Number Nine Wind Farm

Aroostook County, Maine

Water Quality and Stream Assessment Surveys Work Plan

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1.0 INTRODUCTION

EDP Renewables (EDPR) proposes to construct the Number Nine Wind Farm (Project), a wind energy generation project located in Aroostook County, Maine. The Project will include approximately 125 2.0 MW wind turbines as well as approximately 45 miles of overhead generator lead electrical line. The Project will also include associated access roads and underground and/or overhead electrical collector systems, a new substation, and an operations and maintenance building.

The Project area is located in the Laurentian Plains and Hills Ecoregion in northeastern Maine (US Environmental Protection Agency [USEPA] 2007). The Laurentian Plains and Hills are characterized by spruce-fir forests with patches of deciduous trees interspersed with glacial lakes. Land within the Project is privately owned and the primary land use is timber harvest. Elevations in the Project area range from approximately 500 to 1,700 feet (ft, approximately 150 to 520 meters [m]) above sea level. The dominant vegetation type is mixed spruce-fir and deciduous forest. Common deciduous trees in the Project include maple (Acer spp.), beech (Fagus spp.), and birch (Betula spp).. Much of the area's forest cover has been harvested within the last 0-20 years. Forested, scrub-shrub, and emergent wetlands, as well as perennial and intermittent streams, also occur within the Project area.

Tetra Tech. Inc. (Tetra Tech) has prepared this Water Quality and Stream Assessment Surveys Work Plan (Plan) for EDPR as part of Maine Department of Inland Fisheries and Wildlife's (MDIFW's) Curtailment Policy and Wind Power Preconstruction Study Recommendations. MDIFW's policy requires assessment of possible impacts that could result from large-scale wind power development projects on mapped and unmapped intermittent and perennial streams. Stream assessments are proposed at two stream locations located within the Project area. This Plan describes the objectives, methods, and locations proposed for the Water Quality and Stream Assessment Surveys (Surveys), and will serve as a preliminary work plan for review by MDIFW and Maine Department of Environmental Protection (MDEP), with the understanding that details of the Surveys may be revised over the coming months as Project details are revised, and if additional feedback from MDIFW and/or MDEP are received upon their review of this Plan.

2.0 OBJECTIVES

The objective of the proposed Surveys is to establish baseline information regarding water quality before, during, and after construction at locations downstream of the Project, and to compare collected data to data collected for control sites for the purpose of assessing potential impacts of the Project to water quality. Survey information collected is intended to provide a basis for comparison with water quality conditions during and after Project construction.

3.0 METHODS

Methods for completion of the baseline Surveys are based, in part, on MDEP's standardized methods to collect and analyze aquatic life in flowing waters and assessment of stream water quality

classification.[1] There will be two stream monitoring locations within the Project area. The location of these two stream monitoring locations have yet to be determined, and will be identified based on meetings with EDPR, Tetra Tech, and MDIFW biologists; a review of available wetland and waterbody delineation data for the Project; and site visits to the Project area by Tetra Tech and EDPR Project staff. Representative streams will be selected for inclusion in the Surveys to assess general water quality conditions in subwatersheds located in the proximity of the Project. The proposed sampling locations may be altered as a result of input received from MDIFW and MDEP upon their review of this Plan. Before the Surveys are initiated, MDIFW and MDEP will provide their concurrence with the proposed methods and level of effort outlined in the final version of this Plan.

Completion of the Surveys is proposed for 2015, and Surveys will be initiated prior to construction of the Project to obtain baseline conditions of stream habitats. Baseline information to be collected includes water quality, aquatic life, and physical stream characteristics. Water temperature data loggers will be installed at each of the identified stream monitoring locations, which represent locations deemed valuable by MDIFW and MDEP. Additional assessment of water quality conditions and determination of stream classification will be achieved through benthic macroinvertebrate sampling conducted in accordance with MDEP's accepted assessment methods (i.e., rock bag method).

In addition to the initial baseline Surveys, monitoring will continue during one season of construction, and completed on an annual basis for three years following construction of the Project, for a total of five seasons of monitoring.

All monitoring locations will be recorded with geographic information system (GIS) data and photographic documentation for incorporation into Survey reports that will be provided (see Section 3.3, Reporting). GIS and other data to be recorded includes identification of each sampling location to include the name of the stream/waterbody (if applicable; if streams/waterbodies are unnamed they will assigned an identification code), stream type (intermittent/perennial), sub-watershed, bankfull` b width, substrate characteristics, overall gradient, and statutory stream classification per Maine Revised Statutes Title 38 §467. In addition, an assessment of physical stream characteristics will be conducted for each sampling location, using U.S. Environmental Protection Agency Physical Habitat forms and methods.

3.1 Water Temperature Monitoring

Although not specific to the 2002 MDEP sampling guidance, water temperature data will be obtained at sample locations located upstream (where possible) and downstream of the proposed Project using data-logging temperature sensors installed in the watercourse at each monitoring location. Water

[1] Davies, S.P. and L. Tsomides. 2002. Methods for Biological Sampling and Analysis of Maine's Rivers and Streams. Maine Department of Environmental Protection, Bureau of Land and Water Quality. January 1987, revised August 2002.

temperature also will be obtained using appropriate instrumentation during macroinvertebrate sampling procedures, along with additional water quality parameters including specific conductance, dissolved oxygen, pH, and total dissolved solids. The data-logger temperature sensors will record water temperature at intervals of 30 minutes. Data will be downloaded at intervals of approximately six months. It is recommended that each data-logger be collected prior to spring high water levels (e.g., early April) and again in late-summer (e.g., October).

For the installation, the data-logging temperature sensors will be in weighted protective housings (e.g., iron pipe) attached to fixed anchors (e.g., steel rods) attached to the streambed and/or bank. Locations of the installed equipment will be obtained using a backpack global positioning system receiver. The equipment will be installed in relatively deep locations at each site (if feasible), and Tetra Tech will take reasonable care to install the equipment to limit the potential for loss. Even with these precautions it is important to note that equipment installed in streams is subject to loss during high-flow events—Tetra Tech will not be responsible for lost equipment and/or data.

3.2 Biological Monitoring

To monitor potential changes in stream classification, biological monitoring will be conducted at monitoring locations in 2015 prior to construction. Biological monitoring will be conducted in accordance with the methodology outlined in *Methods for Biological Sampling and Analysis of Maine's Rivers and Streams* (Davies and Tsomides 2002). Pursuant to the methodology, one set of rock bags or rock baskets (i.e., three individual replicate samples) will be deployed within suitable sampling habitat at each of the two stream monitoring locations, to target collection of benthic macroinvertebrate species composition data within each stream. If the potential stream sample locations are dry or otherwise do not provide suitable benthic macroinvertebrate sampling habitat at the time of sampler deployment, additional potential stream sampling areas farther downstream or nearby within the associated watershed will be investigated. Per MDEP protocol (Davies and Tsomides 2002), samplers will remain in the stream between 28 and 56 days (+ / - four days), with the longer exposure period applied in low velocity or impounded habitats to allow time for adequate colonization. Sampling will be completed within the standard sampling season upon which all macroinvertebrate classification criteria are based, which is the late summer, low flow period (July 1–September 30).

Maine DEP Biological Unit Stream Macroinvertebrate Field Data Sheets will be completed at the time of sampler deployment and retrieval. Samples will be preserved in the field and submitted to Lotic, Inc. located in Unity, Maine (or a similarly qualified firm) for sorting and taxonomic identification and enumeration. Lotic, Inc. (or selected firm) will in turn submit the macroinvertebrate data to the MDEP for stream classification identification based on benthic macroinvertebrate taxonomy results. Representatives from MDIFW and MDEP will be invited to participate in the monitoring.

3.3 Reporting

The results of the stream monitoring will be included in an annual monitoring report provided to EDPR by 01 March 2016. The report will include the methodology, results, and analyses of the stream

monitoring activities; MDEP stream classification determinations; as well as recommendations for changes to the monitoring program or potential remedial actions.