

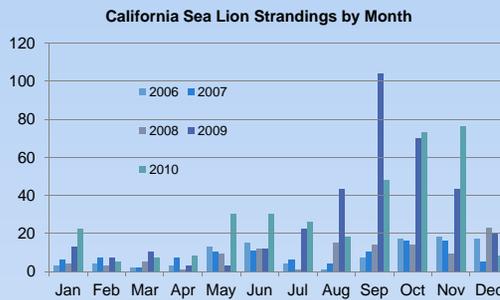
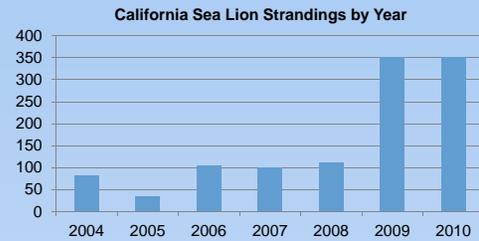
Dramatic increase in California sea lion strandings along the Oregon coast in 2009 and 2010

Rice, James M.¹; Duffield, Deborah A.²; D'Alessandro, Dalin²

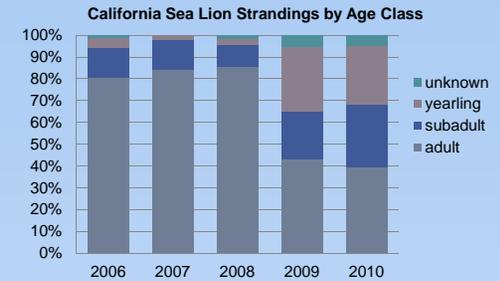
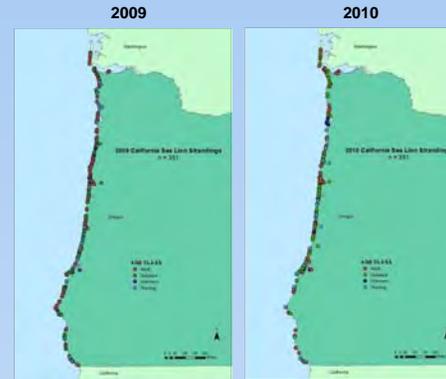
(1) Marine Mammal Institute, Oregon State University, 2030 SE Marine Science Dr., Newport, OR 97365; (2) Portland State University, Biology Department, P.O. Box 751, Portland, OR 97207

Abstract

There was a significant increase in the number of stranded California sea lions (*Zalophus californianus*) along the Oregon and southern Washington coasts (from Brookings, OR to Long Beach peninsula, WA) between January 2009 and December 2010. These included both moribund and dead animals. Between 1989 and 2008, the mean number of California sea lion strandings per year recorded by the Oregon Marine Mammal Stranding Network was 43.6 (SD=33.98, Range=2-104). In both 2009 and 2010, however, reported strandings increased to 351 animals; a more than three-fold increase over any previous year on record (going back to 1989). The autumn months (September through November) were the most active times for strandings (coincident with the annual northward migration). Necropsies were conducted on 132 carcasses, although many were too degraded for histopathology. *Leptospira* was detected by PCR analysis of harvested kidney tissue in 44% (11 of 25) of tested cases in 2009 and in 71% (12 of 17) in 2010, and histologic evidence of leptospirosis was found in an additional 23 cases not yet tested by PCR (as of this writing). Numerous sickly sea lions, showing symptoms of leptospirosis (depression, emaciation, polydipsia, reluctance to use hind flippers, vomiting), but whose eventual death could not be confirmed, were observed in both years as well. We also found a sharp increase in the proportion of yearlings involved in these strandings. Historically, this age class comprises less than 10% of California sea lion strandings in this region; however we found that yearlings, many of which appeared emaciated, made up 30% of the affected animals in 2009 and 27% in 2010. We postulate that hunger drove large numbers of starving yearlings north into Oregon waters in pursuit of accessible prey at a time when El Niño conditions in California had left weaning sea lions with poor foraging opportunities.



Leptospirosis commonly appears in California sea lions in autumn



2009 and 2010 saw a significant rise in the proportion of yearling sea lions on Oregon beaches. Most of these were emaciated, likely starving due to poor foraging conditions in California and many were found in rivers, presumably seeking fresh water to drink and small schooling fish they could successfully capture.

Leptospirosis

Clinical signs include depression, anorexia, polydipsia, reluctance to use hind flippers, vomiting, and muscle tremors, typically resulting in death (often by severe suppurative bronchopneumonia). Gross renal lesions include swelling of kidneys, loss of differentiation between the renal medullae and cortices, pale tan colored cortices, subcapsular and corticomedullary hemorrhages.



Year	Positive	Negative	Suspicious	total	% positive
2006	6	3	0	9	67%
2007	5	9	3	17	29%
2008	5	21	0	26	19%
2009	11	12	2	25	44%
2010	12	5	0	17	71%
Total	39	50	5	94	41%

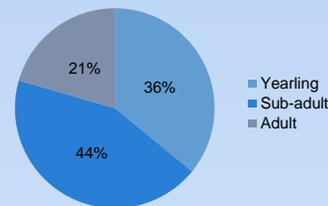
Animal ID	Serovar				
	Pomona	Grippo	Hardjo	Ictero	Canicola
HMSC09-09-20-Zc-3	>102400	200	N	3200	N
HMSC09-09-29-Zc	102,400	3200	3200	25,600	1600
HMSC09-11-14-Zc-2	>102400	400	6400	6400	1600
HMSC10-10-16-Zc	102400	200	3200	3200	N
HMSC10-10-20-Zc	102400	800	12800	6400	N
HMSC10-10-21-Zc	102400	400	1600	1600	200
HMSC10-10-21-Zc-2	>102400	1600	N	3200	6400
HMSC10-11-03-Zc	>102400	1600	N	6400	N
HMSC10-11-07-Zc	>102400	1600	1600	3200	800
HMSC10-11-09-Zc-3	>102400	3200	6400	3200	25600
HMSC10-11-15-Zc	51200	800	400	400	400
HMSC10-12-10-Zc	1600	100	100	200	N

N = Negative; Titers are reported as reciprocal values (i.e. 64 = 1: 64)

Serology was performed on 12 cases that were positive for *Leptospira* by PCR. Sera were screened against a reference panel of 5 *Leptospira* spp. using the microscopic agglutination test (MAT). *Leptospira interrogans* serovar Pomona was most strongly identified.

Positive Leptospira PCR by Age Class

2006-2010 n=39



Strandings Coincided with a Massive Local Concentration of Apparently Healthy Sea Lions



Between October and December 2009, an extraordinary aggregation (approximately 5,000 individuals at a time) was observed on the beach and floating in rafts at Heceta Head, north of Florence, Oregon (44.129831 N, 124.12371 W). This heavy concentration of sea lions was likely indicative of an anomalous density of nearby prey. A smaller but still unusually large aggregation of sea lions returned to this area in the fall of 2010.

We would like to acknowledge the contributions of the pathologists of the Veterinary Diagnostic Laboratory at OSU for their necropsy and diagnostic services, as well as the numerous citizen stranding network volunteers who assisted in data and tissue collection.

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