National Aeronautics and Space Administration

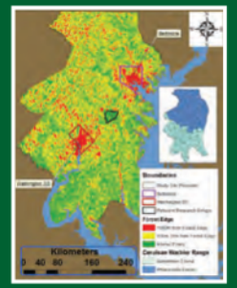
DEVELOP National Program

ECOLOGICAL FORECASTING

South San Francisco Bay Ecological Forecasting

Hyperspectral Mapping of the Invasive Species Pepperweed and the Development of a Habitat Suitability Model

Invasive perennial pepperweed (*Lepidium latifolium*) has spread rapidly throughout the western United States in the past 15 years. The purpose of this study is to map the contemporary distribution of pepperweed throughout the restored South San Francisco Bay Salt Ponds and create a habitat suitability model to predict future spread. Pepperweed reflectance data were collected in situ with the GER 1500 spectroradiometer along with presence and absence pepperweed data points. A Spectral Angle Mapper (SAM) classification algorithm was used to distinguish pepperweed spectra and map its distribution on an EO-1 Hyperion image of the study area.



Baltimore-Washington Ecological Forecasting

Mapping Forest Fragmentation in the Baltimore-Washington Corridor Using NASA Remote Sensing Technologies and Examining Its Effects on Wildlife Biodiversity

This project examines the impact of forest fragmentation on biodiversity by developing a methodology to quantify forest area loss and correlate species population change. Utilizing NASA remote sensing data to map forest cover change, as well as in situ species population estimates, this project illustrates to end users how to correlate bird species loss with loss of forest area.

Maryland Ecological Forecasting

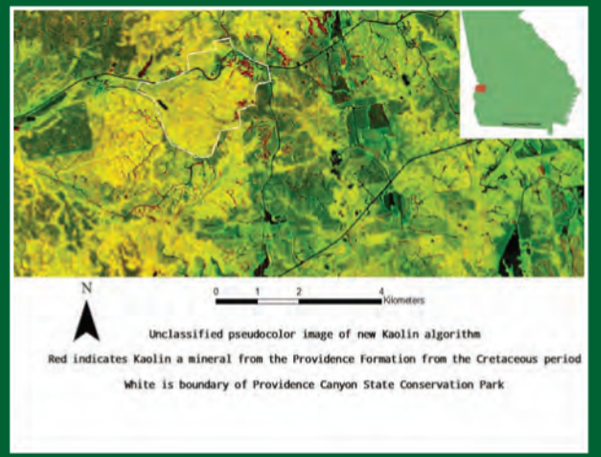
Application of NASA Observational Data and Habitat Suitability Modeling for Wavyleaf Basketgrass (*Oplismenus hirtellus*) for Early Detection by the Maryland Department of Natural Resources Wildlife and Heritage Service

This project used NASA's Invasive Species Forecasting System (ISFS) to create a predictive habitat suitability map for wavyleaf basketgrass (WLBG). This map showed habitats potentially vulnerable to invasion by WLBG, knowledge that could help natural resource managers hone their survey efforts for early detection of new invasions. This project partnered with the Maryland Department of Natural Resources and Wildlife and Heritage Service in their management of wavyleaf basketgrass.

Great Lakes Ecological Forecasting and Water

Decision Support for Asian Carp Population Assessment and Management in the Great Lakes

The Great Lakes and St. Lawrence Cities Initiative DEVELOP team has applied remote sensing technology to enhance decision support relating to the invasive Asian Carp species threatening the Great Lakes, using NASA remote sensing technologies and sensors such as MODIS and the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) Data Analysis System (SeaDAS).



Georgia Ecological Forecasting

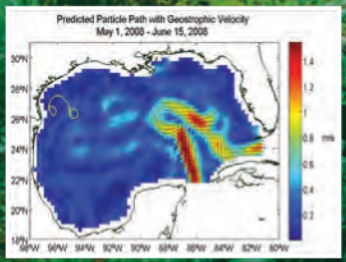
Using NASA's Earth Observation Systems To Map and Monitor the Habitat of the Threatened Plumleaf Azalea at Providence Canyon State Conservation Park, GA

The Plumleaf Azalea (*Rhododendron prunifolium*) is an extremely rare ornamental flowering shrub that is only known to exist along the Middle Chattahoochee Watershed located on the Georgia-Alabama state line. Providence Canyon State Conservation Park provides a unique ecological environment where the largest population of *R. prunifolium* in the world thrives. This project partnered with the Providence Canyon State Conservation Park and Thomas University to explore how NASA Earth Observing Systems (EOS) can be used to study the environmental factors that make *R. prunifolium* thrive in these canyons. These findings will facilitate restoration efforts by identifying other areas of exposed Providence Sand formations. Providence Canyon State Conservation Park will be aided by this research in fulfilling part of its resource management plan.

Padre Island Ecological Forecasting

Utilizing NASA EOS, European Remote-Sensing Satellites 1 and 2 (ERS-1&2), and Environmental Satellite (ENVISAT) to Create a Methodology for Monitoring Marine Debris Dispersal to Coastal Areas by Examining the Gulf of Mexico Loop Current and Associated Circulation Patterns

In the Gulf of Mexico, the Loop Current and associated eddies potentially trap and transport debris onto shores, such as the shore of Padre Island National Seashore in Texas. This project uses sea surface height and height anomaly data generated from TOPEX/Poseidon, Jason 1, and Jason 2, as well as European altimeter satellites ERS 1, ERS 2, and ENVISAT radar altimeters. MODIS sea surface temperature data were used to monitor the position of the Loop Current. This research will provide the National Oceanic and Atmospheric Administration's Marine Debris Program and the Padre Island National Seashore with a methodology to monitor Gulf circulation and predict particle paths.



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