

DATE: August 17, 2012

FROM: Brian Busiek, P.E.  
Ryan O'Banion

PROJECT: Little Patuxent Watershed Study

TO: Hala Flores, P.E.

CC: Richard Fisher, Jeff Cox

SUBJECT: Draft Rapid Wetland Condition Assessment Protocol

---

## Memorandum

### Introduction

A Rapid Wetland Condition Assessment protocol is under development as part of the Little Patuxent Watershed Study. This protocol is intended to provide the County with more information on the condition of wetland reaches encountered during stream assessment fieldwork than what was previously collected during past watershed assessments. In past assessments, wetland reaches were noted and environmental feature and infrastructure impacts were assessed, but physical habitat assessments were not performed. This is due to the fact that the County's physical habitat assessment protocol, based on the Maryland Biological Stream Survey (MBSS) Maryland Physical Habitat Index (MPHI), was only applicable for perennial stream channels. Without an MPHI score, the County was unable to include wetland reaches in its rating and prioritization scheme for reach restoration.

For the Little Patuxent Watershed Study, the LimnoTech/Versar team was tasked with developing a field assessment protocol of wetland condition that is analogous to the MPHI for perennial streams. This protocol needs to be:

- comparable in effort to the County's perennial stream physical habitat assessment protocols;
- able to be uniformly implemented among multiple teams for consistency; and
- comprehensive enough to give a basic comparative understanding of wetland condition.

This technical memorandum discusses the development of the test version of the Rapid Wetland Condition Assessment protocol and future steps that will be completed to evaluate the efficacy and need for refinement of the protocol.

### Rapid Wetland Condition Assessment Protocol Development

To develop the current version of the Rapid Wetland Condition Assessment protocol, the LimnoTech/Versar team initially reviewed existing wetland assessment protocols developed by other states, including Florida, Oregon, Delaware, and Michigan. The team also reviewed an

independent evaluation of assessments compiled by EPA in 2004 (USEPA, 2004). Of the rapid assessments reviewed, the Delaware Rapid Assessment was found to have goals and data fields most similar to those desired for this project (DNREC, 2010). However, this review confirmed that this and other protocols, while faster than traditional wetland functional assessments, were not streamlined enough to incorporate into the County's current watershed assessment protocol. Assessment times in the reviewed protocols ranged from hours to days, significantly more than the 10 to 15 minutes typically allocated for a stream habitat assessment. Using wetland scientists on the team and a strong knowledge of the County's watershed assessment program, the LimnoTech/Versar team developed a Rapid Wetland Condition Assessment protocol that was used by field assessment crews in the Little Patuxent Watershed.

The data collection protocol is intended to require a similar effort as the MBSS MPHI habitat assessment currently being used for perennial streams. The physical habitat assessment protocol used by Anne Arundel County is described in the 2003 *Physical Habitat Index for Freshwater Wadeable Streams in Maryland* report developed by the Maryland Department of Natural Resources (MDNR) and the *Field Data Collection Guide for Watershed Studies* developed by the Anne Arundel County Department of Public Works (Anne Arundel County, 2010). Physical habitat condition assessment parameters for perennial streams are collected from a 75 meter representative section of each reach. Collected habitat assessment parameters include qualitative observations of in-stream and riparian conditions (*i.e.*, fish presence, bacteria or algae presence, aquatic vegetation presence, water clarity and odor, and riparian vegetation character) as well as quantified assessment parameters used to calculate an MPHI score. Data used to support the calculation of a scaled MPHI score for each perennial stream reach includes individual scores for remoteness, shading, epifaunal substrate, instream habitat, woody debris and rootwads, and bank stability.

The Rapid Wetland Condition Assessment protocol was developed using similar terminology, data fields, and quantification processes found in the perennial stream habitat assessment discussed above. This allows for field staff familiar with the current perennial stream assessment protocol to be more comfortable and easily trained with the new wetland assessment methods. The current version of this Rapid Wetland Condition Assessment focuses on collecting information that can be used to assess the relative condition of the wetlands within the watershed. This is in contrast to significantly more comprehensive, and more time consuming wetland hydrogeomorphic functional assessments reviewed above.

Three categories of data collection associated with wetland condition were chosen for this Rapid Wetland Condition Assessment protocol: wetland type and context, habitat and plant community, and hydrology and water quality.

The **wetland type and context** category includes data fields meant to capture information about the location and type of wetland and limited information about the surrounding landscape. The size of the wetland is established by recording average wetland width. Wetland width and reach breaks allow for the rough calculation of wetland area. In addition, wetland contextual data such as riparian vegetation type and width, dominant surrounding land use, and distance to nearest road are also recorded. Collectively, this information provides a basic understanding of the size, type, and setting of the wetland.

The **habitat and plant community** category is comprised of five data fields. These fields are designed to provide an understanding of the makeup and vertical structure of plants in the wetland. The plant community is further recorded by requiring the assessor to identify if wetland plants are dominant and if they are invasive or native species. Wetland habitat is evaluated by assessing the diversity and abundance of typical habitat structures. Finally, the presence and type of fauna observed during the assessment are also recorded to provide basic information about the wildlife community.

The **hydrology and water quality** category is comprised of six data fields. During the rapid assessment, water quality sampling or monitoring of the hydroperiod of a wetland is not performed due to time constraints. Therefore, alternate data fields have been developed to better understand the wetland hydrology. Field teams estimate the percent of the wetland that is inundated at the time of assessment. If the wetland does have inundation, a series of data fields are collected about the clarity and smell of the water. An evaluation of human intervention is also recorded to better understand if wetland hydrologic conditions are already being affected by anthropogenic sources.

During field testing, the LimnoTech/Versar team regularly collaborated internally to understand any issues encountered with the wetland assessment protocol. Already, changes have been made based on this collaboration and feedback from field assessors.

## Draft Rapid Wetland Condition Assessment Data Fields

The current version of the Rapid Wetland Condition Assessment includes 19 assessment data fields for input. In an effort to keep the wetland assessment streamlined and familiar to assessors, seven of the data fields are identical to ones used in the traditional stream assessment protocol. The 19 data fields currently being tested are found below. Fields in bold font match identical fields used in the stream habitat assessment.

### **WETLAND TYPE AND CONTEXT**

#### *(1) Wetland subclass*

- flat
- depressionnal
- riverine impoundment
- headland spring seep

#### *(2) Wetland edge definition*

- Defined
- Undefined

#### *(3) Average wetland width*

- 0 – 50ft
- 51 – 100ft
- 101 – 150ft
- > 150ft

**(4) Dominant surrounding land use**

- **agricultural**
- **residential**
- **commercial**
- **industrial**
- **forest**
- **field/pasture**
- **other (specify)**

**(5) Dominant riparian vegetation**

- **trees**
- **shrubs**
- **herbaceous**
- **grasses**
- **other (specify)**

**(6) Riparian vegetation width**

- **None**
- **1-20 ft**
- **21-35 ft**
- **35-50 ft**
- **>50 ft**

**(7) Remoteness (distance to nearest road in meters)****HABITAT AND PLANT COMMUNITY****(8) Plant structure diversity**

	<b>Present</b>	<b>Weakly Represented</b>	<b>Not Present</b>
<b>Trees</b>			
<b>Herbaceous</b>			
<b>Shrubs</b>			

**(9) Wetland plants (sedges, rushes, willows, alders, etc) present?**

- **Dominant, greater than 75% of plants observed**
- **Equal mix, between 51 and 75%**
- **Subdominant, between 25 and 50%**
- **Low to absent presence, between 0 and 25 %**

**(10) Invasive species presence**

- **Absent**
- **Generally absent, between 1 and 25% coverage**
- **Moderately present, between 25 and 50% coverage**

- Frequent, between 50 and 75% coverage
- Dominating, greater than 75% coverage

(11) *Wetland habitat (Types = woody debris, snags, dens, cavities, pools, hummocks, leaf packs, root wads, aquatic plants)*

- Optimal – terrestrial and aquatic habitat structures are abundant, greater than 6 types present or greater than 50% coverage
- Sub-optimal – 4 or 5 types present or 30-50% stable habitat coverage. Adequate.
- Marginal – 2 or 3 types present or 10-30% stable habitat. Less than desirable.
- Poor – 0 to 1 type present or less than 10% stable habitat. Lack of habitat is obvious.

(12) Wildlife observed? If so, note the types observed during assessment.

### **HYDROLOGY/WATER QUALITY**

(13) *Percent wetland area inundated*

- 0
- 1-25%
- 26-50%
- 51-75%
- 76-100%

(14) *Sediment odor*

- **sewage**
- **chlorine**
- **petroleum**
- **rotten eggs**
- **none**
- **other (specify)**

(15) *Water clarity*

- **clear**
- **milky**
- **foamy**
- **turbid**
- **light brown (other than tannins)**
- **dark brown (other than tannins)**
- **oily sheen**
- **reddish**
- **greenish**
- **other (specify)**

(16) *Water odor*

- **sewage**
- **chlorine**

- fishy
- rotten eggs
- none
- other (specify)

(17) Nuisance algae (dense algal mats) present?

- None
- Minor, 1-10% of wetland area affected
- Moderate, 11-50% affected Severe, >50% affected

(18) Human intervention (flow modification, ditching, man-made impoundments, plowing, filling)

- None
- Minor, 1-10% of wetland area affected
- Moderate, 11-50% affected
- Severe, >50% affected

#### **OVERALL CONDITION**

(19) Provide field call of wetland condition

- Pristine, should be preserved
- High quality, should be preserved
- Somewhat healthy
- Degraded, should be candidate for restoration
- Degraded, should not be candidate for restoration due to small size, remoteness, access issues, etc.

## **Future Analysis of the Wetland Rapid Assessment Protocol**

Following collection of field data, the LimnoTech/Versar team will analyze the data collected and document the wetland protocol as well as recommendations for modification and/or further evaluation. The data analysis will entail assigning numeric values to a subset of the recorded values in the data fields and performing a statistical analysis on these fields to establish internal consistency. It is anticipated that validation of overall wetland condition using an established more detailed wetland functional assessment will be recommended for a subset of the wetlands in the watershed. Once this validation has been completed, additional statistical analyses can be performed to identify data fields that correlate strongly with overall wetland condition. The correlated data fields can then be combined into an index that provides an overall wetland score that can be used in the County's reach restoration ranking scheme.

## **References**

Anne Arundel County, 2010. Field Data Collection Guide for Watershed Studies, Anne Arundel County Department of Public Works. Prepared by LimnoTech and Versar.

Delaware Department of Natural Resources and Environmental Control. 2010. Delaware Rapid Assessment Procedure Version 6.0. User's Manual and Data Sheets. Available at:

[http://www.dnrec.delaware.gov/Admin/DelawareWetlands/Documents/DERAP\\_Field\\_Protocol\\_v6%20\\_Aug2010.pdf](http://www.dnrec.delaware.gov/Admin/DelawareWetlands/Documents/DERAP_Field_Protocol_v6%20_Aug2010.pdf)

United States Environmental Protection Agency. 2004. Review of Rapid Assessment Methods for Assessing Wetland Condition. EPA/620/R-04/009. Available at:  
[http://www.epa.gov/nheerl/download\\_files/publications/rapidmethodreview.pdf](http://www.epa.gov/nheerl/download_files/publications/rapidmethodreview.pdf)