

Investigating the Role of Spring-Neap and Tidal Variability on Water Quality and Nutrients Across Marsh Habitats

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Introduction

The Complete Marsh Project investigates how the interaction of tidal flows and geomorphology influence water quality and nutrients in the North Delta. We present data to examine spatial and temporal differences in water quality within the Suisun Marsh.



Figure 1: Suisun Marsh maps. A researcher collecting sonde data.

Methods

The Complete Marsh Project performs 24-hour automatic sampling of water conducted twice monthly, to record data on spring-neap tides, coupled with 15-minute continuous water quality sonde data. This was collected from 2017 to 2018 at four study sites: First Mallard Branch, Sheldrake, Hill, and Peytonia Sloughs which differ in regards to their banks, diked or not diked.

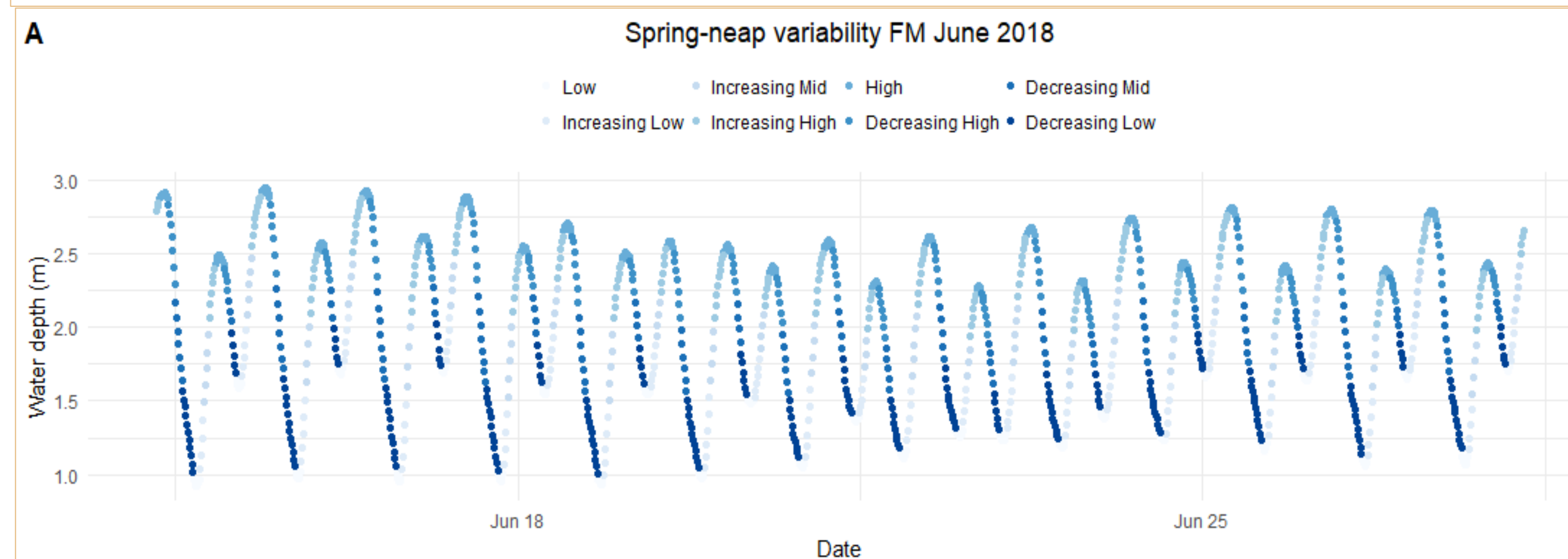
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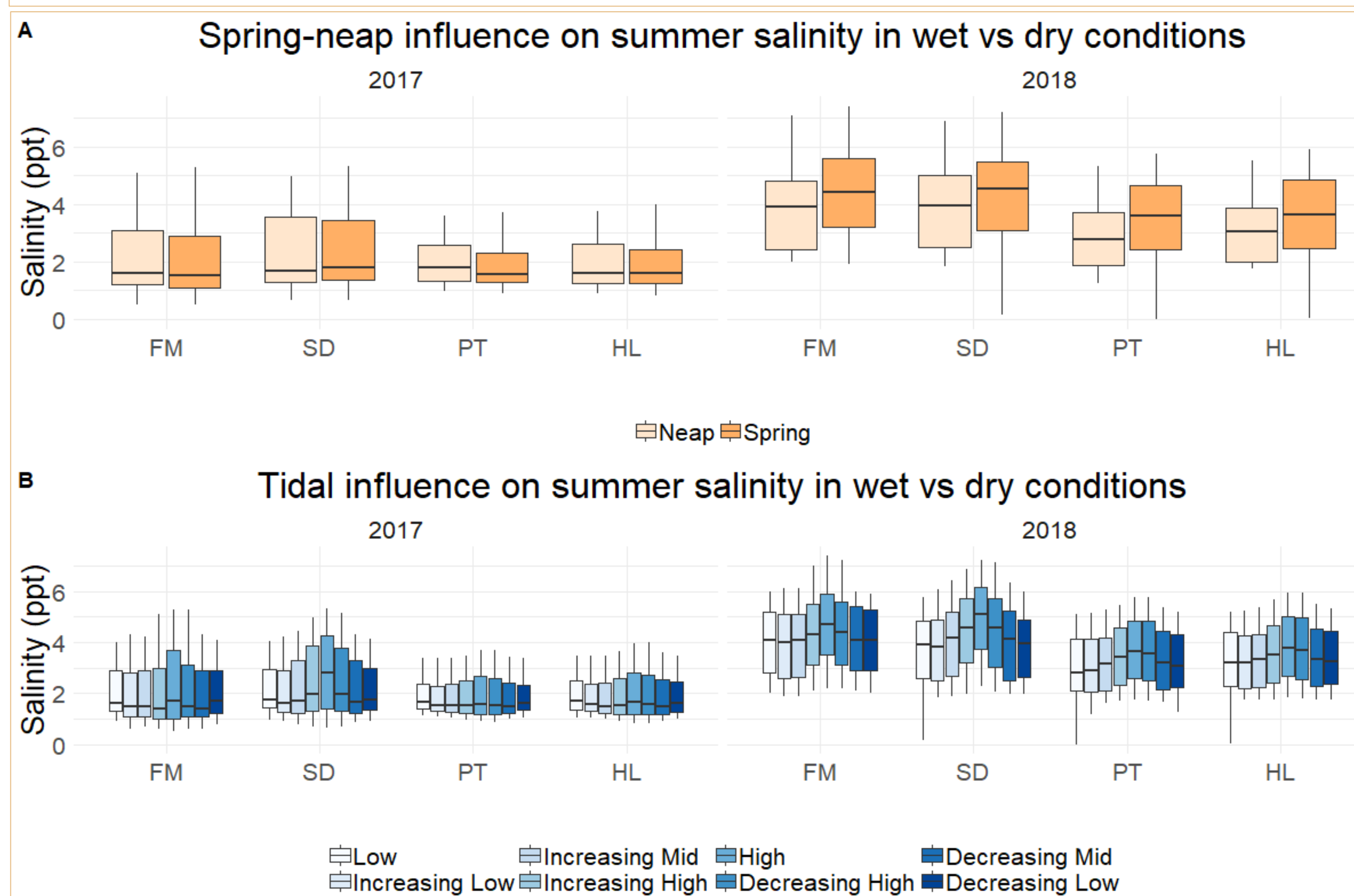
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Questions and Research

Characterizing spring-neap and tidal variability in sloughs.



How do spring-neap and tides influence salinity during the summer across wet and dry conditions and sites?



How does spring-neap and tide influence dissolved oxygen in the summer across wet and dry conditions across different sites?

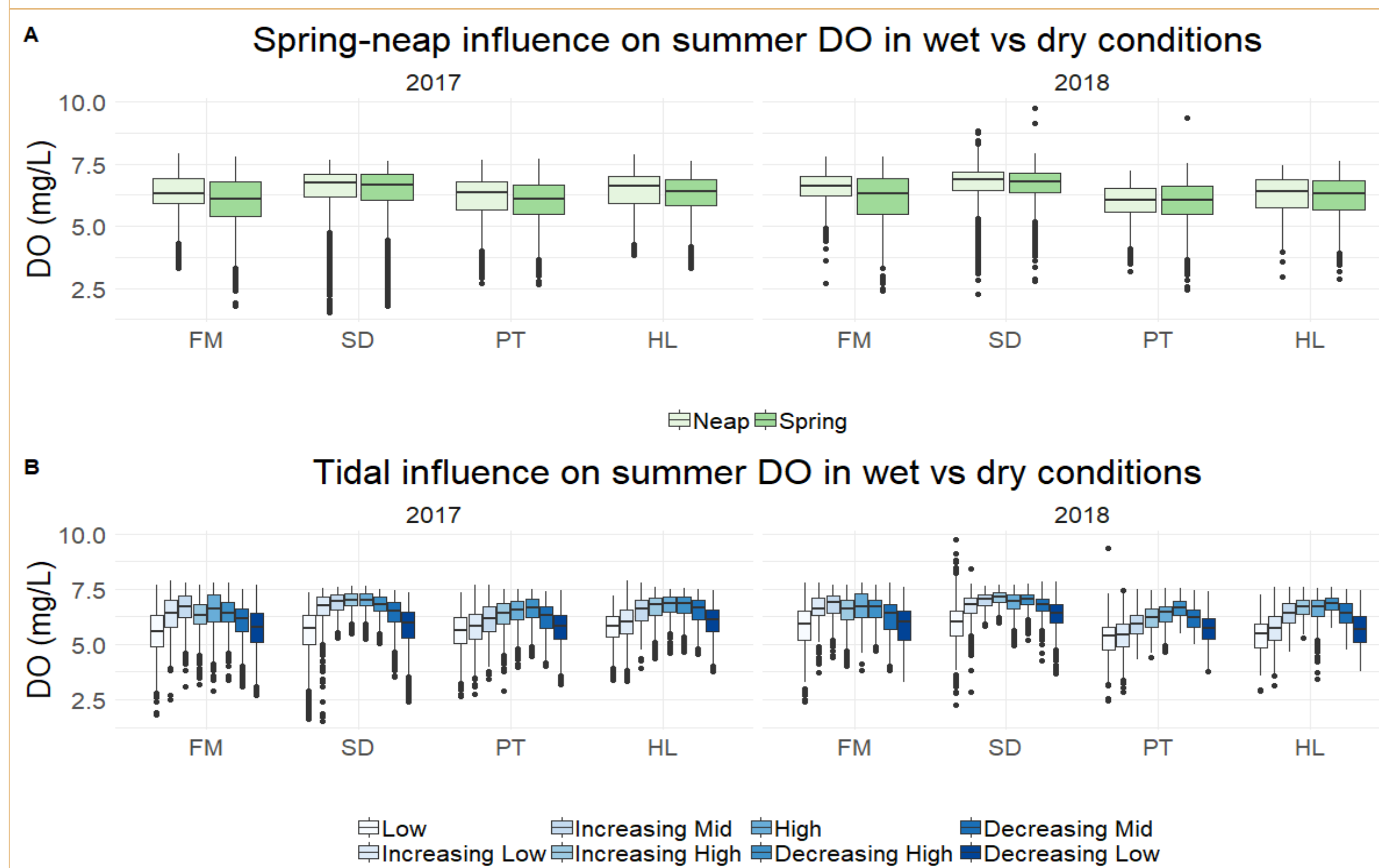


Figure 2: Varying tides, salinity, and DO by site and time.

How does spring-neap and tide influence nitrogen and phosphorous in the summer?

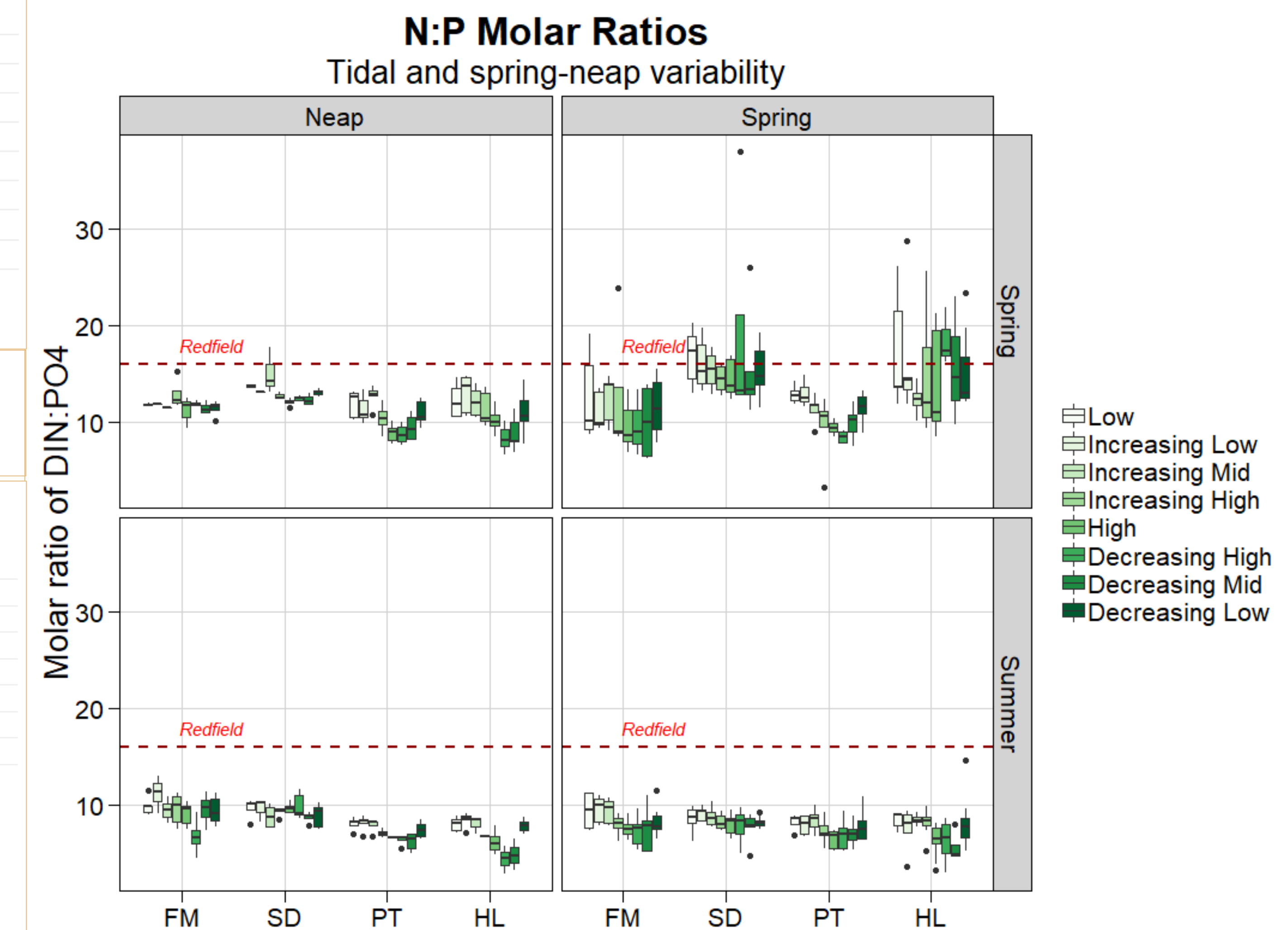


Figure 3: Seasonal, tidal and spring-neap variability in DIN:PO4

Summary

- Summer salinities varied with spring and neap tides particularly in 2018 reflecting a stronger influence from the bay.
- First Mallard Branch and Sheldrake had relatively high salinities due to their proximity to the bay.
- Dissolved oxygen showed no difference across sites and years. Sloughs were more oxygenated at high tide.
- In 2018, there was greater N:P ratio variability in the spring tide of the spring season, particularly in Sheldrake and Hill slough.
- Our findings suggest that fine-scale hydrologic variability has effects on water quality and food webs, which are important environmental conditions for fishes.