



**BOONE AND CROCKETT CLUB  
UNIVERSITY PROGRAMS  
2021**



# WELCOME



We are happy to share accomplishments of the Boone and Crockett Club's University Programs for 2021.

Despite continued challenges of the pandemic, our students continue to make great strides in pursuing their research, sharing their work, and carrying forward the Club's mission. The immediate impact of University Programs is demonstrated by way of research publications, professional presentations, diverse outreach activities, and important policy activities described in this report.

The legacy of the program is evident in the work these Fellows complete in their professional positions. Thus, University Programs has a continued and enduring impact on conservation which is strengthened with each new crop of graduates. Our Former Fellows initiative means you will hear more from past fellows. We continue to look for avenues to link science, policy, and education in ways that support the Club's mission while addressing pressing crises in conservation. We do so by sharing meaningful lessons from the past to build the future. Regular and Professional members serve as important conduits of the Club's rich history, legacy, and afford important learning opportunities for our students. We continue to be grateful for your support, willingness to engage with our Fellows, and input on how we can get better. We welcome your comments and suggestions. We are planning on a University Programs retreat at the Theodore Roosevelt Memorial Ranch in June 2022 and invite you to attend. A huge thanks to Ben Wallace for his commitment to supporting Associate memberships for all current and former fellows. We thank Bill Demmer, Karlie Slayer, and Rose Stewart for their continued involvement, dedication, and support of our activities.

Dave Hewitt and Josh Millsbaugh  
University Programs, Deputy Co-Chairpersons

It is the mission of the Boone and Crockett Club to promote the conservation and management of wildlife, especially big game and its habitat, to preserve and encourage hunting, and to maintain the highest ethical standards of fair chase and sportsmanship in North America.

The Club's University Programs help serve this mission by attracting the brightest students to the strongest universities to work with the foremost wildlife faculty.

## 2021 AT A GLANCE



- Clemson University (in development)
- Michigan State University
- Mississippi State University (inactive)
- Oregon State University (inactive)
- Texas A&M University
- Texas A&M University-Kingsville
- University of Montana
- University of Wisconsin-Stevens Point

SPONSORED BY



TOTAL EXTERNAL FUNDING:

**\$5,100,000+**

**3 ENDOWED  
PROFESSORSHIPS  
(2 PROFESSORS IN PLACE)**

NUMBER OF GRADUATES: **6**

**TOTAL FELLOWS: 29**

UNDERGRAD: **2**

MASTERS: **11**

PHD: **13**

POSTDOCTORAL: **3**

**AWARDS: 17**

SCHOLARLY PUBLS: **29**

POPULAR ARTICLES: **15**

INVITED TALKS: **21**

RESEARCH PRESENTATIONS: **60**

COURSES TAUGHT: **4**

See page 14 for full list of awards.

# 2021 UNIVERSITY PROGRAMS EVENTS

## SPRING MEETING PRESENTATIONS

Two B&C Fellows gave presentations about their research during the 2021 Spring (Virtual) Boone and Crockett Club Meeting: Tommy Young (University of Wisconsin – Stevens Point) and Chris Hansen (University of Montana). Tommy, a senior at UWSP, talked about the influence of hard mast production on bait site visitation of black bears and potential management implications for his work. Chris, a PhD candidate nearing completion of his degree, presented his work about the conservation benefits of sustainable land use on mammal communities, with a specific focus on rangelands and urbanization.

## 2021 WEBINARS

### LEADERSHIP FROM ANY CHAIR

Jordan Burroughs and Mike Opitz (January 2021)

Jordan and Mike focused their webinar with the students on the concept of “leading from any chair”, sharing their perspectives on effective leadership approaches and the characteristics of great leaders, and including interactive components to engage the fellows throughout the webinar.

### DEALING WITH BOARDS, COMMISSIONS, AND ADVISORY COUNCILS IN THE ROLE OF A PROFESSIONAL RESOURCE MANAGER

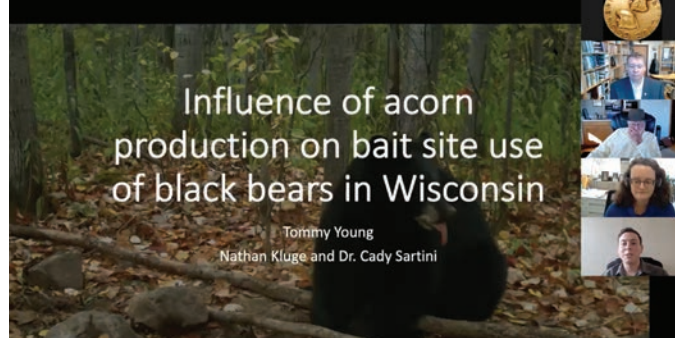
Johnny Evans, Joanna Prukop, Ron Regan, Christine Thomas, and John Tomke (April 2021)

Professional and Regular Boone and Crockett members each spent a few minutes sharing their experiences serving on or working with state or federal agency boards and commissions, and then participants broke up into smaller groups for Q&A and continued discussion.

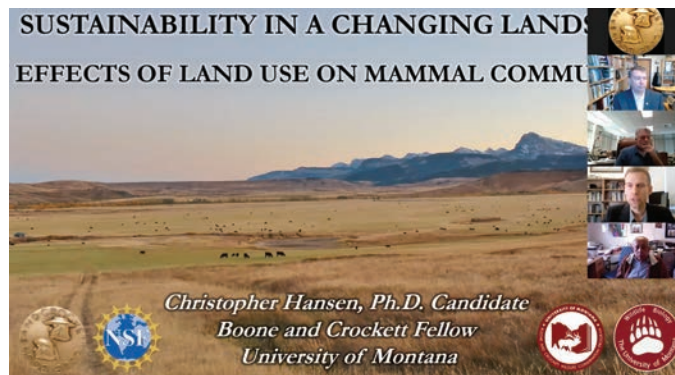
### SCIENCE COMMUNICATION TO BROAD AUDIENCES

Bronson Strickland (September 2021)

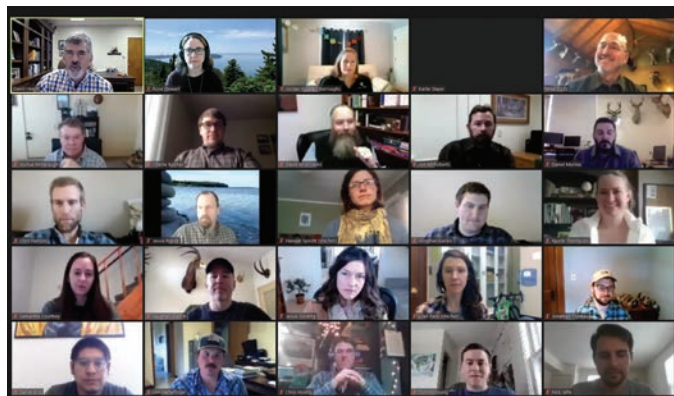
Bronson shared his insights about using effective communication strategies, knowing your audience, and talking about polarizing topics. We also kicked off a plan to revitalize Boone and Crockett “Trophy Points” in collaboration with current B&C Fellows, who will have the opportunity to conduct interviews and write articles for this initiative.



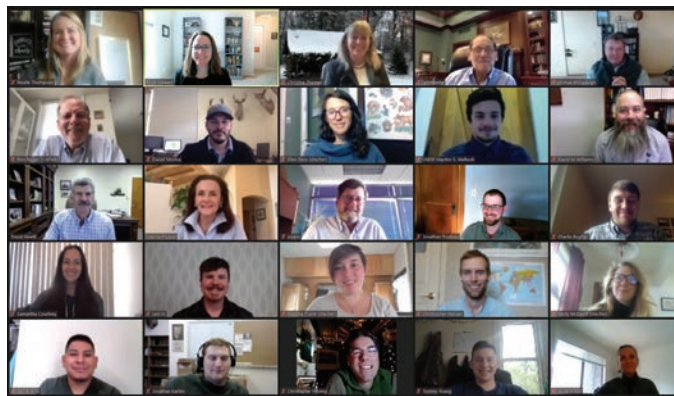
Tommy Young presenting at the Spring Meeting - March 2021



Christopher Hansen presenting at the Spring Meeting - March 2021



Leadership from Any Chair - January 2021



Dealing with Boards, Commissions, and Advisory Councils in the Role of a Professional Resource Manager - April 2021

**TROPHY POINTS: BIG GAME RESEARCH**

[f](#)
[t](#)
[p](#)
[v](#)

**GREATER APPRECIATION THROUGH INCREASED KNOWLEDGE**

Theodore Roosevelt was a hunter and a naturalist. Knowledge gained from his time afield fueled TR's zeal for conservation and elevated his appreciation for nature. One of the missions of the Boone and Crockett Club is to disseminate knowledge to ensure many are passionate about wildlife conservation.

Below is a complete list of the Trophy Points articles that are available.

**POPULATION-LEVEL EFFECTS OF CHRONIC WASTING DISEASE**  
*By David Hewitt (Professional Member, Boone and Crockett Club)*

Chronic wasting disease (CWD) is a malady of the deer family. This disease is caused by a protein in the deer's body called a prion. Prion proteins can misfold, giving the protein a conformation that makes it resistant to being broken down by the body's natural processes. Because these abnormal proteins are not metabolized, they accumulate. Furthermore, misfolded proteins can cause normal versions of the protein to misfold, setting off a chain reaction. Problems develop in the deer's brain because the abnormal proteins accumulate; they disrupt nervous-system function. Deer so afflicted lose coordination, become emaciated, lose body weight, and eventually die.





## STAY UP TO DATE WITH UNIVERSITY PROGRAMS IN FAIR CHASE MAGAZINE

Each issue of *Fair Chase* magazine includes an update from our University Programs. Individual schools, projects, and students are profiled as a way to inform our readership on current University Program happenings.

# 2021 BOONE AND CROCKETT FELLOW OUTSTANDING ACHIEVEMENT AWARD IN GRADUATE RESEARCH



In 2019 the Club established the annual Boone and Crockett Fellow Outstanding Achievement Award to recognize a graduate student whose research advances the Club's mission and informs natural resource management and policy decisions in North America. The award highlights and strengthens the connection between students and the Boone and Crockett Club that supports them. The pool of applicants for the Outstanding Boone and Crockett Fellow for 2021 was excellent. The selection committee could find no distinction between the top two applicants and chose to honor both with the award. Congratulations to this year's outstanding fellows, Levi Heffelfinger of Texas A&M University-Kingsville and Ellen Pero of the University of Montana.

## 2021 AWARD WINNER - LEVI HEFFELFINGER

Texas A&M University-Kingsville - Caesar Kleberg Wildlife Research Institute - Ph.D. - 2021

**Dissertation Title: Resource Selection, Habitat Influences on Population Performance, and Body Size Trade-Offs of Cervids in a Nutritionally Variable Environment**

Levi grew up with an early influence in wildlife science in southern Arizona. From a young age, he accompanied his dad on wildlife surveys and captures. Being an avid hunter, his appreciation for the outdoors has driven his love for wildlife research. Levi earned his bachelor's degree from the University of Arizona and his Master's degree from University of Nevada, Reno, where he worked with mule deer movement and demographics in the Mojave Desert. Levi's doctoral work focuses on the influence of fragmented landscapes (energy and agricultural development) on mule deer movement and population performance. In the future, he hopes to work at the interface of management and research of large game animals.

## 2021 AWARD WINNER - ELLEN PERO

University of Montana - Ph.D. - Projected to Graduate Winter 2021

**Dissertation Title: Integrated ecology of a reintroduction: Missouri elk restoration/ ecology and management of the restored elk population in Missouri**

Growing up, Ellen spent summers on the lake and in the woods of Michigan, developing an eagerness to spend her life working with and for the natural world. She received her bachelor's degree in Fisheries and Wildlife from Michigan State University and her Master's degree from University of Manitoba, where she studied the behavioral ecology of a threatened ground squirrel. At University of Montana, Ellen is focusing on how elk population dynamics, physiological stress, movement and resource selection, and reproductive behavior interact and progress following reintroduction to a new landscape. Ellen aims to obtain a research biologist position with a state or federal agency where her work can inform wildlife management, conservation, and policy.

Due to the impacts of COVID-19, last year's award winner was not featured in the 2020 Annual Report. Christopher Hansen was presented his award and given the opportunity to present his work at the 2021 Spring (Virtual) Boone and Crockett Club Meeting. See page 3 for more details.

## 2020 AWARD WINNER - CHRISTOPHER HANSEN

University of Montana - Ph.D. - 2021

**Dissertation Title: Conservation Benefits of Sustainable Land Use on Mammal Communities**

Chris Hansen is a fourth-year Ph.D. candidate whose research explores the conservation benefits of sustainable land use on mammal communities, specifically focusing on rangelands and urbanization. Chris obtained his Bachelor of Science degree in Biology at Truman State University and his Master of Science degree in Fisheries and Wildlife Sciences at the University of Missouri, where he managed a research project developing a monitoring protocol for ruffed grouse in South Dakota. One of Chris's projects involves the analysis of over 21,000 BLM grazing allotments in the western U.S. to evaluate trends in grazing patterns and vegetation resources over the past 30 years.



Levi Heffelfinger



Ellen Pero



Christopher Hansen

Learn more about the Outstanding Fellow Award and see a complete list of award winners online at [www.boone-crockett.org/boone-and-crockett-fellow-outstanding-achievement-award](http://www.boone-crockett.org/boone-and-crockett-fellow-outstanding-achievement-award)

# 2021 FORMER FELLOW VIDEO PROJECT

SINCE 1992 MORE THAN 100 BOONE AND CROCKETT FELLOWS HAVE COMPLETED COURSES OF STUDY IN WILDLIFE CONSERVATION AND RELATED FIELDS.

A complete listing of current and former fellows as well as the interview video can be found online at [www.boone-crockett.org/boone-and-crockett-fellows-program](http://www.boone-crockett.org/boone-and-crockett-fellows-program).

“While conducting these interviews, I realized the impact that the Boone and Crockett University Program has had on its fellows, in both their lives and in their careers. All spoke fondly of the program itself, yet when they spoke of their Boone and Crockett professor, their mentor, I could tell something truly special was created—something those fellows will pass on to future conservation professionals.”  
- PJ DelHomme



Gregory Schildwachter



Alex Sienkiewicz

The Boone and Crockett Club's University Programs is among the most forward-looking educational programs for university students in any field. There are immediate payoffs because our fellows' research informs important wildlife management and policy issues of the day. However, the enduring legacy of the Club's University Programs is evident in the work our fellows complete during their professional careers. Thus, return on investment often occurs many years after a fellow graduates as they gain positions of leadership and influence in conservation. Fellows carry forward the conservation values, technical skills, and an ability to integrate science with policy that they learned during their time as a fellow.

In collaboration with B&C writer and content creator PJ DelHomme, we embarked on a new initiative to reconnect with former fellows and to hear, in their words, what their program meant to them, their career, and how it influenced their outlook on conservation. This video project is one way we hope to demonstrate the enduring legacy of the Boone and Crockett Club's University Programs.

## FEATURED FORMER FELLOWS

### AMY DECHEN QUINN

Post-Doc—Completed 2011

**PROFESSOR/SUPERVISOR:** William Porter, Michigan State University

**RESEARCH PROJECT/THESIS TITLE:** Influences of movement behavior and space use in evaluating disease risk among white-tailed deer in central New York

**CURRENT ROLE:** Associate Professor, SUNY – Cobleskill, Department of Fisheries, Wildlife and Environmental Studies

### MARK STEINBACH

Ph.D—2004

**PROFESSOR/SUPERVISOR:** Jack Thomas, University of Montana

**RESEARCH PROJECT/THESIS TITLE:** Evaluating the consequences of public land grazing permit buyout program, permit reductions, and increased fees on land ownership and open space in Western states

**CURRENT ROLE:** Executive Director, Texas Land Conservancy

### JON MCROBERTS

Post-Doc—Completed 2020

**PROFESSOR/SUPERVISOR:** Josh Millspaugh, University of Montana

**RESEARCH PROJECT/THESIS TITLE:** Survival, recruitment, and movement patterns of white-tailed deer in Missouri

**CURRENT ROLE:** Research Administrator, University of Montana



Amy Dechen Quinn

### GREGORY SCHILDWACHTER

Ph.D—1997

**PROFESSOR/SUPERVISOR:** Hal Salwasser and Dan Pletscher, University of Montana

**RESEARCH PROJECT/THESIS TITLE:** Voluntary agreements to conserve endangered species on private land: accommodating local interests with trusting relationships

**CURRENT ROLE:** Consultant, Watershed Results LLC



Jon McRoberts

### ALEX SIENKIEWICZ

Ph.D—2006

**PROFESSOR/SUPERVISOR:** Jack Thomas, University of Montana

**RESEARCH PROJECT/THESIS TITLE:** Post-fire management and public lands conflict: the Bitterroot National Forest and beyond

**CURRENT ROLE:** District Ranger, Yellowstone District, Custer Gallatin National Forest



## MICHIGAN STATE UNIVERSITY BOONE AND CROCKETT PROGRAM

With roots in the northern hardwood forests, Great Lakes, and agricultural ecosystems of the upper Midwest, Michigan State University (MSU) is home to one of the premier fisheries and wildlife programs in the nation. In fall 2021, MSU opened the search for its next Boone and Crockett Endowed Chair based in the Department of Fisheries and Wildlife. The individual selected for this position will develop a nationally recognized program in wildlife policy (including regulatory and non-regulatory approaches), governance, and conservation leadership. The professor will be adept at transferring science to wildlife policy development, implementation, and evaluation, with a focus on governance of wildlife resources and their habitats in the United States from a biological, social, and economic perspective. We also continue to support B&C Fellows brought into the program by the late Dr. Bill Porter, who are being advised by Dr. David Williams, Interim Director of the Boone and Crockett Quantitative Center at MSU.

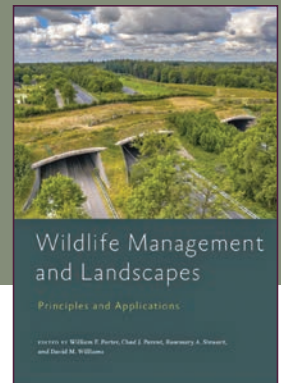
### FUNDING SOURCES

- MSU Boone and Crockett Club endowment
- Michigan Department of Natural Resources
- The Hal and Jean Glassen Memorial Foundation
- MSU College of Agriculture and Natural Resources
- MSU Extension
- MSU AgBioResearch
- MSU/Michigan DNR Joint Wildlife Disease Initiative



### WILDLIFE MANAGEMENT AND LANDSCAPES

Published in 2021, this book co-edited by Bill Porter, Chad Parent, Rose Stewart, and David Williams explores the intersection between wildlife management and landscape ecology in the 21st century. We developed this book for students studying these relationships, and for practicing wildlife managers and landscape ecologists. This edited volume is part of The Wildlife Society's Wildlife Conservation and Management book series.



LEFT: Research technician group for the 3rd field season of a study looking at impacts of harvest regulations on deer population demographics in areas where CWD has been detected.

RIGHT: GPS-collared white-tailed deer that are being monitored as part of Jonathan Trudeau's deer movement PhD research.



### BOONE AND CROCKETT FELLOW NOELLE THOMPSON

Noelle was raised on the south side of Chicago, where she developed an interest in zoos and wildlife conservation at an early age. As an undergraduate student, Noelle worked in the University of Illinois CWD lab and became interested in wildlife diseases and applied research. She received her M.S. degree from the University of Illinois, assessing deer habitat use and spatial structure in an important natural area with implications for potential disease spread. Noelle's doctoral work at Michigan State University uses agent-based modeling to evaluate cost-effective, socially acceptable, and effective management strategies for CWD in Michigan's free-ranging deer herds. Noelle is in the final stages of her dissertation work and recently accepted a position as a Wildlife Disease Biologist with the Kentucky Department of Fish and Wildlife Resources.

# UNIVERSITY OF MONTANA



Dr. Joshua Millspaugh

## UNIVERSITY OF MONTANA BOONE AND CROCKETT PROGRAM

Long known for its exceptional big game research, the University of Montana hosted the original Boone and Crockett Professor, beginning in 1987. The Boone and Crockett Program at Montana is focused primarily on the integration of wildlife conservation and land management. Our program addresses society's most significant wildlife and natural resource challenges through collaborative, relevant, and high-caliber research and teaching.

The Program prepares future conservation leaders through science-based instruction that promotes wise stewardship, application of the best available science, and informed policy decisions. A key component of the research-teaching effort is centered on the Boone and Crockett Club's Theodore Roosevelt Memorial Ranch and the Elmer E. Rasmuson Wildlife Conservation Center near Dupuyer, Montana. The 6,000-acre working cattle ranch and the Center are adjacent to the Lewis and Clark National Forest, along the Rocky Mountain Front.

### POLICY IMPACT

In collaboration with the Association of Fish & Wildlife Agencies, the University of Montana Boone and Crockett Program is building a clearinghouse of state-based conservation revenue streams to give leaders in the field a better view of how wildlife conservation is paid for. Breaking down varying revenue streams by source for each state, and aggregating these data nationwide, will offer a holistic picture of nationwide conservation funding that is currently unavailable.

### FUNDING SOURCES

- National Science Foundation
- Rocky Mountain Elk Foundation
- North Dakota Game and Fish Department
- Missouri Department of Conservation
- U.S. Bureau of Land Management
- U.S. Forest Service
- Conservation Frontlines Foundation
- Montana Fish, Wildlife, and Parks
- South Dakota Department of Game, Fish, and Parks
- Blackfeet Nation
- Wyoming Game and Fish Department
- Wyoming Department of Transportation
- U.S. Department of Defense
- National Park Service
- Nevada Department of Wildlife
- UM Boone and Crockett Club endowment



LEFT: Ellen Pero is one the Boone and Crockett Club 2021 Outstanding Fellow Award winners. Read more on page 4.

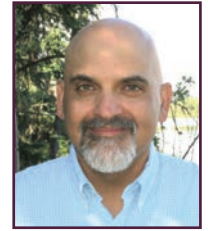
RIGHT: In May 2021 a bill was signed into law by Montana Governor Gianforte that allows many of Montana's non-resident college students to purchase hunting and fishing licenses at a resident rate. The legislation results from a collaboration between the Boone and Crockett Program at the University of Montana (UM), the Boone and Crockett Club, and the Congressional Sportsmen's Foundation, a nonprofit organization that works with Congress and state governments to protect and advance hunting, angling, trapping, and recreational shooting.



### BOONE AND CROCKETT FELLOW CHARLIE BOOHER

Charlie grew up hunting, fishing, camping, and paddling with his family in Michigan and Wisconsin. He received his bachelor's degree from Michigan State University, where he combined traditional training in wildlife management with studies in conservation policy, interning with organizations including The Wildlife Society, the Theodore Roosevelt Conservation Partnership, and Michigan United Conservation Clubs. Charlie is pursuing a joint M.S. in Wildlife Biology and a Master of Public Administration from the University of Montana. His thesis aims to address major issues facing the field of wildlife conservation by clarifying commonly used – but rarely defined – language surrounding wildlife consumption, compiling and analyzing state-specific responses to declines in funding for fish and wildlife agencies, and discussing issues for the future of the field nationwide. In the future, Charlie hopes to work in Washington, DC at the intersection of wildlife research and natural resources policy.





Dr. Perry Barboza

## TEXAS A&M UNIVERSITY BOONE AND CROCKETT PROGRAM

The Boone and Crockett program at Texas A&M connects wildlife science with policy.

We help young scientists inform policy makers. We also help young policy makers understand the science of lands, animals, and people. Our graduate research projects include studies of bison, caribou, deer, and moose that seek to inform management of populations and habitats. Our teaching programs prepare students to address policy issues from their first year in wildlife & fisheries science through the end of their masters and doctoral degrees.

## FUNDING SOURCES

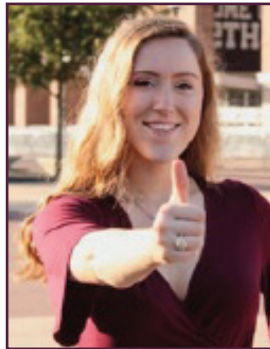
- Alaska Department of Fish and Game
- Alaska Science Center USGS
- Rob and Bessie Welder Wildlife Foundation
- National Institute of Food and Agriculture
- College of Agriculture and Life Sciences
- Dr. Red Duke Boone and Crockett Wildlife Conservation and Policy Program at Texas A&M



ABOVE: ABOVE: The 2021 Conservation Capstone team, who were mentored by Dr. Perry Barboza and Dr. Blease Graham. MPSAA student Zac Nowak was a team leader and a graduate of the Wildlife and Fisheries program at A&M.

## 3+2 PROGRAM AT TEXAS A&M

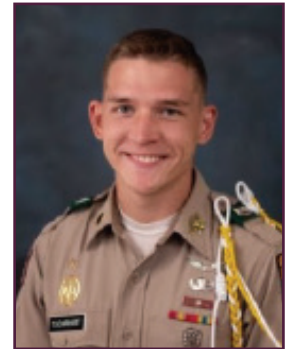
Four undergraduate wildlife majors decided to continue in public policy by applying to the Bush School after completing the course “Fish and Wildlife Laws and Administration” taught by Dr. Perry Barboza. Thomas “Ray” Edwards, Erin Kavanagh, Hunter Parker, and Cole Tschirhart began the Master of Public Service and Administration (MPSAA) degree in fall 2021. This is a very competitive program: the Bush School received over 400 applicants for 100 seats and all four of our applicants were admitted.



Erin Kavanagh



Hunter Parker



Cole Tschirhart



## BOONE AND CROCKETT FELLOW AMELIA CHRISTIAN

Despite growing up in the suburbs of Dallas, TX, Amelia has been finding ways to study and interact with animals from a very young age. Amelia received her B.S. degree in Animal Science from Texas A&M University, where she became interested in animal nutrition research and continued on in an M.S. program focused on nutrient changes associated with different species, seasons, and stages of growth of bamboo offered to captive giant pandas. Amelia’s Ph.D. research at Texas A&M involves understanding protein utilization by brown bears during the period of lean mass gain immediately following hibernation and the period of fat gain prior to hibernation. Understanding these limitations has applications in managing resources and habitat of brown bears in the wild, as well as implications for other threatened bear species.

## TEXAS A&M UNIVERSITY - KINGSVILLE BOONE AND CROCKETT PROGRAM

Texas A&M University-Kingsville's (TAMUK) wildlife program has 150 undergraduate and 60 graduate students who learn about range and wildlife management in the southwestern United States. These students work with the program's 20 scientists to study wildlife ecology and management, focusing on applied studies that address challenges confronting wildlife biologists. TAMUK has nationally recognized research programs in big game, upland gamebirds, wild cats, waterfowl and wetland birds, and habitat restoration. A unique aspect of TAMUK's wildlife program is the Caesar Kleberg Wildlife Research Institute (CKWRI), a privately funded entity that supports wildlife research at the university. The CKWRI ensures faculty and students have the finest research facilities, including GIS, molecular ecology, necropsy, and forage analysis labs as well as facilities to work with captive ungulates and birds. TAMUK's vigorous wildlife research programs provide undergraduate and graduate students innumerable opportunities for hands-on experience in a wide variety of research activities.

### POLICY IMPACT

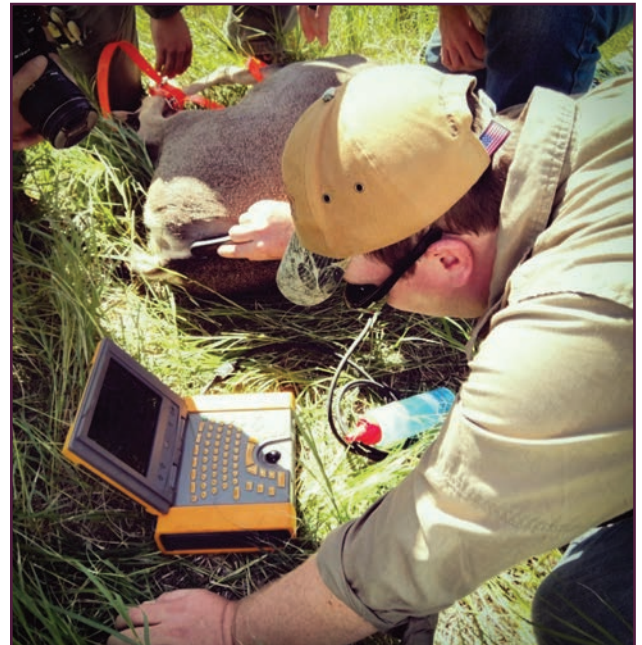
Because of our work assessing mule deer movement in the Texas Panhandle, the Texas Parks and Wildlife Department (TPWD) used our results to define a new Chronic Wasting Disease management and surveillance zone near Lubbock, Texas. We also served on a special task force formed by TPWD to provide the agency with input about their response to the recent spread of chronic wasting disease in Texas.

### FUNDING SOURCES

- Boone and Crockett Endowed Fellowship at TAMUK
- Texas Parks and Wildlife Department
- Mule Deer Foundation
- Caesar Kleberg Wildlife Research Institute
- Private landowners in the Texas Panhandle



ABOVE: Calvin Ellis started as a B&C Fellow the fall semester, 2021, and is studying mule deer dispersal in the Texas Panhandle and implications for chronic wasting disease epidemiology. RIGHT: Levi Heffelfinger in the field taking an ultrasound of a mule deer.



### BOONE AND CROCKETT FELLOW LEVI HEFFELFINGER

Levi grew up in Tucson, AZ and developed an interest in hunting and game management at a young age. He earned his B.S. degree in Wildlife Management and Conservation from the University of Arizona, and an M.S. degree from the University of Nevada, Reno. Levi joined the Caesar Kleberg Wildlife Research Institute at TAMUK in 2017, where he conducted his Ph.D. research on resource selection, habitat influences on population performance, and reproductive ecology of mule deer in a fragmented landscape. Levi's work will be used to establish an adaptive management plan as mule deer populations in the Texas Panhandle continue to increase. Levi recently defended his dissertation and will move into an Assistant Professor of Research position at CKWRI/TAMUK, based in the Panhandle. 2021 Outstanding Fellow Award Winner - See page 4.





## UNIVERSITY OF WISCONSIN - STEVENS POINT BOONE AND CROCKETT PROGRAM

Since 2012, the University of Wisconsin-Stevens Point has offered the Douglas R. Stephens Boone and Crockett Club Fellowship in Wildlife Conservation, awarded to undergraduate students who display academic excellence and are interested in gaining a background in wildlife conservation and leadership skills. The faculty-mentored student research fellowships further the mission of the Boone and Crockett Club and advance the educational, research, and outreach mission of the College of Natural Resources. UWSP's Wildlife Ecology program has over 300 undergraduate majors and seven full-time faculty members. The program emphasizes undergraduate teaching and incorporates research in areas such as conservation biology, avian ecology, predator ecology, wetland ecology, wildlife health, population dynamics, wildlife damage management, and habitat management. Practical, hands-on experience inside and outside the classroom is a cornerstone of the program. Undergraduate courses focus on the problem-solving and scientific skills needed to understand the ecological interactions affecting wildlife management, including game, non-game, endangered, and invasive species. Graduates of the Wildlife Ecology and Management program are academically qualified to become Certified Wildlife Biologists. UWSP's Wildlife Society Student Chapter is consistently among the best in the nation.

### FUNDING SOURCES

- Douglas R. Stephens Boone and Crockett Club Wildlife Research Fellowship Endowment
- Douglas R. Stephens Wildlife Research Fellowship Endowment - Stephens Family Fund



RIGHT: Trail camera photo captured by the Snapshot Wisconsin program. B&C Fellow Hayden Walkush is analyzing these photos to help inform Wisconsin turkey harvest regulations.

### OUTREACH SPOTLIGHT

We worked with the Wisconsin Center for Wildlife and the Wisconsin Center for Forestry to develop educational materials for landowners, agency personnel, and private industry employees for managing Neotropical Migrants on forested land. We are now submitting a funding proposal to enhance that work at a larger spatial scale.



### BOONE AND CROCKETT FELLOW HAYDEN WALKUSH

Hayden's passion for wildlife grew as he explored the waters and woods of Central Wisconsin as a child. He is pursuing an undergraduate degree in Wildlife Ecology from the University of Wisconsin - Stevens Point. Hayden's undergraduate research focuses on Wisconsin's eastern wild turkey population, which has experienced a decline in spring and fall harvest. Using the citizen science program "Snapshot Wisconsin" and agency harvest data, Hayden is studying whether yearly harvest demographics are reflected in Snapshot Wisconsin's reported male-to-female ratios. If his predictions are supported, Snapshot Wisconsin's estimation of population demographics could be used to predict population trajectories and help inform the state's decisions on hunting season frameworks. In the future, Hayden hopes to continue in the academic realm where the results of his research can help inform wildlife management decisions.

## CLEMSON UNIVERSITY BOONE AND CROCKETT PROGRAM

In partnership with the Boone and Crockett Club, Clemson University is in the process of establishing a Distinguished Professorship in Wildlife Conservation. This newly endowed program will focus on coordinating outreach, teaching, and applied research efforts to enhance and promote game species management and wildlife conservation on private lands. This not only meets a regional need (90 percent of land and wildlife habitat in the Southeast is privately owned) but addresses a growing priority for advancing big game management globally.

Clemson has a long history of exceptional research, teaching, and outreach programs in applied wildlife management and conservation both globally and locally. Internationally, Dr. Shari Rodriguez and her students study human-wildlife conflict, with ongoing studies of humans and elephants in Myanmar, tigers in India, and jaguars in Columbia. In the southeastern US, our faculty and students are conducting cutting edge wildlife research on key issues related to white-tailed deer management and a variety of other game species. Clemson houses the James C. Kennedy Waterfowl and Wetlands Center, and in 2021 Clemson was announced as the new home for the National Bobwhite Conservation Initiative, further establishing Clemson as a leading institution for applied wildlife management research and training in the region, and nationally.

### RESEARCH SPOTLIGHT

In 2018, in collaboration with state and federal agencies, Clemson created the Carnivore Ungulate Team (CUT) to undertake a large multi-year study of the demography and movement ecology of doe and fawn white-tailed deer on private lands in the Piedmont region of South Carolina. A series of well-publicized studies from the coastal plain of South Carolina have suggested that fawn predation by coyotes is limiting white-tailed deer populations in the region, leading to the development of coyote control policies and shooting incentive programs in South Carolina and throughout the southeastern US. However, we don't know if coyotes are having similar effects in other portions of the southeast where conditions vary, nor how coyote control could be impacting fawn survival where it is practiced. Further, wild pig populations are rapidly increasing in the southeast, potentially influencing how deer and coyotes interact on the landscape. To address these questions, we are conducting the first detailed study to simultaneously evaluate the behavior and survival of deer, coyotes and wild pigs in this system, providing information that can be used to inform future public policy and private land management decisions.



ABOVE: Elizabeth Saldo (MS student) studies the impact of wild pigs on wildlife, and particularly how use of deer feeders could be influencing that relationship.

BELOW: Clemson deer team during capture and placement of a GPS tracking collar on a captured doe prior to release on private lands in South Carolina.



# 2021 BOONE AND CROCKETT FELLOWS



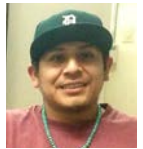
**BRIDGETT BENEDICT**  
Ph.D. student; Texas A&M  
The effects of insects on North American ungulates



**CHRISTOPHER HANSEN**  
Ph.D. student; U of Montana  
Conservation benefits of sustainable land use on mammal communities



**ELLEN PERO**  
Ph.D. student; U of Montana  
Ecology and management of the restored elk population in Missouri



**DANIEL BIRD**  
Ph.D. student; U of Montana  
Modeling migration and habitat use of elk in Montana (co-advised by Jed Brodie)



**LEVI HEFFELFINGER**  
Ph.D. student; TAMU-Kingsville  
Influence of agriculture on mule deer demographics and movement in the Texas panhandle



**LESLIE SKORA**  
M.S. student; Michigan State  
Monitoring brown bear abundance at Katmai National Park, Alaska



**CHARLIE BOOHER**  
M.S. & MPA student; U of Montana  
Looking to the future of conservation: the role of hunting in wildlife policy



**CHRIS HOVING**  
Ph.D. student; Michigan State  
Coupled human and natural systems models of oak management in a changing climate



**LAUREN SNOBL**  
M.S. student; U of Montana  
Effects of wildfire on elk habitat and distributions in the Blackfoot-Clearwater area, Montana



**VAUGHAN BRANCH**  
M.S. student; U of Montana  
Management authority on federal lands and effective collaboration on habitat connectivity



**NICK JAFFE**  
Ph.D. student; Michigan State  
Ecological and economic effects of wolf recolonization in the Lower Peninsula of Michigan



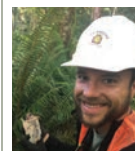
**HANNAH SPECHT**  
Postdoctoral fellow; U of Montana  
Evaluation of survey approaches to assess status of non-game indicator species



**AMELIA CHRISTIAN**  
Ph.D. student; Texas A&M  
Nitrogen metabolism and adaptive capacity of carnivorous bears



**JONATHAN KARLEN**  
MPA student; U of Montana  
Species richness and bear occupancy after a recent mixed-severity wildfire in western MT



**SEAN SULTAIRE**  
Postdoctoral fellow; U of Montana  
Estimating abundance of big game species in northern Nevada



**MIKE CLAWSON**  
Postdoctoral fellow; U of Montana  
Demographic modeling of harvested wildlife



**JESSICA KROHNER**  
M.S. student; U of Montana  
Fisher occupancy in Montana and Idaho



**NOELLE THOMPSON**  
Ph.D. student; Michigan State  
Modeling white-tailed deer disease risk to determine cost-effective management techniques



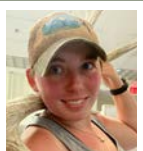
**SAMANTHA COURTNEY**  
M.S. student; Michigan State  
Quantifying factors affecting disease transmission in deer (co-advised by Dwayne Etter)



**LANDON MAGEE**  
M.S. student; U of Montana  
Analyzing moose population dynamics on the Blackfoot Reservation, MT (co-advised by Chad Bishop)



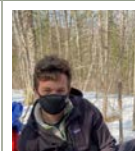
**JONATHAN TRUDEAU**  
Ph.D. student; Michigan State  
Assessing drivers of spread and transmission of CWD in Michigan deer



**MADISON CRANE**  
M.S. student; U of Montana  
Resource selection as a contributor to movement ecology of pronghorn across Montana



**MOLLY MCDEVITT**  
Ph.D. student; U of Montana  
Pronghorn movement and survival in Montana and South Dakota (co-advised by Paul Lukacs)



**HAYDEN WALKUSH**  
B.S. student; U of Wisconsin-Stevens Point  
Predicting fall harvest demographics of Eastern wild turkeys using Snapshot WI images



**CALVIN ELLIS**  
M.S. student; TAMU-Kingsville  
Mule deer dispersal in the Texas Panhandle and implications for chronic wasting disease



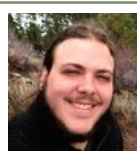
**DANIEL MORINA**  
Ph.D. student; U of Montana  
Ecology and management of elk in North Dakota



**TOMMY YOUNG**  
B.S. student; U of Wisconsin-Stevens Point  
Influence of hard mast production on bait site visitation of black bears



**JESSIE GOLDING**  
Ph.D. student; U of Montana  
Multi-species mesocarnivore monitoring



**WALDEMAR ORTIZ-CALO**  
M.S. student; U of Montana  
Evaluating white-tailed deer space-use relationships

See complete fellow profiles online at [www.boone-crockett.org/boone-and-crockett-fellows-program](http://www.boone-crockett.org/boone-and-crockett-fellows-program)

# DEMME SCHOLARS PROGRAM



Mr. Mark Rey

The thirteenth cohort of Demmer Scholars enjoyed a partial return to normal during the ongoing COVID pandemic. Half of the 26 student participated in person, and the other half took the class virtually as the 2020 class did. Selected impressions below suggest that both groups enjoyed the experience.

“Coming into the Summer of 2021, I truly had no idea what to expect from my class and internship experience. After an unprecedented year full of anxieties around COVID-19, my senior year classes being entirely online, and a lack of any sporting events for the academic year, I was ready for a positive new experience and very excited for the prospect of living and working in the Washington, DC area.”

**ALEXIA NAGY**

Michigan State University, interned in person with the Aluminum Association.

“My internship with the National Institute of Allergy and Infectious Diseases allowed me to grow in many ways. I became informed about numerous emerging areas of scientific discovery, became more adept at navigating a primarily virtual workspace, became further aware of the intricacies of one of the most crucial federal organizations at this point in history, and became confident in my abilities to work with a diverse group of people with different skillsets in order to promote a collective mission.”

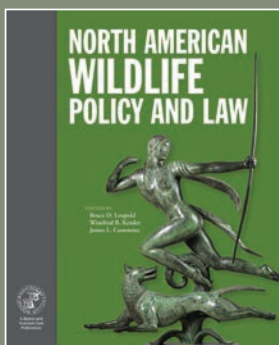
**RYAN JARRATT**

Mississippi State University, interned virtually with The National Institutes of Health.

“Overall, working with the Congressional Sportsmen’s Foundation allowed me to explore sportsmen-related policy throughout the United States, and realize how policies could affect hunting and fishing. It was my first time in a policy-centered position, and something I really enjoyed about the work is that I feel knowledgeable and comfortable discussing a lot of hunting and fishing issues across the country.”

**MADELINE DAMON**

University of Montana, interned virtually with the Congressional Sportsmen’s Foundation.



**NORTH AMERICAN WILDLIFE POLICY AND LAW**

A basic understanding of wildlife law and policy is essential knowledge for anyone who aspires to work in wildlife management and other natural resource fields. The Boone and Crockett

Club is pleased to have published a book, *North American Wildlife Policy and Law*, for anyone interested in natural resource management, public policy, or environmental law. Edited by: Bruce D. Leopold, Winifred B. Kessler, and James L. Cummins

Available in hardcover or eBook. Individual chapter PDFs are also available on B&C’s website.



The thirteenth cohort of Demmer Scholars

# 2021 UNIVERSITY PROGRAMS ACCOMPLISHMENTS



## SELECTED AWARDS

**Charlie Booher** received a Kathy & Jack Thomas Endowed Scholarship from the University of Montana W.A. Franke College of Forestry & Conservation and a Wild Sheep Foundation Life Member Scholarship.

**Chris Hansen** was awarded the Boone and Crockett Fellow Outstanding Achievement Award in Graduate Research in December 2020. Chris also received a Montana Association of Geographic Information Professionals Higher Education Scholarship.

**Levi Heffelfinger** received the Clarence Cottam Award for Outstanding Graduate Student Presentation (1st place) from the Texas Chapter of The Wildlife Society. Levi was also named the TAMU-Kingsville College of Agriculture and Natural Resources Outstanding Ph.D. Student and was awarded a 2021 Boone and Crockett Fellow Outstanding Achievement Award in Graduate Research.

**David Hewitt** was a co-author on the Texas Chapter of The Wildlife Society's Outstanding Scientific Article of the Year.

**Jonathan Karlen** received the President's Outstanding Senior Award from the University of Montana and a Professional Excellence Award from the Davison Honors College.

**Landon Magee** was a recipient of a Cobell Graduate Scholarship and a Sloan Indigenous Graduate Program Fellowship.

**Ellen Pero** received a Franke Fellowship and a Bertha Morton Scholarship from the University of Montana and was awarded a 2021 Boone and Crockett Fellow Outstanding Achievement Award in Graduate Research.

**Bill Porter** was honored posthumously with the Michigan Chapter of The Wildlife Society's Legacy Award.

**Noelle Thompson** received a Hal and Jean Glassen Conservation Medicine Fellowship and a Vera Wallach Graduate Scholarship for Wildlife Ecology or Management from Michigan State University.

**Jonathan Trudeau** received the Joseph G. Schotthoefer Memorial Student Award from the Safari Club International Michigan Involvement Committee.

## SELECTED PEER-REVIEWED PUBLICATIONS

Beck, J. M., K. C. Elliott, **C. R. Booher**, K. Renn, and R. A. Montgomery. 2021. The application of reflexivity for conservation science. *Biological Conservation* 262:109322.

**Belsare, A. V., J. J. Millspaugh**, J. R. Mason, J. Sumners, H. Viljugrein, and A. Myrsterud. 2021. Getting in front of chronic wasting disease: model-informed proactive approach for managing an emerging wildlife disease. *Frontiers in Veterinary Science* 7:608235.

Blackburn, A., **L. J. Heffelfinger**, A. M. Veals, M. E. Tewes, and J. H. Young Jr. 2021. Cats, cars, and crossings: the consequences of road networks towards the conservation of an endangered felid. *Global Ecology and Conservation* 27: e01582.

**Christensen, S. A.**, M. T. Farr, and **D. M. Williams**. 2021. Assessment and novel application of N-mixture models for aerial surveys of wildlife. *Ecosphere* 12(8): e03725.

Cove, M., R. Kays, H. Bontrager, et al., **C. Hansen, J. Millspaugh**, et al. 2021. SNAPSHOT USA 2019: a coordinated national camera trap survey of the United States. *Ecology* 102(6):e03353.

**Crawford, J. C., W. F. Porter**, M. Chamberlain, and B. Collier. 2021. Wild turkey nest success in pine-dominated forests of the Southeastern United States. *Journal of Wildlife Management* 85(3): 498-507.

Fullbright, T. E., D. J. Drabek, J. A. Ortega-S, S. L. Hines, R. Saenz, T. A. Campbell, **D. G. Hewitt**, and D. B. Wester. 2021. Forb standing crop response to grazing and precipitation. *Rangeland Ecology and Management* 79:175-185.

Hines, S. L., T. E. Fullbright, A. Ortega, S. L. Webb, **D. G. Hewitt**, and T. Boutton. 2021. Compatibility of dual enterprises for cattle and deer in North America: a quantitative review. *Rangeland Ecology and Management* 79:21-31.

**Hollingsworth, K. A.**, R. D. Shively, S. Glasscock, J. Light, D. Tolleson, and **P. S. Barboza**. 2021. Trace mineral supplies for populations of little and large herbivores. *PLOS One* 16(3): e0248204.

**Krohner, J. M.**, P. M. Lukacs, R. Inman, J. D. Sauder, J. A. Gude, C. Mosby, J. A. Coltrane, R. A. Mowry, and **J. J. Millspaugh**. Finding fishers: determining fisher distribution in the Northern Rocky Mountains. *Journal of Wildlife Management* (In press).

**Martin, J. M.**, J. Zaretsky, D. D. Briske and **P. S. Barboza**. 2021. Vulnerability assessment of the multi-sector North American bison management system to climate change. *People and Nature* 3:711-722.

Moll, R. J., **J. T. McRoberts, J. J. Millspaugh**, K. H. Wiskirchen, J. A. Sumners, et al. 2021. A rare 300 kilometer dispersal by an adult male white-tailed deer. *Ecology and Evolution* 11:3685-3695.

**Pero, E. M.**, D. A. Bell, Z. Robinson. **M. C. Chitwood**, et al., and **J. J. Millspaugh**. One size does not fit all: genetic considerations from the Missouri elk restoration. *Conservation in Practice* (In press).

Shively, R. D., and **P.S. Barboza**. Monitoring diet by automated microhistology. *Wildlife Society Bulletin* (In press).

**Sultaire, S.M.**, J. M. Humphreys, B. Zuckerberg, J. N. Pauli, and G. J. Roloff. Spatial variation in bioclimatic relationships for a snow-adapted species along a discontinuous southern range boundary. *Journal of Biogeography* (In press).

**Thompson, D. P.**, J. A. Crouse, **P. S. Barboza**, M. O. Spathelf, A. M. Heberg, S. D. Parker, and M. A. Morris. 2021. Behavior influences thermoregulation in boreal moose during the warm season. *Conservation Physiology* 9(1):1-12.

Tucker, J. M., K. M. Moriarty, M. E. Ellis, and **J. D. Golding**. 2021. Effective survey area is a major driver of power to detect long-term trends in occupancy. *Ecosphere* 12: e03519.

**Wright, C. A., J. T. McRoberts**, C. T. Rota, K. H. Wiskirchen, B. J. Keller, and **J. J. Millspaugh**. 2021. Female white-tailed deer (*Odocoileus virginianus*) behavior during pregnancy, parturition, and lactation in two contrasting ecoregions. *Wildlife Society Bulletin* 45:430-444.

## BOOKS AND BOOK CHAPTERS

**Morina, D. L., C. P. Hansen, L. P. Hansen, and J. J. Millspaugh.** 2021. The efficacy of antler harvest regulations in meeting management objectives. Pages 263-282 in K. Pope and L. Powell, editors. Harvest of fish and wildlife: new paradigms for sustainable management. CRC Press, Boca Raton, FL, USA.

**Porter, W. F., C. J. Parent, R. A. Stewart, and D. M. Williams,** editors. 2021. Wildlife management and landscapes: principles and applications. Johns Hopkins University Press in affiliation with The Wildlife Society, Baltimore, MD, USA.

Shiple, L. A., R. C. Cook, and **D. G. Hewitt.** 2020. Techniques for wildlife nutritional ecology. Pages 439-482 in N. J. Silvy, editor. The wildlife techniques manual, 8th ed. John Hopkins University Press, Baltimore, MD, USA.

## SELECTED POPULAR ARTICLES

**Booher, C. R.** 2021. Hunting is conservation, but is it enough? Bugle Magazine (In Press).

**Booher, C. R.** 2021. Is R3 paying dividends? Michigan Out-of-Doors Magazine 74(4).

**Ellis, C. C., L. J. Heffelfinger,** and M. J. Cherry. 2021. The past, present, and future of chronic wasting disease in Texas. South Texas Wildlife 25(3):3-4.

**Hewitt, D. G.** 2021. Working for wildlife during a wild year. South Texas Wildlife 24(4):3-4.

**Hewitt, D. G.,** R. W. DeYoung, M. J. Cherry, and Charles A. DeYoung. 2021. Chronic wasting disease and deer management on private land. Caesar Kleberg Wildlife Research Institute Management Bulletin No. 10.

**Karlen, J. G.** 2021. Student-led initiative in Montana makes hunting more accessible for peers. Conservation Frontlines E-Magazine 3(3): 66-73.

**Millspaugh, J. J., and J. G. Karlen.** 2021. CSF partnering with Boone and Crockett program at the University of Montana on bill to make hunting accessible to Montana students. Fair Chase Magazine 37(2):50-53.

## SELECTED PRESS FEATURES

“Boone and Crockett Club-backed hunting bill signed into law by Montana Gov. Gianforte”. Boone and Crockett Club website [Press release], May 2021. Written by **J. Millspaugh** and **J. Karlen.**

“Creating innovative models to assess spread, possible management of deadly chronic wasting disease”. Futures Magazine [Article], Feb 2021. Featuring **D. Williams, J. Trudeau, J. Cook, N. Thompson,** and **S. Christensen.**

“CSF partnering with Boone and Crockett Program at the University of Montana on bill to make hunting accessible to Montana students”. Congressional Sportsmen’s Foundation [Resource center post], Mar 2021. Written by **J. Millspaugh** and **J. Karlen.**

“Sustainable Missoula: Clark Fork watershed education does more than teach”. Missoula Current [online news journal article], Jun 2021. Written by **J. Karlen.**

“Tracking wildlife’s ups and downs”. Montana Outdoors Magazine [feature article], Sep/Oct 2021. Featuring **H. Specht.**

## COURSES TAUGHT BY B&C PROFESSORS

Assumptions in Wildlife Habitat Management, Spring 2021. **J. Millspaugh** (Instructor). Graduate students.

Fish and Wildlife Law and Administration, Spring and Fall 2021. **P. Barboza** (Instructor). Junior undergraduates.

Public Service and Administration Capstone Seminar, Spring and Fall 2021. **P. Barboza** (Advisor). Professional graduate students.

Wild Sustenance, Fall 2021. **J. Millspaugh** (Instructor). Undergraduate and graduate students.

## SELECTED OUTREACH AND PROFESSIONAL ACTIVITIES

Association of Fish and Wildlife Agencies, Climate Adaptation Committee: **C. Hoving.**

Boone and Crockett Official Measurer: **D. Morina.**

Chronic Wasting Disease Task Force and Private Lands Advisory Committee, Texas Parks and Wildlife Department: **D. Hewitt.**

Conservation Lands Advisory Committee, Missoula Parks and Recreation: **H. Specht.**

Diversity, Equity, and Inclusion Committee. Department of Rangeland, Wildlife and Fisheries Management, Texas A&M University: **P. Barboza.**

Michigan State Fisheries and Wildlife Graduate Student Organization. **S. Courtney,** Faculty Representative and Seminar Coordinator.

Missoula Climate and Energy Team, Missoula City Council. **J. Karlen.**

North Central Section of The Wildlife Society: **J. Riddle,** President.

Rocky Mountain Elk Foundation National Science Advisory Group and Montana Project Advisory Committee: **J. Millspaugh.**

University of Montana Wildlife Biology Graduate Student Mental Health/Wellbeing Working Group: **E. Pero.**

University of Montana Graduate and Professional Student Association: **M. Crane,** Undergraduate Liaison, **M. McDevitt,** Guest Speaker Committee, **L. Snobl,** Seminar Coordinator.

University of Montana Strategic Planning Committee: **J. Millspaugh.**

University of Montana WBIO R Group for Graduate Students, **W. Ortiz-Calo,** Co-Coordinator.

UWSP College of Natural Resources Student Success Center, **H. Walkush,** Peer Mentor.

Wilderness and Civilization Program at University of Montana: **C. Hansen,** Trail Camera Advisor and Guest Speaker.

Wildlife Disease Association, Michigan Student Chapter. **N. Thompson,** Treasurer and Fundraising Chair.

Wildlife Society, Early Career Professional Working Group: **J. Trudeau,** Chair.



Trailcam photos from the Theodore Roosevelt Memorial Ranch in Dupuyer, Montana. All images and associated video © 2021 The University of Montana

This annual report was created by the Boone and Crockett Club, in collaboration with the Boone and Crockett Program at Michigan State University.

Design by Karlie Slayer and Rose Stewart