

Sustaining Natural Capital: Protecting Society & the Environment

June 7, 2012

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GEER / INTECOL Conference

Demonstration of an Approach & Methodology

for

Streamlining Central Everglades Project Planning

based on

Ecosystem Services Value of a Restored River of Grass

What's this all about?

- Problem: Insufficient consideration of economic value of *natural capital* for decision-support requiring trade-off analysis !
- Solution: Calculate the total economic value of natural capital for decision-makers
 - Use to Streamline Central Everglades Project Planning (CEPP) per Comprehensive Everglades Restoration Plan CERP/USACE/White House policy and protocols
 - Legislate State requirements along lines of federal recommendations and peer-reviewed approach

Streamlining CEPP using four essential evaluation tools per State/Federal protocols

- CEPP region Conceptual Ecological Model (CEM)
- CERP Table 5-1 **Yellow Book** Goals & Objectives
- Ecosystem Services Valuation (ESV) using the Costanza, et al, Synthesis [~ Per White House/NRC Recommendations]
- Incorporate Sea Level Rise Planning in Civil Works projects [Like CERP/CEPP]
- REFERENCES: CERP 2011 ***Adaptive Management Integrated Guide*** protocols (p. 13, 14, 16, D-10); See Slide 21 and:
 - http://www.evergladesplan.org/pm/pm_docs/adaptive_mgmt/062811_am_guide_final.pdf
- USACE Guidance Engineering Circular EC 1165-2-212; See:
 - http://publications.usace.army.mil/publications/eng-circulars/EC_1165-2-212.pdf

D-10* AM Activity 4, 5 in Project Development

- Activity 4 requirement: Develop a CEPP CEM
- Establish CEPP valuation measures based on CEM Drivers, Stressors, and Attributes, and
- Adaptive Mgt (AM) Activity 5 requirement:
 - *Pursue CERP Table 5-1 goals & objectives , emphasizing ecological goals, especially first stated objective: Increase total spatial extent of natural area (acres) [restore sheet flow implied]*
 - Compare Ecosystem Service Benefits to Costs

CERP Table 5-1 Goals & Objectives

Goal: Enhance Ecologic Values; Objectives:

- Increase the total spatial extent of natural areas
- Improve habitat (biomes) and functional quality
- Improve native plant & animal species abundance & diversity

Goal: Enhance Economic Values And Social Well Being

- Increase availability of fresh water (ag/municipal & industrial)
- Reduce flood damages (agricultural/urban)
- Provide recreational and navigation opportunities
- Protect cultural and archeological resources and values

FOOTNOTE: How will Goals & Objectives be affected by Sea Level Rise/Vice-versa

CEPP Federal Register Summary

- Next step for CERP(+) = CEPP as of 2 Dec 11:
 - *Federal Register Vol 76, #232: Redirect water that is currently discharged to the east and west coast estuaries from Lake O and restore water flow to the south, allowing for restoration of natural habitat conditions, and water flow in the central Everglades [ecosystem]... reconnecting the ecosystem from Lake O to ENP and FL Bay.*
 - *CERP/CEPP projects identified to accomplish this include ... sheet flow enhancement.*

CEPP process Boundaries

Presently
Defined as a
Wish Bone to
connect the
head bone with
the foot bone
via the back
bone



Adaptive Management Activity 5 Requirements:

Consider Benefits and Costs

Apply Costanza \$ynthesis values to get Benefits

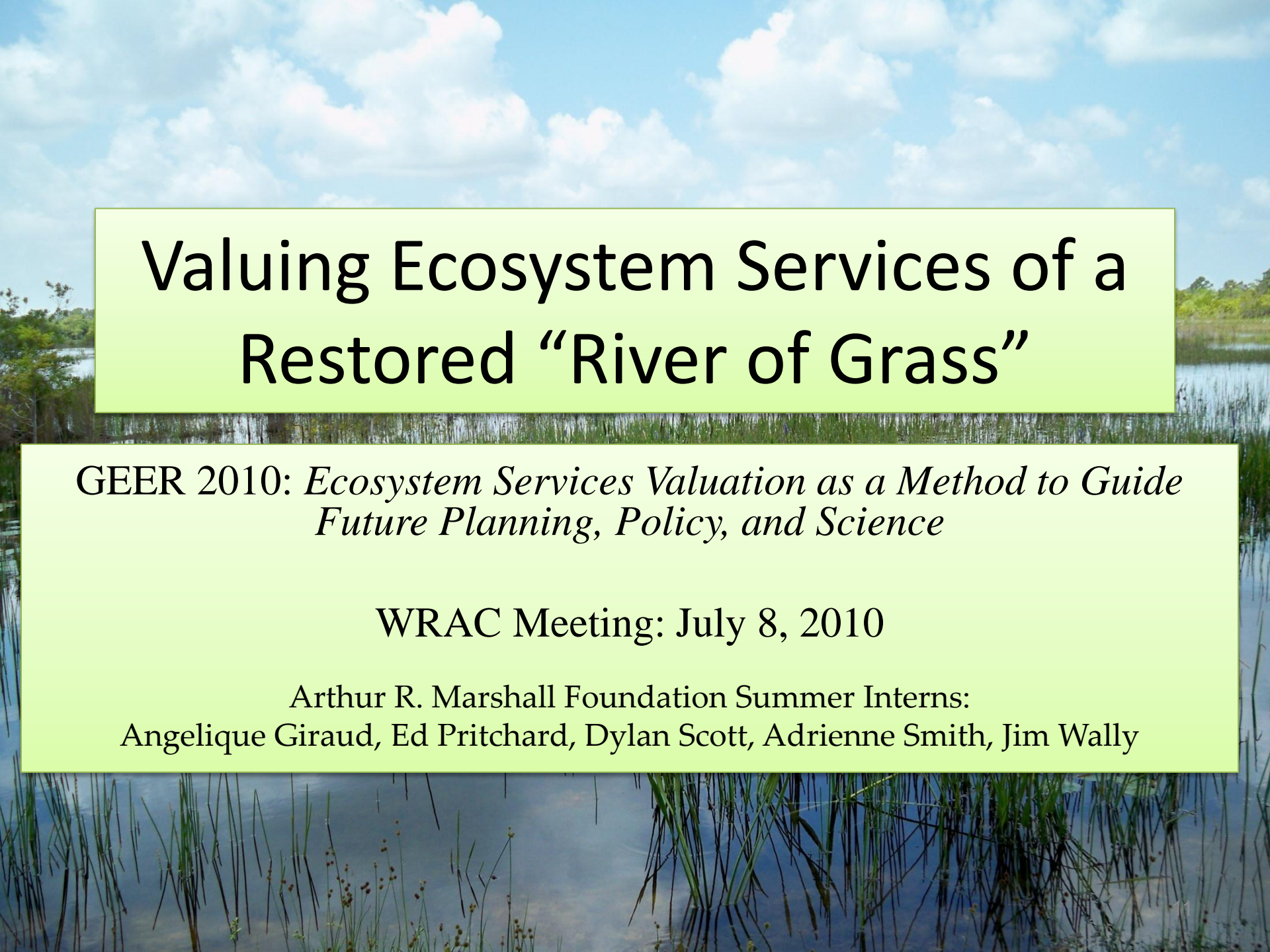
- Calculate Ecosystem Service Value (benefits) in terms of \$\$\$ per acre per year based on:
 - Costanza value of \$/acre/yr (benefits transfer)
 - Total spatial extent of natural area added (acres)
 - 40 year CERP life-cycle (conservative)
- Notional example (\$40 billion in benefits based on avg value)
ESV = \$10,000/Acre/yr x 100,000 acres x 40 yrs = \$40 Billion
- Compare Benefits to Cost (B:C) for return on investment decision-support; 6:1 is conservative

ESV Demonstration by 2010 Summer Interns

- The Colorful Slides are theirs
- Here it comes again with credible "peer review" as the means to streamline the CEPP Process with Synthesis that all can understand

Everglades Coalition Conference, January 7, 2011; Weston, FL

- The Honorable Rock Salt, Deputy Assistant Secretary of the Army (Civil Works):
 - *From what I have seen in my travels, your 2010 Interns came up with the best illustration of how Ecosystem Services Valuation [ESV] should be applied of any I have seen.*
 - *Secretary Salt has attended and spoken at A Conference on Ecosystem Services (ACES) in 2008 and 2010, and is on the White House Committee inducting an ESV approach as a matter of national policy.*



Valuing Ecosystem Services of a Restored “River of Grass”

GEER 2010: *Ecosystem Services Valuation as a Method to Guide Future Planning, Policy, and Science*

WRAC Meeting: July 8, 2010

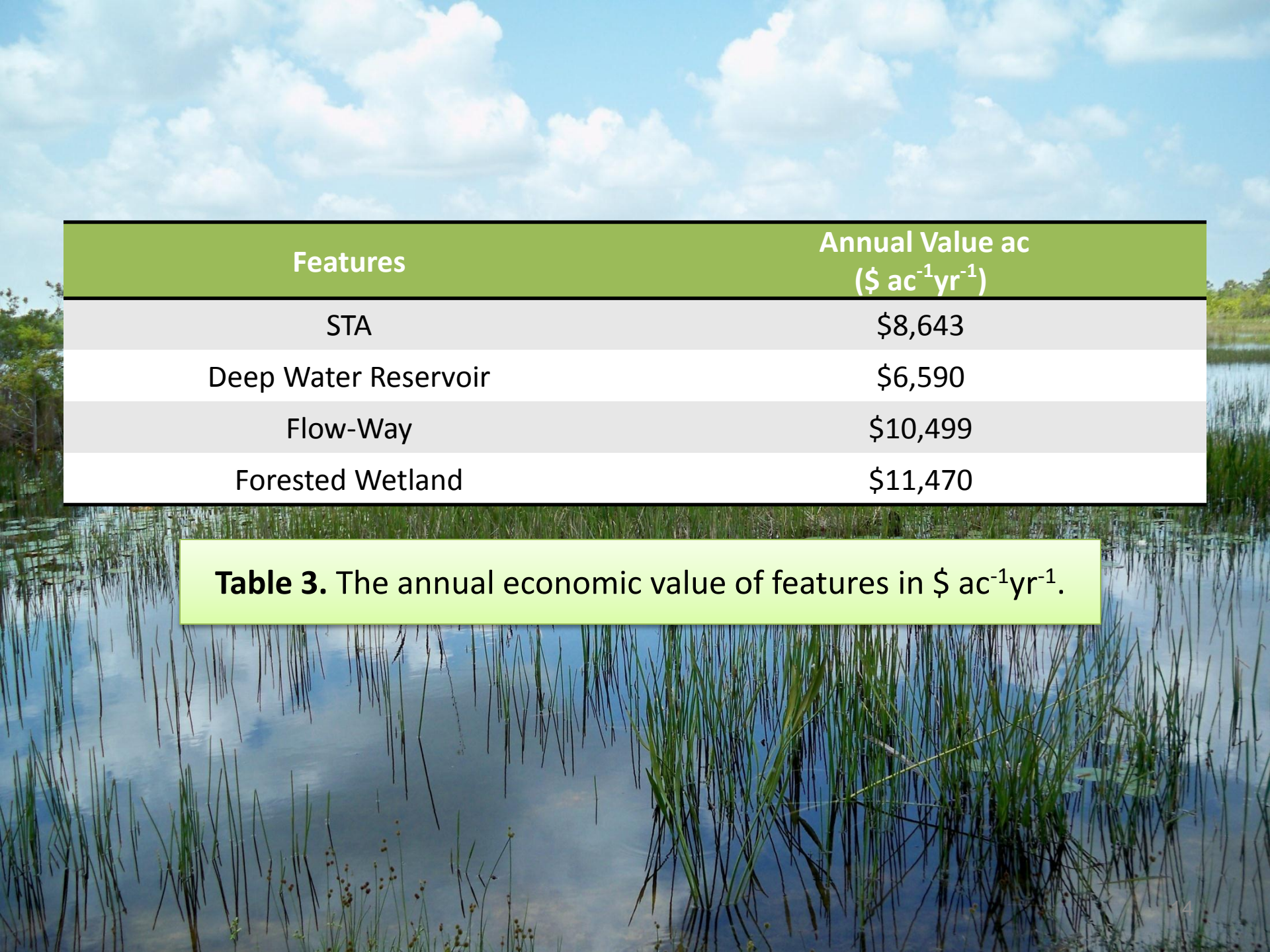
Arthur R. Marshall Foundation Summer Interns:
Angelique Giraud, Ed Pritchard, Dylan Scott, Adrienne Smith, Jim Wally

The Honorable Rock Salt gives the 2010 Summer Intern Team a thumb's up on their ESV "How-to-do-it" Demonstration Project!



Introduction

- Valuing ecosystem services = ESV is an aid to environmental decision-making
- Six configurations are from ROG stakeholders
- Analysis uses Costanza, et al, synthesis of planetary ecosystem services value with benefits in terms of \$\$\$ per acre per year
- Benefit-to-cost (B:C) ratios are indicators of optimum value



Features	Annual Value ac (\$ ac ⁻¹ yr ⁻¹)
STA	\$8,643
Deep Water Reservoir	\$6,590
Flow-Way	\$10,499
Forested Wetland	\$11,470

Table 3. The annual economic value of features in \$ ac⁻¹yr⁻¹.

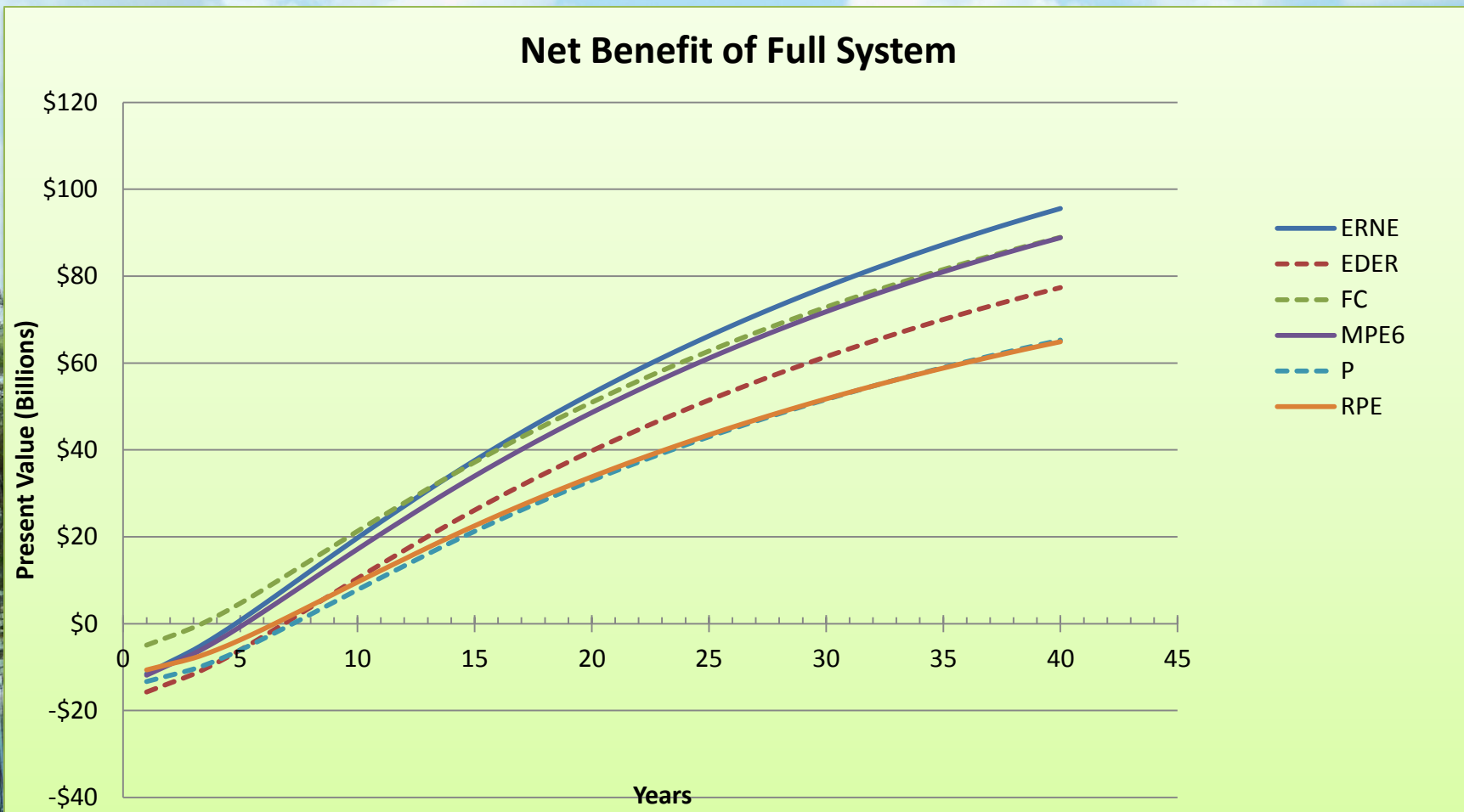


Figure 3. Net benefit of “river of grass” including benefits to estuaries. The Everglades River of Grass Northern Expansion (ERNE) configuration provides the estuaries with the greatest ecosystem benefit. EDER=ERDC

Total Restoration of Estuaries

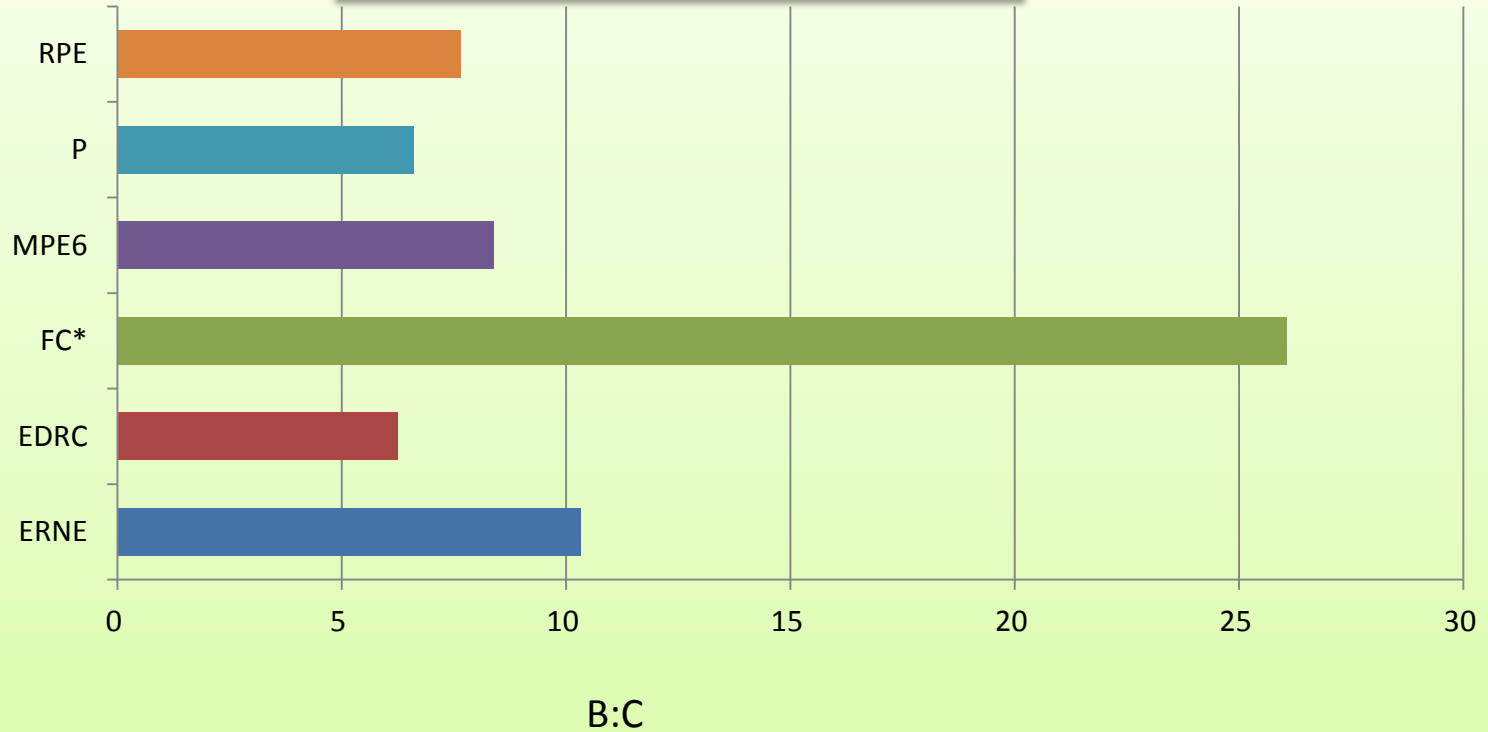


Figure 4. The benefit-to-cost ratio of configurations for the total restoration of affected estuaries. *Florida Crystals (FC) has the highest B:C ratio due to the absence of a deep water reservoir, resulting in a low capital and O&M cost.

Benefits' Transfer Pros and Cons

- First the bad news: BT is controversial because not every biome (ecosystem) type is the same, locally. Alternative analysis is data and modeling intensive incurring significant time and costs; may result in more BT than using the Costanza Synthesis
- Now the good news: BT using the Costanza Synthesis can be done in weeks v. years; meets **quicker, better, cheaper** method needed for a streamlined approach, close enough for Govt Work for the CEPP case.

On Benefit:Cost Ratios \Leftrightarrow ROI

- A notional average ROI is a conservative B:C = 6:1
- B:C Provides an understandable total \$ynthesis in govt sought-after Return on Investment (ROI)
- When the Ecosystem is given back to nature to the max, Florida Crystals Corp P.E. has calculated that the B:C approaches 26:1 (\$26 benefit per \$1 invested)
- In calculating the ESV of the EH NWR, based on maximum preservation at minimum cost, long-term (optimum) B:C ratios may approach 100:1.

Literature confirms; See Wakefield on Costanza:

<http://www.uvm.edu/research/?Page=news&storyID=1153&category=uvmresearch>

ESV Final Points

- Numerous NGO studies and robust B:C ratios $> 6:1$ indicate viability of Ecosystem Services Valuation for better decision-support, understandable by Office of Management & Budget, Congress and the Public
- When ecosystem services are not given a dollar value, the default value is zero (NRC 2005);
 - Does this place policy of *no net loss of wetlands* at risk?
- CEPP implementers should adopt the ESV approach and make the Everglades restoration Total Economic Value calculation an example to follow.
 - **Take-Home Assignment: Pester CERP/CEPP *principals* to do so!**

Previous Presentations Made To:

- GEER Conference 7/31 – 8/2/2010
- Everglades Coalition Conference 1/7/2011
- FGCU Sustainability Class 2/16/2011
- Waterfowlers' Conference, 4/26/2011
- Everglades Coalition Conference 1/7/2012
- Everglades Legislative Caucus, 1/17/2012
- SFWMD Gov Board (Hard Copy) 2/9/2012
- Rivers Coalition Meeting 2/23/2012
 - Pushing Govt Std Operating Procedures (SOP)

PRIMARY REFERENCES

- White House Report, July, 2011: Sustaining Natural Capital – Protecting Society and the Economy
http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_sustaining_environmental_capital_report.pdf
- Costanza, et al, Report on value of the planet's 18 biomes; Google ***Nature 387***, or
http://www.uvm.edu/giee/publications/Nature_Paper.pdf
- Valuing Ecosystem Services – Towards Better Environmental Decision-making, NRC 2005; See
http://www.nap.edu/catalog.php?record_id=11139
- For Additional information and more references:
 - Go to www.ArtMarshall.org; Contact JAMinfo@AOL.com
 - See: http://www.palmbeachpost.com/opinion/letters/return-on-saving-everglades-90-billion-883668.html?cxtype=ynews_rss

Questions



Gators are an Indicator Species!

Go Gators!

