A.1: Plenary

A.1.1: Ashe

The Migratory Bird Treaty at 100: Charting a Course for the Next Century of Bird Conservation

Dan Ashe[1]*

[1] Director, U.S. Fish and Wildlife Service, Easton, MD 21601, USA

A.1.2: Serie-Blohm

Migratory Bird Treaty: Legacy and Foundation for Waterfowl Management in North America

Jerome R. Serie[1]*, Robert J. Blohm[2]*, David E. Sharp[3]

[1] Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Retired, Easton, MD 21601, USA, jrserie@goeaston.net
[2] Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Retired, Bowie, MD, 20715, USA
[3] Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Retired, Littleton, CO, 80127, USA

The period from the Civil War until the turn of the century was a time of massive industrial growth, westward expansion, and unprecedented exploitation of native wildlife and their habitats. Naturalists were outspoken in their belief that wildlife, especially game species, needed protection from the onslaught of market hunting and spring shooting. The events that ensued, lead by George Bird Grinnell and Theodore Roosevelt who advocated for greater Federal protection, generated wide-spread public support but were countered by those advocating “States Rights.” Following a 20-year struggle of weakened attempts for Federal protection of migratory birds, including the passage of the Lacey Act in 1900 and the Weeks-McLean Act in 1913, the idea of a Migratory Bird Treaty with Canada began to take hold. Then, in 1916, a treaty was signed by President Wilson between the U. S. and Canada (represented by Great Britain, signed by King George V). Canada quickly passed into law the Migratory Bird Convention Act in 1917. But, a two year struggle followed in the U.S., after which Congress ultimately passed the Migratory Bird Treaty Act in 1918. This law was unsuccessfully challenged in the U.S. Supreme Court, clearing the way for Federal protection for all migratory game birds. It became a template for other international treaties and amendments for migratory birds as well as the foundation for modern day waterfowl management. The drought of the 1930s brought greater attention to waterfowl and wetland resources. “Ding” Darling and Professor Aldo Leopold advised President FDR to appropriate emergency funds to relieve the desperate situation. Many new Federal initiatives followed, most notably the “Duck Stamp Act” of 1934, Fred Lincoln’s introduction of “Flyways” in 1937, and the implementation of the Waterfowl Flyway Management System, beginning in 1947-1948. In cooperation with Canada, systematic waterfowl breeding ground surveys began in 1955 to inventory annual population and wetland changes. Leg banding efforts for ducks and geese were expanded to be regionally representative and methods to track recoveries continued to improve. Harvest surveys developed in the 1960s, with information from hunters yielding insights on species harvests and age and sex composition. These international data-gathering programs, all originating from the Migratory Bird Treaty of 1916 and its

articulation of Federal responsibilities and oversight, were soon bolstered by cooperative partnerships with State/Provincial agencies and NGOs, and continue to be reviewed and updated periodically. Today, they remain the hallmark monitoring programs that guide waterfowl and wetland management in North America.

B.1: Waterfowl Legacies: Pioneering Diplomacy, Science, and Management: Celebrating 100 Years of the Migratory Bird Treaty Act (Organizer: Chris Williams)

B.1.1: Perry

Management Research on Waterfowl Life Cycles, Populations and Energetics

Matthew C. Perry[1]*

[1] Emeritus Scientist, USGS Patuxent Wildlife Research Center, 12100 Beech Forest Road, Laurel, Maryland 20708 USA, mperry1209@verizon.net

In the 1920-30s, biologists (Uhler, Sperry, Hotchkiss) of the Bureau of Biological Survey scoured the country looking for key waterfowl areas that provided optimum habitat as refuges for declining waterfowl populations. Darling and Gabrielson had the foresight to realize the value of wildlife research dealing with habitat, and in 1936, Patuxent Research Refuge developed out of their dream. Scientists stationed at Patuxent (McGilvrey, Uhler, Webster), initiated innovative studies on techniques, including impoundment management, nest-box construction, green-tree reservoirs, and moist-soil management, to improve waterfowl populations on a continental basis. Concurrently, other scientists (Stewart, Sincock, Stennis) conducted extensive surveys in Chesapeake Bay and Currituck Sound on the distribution of submerged aquatic vegetation (SAV) and the control of exotic SAV, to better understand and manage habitats in a more natural setting. Stewart and Uhler conducted studies of waterfowl foods in the Bay and demonstrated major changes in food habits due to environmental degradation. Stewart's 1962 report does not mention grazing on land by Canada geese, which now is common, and was subsequently adapted as a feeding mechanism for swans, snow geese, and brant. Stewart was one of the key researchers who established the Northern Prairie Wildlife Research Center (NPWRC), which was devoted to waterfowl breeding ground studies. Biologists at NPWRC developed the first telemetry studies with prairie ducks, and their techniques were used extensively nationwide. Following early studies of the canvasback at Delta Waterfowl Station by Hochbaum, new studies with this species were conducted in Manitoba and on the Mississippi River by Trauger, Anderson, and Serie. Realizing not all problems were on the breeding grounds, wintering studies were started with canvasbacks on Chesapeake Bay by Uhler, Perry, and Haramis. Haramis developed techniques with implanted transmitters, which led to their use in seaducks with satellite telemetry throughout North America to better delineate populations. The distribution of seaducks was linked to food habits in these habitats, which led to energetic studies with captive seaducks by Wells-Berlin in 3-meter dive tanks at Patuxent. Current telemetry and energetic studies are being conducted in relation to wind turbine sites on the east coast. Research at Patuxent and other facilities was key to improved management of waterfowl populations.

B.1.2: Fredrickson

A Century of Land Management Evolution: From Guess Work to Complex Decision-making in Highly Modified Landscapes Exhibiting Extreme Variability

Leigh H Fredrickson[1]*, Murray K Laubhan[2], Kenneth Higgins[3], Sammy L King[4]

[1] Wetland Management and Educational Services, Inc., giantcoot@gmail.com
[2] U.S. Fish and Wildlife Service, Region 6, 134 Union Blvd., Lakewood, CO 80228, USA
[3] Department of Natural Resource Management, South Dakota State University, Brookings, SD, USA
[4] U.S. Geological Survey, Louisiana Cooperative Fish and Wildlife Research Unit, Louisiana State University, Baton Rouge, LA, USA

Land management constantly evolved over the past century from simply protecting a site and/or species of concern to implementing complex and costly programs to produce foods and habitats to meet waterfowl life cycle events over broad spatial and temporal scales. Federal areas requiring management expanded from one in 1903 to over 500 in the new millennium with similar increases in state ownership. During the drought era, most areas were representative of the ecological systems in which they occurred, but by the 21st Century these same sites became small remnants in a sea of urban or agricultural development.

Although the general characteristics and distributions of nearly all waterfowl species were described before the 20th century, critical information regarding, lifecycle events and their relationship to ecological processes developed more slowly. Consequently, important information to make informed land management decisions was lacking during major periods of expansion. As public lands expanded there was increasing need for qualified professionals to plan, develop, and manage the constantly increasing area of protected sites. The early growth of the refuge system coincided with the creation of the CCC program that provided jobs during the recession. In many cases, the expertise of engineers and laborers in the CCC program was well- suited to build the physical infrastructure to manage public lands in modified systems. Unfortunately, a similar depth of understanding required to develop ecologically based objectives and an infrastructure suitable for growing foods and sustaining habitats for the complex life history needs and habitat dynamics of waterfowl in a wide suite of geomorphic settings was lacking.

Management infrastructure protocol developed during the CCC days was based on early dogma set in place in response to wide-spread drought and the fear of no water, agricultural thinking, and the lack of understanding about wetlands and ecological processes at a landscape level. Unfortunately the knowledge to develop appropriate infrastructures necessary to successfully manage and achieve objectives appropriate for a site were insufficient, considering the abundance of modified habitats that formed the bulk of the public domain in combination with a rudimentary understanding of waterfowl ecology in relation to both upland and wetland habitats, as well as the processes that drive these systems. Early biologists studying waterfowl held positions in the Biological Survey and focused on diseases and food habits. Thus, publications often held habitat information. Techniques and approaches used in early studies, however, were often inadequate or inappropriate to stimulate thinking appropriate for anatids with a wide spatial distribution and constantly changing needs to meet life cycle events. Furthermore, the term “wetland” was not commonly used until the 1970s, and techniques to study wetlands were poorly developed until late in the 20th Century. Thus factors such as soils, ground water, and a host of abiotic conditions were largely ignored. Our collective experience suggests current approaches facilitate broad-scale modeling of waterfowl populations which have affected management decision processes across broader scales. Nevertheless we argue that management at local and regional scales has been eroded due to complex, multi-scale

systemic changes in combination with a lack of process-level ecological understanding. Thus to move forward, researchers must work within integrated multi-disciplinary groups and challenge themselves to learn non- traditional disciplines (e.g. hydrology, soils, geology) to understand the role of changing climates, landscapes, water availability, and other abiotic factors on model assumptions and validity. This presentation is an attempt to capture the successes and failures of land management across a large spatial and temporal scale and to encourage a new generation of talent to attack these critical challenges with renewed vigor.

B.1.3: Batt

Shifting Paradigms for Prairie Habitat Conservation

Bruce D. Batt[1]*, James K. Ringelman[2]

[1] Ducks Unlimited, Inc., Retired. Memphis, TN, 38119, USA, bbatt02@aol.com
[2] Ducks Unlimited, Inc., Menoken, ND, 58558, USA

A “paradigm” provides the basic assumptions, beliefs, and methodologies that are embraced by a scientific and management community. The paradigms that drive duck conservation have shifted and expanded over the last century with advances in scientific knowledge and changes in land- use and societal values. Paradigm shifts have been especially apparent in the conservation of prairie duck breeding habitat. Stimulated by the devastating drought of the 1930’s, early management focused on restoring individual, large wetlands to drought-proof the prairies. Drought and agriculture were the enemies, and there was concern that duck populations would not recover without human intervention. A few government and private conservation organizations, motivated by dedicated duck hunters, led the way. Researchers focused on understanding the natural history of species and managers used their best professional judgment when selecting projects. Little thought was given to “uncertainty” in the science guiding management actions. Over the ensuing decades, as paradigms evolved, wetland managers recognized the threats to small wetlands but had few tools to protect them until public policy in the form of the Clean Water Act provided a mechanism in the U.S. When new findings revealed alarmingly low duck nest survival due to predation, the spotlight shifted to the uplands and prompted the development of intensive management techniques to improve nest success. The NAWMP stimulated private-public Joint Ventures of land owners and conservation organizations. Simulation models were developed to prescribe management actions, and momentum shifted to working with agriculture instead of against it. Research became more focused on hypothesis testing, and uncertainty was quantified by confidence intervals. As we enter the latest era of duck conservation, our paradigms continue to shift. The populations of many duck species have rebounded from historic lows. Most intensive management techniques are considered cost-prohibitive, not scalable in a manner that will have a significant impact on continental duck populations, or ineffective at increasing recruitment. The current paradigm emphasizes the permanent protection of existing upland and wetland habitat on private lands and the promotion of more waterfowl friendly farming practices on whole prairie landscapes.
Private-public partnerships engage industry and other non-traditional partners and new sources are funding conservation through the recognition and commoditizing of the ecological goods and services provided by wetlands and grasslands. Much of this is made possible by sophisticated geospatial models that include entire watersheds. Uncertainty is embraced and is being systematically reduced through the application of adaptive resource management and other approaches. Continued investment in research, adaptation and creative thinking will continue to shape new paradigms for waterfowl conservation.

B.1.4: Sedinger, J.

Eighty-five Years of Monitoring and Modeling Waterfowl Populations

James S. Sedinger[1]*, Ray T. Alisauskas[2], James O. Leafloor[3]

[1] Natural Resources and Environmental Science, University of Nevada Reno, 1664 N. Virginia St, Reno, NV 89557, USA, jsedinger@cabnr.unr.edu
[2] Environment Canada, Prairie and Northern Research Center, 115 Perimeter Rd or 115 Veterinary Rd, Saskatoon, Saskatchewan S7N 0X4, Canada
[3] Canadian Wildlife Service, 150-123 Main Street, Winnipeg, Manitoba R3C 4W2, Canada

Management of North American waterfowl has been in the vanguard of the application of quantitative approaches since Frederick Lincoln's leadership in organizing the North American bird banding and his innovative approach in 1930 to estimating abundance of ducks from band recoveries. Aerial reconnaissance surveys to assess distribution and abundance, especially in remote boreal and arctic regions, soon followed and methods were standardized and institutionalized beginning in the 1950s, producing what we now know as the May breeding waterfowl survey. The May breeding waterfowl survey is the longest running and most extensive assessment of wildlife populations in existence and is often pointed to as an example of effective monitoring of wildlife. Statistically based aerial surveys of goose populations began in the 1970s in for some midcontinent Canada Geese and in the mid-1980s for geese nesting in southwestern Alaska. Counts of individuals in surveys have been combined with analysis of data from marked individuals since at least the 1950s to inform management. Joe Hickey was among the first to attempt to estimate survival rates from band recovery data using ad hoc methods that he developed. Harvest surveys were instituted in the U.S. in the early 1960s, followed by Canada in the 1970s. Formal statistical approaches to estimation of survival and harvest rates were developed by Brownie, Robson and David Anderson (then of the U. S. Fish and Wildlife Service) in the late 1970s. Accompanying analytical software (BROWNIE) revolutionized demographic analysis based on band recovery data. Groundbreaking work by Anderson and Burnham provided a sound theoretical basis for assessing the relationship between harvest and survival, with important implications for population management. A general consensus has emerged that harvest is largely additive to other sources of mortality in geese, although recent studies suggest the potential for compensation at low harvest rates even in geese. The situation for ducks remains more clouded.

B.1.5: Anderson

Evolving Perspectives on Waterfowl Research and Conservation: Scale, System Integrity and Human Impacts

Michael G. Anderson[1]*, David L. Trauger[2]

[1] Institute for Wetland and Waterfowl Research, Ducks Unlimited Canada, Stonewall, Manitoba, R0C 2Z0, Canada, m_anderson@ducks.ca
[2] U.S. Geological Survey, Retired, Marine on Saint Croix, MN 55047, USA

Since the beginning of systematic waterfowl conservation in North America, research has helped inform management decisions. This research has become more diverse, topically and geographically, and more systematized (e.g., structured decision making) as it evolved from natural history and basic inventories toward management experiments, ecosystem studies and linked social/ecological investigations. Collaborations of habitat managers and scientists in formal or informal adaptive management have been particularly useful. This experience has led many of us to focus on new problems, often at larger scales, as those most vital to long-term conservation successes. A shifting focus from managing nesting habitat patches to conserving grassland-dominated landscapes is one example. Likewise we have gained greater understanding of the importance of regional hydrology and watershed processes for maintaining wetland systems, and such work at the watershed scale is different than more fine-grained small-unit management approaches that have consumed much of our attention. Accompanying this scaling up has been a trend from working within single agencies, to multi-agency partnerships (e.g., NAWMP Joint Ventures) to coalitions of interest groups pursuing conservation of ecosystem processes for multiple objectives. Harvest managers also have begun to re-think micro-managing individual species, recognizing the limitations of system control, and considering the possibilities of less-risk-averse or multi-stock approaches to harvest management. We also have recognized the need to manage waterfowl from an annual-cycle perspective, so our scale of interest has expanded temporally and well as spatially. Biologists now understand a little more about the connections between wintering, staging and breeding areas, and the combined effects of conditions there on population dynamics. But there still is much to learn. These expanded scales of thinking about waterfowl management have offered useful lessons for other migratory taxa, and developments like the “other bird” initiatives under NABCI and the National Fish Habitat Partnership attest to this. However, we are also increasingly aware of the expanding, indeed overwhelming, human impact on our planet – from the demands of land and water to produce food and fiber for billions of people, to the alteration of our climate system and widespread destruction of ecosystem integrity. These global issues have become those that will matter most for sustaining the habitats and social cohesion on which 21st century waterfowl conservation will depend.