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**AFS Officer Candidate Biography**

***President-elect:***

**Steven R. Chipps**

Steve Chipps serves as the Unit Leader of the USGS, South Dakota Cooperative Fish and Wildlife Research Unit at South Dakota State University. Prior to arriving in South Dakota, Steve worked as a Postdoctoral Fellow (1997-1999) with the Illinois Natural History Survey’s Center for Aquatic Ecology at the University of Illinois. He received his B.S in Zoology from Davis and Elkins College (1990), M.S. in Fisheries Science from West Virginia University (1992), and a Ph.D. in Forestry, Wildlife and Range Sciences from the University of Idaho (1997). Steve has been an active member of the American Fisheries Society for 25 years and the Dakota Chapter AFS for 17 years. He has served as Secretary-Treasurer (2005-2007) and President of the Education Section (2009-2011) of the American Fisheries Society and has chaired the Continuing Education Committees for the Dakota Chapter (2004-2015) and the North Central Division of AFS (2005-2006). He also served as chair of the Education Section’s *John E. Skinner Memorial Scholarship Award* (2003-2005) and presently serves as a Science Editor for *Fisheries magazine*. In 2012, Steve was honored to receive the Dakota Chapter’s *Robert L. Hanten Distinguished Professional Service Award*. In Steve’s view, the Dakota Chapter AFS is an important, professional ‘home’ to all of us because it provides a forum for communication, networking, and recognition of hard work – as well as the comradery for fisheries science that we all share. If elected to serve as your next President, Steve would work to continue the long-standing tradition of excellence that the Dakota Chapter brings to our members and to the mission of the American Fisheries Society.

***Vice President:***

**Dave Fryda**

Greetings Dakota Chapter members. I’d like to throw my name in the hat for the Vice President of Dakota Chapter for the coming year. I was born and raised a river rat on the banks of the Missouri River in Springfield South Dakota. Well past 4 decades later not much has changed other than I’m a little farther upstream. I received my B.S. from SDSU in 1994 and M.S. in 2000. In those early years I worked a number of seasonal jobs for SDGFP and the SDSU COOP Unit primarily on Missouri River System fisheries. I did a year stint for Idaho Fish and Game working with white sturgeon before I came to my senses and moved back to the Dakota’s and pheasants. I started as a District Fisheries Biologist for ND Game and Fish in Riverdale in 2000 and was in that position for 7 years. For the last 9 years I’ve been the Missouri River System Supervisor for NDGF still stationed in Riverdale. I’ve previously served the Dakota Chapter on the Environmental Concerns Committee and as Vice President sometime in the early 2000’s. And last but not least I am a proud survivor of the great Spearfish Dakota Chapter AFS salmonella scare. I’ve enjoyed the Dakota Chapter throughout my career and look forward to serving the chapter again if I’m elected.

***Secretary/Treasurer:***

**Michael L. Johnson**

My name is Mike Johnson and I am putting my name in the hat for the office of Secretary/Treasurer for the AFS Dakota Chapter. I grew up in North Dakota and I enjoy spending a great deal of time outdoors recreating and exploring. This interest in the natural world is ultimately what led me to pursue a career in fisheries management. I graduated from North Dakota State University in 2011 with a B.S. in Fisheries and Wildlife Management. I was lucky to get seasonal work my first summer with the North Dakota Game and Fish Department in Williston. This initial foot in the door led to several years of seasonal employment with the department in Williston and Jamestown thus, giving me experience in all varieties of landscapes and waters our state has to offer. Most recently (about a year to be exact), I was quite fortunate to land a permanent career as a Fisheries Biologist with the department in our Jamestown location. I am really enjoying my job and looking for opportunities to improve and reach out with other fisheries professionals. It would be an honor to hold this position for the chapter and to meet/integrate with you all. Thanks.

**Dakota Chapter of the AFS 2016 Meeting Program**

**Monday, February 1st**

12:00 – 6:00 Registration Open

2:00 – 4:30 Continuing Education Course

*“Is graduate school for you? A guide for both students and professionals”*

5:00 – 6:00 Dakota Chapter ExCom Meeting

6:00 Welcome Social Begins

7:00 – 9:00 Oahe Tagging Project Update

**Tuesday, February 2nd**

6:30 – 8:00 Registration Reopen

6:30 – 8:00 Poster Set-up

6:30 – 8:00 Breakfast

8:00 Welcome and Opening Remarks – Greg Simpson, Dakota Chapter President

8:10 Tom Lang

*Plenary Speaker*

9:20 – 9:40 Snack Break

Paper Session: Fish Presence & Response

Moderator: Greg Simpson

9:40 *Presence of Zebra Mussels in the Red River of North Dakota.* **A.W. DeLorme**\*\*\* and L.M. Wieland

10:00 *Effects of Catch and Release Regulations on Brown Trout (Salmo trutta) Populations in Rapid Creek, South Dakota*. **Seth Fopma**\*\*, Dalton Delong, Louis Eastwood, Jenna Haag, Chance Kirkeeng, Andrew Kruse, Chuck Mordhorst, Collin Sherlock, and Brian Graeb

10:20 *Short Term Response of Brown Trout to Habitat Manipulation.* **Austin Galinat**\*\*\*

10:40 *Analysis of Brown Trout (Salmo trutta) Predation on Mountain Suckers (Pantosteus jordani) in Black Hills Streams.* **Garrett Rowles**\*, Jake Davis, Katie Bertrand, and Seth Fopma

11:00 – 11:10 Snack Break

Paper Session: Miscellaneous Hatchery

Moderator: Mike Barnes

11:10 *Evaluation of Stable Isotope Analysis and Otolith Microchemistry for the Classification of Wild and Hatchery Origins and Natal Stream Origins of Rainbow Trout in the Deerfield Reservoir System, South Dakota.* **Jeremy L. Kientz**\*\*\*, Steven R. Chipps, and Jacob L. Davis

11:30 *Airborne Formaldehyde Levels during Simulated Formalin Treatments in Vertical-Flow Incubators at a Production Fish Hatchery.* **Jill M. Voorhees**\*\*\* and Michael E. Barnes

11:50 *Reproductive Performance of Landlocked Fall Chinook Salmon from Lake Oahe, South Dakota.* **Kelsen Young**\*, Patrick Nero, Eric Krebs, and Michael E. Barnes

12:10 – 1:10 Lunch Break

Paper Session: Hatchery Rearing

Moderator: Mike Barnes

1:10 *Initial Investigations of Cloves and a Clove Oil Component as Water Mold Inhibitors.* **Sierra Hauff**\* and Michael E. Barnes

1:30 *Full and Partial Overhead Tank Covers Improves Trout Rearing Performance.* **Eric Krebs**\*\*\*, Patrick Nero, Jeremy Kientz, Lily M. Walker, Timothy M. Parker, and Michael E. Barnes

1:50 *Environmental Enrichment Affects the Performance of Rainbow Trout Reared at Two Velocities in Circular Tanks.* **Jeremy L. Kientz**\*\*\* and Michael E. Barnes

2:10 – 2:20 Break

2:20 *Petri Dish Incubations of Landlocked Fall Chinook Salmon Eggs.* **Hannah Neumiller**\*, **Gretchen Blain**\*, and Michael E. Barnes

2:40 *A Comparison of Three Feeding Techniques during Raceway Rearing of Domesticated Rainbow Trout.* **Patrick Nero**\*\*\*, Emily P. Trappe, and Michael E. Barnes

3:00 *Acoustic Transmitters Impact Rainbow Trout Growth in Competitive Environment.* **Tanner J. Urbaniak**\*, Michael E. Barnes, and Jacob L. Davis

3:20 – 3:40 Snack Break

3:40 – 4:45 Business Meeting

5:30 – 6:30 Poster Social

6:30 – 10:00 Dinner Banquet and Awards

**Wednesday, February 3rd**

6:30 – 8:00 Breakfast

8:00 Opening Remarks

Paper Session: Fish Movement

Moderator: Jake Davis

8:10 *Should I Stay or Should I Go Now: the Impacts of Stocking Rainbow Trout in an Open System.* **Robert Hanten**\*\*\*, Hilary Meyer, and Mark Fincel

8:30 *Vertical Swimming Behavior of Immediately-hatched Pallid Sturgeon: Implications for Downstream Drift Distance.* **Daniel A. James**\*\*\*, Jeffrey Powell, Landon L. Pierce, and Dane A. Shuman

8:50 *Small Stream Fish Ladders for Drop Culverts.* **John Lorenzen**\*\*, Brian Graeb, Chelsey Pasbrig, and Katie Bertrand

9:10 – 9:30 Snack Break, *Poster tear down*

9:30 *Fast Food: Movement of Gizzard Shad in Lake Sharpe, South Dakota.* **Hilary Meyer**\*\*\*, Robert Hanten, and Mark Fincel

9:50 *Emigration of Hatchery-reared Pallid Sturgeon through Gavins Point Dam: Implications for Management and Recovery.* **Landon L. Pierce**\*\*\*, Daniel A. James, Dane A. Shuman, Kirk D. Steffensen, Ryan Wilson, Kyle R. Winders, and Patricia Herman

10:10 *General Movement, Location, and Emigration of Stocked Juvenile and Adult Paddlefish in Lake Sharpe, South Dakota.* **William Stacy**\*\*\*, Kristen Grohs, Daniel James, Landon Pierce, Dane Shuman, and Hilary Meyer

10:30 – 10:40 Break

Paper Session: Water Condition

Moderator: John Carreiro

10:40 *Population Dynamics of Bluegill in Pactola Reservoir.* **Chuck Mordhorst**\*

11:00 *The Condition of North Dakota’s Lakes: An Evaluation Using Data from the 2012 National Lake Assessment.* **Joseph Nett**\*\*\*

11:20 *Spatial Distribution of Habitat Association of Five Species in Lake McConaughy, NE.* **Benjamin J. Schall**\*\*, Casey W. Schoenbeck, and Keith D. Koupal

11:40 *Aquatic Endangered Species and Water Quality in South Dakota.* **Matthew S. Schwarz**\*\*\*

12:00 *Sources of Unauthorized Introductions within the Black Hills of South Dakota.* **Jacob L. Davis**\*\*\*, Scott A. Carleton, and Steven R. Chipps

12:20 – 12:30 Break

12:30 – 12:40 Best Paper/Poster Awards

Adjourn

**List of Posters**

*Freshwater Fish Species Diversity and Size in a Canal System in Guanacaste Region, Costa Rica.* **Saul Bobtail Bear**\*

*Dual Residency, Fish of the Montana-North Dakota Border.* **Caleb Bollman**\*\*\* and **Matt Rugg**\*\*\*

*Temporal and Spatial Response Patterns of Ichthyoplankton to Highly Variable Eastern South Dakota Rivers.* **Crystal Garcia**\*\*\*, David A. Schumann, Jessica Howell, Brian Graeb, and Katie N. Bertrand

*Effective Range of Acoustic Transmitters at Priority Locations within Lake Sharpe.* **Robert Hanten**\*\*\* and Mike Greiner

*An Assessment of Superglue for Suturing Surgical Implications of Passive Integrated Transponders (PIT) Tags of Small-bodied Fishes.* **Joshua Hoekwater**\*\*\*, David A. Schumann, and Katie A. Bertrand

*North Dakota’s 2015 Ecoregion Reference Network Biological Monitoring Summary.* **Aaron Larsen**\*\*\*

*Survival of Gizzard Shad after Dummy Transmitter Implantation.* **Hilary Meyer**\*\*\*, Robert Hanten, Mark Fincel, and Jacob L. Davis

*Using Data from the 2012 National Lakes Assessment to Describe the Biological Condition of North Dakota’s Lakes.* **Joseph Nett**\*\*\*

*Feasibility of Oxytetracycline Marking Juvenile White Bass: Mortality and Mark Visibility.* Matthew A. Perrion, **Benjamin J. Schall**\*\*, Casey W. Schoenebeck, Keith D. Koupal, and Bryan Sweet

**Paper Abstracts**

Fish Presence & Response Session:

Presence of Zebra Mussels in the Red River of North Dakota

**A.W. DeLorme**\*\*\* and L.M. Wieland

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As in past years we sampled a variety of waters in eastern North Dakota for Zebra Mussel veligers (ZMV) and adults. We sampled 6 sites on the Red River on June 23 and 24. In July we sampled an additional 22 sites on a variety of water bodies. Sampling included using plankton nets to sample for the veliger larvae and examination of hard structures for adults and juveniles. Plankton samples collected were shipped to the Dreissenid Veliger Lab of the Montana Fish, Wildlife, and Parks Department for identification. All six samples from the Red River came back positive for veligers. This is the first time ZMV have been recorded anywhere in North Dakota other than the Red River at Wahpeton. The other non-Red River sites sampled in North Dakota were negative for ZMV. All Red River sites had much higher numbers than had ever been reported in the Red River at Wahpeton, the only site that had previously tested positive for zebra mussel veligers in the state of North Dakota. On July 9th the City of Fargo water treatment plant reported that they had pulled one of their screens and found an adult Zebra mussel. Since that time there has been at least one other report of Zebra mussels adults in the Red River at Grand Forks. Zebra mussel adults and larvae are currently present in the Red River. The details and ramifications of this invasion will be discussed.

Effects of Catch and Release Regulations on Brown Trout (*Salmo trutta*)

Populations in Rapid Creek, South Dakota

**Seth Fopma**\*\*\*, Dalton Delong, Louis Eastwood, Jenna Haag, Chance Kirkeeng, Andrew Kruse, Chuck Mordhorst, Collin Sherlock, and Brian Graeb

South Dakota State University

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Catch and release regulations haves been utilized by managers for over a century to aid in the production of quality fisheries. Implemented biologically as a way to protect key species and bolster population density, catch and release regulations have also been enacted due to a variety of social pressures. Enacted in 2006, the section of Rapid Creek enclosed within the boundaries of the Meadowbrook Golf course is one of three catch and release regulation areas in the Black Hills of South Dakota. While the social impacts of the regulation have been examined its biological relevance has not been well documented. Standard sampling, conducted by South Dakota’s Department of Game Fish and Parks, indicated increased brown trout (*salmo trutta*) density within the catch and release area. We compared population dynamics between two sections. Brown trout were collected fall 2015 from Rapid creek within city limits. We collected 102 trout from the catch and release regulation area and 129 from reaches under statewide regulations (5 trout/day, one 15+”inches) during fall 2015. Otoliths were extracted, prepared and aged to estimate growth, mortality, and recruitment patterns in the two study reaches. Results indicate insignificant differences in population dynamics between the two regulation areas. The results of this study will be used to inform managers on potential adaptive management actions.

Short Term Response of Brown Trout to Habitat Manipulation

**Austin Galinat**\*\*\*

In the early 2000’s, declines in the fishery in Rapid Creek below Pactola Reservoir, Black Hills, South Dakota, caused concern for anglers and fisheries managers. Previous research indicated that available habitat was limited and was a potential driver in the decline. Additionally, predation by terrestrial mammals was also identified as potentially being a substantial contributor to natural mortality. In an attempt to mitigate these problems, an approximately 2 km stretch of stream is undergoing habitat manipulation. Evaluations are occurring to study the long-term effects of the project; while the short-term effects on the fishery are presently being identified. As this is a high profile fishery, understanding the response by the resident fish population to this work will be an essential part of planning future in-stream habitat work as well as providing useful information for interactions with the public. As a result, the objectives of this study are to evaluate the short-term movements of resident brown trout during and after the habitat manipulation. More specifically, we aim to quantify displacement, if it occurs, as well as habitat selection following completion of the project. Twenty fish were implanted with radio transmitters, 15 within the section of stream undergoing habitat manipulation and five outside. Fish are tracked three times a week for a period of 150 days. Fish movement will be measured as number of movements, as well as gross, total and net movement. Additionally, habitat selection following completion will be evaluated by determining distance from tagging location to final location, if applicable. The results of this study will be essential in understanding the impact on the fishery while planning future in-stream habitat work and will provide insight into the extent of terrestrial predation.

Analysis of Brown Trout (*Salmo trutta*­­) Predation on

Mountain Suckers (*Pantosteus jordani*) in Black Hills Streams

**Garrett Rowles\***, Jake Davis, Katie Bertrand, and Seth Fopma

South Dakota State University

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Brown Trout (*Salmo trutta)* were introduced into Black Hills streams in the 1930’s to provide increased angler opportunities and satisfaction. Brown Trout undergo an ontogenetic diet shift early in life switching from a primarily insectivorous feeding strategy to piscivory. Piscivorous trout often live longer and exhibit increased growth rates when compared to trout with primarily insectivorous diets. Piscivory has been shown to contribute up to 75 percent of total diet weight in adults. Introduced non-native fish can have detrimental effects on native fish populations. Mountain Sucker (*Pantosteus jordani)*, a species of conservation concern in South Dakota, is a fish that may be subjected to additive mortality due to Brown Trout co-occurrence and piscivory. Fish were sampled during August and October of 2015 in six stream reaches across the Black Hills reflecting differing densities of Brown Trout and Mountain Suckers. All fish were collected, weighed, and measured (TL) before release. We performed gastric lavage on Brown Trout greater than 200 mm (TL) to examine diet, and all trout were tagged with a 12 mm half-duplex PIT tag prior to release. Diets were preserved with formalin, and after returning to the laboratory, diet items were sorted and identified. Prey fish frequency in diets will be compared to with item abundance in stream reach to evaluate patterns in prey use and potential gape limitations. This information will be used to inform stocking and restoration practices in the Black Hills.

Miscellaneous Hatchery Session:

Evaluation of Stable Isotope Analysis and Otolith Microchemistry for the Classification of Wild and Hatchery Origins and Natal Stream Origins of Rainbow Trout in the

Deerfield Reservoir System, South Dakota

**Jeremy L. Kientz1\*\*\***, Steven R. Chipps2, and Jacob L. Davis3

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South Dakota Department of Game, Fish and Parks

4130 Adventure Trail

Rapid City, South Dakota 57702

Natural reproduction by Rainbow Trout is rare in the Black Hills of South Dakota, however a naturalized population occurs in Deerfield Reservoir and its upstream tributaries, South Fork Castle Creek and Castle Creek. Hatchery-reared Rainbow Trout, which have been inconsistently marked with fin clips due to labor constraints, are also stocked into Deerfield Reservoir. Thus research into new methods for classification of wild and hatchery Rainbow Trout is needed. In addition, questions remain regarding the contribution of wild fish to the overall reservoir fishery and the contribution of unique tributary streams. We collected wild (no clip), and hatchery fish that had been in the reservoir for 2 months (pelvic fin clip) and over 1 year (adipose fin clip). We then used stable isotope analysis in order to distinguish wild and hatchery origin Rainbow Trout using δ13C and δ15N signatures in muscle and fin tissue, and otolith microchemistry to investigate the contribution of natal streams to wild Rainbow Trout production using barium (Ba137) and strontium (Sr88) concentrations. Using k-nearest neighbor analysis, over 90% of wild Rainbow Trout were correctly classified using isotopes from both muscle and fin tissue. Out of 9 wild individuals collected in Deerfield Reservoir, 4 were classified to South Fork Castle Creek and 5 were classified to Castle Creek, indicating similar contribution from both tributaries. Our results indicate that stable isotope analysis can be used

Airborne Formaldehyde Levels during Simulated Formalin Treatments

in Vertical-Flow Incubators at a Production Fish Hatchery

**Jill M. Voorhees1**\*\*\*and Michael E. Barnes2

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Formalin, an aqueous solution of formaldehyde and methanol, is widely used in aquaculture facilities to treat water molds during egg incubation. Given the carcinogenic properties of formaldehyde, an understanding of occupational exposure by aquaculture workers is essential. The study evaluated formaldehyde levels in an incubation room, at a production fish hatchery, during six different formalin treatment scenarios: one, three, or five vertical flow incubations stacks, each receiving 1,667 mg/L formalin treatments for 15 minutes with the incubation room door either open or closed. The results indicate that the level of formaldehyde being aerosolized increased as the number of stacks treated increased and that the Occupational Safety and Health Administration limits of 2.0 ppm for formaldehyde short-term exposure were attained during the treatment scenarios. However, keeping the door open during formalin treatment resulted in lower aerosolized formalin levels and a reduction in the time required to return to basal levels. Based on these results, it is imperative that workers are not present during formalin treatment; if it is unavoidable the use of appropriate safety equipment needs to be required.

Reproductive Performance of Landlocked Fall Chinook Salmon

from Lake Oahe, South Dakota

**Kelsen Young**\***,** Patrick Nero, Eric Krebs, and Michael E. Barnes

South Dakota Department of Game, Fish and Parks

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Landlocked fall Chinook Salmon (*Oncorhlynchus tshawytscha)* from Lake Oahe, South Dakota exhibit relatively unique reproductive characteristics, particularly when compared to fish in their native range. This study documents spawning female length, fecundity, egg size, and egg survival in 1988, 1998-2006, 2008, and 2015. At a mean of 722 mm, spawning female Oahe salmon lengths were similar to ocean-run fish, and ranged from 584 mm in 1988 to 914 mm in 2015. Fecundity was at the low end of the range reported for other populations, averaging 3,090 eggs for the 12 years studied. Egg sizes from Lake Oahe salmon were the smallest reported for any population, except for the eggs collected in the fall of 2015. Percent survival to the eyed-egg stage was also the lowest of any population in their native range, averaging 32.4%. Egg survival ranged from 0 to 100%, with a mean survival in 1999 of 63.7% survival. Significant correlations were observed between female length, weight, condition factor and egg size and fecundity. Percent survival was not correlated to female length, fecundity, or eggs size. While reproductive characteristics vary from year-to-year, this information, particularly on fecundity and egg survival, should assist in the determination of the number of females to be spawned to reach hatchery production needs as determined by fisheries management restocking requests.

Hatchery Rearing Session:

Initial Investigations of Cloves and a Clove Oil Component as Water Mold Inhibitors

**Sierra Hauff**\*and Michael E. Barnes

South Dakota Department of Game, Fish and Parks

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A need exists for less-problematic chemical control of fungal (water mold) infestations on fish eggs during hatchery incubation. This study examined the antifungal properties of cloves (*Syzygium aromaticum)* and eugenol, the main active ingredient in clove oil. In the first experiment, ground cloves significantly affected the timing of water mold infestation on sesame seeds subjected to fungal spores during static incubation in Petri dishes. Visible fungal growth was observed beginning at 48 hours in control dishes, while growth was not observed in any of the dishes containing ground cloves for the duration of the study. A second experiment used nonviable Chinook salmon (*Oncorhynchus tshawytacha)* eggs to compare bath and dip 1% eugenol treatments, with or without ethanol acting as an aqueous mixing agent. There was a significant difference in the timing of fungal growth on the eggs among the treatments. After 288 hours all of the control dishes contained fungal growth. Fungal growth was only observed in one of dishes subjected to a eugenol bath treatment, while the other two replicates were void of any fungal growth during the 504 hour trial. One dish also exhibited fungal growth in the eugenol dip treatment at 384 hours. None of the dishes receiving the eugenol and ethanol bath, or the eugenol and ethanol dip, exhibited any fungal growth. These initial experiments indicate that clove oil, and the eugenol it contains, may have utility during hatchery operations as anti-fungal agents.

Full and Partial Overhead Tank Covers Improves Trout Rearing Performance

**Eric Krebs**\*\*\*, Patrick Nero, Jeremy Kientz, Lily M. Walker,

Timothy M. Parker, and Michael E. Barnes

South Dakota Department of Game, Fish and Parks

McNenny State Fish Hatchery

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Environmental enrichment during hatchery productions can be an important tool to improve production efficiency and fish condition. This study examined the effects of different overhead tank cover regimes during Rainbow Trout (*Onchorynchus mykiss)* and Brown Trout (*Salmo trutta)* rearing. Three different overhead cover treatments were applied to circular tanks: near-full (98%) cover, partial (65%) cover, and no cover. Fish growth and feed conversion ratio were significantly improved in tanks with either partial covers or near-full covers in comparison to no covers. There were no significant differences in condition factor, visceral somatic index, hepatosomatic index, nor hematocrit values in fish reared under any of the cover treatments. These results indicate that either partial or near-full covers should be used for optimum hatchery production, with full covers providing the additional benefit of preventing fish from jumping out of the tanks.

Environmental Enrichment Affects the Performance of Rainbow Trout

Reared at Two Velocities in Circular Tanks

**Jeremy L. Kientz**\*\*\* and Michael E. Barnes

South Dakota Department of Game, Fish and Parks

McNenny State Fish Hatchery

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While environmental enrichment has been used extensively during hatchery rearing in an attempt to improve post-stocking survival, its potential impacts on routine fish culture practices have largely been ignored. This study examines a novel environmental enrichment technique designed to have negligible effect on regular tank cleaning and other culture activities. The rearing performance of juvenile Rainbow Trout Oncorhynchus mykiss was evaluated in near-fully-covered circular tanks enriched by the addition of vertically-oriented aluminum rods using two water velocities (2.0 BL/s and 2.75 BL/s). After 51 days, total tank weight gains were significantly higher, and feed conversion ratios significantly lower, in environmentally-enriched tanks compared to control (non-enriched) tanks, regardless of water velocity. There were no significant differences in hepatosomatic index, splenosomatic index, and viscerosomatic index between the environmentally-enriched and control tanks. Weight gain was significantly higher and feed conversion ratios significantly lower in the tanks of trout reared at the lower water velocity. These results demonstrate that vertically-oriented aluminum rods are an environmental enrichment treatment that improves fish growth and feed conversion in circular rearing tanks, with minimal impacts on typical fish culture activities.

Petri Dish Incubation of Landlocked Fall Chinook Salmon Eggs

**Hannah Neumiller**\*, **Gretchen Blain**\*, and Michael E. Barnes

South Dakota Department of Game, Fish and Parks

McNenny State Fish Hatchery

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Spearfish, South Dakota 57783

Eggs from landlocked fall Chinook salmon (*Oncorhynchus tshawytscha*) from Lake Oahe, South Dakota, typically experience poor survival during hatchery incubation. Experimentation to improve egg survival using production incubators could endanger thousands of eggs, making the need for small-scale incubation techniques imperative. This study evaluated the incubation of salmon eggs in Petri dishes in household refrigeration units during two experiments. In the first experiment at 9°C, each dish held 10 eggs. Three water change intervals were used prior to the eyed stage: every day, every three days, and every seven days. After egg eye-up, water changes occurred either every day or every three days, creating a total of six water change treatments. Water change treatments were the same in the second experiment, but each dish held 15 eggs and the water temperature was 11°C. In both experiments, no significant differences were observed in survival to the eyed-egg stage, or hatch among the treatments. In the first experiment, mean (SE) egg eye-up and hatch were 61.3% (3.1) and 52.3% respectively, with similar values [56.0% (2.6), 46.2% (2.3)] in the second experiment. The start of hatching was nearly 55 incubation days in the first experiment and at 46 days in the second experiment. The results from this study indicate that up to 15 Lake Oahe salmon eggs can be placed in Petri dishes with water changes of every seven days prior to eye-up and every three days from eye-up to hatch, thereby making this a viable and relatively easy technique for future experimentation.

A Comparison of Three Feeding Techniques during Raceway Rearing

of Domesticated Rainbow Trout

**Patrick Nero**\*\*\*, Emily P. Trappe, and Michael E. Barnes

South Dakota Department of Game, Fish and Parks

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Three feeding techniques were evaluated during the rearing of domesticated rainbow trout for 164 days in production raceways. Eight-hour continuous feeding belt feeders, once-a-day hand feeding, and demand feeders were used to dispense feed at a projected growth rate of 0.060 cm/day, approximately 75% of satiation feeding-levels. Rainbow trout started the trial at 140 mm total length, and nearly doubled in length after 164 days. At the end of the experiment, there were no significant differences in total raceway weight gain, food conversion ratio, individual fish length, individual fish weight, fin condition, or survival among the three feeding techniques. Once-a-day hand feeding is recommended for juvenile domesticated rainbow trout at less-than-satiation feeding levels to maximize the efficient use of hatchery labor.

Acoustic Transmitters Impact Rainbow Trout Growth in a Competitive Environment

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Fish implanted with acoustic transmitters are typically assumed to perform after stocking similar to untagged fish. In this study, three groups (tagged, sham, and control) of Rainbow Trout (*Oncorhynchus mykiss*) were maintained together in the same population for 90 days. The fish in the tagged group were anesthetized and had an inert transmitter inserted via a ventral incision, the sham group was anesthetized and had an incision without transmitter implantation, while the control group was anesthetized only. This procedure was repeated for three separate populations, each containing the three groups of fish. In each population, trout with the inert transmitters grew slower than fish from the other two groups throughout the experiment. However, the reduction in growth occurred primarily during the first 38 days post tagging, with tagged fish growing at similar rates to the other two groups for the final 52 days of the experiment. Mortality data indicated a survival threshold of 280 mm length in the tagged fish, with 100 % survival of the Rainbow Trout greater than 280 mm and only 59.1 % for trout less than 280 mm. Based on the results of this study, Rainbow Trout implanted with acoustic transmitters should be held prior to release for a minimum of 38 days to ensure survival and similar growth patterns as untagged conspecifics, and only trout with an initial length greater than 280 mm should be used for acoustic studies.

Fish Movement Session:

Should I stay or Should I Go Now: the impacts of stocking Rainbow Trout in an open system

**Robert Hanten**\*\*\*, Hilary Meyer, and Mark Fincel

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Since 1981, Rainbow Trout (*Onchorynchus mykiss*) have been stocked annually in Oahe Marina, an artificial backwater marina (<1 hectare) connected to Lake Sharpe in central South Dakota. These stockings are important to anglers, generating up to 16,000 angling hours annually with estimated exploitation up to 35%. However, raising Rainbow Trout to a size sought after by anglers is expensive. Thus, it is important to maximize angler returns. The objectives of this study were to 1) determine how long stocked Rainbow Trout are available to anglers in Oahe Marina, 2) determine if Rainbow Trout stock timing could be adjusted to maximize availability to anglers in Oahe Marina and 3.) investigate water temperature and discharge as variables that might explain why and when Rainbow Trout leave Oahe Marina. In 2015, 42 Rainbow Trout were surgically implanted with programmable ultrasonic telemetry tags (Vemco V9-1x and 2x tags; 414 and 378 day tag-life respectively; 9 mm; 69 kHz). In April, 20 implanted Rainbow Trout were stocked in Oahe Marina with 3,200 non-implanted fish (spring stocking). In September, 22 implanted Rainbow Trout were stocked in Oahe Marina with 1,600 non-implanted fish (fall stocking). For both spring and fall stockings, half the fish (both implanted and non-implanted) were stocked at two different time periods 1 week apart. Rainbow Trout movements were tracked and positions recorded using 12 passive receivers located within and outside Oahe Marina to continually monitor Rainbow Trout status. Preliminary results indicate Rainbow Trout stocked on April 1st and 8th remained within Oahe Marina an average of 13.0 and 8.3 days. Three known fate spring stock transmitter fish were harvested within 2 days of being stocked. From April 16th-19th, 12 of the remaining 17 Rainbow Trout exited Oahe Marina and eleven of these fish were found downstream of Oahe Marina. This was an interesting observation because this mass exodus included Rainbow Trout from both stocking time periods. After dispersal from Oahe Marina, the Bad River appeared to be a concentration location for Rainbow Trout. Rainbow Trout stocked on September 10th and 16th remained in Oahe Marina an average of 13.0 and 32.0 days, respectively. Further efforts will work to document downstream movement patterns of these fish. Preliminary results suggest Rainbow Trout stocked earlier in the spring and later in the fall result in higher availability of these fish to anglers. South Dakota Game, Fish and Parks will implant and stock an additional 40 trout (20 spring, 20 fall) in 2016. Movement of stocked Rainbow Trout will be monitored through 2017.

Vertical Swimming Behavior of Immediately-hatched Pallid Sturgeon:

Implications for Downstream Drift Distance

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Since closure of the six main-stem dams on the Missouri River, evidence of natural recruitment by the endangered Pallid Sturgeon (Scaphirhynchus albus) has not been observed. Following successful hatch, Pallid Sturgeon larvae are thought to drift hundreds of kilometers downriver as they develop into exogenously feeding larvae, however, dams reduce the available drift distance by fragmenting the river. It is unclear whether larvae enter the drift immediately after hatch or exhibit a delayed drift-entry, which could affect total drift distance. It also is unclear if larvae behavior is affected by reduced turbidity due to dams. We examined the movement behavior of Pallid Sturgeon by placing immediately-hatched larvae into vertical, 1-m tall, tubular microcosms. We recorded larvae location within each tank at random times over a 7-day period, replicated under four light treatments (i.e., turbidity simulations), to document initiation of upward swimming behavior to approximate active drift-entry. Vertical movement behavior of larvae among four light treatments (10, 30, 60, and 95% ambient light) did not differ. The majority (87%) of larvae was observed near the substrate through the third day. Most larvae were observed near the surface on the fourth day (62%) and increased on the fifth day (75%). By the sixth day, >96% of larvae were observed near the tank surface. This study suggests, in the absence of horizontal water flow, that most Pallid Sturgeon larvae actively enter the drift beginning on the fourth day after hatch and fully enter the drift by the sixth day after hatch.

Small Stream Fish Ladders for Drop Culverts

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Stream connectivity is important for fishes as it allows longitudinal migration within watersheds. Road crossings (i.e., steel culverts, box culverts, etc.) can block fishes from migrating upstream hindering their life cycle and ability to recolonize. Fish ladders designed to retrofit culverts and eliminate stream fragmentation, specifically for small stream fishes, do not exist. We tested fish ladders on culverts in 10 streams in the Black Hills and 9 streams in eastern South Dakota. Fish that ascended ladders were captured in funnel traps to estimate passage rate. Drop height, ladder slope, water velocity, depth, discharge, fish density below culvert, and plunge pool depth were measured at each site to evaluate if there were any variables driving passage. Overall, 1,213 fishes representing 23 species passed fish ladders throughout the summer with a mean passage rate ± SE in the Black Hills of 1.22 ± 0.38 fish/day and 28.05 ± 19.60 fish/day in Eastern SD. Among sites we found no relationship between passage rate and our independent variables though daily discharge influenced passage rate within some sites. Culverts retrofitted with passable fish ladders have the potential to reverse the negative effects of habitat fragmentation on lotic fishes.

Fast Food: Movement of Gizzard Shad in Lake Sharpe, South Dakota

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Gizzard Shad (*Dorosoma cepedianum*) are an important part of the food web in Lake Sharpe, South Dakota. Because of flooding on the Missouri River during 2011, the connection between Hipple Lake, a backwater habitat, and Lake Sharpe is at risk of silting in. South Dakota Game, Fish and Parks (SDGFP) biologists believe Hipple Lake is an important component in Gizzard Shad production and over-winter survival. However, SDGFP only has anecdotal evidence of Gizzard Shad use of Hipple Lake. The objectives of this study are to 1.) describe seasonal movements in and out of Hipple Lake 2.) describe winter habitat use and 3.) describe seasonal movements of adult Gizzard Shad in Lake Sharpe. To gain a better understanding of how Gizzard Shad use the available habitats within Lake Sharpe, we captured and implanted 40 adult shad with ultrasonic telemetry tags (Vemco V13 tag; 69 kHz, 13 mm, 1135 day tag-life). Twelve stationary receivers were deployed in Lake Sharpe to record movements/habitat use of tagged Gizzard Shad. Twenty Gizzard Shad were tagged in June of 2014, and twenty were tagged in June of 2015. We summarized one year of movement data from tagged Gizzard Shad. Nine tagged Gizzard Shad used Hipple Lake during the winter of 2014. Of these nine fish, three were originally tagged in Hipple Lake, three were tagged in Oahe Marina and three were tagged in Joe Creek. Gizzard shad began arriving in Hipple Lake as early as 11/11/14, and most fish remained in Hipple Lake until the first week of June. The last two remaining fish departed from Hipple Lake on 6/29/15. Gizzard Shad remained in Hipple Lake for an average of 150 days (range: 48-203) through the winter and early spring. Hipple Lake appears to be an important over-winter habitat for adult Gizzard Shad in Lake Sharpe. Gizzard Shad can move considerable distances over a short time period during summer and early fall. For example, one fish traveled from LaFramboise (near Capital Creek) to the mouth of Hipple Lake, and to DeGrey (approximately 50 river kilometers), in one day. Another fish was detected in LaFramboise, the Bad River and Cedar Creek (approximately 40 river kilometers) in one day. South Dakota GFP will continue tracking the movement of tagged Gizzard Shad in Lake Sharpe for at least two additional years.

Emigration of Hatchery-reared Pallid Sturgeon through Gavins Point Dam:

Implications for Management and Recovery

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Emigration is a means for individuals and genetic diversity to enter a receiving population, but acts as mortality for the source population. The endangered Pallid Sturgeon (*Scaphirhynchus albus*) population in the Missouri River is maintained by stocking hatchery-reared fish. Due to genetic differences among Pallid Sturgeon throughout their range, locally-collected broodstock are used for propagation, with the exception being the Missouri River between Fort Randall Dam (SD) and Gavins Point Dam (NE-SD). Pallid Sturgeon stocked in this reach are progeny from broodstock collected in Montana and North Dakota. Downstream emigration of these fish maintains gene flow that likely occurred before impoundment. However, if emigration is too much, then there is potential for outbreeding depression in the downstream population. We evaluated recapture data from marked Pallid Sturgeon to improve our understanding of downstream emigration through Gavins Point Dam. Of the 12,030 Pallid Sturgeon stocked between Fort Randall Dam and Gavins Point Dam, 893 (7%) were captured in the stocking reach and 219 (1.8%) were captured downstream of Gavins Point Dam. The number of new emigrants found each year has increased since 2004 and peaked at 30 in 2012 and 2014. If survival and recapture probabilities are similar upstream and downstream of Gavins Point Dam, then our results suggest that emigration could be substantial (i.e., approximately 19%) and it may be necessary to reconsider current stocking procedures for Pallid Sturgeon. Additionally, emigration may explain some variability in catch rates of Pallid Sturgeon in these sample reaches.

General Movement, Location, and Emigration of Stocked

Juvenile and Adult Paddlefish in Lake Sharpe, South Dakota

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Throughout the past 50 years, Paddlefish (*Polyodon spathula*) fisheries in the US have declined due to overexploitation and habitat modification. Paddlefish management varies regionally, with many states instituting special regulations and stocking programs. One such fishery has been successfully established in Lake Francis Case, a main-stem Missouri River reservoir in South Dakota. The next upstream reservoir, Lake Sharpe, SD could support a similar fishery. To identify general movement patterns, areas of Lake Sharpe that stocked paddlefish would use, and if paddlefish would emigrate from the reservoir, we stocked 29 juveniles and 20 adults implanted with acoustic transmitters at two locations in Lake Sharpe. During May-November of 2015 whole-lake tracking completed twice per month, while passive receivers were placed at the downstream end of the reservoir, near Big Bend Dam. Adult paddlefish regularly moved throughout the reservoir during the summer; 80% were detected near Big Bend Dam, ~80 km from their release site, with some returning to the upstream end of the reservoir near Oahe Dam. One adult transmitter was located below Big Bend Dam indicating that emigration from the system is a possibility, though not frequent during this limited timeframe. Limited movement was observed for juvenile paddlefish, with some using similar habitats as adults, and others remaining near their off-channel stocking locations, Hipple Lake and the Bad River. In 2016, telemetry equipment compatible with SDGFP’s existing acoustic array used for other research, will significantly increase our data collection capabilities, providing additional insight into movement patterns of paddlefish in Lake Sharpe.

Water Condition Session:

Population Dynamics of Bluegill in Pactola Reservoir

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Pactola Reservoir contains a large population of bluegill (*Lepomis macrochirus*) as the result of an unauthorized introduction. While Bluegill are the most frequently encountered species in standard sampling surveys little data exists on this population. We examined the population dynamics of bluegill by determining and analyzing rates of growth, recruitment and mortality. Data was obtained by sampling a large number of individuals and collecting otoliths as aging structures from a representative subset of fish sampled. Ages were determined by the consensus of three readers. This data provides us with valuable information as to the factors limiting the bluegill population within the system, as well as providing a metric by which we can compare this population to others. Although bluegill are not a target management species in Pactola Reservoir understanding the factors that drive this population are essential to sound management of this complex Fishery.

The Condition of North Dakota’s Lakes:

An Evaluation Using Data from the 2012 National Lakes Assessment

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The National Lakes Assessment (NLA) is a program that has been developed by the Environmental Protection Agency to evaluate the condition of the Nation’s lakes with known precision and accuracy. In North Dakota (ND), the NLA targeted 44 lakes for assessment in 2012 with the ND Department of Health intensifying the assessment for a sample population of 52 lakes. Greater than 50% of North Dakota lakes were considered poor regarding total phosphorus, influenced by greater than 87% of lakes in the Northern Plains (NPL) ecoregion being poor. Similarly, greater than 45% of lakes throughout the State were considered poor for total nitrogen, with nearly 86% of NPL lakes in poor condition. Despite these numbers, however, North Dakota lakes improved with regard to nutrient concentration compared to the 2007 NLA. The majority of North Dakota lakes were considered moderate risk with regard to chlorophyll concentration (73%), which was reflected within the NPL (63%) and Temperate Plains (TPL) (79%) regions as well. Similarly, the majority of ND lakes were considered low risk for microcystin concentration (95%). Nearly 60% of North Dakota lakes were in good condition for littoral vegetation, with greater than 75% of lakes in the TPL region in good condition. Percent of North Dakota lakes in good condition for riparian disturbance and riparian condition was 40% and 53%, respectively. Participation in these national assessments provides states with invaluable information on the health and condition of their waters.

Spatial Distribution and Habitat Association of Five Species in Lake McConaughy, NE

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Use of standardized sampling protocols is highly influenced by spatial distribution and habitat use of fish. Effectively sampling large waterbodies can be difficult, and limited information exists regarding seasonal horizontal distribution of fishes in large reservoirs. The objectives of this study were to determine seasonal distribution patterns and habitat associations of several important fish species in Lake McConaughy, Nebraska using catch per effort (C/f) data from extensive gill net surveys (n = 108). Three horizontal lake zones approximating the riverine, transition, and lacustrine zones were used to compare mean catch data for Walleye (*Sander vitreus*), White Bass (*Morone chrysops*), Hybrid Striped Bass (*Morone chrysops × Morone saxatilis*), Channel Catfish (*Ictalurus punctatus*), and Alewife (*Alosa pseudoharengus*). Species specific C/f differences occurred both by zone and season. For example, significantly more White Bass were collected in the transition and lacustrine zones of the reservoir in September than in May or July. Regression analysis and Akaike’s Information Criterion were used to elucidate relationships between C/f and habitat variables including water temperature, dissolved oxygen, Secchi depth, relative chlorophyll a, and bank slope. The information obtained from this research can be valuable to biologists for assessing current sampling protocols.

Aquatic Endangered Species and Water Quality in South Dakota

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South Dakota provides habitat for two species of fish that are federally listed as endangered under the Endangered Species Act.  In South Dakota the riverine pallid sturgeon (*Scaphirhynchus albus*) primarily occurs in the Missouri River whereas the Topeka shiner (*Notropis topeka*) is a prairie stream fish that occurs within the James, Vermillion and Big Sioux watersheds of eastern South Dakota.  Recent recovery documents for these species indicate that water quality issues remain a concern.  I will discuss some of the ongoing efforts by the U.S. Fish and Wildlife Service to evaluate and address water quality concerns to these species including agricultural nutrients and pesticides, Concentrated Animal Feeding Operations, oil spills, and permitted point source discharges from industrial facilities and municipal water treatment plants.

Sources of Unauthorized Introductions within the Black Hills of South Dakota

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The introduction of organisms to aquatic systems, often to facilitate a fishery, has become a global issue. In North America, these “illegal stockings” tend to be focused in areas where few native gamefish species exist. As historic fish assemblages in the Black Hills of South Dakota were simple and lacked sport species, introductions of several salmonid species by state and federal agencies began in the late 1800’s. However, many unauthorized stockings by the general public have occurred, resulting in the establishment of additional warm and cool water species within the Black Hills Fish Management Area. As introductions continue to occur, the source populations of these individuals are unknown. Thus, our objectives were to determine source populations of recent unauthorized species or determine if the introductions resulted in a naturally reproducing population. Since 2012, otoliths were collected from potential founder fish from systems in which unauthorized introductions were found to have occurred. Results have indicated that both Dumont Pond and Legion Lake now supports a naturally reproducing population of northern pike (*Esox lucius)*. However, walleye (*Sander vitreus)* within Pactola Reservoir appear to be a recent introduction and no naturally production has been documented to this point. Illegal stockings often complicate management decisions and often lead to costly removal efforts as research suggests that these species may negatively affect trout species through competition and predation. Determining the source populations will aid in more focused education and enforcement efforts in an attempt to curb the incidences of unauthorized introductions within the area.

**Poster Abstracts**

Freshwater Fish Species Diversity and Size in a Canal System in Guanacaste Region, Costa Rica

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Agricultural canals were built 30 years ago in Costa Rica to improve water availability for crops. The canals are connected to natural waterways and consist of two types: entrance, which have cool, clear, fast moving water, and drainage, which have warm, silty, slow moving water. I was addressing whether fish species diversity and abundance differed between the two canal types. I also hypothesized that average fish length would be bigger in the entrance canals than in drainage canals. Research occurred in the Bagatzi Canals outside of Palo Verde National Park in the Guanacaste Region of Costa Rica. I sampled entrance canals and drainage canals. I captured fish with an electro-fisher, nets, and seine.  All fish were identified by species, measured for length, and released. Water temperature, water flow rate, dissolved oxygen concentration, and GPS coordinates were taken at each sample site.  Twelve fish species and one eel species were captured.  A rough observation of the data reveals that *Astyanax aeneus*, *Poecilia gillii*, and *Archocentrus nigrofasciatus* were the most abundant and common species, with *A. aeneus* appearing in all sample sites except for one. Initial analysis supports the hypothesis that mean fish length was greater in the entrance canals. Differences in species diversity, abundance, and mean length are likely due to differences in water characteristics.

Dual Residency, Fish of the Montana-North Dakota Border

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Paddlefish (*Polyodon spathula)*, Pallid Sturgeon (*Scaphirhynchus albus)*, and Walleye (*Sander vitreus)* are three species that seasonally utilize and move between habitats within the Missouri-Yellowstone River system in North Dakota and Montana. Paddlefish spend most of their life in the headwaters of Lake Sakakawea in North Dakota but make spawning runs into Montana up the Missouri and Yellowstone Rivers during May and June. Pallid Sturgeon spend much of the year in the Missouri River below its confluence with the Yellowstone but migrate into Montana up the Missouri and Yellowstone Rivers during June and July. There also appears to be a segment of the Lake Sakakawea Walleye population that migrates up the Yellowstone River to spawn during April and May. Evidence of this connection is documented on an annual basis through tagging efforts using metal jaw tags, radio telemetry tags, and floy tags. These large migrations are necessary for these species to complete vital life history stages and in the case of the federally endangered Pallid Sturgeon, lack of sufficient, unimpeded river reaches is the leading hypothesis of unsuccessful wild recruitment. This migratory behavior provides the opportunity and need for inter-state coordination that focuses on habitat preservation and fish passage.

Temporal and Spatial Response Patterns of Ichthyoplankton

to Highly Variable Easter South Dakota Rivers

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Prairie streams are characterized by extreme disturbance regimes where fish assemblages are subject to dramatic environmental pressures. Local fish assemblages are generally structured by abiotic conditions; however, common opportunistic reproductive strategies allow rapid biological response to stochastic disturbance. Consequently, the assemblage’s ability to return to an equilibrium state is partially dependent on post perturbation reproductive success. Little is known about fish reproductive patterns in South Dakota basins and the influence that environmental extremes may have on larval production. The objective of this research was to (1) evaluate the reproductive output of native fish assemblages in three eastern South Dakota basins (Vermillion, James, and Big Sioux) and (2) describe the response of ichthyoplankton to disturbance regimes in the James River basin. Sampling of individuals to describe regional and temporal patterns of reproduction was conducted in late spring and early summer from 2010-2012 using larval fish drift nets. Species captured were opportunistic reproductive strategists, potentially an adaptation to allow for quick recovery after major flood and drought events. Although all species were categorized as opportunistic, variability in spawning tactics were evident; some species protracted spawning while others responded to specific temperature and discharge spawning cues. Larval production in the lower James River pre-flood (2003-2004), during (2010), and post-flood (2012) demonstrated successional patterns reflected by changing taxa richness and abundance. Subtle variability in spawning strategies of prairie fishes and progressive ichthyoplankton response to disturbance regimes suggests that reproductive efforts are adapted to maximize the potential for successful recruitment in these severe systems.

Effective Range of Acoustic Transmitters at Priority Locations within Lake Sharpe

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We initiated an acoustic telemetry study to monitor Gizzard Shad (*Dorosoma cepedianum*) and Rainbow Trout (*Onchorynchus mykiss*) movements within Lake Sharpe. Two locations were of particular interest, Hipple Lake and Oahe Marina. Hipple Lake was hypothesized to provide seasonal thermal refugia for Gizzard Shad, the primary prey fish in Lake Sharpe. Oahe Marina, the location of a popular put-and-take trout fishery, was deemed a priority location to quantify residence time and thus, availability of these fish to anglers. Migratory behavior can only be reliably estimated if there is high probability of detecting tagged fish within the study area (i.e., detection efficiency, DE). The objective of this study was to determine the effective range (DE >80%) for the acoustic transmitters (tags) implanted in Gizzard Shad and Rainbow Trout at Oahe Marina and Hipple Lake receivers (Vemco VR2W). During late August and early September, Vemco tags comparable in size and power output to those implanted in Gizzard Shad and Rainbow Trout were placed at fixed distances for 24h and DE was quantified. In Hipple Lake, DE for both tags was >90% out to 274 m. In Oahe Marina, DE for both tags was >90% at 137 m, which is the maximum distance from the receiver to shore. While tag detections in Oahe Marina provide a reliable estimate of fish movement since >90% DE was achieved at all ranges and tag types, further testing at distances >274 m is needed in Hipple Lake.

An Assessment of Superglue for Suturing Surgical Implications of

Passive Integrated Transponder (PIT) Tags of Small-bodied Fishes

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Biologically inert passive integrated transponder (PIT) tags are common in fisheries research and management; often used to study life history characteristics, population parameters, and behavior. Recent advances in PIT tag technology have included the development of 8.4 x 1.4 mm tags which are 30% smaller than their predecessor. Small PIT tags offer numerous applications to further our understanding of small-bodied fish ecology; however, the effectiveness of various implantation practices has not been empirically compared. Observed species-specific responses to PIT tag implantation procedures create an opportunity to refine insertion techniques. Our objective was to evaluate the effectiveness of cyanoacrylate (superglue) as a suturing agent to improve retention of PIT tags, relative to no suturing agent, following surgical implantation. Three fish species (Johnny Darter, *Etheostoma nigrum*; Tadpole Madtom, *Noturus gyrinus*; Common Shiner, *Luxilus cornutus*) prone to tag ejection were surgically implanted with PIT tags and sutured with superglue (Schumann, unpublished data). During a three week study period, mortalities and expelled tags were recorded daily whereas growth and incision healing were assessed weekly for comparison with individuals without suturing. Physiological impacts of the suturing were species-specific; however, mortality increased for only Johnny Darter when sutured. Generally tag ejection rates were reduced and healing rates were increased when sutured compared to non-sutured treatments. No significant differences were observed in relative daily growth rates of sutured and non-sutured treatments for all species and impacts to growth were acute. These results could lead to improvements in the suitability of PIT tag insertion techniques for small-bodied fishes.

North Dakota’s 2015 Ecoregion Reference Network Biological Monitoring Summary

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The North Dakota Department of Health’s Division of Water Quality utilizes an ecoregion approach to biological monitoring and Index of Biological Integrity (IBI) development. The state of North Dakota has four level III ecoregions. Within each ecoregion, targeted reference and disturbed sampling locations are visited to evaluate the gradient of anthropogenic stressors. In 2015, biological monitoring efforts focused on the Lake Agassiz Plain ecoregion where a total of 20 sampling sites were visited with 10 sites each considered reference and disturbed. A total of 3919 individual fish were collected, representing 33 species. Numerically, the most abundant species were; 1122 common carp (28.6%), 790 blacknose dace (20.2%), 490 fathead minnow (12.5%), 362 common shiner (9.2%). Overall, total taxa collected at each site ranged from 1 – 15 with a median of 7. When analyzed by site type, reference site total taxa ranged from 6 – 15 with a median of 8 and disturbed site total taxa ranged from 1 – 8 with a median of 3. Overall IBI scores ranged from 1 – 80 with a median of 41. When analyzed by site type, reference site IBI scores ranged from 27 – 80 with a median of 64 while disturbed site scores ranged from 1 – 51 with a median of 21.

Survival of Gizzard Shad after Dummy Transmitter Implantation

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South Dakota Game, Fish and Parks biologists implanted Gizzard Shad (*Dorosoma cepedianum*) with acoustic telemetry transmitters during the spring of 2014 and 2015. Gizzard Shad have never been implanted with transmitters prior to this study, so a general understanding of post-surgery survival is needed. Our objective was to determine effects of tag implantation and surgery duration on short-term survival of Gizzard Shad. Adult Gizzard shad were collected by shoreline electrofishing during April-May 2014 and 2015. After capture, fish were randomly assigned to the treatment or the control group. Forty-nine fish (29 in 2014, 20 in 2015) were surgically implanted with Vemco V13 dummy tags (13 mm), and 40 fish (20 per year) were considered control fish, where no surgery was performed. Fish were placed in a 4m x 4m x 2m floating net pen, and survival assessed 3 days (2014 trial) and 5 days (2015 trial) post-surgery. We used an analysis of variance to test for differences in survival of tagged and control fish (α = 0.10). We assessed effects of treatment, surgery duration (s), temperature (°C), holding time (d) and length (mm) on survival with logistic regression (α = 0.10). There was no difference between survival of tagged (86.7%) and control fish (88.3 %; p = 0.7). Water temperature was the only significant variable that influenced survival of Gizzard Shad (p = 0.097). Interestingly, Gizzard Shad survival increased as water temperature increased. Short-term survival of Gizzard Shad implanted with dummy transmitters was similar to control fish, suggesting that effects of implantation and surgery duration do not have adverse short-term impacts on Gizzard Shad. Mortality rates in control fish indicate that handling protocols may need to be refined to increase survival rates in future research.

Using Data from the 2012 National Lakes Assessment to describe

the Biological Condition of North Dakota’s Lakes

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The National Lakes Assessment (NLA) is a program that has been developed by the Environmental Protection Agency to evaluate the condition of the Nation’s lakes with known precision and accuracy. As part of the 2012 NLA, 50 and 52 lakes were sampled for benthic macroinvertebrates and zooplankton in North Dakota (ND), respectively. Greater than 30% of ND lakes were in poor condition based on zooplankton multimetric index (MMI) scores, with approximately 40% and 25% considered poor in the Northern Plains (NPL) and Temperate Plains (TPL) Ecoregions, respectively. Zooplankton MMI was strongly correlated to total riparian canopy cover (R=0.425) and close-to-shore human influences (R=-0.371). Greater than 50% of ND lakes were in good condition based on macroinvertebrate MMI, with approximately 25% and 65% of lakes in good condition within the NPL and TPL, respectively. Macroinvertebrate MMI was significantly correlated to areal cover from woody vegetation in the canopy (R=0.315) and understory layers (R=0.332). Further, increased human influence from agriculture correlated negatively to macroinvertebrate MMI scores (R=-0.325). Zooplankton MMI correlated with increased submerged littoral vegetation (R=0.448) and index of total riparian canopy cover (R=0.425). Ordination using common taxa indicates both benthic macroinvertebrates and zooplankton taxa were most correlated to increased in-lake and riparian cover, the latter being dominated by woody vegetation. Results from the 2012 NLA (as well as past and future assessments) provide useful information to the State regarding the condition of biological communities in its lakes.

Feasibility of Oxytetracycline Marking Juvenile White Bass: Mortality and Mark Visibility

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Chemical batch marks such as oxytetracycline hydrochloride (OTC) can be beneficial for estimates of stock contribution. However, no information currently exists on the feasibility of marking White Bass *Morone chrysops* with OTC. The objectives of this study were to 1) assess the quality of marks on fingerling White Bass sagittal otoliths 14 days post-immersion when immersed in 0-, 350-, and 500-mg/L solutions of OTC and 2) determine the level of mortality at intervals up to 96 hours post-immersion for each treatment. A total of 900 White Bass were utilized with 100 fish used in three replicates per treatment. Mark visibility was ranked on a scale of 0-3, and mean mark score ± SE was higher in the 500 mg/L treatment (2.5 ± 0.1) than the 350 mg/L treatment (2.0 ± 0.1). No differences in mortality were detected among control and treatment groups up to 96 h post-marking. Batch marking fingerling White Bass using 500 mg/L OTC solution resulted in low mortality rates and visible marks and therefore represents a viable option for biologists seeking to assess stock contribution.

**Business Meeting Agenda**

February 2nd, 2016

**Call to Order, Confirmation of Quorum** Greg Simpson

**Approval of the 2015 Business Meeting Minutes**

**Officer’s Reports**

President Report Greg Simpson

Vice-President Report Jill Voorhees

Secretary/Treasurer Report Jake Davis

President-Elect Report Casey Williams

SDSU Student Subunit Report Chad Kaiser

VCSU Student Subunit Report Lane Dahl

**Committee Reports**

Awards and Nominations Kurt Eversman

Continuing Education Dan James

Membership Matt Ward

Information Hilary Meyer

Student Affairs Greg Simpson

Resolutions Chelsey Pasbrig

Schmulbach Scholarship Wayne Nelson-Stastny/Zach Shattuck

Environmental Concerns Geno Adams/Michael Johnson

NCD Tech Committees

NCD Walleye Mark Fincel/Todd Caspers

NCD Centrachid Dan Nelson

  NCD Esocid Brian Blackwell

**Old Business**

Secretary/Treasurer as a two year appt.

**New Business**

Muskellunge Symposium

Skinner Fund

Second signer on Checking Account, Jake Davis

Valley City Sub-unit

**Business from the floor**

**Adjourn**

**Committee Reports:**

**Awards and Nominations**

Nominations were requested by members for the Distinguished Service Award, Young Professional Award, and Resource Conservation Award. Nominations for each category were received and winners will be announced during the banquet awards ceremony. Award nominations were solicited by the committee to chapter members. Chapter members provided nominations for each of the chapter awards. The Awards and Nominations Committee voted based on the nominations and selectee's were referred to the Executive Committee for consideration.

- Brochures, announcements and applications for many of the chapter awards were updated with the correct contact information as well as proper dates and deadlines.

- A document was created that contains a history of chapter award winners since 2011.

**Continuing Education**

Steve Chipps (USGS, SDSU) stepped down from the CE co-chair position in 2015. Daniel James (FWS) accepted the co-chair position at the request of President Greg Simpson. The CE developed a workshop for the 2016 annual meeting, entitled “Is graduate school for you? A guide for both students and professionals.” The course is being put together by Melissa Wuellner (SDSU), Dave Lucchesi (SDGFP), Casey Williams (VCSU), and Dan James (FWS).

At the 2016 Annual Meeting, the CE plans to revisit the member survey conducted in 2011, update CE course progress since then, and conduct another member to survey to address the needs of the membership.

**Membership**

Attendance at last year’s meeting in Bismarck included a total of 119 people. Membership type and affiliation breakdown are as follows: SD Game, Fish and Parks (24), SD State University (23), US Fish and Wildlife Service (19), ND Game and Fish (15), Valley City State University (14), MT Fish, Wildlife, and Parks (6), Sitting Bull College (3), Dakota College (3), US Forest Service (2), ND Depart. of Health (2), Barr Engineering (1), QEP Resources (1), Retired (1), University of Idaho (1), University of Mary (1), University of North Dakota (1), University of South Dakota (1) US Geological Survey (1).

**Information**

The Information and Web Support Committee updated and maintained the Dakota Chapter website during the 2015 calendar year. Updates include re-formatting the website in March of 2015 to enable easier browsing and to make the website more aesthetically pleasing. Updates were made periodically through the year with pertinent Dakota Chapter information, meeting and workshop announcements, news as well as interesting articles and videos related to fisheries and AFS. A PayPal account was also created for the Dakota Chapter AFS to allow members to pay dues online, as well as register for the 2016 annual meeting online. The Information and Web Support Committee will continue to maintain the Dakota Chapter website (hosted through the American Fisheries Society), and would appreciate any feedback from members to enhance our web presence.

**Student Affairs**

*SDSU Subunit Report*

Our student sub-chapter has had a whirlwind of activity over the past year. With the bringing of the New Year new officers have been elected, now of which three are undergraduates who are excited to share their talents with our society. The 2015 school year brought back students with previous experience, but more importantly many new faces such that our total members have increased from last year.

Members got an early start to summer by helping the Kampeska Chapter of Izaak Walton League of America out at Memorial Park in Watertown with their first “Water Resource Day.”

South Dakota State began a Natural Resources Camp that allows high schoolers to explore all aspects of natural resources. Students joined AFS members at Oak Lake Field Station retrieving trap nets and sorting through the fish that were captured. Fisheries Society members taught the students how the different gears worked, basic lake ecology, and fish identification.

The learning didn’t stop there. Upward Bound, a federally funded educational program, joined a group of undergraduate and graduate students at Oak Lake Field station later that summer. Students got a chance to learn about lake ecology, gear selectivity, and fish identification. Even better students got to wader-up and get in the water to pull in trap nets and backpack electrofish. Faces were nothing but smiles at the end of the day as it was some of the students first time getting to hold a fish!

Our sub-chapter then moved closer to home and hosted two days’ worth of middle school student from Brookings Middle School at the Dakota Nature Center in Brookings. Once again kids got to learn about not only how to identify and capture the fish, but what kind of results we can get from the data that are collected. The kids had fun pulling seines through the grass “capturing” their fellow classmates.

Towards the end of summer a caravan of SDSU AFS member woke up before the sunrise and drove out to Whitlock’s Bay to help South Dakota Department of Game, Fish and Parks with their annual salmon spawn. Students got to experience how ferocious salmon can be in the raceways as well as the proper technique of milt extraction. It was definitely an eye-opening experience for undergrads and graduate students alike.

Finally SDSU AFS is gearing up to put together their annual job fair where natural resource employers from multiple states come to find their upcoming field season workers. This is just another step preparing our students for not only working out in the field, but the process that it takes to be considered for a job that they apply for.

South Dakota State University AFS is always looking for opportunities to collaborate and help so if you or someone you know is seeking help with their fisheries work feel free to get a hold of our student chapter.

*Valley City Subunit Report*

The Valley City State University American Fisheries Society Student Subunit is well into its second year and the club has grown to 51 paid members. We have been fortunate enough to have a good turnout for various events such as canoeing, the annual Christmas Banquet, and a fishing tournament. These events have helped new students become more involved in the program and more dedicated to their academic career. We continue to try and improve each and every student member by getting them out in the field with other fisheries students. We have discussed other projects in our community to give students the opportunity to volunteer for something that may be useful in the future. For instance, we are developing a ” pickled fish project” which will distribute a basic fish collection and simple dichotomous key to local high schools to educate and inspire the younger generation. We just recently completed our winter fundraiser which was an ice fishing gear raffle. This will give us the necessary funds to support club members in career building activities and events, including invited guest speakers and travel to scientific meetings.

**Resolutions**

The Resolutions Committee did not receive any resolutions or items of concern. The Environmental Concerns Committee was asked if any concerns from their perspective warranted a resolution by the Dakota Chapter. At the point of this writing, no resolutions were noted or sent in to the Resolutions Committee.

**Schmulbach Scholarship**

A selection was made from the applications received. The Schmulbach award will be announced at the awards presentation during the banquet.

**Environmental Concerns**

**North Dakota’s Report to Environmental Concerns Committee**

Report to the Dakota Chapter – American Fisheries Society

January, 2016

North Dakota Representative to Environmental Concerns Committee:

Michael L. Johnson – North Dakota Game and Fish Department – Jamestown, ND

**Action**

-Requested:

-Recommended Motion:

-Minority View:

-Background for Motion:

-Cost:

**Concerns and Issues**

**Blue Green Bloom**

This year the occurrence of blue green blooms did not necessarily occur at a higher rate but rather, received more attention than years past in regards to public health and safety concerns. Not surprisingly, we do experience a number of these occurrences during the open water season with differing levels of intensity. Likely the worst case scenario in 2015 happened at Homme Dam in August where microcystin levels were approximately twice recommended levels. This resulted in an advisory to the public in regards to swimming. The local SCD is currently in the first year of a five year watershed restoration project for Homme Dam watershed.

Unfortunately, these and related occurrences are not uncommon in our area.

“Obviously farming practices, past commodity prices, and the Farm Bill have caused tremendous impacts to North Dakota landscape … and it’s only a matter of time before we see accelerated eutrophication problems in our managed lakes.” *Greg Power – Fisheries Division Chief – NDGF Dept.*

**Oil/Brine Spills**

Though activity has slowed down as of late in the oil prospecting region of our state, negative environmental impacts are still occurring at too high of a rate. As of today (1/24/2016), in the last 12 months, 1,149 contained and 330 uncontained oil/brine leaks have occurred in North Dakota. So far to start out 2016, there are ‘reported’ 66 contained and 27 uncontained oil/brine leaks (ND Department of Health). One example of a notable incident occurred in 2015 in Blacktail Creek, a tributary of the Little Muddy River which flows into the mighty Missouri. “What was most troubling about this spill is that the pipeline had been leaking for more than three months before it was discovered and had leaked three million gallons of saltwater in that time” *Aaron Slominski – NW District Fisheries Biologist – NDGF Department*



Additionally, the North Dakota Public Service Commission has approved the installation of a crude oil pipeline (owned by Phillips 66) to cross underneath Lake Sakakawea approximately 7,000 linear feet with the capacity for 140 barrels of crude per day (Bismarck Tribune, 5 January 2016).

**Drain Tile**

Still occurring at a high rate and unregulated for the most part.

**Zebra Mussels**

Zebra mussel adults have now been documented in the Red River starting with a discovery at the Fargo water treatment plant. Subsequent sampling by NDGF Department Fisheries Staff revealed scattered populations throughout the entire river though in relatively low densities. This does not come as a surprise as well established populations have been in the Ottertail River, located upstream to the Red’s origin, for years and the more recent discovery of a population in downstream Lake Winnipeg. Additionally, water samples collected throughout the mainstem Red by VCSU showed high veliger numbers this past summer. Thankfully, samples from ND tributaries remain negative.

**Restorations**

**Powers Lake**

Powers Lake is a 1600+ acre lake in the NW part of the state. Recently, due to heavy algae and blue green bacteria blooms, locals initiated a restoration effort. Phase I included sediment dams and other BMPs in the watershed to reduce allochtonous nutrient loads. This summer, Phase II, dredging of phosphorus laden sediment, was initiated. Further funding will dictate the continuation of dredging next spring (Minot Daily News 25 October 2015).

**SOL**

NDGF Department’s Save Our Lakes program, spearheaded by Scott Elstad, is a vital component in fishery related water quality improvement and protection in our state. Through cooperation starting at the local level, BMPs are put into action, fish habitat is improved, and additional fishing access is made possible. One example of a 2015 SOL project is a cooperative effort with landowners and the county SCD to fence off the James River between the Jamestown Reservoir and upstream impoundments of the Arrowwood Wildlife Refuge Complex. The project protected river bank and water from cattle erosion and nutrient inputs while providing alternate water sources for ranching operations.

***NCD Tech Committees***

**NCD Walleye**

SD hosted Walleye Technical Committee summer meeting. There were 45 attendees for the 2015 WTC summer meeting held at Dakota Nature Park in Brookings, SD.  The SDSU student sub-unit assisted by catering all the breaks during the meeting, as well as the welcome social BBQ.  The WTC donated $250 to the SDSU sub-unit to be used for Sauger Scholarship awards for their help with arrangements. We had six guest speakers present during the Walleye Tagging Methods Workshop, and 16 workshop attendees.  Eighteen oral presentations were included in the program.

**NCD Ictalurid**

In 2015, the North Dakota Game and Fish Department provided a little manpower to help the Minnesota Department of Natural Resource with their 5-year population assessment and creel survey of the well-known catfish fishery on the Red River. One new addition during that survey was the tagging of several hundred channel catfish, in cooperation with Manitoba fisheries and the University of Nebraska (Mark Pegg) who have been tagging catfish for several years north of the border.  They asked us (and MN) to participate to get a broader sample, with the intent of monitoring movements of catfish.  Benefits to us will include some indication of catfish movements over the many modified dams on the Red River mainstem.  There have been some inquiries into a commercial fishery for catfish in Manitoba, and hopefully by demonstrating the “International” nature of the stock, it will make it easier to deny such requests in the future.

In other areas of North Dakota, catfish typically don’t get much attention from anglers.  However, our biologists have been taking catfish from walleye spawning nets in the spring and stocking them in smaller waters around the state with quite a bit of positive feedback.  Most of these smaller waters tend to be marginal fisheries, kids ponds, etc. that we can manage as put and take fisheries.  The catfish are able to withstand warmer temperatures than the put and take trout we stock in the spring, which prolongs fishing into the summer, plus they tend to eat undesirable fish, like bullheads, and they can sure bend a pole better than a 6” perch or bluegill, so they add a little excitement to some of our kids’ ponds.

One other bit of excitement to note is the capture of flathead catfish again in Lake Oahe.  They’ve always been in low abundance down there, but following 2003 we went almost a decade without sampling one.  It had gotten to the point where we were beginning to consider them extirpated, and even removed them from our species of conservation priority (SWG) list because we considered them a lost cause.  However, we’ve sampled flatheads each of the last three years, including two individuals in 2015.  So we’re pleased to see that!

South Dakota

*(report provided by Todd St. Sauver and Dave Lucchesi)*

*Use of Baited Hoop Nets to Supply Channel Catfish for Stocking Urban and Community Fishing Ponds.*  Channel cats are widely used by other states in put-and-take urban and community fisheries.  However, SD does not currently have a supply of these fish for this use.  We are currently planning an attempt to capture underutilized wild channel catfish from eastern SD rivers by using baited hoop nets.

*Use of Baited Hoop Nets to Sample Channel Catfish Populations in Select Southeastern South Dakota Lakes and Impoundments.*  Channel catfish have been introduced into several lakes and impoundments in southeastern South Dakota to diversify fishing opportunity.  Channel catfish bycatch in standard survey trap nets and gill nets indicate some of these populations are becoming quite large.  Surrounding states use baited hoop nets to monitor channel cat populations.  We intend to use baited hoop nets on a small number of our catfish waters to determine the feasibility of using this gear for standard sampling in the future.

*Hatchery Rearing of Channel Catfish to a Catchable Size.* We also intend to request that Blue Dog State Fish Hatchery in Waubay attempts to rear channel catfish on heated water over the winter to supply catchable-sized fish for our urban and community fisheries program.

*Assessment of the Lake Mitchell Flathead Catfish Population (Matt Wagner, Tanner Stevens and Dave Lucchesi).* The flathead catfish population in Lake Mitchell, a 670 acre impoundment in southeastern South Dakota, had gone unstudied since its discovery in the 2007 (unauthorized introduction). This new population has the potential to influence the food web as well as provide a unique sport fishery. Low frequency electrofishing (LFC) with a chase boat was used to sample the population in June of 2013 and 2015 and June, July, August, and October of 2014. Population size, inter-seasonal diets, and growth rates were estimated to characterize the population. Hallprint dart tags along with adipose fin clips were initially used for mark-recapture, however, dart tag loss was high, and therefore, tagging was discontinued in 2015. Diets were obtained from a subsample of fish during each sampling period (2014 only), and pectoral spines were taken for age and growth analysis (2013-2015). Diet items were identified to the lowest possible taxon, and quantified by percent occurrence and by number. Mean back-calculated length at age was used to quantify growth.

Flathead catfish almost exclusively inhabited rip-rap or areas adjacent to rip-rap in Lake Mitchell. Population estimates ranged from 1197 fish or 1.78 fish/acre [2015 returns of 2014 marked fish; 95% CI 932, 1461] to 1348 fish or 2.01 fish/acre [multiple mark and recapture in 2014; 95% CI 459, 1455]. Flathead catfish exhibited generalist predatory patterns with crayfish and fish making up relatively equal proportions of their diet. There has been natural recruitment in each of the past 10 years with an exceptionally large year class produced in 2012. Fish grew faster than average at age-1 and age-2 and slowed to average at age-3 and older when compared to other North American populations. In 2015, individuals from the large 2012 year class started to exhibit slowed-growth and poorer-condition suggesting some density dependent effects. Information from this study has been presented at a Chapter meeting, statewide and regional meetings and will be submitted to a regional journal.

**NCD Centrachid**

No report filed

**NCD Esocid**

The 2015 summer Esocid Technical Committee (ETC) meeting was July 23 at Dakota Nature Park in Brookings, South Dakota. The business meeting was held in conjunction with the joint Centrarchid, Walleye, and Esocid Technical Committees Meeting. The next ETC meeting will take place during the Hugh C. Becker Muskie Symposium in Minnetonka, Minnesota during March 2016 and not at the Midwest Fish and Wildlife Conference in Grand Rapids, Michigan.

The Hugh C. Becker Muskie Symposium will take place March 13-15, 2016 in Minnetonka, MN. Muskellunge researchers, resource managers, and anglers from across North America will gather for 3 days of technical presentations, poster sessions, panel discussions, and great socials. This symposium will commemorate the 50th Anniversary of Muskies, Inc. Presentations and socials will be held at the Sheridan Minneapolis West, Minnetonka, MN. Early registration for the meeting will be available through February 16, 2016. There will be a reduced fee for students. Check Muskiesinc.org for information on arrangements and to register for the meeting.

Dakota Chapter Esocid Update

Angler reports of muskellunge being caught from Lake Sinai (1,200 acres) in Brookings County began this spring. Muskellunge were first stocked into Lake Sinai in 2011. Many large northern pike were observed in southeast South Dakota waters during 2015 walleye spawning operations.

Muskellunge populations in northeast South Dakota were sampled during the 2015 spring at Amsden Dam (235 acres) and Lynn Lake (1,600 acres) using large trap nets. The Amsden Dam population was estimated at 18 individuals and 202 fish were estimated to be present in Lynn Lake. Muskellunge stocking in Amsden Dam will likely discontinue because of apparent low survival. Muskellunge were stocked into Middle Lynn Lake for the first time this fall. Middle Lynn Lake (740 acres) is adjacent to Lynn Lake and during a high water period some muskellunge moved into Middle Lynn Lake from Lynn Lake. A 46.5-inch muskellunge was harvested by an angler fishing Middle Lynn Lake in May 2015.

Research comparing muskellunge catches between two trap net designs in three South Dakota waters was recently published in *The Prairie Naturalist* (47:21-25).

1. Program Notes:

   \* - Undergraduate Student

   \*\* - Graduate Student

   \*\*\* - Professional

   Presenting authors in **Bold** [↑](#footnote-ref-1)