Biological Services Program

FWS/OBS-82/52
SEPTEMBER 1982

ATLAS OF THE SPAWNING AND NURSERY AREAS OF GREAT LAKES FISHES

Volume VIII-Detroit River

Great Lakes-St. Lawrence Seaway
Navigation Season Extension Program

Fish and Wildlife Service
U.S. Department of the Interior

Corps of Engineers
U.S. Department of the Army

The Biological Services Program was established within the U.S. Fish and Wildllfe Service to supply scientific information and methodologies on key environmental issues that Impact fish and wildlife resources and their supporting ecosystems. The mission of the program is as follows:

- To strengthen the Fish and Wildlife Service in its role as a primary source of information on national fish and wildlife resources, particularly in respect to environmental impact assessment.
- To gather, analyze, and present information that will aid decisionmnakers in the identification and resolution of problems associated with major changes in land and water use.
- To provide better ecological information and evaluation for Department of the Interior development programs, such as those relatfng to energy development.

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FWS/OBS-82/52
September 1982

ATLAS OF THE SPAWNING AND NURSERY AREAS OF GREAT LAKES FISHES

VOLUME VIII
Detroit River

by

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PREFACE

The fish resources of the Great Lakes have changed markedly since the settlement of the Great Lakes Basin began in the late 1700s-early 1800s. Local declines in the abundance of some highly valued species that supported early fisheries were reported in the 1800s. By the late 1950s-early 1960s, a number of important native species had disappeared from the catch, most once-productive stocks were depleted, and the fisheries that persisted were supported mainly by species of low value and utility. These undesirable changes have been attributed to the overharvest of desirable species, the invasion and introduction of undesirable exotic species, lowered water quality, and the destruction of portions of the physical habitat, including spawning grounds, vital to the maintenance of the resource base.

Since the 1950s, intensive efforts have been mounted to reestablish stable, self-sustaining fish communities, mainly by reducing sea lamprey abundance, limiting the harvest of remnant native stocks, and stocking desirable native or exotic species to replace or supplement depleted populations. Many of the native species and some of the desirable, introduced species have responded favorably and are now supporting valuable, productive fisheries. These successes suggest that continued judicious exercise of established management strategies will result in further significant improvements in the fish resources and the fisheries. An emerging perspective suggests, however, that enduring, major improvements in the fish resources and the fisheries will require greater emphasis on rehabilitation efforts directed more specifically at safeguarding and improving the quality of the fish habitat in general, and on ensuring fuller utilization of the specialized habitat required by sensitive, embryonic- juvenile life stages of species that are to be included in any future, self-sustaining resource base. We prepared this atlas to provide a comprehensive information base against which past changes in the condition and use of spawning and nursery habitat of Great Lakes fishes could be viewed and evaluated and the needs of the future, self-sustaining resource base could be projected.

The atlas is composed of the following 14 volumes:

I. Spawning and Nursery Areas of Great Lakes Fishes: A Summary by Geographic Area

II. Lake Superior

III. St. Marys River

IV. Lake Michigan

V. Lake Huron

VI. St. Clair River

VII. Lake St. Clair

VIII. Detroit River

IX. Lake Erie

X. Niagara River

XI. Lake Ontario

XII. St. Lawrence River

XIII. Reproductive Characteristics of Great Lakes Fishes

XIV. Literature Cited

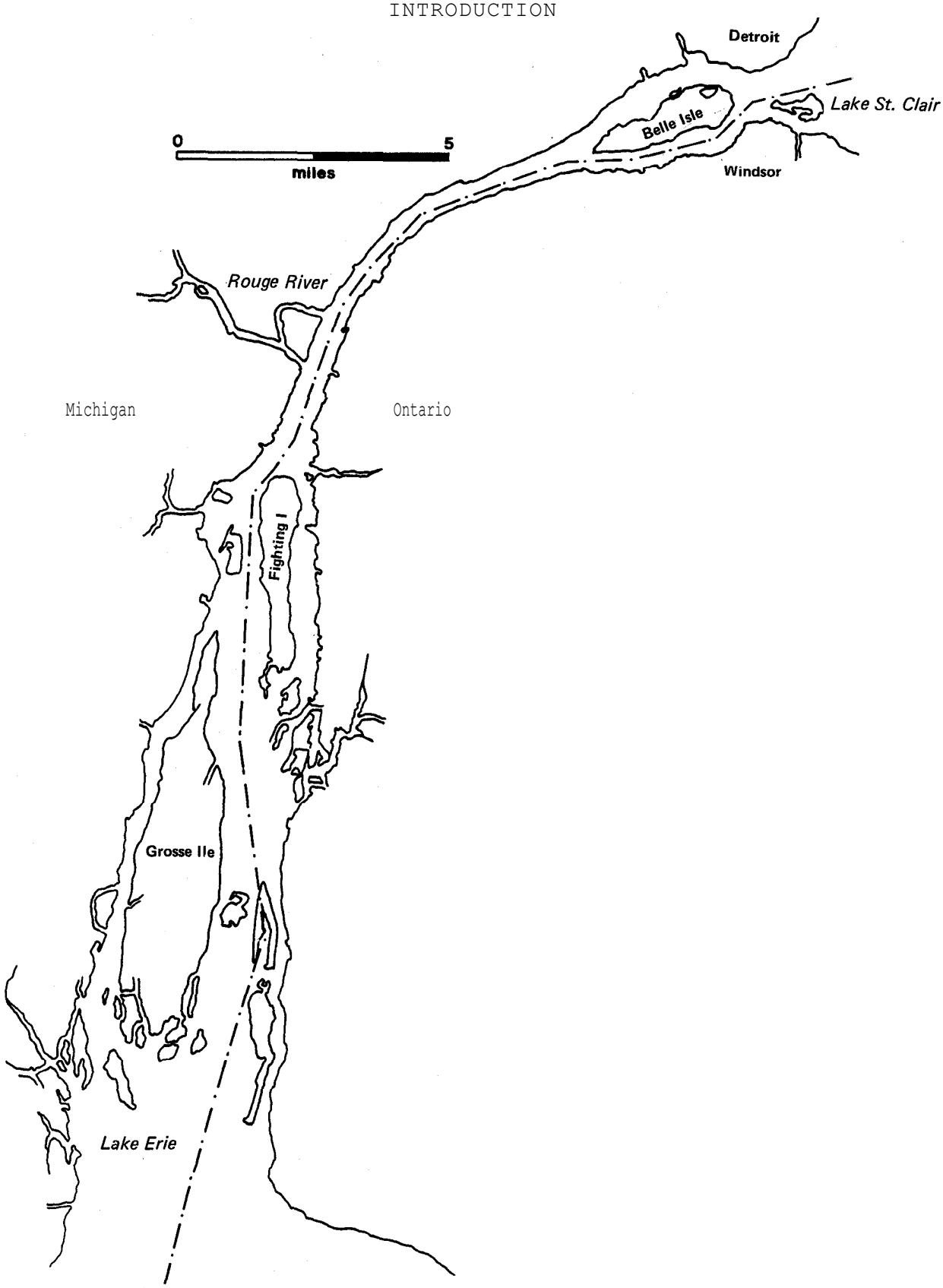
Volume I is designed to permit the reader to determine quickly. whether a particular geographic area of interest contains fish spawning or nursery areas that are described in volumes II-XII. Volumes II-XII consolidate existing information describing spawning and nursery areas used by stocks of fish, including anadromous stocks, considered to be residents of the Great Lakes and their connecting waters. The information presented for each spawning or nursery area identified in volumes II-XII includes, when known, the area's precise location, history of use, season of use, water temperatures during the season of use, major substrate type, and water depth. Pre- and post-spawning migrations of mature fish and movements of young fish are also described, insofar as this information serves to better delineate spawning or nursery areas. Volume XIII contains concise descriptions of the reproductive characteristics of species included in volumes I-XII.

In the preparation of the atlas we found that considerable information was available for most of the species that support (or supported) major recreational or commercial fishes, or that are or were major components of the forage base; conversely, relatively little information was available for many other species not included in these general categories. For most species, spawning areas were more completely described than were nursery areas. The historical information in particular provided more extensive descriptions of spawning areas than of nursery areas, because much of this information was obtained from records of fisheries that had been conducted for spawning fish. Thus, although the information available to us for compilation was relatively extensive, it was nonetheless incomplete for the reasons given above. Users of the atlas are therefore cautioned not to view the lack of explicit reference to a given area as conclusive evidence that the area is or was not used as a spawning or nursery area by Great Lakes fishes.

Sources of the information incorporated in the atlas are described in volume I. Acknowledgements are also given in volume I.

CONTENTS

Volume VIII. DETROIT RIVER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The Detroit River, together with the St. Clair River and Lake St. Clair, forms the connecting waterway between Lake Huron and Lake Erie. This connecting waterway and its tributaries are important spawning and nursery areas for many species that support major fisheries in the waterway and in Lake Huron and Lake Erie (Nester and Hatcher, pers. comm. 1981; Scott et al. 1978).

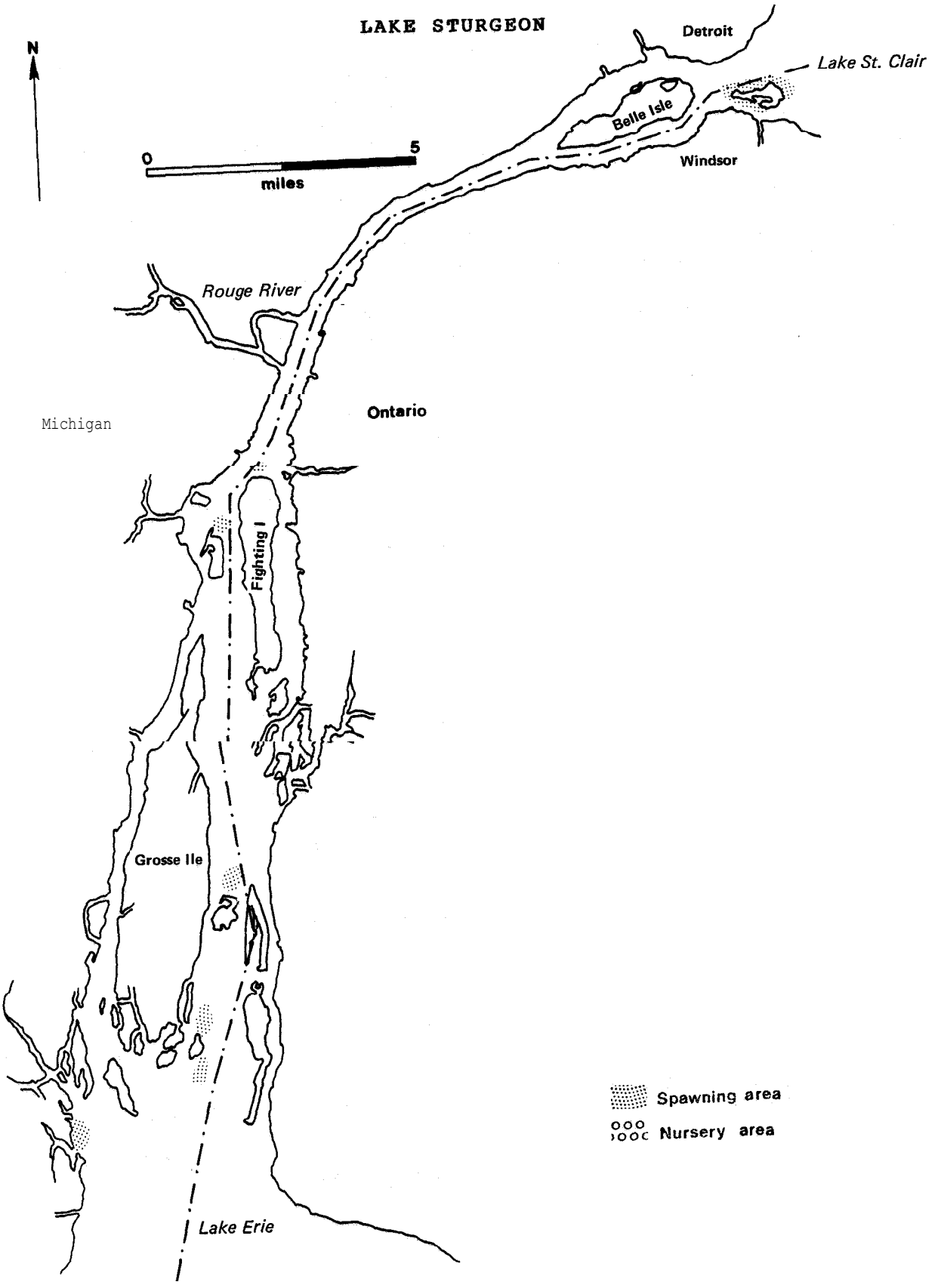
Almost 60 species of fish have been recorded as residents, or migrants, in the Detroit River (MWRC 1975; Thomas, pers. comm. 1979). This volume describes the reproductive habitat used by the 32 species for which information was available. Twenty-seven species treated in this volume are native to the Detroit River. Most of these 27 species probably spawned (or spawn) in the shallow embayments and shoreline areas of the islands in the lower portion of the river. Many of these areas in the lower river have been degraded (Jaworski and Raphael 1978a).

The five exotic species treated in this volume have been introduced by man or have immigrated into the river from populations established elsewhere in the Great Lakes drainage. Smelt spawn along island shorelines; alewives, gizzard shad, carp, and goldfish probably spawn in protected areas near shore.

The river is an important migration route for larvae (Environ. Can. 1977a; Nester and Hatcher, pers. comm. 1981) which move through it in large numbers during the summer (Scott et al. 1978b). Although the residence time of most larvae may be short because of the swift currents that prevail, the river must be considered an important nursery area.

The information in this volume is presented in narrative form, by species. A map accompanies each species narrative when there was sufficient information to warrant graphic summarization. Because the connecting waters have not been assigned to statistical fishing districts (Smith et al. 1971) the species narratives in this volume present the available information by geographic area beginning at the head of the river and continuing downstream to the mouth. For each referenced location within the river the narrative first presents the available information for spawning areas and then for nursery areas. Historical information is presented before the more current information.

For the purposes of this atlas, we define the head of the Detroit River as that portion of the river immediately downstream from a line connecting Windmill Point (42°21'30", 82°55'30") and Askins Point (42°20'00", 82°53'30"); and the mouth of the Detroit River as that portion of the river immediately upstrean from a line connecting the north boundary of the Pointe Mouillee State Game area (42°12'20", 83°11'20") and Bar Point (42°03'00", 83°06'30").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Fighting I
Grosse Ile
Lake Erie
Spawning area
Nursery area

Historically, the Detroit River was used by sturgeon during the spawning season (MSBFC 1899). Sturgeon from Lake Erie migrated into the river to spawn (Prince 1918). The lower portion of the river was historically thought to be the natural spawning grounds; these were used from early May into June (Gunckel 1897; Rathbun and Wakeham 1897). The river is still considered a spawning ground (U.S. Army Eng. Dist. 1979).

Peach Island Shoal (42°20'30", 82°55'00"). This may be a spawning site (U.S. Army Eng. Dist. 1979). The downstream side of Peach Island (42°20′45″, 82°55′30″) supports good fishing for sturgeon in the spring, and it may be a spawning area (FWS 1979d).

Fighting Island (42°13'00", 83°07'00″). Since the 1950s, sturgeon have spawned off the northern point of the -island over gravel in about 30 ft of water (Organ et al. 1978).

Grassy Island (42°13′30″, 83°08'00"). Since the 1950s, sturgeon have spawned in about 30 ft of water over gravel in an area (42°13'45", 83°07'55") about 1/4 mi N of Grassy Island (Organ et al. 1978).

Grosse Ile (42°08'00", 83°09'00"). Intensive fishing to provide spawn for a hatchery operation occurred during the spring at the Michigan Central Railroad bridge (location unknown) (MSBFC 1895).

Stony Island (42°07'30", 83°08'00"). Until the 1970s, sturgeon spawned over rock in 10-20 ft of water in an area (42°08'20", 83°07'50") 1/2 mi N of Stony Island (Organ et al. 1978).

Sugar Island (42°05'30", 83°08'40"). Until the 1970s, 'sturgeon spawned in 10-20 ft of water over rock, in an area (42°06'00", 83°08'35") about 1/2 mi N of the island, and in a second area (42°05'05", 83°08'40") about 1/2 mi S of the island (Organ et al. 1978).

Sturgeon Bar (42°04'05", 83°11′15″). Until the 1930s, sturgeon spawned around the bar in 1-3 ft of water (Organ et al. 1978).

Clarke's Point (location unknown). Intensive fishing occurred during spring to provide spawn for a hatchery operation (MSBFC 1895).

SPOTTED GAR

Elba Bay (42°06'00", 83°09'00"). The bay is a spawning and nursery area. Spawning was observed over a silt bottom in about 1 ft of quiet water in June at a water temperature of 70°F. Fish remain in this area for an extended period after spawning. Young-of-the-year have also been collected in this area in June (Thomas, pers. comm. 1979).

GAR spp.

Sugar Island (42°05'30", 83°08'40"). Gars spawn in an area (42°05′15″, 83°08′00″) about 1/2 mi E of the island at the edge of Livingstone Channel, over vegetation in 6-10 ft of water in July (Organ et al. 1978).

Milleville Beach (42°02'45", 83°11′15″). Gars spawn here along shore (Organ et al. 1978).

ALEWIFE

The alewife presumably entered the Detroit River from Lake Erie between 1931 and 1933, when alewives were first recorded for Lake Erie and Lake Huron respectively (Miller 1957).

During 1974-75, impingement of adult alewives at power plants along the Detroit River increased when fish moved upstream to spawn; the spawning run began when water temperatures rose to about 46-57°F. Impingement of young-of-the-year increased in the fall when these fish migrated downstream to Lake Erie (Detroit Edison 1976b-e). In 1977, larvae were collected from June to August in an area (42°21′15″, 82*57′00″--42°20′30″, 82°56′50″) just east of Belle Isle (42°20'30", 82°58@30") and also in the Trenton (42°12′30″, 83°08'30″), Livingstone (42°08′00″, 83°07′30″), and Amherstburg (42°08'00", 83°07′10″) channels of the lower river; peak abundance occurred on July 5-25. These larvae probably resulted from spawnings in the St. Clair River delta or in its tributaries (Nester and Hatcher, pers. comm. 1979).

GIZZARD SHAD

The gizzard shad presumably entered the Detroit River from Lake Erie between 1848 and 1877, when this species was first recorded for Lake Erie and Lake Huron respectively (Miller 1957). During 1974-75, impingement of adult gizzard shad at power plants along the Detroit River increased when fish moved upstream to spawn. Impingement of young-of-the-year gizzard shad increased in the fall when these fish migrated downstream to Lake Erie (Detroit Edison 1976b-e). In 1977, larvae were collected from May to July in an area (42°21'15", 82°57'00"--42°20′30″, 82°56′50″) just east of Belle Isle (42°20'30", 82°58'30") and in the Trenton (42°12′30″, 83°08′30″), Livingstone (42°08'00", 83°07'30"), and Amherstburg (42°08′00″, 83°07′10″) channels in the lower river; peak abundance occurred from late May to early July. These larvae probably resulted from spawnings farther upstream in the river or in Lake St. Clair (Nester and Hatcher, pers. comm. 1979).

Maple Beach (42°03'15", 83°11'15") --Sturgeon Bar (42°04'05", 83°11'15"). Since the 1940s, gizzard shad have spawned here among aquatic vegetation in 1-4 ft of water within about 1/2 mi of shore (Organ et al. 1978).

LAKE HERRING

Historically, large spawning runs from Lake Erie entered the Detroit River in September; these runs disappeared by the late 1800s or early 1900s due to overfishing and pollution (FWS 1977; MSBFC 1887, 1893, 1895; Smith 1972). A small portion of the population from eastern Lake Erie passed through the Detroit River on its way to spawning grounds in Lake St. Clair (FWS 1977; Rathbun and Wakeham 1897).

LAKE WHITEFISH

Historically, large numbers of lake whitefish migrated from Lake Erie to spawn in the Detroit River (Kerr and Kerr 1860-1898; Milner 1874a; Stockwell 1875a; Wright 1955). Portions of the population from the eastern basin of Lake Erie migrated through the river into Lake St. Clair in late October and early November to spawn; some of these fish probably spawned in the Detroit River (FWS 1977; Rathbun and Wakeham 1897; Ward 1895). The run had almost disappeared by the early 1900s (Smith 1969, 1972; Trautman 1957), although a run from Lake Erie still entered the Detroit River in 1910 (Reighard 1910). In 1836-37, half of the catch of lake whitefish from the Great Lakes was made in the Detroit River (MSBFC 1887). Large numbers of migrating fish were caught in seines at Bois Blanc Island (42°05'40", 83°07'15"), Fighting Island (42°13'00", 83°07'00"), Stony Island (42°07'30", 83°08'00"), Grassy Island (42°13'30", 83°08'00"), Mamajuda (42°11'30", 83°08'15"), and Belle Isle (42°20'30", 82°58'30") (Bower 1897; Clark 1910; MSBFC 1887, 1888, 1890, 1893, 1895; Mich. State Comm. Supt. State Fish. 1879; Nevin 1905; Rodd 1914, 1917, 1918). Historical information primarily refers to hatchery operations in which ripe adults were collected and held in pens where they spawned (Nevin 1898; Sterling 1876). The Michigan Fish Commission's center for spawn collection was moved to the Detroit River opposite Belle Isle in 1892 (Langlois 1941).

The migration usually followed the same course among the islands year after year (Milner 1874a). In some years, runs started as early as the last week in September (Milner 1874a). Runs usually began in mid-October and lasted 3-5 weeks (Bower 1897; MSBFC 1893, 1895; Ont. Game Fish 1912, 1917). Eggs were collected as early as October 31 and as late as December 16; peak spawning occurred between November 8 and December 1 (Bissell 1890; Bower 1897; Milner 1874a; MSBFC 1890). In 1896, eggs were last taken from ripe fish on December 16 at Grassy Island and on December 12 at Belle Isle. Hatching began on March 25 and was completed by April

18 (Bower 1897). Spawning occurred along the "channel banks" (MSBFC 1887) and at the mouth of the river (Gunckel 1892), but no specific sites were identified.

Belle Isle (42°20'30", 82°58'30"). In 1977, a few lake whitefish larvae were collected in late April in an area (42°21'15", 82°57′00″--42°20′30″, 82°56′50″) just east of the island (Nester and Hatcher, pers. comm. 1979).

Grassy Island (42°13′30″, 83°08'00"). Larvae were found here in April within 5-6 in. of the surface (Milner 1874a).

Livingstone Channel (42°08'00", 83°07'30"). In 1977, a few larvae were collected here in mid-April (Nester and Hatcher, pers. comm. 1979).

LAKE TROUT

Historically, large spawning runs of lake trout entered the Detroit River, but these runs disappeared by the early 1900s (Smith 1972).

RAINBOW SMELT

Rainbow smelt eggs planted in Crystal Lake (44°40'00", 86°10'00") (Lake Michigan drainage) in 1912, are believed to be the source of smelt found in all of the Great Lakes except Lake Ontario. Rainbow smelt presumably entered the Detroit River from Lake St. Clair between 1932 and 1935, when this species was first recorded for Lake St. Clair and Lake Erie respectively (Van Oosten 1937a). Large spawning runs of smelt occur in the river during April (FWS 1977).

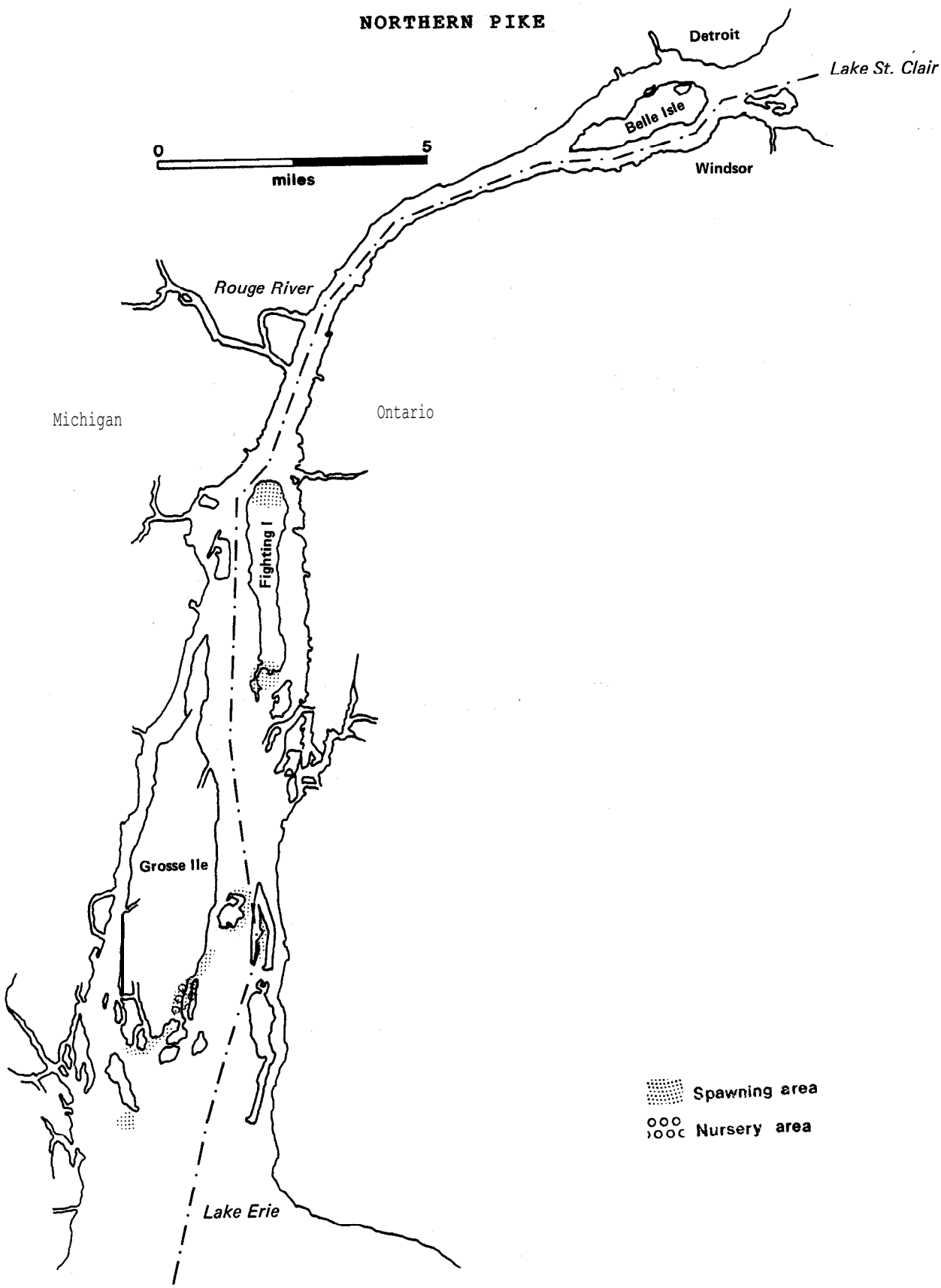
Belle Isle (42°20′30″, 82°58′30″). Young-of-the-year smelt have been collected in an area (42°20'30", 82°57'00") near the eastern end of Belle Isle. In 1974-75, larvae were entrained by the Canners Creek Power Plant (42°21'15", 82°57'30") from April to September; peak entrainment occurred in mid-July (Detroit Edison 1976b). In 1977, larvae were collected from May to July just east of (42°21'14", 82°57'00"--42020′30″, 82°56′50″) just east of the island; peak abundance occurred May 31 to June 6 (Nester and Hatcher, pers. comm. 1979).

Delray Power Plant (42°17′30″, 83°06'00") and River Rouge Power Plant (42°16'30", 83°06'30"). In 1974 and 1975, impingement of adults increased in the spring when spawning runs entered the river, perhaps from Lake Erie. Smelt eggs were found in entrainment samples taken at both plants in late March through May, and larvae were collected from late April to September; peak abundance occurred in July (Detroit Edison 1976c,d).

Trenton Channel (42°12′30″, 83°08′30″). In 1977, larvae were collected in the Trenton Channel at the north end of Grosse Ile from May to July; peak abundance occurred May 16 to June 6 (Nester and Hatcher, pers. comm. 1979). In 1974-75, larvae were collected in entrainment samples at the Trenton Channel Power Plant (42°07'20", 83°11'00") from late May to early September; peak entrainment occurred in mid-July (Detroit Edison 1976e).

Stony Island (42°07'30", 83°08'00"). In 1977, larvae were collected in the Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07′10″) channels from early May to late June; peak abundance occurred in the second week of May (Nester and Hatcher, pers. comm. 1979).

Sugar Island (42°05'30", 83°08'40"). The rock and sand area around the northern end of the island is used for spawning (Organ et al. 1978). Smelt have spawned here since their introduction into the river, and it is the major spawning area in the river. Pipe adults have been collected here over sandy bottom from April 15 to May 1. Spawning occurs in swift water 2-4 ft deep at water temperatures of about 44°F. Adults disperse immediately after spawning (Thomas, pers. comm. 1979).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Lake Erie
Spawning area
Nursery area

Fighting Island (42°13'00", 83°07'00"). The marshes are spawning areas (Environ. Can. 1977a).

Stony Island (42°07'30", 83°08'00"). Since the 1950s, northern pike have spawned over mud and aquatic vegetation in 1-7 ft of water on the north and east sides of the island (Organ et al. 1978).

Crystal Bay (42°07'00", 83°07'15"). Northern pike spawn at the head of the bay, directly east of Stony Island (Organ et al. 1978).

Grosse Ile (42°08'00", 83°09'00"). Northern pike spawn in the following areas at the southern end of the island:

Elba Island (42°06'10", 83°08'50"). Since the 1950s, spawning has occurred along shore in an area (42°07'00", 83°08'30") about 1/2 mi N of the island (Organ et al. 1978).

Elba Bay (42°06'00", 83°09'00"). This is a major spawning area (Organ et al. 1978). For many years, northern pike from western Lake Erie have migrated to the bay in late winter. Spawning has been observed in water 5 ft deep during April 15 to May 1 when the water temperature reached 40°F. There is little current in the bay; the bottom is mostly silt, and aquatic vegetation is relatively abundant. After spawning, the adults leave the area. The vegetated portions of the bay are nursery grounds (Thomas, pers. comm. 1979).

Hickory (Meso) Island (42°05'30", 83°09'00"), Spawning occurs among aquatic vegetation from the northern portion of the island west to the Ford Yacht Club (42°05'30", 83°10'15") (Organ et al. 1978).

Celeron Island (42°04'45", 83°10'30"). Since the 1950s, northern pike have spawned at the southern tip of the island over sand (Organ et al. 1978).

MUSKELLUNGE

The following areas are spawning sites for muskellunge in the Detroit River (Organ et al. 1978):

Belle Isle (42°20'30", 82°58'30"). Spawning occurs along shore from the east tip of Belle Isle (42°21'00", 82°57'15") to the Detroit Yacht Club (42°21'00", 82°58'30"), in 1-6 ft of water over a clay bottom, and also over Scott Middle Ground (42°20'50", 82°59'05").

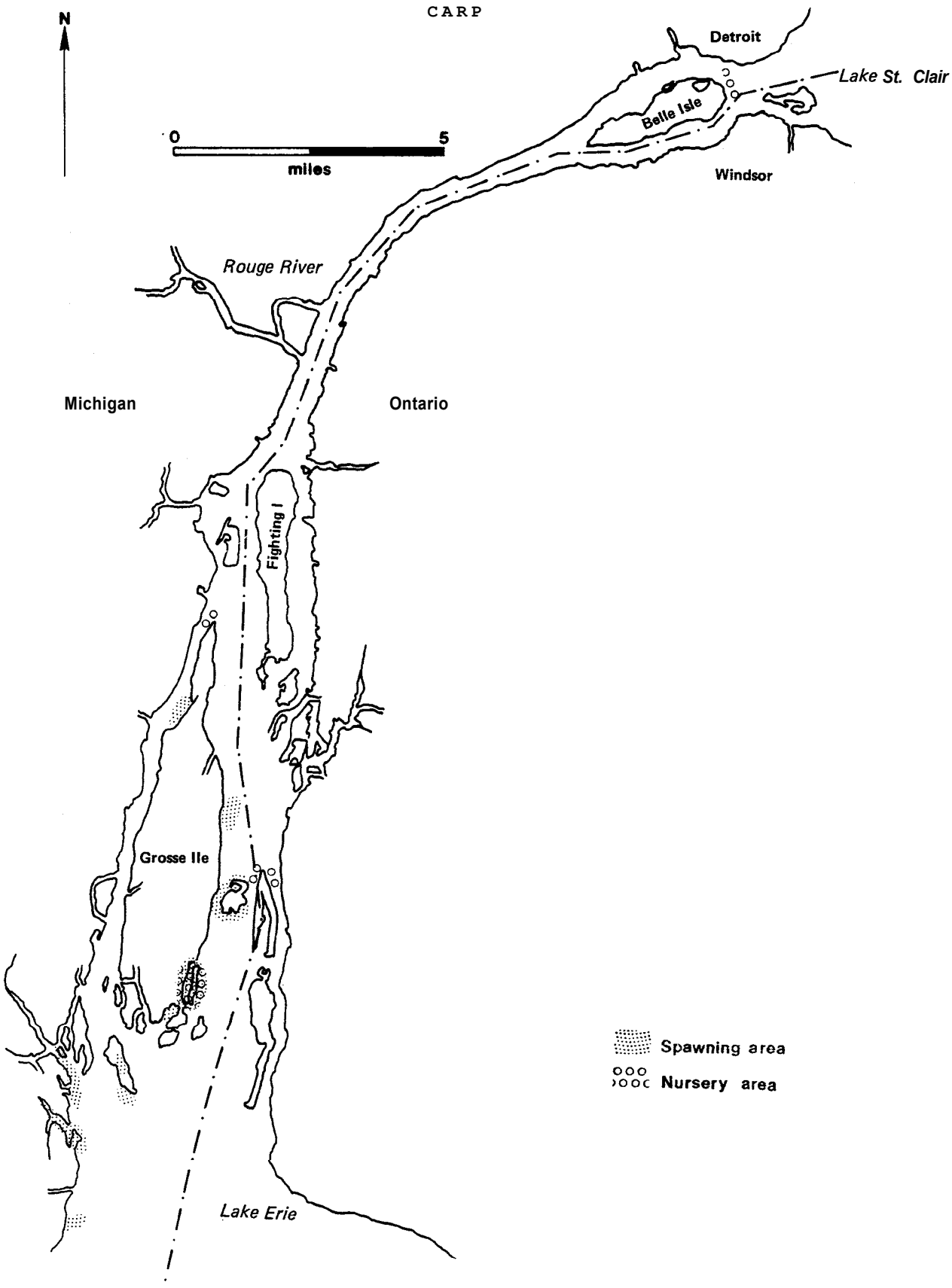
Stony Island (42°07'30", 83°08'00"). Since 1973, muskellunge have spawned in a weedy area (42°07'10", 83°08'00") about 1/4-1/2 mi S of Stony Island at depths of 5-10 ft.

Sugar Island (42°05'30", 83°08'40"). Since 1973, muskellunge have spawned in the shallow vegetated area (42°05'00", 83°08'30") 1/2 mi SE of Sugar Island.

GOLDFISH

Elba Bay (42°06'00", 83°09'00"). Spawning occurs in the bay between Elba Island (42°06'10", 83°08'50) and Grosse Ile (42°08'00", 83°10'00") over mud and aquatic vegetation (Organ et al. 1978). Goldfish begin to move into the bay when the water temperature reaches 45°F, and spawning occurs at 55°F in 5 ft of water in current-free areas. The bay is also a major nursery area (Thomas, pers. comm. 1979).

Sturgeon Bar (42°04'05", 83°11'15"). Since 1936, goldfish have spawned over gravel and mud in the inlet (42°02'40", 83°11'20") between the bar and Maple Beach (42°03'15", 83°11'15") (Organ et al. 1978).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Grosse Ile
Lake Erie
Spawning area
Nursery area

Prior to 1900, substantial populations of carp-were established in the Detroit River. The origin of these fish is unknown; presumably they originated from populations that had become established in Lake St. Clair or Lake Erie (McCrimmon 1968). Spawning generally occurs during May to July among vegetation in water less than about 3 ft deep (Organ et al. 1978).

Belle Isle (42°20'30", 82°58'30"). In 1977, carp larvae were found in an area (42°21'15", 82°57'00"--42°20′30″, 82°56′50″) just east of the island from late May to mid-July; peak abundance occurred in late June (Nester and Hatcher, pers. comm. 1979).

Grosse Ile (42°08'00", 83°10'00") (Organ et al. 1978, unless noted otherwise).

> Bridge Road (42°10'20", 83°09'20") . Carp spawn in the mud bottomed marshes on the northwestern shore of the island in an area (42°10'40″, 83°09′15″--42°10'00", 83°09'40") extending about 1/4 mi N and S of the bridge.
>
> Thorofare Canal (42°10'10", 83°08'30"). Carp spawn over mud and vegetation in a small area (42°09'10", 83°08'15") on the east shore about 1 mi S of the east outlet of the canal.
>
> Elba Bay (42°06'00", 83°09'00"). Carp spawn over mud and vegetation in the bay and inlets between Elba Island (42°06'10", 83°08'50") and Grosse Ile (42°08'00", 83°09'00") (Organ et al. 1978). Carp begin to migrate to Elba Bay when the temperature of the water reaches about 45°F. Spawning takes place over a silt bottom in 5 ft of water with very little current, at a water temperature of 55°F. The bay is also a major nursery area (Thomas, pers. comm. 1979).
>
> Hickory (Meso) Island (42°05'30", 83°09'00"). Carp spawn over mud in the bay area northwest of the island.

Stony Island (42°07'30", 83°08'00"). Since the 1950s, carp have spawned around the island over mud and aquatic vegetation (Organ et al. 1978).

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07′10″) Channels. In 1977, carp larvae were collected from late May to early July; peak abundance occurred at the end of May (Nester and Hatcher, pers. comm. 1979).

Trenton Channel (42°12′30″, 83°08′30″). In 1977, carp larvae were collected from late May to mid-July; peak abundance occurred at the end of May (Nester and Hatcher, pers. comm. 1979).

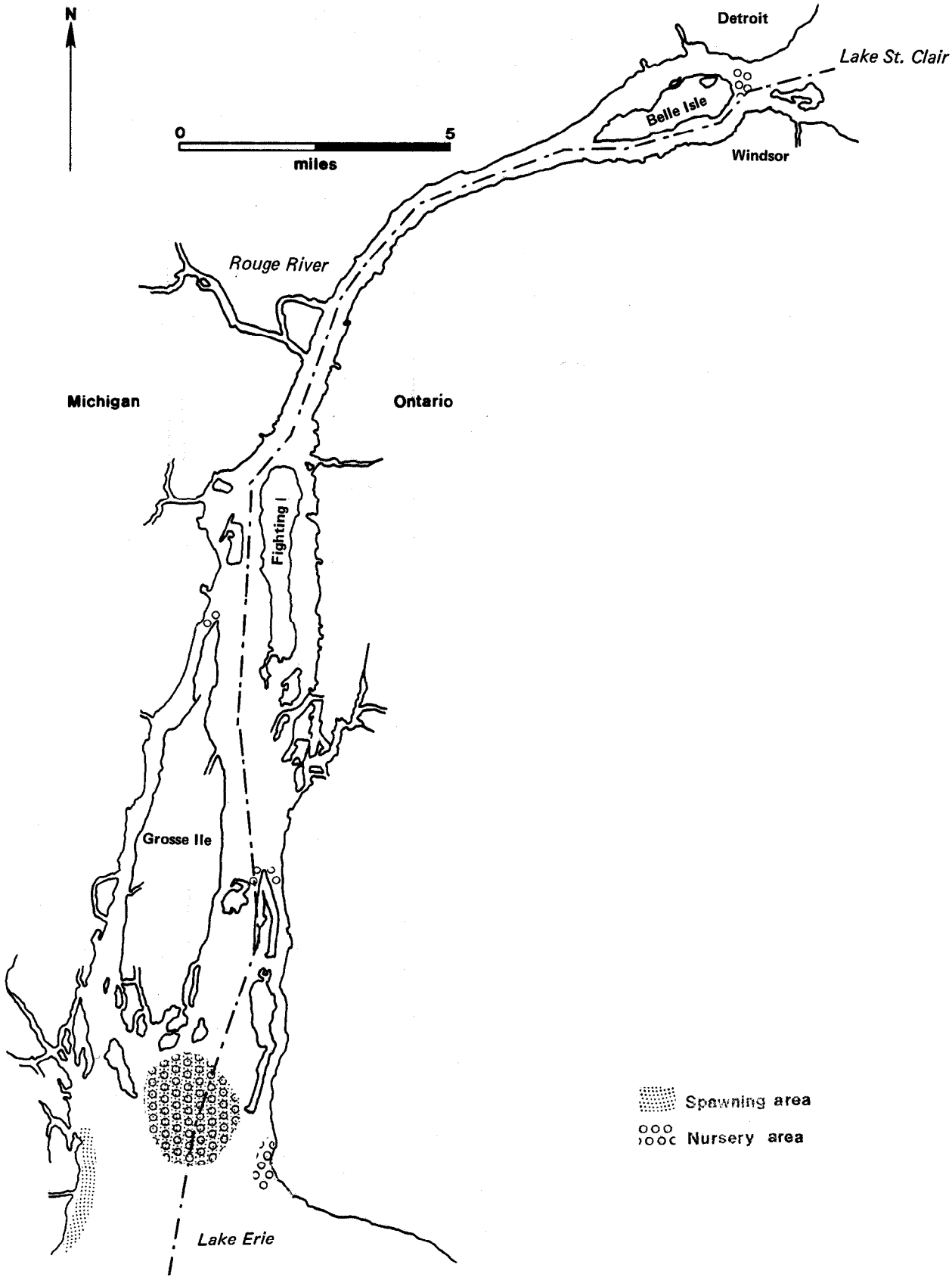
Celeron Island (42°04'45", 83°10'30"). Since the 1920s, carp have spawned over mud in a small area along the southern tip of the island in 5-6 ft of water; they also spawn over mud in the small lake in the center of the island (Organ et al. 1978).

Brownstown Creek (42°05'00", 83°12'00"). Since the 1920s, carp have spawned over mud at the mouth of the creek (Organ et al. 1978).

Sturgeon Bar (42°04'05", 83°11'15"). Since 1936, carp have spawned over gravel and mud in the first inlet (42°04'40", 83°11'20") south of the bar. Since 1920, carp have spawned over mud along the shoreline (42°04'30", 83°11'30") about 1/4 mi N of the bar (Organ et al. 1978).

Milleville Beach (42°02'45", 83°11'15"). During the 1970s, carp spawned in a small area along the shore here in less than 3 ft of water (Organ et al. 1978).

EMERALD SHINER



Belle Isle (42°20'30", 82°58'30"). In 1977, emerald shiner larvae were collected in an area (42°21'15", 82°57'00"--42°20'30", 82°56°50") just east of the island during May to July (Nester and Hatcher, pers. comm. 1979).

Trenton Channel Power Plant (42°07'20", 83°11'00"). In 1974-75, impingement of adults at the plant increased during spring when spawning runs entered the river. Most young-of-the-year (YOY) were impinged during the fall when they migrated downstream to Lake Erie (Detroit Edison 1976e). In 1977, larvae were collected during May to July in the Trenton Channel (42°12'30", 83°08'30") (Nester and Hatcher, pers. comm. 1979).

Livingstone (42°08'00", 83°07'10") and Amherstburg (42°08'00", 83°07'00") Channels. In 1977, larvae were collected during May to July (Nester and Hatcher, pers. comm. 1979).

Sugar Island (42°05'30", 83°08'40"). For 30-40 years, emerald shiners have spawned in a 4 sq mi area from about 42°04'30", 83°09'00" 1 mi S of Sugar Island to about 42°02'40", 83°08'50" at the mouth of the Detroit River. Adults begin concentrating here in May. Ripe females were observed in fairly clear, slow-moving water in areas with no vegetation. Spawning occurs over sand bottom in 10-12 ft of water when the water temperature reaches about 55-60°F. Adults disperse into nearby areas soon after spawning. Hatching occurs here from late May into early June. This area is a major nursery ground (Thomas, pers. comm. 1979).

Sunset Beach (42°03'20", 83°07'00"). In 1975, YOY were collected in beach seines here in August (Paine 1976).

Sturgeon Bar (42°04'05", 83°11'15"). Emerald shiners spawn at the 6 ft contour along the west shore from the bar south to 42°01'55", 83°11'00" near the mouth of the Huron River (Organ et al. 1978).

SPOTTAIL SHINER

Belle Isle (42°20'30", 82°58'30"). In 1977, a few spottail shiner larvae were collected in an area (42°21'15", 82°57'00"--42020'30", 82°56'50") just east of the island in late June and early July (Nester and Hatcher, pers. comm. 1979).

Trenton Channel (42°12'30", 83°08'30"). In 1977, a few larvae were found from early June to mid-July (Nester and Hatcher, pers. comm. 1979).

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07'10") Channels. In 1977, a few larvae were found in the Livingstone Channel in mid-July and in the Amherstburg Channel in mid-June (Nester and Hatcher, pers. comm. 1979).

MINNOW spp.

Belle Isle (42°20'30", 82°58'30"). In 1977, large numbers of unidentified minnow larvae were collected in an area (42°21'15", 82°57'00"--42°20′30″, 82°56′50″) just east of the island from late May to early August (Nester and Hatcher, pers. comm. 1979).

BASF Wyandotte Corporation (42°13'00", 83°08′30"). Spawning occurs along shore here (Organ et al. 1978).

Trenton Channel (42°12′30″, 83°08′30″). In 1977, larvae were collected from late May to late August; peak abundance occurred in early July (Nester and Hatcher, pers. comm. 1979).

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07'10"). In 1977, larvae were collected from late May to early August in the Livingstone Channel and to late July in the Amherstburg Channel (Nester and Hatcher, pers. comm. 1979).

Elba Island (42°06'10", 83°08'50"). Spawning occurs over mud in less than about 5 ft of water along the eastern shore of the island and in an area (42°06'55", 83°07'40") about 1 mi NE of the island, immediately west of Livingstone Channel (Organ et al. 1978).

Grosse Ile (42°08'00", 83°10'00"). Since the 1950s, spawning has occurred in less than about 4 ft of water at the southern tip of the island off the Ford Yacht Club (42°05'20", 83°10′15″) (Organ et al. 1978).

WHITE SUCKER

Belle Isle (42°20'30", 82°58'30"). In 1977, a few white sucker larvae were collected in an area (42°21'15", 82°57'01"--42°20'30", 82°56′50″) just east of the island in late May and early July (Nester and Hatcher, pers. comm. 1979).

Trenton Channel (42°12′30″, 83°08′30″). In 1977, a few larvae were collected in late May and late June (Nester and Hatcher, pers. comm. 1979).

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07′10″) Channels. In 1977, a few larvae were collected in late May and early July (Nester and Hatcher, pers. comm. 1979).

Michigan

Ontario

Channel catfish spawning areas were identified only in the lower river (Organ et al. 1978):

Stony Island (42°07'30", 83°08'00"). Channel catfish spawn along all but the eastern shore of the island; spawning occurs among aquatic vegetation over mud in 1-3 ft of water.

Elba Island (42°06'10", 83°08'50"). Spawning occurs along the east and north shores of the island.

Fox Island (42°06'20", 83°08'30")--Powderhouse Island (42°06'30", 83°08'10"). Since the 1950s, spawning has occurred between the islands over mud in 6-12 ft of water.

Sturgeon Bar (42°04'05", 83°11'15")--Maple Beach (42°03'15", 83°11'15"). During the 1940s and the 1970s, channel catfish spawned along shore in this area in 1-4 ft of water among vegetation. The absence of catfish in this area during the 1950s and 1960s has been attributed to high water levels, temperature changes, and pollution.

Milleville Beach (42°02'45", 83°11'15"). Since the 1950s, channel catfish have spawned in an area (42°02'40", 83°09'50") about 1 1/4 mi off Milleville Beach over a mud bottom in 10-12 ft of water.

BULLHEAD spp.

Bullhead spawning areas were identified only in the lower river; spawning occurs as early as March (Organ et al. 1978).

Stony Island (42°07'30", 83°08'00"). Bullheads spawn along all but the eastern shoreline of the island; spawning occurs among aquatic vegetation over mud in 1-3 ft of water.

Elba Island (42°06'10", 83°08'50"). Spawning occurs along the east shore of Elba Island over mud.

Grosse Ile (42°08'00", 83°09'00"). Since 1950, bullheads have spawned at the mouth of Frenchman Creek (42°05'30", 83°09'50") and between Hickory (Meso) Island (42°05'30", 83°09'00") and Grosse Ile; spawning occurred on mud in 1-3 ft of water.

Sturgeon Bar (42°04'05", 83°11'15")--Maple Beach (42°03'15", 83°11'15"). In the 1940s and the 1970s, bullheads spawned along this shore among vegetation in 1-4 ft of water. The absence of bullheads in this area during the 1950s and 1960s has been attributed to high water levels, temperature changes, and pollution.

TROUT-PERCH

Belle Isle (42°20'30", 82°58'30"). In 1975, larvae were collected in entrainment samples at the Conners Creek Power Plant (42°21'15", 82°57'30") from late-May to mid-August (Detroit Edison 1976b). In 1977, a few troutperch larvae were collected in an area (42°21'15", 82°57'00"--42°20'30", 82°56′50″) just east of Belle Isle from early May to mid-July (Nester and Hatcher, pers. comm. 1979).

Delray Power Plant (42°17′30″, 83°06'00") and River Rouge Power Plant (42°16′30", 83°06′30″). In 1975, larvae were collected in entrainment samples from late May to mid-July (Detroit Edison 1976c,d).

Trenton Channel (42°12'30", 83°08'30"). In 1977, one larva was collected in late June (Nester and Hatcher, pers. comm. 1979).

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07'10") Channels. A few larvae were collected in late May and early June (Nester and Hatcher, pers. comm. 1979).

BROOK SILVERSIDE

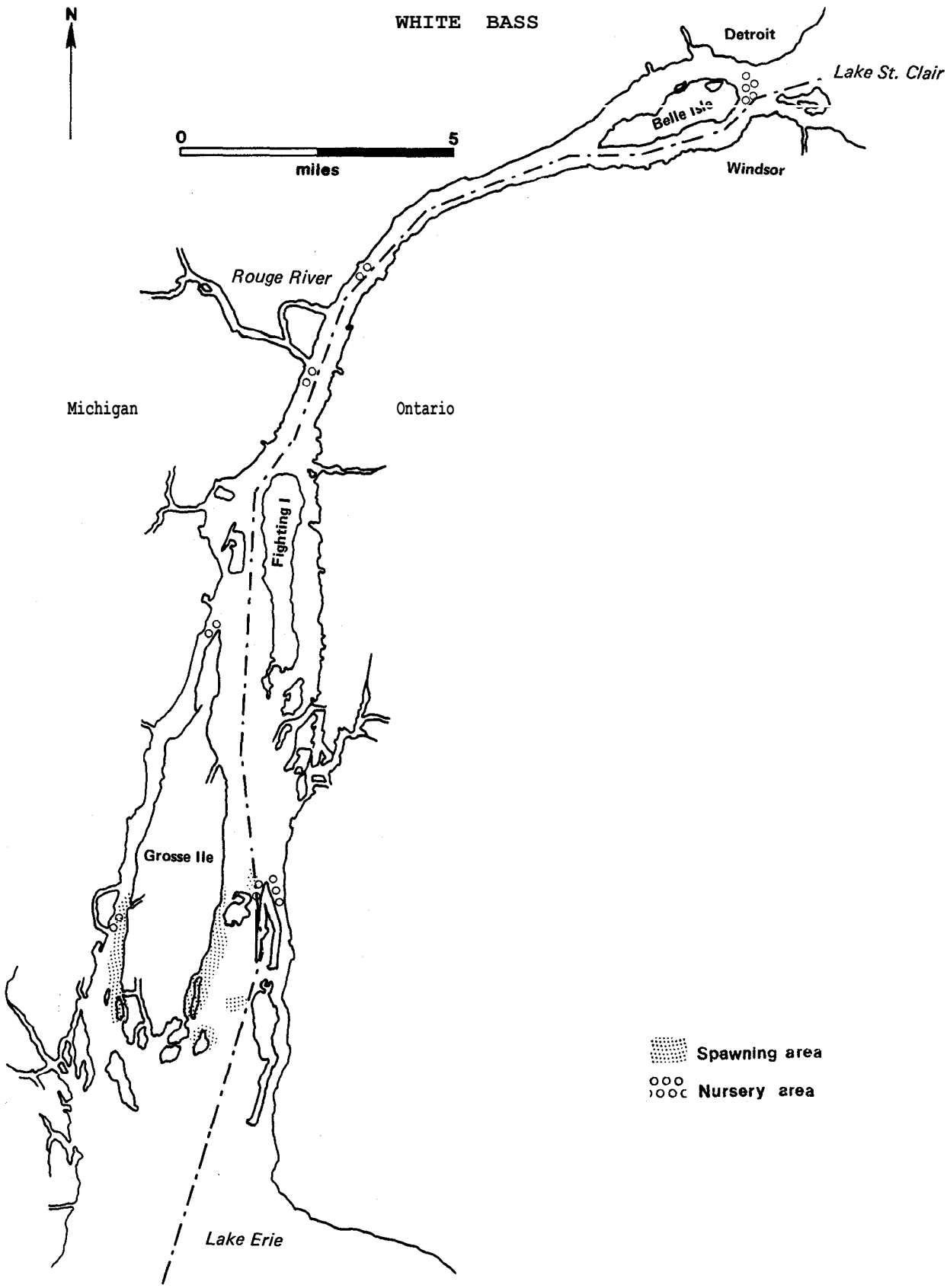
Belle Isle (42°20'30", 82°57'00"). In 1977, a few larvae were collected in July in an area (42°21'15", 82°57'00"--42°20′30″, 82°56′50″) just east of the island (Nester and Hatcher, pers. comm. 1979).

BURBOT

Belle Isle (42°20'30", 82°58'30"). In 1977, a few burbot larvae were collected in an area (42°21'15", 82°57'00"--42020′30″, 82°56′50″) just east of the island from mid-April to early July (Nester and Hatcher, pers. comm. 1979).

Trenton Channel (42°12′30″, 83°08′30″). In 1977, one larva was collected in mid-May (Nester and Hatcher, pers. comm. 1979).

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07′10″) Channels. In 1977, a few larvae were collected in early May and early July (Nester and Hatcher, pers. comm. 1979).


WHITE BASS
N
0
5
miles
Detroit
Lake St. Clair
Belle Isle
Windsor
Rouge River
Michigan
Ontario
Fighting I
Grosse Ile
Lake Erie
Spawning area
Nursery area

Belle Isle (42°20'30", 82°58'30"). In 1977, a few white bass larvae were collected in an area (42°21'15", 82°57'00"--42°20'30", 82°56'50") just east of the island from late May to early July (Nester and Hatcher, pers. comm. 1979).

Delray Power Plant (42°17'30", 83°06'00") and River Rouge Power Plant (42°16'30", 83°06'30"). In 1974-75, white bass larvae were collected in entrainment samples in mid-June (Detroit Edison 1976c,d).

Grosse Ile (42°08'00", 83°09'00"). White bass migrate from the western basin of Lake Erie to a major spawning ground along the southeast shore of Grosse Ile; this area extends from Stony Island (42°07'30", 83°08°00") south to Elba Island (42°06'10", 83°08'50"). Spawning takes place during the last week in May to the first week in June in 8 ft of water at water temperatures of 60-65°F. The water is clear and swift, and vegetation is abundant (Thomas, pers. comm. 1979). Since the 1950s, the area (42°06'15", 83°08'40"--42°07'45", 83°08'20") of mud, rock, and gravel extending about 2 mi N from the middle of Elba Island has been used for spawning. Since the 1920s, white bass have also spawned along the west shore of Grosse Ile from the south end of Swan Island (42°06'00", 83°10°30") north along the shore to a point (42°07'15", 83°10'30") opposite the Trenton Channel Power Plant (42°07'20", 83°11'00") (Organ et al. 1978). In 1975, white bass larvae were collected in entrainment samples at the power plant in late June and early July (Detroit Edison 1976e). In 1977, larvae were collected in Trenton Channel (42°12'30", 83°08'30") from late May to late June (Nester and Hatcher, pers. comm. 1979).

Stony Island (42°07'30", 83°08'00"). White bass spawn about 1/4 mi off the northeast tip of Stony Island in water 4-8 ft deep (Organ et al. 1978).

Livingstone Channel (42°08'00", 83°07'30"). Spawning occurs in a small area with rock substrate at 42°06'10", 83°07'55", between Elba Island and the channel (Organ et al. 1978). In 1977, white bass larvae were collected in the Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07'00") channels from late May to late June; peak abundance occurred in mid-June (Nester and Hatcher, pers. comm. 1979).

Sugar Island (42°05'30", 83°08'40"). Since the 1950s, white bass have spawned along the northern shore of the island in less than about 6 ft of water (Organ et al. 1978).

ROCK BASS

Hickory (Meso) Island (42°05'30", 83°09'00"). Rock bass spawn in the area (42°05'25", 83°09'40") west of the islands in 2-3 ft of water among aquatic vegetation (Organ et al. 1978).

Elba Bay (42°06'00", 83°09'00"). Ripe adults have been collected in the bay in late June. During the 1970s, spawning occurred in about 5 ft of water over a silt bottom in areas with little current (Thomas, pers. comm. 1979).

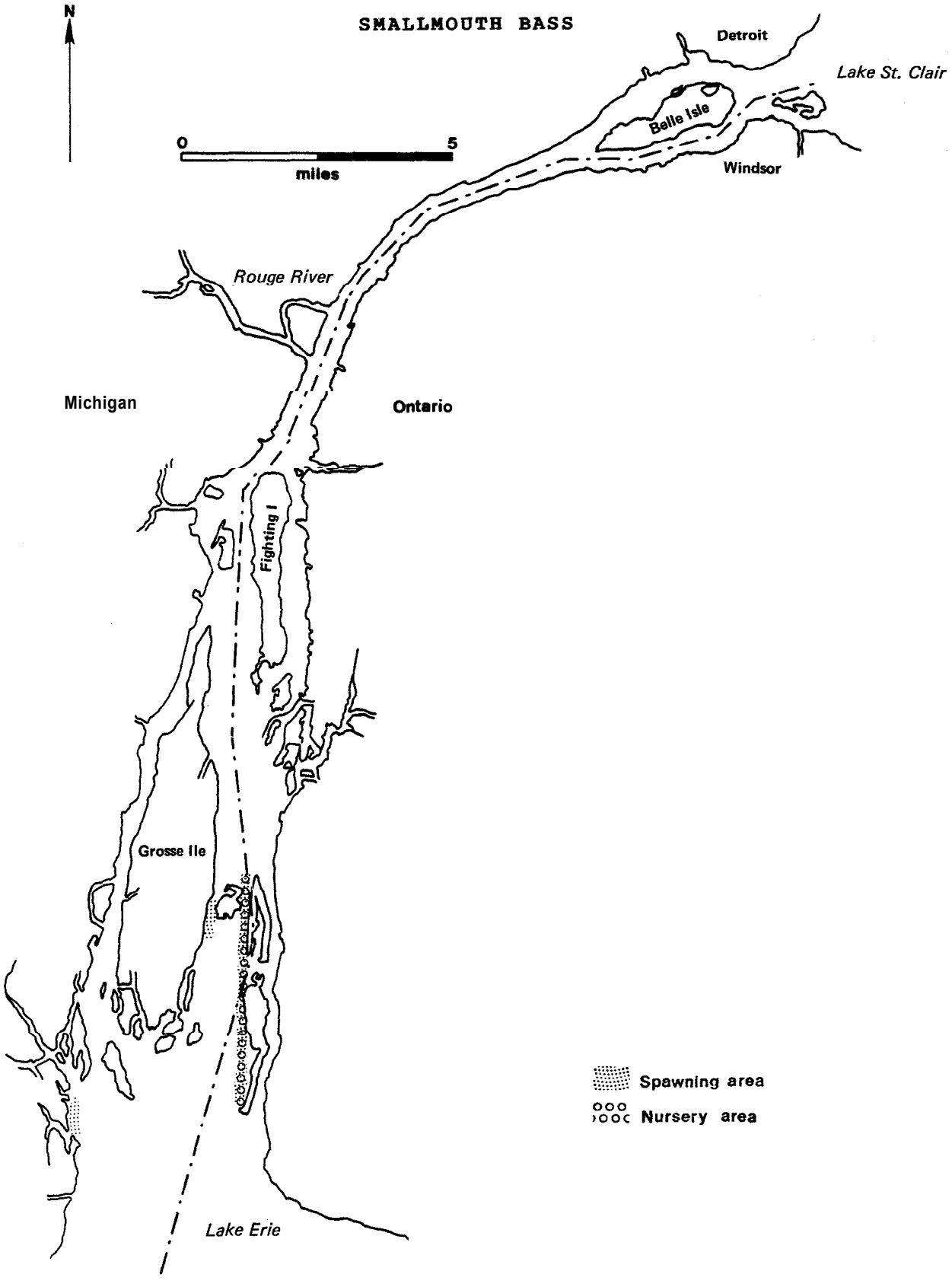
BLUEGILL

Fighting Island (42°13'00", 83°07'00"). The marshes of the island are spawning areas for bluegills (Environ. Can. 1977a).

Hickory (Meso) Island (42°05'30", 83°09'00"). Bluegills spawn in the area (42°05'25", 83°09'40") west of the islands among aquatic vegetation in 2-3 ft of water (Organ et al. 1978).

Sturgeon Bar (42°04'05", 83°11'15"). Since the 1940s, bluegills spawned just south of the bar over mud, sand, and gravel in 1-3 ft of water (Organ et al. 1978).

Milleville Beach (42°02'45", 83°11'15"). Bluegills spawn along this shoreline in 1-3 ft of water (Organ et al. 1978).


SMALLMOUTH BASS
N
0
5
miles
Detroit
Lake St. Clair
Belle Isle
Windsor
Rouge River
Michigan
Ontario
Fighting I
Grosse Ile
Lake Erie
Spawning area
Nursery area

Historically, smallmouth bass were believed to spawn at the mouth of the river, where there was clear, rapidly moving water (Gunckel 1892).

Livingstone Channel (42°08'00", 83°07'30"). The channel is a major spawning ground: spawning has been observed here since the 1930s. Males have been observed guarding nests in mid-May along dikes on both sides of the channel, throughout the 2-mi length of the channel. Spawning occurs over limestone rock about 1 ft in diam., in 3 ft of water at temperatures of about 55°F. Adults tend to remain in the area after spawning. This area is also a nursery ground (Thomas, pers. comm. 1979).

Grosse Ile (42°08'00", 83°09'00"). Since the 1950s, smallmouth bass have spawned between Grosse Ile and Stony Island (42°07'30", 83°08'00") over rock and gravel (Organ et al. 1978).

Sturgeon Bar (42°04'05", 83°11'15"). Since the 1940s, smallmouth bass have spawned between the bar and the adjacent shoreline in 1-2 ft of water over sand and gravel (Organ et al. 1978).

LARGEMOUTH BASS

Historically, largemouth bass appeared in the river in late May to early June and spawned in August. Spawning occurred in 2-3 ft of water, on gravel banks or in pools or eddies (Jordan 1877).

Crystal Bay (42°07'00", 83°07'15"). Since the 1950s, largemouth bass have spawned at the head of the bay in 2-4 ft of water, on mud, among aquatic vegetation (Organ et al. 1978).

BASS spp.

Fighting Island (42°13'00", 83°07'00"). The marshes of the island provide spawning habitat for black bass (Environ. Can. 1977a).

WHITE CRAPPIE

Elba Island (42°06'10", 83°08'50"). Ripe adults have been collected after April 1 in Smith's Cut (42°06'30", 83°08'10"), north of the island, over a silt bottom in areas with little current. Spawning takes place at a depth of 4-5 ft at a water temperature of less than 40°F. This water is slightly turbid and has little vegetation. Fish are present in the spawning area for about 1 week. White crappies have spawned in this area for about 20 years (Thomas, pers. comm. 1979).

CRAPPIE spp.

Sturgeon Bar (42°04'05", 83°11'15"). Since the 1940s, crappies have spawned just south of the bar over mud, sand, and gravel in 1-3 ft of water during late April and May (Organ et al. 1978).

Milleville Beach (42°02'45", 83°11'15"). Spawning occurs in this area in 1-3 ft of water (Organ et al. 1978).

CENTRARCHID spp.

Belle Isle (42°20'30", 82°58'30"). In 1977, centrarchid larvae were collected in an area (42°21'15", 82°57'00"--42020'30', 82°56'50") just east of the island from late May to late July (Nester and Hatcher, pers. comm. 1979).

Trenton Channel (42°12'30", 83°08'30"). In 1977, a few larvae were found in early June and late July (Nester and Hatcher, pers. comm. 1979).

Livingstone Channel (42°08'00", 83°07'30"). In 1977, a few larvae were found in late June to late July (Nester and Hatcher, pers. comm. 1979).

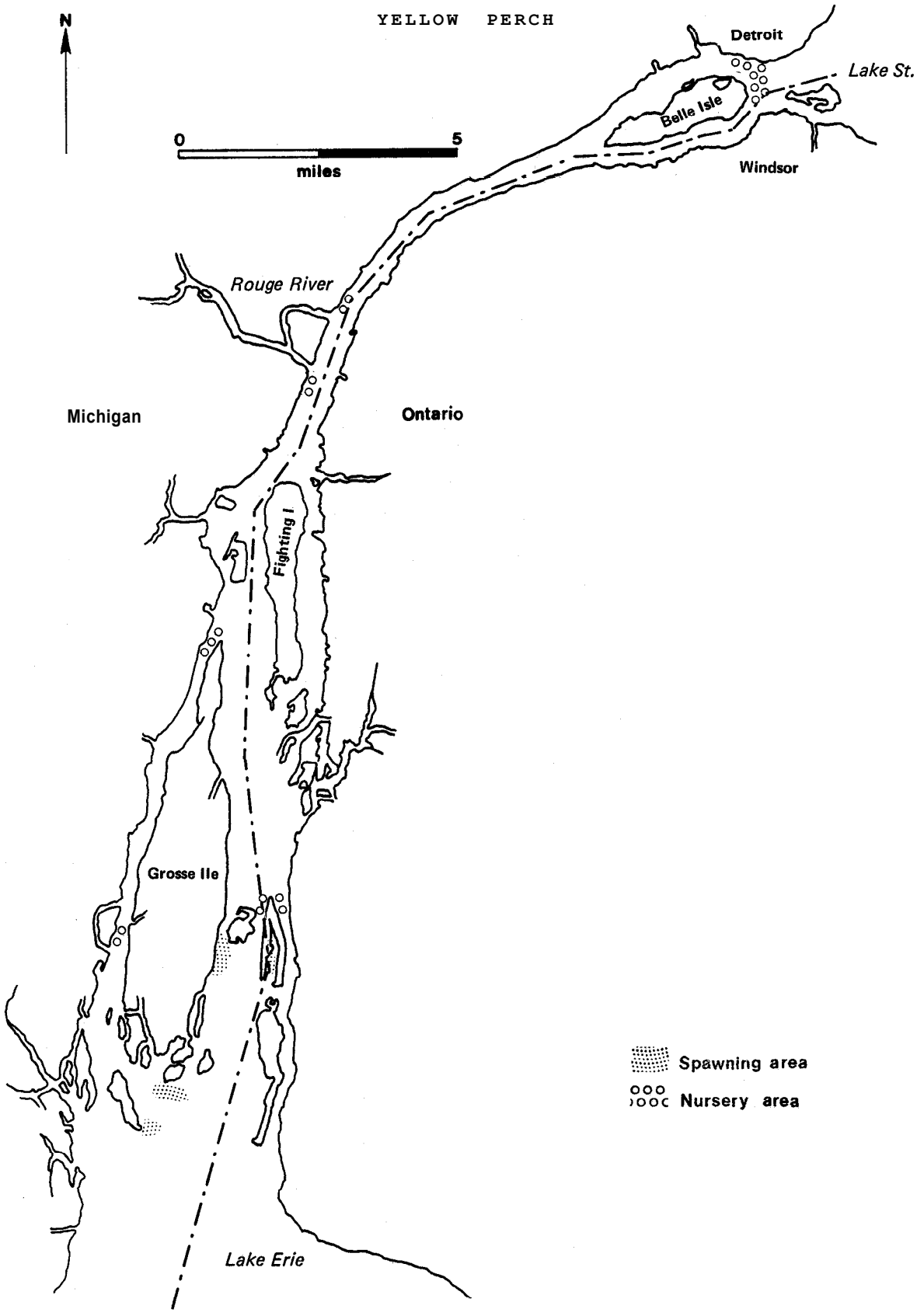
Amherstburg Channel (42°08'00", 83°07'10"). One larva was collected in mid-May (Nester and Hatcher, *pers.* comm. 1979).

JOHNNY DARTER

Belle Isle (42°20'30", 82°58'30"). In 1977, a few larvae were collected in an area (42°21'15", 82°57'00"--42°20'30", 82°56'50") just east of the island from late May to late June (Nester and Hatcher, pers. comm. 1979).

Trenton Channel (42°12'30", 83°08'30"). In 1977, a few larvae were collected in June (Nester and Hatcher, pers. comm. 1979).

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07'10") Channels. In 1977, a few larvae were collected in June (Nester and Hatcher, pers. comm. 1979).


YELLOW PERCH
N
0
5
miles
Detroit
Lake St.
Belle Isle
Windsor
Rouge River
Michigan
Ontario
Fighting I
Grosse Ile
Lake Erie
Spawning area
Nursery area

Spawning occurs in the Detroit River during early to mid-April (Organ et al. 1978). Impingement of adults at the power plants along the river increased in the spring during the spawning run; impingement of young-of-the-year yellow perch increased in the fall when these fish were moving downstream to Lake Erie (Detroit Edison 1976b-e).

Belle Isle (42°20'30", 82°58'30"). In 1975, yellow perch larvae were collected in entrainment samples at the Connors Creek Power Plant (42°21115, 82°57′30″), on the Michigan shore opposite Belle Isle, from mid-May to mid-August (Detroit Edison 1976b). In 1977, larvae were collected in an area (42°21'15", 82°57'00"--42°20′30″, 82°56′50″) just east of Belle Isle from early May to late July; peak abundance occurred during the week of May 9 (Nester and Hatcher, pers. comm. 1979).

Delray Power Plant (42°17′30″, 83°06'00") and River Rouge Power Plant (42°16′30″, 83°06′30″). In 1974-75, yellow perch larvae were collected in entrainment samples at the power plants from mid-May to early August (Detroit Edison 1976c,d).

Trenton Channel (42°12′30″, 83°08′30″). In 1974-75, larvae were collected in entrainment samples at the Trenton Channel Power Plant (42°07′20″, 83°11'00") in June to early August (Detroit Edison 1976e). In 1977, larvae were collected in the channel from early May to late June; peak abundance occurred during the week of May 9 (Nester and Hatcher, pers. comm. 1979).

Crystal Bay (42°07'00", 83°07'15"). Yellow perch spawn at the head of the bay in 2-4 ft of water over aquatic vegetation and mud (Organ et al. 1978). In 1977, larvae were collected in the Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07′10″) channels from early May to late July; peak abundance occurred the week of May 9 (Nester and Hatcher, pers. comm. 1979).

Grosse Ile (42°08'00", 83°09'00"). Yellow perch spawn along the eastern shore of the island, off the southwest tip of Stony Island (42°07′30″, 83°08'00"); spawning occurs in 2-6 ft of water over gravel and mud (Organ et al. 1978).

Hickory Island (42°05'20", 83°09'15"). In the 1970s, yellow perch spawned in an area (42°05'00", 83°09'45"--42°05'05", 83°08'50") off the southern tip of the island, over mud and gravel in 3-14 ft of water (Organ et al. 1978).

Celeron Island (42°04'45", 83°10'30"). Since the 1950s, yellow perch have spawned off the southeast tip of the island, over sand and gravyl in 2-3 ft of water (Organ et al. 1978).

LOGPERCH

Belle Isle (42°20'30", 82°58'30"). In 1975, logperch larvae were collected in entrainment samples at the Conners Creek Power Plant (42°21′15″, 82°57′30″) from mid-May to mid-June (Detroit Edison 1976b). In 1977, larvae were collected in an area (42°21′15″, 82°57′00″--42°20′30″, 82°56′50″) just east of Belle Isle from early May to late August; peak abundance occurred in early June (Nester and Hatcher, pers. comm. 1979).

Delray Power Plant (42°17′30″, 83°06'00") and River Rouge Power Plant (42°16′30″, 83°06′30″). In 1974-75, logperch larvae were collected in entrainment samples from June to early August (Detroit Edison 1976c,d).

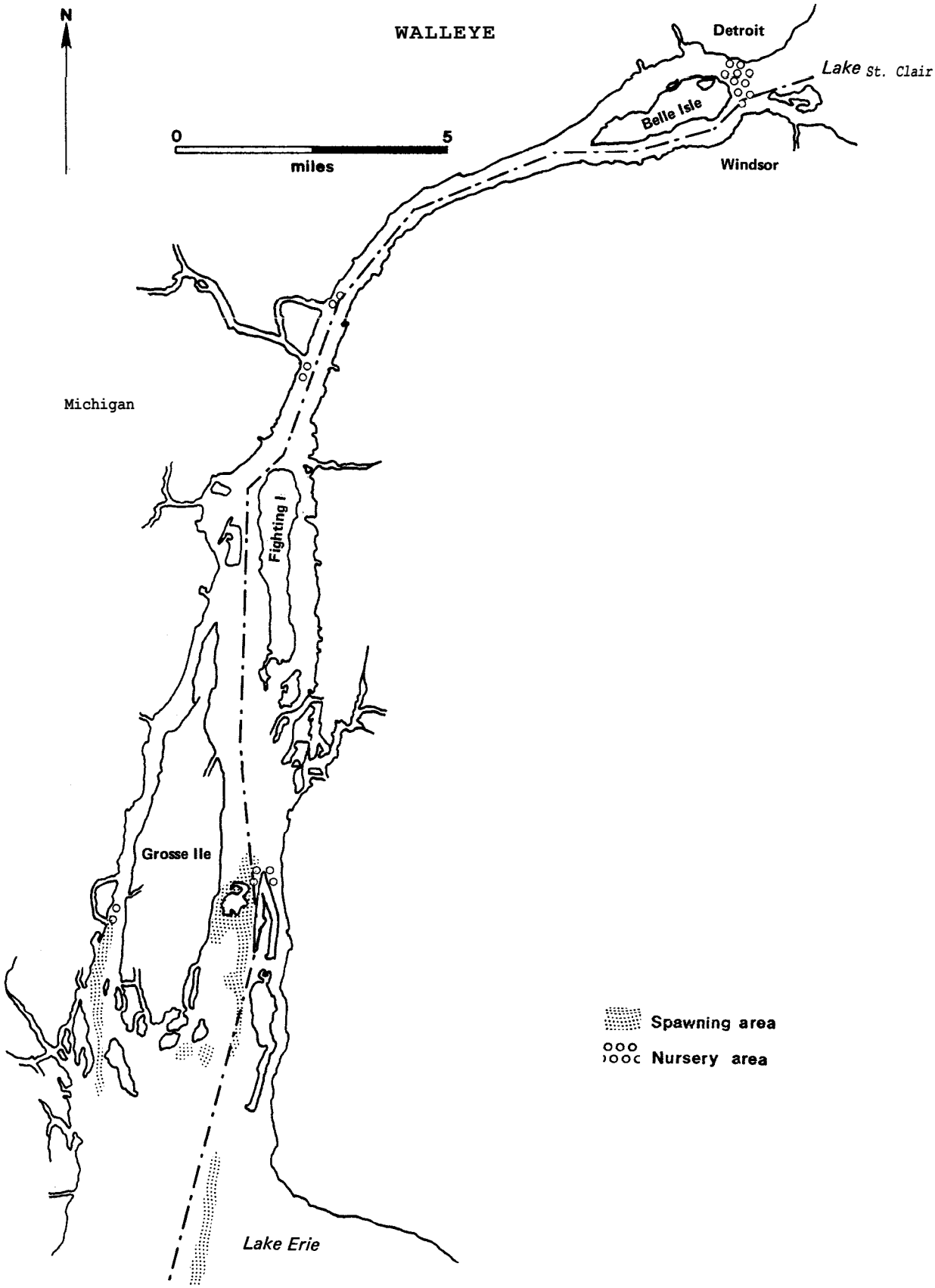
Trenton (42°12′30″, 83°08′30″) and Livingstone (42°08'00", 83°07'30") Channels. In 1977, larvae were collected in early May to late July; peak abundance occurred in early June (Nester and Hatcher, pers. comm. 1979).

Amherstburg Channel (42°08'00", 83°07'10"). In 1977, larvae were collected from early May to late August; peak abundance occurred in early July (Nester and Hatcher, pers. comm. 1979).

SAUGER

Historically, spawning runs of sauger 'from Lake Erie entered the lower Detroit River annually (Gunckel 1897). Only one spawning area has been identified.

Crystal Bay (42°07'00", 83°07'15"). Sauger spawn along the western shore at the head of the bay; spawning occurs during late March to early April in about 13 ft of water (Organ et al. 1978).


N
WALLEYE
Detroit
Lake St. Clair
Belle Isle
0
5
miles
Windsor
Michigan
Fighting I
Grosse Ile
Lake Erie
Spawning area
Nursery area

Spawning runs occurred in the river, presumably from Lake Erie; these declined in the mid-1800s (Schneider and Leach 1979). For several years after 1880, hatchery personnel collected eggs from ripe walleyes captured at Bois Blanc Island (42°05'40", 83°07'15"); but spawning runs to the shores near Detroit were small (Goode 1884, as cited in Regier et al. 1969; Regier et al. 1969).

Historically, walleyes or "pickerel" were believed to spawn annually at the mouth of the river (Gunckel 1892). Pollution and sedimentation have reduced spawning in the river (Busch et al. 1975), but spawning still occurs in some areas (described below) during March to May (Organ et al. 1978), and walleye larvae have been collected in many locations in the river.

The Detroit River is part of a complex migration route, in which one or several populations of walleyes move between the St. Clair-Detroit River system and the western basin of Lake Erie (Applegate and Van Meter 1970; Environ. Can. 1977a; FWS 1979d; Regier et al. 1969; Schneider and Leach 1977). Extensive post-spawning migrations occur from the Maumee Bay area (41°43'00", 83°25'00") into the Detroit River and Lake St. Clair (Van Vooren 1976a).

Belle Isle (42°20'30", 82°58'30"). In 1975, walleye larvae were collected in entrainment samples at the Conners Creek Power Plant (42°21'15", 82°57′30″), on the Michigan shore opposite Belle Isle, in April and May (Detroit Edison 1976b). In 1977, a few larvae were collected in an area (42°21′15″, 82°57'00"--42°20′30″, 82°56′50″) just east of Belle Isle in early May (Nester and Hatcher, pers. comm. 1979).

Delray Power Plant (42°17′30″, 83°06′00") and River Rouge Power Plant (42°16′30″, 83°06′30″). In 1975, walleye larvae were identified in entrainment samples at the Delray plant from late March to mid-June and at the River Rouge plant from mid-February to mid-June (Detroit Edison 1976c,d). [Authors' note: We believe it is unlikely that walleye larvae were present in the river before early April.]

Stony Island (42°07'30", 83°08'00"). During the 1970s, walleyes spawned over mud and vegetation around the island and in an area (42°08'01", 83°07′35") about 1/4 mi NE of the island (Organ et al. 1978).

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07'10") Channels. Walleyes spawn over gravel and mud along the western edge of the Livingstone Channel from 42°06'50", 83°07'45" south to 42°05'15", 83°07'55" and in a small area between Powder House Island (42°06′30″, 83°08′10″) and the channel in 8-14 ft of water (Organ et al. 1978). In 1977, a few larvae were collected in the channel in early May and mid-July and in the Amherstburg Channel in early May (Nester and Hatcher, pers. comm. 1979).

Sugar Island (42°05'30", 83°08'40"). Since the 1950s, walleyes have spawned off the southwest shore of the island over gravel and off the southeast shore over unknown substrate (Organ et al. 1978).

Trenton Channel Power Plant (42°07'20", 83°11'00"). During the 1970s, walleyes spawned from the plant south to Celeron Island (42°04'45", 83°10'30"). Since the 1950s, spawning has occurred over gravel alongshore adjacent to the plant and the Monsanto Company plant (42°07'00, 83°11'00") (Organ et al. 1978). In 1975, walleye larvae were identified in entrainment samples at the power plant from late March to late May (Detroit Edison 1976e).

Detroit River mouth (42°02'40", 83°10'15"). During the 1970s, walleyes spawned in an area (42°03'20", 83°08'10"--42°00'50", 83°08'30"), along the western edge of the Downbound Shipping Channel over gravel and mud (Organ et al. 1978).

FRESHWATER DRUM

Belle Isle (42°20'30", 82°58'30"). In 1977, a few larvae were collected in an area (42°21'15", 82°57'00"--42°20'30", 82°56'50") just east of the island in June and July (Nester and Hatcher, pers. comm. 1979).

River Rouge Power Plant (42°16'30", 83°06'30"). In 1975, larvae were collected in entrainment samples in late May (Detroit Edison 1976d).

Stony Island (42°07'30", 83°08'00"). During the 1970s, freshwater drum spawned in an area (42°07'05", 83°07'45"--42°08'30", 83°07'35") immediately west of the shipping channel, off the east shore of the island (Organ et al. 1978).

Trenton Channel Power Plant (42°07'20", 83°11'00"). During the 1970s, spawning occurred from the plant south to Celeron Island (42°04'45", 83°10'30") (Organ et al. 1978).

Livingstone Channel (42°08'00", 83°07'30"). Since the 1950s, spawning has occurred in an area (42°06'50", 83°07'45"--42°05'15", 83°07'55") along the western edge of Livingstone Channel over mud and gravel, in 4-8 ft of water (Organ et al. 1978).

Amherstburg Channel (42°08'00", 83°07'10"). In 1977, a few larvae were collected in late May (Nester and Hatcher, pers. comm. 1979).

Detroit River mouth (42°02'40", 83008°50"). During the 1970s, spawning occurred in an area (42°03'20", 83°08'70"--42°00'55", 83°08'30"), along the western edge of the Downbound Shipping Channel, over mud and gravel (Organ et al. 1978).

FOURHORN SCULPIN

In 1977, a few postlarvae were collected from April-June in the river; spawning probably occurred as far upstream as Lake Huron (Nester and Hatcher, pers. comm. 1979).

Belle Isle (42°20'30", 82°58'30"). A few postlarvae were collected in an area (42°21'15", 82°57'00"--42°20'30", 82°56'50") just east of the island from mid-April to mid-May.

Trenton Channel (42°12’30”, 83°08’30”). A few postlarvae were collected from early May to early June.

Livingstone (42°08'00", 83°07'30") and Amherstburg (42°08'00", 83°07’10”) Channels. A few postlarvae were collected in early May.

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15. Supplementary Notes

This document is one of a set of fourteen volumes.

16. Abstract (Limit: 200 words)

This atlas is a compilation of current spawning and nursery information concerning the fishes of the Great Lakes. The complete set consists of fourteen volumes. The information may be used to support permit and project reviews, impact statement reviews, planning of baseline research, and coordination with other agencies, and identification of data gaps. The report locates spawning and nursery areas in the Great Lakes and describes spawning and nursery characteristics, timing, and habitats of major fish species of the Great Lakes area.
The first volume is a summary by geographic area, volumes II through XII contain the specific areas referenced in volume I. Volume XIII contains the species spawning and nursery charac teristics for the major species, and Volume XIV cites the references used in compiling this work.
The titles of the volumes addressing the spawning and nursery areas for each fish species site specifically are: II., Lake Superior; III, St. Mary's River; IV, Lake Michigan; V, Lake Huron; VI, St. Clair River; VII, St. Clair Lake; VIII, Detroit River; IX, Lake Erie X, Niagara River; XI, Lake Ontario; XII, St. Lawrence River. The title of Volume XIV is, Species Reproduction Characteristics.

17. Docoment Analysis. a. Descriptors

Fishes;aquatic animals, bass, carp, catfishes, minnows, perch, salmon, shiners, trout, aquatic biology, water resources, atlas, marine biology

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