Waterbirds of the Chesapeake Region: An Introduction

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This special publication about the waterbirds of the Chesapeake Bay region resulted from a 2005 symposium at the joint meeting of the Estuarine Research Federation and the Chesapeake Research Consortium in Norfolk, Virginia. This venue provided an ideal time for biologists and managers from numerous agencies, academic institutions, and non-governmental organizations to convene and present information on more than 50 species of waterbirds in the region. Despite the fact that the Chesapeake region has one of the highest concentrations of ornithologists and resource managers in the U.S., relatively few reports have been published in peer-reviewed literature specifically on waterbird populations or their habitats. The co-editors of this volume saw this symposium as an ideal opportunity to synthesize a great deal of information assessing status, trends, threats, habitat conditions and changes of the many species of waterfowl, shorebirds, rails, colonial wading birds and seabirds and present it all at one time. In the following, we provide a brief backdrop to the volume and the context of the chapters contained therein.

The enormous concentrations of waterbirds within the Chesapeake Bay and along the islands and marshes of the Virginia-Maryland seaside have excited the imaginations and appetites of humans, from the earliest hunter-gatherers on its shores, to the period of European colonization when Captain John Smith and others plied the coastlines, and into the 21st Century. While there was little abundance or distribution information about any natural resource within the regions until well into the 20th Century, anecdotal references and some "traditional ecological knowledge" (Ford and Martinez 2000) suggest that both the Chesapeake and the ocean bays and islands were biologically much richer and more productive in the pre-1900 period than they are currently (Horton and Eichbaum 1991; Ray and McCormick-Ray 2004). The long history of human influences on the Chesapeake Bay include: finfish, oyster and crab harvesting, damming of rivers, harbor industrialization, urban and suburbanization, agriculture, and inputs from sewage treatment, power plants, and numerous military bases. These factors have been well documented and leave little doubt that the current ecosystems of the Bay and the Delmarva region have been seriously compromised (Horton and Eichbaum 1991; Curtin *et al.* 2001; Ernst 2003; Ray and McCormick-Ray 2004; Powledge 2005). Whether conditions will improve in the near term is a subject of much controversy (2020 panel, 1988) and will be addressed in the contributions in this volume.

From a waterbird community perspective, the primary interest before the 1960s was in waterfowl hunting. Especially on Maryland's Eastern Shore, hunting was (and remains today) an important cultural and economic force. In the Susquehanna River flats area of Maryland, and along the Virginia portion of the Delmarva especially near Chincoteague, market hunting was a major source of income and large numbers of waterfowl and shorebirds were shipped to Washington, Baltimore, and Philadelphia in the late 1800s, before the Migratory Bird

Protection Act was passed in 1918 (Reed and Drabelle 1984; Barnes and Truitt 1997). Protection of migratory birds was largely precipitated by National Audubon Society efforts in reversing dramatic declines in waterbirds along the Atlantic Coast, especially egrets and terns, as sources of feathers for the millinery trade. A half century later in the 1960s, a turning point in environmentalism was reached in the United States, due in part to the startling revelations of Rachel Carson's *Silent Spring* (1962). Suddenly, the public became aware of the hazards of agricultural chemicals to both wildlife (see chapter by Rattner and McGowan) and human health. Some of the major victims of these pesticides were the waterbirds described in this volume, most notably the Bald Eagle *Haliaeetus leucocephalus* (chapter by Watts *et al.*), Osprey *Pandion haliaetus* (Watts and Paxton chapter), and Great Blue Heron *Ardea herodias* (chapter by Williams *et al.*). One of the more positive signs among waterbirds is the expansion of all three of these species over the past 40 years after most organochlorine pesticides were banned during the 1970s. From 1970 to 2005, Bald Eagle nesting pairs have increased by more than an order of magnitude, Ospreys have doubled, and Great Blue Herons have increased six fold. In addition, Eastern Brown Pelicans *Pelecanus occidentalis* now nest in Maryland, farther north than their historic range.

The picture for waterfowl (Anatidae) is not nearly as bright however. The chapters by Perry *et al.*, and Costanzo and Hindman point to a number of habitat problems that have resulted in major distribution and abundance changes in certain species (e.g., diving ducks), prey selection changes and numerical declines in both breeding populations and winter (e.g., American Black Ducks *Anas rubripes*, Costanzo and Hindman chapter). The erosion or loss of islands in the Chesapeake Bay has placed additional pressures on nesting populations of colonial waterbirds (chapter by Williams *et al.*; Brinker *et al.*) as well as Black Ducks. The dramatic increases of non-migratory (resident) Canada Geese *Branta canadensis* and Mute Swans *Cygnus olor* have also taken a toll on submerged aquatic vegetation in the Bay shallows; also, in many river systems, such as the Patuxent, herbivory by geese has resulted in degraded habitat for rails (Haramis and Kearns chapter) and other waterbirds.

Along the seaside of the Delmarva, a large expanse of relatively pristine barrier island habitat has supported large populations of nesting waterbirds, including federally threatened Piping Plovers *Charadrius melodus* and another species of concern, the American Oystercatcher *Haematopus palliatus* (see chapters by Boettcher *et al.* and by Wilke *et al.*, respectively). Predator management of Red Foxes *Vulpes fulva* has resulted in a dramatic increase in nesting populations on some islands, especially on the Virginia barrier islands. Predator expansion and sea-level rise are two pervasive threats along both the Delmarva seaside marsh region, as well as the Chesapeake Bay (see chapters by Wilson *et al.* on marsh birds, Brinker *et al.* on seabirds, and by Costanzo and Hindman on Black Ducks). Even on island restoration sites, Red Foxes have proven to be a major impediment to establishing nesting colonies of Common Terns *Sterna hirundo*, Least Terns *S. antillarum*, and other ground-nesters (chapter by Erwin and Beck). Nonetheless, island restoration using dredged materials has initially proven to be a very promising method for providing a mosaic of both wetland and upland habitats to attract significant numbers of nesting, migrating, and wintering waterbirds.

Many studies of birds neglect to provide the proper ecological context for changes, and in that vein, the chapter by Viverette *et al.* is very useful in providing the trophic connections between waterbirds and finfish dynamics. Such studies are all too rare, yet the recent changes in distributions, e.g., Brown Pelicans shifting northward and the expansion of Double-crested Cormorants *Phalacrocorax auritus*, reveal that our understanding of population changes over larger landscapes will never be complete without knowing more about food web dynamics.

Of course, any volume of this nature raises as many questions as it answers, yet we hope the contributions here demonstrate

how much we already know about the system and will stimulate others to fill in our knowledge gaps. For the first time, a large amount of information has been synthesized, and patterns for many species are becoming clear. A good deal more work lies ahead for improving our understanding of these populations and habitats, and just as importantly, for educating the public and our political representatives of the significance of this group of wildlife as an essential biological resource and as bioindicators of ecosystem health (chapter by McKay). Although resources always appear to be limited, we make the following suggestions: (1) improving the rigor of waterbird surveying as many past efforts have been erratic, made changes in methods or observers, and have not attempted to determine biases such as species detection differences; (2) waterbird biologists need to coordinate more effectively with fisheries (both finfish and shellfish) researchers and managers to try to bridge the gap in our knowledge of trophic relationships for major food webs; (3) recent breakthroughs in stable isotopes, molecular genetic analyses, and satellite telemetry allow researchers to accurately determine the source populations of migrating and/or wintering assemblages of waterbirds of concern (e.g., seaducks); (4) with the increased awareness of avian diseases, e.g., West Nile Virus and Avian Influenza, researchers should routinely archive blood and other tissues (e.g., feathers with tick instars) as part of a national surveillance network, and (5) ensure that biologists and managers with waterbird expertise are represented on local, regional, state, and national-level committees (e.g., Atlantic Flyway Council, subcommittees of the Chesapeake Bay Program, state marine resource commission committees, U.S. Army Corps of Engineers Dredged Material Program) to ensure that waterbird populations are considered when large-scale decisions are being rendered that affect both terrestrial and aquatic resources.

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