

# U.S. Geological Survey South Dakota Cooperative Fish and Wildlife Research Unit

## 2012 ANNUAL REPORT



### **IN COOPERATION WITH:**

South Dakota State University  
South Dakota Department of Game, Fish & Parks  
Wildlife Management Institute  
U.S. Fish and Wildlife Service

# South Dakota Cooperative Fish and Wildlife Research Unit

## FOREWORD

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The South Dakota Unit of the U.S. Geological Survey's Cooperative Research Unit program has served an important role in graduate education and technical assistance in fish and wildlife management at South Dakota State University since 1963. Research at the South Dakota Unit, guided by our Coordinating Committee, is conducted primarily by graduate students (M.S. and Ph.D.) studying a wide range of natural resource problems. The Unit is housed in the Department of Natural Resource Management at South Dakota State University, where we share a large supply of field equipment and on/off-campus laboratory facilities. The USGS EROS Data Center and the GIS Center of Excellence (GISCE) at SDSU provide unique resources and collaborative opportunities for the South Dakota Coop Unit.

Since 1963, about 235 theses and dissertations have been completed by students working through the South Dakota Coop Unit. Unit students have conducted research on a variety of topics that include endangered species, wetland ecology, fisheries management, upland game, big game management, and non-game species. A list of theses and dissertations is available at <http://www.sdstate.edu/wfs/publications/index.cfm>. In 2010, Professor Emeritus and Assistant Unit Leader (retired) Dr. Kenneth F. Higgins established an endowment to support graduate student research at SDSU. The *Kenneth F. Higgins Waterfowl Legacy Research Endowment* is directed toward supporting graduate student research activities that benefit wetland-dependent avian species. In 2012, Adam Janke – a Ph.D. student studying waterfowl in South Dakota – was the first recipient of the *Kenneth F. Higgins Waterfowl Legacy Research Award*. Contributions to the endowment can be made by contacting the SDSU Alumni Association (888.735.2257; [alumni@statealum.com](mailto:alumni@statealum.com)).

We look forward to 2013 as the South Dakota Unit enters our 50<sup>th</sup> year of service. We will continue to address applied research needs of our state and federal cooperators to help manage fish and wildlife resources in the Northern Great Plains. Please feel free to contact us for more information.

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605.688.5467

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[http://www.coopunits.org/South\\_Dakota/](http://www.coopunits.org/South_Dakota/)

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## UNIT STAFF AND COOPERATORS

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### **DR. STEVEN R. CHIPPS**

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Professor  
Human Dimensions of Wildlife Management  
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### **MRS. KATHRYN TVEDT**

Unit Administrative Support Specialist  
[Kathryn.Tvedt@sdstate.edu](mailto:Kathryn.Tvedt@sdstate.edu)



Larry Gigliotti, Kate Tvedt, Steve Chipps, Josh Stafford

## COOPERATORS

South Dakota State University (SDSU); South Dakota Game, Fish and Parks (GFP); U.S. Geological Survey (USGS); Wildlife Management Institute (WMI); and the U.S. Fish and Wildlife Service (USFWS).



## **COORDINATING COMMITTEE**

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Tony Leif, Director  
Division of Wildlife  
SD GFP  
523 East Capitol Avenue  
Pierre, SD 57501-3182

Dr. Stephen Torbit  
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Pat Ruble  
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Dr. Barry Dunn  
Dean SDSU, College of  
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Brookings, SD 57007

Dr. Michael Tome  
Unit Supervisor  
Cooperative Research Units  
206 4<sup>th</sup> Avenue  
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## **RESEARCH PERSONNEL**

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### **Post-Doctoral Associates**

Lisa McCauley

Kjetil Henderson  
Ryann Cressey  
Fred Oslund

### **Ph.D. Candidates**

David Deslauriers  
Mark Fincel  
Adam Janke  
Tandi Perkins  
Tobias Rapp  
Daniel James

### **Undergraduate Research Technicians**

Jason Augspurger  
Austin Galinat  
Tiffany Hennigs  
Taylor Ignaszewski  
Zach Jessee  
Bailey Ketelsen  
Danielle Meyerink  
Christopher Sundmark  
Aaron Sundmark  
Riley Schubert  
Josh Zylstra

### **M.S. Candidates**

Laura Heronimus  
Natalie Scheibel  
Megan Thul  
Cameron Trembath

## COOPERATING FACULTY – SOUTH DAKOTA STATE UNIVERSITY

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<u>Name</u>	<u>Department</u>	<u>Cooperative Activity</u>
Dr. Katie Bertrand	Natural Resource Management	Fish ecology
Dr. Brian Blackwell	Natural Resource Management	Fish ecology
Dr. Michael Brown	Natural Resource Management	Limnology studies
Dr. Delvin DeBoer	Civil and Environmental Engineering	Water quality
Dr. Chuck Dieter	Natural Resource Management	Wildlife research
Dr. Barry Dunn	Dean, College of AgBio Sciences	Administration
Dr. Leigh Fredrickson	Natural Resource Management	Wetlands research
Dr. Brian Graeb	Natural Resource Management	Fish ecology studies
Dr. Troy Grovenburg	Natural Resource Management	Wildlife research
Dr. Daniel Hubbard	Natural Resource Management	Wetland studies
Dr. Jon Jenks	Natural Resource Management	Wildlife ecology
Dr. Kent Jensen	Natural Resource Management	Bird studies
Dr. Carter Johnson	Natural Resource Management	Wetland ecology
Dr. Carol Johnston	Natural Resource Management	Wetland ecology
Mr. Michael Kjellsen	Natural Resource Management	National Wetland Inventory
Dr. Gary Larson	Natural Resource Management	Plant science
Dr. Thomas Loveland	EROS-GIS Center of Excellence	Breeding bird study
Dr. Darrell Napton	Geography	Wetland study
Dr. Regg Neiger	Veterinary Sciences	Waterfowl studies
Dr. Nels Troelstrup	Natural Resource Management	Oak Lake Field station
Dr. David Willis	Natural Resource Management	Administration
Dr. Michael Wimberly	GIS Center of Excellence	Pallid sturgeon
Dr. Melissa Wuellner	Natural Resource Management	Fish ecology studies

## REGIONAL COOPERATING SCIENTISTS

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<u>Name (South Dakota Unit Person)</u>	<u>Agency/University</u>	<u>Subject</u>
Dr. Michael Anteau (Stafford)	USGS – NPWRC	Wetland and waterbird health
Dr. Jane Austin (Stafford)	USGS – NPWRC	Waterbird and wetland ecology
Mr. Michael Barnes (Chipps)	SD GFP	Salmonid ecology
Dr. James Breck (Chipps)	MI DNR	Fish bioenergetics
Dr. John Coluccy (Stafford)	Ducks Unlimited, Inc.	Conservation planning
Mr. Jake Davis (Chipps)	SD GFP	Black Hills trout
Mr. Kris Edwards (Chipps)	SD GFP	Hydroacoustics
Dr. Michael Eichholz (Stafford)	Southern Illinois University	Migration ecology
Dr. Mark Fincel (Chipps)	SD GFP	Hydroacoustics
Mr. Craig Flemming (Chipps)	US Army Corps Engineers	Pallid sturgeon
Mr. Gene Galinat (Chipps)	SD GFP	Black Hills trout
Dr. Robert Gates (Stafford)	The Ohio State University	Spring-migration ecology
Dr. James Garvey (Chipps)	Southern Illinois University	Diet Quantification
Dr. Heath Hagy (Stafford)	Illinois Natural History Survey	Waterbird foraging ecology
Dr. Daniel James (Chipps)	FWS-Pierre, SD	Rapid Creek ecology
Dr. Rex Johnson (Stafford)	FWS HAPET – Fergus Falls	Conservation planning
Dr. Dylan Kesler (Stafford)	University of Missouri	Avian ecology, modeling
Dr. Robert Klumb (Chipps)	FWS-Pierre, SD	Pallid Sturgeon
Mr. Dave Luchessi (Chipps)	SD GFP	Small impoundments
Dr. Charlie Madenjian (Chipps)	USGS Great Lakes Sci Cntr	Fish bioenergetics

Dr. Brian McLaren (Chipps)	Lakehead University	Lake sturgeon ecology
Mr. Rocco Murano (Stafford)	SD GFP	Waterfowl ecology
Dr. Ben O'Neal (Stafford)	Franklin College	Radar ornithology
Dr. Craig Paukert (Chipps)	Missouri Coop Fish and Wildlife Unit	Paddlefish
Dr. Aaron Pearse (Stafford)	USGS – NPWRC	Biometrics
Dr. Robert Pilsbury (Chipps)	University of Wisconsin	Didymo in the Black Hills
Dr. Greg Sass (Stafford)	Illinois Natural History Survey	Integrated wetland management
Mr. Greg Simpson (Chipps)	SD GFP	Black Hills trout
Mr. Todd St. Sauver (Chipps)	SD GFP	Small impoundments
Mr. Kurt Schilling (Chipps)	FWS	Hatchery Studies
Dr. James Stone (Chipps)	South Dakota School of Mines & Tech.	Hg Studies
Mr. Sam Stukel (Chipps)	SD GFP	Pallid sturgeon
Dr. Corey Suski (Chipps)	University of Illinois	Fish Physiology
Dr. Chris Swanson (Stafford)	FWS – Kulm WMD	Grassland bird ecology
Dr. David Wahl (Chipps)	Illinois Natural History	Bioenergetics
Mr. Matt Ward (Chipps)	SD GFP	Walleye foraging
Dr. Pat Weatherhead (Stafford)	University of Illinois	Risk taking in ducks
Dr. Molly Webb (Chipps)	FWS, Bozeman, Montana	Lake sturgeon reproduction
Dr. Tim Welker (Chipps)	US Army Corps Engineers	Pallid sturgeon
Mr. George Williams (Chipps)	US Army Corps Engineers	Pallid sturgeon
Dr. Steve Windels (Chipps)	National Park Service	Lake sturgeon

## **ADMINISTRATIVE SUPPORT**

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### **SOUTH DAKOTA DEPARTMENT OF GAME, FISH & PARKS**

The South Dakota Unit works closely with SD Department of Game, Fish and Parks. We thank Tony Lief, Tom Kirschenmann, John Lott, Geno Adams, Chad Switzer, Eileen Dowd Stukel and Emmett Keyser for their administrative assistance. We are particularly grateful to Tanna Zabel for her help and assistance with Federal Aid coordination.

### **SOUTH DAKOTA STATE UNIVERSITY**

The Unit receives administrative assistance from SDSU and we wish to thank Kate Tvedt, Terri Symens, Di Drake, and Dawn Van Ballegooyen (NRM), as well as personnel from the Office of Grants and Sponsored Programs: Holly Beutler, Dr. James Doolittle, Nicole Lounsbery, Brenda Hayne, Kay Scheibe, and Doug Ward for their assistance and advice.

### **US GEOLOGICAL SURVEY, COOPERATIVE RESEARCH UNIT PROGRAM**

The South Dakota Unit receives guidance and assistance from the CRU Headquarters staff in Reston, VA. We thank Suzanne Cartagirone, Shana Coulby, Brenda Croston, Don Dennerline, Terry Linton, Rita Raines, Mike Tome and Kevin Whalen for their advice and assistance.

### **US FISH AND WILDLIFE SERVICE**

We thank the Great Plains Fish & Wildlife Management Office, Gavin's Point National Fish Hatchery, Garrison National Fish Hatchery, and the National Wildlife Refuge offices for continued support of Unit-related research.

## PROGRAM DIRECTION STATEMENT

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The Unit's program direction is reviewed annually by our Coordinating Committee. The overall program direction will be to conduct applied research to benefit management of Northern Great Plains habitats and biota. Wetland research in the Prairie Pothole Region will incorporate landscape-level influences on the fish, wildlife, invertebrates, and plant communities of wetlands. Ecological services – such as water retention, livestock forage, flood reduction, ground water recharge, esthetics, and fishery potential – will be included in research efforts when appropriate. Applied aspects of wetland research will strive to address wetland conservation, waterfowl production, human dimensions of wildlife management, and integration with agricultural and aquaculture practices. Fisheries research will focus on the management, conservation, and production of native species and sport fishes. The Unit will develop collaborative and integrative research programs with state, federal, and NGO agencies to address emerging issues dealing with climate change, land-use patterns, invasive species, and conservation of fish and wildlife of the Northern Great Plains. Because of its socio-economic and recreational value, the Missouri River provides unique challenges and opportunities in the region. Thus, the study of native, endangered, and introduced fishes and wildlife of the Missouri River will continue to be a focus of Unit research.



## **COMPLETED PROJECTS**

### **Latitudinal Variation in Juvenile Pallid Sturgeon Physiology**

Restoration efforts for the endangered pallid sturgeon (*Scaphirhynchus albus*) have been largely targeted at population augmentation. Recent studies show that pallid sturgeon from the upper Missouri River are genetically distinct from fish found in the middle Missouri and lower Mississippi rivers, but it is not clear if genetic differences are linked to physiological adaptation. Pallid sturgeon populations inhabit a wide range of environmental conditions that might contribute to regional, physiological adaptations. We conducted a common-environment experiment using age-0 pallid sturgeon from two genetically distinct source populations. We measured absolute growth, food consumption, feed conversion efficiency and routine metabolic rate of pallid sturgeon from the upper basin (UB; Montana, North Dakota, South Dakota) and middle basin (MB; Gavins Point Dam, SD to Kansas City, MO) of the Missouri River at 10, 14, 18, 22, 26 and 30°C. Upper basin pallid sturgeon exhibited faster growth at temperatures greater than 18°C. Feed conversion efficiency by UB sturgeon was significantly greater than MB sturgeon at 18 and 22°C. Upper basin pallid sturgeon had higher consumption rates at 22, 26 and 30°C (32.3%, 15.2%, and 15.2%, respectively) and greater metabolic rates (20.4%) at 18°C than MB sturgeon. Rapid growth by UB fish could be a compensatory adaptation to contracted growing seasons typically experienced in northern latitudes. Understanding the presence and pattern of local adaptations in broadly distributed species is important for preservation of such adaptations as a means to conserve genetic diversity.

#### **FUNDING**

U.S. Army Corps of Engineers

#### **INVESTIGATOR**

Hilary Meyer, M.S. candidate

#### **FACULTY**

Steve Chipps, Brian Graeb, Robert Klumb

#### **COMPLETED**

November 2011



## **ONGOING PROJECTS**

### **Influence of Reservoir Productivity on Food Web Structure and Walleye Stocking Success in Two South Dakota Impoundments**

Management of walleye fisheries in South Dakota impoundments can be hindered by factors that include poor habitat quality, eutrophication and limited natural recruitment. Richmond and Mina reservoirs, in northeastern South Dakota, are important regional fisheries managed for walleye. Natural reproduction of walleyes in both reservoirs is low, necessitating periodic stocking of fingerling fish. The extent to which factors such as prey availability and(or) environmental variation influences growth and survival of young walleyes is not known. To address these questions, we are using a combined field and experimental approach to evaluate diet, growth and survival of fingerling walleye in Mina and Richmond reservoirs.

#### **FUNDING**

South Dakota Department of Game, Fish & Parks (F-15-R-1521)

#### **INVESTIGATOR**

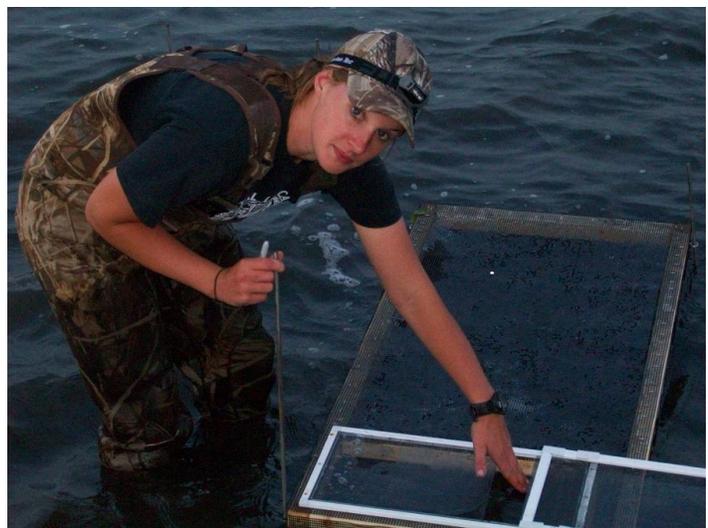
Megan Thul, M.S. candidate

#### **FACULTY**

Steve Chipps and Brian Blackwell

#### **EXPECTED COMPLETION**

November 2012



## Lake Sturgeon Population Characteristics, Movements and Habitat Use in Namakan Reservoir

The Namakan River and Reservoir of Northwestern Ontario and Northern Minnesota are home to a recovering population of Lake Sturgeon (*Acipenser fulvescens*). Although the adult portion of this population has been well studied in recent years, very little information has been available for the juvenile (< 60 cm) portion. This study was designed first to gather baseline information focused primarily at locating on a broad scale the “nursery areas” used by juvenile Lake Sturgeon. Netting at 14 locations varying in depth and water flow velocity, returned catches per unit effort ranging from 0.9 juveniles per net set in the Namakan Reservoir to 4.1 juveniles per net set in the upper Namakan River. The highest catches occurred at Bill Lake, located on the Namakan River about 14 km from the river mouth. Acoustic telemetry, a second part of the study, was focused at Bill Lake, where six V2RW acoustic receivers and two “synctags” (VEMCO, Amirix Systems Ltd., Halifax, NS) were stationed in a VEMCO positioning system (VPS) array. At three locations, including Bill Lake, a total of 18 acoustic transmitters were implanted in juvenile Lake Sturgeon, later aged at 4-6 years. Of the juvenile lake sturgeon with transmitters, eight caught elsewhere were not relocated, and two caught at Bill Lake were also not relocated, while the remaining eight at Bill Lake were relocated by the VPS at an average of 6,913 (range = 3,470 to 11,442) geographic positions with an accuracy of <5 m. A resource selection function was calculated to compare use and availability of depth and water flow within the portion of Bill Lake occupied from August through December, 2010. Areas of both lower (6-8 cm/s) and higher (14-16 cm/s) water velocities were used more within the 95% Kernel Density Estimator home ranges of each of the eight fish than would be expected by chance. Shallow (< 6 m) areas of the Namakan River at Bill Lake were also avoided, amounting to <2% of all detections. Tracking was unable to identify diel movement patterns, but occasional peaks in activity were identifiable. The most noticeable peak in activity occurred with the onset of ice cover over Bill Lake. The habitats used within the Namakan River and Reservoir by juvenile Lake Sturgeon consist of deep (>10 m) and lotic waters corresponding to known spawning locations. The strategy among all the juvenile Lake Sturgeon monitored in this study for selecting these habitats corresponds to high site fidelity towards nursery areas.

### FUNDING

U.S. National Park Service, Ontario Ministry of Natural Resources, Lakehead University

### INVESTIGATOR

Cam Trembath, M.S. candidate

### FACULTY

Brian McClaren and Steve Chipps

### EXPECTED COMPLETION

December 2012



## **Spatial Distribution of Rocky Mountain Sandhill Cranes in Response to Habitat Conditions During the Annual Cycle**

This study documents the annual life cycle of sandhill cranes to changing habitat availability in the intermountain corridor from Idaho to Mexico. Study areas include FWS refuges and surrounding private land in parts of five states including Idaho, Colorado, and New Mexico, in two flyways (Central and Pacific), and in two countries (USA and Mexico). Objectives are to 1) identify wetland and agricultural habitats; 2) summarize long-term hydrologic and climatic data for wetland systems; 3) monitor seasonal use of wetland and agricultural habitats by cranes; 4) link chronology and extent of movements with climatic, hydrologic, wetland, and agriculture conditions; and 5) monitor habitat conditions of selected wetlands and link with timing, type, and duration of use by cranes. The information is important in the Conservation Planning process because the role of refuges is identified within the surrounding private landscapes.

### **FUNDING**

U.S. Fish and Wildlife Service; photo by Tom Bentley, DOE

### **INVESTIGATOR**

Tandi Perkins, Ph.D. candidate

### **FACULTY**

Leigh Fredrickson and Charles Berry

### **EXPECTED COMPLETION**

April 2013



## **Development of a Spatially Explicit Growth Model for Larval Pallid Sturgeon: A New Tool for Habitat Assessment**

The pallid sturgeon (*Scaphirhynchus albus*) is a federally endangered species native to the Missouri and lower Mississippi River. Throughout much of the Missouri River system, natural reproduction by pallid sturgeon is believed to be negligible--attributed primarily to the loss of spawning habitat and(or) rearing areas. Long-term recovery and maintenance of this species will likely require significant habitat restoration efforts, with an emphasis on spawning and nursery habitat. Thus, knowledge about feeding and growth dynamics of larval pallid sturgeon is important for identifying rearing areas and monitoring habitat restoration efforts. The goal of this study is to develop a model that could be used to evaluate spatially-explicit growth potential for larval pallid sturgeon. By combining physiological energetics with site-specific, environmental conditions, the approach developed here will enable biologists to identify important rearing areas in the Missouri River.

### **FUNDING**

U.S. Army Corps of Engineers (RWO #104)

### **INVESTIGATOR**

David Deslauriers, Ph.D. candidate

### **FACULTY**

Steve Chipps, Robert Klumb, Brian Graeb

### **EXPECTED COMPLETION**

December 2015



## **Evaluating Relationships Between Wetland Quality, Land Use, and Waterbirds in the Prairie Pothole Region**

Wetland drainage and upland conversion for agriculture has significantly altered the landscape of the Prairie Pothole Region of North America. As a result, this region now contains a mosaic of disturbance regimes, from relatively intact pasturelands to nearly complete wetland and upland loss and conversion. Further, wetland drainage and upland conversion continue in the region and may be accelerating due to high commodity prices and mechanized drain tiling. Consequences of conversion may disturb bottom-up processes and reduce carrying capacity for waterbirds that rely on wetlands. Conservation and management efforts require reliable information on the responses of birds to habitat loss and for efficient allocation of resources. We will investigate wetland health and degradation by measuring plasma-metabolite dynamics of spring-migrating waterfowl and other waterbirds to variation in habitat quality in the Prairie Pothole Region.

### **FUNDING**

U.S. Geological Survey (RWO #103)

### **INVESTIGATOR**

Adam Janke, Ph.D. candidate

### **FACULTY**

Joshua Stafford, Michael Anteau (NPWRC)

### **EXPECTED COMPLETION**

December 2015



## Development and Evaluation of a Larval Pallid Sturgeon Energetics Model

Knowledge about feeding and growth dynamics of larval pallid sturgeon is important for identifying rearing areas and monitoring habitat restoration efforts. Use of ecological models to estimate growth potential of larval pallid sturgeon represents a new approach for assessing habitat suitability for this critical life stage. However, to accomplish this will require a better understanding of larval fish energetics. We will develop a larval pallid sturgeon bioenergetics model using a generalized mass-balance equation,

$$C = (M_s + M_a + SDA) + (F + U) + (G),$$

where food consumption (C) is balanced by 1) respiratory demands ( $M_s$ ,  $M_a$ , and SDA), 2) waste losses (F and U) and 3) growth processes (G). Here,  $M_s$  equals standard metabolism,  $M_a$  is energy expenditure due to activity, SDA is specific dynamic action, F and U are losses due to egestion and excretion, respectively, and G represents somatic growth and gonad production. Standard metabolism ( $M_s$ ) is modeled as a function of body mass and water temperature. Other parameters are defined as a constant proportion of consumed energy (i.e., SDA, F, and U) or as a fixed multiplier of standard metabolism.

### FUNDING

U.S. Army Corps of Engineers (RWO #104)

### INVESTIGATOR

Laura Heironimus, M.S. candidate

### FACULTY

Steve Chipps, Robert Klumb (USFWS)

### EXPECTED COMPLETION

December 2015



## **Quantifying Trophic Interactions and Effects of Harvest Regulations on Lake Trout and Northern Pike in Pactola Reservoir, South Dakota**

Lake trout are a non-native fish in South Dakota and were first stocked in Pactola Reservoir in the late 1970s. Unlike other salmonids, lake trout exhibit relatively slow growth and long maturation time, resulting in a fishery that takes years to develop. By the early 2000s, lake trout were reported to be a popular sport fishery in Pactola Reservoir, with the state record being broken three times in the summer of 2003. However, since the early 2000's, few fish exceeding 400 mm have been documented in the catch-thus contributing little to a trophy fishery. Moreover, body condition of lake trout is poor as indicated by a mean relative weight ( $W_r$ ) of less than 85. Slow growth and poor condition of lake trout indicate that density dependent factors may be impacting the population. To ensure that the management goals for lake trout are ecologically sound, information on population attributes and growth dynamics are needed. Additionally, a better understanding of the interspecific interactions between lake trout and other top-level predators, especially northern pike, is needed.

### **FUNDING**

South Dakota Game, Fish and Parks

### **INVESTIGATOR**

Natalie Scheibel, M.S. candidate

### **FACULTY**

Steve Chipps

### **EXPECTED COMPLETION**

December 2015



## **Evaluating the Value of the Internet for the Collection of Scientific Data (use, harvest and attitudes) from Anglers**

Fishery managers have long recognized the need for and value of human dimensions information for managing the fisheries resources. Collecting good scientific data representative of the angling population is very expensive and takes months to collect and analyze. Recent advances in computer technology and widespread use of the Internet by the public have generated considerable interest in using Internet-based survey methodology. The main advantages of using the Internet are speed and cost savings. However, two major factors that reduce the validity of Internet-based survey methodology are non-response bias and sample validity resulting from incomplete coverage of the target population. It may be possible to develop correction formulas for certain data that would be applicable for longer periods without the need for expensive annual correction procedures. Such correction formulas could save SDGFP considerable amounts of effort and money and permit annual collection of reliable and valid angler data.

### **FUNDING**

S.D. Game, Fish and Parks

### **INVESTIGATOR**

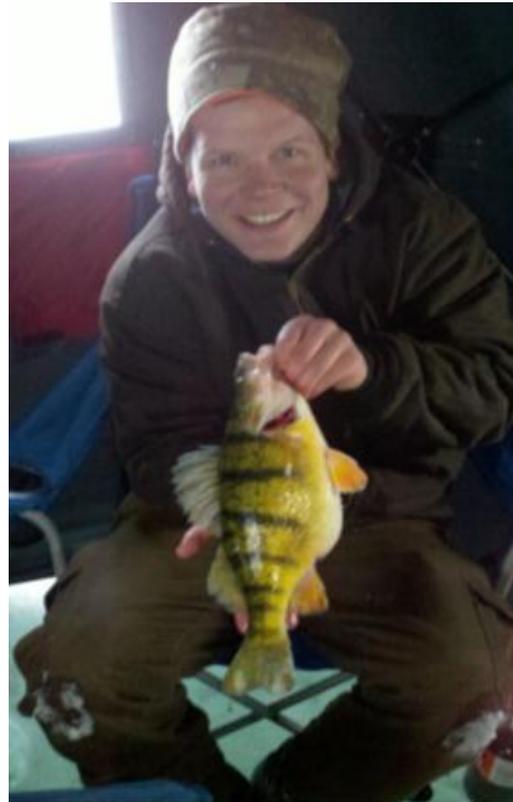
Kjetil Henderson, M.S. candidate

### **FACULTY**

Larry Gigliotti

### **EXPECTED COMPLETION**

June 2014



## **Dynamics of Wetland and Grassland Wetland Ecosystems in the Northern Great Plains**

The U.S. Geological Survey is engaged in an on-going research effort to better understand wetland and grassland ecosystems and their associated biotic communities in the Northern Great Plains (NGP). Of specific research interest are the influences of landscape modification to support agriculture, habitat fragmentation, climate change, invasive plant and animal species, and runoff of chemicals and sediments on native flora and fauna. This project will use and update a historical (1960s) dataset to quantify dynamics of wetlands and their plant communities in the NGP. We will use this long-term comparison to investigate drivers affecting the biota and ecosystem function of wetland and grassland ecosystems, including land use and climate change. This project will directly contribute to priority information needs and conservation programs of partners and partnership organizations in the NGP, such as the Prairie Pothole and Northern Great Plains Joint Ventures.

### **FUNDING**

U.S. Geological Survey-CRU, and Northern Prairie Wildlife Research Center - (RWO #108)

### **INVESTIGATOR**

Ryann Cressey, M.S. candidate

### **FACULTY**

Joshua Stafford, Jane Austin (NPWRC)

### **EXPECTED COMPLETION**

September 2015



## Settling dynamics of breeding ducks in the U.S. Prairie Pothole Region, 1987-2011

In 1988, the U.S. Fish and Wildlife Service created two Habitat and Population Evaluation Teams to conduct an annual sample of wetlands and waterfowl (Cowardin et al 1995) in the U.S. Prairie Pothole Region. The goal of this survey is to estimate the impacts to lands in the National Wildlife Refuge System on waterfowl breeding populations and production. Approximately 583 4-mi<sup>2</sup> plots and 5,000 wetlands are surveyed each year for wetland condition and breeding pairs and aerial photography of each 4-mi<sup>2</sup> plot captures images of approximately 20,000 wetlands and surrounding uplands. Each year these aerial photos of plots are manually interpreted to estimate wetland ponded area and changes in upland land use. The resulting dataset spans 24 field seasons, making it a unique long-term habitat and population database. The objective of this study is to quantify the influence of local-scale factors on waterfowl pair density, using such variables as terrain relief and position, abundance and proximity of woody vegetation, emergent cover types and hydrologic conditions.

### FUNDING

U.S. Fish and Wildlife Service, Region 3 HAPET Office

### INVESTIGATOR

Fred Oslund, M.S. candidate

### FACULTY

Joshua Stafford, Rex Johnson (HAPET)

### EXPECTED COMPLETION

September 2015



## TEACHING

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### STEVE CHIPPS

#### Spring 2012: *Trophic Ecology*

This course covered theoretical and applied aspects of aquatic food web management with an emphasis on lake ecosystems. Quantitative methods for food web analysis and applied approaches to food web management were major themes of the course. The course is intended for advanced students in fisheries and wildlife sciences, biology, or zoology.

#### Fall 2012: *Aquatic Invertebrate Ecology*

This course covered the phylogeny, life-history, habitats and ecology of major freshwater invertebrates. Students developed an appreciation for biomonitoring theory and studied the impacts of exotic and invasive species.

### LARRY GIGLIOTTI

#### Fall 2012: *Advanced Human Dimensions*

This course is designed to provide students aspiring to work in fisheries and wildlife or other natural resource management fields, whether at the federal, state, or local level of government or an NGO, with a basic level of understanding of the social aspects of management and some practical applied human dimensions skills.

### JOSHUA STAFFORD

#### Spring 2012: *Special Topics: The Beak of the Finch*

This course was a reading seminar where graduate students read and discussed Jonathan Weiner's classic book *The Beak of the Finch*. Students developed an improved understanding of evolutionary ecology, particularly how natural selection can work and be observed in near real time under ideal circumstances.

## THESES AND DISSERTATIONS

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Fincel, M.J. 2011. Productivity and trophic interactions in the Missouri River impoundments. Ph.D. Dissertation, South Dakota State University, Brookings, SD.

James, D.A. 2011. The influence of *Didymosphenia geminata* on fisheries resources in the Black Hills of South Dakota. Ph.D. Dissertation, South Dakota State University, Brookings, SD.

Meyer, H.A. 2011. Influence of diet and environmental variation on physiological responses of juvenile pallid sturgeon *Scaphirhynchus albus*. M.S. Thesis, South Dakota State University, Brookings, SD.

## AWARDS AND HONORS

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STEVE CHIPPS, UNIT LEADER:

- Received the *Distinguished Professional Service Award* from the Dakota Chapter of the American Fisheries Society

JOSHUA STAFFORD, ASSISTANT UNIT LEADER:

- Received a *STAR Award* (Special Thanks for Achieving Results) for exceeding performance standards
- Received a *USGS Non-monetary Award* for service to Cooperators

LARRY GIGLIOTTI, ASSISTANT UNIT LEADER:

- Received a *USGS Non-monetary Award* for service to Cooperators

ADAM JANKE, PH.D. STUDENT (STAFFORD):

- Received the *Kenneth F. Higgins Waterfowl Legacy* scholarship (2012)
- Won the Best Student Presentation Award at the 2012 annual meeting of the South Dakota Chapter of The Wildlife Society

AUSTIN GALINAT, UNDERGRADUATE TECHNICIAN (CHIPPS)

- Received the *Sauger Scholarship Award*, Dakota Chapter American Fisheries Society (2012)

HILARY MEYER, M.S. STUDENT (CHIPPS)

- Received *Honorable Mention Best Student Poster Award*, Missouri River Natural Resources Conference (2012)

## SCIENTIFIC PRESENTATIONS

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- Behney, A. C., R. O'Shaughnessy, M. W. Eichholz, and J. D. Stafford. 2012. Ecological factors influencing foraging behavior of ducks during spring migration in the Wabash River floodplain, USA. 3rd Pan-European Duck Symposium, Jindřichův Hradec, Czechia.
- Deslauriers, D., D. McLeod, S. Windels, S.R. Chipps, C.A. Trembath, S.L. Shaw, and B. McLaren. 2012. Do sturgeon require passports? A collaborative research effort to describe lake sturgeon seasonal distribution between the Namakan River (Canada) and Reservoir (United States). 142<sup>nd</sup> Annual meeting of the American Fisheries Society, St. Paul, MN.
- Dolson, D., M. Duda, C. Miller, L. Gigliotti, and N. Sexton. 2012. The quandary of Internet survey expediency vs. mixed-mode survey reliability. Pathways to Success Conference, Breckenridge, CO.
- Galinat, A., J. Davis, G. Galinat, and S.R. Chipps. 2012. Seasonal and size-dependent diet composition of northern pike in Pactola Reservoir, South Dakota. Dakota Chapter of the American Fisheries Society, Chamberlain, SD.
- Gigliotti, L.M, and E.D. Stukel. 2012. Citizen's beliefs and attitudes towards climate change in South Dakota. Pathways to Success Conference, Breckenridge, CO.
- Hagy, H.M., R.V. Smith, J.D. Stafford, A.P. Yetter, C.J. Whelan, C.S. Hine, M.M. Horath, R.M. Kaminski, and K.J. Reinecke. 2012. Foraging thresholds for accurately estimating carrying capacity for non-breeding waterfowl. Long Point Waterfowl Partners Forum, Long Point, Ontario, Canada.
- Henderson, K.R., and L.M Gigliotti. 2012. Value of the Internet for the collection of angler data. 142<sup>nd</sup> Annual meeting of the American Fisheries Society, St. Paul, MN.
- Henderson, K.R., and L.M Gigliotti. 2012. Evaluating biases associated with conducting an Internet statewide angler survey. Pathways to Success Conference, Breckenridge, CO.
- Higgins, K.F. 2012. Changing farm crops, demographics, and land use practices in South Dakota during the past 125 years. Annual meeting of Pheasant's Forever, Pierre, SD.
- Higgins, K.F. 2012. Prairies, Plains, and Preservation: 16,000 years of use and abuse. 23<sup>rd</sup> Bi-annual North American Prairie Conference, University of Manitoba, Winnipeg, Manitoba, Canada.
- James, D.A., and S.R. Chipps. 2012. An evaluation of the efficacy of whole-stream phosphorus enrichment to reduce coverage of *Didymosphenia geminata* in an oligotrophic stream. 142<sup>nd</sup> Annual meeting of the American Fisheries Society, St. Paul, MN.

- Kaemingk, M.A., J.C. Jolley, D.W. Willis, and S.R. Chipps. 2012. Priority effects among young of the year fish: reduced growth of bluegill sunfish caused by yellow perch. Dakota Chapter of the American Fisheries Society, Chamberlain, SD.
- Kaemingk, M.A., D.J. Dembkowski, H.A. Meyer, and L.M. Gigliotti. 2012. Some insight for undergraduates seeking an advanced degree in wildlife and fisheries sciences. 142<sup>nd</sup> Annual meeting of the American Fisheries Society, St. Paul, MN.
- Meyer, H.A., S.R. Chipps, B.D.S. Graeb, and R.A. Klumb. 2012. Evidence for countergradient variation in pallid sturgeon physiology. Dakota Chapter of the American Fisheries Society, Chamberlain, SD.
- Meyer, H.A., S.R. Chipps, B.D.S. Graeb, and R.A. Klumb. 2012. Latitudinal variation in pallid sturgeon physiology and implications for bioenergetics models. Missouri River Natural Resources Conference, Pierre, SD.
- O'Shaughnessy, R., A.C. Behney, M. W. Eichholz, & J. D. Stafford. 2012. Testing the ideal free distribution of spring migratory waterfowl along the Wabash River, Illinois. North American Ornithological Conference, Vancouver, Canada.
- Rapp, T., B.D.S. Graeb, S.R. Chipps, and R.A. Klumb. 2012. Ontogenetic prey preferences of pallid sturgeon. Dakota Chapter of the American Fisheries Society, Chamberlain, SD.
- Rapp, T., D.A. Shuman, B.D.S. Graeb, S.R. Chipps, and E.J. Peters. 2012. Diet composition and feeding patterns of shovelnose sturgeon with inferences about foraging habitats in the lower Platte River, Nebraska, USA. Missouri River Natural Resources Conference, Pierre, SD.
- Rapp, T., B.D.S. Graeb, S.R. Chipps, and R.A. Klumb. 2012. Ontogenetic prey preferences of pallid sturgeon. Missouri River Natural Resources Conference, Pierre, SD.
- Squillace, M., J.M. Stone, and S.R. Chipps. 2012. Historical trends associated with sediment-bound mercury for select South Dakota lakes. Western South Dakota Hydrology Conference, Rapid City, South Dakota.
- Squillace, M., J. Stone, and S.R. Chipps. 2012. Historical sediment mercury deposition for South Dakota lakes. Dakota Chapter of the American Fisheries Society, Chamberlain, SD.
- Stafford, J. D., B. J. O'Neal, and R. P. Larkin. 2011. Waterfowl on weather radar: a new view of dabbling duck migration. South Dakota Ornithologists' Union Fall 2011 Meeting. Banquet Speaker.

Stafford, J. D., A. Janke, R. Murano, and M. Anteau. 2012. Functional responses of waterfowl to wetland and upland conversion and degradation in East River South Dakota (Pilot Year – Spring 2012). Presentation to the South Dakota Department of Game, Fish & Parks Fall Wildlife Staff Meeting, Custer, South Dakota.

Thul, M.D., S.R. Chipps, B.G. Blackwell. 2011. Growth and survival of stocked fingerling walleye in South Dakota. 72<sup>nd</sup> Midwest Fish and Wildlife Conference, Des Moines, Iowa.

Thul, M.A., S.R. Chipps, and B.A. Blackwell. 2012. Experimental assessment of age-0 walleye survival and growth in South Dakota. Dakota Chapter of the American Fisheries Society, Chamberlain, SD.

## **WORKSHOPS & TRAINING**

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James, D.A. and S.R. Chipps. A review of before-after-control-impact (BACI) designs: a statistical design for detecting changes in aquatic systems. Annual meeting of the Dakota Chapter of the American Fisheries Society, Chamberlain, SD. February 21, 2012.

Chipps, S.R., K. Pope, C. Chizinski, and C. Berry. DOI Motorboat Operator Certification Course (MOCC), Brookings, SD. May 29-31, 2012.

## **TECHNICAL AND POPULAR PUBLICATIONS**

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DeJong, J.R., and K.F. Higgins. 2012. An analysis of landscape level characteristics which may be influencing wetland use by lesser scaup during spring migration in the Central flyway. Report to the U.S. Fish and Wildlife Service, Fergus Falls, MN.

Hine, C. S., R. V. Smith, A. P. Yetter, M. M. Horath, J. D. Stafford, and H. M. Hagy. 2012. Waterbird and wetland monitoring at The Emiquon Preserve. 2011 Annual Report. The Nature Conservancy. INHS Technical Report 2012 (15). May. 42 pp.

Yetter, A. P., M. M. Horath, C. S. Hine, R. V. Smith, and J. D. Stafford. 2011. Illinois Waterfowl Surveys and Investigations. INHS Technical Report 2011 (41). November. 74 pp.

Smith, R. V., J. D. Stafford, A. P. Yetter, Christopher J. Wehlan, Christopher S. Hine, and Michelle M. Horath. 2011. Foraging thresholds of spring migrating dabbling ducks in Illinois. INHS Technical Report 2011 (37). November. 55 pp.

## SCIENTIFIC PUBLICATIONS

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- Csargo, I.J., S.R. Chipps, and M.L. Brown. 2012. Application of a bioenergetics model for hatchery production: largemouth bass fed commercial diets. *North American Journal of Aquaculture* 74:352-359.
- Dassow, J., M. W. Eichholz, J. D. Stafford, and P. J. Weatherhead. 2012. Increased nest defense of upland-nesting ducks in response to experimentally reduced risk of nest predation. *Journal of Avian Biology* 43:61–67.
- Fincel, M.J., J.A. VanDeHey, and S.R. Chipps. 2012. Non-lethal sampling of walleye for stable isotope analysis: a comparison of three tissues. *Fisheries Management and Ecology* 19:283-292.
- Fincel, M.J., S.R. Chipps, B.D.S. Graeb, and K. Edwards. 2012. Larval gizzard shad characteristics in Lake Oahe, South Dakota: a species at the northern edge of its range. *Journal of Freshwater Ecology* 27:1-10.
- Fincel, M.J., J.A. VanDeHey, A. Wuestewald, and S.R. Chipps. 2012. Comparing isotope signatures of prey fish: does gut removal affect  $^{13}\text{C}$  or  $^{15}\text{N}$ ? *Journal of Freshwater Ecology* 27:55-62.
- James, D.S., I.J. Csargo, A. Von Eschen, M.D. Thul, J.M. Baker, C.A. Hayer, J. Howell, J. Krause, A. Letvin, and S.R. Chipps. 2012. A generalized model for estimating the energy density of invertebrates. *Freshwater Science* 31:69-77.
- Kaemingk, M.A., J.C. Jolley, D.W. Willis, and S.R. Chipps. 2012. Priority effects for age-0 yellow perch result in reduced growth for age-0 bluegill. *Freshwater Biology* 57:654-665.
- Kahara, S.N., and S.R. Chipps. 2012. Wetland hydrodynamics and long-term use of spring migration areas by lesser scaup in eastern South Dakota. *Great Plains Research* 22:69-78.
- Kesler, D., R. Laws, A. Cox, A. Gouni, and J. D. Stafford. 2012. Survival and population persistence in the critically endangered Tuamotu Kingfisher. *Journal of Wildlife Management* 76:1001–1010.
- O’Neal, B. J., J. D. Stafford, and R. L. Larkin. 2012. Stopover duration of fall-migrating dabbling ducks. *Journal of Wildlife Management* 76:285–293.

- Ruebush, B. C., G. G. Sass, J. H. Chick, and J. D. Stafford. 2012. In-Situ tests of sound-bubble-strobe light barrier technologies to prevent range expansions of Asian carp. *Aquatic Invasions* 7:37–48.
- Shaw, S.L., S.R. Chipps, S.K. Windels, M.A.H. Webb, D.T. McLeod, and D.W. Willis. 2012. Lake sturgeon population attributes and reproductive structure in Namakan Reservoir, Minnesota and Ontario. *Journal of Applied Ichthyology* 28:168-175.
- Schoenebeck, C.W., M.L. Brown, S.R. Chipps, and D. R. German. 2012. Nutrient and algal responses to winterkilled fish-derived nutrient subsidies in eutrophic lakes. *Lake and Reservoir Management* 28:189-199.
- Spindler, B.A., S.R. Chipps, R.A. Klumb, B.D.S. Graeb, and M.C. Wimberly. 2012. Habitat and prey availability attributes associated with juvenile pallid sturgeon occurrence in the Missouri River. *Endangered Species Research* 16:225-234.
- Smith, R. V, J. D. Stafford, A. P. Yetter, M. M. Horath, C. S. Hine, and J. P. Hoover. In Press. Foraging ecology of fall-migrating shorebirds in the Illinois River valley. *PLoS ONE* 7(9): e45121. doi:10.1371/journal.pone.0045121
- Straub, J. N., R. J. Gates, R. D. Schultheis, T. Yerkes, J. M. Coluccy, and J. D. Stafford. 2012. Wetland Food Resources for Spring-Migrating Ducks in the Upper Mississippi River and Great Lakes Region. *Journal of Wildlife Management* 76:768–777.