The mission of the Boone and Crockett Quantitative Wildlife Center is to advance wildlife conservation through the application of advanced mathematics, statistics, computer modeling, and ecological sciences.
INTRODUCTION

This vision statement is intended to guide the development and operation of the Boone and Crockett Quantitative Wildlife Center (QWC) as a center of excellence at Michigan State University. The document follows the Guidelines for Developing a Strategic Plan for Institutes, Centers, and Other Similar Operations Engaged in Research – January 18, 2011. As with many centers, the chief benefits in creating the QWC are sharper internal focus that serves as a catalyst to high-caliber work, greater external visibility that helps attract extramural support, attraction of talented students and research scientists, and increased credibility to impact wildlife conservation policy through science. The QWC is viewed as a complement to the Quantitative Fisheries Center (QFC) and together these two centers provide a nexus for enhancing the University’s contribution to the wise stewardship of all natural resources. Thus, the QWC and QFC serve the University by contributing to the economic and social fabric of Michigan and the nation.

The QWC is authorized to use the name BOONE AND CROCKETT Quantitative Wildlife Center through an addendum to the Boone and Crockett Club Endowment that established a Boone and Crockett Chair of Wildlife Conservation at Michigan State University in 2010. The professor occupying this chair is also designated as the Director of the QWC. The QWC is authorized as a CENTER through agreement by the Michigan State University. Oversight of the QWC is provided by the Michigan Boone and Crockett Partners. The physical space occupied by the QWC is hosted by the Department of Fisheries and Wildlife. The operational funds are provided by the Boone and Crockett Club Endowment through the Boone and Crockett Professor of Wildlife Conservation.

1The Michigan Boone and Crockett Partners group includes regular and professional members of the Boone and Crockett Club residing in Michigan; the Michigan Department of Natural Resources as represented by the Chief of the Division of Wildlife; the Glassen Foundation; Michigan State University as represented by the Chair of the Department of Fisheries and Wildlife, the Director of MSU Extension and the Director of AgBioResearch.
SUPPORT OF BOLDER BY DESIGN

The QWC supports the Land Grant mission of Michigan State University and is aligned specifically with the Strategic Imperatives outlined in *Bolder by Design*. We are a student-centered research center and believe that a cornerstone of all that we do should be the promotion of a student experience that is inspirational as well as educational. Our ability to help students learn to draw on their passion, creativity, and intellect is critical to our success. In turn, we focus their energy and ability on solving the major challenges facing conservation.

The goals of the QWC are built on research, education, and outreach as an organizing framework. Our objectives are intended to address each of the six imperatives of *Bolder by Design* as central tenets to management of immediate and ongoing actions. Our objectives speak directly to the value of innovative design by addressing math, statistics, and computer modeling as the root of interdisciplinary decision making. Because quantitative techniques are a common language across disciplines, this innovative design has value beyond the boundaries of conservation and any single geographic region. Growing our capability with this interdisciplinary language will open an ever-expanding suite of opportunities for new research. Finally, our actions are guided by the core principle that our reason for existence is to nurture the highest possible performance of every individual. This principle is a philosophical cornerstone of the university programs of the Boone and Crockett Club across the nation.
MISSION

The mission of the Boone and Crockett Quantitative Wildlife Center is to advance wildlife conservation through the application of advanced mathematics, statistics, computer modeling, and ecological sciences.

We engage science with passion because we value science as a foundation of the wise decision-making necessary to ensuring a vibrant wildlife legacy for future generations of Americans. We view quantitative tools as a common language among sciences and therefore a pathway for engaging interdisciplinary approaches to wildlife conservation. These interdisciplinary partners include economic and social scientists as well as ecologists and wildlife conservationists. In concert with the larger mission of Michigan State University as a Land Grant institution, our mission is built on a tripartite framework:

(1) research – pioneering new tools that extend analytical and ecological knowledge,
(2) education – building a rich learning experience in the quantitative and ecological sciences that fosters growth of scientists and leaders of the highest caliber, and
(3) outreach – promoting the application of the tools and expertise to enable those who manage wildlife as a public trust to engage in interdisciplinary decision-making more effectively.
We envision the QWC as a nationally-recognized catalyst for advancing the power of quantitative methods and ecological knowledge to ensure that conservation principles and our wildlife legacy are central to human experience in the generations to come.

As a center of excellence at Michigan State University, the QWC applies advanced methods in mathematics, statistics, and computer modeling to understanding wildlife ecology with a specific focus on the challenges inherent to the conservation of wildlife resources. Research findings are integrated with new educational programs designed to inspire as well as train students and professionals. Ultimately, this research and educational engagement is envisioned to involve work throughout the Great Lakes States and beyond, and to influence policy makers and other stakeholders on a national level.

In all of these activities, the QWC is student-centered. It seeks to enhance the suite of scientific, communication, and leadership skills that are essential to successful conservation of wildlife resources. We invest in people, and capable people are our core product.
EXTERNAL TRENDS AND CONDITIONS

The extraordinary legacy of wildlife populations and conservation principles that are a hallmark of the 20th century in North America were established by the evolution of a unique partnership. Wildlife resources were extirpated from much of their ranges in North America by the end of the 19th century as a result of unregulated harvest and habitat destruction. A partnership comprised of hunting organizations with political might and money emerged during the 20th century, led by conservation organizations such as the Boone and Crockett Club. Hunters promoted establishment of laws to protect wildlife and instituted a tax on firearms and ammunition to fund wildlife restoration. This protection and dedicated funding provided the political will and financial means to establish state wildlife agencies. The demand for trained professionals to staff these agencies and the need for better science to address the challenges the agencies faced in restoring wildlife dove-tailed with the mission of Land Grant universities. Over a span of five decades beginning soon after World War II, the first stage of this partnership produced the most dramatic successes in wildlife restoration in human history. Nearly all of the larger species of birds and mammals once nearing extinction were re-established throughout their original range.
At the heart of this success in wildlife restoration was recognition of the importance of conservation. Some have argued that conservation is among the greatest ideas of humankind. First introduced to the American vernacular by Theodore Roosevelt at the turn of the century, American conservation was founded on the principles that all natural resources are part of an integral whole, that stewardship of those resources is a public responsibility, and that science is the key to effective conduct of that responsibility. Aldo Leopold’s articulation of the need for a “land ethic” and for “deep-digging research” set the philosophical and scientific cornerstones for conservation. Through the 20th century, the concept of conservation became intrinsic to the American psyche in two forms. First was hunting and the development of regulations to ensure careful stewardship of wildlife resources. The basis of these regulations was a set of core values known as the North American Model of Wildlife Conservation that speaks to management of wildlife resources as a public trust. Second was an environmental ethic that brought focus on protection of endangered species and careful stewardship of the natural environment more generally.

These values became integral to American society, reaching a zenith with political action in the mid-20th century. The result was not just dramatic improvement in the distribution and abundance of many species of wildlife, but codification of the need to integrate social and economic issues into the decision making process of conservation. Legislation such as the National Environmental Policy Act of 1969 explicitly required inclusion of social and economic factors into this decision making process. The ensuing 40 years of attempting to integrate the values and the science of ecology, economics, and social dimensions into decisions about conservation have met with mixed success. However, it is essential that we engage them effectively because wildlife resources and the values of North American conservation are once again at risk.
Among the major threats to wildlife resources and the core values of North American conservation are four game-changing trends.

(1) **LAND-USE CHANGE** – Economic and social forces associated with growing human populations are affecting land use and habitat. Most dramatic are the effects of urban expansion and energy development.

(2) **CLIMATE CHANGE** – Shifts in the distribution and abundance of wildlife populations arising as a result of warming climates and changes in precipitation patterns. The suites of species that comprise wildlife communities as we know them today are being disrupted with enormous and unpredictable consequences.

(3) **WILDLIFE-BORNE DISEASES** – The growing incidence of diseases resulting from increased wildlife abundance and changes in climate will present major challenges. Many diseases are capable of infecting both wildlife and domestic livestock species, and more than 70% of diseases affecting humans arise in wildlife or livestock. As a result, diseases will bring increased pressure on the economics of agricultural systems and human health.

(4) **SOCIETAL VALUATION OF CONSERVATION** – Changes in human demographics will reshape the value society places on wildlife and conservation. As society continues to move into urban environments, there will be continued erosion of appreciation of wildlife and understanding of wildlife management based on direct experience with the land. These shifts will be exacerbated by expansion of the range of values expressed about wildlife from absolute protection to increased exploitation to elimination as nuisances.
At the heart of the economic, social, and ecological sciences is a common language that is based on clear mathematical, statistical, and computer modeling constructs. This language is evolving rapidly, driven by rapid advances in computing, remote sensing, and new analytical tools. Economic interests, in particular, are moving aggressively to take advantage of new quantitative tools. Those agencies and organizations interested in promoting wildlife are now realizing that they will need to be equally aggressive. They will need partners who can help them learn to employ this quantitative language successfully.

While other universities have the requisite quantitative expertise to be able partners, Michigan State University, through its Boone and Crockett Quantitative Wildlife Center stands apart. The QWC has an unusual ability to engage complex conservation issues with quantitative strength by virtue of the unique partnership that is the foundation of the Boone and Crockett program in Michigan.

First, Michigan State University employs many of the world's foremost quantitative minds. The university has an excellent track record for creating environments conducive to quantitative sciences in natural resources as exemplified by its Quantitative Fisheries Center. The university will soon be home to the Facility for Rare Isotope Beams (FRIB), a new billion dollar facility for high-energy physics research. These facilities employ top quantitative experts in mathematics and statistics, thus expanding opportunities for the Boone and Crockett Quantitative Wildlife Center to be on the cutting edge of quantitative methods.

Second, cooperation between Michigan State University and the Michigan Department of Natural Resources offers a funding stream to support research and a pragmatic context for research. Through a unique arrangement, the Department of Natural Resources provides partial salary support for faculty scientists within Michigan State University. New office spaces accommodate Department of Natural Resources staff in immediate proximity to the Boone and Crockett Quantitative Wildlife Center. This arrangement provides an exceptional avenue for financial support of the Boone and Crockett Quantitative Wildlife Center because the Michigan Department of Natural Resources has access to federal Pittman-Robertson funds and Michigan State University has the ability to provide the requisite 25% match to secure these funds. Agency biologists and managers bring the pragmatism necessary to ensure that research findings have application to current wildlife issues.
Third, Boone and Crockett members offer the perspectives needed to ensure that research findings and management solutions can be translated to policy. The Boone and Crockett Club is the oldest conservation organization in North America and one of the foremost advocates of wildlife conservation today. The Club is composed of 100 regular members who collectively maintain exceptional access to the highest levels of federal government in the US. Through its leadership of the American Wildlife Conservation Partners, a consortium of 42 fish and wildlife organizations representing 6 million members, the Boone and Crockett Club has been central to writing the conservation agendas of the Executive Branch of the federal government.

There is little question that the trajectory of the QWC will be one of growth because social and economic trends will create an ever-increasing challenge for wildlife conservation. Two factors will drive the future need, and therefore potential success of the QWC. First will be the continuing strong interest within society for wildlife and the need for science-based decisions about the management of wildlife. Second will be the accelerating growth in data resources, computing power, and analytical tools to bring better science into those decisions. It is certain that the next generation of wildlife scientists and conservation leaders will need to be much better equipped in quantitative skills.
GOALS

The goals of the Boone and Crockett Quantitative Wildlife Center are designed in accord with the three main principles of its mission:

(1) RESEARCH – pioneering new tools that extend our analytical and ecological abilities. Our goals are to:
   a. Implement state-of-the-art quantitative and ecological analyses to understand the influences of game-changing trends on wildlife.
   b. Serve the research needs of QWC partners as these relate to quantitative analyses to aid in management and policy decisions.
   c. Develop new tools arising from mathematics, statistics, and modeling to understand the population ecology, behavior, and habitat relationships of wildlife.

(2) EDUCATION – enhancing the quantitative and ecological expertise and leadership capabilities of both the current and next generation of wildlife ecologists. Our goals are to:
   a. Develop innovative and effective educational experiences that both inspire students and provide them with the tools to be successful: quantitative and ecological science skills, communication abilities, and leadership capabilities.
   b. Promote wider understanding of quantitative tools in the application of science in wildlife conservation efforts at state, regional, national, and international levels.

(3) OUTREACH – promoting the application of quantitative tools and expertise by those who manage wildlife as a public trust and by those who use it. Our goals are to:
   a. Enhance the capabilities for application of quantitative tools, data resources and ecological understanding among QWC partners.
   b. Inspire and equip the next generation of leaders of wildlife conservation, arming them with the tools of quantitative techniques, ecological knowledge, communication abilities, and leadership skills.
OBJECTIVES

(1) Build a core staff and research program to address game-changing trends, partner needs, and to create new quantitative tools.

- **Immediate**: Establish a core staff complement to include one faculty member who serves as Associate Director of QWC, at least 2 postdoctoral associates, and 2 doctoral students by July 2014. Leadership assignment: Boone and Crockett Professor as Director of QWC.
- **Immediate**: Confer with Michigan DNR and Boone and Crockett Club to identify near-term research needs by December 2014. Leadership assignment: Boone and Crockett Professor as Director of QWC.
- **Immediate**: Seek collaborative research efforts with the Quantitative Fisheries Center that emphasize interdisciplinary problem-solving through integration of quantitative tools by July 2015. Leadership assignment: Associate Director of QWC.
- **Immediate**: Seek new research projects to continue to expand on landscape-level approaches to understanding wildlife ecology and the potential to promote wildlife conservation through regional policy initiatives. Leadership assignment: Boone and Crockett Professor as Director of QWC.
- **Immediate**: Seek new research that draws together ecology and risk-management principles through structured decision-making processes to address wildlife conservation issues more cost-effectively. Leadership assignment: Core staff of QWC.
- **Ongoing**: Develop an affiliate group of faculty and scientists from within MSU and among outside agencies and institutions. Affiliate members will be formally associated with the QWC when they are actively involved with graduate students in the QWC.
- **Ongoing**: Conduct timely research to respond to both short- and long-term needs of the Michigan DNR and the Boone and Crockett Club. Specific program plans will be developed in consultation with the Michigan Boone and Crockett Partners, a group whose members include the Boone and Crockett Club members residing in Michigan, the Chief of the Division of Wildlife for the Michigan DNR, the Director of AgBioResearch, the Director of MSU Extension, the Chair of the Department of Natural Resources, and a representative of the Glassen Foundation. Leadership assignment: Boone and Crockett Professor as Director of QWC.
- **Ongoing**: Acquire ongoing funding and research contracts to address game-changing issues in wildlife management and conservation policy. Core staff will work to position the QWC to be successful in obtaining contracts for research and outreach. Leadership assignment: Boone and Crockett Professor as Director of QWC.
- **Ongoing**: Develop a series of scholarly publications directed to three outlets: top-tier journals (e.g., Ecological Applications, Landscape Ecology), management-focused journals (e.g., Journal of Wildlife Management) and popular magazines that emphasize wildlife conservation (e.g., Fair Chase, Audubon). Leadership assignment: Core staff.
OBJECTIVES

(2) Build skills in quantitative methods, ecology, and leadership among students.

- **Immediate**: Identify a set of recommended courses in statistics, modeling, ecology, structured decision-making, leadership, and communication with associated descriptions of strengths and weaknesses of each course for use by each cohort of incoming students by July 2014. Leadership assignment: Associate Director of QWC and current graduate students.

- **Immediate**: Develop a seminar course to explore the power of futures mapping and examine the changing context of wildlife conservation by December 2014. Leadership Assignment: Boone and Crockett Professor as Director of QWC.

- **Immediate**: Develop a seminar course to explore effective written and oral communication by July 2015. Leadership assignment: Associate Director of QWC.

- **Immediate**: Engage > 2 undergraduate students in research being conducted by the QWC. Leadership assignment: Associate Director of QWC.

- **Immediate**: Establish an internal, dedicated lab meeting to present and discuss all ongoing projects once each semester. Leadership assignment: Associate Director of QWC.

- **Ongoing**: Develop a seminar course to explore the application of ecological principles to wildlife conservation. Leadership assignment: Boone and Crockett Professor as Director of QWC.

- **Ongoing**: Develop a coordinated schedule of lunch meetings and seminars with QFC and other labs. Leadership assignment: Associate Director of QWC.

- **Ongoing**: Collaborate with QFC in teaching workshops and short-courses in quantitative methods. Leadership Assignment: Associate Director of QWC.

- **Ongoing**: Teach structured courses in Wildlife Policy and Leadership in Natural Resources and Environmental Management. Leadership assignment: Boone and Crockett Professor as Director of QWC.

- **Ongoing**: Engage graduate students and post-doctoral associates in the QWL in training to increase their conceptual depth in pedagogy and their practical skills in teaching. Leadership assignment: Boone and Crockett Professor as Director of QWC.
OBJECTIVES

(3) Promote the application of new tools and research findings by managers and the synthesis of science for a broader community of scientists and policy makers.

- **Immediate**: Develop a workshop for Division of Wildlife biologists to address a need in developing greater understanding of a quantitative tool by December 2014. Leadership assignment: Associate Director of QWC.
- **Immediate**: Develop a series of research presentations for the Michigan Boone and Crockett Partners that explicitly identify the implications of the research findings for management and policy by July 2015. Leadership assignment: Associate Director of QWC.
- **Ongoing**: Meet annually with the Michigan DNR to identify and schedule training programs for Division of Wildlife staff. Leadership assignment: Associate Director of QWC.
- **Ongoing**: Submit abstracts for oral presentation at professional conferences, to wildlife management agencies, and community groups. Leadership assignment: Boone and Crockett Professor as Director of QWC.
- **Ongoing**: Submit manuscripts for peer-reviewed publications and technical reports. We will seek the informal peer-review of our research through interaction with agency staff as well as the formal peer-review associated with the process of scholarly publication. Leadership assignment: Boone and Crockett Professor as Director of QWC.
- **Ongoing**: Develop scholarly reports and publications that synthesize across multiple research efforts and disciplines to explain ecological phenomena and offer management solutions. Leadership assignment: Boone and Crockett Professor as Director of QWC.
METRICS

We will use a series of concrete performance metrics to evaluate success and growth of the program.

(1) Numbers of post-doctoral research associates, doctoral students, and Master’s degree students in residence, completing degrees, and successfully employed.

(2) Number of publications - peer-reviewed, invited, and popular articles; book chapters.

(3) Number of outreach activities - professional presentations and consulting activities with special emphasis on work with QWC partners.

(4) Amount of research funding – internal and external competitive grants, collaborations with others within the Department of Fisheries and Wildlife and across the university, collaboration with other universities and conservation organizations, and cooperative work with Michigan DNR.

(5) Number of publications of synthetic articles and professional engagement activities at local, regional, national, and international levels; collaborative work to address policy issues.

(6) Number of instances that show research findings of the QWC contribute to demonstrated leadership by MSU, Michigan DNR, and Boone and Crockett Club.

(7) Numbers of educational events, classes, and interns hosted by QWC.

(8) Numbers of graduates of QWC programs occupying professional leadership positions in wildlife conservation.
ACHIEVEMENT STRATEGIES

(1) CAPACITY - We intend to be an efficient and fluid organization composed of a team of talented graduate students, post-doctoral scholars, and faculty. Core staff will have primary responsibility for addressing short-term research and outreach questions from the Boone and Crockett Club, Michigan DNR, Michigan State University, and others. We will be proactive in seeking collaboration with other faculty and involvement of other graduate and undergraduate students as opportunities arise.

(2) MANAGEMENT TO ENSURE REALIZATION OF GOALS - To ensure high productivity, we will formulate annual work plans that drive our activities. The development and prioritization of these work plans will be conducted in consultation with the Michigan Boone and Crockett Partners. We will seek to coordinate our activities with the Quantitative Fisheries Center to enhance our collective impact. The close interaction with the Partners will allow them to assist in identifying important issues, opportunities for funding, and opportunities for input to management and policy. Their attention to broader networks will help us anticipate emerging issues and position the QWC to be more competitive in obtaining research contracts and grants. We will use two approaches to ensure that we communicate our progress to sponsors and cooperators, and bring projects to completion:
   a. Quarterly reporting – all projects will produce concise quarterly reports (2 pages) of objectives and accomplishments.
   b. Annual reporting – we will hold a meeting of core staff and students to review progress at least once annually. We will hold twice-annual meetings with the Michigan Boone and Crockett Partners to report accomplishments. Finally, we will report annually to the Boone and Crockett Club and to the Department of Fisheries and Wildlife.

(3) MEASURABLE OUTCOMES - We will measure outcomes in terms of our ability to impact the scientific and wildlife management and policy communities. We will focus on three principal questions:
   a. How is our work viewed by the scientific community? (Are we publishing in top journals? Are we successful in obtaining funding?)
   b. How is our work viewed by wildlife managers and policy makers? (Are we effectively engaging partners in affecting management and policy? What changes are evident in the abilities of wildlife managers and policy makers? What changes are evident in management actions or policy decisions?)
   c. How successful are our students? (Are they competing at the highest levels and succeeding in getting jobs in key positions, and then displaying leadership?)
IMPLEMENTATION PLAN AND TIMETABLE

(1) HIRING AND ADVANCEMENT OF CORE STAFF
a. Associate Director - A conceptual plan is now in place with the Michigan Division of Wildlife. This will provide a 5-year, renewable agreement to fund the position. Dr. David Williams, Assistant Professor (Fixed Term) in the Department of Fisheries and Wildlife will be appointed to the position as of January 1, 2014. Dr. Williams brings strong quantitative abilities, excellent mentoring skills, and a record of close, productive collaboration with wildlife biologists in the Division of Wildlife.
b. Post-doctoral Research Associate - A post-doctoral research associate will be funded by the Boone and Crockett Endowment at Michigan State University. The position will be a two-year appointment with an additional optional year contingent on performance. This approach offers a continuing influx of high-quality talent with state-of-the-art skills. A national search is now underway and we intend to fill the position beginning August 15, 2014.
c. Graduate Assistants - Two doctoral-level graduate assistants will be employed on a continuing basis with personnel turning over as students complete their degree programs. One assistantship is provided by the Michigan Division of Wildlife and we will seek support for the second assistantship from Michigan State University.

(2) ANNUAL WORK PLANNING
a. Annual work plans will be updated each May as part of the spring meeting of the Michigan Boone and Crockett Partners. The work plan will outline short-term (6 to 18 months) analysis activities, longer-term (3 to 5 years) research projects, proposals and publications, educational workshops, and outreach efforts for each of the core staff and for the group.
b. Milestone accomplishments, significant events, and products will be reported each November at the fall meeting of the Michigan Boone and Crockett Partners.
MONITORING AND EVALUATION PLAN

Performance metrics for monitoring the accomplishments and impact of the plan include:

(1) Ongoing support of partner agencies determined by continued base funding and acquisition of extramural funding.

(2) Number of publications and impact factors of scientific journals in which publications occur.

(3) Number of popular articles written to promote a greater understanding of quantitative methods, wildlife ecology, and policy issues among Boone and Crockett Club members, agency staff, Natural Resource Commissioners and other policy makers, and the lay public.

(4) Number of affiliated graduate students, postdoctoral associates, completions of degree programs, and placements in professional positions.

(5) Number of outreach activities and educational programs presented by core staff and affiliated graduate students, postdoctoral associates, and faculty.

(6) Reports of impacts of research on management and policy issues.
SUNSET PROVISION

The Quantitative Wildlife Center is created as an addendum to the existing Endowment Agreement and is supported by the Boone and Crockett Club Endowment. No institutional funding is sought beyond the endowment and operating funds provided to the Boone and Crockett Professor. Consequently, the QWC will continue so long as it meets the requirements of partners of the Endowment Agreement: the Boone and Crockett Club, Michigan Department of Natural Resources, and Michigan State University. Review of the QWC by the partners will occur annually.

BYLAWS AND OPERATING PROCEDURES AND PRINCIPLES

Formal description of bylaws and operating procedures and principles is waived because (1) the QWC has fewer than five tenure-system faculty, (2) the QWC reports only to the College of Agriculture and Natural Resources through the Department of Fisheries and Wildlife, and (3) more than 50% of the operating budget is provided by the Boone and Crockett Endowment and extramural grants and contracts.
Dr. Porter is the first Boone and Crockett Chair of Wildlife Conservation in the Department of Fisheries and Wildlife at Michigan State University. His research explores population dynamics and the behavior of wildlife in relation to habitat, emphasizing the application of ecological knowledge to management and conservation policy. Most of the work he and his students do focuses on larger vertebrates, including moose, wild turkeys, elk and white-tailed deer, but recent studies also examine songbird communities. Current studies emphasize the fundamental forces now reshaping wildlife conservation: climate change, land-use change due to energy development and urban sprawl, disease eruptions in wildlife, and societal interest in the stewardship of wildlife populations.

His teaching includes courses at the undergraduate and graduate levels in wildlife management and policy. Current courses explore the issue of wolf restoration in US National Parks and the northern Great Lakes region, and sustainability of the Northern Forest from Minnesota to Maine.
Dr. Williams’ research interests are broad, but focus on understanding how landscape heterogeneity influences populations, animal movements, and habitat use, and applying that knowledge in the context of larger ecological processes and management decisions. Current research projects are evaluating black bear densities across the Lower Peninsula of Michigan, local population responses of white-tailed deer to outbreaks of epizootic hemorrhagic disease, the role of habitat and management policies on trophy deer distributions, factors driving animal-vehicle collision patterns, bear and deer movements in response to landscape features and roads, and novel approaches to suburban-urban deer management.

In addition to research, he has taught FW419 Applications of Geographic Information Systems to Natural Resource Management, and currently teaches FW424 Population Analysis and Management.
Joanne is a research associate in the Quantitative Wildlife Center. Joanne’s research interests fall within wildlife and landscape ecology, spanning both applied and basic research questions. In particular, she is interested in the how human-dominated landscapes influence animal behavior and, in turn, populations. Her master’s research at Eastern Illinois University focused on population genetics and social structure of beavers in Illinois. Joanne recently completed her dissertation research at Southern Illinois University examining differences in survival, space use, and habitat selection between swamp rabbits, a habitat specialist, and eastern cottontails, a generalist, in bottomland hardwood forests. Currently, Joanne is using noninvasive genetic sampling methods to delineate deer social groups and examine space use in relation to landscape features in urban-suburban areas of south-central Michigan. Information on social structure and space use will be used alongside sociological data on residents’ perceptions of human-deer conflicts in an effort to model appropriate scales and socially acceptable methods of local deer management in urban settings.
DR. CHAD PARENT
RESEARCH ASSOCIATE

Chad is a research associate in the Quantitative Wildlife Center. Chad’s research ethos is influenced by his experiences working with diverse landowners and natural resource agency personnel. He applies these perspectives to his research to enable users of wildlife knowledge to more easily understand and adopt complex quantitative methodologies. The focus of his research integrates landscape and population ecology to inform decisions about management and conservation. This has included analyses that spatially prioritize where northern bobwhite management is needed based on models that investigate how landscape heterogeneity influences northern bobwhite abundance on arid rangelands. This also has included studying wild turkey survival, habitat selection, and home range during winter to inform future decisions about the translocation of turkeys to extreme northern regions. Currently, Chad coordinates the Midwest Wild Turkey Consortium (MWTC). The MWTC is a collaborative effort by natural resource agencies and the QWL to develop proactive conservation strategies for wild turkeys by coalescing agency perspectives with quantitative methodologies. Chad received a Ph.D. in Wildlife Science from the Caesar Kleberg Wildlife Research Institute at Texas A&M in Kingsville, and a M.S. and B.S. in Biology from the University of North Dakota.
ANDREA BOWLING
PH.D. CANDIDATE

Andrea is in the Department of Fisheries and Wildlife and the Ecology, Evolutionary Biology, and Behavior Program at MSU. She received a B.S. in Biology with a concentration in Ecology, Evolution and Conservation from the University of Texas at Austin. She received a M.S. in Wildlife, Ecology, and Conservation from the University of Florida. She has worked as a biological technician on many field projects for both government agencies and private NGOs. Andrea most recently comes from USGS as a student services contractor working on manatee population dynamics. Her research interests include population ecology and landscape ecology. She enjoys applied quantitative research including endangered species and game species studies. Andrea believes that sound management decisions are made based on the framework of well-designed and instituted research. Her dissertation work will evaluate the effects of habitat types and configuration and weather patterns on wild turkey population fluctuations and harvest potential.
REBECCA CAIN
PH.D. STUDENT

Rebecca is a Ph.D. student in the department of fisheries and wildlife at Michigan State University. She received her B.S. from Clemson University in Clemson, South Carolina in December 2011. She then went on to receive a Master’s of Earth & Environmental Resources Management (M.E.E.R.M) degree from the University of South Carolina in Columbia, SC in May 2014. Her thesis topic focused on statistical analyses of white-tailed deer harvest data collected from various southeastern states in an attempt to better understand how different management strategies impact annual harvest of the species. She has successfully completed the Quality Deer Management’s Deer Steward I & II certification courses. Her research focuses on using trophy white-tailed deer harvest data to expose possible explanations for the landscape distribution of trophy harvest occurrences that are seen in the historical dataset. Over the course of her project, she will be working closely with both the Michigan Department of Natural Resources and the Boone & Crockett Club.
Sonja is a PhD student and Boone and Crockett Fellow in the Department of Fisheries and Wildlife at Michigan State University. Originally from Bemidji, Minnesota, Sonja graduated with a biology degree from Minnesota State University, Mankato in 2005. While completing her undergraduate degree, she worked for the Minnesota DNR farmland wildlife population research group as a wildlife biology research intern, focusing on white-tailed deer and furbearer species. In 2006, Sonja began her M.S. research through Penn State University and the Pennsylvania Cooperative Fish and Wildlife Research Unit. Sonja evaluated habitat use, movement, and survival rates of white-tailed deer and exotic sika deer on Assateague Island National Seashore, Maryland. In April of 2008, Sonja accepted the Deer/Moose project lead position with the Massachusetts Division of Fisheries and Wildlife where she was responsible for research and management of deer, moose, and captive ungulates in the state. She then spent two years working on ungulate research at the University of Montana before moving in August 2013 to Michigan to begin her PhD research on white-tailed deer and disease ecology at Michigan State University. Sonja's research interests include wildlife population ecology and management, with a particular focus on
ANDREW CROSBY  
PH.D. STUDENT

Andy is a University Distinguished Fellow and PhD student in the Quantitative Wildlife Center at Michigan State University. He received his B.S. in Fisheries and Wildlife Ecology from Northland College in Ashland, WI, in 2005, and his M.S. in Wildlife Ecology and Management from Oklahoma State University in 2012 studying the effects of a habitat restoration program for northern bobwhites. Between degrees, Andy worked in wildlife research doing jobs as diverse as using track plates to monitor carnivores in the Sierra Nevada of California, using scat detection dogs to monitor wolf, moose, and caribou in northeast Alberta, and monitoring birds and bats at wind farm sites in Texas and Oklahoma. His current research interests include using new techniques in quantitative ecology to model the effects of land-use change on wildlife species in the upper Great Lakes and working to integrate the needs of the human population with the conservation needs of the region.
KATHRYN FREN
PH.D. STUDENT

Kathryn is a PhD student in the Department of Fisheries and Wildlife and the Environmental Science and Policy Program at Michigan State University. She graduated from Hope College in 2006 with a degree in biology and writing, and subsequently received an M.S. degree from the University of Michigan's School of Natural Resources and the Environment. Since then, she has worked on wildlife research projects around the country, including seabird restoration and monitoring projects in Maine and Alaska and a salmon conservation project in northern Oregon. Kathryn’s dissertation research will focus on the intersection of land use policy, wildlife conservation, and human wellbeing across large landscapes.
BRYAN STEVENS
PH.D. STUDENT

Bryan is a Boone and Crockett Fellow and PhD student in the Ecology, Evolutionary Biology, and Behavior program and the Department of Fisheries and Wildlife at MSU. He received a MS degree in statistics, and M.S. and B.S. degrees in wildlife resources, all from the University of Idaho. Prior to U. Idaho he earned an AAS degree in wildlife science from Hocking College. Bryan’s M.S. research focused on measuring and modeling sage-grouse fence collision risk in sagebrush-steppe habitats of southern Idaho (wildlife), and using stochastic population models to develop a likelihood-based framework for modeling and evaluating collision-risk hypotheses with wildlife-infrastructure collision data (statistics). Prior to graduate school, he worked on a variety of fisheries and wildlife projects for the states of Ohio and Idaho, including work with wild turkeys and both warm- and cold-water fisheries. Bryan’s research interests are focused on the intersection of ecology, natural resource management, and applied statistics. This includes applied population and statistical ecology, harvest management, and landscape-scale conservation and management of wildlife. His dissertation research is focused on wild turkey population ecology and assessment, and using decision-analytic methods to inform harvest management under uncertainty.
HEATHER PORTER  
M.S. STUDENT

Heather Porter is a Masters student in the Department of Fisheries and Wildlife at Michigan State University. She received a B.S. degree in Biology and a second B.S. degree in Wildlife Conservation and Management from Missouri Western State University in 2007. Since 2007, Heather has worked as a field technician for various research projects throughout the Midwest and southeastern United States, including herpetofauna surveys, shorebird monitoring, and multi-species mammal inventories. Most recently she worked for Kansas State University monitoring wind turbine impacts on greater prairie-chickens. Heather’s current work is under the direction of Dr. Michael Jones of the QFC at MSU and Dr. David Luukkonen of the Michigan Department of Natural Resources. While at MSU her research will focus on developing models to simulate sharp-tailed grouse response to habitat management and hunter harvest in Michigan’s eastern Upper Peninsula. This research will help to develop an adaptive framework for the Michigan Department of Natural Resource’s management of
AMY DECHEN QUINN
ASSISTANT PROFESSOR

Amy’s research interests focus on the ecology and evolution of mammalian social behavior, the influence of landscape structure on animal movements, and the ecology and management of wildlife diseases. Amy received a Ph.D. in Ecology from the State University of New York College of Environmental Science and Forestry where she investigated the temporal and spatial factors that influence movement behavior and space use of white-tailed deer to evaluate the risk of chronic wasting disease spread. She deployed nearly 100 GPS collars to estimate the importance of landscape composition and configuration on animal space use, and she implemented step selection analyses to identify individual resource selection strategies. Additionally, Amy’s interest in veterinary medicine and animal welfare has fostered a focus on developing wildlife capture and handling protocols that minimize stress and injury to study animals and reduce bias in datasets. Amy also holds a Bachelor’s degree in Biology from Albright College and a Masters degree in Ecology from the Pennsylvania State University where she studied differential maternal investment strategies of white-tailed deer.

Amy is currently an Assistant Professor of Wildlife Management at State University of New York at Cobleskill.
MARTA JARZYNA, PH.D.

Marta received a Ph.D. from Michigan State University. For her doctoral research she worked to understand how avian populations are affected by climate change and land use dynamics, and she hopes that her research will contribute to better-informed conservation decisions in the years to come. She received a Master’s degree in Engineering with concentration on Environmental Protection from the Warsaw Agricultural University in Poland. She also received a Master’s degree in Geographic Information Systems from the Pennsylvania State University. She has worked as an ecological analyst on an array of natural resources and wildlife management projects for consulting companies, government agencies, and non-profit organizations in the US as well as abroad. Her research interests include wildlife conservation and landscape ecology. Marta delves into problems of spatial and temporal pattern analysis and habitat suitability modeling, to name the few, and she enjoys applying cutting-edge quantitative tools to wildlife ecology problems.

Marta is currently a Postdoctoral Research Associate at Yale University.
NATHAN SNOW, PH.D.

Nathan was a Boone and Crockett Fellow and PhD student in the Department of Fisheries and Wildlife at Michigan State University. Nathan received his M.S. in Fish, Wildlife, and Conservation Biology from Colorado State University studying the effects of roads on the San Clemente Island fox. Prior to that, he received his B.S. from Central Michigan University. Nathan also spent time working for the USDA/Wildlife Services/National Wildlife Research Center conducting research on finding effective management strategies for invasive vertebrate species. Nathan’s main research interests involve finding effective resolutions to human-wildlife conflicts, particularly the mitigation of wildlife-vehicle collisions using preemptive strategies. Nathan focused his research on moose-vehicle collisions throughout the northeast United States.

Nathan is currently a Postdoctoral Research Associate at the USDA National Wildlife Research Center, Ft. Collins, Colorado.
JODI KREUSER, M.S.

Jodi Kreuser was a Boone and Crockett Fellow and Masters student in the Quantitative Wildlife Laboratory. She earned her B.S. in Wildlife Ecology from the University of Wisconsin at Madison with a concentration on International Agriculture and Natural Resources. Her interests include avian ecology, migratory bird behavior, occupancy modeling, and landscape dynamics. Jodi’s Master’s research applied quantitative methods to evaluate the temporal and spatial landscape ecology of songbird communities in response to climate change.
MICHIGAN
BOONE AND CROCKETT
PARTNERS

Margaret Bethel, MSU Extension
Doug Buhler, MSU AgBioResearch
Thomas Coon, Oklahoma State University, Division of Agricultural Sciences and Natural Resources
Bill Demmer, Boone and Crockett Club Member
Rebecca Humphries, National Wild Turkey Federation
Michael Jones, Department of Fisheries and Wildlife
J. Russell Mason, Michigan Division of Wildlife
William Porter, Department of Fisheries and Wildlife
Steve Pueppke, MSU Global and Strategic Initiatives
James Shinners, Boone and Crockett Club Member
Morrison Stevens, Boone and Crockett Club Member
Al Stewart, The Hal & Jean Glassen Memorial Foundation
William Taylor, Department of Fisheries and Wildlife
David Williams, Department of Fisheries and Wildlife
Scott Winterstein, Department of Fisheries and Wildlife