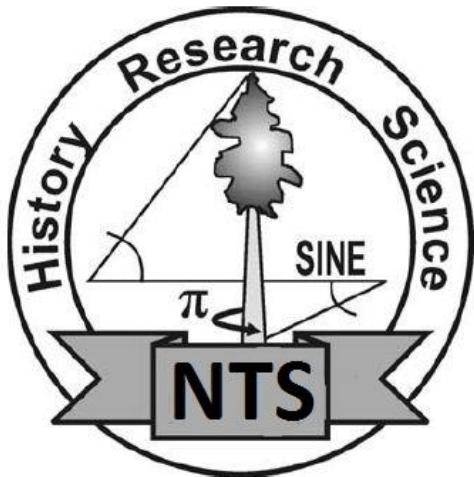


The Last on Earth: Marcy Woods -Ontario's Endangered Treasure

Scientific Report Prepared for
Friends of Marcy Woods, October,
2005

Bruce Kershner
Professional botanist, forest ecologist,
Environmental Scientist

Native Tree Society
Special Publication #15



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<http://www.nativetreesociety.org>
<http://www.ents-bbs.org>

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The Native Tree Society (NTS) is a cyberspace interest groups devoted to the documentation and celebration of trees and forests of the eastern North America and around the world, through art, poetry, music, mythology, science, medicine, wood crafts, and collecting research data for a variety of purposes. Our discussion forum is for people who view trees and forests not just as a crop to be harvested, but also as something of value in their own right. Membership in the Native Tree Society and its regional chapters is free and open to anyone with an interest in trees living anywhere in the world.

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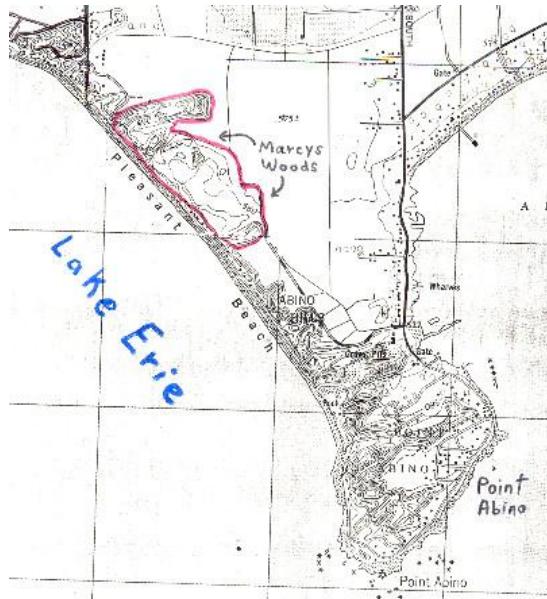
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Forward/Introduction

This report is one of a series written by Bruce Kershner that the Native Tree Society (NTS) are publishing or republishing as part of its Special Report series. They were given to fellow NTS member Dale Luthringer prior to Bruce's untimely death in 2007 with the goal of them eventually being published and made available to other tree researchers.

This report: "The Last on Earth: Marcy Woods - Ontario's Endangered Treasure" was prepared in March 2005, by Bruce Kershner, for the Friends of Marcy Woods. The text included herein is complete and as written by Bruce Kershner aside from corrections of minor typographical errors.

The report focuses on the Marcy Woods area, a small patch of old growth forest on the west side of the Abino Peninsula. The peninsula juts into the northern (Ontario) side of Lake Erie about 10 miles west of the outflow of the Niagara River from Lake Erie. The Friends of Marcy Woods group that sponsored the report is no longer active. It was created to ensure the preservation of the old growth forest in a time of ownership transition.



Currently "Marcy's Woods: A Private Nature Reserve Committed to Environmental Preservation"



is owned by the DiCienzo family. Their website, <http://www.marcyswoods.ca/ownership-of-marcys-woods.php> says on Thursday July 24, 2003 the family purchased Marcy's Woods in an effort to uphold, implement, and serve as a model of how of private ownership can lead to successful preservation of a nature reserve. The property had been owned for the previous 100 years by the Marcy family. At the time of the report the property was being considered for sale or development.

Bruce Kershner in fact testified before the Fort Erie, ONT city council on May 13, 2002 on Marcy Woods.



The Municipal Corporation of the
Town of Fort Erie

REGULAR COUNCIL MEETING

MONDAY, MAY 13, 2002

COUNCIL CHAMBERS

<http://www.town.forterie.ca/WebSite/townoffterie.nsf/Doc/OpenDoc.html?OpenFrameSet&ID=96AA188FE3215C4B85256D5E00682382&File=May13r.pdf&Title=COUNCIL%20MINUTES&Document=May%202013,%202002%20-%20Regular%20Council> The bulk of the city council meeting dealt with accounts and consideration of Marcy's Woods. As for Mr. Kershner's testimony te minute read in part:

“Mr. Eberly introduced Bruce Kershner, a Forest Ecologist from Western New York. Mr. Kershner is conducting the Niagara Peninsula Old Growth Survey for the Bert Miller Nature Club. He has discovered 200 previously unknown Old Growth Forests and has written four books on the subject.

Mr. Kershner indicated this is a bi-national issue because Americans are just as concerned as Canadians about the preservation of Marcy’s Woods because it is so unique.

Mr. Kershner stated the biodiversity of Marcy’s Woods is considered to be as significant as the Niagara Gorge and Point Pelee National Park. It is recognized as an “Area of Natural and Scientific Interest” by Ontario government researchers. Marcy’s Woods is declared to be an “Environmentally Significant Area” by the Regional Municipality of Niagara. It contains a provincially significant and rare wetland.

Mr. Kershner further stated it contains the only known Old Growth Black Maple Forest in the world covering 65-70 acres. It contains one of only three sites in the world with Old Growth Hemlock trees that grow on sand dunes. It is the only place in Canada to possess all species of two groups of wildflowers, the Trilliums (the symbol of the Province of Ontario) and the Waterleafs. It possesses one of the most extensive stretches of wild and undisturbed beach on Lake Erie.

Mr. Kershner remarked if someone was to come in to develop this land, all of this would go under. He said if a developer were to purchase Marcy’s Woods, the Town should not permit them to develop it.

Mr. Kershner urged Council to take bold and public action towards the preservation of Marcy’s Woods, to urge the Ontario Government, M.P.P. Tim Hudak and M.P. John Maloney to do everything in their power including the expropriation of the lands.”

The result of this day’s meeting was the introduction and passage of the following resolution:

Resolution No. 21 Haggerty-Anderson

WHEREAS the property known as “Marcy’s Woods”, located in the Town of Fort Erie, is made up

of approximately 300 acres of virgin Carolinian forest, fragile sand dunes, wet lands, farmland and provincially designated areas of natural and scientific interest, and

WHEREAS for many years the Marcy family, which owns the property, has allowed local naturalists and school children to visit Marcy’s Woods, and

WHEREAS the Nature Conservancy of Canada, in concert with the Province of Ontario has been negotiating with the Marcy family for the acquisition of Marcy’s Woods, for the benefit of the public, and

WHEREAS the Province of Ontario has allocated \$900,000.00 towards the purchase of Marcy’s Woods, and

WHEREAS the Marcy family has been presented, by a private interest, with an offer to purchase Marcy’s Woods for what is reported to be \$2.8 million or, alternatively \$2.6 million for the shares of the corporation that owns the property, and

WHEREAS all Ontarians deserve to share in the beauty, serenity and uniqueness of Marcy’s Woods, and

WHEREAS the only way to guarantee protection and preservation of this unique part of our natural heritage is for it to be placed in public ownership;

NOW THEREFORE BE IT RESOLVED by the Municipal Council of the Town of Fort Erie that:

1. The Government of Ontario, either directly or through the Nature Conservancy of Canada, is hereby urged to acquire, without delay the property known as Marcy’s Woods, for the benefit of the people of Ontario.

2. In the interim, the Province of Ontario, be petitioned to take all appropriate steps to ensure the protection and preservation of the property known as Marcy’s Woods.

3. The Premier of Ontario, Mr. Ernie Eves and The Honourable Tim Hudak, Minister of Consumer and Business Services and Erie-Lincoln, MPP and the Nature Conservancy of Canada be so notified of teh resolution (CARRIED)

Native Tree Society Special Publication #15, March 2012

The Minutes of a meeting of the Planning Services Committee held in Committee Room 4, Regional Municipal Building, Thorold, Ontario on Wednesday, June 12, 2002 commencing at 2:05 p.m. indicates the Planning Services Committee revisited the subject of Marcy's Woods and again endorsed the above resolution.

<http://www.town.forterie.ca/WebSite/townofforterie.nsf/CouncilMinutes/index.html>

The woods was eventually privately purchased. The home page website for the Marcy's Woods Nature Reserve, <http://www.marcyswoods.ca/> expresses the following: "The north shore of Lake Erie contains one of Canada's most unique biodiversities, Marcy's Woods. Marcy's Woods is a protected private nature reserve that is comprised of 285 acres of intact Carolinian forest that offers spectacular scenery, and is the habitat of many plants, animals, birds and reptile species, several of which are endangered.

Through the private ownership of Marcy's Woods by the Dino DiCienzo family, the natural resources of Marcy's Woods including the sensitive wetlands, sand dunes, flora and fauna will be protected, restored and managed. "

It is my hope that the site continues to be preserved from development and continues to be a resource for nature education in the region.

There are many reports on Marcy Woods found online. There is testimony from a number of people reported in the minutes of the May 13, 2002 Ft. Erie council meeting cited above. There is also a series of blogs on the Marcy's Woods Nature Reserve website describing hikes and various activities taking place at the reserve: <http://www.marcyswoods.ca/blog/>

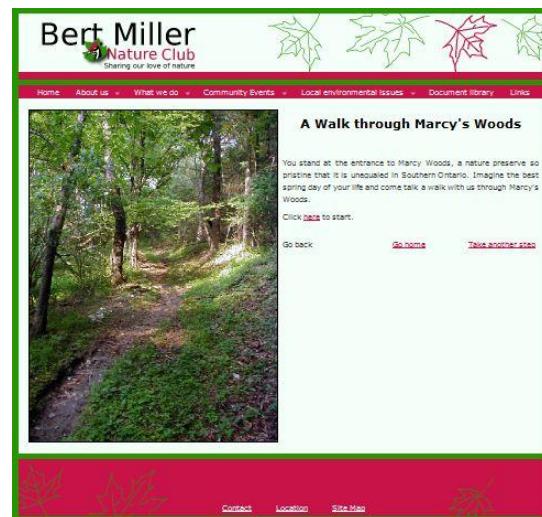
The Bert Miller Nature Club, one of the sponsors of Mr. Kershner's research has an excellent article on Marcy's Woods on their website:
<http://www.bertmillernatureclub.org/what-we-do/projects/marcys-woods>



This screenshot shows the Bert Miller Nature Club website. The header features the club's name and a nature-themed graphic. The main content area is titled "Marcy's Woods - A Natural Learning Site". It includes a photograph of a dead tree trunk, a paragraph of text about the tree's importance as a habitat for woodpeckers, and a quote from Dr. Bert Miller. At the bottom of the page are links for "Contact", "Location", and "Site Map".

The page includes a link that lets the visitor take a slide-show walk through Marcy's Woods:

<http://www.bertmillernatureclub.org/what-we-do/projects/marcys-woods/walk>



This screenshot shows a slide-show walk through Marcy's Woods. The top part of the page is identical to the previous screenshot. Below it, there is a large image of a forest path. To the right of the image, there is a caption: "A Walk through Marcy's Woods". Below the image, there is a small text box with instructions and three buttons: "Click here to start.", "Go back", and "Take another step". At the bottom of the slide-show area are the same navigation links: "Contact", "Location", and "Site Map".

An nice article about the usage of Marcy's Woods appeared in the Niagara Falls review in May 2011
<http://www.niagarafallsreview.ca/ArticleDisplay.aspx?e=3120190> entitled: "Loving Nature – Students get a close-up look at Marcy's Woods" by Ray Spiteri.

The screenshot shows the homepage of niagarafallsreview.ca. At the top, there's a large blue banner with the text "niagarafalls review .ca". Below the banner, there's a scenic image of a river flowing through a forest with autumn foliage. A navigation bar below the banner includes links for HOME, NEWS, SPORTS, and ENTERTAINMENT. Underneath this, another navigation bar offers links for LOCAL, ONTARIO, CANADA, and WORLD. The main headline on the page is "Students get closeup up look at Marcy's Woods Loving nature". Below the headline, it says "By Ray Spiteri, Niagara Falls Review Thursday, May 12, 2011 9:02:46 EDT AM".

The first couple of lines read, “Nineteen students from Notre Dame Catholic Elementary School in Niagara Falls traded in their cellphones and iPods Wednesday for a day at Marcy’s Woods, home to several endangered plants and animals.”

“The focus of this walk is for them to be still in nature, away from the business of life, to take in the beauty of creation and how God speaks to us through creation,” said Caroline Matovic, of the Spiritual Centre Outdoor Education Program.”

I also found a series of reports by Earl Plato, on his blog – When Nature Calls

<http://naturecall.blogspot.com/> that discuss Marcy’s Woods. One of theose blogs, for example, from November 23, 2007 is entitled: “The Hooded Warbler – Marcy’s Woods”

<http://naturecall.blogspot.com/2007/11/hooded-warbler-marcy-woods.html> More posts about Marcy’s Woods can be found on another blog – Nature Articles: <http://naturearticles.blogspot.com/> The posts on these two blogs range in date from 2007 until 2009.



Earl Plato

Earl describes himself as: I am a long time writer of nature and local history for area newspapers. This is my attempt to share some of my love of Fort Erie and the Niagara Peninsula and its history.

<http://www.earlplato.ca/> These blogs about Marcy’s Woods by Mr. Plato give an excellent feel for the nature of the woods.

Bruce Kershner first describes Marcy Woods in his report “Old Growth Forest Survey of Niagara Peninsula, Project of Bert Miller Nature Club, First Phase Report to Trillium Foundation, October 2003.”

**Old Growth Forest Survey
of Niagara Peninsula**
Project of Bert Miller Nature Club
First Phase Report to Trillium Foundation
October 2003

Summary of Old Growth Discoveries:

Highly significant discoveries were made during the first phase of the Old Growth Forest Survey of the eastern Niagara Peninsula, sponsored by the Bert Miller Nature Club. Out of 51 forest sites that were surveyed, 22 were confirmed as old growth forest (or old growth forest trees). These total approximately 279 acres.

“Highly significant” could be an understatement. The magnitude of the discoveries far surpassed all expectations. This is evidenced in the following findings of the first year of the survey:

- 1) Discovery of the world’s last old growth black maple forest, Marcy’s Woods. It is also only the second site in North America where mature (as well as old growth) eastern hemlock grows on sand dunes.
- 2) The tree species, scarlet oak, was discovered for the first time in Canada. Its official range map in all future tree guides must be adjusted as the newest addition to Canada’s flora. The site where scarlet oak was found is in the Brooks Monument Oak Grove. It is also the only “big-tree” old growth scarlet oak grove recorded in North America, outside of the southern Appalachians.
- 3) Discovery of Canada’s only old growth Shumard oak forest (Gray Family Forest), and the only old growth Shumard oak forest outside of the U.S. Deep South.
- 4) The largest old growth forest within the city limits of any city in eastern North America. This is Niagara Glen (60 acres) plus the Niagara Gorge ancient cedar zone (10 acres) that lies within the City of Niagara Falls, Ontario, with a combined total of 70 acres.
- 5) Original discovery of ultra-ancient cedars in the Niagara Gorge. Although the gorge has been studied over 200 years by hundreds of scientists, until now, no one had realized that it had cedars that attained ages over 500 years, probably to 700 years or older.
- 6) Discovery of possibly the tallest hardwood forest (including a possible candidate for the tallest tree) in the Province of Ontario: Niagara Glen’s old growth forest. Its tallest tulip tree has a champion height of over 130 feet. The Glen also has Canada’s tallest sassafras and chinquapin oak.
- 7) Ultra-ancient black gums, 300 to 500 years old, in the Bowmans Archery Club Black Gum Grove. This makes this the oldest known hardwood forest in the Niagara Peninsula.
- 8) Discovery of some of the largest diameter trees (for their species) in Ontario. These include a 6-foot diameter red oak, 4-foot Shumard oak (probable Canadian champion), 42-inch diameter scarlet oak (probable Canadian champion); Canada’s national champion

This document is available for download as a pdf file on the Bert Miller Nature website (42 MB) at:

<http://www.bertmillernatureclub.org/assets/docs/library/OLD%20GROWTH%20FOREST%20SURVEY%20OCTOBER%202003.pdf>

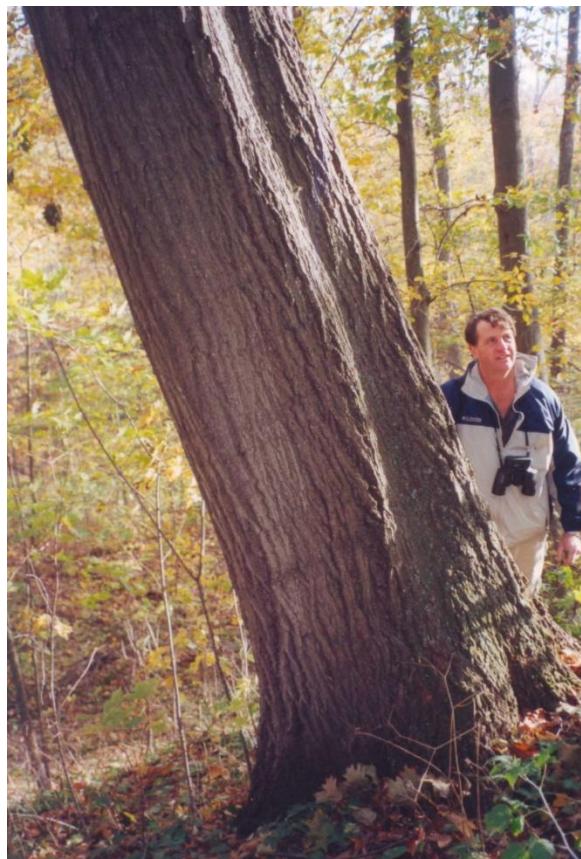
The highlights of the report reads; “1) Discovery of the world's last old growth black maple forest, Marcy's Woods. It is also only the second site in North America where mature (as well as old growth) eastern hemlock grows on sand dunes.” A longer description is found on pages 30-32 of the report.



Marcy's Woods



Primal forest scene only 500 feet from lake Erie



300 year old black maple



Close-up of old growth black maple bark

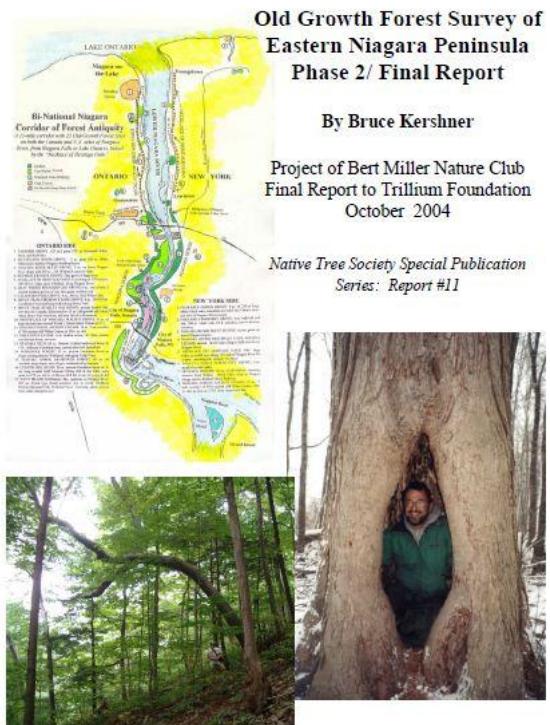


Red trillium in the spring, part of a large colony



Marcy's Woods – view from the wild beach

The second phase of this research report was completed by Brue Kershner in 2004: "Old Growth Forest Survey of Eastern Niagara Peninsula, Phase 2/ Final Report" This document was republished as part of the NTS Special Publication Series, #13.



It is available for download as a pdf file here:
<http://www.ents-bbs.org/viewtopic.php?f=281&t=3806#p15917> The
was little additional information on Marcy Woods
obtained during the second phase of the investigation,

but several additional dune forests were located along the shore of Lake Erie.

Carolinian Canada has an excellent overview of what they call the “Point Abino Peninsula Sandland Forest”

http://www.carolinian.org/CarolinianSites_PointAbino.htm



The overview of the areas reads:

“An exceptionally diverse, well developed, extensive and species-rich representation of the Lake Erie coastal shoreline. Contains backshore dune ridges, basin wetland landforms and other significant communities that are very sensitive to disturbance (Eagles & Beechey, 1985).

This large, privately owned area comprises the most extensive and spectacular expanse of naturally forested sandland hills, wetland basins and undisturbed shorelines along the north coast of Lake Erie in this region... The aeolian sands form a spectacular series of undisturbed forest stabilized sand dune ridges at the headland and along the peninsula's western edge. Northeastwards and inland is an extensive, poorly drained wetland forest and scrub mosaic (MacDonald, 1980 in Eagles & Beechey, 1985).

Carolinian Forest is a term commonly used to refer to as the eastern deciduous forest in the United States characterized primarily by a predominance of deciduous, or broad-leaf trees. The term Carolinian is primarily used in Canada.

References from Carolinian Canada

* Allen, G.M., P.F.J. Eagles and S.D. Price (eds.) 1990. *Conserving Carolinian Canada: Conservation Biology in the Deciduous Forest Region*. University of Waterloo Press, Waterloo. 346 pp.

* Brady, R.F. (ed.) 1980. *Point Abino Site Summary*. In, *Regional Municipality of Niagara Environmentally Sensitive Areas*. Department of Geography, Brock University, St. Catharines. viii + 392 pp.

* Eagles, P.F.J. and T.J. Beechey (eds.) 1985. *Critical Unprotected Natural Areas in the Carolinian Life Zone of Canada. Final Report, Identification Subcommittee, Carolinian Canada*. The Nature Conservancy of Canada, The Ontario Heritage Foundation and World Wildlife Fund (Canada). 400 pp.

* Macdonald, I.D. 1980. *Life Science Features of the Haldimand Clay Plain Physiographic Region*. Ontario Ministry of Natural Resources, Parks and Recreation Section, Central Region, Richmond Hill, Ontario. SR OFER 8001. vii + 266 pp. + map.

Edward Frank, editor

General Background

This document is one of a series of Special Reports being published by the Native Tree Society consisting of reports of old growth sites written by Bruce Kershner just prior to his untimely death from esophageal cancer in February 2007. Bruce S. Kershner (April 17, 1950 - February 16, 2007) was an environmentalist, author, and forest ecologist. He served as a University of Buffalo adjunct faculty member. He earned a Master of Science Degree in Botany-ecology from University of Connecticut. He was widely acclaimed as an authority on old growth forests, documenting hundreds of ancient trees and forests in eastern North America, where previously no one thought they had existed. He is an author of a dozen books on natural history, including: The Sierra Club Guide to the Ancient Forests of the Northeast by Bruce Kershner and Robert T. Leverett (May 1, 2004); National Wildlife Federation Field Guide to Trees of North America by Bruce Kershner, Craig Tufts, Daniel Mathews and Gil Nelson (May 9, 2008); and Secret Places: Scenic Treasures of Western New York and Southern Ontario by Bruce Kershner (Aug 1994).

Bruce Kershner won numerous awards for his environmental activism. These included 'Environmentalist of the Year' in 1987 and 1988 from the Sierra Club (Niagara Group) and the Adirondack Mountain Club, and 'Environmentalist of the Year in New York State' in 1996 from Environmental Advocates of New York. Robert Leverett, a co-author and colleague of Bruce described him as a "a buzz-saw and indefatigable. His role often was one of calling attention to forests in danger, leading the charge to get them protected, and in being an inspiration to others."

These documents were given to his friend and colleague Dale Luthringer prior to his death with the goal of seeing them eventually published. The Native Tree Society has received permission from his widow to do so. The text and tables were reformatted to better fit the NTS Special Report format, but the content presented is as written by Bruce Kershner and has not been otherwise edited or altered.

Additional information relating to these reports and updates on the current state of affairs at the described sites have been compiled and are presented as separate articles within each individual report. A final document includes biographical information, miscellaneous smaller reports written by Bruce Kershner, listings and excerpts from articles talking about Bruce and his work, tributes and eulogies written upon his passing, and other materials in a similar vein.

Disclaimer

Bruce Kershner has argued in these documents that based upon extensive experience by the researchers, through using a series of physical characteristics that the ages of individual trees could be estimated to within 10 to 15% of their true ages. It is the position of the Native Tree Society that tree age estimates based only on physical characteristics cannot be made to this degree of accuracy. Based upon physical characteristics alone, the age of an individual tree may be greatly underestimated or over-estimated even by an experienced researcher. Where permitted, in order to obtain accurate tree age information, dendrochronological methods, including taking cores from select standing trees and counting the rings present in fallen trees, should be used to provide baseline chronological data and to serve as a calibration for the apparent ages as indicated by physical characteristics.

Physical characteristics are commonly used by dendrochronologists to determine which trees in a stand or area are likely the oldest and to help select which trees to sample. Listings of characteristics found in old trees very similar to the one written by Kershner have been produced by the dendrochronology community. Dr. Neil Pederson recently published the article "External Characteristics of Old Trees in the Eastern Deciduous Forest (Volume 30 (4), 2010 Natural Areas Journal, pp. 296-307)." A similar article "Identification of Old Ponderosa Pine Trees in the Front Range(18 USDA Forest Service Gen. Tech. Rep. RMRS-GTR-110. 2003)," deals with the characteristics of this conifer. Physical characteristics are a valuable tool

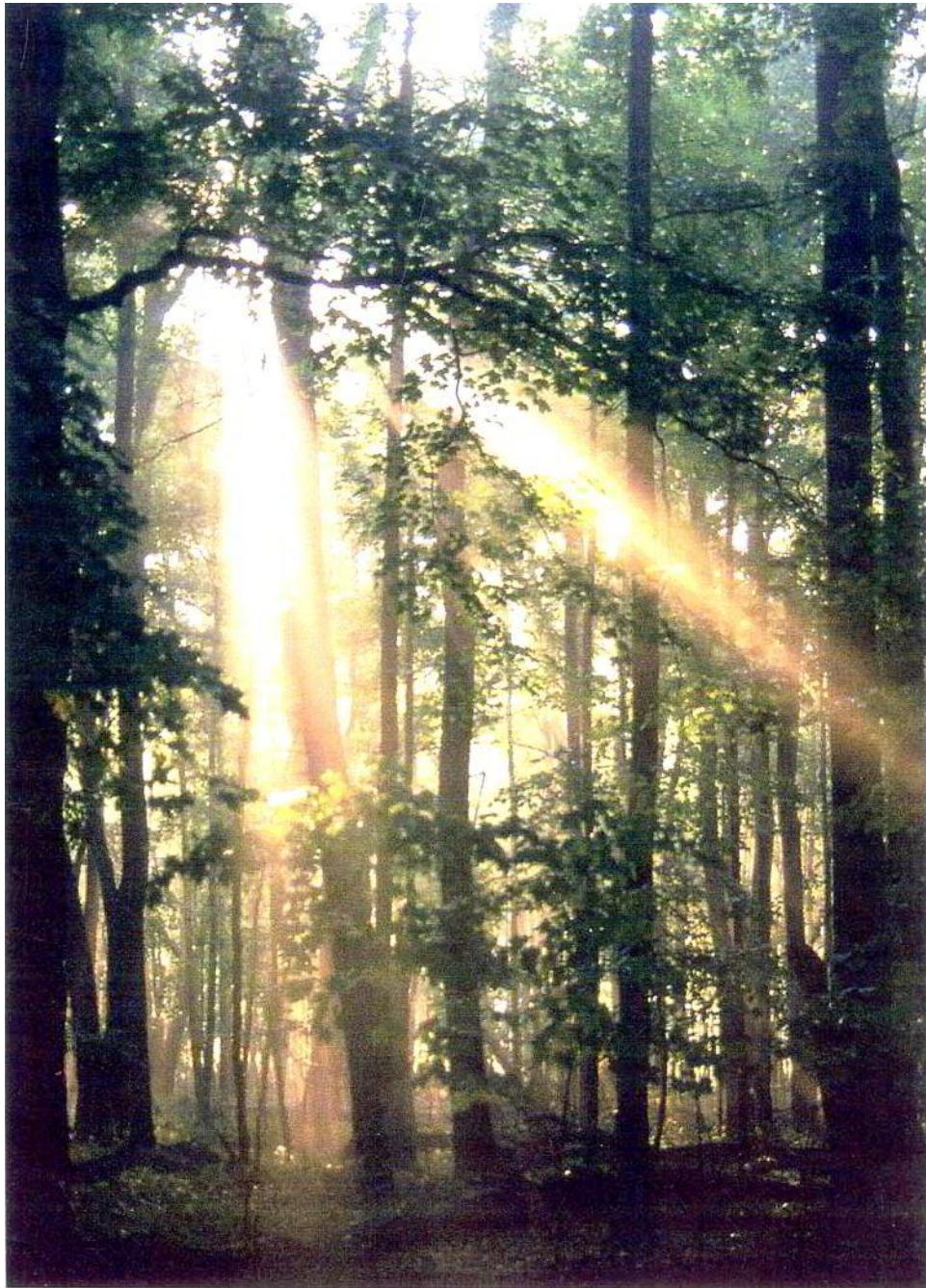
for old growth researchers, but for determining the age of a specific tree, an accurate age can only be determined through coring and similar dendrochronological techniques.

The above qualifications should not be misapplied to Kershner's old-growth designations. Old growth forest is essentially an anthropogenic designation with no distinct ecological boundary. As such there have been hundreds of old growth definitions that have been applied different situations and by different individuals. Kershner has provided one such definition. He has explicitly defined an old tree and one of a certain age or one which has certain

physical characteristic he characterizes as an indication of old age. He further has explicitly defined an old growth forest as one which has certain specific criteria, including old trees, and is lacking in other characteristics. Therefore by definition, if a forested site has these characteristics it is an old growth forest. He has used this definition to many old growth forest sites in the northeastern United States and Canada. In contrast, such as in the Niagara Gorge for example, he has also used these criteria to exclude potential sites as old growth. Other researchers can argue the merits of the criteria used for this definition, but it appears to have been fairly and equitably applied by Kershner in these reports.

The Last on Earth: Marcy Woods

Ontario's Endangered Treasure



**The Last on Earth:
Marcy Woods
Ontario's Endangered Treasure**

Scientific Report Prepared for
Friends of Marcy Woods
October, 2005

Bruce Kershner
Professional botanist, forest ecologist,
Environmental Scientist

Background of Bruce Kershner

Bruce Kershner is a consulting botanist, forest ecologist, and international scientific authority on Old Growth Forests. He has authored 13 books on trees and natural history, including five books about Old Growth Forests. His most recent, *Sierra Club Guide to Ancient Forests of the Northeast* (2004, Sierra Club Books and University of California Press), is the first guide to Old Growth Forests ever written for eastern North America. His ground-breaking research also includes the first systematic regional survey for Old Growth Forests of southern Ontario, as well as for New York State and New Jersey. Among his 250 Old Growth Forest discoveries are North America's second tallest hardwood forest, the largest Old Growth hardwood forest on the entire Canada-US international boundary, Ontario's tallest hardwood forest, the world's last Old Growth Black Maple Forest, and the oldest forest in New York State. He documented that Old Growth Forests, including 1,500 ancient Northern White Cedars (up to 900 years old), occupy most of the Niagara River Gorge. A University of Buffalo adjunct faculty member, he earned a Master of Science Degree in Botany-ecology from University of Connecticut. His newest book (in press) is *National Wildlife Federation Guide to Trees of North America*. His research has been featured several times in the New York Times, CBC, CFTO, Hamilton Spectator, ABC-TV News, and numerous other TV and radio, newspapers and magazines. His most recently published peer-reviewed scientific journal article in *Natural Areas Journal*, 2005.

"Walking into an ancient forest, a man becomes displaced in time. In this sequestered primeval forest, a humble poem of tribute to God rises from the deep of man's soul."

- John Muir, early Ontario botanist-explorer (1840s), creator of the National Parks concept, founder of the Sierra Club

Photo Credits: The majority of photographs were generously provided by naturalist and photographer, Carl Milazzo; the source for the back cover photo is "National Audubon Society Field Guide to Trees, Eastern Region." The front cover photo and selected others in the report were contributed by members of Friends of Marcy Woods.

recommendations for
protection of Marcy Woods

Marcy Woods is the *last known Old Growth Black Maple forest on Earth*. It is also the refuge for the greatest concentration of rare and threatened plant and animal species in the Province of Ontario.

If there were a "Nobel Prize for Natural Heritage Sites," Marcy Woods would be a prime candidate. This is because it has so many globally-significant and other superlative environmental, natural heritage, and cultural heritage features.

Together, they make an overwhelmingly convincing case that Marcy Woods should be a top priority for Provincial protective action and funding. This governmental action is imperative because of the current threats to develop the most sensitive and significant parts of the property.

The sum of all the facts about Marcy Woods' global significance should lead all reasonable-minded government decision-makers to these inescapable conclusions:

only the government has the power and resources to protect Marcy Woods .

Government action (primarily the Province) must be immediate and decisive. this should follow Minister of Housing Hon. John Gerretsen's bold decision to issue the "Indefinite ministerial Zoning Order" on September 2005. Marcy Woods, however, still does not have the provincially-ordered permanent protection plan.

if the Province does not show leadership and take the necessary protective actions to preclude development of Marcy Woods Old Growth Forest, the losses will be globally significant and irreversible ... and inexcusable.

There exist alternative -- and feasible -- locations for the proposed development on the lakefront sand dunes. But there is only one location in the world for Marcy Woods Virgin Old Growth Forest and its "Endangered Species Refuge"

Its loss, or loss of any part of it, would be a tragic legacy that this Provincial government has the power to avoid.

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The Last on Earth[†] Marcy Woods, Ontario's Endangered Treasure

Scientific Report

by Bruce Kershner, Forest Ecologist
Prepared for Friends of Marcy Woods

Introduction

Marcy Woods, the *last known Old Growth Black Maple forest on Earth*, is a globally-significant natural heritage site. Its need for protection is made even more compelling by the fact that it is also the refuge for the greatest concentration of rare and threatened plant and animal species in the Province of Ontario. This biodiversity record even surpasses the famed Point Pelee National Park, located at the opposite end of Lake Erie.

However, these are only a few of the many superlative environmental, natural heritage, and cultural heritage features of Marcy Woods. The full picture of the remarkable -- and threatened -- assets of Marcy Woods, especially those of its Old Growth Forest, have never been presented in one document. Therefore, this scientific report has been prepared to thoroughly document the factual basis and evidence for this array of outstanding and world-class features of Marcy Woods. The report's documentation is based on extensive on-site field data collection by the author, an international scientific authority on Old Growth Forests, and supported by major scientific literature and other reliable sources.

The globally significant features of Marcy Woods

The outstanding array of world-class superlative features possessed by Marcy Woods make the compelling case for the government to seek the highest level of protection. It is essential to recognize that *each one of these features stands on its own as sufficient justification for the need for immediate protection*. Collectively taken together, they make the case that the Province should designate Marcy Woods as Ontario's highest priority natural heritage site demanding government protective action.

- it is the last known Old Growth Black Maple Forest in the world (65 acres)
- it is the refuge of 4 species of Trillium wildflowers, the only such place in Ontario. As a result, Marcy Woods can be viewed as "the Symbol of Ontario" since it is the only place to see virtually all of its Trillium species, Ontario's official symbol and emblem. Furthermore, it is the only known place in southern Ontario where one can literally see the Province's virgin landscape as it existed before European settlement.
- it is the only Virgin Old Growth Forest confirmed (so far) in Southern Ontario (south of the Canadian Shield). Virgin Old Growth is the "rarest of the rare." "Virgin" Old Growth Forest is designated for Old Growth Forests which have had no evidence of intentional disturbance by humans, such as timber cutting, burning, plantations, thinning, draining, grazing. In the neighboring US states, there are only several properties containing Virgin Old Growth Forest in the large region bounded on the west by lower Michigan and Indiana, and all the way east to the Atlantic coast states from New Jersey to Maine.
- it possesses the greatest concentration of rare and threatened plant and animal species of any site in Ontario. These include:
 - 3 Nationally Threatened wildlife species (Hooded Warbler, Fowler's Toad, and Acadian Flycatcher), and the Nationally Rare Giant Swallowtail, Canada's largest butterfly; also 23 other nationally or provincially rare species of birds.
 - one of the last places in Canada where nationally rare Southern Flying Squirrel and 3 kinds of reptiles and amphibians still survive.
 - 15 Nationally or Provincially Threatened or Rare plants, including the Hop Tree, White Wood Aster, Spring Avens
- an official Canadian "Center for Woodpecker Diversity," hosting 7 species of woodpeckers. The Committee on Status of Wildlife in Canada states the loss of this habitat would threaten the existence of many of the birds in Canada.
- One of Ontario's "rare insect refuges," including butterfly species new to Ontario.

- Canada's highest quality example of Carolinian Forest, the nation's rarest and most southern ecosystem and geographical zone
- it harbours what is probably the longest stretch of completely pristine, but still unprotected, sand beach on the entire bi-national shore of Lake Erie. Although it ranks at the highest level of priority for protection, it still remains threatened from development. It is not clear if elected and Ministry officials are undertaking actions leading toward Marcy Woods' permanent protection. When a certain place *just happens to be* "the last on Earth," one would certainly hope they are.
- its 80-foot sand dunes are part of Lake Erie's most extensive sand dune system
- largest tract of Old Growth Forest on Lake Erie's 835-mile long Canadian-US shore. It is one of the only places where one can see and experience some of the tallest and oldest trees overlooking the waters of Lake Erie, where one can walk through a forest that is virtually unchanged from the way it was when only the Native Peoples lived here. See the following chart on the "Values and Benefits" of Old Growth Forests which details all the beneficial effects of Old Growth.
- one of only 3 places in the world known where Old Growth Hemlock trees grow on sand dunes as a significant component of an Old Growth Forest.
- one of the only known places where the evergreen shrub, Canada Yew, thrives on sand dunes. It grows as sizable colonies that carpet the forest floor. Like the forest itself, these Yew shrubs are also Old Growth, probably 500 years old or more (even older than any of the individual trees).
- recognized as an "Area of Natural and Scientific Interest" by Ontario, part of a United Nations "World Biosphere Reserve." One scientific study states that "its destruction would be a major loss to the natural heritage of the province."
- the 120+ acre forested wetland adjacent to the Old Growth Black Maple Forest on the inland (north) side may also be Old Growth Swamp Forest. It has never been surveyed, but several brief visits into this challenging terrain indicate it may also be filled with Old Growth Forest and rare species. It is particularly notable that it has been designated as a "Provincially Significant Wetland."



White Trillium (Ontario's official emblem) and Painted Trillium, 2 of 4 Trillium species growin at Marcy Woods. Purple Violet is between them.



Red Trillium and Yellow Trillium, the other two of the 4 Trillium species that grow at Marcy Woods.

Old Growth Forests: Their Unique Values and Benefits

- They contain the oldest, tallest and largest living things, attributes worthy in their own right
- They are a unique scientific, research and educational resource. They provide pristine outdoor laboratories where natural process can be studied and taught, free of the conflicts of human disturbance. They are among the only places for us to learn what the maximum longevity, height, and size that trees can attain, and where to find and study the rarest species.
- They provide habitats for numerous rare and endangered animals and plants, many of which have few other places to live. There are Eastern U.S. 56 species of wildlife that prefer, or thrive best in, very mature or old growth forests. They are the home for the highest proportion of threatened and rare species. At least 60 species of plants are found nowhere else except in Eastern ancient forests.
- They serve as irreplaceable genetic banks, saving examples of life forms that may have value for the future because their genes enabled them to survive under severe conditions and to achieve great longevity, or the greatest height or size; or are examples of genetic attributes from past ages, still surviving in our times.
- They are living historic monuments since they preserve the original landscape. They are the only place where you can see (and walk through!) the last surviving landscapes of the pre-European era when only Native People lived here. They are part of our irreplaceable legacy.
- They are a source of enduring beauty and aesthetics, and are sought after as a source or model for art, photography, poetry and literature. Ancient Forests are one of the top five most admired Nature scenes, according to national surveys of the public. Old Growth Forests are one of the most popular nature scenes to appear on calendars, post cards, and photographs.
- Their forest cathedral settings and hushed primeval forest create places for inspiration and communing with the Creator. They teach lessons of wisdom about recycling, life and death, symbiosis, timelessness and the Eternal. They are indeed majestic examples of the “Lord’s Creation.”
- They provide pristine places for people to renew themselves and receive therapeutic benefits by getting away from the stresses of daily life
- They can benefit the local or tourism economy. Large and ancient trees are always rated at the top of the list of admired natural features by the tourism public. Because they are so highly valued, people will spend money to visit them. By protecting and publicizing our local old growth forests, local communities can benefit financially, and can enhance their reputation. (Possessing a primeval forest is a “classy” asset to showcase.)

Some foresters dismiss Old-Growth Forest, claiming they have no economic value while uncut, or they call them “wasted timber.” Wood products are not the only economic value of magnificent and primeval forests. Ancient forest possesses economic value in the uncut, unmanaged condition, as a permanent, long-term tourist and recreation-business resource. Cutting down “Heritage Forest” or Historic or Champion Trees for the short-term profit is a skewed and destructive way to treat an irreplaceable treasure.

Location and Brief History of Marcy Woods Property

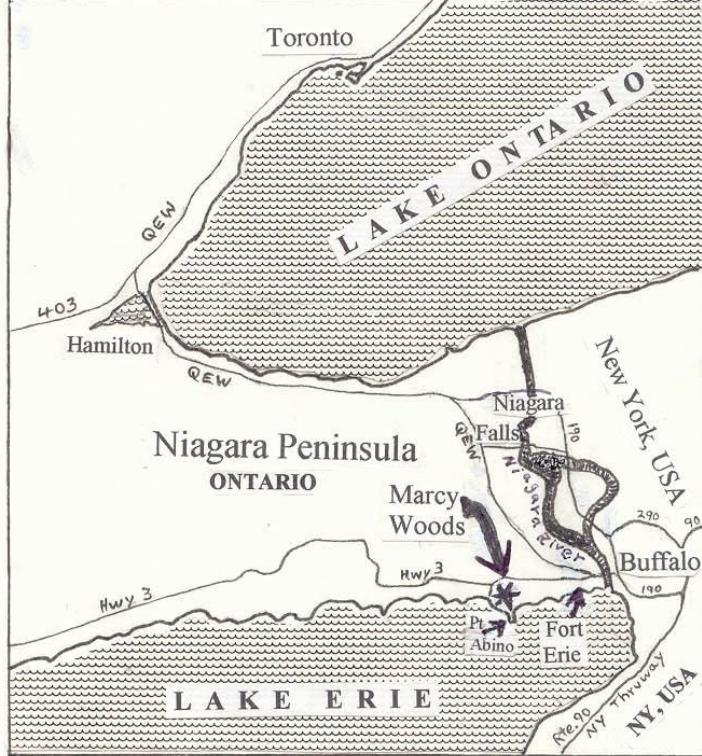
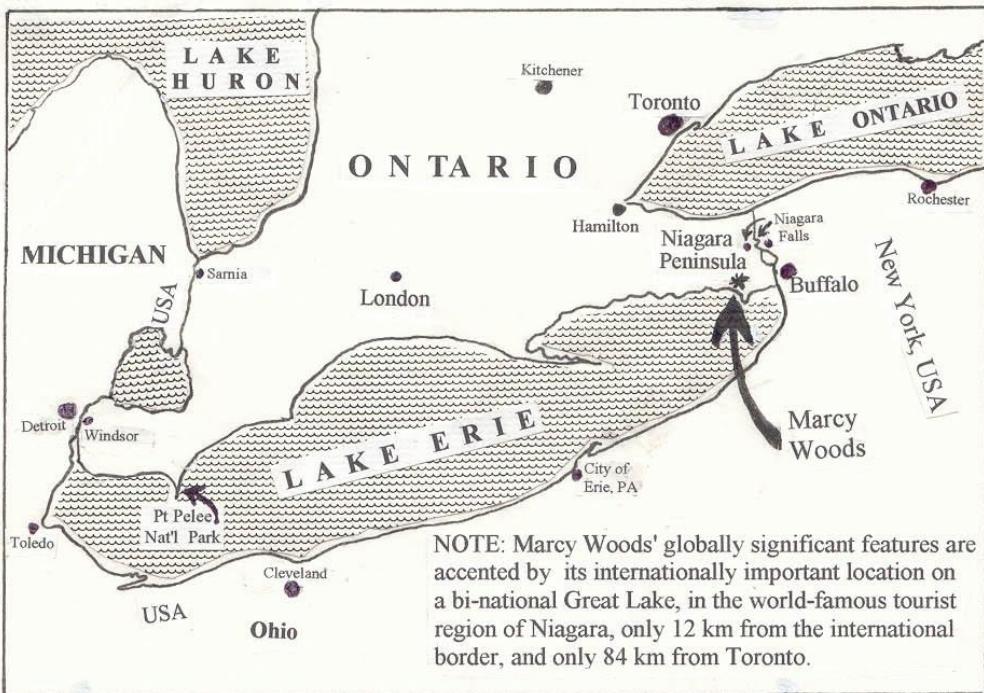
Marcy Woods is located at the southwest corner of the Town of Fort Erie, approximately 13 km (8 miles) west of the city of Buffalo, New York. The property covers 108 ha (260 acres), with about 0.8 km (1/2 mile) of beach along Lake Erie. It can be reached by automobile only by taking Holloway Bay Road south from Highway 3. At the end of Holloway Bay Road, a gated sand driveway leads to the entrance of the property.

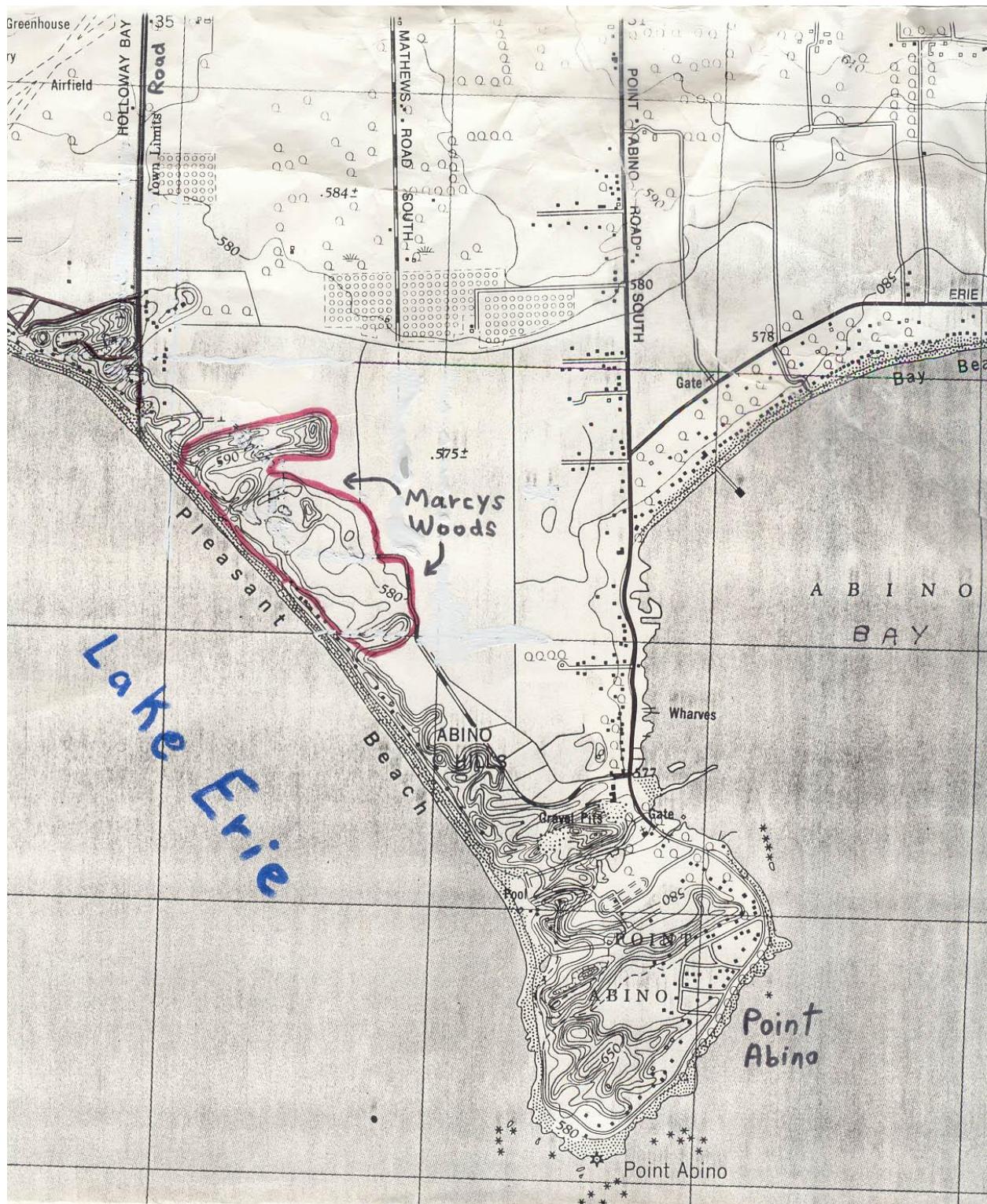
Dr. Wm. H. Marcy, a Buffalo physician, purchased the property from a local landowner in 1926. His intention was to use the property as a quiet nature retreat for his family. Recognizing the pristineness of the forest and the beach, his policy was to leave it as natural as possible, treating it as a nature preserve. The only physical changes added during the roughly five decades that the Marcy family owned it were a cabin and a narrow, primitive sand woods road that allowed access to the cabin.

The tremendous natural heritage values of Marcy Woods became recognized by scientists, naturalists, and government officials during the last decades of the 20th century. Non-profit organizations and the Ontario government entered into discussions with Dr. William Marcy's son, Dr. George H. Marcy, about designating the property as a nature preserve or other natural area designation. However, Dr. George Marcy died before his intentions of permanent preservation could become a reality.

When Dr. Marcy died in 1994, the property was inherited by his three daughters and a son. The siblings could not agree as to whether the property should be sold to the Nature Conservancy of Canada to be kept as a nature preserve, or allowed to be sold to a developer. The Nature Conservancy of Canada tried to purchase it, but it was ultimately purchased by an Ontario developer. At this time, the Ontario government has imposed a prohibition against development (called a Zoning Order) on the property until various serious issues can be resolved.

Regional Locator Maps for Marcy Woods





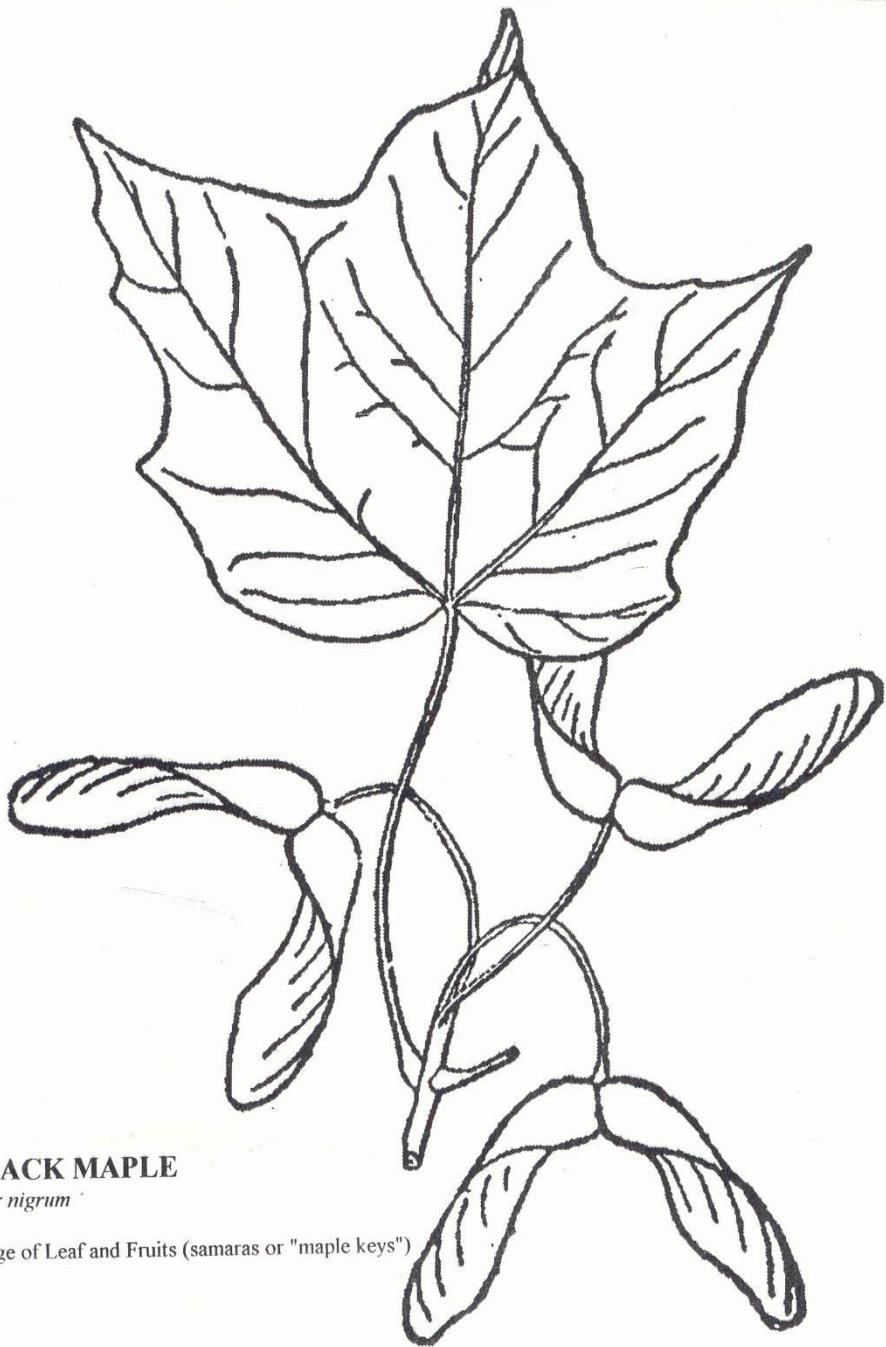


Note: only boundary of Old Growth Forest is shown. The Old Growth is only a portion of the much larger original Marcy property (boundary not shown on map).

The Age, Types and Abundance of trees OF Marcy Woods Old Growth Forest

The remarkably rich biodiversity of Marcy Woods property is demonstrated by the *record-setting 92 tree species* so far recorded within the property's boundaries. Of these, 14 of the 23 tree species in this forest's canopy* grow to old growth age (150 to 350 years old). Add to this a 15th old-growth species, the evergreen Canada Yew, that probably reaches 500 years old; it closely resembles young Hemlock trees growing in the form of shrub colonies. *canopy: the mostly continuous, high layer of tree crowns (tops) and branches that create the shaded habitat underneath. The dominant or most common forest canopy tree of the forest is Black Maple (25 - 40% of forest canopy). However, it is not uniformly the most common canopy tree in all portions of the Old Growth Forest; this natural variability is a typical situation in native forests. In some small areas, no particular tree species dominates. American Beech (5 - 18%), White Ash (3 - 12%), and Northern Red Oak are moderately common trees in the canopy (3 - 12%).

The chart on the next page displays the age, diameter, dominance and relative abundance for all trees that are present in the canopy of Marcy Woods.



BLACK MAPLE

Acer nigrum

Image of Leaf and Fruits (samaras or "maple keys")

AGE, SIZE AND COMPOSITION OF TREES COMPRISING THE CANOPY OF MARCY'S WOODS OLD GROWTH FOREST

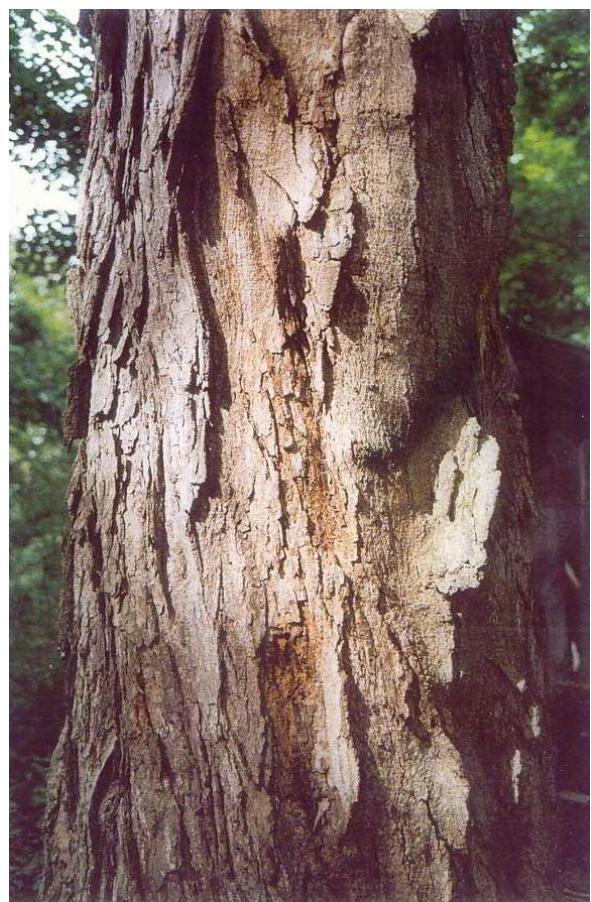
| TREE SPECIES (Reaching Old Growth Status) | AGE RANGE** Years | DIAMETER RANGE (inches) | How Much | | COMMENT |
|--|----------------------|------------------------------|---|--------------------------------|---------|
| | | | of Canopy It Comprises (%) | (depending on location) | |
| BLACK MAPLE | 165 - 310 | 18 - 38 | 25 - 40 % | annual ring count obtained | |
| American BEECH | 150 - 175 | 28-Oct | 5 - 18 % | annual ring count obtained | |
| WHITE ASH | 165 - 180 | 19 - 40 | 3 - 12 % | annual ring count obtained | |
| Northern RED OAK | 120 - 220 | 24 - 38 | 3 - 12 % | annual ring count obtained | |
| Eastern HEMLOCK | 155 - 325 | Oct-32 | 3 - 8 % | annual ring count obtained | |
| SUGAR MAPLE | 150 - 230 | 20 - 32 | 3 - 8 % | physical features-->age estim. | |
| American BASSWOOD | 140 - 175 | 24 - 36 | 2 - 5 % | annual ring count obtained | |
| RED MAPLE | 150 - 160 | 17 - 40 | 2 - 5 % | annual ring count obtained | |
| TULIP TREE (Yellow Poplar) | 150 - 175 | 30 - 36 | 1 - 2 % | physical features-->age estim. | |
| RED ELM (Slippery Elm) | 150 - 170 | 15 - 28 | 1 - 2 % | physical features-->age estim. | |
| YELLOW BIRCH | 150 - 240 | 18 - 26 | rare | physical features-->age estim. | |
| Eastern WHITE PINE (CANADA YEW) | 150 - 230 500 + | 20 - 25 75' wide colonies | rare Shrub colonies, not in canopy, but notable as oldest organism in woods | annual ring count obtained | |

Not Recorded as Old Growth:

| | | | | |
|--------------------|-----------|---------|---------|--------------------------------|
| Black Walnut | 100 - 120 | 16 - 20 | rare | physical features-->age estim. |
| Eastern Cottonwood | 80 - 100 | 18 - 38 | 1 - 2 % | physical features-->age estim. |
| Shagbark Hickory | 100 - 130 | 15 - 22 | rare | physical features-->age estim. |
| Bitternut Hickory | 100 - 130 | 15 - 19 | 1 - 2 % | physical features-->age estim. |
| Black Cherry | 80 - 100 | 15 - 20 | 1 - 2 % | physical features-->age estim. |
| Hop Tree | 15 - 40? | 1 to 4 | 1 - 2 % | Nationally rare tree |

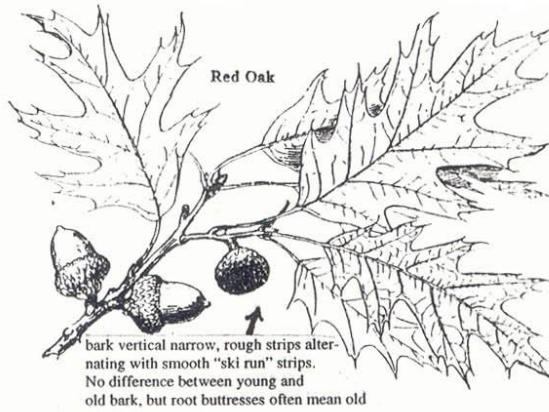
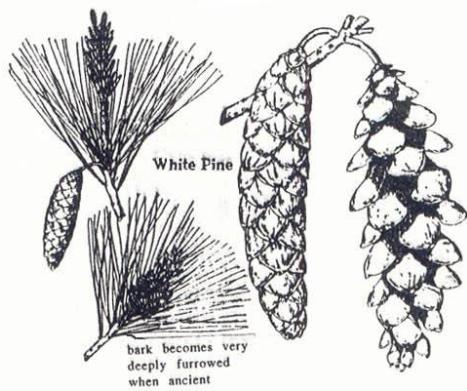
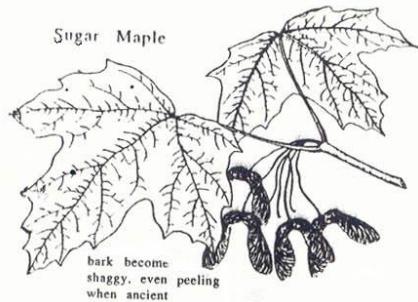
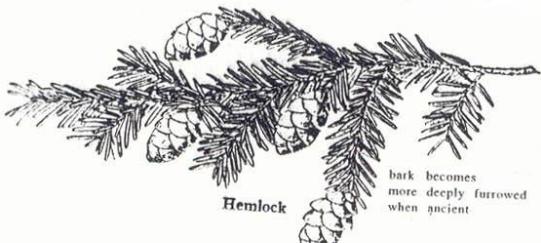


300 year old Black Maple at Marcy Woods

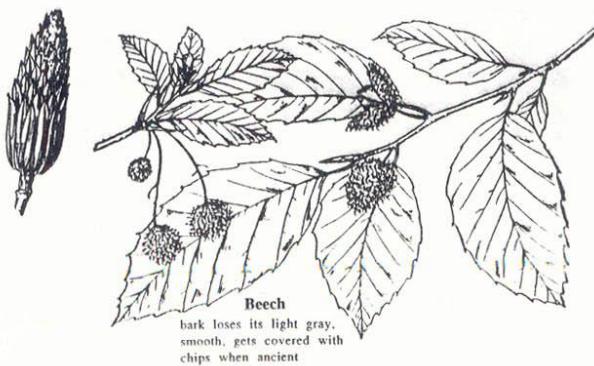
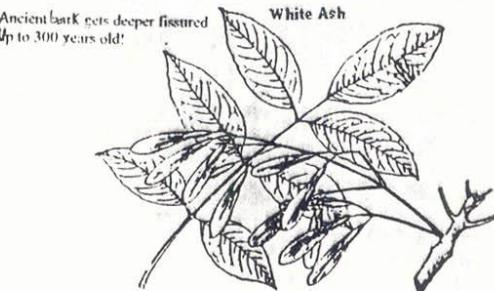


Closeup of Black Maple Trunk, showing balding and shaggy features typical of Old Growth bark (in Marcy Woods)

Old-Growth Tree Species



Ancient bark gets deeper fissured
Up to 300 years old!



MARCY WOODS IS THE WORLD'S LAST OLD GROWTH BLACK MAPLE FOREST

One of the major features of Marcy Woods that clearly establishes its global significance is its documentation as the last known Old Growth Black Maple Forest on earth. Ontario has other regionally, provincially, or even nationally and bi-nationally significant forests or natural communities. However, Marcy Woods is one of its few *globally* significant forests.

One does not make a claim of this scale lightly. This author asserts this globally unique and irreplaceable status as an international authority on Old Growth Forests who has solid research backing for this claim.

First, the term "Old Growth Black Maple Forest" needs to be clarified. Such a forest is one in which the most common tree species in the canopy is Black Maple. "Most common" (scientifically called "dominance") is measured on a forest-wide basis, since other tree species may be dominant in small sections, or there may even be no dominant species in some locales, just a mix of individual different tree species. The Black Maples in the canopy are a mix of Old Growth and mature trees (an indicator of a healthy forest ecosystem). With younger Black Maples in the understory and saplings below them, it shows that this forest appears to be regenerating successfully since all age classes or generations are represented. As the oldest trees die (at 300-450 years old), they are being replaced by the next arboreal generation.

Preliminary field data showed that Black Maple comprises approximately 25 to 40% of the canopy, as much as the next 4 to 5 tree species combined (Beech, White Ash, Northern Red Oak, Hemlock, Sugar Maple).

The fact that it is the world's last known Old Growth Black Maple Forest is supported by very extensive personal field research, literature surveys, and consultations with many other scientific authorities in this discipline. But *the simple fact that Marcy Woods is an Old Growth Forest is enough justification to protect it in its natural state*. This is because the extreme rarity of Old Growth Forests is compelling enough, even if it wasn't a Black Maple Forest. If you add to this, the large acreage of Marcy Woods, its amazingly pristine state, and all its other outstanding features (pristine coastal sand dune ecosystem, global center for rare species, Lake Erie's last long stretch of unprotected pristine sand beach), you reach the inescapable, unbiased conclusion mentioned at the beginning of this document:

Marcy Woods deserves the highest possible level of protection, analogous to a "Nobel Prize for Natural Heritage Sites."

Table Evidence for Marcy Woods' global distinction as the last known Old Growth Black Maple Forest in the world

- *Old Growth in the East, A Survey* (2003, Center for Science in the Public Interest). This ground-breaking 200-page publication presents the results of the first and only exhaustive compilation of known Old Growth sites undertaken in eastern North America. I analyzed the data and descriptions from all 1,198 Old Growth Forest sites from 34 US states, and found no sites that were dominated by Black Maple. In fact, virtually none even mention the presence of Black Maple; those that do, mention it only as a minor component. The publication does not cover eastern Canada (no similar survey of eastern Canada's or Ontario's old growth has been done unfortunately, so no one has any idea how much has survived). However, 90% of Black Maple's range lies within the US (the rest residing in the narrow zones along Ontario's side of Lake Erie, and a limited area in the St. Lawrence zone of Ontario and Quebec).
- among the approximately 250 Old Growth Forests that I have personally discovered or co-discovered in the northern states of the eastern US (180 sites) and southern Ontario (70 sites), *not one was a Black Maple Forest* (other than Marcy Woods).
- the Natural Areas Inventories for Hamilton Region, Halton-Norfolk, Windsor, recorded no Old Growth Forests dominated by Black Maple Forests in their respective regions.

- the 1999 publication "*Woodland Heritage of Southern Ontario*," published by Federation of Ontario Naturalists (Ontario Nature), does not record Black Maple Forest among any Old Growth Forests that it researched and describes. This fine publication identified 37 forests that the authors believed to be exemplary mature forests, pristine mature forests, or Old Growth Forests.
- "*Old Growth Forest Definitions for Ontario*", from Ontario Ministry of Natural Resources (2003). This publication charts data for species of trees in eastern Canada that attain old growth status. It lists the maximum ages to be 27 tree species that are common enough to dominate or make up a significant proportion of the composition of an Old Growth Forest. Of the more than 75 forest types in Ontario, Black Maple is not listed as the dominant species for any of them, and is only mentioned as a component of one forest type, a non-Old Growth, successional stage floodplain forest ("Lowland-Transitional Deciduous"). In this community, it is associated with Willows, Aspen, Elm, Sycamore, and Basswood. This publication does not mention the type of forest at Marcy Woods, and may not even have known how different it was.
- numerous well-known Old Growth Forest authorities, both from US and Canada were contacted and none were aware of any Old Growth Forest dominated by Black Maple. In fact, only one botanist knew of any existing forest containing any individual Old Growth Black Maples at all. (to obtain a list of these sources, contact the author at ancientforest@webeditor.com)
- the following two major sources on forests or Old Growth Forests fail to mention any Old Growth Forest dominated by Black Maple (see Appendix for complete bibliographic information):
 - *The Old Growth Forests of Southern Ontario*. Dr. Willard Carmean, 2000
 - *Potential Natural Vegetation of the Coterminous United States*. American Geographical Society, 1964
- The reason why Marcy Woods is the only known Old Growth Black Maple forest is probably because all other Old Growth Black Maple forests that existed in the past were cut down between European settlement period and the modern era. Furthermore, the Black Maple Forest type was probably always uncommon; in other words, there weren't very many such sites in the first place. Evidence of this is that the only forest communities in Ontario's official list of types of natural communities in "*Ecological Land Classification for Southern Ontario*" (1998, Ontario Ministry of Natural Resources, South Central Science Section Field Guide, H.T. Lee, W. D. Bakowsky, et al) lists only one community type dominated by Black Maple, "Moist-Fresh Sugar Maple-Black Maple Deciduous," and it is listed as "Rare." The specific subject of Old Growth status, however, is not dealt with in this publication since it is not a feature or parameter in the classification or identification of community types.
- In neighboring New York State, the official listing of the state's natural plant communities does not identify a single community dominated by Black Maple, nor even mention the species as a significant component of any forest or other community in the New York State. These publications are *Ecological Communities of New York State*. Carol Reschke (1990, New York Natural Heritage Program., NY State Dept. of Environmental Conservation, Latham, N.Y., 96p.) and the *2nd Edition* of this publication (Gregory Edinger, D.J.Evans, et al., Jan. 2002). From an ecological standpoint, New York State should be no different regarding this forest type than southern Ontario because Marcy Woods is only 8 miles from New York State's boundary. It shares the same Lake Erie shoreline, and possesses the same climate and soil types in the Niagara region as does southern Ontario.

MARCY WOODS IS A VIRGIN OR NEAR-VIRGIN OLD GROWTH FOREST

Another feature that contributes to Marcy Woods' global significance is that it is a *virgin* or *near-virgin* Old Growth Forest. This means it is the "rarest of the rare" among eastern North American forests based on this feature alone. Old Growth Forest is rare enough (about 99.8% of the East's original forest was cut down). Of the original or Old Growth Forest that did survive, probably only 2 to 3% of the sites were lucky enough to have escaped all disturbance by both deliberate human activity, as well as natural disasters.

The identity of Marcy Woods as an *Old Growth* Forest is overwhelmingly established by the data in the preceding table that displays the ages of the trees of Marcy Woods. The issue of whether Marcy Woods is "*virgin*" Old Growth does not center around the age of the forest's trees, but on whether deliberate human disturbance occurred or not (pristineness).

"*Virgin*" applies to a forest that shows no evidence of having been subjected to any tree cutting, including timber harvesting or selective logging, thinning or any forest management (and no grazing, draining, planting). The term "*near-virgin*" allows for one or two trees to have been removed once in a decade or so, or casual firewood (dead wood) collecting. Such activity should not have been on a scale that would have affected the process of forest succession, or the composition of the forest, and preferably should be only a past, not present occurrence. It should also not result in opening up of the canopy which causes a significant increase in sunlight.

Since southern Ontario has had such a long history of intensive human settlement and forest exploitation and management, any claim that a forest is virgin or near-virgin Old Growth must be supported with solid and credible evidence. That is why claims of "*virgin forest*" are often scoffed at by scientists or government agencies, especially when such claims are made by untrained individuals who use the term casually without knowing the criteria needed to use the term accurately.

The virgin or near-virgin Old Growth status of Marcy Woods is supported by 16 categories of physical or historical evidence. These categories or indicators have been established based on more than 20 years of field research, using data from hundreds of other Old Growth sites that this researcher has personally discovered and/or investigated. Of the 16 indicators or evidence presented ahead, 11 are indicators of the absence of particular kinds of human-caused forest disturbance. The other 5 are features that develop only under conditions of long duration of pristine natural conditions, without forest disturbance, or conditions typical of sites with no logging history (in this case, the owner's intentional choice).

1) History of the Property - According to Dr. George Marcy, as well as recollections by his family, never cut down any trees in the forest since his father purchased it in 1926, except in a very restricted zone associated with the cabin, the primitive sand woods road, one foot trail, and utility right-of-way (ROW). This totals no more than 5% of the Old Growth Forest. *From hereon, the "virgin" area discussed will be the 95% of the forest that is not adjacent to the cabin, primitive road, trail and ROW.* In addition, he planted some native trees on the relatively small area on the sand dunes nearest the lake where erosion was causing loss of the forest.

Dr. Marcy also related that the previous owner had not done anything with this woods on the sand dunes. A likely reason is because it was distant from his farm to the north, and is largely separated from it by an extensive, densely wooded swamp.

2) Absence of Stumps - Not a single old tree stump or remnants of old logs with sawed ends have been found in the virgin portion of the woods. Remnants of Hemlock stumps can be detected for up to a century after they were cut, but no such evidence could be found. A few small trees were cut by vandals recently near the eastern part of the woods near the sand woods road, but nothing in the interior was touched.

3) Absence of Coppiced Trees - One of the best indicators that a forest has been subjected to past logging is the presence of coppiced trees. "Coppiced" trees (an old English term) are trees that have two or three (or more) trunks growing out of the same base. They are actually stump sprouts that result when the original mature tree is cut and the tree's survival response causes it to send up two or more sprouts from the stump. The observer may see multiple, moderately thick trunks from the same base (the former stump) long after the original trunk was cut. The presence of coppiced (multi-trunked) trees can reveal a cutting history going as far back as two centuries. The presence or absence of coppiced trees is a very reliable indicator of a history of, or absence of, cutting in the past. The tree

species that grow in Marcy Woods that are best known for their ability to sprout from cut stumps are Red Oak, Red Maple, White Ash, Tulip Tree, Cottonwood, Silver Maple, Paper Birch, Black Walnut, and Black Cherry. In addition, past cutting of Beech often results (decades later) in a tight clustering of mature Beech trees that grew from root sprouts surrounding the mature "mother" Beech that was cut. No such pattern of Beeches exists in Marcy Woods.

4) Absence of Open Grown Trees - There are no trees with "open-grown" appearance, referring to boughs or large branches that emerge from the trunk of a mature tree at 5 to 15 feet above the ground, and spread more or less horizontally from the trunk. This results from significant cutting in a forest that opens it up to sunlight for a long enough period of time to allow younger trees to develop the open branching pattern that is typical of sun-lit conditions. After a few decades, such logged forests finally evolve into a closed canopy which produces enough shade below to prevent large branches from continuing to develop at low levels or in a horizontal direction. The observer in such forests would know that the presence of large open-grown trees reveals an early logging history as far back as two or more centuries. The only trees in Marcy Woods with open-grown or low-branching trees are on the dune zone corridor closest to the beach. This is where sunlight is abundant because it enters laterally from the direction of the lake, and also the unconsolidated sand and lake storms maintain a more open and shorter forest because of blowdowns and stunted growing conditions.

5) Absence of Logging Road Corridors - Not even subtle evidence of long-ago logging road or skid road corridors can be detected in this forest. Close analysis of 1934 aerial photos of Marcy Woods would be a more certain way of revealing logging road evidence, but none exists. If there had been logging in the 1800s, such corridors would have been still detectable on these aerial photos, since they can remain visible up to 100 to 125 years after they were constructed.

6) Absence of Blowouts or Denuded Areas - Significant cutting and removal of trees, together with logging road construction and use, on sand dunes sometimes lead to exposure of the underlying sand substrate. This often is followed by erosion due to strong lake winds and rain. The common result, as can be seen just to the west of Marcy Woods, is occurrence of blowouts that expand into patches of bare sand and loss of mature forest. The zone closest to the lake has naturally been subjected to strong lake winds and rain for centuries, but the mature forest growth had largely kept erosion and blowouts of the sand dunes to a minimum. Further, the thick humus organic layer that takes centuries to develop is destroyed by logging road construction and heavy vehicle use. Healing of the organic soil layer after disturbance from heavy duty activities such as logging is excruciatingly slow. Thus, significant logging in the past, even as far back as the 1800s almost always leaves its mark in a sand dune forest in the form of bare sand corridors, patches, as well as scrubby forest. Nothing like these conditions exist inland from the natural lake erosion corridor. To sum it up, a very old and pristine forest with an equally pristine organic soil layer would likely be absent in portions of the forest where early, significant logging had occurred.

7) Absence of "Pioneer" or Early Successional Tree Species - The interior portions of Marcy Woods have virtually no tree species typical of early successional stages or that establish themselves after logging (or other major disturbances). This is because significant cutting and removal of trees opens up the forest canopy, allowing abundant sunlight into a habitat that has been continuously shaded (after spring leaf-out) for centuries. Again, the only exception is the relatively narrow zone on the top of the primary dunes closest to the shore. This is where sunlight is abundant because of its direct south-facing exposure to the sun, and the unstable conditions due to storms and shifting sands which frequently causes mature trees to topple.

If tree cutting had taken place in the second half of the 1800s or the early 1900s, these pioneer or early successional species would be present: Aspens, Cottonwood, Black Locust, Buckthorn, White Birch, Manitoba Maple, Hawthorn, and Red-Cedar. These species vegetate the neighboring dunes from Sherkston and westward. But they are virtually absent in the interior of Marcy Woods, indicating that the tall canopy and its deep shade have been essentially intact (except for small gaps caused by falling of large trees) for centuries.

8) Absence of Non-Native or Alien Invasive Weed Species - The ecological integrity of large portions of Marcy Woods is demonstrated by the fact that non-native or alien invasive weed species are minor to rare. Examples of these species that establish themselves in disturbed forests are Multiflora Rose, Garlic Mustard, Japanese Barberry, Tartarian Honeysuckle, Norway Maple, and Motherwort.

9) Presence of Hemlock on the Dunes - Marcy Woods is one of only three places in the world known where Old Growth Eastern Hemlock grows with any frequency on sand dunes. Sand dunes offer the opposite conditions required for Hemlocks to germinate and establish themselves. Their seeds need a) a layer of organic soil or decaying wood, b) shade and c) moisture. Dunes usually offer little organic soil or shade, and drought-like conditions are common because rainwater is not retained in the upper sand layer. The presence of Old Growth Hemlocks in a Carolinian Forest is a confident sign of minimal disturbance since cutting of Hemlocks (in a forest that would otherwise be poor habitat for them) usually results in their future elimination. The Hemlocks do not return to the forest because the new conditions created by the logging are unfavorable for regeneration, and the seed source from the former Hemlocks is gone. It probably takes a minimum of 750 years or more for conditions on an unvegetated sand dune to develop a mature shaded forest with a thick layer of organic soil that allows Hemlocks to establish themselves (and grow to become 300 years old as at Marcy Woods).

10) Extremely High Diversity of Plant and Animal Species - Human disturbance, such as past logging, has the well-known effect of reducing diversity of rare and sensitive species. The incredible biodiversity of Marcy Woods, particularly the record-breaking number of rare and threatened plant and animal species, is a strong indicator of the lack of past disturbance. The centuries that it takes to attain natural pristineness ("high natural integrity"), combined with the unusual dune habitat and unique climatic/geographical Carolinian Zone, have enabled this amazing diversity and unique forest type to evolve.

11) Soaring Branchless Trunks - Soaring trunks, often reaching 40 to 80 feet before the first bough is reached, are a typical feature in the forest interior of Marcy Woods (see photos on following pages). This striking feature of the mature and Old Growth canopy trees only develops when those trees have spent the entire first part of their life in a forest with a long duration of virtually continuous deeply shaded conditions. Whether those trees grew up under shade or in a temporary sunnier gap created by a fallen tree, they had to grow vertically to the canopy layer before they were capable of obtaining the consistent sunlight they required to enable them to grow the thick lateral branches at that height level. Thus, a forest dominated by trees with soaring, branchless trunks is one that has not been opened up by removal of numerous trees, and the accompanying sudden decrease in shade, and great increase in sunlight that would follow. The lowest boughs of trees that grow up in a selectively logged forest put out boughs much closer to the ground than would be seen in Marcy Woods, even if that cutting were done 100 to 120 years ago.

12) Presence of Multi-layered Forest Structure - This feature is not, by itself, an assurance that Marcy Woods was never logged. But in context with the other features described here, it does provide confidence to this conclusion. The interior forest of Marcy Woods displays a well-developed layered structure with a healthy ground flora, shrub layer, understory tree layer, and tree canopy layer. This one of the "classic" features often listed for many undisturbed Old Growth Forests, since tree cutting in the past often breaks up the uniformity of this structure, this is one more piece of evidence that this kind of human disturbance is not part of Marcy Woods' history.

13) Very Steep Slopes - Approximately one-third of the Marcy Woods Old Growth Forest is located on steep to very steep dune slopes, or is on the summits of the long crests and ridges accessible only by ascending those steep slopes. It was common practice before the 1920s (when Dr. Marcy purchased the property) to avoid logging on steep slopes because the physically challenging access didn't make it a worthwhile endeavor, and many rural landowners knew that it would lead to erosion and even land slumping. Steep slopes, in fact, are one of the three most common locations (31% of 140 Old Growth sites surveyed) to find Old Growth Forests in eastern North America. If any logging had ever taken place on these steep slopes, vegetation differences and erosional evidence of this past activity would be very obvious today.

14) Conservation Ethic Often Practiced by Owners of Lake Shore Properties

15) Conservation Ethic Often Practiced by Property Owners of Scenic Zones Valued by the Community

16) Conservation Ethic Almost Always Practiced by Owners of Estates or Properties in Recreational Cottage Districts

The above three related factors are very likely to have all played a role in leading previous property owners (before Dr. Marcy) to make the decision to let the forest of (what is now) Marcy Woods remain in a natural state.

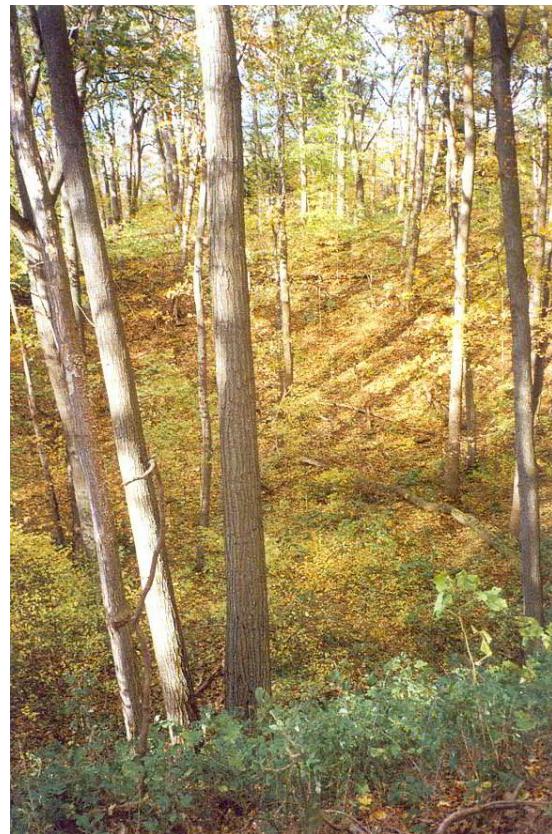
These are among the conclusions of a study that I conducted of 140 southern Ontario, western New York, and southern New York Old Growth sites in which the shoreline or lake frontage location (reason #14) of 20% of the sites was very likely to be the motivation or major contributing factor for the early owners' decision to avoid logging. Rural landowners of such properties frequently did not cut the corridor of forest near the shore or river banks because of the commonly held ethic that it would protect the water shore or river banks because of the commonly held ethic that it would protect the water quality and fishery from erosion. (This conservation ethic seems to be much less common today.)



Soaring Old Growth Tulip Tree, with lowest bough at astonishing 75 feet above the ground (in Marcy Woods).



Monumental Old Growth Tulip Tree at Marcy Woods, with soaring, branchless trunk, a typical feature of Old Growth Forest



Old Growth Forest on sand dune slope in Marcy Woods, showing soaring, branchless trunks of Red Oak and Black Maple

For reason #15, owners of properties that were highly valued as scenic zones (such as lake and beach front, peninsulas, waterfalls, panoramic vista points) also frequently avoided logging the forests (especially forests with impressive trees) on those lands because it would be counter to the goal of protecting that scenery. In the study of 140 Old Growth sites referred to above, this reason appears to be the primary factor explaining the survival of 10% of Old Growth Forests.

In the case of Marcy Woods, it is part of the western base of Point Abino, a peninsula with notably high forested sand dunes, and a great stretch of glistening, white sand beach, renowned for their scenic value. In addition, the dune forest of Marcy Woods, unlike that of the Abino peninsula, is separated from the farmland to the north by a very large swamp, which would have been a further deterrence for access.

Reason #16 is closely related to #15, but still is distinct. For areas that were viewed as recreational cottage districts or affluent estate properties, the scenery was viewed as a vital asset that made it a desirable property to select for establishing an estate or vacation cottage district. Further, affluent owners would not have any financial need to raise revenues from sale of cut timber. In my survey of 97 southern Ontario and western NY Old Growth sites, this was the very likely reason for survival of the Old Growth Forest for 8% of the sites. In Marcy Woods case, its forest of "stately or impressive trees" (together with the lake view and beach) ensured that cutting of this grand forest was never considered for this reason.

BLACK MAPLE IS A DISTINCT TREE SPECIES from sugar maple

Black Maple is recognized as a distinct tree species by the highest authoritative government sources and tree identification guides (see separate list in the Appendix). But because its leaf resembles that of the much more common and wide-ranging Sugar Maple, some scientists nevertheless have taken the position that it is only a subspecies of Sugar Maple. Any scientific difference of opinion, however, as to their separate species status would normally be a strictly academic issue. But in the controversial climate surrounding protection of Marcy Woods, opponents of its protection could try to challenge the separate taxonomic status of Black Maple.

It is a common tactic of developers to hire scientific consultants who are paid to promote a scientific position specifically designed to weaken or contradict the claims of those who want to protect a natural area. Typically, they selectively choose facts out of context, or only display minority views as if they were established views. Even if the case for protection of a site is clearly stronger and backed with more supporting facts and authorities, the developer's hired consultants' tactics simply dismiss these with the claim that the matter is just "an honest professional difference of scientific judgment and interpretation between equally valid experts." To scientifically untrained government decision makers, or to a judge or jury, who are overwhelmed with the unfamiliar scientific terminology, this can be a credible-sounding claim. By casting doubt on the separate species status of Black Maple, the promoters of housing and other development in Marcy Woods would aim to "demote" it to a "subspecies" of the very common Sugar Maple. By pushing a case for this "demotion", it would take away the unique status of Marcy Woods as "the world's last Old Growth Black Maple Forest," turning it instead into the much less compelling "world's last Old Growth forest of the Sugar Maple subspecies called Black Maple."

The aim of this section is to leave no doubt that Black Maple is indeed a distinct tree species, and any attempt by pro-development forces to question this should be dismissed by political decision makers (who will be deciding the future of Marcy Woods).

Authoritative Sources That Recognize Black Maple as a Distinct Tree Species

- Black Maple is recognized as a distinct and separate tree species by all the government and scientific authorities that conduct collaborative taxonomic* research and make the final taxonomic determinations on the species status of each species. For Black Maple, its official scientific name (followed by the botanist who named it) is: *Acer nigrum* (Michaux F.) (Taxonomic Serial No. 182135)
- The Appendix lists 23 of the authoritative sources that support its separate species status. A sampling of some of the most important and most recognized of these sources include:
 - Integrated Taxonomic Information System (ITIS), a partnership of US and Canadian agencies, scientists, and NGOs, the most authoritative source on taxonomic status of plants.
 - Canadian Biodiversity Information Facility, a clearinghouse coordinated by 8 Canadian federal agencies, and Ontario Min. of Natural Resources.
 - Biota of North America Program
"taxonomic" refers to the science of classification , differences between, and naming of species
 - Species 2000 Project, global consortium of scientific & gov't groups, directed by Canadian official
 - Manual of Vascular Plants of the Northeastern United States and Adjacent Canada
 - Illustrated Flora of the Northeastern States and Canada
 - Silvics of Forest Trees of the U.S. and Silvics of North America, US Forest Service

Physical Differences Between Black Maple and Sugar Maple

To people who know their trees, distinguishing the Black Maple and Sugar Maple is not difficult. There are actually 32 physically observable or other major differences between the two species (listed in the following chart). Note that close similarities of leaves between different tree species is a very common occurrence. Examples of such major tree species in the Niagara region are Red and Black Oaks, White and Red Elms, Red and White Mulberries. This is because these species are all closely related. But in the case of these trees, their separate species status is not questioned. Similarly, there is no question that Black Maple and Sugar Maple are also closely related, but are still separate species. Leaf shape is actually a superficial genetic difference.

The fact that Black Maple and Sugar Maple often hybridize with each other (as with the above-mentioned Oaks and Mulberries), unfortunately, complicates identification. In fact, Sugar Maple and Sugar Maple-Black Maple hybrids are components of Marcy Woods' forest. But Old Growth and mature Maple trees unquestionably dominate the canopy of Marcy Woods.

Table: Observable Physical Differences Between Black Maple and Sugar Maple

| | Black Maple | Sugar Maple |
|-------------------------|---|--|
| Leaf | blackish-green upper surface (one of the 2 reasons for its name) thicker 3-lobed or sometimes 5-lobed lobes are shallow typically has 5 - 8 points edges bend down (drooping), causing leaf to have a "wilted" appearance leaf stem is pendant finely hairy or wooly undersurface yellow-green beneath autumn leaf turns color earlier autumn leaf drops (shed) earlier autumn leaf mostly turns yellow leafstalk is enlarged abruptly at base and usually bears stipules large enough to enclose the bud | medium green upper surface thinner always has 5 lobes lobes are more deeply indented typically has 12 - 15 points leaf is flat, not drooping leaf stem is not pendant finely hairy only on veins of undersurface medium green beneath autumn leaf turns color later autumn leaf drops (shed) later autumn leaf mostly turns orange and red leafstalk is not much enlarged and have no stipules or small stipules that do not cover the bud |
| Twig | stouter conspicuous warty lenticels orange-green and hairy when first appears orange-brown and smooth during 1st year pale gray-brown at second year | more slender smooth, without conspicuous lenticels light brown when first appears |
| Bud | pointed | conical |
| Flower | covered with fine white hairs on outer surface | has sparsely hairy scales |
| Fruit | yellow-green opens a few days later than Sugar Maple wings of fruit (samaras) slightly more divergent or spread apart | yellow opens a few days earlier than Black Maple wings of fruit (samaras) less spread apart |
| Bark | typically does not form plates on older trees, deeply furrowed and ridged, often with protruding flanges on older trees, sometimes almost black (one of the 2 reasons for its name) | typically forms plates on older trees, usually scaly or knobby- ridged on older trees, brown-gray to gray |
| Branch Growth | young trees show less forking of branches | young trees show more forking of branches |
| Tree Size | generally smaller and shorter in size; typically up to 75 feet tall, 3 feet diam. maximum height recorded: 118 feet; maximum diameter recorded: 5.8 feet | generally somewhat larger and taller in size; typically up to 90 feet tall, 4 feet diam.; maximum height recorded: 151 feet; maximum diameter recorded: 7.3 feet |
| Geographic Range | extends further west than Sugar Maple, into central and western Iowa, South Dakota, Arkansas | doesn't extend as far west, but ranges much further north and east |
| Habitat | a) tolerant of floodplain soils b) closely associated with limestone-related basic soils in southern Ontario c) rarely attains dominant status in forests d) sources do not mention pure sand as its habitat | a) doesn't tolerate flooding b) grows on any soil but does well on acid soils c) frequently is the dominant forest species d) grows well on pure dune sand in moist climates |
| Hybridization | In the eastern part of its range, Black Maple hybridizes easily with Sugar Maple. However, in the western part of its range (US Great Plains states), Black Maple is genetically distinct enough that it shows little tendency to cross with Sugar Maple. | |

TREE SURVEY ALONG SAND WOODS ROAD THROUGH MARGY WOODS PROPERTY

A separate tree survey was conducted along the primitive sand woods road that connects the western end of the Marcy Woods property near Holloway Bay Road to the old Marcy family cabin. This served as an ideal survey transect since it is the only clear corridor through the woods and is the only significant human development in the woods besides the cabin. The purpose of this specific survey is to record a baseline of what trees grow along the margin of the sand woods road. With this data, future researchers will be able to compare any changes in the trees that might result from any future improvements to the road.

This was not meant to be a complete survey of all the trees along this corridor. Such a project would have taken much too long. Only trees that abutted the woods road were recorded, including those whose roots extended to the edge of the road. These included both Old Growth and non-old growth trees. Although specific data was not recorded for other trees close to the road, photodocumentation of most of the length of the road and its adjacent trees was obtained both before and after the road widening (and deepening) conducted by the new owner in August 2003. It should be noted that the number of Old Growth trees that grow within 15 feet on either side of the road probably totals 5 times the number of trees recorded for this selective survey.

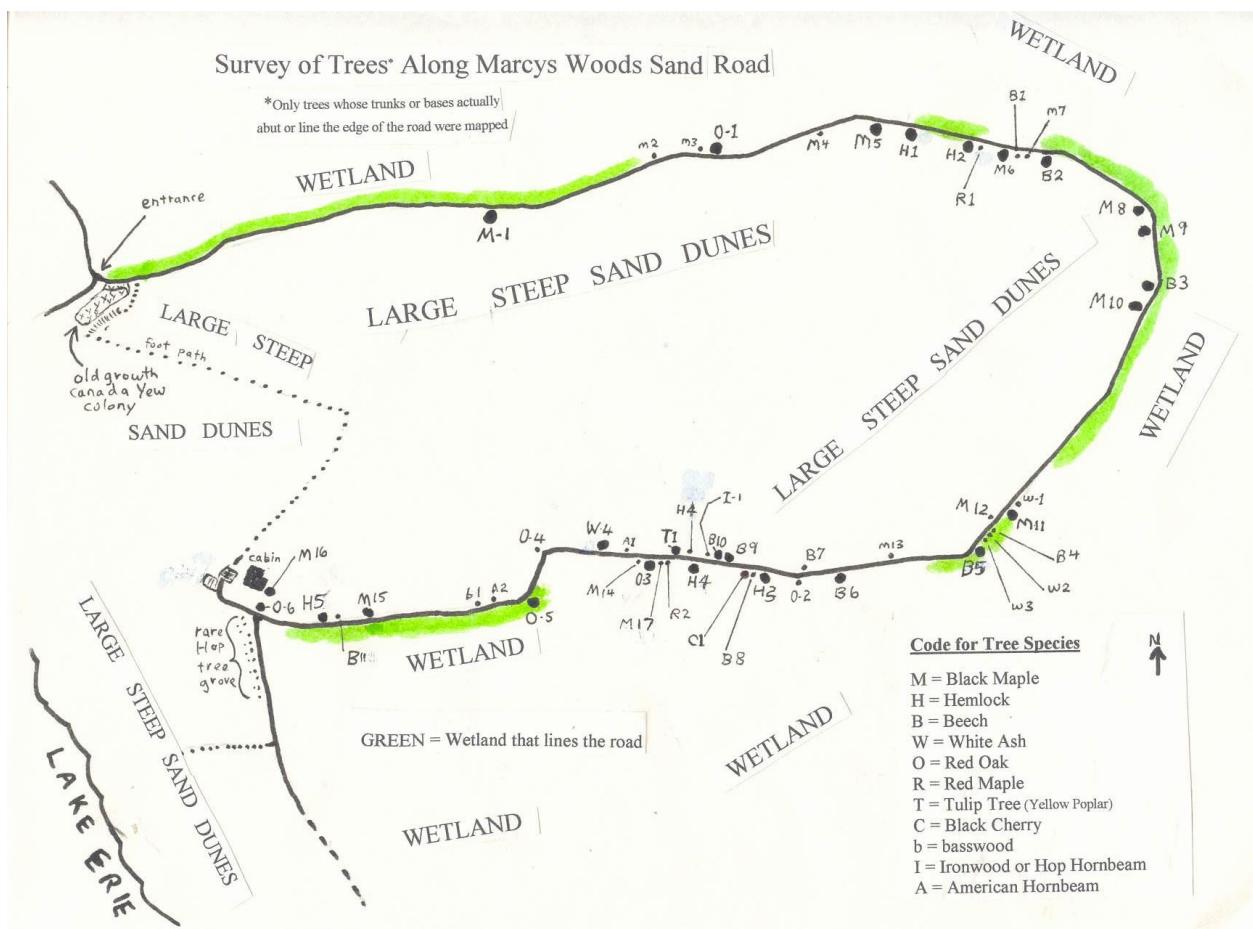
In addition to the tree survey, 1) wetlands that are regulated under Ontario law that line the road corridor were mapped for future reference, and 2) uncommon and rare species of plants and animals that grew or nested along the road corridor were also recorded.

Summary of Results

- a) 23 individual trees (8 inches diameter or greater), representing 7 different species of Old Growth trees grow on the margin of the road. These include 7 Black Maples up to 310 years old. A large colony of Old Growth Canada Yew, an evergreen shrub, also grows along the road, located at the entrance to the property. The 2003 road widening destroyed roughly 300 square feet of this colony.
- b) 10 individual trees (8 inches diameter or greater), representing 6 different species of non-old growth trees grow on the edge of the road. These included 3 Black Maples.
- c) 16 individual trees (1 to 7 inches diameter), representing 5 different species of tree saplings or small tree species grow on the edge of the road. Other tree saplings or small trees that are no longer living were also recorded, but are not presented in this report.
- d) length of woods road abutted by wetlands = 1700 feet
- e) 22 rare and uncommon species adjacent to road =
 - 4 tree species: nationally rare Hop Tree, globally rare Black Maple Old Growth Forest, and 2 regionally rare trees: Tulip Tree, Poison Sumac
 - 2 regionally rare shrub species
 - 12 rare wildflowers. This may be the only place in Canada where 4 Trillium species grow together
 - 4 animal species with habitat and nest sites recorded adjacent to road: Acadian Flycatcher (nationally endangered), Hooded Warbler (nationally threatened), Fowlers Toad (nationally rare), Giant Swallowtail (largest butterfly in Canada, nationally rare)

Survey of Trees* Along Marcys Woods Sand Road

*Only trees whose trunks or bases actually
abut or line the edge of the road were mapped



SURVEY OF TREES ALONG MARGIN OF MARCYS WOODS ROAD

AGE, SIZE AND SPECIES

Note: map numbers correspond to preceding map of tree locations

| TREE SPECIES | Map Number | AGE (estim.) Years | DIAMETER inches | COMMENT |
|--------------------------|------------|--------------------|-----------------|--|
| BLACK MAPLE | M-1 | 275 | 35" | OLD GROWTH |
| | M-2 | < 50 | 5" | |
| | M-3 | 40 | 7" | |
| | M-4 | < 50 | 5" | |
| | M-5 | 150 | 16" | OLD GROWTH |
| | M-6 | 150 | 16" | OLD GROWTH |
| | M-7 | 75 | 8" | |
| | M-8 | 220 | 21" | OLD GROWTH |
| | M-9 | 230 | 25" | OLD GROWTH |
| | M-10 | 160 | 16" | OLD GROWTH |
| | M-11 | 130 | 17" | |
| | M-12 | <50 | 6" | |
| | M-13 | 40 | 6" | |
| | M-14 | 100 | 8" | |
| | M-15 | 240 | 23" | OLD GROWTH |
| | M-16 | 310 | 38" | OLD GROWTH |
| | M-17 | <50 | 5 | |
| BEECH | B-1 | < 50 | 2" | |
| | B-2 | 220 | 24" | OLD GROWTH |
| | B-3 | 160 | 16" | OLD GROWTH |
| | B-4 | < 50 | 4" | |
| | B-5 | 150 | 16" | OLD GROWTH; 15' from road but sensitive to future widening |
| | B-6 | 175 | 17.5" | OLD GROWTH |
| | B-7 | 90 | 10" | |
| | B-8 | < 50 | 4" | |
| | B-9 | 150 | 33.5 | OLD GROWTH |
| | B-10 | 170 | 22 | OLD GROWTH |
| HEMLOCK | B-11 | 100 | 11 | |
| | H-1 | 350 | 24 | OLD GROWTH |
| | H-2 | 300 | 21 | OLD GROWTH |
| | H-3 | 170 | 12.5 | OLD GROWTH; grows on stilt roots |
| RED OAK | H-4 | 40 | 5 | |
| | H-5 | 310 | 22 | OLD GROWTH |
| | O-1 | 170 | 33 | OLD GROWTH |
| | O-2 | 100 | 24 | |
| | O-3 | 200 | 33 | OLD GROWTH |
| | O-4 | 75 | 14 | |
| WHITE ASH | O-5 | 150 | 28" | OLD GROWTH |
| | O-6 | 155 | 41"" | OLD GROWTH |
| RED MAPLE | W-1 | < 50 | 5" | |
| | W-2 | 80 | 11" | |
| | W-3 | < 50 | 2" | |
| | W-4 | 160 | 18" | OLD GROWTH |
| TULIP TREE (Yellow Pop.) | R-1 | 50 | 22" | |
| | R-2 | 80 | 13" | |
| BASSWOOD | T-1 | 150 | 30" | OLD GROWTH |
| | b-1 | 40 | 11.5" | |
| Black Cherry | C-1 | 150 | 16" | OLD GROWTH |
| | I-1 | 50 | 3" | |
| | A-1 | < 50 | 5" | |
| Ironwood (Hop Hornbeam) | A-1 | < 50 | 5" | |
| | A-1 | < 50 | 5" | |



Marcy Woods skyward view of soaring, branchless trunks and staghorn-shaped branches typical of Old Growth Trees



Marcy Woods Black Maple trunk with spiral grain, an Old Growth feature displayed by many Old Growth Trees



Red Trilliums and Spring Beauties at Marcy Woods



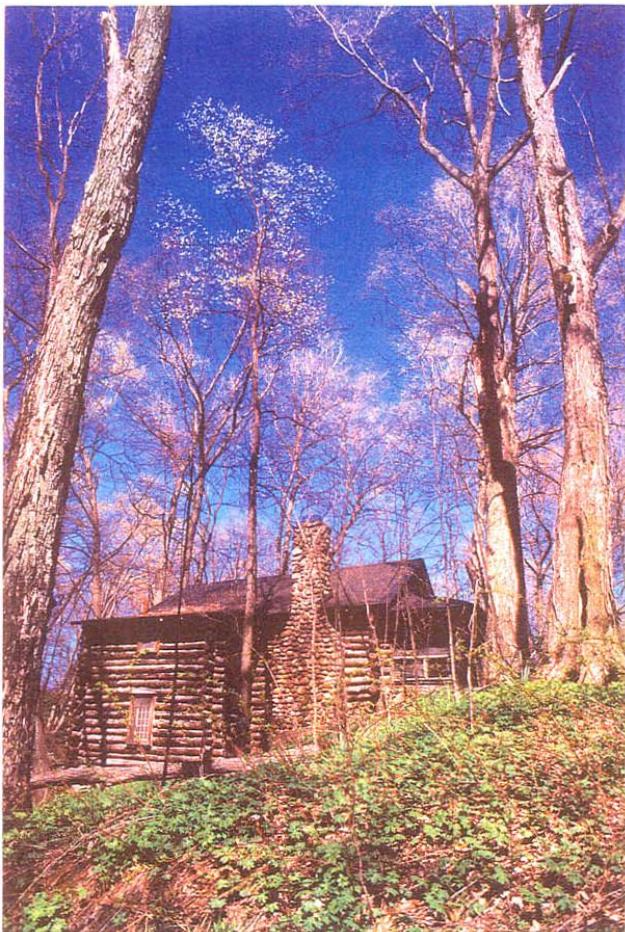
Red Trillium (at top), Round-leaf Hepatica (purple), and Trout Lily (yellow) at Marcy Woods



Royal Fern, eastern Canada's largest fern, at Marcy Woods



Uncommon Broad-leaved Waterleaf (maple-shaped leaf), Spinulose Wood Fern (R.), and Jack-in-the-Pulpit (3-leaved on L.) in Marcy Woods.



Marcy Woods Cabin dwarfed by towering 250-year old
Old Growth Black Maples

View from Marcy Woods beach dunes, a formally designated
Coastal Hazard Zone. The highly weathered tree trunks are
upside-down due to severe lake storms.





Sunset and weathered log at Marcy Woods beach



Sunset from Marcy Woods pristine beach

Appendix

Appendix A. DEFINITION OF OLD GROWTH FOREST

Old-Growth Forest has two parts to its definition:

- 1) a natural community that has been *continuously forested* since before European settlement, AND
- 2) that forest's canopy must be dominated by trees with ages of 150 years or older. Most old-growth forests have 8 or more trees per acre that are 150 years old or greater.

The 150-year figure is based on easily observed and well-documented changes that appear in trees around the 150-year mark. These include dramatic changes in bark, shape of trunk and canopy branches. It is not a randomly-derived figure.

Old-Growth Forest Synonyms or related terms:

| | |
|-----------------------|---------------------|
| Ancient Forest | Primeval Forest |
| Pre-settlement Forest | Primary Forest |
| Original Forest | First-Growth Forest |

Old-Growth Forest Grove: A small stand of Old Growth, smaller than 20 acres

Virgin Old Growth:

An ancient forest that has had NO intentional disturbance by humans. A “virgin” old-growth forest is the rarest of all. Most other old-growth forests, in the past 200 years, have had a minor to moderate amount of human disturbance such as selective logging, thinning, firewood cutting, fire, cattle grazing, etc. Ecologists debate as to whether disturbance by Native Americans should be an exception when applying the label of virgin.

Champion & Historic Trees:

Individual trees of record large size or age for their species, or of historic remarkability. Many Champion Trees grow in Ancient Forests. However, others are single trees in yards, road sides, meadows and parks, sometimes in young forests. Some are exotic species and were planted, not natural.

People regularly get Champion Trees mixed up with Ancient Forests, even though they are as different as an individual human is from a neighborhood.

APPENDIX B. Methods Used for Field Research

Criteria to Determine if a Site is Old Growth

When a potentially old forest site is examined for the first time, a professional, scientific determination can accurately be made as to whether the forest is Old Growth or not. *The general definition of Old-Growth Forest is provided in the Appendix.* The determination if a forest is Old Growth is based on 30 criteria and techniques. A common misconception is that most of a site's trees must be cored with an increment borer to obtain enough age data (by counting the annual rings) to make an accurate conclusion. This is an invasive and very laborious process, and no longer necessary for Old Growth identification. Extensive past field research, including data from a very large amount of sampling of tree cores, has now been done to have established clear criteria and Old Growth indicators. Many of these criteria were derived based on original field research over the last 20 years by this researcher and others. About a dozen different physical features of thousands of young, mature and old trees were recorded, and compared with the ages of those trees ages to see if there was a pattern.

These features (described in the chart ahead) involve details of the bark, trunk ("bole"), tree crown, major branches, tree size, and bizarre growth forms. For dozens of tree species typical of Eastern forests, a very clear correlation was found between physical changes of specific features and age that often enables one to visually distinguish an Old Growth tree from a younger tree. Furthermore, the more extensive, more prominently developed, or higher up the trunk the Old Growth bark features are, the older the tree tends to be.

Eastern trees have been defined as "old growth" at around 150 years old because the data analysis shows that this is when the physical changes become recognizable or developed enough to be reliable as Old Growth indicators. The process is not restricted only to assessing *individual trees, however.* Physical features of the forest "floor," and differences in abundance and kinds of tree species are also valuable as Old Growth indicators.

In addition, in most cases, a researcher's field experience enables one to confirm or reject sites as old growth forest in a relatively short time. This avoids the need to analyze all the criteria or use the increment borer to core the trees each time. By observing all the Old Growth indicators of a tree, an experienced Old Growth researcher can usually estimate the age of trees with an accuracy as close as 10% of the tree's actual age.

Documentation

When a site is identified as Old Growth, the following data is recorded:

Primary old growth tree species that comprise the forest

Old-Growth tree diameters, ages and relevant Old Growth characteristics

Assessment of category of Old Growth and determination of its disturbance and ecological quality

Acreage and shape of Old-Growth Forest tract

Landforms, geological information, route taken

topographic map is obtained and analyzed

Information about the land use history and ownership

some of land use history can be obtained by "reading the landscape" to see evidence of past logging, grazing, flooding, clearing of ground flora, deer browsing, fire, agriculture

property owner is interviewed

old and recent aerial photos are compared and analyzed

numerous photos prints and slides are taken

Field Research Techniques Used to Measure or Estimate Age of Trees:

Measurement of Tree Ages.

Increment Borer – used only when necessary. Very accurate, but invasive, laborious, time consuming

Counting rings of trees with exposed inner surfaces: blown down trees, trees cut when fallen across trails, stumps, hollow trees. Numerous records of tree ages can be obtained from these sources.

Estimating tree ages by experienced researchers – Using extensive field experience, old growth experts can quickly distinguish non-old growth trees from old growth trees, and can use visual observation of physical indicators to accurately estimate tree ages without needing to use the invasive and laborious increment borer.

Assessment of Growing Conditions for that Site –

Is it poor growing conditions (slow growth)? If so, small diameters could still mean very old for that size tree.

Is it rich growing conditions (rapid growth)? If so, large diameters could mean trees are not as old as they look, not necessarily old at all. Matching with type of tree species (trees fall into fast, medium, or slow growing categories) and presence of old growth indicators below will determine answer.

APPENDIX C.

Physically Observable Features Used to Identify Old Growth

1. Large Diameter Trunks (30 inches diameter or greater) [common in Marcy Woods] Several "Big-Trees" per acre, preferably 8 or more per acre, are an excellent indicator. The most common Northeastern "Big-Tree" species: *oaks, maples, hemlock, pines, ash, birch, beech, basswood, walnut, sycamore, black cherry*. The Big-Tree Rule does NOT apply to fast-growing trees that rarely grow in Old Growth Forests: *willows, aspens, paper birch, silver maple, Manitoba (ash-leaf) maple*. Lack of Big-Trees does NOT mean "not old growth." Small-tree Old Growth is found in harsh environments such as rocky slopes, hill-tops, cliffs, wetlands, sand dunes, rock pavements. Some species that normally are small or medium-sized attain great age: hop hornbeam, black gum, cedars.

2. Old Growth Bark ("Antique Bark") This is the most reliable Old Growth Indicator.

[common in Marcy Woods] When trees reach 150 years old, the bark changes on most species, which looks very different from bark of younger trees. [SEE PHOTO ON PAGE 11] Excellent sign!: Balding bark (exfoliating due to long periods of weathering), shaggy bark (separating or curling strips), craggy bark (deeply grooved, fissured bark), platy bark. Trees that display this: *pines, maples, birches, oaks, tulip tree, sycamore, black gum, cottonwood, cucumber magnolia, walnut, hop hornbeam*. Hemlocks get rusty-hued.

3. "Staghead-shaped" Branches in the Crown This is a very reliable Old Growth Indicator. [observed in Marcy Woods, SEE PHOTO ON FOLLOWING PAGE] Thick trunk ends in short, craggy boughs that radiate out horizontally, then bend up at right angles - caused by centuries of damage and healing from ice and wind storms, lightning

4. Soaring Branchless Trunks with Lowest Bough at Great Height [common in Marcy Woods] Lowest bough starts at 25 to 40 feet up, or even as high as 60 to 90 feet!

5. Presence of Long-lived or Shade-tolerant Trees [common in Marcy Woods] Best indicators are *hemlock, sugar maple, black maple; white, black, chinkapin, chestnut, white, bur and red oak; yellow and black birch, tulip tree, beech, black gum, white and red cedar, white pine, white ash, walnut, hop hornbeam* Short-lived or shade intolerant trees that indicate a site is NOT old growth (if numerous): *willows, aspens, cottonwood, paper and gray birch, sumac, black locust, Manitoba (ash-leaf) maple*

6. Moss Grows Up the Trunk [common in Marcy Woods]

The higher up a trunk that moss grows, the more confident that the tree is of great age. Reason: moss grows very slowly, and starts growing from the base (in our region – does not apply down upper mountain elevations, South, Pacific states or Tropics). Best moss-growers: *yellow birch, sugar maple, white ash, cucumber magnolia, white oak*. Do not get moss mixed up with lichens, which can be light green.

7. Presence of Commercially Very Valuable Species Include medium to large black walnut, cedars, black cherry, white pine – excellent sign if significant number of them!

8. Buttressed Trunk Bases [common in Marcy Woods] Trunk bases and roots flare out or swell at the base

Bizarre Growth Forms (# 9 - 11) The greater the age of a tree, the greater its chance of growing into bizarre shapes (nick-named "Gnarl Factor"). Conversely, the more bizarrely-shaped a tree is, the more likely it is to be ancient. Also, the harsher the growing conditions (cliffs, boulders, steep slopes, swamps) a tree has endured, the greater its chance is to develop a bizarre shape. These are only "rules of thumb," however, since many ancient trees do not become bizarre. Some may even grow straight and towering in harsh habitats.

9. Knotty, Knobby, Gnarly, picturesque, charismatic, "misshapen" trunks [observed in Marcy Woods]

10. Spiral-Grain visible swirling up the trunk [observed in Marcy Woods, SEE FOLLOWING PHOTO]

11. Other bizarre growth forms: [some examples observed in Marcy Woods] Trunks that grow at an angle ("Leaners") "Zigzag" shaped trunks Trees growing on Stilt-Roots (hemlock, yellow birch, hop hornbeam) Two different trees (same or different species) with intertwined trunks ("Lover Trees") Trees with 2 fused trunks or branches that create "Window Trees" Trees with very large burls (irregular or rounded, often knobby, growths

caused by non-lethal microbial infestation that only grow to a large size (up to 6 feet across) over a very long period of time)

12. Pit and Mound Shapes on the Forest Floor [present in Marcy Woods] Depressions and mounds, 2 to 4 foot deep and high, are only caused by toppling of *large* trees in the long-ago past, which then decayed away to leave “grave monuments” as reminders they were there. If large trees grow among pits-and-mounds, it ensures a continuous time period of many centuries that large trees have made up this forest. Past logging eliminates big trees that can create pit-and-mounds, and agriculture flattens out pit-and- mounds. *Absence* of pit-and-mounds, however, does not mean much.

13) Many Large Logs in Different Stages of Decay [common in Marcy Woods]

Created by large standing trees that fall here and there over a long period of time, with the older logs reaching greater stages of decay. In contrast, logging (actually “de-logging”) in the past removes large trees that would otherwise contribute to the supply of older logs. *Absence* of logs, however, does not always imply anything.

Includes abundant “coarse woody debris” which means fallen branches, especially common in mountain and Northwoods forests. Lush moss layers often carpet the logs

14) Abundant and Diverse Populations of Fungi, Mushrooms, Lichens, Mosses and Ferns [observed in Marcy Woods] Old Growth Forests are the best place to find the most mushrooms, lichens, and primitive plants.

Reason: large, continuous supplies of decaying logs; thick carpets of decaying leaves and rich organic soil; millennia of relatively stable conditions for soil colonies of fungi to grow undisturbed, and no shocks from the introduction of bright light or drying and compaction conditions caused by logging or natural disasters. 51 species of lichen grow only in Old Growth Forests. However, scarce fungi, moss or ferns do not imply much.

OBSERVABLE FEATURES USED TO DETERMINE ABSENCE OR PRESENCE OF
LOGGING OR HUMAN DISTURBANCE (continued)

A few, scattered stumps or minor signs of the above disturbance-indicators do NOT rule out an Old Growth Forest. It just indicates that it had some past disturbance. When disturbance-indicators are regular and common (and Old-Growth Indicators are rare or absent), it is definitely NOT old growth.

[NONE OF THESE SIGNS WERE OBSERVED IN MARCY WOODS OLD GROWTH, except see # 26]

The following signs indicate a site may NOT be Old Growth:

15. Numerous stumps [none in Marcy Woods except a few along road or adjacent to cabin]
16. Logging road corridors through the forests
17. “Open-Grown” trees with branches that start 5 to 15 feet from the ground, spreading horizontally out (indicating the trees started in a sun-lit field or clearcut) [exception: open-grown trees grow in Marcy Woods' sunny sand dune Old Growth Forest corridor that lines the beach]
18. Trees that prefer to grow in young and disturbed forests, such as *aspen, black locust, white and gray birch, hawthorn, Norway maple, willow* [grows in wetland adjacent to Old Growth Forest], *Manitoba maple (ash-leaf maple or box-elder)* [grows in open dune Old Growth Forest corridor along beach front]
19. Presence of planted or non-native trees, such as *Norway spruce, Scots pine, tree of heaven, Norway maple*.
20. Trees with multiple trunks from their base (“coppiced trees”), which means they sprouted from a stump created by logging. Applies to *red and black oak, red and silver maple, birches, white ash* (note that Basswood grows multiple trunks naturally) [virtually none in Marcy Woods]
21. Old stone walls running through the forest

APPENDIX D. RARE AND THREATENED SPECIES OF
PLANTS AND ANIMALS RECORDED ON MARCY WOODS PROPERTY

Note: Scientific Latin names are provided only for the plant species. Accurate as of 2003.

- 4 tree species:

Nationally Threatened: Hop Tree (*Ptelea trifoliata*) - also legally protected, designated "species of special concern"

Globally Endangered: Black Maple (*Acer nigrum*) - uncommon as a species. In the category of age, Old Growth individuals are rare, and it is the only Old Growth Black Maple Forest in the world

Regionally Rare: Tulip Tree (*Liriodendrum tulipifera*)

Poison Sumac (*Rhus vernix*)

- 2 shrub species:

Southern Arrowwood (*Viburnum recognitum*) - regionally rare

Lowland Virginia Creeper (*Parthenocissus quinquefolia*) - regionally rare

- 12 wildflower species:

Nationally Rare Species:

White Wood Aster (*Aster divaricatus*)

Appalachian Sedge (*Carix appalachica*)

Spring Avens (*Geum vernum*)

White, Red, Yellow and Painted Trilliums - may be the only place in Canada where all 4 of these Trillium species grow together (*Trillium grandiflorum*, *T. erectum*, *T. luteum*, *T. undulatum*)

Provincially Rare: Blunt-scaled Oak Sedge (*Carex albicans* var. *albicans*)

Regionally Rare Species:

Hairy Rock Cress (*Arabis hirsuta* var. *pycnocarpa*)

Yellow Giant Hyssop (*Agastache nepetoides*)

Tall Bellflower (*Campanula americana*)

Muhly Grass (*Muhlenbergia schreberi*)

Black-seeded Clearweed (*Pilea fontana*)

Nodding Chickweed (*Cerastium nutans*)

Hairy Wild Rye (*Elymus villosus*)

Seaside Spurge (*Euphorbia polygonifolia*)

- 16 animal species (plus many rare insect species):

Nationally Rare:

Southern Flying Squirrel Fowlers Toad

Hog-Nosed Snake Western Chorus Frog

Giant Swallowtail - largest butterfly in Canada

Nationally Rare Birds:

Acadian Flycatcher (endangered) Hooded Warbler (threatened),

Cerulean Warbler Red-headed Woodpecker

Regionally Rare Birds: Red-bellied and Pileated Woodpeckers

Carolina Wren Winter Wren

Black-and-White Warbler Black-Throated Green Warbler

Tufted Titmouse Northern Waterthrush

Appendix E AUTHORITATIVE SOURCES THAT RECOGNIZE BLACK MAPLE AS A DISTINCT TREE SPECIES

Black Maple is recognized as a distinct and separate tree species by all the government and scientific authorities that conduct collaborative taxonomic research and make the final taxonomic determinations on the species status of each species. Here are 23 of these sources that support its separate species status (for complete bibliographic information, see Appendix for list of Literature and Internet Web site Sources):

Integrated Taxonomic Information System (ITIS). This partnership of US and Canadian agencies, scientists, and NGOs is one of the most authoritative sources on the taxonomic status of plant species.

Taxonomic Nomenclature Checker, authoritative list of 80,000 scientific names of North American plants maintained by USDA's Agricultural Research Service

Canadian Biodiversity Information Facility, a clearinghouse coordinated by 8 Canadian federal agencies, and

Ontario Min. of Natural Resources, provides updated scientific names of Canada's rare species.

Biota of North America Program, lists updated taxonomic status of North America's plants

Species 2000 Project, global consortium of scientific and government organizations, currently directed by a Canadian official, that compiles data on all known species

The PLANTS Database, operated by USDA's National Plant Data Center

Manual of Vascular Plants of the Northeastern United States and Adjacent Canada.

Illustrated Flora of the Northeastern States and Canada.

Silvics of North America. US Forest Service

Silvics of Forest Trees of the U.S. US Forest Service

Gray's Manual of Botany. 8 Vol.

A Natural History of Eastern Trees, Donald Culross Peattie

National Audubon Society Field Guide to North American Trees: Eastern Region.

Peterson Field Series, Guide to Eastern Trees: Eastern US and Canada

Complete Trees of North America, A Field Guide & Natural History.

Golden Field Guide, Trees of North America

Potential Natural Vegetation of the Coterminous United States. Amer. Geographical Society

Ecological Land Classification for Southern Ontario. Ont. Ministry of Natural Resources, 1998

Ecological Communities of New York State. NY Natural Heritage Program, 1990 and 2002 update

Woodland Heritage of Southern Ontario. Fed. of Ontario Naturalists (Ontario Nature)

Old Growth Forest Definitions for Ontario. Ontario Ministry of Natural Resources, 2003

Old Growth in the East, A Survey. 2003

The Old Growth Forests of Southern Ontario. Ontario Extension Notes, 2000

APPENDIX F

Literature Sources

Ancient Forest Exploration Guide. Pamphlet written and published by the non-profit group, Ancient Forest Exploration and Research, Toronto, Ont., c. 2000.

Baldwin, Mark. Natural History Atlas to the Chautauqua-Allegheny Region. Roger Tory Peterson Institute of Natural History, Jamestown, NY, 243 p., 2001. Offers detailed descriptions of forest natural areas on Lake Erie's south shore for comparison

Barnard, Ned Sibley. New York City Trees. Columbia University Press, 240 p., 2002

Bert Miller Nature Club members. Birds of Marcy Woods; Fungi of Marcy Woods by Dr. Robert Fisher and Eira Voth; Moths and Butterflies of Marcy Woods by Paul McGraw. publ. by Bert Miller Nature Club, a chapter of Ontario Nature, Fort Erie, Ont., 2000. (three compilations totaling nearly 300 species, bound into a single 10-page publication).

Britton, Nathaniel L. and Helen C. Brown, Illustrated Flora of the Northeastern States and Canada. Dover Press, 2,049 p., 1970

Brockman, C.Frank. Trees of North America, Golden Field Guide. St. Martins Press, 280 p., 2001

Brown, Ron. Ontario's Secret Landscapes: 50 More Visits to Unusual Ontario. Boston Mills Press, Erin, Ont., 1999

Burns, Russell M. and Barbara H. Honkala. Silvics of North America. Agric. Handbook No. 654. US Dept. of Agriculture, Forest Service, Wash., DC, 877 p., 1990

Carmean, Dr. Willard. The Old Growth Forests of Southern Ontario. Ontario Extension Notes, 10 p., 2000. The author is a Lakehead University professor, in Thunder Bay, Ontario.

Chapman, L.J., D.F. Putnam. The Physiography of Southern Ontario. Ontario Research Foundation, Univ. Toronto Press, Toronto, Ont., 386 p., 1966

Cundiff, Brad. Hike Ontario Guide to Walks Around Toronto. Boston Mills Press, Erin, Ont., 176 p., 1995

Cundiff, Brad. Hike Ontario Guide to Walks in Carolinian Canada. Boston Mills Press, Erin, Ont., 176 p., 1998

Davis, Mary Byrd. Old Growth in the East, a Survey. Revised Edit.. Appalachia-Science in the Public Interest, on behalf of Eastern Old-Growth Clearinghouse, Georgetown, KY, 249 p., 2003

Eagleson, Janet. Nature Hikes: Near-Toronto Hikes and Adventures. Boston Mills Press, Erin, Ont., 206 p., 2000

Elias, Thomas S. The Complete Trees of North America, a Field Guide & Natural History. Gramercy Publ., 1987

Essex Region Conservation Authority. City of Windsor Candidate Natural Heritage Site Biological Inventory

Evaluation Report. City of Windsor, Ont., Departments of Planning and Parks & Recreation, 212 p., 1992

Essex Region Conservation Authority. Environmentally Significant Areas Status, 1992 Update. City of Windsor

Candidate Natural Heritage Site Biological Inventory. Unpublished report. Essex Co., Ont., 1994

Fernald, Merritt Lyndon, Gray's Manual of Botany. 8th Centennial Edition. 8 Volumes. Portland, WA, Dioscorides Press, 1632 p., 1991

Gartshore, Mary E., D.A. Sutherland, and J.D. McCracken, The Natural Areas Inventory of the Regional Municipality of Haldimand-Norfolk. Vol. 1 Natural Areas; Vol. 2 Annot. Checklists. Norfolk Field Naturalists, Simcoe, Ont., 118 p., 1987

Gleason, H. A., & A. Cronquist. Manual of Vascular Plants of the Northeastern United States and Adjacent Canada. Van Nostrand-Reinhold Co., New York, NY, 1963

Heagy, Audrey E., edit. Hamilton-Wentworth Natural Areas Inventory. Vol. 2 Site Summaries. Hamilton Naturalists Club, Hamilton, Ont., 330 p., 1993

Hough, T. Silvics of Forest Trees of the U.S. Agric. Handbook No. 271. US Dept. of Agriculture, Forest Service, Wash., DC, 1965

Jacob, Katherine. Grand River Country Trails. publ. by The Record, in cooperation with Grand River Conserv. Authority and other public lands agencies, Kitchener, Ont., 103 p., 1999

Jacob, Katherine. Oak Ridges Moraine Trails. Conservation Ontario (organization of Ontario's Conservation Authorities), 120 p., 2003

Kershner, Bruce. Buffalo's Backyard Wilderness: Ecological Study of Victor Reinstein Nature State Preserve.

Western NY Heritage Institute/Canisius College Publ., 156 p., 1993. Comprehensive study of the Niagara Region's first documented original Old Growth Forest

Kershner, Bruce. Guide to Ancient Forests in Vicinity of New York City. New York Old Growth Forest Association, 108 p., 1998. (earliest guide to southern NY State's and New Jersey's old growth forests.)

Kershner, Bruce. Guide to Ancient Forests of Pennsylvania. New York Old Growth Forest Association, 78 p., 2001. (Earliest guide to this state's old growth forests).

Kershner, Bruce. Old Growth Forest Survey of Eastern Niagara Peninsula. Bert Miller Nature Club, Fort Erie Chapter of Ontario Fed. of Naturalists, 152 p., 2004. Scientific report on southern Ontario's first comprehensive survey for old growth forests.

Kershner, Bruce. Old Growth Forest Survey of Western New York. Adirondack Mountain Club, 126 p., 1995. Scientific report on New York State's first comprehensive survey for old growth.

Kershner, Bruce and Robert Leverett. Sierra Club Guide to Ancient Forests of the Northeast. Sierra Club Books & Univ. of Calif. Press, 268 p., 2004.

Kuchler, A.W. Potential Natural Vegetation of the Coterminous United States. American Geographical Society, 154 pp. & wall map, 1964.

Larson, Brendan, John Riley, et al. Woodland Heritage of Southern Ontario. Federation of Ontario Naturalists. Fish Point, Point Pelee National Park, 262 p., 1999

Lee, H.T., W. D. Bakowsky, et al. Ecological Land Classification for Southern Ontario. Ontario Ministry of Natural Resources, South Central Science Section Field Guide, 1998. Also the 2002 updated 2nd Edition of this publication by Gregory Edinger, D.J.Evans, et al.

Lewis, J.C., editor. Guide to the Natural History of the Niagara Region. Cam Lewis Enterprise publ. at Brock Univ., St. Catharines, Ont., 447 p., 1991.

Little, Elbert L. National Audubon Society Field Guide to North American Trees: Eastern Region. Alfred Knopf, Inc., New York, NY, 714 p., 2003.

MacPherson, Allen. Ontario Provincial Parks Trail Guide. Boston Mills Press, Erin, Ont., 168 p., 2000 Provides descriptions of parks with notable forests for comparison

Marleau, Jason. Backroad Mapbook: Cottage Country Ontario. Backroad Mapbooks Publ./ Musio Ventures, Inc., Ltd., New Westminster, BC, 63 p., 1998. Provides detailed descriptions of so. Ontario forested natural areas for comparison

Marleau, Jason, and Russell Mussio. Backroad Mapbook: Southwestern Ontario. Backroad Mapbooks Publ., Ltd /Musio Ventures, Inc., New Westminster, BC, 71 p., 2003. Provides detailed descriptions of so. Ontario forested natural areas for comparison

Marleau, Jason. Backroad Mapbook: Eastern Ontario. Backroad Mapbooks Publ., Ltd /Musio Ventures, Inc., New Westminster, BC, 66 p., 1998. Provides detailed descriptions of so. Ontario forested natural areas for comparison

McLean, Ross E., Anne Craik, J. Sherk. Country Walks: The Niagara Escarpment. Boston Mills Press, Erin, Ont., 144 p., 1994. Describes so. Ontario forested natural areas for comparison

Newcomb, Lawrence. Newcomb's Wildflower Guide. Little, Brown & Co., 490 p., 1977.

Oldham, Michael. Reconnaissance Botanical Inventory of Marcy Woods, Point Abino, Niagara Regiona; Municipality, Ontario. Natural Heritage Info. Ctr., Ont. Min. Natural Resources, Peterborough, Ont., 25 p., 2000
This comprehensive field survey of nearly all plant species on Marcy Woods property discovered numerous rare and threatened species.

Peattie, Donald Culross. A Natural History of Eastern Trees. Crown Publ., 624 p., 1958

Petrides, George A. A Field Guide to Eastern Trees: Eastern United States and Canada, including Midwest. Peterson Field Guide Series. Houghton Mifflin Co., New York, NY, 1998

Reschke, Carol. Ecological Communities of New York State. New York Natural Heritage Program, NY Dept. of Environmental Conservation, Latham, NY, 96 p., 1990. Also 2nd Edition of this publication, Gregory Edinger, D.J.Evans, et al., 2002

Sargent, Charles Sprague. Manual of the Trees of North America. 3 volumes. Dover Publ., Inc., New York, NY, 892 p., 1965 Dr. Sargent was long-time director of Harvard Univ. Arnold Arboretum

Stabb, Mark. Ontario Old Growth Ecotour. Published by Ancient Forest Exploration and Research, jointly with Canadian Nature Federation, Ottawa, Ont., pamphlet, 2001

Stabb, Mark and Steve Patterson. Southern Flying Squirrels in Marcy Woods: Results of a Reconnaissance Survey. Scientific report for Bert Miller Nature Club, a chapter of Federation of Ontario Naturalists (Ontario Nature), Fort Erie, Ont., 7 p., 2000.

Ursic, Ken, Anthony Goodban. Summary List of Vascular Plants observed on the Marcy Farm Property, Point Abino, Ontario. Dougan & Assoc. Ecological Consulting Services, Guelph, Ont., 2000. A compilation of 521 species of plants found on Marcy Woods property, with emphasis on discovery and status of rare and threatened species.

Van Gelderen, D.M., P.C. de Jong, et al. Maples of the World. Timber Press, Portland, OR, 1994

Wake, Winifred. A Nature Guide to Ontario. Federation of Ontario Naturalists (Ontario Nature), Univ. Toronto Press, Toronto, Ont. 468 p., 1997. Provides detailed descriptions of forested natural areas for comparison

Waldron, Gerry. Trees of the Carolinian Forest. Boston Mills Press, 275 p., 2003

Yaki, Gustave. Plants of the Niagara Peninsula. Special Publ. No. 2, Niagara Falls Nature Club, 44 p., 1970
Zenkert, Charles A. The Flora of the Niagara Frontier Region. Bulletin 16, Buffalo Society of Natural Sciences, 328 p., 1934

Zenkert, Charles A. and Richard H. Zander. The Flora of the Niagara Frontier Region, Supplement. Vol. 16, Bulletin of Buffalo Society of Natural Sciences, 1975

APPENDIX F. continued ...Internet Web Site Sources

All Reference Encyclopedia Tree Index:

<http://reference.allrefer.com/wildlife-plants-animals/plants/tree/>

Biota of North America Program. one of the most complete botanical websites on the Internet; provides a checklist the most up to date taxonomically correct names of the vascular plants of North America. Operated by North Carolina Botanical Garden, at University of North Carolina, Chapel Hill

<http://www.bonap.org/>

Canadian Biodiversity Information Facility. Consortium of 8 Canadian federal natural resource, environmental and other agencies who coordinate a clearinghouse at Ontario MNR to search for and inventory all of Canada's known rare native species and communities.

http://www.cbif.gc.ca/home_e.php

Carolinian Canada, website for this non-profit organization that works to protect and acquire Carolinian forests. Describes natural areas containing quality examples of these forests.

http://www.carolinian.org/CarolinianSites_1984CarolinianCanadaSites.htm

ENature Tree Field Guide:

<http://enature.com>

http://209.133.64.41/search/show_search_thumb.asp?curGroupID=10

Integrated Taxonomic Information System (ITIS), partnership of governments, scientists, and organizations, headquartered in US Dept. of Agriculture to provide the authoritative source on the taxonomic status of plant species.

<http://www.itis.usda.gov/servlet/SingleRpt/SingleRpt>

Taxonomic Nomenclature Checker. USDA's Agricultural Research Service maintains lists of 80,000 accurate species and genus scientific names of North America's plants <http://pgrdoc.ipgri.cgiar.org/taxcheck/grin/index.html>

The PLANTS Database (version 5.1.1). National Plant Data Center, Ntl Resources Cons. Service, US Dept. Agric., Baton Rouge, LA 70874-4490 This is the specific page for Black Maple

http://www.cbif.gc.ca/pls/itisca/next?v_tsn=182135&taxa=Acer+nigrum&p_ifx=cbif&p_lang=

Species 2000 Project. a consortium of numerous government natural resource and scientific agencies, universities, and non-profit organizations whose goal is to enumerate all known species of organisms on Earth for studies of global biodiversity. Its current director is a Canadian federal natural resource ministry.

<http://www.sp2000.org/>

"The Lake Erie Shore Guide" provides extensive, multi-page coverage of Lake Erie's shore, including notable natural areas and forests. http://www.associatedcontent.com/content.cfm?content_type=article&content_id=7345

US Dept. of Agriculture Tree Fact Sheets:

http://plants.usda.gov/cgi_bin/topics.cgi?earl=fact_sheet.cgi

Natural Heritage Resources of Ontario: Rare Vascular Plants. 3rd Ed., Michael Oldham, Ont. Min. of Natural Resources., natural Heritage Info. Ctr, Box 7000, Peterborough, Ont., 1999
<http://nhic.mnr.gov.on.ca/MNR/nhic/species/lists/rarevascular.pdf>

Natureserve Explorer, an Internet website encyclopedia on all North American plant species

<http://www.natureserve.org/explorer/>

Eastern Native Tree Society. This organization locates and measures eastern North America's largest and tallest trees. Its website is one of the only reliable sources for data on maximum size of trees; the limited data on Old Growth Black Maple dimensions and locations indicates how scarce large specimens are.

Maximum Size of Living Trees: http://www.uark.edu/misc/ents/bigtree/webpage_tall_tree_list.htm

Maximum Size of Trees of the Past: http://www.uark.edu/misc/ents/bigtree/great_eastern_trees.htm

Appendix G.

Scientific and Common Names of Tree Species and Rare Plants Referred to in This Report

TREES

Bold = recorded as Old Growth in Marcys Woods

| | |
|-------------------------------------|---|
| Ash, White | <i>Fraxinus americana</i> |
| Aspens | <i>Populus tremuloides</i> , <i>P. grandidentata</i> |
| Basswood | <i>Tilia americana</i> |
| Beech, American | <i>Fagus grandifolia</i> |
| Birch, Gray | <i>Betula populifolia</i> |
| Birch, Paper | <i>Betula papyrifera</i> |
| Birch, Yellow | <i>Betula allegheniensis</i> |
| Buckthorn, Eur. | <i>Rhamnus frangula</i> |
| Cedar, E. Red | <i>Juniperus virginiana</i> |
| Cedar, No. White | <i>Thuja occidentalis</i> |
| Cherry, Black | <i>Prunus serotina</i> |
| Cottonwood, E. | <i>Populus deltoides</i> |
| Dogwood, Pagoda | <i>Cornus alterniflora</i> |
| Elm, Red (Slippery) | <i>Ulmus rubra</i> |
| Elm, White (Amer.) | <i>Ulmus americana</i> |
| Hawthorn spp. | <i>Crataegus spp.</i> |
| Hemlock, Eastern | <i>Tsuga canadensis</i> |
| Hickory, Bitternut | <i>Carya cordiformis</i> |
| Hop Tree | <i>Ptelea trifolia</i> |
| Hornbeam, American | <i>Carpinus americana</i> |
| Hornbeam, Hop (Ironwood) | <i>Ostrya virginiana</i> |
| Locust, Black | <i>Robinia pseudoacacia</i> |
| Maple, Black | <i>Acer nigrum</i> |
| Maple, Manitoba (Ash-leaf) | <i>Acer negundo</i> |
| Norway Maple | <i>Acer platanoides</i> |
| Maple, Red | <i>Acer rubrum</i> |
| Maple, Silver | <i>Acer saccharinum</i> |
| Maple, Sugar | <i>Acer saccharum</i> |
| Oak, Black | <i>Quercus velutina</i> |
| Oak, Chinkapin | <i>Quercus muehlenbergii</i> |
| Oak, No. Red | <i>Quercus borealis</i> |
| Pine, White | <i>Pinus strobus</i> |
| Poison Sumac | <i>Rhus vernix</i> |
| Spruce, Norway | <i>Picea abies</i> |
| Tree of Heaven (Ailanthus) | <i>Ailanthus altissima</i> |
| Tulip-Tree | <i>Liriodendron tulipifera</i> |
| Walnut, Black | <i>Juglans nigra</i> |
| Yew, Canada | <i>Taxus canadensis</i> (shrub) |

RARE (marked as bold) PLANTS, SHRUBS, and other mentioned species

| | |
|--------------------------------|--|
| Arrowwood, Southern | <i>Viburnum recognitum</i> |
| Aster, White Wood | <i>Aster divaricatus</i> |
| Avens, Spring | <i>Geum vernum</i> |
| Barberry, Japanese | <i>Berberis japonica</i> |
| Bellflower, Tall | <i>Campanula americana</i> |
| Chickweed, Nodding | <i>Cerastium nutans</i> |
| Clearweed, Black-seeded | <i>Pilea fontana</i> |
| Garlic-Mustard, | <i>Alliaria petiolata</i> |
| Grass, Muhly | <i>Muhlenbergia schreberi</i> |
| Honeysuckle, Tartarian | <i>Lonicera tartarica</i> |
| Hyssop, Yellow Giant | <i>Agastache nepetoides</i> |
| Motherwort, | <i>Leonurus cardiaca</i> |
| Rock Cress, Hairy | <i>Arabis hirsuta</i> var. <i>pycnocarpa</i> |
| Rose, Multiflora | <i>Rosa multiflora</i> |
| Sedge, Appalachian | <i>Carix appalachica</i> |
| Sedge, Blunt-scaled Oak | <i>Carex albicans</i> var. <i>albicans</i> |
| Spurge, Seaside | <i>Euphorbia polygonifolia</i> |
| Trillium, Painted | <i>Trillium undulatum</i> |
| Trillium, Red | <i>T. erectum</i> |
| Trillium, White | <i>T. grandiflorum</i> |
| Trillium, Yellow | <i>T. luteum</i> |
| Virginia Creeper, Lowland | <i>Parthenocissus quinquefolia</i> |
| Wild Rye, Hairy | <i>Elymus villosus</i> |

Wildflowers referred to only in Color Photos:

| | |
|-------------------------|-------------------------------|
| Blue Flag Iris | <i>Iris versicolor</i> |
| Hepatica, Round-leaf | <i>Hepatica americana</i> |
| Jack-in-the-Pulpit | <i>Arum triphyllum</i> |
| Marsh-Marigold | <i>Caltha palustris</i> |
| Royal Fern | <i>Osmunda regalis</i> |
| Spring Beauty | <i>Claytonia virginica</i> |
| Trout Lily | <i>Erythronium americanum</i> |
| Waterleaf, Broad-leaved | <i>Hydrophyllum canadense</i> |
| Wood Fern, Spinulose | <i>Dryopteris spinulosa</i> |

*"One impulse from a vernal woods may teach you more of man,
Of moral evil and of good, than all the sages can."*

- English poet, William Wordsworth



Twilight and stars over Marcy Woods and cabin



Black Maple leaf displayed in its autumn color glory.

PREPARED DURING THE
"YEAR OF THE VETERAN 2005"
FOR PRESENTATION TO

PREMIER DALTON McGUINTY
MINISTER JOHN GERRETSEN



A SPECIAL PROJECT
BY
FRIENDS OF MARCY WOODS

INSPIRED BY ITS CO-FOUNDER
MR. BERT MILLS*
(1925 - AUG. 28, 2005)

* Upon hearing of the indefinite extension of the Provincial Zoning Order for Marcy Woods in the week before his passing, WWII veteran Bert Mills exclaimed "My heart soars!"