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Habitat Use by Masked Ducks Along the Gulf Coast of Texas

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ABSTRACT.—We counted 47 Masked Ducks (*Nomonyx dominicus*) in seven flocks during the fall and winter of 1992–1993 on 1009 64.75-ha plots in the Coastal Plains of Texas. Among the three wetland subclasses used by Masked Ducks, bird densities were higher on lacustrine littoral aquatic-bed rooted vascular and lacustrine littoral aquatic-bed floating vascular than palustrine scrub-shrub broad-leaved deciduous wetlands. These wetlands provide important habitat even though they are not the most abundant wetlands in the region. *Received 23 June 1998, accepted 25 Aug. 1998.*

Masked Ducks (*Nomonyx dominicus*) are small, scarce, and reclusive inhabitants of wetlands throughout eastern South America and north into Texas and Florida (Johnsgard and Carbonell 1996, Lockwood 1997, Todd 1997). Little ecological data exist for this species anywhere, but particularly at the northern extent of its range. Appropriate habitat has been subjectively defined as overgrown swamps and marshes, where aquatic plants like water hyacinth (*Eichornia crassipes*) and water lilies (*Nymphaceae* spp.) occur (Johnsgard and Carbonell 1996, Todd 1997). Our objective was to quantify habitat use by Masked Ducks in the Coastal Plains of Texas.

The study area covered 5.5 million ha from Galveston Bay, Texas south to the Rio Grande River (Anderson et al. 1996, 1998). The region is dominated by coastal prairie and sandy plains in the southeast, and rice fields and coastal marsh in the northeast (Anderson et al. 1996). Palustrine and estuarine wetlands (Cowardin et al. 1979) are the most abundant of the wetland systems (Muehl et al. 1994).

We conducted ground based surveys of all wetlands located on 512 quarter-sections (64.75-ha plots) in 1991–1992 and 1009 in 1992–1993 (Anderson et al. 1996, 1998). Surveys for Masked Ducks on wetlands were conducted during September, November, January, and March. Wetlands were classified according to Cowardin and coworkers (1979). Surveys were part of a larger project addressing waterbird habitat use (Anderson 1994, Anderson et al. 1996), waterbird abundance (Anderson et al. 1998), and wetland abundance (Muehl et al. 1994).

We compared densities (no./ha) of Masked Ducks among wetland types on which they occurred using ANOVA and Scheffe's procedure as the mean separation technique with $\alpha = 0.05$ (SAS Institute Inc. 1988). We included in the analysis all wetlands of a type on which Masked Ducks were observed (Anderson et al. 1996). We compared microsite habitat use in wetlands with two-way contingency tables and a *G*-test (Sokal and Rohlf 1995). Count

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periods were considered independent because counts were at least two months apart, wetlands were dynamic (Muehl et al. 1994), and the number of birds varied among count periods (Anderson et al. 1996, 1998). All Masked Duck density data were rank transformed (Conover and Iman 1981, Potvin and Roff 1993) because of the large number of wetlands that had no Masked Ducks. Data were back transformed for presentation.

We did not observe any Masked Ducks during 1991–1992. During 1992–1993, we counted 47 Masked Ducks (September 6; November 4; January 34; March 3) in 7 flocks in 4 separate basins. Masked Ducks occupied 0.3% of quarter-sections surveyed during 1992–1993. All observations were made in the coastal and other crop strata of the area referred to as the Texas Mid-coast (Anderson et al. 1996, 1998). Masked Duck flocks averaged 6.7 birds (SE = 3.16; range 1–25). Sixty-four percent (n = 22) of undisturbed Masked Ducks were observed feeding.

Masked Duck densities (no./ha) on lacustrine littoral aquatic-bed rooted vascular ($\bar{x}$ = 0.93; SE = 0.52) and lacustrine littoral aquatic-bed floating vascular ($\bar{x}$ = 0.40; SE = 0.40) wetlands were not different, but densities on both were greater than densities on palustrine scrub-shrub broad-leaved deciduous ($\bar{x}$ = 0.16; SE = 0.15) wetlands (ANOVA: F = 10.23; df = 2, 199; $P < 0.001$). Masked Ducks did not occur on the other 79 wetland subclasses that were surveyed. Masked Ducks were equally likely to occur in open water (43%) and in emergent vegetation microsites within these three wetland types (57%; G-test: G = 0.2; $P > 0.05$).

Masked Ducks occupied wetlands that averaged 8.25 ha (SE = 1.94) in area. All wetlands were seasonally or semipermanently flooded with fresh water and had emergent vegetation interspersed with open water [i.e., cover type two (Stewart and Kantrud 1971)]. Rooted vascular vegetation on occupied wetlands was primarily yellow lotus (*Nelumbo lutea*), but yellow waterlily (*Nuphar mexicana*) was also present. Floating vascular wetlands were dominated by water hyacinth. Scrub-shrub vegetation was primarily huisache (*Acacia smallii*) and sesbania (*Sesbania drummondii*).

Although few Masked Ducks were observed, it was apparent that they prefered wetlands with abundant vegetation, particularly aquatic-bed and scrub-shrub wetlands. No Masked Ducks were observed in emergent wetlands, as has often been stated (Johnsgard and Carbonell 1996, Lockwood 1997, Todd 1997). Masked Ducks also are known to occur in flooded rice fields in Venezuela (Gomez-Dallmeier and Cringan 1990), but none were observed in the Texas rice fields we surveyed.

It is interesting to note that Masked Ducks were not found on smaller (palustrine) aquatic-bed wetlands, which are more common than lacustrine littoral aquatic-bed wetlands in the area (Muehl et al. 1994). Their absence from these wetlands may be related to preference for larger (lacustrine) wetlands, which provide greater habitat diversity, increased protection from predators, and more food resources (Anderson et al. 1996). However, Weller (1968) and Todd (1997) indicated that Masked Ducks can use smaller wetlands than other stiff-tailed ducks because they can take-off vertically like dabbling ducks.

Previously, no specific information existed on Masked Duck densities (Johnsgard and Carbonell 1996). Anderson and coworkers (1998) estimated 3817 Masked Ducks occurred in coastal Texas during January 1993, but only 354 during March 1993. Masked Ducks are not as abundant or wide-spread as other waterfowl species in the study area and are rare throughout their range (Johnsgard and Carbonell 1996). The presence of Masked Ducks in Texas may be a temporary phenomenon (Johnsgard and Hagemeyer 1969, Blankenship and Anderson 1993) or they may always be present, but seldom seen, as a result of their rarity, secretive nature, and the preponderance of private property in Texas.

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Gizzard Contents of Piping Plover Chicks in Northern Michigan

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ABSTRACT.—The diet of Piping Plovers (*Charadrius melodus*) is not well known and information on diet requirements will enhance food resource assessment and identification of suitable habitat for this rare species. Discovery of four dead Piping Plover chicks at Grand Marais, Michigan, allowed us to examine their digestive tracts for identifiable prey. Gizzard contents represented 16 families in 6 orders of freshwater and terrestrially occurring insects confirming behavioral observations that plover chicks opportunistically capture insects in shallow water and along shorelines. The most commonly taken orders were Hymenoptera, Coleoptera, and Diptera. *Received 6 May 1998, accepted 30 Aug. 1998.*

Little is known about the diet or foraging behavior of the Piping Plover (*Charadrius melodus*) during any part of its annual cycle. Federal threatened and endangered status (U.S. Fish and Wildlife Service 1985) and sensitivity to human disturbance preclude collection of birds for stomach content analysis and require use of nondisruptive techniques to sample food while plovers are present. Because food availability is critical to shorebird reproductive success, migration, and overwinter survival (Howe 1983, Helmers 1992), assessment of food resources is an important component of conservation efforts for this species. Direct observations of food preference and foraging ecology are needed to im-

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