

Aquaria and Zoos as Labs: Recording Vocalizations of Marine Mammals using Audacity

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Abstract

Students and professors at St. Francis College conducted an inventory of marine mammals in aquaria and zoos in the New York City region. Behavior of the marine mammals was recorded, and vocalizations were recorded using Audacity, a free down-loadable software. Correlations of vocalizations and behavior were then noted. The participants in these mini “field trips” were able to develop useful biology laboratory curricula for ecology, marine biology, and marine mammal cognition courses.



Seals (left, Maritime Aquarium)
Sea lions above and below (Central and Prospect Park Zoos)



Introduction

In this study, we focused on large marine mammals. California sea lions (*Zalophus californianus*) and harbor seal (*Phoca vitulina*) are aquatic mammals belonging to the Order Pinnipedia. They are native to the western coast of North America, though some are found along the southern coast of Alaska. Males can grow up to 800 pounds and 8 feet in body length. They are intelligent animals that can easily be trained to perform various tasks..

Sea lions exhibit a complex vocalization system comprised of a number of sounds, most prominently, barks; the other sounds can be characterized as grunts, squeals, and growls. Adult female sea lions often have higher-pitched barks, and use their vocalizations mainly to call to their pups. Males tend to produce a grunting sound, especially when they are defending territory. Pup vocalization is less predictable; however, they can produce a specific call in order to find their mothers. Sea lions can also produce buzzing and clicking sounds underwater.

Vocalizations of captive marine mammals are used for many different purposes, including as signatures in mother—offspring relationships. However, vocalizations might become less differentiated in captivity.

As the seals did not vocalize naturally (only upon a fish reward from a trainer) we could not focus on their vocalizations.

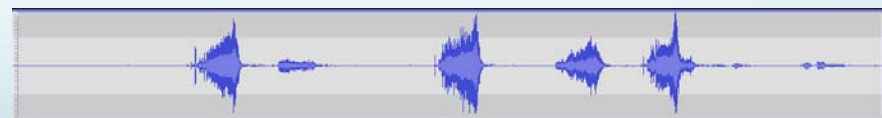
Results

Sea lions and seals were observed multiple times in the New York Aquarium, Bronx Zoo, Central Park Zoo, Prospect Park Zoo, the Maritime Aquarium, and the Aquarium of Niagara. If they were vocal, they were recorded with Audacity, a free down-loadable software program. Sometimes they would only vocalize if a trainer gave them a fish reward. We learned much about the animals that we did not anticipate, such that the animals often get cataracts and other eye diseases. Also, one male sea lion had been branded, because he got into fishermen’s nets. He thus became a “rescue” and now resides at the Queens Zoo. We also discovered the Macaulay Library of Recordings (<http://macaulaylibrary.org>), which has over fifty sea lion recordings in both captivity and in the wild. We have begun analyzing this data set in addition to our own.

Selected Data

Captivity Location	Species	Number of Pinnipeds	Total # of vocalization/ 20 minutes	Avg. Time (s) Per vocalization	Avg. Time between voc.
Bronx Zoo	California Sea Lions	5 (total) - 1 female pup - 4 adult Females	47 (Total) - 41 (from Pup) - 6 (all from mother)	.6 sec. 1.6 sec.	~21 sec. ~4 min
Queens Zoo	California Sea Lions	4 - All Males	58 (total)	1.2 – 1.5 sec.	Simultaneously vocalize for 12 seconds.
Central Park Zoo	California Sea Lions	5 - 3 Females (2Adults, 1 pup) - 2 males (1Pup, 1 Juvenile)	33 (total) - 28 barks from juv. Male. - 5 total barks from other Sea Lions	~ 1.9 sec. .7 sec	1 voc. Every 45 – 50 sec. ~every4 minutes
Prospect Park Zoo	California Sea Lions	3 - Both Female Adults	8 (total)	1.4 sec	Every 4 – 4 and half minutes
Maritime Aquarium	Harbor Seals	4 - All Females	0 (total) *3 vocalizations during show, which were targets from trainers	N/A *4.5 sec.	N/A

Ten-month old pup vocalizations (captive)



Pup responding to its mothers call (wild)



Time (sec)