

Results

Twenty-one filtration trials, across the four study sites, were included in the analyses. A single filtration trial at Deanza (2019-4-17; Table 4) was removed from the analysis because the mean upstream Chl α ($M = \text{NA}$, $SD = \text{NA}$) was within the detection limit of the sensor ($\pm 0.1 \text{ g/L}$). Filtration trials across sites were not distributed equally (Table), Deanza had more than twice the amount filtration trials ($N = 9$) as San Rafael ($N = 4$), Morro Bay ($N = 4$), and Shellmaker ($N = 4$).

Habitat Clearance Rates

% latex table generated in R 3.6.3 by xtable 1.8-4 package

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## % Thu Oct 12 22:29:21 2023

## \begin{table}[ht]
## \centering
## \begin{tabular}{rlrrrr}
## \hline
## & variable & rank\_avg & rank\_sd & imp\_avg & imp\_sd \\
## \hline
## 1 & Site & 1.41 & 0.70 & 26.03 & 4.61 \\
## 2 & Salinity & 2.51 & 1.05 & 19.82 & 4.26 \\
## 3 & OC & 2.59 & 1.03 & 19.41 & 4.25 \\
## 4 & TPM & 4.58 & 1.11 & 12.40 & 3.45 \\
## 5 & Turbidity & 4.89 & 1.06 & 11.28 & 3.16 \\
## 6 & Temp & 5.01 & 0.97 & 11.07 & 2.77 \\
## \hline
## \end{tabular}
## \end{table}

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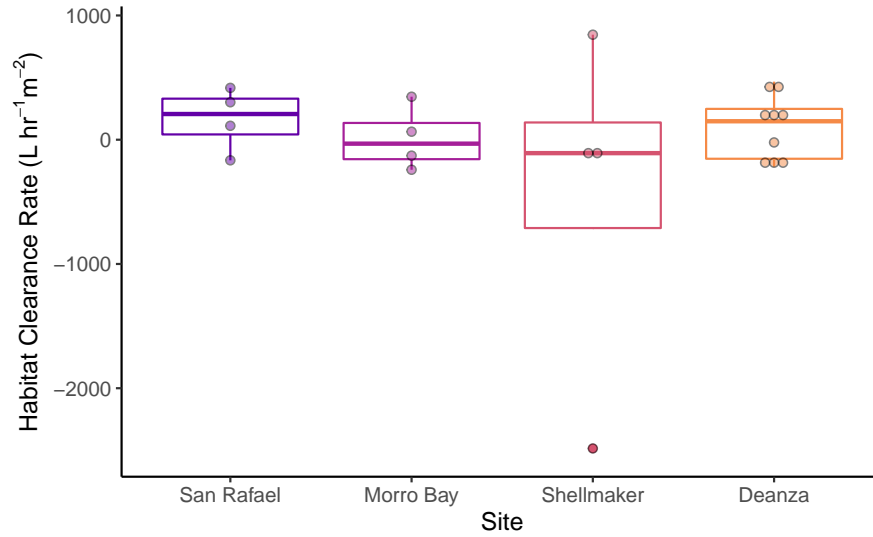


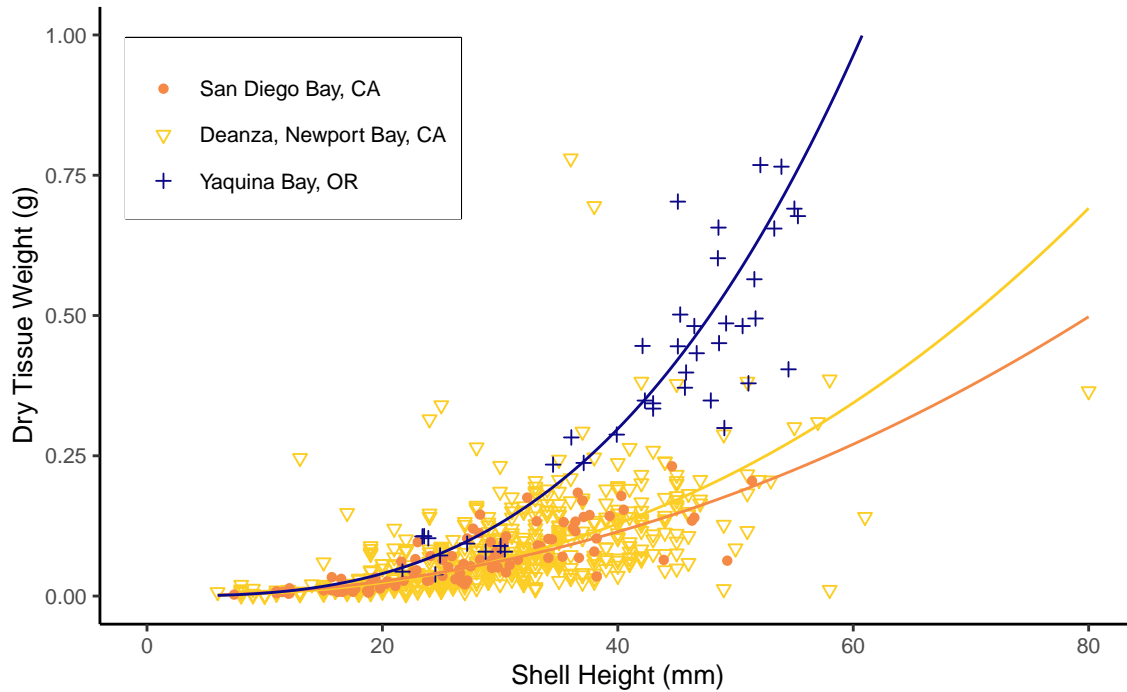
Figure 1: Box plots of habitat clearance rates (HCR) during filtration trials; control trials are listed in Table 1. Each data point is the mean of a single filtration trial. HCR was not statistically different among sites (one-way Kruskal-Wallis). Filtration trials were conducted between February 2018 to June 2019 at San Rafael, CA (restored *O. lurida* reefs); Morro Bay, CA (Morro Bay Oyster Company *C. gigas* aquaculture); and Newport Bay, CA (Shellmaker and Deanza, restored beds).

Mean HCR (Habitat Clearance Rates) at San Rafael was $166.252 \text{ L hr}^{-1} \text{ m}^{-2}$ ($N = 4$, $SD = 254.7$), $10.3 \text{ L hr}^{-1} \text{ m}^{-2}$ ($N = 4$, $SD = 257.1$) at Morro Bay, $-463.9 \text{ L hr}^{-1} \text{ m}^{-2}$ ($N = 4$, $SD = 1420.2$) at Shellmaker, and

104.6 L hr⁻¹ m⁻² ($N = 9$, $SD = 250.9$) at Deanza (Figure 1). There is not sufficient evidence to conclude that HCR was significantly different among sites (one-way Kruskal-Wallis, $p = 0.83$) (Figure 1). A random forest regression containing only filtration trials ($R^2 = 0.64$) indicated that OC (11.8952044%) had the highest relative importance to the model, followed by Salinity (19.7606556%), Site (28.6586351%), Temp (10.7208909%), TPM (15.9469001%), and Turbidity (13.0177139%).

Particle Selection

Allometric Predictor of Biomass



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Ambient water quality during filtration trials varied within and among sites (Figure ??). Salinity was significantly different among sites as determined by a one-way ANOVA at a $p < 0.05$ ($F(3, 17) = 24.7$, $p < 0.001$), along with turbidity ($F(3, 17) = 66.74$, $p < 0.001$), and TPM ($F(3, 15) = 20.06$, $p < 0.001$) (Figure ??).

Temperature ($F(3, 17) = 2.43$, $p = 0.10$), and Chl α ($F(3, 17) = 2.17$, $p = 0.13$) were not different among sites (Figure ??). OC was significant among sites ($F(3, 15) = 3.92$, $p = 0.03$), but the post-hoc Tukey HSD did not reveal significant differences among sites. Therefore, I use a less conservative post-hoc analysis, the Newman-Keuls method, and found that OC was significantly different between Shellmaker and Deanza (p

= 0.01).

Percent Chlorophyll α Removal

The mean percent Chl α removal at the San Rafael site was 1.2% ($N = 4$, $SD = 4.36$) (Figure ??). Filtration trials at Morro Bay had a mean Chl α removal of 0.5% ($N = 4$, $SD = 15.1$). At Deanza, mean Chl α removal was 1.9% ($N = 9$, $SD = 7.5$). Mean Shellmaker Chl α removal was -11.2 % ($N = 4$, $SD = 34.3$) (Figure ??). Chl α removal in filtration trials did not differ significantly between sites (one-way Kruskal-Wallis, $p = 0.98$).

Seston Quantity and Quality

Northern San Francisco Bay (San Rafael) TPM averaged 46.04 mg/L ($N = 4$, $SD = 20.74$), and Morro Bay TPM averaged 15.53 mg/L ($N = 3$, $SD = 1.74$) (Figure ??). Newport Bay (Deanza and Shellmaker) TPM averaged 4.3 mg/L ($N = 13$, $SD = 0.85$). Northern San Francisco Bay (San Rafael) OC averaged 0.14 ($N = 4$, $SD = 0.05$), and Morro Bay OC averaged 0.26 ($N = 3$, $SD = 0$). Newport Bay (Deanza and Shellmaker) OC averaged 0.243 ($N = 13$, $SD = 0.05$) (Figure ??).

Filter Feeding Community

In November 2017 the estimated bivalve density at San Rafael was 420 individuals/m², all of which were *Ostrea lurida* (Figure ??). Other bivalves were noted, but were rare, and were not detected in sample bags (C. Zabin, unpublished data). Morro Bay had an estimated 409 *Crassostrea gigas* individuals/m² in the summer of 2018 (Morro Bay Oyster Company); personal field observations confirm the lack of bivalve fouling on the aquaculture lines. In May 2018, Shellmaker had an estimated 1283.2 individuals/m², composed of *Adula diegensis* (545.6 individuals/m²), *Musculista senhousia* (438.4 individuals/m²), *O. lurida* (238.4 individuals/m²), *Mytilus galloprovincialis* (51.2 individuals/m²), *Geukensia demissa* (8 individuals/m²), and *Argopecten ventricosus* (1.6 individuals/m²) (Figure ??). Deanza had an estimated 2588.8 individuals/m² in May 2018, and was composed of *M. senhousia* (1979.2 individuals/m²), *A. diegensis* (296 individuals/m²), *O. lurida* (233.6 individuals/m²), *M. galloprovincialis* (80 individuals/m²) (Figure ??).

Direct biomass data were only available for Deanza, which estimated 39.96 g/m² of bivalve dry tissue weight (DTW) (Figure ??). *O. lurida* had the highest DTW with 20.47 g/m², followed by *M. galloprovincialis* (2 g/m²), an unknown *Modiolus* sp. (0.62 g/m²), *A. diegensis* (2.29 g/m²), and *M. senhousia* (14.3 g/m²) (Figure ??).

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