New YorkView 2019 – 2020

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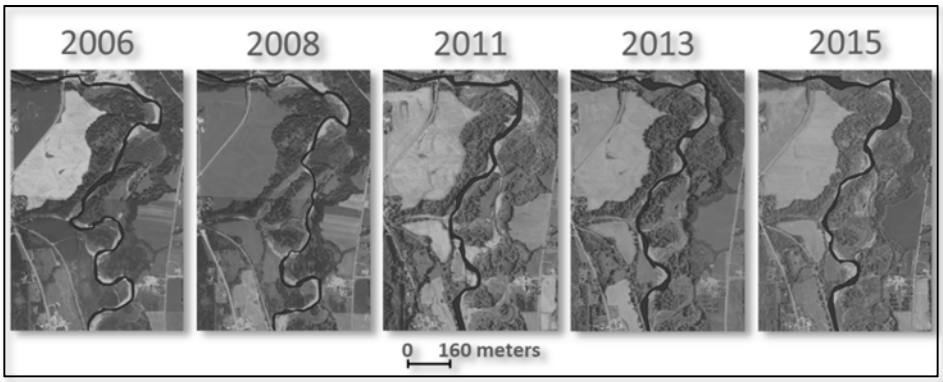
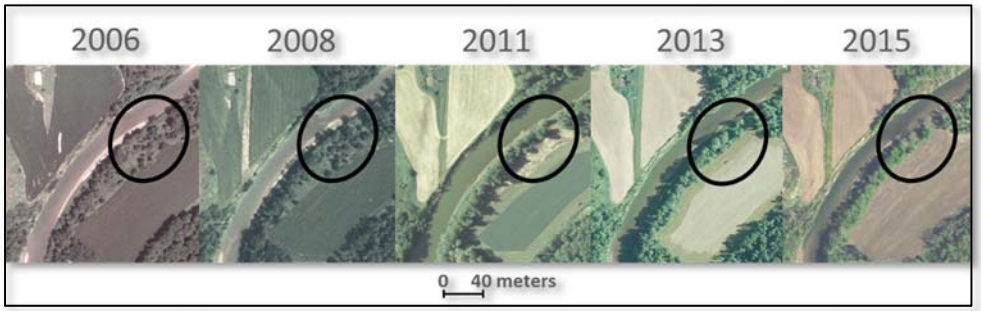
Riparian vegetation provides many important ecosystem functions and conservation benefits. Recent studies have utilized newly developed remote sensing technologies to explore high spatial resolution riparian vegetation delineation. In GY19, New YorkView (NYView) focused on stream riparian analysis within two related components. The first used Google Earth Engine (GEE) to assess temporal and spatial changes in river geomorphology and riparian vegetation. We developed a new approach using GEE to quantify changes in river channel location and adjacent floodplain vegetation extent and fraction over time. Our method incorporated automatic multi-temporal image classification based on publicly available 1 m aerial images. We tested the method by characterizing temporal and spatial trends in riparian vegetation and river channel position for the mainstem of the Genesee River, New York, USA from 2006–2015. Our method allows stakeholders and managers to process remotely sensed imagery and investigate trends in river channel and riparian vegetation dynamics over time, while reducing the cost of data processing, storage and software licensing compared to traditional methods.



An example of National Agricultural Image Program (NAIP) images showing channel changes over time on the mainstem of the Genesee River in Alleghany County, NY (in black).

The second component of the GY19 study focused on developing a framework to quantify riparian vegetation delineation accuracy, which was tested by comparing riparian vegetation maps produced through two independent processes at different spatial resolutions. One process created riparian maps based on 1 m pixel aerial photographs using random forest classification within an online image processing environment, while the other used maps from a variety of 30 m pixel satellite images created with a decision tree classifier in a proprietary image processing software package. An important consideration within this project was identifying factors that influence the accuracy differences between the processes in order to characterize product applicability. We quantified accuracy of the two processes in terms of riparian vegetation and channel boundary delineation for two rivers in New York State, USA. Accuracy of channel boundary delineation and vegetation classification were both 20% higher for the higher spatial resolution product. Several factors influenced these differences, including detection of higher order streams, land use, and riparian zone width. The procedure developed in this study can enable the holistic quantification of riparian vegetation delineation accuracy for both channel boundary delineation and vegetation classification.



An example of NAIP images showing riparian vegetation conversion into agricultural land use in Alleghany County, NY.

New YorkView 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. AmericaView is funded by USGS grant agreement G18AP00077.

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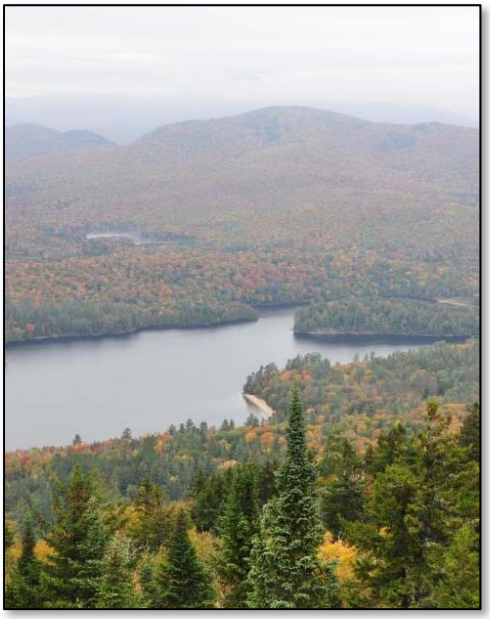
Benefits to New York State

NYView has been supporting the application of remote sensing data and products to solve challenges faced by New York State citizens as part of the AmericaView Consortium since 2009. Remotely sensed imagery provides a unique opportunity to observe the ground surface from above. This imagery is used for a wide range of applications in New York State including analyzing land use and land cover change, quantifying water quality, characterizing vegetation dynamics, planning or monitoring urban growth, and supporting response to a wide range of emergency situations.

NYView initially focused on facilitating access to diverse remote sensing data and products, and supporting collaborative research, teaching, and outreach among consortium members. Since becoming a full member of AmericaView in 2014, NYView has also supported training of high school teachers, undergraduate and graduate students, and used Landsat change pairs from sites across the state to demonstrate applications of remote sensing data for visitors at the New York State Fair. NYView has also invested time in developing video modules and lab exercises to support use of the cloud-based Google Earth Engine platform.



Rich Lake from Goodnow Mountain at the Adirondack Ecological Center in Newcomb, NY

The reservoir of the Mount Morris Dam in the Genesee River in Letchworth State Park.

Beyond the important education focus described above, NYView has also performed research that explored the integration of airborne lidar and Landsat data to quantify forest aboveground biomass as well as investigating the utility of remote sensing and spatial analysis to assess trends in vegetation extent and vigor along riparian corridors.

New YorkView Consortium Membership

Current NYView consortium members include: the State University of New York (SUNY) College of Environmental Science and Forestry (ESF), the Institute for Resource Information Sciences (IRIS) at Cornell University, SUNY Fredonia, and SUNY Plattsburgh. NYView aims to continue to support collaboration and enhance remote sensing activities across the state. Interested researchers and users of remote sensing data should visit the NYView webpage (www.esf.edu/nyview) or contact the NYView Principal Investigator for more information.

ESF

Cornell University

IRIS
Institute for Resource Information Sciences

Plattsburgh
STATE UNIVERSITY OF NEW YORK

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