

# **A COMPARISON OF ATMOSPHERIC CARBON PROCESSES IN SELECT NATURAL AND RESTORED WETLANDS**

**Frank Anderson, Brian Bergamaschi, W. Barclay Shoemaker, L. Windham-Myers, and R. Fujii**



# *Areas of Commonality*

Agricultural/Hydrological Management



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Land Subsidence/Peat Oxidation



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Invasive Species



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Ecosystem Services



<http://news.nationalgeographic.com/news/2013/02/130220-birds-california-conservation-cranes-farmers-science/>

# Areas of Commonality

Agricultural/Hydrological Management



Invasive Species



Land Subsidence/Peat Oxidation

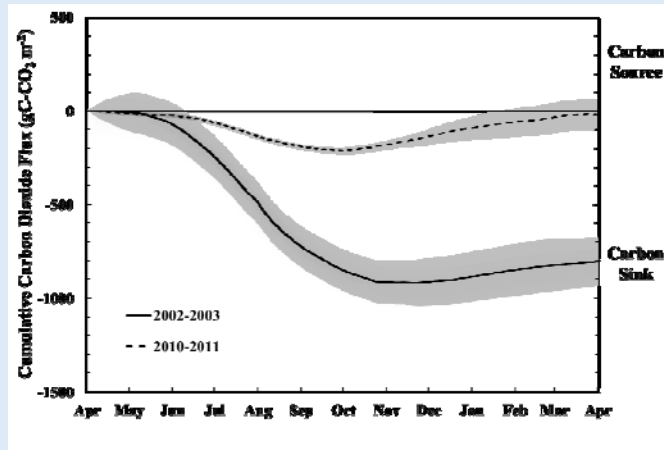


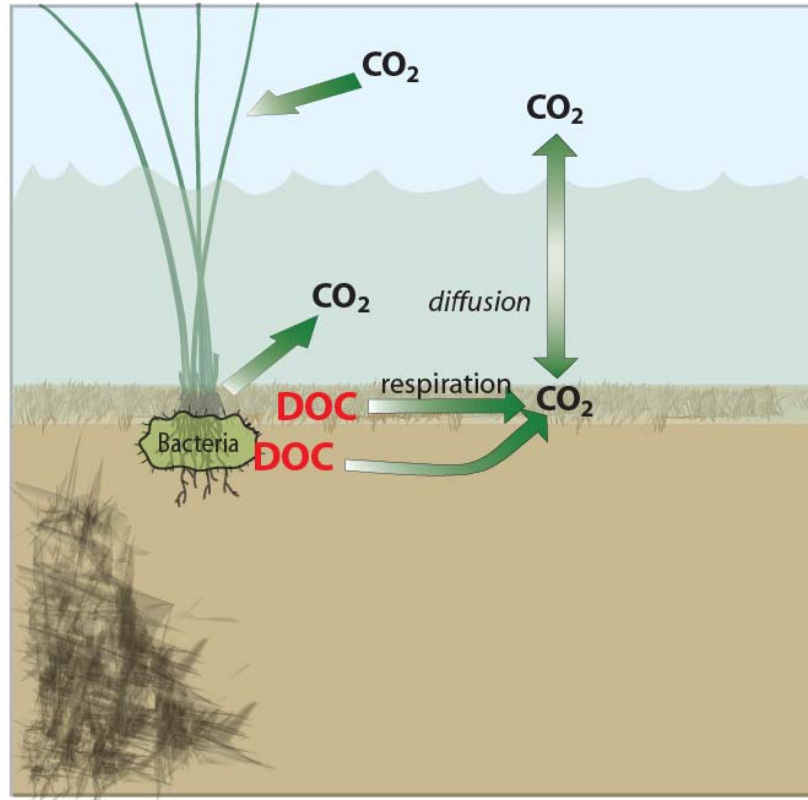
Ecosystem Services

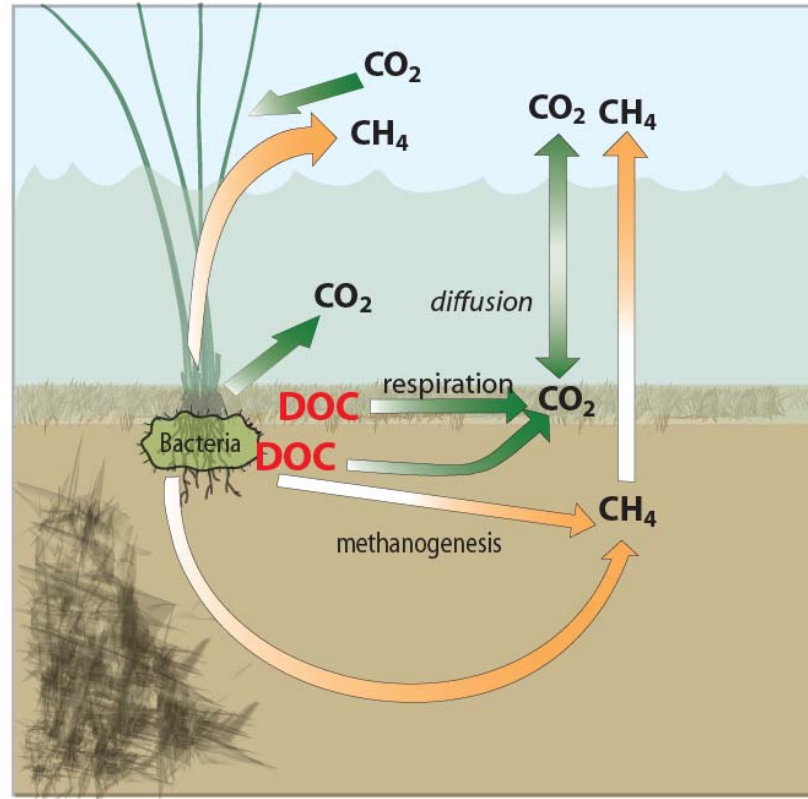


<http://news.nationalgeographic.com/news/2013/02/130220-birds-california-conservation-cranes-farmers-science/>

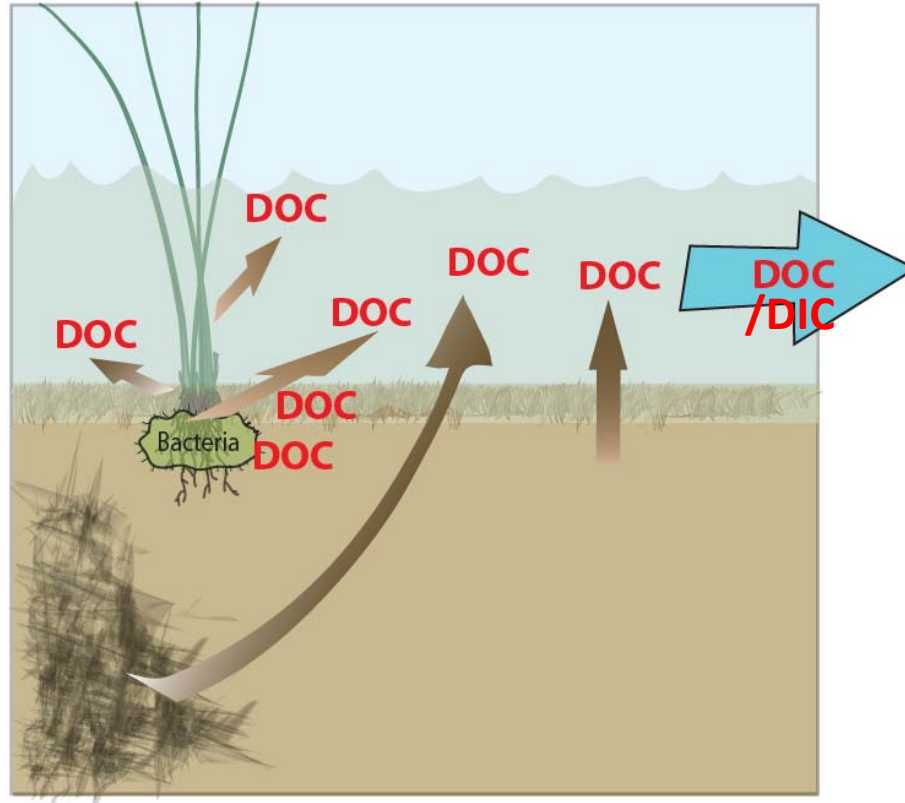
Annual Atmospheric Carbon Balance



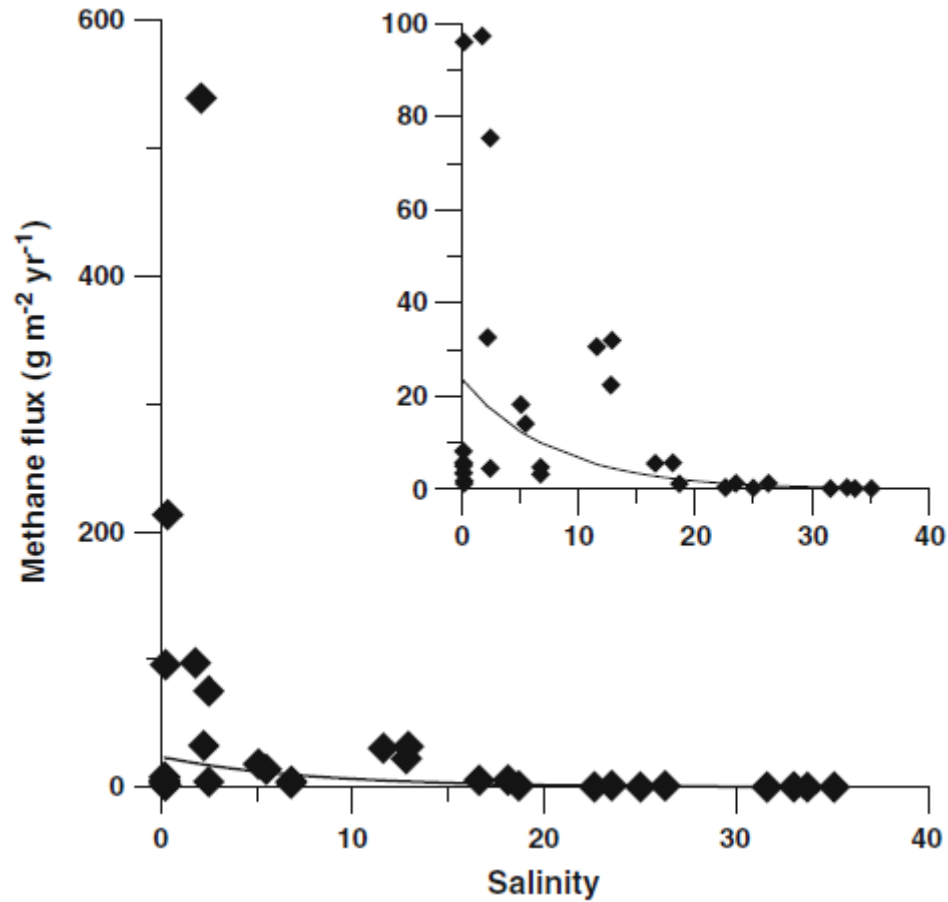




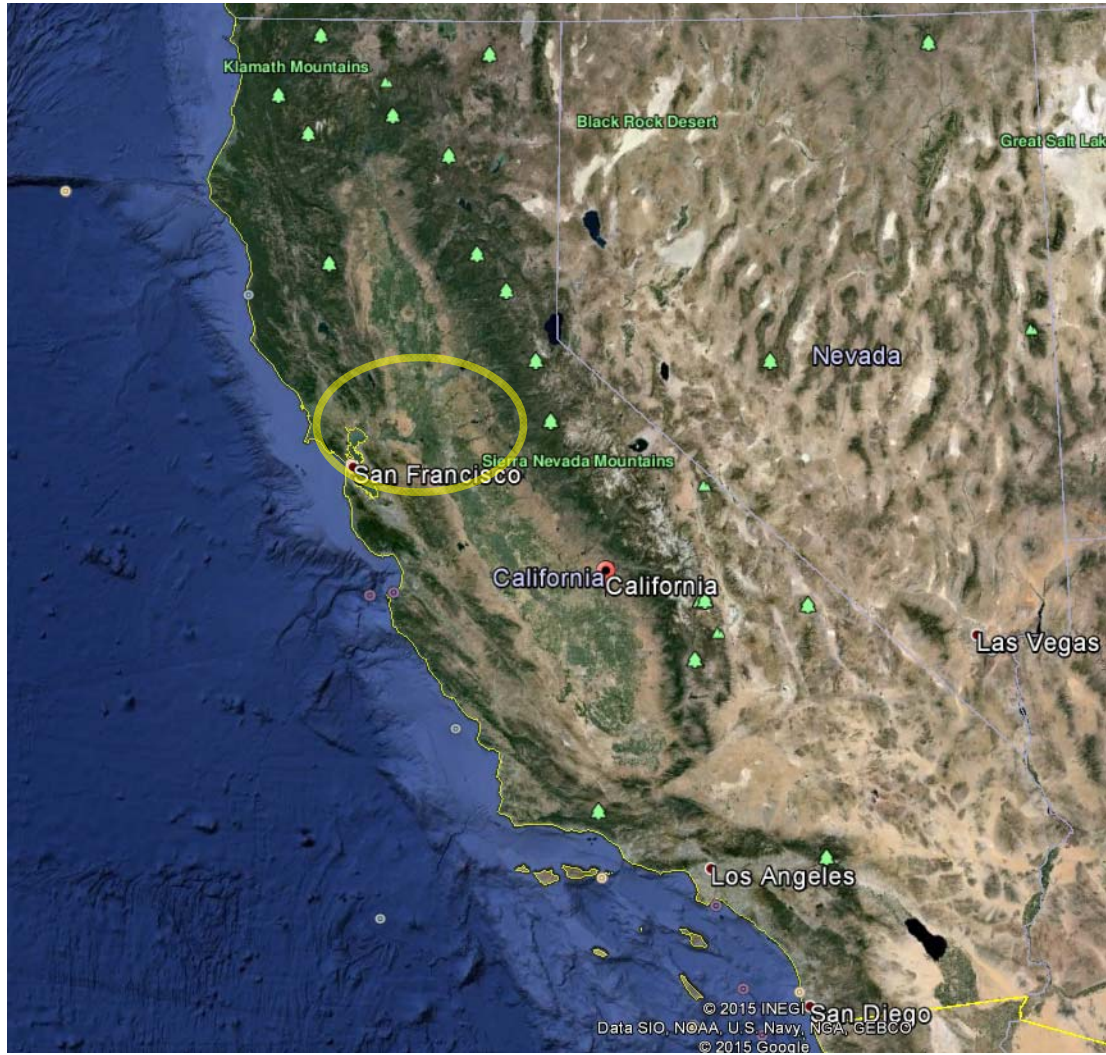




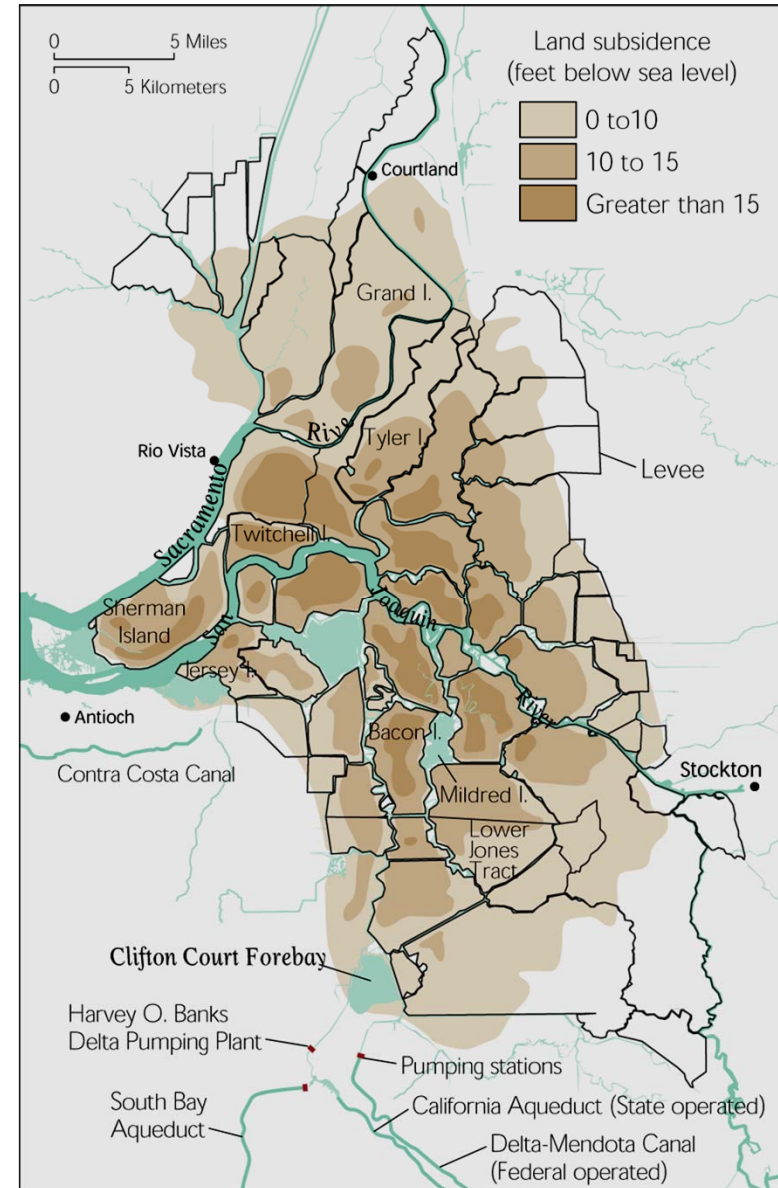
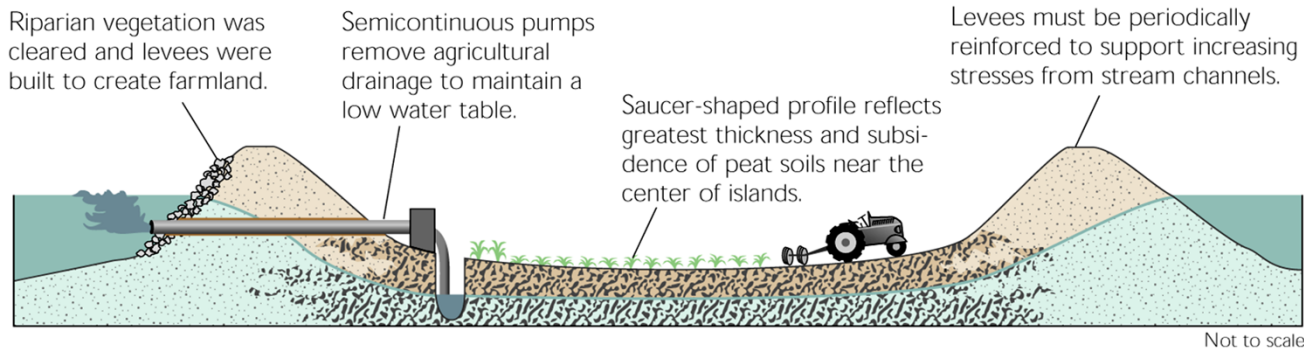
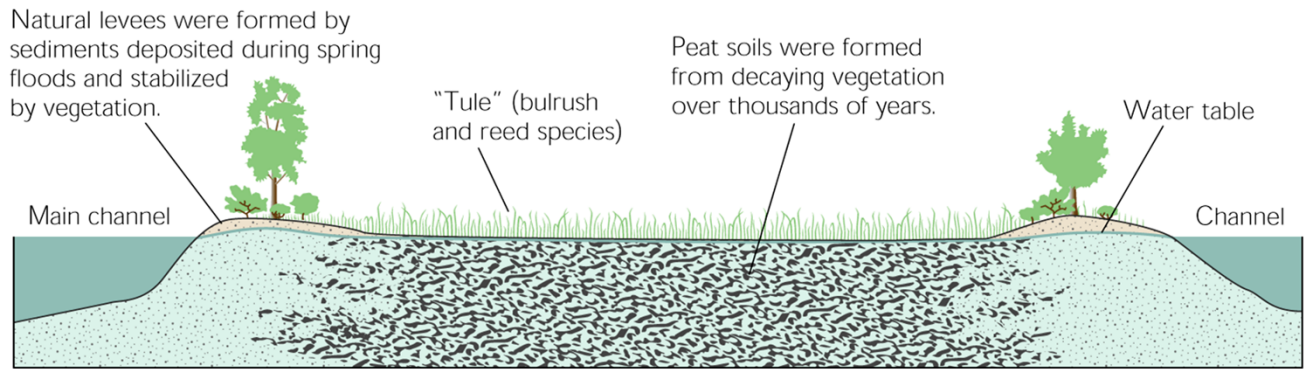
## Methane shows high variability under non-saline conditions (<18 ppt)



Poffenbarger et al.(2011) Wetlands



# Sacramento – San Joaquin Delta









Flooded Site



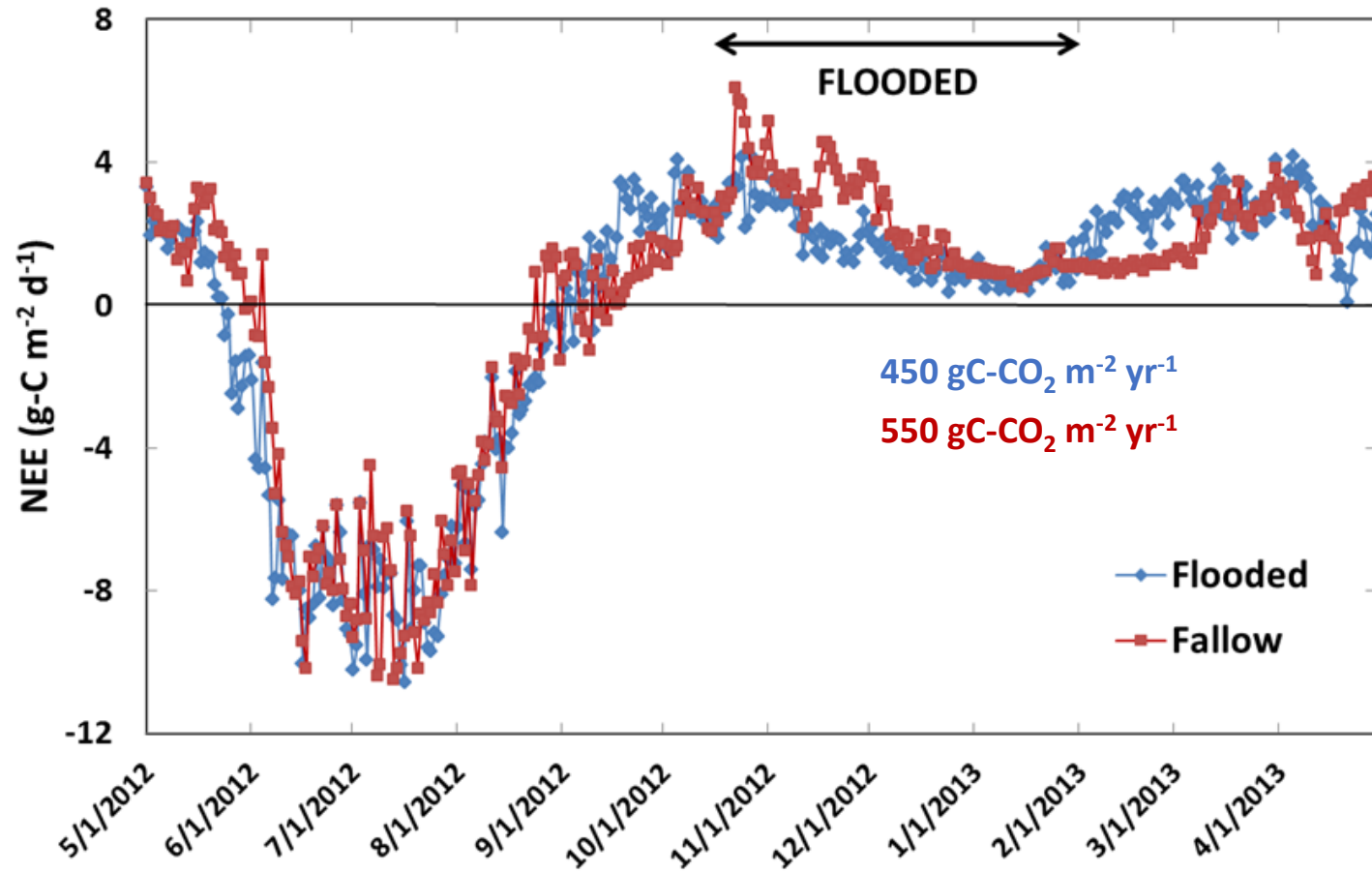
Reference Site  
(Winter: Fallow)



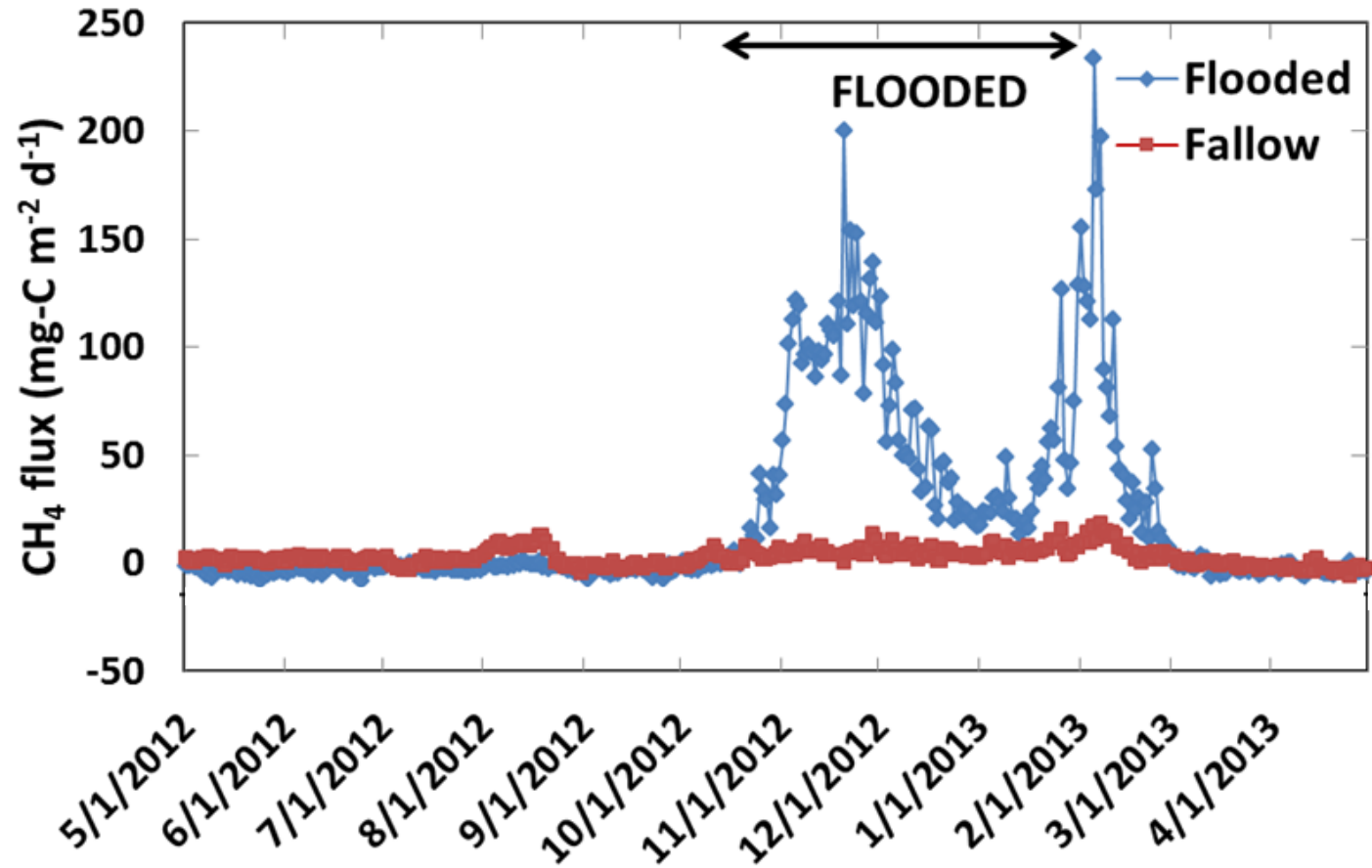
Map courtesy from Steve Deverel Hydrofocus



# Carbon Dioxide Fluxes

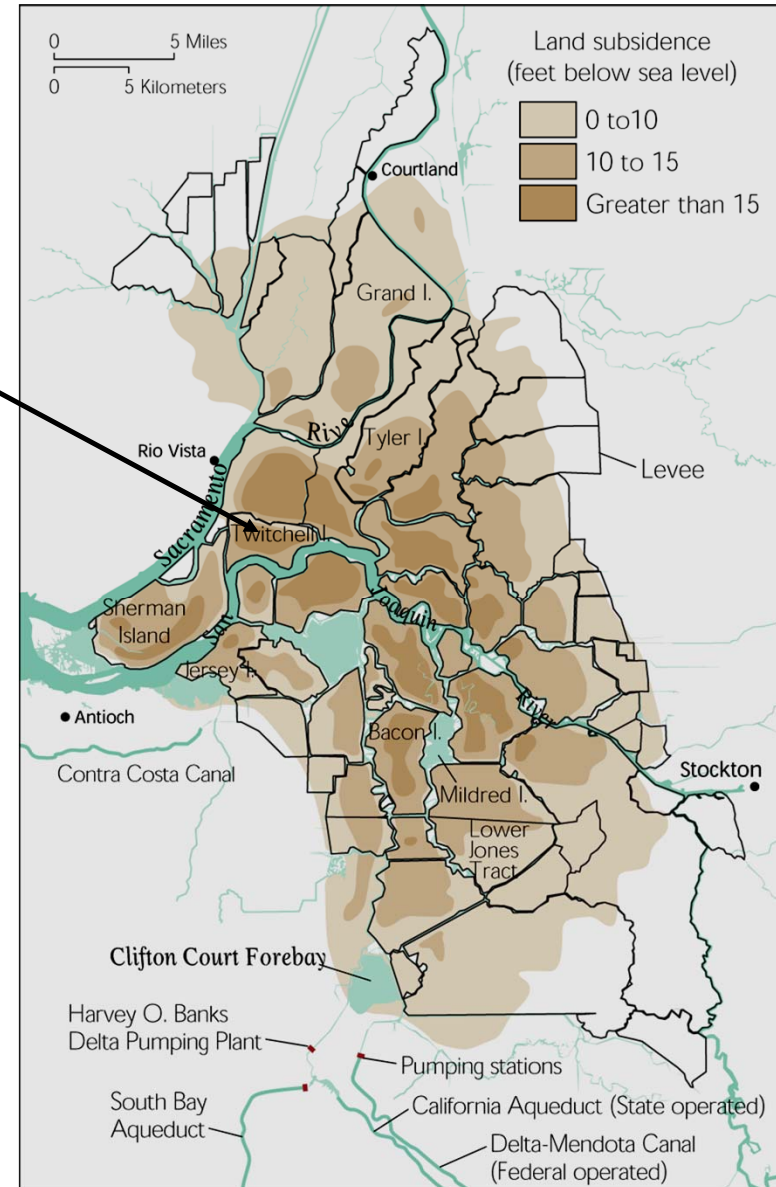


# Methane Fluxes





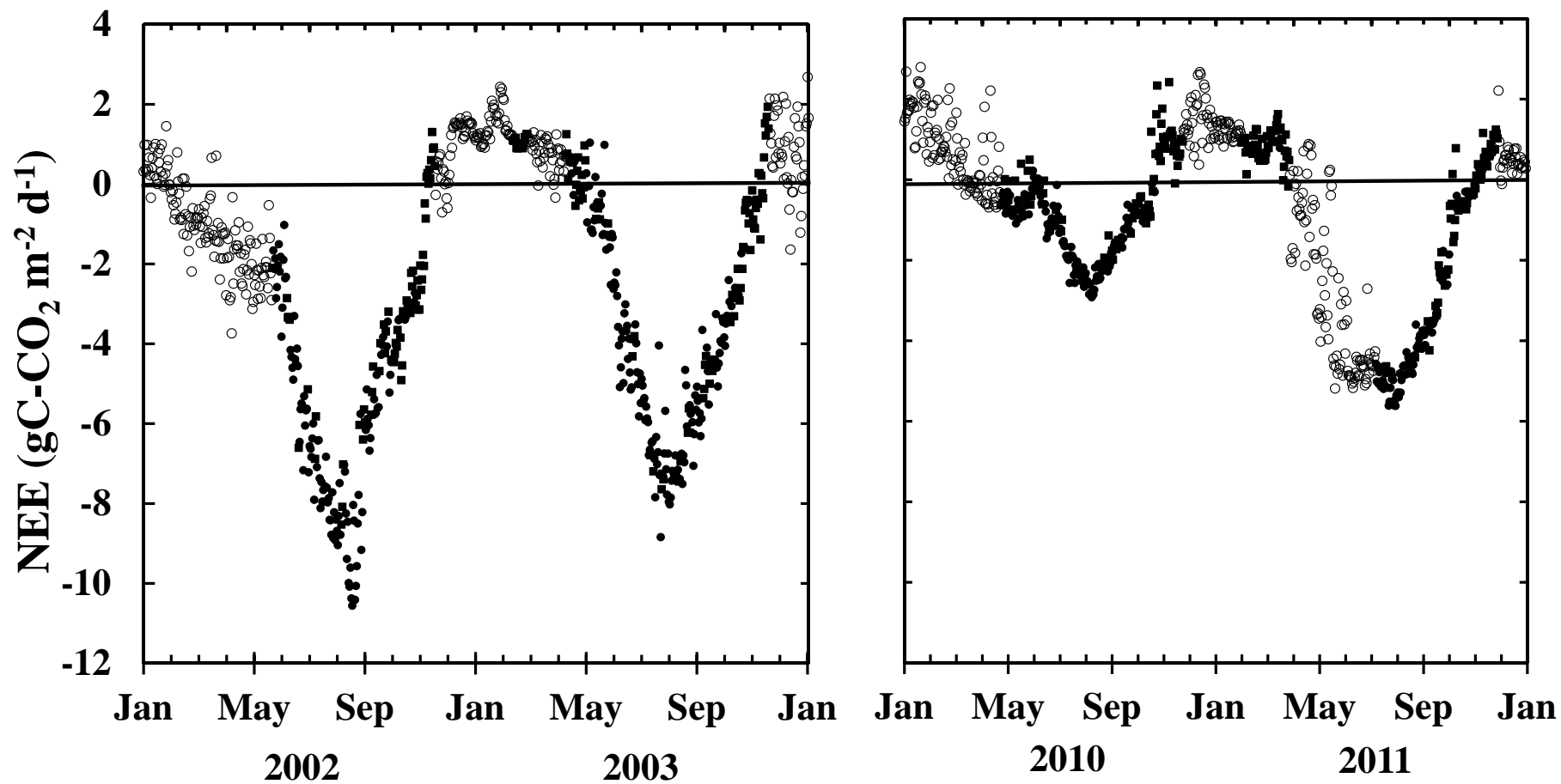
# *Twitchell Island*



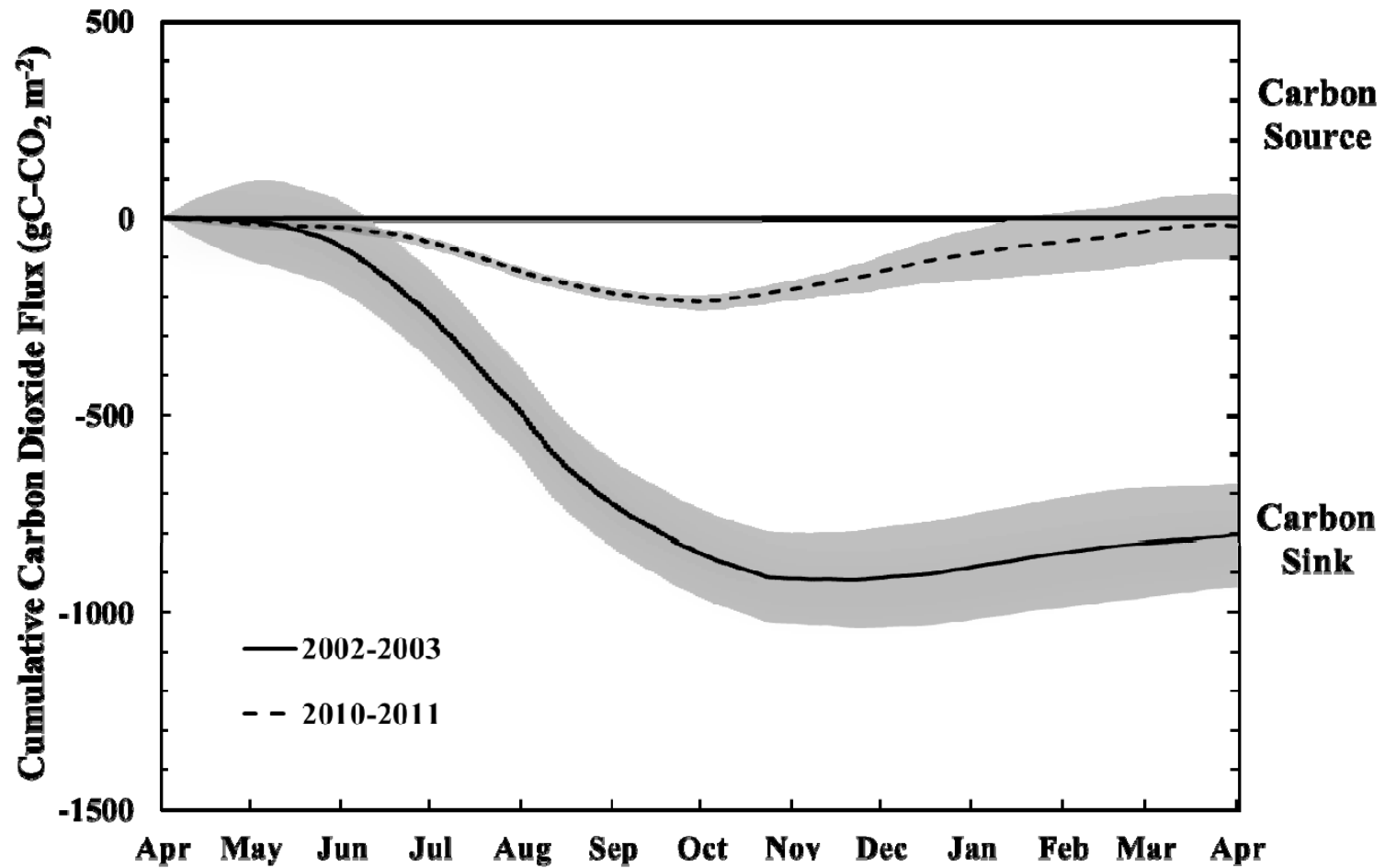
# Twitchell Island Impounded, Freshwater Wetland



## *Twitchell Island NEE*

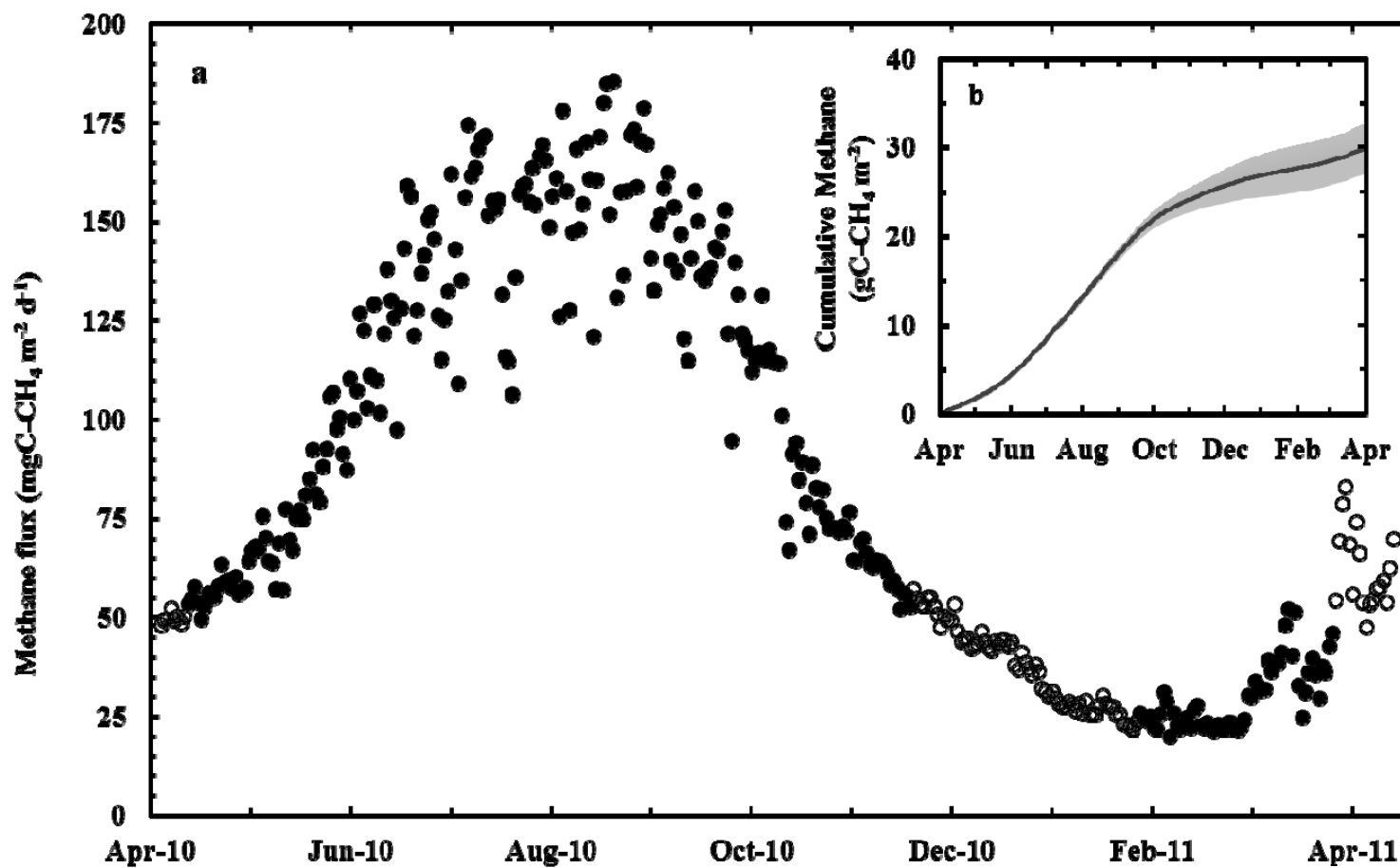


## *Twitchell Island Wetland Annual Carbon Balance*

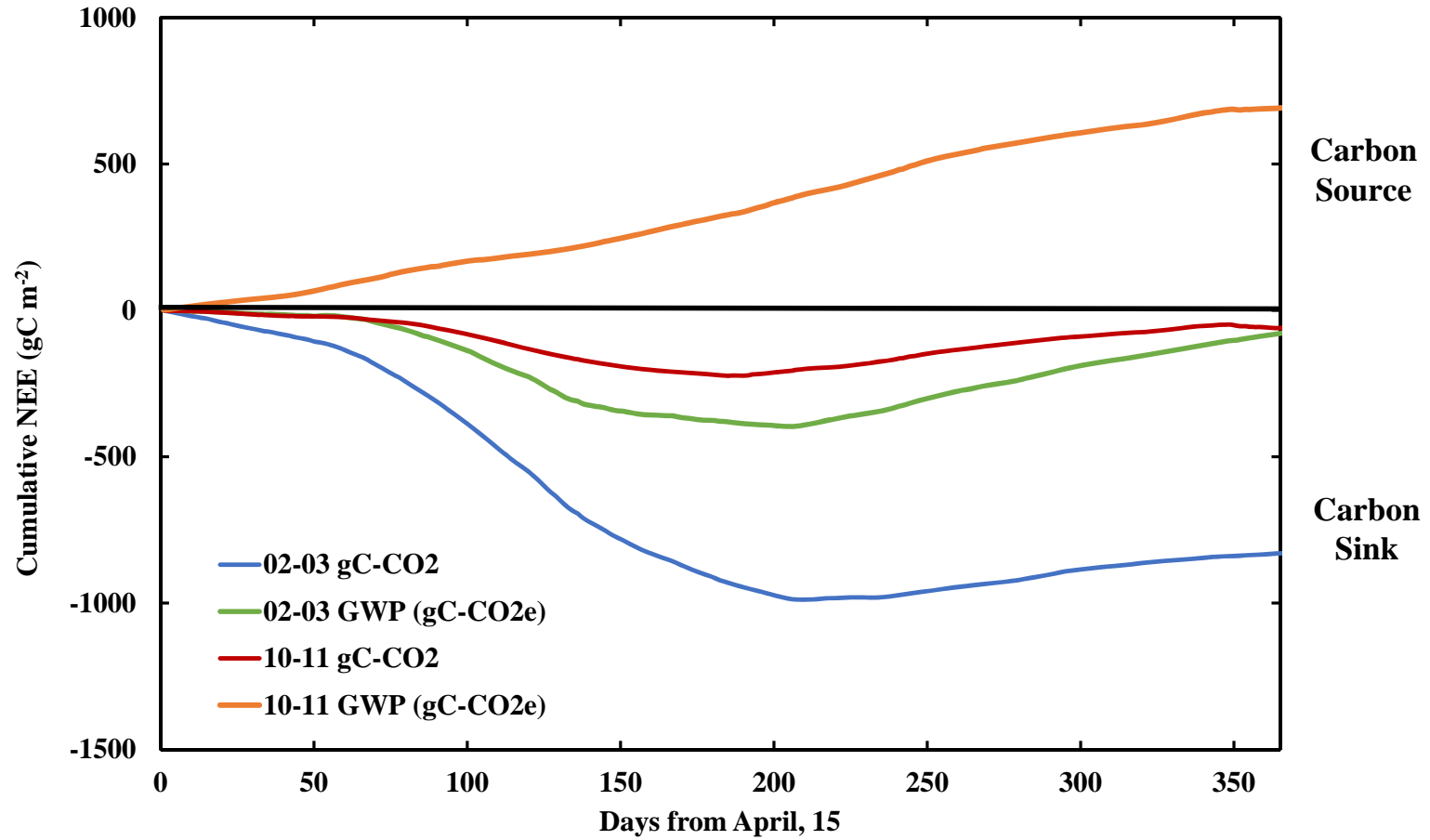




## *Twitchell Island Methane Flux*



# *Twitchell Island Wetland Global Warming Potential*



# *Suisun Marsh: Tidal Regime, Salinity and Invasive Species*

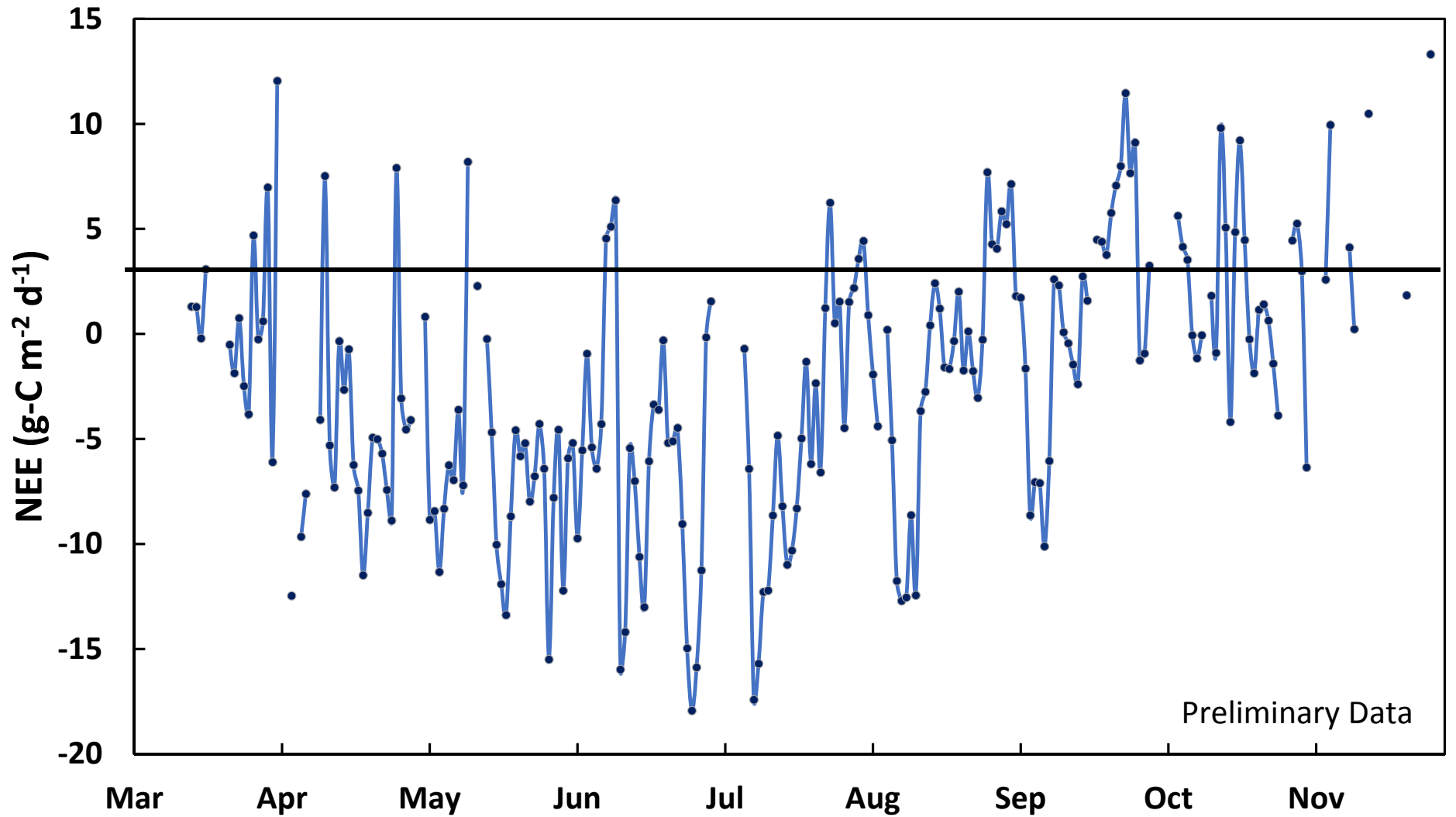




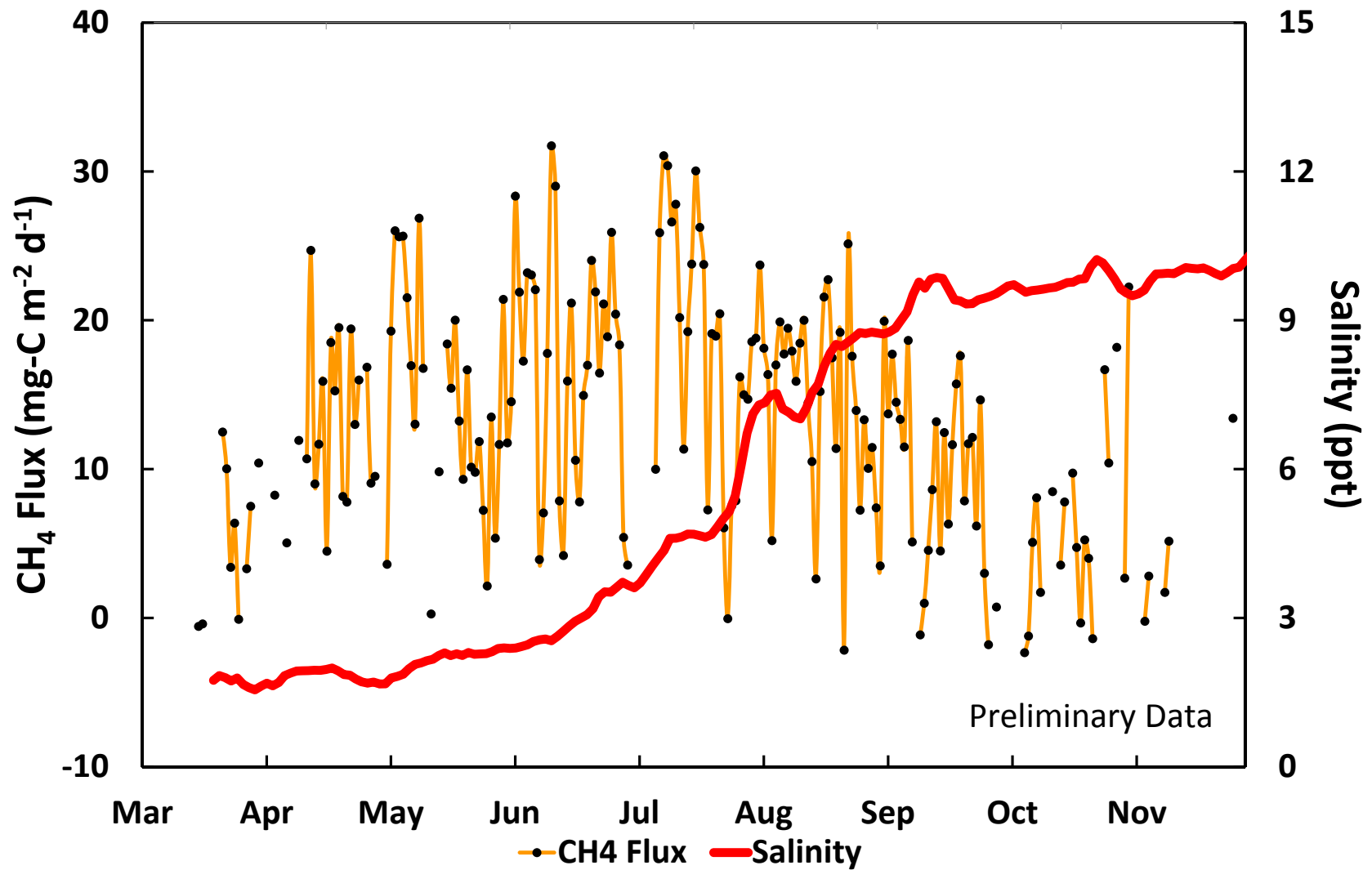
***Suisun Marsh: Tidal Regime, Salinity and Invasive Species***



## *Suisun Marsh CO<sub>2</sub> Flux (2014)*



## Suisun Marsh CH<sub>4</sub> Flux vs. Salinity (2014)



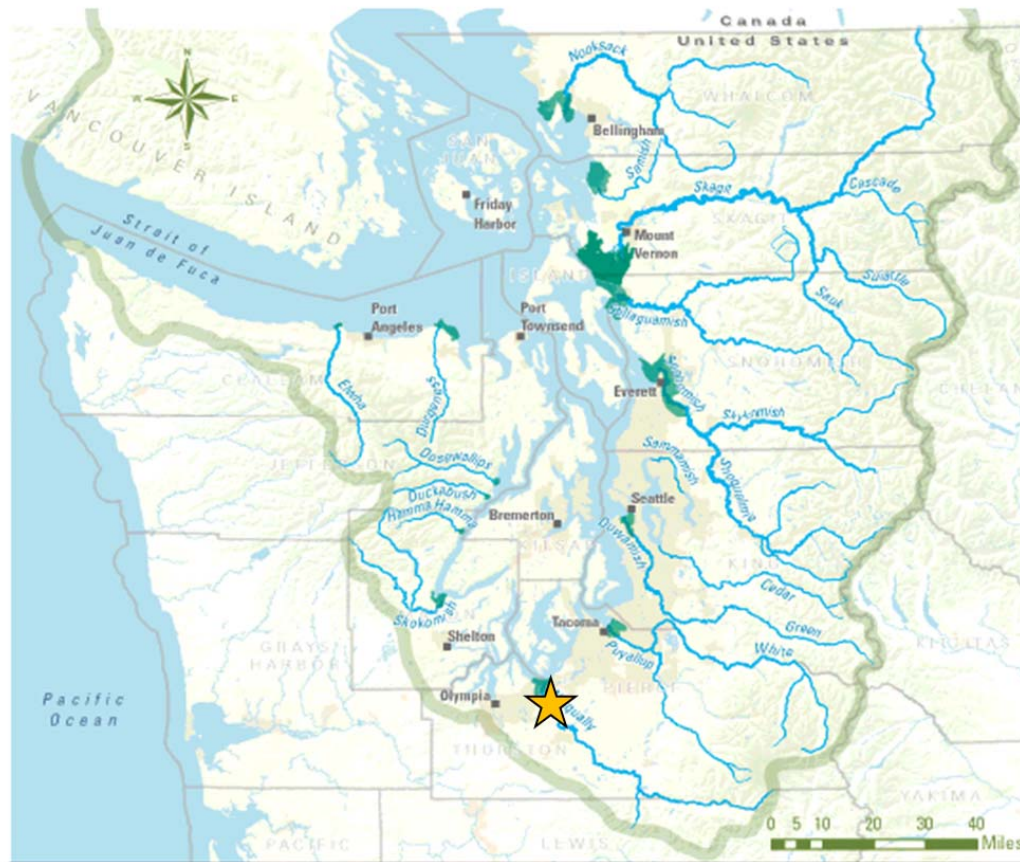


## *Conclusions*

- Annual variability in carbon balances
- Drained peat soils are a net carbon loss
- Intermittent flooding does not reduce carbon loss from peat soils
- Tidal regime may influence respiration and methane emissions
- Lateral flux of DIC/DOC can play an important role

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**Chinook salmon river deltas**



figure 2



## Nisqually Reference Site



## Nisqually Restored Site

