

THE ECOLOGY OF A SEA OTTER RAFT

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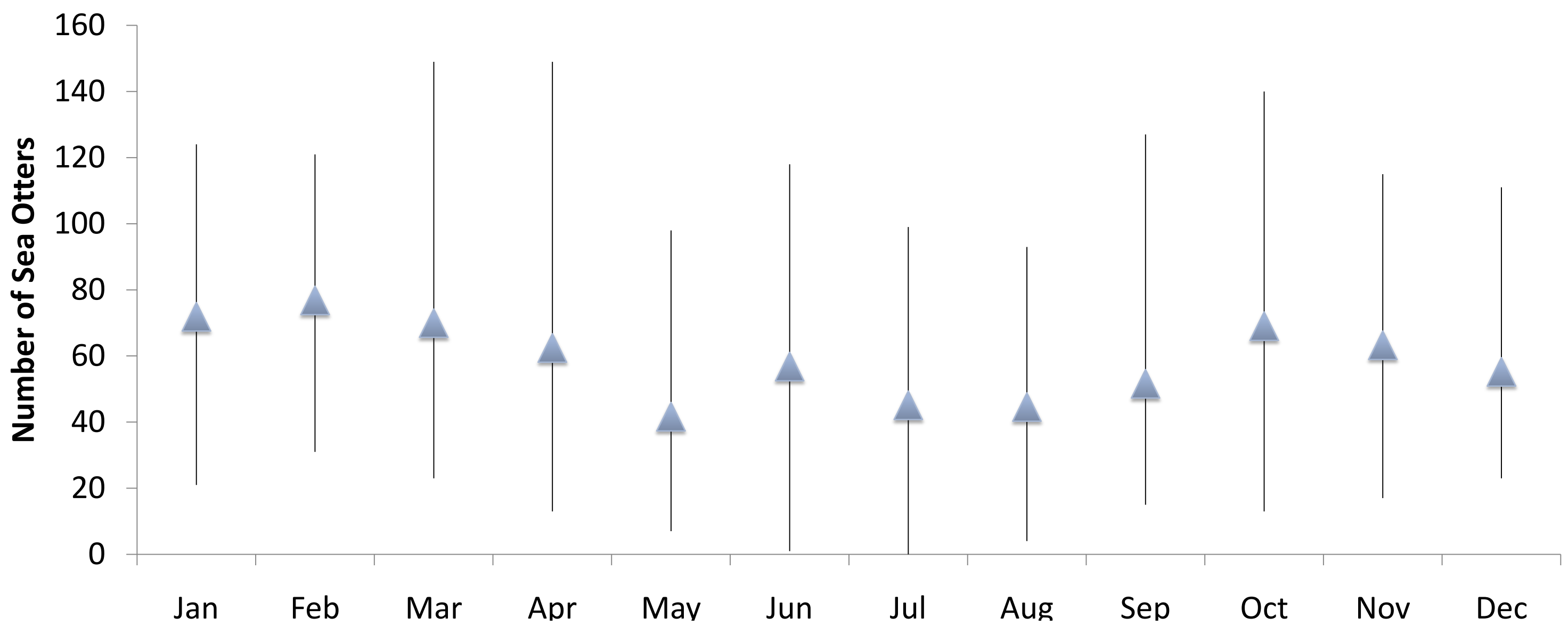
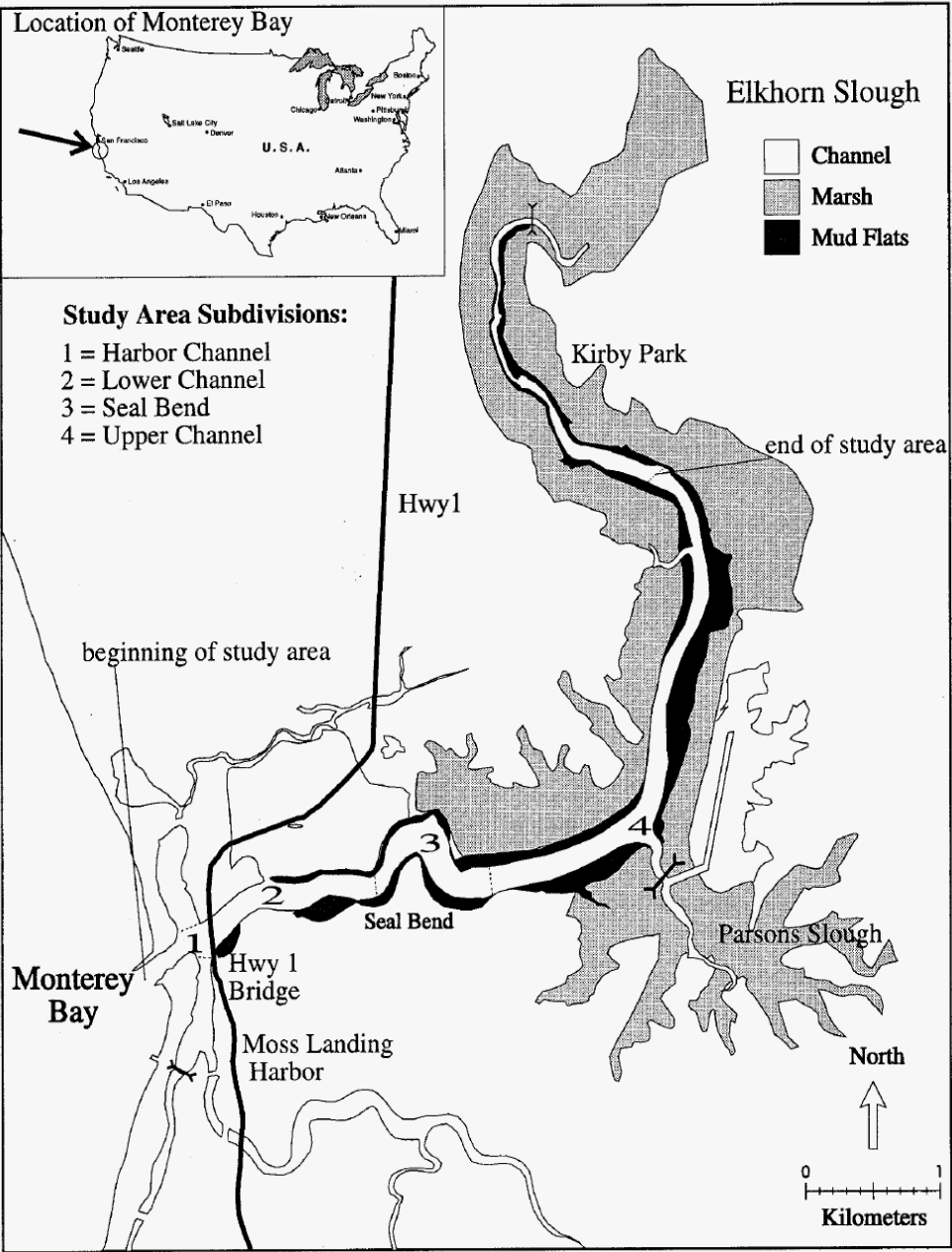
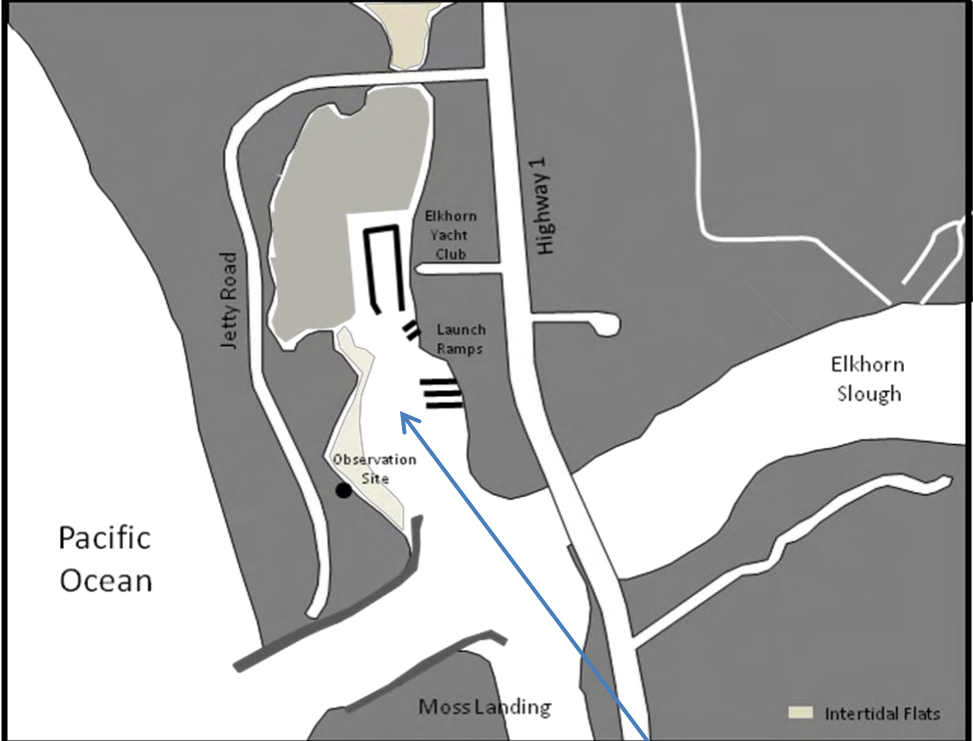
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ABSTRACT

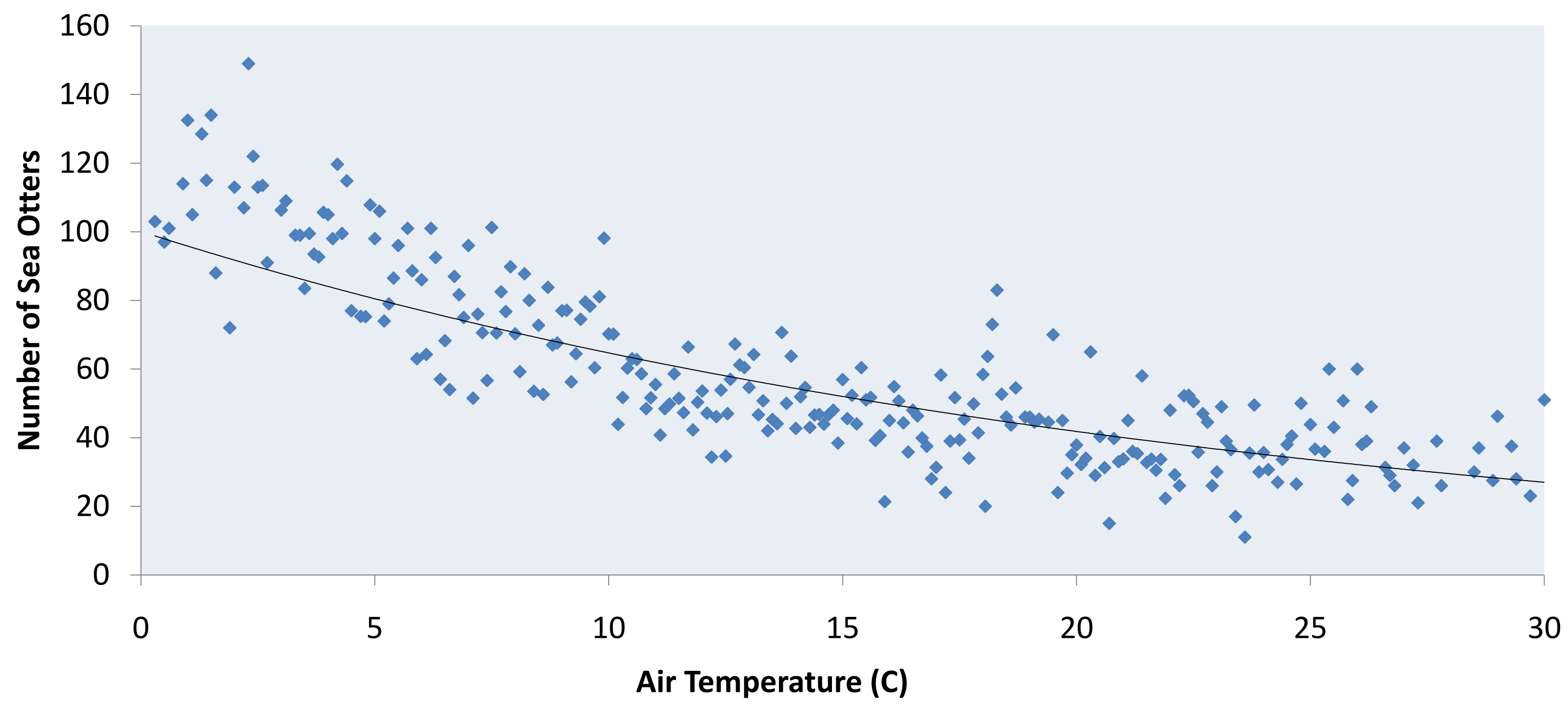
Elkhorn Slough, California has been important for sea otters, particularly since 1995. It hosts approximately 4% of the entire California sea otter population. Although a few males are defending territories within the slough, this has been primarily a non-territorial area currently located in the Moss Landing North Harbor. Here, mainly non-territorial male sea otters were observed for a 24-hr cycle, twice a month, during 25 surveys between August 2007 and July 2008. In addition, 52 daytime surveys were conducted between August 2006 and October 2007 at various times between dawn and dusk (1080 instantaneous samples). The daytime distribution of behavioral categories deviated significantly from expected (Chi-Square=31.49; P<.0001) and consisted of 54% resting, 23% grooming, 11% interacting, 10% moving in and out of the area, and 2% foraging. While resting was consistently prevalent throughout the day, grooming and interactions increased in the early morning and before dusk. Daily 24-hr cycles were similar for each of the 25 surveys with a maximum number of sea otters (between 72-149 animals) observed during the night, a subsequent drop in numbers between dawn and noon, and an increase in the afternoon and through dusk. These cycles were more strongly related to time of day than tide. During the day, sea otter numbers averaged between 40-50 animals, but the composition of the raft changed, with otters constantly moving in and out of the area. The number of otters present in the raft (and the number of otters hauled out on the beach at night) was strongly correlated with the inverse of the air temperature, suggesting group cohesion may aid in thermoregulation. The number of otters hauled out on the beach peaked at nighttime, and was almost none during the daytime which we believe may be more related to disturbance. This is currently being investigated.

California sea otters concentrate around Monterey Bay, where several territorial male areas are found in prime feeding habitat, especially in dense kelp forest areas. These territories are held long-term by males fit enough to maintain them. Animals not holding a territory, and recently weaned pups ousted from their natal area by the adult male tenant, generally congregate in “male areas” which are found at the periphery of the sea otter range, and are areas where expansion into new unoccupied territories should occur. An important male area is in the Moss Landing North Harbor, at the mouth of Elkhorn Slough.

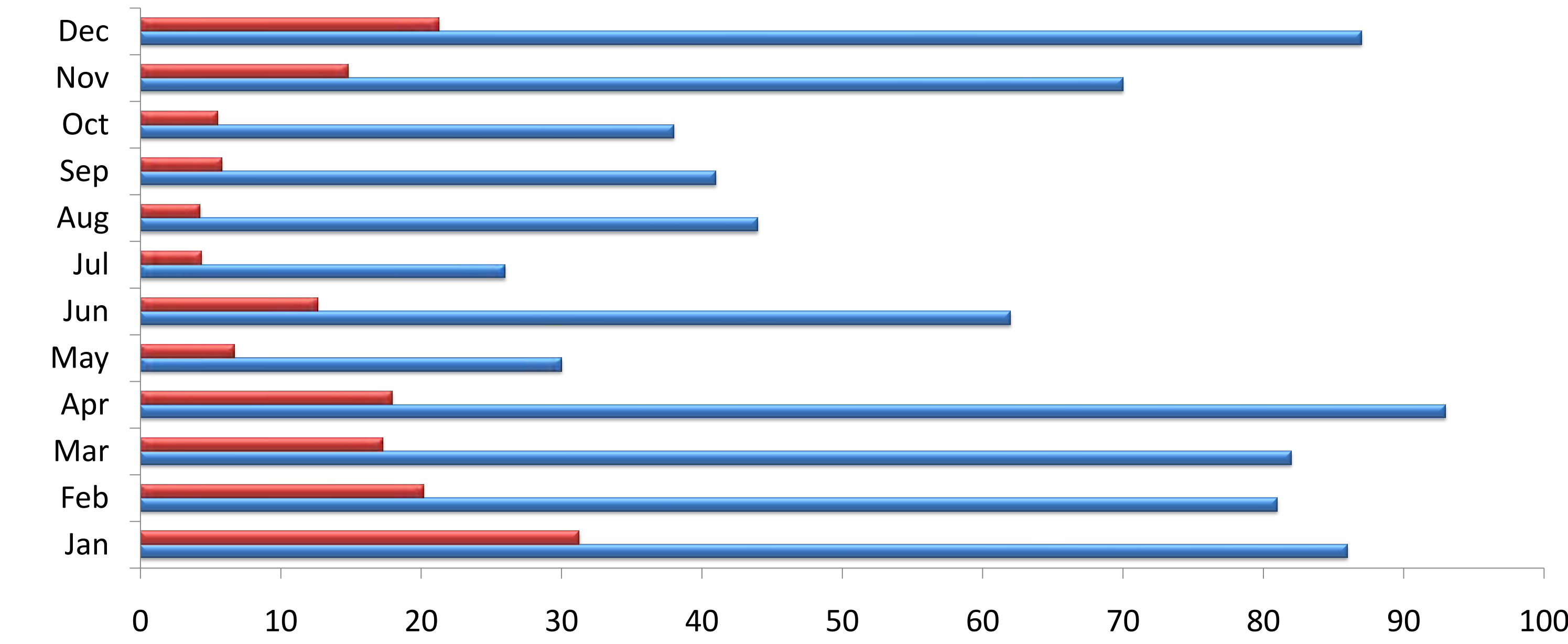
Nonetheless, the presence of males in an accessible location close to shore set the ideal stage for the study of the behavioral ecology of non-territorial males. Not much effort has been devoted by researchers into understanding the dynamics of male areas and their importance to the health and increase of the sea otter population in California.



(Above) Number of sea otters counted (min-average-max) fluctuated with the season being higher in the winter months



(Above) Number of sea otters counted was correlated with temperature



(Above) Number of sea otters hauled out on the beach increases in the winter months, a phenomenon which may be correlated with temperature, since sleeping huddled up on the beach keeps the animals dry and using less energy.

METHODS

Study Period
August 2007 – July 2008

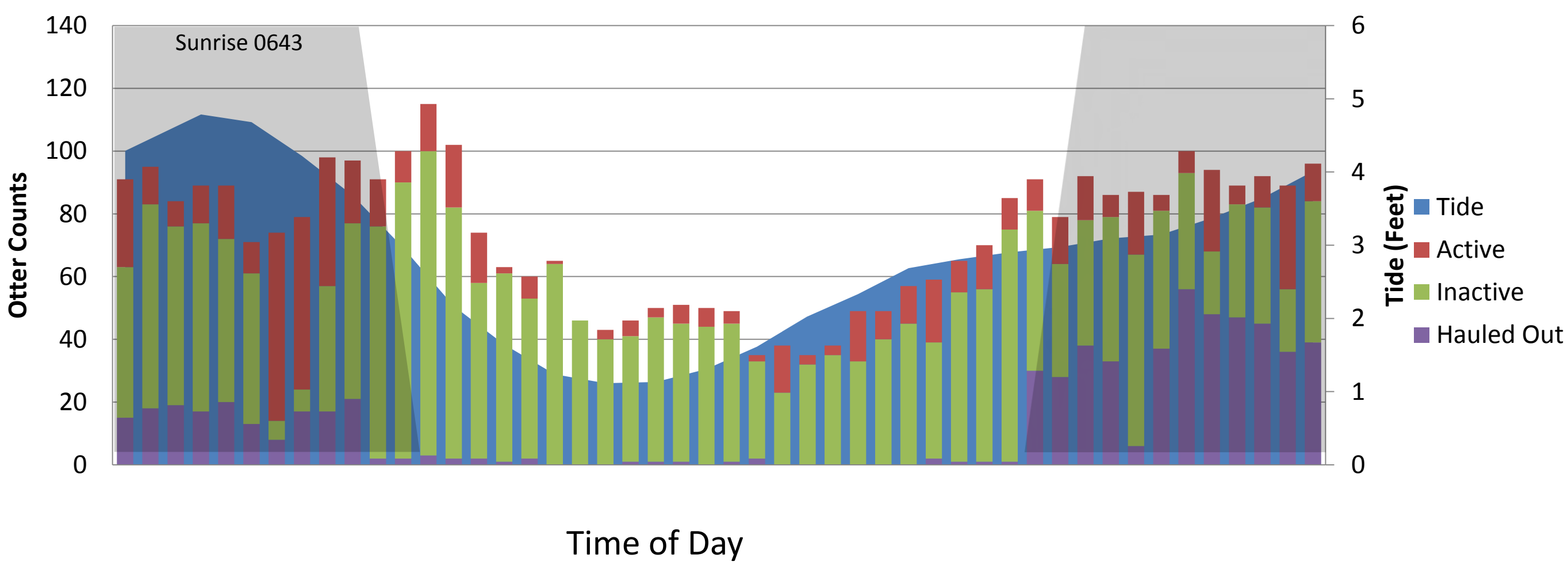
Sampling Methods
Sea otters were counted every half-hour for a 24-hr cycle twice a month in Moss Landing North Harbor.

Sea otters were categorized as active, inactive and hauled-out. This categorization of behaviors was chosen to be able to apply it consistently throughout the 24-hr period (i.e., both in darkness and in light).

Otters were inactive when they were not showing any detectable movement. They were active when they were moving (i.e., grooming, active swimming and/or interaction), and they were hauled out when they were on land.

Observations were conducted using a high powered image stabilized binocular during daylight hours, and with a night scope in the darkness. Otters were counted by sweeping with the binocular from one end of the study site to the other and by noting the activity status of each otter instantaneously as the sweeping occurred. While one observer counted, another kept the tally on a datasheet.

Before each count started, ambient temperature, wind speed and direction were recorded from a portable weather station. Tidal information, water temperature and more detailed weather information was collected a posteriori using other on site weather stations.



(Above) An example of the daily pattern of a male sea otter raft in Moss Landing Harbor. Numbers increase at night, including number of animals on the beach, and decrease early in the morning as otters leave the raft to forage. Animals go ‘to and from’ the resting area throughout the day, and come back in larger numbers again as darkness falls. Since this pattern is consistent throughout each of the days sampled, we believe time of day to be the key factor determining resting patterns, although tidally related fluctuations are being investigated. We believe the absence of sea otters on the beach during the day to be related to human disturbance and we are investigating this as well.



Behavior	Occurrence
Resting	54%
Grooming	23%
Interacting	11%
Foraging	2%
Moving in and out	10%

ACKNOWLEDGEMENTS

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