Wetland and Buffer Functions

Semi-Quantitative Assessment Methodology

(SAM)

Final Working Draft

User's Manual

February 2000

This Functional Assessment was developed as a voluntary project available to the public. After four years of field use and peer review, we have incorporated the comments we received. Comments are requested on this final working draft, which we will finalize in summer/fall 2002. Please send all comments, reviews, and results of field assessments to:

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INTRODUCTION

The Semi-quantitative Assessment Methodology (SAM) is a rapid method for determining what functions are being performed and (qualitatively), how well. While highly detailed methodologies exist, which are excellent ways to obtain this information, these generally take several hours per wetland, and require extensive training before the user can apply them. There is a need for a rapid methodology that will give wetland scientists, reviewers, and landowners a good understanding of how well a wetland and its buffers function, and thus, what value each system may have in a landscape context. SAM does not replace the highly detailed accurate method developed by scientists and published by the Washington State Department of Ecology named the Washington State Functional Assessment Method (WASFAM, 1999). This methodology segregates wetlands by hydrogeomorophic class. There are models for Depressional and riverine, but not estuarine or slope wetlands. SAM does not differentiate wetlands by hydrogeomorphic class and so can be used for any freshwater or estuarine wetland.

SAM was created by Dr. Sarah Spear Cooke to fill that need. In eight years of field testing and review, many wetland scientists have submitted SAM results to agencies and peers. There is consensus among the Pacific Northwest wetland community is that SAM works well.

However, some reviewers commented that SAM could be made more user-friendly. Therefore we at Cooke Scientific Services (CSS) created this updated version of SAM, incorporating user comments. It is based on the best available science that supports the choice of particular functions in particular categories. For a detailed discussion of this science, please see Appendix A: Sources.

This section is a brief, usable guide that can be carried in the cruiser vest and brought into the field. We strongly recommend that users read through Appendix A before doing fieldwork, to give them general background in assessment methodologies and wetland functions, and specific background in how these functions are assessed, evaluated, and analyzed in SAM.

Goals of the Functional Assessment

The purpose of SAM is to assist wetland professionals in identifying and quantifying a **potential** wetland function in an individual wetland. The term "potential" is important, because it is usually not possible to verify the presence of a function from a single site visit. A determination of the potential for a function to occur, based on the presence of physical characteristics that are conducive to the function, is all that can be determined in a quick evaluation. For example, we can tell that a site has good amphibian **habitat**, but it is not always possible, at every season, to tell whether amphibians are **using that habitat.**

The assessment form is designed to be used for wetlands of all sizes and degree of hydrologic connectivity, from one isolated wetland to all the wetlands in a basin. SAM is based on a system developed by Reppert that has been modified for greater applicability to Northwest wetland ecosystems. This final version of SAM reflects reviewers' comments and the most recent science. For instance, Reppert weights absolute wetland size very heavily. The 2000 SAM considers wetland size as the relative result of a matrix of variables, including percent of wetland loss within basin.

The revised form is designed for ease of use and repeatability of results. It provides a quick screening technique for a broad spectrum of wetland functions. It requires little training and uses as little jargon as possible. While most questions will be answered in the field, a few will require additional references available through public domain sources.

How to Use the Results

The results of an individual wetland assessment can be used to determine the presence and relative importance of functions within the wetland. An entire watershed wetland functional analysis (or a sub-basin assessment) may be used to rank individual wetlands by function against other wetlands in the same drainage system. In this way, functions that are either lacking, are only moderately functioning, or are functioning on a very low level can be identified for management purposes. For instance, if a sub-basin lacks sufficient stormwater storage, a mitigation wetland can be designed specifically to improve that function. The identification of low-level functions can also be used to guide management decisions for future growth and development in a basin or subbasin.

Unlike most functional assessments, this method is not intended to assign an absolute value to a function present in a wetland. It is also not meant to be used to assign an absolute "value" to an individual wetland for mitigation purposes. SAM is intended to be an "at-a-glance" guide for wetland scientists in evaluating a specific function in a specific wetland and buffer system. For example, Wetland A scores high for baseflow/groundwater support, and also scores high for fish habitat, while it has low scores for other wetland functions. Only humans can assign "value" to these functions within the context of public policy and land-use.

To Do Beforehand

Obtain United States Geological Survey (USGS) topographic map, National Wetlands Inventory (NWI) map, and an aerial photo of the wetland and its basin. Use these public domain resources to find the information that you will need to complete the assessment form:

1. How much wetland area has been lost in the basin? For example, if a wetland is in the flood plain of a major river that is now heavily urbanized, we can assume that at least 70 percent of wetlands in the area have been lost. If the wetland is on a mountain peak in undeveloped forest land, we can assume that, even if there were seep wetlands to be lost, they have not been lost.
2. Where is the wetland located in the drainage: upper (headwaters), middle, or lower (discharges to Puget Sound or equally large body of water) third (of the drainage)?
3. How much impervious/developed area is in the wetland's immediate basin?
4. What types of land use dominate the surrounding basin?
5. Is the wetland publicly or privately owned?

To Do in the Field

First, determine wetland boundaries using the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) or other manual acceptable to the jurisdiction in which the wetland lies such as the Washington State Wetlands Identification and Delineation Manual (WSDOE 1997). Next, assign basic hydrogeomorphic (HGM) classifications to all wetland types found (Brinson 1992). While some wetlands are mosaics of different HGM types, they are typically dominated by one or more of the following types:

1. Riverine (immediately associated with perennial flowing water)
2. Riverine / Impounding (closely associated with perennial or seasonal flowing water, e.g., a backchannel, oxbow, or slough)
3. Lacustrine (the shallow waters of lakes and large ponds)

4. Depressional Flow-Through (the most common type of wetland encountered in the urbanizing area west of the Cascades in the Pacific Northwest, these are bowls with holes in their lips)
5. Depressional Isolated (including bogs, these wetlands get input from precipitation and groundwater, and discharge to ground water, i.e., there is no surface water connection)
6. Estuarine (e.g., salt marshes, mud flats, or other brackish-water wetlands influenced by tides) Note: SAM is probably not the best assessment tool for estuarine systems.

Where wetlands are separated by space or by HGM type, evaluate them separately. This is also true where functional performance separates two wetlands that would be considered one by delineation alone. For example, where a large wetland contains a highly disturbed portion connected to a relatively undisturbed scrub/shrub wetland, evaluate the whole as two wetlands. The score for the combined wetland would be too high since the size component yields a higher ranking if the combined acreage and larger number of community types are used, while the low-level functions of the disturbed area would be outweighed.

What is the wetland's HGM type and position in the landscape? It can be categorized as depressional/headwater, mid-sloped wetland, or riverine/lacustrine.

What is the type and condition of the inlet and outlet of each wetland (e.g, culvert—note size, material; stream—note whether it is perennial or intermittent, substrate, etc.)? What percentage is open water, and is that open water perennial, frequent, or intermittent? What vegetation communities dominate or are present in the wetland?

Once you have determined the number and boundaries of the wetlands to be assessed, turn to their buffers. How far do the buffers extend? What kind of land use dominates the buffers?

With this on-the-ground information in hand, you are ready to sit on a fallen log or tractor tire, spread out your delineation forms and public domain search results, and take a rest while you complete the form.

How to Use the Form

The form is designed to examine the presence of discrete functions and to determine how well a discrete wetland performs a given function. The functional attributes analyzed are:

Functions Present on the Semi-quantitative Performance Assessment Form.

1. Flood/Storm Water Control
2. Erosion/Shoreline Protection
3. Natural Biological Support
4. Specific Habitat Functions

1. Base Flow/Groundwater Support
2. Water Quality Improvement
3. General Habitat Functions
4. Cultural & Socioeconomic Values

Each function is divided into three groups based on characteristics that, when totaled, determine the relative quality of the function being examined. The groups are assigned as follows: Group 1 (higher quality characteristics: 3 points) Group 2 (medium quality characteristics: 2 points), and Group 3 (lower quality characteristics: 1 point). The points are totaled at the end of each section. Scores can be used for an individual wetland by ranking the total achieved by the wetland for the function against the total possible points available for that function, a number that can be expressed as a percentage. If any questions cannot be answered because it is a character not found in that wetland (not because you don't know the answer), leave them blank. The total number of points is decreased by that amount. (See the sample assessment form in Appendix A.) Where any character is not applicable to a given wetland (e.g., Flood/Stormwater Control only applies to depressional wetlands; Erosion/Shoreline Protection only applies to lacustrine, riverine, or estuarine wetlands;), eliminate it from the total. Totals can be usefully applied as percentages, so the score achieved out of the total possible is the new percentage.

Very occasionally, an entire function may be inappropriate for a particular wetland (erosion and shoreline protection, base-flow/groundwater support). This function should, therefore, be omitted for this wetland.

Again, SAM is only *semi*-quantitative. Each function's score is composed of elements that may be of greater or lesser value to the user, landscape, or society at any given time.

The scores can be used for all wetlands within a drainage area by ranking the wetlands for each function and establishing which wetlands have a high degree of performance for that function and which have a low degree of function. Wetlands that are difficult to replace (e.g., bogs and mature forested wetlands) have a higher value with SAM than those that are easier to replace (e.g., emergent and scrub-shrub wetlands with mineral soils).

You can use existing data available through public domain resources, such as those listed in Table 2, to provide much of the information that the form requires. You can determine or deduce other facts during a field visit. The overall function scores are not meant to be totaled. Each function and wetland is unique. And the score obtained by one particular function should only be compared to the score of the same function of other wetlands.

Before You Start,: Determine the wetland size. In SAM 2000, size is the result of a matrix of variables. Divide the total by five (the number of attributes) for the final figure. Use this figure wherever SAM asks for size.

Table 1: Determining Wetland Size in Landscape Context

Attribute	Low (1 pt.)	Medium (2 pts.)	High (3 pts.)	Total
Absolute Size	<5 acres	5-10 acres	> 10 acres	
Wetland Loss in Basin	> 60 %	20 – 60 %	< 20 %	
Size Relative to Other Wetlands in Basin (on NWI maps)	< 100% of average size	100 – 200 % of t average size	> 200% of average size	
Buffer Size	< 75 feet	75 to 200 feet	> 200 feet	
Buffer Condition	> 60% disturbed	20-60% disturbed	< 20% disturbed	
Relative Size	If score is ≥1 then give the question a 1 If score is 1.5 to 2 then give the question a 2 If score is 2.5 to ≥3 then give the question a 3			**score** /5

1.0 FLOOD/STORMWATER CONTROL

Size: [From Table 1].

Location and type of wetlands: Categorize the wetland's HGM type and location: lacustrine, deep depressional or headwater, bogs (3 pts.), mid-slope (2 pts.), shallow non-headwater depressional or riverine (1 pt.)

Forested cover: From pre-visit research and from delineation results, estimate whether the wetland has greater than 30 percent forested cover (3 pts.), 10 to 30 percent forested cover (2 pts.), or. less than 10 percent forested cover (1 pt.).

Outlet condition: Describe the wetland's outlet. Is it constrained –culverted (3 pts.), semi-constrained some type of non-culverted constriction (2 pts.), or unconstrained (1 pt.)?

- In **constrained** outlets, outflow is significantly less than inflow, and water backs up into the wetland e.g., where very small culverts, blocked large culverts, or berms are present and block most of the flow that would otherwise exit the wetland. Isolated wetlands should be considered to have bermed or blocked culverts.

- **Semi-constrained** outlets are those where outflow is not significantly less than inflow, for example, a relatively large culvert that is partially blocked or impedes flow to a moderate extent, or a stream with a V-shaped cross-section constrained to flow through a small culvert or narrow ditch.

- **Unconstrained** outlets are found in most sloped wetlands, and in wetlands with culverted outflows which are large enough to be unimpeded. Since residence time in sloped wetlands, which discharge to seeps, is assumed to be very short, these are considered to have an unconstrained outlet. Because

Position in drainage basin: Describe the wetland's position in the drainage basin. Use the basin topographic map to determine whether the wetland is in the upper (3), middle (2), or lower (1) third of the drainage.

Soils: From delineation data sheets, characterize the wetland's soils as:

- Heavily organic e.g, mucks and peats (3 pts.)

- Mixture of organic and mineral soil, with greater than 40 percent fines, e.g., silt loams and clay loams (2 pts.)

- Mineral and gravel, or only gravel, with greater than 40 percent coarse texture, e.g., gravelly loams and sandy gravelly loams (1 pt.)

2.0 BASEFLOW/GROUNDWATER SUPPORT

This function is appropriate for riverine wetlands or depressional wetlands that discharge to groundwater. If the wetland you are assessing is neither, skip this section.

Size: [From Table 1.]

Location and type of wetlands: Categorize the wetland's HGM type and location: lacustrine, deep depressional or headwater, bogs (3 pts.), mid-slope (2 pts.), shallow non-headwater depressional or riverine (1 pt.) see Flood/Stormwater Control question and use that answer.

Position in drainage basin: : If the wetland is higher up in the basin, it has time and strata to discharge to groundwater. If it is lower in the drainage, it is likely to drain into a larger water body relatively quickly. Headwaters or upper third of the basin gets 3 points, mid basin gets two points and low in the basin gets one point.

Frequency of flooding (or saturation):

- Permanently flooded/intermittently exposed (3 pts.) Perennial standing water (perhaps not during severe droughts).
- Seasonally or semi-permanently flooded (2 pts.) Flooded for two or more weeks during the growing season.
- Temporarily flooded or saturated (1 pt.) Flooded for less than two weeks during the growing season, OR never flooded but saturated to or near the soil surface for over two weeks during the growing season.

Look for the same signs in the field that you would use to determine if a wetland satisfies the hydrology criteria for a jurisdictional wetland (drift lines, scour marks, matted vegetation, drainage patterns, etc.). Neighbors, local City or County staff may have long-term information on flooding and soil saturation. If the wetland is flooded most of the year than it has high potential for water to move into the ground. If there is no water present, none can move into the ground.

Duration of Flooding/Saturation:

- The wetland vegetation comprises over 40 percent obligate species (3 pts.)
- The wetland vegetation consists of between 20 and 40 percent obligate species (2 pts.)
- The wetland vegetation comprises less than 20 percent obligate species (1 pt.)

Duration and timing of inundation and saturation can be roughly determined from the composition of plant species. Where over 40 percent of vegetation is obligate, the wetland's soil is assumed to be full of or under water well into the dry summer months. Timing of flood events is critical to many fish and wildlife species. For example, a prevalence of vernal obligate species would indicate that the area is very wet in the early spring months, but then dries out rapidly in early summer.

3.0 EROSION/SHORELINE PROTECTION

This function is only appropriate for riverine or lacustrine wetlands. If the wetland you are assessing is neither, skip this section.

Shoreline vegetation: Within 100 feet of the ordinary high water mark (OHWM), look for:

- Dense woody and/or dense emergent vegetation (3 pts.)
- Dense emergent or sparse woody vegetation (2 pts.)
- Sparse grass and herbs or no vegetation (1 pt.)

Wetland area adjacent to the OHWM: How far does the wetland extend past the OHWM?

- Over 200 feet (3 pts.)
- 100 to 200 feet (2 pts.)
- Less than 100 feet (1 pt.)

Level of shoreline or sub-basin development: From pre-visit research, and from wetland delineation experience, determine how much development exists within 250 feet of the shoreline.

- Less than 20 percent is developed shoreline (3 pts.)
- Between 20 and 60 percent of the shoreline is developed (2 pts.)
- Over 60 percent of the shoreline area is cleared or developed (1 pt.)

4.0 WATER QUALITY IMPROVEMENT

Speed of flow: In the field, note the speed of water flow through the wetland.

- Slow flow (3 pts.). Field indicator: no evidence of scour, e.g., in isolated wetlands.
- Moderate flow (2 pts.). Field indicator: partial scour, e.g., in most slope wetlands.
- Fast flow (1 pt.). Field indicator: extensive scour, e.g., a channel through the wetland.

Amount of vegetative cover: From your delineation data sheets (current aerial photos can also be helpful), and excluding open water zones from the calculation, determine if the wetland has:

- More than 80 percent vegetative cover (3 pts.)
- Between 50 and 80 percent vegetative cover (2 pts.)
- Less than 50 percent vegetative cover (1 pt.)

Level of basin development: From pre-visit research aerial photos, supplemented by field work, determine how developed the wetland's basin is.

- Upstream from the wetland is less than 20 percent developed (3 pts.)
- Between 20 and 50 percent is developed (2 pts.)
- Over 50 percent of the basin upstream of the wetland is developed (1 pt.).

If an areas has been cleared but not paved, it should be considered developed at only 65 percent of the percentage of a cleared and paved area. For example, if 50 percent of the basin consists of a cleared gravel area, it is considered 33 percent developed. If 80 percent of the basin has been clear-cut, it is considered to be 52 percent developed.

Retention time:

Overland flow contained in the wetland: (If the wetland is riverine, skip this question.) From your delineation data sheets, supplemented by topographic maps and current aerial photos, determine how much overland flow is contained in the wetland. This value is a matrix of three different attributes:

Divide the total by two (half the number of attributes) to obtain this function's score, weighted for importance.

Table 2: Overland Flow Contained in Wetland

Attribute	Low (1 pt.)	Medium (2 pts.)	High (3 pts.)	Total
Configuration	Plate-shaped	Shallow bowl-shaped	Deep Bowl-shaped	
Drainage Basin Size	< 2 acres	2-5 acres	> 5 acres	
Outlet	Unconstrained	Semi-constrained	Constrained	
Input	Groundwater only	Surface flow and groundwater	Surface flow	
Basin Condition	< 20% impervious	20-40 % impervious	>40% impervious	
Flow Contained				**score/ 2**

Soils: From delineation data sheets, characterize the wetland's soils as:

- Heavily organic, e.g., mucks and peats (3 pts).

- Mixture of organic and mineral soil, with greater than 40 percent fines, e.g., silt loams and clay loams (2 pts.)
- Mineral and gravel, or only gravel, with greater than 40 percent coarse texture, e.g., gravelly sandy loams and gravelly loams (1 pt.)

5.0 NATURAL BIOLOGICAL SUPPORT

Size: [See Table 1.]

Connectivity: In the field, or on current aerial photographs, determine the proximity and number of different natural and farmed community types adjacent to the wetland. This includes meadows, forests, shrub communities, rivers). If > 60% of the buffer is vegetated with a buffer greater than 50 feet wide there is high connectivity (3 pts.). If 20 to 55% of the buffer is vegetated than there is moderate connectivity (2pts.) If < 20% of the buffer is vegetated then there is low connectivity (1 pt).

Vegetation structure: Determine the vegetative structure of the wetland.

- Forested wetlands (especially mature forested wetlands), or those that are mosaics of many community types (e.g. forested, scrub-shrub, and emergent) have high vegetation structure (3 pts.).
- Two canopy layers, e. g., shrub communities with over 30 percent areal cover of emergent vegetation in patches, or forested communities with only shrub or emergent understories, not both) have a moderate to high amount of structure (2 pts.).
- One layer, e.g., over 90 percent emergent or shrub vegetation, has low structure.

Surface water presence: From pre-visit research, supplemented by field data collected, determine if the wetland has:

- Over 30% permanent open water (e.g., in pools)
- Over 30% permanent surface water (1 to 12 inches — assumed if a stream is adjacent to the wetland)
- Over 30% seasonal surface water (1 to 12 inches during less than 4 weeks of the growing season

Community types: Determine the vegetation community types present in the wetland, based on the Cowardin system (Cowardin et al. 1979), defined in Table 4, Appendix A. The habitat types include forested areas, shrub areas, emergent areas, aquatic bed areas, and open water areas.

- Three or more habitat types comprise over 30% of areal cover (3 pts.)
- Two habitat types comprise over 30% of areal cover (2 pts.)
- One habitat type comprises over 30% of areal cover (1 pt.)

Plant diversity: How many plant species are present in the wetland that comprise more than 5 percent cover, not counting non-native species

- More than 15 (3 pts.)
- Between 7 and 15 (2 pts.)
- Fewer than 7 plant species present in the wetland (1 pt.).

Percentage of invasive species: How much areal vegetation cover is contributed by invasive and/or non-native plants, a list of which is found in Table 5, Appendix A. Invasive species are those that out-compete native vegetation.

- Less than 10 percent (3 pts.)
- Between 10 and 50 percent (2 pts.)
- More than 50 percent (1 pt.).

Organic accumulation: In the field, determine if the wetland has high, moderate, or low organic accumulation. Assess this by examining the soils or peat deposits. It the soils are predominantly mineral in character then organic accumulation is low. If the soils have a thin layer of organic material over mineral soil (< 6 inches of partially decomposed leaf matter), or organic rich mineral soils are present, then the accumulation is moderate. If thick (greater than 6 inches) peat deposits occur, the accumulation is high.

Organic export: In the field determine, if the export of organic material is low, moderate, or high. The wetland must have a discrete surface water flow and outlet for organic export to occur. A clear outlet, at least seasonal surface water flows, and evidence of high biomass production are all indicative of wetlands that have high organic export. It is assumed that if organic productivity is low and hydrologic flow is slow to moderate, then organic export is low; if flow is rapid then organic export is moderate. Table 7 describes the export characteristics under different productivity and flow rates.

Table 3. Organic export characteristics.

	Productivity		
Speed of Flow	Low	Moderate	High
Slow	low	low	moderate
Moderate	low	moderate	high
Rapid	moderate	high	high

Habitat features: In the field, determine whether there are few, some, or many habitat features present. Habitat features include logs, snags, perches, and any other natural feature where wildlife could perch, nest or take cover.

Buffer condition: In the field or on current aerial photographs, determine the condition of the buffer within 200 feet of the wetland. The buffers are either undisturbed, slightly disturbed, or highly disturbed based on the presence of clearing, filling, presence of invasive species, dumping, or any other obvious human influence on the vegetation community. If less than 20 percent of the buffer is disturbed, it is lightly disturbed; 20 to 60 percent is considered moderately disturbed, and over 60 percent is highly disturbed.

Connection to upland habitats: In the field, or on current aerial photographs, determine if the wetland and associated buffer are well connected to upland habitats (over 60 percent is connected to forests and prairies), partially connected to upland habitats (20 to 60 percent attached to upland habitats), or isolated from upland habitats (less than 20 percent of the wetland and/or buffer is connected to other natural upland habitats).

6.0 OVERALL HABITAT FUNCTIONS

Size: Determining the wetland size is easiest from the resources listed in Table 2 if the correct wetland outline and location are indicated. Otherwise, estimate the location and size and select the category that best fits the wetland: less than 5 acres, between 5 and 10 acres, or greater than 10 acres.

Habitat diversity: In the field, or on current aerial photographs, determine if the wetland and associated buffer display high, moderate, or low habitat diversity. High habitat diversity is present in wetland systems that have two or more wetland communities with many native plant species, and either undisturbed buffer, or a buffer of a highly structurally complex forest over 200 feet wide. Moderate habitat diversity would be present if either one community dominated by many plant species was present, or two communities dominated by only a few plant species was present. Low diversity would be represented by one community dominated by only a few plant species with either no buffer or a very simple buffer, such as lawn.

Presence of sanctuary or refuge: In the field or on current aerial photographs, determine if the wetland and associated buffer act as a continuous corridor at least 200 feet wide to other undisturbed vegetated areas for movement of wildlife in the region, or if they represent a regionally rare wetland type identified by the Washington State Department of Natural Resources or a local agency. Wetlands in highly developed drainages have a relatively higher function for refuge.

7.0 SPECIFIC HABITAT FUNCTIONS

Invertebrate habitat: In the field, or from observations of local wetlands biologists, determine if the wetland is adjacent to a creek, stream or river. Wetlands near aquatic habitats can be considered to have aquatic invertebrates (insects), even if none are directly observed. The amount of habitat present determines the rating for habitat. Examples of invertebrate habitat are muddy shallow water areas where water velocities are slow, no fine sediments are built-up, and thin-stemmed emergent plants such as sedges, rushes and some aquatic herbs are present. Low habitat potential is indicative of little or no obvious preferred shallow water or emergent habitat present within the wetland and adjacent buffer from early spring to mid summer. Moderate habitat potential is where a small to moderate area of emergent or other viable wetland habitat is present. High habitat potential is where a large amount of emergent or other viable habitat is present.

Amphibian habitat: Based on your own field visits or local wetlands biologists' observations, determine if the wetland contains amphibians. Look for egg masses, or empty egg cases. Field evaluations should include looking under logs, in shallow surface water, or along the shoreline attached to thin-stemmed emergent plant stems. Water depth is important, with individual species preferring specific depths. In general, shallow water zones with between 1 and 2.5 feet of water are ideal. More information will be supplied in the next draft. Low habitat potential is indicated by little or no moist soil or shallow water habitat within the wetland and adjacent buffer during the late winter through mid summer. Urbanized wetlands where bullfrogs are present are less likely to have a rich amphibian fauna. Moderate habitat potential is where a small to moderate area of moist soil or shallow water habitat present during the late winter to mid summer, and high habitat potential is where a large amount of moist soil or shallow water habitat present for most to all of the year. Sloped wetlands adjacent to streams usually have moderate amphibian habitat.

Fish habitat: Note: SAM will help you to determine the potential for fish habitat, but not necessarily the presence of fish. Determine if there is a permanent water source, based on your own field observations or those of local fisheries biologists. In the field, look for the following characteristics: a lack of culverts or other barriers to movement downstream of the wetland that are more than 15 feet long, bottom sediments that are at least partially gravels of the correct size for salmonids, overhanging vegetation along the banks of the stream to prevent water temperatures from getting too high, and/or that the wetland contains obvious fish (look for fry in moving water, or under debris along the shoreline). Low habitat potential is indicated by little or no permanent moving water within the wetland and no obvious fisheries habitat. Moderate habitat potential is where a small channel of permanent shallow water habitat is present, and high habitat potential is where the stream channel is unobstructed, the bottom gravels are extensive and clean, and there is considerable overhanging vegetation on the banks of the channel. Generally, if a stream has good gravels, permanent moving water and overhanging vegetation, it has high fish habitat potential. If the same conditions exist, but an obstruction is present downstream, then the habitat potential is only moderate or low (depending on the nature of the obstruction).

Mammal habitat: In the field, or from of local wetlands biologists' observations, look for obvious signs of small mammals such as tracks or scat in the wetland. Low habitat potential is indicative of little or no dense shrub or structurally diverse habitat within the wetland and adjacent buffer. Presence of houses and pets decreases the likelihood of native small mammals using the wetland as habitat. Moderate habitat potential is where a small to moderate area of dense shrub or structurally diverse habitat is within the wetland and adjacent buffer boundary.

High habitat potential is where a large very structurally diverse wetland is adjacent to a relatively undisturbed buffer that is at least 100 feet wide.

Bird habitat: In the field, or from local wetlands biologists' observations, look for obvious signs of birds (visual identification or song recognition) in the wetland. Low habitat potential is indicated by highly disturbed wetlands that have little vegetation and no open water ponds. Moderate habitat potential is found in small isolated shrub or emergent wetlands, or small farm ponds or retention/detention ponds with a small amount of buffer, or buffer that is somewhat structurally diverse (not just lawn). High habitat potential is available in seasonally flooded agricultural fields, large structurally diverse wetlands, or lacustrine (lake or large pond systems) with associated wetland and buffer habitats

7.0 CULTURAL/SOCIOECONOMIC

Educational opportunities: In the field, or through evaluation of tax records, determine the ownership of the wetland. Publicly owned wetlands within close proximity of neighborhood schools, churches or other organizations, offer high potential for wetland educational opportunities. Wetlands that have established boardwalks, walking paths nearby or around the perimeter, or are near large park systems, also have high opportunity for education. Wetlands that are either privately owned or in remote areas far removed from human access afford less of an opportunity for education.

Aesthetic value: Field evaluations of the aesthetic value of a particular wetland are purely subjective. Gather a consensus of opinions of those wetland evaluators involved in filling out the form.

Commercially valuable natural resources: Determine the ownership of the land. This can be done in the field or through interviews of neighbors. Public domain information such as tax records and timber sales records can also be used. Private land affords more opportunity for commercial activities in wetlands. Look for evidence of past commercial activities such as logging, peat excavations, piers for fishing or launching boats, or signs advertising hunting opportunities.

Historical or archeological value: Sites of important historical or archaeological value will sometimes be documented at the County level, or with the local tribes. Occasionally there will be a sign posted in the field.

Recreational opportunities: In the field, or through evaluation of tax records, determine the ownership of the wetland. Recreational opportunities can be determined in the field if the land is public or free-access private and there are areas to enjoy active recreation (walking, fishing, boating, running) or passive recreation (birdwatching, photography).

Public access: Public access can be defined as available if the land is publicly owned and there are no signs posted which prevent access. Some private lands are also available for public access if the owner has communicated public access through signs or verbal communication with neighbors. There are publicly owned areas that have no public access such as watershed properties. These areas should be placed in the first category "privately owned".

Proximity to open space: In the field, or on current aerial photographs, determine the proximity of the wetland and adjacent buffer to open space. Wetlands within riparian corridors with vegetated protected slopes under local ordinances qualify as "open space".

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