

Using Radar to Understand Migratory Birds and Their Habitats: Critical Needs for the Gulf of Mexico

Nearly all Neotropical migratory landbird species of the eastern United States as well as many western species use Louisiana and the northern Gulf of Mexico coast during their transcontinental migrations each spring and fall. Radar has determined that hundreds of millions of birds make the nocturnal crossing of the Gulf of Mexico resulting in daily flights of as many as 2.5 million individuals stopping in Louisiana to feed and rest. These migration landings are so spectacular that the term “fallout” has been coined to describe the concentrations of birds arriving on the coast.

The Department of the Interior manages over 30 U.S. Fish and Wildlife Service and National Park Service properties in Louisiana; in addition there are State and nongovernmental conservation areas in Louisiana and considerably more along the northern gulf coast. These public and private lands provide critical habitat for wintering, breeding, and migrating continental populations of birds. The international organization Partners in Flight listed 51 species of birds using Louisiana coastal habitats as species of concern that require management and monitoring. Many are in need of urgent attention because of declining numbers.

In the past century, Louisiana has lost more than 1,900 square miles of coastal land, an area roughly the size of Delaware. By 2050, without further intervention, the national landscape could lose another 900 square miles from this valuable ecosystem, which supports the Nation’s oil and gas production, seafood harvest, and shipping industry. As the first line of defense against the degradation of this ecosystem, the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) has 131 active projects expected to benefit more than 117,000 acres of coastal wetlands while building a framework for long-term solutions to save “America’s Wetland.”

In the midst of all these restoration efforts, there is little understanding about how the relatively recent coastal land loss affects survival strategies and habitat requirements of birds that have been shaped over millennia.

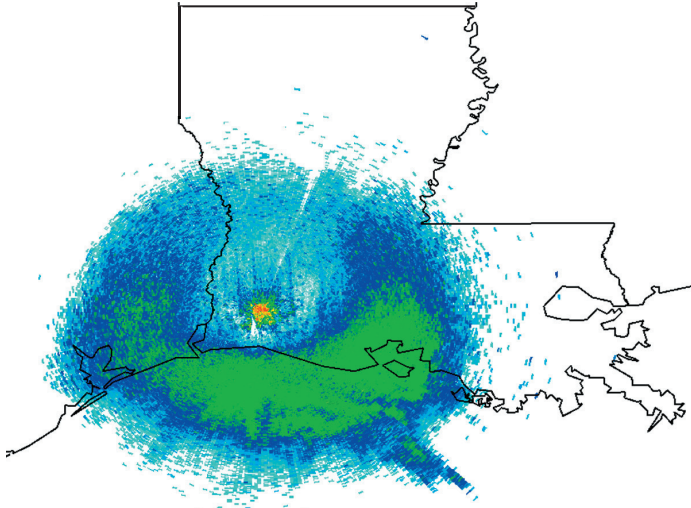
Mortality during the migratory period can be high. Recent research on the black-throated blue warbler (*Dendroica caerulescens*) indicates that more than 85% of the annual mortality for the species occurs during migration. It is critical that we develop tools and models to inform decisions regarding land acquisition, conservation, and restoration efforts. Indeed there is a general consensus among Department of the Interior land managers and decision makers that knowledge of landscape level habitat relations is the key to migratory bird conservation.



Photographs courtesy of Bill Goulet, Alan Williams and Michael L. Gray/Gulf Coast Bird Observatory

The Opportunity . . .

Radar technology makes possible the new tools and models needed to inform bird conservation decisions. Whereas radar has been used for decades to describe bird movements, the recent development of digital, Doppler weather radar capabilities and its increased accessibility have presented new opportunities for bird research. With these new research opportunities come new technological challenges.



A radar image showing about 2.6 million birds arriving on the coast after a transgulf flight.

Distributed across the United States, more than 150 National Oceanic and Atmospheric Administration (NOAA) weather radar stations are collecting echoes 24 hours per day 7 days per week to create massive databases that require complex analyses. Much of the radar data application to bird research to date has relied on lower resolution data (referred to as Level III data). In 2004, high resolution (Level II: 8 to 10 times greater precision) data became more readily available to the scientific community.

The National Wetlands Research Center is cooperating with the NOAA National Climatic Data Center to develop and test software and protocols that can convert the new high resolution radar data for use in statistical and geographic information system programs. This joint effort will enable and facilitate the next generation of migratory bird habitat research.



Radar analyses will help quantify bird migration at a specific time and at landscape, regional, and continental scales. New advances resulting from the USGS/NOAA joint effort, along with input from the U.S. Fish and Wildlife Service, will contribute to our understanding of broadscale responses of birds to ecological change and will inform decisions related to:

- ▶ land acquisition for bird habitat
- ▶ habitat restoration projects and priorities
- ▶ landscape-level conservation planning
- ▶ harvest regulations
- ▶ zoning and development projects
- ▶ permitting and regulations for communication towers, wind farms, and other tall structures
- ▶ enhancing bird inventory and monitoring programs
- ▶ providing visualization tools for outreach programs
- ▶ support birding and ecotourism activities on Federal and private lands.

This unique USGS/NOAA/USFWS joint effort will need to grow and expand in order to take advantage of the major advancements in radar technology that will be released in approximately 5 years. Joint research conducted today will position all agencies to capitalize on this new and emerging technology.

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