Docket No. _____
Exh. TDI-SM2

TDI New England
A Blackstone Portfolio Company

AQUATIC INVASIVE SPECIES MANAGEMENT AND CONTROL PLAN

FOR THE NEW ENGLAND CLEAN POWER LINK HVDC TRANSMISSION PROJECT

December, 2014

1.0 INTRODUCTION

This Aquatic Invasive Species Management and Control Plan (Plan) is intended to describe the specific protocols to be followed by Champlain VT, LLC, d/b/a TDI-New England (collectively the Applicant or TDI-NE) during the construction, operation, and maintenance of the New England Clean Power Link Project (NECPL or Project) to manage aquatic invasive species (AIS). This Plan is intended to serve as supporting evidence to be used by the Vermont Agency of Natural Resources (ANR) and Vermont Public Service Board (PSB) in documenting steps taken by the Applicant to minimize impacts to the natural environment, including specific natural resource features described herein. In addition, this Plan is intended to provide guidance to TDI-NE personnel and/or contractors for specific required, allowed, and prohibited activities associated with NNIS management for the Project.

Invasive species are a serious problem in the United States, one that has received particular attention in the State of Vermont. Pursuant to V.S.A. §1454, it is illegal to "transport an aquatic plant or aquatic plant part, zebra mussels (Dreissena polymorpha), quagga mussels (Dreissena bugensis), or other aquatic nuisance species identified by the secretary by rule to or from any Vermont waters on the outside of a vehicle, boat, personal watercraft, trailer, or other equipment". The law defines an aquatic plant as "…a plant that naturally grows in water, saturated soils or seasonally saturated soils, including algae and submerged, floating leafed, floating, or emergent plants."

1.1 Goals and Objectives

The goal of the Plan is to prevent the introduction and spread of invasive species potentially associated with Project-related operations and activities. To achieve this goal, the Plan has the following objectives:

- Identify potential plant and animal AIS concerns in the Project area, or within the broader vicinity (e.g., Lake Champlain).
- Identify potential pathways for AIS introduction in the Project area.
- Enact protocols to prevent and control AIS during Project construction, operation, and maintenance.

2.0 POTENTIAL AQUATIC INVASIVE SPECIES

This section includes a description of priority aquatic non-native and exotic species that have been identified as potentially occurring in Lake Champlain. Although this list is only a subset of the estimated 50 aquatic species currently known to reside in the lake, it is anticipated that management strategies related to these species will address the potential spread of other AIS.

2.1 Aquatic Animal Species

2.1.1 Zebra Mussel

Zebra mussels (Dreissena polymorpha) are small barnacle-like mollusks. They have caused some serious economic and environmental problems in many areas. These mussels are highly prolific and able to form dense colonies, out-competing native species. They feed by filtering plankton out of the water, which impacts water clarity and alters the food web.

2.1.2 Alewife

Alewife (Alosa pseudoharengus) is a marine fish from the herring family capable of surviving in fresh water. They reproduce quickly and can soon become the most dominant fish species in a lake. Alewife are very efficient feeders and consume huge quantities of zooplankton, which enables them to out-compete other species.

2.1.3 Rusty Crayfish

Rusty crayfish (Orconectes rusticus) can be identified by their robust claws with black bands on the tips, and dark, rusty spots on each side of their body. They can out-compete native species, forcing native crayfish from daytime hiding areas and destroying aquatic plant beds. Rusty crayfish have likely been spread into numerous waterbodies in Vermont by anglers using them for bait.

2.1.4 Sea Lamprey

The sea lamprey (Petromyzon marinus) is a nuisance species in the Lake Champlain Basin. During a brief period in their 5-6 year life cycle, sea lamprey are parasites associated with the decline of Lake Champlain trout and salmon populations. During this period, they migrate into Lake Champlain to feed on the blood and body fluids of host fish using their circular, suctioning mouths and small, sharp teeth.

2.1.5 Spiny waterflea

The Spiny waterflea (Bythotrephes cederstroemi) is a tiny planktonic crustacean with a long, barbed spine. It is native to Europe, but was discovered in North America in Lake Huron in 1984, likely introduced through ballast water dumping. In addition to competing with native zooplankton, it is much more difficult for small fish to ingest and is therefore a poorer food source. They can also hook on anglers' lines with their hooks.

2.1.6 Quagga Mussel

While not currently found in Lake Champlain, Quagga mussel (Dreissena bugensis) is a species of potential concern as it has been reported in Lake Erie and Lake Ontario, the St. Lawrence River, and the Mississippi and Ohio rivers. The quagga has the same nuisance aspects as the zebra mussel, i.e., biofouling, filter feeding, alteration of food webs, but has a higher tolerance for colder, deeper waters.

2.2 Aquatic Plant Species

Table 2-1 lists the sixteen plant species for which Vermont law prohibits the movement, sale, and/or distribution[1]. Of these, the following have been identified as priorities by various resource agencies and organizations.

2.2.1 Water Chestnut

Water chestnut (Trapa natans) is a glossy, green, triangular-leaved annual plant that can easily choke the waterbodies it invades, out-compete native plants, and reduce oxygen levels (thereby increasing the potential for fish kills). Dense, nearly impenetrable water chestnut growth can make fishing, hunting, swimming, boating, and other recreational activities nearly impossible. Its sharply-spined fruits wash ashore and can be hazardous to people who step on them.

2.2.2 Eurasian watermilfoil

Eurasian watermilfoil (Myriophyllum spicatum) is a rooted, submerged perennial plant that grows rapidly, producing dense stands. It aggressively competes with native plant communities, reducing biodiversity. Dense mats clog propellers, impair swimming, restrict boating and fishing accesses, and affect water quality.

[1] http://www.watershedmanagement.vt.gov/lakes/docs/ans/lp_ansprohibitedlist.pdf.

2.2.3 Variable-leaved watermilfoil

Variable-leaved watermilfoil (Myriophyllum heterophyllum) is a rooted, submerged perennial plant that was first confirmed in a Vermont lake in 2008. Like its cousin Eurasian watermilfoil, variable-leaved watermilfoil is aggressive and grows rapidly, and dense growth can crowd out beneficial native aquatic plants, reducing biodiversity. It can also impair recreational uses including swimming, boating and fishing.

Table 2-1: Illegal Plant Species in Vermont

Scientific Name	**Common Name**
Cabomba caroliniana	fanwort, green cabomba, Carolina fanwort, Carolina water-shield, fish-grass, Washington-grass, Washington plant
Egeria densa	Brazilian elodea, giant or leafy elodea, waterweed, anacharis, anacharis densa, anacharis canadensis gigantea, elodea canadensis gigantea, Brazilian or South American waterweed, oxygen weed, common, giant, or densa waterweed, egeria
Hydrilla verticillata (L.f. Royle)	hydrilla, Florida elodea, oxygen weed, water thyme, waterweed, star vine, oxygen plant
Hydrocharis morsus-ranae	European frogbit, common frogbit, water poppy, kilpukka, floating frogbit
Hygrophila polysperma	East Indian hygrophila, dwarf hygrophila, ceylon, hygro, Indian water star, Indian swampweed, Miramar weed, green hygro, oriental ludwigia, hygrophila, tropic sun, sunset hygro
Myriophyllum aquaticum	variable-leaved watermilfoil, two-leaf watermilfoil, variable watermilfoil, red myrio, myriophyllum sp., myriophyllum pinnatum, green or red foxtail
Myriophyllum spicatum	Eurasian watermilfoil, spike(d) watermilfoil, foxtail, myriophyllum sp., milfoil
Najas minor	European naiad, brittle naiad, brittle waternymph
Nymphoides peltata	yellow floating heart, asaza, entire marshwort, floating heart, fringed water lily, water fringe, water snowflake
Potamogeton crispus	curly leaf pondweed, curly pondweed, curled pondweed, crispus
Salvinia auriculata Salvinia herzogii Salvinia molesta Salvinia biloba	giant or common salvinia, butterfly fern, Koi kandy, water fern, (aquarium) water moss, water velvet, Karibaweed, salvinia, floating moss, water spangles, Africal payal or pyle
Trapa natans	water chestnut, European water chestnut, water caltrope

3.0 AIS CONTROL PROCEDURES

Preventing the introduction and establishment of aquatic invasive species is the most fiscally and environmentally responsible approach to take when developing a project in a waterway. The movement of vehicles, equipment and personnel, and the transport of materials to and from areas that are inhabited by invasive species could result in the unintentional spread of these species. The Applicant has developed procedures to control the transport of invasive species from areas where they may occur along the Project route.

3.1 Pathways for AIS Introduction

Cable installation will involve the transport of construction materials and equipment from one waterbody to another. Specifically, it is anticipated that the Hudson River and Champlain Canal will be utilized by vessels carrying the transmission cables, specialized equipment, and other construction-related units to the Project area. As the Lake Champlain Basin Program has reported that "the Hudson River has over twice as many exotic species as Lake Champlain," the Canal represents a potential vector.

3.2 Control Measures

3.2.1 Best Management Practices

All Project personnel and contractors will be provided training related to preventing the spread of AIS, prior to in-water work. This training will include an overview of general precautionary measures as well as decontamination procedures (See Section 3.2.2 below). Precautionary preparations could include but not be limited to:

- Inspecting all boats, motors, trailers and other equipment that are to be deployed, to make sure that biological nuisance species are not being transferred.
- Never taking wet equipment to the field. All boats, trailers and equipment should be completely air-dried for at least 2 days prior to being redeployed or stored.
- Never transferring water between waterbodies, and always making sure that bilge areas (or all interior low areas if there is no bilge area) and storage compartments are drained before leaving a site.
- Always keeping extra boat plugs handy.
- Maintaining a full spray bottle with a Lysol solution or full-strength vinegar for use on the wet wells, bilge areas and other small areas.

The steps listed above will provide a short-term barrier to the spread of AIS and allow for a more efficient use of time during the decontamination process.

3.2.2 Equipment Decontamination

The Applicant proposes two levels of decontamination to address AIS concerns related to the use of equipment, including small vessels (less than 20 feet) in the construction, operation, and/or maintenance of the Project.

Level 1

Level 1 decontamination will be used for equipment, including any small vessel, that has been used in a waterbody with a known or suspected infestation for a very short period of time (generally <1 hour) or is being transferred between sites that have known or suspected infestations.

The following constitutes Level 1 decontamination:

- All equipment will be pre-selected so as to be easily inspected and cleaned.
- All equipment will be visually inspected for visible vertebrates, invertebrates, plant, and algae.
- All equipment will be cleaned with disinfectant solution or hot soapy water. Equipment will be rinsed thoroughly and allowed to dry before next use.
- Vessel bilges will be drained by removing the drain plug, and all water will be removed from interior spaces. After draining contained water, all compartments that held water should be power washed and left open to completely dry prior to use at the next site.
- Vessel hulls will be washed with hot soapy water and rinsed thoroughly.
- Visual inspections for potential AIS species will be completed with particular attention to: 1) cracks and crevices in which mussels or aquatic macrophyte segments may become trapped, and 2) areas on propellers that may harbor aquatic macrophytes or juvenile mussels.

During Level 1 decontamination, wash and rinse water will not be allowed to drain to surface waters and all chemicals must be disposed of in accordance with state and federal regulations.

Level 2

Level 2 is used in addition to Level 1 when transferring a small vessel or piece of sampling gear away from a waterbody with a known or suspected infestation of an ANS (e.g. zebra mussels, golden algae, Eurasian milfoil).

The following constitutes Level 2 decontamination:

- Field equipment should be washed in a disinfectant solution or hot soapy water as previously discussed, but hard surfaces should also be scrubbed with a brush to remove any attached AIS. All equipment should be thoroughly rinsed and left in the open to dry for at least two days.

- All interior surfaces of the vessel that may hold water, including bilge areas and wet wells, should be washed with hot soapy water and rinsed thoroughly. Areas that hold water should also be sprayed with the disinfectant solution and not rinsed.
- Vessel hulls, decks, propellers, lower units on outboard motors, and mooring lines should be washed using a brush or soap mop.
- All cleaned areas will be left open to the air for at least 2 days.
- A visual inspection for AIS will be conducted immediately prior to relocation of the vessels/equipment to another waterbody.

3.2.3 Large Vessel Protocols

There will be a total of 6 barges and tugs performing round trips to transport the 198-miles of transmission cable from Port of Elizabeth, NJ to Lake Champlain. Each of the barges will be approximately 165 feet in length and weigh 339 tons. With the additional weight of the transmission cables, which is approximately 1,730 tons per barge load, and the need to minimize handling of the cables for reliability reasons, it is not practical to remove the barges or their cargo prior to entering the lake. In addition, the barges will be in constant operation once they leave port, further reducing the potential risk of AIS species attaching to these vessels.

Therefore, for larger vessels the Applicant will take the following measures to avoid the introduction of invasive species:

- Due to the size limitations of the locks of the Champlain Canal, the barges will likely need to be specially built for this project and therefore will have no hull growth.
- In the event that existing vessels are utilized (such as tugs), prior to use they will be visually inspected by divers for visible vertebrates, invertebrates, plant, and algae. Any observed materials will be manual removed by divers.
- The barges will have no ballast on the trips from Port of Elizabeth, NJ as the cables will weigh down the vessel to the load line.
- The vessels will travel at the maximum safe speed from Port Elizabeth, NJ. It is estimated that the trip will be approximately 36 hours (1.5 days) to reach the end of the Champlain Canal, assuming a vessel cruising speed of approximately 6 knots.
- Prior to exiting from the Champlain Canal to Lake Champlain, the barges will be visually inspected at and above the waterline for visible vertebrates, invertebrates, plant, and algae.