

Spatial subsidy of copepods at a restored Cache Slough Complex marsh

Rowan Yelton, Anne Slaughter and Wim Kimmerer
Correspondence: ryelton@sfsu.edu



CONCLUSIONS

The interaction between diel tidal and abundance patterns mediates transport of copepods into a marsh

- Adjacent channel provided a large subsidy of copepodites and adults to Wildlands, suggesting high predation in the marsh.
- Our study gives does not support the idea that restored tidal marshes will subsidize copepod populations in adjacent waters.
- High-frequency, labor intensive sampling of individual tidal cycles result in variable fluxes with wide error bars. Estimating the long-term flux requires many assumptions. The best method to obtain long-term flux estimates may be through automated sampling.

METHODS

DEFINITIONS
Diel vertical migration: Vertical migration in the water column in relation to light
Net flow: Average flow over the tidal cycle
Tidal flow: High frequency deviation from the net flow
Flux: transport of a material (e.g. copepods) by water

SAMPLING:

- Inside main entrance to the Wildlands marsh (Liberty Island Conservation Bank)
- 4x 25-hour sample events
- Continuous pumping into 53 µm mesh nets
- Samples were integrated over the hour
- Water quality and chlorophyll samples also taken hourly
- 15-minute ADCP volume flow rate data collected by the USGS

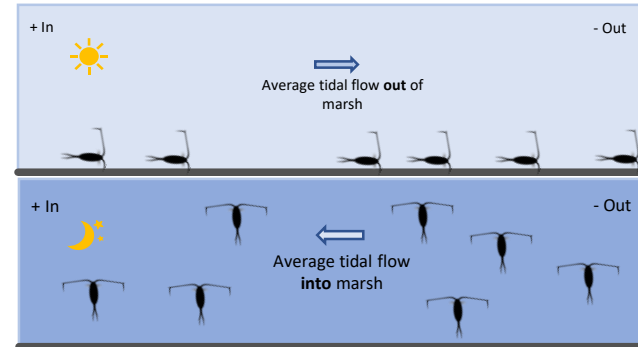
FLUX CALCULATION:
 $(QP)_{total} = (Q_t)(P)_{advective} + (Q_d)(P)_{dispersive}$

- Q is volume flow rate
- P is abundance
- Subscript t is deviation from the tidal cycle mean
- <> is an average over the tidal cycle
- We focused on the dispersive flux because we did not sample at the back entrance of Wildlands. Thus we do not know the complete advective flux through the marsh

LONG TERM FLUX

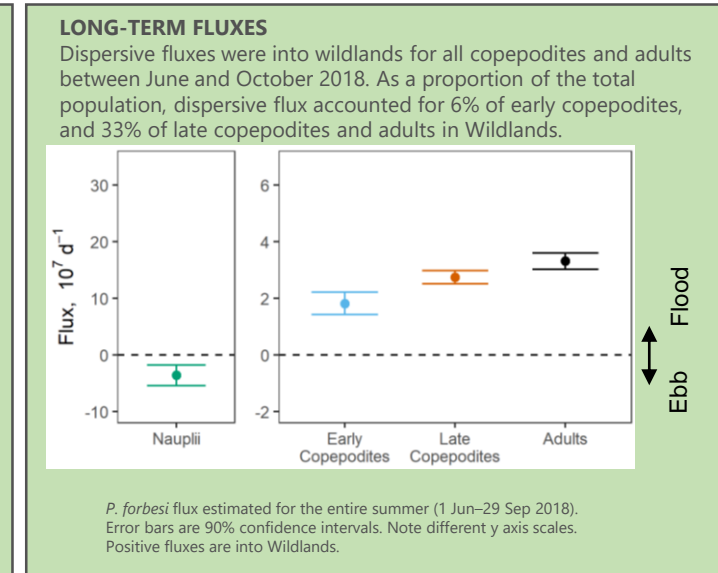
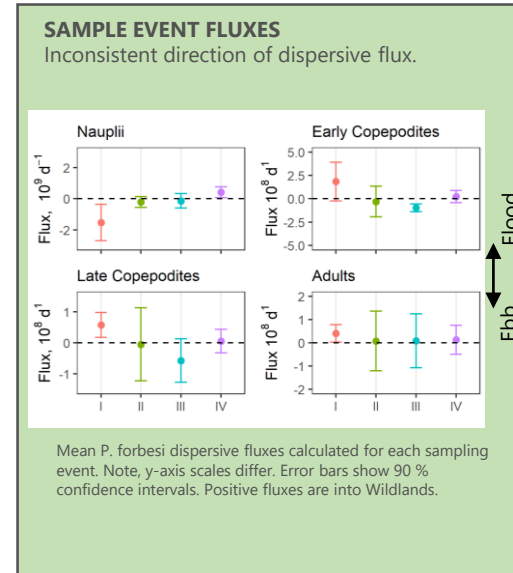
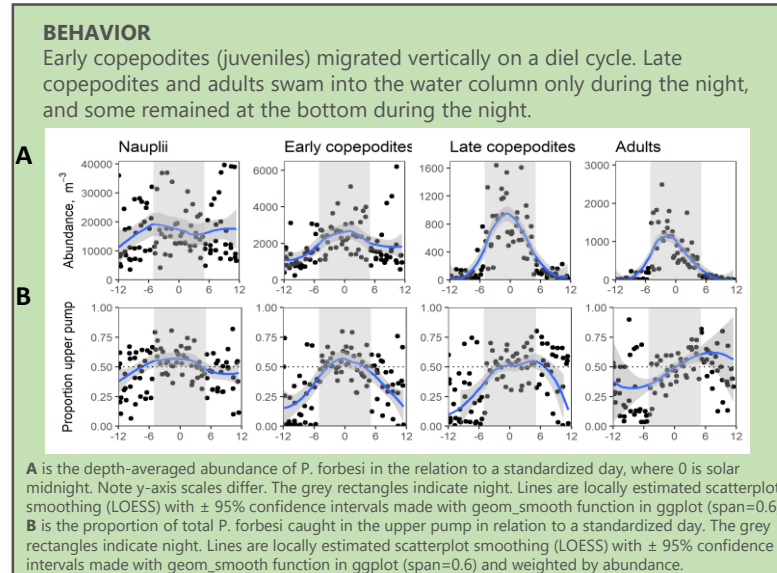
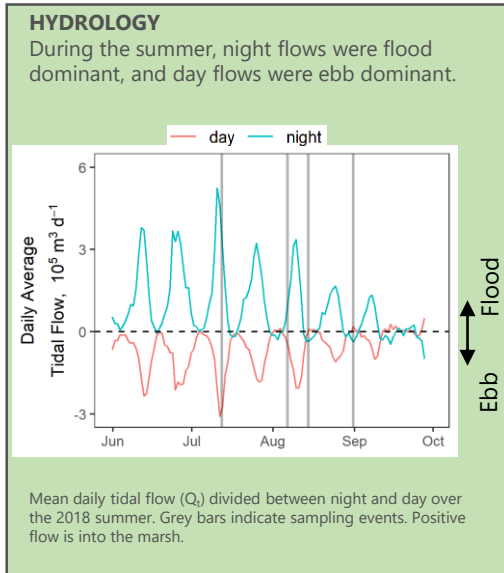
- Estimated from June to October 2018
- ADCP volume flow rate data from entire time period
- Hourly average of upper and lower pump abundances from all sampling events assigned to each hour of the summer

Map of Wildlands marsh in the San Francisco Estuary



- During the day, copepods stay on the bottom of the marsh, out of tidal currents
- During the night, copepods enter the water column, where they are transported by tidal currents
- Over the summer, tidal flows were flood dominant at night

RESULTS



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