Phosphorus Flux in the Stormwater Treatment Areas

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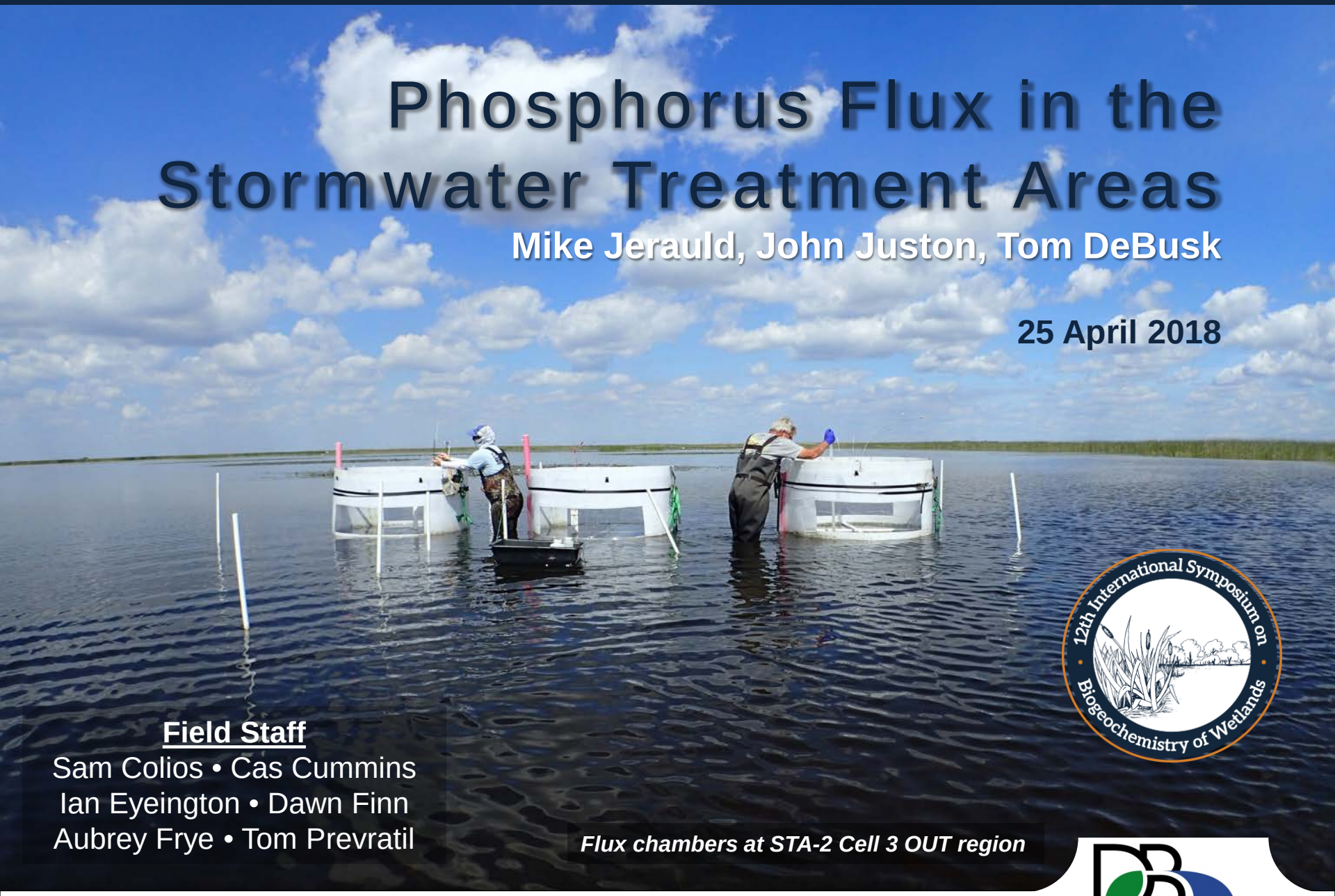
25 April 2018



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Ian Eyeington • Dawn Finn
Aubrey Frye • Tom Prevratil

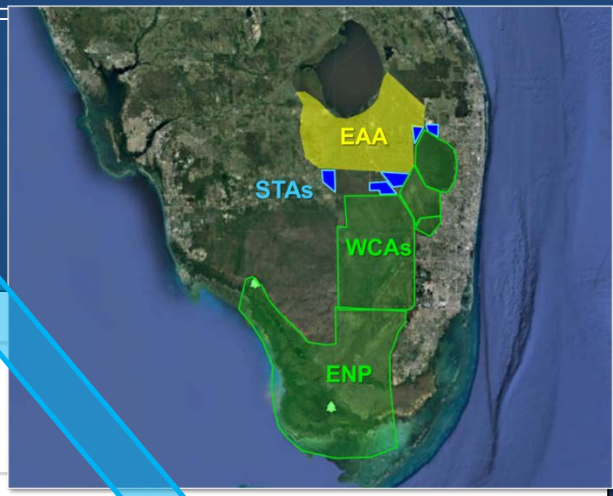
Flux chambers at STA-2 Cell 3 OUT region

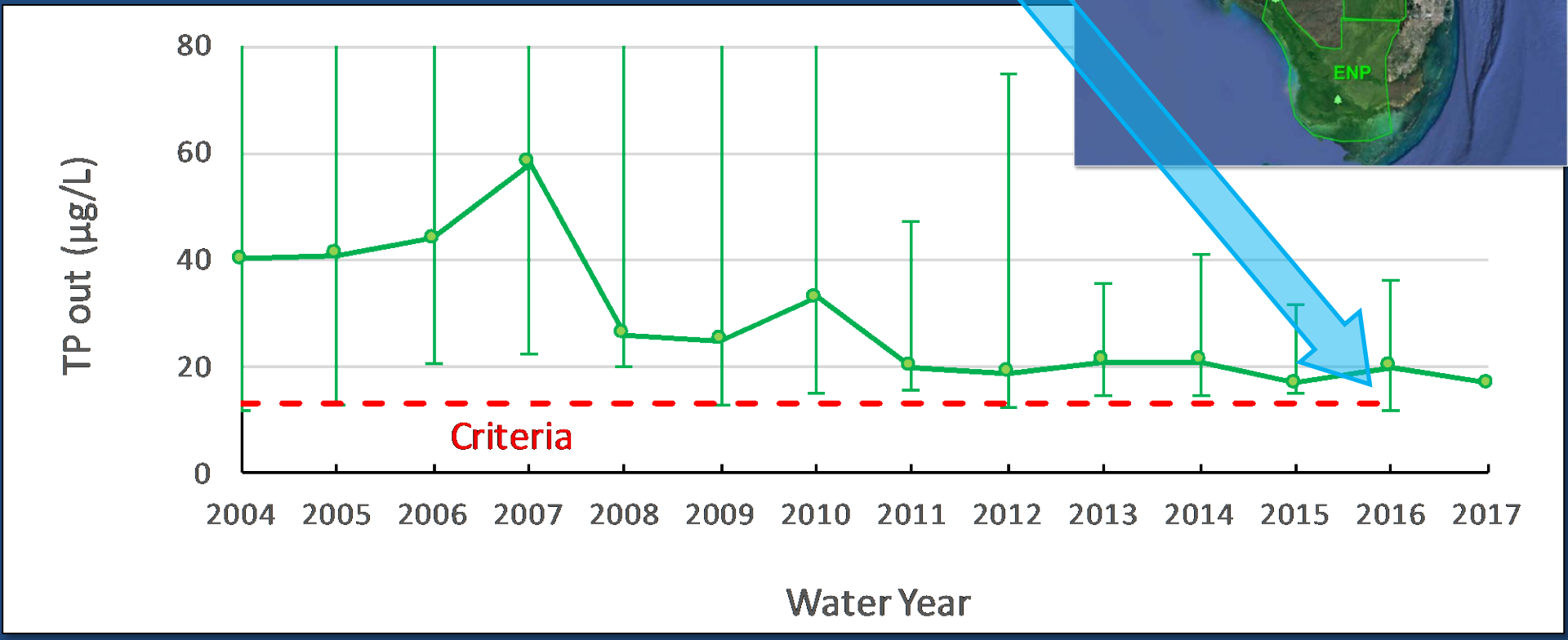
12th International Symposium on Biogeochemistry of Wetlands

DB Environmental

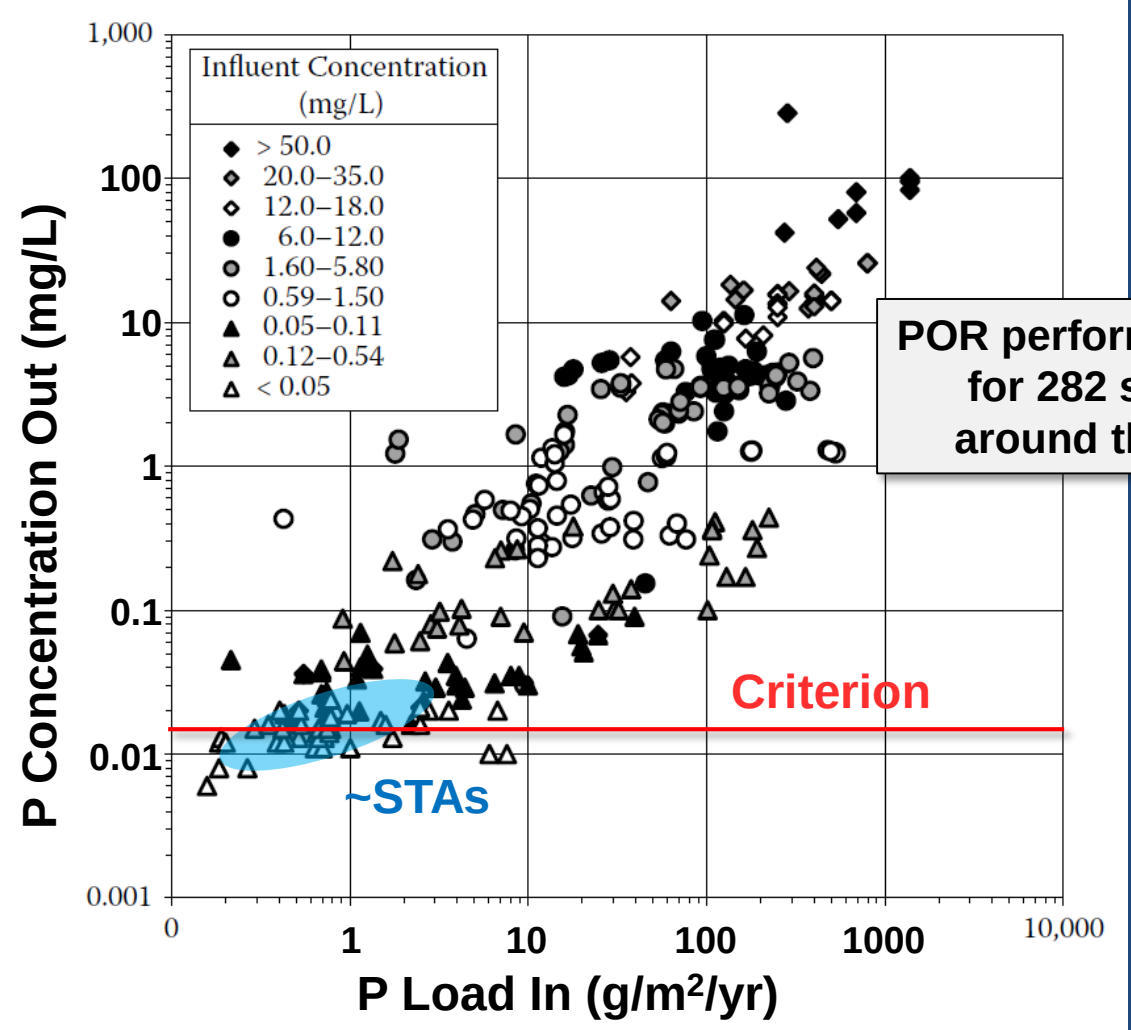
STAs: a remarkable feat of ecological engineering

…but <u>further optimization</u> is needed





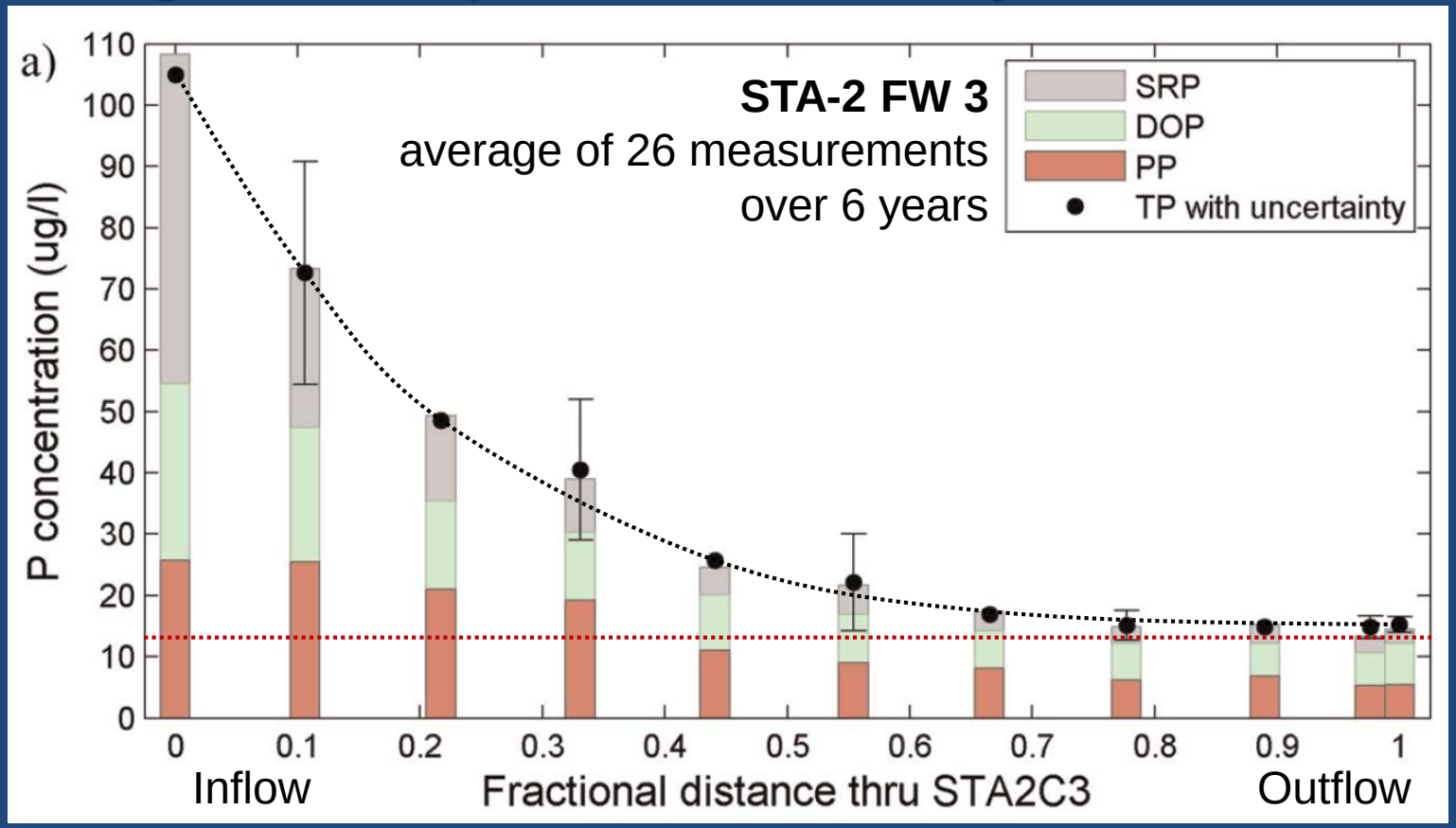
Everglades restoration driving unprecedented research



Kadlec and Wallace 2009

Internal P loading limiting lower concentrations?

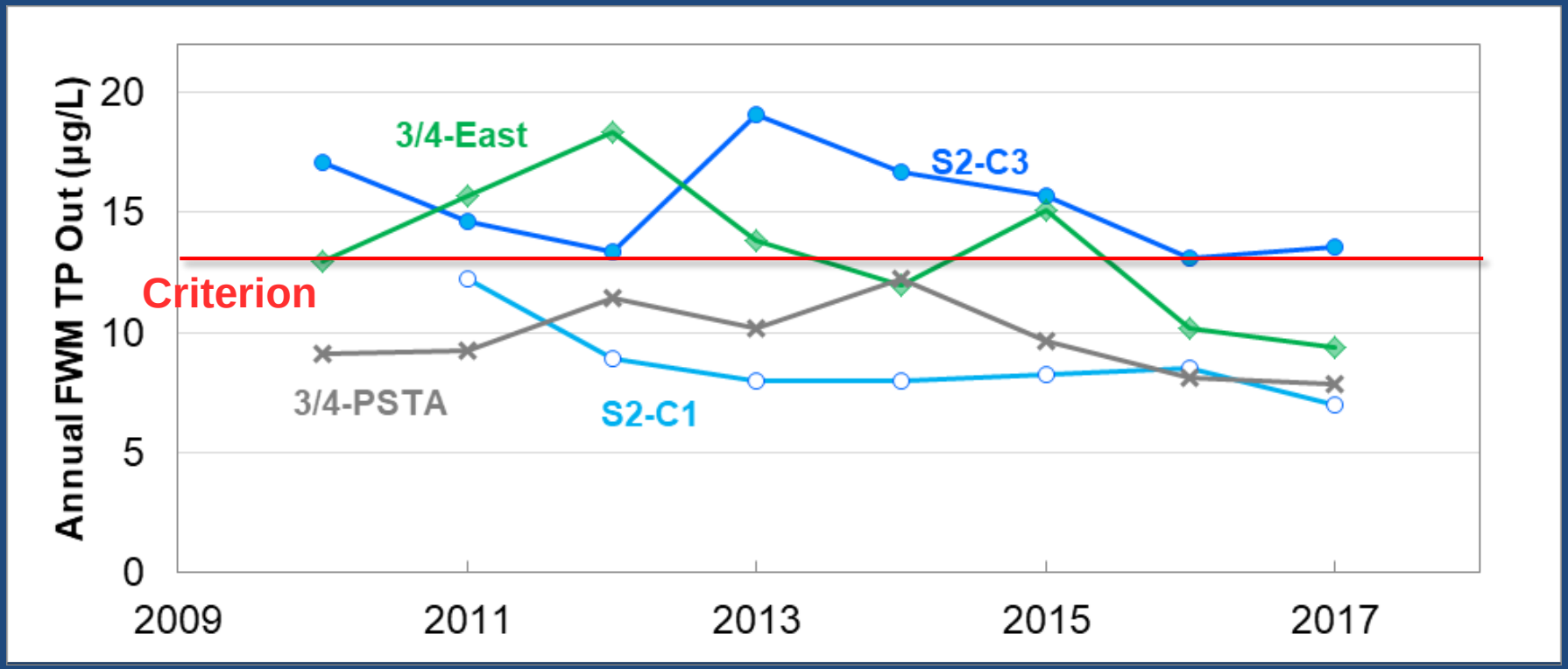
Average internal P profile STA-2 Flow-way 3



Juston and DeBusk, 2011

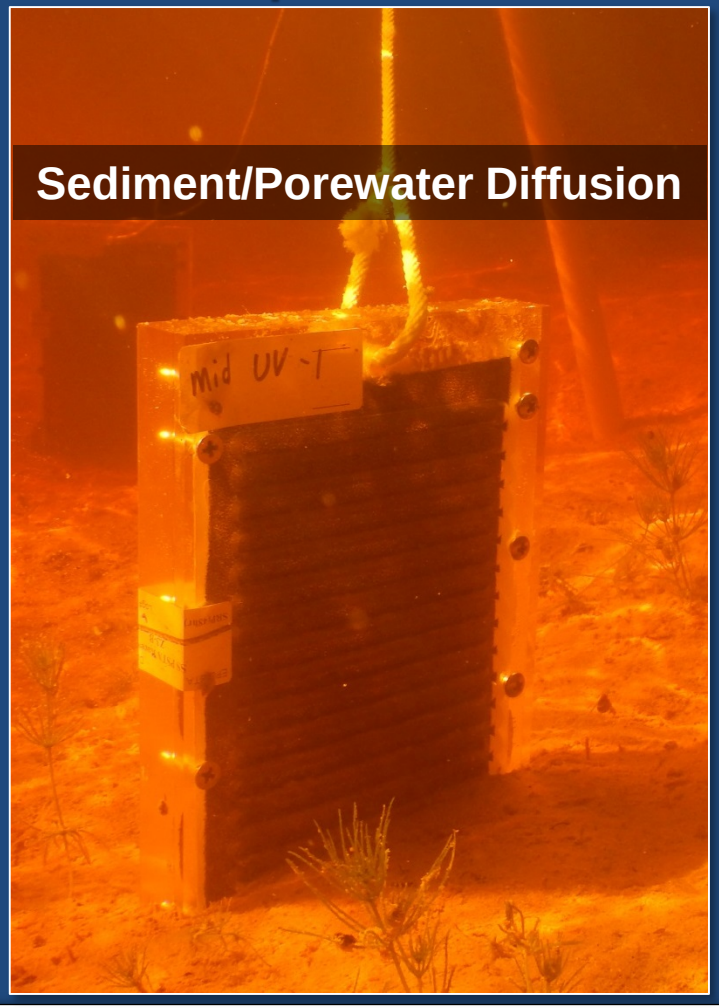
A few parts per billion makes the difference

Annual outflow TP of 4 ‘well-performing’ flow-ways

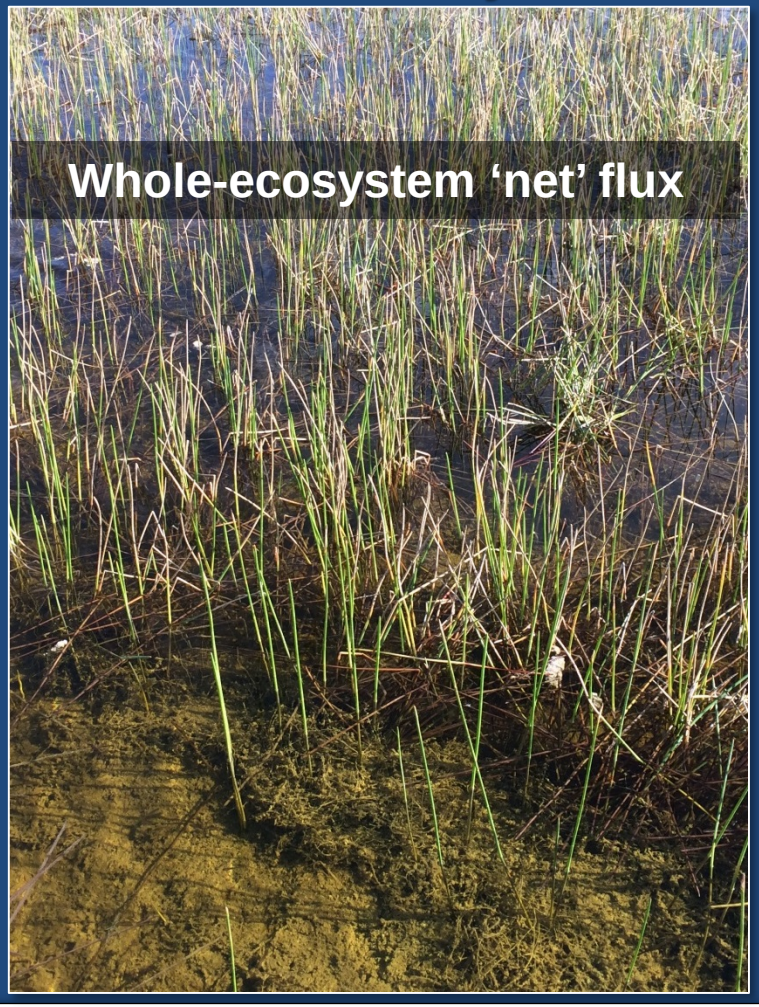


Measuring internal load

Most prior studies

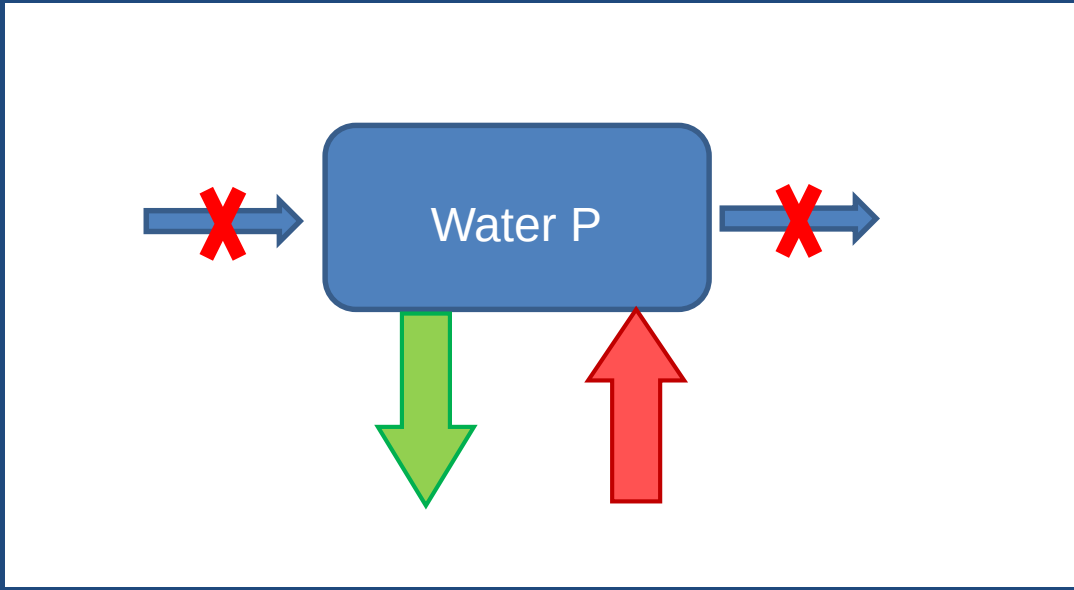


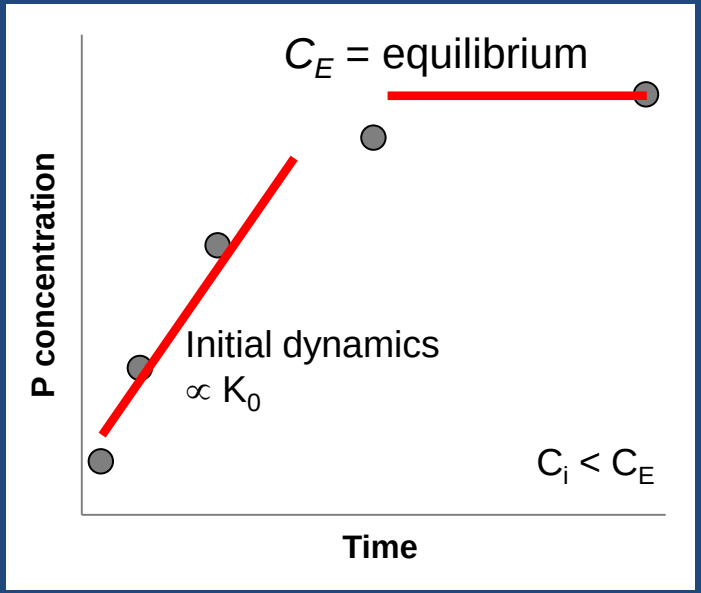
This study



Measuring internal load

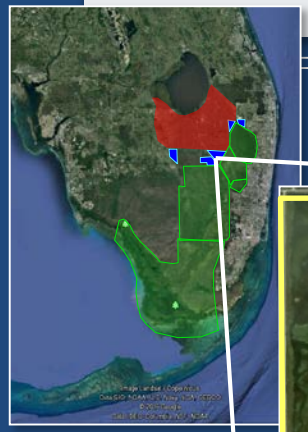
The dynamic response of water-soil-biota equilibria during no-flow intervals provides a useful window for directly estimating internal loading rates

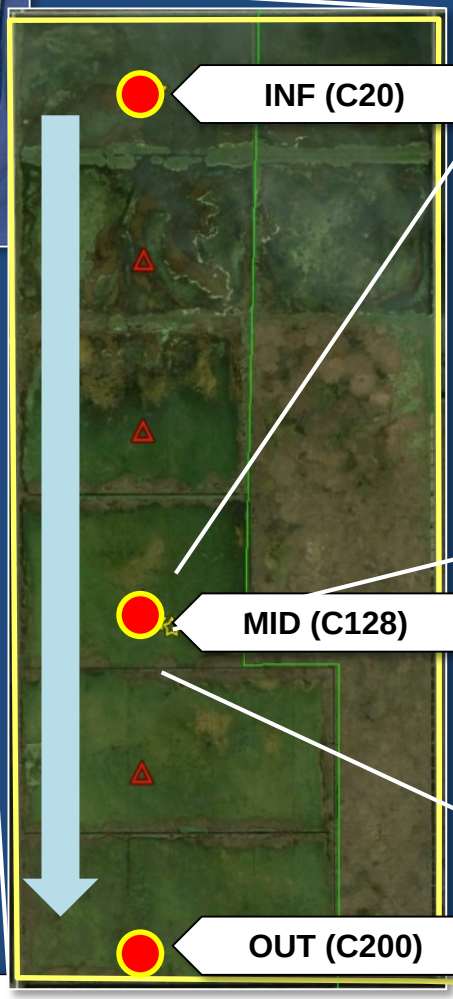


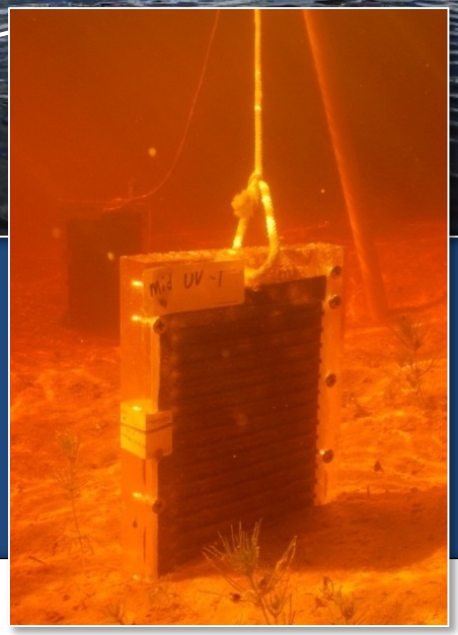


1. Isolate a parcel of water from flows – batch equilibrates
2. Measure surface water concentrations over time (14 d)
3. Apply simple model (KC) to partition removal and infer internal load rate

Study area and experimental design

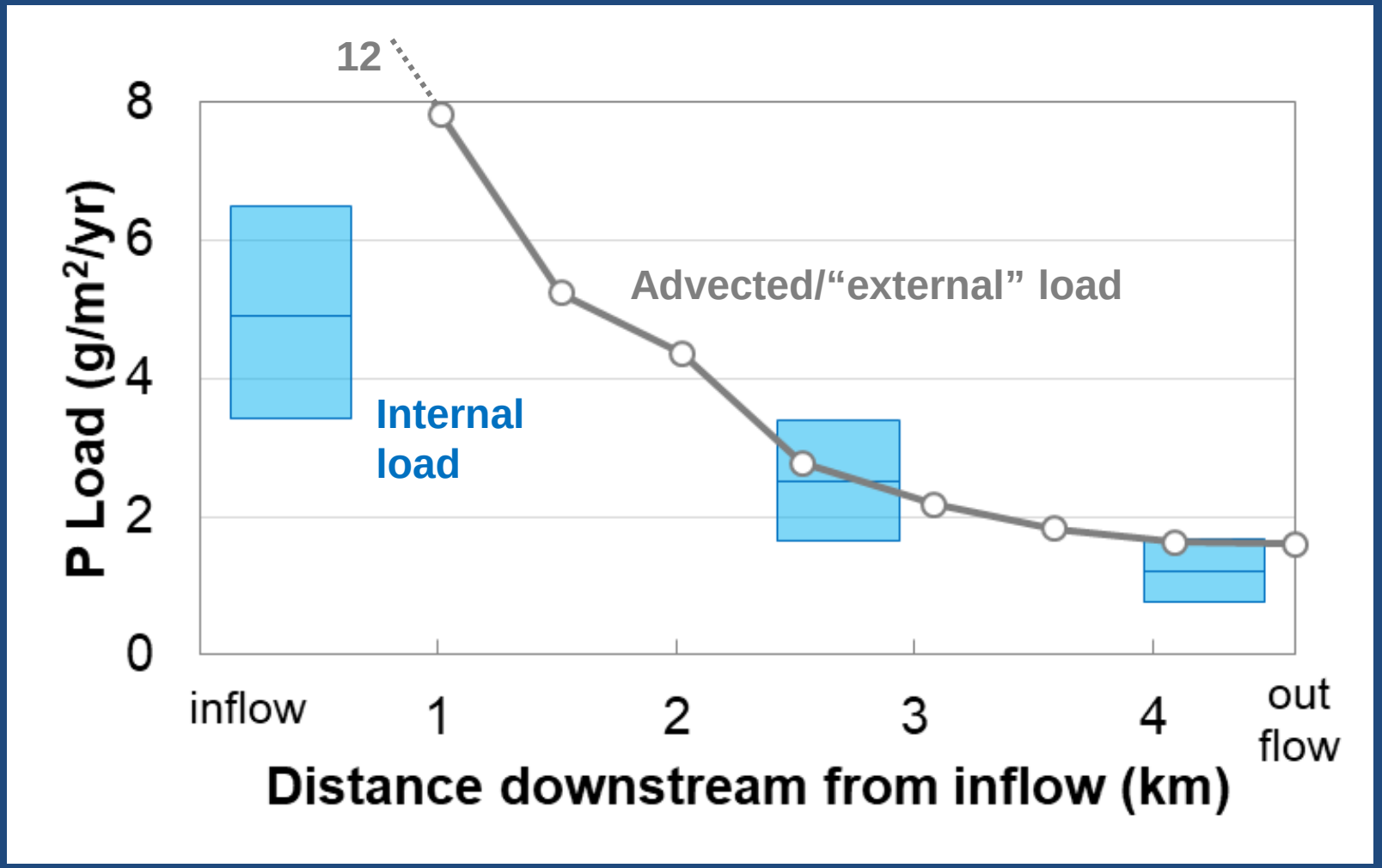




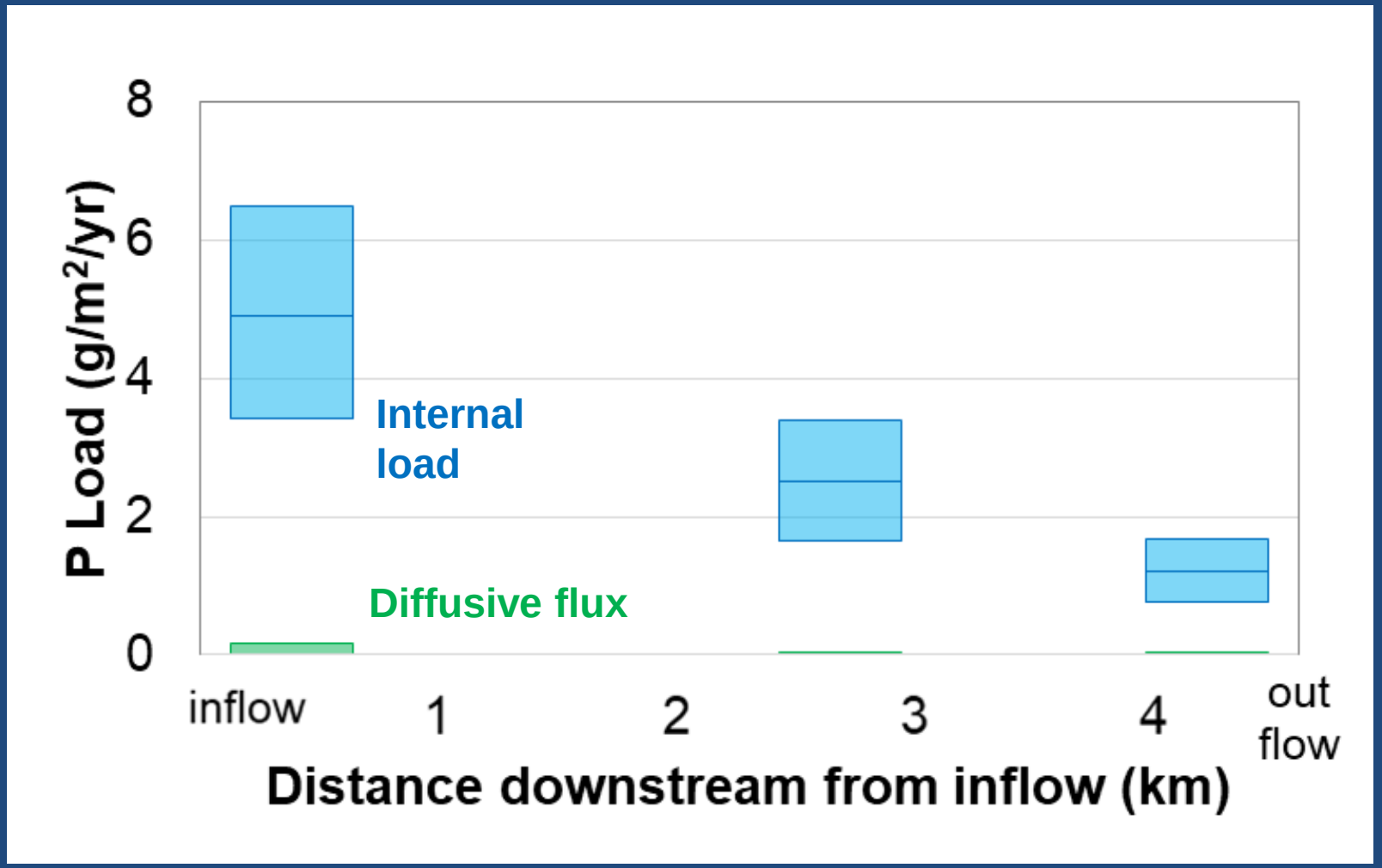


DB Environmental

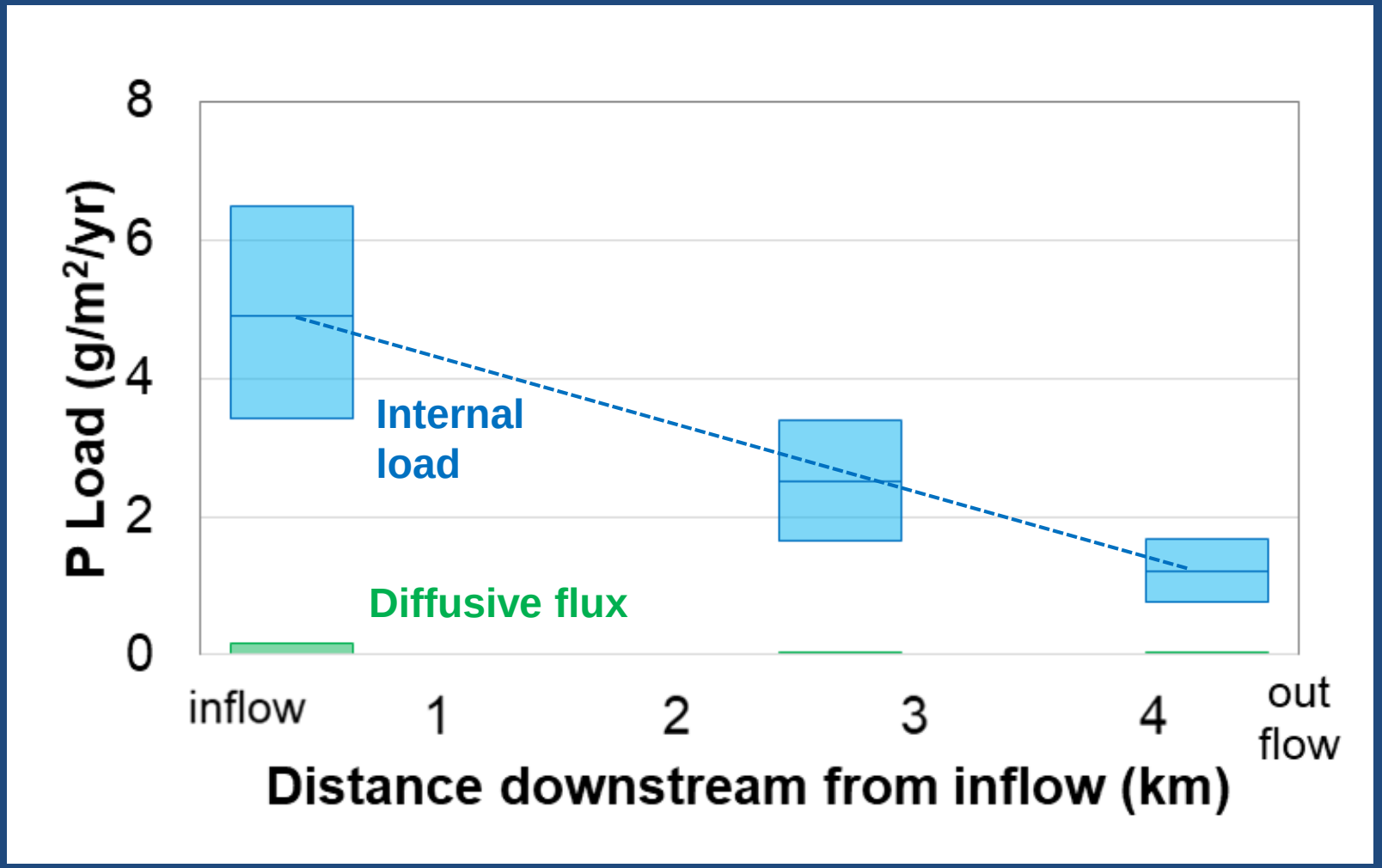
1. Internal load is sizeable compared to external load



2. Diffusive flux is negligible contributor to int. load



3. Longitudinal gradient in internal load



Conclusions

Internal P load is:

- Detected in an STA flow-way…
- Far exceeding diffusive flux…
- Comparable to external loads…
- Even in low-P outflow region.

Looking forward

- Contributes to STA flow-way **performance differences**?
- Provide **management options** to improve STA performance?


Chamber installation at STA-3/4 Cell 3A


Chamber installation at STA-3/4 Cell 3B