Nitrogen Effects on Salt Marshes

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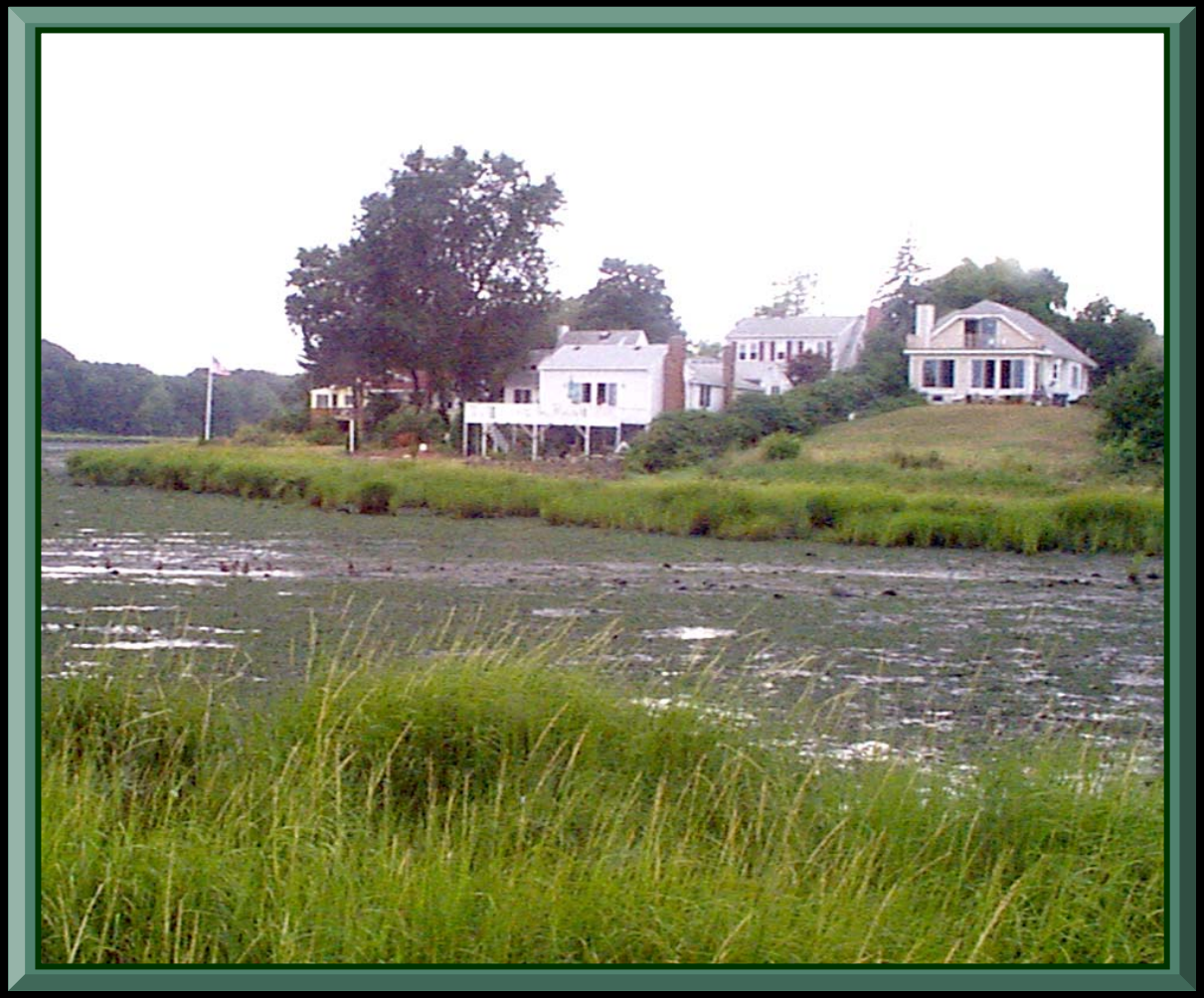
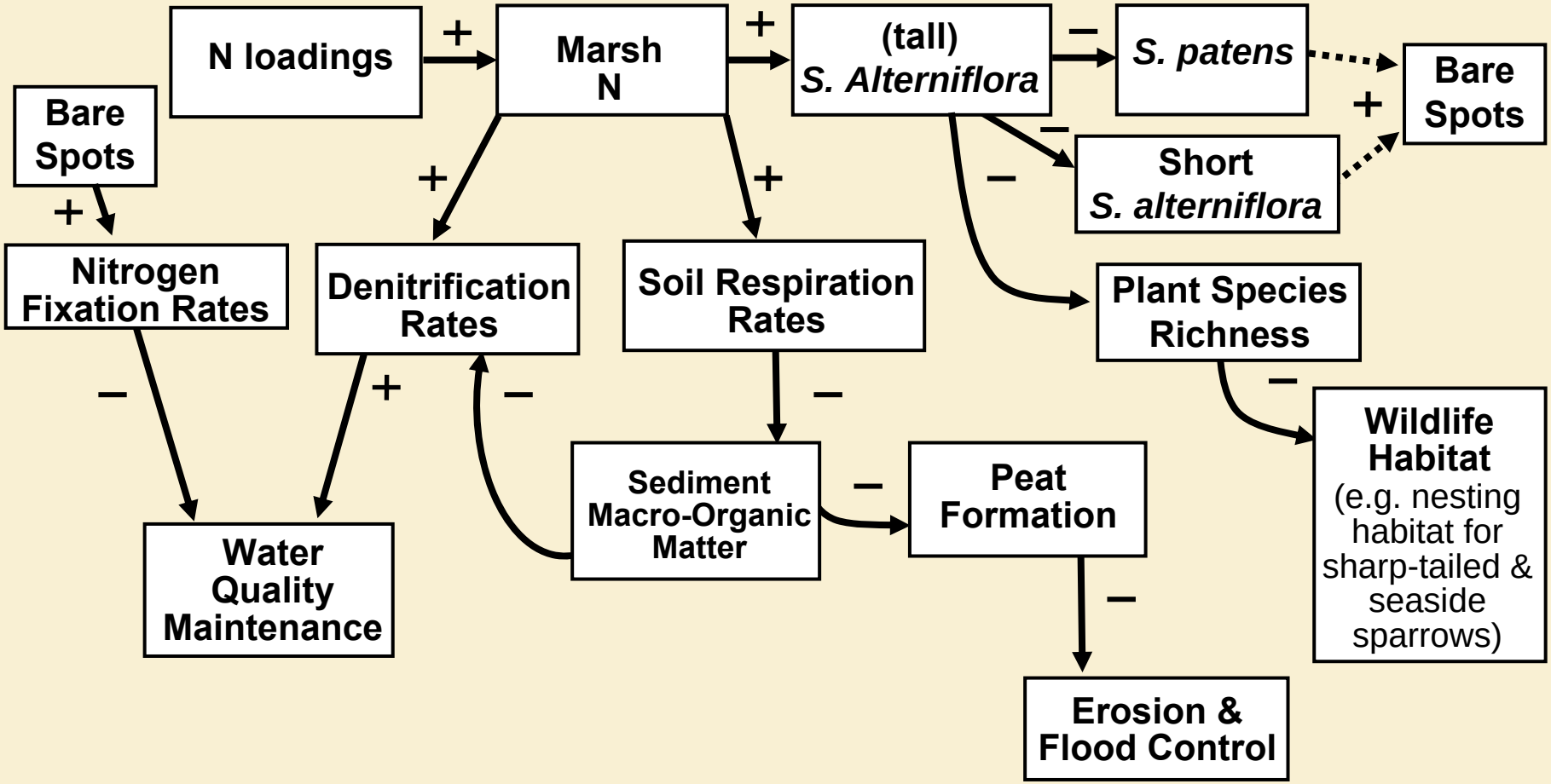


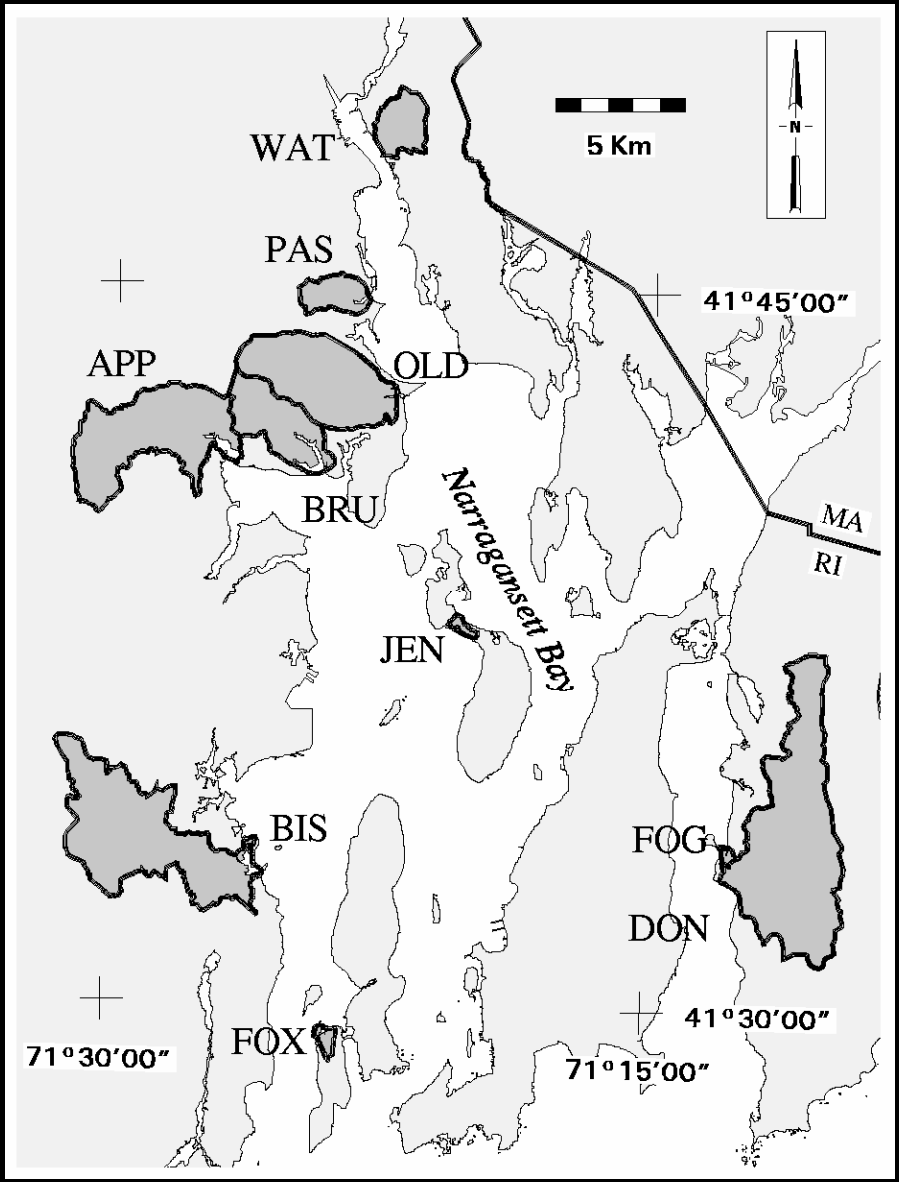
Some Mechanisms for Changes in Marsh Structure and Function due to Nitrogen Over-enrichment



Narragansett Bay Coastal Wetlands Survey

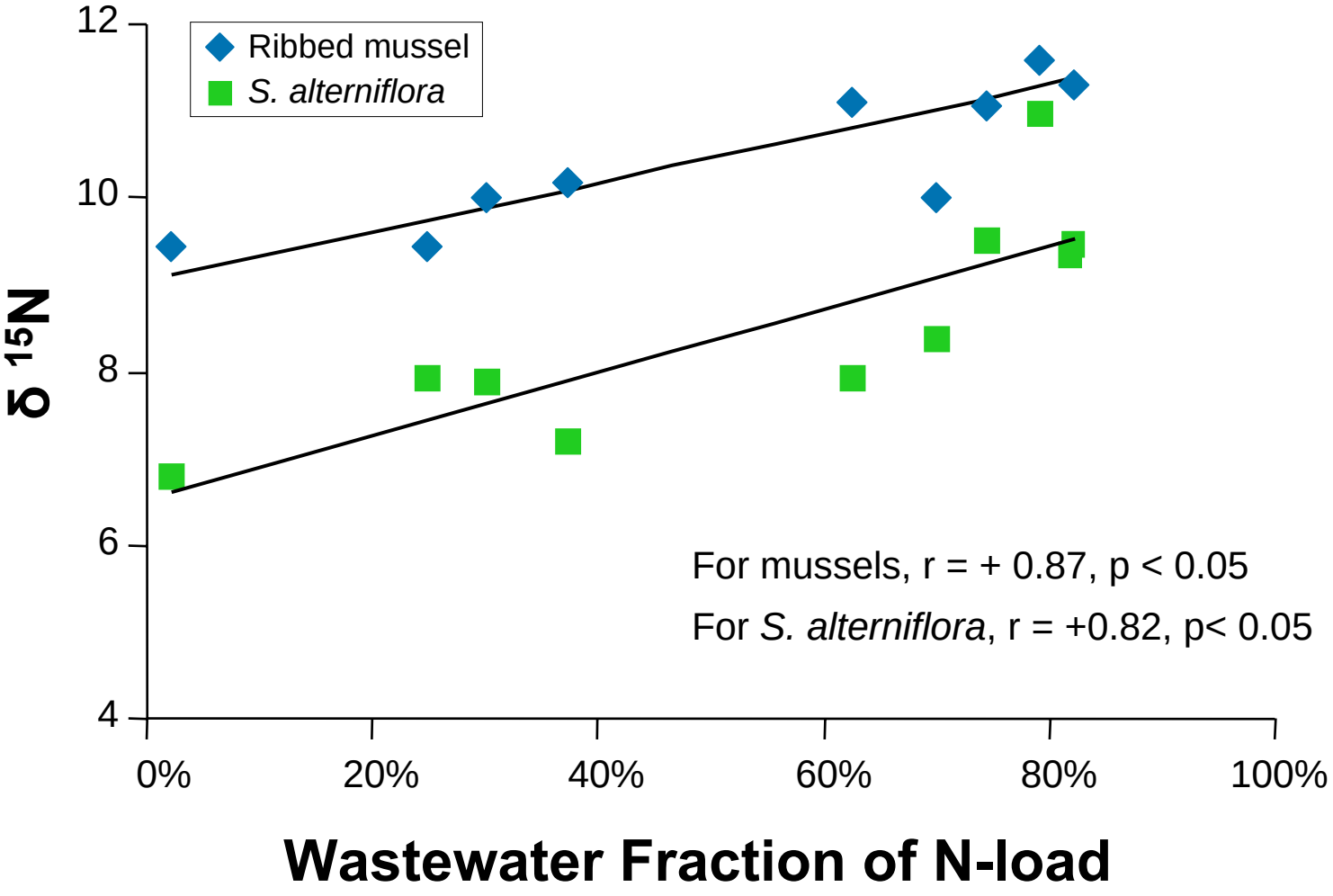
- Use of space-for-time substitution for selection of sites (Residential development, Watershed nitrogen loads). These sites represent a coastal wetlands reference set.
- Development of a reference set of responses (plants, animals, soils)

Study Sites in Narragansett Bay

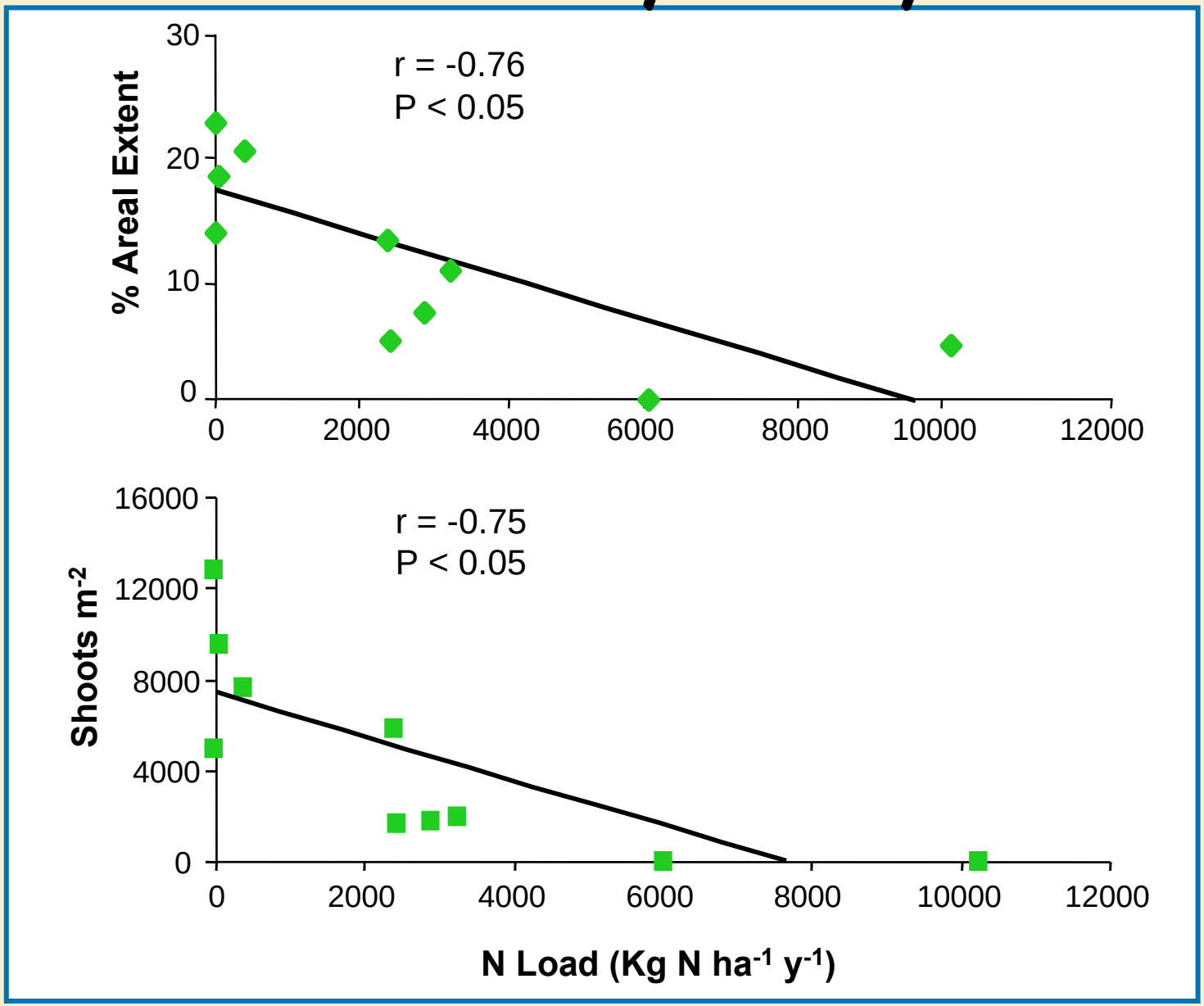


Watershed and Marsh Areas and Calculated Nitrogen Loadings

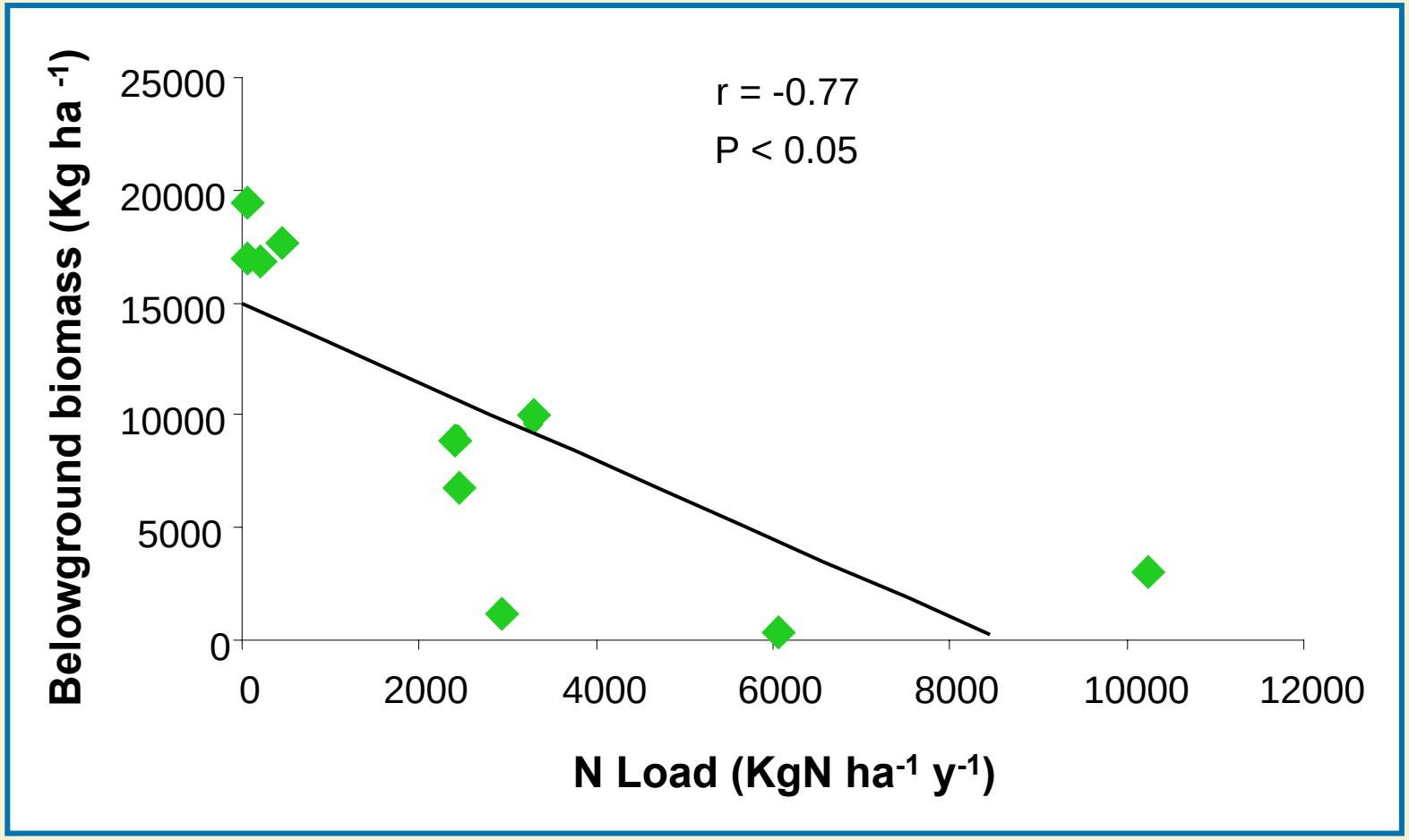
Marsh	Areas		Calculated Nitrogen Loads	
	Watershed Area, ha	Marsh Area, ha	Total N load (kg N yr^{-1})	Marsh area normalized N load (kg N ha^{-1} yr^{-1})
JEN	41	12	29	**2**
FOX	62	10	103	**10**
FOG	30	4	280	**63**
DON	2975	29	11593	**400**
PAS	314	4	9917	**2418**
BRU	781	9	22344	**2440**
BIS	2296	4	11235	**2922**
OLD	1505	10	31587	**3282**
WAT	402	2	11920	**6037**
APP	1738	3	32472	**10253**


Ribbed mussel
S. alterniflora
12
10
8
6
4
δ 15N
For mussels, r = + 0.87, p < 0.05
For S. alterniflora, r = +0.82, p< 0.05
0%
20%
40%
60%
80%
100%
Wastewater Fraction of N-load

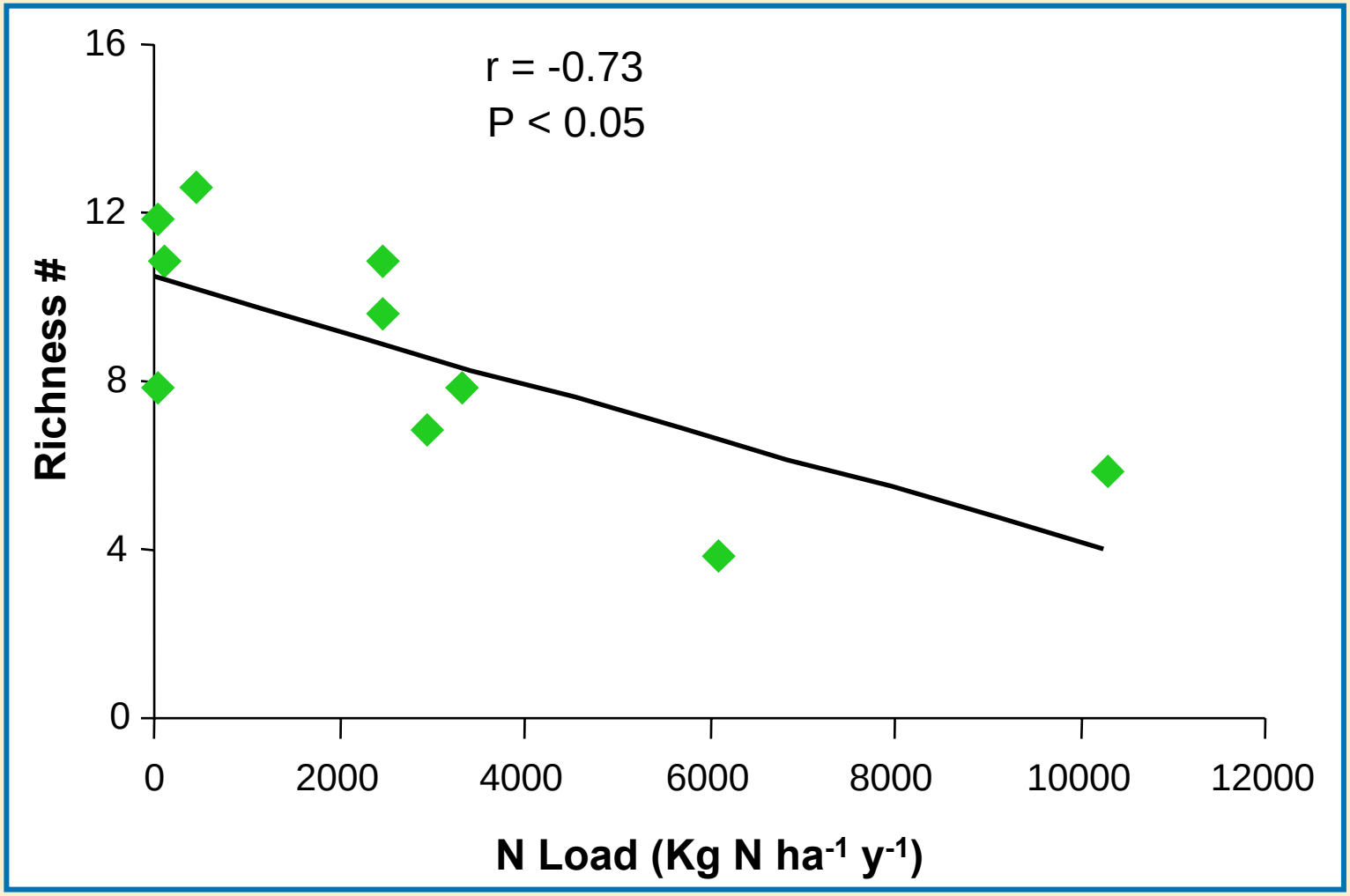
Extent & Density of *S. patens*

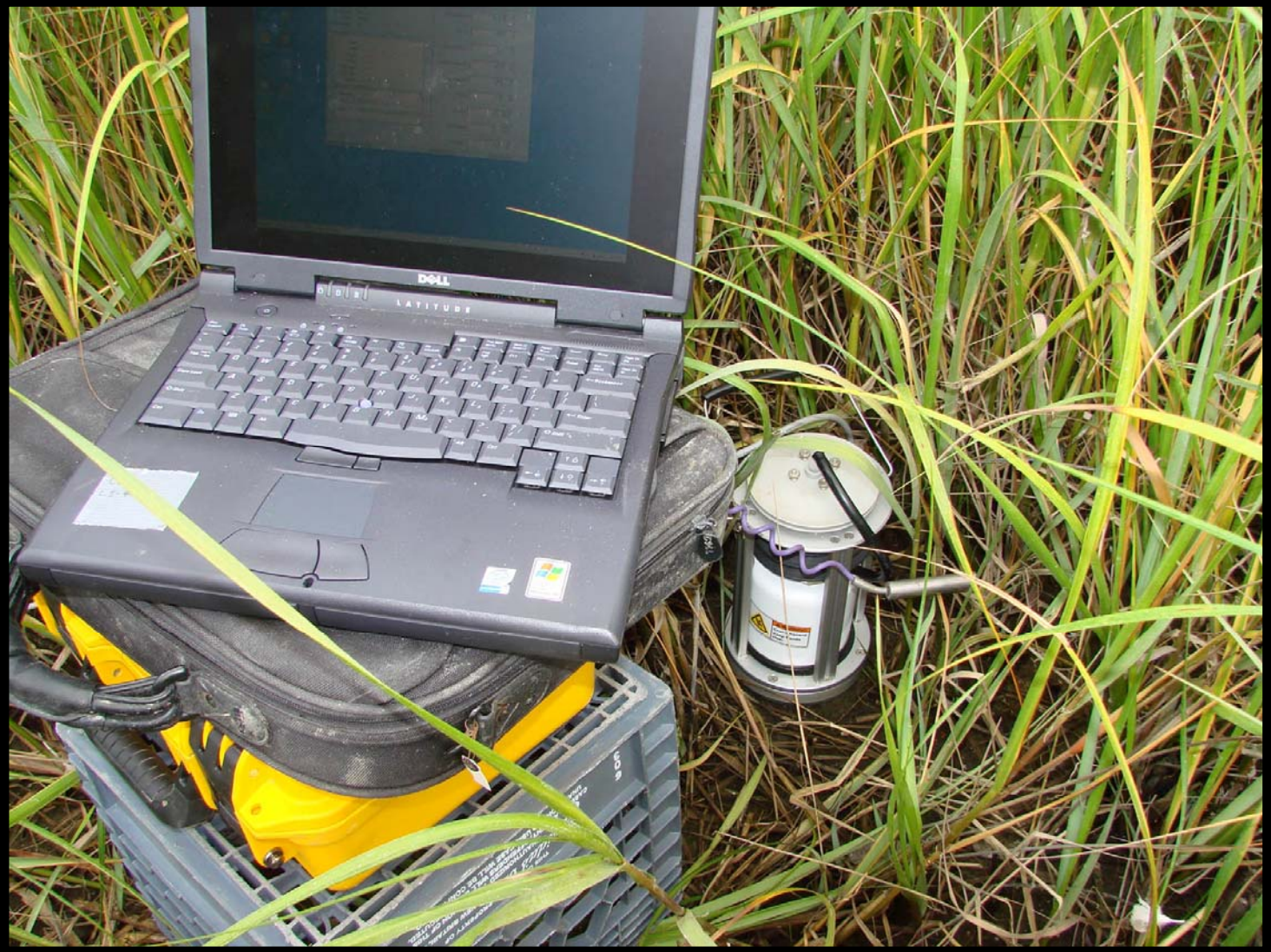


S. patens Belowground Biomass (Kg ha^{-1})



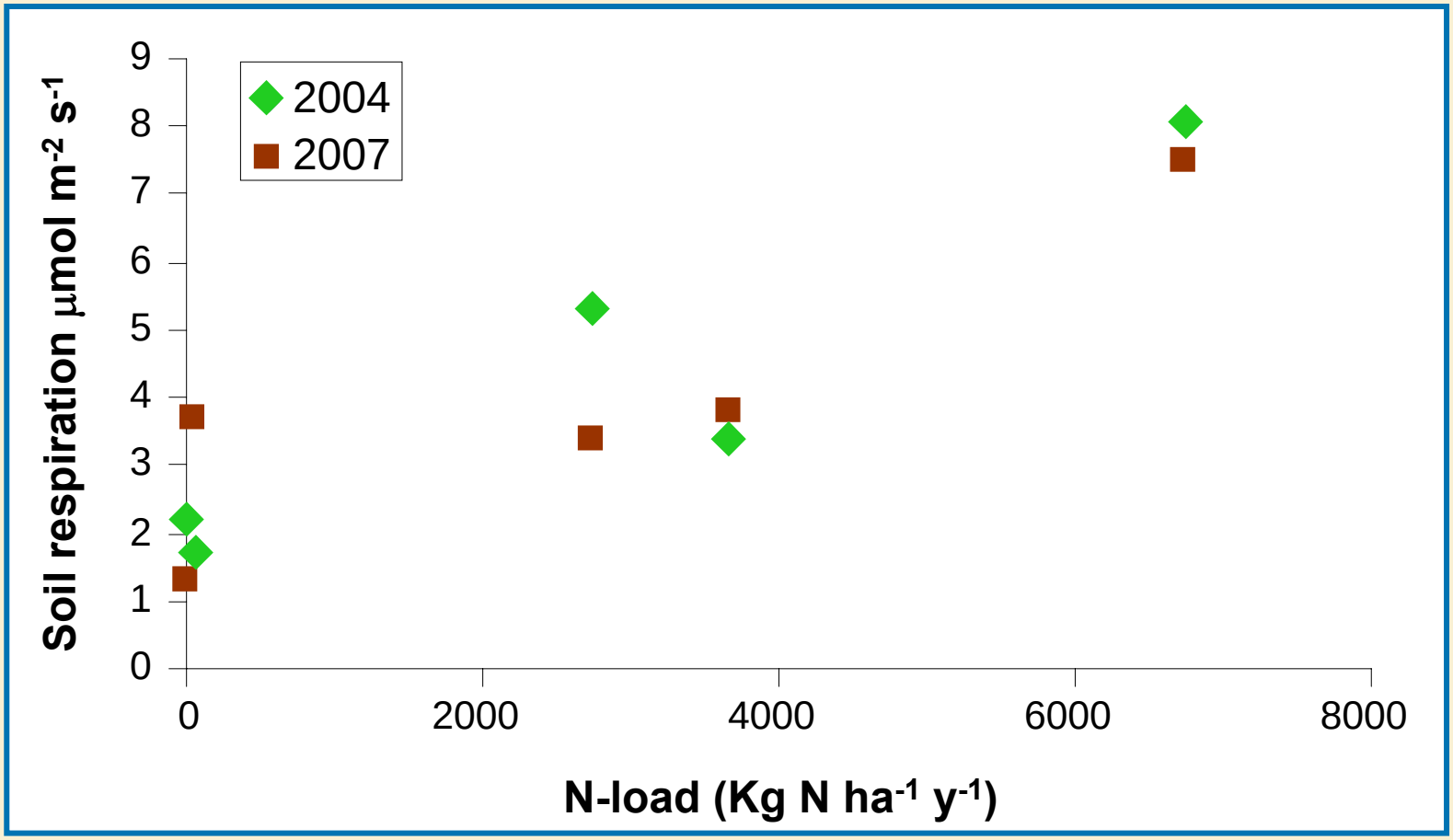
Plant Species Richness





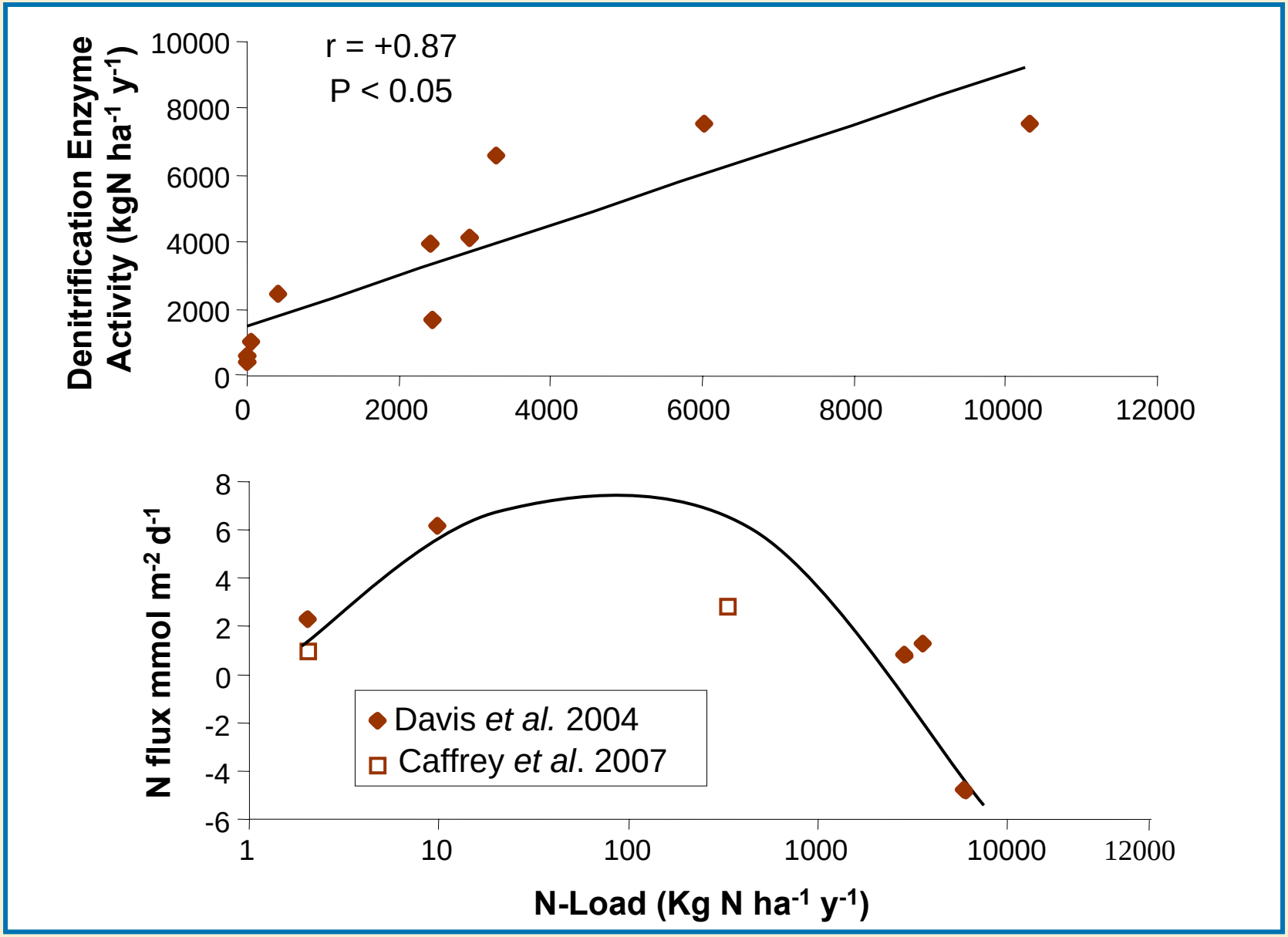
Set up for measuring soil respiration in the field

Narragansett Bay Soil Respiration



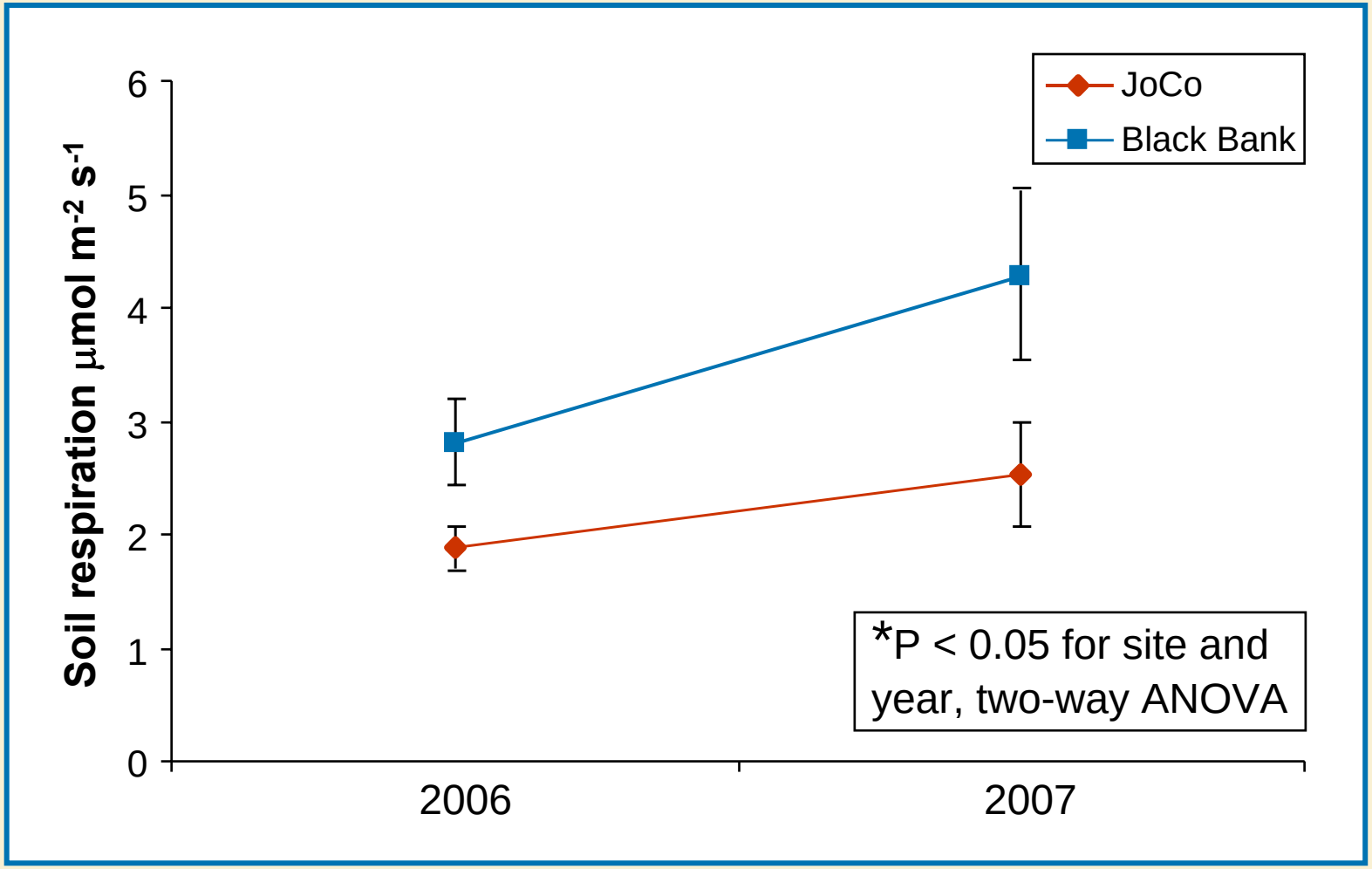
2004	**2007**
r = +0.92	r = +0.87
P = 0.03	P = 0.05

High Marsh Denitrification Potential & Nitrogen Flux



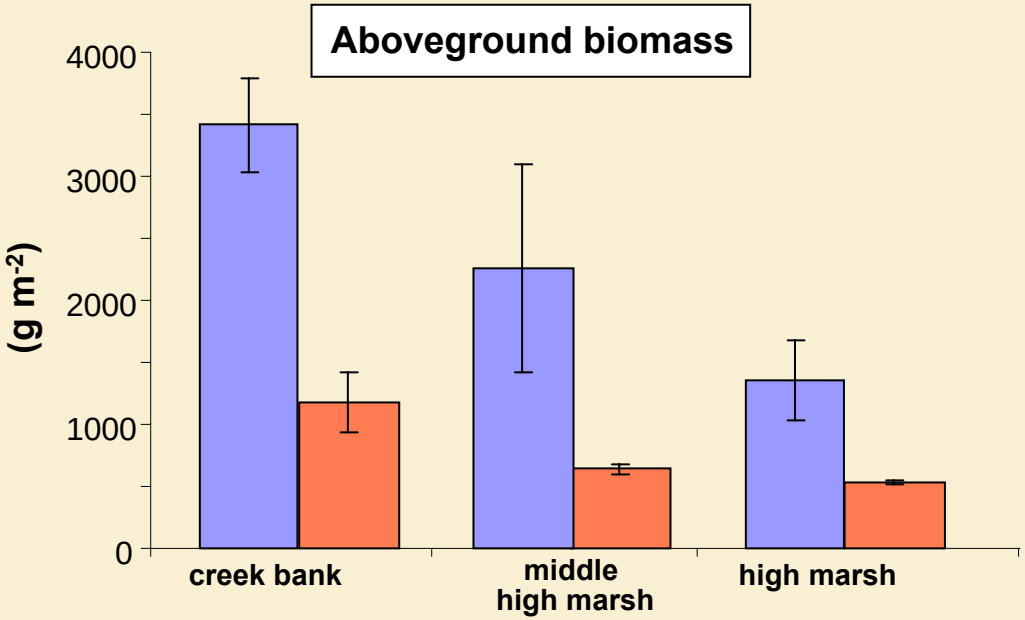
Location of study sites in Jamaica Bay, NY

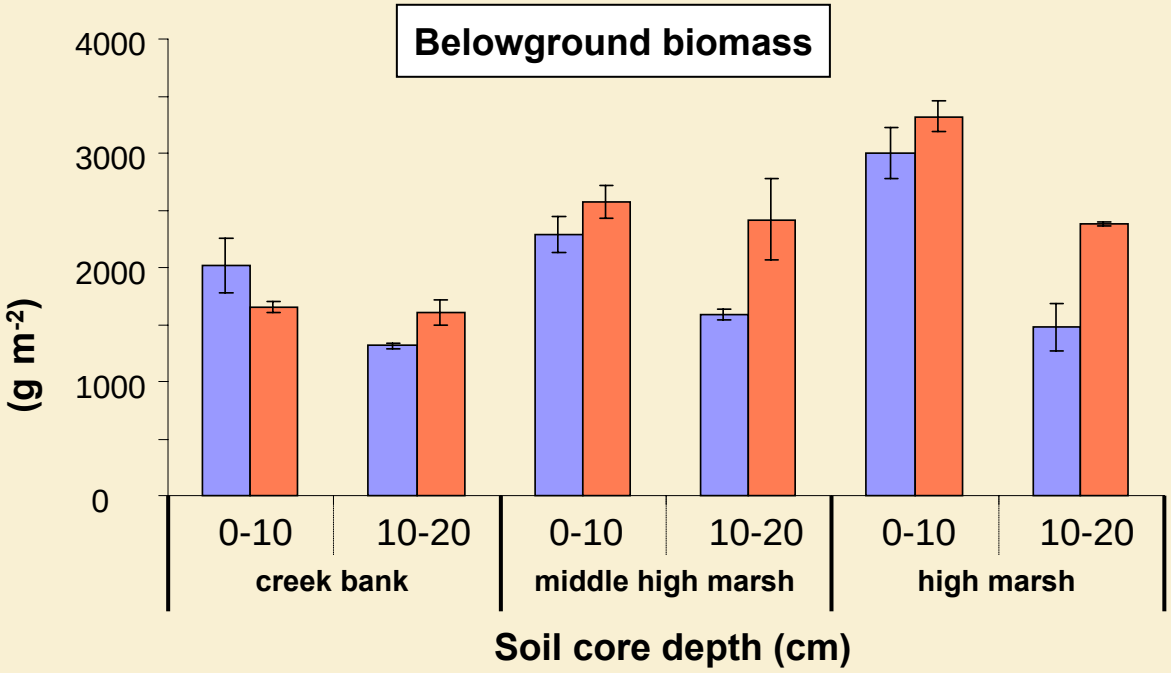
Jamaica Bay Creek Bank Soil Respiration



Jamaica Bay 2007

Black Bank
JoCo





JoCo (47 % organic matter)

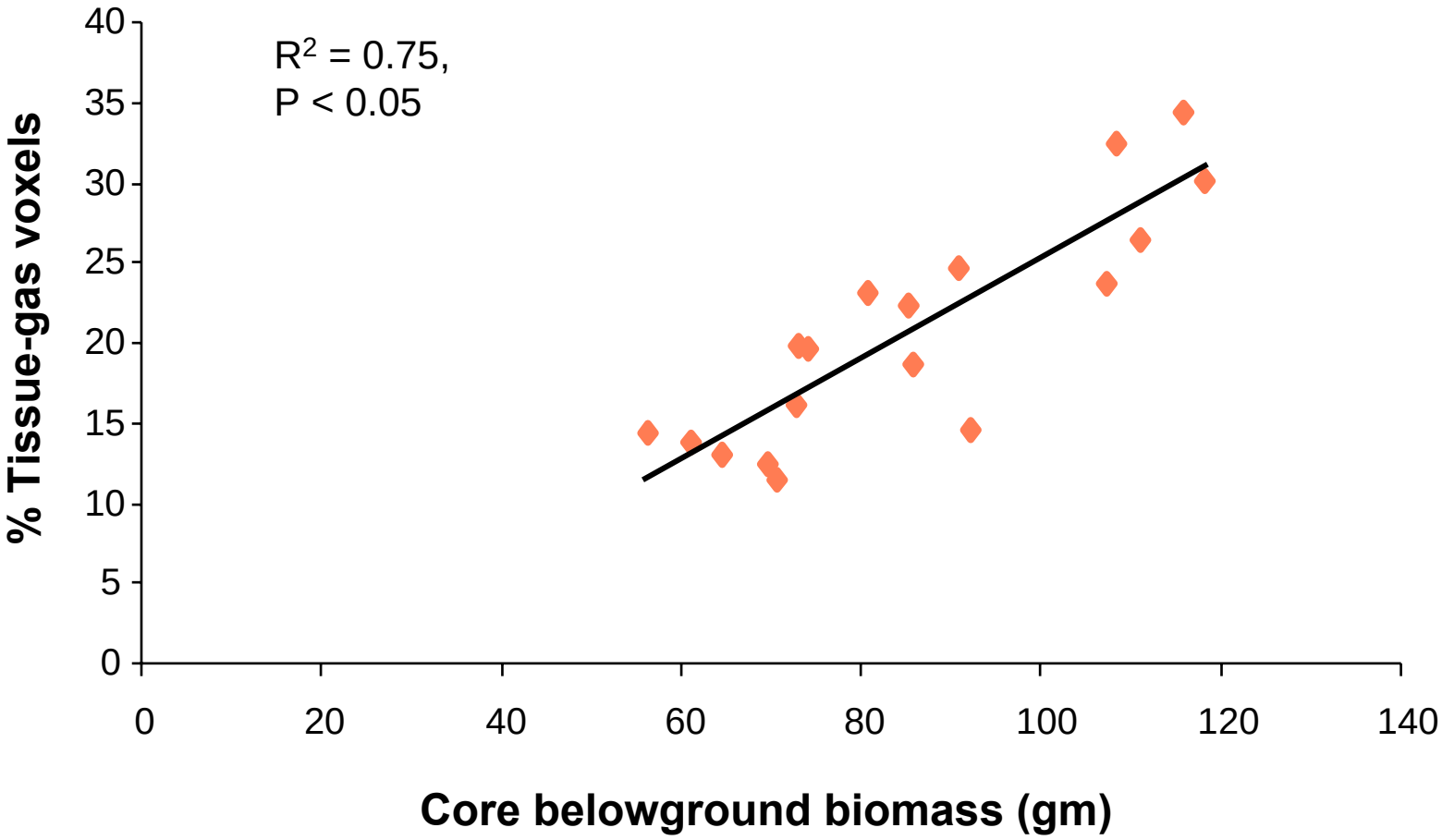
Black Bank (31% organic matter)

Soil cores from the middle high marsh in Jamaica Bay, NY

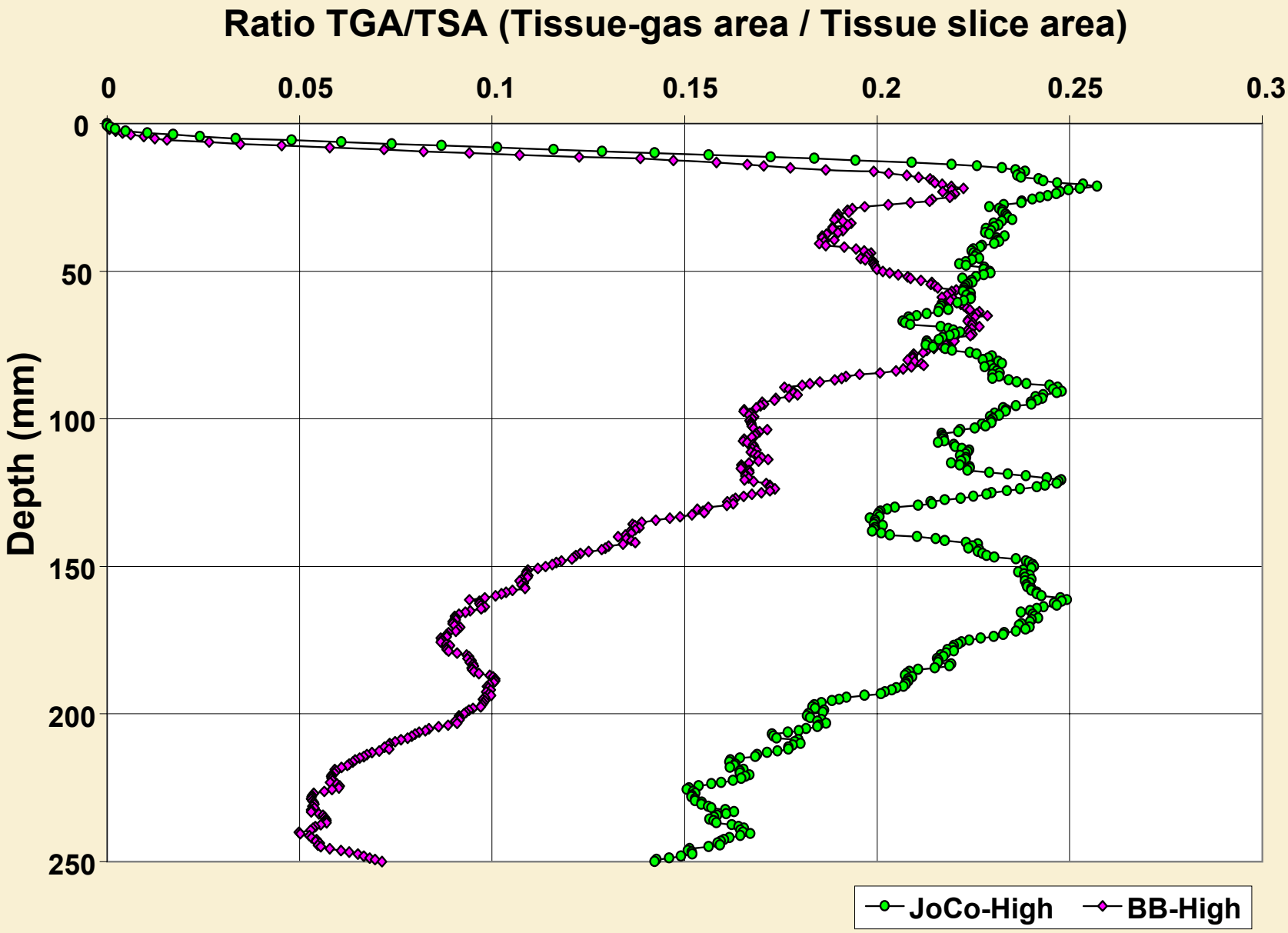
Fisher Scientific
14 2:00PM

Marsh Cores are CT Scanned at Local Hospitals

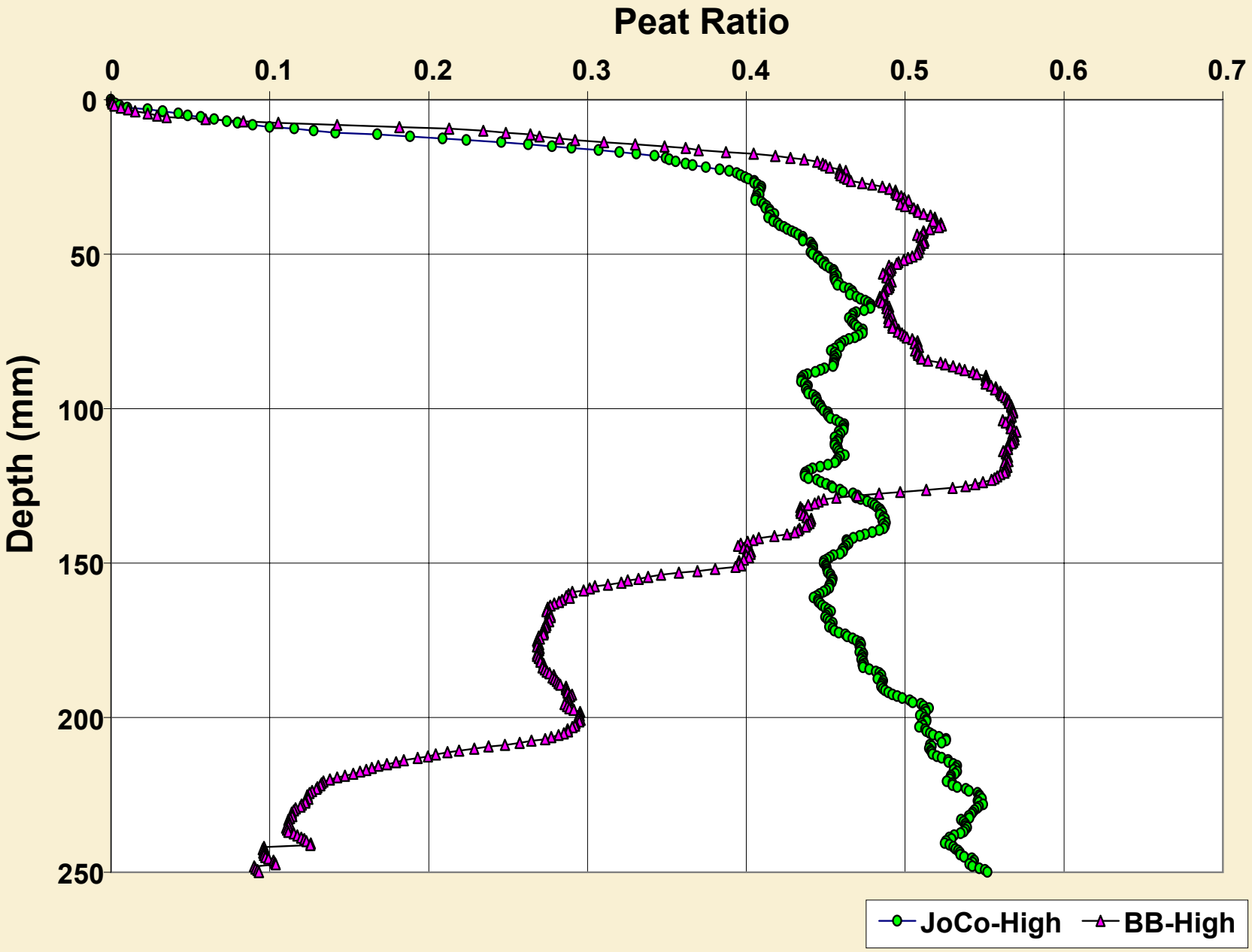
Relationship of the % tissue-gas CAT scan voxels and belowground biomass



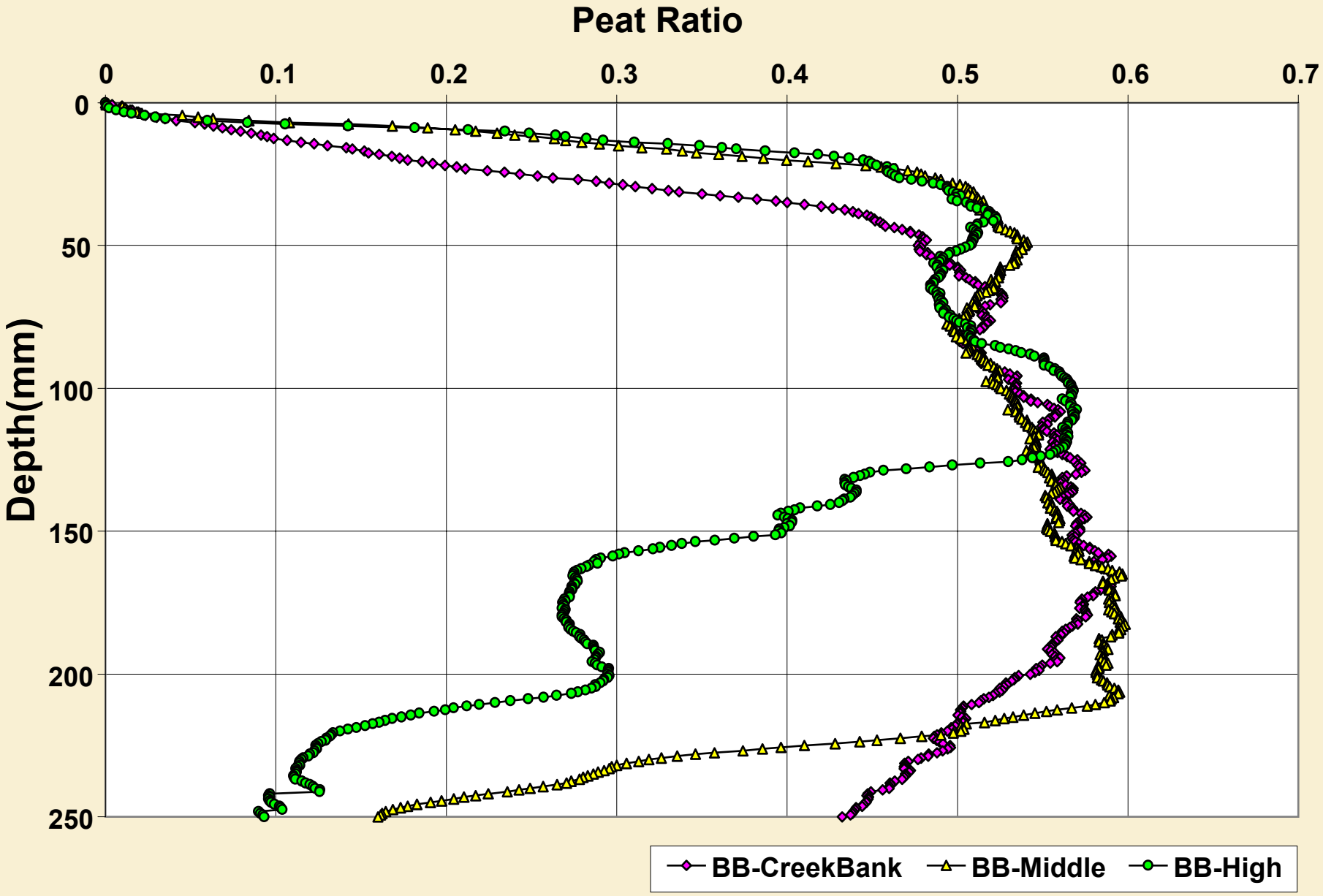
JoCo vs Black Bank High Transect for Tissue-Gas Area Ratio



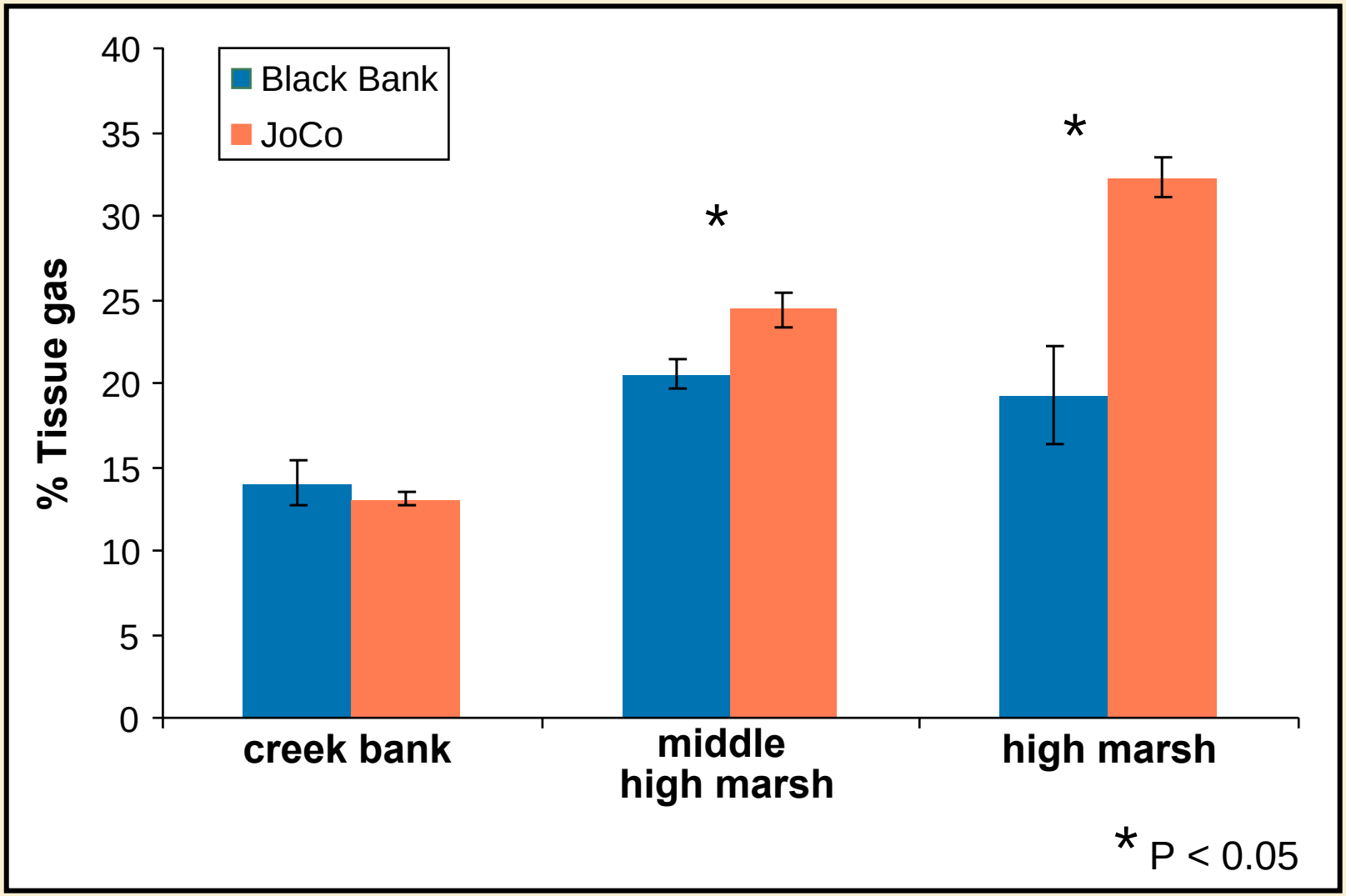
JoCo vs Black Bank for Peat at the High Transect



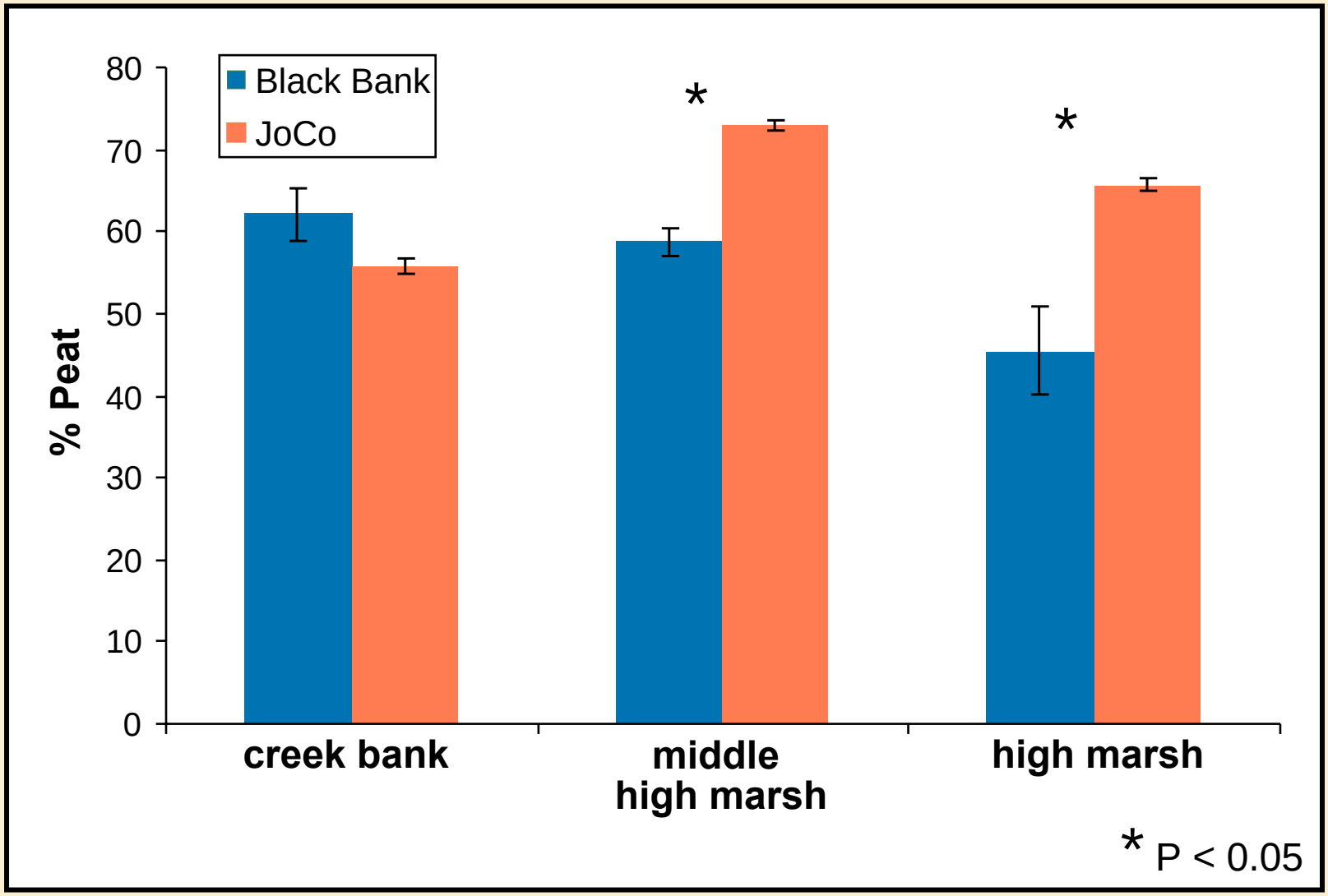
Black Bank-2007: Peat Comparision between Transects



CT Scan: % Tissue-gas (roots & rhizomes) of Total Core Volume



CT Scan: % Peat of Total Core Volume



The Time is Now

- Educate the public about conservation initiatives to minimize anthropogenic stressors
- Prioritize disturbed sites and carry out restorations
- Protect healthy coastal systems including watershed buffers
- Efforts to minimize N loads

Healthy northeastern salt marsh