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

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

February 2012

By
Albert C. Garofalo

Bert Miller Nature Club
P.O. Box 1088 Ridgeway, ON LOS 1N0

In Partnership with:

Ontario

Niagara Frontier Botanical Society Est. 1983

Peninsula Field Naturalists

Royal Botanical Gardens www.rbg.ca

Buffalo Museum of Science

Natural Heritage Information Centre

Niagara Falls Nature Club
P.O. Box 901, Niagara Falls, Ontario, L2E 6V8.

EKERT HERBARIUM
Buffalo State
State University of New York

Table of Contents

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

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, Red-headed Woodpecker, 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, recreational activities 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.

There has been a long history of plant collecting (by plant collectors such as: George W. Clinton, David F. Day, Edna M. Porter, Frank W. Johnson, John Macoun, Charles Zenkert, and Bert Miller) along parts of the Lake Erie coast. This 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, are 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 parts of 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 observations of vascular plant species. Proper plant collection protocols were followed. 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 Mulberry (*Morus sp.*) collections were sent to the University of Guelph's Biodiversity Institute of Ontario for genetic testing to determine the distinction between hybrids of White Mulberry (*Morus alba*) and Red Mulberry (*Morus rubra*). Voucher specimens of Bugseed species (*Corispermum spp.*), a taxonomically difficult genus, were sent to Diana Bizecki Robson, an expert on the genus, at the Manitoba Museum in Winnipeg for determination. Willow specimens (*Salix spp*.) were sent to Dr. George Argus, an authority on the genus in North American, at the Canadian Museum of Nature in Ottawa for determinations. Other difficult plant collections, and problematic taxa were confirmed by Michael J. Oldham, Botanist / Herpetologist, at the NHIC.

A herbarium search was made to locate all records of species at risk and other significant species found in 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. The 2011 field season (Phase II) employed a full season inventory, ensuring each study area was visited, ideally, at least three times throughout the growing season (early May, July, and late September).

A list of all vascular plant species observed were recorded. As well, a list of faunal species were documented 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, conservation authority lands and provincial parks were also surveyed.

5.0 Methods

Field studies were conducted in the study area between August 10th and November 4th, 2010; and May 6th to November 17th, 2011. Surveys were undertaken in a variety of weather conditions from sunny and unusually hot to cool and rainy. The 2011 field season was particularly hot with a number of days having exceeded 37° Celsius with a humidex of 48° C.

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, Regional Municipality of Niagara, Ontario in 2010. Specifically, 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 during the first field season of 2010. During the second field season (2011), surveys continued west to the Grand River. 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, during the 2010 field season, 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.

The 2011 field season continued surveys from the border between the Town of Fort Erie and the City of Port Colborne to the Grand River in Haldimand County.

This effectively covered spring, summer, and fall surveys of the Lake Erie coast from the Niagara River to the Grand River.

In addition to field 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.

Presence/absence surveys for species at risk, and those species tracked by the NHIC, are proposed for the upcoming 2012 field season, pending funding, to continue west from the Grand River to the western terminus of the study area where Ecodistrict 7E-5 (the Haldimand Clay Plain) meets the Norfolk Sand Plain, just outside of Port Dover, ON.

6.0 Analysis of Data and Results

To date, hundreds of species have been identified in the study area along the Lake Erie coast. The first year of the project (Phase I) includes data from field surveys conducted from August 10th to November 4th, 2010. The second year of the project (Phase II) includes findings from field surveys conducted from May 6th to November 17th, 2011.

Phase I

Phase I of this project has documented 145 element occurrences of species at risk and those species tracked by the NHIC in the study area. 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.

The first field season (Phase I) 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.

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 (*Quercus shumardii*), Swamp Rose Mallow (*Hibiscus moscheutos*), American Ginseng (*Panax quinquefolius*), Eastern Prickly Pear Cactus (*Opuntia humifusa*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Hooded Warbler (*Wilsonia citrina*), Peregrine Falcon (*Falco peregrinus*), Fowler's Toad (*Anaxyrus fowleri*) and *cf.* Woodland Vole (*Microtis pinetorum*).

New species at risk recorded in the study areas which were not previously known to occur here include: Eastern Prickly Pear Cactus, Shumard Oak, Swamp Rose Mallow, and *cf.* Woodland Vole. Species which are tracked by the NHIC and not previously reported in the study area include: Lizard's Tail (*Saururus cernuus*), Schreber's Wood Aster (*Eurybia schreberi*), and Virginia Bluebells (Mertensia virginica).

To confirm this, over 350 voucher specimens were collected and deposited in registered herbariums during the first field season.

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: Canada Lily (*Lilium canadense*), , Slim-leaved Goosefoot (*Chenopodium leptophyllum*), White Wood Aster (*Eurybia divaricata*), Wild Licorice (*Glycyrrhiza lepidota*), Wild Rice (*Zizania aquatica*), Wooly Beach-heather (*Hudsonia tomentosa*), Yellow Corydalis (*Corydalis flavula*), Blanding's Turtle (*Emydoidea blandingii*) and Eastern Hog-nosed Snake (*Heterodon platirhinos*).

Phase II

Phase II of this project has documented 91 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 29 distinct species either considered at risk by the Committee on the Status of Species at Risk in Ontario (COSSARO) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or tracked by the NHIC.

The second field season (Phase II) of this project has delivered detailed information on 5 of the 10 target species at risk listed in the Species at Risk Stewardship Fund project application. These include: Eastern Flowering Dogwood (*Cornus florida*), Spotted Wintergreen (*Chimaphila maculata*), Bobolink (*Dolichonyx oryzivorus*), Fowler's Toad and Peregrine Falcon. Target species that were confirmed extant in the study area through field observations include: Peregrine Falcon, Fowler's Toad and Bobolink.

17 species at risk have been recorded as extant in the study area as part of Phase II of the survey. These are: American Chestnut (*Castanea dentata*), Hoptree, Red Mulberry, Butternut, Swamp Rose Mallow, Bald Eagle (*Haliaeetus leucocephalus*), Barn Swallow (*Hirundo rustica*), Bobolink, Chimney Swift (*Chaetura pelagica*), Eastern Meadowlark (*Sturnella magna*), Red-headed Woodpecker, Hooded Warbler, Peregrine Falcon, Blanding's Turtle (*Emydoidea blandingii*), Fowler's Toad, Milksnake (*Lampropeltis triangulum*), and Snapping Turtle (*Chelydra serpentina*).

Over 400 voucher specimens have been collected during the 2011 field season to document the field findings and will be deposited at registered herbariums. Michael J. Oldham, Botanist / Herpetologist from the NHIC determined plant collections from Phase II of the project. Problematic taxa such as Bugseed and Willow species were sent to authorities on the respective genus for determination.

Phase I & Phase II Summary

In summary, this project has documented 145 element occurrences during Phase I of the project and 91 element occurrences during Phase II of the project. This totals 236 distinct 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 46 distinct species.

Of the 236 element occurrences and 46 distinct species documented to date, 27 are considered species at risk. Of these, 21 have been confirmed extant in the study area. The Committee on the Status of Species at Risk in Ontario rank 6 of these species as Endangered, 7 as Threatened, and 8 are considered a Special Concern. The extant species at risk include 8 plant species, 8 bird species, 4 herptiles and 1 mammal.

Detailed information has been collected for all extant occurrences of the 21 species at risk:

American Chestnut (*Castanea dentata*) COSSARO Rank: Endangered
One location for American Chestnut was documented from the study area. The occurrence location is Lorraine Bay in Port Colbonre. A single tree was observed. Currently, it persists only as young stems or suckers arising from copice growth off a large stump which died and has been cut almost level with the sandy ground. The stems suckering from the stump are aproximately 3-4m tall. The origianl stump measures aproximately 1m in diameter and was likely a very old tree. Reports from the landowner suggest that this tree might have been planted by early settlers who brough the seed from the southern states.

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. The population was healthy and fruiting at the time of visit.

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

Common Hoptree (*Ptelea trifoliata*) COSSARO Rank: Threatened
Common Hoptree has been documented from Erie Beach, Waverly Beach, Crescent Beach, Rose Hill, Bertie Bay, Thunder Bay, Prospect Point, Crystal Beach, Abino Bay, Point Abino, Pleasant Beach, Sherkston Shores, Silver Bay, Pine Crest Point, and Nickel Beach; with a particularly large concentration at Windmill Point and Marcy's Woods. As part of this study, a previously unreported colony of Hoptree was documented from Long Beach Conservation Area. This observation extends the known range of Hoptree in the Regional Municipality of Niagara by 16 km to the west.

Eastern Prickly Pear Cactus (*Opuntia humifusa*) COSSARO Rank: Endangered
A new location for Eastern Prickly Pear Cactus has been documented at Thunder Bay in Fort Erie. 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.

Red Mulberry (*Morus rubra*) COSSARO Rank: Endangered
Mulberry trees in the study area are clearly hybridizing. The distinction between the two parents could not be fully discerned, therefore, leaf samples from 11 voucher specimens were sent to the University of Guelph's Biodiversity Institute of Ontario for genetic testing. The lab determined an accurate identification of all 11 mulberry samples using rbcL and ITS2 plant barcode regions matched to the Barcode of Life Data Systems, the National Center for Biotechnology Information Genbank, and the Ministry of Natural Resources Mulberry References.

DNA was successfully extracted and sequenced from all 11 mulberry samples with rbcL barcode regions matching both white mulberry and hybrid, *Morus alba* and *Morus alba x rubra* respectively, while ITS2 barcode regions matched white mulberry *Morus alba* only. The true power of discrimination came from the ITS2 from the ribosomal RNA gene from nuclear DNA which matched 100% in NCBI and MNR Mulberry References to white mulberry only.

Historically, Red Mulberry was reported by David F. Day in 1888 from "the ferry landing on the Canadian side" in Fort Erie, which is just outside of the study area. Red Mulberry was also known from the "plains of Buffalo" just across the Niagara River. A Red Mulberry reported by Bruce Kershner from the Sugarloaf Hill area was visited in February, 2012. It will be revisited during the growing season to confirm this report of Red Mulberry in the study area.

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-Yellow Birch swamp.

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


Photo by Tom Staton


Photo by Tom Staton

Birds

Barn Swallow (*Hirundo rustica*) COSSARO Rank: Threatened
Barn Swallows were observed in June and July of 2011 at three study areas: Cedar Bay and Pine Crest Point in Port Colborne and at Sunset Bay in Wainfleet.

Bobolink (*Dolichonyx oryzivorus*) COSSARO Rank: Threatened
Prior to the year 2000, Bobolink were common and would breed in large numbers in the hay fields around Marcy's Woods. These agricultural fields have since been abondonded and have grown in. Bobolink are no longer known to be breeding here. They were observed in the 2011 breeding season just to the north of the study area in hay fields.

Bald Eagle (*Haliaeetus leucocephalus*) COSSARO Rank: Special Concern
Bald Eagles have been confirmed nesting in the study area in February, 2012. This is the first time Bald Eagles have been confirmed nesting on the mainland in the Niagara Peninsula since they were listed as a species at risk. Bald ealges have also been observed flying overhead in a number of study areas such as Mohawk Point, Rock Point and James N. Allan Provincial Park.

Chimney Swift (*Chaetura pelagica*) COSSARO Rank: Threatened
The Lake Erie coast, along large parts of Fort Erie, is an important feeding area for Chimney Swifts during the breeding season. They have been present here in moderate numbers since the 1980's until the present. They were also observed in 2011 along the shoreline at Nickel Beach in Port Colborne and at Sunset Bay in Wainfleet.

Eastern Meadowlark (*Sturnella magna*) COSSARO Rank: Threatened
Eastern Meadowlark was observed in at a single study area in 2011. One bird was heard vocalizing in a hedgerow treetop along a hay field during breeding season; near the edge of the study area in.

Peregrine Falcon (*Falco peregrinus*) COSSARO Rank: Threatened
A single individual was observed flying from the large mill along the pier at the head of the Welland Canal in Gravelly Bay, Port Colborne going west past Sugarloaf Point in the fall of 2010. Another individual was observed in the same area on Jan. 1, 2012 by T. Seburn and M. Jacklin.

Hooded Warbler (*Wilsonia citrina*) COSSARO Rank: Special Concern
Hooded Warblers, previously reported by local naturalists as nesting in raspberry thickets 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 where two pairs have been observed in 2011 calling on territory and carrying food.

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 cavities of mature, 1-2 m diameter Cottonwood trees (*Populus deltoides*), which are remnants from the original forested dune communities. During Phase II of the project, two additional locations for Red-headed Woodpecker were reported. One sighting was from the Cedar Bay area in Port Colborne at Centennial Park. The other sighting was from Sunset Bay in Wainfleet were they were reported at a bird feeder on two occasions in 2011.

Herptiles

Blanding's Turtle (*Emydoidea blandingii*) COSSARO Rank: Threatened
Blanding's Turtle was observed in one study area during the 2010 and 2011 field seasons. Blanding's Turtle is also known from a number of other locations in the study area in Fort Erie, Port Colborne, Wainfleet, Sherbrooke and Dunn Townships.

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. Efforts to locate and document breeding pools were conducted during the breeding season of 2011. A number of breeding pools were documented on the bedrock headlands of Lake Erie. Later in the year, these pools were revisited and tadpoles were observed metamorphosing. In addition, Fowler's toads were occasionally observed in sand burrows excavated below pieces of drift wood scattered along the beach.

Milksnake (*Lampropeltis triangulum*) COSSARO Rank: Special Concern
One mature Milksnake was observed at Rock Point Provincial Park on the sand dunes in 2011 and a dead juvenile snake was observed at Cedar Bay in Port Colborne. Milksnake is also known from the Lorraine Bay area, reported there back in 2007.

Snapping Turtle (*Chelydra serpentina*) COSSARO Rank: Special Concern
Snapping Turtle was observed in two study areas during the 2011 field season. One was Point Abino, in Fort Erie where it was seen in a dug out pond. The other sighting was of a turtle crossing Lakeshore Road, southbound, just west of the intersection at Quarry Road in Wainfleet near a large agricultural drain.

***cf.* Woodland Vole *(Microtus pinetorum*) COSSARO Rank: Special Concern**
A photo was taken to document this possible species of large Carolinian woodlands. It was observed along the beach on the edge of the forested dunes at Point Abino. 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: 2011-2012_SARSF_Data_Submission_Worksheet_12-11-BMNC).

There are currently 6 species at risk which are historically documented from the study area but could not be reconfirmed as extant. These are: Flowering Dogwood, Spotted Wintergreen, White Wood Aster (Eurybia *divaricata*), Piping Plover (*Charadrius melodus*), Common Five-lined Skink (*Plestiodon fasciatus*), and Eastern Hog-nosed Snake (*Heterodon platirhinos*).

Of those species tracked by NHIC and documented to date in the study area, 6 could not be reconfirmed as extant. This historic species reported from the study area but not reconfirmed extant through field studies include: Canada Lily, Slim-leaved Goosefoot, Wild Licorice, Wild Rice, Wooly Beach-heather and Yellow Corydalis.

A detailed literature search has not yet been completed as part of Phase I and Phase II of this study but will undoubtedly reveal numerous additional historical species which are tracked by the NHIC. During the final field season, these species will be searched for to confirm if they are present or absent from the study area.

A number of provincially significant, regionally restricted, or locally rare plant species have been confirmed in the study area during the second field season (Phase II): Strange Cinquefoil (*Potentilla supine ssp. paradoxa*), which was previously only known in Niagara from the sandy shores of Lake Ontario, has been confirmed for the first time along the Lake Erie coast in the Region of Niagara. Indian Grass (*Sorghastrum nutans*), previously only known from Point Abino within the study area, and not seen since 1923, was observed at two other locations. Two new locations of Small Skullcap (*Scutellaria parvula*) were observed at Sugarloaf Point and Rock Point Provincial Park. Hair-like-beak-rush (*Rhynchospora capillacea*), another species not seen along the Lake Erie coast in the Niagara Region since the 1920's, was observed and confirmed as present in the study area in 2011.

Many other provincially significant, regionally restricted and locally rare plant species were also observed during the first field season (Phase I). New and historic populations of significant species such as Twig-rush (*Cladium mariscoides*), Kalm's St. Johns Wort (*Hypericum kalmianum*), Sand Cherry (*Prunus pumila*), 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 locally as rare and historic, 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 during the final field season of the study during flowering time when the species is most conspicuous.

During Phase I, habitat analysis was conducted by plane during a flyover of the study area. This activity was a valuable exercise allowing a quick and effective search for additional and potential new habitat for species at risk.

This study has also collected data on a number of invasive species which could potentially pose a threat to a number of species at risk. Lesser Celandine (*Ranunculus ficaria*) was reported in the Niagara Regional Municipality for the first time as part of this study. This highly invasive species is currently spreading along the floodplain of Six Mile Creek. Another species, reported for the first time in the study area, is Goat's Rue (*Galega officinalis*). Blue-Lyme Grass (*Leymus arenarius*), a horticultural plant native to the northernmost sea coasts and parts of the northern Great Lakes, has been planted in two locations along the shoreline and will be monitored to see if it is spreads and naturalizes on native beachgrass dune communities.

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, who attended talks, presentation and guided club hikes. As well, students from Niagara College, members of beach improvement associations and local cottage associations attended outings and guided walks along the coast hosted by this project. Further, the general public and landowners who received literature, kindly donated by the local office of the Ministry of Natural Resources were also reached by the landowner contact component of this project. Many of the local landowners 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.

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

Over 20-30 regular volunteers participated in field surveys as part of Phase I and Phase II of this project. 15-20 members of the Bert Miller Nature Club attended an organized hike focusing on species at risk and the Lake Erie shoreline on September 18, 2011. This was a follow up to a similar hike in 2010. Four 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. On June 6th, 2011, over 10 Niagara College students were guided on a hike to learn more about this project and to observe species at risk and their habitats along the Lake Erie coast. On October 28, 2011, about 30-40 Niagara College students visited Crescent Beach to study in an outdoor setting and learn about species at risk on the Lake Erie coast. During phase I of the project, another two

classes from the college also participated in a guided hike. On June 19, 2011, this project also guided a group from the Niagara-on-the-Lake Surf Club, who frequent the waves of Lake Erie, on a tour of Pleasant Beach to highlighting the ecology of the shoreline and the importance of species at risk. Prior to the hike, the Surf Club hosted a beach cleanup and BBQ. In the summer of 2010, 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.

One of the best outreach opportunities of this project was guiding the Lorraine Bay Cottage Association, on June 25, 2011 for a hike-and-learn walk on their lands. This provided an opportunity to highlight the species at risk present on their lands and to share best stewardship practices with these landowners. Further, on October 16, 2011, the 10-15 members of the Crescent Beach Improvement Association were also guided on a hike to explain the ecology of beachgrass sand dunes and the species at risk which make their home there.

A presentation was prepared and delivered to local nature clubs in the Niagara Region and in Western New York. The talk highlights the study findings and the significance of species at risk and 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. These took place during the first year of the project and continued into Phase II of this project. On March 31, 2011 a public talk highlighting the findings of this project was given at the St. Catharine's Library and received great attendance. On April 4, 2011, the same talk and presentation was given at the Yearich Auditorium at Niagara College to dozens of students and members of the faculty. An updated talk was also given to the Niagara Falls nature club on February 15th and the same talk was given to the Niagara Frontier Botanical Society, in Amherst New York the night before. 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.

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 and Kacey Page 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; Steve Daniel, 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, Jim Battaglia, Rick Young, Dora Young, Janet Damude, Carol Horvat, John Stevens, Steven Daniel, 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, Neil Stewart, Linda Wierstra, Amy Brunning 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 extensive field surveys which provided details on the occurrence and distribution of 236 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 21 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 a number of target species at risk listed in the SARSF project application. In addition, a number of 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*).

Lastly, the Bert Miller Nature Club was awarded a Carolinian Canada Conservation Award in 2011. The award was in the group category, and recongized the club for leading an innovative and collabrative partnership that will provide high quality plant invnetory data for significant Lake Erie coastal areas. This award was received at their annual general meeting on May 27, 2011.

The project goal and objective of surveying parts of the Lake Erie coast in Ecodistrict 7E-5 to identify the occurence and distributiion of speices at risk and their habitats has resulted in the compilation of detailed data on 236 element occurneces.

Receiving the Carolinian Canada Conservation Award 2011

9.0 Budget

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

Unspent funds amount to $362.82 of the total budget amount of $30 000.

The unspent funds come from the Vehicle Travel and Fieldwork Expense section and the Equipment Costs section of the budget and equal $472.89 and $46.65 respectively. This totals $519.54 of unspent funds.

The Materials and supplies section and the Administration Costs section were over spent by $100.00 and $56.72 respectively. This totals $156.72 of overspent funds.

Therefore, $519.54 of unspent funds minus $156.72 of overspent funds totals $362.82 in unspent funds.

The vehicle mileage expenditure for the project was based on an estimation of the funds needed to cover project travel expenses of $4000.00. The actual amount of this expenditure was $3527.11 Therefore; $472.89 was unspent from this fund. This represents a reasonable difference due to the estimated cost of the budget vs. the actual cost of the budget.

Similarly, the estimated total amount for the Equipment Costs expenditure was $250.00. The actual amount spent was $203.35. Therefore $46.45 was unspent from this fund. This represents a reasonable difference in the estimated cost of this expenditure vs. the actual cost. In addition, the original Equipment budget was for binoculars. The Bert Miller Club had an extra set of binoculars available for use instead of purchasing a new pair. Instead, the project needed an updated version of Microsoft Access to support the use of a species database to input and analyze project records. Therefore, the binocular funds were used to purchase the Access program instead.

The Materials and supplies expenditure was estimated to be $1000.00 for genetic testing of Mulberry specimens. The actual cost of genetic testing for Mulberry specimens was $1 100.00. This expenditure was underestimated by $100.00

The Administrative Costs section was estimated at $500.00. The actual cost of phone, office supplies and photocopies was $556.72. This expenditure was underestimated by $56.72.

The strategy to address this underestimation of costs ($156.72) in the Material and Administrative expenditures is to cover it by applying a portion of the ($519.54) overestimation of the Travel and Equipment expenditures.

This leaves at total of ($519.54 – 156.72) $362.82 of unspent funds.

ELIGIBLE EXPENDITURE	TOTAL AMOUNT	PAYMENT CLAIM #1	FINAL PAYMENT	UNSPENT FUNDS
Human Resources Costs: **Project Coordinator** **Rate of Pay:** $ 26.00/hour **Length of contract:** (23.3 weeks) = $24,250	**$24,250.00**	**$16,640.00**	**$7,610.00**	**$0**
Equipment and purchase cost: Microsoft Access for databasing species	**$250.00**	**$0**	**$203.35**	**$46.65**
Materials and supplies: Genetic testing to determine pure or hybrid Red Mulberry samples = $1100	**$1,000.00**	**$0**	**$1,100.00**	**$ - 100.00**
Travel and Fieldwork Expenses: Gas mileage for project coordinator and volunteers	**$4,000.00**	**$2,503.01**	**$1,024.10**	**$472.89**
Administrative costs: Phone, office supplies and photocopies	**$500.00**	**$336.18**	**$220.54**	**$ - 56.72**
TOTAL	**$30,000.00**	**$19,479.19**	**$10,157.99**	**$362.82**

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 requested from SAR-SF
Human Resources	Letter of Offer	Wages for Field Botanist / Project Coordinator ($26/hr, 40 hr/wk, for 16 wks)	16,640.00		16,640.00
Administrative Costs	# 1 - 15	Photocopies and Phone costs (see attached receipts and spreadsheet)	336.18		336.18
Travel Costs		Gas (see attached mileage spreadsheet)	2503.01		2503.01
		Totals	**$19,479.19**		**$19,479.19**

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	Letter of Offer	Wages for Field Botanist / Project Coordinator ($26/hr, 40 hr/wk, for 7.32 wks)	7,610.00		7,610.00
Administrative Costs	# 1 - 10	Photocopies, paper, trimmer, parcel shipping and phone costs (see attached receipts and administrative costs spreadsheet)	220.54		220.54
Equipment Costs	# 11	Microsoft Access for species databasing	203.35		203.35
Materials and Supplies	#12	Genetic testing to determine Mulberry specimens, Biodiversity Institute of Ontario	1,100.00		1,100.00
Travel Costs		Gas (see attached mileage spreadsheet)	1,024.10		1,024.10
		Totals	**$10,157.99**		**$10,157.99**

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: 2011-2012_SARSF_Data_Submission_Worksheet_12-11-BMNC)
-Project Summary Form (excel file: Project_Summary_Form_2011_12_12-11-BMNC)
-Payment Claim Form and Official Invoice (word file: SARSF_Payment Claim Form_Final Report_2011_12_12-11-BMNC)
-Agreement Change Request Form (word file: SARSF_Agreement Change Request_Final Report_2011_12_12-11-BMNC)
-Letter of Offer (word file: Letter of Offer_2011)
-Receipt # 1_2 (jpeg file: Receipt # 1_2)
-Receipt # 3_4_5 (jpeg file: Receipt # 3_4_5)
-Receipt # 6 (jpeg file: Receipt # 6)
-Receipt # 7 (jpeg file: Receipt # 7)
-Receipt # 8 (jpeg file: Receipt # 8)
-Receipt # 9 (jpeg file: Receipt # 9)
-Receipt # 10 (jpeg file: Receipt # 10)
-Receipt # 11 (jpeg file: Receipt # 11)
-Receipt # 12 (pdf file: Receipt # 12)
-Mulberry DNA testing Summary (pdf file: LECPM Report)
-Mileage Documentation (excel file: Gas Mileage_Lake Erie Coast_2011_12_Project_Final Report)
-Printing and Administration (excel file: Printing and Admin Costs_Lake Erie Coast Project_2011_12_Final Report)
-Lake Erie North Shore Inventory - 2011 Part 1 - Article in the Rambler newsletter
(also available at: http://www.bertmillernatureclub.org/what-we-do/projects/lake-erie-coast-project-2011-part-1/)
-Lake Erie North Shore Inventory - 2011 Part 2 - Article in the Rambler newsletter
(also available at: http://www.bertmillernatureclub.org/what-we-do/projects/lake-erie-coast-project-2011-part-2/)
-Lake Erie North Shore Inventory - 2011 Part 3 - Article in the Rambler newsletter
(also available at: http://www.bertmillernatureclub.org/what-we-do/projects/lake-erie-coast-project-2011-part-3/)
-Carolinian Canada Conservation Award 2011 (jpeg file: CC Conservation Award_1)
-Carolinian Canada Conservation Award 2011 (jpeg file: CC Conservation Award_2)
-Land Owner Letter
(adobe pdf file: Ecological Survey of the Lake Erie Coast Landowner Contact Letter)
-Permission form (adobe pdf file: Landowner Permission Form)

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. 2000. Reconnaissance Botanical Inventory of Marcy's Woods, Point Abino, Niagara Regional Municipality, Ontario. Ontario Natural Heritage Information Centre, Ministry of Natural Resources Peterborough, Ontario

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.