MONTANA NATURAL HERITAGE PROGRAM

WETLAND PROGRAM PLAN

CREATING COMPREHENSIVE WETLANDS MAPPING, TOOLS, AND SCIENCE-BASED INFORMATION FOR MONTANA'S PRIVATE AND PUBLIC WETLAND COMMUNITY

PLANNING YEARS 2016-2020

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Background

The mission of the Montana Natural Heritage Program (MTNHP) is to be Montana's source for reliable, objective information and expertise to support stewardship of our native species and habitats, emphasizing those of conservation concern. The MTNHP was created by the Montana legislature in 1983 as part of the Natural Resource Information System (NRIS) of the Montana State Library (MSL). MTNHP is "a program of information acquisition, storage, and retrieval for data relating to the flora, fauna, and biological community types of Montana." (MCA 90-15-102). The MTNHP's activities are guided by statute (MCA 90-15) as well as through ongoing interaction with and feedback from principal data source agencies. Since the first staff was hired in 1985, the Program has logged a 30-year record of success, and developed into a highly respected, service-oriented program. Currently the program has an annual budget of approximately 1.5 million dollars and a staff of 20 professionals with expertise in zoology, ecology, botany, database management, and geographic information systems. MTNHP is widely recognized as one of the most advanced and effective of over 80 natural heritage programs throughout the western hemisphere.

The enabling legislation for the MTNHP provides the State Library with the option to contract the operation of the Program, and to make available state resources and facilities as part of the contract for services. Since 2006, MTNHP has been operated by the University of Montana (UM) through a renewable 2-year contract with the Montana State Library. MSL receives legislative funding for the core program operations, and the MTNHP leverages that core funding to acquire additional funds. As of 2015, the State Library contract provides approximately $440,000 per year for the core services of the program, and the MTNHP secures an approximate additional $1,100,000 per year for more than 50 active projects with state, federal and private sector entities.

MTNHP's Wetland Program is part of our Ecology Program, under the direction of the Senior Ecologist/Spatial Analysis Lab Director. We have offices at the Montana State Library in Helena, Montana and at the University of Montana in Missoula, Montana. Staff working in the Wetland Program include an Ecologist/Projects Manager, a Wetland Mapping Coordinator, a Photointerpreter/Remote Sensing Specialist, two Ecologist/GIS Specialists, and two Ecologist/GIS Analysts. During the summer, these staff are assisted in field surveys and assessments by trained seasonal botanists and ecologists, many of whom return to MTNHP each year. We also benefit from paid and unpaid interns and graduate students who fill roles ranging from field support to data entry. Collectively, Wetland Program staff have over 80 years of experience with spatial analysis, monitoring and assessment, site descriptions, reporting, and project management. We are actively involved with professional societies and regularly report on our research findings at local, regional, and national conferences.

Partnerships and collaboration

MTNHP's planning and activities are informed through annual meetings and informal communications with a partner committee that includes representatives of the major federal land agencies, the NRCS,

the EPA, state agencies, tribes, NGOs, and the private sector. We have regular data exchanges with the USFS and the BLM, and provide wetland data in response to data requests from agencies, planning departments, weed districts, private landowners and other stakeholders. We work collaboratively with the NRCS on land cover classification and analysis, and share information formally and informally with members of the Montana Wetland Council (MWC), the NatureServe network, Montana tribes, and university faculty and students. We have regular meetings with the Montana Department of Environmental Quality (MT DEQ) wetland, TMDL, and 319 programs, and collaborate on outreach and training. Our Spatial Analysis Lab in Missoula is actively engaged in a number of region-wide projects for the Forest Service, and we collaborate regularly with Regional Specialists in ecology, botany, wildlife, fisheries, and planning. We have several interactive web applications that allow users to identify species and habitats of concern, and download custom maps. We are active participants in meetings of the MWC, the National Wetland Monitoring and Assessment Workgroup, the Montana Association of Geographic Information Professionals, and several professional societies. We are theme stewards for the Montana Spatial Data Infrastructure (MSDI) Wetlands and Land Cover Themes, and collaborate with other theme stewards, especially Hydrography and Elevation. Our wetland mapping work has been funded by federal and state agencies, tribes, local conservation districts and private corporations.

Montana is unique in that we have two state agencies, MTNHP and the MT DEQ working to advance the goals defined in Wetland Program Plans. Accordingly, MTNHP works closely with the Wetland Program at MT DEQ, collaborating on research projects and development of database tools, designing workshop and course content for MT DEQ-sponsored training, and teaching multiple annual wetland plant identification workshops provided by MT DEQ for agencies and consultants. MTNHP leads the Mapping, Assessment and Monitoring Workgroup of the MWC, and MTNHP staff are members of the MWC Steering Committee. We worked with MT DEQ and other partners to develop the document *Priceless Resources: A Strategic Framework for Wetland and Riparian Area Conservation and Restoration in Montana 2013–2017 (*hereafter *Priceless Resources*), and this Wetland Program Plan, as well as the 2009-2015 plan it replaces, is designed to advance the objectives in that document.

Accomplishments under the 2009-2015 Wetland Program Plan

In our first Wetland Program Plan (MTNHP 2009), we laid out eight objectives: 1) Develop consistent and accurate statewide digital mapping of all wetlands and riparian areas; 2) Describe the range of natural variability in wetland ecological systems in Montana; 3) Evaluate and describe the impacts of human activities on wetlands and riparian areas; 4) Enable the collection of data to track and predict the impacts of climate change, drought and changing water supply on the functions and ecological integrity of wetlands and riparian areas; 5) Identify effective performance standards, monitoring tools, and management practices to enhance the effectiveness of compensatory and voluntary mitigation, restoration, planning and resource management; 6) Promote data exchange and information sharing across jurisdictions; 7) Facilitate identification and protection of high-quality sites, sites of ecological importance and particularly vulnerable wetlands; and 8) Encourage multi-jurisdictional efforts to address threats to wetlands and riparian areas. While much of this work is ongoing and included in this successor WPP, we made significant accomplishments under each objective. For example,

- As of December 2015, we have completed new digital mapping for 2,264 USGS 24K Quads, a total of 3,062,773 mapped acres. Combined with historic mapping completed in the 1980s, we will meet the goal of statewide wetland mapping by the spring of 2016.
- Working with the Colorado Natural Heritage Program and the Wyoming Natural Diversity Database, with funding from EPA's Office of Water and Wetlands, we described the range of natural variability for four wetland ecological systems that occur across Montana, Wyoming, Colorado and Utah (Vance et al. 2012).
- We completed rotating basin assessments in the Prairie Pothole Region, Southeast Montana, Southwest Montana and the Seeley Swan area of Northwest Montana, evaluating the impact of human disturbance on ambient condition (McIntyre et al. 2011; Newlon 2012; Newlon et al. 2013; Hart et al. 2015).
- We completed an assessment and analysis of climate-sensitive headwater wetlands across the Upper Missouri basin (Vance et al. 2015), and compiled a literature review on the impact of water supply and drought on Prairie Pothole wetlands (Vance et al. 2013).
- We included management and restoration considerations in all wetland ecological system descriptions in our online *Montana Field Guide to Ecological Systems* (http://fieldguide.mt.gov/displayES_LCLU.aspx) and published guidelines for the restoration of Prairie Potholes (Luna et al. 2012).
- We described a network of herbaceous wetlands across a range of condition classes for Montana (Newlon and Vance 2011), as well as describing and assessing groundwater-dependent ecosystems across the state (Vance et al. 2015).
- In addition to our work with the Wetland Council, we collaborated with the National Monitoring and Assessment Workgroup to develop and implement the 2011 National Wetland Condition Assessment (EPA, forthcoming) and will partner with MT DEQ to conduct the 2016 National Wetland Condition Assessment in Montana.
- We have offered 18 Wetland Plant Identification workshops to agency personnel and consultants across the state, with funding from MT DEQ.
- Working with local efforts, we have developed Montana-specific Coefficients of Conservatism for over 1,400 Montana wetland plants.

Wetland Program Planning 2016-2020

Goal statement:

Public and private partners rely on the Montana Natural Heritage Program as Montana's authoritative source for wetland and riparian mapping, monitoring and assessment tools, and science-based information on the distribution, extent, condition and biodiversity significance of the state's wetlands and riparian areas. All mapping, data and information is readily available and easily accessed in multiple formats, including interactive web-based delivery.

Strategic Actions:

To achieve our goal, we have identified nine Strategic Actions. These are:

1. Complete statewide wetland and riparian mapping based on contemporary imagery, and develop a plan for ongoing remapping in areas where rapid land cover or land cover change has occurred;

2. Develop an "MT-NWIPlus" product which appends a suite of value-added attributes to wetland and riparian mapping, including ecosystem services functions, increasing utility to a range of users;

3. Refine MTNHP's wetland assessment methodology to make it more user friendly, more compatible with other assessment tools, and more appropriate for use in restoration and mitigation contexts;

4. Promote the identification, description and voluntary protection/restoration of biologically and ecologically significant wetlands and riparian areas;

5. Continue to establish a network of sites for long-term trend monitoring to help develop a science-based understanding of wetland responses to natural and human stressors;

6. Develop integrated databases of assessment data that can be linked to MTNHP's interactive web applications and tools, and ensure that all MTNHP GIS-based data sets and tools are discoverable and downloadable from the Montana State Library website and linked to other websites;

7. Ensure that MTNHP maps and data are compatible with emerging standards for vegetation mapping, including the National Vegetation Classification Standard;

8. Participate in scientific and professional meetings, workgroups, interdisciplinary teams and the Montana Wetland Council to facilitate awareness of our information resources and tools and to support the development of integrated mapping, assessment and reporting solutions;

9. Deliver high-quality training to agency and private sector professionals to help them identify, manage and restore wetland biological resources.

MTNHP's Strategic Actions, the EPA's Core Elements Framework, and Montana's Strategic Framework

In 2009, the EPA National Wetlands Division developed the Core Elements Framework (CEF) to guide development of wetlands programs. Within this Framework, the four elements of a program are: 1) Monitoring and Assessment; 2) Regulation; 3) Voluntary Restoration and Protection and 4) Water Quality Standards:
(http://www.epa.gov/sites/production/files/201510/documents/2009_03_10_wetlands_initiative_cef_full.pdf).

In Montana, both MTNHP and MT DEQ engage in activities related to Monitoring and Assessment. The Army Corps of Engineers (ACOE) has primary responsibility for regulating wetland impacts under the

Clean Water Act section 404, and MT DEQ is currently expanding its section 401 certification efforts. Voluntary restoration and protection are undertaken by a wide range of entities, from watershed groups to non-profits to state and federal agencies, often with financial support of MT DEQ and science-based guidance from MTNHP. Currently, there are no water quality standards for wetlands at the state level, although some tribes have attempted to identify parameters that could be used.

The Strategic Actions in this Plan focus primarily on Core Elements 1 (Monitoring and Assessment) and 3 (Voluntary Restoration and Protection). However, data and information resources developed under the Plan are critical to other agencies' activities. For example, while our NWI mapping is explicitly non-jurisdictional, it is frequently used by the ACOE and the Montana Department of Transportation for preliminary screening of sites where section 404 waters may be present. Similarly, while MTNHP is a non-regulatory agency, our data resources and documentation of reference wetlands would be important elements in the development of narrative biological criteria for water quality.

The Strategic Actions outlined in this Plan have also been designed to address all seven of the current Five-Year Strategic Directions in the Montana Wetland Council's *Priceless Resources*: 1) Restoration, Protection and Management; 2) Mapping; 3) Monitoring and Assessment; 4) Planning and Policy; 5) Vulnerable and Impacted Wetlands; 6) Public Communication; 7) Montana Wetland Council.

In the following pages, we expand on each of our Strategic Actions, identify the relevant Core Element(s) and Strategic Direction(s) from *Priceless Resources* which the Action supports, and list the specific activities, with a time frame, that we intend to undertake in support of each Action. While the Plan is ambitious, we believe that with solid support from the EPA and our other state, federal, tribal and nonprofit partners, we will be able to continue the current staffing level and degree of expertise, and thus carry out the Plan. However, specific activities should be understood to be dependent on funding and staffing, and time lines should be seen as projections, subject to change.

Action 1. Complete statewide wetland and riparian mapping based on contemporary imagery, and develop a plan for ongoing remapping.

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Primary); Regulation (Secondary); Water Quality Standards (Secondary).

Strategic Directions: Restoration, Protection and Management (Primary); Mapping (Primary); Monitoring and Assessment (Primary); Planning and Policy (Secondary); Public Communication (Secondary).

Overview: Since 2007, digital mapping of Montana's wetland and riparian areas has been one of the keystones of our Wetland Program. Partners use the digital data to locate wetland resources, to evaluate potential project impacts, to assess habitat potential, to prepare watershed plans and identify areas where wetlands may offer water quality benefits, and to support large-scale restoration. In 2016, we will complete the currently funded mapping, which will result — for the first time ever in Montana — in a statewide digital data layer. However, this layer will still not be current. Much of the Rocky Mountain Front, the Prairie Pothole Region, and Central Montana will only have "historic" mapping, i.e.,

mapping completed by the National Wetlands Inventory in the 1980s. This mapping is outdated, does not include any riparian areas, and, because of technological limitations when it was produced, is often inferior in quality, especially for smaller, temporary wetlands. Unfortunately, while we have been able to put together an impressive array of funders over the years, the areas without current mapping are largely in private or tribal ownership, and therefore difficult to fund. In other areas, notably the oil fields of Eastern Montana and the tillable parts of the prairies and plains, even current mapping is rapidly becoming out of date through land use change. The same may be true in forested areas where extensive beetle kill has exposed wetlands that could not been seen in imagery when forest canopy was present.

An important part of completing the mapping is making the map product available in multiple formats to accommodate a range of user needs. Currently, we manage only our own data products, making them available as geodatabases in the current and one-off ArcGIS version from the Montana State Library website (http://mslapps.mt.gov/Geographic_Information/Data/DataList/datalist_Details?did={f57e92f5-a3fa-45b2-9de8-0ba46bbb2d46), and provided geodatabase extracts on request to users. We also submit completed mapping to the NWI for inclusion in their databases. Users who wish to have historic data must download it from the NWI. There is a considerable lag time (on the order of >2 years, in some cases) between us submitting data to the NWI and them making it available on their website. Consequently, users who rely only on our website cannot find historic data, while users who rely only on the NWI website may not find the most current data.

The following activities are intended to address this Action.

Action 1 Activities:

1. Complete all currently funded wetland and riparian mapping (July 2016);

2. Assemble a single, statewide data layer consisting of the best available digital mapping (historic and contemporary) and make it available, with metadata, from the Montana State Library website, including annual updates (September 2016, and annually thereafter);

3. Update the web page on the MTNHP website with a current wetland mapping status map so that users have a quick, visual indicator of the mapping available for a given area of interest (October 2016, and annually thereafter);

4. Update the MTNHP MapViewer (http://mtnhp.org/mapviewer/) web application annually with the statewide data layer to ensure that users without GIS access can view wetland and riparian mapping (November 2016, and annually thereafter);

5. Develop a methodology for using high-resolution aerial imagery and/or satellite remote sensing products to identify areas where land cover and land use change is likely to have affected the extent, distribution, or types of wetlands and riparian areas (July 2017);

6. Develop a methodology for rapid extraction of riparian corridors from high-resolution aerial imagery, and create a digital map of riparian areas along the Rocky Mountain Front, where these areas are currently unmapped (October 2017);

7. Complete new wetland and riparian mapping for all USGS quadrangles where only historic mapping exists (August 2016 – December 2020);

8. Complete new wetland and riparian mapping for at least 100 USGS quadrangles where the methods developed under Activity 2 indicate land cover and land use change has occurred (August 2017 – December 2020).

Action 2. Develop an "MT-NWIPlus" product

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Primary); Regulation (Secondary); Water Quality Standards (Secondary).

Strategic Directions: Restoration, Protection and Management (Primary); Mapping (Primary); Monitoring and Assessment (Primary); Planning and Policy (Secondary); Public Communication (Secondary).

Overview: The US Fish and Wildlife Service (USFWS) began developing methods several years ago to aid in the prediction of wetland function from National Wetlands Inventory mapping. By adding attributes such as landscape position, landform, waterflow path and waterbody type (collectively, "LLWW descriptors," after Tiner 2003), basic NWI maps can be transformed in to what the USFWS refers to as "NWIPlus " (http://www.fws.gov/northeast/wetlands/factsheets/NWIPlus_FactSheet.pdf). Since our early mapping efforts, MTNHP has experimented with different ways to incorporate these descriptors into our mapping, and to associate wetland functions with each combination (Kudray and Schemm 2008; Vance 2009; Newlon and Burns 2009). Recently we were awarded a grant from the USGS to revise the descriptors (developed in the Northeast) to reflect Rocky Mountain conditions. We are currently working under a Wetland Program Development Grant to automate the assignment of descriptors to our mapping, and to field-validate the links between LLWW attributes and wetland functions.

We believe that the NWIPlus concept can and should be taken further. Currently, we are providing GIS support to MT DEQ to produce a statewide Wetland Prioritization Database. Part of this Database also advances another task in one of our Wetland Program Development Grants to assign conservation status ranks to wetlands. For each wetland polygon in the statewide wetland mapping database (as of November 2015), we have calculated several measures of rarity, relative size, habitat significance, and potential threats. These are augmented by factual attributes such as ownership category (federal, state, private or tribal), protection (e.g., conservation easements), all hydrologic units (from basin to subwatershed), county, ecoregion, etc. We have also calculated a suite of landscape level threats and attributed these, by severity, to each wetland. Using this new "MT-NWIPlus" database, a user who (for example) wants to identify all privately-owned emergent wetlands, not under a conservation easement,

in the Blackfoot River subbasin with one or more species of concern, and at risk from exurban development, can run a simple query on the geodatabase in ArcGIS, returning the result in minutes. We believe this is a powerful tool that can and should be expanded. Accordingly, we plan the following activities:

Action 2 Activities

1. Complete the automated attribution of LLWW attributes to all mapped wetlands in Montana (September 2016) and update the attribution as new quads are mapped (September 2016, and annually thereafter);

2. Complete field verification of LLWW attributes and their associated functions, and add documentation to our wetland mapping website (September 2016);

3. Complete statewide image classification to identify large stands of Russian Olive, and add these to the MT-NWIPlus database as it is developed (December 2016, with a repetition in December 2019);

4. Update our current MT-NWIPlus geodatabase to reflect each year's new mapping and make the geodatabase tables available for download (September 2016, and annually thereafter));

5. Extend the characterization of wetland function based on LLWW attributes to include a characterization of related Ecosystem Services, and add documentation to our website (March 2018);

6. Continue to add and update factual and derived/calculated attributes to the MT-NWIPlus database, based on user input and newly developed datasets. For example, users are currently requesting an attribute that indicates whether a wetland is within the perimeter of a wildfire that has burned during the past five years (June 2017, and as needed and funded thereafter);

7. Revise and apply the methods used in an earlier WPDG to identify wetlands that are geographically isolated, based on current mapping and pending interpretation of the Waters of the U.S. rule. Add this attribute to the MT-NWIPlus geodatabase (September 2018);

8. Develop and document repeatable methods for assigning each mapped wetland to a specific National Hydrography Dataset reach code, so that watershed planners can easily identify whether a specific wetlands is or is not associated with a specific impaired (or unimpaired) reach, and so that linkages between wetlands and associated reach-based fisheries information can be made (September 2018);

9. Integrate all attributes found within the MT-NWIPlus database into the MTNHP MapViewer so that users without ArcGIS expertise can run the same queries using the interactive web tool (October 2018, and semi-annually as data changes);

10. Ensure delivery of MT-NWIPlus data to users who request all MTNHP data records (plants, animals, biological communities) for a specific project area as a clipped digital dataset or a written summary, by creating updateable database linkages between our species and community records and our wetland mapping datasets (September 2018, and ongoing as data changes).

Action 3. Refine MTNHP's wetland assessment methodology.

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Primary); Regulation (Primary); Water Quality Standards (Secondary)

Strategic Directions: Restoration, Protection and Management (Primary); Monitoring and Assessment (Primary); Vulnerable and Impact Wetlands (Primary); Planning and Policy (Secondary); Public Communication (Secondary); Montana Wetland Council (Secondary).

Overview: MTNHP has developed a robust Ecological Integrity Assessment (EIA) method over the past 8 years, compatible with the EPA's 1-2-3 assessment approach and with the EIAs used by NatureServe and member Heritage Programs, including Colorado (MTNHP 2015). In addition, MTNHP's EIA is similar in scope and content to the intensive method used in the 2011 and forthcoming 2016 National Wetland Condition Assessment. Using funding from Wetland Program Development Grants, we have produced a protocol, datasheets and a database template that can be used by States and Tribes in their own assessments. However, a number of issues will have to be addressed to make the EIA method more user friendly, more compatible with other assessment tools, and more appropriate for use in restoration and mitigation contexts. Many potential users find the GIS-based Level 1 assessment to require too many inputs for the information it yields, while others feel that the degree of botanical expertise demanded by the Level 3 component puts the method out of reach for consultants, agency personnel, and watershed groups. The Level 2 method, while streamlined, focuses more on disturbance than on condition, and uses qualitative judgement over more repeatable qualitative measures. Some users feel that the entire method puts too much emphasis on landscape level stressors, and does not sufficiently address the long term threats posed by invasive species. In a restoration and mitigation context, the EIA method is often passed over in favor of the function-based assessment developed by the Montana Department of Transportation (a regulated agency). To date, no one in Montana has compared the two methods in a mitigation and restoration context.

Finally, in our assessments around the state, field crews have raised a number of questions about the timing of assessments and the broad validity of the assessment area approach in large wetland complexes. For example, while we consider June through early September to be the "index period" for wetland assessment, in cold years, few plants have flowered by the time we start assessments in June. In unusually warm years, such as 2015, flower structures are desiccated by August. In both cases, identification of species is difficult if not impossible. We have never determined whether sites assessed during suboptimal flowering times have lower scores on Level 3 metrics than sites assessed during prime times. Similarly, we don't know with certainty that the 0.5 hectare assessment area (AA) approach, broadly used across the country in Level 3 assessments, is appropriate for assessing large wetland complexes. One rule of the AA establishment is that it does not cross ecological systems: a wet meadow

AA can't overlap include a large chunk of riparian shrubland, for example, lest the combined systems skew scores on floristic richness or habitat complexity. But, there is an unexplored question here: would the wet meadow, riparian shrubland, and other components of a wetland complex all score within the same range on Level 3 assessments? Or do certain kinds of wetlands — forested wetlands, for example, with their extreme microtopography-driven floristic richness— inherently "do better?"

We want to make our wetland assessment method more user friendly, more compatible with other assessment tools, and more appropriate for use in restoration and mitigation contexts. We also want to make data broadly available to all interested parties, and to answer some of the lingering questions about assessment.

Action 3 Activities:

1. Develop a "Level 2.5" assessment tool that incorporates a Rapid Floristic Quality Assessment Index based on common, easy to recognize species (September 2016);

2. Develop an "Index of Alien Invasibility" that helps predict whether a given site is likely to experience widespread weed development in the foreseeable future (September 2016);

3. Set thresholds for a Level 1 assessment method based on a single data layer, a "Human Disturbance Index" derived from our Montana Land Cover dataset (March 2017);

4. Carry out side-by-side assessments on 20 wetland sites using MT DOT's functional tool and MTNHP's Ecological Assessment Protocol to determine whether the tools yield similar conclusions about wetland health (Summer 2017 and 2018);

5. At 16 known and documented reference sites representing the four main wetland types found in Montana (wet meadows, fens, marshes and riparian shrublands), carry out Level 3 assessments in mid-June and late August of the same year and compare results (8 sites x 2 surveys in 2019 and 8 sites x 2 surveys in 2020);

6. Conduct Level 2 Ecological Integrity Assessments at 8 wetland complexes >10 acres in size with multiple wetland types in a mosaic, and carry out a Level 3 survey in each of three wetland types (n=24) (Summer 2019 and 2020);.

7. Enter all assessment data from Activities 5 and 8into a central database (See Action 6 for detail) upon completion and update WebViewer (October 2017, and semi-annually thereafter).

8. Review NWCA 2016 datasheets and protocols to ensure that data collected at assessment sites is sufficient to complete MTNHP EIA protocols as well (May 2016)

9. Participate in all NWCA 2016 activities, including training and assessment (January 2016-March 2017)

Action 4. Promote the identification, description and voluntary protection/restoration of biologically and ecologically significant wetlands and riparian areas.

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Primary); Regulation (Primary); Water Quality Standards (Secondary)

Strategic Directions: Restoration, Protection and Management (Primary); Monitoring and Assessment (Primary); Vulnerable and Impact Wetlands (Primary); Planning and Policy (Primary); Public Communication (Primary); Montana Wetland Council (Secondary).

Overview: The overall goal of the MTNHP, like other Heritage Programs across the country, is to provide science-based data on the species and habitats of the state, emphasizing those of conservation concern. Before we began using GIS to locate likely target-rich areas for high quality wetlands and an EIA approach for assessing them, MTNHP ecologists mined local knowledge from agency biologists, recreationists and landowners to find ecologically significant wetlands, and documented them with simple descriptive notes. Not all of the wetlands that were suggested proved to be high quality, but several were given an A-rank in the NatureServe scoring hierarchy. The field data and descriptions of those A-ranked wetlands are available to help determine if any have been assessed in more recent projects, to guide imagery examination to determine whether the wetlands still appear to be stressor–free, and to guide crews to those areas to carry out assessments and gather data that can be entered into our databases, as well as adding to our list of reference standard wetlands.

Heritage programs typically use a conservation ranking tool to assign conservation status ranks to plant and animal species, and in some cases, plant and animal associations. These rankings alert planners, developers and land managers of the presence of species or communities of concern in a project area. While the conservation ranking tool is not entirely suitable for ranking wetlands, we have been working on a comparable approach that will allow us to assign the designation of "Wetlands of Special Significance" (WSS) to individual wetland occurrences, based on characteristics that can be determined with a suite of GIS layers. For example, a wetland of a type not usually found in a given area might receive the WSS designation, as might an unusually large wetland, a complex wetland mosaic, wetlands in areas where pockets of protected lands are surrounded by heavily impacted lands, and so on. Currently, we are working on this GIS tool, but it will require field validation before the concept can be promoted to the public.

One of the ways that wetland and riparian protection can be communicated to the public is through identification of "wetland treasures" or a state's "wetland heritage," as has been done in other areas. Working with existing data and tools, we believe we can identify ecologically significant candidate wetlands (where observation would not increase human impacts) that could be featured in a number of formats, including a downloadable field guide, a phone/tablet app, or a printed guide. Based on conversations with colleagues in other states, we believe that such tools engender more appreciation for, and a better understanding of, the values of wetlands. Montana Wetland Council partners have also expressed interest in this project as a way to highlight lands under their jurisdiction.

As noted above, we are also working with MT DEQ on a Wetland Prioritization Database, which they intend to mine for restorable wetlands that watershed groups can take on. Our users differ from MT DEQ's, in that they are more often agency professionals, academics, consultants, and large landowners (e.g., timber companies). Hence, we will integrate the dataset developed for the DEQ project into our MT-NWIPlus product, and demonstrate to users how it can be applied to a wide suite of resource decisions, from beaver reintroduction to research natural area nomination to vegetation management to fisheries suitability analyses. Before doing so, however, we will need to add more data, specifically identifying species occurrences or predicted distributions that overlap with wetland locations.

Action 4 Activities:

1. Review lists of ecologically significant wetlands and their associated records to identify those that were ranked as "A" and have not been assessed in our subsequent projects, and carry out a full EIA assessment at a minimum of 12 of them, focusing on types (e.g., forested wetlands, wetlands in the Great Plains) that are not well represented in our reference network (June – August 2018 and 2019);

2. Complete identification of "Wetlands of Special Significance" within our statewide wetland mapping geodatabase (July 2016);

3. Add the "Wetlands of Special Significance" designation to our mapping where appropriate, so that such wetlands can be immediately identified in the MapViewer application or in response to requests for project planning datasets. Produce full metadata and a MapViewer Help topic describing the concept, the methods by which each wetland was selected, and the implications for project planning (December 2016);

4. Mine existing data and GIS datasets to identify candidate wetlands for a "Wetland Treasures" publication or application, ensuring that public interest would not increase impacts. The goal of this activity would be to identify a minimum of 200 potential sites (March 2017);

5. Conduct rapid field assessments on potential sites until at least 50 are deemed suitable for the project, based on site-specific diversity, the absence of noxious weeds, scenic appeal, and a low probability of human impacts (June – August 2018);

6. Develop descriptions, including unique features, land use history (if known), lists of common species, photographs, directions, caveats about use, and other material for each of the 50 wetlands selected in Activity 5, and assemble these into a document that can be disseminated through the web or via a GPS-linked phone app (March 2019);

7. Work with the MT Department of Tourism and federal resource offices (as appropriate) to disseminate a brochure describing the "Wetland Treasures" project and directing users to the web for more information (June 2019);

8. Link species occurrence data and predicted distribution models to each wetland polygon in the online version (i.e. MapViewer) of our geodatabase, so that specific locational information on

species of concern, harvestable species and TES species is available onto to users with password-protected access to such data (September 2020).

Action 5. Continue to establish a network of sites for long-term trend monitoring to help develop a science-based understanding of wetland responses to natural and human stressors.

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Primary); Regulation (Primary); Water Quality Standards (Primary).

Strategic Directions: Restoration, Protection and Management (Primary); Monitoring and Assessment (Primary); Mapping (Secondary); Vulnerable and Impact Wetlands (Primary); Planning and Policy (Primary); Public Communication (Primary); Montana Wetland Council (Secondary).

Overview: A network of reference wetlands is a critical component of a wetland program, supporting everything from development of water quality standards to detection of change in wetlands subjected to human and natural stressors to setting reasonable performance standards for restoration and mitigation. "A network of reference wetlands" should be understood, in this context, as a suite of sites that represent the full spectrum of conditions, from minimally disturbed benchmark (usually referred to as "reference standard") to degraded. Over the years, we have collected data across the state in our rotating basin assessments, representing the full suite of palustrine and riverine wetland types, and reflecting the full range of condition. However, with the exception of data collected during a WPDG-funded project to begin an herbaceous wetland reference network (Newlon and Vance 2011), data has not been grouped or presented in a convenient way for others to use. Even with a consolidated statewide database accessible through MapViewer, additional database work will be required to select out the "best" examples of each wetland type in each condition. Ideally, this extract would be discoverable and downloadable, with photos and key assessment information, from our Wetland Program webpage, allowing users to explore each type of wetland and its response to stressors. A reference network of this type will also be invaluable to wetland mappers, allowing new mappers who may never have seen a prairie pothole wetland to compare photographs with aerial imagery, and understand how the same wetland type may look different in different settings as a result of land use pressures. For example, a heavily grazed temporarily flooded emergent wetland in the Plains may resemble a lightly impacted seasonally flooded unconsolidated shore wetland at first glance on aerial imagery. By making a set of photos and narratives available to future mappers, we will increase the accuracy of the mapping effort over time.

In a rapidly changing environment, we also need to establish and maintain a baseline set of "sentinel" wetlands, representing the best reference standard discoverable in a given area. For example, we have little difficulty in finding minimally disturbed fens in high-elevation watersheds. In the Prairie Pothole Region and the Great Plains, finding an undisturbed freshwater marsh is extremely difficult. We have identified a set of potential reference standard sites on public lands in these areas with funding from the BLM, but we have not had financial support to field-verify them. As part of our Wetland Program Plan,

we want to establish a statewide sentinel wetland network, representing the best condition found in the wetland's ecoregion, and under the management of a public land agency so that access remains possible. This sentinel network will allow us and our successors to monitor how natural stressors — drought, climate change — impact wetlands over time, as well as tracking interannual variability resulting from naturally shifting levels and seasonality of precipitation.

We also have a unique opportunity to evaluate natural "restoration" in a post-fire context. In 2015, forests across Montana burned from mid-July through September. Many of these fires swept through areas where we have previously carried out Level 3 assessments. Similarly, our other landscape mapping projects have produced a statewide map of insect-killed forests, areas where fires are likely to burn in the future. Identifying wetlands in those areas and (where no assessment data exists) collecting baseline data now will facilitate tracking post-fire recovery of wetlands well into the future.

Related to the idea of long-term recovery after fire is the question of how restoration sites fare over time. To our knowledge, no one in Montana has determined whether the typical 5-year monitoring period is long enough to ensure ongoing wetland ecological integrity. Our field observations suggest that many of these sites are degrading over time, despite maintaining their target function. During the performance period of this WPP, we want to assess a number of sites that were restored >5 years ago using both functional and EIA approaches to determine if, as we suspect, functional restoration does not always equate to long-term ecological restoration.

Action 5 Activities:

1. Mine existing datasets to find representative examples of wetland types (both herbaceous and woody) in the four condition classes used in our assessments, determining which, if any types are not fully represented (June 2017);

2. Assemble reference network data into a single document, organized by Omernik Level 3 Ecoregion and wetland type, with narratives and photos setting out the expected vegetation communities and biophysical features associated with each condition class (December 2017);

3. Collect Level 2 field data for targeted wetland types/locations not adequately represented in the reference network (July — August 2018);

4. Publish a compendium of reference network wetlands to the MTNHP website, with links from MapViewer, and make it downloadable as a pdf. Ensure that reference network wetlands are flagged as such in MT-NWIPlus (June 2019);

5. Mine existing Level 3 datasets to develop an initial set of sentinel wetlands, i.e., wetlands in minimally or least disturbed condition; minimally disturbed wetlands, when available, will always be selected over least disturbed (December 2018);

6. Identify ecoregions where additional sentinel wetlands are needed to capture the range of natural variability, and use landscape screening tools to identify candidate sites on public land (June 2019);

7. After field verification that a site is suitable (in terms of condition, access, and distance from potential human stressors), collect Level 3 data to establish new sentinel sites (June — August 2019);

8. Assemble all data into a single, separate database. Publish availability in "What's New" section of MTNHP website, and in an email/newsletter to Wetland Council Members, agency and professional partners, and the Rocky Mountain Chapter of the Society of Wetland Scientists. Make database available on request to these partners (June 2020);

9. Begin rotating surveys of sentinel wetlands, visiting 8-10 per year on a 5-year cycle (July — August 2020);

10. Review existing datasets to identify wetlands with Level 3 survey data located within perimeters of 2015 and 2016 fires (March 2017);

11. Revisit up to 10 wetlands affected by high intensity/high severity fires, and document conditions with Level 3 EIA tool (5 wetlands in June — August 2017, 5 wetlands in June — August 2018, with the 2017 wetlands revisited and re-documented in 2020);

12. Review existing datasets to identify wetlands with Level 3 survey data in areas where Landfire and USFS maps indicate high probability of fire in the near future (March 2018);

13. Revisit these wetlands within the first or second year after a fire (variable, 2019 and 2020);

14. Carry out field assessments, using both functional and EIA methods, at a minimum of 8 wetlands sites that have been actively restored to meet mitigation requirements, focusing on restorations that have occurred more than 5 years ago but less than 10 years ago (July — August 2019);

15. Present results of Activity 14 in a professional presentation at a regional or national conference, and in a newsletter article submitted to a professional society (September 2020).

Action 6. Develop integrated databases of assessment data that can be linked to MTNHP's interactive web applications and tools, and ensure that all MTNHP GIS-based data sets and tools are discoverable and downloadable from the Montana State Library website and linked to other websites.

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Primary); Regulation (Secondary); Water Quality Standards (Secondary).

Strategic Directions: Restoration, Protection and Management (Primary); Monitoring and Assessment (Primary); Vulnerable and Impacted Wetlands (Primary); Planning and Policy (Secondary); Public Communication (Primary); Montana Wetland Council (Primary).

Overview: Individual staff within agencies such as MT DEQ, the BLM and the USFS are aware of our assessment activities and know that we maintain databases of assessment results that are available on request. However, this does not meet our broad goal of making information and data available to a broad suite of users. Because the method has been in development since its inception, there have been small changes in the protocol through every assessment cycle. While these changes have strengthened the EIA itself, they have posed challenges for data management. Each assessment project has generated an Access database with all observed and calculated data values, but because of the changes in the protocol, the data structure in some of the databases differs from the others, making it difficult to compile all the data into a single source that can be served up through MTNHP's MapViewer. Thus, users investigating species, communities, and the presence of wetlands through MapViewer have no way of knowing that there is additional information in the form of detailed Level 2 and 3 assessments. We have also not incorporated the data from the 2011 National Wetland Condition Assessment (NWCA) into our own databases, because of differences in data structure, although the actual information collected in the NWCA is extensive enough to populate all our data fields. This problem will be addressed for the 2016 NWCA assessment by entering raw data from scanned NWCA datasheets directly into a MTNHP EIA template after field season (with partner funding), and can be alleviated going forward now that the assessment protocol has become more stable. Nonetheless, we need to make past data available to our internal and external partners, including those who might not even know it exists unless they come across it on MapViewer.

We have, and anticipate, similar challenges with our other data sets. For example, our Human Disturbance Index, which has proven to be extremely valuable for landscape-level analyses in contexts other than wetland assessments (e.g., habitat and corridor assessments), is largely unknown outside our own office and an immediate cadre of partners. Even the wetland mapping suffers from a certain anonymity. While seasoned GIS users in Montana are familiar with the National Wetlands Inventory, and know about our wetland layer because it is part of the Montana Spatial Data Infrastructure, new agency staff, consultants and others may not understand its breadth or utility. This is an issue that could be addressed through some revisions to the MTNHP Wetlands Data website, postings to our social media sites, placement of data on partner geospatial portals, and semi-annual newsletter submissions to partner agencies and organizations (e.g. Montana Wetland Council, Rocky Mountain CESU, Society of Wetland Scientists, The Wildlife Society, the Association of State Wetland Managers and non-profits such as Ducks Unlimited).

Action 6 Activities:

1. Create a new assessment database template and enter all data from previous assessments into it, recalculating Floristic Quality Assessment metrics from previous studies using newly developed Coefficients of Conservatism for Montana Wetland Plants and updated species names as appropriate (June 2017);

2. Enter all Montana data from the 2011 NWCA and the upcoming 2016 NWCA into the newly developed database and calculate Montana-specific assessment metrics as appropriate; flag sites that are found to be either reference standard or highly degraded with special modifiers (October 2017);

3. Make all assessment data discoverable through the MTNHP MapViewer web application (March 2018);

4. Revise the MTNHP Wetlands Data page and ancillary pages to better inform users of the kinds of data and tools we have available, provide live links to the data and tools, and offer guidance in their use (March 2018, and annually thereafter);

5. Develop a semi-annual outreach program that collects and submits information and updates to partners, users, and potential users through social media, electronic newsletter submissions, and (as appropriate), email (June 2018, and semi-annually thereafter).

Action 7. Ensure that MTNHP wetland maps and data are compatible with emerging standards for vegetation mapping and are crosswalked into other maps.

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Primary); Regulation (Secondary); Water Quality Standards (Secondary).

Strategic Directions: Restoration, Protection and Management (Primary); Monitoring and Assessment (Primary); Public Communication (Primary); Montana Wetland Council (Secondary).

Overview: MTNHP's wetland mapping, like all NWI mapping, uses the Cowardin classification system (Cowardin et al. 1979) for wetland mapping, and the USFWS's standards for riparian mapping, which are the mapping standards set by the Federal Geographic Data Committee (FGDC). This means that every polygon is identified using Cowardin and USFWS nomenclature, such as "Palustrine Emergent Saturated" or "Riparian Lower Perennial." While these terms are meaningful to some of our partners, and are explained in our metadata and fact sheets, they do not crosswalk easily with other classification systems. For example, the Montana Land Cover and Land Use dataset uses the Ecological Systems classification (Comer et al. 2003), as do the national Landfire dataset and the National ReGAP dataset, and our own Montana Field Guide. The Natural Resources Conservation Service (NRCS) and the BLM are working on Ecological Sites Descriptions (ESDs), which use soil and vegetation to produce state-and-transition models for different sites, including riparian sites and wetlands. Scientific researchers and agency biologists in Montana tend to use a Montana-specific riparian classification scheme (Hansen et al). Adding to this array, 2016 is likely to see the release of the National Vegetation Classification Standard (NVC) from the FGDC. While it is uncertain, at this point, that the NVC will become a mapping standard, it is currently a requirement that anyone who collects vegetation data using federal funds crosswalks their classification to the NVC at some level, either as coarse as a Class (e.g., Forest and Woodland) or as fine as an association (e.g., *Populus balsamifera ssp. trichocarpa - Picea engelmannii / Equisetum arvense* Forest).

Currently, the Montana Field Guide lists and describes 18 wetland and riparian Ecological Systems (http://fieldguide.mt.gov/displayES.aspx?id=8). Each of these descriptions has a section linking the Ecological System to Cowardin classes (a one-to-many relationship, in most cases), but the links are incomplete and in several cases, inaccurate. Similarly, crosswalks to the NVC are based on an early version of the Standard, and both names and whole concepts have been changed during its development. There are no crosswalks to the Hansen system, or the Ecological Sites. There is nothing in any of our web materials that can help users crosswalk from a Cowardin or USFWS classification to a potential NVC group or macrogroup, to the Ecological Systems, to Hansen, or to the NRCS/BLM ecological sites. To the extent that users are confused by the multiple classifications and lack a way to integrate them, the utility of our mapping and data is limited. This is especially problematic with our statewide Land Cover Land Use dataset, which classifies land cover using Ecological Systems. This is only part of the problem. The main problem is that while it incorporates all 18 wetland Ecological Systems, the scale at which the images were classified (30m) and the recommended resolution for use of the data (1:100,000) means that tens of thousands of wetlands and riparian areas are not shown, are misplaced, or are improperly classified. Furthermore, certain kinds of systems are not accurately named or described. For example, large beaver-created wetland complexes are not considered to be a separate Ecological System, despite the fact that many have persisted for decades or longer. Now that we are nearing the goal of a statewide digital wetland layer, we need to either "burn in" all wetland polygons, or at least those that meet some minimum mapping unit size. The tasks of selecting the minimum mapping unit, crosswalking Cowardin types to probable ecological system, and aggregating multiple Cowardin types (where they occur in a single wetland or complex) into ecological systems will require sustained effort over the WPP period.

Action 7 Activities

1. Using NatureServe and MTNHP databases, produce a Montana-specific extract of the NVC, from the broadest classes through the finest associations recorded (or believed to occur) in Montana. Publish on our website under a distinct NVC page, with links to and from our Wetlands web pages (December 2016);

2. Update all 18 wetland Ecological Systems in the Montana Field Guide with crosswalks to the NVC and (for Riparian Systems) the Hansen classification, and review and revise crosswalks to the Cowardin and USFWS classifications (December 2017);

3. Through an iterative process, evaluate the best minimum mapping unit for wetlands in the Montana LCLU dataset, and evaluate potential ecological system classifications for wetland complexes (June 2017);

4. Develop a new Ecological System description for "Beaver-flooded wetland complexes" that are a minimum of 5 acres in size (March 2018);

5. Develop a dichotomous key for crosswalking Cowardin and USFWS classified-wetland polygons (at the individual polygon scale) to Ecological Systems, and develop an automated method in ArcGIS, using Python scripts, to apply the crosswalk to the MT-NWIPlus dataset (September 2017);

6. "Burn in" all MT-NWIPlus mapping into the Montana LCLU dataset, aggregated and reclassified through Activities 3-5 (September 2018);

7. Identify recently-developed riparian and wetland ESDs that can be crosswalked to Ecological Systems, and revise Montana Field Guide to include this crosswalk (March 2019).

Action 8. Participate in scientific and professional meetings, workgroups, interdisciplinary teams and the Montana Wetland Council.

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Secondary); Regulation (Secondary); Water Quality Standards (Secondary).

Strategic Directions: Restoration, Protection and Management (Primary); Monitoring and Assessment (Primary); Public Communication (Primary); Montana Wetland Council (Primary).

Overview: For partners to rely on MTNHP as the authoritative state source for wetland mapping, data and tools — the goal of this plan — they need to be aware of the resources we have created and manage, and understand how they can be applied to address planning, management, protection and restoration questions. At the same time, we need to be aware of what our partners are doing, and stay abreast of scientific and technical innovations, both in wetland science and in geospatial and geostatistical analysis.

Since the economic contractions following 2008, we have not seen any increase in our state funding allocation, although our costs — salaries, benefits, supplies — have continued to rise. Similarly, reductions in federal funding have led to staff loss, and fewer funded projects. To maintain financial stability, we have cut "non-necessary" costs, like memberships in the Society of Wetland Scientists, the Montana Association of Geographic Information Professionals and the Association of State Wetland Managers, and have curtailed all conference attendance that is not subsidized by another entity. While this has been a solution for the short term, it is unsustainable over the long term, especially for those MTNHP staff who are new to the profession. And in the long run, it undermines our ability to develop new projects with new partners.

We have also reduced our one-on-one consultation with tribal partners. In previous years, we collaborated at no cost with the Confederate Salish and Kootenai, the Blackfeet, Fort Peck and Fort Belknap, on everything from joint mapping projects to database development to direct assistance with editing their WPPs and WPDG applications. We also worked on funded tech transfer projects with the Northern Cheyenne and Rocky Boys. In recent years, we have had no funds to travel to the reservations, and tribal staff have had insufficient funding to come to Wetland Council meetings, resulting in a drop in interaction and communication, and increasing isolation of the tribes. This is something we would like to address.

We have, on the other hand, stepped up engagement with local partners, both in an ad hoc way and through participation in working groups, steering committees and review panels. Over the past eighteen months, we have participated in an Interagency Working Group on Orthoimagery, which works on planning and securing statewide aerial imagery on an biennial basis. We work formally and informally as part of the Interagency Group on Hydrography, which is currently integrating our digital mapping of rivers and streams into a Montana version of the National Hydrography Dataset (NHD), and is collaborating with the USGS to find a way to batch process state-level revisions into the national dataset. Our Russian Olive mapping is part of a joint effort with an Interagency Russian Olive Working Group. We work with the US Forest Service on GIS-based tools and models for restoration and protection of aquatic and wetland habitat, and are co-authoring one of the agency's Technical Reports. We participate in a Conservation Planning workgroup that is part of the Montana Wetland Council. One of our staff is a board member on the Wetlands Section of the Wildlife Society, and edits their newsletter. Another is an affiliate faculty member in the Systems Ecology Program at the University of Montana. We acted as technical advisors to the Office of Water's consultant who was attempting to identify limits of hydrologic change in Prairie Pothole wetlands. We have been active participants in the National Monitoring and Assessment Workgroup since 2004. And of course, we participate in all Montana Wetland Council meetings, often as presenters, serve on the Council's Steering Committee, and lead the Mapping and Monitoring workgroups. However, all this engagement comes at a time cost that has to be covered by salaries, or by voluntary contributions of personal time to participate in these efforts or make up for project time lost. Over the long term, this too is not tenable.

Action 8 Activities

1. Provide current memberships for science staff in the Association of Wetlands Managers, the Society of Wetland Scientists, and the Wildlife Society (January 2017, and annually thereafter);

2. Provide current memberships for all mapping and GIS staff in the Montana Associated of Geographic Information Professionals (January 2017, and annually thereafter);

3. Provide support for five (5) staff to attend at least one national professional conference every two years even if s/he is not presenting work (January 2017, and biennially thereafter);

4. Provide support for five (5) staff to attend at least one regional professional conference every two years even if s/he is not presenting work (January 2017, and biennially thereafter);

5. Support each Wetlands Program staff member to participate in at least one professional or technical working group through underwriting of salary and travel (January 2017, and annually thereafter);

6. Ensure attendance of at least two MTNHP staff members at every Wetland Council Meeting (March 2017, and three times per year thereafter);

7. Meet at least once every two years with our 6 tribal partners (3 per year) on their Reservation to discuss potential collaboration, technical needs, and if possible, data sharing (June 2017, and annually thereafter.

Action 9. Deliver high-quality training to agency and private sector professionals to help them identify, manage and restore wetland biological resources.

Core Elements: Monitoring and Assessment (Primary); Voluntary Restoration and Protection (Primary); Regulation (Primary); Water Quality Standards (Secondary).

Strategic Directions: Restoration, Protection and Management (Primary); Monitoring and Assessment (Primary); Public Communication (Primary); Montana Wetland Council (Primary).

Overview: Interactive web applications, GIS and database tools, sophisticated maps, and complex assessment tools all add to the resources that wetland professionals can draw upon to identify, manage, protect and restore Montana's wetlands. However, the increasing sophistication of our information resources comes with an increasingly steep learning curve, which may itself become an obstacle if our partners are left to navigate through these resources by themselves. Therefore, it is important that we offer a full range of training and technical resources to our agency and professional partners, whether in the form of dichotomous keys, technical manuals, online Help resources, presentations and workshops, or hands-on trainings.

Action 9 Activities:

1. Revise our Wetlands web pages as a portal to provide clear and consistent information, links, and access options for our data and mapping, and link to our social media outlets (September 2017);

2. Develop training on uses of the MT-NWIPlus database, including handouts, materials, and PowerPoints (June 2017);

3. Deliver two trainings a year at no cost to agency and professional partners interested in our wetland data resources (September 2017, and annually thereafter);

4. Offer at least two Wetland Plant Identification workshops each year for consultants and agency personnel to build botanical expertise and capacity in the community (June — August 2016, and each summer thereafter);

5. Support all wetland staff to provide at least one professional presentation highlighting our data and information resources every two years at a local, regional or national meeting (2017, and biennially thereafter).

Conclusion

Montana is widely respected for its well-integrated and collaborative wetland protection, restoration and mitigation activities. At the heart of these activities is a solid foundation of science-based

information, including literature reviews, field guides, assessment results, models and spatial and tabular data, plus training and guidance in putting this information to use. With its unique positioning in a non-regulatory agency like the Montana State Library, and the resources of the University of Montana to call on, the Montana Natural Heritage Program has built the relationships and networks that have allowed it to make great progress towards becoming a "one-stop shop" for data and information. This Wetland Program Plan is an ambitious vision for taking the next steps towards fulfilling the MTNHP's mission, and reaching the overarching goal of "no net loss" of Montana's wetlands and riparian areas.

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