitoring site on a map, aerial photograph, and/or site description form. A sample "Photographic Site Description and Location" form, developed by Hall (2002), is provided in *A Weed Manager's Guide to Remote Sensing and GIS* for reference. Information such as date, observer, location, site description, objectives, identification numbers, and locations of witness site, photo points, and camera points, including distances and directions between points, should be recorded.

Equipment Checklist

- ☐ Camera
  - ☐ Memory cards
  - ☐ Extra batteries
  - ☐ Film
- ☐ Tripod
- ☐ GPS
- ☐ Forms
  - ☐ Site description and location
  - ☐ Camera location and photo points
  - ☐ Photo ID cards
- ☐ Clipboard
- ☐ Compass
- ☐ 100 ft measuring tape
- ☐ Copies of original photos (site locator field book)
- ☐ Fenceposts
- ☐ Steel stakes
- ☐ Hammer
- ☐ Meter board
- ☐ Metal detector
- ☐ Spray paint

NOTE: An editable equipment checklist is available for download in *A Weed Manager's Guide to Remote Sensing and GIS.*

7. **Determine when to photograph.** Determine how frequently the photo points should be photographed, the duration of monitoring, as well as the time of year at which photographs should be taken. For example, if the efficacy of a treatment is to be monitored, photographs might be taken immediately before the treatment and two months after the treatment. If weed spread is to be monitored, then the photos might be collected once per year at the time when the weeds are most visible (e.g., during peak flowering).

8. **Create a site locator field book.** It is recommended that a pocket-size site locator field book be created to aid in locating the monitoring location and witness, camera, and photo points during subsequent visits to the area. The field book should contain copies of the original photo point photographs and directions from the witness sites to each camera location and orientation of the photo point.

Figure 3: Photo Point Monitoring SOP

Photo Point Monitoring

DATE_____
AREA_____
UNIT_____
CAMERA: 1 2 3 4 5
PHOTO: A B C D
E F G H I J

Site identification card—Identification cards (11" x 8.5") such as this one, placed within the camera's field of view, provide permanent identification information for the photograph.

CAUTION

Be careful not to trample the vegetation when locating photo points.

IMPORTANT

Repeat photographs should be taken using the same format camera (and film, if applicable) as used for the original photograph. If a different format camera is used, adjustments must be made to ensure that the view through the camera matches the original photograph.

Photograph the Scene or Subject

The following steps outline basic considerations and procedures for photographing the scene or subject of photo points.

1. **Create photo identification cards.** It is recommended that a photo identification card be placed within the camera's field of view each time a photo point is photographed to embed pertinent information about the site into the picture (figure 3). The card should contain the site name, photo point number, camera point identification, and date. Other information such as the photograph number, time of day, and the photographer's initials may also be included. A sample identification card developed by Hall (2002) is available in *A Weed Manager's Guide to Remote Sensing and GIS*. Hall recommends copying the identification card onto blue paper for best visibility. Laminated cards can be reused by writing pertinent information with dry erase markers. Small chalk boards can also be used as photo identification markers.
2. **Locate photo and camera points.** Using site location information (e.g., information found on a "Photographic Site Description and Location" form) and a site locator field book and/or a GPS unit, locate the photo and camera points.
3. **Photograph the scene/subject.** It is recommended that original and repeat photographs be taken using a tripod at a designated height. For repeat photography, point the camera toward the photo point and compare the view through the camera to a copy of the original photograph. Adjust the camera until the view through the camera is the same as the original photograph. You may want to record the aperture, shutter speed, focal length of the lens, and film speed (if not using a digital camera).

Figure 3—Photo point monitoring site showing a photo identification card and a meter board. (Adapted from Hall 2002.)

A Weed Manager's Guide to Remote Sensing and GIS — Mapping & Monitoring
~ 4 ~

Figure 3: Photo Point Monitoring SOP

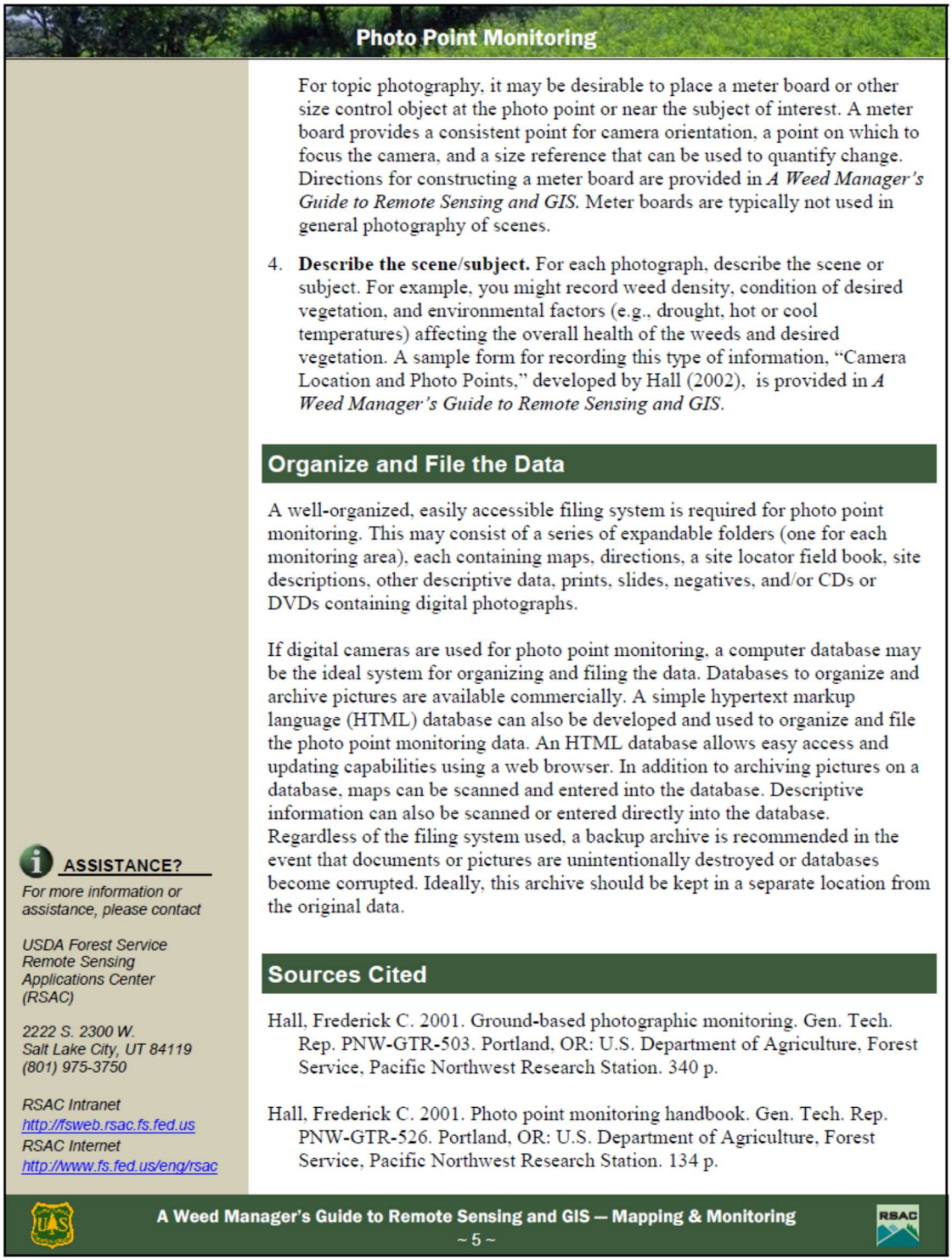

Photo Point Monitoring

For topic photography, it may be desirable to place a meter board or other size control object at the photo point or near the subject of interest. A meter board provides a consistent point for camera orientation, a point on which to focus the camera, and a size reference that can be used to quantify change. Directions for constructing a meter board are provided in *A Weed Manager's Guide to Remote Sensing and GIS*. Meter boards are typically not used in general photography of scenes.

4. **Describe the scene/subject.** For each photograph, describe the scene or subject. For example, you might record weed density, condition of desired vegetation, and environmental factors (e.g., drought, hot or cool temperatures) affecting the overall health of the weeds and desired vegetation. A sample form for recording this type of information, "Camera Location and Photo Points," developed by Hall (2002), is provided in *A Weed Manager's Guide to Remote Sensing and GIS*.

Organize and File the Data

A well-organized, easily accessible filing system is required for photo point monitoring. This may consist of a series of expandable folders (one for each monitoring area), each containing maps, directions, a site locator field book, site descriptions, other descriptive data, prints, slides, negatives, and/or CDs or DVDs containing digital photographs.

If digital cameras are used for photo point monitoring, a computer database may be the ideal system for organizing and filing the data. Databases to organize and archive pictures are available commercially. A simple hypertext markup language (HTML) database can also be developed and used to organize and file the photo point monitoring data. An HTML database allows easy access and updating capabilities using a web browser. In addition to archiving pictures on a database, maps can be scanned and entered into the database. Descriptive information can also be scanned or entered directly into the database. Regardless of the filing system used, a backup archive is recommended in the event that documents or pictures are unintentionally destroyed or databases become corrupted. Ideally, this archive should be kept in a separate location from the original data.

ASSISTANCE?

For more information or assistance, please contact

USDA Forest Service
Remote Sensing
Applications Center
(RSAC)

2222 S. 2300 W.
Salt Lake City, UT 84119
(801) 975-3750

RSAC Intranet
http://fsweb.rsac.fs.fed.us
RSAC Internet
http://www.fs.fed.us/eng/rsac

Sources Cited

Hall, Frederick C. 2001. Ground-based photographic monitoring. Gen. Tech. Rep. PNW-GTR-503. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 340 p.

Hall, Frederick C. 2001. Photo point monitoring handbook. Gen. Tech. Rep. PNW-GTR-526. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 134 p.

Figure 4: GPS SOP

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Environmental Monitoring Branch
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P.O. Box 4015, Sacramento CA 95812-4015

SOP Number: FSOT004.00
Previous SOP: None
Page 2 of 6

STANDARD OPERATING PROCEDURE
Using the Garmin® GPS III+ unit

1.0 INTRODUCTION

1.1 Purpose

This Standard Operation Procedure (SOP) discusses the specific procedure for using the Garmin® GPS III+ unit to determine global position. This SOP will cover the basic features and navigation of the Garmin® GPS III+ unit, initializing the unit, marking waypoints, and traveling to waypoints.

1.2 Definitions

1.2.1 Waypoint: A destination or point of reference in longitude and latitude.

2.0 MATERIALS

2.1 Garmin® GPS III+

2.2 Garmin® GPS III+ manual

2.3 4 AA batteries

3.0 PROCEDURES

Instructions included here are modified from the Garmin® GPS III+ Owner's Manual and Reference.

3.1 Turning On and Off the GPS III+

3.1.1 To turn the GPS III+ on or off, press and hold the red power key. When turning off the unit the power key must be held down for at least 1 second.

3.2 Initializing the GPS III+

3.2.1 Check the GPS III+ to see if initialization is needed prior to entering an area you are unfamiliar with (see 3.2.3).

3.2.2 Initialization is required under three circumstances: if the unit has never been used before, after the unit has been moved more than 500 miles from its last use, or if the unit has had its memory cleared. Memory clearing may result from loss of battery power for an extended period.

Figure 5: GPS SOP

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STANDARD OPERATING PROCEDURE
Using the Garmin® GPS III+ unit

3.2.3 When initialization is needed, the GPS III+ will give a message informing you of this. Press ENTER when this occurs. Use the rocker keypad (the large center button that reads GPS III+) to highlight 'Use Map' and press ENTER. Once a map appears, use the rocker keypad to point to your approximate location. The zoom IN and OUT buttons can also be used to make this easier. Once you have pointed to your approximate location, press ENTER. Initialization is complete.

3.3 Navigation (NAV) Setup

3.3.1 The first time you use the GPS III+ it is important to check the navigation (NAV) setup. The GPS III+ will hold the navigation (NAV) setup parameters in its memory and does not need to be reset each time you turn the power off and on. If the memory is cleared, the navigation (NAV) setup will have to be reset. By pressing the Rocker keypad (top, bottom, left, right) one can maneuver to the field that needs to be corrected.

3.3.1.1 Press MENU twice to get to the main menu and select "setup" using the Rocker keypad.

3.3.1.2 Use the Rocker keypad and Enter key to select the following parameters.

i. POSN: you may choose any position format preferred or required for the project.
ii. MAP DATUM: NAD27 CONUS
iii. UNITS: Statute
iv. Heading: True

3.4 Navigating Through Different Screens

3.4.1 When the GPS III+ is first turned on, it will go thru a sequence of three introductory screens. There are then six main screens displaying different information. In order to navigate through these screens press the PAGE key or the QUIT key. The PAGE key moves you through the screens in a forward direction, while the QUIT key moves you through the screens in the reverse direction. To change the orientation of the screen, from vertical to horizontal and vice versa, press and hold the PAGE key.

Figure 5: GPS SOP

3.4.1.1 The first main screen in the sequence is the satellite status page. While the GPS III+ is locating satellites, it will read "acquiring stats". On this page you can find the battery level (E though F scale), the number of satellites you are currently receiving a signal from, and what type of navigation you are capable of. See section 3.5.5 for further details.

3.4.1.2 The second page is the position page. Your current position, time, date, speed, and other stats can all be found on this page. If the incorrect time is displayed, refer to the owner's manual to reset. The order in which these stats appear depend upon which screen orientation is in use.

3.4.1.3 The map page is the third page in the sequence. This page is used in initialization and when traveling to waypoints (see sections 3.5 & 3.6 for further details regarding waypoints). Your present position is also indicated on this page with a dark arrow. Basic stats, such as speed and distance can be found on this page, though they can only be seen when traveling to waypoints.

3.4.1.4 The compass page and highway page are the fourth and fifth pages and have essentially the same function. Both pages are used for navigation when traveling to a waypoint. When using the compass page you want to keep the arrow pointing straight up (this means you are heading directly towards your destination). When using the highway page the idea is to keep the pointer pointing up and the image of the highway straight ahead.

3.4.1.5 The sixth and last page in the sequence is the active route page. One function of this page is to list the waypoints that have been selected. This page has other functions that can be found on pg. 58 of the manual.

3.5 Finding Satellites

3.5.1 The GPS unit takes time to achieve maximum accuracy. Turn on the unit 10 minutes before using for more accurate readings.

3.5.2 If you are not already there, find the satellite status page.

Figure 5: GPS SOP

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STANDARD OPERATING PROCEDURE
Using the Garmin® GPS III+ unit

3.5.3 The GPS III+ will automatically gain a signal from satellites on its own. In order to gain any signal you need to have a sky view. Signals from the satellites can be obstructed if using the unit indoors, or if surrounded by or standing near tall buildings, and canopy cover.

3.5.4 A signal is needed from at least three satellites to take 2D readings (longitude and latitude), and from at least four satellites to take 3D readings (longitude, latitude, and altitude).

3.5.5 The numbers within the circle represent satellites in the sky. Highlighted numbers correspond to satellites that the GPS III+ is currently receiving a signal from. The bars indicate the strength of the signal you are receiving from each satellite. A tall bar indicates a strong signal, while a short bar indicates a weak signal. The accuracy of the position fix is indicated by EPE (Estimated Position Error) and DOP (Dilution of Precision) figures. For more information on EPE or DOP refer to the owners manual.

3.6 Marking and Naming a Waypoint

3.6.1 To mark a waypoint or your current position, press and hold the ENTER key. A new screen should appear that gives the name of the waypoint (a default 3 digit number), the symbol it is represented by (this is located directly to the left of the name), the time and date, and the position of the point. For further detail or to reference a waypoint, please see owner's manual.

3.6.2 To change the name of the waypoint use the rocker keypad to highlight the name (or number) field and press ENTER. Using the rocker keypad you may now enter the new name of the point. Once you have entered the proper name, press ENTER.

3.6.3 To change the symbol given for the waypoint, highlight the symbol using the rocker keypad and then press ENTER. A menu should appear of different symbols to choose from. Select a symbol and then press ENTER. Highlight the 'done' button and press ENTER.

Figure 5: GPS SOP

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STANDARD OPERATING PROCEDURE
Using the Garmin® GPS III+ unit

3.7 Traveling to a Marked Waypoint

3.7.1 If you have a waypoint already marked on the GPS III+ that you wish to travel to, begin by pressing the key labeled GOTO. Using the rocker keypad highlight the tab labeled 'All' or 'Nearest Waypoints'. Select the desired waypoint and press ENTER.

3.7.1.1 Using the map page you can also select a destination by using the rocker keypad to move the cursor to the location of the desired destination. In this case you do not need to already have a waypoint created, as the GPS III+ will create one automatically in its absence. Once you have moved the cursor to the correct location press GOTO and then press ENTER. If you wish to cancel a GOTO destination, press the GOTO button followed by the MENU button. When a menu pops up highlight 'Cancel GOTO' and press ENTER.

3.7.2 Now that your destination has been selected, the map page, compass page and highway page can be used to navigate yourself to the destination by following the arrow.

4.0 REMEDIAL ACTION IN CASE OF MALFUNCTION

4.1 Turn the unit off then back on. Check that the batteries are installed correctly, as indicated under the battery cover. Try new batteries if available.

4.2 Do not let the GPS III+ get wet.

5.0 REPORTING REQUIREMENTS

Record a waypoint and position data on water quality sheets, or in a notebook, or on a COC as required.

6.0 REFERENCES

Garmin® GPS III+ Owner's Manual and Reference

APPENDIX F. FY 2023 Information

Section A6.b: Work Schedule and Section A8: Training

Work for FY 2023 will consist of these primary areas:

1) Compile data from FY 22 Wetland Monitoring and Assessment of the Lower Flathead River and Camas watersheds. Write and publish reports for both watersheds.

2) Land cover change analysis and mapping in both watersheds.

3) Continue review of other Tribes and states' Wetland Water Quality Standards (WQS), then draft the addition of Wetland WQS for CSKT.

4) Analyze changes in wetland acreage and conditions across the FIR using previous MWAM and plant list data.

5) Analyze survey responses from CSKT resource professionals about wetland resources on the FIR. Release and distribute separate survey for other non-CSKT individuals involved in wetland conservation on the FIR.

6) Promote sound wetland conservation activities through effective wetland and riparian education and outreach activities.

7) Project management

8) Training

9) Coordinate wetland soil carbon study, collect samples, perform laboratory analysis, and communicate results to CSKT and EPA.

Table 7: FY 23 work schedule

Project Task	Timeframe	Commitment	Responsible Party	Results and Transfer
1. Wetland Monitoring and Assessment	May - June 2022	o Identification of assessment sites	Coordinator and Contractor: Dennis Lichtenberg	Share maps with Coordinator
		o Compilation of assessment site maps		
	June 2022	o Field Coordination	Coordinator	N/A

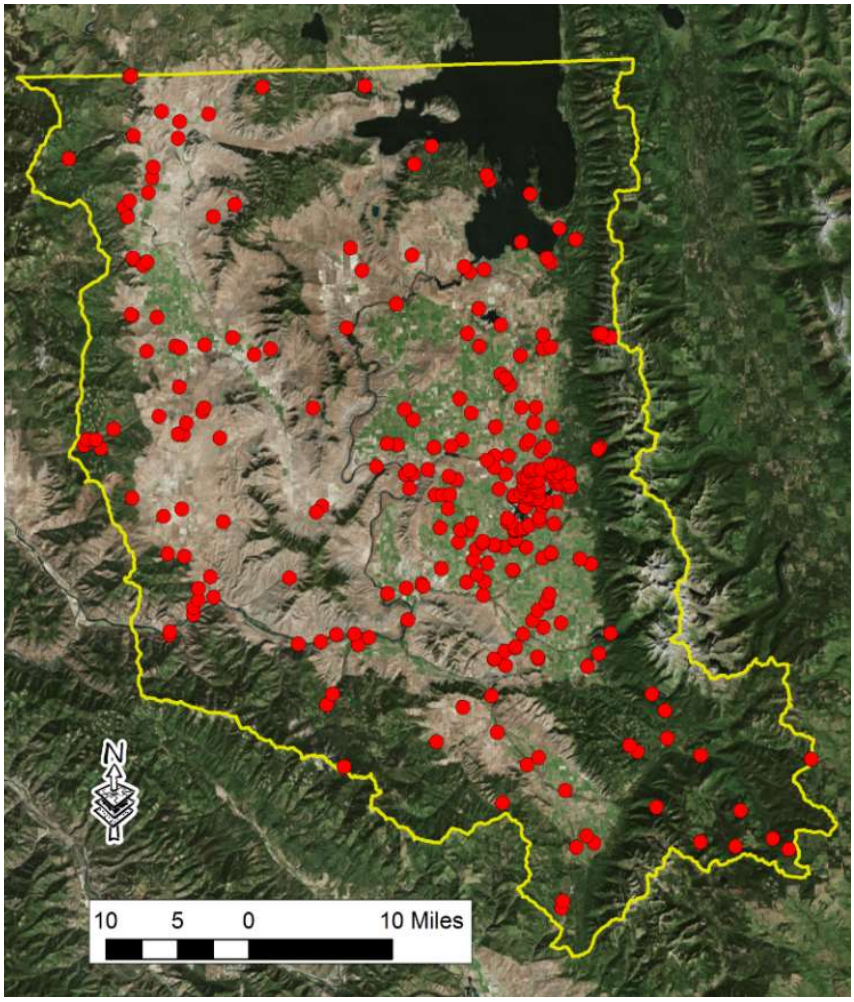
	Aug, Sept 2022	o Field Data Collection	Coordinator, Contractors and Botanist	N/A
	Oct. 2022	o Accuracy and verification of field data	Coordinator	N/A
	Nov- Dec. 2022	o Compilation of raw data	Contractor: Dennis Lichtenberg	Field staff and contractors transfer data to report writer
	Jan - April 2023	o Plant species tabulation and verification	Botanist	
		o Raw data conversion into tables and graphs	Coordinator and Contractors: Dennis Lichtenberg and Geum	
		o Compilation of collected data		
		o Writing of individual WL site assessment reports		
		o Editing , formatting and compilation into final report	Coordinator	Report writer submit draft to Environmental Division for review
	Sept. 2023	o Final Lower Flathead River and Camas Wetland Watershed Assessment reports and Electronic Data Deliverable (EDD) provided to CSKT and EPA	Coordinator	Final Lower Flathead and Camas watershed reports to CSKT and EPA (electronic and print)
2. Land cover change analysis and mapping	Oct-Dec 2022	o Analyze and compare current and previous photos of the watersheds	Contractor: Dennis Lichtenberg	Acreage change table and maps submitted to Coordinator
		o Prepare a map showing land-cover changes over time		
	as requested, 2022-2023	o Present to local organizations,	Coordinator and contactor	verbal transfer of data/results

		schools, and programs		
3. Review EPA and Tribes' WQS for wetlands	Jan. 2022-March 2023	o Research WQS for wetlands	Coordinator	N/A
	Apr. 2023	o Draft a strategy for developing CSKT WQS for wetlands		N/A
4. Analyze changes in wetlands across FIR	Oct. 2021-Mar. 2022	o Analyze NWI data, assess trends over time	Contractor	Charts and graphs shared and reviewed with Coordinator
	June, 2022	o Report on trends of each watershed's wetland functionality	Coordinator and Contractor	Information used in future FY23 project.
5. GIS-based survey about wetland resources	Oct. 2021-Jan. 2022	o Create a GIS-based survey	Contractor and Coordinator	Shared with Division staff
	Oct. 2021-Feb. 2022	o Test survey	Division staff	Staff provides feedback to Contractor and Coordinator
	Mar. 2022-Sep. 2022	o Deploy survey and conduct interviews	Coordinator	Coordinator engages with participants
	Oct. 2022-Feb. 2023	o Analyze and summarize results	Contractor and Coordinator	Results utilized in future FY23 project.
6. Education and Outreach	Fall 2022 & 2023	o Lake Honoring presentations to grades 9-12	Coordinator	verbal transfer of data/results
	Spring 2022 & 2023	o River Honoring presentations to grades 4-5		
	as requested	o Presentations at reservation schools or to local non-profits		

7. Project Management	Dec 2021 - May 2022	o Complete Quality Assurance Project Plan (QAPP) and submit draft to EPA Region 8 for approval. Edit as needed until final draft is approved	Coordinator	All documents submitted via grants.gov or max.gov
	Ongoing	o Edit WPP (2021-2025) as needed		
8. Training	Ongoing	o Train and assist with non-point source, water quality and regulatory activities as needed to gain a deeper understanding of water issues reservation-wide	Coordinator	Training records will be maintained by Coordinator and Environmental Protection Administrative staff
	TBD	o MDOT Rapid Assessment Method training		
	TBD	o Internal CSKT trainings		
	TBD	o Beginners Plant ID for wetland delineation		
9. Soil carbon analysis project	Summer 2022	Coordinate project with volunteer and laboratory	Coordinator and Volunteer	N/A
	September 2022	Finalize methods, collect samples		Volunteer and coordinator bring samples to FLBS
	Fall 2022 – Winter 2023	Laboratory analysis	FLBS	FLBS sends to coordinator and volunteer
	Spring 2023	Review study and analysis, coordinate meetings with	Coordinator and Volunteer	N/A

		CSKT staff and volunteers		
	Summer 2023	Conference presentations, share results with EPA and CSKT		

Section A6.c. Geographical locations (FY22)
Potential field training sites that have previously been monitored:



Section A6.d. Resource and Time Constraints (FY22-23):

Due to the novel Coronavirus, the CSKT experienced interruptions to operations periodically during FY20 and FY21. This prompted the Tribes and programs within it to come up with innovative solutions to meet program objectives and grant-funded obligations. Other than impacts to public engagement opportunities, the wetlands

program was able to meet all major objectives for FY21. With the unpredictable nature of this virus and its toll on society and workplaces, there could be impacts to operations and timetables in FY22. If stated goals and objectives are not able to be met in a timely fashion, the program will report changes in operations and timelines to the EPA.

For the wetland soil carbon project, the bulk of the work was completed by SKC student researcher Erin Bell. Erin was starting her senior year during the September 2022 sampling weeks and was limited to a single season in order to produce her senior thesis paper in conjunction with this study. Her volunteer efforts, and the short timeframe, limited the variables we could test in this small pilot study.

APPENDIX G: FY22-23 Workplan

Wetland Conservation Program Work Plan
Fiscal Years 2022-23

April 22, 2021

Confederated Salish & Kootenai Tribes
Division of Environmental Protection
Natural Resources Department
PO Box 278
Pablo, MT 59855

Sponsoring Organization/Authorized Representative:
Tom McDonald, CSKT Tribal Chairman
Confederated Salish and Kootenai Tribes
P.O. Box 278
Pablo, Montana 59855
Email: tom.mcdonald@cskt.org
Phone: (406) 675-2700 ex. 1007
Fax: (406) 275-2806

Administrative Contact:
Norrie Dusty Bull-Irvine
Office of Administration and Budget (OAB)
Confederated Salish and Kootenai Tribes
P.O. Box 278
Pablo, Montana 59855
Email: Norrie.Dustybull@cskt.org
Phone: (406) 675-2700 ext. 1009
Fax: (406) 275-2806

Program Contact:
Wilhelmina "Willie" Keenan, Environmental Protection Division Manager
Confederated Salish and Kootenai Tribes
P.O. Box 278
Pablo, Montana 59855
Email: Willie.Keenan@cskt.org
Phone: (406) 675-2700 ext. 7208

EPA Project Officer:
Ben Carlson, Tribal Program Manager
Tribal Assistance Branch
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Denver, CO. 80202
Email: carlson.benjamin@epa.gov
Phone: (303) 312-6012

EPA Contact:
Matthew Null, Grant Specialist
U.S. Environmental Protection Agency, 8TMS-G
1595 Wynkoop Street
Denver, CO 80202
Null.Matthew@epa.gov
Phone: (303) 312-6429

CSKT Wetland Conservation Program Workplan FY 2022-2023
Project period 10/1/21 – 9/30/23

The following components of the Confederated Salish and Kootenai Tribes (CSKT) Wetland Conservation Program for Fiscal Year 2022 and 2023 describe the CSKT's Wetlands program commitments, output, timeframe and expected outcomes based on the FY20 Region 8 Wetland Program Development Grant (WPDG) and the Tribal WPDG, awarded for FY22-24. Work plan components are to address implementation of the CSKT Wetlands program in accordance with grant deliverables.

The Tribe's Wetlands Coordinator will be responsible for all components, and the Environmental Protection Agency (EPA) will provide technical assistance, training and policy guidance as needed.

Region 8 WPDG FY 22-23 major tasks:

1. Analyze and summarize CSKT wetland monitoring, assessment, and mapping data to gain a bigger picture look at wetland conditions and acreage on the Flathead Indian Reservation (FIR). FY22

2. Create and distribute a GIS-based survey to collect input from CSKT resource professionals about wetland resources, risk factors, needs, and opportunities for restoration in each of the seven sub-basins on the FIR. FY22

3. Use the information collected in tasks 1 and 2 to update the 'Issue Assessment' chapter on each of the seven watersheds on the FIR (sub-basins). FY23

4. Convene an Advisory Committee of Tribal resource experts to set goals for the updated plan and outline implementation activities for the updated Wetlands Conservation Plan. FY23

Tribal WPDG FY 22-23 major tasks:

1. Watershed-based wetland monitoring and assessment of the Lower Flathead River watershed and the Camas watershed.

2. Land cover change analysis and mapping in both watersheds.

3. Data analyses for both watersheds to update the watershed profiles.

4. Outreach and education through conventional in-person opportunities as well as through the development of digital teaching tools.

REGION 8 WPDG

Region 8 WPDG Component 1: Analyze and summarize CSKT wetland monitoring, assessment, and mapping data to gain a bigger picture look at wetland conditions and acreage on the Flathead Indian Reservation (FIR).

Estimated component work FTE: .54 (1128.9 hours)

Estimated component cost: $ 55,500

Commitments

The Wetlands Conservation Coordinator will secure contractors to perform data analyses, mapping and other technical elements of the work. The coordinator will transfer data in a secure and timely manner and will oversee the contractor's work, providing feedback throughout the process. The GIS specialist (contractor) will analyze NWI data to create a chart and graph for each watershed of the current wetland acreage according to the Cowardin classification system. The data analyses and technical writing contractor will analyze monitoring and assessment data as well as plant data from 1992-2020 to assess trends over time. They will produce a brief report of trends in wetland functionality and plant community change for each of the seven watersheds on the FIR.

Output and Timeframe

1. Charts and graphs of current wetland acreage according to the Cowardin classification system for each watershed, Q1-Q2 FY22
2. A brief report of trends of wetland functionality and plant community change for each of the seven watersheds. Q3 FY22

Outcome (short-term)

1. Improved data on wetlands losses or increases by type
2. Improved baseline information on wetlands extent, condition, and performance
3. Increased understanding of wetland ecologic condition at the population scales

Outcome (long-term)

1. Improved efficiency and accuracy for tracking wetlands gains and losses on a watershed basis
2. Enhanced capacity to monitor progress on Tribal and National goals
3. Increased capacity to make management decisions based on wetland functions in specific watersheds
4. Increased quality of wetlands

Region 8 WPDG Component 2: Create and distribute a GIS-based survey to collect input from CSKT resource professionals about wetland resources, risk factors, needs, and opportunities for restoration in each of the seven sub-basins on the FIR.

Estimated component work FTE: .95 (1975.05 hours)

Estimated component cost: $97,125

Commitments

The Wetlands Coordinator and the GIS specialist will research GIS-based platforms for surveying people as well as templates for survey questions designed to capture institutional knowledge. The specialist will create a draft survey that is simple to use and can be completed in less than half an hour to boost participation. The CSKT Division of Environmental Protection will test the survey internally to work out any issues, and to determine whether we are asking the correct questions and whether the mapping features work properly. The planning phase will be robust to ensure we get the most effective outcomes. After the survey is deemed effective, the Coordinator will begin promoting the project to partners and begin scheduling times for people to participate in the survey. CSKT Program Managers will be engaged to encourage participation from staff in various disciplines. The survey will conclude with an option to participate on a deeper level. The Coordinator will engage those with further interest by either conducting a long-form interview or inviting them to join the Advisory Committee. After at least one expert from each required discipline (lands, wildlife, fisheries, Water Resources, Tribal Historic Preservation, etc.) has contributed to the survey, the GIS specialist will analyze the data and produce a map of each of the seven watersheds with the areas of high risk, high resource value, and opportunities identified.

Output and Time Frame

1. Create a GIS-based survey, Q1FY22
2. Test survey, Q1FY22
3. Deploy survey and conduct interviews, Q2-Q4 FY22
4. Analyze and summarize results, Q1-Q2 FY23

Outcome (short-term)

1. Improved baseline information on wetland extent, condition, and performance

Outcome (long-term)

1. Enhanced capacity to monitor progress on Tribal and National goals
2. Better-informed land management and decision-making at the watershed scale

Region 8 WPDG Component 3: Use the information collected in tasks 1 and 2 to update the 'Issue Assessment' chapter on each of the seven watersheds on the FIR (sub-basins).

Estimated component work FTE: .54 (1128.6 hours)

Estimated component cost: $ 55,500

Commitments

The Wetland Coordinator will collaborate with the technical writing contractor to compile a current 'watershed profile' for each of the seven watersheds utilizing the data analyses, charts, graphs, and reports produced in previous stages of this project as well as external resources (i.e. scientific journals, etc.). Each watershed profile will identify threats to aquatic resources, wetlands of special concern, and opportunities for restoration as well as land use patterns, wetland acreage by type and notable changes in plant communities over time. This will improve the organization's capacity to consider wetlands at the watershed scale and assist in decision-making as the project moves into the final task.

Output and Time Frame

1. Write an updated watershed profile for each of the seven watersheds on the FIR, Q3-Q4 FY23

Outcome (short-term)

1. Improved capacity to consider wetlands at the watershed scale to assist in decision-making
2. Improved wetland protection efforts

Outcome (long-term)

1. Increased quantity of wetlands
2. Increased quality of wetlands

Region 8 WPDG Component 4: Convene an Advisory Committee of Tribal resource experts to set goals for the updated plan and outline implementation activities for the updated Wetlands Conservation Plan

Estimated component work FTE: .68 (1410.75 hours)

Estimated component cost: $ 69,375

Commitments

The coordinator will utilize survey responses as well as CSKT Division Manager recommendations to identify a small but committed group of diverse resource experts to serve on the advisory committee. This group will utilize the data summaries, reports, maps and watershed profiles to assess progress toward goals and strategies outlined in the original Plan (1999). They will update the goals and implementation activities based on current conditions on the ground. The contractor will facilitate the committee and synthesize ideas into an updated Wetlands Conservation Plan. By advancing the state of knowledge, this project will develop our Tribes' capacity to increase the quantity and quality of wetlands on the FIR in the long term.

Output and Time Frame

1. Identify key personnel with expertise in wetland conservation, Q1 FY23
2. Convene committee to update the Wetlands Conservation Plan, Q1-Q4 FY23
3. Updated goals and implementation activities to guide wetland conservation and restoration on the FIR, Q3 FY23
4. Share results with CSKT Tribal Council and EPA, Q4 FY23

Outcome (short-term)

1. Increased program effectiveness and decision-making capacity
2. Development of wetland protection strategies that reflect a changing landscape
3. Stronger, more comprehensive, and better coordinated wetland protection activities on the reservation
4. More efficient and effective allocation of resources

Outcome (long-term)

1. Increased quantity of wetlands
2. Increased quality of wetlands

TRIBAL WPDG

Tribal WPDG Component 1: Watershed-based wetland monitoring and assessment of the Lower Flathead River watershed and the Camas watershed.

Estimated component work FTE: .15 (298.5 hours)

Estimated component cost: $95,237

Commitments

The Wetland Coordinator, a CSKT botanist, and a mapping contractor will monitor, assess, and evaluate wetland conditions in the Lower Flathead River and Camas Watersheds (Appendix A), building upon previous work. Staff will revisit five (5) monitoring sites from the 2009 Lower Flathead assessment and five from the 2010 Camas assessment, and select fifteen (15) new wetland sites for vegetation and wetland assessment surveys in each watershed. Selected wetlands will represent the full range of human disturbance, ownership, and wetland types found in the both watersheds, including compensatory mitigation sites when present. There are multiple steps to select sites, leading to a stratified sampling of the watershed.

Output and Timeframe

1. Assessment site selection, permissions, maps, and field coordination, Q1- Q3 FY22
2. Wetland assessments, site photos, plant lists and plant cover estimates will be made in the field, Q4 FY22
3. Accuracy and verification of field data; compilation of raw data; data analyses and conversion into tables and graphs; writing of individual site assessment reports; editing, formatting and compilation into final report. Q1- Q2 FY23
4. Final watershed-based wetland assessment report submitted to CSKT and EPA. Q4 FY23

Outcome (short-term)

1. Improve watershed-scale understanding of wetlands function and condition
2. Documentation and accuracy tracking of wetlands gains and losses

Outcome (long-term)

1. Ability to identify issues that can be addressed through comprehensive watershed conservation strategies
2. Enhance capacity to monitor progress on Tribal and National goals

Tribal WPDG Component 2: Land cover change analysis and mapping in both watersheds.

Estimated component work FTE: .03 (59.7 hours)

Estimated component cost: $19,048

Commitments

The program's NWI photo interpreter will analyze color infra-red aerial photography with Arc GIS and other ancillary data sources to determine changes in wetland size, extent, and type for the watershed of interest by comparing against earlier NWI maps, aerial photos, and previous data collected by CSKT. Staff will then build a map to show landscape-scale changes in land-cover throughout both watersheds. This tool will be used to inform management and restoration decisions as well as to educate the public about impacts of land management to wetlands.

Output and Timeframe

1. Select a representative sub-sample of both watersheds. Q1 FY22
2. Analyze and compare current and previous photos of the watershed. Prepare a map showing land-cover changes over time in a sample of the watershed. Q1 FY22
3. Present to local organizations, schools, and programs as requested. Turn in to EPA with year-end report. FY22-24. Report by end of FY22.

Outcome (short-term)

1. Determine changes in wetland size, extent, type
2. Use for determination of mitigation and restoration planning

Outcome (long-term)

1. Improved baseline information on wetland extent and change over time to inform tribal regulatory programs
2. Protection and restoration of specific classes and functions of wetlands

Tribal WPDG Component 3: Data analyses for both watersheds to update the watershed profiles.

Estimated component work FTE: .1 (208.95 hours)

Estimated component cost: $66,667

Commitments

This task dovetails with a watershed conservation planning effort that will be completed through a different funding source. Utilizing data collected and analyzed in tasks 1 and 2 of this proposal, the wetland coordinator will collaborate with the technical writing contractor to compile a current 'watershed profile' for both of the watersheds utilizing the data analyses, charts, graphs, and reports produced in the concurrent project as well as external resources (i.e. scientific journals, etc.). This will improve the completeness of the dataset to be included in the conservation planning efforts and improve the outcomes.

Output and Timeframe

1. Supply data gathered in the wetland assessment and monitoring efforts of the Lower Flathead River Watershed and the Camas Watershed to the technical writer that will be compiling updated watershed profiles. These profiles will guide the goal-setting and implementation activities included in the updated Wetland Conservation Plan in the concurrent project. FY23.

Outcome (short-term)

1. Improved capacity to consider wetlands at the watershed scale to assist in decision-making
2. Improved wetland protection efforts

Outcome (long-term)

1. Increased quantity of wetlands
2. Increased quality of wetlands

Tribal WPDG Component 4: Outreach and education through conventional in-person opportunities as well as through the development of digital teaching tools.

Estimated component work FTE: .01 (29.85 hours)

Estimated component cost: $9,524

Commitments

Develop a GIS-based story map about 'Wetland Conservation on the Flathead Indian Reservation'. This non-technical overview of the program's research will be presented to important decision makers, such as Kootenai, Selis, and Qlispe elders, CSKT Tribal Council, and resource experts in other fields to help guide wetland conservation efforts into the future. The story map will also be a great teaching tool for general audiences, such as students at Salish Kootenai College and local public schools.

The Wetland Coordinator will continue to provide information and education about wetlands to students throughout the FIR and surrounding areas at in-person events such as the annual River Honoring and Lake Honoring, as well as through classroom or community presentations as requested.

Output and Timeframe

1. The story map will summarize wetlands conservation on the FIR, based on data collection and analyses from this project as well as the broader analyses in the concurrent project. The product will be relatable and easily understood, with lots of maps, photographs and examples. Q1 FY 23- Q1 FY24.
2. Present story map to local decision-makers. Q2 FY24.
3. River Honoring presentations to grades 4-5. Q3, FY22-FY24.
4. Lake Honoring presentations to grades 9-12. Q1, FY22-24
5. Presentations at reservation schools or to local non-profits. FY22-24, upon request.

Outcome (short-term)

1. Increased stakeholder and decision-maker understanding of a wetland's condition for a variety of "uses" including traditional and cultural uses
2. Increased stakeholder and decision-maker understanding of wetland ecologic condition at population scales
3. Provide education about wetlands, riparian areas, and aquatic nuisance species prevention
4. Improve opportunities for Natural Resource Department employees to interact with students and teachers

Outcome (long-term)

1. Better public understanding of the values and functions of wetlands and riparian areas
2. An informed citizenry to better maintain watersheds and the wetlands within them