



## **Canada-United States-Ontario-Michigan Border Transportation Partnership**

# **Draft Natural Heritage Work Plan**

**March 2006  
Version 2**

## PREFACE

The Canada - U.S. – Ontario - Michigan Border Transportation Partnership (The Partnership) is composed of the Federal Highway Administration and Transport Canada representing the federal levels of government, and the Ontario Ministry of Transportation and the Michigan Department of Transportation representing the provincial/state level. The purpose of the Partnership is to improve the movement of people, goods, and services across the United States and Canadian border within the region of Southeast Michigan and Southwestern Ontario.

This international transportation improvement project will require approvals from governments on both sides of the border. The Partnership has developed a coordinated process that will enable the joint selection of a recommended river crossing location that meets the requirements of *Ontario Environmental Assessment Act* (OEA), *Canadian Environmental Assessment Act* (CEAA), and *National Environmental Policy Act* (NEPA).

The goal of the partnership is to:

- obtain government approval for a new or expanded crossing with connections to the provincial highway system in Ontario and the interstate freeway system in Michigan, including provisions for processing plazas to improve traffic and trade movements at the Windsor-Detroit border;
- completion of comprehensive engineering to support approvals, property acquisition, design and construction; and,
- submit environmental assessment documents to request approval by December 2007.

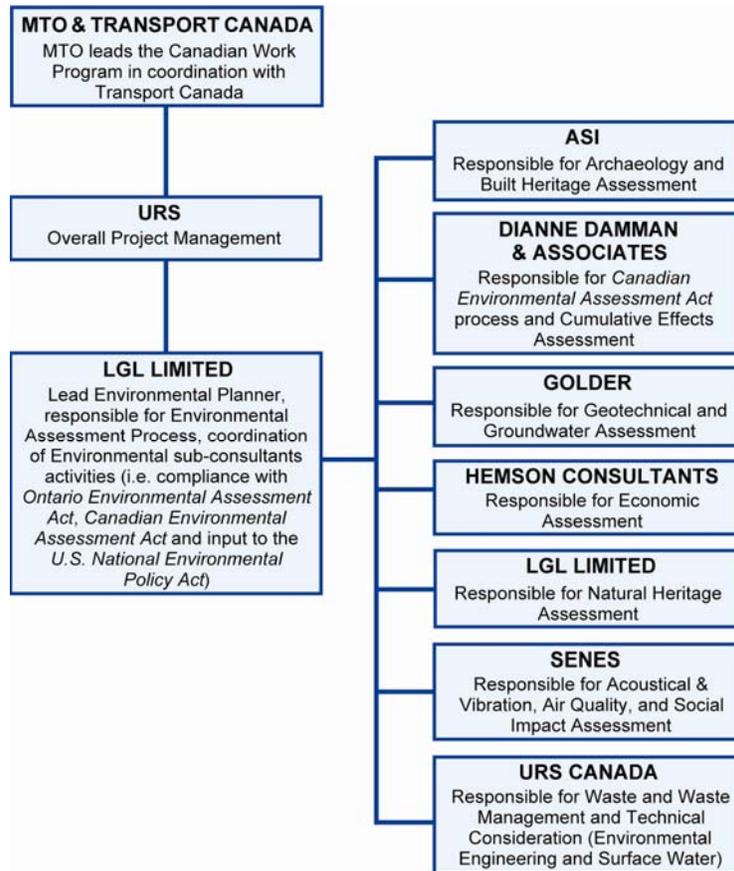
The Partnership completed a *Planning/Need and Feasibility Study* (P/NF) in January 2004 to address cross-border transportation demands for a 30-year planning period. Included in the documentation for that study was an Environmental Overview Report which provided an inventory of the existing condition in a Focused Analysis Area. Subsequently, in accordance with the *Ontario Environmental Assessment Act*, MTO prepared and submitted in May 2004 an environmental assessment Terms of Reference to the Ontario Ministry of the Environment for review and approval. The Terms of Reference was approved by the Ontario Minister of the Environment on September 17, 2004. The Terms of Reference outlines the framework that MTO and Transport Canada will follow in completing the Detroit River International Crossing Environmental Assessment (DRIC EA).

The Ontario Ministry of Transportation (MTO) is leading the Canadian work program in coordination with Transport Canada. The Michigan, Department of Transportation (MDOT), in coordination with the Federal Highways Administration (FHWA), is leading the U.S. work program.

The partnership is moving forward with technical and environmental work leading to the selection of a new or expanded border crossing, to address cross-border transportation demands for a 30-year planning period.

As an initial step in the DRIC EA process and to build upon the work completed in-depth secondary source data collection has been conducted. This work has been focused within the Preliminary Analysis Area (PAA) identified in the Environmental Overview Report, (as Amended January 2005). The noted data collection effort has been documented in a series of Working Papers. Working Papers have been prepared for the following topics: social impact assessment; economic assessment; archaeological resources; cultural resources; natural heritage; acoustics and vibration; air quality; waste and waste management; and technical considerations. The Working Papers are presented within the Environmental Overview Report (June 2005).

The Canadian Study Team and their tasks are presented below.



The purpose of the Working Papers is to document the secondary source data collection by: describing the data collection/sources used; providing an overview of study area conditions; identifying significance/sensitivity of features in the study area; and, identifying gaps in study area data and developing Work Plans to fill identified data gaps.

In conjunction with the Working Papers, a Work Plan for each discipline has been prepared to structure the filling of identified data gaps. They provide:

- a schedule and order of events for the subject under investigation by phase;
- a rationale for further data collection methodologies;
- data sources;
- methods of assessment, criteria, indicators and measures; and,
- details on the integration of each work plan with the work plans of other disciplines.

The Work Plans have been developed based on current knowledge of existing conditions within the PAA and therefore, should be considered to be living documents which will be subject to agency and public review. The partnership is aware that the assessment and evaluation of alternatives at all phases will require applying the requirements of three pieces of legislation, the OEA, CEAA, and NEPA. Therefore, in preparing the Work Plans, the partnership has sought to integrate the most rigorous requirements from each piece of legislation.

# Natural Heritage Work Plan

1.	Introduction .....	1
1.1	Planning/Need and Feasibility Study – Existing Environmental Conditions .....	1
1.1.1	National Conservation Areas and Wildlife Preserves .....	1
1.1.2	Watercourses and Fisheries .....	2
1.1.3	Wetlands .....	3
1.1.4	ESAs, ANSIs and Provincial Parks .....	3
1.1.5	Additional Natural Areas .....	3
1.1.6	Species at Risk .....	4
1.1.7	Land Use and Municipal Environmental Policy Areas .....	4
1.1.8	Detroit River .....	4
1.2	Detroit River International Crossing – Terms of Reference .....	7
1.3	Natural Heritage Work Plan .....	7
2.	Stage 1 – Define Study Area .....	11
2.1	Task 1 – Define Area of Investigation .....	11
2.2	Task 2 – Data Collection .....	11
2.3	Task 3 – Data Analysis .....	12
2.4	Task 4 – Evaluate Alternatives .....	12
2.5	Task 5 – Conduct Impact Assessment .....	13
2.6	Task 6 – Recommend Environmental Protection Measures .....	13
2.7	Results .....	13
3.	Stage 2 – Illustrative Alternatives .....	14
3.1	Task 1 – Define Area of Investigation .....	14
3.2	Task 2 – Data Collection .....	14
3.3	Task 3 – Data Analysis .....	15
3.4	Task 4 – Evaluate Alternatives .....	15
3.5	Task 5 – Conduct Impact Assessment .....	15
3.6	Task 6 – Recommend Environmental Protection Measures .....	15
3.7	Results .....	15
4.	Stage 3 – Practical Alternatives .....	16
4.1	Task 1 – Define Area of Investigation .....	16
4.2	Task 2 – Data Collection .....	16
4.3	Task 3 – Data Analysis .....	17
4.4	Task 4 – Evaluate Alternatives .....	17
4.5	Task 5 – Conduct Impact Assessment .....	17
4.6	Task 6 – Recommend Environmental Protection Measures .....	17
4.7	Results .....	17
5.	Stage 4 – Concept Design Alternatives .....	18
5.1	Task 1 – Define Area of Investigation .....	18
5.2	Task 2 – Data Collection .....	18
5.3	Task 3 – Data Analysis .....	19
5.4	Task 4 – Evaluate Alternatives .....	19
5.5	Task 5 – Conduct Impact Assessment .....	20
5.6	Task 6 – Recommend Environmental Protection Measures .....	22
5.7	Results .....	22
6.	Environmental Protection Measures .....	23
6.1	Provincial and Federal Environmental Protection Requirements .....	23

6.2 Environmental Practices for Highway Design and Construction .....24  
6.3 Environmental Standards Project.....26

**List of Tables**

Table 1. Federal and Provincial Status of Species at Risk .....5  
Table 2. Natural Heritage Investigation by Study Stage .....9  
Table 3. Natural Heritage Information from Secondary Sources ..... 11  
Table 4. Detailed Field Investigations to be Conducted Over Multiple Seasons for Concept  
Design Alternatives..... 18  
Table 5. Environmental Impacts and Protection Measures to be Addressed at the Concept  
Design Alternatives Stage .....20  
Table 6. Environmental Practices for Highway Design and Construction.....25

**List of Figures**

Figure 1. Key Plan of the Preliminary Analysis Area ..... 14  
Figure 2. Key Plan of the Area of Continued Analysis ..... 16

# 1. INTRODUCTION

## 1.1 Planning/Need and Feasibility Study – Existing Environmental Conditions

The Partnership jointly commissioned a Planning/Need and Feasibility Study (P/NF) (Canada-US-Ontario-Michigan Border Transportation Partnership 2004), which identified a long-term strategy to address the safe and efficient movement of people and goods between southeast Michigan and southwest Ontario. Although conducted in a manner consistent with the environmental study processes in both countries, the P/NF Study was not completed within the formal environmental study framework. The findings of the P/NF Study, however, serve as an important basis for governments to move forward in the development and improvement of cross border transportation services, including proceeding with the environmental study processes in the U.S. and Canada for major transportation improvements at the Detroit River International Crossing.

A consultation component was incorporated into the P/NF Study process. Canadian and U.S. government departments, ministries and agencies, local municipalities, First Nations groups, private sector stakeholders in border transportation issues, as well as the general public were engaged in the course of the study. Throughout the P/NF Study, the Partnership affirmed that the findings of the P/NF Study may be used to initiate environmental studies in accordance with the requirements of the U.S. *National Environment Policy Act* (NEPA), *Canadian Environmental Assessment Act* (CEAA) and *Ontario Environmental Assessment Act* (OEAA). This step would be followed by completion of the appropriate environmental impact/assessment studies, design of the approved improvements and ultimately, construction.

During preparation of the P/NF Study, background papers were prepared to establish existing conditions within the Preliminary Analysis Area (PAA). The PAA is roughly bounded by 9th Concession Road in the Town of Lakeshore, County Road 18 in the Town of Amherstburg on its southern extent and by the Detroit River on its western and northern extent. An Environmental Overview Working Paper (Canada-US-Ontario-Michigan Border Transportation Partnership 2005) was prepared to document environmental constraints which may preclude or otherwise constrain the generation of feasible transportation alternatives. The information contained in the Environmental Overview Working Paper was gathered from readily available secondary sources. Natural heritage features identified in the Environmental Overview Working Paper included: watercourses; wetlands; woodlands; wildlife habitat; and, groundwater. A summary of the natural heritage information contained in the Environmental Overview Working Paper is presented below. Information has been supplemented by LGL Limited.

### 1.1.1 National Conservation Areas and Wildlife Preserves

The Detroit River has been designated a Canadian Heritage River; therefore, the preservation and enhancement of its natural, cultural and recreational features are

federally and provincially managed. Additionally, in conjunction with the U.S., the establishment of the Detroit River International Wildlife Refuge has been initiated to preserve and restore the natural features of the Detroit River to protect wildlife habitat. Once established, the Refuge will include the marshes, coastal wetlands, islands, shoals and riverfront lands from Mud Island in the north, to Sterling State Park in Monroe County in the south. The Heritage River program and the International Refuge are integrated and mutually supporting.

## 1.1.2 Watercourses and Fisheries

The PAA encompasses several watercourses of the Detroit River and Lake St. Clair watersheds, including Pike Creek, Canard River, Little River and Turkey Creek. The Detroit River is part of the St. Lawrence River watershed, conveying water from Lake St. Clair to Lake Erie, and serves as an international boundary and major shipping route. The northeast quadrant of the PAA, is drained by Pike Creek, which originates around Maidstone (Town of Tecumseh) and drains northward into Lake St. Clair at Pike Creek (Town of Lakeshore). In the south quadrant of the PAA, Canard River drains a large area of central and western Essex County, and outlets into the Detroit River southeast of Loiselleville (Town of Amherstburg). The headwaters of this watercourse extend as far east as Essex (Town of Essex), as far south as Malden Centre (Town of Essex), and as far north as the southern limits of the City of Windsor. Pike Creek and Canard River convey drainage from active agricultural areas, and most of the headwaters are heavily channelized, resulting in a degradation of fish habitat and the development of barriers to fish movement. Little River outlets at the mouth of the Detroit River, along the eastern limits of the City of Windsor, and drains a combination of rural and urban areas. The headwaters are heavily channelized and originate between Oldcastle and Maidstone (Town of Tecumseh), and then flow northward through east Windsor. Turkey Creek conveys stormwater flows from the urban area in the central-western portion of the PAA. This watercourse originates within and surrounding the southern parts of the City of Windsor, and flows southwest into the Detroit River at LaSalle (Town of LaSalle).

The water quality of the PAA watercourses are influenced by numerous contaminants including: combined sewer overflows, stormwater runoff, dry weather seepage, septic tank seepage, industrial plant outlets, wastewater treatment plant effluent wet weather bypass, and run-off from agricultural fields and uncontained manure piles. The City of Windsor contributes an estimated 1% to 5% of contaminants into the Detroit River. Despite the degradation of water quality and fish habitat, and the presence of barriers to fish movement, fish are well distributed throughout the watercourses of the PAA. These watercourses are characterized as providing warmwater habitat, and in the lower reaches support communities of coarse and sport fish species, while the upper reaches support bait and coarse fish species. Mottled sculpin (*Cottus bairdi*) have been reported in a headwater tributary of Pike Creek, and generally characterize coldwater fish communities. Records from Essex Region Conservation Authority (ERCA) indicate that sport fish have been documented in the upper reaches of Little River and Pike Creek. At the outlets of Turkey Creek and Canard River, and along the Detroit River there are several Provincially Significant Wetlands known to provide critical spawning, rearing and nursing habitats for warmwater fish communities.

### 1.1.3 Wetlands

Within and adjacent to the PAA, all of the wetlands are located along/adjacent to the Detroit River between the towns of LaSalle and Amherstburg. Provincially Significant Wetlands (PSW) in the area include: the Detroit River Wetland Complex; Turkey Creek Wetland; Fighting Island Wetland; and, Canard River Marshes. The Detroit River Wetland Complex is composed of six individual wetlands (River Marshes, Grassy Island, Turkey Island, the north end of Fighting Island, the east side of Fighting Island, and south end of Fighting Island), and encompasses 462.5 ha. Turkey Creek wetland is a coastal wetland encompassing 32.0 ha at the outlet of Turkey Creek, and Fighting Island Wetland is opposite LaSalle, encompassing 113.0 ha of Fighting Island. Canard River Marshes are a 416.33 ha coastal wetland complex composed of two wetlands at the outlet of the Canard River. The Detroit River and associated wetland systems provide an important regional linkage between the Lake St. Clair Flats, the largest wetland complex in the Great Lakes, and Lake Erie.

### 1.1.4 ESAs, ANSIs and Provincial Parks

Several Environmentally Significant Areas (ESAs) and Areas of Natural and Scientific Interest (ANSIs) have been identified in the PAA, and many of the ESAs have overlapping designations as PSWs and/or ANSIs. Most of the significant natural areas are concentrated to the southwest of the City of Windsor and include:

- Ojibway Prairie Complex (ESA 3 and ANSI);
- Canard River Marshes (ESA 13, ESA 78 and PSW);
- LaSalle Woods (ESA 18);
- Ojibway Black Oak Woods (ESA 19 and ANSI);
- Spring Garden Road Prairie (ESA 29 and ANSI);
- Peche Island (ESA 30);
- Fighting Island (ESA 32 and PSW);
- Fairplay Woods (ESA 38);
- Devonwood (ESA 45);
- St. Claire College Prairie (ESA 49);
- Reaume Prairie (ESA 64);
- Turkey Creek (ESA 76 and PSW);
- Detroit River Marshes (ESA 77 and PSW); and,
- Ojibway Prairie Provincial Nature Reserve.

### 1.1.5 Additional Natural Areas

Candidate Natural Heritage Sites (CNHS) are remnant forest and prairie habitat areas inventoried by the City of Windsor and the Town of LaSalle in an effort to identify areas

not designated or afforded some form of preservation status. Thirty-eight CNHS have been inventoried and described within the City of Windsor, and an additional 27 have been evaluated within the Town of LaSalle. Following the evaluations, sites were categorized as either needing designation as an Environmental Policy Area (EPA) or not. This in turn resulted in the application of some influential land use and planning considerations.

The evaluation of most of the PSWs, ESAs, ANSIs and CNHSs has led to the incidental accounting for the majority of the woodland features within the PAA. Remaining woodlands are generally encompassed in the recreational and open space features that make up the greenway systems of the local communities.

### 1.1.6 Species at Risk

The designated natural areas within the PAA provide habitat to numerous species at risk. The Ontario Ministry of Natural Resources' (MNR) Natural Heritage Information Centre database and Environment Canada's Species at Risk database indicate the presence of many federal and provincial species at risk within or adjacent to the PAA. A summary of these species is presented in Table 1. Regionally and locally rare species are distributed primarily within designated natural areas in the PAA.

### 1.1.7 Land Use and Municipal Environmental Policy Areas

The lands of Essex County, outside of the City of Windsor and the Town of LaSalle are predominantly agricultural in use. They are interspersed with significant natural areas (PSWs, ESAs, ANSIs, CNHSs, Provincial Nature Reserve), and within the City of Windsor Official Plan (O.P.) there are several types of environmental policy areas. These include Natural Heritage Feature, Environmental Policy Area A, Environmental Policy Area B and Candidate Natural Heritage Site. The Town of LaSalle O.P. includes Wetland, Natural Environment, Candidate Natural Heritage Site and Environmental Policy Area B.

Major floodplain areas located within the PAA have been identified within a Floodplain Development Control Area (Town of LaSalle) or within the Development Constraint Areas (City of Windsor).

### 1.1.8 Detroit River

The importance of the Detroit River as a natural heritage feature is only one component of its function. Parks Canada designated the Detroit River as a Canadian Heritage River, which recognizes its importance to Canadian history and culture. The Detroit River received American Heritage River designation in 1998 and Canadian Heritage River designation in 2001, making it the first River with dual designations.

The Detroit River Remedial Action Plan (RAP) is an environmental restoration plan designed to improve the environmental conditions within the Detroit River Area of Concern (AOC). Work on the RAP began in 1987 after the signing of the Protocol amending the Canadian-U.S. Great Lakes Water Quality Agreement.

TABLE 1. FEDERAL AND PROVINCIAL STATUS OF SPECIES AT RISK

Species At Risk Act	Endangered <sup>1</sup>		Threatened <sup>2</sup>		Special Concern <sup>3</sup>	
	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name	Common Name
Schedule 1 <sup>4</sup>	<b>Invertebrates</b>		<b>Fish</b>		<b>Invertebrates</b>	
	<i>Villosa fabalis</i>	rayed bean	<i>Lepisosteus oculatus</i>	spotted gar	<i>Danaus plexippus</i>	Monarch
	<i>Lampasilis fasciola</i>	wavy-rayed lampmussel	<b>Vascular Plants</b>		<b>Fish</b>	
	<i>Simpsonaias ambigua</i>	mudpuppy mussel	<i>Gymnocladus dioicus</i>	Kentucky coffee-tree	<i>Macrhybopsis storeriana</i>	silver chub
	<i>Pleurobema sintoxia</i>	round pigtoe	<i>Ptelea trifoliata</i>	common hop-tree	<i>Opsopoeodus emiliae</i>	pugnose minnow
	<i>Epioblasma torulosa rangiana</i>	Northern riffleshell	<i>Liatris spicata</i>	dense blazing star	<i>Minytrema melanops</i>	spotted sucker
	<i>Epioblasma triquetra</i>	Snuffbox	<i>Aletris farinosa</i>	colicroot	<b>Vascular Plants</b>	
	<b>Fish</b>		<i>Symphotrichum praealtus</i>	willow aster	<i>Rosa setigera</i>	prairie rose
	<i>Noturus stigmosus</i>	northern madtom	<i>Hydrastis canadensis</i>	goldenseal	<i>Fraxinus quadrangulata</i>	blue ash
	<b>Vascular Plants</b>		<b>Herpetofauna</b>		<i>Solidagoriddellii</i>	Riddell's goldenrod
	<i>Morus rubra*</i>	red mulberry	<i>Sternotherus odoratus</i>	common musk turtle	<b>Herpetofauna</b>	
	<i>Lespedeza virginica*</i>	slender bush-clover	<i>Apalone spinifera</i>	spiny softshell	<i>Graptemys geographica</i>	map turtle
	<i>Liparis liliifolia</i>	lily-leaved twayblade	<i>Thamnophis butleri</i>	Butler's gartersnake	<i>Lampropeltis triangulum</i>	milksnake
	<i>Platanthera leucophaea</i>	prairie white-fringed orchid	<i>Regina septemvittata</i>	queen snake	<b>Birds</b>	
	<i>Ammania robusta</i>	scarlet ammannia	<i>Elaphe gloydi</i>	eastern foxsnake	<i>Icteria virens</i>	Yellow-breasted Chat
	<i>Agalinis skinneriana*</i>	pale purple false foxglove	<i>Sistrurus catenatus</i>	massasauga		
	<i>Juglans cinerea</i>	butternut	<i>Sternotherus odoratus</i>	stinkpot		
	<i>Polygala incarnata*</i>	pink milkwort	<i>Heterodon platirhinus</i>	eastern hog-nosed snake		
	<i>Plantago cordata*</i>	heat-leaved plantain	<b>Birds</b>			
	<i>Carex lupuliformis*</i>	false hop sedge	<i>Wilsonia citrina</i>	Hooded Warbler		
	<i>Lipocarpa micrantha</i>	small-flowered lipocarpa	<i>Ixobrychus exilis</i>	Least Bittern		
	<i>Trillium flexipes*</i>	drooping trillium	<b>Mammals</b>			
	<i>Gentiana alba</i>	white prairie gentian	<i>Urocyon cinereoargenteus</i>	grey fox		
	<i>Panax quinquefolius</i>	American ginseng				
	<b>Herpetofauna</b>					
	<i>Clemmys guttata</i>	spotted turtle				
	<b>Birds</b>					
	<i>Colinus virginianus</i>	Northern Bobwhite				
	<i>Empidonax virescens</i>	Acadian Flycatcher				
	<i>Tyto alba</i>	Barn Owl				
<i>Rallus elegans*</i>	King Rail					
<i>Protonotaria citrea*</i>	Prothonotary Warbler					
<b>Mammals</b>						
<i>Taxidea taxus</i>	American badger					

**TABLE 1. FEDERAL AND PROVINCIAL STATUS OF SPECIES AT RISK**

<i>Species At Risk Act</i>	Endangered <sup>1</sup>		Threatened <sup>2</sup>		Special Concern <sup>3</sup>	
	Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name	Common Name
Schedule 2 <sup>5</sup>	<b>Vascular Plants</b> <i>Castanea dentata</i>	American chestnut				
Schedule 3 <sup>6</sup>			<b>Vascular Plants</b> <i>Celtis tenuifolia</i>	dwarf hackberry	<b>Fish</b> <i>Ictiobus cyprinellus</i> <i>Moxostoma carinatum</i> <i>Lepomis humilis</i> <i>Etheostoma blennioides</i> <b>Vascular Plants</b> <i>Quercus shumardii</i> <i>Hibiscus mocheutos</i> <i>Arisaema dracontium</i> <b>Herpetofauna</b> <i>Eumeces fasciatus</i> <b>Birds</b> <i>Melanerpes erythrocephalus</i>	bigmouth buffalo river redhorse orangespotted sunfish greenside darter  shumard oak swamp rose mallow green dragon  five-lined skink  Red-headed Woodpecker
Not Applicable <sup>7</sup>	<b>Birds</b> <i>Haliaeetus leucocephalus</i> *	Bald Eagle	<b>Vascular Plants</b> <i>Iris lacustris</i> <b>Herpetofauna</b> <i>Emdoidea blandingii</i>	dwarf lake iris  Blanding's turtle	<b>Birds</b> <i>Chlidonias niger</i>	Black Tern

\*Species regulated under the Ontario *Endangered Species Act*.

<sup>2</sup>Threatened: A species likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

<sup>3</sup>Special Concern: A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events, but does not include an extirpated, endangered or threatened species.

<sup>1</sup>Endangered: A species facing imminent extirpation or extinction throughout its range.

<sup>4</sup>Schedule 1: The official list of wildlife species regulated by the *Species At Risk Act*.

<sup>5</sup>Schedule 2: Species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

<sup>6</sup>Schedule 3: Species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

<sup>7</sup>Species listed in Ontario that are not regulated under the *Species At Risk Act*.

Since then, Environment Canada, U.S. Environmental Protection Agency, Ontario Ministry of Environment and Michigan Department of Environmental Quality have work closely with other stakeholders to bring the RAP to realization. A total of 104 recommended remedial actions were selected for implementation through the RAP process. In order to reflect the local needs of each jurisdiction, separate RAP implementation frameworks were developed for the Canadian and American sides of the AOC. Notable environmental successes have been experienced on both sides of the AOC including protecting 366 ha of wetland within the AOC and the Windsor Riverfront Pollution Control Planning Study adopted by the City of Windsor. Currently, a Detroit River Canadian Cleanup Committee has been established to facilitate the implementation of the RAP recommendations as well as a Corridor Monitoring Committee to monitor local activities that affect the AOC.

## 1.2 Detroit River International Crossing – Terms of Reference

A Terms of Reference was submitted to the Ontario Ministry of the Environment for approval in May 2004. The Terms of Reference identifies the framework that the proponent must follow in completing an individual environmental assessment. The Terms of Reference received approval in September 2004.

The planning process that the Route Planning Study and Environmental Assessment Study will follow is outlined in the Terms of Reference and consists of four stages:

- Stage 1 – Define Study Area;
- Stage 2 – Illustrative Alternatives;
- Stage 3 – Practical Alternatives; and,
- Stage 4 – Concept Design Alternatives.

## 1.3 Natural Heritage Work Plan

The Natural Heritage Work Plan presents the approach and methodology for conducting the Natural Heritage Investigation for the Detroit River International Crossing Route Planning and Environmental Assessment Study. The proposed approach to completing the Natural Heritage Investigation is to increase the level of detail used to assess natural heritage features progressively as the geographical area of study is sequentially narrowed down. The proposed level of analysis, resolution, and type of data collection at each stage of the study is designed to maximize efficiency. The Natural Heritage Investigation is also designed to complement the work to be performed in the U.S. A summary of the Natural Heritage Investigation in relation to the study stages is presented in Table 2.

At each stage of the study process, similar tasks will occur. These tasks include:

**Task 1 – Define Area of Investigation** - Identify the study area for the purposes of investigating the potential effects of the project.

**Task 2 – Data Collection** - Identify the type, source, level of detail and methods to be used to obtain information.

**Task 3 – Data Analysis** - Identify how the information will be interpreted to determine the significance and sensitivity of natural heritage features.

**Task 4 – Evaluate Alternatives** - Identify the natural heritage criteria and indicators that will be used to compare alternatives.

**Task 5 – Conduct Impact Assessment** - Identify the range of potential environmental effects to be assessed.

**Task 6 – Recommend Environmental Protection Measures** - Identify the range of potential environmental protection measures to be assessed. Environmental protection measures typically include avoidance, minimization, mitigation, compensation and monitoring.

These tasks are summarized for each stage of the study process in Table 2.

**TABLE 2. NATURAL HERITAGE INVESTIGATION BY STUDY STAGE**

Study Stage <sup>1</sup>	Level of Analysis <sup>2</sup>	Task 1 Define Area of Investigation	Task 2 Data Collection	Task 3 Data Analysis	Task 4 Evaluate Alternatives	Task 5 Impact Assessment	Task 6 Environmental Protection Measures
<b>Stage 1</b> – Define Study Area	Ecodistrict - 1:250,000 scale	Preliminary Analysis Area	<ul style="list-style-type: none"> <li>• Secondary source</li> <li>• Air photo interpretation</li> </ul>	Identify designated/regulated natural heritage features to determine national, provincial, regional and local significance	<ul style="list-style-type: none"> <li>• Avoid, where feasible, designated/regulated natural heritage features located within Preliminary Analysis Area</li> </ul>	Opportunities/Constraints Analysis	<ul style="list-style-type: none"> <li>• Avoidance</li> </ul>
<b>Stage 2</b> – Illustrative Alternatives	Ecosession - 1:100,000 scale	Illustrative routes, plazas, plaza extensions and crossings rights-of-way, footprints and adjacent zones of influence	<ul style="list-style-type: none"> <li>• Secondary source</li> <li>• Air photo interpretation</li> <li>• Windshield/ aerial surveys</li> </ul>	Identify designated/regulated natural heritage features to determine national, provincial, regional and local significance	<ul style="list-style-type: none"> <li>• Compare potential loss of designated/regulated natural heritage features located within rights-of-way and footprint areas (extent, significance).</li> <li>• Compare potential disturbance to designated/regulated natural heritage features located within adjacent zones of influence (extent, significance)</li> </ul>	Opportunities/Constraints Analysis	<ul style="list-style-type: none"> <li>• Avoidance</li> </ul>
<b>Stage 3</b> – Practical Alternatives	Ecosite - 1:10,000 scale	Practical routes, plazas, plaza extensions and crossings rights-of-way, footprints and adjacent zones of influence	<ul style="list-style-type: none"> <li>• Secondary source</li> <li>• Air photo interpretation</li> <li>• Preliminary single season pedestrian surveys</li> </ul>	Identify landscapes, ecosystems/communities and populations/species to determine national, provincial, regional and local significance and sensitivity to impacts	<ul style="list-style-type: none"> <li>• Compare potential loss of terrestrial and aquatic landscapes, ecosystems/communities and populations/species located within rights-of-way and footprint areas (extent, type, significance, sensitivity)</li> <li>• Compare potential disturbance to terrestrial and aquatic landscapes, ecosystems/communities and populations/species located within adjacent zones of influence (extent, type, significance, sensitivity)</li> </ul>	Generic Impacts	<ul style="list-style-type: none"> <li>• Avoidance</li> <li>• Minimization</li> <li>• Generic mitigation</li> </ul>

**TABLE 2. NATURAL HERITAGE INVESTIGATION BY STUDY STAGE**

Study Stage <sup>1</sup>	Level of Analysis <sup>2</sup>	Task 1 Define Area of Investigation	Task 2 Data Collection	Task 3 Data Analysis	Task 4 Evaluate Alternatives	Task 5 Impact Assessment	Task 6 Environmental Protection Measures
Stage 4 – Concept Design Alternatives	Ecoelement - 1:1,000 scale	Concept design routes, plazas, plaza extensions and crossings rights-of-way, footprints and adjacent zones of influence	<ul style="list-style-type: none"> <li>• Secondary source</li> <li>• Air photo interpretation</li> <li>• Detailed multi-season pedestrian surveys</li> </ul>	Identify landscapes, ecosystems/ communities and populations/species to determine national, provincial, regional and local significance and sensitivity to impacts	<ul style="list-style-type: none"> <li>• Compare potential loss of terrestrial and aquatic landscapes, ecosystems/communities and populations/species located within rights-of-way and footprint areas (extent, type, significance, sensitivity).</li> <li>• Compare potential disturbance to terrestrial and aquatic landscapes, ecosystems/communities and populations/species located within adjacent zones of influence (extent, type, significance, sensitivity)</li> </ul>	Conceptual Site-Specific Impacts	<ul style="list-style-type: none"> <li>• Avoidance</li> <li>• Minimization</li> <li>• Conceptual site-specific mitigation, compensation and monitoring</li> </ul>

<sup>1</sup> Detail Design is not currently included in the Detroit River International Crossing Route Planning and Environmental Assessment Study

<sup>2</sup> Ecodistrict – a part of an ecoregion characterized by a distinctive pattern of relief, geology, geomorphology, vegetation, soils, water and fauna.

Ecosection – a part of an ecodistrict throughout which there is a recurring pattern of terrain, soils, vegetation, water bodies and fauna.

Ecosite – a part of an ecosection having a relatively uniform parent material, soil and hydrology, and a chronosequence of vegetation.

Ecoelement – a part of an ecosite displaying uniform topographical, soil, vegetative and hydrological characteristics.

## 2. STAGE 1 – DEFINE STUDY AREA

A study area will be established to encompass the stated problems, opportunities and range of feasible alternatives. The study area will be generated based on a review of significant physical and environmental constraints that may preclude the development of feasible alternatives and the ability to provide continuous corridors of sufficient area to generate a range of linear transportation facility alternatives.

### 2.1 Task 1 – Define Area of Investigation

The area of investigation is the Preliminary Analysis Area identified in the amended Environmental Overview Document. In general, this includes the City of Windsor and the Towns of LaSalle, Tecumseh and Amherstburg.

### 2.2 Task 2 – Data Collection

Natural heritage information will be collected from readily available secondary sources and interpretation of aerial photographs. A list of the secondary source information to be collected and its source is presented in Table 3.

**TABLE 3. NATURAL HERITAGE INFORMATION FROM SECONDARY SOURCES**

Secondary Source Information	Information Source
Canadian Heritage River Systems Studies	Parks Canada
Wetland Baseline Studies	Environment Canada Ministry of Natural Resources
Species-at-Risk Studies	Environment Canada Ministry of Natural Resources
Detroit River Remedial Action Plan (RAP) Studies	Essex Region Conservation Authority Environment Canada
Official Plans and Secondary Plans	City of Windsor Town of Tecumseh Town of LaSalle Town of Amherstburg
International Biological Program (IBP) Inventories	Ministry of Natural Resources
Natural Resource Values Information System (NRVIS) mapping	Ministry of Natural Resources
Areas of Natural and Scientific Interest (ANSI) reports and maps	Ministry of Natural Resources
Wetland Evaluation System data records and maps	Ministry of Natural Resources
Fisheries Management Plans	Ministry of Natural Resources
District Land Use Guidelines	Ministry of Natural Resources

**TABLE 3. NATURAL HERITAGE INFORMATION FROM SECONDARY SOURCES**

Secondary Source Information	Information Source
Fish Sampling Stations databases and maps	Essex Region Conservation Authority Ministry of Natural Resources, Great Lakes Fisheries Assessment Unit
Watershed and Sub-watershed Studies	Essex Region Conservation Authority Ministry of Natural Resources Local Municipalities
Carolinian Canada inventories and maps	Carolinian Canada
Environmentally Sensitive Area (ESA) studies	Essex Region Conservation Authority
Tallgrass Ontario inventories and maps	Tallgrass Ontario
Natural Heritage Information Centre (NHIC) database and maps	Ministry of Natural Resources, Natural Heritage Information Centre
Breeding Bird Atlas, Mammal Atlas, Herpetofauna Atlas, Butterfly Atlas	Local Field Naturalists Ministry of Natural Resources, Natural Heritage Information Centre Bird Studies Canada
Local Flora and Fauna Surveys	Local Field Naturalists Bird Studies Canada University Research
Detroit River Flow Regime and Transboundary Effects, Water Levels and Flows, Ice Regime, Water Quality	Essex Region Conservation Authority Environment Canada City of Windsor University Research

Recent aerial photography will be obtained from the County of Essex. The location, type and geographical extent of natural heritage features will be verified and updated through air photo interpretation.

### 2.3 Task 3 – Data Analysis

The federal, provincial, regional and local significance of regulated/designated natural heritage features will be determined.

### 2.4 Task 4 – Evaluate Alternatives

No evaluation of alternatives will be performed at this stage. Criteria will be used to identify opportunities/constraints located in the area of investigation. The first goal will be to avoid the following federally and provincially designated/regulated natural heritage features where feasible:

- Significant portions of the habitat of threatened or endangered species (provincial) and species-at-risk (federal);
- Provincially significant wetlands (PSWs);
- Provincially significant areas of natural and scientific interest (ANSIs);

- Significant wildlife habitat;
- Significant woodlands;
- Significant valleylands; and,
- Fish habitat.

The second goal is to avoid the following regionally and locally designated/regulated natural heritage features where feasible:

- Conservation lands and parks;
- Environmentally significant areas (ESAs);
- Candidate natural heritage sites (CNHSs);
- Regionally significant areas of natural and scientific interest (ANSIs);
- Life science sites;
- Non-provincially significant wetlands; and,
- Municipal Environmental Protection lands.

## 2.5 Task 5 – Conduct Impact Assessment

Impact assessment will be carried out using a geographical information system (GIS). Natural heritage information will be entered into a GIS using geo-referenced polygons and/or points with an attached database. The database will be structured so that new data generated during later phases of the environmental assessment study can be easily added. Depending on the nature of the data, information can be queried and then displayed as either a graph, a chart or as a layer on the GIS.

The individual layers within the GIS will be overlaid to create a composite map. The composite map will be used as a basis for examination of environmental and technical feasibility of opportunity corridors, illustrative and practical alternatives. For mapping and analysis purposes, the boundaries of natural heritage features will be accurate to at least 1:250,000 scale.

## 2.6 Task 6 – Recommend Environmental Protection Measures

Avoidance of natural heritage features is the only practical environmental protection measure to be considered at this stage.

## 2.7 Results

The Preliminary Analysis Area will be refined based on a review of natural heritage opportunities and constraints to the development of a linear transportation facility. Illustrative alternatives will be generated and carried forward for further evaluation.

### 3. STAGE 2 – ILLUSTRATIVE ALTERNATIVES

Illustrative alternatives represent the full set of alternative highway alignments/crossing locations to be considered. Illustrative alternatives will be generated by identifying routes, plazas, plaza extensions and crossings extending from Highway 401 to the Canada/U.S. border.

#### 3.1 Task 1 – Define Area of Investigation

The area of investigation is illustrative routes, plazas, plaza extensions and crossings within the Preliminary Analysis Area (Figure 1). In general, this includes the City of Windsor and the Towns of LaSalle, Tecumseh and Amherstburg.

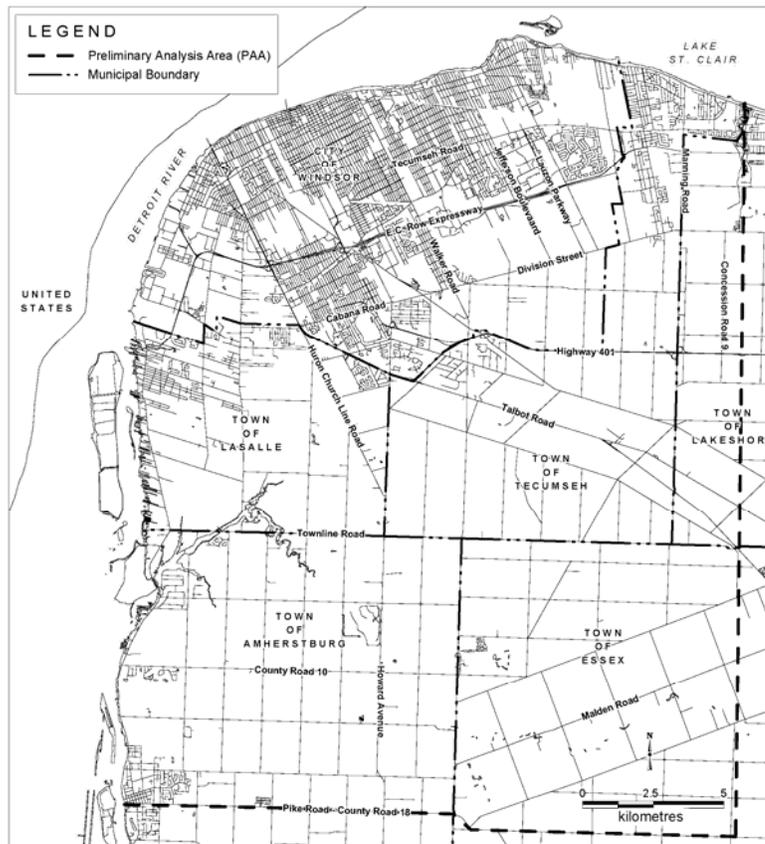


FIGURE 1. KEY PLAN OF THE PRELIMINARY ANALYSIS AREA.

#### 3.2 Task 2 – Data Collection

Natural heritage information collected previously from secondary sources will be supplemented with aerial/windshield surveys.

An aerial survey was conducted during this stage in March 2005. The aerial survey identified seasonally inundated areas, intermittent streams and vegetation before leaf-out. During the aerial survey, the study area was recorded using videotape and photographs. A second aerial survey was conducted in late summer to take oblique photographs of potential crossing locations.

Windshield surveys will also be conducted, where necessary, to verify and augment information collected during aerial surveys.

### 3.3 Task 3 – Data Analysis

The federal, provincial, regional and local significance of regulated/designated natural heritage features will be determined.

### 3.4 Task 4 – Evaluate Alternatives

Alternatives will be evaluated using comparative criteria. The evaluation of illustrative alternatives will be based on: the potential loss of regulated/designated natural heritage features located within rights-of-way and footprint areas; and, the potential disturbance to regulated/designated natural heritage features located within adjacent zones of influence. Secondary source information and aerial/vehicle reconnaissance will be used to determine the extent and significance of designated natural heritage features.

### 3.5 Task 5 – Conduct Impact Assessment

Impact assessment will be carried out using a geographical information system (GIS). For mapping and analysis purposes, the boundaries of natural heritage features will be accurate to at least 1:100,000 scale.

### 3.6 Task 6 – Recommend Environmental Protection Measures

Avoidance of natural heritage features is the only practical environmental protection measure to be considered at this stage.

### 3.7 Results

The illustrative alternatives will be evaluated to select a technically preferred illustrative alternative(s). Practical alternatives will be generated and carried forward for further evaluation.

## 4. STAGE 3 – PRACTICAL ALTERNATIVES

Practical alternatives represent the set of illustrative alternatives that, upon evaluation of impacts and benefits, are carried forward for further consideration. Practical alternatives are generated through more detailed design (although still at a preliminary level) to better identify property requirements, infrastructural implications, construction staging impacts and mitigation measures.

### 4.1 Task 1 – Define Area of Investigation

The area of investigation is practical routes, plazas, plaza extensions and crossings within the technically preferred illustrative alternative(s). This area is known as the Area of Continued Analysis (ACA) and is illustrated in Figure 2.

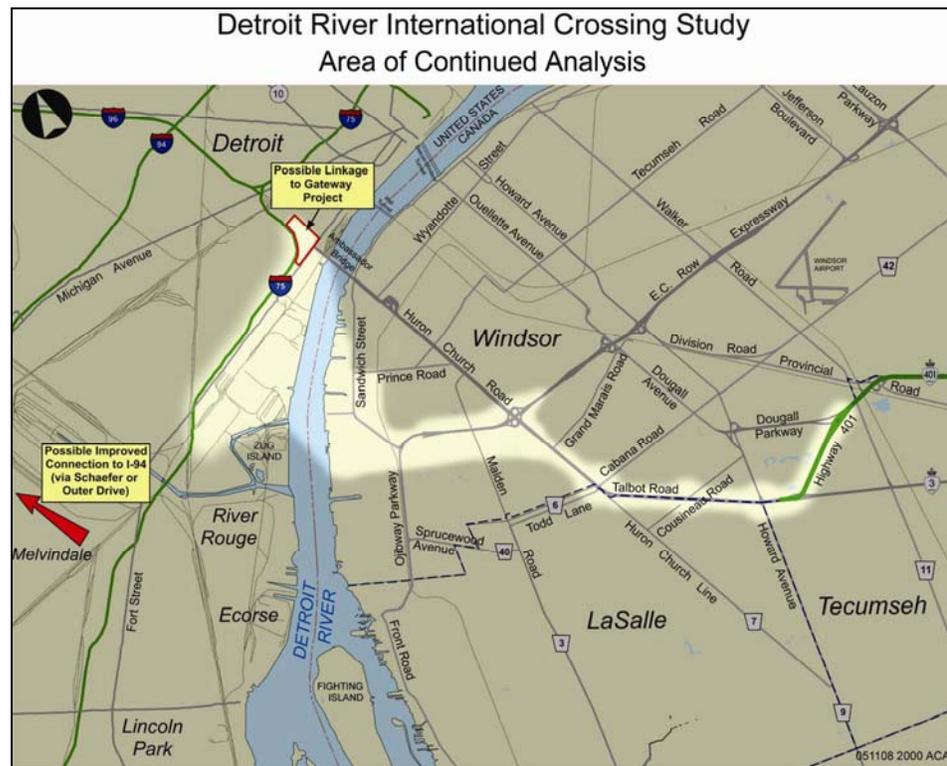


FIGURE 2. KEY PLAN OF THE AREA OF CONTINUED ANALYSIS.

### 4.2 Task 2 – Data Collection

Natural heritage information collected previously from secondary sources and windshield/aerial surveys will be supplemented with preliminary pedestrian surveys conducted over a single season. The pedestrian surveys will be used to identify the

general composition, structure and function of terrestrial and aquatic ecosystems. The pedestrian surveys will be conducted by qualified biologists during an appropriate season.

### 4.3 Task 3 – Data Analysis

Data will be analyzed at the landscape, ecosystem/community and population/species level to determine the extent, type, significance and sensitivity of natural heritage features. Designated/regulated and non-designated/regulated natural heritage features will be addressed at this stage.

### 4.4 Task 4 – Evaluate Alternatives

Alternatives will be evaluated using comparative criteria. The evaluation of practical alternatives will be based on: the potential loss of terrestrial and aquatic landscapes, ecosystems/communities and populations/species located within rights-of-way and footprint areas; and, the potential disturbance of terrestrial and aquatic landscapes, ecosystems/communities and populations/species located within adjacent zones of influence. Secondary and preliminary primary information will be used to determine the extent, type, significance and sensitivity of natural heritage features.

### 4.5 Task 5 – Conduct Impact Assessment

Impact assessment will be based on generic impacts typically resulting from the development of linear transportation facilities. For mapping and analysis purposes, the boundaries/locations of natural heritage features will be accurate to at least 1:10,000 scale.

### 4.6 Task 6 – Recommend Environmental Protection Measures

Environmental protection measures to be incorporated at this stage include avoidance of natural heritage features, minimization of the loss of natural heritage features and generic mitigation measures typically incorporated into the design of linear transportation facilities.

### 4.7 Results

The practical alternatives will be evaluated to select a technically preferred practical alternative(s). Concept design alternatives will be generated and carried forward for further evaluation.

## 5. STAGE 4 – CONCEPT DESIGN ALTERNATIVES

Concept design alternatives represent the set of practical alternatives that, upon evaluation of impacts and benefits, are carried forward for further consideration. Concept design includes the consideration and development of specific engineering and environmental issues to further understand very particular implications of the recommended alternative. The level of engineering detail is sufficient to develop environmental protection measures in consultation with the appropriate agencies and to secure environmental assessment approvals.

### 5.1 Task 1 – Define Area of Investigation

The area of investigation is concept design routes, plazas, plaza extensions and crossings within the technically preferred practical alternative(s) in the ACA (Figure 2).

### 5.2 Task 2 – Data Collection

Natural heritage information collected previously from secondary sources, windshield/aerial surveys and preliminary pedestrian surveys conducted over a single season will be supplemented with detailed pedestrian surveys conducted over multiple seasons. The pedestrian surveys will be used to identify the specific composition, structure and function of terrestrial and aquatic ecosystems. The pedestrian surveys will be conducted by qualified biologists over multiple seasons during an entire year to inventory fish, wildlife and vegetation during optimal conditions for the communities and species present. The type and timing of pedestrian surveys to be performed are described in Table 4.

**TABLE 4. DETAILED FIELD INVESTIGATIONS TO BE CONDUCTED OVER MULTIPLE SEASONS FOR CONCEPT DESIGN ALTERNATIVES**

Ecological Component	Sample Method/Protocol	Timing
Soils	<ul style="list-style-type: none"> <li>pedestrian survey with soil probe</li> <li>identify areas of seeps, springs and groundwater upwelling</li> </ul>	April
Fish	<ul style="list-style-type: none"> <li>fish sampling with backpack electrofisher, minnow traps, seines and dip nets</li> </ul>	April, July/August
Reptiles and Amphibians	<ul style="list-style-type: none"> <li>incidental observations</li> <li>pedestrian survey</li> <li>amphibian call counts at dusk using Marsh Monitoring Program protocol</li> <li>salamander vernal pool habitat survey after dark with a light source</li> </ul>	April to June, Incidental Observations Throughout

**TABLE 4. DETAILED FIELD INVESTIGATIONS TO BE CONDUCTED OVER MULTIPLE SEASONS FOR CONCEPT DESIGN ALTERNATIVES**

Ecological Component	Sample Method/Protocol	Timing
Birds	<ul style="list-style-type: none"> <li>incidental observations (sight, vocalization, nests, etc.)</li> <li>5 minute point-count survey</li> <li>stick nest, snag and cavity tree survey</li> <li>spring and fall migration survey</li> </ul>	March to September, Incidental Observations Throughout
Mammals	<ul style="list-style-type: none"> <li>incidental observations (sight, vocalization, scats, tracks, odours, dens, etc.)</li> <li>pedestrian survey</li> <li>tracking survey in snow</li> <li>bat survey using tape recorder</li> </ul>	March, June, Incidental Observations Throughout
Vegetation	<ul style="list-style-type: none"> <li>pedestrian survey using a plotless method to identify all species within a community</li> </ul>	April, June, September
Fish Habitat	<ul style="list-style-type: none"> <li>Environmental Manual: Fisheries (MTO 1994)</li> <li>Environmental Reference for Highway Design (MTO 2002)</li> </ul>	April, August
Vegetation Communities	<ul style="list-style-type: none"> <li>Ecological Land Classification for Southern Ontario (Lee et al. 1998)</li> <li>Wetland Evaluation System for Southern Ontario – Third Edition (MNR 1993)</li> <li>Environmental Reference for Highway Design (MTO 2002)</li> </ul>	April, June, September
Wildlife Habitat	<ul style="list-style-type: none"> <li>Significant Wildlife Habitat Technical Guide (MNR 2000)</li> <li>Environmental Reference for Highway Design (MTO 2002)</li> </ul>	March to June

### 5.3 Task 3 – Data Analysis

Data will be analyzed at the landscape, ecosystem/community and population/species level to determine the extent, type, significance and sensitivity of natural heritage features. Designated/regulated and non-designated/regulated natural heritage features will be addressed at this stage.

### 5.4 Task 4 – Evaluate Alternatives

Alternatives will be evaluated using comparative criteria. The evaluation of concept design alternatives will be based on: the potential loss of terrestrial and aquatic landscapes, ecosystems/communities and populations/species located within the rights-of-way and footprint areas; and, the potential disturbance to terrestrial and aquatic landscapes, ecosystems/communities and populations/species located within adjacent zones-of-influence. Secondary and detailed primary information will be used to determine the extent, type, significance and sensitivity of natural heritage features.

## 5.5 Task 5 – Conduct Impact Assessment

Impact assessment will be based on conceptual site-specific impacts resulting from the proposed project. For mapping and analysis purposes, the boundaries/locations of natural heritage features will be accurate to at least 1:1,000 scale. Conceptual site-specific impacts to be considered at this stage are presented in Table 5. A cumulative effects assessment will be conducted in accordance with the requirements of the *Canadian Environmental Assessment Act*.

**TABLE 5. ENVIRONMENTAL IMPACTS AND PROTECTION MEASURES TO BE ADDRESSED AT THE CONCEPT DESIGN ALTERNATIVES STAGE**

Ecological Component	Environmental Impacts	Environmental Protection Measures
Fish and Fish Habitat	Loss of fish habitat from physical modifications	<ul style="list-style-type: none"> <li>• Avoidance</li> <li>• Minimize footprint area</li> <li>• Design modifications including innovative construction techniques</li> <li>• Restoration/enhancement</li> <li>• Compensation</li> </ul>
	Alterations to base flow	<ul style="list-style-type: none"> <li>• Stormwater management practices</li> <li>• Minimize dewatering requirements</li> <li>• Monitoring and contingency measures</li> </ul>
	Changes in water quality and quantity	<ul style="list-style-type: none"> <li>• Stormwater management practices</li> <li>• Best management practices</li> <li>• Erosion and sedimentation control</li> <li>• Monitoring and contingency measures</li> </ul>
	Barriers to fish passage	<ul style="list-style-type: none"> <li>• Bridges and open bottom culverts</li> <li>• Fish-friendly closed culvert design</li> </ul>
	Changes to water temperature	<ul style="list-style-type: none"> <li>• Stormwater management practices</li> </ul>
	Fish mortality	<ul style="list-style-type: none"> <li>• In-water construction timing restrictions</li> <li>• In-water construction staging</li> <li>• Working "in the dry"</li> <li>• Fish rescue/relocation</li> </ul>
	Impacts on species at risk and their habitat	<ul style="list-style-type: none"> <li>• Prevent loss of essential fish habitat</li> <li>• Prevent direct effects on species at risk</li> <li>• Prevent fish mortality</li> </ul>
Vegetation and Vegetation Communities	Loss of vegetation communities from physical modifications	<ul style="list-style-type: none"> <li>• Avoidance</li> <li>• Minimize footprint area</li> <li>• Design modifications including innovative construction techniques</li> <li>• Restoration/enhancement</li> <li>• Compensatory mitigation</li> </ul>
	Disturbance to vegetation from edge creation (sunscald, windthrow, light penetration, rain shadow, etc.)	<ul style="list-style-type: none"> <li>• Design modifications including innovative construction techniques</li> <li>• Pre-stressing vegetation</li> <li>• Landscaping</li> <li>• Apply ecological restoration principles</li> <li>• Follow up monitoring</li> </ul>

**TABLE 5. ENVIRONMENTAL IMPACTS AND PROTECTION MEASURES TO BE ADDRESSED AT THE CONCEPT DESIGN ALTERNATIVES STAGE**

Ecological Component	Environmental Impacts	Environmental Protection Measures
	Disturbance to vegetation from drainage modifications including changes in groundwater levels	<ul style="list-style-type: none"> <li>• Maintain existing drainage patterns and groundwater levels</li> <li>• Stormwater management practices</li> <li>• Compensatory mitigation</li> </ul>
	Introduction of exotic or invasive species	<ul style="list-style-type: none"> <li>• Landscape with non-invasive, indigenous species</li> <li>• Minimize disturbance to vegetation</li> <li>• Plant management</li> <li>• Follow-up monitoring</li> </ul>
	Disturbance to vegetation from salt spray	<ul style="list-style-type: none"> <li>• Manage salt applications</li> <li>• Planting of salt tolerant species in vulnerable areas</li> </ul>
	Plant mortality	<ul style="list-style-type: none"> <li>• Prevent loss of vegetation communities</li> <li>• Prevent plant mortality</li> <li>• Transplanting/manual seed collection and dispersal</li> </ul>
	Impacts on species at risk and their habitat	<ul style="list-style-type: none"> <li>• Prevent loss of essential vegetation communities</li> <li>• Prevent direct impacts on species at risk</li> <li>• Prevent plant mortality</li> </ul>
Wildlife and Wildlife Habitat	Loss of wildlife habitat from physical modifications	<ul style="list-style-type: none"> <li>• Avoidance</li> <li>• Minimize footprint area</li> <li>• Design modifications including innovative construction techniques</li> <li>• Restoration/enhancement</li> <li>• Compensatory mitigation</li> </ul>
	Disturbance to wildlife habitat from increased noise, light penetration and human intrusion	<ul style="list-style-type: none"> <li>• Landscaping</li> <li>• Design modifications including innovative construction techniques</li> <li>• Follow up monitoring</li> </ul>
	Barriers to wildlife passage	<ul style="list-style-type: none"> <li>• Species-specific wildlife crossings for target wildlife species</li> <li>• Bridges and oversized culverts with vertical clearance and dry benches</li> <li>• Wildlife-friendly closed culvert design</li> </ul>
	Wildlife/vehicle conflicts	<ul style="list-style-type: none"> <li>• Wildlife crossing deterrents</li> <li>• Driver education</li> <li>• Signage and speed limits</li> <li>• Bridges and oversized culverts with vertical clearance and dry benches</li> <li>• Wildlife-friendly closed culvert design</li> </ul>
	Wildlife mortality	<ul style="list-style-type: none"> <li>• Prevent loss of wildlife habitat</li> <li>• Construction timing restrictions</li> <li>• Construction staging</li> <li>• Wildlife rescue/relocation/dispersal</li> </ul>
	Impacts on species at risk and their habitat	<ul style="list-style-type: none"> <li>• Prevent loss of essential wildlife habitat</li> <li>• Prevent direct effects on species at risk</li> <li>• Prevent wildlife mortality</li> </ul>

**TABLE 5. ENVIRONMENTAL IMPACTS AND PROTECTION MEASURES TO BE ADDRESSED AT THE CONCEPT DESIGN ALTERNATIVES STAGE**

Ecological Component	Environmental Impacts	Environmental Protection Measures
Ecosystems	Ecosystem degradation	<ul style="list-style-type: none"> <li>• Avoidance of sensitive ecosystems</li> <li>• Minimize fragmentation and encroachment</li> <li>• Design modifications including innovative construction techniques</li> <li>• Stormwater management practices</li> <li>• Best management practices</li> <li>• Restoration/enhancement</li> <li>• Compensatory mitigation</li> <li>• Follow up monitoring</li> </ul>

## 5.6 Task 6 – Recommend Environmental Protection Measures

Environmental protection measures to be incorporated at this stage include avoidance of natural heritage features, minimization of the loss of natural heritage features and conceptual site-specific mitigation, compensation and monitoring measures for the proposed project. Conceptual site-specific environmental protection measures to be considered at this stage are presented in Table 5. At this stage of the analysis, compensation measures will be identified. Monitoring and contingency measures will also be identified to ensure compliance with environmental legislation and regulations, to determine the accuracy of impact predictions and to assess the effectiveness of mitigation measures. Contingency measures will be recommended to address unforeseen or intensified impacts or mitigation measures that prove ineffective. Follow up monitoring to assess ecological trends will also be recommended.

## 5.7 Results

The concept design alternatives will be evaluated to select a technically preferred concept design alternative. Detail design is not included in the current scope of work for the Detroit River International Crossing Route Planning and Environmental Assessment Study.

## 6. ENVIRONMENTAL PROTECTION MEASURES

The environmental protection measures described in Table 5 represent a wide range of measures that MTO uses to address potential environmental effects. Although project specifics have the greatest influence on their selection, the approaches to environmental protection can be generally categorized in order of preference as:

- avoidance/prevention;
- control/mitigation (reducing the severity of environmental effects);
- compensatory mitigation (provision of equivalent or countervailing environmental features)
- restoration/enhancement (improvement over previous environmental conditions); and,
- environmental monitoring.

These environmental protection measures are incorporated into the planning, preliminary design, detail design and construction phases of MTO projects.

### 6.1 Provincial and Federal Environmental Protection Requirements

MTO complies fully with the requirements of federal and provincial environmental legislation, regulations and policies including:

#### Federal

- *Canadian Environmental Assessment Act;*
- *Species at Risk Act;*
- *Fisheries Act;*
- *Canada Wildlife Act;*
- *Migratory Birds Convention Act;*
- *Federal Policy on Wetland Conservation;* and,
- *Policy for the Management of Fish Habitat.*

#### Provincial

- *Environmental Assessment Act;*
- *Endangered Species Act;*
- *Fish and Wildlife Conservation Act;*
- *Planning Act and the Provincial Policy Statement;*
- *Lakes and Rivers Improvement Act;*

- *Ontario Water Resources Act;*
- *Conservation Authorities Act;* and,
- *Forestry Act.*

These legislative requirements are the most relevant to the Natural Heritage Work Plan.

## 6.2 Environmental Practices for Highway Design and Construction

MTO's environmental practices seek to avoid potential adverse environmental effects where possible. For situations where avoidance is not environmentally, technically or economically feasible, MTO has developed or adopted environmental practices that are incorporated into the design and construction of highway projects. These practices typically include:

- environmental design criteria (i.e. project components are designed to meet accepted prescribed or performance requirements/targets);
- stormwater management practices/best management practices (i.e. common sense actions used to protect surface water);
- Ontario Provincial Standards (OPSs) including specifications and drawings that have been adopted by the Professional Engineers of Ontario (PEO);
- Standard Special Provisions (SSPs) developed by MTO related to erosion and sedimentation control, protection of fish habitat, etc.; and,
- Non-standard Special Provisions (NSSPs) developed by MTO including operational constraints implemented during construction of the facility.

SSPs are used to implement technical requirements and/or administrative agreements/protocols required to constrain the Contractor which have not been prepared as OPSs. NSSPs define site-specific mitigation measures where a suitable OPS or SSP is not available or requires additional clarification. New NSSPs are prepared on a project-by-project basis to implement special provisions related to MTO environmental commitments or environmental approval, permit or exemption requirements.

A summary of environmental practices frequently used for highway design and construction is presented in Table 6.

**TABLE 6. ENVIRONMENTAL PRACTICES FOR HIGHWAY DESIGN AND CONSTRUCTION**

Ecological Component	Environmental Protection Practices	Description
Fish and Fish Habitat	Environmental Manual: Fisheries (MTO 1994)	<ul style="list-style-type: none"> <li>Establishes a standard approach for fisheries assessments of highway projects.</li> </ul>
	MTO/MNR Fisheries Protocol (MTO/MNR 1993)	<ul style="list-style-type: none"> <li>Establishes procedure for provincial review of MTO projects affecting fish habitat.</li> </ul>
	Fish Habitat Conservation and Protection Guidelines (DFO 1998)	<ul style="list-style-type: none"> <li>Establishes procedure for federal review of projects affecting fish habitat.</li> </ul>
	SSP 199F47 - Watercourse/Fisheries Protection – Use of Confined Explosives	<ul style="list-style-type: none"> <li>Specifies limitations on blasting near specified fisheries waters.</li> </ul>
	NSSP - Watercourse/Fisheries Protection – General	<ul style="list-style-type: none"> <li>Specifies generic protection requirements for watercourses.</li> </ul>
	NSSP - Watercourse/Fisheries Protection During Work in Watercourses and on Watercourse Banks	<ul style="list-style-type: none"> <li>Specifies details and timing for temporary protection systems (culvert, channel, pumping/piping).</li> </ul>
	NSSP - Watercourse/Fisheries Protection During Watercourse Relocation	<ul style="list-style-type: none"> <li>Specifies details and timing for watercourse relocation.</li> </ul>
	NSSP - Watercourse/Fisheries Protection – Temporary Watercourse Crossing	<ul style="list-style-type: none"> <li>Specifies details and timing for watercourse crossing.</li> </ul>
	NSSP - Water Taking	<ul style="list-style-type: none"> <li>Specifies details and timing where water taking is prohibited; or MTO has water taking permits.</li> </ul>
Vegetation and Vegetation Communities	OPSS 565 - Construction Specification for the Protection of Trees	<ul style="list-style-type: none"> <li>Stipulates constraints and requirements for tree protection. Stipulates requirements for barrier tender item.</li> </ul>
	NSSP - Landscape Planting	<ul style="list-style-type: none"> <li>Stipulates requirements for landscape tender items.</li> </ul>
Wildlife and Wildlife Habitat	NSSP - Migratory Birds	<ul style="list-style-type: none"> <li>Stipulates requirement to protect migratory birds and their habitat.</li> </ul>
Designated Areas	SSP 199F12 - Environmentally Sensitive Areas	<ul style="list-style-type: none"> <li>Prohibits entry into identified environmentally sensitive areas including wetlands, ANSIs, ESAs, etc..</li> </ul>
Stormwater Management	Stormwater Management Planning and Design Manual (MOE 2003)	<ul style="list-style-type: none"> <li>Provides technical and procedural guidance for the planning, design and review of stormwater management practices.</li> </ul>
	MTO Drainage Management Manual (1997)	<ul style="list-style-type: none"> <li>Describes the practice of drainage management normally associated with the planning and design of highway projects.</li> </ul>

**TABLE 6. ENVIRONMENTAL PRACTICES FOR HIGHWAY DESIGN AND CONSTRUCTION**

Ecological Component	Environmental Protection Practices	Description
Erosion and Sediment Control	Environmental Manual: Erosion and Sedimentation Control (MTO 1994)	<ul style="list-style-type: none"> <li>Establishes a standard approach for erosion and sedimentation control on highway projects.</li> </ul>
	OPSS 577 and Amendment to OPSS 577 - Construction Specification for Temporary Erosion and Sediment Control Measures	<ul style="list-style-type: none"> <li>Stipulates requirements for temporary erosion control tender items.</li> <li>Specifies installation and removal timing requirements for temporary erosion control tender items.</li> </ul>
	NSSP - Erosion and Sediment Control – General	<ul style="list-style-type: none"> <li>Specifies time constraints for duration of earth exposure.</li> <li>Specifies standby supply of silt fence and operational constraints.</li> </ul>
	OPSS 570 - Construction Specification for Topsoil	<ul style="list-style-type: none"> <li>Stipulates requirements for topsoil tender items.</li> </ul>
	SSP 571S01 - Sodding	<ul style="list-style-type: none"> <li>Stipulates requirements for sodding tender items.</li> </ul>
	SSP 572S01 - Seeding and Cover	<ul style="list-style-type: none"> <li>Stipulates requirements for seeding and cover tender items.</li> </ul>
Environmental Monitoring	Construction Administration and Inspection Task Manual	<ul style="list-style-type: none"> <li>Describes the required activities and level of inspection for protection of the environment during construction.</li> </ul>

### 6.3 Environmental Standards Project

MTO has embarked on a process to develop a comprehensive, current and consistent end-results oriented approach to environmental compliance that will encompass all environmental factors for all highway activities from planning through to operation and maintenance. The Environmental Standards Project is the first step in developing a systematic approach to environmental management that will:

- provide an interpretation of federal and provincial environmental requirements as applied to transportation planning, and highway design, construction, operation and maintenance;
- update and standardize the environmental practices for highway design and construction;
- develop ways to measure and evaluate environmental performance; and,
- improve document control to better demonstrate how the Ministry meets its commitment to the environment.

Several documents are being prepared as components of the Environmental Standards Project. These documents include: Environmental Management Overview (2002); Environmental Protection Requirements (2004); Environmental Best Practices and Measures for Environmental Performance for Design (in press); and, Environmental Best Practices and Measures for Environmental Performance for Construction (in press). The documents address fisheries and aquatic ecosystems, surface water, groundwater,

wildlife, wetlands, vegetation, designated areas as well as other technical specialties. The environmental standards set through MTO's Environmental Standards Project will be incorporated into the Detroit River International Crossing project as they become available.