# KENTUCKYVIEW REMOTE SENSING ACTIVITIES 2014 - 2015

INLAND WATER QUALITY MONITORING PROGRAM

KentuckyView has been involved with Kentucky Lake water quality mapping projects to establish a methodology for mapping water quality parameters. Factors included total suspended solids (TSS) concentrations, turbidity and Chlorophyll-a (an indicator of phytoplankton biomass) using Landsat-5, 7, and 8, as well as hyperspectral sensors. For this high-impact study, named the "Inland Water Quality Monitoring Project," Landsat-8 imagery was utilized to develop the needed methodology. This activity is the first key step in establishing a state-wide water quality monitoring program in support of environmental planning and modeling activities.

Some of the lake areas in Kentucky are unique coastal landforms, which occur where rivers and lakes mix in shallow wetlands located near the mouth of a river. Several communities have developed adjacent to large lakes. These lakes provide important fish and wildlife habitat, require water quality protection and flood control, and offer a number of economic benefits, becoming important sources of water, navigation and food. Results of the monitoring program are presented at local to regional meetings, to draw community attention to climate change impacts and adaptation. This project encourages continuing and new collaborations among institutions in Kentucky and surrounding states.

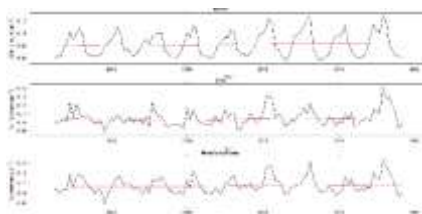*Contact: Dr. Haluk Cetin, hcetin@murraystate.edu*
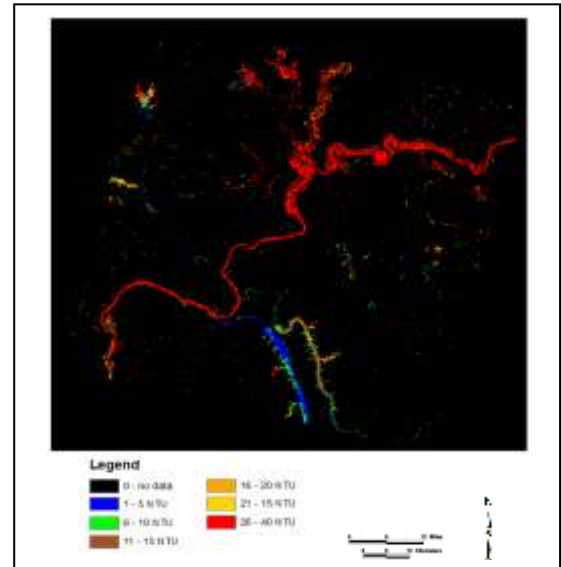
Classified image of Landsat 8 with turbidity values (NTU, Nephelometric Turbidity Units) for each water pixel

KENTUCKYVIEW SOIL MOISTURE MONITORING PROGRAM
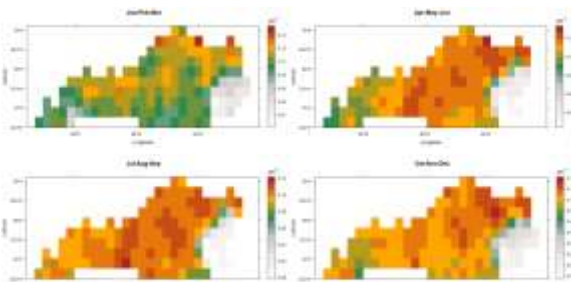
Spatial Variability in Kentucky Soil Moisture

Soil moisture for the Major Kentucky biomes

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KentuckyView developed a methodology to estimate soil moisture based on spectral measurements and imagery. The main objective of the project was investigating the spatial and temporal variability in remote sensing soil moisture for the State of Kentucky. Observed trends in satellite soil moisture estimates were analyzed for different Kentucky biome types. To accomplish this task, soil moisture data from the Advanced Microwave Scanning Radiometer EOS (AMSR-E)) for years 2002-2011 were used. Daily AMSR-E data were averaged to produce monthly estimates. Moderate Resolution Imaging Spectroradiometer (MODIS) land cover data were used to subset the AMSR-E data for the major Kentucky biomes: forest and cropland. Results showed that the spatial variability of soil moisture is related to vegetation type. AMSR-E soil moisture data show an apparent decreasing trend in Kentucky soil moisture during the vegetation growing season. This trend was consistent with observed decreases in precipitation duration during the growing season in Kentucky, particularly from July to September. In conclusion, AMSR-E soil moisture data were capable of detecting the spatial and temporal variability in soil moisture for Kentucky biomes. Evaluating satellite soil moisture products is important for improving our understanding of the spatial variability in vegetation carbon/water cycles.

BENEFITS TO KENTUCKYVIEW

The primary focus of KentuckyView is the use of images collected from spaceborne and airborne sensors, as well as other geospatial technologies, to support K-16 education, applied research, and public outreach. The Soil Moisture Monitoring Program and Inland Water Quality Monitoring Program have improved understanding of environmental conditions, allowing Kentucky to manage agricultural and water resources more efficiently. Remote sensing education and outreach activities, such as 2015 Earth Observation Day presentations, helped inform and educate teachers, students and the public.

The 2015 Earth Observation Day

Date of Event: April 7, 2015
Title of Event: Earth Observation Day Meeting
Organizer: Dr. Haluk Cetin
Number of Teachers: 9
Number of Students: 39
Number of Visitors (Public): 2

Earth Observation Day celebrations were held at the Curris Center of Murray State University (MSU) on April 7, 2015. The event started at 10:00AM with a presentation by the keynote speaker, ASPRS President Dr. Stewart Walker, who is the Director of Product Initiatives at BAE Systems based in San Diego, California. Dr. Walker's presentation entitled "Trends in Commercial Software for Photogrammetry" was well received. Prior to the lunch break, one graduate student, two Directed Studies class undergraduate students, and six Introduction to Remote Sensing class undergraduate students of Dr. Cetin presented their term project results. An afternoon four-hour poster session was held: 35 MSU students presented their posters (five graduate and 30 undergraduate posters).

2015 Earth Observation Day at Murray State University

KENTUCKYVIEW CONSORTIUM MEMBERSHIP

- *Morehead State University - Institute for Regional Analysis and Public Policy*
- *Kentucky Division of Geographic Information*
- *Kentucky Geological Survey*
- *Eastern Kentucky University - Department of Geography*
- *Jefferson Community and Technical College*
- *Kentucky State University*
- *Murray State University - Mid-America Remote Sensing Center and the* Department of Geosciences (official member of record)
- *University of Kentucky -* College of Agriculture
- *Western Kentucky University -* Department of Geography and Geology
- *University of Louisville -* Center for Geographic Information Sciences
- *Northern Kentucky University -* History and Geography Department

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