

# Southeast Ecological Science Center



## Who We Are What We Do



# Who We Are

The U.S. Geological Survey (USGS) Southeast Ecological Science Center (SESC) is a research center that studies the biology and ecology of aquatic environments in the United States and around the world. This brochure offers a glimpse of the diverse issues addressed by SESC researchers.

Founded in 2009, SESC was created to bring together scientific experts in biology and ecology throughout the Southeastern U.S. and Caribbean. The Center's roots lie in U.S. Fish and Wildlife Service and National Park Service research units that were brought into the USGS as the Biological Research Division in 1994. For almost a decade, research was carried out through the USGS Florida Integrated Science Center, which cultivated an integrated approach to earth and environmental science that focused on problems facing society. The Center still supports the Department of the Interior commitment to serve communities by providing scientific information to the public.

SESC scientists apply their expertise to a variety of wetland and aquatic research and monitoring issues that require coordinated, integrated efforts to better understand natural environments. By increasing basic understanding of the biology of important species and broader ecological processes, this research provides information to policy-makers and aids managers in their stewardship of natural resources and regulatory functions.



# Greater **Everglades** Ecosystem Restoration

Everglades restoration begins with understanding the ecological importance of water, with an end goal of restoring and protecting a resilient ecosystem. USGS scientists are involved with determining the biological indicators of ecosystem conditions at every step of the process, from investigating the biology of important species to studying how the ecosystems in and around the Everglades are shaped by processes such as seasonal water cycle, drought, flooding, fire, hurricanes, freezes, and impacts from exotic plants and animals.

Scientists from SESC investigate the relationship between water and the habitat of key species in the region through field studies and ecological models that test the habitat needs of alligators, crocodiles, amphibians, fishes, manatees, birds, crabs, apple snails, sea turtles, terrapins, and pink shrimp. USGS projects look at the dynamics driving systems such as marshes, mangroves, estuaries, pine rocklands, and coral reefs.

For more information on USGS work in the Everglades, visit: <http://sofia.usgs.gov/>.

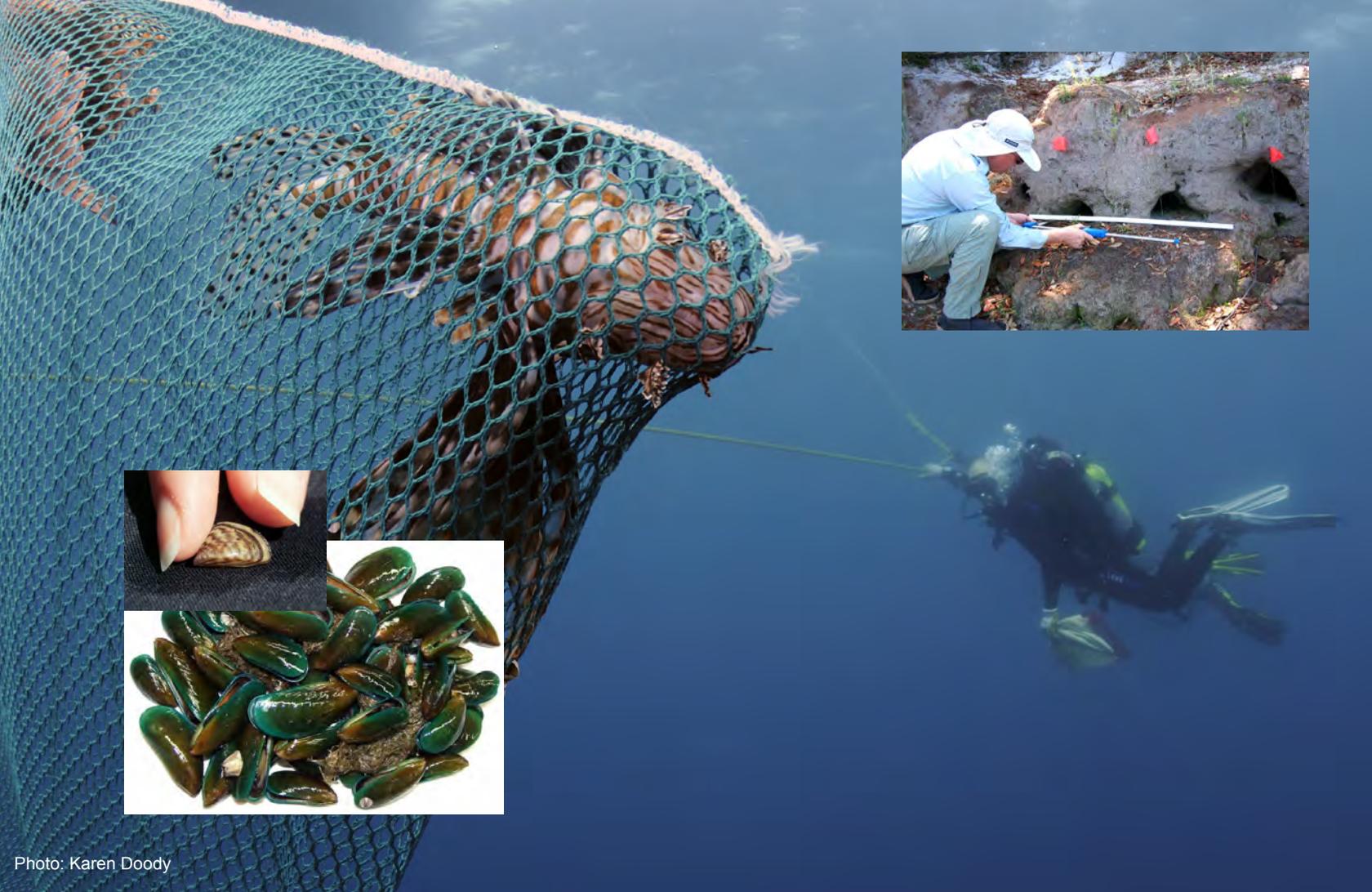


Photo: Karen Doody

# Non-indigenous Aquatic Species and Invasives

Non-indigenous or invasive species rank second only to habitat loss as a factor that threatens native biodiversity. The geographic distribution and basic biology of these exotic species is often poorly understood, and each new exotic species can create unintended consequences and complicated challenges for natural-resource managers.

The USGS researches the basic biology and environmental tolerances of these species to provide resource managers with the ecological facts they need to help mitigate and control unwanted effects of these species.

The Center also maintains the national Non-indigenous Aquatic Species (NAS) database, which includes information in the form of fact sheets, distribution maps, and an alert system for over 1,000 aquatic species distributed throughout the entire United States.

To subscribe to the NAS Alert System, visit: <http://nas.er.usgs.gov>.



# Imperiled **Native** Freshwater Species

Nearly 40 percent of fish species in North American streams, rivers and lakes are now in jeopardy of extinction, with over 700 native fishes listed as “imperiled” by the American Fisheries Society (AFS) Endangered Species Committee.

The USGS researches the biology of imperiled native freshwater organisms of North America such as fishes, crayfish, snails, and mussels to provide information for the protection and recovery of these species.

The SESC maintains an interactive Web site containing information about AFS-listed imperiled freshwater species. At this Web site, one can view listings of animals by freshwater ecoregion, state, or province and plot distributions of these same imperiled species by eco-region or political boundaries.

For more information, visit the interactive website at: <http://fl.biology.usgs.gov/afs/>.



# Amphibian Research and Monitoring Initiative

The rapid population decline of amphibians such as frogs, toads, salamanders, and newts led the Department of Interior to establish the Amphibian Research and Monitoring Initiative (ARMI) in 2000. The Southeastern U.S. is home to more than 140 species of amphibians, which represent over half the known amphibian species in the U.S.

By tracking the health and stability of amphibian populations, ARMI provides valuable information on environmental relationships and population dynamics. Studies look at how habitat change, disease, contaminants in water, and climate change affect amphibian abundance and diversity.

Amphibians are an important indicator of ecosystem conditions, and scientific observations and analyses can be used to develop informed management and protection strategies for amphibian health and habitat conditions.



# The **Sirenia** Project

The Center's Sirenia Project conducts long-term monitoring and detailed studies on the life history, population dynamics, and ecological requirements of the West Indian manatee (*Trichechus manatus*). USGS biologists work cooperatively with other Federal and state researchers and managers on research identified as essential for the recovery of the species.

The Manatee Individual Photo-Identification System, or MIPS, is a valuable compilation of records of individual manatee life histories that provides a basis for assessing risks to the manatee population and estimating life-history parameters such as survival and recruitment. Research in conservation genetics looks at the genetic diversity of manatee populations in Florida and throughout the Caribbean, providing guidance for future management. Health assessments of native manatees living in the wild provide valuable baseline information on their fitness in different geographic regions, as well as archive samples for future analyses, such as genetics. Ecological studies of manatees help managers evaluate habitat use and the impacts of hurricanes, low temperatures, red tide, and other environmental factors on the health and survival of the West Indian manatee.



# Corals, Coastlines, and Estuaries

In addition to their dazzling beauty and diversity, coastal, benthic, and estuarine environments provide the nursery grounds for rare commercially and recreationally valuable fish and other marine life. Scientists at USGS investigate sea turtle nesting beaches, coral reefs, mangroves, salt marshes, and estuaries throughout the Southeastern U.S. and Caribbean. This work provides science that Department of the Interior resource managers can use to protect and preserve these sensitive habitats and ecosystems.

Research looks at the ecological structure and function of these ecosystems, the role of marine reserves, land-based effects to reefs and estuaries, and ecosystem responses to global change. Scientists from SESC are involved with the interagency DISCOVRE program, which looks at cold coral reefs found in the depths of the Gulf of Mexico and Atlantic Ocean. Another recent scientific discovery was the surprising diversity and abundance of species found in coral communities in the sheltered harbors of the Virgin Islands. SESC scientists are studying these coral communities to understand what makes them resilient to stressors.



Photo: Anne Morkill



# Contaminants Biology

Environmental contaminants originate from a variety of human activities including industry, energy production, agriculture, transportation, recreation, wastewater treatment, and urban horticulture. The Contaminant Biology Program at USGS looks at the effects of these potentially damaging contaminants on aquatic and wetland plants and animals throughout the food chain, especially as they may impact imperiled native species and habitats.

Researchers at SESC conduct risk assessments of contaminants such as heavy metals, methyl mercury, and copper as well as polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and organochlorine pesticides (including DDT and DDE). Furthermore, emerging contaminants such as fragrances/musks, flame retardants, triclosan, personal-care products, and pharmaceuticals can affect aquatic environments and fish health. By looking at the effects of contaminants (including sublethal effects), SESC scientists provide information on how contaminants interact with species living in and dependent upon aquatic habitats. This data is valuable for fish-consumption advisories and provides information needed for managing water resources and species.



# Sea Level Rise and Climate Change

Innovative modeling efforts at USGS provide new techniques for assessing the past and future effects of sea level rise, and the likely effects of climate change on Florida's habitats.

Researchers at SESC, in collaboration with our affiliated USGS Centers and University scientists, are combining three-dimensional hydrologic models with historical data on tidal sea level and climate to fine-tune the predictive capabilities of decision-support tools. These tools evaluate how climate change affects biological, hydrological, and geological drivers of ecosystem dynamics. For example, models are being designed to factor in important disturbance events, such as the role that hurricanes play as drivers of coastal change by triggering a tipping point in coastal vegetation patterns.

Ecologists are also working with climate downscaling teams to look at the effects of regional climate change on habitats within Florida at a scale that is useful to resource managers.



## Southeast Ecological Science Center

7920 NW 71st Street  
Gainesville, FL 32653  
Tel: 352-378-8181  
Fax: 352-378-4956

**U.S. Department of the Interior**  
KEN SALAZAR, Secretary

**U.S. Geological Survey**  
Marcia K. McNutt, Director

Visit us on the Internet at:  
***<http://sesc.usgs.gov>***

Suggested citation:  
Pawlitz, R.J., 2011, Southeast Ecological  
Science Center: Who we are, what we do:  
U.S. Geological Survey General Information  
Product 120, 20 p.

ISBN 978-1-4113-3049-8



Printed on recycled paper