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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Angler preferences and species identification competence on three lakes with liberalized black bass regulations
Co-Author: Dave Neuswanger

Abstract: A concurrent increase in largemouth bass abundance and decrease in walleye recruitment success has occurred in many northern Wisconsin lakes over the last decade. In many instances largemouth bass growth and size structure have become undesirable and a direct negative interaction between walleye and largemouth bass has been hypothesized. Liberalizing black bass regulations, with the goal of decreasing abundance, is becoming a common response to these issues. However, the effectiveness of this management action is dependent on angler interest in harvesting bass, particularly smaller bass. Also, preservation of excellent smallmouth bass populations is a common objective that could be jeopardized by these regulations. We conducted angler interviews on three Sawyer County lakes where minimum length limits for black bass were recently dropped. Our objectives were to determine preferences regarding bass harvest under these circumstances and to gauge the competence of anglers in distinguishing between black bass species. In general, anglers showed a high level of interest in harvesting largemouth bass in these lakes (53% of all respondents). Of those indicating they were interested in harvesting largemouth bass a majority were interested in fish less than 14 inches. There was generally less interest in harvesting smallmouth bass. Most anglers were able to correctly identify black bass by species from examining photographs, and anglers interested in harvesting bass showed higher identification competence than other anglers.

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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Predicted Effects of Angler Harvest on Largemouth Bass Abundance in Northern Wisconsin Lakes

Co-Author: Daniel Isermann, Michael Hansen, Jonathan Hansen

Abstract: Largemouth bass *Micropterus salmoides* abundance has increased in some northern Wisconsin lakes. Increases in abundance could affect largemouth bass population dynamics, resulting in slower growth and reduced size structure. Furthermore, the potential for negative interactions with other species such as walleyes is a concern for both anglers and biologists. Harvest regulations for largemouth bass have been liberalized in some northern Wisconsin lakes, although low rates of bass exploitation may prevent significant reductions in bass abundance. Our study will determine if angler harvest under different harvest regulations will reduce largemouth bass abundance in northern Wisconsin lakes. Specifically, we will determine levels of exploitation required to reduce largemouth bass densities under a variety of harvest regulation scenarios. We expect that angler exploitation will have to increase drastically to have a significant impact on largemouth bass populations in northern Wisconsin lakes.

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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Early Observations of Liberalized Black Bass Regulations in NW Wisconsin
Co-Author: Max Wolter

Abstract: In the early 2000's, noticeable increases in largemouth bass densities were observed in many NW Wisconsin lakes. Concurrently, a decrease in walleye recruitment was observed in lakes with a mix of natural reproduction and stocking. In response to these changes, black bass sport angler regulations were liberalized on four lakes, replacing the 14 in minimum size limit with a no minimum size limit. The objectives of this regulation change were to re-establish naturally reproducing walleye populations and improve growth rate and size structure of largemouth bass populations. Here we present early observations of fish community changes since implementation of the liberalized regulation. Creel surveys found anglers were interested in harvesting largemouth bass less than 14 inches. However, most of the increase in harvest was from fish between 12-14 inches. Electrofishing surveys found decreases in largemouth bass catch rates only on the two largest lakes. No apparent changes occurred in the number of largemouth bass greater than 14 inches. Largemouth bass growth rates showed signs of improving on one of the lakes examined. Increases in walleye recruitment occurred only on the largest lake that also had the lowest largemouth bass densities. In 2012, the liberalized bass regulations were implemented for most waterbodies in Burnett and Washburn counties. Future work will monitor changes to black bass population dynamics across a broader geographic scale, assess survival of large fingerling walleye stocking on three lakes, and examine broader fish community impacts after implementation of these liberalized regulations.

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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Largemouth Bass in Northern Wisconsin: Potential Dietary Interactions with Walleyes

Co-Author: Daniel A. Isermann, Brian L. Sloss, Keith Turnquist

Abstract: Largemouth bass *Micropterus salmoides* abundance has increased in many northern Wisconsin lakes over the last decade and this has caused some concern among anglers and biologists because of potential interactions with walleyes *Sander vitreus*. Previous studies have provided evidence of a negative interaction between the two species occurring through predation of adult largemouth bass on juvenile walleyes and competition for prey. However, the extent of these interactions remains poorly understood. Our objective was to determine if diet overlap and predation occurs between walleye and largemouth bass in 2 northern Wisconsin lakes. Diets were collected from adult largemouth bass and walleyes at 2-week intervals during May-October 2012 on Big Sissabagama and Teal lakes in Sawyer County, WI. Whole genomic DNA extraction and sequencing was used to identify the source species for remnant fish tissue in diet samples. Diet analysis suggests that crayfish *Orconectes* spp and sunfish *Lepomis* spp. constitute the major diet items for largemouth bass, whereas yellow perch *Perca flavescens* and sunfish constitute the major diet items for walleye. Diet overlap between largemouth bass and walleye ranged from moderate on Big Sissabagama Lake to low on Teal Lake. Furthermore, no largemouth bass predation on walleye has been observed at this point.

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Presentation Type: Presentation

Dates: Both Wednesday and Thursday

Title: DIETARY HABITS AND OVERLAP BETWEEN WALLEYE AND SMALLMOUTH BASS IN THE TURTLE-FLAMBEAU FLOWAGE, WISCONSIN

Co-Author: Jim Zarzycki

Abstract: Long-standing concerns and recent agency and media attention towards potential bass-walleye interactions have spurred fears amongst Turtle-Flambeau Flowage stakeholders that high numbers of smallmouth bass may be inhibiting (directly or indirectly) the Flowage's esteemed walleye population. Despite the fact that most of the published literature regarding smallmouth bass and walleye ecology suggests that the two species can live in relative harmony, concern remains that smallmouth bass are outcompeting walleye. We used gastric lavage techniques to sample the stomach contents of Flowage smallmouth bass and walleye captured via electrofishing and angling (done in cooperation with the local lake association). Index of Absolute Importance (IAI) and Index of Relative Importance (IRI) were calculated for each prey type ingested. Diet overlap between smallmouth bass and walleye was evaluated using the Schoener index. In addition, the proportion of total volume comprised by each prey type was determined in order to compare results with a 1989 Turtle-Flambeau Flowage dietary study. Results are anticipated to support field observations that smallmouth bass diets were comprised heavily of crayfish, while walleye diets were comprised heavily of fish.

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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Measuring walleye spawning habitat using side scan sonar versus transect-based methods

Co-Author: Brian L. Sloss and Daniel A. Isermann, U.S. Geological Survey, Wisconsin Cooperative Fishery Research Unit, College of Natural Resources, University of Wisconsin-Stevens Point

Abstract: The Wisconsin Department of Natural Resources' (WDNR) Walleye Sander vitreus Management Plan specifically recognizes that information on habitat, genetic integrity, and population status are critical components for sustainably managing the walleye resource within the state. Previous research has addressed each one of these components to varying degrees, but time and fiscal constraints continue to hamper the collection of consistent, quantitative habitat data for use in the walleye management process. Our objective was to determine if side-scan sonar can be used to accurately and efficiently classify walleye spawning habitat, and, if so, to use this habitat information to determine if relationships exist among spawning habitat availability, genetic characteristics, and the biological characteristics of walleye populations in northern Wisconsin. Fifteen lakes in Oneida and Vilas counties will be used in this study. The lakes were selected based on genetic structure, availability of population data, and recruitment classification code. Side-scan sonar and an established transect-based method were used to estimate proportional littoral zone substrate composition at 100 randomly-selected locations on each of the 15 lakes. We hypothesize that the side-scan sonar method will provide substrate information sufficient to quantify high-, medium-, and low-quality walleye spawning habitat at significantly reduced effort than transect-based methods. We will discuss the implementation of this data in the larger process of determining if relationships exist among habitat availability, genetic characteristics, and biological characteristics of walleye in Wisconsin.

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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Lake Habitat Mapping with Side-Scan Sonar in Nine Wisconsin Lakes (Preliminary).

Co-Author: Ron Crunkilton

Abstract: Lake habitat features such as substrate, coarse woody habitat, depth, and vegetation are important components of the ecosystem, and are used by fish and other aquatic organisms for foraging, refuge, and spawning. Traditionally, habitat has been measured manually using quadrats and transects, and depth maps for the study area were constructed without GPS/Sonar technology. Side-scan sonar technology has more recently been used to map underwater habitat features such as substrate and coarse woody habitat; however, this technology has not been employed for habitat mapping of inland Wisconsin lakes. Our main objectives were to determine the accuracy of sonar interpretation for lake habitat mapping for 9 Eastern Marathon County kettle lakes with glacial origin, the accuracy of new depth maps created from sonar depth readings, and to see if different habitat combinations can be used to predict fish diversity. The Lowrance HDS5 side-scan (or structure scan) was used to collect data from 9 lakes in the study area, from the shoreline to 30.5 meters perpendicular around the entire perimeter. This data was compared to manually measured ground truth data collected from random sampling points within each habitat type using a standard error matrix. Results show low accuracy of substrate interpretation (44 percent); however, CWH abundance/absence interpretation accuracy is high (81 percent). This method could provide a quick, cheap alternative for fish biologists to use when measuring lake habitat for future projects.

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Presentation Type: Presentation

Dates: Only Wednesday

Title: OZAUKEE FISH PASSAGE PROGRAM: DAM REMOVAL/REMEDIATION SUCCESS STORIES FOR FISH PASSAGE IN THE MILWAUKEE RIVER WATERSHED

Co-Author: Matt Aho, Luke Roffler, and Beth Stuhr

Abstract: During 2009 and 2010, the Ozaukee County Planning and Parks Department was awarded a combined \$5.2 million in funding from the National Oceanic and Atmospheric Administration and \$2 million from the US Environmental Protection Agency to develop, refine, and implement an “Ozaukee County Fish Passage Program” (Program). The Program reconnects existing, high quality habitat in Milwaukee River tributaries to Lake Michigan, the Milwaukee Estuary, and lower reaches of the mainstem Milwaukee River by inventorying and removing impediments to native fish and aquatic life passage. Together, the Program, municipalities, consultants, youth service corps, non-profit organizations, and volunteers have removed over 170 fish passage barriers reconnecting over 100 stream miles of fish habitat, reclaiming access to thousands of acres of wetlands. The keystone project of the comprehensive, watershed-scale Program is the modification or removal of major dams along the mainstem of the Milwaukee River that resulted in a high level of coordination amongst a multitude of partners on research, design and engineering, public input and cooperative funding. This session will detail the genesis, coordination, public input, design and engineering, and management of the Program through a case study of the modification or removal of these major dams. The session will explore the challenges of a watershed-scale program and providing measurable outcomes through the keystone dam project case study.

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Presentation Type: Presentation
Dates: Only Wednesday

Title: Trends in Wisconsin muskellunge fishery based on 47 years of angler entries from a single countywide contest
Co-Author: Gregory Sass

Abstract:

The Vilas County, Wisconsin Musky Marathon is a countywide fishing contest sponsored by the Vilas County Tourism and Publicity Committee. The contest records hundreds of entries annually and has documented many of the largest muskellunge captured by anglers in the county from 1964 to 2010. We analyzed length and weight data from the single largest and ten largest harvested muskellunge entered to test for changes in these growth variables over time. No significant change was found in length or weight of the largest fish registered annually in the contest over this time period. However, mean length and weight of the top ten muskellunge harvested has declined significantly over time. On average, mean length and weight of the top ten muskellunge harvested has declined by 4.1 inches and 9.4 pounds during 1964 – 2010, respectively. Contest data also indicated that the practice of catch and release has gained popularity over time. Since a catch and release category was officially added in 1983 the percentage of released fish entered has increased from 22% to 91% of all fish entered. Negative public perceptions of harvesting muskellunge resulted in the contest becoming catch and release only in 2011. Our results suggest that the maximum growth potential of muskellunge in Vilas County has not changed over time; however, density-dependent effects on growth may be negatively affecting the number of muskellunge reaching maximum sizes. Changes in minimum size limits, stocking rates, and angler attitudes need to be considered to increase growth potential of muskellunge in northern Wisconsin.

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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Muskellunge size structure changes and angler perceptions in the Spider Lake Chain
Co-Author: Jeffrey Kampa

Abstract: The Spider Lake Chain in Sawyer County, WI has historically sustained a high density muskellunge fishery characterized by slow growth rates and poor size structure. The chain is currently managed with a 28" minimum length limit. Anglers have recently reported increased catch of larger muskellunge, and have expressed support for a higher minimum length limit. We compared spring fyke netting results between surveys conducted during 2006 and 2012 to assess recent changes in size structure, and measured growth of individual fish marked with PIT tags during 2006 and recaptured during 2012 netting surveys or by anglers with PIT tag readers during 2011-2012. Length frequency distributions indicated improvement in the number of fish from 30-38 inches, but no change in number of fish over 40" TL. Growth rates of individual fish were similar to growth rates of fish from two other high-density muskellunge lakes in the area. Although some improvement in the Spider Lake Chain muskellunge fishery is evident from fyke net data, the system still contains many relatively small fish that are growing slowly. The length frequency distribution of muskellunge reported by volunteer anglers keeping logs of fish captured in the Spider Lake Chain provided evidence that anglers catch a disproportionate number of large fish in the system. The effectiveness and size selectivity of muskellunge anglers provides a different view of the population than fishery assessments, and these differences are important to shared understanding of the fishery between management biologists and anglers.

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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Evaluation of Potential Size Selectivity of Tribal Muskellunge Spearing in Northern Wisconsin Lakes
Co-Author: None

Abstract:

Since affirmation of tribal fishing rights in 1983 the Wisconsin Department of Natural Resources has worked to integrate tribal harvest opportunities with sport fisheries in the Ceded Territory. Concerns exist over the potential for tribal spearers to select for large fish which could conflict with increasing angler desire for trophy muskellunge fisheries and potentially result in overharvest of females over time. We undertook an evaluation to evaluate potential size selectivity of tribal spearing of muskellunge in northern Wisconsin Lakes.

We compared muskellunge length frequency distributions from population surveys and tribal spear fisheries. Population survey data was found to produce unbiased representations of existing size structure. Subsequent comparison of length frequency distributions of adult muskellunge populations at large and that of fish taken by tribal spear fishing showed highly significant ($p < 0.005$) differences. Relative to their abundance in the overall population, the tribal spear fishery tends to avoid adult muskellunge less than approximately 35-36" in length and select for fish greater than that size. Each of six lakes evaluated showed a similar degree of size selectivity in tribal spear harvest relative to spring population survey data.

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Presentation Type: Presentation

Dates: Both Wednesday and Thursday

Title: Genetic Diversity of Hatchery-Reared Muskellunge: Impacts of Propagation Practices

Co-Author: Brian L. Sloss, Justin A. VanDeHey, and Martin J. Jennings

Abstract: Conserving genetic resources within and among native, natural reproducing populations is a priority for sustainable fisheries management programs and, more specifically, fish propagation programs. The Wisconsin Department of Natural Resources muskellunge (*Esox masquinongy*) propagation program has implemented a comprehensive set of recommendations to conserve genetic diversity at the hatchery- and stock-level. Targets for broodstock numbers, mating strategies, and hatchery rearing strategies were developed to maximize genetic diversity and effective population size (N_e) in hatchery-produced muskellunge. The objective of this phase of the study was to determine if the changes implemented in the program successfully met the goals of conserving genetic diversity at critical stages of muskellunge propagation. Tissue samples (broodstock and fingerlings) and whole specimens (fry) were obtained from Governor Tommy Thompson State Fish Hatchery for analysis of genetic diversity at 14 microsatellite loci. Analyses included all broodstock ($N = 47$) and 700 fingerlings during 2011 and all broodstock ($N = 72$), 181 fry, and 300 fingerlings during 2012. Observed heterozygosity and allelic richness were used to estimate genetic diversity and effective number of breeders (N_b) was estimated using both molecular and demographic-based estimators. Across a given year's production, total genetic diversity levels (all grow-out ponds pooled together) did not significantly differ among broodstock, fry, and fingerling life stages. However, when each pond was considered separately for the 2011 production year, genetic diversity levels in 1 of the 7 rearing ponds significantly differed from that year's broodfish. Significant differences were observed in N_b between broodstock and fingerling life stages during 2011 and between broodstock and fry life stages during 2012. These findings show both success and areas for improvement in the overall goal of conserving genetic diversity in muskellunge propagation. These findings will ultimately be considered as part of a larger study of broodfish and production fish from the past 7 years to provide a thorough evaluation of the muskellunge propagation programs conservation genetics goals.

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Presentation Type: Presentation

Dates: Both Wednesday and Thursday

Title: A Comparison of Historical Changes in Lake Morphology of Six Inland Lakes in Wisconsin

Co-Author: Ron Crunkilton

Abstract:

The morphology of lake bottom changes over time was assessed in six central Wisconsin Lakes. Original bathymetric surveys were conducted with ice-grid surveys in cut holes through ice at intersections of perpendicular transects that were equally spaced over a lake surface. Contours were hand-drawn based on survey depths. The second generation of maps were produced with graphing sounders to traverse manually across perpendicular grid transects. Contour maps were hand-drawn after graphing sounder transects were manually stitched together. In this study, bathymetry maps were created with GPS/Sonar technology with sub-meter accuracy for comparison with historical maps. ArcMap 10 software was used to rectify and build 3D models for comparisons of lake depth and volume changes within lakes over time ($H_0: X_1 - X_2 = 0$). Reasons for changes in lake depth and volume were attributed to inaccuracy in historical survey methods, sedimentation and scouring, and rectification errors. This study points out the present need for well-defined base maps with precise (<1cm) elevations so future studies can clearly define bottom changes that may be attributed to natural and anthropogenic factors.

Clam Lake Carp AFS abstract Anthony Havranek
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Clam Lake, located in Burnett Co. (northwest Wisconsin), is historically the largest wild rice producing waterbody in the state. In 2007 the lake experienced a dramatic decline in the density and distribution of its wild rice beds. In 2009, the St. Croix Tribe in cooperation with the WI DNR and Clam Lakes Protection and Rehabilitation District began a study/restoration project on Clam Lake to determine the reason for the continued decline. After considering multiple factors, the group began to focus on common carp (*Cyprinus carpio*) as the main limiting factor. Aging samples and an exclosure study in which wild rice would grow only in a protected and seeded area confirmed this theory.

In 2010, we began a study to develop a population and biomass estimate to compare to threshold values established by researchers at the University of MN. To accomplish this we used radio telemetry and a mark and recapture method to estimate population and biomass.

In 2012 we were able to develop our first population and biomass estimate, and measure these values against responses by the fish and aquatic plant community. We are also continuing to develop our understanding between the bluegill and carp populations on Clam Lake; with our ultimate goal being the restoration of the bluegill as a predator species for carp eggs and larvae.

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Presentation Type: Presentation

Dates: Both Wednesday and Thursday

Title: Zebra Mussel habitat preference, growth, and mortality within and among lakes in northeast Wisconsin and upper Michigan

Co-Author: Tim Ginnett, UWSP and Gregory Sass, WDNR

Abstract: Zebra mussels (*Dreissena polymorpha*) are being transported by recreationists and through natural corridors from the Great Lakes to inland lakes in northern Wisconsin and upper Michigan. With limited zebra mussel management options, there is a need to contain the spread through early detection monitoring. Suitability models based on water calcium concentrations currently assist managers by identifying which lakes to focus pre-invasion monitoring efforts. Knowledge of lake-specific habitat limitations will help refine monitoring efforts by identifying locations within lakes that have high invasion potential. Additionally, quantitative comparisons of population dynamics among lakes across a range of colonization periods will provide information to managers and landowners on anticipated population trajectories following establishment. The objective of this study was to determine zebra mussel habitat preferences and population dynamics within and among lakes in northern Wisconsin and upper Michigan. SCUBA diving was used to sample quadrats at regular intervals along transects representing a variety of substrate types and water depths. Within quadrats, water depth and substrates were recorded to quantify habitat availability. Presence and density of zebra mussels, substrates zebra mussels were attached to, as well as zebra mussel age and length were examined to assess habitat preference and population dynamics. Results indicate that substrate selection is occurring and that population dynamics vary among lakes.

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Title: FishVis: A web-based tool for predicting responses of stream fishes and their habitats to climate change in the Great Lakes region
Co-Author: Jana Stewart (USGS)

Abstract: Climate change is expected to fundamentally alter populations of stream fishes in the Great Lakes region over the coming decades. Fish responses will be complex and will vary among streams and among species. Fisheries managers and policy makers need ways to estimate and visualize the potential consequences of climate change for stream fisheries. Towards that end, in collaboration with colleagues from Michigan, Ohio, and New York, we have developed a web-based geographic-information-system tool, “FishVis”, for representing climate-driven distribution shifts in common stream species for the U.S. portion of the Great Lakes region. FishVis allows users to display the modeled current and future (mid-century) summer water temperatures (July mean) for all of the more than 200,000 stream reaches in the region. Based on these water temperatures and reach-specific data on climate, stream flow, geology, and land cover, the distributions of 16 fish species in three thermal guilds (cold, cool, and warm) are predicted under current and future climate conditions. Future predictions are derived from the pooled results from 10 different climate-change models. Output of FishVis consists of maps, visible at any scale from the entire region down to about a 1-km-square grid, portraying water temperature and probability of occurrence of each species in all streams and rivers. Map overlays of aerial photos, topography, roads, protected areas, existing land use, and an index of watershed environmental disturbance are available to aid in the identification of stream reaches warranting specific management responses to projected climate-change impacts. All data layers within FishVis will also be available upon request for use in other stream and fisheries management applications.

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Presentation Type: Presentation

Dates: Both Wednesday and Thursday

Title: Learning to manage and managing to learn: sustaining inland fisheries in a changing climate

Co-Author: Jonathan Hansen (WI DNR), Jereme Gaeta (UW-Madison), Stephen Carpenter (UW-Madison)

Abstract: Freshwater systems are being transformed by multiple broad scale drivers such as global climate change, and thus future management decisions will be made in conditions outside the scope of past experience. In order to maintain inland fisheries in a changing climate, they must be managed for increased resilience to novel environmental conditions. This approach to management requires viewing local fisheries in their regional context, utilizing a diversity of management tools to manage for heterogeneous lake types, monitoring, and applying adaptive management. We outline how each of these components increase resilience of inland fisheries and how they could be applied to fisheries management on local to regional scales using a case study of multispecies sport fisheries in Wisconsin. In recent years, black bass (*Micropterus* spp.) have increased while walleye (*Sander vitreus*) have decreased. Numerous hypotheses are plausible to explain these trends, and it is uncertain how management can affect the trajectories of these species under future conditions. Managing for resilience in this system entails maintaining heterogeneous fisheries using diverse but redundant regulations. This approach can promote fisheries resilience under unknowable future conditions, and combined with monitoring creates an adaptive management approach that allows learning about critical uncertainties in factors influencing bass and walleye. Although many real-world challenges exist to implement these resilience strategies, management designed to accommodate uncertainty and illuminate its consequences is the only way to maintain critical fisheries in a rapidly changing world.

TITLE: Beavers, Brook Trout, Humans and Geology – Investigating controls on water temperature in Otter Creek, Forest County, WI

AUTHORS: Andy Selle – Inter-Fluve; Matt Steinbach – Forest County Potawatomi Community

ABSTRACT: Otter Creek is a tributary to the Peshtigo River near the Forest and Marinette County line. The creek is +/- 22 miles long and includes a total of 12 perennial tributaries. Brook trout have been found consistently in the headwaters of the creek, a steep lower section, and in a tributary, but are absent throughout much of the mainstem and most tributaries. Stream temperature governs the extent of brook trout in the watershed. The study employed temperature loggers from May- September, a surveyed long profile of the mainstem, 1850s - GLO maps, and aerial photo analysis to determine the natural thermal regime of the creek and inform aquatic management options. Temperature loggers indicated that most of the mainstem is above the limits for brook trout between mid-June and Mid-August, but optimal otherwise. The profile survey indicated four distinct stream segments, based on slope, each controlling the overall geomorphology and to an extent, water temperature of that segment of stream. Additional hydraulic controls included relic logging crossings, beaver dams, and localized geology (drumlins). The results of the study indicated the stream includes a few anthropogenic impacts that should be remedied. The thermal regime is controlled by bed slope and geology which controls water velocity and channel form. Several tributaries were identified that could provide cold water refuge once hydraulic controls were removed during the critical summer period when brook trout cannot persist in sections of the mainstem. Beaver management can be informed by bed slope within the channel. Steep sections with cold water can be managed to maintain cold water, however, flat sections of the channel will include wetland stream forms and warm water regardless of the presence of beavers or other hydraulic controls. Due to geologic controls, Otter Creek will likely remain a diverse array of warm, cool, and cold water habitats within the watershed.

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Presentation Type: Presentation

Dates: Both Wednesday and Thursday

Title: Stock Characteristics of Lake Whitefish in Lake Michigan

Co-Author: Daniel Isermann, Brian Sloss, and Justin VanDeHey

Abstract: Lake whitefish, *Coregonus clupeaformis*, support important recreational, commercial, and tribal fisheries in the Great Lakes, including Lake Michigan. Genetic analyses indicate at least six distinct lake whitefish stocks exist in Lake Michigan resulting in a mixed-stock fishery. Biological characteristics could vary among these stocks, which could result in stock specific responses to exploitation. The objectives of our study were to determine if capture location in October is an accurate identifier of genetic stock and to determine if stocks differ in terms of growth, maturation, age structure, condition, and fecundity. Initial results indicate that some biological differences exist among stocks; continued analysis will determine if these differences are meaningful from a management standpoint.

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Presentation Type: Presentation
Dates: Both Wednesday and Thursday

Title: Status of Lake Sturgeon Restoration in the Namekagon River, Wisconsin
Co-Author: Jamison Wendel, Gene Hatzenbeler, and Martin Jennings

Abstract: Lake sturgeon (*Acipenser fulvescens*) access to habitat upstream of the Trego Dam on the Namekagon River was eliminated when dam operations began in 1927. A restoration plan developed by Wisconsin Department of Natural Resources was initiated during 1993. Restoration tactics include stocking hatchery-reared lake sturgeon from a genetically appropriate source above the dam and protecting stocked fish from harvest with a closed lake sturgeon fishing season in the Namekagon River and Trego Flowage. Sixteen lake sturgeon were observed or captured upstream from the Trego dam during 2006 – 2012. We captured 10 fish in the Trego Flowage and 6 from the Flowage to approximately 20 miles upstream. Captured lake sturgeon originated from 6 year classes and ranged from 12.5 to 41.8 inches total length. The restoration plan recommends maintaining the closed fishing season and stocking lake sturgeon until a self-sustaining population is established above the dam. In addition, DNR Fish Management staff will explore fish passage options at the dam to allow upstream passage.

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Title: Evaluating Harvest Regulations for Lake Sturgeon in the White Rapids Section of the Menominee River
Co-Author: Mike Donofrio and Ed Baker

Abstract: The Menominee River currently supports some of the largest stocks of lake sturgeon associated with Lake Michigan and some of these stocks have supported hook-and-line fisheries for decades. Enacting harvest regulations that prevent overfishing of lake sturgeon in the Menominee River has been a challenge for fishery managers because of lake sturgeon life history and a lack of specific information on abundance, recruitment, and the potential effects of exploitation. Furthermore, with the future implementation of fish passage, lake sturgeon stocks in the Menominee River could act as a source of recruitment for other portions of the river, Green Bay, and Lake Michigan. Fishery managers with the Wisconsin and Michigan Departments of Natural Resources (DNR) will be required to achieve a balance between exploitation and recruitment in order to promote the sustainability and recovery of lake sturgeon stocks in Lake Michigan. Our objectives were to determine the potential effects of harvest regulations on lake sturgeon reproductive potential in the White Rapids section of the Menominee River. We will present the results of our ongoing simulation exercises and discuss future projects designed to better understand lake sturgeon dynamics in the Menominee River system.

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Presentation Type: Presentation

Dates: Both Wednesday and Thursday

Title: Gill lice infection of brook trout in Wisconsin streams

Co-Author: Sue Marcquenski, Kari Soltau, Paul Kanehl, Dan Walchak, Justin Haglund, Aaron Nolan

Abstract: Anecdotal observations of gill lice on trout by anglers and WDNR fisheries biologists suggest gill lice may be infecting more brook trout and spreading to more streams in some parts of Wisconsin. The gill lice species infecting Wisconsin brook trout is *Salmincola edwardsii*, which likely coevolved with brook trout given its host specificity. We have little information on the dynamics and impact of gill lice on brook trout populations and on current and past distributions of gill lice in Wisconsin. In 2012 we documented trends in gill lice infection of brook trout in Ash Creek and Tenny Spring Creek. In Tenny Spring Creek, the brook trout infection rate increased from 12% in June (n=157) to 26% in September (n=114) and 39% in November (n=51). In Ash Creek, the infection rate of age 1 and older brook trout increased from 42% in April (n=312) to 95% in October (n=155); 94% of age 0 brook trout in October were also infected (n=115). Infected age 0 brook trout had from 2 to 11 gill lice per trout (average=4; n=21). Infected age 1 and older brook trout had from 1 to 70 gill lice per trout (average=16; n=59). Age 0 brook trout recruitment in Ash Creek was significantly less than expected based on long-term stock-recruitment data. Given the poor condition and high infection rate of age 0 brook trout going into winter, we expect to see a recruitment failure in our upcoming spring survey of age 1 brook trout. We will discuss hypotheses on why gill lice may be becoming a significant problem in some streams, and we will discuss a new angler-based monitoring program to begin to document the presence and absence of gill lice in brook trout populations across Wisconsin.

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Presentation Type: Presentation
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Title: Comparative susceptibility among three stocks of yellow perch, *Perca flavescens* (Mitchill), to viral haemorrhagic septicaemia virus (VHSV) strain IVb from the Great Lakes

Co-Author: E. Emmenegger, J. Glenn, J. Winton, & F. Goetz

Abstract: The Great Lakes strain of viral haemorrhagic septicaemia virus IVb (VHSV-IVb) is capable of infecting a wide number of naive species and has been associated with large fish kills in the Midwestern United States since its discovery in 2005. The yellow perch, *Perca flavescens* (Mitchill), a freshwater species commonly found throughout inland waters of the United States and prized for its high value in sport and commercial fisheries, is a species documented in several fish kills affiliated with VHS. In the present study, differences in survival after infection with VHSV IVb were observed among juvenile fish from three yellow perch broodstocks that were originally derived from distinct wild populations, suggesting innate differences in susceptibility due to genetic variance. While all three stocks were susceptible upon water-borne exposure to VHS virus infection, fish derived from the Midwest (Lake Winnebago, WI) showed significantly lower cumulative % survival compared with two perch stocks derived from the East Coast (Perquimans River, NC and Choptank River, MD) of the United States. However, despite differences in apparent susceptibility, clinical signs did not vary between stocks and included moderate to severe haemorrhages at the pelvic and pectoral fin bases and exophthalmia. After the 28-day challenge was complete, VHS virus was analyzed in subsets of whole fish that had either survived or succumbed to the infection using both plaque assay and quantitative PCR methodologies. A direct correlation was identified between the two methods, suggesting the potential for both methods to be used to detect virus in a research setting.