

Southeast Ecological Science Center

Mission

The Southeast Ecological Science Center provides the science necessary to manage the living aquatic natural resources of the Nation and address the challenges to those resources in the future.



Introduction

Aquatic ecosystems, from deep sea reefs and coastal marshes to freshwater springs and wetlands, are home to diverse assemblages of life. These commercially and ecologically important systems are part of our national heritage, and are often treasured places or refuges that protect rare or threatened species. In the water-rich Southeastern United States, managers face the challenge of understanding how water and land use affect the region's aquatic life. The Southeast Ecological Science Center (SESC) helps address that challenge by providing objective science that can be used to evaluate proposed actions and develop management strategies.



History

Formed in 2009, the SESC consists of experts in biology and ecology from around the Southeastern United States and Caribbean. The Center's roots go back to several U.S. Fish and Wildlife Service and National Park Service research units that were brought into the USGS as the Biological Resources Division. For almost a decade, these units were part of the USGS Florida Integrated Science Center, which promoted an interdisciplinary approach to science that focused on problems facing society. Today, SESC scientists continue to pursue a range of disciplinary and interdisciplinary research projects addressing mission areas established in the USGS Science Strategy.

Activities

As part of the U.S. Geological Survey (USGS), the SESC serves resource managers, partners, and the general public by doing research on scientific issues they face. Many priority issues come directly from the U.S. Congress, the U.S. Department of the Interior, or other government agencies. Emerging issues, critical gaps of information, and future research directions can also be identified by strategic planning efforts within the USGS or through dialogues with its partners. Once a need for information is identified, SESC scientists tackle the issue with research projects based in biology, ecology, statistics, geography, and other fields of environmental science.

USGS Science Strategy At A Glance

- Understanding Ecosystems and Predicting Ecosystem Change
- Climate Variability and Change
- Energy and Minerals for America's Future
- A National Hazards, Risk, and Resilience Assessment Program
- The Role of Environment and Wildlife in Human Health
- A Water Census of the United States

Research Capabilities

The diverse research at the SESC reflects the many ways in which science informs modern policy, planning, and management. Environmental-impact assessments, risk analysis, threat assessments, and monitoring studies are common. Telemetry explores how threatened species, such as sea turtles, manatees, and sturgeon, use habitats. Genetic analysis is used to investigate breeding patterns, experiments test species' environmental tolerances and responses to toxins, and diets are studied by using isotope or DNA analysis. Researchers also document sightings of damaging invasive species such as Asian carp, Burmese pythons, lionfish, and mussels and study their effects on native species.

In addition to the ongoing need for scientific information on imperiled and invasive species, managers also need integrated science for the growing number of ecosystem-based management and restoration projects around the Nation. The SESC has worked with other USGS Centers to develop



Manatee health assessment

interdisciplinary models that investigate how physical attributes such as changing hydroperiods, flow regimes, shorelines, and substrates affect wildlife and aquatic species. Past projects have looked at rivers, springs, freshwater and saltwater marshes, estuaries, and coral reefs. SESC researchers also explore drivers of ecosystem change, such as fire and land-use/land-cover change. In the Everglades, ecosystem models have tested natural dynamics and

USGS Research Programs at SESC

- Status and Trends of Biological Resources
- Terrestrial Freshwater and Marine Ecosystems
- Wildlife: Terrestrial and Endangered Resources
- Fisheries: Aquatic and Endangered Resources
- Invasive Species
- Contaminant Biology
- Biological Informatics

drivers of changing habitat suitability to help assess management alternatives and identify ecosystem sensitivity to a range of stressors.

Theoretical ecology—the development of statistical and numerical models—is also important at the SESC. These tools open new avenues of research, by making it possible to test new types of hypotheses. For example, a statistical model designed to test interactions between invasive and



Larval mole salamander

native species can now be used to test other interactions between two species with overlapping ranges.

New modeling and statistical techniques are also important for climate science, an emerging area of research that helps managers and planners understand how

climate change and sea-level rise are likely to affect wildlife, habitats, and humans. SESC scientists have developed models of climate change and sea-level rise that forecast future effects on habitats in Florida. Projects are designed to provide information that is useful for adaptation and mitigation strategies.

SESC experts in structured decision-making and adaptive management can facilitate the process of identifying shared management goals and critical uncertainties that tie in with those goals. Such frameworks provide managers and stakeholders with clarity on how trends in monitoring data and emerging science can be used to assess progress toward goals.

One Center, Many Locations

The SESC administrative office is in Gainesville, Florida, and research facilities and field stations are located throughout Florida and the Caribbean. This gives scientists easier access to the species and ecosystems they study. Often, SESC scientists work alongside partners, sharing resources and facilities.

For More Information

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