

AMHERST ISLAND FERRY TERMINALS STUDY

G.W.P. 4067-09-00



TRANSPORTATION ENVIRONMENTAL STUDY REPORT

JANUARY 2014



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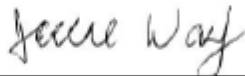
PRELIMINARY DESIGN AND CLASS ENVIRONMENTAL ASSESSMENT GROUP 'B'

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Amherst Island Ferry Terminals Study

Loyalist Township, County of Lennox and Addington

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4.1.2. Physiography

The *Physiography of Southern Ontario* presents the study area as being located within the Napanee Plain. The Napanee Plain is a flat-to-undulating plain of limestone from which the glacier stripped most of the overburden. The thin, discontinuous layer of drift is comprised of Glaciolacustrine Deposits consisting of silt and clay, minor sand and gravel, near shore and beach deposits. The thickness of the soil deposits of the Napanee Plain is only a few inches over much of the region, while some deeper glacial till occurs in the stream valleys and toward the north. According to the well records for the wells located within the study area, the thickness of the overburden soil is generally less than 1 m.

4.1.3. Geology

4.1.3.1. Quaternary Geology

MNR's "Ontario Geological Survey Preliminary Map P. 2204, *Geological Series, Quaternary Geology, Toronto and Surrounding Area, Southern Ontario*" (1980) indicates that the study area is dominated by bare bedrock terrain and bedrock-drift complex topography.

4.1.3.2. Bedrock Geology

On *Map 2544-Bedrock Geology of Southern Ontario*, the Palaeozoic (bedrock) geology of the study area is characterized by Middle Ordovician aged limestone with thin soil cover. Bedrock ridges can be seen exposed at the ground surface intermixed with valleys and low-lying depressions. The Paleozoic limestone overlies the granites and magmatites of the Precambrian shield as well as sandstone in some areas. These geologic variations in the bedrock determine important aspects of the groundwater conditions in the study area.

4.1.4. Hydrogeology

According to an available hydrogeological study (Western Cataraqui Region Groundwater Study, Volume I, Groundwater Inventory and Findings, Trow Associates, April 2007), three shallow hydrogeological zones exist in the study area, including the Limestone, the Precambrian Rocks of the Canadian Shield and the Sandstone aquifer systems. The shoreline within the study area is dominated by the limestone aquifer system with small isolated areas of Precambrian and Sandstone systems. According to the well records for the water wells located within the study area, the groundwater table ranges from 1.2 m to 20 m below ground surface. The groundwater flow is inferred to be towards Lake Ontario.

Groundwater usage within the study area is generally limited to domestic, private and agricultural uses.

4.1.5. Fish and Fish Habitat

The study area is located within the Millhaven Creek and Amherst Island watersheds within the jurisdiction of CRCA. According to the *Cataraqui Source Protection Area Assessment Report*



(2011), watercourses within the study area are classified as warmwater streams. MNR classifies nearshore areas of Lake Ontario as coldwater habitat. However, site specific investigations undertaken in support of this project determined that coldwater habitat (specifically, Lake Whitefish and Lake Trout spawning habitat) was not observed in the study area. Based on this finding, the less restrictive, warmwater timing window (July 1 to March 31) should apply to in-water construction activities at both terminals.

Information from the CRCA identifies spring and fall runs of Rainbow Trout (*Oncorhynchus mykiss*), Brown Trout (*Salmo trutta*), Chinook Salmon (*Oncorhynchus tshawytscha*) and Coho Salmon (*Oncorhynchus kisutch*) from Lake Ontario into Millhaven Creek. Therefore, the mouth and the area east of the Millhaven Terminal could potentially be used as a staging area by these fish species as they prepare to migrate upstream.

Based on the MNR reports from nearby Fisheries Assessment Unit collection sites, historical (1977) MNR fish species lists and CRCA data, **Table 4-1** outlines fish species noted in the vicinity of both terminals and the dominant fish species in this area of Lake Ontario. **Table 4-2** summarizes the fish species observed during the summer 2012 field visits.

Table 4-1: Fish Species Noted by Agencies

Common Name	Scientific Name	Common Name	Scientific Name
Millhaven Terminal			
Alewife	<i>Alosa pseudoharengus</i>	Black Crappie	<i>Pomoxis nigromaculatus</i>
Yellow Perch	<i>Perca flavescens</i>	Brown Bullhead	<i>Ameiurus nebulosus</i>
Round Goby	<i>Neogobius melanostomus</i>	Golden Shiner	<i>Notemigonus crysoleucas</i>
Walleye	<i>Sander vitreus</i>	White Sucker	<i>Catostomus commersonii</i>
Rock Bass	<i>Ambloplites rupestris</i>	Common Shiner	<i>Luxilus cornutus</i>
Lake Trout	<i>Salvelinus namaycush</i>	Bluntnose Minnow	<i>Pimephales notatus</i>
Lake Whitefish	<i>Coregonus clupeaformis</i>	Longnose Dace	<i>Rhinichthys cataractae</i>
Rainbow Smelt	<i>Osmerus mordax</i>	Creek Chub	<i>Semotilus atromaculatus</i>
Slimy Sculpin	<i>Cottus cognatus</i>	Banded Killfish	<i>Fundulus diaphanus</i>
Threespine Stickleback	<i>Gasterosteus aculeatus</i>	Johnny Darter	<i>Etheostoma nigrum</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>	Fallfish	<i>Semotilus corporalis</i>
Brown Trout	<i>Salmo trutta</i>	Stonecat	<i>Noturus flavus</i>
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	Blackstripe Topminnow	<i>Fundulus notatus</i>
Coho Salmon	<i>Oncorhynchus kisutch</i>	Largemouth Bass	<i>Micropterus salmoides</i>
Pumpkinseed	<i>Lepomis gibbosus</i>	Central Mudminnow	<i>Umbra limi</i>
Northern Pike	<i>Esox Lucius</i>	Iowa Darter	<i>Etheostoma exile</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>	Blacknose Dace	<i>Rhinichthys atratulus</i>
Stella Terminal			
Alewife	<i>Alosa pseudoharengus</i>	Lake Trout	<i>Salvelinus namaycush</i>
Yellow Perch	<i>Perca flavescens</i>	Lake Whitefish	<i>Coregonus clupeaformis</i>
Round Goby	<i>Neogobius melanostomus</i>	Rainbow Smelt	<i>Osmerus mordax</i>

Common Name	Scientific Name	Common Name	Scientific Name
Walleye	<i>Sander vitreus</i>	Slimy Sculpin	<i>Cottus cognatus</i>
Rock Bass	<i>Ambloplites rupestris</i>	Threespine Stickleback	<i>Gasterosteus aculeatus</i>

Table 4-2: Fish Species Observed During Field Visits in Summer 2012

Location	Fish Species
Millhaven Terminal	
East	Round Goby, Perch, Largemouth Bass, Common Carp (<i>Cyprinus carpio</i>), Smallmouth Bass
West	Round Goby, Smallmouth Bass, Freshwater Drum (<i>Aplodinotus grunniens</i>)
Lakeward	None
Stella Terminal	
East	None
West	Smallmouth Bass, Round Goby
Lakeward	None

MNR provided the sensitivity status for the nearshore areas adjacent to both terminals. The findings of site specific investigations were used to further discriminate habitat sensitivity within the study area to assist in the evaluation of alternatives. The designation was based on several primary factors used in DFO's Habitat Alteration Assessment Tool (HAAT) model. Key factors considered include: the presence of aquatic macrophyte, communities, their density and diversity; water depth; substrate type; and degree of exposure / shelter to open water habitat. Table 4-3 summarizes the sensitivity ranking associated with the aquatic habitat adjacent to both terminals.

Table 4-3: Aquatic Habitat Sensitivities

Location	Sensitivities
Millhaven Terminal	
East	Moderate to High
West	Low to Moderate
Lakeward	Low
Stella Terminal	
East	Low to Moderate
West	High - nearshore Low to Moderate - Lakeward
Lakeward	Low

4.1.6. Terrestrial Ecosystems

The study area is positioned within the Huron-Ontario section of the larger Great Lake-St. Lawrence Forest Region. On sites with abundant moisture and good drainage, these upland forests are typically dominated by Sugar Maple (*Acer saccharum*), Red Maple (*Acer rubrum*), Red Oak (*Quercus rubra*), Basswood (*Tilia americana*), American Beech (*Fagus grandifolia*), Eastern White Pine (*Pinus strobus*), Eastern Hemlock (*Tsuga canadensis*), White Ash (*Fraxinus*