Yellow Perch Research and Management in Lake Michigan: Evaluating Progress in a Cooperative Effort, 1997–2001

The Lake Michigan Yellow Perch Task Group (YPTG)

COMPILED BY

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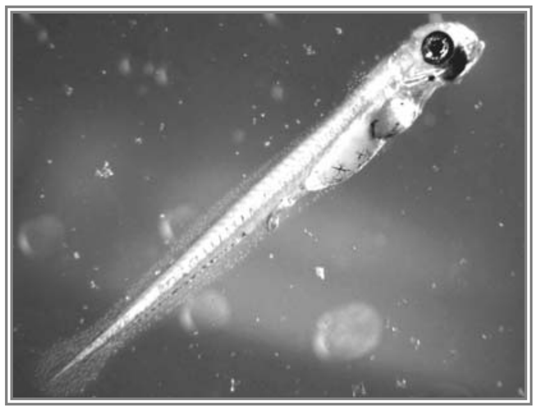
ABSTRACT

Yellow perch (*Perca flavescens*) is an important component of near-shore freshwater fish communities. It plays an important role in energy cycling and transfer, and is available to nearly all segments of the angling public and to commercial fisheries. Beginning around 1990, yellow perch population density declined in Lake Michigan due in part to an almost complete lack of recruitment. In response to this dramatic decline, the Lake Michigan Yellow Perch Task Group (YPTG) was formed (under the auspices of the Great Lakes Fishery Commission's Lake Michigan Committee) to develop a multi-agency research initiative to identify the likely cause(s) for yellow perch recruitment failure. The multi-agency effort has made substantial progress in addressing this question, and serves as a model for agencies to work collaboratively to address important management questions with a sound research strategy. We highlight the work conducted during 1997–2001 to address five factors (predation, zooplankton availability, temperature, mass water movement, spawning stock characteristics) potentially influencing recruitment of yellow perch. Thus far, work to address influence of forage availability and stock characteristics on yellow perch recruitment has yielded significant results. The YPTG continues work to quantify the relative importance of (and interaction among) the factors described above in determining yellow perch survival and recruitment. The cooperative approach used by the YPTG to address these issues holds great promise, and can be used by agencies managing shared resources regardless of the system in question.



ILLINOIS NATURAL HISTORY SURVEY

Newly hatched yellow perch larva, about 5.5 mm long.

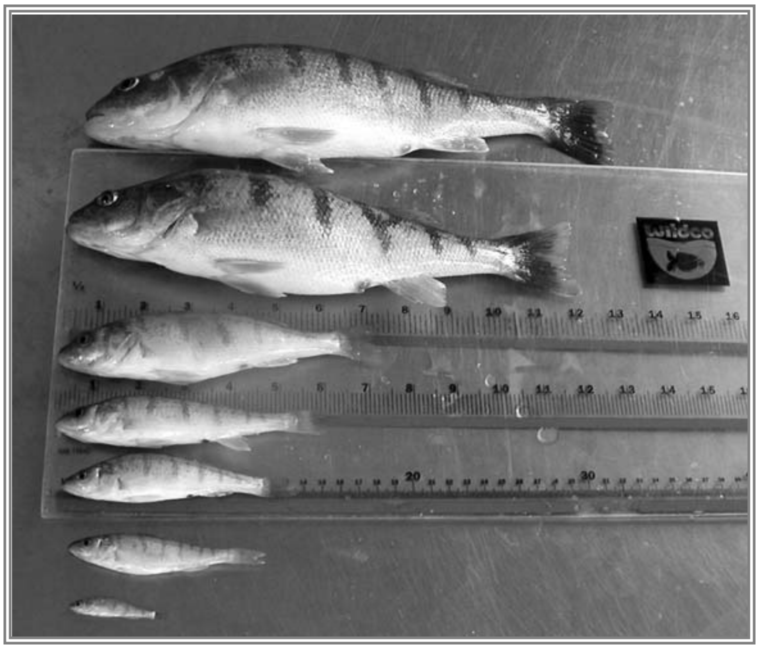
Yellow perch (*Perca flavescens*) is an important ecological and economic component of the Lake Michigan fish community. This species is indigenous to Lake Michigan, and plays an important role in energy cycling and transfer, especially in the near-shore waters of the lake (e.g., Evans 1986). Yellow perch are caught from piers, small boats, and party boats; thus, they are available to nearly all segments of the angling public. Historically, yellow perch supported a commercial fishery throughout much of the lake, but now only a limited fishery is permitted in Green Bay (Figure 1). Although yellow perch are small relative to other fish, it is among the most important Lake Michigan species in terms of annual weight of fish harvested. Between 1985 and 1993, commercial and recreational fishers annually harvested more than 1.1 million kg of yellow perch (GLFC 2000). During this period, yellow perch comprised approximately 85% of sport fish catch (Francis et al. 1996).

Beginning around 1990, yellow perch population density declined in Lake Michigan due in part to an almost complete lack of recruitment (Eshenroder et al. 1995; Francis et al. 1996; Shroyer and McComish 1998).

JERRY RANVILLE, MICHIGAN DNR

Historically, yellow perch supported a commercial fishery throughout much of the lake, but now only a limited fishery is permitted in Green Bay.

In response to the decline, the Yellow Perch Task Group (YPTG; Table 1) was formed in March 1994 (Francis et al. 1996) by the Lake Michigan Committee (LMC) of the Great Lakes Fishery Commission. The LMC is composed of representatives from the four states and tribal authorities bordering the lake, and is responsible for Lake Michigan fisheries management decisions and policy for the lake. Management actions are based on a series of Fish Community Objectives (FCO; Eshenroder et al. 1995); the specific objective for yellow perch in Lake Michigan is to "maintain self-sustaining stocks…[with] expected annual yields [of] 0.9 to 1.8 million kg…." With annual yellow perch yields well below the lakewide target levels described in the FCO, the YPTG was directed to develop a multi-agency research initiative to identify the likely cause(s) for yellow perch recruitment failure observed in Lake Michigan. Core YPTG membership consisted of at least one representative from each management agency, plus several researchers with known interest and experience in yellow perch research questions. In addition to this core group, researchers and managers from outside the basin were invited to attend meetings as regularly as possible.



BRIAN BREIDERT, INDIANA DNR

Yellow Perch Task Group research efforts were organized around specific processes / mechanisms affecting different life history stages.

The research effort described below grew out of a list of 17 hypotheses, developed by the Lake Michigan YPTG with input from stakeholders, that addressed possible factors limiting survival and recruitment of yellow perch. Prioritization of hypotheses and research direction was based on comments of Lake Michigan constituent groups, extensive review of scientific literature, and consultation with yellow perch experts from throughout North America. From this prioritized list of 17 hypotheses, members of the YPTG developed five research proposals focusing on potential factors limiting survival of yellow perch in the first year of life. Proposals (and subsequent research) were organized around specific processes/ mechanisms affecting different life history stages (Table 2; see also

Figure 1. Lake Michigan, study site for YPTG research initiative. Figure shows state agencies involved in the collaborative effort; scale of the effort; and south main basin, north main basin, and Green Bay areas of the lake where research efforts were conducted.

Whiteside et al. 1985). Beginning in 1996, funds were sought to complete the proposed work; these funds supplemented the ongoing yellow perch stock assessment work conducted by state management agencies using funding provided primarily through the Federal Aid in Sport Fish Restoration program. Since 1998, grants from numerous outside sources have provided additional funding to expand YPTG research efforts.

The YPTG research initiative can best be described as an informal collaboration—a loosely organized group and process that have evolved and strengthened over time. Meetings are typically held twice annually to share research results, evaluate progress in addressing hypotheses, "float" new ideas, and reevaluate and redirect efforts as necessary. The YPTG also interacts regularly with constituents, both at formal public meetings and by inviting them to join regular task group meetings. Occasional workshops have been held, outside of the regularly scheduled twice-yearly meetings, to inform constituents of the status of yellow perch populations, to stimulate research ideas, and to develop proposals for identified funding needs. Specific assignments weren't made to group members; rather, an overall plan of action (research hypotheses based on likely mechanisms) was established, and parts of the plan were addressed opportunistically (i.e., as funding, vessel time, samples became available). The group is of the belief that this specific resource management problem has provided us with an opportunity to expand our knowledge of the Great Lakes ecosystem.

We highlight here the work conducted during 1997–2001 to address five factors (predation, zooplankton availability, temperature, mass water movement, spawning stock characteristics; Table 2) potentially influencing recruitment of yellow perch. We describe in detail the work that has occurred to investigate two of these factors (zooplankton, stock characteristics), discuss progress toward understanding the impacts of the other factors, and provide an evaluation of progress resulting from this cooperative effort.

Do zooplankton density, size structure, and / or taxonomic composition limit recruitment of yellow perch?

The availability of appropriate numbers, sizes, and taxa of zooplankton prey is a critical determinant of growth and survival of larval fishes (e.g., Miller et al. 1990). Small changes in growth rates can result in large fluctuations in survival of larval fishes (Rice et al. 1993). In species like yellow perch that have a limited reserve of endogenous energy available from the yolk sac, food availability near the time of first feeding may directly influence survival (Miller et al. 1988). Reduced zooplankton availability reduces growth and thereby increases the amount of time larval

Table 1. Institutional participation in the Lake Michigan Yellow Perch Task Group research effort. Hypotheses are those referred to in Table 2 (T—Temperature, S—Spawning stock, M—Mass water movement, Z—Zooplankton, P—Predation). Hypothesis area "N" refers to development of new technologies or applications. Work to address these hypotheses included lab, field, and modeling efforts.

Institution	Hypothesis area	Field, lab, modeling
Ball State University (Indiana)	S, P	Field, modeling
Cooperative Institute for Limnology and Ecosystems Research (Michigan)	P	Field
Central Michigan University	Z, P	Field
Illinois Department of Natural Resources	S	Field
Indiana Department of Natural Resources	S, P	Field
Illinois Natural History Survey	S, M, Z, P, N	Field, lab
Michigan Department of Natural Resources	S	Field
Michigan State University	S, M, Z, P, N	Field, lab, modeling
North Carolina State University	T, M, P, N	Field, lab
Great Lakes Environmental Research Laboratory (NOAA—Michigan)	M, N	Field, lab
University of Michigan	M, N	Field
University of Maryland—Chesapeake Biological Laboratory	S, Z, N	Field, lab
University of Wisconsin—Milwaukee	T, M, Z, P, N	Field, lab
Wisconsin Department of Natural Resources—Green Bay	T, S, P	Field
Wisconsin Department of Natural Resources—Milwaukee	S, P	Field

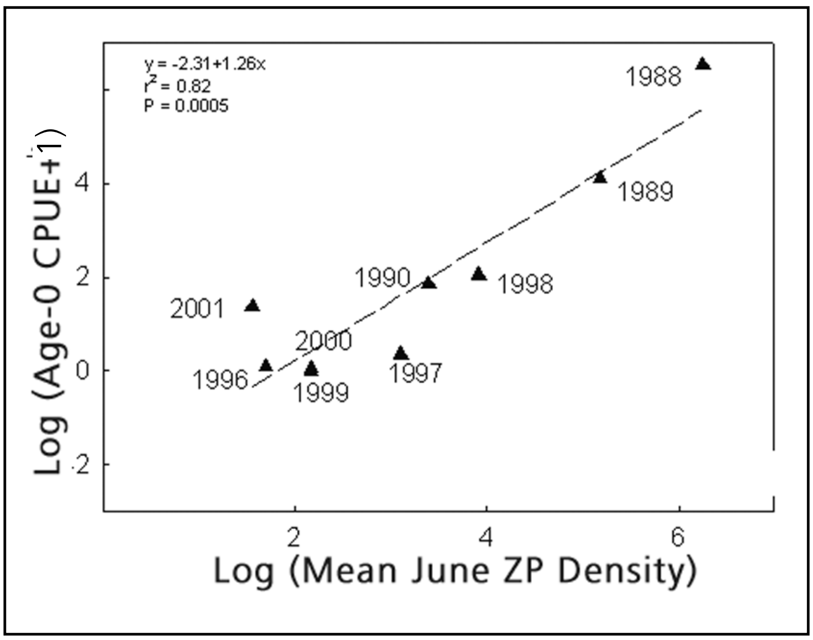
Table 2. Likely importance of various hypothesized factors at different life history periods. Life history period descriptions are adopted from Whiteside et al. (1985). "X" indicates that the YPTG believes this hypothesis can be an important determinant of recruitment success at a given life stage.

Life history period	Hypothesis				
	Temperature (T)	Spawning stock (S)	Mass water movement (M)	Zooplankton (Z)	Predation (P)
Egg	X	X			
Early larval	X	X	X	X	X
Late larval / early pelagic	X		X	X	X
Early juvenile / late pelagic	X		X	X	X
Advanced juvenile / littoral	X				X

fishes are vulnerable to predators (Leggett and Deblois 1994; Letcher et al. 1996). Zooplankton size also affects larval fish growth and survival through gape limitation (Miller et al. 1990). Upon hatching, larval fishes must rely on small zooplankton for prey (DeVries et al. 1998), but as larvae grow, they can feed on larger zooplankton. Zooplankton taxonomic composition also can be important to growth and survival of larval fishes, because the relative capture efficiency for different zooplankton taxa of similar sizes affects the relative energetic benefit to the fish (Mayer and Wahl 1997).

The extensive body of work concerning larval fish and zooplankton interactions served as the basis from which to direct research specific to Lake Michigan yellow perch. The YPTG hypothesized that zooplankton influences were most important at larval and post-larval stages, but could extend to the early juvenile stage when these fish are still pelagic (Table 2). To investigate these hypotheses, the YPTG chose a variety of approaches. Using historic zooplankton data, the Illinois Natural History Survey (INHS) demonstrated that the density of zooplankton available when yellow perch are first feeding (May–June) in southwest Lake Michigan (Figure 1) is related to the number of yellow perch recruits surviving to autumn (August–October) (Dettmers et al. 2003; Figure 2). Furthermore, the density of zooplankton present when yellow perch larvae begin to feed was substantially lower in the late 1990s as compared to the late 1980s (Dettmers et al. 2003), the last period of strong yellow perch recruitment. Because larval yellow perch densities were quite low in southern main basin waters, precluding a examination of larval yellow perch diets, the YPTG also moved collaboratively to study zooplankton-larval yellow perch relationships in

Figure 2. Relationship between log (June zooplankton density) and log (age-0 yellow perch CPUE +1) in Illinois waters of Lake Michigan during 1988–2001. Data are not presented for 1991–1995 because zooplankton sampling was not conducted during those years. Adapted from Dettmers et al. 2003.



MARTHA KNEUER, ILLINOIS NATURAL HISTORY SURVEY

Illinois Natural History Survey personnel retrieve a neuston net used for sampling larval yellow perch.

Green Bay (Figure 1). Wisconsin DNR (WDNR) and University of Wisconsin—Milwaukee (UWM) personnel collected zooplankton and larval fish samples, and these groups collaborated with INHS and Michigan State University (MSU) in sample processing and data analysis. Stomach contents from larval yellow perch in Green Bay indicated that smaller larval yellow perch were gape limited, and that the availability of copepod nauplii is critical to early foraging success (Bremigan et al. 2003). Eventual survival of age-0 yellow perch in Green Bay also was compromised when first-feeding yellow perch experienced low densities of small copepods (Bremigan et al. 2003). Additional work modeling the dynamics of larval fish growth as a function of temperature and zooplankton in Green Bay is being completed by researchers at North Carolina State University (NCSU).

Larval yellow perch in Green Bay selected larger taxa and sizes of zooplankton as they grew, and larger larvae contained more food in their guts. To determine whether these field observations were reflective of mechanisms, INHS and the University of Illinois conducted laboratory experiments. These results supported the field data, indicating that first-feeding larvae selected for and grew best on copepod nauplii and small copepods and that as yellow perch larvae grew longer than 12 mm, they preferred larger copepods and small cladocerans (Graeb et al. 2004). When these optimally-sized prey were not present, survival declined dramatically.

Because extensive spatial and temporal zooplankton sampling is expensive, the YPTG sought other possible measures of early larval fish condition and of the influence of forage availability on survival. As a result, RNA:DNA ratios are being used by University of Maryland (U Md) personnel to assess larval yellow perch foraging and health. Larval fish with high RNA:DNA ratios are generally in good condition, whereas those with low ratios probably experienced food limitation (Bulow

1987). In laboratory experiments conducted as part of the YPTG research initiative, this ratio demonstrated divergence in condition of fed and unfed yellow perch in as little as one day (T. Miller and C. Heyer, University of Maryland, Solomons, Maryland; unpublished data). These laboratory data will be used to develop models that estimate the probability of mortality in cohorts of yellow perch larvae in Lake Michigan, based on the proportion of larval yellow perch at or below a given RNA:DNA level.

Taken together, the insights from these YPTG studies of diet and zooplankton availability reveal that: (1) zooplankton density and taxonomic composition have marked effects on yellow perch growth and survival in Lake Michigan, (2) appropriate diet is critical to recruitment, and (3) conditions in recent years have been less than optimal. These results begin to provide us with explanatory and predictive capabilities that will improve management of Great Lakes yellow perch fisheries.

Do characteristics of the spawning stock limit recruitment?

Characteristics of the spawning population are likely important to yellow perch recruitment (Table 2). These include maturity schedule, egg production and deposition, potentially heritable traits (e.g., larval size, early growth characteristics), and abundance of spawning yellow perch. Craig and Kipling (1983) found negative effects on recruitment at the highest levels of yellow perch stock biomass, and Sanderson et al. (1999) suggested that cyclic patterns of cohort dominance in yellow perch populations in small lakes were primarily driven by intraspecific mechanisms (competition, cannibalism, population reproductive potential). In Lake Huron, age-specific compensatory mechanisms may be an important factor driving yellow perch abundance and recruitment (Thayer 2002).

YPTG members are using field, laboratory, and modeling approaches to evaluate spawning stock characteristics including egg production and deposition, heritable traits, spawner abundance, and stock:recruit relationships. In the field, diving surveys to assess yellow perch egg deposition were conducted by WDNR and INHS in several areas of the lake during 1996–2001. The highest egg mass index in Illinois waters was observed in 2000 (Pientka et al. 2001), but observed egg deposition is not strongly related to larval or juvenile yellow perch abundance or subsequent year class strength. These results suggest that the bottleneck for yellow perch recruitment occurs sometime post-hatch.

Laboratory experiments by U Md, NCSU, and UWM detected maternal effects in the offspring of Lake Michigan yellow perch (Heyer et al. 2001). These effects resulted from differences in female size, age, gonadosomatic index (GSI), and egg production, and were expressed most in larval size and yolk volume; progeny of older females were shorter but had larger yolk volume than progeny of younger females. These differences indicate that managers should build a spawning stock of diverse ages that produces offspring with a wide distribution of traits. This, in turn, enhances the probability of successful recruitment in the variable Lake Michigan environment.

Knowledge concerning the stock:recruit relationship is critical to management of Lake Michigan yellow perch populations, and work to describe yellow perch stock:recruit relationships is being conducted by several YPTG research groups. For example, Ball State University researchers developed a predictive relationship between stock-size ($\geq$130 mm) and quality-size ($\geq$200 mm) yellow perch in southern Lake Michigan (Shroyer and McComish 1998). This relationship may be applicable to other areas of southern Lake Michigan, providing managers the ability to forecast available numbers of harvestable yellow perch. YPTG members are working to develop these relationships with independent data from other areas of the lake. Development of Lake Michigan yellow perch population models is also ongoing (Allen 2000; Wilberg et al. 2004). Results of this modeling work, including estimates of abundance, mortality, catchability, and projected stock size, will improve our ability to model stock:recruit relationships of Lake Michigan yellow perch, and ultimately to successfully manage Lake Michigan yellow perch populations.

PRADEEP HIRETHOTA, WISCONSIN DNR

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Fish species are naturally subdivided into localized populations or stocks; differences between these stocks can be adaptive (MacLean and Evans 1981; Philipp and Whitt 1991; Philipp et al. 1993). Thus, identification of stock structure is critical to the successful management of Lake Michigan yellow perch. The YPTG adopted two approaches to address the issue of stock structure: a lake-wide tagging study to determine degree of movement and mixing of Lake Michigan yellow perch, and a separate genetic study of the lake-wide population structure of yellow perch. The tagging study began with all agencies tagging fish in their respective waters of the lake, including

Green Bay. Tagging and recapture data were forwarded to INHS, where the data are being analyzed to provide information on population size, mortality, and exploitation (Glover et al. 2004). For the genetic study, all agencies participated in collecting tissue samples from around the lake and sent samples to the University of Minnesota for analysis. Miller (2003) found strong population differentiation, and tentatively recommended management of yellow perch in Lake Michigan based on three stocks: Green Bay, southern main basin of Lake Michigan, and northern main basin of Lake Michigan (Figures 1 and 3).

Understanding the importance of other factors

While work to address effects of zooplankton availability is well advanced and progress on Lake Michigan yellow perch stock characteristics is closer to fruition, research to address hypotheses related to predation, temperature, and lake current effects is still in the early stages. Early results from laboratory experiments by NCSU and UWM show the potential for significant predation, but field collections by INHS, University of Michigan (UM), and Central Michigan University (CMU) indicate that predation is not the primary factor determining yellow perch recruitment in the main basin of Lake Michigan. YPTG members are working to complete correlation analyses of yellow perch and predator abundances, to determine whether the negative relationship between alewife and yellow perch abundance observed for Indiana waters (Shroyer and McComish 2000) occurs throughout the lake. We also are using the predator diet field data along with data from laboratory experiments to develop formal models quantifying the influence of different predators on Lake Michigan yellow perch populations at several levels of predator and alternate prey abundance. Completion of these tasks will allow us to make informed recommendations concerning the advisability of yellow perch predator (e.g., alewife) management, and to develop specific, targeted strategies if management is warranted.

Interest in the influence of lake currents (mass water movement) on yellow perch recruitment (Table 2) is a recent development, motivated by the observation that newly-hatched larvae were only found close to shore; these larvae were then lost to researchers until they returned to shore as demersal age-0 fish longer than 50 mm total length. One explanation for this phenomenon is that larval yellow perch, residing primarily in the top 2 m of water (Post and Evans 1989), are transported by surface currents. The influence of currents and physical transport has long been recognized in the marine environment (e.g., Frank and Leggett 1983), but has generally not been recognized in lentic freshwater systems. Personnel from UWM, UM, NCSU, U Md, Michigan DNR, MSU, and INHS are working to evaluate the relative advantages (e.g., food resources) and disadvantages (e.g., alewife predation) of being offshore for pelagic yellow perch—whether offshore transport will

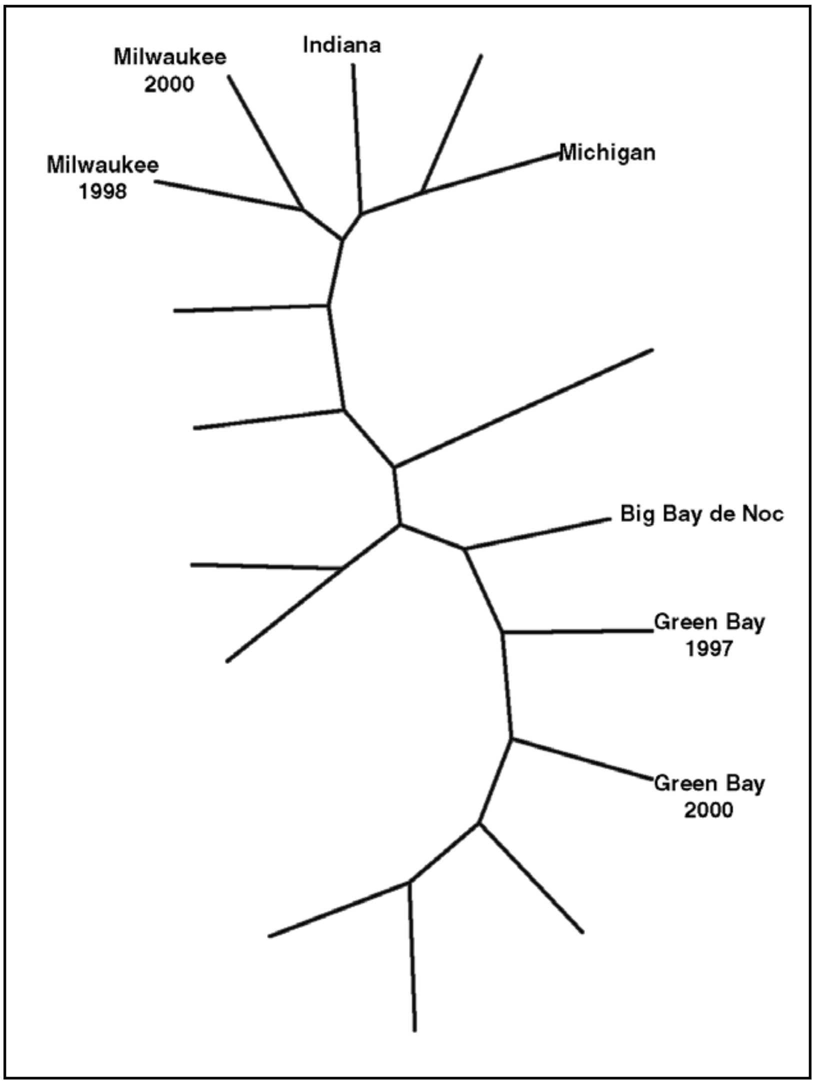


Figure 3. Tree diagram depicting genetic relationships among yellow perch from Lake Michigan (adapted from Miller 2003). The diagram was constructed from the chord genetic distance (Cavalli-Svorsa & Edwards 1967) matrix based on data for five microsatellite DNA loci. Lake Michigan south main basin sites (Milwaukee, Indiana, Michigan) clustered on a distinct branch from Green Bay sites (Green Bay, Bay de Noc).

improve or inhibit larval growth, whether changes in growth influence mortality, and whether offshore transport changes relative vulnerability to predation. This work involves multi-agency sampling cruises coordinated with mass water movement events (currents, upwellings, downwellings), as well as regular (at least weekly) communication among participating agencies. Early results of this work indicate that zooplankton density at some southern Lake Michigan locations was at least twice as great offshore (13.3 km) than in near-shore waters, and that predator (alewife) distributions overlapped the spatial distribution of larval yellow perch, indicating that as yellow perch are transported offshore, they may still be vulnerable to predation by alewife (Balge 2003). Yellow perch have traditionally been considered an "inshore" fish (Eshenroder et al. 1995), and related research and management activities have traditionally focused on the inshore areas of Lake Michigan. YPTG researchers demonstrated that a near-shore focus is limiting, and that the entire lake system should be considered as important habitat for yellow perch. Future work to identify where larvae are ultimately transported (i.e., where the "pelagic/larval" to "benthic/juvenile" transition occurs, sensu Whiteside et al. 1985), will require efforts similar to oceanographic research because of the scale involved. Fisheries biologists and physical limnologists will need to work together to describe and predict patterns in lake currents and upwelling/downwelling events that are essential to understanding this important life-stage transition. We believe that the flexible structure of the YPTG and its interest in research to solve management questions will permit a relatively easy transition toward developing collaborations among fisheries biologists and limnologists to address this important question. Combining the expertise of these groups will help to predict yellow perch year-class strength, and will provide insights into factors affecting early life history dynamics of other important Great Lakes fishes.

Progress and advancements: implications for fisheries management

The task group structure was chosen to foster scientific collaboration and insure that management was based on the best available scientific information. So far, we believe the effort has been very successful. Although research is still ongoing, the YPTG has made considerable progress since 1997 toward its objective of identifying the causes of poor yellow perch recruitment in Lake Michigan. We identified and implemented a collaborative approach among a large number of researchers and managers that made more progress in a shorter time period than most YPTG members would have predicted. We are using data and samples in ways that they wouldn't normally be used, and conducting research in areas that have proven extremely fruitful but that wouldn't normally be funded as part of standard agency research efforts. For example, larval fish sampling would not normally be conducted by state resource agencies on the Great Lakes, but this work has provided insights into factors affecting early life history dynamics of many important Great Lakes fishes. There are some pitfalls with the task group approach we adopted, mainly related to the logistics associated with coordinating efforts among so many agencies across such a broad spatial scale, but we feel that these pitfalls are relatively minor and easily overcome using appropriate communication tools (e.g.; semi-annual meetings, YPTG listserv).

Findings to date from the Lake Michigan YPTG research initiative have several significant implications for management of yellow perch populations in Lake Michigan, and for fish populations in general. These include:

- **Improved stock assessment—**Coordinated research and assessment activities led to lake-wide improvements in yellow perch stock assessments. Lake-wide coordination and standardization of methods improved compatibility and usefulness of data. Knowledge gained through the development of statistical catch-at-age models, along with information about how spawner abundance influences recruitment gathered from stock:recruit modeling, will provide managers more explicit and detailed information about yellow perch stocks as they seek to effectively balance the recreational and commercial demands on these fish populations. This difficult task must also involve economic and sociological considerations, including the input of stakeholders, as well as information concerning ecological factors.
- **Better understanding of mechanisms—**Work by YPTG researchers has improved our predictive capabilities with respect to yellow perch recruitment. We have a better understanding of how recruitment is related to zooplankton abundance and temperature; knowledge concerning these relationships will improve Lake Michigan yellow perch management. Other data currently being processed has the potential to yield similarly valuable predictive relationships. For example, if predation from alewife proves important (at the popula-

MARTHA KNEUER, ILLINOIS NATURAL HISTORY SURVEY

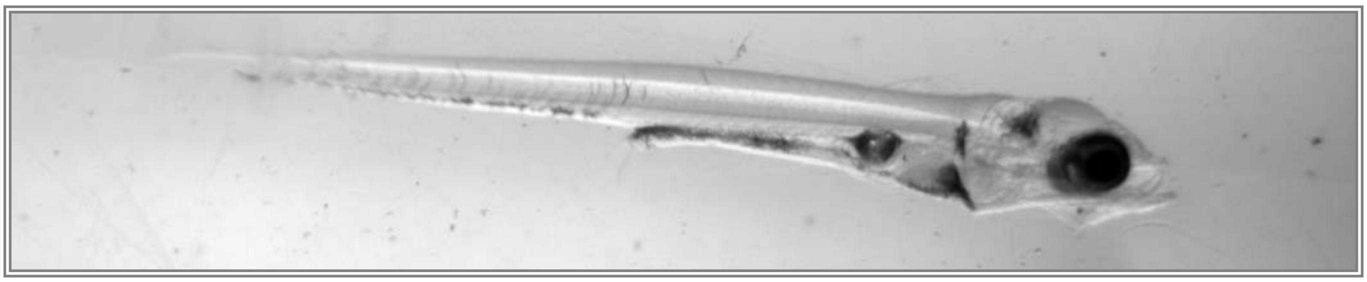
Wayne Brofka and Jill Ludowise remove yellow perch from a fyke net before tagging.

tion level) to survival of larval yellow perch, information gathered through the efforts of the YPTG will allow managers to develop plans to manage this predation. If recruitment is reduced in years when significant offshore transport does not occur, we can manage more conservatively when we know this transport is not taking place.

- **Adaptation of new technology and ideas**—The YPTG was formed to address issues of importance to the management of Lake Michigan yellow perch, but insights and new techniques developed through this effort will benefit other areas of fisheries research and management. For example, new acoustic sampling methods will help determine early life history dynamics and predator:prey dynamics for species other than yellow perch. Insights from research on the significance of RNA:DNA ratios will prove valuable outside the Great Lakes basin. YPTG members are applying marine-scale approaches to answer yellow perch recruitment questions; research on a freshwater fisheries issue had not previously been conducted at the scale the YPTG attempted to work at in Lake Michigan. Knowledge gained through these innovative efforts will ultimately help address other Great Lakes fisheries questions.

Conclusion

Lake Michigan yellow perch cohorts produced in 1998 and 2002 were the most abundant observed in the lake during the last decade, and information gathered from study of these cohorts will expand our knowledge of potential causal mechanisms behind the generally poor recruitment observed during 1990–2002. The YPTG plans to continue this approach and increase our understanding of Great Lakes yellow perch populations by expanding collaborative efforts with other yellow perch researchers and managers. In our judgment, keys to the long-term success of this group include a dynamic and collaborative interaction among researchers and managers; the recognition that a problem exists that no single agency or group can effectively attack; willingness to share data and observations among group members, especially outside of formal meetings; and embracing expertise from outside the core group of participants to address key research needs. This model can result in substantive progress in addressing difficult management decisions regarding exploited fish stocks, regardless of the system.



ILLINOIS NATURAL HISTORY SURVEY

A 9-mm long yellow perch larva.

Acknowledgments

SARAH THAYER, MICHIGAN DNR

Members of the Yellow Perch Task Group include Paul Allen (current chairperson), Matt Balge, Brian Belonger, Jim Bence, Fred Binkowski, Brian Breidert, Mary Bremigan, Wayne Brofka, Pat Charlebois, David Clapp, Randy Claramunt, John Dettmers, Brad Eggold, Dean Fitzgerald, Jim Francis, Richard Fulford, Brian Graeb, Justine Hasz, Rich Hess, Chris Heyer, Pradeep Hirethota, Bill Horns, John Janssen, Dave Jude, Mike Keniry, Cliff Kraft, John Kubisiak, Dan Makauskas, Ellen Marsden, Doran Mason, Scott McNaught, Loren Miller, Tom Miller, Janel Palla, Bernie Pientka, Steve Pothoven, Jim Rice, Steve Robillard, Phil Schneeberger, Candy Schrank, Steve Shroyer, Sarah Thayer, Mike Wilberg, and Kirby Wolfe.

The Yellow Perch Task Group acknowledges the many agencies and organizations that provided funding for the work described. These organizations include the American Fishing Tackle Manufacturers, Ball State University, Central Michigan University, Great Lakes Fishery Commission, Great Lakes Fishery Trust, Illinois-Indiana Sea Grant, Illinois Department of Natural Resources, Illinois Natural History Survey, Indiana Department of Natural Resources, Michigan Department of Natural Resources, Michigan Sea Grant, Michigan State University, National Oceanic and Atmospheric Administration, North Carolina State University, U.S. Fish and Wildlife Service, University of Maryland Center for Environmental Science—(CBL), University of Michigan, University of Wisconsin, Wisconsin Department of Natural Resources, and Wisconsin Sea Grant. Since 1998, grants from these and other sources provided more than $3 million in funding to further the lake-wide yellow perch research initiative. In addition, non-financial support was provided by many of the above institutions, as well as by many commercial and recreational stakeholders around Lake Michigan. Many past and present Great Lakes researchers and managers laid the groundwork for this successful collaborative effort.

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