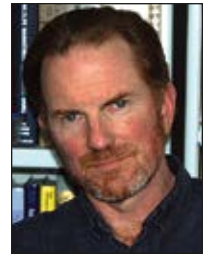


WHY NUMBERS MATTER: THE BOONE AND CROCKETT QUANTITATIVE WILDLIFE CENTER AT MICHIGAN STATE UNIVERSITY



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Occasionally I go to my bookcase and pick an issue from the first volume of the *Journal of Wildlife Management*, published in 1937, and peruse it. The wildlife conservation movement in North America began nearly a century before that first issue, but the application of science to wildlife management began in earnest during the 1930s when active restoration programs, fueled by the first university wildlife management programs and Pittman-Robertson Wildlife Restoration Act funding, were established. Being a wildlife scientist in those days must have been like being the proverbial kid in a candy store—the world of inquiry was wide open. There was so much to learn and describe. Much of the early wildlife scientific literature did just that—describe observations of wildlife habitats and populations.

Those early years of wildlife science did much to inform wildlife management. For example, Dr. Paul Errington, leader of the first Cooperative Wildlife Research Unit at Iowa State University (est. 1932) pioneered work on northern bobwhites and muskrats. He developed the principle of compensatory harvest mortality, i.e., fall hunting and trapping mortality would compensate for surplus animals added to the population during spring reproduction that would otherwise die during the winter

period; a zero-sum game. This formed the basis for many hunting seasons and bag limits. Errington developed his theory using empirical data—data derived from observation and simple experiments. Statistical methods—if used at all in those early studies—were quite simple.

As wildlife managers and scientists learned more, the questions became more complex. For example, Errington's theory of the inverse relationship between hunter harvest and winter mortality was based on resident game and furbearer populations subjected to a defined annual harvest season and studied in a relatively small area. What about migratory game bird species who may encounter several "opening days" during their fall migration that takes them across many state and provincial borders? Dr. David Anderson, leader of the Colorado Cooperative Wildlife Research Unit addressed this in a classic paper published in the journal *Ecology* in 1975, demonstrating that fall harvest of mallard ducks was compensatory to winter mortality up to a point during migration, and then would become additive to the winter mortality. The analyses Anderson did were largely from data derived from the recovery of leg bands from hunter-killed mallards. The statistics were complex and pioneering and led eventually to the system of adaptive harvest management in place today. We

know now that Errington's theory, pioneering in its time, is not as simple as a direct inverse relationship between hunter harvest and winter mortality. Nature is much more complex, and empirical evidence has its limits in helping us understand wildlife management issues.

Open a current issue of *Ecology* today and you will see quite different papers than those published in 1937—or in 1987 for that matter. The questions driving the research reflect the variety of complex natural resource management issues we face today. The geographic scale of the studies is often orders of magnitude beyond what scientists in the early years could have been able to address. Studying the dynamics of wildlife populations, habitat associations across landscapes, and human interactions is much different than studying, for example, the chemical composition of an organic compound. Wildlife populations cannot be studied on a lab bench and manipulated with nice, neat, controlled experiments. The challenge for wildlife scientists is the tremendous uncertainty that exists in natural systems. Understanding every factor—the inputs, outputs, interactions, random and non-random events is daunting and near impossible. Predicting how wildlife populations will respond to management interventions throughout their range or at a landscape

scale—or to other factors, such as predators, diseases, climate change, and energy development—requires a very sophisticated scientific approach. As such, major advances in statistical methods have resulted from the work of wildlife scientists. That work, though, is far from done, and the challenges we will face tomorrow and into the future will require further innovation. The Boone and Crockett Quantitative Wildlife Center (QWC) at Michigan State University, under the direction of B&C Professor Bill Porter, is a catalyst for such innovation.

The Boone and Crockett QWC has a mission built upon research, education, and outreach. QWC is pioneering new tools to help solve critical questions in wildlife conservation. In doing so, a rich learning experience is fostered where students working on a variety of wildlife science challenges interact and collaborate. This fosters their growth as scientists. Promoting the application of the tools that QWC develops facilitates engagement by students with wildlife managers who deal with the most pressing conservation issues of the day and contributes to their development as future conservation leaders.

The QWC is currently focused on critical questions

confronting wildlife conservation related to land-use change, climate change, wildlife-borne diseases, and societal values. Studies underway include:

- Estimating black bear abundance in the Lower Peninsula of Michigan using genetic information in order to fine-tune bear management unit boundaries, assess human-bear interactions, and better understand the impact of harvest seasons on the bear population.
- Understanding the role of disease outbreaks such as epizootic hemorrhagic disease on the population dynamics of whitetail deer.
- Enhancing wild turkey harvest management strategies by developing statistical techniques that can be applied to data collected by wildlife managers to close the gaps in our knowledge of turkey population dynamics patterns across space and time.
- Understanding why some areas consistently produce Boone and Crockett Club record whitetail deer by applying recent developments in spatial statistical analyses to geographic information systems.

These are just a few examples of the work ongoing at QWC. Additionally, there are programs that provide students with experiential opportunities at the interface of science and policy development, such as a course where students travel to Yellowstone National Park and interact with wildlife managers and policymakers on hot-topic issues such as predator and

prey management.

Professor Porter is measuring the success of QWC by assessing: 1) the quality of the students he is bringing into the program (talent); 2) the development of students' quantitative skills, ecological depth, and leadership abilities (growth); 3) the production of science tools and information and how they are received by practitioners and scientists

(contribution); and (4) the success of QWC team members (impact). Based on my visits to the QWC and my interactions with the students, faculty, and wildlife managers involved, the number I use to grade the program is 100! ■



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