# NEW YORKVIEW
2020 – 2021

NEW YORKVIEW 2020 – 2021 ACTIVITIES

During GY20, New YorkView (NYView) worked with the New York State (NYS) Department of Environmental Conservation (DEC) Water Hub to support an ongoing water quality project aimed at using satellite imagery to derive chlorophyll-a concentration in NYS lakes. As a foundation for this project, NYView synthesized existing research relevant to characterizing lake water quality and developing a categorization scheme for NYS lakes. A graduate student funded by NYView and DEC reviewed the literature to develop an annotated bibliography of lake assessment methodologies based on satellite imagery, with a particular focus on sensors that researchers have integrated with Sentinel-2 imagery. The review reported different atmospheric correction approaches applied, and documented the range of multi-band indices used to estimate chlorophyll-a. This analysis has formed a foundation for continued work using historical water quality data, satellite images, and statistical analyses to estimate chlorophyll-a concentration for lake types that vary based on parameters such as depth, clarity, and phosphorus. The NYS DEC aims to create an operational lake water-assessment tool. The project will compare tools such as Google Earth Engine with alternatives such as ArcGIS.
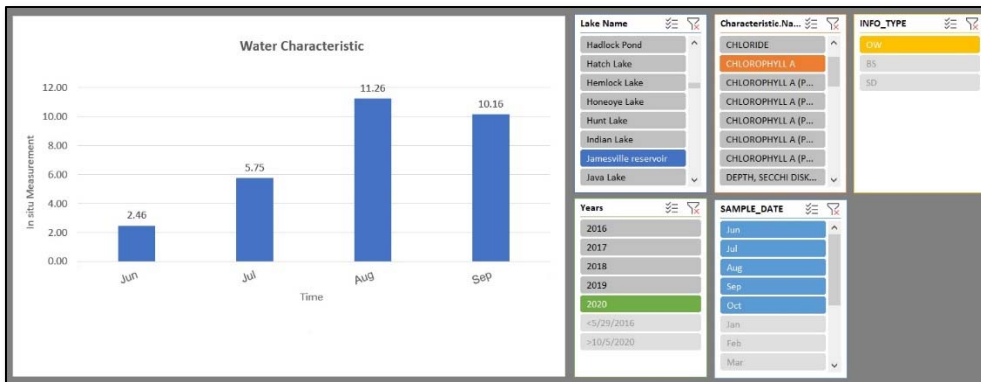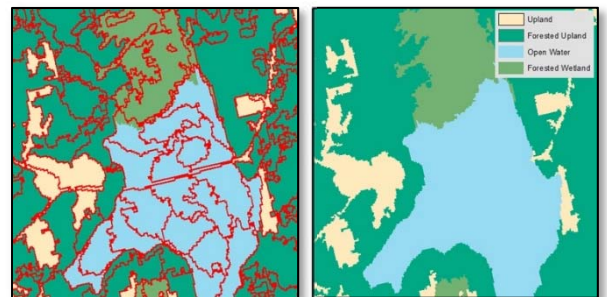

An example of the Pivot-table dashboard used to extract water characteristics of NYS lakes to facilitate assessment of lake trophic state.

The second component of study in GY20 focused on spatial and temporal characterization of wetlands in NYS. This work provides a foundation for expanding study in this area during GY21. During GY20 a graduate student developed a workflow for classifying types of wetland in NYS using remotely sensed imagery. Experimentation considered the utility of a range of input data types, including both spectral and spatial data from Landsat and Sentinel sensors and features derived from those data such as multi-spectral indices and texture. The research also tested

A Sentinel-2 image of Basic Creek Reservoir, in Albany County NY.

Segments derived from Sentinel-2 imagery (on left), with classified map (on right).

selection of parameters for segmentation to support object-based classification, and explored the influence of training sample design on classification accuracy. In the example shown above, image segments were derived from Sentinel-2 visible and near-infrared bands. Classification subsequently used features for these objects derived from Sentinel-2 (image bands, indices, and texture features), as well as features from Sentinel-1 and other radar missions, and topographic characteristics derived from a digital elevation model.

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BENEFITS TO NEW YORK STATE

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

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 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 developed video modules and lab exercises to support use of the cloud-based Google Earth Engine platform. In addition to the
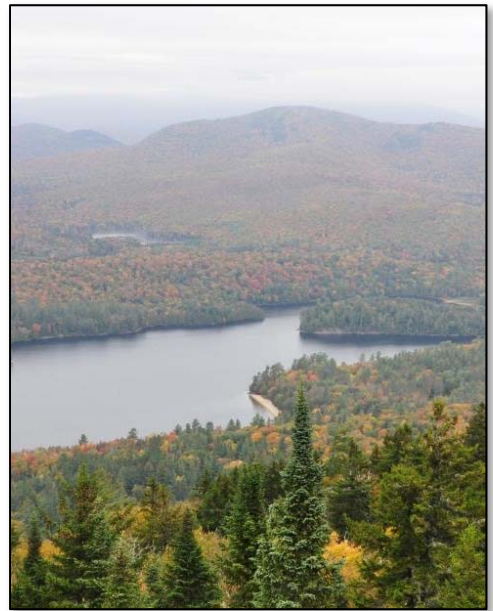
Rich Lake from Goodnow Mountain at the Adirondack Ecological Center in Newcomb, NY.

important education focus described above, NYView has also performed research that has 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. Ongoing research projects focus on using remote sensing data to support assessment of water quality in lakes and characterizing change in wetlands over time.

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

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.