

2009 Everglades Coalition Panel on Restoring Flow from Lake Okeechobee to WCA-3

- *Dynamic Storage & Sheet Flow** V.
Reservoirs and other static storage
- For needs and requirements for storage --
Get to the right balance:
 - Look at potential of dynamic storage and sheet flow* first, then static storage needs
 - * Per CERP Section 2.3.1
 - Consider ecosystem services value trade-offs

With US Sugar Land Purchase at hand, need for a new Vision and Plan

- DOI *Vision and Plan for Successful Everglades Restoration* is a good start
- Much like the Marshall Plan of the 1980's:
 - Effective repair requires restoration of sheet-flow to the greatest possible extent from the Kissimmee Lakes to FL Bay.
- What is the *Vision and Plan* for restoring the missing link to revitalize the river of grass in the EAA? Looks a lot like the 1981 Marshall Plan!

Revisit the Marshall Plan, again?

- Take a hard(er) look at dynamic storage and sheet flow thru-put potential
- Ecosystem Services Value of restoring the missing link to revitalize the river of grass through some 95,000 Acres of the Marshall Plan flow path, re-vegetated?
- Number-crunching follows

Flow from Lake O rated @ 6660 CFS^A

$$6660 \times 60 \text{ sec} = 399600 \text{ CFMin}$$

$$399600 / 43560^{\text{B}} = 9.1736 \text{ A-ft/Min}$$

$$9.1736 \times 60 \text{ min} = 550.413 \text{ A-ft/Hr}$$

$$550.413 \times 24\text{hrs} = 13209.92 \text{ A-ft/Day}$$

$$13209.9 \times 30\text{days} = 396,297.5 \text{ A-ft/mo}$$

^A CFS = Cubic Ft/Second - Ref: USACE Recon Study, 1994

^B Cubic feet (CF) in one Acre-foot (A-ft) = 43560 CF

Flow Thru-Put: 8 months

- Flow possibility in 5 month wet/rainy season
 - June - October
 - 5 mo. x 396297 A-ft/mo = 1,981,488 A-f
- Possibility of continued flow, next 3 dry mos:
(historic natural system flow after wet season)
 - Nov-Dec = 0.5 x 396297 = 198,149 Acre-Ft
 - Dec-Jan = 0.3 x 396297 = 118,889 Acre-Ft
 - Jan-Feb = 0.15 x 396297 = 59,445 Acre-FT
- POTENTIAL TOTAL THRU PUT - 8 MONTHS =
2,357,971 Acre-Ft

“instantaneous” dynamic storage

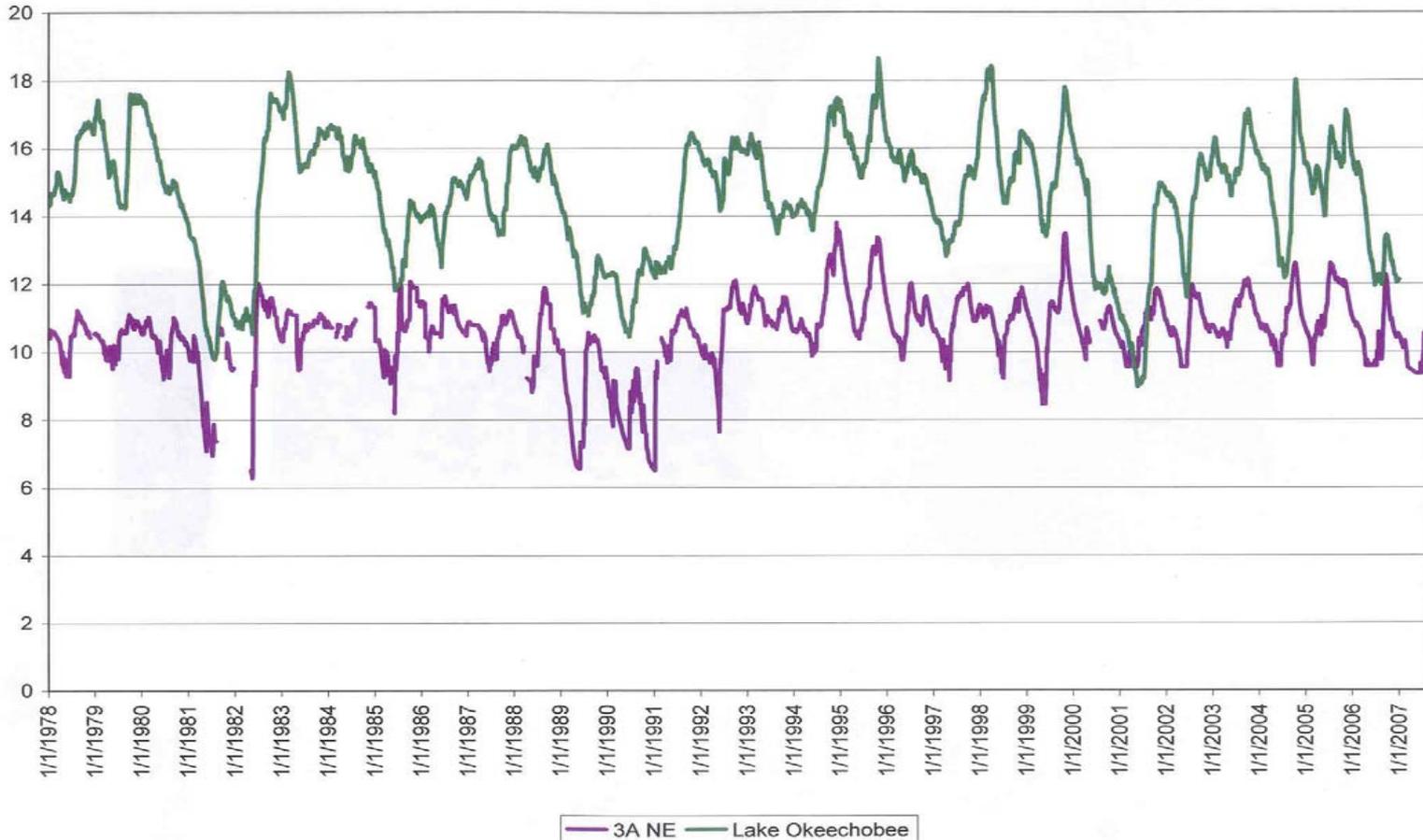
- Assumptions:
 - Flow over ~95,000 Acres, re-vegetated
 - Average water depth = 2.5 feet
 - Range .5 to 3.5 feet (3.5 feet is high water event)
- Then $95,000 \times 2.5 = 237,500$ Acre-Feet
- Therefore residence time about 8 months
- Result: treatment and storage naturally by dynamic storage and sheet flow
 - See CERP Section 2.3.1

Dynamic Storage & sheet flow potential?

- Previous back-of-the-envelope calculations are oversimplified, right?
- **What do the more complex models indicate?**
- What is the proper balance between:
 - Reservoir static storage versus dynamic storage & sheet flow
 - Use of gravity-driven flow and pumping?
- Marshall plan was extant-based restoration
 - Minimize a fossil-fuel-driven system
 - Maximize gravity-driven flow and solar radiation as primary production mechanisms.

Lake O to WCA-3: Will it flow?

Lake O – WCA Stage Level Data '78-'07



What is Ecosystem Services Value of 95K acres of Plan 6 wetlands restored?

- Natural Capitalism generic value of wetlands for 17 services rendered to society =
 - \$7924 per acre per year
 - \$7924 x 40 year CERP life cycle x 95K acres =
 - ESV = \$30,111,200,000, but there is more eco-value
- TOTAL ESV of Plan 6 implemented:
 - \$ 69,156,351,518
 - Ref: ESV of restoring flow from Lake O to WCA-3; A Conference on Ecosystem Services; Naples, FL, 2008

Why 95,000 Acres?

- That is the potential acreage achievable with USSC land purchase, land swaps, and land presently state owned, to restore the missing link, and re-vegetate same.
- Maximum treatment area will be needed to meet water quality standards for water moving south.
- Is there any other choice?

Conclusions

- Maximize the acreage of dynamic storage and sheet flow to meet water quality standards (=> Flow path re-vegetated)
- Avoid rock mines and reservoirs in the 95,000 acre sheet-flow path, to maximize ecological services benefits, i.e. maximize economic benefits.
- Plan for restoring the missing link concurrently with the US Sugar Corp land purchase, as the means to speed up the action and avoid preventable degradation.

QED!

- Questions?