



The Vegetation Mapping Project of Everglades National Park and Big Cypress National Preserve

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INTRODUCTION

The National Park Service South Florida/Caribbean Network (NPS SFCN), U.S. Army Corps of Engineers (USACE), and South Florida Water Management District (SFWMD) are collaborating to map Everglades National Park (EVER) and parts of Big Cypress National Preserve (BICY). The Restoration Coordination and Verification (RECOVER) Vegetation Mapping Project of the Greater Everglades, a component of the Comprehensive Everglades Restoration Plan (CERP), was initiated in 2004 to provide accurate pre-restoration reference maps to researchers and resource managers. The methodology was updated in 2009 to incorporate fully digital technology and maximize efficiency. Approximately 40% of the Greater Everglades has been mapped – this project will finish the remaining 60% (Fig. 1).

METHODS

MAPPING

- ❖ Digital stereoscopic color-infrared aerial imagery was acquired in April 2009 for EVER and in April 2014 for BICY.
- ❖ The landscape is divided into 50m x 50m grid cells as a minimum mapping unit (Fig. 2A-B).
- ❖ Some 1,698,867 cells are being mapped in EVER and some 838,806 cells in BICY.
- ❖ Photo-interpretation is done by superimposing the grid over three-dimensional color-infrared imagery at photogrammetric work stations (Fig. 2A-B).
- ❖ Each cell's dominant community is classified using a dichotomous key containing some 600 unique vegetation codes from the Rutchey et al. "Vegetation Classification for South Florida Natural Areas" (version 6.15.09 available at <https://irma.nps.gov/>).
- ❖ EVER and BICY have been divided into six mapping Regions (Fig. 3).

GROUND-TRUTHING

- ❖ SFCN is collecting ground-truth data at approximately 6,000 Training Points and 1,400 Accuracy Assessment points (Fig. 3 and Fig. 4). Each has an identification number, coordinates, and a polygon wherein data are collected (usually a grid cell).
- ❖ Data include plant species present, relative abundance, community structure, vegetation code, and photos. The SFCN geodatabase links data to a spatial location (Fig. 5C-E).
- ❖ SFCN collects spatially explicit Verification Points that rapidly document the vegetation community in a cell.
- ❖ Photo-interpreters (trained in South Florida botany and ecology) use Training Points, Verification Points, and a photo-interpretation key to identify the vegetation community in each cell (Fig. 2B and Fig. 5C-E).
- ❖ QA/QC is done in groups of approximately 1,200 cells.

ACCURACY ASSESSMENT

- ❖ Accuracy Assessment data collection was completed in 2011 for EVER and is nearly complete for BICY. This dataset is not available to photo-interpreters as it will be used to assess the accuracy of the maps once they are complete.

ACKNOWLEDGMENTS

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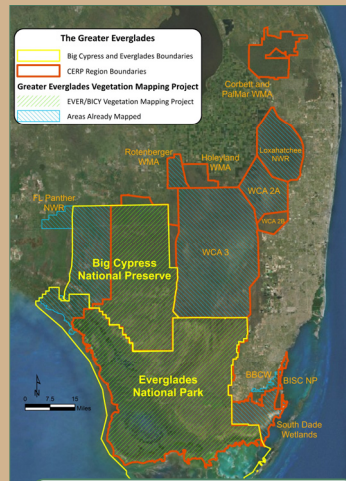


Fig. 1. EVER/BICY Vegetation Mapping Project footprint within Greater Everglades CERP footprint.

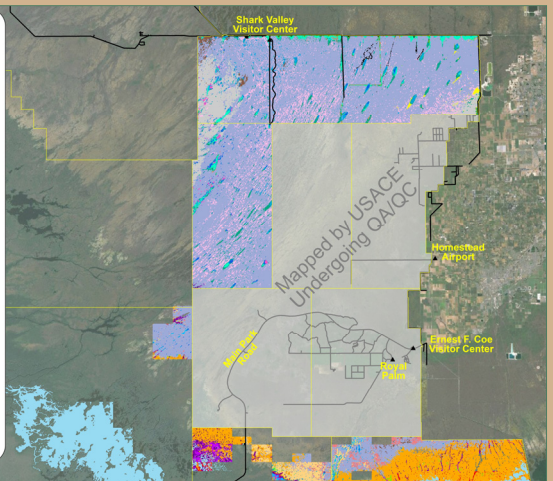


Fig. 6. Mapping progress as of April 2015. Each vegetation code corresponds to a vegetation community in the Rutchey et al. (2006) "Vegetation Classification System for South Florida Natural Areas."

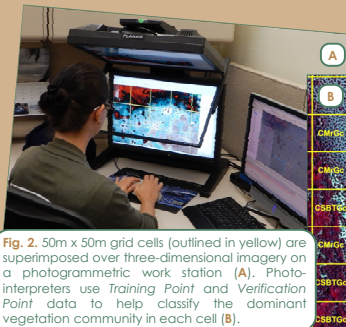


Fig. 2. 50m x 50m grid cells (outlined in yellow) are superimposed over three-dimensional imagery on a photogrammetric work station (A). Photo-interpreters use Training Point and Verification Point data to help classify the dominant vegetation community in each cell (B).

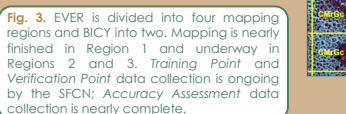


Fig. 3. EVER is divided into four mapping regions and BICY into two. Mapping is nearly finished in Region 1 and underway in Regions 2 and 3. Training Point and Verification Point data collection is ongoing by the SFCN; Accuracy Assessment data collection is nearly complete.

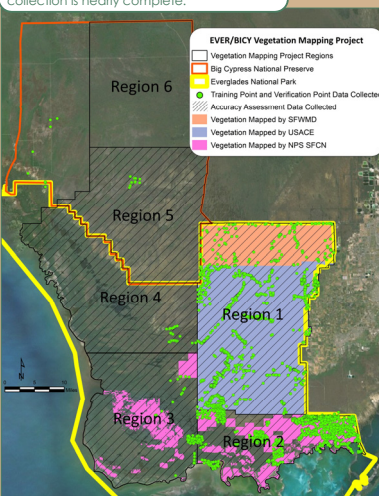


Fig. 5. The highlighted star on Fig. 2B represents a spatially explicit Training Point. The SFCN geodatabase (C) contains data from a datasheet (D) used out on the field (E). The geodatabase links the point to the photo (F) and vegetation information including community structure and classification.

RESULTS

As of April 2015, SFCN has collected 1,965 Training Points, 771 Verification Points, and 1,274 Accuracy Assessment points (Fig. 3). Region 1 is approximately 80% complete; SFWMD mapped the first section and USACE is mapping the rest. SFCN is mapping Regions 2 through 6. Region 2 is approximately 57% complete and will be finished in 2015. Region 3 is approximately 18% complete and will be finished in 2016 (Fig. 6). Region 4 is expected in 2017 and Regions 5 and 6 in 2018. The map will have over 80% accuracy with 90% confidence. Final reports will be available in 2018 for the EVER map and in 2019 for the BICY map.

DISCUSSION

This map will provide essential baseline information to detect and document changes in spatial extent, pattern, and proportion of plant communities as they respond to hydrological modifications from CERP implementation, ecosystem management and restoration, and climate change. It can be used to compare present conditions to past assessments and predict future conditions. Ancillary products from this project (the SFCN geodatabase) are being used as training data for the Everglades Landscape Vegetation Succession (ELVeS) model, by the Natural Resource Condition Assessment (NRCA) for EVER, and other agencies.