

# TURNOVER RATES OF FALL MIGRATING PECTORAL SANDPIPERS THROUGH THE LOWER MISSISSIPPI ALLUVIAL VALLEY



Photo by J. Wilson

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## **INTRODUCTION**

The Mississippi Alluvial Valley (MAV) is the historic alluvial floodplain of the Lower Mississippi River. Most of the MAV is in Arkansas, Louisiana, and Mississippi with smaller segments in Tennessee, Missouri, Illinois, and Kentucky. Before European settlement, the MAV was a 10 million-ha forested wetland system created and maintained by backwater and headwater flooding as well as localized ponding on poorly drained soils. Long duration flooding in the MAV led to sediment and nutrient deposition. Much of the land has been cleared and converted to agriculture and aquaculture. Roughly 20% of the original forested area remains (Elliott and McKnight 2000).

In addition to the changes in land cover types, the MAV has also experienced major changes in hydrology. The building of dams, levees and other water control structures has altered many of the hydrological processes (Elliott and McKnight 2000). While historical use of the predominately forested region by migrating shorebirds was low, they most likely made use of the sandbars and shores on the Mississippi River as well as the sloughs and backwater areas in the MAV (Tewdt et al. 1998). Many of these areas no longer exist due to changes in the region. Because shorebirds are concentrated during migration, they are dependent on relatively small areas and especially vulnerable to habitat changes (Myers 1983). With many of the natural stopover sites no longer available, the open agricultural and aquacultural fields in the MAV now provide much of the habitat for migrating shorebirds (Tewdt et al. 1998). The Lower Mississippi Alluvial Valley Joint Venture (LMVJV) was organized in the late 1980's in order to implement the North American Waterfowl Management Plan in the MAV. Partners in the LMVJV include members from state agencies in the joint venture area, several federal agencies, and non-government conservation groups. In 1989, the Neotropical Migratory Bird Program, better known as Partners in Flight (PIF), was established as a cooperative initiative for the conservation of neotropical migrants and their habitats. An informal coalition between the PIF and LMVJV has developed over the past several years (Loesch et al. 1995). Based on consultation with the Western Hemisphere Shorebird Reserve Network, the PIF and LMVJV identified foraging habitat during fall migration as the primary habitat need for shorebirds in the MAV.

The U.S. Shorebird Conservation Plan outlined 3 steps for stabilizing and enhancing continental populations of shorebirds. Those steps include compiling existing information, identifying important questions and prioritizing future research and conservation needs. These plans have been fine tuned at the Bird Conservation Region (BCR) level by the Shorebird Working Group of the LMVJV Migratory Bird Science Team. In the MAV BCR, the 2 top research priorities are estimating the abundance of shorebirds using the MAV during fall migration and estimating fall migration turnover rates.

Turnover rates for shorebirds in the MAV are defined as the average time in days that a shorebird takes to pass through the MAV BCR. In 1995, the Mississippi Alluvial Valley Bird Initiative developed management objectives for the MAV based on the assumption that the average length of stay for a migrating shorebird was 10 days. The primary objective of this study is to test this assumption. We plan to look at the pectoral sandpiper (*Calidris melanotos*, PESA) as a model for shorebird migratory turnover rates. We will estimate the length of stay at sites within the MAV and evaluate these estimates as a subset of the total turnover rate for the MAV. The turnover rate estimate will be used in conjunction with a shorebird population estimate to calculate shorebird use days in the MAV.

### **The Pectoral Sandpiper**

The pectoral sandpiper was chosen for this study because it is abundant in the lower MAV throughout fall migration (James and Neal 1986, Smith et al. 1991) and much is known about PESA life history (Holmes and Pitelka 1998). In addition, a comparison between age classes can be made as adult and juvenile PESAs migrate during different periods (Pitelka 1959). Also, unlike many other *Calidris* species, PESAs can be sexed (Holmes and Pitelka 1998). Lastly, PESAs can carry radio transmitters as they have a relatively large body mass for a sandpiper (Dunning 1993).

The PESA is a narrow banded and long distance migrant (Skagen et al. 1999). Birds breeding in Siberia may migrate up to 16,000 km one way during their fall migration to South America (Jackson 1997). More typically, a fall migrant would travel 8,000 to 10,000 km (Skagen et al. 1999). Being a narrow banded migrant means that 90% of PESAs are found within a relatively narrow strip of land during their migrations through North America (Skagen et al. 1999).

Once reported in “enormous” numbers along migratory pathways, the PESAs abundance now appear significantly reduced from a century or more ago. This is possibly due to market hunting in the late 19th century but more likely because of recent habitat loss and degradation (Holmes and Pitelka 1998). During their spring migration north, PESAs are believed to make several feeding stops rather than concentrate in a few large stopover areas (Farmer and Wiens 1998). However, this is believed to be a function of stopover availability. An increase in the spacing of stopover sites is predicted to shift migration strategy from “hops” to “jumps” (Farmer and Wiens 1998). “Jumps” are characterized by long distance flights with few stops while “hops” are defined by short flights and frequent, brief refueling periods at stopover sites (Piersma 1987).

The PESA breeds on the wet tundra in North America and the Siberian Arctic, arriving at the breeding grounds during late May and early June. Migration south is asynchronous. In northern Alaska, males depart first in early to mid-July, females in late July to mid-August and juveniles mid-to-late August (Pitelka 1959). Peak numbers in the MAV typically occur around mid-August to mid-September (Reid et al. 1983, DeCecco and Cooper 1996, Twedt et al. 1998). Shorebirds readily colonize available habitat during migration as opposed to returning to the same sites regardless of habitat quality. This is likely an adaptation to the dynamic nature of the diverse wetlands they frequent (Skagen and Knopf 1994). The PESA ends its fall migration in South America, wintering from southern Bolivia and northern Argentina to Paraguay (Cramp and Simmons 1983).

Food availability is considered a key consideration in the support of fall migratory shorebirds (Augustin et al. 1999). An aquatic gleaner and prober, the PESA feeds on small invertebrates on top of the substrate and just below the surface (Holmes and Pitelka 1998). Chironomid midges are generally believed to be the principle macroinvertebrate in shorebird habitats, although one study in the MAV found them to account for less than 3% of the biomass (Augustin et al. 1999). Skagen and Oman (1996) found many shorebirds to be cosmopolitan in their food choices. Due to the dynamic nature of their stopover sites, shorebirds are likely to encounter variable and unpredictable food resources (Davis and Smith 1996). Because of the unpredictability of these food sources, shorebirds are expected to be opportunistic feeders, that is, feeding on invertebrates in relation to their availability (Skagen and Knopf 1994, Davis and Smith 1996).

## **RESEARCH**

Research was conducted at 3 sites in eastern Arkansas during the fall of 2001. Thirty-seven PESAs were equipped with radio-transmitters and tracked using a truck mounted antenna and hand-held antennas. The length of stay at the sites was determined from the length of time the transmitters could be located at the sites. Further analysis is still being conducted. Research will be resumed during the fall of 2002 and will likely include additional sites in Mississippi and Louisiana.

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