



# A Tool to Estimate the Impacts of Development on Water: ISAT

## Using the NEMO Network: Project Profile #2



### The Project

In 2000, UConn's Geospatial Technology Program and the National NEMO Network developed a prototype geographic information system (GIS) tool that could be used by local planners, managers and decision makers in land use and watershed planning. However, turning this prototype into a robust tool suitable for widespread use was a task outside the capabilities of UConn staff. Enter the NOAA Coastal Services Center, who partnered with UConn to create the **Impervious Surface Analysis Tool (ISAT)**, which estimates levels of landscape imperviousness. Impervious cover has been shown by national studies to be a reliable and useful landscape indicator of the impact of development on water resources.

ISAT is an "extension" that can be used as part of the popular GIS software ArcView (a product of ESRI). Using impervious surface coefficients with land cover and factoring in population density data, ISAT can estimate the percentage of impervious cover for any geographic area selected by

the user (watersheds, towns, etc.). ISAT can also be used to estimate future levels of imperviousness under various development scenarios.

After the ISAT was tested in-house by NOAA and UConn, the two partners held a NEMO Network workshop in October 2002. The workshop had three objectives: (1) to train interested Network projects in the use of ISAT; (2) to solicit feedback from GIS-savvy NEMO Network staffers, and; (3) to encourage NEMO programs to develop local datasets to drive ISAT, since the tool is most accurate when region-specific impervious surface coefficients are used.



*Attendees learn how to use ISAT at the NOAA and UConn sponsored training workshop in 2002.*

### Results to Date

Seven NEMO Programs attended the 2002 training session. In addition, ISAT "user group" sessions were held at both NEMO University 3 (2003) and NEMO University 4 (2005) conferences. The use of ISAT is growing within the NEMO Network and several NEMO programs have put the ISAT tool to good use for communities. ISAT is also being used in the general community, since the tool is

ISAT downloadable at:

[www.csc.noaa.gov/crs/cwq/isat.html](http://www.csc.noaa.gov/crs/cwq/isat.html)



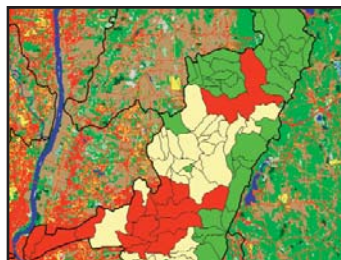
Contact the National NEMO Network Hub for more information:

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Web: nemonet.uconn.edu

downloadable free of charge from the NOAA CSC website. Here are some examples:

▶ The Office of Environmental Health Hazard Assessment at the California EPA, a **California NEMO** partner, is using ISAT as part of a watershed risk assessment of the Secret Ravine Watershed in Placer County. The office is analyzing impervious areas within each subwatershed as one physical stressor that affects the population of fall-run Chinook salmon in the creek. These efforts have launched an initiative to develop state-wide impervious surface coefficients.

▶ **Connecticut NEMO** used the ISAT tool to chart statewide changes in impervious cover levels over a 17-year period. The analysis was conducted at the local watershed level, and in particular identified watersheds that had experienced significant increases in imperviousness. The data is being used by the Connecticut Department of Environmental Protection (CT DEP) as part of an effort to prioritize coastal lands for open space acquisition. In addition, the USGS is using the ISAT as part



*ISAT analysis for the Hockanum River Watershed, Connecticut.*

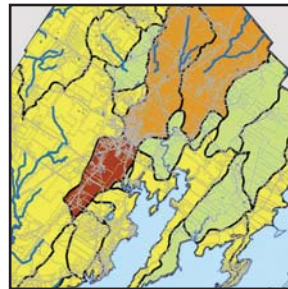
of several watershed studies, and the CT DEP Water Bureau is considering using impervious cover—as determined by ISAT—as the basis for some of their Total Maximum Daily Load (TMDL) regulatory allocations.

▶ **Northland NEMO** (Minnesota/Wisconsin) used ISAT in calculating impervious surfaces for the City of Duluth, which included this information in determining which tax forfeit lands to protect. ISAT is also currently being used to calculate impervious surfaces for Minnesota's entire Lake Superior Watershed.

▶ **South Carolina NEMO** developed impervious surface coefficients for a wide variety of land uses in the three-county region surrounding Charleston, South Carolina. The data helps fuel NEMO educational efforts in the area.

▶ The **Maine NEMO** Program used the ISAT tool to evaluate existing impervious surface coverage compared to projected conditions for the Town of Freeport. The results spurred the town

to revise their comprehensive plan and zoning to significantly limit the amount of impervious surfaces at full build out.



*An analysis on impervious surfaces in Freeport, Maine.*

## What this Project Demonstrates

The ISAT story, although still evolving, has many stories to tell. First, it's the story of a successful three-way collaboration: a Network of education projects with

a need for landscape information (NEMO); a small research shop with a good idea on how to provide that information (UConn Geospatial Technology Program), and; a federal Center with the knowledge and skills to make the good idea a workable reality (NOAA CSC). Second, as with other projects in this Profile series, the ISAT story shows the power of the NEMO Network as a disseminator of information and tools. Third, it demonstrates the potential of the NEMO Network as an "R&D" (research and development) engine, helping to test, improve and localize a particular technical tool or model.