Session I2: Applications and Analyses using National Aquatic Resource Surveys Data and Geospatial Information

Room A106
10:00 – 11:30 am

0307
I2-1

Using AttILA for Landscape-Based GIS Analyses in the Identification of Reference Lakes for EPA's 2012 National Lakes Assessment

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ATtILA (Analytical Tools Interface for Landscape Assessment) is an easy to use ArcView extension that calculates many commonly used landscape metrics. By providing an intuitive interface, the extension provides the ability to generate landscape metrics to a wide audience, regardless of their GIS knowledge level. We will focus on the use of ATtILA as one of several tools to identify candidate reference sites for EPA's 2012 National Lakes Assessment.

The National Lakes Assessment is designed to provide statistically valid regional and national estimates of the condition of US lakes. It uses a probability-based sampling design to represent the condition of all lakes in similar regions sharing similar ecological characteristics and includes the use of regionally relevant reference sites. As part of the process to identify reference sites, we are using ATtiLA to assess watershed condition based on several metrics, including percent of watershed in agricultural, human and natural use, presence/extent of riparian buffers, percent of impervious surfaces and urban/residential densities, among others. ATtILA accepts data from a broad range of sources and is equally suitable across all landscapes, from deserts to rain forests to urban areas, and may be used at local, regional, and national scales. For the 2012 NLA we will be using the 2006 National Land Cover Dataset for our ATtILA analyses. The presentation will also refer to examples of regional and state applications of ATtILA and the role of GIS-based landscape analyses in the reference site selection process.

0279
I2-2

The Development of a Reference Lake Screening Tool for Natural Lakes in the Prairie Pothole Region of the United States Using 2007 NLA Land Use and Water Chemistry Data

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Setting reference condition expectations is a major challenge for regional lake assessment or water quality criteria development. In the Prairie Pothole Region (PPR), it difficult to find a set of lakes that is considered "reference" given the fact that the landscape has been altered by agricultural practices and drainage. Also, there is the lack of available water quality data for lakes in this region. In this study we developed a multi-step screening approach to identify a set of potentially "least disturbed" reference lakes. The study was modeled after work conducted in the Northeastern US by Herlihy et al. (In review). Data from 92 randomly selected natural lakes located in the PPR of North Dakota, South Dakota, Minnesota and Iowa collected as part of the 2007 US National Lakes Assessment (NLA) were used in this study. In the initial screening step, land-use and hydrology data were used in a GIS analysis to assess the relative human disturbance in each lake's watershed and within a 200-m buffer area of each lake. Lakes that passed the initial screening were screened again by viewing aerial photos to look for evidence of agricultural and developed land use within a 100m buffer area around the lake. Of the initial 92 lakes, 15 passed the multi-step land use screen using criteria of < 15% row crop and developed land use in the watershed and < 5% row crop and developed land use in the 200 m buffer area. Thirteen lakes passed the aerial photo screen to serve as an initial set of potential candidate reference lakes. Water chemistry and physical habitat data from the NLA were then used in the final step to verify lakes as reference lakes and to identify high quality lakes. Given the natural variability of lakes in the PPR, the fact that reference condition may change through the years, and the lack of available water quality data for the majority of lakes in this region, such a screening tool can be advantageous because it can be done inexpensively and in a short period of time.

0125
I2-3

Applying NHDPlus to Support the NLA and NRSA

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The National Hydrography Dataset Plus (NHDPlus) is a set of geospatial layers formed from the integration of the National Hydrography Dataset (NHD), the National Elevation Dataset (NED) and the Watershed Boundary Dataset (WBD). If trying to describe NHDPlus in a single sentence, it would be 'NHDPlus provides the framework for the analysis of the interaction between the landscape and the stream network.' Over the past four years, NHDPlus has become an important part of the National Aquatic Resource Surveys (NARS) specifically the National Lake Assessment (NLA) and the National Rivers and Streams Assessment (NRSA). This presentation will discuss the NHDPlus support both past and future to the NLA and the NRSA, beginning with sample frame design through analysis of survey results.

0208
I2-4

Creating the Spatial Framework for National Aquatic Resource Surveys (NARS): Melding National Aquatic Data Sets with Survey Requirements

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The US EPA's National Aquatic Resource Surveys (NARS) require a consistent spatial representation of the resource target populations being monitored (*i.e.*, rivers and streams, lakes, coastal waters, and wetlands). A sample frame is the GIS representation of this target population, and is created for each resource type. Sample frames for rivers and streams and for lakes are derived directly from NHDPlus, while the sample frames for coastal waters and wetlands have a more complex derivation from several sources. The process of taking nationally available data sets, regardless of source, involves extracting the subset of features that represent the target population and adding additional attributes required for the resource-specific survey design. We improve the sample frames by incorporating corrections to the spatial representation of the resource of interest, using information from GIS and desktop evaluations of selected sample features as well as the results from field sampling visits. In addition, we improve sample frames through incorporation of state-provided sample frames, which often use different source material and contain refinements based on a state organization's knowledge of its aquatic resources. Improving the NARS sample frames reduces over coverage and corrects under coverage of target populations. We address these steps in the ongoing refinement to NARS sample frames and look at how improvements to sample frames: 1) improve NARS survey quality over time, 2) harmonize with state sample frames, and 3) help inform and improve national data sets used in construction of NARS sample frames.