

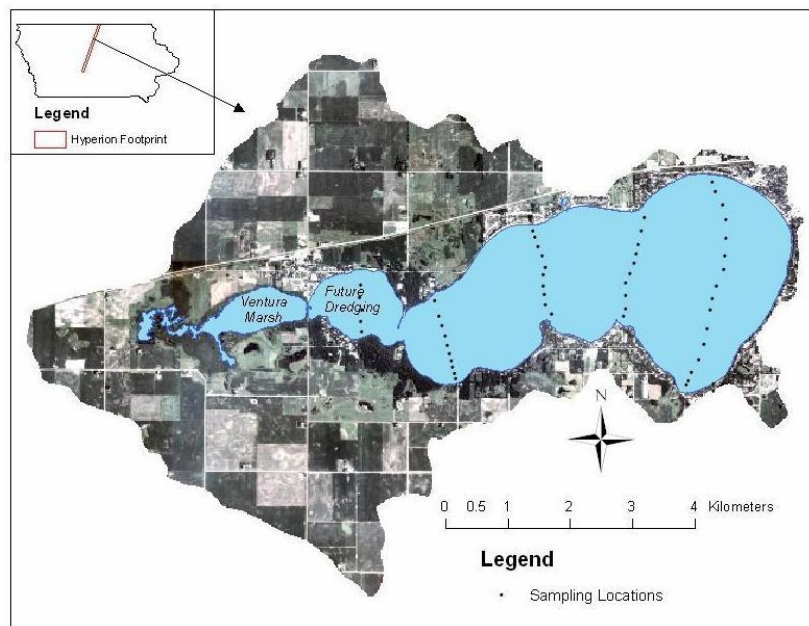
MONITORING SPATIAL AND TEMPORAL WATER QUALITY CHANGES IN CLEAR LAKE USING SATELLITE-DERIVED HYPERSPECTRAL IMAGERY

Goal

The goal of this project is to determine the feasibility of hyperspectral satellite imagery in accurately assessing the water quality of Clear Lake in north central Iowa and to develop a spatio-temporal model that more accurately assesses the water quality than linear regression.

Study Area

Clear Lake, Cerro Gordo County Iowa



Map showing study area of Clear Lake in Cerro Gordo County Iowa

Objectives

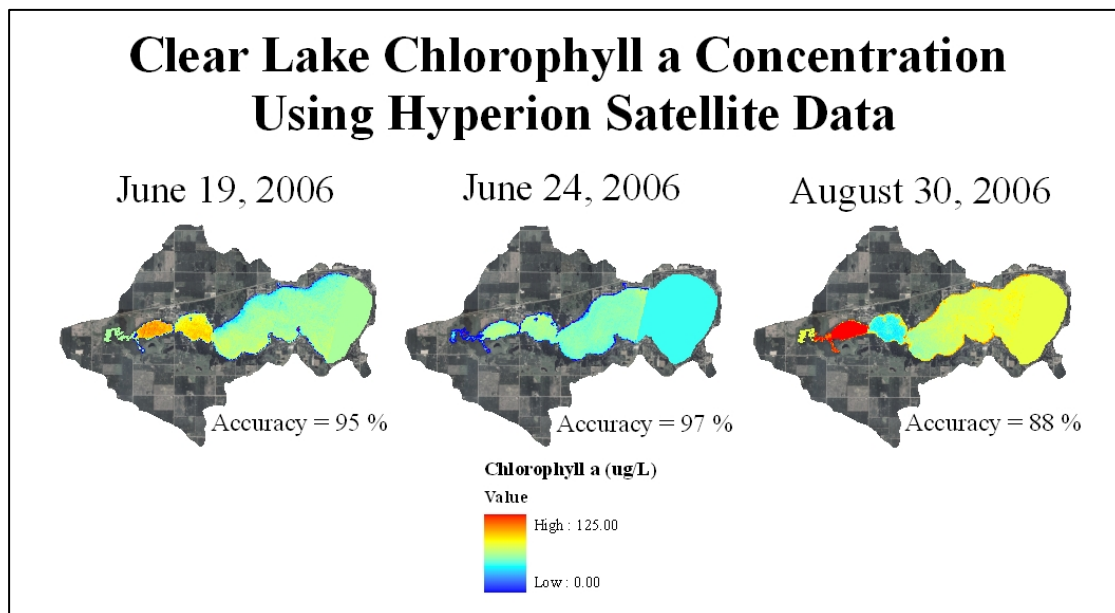
1. To determine the various wavelengths that can aid in the prediction of different water-quality factors.
2. To develop neural network algorithm for mapping water-quality constituents.
3. To determine trends in water quality based upon the water-quality maps created from the hyperspectral data.
4. To compare the neural network model to linear regression models previously developed from remotely-sensed data.

Methods

Water quality of Clear Lake will be evaluated by comparing data collected using three methods: satellite-derived hyperspectral images, field spectrometer, and *in situ* field measurements. GPS points will be collected along with on site measurements. An artificial neural network will then be used to developed to model that will accurately assess the water quality of the lake for various contaminants. A map will then be created and compared to maps created from *in situ* field measurements. The neural network model will also be compared to previously-developed linear regression models.

Expected Products

1. Processed remote sensing images that display temporal and spatial water quality changes in Clear Lake.
2. Potential causes/sources of harmful water quality constituents.
3. An effective model that can be used accurately with future images of the lake to predict water quality.



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Collaborators: Iowa DNR