

## The Management of Wetlands for Aquatic Birds

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**Abstract.**—A primary use of wetlands in North America is their management for hunted waterfowl. Other wetland systems are managed for various purposes, or are not consistently managed at all. Recent studies on wetland use by birds demonstrate forcefully that wetlands of all sorts are valuable habitat, including small and isolated wetlands that are actively managed for other purposes. Even the great wetlands such as the Everglades and Llanos will require increasing amounts of active management to retain their value as avian habitat. The importance of small wetlands is well demonstrated in Europe and needs to be better appreciated in North America. Such wetlands may be crucial for some regional bird populations even if used intermittently. Maintenance of avian populations in wetlands will require research on the responses of bird populations to management and also the institution of active management to achieve specific goals, in which birds should figure prominently.

**Key words.**—Birds, Everglades, Llanos, management, water, wetlands.

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A primary use of wetlands in North America is their preservation and management for aquatic birds, particularly hunted waterfowl. The National Wildlife Refuge System of the United States includes hundreds of wetlands that have as their primary mission the support of breeding, migrating, and wintering ducks, geese, and swans. These wetlands are also habitat for avian species that are not the explicit target of management. Other wetland refuges are actively managed for unhunted waterbirds, such as Whooping Cranes on the Aransas Refuge in Texas and Snail Kites on the Loxahatchee Wildlife Refuge in Florida. Clearly without this long-term federal commitment to managing certain wetlands for aquatic birds, North America would by now be far the poorer in its remnant aquatic habitat.

However there are other wetland systems in North America, many owned or controlled by government agencies and private conservation organizations, that have other primary missions. Some are manipulated to increase habitat diversity, most are involved in "multiple use" strategies, still others are primarily water catchment or flow areas. Unfortunately the wildlife management strategies of these may be poorly defined or extremely changeable. Ranging from great river basins to small local marsh pockets that were by happenstance spared from development, these marshes may be extremely important to some avian populations. It therefore may be of some value that these wetlands be better understood with respect to

their role in maintaining aquatic bird populations.

The symposium on "The use of natural vs. man-modified wetlands, by shorebirds and waterbirds," published in this volume of *Colonial Waterbirds*, demonstrates forcefully that wetlands of all sorts are valuable as aquatic bird habitat. Regionally important habitats include ricefields (Fasola 1986), estuarine mudflats (Wilcox 1986), open marsh water management pools (Brush et al. 1986), irrigation ponds (Clay and Nelson 1986), and urban storm-water catchment basins (Duffield 1986), as well as vast tropical wetlands such as the Florida Everglades and the Venezuelan llanos (Kushlan 1986, Morales and Pacheco 1986). It appears that some of the most highly altered sites are of critical international importance to wintering and migratory shorebirds and waterbirds. This is especially so in Europe (Beintema 1986, Hafner et al. 1986, Davidson and Evans 1986, Fasola 1986).

The contributions to this symposium show that the various species of aquatic birds are extremely sensitive to habitat variables and that this sensitivity can be exploited to enhance the habitat value of a site while not adversely affecting other concurrent uses. In fact it seems likely that the heavy use of such sites by aquatic birds will increase the chances of a wetland being preserved and therefore be available for alternative uses. The use of even isolated wetlands by aquatic birds should be of value to many of their other users.

An important consideration beyond



preservation is that each of the wetlands noted above are being actively managed by manipulations of one sort or another. Such is readily seen in urban catchments or mosquito control impoundments but is no less true of the Everglades and Llanos. One might think that, because of their vastness, these great wetlands would be naturally functioning entities where the highest good could be achieved by a hands-off *laissez faire* approach.

However, the Everglades for example is nearly totally surrounded by levees and used primarily for flood control and water supply management. The natural area compartment, Everglades National Park, is only a tiny fraction of the original Everglades and a minor downstream tail of the remnant marsh. In that two and one half million people live adjacent to the Everglades, it is unreasonable to expect anything but strict management of these reservoirs. A *laissez faire* management strategy is a recipe for human disaster, a fact well recognized by two agencies responsible for most of the Everglades, the Army Corps of Engineers and the local water management district. But such a hands-off policy would be equally disastrous environmentally to the national park. Serious consideration has been given, for example, to removing existing levees and allowing water to flow freely again. However with the Everglades half its natural size and no less water needing a place to flow, such would lead to severe ecological disruptions (Kushlan 1986). Unfortunately, the Everglades in all its compartments must always be actively managed, no matter how distasteful this might seem.

Similarly in the Llanos, it is highly unlikely that the policy for increased control will be altered to accommodate preservationist concerns. As the llanos is increasingly leveed, it will be managed for cattle production. However such management may actually enhance use of the llanos for some birds, at least seasonally (Morales and Pacheco 1986). Or improperly managed it could be subject to nutrient depletion and perhaps the same kinds of bird population decreases seen in the Everglades owing to water management practices there.

Understanding the relationships of wetland birds to management strategies

will allow managers to take the needs of aquatic birds into consideration. Aquatic birds can play an important role in wetland management in that they are extremely sensitive to hydrological fluctuations. Such sensitivity can be used to set management goals for the wetlands. Information on the effects of water management on avian population parameters is desperately needed for most wetland types.

Not only is the wetlands itself an important habitat for aquatic birds but so are the dredgings often removed from it for one reason or another. It is rather unlikely that navigation channels will cease to be tended, so it is a fortunate circumstance that appropriate deposition of dredged material often enhances nesting habitat for aquatic birds (Parnell et al. 1986). Similarly dredging along the Mississippi River has apparently affected, and in some cases provided, habitat for Least Terns. Mary Landin in a paper presented at the symposium but not published provided detailed information on the distribution of Least Terns along the Mississippi River ("Interior Least Terns in the Lower Mississippi River and its tributaries: two years' surveys," unpubl. ms. 1986). Water levels appeared to be an important aspect of the distribution and success of the annual nesting effort. She found in one survey that 21 of 25 nesting sites were on dike fields. Thus governmental management activities provide the sites and determine their use in any year. Clearly the management agency holds important responsibilities for the welfare of this endangered waterbird.

Perhaps the most forceful result of the symposium was not so much its revelations about the the great marshes and rivers, but its emphasis on small sites. In North America such sites are often overlooked out of concern for the larger wetland systems that still grace the landscape. However, the European contributors point out that it is on small isolated sites that most of their regional populations depend. Such sites are must be intensely managed and manipulated. Evans (1986) even demonstrated the beneficial effects of herbicides on bird use of wetlands. This manipulation would be unusual if not illegal in the United States, but such drastic measures may be desirable in many more situations than are now appreciated. It is well known that the



most productive marshes are about 50% open area, which occurs only when plant succession is arrested by such means as drying, flooding, fire, or even herbicide application.

Only recently have North Americans begun to look carefully at small isolated sites. Small marshlands may be used by waterbirds only seasonally or perhaps not every year. Yet they remain an important aspect of the total support system for some populations. There seems to be little evidence available as to where the line can be drawn as to the value of even the smallest wetland for wildlife. A small prairie pond supports a diverse and abundant avian community, if properly managed (Weller 1981). More information is needed on small wetlands and their role in avian population dynamics.

Wetlands clearly play a crucial role in the population dynamics of many avian populations, and such wetlands, large and small, will need to be increasingly managed. It will be an unusual wetlands that is of sufficient size and sufficiently pristine condition that management is not required. Even the largest wetlands are but remnants in which ecological functions have been significantly altered (Kushlan 1979). The effect of such alteration on aquatic birds needs to be better understood. Moreover an understanding of the relationship of management to avian responses can be an important tool in setting management goals for such a wetland. But unfortunately such understanding can be used only if agencies and organizations undertake their wetland stewardship through active management.

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