

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

2016 ANNUAL REPORT
OCTOBER 2015 – SEPTEMBER 2016



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

The U.S. Geological Survey, South Dakota Cooperative Fish & Wildlife Research Unit would like to extend our thanks to alumni, cooperators, students and staff for another productive year at South Dakota State University. Unit scientists are fortunate to work with a talented group of graduate students, research associates and agency biologists to address wildlife research needs in our state and region. Since 1963, over 250 students have received graduate degrees working with Unit scientists at the SD Coop Unit. Research at the South Dakota Coop Unit, guided by our Coordinating Committee, is conducted primarily by graduate students studying a range of topics that include endangered species biology, wetland ecology, fisheries management, upland game, big game management, and non-game species. 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 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.



In 2010, Professor Emeritus and Assistant Unit Leader Dr. Kenneth F. Higgins (retired) established the *Kenneth F. Higgins Waterfowl Legacy Research Endowment*, directed at supporting graduate student research that benefits wetland-dependent avian species. Contributions to the endowment can be made by contacting the SDSU Alumni Association (888.735.2257; alumni@statealum.com).

Continuing our long-standing tradition of cooperative research, the South Dakota Coop Unit looks forward to 2017 and addressing research needs of our state and federal partners to better manage fish and wildlife resources in the Northern Great Plains. Feel free to contact us for more information.

Steven R. Chipps, Unit Leader
Larry M. Gigliotti, Assistant Unit Leader
Joshua D. Stafford, Assistant Unit Leader

UNIT ADDRESS: U.S. Geological Survey, South Dakota Cooperative Fish and Wildlife Research Unit, McFadden Biostress Laboratory, NRM Box 2140B, 1390 College Ave, Brookings, SD 57007; telephone: 605-688-5467; fax: 605-688-4515; e-mail: Kathryn.Tvedt@sdstate.edu.
http://www.coopunits.org/South_Dakota/

CONTENTS

	Page
UNIT STAFF AND COOPERATORS	4
COORDINATING COMMITTEE.....	5
RESEARCH PERSONNEL	5
COOPERATORS AND COLLEAGUES.....	6
ADMINISTRATIVE SUPPORT.....	7
PROGRAM DIRECTION STATEMENT.....	8
ALUMNI NEWS	9
COMPLETED PROJECTS.....	11
ONGOING PROJECTS	17
TEACHING.....	27
AWARDS AND HONORS.....	27
SCIENTIFIC PRESENTATIONS	28
WORKSHOPS & TRAINING.....	31
THESES AND DISSERTATIONS	31
PEER-REVIEWED PUBLICATIONS.....	32

UNIT STAFF AND COOPERATORS

DR. STEVEN R. CHIPPS

Unit Leader and Adjunct Professor
Fisheries Management and Ecology
Steven.Chipps@sdstate.edu

DR. JOSHUA D. STAFFORD

Assistant Unit Leader and Adjunct Associate Professor
Waterfowl and Wetlands Ecology and Management
Joshua.Stafford@sdstate.edu

DR. LARRY M. GIGLIOTTI

Assistant Unit Leader and Adjunct
Assistant Professor
Human Dimensions of Wildlife
Management
Larry.Gigliotti@sdstate.edu

MRS. KATHRYN TVEDT

Unit Administrative Support Specialist
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

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

Dr. Stephen Torbit
Assistant Regional Director
USFWS-Mountain Prairie
Denver Federal Center
P. O. Box 25486, DFC
Denver, CO 80225-0486

Pat Ruble
Midwest Field Representative
Wildlife Management
Institute
12748 West Bank Drive
Millersport, OH 43046

Dr. Daniel Scholl
Interim Dean
College of Agriculture and
Biological Sciences
SDSU, Box 2207
Brookings, SD 57007

Dr. Michael Tome
Unit Supervisor
Cooperative Research Units
206 4th Avenue
Brunswick, MD 21716

RESEARCH PERSONNEL

Fulbright Fellow

Dr. Murugan Muthiah

Ph.D. candidates

Jarrett Pfrimmer
Lily Sweikert
Aaron Sundmark

M.S. candidates

Alex Rosburg
Travis Rehm
Fred Oslund
Neal Martorelli
Jeremy Kientz

Undergraduate research technicians

Jason Augspurger
Wesley Bowen
Tiffany Hennigs
Denielle Meyerink
Isaiah Porteous
Riley Schubert
Kelsen Young
Josh Zylstra

COOPERATING FACULTY – SOUTH DAKOTA STATE UNIVERSITY

<u>Name</u>	<u>Department</u>	<u>Cooperative Activity</u>
Mr. Peter Bauman	Natural Resource Management	Land use/change
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. Chuck Dieter	Natural Resource Management	Wildlife research
Dr. Michele Dudash	Head, Natural Resource Management	Administration
President Barry Dunn	President, SDSU	Administration
Dr. Brian Graeb	Natural Resource Management	Fish ecology studies
Dr. Troy Grovenburg	Natural Resource Management	Wildlife research
Dr. Jonathan 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
Dr. Thomas Loveland	EROS-GIS Center of Excellence	Breeding bird study
Dr. Michael Miller	Economics	Economic Impact of Fishing
Dr. Lora Perkins	Natural Resource Management	Neonicotinoids
Dr. Daniel Scholl	Interim Dean, College of ABS	Administration
Dr. Nels Troelstrup	Natural Resource Management	Oak Lake Field station
Dr. Michael Wimberly	GIS Center of Excellence	Pallid sturgeon
Dr. Melissa Wuellner	Natural Resource Management	Fish ecology studies

REGIONAL COOPERATING SCIENTISTS

<u>Name (South Dakota Unit Person)</u>	<u>Agency/University</u>	<u>Subject</u>
Mr. Geno Adams (Gigliotti)	SD GFP	Internet Angler Surveys
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
Dr. Michael Eichholz (Stafford)	Southern Illinois University	Migration ecology
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	Pallid sturgeon
Dr. Rex Johnson (Stafford)	FWS HAPET – Fergus Falls	Conservation planning
Dr. Mark Kaemingk (Chipps)	University of Nebraska	Fish bioenergetics
Dr. Dylan Kesler (Stafford)	University of Missouri	Avian ecology, modeling
Dr. Wes Larson (Chipps)	University of Wisconsin-Stevens Point	Fish genetics
Mr. Dave Lucchesi (Chipps)	SD GFP	Small impoundments
Dr. Jonathan Lundgren (Stafford)	Blue Dasher Farms	Pesticides
Dr. Charlie Madenjian (Chipps)	USGS Great Lakes Science Center	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. Kevin Pope (Chipps)	University of Nebraska	MOCC training
Dr. James Rice (Chipps)	North Carolina State University	Fish bioenergetics
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
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. 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. Tammy Wilson (Gigliotti)	National Park Service	Wildlife/Human dimensions

ADMINISTRATIVE SUPPORT

SOUTH DAKOTA DEPARTMENT OF GAME, FISH & PARKS

The South Dakota Coop Unit works closely with SD Department of Game, Fish and Parks. We thank Tony Leif, 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, Dawn Van Ballegooyen, and Dr. Michele Dudash from NRM as well as Martha Aragon, Dr. James Doolittle, Shirley Jensen, Billie Jo Pirlet, Kay Scheibe, Dr. Daniel Scholl, Barbara Suderman, Ann Taecker, and Doug Ward.

US GEOLOGICAL SURVEY, COOPERATIVE RESEARCH UNIT PROGRAM

The USGS-CRU Headquarters staff in Reston, VA provide guidance and assistance to Unit personnel. We thank Suzanne Cartagirone, Shana Coulby, Brenda Croston, Don Dennerline, Derek Geary, Melissa Thode, Mike Tome, John Thompson and John Organ 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

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, biota, and human dimensions. Wetland and upland research in the Prairie Pothole Region will incorporate landscape-level influences of natural and anthropogenic variation on the fish, wildlife, invertebrates, and plant communities in this region. 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 and upland research will address wetland conservation, production of waterfowl and other avifauna, 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.



ALUMNI NEWS

Cooperators of the South Dakota Coop Unit provide critical support for the Unit program and in return, they benefit from research products and technical training associated with graduate education at SDSU. Job placement and professional accomplishment are testaments to the success of students and research associates who have moved on to careers with Federal, State, or Non-government (NGO) partners – as well as academic institutions in the U.S. and Canada. A few recent examples:

FEDERAL AGENCIES: Dr. Daniel James (Ph.D. 2011), Fisheries Biologist with the U.S. Fish & Wildlife Service (USFWS) and Adjunct Faculty member in NRM was appointed to serve on the *Effects Analysis Science Team* for Pallid Sturgeon recovery in the upper Missouri River basin. Laura Heironimus (M.S. 2015) and Kjetil Henderson (M.S. 2014) recently accepted Fisheries Biologist positions with the USFWS in Arcata, CA and Carterville, IL, respectively. And Dr. Carry Ann-Hayer (Research Associate, 2012) recently accepted a new position with the USFWS in Green Bay, WI.



Laura Heironimus with a white sturgeon on the San Joaquin River,

STATE AGENCIES: Dr. Katie Bertrand (Postdoc 2007), Associate Professor with NRM, and Dr. Mark Fincel (Ph.D. 2011), Senior Biologist with SD Game, Fish and Parks (SDGFP), currently serve as President and President-elect, respectively, for the Education Section of the American Fisheries Society (AFS). Hilary Meyer (M.S. 2011), Fisheries Biologist with SDGFP Missouri River Fisheries Center, serves as co-Editor of the Education Section Newsletter for AFS; and Mike Greiner (M.S. 2013) recently returned to South Dakota where he works as a Fisheries Biologist for SDGFP on the Missouri River. Megan

Thul (M.S. 2014) joined the Iowa Department of Natural Resources' *Interior Rivers and Streams Investigations Team* where she works as a Fisheries Biologist at the Manchester Research Station. And Natalie Scheibel (M.S. 2015) recently accepted a position as Assistant District Fish Biologist for the Oregon Department of Fish and Wildlife working with anadromous salmon in Newport,



Natalie Scheibel (right) collecting steelhead from the Methow River, WA

OR. Jeremy Kientz (M.S. 2016) is a Research Biologist with SDGFP's McNenny Hatchery in Spearfish, SD where he works with trout ecology & management in the Black Hills. Jeremy was a recipient of the *Janice Lee Fenske Memorial Award* at the 2016 Midwest Fish & Wildlife Conference in Grand Rapids, MI.

NGO PARTNERS: Ryan Cressey (M.S. 2016) was hired by Ducks Unlimited, Inc. in 2015. Ryann works at the Great Plains Regional Office in Bismarck, North Dakota and is a full time, permanent Wetland Biologist.



Ryan Cressey

UNIVERSITIES: Dr. David Deslauriers (Ph.D. 2015) is a Post-doctoral Research Fellow working with Lake Sturgeon at the University of Manitoba. David was recently honored as a *2016 Outstanding Young Professional* by the Education Section of the American Fisheries Society and serves on the



Dr. David Deslauriers (left)

Foundation Committee for the North American Sturgeon and Paddlefish Society. Dr. Adam Janke (Ph.D. 2016) recently started his new position as Assistant Professor at the University of Iowa, Ames, IA. Adam received numerous awards as a Coop Unit student including the *Edward D. & Sally M. Futch Graduate Fellowship* from Ducks Unlimited.



Dr. Adam Janke

COMPLETED PROJECTS

Growth Potential of Age-0 Pallid Sturgeon in the Missouri River: Insight From an Individual Based Model

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 of this species will likely require significant habitat restoration efforts, with an emphasis on spawning and nursery habitat. In this study, we developed a growth model that will allow researchers to evaluate habitat quality and survival potential for age-0 pallid sturgeon. Using an individual-based modeling approach, we evaluated growth potential of Pallid Sturgeon in the Missouri River. The model, developed for age-0 sturgeon, combines information on functional feeding response, bioenergetics and swimming ability to regulate consumption and growth within a virtual foraging arena. Empirical data on water temperature, water velocity, and prey density were obtained from three sites in the Missouri River and used as inputs in the model to evaluate hypotheses concerning factors affecting pallid sturgeon growth. The model was also used to evaluate the impacts of environmental heterogeneity and water velocity on fish growth variability, foraging success and dispersal ability. Growth was simulated for a period of 100 days using 100 individuals (first feeding; 19 mm and 0.035 g) per scenario. Higher growth was shown to occur at sites where high densities of Ephemeroptera and Chironomidae larvae occurred throughout the growing season. Highly heterogeneous habitats (i.e., wide range of environmental conditions) and moderate water velocities (0.3 m/s) were also found to positively affect growth rates. The model developed here provides an important tool for evaluating growth hypotheses and(or) identifying habitats in the Missouri River that are favorable to age-0 pallid sturgeon growth.

FUNDING

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

INVESTIGATOR

David Deslauriers, Ph.D. candidate

FACULTY

Steve Chipps, Brian Graeb, Brian McLaren
(Lakehead University)

COMPLETED

June 2016



Evaluating Relationships Among Wetland Quality, Land Use, and Waterbirds in the Prairie Pothole Region

The conversion of grassland and wetland ecosystems in the Prairie Pothole Region (PPR) has been a pervasive challenge for conservationists dating back to the early 1900's. The legacy of steadily increasing agricultural intensity in the southern portions of the PPR, including eastern South Dakota, has left many wetland ecosystems in a matrix of intensive agricultural production. With little surrounding nesting cover, these wetlands have limited potential for waterfowl reproduction but may still play an important role each spring facilitating migration of waterfowl en route to more northerly breeding areas. Our research sought to understand the contributions of wetlands in intensively farmed landscapes for migrating ducks. We measured a number of biotic attributes of wetlands including the density of aquatic invertebrates and submersed macrophytes and use by spring-migrating ducks. We also measured concentrations of lipid metabolites circulating in plasma of female lesser scaup (*Aythya affinis*) and blue-winged teal (*Anas discors*) to understand refueling performance of migrants using wetlands with variable biotic and abiotic characteristics. Duck abundance, refueling performance, and prey availability were generally similar across the upland cultivation gradient, if not slightly greater in more intensely farmed landscapes. These results suggest wetlands in intensively farmed landscapes in eastern South Dakota currently confer similar benefits to migrating waterfowl as those in less intensively farmed landscapes. Further, they raise questions about whether wetlands in intensively farmed landscapes are indeed resilient to adjacent land use or simply compensate for degradation through increased productivity characteristic of landscapes with intensive crop production; an important question for setting wetland restoration priorities in the region.

FUNDING

U.S. Geological Survey (RWO #103), South Dakota
Department of Game, Fish & Parks

INVESTIGATOR

Adam Janke, Ph.D. candidate

FACULTY

Joshua Stafford, Michael Anteau (NPWRC)

COMPLETED

April 2016



Development and Application of a Larval Pallid Sturgeon Energetics Model

Knowledge about feeding and growth dynamics of larval pallid sturgeon (*Scaphirhynchus albus*) 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. In this study, we developed and tested a bioenergetics model for young-of-year pallid sturgeon. To parameterize the model, we measured metabolic rate and growth of pallid sturgeon subjected to a range of temperatures commonly found in the Missouri River (13–24°C). We then used the model to evaluate effects of pre- and post-dam water temperatures on larval growth rates in the lower (LMR) and upper (UMR) Missouri River. Using information on prey composition and water temperature, we found that growth increased by 1.0% but decreased by 65 % from pre- to post-dam periods in the LMR and UMR, respectively. Our modeling results revealed that accumulated thermal units (ATU) during the growing period in the LMR were similar between pre- and post-dam periods but declined by 54% in the UMR. Our findings suggest that cold water from deep-release storage reservoirs negatively impacted growth of larval Pallid Sturgeon within at least 110 km downstream; however, at distances greater than 960 km below impoundments, the negative impacts from cold water releases below dams are no longer detected. With six major dams along the main stem upper Missouri River, thermal depression may be an important cause of recruitment failure in Pallid Sturgeon and we recommend that future efforts evaluate the spatial distribution of cold water impacts on larval Pallid Sturgeon growth and survival.

FUNDING

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

INVESTIGATOR

Laura Heironimus, M.S. candidate

FACULTY

Steve Chipps

COMPLETED

December 2015



An Assessment of Direct Mortality to Avifauna from Wind Energy Facilities in North Dakota and South Dakota

Potential impacts of large wind energy developments to migratory and resident bird populations in the Prairie Pothole Region (PPR) within North Dakota and South Dakota remain poorly understudied even though 2,230 turbines are actively generating power in these states and numerous wind energy projects have been proposed for future development. Conservation agencies (both state and federal) entrusted with the protection of migratory birds and resident wildlife require empirical information to make informed decisions that minimize potential negative impacts to waterfowl, shorebirds, waterbirds, songbirds, galliformes, and raptor species that rely on large intact blocks of mixed-grass prairie and abundant wetlands to meet their life-history requirements. However, no information on potential direct mortality from wind turbines is available for the Missouri Coteau portion of the PPR across these avian guilds. Additionally, the Missouri Coteau is considered the most productive landscape for nesting waterfowl in North America. Because of the unique topographical characteristics of the Missouri Coteau and its importance to avian communities, site-specific information is in need to inform managers and wind energy developers regarding the siting of wind farms in areas whereby adverse impacts from direct mortality to birds are minimized.

FUNDING

U.S. Geological Survey (RWO # 110)

INVESTIGATOR

Bri Graff, M.S. candidate

FACULTY

Troy Grovenburg, J. Stafford, J. Jenks, C. Swanson (USFWS), K. Jensen, R. Klaver (USGS), S. Kempema (GFP)

COMPLETED

February 2016



Survival, Abundance and Relative Predation of Wild Rainbow Trout in Deerfield Reservoir, South Dakota

South Dakota's Black Hills lakes and streams are home to many trout species. While Brook and Brown Trout populations are sustained almost entirely by natural reproduction, most Rainbow Trout populations are supplemented with hatchery stockings due to their lack of reproduction, poor survival, and failure to recruit into adult populations. Deerfield Reservoir is an exception, where wild Rainbow Trout are known to successfully reproduce. Nonetheless, Rainbow Trout continue to be stocked due to uncertainties regarding the proportion of wild fish in the population. These uncertainties stem from an inability to distinguish between wild and hatchery Rainbow Trout. Our work focused on identifying new techniques to classify Rainbow Trout and their origins using analysis of carbon and nitrogen stable isotopes in fin and muscle tissues and analysis of otolith microchemistry. We found that wild Rainbow Trout can be classified with greater than 90% accuracy using stable isotope signatures in pectoral fin or muscle tissue. Using otolith microchemistry to identify natal tributary stream origin, we found that natal origin (stream) for wild Rainbow Trout could be classified with over 80% accuracy. Based on Ba and Mn concentration (mmol mol^{-1}) in the fish's otoliths, we found that 67% of wild Rainbow Trout in Deerfield Reservoir originated from Castle Creek, whereas 33% were classified to South Fork Castle Creek. These results indicated that Castle Creek likely contributes a greater number of wild Rainbow Trout recruits to the Deerfield Reservoir population than South Fork Castle Creek. Overall our results revealed that a healthy, sustainable population of wild Rainbow Trout exist in Deerfield Reservoir. Fisheries managers can use the results of our study to identify future management strategies for Deerfield Reservoir and the wild Rainbow Trout population.

FUNDING

South Dakota Game, Fish and Parks

INVESTIGATOR

Jeremy Kientz, M.S. candidate

FACULTY

Steve Chipps, Jake Davis (GFP), Dan James (USFWS)

COMPLETED

May 2016



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

Wetlands in Stutsman County, North Dakota were revisited after 50 years to assess changes in wetland conditions and plant communities within wetland zones in the Prairie Pothole Region. Within this region, a severe drought occurred in 1988- 1992 followed by the longest deluge starting in 1993 with wetlands still impacted today. In 2013 and 2014, we revisited 80 of the original wetlands measuring water depths and specific conductivity as well as measuring wetland size from aerial imagery. Additionally, we conducted quadrat-based vegetation surveys within 4 wetland zones (i.e., wet meadow, shallow marsh, deep marsh, and open water) to examine changes in species composition, frequency, abundance, and to document progression of invasive plant species. Although wetlands across the study area responded to deluge conditions differently, plant communities within wetland zones were only 25 % similar in species composition across all study areas from the 1960s to 2013-14. Moreover, invasive plant species increased in frequency and became some of the most abundant species within wetland zones. Climatic extremes in combination with invasive plant species greatly impacted species composition, frequency and abundance of individual plant species in plant communities within wetland zones across our study area.

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)

COMPLETED

June 2016



ONGOING PROJECTS

Human Dimensions of Habitat Loss in the Plains & Prairie Pothole LCC

The Plains & Prairie Potholes Landscape Conservation Cooperative (PPP-LCC) identified habitat loss (factors influencing land use and land conversion) as a key research need in 2012. This grassland-wetland ecosystem provides essential habitat for an array of wildlife, especially waterfowl. Temperate grasslands are one of the most threatened biomes worldwide, with the greatest threat being conversion to annual crop production. Recent studies have estimated a net loss of 1.3 million acres of grassland from 2006 to 2011 in five states (ND, SD, NE, MN, IA). Many factors contribute to loss of wildlife habitat, but ultimately it comes down to decisions made by the private landowner. Currently, economic pressures from high corn and soybean prices probably figure heavily in the decision; however, understanding how a private landowner responds to economic incentives/pressures may identify strategies to reduce habitat loss in the Plains and Prairie Pothole Region. Also, farmers and ranchers generally have more than an economic interest in their lands often with strong social and cultural ties to their lands. Moreover, half of all current farmers and ranchers are likely to retire in the next decade often resulting in the agricultural land being split among surviving relatives who do not plan to continue farming/ranching. The purpose of this study is to (1) measure attitudes and behaviors towards participating in conservation programs, (2) identify future changes in farming/ranching practices related to the aging trend of farmers/ranchers, and (3) measure the wildlife value orientations of landowners and the relationship with attitudes and intended behaviors towards participating in conservation programs.

FUNDING

U.S. Fish and Wildlife Service (RWO # 112)

INVESTIGATOR

Lily Sweikert, Ph.D. candidate

FACULTY

Larry Gigliotti

EXPECTED COMPLETION

December 2017



Social & Economic Impact of Fishing in Selected Small Lakes & Impoundments in South Dakota

South Dakota Game, Fish and Parks (GFP) has expressed a need for information to estimate the Direct Economic Impact (DEI) of fishing and other water-related recreation in selected small lakes and impoundments to local and state economies. GFP's strategic plan for the East River Fisheries Management Area (SDGFP, 2014a) lists a total of 257 natural lakes and impoundments (Table 1); the strategic plan for West River Fisheries Management area (SDGFP, 2014b) lists two natural lakes and over 100 small lakes and ponds under GFP management; and the strategic plan for the Black Hills Fisheries Management Area (SDGFP, 2014c) lists 47 small lakes and ponds under GFP management. Over time many of these lakes will require very expensive habitat renovation projects (e.g. dam repair, dredging, docks and boat ramps, complete fish renovations, etc.) to improve or maintain quality recreational services. Economic information of the value of fishing and other water-related recreation can help inform decisions regarding expensive habitat renovation projects. Combined with usage information this information was used to estimate the value of recreational activities at various lakes and to justify expenditures for improving amenities and services provided by South Dakota.

FUNDING

South Dakota Game, Fish and Parks

INVESTIGATOR

Aaron Sundmark, Ph.D. candidate

FACULTY

Larry Gigliotti

EXPECTED COMPLETION

December 2018



Influence of Fish Density on Growth Rate of Brown Trout in Spearfish Creek, South Dakota

Trout fishing provides important angling opportunities in the Black Hills of South Dakota. Creel surveys show that nearly 85% of anglers view trout as important to their fishing experience and are supportive of restrictive regulations such as reduced creel limits and(or) size restrictions. In Spearfish Creek, South Dakota, mean biomass of Brown Trout >200 mm is about three times greater than that in Castle or Rapid creeks. However, age-3 Brown Trout in Spearfish Creek are about 30% smaller (220 mm) than similarly aged fish in Rapid Creek (315 mm; James and Chipps 2016). Because angler harvest of Brown Trout is generally low in Spearfish Creek, management options for increasing the size structure of the trout population may be limited. Liberalized regulations, for example, may have limited effect due to low angler harvest and(or) the social stigma associated with harvesting naturalized trout. From a management perspective, experimental manipulation of Brown Trout abundance shows promise as an approach for increasing the growth rate of stream-dwelling trout. Reductions in trout biomass are anticipated to reduce intraspecific competition and improve growth of age 3+ Brown Trout; these efforts can be targeted in areas where fish densities are high to improve the quality of Brown Trout sought by anglers.

FUNDING

South Dakota Game, Fish and Parks

INVESTIGATOR

Travis Rehm, M.S. candidate

FACULTY

Steve Chipps, Jake Davis (GFP)

EXPECTED COMPLETION

December 2018



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-mi² plots and 5,000 wetlands are surveyed each year for wetland condition and breeding pairs and aerial photography of each 4-mi² 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

December 2016



Growth Potential and Genomic Signatures of Selection in Yellow Perch

Yellow perch (*Perca flavescens*) are an important sport fish and prey component of fish communities across the Midwestern United States. In South Dakota, two distinct population types of Yellow Perch have been characterized that differ in growth, survival, and recruitment patterns. High quality populations exhibit fast growth, high mortality, low population densities, and inconsistent recruitment. In contrast, low quality populations are characterized by slow growth, low mortality, high population densities, and relatively consistent recruitment. The role of genetics in contributing to these population characteristics is currently unknown. To address these questions, we used a combination of laboratory and common garden growth experiments to compare relative growth and survival of age-0 yellow perch from the two population types. We then used high-throughput RAD sequencing to scan the yellow perch genome for genetic markers associated with population type. The laboratory and common garden experiments showed no significant differences between weight standardized specific growth rates of perch from the high and low quality populations. Results from the RAD sequencing also produced limited evidence of adaptive divergence between population types. Our results represent an important initial step towards determining the genetic basis of growth and mortality variation in this recreationally and ecologically valuable species.

FUNDING

South Dakota Game, Fish and Parks

INVESTIGATOR

Alex Rosburg, M.S. candidate

FACULTY

Brian Blackwell (GFP), Justin VanDeHey (UWSP), Wes Larson (UWSP), and Steve Chipps

EXPECTED COMPLETION

July 2017



Effectiveness of Roundup® Ready Alfalfa for Nesting Habitat and Seedbed Preparation

Ring-necked pheasant and waterfowl populations provide bountiful recreational opportunities for residents and visitors of South Dakota, providing a strong economic boost for local economies. This provides strong incentives for the maintenance and sustainability of their populations. With a rapidly changing landscape to agricultural production, primarily due to the loss of CRP, management of remaining grasslands is imperative to the success of upland nesting game birds. Traditional management practices to provide nesting/brood rearing cover involve the use of agricultural crops to prepare tracts of land for grassland restoration, providing negligible benefits for wildlife during this time. New techniques to reduce the use of agriculture in restorations are being explored, including using Roundup® ready (RR) alfalfa as a means to prepare seedbeds for grassland restoration. RR alfalfa could provide nesting cover as well as an economically feasible way of controlling invasive and noxious weeds during restoration. The effectiveness of using RR alfalfa in grassland restorations and how upland nesting game birds utilize these tracts is unexplored, however, creating a knowledge gap in our understanding of the best management practices for grasslands. This study aims to close the gap in knowledge and help us manage grasslands for the benefit and sustainability of upland nesting game bird populations.

FUNDING

South Dakota Game, Fish and Parks
U.S. Fish and Wildlife Service
South Dakota State University
USGS, South Dakota Coop Unit

INVESTIGATOR

Neal Martorelli, M.S. candidate

FACULTY

J. Stafford, R. Haffele, J. Freidel, T. Runia, and R. Murano (GFP)

EXPECTED COMPLETION

December 2016



Evaluation of the James River Conservation Reserve Enhancement Program in South Dakota

Although much of the original wetland area in the lower 48 states of the United States has been lost, progress has been made in recent decades to reduce additional loss and restore wetlands in watersheds throughout the Midwest. The Conservation Reserve Enhancement Program (CREP) is a valuable tool for wetland conservation, focusing the enrollment of wetland acreage in regions of priority determined by each state. The United States Department of Agriculture introduced CREP in 1998, forming partnerships with state and nongovernmental organizations in an effort to address specific regional conservation priorities. In South Dakota, a CREP project was proposed and approved for the James River watershed. The program was intended to provide a variety of environmental benefits and improvements, such as reducing peak flooding, sediment, phosphorus, and nitrogen pollution, and channel stabilization. The program aims to provide habitat for breeding non-game wildlife, specifically bobolink, upland sandpiper, chestnut-collared longspur, western meadowlark, grasshopper sparrow, savannah sparrow, dickcissel, and sedge wren. Projections also indicate production of 285,000 pheasants and 60,000 ducks annually from the project. Further, this CREP project was unique in that all lands under contract would also be required to allow public use through South Dakota's Walk-in Area program. This project aims to assess effects of CREP on water quality in the James River, its tributaries, and watershed wetlands and evaluate functional and numerical responses of avifauna to the James River CREP program.

FUNDING

South Dakota Game, Fish & Parks
U.S. Fish and Wildlife Service
South Dakota State University
USGS, South Dakota Coop Unit

INVESTIGATOR

Jarrett Pfrimmer, Ph.D. candidate

FACULTY

J. Stafford, K. Bertrand, E. D. Stukel (GFP), M. Norton, and R. Murano (GFP)

EXPECTED COMPLETION

December 2017



Structured Decision Support for Bald Eagle Monitoring in Alaska

Bald eagle (*Haliaeetus leucocephalus*) populations are susceptible to environmental contaminants. Consequently, bald eagles are a “vital sign” monitored by the Southwest Inventory and Monitoring Network (SWAN) in cooperation with Lake Clark National Park and Preserve (LACL), Katmai National Park and Preserve (KATM), and Kenai Fjords National Park. Inconsistencies in objectives and perceptions of state-variable importance between parks have made it difficult to integrate sampling designs under a regional protocol. Therefore it is important for the sustainability of the bald eagle monitoring program to conduct a formal process involving scientists and resource managers at the National Parks in Alaska that elucidates common objectives and fosters consensus and buy-in. Our goal is to develop a structured decision process that uses surveys to identify core values, sets objectives, identifies reasonable sampling scenarios, and choose an optimal sampling regime that optimizes objectives and minimizes cost.

FUNDING

National Park Service (RWO #115)

INVESTIGATOR

Rebecca Kolstrom. M.S. candidate

FACULTY

Tammy Wilson (NPS), Larry Gigliotti

EXPECTED COMPLETION

October 2018



Status of Reintroduced Swift Fox in Southwestern South Dakota

Since establishing that restored swift fox (*Vulpes velox*) populations in western South Dakota were in jeopardy of extinction due to high potential mortality, an additional factor that could further affect population viability of swift foxes has colonized rangeland within the distribution of the species. Plague (*Yersinia pestis*) is now evident within black-tailed prairie dog (*Cynomys ludovicianus*) towns throughout western South Dakota. Although the relationship between swift foxes and prairie dogs is controversial, swift foxes have been documented consuming prairie dogs during the pup-rearing period. Swift fox prefer shorter vegetation structure and become displaced as a result of the lack of vegetative clipping provided by prairie dogs. Vegetation height likely impacts the ability of fox to detect predators, which will greatly affect survival. Since the highly successful reintroduction in this area, there has been an apparent decline in the local swift fox population that seems directly related to plague, recent weather patterns, and possibly increased coyote numbers. Nevertheless, no information on the status of swift foxes in western South Dakota has been collected since a viability analysis completed in 2011, which was based on data collected pre-colonization of plague. Consequently, the status of swift fox in areas where prairie dog towns have been decimated by plague, including the Badlands Region, is unknown. Therefore, the purpose of this study is to determine the current status of swift fox as it relates to the Badlands National Park area and the historic population in Fall River County in southwestern South Dakota. This region of the state is within the historic distribution of the species and is representative of the area of effect of previous successful restoration efforts for the species conducted during the past decade.

FUNDING

U.S. Geological Survey (RWO # 111)

INVESTIGATOR

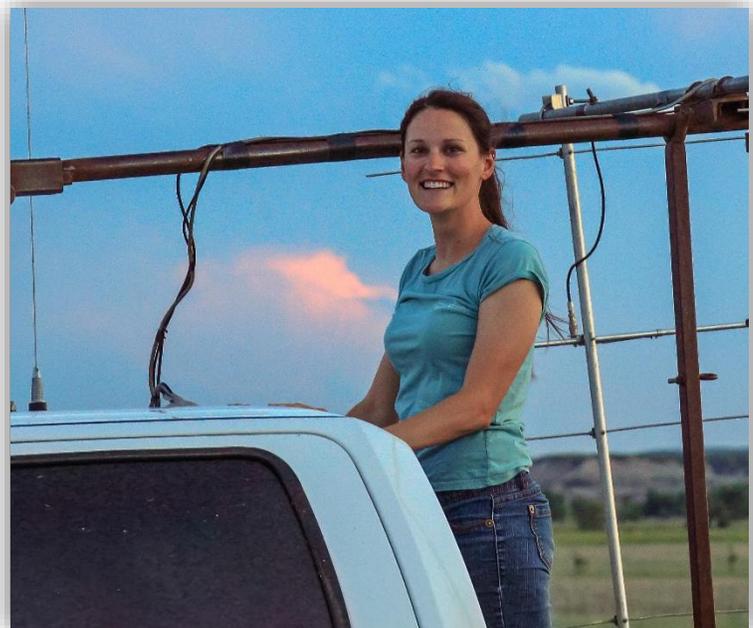
Sarah Nevison, M.S. candidate

FACULTY

J. Jenks, J. Stafford, E. Childers
(NPS), J. Delger (NPS)

EXPECTED COMPLETION

October 2016



Investigating the Role of Super-shedders in Respiratory Disease Persistence and Transmission in Bighorn Sheep

Bighorn sheep (*Ovis canadensis*) respiratory disease is a major impediment to recovering bighorn sheep populations in western North America. Current understanding of the transmission dynamics of respiratory pathogens, believed to play a role in the etiology of this disease, is limited. The purpose of this study is to investigate aspects of these transmission processes, and specifically to determine if variability exists in the shedding rates of pathogens within individual bighorn sheep and the importance of this variability in sustaining the disease. Our hypothesis is that respiratory disease persists in bighorn sheep populations through infection of a small number of chronically infected or “super-shedder” animals that drive disease transmission in bighorn sheep herds. To test this hypothesis, we will capture free-ranging bighorn sheep with a known history of pathogen shedding and house them in a captive facility. We will then monitor their pathogen shedding patterns through time and classify individuals as either chronic, intermittent or non-shedders. Once we have established their shedding status we will perform commingling experiments of individuals from the various groups, and monitor shedding rates to determine if an individual’s shedding status changes based on its association with individuals exhibiting different shedding patterns. We will also monitor the effect of commingling on individual lamb survival. Through this experiment we hope to elucidate the importance of pathogen shedding patterns in bighorn sheep respiratory disease which will lead to the development of effective management strategies to recover bighorn sheep populations.

FUNDING

U.S. Geological Survey (RWO # 113)

INVESTIGATOR

Brandi Crider, M.S. candidate

FACULTY

J. Jenks, D. Walsh (USGS), F. Cassirer (IDFG), T. Besser (WSU)

EXPECTED COMPLETION

December 2016



TEACHING

STEVE CHIPPS

Spring 2016: *Aquatic Trophic Ecology* (3 credits)

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.

LARRY GIGLIOTTI

Spring 2016: *Advanced Human Dimensions* (3 credits)

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 an understanding of the social aspects of management and some practical applied human dimensions skills, via readings of a broad range of human dimensions literature and discussions of human dimensions concepts applied to natural resource issues.

AWARDS AND HONORS

RYANN CRESSEY, *Susan Gay Simpson Memorial Award for Waterfowl Research*, Central Flyway Technical Section Committee (2015)

DAVID DESLAURIERS, *Outstanding Young Professional Award* – Honorable mention, Education Section American Fisheries Society, Kansas City, MO. (2016)

ADAM JANKE, *Best Oral Presentation*, South Dakota Chapter of The Wildlife Society (2016); *USGS Cooperative Research Unit Student Travel Award*, 7th North American Duck Symposium (2016); *North Central Chapter of Society of Wetland Scientists Student Research Award* (2015)

ADAM JANKE, *Dave Ankney & Sandi Johnson Waterfowl and Wetlands Graduate Research Scholarship* (2015)

JEREMY KIENTZ, *Janice Lee Fenske Memorial Award*, 76th Midwest Fish & Wildlife Conference, Grand Rapids, MI. (2016)

SCIENTIFIC PRESENTATIONS

1. Chipps, S.R., Scheibel, N.C., D.J. Dembkowski, and J.L. Davis. 2016. Impacts of Northern Pike predation on a stocked Rainbow Trout fishery. 147th Annual meeting of the American Fisheries Society, Kansas City, Missouri.
2. Chipps, S.R., Heironimus, L.B., D. Deslauriers, and D. Galat. 2016. Growth of larval Pallid Sturgeon as influenced by changes in Missouri River water temperatures. 76th Annual Midwest Fish and Wildlife Conference, Grand Rapids, Michigan.
3. Chipps, S.R. 2016. Fish consumption advisories: what is the long-term prognosis? Board of Directors, East Dakota Water Management District, Brookings, South Dakota.
4. Chipps, S.R. 2016. Modeling mercury accumulation in fishes using bioenergetics models. Department of Biology, Kansas State University, Manhattan, Kansas.
5. Chipps, S.R. 2016. Mercury dynamics in aquatic environments: implications for humans and fish. Department of Natural Resource Management, South Dakota State University, Brookings, South Dakota.
6. Cressey, R.L., J.E. Austin, and J.D. Stafford. 2016. Changes in species abundance in wetland zones in the Prairie Pothole Region after 50 years. Annual Meeting of Society of Wetland Scientists, Corpus Christi, Texas.
7. Davis, J.L., S.A. Carleton, and S.R. Chipps. 2016. Sources of unauthorized fish introductions within the Black Hills of South Dakota. 52nd Annual meeting of the Dakota Chapter American Fisheries Society, Spearfish, South Dakota.
8. Dembkowski, D.J., M.R. Wuellner, A. Rosburg, and S.R. Chipps. 2016. Dynamics and demographics of Yellow Perch in South Dakota glacial lakes with dissimilar population types. 147th Annual meeting of the American Fisheries Society, Kansas City, Missouri.
9. Deslauriers, D., S.R. Chipps, L.A. Heironimus, and R.A. Klumb. 2016. Development and application of a spatially explicit growth model for age-0 Pallid Sturgeon. 147th Annual meeting of the American Fisheries Society, Kansas City, Missouri.
10. Gigliotti, L.M. 2016. Hunting and fishing in South Dakota. 22nd International Symposium on Society and Resource Management, Michigan Technological University, Houghton, Michigan.
11. Gigliotti, L.M., and L.A. Sweikert. 2016. Human dimensions of habitat loss in the Plains and Prairie Pothole Ecoregions. 76th Midwest Fish and Wildlife Conference, Grand Rapids, Michigan.

12. Gigliotti, L.M., and L.A. Sweikert. 2016. Wildlife Value Orientations of Farmers/Ranchers in the Plains and Prairie Pothole Landscape Conservation Cooperative. 22nd International Symposium on Society and Resource Management, Michigan Technological University, Houghton, Michigan.
13. Greiner, M.L., D.O. Lucchesi, S.R. Chipps, and L.M. Gigliotti. 2016. Community fisheries in eastern South Dakota: Angler demographics, use, and factors influencing satisfaction. 146th Annual meeting of the American Fisheries Society, Kansas City, Missouri.
14. Janke, A. K., M. J. Anteau, and J.D. Stafford. 2015. Long-term spatial heterogeneity in mallard distribution in their core North American breeding range. Annual Meeting of The Wildlife Society, Winnipeg, Manitoba, Canada.
15. Janke, A. K., J. D. Stafford, and M. J. Anteau. 2016. South Dakota spring migration research update. Scaup Action Team Meeting, Annapolis, Maryland.
16. Janke, A. K., J. D. Stafford, and M. J. Anteau. 2016. Novel contributions of wetlands in agricultural landscapes to duck migration in the Southern Prairie Pothole Region-. North American Duck Symposium, Annapolis, Maryland.
17. Janke, A. K., J. D. Stafford, and M. J. Anteau. 2016. Novel contributions of wetlands in South Dakota's intensively farmed landscapes for spring-migrating ducks. Annual Meeting of the South Dakota Chapter of The Wildlife Society, Oacoma, South Dakota.
18. Kientz, J.L., S.R. Chipps, and J.L. Davis. 2016. Evaluation of stable isotope analysis and otolith microchemistry for the classification of wild and hatchery Rainbow Trout in Deerfield Reservoir, South Dakota. 52nd Annual meeting of the Dakota Chapter American Fisheries Society, Spearfish, South Dakota.
19. Larson, W.L., K. Turnquist, J. VanDeHey, B. Blackwell, S. Chipps, B. Sloss, and A. Rosberg. 2016. Genomic signatures of selection in yellow perch populations with variable growth trajectories and mortality rates. 147th Annual meeting of the American Fisheries Society, Kansas City, Missouri.
20. Martorelli, N. P. and J. D. Stafford. 2016. Evaluation of waterfowl use and thermal characteristics of alfalfa and perennial grasses in Eastern South Dakota. 7th North American Duck Symposium, Annapolis, Maryland.
21. Martorelli, N. P. and J. D. Stafford. 2016. Evaluation of waterfowl use and thermal characteristics of alfalfa and perennial grasses in Eastern South Dakota. South Dakota Wildlife Society Annual Meeting, Oacoma, South Dakota.
22. Martorelli, N. P. and J. D. Stafford. 2016. Evaluation of gamebird use and thermal characteristics of alfalfa and perennial grasses in Eastern South Dakota. South Dakota Game Fish and Parks, Annual Meeting, Chamberlain, South Dakota.

23. Nevison, S.A., E.L. Childers, J. Delger, J.D. Stafford, and J.A. Jenks. 2016. Assessing the status of reintroduced swift fox (*Vulpes velox*) in southwestern South Dakota. Swift Fox Conservation Team Meeting, Fort Collins, Colorado.
24. Nevison, S.A., E.L. Childers, J. Delger, J.D. Stafford, and J.A. Jenks. 2015. Assessing the status of reintroduced swift fox (*Vulpes velox*) in southwestern South Dakota. The Wildlife Society Annual Meeting, Winnipeg, Manitoba, Canada.
25. Pfrimmer, J.D., L. Gigliotti, J.D. Stafford, D. Schumann, and K. Bertrand. 2015. Motivations for enrollment into the Conservation Reserve Enhancement Program in the James River Watershed of South Dakota, USA. Annual Meeting of The Wildlife Society, Winnipeg, Manitoba.
26. Stafford, J.D., A.K. Janke, and B.J. O'Neal. 2016. Recent research on migrating waterfowl in the Midcontinent. Invited seminar, Department of Biology, North Dakota State University, Grand Forks, North Dakota.
27. Stafford, J.D., A.K. Janke, and M.J. Anteau. 2016. A Physiological assessment of wetland habitats for Spring-migrating ducks in the Southern Prairie Pothole Region. South Dakota Department of Game, Fish and Parks Research Review Meeting. Pierre, South Dakota.
28. Stafford, J.D., A.K. Janke, and B.J. O'Neal. 2016. Two views of waterfowl migration. Banquet Presentation, Detroit Lakes Bird Festival, Detroit Lakes, Minnesota.
29. Sundmark, A., and L.M. Gigliotti. 2016. Social and economic importance of selected South Dakota fishing impoundments: Progress update. South Dakota Game, Fish and Parks Summer Fisheries Meeting, Mobridge, South Dakota.
30. Sweikert, L.A., and L.M. Gigliotti. 2016. Conserving the Plains and Prairie Pothole Ecoregions: A land relations scale. 76th Midwest Fish and Wildlife Conference, Grand Rapids, Michigan.
31. Sweikert, L.A., and L.M. Gigliotti. Conserving the Great Plains: A land use value scale. 22nd International Symposium on Society and Resource Management, Michigan Technological University, Houghton, Michigan.

WORKSHOPS & TRAINING

STEVE CHIPPS:

Co-Instructor with D. Deslauriers (U. Manitoba), FISH BIOENERGETICS 4.0: Introduction and overview of bioenergetics modeling using R. 76th Annual Midwest Fish & Wildlife Conference, Grand Rapids, Michigan. January 2016.

Co-Instructor with D. Deslauriers (U. Manitoba) and J. Rice (NCSU), FISH BIOENERGETICS 4.0: Introduction and overview of bioenergetics modeling using R. 147th Annual meeting of the American Fisheries Society, Kansas City, Missouri. August 2016.

THESES AND DISSERTATIONS

CRESSEY, R.L. 2016. Changes in wetland plant communities and wetland conditions in the Prairie Pothole Region after 50 years. M.S. Thesis, South Dakota State University, Brookings. 148 pp. <http://openprairie.sdstate.edu/etd/1001>.

JANKE, A.K. 2016. A physiological assessment of wetland habitats for spring-migrating ducks in the agricultural landscapes of the Southern Prairie Pothole Region. Ph.D. Dissertation, South Dakota State University, Brookings. 228 pp. <http://openprairie.sdstate.edu/etd/677/>

KIENTZ, J.L. 2016. Survival, abundance, and relative predation of wild Rainbow Trout in Deerfield Reservoir, South Dakota. M.S. Thesis, South Dakota State University, Brookings. 97 pp. <http://openprairie.sdstate.edu/etd/991/>



PEER-REVIEWED PUBLICATIONS

1. Breegemann, J.J., M.A. Kaemingk, T.J. DeBates, C.P. Paukert, J.R. Krause, A.P. Letvin, T.M. Stevens, D.W. Willis, and S.R. Chipps. 2016. Potential direct and indirect effects of climate change on a shallow natural lake fish assemblage. *Ecology of Freshwater Fish* 25:487-499.
2. Cressey, R., J.E. Austin, and J.D. Stafford. 2016. Three responses of wetland conditions to climatic extremes in the Prairie Pothole Region. *Wetlands*. DOI 10.1007/s13157-016-0818-8
3. Davis, J.L., J.W. Wilhite, and S.R. Chipps. 2016. Mink predation on Brown Trout in a Black Hills stream. *Prairie Naturalist* 48:12-20.
4. Deslauriers, D., L.A. Heironimus, and S.R. Chipps. 2016. Test of a foraging-bioenergetics model to evaluate growth dynamics of endangered Pallid Sturgeon (*Scaphirhynchus albus*). *Ecological Modelling* 336:1-12.
5. Deslauriers, D., R. Johnston, and S.R. Chipps. 2016. Effect of morphological fin-curl on the swimming performance and station-holding ability of juvenile shovelnose sturgeon. *Journal of Fish and Wildlife Management* 7:198-204.
6. Deslauriers, D., L.A. Heironimus, and S.R. Chipps. 2016. Lethal thermal maxima for age-0 Pallid and Shovelnose Sturgeon: Implications for shallow water habitat restoration. *River Research and Applications* DOI:10.1002/rra.3022.
7. Fincel, M.J., S.R. Chipps, B.D.S. Graeb, and M.L. Brown. 2016. Diet breadth and variability in *Sander spp.* inferred from stable isotopes. *River Research and Applications* 32:984-991.
8. Gigliotti, L.M., and E.C. Metcalf. 2016. Motivations of female Black Hills deer hunters. *Human Dimensions of Wildlife* 21: 371-378.
9. Gigliotti, L.M., and K.R. Henderson. 2015. Reasons anglers did not respond to an internet survey and evaluation of data quality. *Proceedings of the South Dakota Academy of Science* 94:155-170.
10. Graff, B.J., J.A. Jenks, J.D. Stafford, K.C. Jensen, and T.W. Grovenburg. 2016. Assessing spring direct mortality of avifauna from wind energy facilities in the Dakotas. *Journal of Wildlife Management*. DOI: 10.1002/jwmg.1051
11. Greiner, M.J., D.O. Lucchesi, S.R. Chipps, and L.M. Gigliotti. 2016. Community fisheries in eastern South Dakota: Angler demographics, use, and factors influencing satisfaction. *Human Dimensions of Wildlife* 21: 254-263.

12. Henderson, K.R., and L.M. Gigliotti. 2015. Angler satisfaction in South Dakota. Proceedings of the South Dakota Academy of Science 94:171-186.
13. Hine, C.S., H.M. Hagy, M.M. Horath, A.P. Yetter, R.V. Smith, and J.D. Stafford. 2016. Response of aquatic vegetation communities and other wetland cover types to floodplain restoration at Emiquon Preserve. Hydrobiologia. DOI 10.1007/s10750-016-2893-5
14. James, D.A., and S.R. Chipps. 2016. Influence of *Didymosphenia geminata* blooms on prey consumption and associated diet and growth of Brown Trout. Transactions of the American Fisheries Society 145:195-205.
15. Meyer, H.A., S.R. Chipps, B.D.S. Graeb, and R.A. Klumb. 2016. Growth, food consumption and energy status of juvenile Pallid Sturgeon fed natural or artificial diets. Journal of Fish and Wildlife Management DOI 10.3996/082015-JFWM-076.
16. Sass, G.G., A.L. Rypel, and J.D. Stafford. 2016. Fisheries Habitat Management: Lessons learned from Wildlife Ecology and a Proposal for Change. Fisheries, *in press*.
17. Scheibel, N.C., D.J. Dembkowski, J.L. Davis, and S.R. Chipps. 2016. Impacts of Northern Pike on stocked Rainbow Trout in Pactola Reservoir, South Dakota. North American Journal of Fisheries Management 36:230-240.
18. Stafford, J.D., A.K. Janke, E.B. Webb, and S.R. Chipps. 2016. Invertebrates in Managed Waterfowl Marshes. Pages 565-600 *in* D. Batzer and D. Boix, editors. Invertebrates in Freshwater Wetlands: An international perspective on their ecology. Springer. New York, NY.