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MEMORADUM REGARDING THE WETLAND FUNCTIONS AND VALUES ASSESSMENT AT
OPERABLE UNIT 2 (OU 2) NSY PORTSMOUTH ME
07/27/2011
TETRA TECH INC

MEMORANDUM

TO: Dan Witt
FROM: Sarah Watts
DATE: 27 July 2011
SUBJECT: Wetland Functions and Values Assessment at OU2 – Portsmouth Naval Shipyard

On 8 June 2011, Sarah Watts and Lori Anderson (Tetra Tech) visited Portsmouth Naval Shipyard (PNS), Kittery, Maine, to perform a Wetland Functions and Values Assessment (Assessment) on the southern-facing shoreline of the Operable Unit 2 (OU2 survey area). This survey was completed as part of the pre-design stage for this site, and will serve as a baseline to compare future surveys to determine if there have been any changes following implementation of the remedial action. A qualitative evaluation of the functions and values was performed at the OU2 survey area using methods described in the U.S. Army Corps of Engineers: The Highway Methodology Workbook Supplement "Wetlands Functions and Values: A Descriptive Approach" (1999), hereafter referred to as the Highway Method. Photographic documentation was provided by U.S. Navy and is included in Attachment 1. The Highway Method Assessment evaluation form and site sketch are included in Attachment 2. The Highway Method Rationale Reference Number Descriptions are included as Attachment 3.

Operable Unit 2 Survey Area

The OU2 survey area primarily comprises a manmade riprap revetment rocky shoreline that can be divided into three zones, including an upland zone, and two wetland zones that can be described according to the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et. al 1979). Beginning at the landward side and moving seaward, these zones are as follows: (1) Upland rocky shore, natural or artificial (i.e., manmade riprap revetment), (2) Estuarine intertidal rocky shore, irregularly flooded, mixed artificial (i.e., manmade riprap) / natural rock, and (3) Estuarine intertidal aquatic bed, algal, regularly flooded, mixed artificial / natural rock. The area considered during the evaluation of wetland functions and values is approximately 1,300 feet long by approximately 20 feet wide.

The western two thirds of the survey area comprises artificial manmade riprap revetment, becoming a more natural rocky shore in the eastern one third of the survey area. A cement brick seawall forms part of the northern boundary of the survey area in the eastern section, becoming a natural rocky shore in the easternmost section of the survey area. The top of slope along the revetment is approximately 4 feet wide and bound on the north side by a wooden fence. Vegetation growing within the upland portions includes those species that are typical colonizers of disturbed sites, such as staghorn sumac (*Rhus typhina*), blackberry species (*Rubus* species), black cherry (*Prunus serotina*), annual ragweed (*Ambrosia artemisiifolia*), red fescue (*Festuca rubra*), several species of goldenrod (*Solidago* species), poison ivy (*Toxicodendron radicans*), common mullein (*Verbascum thapsus*), Virginia creeper (*Parthenocissus quinquefolia*), and cheatgrass (*Bromus tectorum*), and including invasive species such as Asiatic bittersweet (*Celastrus orbiculatus*), climbing nightshade (also known as bittersweet nightshade) (*Solanum dulcamara*), and black swallow-wort (*Cyanchum louiseae*). Trees and shrubs in the upland areas upgradient from the eastern end of the OU survey area include eastern red cedar (*Juniperus virginiana*), gray birch (*Betula populifolia*), various poplar species (*Populus grandidentata* and *Populus tremuloides*), Scots pine (*Pinus sylvestris*), and red maple (*Acer rubrum*).

The intertidal zone is partially vegetated up to the mean high water line with various species of rockweed (*Fucus vesiculosus* and *Fucus spiralis*) and knotted wrack (*Ascophyllum nodosum*). The rockweed and knotted wrack in the intertidal zone is dense, and appears to have approximately 75 percent cover along the manmade sections of the survey area, and increasing to between 75 and 90 percent cover at the eastern end. Red and green macroalgae known as sea lettuce (*Ulva lactuca*) is present at or below the low tide line. Barnacles and common periwinkle snails (*Littorina littorea*) were observed attached to and between the rocks in the intertidal zone. A small school of fish was observed along the shoreline, and may have been from the stickleback (*Gasterosteus*) or killifish (*Fundulus*) genus.

Three culverts were observed protruding from the riprap along the manmade section of the survey area. It is uncertain what these culverts are intended to drain. No water was draining from the culverts at the time of the survey.

Six buoys were observed in the water offshore of the OU survey area. These buoys appear to be lobster trap buoys.

There was some trash (e.g., plastic bags, bottles) and old metal debris in the intertidal zone, especially in the section of the survey area along the seawall. Additionally, wave action, particularly associated with boat activity in the adjacent channel, was observed to create slightly turbid conditions along the shoreline at low tide when the minor amount of sediment trapped in the riprap was disturbed.

Wildlife species observed utilizing the OU2 survey area included common tern (*Sterna hirundo*), double-crested cormorant (*Phalacrocorax auritus*), and common grackle (*Quiscalus quiscula*). European starling (*Sturnus vulgaris*), greater black-backed gull, American crow (*Corvus brachyrhynchos*), song sparrow (*Melospiza melodia*), herring gull (*Larus argentatus*), northern mockingbird (*Mimus polyglottos*), and gray catbird (*Dumetella carolinensis*) were observed in adjacent habitat or flying overhead.

Five photographs show the OU2 survey area and adjacent shoreline during mid-to-low tide conditions (Attachment 1).

Highway Method Assessment

According to the Assessment criteria, the wetlands in the OU2 survey area intertidal zone provide three principal functions: fish and shellfish habitat, production export, and sediment/shoreline stabilization.

- Fish and Shellfish Habitat – A small school of fish were observed along the shoreline, and six buoys for lobster traps were observed in the open water habitat adjacent to the wetland in the OU survey area. Additionally, common terns were observed diving for fish and feeding in the survey area. The rocky shoreline provides attachment points for abundant fucoid algae, which may provide vegetative cover and food for small fishes and shellfish. Periwinkle snails and barnacles also are present throughout the intertidal zone. Although not directly observed, it is likely that blue mussels (*Mytilus edulis*) are also present in the intertidal zone.
- Production Export – Active use by swimming birds (i.e., double-crested cormorant) and seabirds (i.e., common terns), fish, and periwinkle snails, indicate this area is productive, and economically or commercially used products (i.e., lobster) are found offshore, adjacent to this area. Ample wildlife food sources grow within the intertidal wetland and

adjacent deepwater habitat, and vegetation decay/breakdown would result in detritus (i.e., non-living particulate organic matter) development. Tides provide diurnal flushing and removal of detritus, and replenishment of nutrients.

- Sediment/Shoreline Stabilization – A mixed manmade riprap shoreline and natural rocky shoreline, and a densely (75 to 90 percent cover) vegetated intertidal zone provide shoreline stabilization function in the OU survey area. Wave energy generated during storm events, storm surges, nearby boat traffic, or other significant wave action is dissipated by the rocky shore. Dense vegetation has the potential to trap and stabilize sediments.

Four secondary functions were identified that the wetlands in the OU2 survey area intertidal zone provide: groundwater recharge/discharge, sediment/toxicant retention, nutrient removal, and wildlife habitat.

- Groundwater Recharge/Discharge – No discharge of groundwater was observed along the shoreline. Exposed bedrock is present in the eastern portion of the survey area. The intertidal wetland along the shoreline are associated with a perennial river (i.e., the Piscataqua River), which is tidally influenced in the survey area.
- Sediment/Toxicant Retention – Dense vegetation present in the lower intertidal zone has the potential to trap sediments/toxicants. Deepwater habitat adjacent to the intertidal zone provides opportunity for sediment deposition; however, the high velocity of water movement in the Piscataqua River adjacent to the survey area does not create conditions that are conducive to sediment deposition. Areas where water velocity slows, immediately adjacent to the shoreline and at the eastern end of the survey area, would provide the best opportunity for sediment retention, however only a small amount of sediment was observed in between rocks in the intertidal zone.
- Nutrient Removal – Deepwater habitat adjacent to the intertidal zone provides some minor potential for sediment deposition. Dense vegetation in the lower intertidal zone also provides the potential for sediment deposition and nutrient uptake and removal from the water column. However, only a small amount of sediment was observed in between rocks in the intertidal zone.
- Wildlife Habitat – Wildlife were observed using the wetland and adjacent open water habitat, such as swimming birds (i.e., cormorants) and seabirds (i.e., common terns) in the adjacent open water habitat. Common grackle was observed foraging along the edge of water at low tide. Dense vegetation provides food sources to a variety of trophic levels.

One function and five values were determined not to be applicable to the wetlands in the OU2 survey area intertidal zone. These include: floodflow alteration, recreation, education/scientific value, uniqueness heritage, visual quality/aesthetics, and endangered species habitat.

- Floodflow Alteration – Intertidal zone has variable water levels associated with tidal exchange. There is no basin or water control structure in the wetland to alter or contain floodwater.
- Recreation – Public use of the open water areas around PNS, including the Piscataqua River adjacent to the survey area, is monitored and controlled. The six buoys located adjacent to the survey area appear to be marking lobster traps. The steep riprap

revetment shoreline would provide difficult and dangerous access for recreational use. High water velocity in the river, safety concerns, and limited access preclude recreational use of this area.

- Education/Scientific Value – No educational or scientific value was identified for the OU2 survey area. Steep riprap revetment shoreline would provide difficult and dangerous access for study or educational use.
- Uniqueness/Heritage – No uniqueness/heritage value was identified for the OU2 survey area. The habitat is not locally or regionally unique.
- Visual Quality/Aesthetics – No visual quality/aesthetic value was identified for the OU2 survey area. The manmade riprap revetment and seawall shoreline detracts from visual quality or aesthetics.
- Endangered Species Habitat – No known endangered species utilize this wetland, and the area is not known to contain critical habitat.

Table 1. Results of the Highway Method Wetland Functions and Values Assessment for Operable Unit 2, Portsmouth Naval Shipyard.

Wetland Functions and Values	2011	Future Post-Remedial Action
Principal Functions		TBD
Fish & Shellfish Habitat	X	
Production Export	X	
Sediment/Shoreline Stabilization	X	
Secondary Functions and Values		TBD
Groundwater Recharge/Discharge	X	
Sediment/Toxicant Retention	X	
Nutrient Removal	X	
Wildlife Habitat	X	
Not Applicable Functions and Values		TBD
Floodflow Alteration	N/A	
Recreation	N/A	
Education/Scientific Value	N/A	
Uniqueness/Heritage	N/A	
Visual Quality/Aesthetic	N/A	
Endangered Species Habitat	N/A	

Summary

The estuarine intertidal wetlands and mixed manmade riprap/natural rocky shoreline in the OU2 survey area provide the principal functions of habitat for fish and shellfish, produce usable food products for humans and other organisms, and stabilize the shoreline and have the potential to trap sediments. Secondary functions include recharging or discharging of groundwater,

retaining sediment and toxicants (potential), removing nutrients from the water column (potential), and providing habitat for wildlife.

If additional details or clarification regarding the contents of this report are required, please contact me at (207) 879-9496 ext 241 or sarah.watts@tetrattech.com.

Sarah C. Watts
Managing Environmental Scientist
Tetra Tech, Inc.

ATTACHMENT 1

Site Photographs

**Highway Method Wetland Functions and Values Assessment
Operable Unit 2, Portsmouth Naval Shipyard**



Photo 1. Manmade riprap revetment, intertidal zone in the western section, looking west.



Photo 2. Manmade riprap revetment, seawall and rocky shoreline, intertidal zone in the eastern section.

**Highway Method Wetland Functions and Values Assessment
Operable Unit 2, Portsmouth Naval Shipyard**



Photo 3. Seawall and rocky shoreline, intertidal zone in the eastern section.



Photo 4. Seawall and rocky shoreline, intertidal zone in the eastern section.

**Highway Method Wetland Functions and Values Assessment
Operable Unit 2, Portsmouth Naval Shipyard**



Photo 5. Rocky shoreline, intertidal zone located east and adjacent to the OU2 survey area.

ATTACHMENT 2

**Wetland Functions and Values Assessment
Completed Evaluation Forms & Site Sketch**

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? _____ Is wetland part of a wildlife corridor? Minor or a "habitat island"? No

Adjacent land use Industrial, parking, buildings Distance to nearest roadway or other development 20'

Dominant wetland systems present Estuarine intertidal Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Sea level

How many tributaries contribute to the wetland? None Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. OU2 Survey area

Latitude _____ Longitude _____

Prepared by: SW Date 6/8/11

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office Field

Corps manual wetland delineation completed? Y _____ N

Function/Value	Suitability		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Y	N			
Groundwater Recharge/Discharge	X		6,7,9,15		Intertidal zone along shoreline assoc. with Piscataqua River (perennial river)
Floodflow Alteration		X	3,4,13		Tidal system, no floodwater storage; impervious surfaces, riprap
Fish and Shellfish Habitat	X		2,3,4,5	X	Vegetation is fucoid algal species; Lobster/shellfish pots offshore (6); potential for L
Sediment/Toxicant Retention	X		2,3,9,10,16		Deepwater habitat and rockweed allow sediment trapping, high velocity in most of survey area. lower intertidal zone
Nutrient Removal	X		2,3,8,10 (minor)		Potential for sediment trapping and nutrient attenuation in lower intertidal zone by rockweed/macroalgae.
Production Export	X		1,2,3,4,5,6,7,11	X	Detritus from rockweed production exported w/ tidal exchange. Birds observed using wetland. Lobster traps present.
Sediment/Shoreline Stabilization	X		2,4,8,10,11,12,16	X	Manmade riprap and bedrock shoreline. Sediments trapped and stabilized by dense rockweed.
Wildlife Habitat	X		6,8,13,17		Use by swimming birds and sea birds observed. Wildlife food sources include mollusks, fish, algae.
Recreation		X	2		Buoys for lobster/shellfish pots offshore. No access for recreating except on water. Water velocity is very high.
Educational/Scientific Value		X	N/A		N/A
Uniqueness/Heritage		X	1		Industrial development and parking in adjacent upland.
Visual Quality/Aesthetics		X	N/A		N/A
ES Endangered Species Habitat		X	N/A		N/A
Other					

Notes:

* Refer to backup list of numbered considerations.



Operable Unit 2, Portsmouth Naval Shipyard

Highway Method Wetland Functions and Values Assessment

8 June 2011 S. Watts and L. Anderson, Tetra Tech, Inc.

Ⓟ = PHOTO LOCATION

ATTACHMENT 3

Highway Method Rationale Reference Number Descriptions

Attachment 3

Wetland evaluation supporting documentation; from USACE 1999.

Below is an example list of considerations that was used for a New Hampshire highway project. Considerations are flexible, based on best professional judgment and interdisciplinary team consensus. This example provides a comprehensive base, however, and may only need slight modifications for use in other projects.



GROUNDWATER RECHARGE/DISCHARGE— This function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

CONSIDERATIONS/QUALIFIERS

1. Public or private wells occur downstream of the wetland.
2. Potential exists for public or private wells downstream of the wetland.
3. Wetland is underlain by stratified drift.
4. Gravel or sandy soils present in or adjacent to the wetland.
5. Fragipan does not occur in the wetland.
6. Fragipan, impervious soils, or bedrock does occur in the wetland.
7. Wetland is associated with a perennial or intermittent watercourse.
8. Signs of groundwater recharge are present or piezometer data demonstrates recharge.
9. Wetland is associated with a watercourse but lacks a defined outlet or contains a constricted outlet.
10. Wetland contains only an outlet, no inlet.
11. Groundwater quality of stratified drift aquifer within or downstream of wetland meets drinking water standards.
12. Quality of water associated with the wetland is high.
13. Signs of groundwater discharge are present (e.g., springs).
14. Water temperature suggests it is a discharge site.
15. Wetland shows signs of variable water levels.
16. Piezometer data demonstrates discharge.
17. Other



FLOODFLOW ALTERATION (Storage & Desynchronization) — This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

CONSIDERATIONS/QUALIFIERS

1. Area of this wetland is large relative to its watershed.
2. Wetland occurs in the upper portions of its watershed.
3. Effective flood storage is small or non-existent upslope of or above the wetland.
4. Wetland watershed contains a high percent of impervious surfaces.
5. Wetland contains hydric soils which are able to absorb and detain water.
6. Wetland exists in a relatively flat area that has flood storage potential.
7. Wetland has an intermittent outlet, ponded water, or signs are present of variable water level.
8. During flood events, this wetland can retain higher volumes of water than under normal or average rainfall conditions.
9. Wetland receives and retains overland or sheet flow runoff from surrounding uplands.
10. In the event of a large storm, this wetland may receive and detain excessive flood water from a nearby watercourse.
11. Valuable properties, structures, or resources are located in or near the floodplain downstream from the wetland.
12. The watershed has a history of economic loss due to flooding.
13. This wetland is associated with one or more watercourses.
14. This wetland watercourse is sinuous or diffuse.
15. This wetland outlet is constricted.
16. Channel flow velocity is affected by this wetland.
17. Land uses downstream are protected by this wetland.
18. This wetland contains a high density of vegetation.
19. Other

FISH AND SHELLFISH HABITAT (FRESHWATER) — This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.



CONSIDERATIONS/QUALIFIERS

1. Forest land dominant in the watershed above this wetland.
2. Abundance of cover objects present.

STOP HERE IF THIS WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE

3. Size of this wetland is able to support large fish/shellfish populations.
4. Wetland is part of a larger, contiguous watercourse.
5. Wetland has sufficient size and depth in open water areas so as not to freeze solid and retain some open water during winter.
6. Stream width (bank to bank) is more than 50 feet.
7. Quality of the watercourse associated with this wetland is able to support healthy fish/shellfish populations.
8. Streamside vegetation provides shade for the watercourse.
9. Spawning areas are present (submerged vegetation or gravel beds).
10. Food is available to fish/shellfish populations within this wetland.
11. Barrier(s) to anadromous fish (such as dams, including beaver dams, waterfalls, road crossing) are absent from the stream reach associated with this wetland.
12. Evidence of fish is present.
13. Wetland is stocked with fish.
14. The watercourse is persistent.
15. Man-made streams are absent.
16. Water velocities are not too excessive for fish usage.
17. Defined stream channel is present.
18. Other

Although the above example refers to freshwater wetlands, it can also be adapted for marine ecosystems. The following is an example provided by the National Marine Fisheries Service (NMFS) of an adaptation for the fish and shellfish function.

FISH AND SHELLFISH HABITAT (MARINE) — This function considers the effectiveness of wetlands, embayments, tidal flats, vegetated shallows, and other environments in supporting marine resources such as fish, shellfish, marine mammals, and sea turtles.

CONSIDERATIONS/QUALIFIERS

1. Special aquatic sites (tidal marsh, mud flats, eelgrass beds) are present.
2. Suitable spawning habitat is present at the site or in the area.
3. Commercially or recreationally important species are present or suitable habitat exists.
4. The wetland/waterway supports prey for higher trophic level marine organisms.
5. The waterway provides migratory habitat for anadromous fish.
6. Essential fish habitat, as defined by the 1996 amendments to the Magnuson-Stevens Fishery & Conservation Act, is present (consultation with NMFS may be necessary).
7. Other



SEDIMENT/TOXICANT/PATHOGEN RETENTION — This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands or upstream eroding wetland areas.

CONSIDERATIONS/QUALIFIERS

1. Potential sources of excess sediment are in the watershed above the wetland.
2. Potential or known sources of toxicants are in the watershed above the wetland.
3. Opportunity for sediment trapping by slow moving water or deepwater habitat are present in this wetland.
4. Fine grained mineral or organic soils are present.
5. Long duration water retention time is present in this wetland.
6. Public or private water sources occur downstream.
7. The wetland edge is broad and intermittently aerobic.
8. The wetland is known to have existed for more than 50 years.
9. Drainage ditches have not been constructed in the wetland.

STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.

10. Wetland is associated with an intermittent or perennial stream or a lake.
11. Channelized flows have visible velocity decreases in the wetland.
12. Effective floodwater storage in wetland is occurring. Areas of impounded open water are present.
13. No indicators of erosive forces are present. No high water velocities are present.
14. Diffuse water flows are present in the wetland.
15. Wetland has a high degree of water and vegetation interspersion.
16. Dense vegetation provides opportunity for sediment trapping and/or signs of sediment accumulation by dense vegetation is present.
17. Other



NUTRIENT REMOVAL/RETENTION/TRANSFORMATION — This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

CONSIDERATIONS/QUALIFIERS

1. Wetland is large relative to the size of its watershed.
2. Deep water or open water habitat exists.
3. Overall potential for sediment trapping exists in the wetland.

4. Potential sources of excess nutrients are present in the watershed above the wetland.
5. Wetland saturated for most of the season. Pondered water is present in the wetland.
6. Deep organic/sediment deposits are present.
7. Slowly drained fine grained mineral or organic soils are present.
8. Dense vegetation is present.
9. Emergent vegetation and/or dense woody stems are dominant.
10. Opportunity for nutrient attenuation exists.
11. Vegetation diversity/abundance sufficient to utilize nutrients.

STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.

12. Waterflow through this wetland is diffuse.
13. Water retention/detention time in this wetland is increased by constricted outlet or thick vegetation.
14. Water moves slowly through this wetland.
15. Other

PRODUCTION EXPORT (Nutrient) — This function evaluates the effectiveness of the wetland to produce food or usable products for humans or other living organisms.



CONSIDERATIONS/QUALIFIERS

1. Wildlife food sources grow within this wetland.
2. Detritus development is present within this wetland
3. Economically or commercially used products found in this wetland.
4. Evidence of wildlife use found within this wetland.
5. Higher trophic level consumers are utilizing this wetland.
6. Fish or shellfish develop or occur in this wetland.
7. High vegetation density is present.
8. Wetland exhibits high degree of plant community structure/species diversity.
9. High aquatic vegetative diversity/abundance is present.
10. Nutrients exported in wetland watercourses (permanent outlet present).
11. “Flushing” of relatively large amounts of organic plant material occurs from this wetland.
12. Wetland contains flowering plants that are used by nectar-gathering insects.
13. Indications of export are present.
14. High production levels occurring, however, no visible signs of export (assumes export is attenuated).
15. Other

SEDIMENT/ShORELINE STABILIZATION — This function considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.



CONSIDERATIONS/QUALIFIERS

1. Indications of erosion or siltation are present.
2. Topographical gradient is present in wetland.
3. Potential sediment sources are present up-slope.
4. Potential sediment sources are present upstream.
5. No distinct shoreline or bank is evident between the waterbody and the wetland or upland.
6. A distinct step between the open waterbody or stream and the adjacent land exists (i.e., sharp bank) with dense roots throughout.
7. Wide wetland (>10') borders watercourse, lake, or pond.
8. High flow velocities in the wetland.
9. The watershed is of sufficient size to produce channelized flow.
10. Open water fetch is present.
11. Boating activity is present.
12. Dense vegetation is bordering watercourse, lake, or pond.
13. High percentage of energy-absorbing emergents and/or shrubs border a watercourse, lake, or pond.
14. Vegetation is comprised of large trees and shrubs that withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet).
15. Vegetation is comprised of a dense resilient herbaceous layer that stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive events.
16. Other



WILDLIFE HABITAT — This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.¹

CONSIDERATIONS/QUALIFIERS

1. Wetland is not degraded by human activity.
2. Water quality of the watercourse, pond, or lake associated with this wetland meets or exceeds Class A or B standards.
3. Wetland is not fragmented by development.
4. Upland surrounding this wetland is undeveloped.
5. More than 40% of this wetland edge is bordered by upland wildlife habitat (e.g., brushland, woodland, active farmland, or idle land) at least 500 feet in width.
6. Wetland is contiguous with other wetland systems connected by a watercourse or lake.
7. Wildlife overland access to other wetlands is present.
8. Wildlife food sources are within this wetland or are nearby.
9. Wetland exhibits a high degree of interspersed vegetation classes and/or open water.
10. Two or more islands or inclusions of upland within the wetland are present.
11. Dominant wetland class includes deep or shallow marsh or wooded swamp.
12. More than three acres of shallow permanent open water (less than 6.6 feet deep), including streams in or adjacent to wetland, are present.
13. Density of the wetland vegetation is high.
14. Wetland exhibits a high degree of plant species diversity.
15. Wetland exhibits a high degree of diversity in plant community structure (e.g., tree/shrub/vine/grasses/mosses)
16. Plant/animal indicator species are present. (List species for project)
17. Animal signs observed (tracks, scats, nesting areas, etc.)
18. Seasonal uses vary for wildlife and wetland appears to support varied population diversity/abundance during different seasons.
19. Wetland contains or has potential to contain a high population of insects.
20. Wetland contains or has potential to contain large amphibian populations.
21. Wetland has a high avian utilization or its potential.
22. Indications of less disturbance-tolerant species are present.
23. Signs of wildlife habitat enhancement are present (birdhouses, nesting boxes, food sources, etc.).
24. Other

¹In March 1995, a rapid wildlife habitat assessment method was completed by a University of Massachusetts research team with funding and oversight provided by the New England Transportation Consortium. The method is called WEThings (wetland habitat indicators for non-game species). It produces a list of potential wetland-dependent mammal, reptile, and amphibian species that may be present in the wetland. The output is based on observable habitat characteristics documented on the field data form. This method may be used to generate the wildlife species list recommended as backup information to the wetland evaluation form and to augment the considerations. Use of this method should first be coordinated with the Corps project manager. A computer program is also available to expedite this process.

RECREATION (Consumptive and Non-Consumptive) — This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive opportunities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.



CONSIDERATIONS/QUALIFIERS

1. Wetland is part of a recreation area, park, forest, or refuge.
2. Fishing is available within or from the wetland.
3. Hunting is permitted in the wetland.
4. Hiking occurs or has potential to occur within the wetland.
5. Wetland is a valuable wildlife habitat.
6. The watercourse, pond, or lake associated with the wetland is unpolluted.
7. High visual/aesthetic quality of this potential recreation site.
8. Access to water is available at this potential recreation site for boating, canoeing, or fishing.
9. The watercourse associated with this wetland is wide and deep enough to accommodate canoeing and/or non-powered boating.
10. Off-road public parking available at the potential recreation site.
11. Accessibility and travel ease is present at this site.
12. The wetland is within a short drive or safe walk from highly populated public and private areas.
13. Other

EDUCATIONAL/SCIENTIFIC VALUE — This value considers the suitability of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research.



CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened, rare, or endangered species.
2. Little or no disturbance is occurring in this wetland.
3. Potential educational site contains a diversity of wetland classes which are accessible or potentially accessible.
4. Potential educational site is undisturbed and natural.
5. Wetland is considered to be a valuable wildlife habitat.
6. Wetland is located within a nature preserve or wildlife management area.
7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).
8. Off-road parking at potential educational site suitable for school bus access in or near wetland.
9. Potential educational site is within safe walking distance or a short drive to schools.
10. Potential educational site is within safe walking distance to other plant communities.
11. Direct access to perennial stream at potential educational site is available.
12. Direct access to pond or lake at potential educational site is available.
13. No known safety hazards exist within the potential educational site.
14. Public access to the potential educational site is controlled.
15. Handicap accessibility is available.
16. Site is currently used for educational or scientific purposes.
17. Other

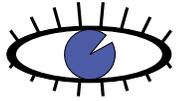


UNIQUENESS/HERITAGE — This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.

CONSIDERATIONS/QUALIFIERS

1. Upland surrounding wetland is primarily urban.
2. Upland surrounding wetland is developing rapidly.
3. More than 3 acres of shallow permanent open water (less than 6.6 feet deep), including streams, occur in wetlands.
4. Three or more wetland classes are present.
5. Deep and/or shallow marsh or wooded swamp dominate.
6. High degree of interspersion of vegetation and/or open water occur in this wetland.
7. Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland.
8. Potential educational site is within a short drive or a safe walk from schools.
9. Off-road parking at potential educational site is suitable for school buses.
10. No known safety hazards exist within this potential educational site.
11. Direct access to perennial stream or lake exists at potential educational site.
12. Two or more wetland classes are visible from primary viewing locations.
13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) are visible from primary viewing locations.
14. Half an acre of open water or 200 feet of stream is visible from the primary viewing locations.
15. Large area of wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
16. General appearance of the wetland visible from primary viewing locations is unpolluted and/or undisturbed.
17. Overall view of the wetland is available from the surrounding upland.
18. Quality of the water associated with the wetland is high.
19. Opportunities for wildlife observations are available.
20. Historical buildings are found within the wetland.
21. Presence of pond or pond site and remains of a dam occur within the wetland.
22. Wetland is within 50 yards of the nearest perennial watercourse.
23. Visible stone or earthen foundations, berms, dams, standing structures, or associated features occur within the wetland.
24. Wetland contains critical habitat for a state- or federally-listed threatened or endangered species.
25. Wetland is known to be a study site for scientific research.
26. Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community.
27. Wetland has local significance because it serves several functional values.
28. Wetland has local significance because it has biological, geological, or other features that are locally rare or unique.
29. Wetland is known to contain an important archaeological site.
30. Wetland is hydrologically connected to a state or federally designated scenic river.
31. Wetland is located in an area experiencing a high wetland loss rate.
32. Other

VISUAL QUALITY/AESTHETICS — This value considers the visual and aesthetic quality or usefulness of the wetland.



CONSIDERATIONS/QUALIFIERS

1. Multiple wetland classes are visible from primary viewing locations.
2. Emergent marsh and/or open water are visible from primary viewing locations.
3. A diversity of vegetative species is visible from primary viewing locations.
4. Wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
5. Land use surrounding the wetland is undeveloped as seen from primary viewing locations.
6. Visible surrounding land use form contrasts with wetland.
7. Wetland views absent of trash, debris, and signs of disturbance.
8. Wetland is considered to be a valuable wildlife habitat.
9. Wetland is easily accessed.
10. Low noise level at primary viewing locations.
11. Unpleasant odors absent at primary viewing locations.
12. Relatively unobstructed sight line exists through wetland.
13. Other

ENDANGERED SPECIES HABITAT — This value considers the suitability of the wetland to support threatened or endangered species.

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CONSIDERATIONS/QUALIFIERS

1. Wetland contains or is known to contain threatened or endangered species.
2. Wetland contains critical habitat for a state or federally listed threatened or endangered species.