

Plastic Trash Census

Conducted at Bahía Jackson, Tierra del Fuego, Chile

February 18, 2016

Introduction:

The Wildlife Conservation Society's 7th Marine Science Expedition to Admiralty Sound in Tierra del Fuego, Chile, took place in February, 2016. During a census of elephant seals at Bahía Jackson, researchers observed that the beach and adjacent grass and scrublands were littered with marine plastic. In order to determine the types and amount of plastic at Bahía Jackson, researchers Christy Gast, Alejandro Vila and Marcela Uhart conducted a marine plastic census.



Elephant seals and Marine Plastic at Bahía Jackson. Troncos, Pastizal and Matoral ecosystems are visible. (photo Christy Gast)

Research Questions:

How much marine plastic is currently on the beach at Bahía Jackson?

Where does the marine plastic at Bahía Jackson come from?

Methodology:

In order to determine how much marine plastic is at Bahía Jackson, data was collected in two manners. Researchers determined that the region of Bahía Jackson adjacent to the coast consisted of three distinct ecosystems: Troncos (Driftwood) lining the tidal zone, Pastizal (Grasslands) in the flat areas, and Matoral (Bushes). Plastic trash became entangled with the driftwood, grass and bushes in different ways, so we conducted separate surveys in each of these areas.

Surveys were conducted in two manners:

First, researchers walked along a 100 meter transect and counted each piece of plastic encountered within one meter on either side of the measuring tape. In this manner, we created a list of each plastic item in a 200 square meter area of each ecosystem. Second, every 20 meters we collected each plastic item in a 2x2 meter square section. In total, plastic was collected from 20 square meters of each ecosystem. This plastic was then weighed.



A section of the 100 meter transect through the matoral (Photo Christy Gast)

Researchers estimated that the plastic was distributed across a 3 hectare section of land adjacent to the shoreline. Of that, .5 hectares constituted Tronco (Driftwood), 1.5 hectares constituted Pastizal (Grassland) and 1 hectare constituted Matoral (Bushes).

The second question, where does the marine trash come from, was addressed through observation and interviews. During the marine expedition, we traveled from the small fishing port of Bahía Mansa through the Strait of Magellan, through Canal Gabriel and throughout the fjords adjacent to the Admiralty Sound (Parry, Ainsworth and Brooks). Along the way, we observed and photographed the kinds of plastic that we recorded at Bahía Jackson, mostly on board small artisanal fishing boats. Additionally, researchers asked boat crews what various types of plastic were used for.



Vila and Uhart weighing plastic collected from 20 square meters in the matoral (Photo Christy Gast)

Analysis:

The transect list yielded a total of 326 individual pieces of marine plastic. Of these, 81 were recorded in the Troncos (Driftwood) section of Bahía Jackson, 9 in the Pastizal (Grassland) and 236 in the Matoral (Bushes). The total weight of trash we recorded was 9.1 kilos. This included 2.2 kilos collected in the Troncos, .15 in the Pastizal and 6.75 in the Matoral.

For survey 1, the transect, 200 square meters were covered in each of the 3 ecosystems. We estimated that Troncos constituted .5 hectares, Pastizal constituted 1.5 hectares, and Matoral constituted 1 hectare. To estimate the total amount and weight distributed across the 3 hectares, the following equations were used:

$$200 \text{ square meters} / 10,000 \text{ square meters or } 1 \text{ hectare} = 0.02$$

Each item of plastic would be divided by .02 and then multiplied by the number of hectares its ecosystem constitutes to determine the number of that item that we would expect to find in the corresponding ecosystem.

For example:

(1 piece of fishnet in the Troncos / .02 hectares) x .5 hectares of Tronco = 25 pieces of fishnet in the Tronco

(1 piece of fishnet in the Pastizal / .02 hectares) x 1.5 hectares of Pastizal = 75 pieces of fishnet in the Pastizal

(1 cigarette package in the Matoral / .02 hectares) x 1 hectare of Matoral = 50 cigarette packages in the Matoral

For survey 2, we collected and weighed plastic from 20 square meters of each ecosystem.

$$20 \text{ square meters} / 10,000 \text{ square meters or } 1 \text{ hectare} = 0.002$$

The total weight in kilos per ecosystem was then divided by .002 and then multiplied by the number of hectares of that item that we would expect to find in the corresponding ecosystem.

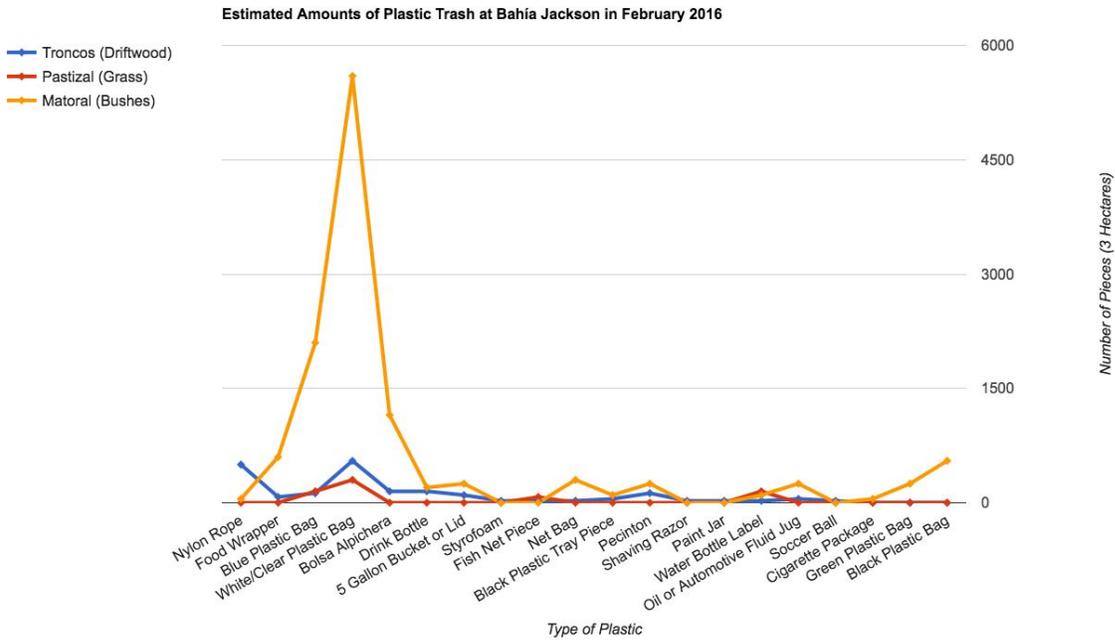
2.2 kilos of plastic collected in the Troncos / .002 hectares x .5 = 550 kilos of plastic

.15 kilos of plastic collected in the Pastizal / .002 hectares x 1.5 hectares = 112.5 kilos of plastic

6.75 kilos of plastic collected in the Matoral / .002 hectares x 1 hectare = 3,375 kilos of plastic

Conclusion:

Regarding the question of how much marine plastic is at Bahia Jackson, it was estimated that there are 14,225 individual pieces, constituting a total of 4,037.5 kilos.



Distribution (in Kilos) of 4,037.5 Kilos of Plastic Trash Over 3 Hectares at Bahía Jackson, Tierra del Fuego, Chile

