Salinity, dissolved oxygen, and nutrient concentrations in Oyster Pond, Falmouth, Massachusetts

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Study Questions:

- What are the current horizontal and vertical distributions of salinity, O₂, and nutrients in OP, and nearby SP?
- 2) What do these distributions tell us about the exchange of salt and nutrients?



- 3) Is growth of primary producers limited by N or P in OP and SP?
- 4) Were there any important changes between salinity, oxygen, or nutrients between 2001 and 2004 in OP?

Eutrophication and Variables of Interest

•Nitrogen – Ammonium, Nitrate (NH_4 , NO_3)

•Phosphorus- Phosphate (PO₄)

•Dissolved Oxygen (O₂)

•Salinity (ppt)



Experimental Procedure/Data Collection

- •Mid- and high-tide collection
- •Surface to bottom measurements at 1 meter increments
- •Recorded temperature and O₂ using YSI probe; record salinity using refractometer; collect water samples for nutrient analysis
- •Sample bottles filtered and frozen for measurement with "Lachat" auto-analyzer
- •Standard spectrophotometric methods
- •Bathymetric profiles of all 6 variables for OP and SP

Oyster Pond and Salt Pond transect points Oyster Pond Salt Pond





O₂ (mg I⁻¹)



Similar



<1

5

OP

SP

.25





More variation and higher in deep water at OP





	Oyster Pond	Salt Pond
Salinity (ppt)	1-2 (12.5)	25 (27)
Dissolved Oxygen (mgL ⁻¹)	9-11 (1.4)	8 (3)
Nitrate µM	1 (0)	3 (0)
Ammonium µM	1-2 (107)	4-5 (55)
Phosphate µM	06 (21)	06



-phosphate concentrations low, salinities above 10ppt usually N-limited

Oyster Pond Transect Points

2004 points eexop. North Basir

2001 points



OP 2001 to 2004 Comparison Plots









Conclusions

•Comparison of Oyster Pond to Salt Pond

- no difference in dissolved oxygen
- lower nitrate, ammonium, salinity in OP
- higher phosphate (only at depth) in OP
- •Limiting nutrients
 - -Both nitrogen and phosphate are limiting in OP and SP
- Interannual difference in Oyster Pond
 - no difference in salinity or dissolved oxygen
 - lower nitrate than 2001
 - higher ammonium and phosphate (only at depth) than 2001

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