Draft iModel Hydrological Screening Targets for WCA3A, WCA3B and ENP

Presentation by the CEPP Eco-subteam

Fred Sklar, Everglades Systems Assessment, Applied Sci. Bureau, SFWMD

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iModel for CEPP Screening

- iModel is a computer optimization program that provides flow scenarios (solutions) to meet numerous, restoration targets simultaneously.
- Modeling team needs hydrologic targets in WCA3A, WCA3B and ENP for the iModel.
- iModel will show percent of target achieved and changes in infrastructure/operations, to achieve an increment of CEPP restoration.
Hydrological and Ecological iModel Targets

- Targets designed to achieve a natural system hydrology needed for ridge and slough landscape conservation and restoration.
- CEPP targets aim for an increment of restoration that will benefit the areas given the current ecology and elevations.
- Assumption is to test possibility of gravity flow from WCA3A to WCA3B to ENP.
- Targets are mainly based on the RECOVER-approved Slough Vegetation Performance Measure (PM) with the caveat that this hydrology may not be suitable for all places during this first increment of CEPP.
Slough Vegetation Performance Measure (PM)

- This RECOVER PM provides a target that describes a full-restoration, pre-drainage pattern of hydroperiods within sloughs, with the expectation that suitable water depths for slough vegetation will provide the desired restoration condition for the entire ridge and slough landscape.

- Four hydrologic metrics are combined to determine suitability for slough vegetation: 1) continuous hydroperiod; 2) continuous dry-down duration below 0.7 ft (20 cm); 3) wet season average water depth; and 4) dry season average water depth.
CENTRAL EVERGLADES

GETTING TO THE HEART OF THE EVERGLADES

Average Wet Season
2-3 ft (60-90 cm)

Average Dry Season
1.5-2 ft (45-60 cm)

Limited Drydown
< 0.7 ft (20 cm)

Continuous Hydroperiod

Weekly Average Water Depth (2000-2011)

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Daily Observed Water Depths and Modeled Slough Vegetation Targets for 1994

- **Observed Site 65**
- **Modeled Slough Vegetation Target**
- **Observed Site 64**
Major features of the ridge and slough landscape in WCA-3A and WCA-3B

Too dry, remnant ridge & slough pattern, no slough vegetation, invasion of willow

Too dry, loss of peat, no ridge & slough pattern, invasion of cattail

Loss of microtopography, “healthy” ridge & slough pattern

Too wet, remnant ridge & slough pattern

Loss of peat, no ridge & slough pattern
Cumulative Tree Island Changes in WCA3 from 1940 until 2004
Date: 2004  Count: 496 (-55.2%)  Hectares: 2,291.3 (-58.1%)
Selecting iModel Targets

• Identify targets:
  – Use PMs for 1) slough vegetation suitability, and 2) recession rates
  – Considering site specific adjustments where appropriate.

• Site 64 in WCA 3A identified as having the best hydrology and the best remaining ridge and slough habitat
  – Use these conditions for comparisons
Evidence for the use of Site 64

Site 64 (Conserved 2 block) evidences the most robust landscape patterning throughout WCA 3 and ENP. The elevation bimodality (ca. 25 cm difference between ridge and slough) results in significantly differing hydroperiods between these two landscape types.
Current elevations show the possibility of gravity feed from WCA3A to WCA3B to ENP
WCA-3A, 3B, ENP Water Level/Depth Comparisons

Average 1995 Wet Season Stage (ft NGVD)
Location of Gages in WCA3 A&B and Draft Proposed Targets

Target of 0.25 ft less than a fully-restored Slough PM time series

Target is a fully-restored (Site 64) Slough PM time series

Target is a “lower” Slough PM time series and 2.5-3.0 ft not to exceed 90 days duration for more than 3 consecutive years

Target is a fully-restored Slough PM time series

Target of 0.5 ft less than a fully-restored Slough PM time series
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Pdf of Relative Elevations of Tree Islands in WCA 3B

- 2.7–4.1 ft
- 1.3–2.2 ft
- 0.7–1.1 ft

Relative Elevation
Avg tree Island Elevation minus Avg. Marsh Elevation)
Location of Gages in ENP and Draft Proposed Targets

Target is a fully restored Slough PM time series at NE-2

Target is a time series that mimics a preserved marl prairie water depths (approx. -0.5 to 1.25 ft)
Recession Rate Targets

• Recession rates are based on FWS Multi-Species Transition Strategy (MSTS) for wood storks, wading birds, snail kites and apple snails in 3A
  – The MSTS was a collaboration between snail kite and apple snail researchers, SFWMD, FWCC, and USFWS scientists with input from other agencies and tribes
  – The MSTS includes species-specific ranges (windows) which reflect water levels or water depths identified by faunal experts and based on the best available science that provide optimal conditions for breeding and foraging
FWS Multi-Species Transition Strategy (MSTS)

USFWS Multi-Species Transition Strategy for WCA-3A

Goal: Through water level management, optimize habitat suitability for tree islands and breeding snail kites, apple snails, wood storks, and other wading birds in WCA-3A, while also providing appropriate inter-annual variability.

2011 Site 64
Recession Rate Cont’d

• Timing of flows through system is critical to many species of wildlife and is inextricably linked to recession and ascension rates

• Recession rates based upon WCA-3AVG (Average of Sites 63, 64 and 65) but can be used at individual sites

• Assumptions:
  – CEPP will move toward a rain driven system
  – Recession/ascension rates are largely driven by rainfall and evapotranspiration
WCA-3AVG Site Locations

Wood Stork - WCA-3AVG January 1 to June 1 Average Weekly Recession Rate of 0.06 to 0.07 feet/week.

Snail Kite - WCA-3AVG January 1 to June 1 Average Weekly Recession Rate of 0.05 feet/week.
Questions?

Florida Softshell Turtle

Healthy Ridge and Slough Fire Pattern