



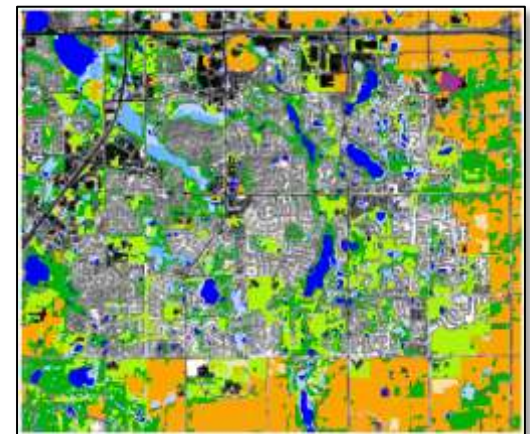
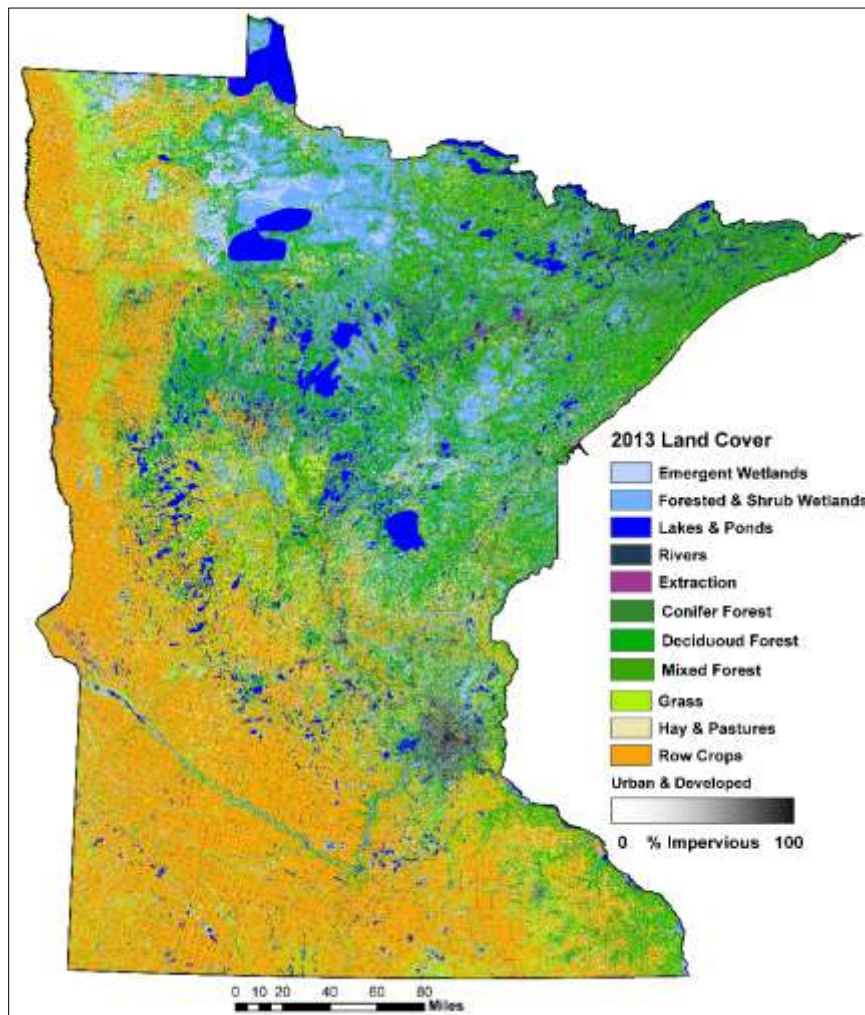
MINNESOTAVIEW REMOTE SENSING ACTIVITIES 2014 - 2015



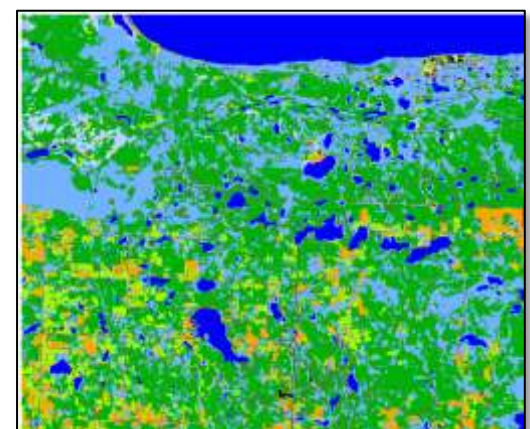
DEVELOPMENT OF SATELLITE REMOTE SENSING FOR MAPPING AND MONITORING MINNESOTA LAND AND WATER

In collaboration with Minnesota agencies, the University of Minnesota is actively involved with research and development of applications of satellite remote sensing, particularly Landsat, for mapping land cover and monitoring water quality. A major accomplishment this year was to generate a new (2013) statewide land cover classification.

The classification used a combination of multitemporal Landsat 8 and LiDAR data by Object-based image analysis. Landsat data was resampled to 15-meter resolution. By using objects instead of pixels we were able to utilize multispectral data along with spatial and contextual information of objects such as shape, size, texture and LiDAR-derived metrics to distinguish different land cover types. While OBIA has become the standard procedure for classification of high resolution imagery we found that it works equally well with Landsat imagery. For the objects classified as urban or developed, a regression model relating the Landsat greenness variable to percent impervious was developed to estimate and map the percent impervious surface area at the pixel level. The overall accuracy for 11 classes, level 2 was 96 percent.



Woodbury, a suburb of St. Paul, with a mixture of land cover and uses.



Lower Red Lake area with cropland, forest, wetland and lakes.

MinnesotaView is a member of the AmericaView Consortium, a nationally coordinated network of academic, agency, non-profit, and industry partners and cooperators that share the vision of promoting and supporting the use of remote sensing data and technology within each state.



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BENEFITS TO MINNESOTA

MinnesotaView supports the development, distribution and application of geospatial information derived from remote sensing data for mapping, monitoring and analysis of land and water resources in Minnesota. Classifications of land cover, impervious surface area and lake water clarity are being used for management and planning by Minnesota agencies at state and local levels.

A long term scientist with the Minnesota Pollution Control Agency wrote in a user testimony, "...remote sensing efforts have paid huge dividends for the advancement of improved lake and river basin management in Minnesota. A recent example is the recently updated land cover for the entire watershed of Lake of the Woods, an international waterbody of considerable significance. We are making substantial progress using the latest remote sensing land cover products in hydrologic models to quantify cumulative impacts from demographic growth, land use, land conversions and climate variability. While it is difficult to quantify the economic impacts of having updated land cover products, watershed restoration and protection projects are mounting into the hundreds of millions of dollars per year expended by various agencies, cities and other governmental units to achieve swimmable and fishable goals. We simply need to have the best remote sensing products to be able to most effectively target implementation actions across the landscape. The University of Minnesota's Remote Sensing and Geospatial Analysis Laboratory and the MinnesotaView project have enhanced and facilitated land and water management in Minnesota with the land cover and water quality maps and statistics they have provided. I can provide numerous examples of how the University of Minnesota's Remote Sensing and Geospatial Analysis Laboratory has provided products to diverse public entities that are being routinely used in watershed management projects. The State of Minnesota has benefited greatly as a result."

ADDITIONAL MINNESOTAVIEW ACTIVITIES

Data Archival and Dissemination

An important part of the mission of the UMN Remote Sensing and Geospatial Analysis Laboratory and MinnesotaView is to archive and disseminate geospatial data, particularly maps, statistics and analyses that have been derived from remote sensing. Examples of the holdings, which draw interest from Minnesota agencies and citizens, include land cover data and periodic lake water clarity assessments. Data and project results are posted on the RSGAL website, rsl.gis.umn.edu as well as at land.umn.edu and water.umn.edu. In FY14 the land website had more than 4,000 unique visitors and the water and lakes websites had 74,000.

This year AmericaView support enabled creation of a new geospatial portal portal.gis.umn.edu for viewing and downloading land cover and lake clarity maps and data.

Providing Remote Sensing Education and Information

The goal of the Remote Sensing Core Curriculum hosted by the University of Minnesota is to provide resources to support a state-of-the-practice educational experience. The RSCC is composed of contributions from authors from academia, government, and industry. It provides a knowledge base of theory and techniques to advance the understanding and use of remote sensing and geospatial science.

The primary activity this year was creation of new in-class exercises, incorporation of YouTube videos into lessons, preparation for expanded/improved lecture content, and solicitation of new contributors for the Remote Sensing Core Curriculum. The RSCC website, r-s-c-c.org, has more than 15,000 visits each month.

MINNESOTAVIEW CONSORTIUM MEMBERSHIP

MinnesotaView was established in 2008 and is working with state agencies and universities in Minnesota to advance remote sensing research and application, education and outreach. The Consortium is led by the University of Minnesota's Remote Sensing and Geospatial Analysis Laboratory, and includes the Minnesota Geospatial Information Office and Minnesota Department of Natural Resources.

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