Wetland Vegetation Mapping from Color Infrared Aerial Imagery


PROBLEM STATEMENT
As part of the Integrated Regional Wetland Monitoring Pilot Project, the Landscape Ecology and Plant Teams are collaborating to produce vegetation maps of six study sites by using field data and remote sensing technologies to classify color infrared aerial photographs. These vegetation maps will be used to calculate pattern metrics to quantify wetland composition, structure, and change.

The production of accurate vegetation maps is a fundamental part of tracking change during the restoration process and a mandatory precursor to productive sampling design, model development, and spatial metric calculation.

Methodological considerations for vegetation map development include finding procedures that were most accurate with the least effort, including field data collection procedures, remote sensing methods, and map development.

OBJECTIVE
To develop accurate vegetation maps using remote sensing technologies for use by all IRWM teams, while developing strategies for map production during longer-term monitoring projects.

METHODS
Vegetation maps were produced in three phases.

1. In the first phase, enhancements were performed on the raw image to extract spectral information. Then, automated (unsupervised) classifications were performed on the raw image plus enhancements, in order to divide unknown plant composition into classes based on spectral properties of the orthorectified color infrared imagery. Random "ground reference" points were assigned to each class and visited by field crews, where percent cover was recorded for every species found within a three-meter radius (relevé).

2. In the second phase, these samples were used to build the training sets for supervised classifications that rendered the final maps.

3. In the final stage, hundreds of additional points were gathered to assess map accuracy.

RESULTS & CONCLUSIONS
We have identified several issues involved in vegetation mapping, including scale, timing, and access, sources of error, and plant identification, especially in highly diverse brackish marshes. Therefore, close collaboration with the Plan Team for plant identification and data collection throughout the vegetation mapping process has been a necessary and effective requirement to produce accurate vegetation maps. In addition, each site requires its own procedure for classifying vegetation with the most accuracy.

For more information, visit: www.irwm.org