

Great Lakes Nearshore Zone, including coastal wetlands

Research Theme Assessment

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Background: This assessment, Great Lakes nearshore zone, including coastal wetlands, spans research that is conducted in relation to habitats that might be characterized as the littoral area of the Great Lakes including those areas spanning much of the shoreline, and bays. For this purpose, the Great Lakes nearshore zone might be considered the area of lake that extends to the thermocline. Also included would be the connecting channels and in some cases river estuaries. Species typically included in this habitat would be most of the Great Lakes coolwater fish community including walleye, yellow perch, and other Percids, the Escoids such as northern pike and Great Lakes Muskellunge, Centrachids such as smallmouth bass, Ictalurids such as channel catfish, Catostomids (suckers), and the numerous nongame shallow water species that inhabit the Great Lakes. Although lake sturgeon are a far ranging species, they are included in this research theme. Lake herring are sometimes also included although they may be equally characterized as a pelagic zone species. Because this theme includes coastal wetlands, research needs relating to that habitat type, especially those with a fisheries connection are included in this theme.

Historical approaches and research areas covered: For the purpose of these assessments, nine areas (within themes) have been identified. They are:

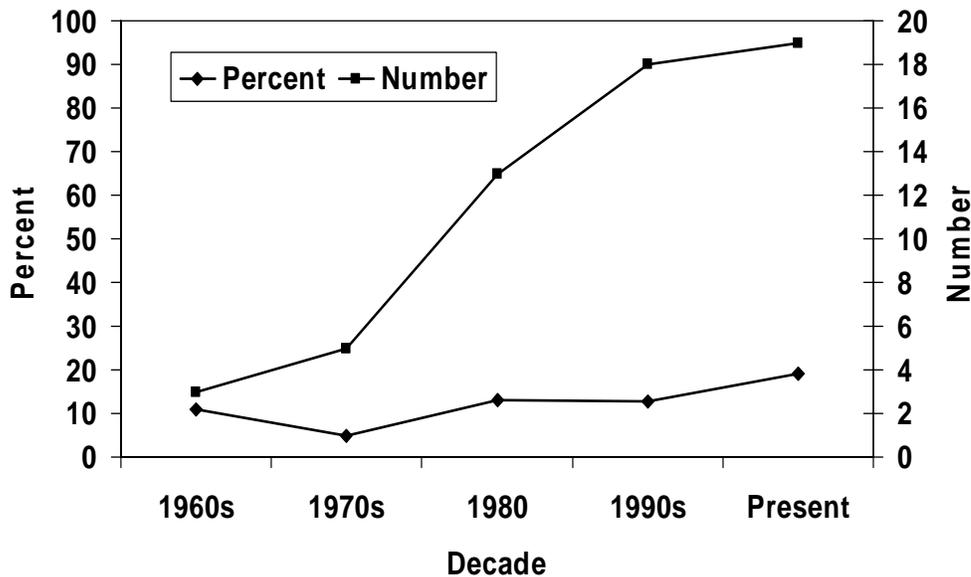
- Sampling,
- GIS Development,
- Fish Distribution,
- Fish Population Dynamics,
- Fishery Dynamics,
- Habitat Relationships,
- Ecosystems,
- Evaluation of Harvest Regulations,
- Evaluation of Hatchery Practices.

These areas provide a basis for characterizing past research conducted by the Fisheries Division.

Published Fisheries Division Research and Technical Reports as well as the current Federal Aid project list provides a means with which to quantify historical research investments by theme and area. Based on this approach, research on the Great Lakes Nearshore Zone has grown in the Fisheries Division from three projects in the 1960s to 19 in 2005 (Figure 1). Overall investment in research, however, has also grown over the decades and the relative proportion of this research theme has remained similar at about 13% of the Division's Research investment since the 1960s.

Figure 1.–Trends in proportion & number of research or technical reports that dealt with Great Lakes nearshore fishes by decade. "Present" represents 2005 study load.

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In addition to growing more numerous, Research within the Great Lakes nearshore zone theme has grown more diverse in species and areas covered (Appendices 1 & 2). Investigations of fish population dynamics has been an area that has received consistent attention and research investment (Appendix 2). Broken out by subcategory, it is apparent that research into the population dynamics of Great Lakes nearshore fishes has grown more diverse and encompassing since the 1960s (Appendix 3). In reviewing the publications and current projects list, it was also apparent that projects have grown in scale and complexity over the decades as well.

Current Research Work: In 2005, there are about 25 active research projects being conducted by the Fisheries Division that are related either entirely or partly to Great Lakes nearshore zone issues. Of those, 19 are solely devoted to Great Lakes nearshore issues. Three of the projects are conducted externally and only involve DNR researchers as consultants or cooperators. Of the total 25 related projects, 18 (72%) are conducted by full time DNR research biologist staff and the remaining 7 projects (28%) are conducted by University “PERM” staff. Of the Fisheries Division’s Research Section, there were 8 DNR staff research biologists with at least one Great Lakes nearshore zone research project active in 2005 reflecting all the Great Lakes Research stations and the Institute For Fisheries Research. Seven different funding sources are reflected by the current active Great Lakes nearshore projects.

The collection of active Great Lakes nearshore zone projects in 2005 reflects a wide variety of species and research areas (Appendices 1-3). Some of these projects are fish community wide assessments that are annually conducted. Some of these projects maintain long-term data sets that form the basis for much of our understanding for the current status and trends of our fish populations in the Great Lakes. These projects have consequently been “on the books” for many years and some include data series reaching back to the late 1960s. These on-going studies remain timely and appropriate because of the dynamic, ever-changing fish community and ecosystem that has characterized the Great Lakes nearshore zone for the last 45 years. The locations of some of these projects include the Michigan waters of Lake Erie, Lake St. Clair, Saginaw Bay, Les Cheneaux Islands, St. Marys River, Michigan waters of Green Bay, and the perch waters of Lake Michigan.

Other projects are more experimental in nature seeking to address a specific question. Geographic Information System development projects for the Great Lakes remain common in 2005 and account for about 20% of the active project load. In addition, most other Great Lakes nearshore zone projects will

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include a spatial element or information need that is accomplished through GIS as some point before project conclusion. Nearly all the other research themes also overlap in vary degrees with the Great Lakes nearshore zone theme or prove integral in the Division's understanding and management of this environment.

Identification of Research Needs: Research needs and opportunities can grow from a variety of sources both internal and external to the DNR. At no point in the Department's history has research need development or identification been the function of any firm or detailed policy or protocol. Instead, research has typically been a blend of management need, and individual researcher interest, both steered by available funding and the criteria for each funding source. In the Great Lakes, research has been closely tied to management and has often constituted adaptive management by evaluation.

Great Lakes research began to be influenced more by interagency priorities and needs with the advent and participation in the Technical Committees formed by the Great Lakes Fishery Commission in the early 1990s. This has generally been regarded as a positive development as it often brought agency partnerships and more direction to Great Lakes research. The formation of Basin Team organization within the Fisheries Division in the late 1990s helped to formalize much of the interaction between field operations (fisheries management) and research personnel. This has helped to give fishery managers more opportunity to influence research project establishment and has helped researchers to better understand management needs.

This current exercise seeks to ultimately identify the top three research needs by theme to receive priority attention and/or funding. The first step of this process has been to compile a complete and fully inclusive list of all research needs, ideas, and questions for this theme area. The approach used has been to review and glean these needs from published documents such as recovery plans, management plans, assessment plans, and research reports. Also consulted has been committee products including research needs lists from the Great Lakes Technical Committees, Division Strategic Planning Committees, Basin Teams, and Ecoteams. Lastly, individual researchers known to specialize or routinely conduct research on Great Lakes nearshore zone issues were invited to submit research ideas.

The resulting feedback ranged from general conceptual research areas in need of attention to project specific ideas. Sometimes, the needs were expressed in the form of a question that needs answering. These research needs for the Great Lakes nearshore zone were then compiled into a spreadsheet and categorized by area within theme and source. In all 264 research needs were documented from 16 different sources (Table 1). Feedback from some Ecoteams and Basin Teams came in the form of individual opinions and were instead attributed to that source.

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Table 1. Sources consulted and corresponding number of research needs conveyed by source specific to Great Lakes nearshore zone research theme.

Source	Number contributed
All River Assessments	25
Basin Teams feedback	15
Comprehensive Wildlife Conservation Strategy document	42
Ecoteams	0
Great Lake's Technical Committee's 2005 list of research priorities	68
Individual staff	33
Lake Huron Draft Environmental Objectives	29
Lake Huron Lake Herring Recovery Plan	1
Lake Michigan Draft Environmental Objectives	19
Lake Sturgeon Recovery Plan	8
Saginaw Bay Walleye Recovery Plan	6
SALBRC Report	8
St. Marys River Assessment document	8
Strategic Planning Committee's 2005 Area's of Emphasis	1
Lake Superior Draft Environmental Objectives	0
Department whitepaper on cormorants	1
Total	264

Although these identified needs sometimes spanned multiple areas within the theme, each was assigned to just one area. The proportions by area differed slightly from the current research investment (Figure 2). This comparison suggests that there should be more emphasis and investment in research concerning habitat relationships, and sampling methodologies and less on GIS development and fish distribution. It should be noted that evaluation of hatchery practices and fishery dynamics largely fell to other established research themes and were partly deemphasized in this exercise because they were reserved for those separate themes. These areas, however, are important to, and highly relevant to Great Lakes nearshore research.

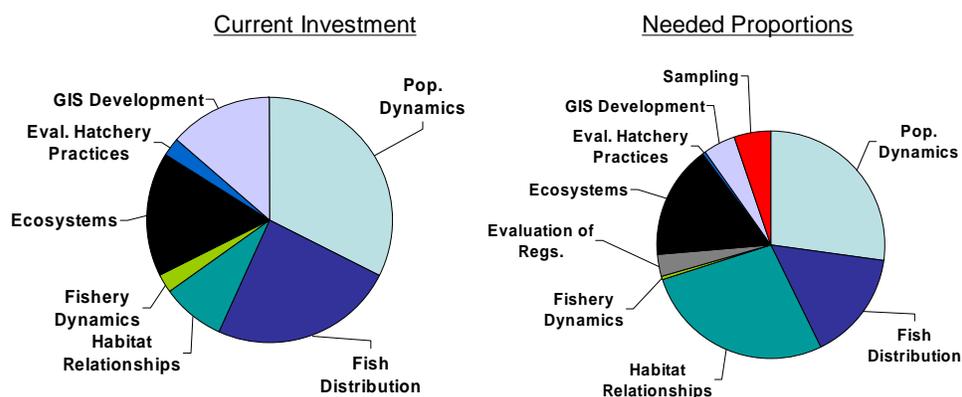


Figure 2. Proportions of research area within the Great Lakes near shore theme compared to the current investment in 2005 and that assessed as future needs through this assessment exercise.

This analysis is just one means to examine needed research emphasis. This information was then presented and discussed at the 2005 annual Research Section meeting. A group of about 14 persons

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reflected on this information and sought to (1) develop criteria for the selection of new research priorities within this theme and (2) to identify the top three needs. After considerable discussion, the group identified 10 criteria for the selection and funding of new research. They are:

1. New studies should address a management need.
2. Studies should be process focused to maximize the ability to export findings to a larger area.
3. Research should be original, something that can't be answered from a literature summary or meta-analysis alone.
4. Studies that compliment or contribute to existing work (like GIS) should get priority.
5. Studies with an implementable end product should have emphasis.
6. Prioritization of new studies should honor interagency obligations.
7. New study priorities should have an obvious benefit for their cost (economically justifiable).
8. Emphasis should be on projects that are attentive to ecosystem perspectives.
9. New projects should fit within the agency's Public Trust Doctrine responsibilities.
10. New projects should fit within the agency's mission, and areas of expertise.

The top three research areas recommended from this 2005 exercise are:

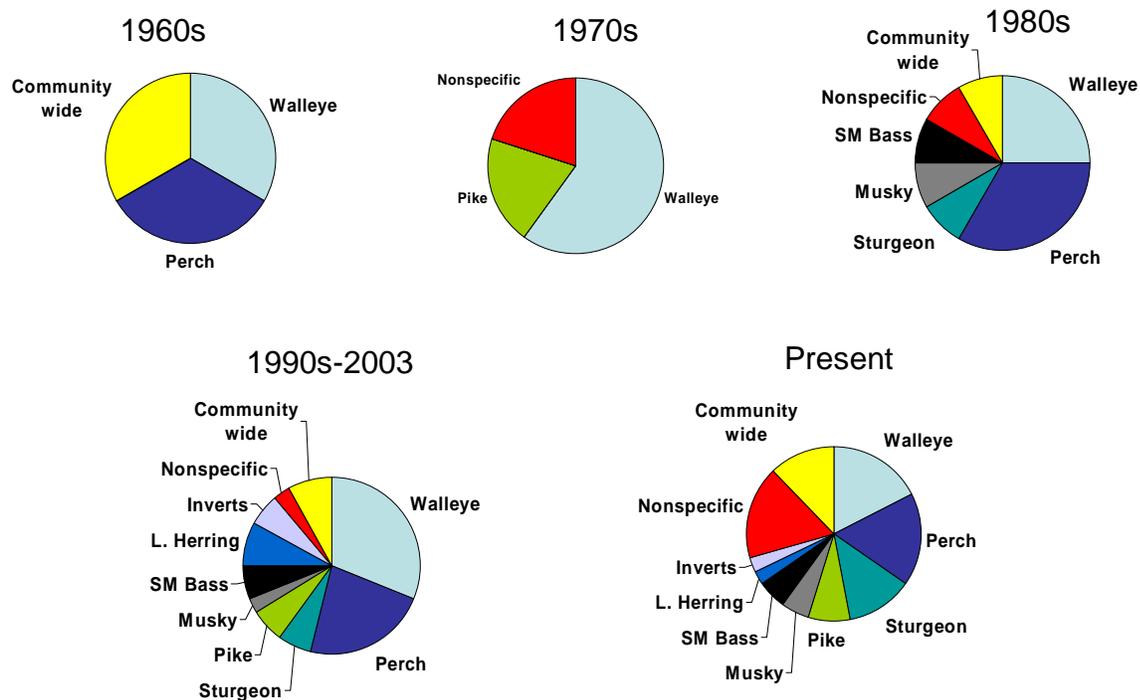
- **Habitat Relationships and linkages to ecosystems**
 - Habitat relationships need more definition.
 - New studies should occur on a relevant spatial scale.
 - Investigations are needed to explore the basis of productivity.
 - Investigations that explore habitat as ecotomes and connection to species diversity.
 - Relationships between habitat and fish communities.
 - Investigations into fish community response to habitat alteration.
 - Quantification of habitat type is needed.
- **Understudied species**
 - Investigations into species have not received much attention in the past such as lake sturgeon, coaster brook trout, and smallmouth bass.
 - Emphasis on keystone species and dominant species that have larger fish community effects.
 - Investigations into linkages between exotic species and production of native species including effects of alewives on nearshore zone native fish production.
- **Human Impacts / Extraction**
 - Effects of exploitation on fish populations.
 - Quantification of mortality rates and components.
 - Studies to help determine sustainability and acceptable harvest levels.
 - Harvest regulation recommendation development and evaluation.
 - Modeling of allowable catch from key fisheries.

Within each of these areas, the focus group agreed that there needs to be greater emphasis on standardization to assessment and sampling so as to better allow comparison of findings between lakes and with other agencies.

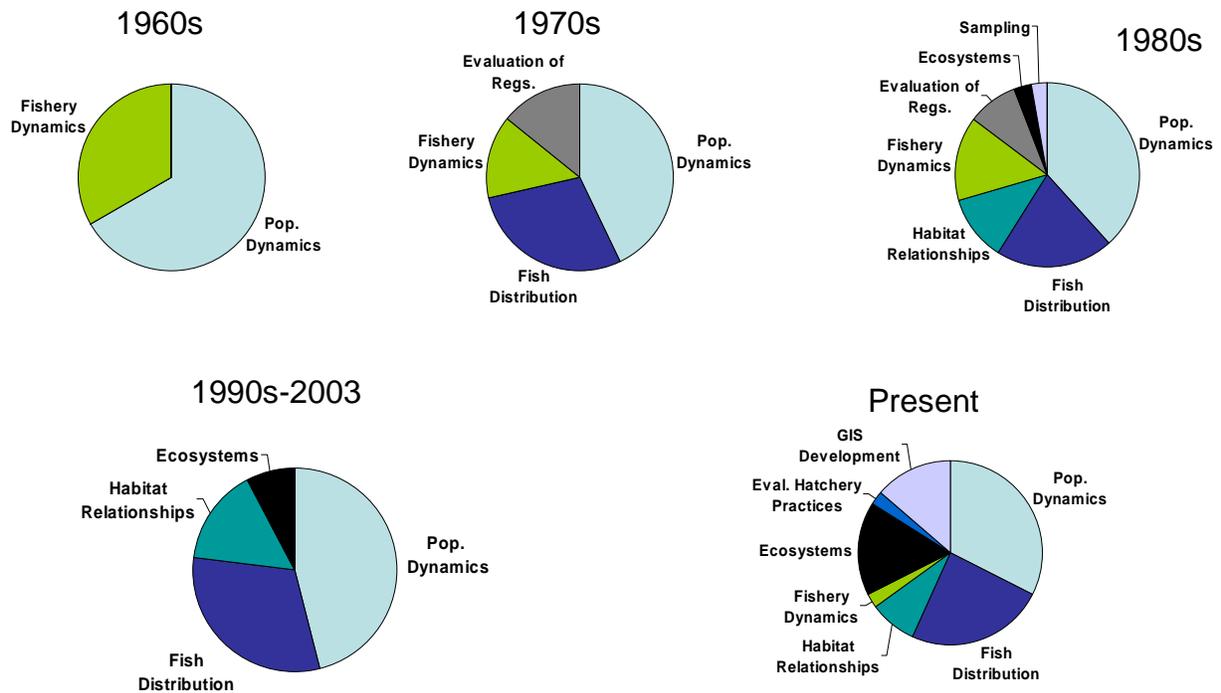
This assessment compiled by Dave Fielder

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Appendix 1.—Trends in proportions of species that were the focus of Great Lakes nearshore research since the 1960s.



Appendix 2. Trends in proportions of research areas within the Great Lakes nearshore zone theme since the 1960s.



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Appendix 3.—Trends in proportions of research by subcategories within the fish population dynamics area for Great Lakes nearshore zone projects since the 1960s.

