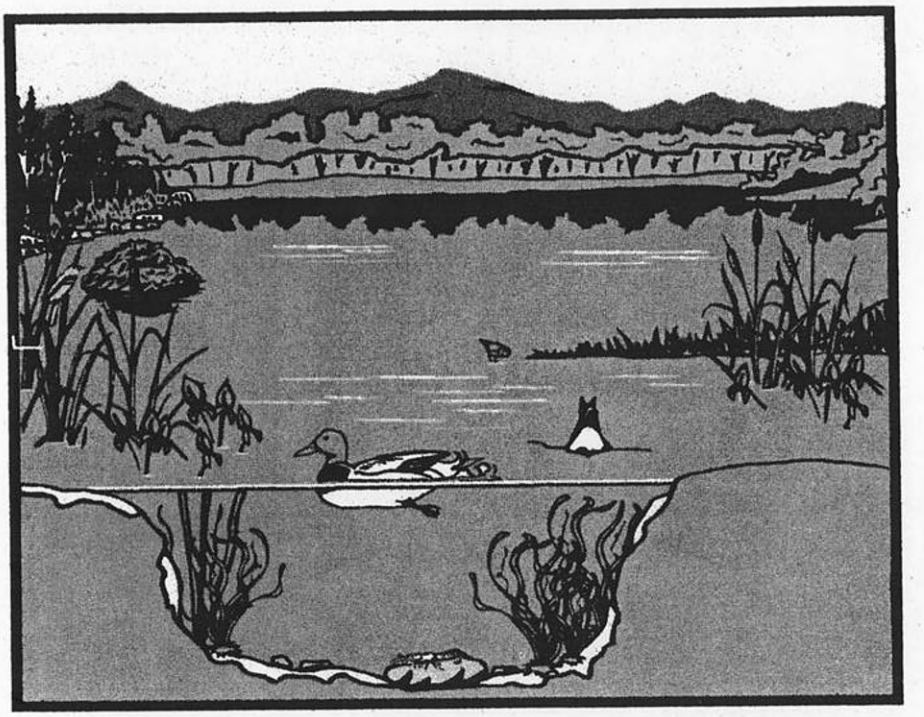
MDT
Montana Wetland Assessment Method



Prepared for:
Montana Department of Transportation
and Morrison-Maierle, Inc.

Prepared by:
Jeff Berglund
Western EcoTech

May 25, 1999

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Prepared for:

Montana Department of Transportation
Environmental Services
2701 Prospect Avenue
P.O. Box 201001
Helena, Montana 59620-1001

and

Morrison-Maierle, Inc.
910 Helena Avenue
P.O. Box 6147
Helena, Montana 59604-6147

Prepared by:

Jeff Berglund
Western EcoTech
1280 Lariat Road
Helena, Montana 59602

May 25, 1999

ACKNOWLEDGMENTS

This revised assessment method would not have come to pass without the review and comments provided by several wetland professionals. The Montana Department of Transportation wetland resources staff, including Pat Basting, Dave Hill, Larry Sickerson, Gordon Stockstad, Mark Traxler, Larry Urban, and Deb Wambach, provided intensive review and valuable comments at all phases of this project. Pam Hackley (OEA Research), Robert Harris (Turnstone Biological), and Beth Kunkel (BRW, Inc.) also participated in the initial brainstorming session and provided key suggestions for revision. Alan Steinle of the U.S. Army Corps of Engineers in Helena provided helpful comments from a policy perspective. Jeff Ryan of the Montana Department of Environmental Quality assisted with issues pertaining to impaired waters. Additional members of the Montana Interagency Wetland Group provided helpful informal comments and suggestions. Finally, Steve Cooper and Bonnie Heidel of the Montana Natural Heritage Program provided invaluable assistance with respect to rare wetland plants and plant associations in Montana.

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INTRODUCTION

In 1989, the Montana Department of Transportation (MDT) and the Montana Department of Fish, Wildlife & Parks (MDFWP) developed a wetland evaluation method to be applied to highway projects in Montana. Substantial revisions of the method and corresponding field forms were undertaken in 1994 and 1996. The 1996 version (Berglund 1996) was tested for three field seasons at several hundred wetlands. Opportunities to improve assessment accuracy and evaluator consistency were noted during this period and incorporated into the 1999 revision. These instructions and the corresponding field forms comprise the 1999 version of this functional assessment method.

As with previous versions, the 1999 evaluation method discussed in this report was primarily designed to address highway and other linear projects, such as pipelines and transmission lines. However, the method can be applied to other types of projects, including mitigation projects, at the discretion of the user. It is important to note that this method is intended to *evaluate* wetland functions and values, and is not to be used to *delineate* jurisdictional wetland boundaries. Wetland delineation should be conducted prior to evaluation using the 1987 Corps of Engineers (COE) wetland delineation manual (Environmental Laboratory 1987) or other COE-approved methods.

The objectives of the revised form are to provide a rapid, economical, repeatable wetland evaluation method applicable to Montana that:

- meets the needs of local regulatory agencies in terms of quantifying jurisdictional wetland functions and values with respect to the majority of proposed wetland disturbance-related and mitigation projects in the state, particularly highway projects;
- minimizes subjectivity and variability between evaluators;
- provides a means of assigning wetlands overall ratings to facilitate avoidance priorities; and
- incorporates some of the principles of the hydrogeomorphic (HGM) assessment method to foster use of the revised form as an interim method until HGM is fully implemented in Montana, and as an alternate method once HGM is implemented. As of the writing of these instructions, the *Regional Guidebook for Assessing the Functions of Intermontane Prairie Pothole Wetlands in the Northern Rocky Mountains* (Hauer et al. 1999) has been completed, and a guidebook addressing riverine wetlands will be available in early summer 1999 (Hauer pers. comm.).

METHODS

Methods applied during the substantial 1996 revisions to the original MDT method are presented in the 1996 instructions (Berglund 1996). Potential revisions to the 1996 version of the method and form were initially discussed at a meeting conducted at MDT during late 1998. Meeting attendees included MDT biologists and primary MDT wetland consultants. A draft revised form was presented to the Montana Interagency Group (consisting of MDT, COE, U.S. Fish & Wildlife Service [USFWS], Environmental Protection Agency [EPA], Federal Highways Administration [FHWA], Montana Department of Environmental Quality [MDEQ], Natural Resources Conservation Service [NRCS], and MDFWP for review and comment in early May 1999. The Montana Natural Heritage Program (MNHP) was consulted with respect to formatting for development of an electronic version of the data forms. The method and corresponding data form were revised in spring of 1999 based upon received comments, meeting results, and literature review.

Primary literature sources referenced during the course of the 1996 method and form development and 1999 revision included *Regional Guidebook for Assessing the Functions of Intermontane Prairie Pothole Wetlands in the Northern Rocky Mountains* (Hauer et al. 1999), *A Comprehensive Review of Wetland Assessment Procedures* (Bartoldus 1999), *Oregon Freshwater Wetland Assessment Methodology* (Roth et al. 1993), *Minnesota Routine Assessment Method for Evaluating Wetland Functions* (Minnesota Interagency Wetland Group 1996), *Draft Hydrogeomorphic Assessment of Riverine Wetlands* (Hauer and Cook 1996), *An Approach for Assessing Wetland Functions Using Hydrogeomorphic Classification, Reference Wetlands, and Functional Indices* (Smith et al. 1995), *Wetland Evaluation Technique* (Adamus et al. 1991), the *Highway Methodology Workbook* (COE 1995), *Washington State Wetlands Rating System for Eastern Washington* (Washington State Department of Ecology [WDE] 1991), and *Washington State Wetlands Rating System - Western Washington* (WDE 1993).

INSTRUCTIONS AND DISCUSSION

A copy of the five-page 1999 MDT Montana Wetland Assessment Form is provided in Appendix A. This section of the report

provides discussion and instructions for completing each of the fields on the form.

The COE Regulatory Division must consider impacts to wetland functions and values when evaluating Section 404 permit applications. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society, and relate to ecological significance without regard to subjective human values (COE 1995). Groundwater discharge is an example of a wetland function. Values are benefits that derive from either one or more functions and the physical characteristics associated with a wetland (COE 1995). The value of a given wetland function, or combination of functions, is based on human judgment of the worth, merit, importance, or quality attributed to those functions.

The following functions and values are evaluated by this method:

- Habitat for federally listed or proposed threatened or endangered plants or animals
- Habitat for plants or animals rated S1, S2, or S3 by the Montana Natural Heritage Program
- General wildlife habitat
- General fish/aquatic habitat
- Flood attenuation
- Long and short-term surface water storage
- Sediment/nutrient/toxicant retention and removal
- Sediment/shoreline stabilization
- Production export/food chain support
- Groundwater discharge/recharge
- Uniqueness
- Recreation/education potential

The form assesses and assigns each of the 12 functions and values ratings of "low", "moderate", or "high" (or, in some cases, "exceptional"), and scores each on a scale of .1 (lowest) to 1 (highest) "functional points". The scoring scale for each function and value is similar to that of HGM, although HGM does not generally consider values and not all of the variables considered by HGM with respect to a given function were included in this method.

Functional points are summed on the data form and expressed as a percentage of the possible total; functions that do not apply to a given wetland are assigned a rank of "NA" and are **not included** in point totals. This percentage is then used in conjunction with other criteria to provide an overall wetland ranking into one of four categories. Category I is the highest overall ranking a wetland can receive, followed by Category II, Category III, and Category IV. Functional points can be multiplied by the total existing or expected (post-project) acreage in the assessment area (AA) to determine the total "functional units" existing, expected to be lost, or expected to be gained at a given site. Wetland categories and functional units are further discussed in the latter portion of this section.

When completing fields 14A through 14L (the functions and values assessment portion of the form), if it is the evaluator's best professional opinion that a rating for a particular function is inadequately represented on the form due to specific site conditions, it is appropriate to override the calculated value and note the justification in the comment space provided. It is important to note, however, that this should be treated as the exception rather than the rule.

Generally, it is appropriate to assess wetlands, or assessment areas (AAs), individually on separate data forms. However, it is also appropriate to address several AAs on one data form if the AAs are very similar with respect to size, composition, exposure to disturbance, and other features. Several very similar roadside ditch wetlands along a proposed highway project would comprise an example of when several AAs could be assessed on one data form. AAs that differ enough from one another such that they would result in different ratings for various functions and values should be assessed on separate data forms.

Several attributes throughout the form are rated by working through matrices. Variables used within these matrices are addressed in a dichotomous, "top to bottom" fashion, resulting in an assignment of functional points and a rating for each evaluated function. An example based on the matrix used to evaluate flood attenuation is provided below. In this example, estimated wetland acreage subject to flooding is at least 10 acres, > 75 percent of the flooded wetland is forested, scrub-shrub, or both, and the site contains an unrestricted outlet, receiving a score of .9 and a rating of "high" for this function.

Estimated wetland area in AA subject to periodic flooding	≥ 10 acres			<10, >2 acres			≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1(H)	.9(H)	.6(M)	.8(H)	.7(H)	.5(M)	.4(M)	.3(L)	.2(L)
AA contains **unrestricted outlet**	.9(H)	.8(H)	.5(M)	.7(H)	.6(M)	.4(M)	.3(L)	.2(L)	.1(L)

1. Project Name: Enter the appropriate project name.

2. Project # and Control #: Enter the appropriate project and control numbers, if applicable.

3. Evaluation Date: Enter the date(s) that the field evaluation was conducted.

4. Evaluator(s): Enter the names and/or affiliation of the personnel conducting the evaluation.

5. Wetland/Site #(s): Enter the wetland identification number(s) and name(s) (e.g., Fish Creek), if applicable.

6. Wetland Location(s): Enter the appropriate legal descriptions, stationing or mileposts, eight-digit watershed descriptor (from the *Hydrologic Unit Map – 1974: State of Montana* [U.S. Geological Survey 1976]), global positioning station (GPS) reference # (if available; not required), and other desired location information for the evaluated wetlands.

7. Evaluating Agency and Purpose: Fill in the appropriate agency (for MDT projects, this will generally be "MDT") and check the appropriate project category.

8. Estimated Total Wetland Size: Enter the estimated or measured (not required) size of the entire wetland that includes the assessment area (AA). If the AA is delineated such that the entire wetland is included, the responses to 8 and 9 will be the same. If evaluating more than one AA on a single data form, enter the average wetland size or the range of wetland sizes.

9. Estimated Acreage of Assessment Area (AA): Indicate the estimated or measured (not required) acreage within the boundaries of the AA using the guidance below. If splitting a wetland into more than one AA, indicate the AA boundaries on the wetland delineation map. Wetlands bisected by roads may be considered as a single AA or as more than one AA, depending on the perceived degree of hydrologic/biological interaction between the two halves. If evaluating more than one AA on a single data form, enter the average AA size or the range of AA sizes. Several example AAs relative to highway projects are provided in Figure 1.

The AA includes the portion of a wetland that is (see Figure 1):

A. within a proposed project right-of-way, construction easement, permit area, known detour area, etc. (e.g., within the area of interest) *and* contiguous to a distance determined by B or C below, whichever distance is *closer* to the proposed project.

B. contiguous up and downstream from the project to physical points of significant hydrologic change (these can include jurisdictional boundaries, points where jurisdictional wetlands are no longer adjacent to a non-wetland channel, natural [geomorphic] or man made constrictions or expansions, points where the gradient changes rapidly, points of significant inflow [e.g., tributaries], or places where other factors limit hydrologic interaction) *or*

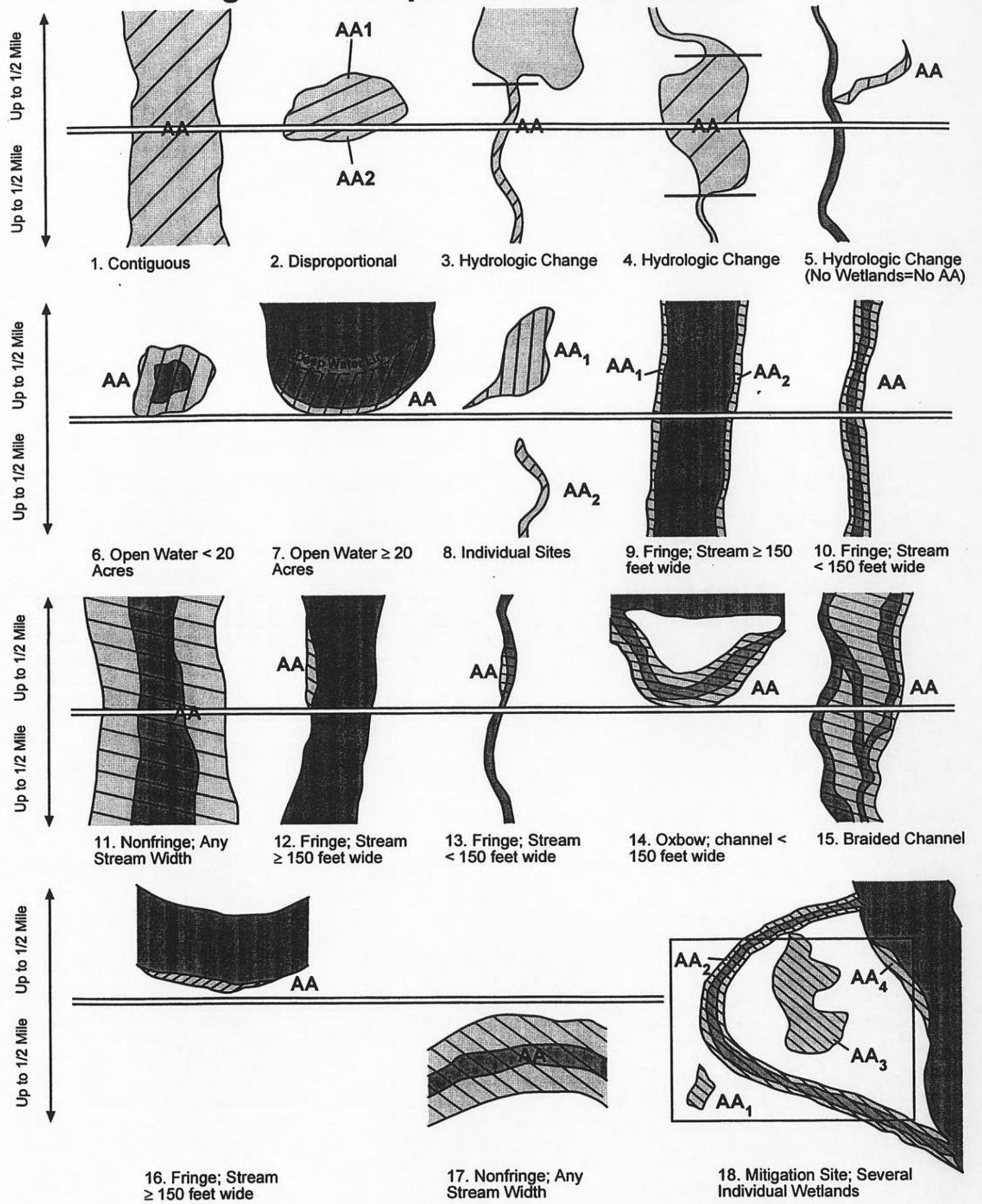
C. contiguous up and downstream from the project to maximum distances of 0.5 mile if no points of significant hydrologic change (including termination of the wetland) occur within this radius.

The following conditions apply to wetlands contiguous with open water. Open water is defined as *any area of standing or flowing water without emergent (not including pioneer species), scrub-shrub, or forested vegetation (e.g., in most cases, a flooded wet meadow would not be considered to contain open water)*.

Where wetlands are contiguous with **standing** non-wetland water bodies (lakes, ponds):

If wetlands are contiguous with < 20 acres of open water (e.g., prairie pothole), include all open water in the AA to a

Figure 1 - Sample Assessment Areas



distance from the project determined by A, B, and C above (see Figure 1, Panel #6).

If wetlands are contiguous with ≥ 20 acres of open water (e.g., Flathead Lake), include open water in the AA to the estimated deep water line (>6.6 feet) or to a point that is double the wetland shoreline width, whichever is greater (see Figure 1, Panel #7).

Where wetlands are contiguous with **flowing** non-wetland water bodies (rivers, streams, irrigation canals):

For fringe wetlands (cumulative width along both banks < 3x bankfull channel width) adjacent to a channel with a bankfull width ≥ 150 feet (e.g., Missouri River), only include the *actual wetlands* in the AA to a distance from the project determined by A, B, and C. Do not include the channel in the AA unless the wetlands extend into it (see Figure 1, Panel #s 9, 12, 16, 18).

For all nonfringe wetlands (cumulative width ≥ 3x bankfull channel width) or those fringe wetlands adjacent to a channel with a bankfull width < 150 feet (e.g., Little Blackfoot River), include the entire channel in the AA to a distance from the project determined by A, B, and C (see Figure 1, Panel #s 10, 11, 13, 14, 15, 17, and 18).

10. Classification of AA: Enter the HGM class(es) (Smith et al. 1995) pertaining to the AA in column 1. HGM classes applicable to Montana are riverine, depressional, slope, mineral soil flats, organic soil flats, and lacustrine fringe. A key to these classes is provided in Appendix C. Class descriptions are provided in Smith et al. (1995).

For columns 2-6, enter the systems, subsystems, classes, water regimes, and special modifiers that apply to the AA using the Cowardin et al. (1979) classification system. Only the riverine, lacustrine, and palustrine systems apply to Montana. A classification hierarchy showing systems, subsystems, and classes from Cowardin et el. (1979) is included in Appendix C. For column 7, enter the estimated percentage of the AA that corresponds to each Cowardin class.

Vegetated classes are distinguished on the basis of what species constitute the uppermost layer of vegetation and cover more than 30% of the substrate (Cowardin et al. 1979). For example, an area with 50% areal coverage of trees over a shrub layer with 60% areal coverage would be classified as a forested wetland; an area with 20% areal coverage of trees over a shrub layer with 60% areal coverage would be classified as scrub-shrub wetland. When trees or shrubs alone cover less than 30% of an area but in combination cover 30% or more, the wetland is classified as scrub-shrub. When trees and shrubs cover less than 30% of an area but the total vegetative cover is 30% or greater, the wetland is assigned to the appropriate class for the predominant life form (e.g., emergent) below the shrub layer. Vegetated classes likely to be encountered are defined below:

Aquatic bed class:	Any areas of open water dominated by plants that grow principally on or below the water surface for most of the growing season. Vegetation is non-persistent and includes submerged or floating-leaved rooted vascular plants, free-floating vascular plants, submergent mosses, and algae.
Emergent class:	Vegetated wetland characterized by erect, herbaceous hydrophytes (e.g., sedges, rushes, grasses, bulrush, cattail), excluding mosses and lichens.
Scrub-shrub class:	Vegetated wetland dominated by woody vegetation less than 6m (20 ft) tall. Species include shrubs, young trees, and stunted trees and shrubs.
Forested class:	Vegetated wetland characterized by woody vegetation that is 6m (20 ft) tall or taller.
Moss-lichen class:	Wetland where mosses or lichens cover substrates other than rock and where emergents, shrubs, or trees make up less than 30% of areal cover.

11. Estimated Relative Abundance of Similarly Classified Sites within Major Montana Watershed Basin:
Circle the estimated relative abundance of sites that are similar in composition to the AA and occur within the same major Montana watershed basin (Appendix A) using the following definitions:

Rare	estimated < 10% of wetlands in basin similar to AA
Common	estimated 10-50% of wetlands in basin similar to AA
Abundant	estimated >50% of wetlands in basin similar to AA

The Major Montana Watershed Basin Map is based on a modification of the 1974 United States Geological Survey Hydrologic Unit Map for Montana, and is used by the MDT Interagency Wetlands Group to determine the suitability of mitigation project locations relative to impact locations.

12. General Condition:

i. Regarding Disturbance. Disturbance at the AA is defined based on land use both at the AA and in the surrounding area. Land use in surrounding areas can provide a measure of disturbance within AAs and negatively influence their habitat quality even though the AAs themselves may be relatively undisturbed. Use the matrix on the form to arrive at an overall determination of "low", "moderate", or "high" disturbance at the AA. Fill in comments as desired.

ii. Prominent Weedy, Alien, and Introduced Species. List prominent weedy, alien, and introduced vegetation species within the AA.

iii. Descriptive Summary. Provide a brief (1 to 2 sentence) descriptive summary of the AA and surrounding area. The description may include dominant species, adjacent land use, proximity to other wetlands, etc.

13. Structural Diversity: Using the table provided on the form, determine the structural diversity rating for the AA. Count only those classes listed under #10 that are vegetated; *do not include unvegetated (e.g., rock bottom, unconsolidated shore, etc.) classes*. Rate the structural diversity based on the "best case" for a given wetland. For example, if non-persistent floating-leaved vegetation is absent during the evaluation, but the reviewer knows or strongly suspects that such vegetation is present during some portion of the year, then this class should be counted in addition to other vegetated classes.

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals: A "red flag" attribute, this field assesses habitat for species receiving protection under provisions of the Endangered Species Act; that is, *listed or proposed threatened or endangered species*. Potential effects to threatened and endangered species are examined by the COE during 404 permit application reviews. According to the COE general conditions for Nationwide 404 permits, "no activity is authorized which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species.". A 1999 USFWS list of threatened and endangered species and species proposed for listing under the Endangered Species Act in Montana is presented in Appendix D.

i. Circle D or S to indicate whether habitat for listed or proposed T&E species is documented or suspected within the AA at the ascertained level using the definitions provided below. It may be appropriate to indicate more than one use level for multiple species. For example, an AA may contain secondary habitat for bald eagles and incidental habitat for peregrine falcons. List the species that correspond to each habitat level determined to apply to the AA.

Primary Habitat: Habitat essential to the short or long-term viability of individuals or populations. The presence of traditional breeding, spawning, nesting, denning, or critical migratory habitat, large seasonal congregations (including communal roosts, staging habitat, traditional foraging congregations, etc.), or USFWS-designated critical habitat or core areas in the AA indicates primary habitat, as does any occurrence of a T&E plant.

Secondary Habitat: Habitat that is occasionally or semi-regularly used by a given species, but that is not necessarily essential to the short or long-term viability of individuals or populations. Examples would include non-specific migration areas and occasional forage or perch sites. Primary habitat, as defined above, may occur in the general vicinity (e.g., within the project area, section, drainage, watershed, etc.), but not in the AA.

Incidental Habitat: Habitat that receives chance, inconsequential use by a given species or habitat conditions or the known distribution of the species would indicate this level of use. This term implies that, while it may be conceivable that a given species may occur at an AA at a given point in time, the chance is remote and the use is not likely to be repeated.

ii. Rating. Use the highest level habitat (e.g., the level that corresponds to the highest functional point value) determined under i to determine the functional point value for the AA. If T&E species habitat is documented at the AA, indicate the source of the documentation.

14B. Habitat for Plants or Animals Rated S1, S2, or S3 by the Montana Natural Heritage Program: This field assesses use of the AA by species rated S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable) by the Montana Natural Heritage Program (not including "watch list" species). Species within these MNHP categories are inclusive of U. S. Forest Service-listed sensitive species and USFWS candidate species that are not subject to the provisions of the Endangered Species Act. *To avoid duplication, do not include species listed above under 14A.* Lists of plants and animals rated S1, S2, and S3 by the MNHP that may be associated with wetlands in Montana are presented in Appendix D.

i. Circle D or S to indicate whether habitat for these species is documented or suspected within the AA at the ascertained level using the definitions provided above under 14A. As discussed under 14A, it may be appropriate to indicate more than one habitat level for multiple species. List the species that correspond to each habitat level applying to the AA.

ii. Rating. Use the highest level habitat (e.g., the level that corresponds to the highest functional point value) determined under **i** to determine the functional point value for the AA. If sensitive species habitat is documented at the AA, indicate the source of the documentation.

14C. General Wildlife Habitat: This field assesses general wildlife habitat potential of the AA based upon evidence of wildlife use and habitat features. The combination of these two variables is considered to more accurately assess this function than if habitat features alone were used. A site may contain what are perceived to be outstanding habitat features for wildlife, but for reasons difficult to detect (such as presence of toxins, etc.) may only receive minimal to moderate use. Opportunities for enhancement may exist if such a situation were correctable. Conversely, a site may contain few desirable habitat features, but may receive significant use due to a general lack of habitat in the area or other factors and may be under-rated for this function if wildlife use was not considered.

With respect to habitat features, variables assessed include structural diversity, evenness of vegetated classes, duration of surface water in at least 10 percent of the AA, and degree of disturbance. Structural diversity and evenness of vegetated classes relate to the amount of niches available in an area. More niches are potentially available as more layers of habitat occur, so more wildlife species potentially are supported by more structurally complex habitats (Cooperrider et al. 1986). Similarly, Hauer and others (1999) state that pothole wetlands with the highest level of ecosystem complexity and diversity tend to have a relatively even spatial distribution of wetland zones.

The duration of surface water, whether perennial or intermittent, plays an important role in the habitat function of wetlands. Free water is an extremely important habitat component of wetlands, particularly during summer (Brown 1985). Generally, the longer surface water is present during the year, the more available it is for wildlife use at a variety of life stages. Degree of disturbance at a wetland can greatly influence its use by wildlife. Examples of disturbance include direct conversion, conversion of upland supporting habitats, and encroachment by human activity sources, such as residences and roads.

i. Evidence of Overall Wildlife use in the AA. First determine the level of evidence indicating wildlife use in the AA based on direct observations (auditory detections are counted as observations), presence of wildlife sign, adjacent upland food sources, presence of extremely limiting habitat features, or interviews with local biologists with knowledge of the AA. Whether or not a habitat feature would be considered as extremely limiting depends on the feature itself as well as the estimated availability of that feature in the general vicinity. For example, bogs or warm springs within areas in which these features rarely occur would be considered extremely limiting habitat features. Circle "substantial", "moderate", or "low" *evidence of use* based on the criteria listed on the data form. For further guidance, refer to the definitions of substantial, moderate, or little to no *use* provided below. *Evidence of use* is considered to be indicative of *level of use*.

Substantial use:	AA is regularly used in high numbers relative to local or transient populations.
Moderate use:	AA is regularly used in small to moderate numbers relative to local populations, or infrequently or sporadically used in any numbers relative to local or transient populations.
Little to No use:	AA is regularly, infrequently, or sporadically used by extremely small numbers relative to local populations, or receives chance, inconsequential use in any numbers relative to local or transient populations.

ii. Wildlife Habitat Features. Working from top to bottom within the double vertical lines, circle the appropriate AA attributes in the matrix provided on the data form to arrive at an exceptional (E), high (H), moderate (M), or low (L) rating. The first variable considered is the structural diversity rating from #13. The second variable is class cover distribution. For class cover to be considered

evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition of the AA (refer to the percentages listed under #10).

The third variable is the maximum duration of surface water (any water above the ground surface that is available to wildlife; not necessarily open water) covering at least 10% of the AA. The 10 percent criterion should be considered a rule of thumb and is intended to be applied primarily at smaller (e.g., less than 1 or 2 acres), rather than larger sites. For example, 9 acres of surface water should not be dismissed at a 100-acre AA simply because this 10 percent guidance is not met. The intent of this criterion is to allow consideration of significant surface water amounts within an AA relative to wildlife habitat, while disallowing insignificant surface water amounts. The final call will depend on the specific situation at hand, and is therefore left to the evaluator. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent where:

Permanent/perennial: Surface water is present throughout the year except during years of extreme drought.

Seasonal/intermittent: Surface water is present for extended periods, especially early in the growing season, or may persist throughout the growing season, but may be absent at the end of the growing season; or surface water does not flow continuously, as when water losses from evaporation or seepage exceed the available streamflow.

Temporary/ephemeral: Surface water is present for brief periods during the growing season, but the water table is well below the surface most of the year; or surface water flows briefly in direct response to precipitation in the immediate vicinity and the channel is above the water table.

The final variable is degree of disturbance at the AA as determined under #12. This will determine the habitat features rating.

iii. Rating. Determine and circle the general wildlife habitat rating and functional points for the AA by applying the results of i and ii to the matrix provided in the data form.

14D. General Fish / Aquatic Habitat: This field assesses general fish and aquatic habitat at the AA based upon the presence of certain groups of fish and habitat features. Assess this function only if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish (e.g., fish use is precluded by perched culvert or other barrier, etc.). If the AA is not or was not historically used by fish due to lack of habitat (including duration of surface water), excessive gradient, etc. (e.g., the AA does not have the opportunity to provide habitat for fish), circle **NA** where indicated on the data form and proceed to the next function.

Variables assessed to determine a rating for habitat quality include duration of surface water, structural cover, shading, and habitat availability. Presence of surface water is an obvious critical component of fish habitat. Seasonally flooded areas can be important nursery and foraging areas for fish (and can result in "high" habitat quality ratings using this assessment); however, longer duration of surface water generally results in higher ratings because surface waters of such duration are available to fish for greater periods and varieties of life stages. Flow or water level stability is an important habitat component for a variety of Montana fish species (Raleigh 1982, Raleigh et al. 1984, Raleigh et al. 1986, McConnell et al. 1984, Hickman and Raleigh 1982, Marcus et al. 1984, Inskip 1982, Stuber et al. 1982).

Abundant structural cover and well-vegetated streambanks and shorelines are also important habitat components for several Montana fish species (Raleigh 1982, Raleigh et al. 1984, Raleigh et al. 1986, McConnell et al. 1984, Hickman and Raleigh 1982, Inskip 1982, Stuber et al. 1982, Krieger et al. 1983, Edwards et al. 1983). Structural cover such as submerged logs and vegetation, other woody debris, floating-leaved vegetation, and large rocks provides resting areas, refuge from predators, hiding areas for predators, and functions as a substrate for insect larva; an important food source for many fish species. High water temperatures that result from removal of streamside vegetation can render habitat as unsuitable for fish that are sensitive to higher temperatures, such as bull trout. Vegetation along streams, ponds, and lakes also provides insect habitat, an important food source for many fish species.

Although the physical habitat attributes of a site may be attractive to fish, use of the area may be significantly reduced or precluded due to the presence of inadequately-sized culverts, dikes, continual sources of degradation, or other causes. Consequently, such potential "habitat modifiers" are also considered in the assessment. In addition to the presence of undersized culverts, dikes, and other such structural habitat modifiers, the method considers whether a waterbody within the AA is listed on the MDEQ list of *Waterbodies in Need of Total Maximum Daily Load (TMDL) Development* (MDEQ 1999) with listed "probable impaired uses" that include *warm water fishery, cold water fishery,* or *aquatic life support.* Fish use and aquatic habitat quality of such listed waterbodies have been determined by MDEQ to be "impaired". The impaired waterbody list is lengthy and dynamic and is not included as an appendix to this

document; however, the list is available on the internet at http://water.montana.edu/docs/tmdl/303d/303dContents.htm .

The presence of certain groups of fish in the AA is considered along with habitat features to derive an overall fish/aquatic habitat rating. This was included in the assessment to reflect MDFWP fisheries management priorities. The ranking of such groups was based on the guiding principles of MDFWP's "Fisheries Beyond 2000" 10-year strategic fisheries management plan (MDFWP 1999). The mission of the plan and the Fisheries Program has the aim of preserving and enhancing all aquatic species and their ecosystems to meet the public's demand for recreational opportunities while assuring prudent stewardship of aquatic species. The Fisheries Program seeks to accomplish this mission by developing and implementing policies and programs that foster sound management of wild fish populations and their habitats, at the same time that it monitors and regulates angler harvests, maintains recreational activities for anglers, and provides improved access to fisheries (MDFWP 1999).

Given these management priorities (managing for wild fish populations and recreational opportunities), the following groups of fish are considered in the assessment in order of descending "rank": native game fish; introduced game fish; non-game fish; and no fish.

i. Habitat Quality. Working from top to bottom within the double vertical lines, circle the appropriate AA attributes in the matrix provided on the data form to arrive at an exceptional (E), high (H), moderate (M), or low (L) rating. The first variable considered is the maximum duration of surface water in the AA. Use the definitions provided above under 14C. The second variable is structural cover. Estimate the percentage of the waterbody within the AA that contains cover objects such as submerged logs, large rocks and boulders, overhanging banks, and submerged and floating-leaved vegetation. The final variable is shading, as determined by estimating the percent of streambank or shoreline within the AA that contains wetland or riparian scrub-shrub or forested communities. This will determine the rating for habitat quality.

ii. Modified Habitat Quality. Circle the appropriate response to the following question: *Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support?* If the answer is yes, then reduce the habitat quality rating determined in **i** above by one level (E = H, H = M, M = L, L = L). If the answer is no, then do not modify the habitat quality rating determined in **i**.

iii. Rating. Determine and circle the general fish/aquatic habitat rating and functional points for the AA by applying the results of **i** and **ii** to the matrix provided in the data form. The term "native" implies a species indigenous to Montana; not necessarily to a given drainage or water body. The evaluator is referred to *A Field Guide To Montana Fishes* (Holton 1990) for the status (native vs. introduced) of fish species known or suspected to occur in the AA.

As listed in the Montana Code Annotated (1997), "game fish" means all species of the family *Salmonidae* (chars, trout, salmon, grayling, and whitefish); all species of the genus *Stizostedion* (sandpike or sauger and walleyed pike or yellowpike perch); all species of the genus *Esox* (northern pike, pickerel, and muskellunge); all species of the genus *Micropterus* (bass); all species of the genus *Polyodon* (paddlefish); all species of the family *Acipenseridae* (sturgeon); all species of the genus *Lota* (burbot or ling); and the species *Ictalurus punctatus* (channel catfish).

Native game fish in Montana include: white, pallid, and shovelnose sturgeon; paddlefish; mountain whitefish; pygmy whitefish; westslope cutthroat, Yellowstone cutthroat, interior redband, bull, and lake trout; arctic grayling; channel catfish; burbot; and sauger.

14E. Flood Attenuation: This field assesses the capability of jurisdictional wetland in the AA to slow in-channel or overbank flow during high water/flood events. This parameter applies only if the AA occurs within or contains a discernible floodplain (e.g., is subject to flooding and possesses the opportunity to attenuate flood waters), based on floodwater proximity, evidence of flood deposits, FEMA maps, etc., and can apply to any AA that includes a flowing water/channel component (e.g., rivers, streams, flowing ditches). If jurisdictional wetland within the AA does not occur within a channel or discernible floodplain, circle **NA** where indicated on the form and proceed to the next function.

Variables used to assess this function are: the area of jurisdictional wetland subject to periodic flooding; percent composition of this area by woody vegetation; and outlet presence or absence. Generally, the larger the wetland, the greater its ability to attenuate flood flows. Wetlands with dense woody vegetation are better able to slow floodwaters than are wetlands dominated by open water or low-growing vegetation, which offer little resistance to such flows. Finally, wetlands with no outlets or with restricted outlets can attenuate and capture floodwaters more effectively than wetlands with unrestricted outlets.

i. Rating. Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

First, estimate the area of *jurisdictional wetland* that is subject to periodic flooding within the AA. This can be based on aerial photos, water marks, silt lines, alternating layers of leaves and fine sediment, ice scars, drift lines, sediment deposition, directionally bent vegetation, or other physical evidence. Do not include non-wetland open water channel in this estimate. Next, determine the approximate percentage of jurisdictional wetland subject to flooding that is classified in forested or scrub-shrub classes (*note: in some cases it may be appropriate to consider dense, extensive stands of hardy persistent emergent vegetation, such as cattail, as scrub-shrub for purposes of this form, as these stands act as primary floodwater attenuators in some parts of the state. If this situation applies, note in the comments section*). Finally, determine whether or not the wetland contains a restricted outlet and circle the appropriate functional points and rating.

ii. Indicate whether there are residences, businesses, or other features (parks, sports fields, historic sites, roads, etc.) that could be damaged by floodwaters located within 0.5 mile downstream of the AA. Describe these features in the comments section.

14F. Short and Long Term Surface Water Storage: This field assesses the potential of the AA to capture and hold surface water originating from flooding, precipitation, upland surface (sheetflow) or subsurface (groundwater) flow. If jurisdictional wetlands in the AA are not subject to flooding or ponding, circle NA where indicated on the data form and proceed with the evaluation.

Variables used to assess this function are: estimated maximum acre feet of water contained in wetlands that are subject to flooding or ponding; duration of surface water; and flood frequency. Wetlands able to contain more water volume (acre feet) are more effective at storing water than wetlands restricted to less capacity under the same conditions. Wetlands that contain surface water for longer periods are capable of storage for slower release into the local system than are wetlands that store surface waters for shorter periods, assisting in the stabilization of local flow regimes. Wetlands that flood or pond frequently provide water storage functions more often than do wetlands that flood or pond less frequently.

i. Rating. Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. First, estimate the maximum acre feet of water contained within *jurisdictional wetland* subject to periodic flooding or ponding within the AA. This can be based on observation, aerial photos, water marks, and other physical evidence (indicate basis in comments). Next, determine the maximum duration of surface water and flooded or ponded wetlands using the definitions provided above under 14C. Finally, estimate (based on photographs, NRCS data, interviews, knowledge of the area, etc.) whether the jurisdictional wetlands that flood or pond do so at a frequency greater than or less than 5 out of every 10 years and circle the appropriate functional points and rating.

14G. Sediment/Nutrient/Toxicant Retention and Removal: This field assesses the ability of the AA to retain sediments and retain and remove excess nutrients and toxicants. This field only applies to wetlands with potential to receive sediments and excess 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 where indicated on the data form and proceed with the evaluation. Nitrogen and phosphorus are the two nutrients most often associated with water pollution; both occur in high concentrations in fertilizers and discharges from sewage treatment plants and livestock operations, and excessive amounts of either can result in algal blooms and subsequent oxygen deficiencies in receiving waters. Toxicants include pesticides, herbicides, petroleum products, metals, and other potentially harmful constituents.

The assessment is based on the site's proximity to sediment/nutrient/toxicant sources; percent cover of vegetation; evidence of flooding or ponding; and presence or absence of an outlet. Wetlands with the potential to receive *and successfully process* sediment, nutrients, and toxicants provide these functions at a higher capacity than do wetlands that receive excessive amounts of these constituents such that other functions are impaired. Generally, a wetland's ability to uptake nutrients and toxicants and filter sediment increases with the density of its vegetation. Flooded or ponded wetlands are indicative of sites that retain water; these areas allow sediments to settle out and increase nutrient/toxicant contact time with vegetation, facilitating uptake. Sites with no outlets or restricted outlets retain water longer (allow more settling and vegetation contact) than do sites with unrestricted outlets.

i. Rating. Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

First, determine if the AA receives or surrounding lands have the potential to deliver low to moderate levels of sediments, nutrients, or toxicants such that other functions in the AA are not substantially impaired (e.g., the wetland is processing these inputs but is not significantly affected by them). Observation of some sedimentation, relatively minor potential sources of nutrients or toxicants, or signs of minor to moderate eutrophication would be indicative of this input level.

If the waterbody within the AA is listed on the MDEQ list of *Waterbodies in Need of Total Maximum Daily Load (TMDL)*

Development (MDEQ 1999) with listed "probable causes" related to sediment, nutrients, or toxicants (e.g. not based exclusively on flow alteration, other habitat alterations, etc.), then the second column of the matrix should be used. Such related probable causes include "metals", "nutrients", "organic enrichment/DO", "suspended solids", "unionized ammonia", "priority organics", "siltation", "other inorganics", "salinity/TDS/chlorides", etc. The impaired waterbody list is lengthy and dynamic and is not included as an appendix to this document; however, the list is available on the internet at http://water.montana.edu/docs/tmdl/303d/303dContents.htm If the AA is not included on the MDEQ TMDL list, but high levels of these inputs are observed or expected and are impairing other functions at the AA, as evidenced by observations of major sedimentation, major contaminant sources, major eutrophication, etc., then the second column of the matrix should be used.

The next two variables address the percent of wetland vegetated cover and whether or not evidence of ponding or flooding occurs in the AA (see indicators under 14E), respectively. The final variable determines the appropriate functional points and rating and pertains to whether or not the AA contains a restricted (or no) outlet or an unrestricted outlet.

14H. Sediment/Shoreline Stabilization: This field assesses the ability of the AA to dissipate flow or wave energy, reducing erosion. Complete this field only if the jurisdictional wetland within the AA occurs on the banks of a river, stream, or other natural or manmade channel, or occurs on the shoreline of a standing water body that is subject to wave action. Variables to consider when determining if a waterbody is subject to wave action include estimated wind velocity, water depth, and fetch (distance across the water). Although not required for application of this assessment method, Linsley and Franzini (1979) cite the following equation for determining wave height: rise of wave (ft) = [(wind velocity [mph])^2 x fetch (miles)] ÷ (1,400 x water depth [ft]). If this field does not apply, circle NA where indicated on the data form and proceed to the next function.

Variables used to assess this function are: percent cover of the wetland streambank or shoreline by species with deep, binding rootmasses; and duration of surface water adjacent to rooted vegetation. Generally, vegetation species with deep, binding rootmasses are more efficient at stabilizing streambanks and shorelines than are species with minor root systems. Wetlands adjacent to surface waters of longer duration generally provide this function more frequently than wetlands adjacent to surface waters of less duration.

i. Rating. Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. First, estimate the total percent cover of wetland streambank or shoreline by species with deep, binding rootmasses. All trees and shrubs are considered to have deep, binding rootmasses. With respect to herbaceous species, annual plants are considered to lack such rootmasses. Perennial herbaceous species vary with respect to their root masses and should be considered individually. Sedges and rushes, for example, are considered to provide deep, binding rootmasses, while Kentucky bluegrass is not.

Next, determine the longest duration of surface water *adjacent to rooted vegetation* in the AA using the definitions provided above under #14C and circle the appropriate functional points and rating.

14I. Production Export/Food Chain Support: This field assesses the potential of the AA to produce and export food/nutrients for living organisms. For purposes of this assessment, "food/nutrients" include particulate and dissolved organic matter, plant forage species, invertebrates, wildlife prey species, etc.

Variables used to assess this function are: vegetated area in the AA; structural diversity; outlet (surface or subsurface) presence or absence; and duration of surface water. Generally, wetlands with greater areas of vegetation have potential for more forage plant production and particulate and dissolved organic material production than do wetlands containing smaller areas of vegetation. Plant layers increase with structural diversity, which tends to increase food chain support by providing forage species and cover for a greater variety of wildlife and insect life. Wetlands with surface or subsurface outlets can more readily export organic material to downstream habitats than can wetlands without outlets. Availability of surface waters for use by fish, aquatic invertebrates, and aquatic wildlife, all potential food chain constituents, generally increases with the duration of these waters. Also, opportunities for breakdown and export of organic materials to downstream aquatic habitats via surface water are generally greater at wetlands containing such waters for longer, rather than shorter durations.

i. Rating. Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. For Factor A in the matrix, estimate the acreage of the vegetated component (all vegetation including persistent, non-persistent, rooted, and floating) within the AA. Factor B pertains to the structural diversity rating determined under #13. For Factor C, indicate (yes or no) whether the AA contains a surface or likely subsurface outlet (see indicators of recharge under 14J below). Finally, circle the appropriate functional points and rating based on the longest duration of surface water in the AA using the definitions provided above under #14C.

14J. Groundwater Discharge/Recharge: This field assesses groundwater discharge and recharge potential at the site. Indicators of discharge include observed springs or seeps, vegetation growing during dormant or drought seasons, wetlands at the toe of a natural slope, permanent flooding during drought periods, and presence of an outlet but no inlet. Indicators of recharge can be more difficult to discern in the field and include observation of a permeable substrate without an underlying impeding layer, or presence of an inlet but no outlet.

i. Rating. Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H = high, L = low, N/A = Not Applicable] for this function. Check the listed statements under Discharge Indicators and Recharge Indicators that apply to the AA. Other site-specific indicators may be added as necessary. Use the matrix on the data form to determine the corresponding rating and functional points. If it is determined that groundwater discharge/recharge potential cannot be reasonably ascertained in the AA at this level of analysis, explain this in the comments section and indicate the rating as "unknown" and functional points as "NA" on the data form.

14K. Uniqueness: This field expresses the general uniqueness of the AA in terms of its replacement potential and habitat diversity; relative abundance in the same major Montana watershed basin; and degree of human disturbance.

The Montana Natural Heritage Program has compiled a list of vegetation associations occurring in Montana and has assigned each association a state "rank" based on its estimated number of occurrences in the state and its estimated total area within the state (MNHP 1998). Associations ranked "S1" have 1 to 5 occurrences in Montana (regardless of total area) or have 6 to 100+ occurrences in Montana that cumulatively total less than 2,000 acres. Associations ranked "S2" have between 6 and 20 occurrences in Montana that cumulatively total greater than or equal to 2,000 acres or have between 21 and 100+ occurrences in Montana that cumulatively total between 2,000 and 10,000 acres (Cooper and DeVelice 1995). This list is dynamic, and the user should ensure that the most current list is applied.

Associations ranked "S1" or "S2" by the MHNP potentially containing wetland communities are listed in Table 1. Associations were generally included on this table if they were: listed as a riparian or wetland community in *Classification and Management of Montana's Riparian and Wetland Sites* (Hansen et al. 1995); indicated as a wetland community on the MNHP list (MNHP 1998); or if at least one of the primary species within the association was listed as a "facultative", "facultative wetland ", or "obligate wetland" species using USFWS classifications.

Table 1 – Potential Wetland Plant Associations Ranked as S1 or S2 by the Montana Natural Heritage Program

Plant Association	Montana Natural Heritage Program State Rank
Abies grandis / Athyrium filix-femina Forest	S2Q
Abies grandis / Senecio triangularis Forest	S2
Abies lasiocarpa / Actaea rubra Forest	S2
Abies lasiocarpa / Oplopanax horridus Forest	S2
Alnus viridis ssp. sinuata Shrubland [Provisional]	S2
Carex scirpoidea - Potentilla diversifolia Herbaceous Vegetation	S2
Crataegus douglasii Shrubland	S2
Deschampsia cespitosa - Potentilla diversifolia Herbaceous Vegetation	S2
Dulichium arundinaceum Herbaceous Vegetation [Provisional]	S2
Juncus drummondii - Antennaria lanata Herbaceous Vegetation	S2
Juncus parryi – Erigeron ursinus Herbaceous Vegetation	S2?
Leymus cinereus Herbaceous Vegetation [Provisional]	S2
Phragmites australis Temperate Herbaceous Vegetation	S2
Picea (engelmannii x glauca, engelmannii) / Lysichiton americanus Forest	S2
Picea engelmannii / Equisetum arvense Forest	S2
Populus deltoides - Fraxinus pennsylvanica Forest [Provisional]	S2Q
Populus tremuloides - Populus balsamifera ssp. trichocarpa / Osmorhiza occidentalis Forest	S2Q
Populus tremuloides / Heracleum sphondylium Forest	S2?
Potamogeton pectinatus - Myriophyllum spicatum Herbaceous Vegetation	S1Q
Potamogeton pectinatus - Ruppia maritima Herbaceous Vegetation	S2Q
Potamogeton pectinatus - Zannichellia palustris Herbaceous Vegetation	S1Q
Potamogeton richardsonii - Myriophyllum spicatum Herbaceous Vegetation	S2Q
Salicornia rubra Herbaceous Vegetation	S2?
Salix glauca Shrubland	S2
Salix reticulata / Caltha leptosepala Dwarf-shrubland	S2
Sarcobatus vermiculatus / Distichlis spicata Shrubland	S2
Thuja plicata / Asarum caudatum Forest	S1
Tsuga heterophylla / Gymnocarpium dryopteris Forest	S2

Bogs, fens, warm springs, and mature forested wetlands are very difficult, and in some cases are not possible, to successfully replicate at mitigation sites. In the absence of these types, wetlands with higher structural diversity or higher MNHP rank are considered more difficult to replicate than sites with low structural diversity or lower MNHP ranks. Wetland types that occur rarely within a watershed are considered to be more unique than wetlands that occur commonly or abundantly within a watershed. Finally, wetlands with low disturbance that are functioning under primarily natural conditions are considered more unique than are wetlands exposed to moderate or high disturbance levels.

i. Rating. Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. First, determine whether the AA is or contains a bog, fen, warm springs, or mature forested wetland (average age of dominant trees is greater than 80 years) using the definitions provided below. When determining if the wetland is/contains mature forested wetland, take care to ensure that non-jurisdictional riparian area is not counted as wetland. If the AA does not contain any of these four wetland types, use the associations listed in Table 1. If none of these associations are present, use the structural diversity rating determined under #13.

Bog: A peat-accumulating wetland that has no significant inflows or outflows and supports acidophilic mosses, particularly sphagnum (Mitch and Gosselink 1993).

Fen: A peat-accumulating wetland that receives some drainage from surrounding mineral soil and usually supports marsh-like vegetation (Mitch and Gosselink 1993).

Forested Wetland: See discussion and definition under #10, Classification of AA.

Next, indicate the estimated occurrence frequency of similarly classified sites within the same major Montana watershed basin using the answer from #11. Finally, circle the appropriate functional points and rating based on the degree of disturbance at the AA as determined under #12.

14L. Recreation/Education Potential: This field assesses the potential of the AA to support recreational and/or educational activities. In the absence of known recreational or educational properties of a site, the rating is determined based on the evaluator's assessment of potential for such use, along with ownership of and degree of disturbance at the AA. Sites that are publicly owned generally offer better access opportunities than do privately owned sites. Potential for recreation or education is usually higher at sites that are less, rather than more, disturbed unless the activity itself would result in substantial disturbance.

i. Is the AA a Known Recreation or Education Site? If the AA is a known recreation or education site, circle the high rating (1 functional point) on the matrix provided on the data form and indicate which types of activities occur on the site under ii. If the site is not a known recreation/education site, proceed to iii.

ii. Recreation and Education Categories That Apply to the AA. Check the categories that apply to the AA.

iii. Potential for Recreation or Education Use. Determine whether there is *strong* potential for recreational or educational use of the AA based on its location, size, diversity, and other site attributes. If so, check the appropriate categories under ii, then proceed to iv. If not, circle the low rating (.1 functional point) on the matrix provided on the data form.

iv. Rating. Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. First, indicate the level of disturbance at the AA using the answer from # 12i. Next, circle the appropriate functional points and rating based on the ownership (public verses private) of the AA.

Function & Value Summary and Overall Rating: Transfer the ratings and functional points assigned for each of the 12 functions in items 14A through 14L to the appropriate fields on the summary form. Record values of 1 under the Possible Functional Points column for functions that apply to the AA but for which no default values appear on the form. For functions that do not apply to a given AA (e.g., flood attenuation), enter "NA" under each of the column headings.

If desired, calculate the functional units for each function by multiplying the actual functional points by the estimated acreage in the AA (from #9). This is optional and will not affect the site's overall rating. In some cases, such as when more than one site is assessed on a single form, it is best to leave this column blank and derive a separate table or other means to depict functional units. Record the totals from the Actual Functional Points, Possible Functional Points, and Functional Units columns (if completed) in the Totals row. Calculate the percentage of the possible functional points that the AA achieved using the following equation: *% of possible = total*

actual functional points ÷ total possible functional points X 100

Determine the appropriate overall rating (described below) based on the criteria indicated on the form.

Category I wetlands are of exceptionally high quality and are generally rare to uncommon in the state or are important from a regulatory standpoint. Category I wetlands can: provide primary habitat (see definition) for federally listed or proposed threatened or endangered species; represent a high quality example of a rare wetland type; provide irreplaceable ecological functions (e.g., are not replaceable within a human lifetime, if at all); exhibit exceptionally high flood attenuation capability; or are assigned high ratings for most of the assessed functions and values. To be rated as a Category I site, the AA must:

- Score 1 functional point for Threatened or Endangered Species (e.g., is documented primary habitat); or
- Score 1 functional point for Uniqueness (e.g., be rare in the USGS Unit and a bog, fen, warm springs or mature forested wetland or "S1" plant association in an undisturbed condition); or
- Score 1 functional point for Flood Attenuation and answer to Question 14E.ii is "yes" (e.g., contains flooded wetlands in excess of 10 acres that are comprised of more than 75% woody vegetation, has a restricted outlet, and there is potential for flood damage downstream); or
- Total actual functional points > 80% (round to nearest tenth) of total possible functional points.

Category II wetlands are more common than Category I wetlands, and are those that provide habitat for sensitive plants or animals, function at very high levels for wildlife/fish habitat, are unique in a given region, or are assigned high ratings for many of the assessed functions and values. To be rated as a Category II site, the AA must not qualify as a Category I site and:

- Score 1 functional point for Species Rated S1, S2, or S3 by the Montana Natural Heritage Program (e.g., is documented primary habitat); or
- Score .9 or 1 functional point for General Wildlife Habitat (e.g., evidence of wildlife use is substantial and habitat quality is high to exceptional or evidence of wildlife use is moderate and habitat quality is exceptional); or
- Score .9 or 1 functional point for General Fish/Aquatic Habitat (e.g., contains native game fish and habitat quality is high to exceptional or contains introduced game fish and habitat quality is exceptional); or
- Achieve "High" or "Exceptional" ratings for both General Wildlife Habitat and General Fish/Aquatic Habitat; or
- Score .9 functional point for Uniqueness (e.g., bog, fen, warm springs, mature forested, or "S2" wetland community common in the watershed but with low disturbance or bog, fen, warm springs, mature forested, or "S2" wetland community rare in the watershed but with moderate disturbance); or
- Total actual functional points > 65% (round to nearest tenth) of total possible functional points.

Category III wetlands are more common, generally less diverse, and often smaller and more isolated than are Category I and II wetlands. They can provide many functions and values, although they may not be assigned high ratings for as many parameters as are Category I and II wetlands. To be rated as a Category III site, the AA must not qualify as a Category I, II, or IV site.

Category IV wetlands are generally small, isolated, and lack vegetative diversity. These sites provide little in the way of wildlife habitat, and are often directly or indirectly disturbed. To be rated as a Category IV site, the AA must not qualify as a Category I, II, or III site and:

- Achieve a "Low" rating for Uniqueness ; and
- Achieve a "Low" rating for Production Export/Food Chain Support (e.g., less than one acre in size and low to moderate structural diversity); and
- Total actual functional points < 30% (round to nearest tenth) of total possible functional points

The overall rating can be used to establish wetland avoidance/protection strategies at the project level. For example, if wetland impacts are unavoidable for a given project, and alternatives are available such that a choice can be made between affecting a Category I or a Category III site, the applicant and reviewing agencies could direct impacts to the Category III site. Other applications of the overall rating concept may include the eventual development of mitigation ratio policy (e.g., mitigate impacts to Category I sites at a 2:1 ratio, Category II sites at a 1.5:1 ratio, Category III sites at a 1:1 ratio, and Category IV sites at a 0.5:1 ratio).

Functional units are not used in determining the overall rating, but are provided for the evaluator's consideration in assessing project impacts, mitigation needs, or in assessing mitigation plans or the success of constructed projects. An example of how functional units could be used to develop mitigation that would replace overall (cumulative) functions and values for a given project is presented

below.

The total actual functional points for a given 8-acre AA is 6.3. Total functional units for the AA would be calculated by multiplying 6.3 points x 8 acres = 50.4 functional units. A proposed highway project would impact 2 acres of the AA. Assuming a relatively uniform distribution of functional capacity across the AA, the loss in functional units to the AA would be 2 acres x 6.3 points = 12.6 functional units. To compensate for lost wetland functions and values, mitigation would need to be designed that would replace the 12.6 functional units. If the predicted total actual functional points for a mitigation project was 5.1, and the goal were to replace 12.6 functional units, the applicant would need at least 2.5 acres of mitigation to compensate for the loss (2.5 x 5.1 = 12.6). If limited to a two-acre mitigation site, the applicant could, in theory, design the mitigation project such that the predicted functional points met or exceeded 6.3, resulting in the replacement of at least 12.6 functional units (2 x 6.3 = 12.6), or could obtain an additional site such that the sum of the functional units for the two sites met or exceeded the total 12.6 point replacement requirement.

Functional Units can also be examined on a function by function basis to compare existing pre-project conditions with predicted post-project conditions. This concept is employed by the HGM method (Smith et al. 1995), and is illustrated by the following table, which assumes a two-acre impact to a 10-acre AA for a hypothetical project.

Function/ Value	Pre-project			Post-Project			
	Functional Points	Size of AA in Acres	Functional Units	Functional Points	Size of AA in Acres	Functional Units	Change in Functional Units
A	.8	10	8	.4	8	3.2	-4.8
B	1	10	10	.6	8	4.8	-5.2

There are several possible ways to determine mitigation needs using this approach, including:

- designing mitigation for individual functions or cumulatively for all functions using the **greatest** predicted loss in functional units as the replacement target (*in this case, designing mitigation such that each function provides a minimum 5.2 functional units or designing the mitigation such that, cumulatively, 5.2 + 5.2 = 10.4 functional units are replaced*); or

- designing mitigation for individual functions or cumulatively for all functions using the **average** predicted loss in functional units as the replacement target (*in this case, designing mitigation such that each function provides a minimum 5 functional units [(4.8 + 5.2) ÷ 2 = 5] or designing the mitigation such that, cumulatively, 5 + 5 = 10 functional units are replaced*); or

- designing mitigation for individual functions or cumulatively for all functions using **individual** predicted changes in functional units as the target (*in this case, 4.8 for function A and 5.2 for function B, or cumulatively using 4.8 + 5.2 = 10 functional units*).

There may be circumstances that simply preclude the replacement of a given function/value parameter at the same level at which it is rated for an affected wetland. For example, if a project impacts a wetland rated "high" for uniqueness due to the presence of a bog, it is very unlikely that the uniqueness parameter could be mitigated at the same level at a replacement wetland because of the difficulty associated with bog replacement. In virtually all cases, appropriate mitigation of lost wetland functions and values will be subject to coordination/negotiation with the regulatory agencies involved in the project.

It is not the purpose of this evaluation form to dictate wetland mitigation policy. What is and is not considered appropriate mitigation will ultimately be determined by the regulatory agencies; primarily the COE and EPA. While this evaluation method does provide a means for quantifying predicted impacts to wetland functions and values, it is important to stress that coordination with the regulatory agencies as to the application of this evaluation method and discussed mitigation determination strategies to a given project is crucial and needs to be carried out on a project by project basis.

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GLOSSARY

Abundant: An estimated 50% or more of wetlands in the same Major Montana Watershed Basin are similar in composition to the AA.

Aquatic wetland bed class: Any areas of open water dominated by plants that grow principally on or below the water surface for most of the growing season. Vegetation is non-persistent and includes submerged or floating-leaved rooted vascular plants, free-floating vascular plants, submergent mosses, and algae.

Bog: A peat-accumulating wetland that has no significant inflows or outflows and supports acidophilic mosses, particularly sphagnum (Mitch and Gosselink 1993).

Common: An estimated 10-50% of wetlands in the same Major Montana Watershed Basin are similar in composition to the AA.

Emergent wetland class: Vegetated wetland characterized by erect, herbaceous hydrophytes (e.g., sedges, rushes, grasses, bulrush, cattail), excluding mosses and lichens.

Fen: A peat-accumulating wetland that receives some drainage from surrounding mineral soil and usually supports marsh-like vegetation (Mitch and Gosselink 1993).

Forested wetland class: Vegetated wetland characterized by woody vegetation that is 6m (20 ft) tall or taller.

Functional unit: A figure derived by multiplying functional points for a given AA by its estimated acreage.

Functional point: A numerical rating, ranging from 0 to 1, assigned to a particular function/value based on given criteria.

Game fish: As listed in the Montana Code Annotated (1997), "game fish" means all species of the family *Salmonidae* (chars, trout, salmon, grayling, and whitefish); all species of the genus *Stizostedion* (sandpike or sauger and walleyed pike or yellowpike perch); all species of the genus *Esox* (northern pike, pickerel, and muskellunge); all species of the genus *Micropterus* (bass); all species of the genus *Polyodon* (paddlefish); all species of the family *Acipenseridae* (sturgeon); all species of the genus *Lota* (burbot or ling); and the species *Ictalurus punctatus* (channel catfish).

Incidental habitat: Habitat that receives chance, inconsequential use by a given species or habitat conditions or the known distribution of the species would indicate this level of use. This term implies that, while it may be conceivable that a given species may occur at an AA at a given point in time, the chance is remote and the use is not likely to be repeated.

Incidental use: AA receives chance, inconsequential use by a given species or habitat conditions or the known distribution of the species would indicate this level of use. This term implies that, while it may be conceivable that a given species may occur at an AA at a given point in time, the chance is remote and the use is not likely to be repeated.

Little to No use: AA is regularly, infrequently, or sporadically used by extremely small numbers relative to local populations, or receives chance, inconsequential use in any numbers relative to local or transient populations.

Moderate use: AA is regularly used in small numbers relative to local populations, or infrequently or sporadically used in any numbers relative to local or transient populations.

Moss-lichen wetland class: Wetland where mosses or lichens cover substrates other than rock and where emergents, shrubs, or trees make up less than 30% of areal cover.

Native fish species: Implies a species indigenous to Montana; not necessarily to a given drainage or water body.

Open water:	Any area of standing or flowing water without emergent (not including pioneer species), scrub-shrub, or forested vegetation (e.g., in most cases, a flooded wet meadow would not be considered to contain open water) .
Permanent/perennial:	Surface water is present throughout the year except during years of extreme drought.
Primary Habitat:	Habitat essential to the short or long-term viability of individuals or populations. The presence of traditional breeding, spawning, nesting, denning, or critical migratory habitat, large seasonal congregations (including communal roosts, staging habitat, traditional foraging congregations, etc.), or USFWS-designated critical habitat or core areas in the AA indicates primary habitat, as does any occurrence of a T&E plant.
Rare	An estimated < 10% of wetlands in the same Major Montana Watershed Basin are similar in composition to the AA.
Regular use:	AA is consistently, normally used by a given species or habitat conditions and the known distribution of the species would indicate this level of use. The presence of traditional breeding, nesting, denning, foraging, or seasonal habitat in the AA constitutes regular use, as does any occurrence of a T&E plant.
Scrub-shrub class:	Vegetated wetland dominated by woody vegetation less than 6m (20 ft) tall. Species include shrubs, young trees, and stunted trees and shrubs.
Seasonal/intermittent:	Surface water is present for extended periods, especially early in the growing season, or may persist throughout the growing season, but may be absent at the end of the growing season; or surface water does not flow continuously, as when water losses from evaporation or seepage exceed the available streamflow.
Secondary Habitat:	Habitat that is occasionally or semi-regularly used by a given species, but that is not necessarily essential to the short or long-term viability of individuals or populations. Examples would include non-specific migration areas and occasional forage or perch sites. Primary habitat, as defined above, may occur in the general vicinity (e.g., within the project area, section, drainage, watershed, etc.), but not in the AA.
Substantial use:	AA is regularly used in significant numbers relative to local or transient populations; includes regular seasonal use, such as migration stopovers and wintering.
Temporary/ephemeral:	Surface water is present for brief periods during the growing season, but the water table is well below the surface most of the year; or surface water flows briefly in direct response to precipitation in the immediate vicinity and the channel is above the water table.

Appendix A

MDT Montana Wetland Assessment Form

MDT Montana Wetland Assessment Form (revised 5/25/1999)

1. Project Name:_____ 2. 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: _____ GPS Reference No. (if applies): _____
Other Location Information:

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, tot., ac., see instructions on determining AA) _____ (visually estimated)
_____ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA (HGM according to Brinson, first col.; USFWS according to Cowardin [1979], remaining cols.)

HGM Class	System	Subsystem	Class	Water Regime	Modifier	% of AA

(Abbreviations: **System:** Palustrine(P)/ **Subsyst.:** none/ **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)/ **System:** Lacustrine (L)/, **Subsyst.:** Limnetic (2)/ **Classes:** RB, UB, AB/ **Subsystem:** Littoral (4)/ **Classes:** RB, UB, AB, US, EM/ **System:** Riverine (R)/ **Subsyst.:** Lower Perennial (2)/ **Classes:** RB, UB, AB, US, EM/ **Subsystem:** Upper Perennial (3)/ **Classes:** RB, UB, AB, US/ **Water Regimes:** Permanently Flooded (H), Intermittently Exposed (G), Semipermanently Flooded (F), Seasonally Flooded (C), Saturated (B), Temporarily Flooded (A), Intermittently Flooded (J) **Modifiers:** Excavated (E), Impounded (I), Diked (D), Partly Drained (PD), Farmed (F), Artificial (A) **HGM Classes:** Riverine, Depressional, Slope, Mineral Soil Flats, Organic Soil Flats, Lacustrine Fringe

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

12. General condition of AA:
i. Regarding disturbance: (use matrix below to determine [circle] appropriate response)

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

Comments: (types of disturbance, intensity, season, etc.):_____
ii. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) _____

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)

# of "Cowardin" vegetated classes present in AA (see #10)	≥ 3 vegetated classes (or ≥ 2 if one is forested)	2 vegetated classes (or 1 if forested)	≤ 1 vegetated class
Rating (circle)	High	Moderate	Low

Comments:

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	D S	_____

II. **Rating** (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus/primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.9 (H)	.8 (M)	.7 (M)	.5 (L)	.3 (L)	0 (L)

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	D S	_____

II. **Rating** (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus/primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.8 (H)	.7 (M)	.6 (M)	.2 (L)	.1 (L)	0 (L)

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

Low (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 exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from #13. For class cover to be considered evenly distributed, 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 [E = exceptional, H = high, M = moderate, or L = low] for this function)

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

Comments:

14D. General Fish/Aquatic 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 or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle **NA** here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted ih the comments.)

i. Habitat Quality (circle appropriate AA attributes in matrix to arrive at exceptional (E), high (H), moderate (M), or low (L) quality rating.

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10%
Shading - >**75%** of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	E	E	H	H	H	M	M	M	M
Shading – **50 to 75%** of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading - < **50%** of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality (Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level [E = H, H = M, M = L, L = L]). *Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity* **or** *is the waterbody included on the MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support?* **Y N** Modified habitat quality rating = (circle) **E H M L**

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Types of fish known or suspected within AA	*Modified Habitat Quality (ii)*			
	Exceptional	High	Moderate	Low
Native game fish	1 (E)	.9 (H)	.7 (M)	.5 (M)
Introduced game fish	.9 (H)	.8 (H)	.6 (M)	.4 (M)
Non-game fish	.7 (M)	.6 (M)	.5 (M)	.3 (L)
No fish	.5 (M)	.3 (L)	.2 (L)	.1 (L)

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 next function.)

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] for this function)

Estimated wetland area in AA subject to periodic flooding	≥ 10 acres			<10, >2 acres			≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1(H)	.9(H)	.6(M)	.8(H)	.7(H)	.5(M)	.4(M)	.3(L)	.2(L)
AA contains **unrestricted outlet**	.9(H)	.8(H)	.5(M)	.7(H)	.6(M)	.4(M)	.3(L)	.2(L)	.1(L)

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles 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 with the evaluation.)

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] for this function. 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			<5, >1 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**	1(H)	.9(H)	.8(H)	.8(H)	.6(M)	.5(M)	.4(M)	.3(L)	.2(L)
Wetlands in AA flood or pond **< 5 out of 10 years**	.9(H)	.8(H)	.7(M)	.7(M)	.5(M)	.4(M)	.3(L)	.2(L)	.1(L)

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive excess 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 with the evaluation.)

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] for this function.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds 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 or ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1 (H)	.8 (H)	.7 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)	.2 (L)
AA contains **unrestricted outlet**	.9 (H)	.7 (M)	.6 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)	.1 (L)

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 does not apply, circle NA here and proceed to next function)

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses	*Duration of surface water adjacent to rooted vegetation*		
	permanent / perennial	seasonal / intermittent	Temporary / ephemeral
≥ 65%	1 (H)	.9 (H)	.7 (M)
35-64%	.7 (M)	.6 (M)	.5 (M)
< 35%	.3 (L)	.2 (L)	.1 (L)

Comments:

14I. Production Export/Food Chain Support:

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] for this function. Factor A = acreage of vegetated component in the AA; Factor B = structural diversity rating from #13; 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 = permanent/perennial; S/I = seasonal/intermittent; T/E /A= temporary/ephemeral or 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	.9H	.9H	.8H	.8H	.7M	.9H	.8H	.8H	.7M	.7M	.6M	.7M	.6M	.6M	.4M	.4M	.3L
S/I	.9H	.8H	.8H	.7M	.7M	.6M	.8H	.7M	.7M	.6M	.6M	.5M	.6M	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.7M	.7M	.6M	.6M	.5M	.7M	.6M	.6M	.5M	.5M	.4M	.5M	.4M	.4M	.2L	.2L	.1L

Comments:

14J. Groundwater Discharge/Recharge: (Check the indicators in i & ii below that apply to the AA)

i. Discharge Indicators

___Springs 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
___Other

ii. Recharge Indicators

___Permeable substrate present without underlying impeding layer
___Wetland contains inlet but no outlet
___Other

iii. Rating: Use the information from i and ii above and the table below to arrive at [circle] the functional points and rating [H = high, L = low] for this function.

Criteria	*Functional Points and Rating*
AA is known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments:

14K. Uniqueness:

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] for this function.

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

Comments:

14L. Recreation/Education Potential: i. Is the AA a known rec./ed. site: (circle) Y N (If yes, rate as [circle] High [1] and go to ii; if no go to iii)

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

iii. Based on the location, diversity, size, and other site attributes, is there strong potential for rec./ed. use? Y N
(If yes, go to ii, then proceed to iv; if no, then rate as [circle] Low [0.1])

iv. Rating (use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Ownership	*Disturbance at AA (#12i)*		
	low	moderate	high
public ownership	1 (H)	.5 (M)	.2 (L)
private ownership	.7 (M)	.3 (L)	.1 (L)

Comments:

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Function al Points	Functional Units; (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat			1	
B. MT Natural Heritage Program Species Habitat			1	
C. General Wildlife Habitat			1	
D. General Fish/Aquatic 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			1	
K. Uniqueness			1	
L. Recreation/Education Potential			1	
Totals:				

OVERALL ANALYSIS AREA (AA) RATING: (Circle appropriate category based on the criteria outlined below) **I** **II** **III** **IV**

Category I Wetland: (Must satisfy **one** of the following criteria; if does not meet criteria, 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**
___ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; if not satisfied, go to Category IV)

___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish/Aquatic 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**
___ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

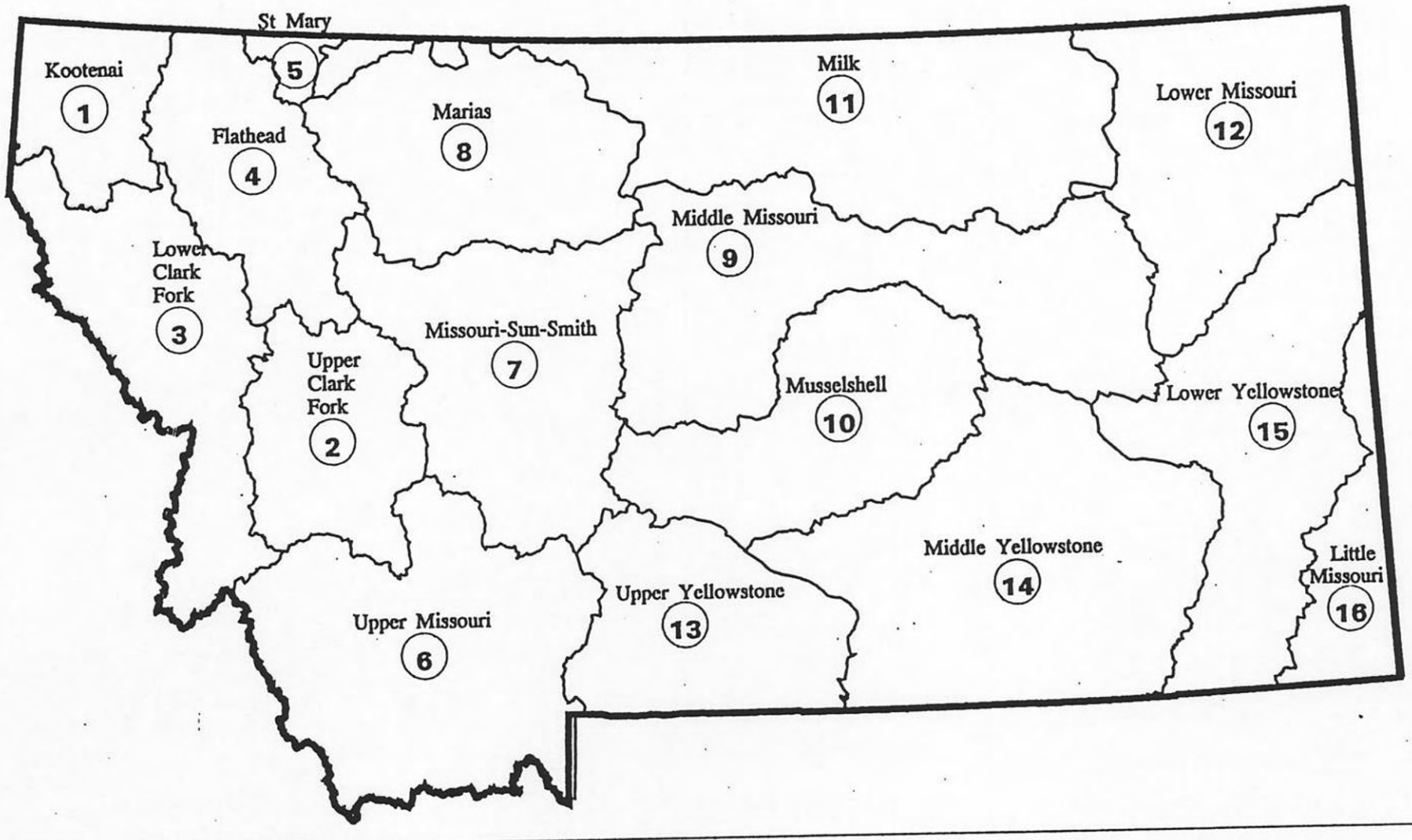
Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if does not satisfy criteria go to Category III)

___ "Low" rating for Uniqueness; **and**
___ "Low" rating for Production Export/Food Chain Support; **and**
___ Total actual functional points < 30% (round to nearest whole #) of total possible functional points

Appendix B

Map of Major Montana Watershed Basins



Major Montana Watershed Basins (from DHES)

—— Watershed Basin

Montana State Library
NRIS Natural Resource Information System
March 1994 - Map Request No: 94NRIS172II

0 50 100 150
Scale of Miles

Appendix C

Key to HGM Classes (Smith et al. 1995)

Cowardin et al. (1979) Classification Hierarchy

Key to Hydrogeomorphic Wetland Classes and Regional Subclasses *

1. Wetland is under the influence of tides 2
1. Wetland is not under the influence of tides 4

2. Salinity greater than 30 ppt ..... Tidal Fringe (Euhaline)
2. Salinity less than 30 ppt 3

3. Salinity 5-30 ppt ..... Tidal Fringe (Mixohaline)
3. Salinity less than 5 ppt ..... Riverine (Tidal)

4. Wetland is topographically flat and has precipitation as a dominant source of water 5
4. Wetland is not topographically flat and does not have precipitation as a dominant source of water 6

5. Wetland has a mineral soil ..... Mineral Soil Flats
5. Wetland has an organic soil ..... Organic Soil Flats

6. Wetland is associated with a stream channel, floodplain, or terrace 7
6. Wetland is associated with a topographic depression or on a topographic slope or flat 9

7. Stream is intermittent or ephemeral ..... Riverine (Nonperennial)
7. Stream is perennial 8

8. Stream is 1st or 2nd order ..... Riverine (Upper perennial)
8. Stream is 3rd order or higher ..... Riverine (Lower perennial)

9. Wetland located in a natural or artificial (dammed) topographic depression 10
9. Wetland located on a topographic slope 13

10. Topographic depression has permanent water >2 meters deep, and wetland is restricted to the margin of the depression ..... Lacustrine Fringe
10. Topographic depression does not contain permanent water >2 meters deep 11

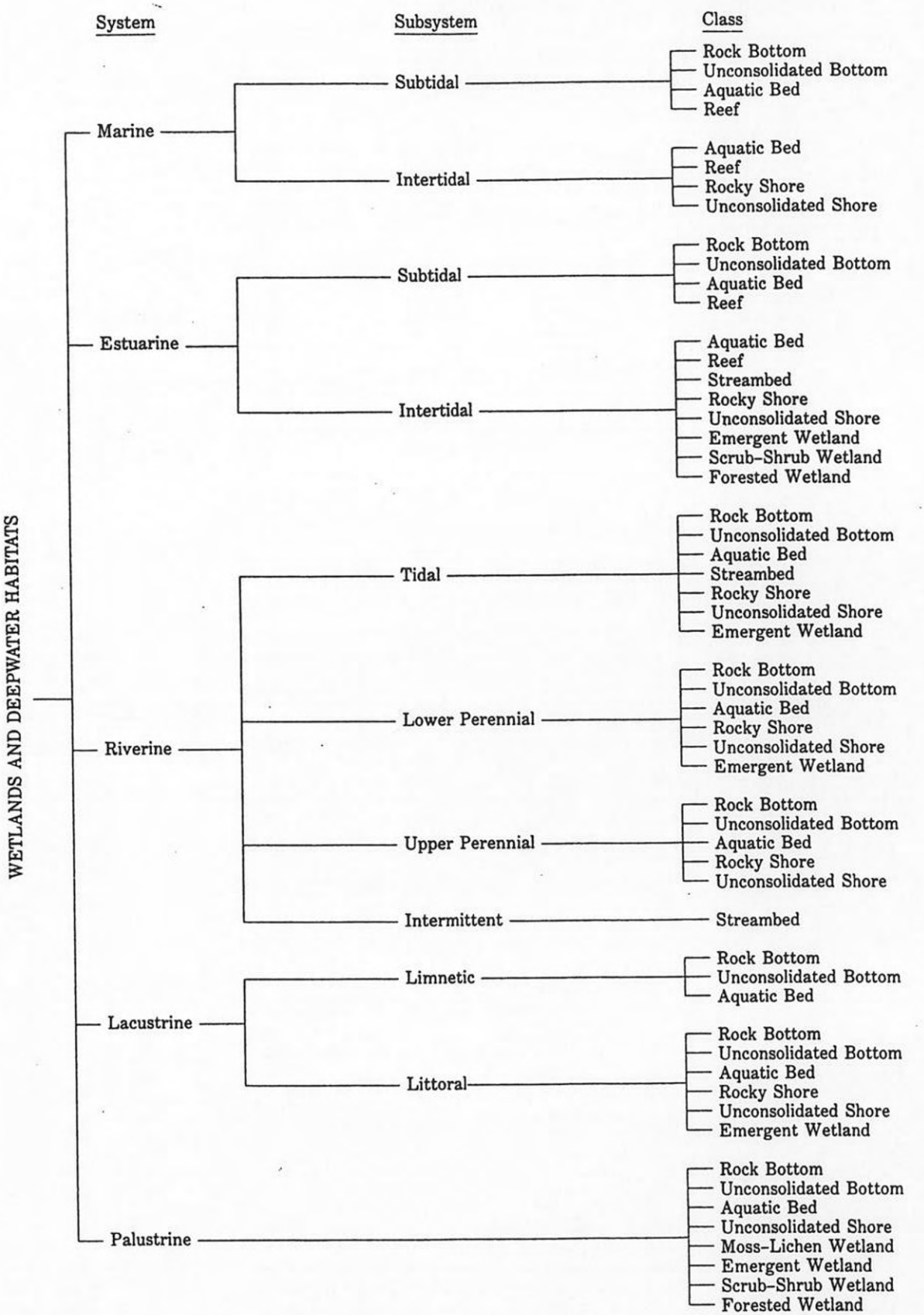
11. Topgraphic depression closed without discernable surface water inlets, outlets, or other connections ..... Depression (Closed)
11. Topographic depression open with discernable surface water inlets, outlets, or other connections 12

12. Primary source of water is ground water ..... Depression (Open, Ground Water)
12. Primary source of water is precipitation, overland flow, or interflow ..... Depression (Open, Surface Water)

13. Primary source of water is ground water ..... Slope
13. Primary source of water is precipitation ..... Organic Soil Flats

* Hydrogeomorphic classes are followed by regional subclass in parenthesis

Key to hydrogeomorphic wetland classes and regional subclasses



Classification hierarchy of wetlands and deepwater habitats, showing Systems, Subsystems, and Classes. The Palustrine System does not include deepwater habitats.