Spatial Differences in Community Composition: a Potential Indicator for CERP

A Demonstration Analysis Using 2007-2012 Epifauna data At 72 shoreline sites from Shoal Point to Manatee Bay

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Presently great concern and controversy about FP&L’s appropriation of additional regional fresh water to resolve cooling canal issues.

More water for Turkey Point seems likely to reduce freshwater inflow to Biscayne Bay.

Q 1: Will future reduction in freshwater flow be reflected in ecosystem changes in Biscayne Bay in the cooling canal vicinity?

Q 2: Given their location and structure, have the cooling canals already reduced freshwater flow to the Bay and altered the adjacent Bay ecosystem -- and can an effect be seen in the faunal community?

We used data from the 72 original (pre-IBBEAM) sites of the Epifauna component of IBBEAM to explore Q 2.
Salinity differs between TPC and TPC-S site groups and most other site groups

Pairwise test for salinity differences (1 = \( p < 0.05 \))
- dry season -
- wet season -
Epifaunal community differs for TPC and TPC-S with NT in dry season and most other site groups in wet season

ANOSIM test for community differences ($1 = p < 0.05$)
- dry season -

ANOSIM test for community differences ($1 = p < 0.05$)
- wet season -
Habitat variables BEST explaining community composition – dry season

<table>
<thead>
<tr>
<th>Starting variables</th>
<th>BEST variables</th>
<th>Pseudo-F</th>
<th>P-value</th>
<th>Proportion explained</th>
<th>Cumulative proportion</th>
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<tbody>
<tr>
<td>Salinity</td>
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* Stepwise DISTLM results include the important variables.

*Halodule*, salinity, and *Thalassia* explain 34.6% of variation in community composition.
Habitat variables BEST explaining community composition – wet season

<table>
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<th>Starting variables</th>
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</table>

* Stepwise DISTLM results include the important variables.

Salinity, Thalassia, and Halodule explain 29.08% of variation in community composition.
Community Analysis using Multidimensional Scaling (MDS) – dry season
Clues to pattern-setting species – dry season
Clues to pattern-setting species
– dry season
Community Analysis using Multidimensional Scaling (MDS) – wet season
Clues to pattern-setting species
– wet season
Clues to pattern-setting species
– wet season
Epifaunal community differs for TPC and TPC-S with NT in dry season and most other site groups in wet season

ANOSIM test for community differences ($1 = p < 0.05$) - dry season -

ANOSIM test for community differences ($1 = p < 0.05$) - wet season -
Conclusion

• Salinity in the cooling canal areas (TPC and TPC-S) differ significantly from other defined areas, both north and south.

• The dry season epifaunal community in the area north of Turkey Point differs significantly from that south of Turkey Point, including the cooling canal areas (TPC and TPC-S), which do not significantly differ from the area to the south (ST).

• The wet season epifaunal community in the cooling plant areas (TPC and TPC-S) differ significantly from site groups to both the north and the south (NT and ST).

• Wet season epifaunal data suggest an ecosystem effect of the cooling canal system during the 2007-2012 period.