



Tropical Storm Impacts to Everglades Stormwater Treatment Area Submerged Aquatic Vegetation Communities

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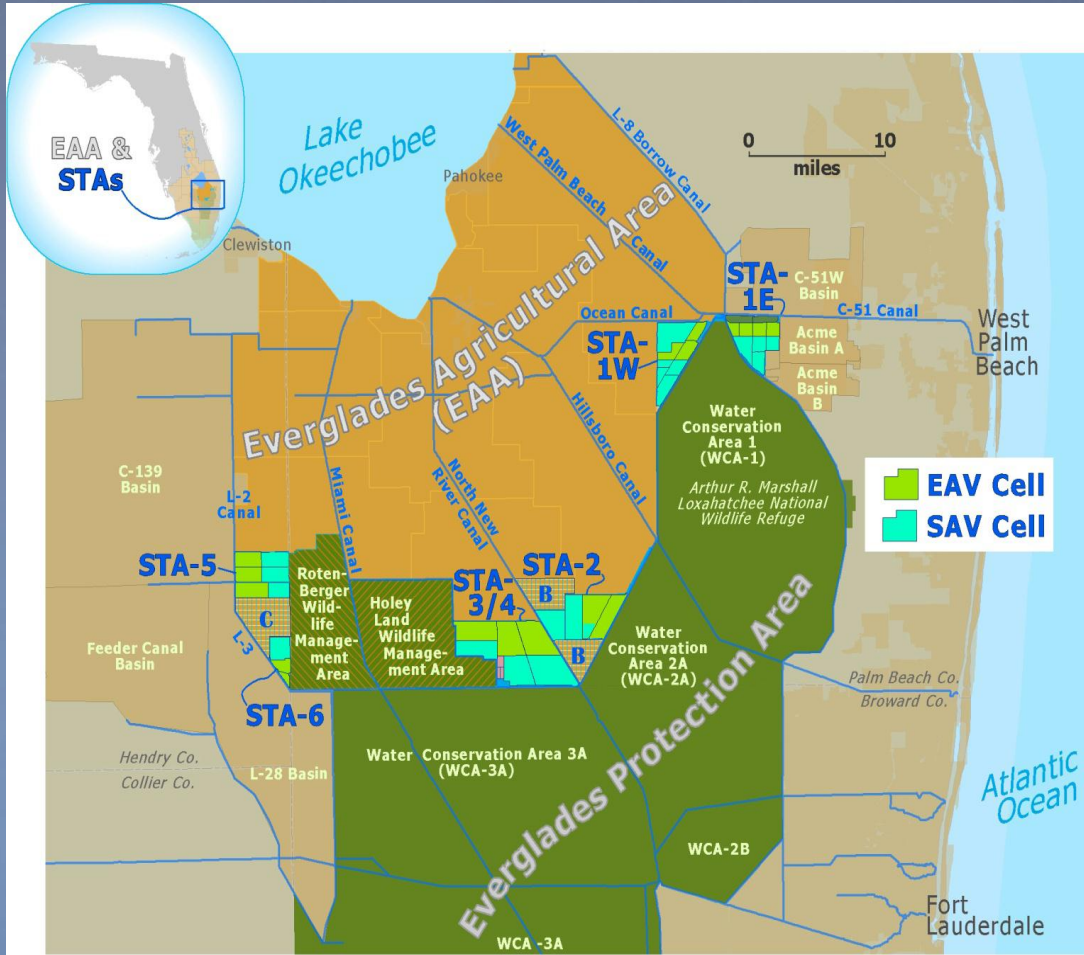


Objectives

- 1) Examine severity of tropical storm impacts in two Everglades Stormwater Treatment Area flowways (STA-1W Cell 5b and STA-2 Cell 3)
 - Impacts on vegetation communities
 - Water quality impacts
- 2) Describe design and management approaches being implemented to minimize future impacts



Everglades STAs



Six very large treatment wetlands (ranging from 913 to 6695 ha)

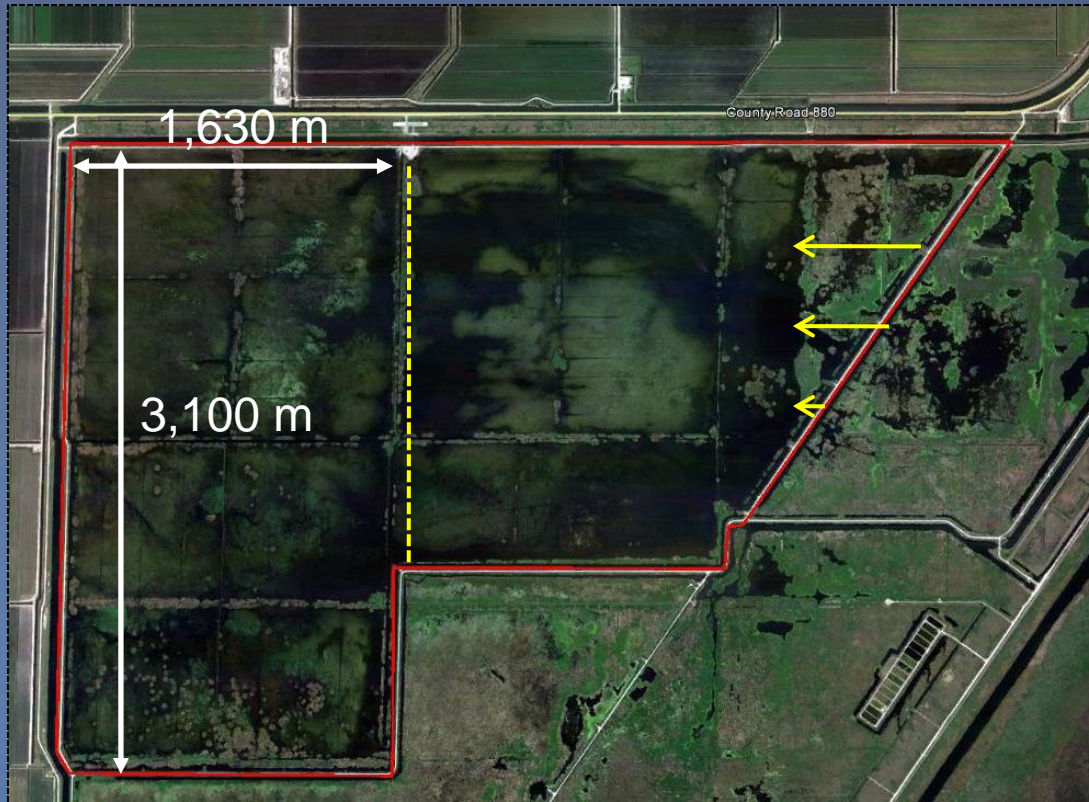
Typically multiple flow-ways in each STA

Most flow-ways have an emergent macrophyte “front end”, followed by a submerged macrophyte (SAV) “back end”

Common SAV species in STAs



Initially, many STA back end cells were comprised of vast uninterrupted expanses of SAV



STA 1W Cell 5b,
outlined in red,
consisted of two
compartments
~ 500 ha in size



Hydrilla in
STA-1W Cell
5b

Outflow region
of STA-1W
Cell 5b



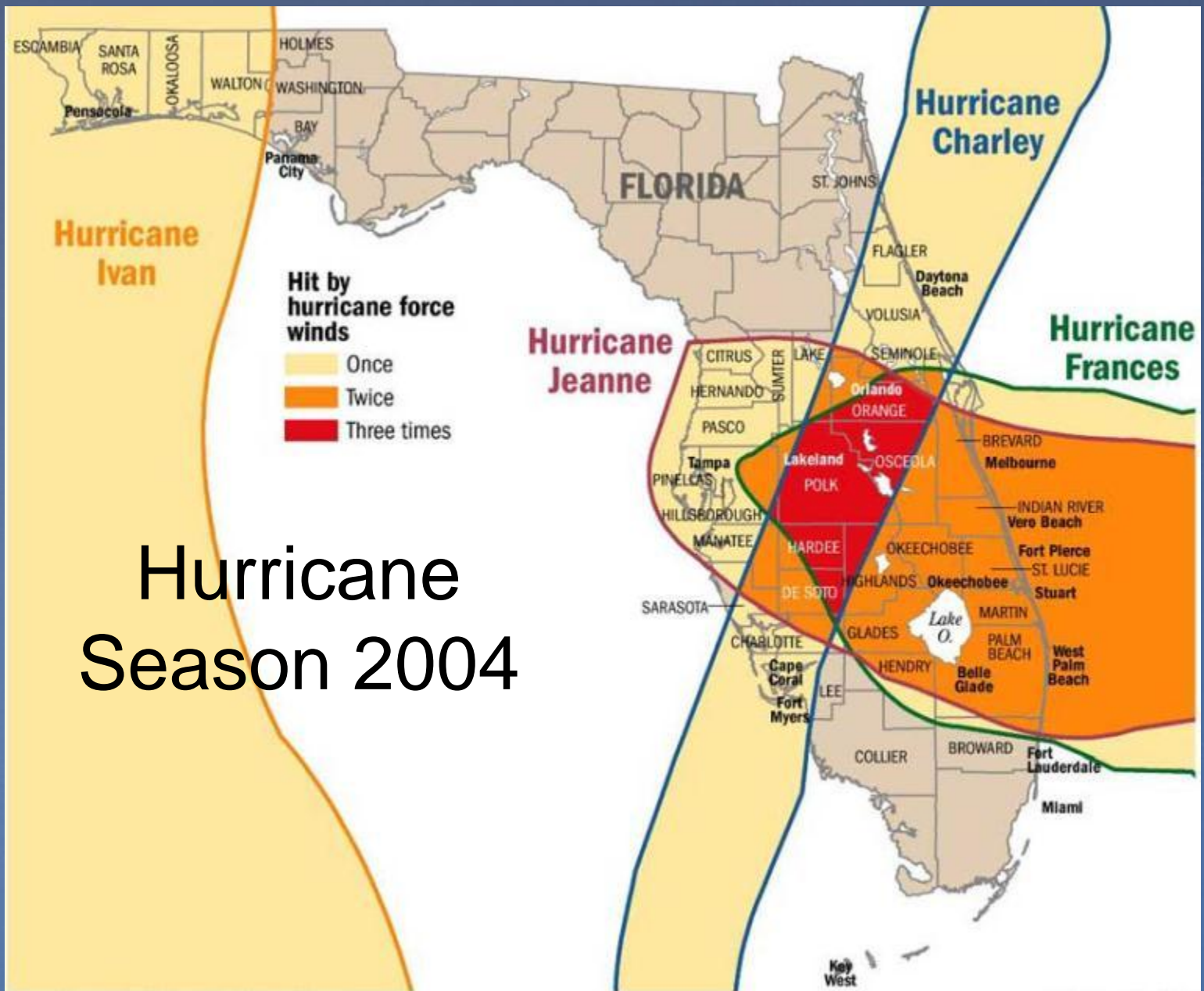
Semi-quantitative SAV assessments in STAs

Plant cover assessed visually and with a rake, which is dragged three times on the bottom (~ 1 m distance) to capture vegetation.



- The rake is used to
 - Facilitate SAV detection under turbid water conditions.
 - Determine if other species are present underneath dense SAV beds
- The assigned cover category takes into account the SAV observed in the vicinity and the vegetation collected with the rake.

Hurricane Season 2004



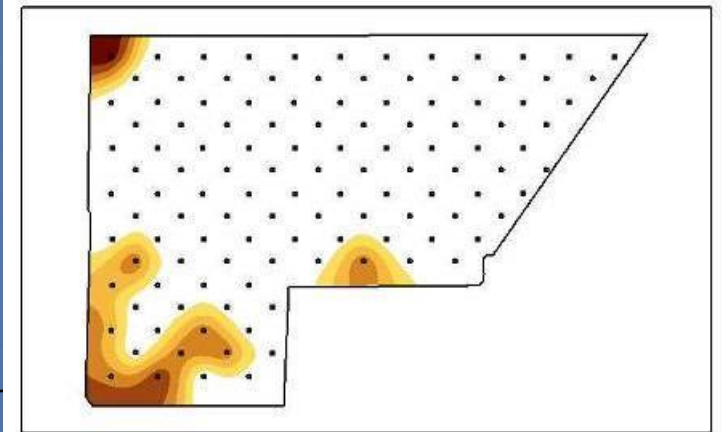
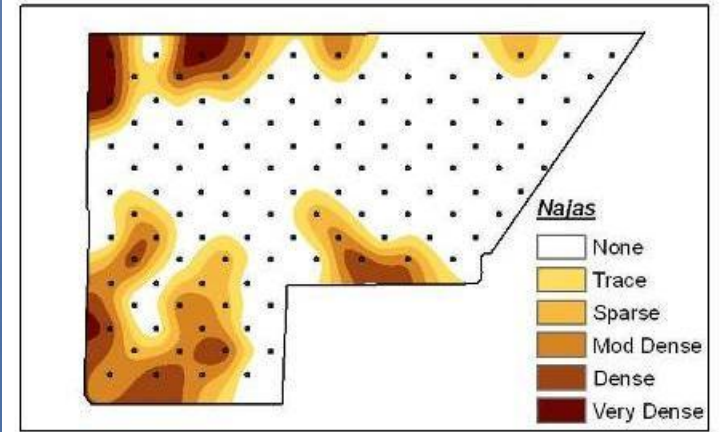
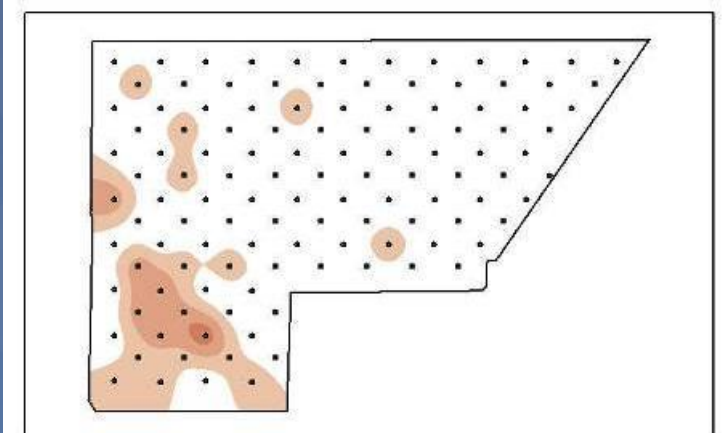
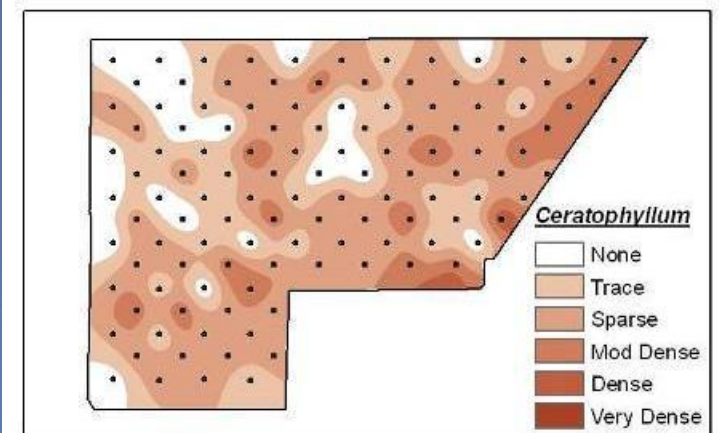
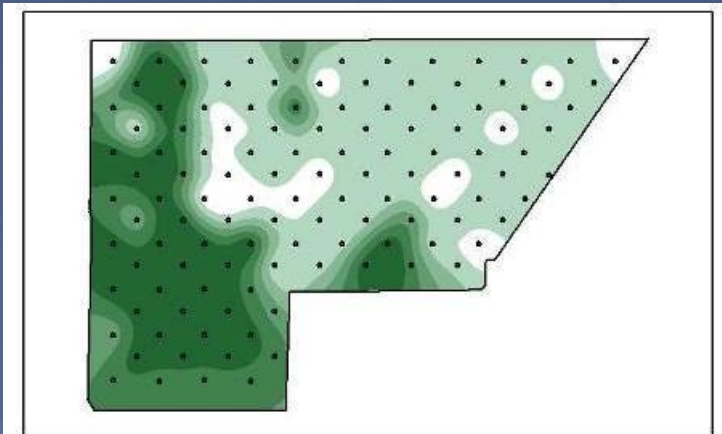
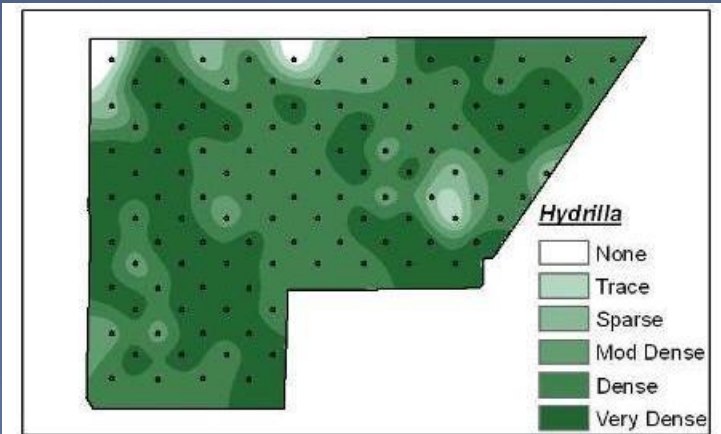
Source: National Weather Service/National Hurricane Center

BRENNAN KING/Staff Artist



SAV before hurricanes: Aug. 2004

SAV after hurricanes: Oct. 2004

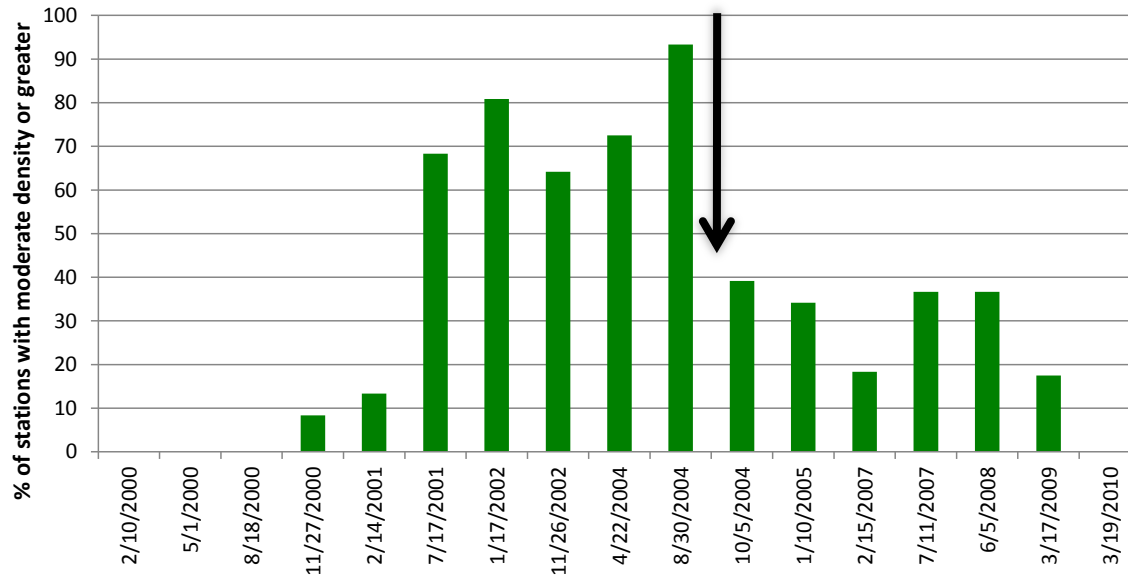


Airborne *Hydrilla*, Lake Toho, Sept. 04

(photo courtesy Ken Langeland, U of FL IFAS)



Hydrilla



STA-1W Cell
5B: Feb 00 –
Mar 10
*Hydrilla Cover
Trends (arrow
depicts 2004
hurricanes)*

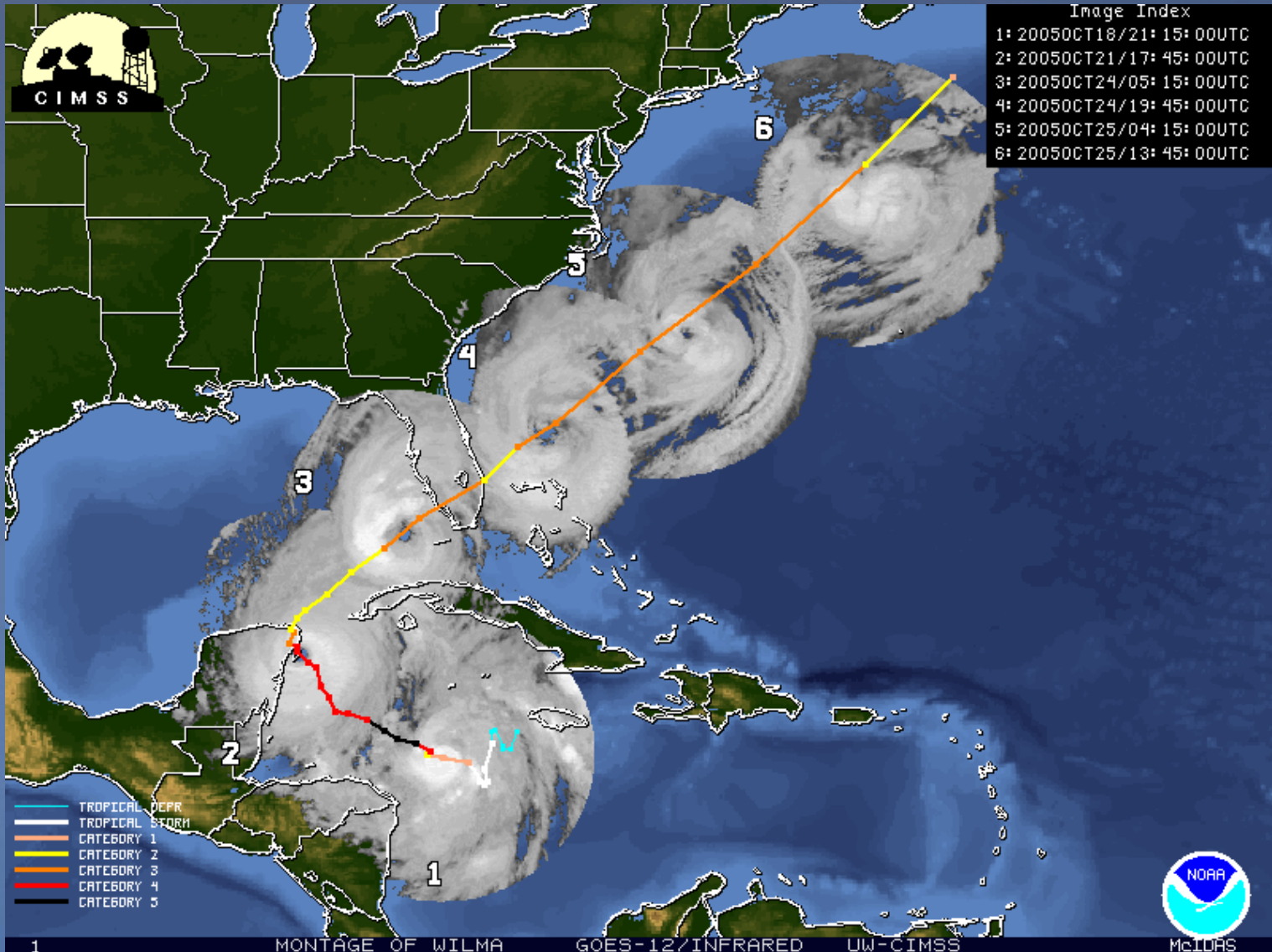




STA-2 Cell 3

Earthen remnants of farm roads support emergent macrophytes, effectively compartmentalizing the cell into 6 sub-cells, each ~ 140 ha

Hurricane Wilma 2005



Transmission Lines in STAs following Wilma



Hurricane Wilma Impacts on SAV in STA-2 Cell 3

Najas

Hydrilla

Ceratophyllum

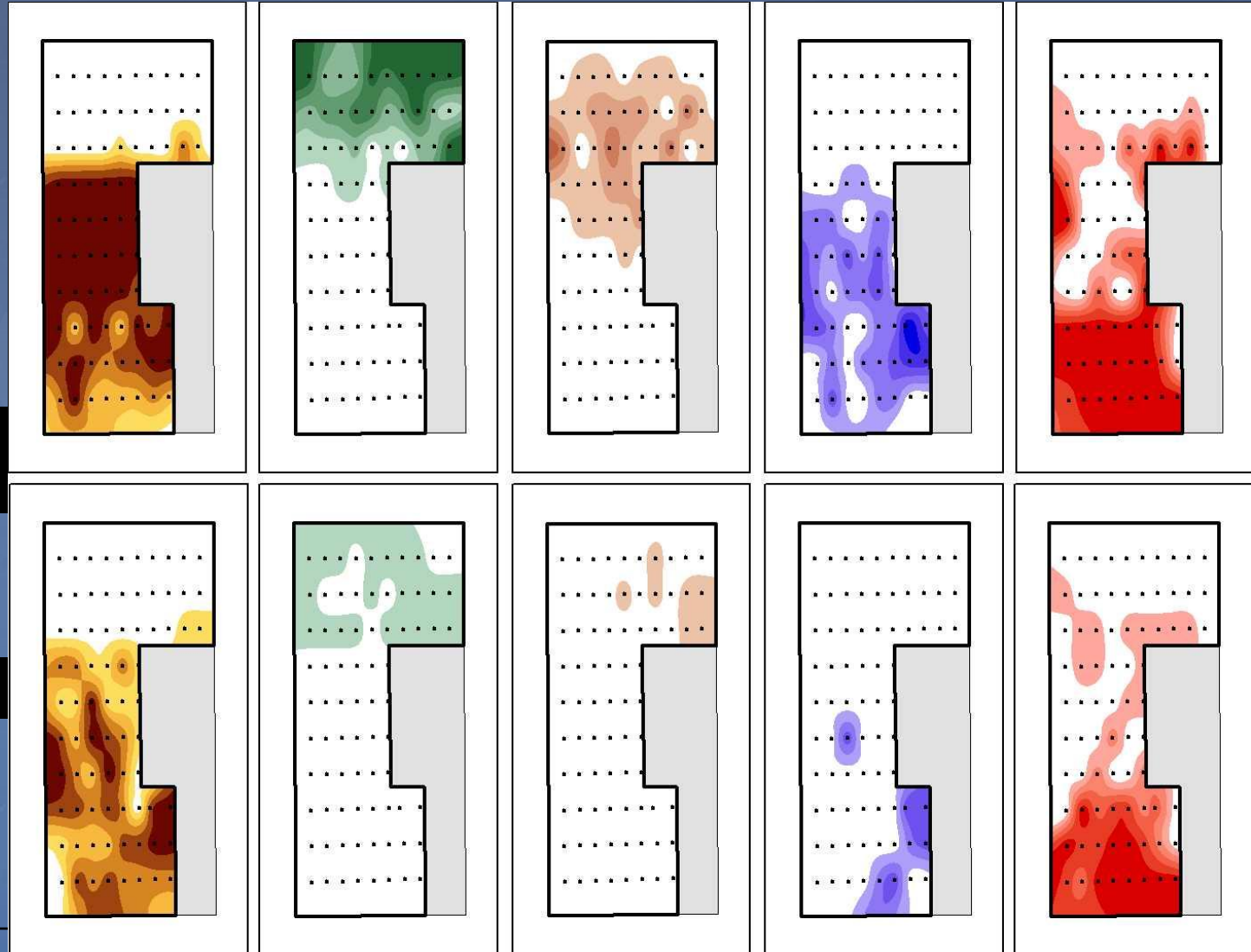
Chara

Potamogeton

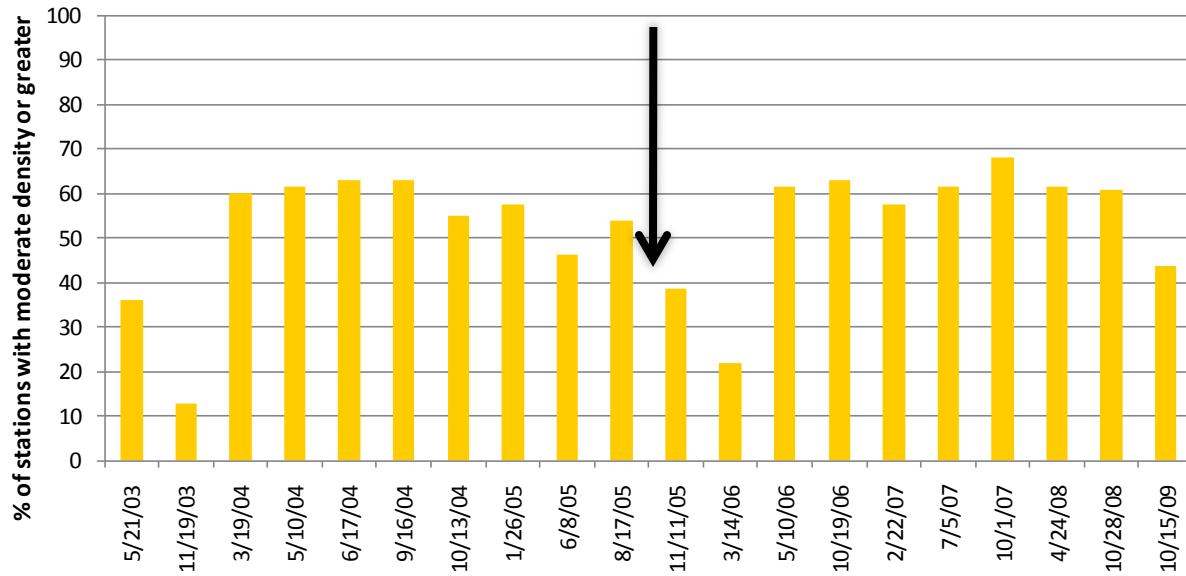
August 2005

Hurricane Wilma:
October 24, 2005

November 2005



Najas

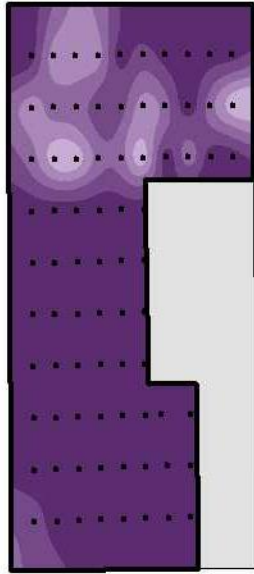


STA-2 Cell 3:
May 03 – Oct 09
Najas Cover
Trends (arrow depicts
2005 Hurricane Wilma)

SAV swept onto the
levee in STA-2 Cell 3
after Hurricane Wilma



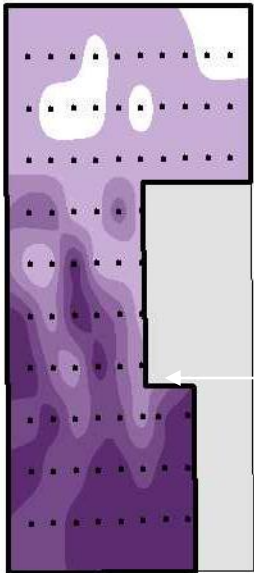
August 2005



SAV



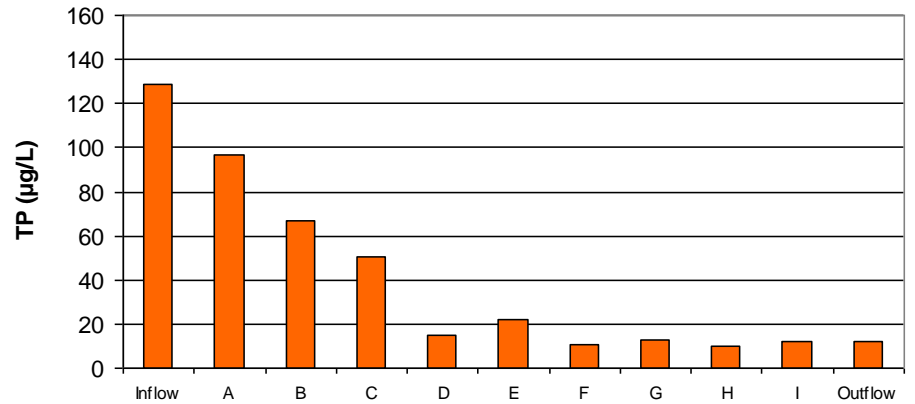
November 2005



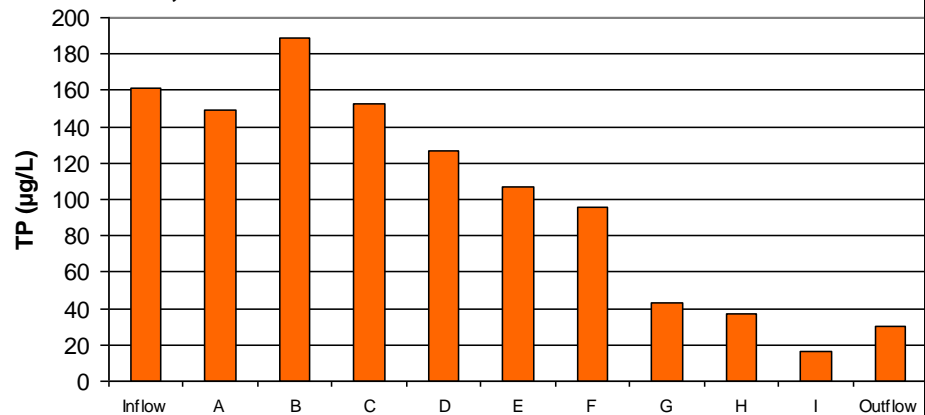
**WQ
Transect F**

Spatial relationship between SAV cover and water quality, STA-2 Cell 3

October 13, 2005



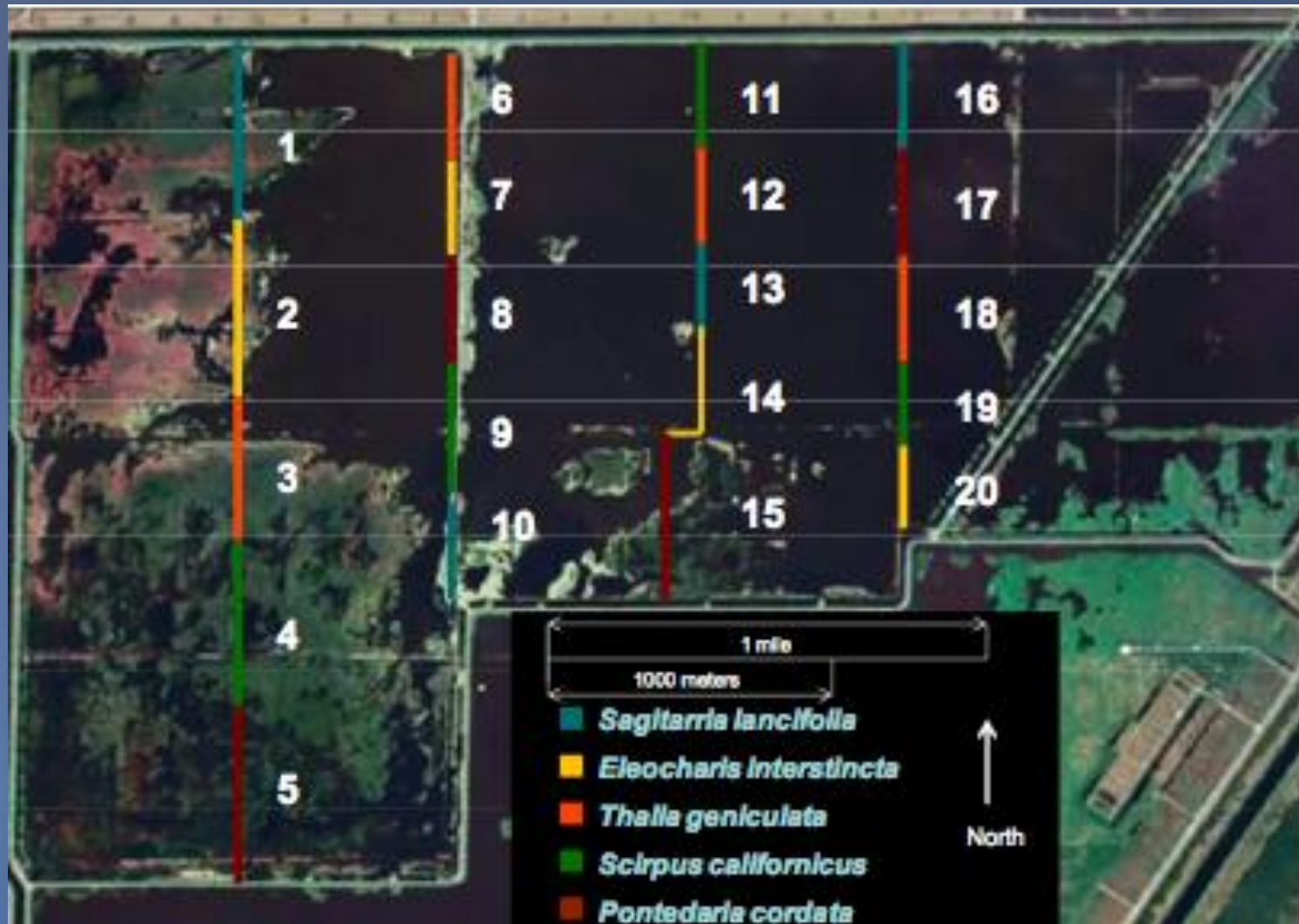
November 3, 2005



Currently, many back end STA cells are highly compartmentalized by bands of emergent macrophytes (STA-3/4 Cell 3B has sub-cells of ~ 20ha and smaller)



Emergent Vegetation Strips in STA-1W Cell 5



Conclusions

- The hurricanes of 2004 and 2005 adversely impacted SAV communities in STA-1W and STA-2. Impacts were characterized through visual observation and with semi-quantitative vegetation surveys.
- In STA-2 Cell 3, internal water quality surveys demonstrated that the SAV impairment temporarily impacted wetland TP removal performance.
- Since 2005, bands of emergent macrophytes have been established to compartmentalize the large shallow SAV wetlands. This approach has proven effective to date, but as of yet it is untested under tropical storm conditions.

