



# Rice Lake Emergent Vegetation Classification

## Objective

For centuries wild rice has been a crop of cultural significance to the Native Peoples of Minnesota. In an effort to preserve this native crop, the U.S. Fish & Wildlife Service (USFWS) has been monitoring the presence of wild rice as well as other aquatic vegetative species on Rice Lake National Wildlife Refuge since 1983. Monitoring and understanding annual variations of wild rice is important to better manage the watershed and the health of the wild rice population. This will be achieved through annual classifications conducted using remotely sensed data.

## Data Sources

Data analysis and results are for USFWS use and not intended for other vegetation mapping applications.

- June 2004 Rice Lake Vegetation Classification
- August 2010 Color-Infrared Orthomosaic
- 100 Reference Plots

## Methods

**1** After dividing the orthomosaic into 25 sections, RGB Clustering was conducted. RGB Clustering is an unsupervised classification that performs a three-dimensional analysis of the spectral values for the input bands.

**2** A layer stack of the newly created RGB Clustered layer, the Red/Near Infrared layer, and the Blue/Green layer was created for each section.

**3** Image Segmentation was performed on each layer-stacked section. The minimum threshold size for a polygon was 150 pixels, roughly 37.5 ft<sup>2</sup>, and the variance settings changed with each section.

**4** Zonal Statistics were calculated for each layer in the stack for each section to get the mean values. The results were saved directly into the attribute table as three new fields.

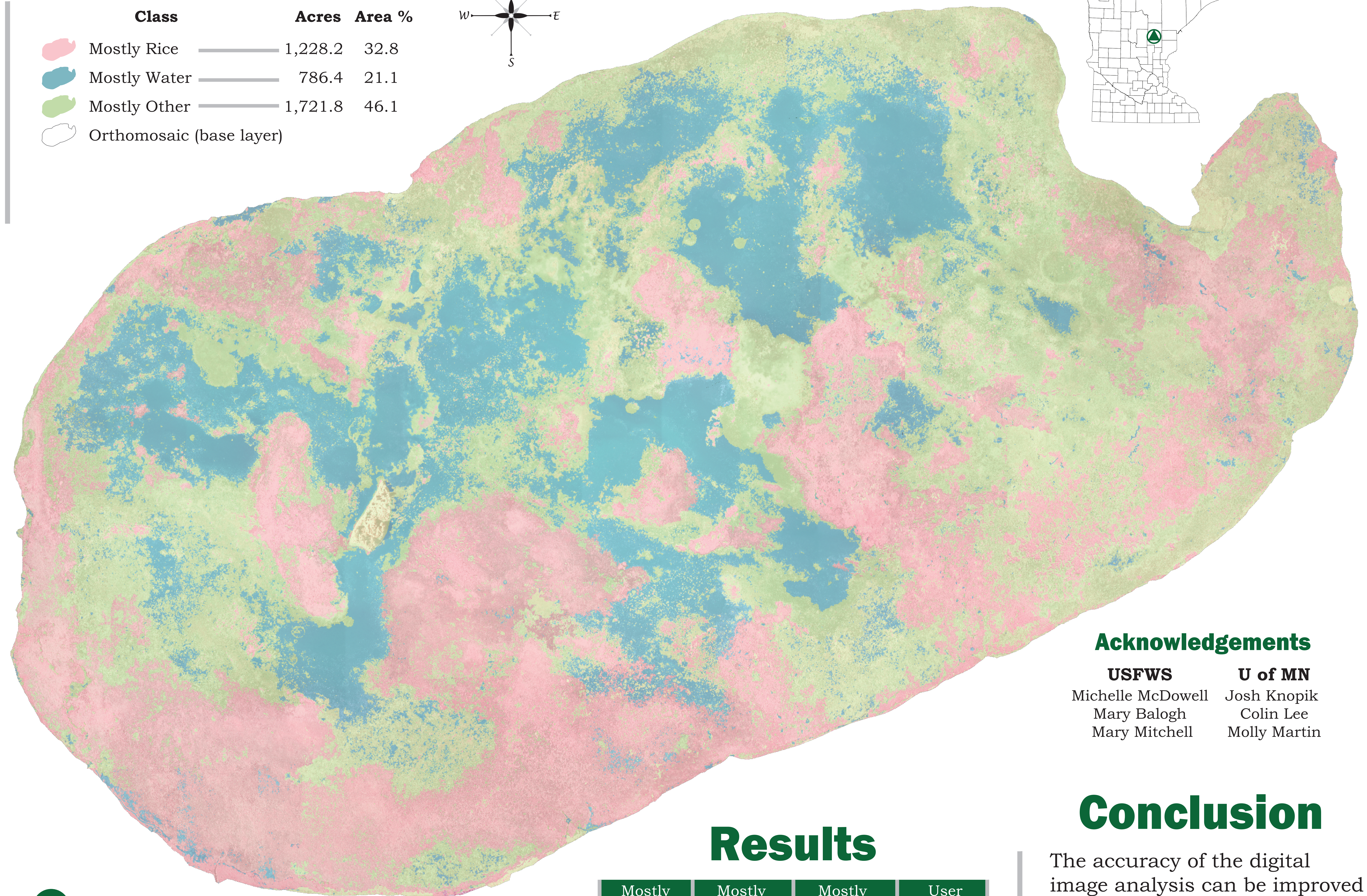
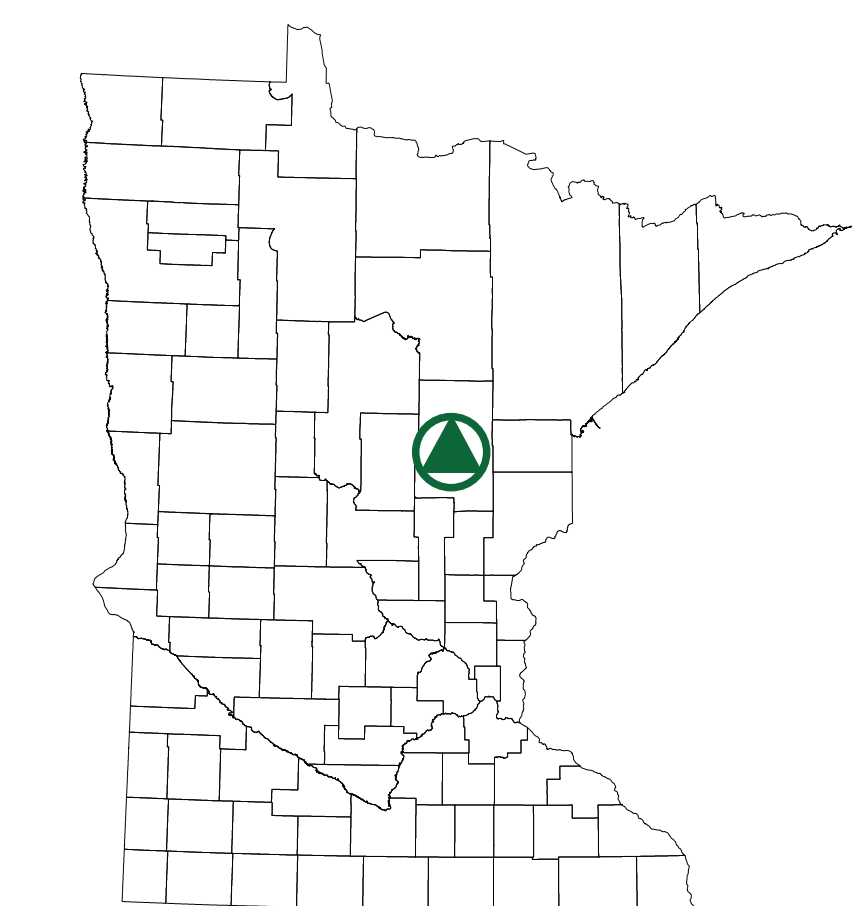
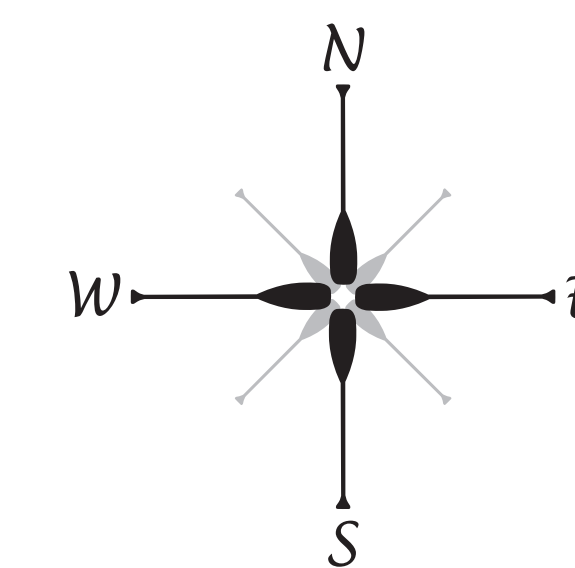
**5** Mean spectral ranges for each class were determined from the reference data.

**6** Attribute queries were run to select polygons with mean spectral values corresponding to mean values for each reference class. Those selected polygons were assigned a value (1, 2, or 3) and stored in a new field.

**7** Each of the 25 sections were then dissolved on the field class and merged into one shapefile for final map production.

## Legend

Class	Acres	Area %
Mostly Rice	1,228.2	32.8
Mostly Water	786.4	21.1
Mostly Other	1,721.8	46.1
Orthomosaic (base layer)		



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## Conclusion

The accuracy of the digital image analysis can be improved by changing the spectral threshold parameters in image segmentation and incorporating texture as an image layer in the analysis. Additionally, utilizing multi-temporal data could improve the classification results.

## Results

	Mostly Rice	Mostly Water	Mostly Other	User Total
Mostly Rice *	34	3	13	50
Mostly Water *	2	42	6	50
Mostly Other *	19	9	22	50
Producer Total	55	54	41	150

\* "Mostly" denotes greater than 50% vegetation based on expert opinion.

**Overall accuracy: 65.3%**