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Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

Work Plan for Assessing Aquatic Vegetation

Prepared for the Michigan Department of Environmental Quality

Enbridge Energy, Limited Partnership

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ATTACHMENT

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LIST OF ACRONYMS

%	Percent
AV	Aquatic Vegetation
Enbridge	Enbridge Energy, Limited Partnership
ft^2	Square Feet
GPS	Global Positioning System
LDB	Left Descending Bank
Line 6B	The pipeline owned by Enbridge Energy, Limited Partnership that runs just south of Marshall, Michigan
MC	Mid-channel
MDEQ	Michigan Department of Environmental Quality
MP	Mile Post
OHWM	Ordinary High Water Mark
RDB	Right Descending Bank

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1.0 INTRODUCTION

On July 26, 2010, Enbridge Energy, Limited Partnership (Enbridge) reported a release of crude oil from the pipeline owned by Enbridge that runs just south of Marshall, Michigan (Line 6B) in the vicinity of its pump station. The crude oil was released below grade level via a break in Line 6B at Mile Post (MP) 608, emerged onto the ground surface, flowed over land following the natural topography into Talmadge Creek, and proceeded to flow downstream into the Kalamazoo River. Following the release, Enbridge performed a variety of response activities under the direction of the United States Environmental Protection Agency and the Michigan Department of Environmental Quality (MDEQ) to remove oil from the river system and respond to the release.

Aquatic vegetation (AV) provides cover for fish, attachment sites for macroinvertebrates, and valuable food sources for waterfowl and other wildlife. The location and composition of AV beds can also provide indications of flow regime, nutrient dynamics, and other in-channel processes. Response actions and investigations completed in response to the Line 6B crude oil release resulted in some impacts to AV within the Kalamazoo River.

This work plan was developed to assess the location, composition, and attributes associated with AV presently within the response areas of the Kalamazoo River. Evaluation of AV will be performed using biologists experienced with identifying and evaluating AV within riverine systems and the range of attributes that it can provide.

2.0 STUDY APPROACH

The objective of the study approach is to define a set of parameters that can easily be evaluated by a team of biologists working to identify and assess the location of AV within the river. The use of snorkeling equipment, self-contained underwater breathing apparatus, or other methods that require being submerged in the river will not be used due to safety concerns, and because the methods outlined below can provide sufficient data to identify and assess the functions and values of the AV in the river.

2.1 Methods

One two-person team will be utilized to assess beds of submergent, emergent, and floating AV occurring in the Kalamazoo River between the Talmadge Creek confluence and MP 37.50 on

the Kalamazoo River in Morrow Lake. For the purposes of this study, AV is defined as all vegetation existing between the river bottom and the Ordinary High Water Mark (OHWM) of the Kalamazoo River. Work access sites, known work areas, backwater areas, and oxbows containing AV will be included within the proposed study area. Based on visual observations, the team will use a global positioning system (GPS) unit capable of sub-meter accuracy to record the approximate location and size of each AV bed. The locations of AV beds will also be hand-drawn on data forms to provide data confirmation and redundancy.

The general location of AV within the river will be identified utilizing downstream mileposts to designate the general location. For example, an AV bed occurring between MP 9.25 and MP 9.50 would be designated as occurring in MP 9.50. Additionally, the location of AV will be identified as being within either the left, right, or central portions of the river. The river is divided into three longitudinal sections parallel to the flow of the river. The one-third section of the river that includes the left bank of the river, as it is viewed looking downstream, is identified as the left descending bank (LDB). The one-third section of the river along the opposite or right bank is identified as the right descending bank (RDB). The central remaining section of the river is the mid-channel (MC). An AV bed may encompass one or more of these areas depending upon its size, and will be named according to the following protocol:

MP – Bank (RDB, LDB, or MC) – 3-digit sequential number.

For example, an AV bed will be named 9.50-LDB-001 if it occurs between MP 9.25 and MP 9.50, it occurs along the LDB, and is the first bed to be assessed between MP 9.25 and MP 9.50.

An AV bed is defined as an area greater than 100 square feet (ft^2) in size containing greater than or equal to 10 percent (%) cover of aquatic vegetation. For each AV bed identified, all dominant and sub-dominant vegetative species will be identified and recorded on an Aquatic Vegetation (AV) Survey Form (a sample form is provided in Attachment A), along with the absolute aerial percent cover for each species within each AV bed. These absolute cover assessments will be based on visual estimation. For the purposes of this study, dominant species are defined as any species comprising more than 10% of absolute percent cover in an area. All invasive species regardless of percent cover will be documented. All species occupying 5% or greater of the river bottom, within an AV bed, will be identified and assessed. AV areas less than 100 ft^2 in size that contain greater than or equal to 10% cover of AV will not

be identified or assessed as AV beds, but their locations will be noted on field maps and recorded with a GPS unit.

Areas of sparse AV (i.e., areas containing less than 10% cover of vegetation) will not be mapped or assessed as AV beds or AV areas. Rather, the percent cover of vegetation that is not within an AV bed or AV area will be estimated for each 0.10-mile section of river. Predominant species within areas of sparse vegetation will be noted.

Surface vegetation will be identified visually using methods modified from Parsons (2001). A viewing tube, constructed from a 12-inch polyvinyl chloride tube with a Plexiglas window on one end, will be used to aid in identification of vegetation below the surface. "Lake rakes" will be used to retrieve specimens for identification if water clarity or water depths prohibit identification from the surface or use of the viewing tube. Any specimens that are unable to be identified on site will be photographed, with limited specimen collection utilized, to facilitate future identification.

Visual observations of the absolute aerial cover of each plant species within each of the vertical layers (stratums) will be recorded in 10% increments. Relative cover will not be recorded. The vertical structure of AV within each AV bed will be identified using the following designations:

- Emergent (plants with vegetative structures extending above the water surface and extending up to the OHWM of the river),
- Floating (plants with vegetative structures on the water surface), and
- Submergent (plants with vegetative structures below the water surface).

Field biologists will also assess the degree to which Aquatic Vegetation is providing the following attributes:

- Providing Fisheries Habitat (Yes or No). A "Yes" answer is provided for any of the following:
    - Visual observation of fish
    - Egg masses or other evidence of past fish use
    - Aquatic macroinvertebrates attached to vegetation (food source for fish)
    - Plant species broad leaved creating potential shading or cover for fish
- Providing Wildlife Habitat (Yes or No), A "Yes" answer is provided for any of the following:

    - Visual observations of wildlife
    - Evidence of past wildlife use, including but not limited to partially eaten or browsed vegetation, scats and tracks
- Providing Bank Protection (Yes or No). A “Yes” answer is provided for any of the following:
    - Aquatic vegetation is of sufficient density or structure to buffer wave action or currents from eroding river bank
        - e.g. dense stand of cattails emerging from bottom of river and protecting bank from erosion.
    - Aquatic vegetation is of sufficient density or structure to buffer scour or erosion of bottom substrates
        - e.g. dense stand of wild celery binding bottom substrates and limiting bottom scour
    - Aquatic vegetation positioned to divert erosive flows away from the river banks.

Photographs will be taken to document the surveyed vegetation areas.

2.2 Results and Deliverables

The results of the assessment will be provided to MDEQ in a format similar to that provided as *Attachment A*. Deliverables will include a shapefile of the collected GPS points/polygons of identified aquatic communities with an attribute table containing collected data as described above and a photographic log taken during the survey.

2.3 Schedule

The pre-dredge AV assessment work is scheduled to begin within one week of receiving agency approval and will continue for approximately three weeks or until the complete river corridor is assessed. Tabulation of data and creation of figures will be completed within 30 days of completing the AV assessment field work. Post dredging assessments will be completed consistent with protocol specified within the Work Plan for Kalamazoo River Wetland Monitoring and Restoration currently under agency review.

3.0 REFERENCES

Parsons, J. 2001. Aquatic plant sampling protocols. Environmental Assessment Program, Olympia, Washington. Publication No: 01-03-017

Attachment A

Sample Aquatic Vegetation Survey Form

Sample Aquatic Vegetation (AV) Survey Form

Site ID:_____ Photo ID:_____

Date:_____ Photo Direction:_____

Personnel:_____

Does AV at this site provide fisheries habitat? YES / NO Explain in comments section below

A "Yes" answer is provided for any of the following:

- *Visual observation of fish*
- *Egg masses or other evidence of past fish use*
- *Aquatic macroinvertebrates attached to vegetation (food source for fish)*
- *Plant species are broad leaved creating potential shading or cover for fish*

Does AV at this site provide wildlife habitat? YES / NO Explain in comments section below

A "Yes" answer is provided for any of the following:

- *Visual observation of wildlife*
- *Evidence of past wildlife use, including but not limited to partially eaten or browsed vegetation, scats and tracks.*

Does AV at this site provide bank protection? YES / NO Explain in comments section below

A "Yes" answer is provided for any of the following:

- *Aquatic vegetation is of sufficient density or structure to buffer wave action or currents from eroding river bank*
- *e.g. dense stand of cattails emerging from bottom of river and protecting bank from erosion.*
- *Aquatic vegetation is of sufficient density or structure to buffer scour or erosion of bottom substrates*
- *e.g. dense stand of wild celery binding bottom substrates and limiting bottom scour*
- *Aquatic vegetation positioned to divert erosive flows away from the river banks.*

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Percent cover of all vegetation:_____ S=submergent, F=floating, E=emergent

Comments/Additional Observations (fish, wildlife usage, etc.)

Dominant and Sub-dominant Species	Type (S, F, E)	Stratum (S, F, E)	Absolute Percent Cover (10% inc.)