NORTH CENTRAL DIVISION OF THE AMERICAN FISHERIES SOCIETY

Joint Winter Business Meeting of Centrarchid, Esocid,

& Walleye Technical Committees

WTC Chair: Dale Logsdon
WTC Chair Elect 2018: Mark Ermer
WTC Immediate Past Chair: Jeff Koch
WTC Secretary: Nicholas Kludt

ETC Chair: Keith Koupal
CTC Chair: Benjamin Schall
Sunday, January 27, 2019

- Meeting was called to order at 2:30 by Dale Logsdon
    - Attendees: Dale Logsdon, Mark Ermer, Nick Kludt, Curt Wagner, Andy Jansen, Jason DeBoer, Janice Kerns, Jordan Weeks, BJ Schall, Melissa Wuellner, Kevin Gaston, Nicholas Haunert, Cameron Goble, Mark Fincel, Heather Hettinger, Zoe Almeida, Rebecca Krogman, Erin Haws, Paul Glander, Patrick Hanchin, John Bruner
- After a brief round of introductions, the minutes from the prior two business meetings were circulated among the group.
    - 2018 winter business meeting minutes were approved
    - 2018 summer business meeting minutes were approved with 1 correction
- Nick Kludt delivered the Treasurer's report, and has confirmed that we did pay for Dale's plaque. The payment for Hilary's is pending. Treasurer's report was approved, Dale move, Mark seconded.
- John Bruner asked about the $5,000 WTC investment within the AFS portfolio. Dale L. opened the discussion.
    - The third quarter investment report indicated market volatility. At the end of the quarter, consolidated accounts were up 5.41% year-to-date, but lost 5.39% over the next 43 days. That puts us at about break-even for the year (up 0.02%). For more details, see the *AFS 2018 3rd Quarter Review*.
    - Marker Ermer suggested and John suggested we wait until summer before making any further investment decisions, given final quarter market volatility.
    - The general consensus was WTC needs a cash buffer to pay for the summer meeting, and we don't want to be caught short of funds.
    - Gist: current investments are holding steady, no immediate plans for more investment.
- Mark Ermer asked about our 501-3c status and tax exempt number for vendors, as it related to paying for the upcoming summer meeting.
    - Drew Holloway, the present NCD Treasurer has that information available as needed.
- Dale L. presented the Sander Travel Award to Zoe Almeida (Ohio State University)
    - Zoe received a copy of the Barton WAE book and $200 from WTC.
    - Janice Kerns presented a $200 match from the Ohio Chapter.


Zoe Almeida (Ohio State) with Dale Logsdon presented the Sander Award & Barton Walleye Management book (L.) and Janice Kerns presented the matching funds from the Ohio Chapter (R.).

- Mark E. opened the discussion on the **2019 Summer Joint Meeting**.
    - Webster, SD, July 16-18
        - $60-85 registration fee, which is consistent with other years
    - Accommodations:
        - $70 per night (SD State Rate)
        - The Galley Hotel Bar and Grill (605) 345-9989
        - Boomers Outback Motel (605) 345-3323
    - Potential evening activities may involve either the archery range or the BB gun range…
- Dale L. opened the discussion on potential workshops at the summer meeting.
    - Previous topics have included age/growth, tagging, and a YEP symposium.
    - Mark Fincel asked about a WAE rearing/hatchery workshop, given the proximity to Blue Dog State Fish Hatchery. Topics that resulted from this discussion included:
        - OTC marking, with an emphasis on methods/concerns with mortality
        - General production techniques, with an aim toward involving more hatchery personnel in WTC proceedings.
        - WAE transport methods, given Iowa's recent research in this area.
    - Patrick Hanchin suggested a broad general theme to encourage participation.
    - Jordan Weeks provided a quick update on the WI governor's preferred fish species ☺
    - Gist: We will be providing the contacts for the 2019 Summer Joint Meeting so folks can register/start the travel approval process.
- Meeting moved into the breakout sessions for CTC, ETC, and WTC reports.
    - For full state updates, please see the appended reports.
    - Kurt Wagner gave the Ohio update.
    - Andy Jansen and Rebecca Krogman updated us on the myriad projects happening in Iowa, among which are investigations of stocking performance of rearing pond product in IO reservoirs and transport method studies.
    - Jason DeBoer provided a brief overview of ongoing research in Indiana.
    - Mark Fincel updated the group on the continuing tagging projects across South Dakota reservoirs.
    - Patrick Hanchin delivered the Michigan report, and noted there have been some concern in his state regarding OTC marking and occasional WAE production losses.
        - Mark E. saw similar issues with some SD fry marking.
        - Dale L. noted MN has observed trouble when pH >6.8.
    - Dale Logsdon, in the Minnesota report, noted that southern MN had good reproduction last year, but this was not observed statewide. MN also tabled a proposed bag limit reduction from 6 to 4 after low/no public support. Additionally, a new 20-24" slot limit toolbox regulation is available to allow more harvest, after the 17-26" slot saw successes.

        - Mille Lacs – OTC marked fry have been released for the past several years, and have demonstrated there is no issue with natural production. It's primarily a recruitment issue.
- Meeting moved into Old Business.
    - The primary topic was a WAE symposium at the 2021 MWFWC in Minneapolis.
    - Potential topics included:
        - Recruitment and reproduction declines
        - Large system or system change through time.
    - Discussion moved into publishing the symposium proceedings.
        - Dale L. asked Doug Austin about publishing in NAJFM as a symposium.
            - Doug indicated there is a tradeoff with this option, as there is less room for content as opposed to a Proceedings book. An example of this is the Catfish 2000 symposium.
        - Melissa Wuellner asked about readership – NAJFM might be more accessible to managers.
            - Consensus was we need to talk to Dan Dougherty (editor of NAJFM) to establish what it takes to get a symposium published.
        - John B. asked about the potential for giving small (e.g. $500) grants to encourage submissions if the symposium is to be published as a unit.
        - Doug A. suggested the potential for a synthesis collection in Fisheries, with 4 or so papers.
    - Mark Fincel suggested bringing in groups like In-Fisherman, etc., to the symposium to encourage more popular press dissemination.
        - Doug A. asked about local fishing guides, or that type of organization.
        - Rebecca Krogman suggested we subsidize registration fees as a means to encourage this outreach.
    - Gist: this discussion generated several good ideas that will need to be explored or developed more fully.
- Meeting moved into New Business.
    - Sander Award deadline change.
        - Dale and Mark suggested moving the Sander Award deadline from Oct. 1 to Nov. 1 to encourage more applications. This meshes with MWFWC moving into January.
        - This change was adopted, and the application materials will be updated to reflect the new deadline.
    - Teleconferencing of business meeting and annual meeting paper presentations.
        - Dale noted there is continued interest in making the WTC/Joint meetings more accessible.
        - John noted there were issues associated with live teleconferencing with a wireless Internet connection; wired connections are preferred.
        - Rebecca K. noted Southern Division records all talks and this was a nice resource to have for review.
        - While the room generally liked the idea, logistics remained unclear.
        - Moving forward, two ideas emerged as starting points.
            - Business meeting – a conference call was identified as the simplest option for business meeting participation. Doug A. said AFS has several lines we can use free of charge.
                - Mark E. said SDGFP has tech support personnel that may be able to facilitate this for the 2019 summer meeting.
            - Paper presentations – recording these within Powerpoint or simply a digital recorder seemed like good first steps.
        - Mark E. and Nick K. were elected ringmasters, and will work on this issue for the 2019 Summer meeting.
- Mark Ermer was installed as the new WTC chair, and Dale Logsdon was presented with a certificate of appreciation for serving. Chair-Elect Lawrence Eslinger (not present) was recognized, and will be transitioned into new duties.

Mark Ermer, SDGFP, (R.) presented Dale Logsdon, MNDNR, (L.) with his certificate of appreciation for serving as Chair.

- Meeting was adjourned at 4:16 PM.
    - We'll see you in Webster this summer!

State/Provincial Updates – Winter 2019

Illinois – Jason DeBoer

Charlie Roswell, INHS Lake Michigan Biological Station

In 2018 we continued collecting data as part of ongoing research/ monitoring projects, including small mesh gill net surveys that collect yellow perch in nearshore Lake Michigan. On the fishery-dependent side of things, we generate estimates of harvest and directed effort for the yellow perch fishery in Illinois waters of Lake Michigan, and assess harvest composition by collecting and aging anal spines, as well as by photographing the urogenital papillae of harvested perch to generate estimates of harvest sex ratios.

In 2018, we saw an increase in total harvest estimates for yellow perch over a year ago; however, harvest remains low relative to estimates for years prior to 2015.

We have evidence (creel survey data and angler reports) that the fall/ winter months are increasingly important for yellow perch angling (relative to spring and summer). We are currently conducting a creel survey to better understand angler effort and harvest (including yellow perch) during October - February.

Cory Suski, University of Illinois

I have an undergrad in my lab group (John Bieber) that recently completed some field work in Wisconsin looking at the role of air exposure in disturbance in fish caught by ice fishing. As part of this, John captured 19 yellow perch; these fish were sampled for gills to quantify molecular indices of disturbance (gene activity), and were also measured for heat loss using a thermal imaging camera.

Jeff Stein, Sportfish Ecology Lab, University of Illinois

Here at the Sport Fish Ecology Lab, we will be kicking off a project later this spring investigating age and growth in walleye, sauger, and saugeye in Illinois. Specific studies are yet to be defined, and we will be very interested in potential collaborations outside of Illinois as well. Core studies in this effort will be led by incoming PhD Student Emma Easterly, who recently completed her M.S. with Dan Isermann at UW-Stevens Point.

Neil Rude, Southern Illinois University

Southern Illinois University Carbondale sauger movement ecology project using otolith microchemistry of fish from the lower five navigation pools of the Ohio River determined that 41-55% of individuals originated from within the Ohio River (likely within those lower pools), 14-28% were assigned as tributary origin (although exact tributaries are unknown), and 31% of individuals likely originated from the Ohio River outside of the study area (upstream). Data suggest the frequency of fish that originated in upriver locations increased from downstream to upstream pools samples, and a high percentage of fish moved throughout their life. The manuscript for this project should be submitted for review in the near future. SIU has published its sauger population demographics and simulation modeling of Ohio River and Kaskaskia River sauger populations manuscript in the Journal of Fish and Wildlife Management.

Results indicated Sauger stocks in both rivers exhibited fast growth rates and high annual mortality. Yield per recruit modeling indicated that the current 356-mm minimum size limit for Sauger in the Kaskaskia River is

sufficient to prevent growth overfishing and likely explains the consistently larger size structure (greater proportion of fish ≥ 356-mm total length), whereas modeling of Ohio River populations suggest that growth and recruitment overfishing of Sauger were likely occurring in the Ohio River with its former regulations. Based on this research, the Illinois DNR has changed its sauger regulations for Ohio River from a 10 Fish Daily Harvest Limit with no length restrictions to a 6 Fish Daily Harvest Limit with a 14inch minimum length limit. SIU/IDNR still participates in the ORFMT annual fall/winter sauger sampling in Ohio River tailwaters and continue to tag sauger to help determine exploitation rates and size of individuals harvested by anglers and shed light on the high observed mortality rates of sauger.

Kasey L. Seibert, Gregory W. Whitledge, Neil P. Rude, Devon C. Oliver, Alex Loubere, and Justin R. Seibert (*2018*) Population Demographics of Sauger and Simulated Effects of Minimum Length Limits in the Kaskaskia and Ohio Rivers. Journal of Fish and Wildlife Management: December 2018, Vol. 9, No. 2, pp. 431-445.

Jeremiah Haas, Exelon

Stocked out a little over 140K advanced fingerlings into P13 & P14 in 2018. Nothing on the research side other than our "X" branded walleyes (2014 year class) are being caught and we looking forward to some age verification work once they get to be a couple years older. Liquid nitrogen freeze brands. We typically do a single or double vertical bar, but we did an X for 2014 so we had a known age class in the river. Pretty much all the Miss. River guys know our brands from IL to MN.

Mike Garthaus and Nerissa McClelland, Illinois DNR

LaSalle Hatchery Broodfish Collection Report-2018

Tournaments

Sauger	IWT/WAT (3/11)	MWC (3/23-24)	IRWC (4/7)	Total
Number ♀ spawned	27	204	43	274
Number of eggs	2,157,000	19,079,000	3,396,000	24,632,000
Egg volume	306,000/L	306,000/L	306,000	
Number eggs/fish	79,888	93,524	78,976	89,897
Number of fry	1,621,000	13,188,000	2,203,000	17,012,000
Hatch rate (%)	75.1	69.1	64.8	69.0

The fry were stocked as follows: 1,800,000 – 3 LaSalle Hatchery Ponds,
15,212,000 – Illinois River.

Kankakee River Walleye

Number of ♀ spawned: 18
Total number of eggs: 2,500,000
Egg volume: 135,000/L (139,111 eggs/fish)
Total number of fry: 300,000 (1.4 million eggs eyed up, but only 300,000 survived hatching)
300,000 fry were stocked in one pond when the pond temperature was 52 ºF. A severe cold front resulted in pond temperatures of 38-40 ºF for four days post stocking. The fry did not survive in the pond and the pond was re-stocked with walleye fry from the Fox Chain O'Lakes on 4/20.

Fox Chain O' Lake Walleye

Number of ♀ spawned: 71
Total number of eggs: 9,900,000
Egg volume was 128,000/L (139,535 eggs/fish)
Total number of fry: 4,833,000
(2,941,000 fry stocked in 7 hatchery ponds, 450,000 fry sent to Jake Wolf, 650,000 fry sent to Fin N Feather Rearing Pond and 792,000 fry stocked in FCOL)
Hatch rate: 48.8%

Walleye x Sauger Hybrids

Number of ♀ spawned: 20
Total number of eggs: 2,771,000
Total number of fry: 1,596,000
(400,000 fry stocked in 2 hatchery ponds, 1,196,000 fry stocked in Lake Evergreen)
Hatch rate: 57.5%

Sauger Stocking in Illinois

Destination Water Name	Source Water Name	Quantity	Size	Date Stocked	Species
CARLYLE LAKE	#3 LASALLE FISH HATCHERY	213868	1.5	5/23/2018	SAUGER
DES PLAINES RIVER	#3 LASALLE FISH HATCHERY	29542	2	6/1/2018	SAUGER
HENNEPIN CANAL	#3 LASALLE FISH HATCHERY	10500	1.7	6/1/2018	SAUGER
HIGHLAND SILVER LAKE	#3 LASALLE FISH HATCHERY	7742	2	6/8/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	1620000	1	4/2/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	1500000	1	4/9/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	10346000	1	4/10/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	625000	1	4/18/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	1121000	1	4/27/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	114408	1.5	5/21/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	81501	1.2	5/24/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	50544	2.1	5/31/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	26030	2	6/6/2018	SAUGER
ILLINOIS RIVER	#3 LASALLE FISH HATCHERY	18706	1.8	6/11/2018	SAUGER
KASKASKIA RIVER	#3 LASALLE FISH HATCHERY	12096	1.8	6/7/2018	SAUGER
KASKASKIA RIVER	#3 LASALLE FISH HATCHERY	13097	2	6/7/2018	SAUGER
PRK - BEAVER LAKE	#3 LASALLE FISH HATCHERY	10080	1.5	5/23/2018	SAUGER

Walleye Stocking in Illinois

Destination Water Name	Source Water Name	Quantity	Size	Date Stocked	Species
#2 JAKE WOLF HATCHERY	#3 LASALLE FISH HATCHERY	450000	1	4/18/2018	WALLEYE
#2 JAKE WOLF HATCHERY	#3 LASALLE FISH HATCHERY	450000	0.5	4/18/2018	WALLEYE
BANNER MARSH - JOHNSON LK	#3 LASALLE FISH HATCHERY	24352	1.8	6/1/2018	WALLEYE
BLOOMINGTON, LAKE	#3 LASALLE FISH HATCHERY	25166	2	6/6/2018	WALLEYE
BUSSE LAKE - FPDCC	#3 LASALLE FISH HATCHERY	21634	1.8	5/31/2018	WALLEYE
CLINTON LAKE	#3 LASALLE FISH HATCHERY	98719	1.3	5/22/2018	WALLEYE
CLINTON LAKE	#3 LASALLE FISH HATCHERY	120894	1.3	5/24/2018	WALLEYE
CLINTON LAKE	#3 LASALLE FISH HATCHERY	8194	2	6/12/2018	WALLEYE
DECATUR, LAKE	#3 LASALLE FISH HATCHERY	44538	1.8	5/30/2018	WALLEYE
EAST FORK LAKE	#3 LASALLE FISH HATCHERY	31512	1.8	5/30/2018	WALLEYE
FIN & FEATHER	#3 LASALLE FISH HATCHERY	650000	1	4/19/2018	WALLEYE
FOX CHAIN O' LAKES	#3 LASALLE FISH HATCHERY	792000	1	4/26/2018	WALLEYE
FOX CHAIN O' LAKES	#3 LASALLE FISH HATCHERY	154592	1.5	5/25/2018	WALLEYE
FOX CHAIN O' LAKES	#3 LASALLE FISH HATCHERY	89558	1.8	5/30/2018	WALLEYE
FOX CHAIN O' LAKES	#3 LASALLE FISH HATCHERY	7334	2	6/14/2018	WALLEYE
FOX RIDGE LAKE	#3 LASALLE FISH HATCHERY	1116	2.1	6/6/2018	WALLEYE
FOX RIVER	#3 LASALLE FISH HATCHERY	50078	1.8	5/29/2018	WALLEYE
HEIDECKE LAKE	#3 LASALLE FISH HATCHERY	49922	1.5	5/22/2018	WALLEYE
HEIDECKE LAKE	#3 LASALLE FISH HATCHERY	20588	1.6	5/30/2018	WALLEYE
KINKAID LAKE	#2 JAKE WOLF HATCHERY	31863	1.85	5/30/2018	WALLEYE
LAKE GEORGE	#3 LASALLE FISH HATCHERY	7384	2	6/7/2018	WALLEYE
LAKE MCMASTER (SD HOLLOW)	#3 LASALLE FISH HATCHERY	11160	2	6/7/2018	WALLEYE
LINCOLN TRAIL LAKE	#3 LASALLE FISH HATCHERY	6194	2.1	6/6/2018	WALLEYE
PECATONICA RIVER	#3 LASALLE FISH HATCHERY	8704	2.1	6/7/2018	WALLEYE
PIERCE LAKE	#3 LASALLE FISH HATCHERY	10570	1.5	5/25/2018	WALLEYE
Pyramid-Denmark Green Wing	#2 JAKE WOLF HATCHERY	2583	1.85	5/30/2018	WALLEYE
Pyramid-Galum-Scaup Lake	#2 JAKE WOLF HATCHERY	2492	1.85	5/30/2018	WALLEYE
ROCK RIVER	#3 LASALLE FISH HATCHERY	73249	1.5	5/25/2018	WALLEYE
SANGAMON RIVER	#3 LASALLE FISH HATCHERY	16380	2.1	6/8/2018	WALLEYE
SHABBONA LAKE	#3 LASALLE FISH HATCHERY	29055	1.9	5/29/2018	WALLEYE
SHELBYVILLE, LAKE	#2 JAKE WOLF HATCHERY	54287	1.5	5/25/2018	WALLEYE
SHELBYVILLE, LAKE	#3 LASALLE FISH HATCHERY	11160	2	6/7/2018	WALLEYE
SHELBYVILLE, LAKE	#3 LASALLE FISH HATCHERY	20628	2	6/12/2018	WALLEYE
SKOKIE LAGOON - FPDCC	#3 LASALLE FISH HATCHERY	9698	1.8	5/31/2018	WALLEYE
STERLING LAKE - LCFPD	#3 LASALLE FISH HATCHERY	4228	1.5	5/25/2018	WALLEYE
TAMPIER, LAKE - FPDCC	#3 LASALLE FISH HATCHERY	12010	1.8	5/31/2018	WALLEYE
VULCAN LAKE	#3 LASALLE FISH HATCHERY	16852	2.2	6/8/2018	WALLEYE
Whalen Lake	#3 LASALLE FISH HATCHERY	3699	1.5	5/24/2018	WALLEYE
WOLF LAKE	#3 LASALLE FISH HATCHERY	16294	1.6	5/30/2018	WALLEYE
WOODS, LAKE OF THE	Logan Hollow Fish Farm	600	7	11/2/2018	WALLEYE

Saugeye Stocking in Illinois

Destination Water Name	Source Water Name	Quantity	Size	Date Stocked	Species
ARGYLE LAKE	#3 LASALLE FISH HATCHERY	16140	1.7	6/1/2018	WALLEYE X SAUGER
ARGYLE LAKE	#3 LASALLE FISH HATCHERY	2067	3.1	10/3/2018	WALLEYE X SAUGER
CARLTON LAKE	#3 LASALLE FISH HATCHERY	15070	2.1	6/1/2018	WALLEYE X SAUGER
CHARLESTON SIDE CHANNEL LK	#3 LASALLE FISH HATCHERY	15545	1.3	5/23/2018	WALLEYE X SAUGER
DAWSON LAKE	#3 LASALLE FISH HATCHERY	8021	1.4	5/21/2018	WALLEYE X SAUGER
EVERGREEN LAKE	#3 LASALLE FISH HATCHERY	300000	1	4/18/2018	WALLEYE X SAUGER
EVERGREEN LAKE	#3 LASALLE FISH HATCHERY	896000	1	4/25/2018	WALLEYE X SAUGER
EVERGREEN LAKE	#3 LASALLE FISH HATCHERY	37479	1.4	5/21/2018	WALLEYE X SAUGER
EVERGREEN LAKE	#3 LASALLE FISH HATCHERY	2185	3.1	10/3/2018	WALLEYE X SAUGER
FORBES LAKE	#3 LASALLE FISH HATCHERY	30900	1.3	5/23/2018	WALLEYE X SAUGER
HOMER LAKE	#3 LASALLE FISH HATCHERY	10506	1.3	5/25/2018	WALLEYE X SAUGER
HOMER LAKE	#3 LASALLE FISH HATCHERY	490	3.1	10/24/2018	WALLEYE X SAUGER
MATTOON, LAKE	#3 LASALLE FISH HATCHERY	44302	1.3	5/23/2018	WALLEYE X SAUGER
PARADISE, LAKE	#3 LASALLE FISH HATCHERY	12360	1.3	5/23/2018	WALLEYE X SAUGER
PARIS EAST LAKE	#3 LASALLE FISH HATCHERY	10864	1.7	6/1/2018	WALLEYE X SAUGER
PARIS WEST LAKE	#3 LASALLE FISH HATCHERY	8148	1.7	6/1/2018	WALLEYE X SAUGER
RANDOLPH COUNTY LAKE	#3 LASALLE FISH HATCHERY	1948	2.3	6/7/2018	WALLEYE X SAUGER
WELDON SPRINGS	#3 LASALLE FISH HATCHERY	2842	2.3	6/6/2018	WALLEYE X SAUGER
WELDON SPRINGS	#3 LASALLE FISH HATCHERY	1715	3.1	10/2/2018	WALLEYE X SAUGER
WOODS, LAKE OF THE	#3 LASALLE FISH HATCHERY	4656	1.7	6/1/2018	WALLEYE X SAUGER
WOODS, LAKE OF THE	#3 LASALLE FISH HATCHERY	2616	3.1	10/3/2018	WALLEYE X SAUGER
World Shooting Complex - Derby Lake	#3 LASALLE FISH HATCHERY	1136	2.3	6/7/2018	WALLEYE X SAUGER

Summary of Recent Surveys in Illinois

Evergreen Lake 925 acres
Summary of spring trap net survey

Saugeye

Saugeye were first stocked into the lake in 1992 as part of a study for the North Central Division of the American Fisheries Society. Saugeye have been stocked every year since 1992 and has resulted in a very good fishery. On April 1, 2015 the saugeye regulation was changed from a 14-inch minimum length limit and 6 per day harvest limit to 18-inch limit and 3 per day harvest limit.

During the survey, 10 frame nets (4x6 frames; 1.5" mesh) were run for two days to collect saugeye and muskie. Frame nets were first utilized in 2002 to assess these fisheries.

Density

In 2015, the catch rate was 9.7 per net-night and declined to 3.3 per net night in 2016. In 2017, the catch rate increased to 6 per net night and in 2018 the catch rate increased to 8.3 per net-night. The average catch rate since 2002 is 5.3 saugeye per net-night. The walleye management plan has a catch rate objective of 2.5 walleye per net-night.

Size Structure

Of the saugeye collected over 10 inches during the 2018 survey, 98% were longer than 14 inches and 46% were longer than 18 inches. In 2017, the catch rate for saugeye over 18 inches was 5.1 per net-night and was the second highest catch rate over the past 14 surveys. In 2018, the catch rate for saugeye over 18 inches was 4 per net-night and was the third highest catch rate over the past 14 surveys. Size structure has improved since the regulation change. The largest saugeye collected during the 2018 survey weighed 10.6 pounds (current state record is 9.68 pounds and was caught in Evergreen Lake in 2001).

Evergreen Lake – 925 acres
Summary of Fall, Night Electrofishing for Saugeye

The lake was divided into two sampling areas. Each area was sampled at night using DC electrofishing for 0.5

hours.

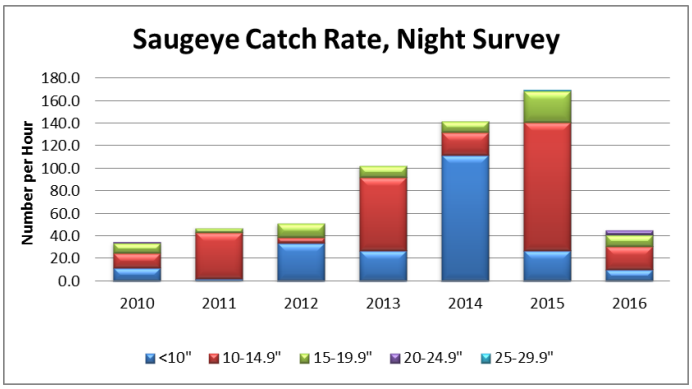
Density and Size Structure

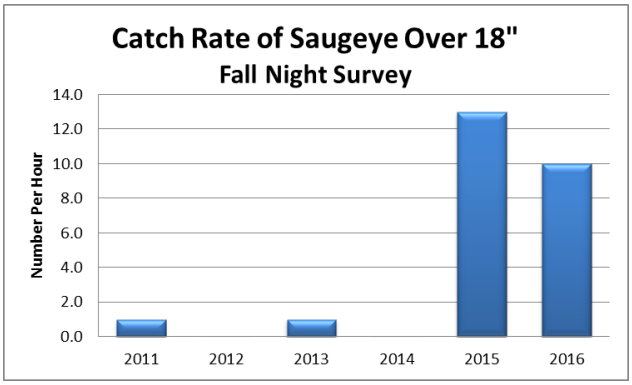
On April 1, 2015 the saugeye regulation was changed from a 14-inch minimum length limit and 6 per day harvest limit to 18-inch limit and 3 per day harvest limit.

In 2013 the catch rate was 102 saugeye per hour and in 2014 the catch rate increased to 142 per hour. In 2015 the catch rate increased to 170 saugeye per hour and represents the highest catch rate ever obtained for saugeye in Evergreen Lake. The number of saugeye collected over 15 inches also increased from 10 per hour in 2014 to 29 per hour in 2015. The catch rate for saugeye over 18 inches increased from zero in 2014 to 13 per hour in 2015.

The 2016 survey resulted in a decline in catch rates. The warmer weather during the survey may have been a factor. The majority of the fall surveys in Central Illinois for walleye and saugeye resulted in lower catch rates. The overall catch rate at Evergreen Lake in 2016 was 45 per hour.

Even though catch rates were low in 2016, there was not a large reduction in the catch rate for saugeye over 18 inches. Catch rates for saugeye over 18 inches improved after the regulation change.





Dawson Lake 158 acres
Summary of spring netting survey

On April 1, 2016 the saugeye regulation was changed from the statewide regulation of 14" and 6 per day to a 15 inch minimum length limit with no more than 1 fish greater than or equal to 20 inches; 3 fish daily harvest limit. Modified fyke nets (4x6 frames) were run for two nights at the end of March to assess the saugeye fishery.

Stocking

The requested stocking rate is 7,110 saugeye per year. In 2018, the State Hatchery System stocked 8021, 1.4" saugeye.

Density and Size Structure

In 2018, the catch per net-night was 13.2 and the average is 14.8 saugeye per net-night. The Fisheries Species Management Plan for walleye lists an objective of at least 2.5 walleye per net-night. The density of saugeye is above the walleye management objective. The catch rate was on a declining trend from 2010 to 2017. Two factors played a role in the decline of catch rates; the stocking rate declined and angler harvest increased.

The increase in catch rate in 2018 suggests the new regulation is working. Future surveys are needed to see if catch rates remain stable.

Dawson Lake 158 acres
Summary of fall, night DC electrofishing

The lake was divided into three sampling areas. Each area was sampled at night for 20 minutes using DC

electrofishing.

On April 1, 2016 the saugeye regulation was changed from the statewide regulation of 14" and 6 per day to a 15 inch minimum length limit with no more than 1 fish greater than or equal to 20 inches; 3 fish daily harvest limit.

Density and Size Structure

In 2017, the catch rate was 131 saugeye per hour. The 12-survey average is 68.5 saugeye per hour. Overall catch rates were relatively stable from 2010 to 2016.

The number of saugeye collected below 10 inches is an indication of how well the stocking was that year. Low catch rates were observed in 2011, 2015, and 2017 for this size range. There are several year classes represented in the 10 to 15-inch size range for the 2017 survey, so the catch rate in this size range is not completely dependent upon one year class. This size range might also contain YOY saugeye.

It appeared there was a reduction in saugeye in the 15 to 20 inch size range from 2010 to 2015. In 2016, the catch rate increased to 17 per hour and was 45 per hour in 2017. In 2017, the catch rate for saugeye in the 20 to 25-inch range jumped to 10 per hour. The 12-survey average is 2 per hour and the second highest catch rate was 4 per hour in this size range in 2011.

The regulation was changed from a 14" length limit and 3 per day to a 14" limit and 6 per day in April of 2011and may be the reason for the decline in catch rates during this time period. The new regulation was implemented on April 1, 2016 to reduce the harvest of saugeye over 15 inches. The new regulation may be part of the reason for the increase in legal saugeye since the regulation change.

Weldon Springs Lake – 29.4 acres
Summary of spring netting survey

Modified fyke nets (4x6 frames) were run on 27 and 28 March 2018 to assess the saugeye fishery.

Regulations

Walleye/Saugeye *April 1, 2016 15" Length Limit 3/day Harvest Limit and only one over 20 inches*

Stocking

Saugeye were first stocked into the lake in 2010. The requested stocking rate is 45 per acre resulting in 1,305 saugeye. All of the saugeye stockings have been above the requested rate.

Density and Size Structure

In 2014, the catch per net-night was 4.7 and was the highest catch obtained for the spring netting survey. In 2017, the catch rate declined to 2 saugeye per net-night. In 2018, the catch remained stable at 2.3 saugeye per hour.

In 2016, the regulation was changed to 15 inch and 3 per day with only one over 20 inches. Of the saugeye collected over 10 inches in 2018, 92% were longer than 14 inches and 72% were longer than 18 inches. The largest saugeye collected was 7.1 pounds. There were only 3 saugeye collected less than 14 inches and suggests stocking survival is low. The large-mesh frame nets fail to collect really small saugeye but are able to collect saugeye in the 9 to 14-inch range.

The spring netting survey results in a better survey of the saugeye fishery than does the fall, night electrofishing survey.

Lake Bloomington – 635 acre
Summary of spring netting survey

Walleye
Modified fyke nets were run for one night to assess the crappie and walleye fisheries. On 13 April 2017, 10 nets were placed around Lake Bloomington and run on April 14th.

Density and Size Structure
The catch rate was 2.9 walleye per net-night and met the management objective of 2.5 per net-night. Of the walleye collected over 10 inches, 97% were longer than 15 inches and 79% were longer than 20 inches. Approximately 83% of the walleye collected were longer than the 18 inch minimum length limit.

SPECIES: WALLEYE
LAKE: LAKE BLOOMINGTON
COUNTY: MCLEAN
ACRES: 635
GEAR: FRAME NETS

YEAR	TOTAL NUMBER AND CPE		Length Limit >460mm >18"	<S <250 <10"	S-Q 250-379 10-14.9"	Q-P 380-509 15-19.9"	P-M 510-629 20-24.9"	M-T 630-759 25-29.9"	>T >760 >30"	PSD	RSD-P	RSD-M	EFFORT	Relative Weight S-Q 250-379 10-14.9"	Q-P 380-509 15-19.9"	P-M 510-629 20-24.9"	M-T 630-759 25-29.9"	Avg. Wr
2017	NO.=	29	24	0	1	5	14	9	0									
	CPE=	2.9	2.4	0.0	0.1	0.5	1.4	0.9	0.0	97	79	31	10	80	87	96	102	96
	%			0	3	17	48	31	0									

Lake Bloomington – 635 acres
Summary of fall, night DC electrofishing

On 23 October 2017, a night survey was conducted using DC electrofishing. The lake was divided into 2 stations and surveyed for a total of 40 minutes.

Density and Size Structure
Catch per hour of walleye was 7 in 2010, but increased to 69 per hour in 2013. The catch rate has declined since then and was 34.3 per hour in 2017. The average catch rate since 1998 is 38.6 walleye per hour. Years with high catch rates were heavily influenced by the catch rate of young-of-the-year walleye.
Since the density of walleye is dependent upon success of stockings, the catch rate of walleye less than 10 inches is a reflection of stocking success. Recent strong year classes were produced in 2007, 2013, 2014, and 2017. The year class in 2015 was average and poor in 2016.
Of the walleye collected over 10 inches in 2017, 50% were over 15 inches and 33% were over 20 inches.
A spring frame netting survey was conducted in the spring to assess the walleye fishery and a report was written for that survey. The frame nets caught larger walleye and the data suggests there are good numbers of legal walleye in Lake Bloomington. The electrofishing surveys seem to collect smaller walleye in higher numbers than the larger walleye and the spring netting surveys miss the smaller walleye and collect the larger walleye.
A new walleye regulation was implemented April 1, 2017. The new regulation is an 18 inch minimum length limit and a 3 per day harvest limit.

Clinton Lake (cooling lake for nuclear power plant) – 4,895 acres
Summary of spring netting survey

REGULATION: Walleye 18" minimum length limit and 3 per day harvest limit.

On April 10 and 11, 2018, 10 frame nets (4x6) with 1.5 inch mesh were run for the collection of walleye and crappie.

Walleye have been stocked into Clinton since 1978. Walleye fry were stocked from 1978 to 2005. Fingerling stockings have been used annually since 1998.

Walleye

DENSITY AND SIZE STRUCTURE

In 2018, a catch rate of 0.8 walleye per net-night was obtained. The walleye management objective is 2.5 walleye per net-night. Of the walleye over 10 inches collected, 100% were over 15 inches and 19% were over 20 inches.

SPECIES: WALLEYE
LAKE: CLINTON LAKE
COUNTY: DEWITT
ACRES: 4895
GEAR: FRAME NETS

YEAR	TOTAL NUMBER AND CPE		Length Limit >460mm >18"	<S <250 <10"	S-Q 250-379 10-14.9"	Q-P 380-509 15-19.9"	P-M 510-629 20-24.9"	M-T 630-759 25-29.9"	>T >760 >30"	PSD	RSD-P	RSD-M	EFFORT	Relative Weight S-Q 250-379 10-14.9"	Relative Weight Q-P 380-509 15-19.9"	Relative Weight P-M 510-629 20-24.9"	Relative Weight M-T 630-759 25-29.9"	Avg. Wr
2017	NO.=	13	5	0	2	7	3	1	0	85	31	7.7	10	106	90	95	92	94
	CPE=	1.3	0.5	0.0	0.2	0.7	0.3	0.1	0.0									
	%			0	15	54	23	8	0									
2018	NO.=	16	14	0	0	13	3	0	0	100	19	0.0	20		99	104		100
	CPE=	0.8	0.7	0.0	0.0	0.7	0.2	0.0	0.0									
	%			0	0	81	19	0	0									
Average		1.1	0.6	0.0	0.1	0.7	0.2	0.1	0.0	92.3	24.8	3.8		106.0	94.5	99.5	92.0	97.0

Illinois River

In 2018 the LaSalle State Fish Hatchery stocked 15.5 million sauger fry into the upper Illinois River, including the upper Peoria, Starved Rock, and the Marseilles reaches. Sauger were stocked between April - June and ranged in size from 1-2.1". The 2018 Illinois River annual fall electrofishing surveys showed good recruitment of YOY sauger up to 7", especially within the Peoria and LaGrange reaches.

Indiana – Corey DeBoom

General Summary of Indiana's Current Walleye Program

Indiana's walleye program is currently supported through stockings conducted through the statewide hatchery system which produces fry and 2" fingerlings stocked in spring/early summer. A number of northern glacial lake fisheries are also maintained through fall stocking of advanced fingerlings (4-7") purchased from private hatcheries in Wisconsin. These three groups of fisheries are commonly referred to as fry, spring fingerling, and fall fingerling lakes by biologists. The statewide hatchery system currently relies on a single brood source from Brookville Reservoir. Brookville is a 5,280 acre Army Corps of Engineers impoundment located in Union and Franklin Counties near the Ohio/Indiana state line. Roughly 800 female walleye are netted and spawned annually from this reservoir with an annual target of 35 million eggs. Eggs are hatched at Cikana State Fish Hatchery in central Indiana. Fry stockings are carried out from Cikana and remaining fry are distributed amongst Cikana, East Fork, and Fawn River hatcheries where they are reared extensively in ponds to the 2" fingerling size. Indiana's walleye fisheries are currently monitored under 2 protocols. Fry and spring fingerling lakes are monitored using fall electrofishing for age-0 fish to monitor stocking success and fall gill netting to monitor adult fish. Fall fingerling stockings in glacial lakes are monitored using fall age-1 electrofishing to monitor stocking success and spring trap netting using small "Lake Michigan" style trap nets to monitor adults. Below is a recently compiled statewide summary of walleye stockings in Indiana to illustrate the current status of the program.

Waterbody	County	Resource Type	Acres	Size	N/Acre[a]	N Stocked[a]	Initial Year
Bass	Starke	Glacial Lake	1,345	Fingerling	50.0	67,250[b]	1980
Brookville	Franklin	Impoundment	5,260	Fry	2,004.6	10,544,450	1974
Cagle's Mill	Owen	Impoundment	1,400	Fingerling	63.1	88,282	1972
Clear	Steuben	Glacial Lake	800	Fingerling	102.0	81,565[b]	1974[c]
Crooked	Steuben	Glacial Lake	828	Fall Fingerling	9.7	8,020[d]	1977
Eagle Creek	Marion	Impoundment	1,350	Fingerling	60.8	82,068	1997
Kokomo	Howard	Impoundment	484	Fingerling	51.9	25,133	1997
Lake-of-the-Woods	Marshall	Glacial Lake	416	Fingerling	55.5	23,104	1990
Maxinkuckee	Marshall	Glacial Lake	1,854	Fingerling[d] Fall Fingerling[c]	107.4 10.0	199,031 18,540	1975
Mississinewa Pond	Wabash	Impoundment	240	Fry	2,036.7	488,800	1993
Monroe	Monroe	Impoundment	10,750	Fry	600.5	6,455,450[b]	1973
Patoka	Dubois	Impoundment	8,800	Fry	697.5	6,138,200[b]	1978
Pike	Kosciusko	Glacial Lake	203	Fingerling	59.6	12,106	1988
Prairie Creek	Delaware	Impoundment	1,275	Fingerling	48.6	61,959	2001
Salamonie	Wabash	Impoundment	2,855	Fingerling	8.2	23,302	1972
Shafer	White	Impoundment	1,281	Fingerling	33.4	42,843	1992
Shriner	Whitley	Glacial Lake	120	Fall Fingerling	10.0	1,200	2016
Summit	Henry	Impoundment	835	Fingerling	41.9	35,025	1999
Sylvan	Noble	Glacial Lake	630	Fall Fingerling	10.0	6,280	1985
Tippecanoe River	Carroll	River	18.6 River Miles	Fingerling	-	29,526	1983
Wall	LaGrange	Glacial Lake	141	Fall Fingerling	10.0	1,410	2009[d]
Winona	Kosciusko	Glacial Lake	562	Fall Fingerling	10.0	5,620	1986
Total			25,050	Fry	-	23,626,900	-
			14,098[cd]	Fingerling	-	768,194	-
			4,135[cd]	Fall Fingerling	-	41,070	-

[a] *Average of 2015 and 2016 stocking*

[b] *2016 stocking year only*

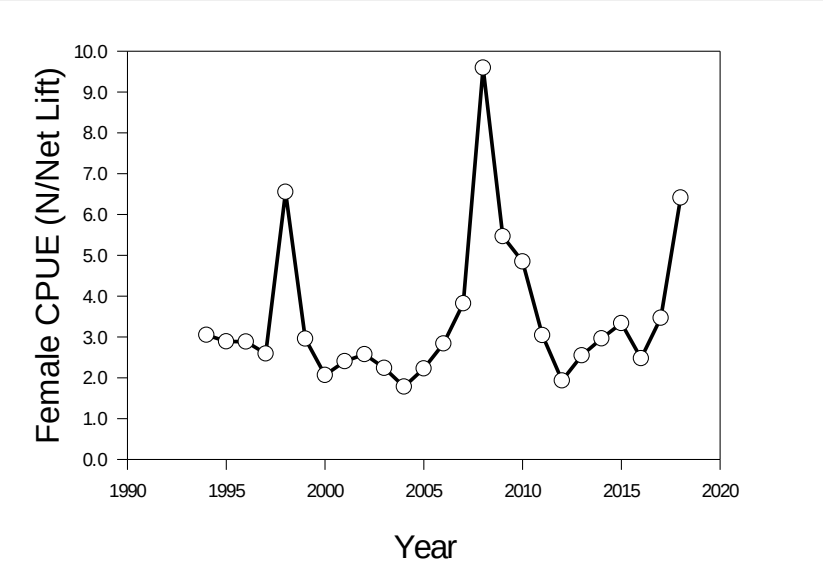
[c] *Even year stocking*

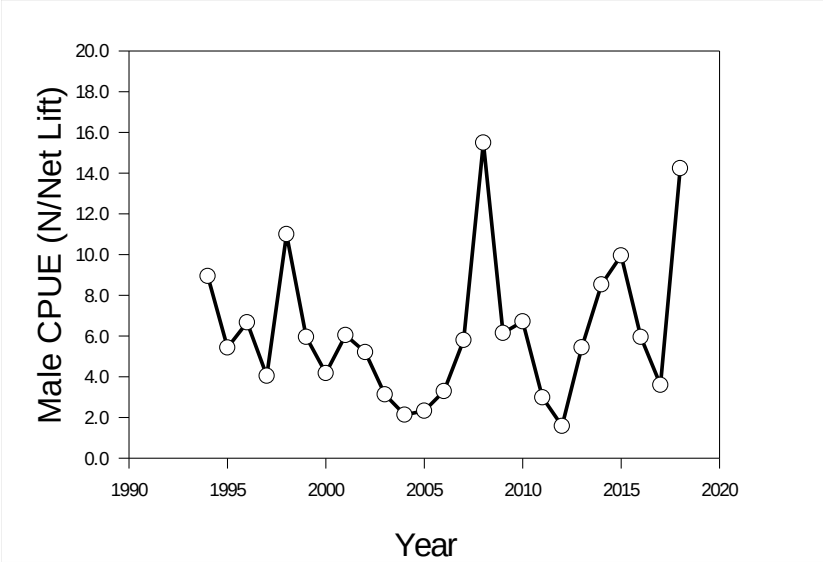
[d] *Odd year stocking*

Projects

1) Indiana's statewide Walleye strategic plan is being rewritten this year. The draft is being put together by district 1 (northwest) fisheries biologist Tom Bacula and district 5 (south / central) fisheries biologist Dave Kittaka.
2) District biologists are conducting comparisons of stocking strategies at several waters. In the southern region of the state, fry and spring fingerling stockings are being compared at Monroe and Cagle's Mill Reservoirs. In the northern glacial lakes region, ongoing work is evaluating the efficacy of privately produced advanced size fingerlings stocked in the fall relative to historical success of fry and spring fingerlings from the state hatchery system. Preliminary results have found that a change from fingerling to fry stocking at Monroe Reservoir has not been successful in maintaining recruitment. Evaluations of the reverse scenario (fry to fingerlings) at Cagle's Mill Reservoir are ongoing. Early evaluations indicate that advanced fall fingerlings have had improved success at establishing walleye fisheries in northern glacial lakes where fry and spring fingerlings previously failed.
3) Similar to evaluations ongoing in other states, there is an interest in evaluating the validity of indexing spring fry and fingerling stocking success/year class strength using fall boat electrofishing for age 0 fish. A project evaluating this question may be undertaken in the near future.

4) Long term trends in gill net catch rates of male and female walleye during spring brood operations at Brookville reservoir were evaluated in 2018. Results indicate no significant trends in catch rates since standardized methods were established in 1994 (see figures below).





Brookville Reservoir Walleye Brood CPUE 1994 – 2018

2018 Walleye Brood Collection Results

Spring 2018 walleye brood netting at Brookville reservoir was completed between March 29th and April 6th. A total of 2,664 walleye were captured including 821 females. Of the collected females 668 were spawned for a total estimated egg take of 37.4 million. Hatching success of collected eggs was 85% with a total fry production of 31.8 million that were stocked or transferred to rearing ponds.

Lake Michigan Yellow Perch – Michigan City Office

A few notable changes have taken place recently in Indiana's Lake Michigan Yellow Perch monitoring program administered out of the Michigan City Fisheries Research station. Historically, Indiana's yellow perch monitoring on Lake Michigan has been conducted under contract with Ball State University going back to the

1970's. A decision has been made to conduct this monitoring within the fisheries section going forward and a new biologist is currently being hired to assist the Lake Michigan office with the additional workload.

The Michigan City office has also been conducting a project to evaluate the effects of cormorant predation on juvenile yellow perch recruitment in the Indiana/Illinois Lake Michigan shoreline region. Preliminary results indicate that this predation may be having a significant impact on yellow perch recruitment in the region. A report on these findings was submitted to USFWS in 2018.

Iowa – Andy Jansen

1) **Evaluation of Interior River Fingerling Walleye Stocking Strategies**

Contact: Greg Gelwicks, (563) 927-3276, gregory.gelwicks@dnr.iowa.gov

Walleye fingerling stocking has greatly increased Iowa's interior river walleye populations over the last 20 years. This has resulted in an increasingly popular fishery that has brought walleye fishing opportunities close to home for many Iowa anglers. The success of this program has also increased demand for two inch long, Mississippi River strain walleye fingerlings. Limited hatchery capacity has made it difficult to consistently produce enough fingerlings of the size and genetic strain requested for the program. Providing information needed to more efficiently utilize our limited hatchery production capacity and exploring the potential of alternative fish culture systems in meeting the demands of the river walleye program is the focus of this study.

Available pond culture space has been a limiting factor for producing Mississippi River strain fingerling walleye to stock in interior rivers. Recent research at the Rathbun Fish Culture Research Facility has shown promising results raising walleye fingerlings using an alternative method, intensive fry culture. Intensively reared walleye fry are stocked into recirculating tanks and trained on formulated feed from day 1 post-hatch, instead of stocking them into ponds where they feed on zooplankton (extensive culture). Evaluating the relative contribution of intensively reared fingerlings to interior river walleye fisheries will determine whether this production method could help further improve river walleye fisheries.

Study sites were selected on four Iowa rivers to evaluate the relative contribution of intensively reared walleye fingerlings to interior river Walleye populations. Extensively reared fingerlings were marked, hauled, and stocked alongside intensively reared fingerlings to serve as a control. Walleye fingerlings produced by this culture method are known to survive and contribute to river walleye fisheries if river conditions are favorable. Intensively cultured walleye fingerlings were marked with a circle freeze brand and extensively cultured fish were marked with a bar brand. Between 44,000 and 57,500 marked intensively and extensively cultured walleye fingerlings were stocked annually in the Wapsipinicon, Maquoketa, and Cedar rivers during June 2015-2017, and in the Shell Rock River in June 2016. Study sites were sampled in late-September and October each year to determine survival and growth of walleye fingerlings. Preliminary results indicate that intensively reared fingerlings contribute to interior river walleye populations at a lower rate than extensively reared fingerlings. Intensively reared fingerlings have accounted for 20% or less of branded young-of-year fish sampled during fall at most sites during most years. River conditions were not conducive to survival of walleye fingerlings raised by either culture method in some rivers each year. We will continue to mark and stock walleye fingerlings raised by each culture method and monitor their survival and growth. The resulting information will guide production and stocking decisions for walleye fingerlings that will provide the greatest benefits for sustaining and improving walleye fisheries in Iowa rivers.

2) **Urban/Community Fisheries Update**

Contact: Tyler Stubbs—Community Fisheries Biologist, tyler.stubbs@dnr.iowa.gov

- Continue to discover illegal stockings of adult Walleye and Yellow Perch in urban lakes and ponds. Some of the Walleye captured in 2018 exceeded 18 inches.

3) **Large Impoundments Fisheries Research Update**

Contact: Rebecca Krogman—Large Impoundments Research Biologist, Rebecca.krogman@dnr.iowa.gov

Sport Fish Study 7041 was extended to allow for better evaluation of recruitment to adulthood by stocked Walleye. This study compares Walleye stocking strategies that differ by fish size at time of stocking, stocking location, and use of rearing ponds. The goal is to identify the optimal stocking strategy for reservoirs based on successful recruitment of stocked fish and cost-efficiency. During 2018-2019, fry and advanced fingerling Walleye were stocked for the final year in all study locations except Big Creek Lake (which is completed) and Lake Icaria (fry only). Stocking rates of advanced fingerlings were cut in half during 2018 due to fish shortages. Nighttime electrofishing will be conducted in the fall and spring to determine relative survival. The spring surveys will be more comprehensive, including all sizes of fish, and up

to 10 fish/10-mm length bin will have their dorsal spines removed for age estimation. Age estimation will be initiated the following summer 2019, and final analyses will become available soon thereafter.

- New Study: River-strain Walleye in Reservoirs

The purpose of this study is to evaluate the survival and contribution of stocked river-strain Walleye in large reservoirs. River-strain Walleye may perform better than lake-strain Walleye under certain conditions, especially in reservoirs with stronger tributary connections or riverine characteristics. A thorough test comparing river-strain and lake-strain Walleye is needed to identify whether one strain is preferable over the other in reservoirs, and what characteristics describing the reservoir environment and community are the best indicators. This study's outputs include strain-specific stocking recommendations for reservoirs, necessary characteristics to inventory prior to establishing a stocking regime at a new location, and general knowledge regarding Walleye survival and contribution to the fishery in study locations.

4) Natural Lakes Fisheries Research Update

Contact: Jonathan Meerbeek, Fisheries Research Biologist, jonathan.meerbeek@dnr.iowa.gov

- Continuing to collect population estimates on Walleye and Muskellunge in Iowa's natural lakes. Overall, Walleye populations are looking healthy. The number of smaller Walleye in the Clear Lake population is encouraging. The protected slot limit on Walleye at Storm Lake seems to be doing what it was intended to do. There may be room to modify the slot range to allow for more male harvest.

Minnesota – Dale Logsdon

2018 Walleye Stocking:

331,645,464 fry
101,388 small fingerlings
1,718,742 large fingerlings
156,896 yearlings or adults

Personnel Changes:

Don Pereira retired as Fish Chief and was succeeded in that position by Brad Parsons. Brad's former regional manager position was filled by Brian Nerbonne who will also be assuming Brad's former responsibilities to the DNR Walleye Technical Committee, and the Citizen/DNR Walleye Workgroup. Gretchen Hansen left the DNR to fill Paul Venturelli's former faculty position at the University of Minnesota.

General:

Discussion regarding reduction of statewide bag limit from 6 to 4 fish has been tabled following the results of a statewide anglers survey that revealed poor public support for the change. Continue to see more lakes with recruitment issues following Zebra Mussel infestation.

DNR Research:

Steve Shroyer - I have compiled statewide fall electrofishing data from 2,975 assessments conducted in 401 Minnesota lakes from 1987-2014. Dave Staples and I have calculated quartiles of age-0 CPUE by lake class, using linear mixed effects models to account for lake and year effects. We are now working on modeling potential effects of variables such as water temperature on electrofishing CPUE, as well as relationships among age-0 electrofishing CPUE, mean length, and subsequent gill-net CPUE of corresponding year-classes at ages 1-6.

Bethany Bethke and Beth Holbrook - The YEP horizon in MN is bright and sparkling with possibility. This summer/fall our project titled "Assessing Yellow Perch populations with experimental sampling gears" will officially begin and over the next two years management and research staff will be sampling populations in 30 lakes to get a comprehensive description of maturity and growth. By including lakes with large and small size structure and declining and stable catch of larger fish we hope to learn more about the specifics of YEP populations in the state to inform future research which will seek to understand why the populations differ.

Dale Logsdon, Loren Miller, and Steve Shroyer - Recent genetic analyses indicate that a distinct strain of Walleyes associated with the Mississippi River and its tributaries below the Twin Cities (Lower Mississippi Strain: LMS) still persists in some southern Minnesota waters despite years of stocking non-local strains. This persistence suggests that the LMS strain may have survival and reproductive advantages over that of the northern strains currently being stocked in those waters. Our current study will directly compare the performance of the LMS strain to a commonly stocked upper Mississippi River watershed strain (MIS strain from Pine River egg source) in a "common garden" experiment using OTC marking and genetic techniques to identify the stocked strains during later recapture. Nine lakes in southern Minnesota will be stocked annually for five years with a 50:50 mixture of LMS and MIS strain fry and recaptured representatives from the strains will be compared for differences in survival, growth, and maturity. In addition, natural reproduction will be quantified through mark/recapture techniques and the offspring genetically analyzed to identify contribution by strain.

Charles Anderson, Andrew Carlson, and Paul Radomski - Gill-net size selectivity of Walleye manuscript recently submitted for publication

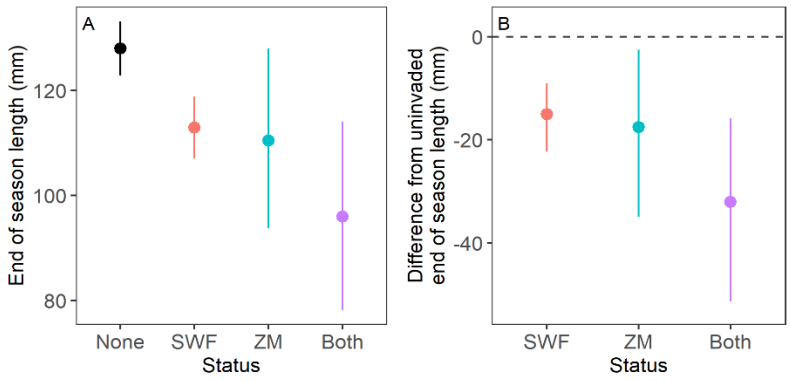
Andrew Carlson - The science of evaluating species distributions against environmental conditions has advanced tremendously in the past decade following technological improvements in tagging and monitoring systems.

Using data collected from acoustically tagged adult Walleye, generalized linear mixed models were developed to predict the probability of occurrence at depth given temperature and oxygen within stratified lakes. Following, using data from a survey-specific temperature and oxygen profile, the relative odds of occurrence for Walleye was calculated throughout the water column and at the depths of the gillnet sites. Comparisons between modeled probability of occurrence and observed catch rates at specific sites were made to evaluate the degree to which site-level patterns can be explained by the habitat sampled. Integrating and accounting for known measures of environmental variability that systematically influence catch statistics will improve the quality and subsequent interpretation fisheries data to support management decisions. Presentation of this research entitled "Assessing Walleye Habitat Use with Species Distribution Models" scheduled for Midwest F&W Conference".

University Research:

Gretchen Hansen - University of Minnesota

We are wrapping up our analysis of the effects of zebra mussels and spiny water flea on walleye in Minnesota's large lakes. We found that Age-0 walleye are smaller in years when either spiny water fleas or zebra mussels were present. Walleye in zebra mussel invaded lakes were on average 18 mm (0.7 in) smaller than in uninvaded lakes (Figure 2); however, high variability means the magnitude of this difference is uncertain and varies among lakes (range=2 to 35 mm smaller, or 0.07 to 1.4 in smaller). Walleye in spiny water flea invaded lakes were on average 15 mm (0.7 in) smaller than in uninvaded lakes (Figure 2); and variability in this estimate was smaller (range=9 to 22 mm smaller, or 0.4 to 00.9 in smaller). Work is ongoing to determine if these changes in growth are linked to lower survival/recruitment.



Also, I have a post-doc starting to look at thermal optical habitat for walleye across Minnesota lakes and how it relates to walleye populations. This is a new study (based on our failed LCCMR proposal) and we are open to ideas and collaborators going forward.

Andrew Hafs – Bemidji State University

A Fish Consumption Advisory, Spatial, and Temporal Variability of Methylmercury in Upper and Lower Red Lake

By Tyler Orgon, Andrew Hafs, Carl Isaacson, Mark Brigham, and Shane Bowe

Limited data is available (n<20 for walleye) for Upper and Lower Red Lake when it comes to mercury. The last mercury-based fish consumption advisory that was conducted within the Red Lake Reservation boundary was in 2002. The objective of my study is to (1) provide an update to the fish consumption advisory, (2) establish a methylmercury to walleye length relationship, (3) determine if methylmercury levels are changing over time, and (4) collect pilot data to determine if mercury in the Red Lakes are impacted by watershed influences or through in-lake production from atmospheric deposition. Methods are currently being developed and sampling will take place over the next year.

Assessing the Dispersal and Condition of Stocked Walleye Fry in a Northern Minnesota Chain of Lakes

By Heather M. Marjamaa, Anthony J. Kennedy, and Andrew W. Hafs

The main goal of this project was to determine if stocking Walleye (WAE) fry into a Northern Minnesota lake, Lake Andrusia, which is located within a chain of lakes, creates negative density-dependent effects within the connected waters due to annual elevated fry density stocking events or if the fry are dispersing well throughout the chain. The primary objectives of this project were to: 1) assess the magnitude of Walleye dispersing to other lakes within the chain at ages 0 and 1, 2) detect if density-dependent effects are occurring among lakes by comparing condition and length at capture, and 3) compare condition and length at capture of marked and unmarked fish.

Age-0 Walleye stocked into Lake Andrusia in May were already widely distributed by late August (Table 1 and 2). Lake Andrusia had the highest marking rates and Cass Lake also had high marking rates for both age-0 and age-1 Walleye (Table 1, 2, and 3). Pike Bay only had one marked fish identified in 2016 and it was an age-0 (Table 1). There was no movement detected into Big Lake during this study. However, upstream movement was detected into Wolf Lake and Lake Kitchi. The overall catch-per-unit-effort (CPUE, measured fish captured per hour) for age-0 Walleye in 2017 was less than 2016 (Table 1 and 2). The median total length (TL) and relative condition (RC) of Walleye sampled from Lake Andrusia didn't seem to be affected by these high density fry stocking events when comparing them to the other lakes within the study (Table 1 and 2). The total length and relative condition would be expected to be affected in Lake Andrusia the most, because that is where the high density fry stocking occurs along with having the most marked fish sampled, but that hasn't been detected yet within this analysis. Overall, there were significant differences found for total length and relative condition when comparing lake by lake. There were also significant differences found when comparing the total length and relative condition of marked vs. unmarked fish. However, there has not been enough evidence to suggest that these findings are related to negative density-dependent effects. Therefore, there has not been enough evidence to suggest that negative density dependent effects are occurring at this time, but the analysis is ongoing. Also, there appeared to be little wild fry production when you look at the marking rates of fish sampled and the catch rates (Table, 1, 2, and 3). Additionally, not all unmarked fry are wild, because some of the lakes within the study have been stocked annually or biannually since 1967.

Table 1: 2016 Age-0 Walleye Sample Results

Lake	N=	Marked	Marking Rate	Median TL (All WAE)	Median RC (All WAE)	Total Hrs Effort	Total CPUE (Fish/Hr)	Marked CPUE	Unmarked CPUE
Andrusia	120	115	95.8%	143	102.3	0.58	207	198	9
Cass	237	198	83.5%	144	96.4	4.79	49	41	8
Wolf	82	32	39.0%	145	99.7	0.64	128	50	78
Kitchi	59	14	23.7%	149	103.1	3.48	17	4	13
Pike Bay	53	1	1.9%	126	104.0	0.97	55	1	54
Big	59	0	0.0%	N/A	N/A	0.59	100	0	0
Totals	**610**	**360**	**59.0%**	**144.0**	**102.3**	**11.05**	**55**	**32.6**	**22.6**

Table 2: 2017 Age-0 Walleye Sample Results									
Lake	N=	Marked	Marking Rate	Median TL (All WAE)	Median RC (All WAE)	Total Hrs Effort	Total CPUE (Fish/Hr)	Marked CPUE	Unmarked CPUE
Andrusia	111	110	99.1%	137	100.2	1.33	83	83	1
Cass	214	207	96.7%	142	99.8	7.36	29	28	1
Wolf	69	17	24.6%	142	100.7	0.70	99	24	70
Kitchi	33	0	0.0%	151	99.8	2.21	15	0	10
Pike Bay	52	0	0.0%	134	100.0	2.88	18	0	18
Big	59	0	0.0%	N/A	N/A	0.84	70	0	0
Totals	**538**	**334**	**62.0%**	**142**	**100.0**	**15.32**	**35**	**21.8**	**13.3**

Table 3: 2017 Age-1 Walleye Sample Results			
Lake	N=	Marked	Marking Rate
Andrusia	20	20	100.0%
Cass	156	126	80.8%
Wolf	11	5	45.5%
Kitchi	2	2	100%
Pike Bay	7	0	0%
Big	27	0	0%
Totals	**47**	**153**	**68.6%**

Estimating Mortality and the Impact of Double Crested Cormorants on Walleye in Leech Lake, Minnesota

By Cody Coyle, Andrew Hafs, and Doug Shultz

The primary objectives for this project are to (1) estimate mortality rates for multiple year classes of walleye in Leech Lake and (2) measure consumption of fishes by Double Crested Cormorants (DCCO). Walleye population data will come from previous surveys done by the MN DNR, which in return will allow for mortality estimates. DCCO consumption is estimated through a bioenergetics model that was developed by a MN DNR biologist. Estimates of consumption from DCCO will be compared to natural mortality estimates to determine the impact they are having on the fisheries, with walleye being the primary focus. Future plans include continuing the DCCO diet study into the 2019 season and to closely monitor walleye populations moving forward with new regulations in place.

Diet Overlap of Piscivores in Minnesota Lakes

By Kamden Glade, Brian Herwig, and Andrew Hafs

Little is known about the diets of top-tier predatory fishes in Minnesota. Limited research, combined with the high rate of empty stomachs in esocids, lead to a knowledge gap regarding primary diet items and potential niche overlap among piscivores. The goal of this study is to use diet samples from walleye, largemouth bass, northern pike, and muskellunge to quantify the seasonal feeding niche of each species. Fish will be sampled using a variety of gears including, but not

limited to, Fyke nets, large frame trap nets, electrofishing, and angling. Diets will be collected using pulsed gastric lavage. Diet samples will be compared among a set of lakes with varying prey fish assemblages in an attempt to determine potential interspecific competition between species. Currently, 18 lakes spread across the northern portion of the state have been chosen for inclusion in this study. Diet samples will also be used to verify stable isotope samples collected from the same set of lakes.

Spatial and Temporal Variability in Post-Larval Yellow Perch Density

By Steve Hauschildt, Andrew Hafs, Carl Isaacson, Debbie Guelda

The objective of this study was to test for the effects of wind speed and direction on post-larval Yellow Perch spatial variability. This study determined wind speed and direction had a significant influence on the distribution of post-larval Yellow Perch and had equal wind densities in both halves of the lake with more fish caught in the downwind sector until winds reached 15 kmph. Wind did not have a significant influence though on how post-larval Yellow Perch were distributed by total length, possibly because Yellow Perch have a spawning period around 10 days resulting in a cohort close in size. During high wind events, more fish were found in the upwind sector of the lake, suggesting that post-larval fish are being moved out of untrawlable areas. From the results of this study it appears Yellow Perch must continually relocate back into shallower areas after each high wind event moves them out, until they are strong enough to resist the wind.

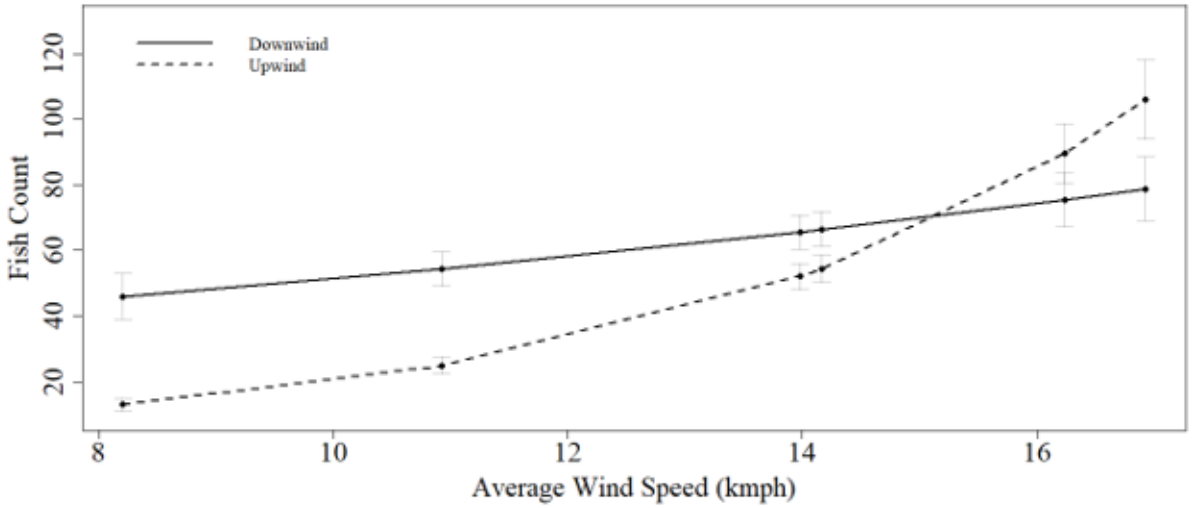
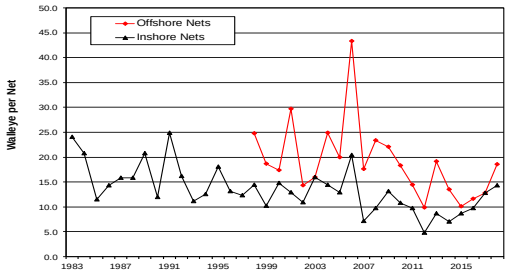


Figure 1. Change in predicted mean fish count in the upwind and downwind sectors of Blackduck Lake, as affected by varying wind speeds (kmph) during the 26 Jun – 07 Jul 17 sampling period. Error bars represent standard error.

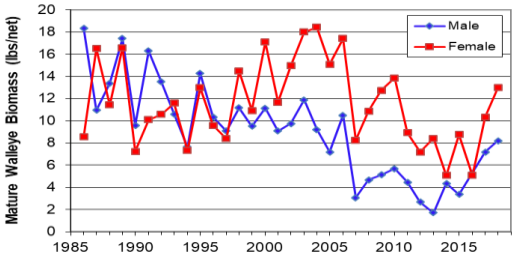
Large Lake updates:

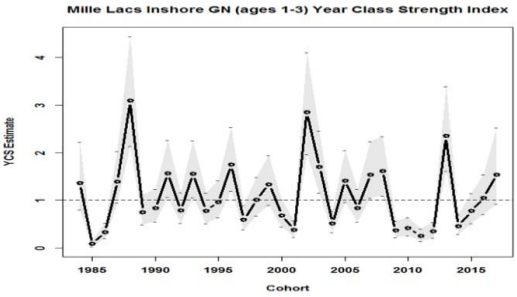
Eric Jensen - Mille Lacs:

Walleye in the Fall Gill Nets

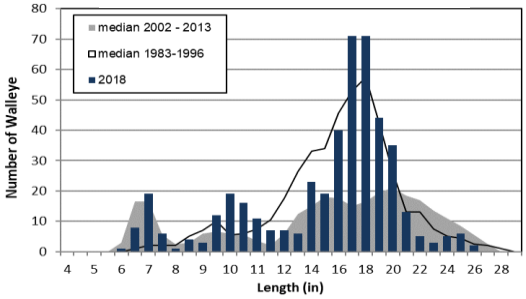


Mature Walleye in the Inshore Fall Gill Nets



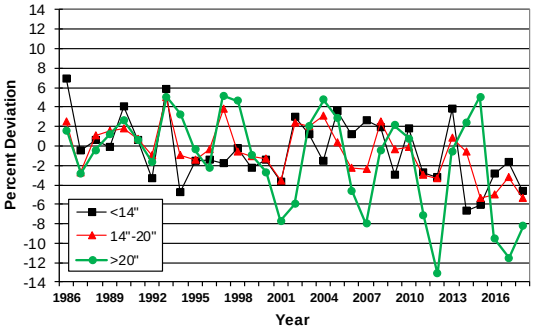


Walleye LFD – Inshore Gill Nets

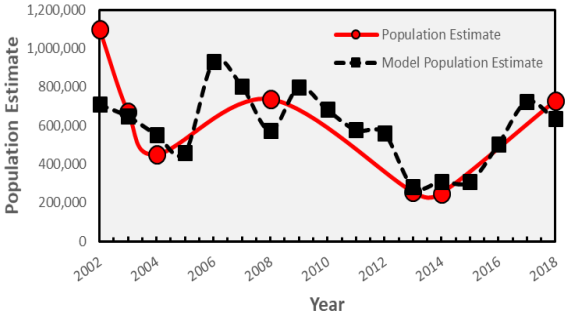


- Walleye numbers continue to increase in both the inshore and offshore nets to where 2018 CPUE in the inshore nets is above the 75th quartile, and the CPUE in the offshore nets is slightly above median
- Our seventh mark-recapture population estimate since 2002 shows that modeling results and trends in the fall gill nets are highly correlated and accurate.
- The 2013 year class of walleye continue to make up the greatest share of fish observed in the fall sampling (about 40%) with the length of age 5 walleye ranging from 14 inches to just over 20 inches. The 2014 and 2016 year classes are about median level, while the 2017 year class is above the 60th percentile, suggesting high recruitment, if this year class is able to persist through the 2019 summer.
- Mature female and male Walleye biomass in the fall gill nets continues to increase; mainly due to somatic growth of the 2013 year class fish and much higher catches of larger fish in the offshore gill nets.
    - CPE appears to have been disproportionately low in 2017 and disproportionately high in 2018 in the off-shore nets.
- Condition of Walleye greater than 20 inches was higher than in 2017, but was still well below average, while condition of Walleye under 20 inches declined and remains below average. The poor condition observed in 2018 is likely due to forage abundance, as age 0 Yellow Perch, were at the second lowest CPE observed, and age 0 Tullibee were at the lowest level observed. However, the CPE of large Spottail Shiner was the second highest observed.
    - Low condition tends to correspond with higher angler catch rates through winter and into July.
- Fall electro-fishing catch rates of YOY Walleye were above the 70th percentile, at 234 Walleye/hr, and age 1 Walleye (2017 year class) were near the 60th percentile at 12.5 Walleye/hr.
- Winter angling pressure (Dec 2017 – March 2018) was about 11% above the 1985-2017 average, mainly due to good ice conditions and a respectable Walleye catch rate of 0.05 fish/angler-hour. Conversely, summer (2018) effort remained relatively low for the sixth consecutive year, which was about 50% average, despite relatively high catch rates. Total angling Walleye kill was estimated at 47,250 lbs (45,700 lbs for State licensed anglers from a safe allocation of 87,800 lbs), with hooking mortality making up 40,200 lbs of kill and harvest weighing in at 7,050 lbs.
- For the first time in four years, summer Walleye targeted effort was over 50% of all effort observed among boat anglers. This was due to a 26% increase in Walleye effort and a 30% decrease in Smallmouth Bass effort

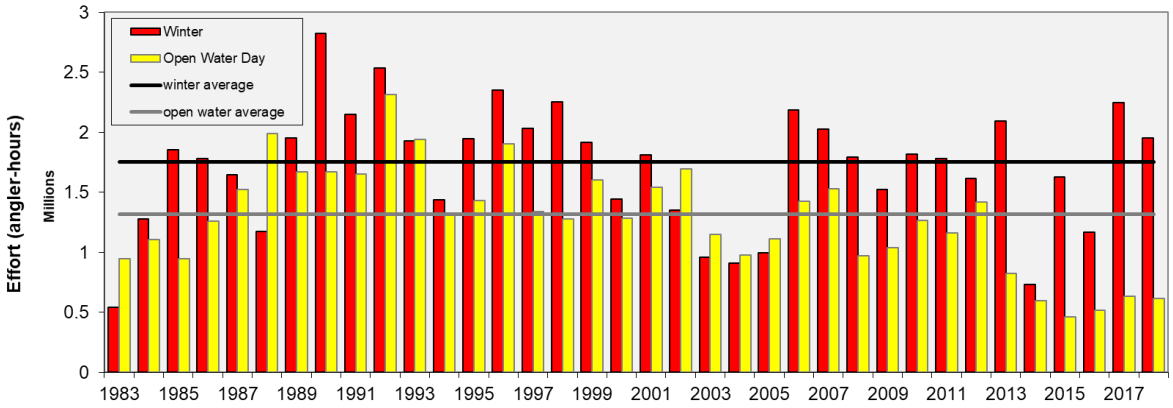
Fall Walleye Condition



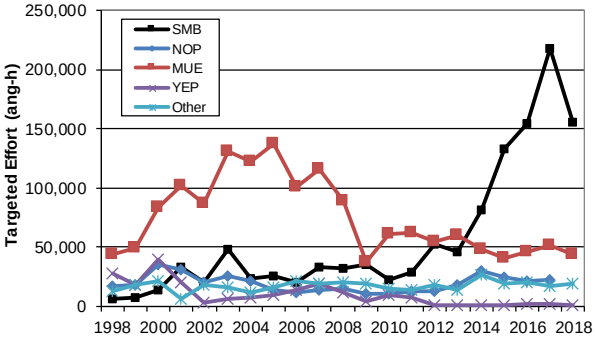
Walleye Population Estimates 2002 to 2018



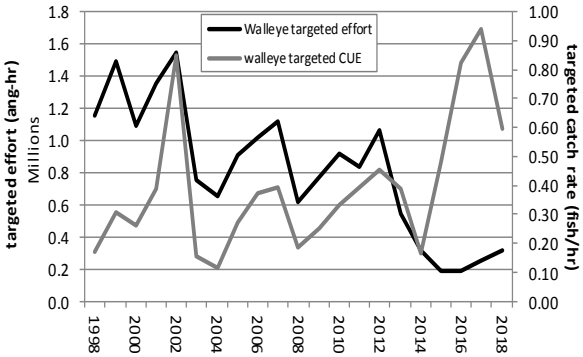
Mille Lacs Angling Pressure



Open Water Targeted Effort for various species



Walleye Targeted Effort and Catch Rate



Matt Hennen – Vermilion:

Currently, there are no major walleye controversies as open water fishing has been pretty solid that last 2 summers. Recruitment of the 2015 and 2016 year classes is moderate to strong. However, in 2018 we saw the 2nd lowest walleye gill-net catch rate (11.6 fish/net) lakewide since 1995 falling below the 25th percentile. This was primarily driven by the lowest catch rate in East Vermilion since 1994 (11.8 fish/net). We had a decent cold front move through during the first few days of sampling which could've had some impact. On a positive note, West Vermilion catch rates were above median at 11.3 fish/net. I suspect that really low catches of fish under 10" lakewide also played a significant role in the low catch rates and indicate a weak 2017 walleye year class on Vermilion. From my understanding, angling success has been really good with one guide telling me it was "on fire" all summer in 2018. So, harvest may have impacted GN catches somewhat. High Fall EF catch rates indicate a potential strong 2018 year class.

Ben Vondra – Rainy, Kabetogama, and Namakan

Nothing new or earth shattering to report up here (which is a good thing). Both lakes are humming along pretty good right now. We did review and will be modifying the Namakan Reservoir walleye regulation from 17-28" PS to an 18-26" PS this year.

2018 Lake Kabetogama Assessment Summary

- Walleye gill net CPUE of 9.3 per net; greater than the long-term median for Kabetogama and similar to 2017.
- Very good catch of 13-14 inch fish and 10-11 inch fish from the 2015 and 2016 year-classes, respectively.
- Good catch of 16-17 inch and greater than 19 inch Walleyes which should provide good angler opportunities for catching and harvesting Walleyes over the next few years.

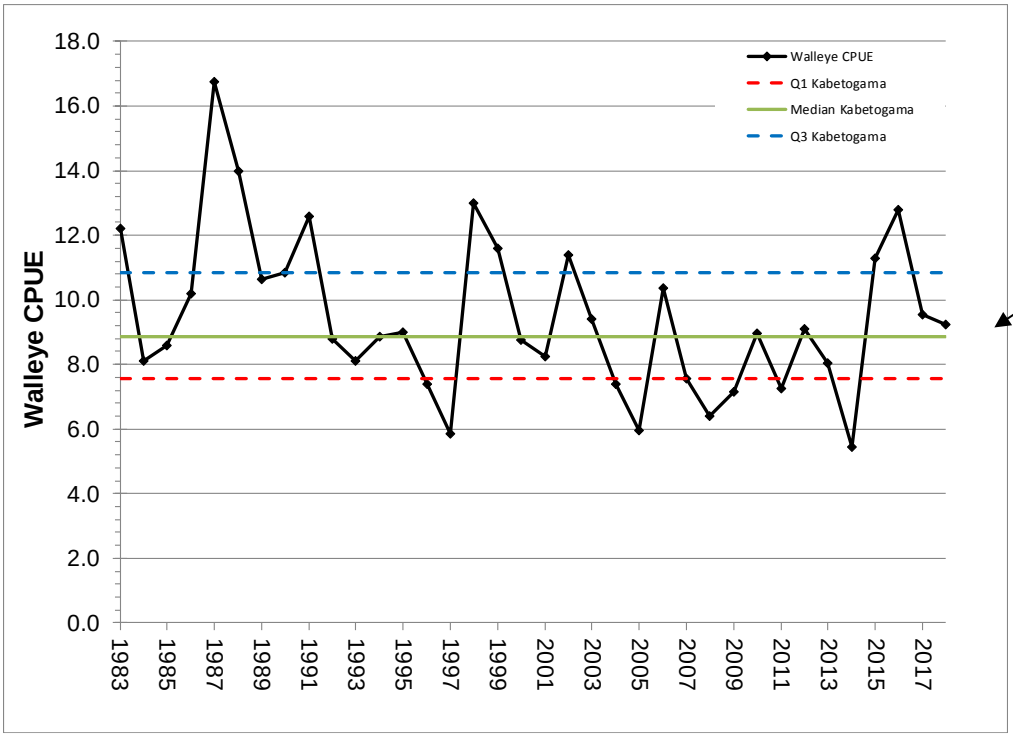


Figure 1. Historical mean walleye per gill net lifted (n = 20), Lake Kabetogama, 1983-2018.

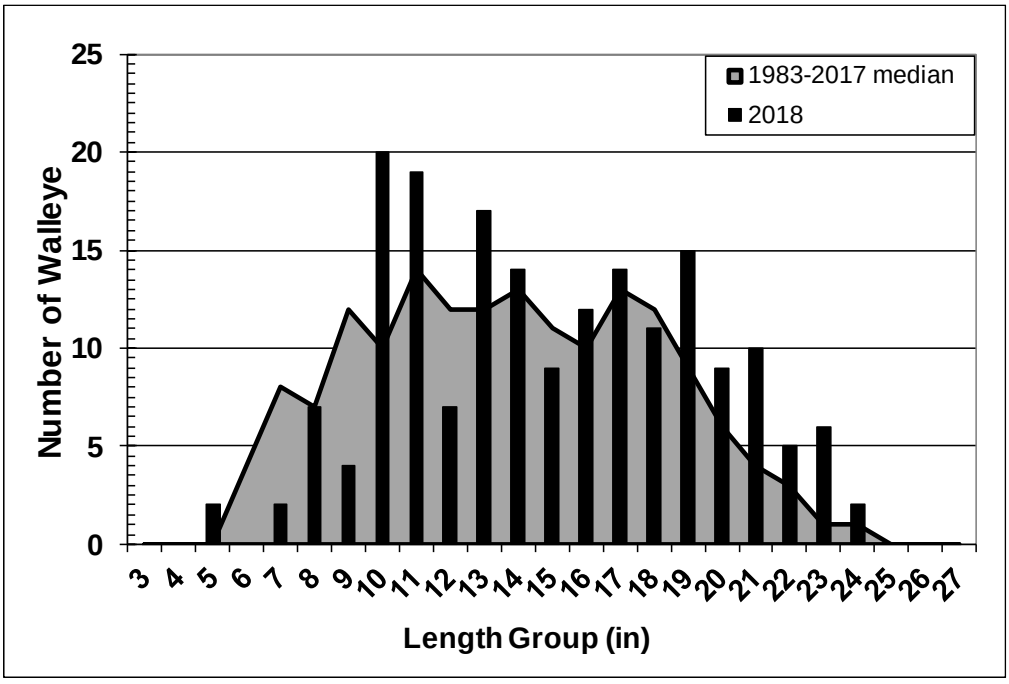


Figure 2. Walleye length-frequency distribution, 2018.

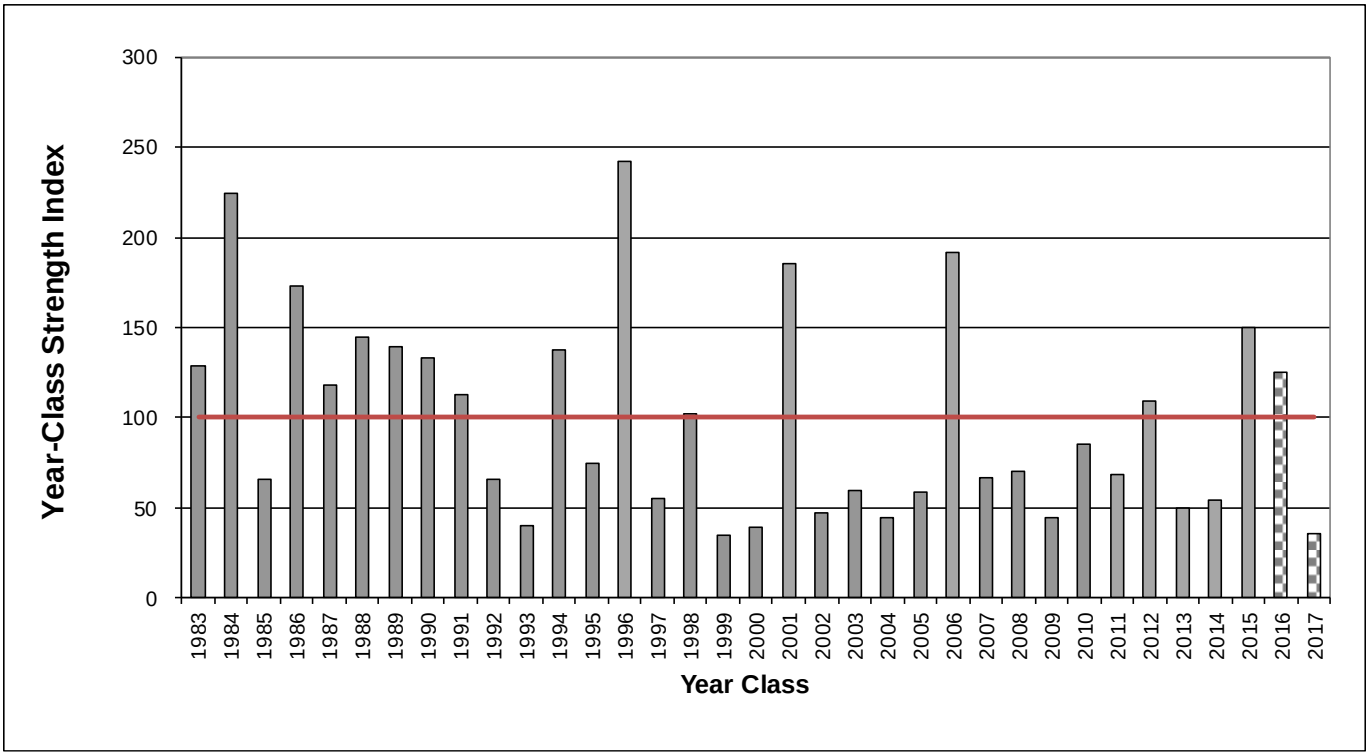


Figure 3. Walleye year-class strength index, year classes 1983-2017 (2016 and 2017 are projected values).

2018 Rainy Lake Assessment Summary

- Walleye gill net CPUE of 5.96; near the median for Rainy Lake.
- Good catch of Walleyes in the 12-13 inch and 15 and 17 inch length groups.
- The 2011 year-class is the strongest year-class since 2001, ranging in length from 13.6 to 20.6 inches and averaged 16.7 inches in the 2017 assessment. No strong year-classes post-2011 but several near average and only one very weak (2014).

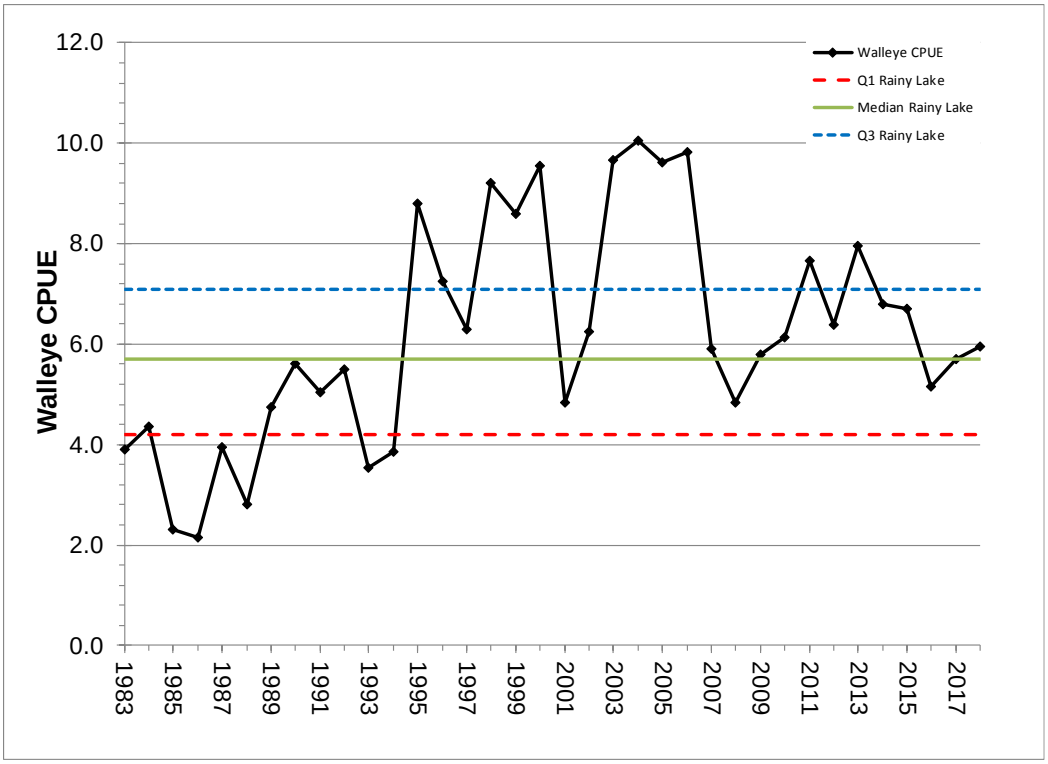


Figure 1. Historical mean walleye per gill net lifted, Rainy Lake, 1983-2018.

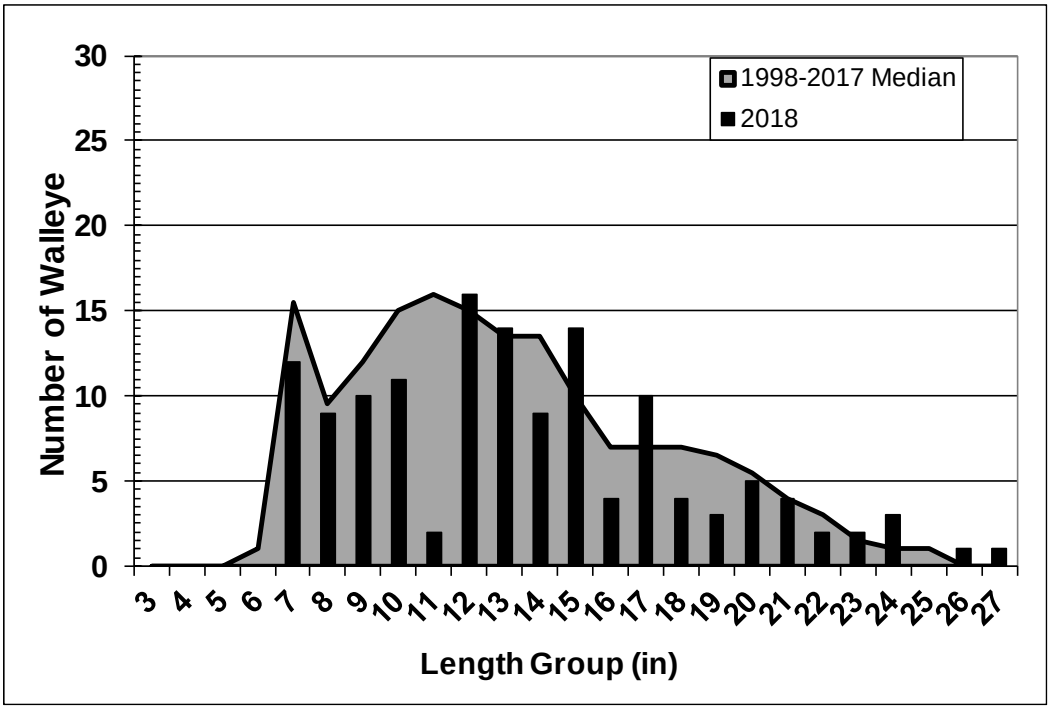


Figure 2. Walleye length-frequency distribution, 2018.

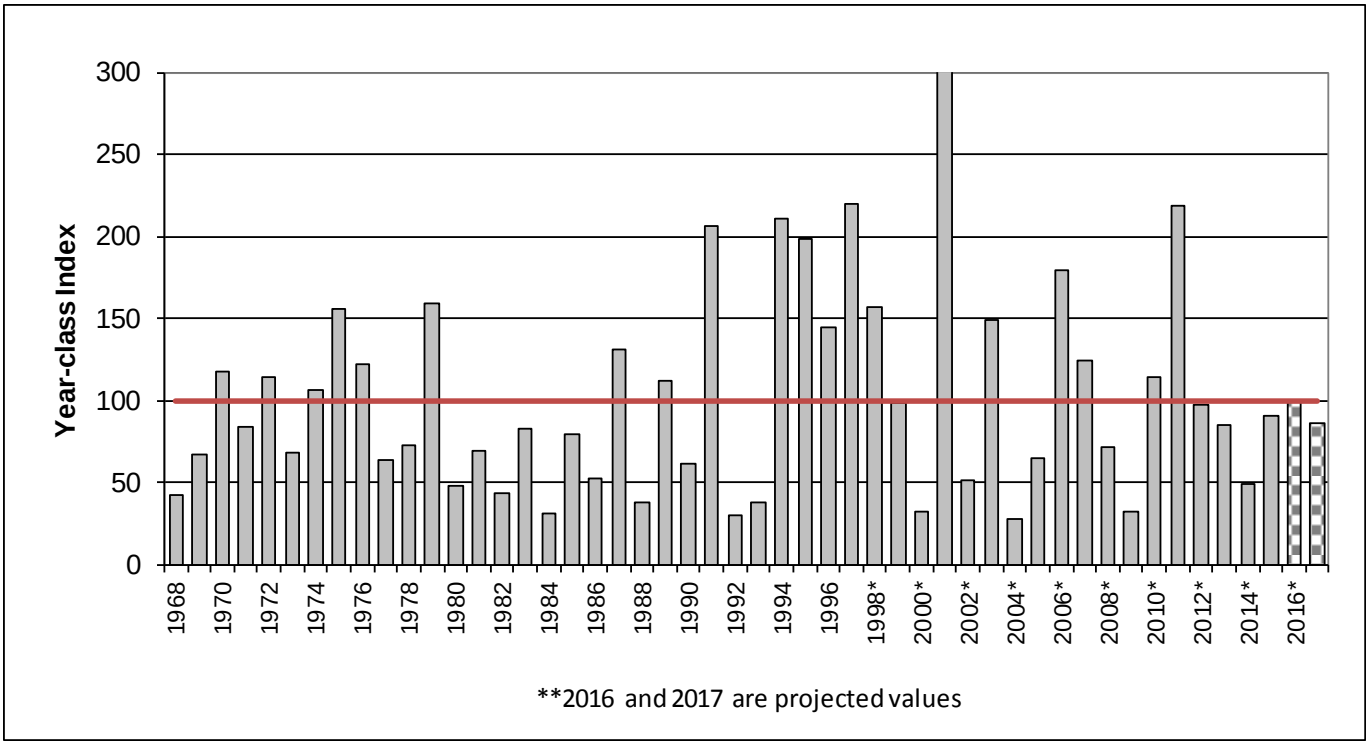
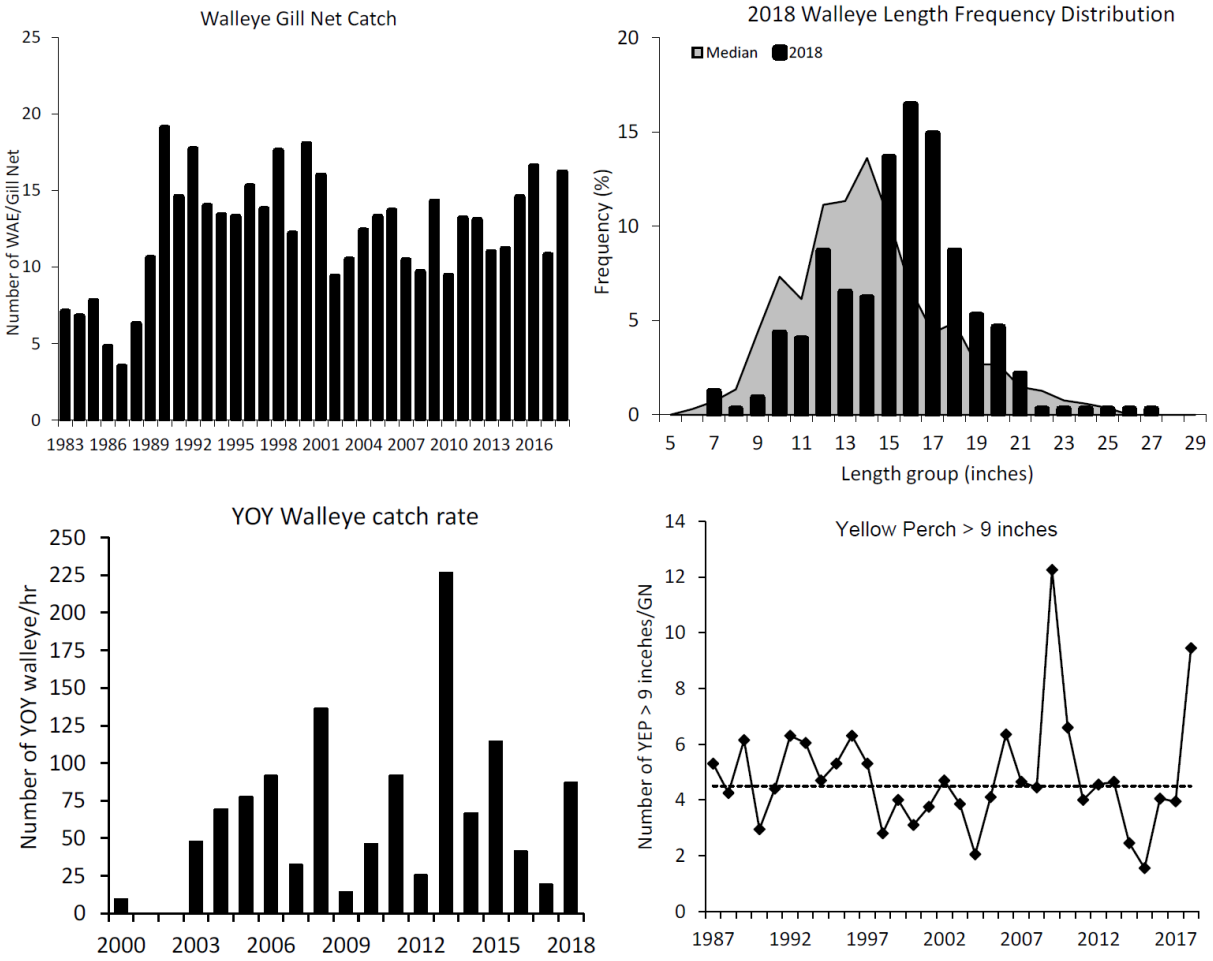


Figure 3. Walleye year-class strength index, year classes 1968-2017 *(24 nets).

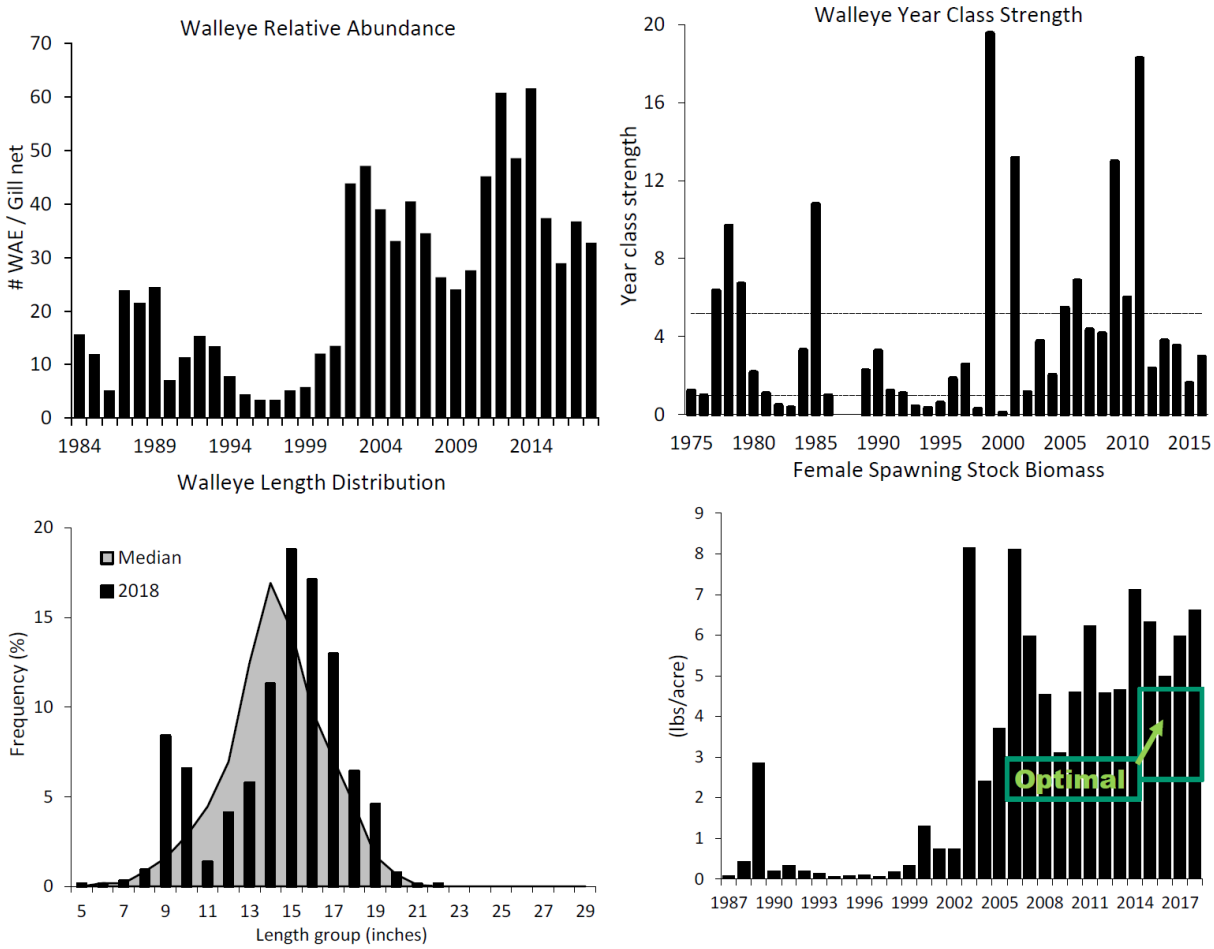
Tony Kennedy – Red and Cass Lakes

Cass Lake 2018 Walleye Population Assessment Summary



- The 2018 walleye gill net CPUE (16.2 WAE/net) was higher than the 2017 catch rate (10.8 WAE/net) and the long-term median catch rate 13.1 WAE/net.
- Size structure of the 2018 walleye sample showed a strong peak at 15 to 17 inches, which corresponds to fish ages 3 to 5, which comprised two-thirds of the total Walleye catch.
- Fall electrofishing produced a catch rate of 87 age-0 WAE/hr, which, based on the relationship between fall electrofishing catch rates and subsequent year class strength, projects the 2018 year class to be above average.
- After reaching a record low in 2015, relative abundance of yellow perch caught during the gill net survey has rebounded and the second-highest ever observed (9.5 fish > 9 inches/GN).

Upper Red Lake 2018 Walleye Population Assessment Summary



- Walleye gill net catch in 2018 was 32.8 fish/net. Although gill net CPUE on state waters declined slightly (2017 = 36.8 fish/net), lakewide CPUE increased slightly. Overall, lakewide relative abundance has been similar for the past three years (range, 30.0 to 33.6 fish/net).

- The above average abundance of fish from 15 to 19 inches is due to the strength of the 2009, 2010, and 2011 year classes (all above the 75th percentile). The above average frequency of 9- to 10-inch fish suggests the 2017 year class will be the strong (best since 2011). Below average frequencies of 11- to 14-inch fish are an artifact of relatively weak year classes produced in 2015 and, to a lesser extent, 2016.

- Recent (ages 1 to 3) year classes are growing rapidly due to moderate Walleye densities whereas many individuals from the strong year classes from 2009 to 2011 grew much more slowly. Thus, the length frequency peak includes representatives from a broad range of year classes. For example, the 15- and 16-inch length groups included at least one fish from each cohort from ages 3 to age 10.

- Spawning stock biomass (SSB) for the Red Lakes (basins combined) increased from 6.0 to 6.6 lbs/acre and remains in the surplus condition (i.e., higher than the optimal condition). The optimal SSB condition of 2.5 to 4.5 lbs/acre was established after examining the stock-recruitment relationship for Red Lakes. SSB at this level produces fry densities that maximize the likelihood of producing a strong year class.

Gerry Albert - Winnibigoshish

Angler catch rates for WAE and NOP were above average. Harvest rates for those species were below average – both in part due to slot limits. Harvestable walleye (less than 18 inches) were in relatively short supply due to recent recruitment issues. That appears about to change as fall 2018 electrofishing catch rates were excellent at all locations (up to 420 per hour) and growth was good with an average length of 6.2 inches (max length 7.5 inches) during the first week of September.

Catch rates in the fall assessment were low for all species. As zebra mussel have become fully established the prevalence of filamentous algae has become a nuisance. This fall was windy and algae was suspended in the water column and moving with the wind generated currents. This coated the nets to the point that they looked like a wall of vegetation in the water and likely affected catch rates. WAE SSB declined from 2.7lbs per acre in 2017 to 1.1lbs per ace in 2018. Not likely real, but quite possibly a result of the nets not fishing properly. It sounds like Mille Lacs had this issue early in the time series of zebra mussel infestation but has reduced lately.

Brett Nelson Lake of the Woods

Highlights for LotW would be formation of the five-year mgmt plan and the two new regs effective 1 March this year (winter WAE/SAR bag reduction from 8 to 6 – same as summer and C/R only from 1 March to 14 April on Rainy River/Four Mile Bay for WAE/SAR).

Walleye and Sauger Stock Status Update:

Lake of the Woods - 2018

The primary assessment used to monitor Walleye and Sauger populations is the annual fall gill net assessment. This assessment has been conducted since 1981, a comparable assessment was conducted from 1968 through 1970. From 1968 through 2001, the fall gill net assessment sampled the near-shore waters of Lake of the Woods, from 6 to 25 feet in depth. In 2002 off-shore nets were added to the assessment. The off-shore nets sample depths from 32 to 35 feet.

Walleye

Walleye catch in the 2018 gill net sample averaged 15.1 per net, which is just below the 2002 to 2018 average of 16.9. Overall Walleye abundance in 2018 is slightly below 2017(Figure 1).

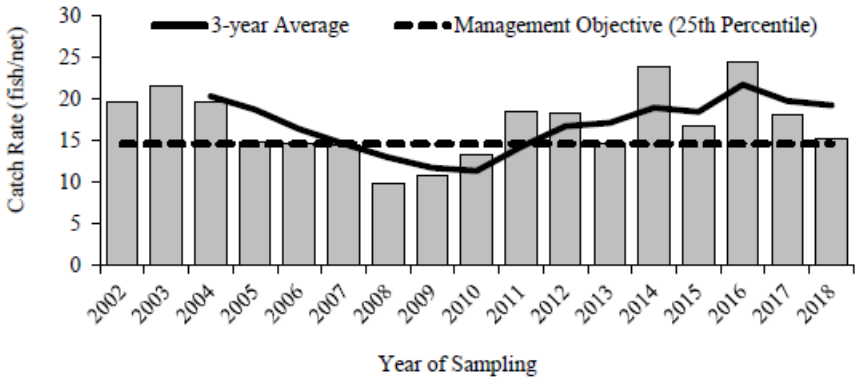


Figure 1. Average of near shore and off shore catch per unit effort of Walleye in September gill nets, 2002 through 2018.

The 2011, 2013 and 2014 year classes were strong, while 2015-2017 year classes are predicted to be of average strength (Figure 2). In 2018, above average catch rates and good growth of young of the year Walleye are an indication of a strong year class. Strong production and recruitment combined with only two weak year classes (2008 and 2012) in the past 10 years results in a healthy and abundant Walleye population.

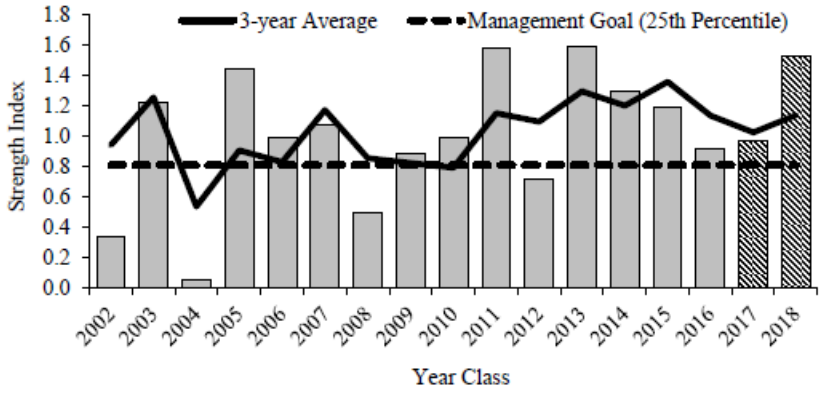


Figure 2. Year class strength of Walleye in Lake of the Woods from 2002-2018. Fished hatched in 2017 and 2018 and not considered fully vulnerable to gill nets; therefore strength values are predicted.

Small Walleye, from 6 to 8 inches long, are abundant. Harvestable-sized Walleye (14-18 inches) are also abundant and these fish are likely from 2011-2014 year classes (Figure 3).

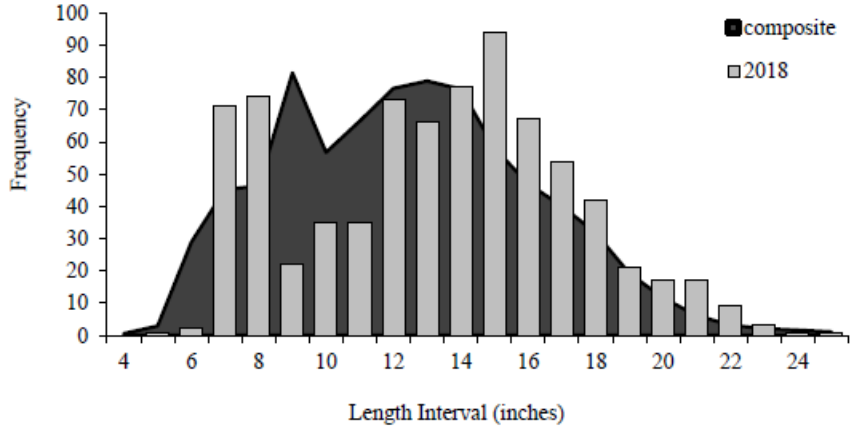


Figure 3. Walleye size distribution from 2018 fall gill net survey (gray bars). Shaded area denotes the average length frequency from 1981-2017.

Sauger

The highest Sauger abundance measured in the fall gill net assessment since 2002 was 30.8 Sauger per lift, which was observed in 2008 (Figure 4). High abundance was driven by young Sauger from strong year classes produced from 2005 through 2007 (Figure 5). In recent years, strong year classes were produced in 2011and 2015 (in addition 2014 and 2016 were near the strong threshold). Recent year classes are predicted to be average (2017) to weak (2018) in strength.

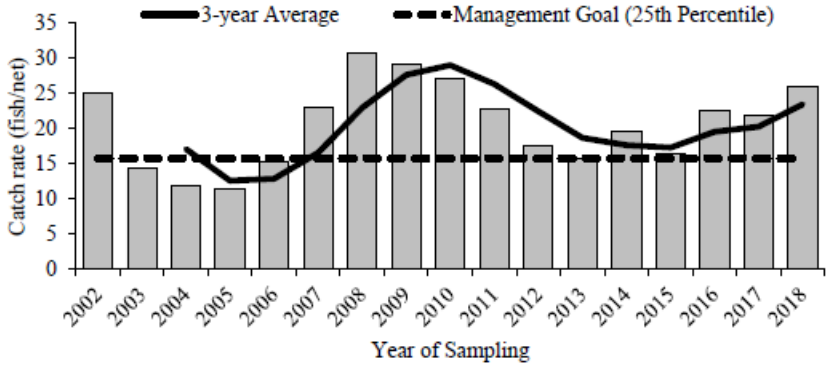


Figure 4. Average of near shore and off shore catch per unit effort of Sauger in September gill nets, 2002 through 2018.

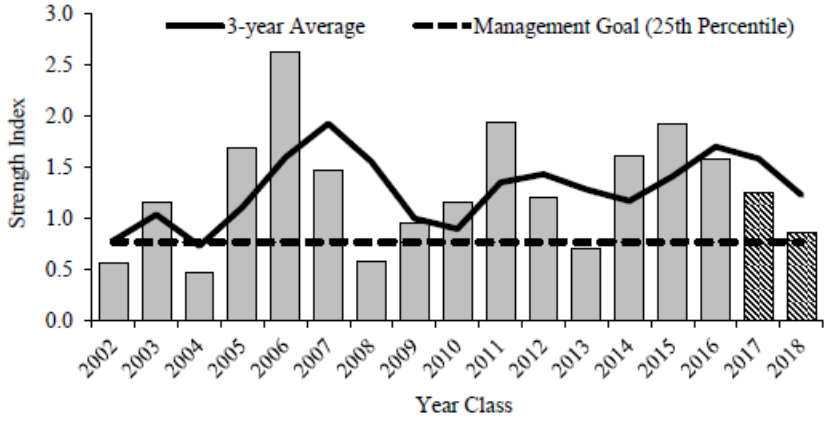


Figure 5. Year class strength of Sauger in Lake of the Woods from 2002-2018. Fished hatched in 2017 and 2018 and not considered fully vulnerable to gill nets; therefore strength values are predicted.

Small Sauger from 8 to 9 inches long were common in the 2018 gill net catch (Figure 6). Of interest to anglers is that Sauger from 11 to 16 inches were relatively abundant, and individuals over 19 inches long were sampled.

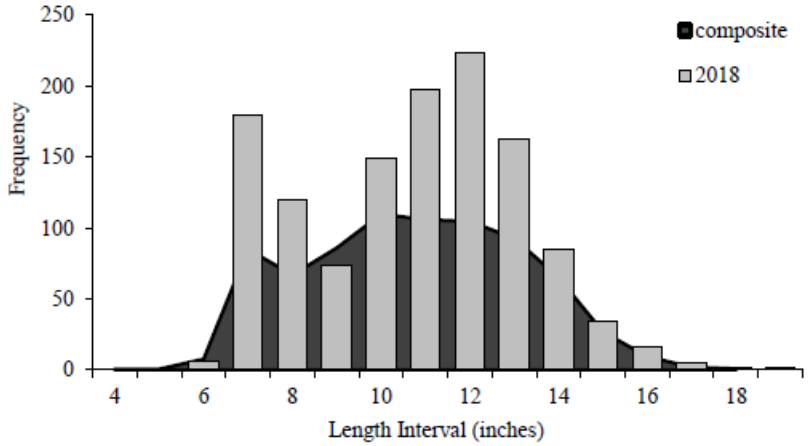


Figure 6. Sauger size distribution from 2018 fall gill net survey (gray bars). Shaded area denotes the average length frequency from 1984-2017.

Creel Survey Highlights

- Summer 2018: Fishing pressure was estimated 645,000 angler-hours and is approximately 100,000 angler-hours below the 2012-2018 average. Walleye (220,000 pounds) and Sauger (67,000 pounds) harvest were below the 2012-2018 average. Since 2012, average summer harvest for Walleye has been 277,000 pounds and 81,000 pounds for Sauger.

- Winter 2017-2018: Fishing pressure and Walleye/Sauger harvest were near the 2012-2018 average. Winter fishing pressure was estimated at 1.94 million angler-hours, approximately 100,000 angler-hours above average. The 2012-2018 average winter harvest is 243,000 pounds for Walleye and 314,000 pounds for Sauger. Winter harvest in 2017-18 was 257,000 pounds for Walleye, and 279,000 pounds for Sauger.

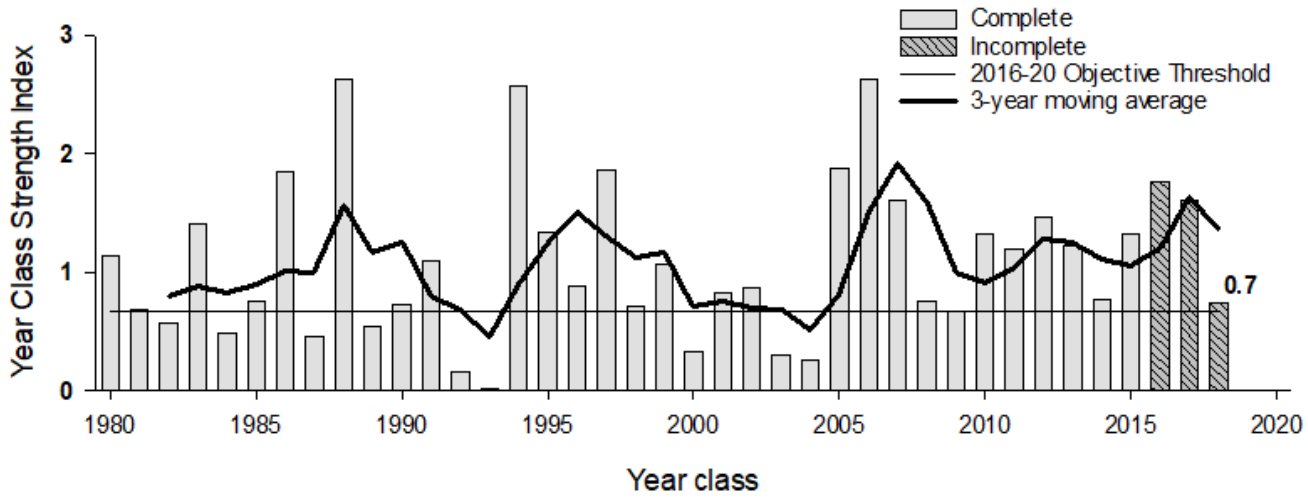
Additional information of sampling programs conducted on Lake of the Woods are located on the Baudette Area Fisheries web page, on the MN-DNR web site, at https://www.dnr.state.mn.us/areas/fisheries/baudette/index.html

MN DNR Fisheries Management Actions and Surveys on Leech Lake: 2018

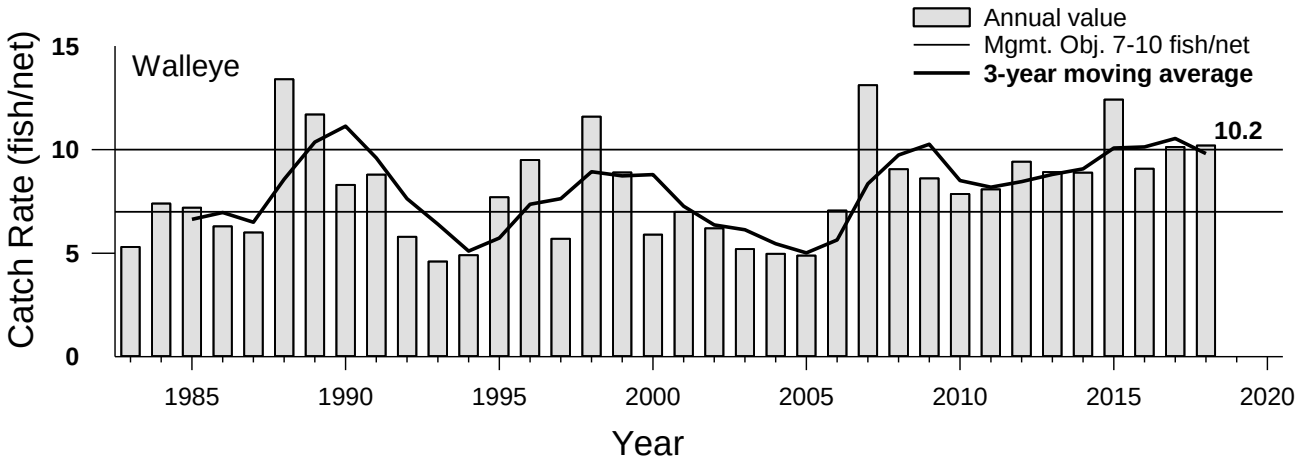
Young-of-Year Walleye Growth and Abundance

- July Seining: The average length (3.5 in.) was above the long-term average of 3.3 inches and the number sampled per acre (3) was below the long-term average of 68.
- August Trawling: The average length (5.2 in.) was below the long-term average of 5.3 inches and the number sampled per hour (69), was below the long-term average of 179.
- September Electrofishing: The average length (6.7 in) was above the long-term average of 6.0 inches. Walleye recruitment is generally higher when mean September length exceeds 6.0 inches. The number sampled per hour (56) was below the long-term average of 100.

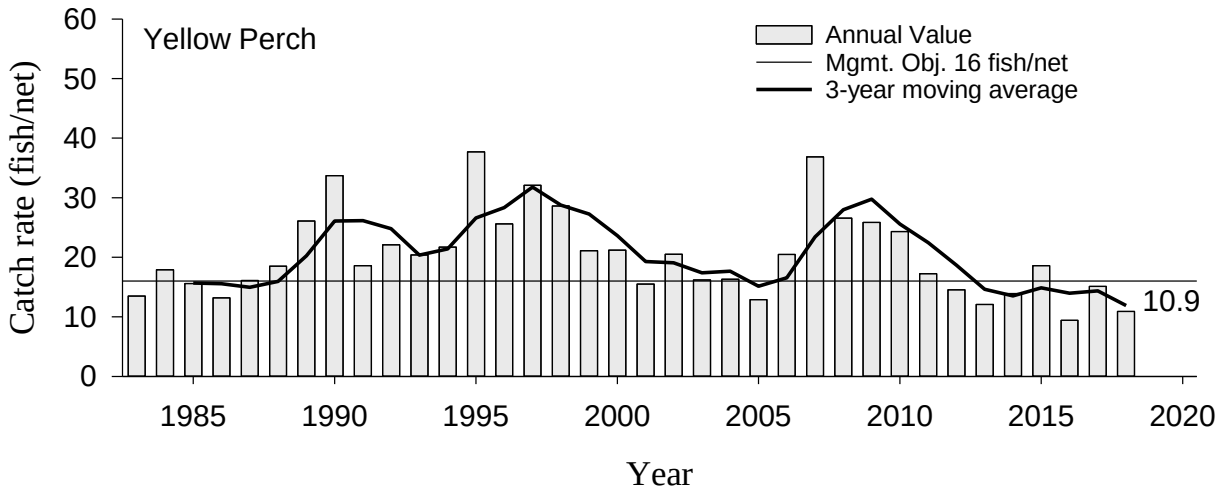
Walleye Recruitment: Year class strength index values are determined from gill net catch of ages 1-3 and predicted for age-0 from gill net and trawl catch data (Figure 1). Incomplete values for 2016 (1.77) and 2017 (1.61) cohorts exceed the management plan objective threshold (0.66) as does the 2018 predicted year class (0.74).



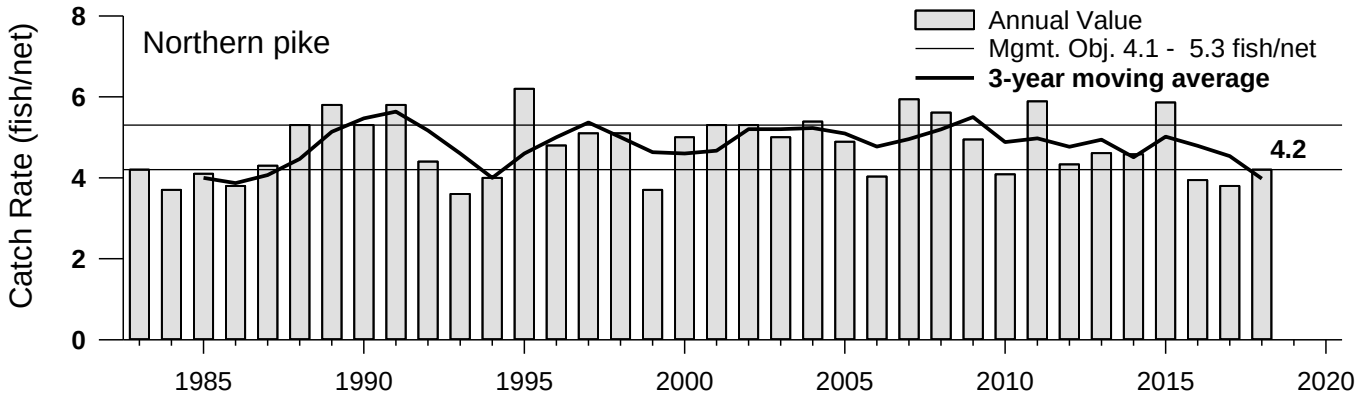
Walleye Abundance and Size Range: The gill net catch rate of 10.2 fish/net was above the management objective. Lengths of Walleye sampled ranged from 7 to 27 inches and demonstrated a balanced size distribution with strong year classes in 2016 and 2017.



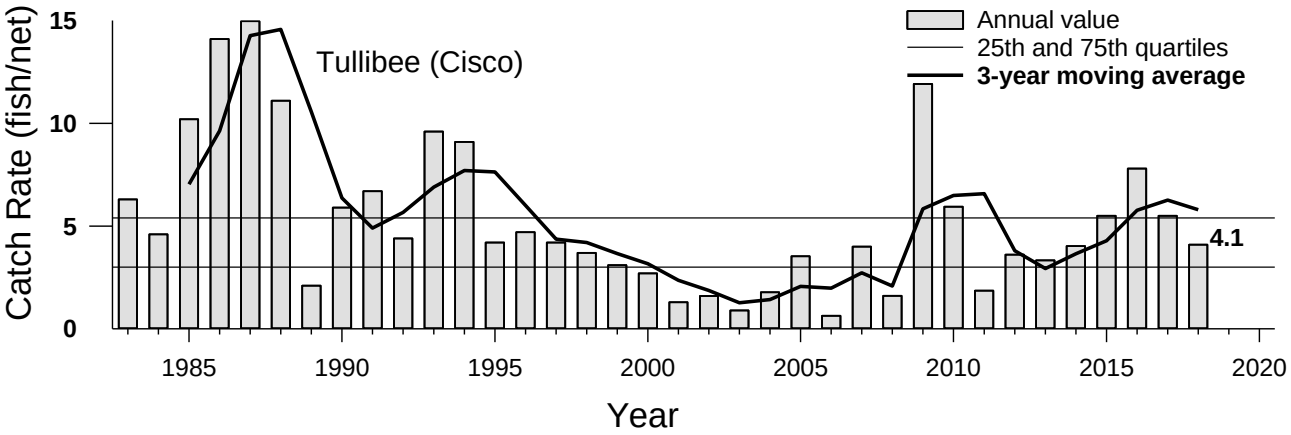
Yellow Perch Abundance and Size Range: The gill net catch rate (10.9 fish/net) remains below the management plan objective of at least 16 perch per net. Perch up to 12" long were sampled.



Northern Pike Abundance and Size Range: Northern Pike gill net catch rates (4.2 fish/net) were just above the lower management objective of 4.1 fish per net. Pike up to 33 inches were sampled.



Tullibee (Cisco) Abundance: The Tullibee catch rate (4.1 fish/net) was within the 25th and 75th quartiles.



Carl Pedersen, Large Lake Specialist, Walker Area Fisheries, Carl.Pedersen@state.mn.us (218) 547-1683

Doug Schultz, Area Supervisor, Walker Area Fisheries, Doug.W.Schultz@state.mn.us (218) 547-1683

Nick Schlesser - Lake Pepin

2018 Lake Pepin/Pool 4 Assessment Summary

- No seining was conducted in 2018 due to a summer flood.
- Gillnetting was also conducted in high water conditions for the 3rd year in a row in 2018.
- A pulse in the spring hydrograph that caught the tail end of the typical Walleye and Sauger spawning period seems to have led to good reproduction.
- Both Trawling and YOY Electrofishing catch rates were more than twice the previous record catch rates, but showed a broad range of sizes including many small individuals.

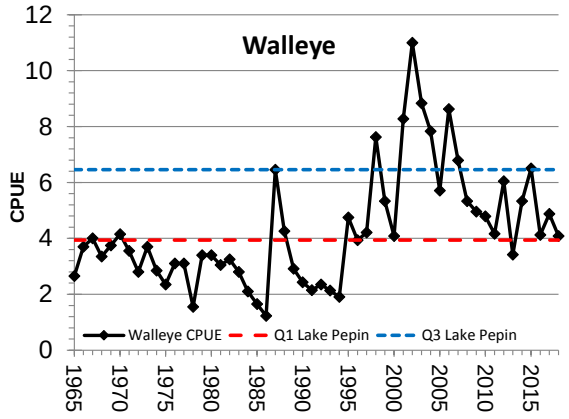


Figure 1. Historical Walleye gill net catch, 1965-2018.

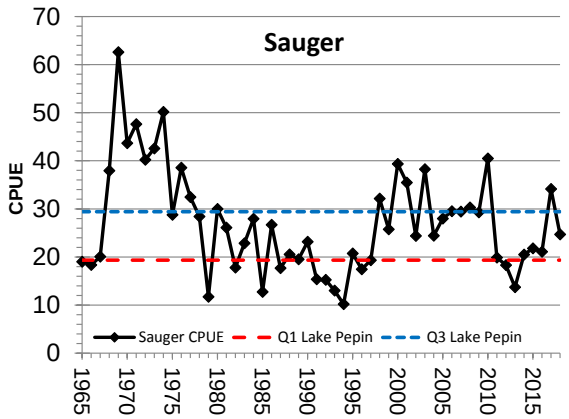


Figure 2. Historical Sauger gill net catch, 1965-2018.

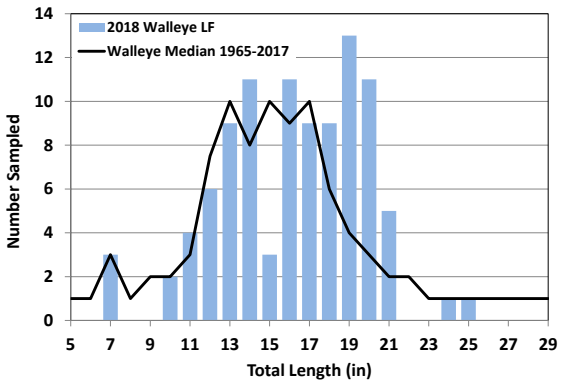


Figure 3. Historical median (1965-2017) and 2018 length frequency distribution of Walleye.

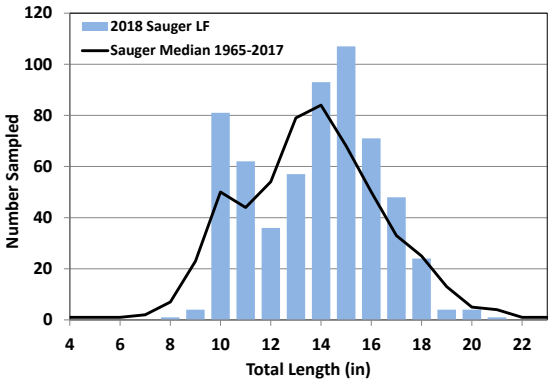


Figure 4. Historical median (1965-2017) and 2018 length frequency distribution of Sauger.

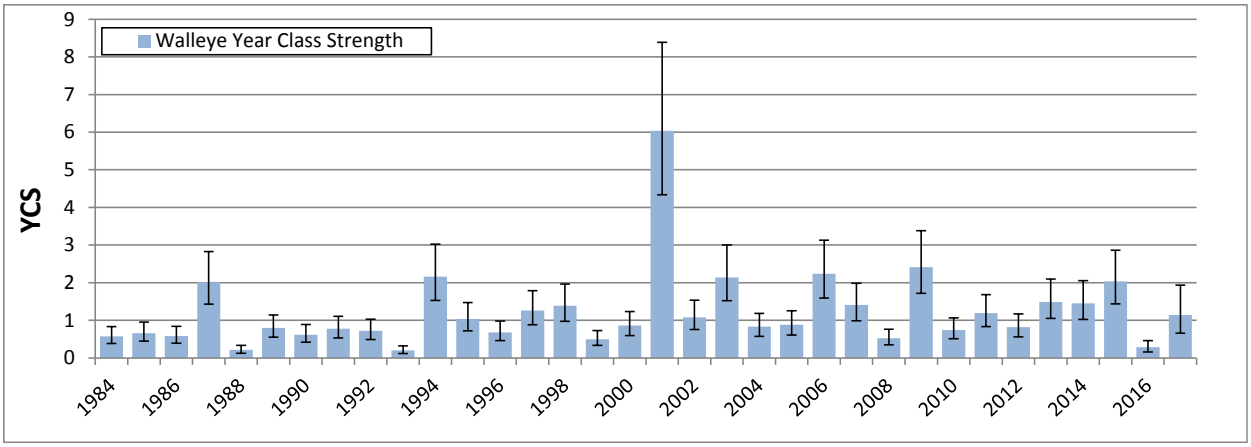


Figure 4. Year-class strength index for Walleye from Lake Pepin (1984-2017).

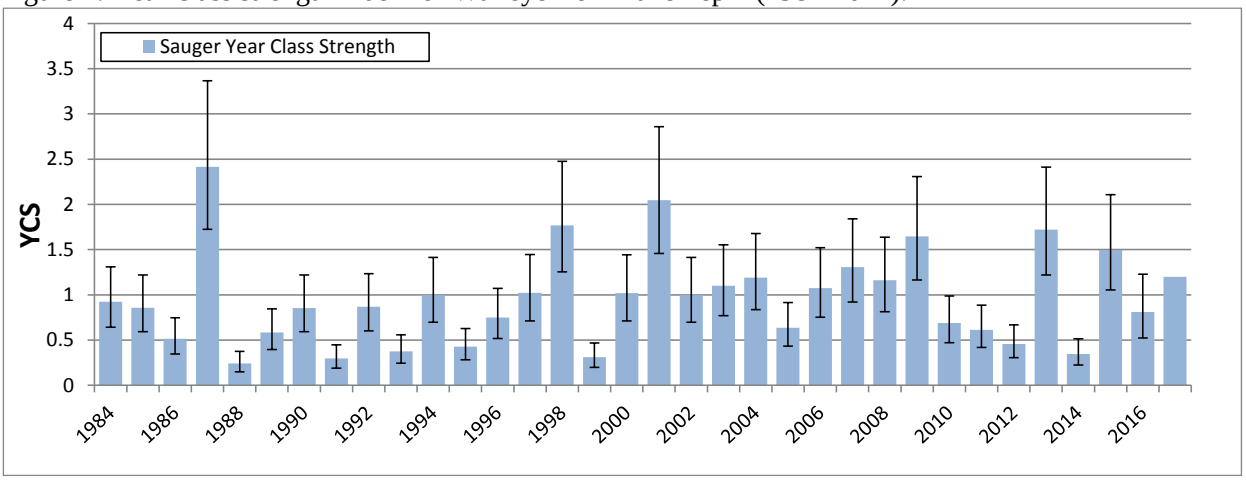
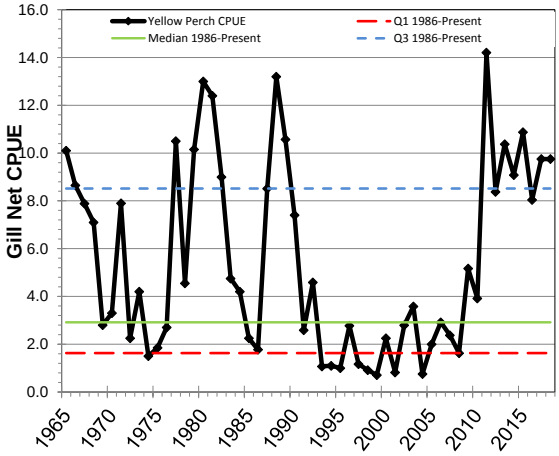
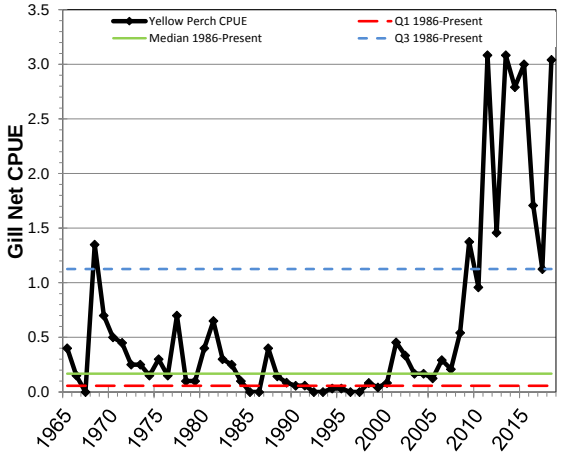


Figure 5. Year-class strength index for Sauger from Lake Pepin (1984-2017).





Figures 6 and 7. Historical catch of all Yellow Perch (left) and Yellow Perch >10” (right) in Lake Pepin gill nets 1965-2018.

Missouri – Ben Parnell

The Stockton Lake Walleye population is assessed by spring electrofishing for adults in the dam area and fall electrofishing for YOY at different locations throughout the lake. Walleye were sampled in the dam area in late March of 2018, resulting in a CPUE of 52 Walleye per hour. Walleye PSD (15) and RSD (20) values were 100% and 15.5% respectively. In the late fall of 2018 catch rates for YOY Walleye were higher than the previous year. In fact, in upper Little Sac sites, they were the fourth highest on record and second highest since 2004. Walleye growth continues to be good with most fish reaching the 15-inch minimum length limit as age two fish. Mean average length of age three male Walleyes has been almost 17 inches, which falls within our objective of 16-18 inches.

In late May of 2018, Stockton Lake was stocked with approximately 229,146 Walleye fingerlings (9 fish per surface acre). This failed to meet our annual stocking request of 300,000 Walleye fingerlings (<4"). This was due to unseasonably cold weather that resulted in poor Walleye production in throughout our hatchery system (see hatchery reports). We recently completed our final year of the 2015-2016 Stockton Lake Creel Survey. This is the first angler survey conducted on Stockton Lake since 2005. One of the primary goals of this angler survey was to key in on Walleye harvest rates and angling effort by conducting roving and access creels simultaneously. I have included excerpts from our creel report below.

Access Creel

In both 2015 and 2016, Walleye were by far the most sought-after fish species on the lake, at 46% and 53% angler preference hours, respectively. For anglers specifically targeting Walleye the total catch rate for Walleye was 0.17 and 0.34 fish per hour in 2015 and 2016, respectively. The catch rate for legal size Walleye (15" mll) was 0.10 fish per hour in 2015 and 0.32 fish per hour in 2016. The harvest rate of legal size Walleye was 0.09 fish per hour in 2015 and 0.31 fish per hour in 2016. The mean length of all harvested Walleye was 17.0 inches in 2015 and 17.5 inches in 2016. All anglers who caught Walleye, including those targeting other species, released 6% of legal Walleye in 2015 and 5% of legal Walleye in 2016.

In accordance with Missouri's Walleye Management Plan 2017-2026, angler harvest rate objectives of 0.1 to 0.2 Walleye/hour and at least one lb./acre Walleye harvested were established to measure stocking success. These metrics were established shortly after the minimum length limit was reduced from 18 inches to 15 inches, aimed at creating a more harvest-oriented fishery. In the 2015 access creel survey, the angler harvest rate of 0.09 fish per hour was slightly below the objective. However, in 2016 the access creel surveys angler harvest rate of 0.31 fish per hour well exceeded the harvest objective for Walleye. Walleye lb./per acre estimates were not available for the access survey.

The specific Walleye fishery that was targeted during the access creel is dynamic in that it is completely reliant on the progression of Walleye spawning behavior. Angler success is heavily dependent on weather conditions and water temperature. For example, during 2015 the area experienced very cold temperatures, that persisted well into March. In fact, not a single angler was interviewed in the entire month of February. The low catch and harvest rates experienced in 2015 could be a result of poor weather conditions and colder water temperatures, rather than relative abundance of legal Walleye in the lake at that time.

Roving Creel

Fishing pressure for Walleye was an estimated 2.2 hours per acre in 2015 and 3.4 hours per acre in 2016. For anglers who preferred a specific species to fish for, Walleye were the third most preferred species by anglers in 2015 (11%) and in 2016 (15%). For anglers specifically targeting Walleye the total catch rate for Walleye was 0.83 fish per hour in 2015 and 0.35 fish per hour in 2016. The catch rate for legal size Walleye (15" mll) was 0.29 fish per hour in 2015 and 0.15 fish per hour in 2016. The harvest rate of legal size Walleye was 0.23 fish per hour in 2015 and 0.15 fish per hour in 2016. On average, fishing pressure, catch rates and harvest rates have increased since the 2001-2005 surveys. When comparing these data with historic trend data, many of these metrics have increased substantially. In fact, the total catch rate of Walleye in 2015 was the highest recorded since 1971.

The mean length of all harvested Walleye was 15.8 inches in 2015 and 16.3 inches in 2016. This represents a significant decrease on average, from the 2001-2005 surveys. The reduction in mean length of harvested fish could be related to

management practices prior to the 2001-2005 creel surveys. More specifically the implementation of a 15-inch minimum length limit on Stockton in the year 2000. This regulation was likely just taking effect during the previous creel survey (2001-2005). All anglers who caught Walleye, including those targeting other species, released 18% of legal Walleye in 2015 and 11% of legal Walleye in 2016.

In accordance with Missouri's Walleye Management Plan 2017-2026, angler harvest rate objectives of 0.1 to 0.2 Walleye/hour and at least one lb./acre Walleye harvested were established to measure stocking success. These metrics were established shortly after the minimum length limit was reduced from 18 inches to 15 inches, aimed at creating a more harvest-oriented fishery. In both 2015 and 2016 roving creel surveys, angler harvest rate objectives were either met or exceeded for Walleye. These data support the idea that the Walleye stocking program on Stockton is maintaining a viable, harvest-oriented fishery.

2018 Walleye Summary for Bull Shoals Lake and Norfork Lake

Nathan Recktenwald
Fisheries Management Biologist
Missouri Department of Conservation
Ozark Regional Office
551 Joe Jones Blvd.
West Plains, MO 65775
(417) 255-9561 ext. 4742
Nathan.Recktenwald@mdc.mo.gov

In March, Ozark Region Fisheries staff collected Walleye brood stock from Bull Shoals Lake near Powersite Dam for Chesapeake Fish Hatchery (Figure 1). Walleye brood stock total Catch Per Unit Effort (CPUE) for males and females combined was 136 fish per hour (Figure 1). For ease of collection, staff made a special operations request to both Southwest Power Administration and U.S. Army Corps of Engineers for Table Rock, as well as Liberty Utilities managers at Powersite Dam for Taneycomo to generate specific water releases. The release requests were fulfilled and significantly helped biologists in Walleye collection by providing enough water for boat navigation and creating favorable spawning conditions by allowing Walleye time to stage in flowing water near the dam. These fish were spawned, and fingerlings were stocked back into Bull Shoals Lake and Norfork Lake in May. A total of 141,039 Walleye fingerlings were stocked in Bull Shoals Lake which was under the production goal of 385,000 fish. Norfork received 35,557 fingerlings which was under the production goal of 176,000 fish. Brood stock collection and spawning was successful, but

unseasonably cold temperatures in the spring negatively impacted Walleye pond production.

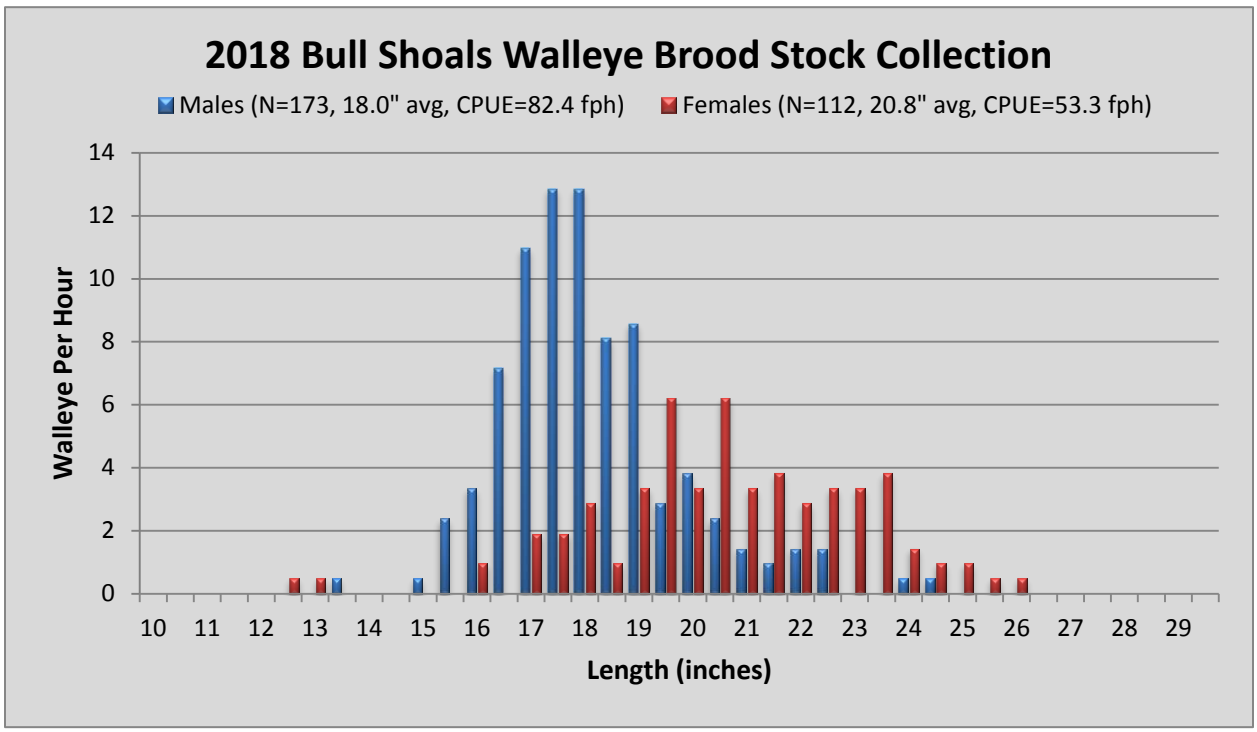


Figure 1. 2018 Bull Shoals Walleye brood stock collection.

2018 Black River Walleye Report - Paul Cieslewicz

The Black River downstream of Clearwater Dam supports a high-quality Walleye population. In spring, spawning male Walleye concentrate on the three riffles downstream of the large pool. Female Walleye can be found throughout the large pool. For the past ten years, Fisheries staff have collected 5-10 female and 30 male Walleye each March for hatchery propagation purposes. These fish are used to produce fingerlings that are stocked into the Black, Current, Eleven Point, and St. Francis rivers.

The 2018 Walleye brood stock collection was greatly hampered by flooding and major cold fronts. On February 26th, Clearwater Lake discharge was increased, and the river quickly rose four feet (Figure 2). Water temperature also decreased significantly during the spawning period. On February 26th, the river was 53F. On March 1st, the river was 48F. On March 1st, six female (4-7 lbs.) and four male (1-2 lbs.) Walleye were captured and transferred to the Chesapeake Fish Hatchery (CFH). On March 4th additional Walleye brood stock were collected from the Current River. All Walleye were verified as Black River Strain before spawning. A total of 20,200 fingerlings were stocked into the Eleven Point River (fingerling request was 15,000).

2018 Lost valley Hatchery Walleye Production Summery - Daniel Fore

In 2018 Lost Valley Hatchery spawned 144 female walleyes and 100 male walleyes to produce 26.5 million eggs. Of those eggs, 4.4 million were shipped to Kansas to be hatched and 7.7 million eggs were hatched at Lost Valley. Those 7.7 million eggs were then divided up among 3 different locations. Lost Valley kept 2.4 million to hatch and the stocked them into their production ponds. Blind Pony Hatchery received just over 600,000 fry and the remaining 4.6 million fry were sent to Kansas. For Lost Valley, the weather was colder than usual and tempering the fry down to ambient temperatures was required before moving them into the production ponds outside. After moving the fish outside, plankton blooms were checked in each pond and showed plankton numbers to be below average for the year. At the

time of harvest Lost Valley produced 134,000 walleye fry averaging around 2 inches in length. These fish were then stocked into Stockton Lake.

Nebraska – Joe Rydell

Walleye Eggs were collected in 2018 from Sherman, Merritt, Lake McConaughy and a test run was done at Elwood. With the walleye population in Sherman declining, Elwood may be the alternative source for eggs. A total of 93,190,060 eggs were collected from Sherman and Merritt to meet the hatchery demands. However due to a low hatch percentage at Merritt, a short run was needed at Lake McConaughy to finish up the state's needs. Most of the eggs were utilized in Nebraska, but some were sent to Colorado, Kansas, and Gavins Point National Fish Hatchery. Nebraska walleye eggs were used for both walleye production and saugeye production.

Research projects going on in Nebraska:

University of Nebraska Kearney Projects

The Harlan and McConaughy projects are still ongoing. In Harlan, they're looking at water quality, zooplankton, and fish community difference between connected, intermittently disconnected, and completely disconnected coves. Walleyes are found more often in coves that are connected (not surprising), but they don't make up too much of our catches.

In McConaughy, we're looking to build a "heat map" that will help to decide where to stock walleyes to avoid predators, find food (zooplankton), and find "cover" (in the form of turbidity). The map is expected to be completed by summer or fall of 2019.

They are also looking at percent stock contribution of walleye in Harlin and Big Mac with hopes of running modeling on what is driving natural recruitment as well as conditions that are reflective of stocking success (or failures).

Another project they are continuing is the 5th and last year of sex specific population assessment from Sherman Reservoir walleye spawning population. The goal is to develop understanding of the development of male and female walleye in the face of heavy angling harvest and a minimum length limit with closed slot regulation. These results will probably be summarized in a couple years.

University of Nebraska Lincoln Projects

Creel projects are still going on.

North Dakota – Todd Caspers

The walleye population in Devils Lake is doing all right. There are many age-classes of walleye in the lake and some of the fish can become quite old, as a 21 year old was sampled in 2013, and we sampled 3, 20 year old walleyes in 2016.

We conducted our Standard Adult Sampling on Devils Lake in July. The overall CPUE of walleye increased a bit to 22 walleye/net-night in our 125' variegated gill nets. (20 last year) This year's catch is a bit above the long-term average of 20.7 walleye/net-night. Size structure was relatively well balanced. One thing that was disappointing was that the catch rate of Q-P sized walleye was only about 4 this year, which is below the long-term average of about 5.7. The northern pike and yellow perch catches were both above the long-term average, but most of the perch were not the "jumbos" that the anglers love. We set a new record high for our white bass, as we caught about 19 white bass per net, whereas the old record was 11 per net and the average is about 4.5 per net. Most of the white bass are from the strong hatch that we observed in 2015, and they are mostly about 11 to 13 inches long now. Due to better walleye reproduction the past two years, we did not stock walleye in Devils Lake in 2018.

We also completed a creel survey on Devils Lake in 2017. The survey covered the periods of May 15, to August 31, 2016, and also December 15, 2016 through March 31, 2017. During the summer period, there were 622,600 angler hours, and anglers harvested about 335,700 walleye, 48,500 pike, 9,200 white bass, 5,000 yellow perch, and 1,700 black crappie. During the winter period, there were nearly 343,700 angler hours, and anglers harvested about 24,300 walleye, 11,500 pike, 350 white bass, 112,385 yellow perch, and 6,500 black crappie. Overall, about 463,500 walleye were likely harvested during both survey periods, which equates to about 3.1 walleye harvested per acre. Nonresidents continue to make up a significant proportion of anglers at Devils Lake, as nonresidents made up about 42 percent of open-water anglers and 49 percent of ice-anglers.

One of our other large lakes, Stump Lake is doing well too. We conducted our Standard Adult Sampling there in late June. The walleye population appears to be doing well, as our catch rate was 26 walleye per net, which is above the long-term average of about 17 walleye per net. The numbers of 10" to 20" walleye were up from last year, and they are above their long-term averages. The yellow perch and white bass were above their long-term averages, whereas pike numbers were below average. We also conducted a creel survey at Stump Lake in conjunction with the Devils Lake creel survey. The survey ran from May 15th through August 31, 2016 and also from December 15th 2016, through March 31st, 2017. During the summer period, there were approximately 52,200 angler-hours, and anglers harvested about 14,300 walleye, 8,500 white bass, 500 pike, and 304 perch. The winter period had about 80,100 angler hours, and anglers harvested about 36,200 perch, 5,400 walleye and 300 pike. Overall, about 19,700 walleye were likely harvested during both survey periods, which equates to about 1.2 walleye harvested per acre. Residents made up about 80% of the anglers in both survey periods, and non-residents made up about 20 percent of the anglers.

In the Northeast District of the state, some of our most impressive walleye waters continue to be new fisheries that were formerly duck-marsh type habitats. Some of these waters are also able to produce good numbers of walleye over 24" long.

Across the rest of the state, the good old days of walleye fishing, and fishing in general, continue to be right now. We are still relatively wet and the fish populations have responded very well to the abundance of water, although some lakes have lost significant amounts of water since their peaks. Statewide, there are about 440

waterbodies that are being managed for fishing. This is a great increase from only about 175 managed fisheries in the early 1990's. Since 1997 we have added about 107 new walleye fisheries. State-wide there are currently about 150 waters that have fishable walleye populations and we seem to be able to add a few on to the total each year. Even since 2012, we have added 45 new walleye lakes, although not all of them are providing a fishery yet. On May 18th, an angler caught a new state-record walleye. The 15 pound 13 oz fish was caught from the Missouri River near Bismarck. About the only place where walleye are not doing so well is the Missouri River system below Lake Sakakawea. This is due to habitat degradation and poor forage production since the flood of 2011. Conditions are improving, but there are still some areas where the walleye populations are still in tough shape, such as in the Garrison Reach where growth and size structure are still poor. The high water this past year will probably not help with the forage production in that stretch of river either.

Our department stocked walleye in over 140 lakes in 2018. Nearly 10 million fingerlings were stocked by our department, with more than 8 million being stocked into relatively small waters. The fingerlings were generally about 30 days old and were around 1.25" long, although size was variable.

Previous to 2015, zebra mussel veligers were sampled in small numbers periodically in the Red River near the confluence with the Otter Tail River near Wahpeton, ND. However, in 2015 there were large numbers of veligers sampled throughout the North Dakota portion of the Red River. There were also adult zebra mussels discovered for the first time that year as well. Department personnel looked for zebra mussels in the fall of 2015 and were able to document that adults were present in many different locations with suitable attachment substrate, so it is likely that adults were present along the entire North Dakota portion of the Red River. In response to the Zebra mussel situation on the Red River, the Department enacted additional ANS regulations in addition to the previous regulations. The new regulations included making sure all drain plugs, etc., are removed during transport, and on the Red River it is now illegal to leave the river with any water, which includes water in bait containers.

Ontario – Lee Gutowsky

Recent publications

Gutowsky, L.F.G., H.C. Giacomini, D.T. de Kerckhove, R. Mackereth, D. McCormick, C. Chu. 2018. Quantifying multiple pressure interactions affecting populations of a recreationally and commercially important freshwater fish. Global Change Biology. 00:000-000. https://doi.org/10.1111/gcb.14556

Gorman, A.M., R.T. Kraus, L.F.G. Gutowsky, C.S. Vandergoot, Y. Zhao, C.T. Knight, M.D. Faust, T.A. Hayden, C.C. Krueger. 2019. Vertical habitat use of adult Walleye conflicts with expectations from fishery-independent surveys. Transactions of the American Fisheries Society. 00:000-000. https://doi.org/10.1002/tafs.10150

Saskatchewan – Mark Duffy

Walleye Culture

Saskatchewan fisheries staff continue to work with staff from the Fish Culture Station on improving egg collection, spawning and rearing. This comes as part of the upgrades to the only provincial hatchery continue. Improvements are largely focused around egg disinfection and increased bio-security both in the hatchery, as well as with fertilized eggs being brought to it. Trials with egg disinfection using Ovadine started in 2016 and continued in 2017. Full egg disinfection protocols were implemented in 2018 and will continue going forward. Survival to the eyed egg stage using water hardening disinfection increased compared to control trials from 69.5% to 81.5%. A new dedicated enclosed spawning trailer has been purchased and customized to our needs to ensure all work is done in a controlled environment to minimize air and light exposure to the eggs.

Walleye Stocks

Walleye stocks around the province continue to be strong, with populations in the northwest portion of the province showing high harvests in both angler catch and commercial harvest. Continued calls for increased walleye quotas in the commercial fishery is occurring to take advantage of this economically important species. Staff are actively monitoring stocks to determine if this is the result of a few strong year classes being recruited to the fishery, or the beginning of a new normal for population levels in the area.

Walleye Movements

Fisheries staff have increased the use of tagging to determine walleye movements on certain waterbodies. We are also collaborating with researchers from the University of Regina who are using a combination of T-bar tags and acoustic telemetry to monitor fish movements. Research is ongoing and providing some interesting results.

South Dakota – Mark Fincel

2019 Northeast South Dakota (B. Blackwell)

15-inch minimum length limit

In 2019, the 15-inch minimum length limit was removed from Richmond, Elm, Enemy Swim, Pickerel, Clear and Roy lakes. Recent sampling was not able to determine whether or not the minimum length limits on these waters were benefiting the fisheries. Because of this, it was decided that the minimum length limits should be removed. Removal of walleye minimum length limits has been a recent trend across eastern South Dakota. Lakes that continue to have a 15-inch walleye minimum length limit in northeast South Dakota are Lynn Lake, Middle Lynn Lake, and Opitz Lake. These three lakes also have a reduced daily limit of two walleyes. Fisheries staff will continue to evaluate the remaining walleye minimum length limits, as part of ongoing walleye population evaluations.

1 over 28 inches

Horseshoe Lake in Day County was added to the lakes that allow for the harvest of only one walleye ≥28 inches in 2019. This regulation has been successful at creating high angler catch rates for large walleyes at Reetz and Twin (Minnehaha County) lakes in eastern South Dakota.

Saugeye stocking

Elm Lake (Brown County, 480 hectare), Richmond Lake (Brown County; 333 hectare) and Mina Lake (Edmunds County, 326 hectare) are impoundments located in northeast South Dakota. Saugeyes were stocked into Mina Lake and Richmond Lake from 1992 – 1998 and into Elm Lake from 1991 - 2000. Sander spp. relative abundance was considered moderate to high in the years that followed the saugeye stockings (Figure 1). Shortly after the termination of saugeye stockings, Sander spp. relative abundance substantially declined and remained low in all three reservoirs. The low relative abundance corresponds to a period of walleye stockings. Walleyes were stocked into Mina Lake and Richmond Lake from 1999 - 2015 and Elm Lake from 2001 - 2015. Recently (i.e., 2016) saugeye stockings were reinstated and were completed in all three reservoirs in 2016, 2017 and 2018. Fall electrofishing for age-0 Sander spp. has indicated the potential presence of strong year classes following the reestablishment of saugeye stockings (Table 1). Plans are to continue to stock saugeyes and evaluate year class contribution to gill net CPUE once recruited.

Table 1. Age-0 fall nighttime electrofishing catch per unit effort (CPUE; number per hour) of Sander spp. from Elm Lake, Richmond Lake and Mina Lake, South Dakota for 2016 – 2018.

	Age-0 electrofishing CPUE		
Lake	2016	2017	2018
Elm	89.5	109.5	112.0
Richmond	10.5[a]	36.0	109.0
Mina	77.6	133.5	74.0

[a] Sampling occurred before fall stocking of large fingerlings; all other stockings were small fingerlings and occurred in summer.

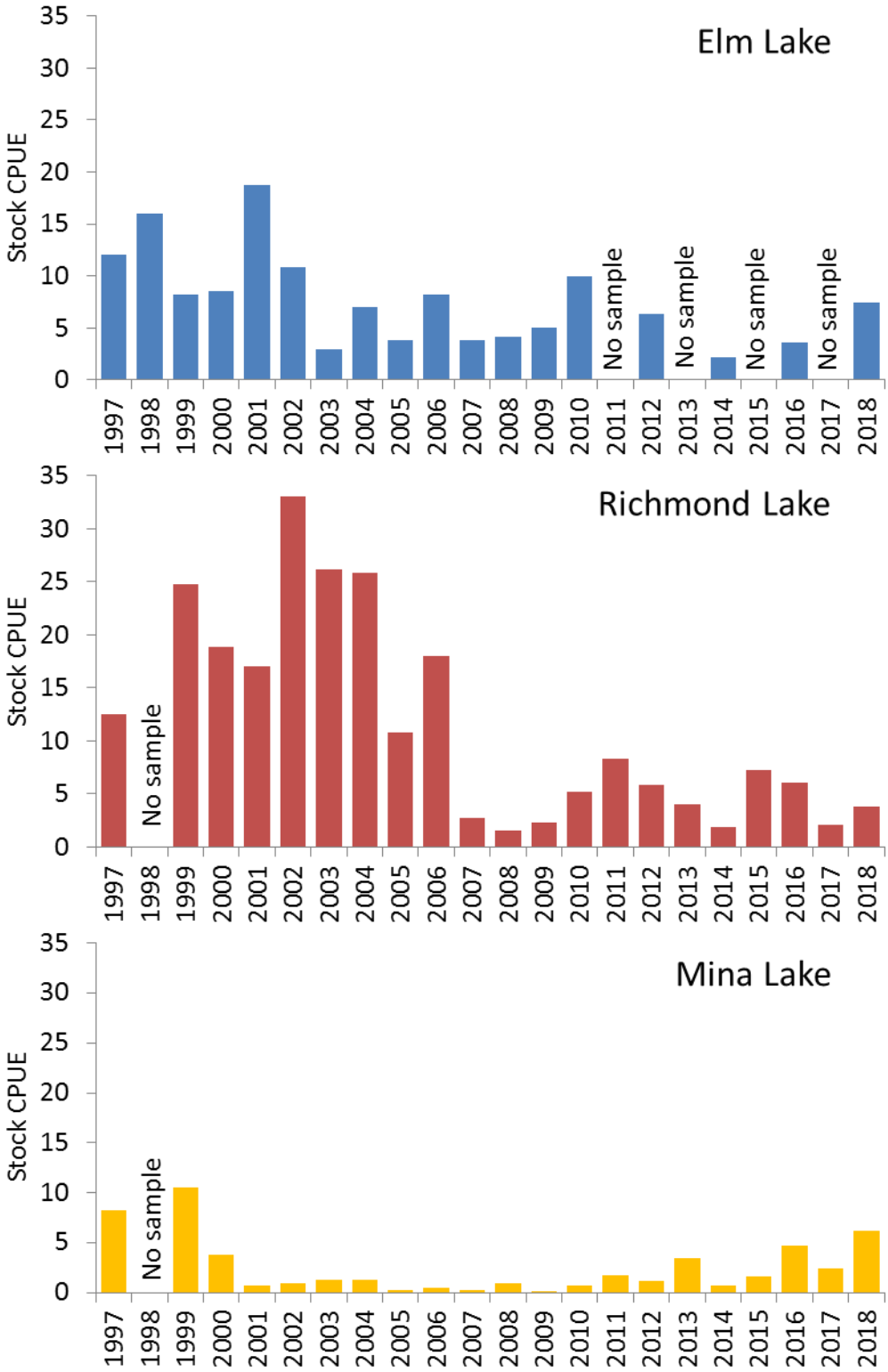


Figure 1. Mean gill net catch per unit effort (CPUE; number per overnight net) of stock-length (≥250 mm TL) Sander spp. from Elm Lake, Richmond Lake and Mina Lake, South Dakota in 1997 – 2018.

2019 Southeast South Dakota (T. StSauver)

- Mild winters resulting in less winterkill have allowed the development of some excellent walleye fishing in marginal lakes.
- Small fingerling saugeye stockings are producing some promising results but evaluation is ongoing.
- A new study to evaluate the stocking of various life stages of yellow perch is in the planning phase.

- Another study to evaluate artificial habitat attached to docks as spawning structures for yellow perch is also being considered.

2019 Upper Missouri River South Dakota (M. Fincel)

Lake Sharpe Walleye Tagging

SDGFP along with South Dakota State University completed the second year of a 5 year tagging study of Walleye in Lake Sharpe, a Missouri River reservoir in central South Dakota. Approximately 4,000 Walleye were jaw tagged in the spring with a mix of standard and reward tags (to assess non-reporting). Goals for the study are to estimate dynamic rate functions, determine exploitation, and model various regulations on the population. So far, estimated corrected exploitation for the population has been between 10-15% so generally a minimally exploited fishery. Tagging will continue on the population through 2021 and regulation modeling to commence thereafter.

Lake Sharpe Walleye Telemetry

SDGFP along with South Dakota State University implanted 28 Walleye this spring (15 from the upper zone and 13 from the lower zone) with acoustic transmitters in Lake Sharpe, South Dakota. We then used 24 passive receivers to track Walleye movements throughout the summer and fall. Generally, fish moved around quite a bit but tended to spend considerable time in the central part of the reservoir – around DeGrey and Cedar Creek (essentially the transition zone). These tags will be active for two years so we should be able to see over winter movements/lake-zone use, indications of natality, as well as another year of fish movement. Another suite of fish will be implanted with acoustic tags in 2019 and 2020.

Walleye Stocking on Lake Oahe

In 2017, 480,000 small Walleye fingerlings were stocked in select bays (n=5) of lower Lake Oahe. In 2018, 2.2 million small Walleye fingerlings were stocked in select bays (n=12) of lower Lake Oahe. All fish were OTC marked and fall surveys suggest contribution to the population in their first year. However, no evaluation of survival through their first winter has been assessed. As these fish recruit to standard surveys (AFS gillnets; roughly age-2), effectiveness of these Walleye stockings will be documented. Currently, select bays of lower Lake Oahe (n=2) are expected to receive 360,000 small Walleye fingerlings stockings in 2019.

Lake Oahe Smallmouth Bass Diets (Age-0 Walleye consumption)

In the summer of 2019, SDGFP along with Iowa State University will begin a study examining the diets of Smallmouth Bass on lower Lake Oahe, South Dakota. In particular, researchers are interested in quantifying consumption of naturally produced and stocked age-0 Walleye. Smallmouth Bass will be collected before and after Walleye stockings throughout the summer months (May-October). Smallmouth Bass will also be tagged to derive local population estimates with hopes of estimating total Walleye consumption in the areas that they are stocked.

Figure 1. Movement patterns of 15 Walleye tagged in Upper Lake Sharpe during the summer of 2018. Y-axis reflects reservoirs locations upstream (Divers Point) to downstream (Iron Nations) and the X-axis represents time throughout the summer of 2018. Each line represents an individual Walleye tagged in Lake Sharpe.

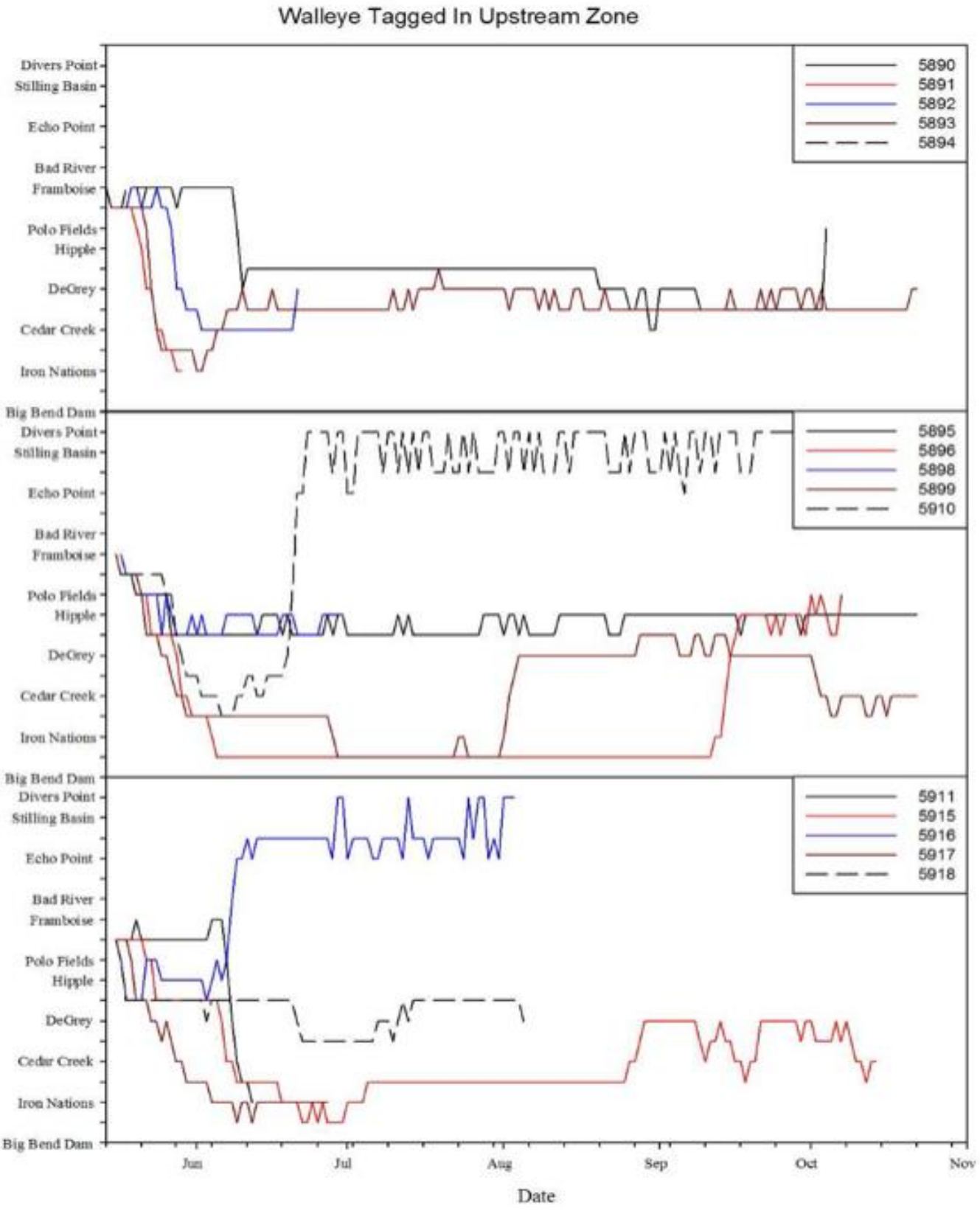
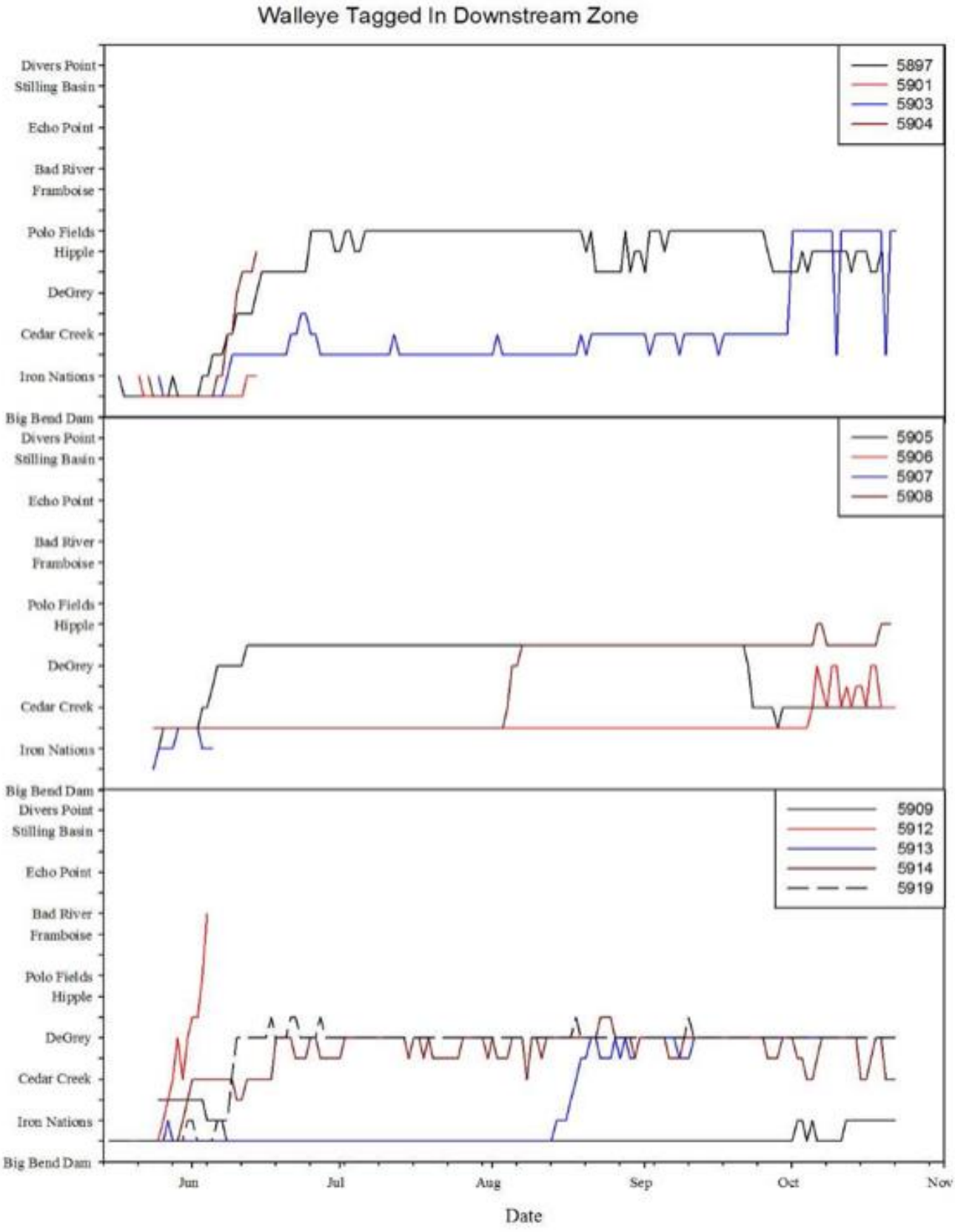


Figure 2. Movement patterns of 13 Walleye tagged in Lower Lake Sharpe during the summer of 2018. Y-axis reflects reservoirs locations upstream (Divers Point) to downstream (Iron Nations) and the X-axis represents time throughout the summer of 2018. Each line represents an individual Walleye tagged in Lake Sharpe.



2019 Lower Missouri River South Dakota (C. Longhenry)

In 2018, SDGFP and NEGPC stocked ~800,000 otc marked walleye fingerling in Lewis and Clark Reservoir. Due to higher than average flows and concerns about possible entrainment, stocking locations were adjusted upstream into the delta area and below the dam upstream. Preliminary results indicate stocking contribution was 20% of the sampled fish in the lake however contribution was higher in upstream areas indicating overall contribution may increase over time as stocked fish move downstream into the lake.

2019 Western South Dakota

No Report