Wisconsin Chapter of the American Fisheries Society

Poster Abstracts

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Title: Lake sturgeon movements after upstream passage on the Menominee River, Wisconsin-Michigan
Co-Author: Daniel A. Isermann

Abstract: Lake sturgeon (*Acipenser fulvescens*) populations in the Great Lakes have declined dramatically over the last two centuries. Construction of hydroelectric dams on Great Lakes tributaries is considered a major contributing factor in this decline. Dams act as barriers to lake sturgeon movement and prevent these fish from accessing historic spawning habitat upriver. As a result many lake sturgeon populations are now listed as threatened, endangered, or a species of concern in many states in the region. Although similar efforts to pass lake sturgeon are being considered for other Great Lakes tributaries, the potential efficacy of these fish passage efforts is largely unknown. Our objectives are to determine: 1) if adult lake sturgeon passed upstream return downstream to the lower Menominee River or Green Bay within 1 or 2 years of passage; 2) if adult lake sturgeon have the opportunity to spawn at least once above Park Mill Dam within 1-2 years after passage; 3) if spawning opportunity, downstream return rates, and use of the downstream fishway at Park Mill Dam are related to timing of passage, time elapsed since passage occurred, month of year, flow or temperature conditions, or in relation to fish attributes such as sex, length, genetic stock, and maturation status and 4) if the number, length, genetic stock, and sex of fish passed upstream and timing of passage can be manipulated to maximize the number of eggs deposited above Park Mill dam by fish that were passed upstream. From October 2014 to May 2016, 120 mature lake sturgeon will be surgically fitted with VEMCO® V16 acoustic transmitters and released in the Grand Rapids section of the Menominee River. Lake sturgeon movements will be monitored using an array of fixed acoustic receivers and will be actively monitored using a portable receiver. We will report preliminary results from this work.

NAME: Skip Sommerfeldt
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Title: An old fish managers' obsession with fishing and numbers.
Co-Author: None

Abstract: The author recounts his history of documented fishing statistics. Starting with the earliest written angling records from 1971 at age 12, summary charts and photos are used to show a long history of documenting angling effort and catch. From a teenage fascination with river walleye fishing and fall salmon fishing (dare I say snagging) in the Marinette WI area, it was on to basically trout-only fishing while in grad school in Utah. Once back in northern Wisconsin in 1984 and working as a fish manager for the WDNR, fishing opportunities expanded and the detailed angling records became intensive. Open-water records since 1984 chronicle a change from an early fixation with lake walleye fishing to a couple-year attempt as a musky hunter in the early 1990's. It then moves to a 2-decade passion for summer bass fishing (mainly because tremendous fishing can be had in the middle of the day, and nights can be used for family time). A few summary statistics for the last 30 years include an average of 104 days fished during the open-water season and a mean of 48 different waters fished for bass each summer. A total of 7,048 actual fishing hours were recorded, for an average of 235 hours per season. A grand total of 16,434 fish were caught, with an overall targeted catch rate of 2.1 fish/hour for walleye, and 1.8 fish/hour for largemouth and smallmouth bass. Ice fishing for walleye using tip-ups also became a huge obsession and 30 seasons of effort are also summarized (including actual hours fished, number of flags, total fish caught by species and a length frequency of walleye from 1984 to 2014). Some summary statistics for ice fishing include an average of 75 days and 215 hours on the ice during a typical winter. A grand total of 2,290 walleye were caught in the 30 ice seasons, with 56% of them being released. Overall, it takes me just over 2.6 hours to catch a walleye of any size using tip-ups, but takes 55 hours for a walleye > 20 inches and 216 hours for a walleye > 24 inches. In addition, I get an average of 1.2 flags per hour of fishing with tip-ups and catch 1 fish for every 2.4 flags seen. Conclusion – even with schooling, raising a family and an entire career in fisheries management, a passion for fishing did not fade with age or time.

NAME: Meghan Williams
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Title: Levels of Persistent Contaminants and Fatty Acids in Wisconsin Sport Fish and Anglers
Co-Author: Krista Christensen, Brooke Thompson, Henry Anderson

Abstract: Between 2012 and 2013, The Wisconsin Department of Health Services Great Lakes Research Program surveyed and analyzed biomarkers of older male Wisconsin anglers (N = 154). Participants provided blood and hair samples, information on their health status, location(s) from which they consumed their catch, species of fish caught/eaten, and their awareness and source of information for fish consumption guidelines. Data collected as part of this survey were analyzed in conjunction with data collected by the Wisconsin Department of Natural Resources on levels of persistent contaminants (mercury, N=13485; polychlorinated biphenyls [PCBs], N=5233; polybrominated diphenyl ethers [PBDEs], N=179; perfluorochemicals [PFCs], N=147), and beneficial fatty acids (EPA and DHA, N=265) in fillets of commonly consumed fish species. The most frequently consumed fish as reported by survey participants were walleye, bluegill, yellow perch, and crappie. In the previous 12 months, 65% of participants consumed fish caught from Lake Michigan, while 27% consumed fish from Lake Superior. PCBs and mercury were detected in both fish fillets (median concentrations of 0.14 ug/g and 0.25 ug/g, respectively) and human serum (median concentration of 1.33 ng/mL) and whole blood, respectively (median concentration of 2.39 mg/L). Anglers in the top quartile for blood mercury were more likely to have consumed crappie, chinook, or largemouth bass, while those in the top quartile for PCBs were more likely to have consumed fish from the Fox River, or rainbow trout, or chinook. The median concentrations for each [PFC] congener was less than 2.5 ng/mL (human) and less than 0.21 ng/g (fish), with the exception of perfluorooctanesulfonic acid (PFOS), which had a median concentration of 14 ng/g in fish fillets and a median concentration of 19 ng/mL in human

serum. Medians of both [summed PBDEs] and [PBDE congeners] were lower in humans compared with fish (median for ∑PBDEs was 5.8 ng/g for fish fillets, and 0.2 ng/mL in anglers' serum). Anglers in the top quartile for PBDE concentrations were more likely to have consumed fish from Lake Superior, or to have eaten lake trout, coho, or lake whitefish. Median fatty acids in fish fillets were 408.9 and 1100 mg/kg for EPA and DHA respectively. DHA was notably higher than EPA in human serum (medians of 57 mg/L and 22 mg/L, respectively). No relationship was found between consumption of any fish species asked about in the survey and the amount of EPA, DHA, or selenium found in anglers' serum or plasma, but anglers whose vitamin D levels were in the top quartile were more likely to have consumed fish from Lakes Erie or Superior, or to have consumed coho salmon. This analysis will allow DHS and DNR to continue developing consumption advisories that give the public accurate information on the species, frequency, and amount of fish that should be consumed to optimize benefits and minimize risks.

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Title: An Overview of the Great Lakes Mass Marking Program
Co-Author: James L. Webster, Kevin W. Pankow, Kevin A. Mann, Matthew S. Kornis, Charles R. Bronte

Abstract: State and tribal fishery managers in the Laurentian Great Lakes, along with the US Fish and Wildlife Service (USFWS), annually stock >20 million salmonines to diversify sport fisheries, restore native fish populations, and control invasive fishes. However, little is known about how well hatchery-reared fish survive and contribute to fisheries, or about levels of natural reproduction by naturalized non-native salmonines. To address these and other issues, the Council of Lake Committees (CLC), of the Great Lakes Fishery Commission, in 2005 to request a basin-wide program to tag/mark all stocked salmonines. The USFWS Great Lakes Fish Tag and Recovery Lab (GLFTRL, Green Bay, WI) was established to design and oversee the implementation of the program, and began using automated fish tagging trailers (AutoFishTM) to coded-wire tag and adipose fin clip hatchery-reared Chinook salmon and lake trout in 2010. Here, we provide a description of the Mass Marking Program, with the objective of raising awareness about this basin-wide program. To date, the lab has tagged and marked 16 million Chinook salmon and 28.5 million lake trout at an average rate of 8,000 fish per hour. Tag recovery teams collaborate with state partners each summer to recover tags and collect bio data from angler-harvested fish. Fish snouts containing tags are sent to the GLFTRL for tag extraction, and thus far >50,000 samples have been processed and >46,000 coded-wire tags recovered. Analysis of recovery data is currently underway, and will become available and more refined as tagged fish age and move through the fishery.

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Title: Smallmouth bass movements in the Menominee River, Wisconsin-Michigan

Co-Author: Joshua Schulze, Daniel A. Isermann, Michael Donofrio

Abstract: Several segments of the Menominee River that borders the states of Wisconsin and Michigan support exceptional fisheries for smallmouth bass. Fishery managers would like to know more about the seasonal movements of these populations in order to make more informed management decisions. Specifically, there is some concern that smallmouth bass congregate in relatively small areas during fall and winter months, making them more susceptible to harvest when compared to other portions of the open-water fishing season. We used acoustic telemetry to determine if smallmouth bass in the Menominee River between Grand Rapids and Park Mill dams all moved to the lower, more lacustrine section of the river during fall or if bass generally remained in the segment of river where they were tagged (i.e., upper, middle, lower). During May 2014, smallmouth bass ≥ 15 inches were collected by electrofishing and implanted with acoustic transmitters and their movements were monitored using both active tracking and fixed receivers. Preliminary results indicate wide variation in smallmouth bass movement, but our preliminary analysis suggests that smallmouth bass utilize a variety of locations for fall/winter habitat. Importance of work- There is some concern among anglers and biologists that smallmouth bass in the Menominee River congregate in relatively small areas during fall and winter months, making them more susceptible to harvest when compared to other portions of the open-water fishing season.

NAME: Angelena Koosmann
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Title: Spatial and temporal assessment of fish assemblages in lower order tributaries of Green Bay, Wisconsin

Co-Author: Dr. Patrick Forsythe; Tammie Paoli; Dr. Robert Howe; Dr. Michael Zorn

Abstract: Quantifying fish biodiversity is often challenging because the diversity of fishes can vary across local and regional geographic scales. Further, many smaller streams that tend to harbor a substantial diversity of fish are relatively understudied. In 2014, a total of 21 tributaries along the east and west shores of Green Bay, Wisconsin were surveyed to describe and compare fish diversity within and among three habitat types, representing a gradient of habitats ranging from coastal near-shore to the main stream channel. Surveys were conducted in a variety of streams and rivers including University Creek, Wequiock Creek, Red River, and May Creek using backpack electroshocking units (in-stream), fyke nets (mouth/transition zone), and beach seines (near-shore) where an accurate representation of the fish community could be observed. I used Shannon's index of diversity to describe the diversity of each tributary based on gear type. A total of 49 species including Percidae, Salmonidae, Esocidae, Lepisosteidae, Centrarchidae, and Cyprinidae were caught over the course of two sampling events (summer and fall). Fish diversity varied within and among the study sites, regardless of the distance from one tributary to the next.

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Title: Otolith-Based Length Limit Simulations for Two Wisconsin Crappie Fisheries: Can We Improve on Pretty Good?
Co-Author: Michael Vaske, Dan Miller, Tom Meronek, and Jacob Thompson

Abstract: A recent model-based evaluation indicated that minimum length limits could improve size structure in some Wisconsin crappie fisheries, but this assessment largely relied on scale-based estimates of crappie age and did not focus on populations where size structure was already considered better than average. Our objective was to use simulation models to determine if minimum length limits could be used to further improve size structure in two north-central Wisconsin lakes where large crappies (≥ 11 in TL) were already present in relatively high numbers.

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Title: Use of a Portable Ultrasound to Determine Sex and Maturity of Adult Lake Sturgeon
Co-Author: Andrea Musch

Abstract: Determining sex and maturity represents an important component of monitoring and managing lake sturgeon populations, but determining these attributes using external morphology or extrusion of gametes is not always possible and other methods are invasive or require fish sacrifice. Our objective is to determine if a portable ultrasound unit can be used to accurately determine sex and maturity stage for adult lake sturgeon to aid in selecting fish for passage and propagation efforts. Our results indicate that the ultrasound can be used to accurately determine the sex of mature lake sturgeon (i.e., F4 and F5 females and M2 males), but the ultrasound was not effective for identifying sex of immature fish. Consequently, the ultrasound device could be used to ensure desired numbers of mature lake sturgeon of a specific sex are selected for passage or propagation efforts, without using invasive procedures.

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Title: Movement and Population Dynamics of Paddlefish, Polyodon spathula, within Mississippi River, Pool 5a
Co-Author: Crystal Gehring and Sarah Fanning

Abstract: The North American Paddlefish (*Polyodon spathula*), named for it's long, spatula-like rostrum, is one of two living paddlefish species that requires extensive travel in order to find adequate spawning grounds. Due to the construction of the lock and dam system on the Mississippi River, spawning migration has been obstructed, traditional spawning locations have changed, water flow necessary for spawning has been altered, and backwater areas needed for juvenile paddlefish rearing has been eliminated. This study was the continuation of a previous, preliminary study conducted in 2013 that observed the concentration of paddlefish and lake sturgeon (*Acipenser fulvescens*) above and below Mississippi lock and dam 5a. Paddlefish were sampled throughout the summer of 2014 using monofilament gill and trammel nets, and five paddlefish were implanted with a Vemco acoustic transmitter. Throughout the summer of 2014, Pool 5a was traversed weekly with a manual receiver to locate paddlefish with implanted transmitters. In addition, paddlefish locations were obtained from stationary receivers deployed by the Minnesota Department of Natural Resources and US Fish and Wildlife Service. Polander Lake appears to be an important area for a small population of paddlefish, yet our data shows that paddlefish use of this area is intermittent. Future research will focus on analyzing habitat data to better understand paddlefish migration and use of Polander Lake.

NAME: Dan Dembkowski
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Title: Response of walleye and yellow perch to water-level fluctuations in glacial lakes
Co-Author: Steven R. Chipps, Brian G. Blackwell

Abstract: The influence of water levels on population characteristics of yellow perch, *Perca flavescens* (Mitchill), and walleye, *Sander vitreus* (Mitchill), was evaluated across a range of glacial lakes in north-eastern South Dakota, USA. Results showed that natural variation in water levels had an important influence on frequently measured fish population characteristics. Yellow perch abundance was significantly ($P < 0.10$) greater during elevated water levels. Yellow perch size structure, as indexed by the proportional size distribution of quality- and preferred-length fish (PSD and PSD-P), was significantly greater during low-water years, as was walleye PSD. Mean relative weight of walleye increased significantly during high-water periods. The dynamic and unpredictable nature of water-level fluctuations in glacial lakes ultimately adds complexity to management of these systems.

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Title: Phenology of annulus formation in walleye and smallmouth bass otoliths
Co-Author: Brianna J. Graff, Melissa R. Wuellner, David W. Willis

Abstract: Walleye and smallmouth bass were sampled monthly (May-October) from Lake Sharpe, South Dakota during 2006 and 2007 to estimate the timing of otolith annulus formation and to evaluate the influence of intrinsic and extrinsic factors on the timing and detection of annulus formation. Timing of annulus formation was evaluated using marginal increment analysis. Walleye samples were stratified by age, sex, and location (i.e., upper and lower Lake Sharpe) and smallmouth bass samples were stratified by age and sex to evaluate the influence of intrinsic and extrinsic factors on timing of annulus formation. Monthly mean marginal increment measurements for both species generally increased from May to June, declined in July, and slowly increased from August to October. July consistently had the lowest mean marginal increment across species and strata, suggesting that annulus formation in walleye and smallmouth bass in Lake Sharpe likely occurs in July. The lack of differences in timing of annulus formation across species-specific strata was surprising given the well-known influences of age, sex, and water temperature on somatic growth. Nonetheless, results will aid managers in improving the accuracy of age estimates and in the design and implementation of better-informed management strategies.

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Title: Using Plasma Sex Steroids to Determine Reproductive Status of Paddlefish in the Upper Mississippi
Co-Author: Joshua Lallaman

Abstract: Freshwater fish species are experiencing great changes to their environment as human impact on freshwater ecosystems becomes more detrimental and persistent. The paddlefish (*Polyodon spathula*) is a large freshwater fish species that is particularly sensitive to human disturbances and has experienced a decline over the last century due to its traits of maturing late in life and not spawning annually. These traits make accurate sex ratios and spawning estimates very important for management and restoration strategies for the species. One way this information can be obtained is through the analysis of plasma sex steroids, a minimally-invasive and non-lethal method in identifying sex and spawning status of individual fish. Paddlefish were collected from the Upper Mississippi River using monofilament gill and trammel nets. Approximately 5ml of blood was taken from each fish, along with length (cm) and weight (kg). Plasma sex steroid concentrations of both testosterone and estradiol were measured using ELISA kits in order to determine the sex and spawning status of the individual. Individuals with elevated hormone levels are considered to be in spawning condition and individuals with elevated estradiol were considered female. Results of this analysis will provide for a better understanding of reproductive dynamics of this small and potentially imperiled population. Plasma sex steroid concentrations will also be compared to known spawning cues, specifically water temperature, photoperiod and water discharge, in order to determine if adequate spawning cues are present during peak physiological readiness. Lastly, we will use the knowledge of spawning status to better understand the diverse movement patterns observed within this population.

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Title: Implementing the Wisconsin Walleye Initiative with Stock-Based Management Goals: Establishing Genetic Guidelines for Public and Private Hatchery Propagation

Co-Author: Keith Turnquist, Brian L. Sloss, and David Giehtbrock

Abstract: The Wisconsin Walleye Initiative (WWI) aims in part to increase the number of walleye in Wisconsin waters through stocking of large fingerlings produced by state, private, and tribal fish hatcheries. The State of Wisconsin has been proactive in implementing stock-based management aimed at protecting the integrity (both genetic and biological) and sustainability of delineated management units of walleye. As such, State hatcheries implement stock-based management practices and conservation-oriented rearing protocols to protect the genetic integrity of Wisconsin's walleye populations. The addition of large scale production of walleye to be stocked in state waters from private and tribal hatcheries created a potential challenge to stock-based management in terms of domestic brood sources and number of broodfish used for annual production. Our objective was to develop a set of easily quantified and measurable genetic metrics and brood source identification practices all hatcheries (State, Private, and Tribal) must meet to be compliant with stock-based management. We used microsatellite genetic data from 21 previously sampled walleye populations to establish minimum genetic diversity threshold values for mean number of alleles per locus, observed heterozygosity, and expected heterozygosity. We developed a system of Bayesian admixture and population assignment measures using the aforementioned 21 populations as references. Each brood source would require a holder to declare one of three management units for origin and the Bayesian result was used to determine if the genetic diversity of the source was consistent with that declaration. These methods allowed WDNR to implement cooperative agreements with various private and tribal hatcheries and effectively meet the goals of increased stocking of extended growth fingerlings in 2014.

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Title: Stock structure and the effects of supplementation on muskellunge in the Great Lakes

Co-Author: Brian L. Sloss, Patrick Hanchin, Kevin Kapuscinski, John Farrell, Loren Miller, Kim Scribner, and Chris Wilson

Abstract: Muskellunge (*Esox masquinongy*) have experienced considerable population declines and several extirpations in and around the Great Lakes. While few populations have persisted relatively unchanged, others have benefited from restoration efforts, and others still have yet to be restored. Additionally, historic and contemporary stocking of Great Lakes and non-Great Lakes strain muskellunge poses a threat to the genetic integrity of remnant populations. Therefore, a broader understanding of the degree of current genetic differentiation among all major Great Lakes populations, including key tributary populations is needed. Our objectives for this project were to: (1) build on existing genetic data to determine if significant genetic structure exists among muskellunge spawning aggregates across the Great Lakes and their tributaries; (2) determine if significant admixture is present in Great Lakes muskellunge populations consistent with introgressive hybridization between stocked and resident Great Lakes muskellunge; and (3) determine if the genetic structure of non-admixed Great Lakes muskellunge populations is consistent with a genetic stock model that can be described in terms of genetic stock identification and degree of stock isolation. Fourteen microsatellite loci were used to characterize genetic diversity and structure of >1,500 muskellunge from >37 locations throughout the Great Lakes and associated inland drainages. Preliminary results suggest discrete genetic structure both east/west and inland-Great Lakes proper. Genetic diversity and molecular variance will be compared within and among various potential genetic structure models to identify possible influences of historical stocking and, ultimately, potential brood sources for Great Lakes muskellunge supplementation efforts.

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Title: Use of Real-Time Polymerase Chain Reaction for Identification of Larval Walleye and Yellow Perch
Co-Author: Hadley Boehm, Dr. Daniel Isermann, and Dr. Brian L. Sloss

Abstract: Identification of larval fish collected from the water column and fish diets is often difficult, and can present a source of error for many studies. Use of DNA barcoding has been shown as an effective tool for the identification of diet items and can be useful in identifying larval fish. However this technique can be cost-prohibitive in situations where numerous samples need identification. Furthermore, many diet and larval studies focus on one or two particular species where it is not necessary to identify every species collected. A molecular technique using real-time polymerase chain reaction (PCR) shows promise in the rapid identification of a single species of interest at a substantial reduction in cost as compared to DNA barcoding. Our objectives were to: 1) develop one real-time PCR assay with markers specific to walleye and markers specific to yellow perch, and 2) determine if the qPCR assay can be used to effectively identify larval walleye and yellow perch collected from the water column and panfish diets. A duplex real-time PCR assay was developed with markers created to isolate and amplify a portion of the cytochrome oxidase I (COI) mitochondrial gene specific to walleye and yellow perch. This is the same gene region sequenced for DNA barcoding. The assay was tested on DNA extracted from 16 tissue samples of walleye, 16 tissue samples of yellow perch, and dietary tissue comprising 12 species previously identified using DNA barcoding. The assay was 100% effective in the identification of all 16 walleye and all 16 yellow perch, and did not produce an identification signature for the 12 other species. Additional testing is necessary on larval walleye and yellow perch; however the potential use of this real-time PCR assay offers a cost effective and efficient means for walleye and yellow perch identification.

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Title: Restored wetland contributions to Great Lakes migratory fish populations, with northern pike as a surrogate for success
Co-Author: Dr. Patrick Forsythe, Dr. Solomon David, Dr. Patrick Robinson, and Stewart Cogswell

Abstract: In the past several decades many wetlands surrounding Green Bay have been restored with the goal of enhancing spawning and nursery habitat for northern pike (*Esox lucius*). However, little research has been conducted to determine how extensively restored wetlands are used by adults at the time of spawning and few studies have attempted to quantify recruitment success from these areas. To address a portion of this uncertainty, we selected two restored wetland areas and monitored the migratory activity of northern pike daily using fyke nets. For each pike collected, sex was determined by expressing gametes and each individual was measured for total length. A numbered, colored floy tag was also inserted at the base of the dorsal fin to track residency time and repeat captures. Wetlands were monitored daily for spawning activity. Observations of spawning were recorded using flagging, and habitat characteristics at spawning locations were measured, including vegetation growth form, percent cover, water depth, and temperature. Initial results show high numbers of adult use relative to site size. 109 individuals were captured during the 2014 field season, with 80 individuals captured at site 1 (a large site) and 29 individuals captured at site 2 (a small site). The size of males and females also differed significantly between sites. Residency time varied widely between the sites, with adults at site 1 staying an average of 17.5 days while adults at site 2 stayed an average of only 3.5 days. When spawning, adults appear to select only areas with 100% vegetation cover, and intermediate water depths based on overall site depth (0.18 m average at site 1 and 0.30 m average at site 2), but do not prefer a certain growth form or temperature. Northern pike are using restored wetlands for spawning activity, but the qualities and behaviors of adults seem to be a function of specific wetlands. Final analyses will attempt to define these characteristics and recommend the best qualities for future restoration activities.

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Title: Biotic and Abiotic Factors Influencing Walleye Recruitment in Escanaba Lake, Wisconsin from 1958-2013
Co-Author: Greg Sass, Josh Raabe, Justin VanDeHey

Abstract: Stock-recruit relationships are one of the most important relationships in fisheries management; they are also one of the most difficult to estimate due to the myriad of factors that can affect the recruitment. Walleye *Sander vitreus* are one of the most popular and intensively managed sportfish in Wisconsin and in North America. Despite this, knowledge of factors affecting recruitment of Walleye are often poorly understood. Our objective was to determine factors that significantly affected recruitment of Walleye in Escanaba Lake. We used Age-0 Walleye (recruits) abundance, Yellow Perch *Perca flavescens* abundance, Walleye spawning stock abundance and May water temperature data from Escanaba Lake collected from 1958-2013 to develop a multiple factor stock-recruit model. We used Statistical Analysis System (SAS) to estimate parameters for a multiple factor Ricker stock-recruit model. Spawning stock abundance explained 28% of recruitment variation. The addition of May water temperature and adult Yellow Perch abundance to the model explained 50% and 62% respectively. Spawning stock abundance, adult Yellow Perch abundance and May water CV all showed a negative correlation with Age-0 Walleye abundance. Based on our model, there are other important, unidentified factors that appear to be affecting Walleye recruitment in this system. Possible variables that may affect Walleye recruitment not included in our model include: wind, water temperatures and prey abundance. The development of a stock-recruit model for Walleye would allow fisheries managers to make better management decisions based on a more accurate estimation of Walleye recruitment.

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Title: Can You Teach Old Anglers New Tricks?
Co-Author: Krista Christensen, Brooke Thompson, Henry Anderson

Abstract: An online survey developed by the Wisconsin Department of Health Services (DHS) evaluated the efficacy of Wisconsin's fish consumption advisory program among men aged 50 years and older who fished Wisconsin waters, a subpopulation that has not previously specifically surveyed. The survey was open from October 2011 – August 2013. The survey gathered information on participants' demographics, health, fishing and fish consumption, knowledge of and response to consumption advisories. For the 3740 respondents, the mean age was 62.2 years; nearly all identified as non-Hispanic white and lived and fished in Wisconsin for over 10 years. Most participants (82.6%) had education beyond high school, and a household income >$35,000 per year. Nearly half of the participants (44.9%) were retired and half were working at least part-time (50.4%). About one quarter lived in a county bordering Lakes Superior or Michigan ('coastal counties'). The average number of combined fish and shellfish meals consumed per year was 89 (SD, 68.7), evenly split between locally caught fish and purchased fish. The top two sources of information regarding fish consumption advisories were the Department of Natural Resources' (DNR) fishing regulations booklet (73.3%) and DNR website or publications (66.8%). The percentage of respondents who felt they had at least 'some' to 'a great deal' of knowledge about advisories regarding mercury was 70%, compared with 55% for advisories regarding PCBs. Most participants (67 to 90% per question) correctly answered 8 of 10 questions designed to test knowledge about how to reduce intake of mercury or PCBs. Overall, 56.9% of respondents reported making at least one of three specific behavioral change in response to knowledge about fish contaminants - avoiding some locations, eating different types of fish, and/or eating fewer fish meals. Those living in coastal counties, those who were working, and

those with more education were more likely to have adopted all three aforementioned behavior changes. The survey results suggest that Wisconsin's fish advisory program does not discourage older men from eating fish they catch, and instead encourages anglers to modify their behavior, such as modifying which species they consume or the locations where they fish. Efforts to educate anglers about the risks and benefits of fish consumption have been more effective among Great Lakes anglers and more targeted education may be needed for inland lakes anglers.