

**Everglades Avian Ecology
Forum
Miami, FL
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*Everglades Hydrology
and
Avian Ecology*

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Desired Outcome

The Formulation and
Implementation of
a True Multi-Species
Recovery Plan
which is
Compatible with
Everglades Restoration

The Import of a Multi-Species Recovery Plan

- The Everglades is an ecosystem
- The engine that drives the Everglades ecosystem is water
- Thus, fundamental to restoring the Everglades is “getting the water right”
- Without a “multi-species recovery plan (MSRP)” that complements “getting the water right” in an ecosystem context, Everglades restoration, as we know it, is in serious jeopardy

Example

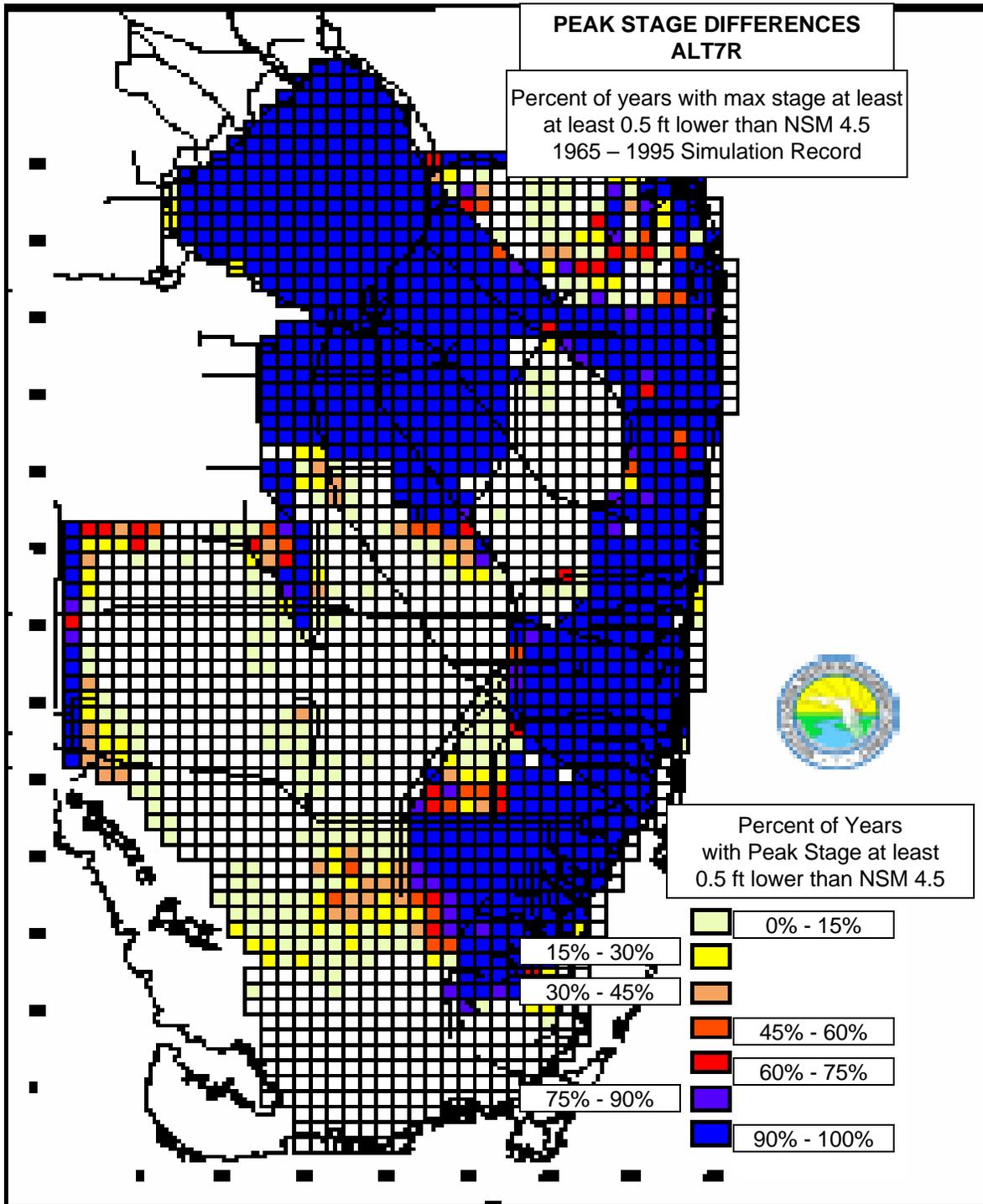
"Saving the Sparrow"

- As projects are being formulated and implemented to restore the Everglades by reducing water levels in WCA 3A and raising them in ENP, government officials declare that the opposite must be done to save the Sparrow
- Voila the ...
 - Emergency Deviations – Dec 1997 – 2000
 - Interim Structural & Operational Plan (ISOP) – 2000 - 2002
 - Interim Operational Plan (IOP) – 2002 – ????
 - Proposed Revisions to CSSS Critical Habitat - 2006

Explanation of Symbols & Abbreviations

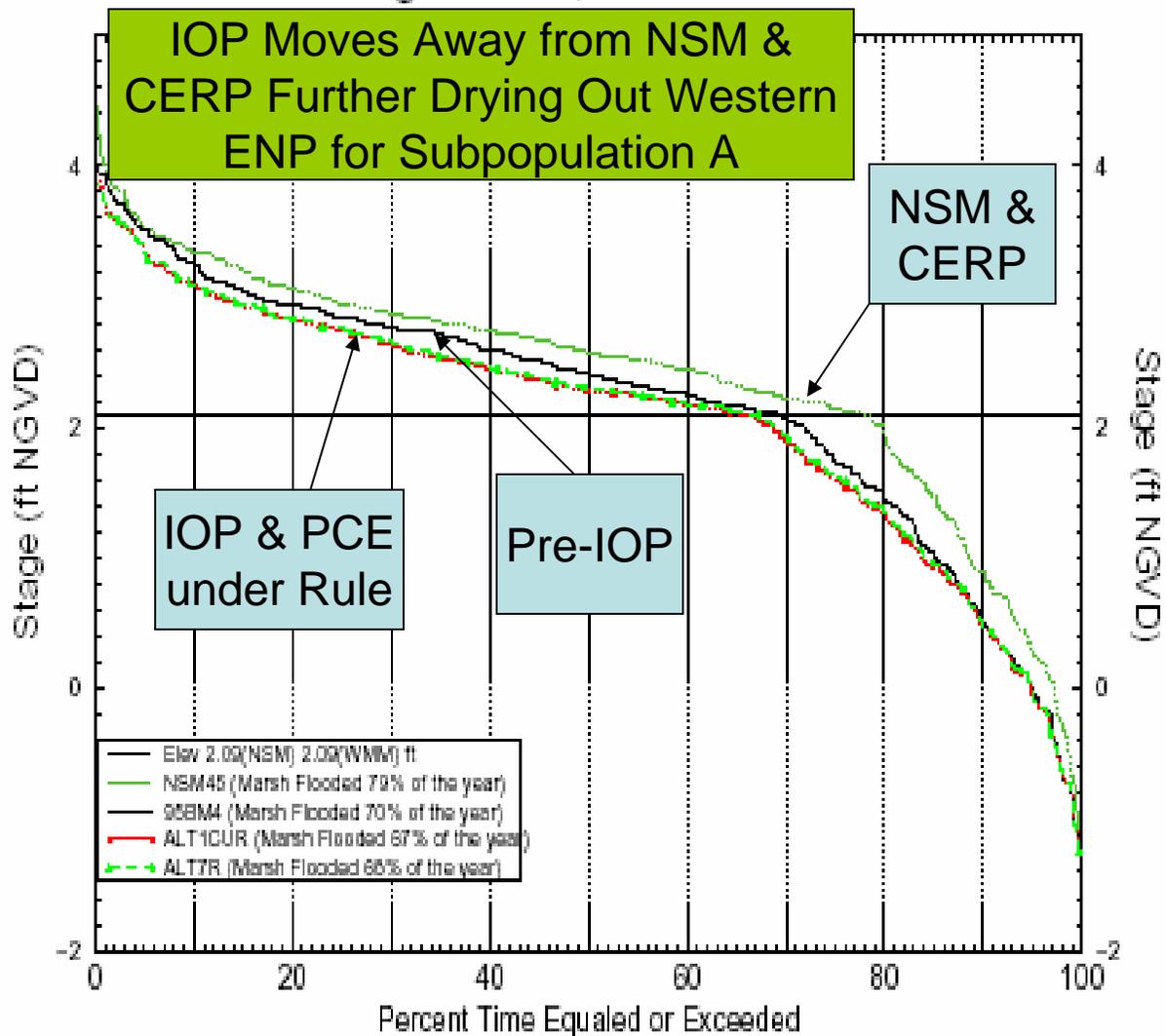
- NSM or NSM 4.5 = Natural System Model = CERP goal
- Base 95 or 95BM4 = Test 7, Phase I or the regulation schedule when jeopardy was declared to the CSSS
- ALT1CUR = ISOP
- ALT7R = IOP

UNDER IOP, ENP IS MUCH LOWER THAN NSM AND HEADED IN THE WRONG DIRECTION



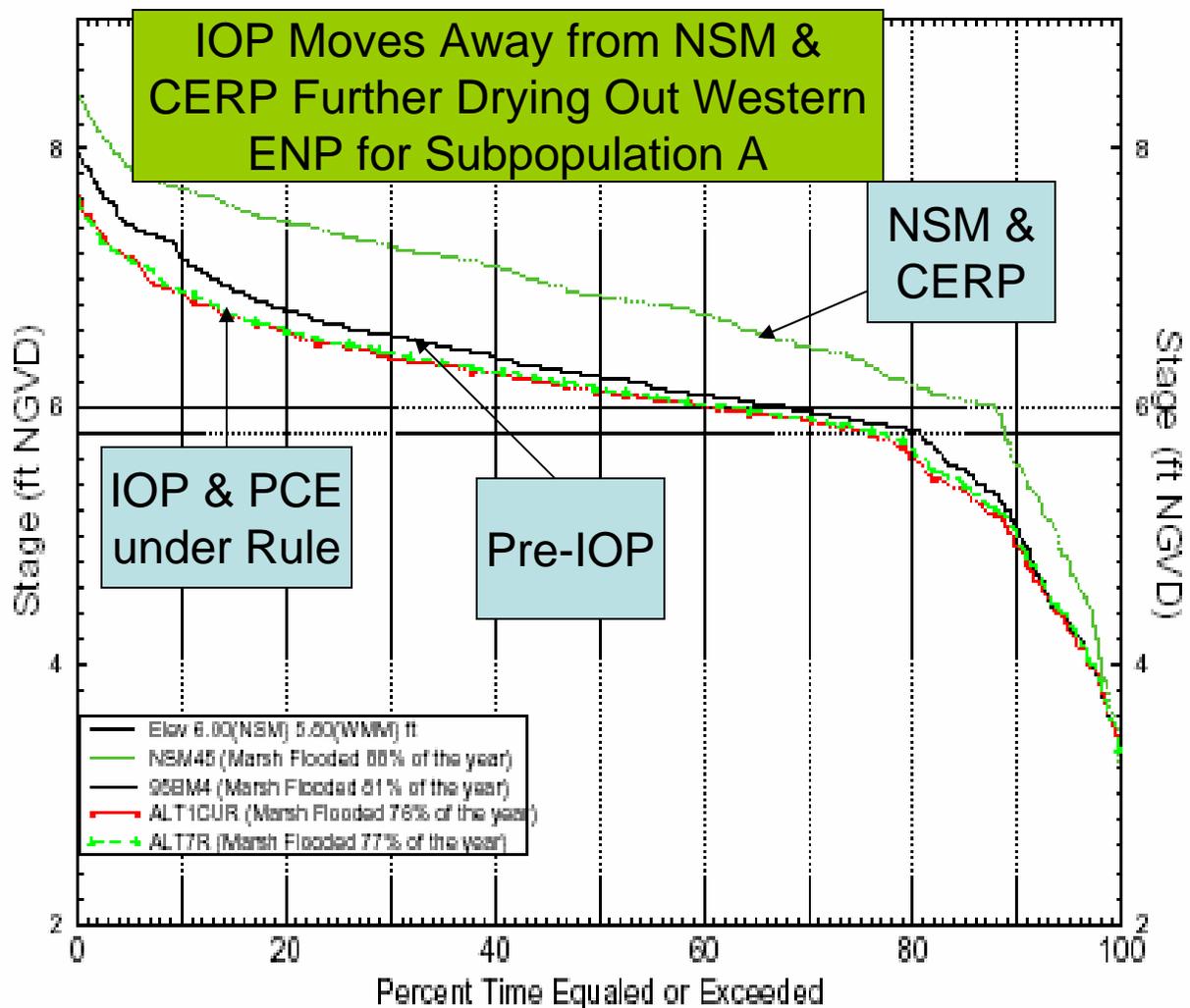
ENP Cell R17 C13

Stage Duration Curves at Marl Lands West of SRS
Gage NP-34, Cell R17 C13



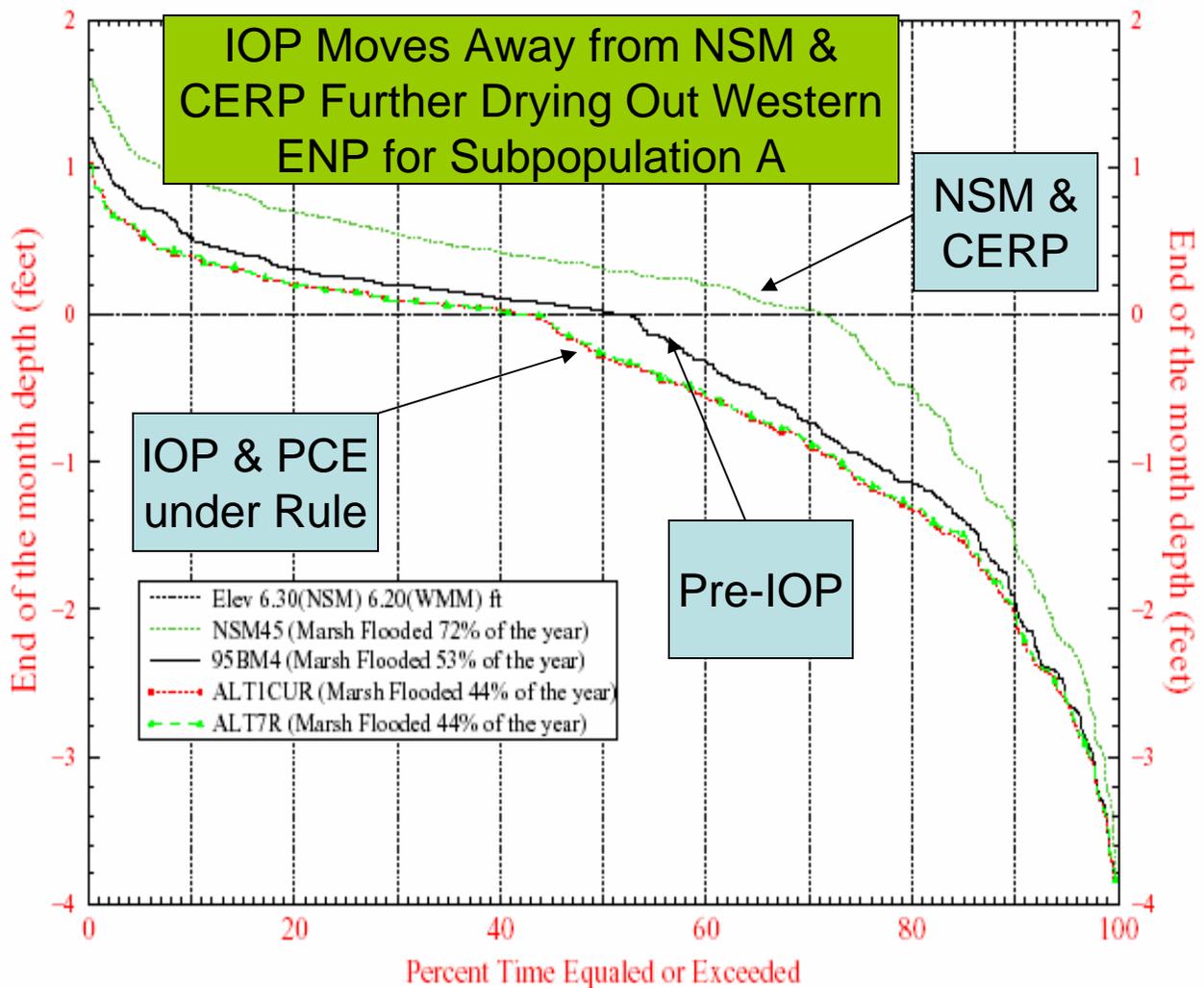
ENP Cell R19 C18

Stage Duration Curves at NW SRS
Gage G-620, Cell R19 C18



ENP Cell R19 C16

Normalized Stage Duration Curves at Cell (R19 C16)
ENP Gage NP205

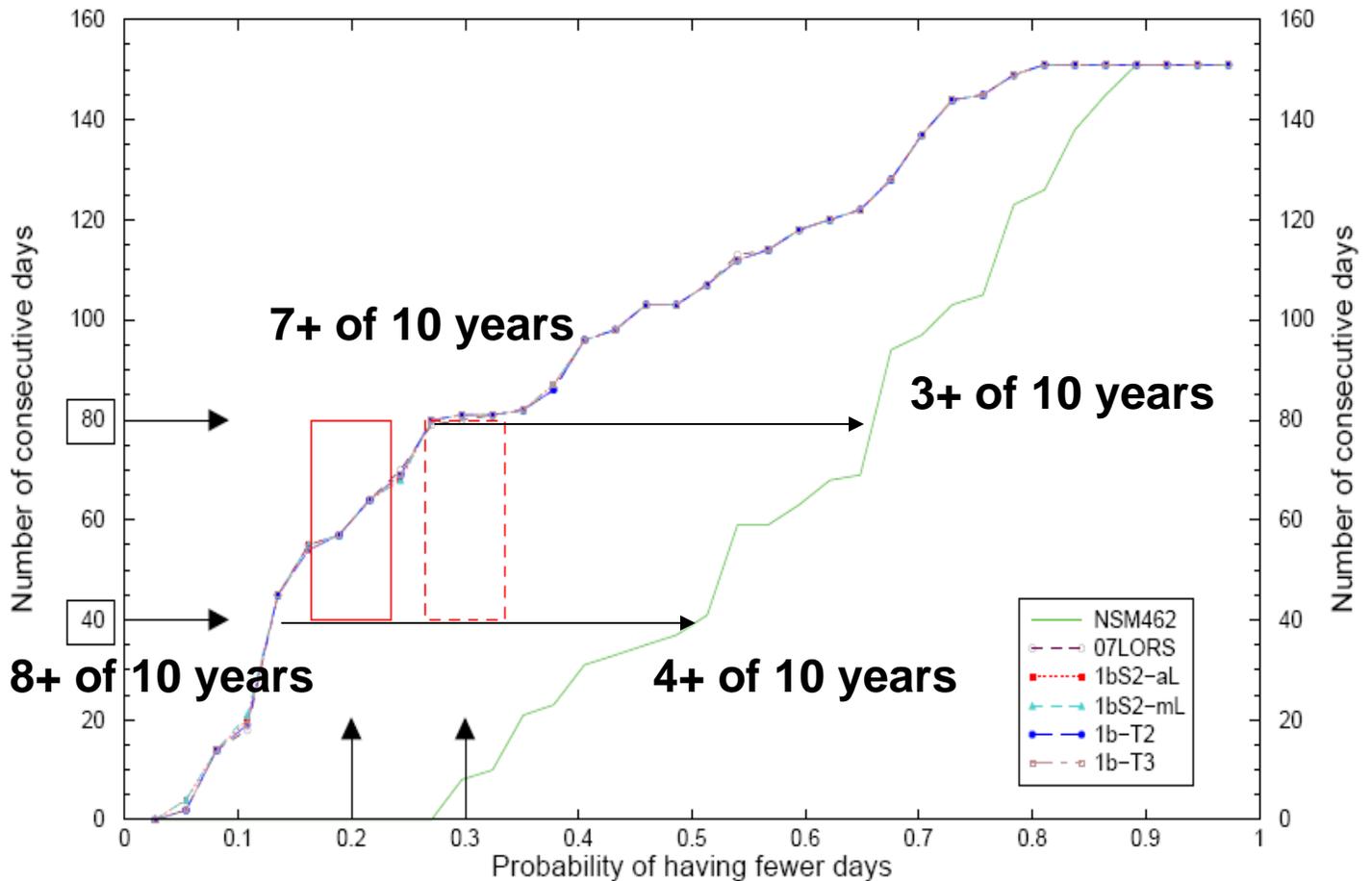


Note: Normalized stage is stage referenced to Land Elevation. Thus, values above zero indicates ponding while below zero indicates depth to the water table.

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Continuous Analysis
SFWM V4.4

Sub-Population A Nesting Availability

Sub-population "A" Nesting Condition Availability (1965-2000)
Number of consecutive days with water levels below ground (2/15-7/15)

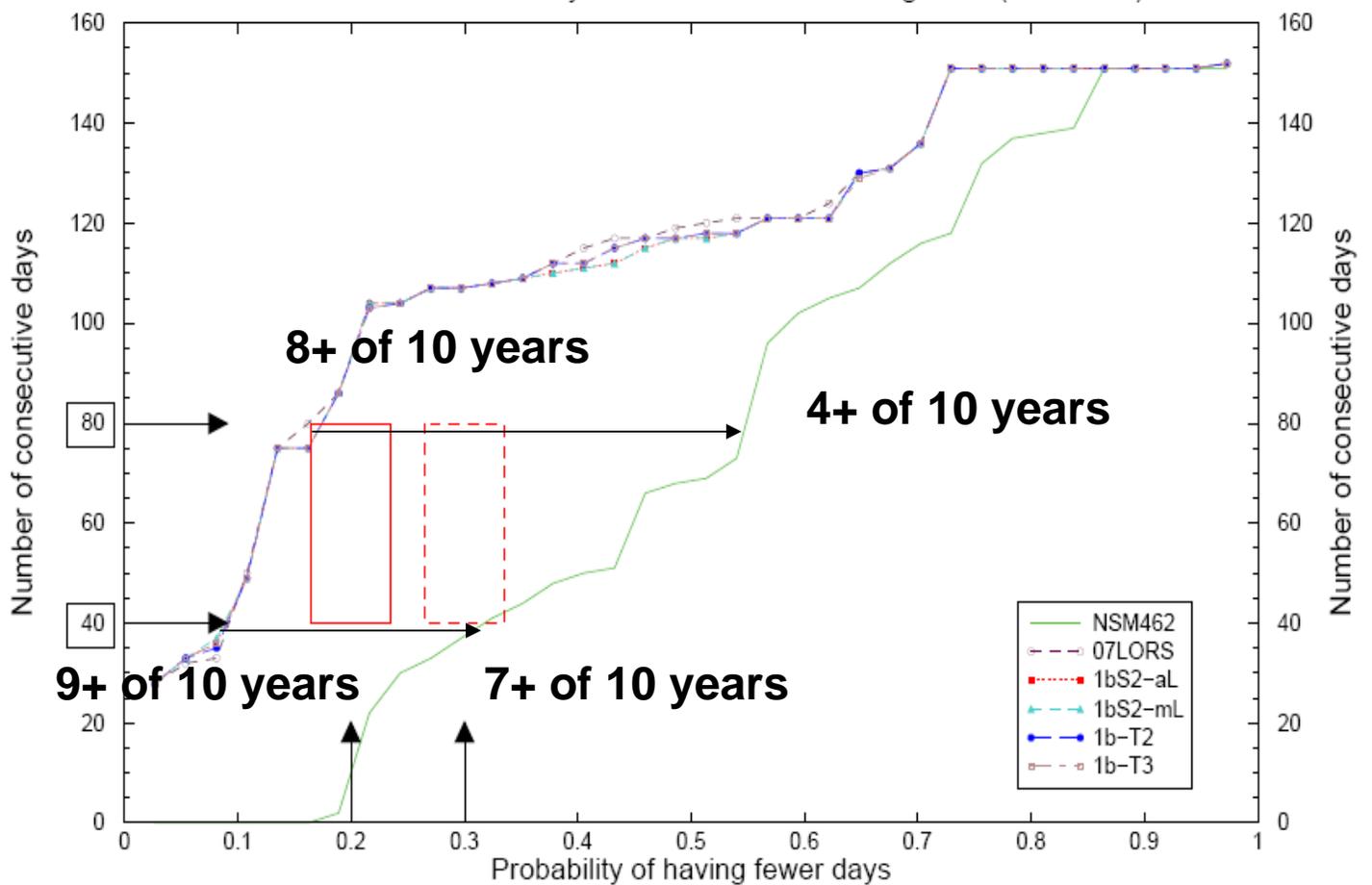


40-80 day window
8 out of 10 years (0.2)

40-80 day window
7 out of 10 years (0.3)

Sub-Population E Nesting Availability

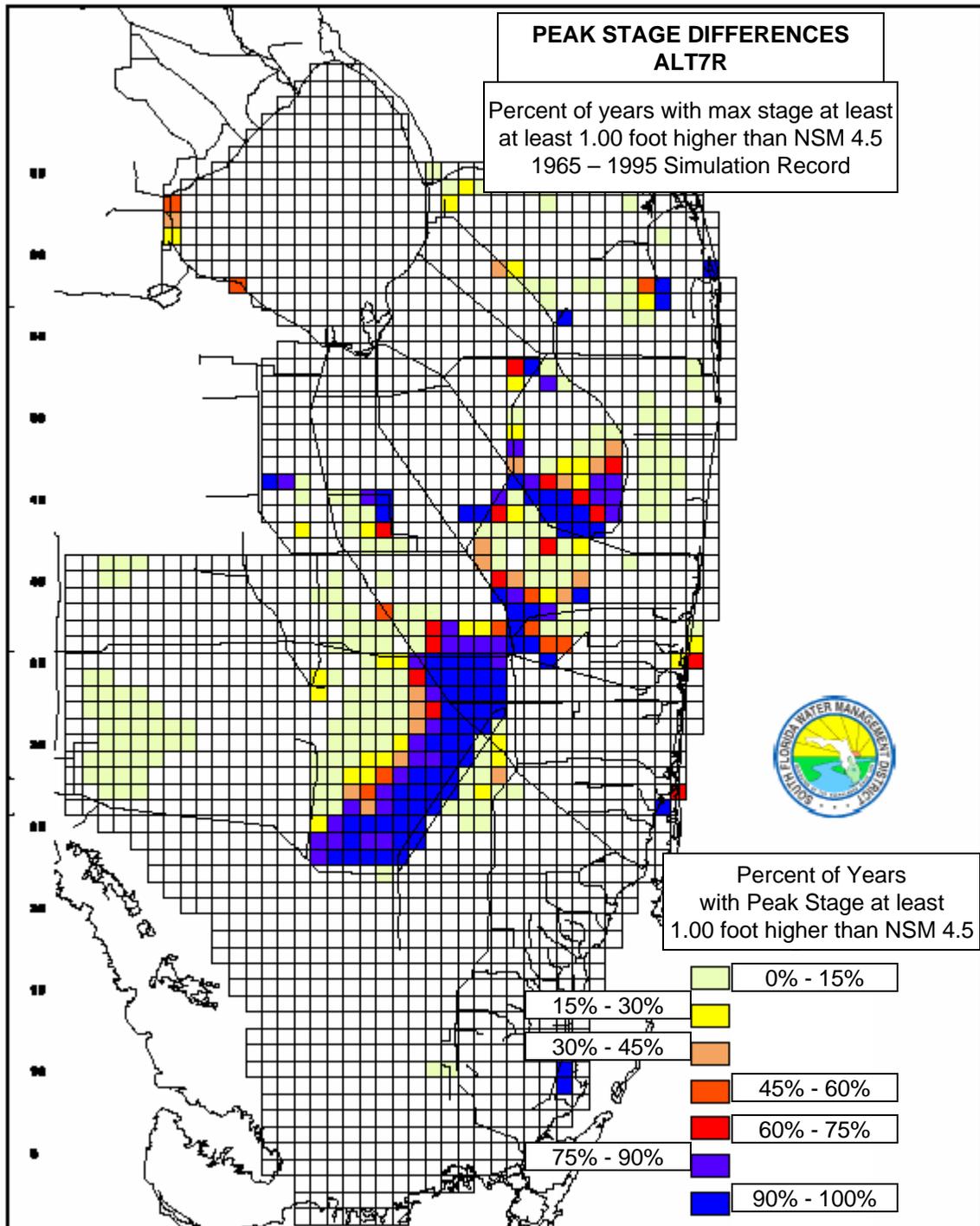
Sub-population "E" Nesting Condition Availability (1965-2000)
Number of consecutive days with water levels below ground (2/15-7/15)



40-80 day window
8 out of 10 years (0.2)

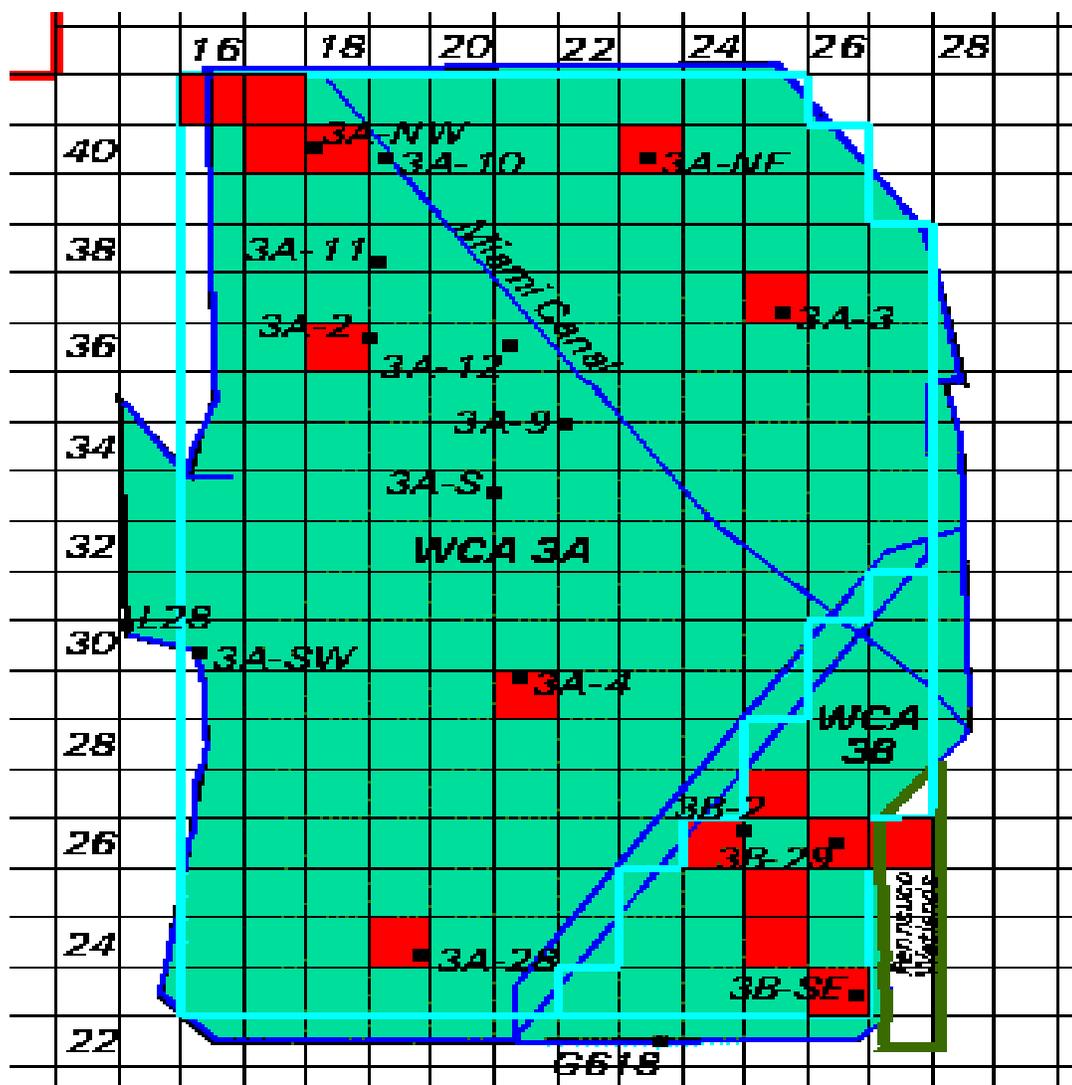
40-80 day window
7 out of 10 years (0.3)

UNDER IOP, WCA 3A & SNAIL KITE CRITICAL HABITAT IS MUCH HIGHER THAN NSM AND HEADED IN THE WRONG DIRECTION



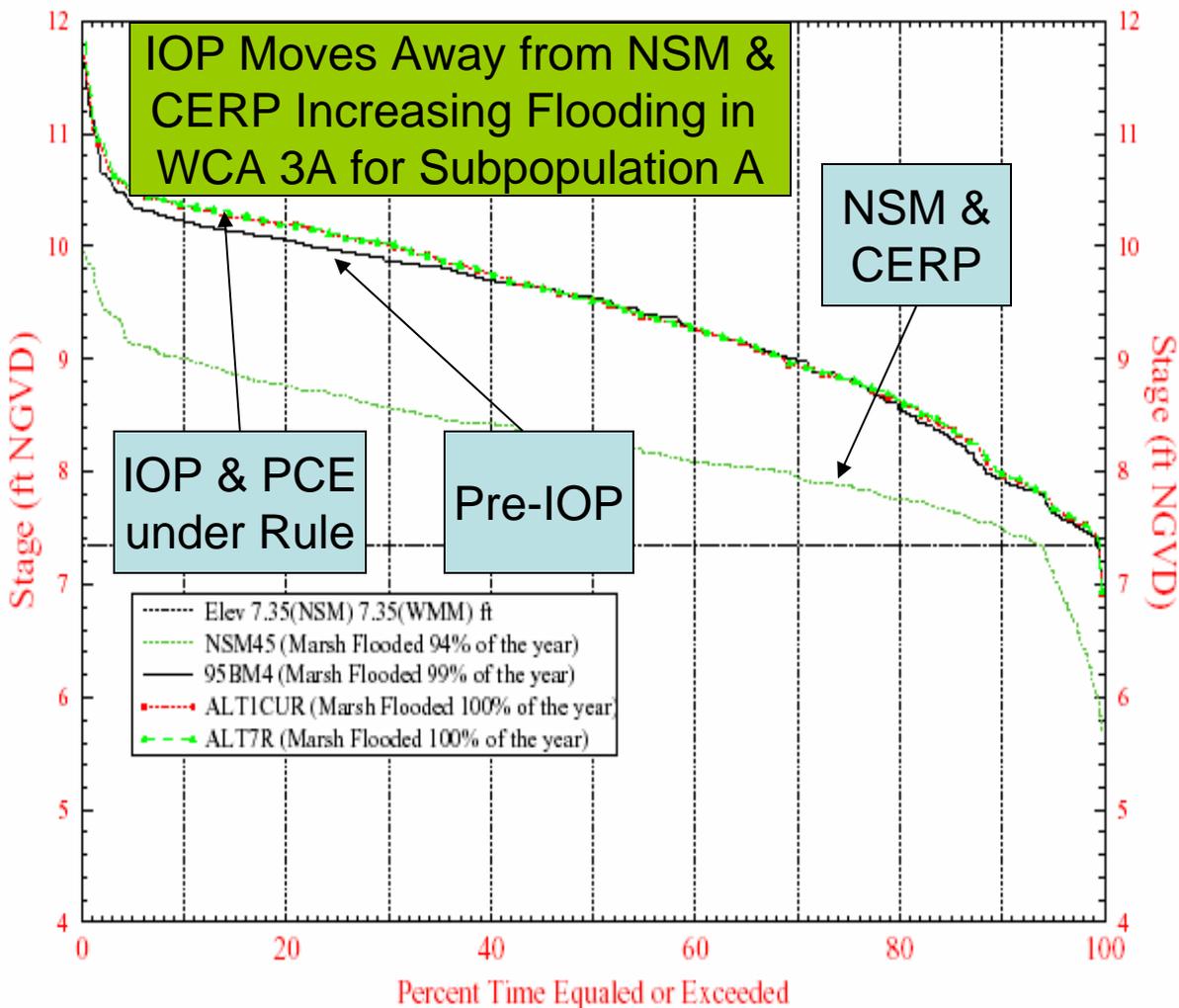
WCA 3A Indicator Cells

Water Conservation Area 3



WCA 3A Cell R24 C19 SNAIL KITE CRITICAL HABITAT MUCH WETTER THAN NSM ... AND GETTING WETTER BECAUSE OF THE SPARROW

Stage Duration Curves at South End of WCA-3A
(Gage 3A-28, Cell R24 C19)

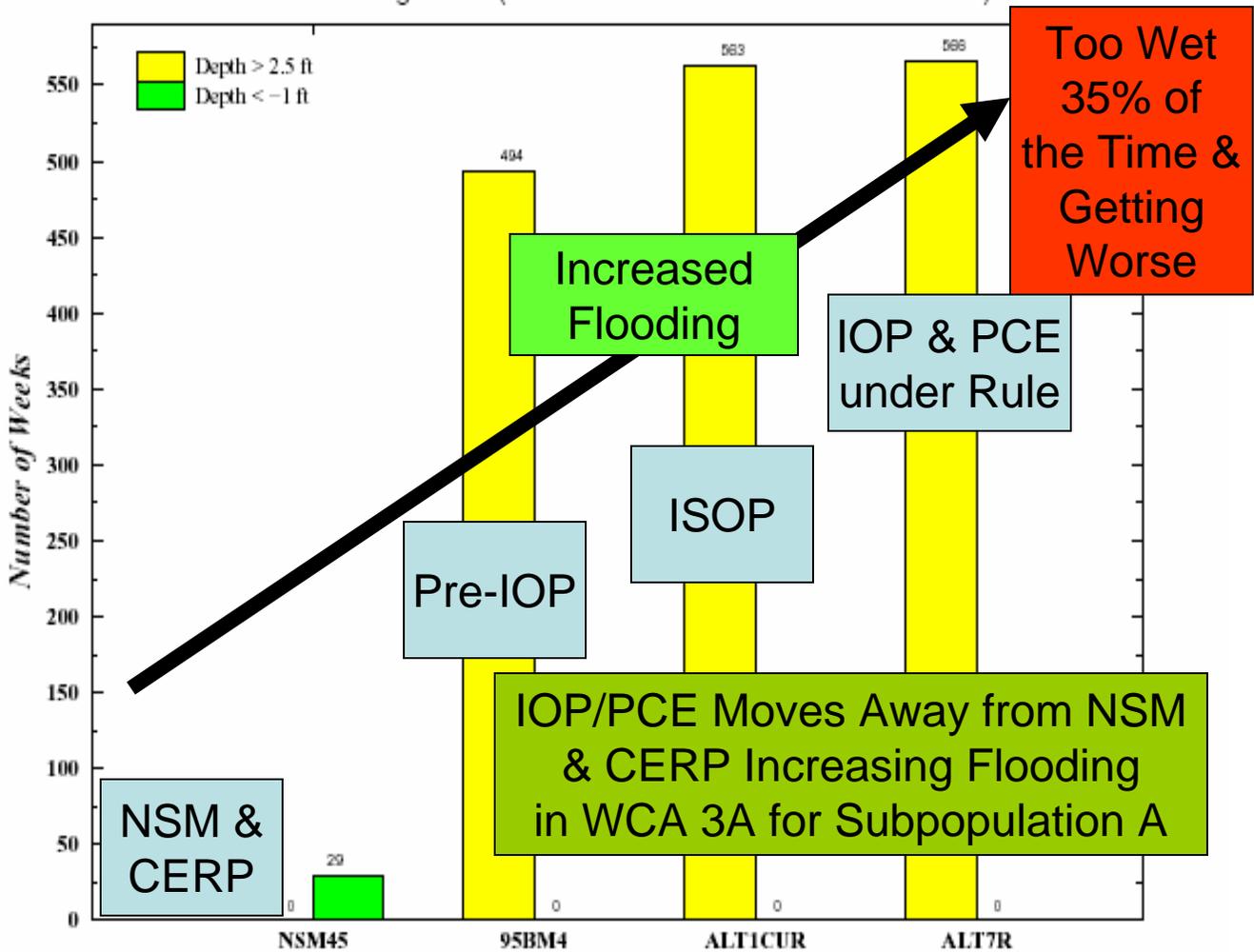


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 Continuous Analysis
 SFWMM V4.4

WCA 3A Regional Indicator

Number of Weeks High/Low Water Depth Criteria Exceeded

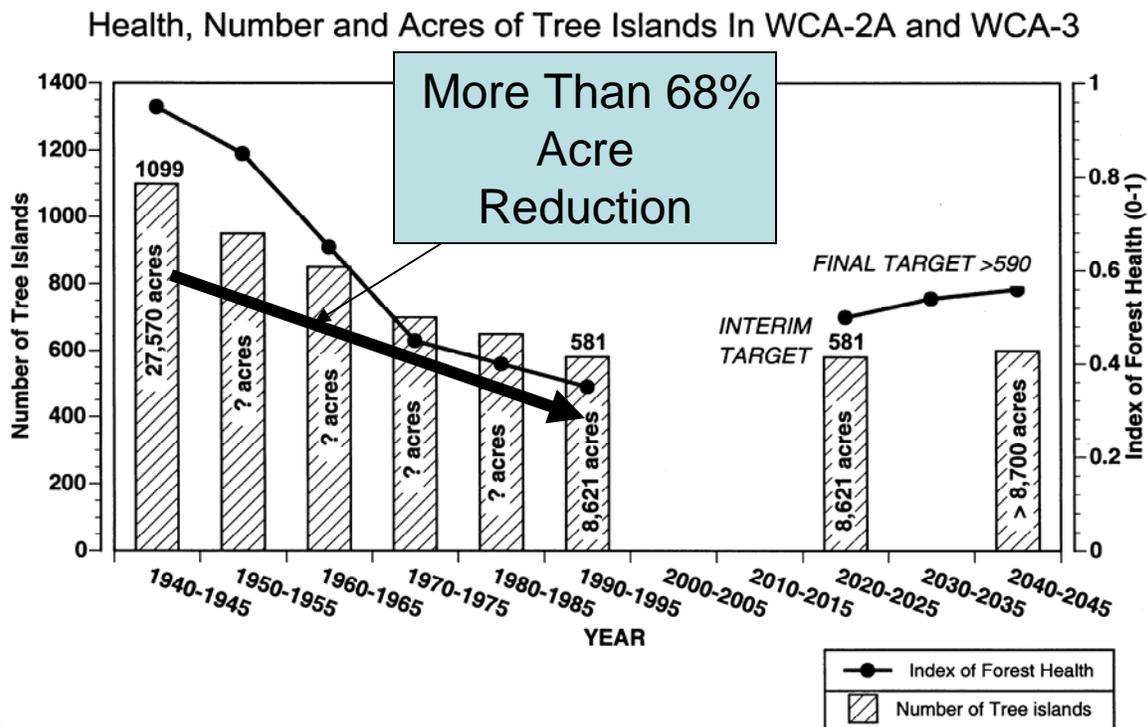
Indicator Region 14 (R23C17-20 R24C17-20 R25C17-21)



Note: The desired condition is to exceed the high water depth as few times as possible and go below the low water depth as few times as possible.

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For Planning Purposes Only
BFWMM V3.4

Tree Island Destruction 1940 to 1995



**US Army Corps of Engineers—8.5 SMA GRR/EIS July 2000—
cost of delay in implementing Mod Waters project:**

- “loss of tree islands has an impact on the critical habitats and cultural resources”
- “it is estimated as loss of 8.4 islands and 246 acres per year”
- “estimated values for full restoration of tree islands may range from \$50,000 to \$500,000 per acre”

WCA 3A

Snail Kite Critical Habitat

"We expect that these stages will result in the degradation of 184,320 acres of snail kite [critical] habitat within WCA-3A in each of the next four years when stages exceed 10.5 feet."

Fish & Wildlife Service Biological Opinion on the Interim Operational Plan for the CSSS, November 17, 2006, page 77.

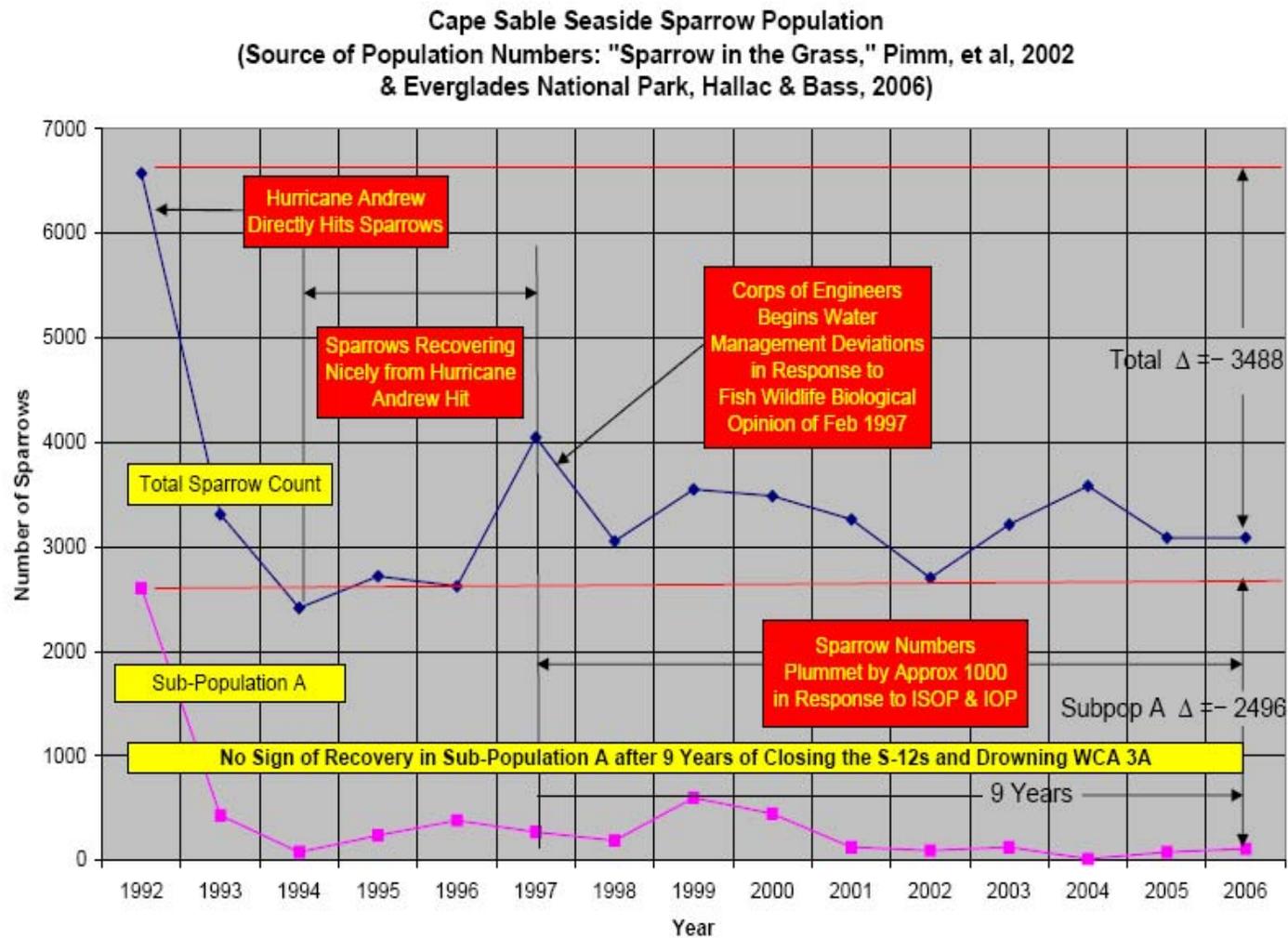
In Summary

- Officials initially said that sparrow deviations were for the short-term, but after 9+ years, there is no end in site
- Serious and irreversible destruction is being done, e.g. tree islands & 10s of thousands of acres of Snail Kite Critical Habitat in WCA 3A have been damaged and/or lost
- With the removal of Mod Waters from the RPA and the added Critical Habitat PCE, flows will have to be blocked in perpetuity
- Jeopardy will potentially be declared on both CSOP and CERP
- And even worse, these unnatural alterations have apparently reduced the sparrow population

A Look at the Hydrology that Has Driven Decisions

Some Key Points that Should Be
Considered as We Move into the
Future ... Modifications to the
Reasonable & Prudent Alternative,
Critical Habitat Proposal, & CERP
Implementation Are Surely
Warranted!!!

Overview of Sparrow Population Changes



S-12 Flow Analysis

“If breeding season flows over the S12s are stopped, this population [Sub-population A] will flourish.”

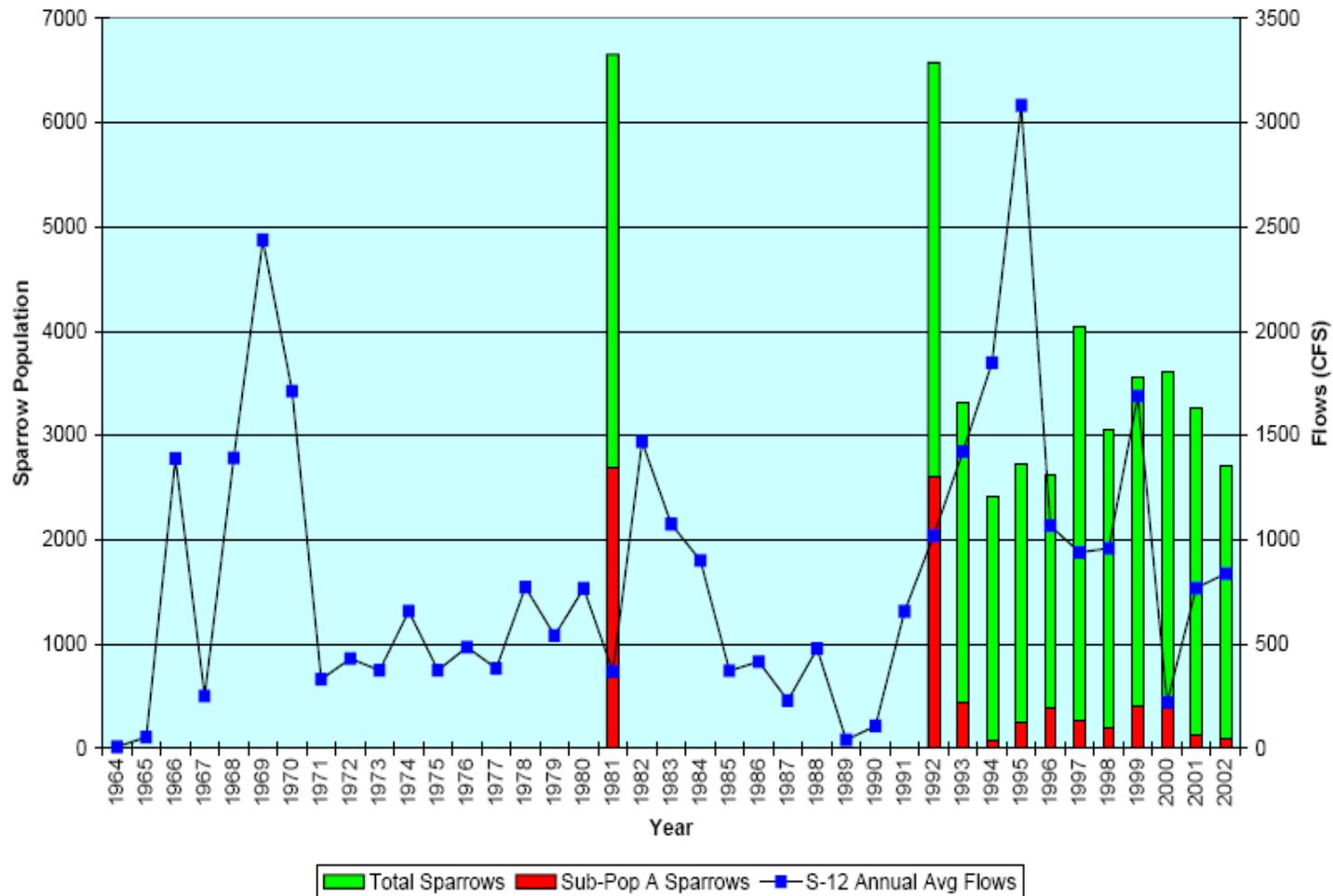
Pimm, S.L., An assessment of risk of extinction of the Cape Sable Seaside Sparrow, Chapter 10 of an unpublished annual report for 1997

S-12 Flow Analysis Summary

- In support of S-12 flows causing sparrow decline, we often see words such as: "From 1993 to 1995, the sparrow population [in Sub-pop A] declined precipitously, from an estimated 2,608 individuals in 1992 to 240 individuals in 1995." ... in actuality the "population declined precipitously" between the 1992 and 1993 census when an 84% reduction occurred (2,608 individuals to 432) when the flows thru the S-12 structures were relatively average.

S-12 Flows versus Sparrow Population

Water Flows Thru S-12's Versus Sparrow Population



S-12 Flow Analysis Summary

- Actually in between 1994 and 1995, when flows were extremely high, the population increased by 300%.
- And when flows were the highest on record in 1995, the population increased another 160%.
- The “precipitous decline” occurred when flows were about average ... the precipitous decline had already taken place when the extremely high rainfall and flows of 1995 occurred.

S-12 Flow Analysis Summary

Bottom Line:

- The precipitous drop in sparrows from 1992 to 1993 cannot logically be attributed to increased flows through the S-12s, as the preceding 7-year period was dry and the flows in 1992 were relatively average
- Although record flows occurred in 1995 (3 years after the precipitous drop), the sparrow population in Sub-pop A increased both in 1995 and 1996
- Even though the S-12s have been utilized to artificially stop flows and dry out Sub-pop A for the past 9 years, there has been no rebound in the sparrow population
- There is much more than flow at work here

Analysis of Water Management

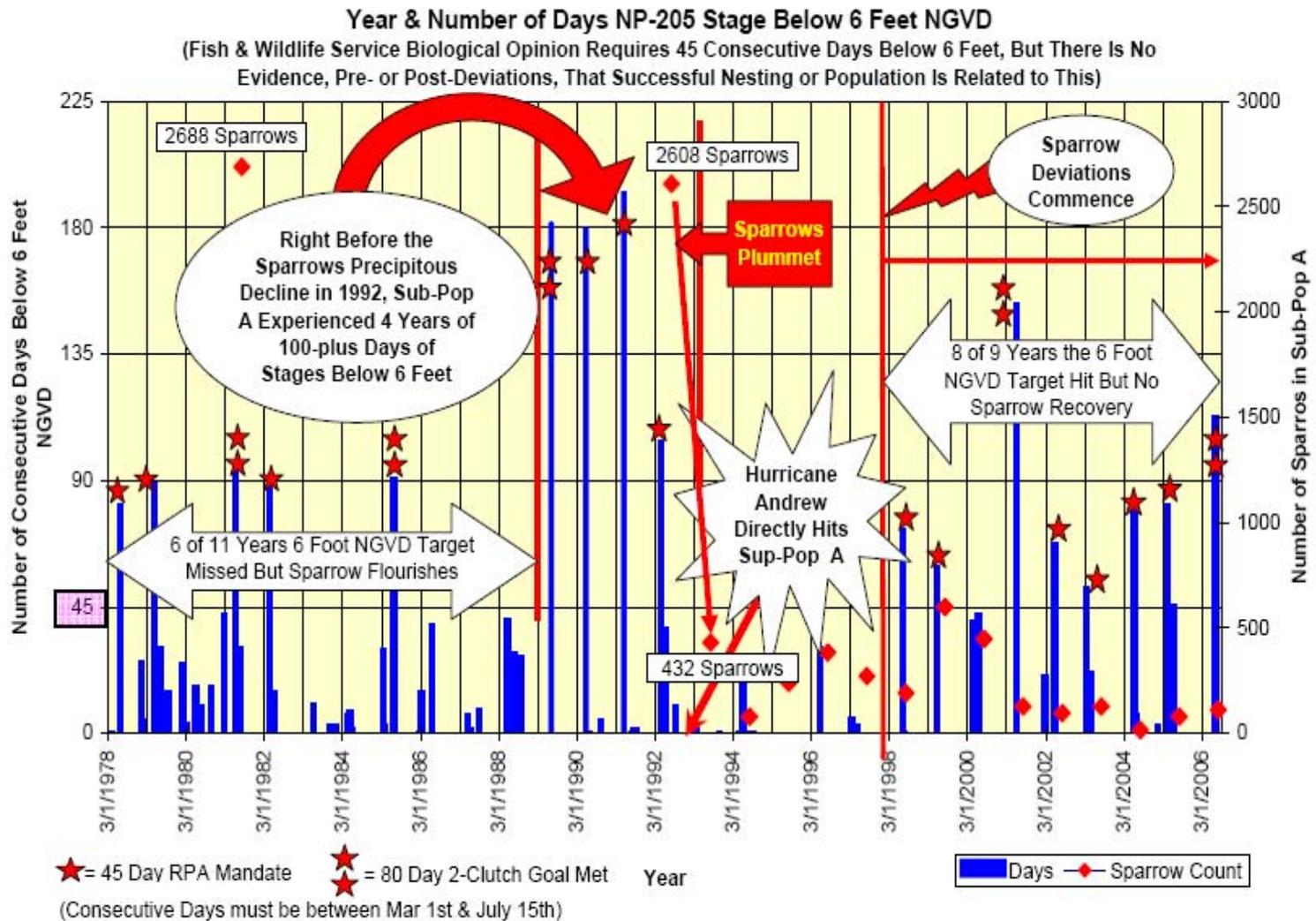
- In support of S-12 flows causing sparrow decline, we often see words such as: “Water management actions during 1993 to 1995 dramatically reduced estimated numbers in this group [Sub-pop A].”
- What water management actions? If anything, for a given rainfall, less water was flowing through the S-12 structures for a given rainfall than previous to this period.

Analysis of Sparrow RPA

At the heart of the FWS RPA is the following requirement as stated in the FWS 1999 BO:

"The Corps must prevent water levels at National Park 205 (NP 205) from exceeding 6.0 feet National Geodetic Vertical Datum (NGVD) [which is ground level] for a minimum of 45 consecutive days between March 1 and July 15. [emphasis added] This would provide water levels sufficient to allow completion of one nesting cycle in approximately 40 percent of the sparrow habitat in subpopulation A. Although sparrows need at least 40 days to complete one nesting cycle and build new nests for each successive brood, more than 40 days may sometimes be necessary to complete the cycle when individuals do not find a mate and/or establish a pair bond in the first day ..." (Biological Opinion, Experimental Program and Modified Deliveries Project, FWS, 1999.)

45-Day Rule Analysis



Summary of 45-Day Rule Analysis

- Essentially met 45-day rule each year since 1998 ... no evidence of sparrow recovery over this 9 year period
- Only met 5 of 11 years between 1978 & 1988 ... but sparrow thrived
- From 1989 thru 1992, met 45-day rule with much room to spare ... but sparrow declined by 84% between 1992 and 1993 census (2,608 to 432 sparrows)
- Can find no discernable correlation between 45-day rule and sparrow population

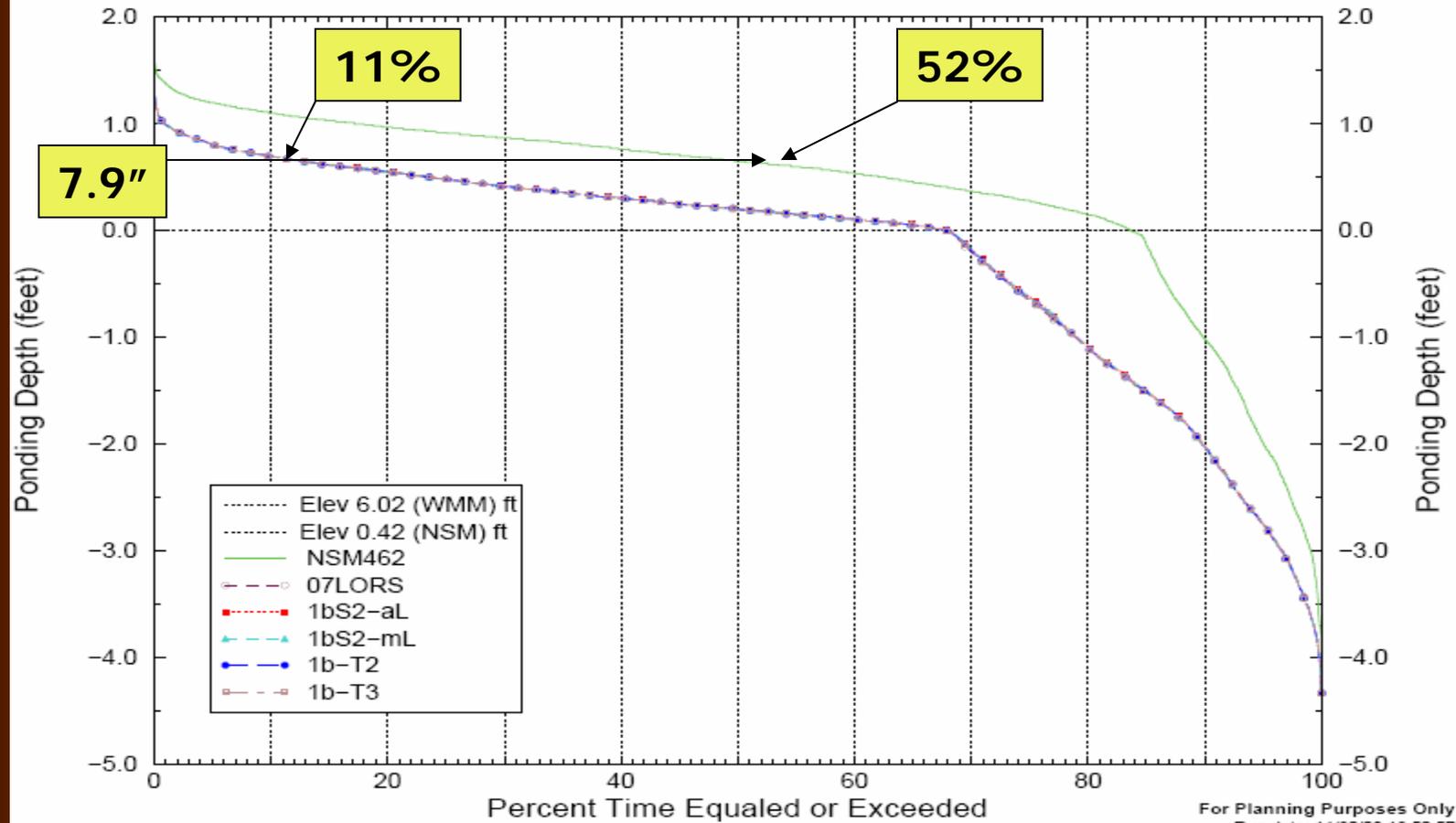
Analysis of PCE

- A proposed rule to revise sparrow Critical Habitat was published in the Federal Register/Volume 71, No. 210/Tuesday, October 31, 2006/Proposed Rules.
- *Based on the above discussions of the life history, biology, and ecology of the species and the requirements of the habitat to sustain the essential life history functions of the species, we have determined that the Cape Sable seaside sparrow's PCEs [Primary Constituent Elements] consist of: ... (4) Hydrologic regime such that the water depth, as measured from the water surface down to the soil surface, does not exceed 7.9 inches (20 cm) during the period from March 15 to June 30 at a frequency of more than 2 out of every 10 years. (p. 63988)*

Sub-Population E – NP-206

Normalized Duration Curves for Everglades National Park

(Gage NP-206, Cell Row 15 Col 21)



Hurricane Andrew

- *"Destruction of marshes by hurricanes threatens its [seaside sparrows] existence"* Common Ornithological Description
- *"The tattered remnants of the Cape Sable seaside sparrow of Southwestern Florida were snuffed out in the hurricane of 1935."* Charles Bebee, 1967
- *"Catastrophic storms, such as the hurricanes in 1935 and 1992, can lead to natural vegetation changes that make the environment unsuitable for Cape Sable sparrows, thus causing local extirpations. Hurricanes may also kill birds directly, as was likely the case in 1992."* FWS, The Red Book, as of January 1995

Hurricane Andrew

- *"The population west of Shark River Slough was in the storm's eye and declined dramatically from 1992 to 1993 ... Andrew may have reduced the sparrow's total numbers from approximately 6000 to 4000 [actual decline was from 6576 to 3312]"* Stuart L. Pimm, et al, *Hurricane Andrew*, Bio Science, 1994.

Hurricane Andrew Summary

In all likelihood, Hurricane Andrew had a major role in the sparrow population precipitous decline, 84% in Sub-population A, between the 1992 census and the 1993 census ... it would only be prudent to reassess its role given the facts at hand

The FACTS

- Sparrows flourished/survived for centuries under natural hydrologic conditions (prior to 1928)
- Sparrows flourished/survived for 36 years after Tamiami Trail was constructed (1928 - 1964)
- Sparrows flourished for 28 years after the S-12 structures were put into operation (1964 - 1992)
- Sparrow population plummeted between 1992 & 1993
- Decline was attributed by FWS to abnormally high flows through the S-12 structures, but neither 1992 nor 1993 experienced particularly high flows
- Hurricane Andrew did hit Sub-pop A directly in August of 1992, but, although initially identified as the culprit, it was quickly disregarded

The FACTS

- Deviations to unnaturally dry out Sub-pop A began in 1997 and the 45-day dry out rule was put into effect in 1999
- Over the 9 years since, the sparrow has not recovered, but further declined by about 1000 individuals
- A historical review of the 45-day rule shows no correlation between sparrow population and artificially drying out Sub-pop A
- In addition to the 45-day rule, FWS is now proposing a 20-cm PCE which further sanctions the unnatural drying out of ENP
- Both the 45-day rule and the 20-cm PCE work in oppositions to Everglades Restoration & CERP
- In order to implement both the 45-day rule & the 20-cm PCE, levees, gates, etc. will be necessary in perpetuity to unnaturally manage the water

Conclusions

- Both RPA & Proposed Critical Habitat Revision for CSSS Work Against Everglades Restoration
- Precipitous Drop in Sparrow Population Was Between 1992 & 1993, & Was Not Due to Water Management Changes or High Flows
- 45-Day Rule Has Neither Worked Nor Is Their Historical Evidence that It Should
- Hurricane Andrew Played a Major Role in the Sparrow Decline, and Future Plans & RPA/Critical Habitat Modifications Should Take This into Account

The Bain of the Everglades Levees, Gates, & Other Structures



The Multi-Species Recovery Plan is a Top Priority

Without an MSRP that is implementable in the ecosystem context, we will continue to:

- Pit species against species
- Pit area against area
- Pit people against people

And the Everglades will be lost forever

Priorities

- Accept that the driver of Everglades restoration is “getting the water right”
- Accept that CERP and associated activities are going to change existing habitats by changing the hydrology
- Accept that species are going to have to adapt to the changes
- Develop a plan to help the species adapt, which includes such things as:
 - Species triage
 - Project sequencing
 - Project timing
 - Design flexibility

The Challenge

Our immediate challenge ...

Quickly develop a methodology, which when overlaid on the long-term restoration process, will ensure the effective transition of all species into a restored ecosystem, while, in the short-term, minimize large-scale, irreversible damage that is done in response to jeopardy opinions ... always seek and find the reasonable, balanced solution.