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NAS SOUTH WEYMOUTH  
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LETTER REGARDING THE SPRING 2014 WETLAND INSPECTION AREA OF CONCERN  
55C (AOC 55C) NAS SOUTH WEYMOUTH MA  
08/04/2014  
TETRA TECH



TETRA TECH

C-NAVY-08-14-5388W

August 4, 2014

Project Number G04642

Mr. Brian Helland, RPM  
BRAC PMO, East  
4911 South Broad Street  
Philadelphia, Pennsylvania 19112

Reference: CLEAN Contract No. N62472-03-D-0057  
Contract Task Order (CTO) No. 0166

Subject: Area of Concern 55C – Spring 2014 Wetland Inspection  
Former Naval Air Station South Weymouth, Weymouth, Massachusetts

Dear Mr. Helland:

This letter documents the results of the spring 2014 Area of Concern (AOC) 55C post-restoration wetland inspection conducted by Tetra Tech, Inc. on June 10, 2014. The purpose of the spring site visit was to conduct an early growing-season assessment of the restored wetland area, make observations at the pond/vernal pool area, conduct an invasive species assessment, and to conduct a comprehensive stem count of woody plant species observed throughout the restored wetland. A meander survey was employed to identify the presence of invasive species, identify and qualitatively assess the condition of the planted material, conduct the woody stem count, and identify any other potential issues that could affect project success. Additionally, the wetland was evaluated using the New England District of the United States Army Corps of Engineers Highway Methodology Functions and Values Assessment (referred to as the Functions and Values Assessment [FVA]).

The spring 2014 wetland inspection was conducted as part of the monitoring program for AOC 55C that includes spring and late summer/early fall wetland inspections. The spring 2014 wetland inspection was performed in accordance with the Final Restoration Plan, Revision 1 for the AOC 55C removal action (Shaw, March 2010) and following procedures used during spring 2011 which are generally consistent with the post-restoration wetland inspections performed at the Rubble Disposal Area and AOC 8. An annual wetland monitoring report will be prepared upon completion of the late summer/early fall inspection which will summarize the spring and fall inspections and the FVA, and provide recommendations regarding the need for further monitoring.

Selected photographs are provided in Attachment A. Evaluation Forms are presented in Attachment B. The Highway Methodology Functions and Values evaluation form and instructions are included in Attachments C and D, respectively. The findings of the inspection are summarized below.

**Herbaceous Vegetation:** The total herbaceous cover of AOC 55C had increased about 40% from the 2013 spring survey, due to less extensive flooding this spring. Only small portions of the wetland near the vernal pool contained standing water. The portions of the wetland that were not inundated by standing water had full herbaceous vegetation coverage (with the exception of the debris piles), with young vegetation (e.g., beggartick, cattail, and mud plantain) was beginning to emerge in the inundated areas. A late spring likely delayed much of the vegetation growth; many grasses were still too young to positively identify. Herbaceous species observed included predominantly bentgrass, barnyard grass, devil's beggartick, shallow sedge, fox sedge, crown vetch, spotted jewelweed, soft rush, rice cutgrass, spotted ladythumb, and yellow foxtail. All of these species are considered facultative (FAC) or wetter. Ragweed was the only facultative upland (FACU) species present in abundance across the site.

Tetra Tech, Inc.

250 Andover Street, Suite 200, Wilmington, MA 01887-1048  
Tel 978.474.8400 Fax 978.474.8499 www.tetrattech.com

In the area immediately south/southeast of the vernal pool and berm, a small area of standing water was observed, with evidence of a deeper inundation earlier in the spring. Cattail, devil's beggartick, shallow sedge, and purple loosestrife (invasive) were observed during the inspection.

**Invasive Species:** Three invasive species were observed within the restoration area: Japanese knotweed, purple loosestrife, and glossy buckthorn. Japanese knotweed was observed scattered throughout the entire extent of the restored area; almost all plants were relatively small. The herbicide applied during the fall of 2012 appears to have been effective on the larger stands, but Japanese knotweed will likely continue to be a problem at the wetland due to the significant seed source present adjacent to the wetland. The presence of Japanese knotweed at the time does not seem to be inhibiting the development of native species within the wetland.

Purple loosestrife was observed throughout the restored wetland in a slightly larger abundance than was observed in 2013. Gallerucella beetles (also known as purple loosestrife beetles) were observed on several of the plants, and foliar damage caused by the beetles was observed on most of the remaining plants.

Glossy buckthorn is well established in the forest surrounding AOC 55C. Glossy buckthorn seedlings were observed within the edges of the restored wetland.

Autumn olive and one plant of reed canarygrass were treated and removed in 2012 and 2013, respectively, and were not observed in the wetland during the spring 2014 inspection.

**Plantings:** A comprehensive woody stem count was conducted during the meander survey in an effort to determine the actual number of woody plants present (volunteer or planted) within the restored wetland. The table below presents the results of the count; the list includes only species observed within the restored wetland area of the Site and does not include woody plants observed on the restored access road.

Scientific Name	Common Name	Number Observed
<i>Acer rubrum</i>	Red Maple	30
<i>Quercus bicolor</i>	Swamp White Oak	15
<i>Clethra alnifolia</i>	Sweet Pepper Bush	31
<i>Spiraea alba</i>	Meadow Sweet	10
<i>Vaccinium corymbosum</i>	Blueberry	9
<i>Myrica pensylvanica</i>	Bayberry	2
<i>Betula populifolia</i>	Grey Birch	5
<i>Populus tremuloides</i>	Quaking Aspen	2
<i>Quercus palustris</i>	Pin Oak	11
<i>Salix discolor</i>	Pussy Willow	1
<i>Sassafras albidum</i>	Sassafras	(not counted in 2014, prevalent along eastern wetland edge)
<i>Robinia pseudoacacia</i>	Black Locust	1
<i>Viburnum nudum</i>	Possumhaw	3
<i>Viburnum (Unk.)</i>		1

**TOTAL 120**

The species planted during the Spring 2013 Remedial Action Contract (RAC) planting included red maple, sweet pepper bush, and pin oak. Any trees or shrubs that were of poor vigor were not included in the count. Most tree saplings appear to have survived the flooded conditions from the spring of 2013. A number of planted maple saplings (about 6) scattered across the wetland were clearly impacted by defoliation, likely from the introduced winter moth that is increasingly invading New England. These trees

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were nearly or completely defoliated, with the remaining leaves heavily damaged. It was unclear at the time of the spring 2014 inspection if the trees would recover from the damage.

In addition to the trees and shrubs located within the restored wetland, the field team also counted the tree and shrub species in the upland areas and along the former haul road that leads to AOC 55C. The results are presented in the table below.

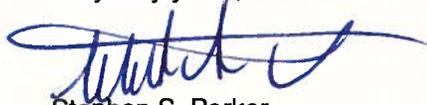
Scientific Name	Common Name	Number Observed
<i>Acer rubrum</i>	Red Maple	2
<i>Quercus bicolor</i>	Swamp White Oak	4
<i>Clethra alnifolia</i>	Sweet Pepper Bush	5
<i>Spiraea alba</i>	Meadow Sweet	4
<i>Quercus palustris</i>	Pin Oak	2
<i>Sassafras albidum</i>	Sassafras	(not counted in 2014, but prevalent in area)

**TOTAL 17**

**Functions and Values:** The Highway Methodology Functions and Values rapid assessment method qualitatively rates the suitability of the wetland in regards to different ecological, cultural, and economic functions. Overall, AOC 55C rated highly for 3 principal functions, including Groundwater Recharge/Discharge, Production Export, and Wildlife Habitat. Additional functions for which the wetland met several suitability characteristics included Floodflow Alteration, Nutrient Removal, and Educational/Scientific Value.

This is the first FVA conducted for AOC 55C. If you have any questions regarding this information, please contact me at (978) 474-8434.

Very truly yours,



Stephen S. Parker  
Project Manager

SSP

c: D. Barney, Navy (1)  
C. Keating, EPA (1)  
K. Keckler, EPA (1)  
D. Chaffin, MassDEP (1)  
P. Steinberg, Mabbett & Associates, Inc. (1)  
P. Sortin, Abington (1)  
M. Brennan, Weymouth (1)  
M. Parsons, Rockland (1)  
Tufts Library, Weymouth (1)  
Public Library, Abington (1)  
Public Library, Rockland (1)  
Public Library, Hingham (1)  
Chief Executive Officer, South Shore Tri-town Development Corp. (1)  
RDM Data Manager, (1 unbound, 1 CD)  
J. Trepanowski, Tetra Tech (1)  
G. Glenn, Tetra Tech (1)  
File G04642-3.2 (1); G04642-8.0 (1)

**Attachment A**

**Photographs**

**PHOTOGRAPHIC RECORD**

**Project:** AOC55 – Spring 2014 Wetland Inspection

**Location:** Formal Naval Air Station South Weymouth, Weymouth, Massachusetts



**Photo No.:** 1  
**Name:** R1  
**Date:** June 10, 2014  
**Photographer:** K. Metcalf  
**Comments:**

Plot 1 on the northwest portion of AOC55.



**Photo No.:** 2  
**Name:** R1  
**Date:** June 10, 2014  
**Photographer:** K. Metcalf  
**Comments:**

Vegetation cover near plot R1, looking west.



**Photo No.:** 3  
**Name:** R2  
**Date:** June 10, 2014  
**Photographer:** K. Metcalf  
**Comments:**

View of plot R2, looking northwest.

**PHOTOGRAPHIC RECORD**

**Project:** AOC55 – Spring 2014 Wetland Inspection

**Location:** Formal Naval Air Station South Weymouth, Weymouth, Massachusetts



**Photo No.:** 4  
**Name:** R3  
**Date:** June 10, 2014  
**Photographer:** K. Metcalf  
**Comments:**  
View of plot R3. Full vegetation coverage.



**Photo No.:** 5  
**Name:** R3  
**Date:** June 10, 2014  
**Photographer:** K. Metcalf  
**Comments:**  
View of AOC55 looking southeast from R3.



**Photo No.:** 6  
**Name:** AOC55  
**Date:** June 10, 2014  
**Photographer:** K. Metcalf  
**Comments:**  
AOC 55 looking southeast from the berm at the vernal pool. Almost complete vegetation cover, little standing water on the northwest portion of the wetland.

**PHOTOGRAPHIC RECORD**

**Project:** AOC55 – Spring 2014 Wetland Inspection

**Location:** Formal Naval Air Station South Weymouth, Weymouth, Massachusetts



**Photo No.:** 1  
**Name:** Red maple damage  
**Date:** June 10, 2014  
**Photographer:** K. Metcalf  
**Comments:**  
Leaf damage likely from winter moths in AOC55.



**Photo No.:** 5  
**Name:** Red maple damage  
**Date:** June 10, 2014  
**Photographer:** K. Metcalf  
**Comments:**  
Dead red maple twig, entirely defoliated.

**Attachment B**

**Evaluation Forms**

**FORMER NAVAL AIR STATION SOUTH WEYMOUTH  
AREA OF CONCERN (AOC) 55C  
POST-REMEDIAL WETLANDS MONITORING**

Plot Number: R1

Investigator: K. Metcalf, D. Anderson

Date: 6/10/2014

**VEGETATION**

Plant Species	% Cover	Wetland Indicator Status
<i>Bidens frondosa</i>	20%	FACW
<i>Alisma subcordatum</i>	2%	OBL
<i>Echinochloa crus-galli</i>	60%	FAC
<i>Acer rubrum</i>	1%	FAC
<i>Lemna minor</i>	1%	OBL

\* Dominant Species  
Invasive Species

Total Percent Cover: 84%  
% Cover by Non-invasives:

**SOILS**

Depth (in)	Horizon	Description	Matrix Color	Redox Features
0-16		saturated to surface	10 YR 7/1	

**Notes:** \*include notes on hydrology, photo #s, % survival woody species, total veg cover  
 \*\*presence, abundance, location of invasive species  
 Soils were saturated to surface water table ~4" below surface. Vegetation cover less than 100% but young emergents.

**FORMER NAVAL AIR STATION SOUTH WEYMOUTH  
AREA OF CONCERN (AOC) 55C  
POST-REMEDIAL WETLANDS MONITORING**

Plot Number: 122

Investigator: K. Metcalf, D. Anderson

Date: 6/10/2014

**VEGETATION**

Plant Species	% Cover	Wetland Indicator Status
<i>Bidens frondosa</i>	10%	FACW
<i>Alisma subcordatum</i>	5%	OBL
<i>Echinochola crus-galli</i>	70%	FAC
<i>Polygonum sp.</i>	15%	-
Purple loosestrife - <i>Lythrum salicaria</i>	2%	OBL
<i>Carex sp.</i>	2%	-

-removed

\* Dominant Species  
Invasive Species

Total Percent Cover: 102  
% Cover by Non-invasives:

**SOILS**

Depth (in)	Horizon	Description	Matrix Color	Redox Features
0-2		Sand	10 YR 3/3	
2-6		Sandy loam	10 YR 3/2	
6-10		"	10 YR 3/2	10 YR 4/1 (mottled)
10-16		Sand - moist	10 YR 2/1	

**Notes:** \*include notes on hydrology, photo #s, % survival woody species, total veg cover  
 \*\*presence, abundance, location of invasive species  
~ 4" of water in pit soils saturated ~ 3" below surface  
1 clump of purple loosestrife in plot was pulled up.

**FORMER NAVAL AIR STATION SOUTH WEYMOUTH  
AREA OF CONCERN (AOC) 55C  
POST-REMEDIAL WETLANDS MONITORING**

Plot Number: R3

Investigator: K. Metcalf, D. Anderson

Date: 6/10/2014

**VEGETATION**

Plant Species	% Cover	Wetland Indicator Status
<i>Carex lurida</i> (shallow sedge)	25%	OBL
<i>Agrostis scabra</i> (bentgrass)	5%	FAC
<i>Carex vulpinoidea</i> (fox sedge)	5%	OBL
<i>Vicia cracca</i> (bird vetch)	10%	NI
<i>Stellaria graminea</i>	5%	UPL
<i>Daucus carota</i>	20%	UPL
<i>Ambrosia artemisiifolia</i>	10%	FACU
<i>Bidens frondosa</i>	15%	FACW
<i>Plantago lanceolata</i>	5%	FACU
<i>Plantago major</i>	5%	FACU
Unknown vine-like, alternating leaves	1%	-
<i>Ludwigia</i> sp.	3%	-
<i>Trifolium pratense</i>	1%	FACU
<i>Trifolium repens</i>	1%	FACU

\* Dominant Species

Invasive Species

Total Percent Cover: 111%  
% Cover by Non-invasives:

**SOILS**

Depth (in)	Horizon	Description	Matrix Color	Redox Features
0-2		Sandy loam	10YR 3/2	
2-14		"	10YR 2/1	
14-16		"	10YR 2/1 (90%)	10YR 6/4 (10%)

**Notes:** \*include notes on hydrology, photo #s, % survival woody species, total veg cover

\*\*presence, abundance, location of invasive species

No soil saturation, no ground water, completely vegetated plot

**Attachment C**

**Highway Methodology Functions and  
Values Assessment Forms**

# Wetland Function-Value Evaluation Form

Total area of wetland ~0.8ac Human made? Y Is wetland part of a wildlife corridor? N or a "habitat island"? N

Adjacent land use Forested Distance to nearest roadway or other development 230 ft

Dominant wetland systems present PFO/PSS Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? Y If not, where does the wetland lie in the drainage basin? Isolated

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland ID: AOCSS

Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

Prepared by: KM Date: 6/10/14

Wetland Impact: Type Restored Area \_\_\_\_\_

Evaluation based on: Office X Field X

Corps manual wetland delineation completed? Y X N X

Function/Value	Suitability		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Y	N			
Groundwater Recharge/Discharge	X		4, 5, 8, 12, 13, 15	X	vernal pool/seep areas to the northeast of the wetland likely receive some groundwater - shallow depth to water table
Floodflow Alteration	X		5, 6, 7, 8, 9, 18		Wetland can slow flood waters from overland flows from surrounding area, though wetland is very small relatively
Fish and Shellfish Habitat		X	NA		
Sediment/Toxicant Retention	X		3, 4, 5, 6		Wetland can hold water for a long duration, though little to no disturbance/pollutant source in area
Nutrient Removal	X		3, 5, 7, 8, 10, 11		Dense veg. across site, ponded water in portion of the wetland
Production Export	X		1, 2, 4, 5, 7, 9, 12	X	Evidence of wildlife use, vegetative community diversity is low to moderate
Sediment/Shoreline Stabilization		X	NA		
Wildlife Habitat	X		3, 4, 5, 7, 8, 10, 13, 17	X	Evidence of use by deer, birds, rabbits, amphibians. Dense veg. cover with topographic diversity across wetland
Recreation		X	5, 6, 10, 11		Ease of access but no known recreational opps. at site
Educational/Scientific Value	X		2, 4, 5, 7, 8, 10		Ease of access, wildlife & wetland enhancements present
Uniqueness/Heritage		X	8, 9, 10, 17		No known unique/heritage features
Visual Quality/Aesthetics		X	3, 5, 6, 8, 9		Restored wetland is very small
ES Endangered Species Habitat		X			No known RTE species
Other					

Notes:

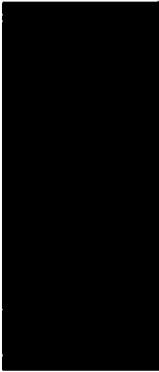
\* Refer to backup list of numbered considerations.

**Attachment D**

**New England District of the United States Army Corps of Engineers**

**Highway Methodology Functions and Values Assessment**

**Wetland Evaluation: Supporting Documentation List of Considerations**



# Appendix A

## Wetland evaluation supporting documentation and reproducible forms.

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Below is an example list of considerations that was used for a New Hampshire highway project. Considerations are flexible, based on best professional judgement 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.
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. Gravel or sandy soils present in or adjacent to wetland.
17. Piezometer data demonstrates discharge.
18. 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 degree 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** — This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.<sup>1</sup>

### 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 retains 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, water falls, road crossing, etc.) 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



**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 erod-



ing 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. Mineral, fine grained, 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 is present by dense vegetation.
17. Other



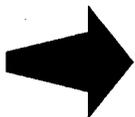
**NUTRIENT REMOVAL/RETENTION/TRANSFORMATION** — This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands, and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of 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 present in the watershed above the wetland.
5. Wetland saturated for most of the season. Poned water is present in the wetland.
6. Deep organic/sediment deposits are present.
7. Slowly drained mineral, fine grained, or organic soils, are present.
8. Dense vegetation is present.
9. Emergent vegetation and/or dense woody stems are dominant.
10. Aquatic diversity/abundance sufficient to utilize nutrients.
11. Opportunity for nutrient attenuation exists.
12. Vegetation diversity/abundance sufficient to utilize nutrients.

#### STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.

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



**PRODUCTION EXPORT (Nutrient)** — This function evaluates the effectiveness of the wetland to produce food or usable products for man 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 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 which 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 stream banks and shorelines against erosion.



#### CONSIDERATIONS/QUALIFIERS

1. Indications of erosion, siltation present.
2. Topographical gradient is present in wetland.
3. Potential sediment sources are present up-slope.
4. No distinct shoreline or bank is evident between the waterbody and the wetland or upland.
5. A distinct step between the open waterbody or stream and the adjacent land exists (i.e. sharp bank) with dense roots throughout.
6. Wide wetland (>10') bordering watercourse, lake, or pond.
7. High flow velocities in the wetland.
8. Potential sediment sources present upstream.
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 bordering watercourse, lake or pond.
14. Vegetation comprised of large trees and shrubs which withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet).
15. Vegetation comprised of dense resilient herbaceous layer which 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.<sup>2</sup>



#### 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, wood land, active farmland, or idle land) at least 500 feet in width.
6. Wetland contiguous with other wetland systems connected by 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/etc.)
16. Plant/animal indicator species present.
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 present.
23. Signs of wildlife habitat enhancement present (birdhouses, nesting boxes, food sources, etc.).
24. Other



**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 within safe walking distance to other plant communities.
11. Direct access to perennial stream at potential educational site available.
12. Direct access to pond or lake at potential educational site available.
13. No known safety hazards 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

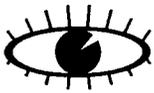
**UNIQUENESS/HERITAGE** — This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the 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 primarily urban.
2. Upland surrounding wetland developing rapidly.
3. More than 3 acres of shallow permanent open water occur in wetlands (less than 6.6 feet deep) including streams .
4. Three or more wetland classes present.
5. Deep and/or shallow marsh, or wooded swamp dominate.
6. High degree of interspersion of vegetation and/or open water occurring 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 at potential educational site.
12. Two or more wetland classes visible from primary viewing locations.
13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) 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 which 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 occur within the wetland.
21. Presence of pond or pond site and remains of a dam occur within the wetland.
22. Wetland 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 which 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 visible from primary viewing locations.
2. Emergent marsh and/or open water visible from primary viewing locations.
3. Diversity of vegetation species visible from primary viewing locations.
4. Wetland dominated by flowering plants, or plants which 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

**ES**

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

**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.
3. Other

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

**FISH AND SHELLFISH HABITAT** — 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 (Marine)**

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. Other
- 2 In 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 mammals, reptiles, 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.