Biological Services Program

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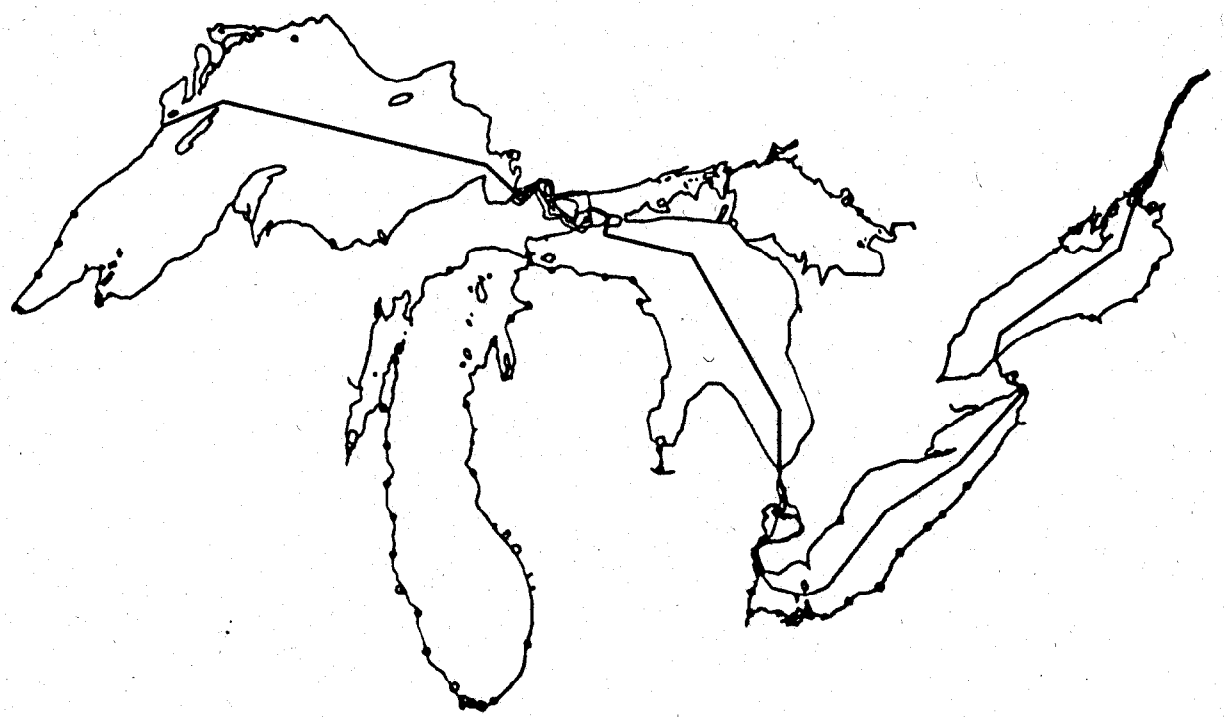
# ATLAS OF THE SPAWNING AND NURSERY AREAS OF GREAT LAKES FISHES

Volume VI--St. Clair River

## Great Lakes-St. Lawrence Seaway Navigation Season Extension Program



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

Corps of Engineers
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- 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 VI
St. Clair 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.

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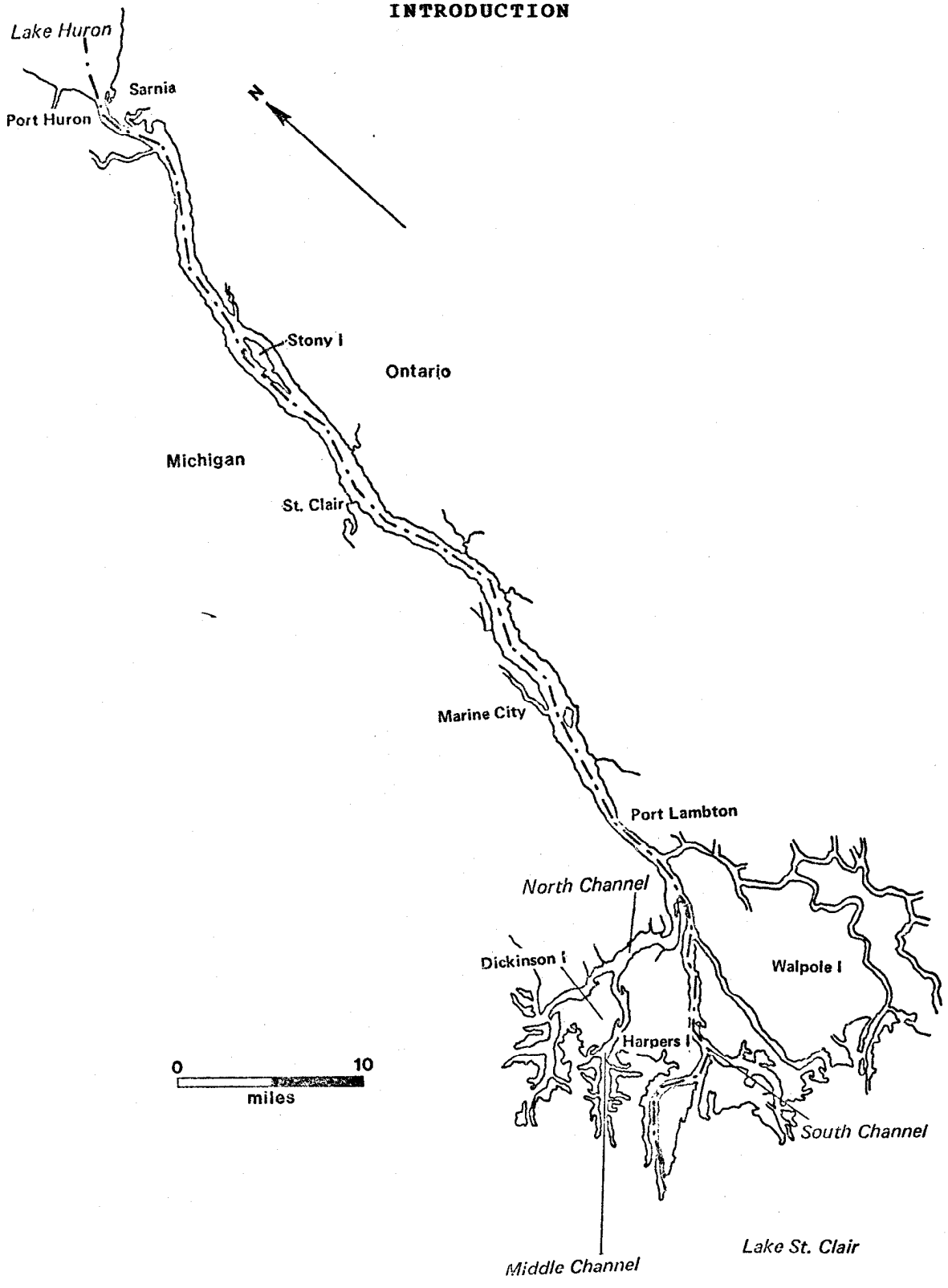
Volume VI. ST. CLAIR RIVER

# INTRODUCTION



The St. Clair River, together with Lake St. Clair and the Detroit River, forms the connecting waterway between Lake Huron and Lake Erie. This 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 90 species of fish have been recorded as residents, or migrants, in the St. Clair River and its delta (MWRC 1975; Tex. Instrum. 1975). This volume describes the reproductive habitat used by the 28 species for which information was available. Twenty-two species treated in this volume are native to the St. Clair River. Most of the native species probably spawned (or spawn) in tributaries to the river or in the shallow embayments and shoreline areas. Lake sturgeon and muskellunqe are believed to be the only native species that spawned (or spawn) in the deeper areas of the river channel.

The six 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. Rainbow trout spawn in the tributaries or along shore. Smelt also spawn in tributaries; alewives, carp, and gizzard shad probably spawn in the tributaries and also 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 assiqned 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 St. Clair River as that portion of the river immediately downstream from a line connecting Fort Gratiot Light (43°00'30", 82°25'30") and Point Edward (43°00'00", 82°25'00"). As the lower limits of the St. Clair River, we included the following portions of the major river channels in the St. Clair Delta: North Channel downstre am to a point (42°38'00", 82°39'15") adjacent to the south side of Bouvier Bay; Middle Channel downstream to a point (42°35'30", 82°38'30") adjacent to Big Fisher and Snooks highways; South Channel downstream to a point (42°30'15", 82°40'00") at approximately the head of the St. Clair Flats Canal; and St. Clair Cutoff to a point (42°32'15", 82°37'30") where it enter Lake St. Clair proper.

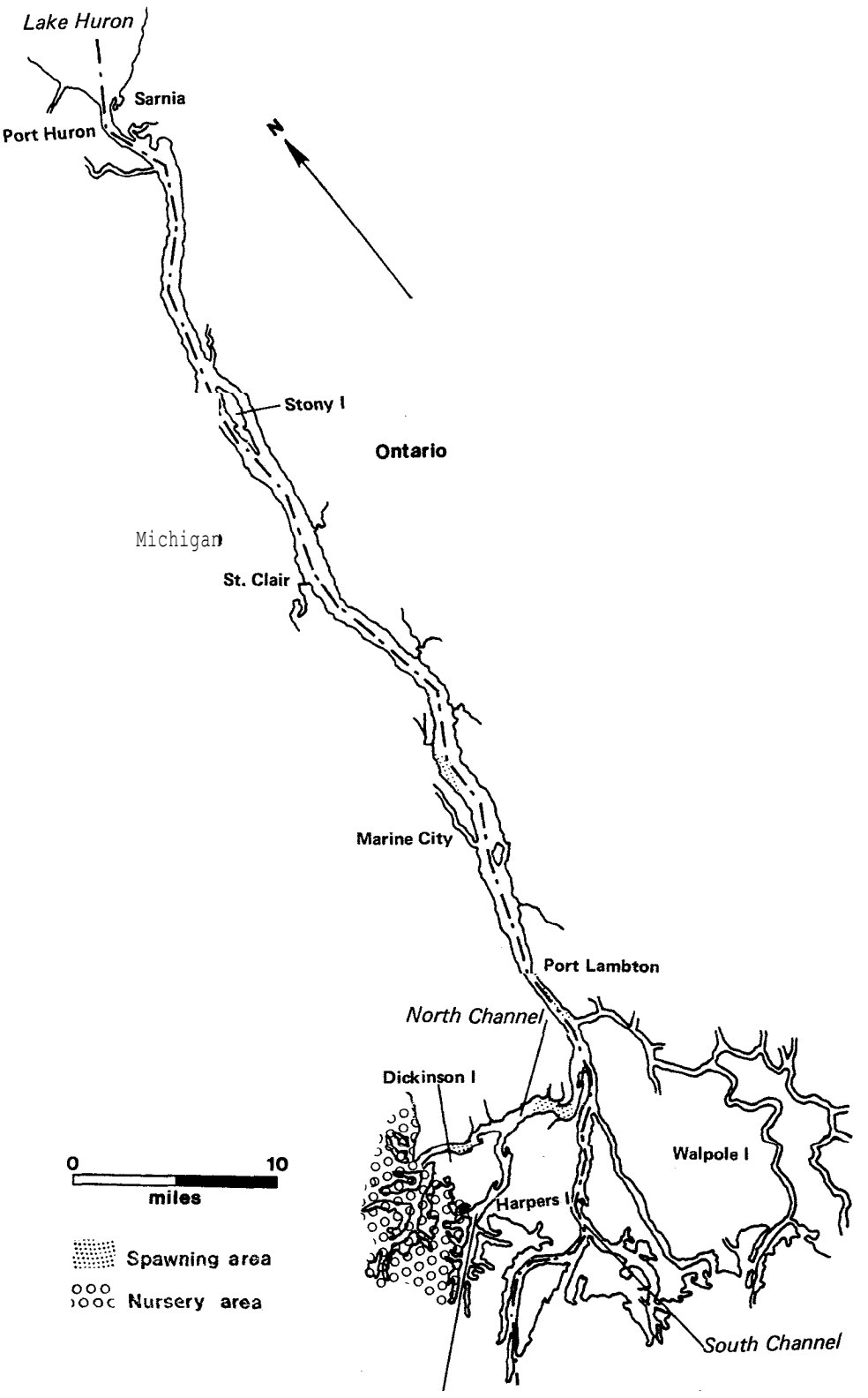
# SEA LAMPREY

The first reported capture of a sea lamprey in the St. Clair River occurred in May 1930 (Hubbs and Pope 1937). Ammocoetes have been found in the main river and in two tributaries.

Port Huron (42°58'30", 82°25'30"). A nesting sea lamprey was observed in 12 ft of water at the outlet of Lake Huron (Morman et al. 1980). A few ammocoetes have been found just downstream of the outlet (Smith and Tibbles 1980).

Black River (42°58'20", 82°25'10") and Pine River (42°49'15", 82°29'10") (Morman 1979; Pearce et al. 1980).

LAKE STURGEON



The St. Clair River has been identified as a sturgeon spawning ground (U.S. Army Eng. Dist. 1979). Spawning begins in the river about mid-May (Dalton, Hill, Kandt, Shell, and Tyrrell, pers. comm. 1979).

Port Huron (42°58'30", 82°25'30"). One sturgeon larva was collected at Port Huron in 1977 (Nester and Hatcher, pers. comm. 1979).

Marine City (42°43'00", 82°30'00"). Ripe adults are caught north of Marine City at 42°44'00", 82°29'00" (Hill, pers. comm. 1979; Shell, pers. comm. 1979).

Port Lambton (42°39'20", 82°30'00")--Baby Point (42°38'30", 82°30'00"). Ripe adults are caught here. Most sturgeon leave the area in mid-June (Hill, pers. comm. 1979; Tyrrell, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). The channels of the river delta are major spawning areas (Int. Great Lakes Levels Board 1973). In 1890, a few ripe and spent fish were captured in June in the North Channel (42°37'30", 82°37'00") for the Algonac hatchery (MSBFC 1890; Post 1890). Ripe fish are presently taken in May and June from deep holes in the North Channel.

Point aux Chenes (42°36'40", 82°32'40"). For many years ripe adults were caught in the 60-82 ft "hole" (42°36'30", 82°32'30") off the point over a bottom of rock, sand, and coal cinders (Dalton, Hill, Kandt, and Shell, pers. comm. 1979; Organ et al. 1978; Trombley, pers. comm. 1979; Tyrrell, pers. comm. 1979). Sturgeon migrate from Lake St. Clair up the North (42°37'30", 82°37'00"), South (42°33'00", 82°39'00"), and Middle (42°35'35", 82°37'30") channels to this spawning site. Young-of-the-year subsequently migrate from this area to the marsh (42°37'30", 82°39'30") between Bouvier (42°39'30", 82°39'00") and Goose (42°35'30", 82°40'30") bays, where they are found among the rushes (Trombley, pers. comm. 1979).

Belle Harbor (42°37'30", 82°37'10"). Ripe adults are caught in the 51 ft "hole" off Belle Harbor over a bottom of gravel, sand, and coal cinders (Hill, pers. comm.; Kandt, pers. comm. 1979).

## ALEWIFE

The alewife presumably entered the St. Clair River from Lake St. Clair between 1931 and 1933, when alewives were first recorded for Lake Erie and Lake Huron, respectively (Miller 1957). Impingement records at power plants along the river indicate that spawning runs of alewives occur in the St. Clair River in the spring. Young-of-the-year are impinged during the fall when they migrate downstream (Detroit Edison 1976a,f).

Port Huron (42°58'30", 82°25'30"). In 1977, alewife larvae were collected in June to August; these probably originated from spawnings in Lake Huron (Nester and Hatcher, pers. comm. 1979).

Black River (45°58'20", 82°25'10"). In 1964-68, many alewives entered the river in the spring and migrated about 5 mi upstream to spawn (Nester, pers. comm. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, alewife eggs and larvae were collected in the St. Clair River near the plant from June to August when water temperatures were about 52-68°F; most were concentrated in the shallow, slower water along the Canadian shore. Spawning probably occurred near the plant or in areas further upstream. Spawning peaked from late June to mid-July (Tex. Instrum. 1975a).

Baby Point (42°38'30", 82°30'00"). In 1977, larvae were collected here from late June to late August; peak abundance occurred in late July (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, alewife larvae were collected in the North Channel at 42°38'00", 82°39'15" from late June to late August and in the St. Clair Cutoff at 42°32'15", 82°37'30" from early July to late August. Peak abundance occurred in late July (Nester and Hatcher, pers. comm. 1979).

## GIZZARD SHAD

The gizzard shad presumably entered the St. Clair River from Lake St. Clair between 1848 and 1877, when gizzard shad were first recorded for Lake Erie and Lake Huron, respectively (Miller 1957). Impingement records at power plants along the river indicate that spawning runs occur in the St. Clair River in the spring (Detroit Edison 1976a,f).

Port Huron (42°58'30", 82°25'30"). In 1977, a few larvae were collected in July, these probably originated from spawninqs in Lake Huron (Nester and Hatcher, pers. comm. 19791.

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, a few larvae were collected near the power plant in May and June at water temperatures of 50-55°F; spawning may not have occurred in the river at this time because few ripe and spent fish were taken (Tex. Instrum. 1975a; Wapora 1978).

Baby Point (42°38'30", 82°30'15"). In 1977, a few larvae were collected in late May to mid-July (Nester and Hatcher, pers. comm. 1979); these were probably in transit from spawning areas farther upstream.

St. Clair Delta (42°37'00", 82°31'00"). In 1977, a few larvae were collected in the St. Clair Cuttoff at 42°32'15", 82°37'30" in July and in

the North Channel at 42°38'00", 82°39'15" in late May to August; these larvae were probably in transit from spawning areas farther upstream (Nester and Hatcher, pers. comm. 1979).

## LAKE HERRING

Large spawning runs of lake herring occurred historically in the St. Clair River, but these disappeared by the early 1900s (Smith 1972).

Lambton County, Ontario (42°45'00", 82°25'00"). In 1913, a heavy spawning run occurred in the fall (Ont. Game Fish 1913a).

## LAKE WHITEFISH

The large spawning runs of lake whitefish that historically entered the St. Clair River from Lake Erie disappeared by the late 1800s or early 1900s (MSBFC 1887; Smith 1972). By 1874, the runs that formerly moved upstream to Mooretown, Ontario (42°50'30", 82°27'45"), about 8 mi from the head of the river (Stockwell 1875a), were decreasing and only proceeded as far as Cottrelville (location uncertain), 12 mi upstream from the river mouth (Milner 1874a). The runs apparently persisted at least until 1887, when the Michigan Fish Commission collected eggs from the St. Clair River (Langlois 1941), but by 1910, the whitefish run had disappeared (Reighard 1910; Wright 1955). Adults were rarely observed entering the St. Clair River from Lake Huron to spawn (Milner 1874a; Stockwell 1875a).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1978, one larva was reported in entrainment samples collected at the plant in April (Wapora 1978).

Baby Point (42°38'30", 82°30'15"). In 1977 and 1978, one whitefish larva was collected each year (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1978, three larvae were collected in the North Channel at (42°38'00", 82°39'15") (Nester and Hatcher, pers. comm. 1979).

## RAINBOW TROUT

No records describing the introduction of rainbow (steelhead) trout in the St. Clair River were located. Presumably, rainbow trout entered the river from Lake Huron. The St. Clair River supports a spawning run of rainbow trout (Ann Arbor News 1979a).

Fort Gratiot Light (43°00'30", 82°25'30"). Spawning has been observed over gravel bottom near the lighthouse at the head of the river (Hill, pers. comm. 1979).

Black River (42°58'20", 82°25'10"). Spawning migrations enter the Black River and its tributary, Mill Creek (Hill, pers. comm. 1979).

## LAKE TROUT

'Spawning runs of lake trout were common in the St. Clair River but disappeared by the early 1900s (Smith 1972).

## SALMON spp.

Black River (42°58'20", 82°25'10"). Salmon enter the Black River and its tributary, Mill Creek, to spawn (Hill, pers. comm. 1979).

## SALMONID spp.

St. Clair Power Plant (42°45'45", 82°28'15"). In 1978, eggs of an unidentified salmonid were collected in May along the Canadian shore across the river from the power plant (Wapora 1978).

## RAINBOW SMELT

Rainbow smelt eggs planted in Crystal Lake (44°40', 86°10') in the Lake Michigan drainage in 1912 are believed to be the source of smelt found in all of the Great Lakes except Lake Ontario. The first record of rainbow smelt in the St. Clair River was established in 1932, when they entered the river from Lake Huron (Van Oosten 1937a). Impingement of adults at power plants along the river increases in the spring when spawning runs occur. Eggs are found in the river and in entrainment samples collected at power plants in April to June (Detroit Edison 1976a,f).

Port Huron (42°58'30", 82°25'30"). In 1944, the spawning run started on April 21 (Van Oosten 1944b). In 1979, the run started on April 19 (UPI 1979). In 1977, smelt larvae were collected from early May to mid-June (Nester and Hatcher, pers. comm. 1979).

Marysville (42°54'45", 82°28'00"). The number of adults impinged at the Marysville Power Plant (42°55'30", 82°27'35") increases during the spring spawning run. Eggs and larvae have been entrained at the plant, and young smelt have been impinged in the fall (Detroit Edison 1976f).

Lambton Generating Station (42°47'30", 82°28'20"). In 1978, larvae were captured from April 25 to June 21; the peak catch occurred in late May. If hatching required 2-3 weeks, spawning probably peaked during the first 2 weeks of May, when water temperatures were about 43-46°F (Kozopas and Leslie 1979; Leslie et al. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). Smelt spawn here soon after ice breakup, usually during late March to April when water temperatures are below 42°F (Detroit Edison 1976a). In 1974, eggs were collected from late May through early June at water temperatures of 48-55°F; peak spawning occurred earlier. Concentrations of eggs were higher in the slower, shallower water near the Canadian shore than at mid-river or along the U.S. shore (Tex. Instrum. 1975a). In 1978, eggs were collected from early April to early June, and were most abundant on the Canadian shore on May 11 (Wapora 1978). In 1974 and 1975, larvae were collected in entrainment samples at the St. Clair Power Plant (Detroit Edison 1976a) and in the river near the plant from May to August. Peak concentrations occurred in the river on May 31; greater concentrations of larvae occurred near the Canadian shore, but there was no significant difference between stations (Tex. Instrum. 1975a). In 1974, young-of-the-year were abundant in collections made from mid-August to late October (Tex. Instrum. 1975a; Detroit Edison 1976a,f).

Baby Point (42°38'30", 82°30'15"). In 1977, smelt larvae were collected here from early May to early July; peak abundance occurred in mid-May (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, smelt larvae were collected in the North Channel at 42°38'00", 82°39'15" from early May to early July and in the St. Clair Cutoff at 42°32'15", 82°37'30" from early May to mid-June. Peak abundance of larvae occurred during May (Nester and Hatcher, pers. comm. 1979).

## MUSKELLUNGE

St. Clair Delta (42°37'00", 82°31'00"). Muskellunge are believed to spawn in the channels of the delta where there is adequate current (Williams 1961).

## CARP

Substantial populations of carp were present in the St. Clair River prior to 1900; presumably these fish originated from plantings made in

Michigan's inland waters during the 1880s or from populations in Lake St. Clair (McCrimmon 1968). Spawning occurs in the St. Clair River during June at water temperatures of about 56°F (Tex. Instrum. 1975a).

Port Huron (42°58'30", 82°25'30"). In 1977, larvae were collected here in June to August (Nester and Hatcher, pers. comm. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). Eggs were collected near the plant from June to August at water temperatures of about 52-68°F. Larvae were collected in the same areas in June and July at water temperatures of about 52-62°F (Tex. Instrum. 1975a).

Baby Point (42°38'30", 82°30'15"). In 1977, a few carp larvae were collected from late June to early August (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). During 1977, larvae were collected in the St. Clair Cutoff at 42°32'15", 82°37'30" from late May to July and in the North Channel at 42°38'00", 82°39'15" from June to July. Larval abundance peaked during the first or second week of July (Nester and Hatcher, pers. comm. 1979).

## SILVER CHUB

Lambton Generating Station (42°47'45", 82°28'20"). In 1978, silver chub larvae were 1.5% of the total catch of larvae made near the station in mid-June (Kozopas and Leslie 1979; Leslie et al. 1979).

## EMERALD SHINER

Baby Point (42°38'30", 82°30'15"). In 1977, a few emerald shiner larvae were collected from late June to late August; abundance peaked in late July (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, a few larvae were collected in the St. Clair Cutoff at 42°32'15", 82°37'30" from mid-June to early August and in the North Channel at 42°38'00", 82°39'15" from mid-July to early August. Peak abundance occurred in early August (Nester and Hatcher, pers. comm. 1979).

## MINNOW spp.

Port Huron (42°58'30", 82°25'30"). In 1977, larvae of unidentified species of minnows were collected from early June to early August; peak abundance occurred in early June and mid-July (Nester and Hatcher, pers. comm. 1979).

Baby Point (42°38'30", 82°30'15"). In 1977, minnow larvae were collected from early June to early August; peak abundance occurred in mid-July and early August (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, minnow larvae were collected in the North Channel at 42°38'00", 82°39'15" and St. Clair Cutoff at 42°32'15", 82°37'30" from late May to early August; peak abundance occurred in early June (Nester and Hatcher, pers. comm. 1979).

## WHITE SUCKER

Port Huron (42°58'30", 82°25'30"). In 1977, larvae were collected here from early June to early July (Nester and Hatcher, pers. comm. 1979).

Lambton Power Plant (42°47'45", 82°28'20"). In 1978, small numbers of larvae were entrained in mid-June (Leslie et al. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, white sucker eggs were collected near the St. Clair Power Plant on June 20, at water temperatures of 48-55°F; larvae were collected from early June through early August. In 1974, white sucker young-of-the-year (YOY) were more abundant than the YOY of most other species during August (Tex. Instrum. 1975a) but were not as numerous in 1978 (Wapora 1978).

Baby Point (42°38'30", 82°30'15"). In 1977, white sucker larvae were collected from late May to mid-July; peak abundance occurred in early June and early July (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, larvae were collected in the St. Clair Cutoff at 42°32'15", 82°37'30" from early June to mid-July; peak abundance occurred during late June. They were also found in the North Channel at 42°38'00", 82°39'15" during June and early July; peak abundance occurred in early June (Nester and Hatcher, pers. comm. 1979).

## NORTHERN HOG SUCKER

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, young-of-the year (YOY) of this species were more abundant than the YOY of most other species collected near the power plant during August (Tex. Instrum. 1975a).

## SUCKER spp.

Spawning runs of "black" suckers occur in most tributaries of the St. Clair River (Shell and Tyrrell, pers. comm. 1979).

Black River (42°58'20", 82°25'10"). A run of "black" suckers enters the river and its tributary Mill Creek (Shell and Tyrrell, pers. comm. 1979).

Pine River (42°49'15", 82°29'10") and Belle River (42°42'25", 82°29'50"). Spawning runs of "black" suckers enter the rivers (Shell and Tyrrell, pers. comm. 1979).

## REDHORSE spp.

Black River (42°58'20", 82°25'10") and Belle River (42°42'25", 82°29'50"). Until about the early 1950s, major spawning runs of redhorses entered these rivers (Kandt, pers. comm. 1979).

## BROWN BULLHEAD

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, brown bullhead larvae were collected near the plant on August 21, when water temperatures were about 68-72°F (Tex. Instrum. 1975a).

## TROUT-PERCH

Port Huron (42°58'30", 82°25'30"). In 1977, larvae were collected in June to August. Many were found in early June, suggesting downstream movement out of Lake Huron (Nester and Hatcher, pers. comm. 1977).

Marysville (42°54'45", 82°28'00"). In 1974-75, larvae were entrained at the Marysville Power Plant (42°55'30", 82°27'35") from June to October (Detroit Edison 1976f).

Lambton Generating Station (42°47'45", 82°28'20"). In 1978, two larvae were entrained in mid-June (Leslie et al. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974-75, larvae were entrained in July and August (Detroit Edison 1976a); larvae were collected in the river in July and September when water temperatures were about 66-72°F (Tex. Instrum. 1975a).

Baby Point (42°38'30", 82°30'15"). In 1977, a few larvae were collected from early June to early August (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, a few larvae were collected in the St. Clair Cutoff at 42°32'15", 82°37'30" in late May and early June, and in the North Channel at 42°38'00", 82°39'15" in early June and mid-July (Nester and Hatcher, pers. comm. 1979).

## BURBOT

Port Huron (42°58'30", 82°25'30"). In 1977, a few young-of-the-year were collected here in late April and May (Nester and Hatcher, pers. comm. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1978, larvae were taken in April and May at all stations across the width of the river (Wapora 1978).

Baby Point (42°38'30", 82°30'15"). In 1977, a few burbot larvae were collected from late April to late May (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, a few larvae were collected in the North Channel at 42°38'00", 82°39'15" in May (Nester and Hatcher, pers. comm. 1979).

## WHITE BASS

Port Huron (42°58'30", 82°25'30"). In 1977, one white bass larva was collected in late July (Nester and Hatcher, pers. comm. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, small numbers of larvae were collected near the power plant in late May to early June when water temperatures were about 50-55°F (Tex. Instrum. 1975a).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, one larva was collected in late June at 42°38'00", 82°39'15" (Nester and Hatcher, pers. comm. 1979).

## ROCK BASS

St. Clair Power Plant (42°45'45", 82°28'15"). Rock bass spawn from late May to early August in the St. Clair River near the power plant, based on the collection of ripe and spent adults (Tex. Instrum. 1975a).

## SMALLMOUTH BASS

Smallmouth bass presently spawn in tributaries of the St. Clair River (Dalton, pers. comm. 7979).

Stag Island (42°53'10", 82°27'50"). Spawning occurs here over "grass" bottom in water 4-5 ft deep (Shell, pers. comm. 1979). The shoals around the island may be a very important spawning area (FWS 1979d).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, fry were collected at the plant in late August when water temperatures were about 68-72°F (Tex. Instrum. 1975a).

## BASS spp.

Black bass were speared on their spawning beds in the St. Clair River (Rathbun and Wakeham 1897).

Algonac (42°37'30", 82°32'15"). The principal bass grounds were in the delta off Algonac (Hardin 1894), although these were not specifically said to be spawning grounds.

## YELLOW PERCH

Impingement of adult yellow perch at power plants along the river increases in the spring as spawning runs move upstream. Young-of-the-year are encountered more frequently in the fall during migrations downstream (Detroit Edison 1976a,f).

Point Edward (43°00'00", 82°25'00"). Spawning occurs here (Dalton, pers. comm. 1979).

Port Huron (42°58'30", 82°25'30"). In 1977, larvae were collected here from mid-May to late June; peak abundance occurred in mid-June (Nester and Hatcher, pers. comm. 1979).

Black River (42°58'20", 82°25'10"). Yellow perch enter the river during the spawning season (Nester, pers. comm. 1981).

Marysville (42°54'45", 82°28'00"). In 1974, adults were impinged at the Marysville Power Plant (42°55'30", 82°27'35") in the spring during spawning runs; larvae were entrained in late July (Detroit Edison 1976f).

Lambton Generating Station (42°47'45", 82°28'20"). In 1978, a few larvae were entrained during late May to late June (Leslie et al. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, yellow perch eggs were collected near the plant during late May to late August when water temperatures were about 48-72°F. Eggs were collected throughout the area, but on June 20 they were concentrated near the bottom on the Canadian side. Larvae were collected from mid-May to early September; peak abundance occurred in late June (Tex. Instrum. 1975a; Detroit Edison 1976a; Wapora 1978).

Baby Point (42°38'30", 82°30'15"). In 1977, yellow perch larvae were collected from late May to late June; peak abundance occurred in early June (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, larvae were collected in the St. Clair Cutoff at 42°32'15", 82°37'30" and in the North Channel at 42°38'00", 82°39'15" from late May to July. Peak abundance occurred at both stations during early June (Nester and Hatcher, pers. comm. 1979).

## LOGPERCH

Port Huron (42°58'30", 82°25'30"). In 1977, logperch larvae were collected from late May to late August; peak abundance occurred during late May to early June (Nester and Hatcher, pers. comm. 1979).

Lambton Generating Station (42°47'45", 82°28'20"). In *1978*, a few larvae were entrained in early June (Leslie et al. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, larvae were collected in the river in late May and were present in entrainment samples in late June (Detroit Edison 1976a; Wapora 1978).

Baby Point (42°38'30", 82°30'15"). In 1977, logperch larvae were collected from late May to early August; peak abundance occurred in early June (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, larvae were collected in the North Channel at 42°38'00", 82°39'15" from late May to late July, and in the St. Clair Cutoff at 42°32'15", 82°37'30" from late May to early August; peak abundance occurred during early June (Nester and Hatcher, pers. comm. 1979).

## WALLEYE

The walleye run in the St. Clair River was once one of the largest runs reported for Michigan waters; this run began in May or June (MSBFC 1888). In the 1880s and 1890s, hatcheries in Michigan and Ontario

obtained eggs from commercial seiners operating along the length of the river (Schneider and Leach 1977, 1979). For at least two decades starting in 1886, hatcheries in Detroit collected eggs from the Canadian side of the river (Regier et al. 1969). The Put-In-Bay hatchery obtained eggs from fishermen at Roberts Landing (42°39'30", 82°30'50") (Downing 1905; MSBFC 1893, 1895); spawn taking also occurred at Port Huron (42°58'30", 82°25'30") (MSBFC 1888). A discrete resident population spawned in the river (Nepszy 1977; Schneider and Leach 1977, 1979); these fish spawned as late as June 5-7 (Downing 1905).

The St. Clair 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) l The river is along a post-spawning migration route for walleyes moving from the Clinton River (42°35'30", 82°47'00") and Lake Erie through the North Channel (42°37'30", 82°37'00") and for walleyes moving from the Thames River (42°19'00", 82°24'30") and Syhenham River (42°33'30", 82°24'30") through the Middle (42°35'35", 82°37'30") and South (42°33'OO", 82°39'00") Channels (Schneider and Leach 1977, 1979; Tyrrell, pers. comm. 1979). Many ripe walleyes are presently caught throughout the river during May (Shell, pers. comm. 1979), but it has been suggested that no spawning occurs in the river itself (Haas and Bryant, undated).

Black River (42°58'20", 82°25'10"). Ripe walleyes enter the river (Hill, pers. comm. 1979).

Marysville (42°54'45", 82°28'10"). In 1975, walleye larvae were entrained at the Marysville Power Plant (42°55'30", 82°27'35") during April to early May (Detroit Edison 1976f).

Stag Island (42°53'10", 82°27'50"). The shoals around the island may be a valuable spawning area (FWS 1979d).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974-75, larvae were entrained from April through early July (Detroit Edison 1976a) and were collected in the river during late May to early June when water temperatures were about 50-55°F. Spent fish and one gravid female were collected in June (Tex. Instrum. 1975a).

Locust Point (42°37'45", 82°31'40")--Roberts Landing (42°39'30", 82°30'50"). Walleyes spawned across the entire width of the river in the area extending from Locust Point to about 1 mi upstream of Roberts Landing (42°40'24", 82°30'45"), but it is not known if spawning still occurs here (Organ et al. 1978).

## DARTER spp.

Port Huron (42°58'30", 82°25'30"). In 1977, a few larvae of unidentified darters were collected in mid-July (Nester and Hatcher, pers. comm. 1979).

Baby Point (42°38'30", 82°30'15"). In 1977, a few larvae were collected from late June to mid-July (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). In 1977, a few larvae were collected in the St. Clair Cutoff at 42°32'30", 82°37'00" in late June and early August and in the North Channel at 42°38'00", 82°39'00" in early June (Nester and Hatcher, pers. comm. 1979).

## FRESHWATER DRUM

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974-75, larvae were present in entrainment samples collected at the plant in late June and mid-July (Detroit Edison 1976a).

North Channel (42°38'00", 82°39'00"). In 1977, one freshwater drum larva was captured in the North Channel at (42°38'00", 82°39'15") during mid-June (Nester and Hatcher, pers. comm. 1979).

## MOTTLED SCULPIN

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, larvae were collected here in late May when water temperatures were about 48-54°F (Tex. Instrum. 1975a).

## SLIMY SCULPIN

St. Clair Power Plant (42°45'45", 82°28'15"). In 1974, larvae were collected near the plant only on July 17, when water temperatures were about 66-70°F (Tex. Instrum. 1975a).

## FOURHORB SCULPIN

Port Huron (42°58'30", 82°25'30"). In 1977, a few larvae were collected during April and May (Nester and Hatcher, pers, comm. 1979).

Lambton Generating Station (42°47'45", 82°28'20"). In 1978, fourhorn sculpin larvae, probably originating from spawnings in Lake Huron in early April, made up 2% of the total catch of larvae at the plant from April 18 to May 15; peak abundance of larvae occurred on April 25-26 (Kozopas and Leslie 1979; Leslie et al. 1979).

St. Clair Power Plant (42°45'45", 82°28'15"). In 1978, larvae were collected near the plant at all stations across the width of the river from April 30 to May 17 (Wapora 1978).

Baby Point (42°38'30", 82°30'15"). In 1977, a few larvae were collected in April and May (Nester and Hatcher, pers. comm. 1979).

St. Clair Delta (42°37'00", 82°31'00"). During 1977, a few larvae were collected in the St. Clair Cutoff at 42°32'15", 82°37'30" from May to July and in the North Channel at 42°38'00", 82°39'15" in May; these larvae probably originated from spawnings in Lake Huron (Nester and Hatcher, pers. comm. 1979).

## SCULPIN spp.

St. Clair Power Plant (42°45'45", 82°28'15"). In 1978, sculpin eggs were collected near the plant at all stations across the width of the river in late May and early June (Wapora 7978).

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1.5. 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.


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