

# CENTRAL EVERGLADES PLANNING PROJECT



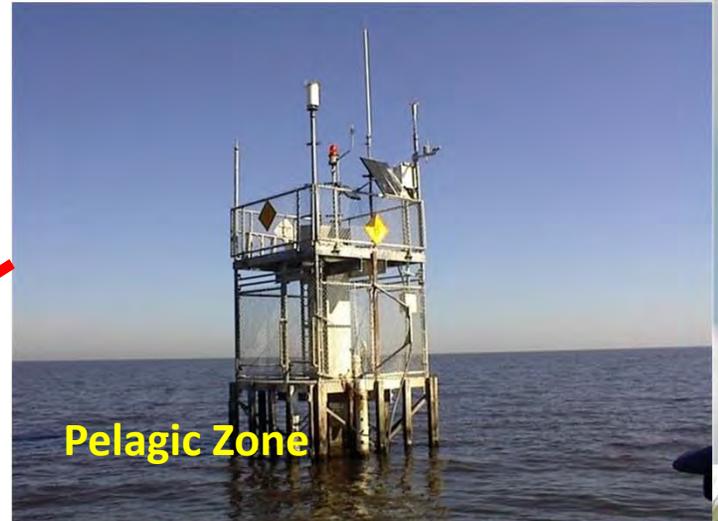
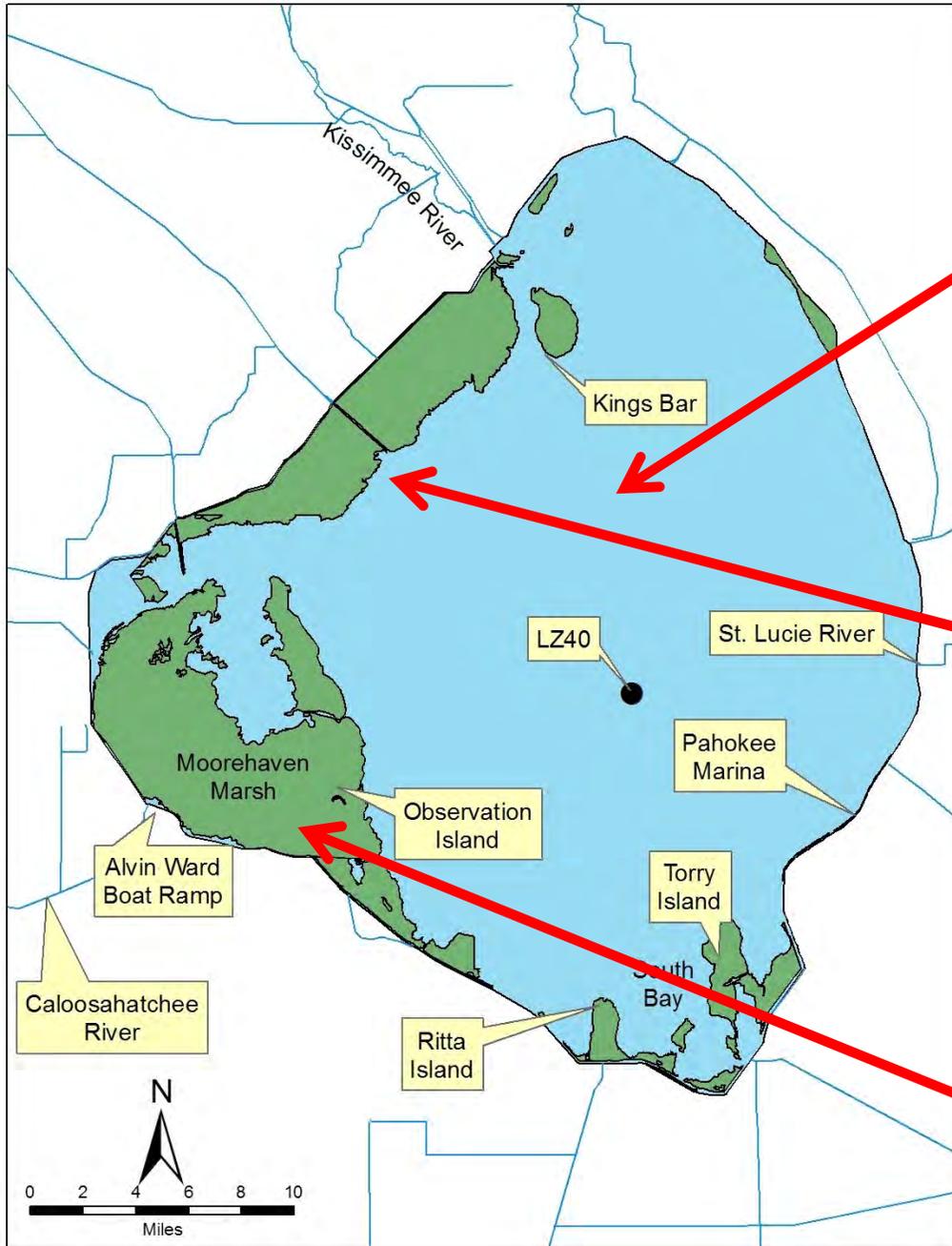
## Lake Okeechobee Ecology and Tier 2 Alternatives Evaluation

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**CENTRAL EVERGLADES**

# TWO MAIN DRIVERS OF LAKE ECOLOGY

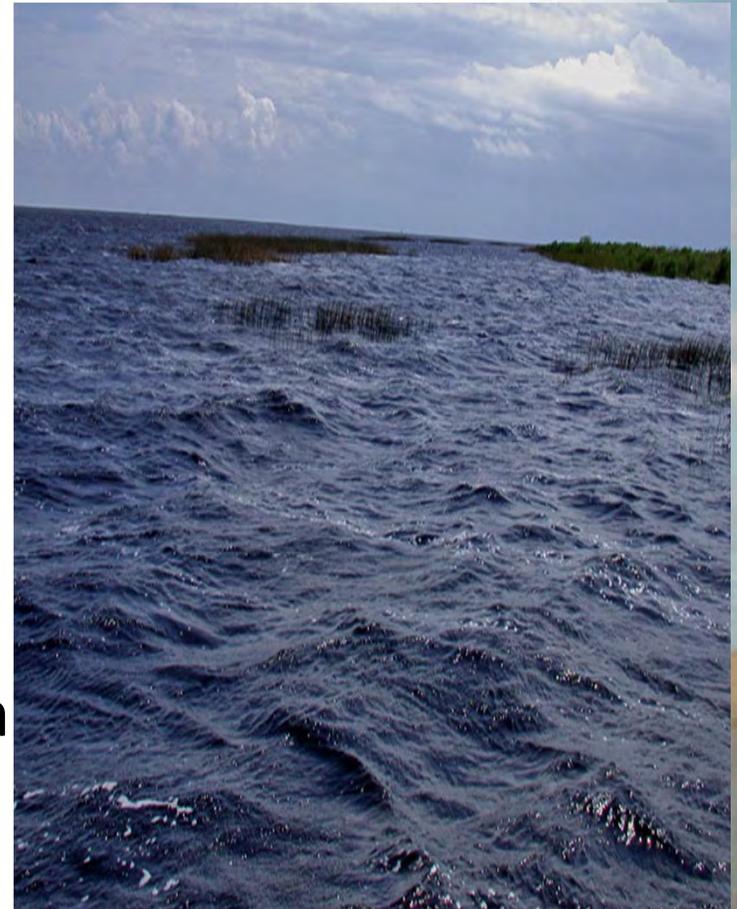
- WATER QUALITY
  - Nitrogen and Phosphorus
  - Transparency
- Lake Stage
  - Water depth
  - Annual cycle of changing depth

# RECOVER LAKE OKEECHOBEE PERFORMANCE MEASURES FOCUS ON LAKE STAGE

- Extreme High Lake Stages Greater Than 17 feet NGVD
- Extreme Low Lake Stages Less Than 10 feet NGVD
- Time Above The Preferred Stage Envelope (12 -15 feet NGVD)
- Time Below The Preferred Stage Envelope

# EXCESSIVELY HIGH > 17 FEET NGVD

- Worst condition for Lake ecological health
  - Drowns emergent marsh vegetation
  - Shades out submerged vegetation
    - Increased depth blocks light from reaching plants
    - Increased depth allows turbid water from pelagic zone to enter nearshore zone and marsh increasing shading
- When coupled with strong winds and waves physically uproots plants
- Effects of plant loss cascade through the entire ecosystem



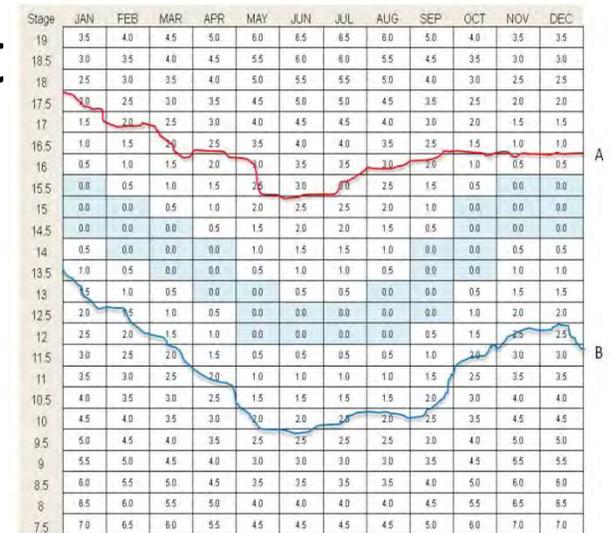
# EXCESSIVELY LOW LAKE STAGE < 10 FEET NGVD

- Next worst condition for Lake ecological health.
  - Marsh and nearshore zone dry out reducing available habitat
  - Short hydroperiod marsh shifts from wetland plants to terrestrial weeds
  - Encourages spread of exotic invasive vegetation
- Performance measure recognizes that occasional low lake stages can have some beneficial effects



# LAKE STAGE ABOVE OR BELOW STAGE ENVELOPE

- Being within the stage envelope of 12 to 15 feet NGVD is ideal
- Being above or below the envelope but not excessively high or low is suboptimal but acceptable if durations are short
- Being below the envelope is generally better than being above



# USING THE *RECOVER* PERFORMANCE MEASURES TO EVALUATE ALTERNATIVES

- **PROBLEM:**
  - Each alternative produces a unique set of hydrologic conditions
  - Some performance measures improve, some worsen
  - Makes alternatives comparisons difficult
- **SOLUTION:**
  - Rank and combine performance measure results to obtain a composite score for each alternative

# BASIS FOR RANKING LAKE OKEECHOBEE ALTERNATIVES

- Ranking uses the four RECOVER approved performance measures weighted for their relative ecological importance:
  - Standard Score Above 17 feet NGVD (50%)
  - Standard Score Below 10 feet NGVD (25%)
  - Standard Score Above Stage Envelope (15%)
  - Standard Score Below Stage Envelope (10%)
- Total ecological effect of combined weighted performance measures is incrementally cumulative

# EVALUATION RESULTS

Run	Baselines			Low Everglades Flow			Medium Everglades Flow			High Everglades Flow		
	WSE	LORS 08	AP5.50	LOK OPT	WS OPT	EST OPT	LOK OPT	WS OPT	EST OPT	LOK OPT	WS OPT	EST OPT
<b>SSA</b>	51.3	81.0	76.3	67.8	61.2	67.2	71.1	63.5	66.9	69.3	66.7	69.9
<b>SSB</b>	70.0	30.7	41.4	48.9	56.3	47.0	50.5	57.4	45.2	47.9	50.8	45.5
<b>SS&gt;17</b>	78.6	99.1	98.7	97.5	95.7	96.1	97.6	95.9	95.6	97.3	96.6	96.2
<b>SS&lt;10</b>	95.7	86.1	90.3	90.4	92.3	90.0	91.0	92.1	89.2	89.7	89.8	89.3
<b>Composite Score</b>	77.9	86.3	87.5	86.4	85.7	85.3	87.3	86.3	84.7	86.2	85.8	85.5

# LAKE OKEECHOBEE STAGES > 15 FEET NGVD

- Concern raised that amount of time above 15 feet NGVD not included as a performance measure but.....
- Time above 15 feet is encompassed in SS above performance measure.
- Except for the water supply alternatives, % time above 15 feet is similar to Adaptive Protocols
- If >15 feet refined to examine only events longer than 2 months, all preferred alternatives, including alternatives with better % time over 15' perform identically

# QUARTILE RANKINGS FOR LAKE OKEECHOBEE

Based On The Spread Between WSE (bad but not the worst) and Adaptive Protocols (good but not ideal)

- Quartile 4: A cumulative weighted score  $>90\%$
- Quartile 3: A cumulative weighted score between 80% and 90%.
- Quartile 2: A cumulative weighted score of between 70% and 80%.
- Quartile 1: A cumulative weighted score  $< 70\%$

# CONCLUSIONS

- WSE falls into Quartile 2, all other alternatives fall into Quartile 3
- Despite all alternatives being in Quartile 3, relative rankings between alternatives indicate real differences in performance
- Best Performer is Lake Okeechobee  
Opt –Medium Flow which is nearly as good as Adaptive Protocols
- Several alternatives perform as well as LORS 08; including one water supply option

QUESTIONS ?

