

Monitoring the presence of beach litter on 12 beaches in the Monterey Bay



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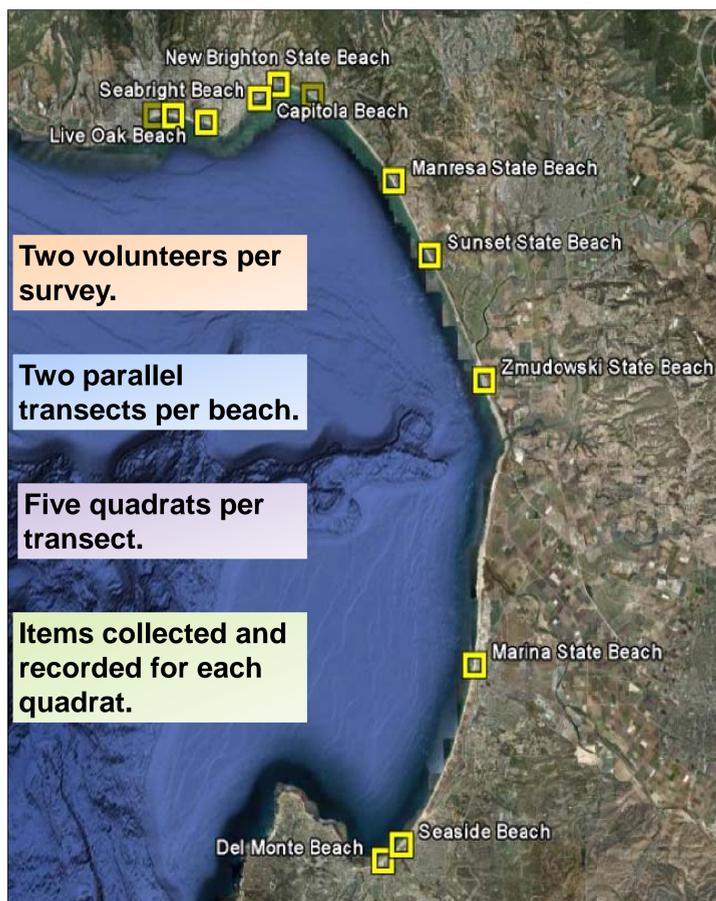
Abstract

New legislation to reduce the use of non-recyclable materials is expected to reduce the amount of land-based debris littering beaches and entering our oceans, negatively impacting marine wildlife. To help address these potentially harmful plastics, I created a standardized method which allowed volunteers to survey the types and abundance of beach litter at 12 beaches within the Monterey Bay. Beach surveys started in July 2009 and will continue through June 2010. I found that smaller fragmented pieces of litter are very prevalent. This baseline study promotes community involvement in the scientific process, raises environmental awareness, and will help to evaluate the policy successes in abating beach litter.

Study Objectives

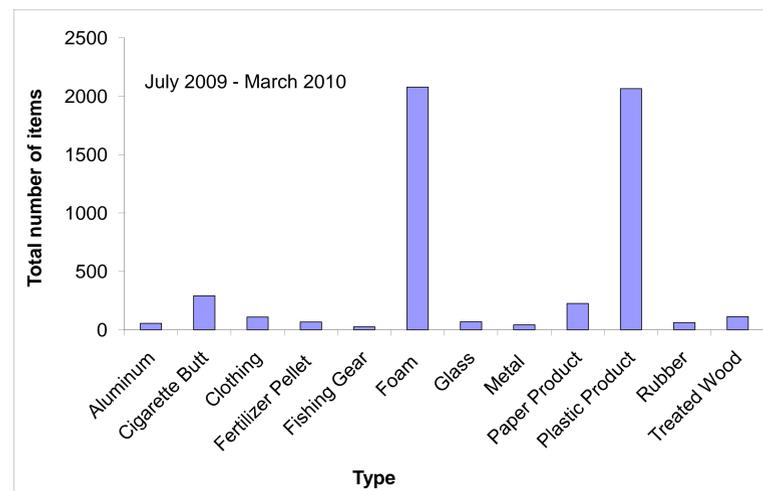
- Assess the types and abundance of beach litter on 12 beaches within the Monterey Bay.
- Identify spatial and temporal relationships between beach location, month, and litter abundance.
- Document presence of harmful anthropogenic litter in the Monterey Bay coastal ecosystem.

Beach Locations and Methods



Summary of Results

- Small fragmented plastics ranging between 0.2 to 3 cm make up 38% of all plastics surveyed (Fig. 1).
- Plastic litter and Styrofoam pieces surpass cigarette butts in abundance.



- Styrofoam pieces make up 40% of total litter (Fig. 2).
- Plastic resin pellets and fertilizer pellets were more abundant after the summer season (Fig. 3 and Fig. 4).
- Remote beaches experience greater abundance in the winter.

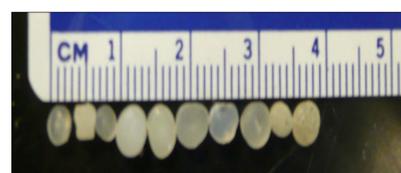
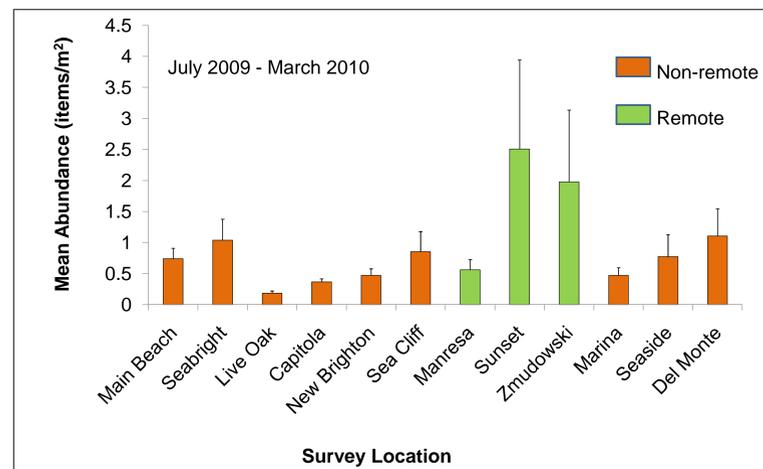


Figure 3. Virgin petroleum resin pellets or nurdles can be confused for fish eggs.



Figure 4. Tiny green time released fertilizer pellets.

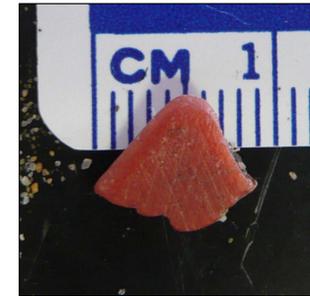


Figure 1. Fragmented plastic shows evidence of photo-degradation and exposure to the elements.



Figure 2. A 50% increase in the abundance of Styrofoam pieces occurred in October through February.

Implications of Results

- Small fragmented plastics can have deleterious impacts on wildlife and people.
- Abundance of Styrofoam may decrease as more polystyrene bans pass.
- Surface current circulation, municipal and agricultural run-off, and storms exacerbate the abundance of litter on remote Monterey Bay beaches.
- Further analysis on a monthly scale may suggest relationships between the abundance of litter and oceanographic and anthropogenic causalities per beach location.

Conclusion

- Beach surveys are cost efficient, require little equipment, and can utilize less experienced surveyors.
- MBNMS can use my baseline study to plan future research projects in monitoring, tracking, identifying, and ultimately the removal of debris.
- Future Questions:

Could mechanical beach cleaning cause fragmentation of plastics?

What types of debris are floating on the Bay?

Acknowledgements

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