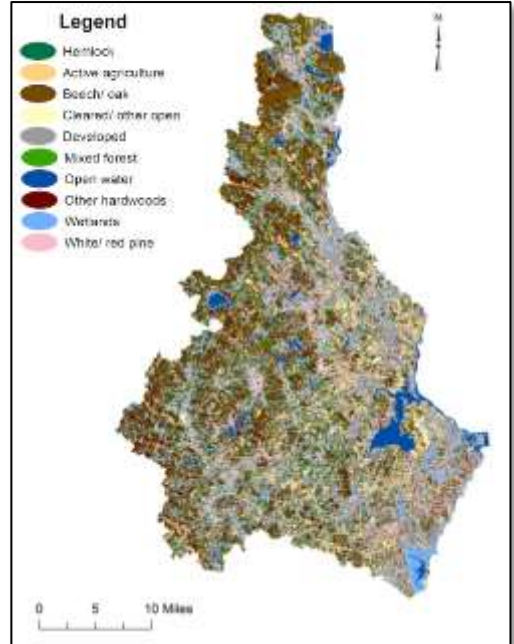# NEW HAMPSHIREVIEW
REMOTE SENSING ACTIVITIES
2014 - 2015

EVALUATING LANDSAT 8 FOR LAND COVER AND FOREST COVER MAPPING

An analysis was conducted using Landsat 8 imagery for mapping forest and other land cover in the New Hampshire Coastal Watershed. The work was performed by a graduate student in the Department of Natural Resources & the Environment at the University of New Hampshire (UNH) under the direction of the New HampshireView (NHView) Director. Forest and other land cover maps were generated from Landsat 8 (L8) and Landsat 5 (L5) imagery using pixel-based and object-based analysis approaches. The results of the object-based analysis on the L8 imagery are shown in the figure at the right. Quantitative accuracy assessment was conducted by generating error matrices for each map. The results of the accuracy assessment showed that the maps were accurate with overall accuracies ranging from 78 to 82 percent. A Kappa analysis was used to test for statistical significance between mapping approaches and using L5 vs. L8. The results showed that there was no significant difference between using the pixel-based approach compared to the object-based approach. Some studies using object-based analysis for moderate resolution imagery have shown improvements using this approach while others, such as this one, have not. Certainly, the object-based approach does not have the same benefit here as it does with high-resolution imagery. In addition, there was no significant difference between using L5 or L8 imagery. This result is not a reflection of the improvements in L8 imagery, but rather shows that there is sufficient information in L5 to produce accurate maps.

Legend
- Hemlock
- Active agriculture
- Beech/ oak
- Cleared/ other open
- Developed
- Mixed forest
- Open water
- Other hardwoods
- Wetlands
- White/ red pine

CREATION OF MINI-TRAINING PRESENTATIONS

Mini-training presentations were created by the NHView Director on various aspects of remote sensing as shown in the table below. These presentations were then given as webinars through the NH Cooperative Extension and the Vermont Center for Geographic Information (VGCI). The webinars were recorded and are available on YouTube as well as the VCGI and NHView websites. These webinars were extremely successful with a large number of views.

Mini-Training Title	Date Presented	Attended Live	Viewed Online
Remote Sensing Basics	10/16/14	51	17,125
Selecting the Best Imagery	11/6/14	38	2686
Accuracy Assessment of Remotely Sensed Data	12/4/14	48	1624
The Power of NIR for Mapping	2/19/15	48	428

Table showing the title, date presented, attendance for the live webinar, and number who have viewed the recorded webinar online through 12/15/15

BENEFITS TO NEWHAMPSHIREVIEW

There are many benefits from the work of NHView to the people of New Hampshire. They include:

- New Hampshire is more than 80 percent forested. Therefore, any developments in remote sensing technology that allow for better mapping of forest and other land cover in the state is of great benefit. Tourism is an important component of New Hampshire's economy and mapping/monitoring the state is vital to continued tourism.
- The creation of mini-training presentations on remote sensing provides many of the New Hampshire State Agencies and others with information to which they might not otherwise have access. Many GIS experts need more knowledge of remote sensing; these presentations are recorded and are readily available to anyone (in NH or not) to watch and learn.
- The GeoSpatial Services Center (GSC) on the UNH Campus raises awareness and provides consulting to everyone interested in learning more about geospatial technologies.

FORMALIZE A GEOSPATIAL SERVICES CENTER ON THE UNIVERSITY OF NEW HAMPSHIRE CAMPUS

As a result of a needs assessment conducted by the NHView Consortium, a GeoSpatial Services Center (GSC) was established on the UNH Campus in the Fall of 2013. After a successful pilot study year, the GSC was continued during the Fall of 2014 and Spring of 2015 semesters. The GSC is funded by support from the UNH Library, NHView, and other NHView partners. Two consultants (graduate student or advanced undergraduate interns) maintain regular hours in the GSC (see poster). Consulting is available to faculty, staff, and students as well as members of the surrounding community that come into the library. The GSC has two high-end PC-based computers that run a variety of geospatial analysis software packages including ArcGIS and ERDAS Imagine (image analysis software). In addition, a number of public-domain software packages are available including QGIS, Google Earth, and MultiSpec. Information about the GSC is posted around campus and online (see poster).

NEWHAMPSHIREVIEW CONSORTIUM MEMBERSHIP

Department of Natural Resources & the Environment, UNH
The Basic and Applied Spatial Analysis Lab (BASAL) conducts basic research on spatial data uncertainty/map accuracy and applied research applying the tools of remote sensing, GIS, and spatial data analysis to solve natural resource problems.

NH GLOBE Partnership, UNH
Carries out GLOBE teacher training in atmosphere, land cover, hydrology, soil and earth system science with a focus on land cover mapping and geospatial technologies

EOS-EarthData, UNH
A digital library of Earth science data that serves scientists, educators and the public

NH GRANIT GIS Repository, UNH
A cooperative project to create, maintain, and make available a statewide geographic database serving the information needs of state, regional, and local decision-makers.

Civil Technology Program, UNH
The Thompson School of Applied Sciences provides a 2-year Associates Degree in the geospatial technologies.

Diamond Library, UNH
The library maintains an extensive map and aerial photo collection for NH.

Forest Watch, UNH
A New England environmental education activity using field, lab, and satellite data analysis methods for assessing the state-of-health of local forest stands

Cooperative Extension, UNH
Offers short courses in geospatial technologies including GIS, GPS, and field mapping

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NH Planning Commissions
NH GIS Conservation Collaborative
NH Fish and Game Department

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NEW HAMPSHIRE VIEW

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