



2021 Annual Report

July 2020 — June 2021

Cooperating Agencies:

U.S. Geological Survey

Iowa Department of Natural Resources

Iowa State University

U.S. Fish & Wildlife Service

The Wildlife Management Institute

Iowa Cooperative Fish & Wildlife Research Unit

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Personnel and Cooperators

Unit Coordinating Committee

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Bill Moritz

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Unit Faculty & Staff

Robert W. Klaver Unit Leader and Professor of Natural Resource Ecology & Management

Open Position Assistant Unit Leader, Fisheries, and Professor of Natural Resource Ecology & Management

Anna Tucker Assistant Unit Leader, Wildlife

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Faculty Collaborators

Brian Wilsey, EEOB
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Julie Blanchong, NREM
Kevin Roe, NREM/EEOB
Michael J. Weber, NREM
Miranda Curzon, NREM
Stephen Dinsmore, NREM
Timothy Stewart, NREM

Graduate Students

Dylan Osterhaus, MS
Jordan Giese, PhD
Katelyn Miller, MS
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Nathan Tillotson, MS
Samuel Leberg, MS
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Nathan Soley, PhD
Daniel Deever, MS
Simone Lord, MS
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Additional Collaborators

Vince Evelsizer, IA DNR
Orrin Jones, IA DNR
Matthew Garrick
Cassandra Nunez
James Adelman
Dan Kaminski
Sidney Brenkus
Corey McKinney, IA Soybean Assoc
Dan Campbell, Syngenta Crop Protection, LLC
Karen Wilke, The Nature Conservancy
Aleshia Kenney, USFWS
Tyler Harms, IA DNR
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Bill Johnson, IA DNR
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Karen E. Kinkead, IA DNR
Carolyn E. Moore, ISU
Keither E. Schilling, IA Geological Survey
Kelly Poole, IA DNR
Stephanie Shepherd, IA DNR

New Projects

Sustainable Rivers Program: Downstream ecological responses to experimental flow releases from Red Rock Dam

Principal Investigators: Michael J. Weber
Student Investigator: Erik Griffen (M.S.)
Collaborators: Iowa DNR
Duration: April 2021 - December 2023
Funding Source(s): US Army Corps of Engineers

Goals and Objectives:

Assess fish reproduction in the Des Moines River in relation to experimental flows from Red Rock Dam.

Progress to date:

Sampling for larval fish and zooplankton began at three sites in the Des Moines and three sites in the Iowa (reference site) rivers in April and will last until July. Juvenile fishes will be sampled periodically in summer and fall. Laboratory work began this spring and will last throughout the winter to process samples.

Future work

This is year 1 of 2 for field work. Additional sampling will be conducted next summer to assess reproduction under different environmental conditions.

Integrated population model for the Mountain Plover in Montana

Principal Investigator:	Stephen J. Dinsmore
Student Investigator:	Rachel Siller
Collaborators:	U.S. Fish and Wildlife Service
Duration:	1 February 2021 to 31 January 2025
Worktag #	AWD- 023898-00001
Funding Source(s):	U.S. Fish and Wildlife Service

Goals and Objectives:

The proposed landscape-scale collaborative research project will provide the first assessment of annual cycle movements and population limiting factors of the Mountain Plover, a species that according to the Breeding Bird Survey appears is experiencing significant long-term declines. The results of this project will provide land management agencies critical information about where the species population may be limited and identify important areas for conservation throughout the annual cycle. The information will allow conservation planners and land managers to develop effective conservation strategies for the species. Without this information, we'll continue to lack critical information to most effectively conserve and manage priority landscapes, and ultimately slow or reverse the declines of the Mountain Plover and the larger suite of focal grassland birds.

Progress:

In fall 2020 I hired a Ph.D. student (Rachel Siller) for the project. She took spring 2021 courses at ISU and began her first of three field seasons in May 2021.

Future Plans:

The plan is for Rachel to complete three summer (may through mid-August 2021, 2022, and 2023) field seasons at the Montana study site and then complete her dissertation by fall 2024.

Continuing Projects

Monitoring Iowa's North American River Otter and Bobcat Populations

Principal Investigator:	Robert W. Klaver
Student Investigator:	Bridget Nixon
Collaborators:	Vince Evelsizer, Iowa DNR
Duration:	April 2015 to January 2021
Funding Source(s):	Iowa Department of Natural Resources Drake University

Goals and Objectives:

Data collected on otter and bobcat populations in Iowa by DNR staff can be used to estimate survival, harvest, age structure, and population trend using statistical population reconstruction modelling. These data, along with ancillary data, may be used to help monitor population trends in these furbearers. Similarly, to previous work done with Iowa bobcats, a habitat suitability map will also be created to better understand the relationship between landscape and habitat characteristics and otter populations.

Objectives:

1. Performing state-space modelling to provide estimates on otter survival, age structure, recruitment, harvest, and population trends in Iowa.
2. Comparing conventional population indices to state-space modelling and integrated population modelling (IPM) to determine which provides superior inferences that warrant its use as an otter and bobcat management tool.
3. Using GIS to, develop and validate a river otter habitat suitability map for Iowa based on the number of otters trapped per HUC 12 watersheds as a function of land cover and landscape metrics comparable to the suitability map developed for the bobcats.
4. Publishing a final report and outlining recommendations to the Iowa DNR for future furbearer monitoring.

Progress:

We assembled the data for all aspects of the project and have begun data analysis for all objectives.

Future Plans:

Bridget Nixon is completing her dissertation which will have information on river otter habitat suitability and state-based and IPM modelling of river otter vital rates.

Ecology of Canada Geese in Urban Areas of Iowa

Principal Investigator:	Robert W. Klaver
Student Investigator:	Benjamin Luukkonen
Collaborators:	Orrin Jones, Iowa DNR
Duration:	June 2018 – October 2021
Funding Source(s):	PR funds through Iowa Department of Natural Resources

Goals and Objectives:

- Evaluate the movement of Canada geese captured in urban areas. Compare movements of the urban geese to the movements of geese captured in rural locations where the goose hunting season is closed.
- Determine the susceptibility of Canada geese captured in urban areas to hunting during the Special September Canada Goose season and the conventional Canada goose hunting season.
- Estimate annual harvest and survival rates for Canada geese captured in urban areas.
- Evaluate a three age-class model to estimate harvest and survival rates of Canada geese in Iowa.
- Where possible incorporate both live recaptures and dead recoveries to improve statistical precision and accuracy to band recovery models.

Progress:

Ben Luukkonen successfully completed his MS degree summer 2020. He published one manuscript (Luukkonen, B. Z., O. E. Jones, and R. W. Klaver. 2021. Canada Goose Survival and Recovery Rates in Urban and Rural Areas of Iowa, USA. *Journal of Wildlife Management* 85:283-292) and has another in review from this thesis.

We captured and fitted GPS/GSM nuisance Canada geese in the Des Moines area in spring 2020 and followed their movements after nest removal. Additionally, we placed transmitters in the Iowa City/Cedar Rapids area during the summer of 2020 to supplement the information on the geese in the Des Moines metro area.

Future Plans:

We plan on capturing additional geese the summer of 2021 to further monitor geese movements.

Developing Capture Techniques and Monitoring the Movement of Sandhill Cranes Breeding in Iowa

Principal Investigator: Robert W. Klaver
Student Investigator:
Collaborators: Orrin Jones and Matthew Garrick
Duration: July 2019 – December 2021
Funding Source(s): PR funds through Iowa DNR

Goals and Objectives:

Sandhill cranes (*Antigone canadensis*) are recolonizing Iowa; however, their population affinity is uncertain. Sandhill cranes are assumed to be affiliated with the Eastern Population, which are primarily found in the Great Lakes states of eastern Minnesota, Wisconsin and Michigan. However, recent research in Minnesota discovered that cranes on the western periphery of the EP might overlap with mid-continent population sandhill cranes (MCP) thereby calling into question the affiliation of Iowa's cranes. It is increasingly important to improve our understanding of Iowa's breeding cranes. The most direct way to do so is through a field research project. However, cranes are a novel species in the modern-day Iowa landscape and there is very little previous work to rely upon. This is a pilot project to assess the feasibility of capturing sandhill cranes in Iowa.

Objectives:

1. Assess the feasibility of capturing breeding sandhill cranes in Iowa.
2. Monitor the habitat use and migration of captured cranes via GPS transmitters.

Progress:

CORVID-19 affected the study plan in 2020. We are not able to hire a technician through Iowa State University. The University mandated they would not allow new projects to start. However, Matt Garrick and Orrin Jones were able to capture and fit GPS/GSM transmitters to five sandhill cranes – two colts and three adults. One of the colts died, presumably by a predator. The remaining four cranes successfully migrated and returned – the adults to their previous nesting sites, the colt exploring the area around Albert Lea, Minnesota.

Future Plans:

We will continue to monitor the movements of the four sandhill cranes to identify movements, habitat use, migration, staging area, and survival. We also plan on capturing additional colts this summer.

Behavioral and Physiological Responses to Anthropogenic Disturbance in Bighorn Sheep

Principal Investigator:	Robert W. Klaver
Student Investigator:	Benjamin Johnson Sidney Brenkus
Collaborators:	Cassandra Nuñez James Adelman
Duration:	August 2018 – August 2022
Funding Source(s):	Bureau of Land Management, and the University of Memphis

Goals and Objectives:

This project covers two studies. Benjamin Johnson conducted a survey of how visitors to Glacier National Park, Montana perceived their interactions with wildlife and how they saw their presence affected resident species.

In the second phase of this project we are developing a respiratory disease monitoring program for bighorn sheep by comparing the behavior of bighorn sheep in the Park compared to populations outside of the Park with recent exposure to disease.

Glacier National Park provides refuge to iconic North American species, including bighorn sheep (*Ovis canadensis*), whose range covers diverse Department of Interior lands. Across this range, bighorns face the ongoing threat of a polymicrobial infection, Bighorn Sheep Respiratory Disease, which can reduce juvenile survival for many years, decimate populations, and lead to local extinctions. Although Glacier's bighorns are thought to be free of the disease, a corridor of contiguous wilderness connects Glacier to populations that have tested positive for the most critical pathogen associated with this disease, *Mycoplasma ovipneumoniae*. As such, efficient biosurveillance programs are essential to anticipating and mitigating the effects of Bighorn Sheep Respiratory Disease outbreaks in Glacier National Park.

However, molecular screening for Bighorn Sheep Respiratory Disease is financially and logistically challenging, requiring physical capture and multiple lab assays. Such costs preclude large-scale, continuous biosurveillance, potentially missing detections and hindering risk assessment. We will address this issue by developing an animal-behavior-based, citizen-driven biosurveillance program for Bighorn Sheep Respiratory Disease in Glacier National Park. We are cooperating with Glacier National Park, U.S. Forest Service, and Montana Fish, Wildlife, and Parks staff on this project. We will provide the NPS with a tool to detect Bighorn Sheep Respiratory Disease and thus determine when mitigation strategies are necessary.

Progress:

Benjamin Johnson successfully completed his MS program in May 2020. We were not able to conduct fieldwork during summer 2020 due to safety concerns surrounding COVID-19.

Future Plans:

Sidney Brenkus and 2 technicians will begin fieldwork in Montana beginning in June 2021.

Cause-specific mortality factors affecting eastern wild turkey in Iowa

Principal Investigator: Robert W. Klaver
Collaborators: Dan Kaminski
Duration:
Funding Source(s): U.S. Geological Survey and Iowa DNR

Goals and Objectives:

Spring wild turkey harvest in Iowa peaked in 2004 and declined in subsequent years. Poults-to-hen ratios declined in Iowa since the late 1980s and the recent 5-year average equaled 2.0 poults/hen, suggesting population decline.

We will determine mortality factors affecting wild turkey fecundity by tracking adult females and poults marked with telemetry devices from nest initiation until fall. The primary goal for this study is to determine cause-specific mortality factors (e.g., predation, disease, etc.) affecting poult survival after 4 weeks of age. Because past studies focused on determining mortality factors for poults prior to 4 weeks of age, there is a gap in our understanding of wild turkey life history between 4 weeks of age and recruitment into the population. This study will provide information important for understanding apparent changes in wild turkey fecundity and populations declines in Iowa and the Midwest.

Progress:

During January and February 2021, we were able to capture and fit with GPS-Iridium transmitters on 24 adult female turkeys in two study areas of southern Iowa.

Future Plans:

This spring and summer of 2021 Iowa DNR will hire a field technician to locate turkey broods and mark the poults with VHS transmitters. We will follow the individual poults to record their survival and any cause specific mortality.

Will again capture and fit GPS-transmitters on adults female turkeys during the 2022 winter.

An Index of Oxbow Restoration Quality for Topeka Shiners Based on the Fish Assemblage

Principal Investigator: Clay L. Pierce
Kevin J. Roe
Timothy W. Stewar
Michael J. Weber

Student Investigator: Dylan M. Osterhaus

Collaborators: Corey McKinney, Iowa Soybean Association
Dan Campbell, Syngenta Crop Protection LLC
Karen Wilke, The Nature Conservancy
Aleshia Kenney, U.S. Fish and Wildlife Service

Duration: January 2019 – December 2021

Funding Source(s): Iowa Soybean Association

Goals and Objectives:

The overall goal of this study is to develop an index of oxbow restoration quality (index) for conservation of endangered Topeka shiners based on characteristics of the fish assemblage. The specific objectives are to:

1. Compile all existing data on fish assemblages in restored oxbows, including abundance of Topeka shiners and associated environmental data (water quality, habitat, restoration status)
2. Develop the index and apply to all oxbows with fish assemblage data
3. Test the index with a subset of existing test data, new data from concurrent restorations, and with environmental data
4. Synthesize results and provide public outreach, management guidance, and both oral and published dissemination of findings.

Progress:

All fieldwork and statistical analyses have been completed for development and testing of the index. Numerous conference presentations and outreach articles have been disseminated documenting the findings of this project. Results have been compiled into three manuscripts. Two of the manuscripts have been submitted for publication in *The American Midland Naturalist* and are currently in review. The third manuscript is currently being finalized.

Future Plans:

Further outreach and dissemination of results is planned for the summer of 2021, continuing into fall 2021. Submission of the third manuscript is expected during the summer of 2021. The thesis defense date for Dylan Osterhaus, the graduate student working on this project, is scheduled for June 14 2021.

Evaluation of Forest and Wildlife Responses to Aerial Applications of Glyphosate

Principal Investigator:	Miranda Curzon
Student Investigator:	Katrina Fernald
Collaborators:	Tyler Harms, Iowa DNR
Duration:	November 2018 - June 2021
Funding Source(s):	U.S. Fish and Wildlife Service's Wildlife Restoration Program and the Iowa DNR Fish and Wildlife Trust Fund

Goals and Objectives:

Objective 1. Quantify forest vegetation response to fall aerial glyphosate application and invasive honeysuckle removal. This will include an assessment of impacts to understory herbaceous plants, shrub species, tree seedlings and saplings, and mature overstory trees.

Objective 2. Evaluate the impact of spray timing on the effectiveness of aerial glyphosate treatment of invasive honeysuckle.

Progress:

With a crew of five (one graduate student and four technicians), we completed pre-treatment vegetation sampling at all three sites (Red Rock, Rathbun, and Mount Ayr WMAs) during summer 2019. This included sampling of herbaceous and woody vegetation in all strata. Additionally, the forest breeding bird community was sampled with bird counts. We also installed deer exclosures to enable assessment of the potential interactive effects of honeysuckle and deer browse on tree regeneration. Weather conditions prevented spray treatments from being applied in November, 2019, so we have identified areas that were sprayed for honeysuckle in previous years to sample during summer, 2020 for comparison with heavily infested and untreated stands already identified and sampled.

Future Plans:

The graduate student, Katrina Fernald, will work with a single field technician to repeat bird counts in the original stands identified and sampled in 2019. They will also sample vegetation and conduct bird counts in newly added stands that were treated in previous years in order to quantify the impact of aerial spray on vegetation structure and forest bird habitat. An additional graduate student is being recruited to continue with the study, now delayed by a year. Aerial treatment of selected plots is scheduled for late Fall, 2020.

Evaluating Floral and Faunal Response to Incorporation of Early Season Forbs into Prairie Restorations

Principal Investigator: Brian J. Wilsey

Student Investigator: Nathan Soley
Daniel Deever
Simone Lord

Collaborators: Katy Reeder, Iowa DNR
Bill Johnson, Iowa DNR
Chad August, Minnesota DNR

Duration: January 2019 – January 2020

Worktag: GR-020317-00001

Funding Source(s): USGS, Competitive State Wildlife Grant

Goals and Objectives:

The objective of the overall project is to restore and diversify native prairies in northwestern Iowa and southwestern Minnesota for non-game species. Prairie plantings often lack early and very late flowering forbs that are important to bees, butterflies and other animal species. The goal of the project is to evaluate establishment techniques (seed vs. transplant additions), management (mowing vs. no mowing), phenological flowering state (early vs. late) and number of species (1, 3 or 6) on forb establishment success and usage of plots by bees and butterflies. Results will be used to develop best management practices for establishing meaningful abundances of the focal plant species.

Progress:

The PI met with Iowa DNR personal, developed an experimental design, and identified sites to be used for the study. Seeds of early (wood betony, prairie phlox, pasque flower) and late flowering species (New England aster, silky aster, and gray goldenrod) have been purchased, and transplants of each species have been grown in the greenhouse. Seeds were tested for viability, and were weighed out for planned seed additions. In 2019, a large experiment was established that varies mowing (establishment vs. none), planting method (seeds vs. transplants [plugs]), early vs. late flowering species, and species diversity (1 vs. 3 early flowering vs. 3 late flowering vs. 6 species) on plant and flower establishment, bee visitation, and butterfly visitation. This experimental setup was applied to three fields in Northern Iowa and SW Minnesota.

Future Plans:

Experimental plots are embedded in approximately 10 acre, first-year prairie plantings that were seeded with a seed mix that left out the target species listed above. Plant survival rate and flower production will continue to be assessed through the 2020 growing season. Mowing treatments (none or establishment mowing) have been assigned to each of the three sites. Plant establishment and flower production was measured in 2019 and 2020, and bee and butterfly visitation are being sampled in May-June, July and August-September 2020 and 2021.

Multiple Species Inventory and Monitoring (MSIM) Program

Principal Investigator:	Stephen J. Dinsmore
Student Investigator:	~20 seasonal field technicians
Collaborators:	Karen E. Kinkead, Iowa DNR Carolyn E. Moore, Iowa State University
Duration:	January 2020 to January 2023
Funding Source(s):	Iowa Department of Natural Resources, State Wildlife Grant

Goals and Objectives:

- Conduct MSIM surveys for birds, mammals, amphibians, reptiles, fish, mussels, butterflies, odonates, and crayfish on 50 Wildlife Management Areas annually during 2015-2018.
- Conduct MSIM surveys on 10-20 additional properties in 2016, 2017, and 2018.
- Enter collected data into the MSIM on-line database, submit county occurrence records to the appropriate Iowa WAP taxonomic subcommittee, provide additionally requested information to the IWAP subcommittees as requested, and change database records as advised.
- Analyze data using (but not limited to): Proportion of area occupied and species density (where applicable) using habitat variables from the field and/or GIS where applicable.

Progress:

In 2020 the MSIM program employed 4 field crews of 4-5 technicians each (27 technicians in total) stationed in Boone, Chariton, Tripoli, and Iowa City. Due to COVID-19, we were unable to fill the Ruthven crew and so cancelled activities in northwestern Iowa. Fieldwork for this project began with training in late March and ended on 15 October 2020. The field season began with a virtual training session in late March 2020 to prepare field technicians for the field season and familiarize them with the MSIM protocols; additional trainings occurred regularly through May 2020 as we slowly added crew members. We completed surveys implementing MSIM protocols at 56 study sites across Iowa. This total includes the traditionally surveyed “permanent” MSIM sites, additional public lands sites, and private lands sites in an effort to expand MSIM data coverage beyond only public lands sites. All species observed during surveys were recorded with special focus given the Species of Greatest Conservation Need (SGCN). All collected data were entered into the MSIM online database.

This effort includes >1400 wildlife surveys conducted on these study sites and approximately 100 survey-related tasks such as site setup and teardown. A summary of species seen by taxa includes 39 mammals (6 SGCN), 131 birds (37 SGCN), 49 herpetofauna (37 SGCN), 78 odonates (12 SGCN), 65 lepidoptera (13 SGCN), 62 fish (21 SGCN), and 7 crayfish (5 SGCN). We encountered many noteworthy sightings in several taxonomic groups as is usual for this program.

We also hired a new Assistant Scientist, Carolyn E. Moore, to replace Rachel Vanausdall as the MSIM biologist.

Future Plans:

We are working to produce more peer-reviewed publications from this important long-term monitoring with plans to hire an ISU-funded post doc in the near future. We also continue to expand the program onto private land sites.

Evaluating Restored Mussel Population Genetics and Survivorship

Principal Investigator:	Kevin J. Roe
Student Investigator:	Katie Miller
Collaborators:	MN DNR
Duration:	Summer 2018 – Summer 2022
Worktag #	GR-019532-00001
Funding Source(s):	SWG-C

Goals and Objectives:

1. Monitor released mussels to establish survival percentages at 3 release site in Iowa.
 - a. We expect to be able to document annual growth for any individuals captured in more than one year of follow-up monitoring.
 - b. Analyze genetic diversity of source population for at least one target species

Progress:

Graduate student Katie Miller has collected a season of growth and survival data for ~200 juvenile *Amblema plicata* that were established at four different sites in the Cedar River Drainage. Ecological data (water velocity, temperature, conductivity, etc.) was also monitored over the course of the year at each site.

Results to date reveal different growth rates across sites and preliminary analysis of ecological data is underway to determine if any parameters are correlated with these differences.

Microsatellite genotype data was collected from the source population of the brood stock, the three female mussels that produced the juveniles, and a subset of the juveniles they produced.

Future Plans:

We are planning a second season of monitoring growth and survival of the established juvenile mussels. At the end of this field season we plan to attach PIT tags on these mussels and 200 additional juveniles that were reared in experimental ponds in MN and release these mussels for future long-term monitoring of growth and survival.

Analysis of the genotype data is in-progress. We will be comparing the genetic diversity of the propagated juvenile mussels to the source population to estimate the amount of genetic diversity retained. The contributions of each female to the propagated population will also be assessed and the relatedness of the three maternal mussels. Evidence for multiple paternity of the propagated juveniles will also be estimated.

Common Carp and Bigmouth Buffalo Population Evaluation in Shallow Natural Lakes

Principal Investigators:	Michael J. Weber
Student Investigator:	Andrew Annear (M.S.) and Marty Simonson (Ph.D.)
Collaborators:	Iowa DNR: Michelle Balmer, George Antoniou, George Scholten, Jonathan Meerbeek, Mike Hawkins, DJ Volger, Ben Wallace, Matt Mork, Ryan Hupfeld ISU: Dr. Grace Wilkinson, Tyler Butts
Duration:	May 2017 - August 2021
Funding Source(s):	Iowa Department of Natural Resources US Fish and Wildlife Service

Objectives:

1. Evaluate the utility of electrofishing to assess common carp and bigmouth buffalo abundance.
2. Monitor changes in common carp and bigmouth buffalo abundance and biomass in response to harvest.
3. Monitor associated sportfish communities.

Common Carp and Bigmouth Buffalo electrofishing CPUE varied by month, lake, and year. Common Carp electrofishing CPUE was highest in early summer while Bigmouth Buffalo electrofishing CPUE was highest in spring and fall, and lowest in summer. Targeted sampling for each species is more efficient at different times of year and sampling for both species concurrently may not be the best option. The relationship between electrofishing CPUE and fish density was non-linear for both Common Carp and Bigmouth Buffalo. Catch rates changed faster than proportional changes in biomass density at low density, and slower than proportional changes in biomass densities at high density. Predicted abundance from electrofishing CPUE and environmental covariates led to population estimates with less variability compared to traditional capture-mark-recapture estimates when recapture rates were low. The model developed could help estimate Common Carp and Bigmouth Buffalo abundance from electrofishing CPUE when few recaptures of tagged fish lead to high uncertainty in population estimates.

Capture-mark-recapture analyses were performed to estimate apparent survival and detection probabilities of Common Carp and Bigmouth Buffalo. The effects of commercial fishing effort, lake size, and fish abundance were also evaluated to determine their relationship to commercial fishing exploitation rates. Common Carp and Bigmouth Buffalo age analyses examined how commercial harvest affected age structure, growth rates, and recruitment of both species.

In each lake year, the sportfish community was sampled in the spring by boat electrofishing and in the fall by trap netting. Standard sampling data was provided to Iowa DNR.

Completed Projects

Acoustic monitoring of Iowa bats

Principal Investigator:	Julie Blanchong
Student Investigator:	NA
Collaborators:	Iowa DNR - Kelly Poole, Stephanie Shepherd
Duration:	April – December 2020
Worktag #	022412-00001
Funding Source(s):	Iowa DNR via USFWS

Goals and Objectives:

1. Develop new drive transect and stationary survey sites in accordance with the North American Bat Monitoring Program (NABAT) design framework.
2. Conduct acoustic surveys for bats in Iowa in summer 2020 to document bat activity, abundance, and distribution.
3. Create a project for Iowa in the NABAT database and submit drive transect routes, stationary site locations, and acoustic data collected in 2020 and from previous survey years to the NABAT database.

Progress:

White-Nose Syndrome (WNS), a devastating disease associated with the mortality of millions of bats, was first documented in New York during the winter of 2005-2006, and is now confirmed in Iowa. The loss of large numbers of bats due to WNS is expected to have enormous economic impacts to agriculture. Knowledge of the abundance and distribution of bat species in Iowa is critically needed to understand the potential ramifications of WNS to Iowa. To gather data on bat abundance and distribution in Iowa, acoustic monitoring has been conducted for several summers along transects in eastern, central and southern Iowa and, as of 2020, northwest Iowa.

In 2020, as in previous summers, we worked with the Iowa Department of Natural Resources (IDNR) to recruit and train volunteers to conduct the acoustic surveys. Relying on well-trained local volunteers to conduct drive transects was efficient and cost effective. It also increased public engagement with the project and public awareness of bats and the threat of WNS. Citizen scientists collected bat echolocation data on 19 drive transects in a total of 10 counties in central, eastern, southern, and northwest Iowa and at 13 stationary survey sites. Each transect and stationary site was surveyed in July.

A NABAT project was created for Iowa in the NABAT database. Drive transect routes, stationary site locations, Kaleidoscope Pro auto identification results, and acoustic files collected in 2020 were uploaded to the NABAT database. In addition, previously surveyed drive transect and stationary site locations, associated Kaleidoscope Pro auto identification results, and acoustic files were submitted for drive transects from 2016, 2018, and 2019 and for stationary survey sites from 2017, 2018, and 2019.

This project will continue and expand in 2021, but as it does not involve a student it will no longer be a Cooperative Fish and Wildlife Research Unit project.

Conclusions and Recommendations:

1. Drive transects and stationary site surveys complement each other with respect to capturing bat activity of different species and these methods should be used in combination for acoustic monitoring studies.
2. Acoustic data collected from bats across Iowa indicates geographic variation in overall bat activity and bat activity by species.
3. Iowa is now officially a part of the North American Bat Monitoring Program which will enable it to contribute to efforts to understand bat population trends at larger spatial scales.

Survey of Psammophilic Insects in Iowa

Principal Investigator: Gregory Courtney
Duration: April 2018 – April 2021
Funding Source(s): Iowa Department of Natural Resources
Wildlife Diversity Small Grants Program

Goals and Objectives:

Little is known about the distribution and diversity of psammophilic (sand-inhabiting or “sand-loving”) aquatic insects in Iowa. The primary goal of this project was to survey shifting-sand and marginal sand-bar habitats across the state for the presence and abundance of psammophilic taxa.

Results: Despite high river levels during 2018 and 2019, and pandemic-related travel limitations in 2020, I was able to conduct periodical surveys from throughout the state. Sites from 40 counties were checked, including 25 samples in 2018, 22 in 2019, and 53 in 2020. Because of high water levels during much of the project, the most comprehensive sampling was from marginal sand rather than truly aquatic (i.e., fully submerged) habitats. Despite the difficulty in sampling these unstable habitats, a number of valuable insights have been gained through this research, most pertaining to psammophilic mayflies and dragonflies, and certain semi-aquatic, sand-inhabiting beetles.

Psammophilic mayflies (Ephemeroptera): Samples from several sites contained nymphs of the unusual “Crabwalker mayfly” (Pseudironidae: *Pseudiron centralis* McDunnough). Collections were mostly from the southern half of the Des Moines Lobe ecoregion, including sites on the South Skunk River (Story Co.), Boone River (Hamilton Co.), Iowa River (Hardin Co.), North Raccoon River (Greene County) and Soldier River (Monona County). Another unusual mayfly, *Homoeoneuria* Eaton (Oligoneuridae), was again recorded mostly from the southern half of the Des Moines Lobe ecoregion, including sites in the S Skunk River (Story Co.), Boone River (Hamilton Co.), and Raccoon River watershed (Guthrie, Greene, Dallas and Polk Co’s.).

Psammophilic dragonflies (Odonata: Gomphidae): Most aquatic samples included nymphs of the Common Sanddragon, *Progomphus obscurus* (Rambur), a widespread species in sand-bottomed rivers across eastern North America. Nymphs of the Flag-tailed Spinyleg, *Dromogomphus spoliatus* (Hagen in Selys), were also recorded at several sites.

Psammophilic (marginal) beetles (Coleoptera): Marginal sandbars often harbor a diverse assemblage of psammophilic beetles. Included are Round Sand Beetles (Carabidae: *Omophron* Latreille), which can be common but rarely seen because of their nocturnal habits. Iowa has a surprisingly rich *Omophron* fauna, with five of the 11 known North American species, including all known species from the midwestern United States. This research documented *O. americanum*, *O. tessellatum*, *O. robustum* and *O. grossum* populations from 52, 22, 15 and 5 sites, respectively. The vast majority of these sites are in the southern half of the Des Moines Lobe ecoregion and adjacent parts of the Southern Iowa Drift Plain ecoregion. *Omophron americanum* and *O. tessellatum* were also recorded from several locations in the northeast part of the state (Paleozoic Plateau ecoregion). The current research failed to provide additional Iowa records of *O. nitidum*, a species last collected from (Ames) Iowa in 1950. In addition to *Omophron*, most marginal sandbars (from across the state) contained multiple species of Variegated Mud-Loving Beetles (Heteroceridae: *Heterocerus* Fabricius) and a predictable assemblage of other psammophilic Carabidae (e.g., *Bembidion* Latreille, *Chlaenius* Bonelli, *Clivina* Latreille, and *Elaphrus* Fabricius).

Flood impacts on psammophilic mayflies: Resident populations of *Pseudiron* were likely impacted by severe mid-summer flooding during 2018 and 2019. Based on historical records and the stage of nymphal development in “pre-flood” samples, the mid-summer floods during this project probably coincided with a critical period of nymphal maturation and adult emergence (especially based on the timing of mature nymph and adult collections in 2020). Likewise, again based on historical records, the timing of floods probably coincided with a critical period of early development (e.g., hatching of eggs and presence of early instar nymphs) of other psammophilic mayflies (e.g., *Homoeoneuria*). *Homoeoneuria* had been recorded in mid- to late summer samples from various rivers in central Iowa; however, mid-July 2018 samples from a few accessible sites in central Iowa were devoid of these psammophilic specialists, suggesting that late June / early July flooding impacted local populations of this species as well. Despite this, at least some of these *Homoeoneuria* populations had “recovered” by summer 2020.

Impact of honeysuckle removal on forest bird communities in southern Iowa

Principal Investigator:	Miranda Curzon
Student Investigator:	Katrina Fernald
Collaborators:	Tyler Harms (IDNR)
Duration:	April, 2020- April, 2021
Funding Source(s):	Iowa DNR Wildlife Diversity Small Grants

Goals and Objectives:

Objective 1. Quantify the short-term response of forest breeding bird community composition (particularly shrub-nesting and insectivorous birds) to removal of the invasive shrub *Lonicera maackii* (Amur honeysuckle).

Objective 2. Determine how long any positive or negative impacts on the forest bird community last after removal of *L. maackii*.

Progress:

Katie expanded the sampling regime of an existing project at Red Rock Wildlife Management Area (WMA), Rathbun WMA, and Mount Ayr WMA to include forest stands that were treated for Amur honeysuckle in 2014 and 2015. The addition of these stands allowed a comparison of vegetation and the forest bird community between heavily infested stands and stands that had been aerially sprayed with glyphosate 5-6 years prior. Additionally, Katie a 3-D terrestrial laser scanner (ground-based LiDAR) to quantify forest vegetation because of the greater level of detail this emerging technology can provide. She is currently analyzing data and preparing her MS thesis which she plans to defend in fall, 2021.

Future Plans:

This grant enabled us to expand existing research so that we could investigate the relationships among honeysuckle removal, forest structure, and forest bird community composition and abundance with greater detail. The training provided and skills gained through applying this approach will benefit the larger project in future years as analysis and interpretation continue.

Conclusions and Recommendations:

Preliminary results suggest that aerial treatment of honeysuckle with glyphosate is effective at reducing, if not entirely eliminating, Amur honeysuckle from upland oak-dominated forests such as those sampled here and does influence forest structure. We also observed a lesser abundance of birds in treated (largely uninfested in 2020) stands, though this not necessarily a negative effect. Ongoing work will determine how the community composition was impacted so that management can be adapted accordingly.

Effects of Tournament Regulation Changes on Largemouth Bass Populations in Iowa

Principal Investigator:	Michael J. Weber
Student Investigator:	Andrea Sylvia (PhD) Brandon Maahs (MS)
Collaborators:	Iowa Department of Natural Resources
Duration:	February 2018 – August 2020
Funding Source(s):	Iowa Department of Natural Resources

Goals and Objectives:

1. Evaluate tournament angler group's adoption of the new bass tournament regulations
2. Assess population level effects of bass tournaments pre- and post-regulation bass tournament regulation change

Introduction:

Affinity towards largemouth bass fishing both recreationally and in tournament events is prevalent in lakes throughout Iowa. In 2011, bass anglers in Iowa comprised 44% of the total anglers in the state, spending 2,440 days targeting bass in Iowa waters. Bass tournaments in Iowa are also very popular, with some lakes seeing as many as 45 bass tournaments during the open water season every year (e.g., Brushy Creek). Past tournament regulation in Iowa consisted of registering the event with the Iowa DNR, a three bass bag limit per angler, and a 15" minimum length limit. Under these conditions, approximately 30% of the bass population in Brushy Creek is weighed in during tournaments each year (A. Sylvia, unpublished data). However, in 2017, the Iowa legislature enacted a law increasing the bag limit to five bass per angler and no minimum length limit (registration of tournaments with the DNR is still required). Once these new regulations are implemented in January 2018, they have the potential to impact largemouth bass populations on Iowa lakes with heavy tournament pressure. Yet, it is unknown to what effect these regulation changes will affect bass populations. Increasing live-well densities, tournament weigh-in procedure times, and increasing fish densities at release locations can all be affected by increased bag limits, potentially resulting in increased bass mortality. Decreasing length limit regulations of bass also cause a larger portion of bass populations to be susceptible to potential tournament associated mortality. However, not all bass tournaments may abide by the newly enacted regulations. While bass tournament regulations have become more relaxed in Iowa, many tournament fishing clubs impose more stringent self- regulation than those of the state management agency. Thus, to what extent new Iowa regulations may impact bass populations remains unknown.

Results:

Number of tournaments (max=42, min=40) was similar between pre-regulation change years (2015-2017) and post-regulation change years (2018-2019). The highest number of bass (1,808) captured by tournament anglers occurred in 2018 after the regulation change; however, the total number of bass captured by tournament anglers in 2019 was the lowest (1,431) among pre- and post-regulation change years. Total number of initial bass mortalities was highest in 2018 (54) compared to 41 bass in 2015, 17 bass in 2016, 31 bass in 2017, and 19 bass in 2019. However, percent of initial tournament mortality remained similar, ranging from 1.17% in 2016 to 2.99% in 2018 (Table 2). Additionally, number of bass per angler per tournament was similar among all years for tournament groups who did not adopt new regulations. Anglers captured less than two bass per angler per tournament across all years, ranging from 1.32 to 1.79 bass/angler/tournament across years. However, the number of bass per angler per tournament for groups that adopted new regulations increased in May and June 2018 but tournament angler catch rates were similar among months and to the pre-regulation years in 2019. Size structure of electroshocked bass was similar across all years (2015-2019). However, tournaments during 2018-2019 post-regulation change captured more bass less than 380-mm (229 bass in 2018 and 155 bass in 2019) compared to a maximum of 137 bass from 2015 to 2017 tournaments. Anglers also capture fewer bass >400 mm in 2019 compared to previous years.

Inventory of Coldwater Streams and Associated Fish Communities in the Iowa Driftless Region

Principal Investigator:	Michael J. Weber
Student Investigator:	Brett Kelly
Collaborators:	Mike Siepker, Iowa DNR
Duration:	January 2020 – September 2020
Funding Source(s):	Iowa Department of Natural Resources US Fish and Wildlife Service

Goals and Objectives:

The objectives of this project are to examine Brook Trout populations in the Driftless Area of northeastern Iowa to 1) evaluate the current spatial distribution of their populations, 2) quantify population characteristics (e.g., abundance, body size, condition), and 3) evaluate effects of biotic and abiotic factors on their distribution and population characteristics.

Introduction:

Coldwater streams occurring throughout the Paleozoic Plateau (Driftless Region) of Northeast Iowa are unique resources. However, little effort has been directed towards locating and cataloging these resources. One of the many reasons that the Driftless Region of northeastern Iowa is unique is that it represents the southwestern edge of the Brook Trout's native range. While Brook Trout were once common in the Driftless Region, they nearly disappeared throughout much of the region by the 1970s. In Iowa, the South Pine population of Brook Trout is the only relict population known to currently exist. Yet, fish surveys in other locations where remnant Brook Trout populations may persist are rare and no information exists regarding the current status of Brook Trout in Iowa. Determining if and where Brook Trout populations have persisted or increased within the Driftless Region of Iowa will allow for improved management of this unique species.

Results:

We collected 23,810 individuals of 33 different species during 141 sampling occasions across three HUC8 watersheds (Upper Iowa River, Yellow River, and Little Maquoketa) and two summer field seasons (2018 and 2019). Creek Chub were the most encountered species (n = 87 sites) and White Sucker comprised the most individuals (n = 3,480 fish; 14.62% of total catch). We observed seven non-game Species of Greatest Conservation Need (SGCN), with both Longnose Dace and Southern Redbelly Dace occurring the most frequently (n = 33 sites). Despite Sculpins (n = 20 sites) being collected at 13 fewer sites than Longnose Dace or Southern Redbelly Dace, similar numbers of Sculpins were captured as all other six non-game SGCN combined (n = 1,232 sculpins versus n = 1,248 other SGCN) and they accounted for 49.68% of the total non-game SGCN catch (n = 2,480 fish). Mississippi Silvery Minnow, Central Mudminnow, and Suckermouth Minnow were all SGCN that only occurred at 1 site each throughout the study. Trout species comprised 15.71% (n = 3,741 of 23,810 fish) of the total number of fish collected. Of those individuals, Brown Trout accounted for 87.33% (n = 3,267 of 3,741) of all trout and were observed at more sites (n = 74) than Brook Trout (n = 19), Rainbow Trout (n = 11), and Tiger Trout (n = 2). A total of 450 Brook Trout were collected, predominately from sites sampled in 2018 (n = 403 individuals). Brown Trout were collected in sympatry with Brook Trout at 78.95% (n = 15 of 19) of sites. Brook Trout were never found in allopatry in the Little Maquoketa watershed and were only collected twice in the Yellow River watershed (n = 70 individuals).

Honors and Awards

Samuel Leberg

- 3rd Place Student Poster Presentation, 2020 Upper Midwest Stream Restoration Symposium

Dylan Osterhaus

- AFS John E. Skinner Award Recipient
- ISU Department of Natural Resources Ecology and Management Student Professional Development Grant

Professional Activities

Teaching/Learning Opportunities

Robert Klaver

- Analysis of Animal Populations (A_ECL 611) Fall 2020
- Forest Landscapes, Wildlife, and Silviculture (NREM 504) Fall 2020

Jordan Giese

- Instructor: AECL 458 Ornithology Lecture, Spring 2021
- Search Committee for ISU-USGS Wildlife Assistant Unit Leader Position
- Invited Reviewer for American Midland Naturalist, Southwestern Naturalist, Wildlife Society Bulletin and Wilson Journal of Ornithology journals
- Social Chair, Iowa State University NREM Graduate Student Organization
- Graduate Student Peer Mentor, Iowa State University NREM Graduate Student Organization

Samuel Leberg

- Participated in the Iowa Learning Farms Virtual Field Day on January 21, "Returning Oxbows to Iowa's Landscape."
- Teaching Assistant-AECL 312-Ecology Lab. Fall 2020.

Ben Luukkonen

- The Wildlife Society, Student Member
- NREM Graduate Student Organization Member

Dylan Osterhaus

- Teaching Assistant: AECL 451 Animal Ecology Capstone, Spring 2021

Matthew Stephenson

- Guest field instructor for distance sampling methods for Ecological Methods (2020)
- Guest lecturer on landscape ecology and nesting ecology for Ornithology (2021)

Graduate Committee Service

Robert W. Klaver

Advisor/Co-Advisor

- Karri Folks (Ph.D., Department of Natural Resources Ecology & Management, Iowa State University)
- Ben Luukkonen (M.S. Department of Natural Resources Ecology & Management, Iowa State University)
- Bridget Nixon (Ph.D., Department of Natural Resources Ecology & Management, Iowa State University)
- Matt Stephenson (Ph.D., Department of Natural Resources Ecology & Management, Iowa State University)

Committee Member

- Zach Dienes (M.S. Department of Natural Resources Ecology & Management, Iowa State University)
- Katrina Fernald (M.S. Department of Natural Resources Ecology & Management, Iowa State University)
- Jordan Giese (Ph.D., Department of Natural Resource Ecology & Management, Iowa State University)
- Emily Grausgruber (Ph.D. Department of Natural Resource Ecology & Management, Iowa State University)
- Blake Mitchell (M.S. Department of Natural Resources Ecology & Management, Iowa State University)
- Robert Valek (Ph.D., Sustainable Agriculture, Iowa State University)

Professional Service & Outreach

Robert Klaver

- Analysis of hunting and fishing license sales as part of class project in A ECL 611
- Peer review articles for multiple scientific journals
- American Society of Mammalogists, Member, 1996 –present
- Great Plains Natural History Society, Member, 2010 –present
- Iowa Action Plan Implementation Committee, Member, 2012 –present
- The Wildlife Society
 - Member, 1974 - Present
 - Iowa Chapter, Member, 2012 – present
 - North Central Section, Member, 2012 – present

Jordan Giese

- American Ornithological Society Membership Committee
- American Ornithological Society Communications Committee

Ben Luukkonen

- Iowa State University, Natural Resource Ecology and Management, Graduate Student Organization, Treasurer, April 2019-April 2020
- The Wildlife Society, Student Member

Dylan Osterhaus

- Iowa State University Student Subunit of the American Fisheries Society Member
- Iowa Ornithologists' Union Member
- American Fisheries Society Member

Matthew D. Stephenson

- Iowa Ornithological Union, Member, 2015-present
- The Wildlife Society, student member 2014-present

Nathan Tillotson

- Iowa State University, Natural Resource Ecology and Management, Graduate Student Organization
- Graduate and Professional Student Senate, 2019 - Present

Presentations

Bartelt, P.E. and **R.W. Klaver**. 2020. Building Integrated Landscape Habitat Models to Better Inform Amphibian Conservation. Linking Monitoring and Research to Amphibian Conservation in the Greater Yellowstone Ecosystem. U.S. National Park Service and Montana State University. Bozeman, MT. 8 – 10 December 2020 [virtual]

Cope, W.R., A.R. Annear, J. Kopaska, and **R.W. Klaver**. 2021. Demographic trends in recruitment and retention of Iowa fishing license purchasers. Iowa Department of Natural Resources Fisheries Bureau Statewide Meeting. 25 February 2021. [virtual]

Giese, J.C., and L.A. Schulte. 2021. Pigs & Prairies: Evaluating the biodiversity response of prairie restoration for biogas production. FW3 Prairie Biology Network Quarterly Meeting [virtual].

Schulte Moore, L., **J. Giese**, M Liebman, J. Niemi, M. O'Neal, and M. Stephenson. 2020. Biodiversity in Iowa Agroecosystems: Win, Lose, or Draw. Ecological Society of American Conference [virtual].

Giese, J.C., and L.A. Schulte. 2020. Pigs & Prairies: Evaluating the biodiversity response of prairie restoration for biogas production. Pigs & Prairies Collaborators Meeting, Bethany, MO.

Osterhaus, D. M., S. S. Leberg, C. L. Pierce, and T. W. Stewart. 2021. Oxbows of dreams: Return of Topeka Shiner to the White Fox Creek watershed. (contributed poster) Iowa State University Department of Natural Resource Ecology and Management Graduate Student Poster Session, April 2021.

Osterhaus, D. M., S. S. Leberg, C. L. Pierce, and T. W. Stewart. 2021. Return of the Topeka Shiner to restored oxbows in the White Fox Creek watershed. (contributed paper) Iowa Chapter, American Fisheries Society Virtual Conference, February 2021.

Osterhaus, D. M., S. S. Leberg, C. L. Pierce, and T. W. Stewart. 2021. Comparison of sampling methodologies for small oxbow wetland fish communities. (contributed paper) Iowa Chapter, American Fisheries Society Virtual Conference, February 2021.

Osterhaus, D. M., S. S. Leberg, K. Wilke, D. Weissenfluh, J. Pudenz. 2021. Returning oxbows to Iowa's landscape. (virtual field day) Iowa Learning Farms, January 2021.

Osterhaus, D. M., E. Martin. 2020. Trends in distribution of Plains Minnow (*Hybognathus placitus*) in Kansas from 1964 to 2017. (contributed poster) American Fisheries Society Virtual Annual Meeting, September 2020.

Leberg, S. S., D. M. Osterhaus, T. W. Stewart, and **C. L. Pierce**. 2020. Effects of tile drainage on restored oxbows as habitat for endangered Topeka shiners and other biota (contributed paper). National American Fisheries Society, Virtual Presentation, September 2020.

Publications

Luukkonen, B. Z., O. E. Jones, and R. W. Klaver. 2021. Canada Goose Survival and Recovery Rates in Urban and Rural Areas of Iowa, USA. *Journal of Wildlife Management* 85:283-292