

A Preliminary Examination of the Influence of Canal
Inputs on Ambient Surface Water Chemistry at the
Tamiami Swales Sites.



A. J Bramburger, J.W. Munyon and
E.E. Gaiser

Proposed water-flow changes:



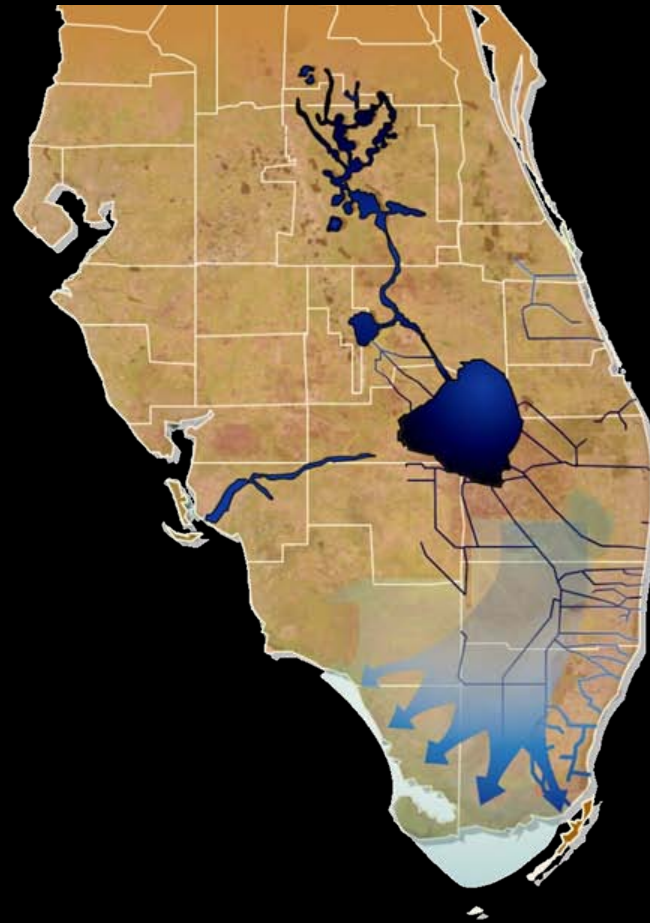
Historical water flow

Proposed water-flow changes:



Current water flow

Proposed water-flow changes:



Proposed CERP water flow

Tamiami Trail modifications:

Assess the effectiveness of water conveyance to ENP under various stage regimes (L-29 Canal).

- One-mile bridge project
 - Allow more natural hydrologic conditions and improved water conveyance.
- Pilot Spreader Swales project
 - Determine effectiveness of spreader swales for conveyance of water as sheet flow into ENP.

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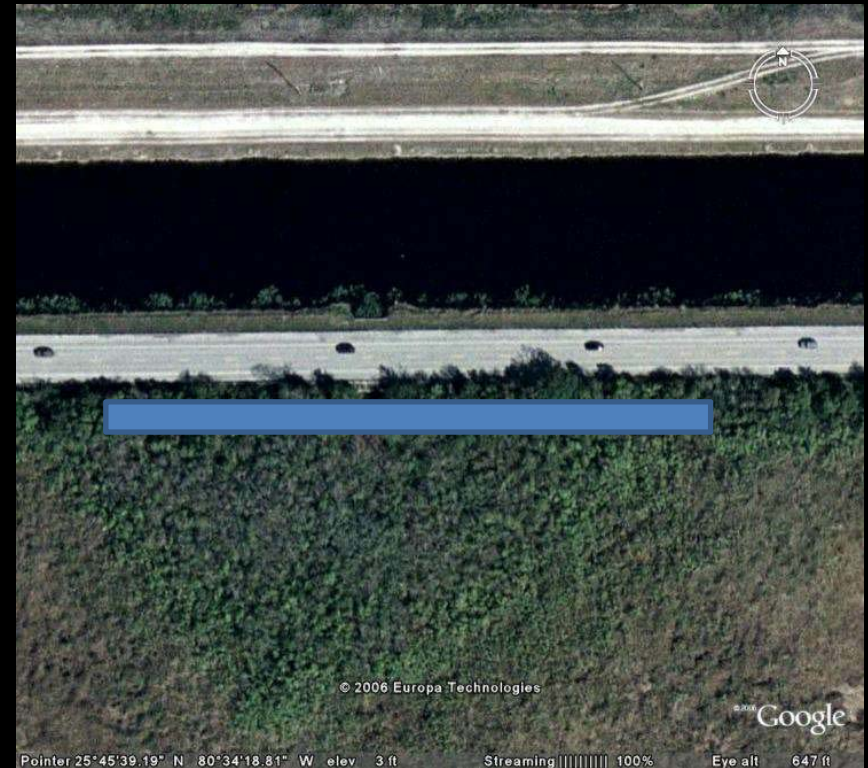
Swales:

- 55 culverts along Tamiami Trail.
- Pilot project
 - 2 spreader swale culverts.
 - 2 control culverts.
- Pre and Post-installation monitoring for:
 - Water quality
 - Soil quality
 - Periphyton
 - Vegetation
 - Consumers



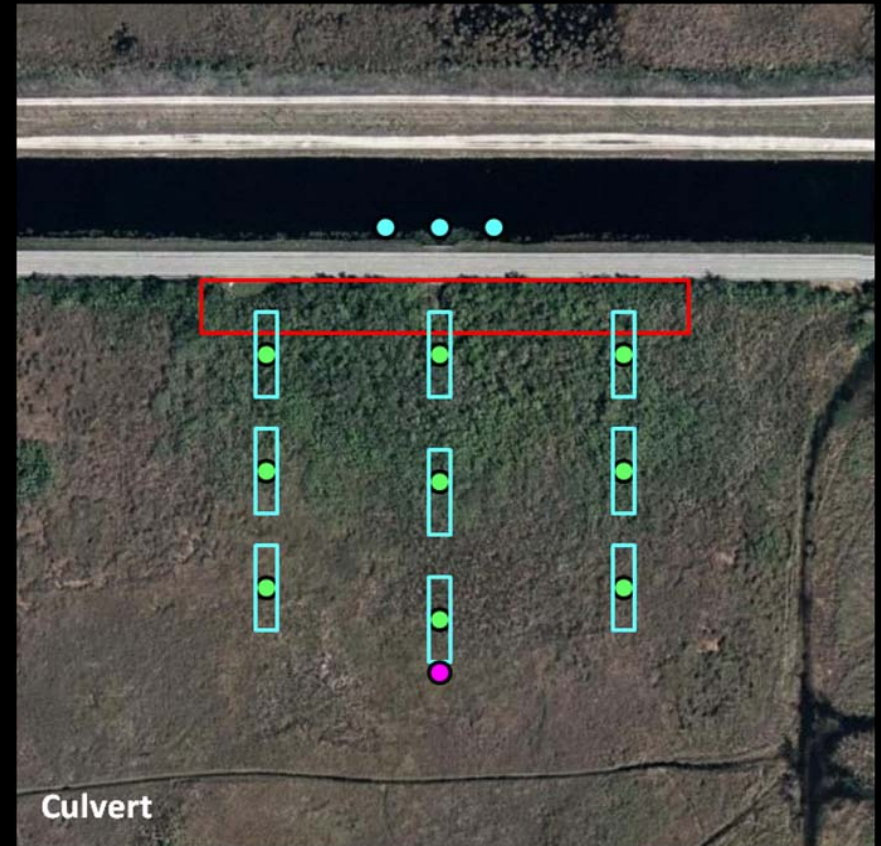
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Methods:

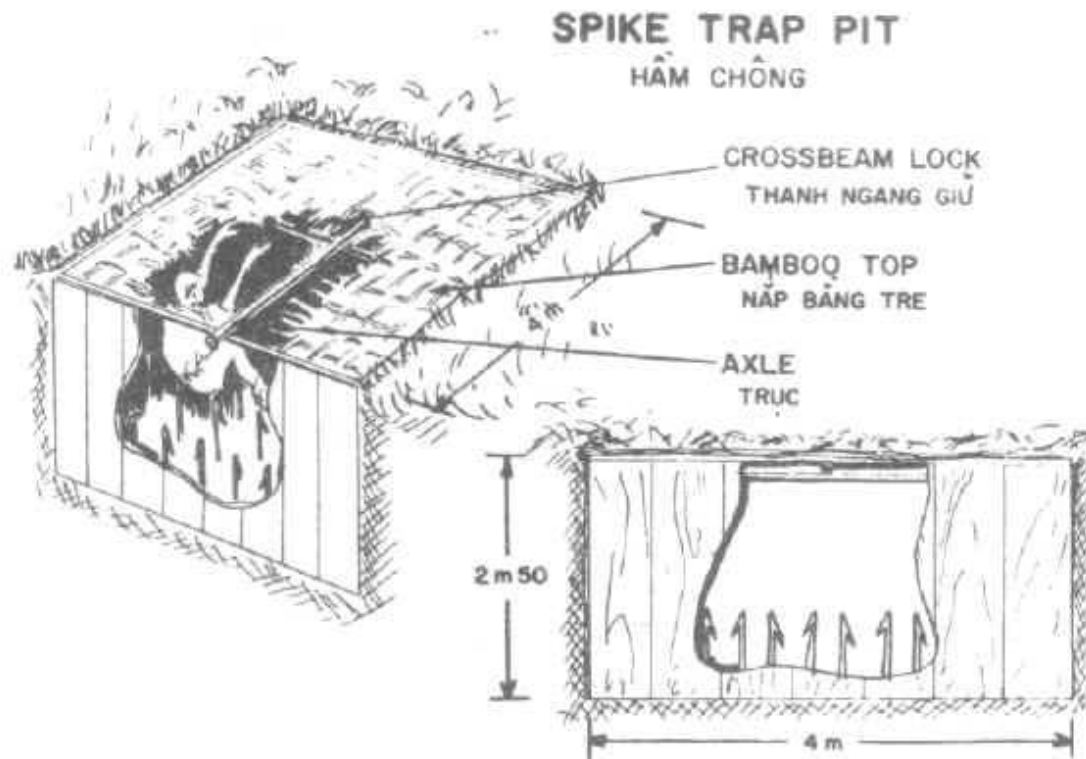
- Water quality monitored monthly at Grab Sample sites.
 - TN, TP, Nitrate/Nitrite, DOC.
- Water quality monitored continuously at ISCO autosampler sites.
 - TN, TP.



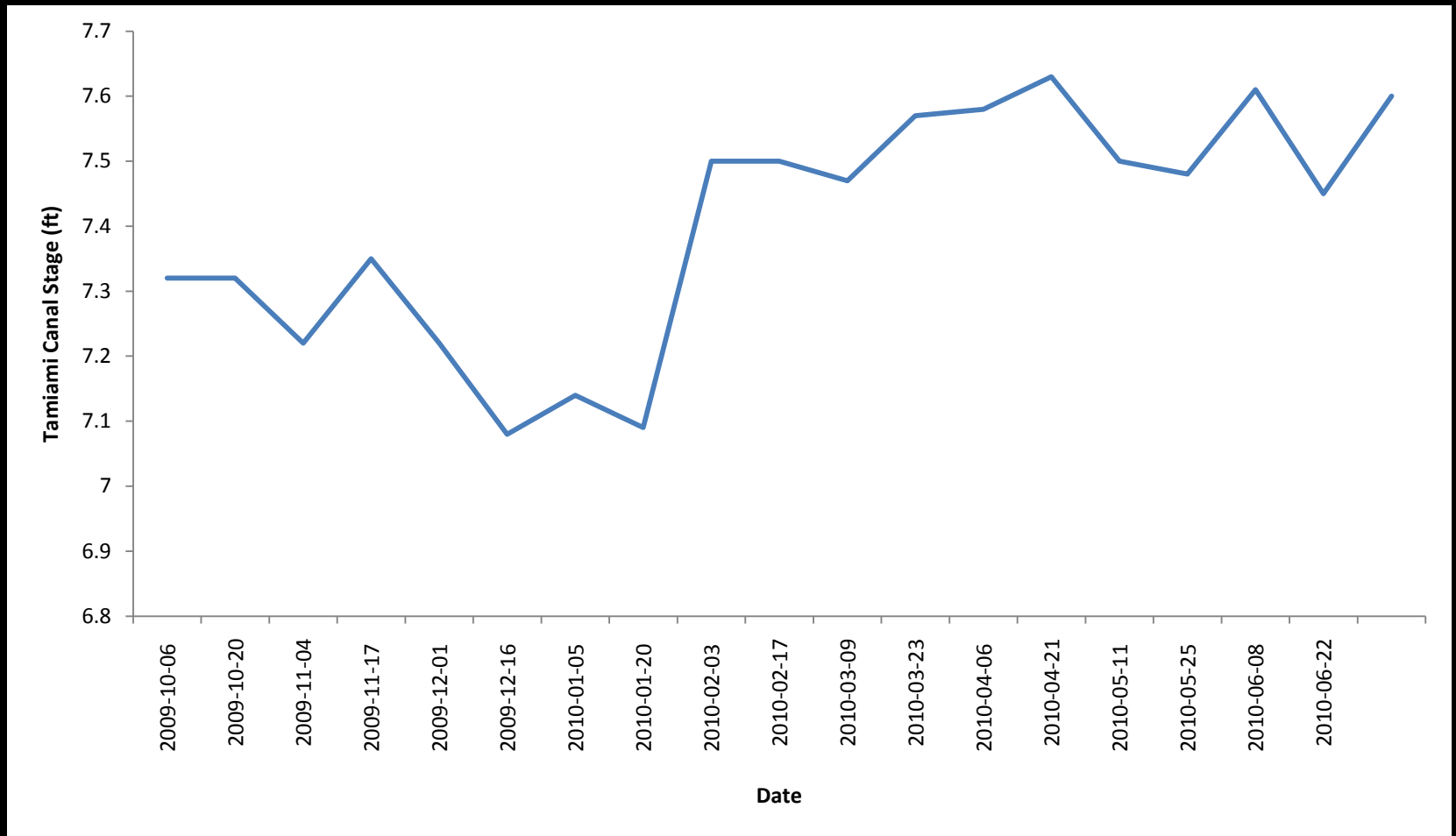




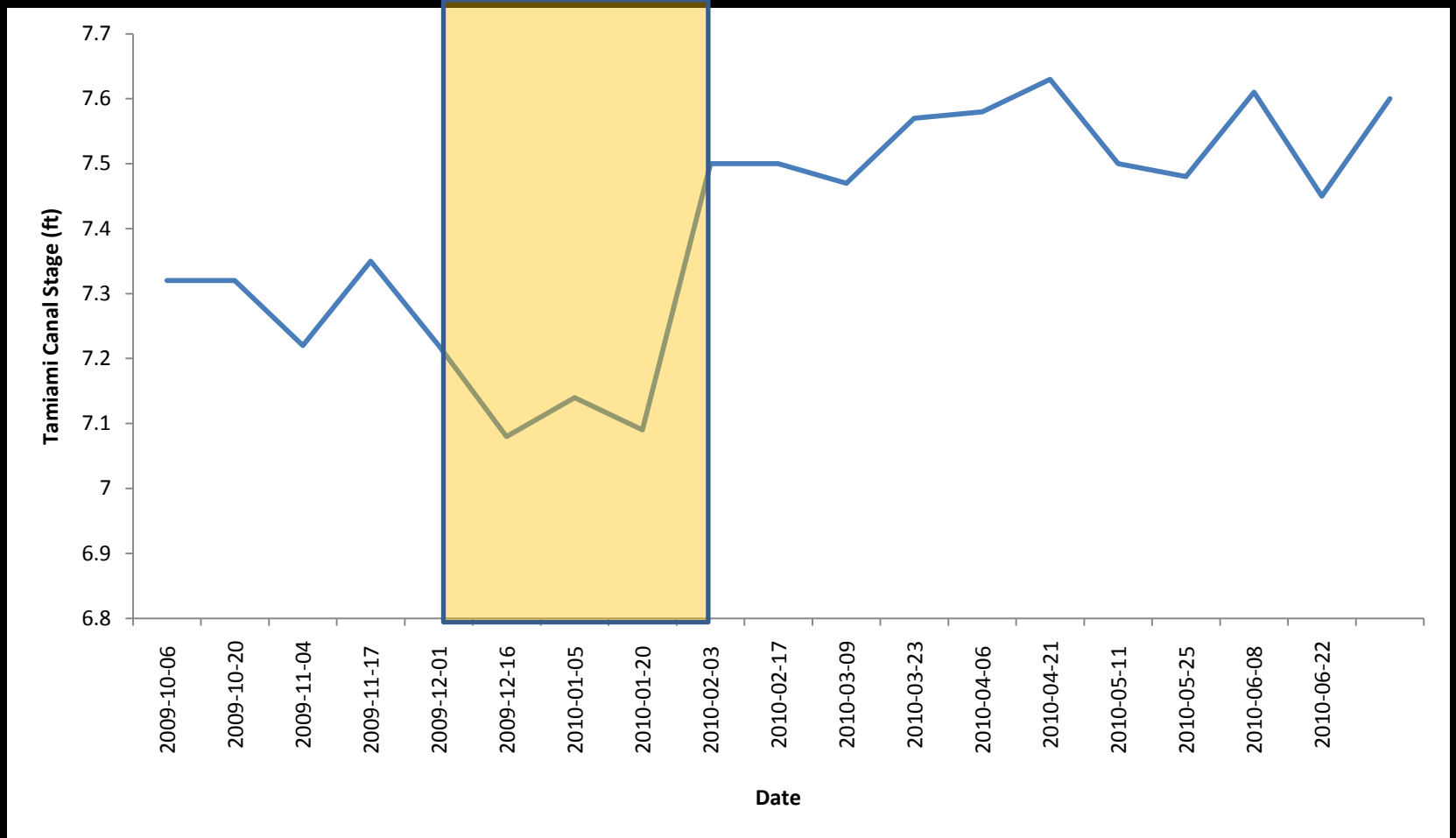
SPIKE TRAP PIT



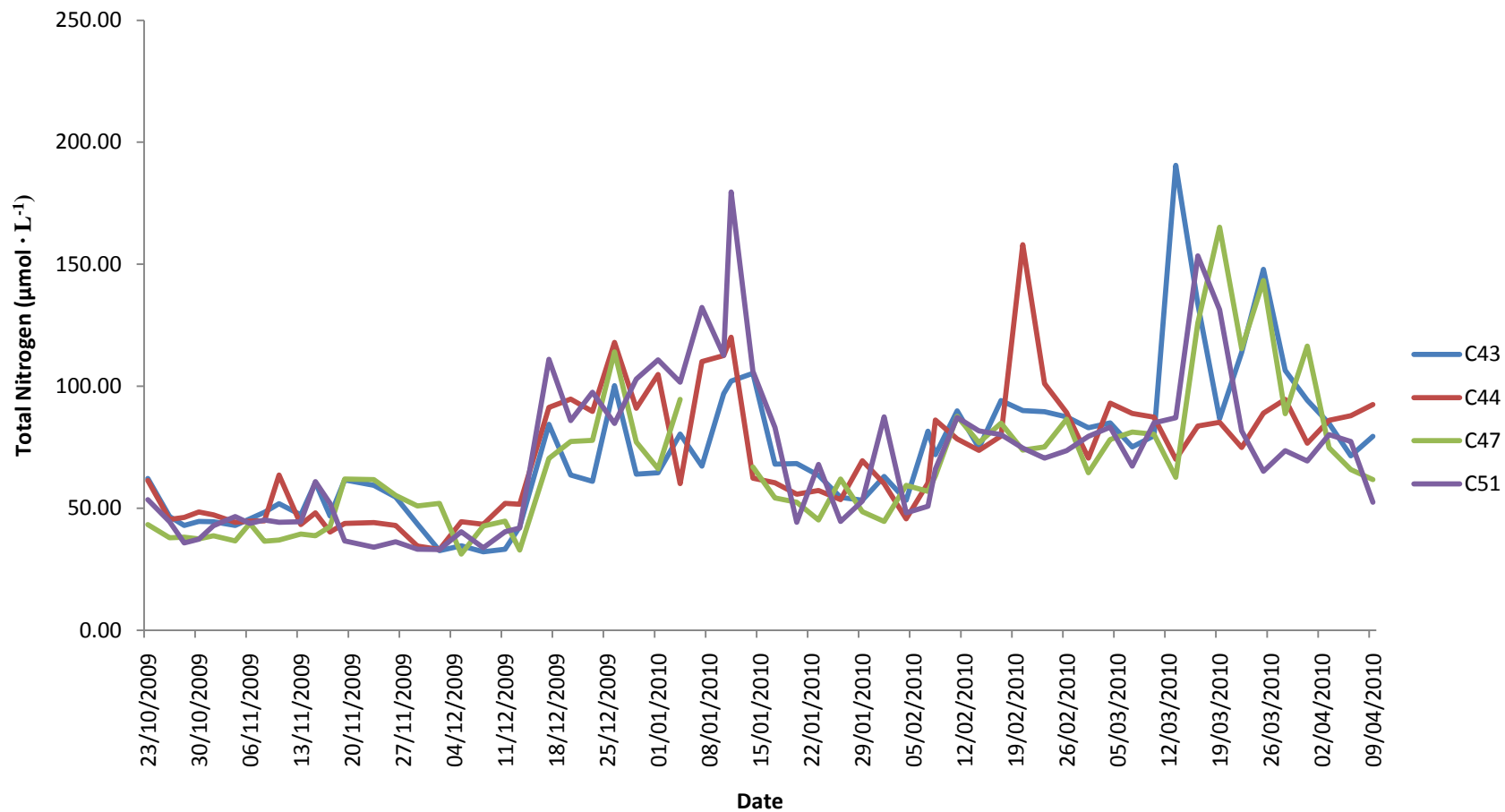
Results – Tamiami Canal Stage



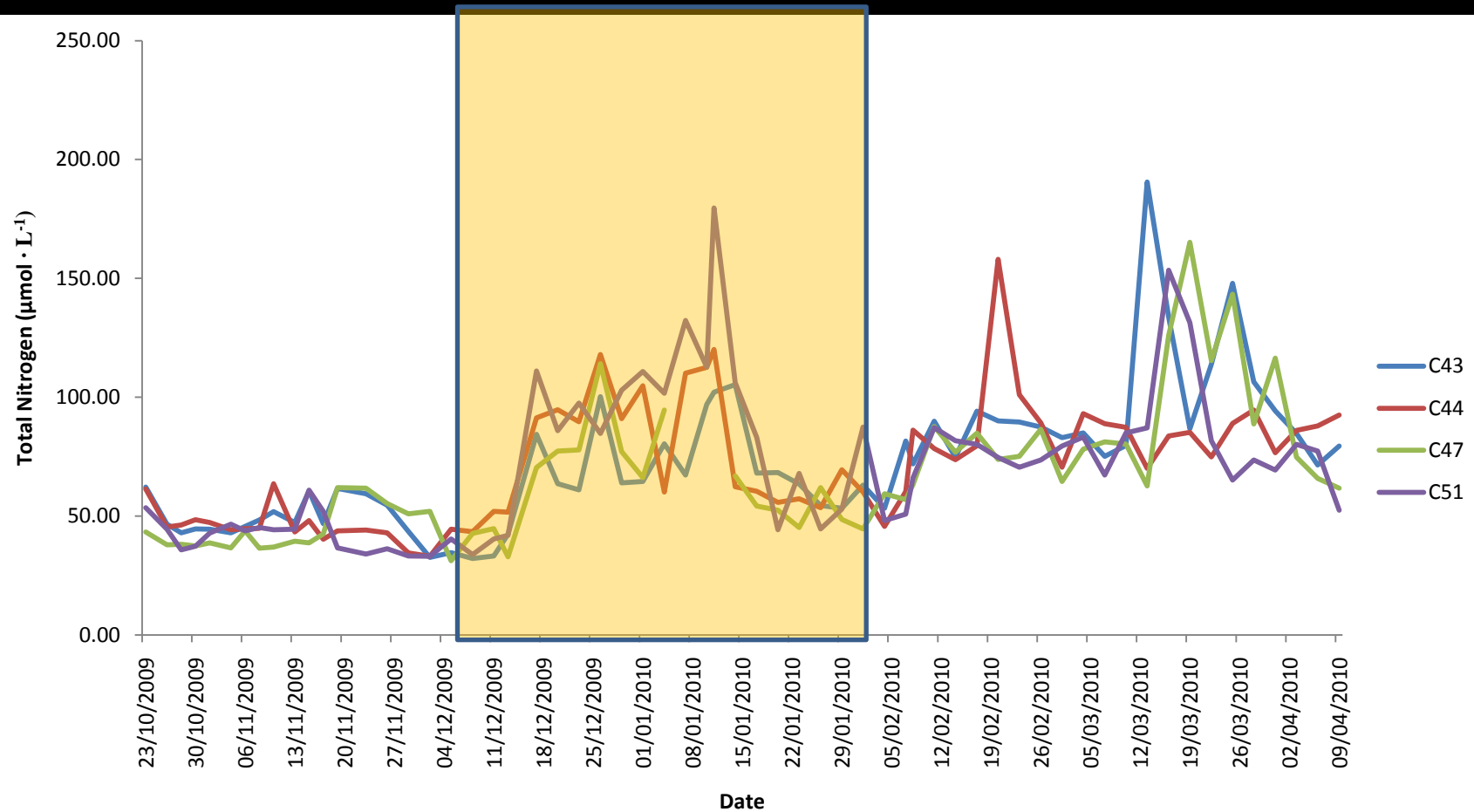
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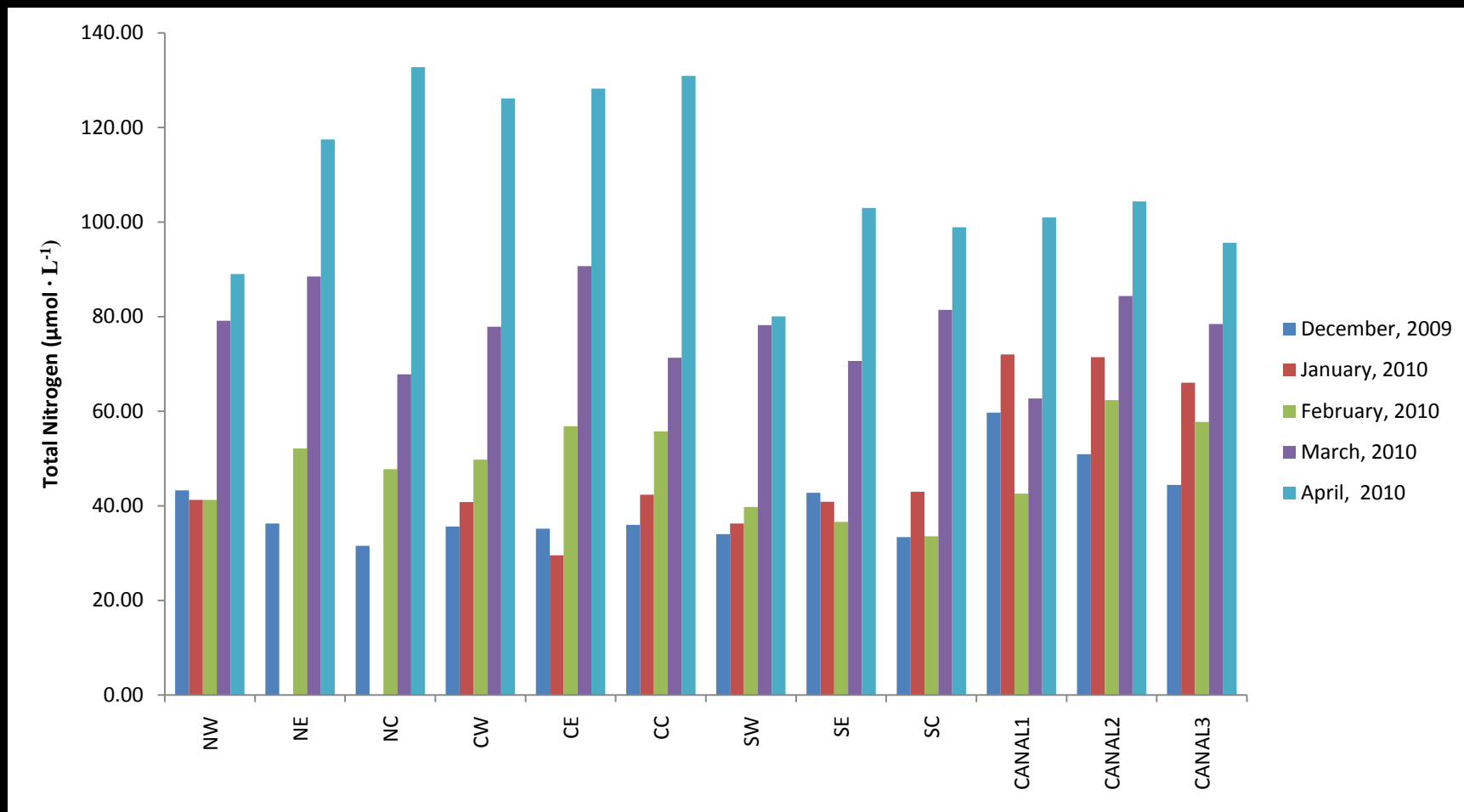
ISCO Total Nitrogen:



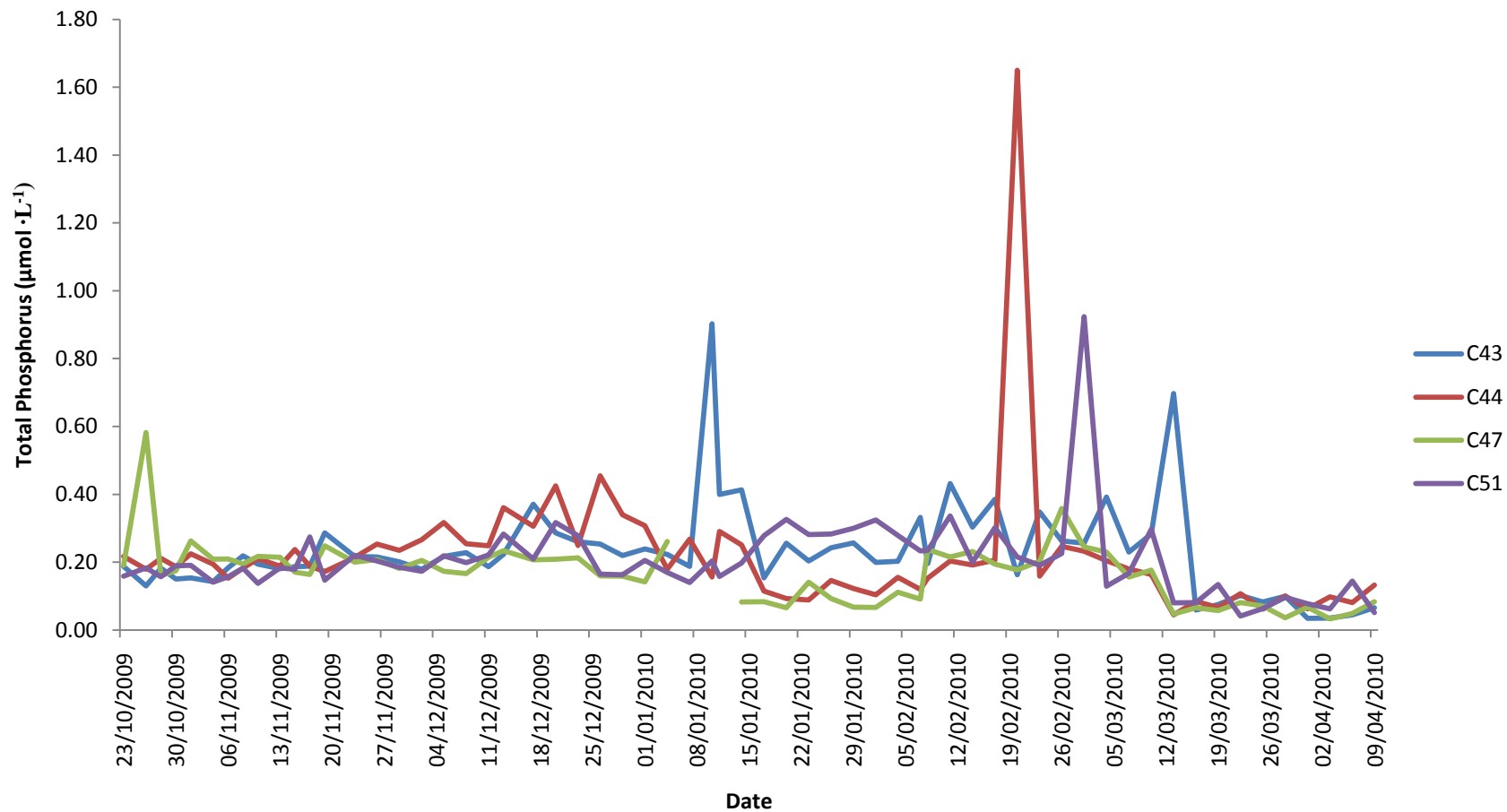
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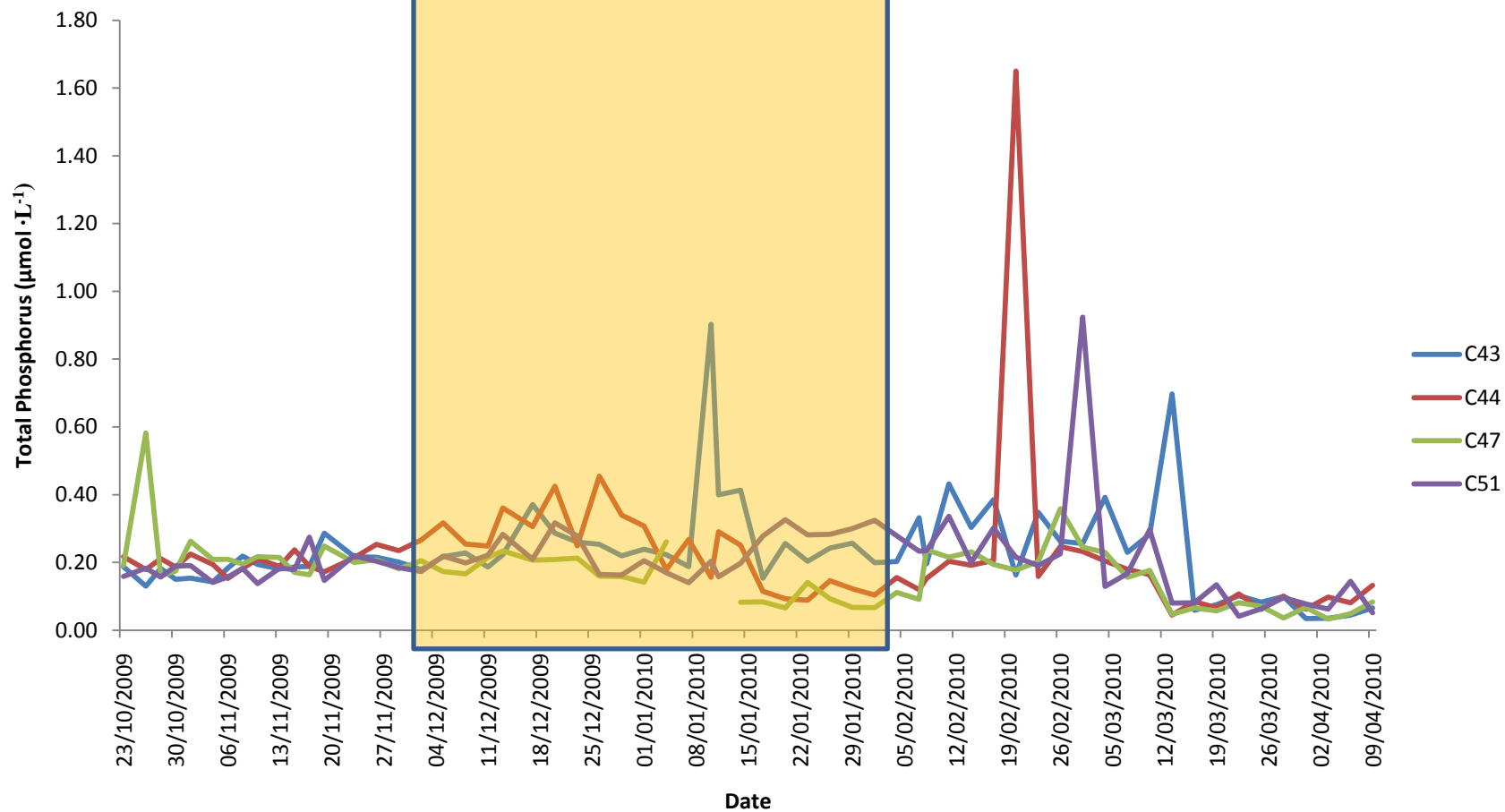
Grab Sample Total Nitrogen



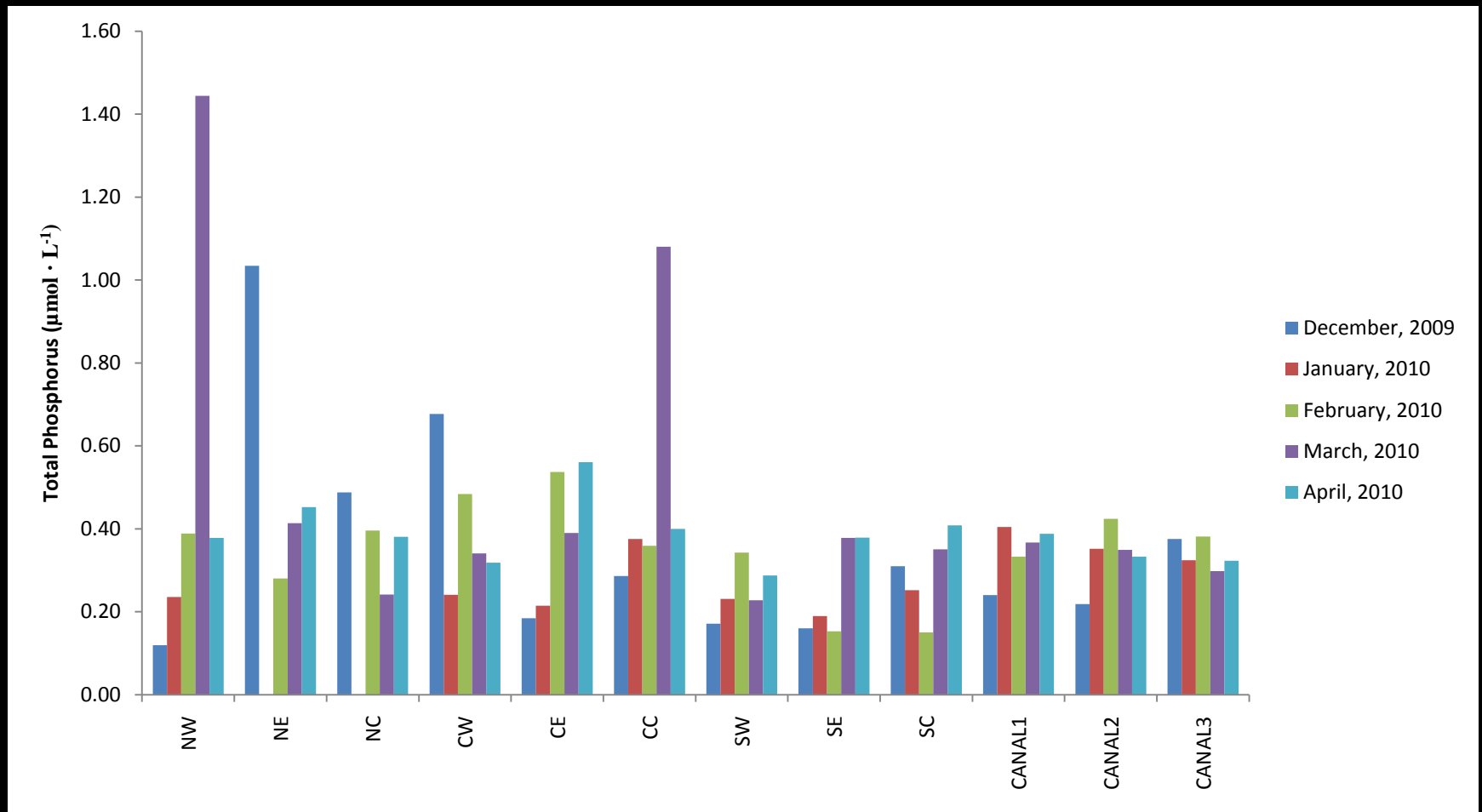
ISCO Total Phosphorus:



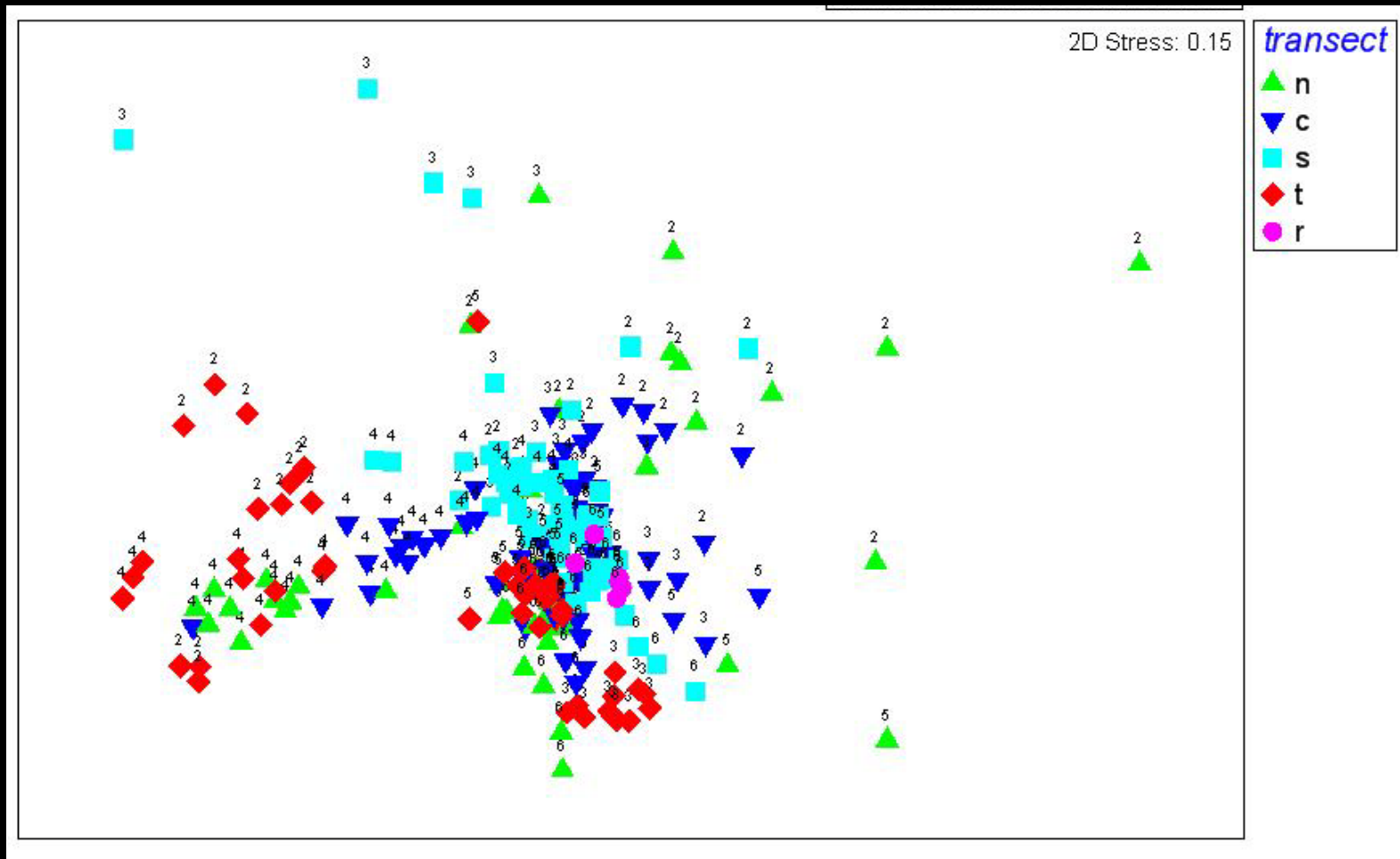
ISCO Total Phosphorus:



Grab Sample Total Phosphorus:



Water Grab NMDS:



Water Grab ANOSIM

Global R = 0.436, p = 0.001

Month	Jan	Feb	Mar	Apr
Dec	0.146 (0.001)	0.351 (0.001)	0.348 (0.001)	0.567 (0.001)
Jan	-	0.534 (0.001)	0.319 (0.001)	0.584 (0.001)
Feb	-	-	0.546 (0.001)	0.780 (0.001)
Mar			-	0.325 (0.001)

R statistic (p value)

Water Grab ANOSIM

Global R = 0.146, p = 0.001

Transect	Central	South	Canal	Ref.
North	0.102 (0.001)	0.239 (0.001)	0.102 (0.002)	-0.03 (0.529)
Central	-	0.075 (0.001)	0.175 (0.001)	-0.085 (0.759)
South		-	0.260 (0.01)	-0.089 (0.696)
Canal			-	0.035 (0.331)

R statistic (p value)

Discussion:

- Water chemistry downstream of Swales culverts is influenced by inputs from Tamiami Canal in various ways.
 - Temporal variations in TN, TP at transect sites coarsely reflect fluctuations in canal.
 - During periods of high stage in canal, water chemistry at transects is more homogeneous.
- However...
 - Temporal and spatial variability is highest in North and Central transects (patchiness in tree halo).
 - Within-site mechanisms also exert a substantial influence on water chemistry parameters.

Implications for future research & management:

- Post-installation monitoring design must be robust enough to detect effects during periods of inundation.
 - Diatoms as indicators of spatial and temporal habitat variability.
- Clear management objectives.
 - What ecological outcomes do we hope to achieve by modifying flow regime?

Acknowledgements:

- Periphyton Lab (FIU)
- FCE LTER
- ENP