THE IMPORTANCE OF PLAYAS TO MIGRATORY BIRDS

WILLIAM P. JOHNSON, Texas Parks and Wildlife Department, PO Box 659, Canyon 79015. bill.johnson@tpwd.state.tx.us

Abstract: Playa lakes are critical to maintaining biodiversity on the Southern Great Plains. Although playas are important to wintering waterfowl, their most important function with respect to migratory birds is to provide areas for them to rest and forage during migration. Not only are bird numbers greatest during migratory periods, but nutrients acquired by shorebirds and waterfowl during fall migration may contribute to overwinter survival. Moreover, nutrients acquired during spring likely contribute to reproductive performance and population recruitment. Loss of playa productivity due to sedimentation or other forms of habitat degradation has the potential to negatively impact the continental populations of certain species, such as Northern Pintails (*Anas acuta*).

Introduction

Playa lakes account for about 2% of the Southern High Plains landscape (Haukos and Smith 1994). Yet, they are the region's dominant wetland type and the most important landscape feature with respect to biodiversity (Bolen et al. 1989a, 1989b). Of the estimated 19,340 playas that occur in Texas (Bolen et al. 1989a, 1989b), none are permanent unless receiving runoff or discharge from anthropogenic sources. Playas functioning naturally go through largely unpredictable wet/dry cycles (Guthery and Bryant 1982, Bolen et al. 1989b), and have been described as the most ephemeral of North America's wetlands (Haukos and Smith 1992, 1994). These wet/dry cycles are the driving force behind playa diversity and behind their importance to wildlife (Smith 2003).

Playas are important to a variety of organisms; 37 species of mammals, over 60 species of macro-invertebrates, 346 species of plants, and 185 species of birds potentially occur on playas (Haukos and Smith 1994, 2004). Of these, birds are the most studied and perhaps the most recognizable (Haukos and Smith 1994, Smith 2003). Playas are the primary wetlands used by waterfowl, shorebirds, and other waterbirds in the Southern Great Plains (Nelson et al. 1983), although the diversity of terrestrial birds utilizing playas often exceeds that of wetland associated species (Curtis and Beierman 1980). From this point forward, this paper focuses strictly on birds. With few exceptions, emphasis will be on the importance of playas to certain life-cycle events, such as migration.

Migratory Birds and Playas: Review

Most accounts of migratory birds using playas, including those from previous playa symposiums (Simpson et al. 1981), have largely focused on wintering waterfowl and the numbers present during mid-winter waterfowl surveys. Although the region is still extremely important to waterfowl, current estimates of wintering waterfowl for this area are far less than those traditionally cited (Nelson et al. 1983; U.S. Fish and Wildlife Service 1988; Bolen et al. 1989a). Survey methodology changed in 2001 (U.S. Fish and Wildlife Service 2005), so today's estimates are not directly comparable with those from earlier surveys. Mid-winter waterfowl surveys conducted from 2001 – 2007 suggest an

average of 367,393 ducks and 146,493 geese occur in the Texas Playa Lakes Region during early January (Texas Parks and Wildlife Department [TPWD], unpublished).

Waterfowl abundance during winter seems great, yet the diversity and sheer numbers of birds using playas is greatest during fall and spring migration (Smith 2003). Annual surveys during migration periods are lacking, but abundance estimates suggest that the numbers of both migrating shorebirds and waterfowl may exceed several million (Davis and Smith 1998b, Smith 2003). Most shorebirds and waterfowl using playas are long to medium distance migrants, and stop on playas to rest, forage, and acquire nutrient (lipid) reserves necessary to complete their migratory journeys (Smith 2003, Skagen 2006).

Shorebird migration distances are among the longest of any birds (Skagen 2006). Many shorebirds that utilize playas during migration nest in the arctic and winter in Central and South America. As a group, the species that migrate through interior North America tend to migrate in "hops," refueling periodically along the way, rather than flying nonstop between breeding and wintering ranges (Cooper 1994, Wilson 1994, Skagen 2006). Although shorebirds may spend only a few days on playas or other interior wetlands during migration (Skagen and Knopf 1994, Wilson 1994), the majority of their time is spent foraging and they are capable of rapidly acquiring lipid reserves (Krapu et al. 1996, Davis and Smith 1998a). Numerous studies have suggested, however, that their ability to acquire nutrients at migration stopover sites is related to wetland conditions (Farmer and Wiens 1999, Davis et al. 2005, Krapu et al. 1996). There also is a growing body of evidence suggesting that nutrient reserves acquired by shorebirds during spring migration are critical to their reproductive success (Skagen 2006). Shorebirds arriving at arctic breeding grounds in good condition (excess nutrient/lipid reserves) may be more likely to survive periods of extreme cold (Farmer and Wiens 1999, Morrison and Hobson 2004) and are able to undergo the physiological changes necessary to transition from migration to breeding condition rapidly (Skagen 2006). The advantage of coming into breeding condition rapidly is that for most birds, and arctic nesters in particular, earlier breeding is related to increased reproductive success (Rohwer 1992, Carrière et al. 1999, Elmberg et al. 2005). The link between spring wetland conditions and subsequent reproductive success, more than anything, underscores the importance of conserving wetlands used by shorebirds during migration.

Like shorebirds, most waterfowl that utilize playas migrate in short bouts, resting and foraging in order to acquire the nutrients necessary to complete their migratory journeys (Bellrose 1980, Haukos et al. 2006). Conditions on migration and wintering grounds, and consequently body conditions of nonbreeding waterfowl, have been correlated with survival and reproductive success (Heitmeyer and Fredrickson 1981, Raveling and Heitmeyer 1981, Krapu and Reinecke 1992, Guillemain et al. 2007). Several species of waterfowl, including Mallards (*Anas platyrhynchos*), Lesser Scaup (*Aythya affinis*), and Canvasbacks (*Aythya valisineria*), have lower survival when arriving on wintering areas in poor condition (Haramis et al. 1986, Dufour et al. 1993, Pace and Afton 1999). Likewise, some waterfowl, such as Lesser Snow Geese (*Chen caerulescens*), use nutrient reserves acquired during spring migration for egg production (Ankney and MacInnes 1978). For others, like Green-winged Teal (*Anas crecca*), arriving on breeding

areas in excellent condition contributes to reproductive success although nutrient/lipid reserves may not be used directly for egg production (Elmberg et al. 2005, Guillemain et al. 2007).

For waterfowl using playas, evidence exists that suggests that conditions they encounter have declined in recent years, and that this has negatively impacted body condition. Luo et al. (1997) found that most playas surrounded by farmland have experienced significant sedimentation; in fact, they found that 90% of cropland playas in their study had lost all of their basin volume due to sedimentation. High sediment loads in playas negatively affects hydroperiod and, potentially, productivity (Tsai et al. 2007). Moon et al. (2007) attributed the significant decline in the body condition of Northern Pintails (*Anas acuta*) wintering on playas to wetland degradation that has occurred over the last 20+ years. They further speculated that declining conditions of playas and subsequent declines in Northern Pintail body condition had the potential to negatively impact the continental population of this species. In addition to the 105,000 (average from 2001-2007 mid-winter waterfowl surveys, TPWD, unpublished) Northern Pintails that winter on playas, many Northern Pintails wintering in coastal Texas and in Mexico utilize playas during migration (Bellrose 1980). Indeed, a recent study suggests that abundance of Northern Pintails on playas during spring migration may be ten-times greater than during winter (R. Matlack, West Texas A&M Univ., unpublished). Assuming that the current Northern Pintail population is 3.3 million (U.S. Fish and Wildlife Service 2007), it is conceivable that 32% ([105,000 x 10]/3.3 million) of the population may utilize playas during the peak of spring migration.

It is not unreasonable to assume that many species of waterfowl and shorebirds, not just Northern Pintails, might be impacted at a continental scale by declining habitat conditions on playas. For most shorebirds and some waterfowl, however, we lack the kind of meaningful population data that will enable us to determine what percent of the population utilizes playas during migration (Smith 2003). Even so, Skagen (2006) and Haukos et al. (2006) emphasized the importance of conserving all interior wetlands, such as playas, for migrating shorebirds and waterfowl. Any reduction in playa functions or productivity has the potential to compromise the ability of migratory shorebirds and waterfowl to acquire the nutrients necessary to complete migration, and perhaps compromises the sustainability of migratory bird populations.

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