Connecting Scientific Data with Commercial GIS Tools

CLIENT:

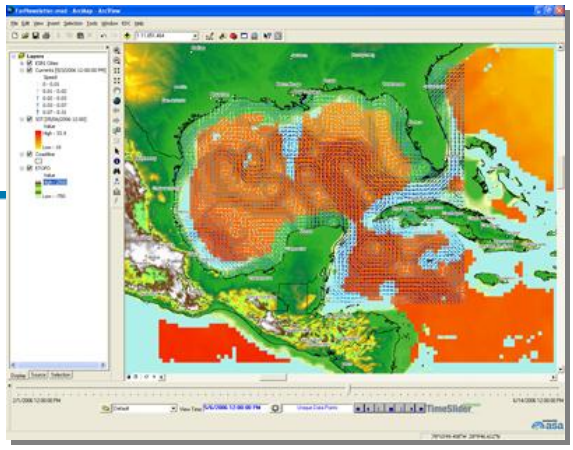
NOAA's Satellite Research and Operation (R&O) project

PROJECT #:

2007-134

PROJECT ELEMENTS:

- Custom ArcGIS extension
- Data management and communications (DMAC)
- Custom Java-based interface for data download and filtering
- Data conversion



PROBLEM. PURPOSE.

As NOAA moves towards ecosystem-based approaches to marine resource management, a large challenge has been integrating satellite-derived data typically stored in scientific formats such as Grib, HDF, and NetCDF with commercial GIS tools. The continuity, global coverage, and high temporal and spatial resolution of satellite data make it an important source for monitoring and characterizing marine ecosystems, but data have been largely inaccessible for scientists working with GIS tools. ASA was commissioned to build a software utility to allow users to connect directly to servers that manage these data and bring it into ArcGIS.

SCIENCE. SERVICES. SOLUTIONS.

ASA developed the Environmental Data Connector (EDC) extension for ArcGIS 9.2 that uses a Java-based browser to allow users to connect to THREDDS (Thematic Real-time Environmental Distributed Data Services) catalogs. The connector leverages existing components from the Unidata libraries so that users can filter large amounts of data in space and time. The data is then converted to raster or feature classes in ArcGIS and is available for standard GIS analysis and display. The raster and feature data are connected to ASA's TimeSlider™ extension so that the data may be animated and analyzed over time. Special customizations were made to the TimeSlider for this project to manage data with non-uniform time steps; the scientific data is highly variable in time with some data, such as in-situ current and wind measurements, being measured every few minutes to climate data that may be measured in terms of decades.

PRODUCTS. RESULTS.

A new extension for ArcGIS that allows users to browse THREDDS catalogs and connect directly to OPeNDAP servers to access large amounts of scientific data and ingest the data into ArcGIS desktop 9.2. Previously this data ingestion and format conversion was a manual process. ASA's EDC extension saves NOAA scientists hundreds of hours and makes more data available as part of the U.S. Integrated Ocean Observing System (IOOS) and other national and global science initiatives.

Future developments for consideration include support for the ERDDAP web service, a RESTful service that can access seven different protocols, and the OGC (Open Geospatial Consortium) standards.