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Mussels as Samplers of Regional Microplastic Contamination Trends

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**Background**

- Discarded plastics enter ocean habitats and degrade into small particles (Canesi et al., 2012).
- Filter-feeding organisms can ingest these particles, although the impacts of this are poorly known, with only 11 published studies to date (Wright et al., 2013).
- Mussels (*Mytilus* sp.) ingest microplastics, and location—at regional as well as local scales—may impact the degree of contamination (Lyon, 2014).

**Methods**

- Mussels were collected from eight locations (one Outer Coast and seven southern Puget Sound) and processed within 24 hours of collection.
- 30 mussels collected per site, 10 from each of three relative tidal heights.
- Digestion of heart and gut in NaClO ($n = 5$ mussels per size class).
- Resulting fluid was centrifuged and the pellet pipetted onto a microscope slide.
- Number and type of plastic particles per sample determined using fluorescence microscopy.

**Results**

- **Figure 1.** Mussel plastic ingestion rates between locations. Results indicate differences in plastic ingestion amounts between similarly sized groups of mussels from different sites ($p = 0.009$). Standard deviation bars included for multi-sample data sets.

- **Figure 2.** Mussel plastic ingestion quantities by mean length of mussels. Results support a correlation between increasing plastic contamination and increasing length (KPN, $p = 0.02$; DIS, $p = 0.01$). Standard deviation bars included for mussel length due to grouping of mussels prior to processing.

**Discussion**

- All mussels surveyed showed measurable levels of microplastic contamination.
- Plastic contamination varied significantly between sites.
- At sites where length was a significant factor in degree of contamination, increasing length was related to increasing contamination.
- Filaments increased with increasing length, but neither location nor tidal height were significant.

**Future Research**

- Quantify plastic contamination within mussels from broader geographic range.
- Characterize the plastic found in mussels.
- Assess physiological and population-level effects of plastic ingestion in marine food webs.

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