Clam biomass, dominated by the invasive *Corbicula fluminea*, varies across the North Delta, but generally increases southward, with potential implications for phytoplankton exports

Clam Populations In The North Delta Dominate Below The Yolo Bypass Toe Drain

BACKGROUND

Invasive clams in the San Francisco Estuary, CA consume plankton and organic particulates, reducing food availability for zooplankton, a key prey for critical fish species including Delta Smelt. With adaptive management actions, such as the North Delta Flow Action, that use augmented flows to improve primary productivity and food availability in the Cache Slough Complex and Lower Sacramento River, it is important to understand the impact of these clams on lower trophic food webs.

METHODS

1. Prior to the 2019 North Delta flow pulse, clams were sampled across six locations throughout the North Delta from Lisbon Weir in the Yolo Bypass Toe Drain to the Sacramento River at Rio Vista
2. The sampling effort in 2019 was limited, so we compared it to a more comprehensive dataset collected in 2014 using ANOVA statistical tests
3. Upon finding no significant differences in median clam density and biomass (as Ash-Free Dry Mass, or AFDM) between 2014 and 2019, the datasets were pooled

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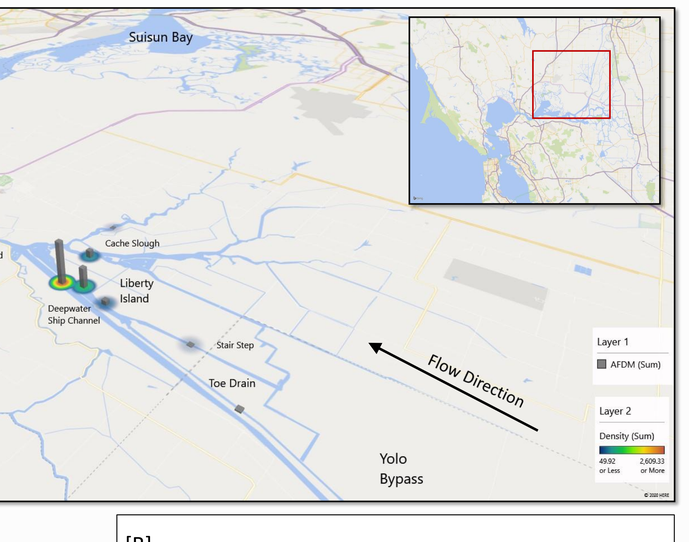
RESULTS

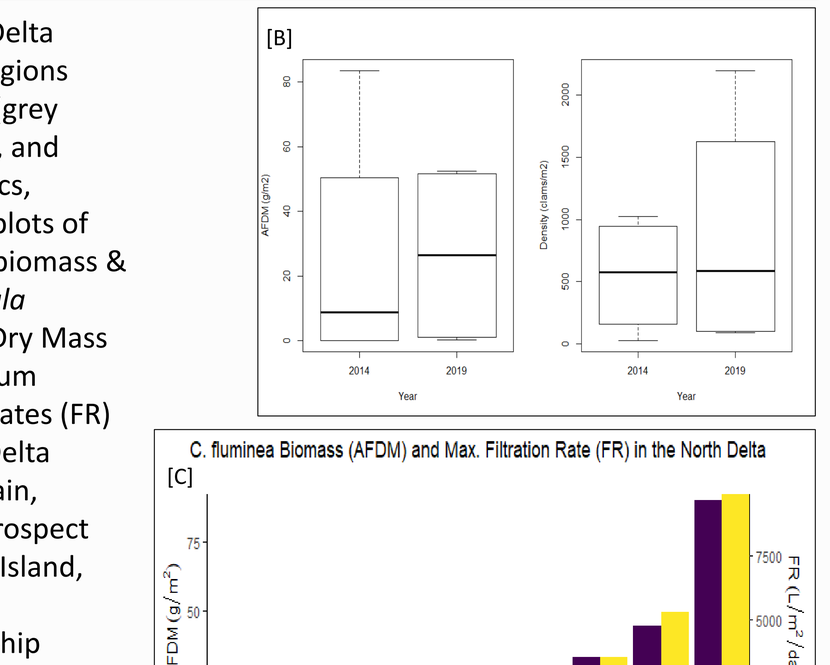
- *C. fluminea* may filter up to 690 L / m^2/day of the water column throughout the North Delta
- Clam biomass and density in the North Delta was not significantly different in 2014 and 2019 (ANOVA: AFDM~Year, p = 0.591; Density~Year, p = 0.789)

SUMMARY

- Clams filter their food out of the water column, potentially impacting the base of the food web by consuming large amounts of phytoplankton
- We conducted a preliminary investigation into these lower trophic-level impacts of clams on the North Delta in 2019 and combined our analyses with an earlier study conducted in 2014
- Clam populations have patchy distributions throughout the North Delta, but are more abundant in both density and biomass from Prospect Slough south
- This may result in potentially high filtration rates below, and lower filtration rates above, the terminus of the Yolo Bypass Toe Drain; though how this affects exports of primary production to the rest of the Delta warrants further study
- Despite the limitations of this study, our preliminary evidence points to a need for more in-depth spatial and temporal investigations of clams in the North Delta to better understand their impacts on Delta food webs

Figures: [A] North Delta benthic sampling regions with clam biomass (grey vertical bars, g·m^{-2}), and density (colored discs, clams·m^{-2}). **[B]** Boxplots of 2014 vs 2019 clam biomass & density. **[C]** *Corbicula fluminea* Ash-Free Dry Mass (AFDM) and maximum potential filtration rates (FR) grouped by North Delta regions (TD=Toe Drain, SS=Stair Step, PS=Prospect Slough, LIB=Liberty Island, LS=Lindsey Slough, DWS=Deep Water Ship Channel, RYI= Ryer Island, RVB=Rio Vista). **[D]** North Delta clam community composition by density and biomass





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