

GREAT LAKES FISHERY COMMISSION

2002 Project Completion Report¹

Network to coordinate research on fish habitat in the near-shore and
tributary environments of the Great Lakes

by:

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May 2002

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BOARD OF TECHNICAL EXPERTS
RESEARCH TASK PROGRESS REPORT

Project Title: Network to coordinate research on fish habitat in the near-shore and tributary environments of the Great Lakes

Principal Investigators: Patricia Chow-Fraser (Canada)

Project Initiation Date: June 2000

Project Completion Date: May 31, 2002

Project Objectives:

1. Development of standardized database structures and fields for cross-walking information from different studies;
2. Development of standardized sampling regimes and analytical protocols so that results can be directly comparable across studies;
3. Identification of research priorities and data gaps pertaining to successful development of habitat classification and inventory;
4. Sharing of research results among all participants and timely dissemination of research results to environmental regulators; and
5. Storage of all relevant information in a centralized Geographic Information System (GIS) database that would be accessible via the internet

Project Deliverables:

1. Maintenance of a network for conservation and measurement of habitat types and incremental change of the quality and availability of fish habitat for coastal wetlands of the Great Lakes basin.
2. Identification of research priorities and potential funding partners with respect to conservation and assessment of fish habitat.
3. Incorporation of a tracking function of monitoring and research activities of coastal wetlands and riverine habitats into the WIRE Net database.
4. Conduct with partners a gear comparison study.
5. Conduct a workshop in association with the annual meeting of the IAGLR.
6. Complete GIS-pilot project for Lake Ontario and the upper St. Lawrence River.

Period Covered in This Report: March-June 2002

Deliverables:

1. Maintenance of a network

I have represented GLFC's interest in the Great Lakes Coastal Wetland Consortium and have kept in touch with those involved in assembling an inventory of wetlands and classifying them. As part of this activity, I worked together with Joel Ingram of Environment Canada to identify steps necessary to assemble a binational GIS wetland database for Lake Ontario. An important achievement this period, and a necessary first step, has been development of a classification scheme (**Table 1**) by Denny Albert and Doug Wilcox that will subsequently be used to classify wetlands for the pilot Lake Ontario project. I have also maintained open lines of communications among investigators who are actively sampling coastal wetlands. A summary

of the wetlands sampled and the elements that have been completed is presented in **Table 2**. To date, our network has sampled about 110 wetland complexes for some component of the wetland foodweb, including the fish community, and I am working to ensure that as many of these as possible will be sampled for water and sediment quality, macrophyte, zooplankton and zoobenthos in the coming year (see anticipated work in the next reporting period)

2. Tracking function of survey data in WIRE Net

Data collected from the field surveys in my research program (“Ecosystem-based assessment of fish habitat in coastal wetlands of the Great Lakes basin”) are being entered into the WIRE Net database, which is managed by me at McMaster University. These data include water quality, sediment quality, macrophyte species, zooplankton, fish and zoobenthos as indicated in **Table 2**.

3. Identification of research priorities and potential funding partners

I have identified that one of the priorities for the habitat task is to develop a mechanism to update wetland/landuse coverages through remote sensing on a regular basis for each Great Lake. In December, I accepted the responsibility of meeting with experts in the field of remote sensing to develop a proposal to monitor changes in landcover in the Great Lakes basin and nearshore areas of the Great Lakes basin using Landsat Thematic Mapper data. After meeting with experts at Earthsat in Washington, DC, and John Lyon from US EPA in Las Vegas in January, I prepared and submitted a proposal to GLFC at the request of Chuck Krueger. The remote sensing experts on this proposal are Dr. Bert Guindon of Canada Centre for Remote Sensing in Ottawa, and the scientists at Earthsat. Unfortunately, this proposal was not funded.

4. Gear Comparison Study

Three groups of investigators were invited to participate in a gear-comparison study: Tom Simon from USEPA, John Brazner and Danny Tanner from USEPA, and our group which consisted of biologists OMNR (Phil Ryan and Dave McLeish) and USFWS (Mike Weimer). The object of the study is to compare changes in the fish species list when electrofishing boat is used versus when fyke nets are used to sample the fish communities in coastal wetlands. Coastal wetlands were to be chosen from shorelines of all five Great Lakes. Together with partners, we were able to carry out field studies in all shorelines except the Canadian shoreline of Lake Huron because we were unable to locate a suitable electrofishing vessel. Data collected by our group are being analyzed and will form the basis of a thesis for Brian Reich at McMaster University. We were not able to contribute data for more than 4 wetlands in Lakes Ontario and Erie because of the late arrival of the fyke nets (didn’t arrive until late July) and the difficulty we had in accessing an electrofishing boat and operator from OMNR and DFO biologists. The two USEPA groups were able to sample many more wetlands on the U.S. shoreline of Lakes Superior, Michigan, and Erie although they have not yet completed their data processing and analyses.

5. Workshop during IAGLR 2002

A session has been organized by Dan Tanner (Duluth USEPA) and Val Brady (Duluth NRRI) during which one graduate student (Brian Reich, M.Sc. candidate) will present results from McMaster’s contribution to the 2001 Gear Comparison study. I have also organized a session on ecology of coastal wetlands jointly with Gord Goldsborough from University of Manitoba; during this session, three other graduate students working on developing indicators of wetland health and condition will present their results (Titus Seilheimer, M.Sc. candidate; Sheila McNair, Ph.D candidate; and Kim DeMutsert, M.Sc. exchange student).

6. Complete GIS-pilot project for Lake Ontario and the upper St. Lawrence River.

This component has been subsumed by another contract from the GLFC (“Binational GIS Database of coastal wetlands for Lake Ontario and the St. Lawrence: a demonstration project”), and the final product (GIS database) will be completed by end of October 2002. In this report, I have included an intermediate product, which is a series of maps of all the wetlands available for the U.S. and Canadian shorelines of the study area. A full description of the metadatabase, along with all the maps of each wetland will be published on the WIRE Net website upon completion of the GIS database pilot project. In the meantime, a sample of the maps that show the type of information that have been assembled towards this project can be found in Appendix 1 in this report.

Manuscripts Submitted/Published:

Signature of Principal Investigator(s):

Patricia Chow-Fraser

Date: May 31, 2002

Table 1.

Classification scheme for naturally occurring Great Lakes coastal wetlands based on dominant hydrologic source and connectivity to lake
(proposed by Denny Albert and Doug Wilcox, November 2001)

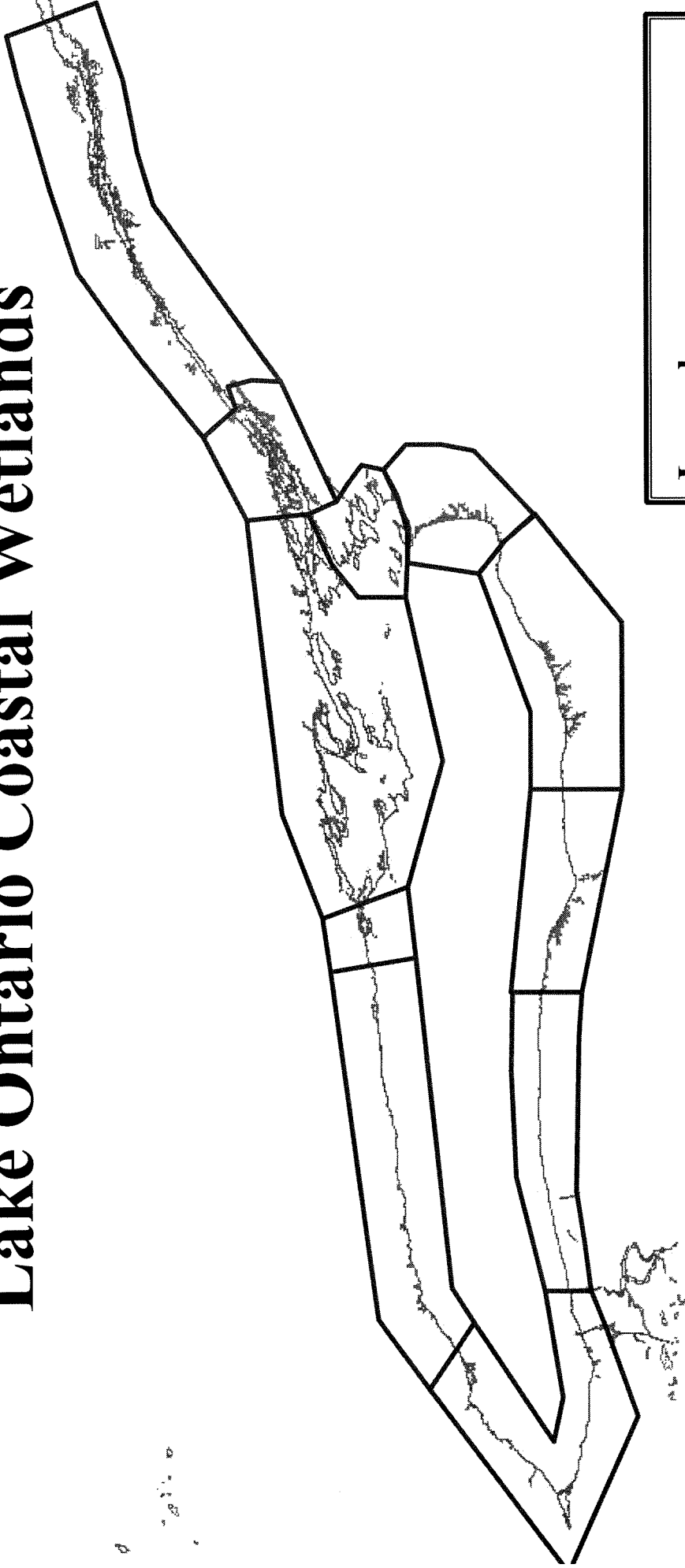
<p>Lacustrine strongly affected by lake level fluctuations, currents, seiches, ice scour</p>	<p>Open</p>	<p><i>Open Shoreline (1)</i> <i>Open Embayment (2)</i></p>
<p>Riverine water quality and sediment accumulation controlled by drainages; water level controlled by coastal processes</p>	<p>Protected</p>	<p><i>Protected Embayment (3)</i> <i>Sandspit Embayment (4)</i></p>
<p>Barrier-Protected separated from lake by coastal processes and protected from wave action; groundwater, surface water more important when not connected to lake</p>	<p>Drowned River-mouth</p>	<p><i>Open drowned river-mouth (5)</i> <i>Barred drowned river-mouth (6)</i></p>
	<p>Connecting Channel</p>	<p><i>Connecting Channel (7)</i></p>
	<p>Delta</p>	<p><i>Delta (8)</i></p>
	<p>Barrier-beach lagoon</p>	<p><i>Barrier-beach lagoon (9)</i></p>
	<p>Swale Complexes</p>	<p><i>Sandspit swales (10)</i> <i>Ridge & swale complexes (11)</i></p>

Table 2. Summary of coastal wetlands sampled for classifying fish habitat in the WIRE Net database.

Wetland Name	Lake/ Channel	Country	24-h Fyke Nets	Water Quality	Sediment Quality	Periphyton /Epiphyton	Macrophyte abundance	Macrophyte P/A List	Zoobenthos	Zooplankton
Bark Bay	Superior	USA	?	2000	2000			2000		1998
Lost Creek	Superior	USA	?	2001	2001	2001	2001	2001		
Misner Marsh	Huron	USA	?	2000	2000	2000	2001	2001		2000
Peshigo Marsh	Michigan	USA	?	2001	2000	2001	2001	2001		2000
Portage Creek	Michigan	USA	?	2001	2001	2001	2001	2001		2000
Seagull Bar	Michigan	USA	?	2000	2000			2000		2000
Sioux River	Superior	USA	?	2000	2000			2000		2000
West Fish Creek	Superior	USA	?	2001	2001	2001	2001	2001		2000
Wildfowl Bay	Huron	USA	?	2000	2000			2000		2000
Baraga	Superior	USA	2001 Burton	2002	2002			2002		
Betsie River	Michigan	USA	2001 Burton	2001	2001			2001		2000
Cedarville	Huron	USA	2001 Burton	2002	2002			2002		
Escanaba/Hwy 2	Michigan	USA	2001 Burton	2002	2002			2002		
Kalamazoo River	Michigan	USA	2001 Burton	2002	2002			2002		
Lincoln River	Michigan	USA	2001 Burton	2002	2002			2002		
Ludington Park	Michigan	USA	2001 Burton	2002	2002			2002		
Mackinac Bay	Huron	USA	2001 Burton	2002	2002			2002		
Manistee River	Michigan	USA	2001 Burton	2002	2002			2002		
Muskegon River	Michigan	USA	2001 Burton	2002	2002		2002	2002		
Nahma/Poplar Point	Michigan	USA	2001 Burton	2002	2002			2002		
Ogontz Bay	Michigan	USA	2001 Burton	2002	2002			2002		
Pentwater Marsh	Michigan	USA	2001 Burton	2001	2001	2001	2001	2001		
Pigeon River	Michigan	USA	2001 Burton	2002	2002			2002		
Portage River (76e)	Superior	USA	2001 Burton	2002	2002			2002		
Taquamenon River	Superior	USA	2001 Burton	2002	2002			2002		
White River	Michigan	USA	2001 Burton	2002	2002		2002	2002		
Buckhorn	Niagara	USA	2001 PCF	2001	2001			2001	2001	
Cootes Paradise	Ontario	Canada	2001 PCF	2001	2001	2000, 2001	2001	1998	2001	1998
Dunnville Marsh (Grand R.)	Erie	Canada	2001 PCF	1998, 2001	1998, 2001			1998, 2001	2001	1998
Little Sodus	Ontario	USA	2001 PCF	2001	2001	2000, 2001	2001	2000, 2001	2001	2000

Appendix I. Maps showing coastal wetlands located on the Canadian and U.S. shoreline of Lake Ontario. These maps are only draft versions, and are subject to change. Please do not cite or use without permission. The full metadata base, along with the maps of the shoreline segments and individual wetlands, and any other analyses will be made available by the end of October 2002 via the WIRE Net website. Anyone who is interested in using the GIS database at McMaster University should contact Dr. Chow-Fraser at chowfras@mcmaster.ca.

Lake Ontario Coastal Wetlands



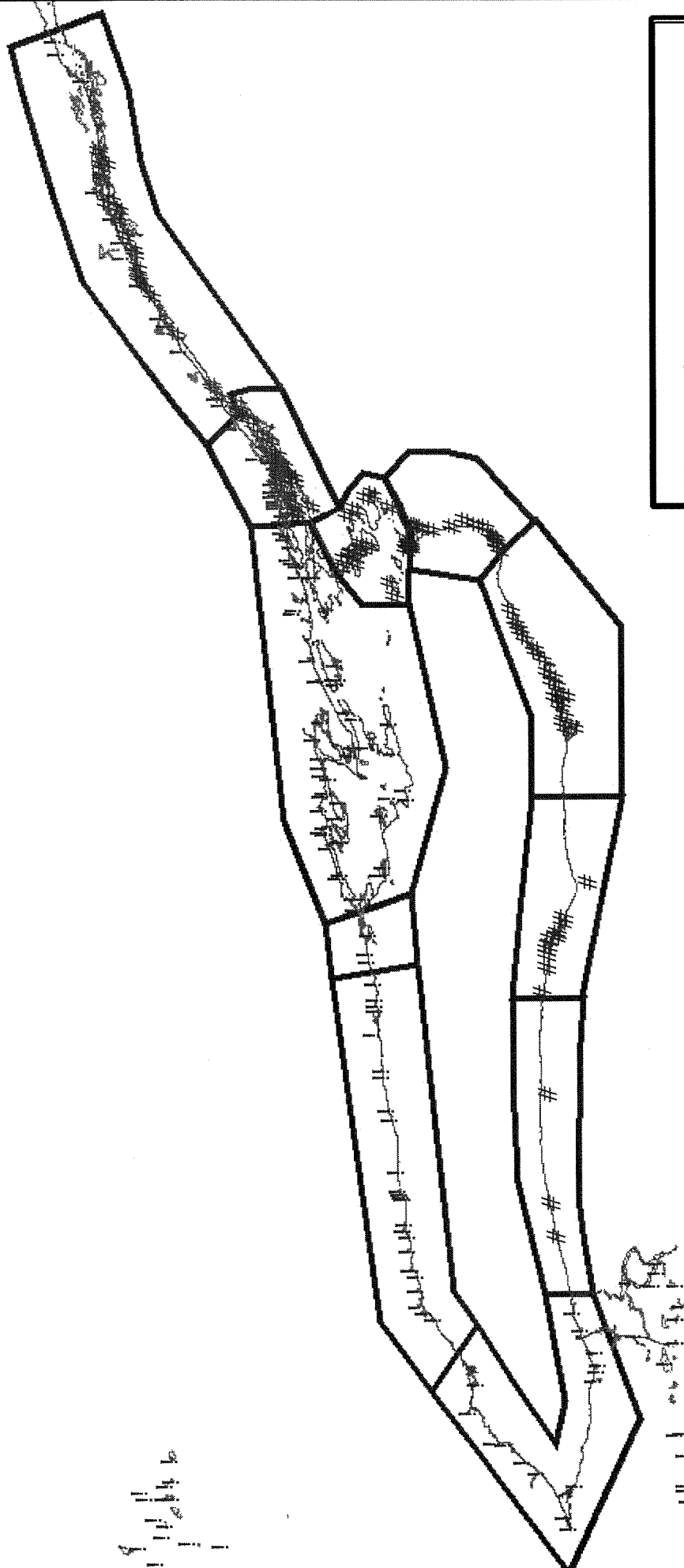
Legend

- Canadian Wetland polygons
- U.S. Wetland polygons
- Lake Ontario shoreline
- Eco-reach



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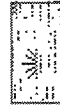
Lake Ontario Coastal Wetlands



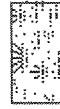
Legend

Herdendorf & Hartley 1980

! NHIC Centroids



Canadian Wetland polygons



U.S. Wetland polygons



— Lake Ontario shoreline

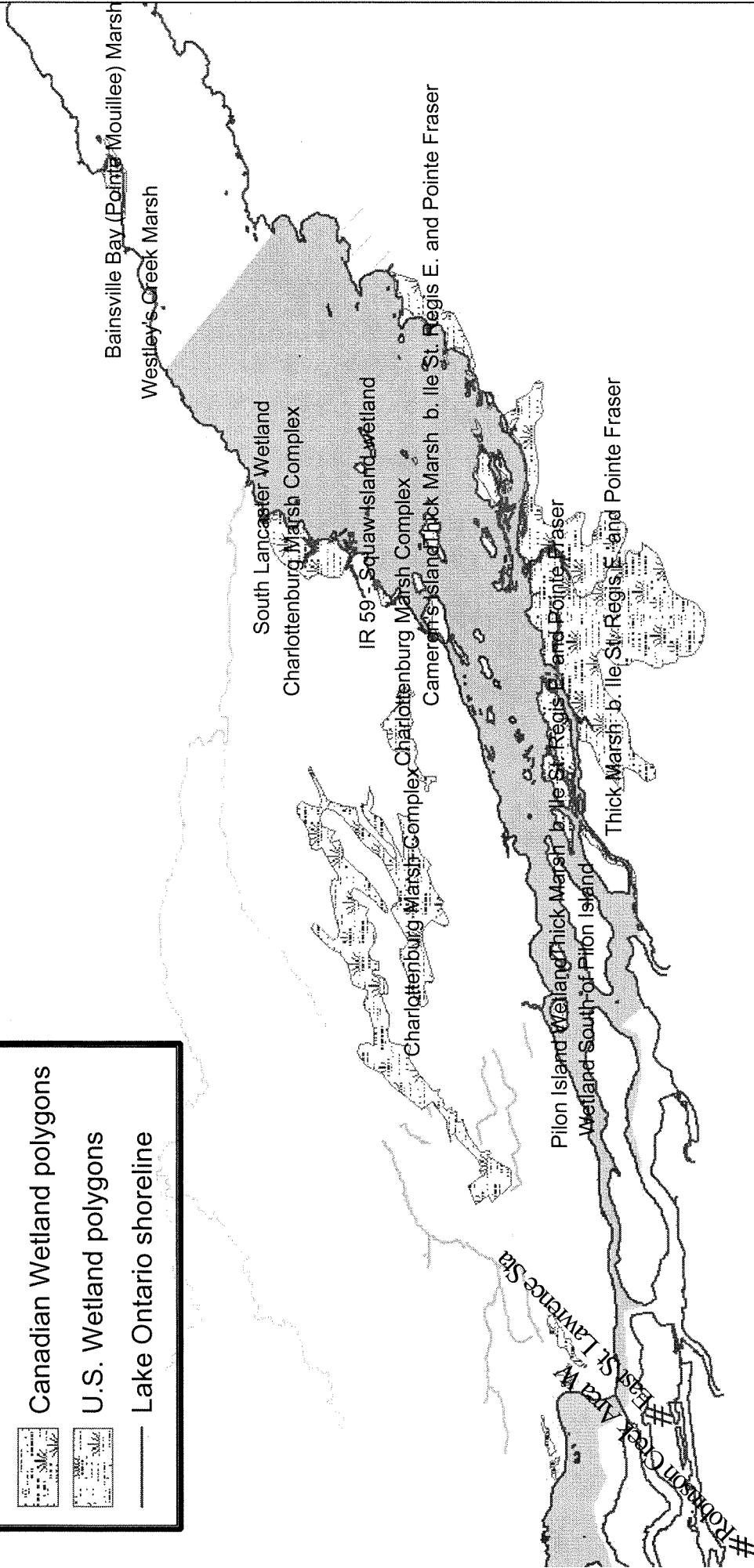


Map 001

St. Lawrence River

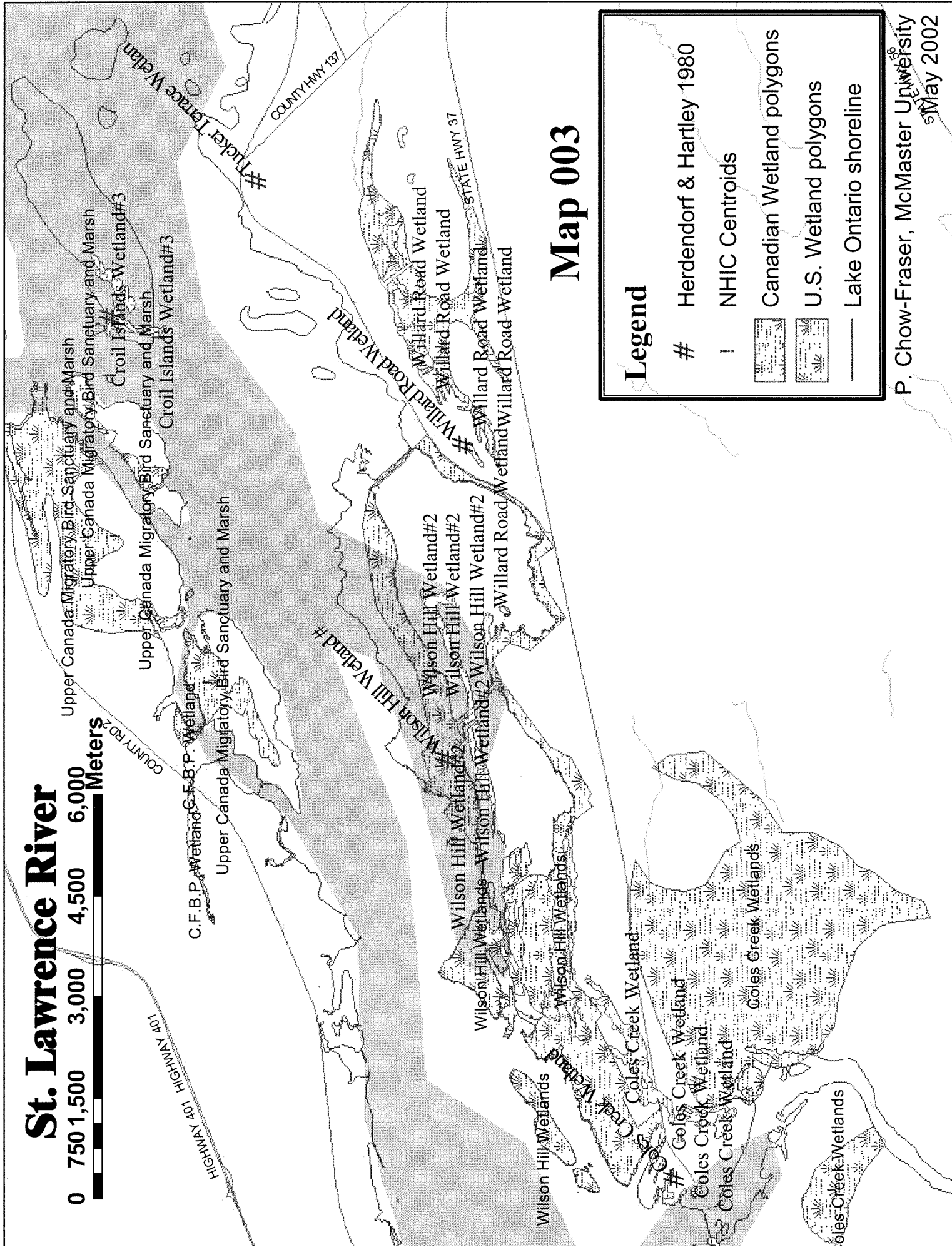
Legend

- # Herdendorf & Hartley 1980
- ! NHIC Centroids
-  Canadian Wetland polygons
-  U.S. Wetland polygons
- Lake Ontario shoreline



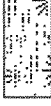

St. Lawrence River

0 750 1,500 3,000 4,500 6,000 Meters



Map 003


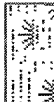

Legend

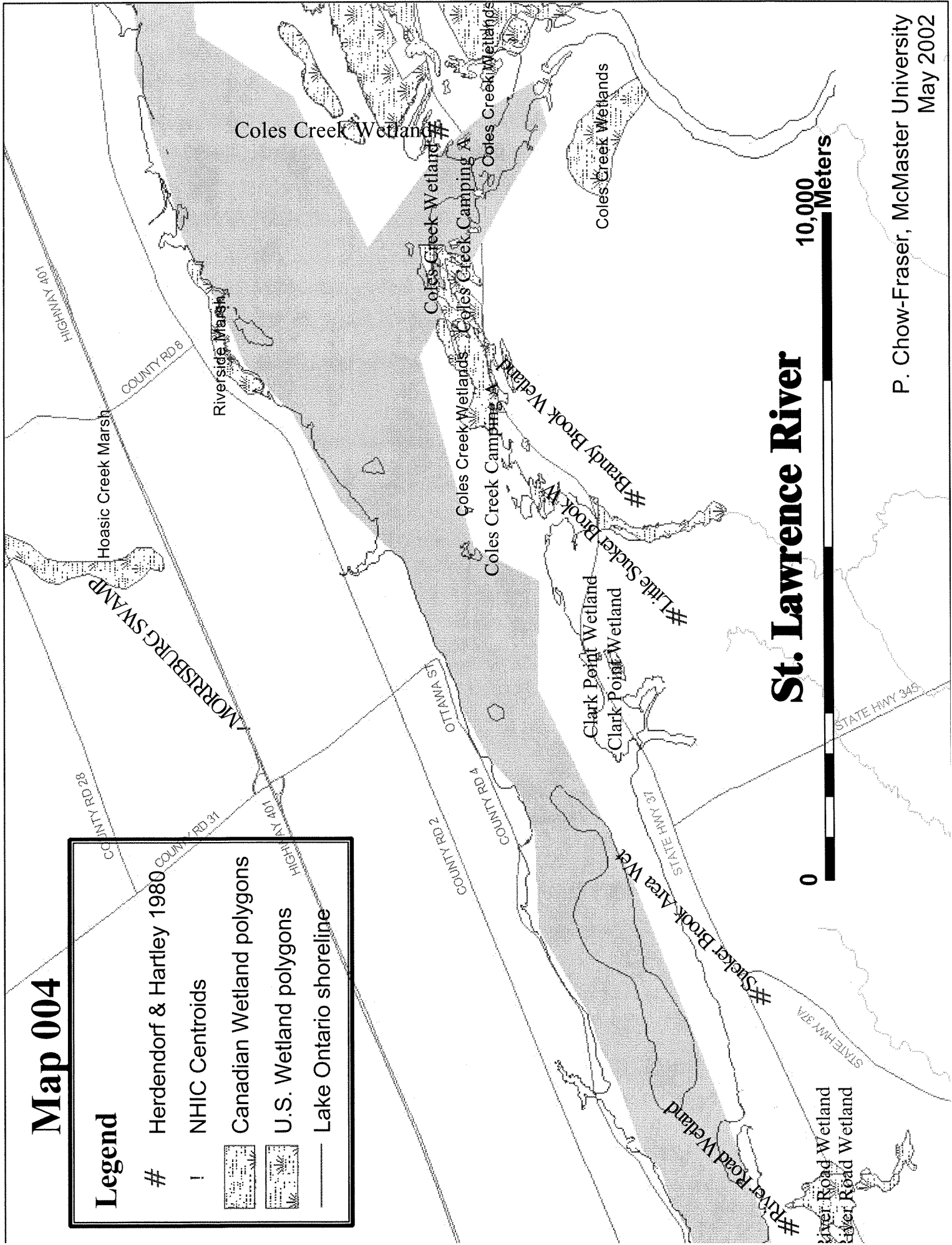
- # Herdendorf & Hartley 1980
- ! NHIC Centroids
-  Canadian Wetland polygons
-  U.S. Wetland polygons
- Lake Ontario shoreline

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Map 004

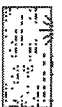


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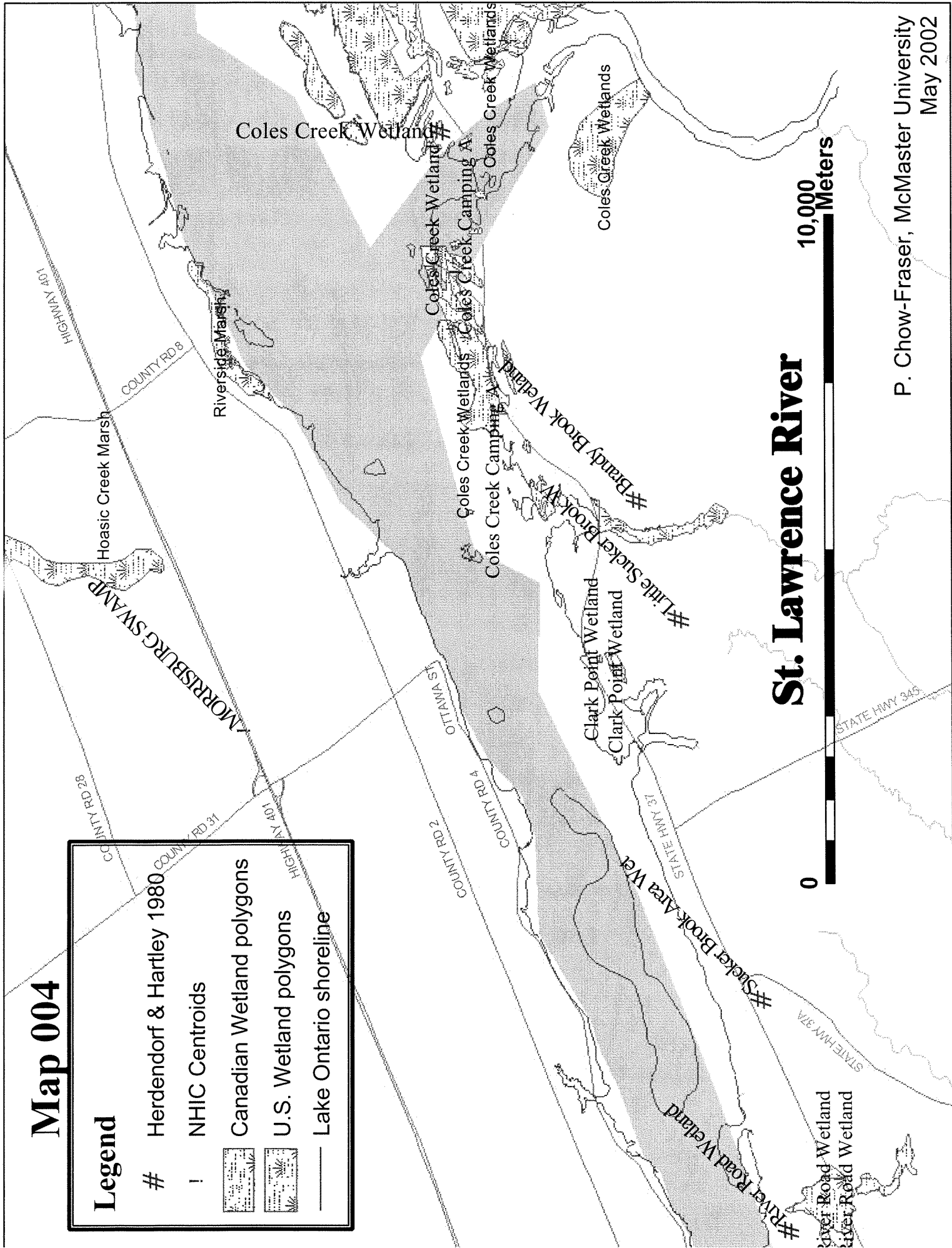
- # Herdendorf & Hartley 1980
- ! NHIC Centroids
-  Canadian Wetland polygons
-  U.S. Wetland polygons
-  Lake Ontario shoreline



Map 004

Legend

- # Herdendorf & Hartley 1980
- ! NHIC Centroids
-  Canadian Wetland polygons
-  U.S. Wetland polygons
-  Lake Ontario shoreline






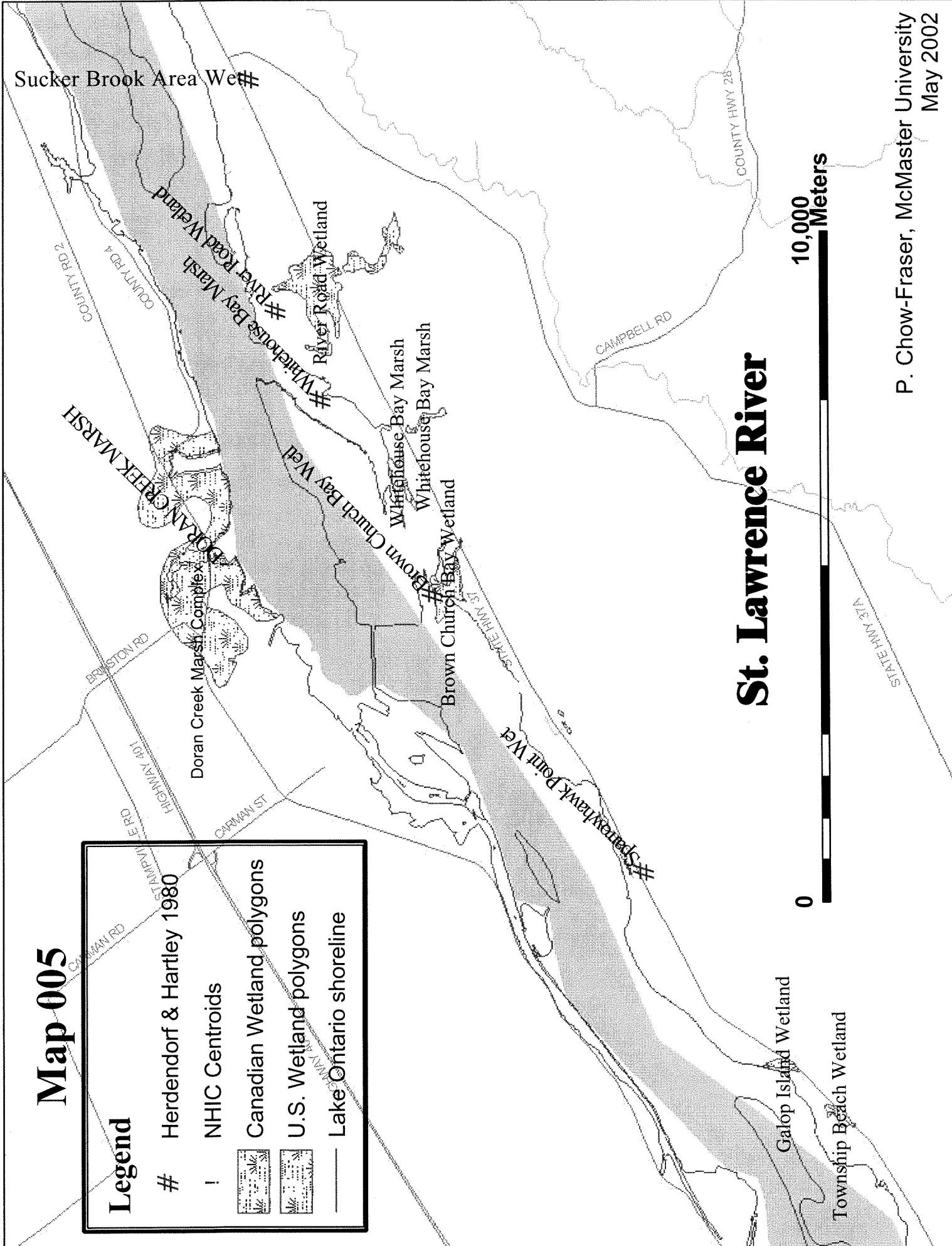
0 10,000 Meters

St. Lawrence River

Map 005

Legend

- # Herdendorf & Hartley 1980
- ! NHIC Centroids
-  Canadian Wetland polygons
-  U.S. Wetland polygons
-  Lake Ontario shoreline



St. Lawrence River



St. Lawrence River

10,000 Meters



HIGHWAY 401
HIGHWAY 401
HIGHWAY 401
COUNTY RD 44
COUNTY RD 2
MCLACHLAN CREEK COMPLEX

McLaughlins Creek Marsh Complex
McLaughlins Creek Marsh Complex

Edwardsburgh Marsh

Johnstown Marsh Complex

Johnstown Marsh Complex

Johnstown Marsh Complex



STATE HWY 37

#Ogdensburg East Area

KING ST E
ROCKTOR AVE
STATE HWY 37
GREEN ST

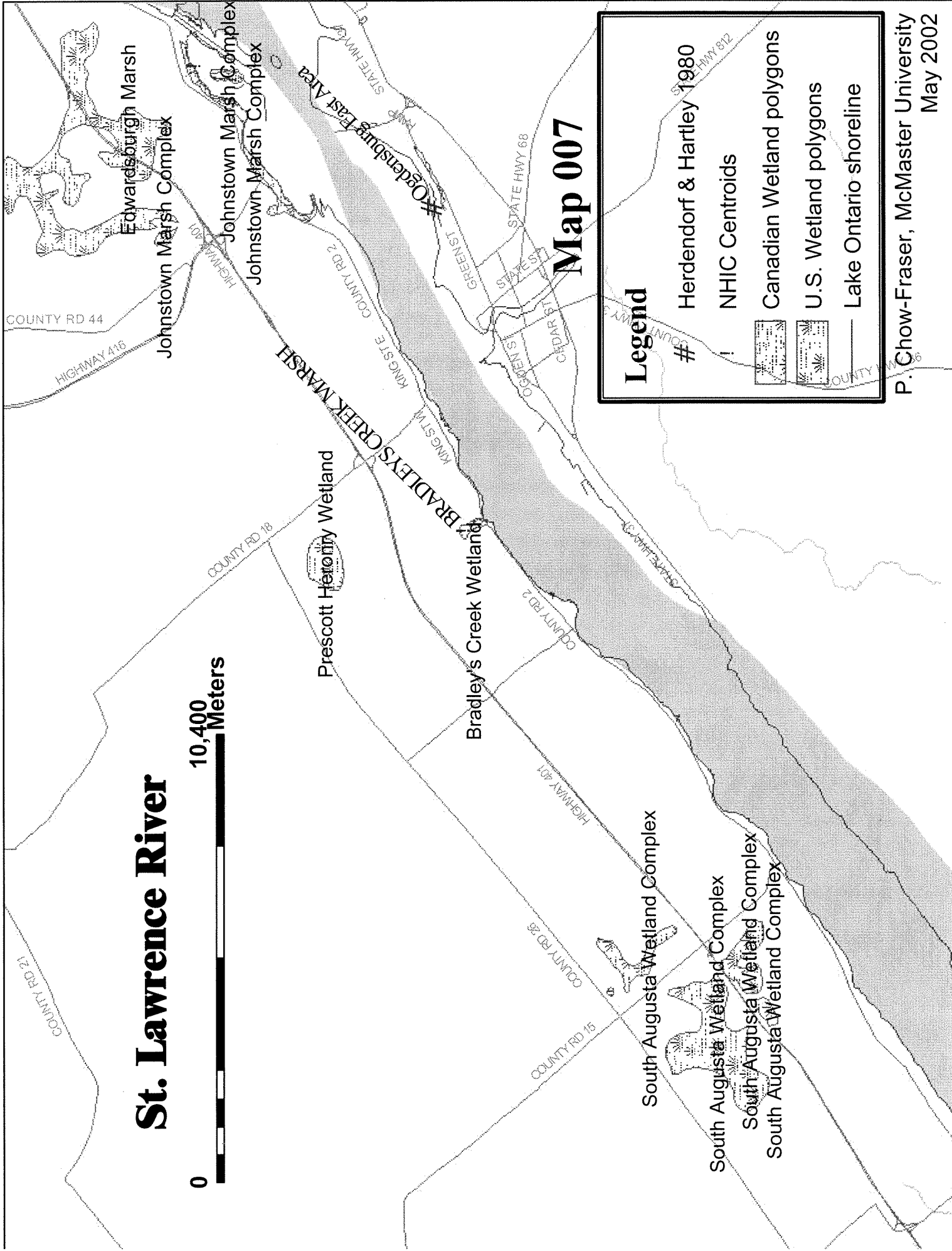
Map 006

Legend

- # Herdendorf & Hartley 1980
- ! NHIC Centroids
-  Canadian Wetland polygons
-  U.S. Wetland polygons
- Lake Ontario shoreline

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St. Lawrence River



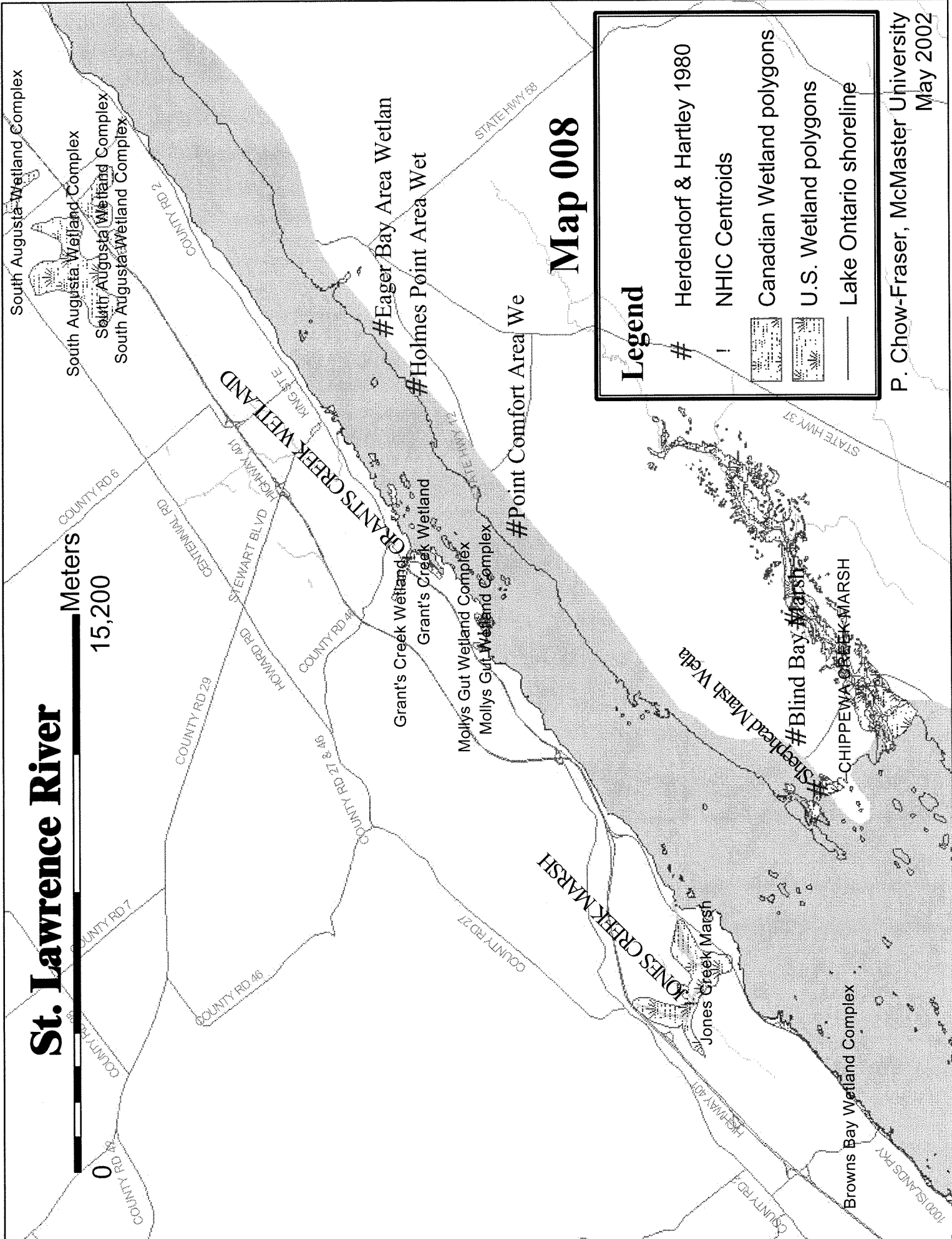
Map 007

Legend

- # Herdendorf & Hartley 1980
- ! NHIC Centroids
- [Stippled Box] Canadian Wetland polygons
- [Cross-hatched Box] U.S. Wetland polygons
- Lake Ontario shoreline


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St. Lawrence River



Map 008

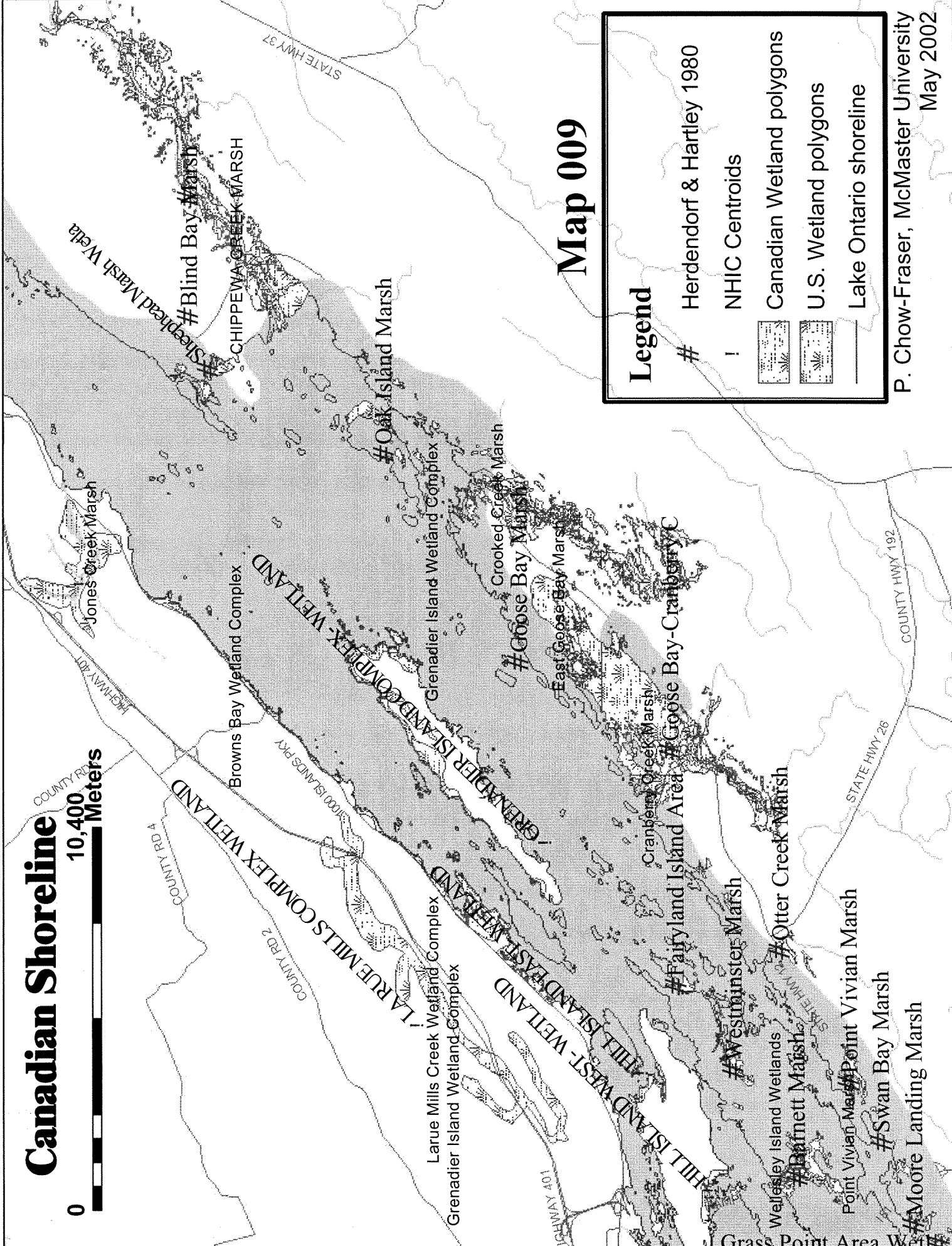
Legend

- # Herdendorf & Hartley 1980
- | NHIC Centroids
-  Canadian Wetland polygons
-  U.S. Wetland polygons
- Lake Ontario shoreline

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Canadian Shoreline

0 10,400 Meters



Map 009

Legend

- # Herdendorf & Hartley 1980
- ! NHIC Centroids
- Canadian Wetland polygons
- U.S. Wetland polygons
- Lake Ontario shoreline

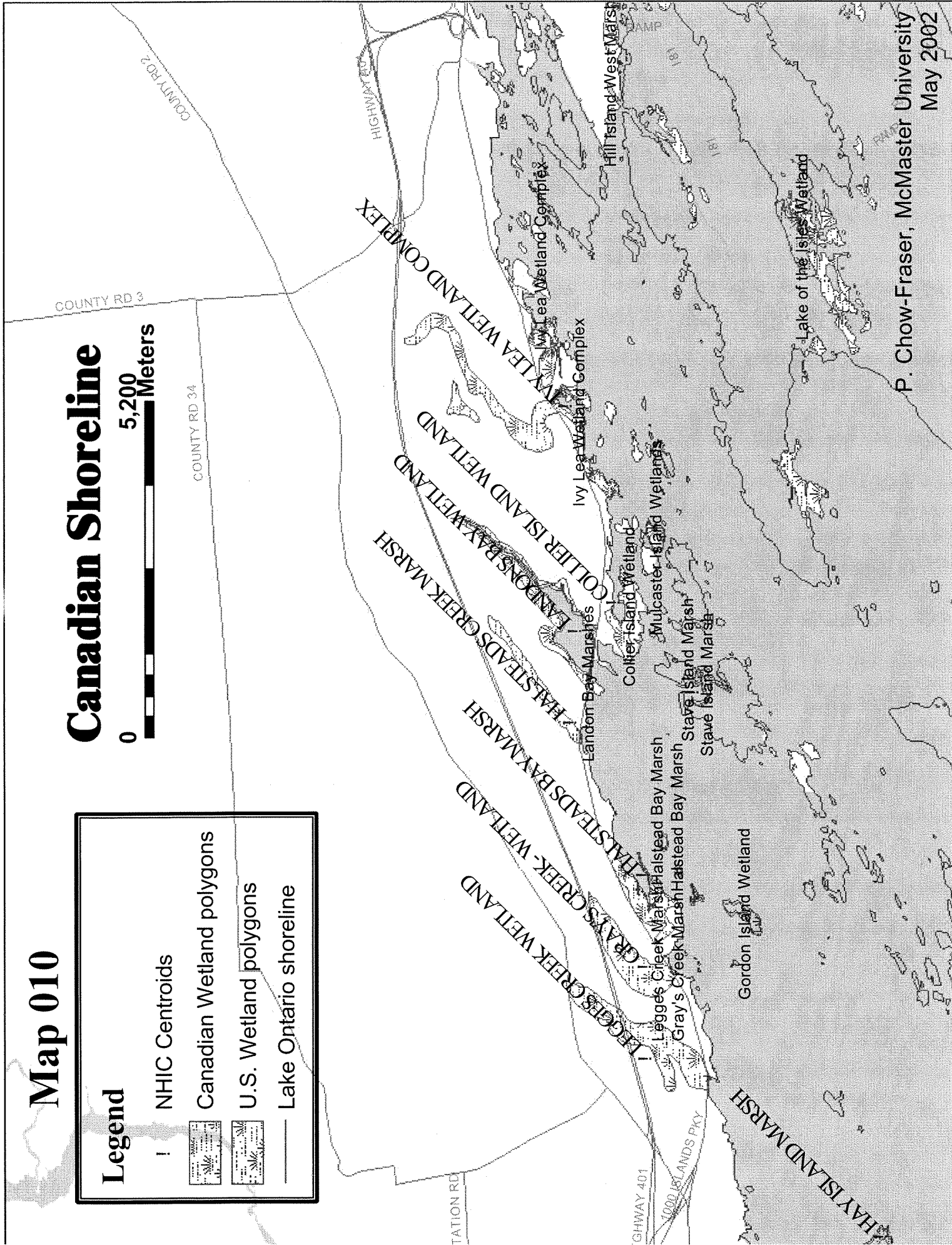
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Map 010

Canadian Shoreline




Legend

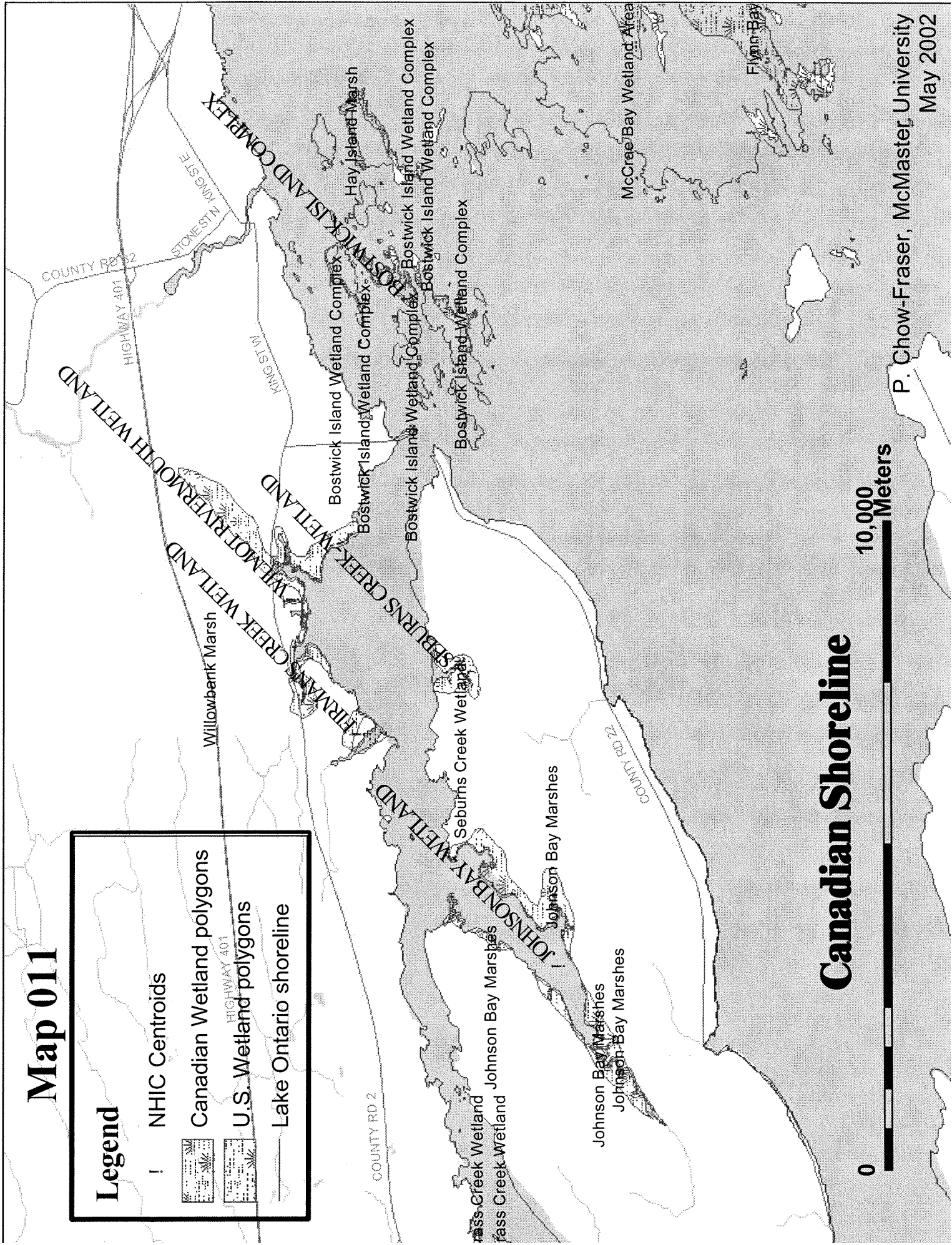
- ! NHIC Centroids
- Canadian Wetland polygons
- U.S. Wetland polygons
- Lake Ontario shoreline



Map 011

Legend

- ! NHIC Centroids
-  Canadian Wetland polygons
-  U.S. Wetland polygons
-  Lake Ontario shoreline



Canadian Shoreline



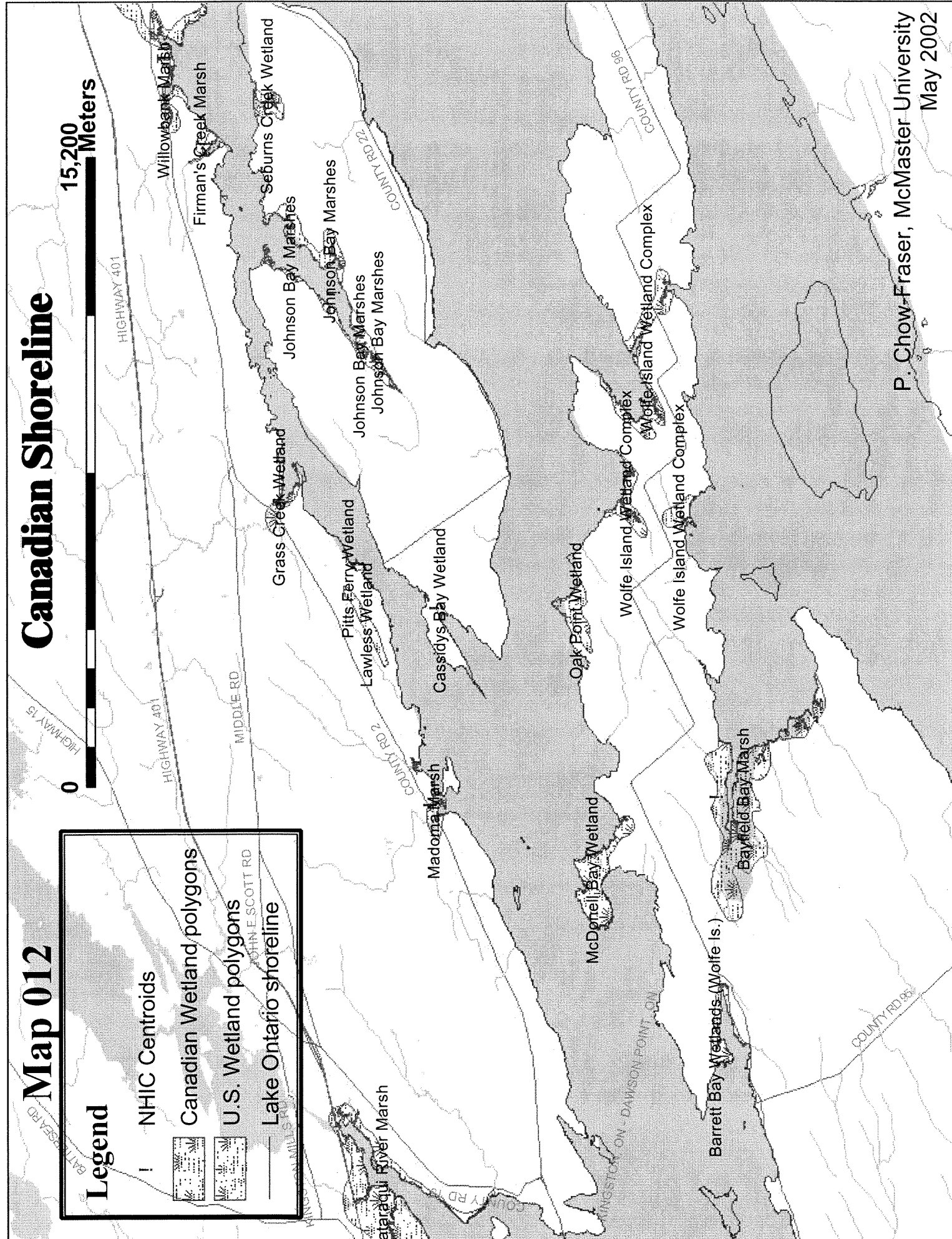
Map 012

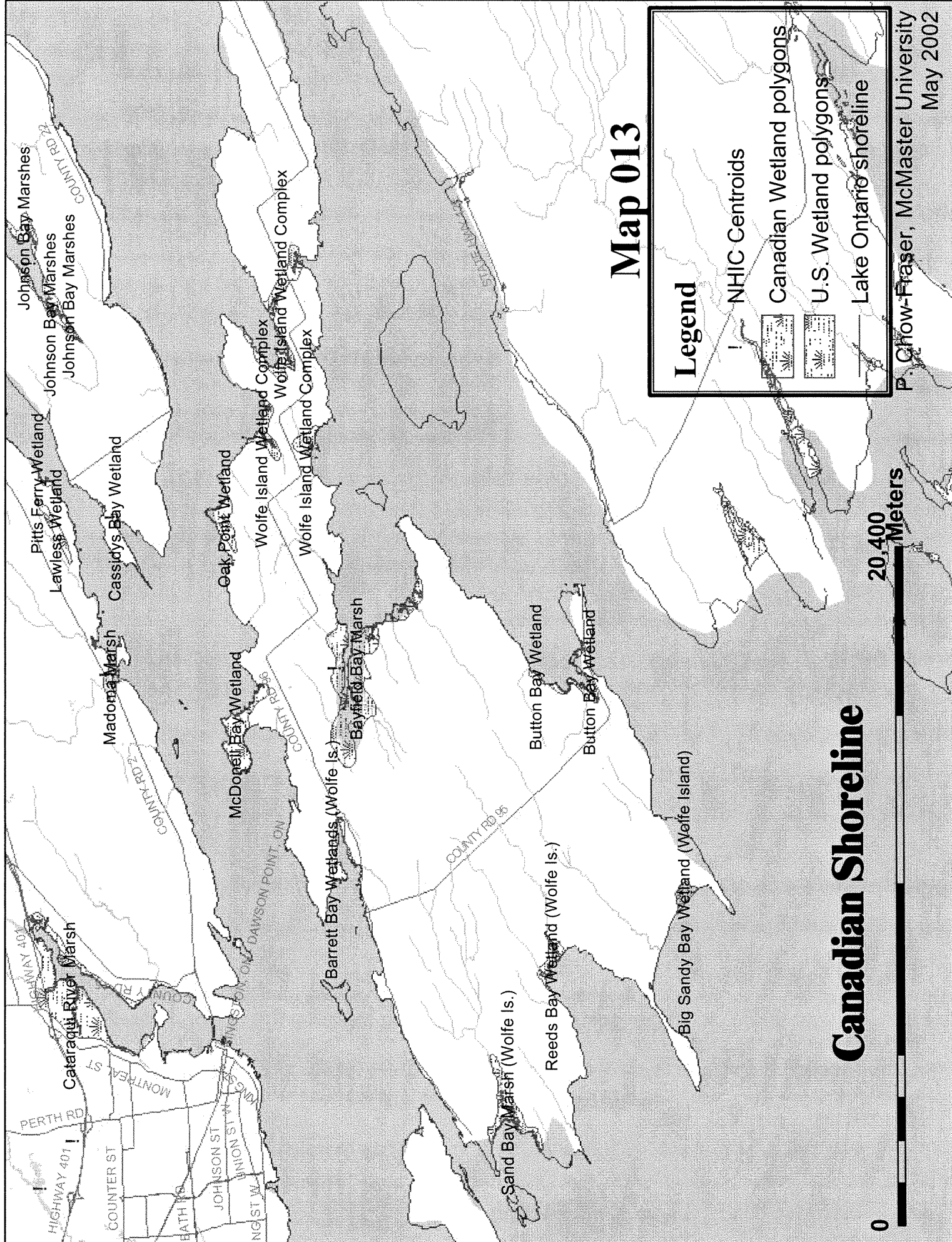
Canadian Shoreline

0 15,200 Meters

Legend

- NHIC Centroids
- Canadian Wetland polygons
- U.S. Wetland polygons
- Lake Ontario shoreline





Map 013

Legend

- ! NHIC Centroids
- Canadian Wetland polygons
- U.S. Wetland polygons
- Lake Ontario shoreline

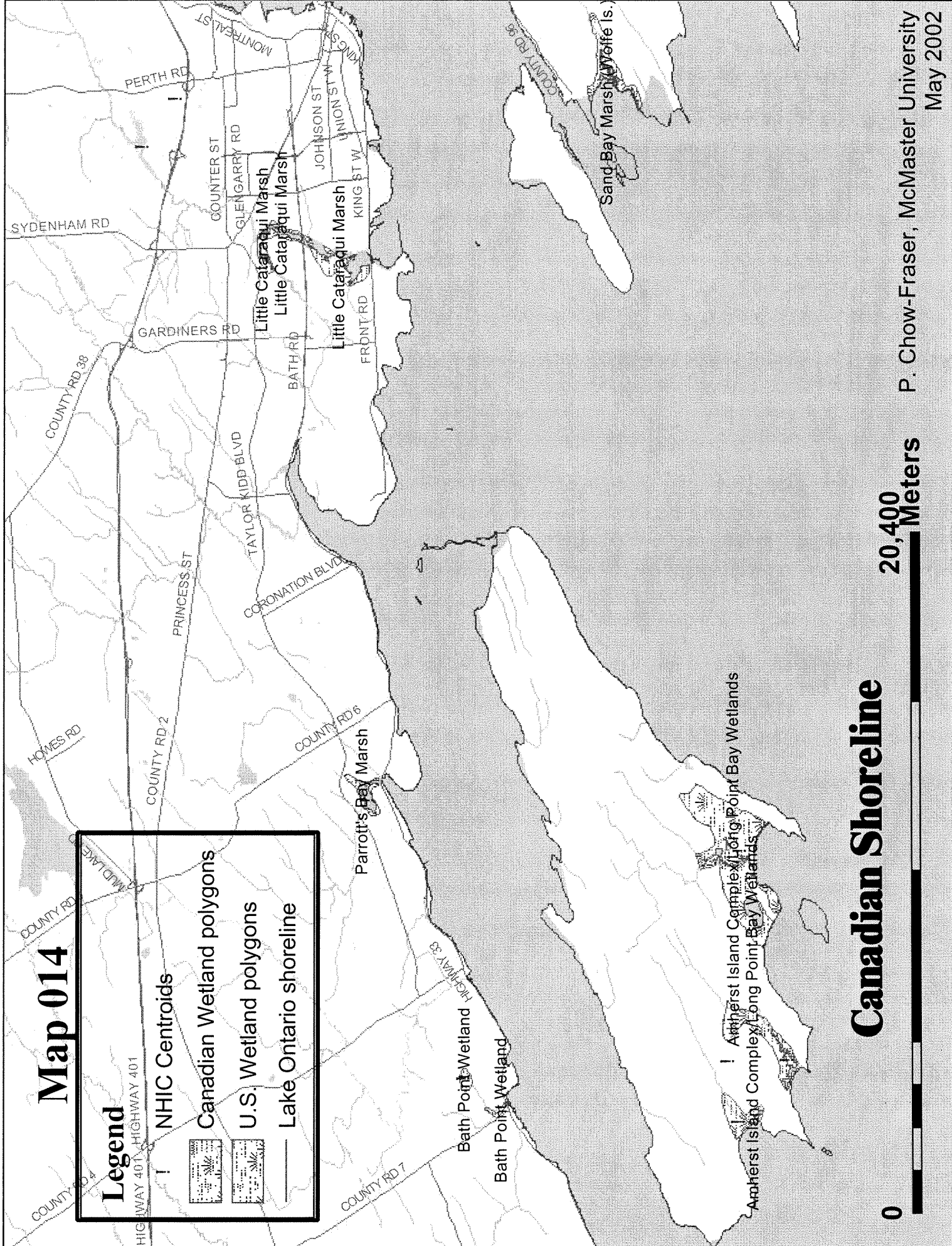
Canadian Shoreline



Map 014

Legend

- ! NHIC Centroids
- Canadian Wetland polygons
- U.S. Wetland polygons
- Lake Ontario shoreline

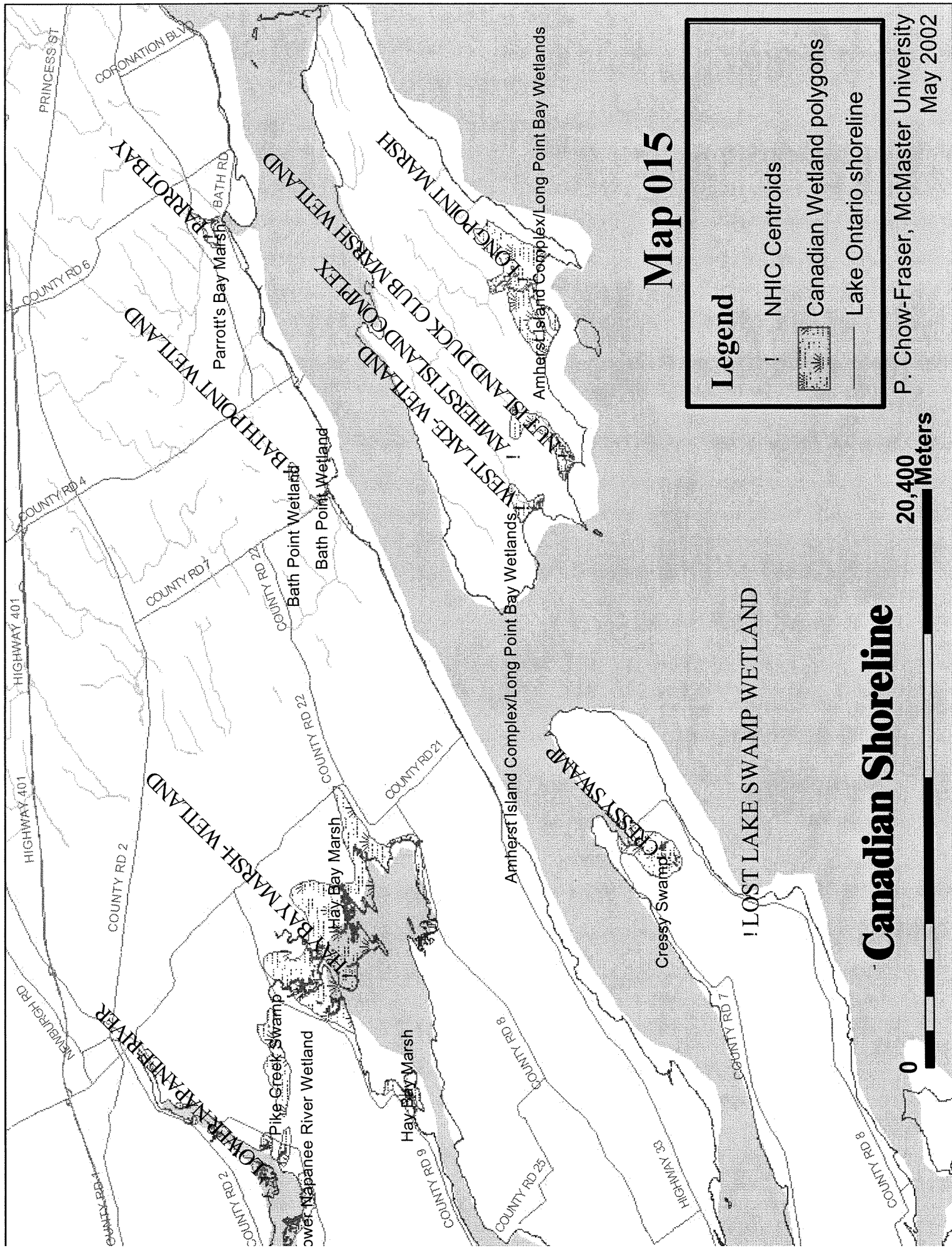


Canadian Shoreline

20,400 Meters

0

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Map 015

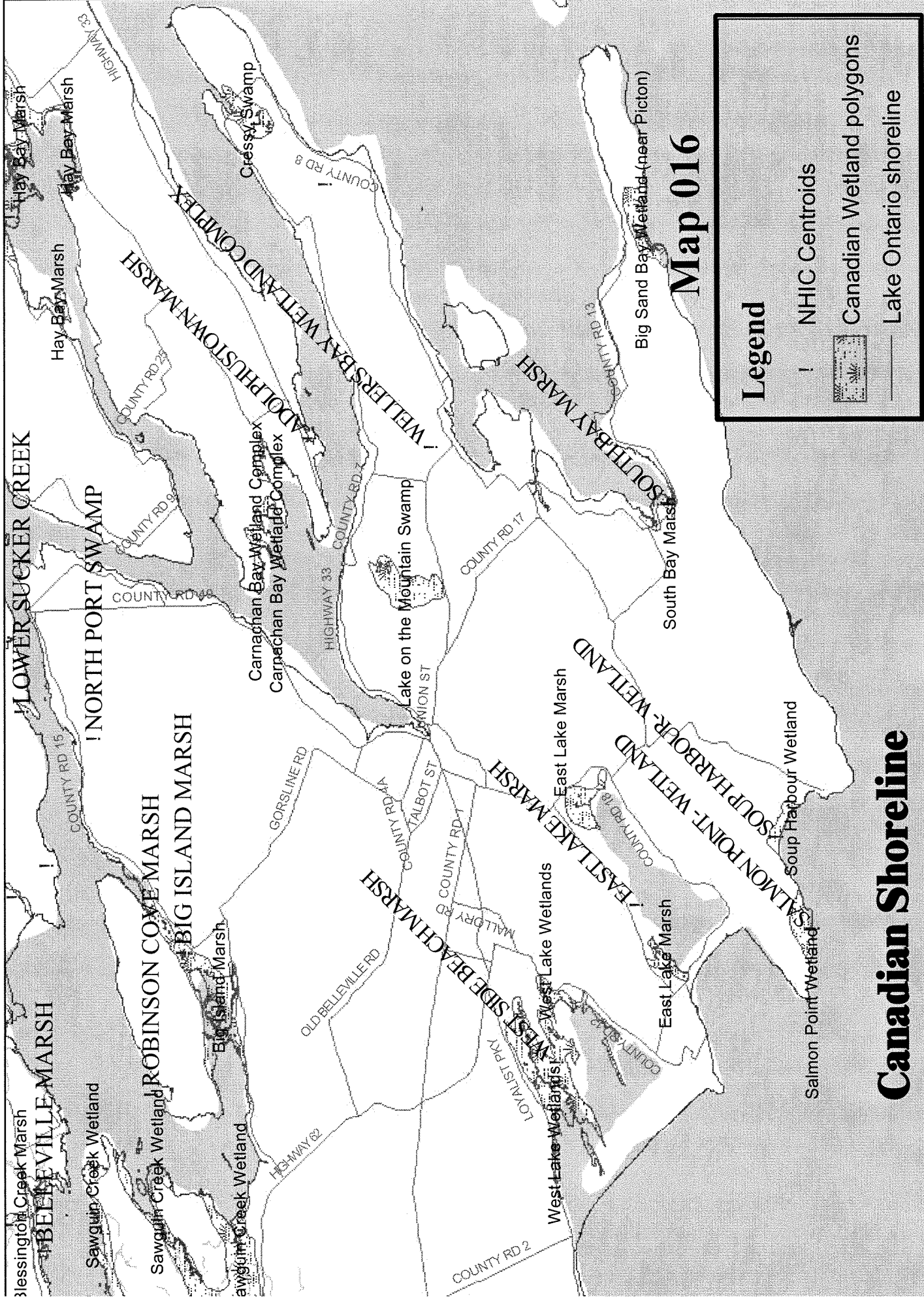
Legend

- ! NHIC Centroids
- [Patterned Box] Canadian Wetland polygons
- Lake Ontario shoreline

Canadian Shoreline

20,400 Meters

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Map 016

Legend

- ! NHIC Centroids
-  Canadian Wetland polygons
- - - Lake Ontario shoreline

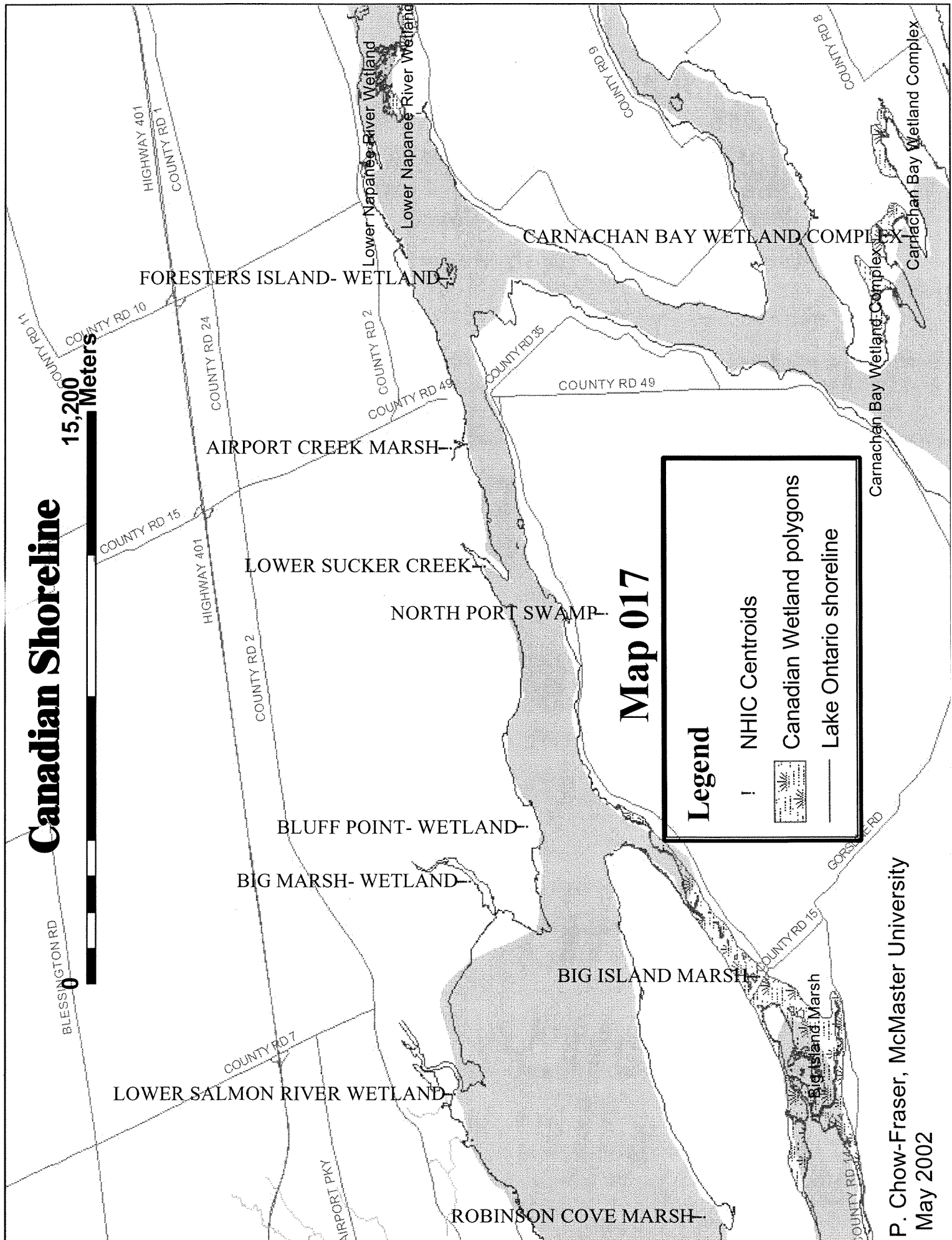
0 25,600 Meters

Canadian Shoreline

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Canadian Shoreline

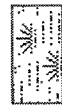
15,200
Meters



Map 017

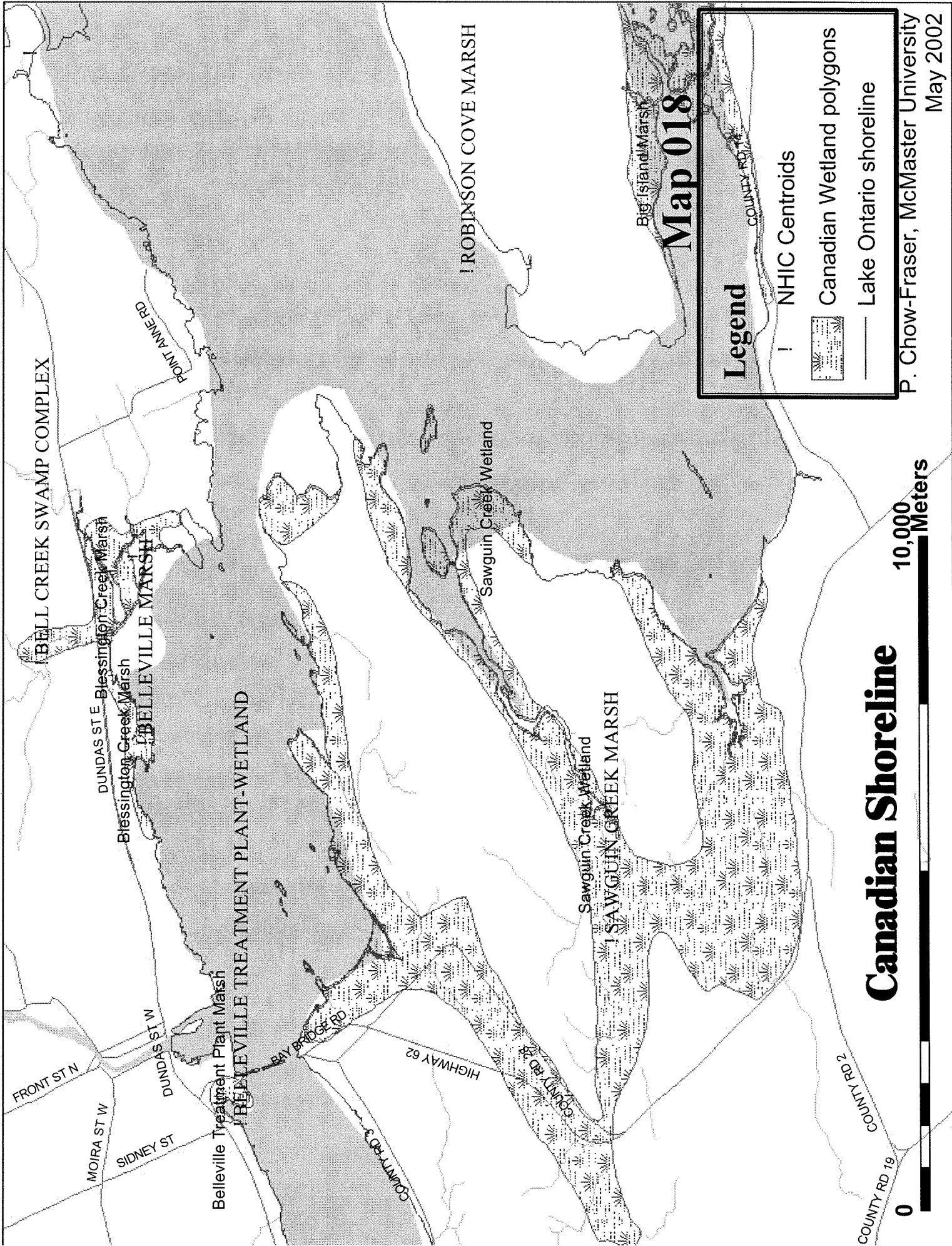
Legend

! NHIC Centroids




Canadian Wetland polygons

— Lake Ontario shoreline



Map 018

Legend

- ! NHIC Centroids
-  Canadian Wetland polygons
- Lake Ontario shoreline

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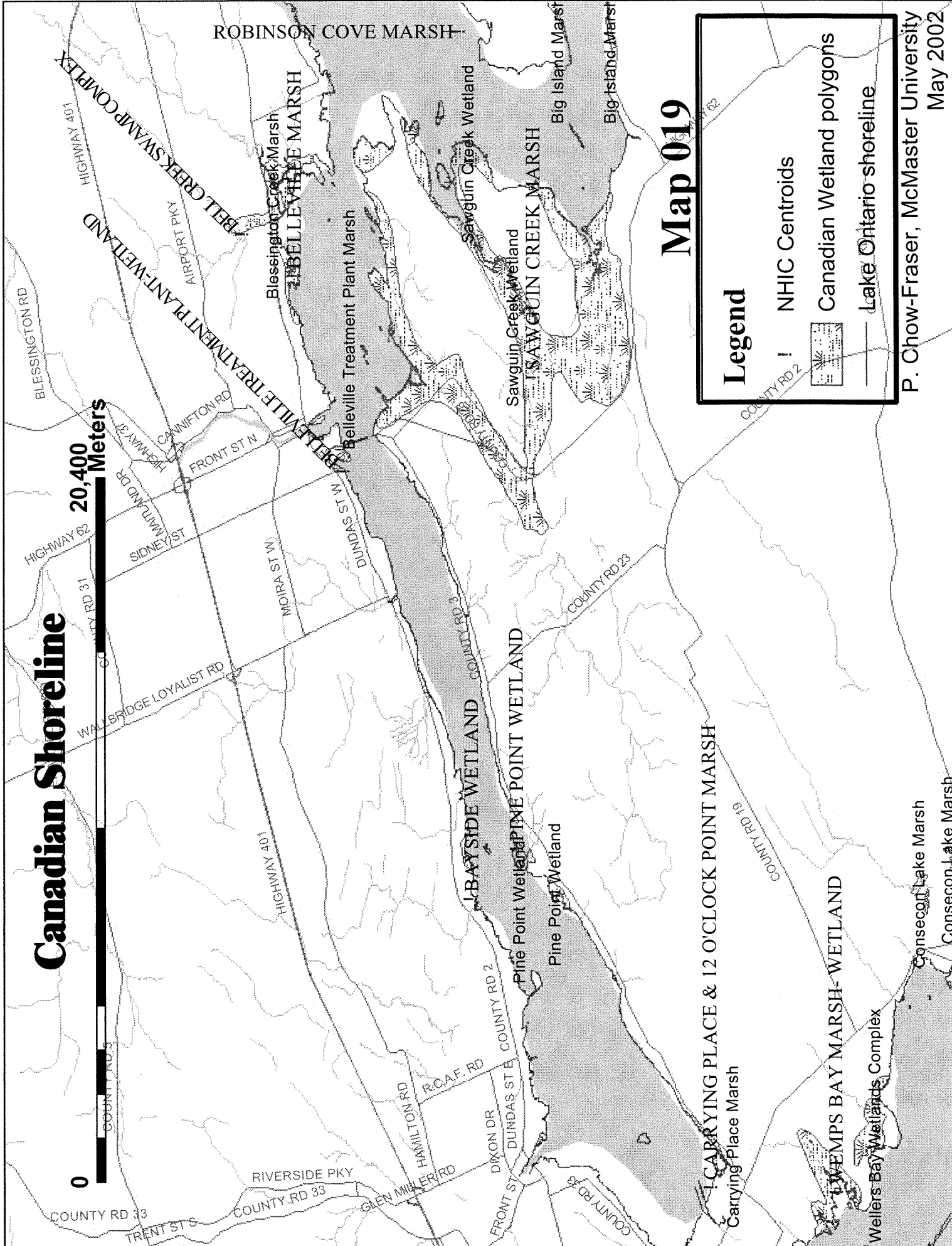
Canadian Shoreline

10,000
Meters

0

Canadian Shoreline

0 20,400 Meters



Map 019

Legend

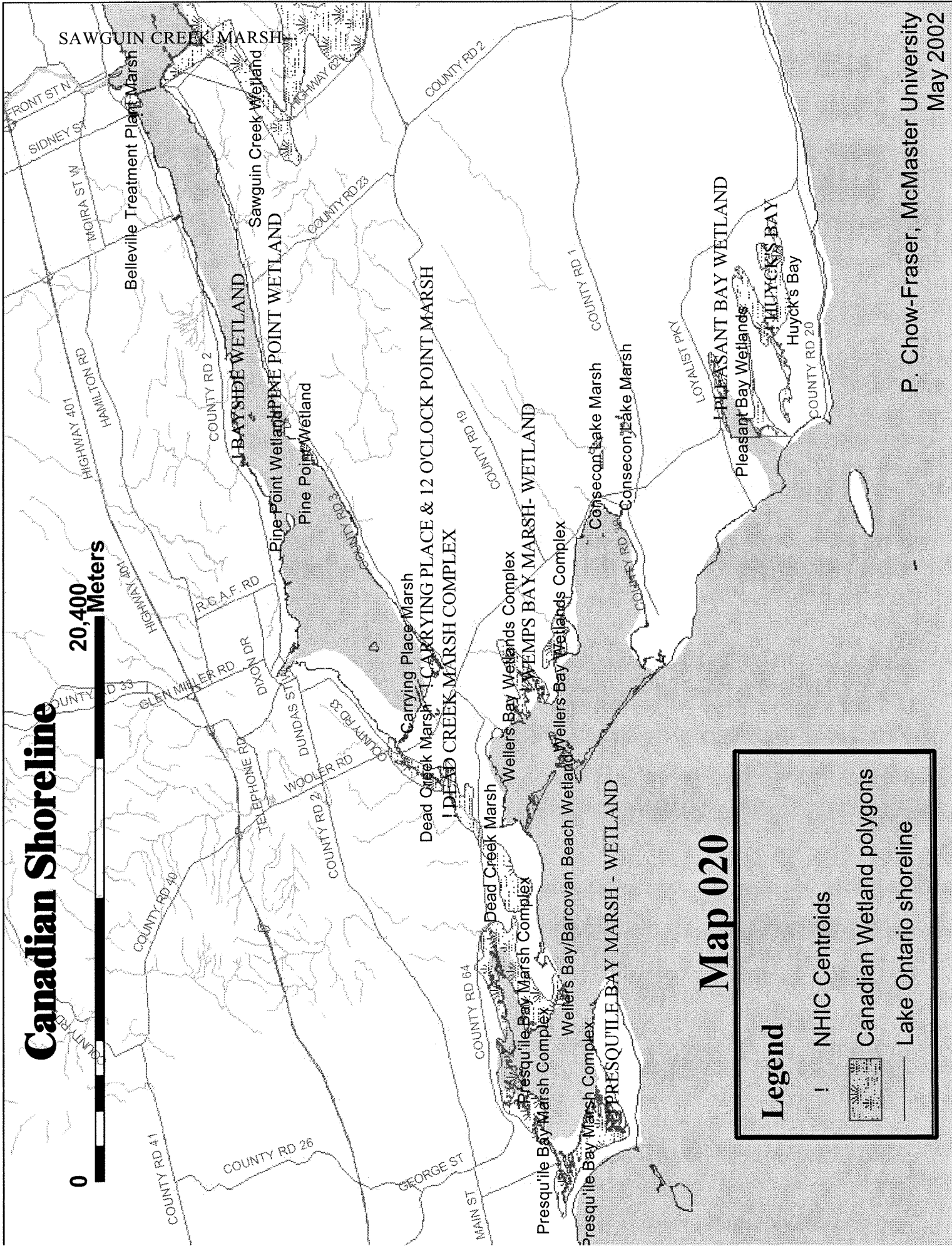
- ! NHIC Centroids
- Canadian Wetland polygons
- Lake Ontario shoreline

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Canadian Shoreline

20,400 Meters

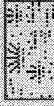
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Map 020

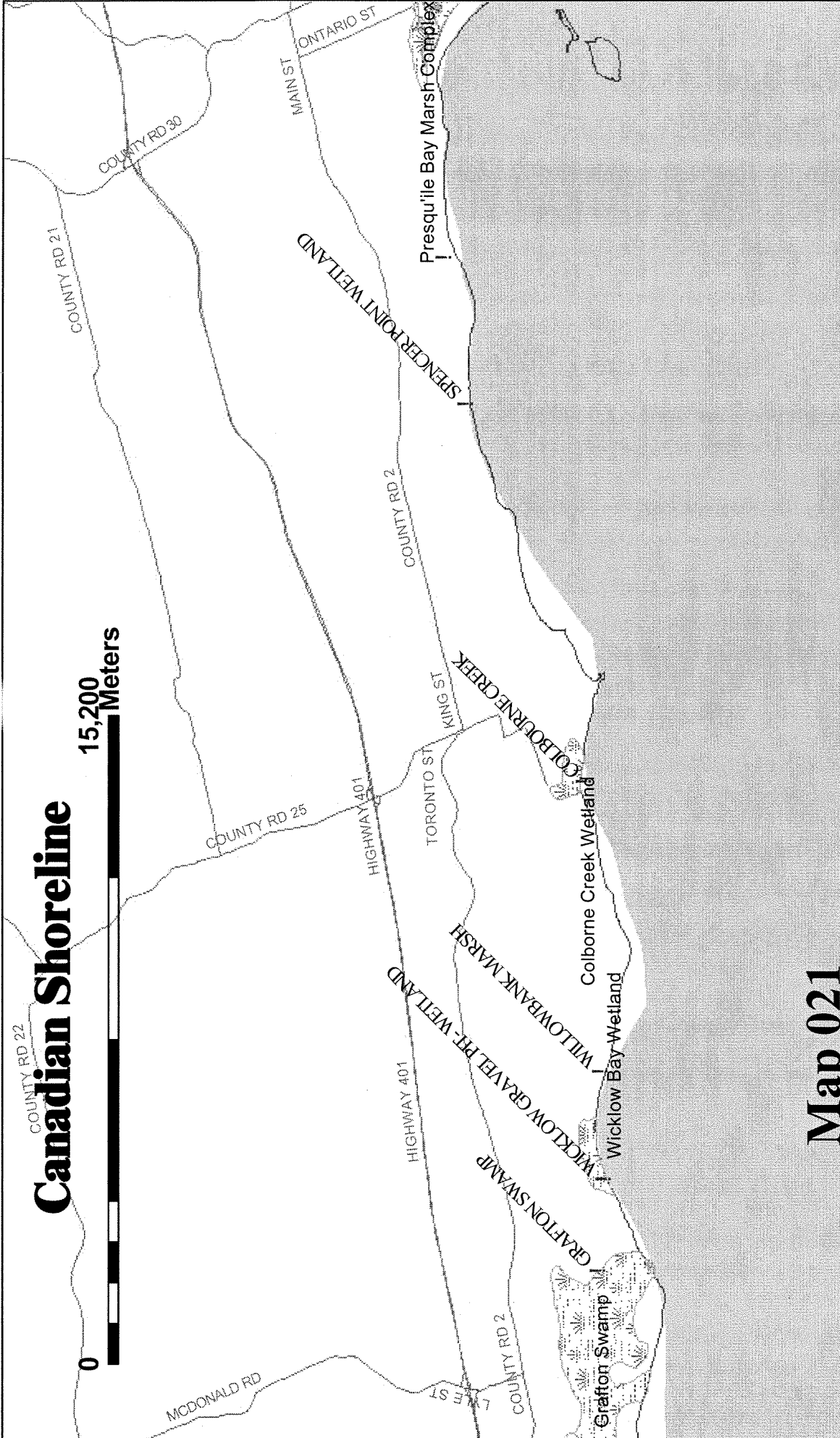
Legend

! NHIC Centroids




Canadian Wetland polygons

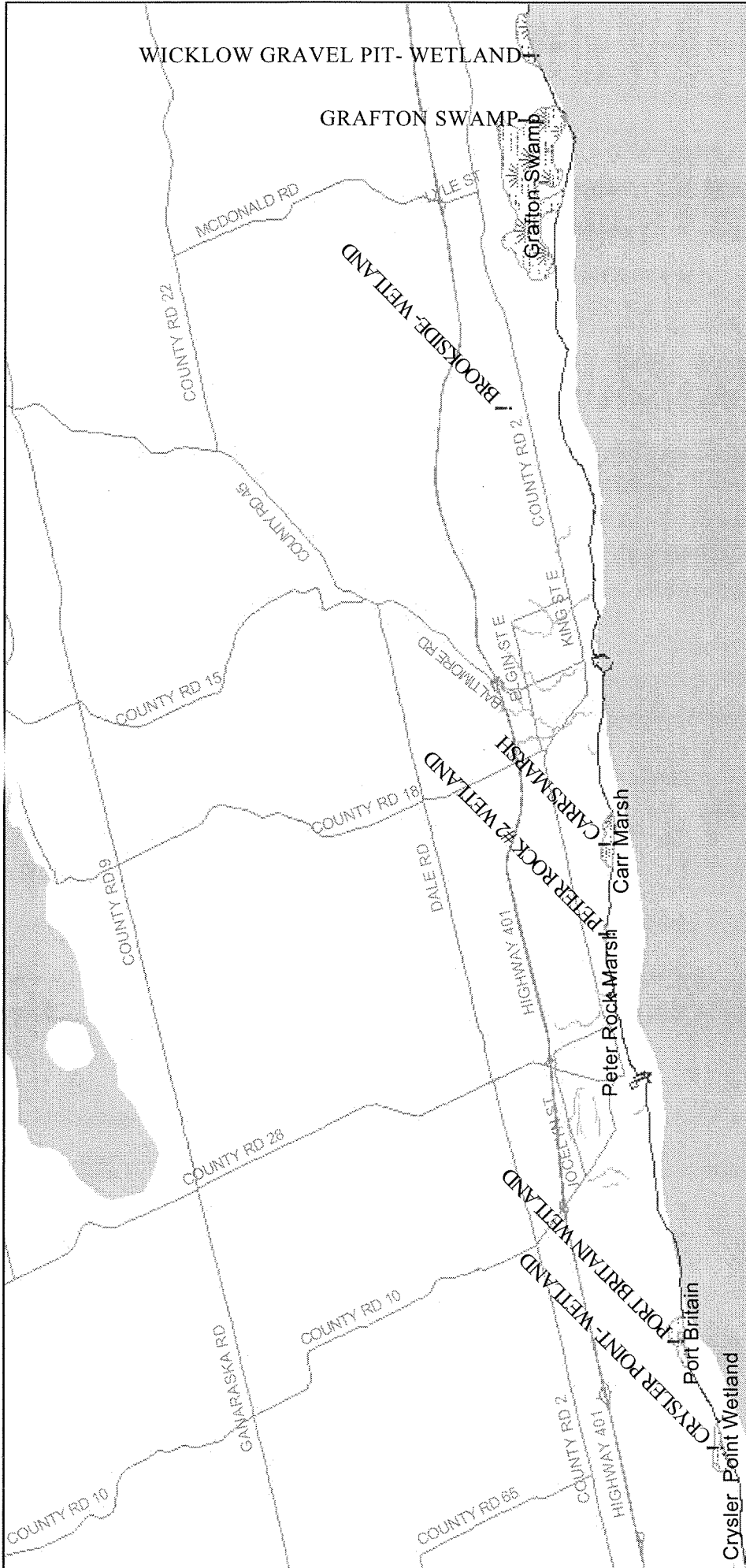
— Lake Ontario shoreline



Map 021


Legend

- ! NHIC Centroids
-  Canadian Wetland polygons
- Lake Ontario shoreline



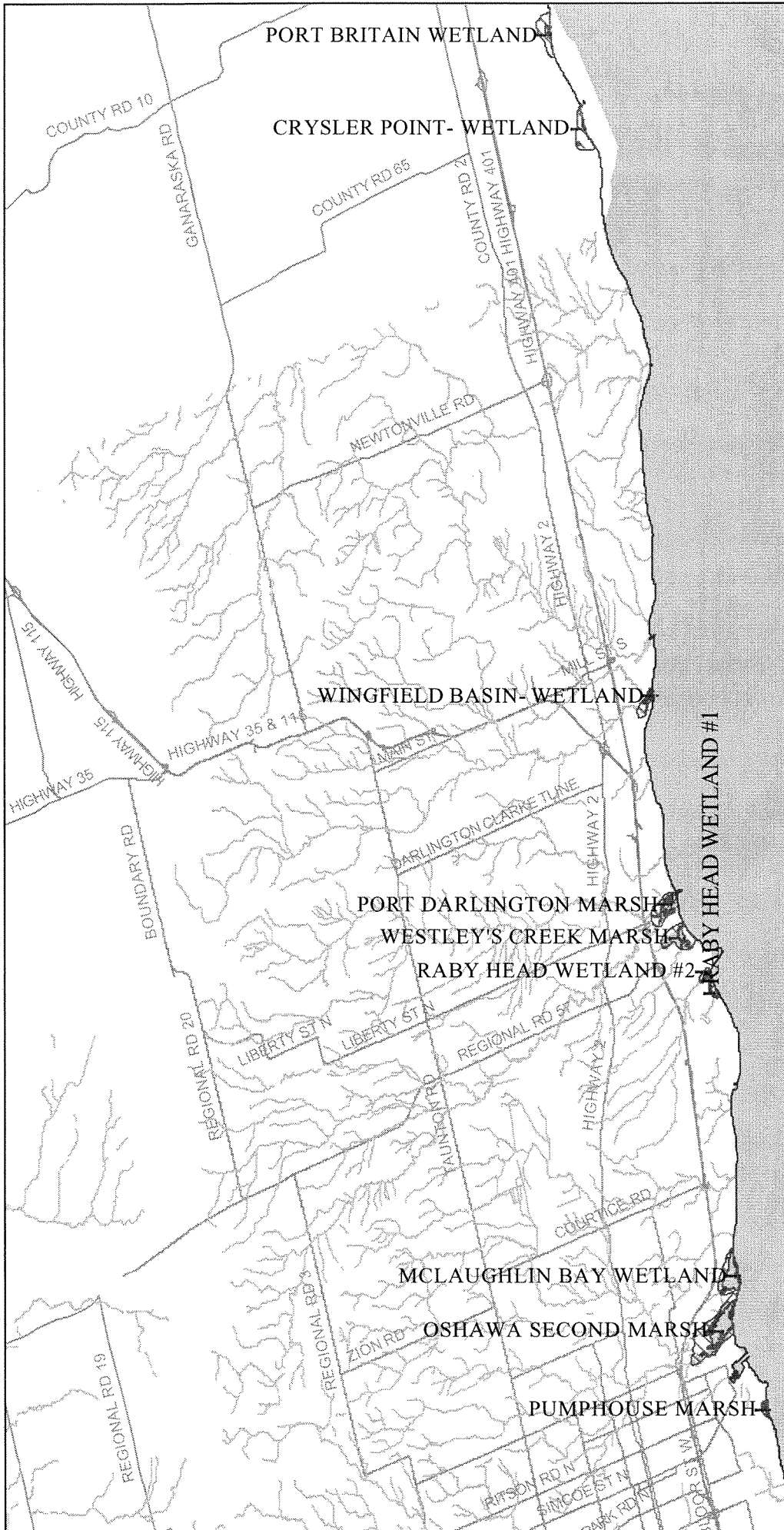
Map 022

Legend

- ! NHIC Centroids
-  Canadian Wetland polygons
- Lake Ontario shoreline



Canadian Shoreline





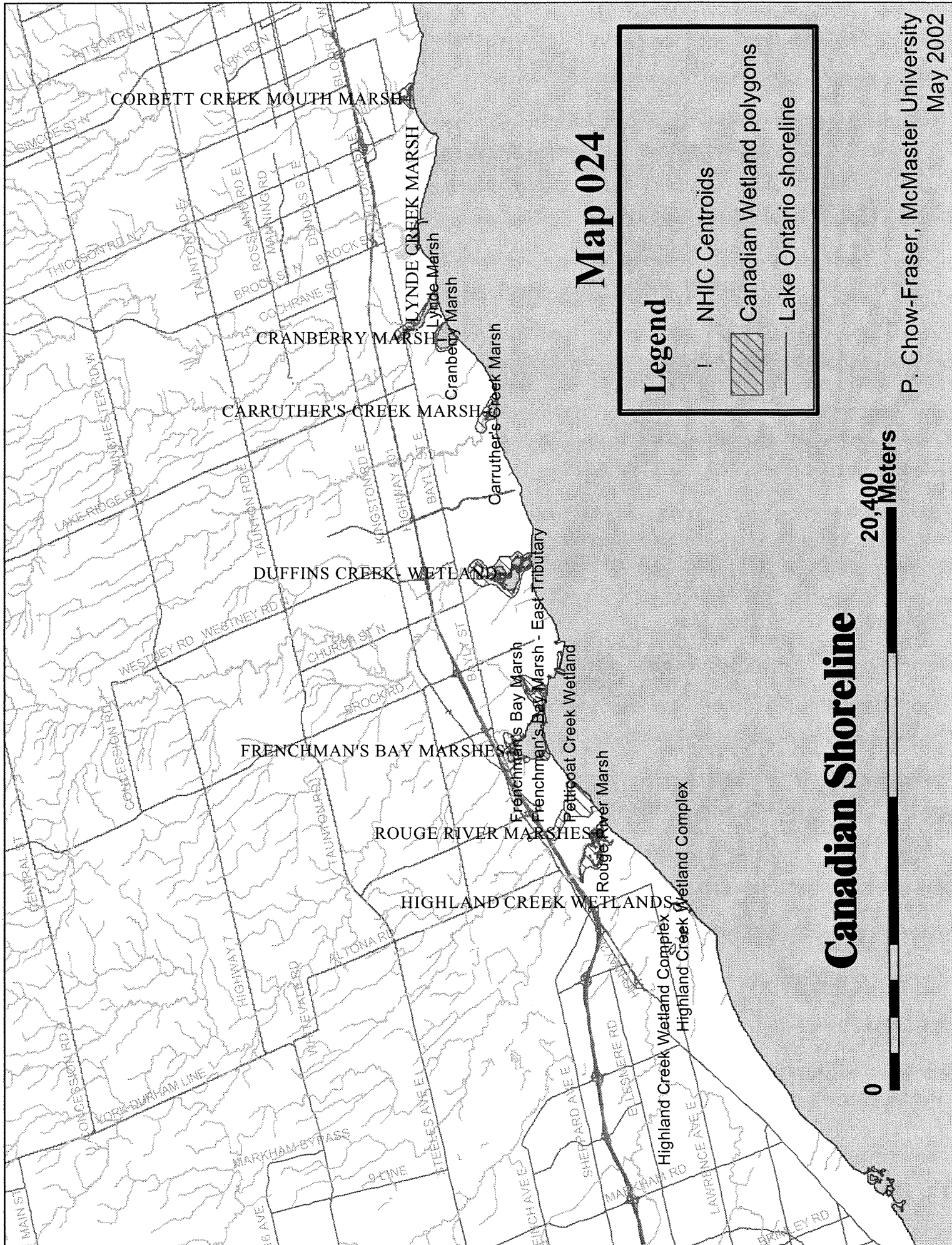
Map 023

Legend

- ! NHIC Centroids
-  Canadian Wetland polygons
-  Lake Ontario shoreline


Canadian Shoreline





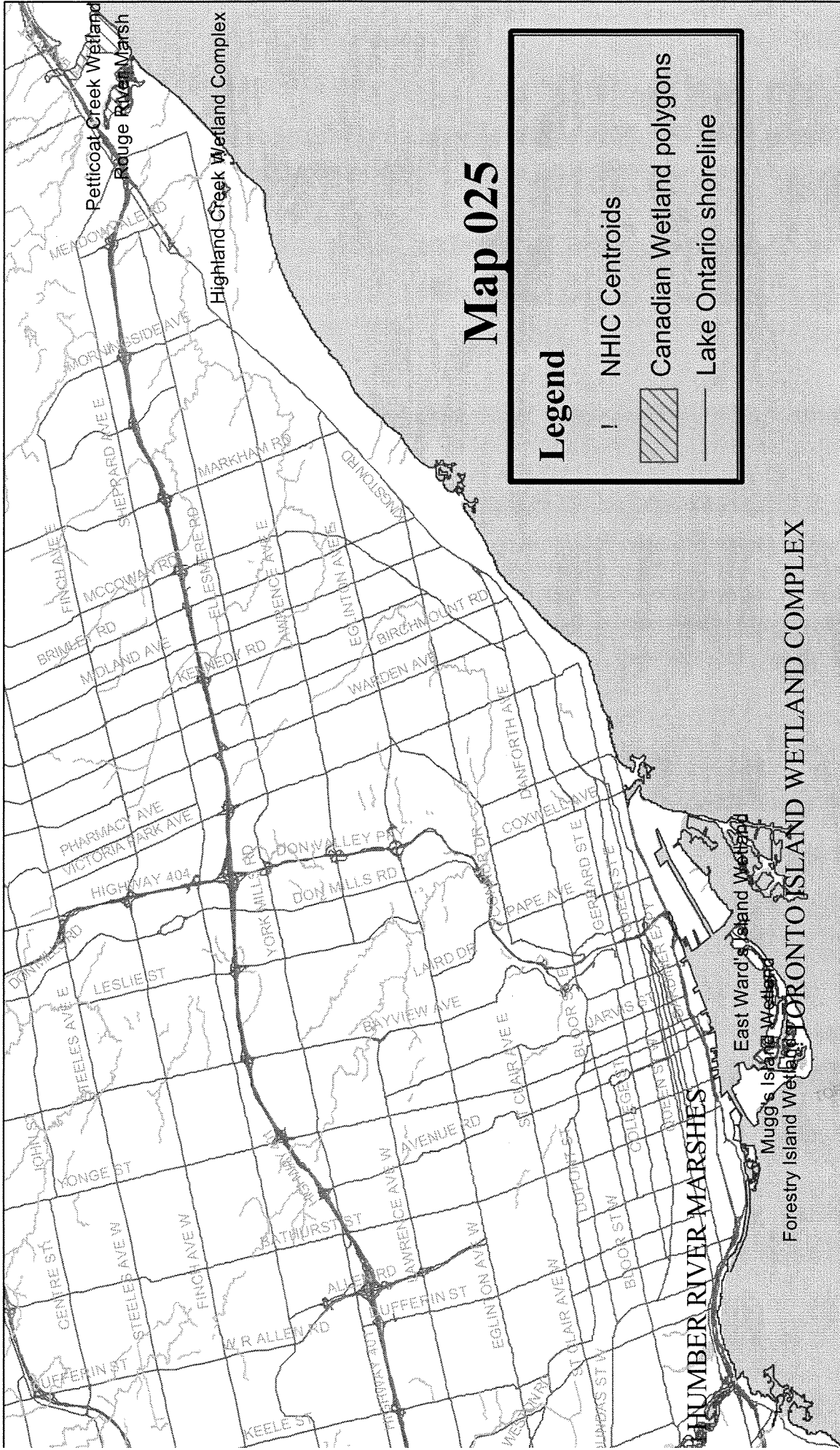
Map 024

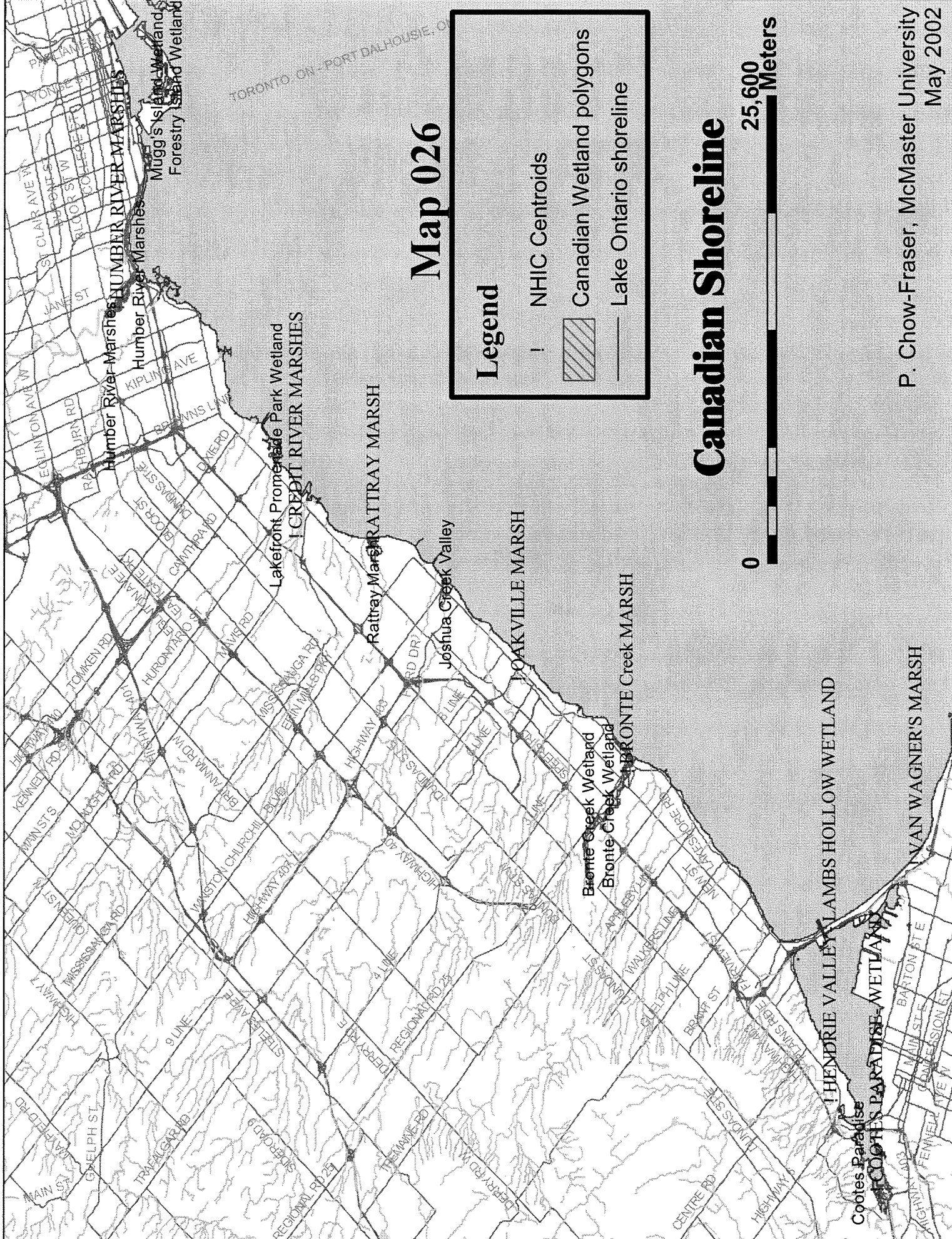
Legend

- ! NHIC Centroids
-  Canadian Wetland polygons
- Lake Ontario shoreline

Canadian Shoreline








Map 026

Canadian Shoreline

Legend

- NHIC Centroids
-  Canadian Wetland polygons
- Lake Ontario shoreline

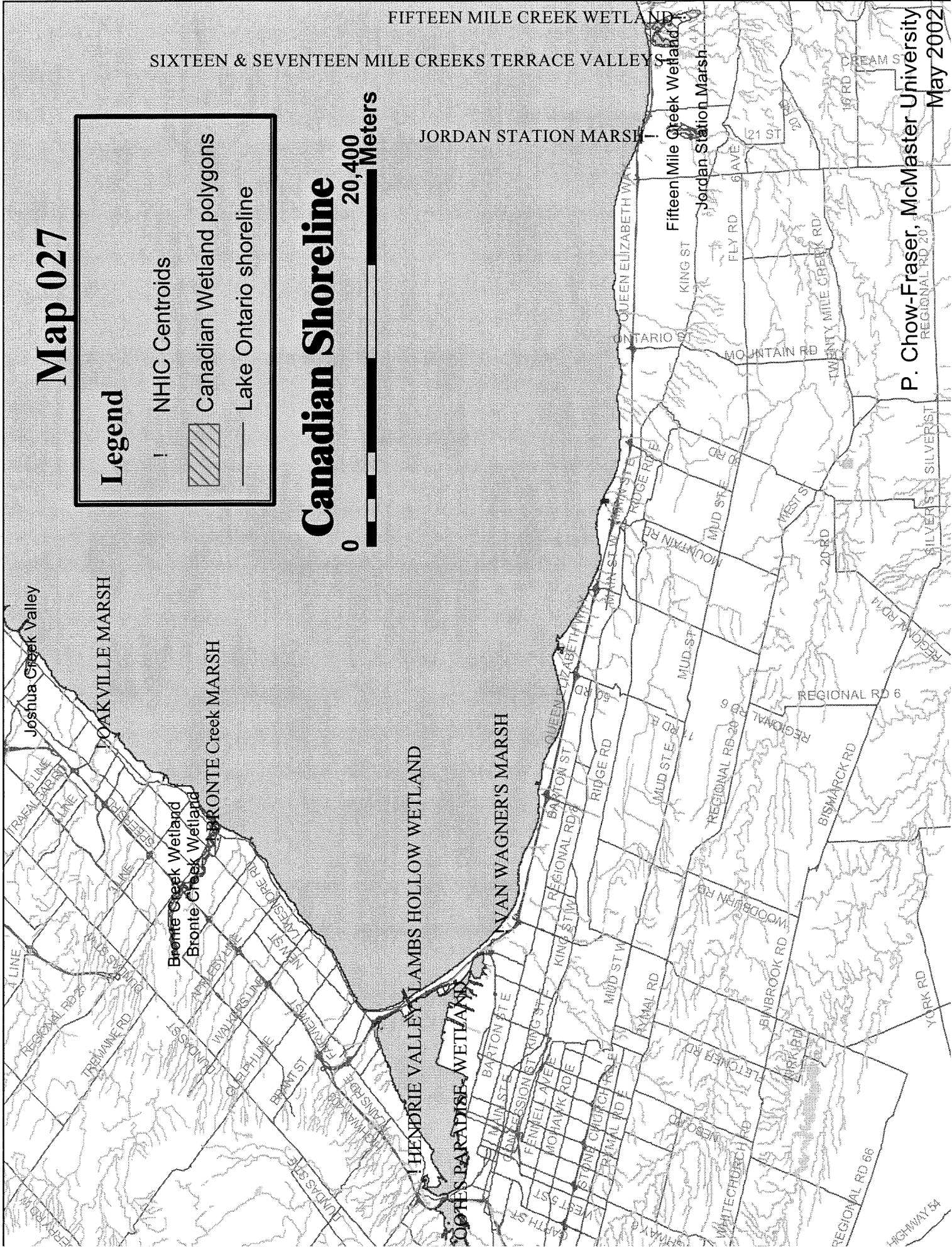


Map 027

Legend

- ! NHIC Centroids
- ▨ Canadian Wetland polygons
- Lake Ontario shoreline

Canadian Shoreline





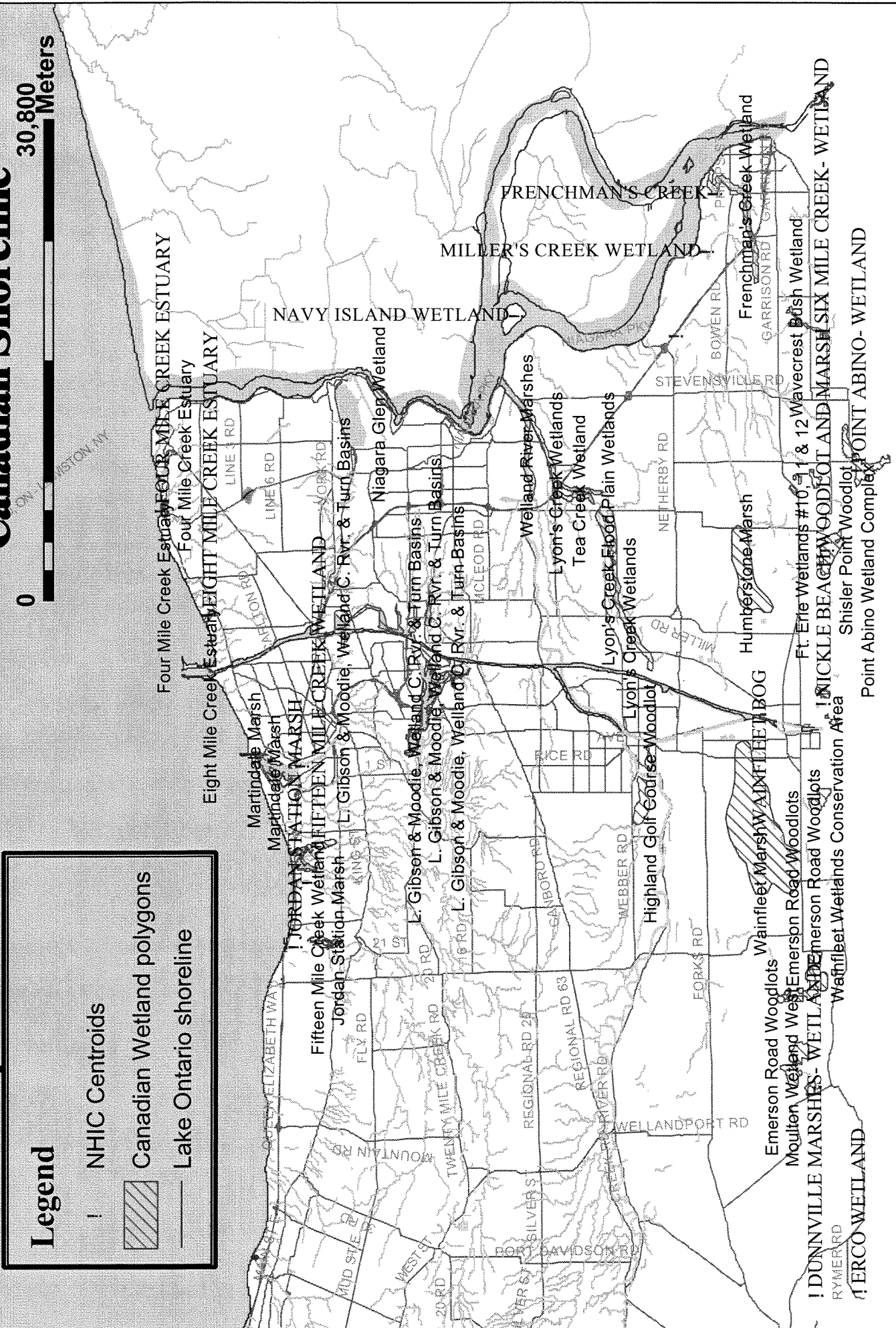
Map 028

Canadian Shoreline



Legend

- ! NHIC Centroids
-  Canadian Wetland polygons
-  Lake Ontario shoreline



Map 029

U.S. Shoreline



Legend

- # Herdendorf & Hartley 1980
- U.S. Wetland polygons
- Lake Ontario shoreline

#Eightmile Creek Wetland
#Tuscarora Bay Wetland





Map 030

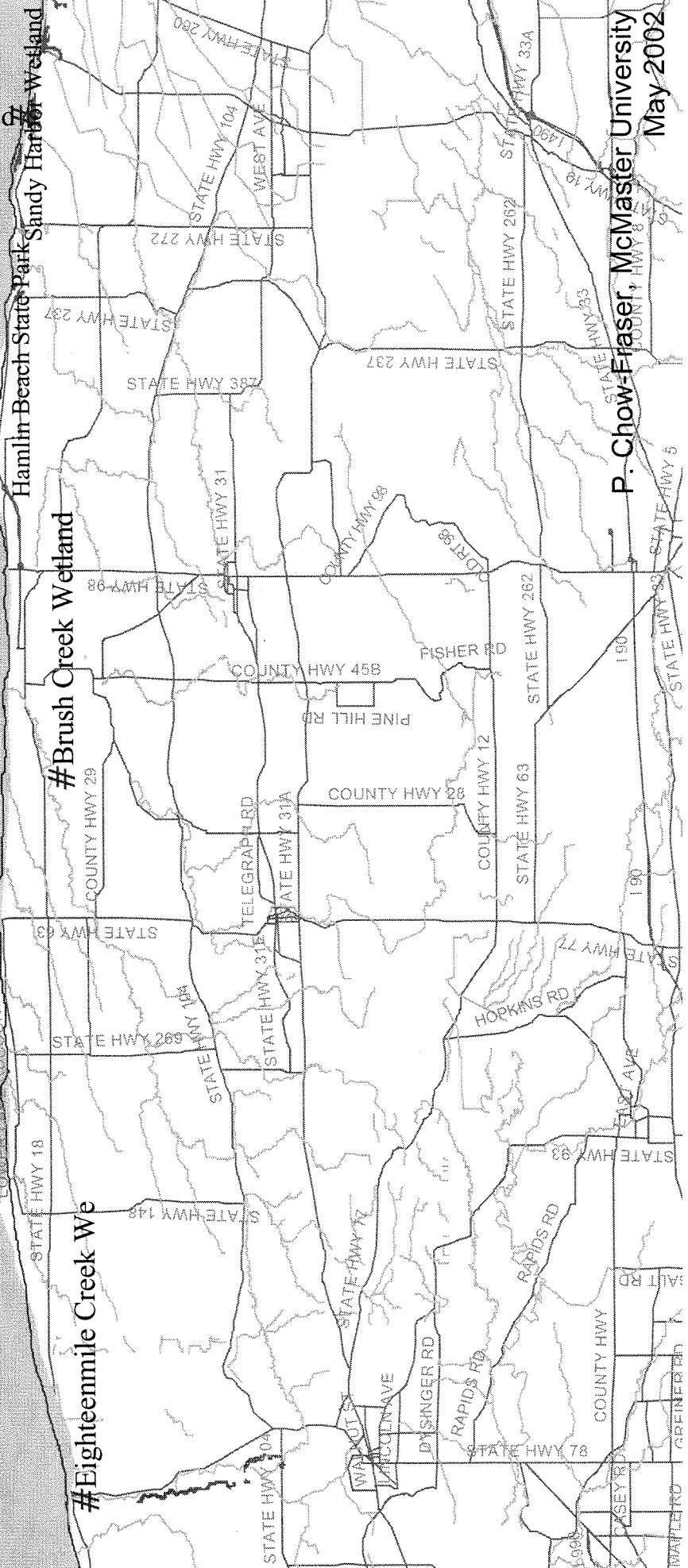
U.S. Shoreline



Legend

- # Herdendorf & Hartley 1980
-  U.S. Wetland polygons
-  Lake Ontario shoreline



Sandy Hrbor Wetland



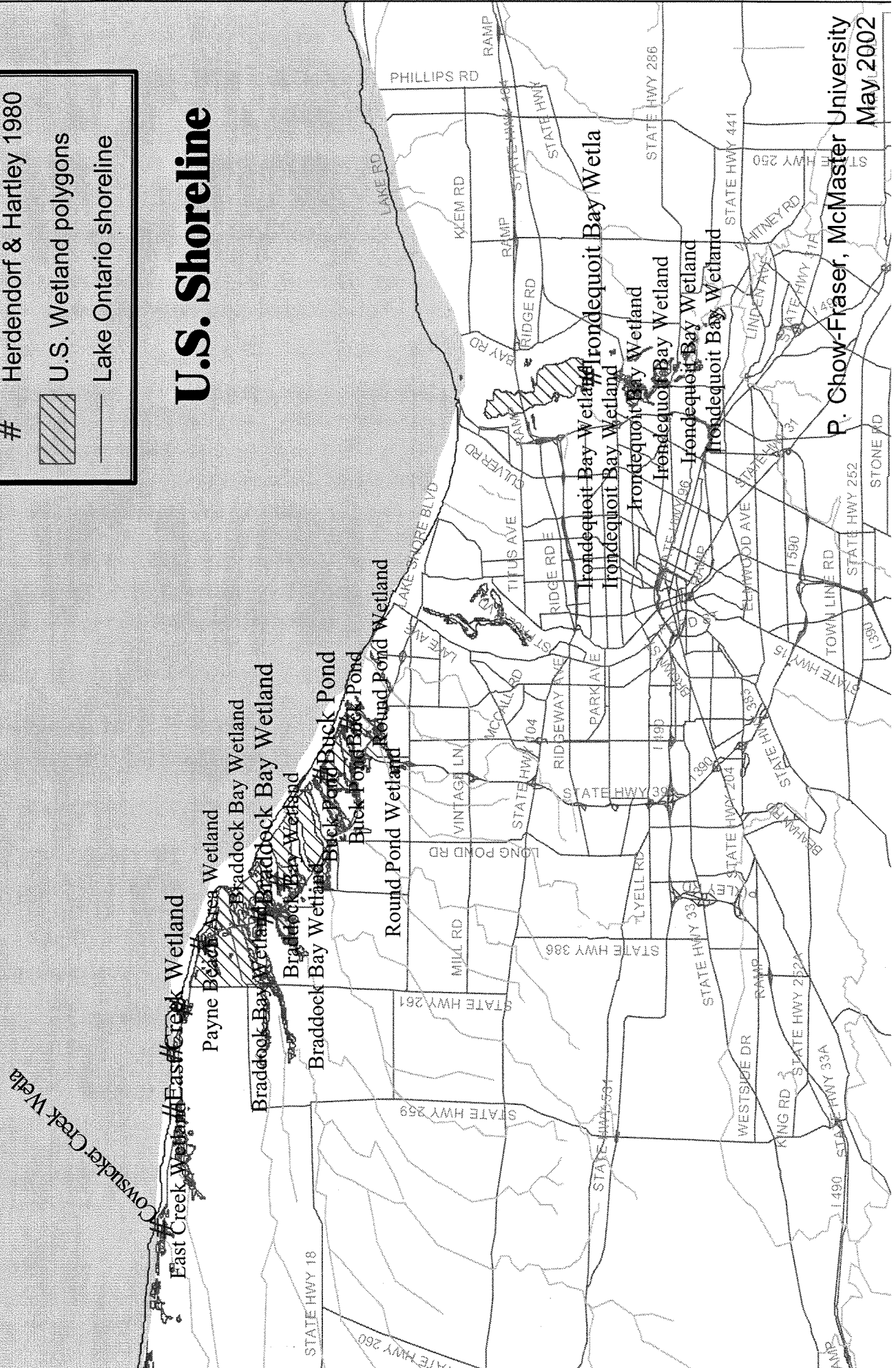
P. Chow-Fraser, McMaster University
May 2002

Map 031

Legend

- # Herdendorf & Hartley 1980
-  U.S. Wetland polygons
-  Lake Ontario shoreline

U.S. Shoreline



P. Chow-Fraser, McMaster University
May 2002

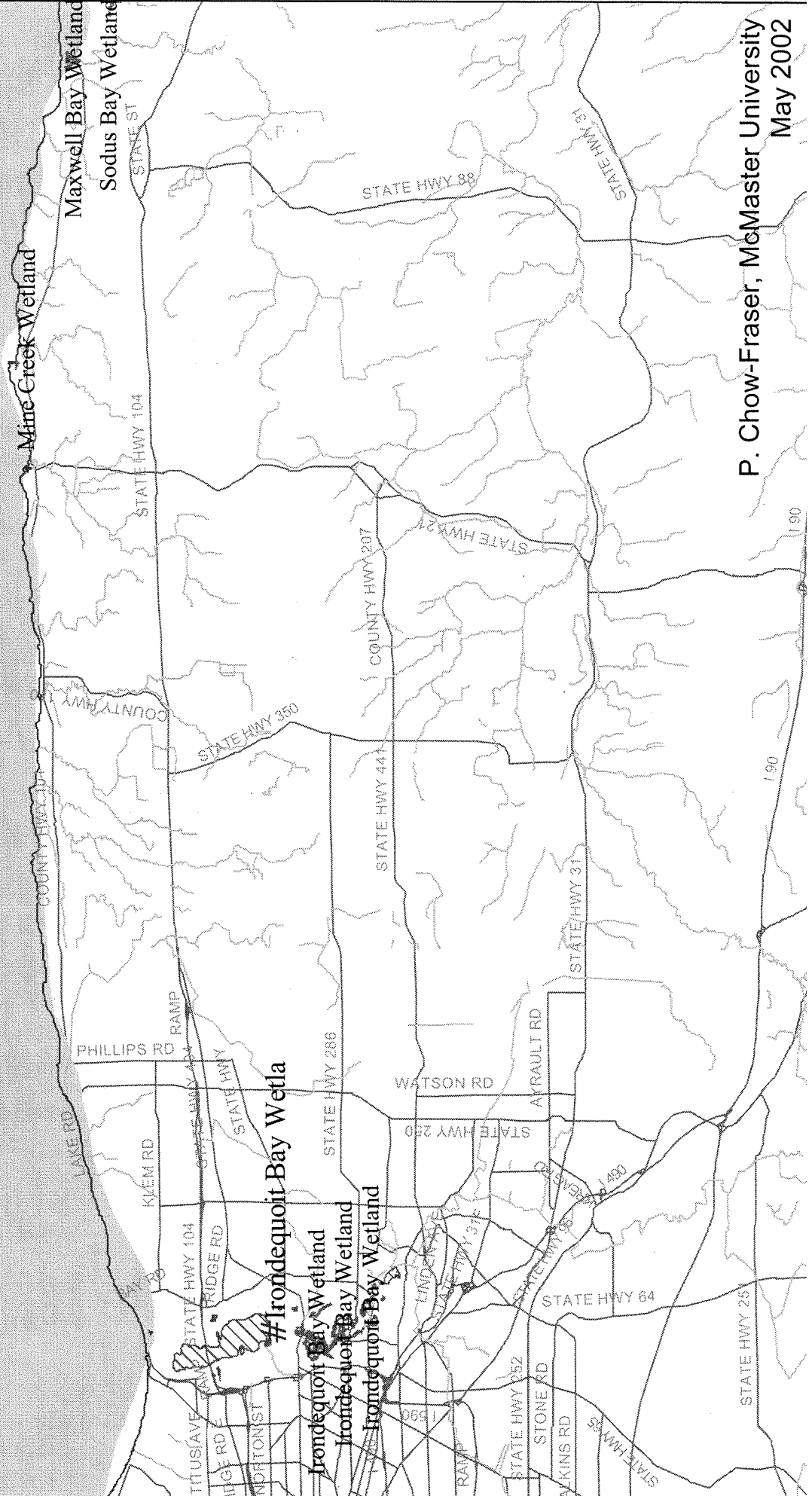
Map 032

U.S. Shoreline





Legend

- # Herdendorf & Hartley 1980
- ▨ U.S. Wetland polygons
- Lake Ontario shoreline



Map 034

Legend

- # Herdendorf & Hartley 1980
-  U.S. Wetland polygons
-  Lake Ontario shoreline



Ramona Beach Marsh #
Sage Creek Wetland #
Mexico Point Area Wetland #

Butterfly Swamp #
Butterfly Swamp

#Snake Creek Marsh
#Rice Creek Marsh
Rice Creek Marsh

#Health Camp-Camp Road
Eightmile Creek Wetland

#Sidmana Hill Wetland
McIntyres Bluff Wetland
Spring Creek Wetland
erling Creek Wetland
erling Creek Wetland

STATE HWY 3
STATE HWY 48
STATE HWY 481
STATE HWY 104
STATE HWY 40

P. Chow-Fraser, McMaster University
May 2002

Map 035

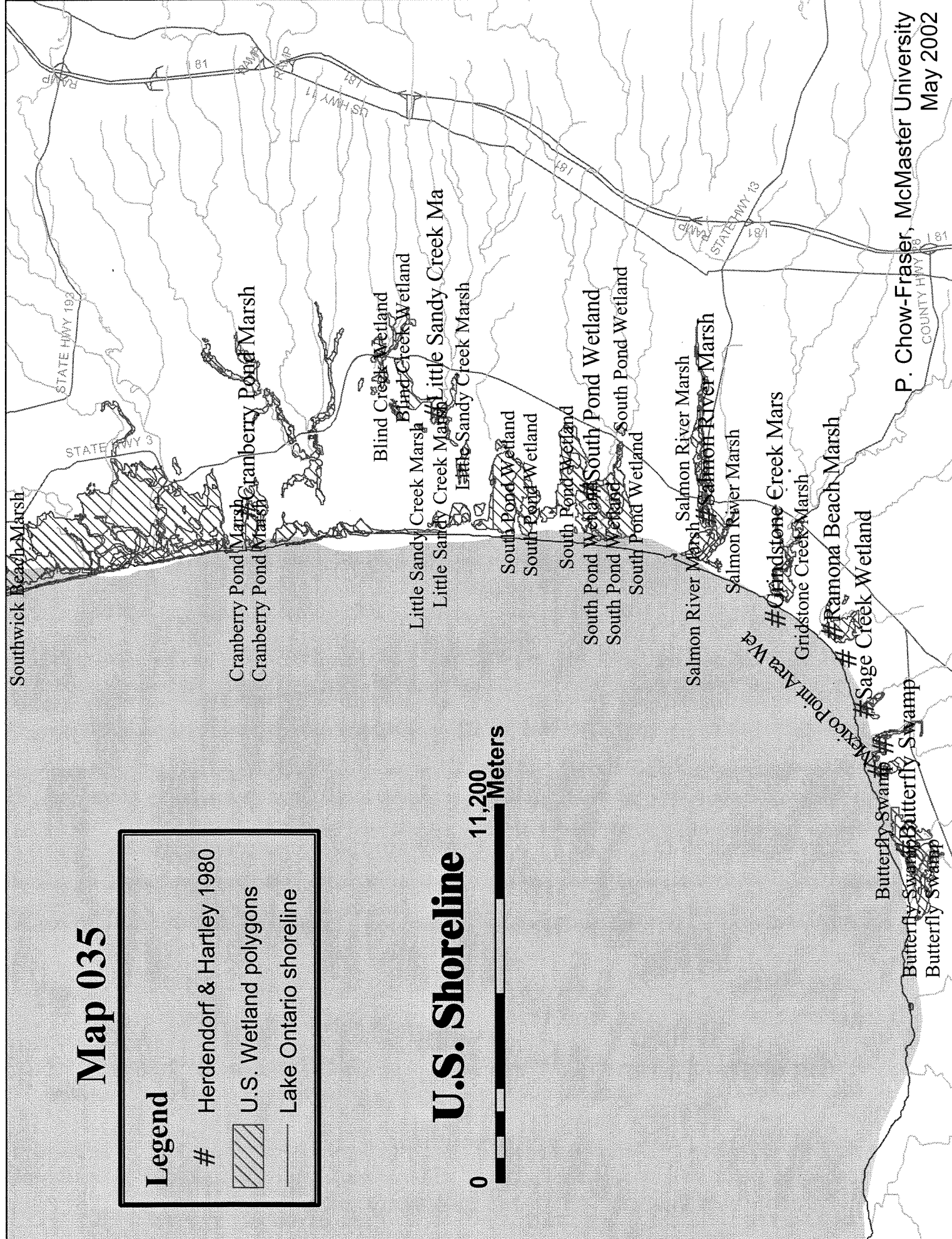
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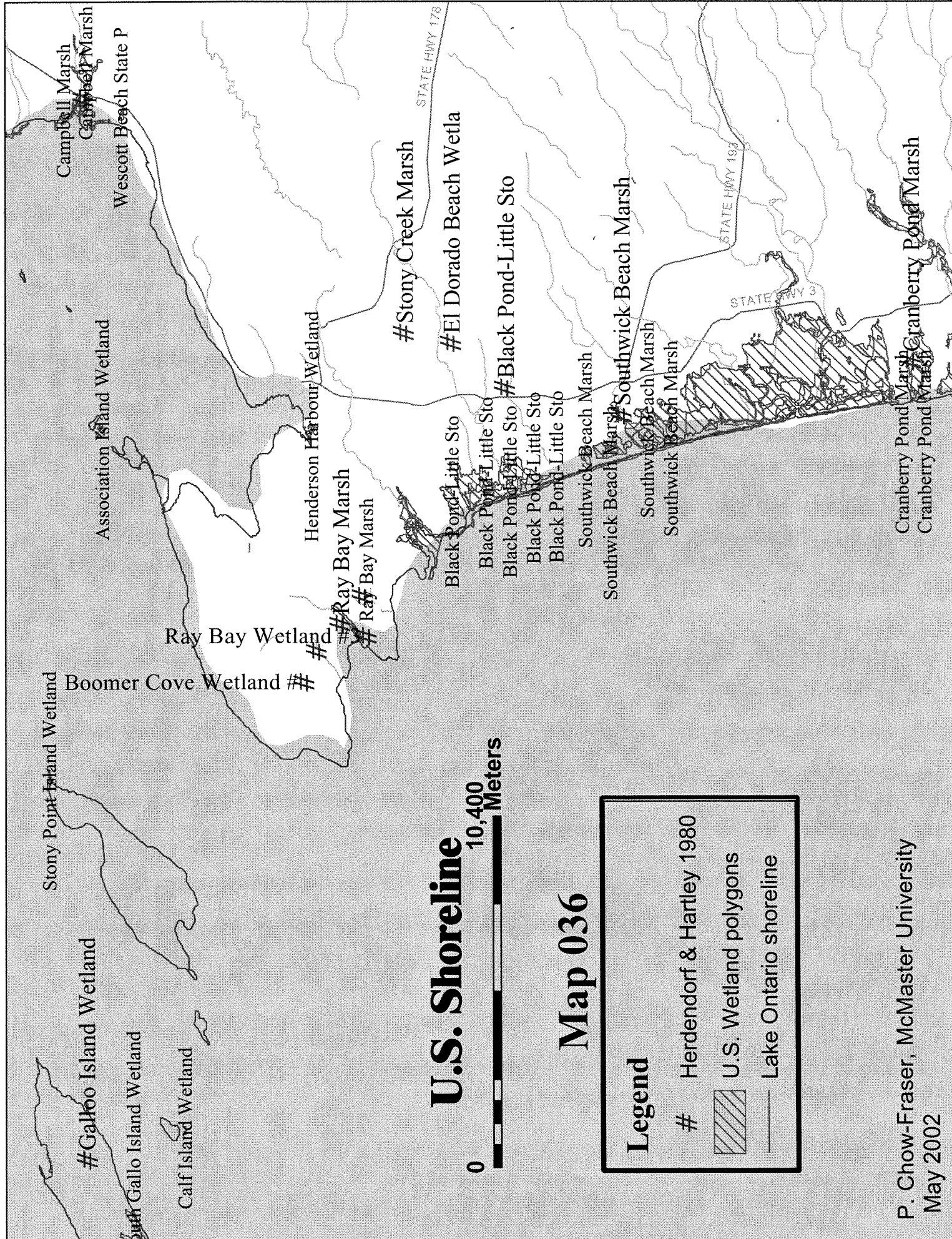
Herdendorf & Hartley 1980

▨ U.S. Wetland polygons

— Lake Ontario shoreline

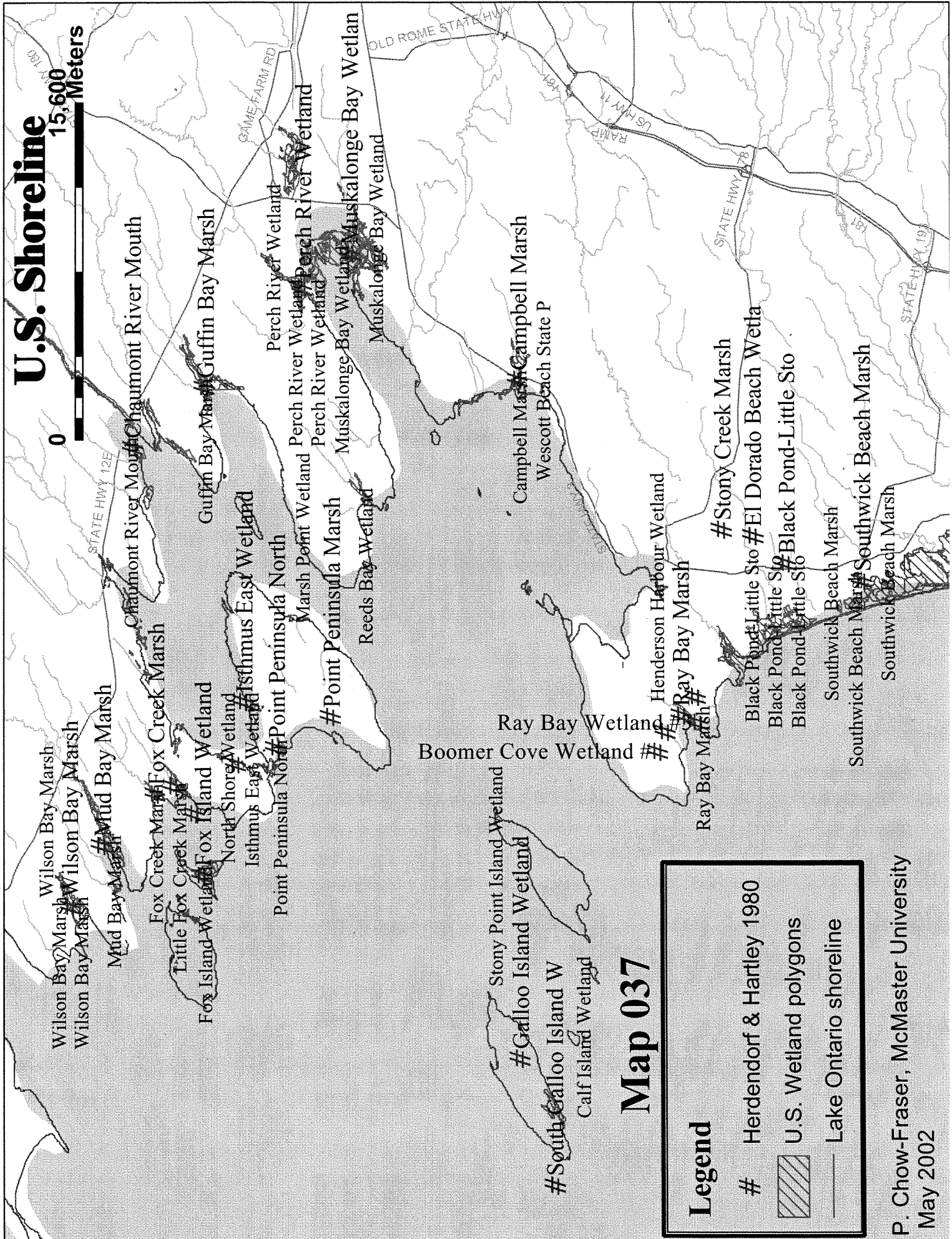
U.S. Shoreline





U.S. Shoreline


15,600 Meters



Map 037

Legend

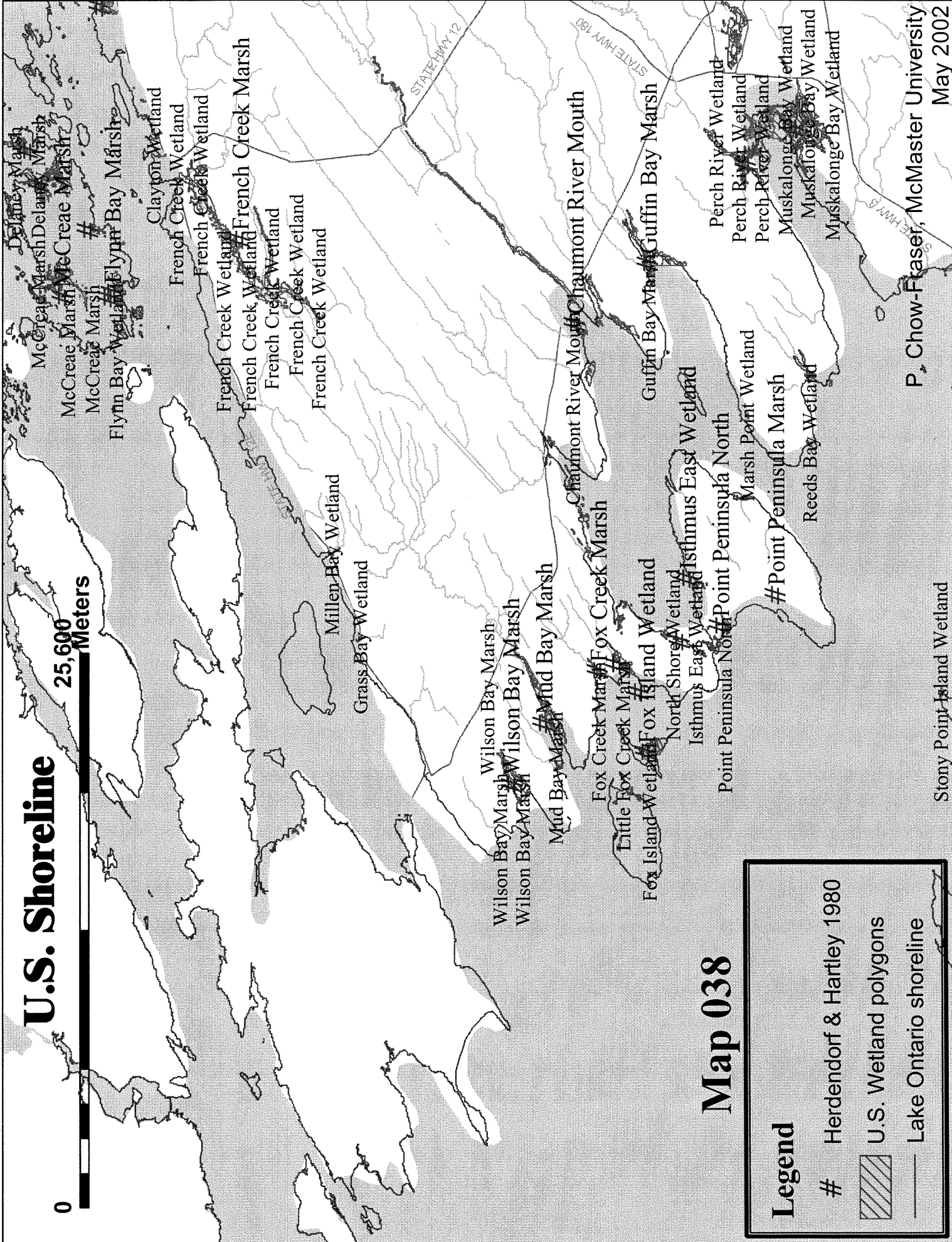
Herdendorf & Hartley 1980

 U.S. Wetland polygons

 Lake Ontario shoreline

U.S. Shoreline


0 25,600 Meters



Map 038

Legend

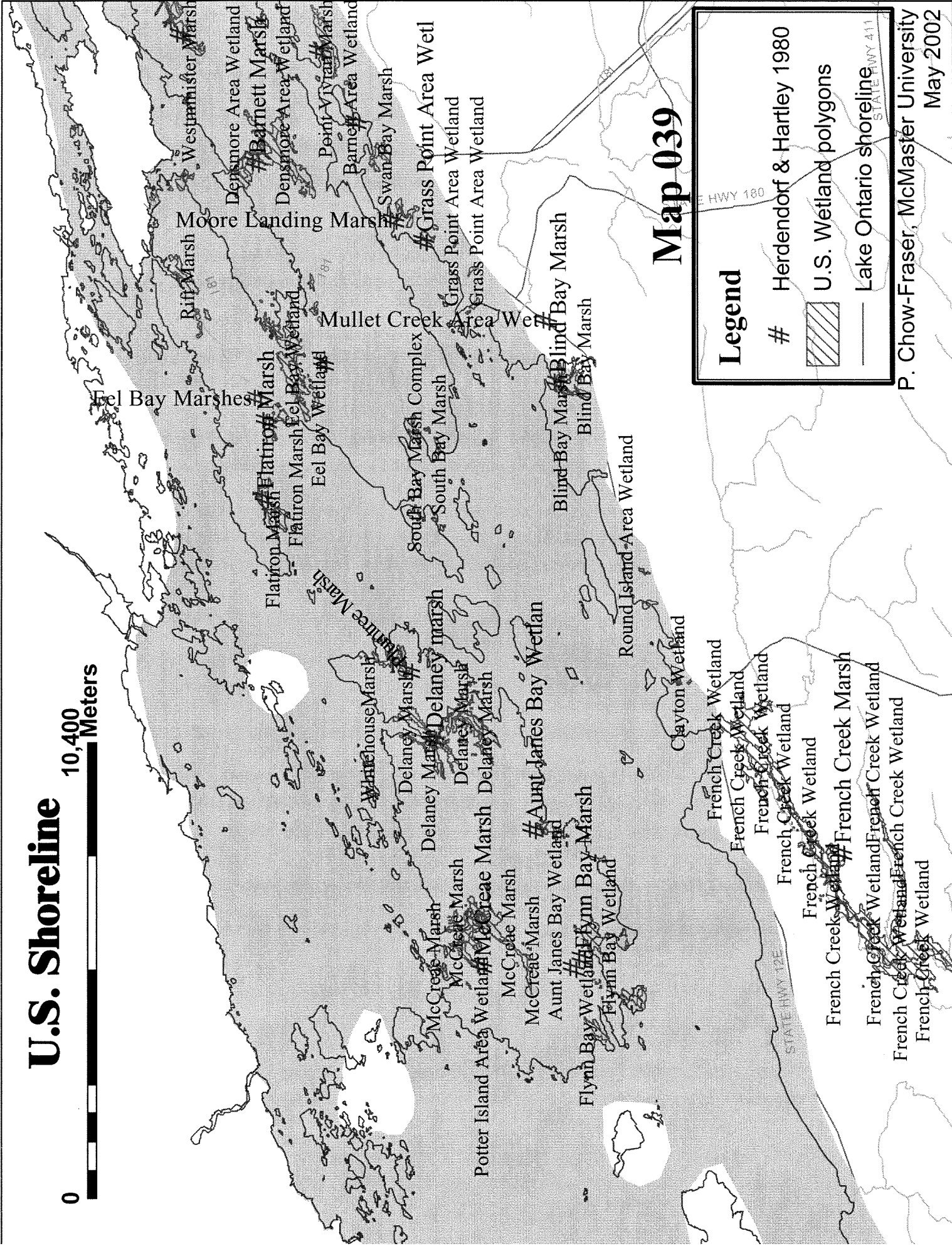
Herdendorf & Hartley 1980

 U.S. Wetland polygons

 Lake Ontario shoreline


U.S. Shoreline

10,400
Meters



Map 039



Legend

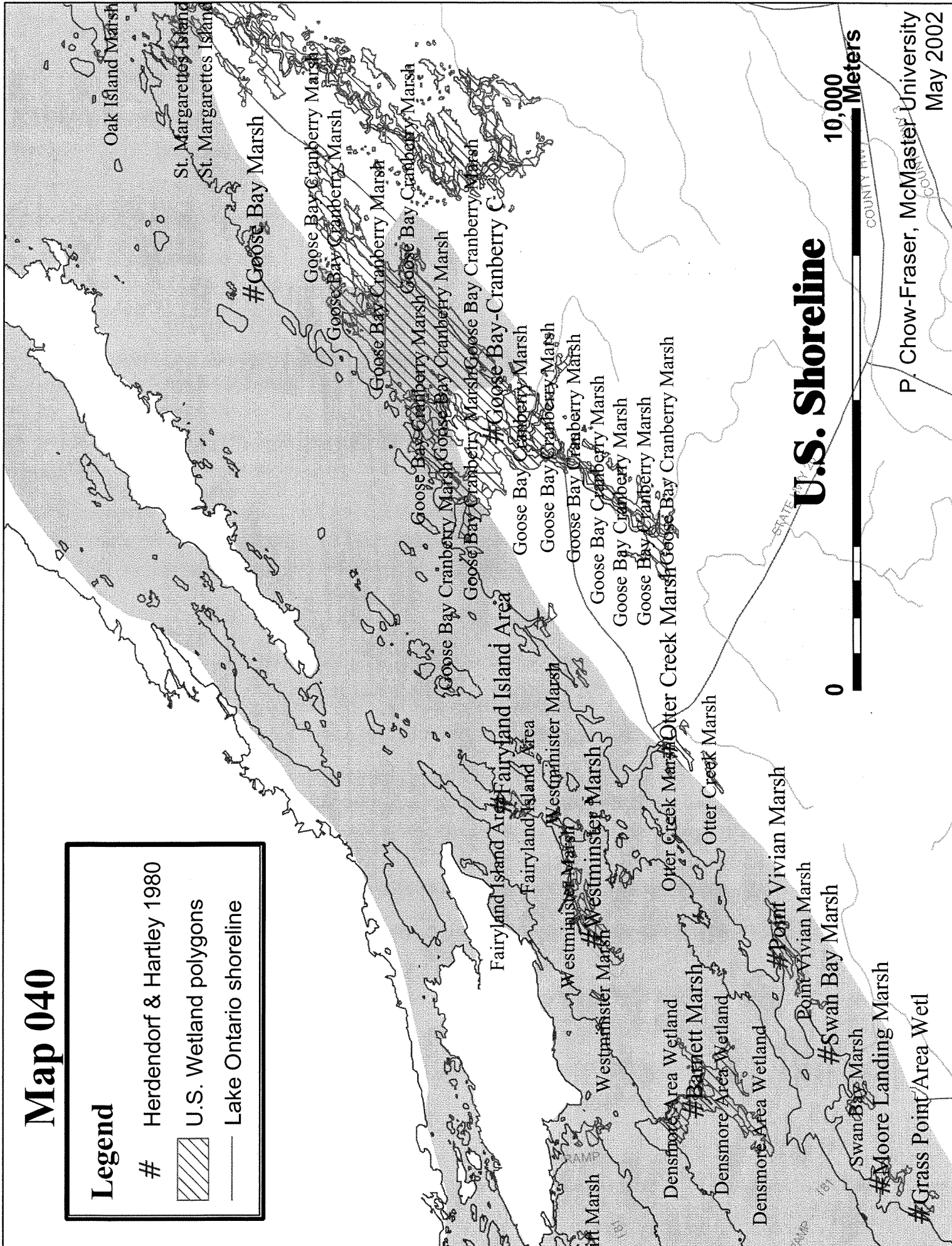
- # Herdendorf & Hartley 1980
-  U.S. Wetland polygons
-  Lake Ontario shoreline

P. Chow-Fraser, McMaster University
May 2002

Map 040

Legend

- # Herdendorf & Hartley 1980
-  U.S. Wetland polygons
-  Lake Ontario shoreline

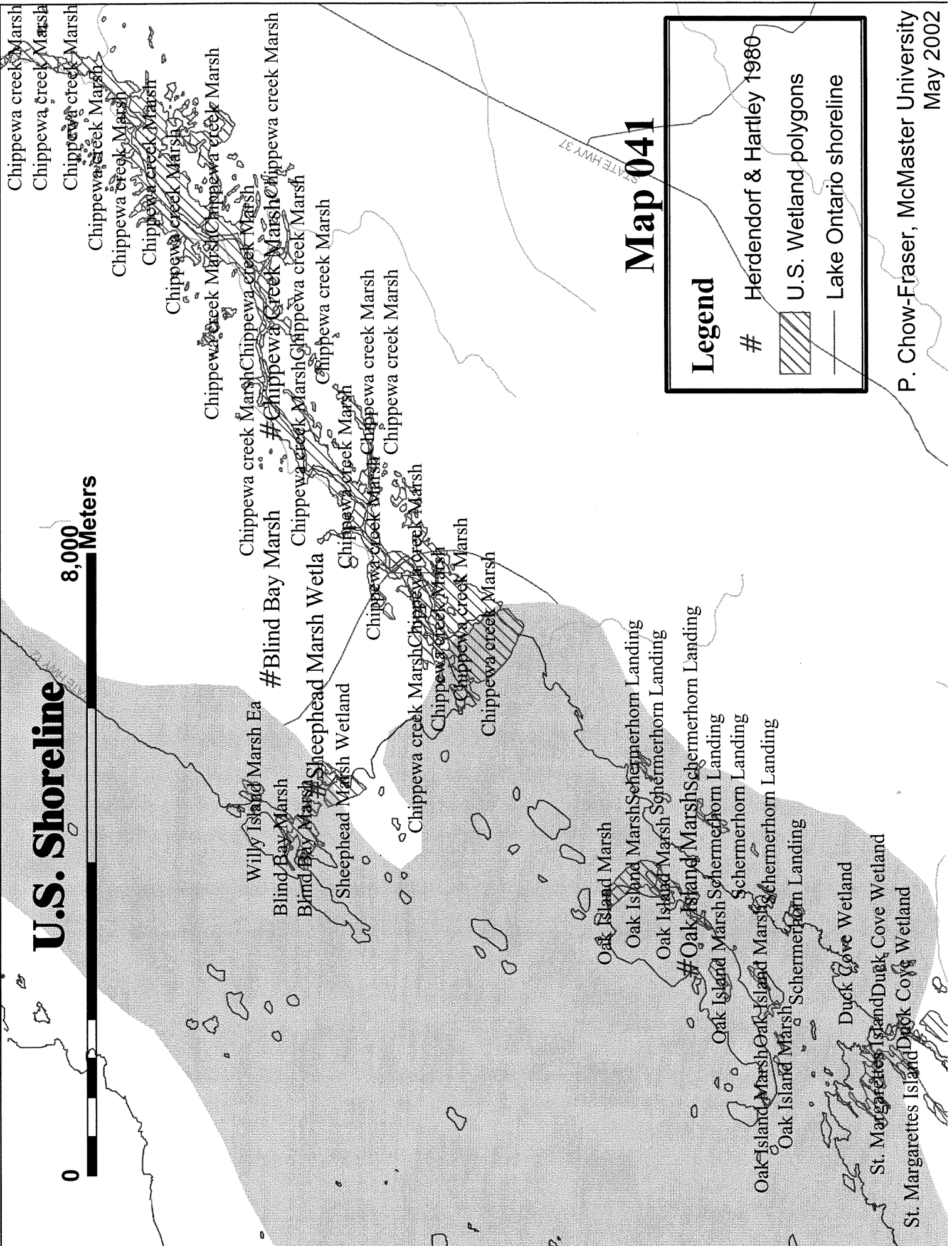


U.S. Shoreline



U.S. Shoreline

0 8,000 Meters



Map 041

Legend

- # Herdendorf & Hartley 1980
- U.S. Wetland polygons
- Lake Ontario shoreline

