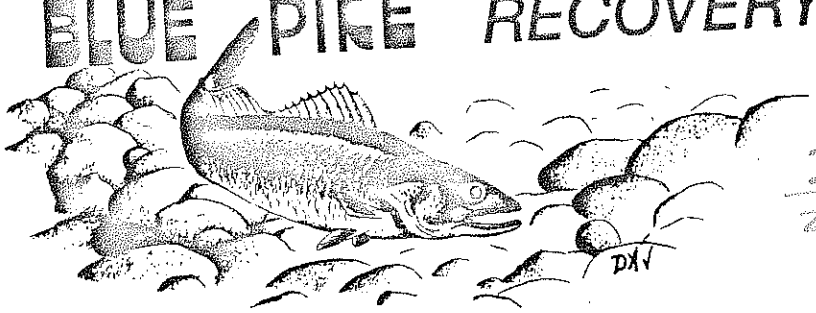
BLUE PIKE RECOVERY PLAN



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recovery plan
fish management
endangered species
life history
distribution, population
morphology
hybrids
fisheries
habitat

prepared for the SURVIVAL, PROTECTION, AND ENHANCEMENT of an endangered species

by the Blue Pike Recovery Team, October 1975

BLUE PIKE *RECOVERY TEAM*

April 1, 1976

Mr. Lynn Greenwalt
Director
U. S. Fish and Wildlife Service
Department of the Interior
Washington, D. C. 20240

Dear Mr. Greenwalt:

In early 1975, you appointed a Blue Pike Recovery Team to prepare a Recovery Plan for the endangered Lake Erie blue pike.

The enclosed Plan, collectively prepared by the Team and reviewed by other concerned agencies, is submitted for your consideration. It represents what the Team presently considers the best possible course of action for a recovery effort and projected costs.

The Recovery Plan has international aspects that must be considered. The blue pike was historically recorded in both United States and Canadian waters of Lakes Erie and Ontario. Plan implementation should, therefore, consider Canadian interests and will require Canadian cooperation.

Another consideration is the difficulty of collecting and identifying blue pike. A distinct possibility exists that if obtainable specimens cannot be confirmed as blue pike or blue pike genetic reservoirs, the Team will recommend the fish be declared extinct.

The Team will annually update the Plan as new information becomes available and as actions are accomplished.

The Team is pleased to have been involved in developing this document and believes it will provide biologically sound guidelines for an initial blue pike recovery effort, provided suitable specimens can be obtained.

Respectfully submitted,

Arden J. Trandahl
Team Leader
Blue Pike Recovery Team

Arden J. Trandahl, Leader
U.S. Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111
612/725-3596

Russell L. Scholl
Ohio Department of Natural Resources
Sandusky, Ohio 44870

John W. Parsons
U.S. Fish and Wildlife Service
Ann Arbor, Michigan 48107

John K. Andersen
U.S. Fish and Wildlife Service
Warren, Pennsylvania 16365

Arnold J. Stoltz
U.S. Fish and Wildlife Service
Hebron, Ohio 43025

Shyrl E. Hood
Pennsylvania Fish Commission
Linesville, Pennsylvania 16424

William F. Shepherd
N.Y. Dept. of Environmental Conservation
Olean, New York 14760

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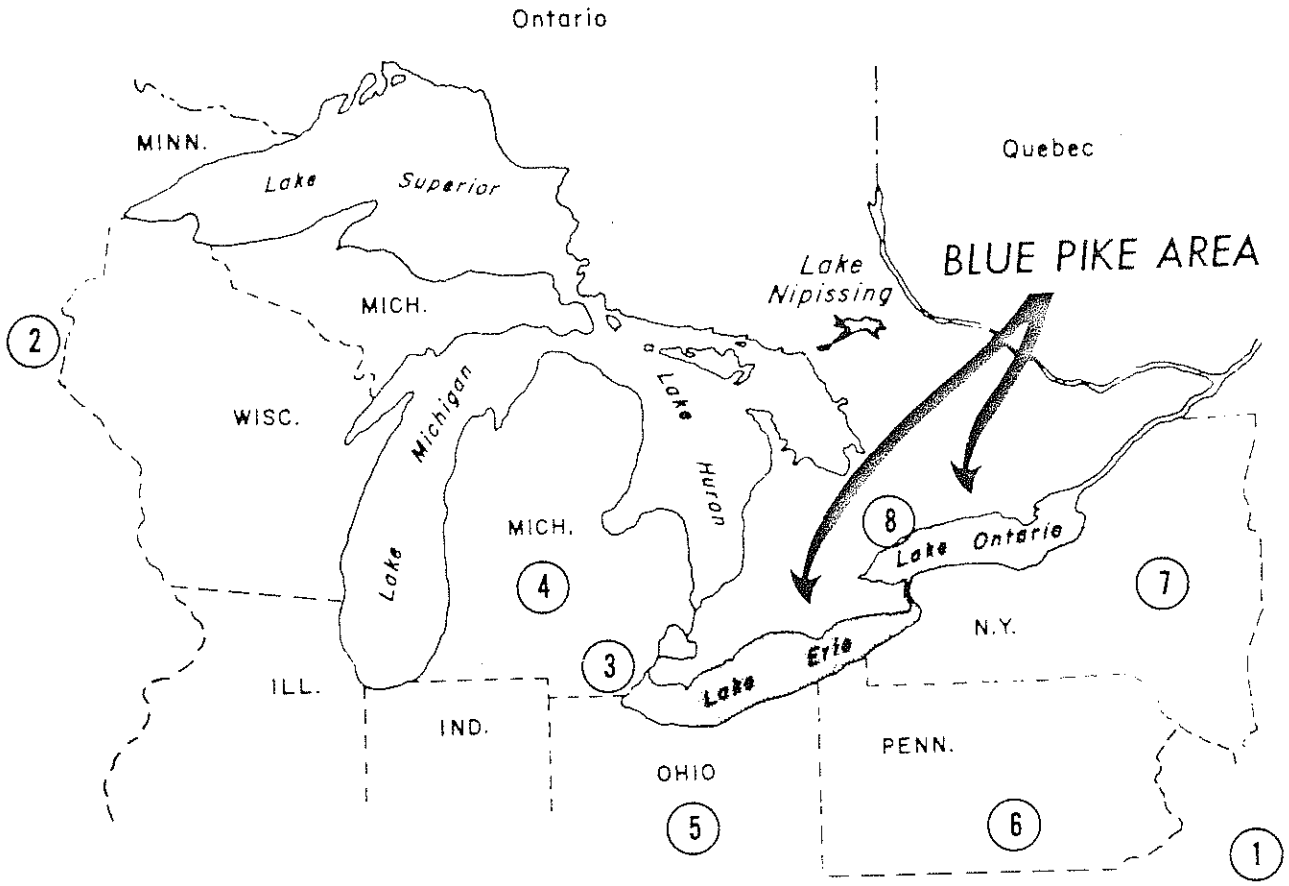


MAJOR COOPERATING AGENCIES BLUE PIKE RECOVERY

(Numbers correspond with locations)

1. Office of Endangered Species, USFWS, Washington, D.C.
2. Hatcheries and Fish Resources , USFWS, Twin Cities, Minnesota
3. Great Lakes Fishery Laboratory, USFWS, Ann Arbor , Michigan
4. Michigan Department of Natural Resources, Lansing, Michigan
5. Ohio Department of Natural Resources, Columbus, Ohio
6. Pennsylvania Fish Commission, Harrisburg, Pennsylvania
7. New York Dept. of Environmental Conservation, Albany, New York
8. Ontario Ministry of Natural Resources, Toronto, Canada

RECOVERY TEAM ENDORSEMENT

Prepared and approved by the following Blue Pike Recovery Team Members:

ARDEN J. TRANDAHL (Leader), Staff Fisheries Biologist, Hatchery Operations, Regional Office, U. S. Fish and Wildlife Service, Federal Building, Fort Snelling, Twin Cities, Minnesota 55111

Arden J. Trandahl

JOHN K. ANDERSEN, Project Leader, Division of Fishery Services, U. S. Fish and Wildlife Service, Warren, Pennsylvania 16365

John K. Andersen

SHYRL E. HOOD, Chief, Warm Water Fisheries, Pennsylvania Fish Commission, Linesville Fish Culture Station, Linesville, Pennsylvania 16424

Shyrl E. Hood

RUSSELL LEE SCHOLL, Fish Management Supervisor, Lake Erie Research Unit, Division of Wildlife, Ohio Department of Natural Resources, Sandusky, Ohio 44870

Russell Lee Scholl

WILLIAM F. SHEPHERD, Lake Erie Unit Leader, Great Lakes Fishery Section, Bureau of Fisheries, Division of Fish and Wildlife, New York Department of Environmental Conservation, Olean, New York 14760

William F. Shepherd

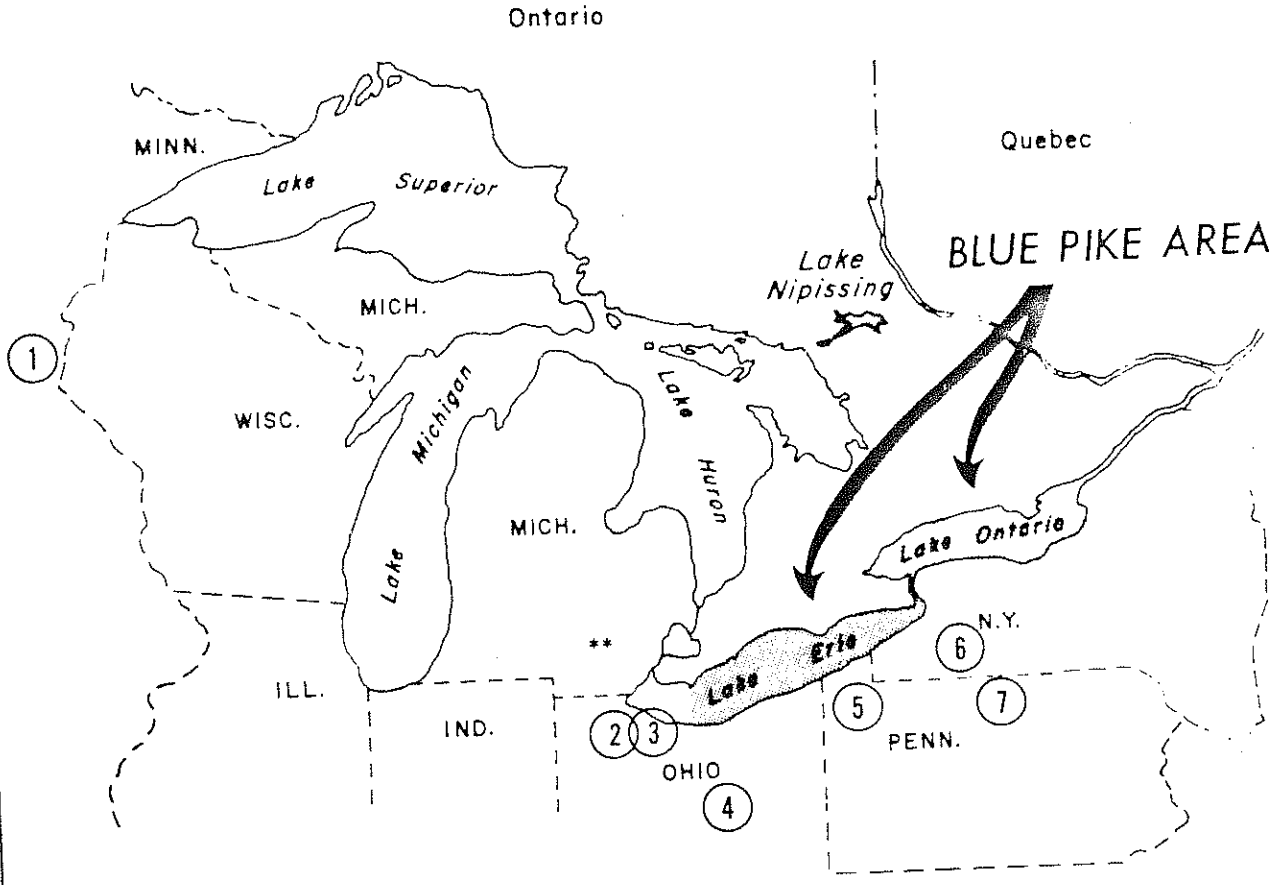
ARNOLD J. STOLTZ, Hatchery Manager, Hebron National Fish Hatchery, U. S. Fish and Wildlife Service, Hebron, Ohio 43025

Arnold J. Stoltz

HARRY VAN METER, Supervisor, Lake Erie Fish Stocks Assessment Project, Sandusky Biological Station, U. S. Fish and Wildlife Service, Sandusky, Ohio 44870

Harry Van Meter

John W. Parsons, formerly of the Great Lakes Fishery Laboratory, U. S. Fish and Wildlife Service, Ann Arbor, Michigan, served as an original Team Member. He resigned in November, 1975 to accept an FAO assignment in Pakistan. He continues to serve as a Team Advisor.



BLUE PIKE RECOVERY TEAM MEMBERS AND LOCATIONS

(Numbers correspond with locations)

(1) Arden Trandahl, Leader, Twin Cities, Minnesota

(2) Harry Van Meter, Sandusky, Ohio

(3) Russell Scholl, Sandusky , Ohio

(4) Arnold Stoltz, Hebron, Ohio

(5) Shyrl Hood, Linesville, Pennsylvania

(6) Bill Shepherd, Olean, New York

(7) John Andersen, Warren, Pennsylvainia

** John Parsons, presently on assignment in Pakistan, Formerly assigned to Ann Arbor, Michigan

PLAN RATIONALE

The passenger pigeon and the dodo bird have long been considered classic examples of species extinction. In more recent times, the blue pike, which once had great economic importance as a valuable source of food and recreation, virtually disappeared, with hardly a passing notice. Following the collapse of the blue pike fishery in the late 1950's and the lack of recruitment, the U. S. Fish and Wildlife Service in the early 1960's informally recognized the endangered status of this fish.

Despite endangerment, attempts to preserve blue pike were lacking. Neither the Endangered Species Protection Act of 1966 (80 Stat. 926) nor its amended version, the Endangered Species Conservation Act of 1969, provided a Federal prohibition against the taking or possession of native endangered fish and wildlife. Under the provisions of these acts, the blue pike was recognized as an endangered species in the "Federal Register" and in the first and second editions of the USFWS publication "Rare and Endangered Fish and Wildlife of the United States"(Resource Publication 34) and in the 1973 third edition, "Threatened Wildlife of the United States"(Resource Publication 114).

The blue pike was declared endangered because it fit the criteria of the 1969 Act. Specifically, the blue pike is threatened because of destruction or drastic modification of habitat, over-exploitation or predation. Because of these and/or other factors, its very existence requires assistance.

The endangered status of blue pike has been recognized in the states of Michigan, Ohio, Pennsylvania, and New York. The Province of Ontario considers blue pike extinct.

Efforts to save the blue pike from extinction were accelerated by the Endangered Species Act of 1973 (87 Stat. 884). This Act expands previous acts on endangered species by providing new provisions for State cooperation and participation in the program through (1) cooperative agreements, (2) grants-in-aid funding and other incentives, (3) implementation of international commitments, (4) assignment of recovery teams, (5) development of recovery plans and (6) implementation of approved recovery plans.

The blue pike require restoration efforts far greater than one agency or level of government can supply. Broad public support of the program is also required. A successful blue pike recovery program will require coordination between state and federal agencies and private institutions. This recovery plan serves as the guide for coordinating the activities of these agencies. The plan identifies restoration problems and proposes a step by step solution by identifying participating agencies, indicating costs and the order in which actions will be undertaken. States must be intimately involved because of habitat they manage; their legal responsibilities for resident wildlife; and biological skills possessed by professional ecologists they employ.

In early 1975, the Director of the U. S. Fish and Wildlife Service, in cooperation with interested states, appointed a Recovery Team to prepare and submit a Blue Pike Recovery Plan. This plan was prepared by the team in accordance with the objectives of the Endangered Species Act of 1973.

SPECIES DESCRIPTION AND STATUS

Introduction

The blue pike, Stizostedion vitreum glaucum, once an abundant and valuable fish of the lower Great Lakes, apparently has been extirpated or nearly so as an entity in Lakes Erie and Ontario. A relict population is reported to exist in a Canadian tributary of Lake Huron. The species is not known to have inhabited other waters. Despite disagreement in the literature concerning the taxonomic differences between the blue pike and the walleye, Stizostedion vitreum vitreum, the blue pike is readily distinguishable by its blue color and lack of yellow pigmentation. The rapid depletion of the blue pike in Lakes Erie and Ontario in the late 1950's was a severe economic loss to the commercial and sport fishery. The last confirmed specimen was collected in 1965. Other species of equivalent value have not replaced the blue pike. Although the cause of the decline is not known, pollution, oxygen depletion, over-exploitation, and competition with rainbow smelt (Osmerus mordax) probably were contributing factors.

Distribution

The distribution of blue pike in the Great Lakes was limited primarily to central and eastern Lake Erie, the Niagara River, and western and southern Lake Ontario (Hubbs and Lagler 1958; Scott and Crossman 1973). Blue pike apparently still inhabit a portion of the Lake Huron

drainage. This conclusion is based upon examination of S. vitreum specimens and photographs of specimens from that water in 1974 (John W. Parsons, personal communication), and from reports on this genus in Lake Nipissing by Harkness (1936), Sinclair (1961), and Jorgensen (1974).

Reports of blue pike in Three-Mile Lake in the Lake Huron drainage, Long Lake in the Lake Ontario drainage, and several unnamed lakes in Canada (Radforth 1944) were found to be unsubstantiated (Stone 1948). Although Radforth (1944) also reported blue pike in Lake Winnipeg, Manitoba, neither Stone (1948) nor Scott and Crossman (1973) could find evidence to substantiate the report.

Taxonomic Status

For much of the last century, the nomenclature of the blue pike has troubled taxonomists. Early observers (Goode 1884; Jordan and Evermann 1902; Dymond 1922) recognized yellow, gray and blue forms of S. vitreum in Lake Erie, but were not sure of the significance of the forms. The yellow form obviously was the walleye but the blue form was different enough to lead Kendall (1921) to suggest that it was a separate species or subspecies and Hubbs (1926) to describe it as a new species, S. glaucum. Later the Lake Erie form was given subspecies status, S. v. glaucum Hubbs (Deason 1936).

Whether the blue form from Lake Ontario was the same as the Lake Erie

subspecies troubled Deason (1936), who suggested that the Lake Erie and Lake Ontario blue pike may have been separate subspecies and recommended further study. Stone (1948) recommended that blue pike be given specific status and that Lake Erie and Lake Ontario blue pike populations be considered separate subspecies. However, his views were never generally adopted. Christie (1973) proposed that Lake Ontario blue pike were migrants from Lake Erie, and presented convincing arguments based largely on similar fluctuations in year-class strengths, commercial production, and growth characteristics of the species in the two lakes. Since the early 1950's, most taxonomists and biologists have accepted the blue pike of Lake Erie and Lake Ontario as a single subspecies. The gray form (or gray pike) of Lakes Erie and Ontario has been widely assumed to be a walleye-blue pike intergrade.

Size and Growth Rate

The smaller average size and slower growth of blue pike were described as factors for helping separate blue pike from walleye and for establishing speciation (Adamstone 1922; Hubbs 1926; Deason 1936; and Stone 1948). Adamstone reported that blue pike in Lake Erie seldom exceeded 0.45 kg and rarely reached 2.3 kg, and that walleyes often weighed 2.3 to 4.5 kg and sometimes as much as 9 kg. Of fish examined by Adamstone, the oldest pike was age VI and the largest was 33 cm in length; for walleyes, the respective values were age XII and 64 cm. Deason reported maximums of age IX and 46 cm for blue pike and age XI and 80 cm for walleyes.

Differences in average lengths of fish at different ages were used by Adamstone and Deason to demonstrate differences in rate of growth. As examples, blue pike and walleyes that had completed six growing seasons were 26 and 34 cm long, respectively, in 1921 (Adamstone 1922), and 31 and 42 cm long in 1927-32 (Deason 1936). Adamstone believed that the difference in growth was hereditary but Deason reasoned that the difference was due to the deeper and colder water in which blue pike characteristically lived.

The sharp decline in abundance and the resultant increase in growth of blue pike in the 1950's dispells the view that blue pike always grew more slowly than walleyes. Parsons (1967) reported that blue pike that had completed four growing seasons were about 8 times heavier in 1959 (1.3 kg) than in 1951 (0.17 kg) and considerably longer (48 cm as compared with 28 cm). In fact, Lake Erie blue pike in 1959 were larger than Lake Erie walleyes of the same age in 1921 (Adamstone 1922), in 1927-32 (Deason 1936), and in 1943-54 (Parsons 1970), and as large as the extraordinarily fast growing walleyes in 1959 (Parsons 1970). For example, in 1959, among fish that had completed 4 years of life, average lengths and weights of blue pike and walleyes were the same (48 cm and 1.3 kg). These data are indications that slow growth, and consequently small size, are not necessarily characteristic of blue pike, and, therefore, have no bearing on taxonomic recognition.

Orbital-Interorbital Proportion

One difficulty in assigning species or subspecies rank to the blue pike was the lack of reliable morphological differentiation between it and the walleye. Although the two forms exhibited nearly identical measurements and counts, Hubbs and Deason demonstrated a tendency for blue pike in Lake Erie to have a proportionately larger orbital length (O) and smaller interorbital width (I).

Hubbs reported that the O/I ratios of Lake Erie walleyes and blue pike ranged from 1.0 to 1.4 and from 1.4 to 2.0, respectively, and were, therefore, useful for separating the two forms. He did not present the data from which these values were determined. Deason, in his key to Lake Erie Stizostedion, gave O/I ratios (he used the term E/I) of 0.9 to 1.4 for adult walleyes (ranging as high as 1.8 for juveniles) and 1.2 to 2.0 for blue pike (values again were highest for juveniles).

The analyses of data from other sources demonstrate that orbital proportions are not necessarily helpful for distinguishing between blue pike and walleye. For example, the increase in growth of blue pike in the mid-1950's described in the previous section was so great that changes in body proportions were almost certain to have occurred; consequently, orbital length and interorbital width proportions for fish of the same size after 1954 most likely changed. (See Hile 1936 and Martin 1949 for a general review of the effect of growth rates on body proportions).

Evidence also is strong that O/I ratios vary among samples of blue pike and walleyes because of differences in the lengths of the fish examined and because of differences in growth rates of the population from which the samples were taken. Reports on S. vitreum specimens in Lake Nipissing (Sinclair 1961; Jorgensen 1974) tend to support this suggestion.

Color

Blue pike generally have been identified in the field by their color. Hubbs and Stone characterized the Lake Erie blue pike in life by its grayish-blue dorsal surface and bluish-white paired fins, and the walleye by its typically brassy yellow dorsal surface (never bluish) and usually yellowish paired fins. Scott and Crossman (1973) described the blue pike from the Niagara River as slate-blue or steel-blue on the dorsal surface, ice-blue to silvery on the sides, and silvery to white on the ventral surface. The paired fins were white. Deason reported that the color of Lake Ontario blue pike was similar to that of fish from Lake Erie, but tended to be a darker, duller shade of blue.

As indicated previously (Parsons 1967), the subspecies in Lake Erie had no yellow pigment. This was based on the examination of blue pike and walleyes in the commercial landings of most fishing ports between Sandusky, Ohio and Dunkirk, New York, during the fall of 1957 and the spring and fall of 1958, 1959, and 1960 (Parsons, personal

Blue pike suspect (above) and typical walleye demonstrate differences in yellow pigment on the body and fins. Fish taken from Lake Erie near Dunkirk, New York in April 1975. (FWS photo by Lee Emery)

communication). During that period, the two were easily separated. The difference in color -- steel blue vs. yellowish mottlings -- was clearly evident. The few fish that were questionable, i.e., the relatively scarce gray form, had yellow pigment on at least some parts of the body or fins. "Gray pike" (in the vernacular of the commercial fishermen) are still occasionally found in eastern Lake Erie, and fishermen sometimes report them as blue pike in their catch records.

Spatial, Bathymetric, Reproductive, and Temporal Isolation

Deason (1936) implied that Lake Erie blue pike ranked as a subspecies in part because of their isolation from walleye stocks in the lake. Blue pike inhabited primarily the eastern and central basins, whereas walleyes were concentrated in the western basin; they spawned in deeper and cooler water than the walleye; they, like walleyes, spawned almost entirely in open lake areas where they were most abundant; and they usually spawned in May, whereas walleyes usually spawned in April. These general conclusions, which Stone generally agreed with and enlarged upon, were based on examination of samples of blue pike and walleyes in the commercial catch in 1927-32 and on analysis of the 1913-32 commercial catch statistics. Other evidence of reproductive isolation was indicated by sharp differences in year-class strength in 1942-56. For example, blue pike had exceptionally strong year classes in 1944, 1949, and 1954 and weak year classes in the other 12 years (Parsons 1967); whereas walleyes in the same period had relatively strong year classes in all years except

1945, 1953, 1955, and 1956 (Parsons 1970).

Stone reported that blue pike spawned in the open water of western Lake Ontario in early May when water temperatures were about 6.6 C (range 3.9-8.9 C), at depths usually near 15 m (extremes 5-28 m), and that Lake Ontario walleyes spawned in April in shallow estuaries and near river mouths. R. G. Ferguson (personal communication) reported that blue pike usually spawned in May at depths exceeding 13 m in the central basin of Lake Erie, and Parsons (1972) reported that walleyes in the western basin spawned about mid-April at depths usually less than 6 m, at water temperatures near 7.2 C (range 5.5-10.0 C). In Pennsylvania waters of the eastern basin of Lake Erie on 21 May 1953, Shyrl Hood (personal communication) observed gravid blue pike and walleyes caught together in gillnets set on the bottom at a depth of 15 m at 8.9 C. These walleyes were of a small isolated population long recognized by fishermen and biologists, but only recently acknowledged in the literature (Wolfert 1969). These observations clearly indicate that walleyes and blue pike in Lake Erie and Ontario spawned at about the same water temperature but that the blue pike typically spawned about a month later because their habitat warmed more slowly in the spring, and that walleyes and blue pike in typical blue pike habitat sometimes spawned at the same location, time, depth, and water temperature.

Intergradation and Introgressive Hybridization

According to Deason, the wide overlap of morphometric characters of blue pike and walleyes in Lake Erie suggested intergradation to such a degree that the two forms were labeled as subpsecies rather than species. He made no reference to intergrades or gray pike. Stone, on the other hand, referred to the gray pike and judged that because of its intermediate color characteristics, it was a walleye-blue pike intergrade; however, he referred to only one specimen in his collection.

Trautman (1957) also assumed that gray pike were intergrades because of their intermediate characteristics, and reported that intergrades were common in Lake Erie when blue pike were abundant.

Despite common acceptance of the existence of intergrades, their capacity to reproduce was never measured. W. B. Scott (personal communication) examined a number of relatively large gray pike, which he assumed to be intergrades, but their gonads were so poorly developed that sex could not be distinguished. Although live young were produced by artificially cross breeding male walleyes and female blue pike, and their reciprocals (Clark 1959), the fish were not raised to maturity.

Regier et al. (1969) theorized that walleye-blue pike intergradation in Lake Erie ultimately led to introgressive hybridization and extirpation of blue pike because the high abundance of walleyes in the mid-1950's caused a serious breach of reproductive isolation. Blue pike were

reported to be vulnerable to introgressive hybridization at that time because their stocks were severely depleted by exploitation and were subjected to summer oxygen depletion and competition with rainbow smelt, Osmerus mordax, for food and space. The history of the composition of the S. vitreum populations of Lake Nipissing suggests that an advanced state of introgressive hybridization of "blue pike" may be in progress there.

Sport Fishery

Statistics on the blue pike sport fishery are lacking, but the following observations give some evidence of the value of the blue pike as a sport fish in Lake Erie. Kelley (1940) reported that sport fishing for blue pike near Cleveland, Ohio, sometimes was so intensive and successful that it appeared more like a "food fishery" than a "sport fishery". Walsh (1955) described a booming sport fishery near Erie, Pennsylvania, in the early 1950's that supported a fleet of 25 party boats, each with a capacity of 20 to 60 fishermen. Alfred Larsen (personal communication), corroborated Walsh's observations. Other areas where blue pike supported large sport fisheries in the 1940's and early 1950's were near Sandusky, Ohio (Clarence F. Clark personal communication); near Dunkirk and Silver Creek, New York (Kenneth Johnston personal communicaton); near the outlet of the Niagara River (W. B. Scott personal communication); and southwest of Buffalo, New York (William F. Shepherd personal communication).

Collapse of the Fishery

The severity of the loss of the blue pike is indicated by the loss of a commercial fishery that produced nearly 450 million kg of marketable fish in 1885-1962. This estimate was based on extrapolations of sporadic reports of annual blue pike landings in United States waters of Lake Erie in 1885-1914, and of Lake Ontario in 1897-1917, and from annual production records for all of Lake Erie in 1915-62 and all of Lake Ontario in 1918-62. These statistics and others reported here, through 1973, were taken from Baldwin and Saalfeld (1962) and unpublished supplements.

Lake Erie

In 1915-59, blue pike contributed 27% of the total commercial production of Lake Erie, and in some years their contribution exceeded 50% (Parsons 1967). Average annual production was 5.8 million kg in 1915-59 (maximum, 12.2 million in 1936), 2,270 kg in 1960-62, and from about 227 kg to zero in 1963-75. The collapse of the blue pike fishery forced blue pike fishermen to either seek other species or go out of business.

Lake Ontario

Commercial production of blue pike in Lake Ontario was about one-tenth that in Lake Erie. Annual production averaged 59,000 kg (maximum 294,000 kg in 1952) in 1918-57, declined to 2,270 kg in 1958-61, and

was insignificant in 1967-75. Apparently, sport fishing was centered in the lower Niagara River and adjacent lake areas in Ontario and New York (E. J. Crossman personal communication) and in and near the Oswego River, New York (William Pearce personal communication).

The loss of the Lake Ontario blue pike was of serious consequence because it was the last of the valuable deepwater species to disappear, preceded by Atlantic salmon, lake trout, and lake whitefish (Christie 1973). Since the late 1950's, biologists of the Ontario Ministry of Natural Resources annually sampled eastern Lake Ontario with gillnets and trawls, and monitored commercial landings, but no blue pike were observed after 1960 (W. J. Christie personal communication). No blue pike were caught during fishery investigations over relatively wide areas of Lake Ontario in 1964 and 1972 (unpublished cruise reports of the Great Lakes Fishery Laboratory's R/V Cisco in 1964 and R/V Kaho in 1972, and of the Ontario Ministry of Natural Resources' R/V Cottus in 1972).

Protection and Propagation

During the history of the blue pike commercial fishery, fishing regulations for Lake Erie were relatively uniform and liberal. Although regulations in this century varied somewhat from state to state over the years, those described for Pennsylvania in 1939 (Granite 1939) generally were representative for the lake as a whole; minimum total

length 28 cm (11 inches), open season March 1 to December 20, minimum gillnet mesh size 8 cm (3-1/8 inches, stretch measure), and minimum mesh size for trapnet cribs 7 cm (2-3/4 inches). Apparently, there were few or no restrictions on the sport fishery.

Despite the collapse of the fishery and the fish population in 1957-59, no changes were made in the regulations to better protect the blue pike primarily because severe fluctuations in abundance of blue pike in the past had become so commonplace that few people were especially alarmed about the condition of the fishery. Consequently, the blue pike were nearly extinct by the time it became known that they were endangered. In fact, commercial fishing for blue pike was not banned until 1967 in Ohio, 1971 in New York, and 1975 in Pennsylvania. Commercial fishing for blue pike is yet to be banned in Canadian waters of Lake Ontario probably because the fish is considered extinct there.

In an attempt to increase abundance, blue pike fry were planted in Lake Erie sporadically from about 1910 to 1962 (Shyrl Hood and Clarence Clark personal communications; planting records are incomplete and are for Pennsylvania only). Most were planted in 1910 (142 million), 1915 (65 million), 1916 (111 million), 1932 (159 million), and 1957 (37 million). Known plantings for each of 10 other years were usually 3 million or less. There was no correlation between numbers planted and production in subsequent years. There are no other known records

of blue pike plantings in waters other than Lake Erie. In face of the evidence, plantings apparently had little effect on blue pike abundance, and the modest fishing restrictions did not curb the decline of the species.

Species Status

The last recorded Lake Erie blue pike in its so-called "pure form" was identified by biologists of the Great Lakes Fishery Laboratory during routine sampling of the commercial landings in 1965. Since then, no confirmed blue pike have been observed by any of the state, provincial, or federal fishery agencies working on Lake Erie, and none have been observed from Lake Ontario. In recent years, various authors gave the following opinions on the status of the blue pike in the Great Lakes: Regier et al. (1969), "disappearance final"; Van Meter and Trautman (1970), "commercially extinct"; McAllister (1970), "rare, perhaps extinct"; Christie (1973), "disappearance of the species"; and Scott and Crossman (1973), "totally disappeared" (these authors deleted blue pike from their list of Great Lakes fishes).

The cause of the purported extinction of blue pike in Lakes Erie and Ontario is not known. Although the views of biologists on the decline or extinction of the form are too numerous and complex to examine here, most believe that one or more of the following factors were involved: pollution and severe oxygen depletion in the summer in the central basin of Lake Erie; excessive commercial and sport exploitation;

competition with and predation by exotic smelt; and introgressive hybridization.

Overview

Evidence is strong that (1) the blue pike is a valid subspecies of Stizostedion vitreum, (2) its habits, habitat, populations, and fisheries generally were separate from those of the walleye in Lakes Erie and Ontario, (3) the Lake Ontario blue pike population consisted largely or entirely of migrants from Lake Erie, (4) it is reported to be extirpated or nearly so in Lakes Ontario and Erie and (5) relict populations are reported to exist in Canadian and U. S. waters; these populations are as yet unconfirmed as blue pike.

Boxes of blue pike, such as these, were common on the commercial vessels of Lake Erie in the first half of the century. (Photo compliments of Shyrl Hood, Pennsylvania Fish Commission, Linesville, Pennsylvania)

THE RECOVERY STEP PLAN

Primary Objective: Restore a viable population of blue pike at a secure level, in suitable habitat, preferably in its former range

SECTION I. BLUE PIKE: STATUS AND POTENTIAL FOR RECOVERY

1. Acquire suspect blue pike specimens for identification and propagation

11. Obtain required federal, state, and foreign collecting permits

12. Inform fishermen of finders fee and the need for specimens

121. News releases, personal contacts, and posters

13. Collect live blue pike suspects

131. Priority areas of collection

1311. Lake Erie

13111. Endemic waters of U. S. and Canada

1312. Canadian waters where suspect blue pike have been reported

1313. Lake Ontario

13131. Endemic waters of U. S. and Canada

1314. Other waters purported to have been stocked with blue pike

132. Public sources (federal, state, and provincial agencies)

1321. Routine fish population surveys

1322. Special blue pike surveys

133. Private sources

1331. Commercial fishermen

13311. Regularly licensed fishermen

13312. Fishermen under special contract to fish for blue pike

1332. Sport fishermen

13321. Voluntary contributors

13322. Creel census

13323. Boat landings

1333. Research and educational institutions, and private contract agencies

13331. Volunteer and contract services

14. Confirm blue pike specimens and populations

141. Morphological characteristics

1411. Coloration, body size, eye size, other

142. Electrophoretic characteristics of enzymes

143. Other genetic characteristics

(Note: If blue pike or acceptable genetic intergrades cannot be found, declare the fish extinct and terminate recovery effort and team.)

SECTION II. BLUE PIKE PRESERVATION AND PROPAGATION

2. Develop program of propagation and culture

21. Artificial propagation in hatcheries and laboratories

211. Hold and protect blue pike broodstock in designated existing state and federal hatcheries

212. Use best hatching and rearing methods and techniques for producing successive generations of blue pike

213. Develop new and more efficient methods and techniques of blue pike propagation and culture including studies on behavior, growth, and environmental tolerances of eggs, fry, and other fish.

2131. Fish hatcheries

21311. State and federal

2132. Laboratories

21321. State and federal agencies, educational institutions, and private contract groups

214. Develop cost analysis and determine feasibility of raising blue pike of different sizes and ages

2141. Fry and post-fry

2142. Fingerlings and yearlings

2143. Broodstock

215. Provide new hatchery production and facilities

2151. Construct separate isolated holding and rearing tanks, ponds and raceways on existing hatchery grounds

2152. Contract private sources to raise blue pike

2153. Construct state or federal hatchery designed for blue pike

22. Lake, reservoir and pond culture

221. Plant broodstock in reservoirs and natural lakes

2211. Establish natural populations and reproduction

22111. Preserve gene pool

22112. Supply eggs for hatcheries

22113. Supply fish for introductions into other waters.

222. Plant fry in state and federal wildlife refuge ponds, lakes, highway borrow pits, and other protected waters.

2221. Supply fingerlings for stocking other waters

2222. Supply fingerlings for rearing as broodstock in hatcheries

223. Assessment of planting success

SECTION III. BLUE PIKE REHABILITATION

3. Long-range plantings of blue pike in Lake Erie and other suitable environments

31. Habitat and environmental inventory

311. Former natural habitat and spawning grounds

312. Environmental factors

3121. Water temperature, quality and depth

3122. Availability of food, escape cover and spawning sites

3123. Levels of interspecific competition and predation

32. Planting methods and practices for optimum survival and assessment

321. Locations

3211. Open water, shorelines, reefs, river mouths

322. Numbers of fish and planting density

3221. Fry, fingerlings and yearlings

323. Time of year

324. Truck, boat, air-drops

33. Protection of natural and planted stocks

331. Continuing public information services

332. Adequate legal restrictions on fishing and their enforcement

3321. Ban sport and commercial harvest of the species

3322. Set aside state and federal sanctuaries

34. Enhancement of habitat for blue pike thru public information programs and enforcement

341. Encourage water quality improvement

342. Enforce anti-pollution laws

35. Evaluation of plantings of blue pike (for long-range plantings as well as first introductions)

351. Monitoring

3511. Routine and special fish population surveys

35111. Federal, state, and provincial agencies

35112. Educational institutions and private contract groups

3512. Examination of angler's catches and net-run catches of commercial fishermen

352. Determination of population structure

3521. Distribution and abundance

3522. Age and size composition

36. Estimation of stocking requirements for maintaining blue pike populations

361. Evaluation of basic stocks

3611. Contribution from natural reproduction

3612. Survival of planted fish

3613. Carrying capacity

362. Determine numbers of fish required for plantings

3621. Sustain secure level of abundance

36211. Fingerlings and yearlings required

362111. First plantings estimated to be 250,000 four-inch fingerlings annually

362112. First plantings estimated to be 5,000 10-12 inch sub-adults or adults annually

36212. Fry and post-fry required

362121. Pilot plantings will consist of any available fry

37. Sustain propagation and plantings, and surveys and investigations as required and as capability permits

371. Successive planting of 500,000 four-inch fingerlings and 10,000 10-12 inch sub-adults necessary to sustain populations.

38. Determine framework for allowable harvest and supportive regulations prior to removal of blue pike from the endangered list.

SCHEDULE OF PRIORITIES, RESPONSIBILITIES, AND COSTS

Section	Type of Action	Step Plan Number	Responsibility (in order) Lead Agency	Cooperators	Target Completion Date	Estimated Costs FY-76	FY-77	FY-78	FY-79	FY-80	FY-81	
Acquire and Identify Specimens	Public Information	12, 121	FWS	Ohio, Ont. N.Y., Pa.	FY-81	1,000	1,000	500	500	500		
	Collection of Specimens	13, 131, 132, 133	FWS	N.Y., Pa., Ohio, Ont.	FY-78	9,000	15,000	12,000				
	Species Confirmation	14, 141, 142, 143	FWS	Universities; States	FY-78	2,000	4,000	2,000				
Preservation and Propagation	Protection of Broodstock	211	FWS	Pa., N.Y.	Continuing	3,000	10,000	15,000	20,000	20,000	20,000	Continuing
	Propagation: Existing Technology	212	FWS	Pa., N.Y., Ohio	FY-79	1,000	5,000	25,000	50,000			
	Propagation: New Technology	213	Pa.	N.Y., FWS, Ohio	FY-79		5,000	50,000	20,000			
	Feasibility and Cost Analysis	214	Pa.	FWS, N.Y., Ohio	FY-78			5,000	5,000			
	New Fish Rearing Units	215, 2151, 2152	States	Pa., N.Y., FWS, Ohio	FY-81				50,000	500,000		
					FY-82					100,000	2,000,000	
	New Blue Pike Hatchery	215, 2153	States/FWS		FY-79			10,000	20,000			
	Broodstock Plantings	221	States/FWS		Continuing			5,000	10,000	10,000	10,000	Continuing
	Fry Plantings	222	States/FWS									
Rehabilitation	Habitat Inventory	31	States	FWS	FY-78		5,000	8,000				
					FY-80			10,000	10,000	10,000		
	Optimum Planting Practices	32	States	FWS	Continuing	500	5,000	5,000	7,500	7,500	7,500	Continuing
	Protection and Enforcement	33, 331, 332	States	FWS	Continuing			5,000	10,000	20,000	25,000	Continuing
	Evaluation of Plantings and Requirements	35, 36	FWS/States		Continuing			20,000	90,000	95,000	145,000	Continuing
	Sustained Propagation	37	FWS/States		Not Determined							
	Harvest and Regulation	38	States/FWS									
					Estimated Cost - FY Total	16,500	50,000	172,500	293,000	763,000	2,207,500	
					Grand Total							$3,502,500

RECOVERY PLAN NARRATIVE

Saving the blue pike from extinction and maintaining stocks for possible rehabilitation will first require the collection and preservation of relatively large numbers of broodstock in hatcheries. One potential source of broodstock is Lake Erie where blue pike were once abundant. The occasional bluish walleye or blue pike suspect collected during the past few years may be blue pike-walleye intergrades. Whether or not some of the intergrades can be selectively propagated into the blue form which is genetically different than walleyes, must yet be determined.

The ultimate solution may depend upon populations of blue pike reported to exist in a drainage system tributary to Lake Huron and other Canadian waters. Also, U. S. waters reported to have been planted with Lake Erie mixed walleye-blue pike stocks may have potential. These waters may provide potential gene pools that could be tapped to save the blue pike from extinction. Further investigation is needed, however, to establish the credibility of both Canadian and U. S. populations.

The selective propagation of blue pike from Lake Erie will be a tedious, time-consuming process. In the spring of 1975, nine blue pike suspects were collected from Lake Erie, of which three were ripe females. The eggs from these fish failed to develop even though they were fertilized with viable sperm. Despite this failure, propagation of suitable specimens will be continued.

Conceivably, if the fish in other waters are verified as blue pike and eggs or fish are made available, the reestablishment of blue pike in Lakes Erie and Ontario may be greatly simplified. Sauger may serve as an example of restoration. Once relatively abundant in western Lake Erie, the sauger became so scarce in the 1960's that the capture of one was a rarity. In an attempt to reestablish the sauger, the Ohio Division of Wildlife planted several hundred thousand fingerlings in the western basin in 1974. Studies in 1975 indicated high survival and rapid growth. If similar results can be obtained with plantings of blue pike, even if it fails to reproduce naturally, a basic stock can be maintained indefinitely in Lake Erie.

Because of the uncertainty of the success or timeliness of some phases of the blue pike recovery plan, several steps in the plan may be active sumultaneously. Perhaps some steps may never to activated. In any case, the plan will be evaluated annually and its course redirected as necessary. Attempts to obtain and propagate blue pike in 1975 have revealed the enormity of the task at hand.

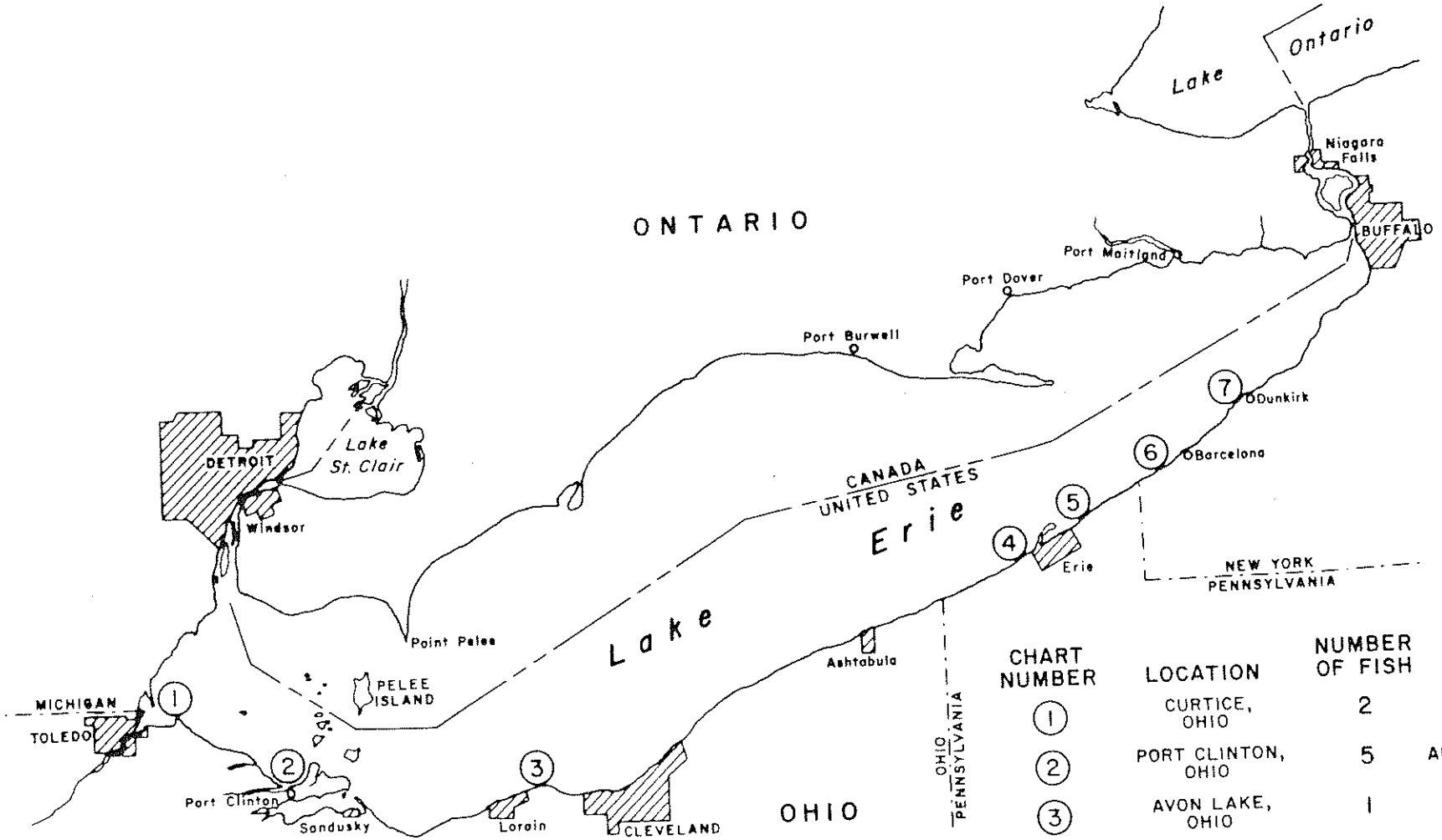
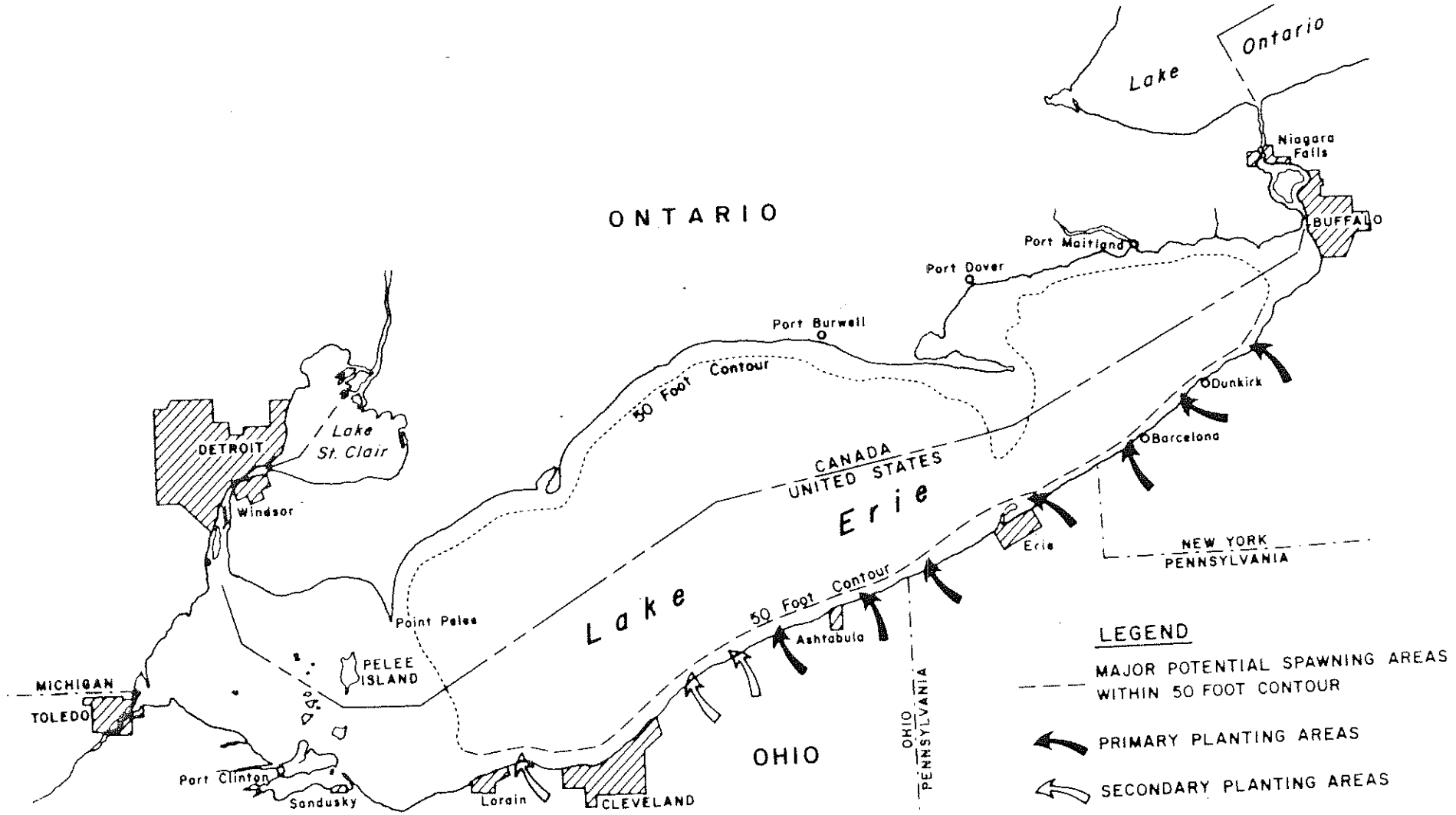


CHART NUMBER	LOCATION	NUMBER OF FISH	DATES
(1)	CURTICE, OHIO	2	JUNE 1975
(2)	PORT CLINTON, OHIO	5	APRIL - MAY 1975
(3)	AVON LAKE, OHIO	1	AUGUST 1972
(4)	ERIE, PENNSYLVANIA	3	SEPT. 1972 - SEPT. 75
(5)	EAST ERIE, PENNSYLVANIA	11	JUNE - SEPT. 1973
(6)	WESTFIELD, NEW YORK	1	MAY 1975
(7)	DUNKIRK, NEW YORK	10	APRIL 1975
		33 TOTAL	

LOCATIONS AND DATES THAT BLUE PIKE SUSPECTS WERE OBTAINED FOR IDENTIFICATION AND PROPAGATION, 1972 - 75. LOCATION AND CHART NUMBERS CORRESPOND

DATE: 1975



LAKE ERIE BLUE PIKE HABITAT AND PROJECTED MAJOR PLANTING AREAS

DATE: SEPT. 1975

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(Asterisks indicate authors referred to in the text)

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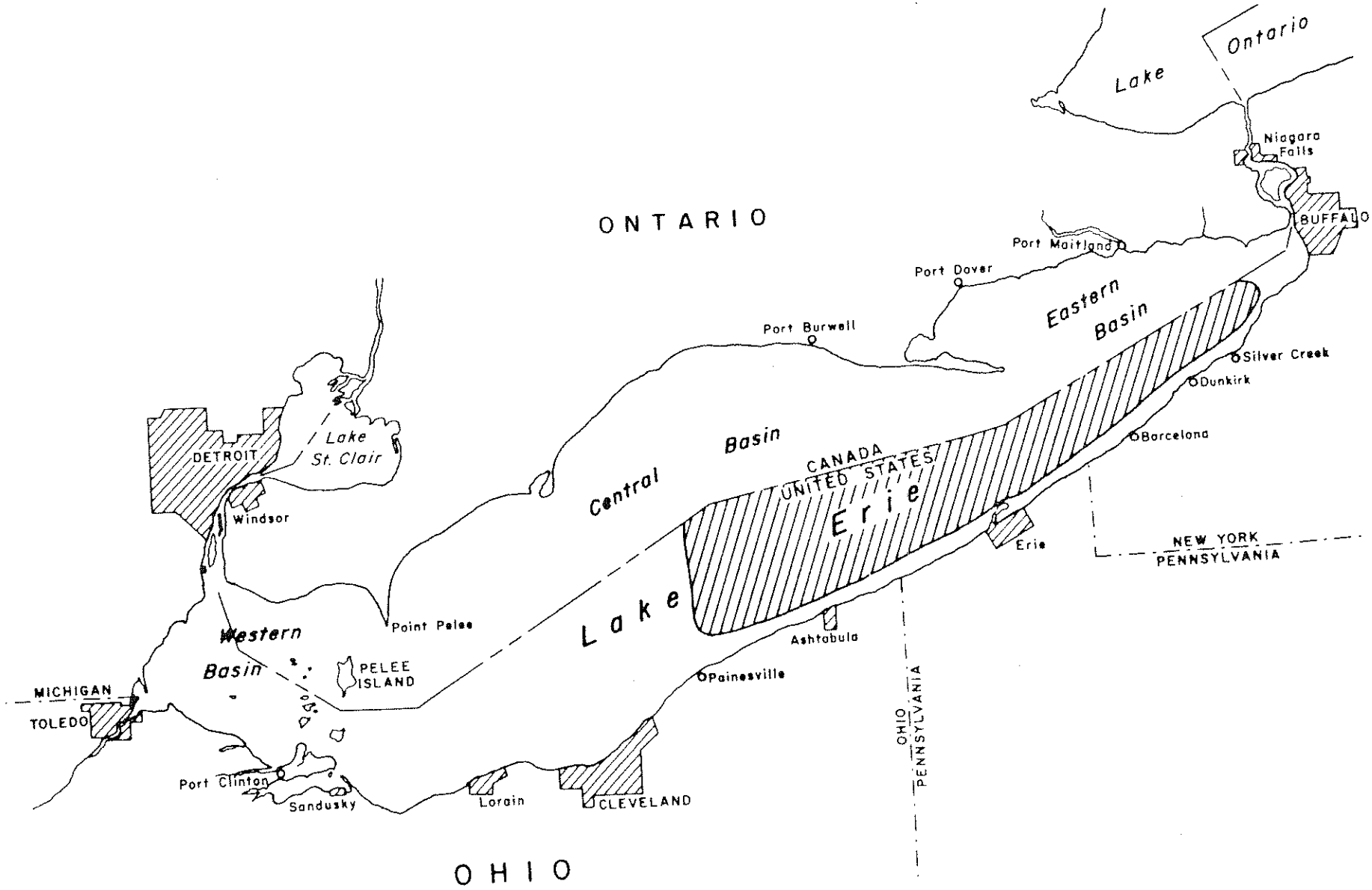
A P P E N D I X

BLUE PIKE, CRITICAL HABITAT -- LAKE ERIE

On the following page is a map, diagraming the preliminary definition of blue pike critical habitat. Additional information is being assembled to further define the critical habitat area. When the Recovery Plan is updated, the new critical habitat definition and areas will be included.

The current description of critical habitat as related to the drawing is as follows:

> Principally in the Central Basin from Painesville, Ohio north to the International boundary northeasterly to Silver Creek, New York in the Eastern Basin, including nearly all of Pennsylvania and New York waters of Lake Erie; at depths ranging from 20 to 100 feet in the spring, April - June, and especially during the spawning period in May, and, in the summer at depths from 50 to 150 feet, where free oxygen concentrations may be critically low (less than 4 ppm), and where water temperature usually is less than 70° F.



CRITICAL HABITAT (Hatched Lines) FOR BLUE PIKE IN LAKE ERIE, PRINCIPALLY IN THE CENTRAL BASIN FROM PAINESVILLE, OHIO NORTHEASTERLY TO SILVER CREEK, NEW YORK IN THE EASTERN BASIN AT DEPTH EXTREMES FROM 20 TO 100 FEET AT WATER TEMPERATURES LESS THAN 70° F.

DISTRIBUTION LIST -- DRAFT BLUE PIKE RECOVERY PLAN

In September, 1975, copies of the draft Blue Pike Recovery Plan were sent to the following for review and comments:

Regional Director
U. S. Fish & Wildlife Service
Federal Bldg., Ft. Snelling
Twin Cities, Minnesota 55111

Regional Director
U. S. Fish & Wildlife Service
John W. McCormack Post Office
and Courthouse
Boston, Massachusetts 02109

Dr. Howard A. Tanner, Director
Michigan Department of
Natural Resources
Stevens T. Mason Building
Lansing, Michigan 48926

Dr. Robert W. Teater, Director
Ohio Department of
Natural Resources
Fountain Square
Columbus, Ohio 43224

Mr. Herbert E. Doig, Director
Division of Fish & Wildlife
New York Department of Environ-
mental Conservation
50 Wolf Road
Albany, New York 12201

Mr. Ralph W. Abele
Executive Director
Pennsylvania Fish Commission
P. O. Box 1673
Harrisburg, Pennsylvania 17120

Mr. K. K. Irizawa
Executive Director
Ontario Ministry of Natural
Resources
Whitney Block, 99 Wellesley St. W.
Toronto, Ontario, Canada M7A 1W3

Dr. Milton Trautman
Museum of Zoology
2578 Kenny Road
Columbus, Ohio 43210

Dr. Reeve M. Bailey
Museum of Zoology
University of Michigan
Ann Arbor, Michigan 48104

Dr. B. Scott
Royal Ontario Museum
Dept. of Ichthyology and
Herpetology
Toronto, Ontario, Canada
M5S 2C6

Mr. Carlos M. Fetterolf, Jr.
Executive Secretary
Great Lakes Fishery Commission
P. O. Box 640
Ann Arbor, Michigan 48105

Mr. John F. Carr
Fishery Administrator
National Marine Fisheries
Service
P. O. Box 648
Ann Arbor, Michigan 48107

Director
Great Lakes Fishery Laboratory
1451 Green Road
Ann Arbor, Michigan 48105

Dr. Stanford Smith
National Marine Fisheries
Service
Ann Arbor, Michigan 48107

DISTRIBUTION LIST -- Cont'd.

Mr. Benny Martin
State Conservationist
Soil Conservation Service
U. S. Department of Agriculture
Box 985, Federal Square Station
Harrisburg, Pennsylvania 17108

Mr. Jerry R. Paine
Supervisor
Lake Erie Fisheries Assessment Unit
Ontario Ministry of Natural Resources
353 Talbot Street West
P. O. Box 40
Aylmer West, Ontario, Canada N5H 2S8

Dr. Bernard Griswold
Acting Leader
Ohio Cooperative Fishery Research Unit
U. S. Fish and Wildlife Service
Ohio State University
1735 Neil Avenue
Columbus, Ohio 43210

Sandusky Biological Station
U. S. Fish and Wildlife Service
2022 Cleveland Road
Sandusky, Ohio 44870

COMMENTS RECEIVED

The draft Recovery Plan has been reviewed by the following and their pertinent comments have been incorporated into this final Plan:

Dr. Stanford H. Smith
National Marine Fisheries Service
P. O. Box 648
Ann Arbor, Michigan 48107

Mr. Carl E. Parker
New York Department of Environmental Conservation
50 Wolf Road
Albany, New York 12201

Mr. Benny Martin
Soil Conservation Service
U. S. Department of Agriculture
Box 985, Federal Square Station
Harrisburg, Pennsylvania 17108

Mr. Herbert Doig, Director
Division of Fish & Wildlife
New York Department of Environmental Conservation
50 Wolf Road
Albany, New York 12201

Dr. Howard Tanner, Director
Ohio Department of Natural Resources
Fountain Square
Columbus, Ohio 43224

Mr. Carlos Fetterolf, Jr.
Executive Secretary
Great Lakes Fishery Commission
1451 Green Road
Ann Arbor, Michigan 48105

Dr. Joseph Kutkuhn, Director
Great Lakes Fishery Laboratory
1451 Green Road
Ann Arbor, Michigan 48105

Ohio Department of Natural Resources
Lake Erie Research Unit
P. O. Box 650
Sandusky, Ohio 44870

Dr. Milton Trautman
Museum of Zoology
2578 Kenny Road
Columbus, Ohio 43210

Regional Director
U. S. Fish and Wildlife Service
John W. McCormack Post Office and Courthouse
Boston, Massachusetts 02109

Mr. Edward R. Miller, Director
Bureau of Fisheries and Engineering
Pennsylvania Fish Commission
R. D. #1, Box 70
Bellefonte, Pennsylvania 16823

Mr. Galen Buterbaugh
Associate Regional Director
U. S. Fish and Wildlife Service
Federal Bldg., Ft. Snelling
Twin Cities, Minnesota 55111

Mr. C. E. Faulkner
Environmental Coordinator
U. S. Fish and Wildlife Service
Federal Bldg., Ft. Snelling
Twin Cities, Minnesota 55111

COMMENTS RECEIVED -- Cont'd.

Mr. A. L. McLain
Great Lakes Coordinator
U. S. Fish and Wildlife Service
Federal Bldg., Ft. Snelling
Twin Cities, Minnesota 55111

Dr. Bernard Griswold
Acting Leader
Ohio Cooperative Fishery Research Unit
U. S. Fish and Wildlife Service
Ohio State University
1735 Neil Avenue
Columbus, Ohio 43210

Mr. Ray Vaughn
Deputy Regional Director
U. S. Fish and Wildlife Service
17 Executive Park Drive N. E.
Atlanta, Georgia 30329

Ontario

Ministry of
Natural
Resources

Parliament Buildings
Toronto, Ontario
M7A 1W3

Our file number .

Your file number .

May 6, 1976

Mr. Arden J. Trandahl
Team Leader
Blue Pike Recovery Team
Room 648, Federal Building
Fort Snelling, Twin Cities
Minnesota 55111, U. S. A.

Dear Arden:

SUBJECT: Blue Pike Recovery Plan (Preliminary)

This will acknowledge with thanks receipt of the above under your April letter. It was pleasant to meet with you briefly to discuss the project and our concerns about some of the items in earlier versions of the report.

We have examined this copy and agree that most of our points of concern have been accommodated to some degree. We are still concerned at the numerous implied references to Nipissing, not only for administrative but also for scientific reasons, related to the applicability of the stock concept. That aspect of course remains a matter for your decision.

We will be pleased to continue cooperation on Lake Erie as discussed.

Again Arden, it was a pleasure to meet you.

Yours very truly,

K. H. Loftus
Director
Fisheries Branch

KHL:bm

Ontario

Ministry of
Natural
Resources

Parliament Buildings
Toronto, Ontario
M7A 1W3

Our file number .
Your file number .

May 6, 1976

Mr. Charles A. Hughlett
Acting Regional Director
U. S. Department of the Interior
Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111
U. S. A.

Dear Mr. Hughlett:

SUBJECT: Blue Pike Recovery Plan

I wish to acknowledge with thanks receipt of your letter of early April enclosing a copy (preliminary) of the above plan.

My staff will be reviewing the plan and commenting at a later date.

Yours very truly,

K. K. Irizawa
Executive Director
Division of Fish and Wildlife

ODNR
Ohio Department of Natural Resources
Fountain Square · Columbus, Ohio 43224 · (614) 466-3770

April 12, 1976

Mr. Charles A. Hughlett
Acting Regional Director
U. S. Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

Dear Mr. Hughlett:

The preliminary draft of the Blue Pike Recovery Plan that you enclosed with your letter of April 2, 1976, appears to have been given considerable thought and is well organized. My major concern, however, is the failure of the plan to convey the "real potential for recovering" this species. The absence of confirmed blue pike recaptures in the past decade and the varied opinions of experts regarding the status of this species connote a large degree of supposition in the plan.

The plan hopefully will overcome the supposition and determine if the blue pike can be reestablished in Lake Erie. I would hope there is a clear distinction between the steps in the plan so that expenditures are realistic in this recovery effort.

Our desire in Lake Erie is to work with immediate resource problems, but certainly we would not want to overlook an important fish that might be reestablished through efforts such as yours and the Blue Pike Recovery Team.

Sincerely,

Robert W. Teater

ROBERT W. TEATER
Director

RWT:dad

Regional Director, FWS, Twin Cities, MN (P&A-FH)

OCT 17 1975

Regional Director, FWS, Boston, MA (FH)

Comments - Blue Pike Recovery Plan

This memorandum is in reference to the subject draft plan which we recently received for comment. Overall, the plan as written seems to be rather thorough. However, in general, we would suggest that the following item be included:

The section of the plan that deals with the Status and Potential for Recovery (Section I) should be expanded to include a stronger analysis of the actual potential for recovery in light of this fish's potential for interbreeding with the walleye. Prior to going into an extensive propagation and culture program, an analysis of the blue pike's genetic and reproductive isolation in the wild and experimental cross-breeding should be pursued. If, in fact, it becomes apparent that such a problem is evident, even if the fish does exist as a true species, further expenditure on the project should be strongly evaluated.

In essence, Section I has given strong thought as to the status of the species but needs to be strengthened in terms of recovery potential. This analysis is especially important prior to the total commitment envisioned in Sections II and III to the total of 3.5 million dollars.

Thank you for this opportunity for comment.

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926

HOWARD A. TANNER, Director

April 15, 1976

Mr. Charles A. Hughlett
Acting Regional Director
Fish and Wildlife Service
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

Dear Mr. Hughlett:

Thank you for the opportunity to comment on your Blue Pike Recovery Plan.

The plan is well researched and provides excellent background on the blue pike.

However, since Atlantic salmon, lake trout and lake whitefish preceded the blue pike to extirpation in Lakes Erie and Ontario, I question the rationale behind deciding that blue pike (rather than some other bona fide species) "require restoration efforts far greater than one agency or level of government can supply" (page 6), or that we should have as our objective to "restore a viable population of blue pike at a secure level, in suitable habitat, preferably in its former range".

The agencies whose cooperation you lean on (page 6) as being so necessary for success with blue pike recovery are the same ones that watched it slip quietly into oblivion. These agencies exert little more coordinated control over fish populations in international Great Lakes waters now than they did then. Quotes from page 21 make my point, "Despite the collapse of the fishery and the fish population in 1957-59, no changes were made in the regulations to better protect the blue pike..."; "In fact, commercial fishing for blue pike was not banned until 1967 in Ohio, 1971 in New York, and 1975 in Pennsylvania. Commercial fishing for blue pike is yet to be banned in Canadian waters of Lake Ontario".

"Adequate legal restrictions on fishing and their enforcement" is buried on the bottom of page 28 of the Recovery Plan, after such things as hatchery construction, brood stock development, and stocking. This arrangement of priorities guarantees that the mistakes of the past will be perpetuated.

Before any meaningful management of international fish stocks can become reality on the Great Lakes, all key management agencies (including Canadian agencies) must become more responsive to the long term needs of the resource base and less to the short term interests of commercial fishermen. Until that time your efforts on blue pike are doomed and no commercially valuable species now present in the lakes is secure from the specter of extirpation.

Please forgive these blunt words--they are not meant to be malicious or incriminating, only realistic.

Sincerely,

C. D. Harris, Chief
Bureau of Renewable Resource Management

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Ogden Reid,
Commissioner

April 30, 1976

Mr. Charles A. Hughlett
Acting Regional Director
U. S. Department of the Interior
Fish and Wildlife Service
Federal Building
Twin Cities, Minnesota 55111

Dear Mr. Hughlett:

Members of my staff have reviewed a revised draft of the Blue Pike Recovery Plan and find that all significant comments submitted previously have been considered and incorporated.

The Division, therefore, finds the Plan in its current form quite acceptable.

Sincerely yours,

Herbert E. Doig
Director
Division of Fish and Wildlife