

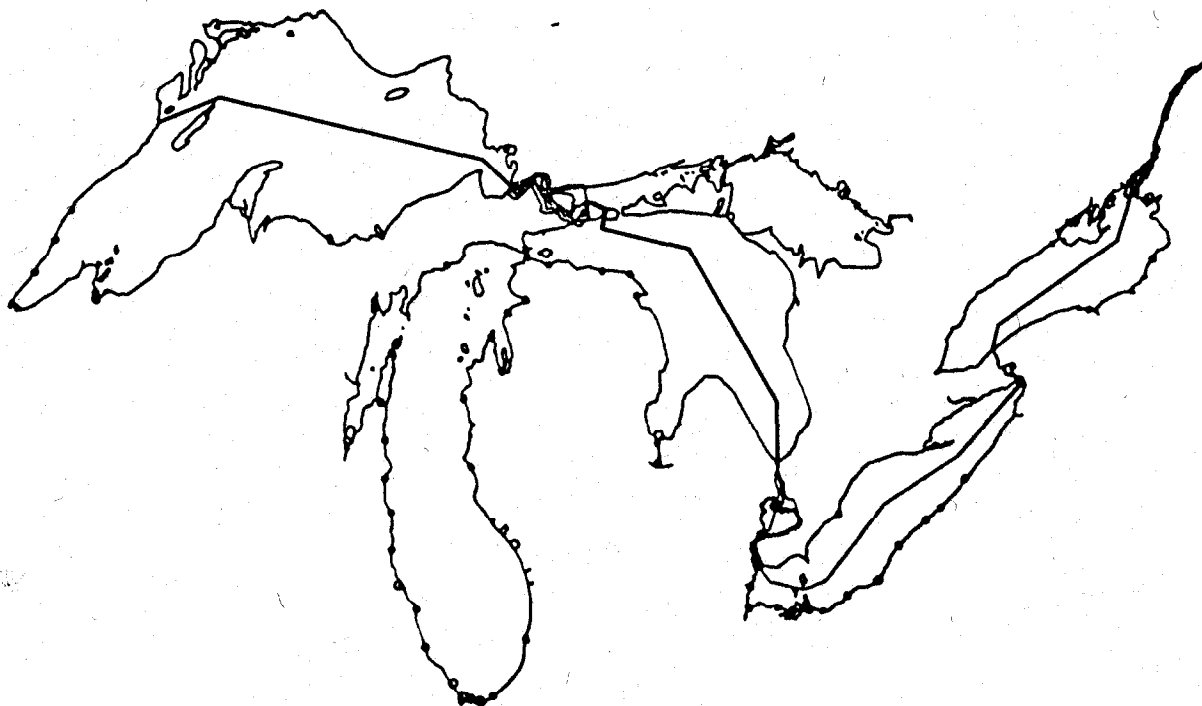
# Biological Services Program

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## ATLAS OF THE SPAWNING AND NURSERY AREAS OF GREAT LAKES FISHES Volume XII-St. Lawrence 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

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- To gather, analyze, and present information that will aid decisionmakers 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 relating to energy development.

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ATLAS OF THE SPAWNING AND NURSERY AREAS  
OF GREAT LAKES FISHES

VOLUME XII  
St. Lawrence River

by

Carole D. Goodyear  
Thomas A. Edsall  
Diane M. Ormsby Dempsey  
G. David Moss  
Paul E. Polanski  
Great Lakes Fishery Laboratory  
U.S. Fish and Wildlife Service  
1451 Green Road  
Ann Arbor,, MI 48105

Project Officer  
Keith Kraai  
U.S. Fish and Wildlife Service  
Region 3  
Federal Building, Ft. Snelling  
Twin Cities, MN 55111

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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<br>of Great Lakes Fishes: A<br>Summary by Geographic Area | VIII. Detroit River                                         |
| II. Lake Superior                                                                       | IX. Lake Erie                                               |
| III. St. Marys River                                                                    | X. Niagara River                                            |
| IV. Lake Michigan                                                                       | XI. Lake Ontario                                            |
| V. Lake Huron                                                                           | XII. St. Lawrence River                                     |
| VI. St. Clair River                                                                     | XIII. Reproductive Characteristics<br>of Great Lakes Fishes |
| VII. Lake St. Clair                                                                     | 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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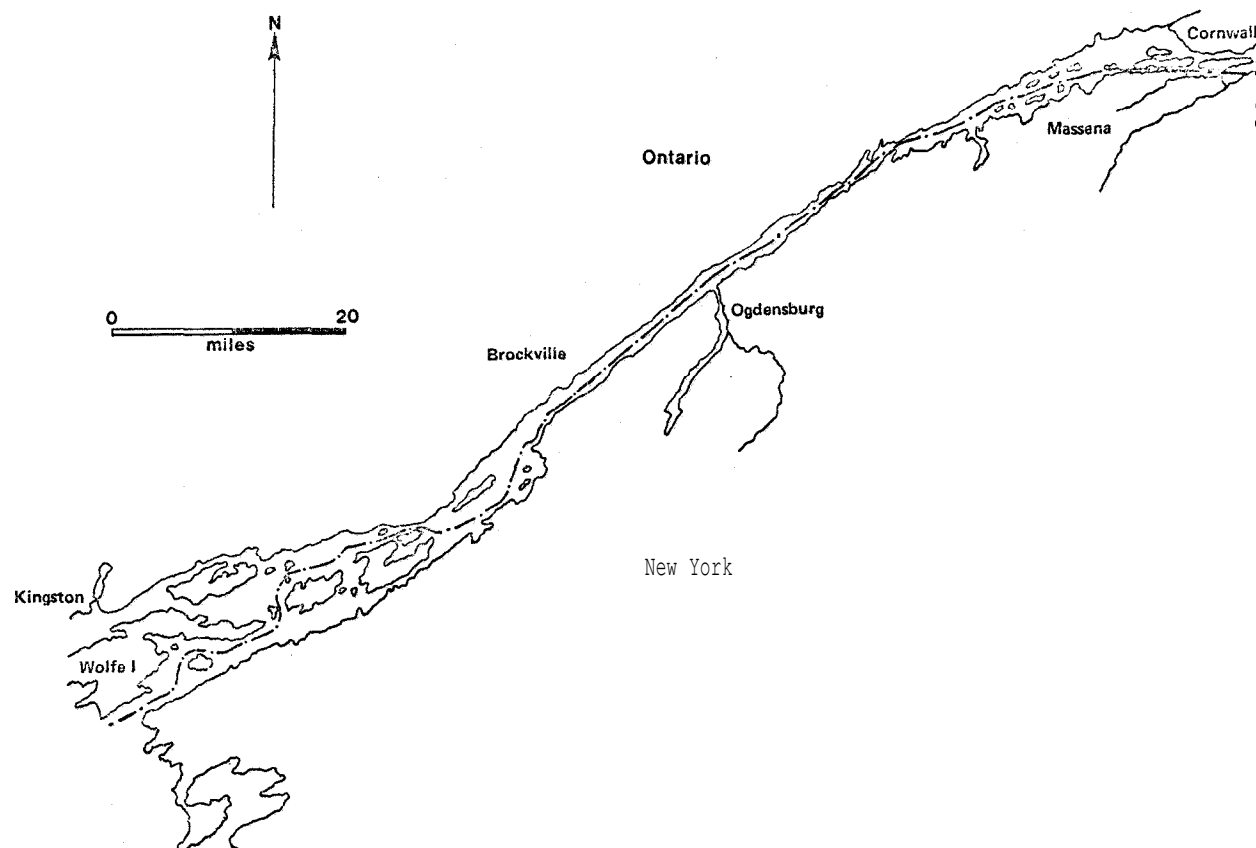
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## INTRODUCTION



The St. Lawrence River forms the connecting waterway between Lake Ontario and the Atlantic Ocean. Only the international section of the river is considered in this atlas. The important breeding habitats in the international section of the St. Lawrence River are the inshore areas, including the extensive wetlands and marshes, and the tributary streams (Geis and Hyduke 1978; LMS 1977; SLEOC 1978; Werner and Ford 1972). Historically, the tributaries, which warm earlier than the main stem of the river, were very important spawning grounds for many St. Lawrence fish species, which often ran long distances upstream (Greeley 1934; Greeley and Greene 1931; Greene et al. 1932; Hazzard 1931). Young fish remained in the creek mouths for some period of time before moving into the river (Greeley and Greene 1931). Heavily used tributaries included the Oswegatchie River (Greene et al. 1932, Raquette River (Greeley 1934), and St. Regis River (Hazzard 1931). The habitats and migration patterns of St. Lawrence River fishes have been drastically altered by the extensive dam construction which has occurred on the river. In the early 1930s, dams were reported to stop spawning runs on the Grass and St. Regis Rivers (Hazzard 1931). Presently, in addition to the Moses-Saunders Dam on the main river at Cornwall, every major tributary is dammed within 20 mi of its mouth (SLEOC 1978). The river mouths, including that of the Oswegatchie River,

are still important spawning areas (Geis and Hyduke 1978). Among the many shoreline bays that are valuable for reproduction, Landons Bay (44°21'15", 76°03'50"), on the Canadian shore opposite Wellesley Island, is a long recognized spawning site (Environ. Can. 1977b) that was closed to fishing during the 1940s for "natural production and propagation" (Ont. Min. Lands For. 1948).

Over 100 species of fish have been recorded as residents, or migrants, in the upper St. Lawrence River (Dunning 1979; Eckert and Hanlon 1977; Evermann and Kendall 1902a). This volume describes the reproductive habitat used by the 45 species for which information was available. Forty species treated in this volume are native to the river. Most of these 40 species probably spawned (or spawn) in tributaries to the river or in the shallow embayments and shoreline areas and around the islands in the upper river.

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. Coho salmon probably spawn in the tributaries or along shore. Smelt also spawn in tributaries; alewives and carp probably spawn in the tributaries and also in protected areas near shore.

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 defined the head of the river as that portion of the river immediately downstream from a line connecting Tibbetts Point (44°06'00", 76°22'15") and Point Frederick (44°13'25", 76°28'15"). The lower boundary of the international section of the river is a line connecting the mouth of the St. Regis River (45°00'00", 74°38'20") and Farlingers Point (45°01'40", 74°39'35").

## SEA LAMPREY

Adult sea lampreys are present in the international portion of the St. Lawrence River, but no ammocoetes have been found in tributaries, and it is not known if spawning occurs in the river (Eckert and Hanlon 1977; Morman et al. 1980; Pearce et al. 1980).

St. Regis River (45°00'10", 74°38'20"). In 1930, a dead sea lamprey was found below the lower riffles in mid-June (Greeley and Greene 1937).

## LAKE STURGEON

Lake sturgeon entered tributaries of the upper St. Lawrence River and migrated considerable distances upstream to reach suitable spawning areas in rapids or riffles; spawning occurred in these tributaries during May and June (Currier 1945, 1946; Smith 1892). Spawning also occurred over gravel and stone bottom in shallow bays in the St. Lawrence River proper (Toner 1943). This species is presently common in the river below the Moses-Saunders Power Dam (45°00'25", 74°47'45") but is rare above the dam (SLEOC 1978). The population in the St. Lawrence, especially above the Moses-Saunders Dam, has been greatly affected by the loss of spawning habitat caused by the construction of dams. The 10 mi section below the Moses-Saunders Dam has a swift current and could provide spawning habitat. The high catch of lake sturgeon less than 10 years old indicates that successful reproduction is occurring in this section of the river or its tributaries (Jolliff and Eckert, undated).

Morristown (44°35'20", 75°29'55"). Spawning historically occurred here in 10-15 ft of water over sand (Jolliff and Eckert, undated).

Oswegatchie River (44°41'45", 75°30'00"). This was an historical spawning area (Jolliff and Eckert, undated).

Massena Intake Dam (44°57'25", 74°55'25"). In 1970, a ripe male was found on June 18 (Jolliff and Eckert, undated).

Moses-Saunders Power Dam (45°00'25", 74°47'45"). In 1970, 27 ripe males were found just below the dam on June 11-19, at water temperatures of 62-64°F (Jolliff and Eckert, undated). During the early 1940s, lake sturgeon were speared in the early summer as they ran into swift water at Cornwall (45°01'00", 74°44'00"), probably for spawning (Toner 1943).

Grass River (44°59'15", 74°46'15"). The river has limited spawning areas below the dam (Jolliff and Eckert, undated).

Raquette River (45°59'40", 74°41'15"). This was an historical spawning area (Greeley 1934). The NYDEC has recently found lake sturgeon in the river (R. Werner, pers. comm. 1979); this river is unobstructed for 19 mi and has several riffle areas (Jolliff and Eckert, undated).

St. Regis River (45°00'10", 74°38'20"). The river has limited spawning areas below the dam at Hogansburg (Jolliff and Eckert, undated).

#### LONGNOSE GAR

Ogdensburg (44°42'00", 75°29'30"). Historically this species moved onto shoals at Ogdensburg for spawning around May 20 (Goode 1884).

Little Sucker Brook (44°52'00", 75°11'05"). Young were found at the mouth of the brook in July (Greeley and Greene 1931).

Grass River (44°59'15", 74°46'15"). Young were found in the lower river in July (Greeley and Greene 1931).

#### BOWFIN

Cornwall (45°00'45", 74°44'00"). Almost 4,000 fingerlings were collected from a single large school in the river near Cornwall (Toner 1937).

#### AMERICAN EEL

American eels are abundant in the St. Lawrence River in September and October during their migration from Lake Ontario to spawning grounds in the Atlantic Ocean (Greeley and Bishop 1932; Hurley 1972a); these adults are often killed in turbines at the Moses-Saunders Power Dam (45°00'25", 74°47'45"). Young eels moving upstream are often concentrated below the dam (Eckert and Hanlon 1977, GLFC 1964). The interruption of these migrations in the river will ultimately affect the population in Lake Ontario (LMS 1977).

#### ALEWIFE

The alewife presumably entered the St. Lawrence River from the Atlantic Ocean or Lake Ontario. The time of its first appearance in the river is unknown. The inshore zone and tributaries along the entire New York shoreline of the St. Lawrence River are spawning and nursery areas for alewives (LMS 1977; Schneider, pers. comm. 1979; Werner and Ford 1972). Inshore movement and spawning begin in the warmer embayments in April or May and continue into July; young-of-the-year are in the nearshore waters throughout the summer (Eckert, pers. comm. 1979; NALCO

1978). Alewife larvae dominate the ichthyoplankton in the river (FWS 1979d). Young were seined in creek mouths and along the river shore in September (Greeley and Greene 1931).

Tibbets Point (44°06'00", 76°22'15")--Thousand Island Bridge (44°18'05", 75°58'55"). Spawning was observed off the dock in Cape Vincent Harbor (44°07'50", 76°20'00") (Eckext, pers. comm. 1979) and also probably occurred along shore at Cape Vincent where several alewife larvae were collected in July (Haynes et al. 1979). In 1976, alewife larvae were 94% of the catch in the Tibbets Point--Thousand Island Bridge area in July and August. An extended period of continuous spawning occurred. Larvae were widely distributed in both littoral and open areas (Werner 1977).

Oswegatchie River (44°41'45", 75°29'55"). In 1878, thousands of alewives entered the river in June, a few days after ripe adults were collected near Ogdensburg (44°42'00", 75°29'30") (Bean 1884b).

Brandy Brook (44°52'50", 75°09'44"). In 1978, one alewife egg was collected in the channel off the mouth of the creek on May 10 (NALCO 1978).

Waddington (44°52'00", 75°12'10"). Ripe adults were collected near Waddington at the end of May (Bean 1884b).

#### MOONEYE

Oswegatchie River (44°41'45", 75°29'55"). Eggs were found in early June just below the Oswegatchie Dam, among rocks in rapidly flowing water less than 2 ft deep; the water temperature was 67°F (Greeley and Bishop 1932).

Tibbits Creek (44°43'50", 75°26'05"). Adults in spawning condition were collected at the mouth of the creek in early July (Greeley and Greene 1931).

#### LAKE HERRING

Adult lake herring were not considered permanent residents of the St. Lawrence River and were not commonly found as far downstream from Lake Ontario as were the young fish. The young fish found in the river were considered downstream migrants from Lake Ontario (Greeley 1934; Greeley and Greene 1931). Young lake herring were collected at the following locations.

Ogdensburg (44°42'00", 75°29'30"). Young lake herring about 1 inch long were found along shore at the Ogdensburg hatchery over sand and boulders in only a few inches of water during June (Greeley and Greene 1931).

Waddington (44°52'00", 75°12'10"). A school of young were found in 3 ft or less of water at the foot of the rapids in late June (Greeley and Greene 1931).

Franklin-St. Lawrence County line (44°59'15", 74°44'00"). Young were dip-netted from the river (Greeley 1934).

#### LAKE WHITEFISH

Ogdensburg (44°42'00", 75°29'30"). One young-of-the-year (YOY) about 1.3 in. long was found in mid-June in association with YOY lake herring at the boat house at the Ogdensburg hatchery (Greeley and Greene 1931).

#### COHO SALMON

No record of coho salmon plantings in the St. Lawrence River was found; those found in the river are assumed to have originated from plantings in Lake Ontario. Two spawning areas have been identified (Whillans, pers. comm. 1979).

Treasure Island (44°75'30", 76°22'20"). East shore.

Howe Island (44°16'00", 76°16'00"). South shore of Cassidys Bay (44°15'45", 76°20'45").

#### ATLANTIC SALMON

In the 1820s, Atlantic salmon were abundant in every tributary of the St. Lawrence River, but by 1859 the species was nonexistent downstream to Quebec (Adamson 1857). Historically, they migrated up the river from the sea (Bean 1903). In the international portion of the river, Atlantic salmon spawned in the following rivers (Edmunds 1874).

Oswegatchie River (44°41'45", 75°29'55").

Grass River (44°59'15", 74°46'15").

Raguette River (44°59'40", 74°41'15").

St. Regis River (45°00'10", 74°38'20").

## LAKE TROUT

Cape Vincent (44°07'45", 76°20'00"). Eggs were collected from ripe lake trout in the the area during November (Bean 1912).

## RAINBOW SMELT

Rainbow smelt were first reported in the upper St. Lawrence River in 1939, when a run entered the Gananoque River (Toner 1940). The inshore waters and tributaries of the St. Lawrence provide spawning and nursery habitat (LMS 1977).

Gananoque River (44°19'30", 76°09'35"). The first record of rainbow smelt in the upper St. Lawrence River occurred here on May 4, 1939; they were observed in 2-3 ft of swift water over a rock and gravel bottom in the raceway of a dam, an area considered to be ideal spawning habitat (Toner 1940).

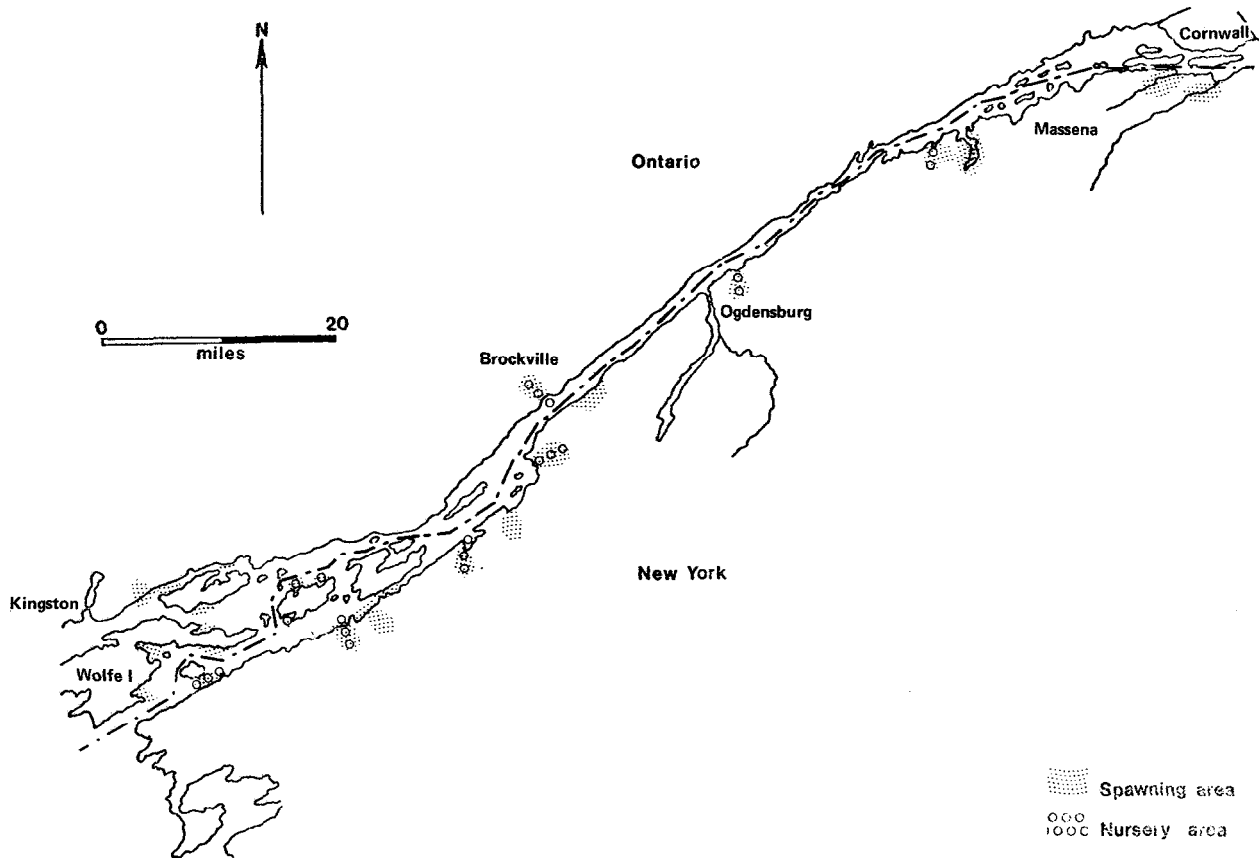
Morristown (44°35'20", 75°39'00"). A few larvae were found at the mouth of the harbor in mid-May (Dunning 1979).

Randy Brook (44°52'50", 75°09'45"). In 1978, a few smelt eggs were found in the channel off the mouth of the brook on May 10 (NALCO 1978).

Coles Creek (44°53'45", 75°07'05"). Dip-netting occurs during the spring run here (Dunning et al. 1978).



## NORTHERN PIKE



In the St. Lawrence River, almost every marsh and stream has a spawning population of northern pike (Eckert, pers. comm. 1979; FWS 1979d). Spawning occurs in marshes and along flooded shorelines (Eckert and Hanlon 1977), and spawning runs also enter creeks (Greeley and Greene 1931). Presently, spawning success is affected by low and fluctuating water levels (Int. Great Lakes Levels Board 1973). Along the St. Lawrence River shore, small marshes are usually more productive than larger ones. A good spawning marsh has a central channel with a slow flow and flooded shallow areas along shore, an average depth of not more than about 1.6 ft, dead and decaying vegetation on the bottom, and a supply of fathead minnows as food for the young (Marean 1976).

Wolfe Island (44°10'00", 76°25'00"). The island provides many spawning sites for northern pike (Environ. Can. 1977b). Spawning occurs at the following locations.

Hinckley Point (44°08'30", 76°21'25"). Button Bay (44°08'55", 76°22'00") and Bayfield Bay (44°11'35", 76°21'00"). Heads of the bays. Lewis Bay (44°12'35", 76°16'05") and Murray Bay (44°12'30", 76°15'25"). Irvine Bay (44°13'40", 76°16'30"). Head of bay (Whillans, pers. comm. 1979).

Millen Bay Marsh (44°10'15", 76°14'45"). In 1974-75, a few adults entered the marsh in mid-April, and a few fry were found there in early July (Marean 1976).

Madoma Marsh (44°15'45", 76°22'45"). Spawning occurs in the marsh and bays (Whillans, pers. comm. 1979).

Chipmans Bay (44°17'15", 76°18'55"). Spawning occurs along the shore south of the bay (Whillans, pers. comm. 1979).

Firmans Point (44°18'25", 76°14'15"). In 1964, one spent and one partly spent female were found in early May; in 1965, a ripe female was found in May (Casselman 1967).

Howe Island (44°15'35", 76°16'35"). Spawning occurs at the head of Quinn Bay (44°15'30", 76°16'30") (Whillans, pers. comm. 1979).

Grindstone Island (44°17'00", 76°07'00"). Flynn Bay (44°15'15", 76°08'10"), McCrea Bay (44°17'00", 76°07'50"), and Delaney Bay (44°17'45", 76°05'20") are spawning and nursery areas (SLEOC 1978; R. Werner, pers. comm. 1979; Werner and Ford 1972).

French Creek (44°14'00", 76°05' 20"). Spawning occurred in the lower section of the creek (Greene et al. 1932). In 1974-75, many northern pike were observed moving upstream in the upper creek and its tributary in late March and April. Fry moved downstream in June and July, and this was classified as a good spawning area (Marean 1976; R. Werner, pers. comm. 1979).

Blind Bay Marsh (44°16'00", 76°01'00"). This cattail marsh is a spawning area (Werner and Ford 1972).

Mullett Creek (44°16'35", 76°00'15"). In 1974-75, a few adults moved into the creek in April, but only one fry was found in early July, and the creek was classified as a poor spawning area (Marean 1976).

Swan Bay (44°18'20", 75°58'00"). This spawning area consists primarily of cattail marsh and some submerged aquatic vegetation (Werner and Ford 1972).

Point Vivian (44°19'00", 75°57'05"). This area contains good spawning habitat and may be a spawning area (Werner and Ford 1972).

Cranberry Creek (44°21'15", 75°52'00"). Spawning occurred in the lower section of the creek (Greene et al. 1932). In 1974-75, many adults were observed moving upstream in April; fry moved downstream in June. This creek was classified as a good spawning area (Marean 1976).

Crooked Creek (44°24'20", 75°48'10"). Spawning occurs here (SLEOC 1978).

Chippewa Creek (44°27'10", 75°45'30"). Spawning occurs here, especially in the lower 4 mi of the creek (Greene et al. 1932; SLEOC 1978). In 1978, a few young-of-the-year were found along shore at the mouth of the creek (Dunning et al., undated).

Jones Creek (44°30'15", 75°48'10"). In 1965, collections of ripe adults indicated a large spawning run. Young-of-the-year move out of the creek and into the river in late summer and fall (Casselman 1967).

Louce Creek Marsh (44°35'00", 75°38'55"). This is an important spawning area; many adults in spawning condition were captured here in 1978 (Geis and Hyduke 1978).

Morristown Point (44°36'00", 75°38'25"). Based on high catches of adults in the spring, spawning may occur just downstream from the point when conditions are favorable (Dunning et al., undated).

St. Lawrence State Park (44°38'15", 75°34'15"). Based on high catches of adults in the spring, spawning may occur here when conditions are favorable (Dunning et al., undated).

Tibbits Creek (44°43'50", 75°26'05"). Young northern pike were found in the creek in the summer (Greeley and Greene 1931). In 1978, a large spring run occurred here (Dunning et al. 1978; Geis and Hyduke 1978).

Sucker Brook (44°52'10", 75°11'45"). This is a spawning area (SLEOC 1978), and young pike were found in the creek in the summer (Greeley and Greene 1931).

Brandy Rook (44°52'50", 75°09'45"), Coles Creek (44°53'45", 75°07'05"), and Grass River (44°59'15", 74°46'15"). Spawning occurs here (SLEOC 1978).

Raquette River (44°59'40", 74°41'15"). Northern pike ran upstream as far as the dam at Raymondville; young fish were present in the river's lower tributaries, including Squeak River and Hutchin's Brook (Greeley 1934).

#### MUSKELLUNGE

The muskellunge probably spawns in marshy areas throughout the river (Eckert, pers. comm. 1979). In the St. Lawrence River, the temperature at which spawning occurs (65°F) is not reached until mid-June (Sauve and Fowler 1961).

Wolfe Island (44°10'00", 76°25'00"). Spawning occurs at the following locations. Browns Bay (44°13'15", 76°24'10"). Head of the bay. McDonnell Bay (44°13'40", 76°23'00"). Head of the bay. The bay just east of McDonnell Bay (44°13'35", 76°22'05") (Whillans, pers. comm. 1979).

Crooked Creek (44°24'20", 75°48'10") and Chippewa Creek (44°27'00", 75°45'30"). Spawning occurs at the creek mouths (SLEOC 1978).

Ogdensburg (44°42'00", 75°29'30"). Several small muskellunge (age not given) were observed at the hatchery dock (Greeley and Greene 1931).

Tibbits Creek (44°43'50", 75°26'05") and Little Sucker Brook (44°52'00", 75°11'05"). Several small muskellunge (age not given) were observed at the mouths of these streams (Greeley and Greene 1931).

#### CARP

The time of the first appearance of carp in the St. Lawrence River is unknown. Carp were present in the St. Lawrence River prior to 1900; presumably these originated from populations in Lake Ontario or from plantings made in New York as early as 1879 (McCrimmon 1968).

Millen Bay Marsh (44°10'15", 76°14'45"). In 1974-75, carp fry were abundant in the marsh during early June through July (Marean 1976); the marsh is a nursery area (R. Werner 1977; pers. comm. 1979).

Tibbits Creek (44°43'50", 75°26'05"). Carp spawned in the lagoon at the creek mouth (Greeley and Greene 1931).

Ogdensburg (44°42'00", 75°29'30")--Massena (44°56'00", 74°53'00"). In this section of the river, carp spawn in less than 2 ft of water in flooded marsh areas; fluctuating water levels often reduce spawning success (Int. Great Lakes Levels Board 1973).

Upper Canada Bird Sanctuary Marsh (44°57'35", 75°01'25"). Spawning was observed in the marsh and on the channel side of Nairne Island (44°57'40", 75°01'10") in areas with 2-4 ft of water, muck bottom, gently-sloping shoreline that flooded periodically, and scattered emergent, submergent, and floating marsh vegetation. Adults began moving to the shallow marshes in early May. Most spawning activity occurred at depths of 3 in. to 1 ft, and eggs were observed on aquatic plants and dead grass. Spawning began at 61-64°F and continued to 79-82°F. Spawning usually ceased sometime between late June and early August. Adults remained in the shallows throughout the summer; by late August they moved out to depths of 6 ft or more. Millions of newly hatched carp fry were observed in pools and depressions throughout the marsh; two weeks later, only a few could be found (Swee 1965; Swee and McCrimmon 1966).

#### RIVER CHUB

Cape Vincent (44°07'45", 76°20'00"). In 1979, adults were found inshore during spring and summer; they were presumed to be spawning (Haynes et al. 1979).

#### GOLDEN SHINER

In 1976, large catches of young-of-the-year golden shiners were made in the upper St. Lawrence River (Eckert and Hanlon 1977). Only one location was identified as a spawning ground.

Tibbits Creek (44°43'50", 75°26'05"). Schools of golden shiners spawned in the creek mouth over beds of vegetation in early June. Ripe males and females were collected, and eggs were found attached to vegetation and stones (Greeley and Greene 1931).

#### PUGNOSE SHINER

French Creek (44°14'00", 76°05'20"). In 1931, a male in breeding colors was collected at the creek mouth on July 11 (Raney 1969b).

Eel Bay (44°18'50", 76°02'30"). This species occurs rarely in the St. Lawrence River; in 1977, several adults in spawning condition were seined along shore in Eel Bay over a gravel and sand substrate with some weeds (Eckert, pers. comm. 1979; Eckert and Hanlon 1977).

#### BRIDLE SHINER

Cape Vincent (44°07'45", 76°20'00"). In 1979, adults were found inshore during spring and summer, probably for spawning (Haynes et al. 1979).

#### COMMON SHINER

Tibbits Creek (44°43'50", 75°26'05"). Common shiners spawned in early June at the mouth of the creek (Greeley and Greene 1931).

#### SPOTTAIL SHINER

Spottail shiners probably spawn over sand shoals in the St. Lawrence River in June or July (Dunning et al., undated).

Cape Vincent (44°07'45", 76°20'00"). In 1894, spottail shiners in spawning condition were found here in late June (Evermann and Kendall 1902a). In 1979, spottail shiners were found inshore in the harbor during spring and summer, probably for spawning (Haynes et al. 1979).

Morristown Point (44°36'00", 75°38'25"). Seine catches of adults increased at the east side of the point from late April to late May; this may have been a spawning concentration (Dunning et al., undated).

Ogdensburg (44°42'00", 75°29'30"). Many spawners and eggs were found in early June in a shallow sand area at the mouth of a small stream at the Ogdensburg Fish Hatchery (Greeley and Greene 1931).

Chimney Point (44°44,00", 75°26,50"). In 1978, many adults were seined in late May over sand and gravel on the west side of Chimney Point; this may have been a spawning concentration (Dunning et al., undated).

#### BLUNTNOSE MINNOW

Cape Vincent (44°07'45", 76°20'00"). In 1979, adults were found inshore in the harbor during spring and summer, probably for spawning (Haynes et al. 1979).

Tibbits Creek (44°43'50", 75°26'05"). Ripe or spawning adults were found at the creek mouth in early June (Greeley and Greene 1931).

#### LONGNOSE DACE

Cape Vincent (44°07,45", 76°20'00"). In 1979, adults were most abundant in July; this may have been a spawning concentration (Haynes et al. 1979).

#### WHITE SUCKER

White suckers enter tributaries of the St. Lawrence River to spawn in early spring after ice breakup (Greeley and Greene 1931; Toner 1943). In the 1930s, spawning runs had been limited by dams on tributaries such as

the St. Regis and Grass rivers, but spawning still occurred in the lower sections of the rivers (Greeley and Greene 1931). Areas known to support spawning include:

French Creek (44°14'00", 76°05'20"). In 1975, some adults entered the creek in mid-April (Marean 1976).

Mullett Creek (44°16'35", 76°00'15"). In 1975, many adults entered the creek in mid- to late April, and one fry was found moving downstream in mid-June (Marean 1976; R. Werner, pers. comm. 1979).

Cranberry Creek East (44°21'10", 75°52'15"). In 1975, many adults entered the creek in late April (Marean 1976; R. Werner, pers. comm. 1979).

Chimney Bay (44°44'05", 75°26'10"). Young were collected in this area 3 mi downstream from Ogdensburg in mid-July (Dean 1903).

Tibbits Creek (44°43'50", 75°26'05"). In 1979, many adults were netted as they entered the creek in mid-April. White sucker larvae were 24% of the total catch of larvae in mid-May in Chimney Bay (44°44'05", 75°26'10"); it was believed that the migration of white sucker larvae out of the bay peaked before mid-May (Dunning 1979).

Grass River (44°59'15", 74°46'15") (Greeley and Greene 1931).

Raquette River (44°59'40", 74°41'15"). White suckers ran upstream to the dam at Raymondville. Young were found in mid-June in pools below the dam (Greeley 1934).

St. Regis River (45°00'10", 74°38'20") (Greeley and Greene 1931).

#### SILVER REDHORSE

Spawning runs of silver redhorses ascend almost every tributary of the upper St. Lawrence River (Eckert, pers. comm. 1979). This species spawns later than the shorthead redhorse (Greeley and Greene 1931).

Ogdensburg (44°42'00", 75°29'30"). Males in breeding condition were found in mid- to late June near Ogdensburg (Greeley and Greene 1931).

Raquette River (44°59'40", 74°41'15"). Adults ascend the Raquette River and its tributaries to the Raymondville Dam (Eckert, pers. comm. 1979; Greeley 1934). Young were found in the Squeak River, a tributary of the Raquette River (Greeley 1934).

## SHORTHEAD REDHORSE

Spawning runs of shorthead redhorses ascend almost every tributary of the upper St. Lawrence River (Eckert, pers. comm. 1979). In the early 1930s, dams on the Grass and St. Regis rivers had curtailed spawning runs, but extensive spawning still occurred in the lower sections of these rivers (Greeley and Greene 1931).

Oswegatchie River (44°41'45", 75°29'55"). Males and females in spawning condition were observed on May 25. In early June, many adults were observed in shallow rapids (less than 2 ft deep); eggs were seen on the bottom among rocks when the water temperature was 67°F (Greeley and Bishop 1932).

Grass River (44°59'15", 74°46'15"). Adults were speared in the lower Grass River, and spawning runs were observed at Massena in early to mid-June (Greeley and Greene 1931).

Raquette River (44°59'40", 74°41'15"). Spawning runs ascended to the dam at Raymondville in the spring (Greeley 1934).

St. Regis River (45°00'10", 74°38'20"). Adults were speared in the river, and spawning was observed at Hogansburg (44°58'30", 74°40'00") (Greeley and Greene 1931).

## GREATER REDHORSE

Spawning runs of greater redhorses probably enter the Raquette River (44°59'40", 74°41'15") and other tributaries (Eckert, pers. comm. 1979). In the early 1940s, this species spawned in areas of rapids in the St. Lawrence River in late May or early June (Toner 1943).

Thousand Island Area (44°20'00", 76°00'00"). Spawners moved into water 10 ft deep in the island and channel area near Ivy Lea (44°21'50", 76°00'35") and deposited eggs among boulders. Fry moved into shallow, fast water where they remained for their first summer of life (Toner 1943). In 1968, the spawning run of greater redhorses in the area closely followed that of the white suckers; greater redhorses were observed spawning at water temperatures of 62-66°F, during late June and early July (Jenkins 1970).

## BROWN BULLHEAD

Brown bullheads move into shallow marshes in creek mouths and bays of the St. Lawrence River to spawn (Eckert and Hanlon 1977; Greeley and Bishop 1932; Greeley and Greene 1931).



Cape Vincent (44°07'45", 76°20'00"). In 1894, ripe adults were found at Cape Vincent in late June (Evermann and Kendall 1902a). In 1979, juveniles were found among rocks along shore; some spawning must have occurred in the harbor, although the habitat is not typical (Haynes et al. 1979).

French Creek (44°14'00", 76°05'20"). Spawning occurred in the lower creek (Greene et al. 1932). In 1974-75, some adults entered the marsh in April, and fry were collected here in June and July (Marean 1976).

Goose Bay (44°22'00", 75°51'15"). Spawning occurred in lower Cranberry Creek (45°21'15", 75°52'00") (Greene et al. 1932). Schools of young guarded by males were found nearshore in Goose Bay in 2-18 in. of water in late June (Greeley and Bishop 1932). In 1974-75, some adults entered Cranberry Creek Marsh in April, but only one fry was collected moving out of the marsh in June (Marean 1976).

Chippewa Creek (44°27'10", 75°45'30"). The lower 4 mi of the creek was a spawning area (Greene et al. 1932).

Morristown Bay (44°35'15", 75°39'10"). An egg mass guarded by an adult was found in early June at a water temperature of 62°F (Greeley and Bishop 1932).

Tibbits Creek (44°43'50", 75°26'05"). Brown bullheads spawned in the lagoon at the creek mouth in early June (Greeley and Greene 1931).

Coles Creek (44°53'45", 75°07'05"). A nest containing an egg mass and guarded by an adult was seen among roots and muck in less than 1 ft of water at the creek mouth in early June (Greeley and Greene 1931).

#### CHANNEL CATFISH

Eel Bay (44°18'50", 76°02'30"). Excavated nests and ripe males were found here in late June; newly hatched fry were found in early July. The nests were constructed in layers of submerged turf in 2-4 ft of water, 60-90 ft offshore (Greeley and Bishop 1932; Toner 1943).

French Creek (44°14'00", 76°05'20") and Cranberry Creek (44°21'15", 75°52'00"). Channel catfish from the river entered these creeks to spawn (Greene et al. 1932).

Chippewa Bay (44°26'50", 75°46'30") and Chippewa Creek (44°27'10", 75°45'30"). Many yolk-sac fry were collected in the bay southeast of the mouth of the creek in early July (Greeley and Bishop 1932). The lower 4 mi of Chippewa Creek provided spawning areas for fish entering from the river (Greene et al. 1932).

#### STONECAT

Ganancque (44°19'30", 76°09'50"). In early June 1935, one adult was found guarding an egg mass, which was attached to the underside of a flat rock in 1 ft of water (Toner 1937, 1943).

#### BURBOT

Burbot spawn in shallow water 1-4 ft deep, over sand or gravel. Spawning occurs under the ice, usually from January to March, when water temperatures are 33-35°F (NALCO 1978).

Morristown (44°35'00", 75°39'00"). In 1979, a few burbot larvae were caught in the harbor in mid-May (Dunning 1979).

Chimney Bay (44°44'05", 75°26'10"). In 1978, one burbot egg was collected inshore east of Chimney Point in late April (NALCO 1978). In 1979, a few larvae were collected in mid-May in the bay (Dunning 1979).

Brandy Brook (44°52'50", 75°09'45"). In 1978, one prolarva was collected in the channel off the mouth of the brook in mid-May (NALCO 1978).

#### BANDED KILLIFISH

Cape Vincent (44°07'45", 76°20'00"). In 1894, ripe adults were found at Cape Vincent in late June (Evermann and Kendall 1902a).

#### ROCK BASS

Rock bass spawn in the St. Lawrence River in 3-15 ft of water over gravel shoals and rocky ledges during June and July. Rock bass and smallmouth bass spawn in the same areas, but the rock bass spawns later than the smallmouth bass, when the water temperature is a few degrees higher (Schneider and Panek, pers. comm. 1979). Rock bass also enter creek mouths to spawn (Greeley and Greene 1931).

Cape Vincent (44°07'45", 76°20'00"). Rock bass is one of the species most commonly observed in spawning condition in the harbor. Spawning occurs in June and July, and eggs are often deposited on clam shells (Haynes et al. 1979).

Millen Bay (44°10'15", 76°14'45"). A nest containing eggs was observed in late June (Greeley and Bishop 1932).

French Creek (44°14'00", 76°05'20"). In 1975, adults entered the marsh in mid-April, and a few fry were found in early June (Marean 1976).

Morristown Bay (44°35'15", 75°39'10"). Spawning was observed, and nests containing eggs were seen in nearshore areas during June at water temperatures of 70-72°F (Greeley and Bishop 1932).

Tibbits Creek (44°43'50", 75°26'05"). A male was seen guarding a nest containing eggs in the lagoon at the creek mouth in early June (Greeley and Greene 1931).

#### PUMPKINSEED

The shallow embayments and creek mouths of the St. Lawrence River are used as spawning and nursery areas by the pumpkinseed (Eckert and Panek, pers. comm. 1979). Pumpkinseeds are the most abundant fish entering the marshes in the spring (Marean 1976). In 1976, pumpkinseed larvae were commonly found in the shallow water zones of the upper river; peak abundance occurred in mid-July (Werner 1977). Pumpkinseed larvae were only 4% of the total, but were one of the more abundant larvae (FWS 1979d; Werner 1977).

Cape Vincent (44°07'45", 76°20'00"). In 1894, adults were found in spawning condition here in late June (Evermann and Kendall 1902a).

Millen Bay (44°10'15", 76°14'45"). In 1974-75, adults entered the marsh in mid-April to early May; one fry was found there in late July (Marean 1976).

French Creek (44°14'00", 76°05'20"). This is a heavily used spawning area (R. Werner, pers. comm. 1979). In 1974-75, many adults entered the marsh in late March to April, and a few fry were found in early July (Marean 1976). Historically, a large school of adults, which included females that appeared to be "distended with eggs", entered the creek mouth in mid-June (Greeley and Bishop 1932).

Cranberry Creek (44°21'15", 75°52'00"). In 1974-75, adults entered the marsh in late April, and a few fry were found there in early July (Marean 1976).

Tibbits Creek (44°43'50", 75°26'05"). Spawning was observed at the creek mouth from mid-June to early July (Greeley and Greene 1931).

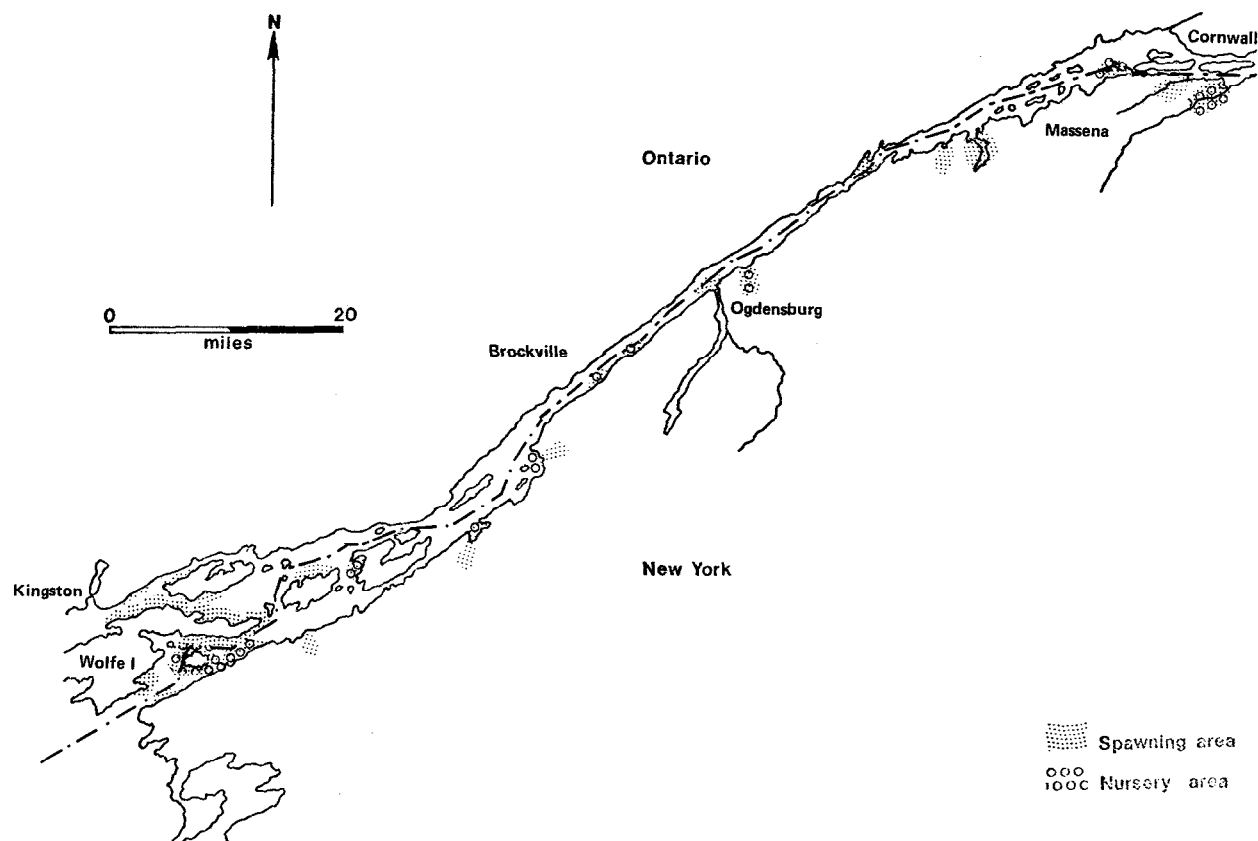
## BLUEGILL

The shallow areas throughout the St. Lawrence River are used as spawning and nursery areas by bluegills (Eckert and Panek, pers. comm. 1979; Werner 1977).

French Creek Marsh (44°14'00", 76°05'20") and Cranberry Creek Marsh (44°21'15", 75°52'00"). In 1974-75, a few fry were collected in June and July (Marean 1976).

Chippewa Bay (44°26'50", 75°46'30"). Ripe males and females were collected in early August (Eckert, pers. comm. 1979).

## SMALLMOUTH BASS



In the upper St. Lawrence River, smallmouth bass move inshore to depths of 3-15 ft to spawn over gravel shoals and rock ledges (Eckert and Hanlon 1977; Greeley and Greene 1931; Schneider and Panek, pers. comm. 1979). Large spawning runs enter tributaries; most spawning in tributaries occurs near the mouth (Greeley and Greene 1931). Historically, the spawning period in the upper river extended from mid-May to July (Rathbun and Wakeham 1897). In the tributaries, spawning occurs during late May to early June; whereas in the colder St. Lawrence River river waters, spawning is later and can continue into July (Greeley, undated; Greeley and Greene 1931; Ont. Game Fish 1912; Stone et al. 1954). Ripe females were collected in the river as late as mid-August (Panek, pers. comm. 1980). Young-of-the-year (YOY) smallmouth bass are found in the littoral zone (Eckert and Hanlon 1977).

Wolfe Island (44°10'00", 76°25'00"). Several spawning areas have been identified here.

Hinckley Point (44°08'30", 76°21'25"). South shore at the base of the point (Whillans, pers. comm. 1979) and around the point (Environ. Can. 1977b).

Hinckley Flats Shoal (44°09'05", 76°20'45"). Button Bay (44°08'55", 76°22'00"). Along the north shore. Bayfield Island (44°11'35", 76°19'45")--Banford Point (44°12'25", 76°14'20"). Along the south shore of Bayfield Island and eastward along shore to about 2 mi E of Banford Point (Whillans, pers. comm. 1979).

Beauvais Point (44°14'00", 76°10'50"). The shoreline around the point. Quebec Head (44°14'20", 76°11'15"), Brakey Bay (44°13'50", 76°13'35"), Dignam Point (44°13'50", 76°13'55"), and Rattray Point (44°14'05", 76°14'25")--Irvine Bay (44°13'40", 76°16'30") (Environ. Can. 1977b).

Holliday Point (44°14'00", 76°16'55") and Oak Point (44°14'15", 76°20'05") (Environ. Can. 1977b; Whillans, pers. comm. 1979).

Brophy Point (44°14'00", 76°23'30") and Knapp Point (44°13'55", 76°23'55") (Environ. Can. 1977b).

Browns Bay (44°13'15", 76°24'10"). Around the shoreline (Environ. Can. 1977b; Whillans, pers. comm. 1979).

Dawson Point (44°12'55", 76°25'30") (Environ. Can. 1977b).

Ferguson Point (44°12'20", 76°26'45"). North shore (Whillans, pers. comm. 1979).

Milton Island (44°14'40", 76°23'55") and The Spectacles (44°14'35", 76°23'15") (Whillans, pers. comm. 1979).

Cassidys Point (44°15'30", 76°20'50"). Along the north shore. Quinn's Bay (44°15'35", 76°16'35") (Whillans, pers. comm. 1979).

Cape Vincent (44°07'45", 76°20'00"). In 1979, smallmouth bass was one of the species most commonly observed in spawning condition in the harbor; spawning occurred throughout the area in June and July (Haynes et al. 1979).

Carleton Island (44°10'45", 76°17'30"). A local population resides in the area (Stone 1951). Young-of--the-year were collected in August and September at depths as great as 15-20 ft (Stone et al. 1951, 1954).

Millen Bay (44°10'15", 76°14'45"). In 1931, nests and many fry were found here in late June (Greeley and Bishop 1932). In 1948-49, nests containing eggs and many fry were found along the protected west shore on gravel in less than 3 ft of water during June 15-30 when the water temperature was 63-70°F. Fry were first seen on June 23 (Stone et al. 1951, 1954).

Dodge Bay (44°10'55", 76°14'00"). In 1948-49, YOY were collected in August (Stone et al. 1951, 1954).

Linda Island (44°12'10", 76°12'25"). A local population resides in the area (Stone et al. 1951). In 1948-49, YOY were collected in August and September at depths as great as 15-20 ft (Stone et al. 1951, 1954).

Cedar Point State Park (44°12'20", 76°11'55") and Beadle Bay (location unknown). Nests were seen here in June (Stone et al. 1951, 1954).

French Creek (44°14'00", 76°05'20"). Spawning occurred in the lower section of the creek (Greene et al. 1932).

Grindstone Island (44°17'00", 76°07'00"). In 1948-49, nests were observed in June along the north shore (Stone et al. 1951, 1954).

Eel Bay (44°18'50", 76°02'30"). A local population exists in the bay (SLEOC 1978; Stone et al. 1951, 1954). In 1948-49, heavy spawning occurred in the bay during the first 2 weeks of June; fry were observed in late June (Stone et al. 1951, 1954).

Point Vivian Marsh (44°19'00", 75°57'05"). This is a potential spawning area (Werner and Ford 1972).

Goose Bay (44°22'00", 75°51'15"). In 1931, many shallow rocky areas provided good spawning habitat, and many fry were found in the bay in late June (Greeley and Bishop 1932). Spawning also occurred in the lower section of Cranberry Creek (44°21'10", 75°52'15") (Greene et al. 1932).

Chippewa Bay (44°26'50", 75°46'30"). A spawning run enters the bay (Dunning et al., undated). Spawning occurred in the lower 4 mi of Chippewa Creek (44°27'10", 75°45'30") (Greene et al. 1932). In 1931, spent adults and fry were found in the bay in mid-June (Greeley and Bishop 1932); in 1978, YOY were collected there in August (Dunning et al., undated).

Morristown (44°35'20", 75°39'00"). A spawning run occurs here (Dunning et al., undated). In 1931, nests, eggs, and many fry were observed during June, especially along the west shore of Morristown Bay. Nests were in 1-2 ft of water among rocks, gravel, and sticks (Greeley and Bishop 1932).

Brooks Point (44°36'55", 75°36'35"). In 1931, nests, eggs, and fry were seen near here at the mouth of an unnamed tributary on gravel in 11 inches of water in mid-June at a water temperature of 77°F (Greeley and Bishop 1932).

Ogdensburg (44°42'00", 75°29'30"). In 1930, spent males and females were collected here in June (Greeley and Greene 1931).

Tibbits Creek (44°43'50", 75°26'05"). A spawning run enters the creek (Dunning et al., undated). In 1930, ripe or spawning adults and a

nest were found at the creek mouth in early June; spent males and females were found here in mid-June, and fry were present on July 1 (Greeley and Greene 1931).

Iroquois (44°51'00", 75°18'30"). Spawning beds were observed here (Ont. Game Fish 1909, 1912).

Little Sucker Brook (44°52'00", 75°11'05"). In 1930, spent males and females were found here in mid-June (Greeley and Greene 1931).

Brandy Brook (44°52'50", 75°09'45"). In 1930, spent males were found here in mid-June (Greeley and Greene 1931).

Coles Creek (44°53'45", 75°07'05"). A spawning run enters the creek (Dunning et al., undated; Webster et al. 1959).

Little Sny Channel (44°58'20", 74°56'40"). In 1933, some ripe and spent adults were found here in mid-June, and young fry were found along shore in early July (Greeley 1934).

Grass River (44°59'15", 74°46'15"). In 1930, spent males and females were found here in mid-June (Greeley and Greene 1931).

Raquette River (44°59'40", 74°41'15"). In 1933, large runs moved upstream to the Raymondville dam. Pollution prevented spawning in the Raquette River proper, but the presence of nests with eggs and many fry indicated that successful spawning occurred in almost all of the river's lower tributaries in May and early June. Young were found in mid-June in pools below the dam (Greeley 1934).

#### LARGEMOUTH BASS

The shallow embayments and marshy littoral areas throughout the St. Lawrence River are spawning and nursery grounds for largemouth bass (Eckert and Hanlon 1977; Panek, pers. comm. 1979).

Navy Bay (44°14'00", 76°28'00"). Spawning occurs at the head of the bay (Whillans, pers. comm. 1979).

Madoma Marsh (44°15'45", 76°22'45") (Whillans, pers. comm. 1979).

Wolfe Island (44°10'00", 76°25'00"). Spawning occurs at the following locations.

Button Bay (44°08'55", 76°22'00"). Head of bay. McGregor Bay (44°12'15", 76°19'10"). In the bay and around Macandie Point (44°12'00", 76°19'40"). Beauvais Point (44°14'00", 76°10'50"). Along the shore about 2 mi W of the point. Irvine Bay (44°13'40", 76°16'30"). Head of bay (Whillans, pers. comm. 1979).



French Creek (44°14'00", 76°05'20"). In 1931, spawning occurred in the lower section of the creek (Greene et al. 1932). In 1974-75, a few adults moved into the marsh in April; a large number of fry moved out of a tributary to the creek in June (Marean 1976; R. Werner, pers. comm. 1979).

Eel Bay (44°18'50", 76°02'30"). In 1931, a spent female and many fry were seen in the shallows of the bay during late June when the water temperature was 77°F (Greeley and Bishop 1932).

Cranberry Creek (44°21'15", 75°52'00"). In 1931, spawning occurred in the lower section of the creek (Greene et al. 1932). In 1974-75, a few adults entered the marsh in late April, and large numbers of fry were collected there in June (Marean 1976; R. Werner, pers. comm. 1979).

Chippewa Creek (44°27'10", 75°45'30"). In 1931, spawning occurred in the lower 4 mi of the creek (Greene et al. 1932). In 1978, large numbers of fry were found at the mouth of the creek among dense vegetation over a mud bottom in mid-July (Dunning et al., undated).

Ogdensburg (44°42'00", 75°29'30"). In 1930, young largemouth bass were common among weed beds in the area in early September (Greeley and Greene 1931).

#### BLACK CRAPPIE

Spawning runs of black crappies enter bays, creek mouths, and lower sections of streams in the spring (Eckert and Hanlon 1977; Greene et al. 1932).

French Creek (44°14'00", 76°05'20"). In 1931, spawning occurred in the lower section of the creek (Greene et al. 1932). In 1974-75, adults entered the marsh in mid- to late April, and a few fry were found there in June (Marean 1976).

Alexandria Bay (44°20'05", 75°55'20"). Ripe fish were collected here in shallow water in late April to May (Eckert and Panek, pers. comm. 1979).

Cranberry Creek (44°21'15", 75°52'00"). In 1931, spawning occurred in the lower section of the creek (Greene et al. 1932). In 1974-75, adults entered the marsh in late April, and a few fry were found there in early July (Marean 1976).

Chippewa Bay (44°26'50", 75°46'30"). In 1931, spawning occurred in the lower 4 mi of Chippewa Creek (44°27'10", 75°45'30") (Greene et al. 1932). Ripe fish were collected in the bay in shallow water in late April to May (Eckert and Panek, pers. comm. 1979).

## IOWA DARTER

Iowa darters are not commonly seen in the St. Lawrence River except when they move inshore in the spring to spawn (Eckert, pers. comm. 1979; Eckert and Hanlon 1977). In 1930, this species was uncommon except in creek mouths (Greeley and Greene 1931).

Tibbits Creek (44°43'50", 75°26'05"). In 1930, males and females in spawning condition were found at the creek mouth in early June (Greeley and Greene 1931).

Waddington (44°52'00", 75°12'10"). In 1976, a few adults in spawning condition were captured near shore in late May (Eckert and Ranlon 1977).

Massena (44°56'00", 74°53'00"). Adults move inshore to spawn in early summer (Eckert, pers. comm. 1979).

## JOHNNY DARTER

Cape Vincent (44°07'45", 76°20'00"). In 1979, gravid adults were observed here in the spring. Spawning occurs under rocks along shore (Haynes et al. 1979).

Chimney Bay (44°44'05", 75°26'10"). In 1979, a few larvae were collected in 49 ft of water in mid-May (Dunning 1979).

## YELLOW PERCH

Yellow perch are abundant in the St. Lawrence River; they spawn in shallow, weedy areas (Eckert and Schneider, pers. comm. 1979). In 1976, yellow perch larvae were one of the more abundant larvae in the upper river (FWS 1979d; Werner 1977); they were most common in water less than 12 ft deep from early to mid-July (Werner 1977).

Cape Vincent (44°07'45", 76°20'00"). A resident population of yellow perch spawns in the harbor area. In 1979, juveniles were observed here in the nearshore waters (Haynes et al. 1979).

Wolfe Island (44°10'00", 76°25'00"). Shoreline areas provide suitable spawning habitat for yellow perch (Environ. Can. 1977b); spawning occurs in several areas.

Button Bay (44°08'55", 76°22'00"). Embayments on the north shore. Bayfield Island (44°11'35", 76°19'45"). Along shore, except on the south side. Lewis Point (44°12'25", 76°16'00"). Along shore west of the point. Chub Point (44°14'00", 76°20'35") (Whillans, pers. comm. 1979).

Quinns Bay (44°15'35", 76°16'35") (Whillans, pers. comm. 1979).

Chippewa Bay (44°26'50", 75°46'30"). Spawning occurs near rooted vegetation in shallow weedy areas during mid-April to early May when water temperatures are 48-54°F. In 1978, eggs and prolarvae were collected in May, and young-of-the-year were collected throughout the summer; they became more abundant as the summer progressed (Dunning et al., undated, 1978; NALCO 1978).

Morristown Harbor (44°35'25", 75°39'05") and Morristown Point (44°36'00", 75°38'25"). In 1978-79, large numbers of ripe and gravid adults were seen in late April, and large numbers of larvae were observed in mid-May. Yellow perch may spawn in areas downstream from the point during years when conditions are favorable (Dunning 1979; Dunning et al., undated, 1978).

St. Lawrence State Park (44°38'15", 75°34'55"). This area may be used for spawning during years when conditions are favorable (Dunning et al., undated).

Ogdensburg (44°42'00", 75°29'30"). In 1978, many adults were collected in littoral areas in late April and early May (Dunning et al. 1978).

Tibbits Creek (44°43'50", 75°26'05"). In 1978-79, large numbers of ripe and gravid adults were seen here in late April, and large numbers of larvae were observed here in mid-May (Dunning 1979; Dunning et al., undated).

Chimney Bay (44°44'05", 75°26'10"). In 1902, young about 1.5 in. long were found in this area, 3 mi downstream from Ogdensburg (Bean 1903). In 1979, large numbers of ripe and gravid adults and many larvae were observed in the bay (Dunning 1979).

Coles Creek (44°53'45", 75°07'05"). In 1978, many adults were collected in littoral areas at the mouth of the creek in late April and early May (Dunning et al. 1978).

#### LOGPERCH

Chippewa Bay (44°26'50", 75°46'30"). In 1978, adults were collected in seines in July and August on sandy shallows along the north shore of Allens Point (44°27'15", 75°46'05"). The collecting sites were typical spawning habitat, and spawning may occur in the area (Dunning et al., undated).

Tibbits Creek (44°43'50", 75°26'05"). In 1930, many adults, including several ripe males, were found in the lower creek in early June (Greeley and Greene 1931).

## WALLEYE

Walleyes entered St. Lawrence River tributaries and moved short distances upstream to spawn (Greeley and Greene 1931). The population in the upper river between Ogdensburg (44°42'00", 75°29'30") and Massena (44°56'00", 74°53'00") declined dramatically between 1960 and 1970 after construction of the Moses-Saunders Power Dam (45°00'25", 74°47'45") eliminated upstream spawning areas. Most walleyes in the river are now found below the dam (Eckert and Hanlon 1977; Int. Great Lakes Levels Board 1973; SLEOC 1978).

Chippewa Creek (44°27'10", 75°45'30"). A juvenile walleye was found east of Brier Hill, about 12 mi upstream (Werner and Ford 1972); walleyes may enter the creek to spawn (R. Werner, pers. comm. 1979).

Oswegatchie River (44°41'45", 75°29'55"). A spawning run still enters the river (Eckert and Hanlon 1977), however, successful spawning probably ended here when the mouth was flooded by dam construction on the St. Lawrence River (Geis and Hyduke 1978).

Sucker Brook (44°52'10", 75°11'45") and Little Sucker Brook (44°52'00", 75°11'05"). In 1930, young walleyes were found in these streams (Greeley and Greene 1931).

Brandy Brook (44°52'50", 75°09'45"). Historically, this was one of the most important spawning areas (Dunning et al., undated; Greeley and Greene 1931). Young walleyes were found in the brook during June (Greeley and Greene 1931). Spawning runs still occur (Eckert and Hanlon 1977).

Long Sault Rapids (approximately 44°59'35", 74°53'40"). This was an important spawning site prior to its flooding by the construction of the Moses-Saunders Power Dam (45°00'30", 74°47'30") (Int. Great Lakes Levels Board 1973).

Grass River (44°59'15", 74°46'15") and St. Regis River (45°00'10", 74°38'20"). In 1930, young walleyes were found in the lower river (Greeley and Greene 1931).

## SLIMY SCULPIN

The inshore waters and tributary streams of the St. Lawrence River are spawning and nursery habitat for this species (LMS 1977).

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