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# Waterfowl Abundance and Distribution in the Mississippi Delta

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# Waterfowl Abundance and Distribution in the Mississippi Delta

by **Aaron Pearce, Richard Kaminski, Stephen Dinsmore, and Kenneth Reinecke**

During mornings of empty skies, a duck hunter has plenty of time to ponder the question, "Where are all the ducks?" Invariably, the distraught hunter arrives at an unhappy conclusion: the ducks are not going to show up, so they must be elsewhere. The typical progression of an unsuccessful morning of hunting leads to multiple explanations as to why there weren't any ducks, such as mild winter temperatures in and north of Mississippi, not enough rain to attract ducks, too much rain and the ducks are

scattered, the region doesn't have enough food to attract and hold ducks, the ducks have been "blown out" of the area due to hunting pressure, and others. Researchers from Mississippi State University (MSU) and the U.S. Geological Survey (USGS) also are interested in these questions and are conducting a three-year study to better understand the dynamics of waterfowl abundance and distribution in the Mississippi Delta. Basic objectives of the study are to develop a practical aerial survey to estimate abundance and

geographic distribution of ducks in the Delta and to identify factors that may influence differences in duck numbers and distribution in winter. Completion of these objectives will provide valuable information for conservation of waterfowl habitats and management of waterfowl hunting seasons.

As most duck hunters in Mississippi know, Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) biologists have conducted aerial waterfowl surveys for many years. Thus, why do we need new

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surveys? The goal of previous surveys was to document duck numbers at locations known to attract or concentrate ducks consistently. However, MSU and USGS researchers and MDWFP biologists currently believe designing an aerial survey that enables estimation of abundance and distribution of wintering ducks throughout the Delta is best for long-term monitoring of duck populations. This goal requires development of a new survey method and leads to initiation of the research project.

During the past three winters, researchers conducted 14 aerial surveys to determine changes in waterfowl numbers over winter (late November – mid-February) and differences in distribution and timing of migration among years. Researchers observed a seasonal peak in abundance each year, but timing of the peak was not consistent among years (Fig. 1). In winters 2002-2003 and 2004-2005, the greatest abundance of ducks occurred in early January; whereas, peak abundance in winter 2003-2004 occurred in mid-February 2004. Scientists also discovered peak abundances were not the same each year. In winters 2002-2003 and 2003-2004, about 450,000 ducks were estimated in the Delta; whereas, nearly 100,000 fewer ducks were present during peak abundance in winter 2004-2005 (Fig. 1). Further, researchers found there were more ducks north of U.S. Highway 82 than were south of this highway in 11 of 14 surveys; whereas, numbers of ducks north and south of U.S. Highway 82 were similar during the remaining three surveys.

The researchers also are trying to identify and understand factors that influence abundance and distribution of ducks in the Mississippi Delta. Some preliminary analyses reveal that temperature may explain patterns in duck abundance observed over the past few winters. A Delta-wide temperature index was calculated as the average temperature in Clarksdale, Greenwood, and Yazoo City a week before and during each aerial survey. The scientists also calculated an average temperature over the same time period for three locations north of Mississippi (Kansas City, MO; St. Louis, MO; and Louisville, KY). Generally, more ducks were in the Delta when average temperatures in the Delta and farther north were lower. Specifically, peak abundances of ducks were observed when

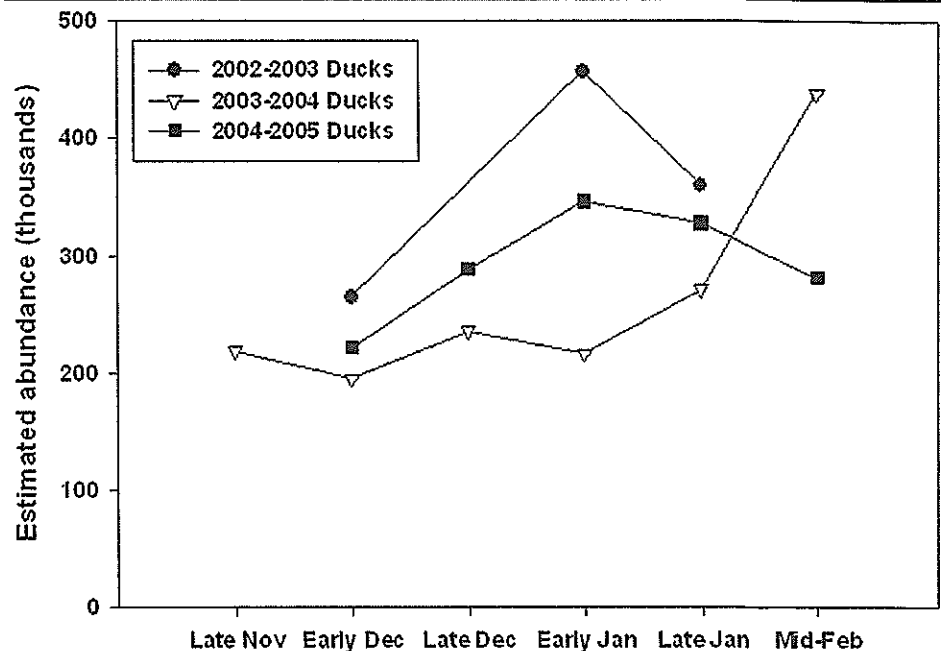
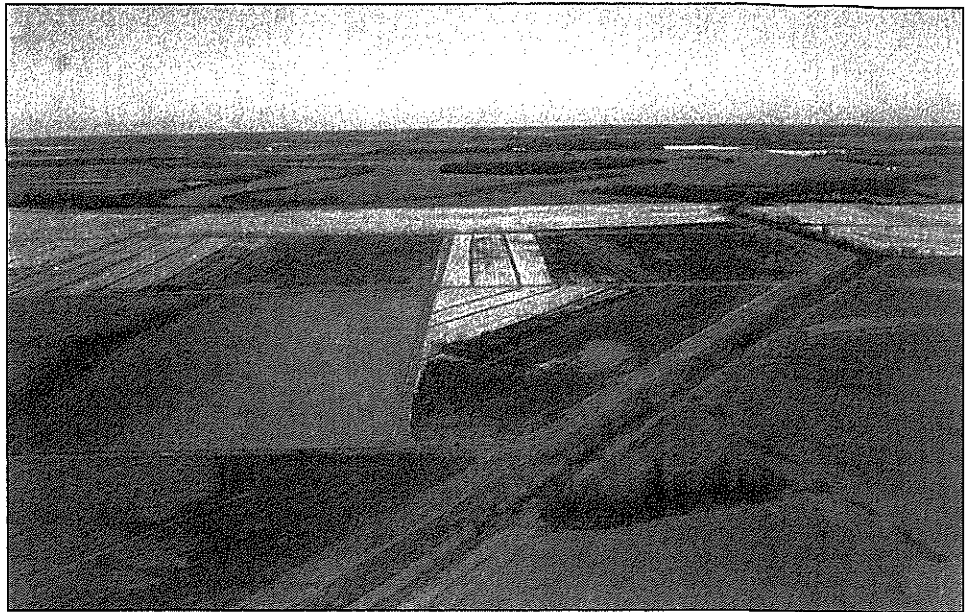


Figure 1. Estimated abundance of total ducks in the Mississippi Delta, winters 2002-2003, 2003-2004, and 2004-2005.

Delta temperatures ranged from 30 to 35° F and northern temperatures were between 20 and 25° F. Not surprisingly, this relationship explained only part of the fluctuations in duck numbers, indicating other factors also influence variation in duck abundance.


The scientists also are studying patterns of habitat use and selection by ducks during winter and relationships between duck use and habitat area and arrangement. During aerial surveys, researchers recorded the types of habitats used by all ducks observed, but only data from Mallards will be summarized here. Habitats were divided into four categories: flooded cropland, forested wetland, natural wetland, and other types. Rice and soybean fields and all other cultivated lands with surface water were included in the



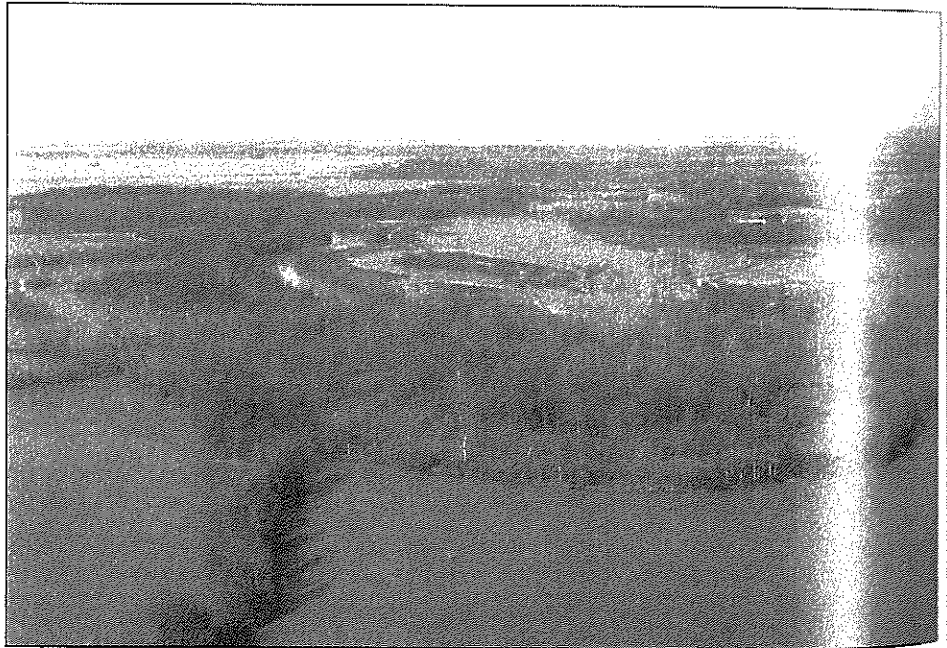
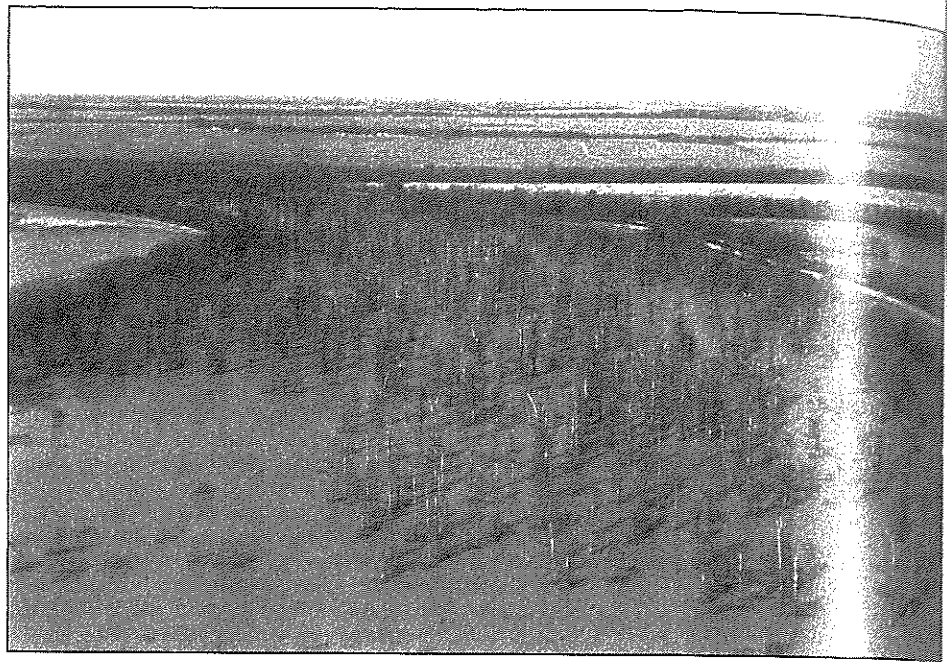
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flooded cropland category. Forested wetlands included bottomland hardwoods and other wetlands with woody vegetation. Natural wetlands were defined as shallow surface water with non-woody vegetation such as grasses and sedges. Other habitats included permanent water, rivers, catfish ponds, and miscellaneous wetlands. Over all surveys, 60% of Mallards were observed using flooded croplands, 30% used natural wetlands, 8% used forested wetlands, and 2% used other wetlands. These data are very important as they reveal habitats used by Mallards; however, the researchers must compare habitat use with availability to determine habitat selection of ducks, a measure of habitat choice relative to the amount of each habitat type present in the Delta during a survey period.

Research efforts to estimate duck abundance and determine factors influencing variation in abundance will assist wildlife professionals better conserve and manage waterfowl wintering in Mississippi. For example, these waterfowl surveys will help conservation planners with the Lower Mississippi Valley Joint Venture determine where to provide habitat for migrating and wintering ducks in the Delta. Biologists with MDWFP can use survey results to set waterfowl hunting seasons around times of peak abundances. Also, public and private waterfowl managers can use knowledge of habitat selection to provide habitats most attractive to wintering waterfowl. Indeed, research is producing important information to help keep waterfowl in the skies over Mississippi.

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