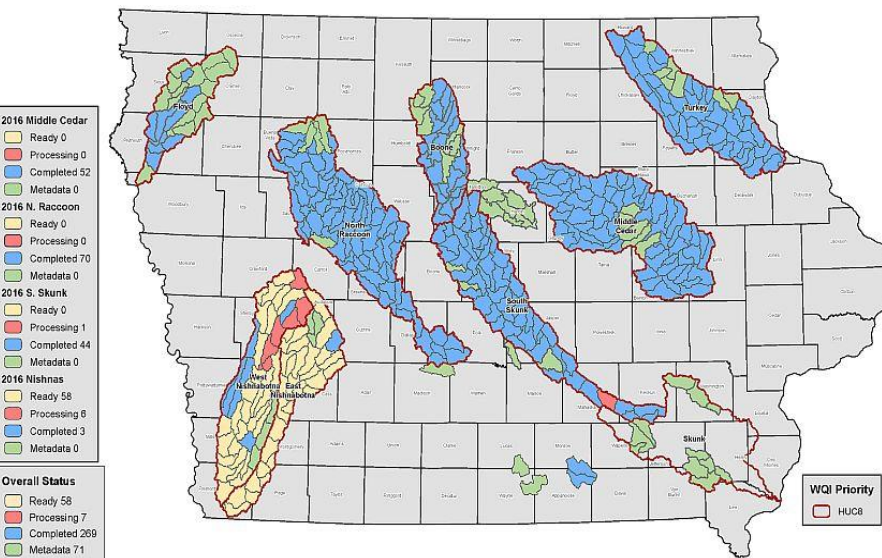## Inventory of Nutrient Management Practices

This project is a priority in Iowa and other upper Mississippi River Basin states because the 2008 Gulf Hypoxia Action Plan has a goal of reducing nutrient loads to the Gulf by 45 percent. This has the potential of impacting every agricultural producer in the state. Several public agencies and two organizations have funded portions of a project to develop technologies to inventory and monitor conservation practices that could potentially meet nutrient reduction targets for Iowa watersheds. IowaView hired a student to be part of a team that digitized conservation practices using aerial imagery and elevation data covering a time period from 2007-2010.

During this funding period, students digitized conservation practices in a total of 220 HUC 12 watersheds. IowaView staff and collaborators reviewed data for six conservation practices (grassed waterways, terraces, water and sediment control basins, pond dams, strip cropping, and contour buffer strips), managed student workers, and created metadata for 71 final datasets.

This project had a component that entailed the evaluation of spring 2016 four-band, six-inch leaf-off imagery to determine if conservation practice changes could be found without using elevation data. Five watersheds in central Iowa were reviewed and staff found that expensive LiDAR elevation data was not necessary to locate most practice changes as long as the imagery used for change detection was color infrared and of sufficient resolution to detect narrow features such as terraces.

Benton County, Iowa.
2010 Iowa DNR 0.6-meter spring color infrared aerial imagery showing riparian area along a stream, terraces and grassed waterways.

This project had another component that included the development of a semi-automated method to identify and classify the non-crop riparian land bordering main stream channels. During this process, stream centerlines were used to locate common land unit polygons within a two-meter distance of the centerline. Technicians modified the polygons to reflect uniform land cover based on aerial photography and LiDAR elevation data and classified the resulting polygons using high resolution land cover data. The timeframe for this dataset was also 2007-2010, and the goal was to create an inventory dataset of riparian vegetation in select watersheds.

The riparian dataset will serve as a baseline to detect land cover change along streams if the data are updated with current imagery. Permanent cover in riparian zones slows the entry of soil and nutrients into waterways and improves the water quality of streams.

Statewide status map of Iowa HUC12 watersheds as of June 30, 2016.

BENEFITS TO IOWA

- **Monitor Daily Changes with Phenocams** –
  Two IowaView phenocams were installed in 2015 – in July (Grand Teton National Park, WY) and August (Grand River Grasslands, IA) at research sites that are used by Dr. Diane Debinski and her colleagues at Iowa State University. These phenocams have been added to a larger phenocam network project that covers the United States and other parts of the world. The cameras take hourly images in both natural color and infrared, during daylight hours, and provide a great record of change over time and timing of events.

- **Remote Sensing Education via MapGive Events** –
  This is a high priority for Iowa since students and many adults do not have exposure to remote sensing or GIS. These events give participants a low-stress introduction to remote sensing/GIS and provide a hands-on service learning project to reinforce and demonstrate what they have learned.

- **Maintain Data Archive** –
  The Orthoserver (http://ortho.gis.iastate.edu) has become a dependable resource for statewide imagery, elevation, and derived remotely sensed datasets such as land cover. Users from the ISU campus, public agencies, and private companies and individuals access the data with use growing each year. Data can be viewed in a browser or as WMS services or REST service endpoints in a GIS software. Keeping the data accessible and adding new datasets are important to enable continued research, analysis, discovery, and education for Iowans.

Grand River Grasslands, Ringgold County IA. Installed phenocam with solar panel and battery.

MapGive event for MLK Jr Day of Service on Iowa State University campus at the GIS Facility. Staff, students, and general public attended the event that created new data from aerial imagery for Ogden, Iowa, and Ruang, Indonesia.

Three Mile Lake, Union County Iowa.
2009 Iowa DNR 0.6-meter spring color infrared aerial imagery, CIR highlights differences in growing vegetation versus water and soil.

IOWAVIEW CONSORTIUM MEMBERSHIP

The mission of the IowaView consortium is to increase the knowledge and use of remote sensing and other geospatial technologies for the benefit of the citizens of Iowa, through education, research, and service. IowaView supports the collection and management of publicly accessible remote sensing data archives (http://ortho.gis.iastate.edu) which include summer NAIP imagery, spring imagery and other datasets useful for research and education. Collaborators come from several departments at ISU as well as from public agencies and organizations.

IOWA STATE UNIVERSITY

GISF ISU GIS Facility

dnr gis

IOWA geographic information council

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