11-15-12
TO: the CERP-CEPP planning team
FROM: L. Jack Moller

Please make this a part of the official record for the CERP-CEPP project and send me a written response for our records which answers each of the following questions and concerns.

I read the Larsen study on ridge and slough habitat and have the following initial thoughts/concerns

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Other portions of the landscape upstream of levees experienced longer hydroperiods and a loss of ridges (Science Coordination Team, 2003; Sklar et al., 2004).

Will the post-CERP water management plans which will push more water into the WCAs cause this loss of ridges? I know the water is supposed to flow unimpeded to FL Bay post-CERP. But, the other day a SFWMD person told me they were considering building a pumping station on the south end of WCA3B to move water south. This also means they will be able to hold water back if they do not use this new pump properly

Page 351:
When primary production exceeds organic matter decomposition, peat accumulates over time, increasing the elevation of the soil surface relative to the water surface.

The question here is how much time? What is the time line for the return of the peat as it once was, pre-drainage? Is this the CERP goal – pre-drainage peat accumulation?

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Soil elevations on tree islands are likewise positively correlated with P concentration (Wetzel et al.,2009), which influences tree island peat accretion directly, through local effects on organic matter production and decomposition rates, and indirectly, by exerting control over the composition of the vegetation community and its ability to sequester additional P (Figure 3). Givnish et al. (2008) surmised that a nutrient gradient resulting from the leaching of P from tree islands is a secondary driver of vegetation community composition and landscape processes in the surrounding marsh.

In all this more recent theory, "Conceptual ridge and slough model", they scientist ignore the fact that birds and alligators played a much more important part in the creation of the island (north of US41) and ridges of sawgrass with it is accompanying higher much elevations.

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Because indefinite expansion of ridge and tree islands is not consistent with the paleoecological record (Bernhardt et al., 2004), another mechanism must have controlled the stability of ridge and tree island boundaries, ensuring long-term heterogeneity.

The author implies that there are other factors to consider when a model is created that will demonstrate the dynamics of a ridge-slough-island system. The answer is in the number and quantity of birds and gators in the system. Of course, neither will exist in large numbers without their food foundation, fish, seeds and insects along with large red blood animals (deer).

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Recent studies of tissue
nutrient composition and turnover rates have suggested that the P demand of vegetation communities on the relatively dry and nutrient-rich tree island heads is 4 times greater than that of communities on the relatively wet and nutrient-poor tails. These relatively high nutrient demands suggest that the indefinite expansion of tree islands may be restricted by P availability in the surrounding marsh

Is the author saying that the tree islands need higher levels of P in the water around the island? And could this be used to allow the current P levels to be increased and thereby allow the EAA/Cities to send polluted water into the WCAs?

The tree island have soil that is richer because of the gator, birds, and fig tree litter that continually supply nutrients to the soil of the island.

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Long-term mean velocities throughout the Everglades have a range of 0.3–1.4 cm s^{-1} (Bazante et al., 2006; Harvey et al., 2009; Leonard et al., 2006; Riscassi and Schaffranek, 2002, 2003, 2004).

Here is where the ACOE should be getting their desired flow rate. The flow rate should not be 3 cm/sec. However, since the above flow rate is stated as being the long-term mean velocity this also means that there will planned flow rates much higher and lower. What are these planned

higher and lower flow rates and what will be the length of time for each extreme? What will the time of year each extreme will each occur?

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Table one does not include a long enough spread of years to be valid. There are many more years worth of data and all the data must be used if this chart is to be taken serious. In my opinion the author "cherry-picked" the years that would prove their desired position.

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Concentrations of larger detrital floc in suspension, measured with a digital floc camera over one day at a single site in central WCA-3A, were even lower (0.001–0.3 mg L^{-1}; Larsen et al., 2009c). Concentrations of suspended sediment are generally unrelated to flow velocities (Larsen et al., 2009c; Noe et al., 2010), suggesting that ambient flow velocities are below the sediment entrainment threshold. The dominant size class of fine sediment (0.45–2.7 μm) and dominance of particulate P by the microbial, acid-hydrolyzable fraction suggest a bacterial origin within the water column (Noe et al., 2007), whereas entrainment of larger aggregates in ambient conditions is likely associated with bioturbation (see subsequent paragraphs). Suspended sediment biogeochemical characteristics, size distributions, and concentrations do not significantly differ between ridge and slough, though the greater discharge through sloughs results in greater unitwidth loading of suspended material compared to ridges (Noe et al., 2010).

Ok, folks how many millions of years will it take to scour a ridge and slough system when we consider such small sizes of suspended sediment moved by the flow of water?

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The hurricane caused velocities as high as 4.9 cm s^{-1} at this research site, gusts of wind as high as 14.2 m s^{-2}, and water levels that increased by 20 cm over several hours (Harvey et al., 2009). These conditions eliminated surface mats of periphyton and *Utricularia* from sloughs and redistributed macrodetritus into lines of wrack that surrounded the edges of ridges and tree islands (Zweig and Kitchens, 2008).

Is this, 4.9 cm/s the flow rate that is needed to truly make a difference and have an impact on the re-creation of the ridge-slough-tree island system?

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This range was consistent with the predicted depth-averaged velocity (3.7 cm s^{-1}) in the field flume at the entrainment threshold using the velocity profile model of Larsen et al. (2009b).

Now I see where the ACOE is obtaining their marching orders to pump enough water into the WCAs to cause a 3 cm/sec flow rate. My questions remain the same:

1: Considering the only real world places and events where scouring could have taken place why should we think that scouring will happen in the open marshes of the WCAs with only 3 cm/sec of flow for a few days?

2: Now,

A. How will we know that scouring has taken place in these large open marsh areas?

B. When will we know that enough, supposed, scouring has taken place?

C. How long will each of these high water events each time they are created by man?

D. How many times a year will these man made high water events take place?

E. How many years will these man made high water events have to happen?

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Prolonged
flooding in southern WCA-3A (Zweig and Kitchens, 2008) and in Taylor Slough (Childers et al., 2006) has greatly reduced the annual net productivity of sawgrass and converted areas of sawgrass or wet prairie to sloughs. Fires that burn ridge peat, followed by two years of relatively deep conditions, have also transformed sawgrass communities to slough (Zweig and Kitchens, 2009).

We now see the foundation for the length of time each man caused flood will last – two years. This for sure will finish all the tree islands and destroy the WCAs. What are your plans to replace the tree islands and the lost vegetation due to the artificial high water depths you desire in WCA3?

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Without flow, well-connected sloughs and the ecosystem attributes that they sustain would likely not persist. However, if flows could not meet the needed water quality criteria, restoration planners would be faced with the option to maintain partial ecosystem function by managing the Everglades for topographic heterogeneity only, through adjustment of water levels. Gradual ridge expansion in a topographically heterogeneous system could be

inhibited or reset by natural episodic events or managed events such as controlled burns and periodic flooding, but these options require further study.

I agree with the basic premise of the above statement it is how we accomplish the flow rates, water depths, durations of each flood event, number of times per year for each event, and how many years will these abnormal high water events have to occur for you reach your desired results?

Jack Moller