FORT COLLINS SCIENCE CENTER
National Institute of Invasive Species (NIISS)

What is the NIISS?

The National Institute of Invasive Species Science (www. NIISS.org) is a consortium of governmental and nongovernmental partners, led by the U.S. Geological Survey (USGS), whose aim is to provide reliable information and advanced decision support tools for documenting, understanding, predicting, assessing, and addressing the threat of invasive species in the United States. The Institute coordinates the National Aeronautical and Space Administration's (NASA's) Invasive Species National Application activities for the Department of the Interior and has a lead role in developing, testing, and deploying NASA-derived remote sensing and landscape-scale predictive modeling capabilities for the invasive species community.

Our vision is to provide national leadership in the area of invasive species science and work with others to disseminate and synthesize current, accurate data and research to detect, predict, and reduce the effects of harmful nonnative plants, animals, and diseases in ecosystems and natural areas throughout the United States. Our mission is to develop cooperative approaches for invasive species science to meet the urgent needs of land managers and the public.

From the field . . .

Field data on aquatic and terrestrial species and diseases can be collected in any form and uploaded in three formats: Palm programs (EcoNab and WIMS), GIS Shapefile, and tab-delimited text file. Users map their fields to NIISS database fields.

. . . to the Web-based global database . . .

The Global Organism Detection and Monitoring System captures information (location data, species characteristics, and environmental attributes) on all taxa of invasive species—terrestrial and aquatic plants, animals, and diseases—to detect, control, and monitor their

spread. These datasets are integrated into the database and displayed as "living maps" of harmful invaders on the Web to serve land managers, landowners, researchers, government officials, and the public.

Users (agency resource managers, citizen scientists, counties, States, tribes) log in for security, getting variable levels of access based on their needs. Data are managed in projects that are created and managed by users.
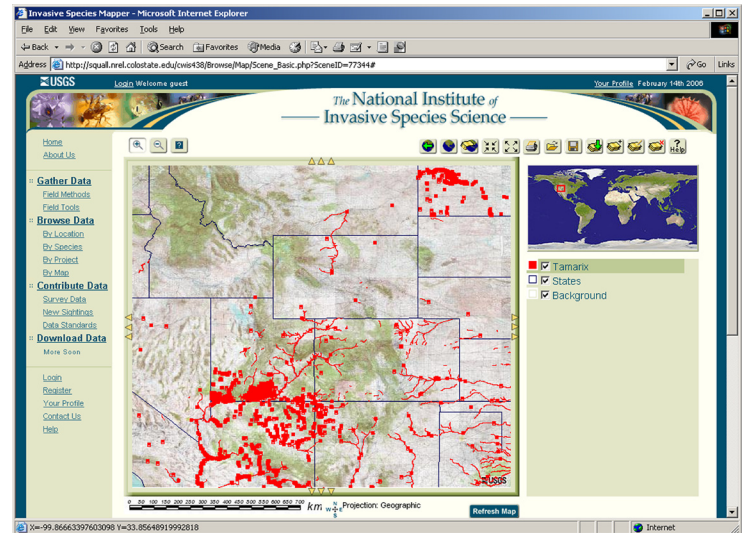
Location "fuzzing" (from quarter quadrangle to 1°) is set by users to protect sensitive species and locations. Core information collected includes date, location, and organism as required fields. Connections to existing regional databases are being developed to integrate and share their data for management efforts. The Web site makes everyone's data more useful and accessible. There are interactive maps of invasive species distributions, and users can add new locations by clicking on the map. Users can query or download the database by species, project, or location. Real-time statistics are being developed for datasets and links to other research. Also available are species profiles, watch lists, and species lists for any selected area.

…to the Invasive Species Forecasting System…

Planned to be available in 2007, the Invasive Species Forecasting System (ISFS) is a Web-based decision support environment that combines field data with satellite and other environmental data to generate landscape- and regional-scale predictive maps of invasive species distributions and potential habitat. Predictive maps are essential to almost all invasive species research and management decisionmaking. The system is the result of a 6-year collaboration

High-speed networking interconnects NASA/USGS cluster computer, modeling, and mass storage resources...

with NASA aimed at enhancing USGS invasive species decision support by the application of NASA engineering, high-performance computing, and remote sensing expertise.

…to help fight invasive species.

By integrating forecasting capabilities, the Web site provides a decision support system for adaptive management, allowing managers to prioritize species and areas through iterative analysis as new data are uploaded. This system will allow communities to engage in cooperation with government and nongovernment organizations. The following projects underway at the Fort Collins Science Center and NIISS exemplify this cooperation.

Locally . . .

Control sites

Early detection site

0 0.5 1   2   3 km

Tamarisk Biomass Map (kg/m^2)

Regionally . . .

Preliminary Model of Potential Spread in 10 Years

Control/Restoration Monitoring Sites

Early Detection Rapid Response Sites

Containment Boundary

Priority Survey Sites

Legend
Expected spread within next 10 Years — Absense locations
Present distribution

Colorado

Nationally ...

Probability of Tamarisk Invasion

Legend
State Boundaries
Invasion Probability
High: 0.605073
Low: 0.000000

0 200 400   600   1,200 1,600 miles

National Wildlife Refuge Invasive Species Inventory

The U.S. Fish and Wildlife Service (USFWS) manages over 500 national wildlife refuges, encompassing nearly 93 million acres and representing every major ecosystem type in the United States. All are experiencing nonnative plant invasions that threaten the refuges' ability to fulfill their conservation mission. A cooperative study between the USGS and the USFWS entails developing and implementing a system for training and using citizen scientists in early detection and rapid response efforts.

Improving the Invasive Species Information Node of the National Biological Information Infrastructure (NBII)
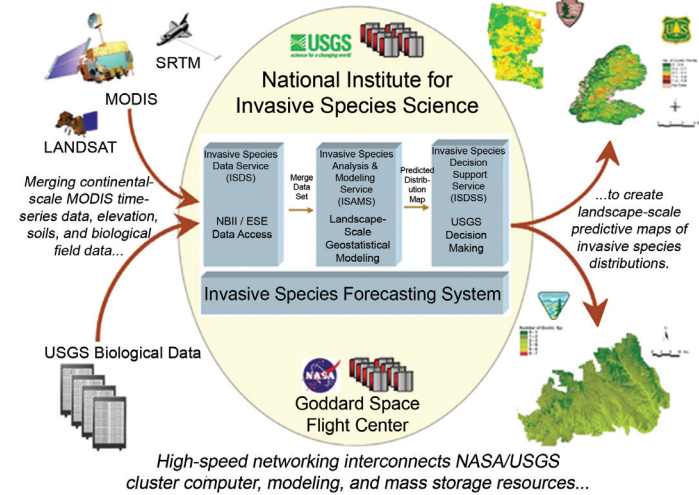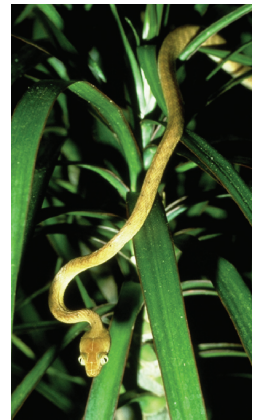
Working with NASA, the NBII, Colorado State University, and many other partners, the Global Organism Detection and Monitoring System and Invasive Species Forecasting System promote better use, sharing, and synthesis of independent regional and taxon-specific databases scattered throughout the country. Already, the www.NIISS.org site can link to species identification tools and automated Web searches for species photographs, images, and bibliographic references. In 2008, more sophisticated models and "probability maps" will be available to improve early detection surveys and Web-based "alert systems" to guide rapid response and restoration efforts.

Brown Treesnake

The brown treesnake is the poster child of our Early Detection and Rapid Response framework. The brown treesnake is responsible for the extirpation of nearly all native bird species and most bats and lizards on Guam. It also exacts between $1 and 4 million per year in damages, including frequent power outages. Keeping this voracious snake from other noninfested islands, such as Hawaii and the Northern Marianas, is a top priority for the Department of the Interior's Office of Insular Affairs.
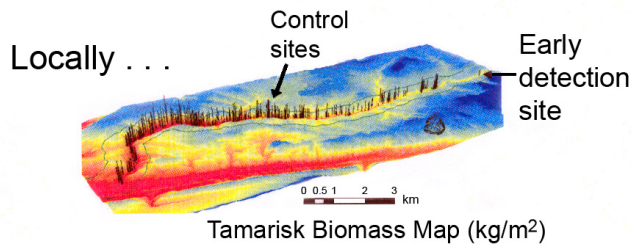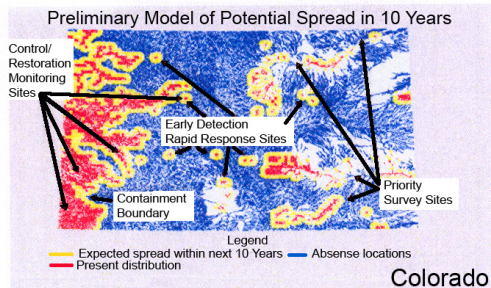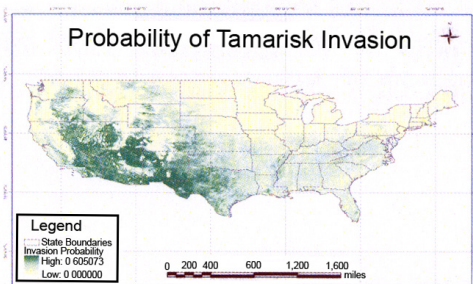
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FORT Online provides information about FORT projects, scientists, publications and other products, science features, and much more.

Visit the FORT website at http://www.fort.usgs.gov
Learn more about the NIISS and the
Invasive Species Science Branch at
http://www.fort.usgs.gov/research/100/100.asp

or www.NIISS.org