

Profile of the USGS National Wetlands Research Center

By DARYL McGRATH

Editor's Note: This is the second profile to appear in *Park Science* of a research center operated by the USGS Biological Resources Division (see 15(3):12-13 for a profile of the Midcontinent Ecological Science Center in Fort Collins, Colorado). One of 17 science and technology centers nationwide, the National Wetlands Research Center is a valuable resource for NPS resource managers with research or technical assistance needs related to wetlands. The entire network of centers is profiled online at http://biology.usgs.gov/pub_aff/centers.html.

IF YOU HAVE WETLANDS IN YOUR PARK AND would like to know more about them, the National Wetlands Research Center (NWRC) in Lafayette, Louisiana, has an ecologist, geographer, or information specialist for you. The NWRC's mission is to develop and disseminate scientific information needed to understand the ecology and values of the nation's wetlands and to manage and restore wetland habitats and associated plant and animal communities. The 71,000-square-foot headquarters is located in the research park of the University of Southwestern Louisiana. The Center also maintains project offices in Gulf Breeze, Florida, Baton Rouge, Louisiana, and Nacogdoches, Texas. Although NWRC research is concentrated in the southeastern United States (the National Park Service administers nearly 50 units in the Atlantic and Gulf Coast clusters in the Southeast Region), the center currently has or previously has had projects or study sites in almost all 50 states, in addition to Mexico, Honduras, Guatemala, England, Italy, Germany, Finland, Micronesia, and Australia.

The NWRC is one of 17 science and technology centers of the U.S. Geological Survey's (USGS) Biological Resources Division (formerly the National Biological Service). The Center originated as the National Coastal Ecosystems Team in 1975 as part of the U.S. Fish and Wildlife Service's Office of Biological Services and was head-

quartered at NASA's Stennis Space Center near Bay St. Louis, Mississippi. The Team moved to Slidell, Louisiana, in 1979, and in 1986, it was given a research mission and renamed the National Wetlands Research Center. In 1992, NWRC moved its headquarters to Lafayette, and it became part of the National Biological Service (NBS) in 1993. In October 1996, NWRC joined the USGS when the NBS became the Biological Resources Division (BRD) of that agency.

The Biological Resources Division's mission is to work with others to provide the scientific understanding and technologies needed to support the sound management and conservation of the nation's biological resources. While it seeks to provide reliable scientific information for all American citizens, BRD recognizes a special obligation to serve the biological information needs of Department of the Interior bureaus, particularly the National Park Service and U.S. Fish and Wildlife Service. The BRD is led by Chief Biologist Denny Fenn, who started his career in the National Park Service in 1972 as a soil scientist and eventually served as NPS Acting Associate Director for Natural Resources before joining NBS.

The NWRC performs an important role in wetlands research. Wetlands in the United States continue to disappear at an alarming rate, particularly in Louisiana,

where coastal wetland loss averages more than 35 square miles per year. Additionally, changes in wetland hydrology or community composition are often propagated up the food web, affecting commercially and recreationally important species such as shellfish, finfish, and waterfowl. Studies at NWRC contribute to scientific understanding of the factors influencing wetland loss and are used to develop management strategies for mitigating those losses. NWRC researchers also study the effects of natural and human-induced impacts on wetlands and the effects wetland changes have on animal communities and populations.

Center organization

The NWRC is staffed by about 150 federal and contract employees who have a broad range of scientific and technical expertise. Research areas and services include plant, animal, and wetland ecology; mapping; remote sensing; modeling; geographic information systems (GIS); computer and electronic technologies; and information technologies and services. The Center is divided into four scientific branches: Animal Ecology, Forest Ecology, Spatial Analysis, and Wetland Ecology, and two offices: Technical Support and Administration.



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The Animal Ecology Branch focuses on the survival of animal species and quality of habitat through studies of population dynamics, inventorying and surveying, examining effects of environmental contaminants on ecosystem food webs, and improving statistical models for ecological research. Animal ecologists study migratory bird populations that are declining because of habitat loss or alteration; resident shorebirds and waterfowl that winter in gulf coast wetlands; and the effects of habitat change on songbirds that stop over in coastal wetlands on their way to the neotropics. In a recent study, researchers developed a GIS-based spatial model to study the behavioral responses to factors influencing distribution of the Northern Pintail duck wintering in the lower Mississippi River region.

The Forest Ecology Branch studies the loss, fragmentation, and degradation of forested wetlands from hydrologic alterations and past management practices. Scientists focus on bottomland hardwood forests, cypress-tupelo swamps, pine savannas, coastal oak ridge (cheniers) forests, and mangrove forests, which together account for more than a third of all wetlands remaining in the contiguous United States. They investigate the functions of southern forested wetlands, develop computer models to forecast alterations in forest composition as a result of environmental change, explore the potential for reforestation and forest restoration, and study the annual growth rings of trees to assess the effects of ecological disturbances on forested wetlands. One ongoing study has identified and is seeking to cultivate salt-tolerant strains of baldcypress for use in wetland forest restoration.

Researchers in the Spatial Analysis Branch help fulfill the information needs of natural resource managers by developing and maintaining databases of landcover satellite images for the Southeast, contaminants for gulf coast estuaries, breeding birds for Louisiana, hydrology and vegetation for the lower Mississippi River valley, and the status and trends (1956-93) of wetlands, uplands, and seagrasses along the Gulf of Mexico. Spatial Analysis Branch personnel develop geographic information systems to analyze trends, produce natural resource inventories, and create simulation models. They also conduct remote sensing studies to develop all-weather, day-and-night

monitoring tools and map habitats to spatially represent ecological, biological, and other data. Recent remote sensing studies have shown that satellite radar can detect coastal flooding and can be used to monitor the recovery of marshes from burning. In addition to their research, representatives from the Spatial Analysis Branch co-chair the \$20 million monitoring program of the Coastal Wetlands Planning, Protection, and Restoration Act with the Louisiana Department of Natural Resources to monitor over 80 wetland restoration projects.

The Wetland Ecology Branch conducts research related to sustainable management and restoration of the nation's coastal saltwater wetlands, coastal and inland freshwater wetlands, submerged aquatic ecosystems, and coastal prairies of Texas (fig. 1) and Louisiana (of which only one percent remains of the 200 million acres present during Colonial times). Wetland ecologists study factors threatening coastal ecosystems and investigate how to stabilize, restore, and manage the coastal landscape. To better understand influences leading to wetland loss, researchers investigate global climate change, accretion and subsidence, herbivory, saltwater intrusion, shading, and disturbances by storm or fire. Studies performed by the Wetland Ecology Branch have demonstrated that estimates for the potential of coastal wetland submergence based on accretion data may underestimate that potential by neglecting the effects of subsidence.

The center's Technical Support Office provides numerous skills that support both the center's and BRD's scientific missions, including technical writing and editing, information management, computer operations, graphics, and education and outreach. Also, the Center's research library, which catalogs and holds many state and federal reports considered as gray literature, is managed by this office. The library is currently engaged in research with the University of Southwestern Louisiana to improve electronic access to environmental information. Technical Support Office staff frequently travel to various events in Louisiana and elsewhere to educate the public about the benefits of wetlands. The NWRC publications staff has edited and produced about 500 technical and series reports and has been instrumental in producing the NBS publication *Our Living Resources* report and the USGS report *Status and Trends of the Nation's Biological Re-*

sources, in addition to the publications *Restless Ribbons of Sand: Atlantic & Gulf Coastal Barriers*, *The Fragile Fringe: Coastal Wetlands of the Continental United States*, and *Willful Winds: Hurricane Andrew and Louisiana's Coast*. The center has won several national and international awards for its publications.

Other services the NWRC offers are conference facilities, tours of the Center, educational programs for local schools and other organizations, a seminar series, and a training workshop series sponsored by the Spatial Analysis Branch, Mid-Continent Mapping Center, and University of Southwestern Louisiana. Schedules for the seminar series and workshop series are available on the NWRC website at <http://www.nwrc.usgs.gov/> under What's New.

Obtaining assistance

The NWRC offers technical assistance in most of its areas of expertise and often relies on cooperative projects to carry out its mission. To initiate a research project with NWRC scientists, contact the appropriate branch chief at the phone number or e-mail address listed in the table (page 15) of research specialties and recent projects. Funding for cooperative research may depend upon current research budgets and planned projects, and parks requesting cooperative projects may be required to provide some funding. Long-term projects may require an interagency agreement or memorandum of understanding. Projects with broad applicability (that is, applicable beyond the boundaries of the requesting park) stand a better chance of being funded or may be funded at a higher level. Regardless of funding considerations, however, the staff of NWRC want to hear from you if you have a wetland problem you would like to discuss. For more information on who to contact or on the areas of expertise at NWRC, consult the Table or visit the center's website. **P_S**

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Table 1**National Wetlands Research Center branches, research areas or services, and ongoing or recent NPS-related projects**

Branch	Research Areas or Services	Ongoing/Recent NPS-Related Proj.
Animal Ecology Branch Carroll L. Cordes, Branch Chief 318-266-8654 carroll_cordes@usgs.gov	Ecosystem analysis, environmental electronics engineering, population ecology, and statistical and laboratory support.	Modeling big game populations at Yellowstone National Park (Bruce Pugesek); vegetation survey of Big Bend National Park and the Sierra del Carmen Protected Area in Mexico (Carroll Cordes).
Forest Ecology Branch Virginia R. Burkett, Branch Chief 318-266-8636 virginia_burkett@usgs.gov	Computer modeling, conservation genetics, dendroecology, functions and processes of forests, and reforestation and forest restoration.	Development of a natural resources database, GIS, & predictive computer model to evaluate ecosystem management for surface water and nutrient control at Jean Lafitte National Historical Park and Preserve (Tom Doyle); assessment of neotropical bird use on a landscape scale at Big Bend National Park (Wylie Barrow); effects of climate change on forests at Big Thicket National Preserve (cooperative project with Paul Harcombe of Rice University); mangrove community dynamics at Everglades National Park (Tom Doyle).
Spatial Analysis Branch James B. Johnston, Branch Chief 318-266-8556 jimmy_johnston@usgs.gov	Geographic information systems, National Spatial Data Infrastructure, photogrammetry and cartography, remote sensing, GIS-based ecosystem assessment and modeling, and spatial analysis training.	Habitat mapping at Jean Lafitte National Historical Park and Preserve (John Barras); seagrass mapping at Gulf Islands National Seashore (Larry Handley).
Technical Support Office Gaye S. Farris, Office Chief 318-266-8540 gaye_farris@usgs.gov	Information management, outreach, library, technical editing, visual information, and computer support and applications.	Library services (Judy Buys); editing and layout of scientific and technical reports in the report series (Beth Vairin); graphics, exhibits, and multimedia (Sue Lauritzen); informational materials for wetland education workshops at Jean Lafitte National Historical Park and Preserve (Susan Horton); computer support and applications (Jim Capezza).
Wetland Ecology Branch Carroll L. Cordes, Branch Chief (Acting) 318-266-8654 carroll_cordes@usgs.gov	Accretion, subsidence, and sea-level rise, coastal prairie management and restoration, global climate change, marsh management and restoration, nutrient dynamics and biogeochemical cycling, plant community dynamics, and submerged aquatic vegetation.	Baseline assessments of ecological processes, water quality, and suspended sediment in aquatic communities at Congaree Swamp National Monument and Big Thicket National Preserve (Lee Foote and Bill Rizzo); assessment of baseline sedimentation rates at Big Thicket National Preserve and Congaree Swamp National Monument (Don Cahoon).