Caloosahatchee SAV Summary and Epiphyte Project

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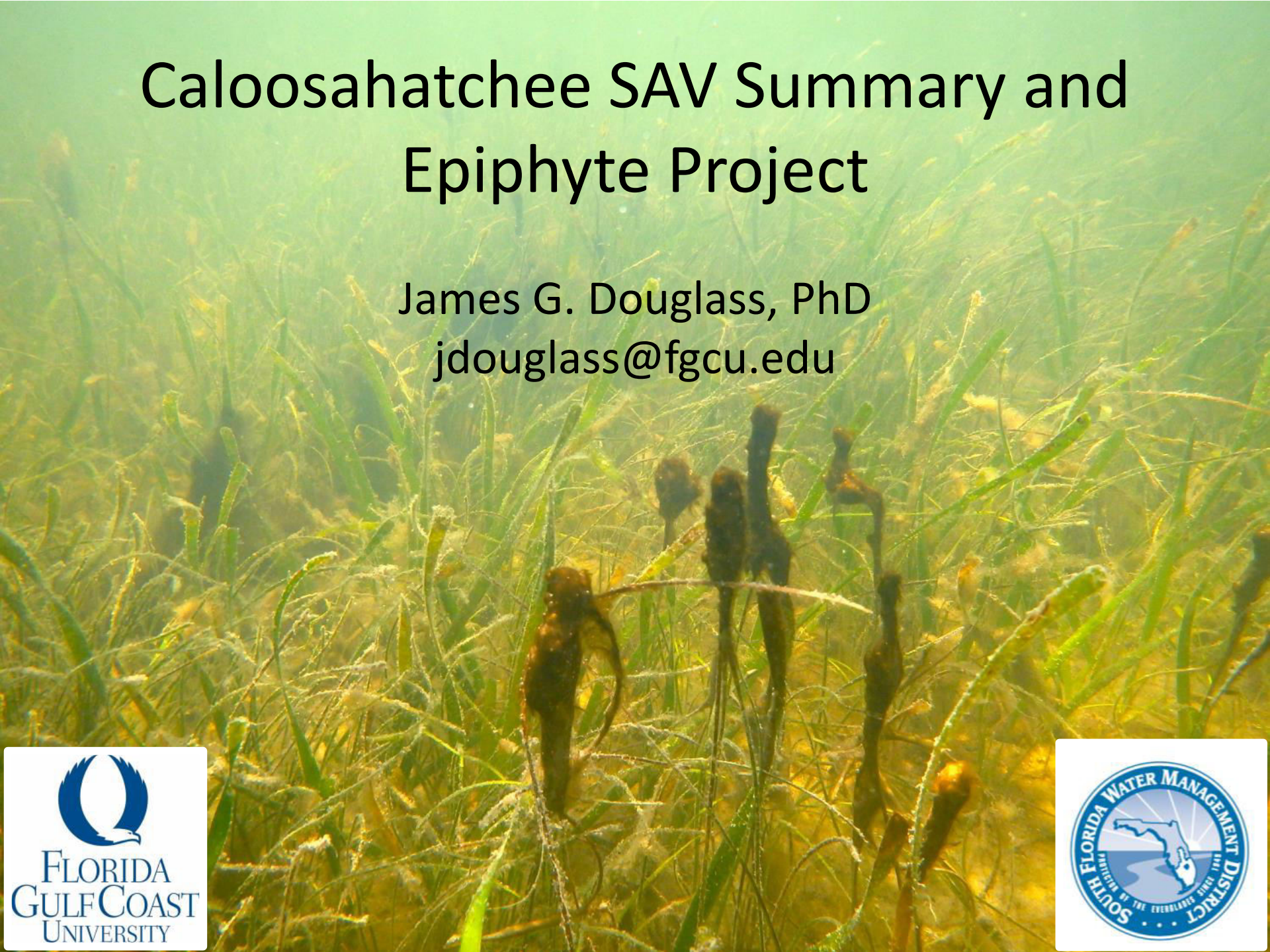
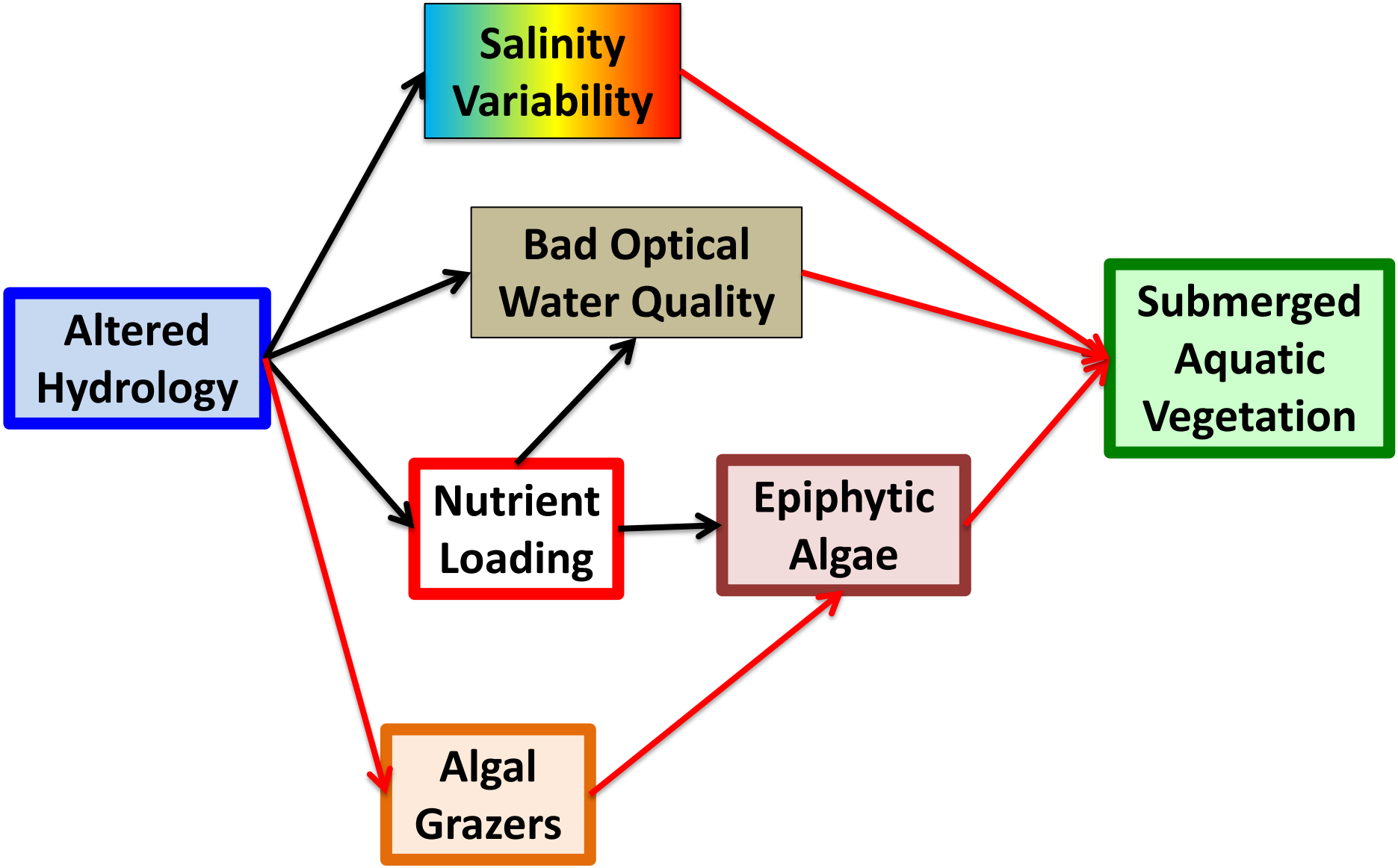
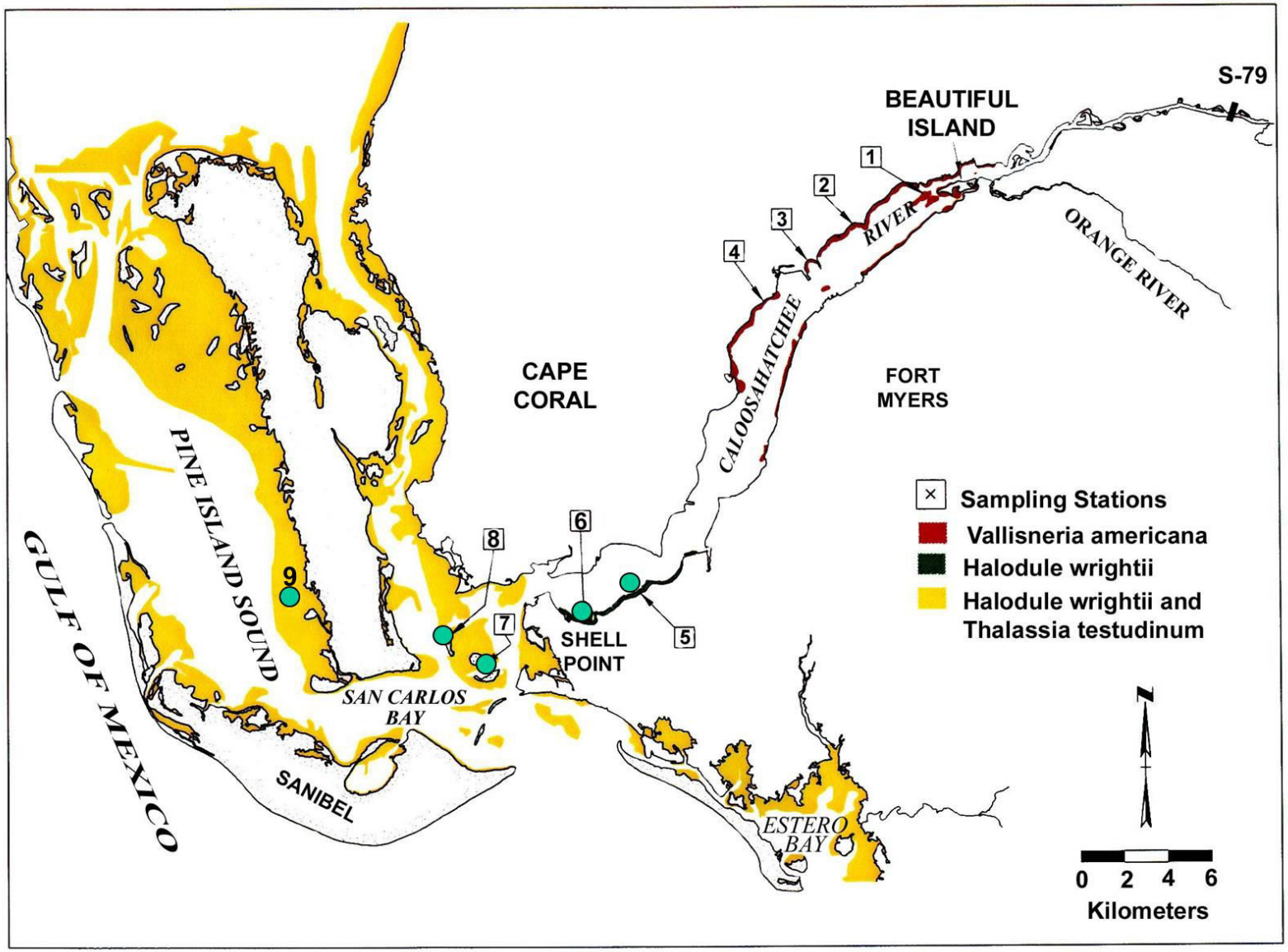


Conceptual Model of Effects on SAV

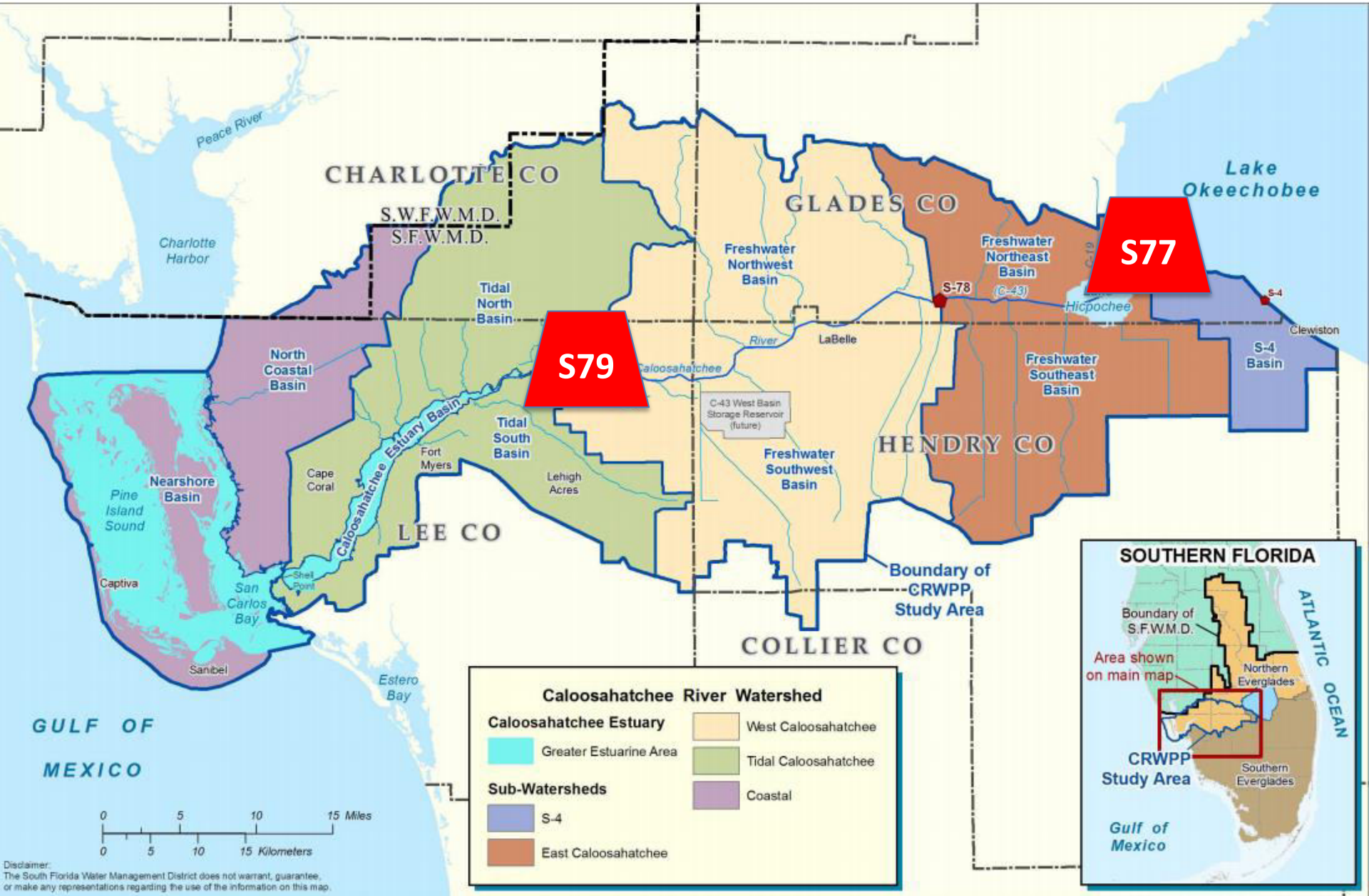


SAV data collected from 9 sites, 1986-2014.
Freshwater flow and salinity analyzed over the same period



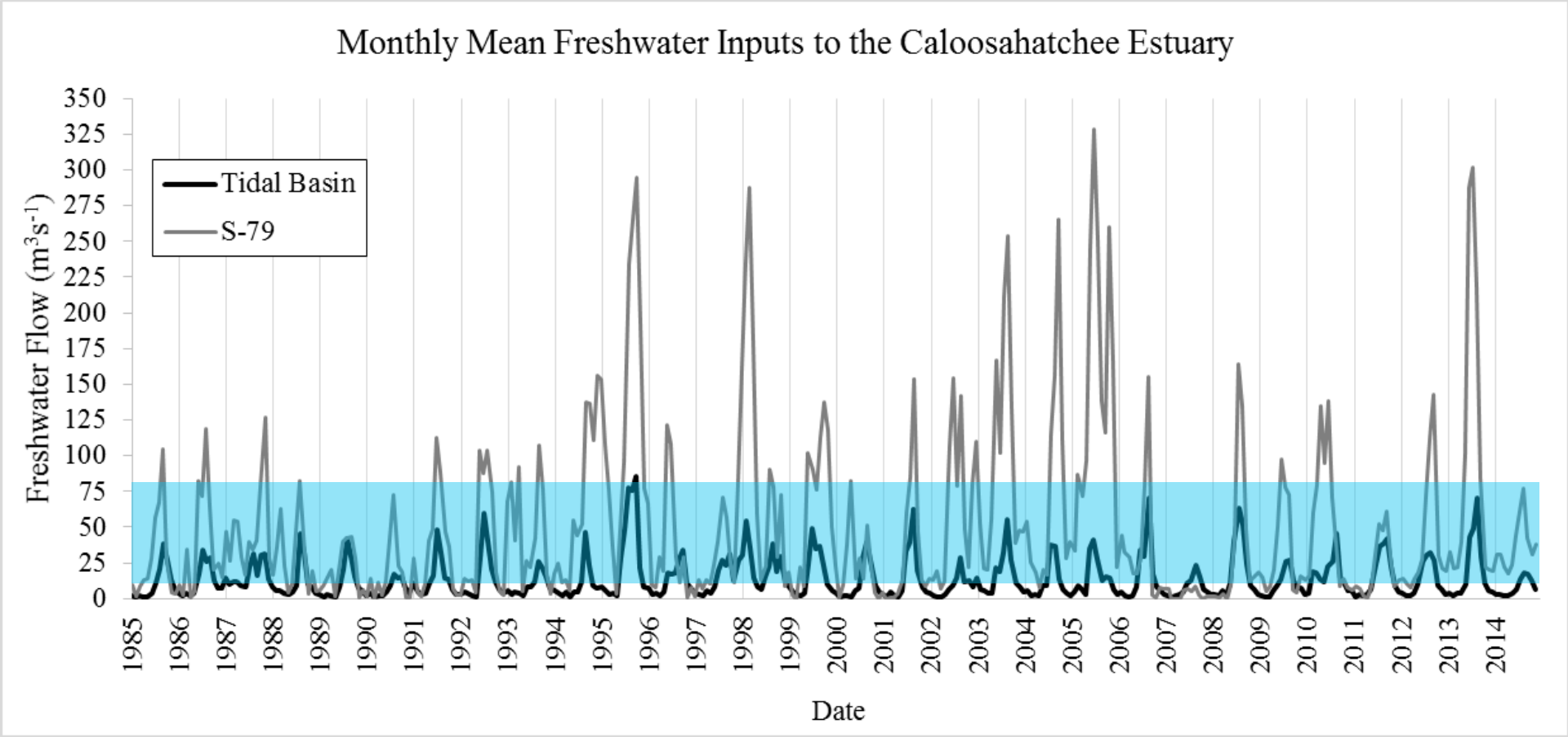
Freshwater Inputs = Tidal Basin, C43 Basin, **Lake O.**

S79 Flow = C43 Basin + **Lake O.**



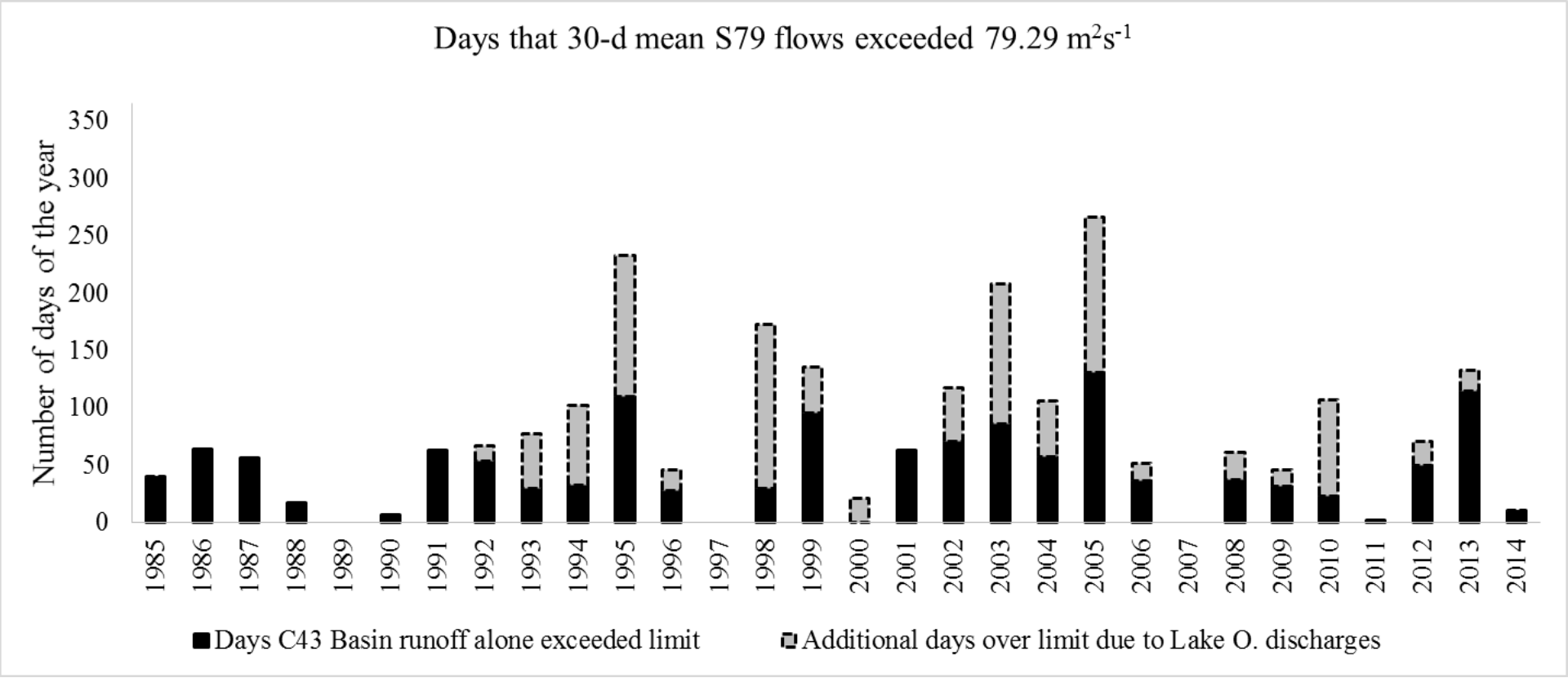
S79 Flow, 1985-2014

- Monthly means often outside **12.74 - 79.29 m^3s^{-1} envelope**



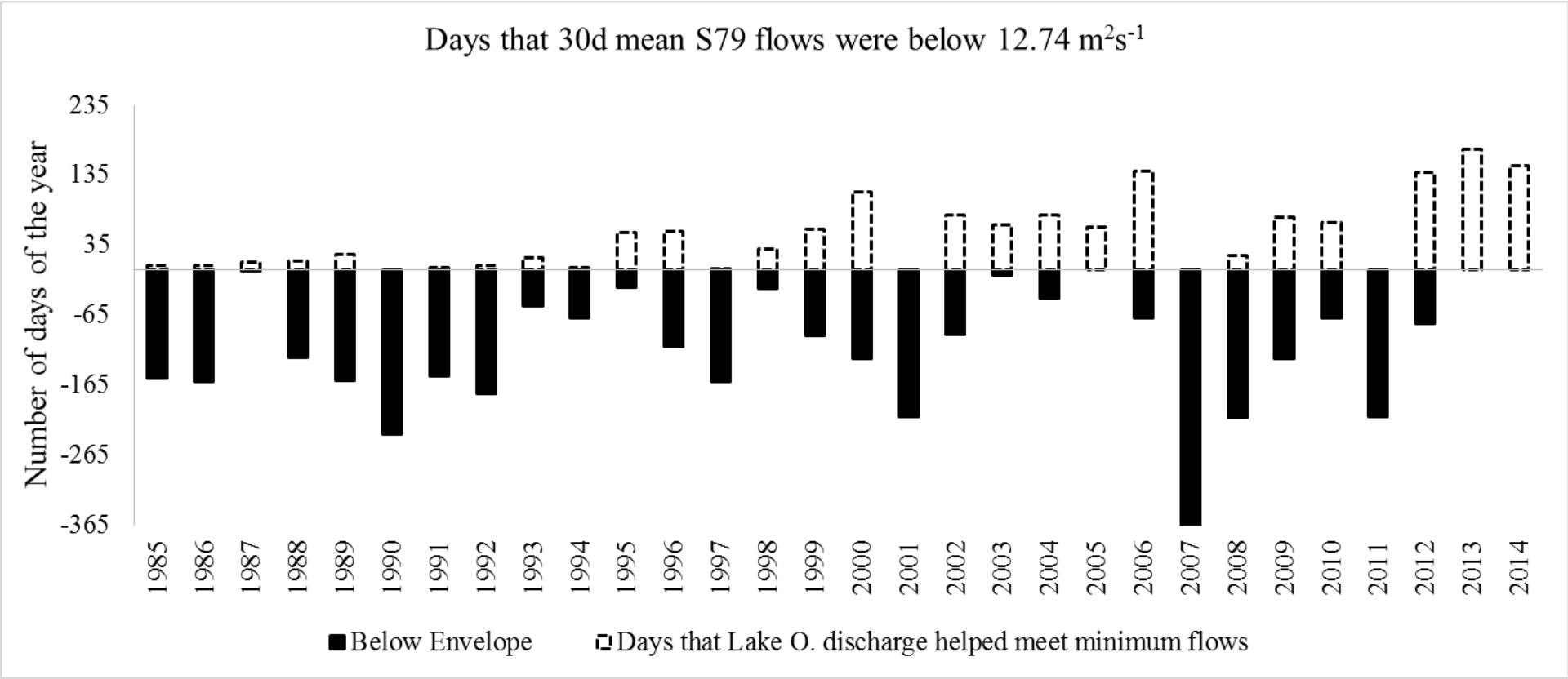
S79 Flow, 1985-2014

- Analyzed how many days per year were ABOVE the maximum
  - And when that was due to Lake O. releases vs. C43 basin runoff alone

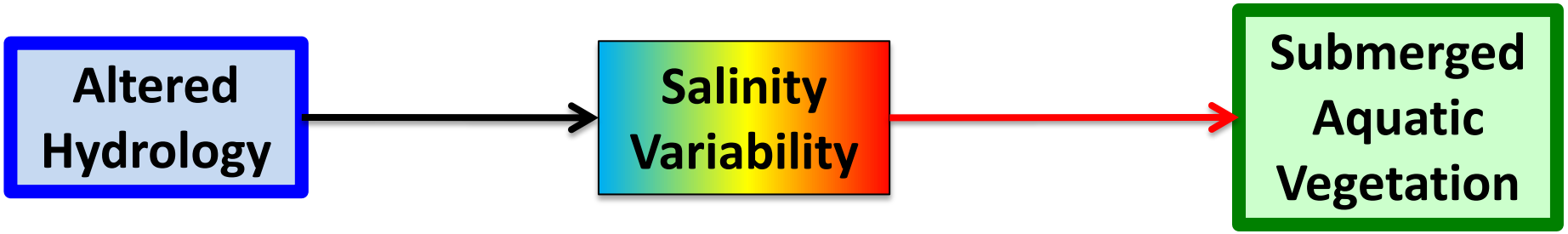


S79 Flow

- Analyzed how many days per year were UNDER the minimum
  - And how often Lake O. releases prevented below-minimum flows



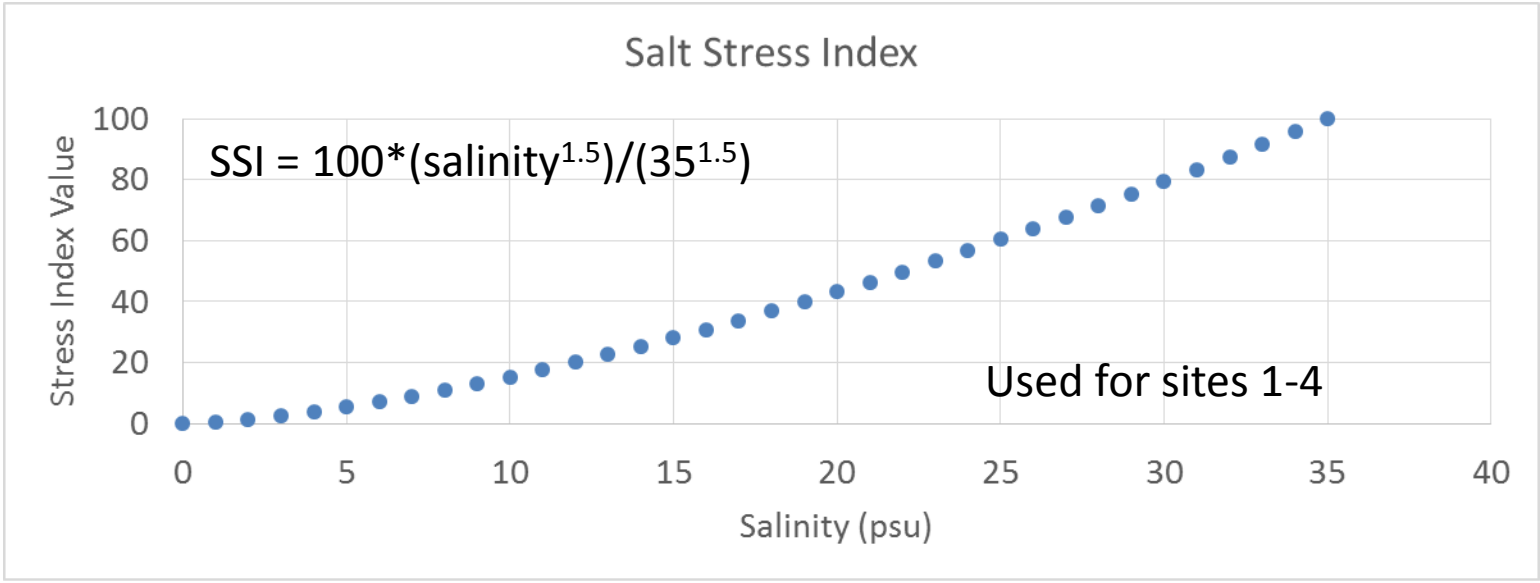
Assessing Salinity Effects on SAV

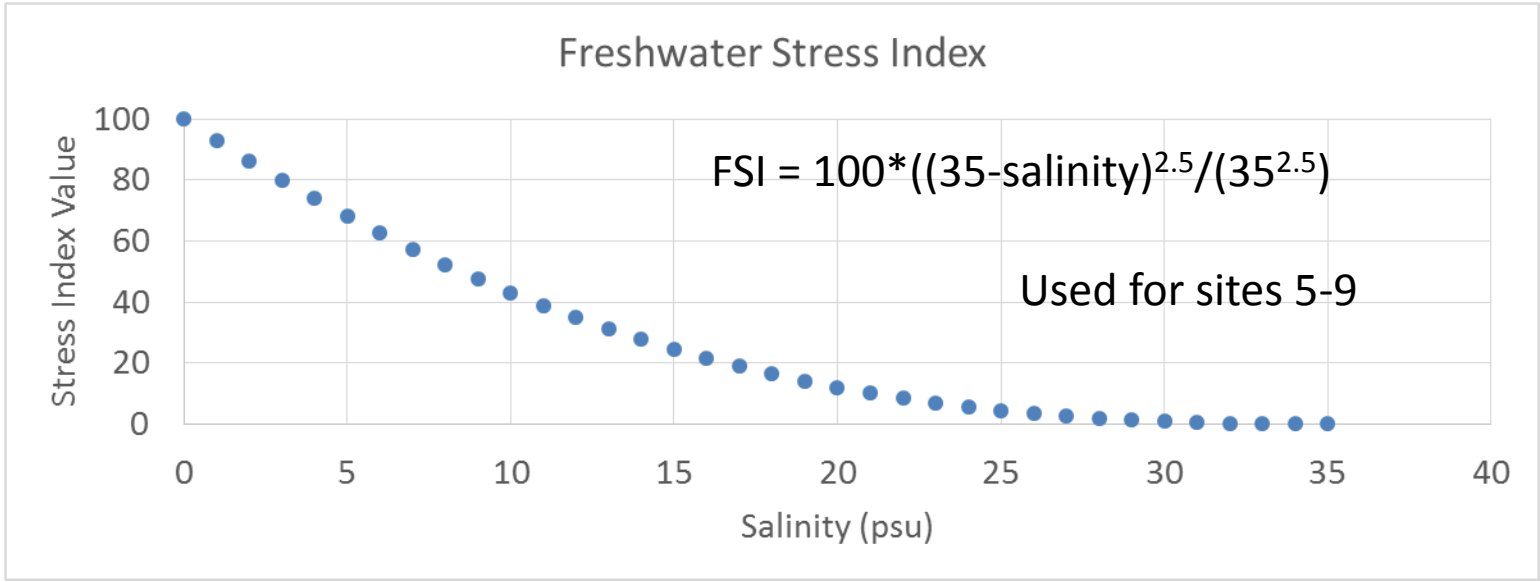


- Used Yongshan Wan's salinity model to calculate salinity for each SAV monitoring site from 1985-2015

- Converted raw salinity to "salinity stress indices" for fresh and saltwater SAV, respectively

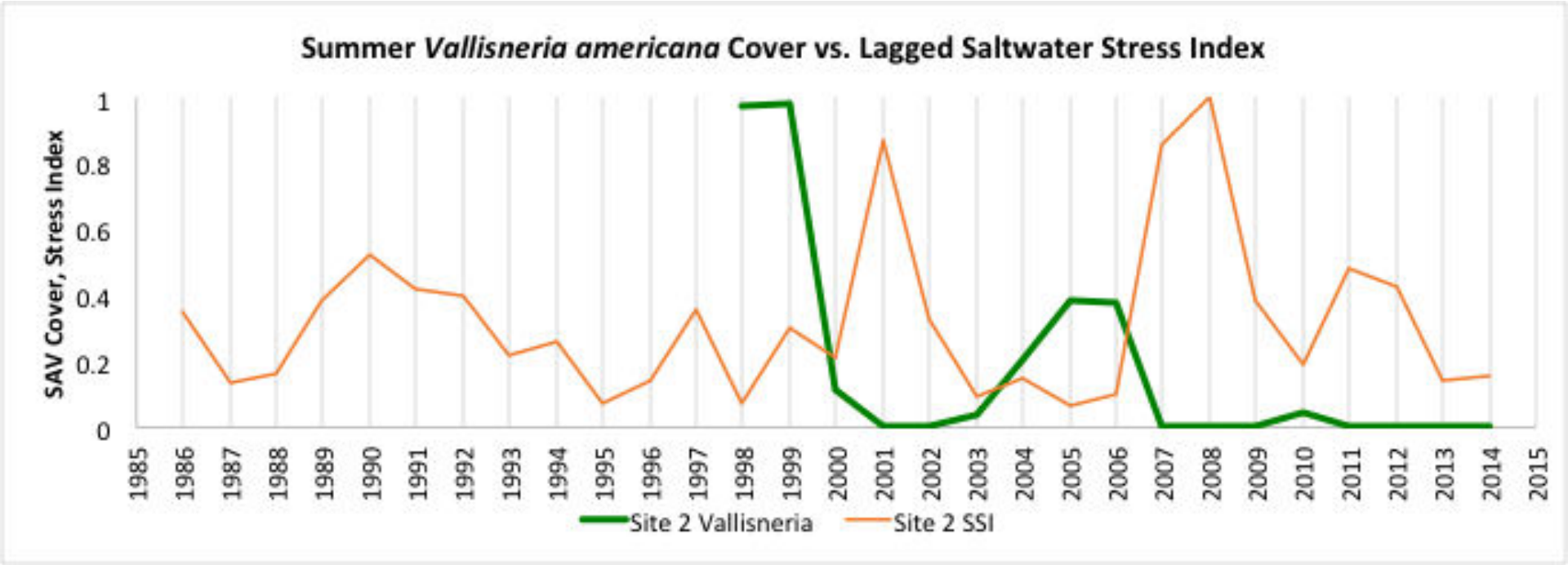
Saltwater stress index, based on salinity response of *V. americana*



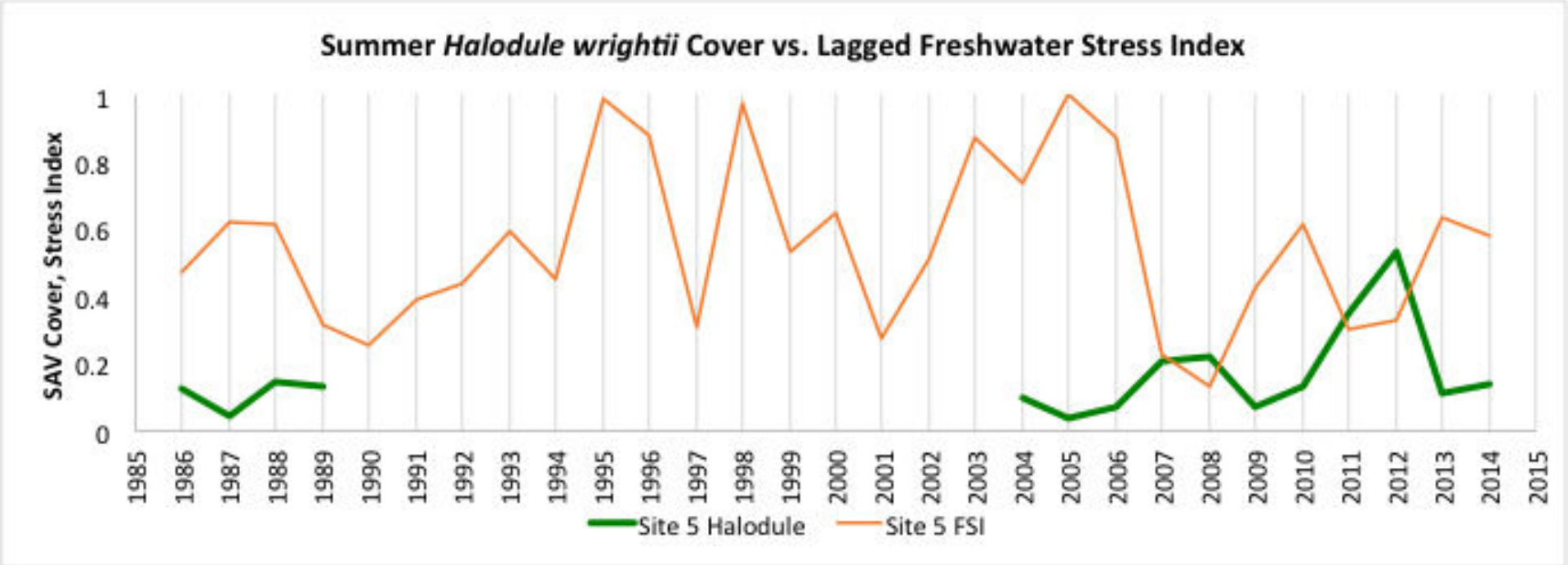


Freshwater stress index, based on salinity response of seagrasses

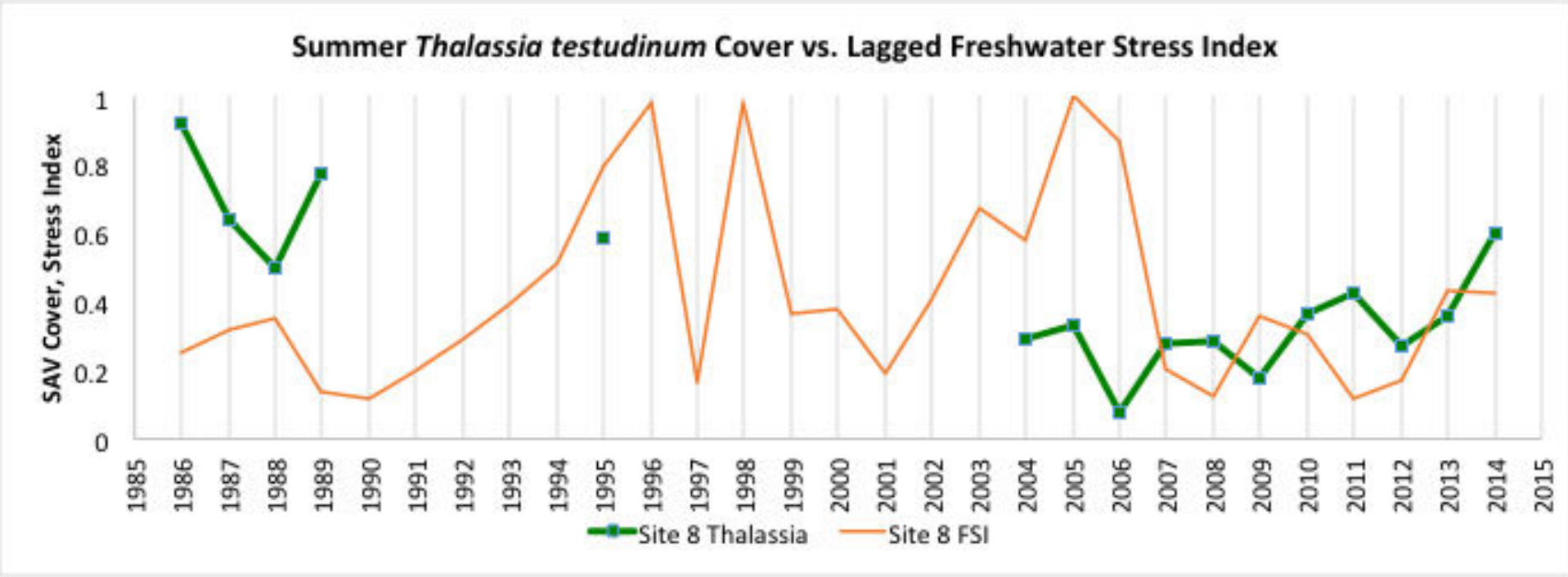
Vallisneria americana trends in relation to SSI in the upper estuary



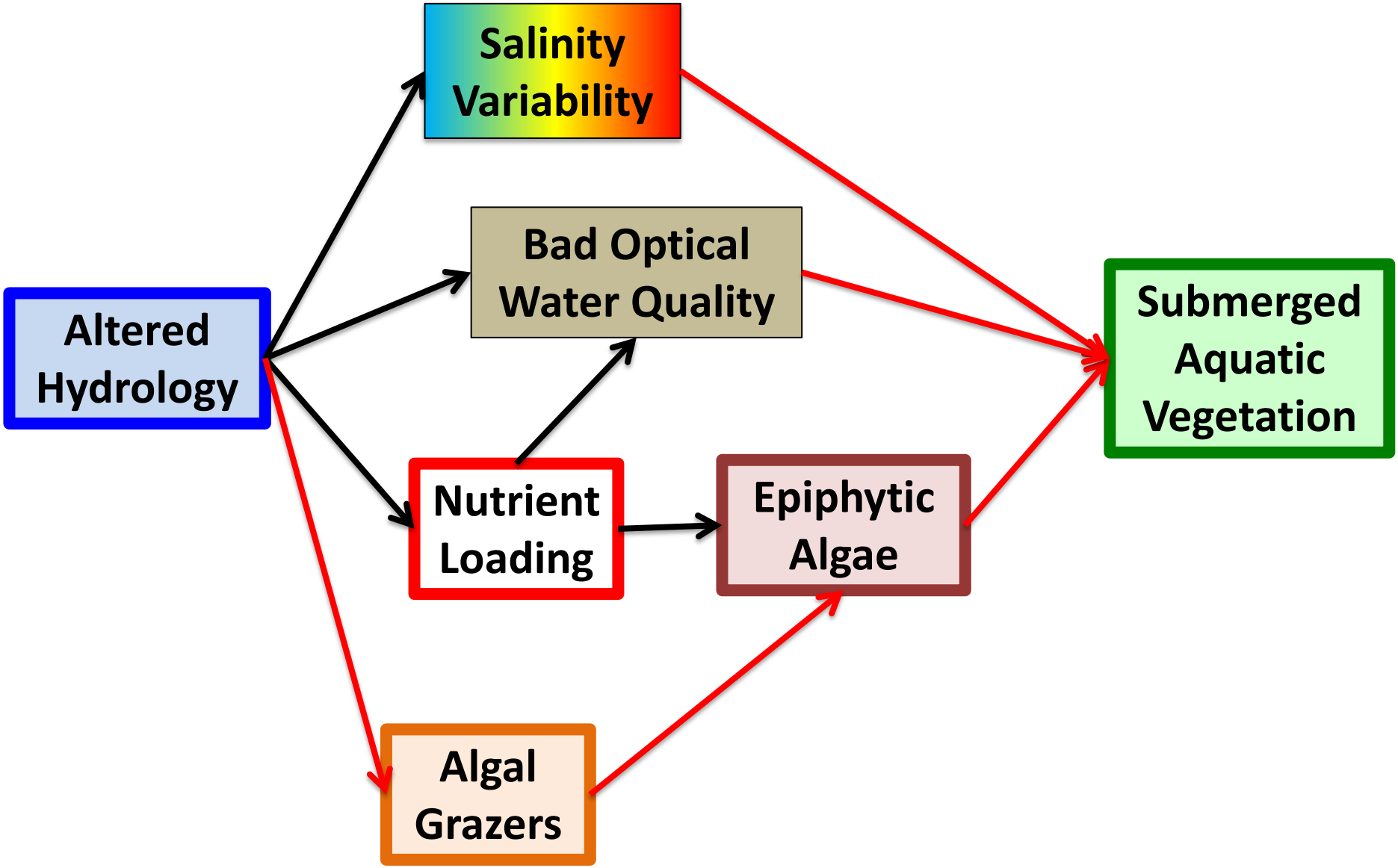
Halodule wrightii trends in relation to FSI in the middle estuary



Thalassia testudinum trends in relation to FS in San Carlos Bay



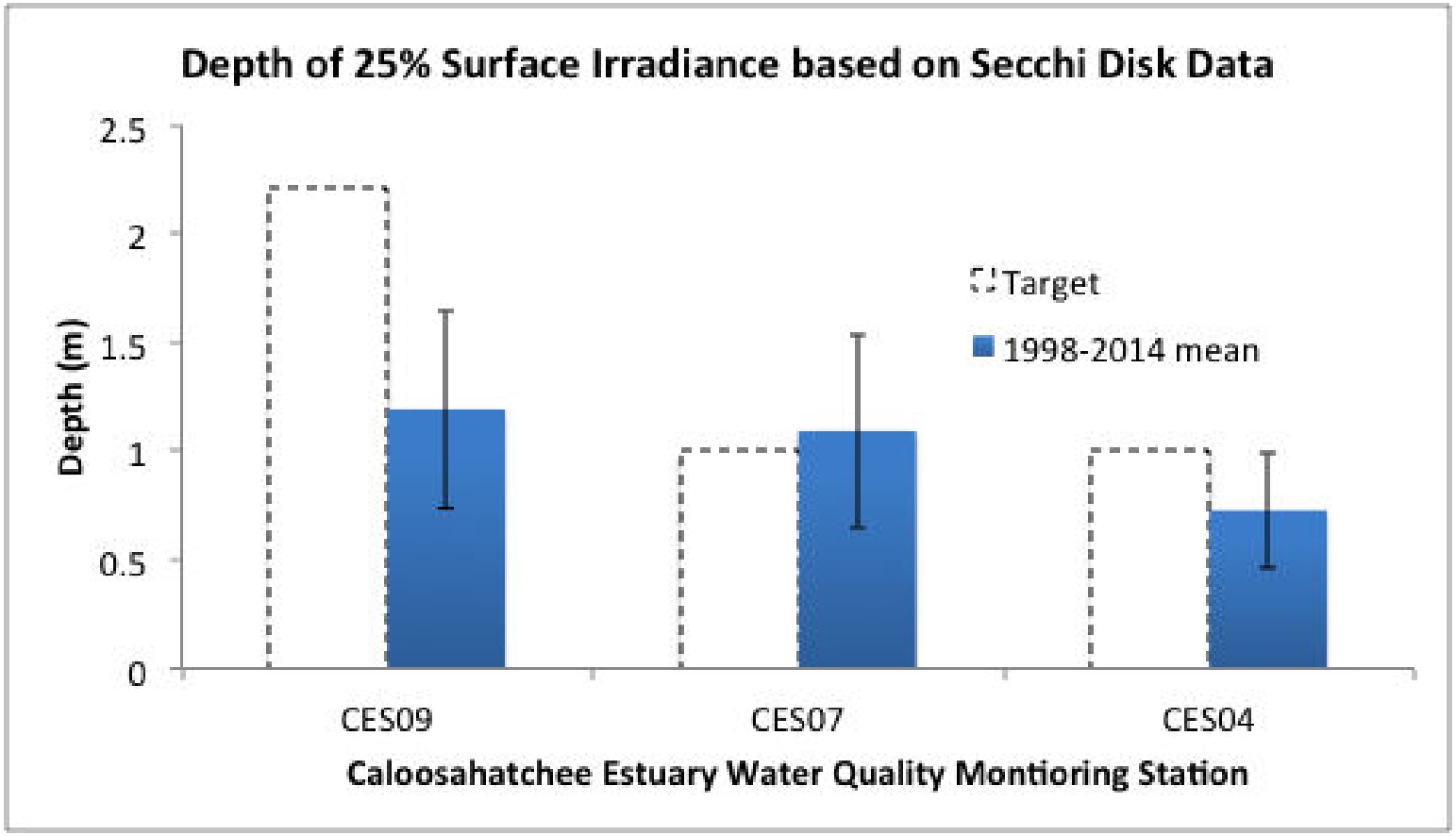
Conceptual Model of Effects on SAV



Optical Water Quality

Light

- **Light** penetration targets for SAV not being met

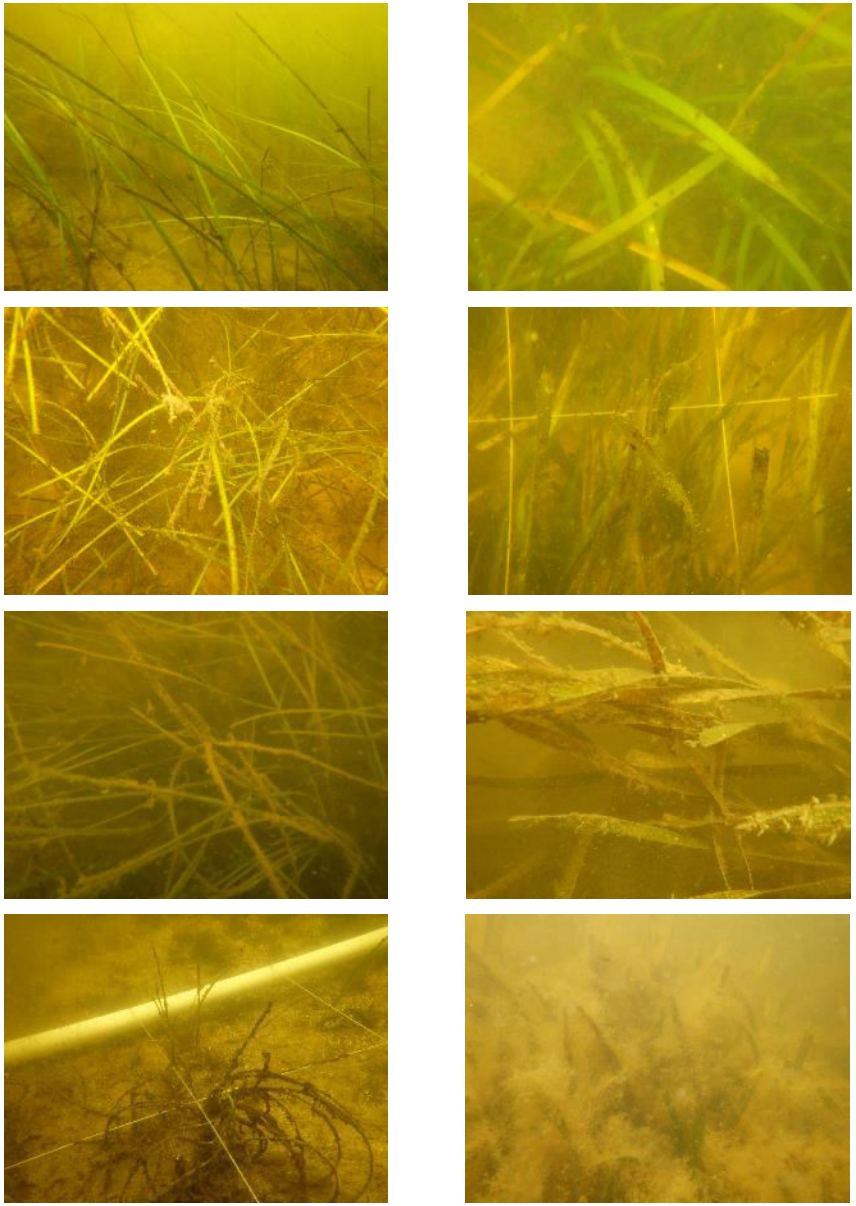


Light targets from Corbett and Hale (FL Scientist 2006)

Epiphytic algae further reduces light, but little is known about it in this system

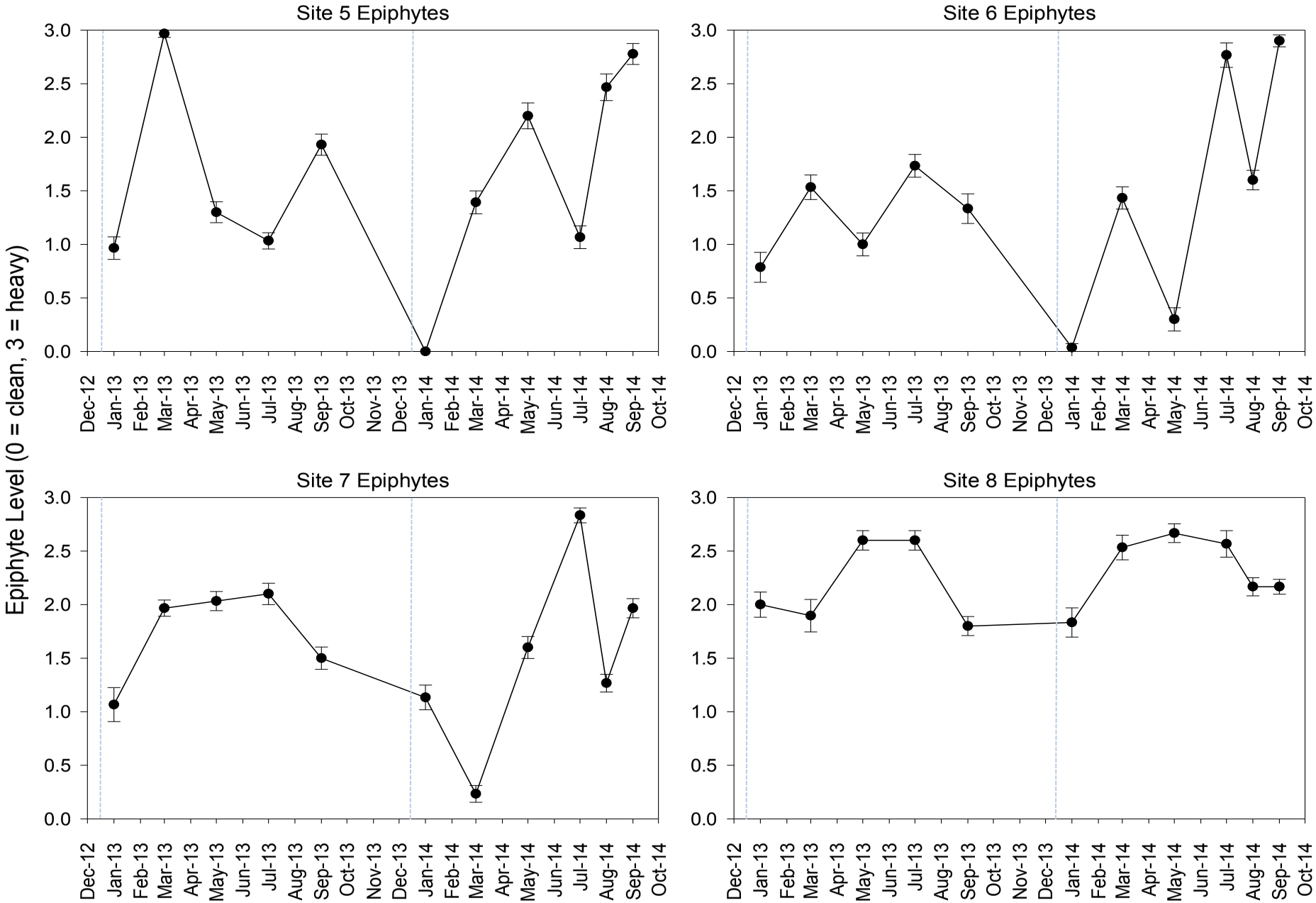
SFWMD Epiphyte Level Key

H. wrightii | *T. testudinum*

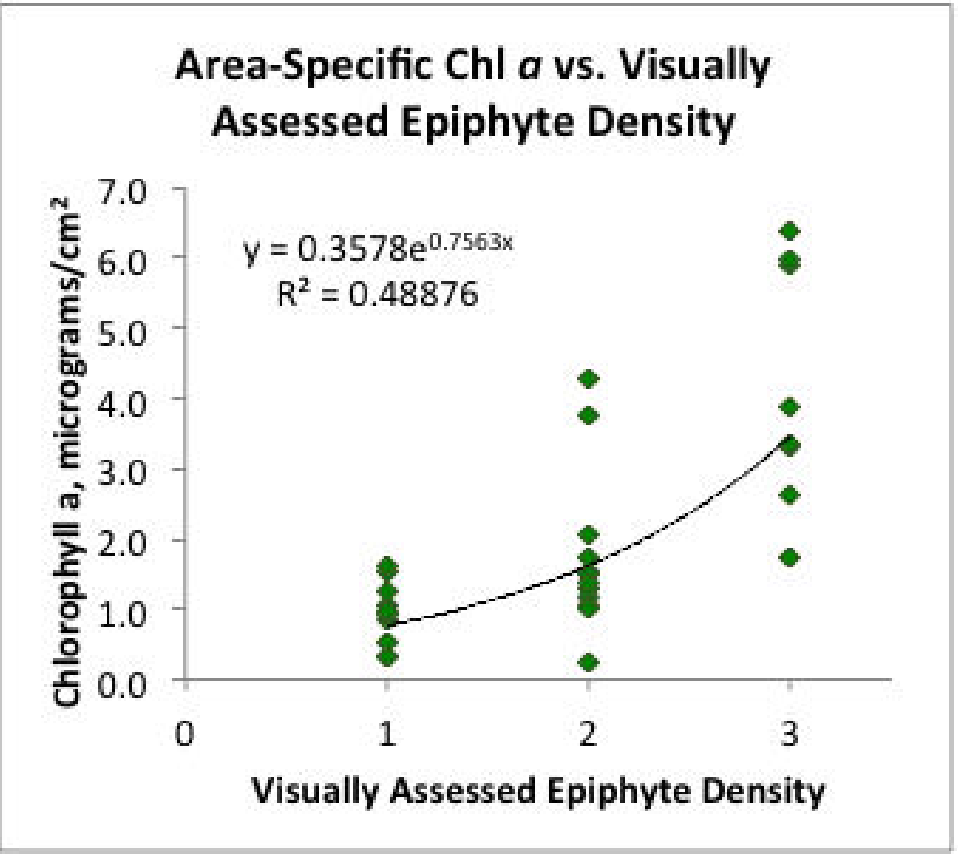


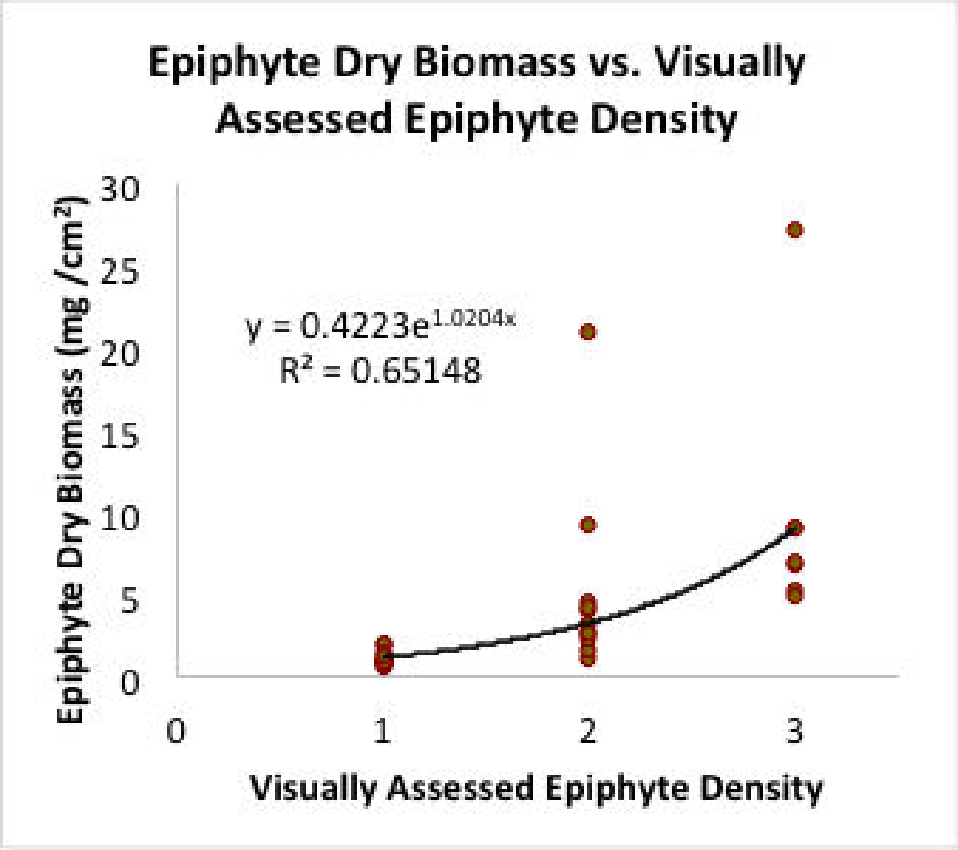
- **Epiphyte Level 0** = Blades look clean; no epiphytes visible to the naked eye
- **Epiphyte Level 1** = Blades have a light or patchy coating of epiphytes
- **Epiphyte Level 2** = Moderately dense epiphytes are obvious on most blades
- **Epiphyte Level 3** = Almost all blades are densely covered in epiphytic growth; blade surfaces obscured

SFWMD visual estimates of epiphytes, 2013-2014



- Comparing more quantitative epiphyte measurements to visual estimates:
  - μg/cm² Chlorophyll *a*
  - mg/cm² Dry Mass

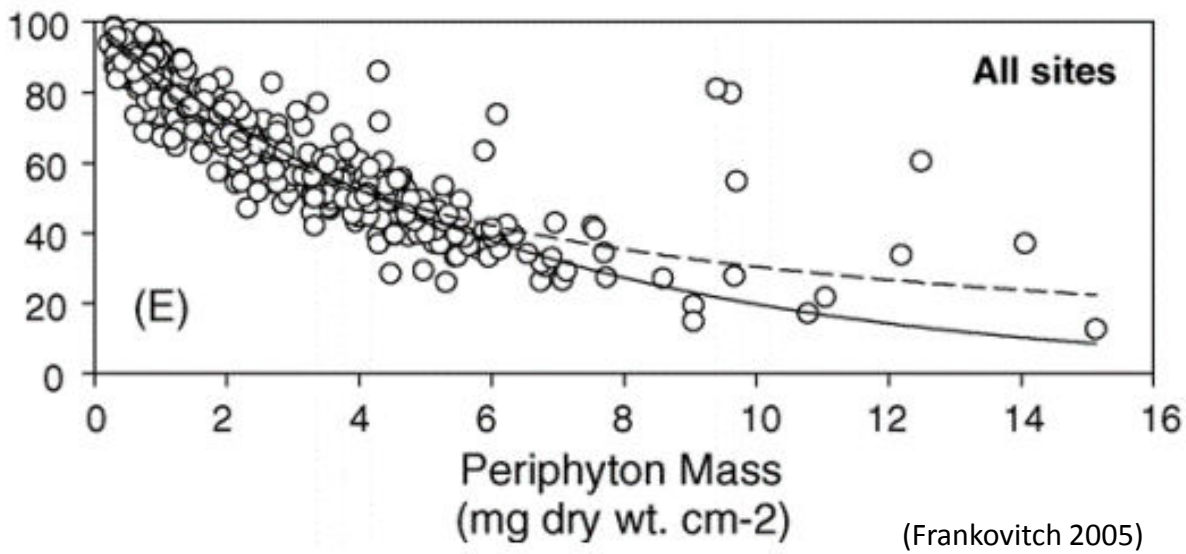




How much light is blocked by epiphytes?

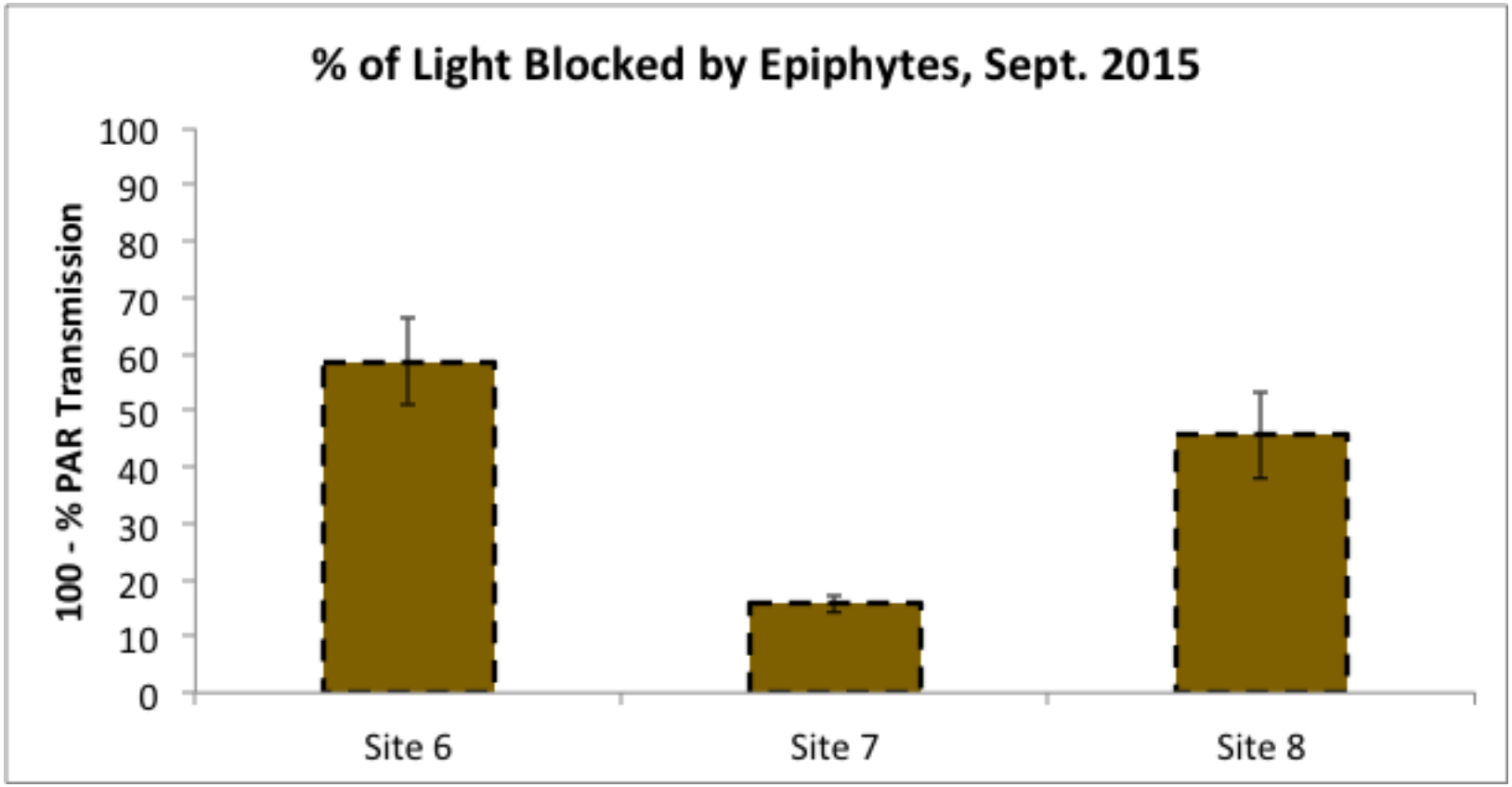
- Model developed by Frankovitch (2005) converts periphyton (epiphyte) density (mg dry mass cm^{-2}) to PAR transmission (I/I_0).

PAR Transmission % = $100\ e^{-0.16(\text{periphyton density})}$



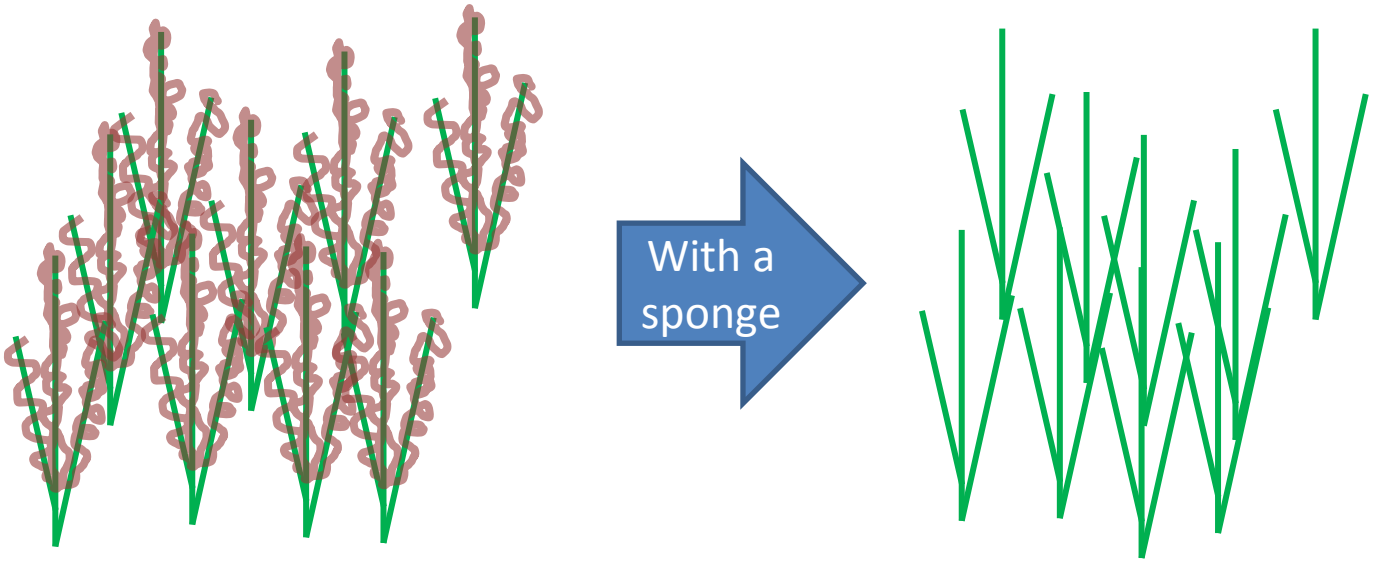
(Frankovitch 2005)

- Preliminary data shows that up to 60% of incident light may be blocked by epiphytes on seagrasses in the Caloosahatchee



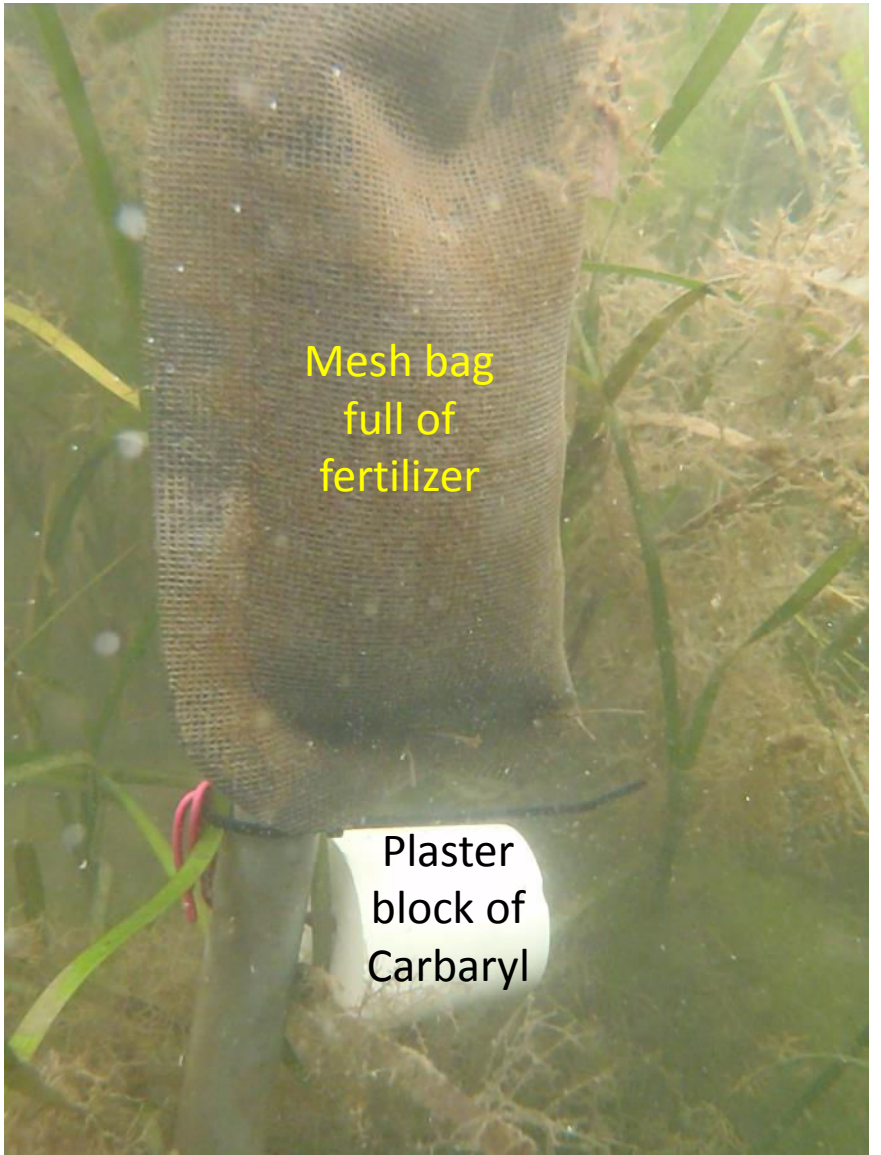
Experiment 1: Epiphyte effects on SAV

- We will **manually remove epiphytes** from 0.125m^2 *Thalassia testudinum* plots to assess epiphyte effects on seagrass health and growth rate in situ.



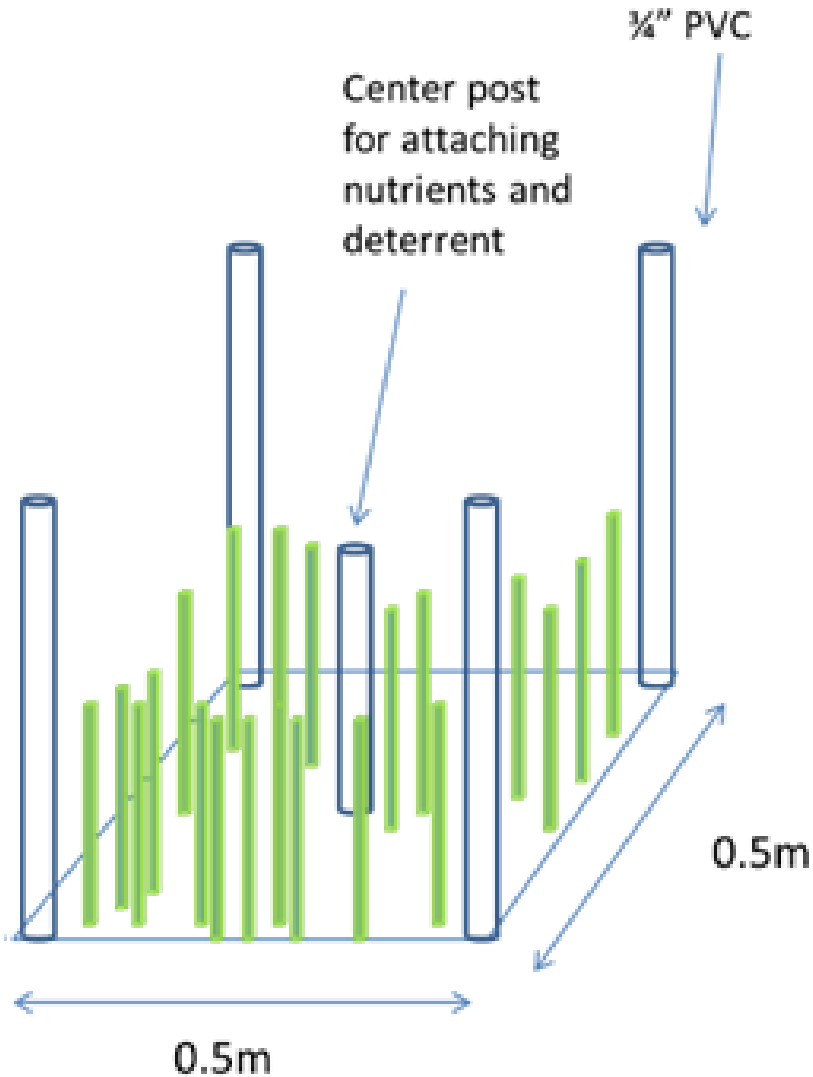
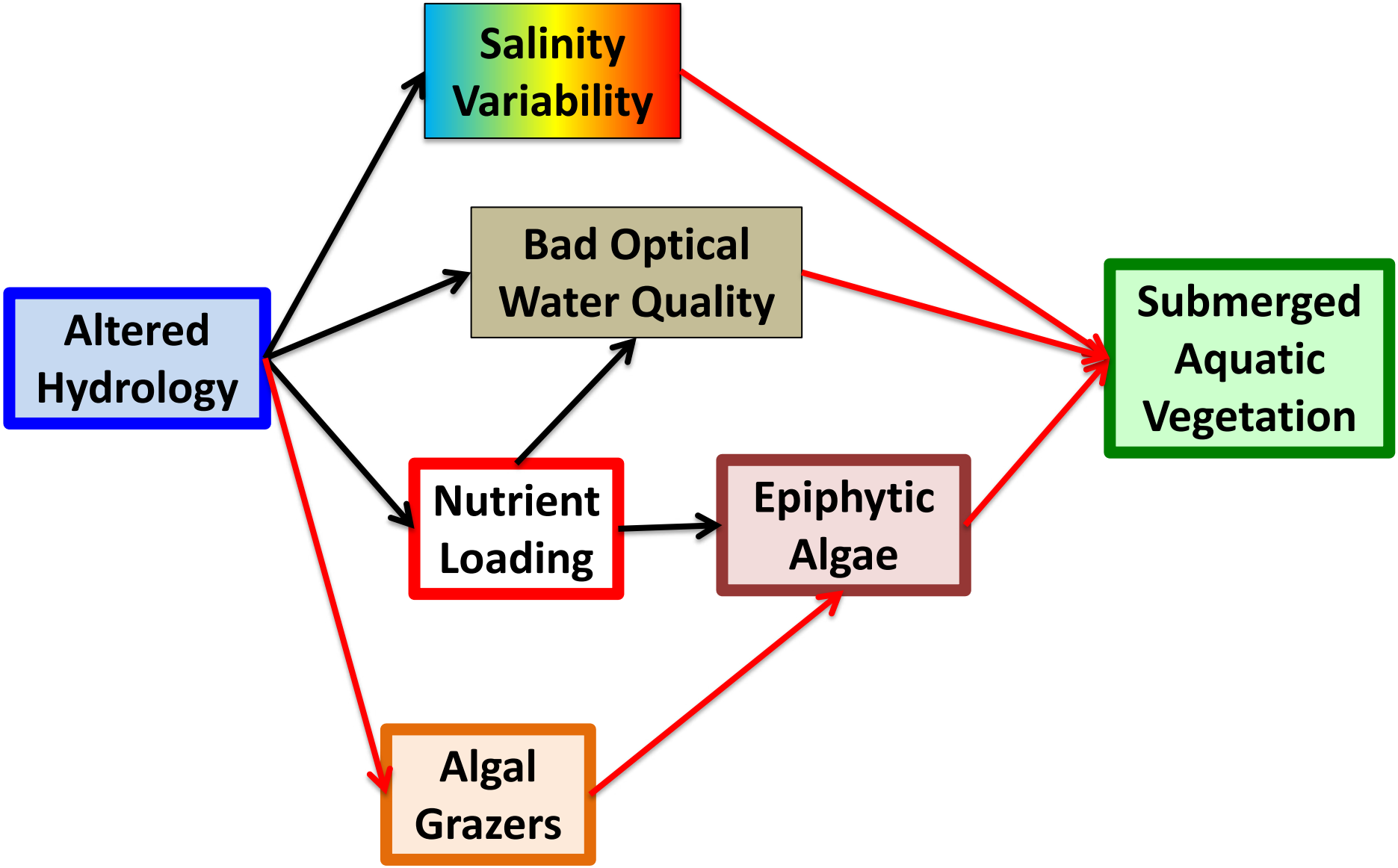
Experiment 2: Causes of Epiphytization

- **Possible causes:**
  - Excess nutrients
  - Lack of grazers
- **Nutrient enrichment**: 175g fertilizer bags
- **Crustacean deterrent**: 400g plaster block containing a chemical deterrent



Experiment 2: Causes of Epiphytization

		Nutrient Enrichment Treatment	
		Control	+Nutrients
Grazer Deterrent Treatment	Control	0 10 plots	N 10 plots
	+Deterrent	D 10 plots	ND 10 plots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