ZooSCAN assessment of temporal and spatial variation in zooplankton assemblage composition in an urbanized coastal ocean

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INTRODUCTION

Urbanization has diverse impacts on coastal ecosystems. Zooplankton play a critical role in these ecosystems and serve as sensitive indicators of environmental change.
To date, no comprehensive zooplankton surveys have been conducted in Burrard Inlet, Vancouver (Canada). Establishing a **baseline** of the spatial and temporal variation in **zooplankton assemblage composition** is necessary for understanding the effects of urbanization on Burrard Inlet's urban waters.



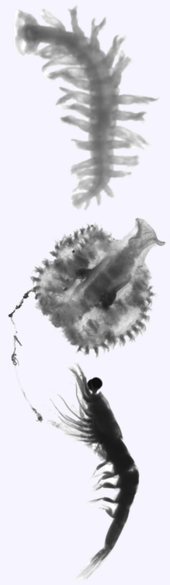
Map of study area, adapted from Grace Melchers.

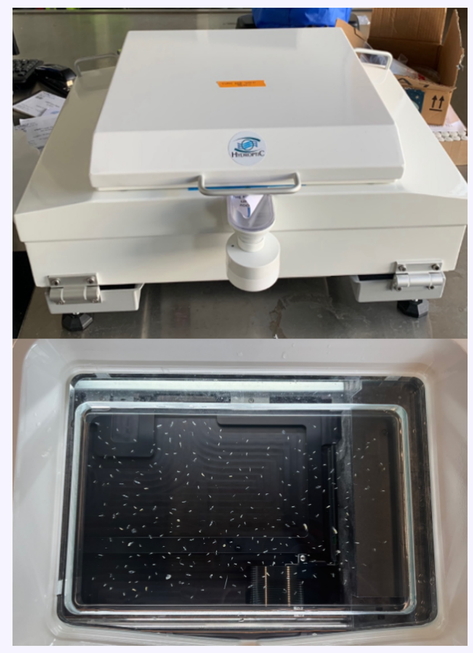
METHODS



Zooplankton samples were collected bimonthly from February 2025 until July 2026, with weekly sampling over the spring phytoplankton bloom in 2026. All samples were collected with a 50cm diameter bongo net, with 250 µm mesh to collect zooplankton species from near the seabed to the surface.

Using ZooSCAN, high resolution images of zooplankton were captured and processed through machine learning to identify major taxonomic groups, organism size, and organism biovolume.





RESULTS

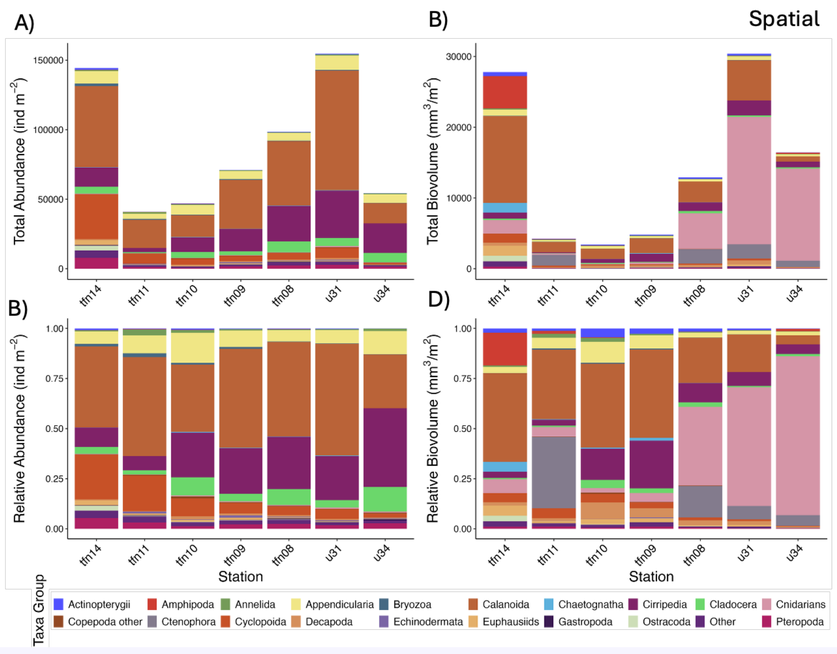


Figure 1. Spatial variation in zooplankton assemblages. Average total abundance (A) and relative abundance (B) are shown on the left. Average total biovolume (C) and relative biovolume (D) are shown on the right.



Calanoid copepods dominated abundance, but biovolume decreased towards the interior more urbanized part of the inlet.



Amphipods made up ~ 20% of the biovolume in the deepest, outer most station (TFN14).



Cnidaria biovolume increased significantly towards the more urbanized part of the inlet, reaching > 80%.

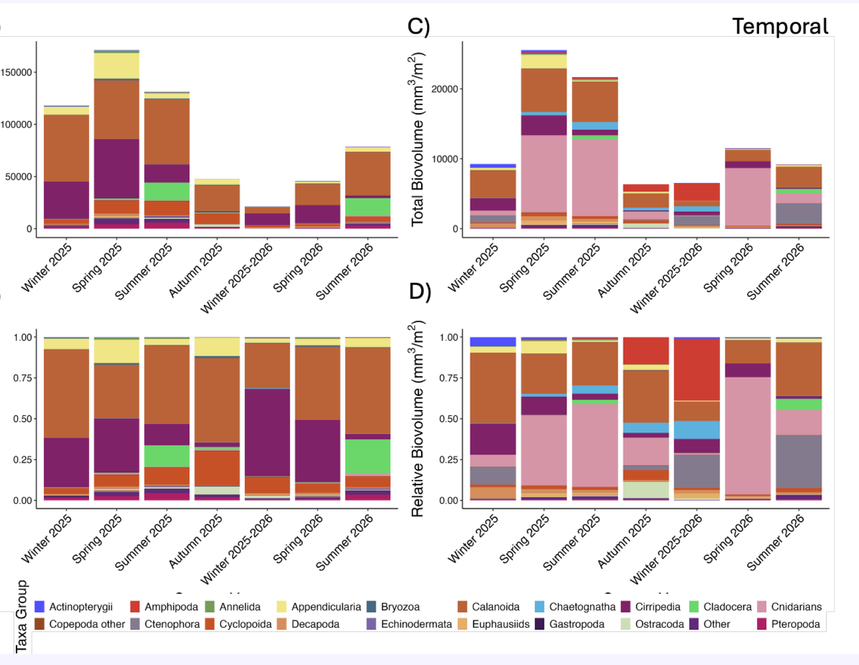
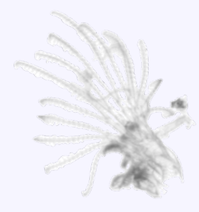


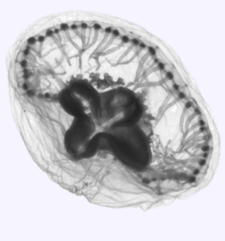
Figure 2. Seasonal variation in zooplankton assemblages. Average total abundance (A) and relative abundance (B) are shown on left. Average total biovolume (C) and relative biovolume (D) are shown on right.



Calanoid copepods contributed significantly to both abundance and biovolume across all seasons.



Cirripedia larvae had high abundance in winter and spring.



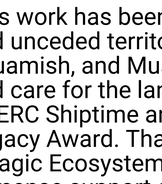
Cnidaria were not significant contributors to seasonal abundance but were major contributors to majority of biovolume in spring and summer.

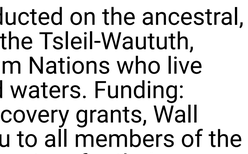
CONCLUSION

Calanoid copepods, Cnidaria, and meroplankton were major community components across the sampling period.

Zooplankton abundance and biovolume were twice as high in 2025 compared to 2026.

Cnidaria dominated biovolume in the more urbanized inner part of Vancouver harbour.





Future Work:

Tease apart the relative roles of natural and anthropogenic environmental variability in structuring zooplankton assemblages.

Assess the impact of urbanization on the functional ecology of the zooplankton community.

ACKNOWLEDGEMENTS

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