Ecological Survey of the Lake Erie Coast in Ecodistrict 7E-5 – Phase I Final Report

Prepared for the Ontario Ministry of Natural Resources Species at Risk Stewardship Fund (SARSF)

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1.0 Project Goals

The Great Lakes coast supports some of the rarest and most threatened ecosystems in Canada. Lake Erie, the southern most Great Lake, is a hotspot for species diversity and supports a number of species at risk including: Hoptree, Hooded Warbler, and Fowler's Toad.

The goal of this project is to inventory parts of the Lake Erie coast which lie in Ecodistrict 7E-5[1] (the Haldimand Clay Plain Physiographic Region[2]) to identify the occurrence and distribution of species at risk and their habitats. This information will improve the status of these species and their habitats by supporting stewardship and recovery actions outlined in Recovery Strategies, Government Response Statements and for recently listed or re-classified species.

2.0 Objectives

The main objective of this project is to conduct presence/absence surveys to determine the occurrence and distribution of species at risk and those species tracked by the Natural Heritage Information Center (NHIC)[3].

Extensive cottage development and urban boundary expansions are a direct threat to the biodiversity of this important coast. A number of species at risk are historically known from this geographically based area. However, most plant collections date back from the late 1800's to the mid-1900's (George W. Clinton, David F. Day, Edna M. Porter, Frank W. Johnson, John Macoun, Charles Zenkert, and Bert Miller).

This long history of plant collecting allows a further objective of this study to include a detailed herbarium search of historic collections from the Clinton Herbarium at the Buffalo Museum of Science (which houses many historic records from the study area dating back to the late 1800's), the Eckert Herbarium at Buffalo State College, and the Herbarium at the Royal Botanical Gardens in Burlington. All recent and historic herbarium records of species at risk, and those species tracked by NHIC, were documented and searched for in the field to determine whether they are still extant or historic and possibly extirpated from the study area.

This detailed inventory also serves to document decades of local knowledge that has been collected and passed on by local nature clubs, naturalists, and landowners, through active collaboration among these multiple stakeholders. Personal communications, correspondence and participation with these stakeholders has encouraged stewardship and multi-partner approaches to species at risk protection and recovery, which is a main objective of this project and the Species at Risk Stewardship Fund (SARSF).

3.0 Approach

Detailed inventories (presence/absence surveys) to determine the occurrence and distribution of species at risk and their habitats, and those species tracked by the NHIC, were conducted along the Lake Erie coast. UTM coordinates were taken for all locations of species at risk, as well as other significant species that were encountered. Their habitats were described using the Ecological Land Classification System for Southern Ontario[4]. Notes were taken on the number of individuals present, population size, vegetational features such as community structure, closure, dominant species in tree, shrub and herb layer, site conditions - including health, reproductive status, quality and extent of suitable habitat, and any threats, disturbances or site management.

Voucher specimens were collected to document vascular plant species following proper collection protocols. No plants were collected when less than 10 individuals were found. These plant collections will be deposited at local registered herbariums. Samples of leaf tissue from Red Mulberry (*Morus rubra*) collections will be sent through the Royal Botanical Gardens for genetic testing to determine the distinction between hybrids with White Mulberry (*Morus alba*) and pure material. Voucher specimens of Bugseed species (*Corispermum spp.*), a taxonomically difficult genus, will be sent to an expert for determination. Plant collections were determined, and problematic taxa were confirmed by authorities, mainly Michael Oldham, Botanist / Herpetologist, with the NHIC.

A herbarium search was made to locate all records pertaining to this geographically-based study area. This was achieved through an important, multi-partner approach with the Niagara Frontier Botanical Society, the Clinton Herbarium at the Buffalo Museum of Science, the Eckert Herbarium at Buffalo State College, and the herbarium of the Royal Botanical Gardens in Burlington. The long history of plant collecting by a number of botanists since the late 1800's has enabled a historic species list to be developed for the study area.

Through conducting detailed field surveys, a search was made for the continued presence of all historic records in the study area. By comparing the list of extant verses historic species, the percent loss or gain of species at risk will be determined for this section of the Lake Erie coast.

The 2010 field season (Phase I) covered late summer and fall plant species. A proposed 2011 (Phase II) field season will employ a full season inventory, ensuring each study area is visited at least three times throughout the growing season (early May, July, and late September). Presence/absence surveys were recorded for all vascular plant species observed. As well, animal species were recorded through visual observations and incidental wildlife sightings.

4.0 Procedure

A landowner contact component of the project distributed letters and access permission forms to landowners in the study area through a door to door campaign. A landowner contact letter and access permission form was distributed along with species at risk educational material, kindly provided by the local Ministry of Natural Resources, Vineland office. Signatures were collected to document permission to access and survey private lands. As well as individual landowners, cottage associations and large property holders such as Vale Inco were contacted for permission to access their lands in order to update and collect new information on species at risk. In addition, public beaches, municipal properties, and conservation authority lands were also surveyed.

5.0 Methods

Field studies were conducted in the study area between August 10th and November 4th, 2010. Surveys were undertaken in a variety of weather conditions from sunny and unusually hot to cool and rainy.

Transects through the study area were walked by the author and a number of competent observers with the intent of traversing as many of the apparent vegetation communities and landform features as possible.

Presence/absence surveys commenced at the eastern most terminus of the study area in the Town of Fort Erie, Ontario. This location occurs at the foot of old Fort Erie, along the beach/bedrock pavement shoreline of Lake Erie, where the break wall at Mather Park ends and meets the dynamic shoreline. From here, surveys continued west along the coast to Point Abino at the border between the Town of Fort Erie and the City of Port Colborne. The southern boundary of the study area is

demarcated by the depth of Lake Erie at the 2m mark. The northern boundary includes the active shoreline of Lake Erie, adjacent sand dunes and swampy back dune muck basins.

As well, parts of the shoreline in the City of Port Colborne and Township of Wainfleet were surveyed, namely Pleasant Beach, Wyldewood Beach, Nickel Beach, Surgarloaf Point, Rathfon Point and Morgan's Point.

In addition to late season/fall surveys for species at risk, and those species tracked by the NHIC, all other vascular plant species observed were recorded and incidental wildlife observations noted.

6.0 Analysis of data and Results

To date, hundreds of species have been identified in the study area along parts of the Lake Erie coast.

Phase I of this project has documented 145 element occurrences of species at risk and those species tracked by the NHIC in the parts of the study area covered to date. These elements represent 30 distinct species either considered at risk by the Committee on the Status of Species at Risk in Ontario (COSSARO)[5] and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)[6] or tracked by the NHIC.

To confirm this, over 350 voucher specimens were collected and deposited in registered herbariums. Following the field season, plant collections were determined by Michael Oldham, Botanist / Herpetologist from the NHIC. Problematic taxa such as Red Mulberry and Bugseed species will be sent to authorities on the genus for determination.

This project has delivered detailed information on 9 of the 10 target species at risk listed in the Species at Risk Stewardship Fund Project Application. Only Snapping Turtle was not reported on.

New species at risk or tracked species recorded in the study areas which were not previously known to occur there include: Eastern Prickly Pear Cactus (*Opuntia humifusa*), Lizard's Tail (*Saururus cernuus*), Schreber's Wood Aster (*Eurybia schreberi*), Shumard Oak (*Quercus shumardii*), Swamp Rose Mallow (Hibiscus moscheutos), Virginia Lungwort (Mertensia virginica), and *cf.* Woodland Vole (Microtus pinetorum).

To date, 12 species at risk have been recorded as extant in the study area as part of Phase I of the survey. These are: Hoptree (*Ptelea trifoliata*), Red Mulberry, Butternut (*Juglans cinerea*), Shumard Oak, Swamp Rose Mallow, American Ginseng (*Panax quinquefolius*), Eastern Prickly Pear Cactus, Red-headed Woodpecker (*Melanerpes erythrocephalus*), Hooded Warbler (*Wilsonia citrina*), Peregrine Falcon (*Falco peregrinus*), Fowler's Toad (*Anaxyrus fowleri*) and *cf.* Woodland Vole.

The Clinton herbarium, the Eckert Herbarium and the Royal Botanical Gardens were checked for records of historic species at risk and those species tracked by NHIC further adding to the records of significant species in the study area. Historic species reported from the study area but not reconfirmed extant through field studies include: Blanding's Turtle (*Emydoidea blandingii*), Canada Lily (*Lilium canadense*), Eastern Hog-nosed Snake (*Heterodon platirhinos*), Slim-leaved Goosefoot (*Chenopodium leptophyllum*), White Wood Aster (*Eurybia divaricata*), Wild Licorice (*Glycyrrhiza lepidota*), Wild Rice (*Zizania aquatica*) and Yellow Corydalis (*Corydalis flavula*).

A detailed literature search has not yet been completed as part of Phase I of this study, and will undoubtedly reveal numerous additional historical species.

Of the 12 species at risk observed in the study area, the Committee on the Status of Species at Risk in Ontario rank 5 of these species as Endangered, 2 as Threatened, and 5 are considered a Special Concern. Detailed information has been collected for all extant occurrences of the 12 species at risk:

American Ginseng (*Panax quinquefolius*) COSSARO Rank: Endangered
As part of this study, a concentration of American Ginseng, recorded 22 years ago, has been revisited and confirmed extant.

Butternut (*Juglans cinerea*) COSSARO Rank: Endangered
Butternut trees have been documented from three study areas: Thunder Bay, Lorraine Bay – Dann Dunes, Sugarloaf Hill and Morgan's Point. A number of trees are declining due to the Butternut Canker.

Eastern Prickly Pear Cactus (*Opuntia humifusa*) COSSARO Rank: Endangered
A new location for Eastern Prickly Pear Cactus has been documented at Thunder Bay. The population sustains itself in a natural sand barren opening on a forested dune. The large population consists of 10 or more clusters of 2-20 pads reproducing and spreading vegetatively. The surrounding community is highly intact and supports a very mature and natural forested dune community with many trees exceeding 1m dbh. Rick Stockton, a local cottage owner, reports that this population has sustained itself in this location for close to 50 years or more, based on his observations. An October 25, 1948 voucher specimen of Eastern Prickly Pear Cactus, housed at the Royal Botanical Gardens and collected by Bert Miller from "Bert Miller's yard - Fort Erie" and "Native of Point Pelee", is the only known record of this species from Niagara. At that time, Bert Miller's yard was on Highland Avenue in urban Fort Erie - not near this station along the Lake Erie coast. However, based on personal communications with Dr. Jim Pringle, taxonomist at the Royal Botanical Gardens, he vaguely recalls an expedition to Niagara of some RBG staff in the early 1960's lead by Bert Miller to observe a thriving planting of Eastern Prickly Pear Cactus in a natural location. It is possible, but cannot be confirmed, that this is the location. Bert Miller was known to transplant plant material on rare occasions. For instance, Earl Plato founder of the Bert Miller Nature Club, recalls Bert Miller transplanting Wild Ginger (*Asarum canadense*) from the Niagara Glen to the forested dunes at Point Abino. However, there is no direct evidence that this location has been planted.

Fowler's Toad (*Anaxyrus fowleri*) COSSARO Rank: Endangered
Fowler's Toads have been observed in a number of study sections. The local office of the Ministry of Natural Resources has collected detailed information on this species in the study area and therefore search efforts were not concentrated on this well studied species.

Red Mulberry (*Morus rubra*) COSSARO Rank: Endangered
Red Mulberry has been recorded at Jaeger's Rocks, Erie Beach, Waverly Beach, Crescent Beach, Thunder Bay and Sugarloaf Hill. The Red Mulberry is clearly hybridizing with White Mulberry in the study area and the distinction between the two parents could not be fully discerned. Collections will be sent through the Royal Botanical Gardens for genetic testing to determine the distinction between hybrids and pure material.

Hoptree (*Ptelea trifoliata*) COSSARO Rank: Threatened
Numerous Hoptrees have been documented from Erie Beach, Waverly Beach, Crescent Beach, Bertie Bay, Thunder Bay, Prospect Point, Crystal Beach, Abino Bay, Point Abino, Marcy's Woods, Pleasant Beach and Nickel Beach, with a particularly large concentration at Windmill Point.

Peregrine Falcon (*Falco peregrinus*) COSSARO Rank: Threatened
A single individual was observed flying from the large mills along the pier at the head of the canal in Gravelly Bay, Port Colborne going west past Sugarloaf Point.

Hooded Warbler (*Wilsonia citrina*) COSSARO Rank: Special Concern
Hooded Warblers, previously reported by local naturalists as nesting in a raspberry thicket along the forested back-dune at Erie Beach, could not be reconfirmed from this study section. Recent clearing of breeding habitat is likely the result of its absence. The species still persists, however, near the Marcy's Woods study area.

Red-headed Woodpecker (*Melanerpes erythrocephalus*) COSSARO Rank: Special Concern
Three breeding pairs of Red-headed Woodpecker have been confirmed with young in the Waverly Beach Section. They are nesting in mature, 1-2 m diameter Cottonwood trees (*Populus deltoides*), which are remnants from the original forested dune communities.

Shumard Oak (*Quercus shumardii*) COSSARO Rank: Special Concern
Fruit, leaf and twig collections have been made to document a new location for Shumard Oak in the deep muck basin swamp behind the dunes near Nickel Beach. These trees are growing on deep (100 -130cm +) accumulations of organic muck in a Red Maple swamp.

Swamp Rose Mallow (*Hibiscus moscheutos*) COSSARO Rank: Special Concern
One of the highlights of this field season includes two new locations for Swamp Rose Mallow at Windmill Point and Rathfon Point. In both locations, the plants were observed in fractured crevices of the bedrock pavement shorelines rooted in moist, washed in sands. Previously this species at risk was not known from the Lake Erie coast east of Turkey Point.


Photo by Tom Staton

***cf.* Woodland Vole *(Microtus pinetorum*) COSSARO Rank: Special Concern**
A photo was taken to document this possible species. An expert determination will be required to confirm this species as present in the study area.

All records of extant and historic species at risk or those species tracked by the NHIC are documented in full detail in the attached Data Submission Worksheet (excel file: 2010_2011_SAR-SF_Data_Submission_Worksheet_8-10-BMNC).

Many other provincially significant, regionally restricted and locally rare plant species have also been recorded. New and historic populations of significant species such as Kalm's St. Johns Wort (*Hypericum kalmianum*), Poison Sumac (Rhus vernix), and Beach Pea (*Lathyrus japonicus*) have been reconfirmed or documented as part of this study. Unfortunately, the Beach Pea has seen a decline from its historic range. Currently, the number of historic plant collections sitting in herbarium cabinets outnumbers the living locations for this rare beach plant.

In a 1942 edition of *This Week Outdoors*, a group of hikers from Buffalo visited the recently reconstructed ruins of old Fort Erie and reported seeing a provincially rare plant called Biennial Gaura (*Oenothera gaura*). As part of this study, we reconfirmed this plant species is still growing at that location almost 70 years later.

Wild licorice (*Glycyrrhiza lepidota*), ranked as rare and historic locally, has not been observed since the 1970's when it was last reported in the Waverly Beach/Erie Beach area by Mr. Gus Yaki, in his Plants of the Niagara Peninsula[7]. Previously, it was collected by Bert Miller in 1966 and before that in 1950. It was also collected by Charles A. Zenkert in the 1950's. Despite a thorough search effort, this study could not confirm the presence of this species in the historically known area. Bert Miller reported the species occurring "just south of site of "Erie Beach", Ontario, and beyond ruins of old Fort Erie". Another search will be made in Phase II of the study during flowering time when the species is most conspicuous.

Further analysis of the study area was conducted by plane during a flyover of the study area searching for additional habitat of species at risk. This activity was a valuable exercise allowing for quick and effective identification of potential new habitat for significant species.

Outreach and volunteer opportunities have been a major part of this project. Over 120 people have been directly reached and were informed about species at risk and the significance of the Lake Erie coast. They include people from local nature clubs in Ontario, Western New York, and beyond; as well as, students from Niagara College, and landowners who received literature, kindly donated by the local office of the Ministry of Natural Resources. These many people were not only informed about species at risk and this project, but many have also taken part, actively volunteering in field surveys and nature walks which highlight and document the diversity of this unique coast.

Over 20 regular volunteers participated in field surveys as part of phase I of this project. Three classes from Niagara College took part in walks along the Lake Erie coast to learn about and observe species at risk and their habitats in an outdoor classroom. Also, members of the Field Botanists of Ontario attended an outing to Rathfon Point to observe species at risk and other rare species and their significant habitats and learned about this project and its goals and objectives. A presentation was prepared and delivered to local nature clubs in the Niagara Region and in Western New York which highlights the study findings and the significance of the Lake Erie Coast. The talks were held in local community centres and publicized as open to the general public and landowners in the study area. A large number of people were reached and requests have been made for additional presentations to highlight species at risk and the findings of this project.

Further, articles in the local nature clubs newsletters have provided effective outreach and awareness of this project. The Bert Miller Club website is also posting articles and announcements for an upcoming presentation which can further highlight this project.

Photo of Niagara College students learning about species at risk and the Lake Erie coast.

7.0 Summary of partnership involvement and their role with the Project

The partners in this study include the Ministry of Natural Resources-Vineland, the Natural Heritage Information Centre, the Royal Botanical Gardens, the Clinton Herbarium, the Ekert Herbarium, the Peninsula Field Naturalists, the Niagara Falls Nature Club, and the Niagara Frontier Botanical Society of Buffalo, New York. The number of partners is a testament to the importance and excitement of this project.

The Niagara Frontier Botanical Society has recently completed a "Botany on the Beaches" survey for the American shoreline of Lake Erie in Western New York and have partnered to assist in continuing this survey along the Canadian shoreline of the lake. This project linkage is an excellent model of international cooperation to support the stewardship of a shared ecosystem.

Carolinian Canada's Lake Erie Trail Project[8] is working to build a walking trail along the Canadian stretch of the coast. This project provided valuable input to the Lake Erie Trail team in such areas as potential trail routes and highlighting points of interest or significance along the route. The proposed Lake Erie Trail Project would like to highlight some of the findings of this study in their proposed trail book and interpretive signage which can further highlight this project and the significance of species at risk..

Key professionals who worked on this project or provided expert support include: Karine Beriault, Species at Risk Biologist, MNR, whose expert support and guidance throughout the project was greatly appreciated; Michael Oldham, Botanist / Herpetologist, NHIC, who reviewed and determined voucher specimens collected by the project; Natalie Iwanycki, Herbarium Curator, Royal Botanical Gardens, who assisted with a review of historical collections from the study area; Joanne Schlegel, Botanist and volunteer with the Clinton Herbarium in Buffalo, who's assistance in the field was invaluable to this project as was her time facilitating the herbarium search at the Buffalo Museums of Science; Kathy Leacock, Curator of Collections at the Buffalo Museum of Science, for allowing permission to conduct research of the historic collections located there; Jim Battaglia, Curator of the Eckert Herbarium and initiator of this international study; Steven Daniels, a superb Ecologist, based out of Rochester, New York, who provided important sightings and support; Marcie Jacklin, a local expert birder; John Riely, Nature Conservancy of Canada / Chief Science Officer and National Director, Conservation Strategies, who provided direction and encouragement at the outset of this project; and Vicki Mckay, Parks Canada Species at Risk Recovery Specialist, who provided expert support on details of species at risk recovery.

Regular project volunteers whose assistance in the field and countless hours of volunteer time was instrumental to the success of the project include: Joanne Schlegel, Rick Young, Dora Young, Jim Battaglia, Steven Daniels, Janet Damude, Joyce Sankey, Jim Grassie, Said Mohamed, Janet Mcullum, Rob Eberly, Rick Stockton, Laurie Dann, Michael Siuta, Ed Fuchs, Thomas Staton, Sarah Staton, Jessica Staton, Sarah Moloney, Natalie and Mrs. Kiers, Paul O'Hara and the numerous attendees of spontaneous Bert Miller Nature Club and Niagara Frontier Botanical Society outings. Their keen observations and field skills were greatly appreciated.

Photo by Steven Daniels

In addition, volunteers with the Bert Miller Nature Club executive, namely: Tim Seburn, Paul Philps, Rick Stockton, Peter Bon Enfant and Marcie Jacklin were involved in the creation, initiation and organization of the project from the start.

Support for this project is gratefully provided by the Ontario Ministry of Natural Resources Species at Risk Stewardship Fund.

Lastly, this project could not be possible without the role of countless landowners who participated in this study and allowed access to their properties and provided valuable information about the natural heritage of their lands.

8.0 Confirm how Project goals and objectives were met

Project goals were met through an extensive three month field survey which provided details on the occurrence and distribution of 145 element occurrences of species at risk or tracked species.

Surveys, inventories and monitoring deliver on this project and the SARSF objectives to improve the status of species at risk and their habitats by supporting stewardship and recovery action. For many species at risk, surveys, inventories, and monitoring are an urgent priority for recovery strategies and action plans. This project is consistent with information and recommendations identified in the Common Hoptree recovery strategy. Specifically, this project has conducted thourough site surveys, including a determination of population size, distribution, health, reproductive status, type, quality and extent of suitable habitat, threats and their significance and current site management at extant, historic and suitable sites, which is listed as an urgent priority in the recovery strategy.

This detailed inventory has addressed some of the top threats for many species as identified in their recovery strategies or action plans, including: habitat loss or degradation, exotic or invasive species, changes in ecological dynamics or natural processes, disturbance or persecution, pollution, consumptive use, accidental mortality and climate or natural disasters. Further, this project has helped to better understand the results of past investments in stewardship projects and could develop and inform best management practices for landowners, planners and land managers.

This project will directly benefit the recovery and protection of 12 species at risk. Field surveys, inventory and monitoring, as conducted by this project, are critical to supporting stewardship and recovery actions outlined in Recovery Strategies, Government Response Statements and for

recently listed or re-classified species. Further, this project has delivered detailed information on 9 of the 10 target species at risk listed in the SARSF Project Application. In addition, 7 species at risk or tracked species not previously known to occur in the study area were identified.

Another main objective of this project and the SARSF is to encourage stewardship and multi-partner approaches to species at risk protection and recovery. The number of volunteer hours and landowner and project partner participation provides a direct measurement of this multi-partner approach to the stewardship and protection of species at risk. This survey has inspired and enabled people to become involved in species at risk stewardship through outreach and volunteer opportunities, as outlined in the objectives.

The number of partners in this project is also a measure of the interest and success of this project. Currently the MNR-Vineland, NHIC, Clinton Herbarium, Royal Botanical Gardens, Ekert Herbarium, Peninsula Field Naturalists, Niagara Falls Nature Club, and the Niagara Frontier Botanical Society are project partners. Potential partnerships may also include Wayne Weller, of Ontario Power Generation, to conduct salamander surveys to help determine the presence/absence of Ambystoma species such as the threatened Jefferson Salamander (*Ambystoma jeffersonianum*).

9.0 Budget

The Bert Miller Nature Club has complied with all terms and conditions of the Agreement. Payment Claim #1 and Payment Claim #2 have covered the Human Resources Costs, Equipment Costs, Vehicle Travel and Fieldwork Expenses, and Printing Costs related to the project and is detailed in the budget below.

Unspent funds amount to $234.52 of the total budget amount of $30,000. The remaining unspent funds come from the Vehicle Travel and Fieldwork Expense section and the Printing Costs section of the budget and equal $214.54 and $19.98 respectively.

The vehicle mileage expenditure for the project was based on an estimation of the funds needed to cover project travel expenses. The total amount of this estimated expenditure was under spent by $214.54 at the end of Phase I of the project. Similarly, the estimated total amount for the Printing Costs expenditure was under spent by $19.98.

The remaining unspent funds represent a reasonable estimate for the total amount of these two expenditures.

			PROJECT TRACKING #: 8-10-BMNC		
ELIGIBLE EXPENDITURE	**TOTAL AMOUNT**	**PAYMENT CLAIM #1**	**PAYMENT CLAIM #2**	**FINAL PAYMENT**	**UNSPENT FUNDS**
Human Resources Costs: **Position Title:** Field Botanist / Project Coordinator **Rate of Pay:** $ 24/hour **Length of contract: Aug. 10, 2010 – Feb. 28, 2011**	**$ 25,500**	**$1,920.00**	**$7,680.00**	**$15,900**	**$0**
Equipment /lease/rental costs: GPS and soil auger	**$ 613.56**	**$ 274.62**	**$338.94**	**$0**	**$0**
Vehicle Travel and Fieldwork Expenses: Gas mileage @ $0.41/km to and from study sites	**$ 3,786.44**	**$221.81**	**$2,097.32**	**$1,252.77**	**$214.54**
Design, printing, and distribution costs: Photocopies and printing of data sheets and maps	**$ 100.00**	**$18.67**	**$24.13**	**$37.22**	**$19.98**
TOTALS	**$ 30,000**	**$2,435.10**	**$10,140.39**	**$17,189.99**	**$234.52**

Detailed Budget for Payment Claim # 1

Project Component	ID # of Receipt	Vendor Name and Description of Expense	Invoice or Receipt Amount	Tax Rebate * (50% of Tax)	Amount covered by SAR-SF
Human Resources		Wages for Field Botanist / Project Coordinator ($24/hr, 40 hr/wk, for 2 wks)	1,920.00		1,920.00
Printing Costs		Staples (Printing of field sheets & agreement)	18.67		18.67
Travel Costs		Gas (see attached mileage spreadsheet)	221.81		221.81
Equipment		Universal Field Supplies (Soil Auger), Pen Press (NTS maps for study area)	274.62		274.62
		Totals	**$2,435.10**		**$2,435.10**

Detailed Budget for Payment Claim # 2

Project Component	ID # of Receipt	Vendor Name and Description of Expense	Invoice or Receipt Amount	Tax Rebate * (50% of Tax)	Amount covered by SAR-SF
Human Resources		Wages for Field Botanist / Project Coordinator ($24/hr, 40 hr/wk, for 8 wks)	7,680.00		7,680.00
Printing Costs		Staples (Printing of field sheets)	24.13		24.13
Travel Costs		Gas (see attached mileage spreadsheet), Welland Aero Center (Flight time)	2097.32		2097.32
Equipment		GPS Central (Garmin 76CSx Handheld GPS Receiver)	338.94		338.94
		Totals	**$10,140.39**		**$10,140.39**

Detailed Budget for Final Payment					
Project Component	**ID # of Receipt**	**Vendor Name and Description of Expense**	**Invoice or Receipt Amount**	**Tax Rebate * (50% of Tax)**	**Amount requested from SAR-SF**
Human Resources		Wages for Field Botanist / Project Coordinator ($24/hr, 40 hr/wk, for 16.6 wks)	15,900.00		15,900.00
Printing Costs		Staples (receipt 1 $31.37), (receipt 2 $5.85)	37.22		37.22
Travel Costs		Gas (see attached mileage spreadsheet)	1,252.77		1,252.77
Equipment			0.00		0.00
		Totals	**$17, 189.99**		**$17,189.99**

Attach - Digital and printed copies of all materials, final products or reports (i.e. brochures, fact sheets, inventories, surveys, posters, CDs, etc) developed as part of the Project:

Encl.

-Data Submission Worksheet
(excel file: 2010_2011_SAR-SF_Data_Submission_Worksheet_8-10-BMNC)
-Project Summary Form
(excel file: Project_Summary_Form_SAR-SF1011_8-10-BMNC)
-Payment Claim Form and Official Invoice
(word file: Payment Claim Form_Official Reciept_Final Report_8-10-BMNC)
-Letter of Offer (word file: Letter of Offer)
-Receipt 1 (jpeg file: Receipt_1)
-Receipt 2 (jpeg file: Receipt_2)
-Mileage Documentation (excel file: Gas Mileage_Lake Erie Coast Project_Final Report)
-Lake Erie Coast Project Newsletter Article in the Rambler
(word file: Lake Erie Coast Project BMNC_Rambler Article_Final Draft)
-Lake Erie Coast Project Newsletter Article in Niagara Nature News
(word file: Lake Erie Coast Project_Niagara Nature News Article and website)
-Land Owner Letter
(adobe pdf file: Ecological Survey of the Lake Erie Coast Landowner Contact Letter)
-Permission form (adobe pdf file: Landowner Permission Form)
-Dvd of photos by study area
-Dvd of historic voucher specimens in the study area

Literature Cited

[8] Carolinian Canada. 2010. Lake Erie Coastal Stewardship Trail. Web site: http://www.carolinian.org/index.htm [accessed 28 February 2010]

[2]Chapman, L.J, D.F Putman. 1984. The physiography of southern Ontario. Ontario Research Foundation.

[1]Crins, W.J. 2002. Ecozones, Ecoregions and Ecodistricts of Ontario. Ontario Parks, for the ELC Working Group. Queen's Printer for Ontario.

[4]Lee, H.T. , W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and Its Application. Ontario Minsitry of Natural Resrouces, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

Oldham, M.J. 2010. Checklist of the Vascular Plants of Niagara Regional Municipality Ontario. Ontario Natural Heritage Information Centre, Ministry of Natural Resources Peterborough, Ontario for Niagara Peninsula Conservation Authority

[3]Oldham, M.J., and S.R. Brinker. 2009. Rare Vascular Plants of Ontario, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of
Natural Resources. Peterborough, Ontario. 188 pp.

Macdonald, I.D. 1990. A Biological Inventory and Evaluation of the Point Abino Peninsula Area of Natural and Scientific Interest. Ontario Ministry of Natural Resources, Southern Region, Aurora. OFER 8904.

Riley, J.L. 1989. Distribution and Status of the Vascular Plants of Central Region, Ontario Ministry of Natural Resources. Ontario Ministry of Natural Resources, Parks and Recreational Areas Section, Central Region, Richmond Hill. OFER SR 8902

[6]COSEWIC. 2010. Canadian Wildlife Species at Risk. Committee on the Status of Endangered Wildlife in Canada.
Web site: http://www.cosewic.gc.ca/eng/sct0/rpt/rpt_csar_e.cfm [accessed 28 February 2010]

[5]Species at Risk in Ontario (SARO) List. Committee on the Status of Species at Risk in Ontario (COSSARO) (http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/276722.html) [accessed 28 February 2010]

[7]Yaki, G.J. 1970. Plants of the Niagara Peninsula. Special Publication No. 2, Niagara Falls Nature Club.

Zenkert, C.A. 1934. Flora of the Niagara Frontier Region. Bulletin of the Buffalo Society of Natural Sciences Volume 16, Buffalo, New York.