

# Citizen science: divers survey marine debris on the seabed of the Israeli Mediterranean coast

Galia Pasternak<sup>1,2</sup>, Boaz Mayzel<sup>2</sup>, Sarah Ohayon<sup>3</sup>, Christine A. Ribic<sup>4</sup>

<sup>1</sup> Department of Maritime Civilizations, The Leon H. Charney School for Marine Sciences, University of Haifa, Israel

<sup>2</sup> The Israeli diving federation, Israel

<sup>3</sup> The society for the protection of nature in Israel

<sup>4</sup> US Geological Survey, Wisconsin Cooperative Wildlife Research Unit, Department of Forest and Wildlife Ecology, University of Wisconsin, Madison, WI, USA



Sea Guard – Diving for the Mediterranean





# Marine debris data in Israel

- Golik, A., Gertner, Y. (1992):  
**Litter in the Israeli coastline.**
- Bowman, D., Manor-Samsonov, N., Golik, A. (1998):  
**Dynamics of Litter Pollution on Israeli Mediterranean Beaches:  
A Budgetary, Litter Flux Approach.**
- Alkalay, R., Pasternak, G., Zask, A. (2007):  
**Clean-Coast Index - A new approach for beach cleanliness  
assessment.**
- Pasternak, G., Zviely, D., Ribic., C.A. Ariel, A., Spanier, E.(2017):  
**Sources, composition and spatial distribution of marine debris along the  
Mediterranean coast of Israel**
- Van der Hal, N., Ariel, A., Angel, D. L (2017):  
**Exceptionally high abundances of microplastics in the oligotrophic Israeli  
Mediterranean coastal waters**

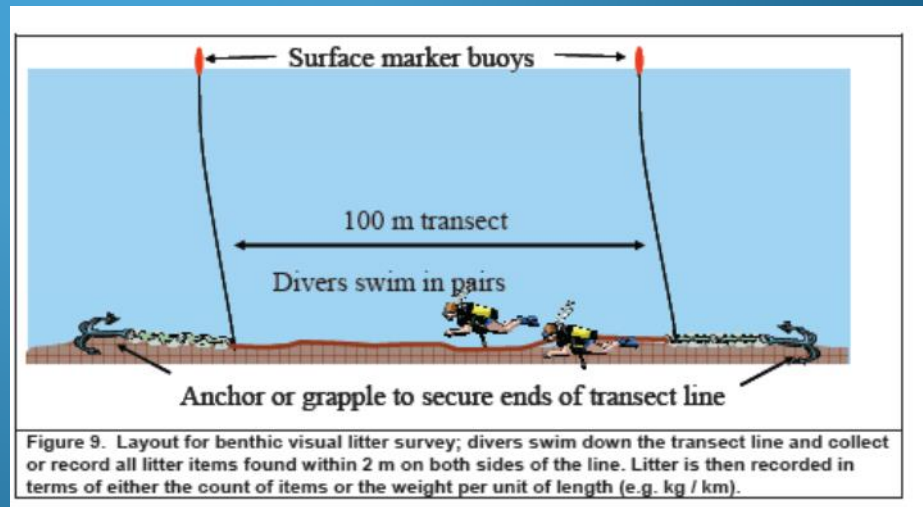


# Preliminary surveys



- 35 coastal dives from the waterline into the sea

- 37 open-sea dives at 10m depth parallel to the shoreline

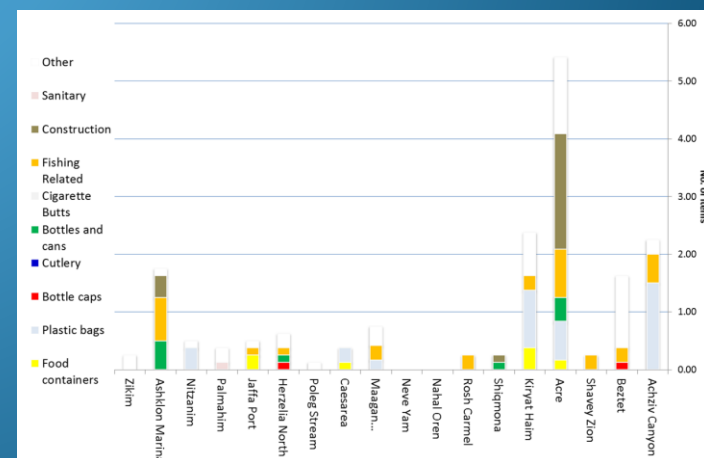
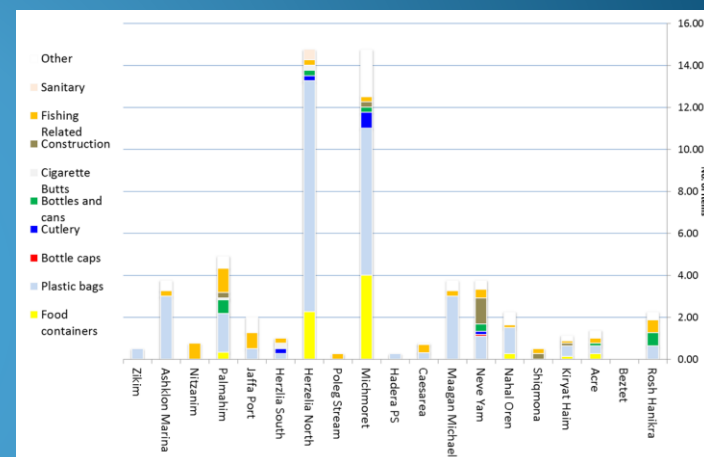






# Preliminary results

- Most of the sites are sandy with little debris on the seafloor.
- Most significant in the coastal surveys: North to Herzeliya marina and Michmoret.
- In the open sea surveys: Northern part of Haifa Bay (i.e. Acre Bay).
- Only one or two survey in each site, due to lack of resources.
- The results were very scattered





# Cleanup data collection

- Since May 2015, major clean up events are accompanied by a researcher representative of the Israeli Diving Federation.
- All the collected marine debris is weighted and sorted according to Cheshire et al. (2009).
- 25 underwater cleanups data were collected.





# Divers training

- In 2015, we established the divers' volunteer program "**Mishmar Hayam**" (Sea Guard).
- Two new specialties were developed: "reef diver" and "underwater surveyor",
- Four days course led by marine ecologists (researchers and PhD. students) diving instructors.
- Background: the local coast environment and its threats, and marine survey methods.







# Divers training

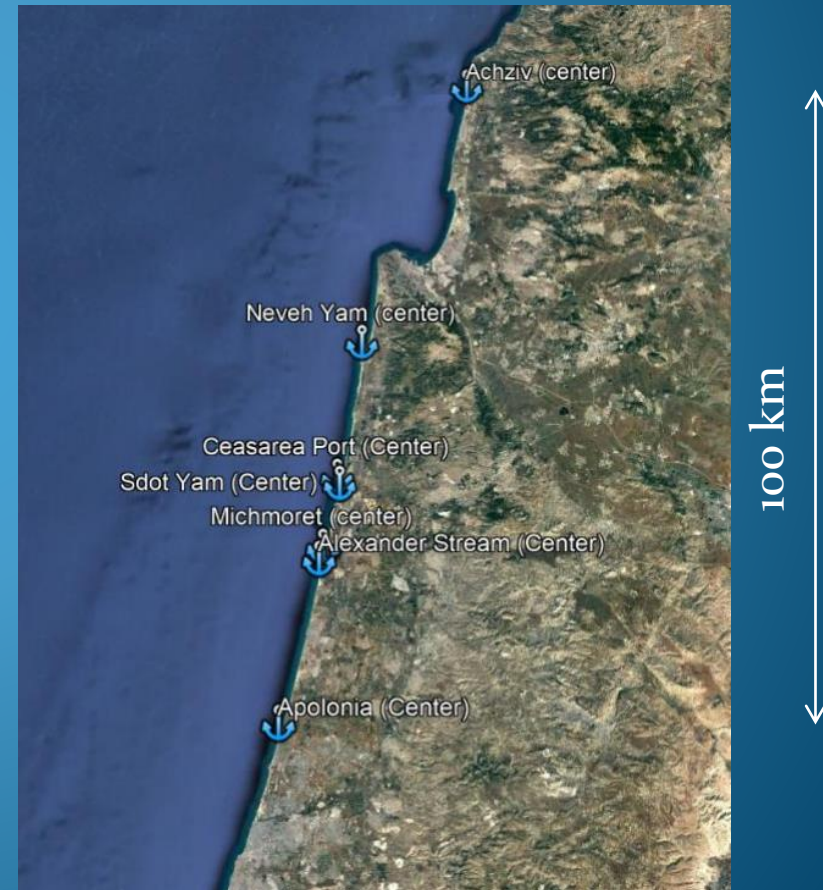
- Focusing on: marine debris and biodiversity.
- The divers are trained to use the survey equipment, plan the dive and survey and conduct supervised surveys.





# Underwater surveys

- 15 surveys in seven different sites (1-4 in each site).
- Near-shore rocky bottom sites (0-5 meters depth).
- 3-8 transects of 100 m by 4 m in every survey.
- All the surveys are supervised by a researcher.



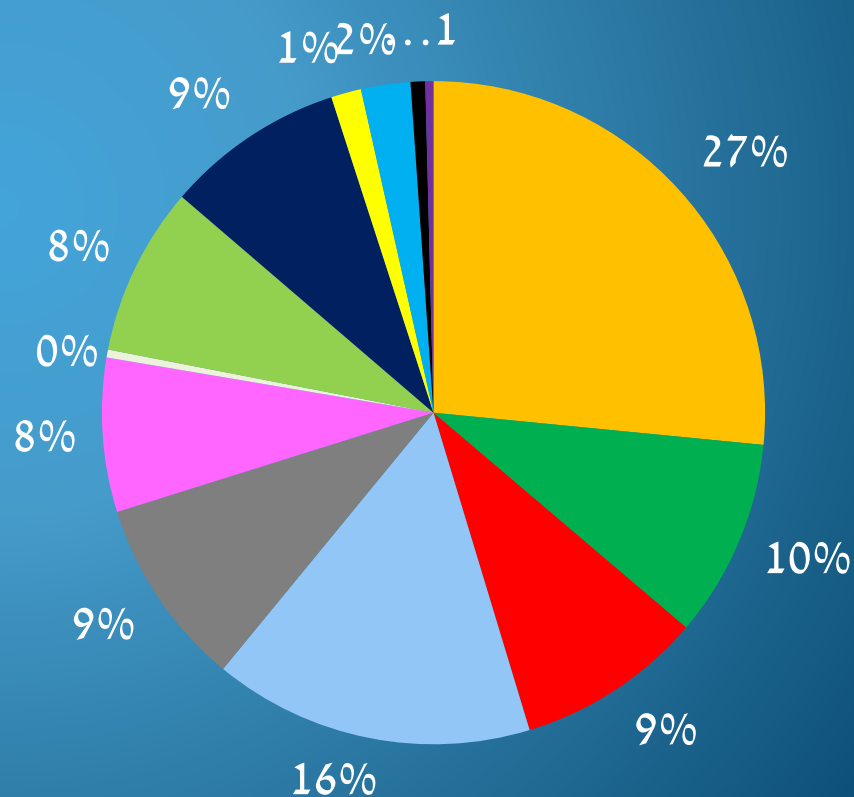




# Main findings

## Categories

- Fishing & Boating
- Drinking bottles and cans
- Bottle caps & lids
- Plastic bags
- Construction and Industrial
- Medical, health & beauty aids and personal items
- Cigarettes, butts & filters
- Cups, tableware, food trays, fast food wrappers & cardboard drink containers
- Plastic Pieces
- Toys and office related
- Packaging
- Automotive parts
- Furniture





# Main findings

## Material

■ Plastic

■ Cloth and Fabric

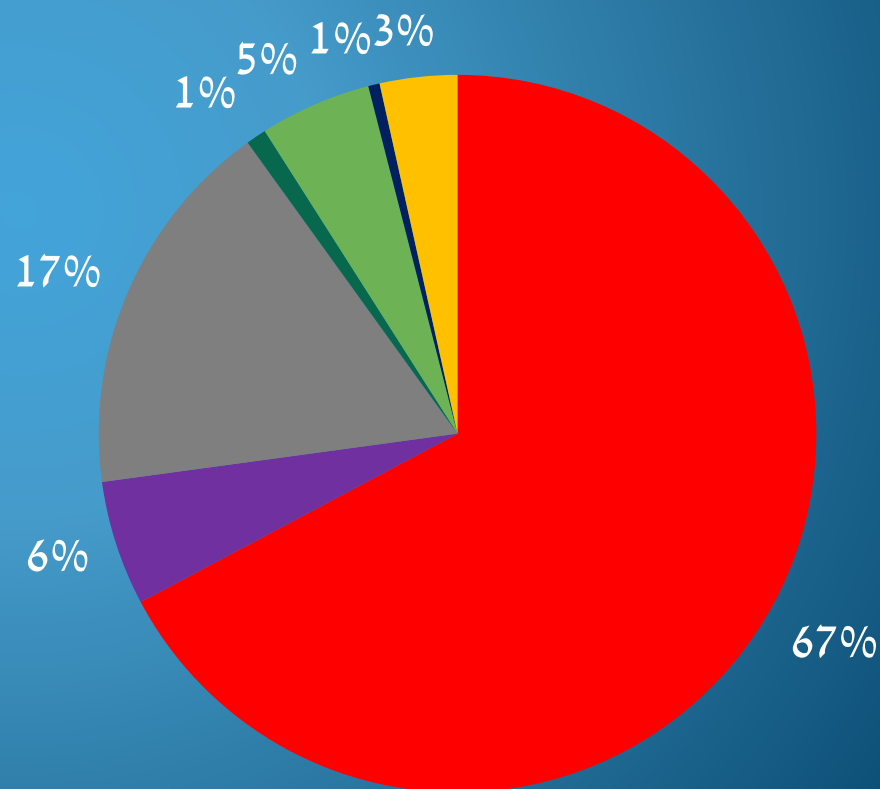
■ Metal

■ Wood

■ Glass and ceramic

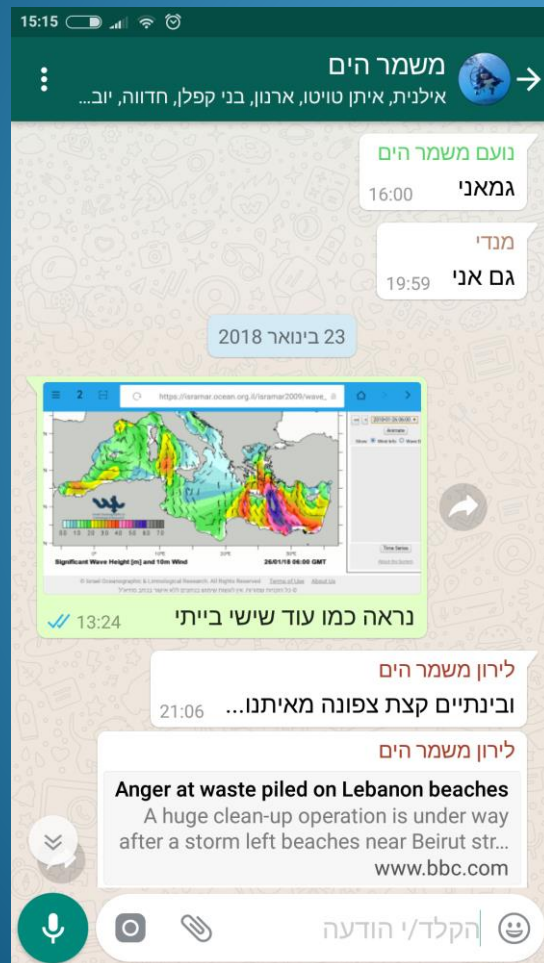
■ Paper

■ Rubber and sponge





# Advancing with technology



Whatsapp group for messages



Reporting application





# Public outreach

- Volunteers give lectures in their local communities
- Accompany cleanup events
- Using photos from our survey to show to non divers what's in there.



# Regional and local services

- Since March 2017 the volunteers conduct four surveys a year in two sites as part of the national action plan (NAP) and our results are reported to UNEP.
- Coastal municipalities use our ecological surveys as part of their blue flag reports.
- Underwater cleanups are summarized and we send recommendations to the relevant authorities.



## תיאור הסקר

- את הסקר ביצעו שמונה צוללים מתנדבים במשמר הים על פי פרוטוקול שהותאם לתנאי בית הגידול הסלעי בריף של אתר גבעת עליה.
- הצוללים התחלקו לשני צוותים, בכל צוות זוג סוקרי חסרי חוליות וזוג סוקרי דגים.
- צוות אחד סקר באתר צפוני למפרץ, מחוץ לתחומי שמורת הטבע המוצעת, וצוות אחד סקר באתר דרומי למפרץ בתוך גבולות השמורה המוצעת.







# Looking forwards

- More trained volunteers
- Youth programs as empowerment tool
- Establish a regular budget





# Thank you!

We are doing it for them...



Wish you peace