



# Marine Mammal Predation in the Lower Columbia River



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## Abstract

The Columbia River Inter-Tribal Fish Commission continued implementation of a project to estimate abundance of sea lions in the lower Columbia River, track fine and course scale movements of individual California sea lions (CSL), and conduct non-lethal hazing of sea lions in the Bonneville Dam tailrace. In addition, we documented predation by sea lions in association with activities. Predation and invasive species management RM&E components included –estimating sea lion abundance and predation by sea lions, using two methods, video-based and tandem boat surveys. We detected 1,132 events of sea lions recorded on video records over a 20 day period from the area upstream of Tanner Creek and beyond the US Army Corps of Engineers observation area. Predation was observed in 8.1% of these observations. Overall, we recommend moving away from video-based abundance estimation toward using tandem boat surveys. Our weekly tandem boat surveys resulted in abundance estimates ranging from 54 to 11 sea lions located between the I205 Bridge and Tanner Creek (approximately 34 river miles). Status and trend monitoring was accomplished by tracking three individual CSLs outfitted with GPS phone tags. Two instrumented CSLs made multiple trips to Astoria and back to Bonneville Dam during the season, a phenomenon that we have previously documented. The third CSL remained near Bonneville Dam for the nearly 3 weeks of tracking. Individuals did show affinity for particular areas near Bonneville Dam. Our boat-based crew hazed sea lions for a total of 31 days from 3/05/2012 to 5/18/2012. Hazing resulted in 288 hazing events on 112 and 371 California sea lions and Steller sea lions, respectively. A total of 1,183 cracker shells and 401 seal bombs were used during deterrent activities. The final direction of sea lions at the end of these encounters resulted in 74.3% of sea lions moving down stream of the hazing boat.



## Non-lethal Hazing

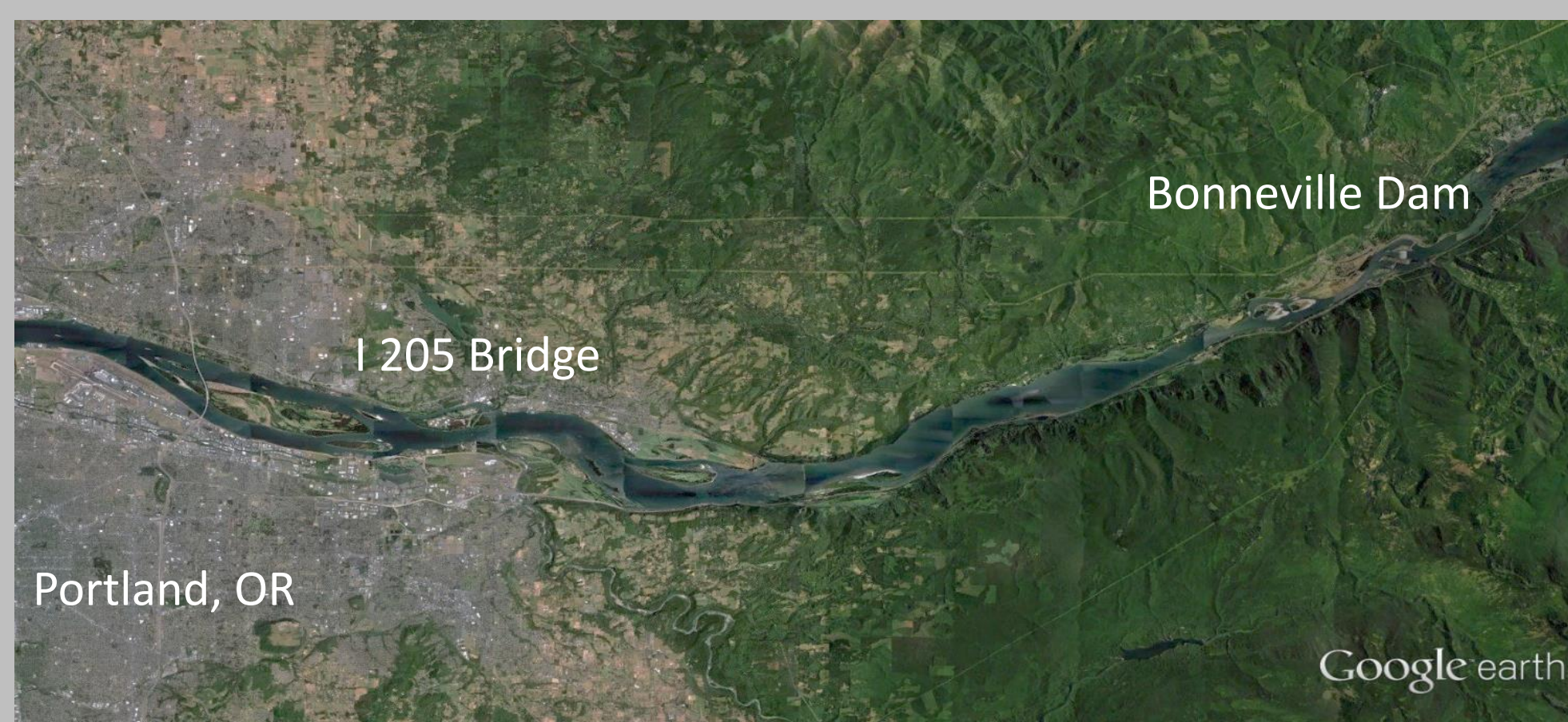


Boat-based hazing using crackershells and seal bombs.

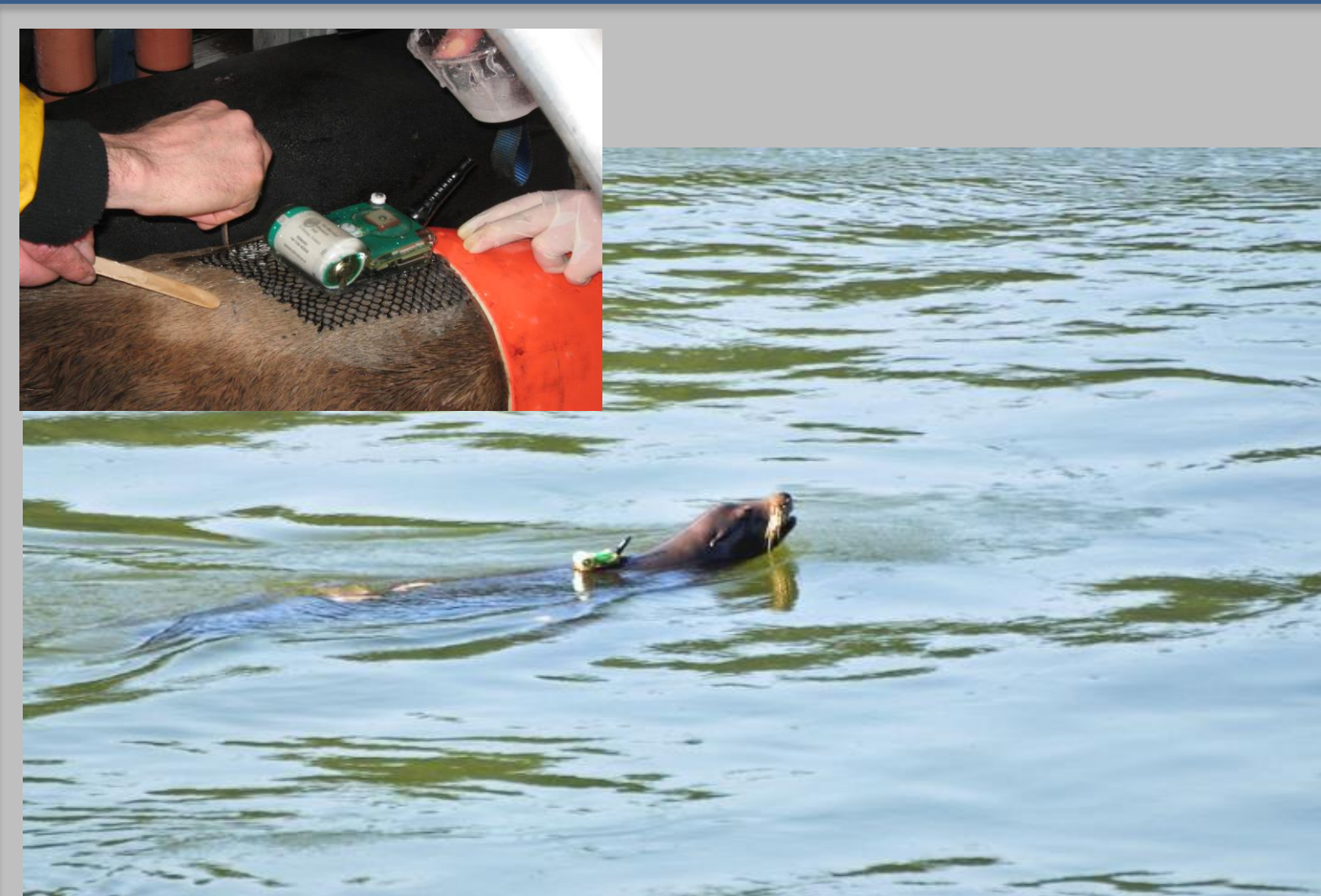
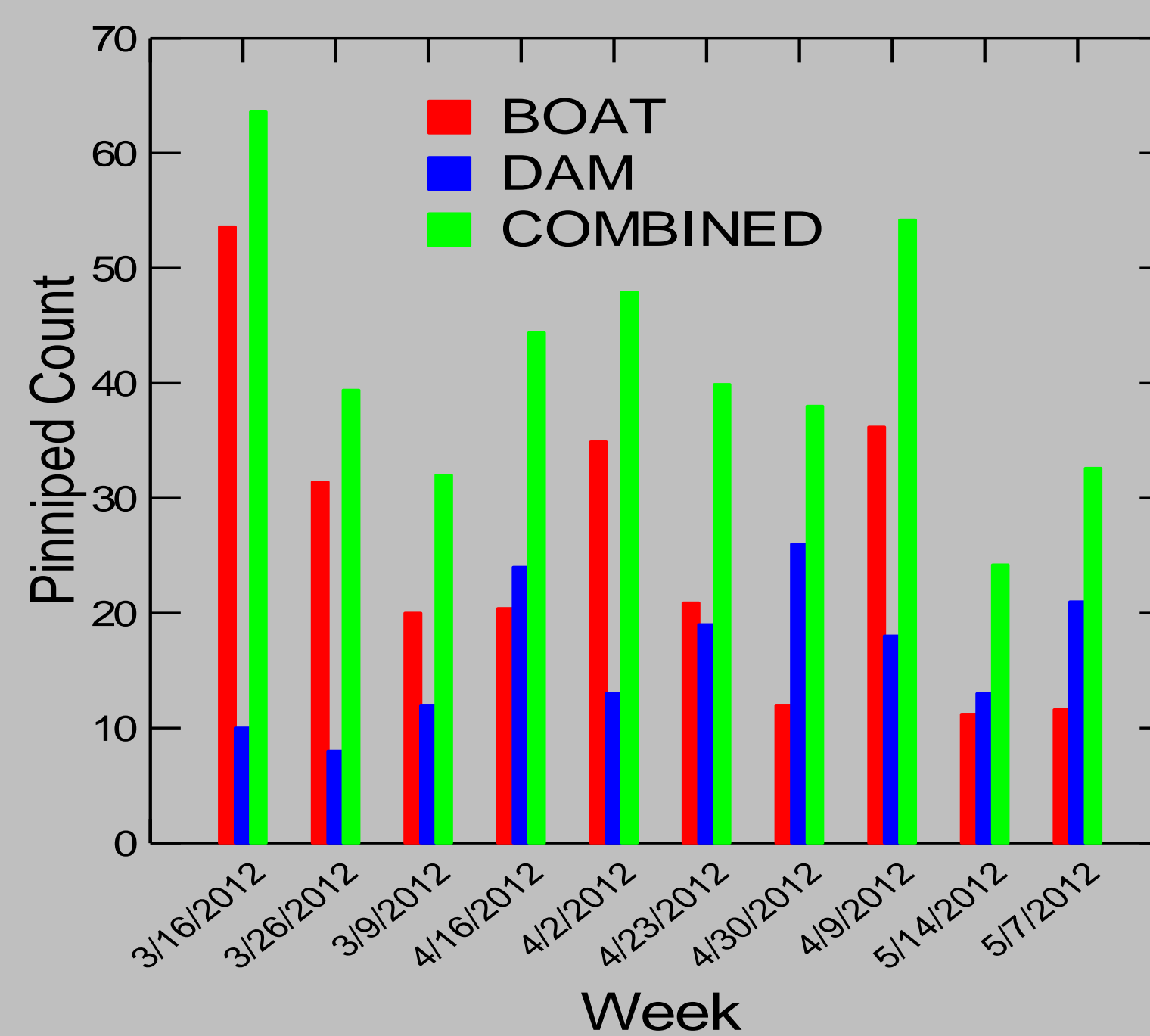
Summary of boat-based hazing activity conducted by the CRITFC at the Bonneville Dam tailrace.

Statistical week	Week of	Days	Take*		Munitions	
			#CSL	#SSL	Cracker Shells	Seal Bombs
10	3/4/2012	4	1	35	118	52
11	3/12/2012	4	4	46	126	95
12	3/18/2012	2	8	16	76	67
13	3/25/2012	4	13	59	154	68
14	4/1/2012	3	10	33	104	29
15	4/8/2012	2	19	15	79	29
16	4/15/2012	3	17	83	227	29
17	4/22/2012	3	13	44	157	25
18	4/29/2012	3	13	36	101	5
19	5/6/2012	1	6	2	17	0
20	5/13/2012	2	8	2	24	2
Grand Total		31	112	371	1183	401

## Marine Mammal Abundance in the Columbia River



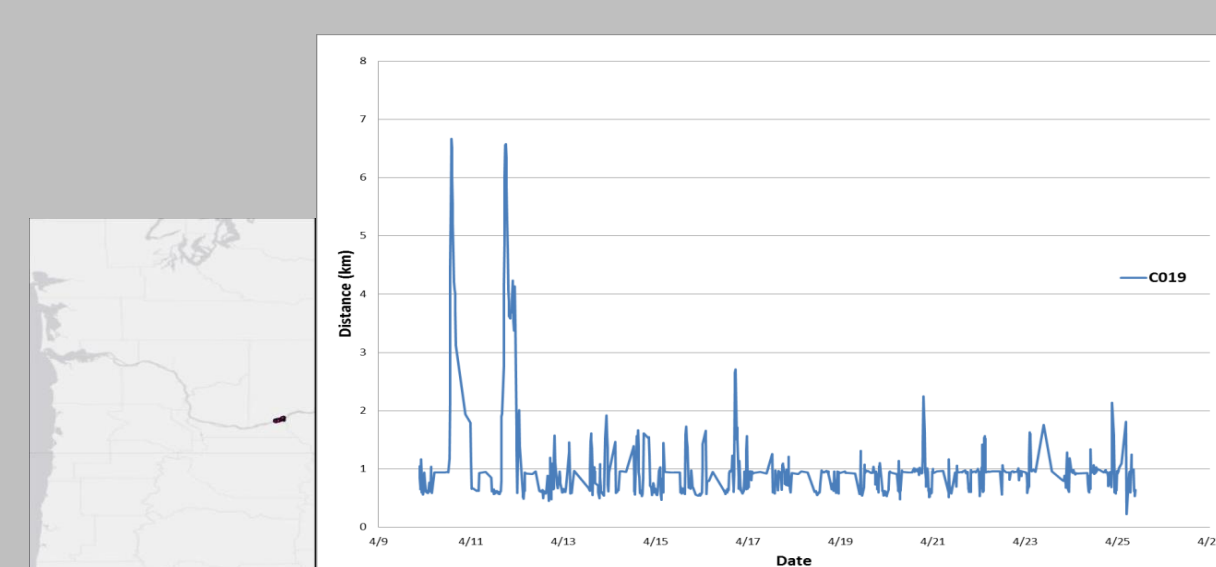
Weekly tandem boat surveys counted sea lions and use mark recapture theory to estimate abundance. The USACE counted sea lions daily at Bonneville Dam.



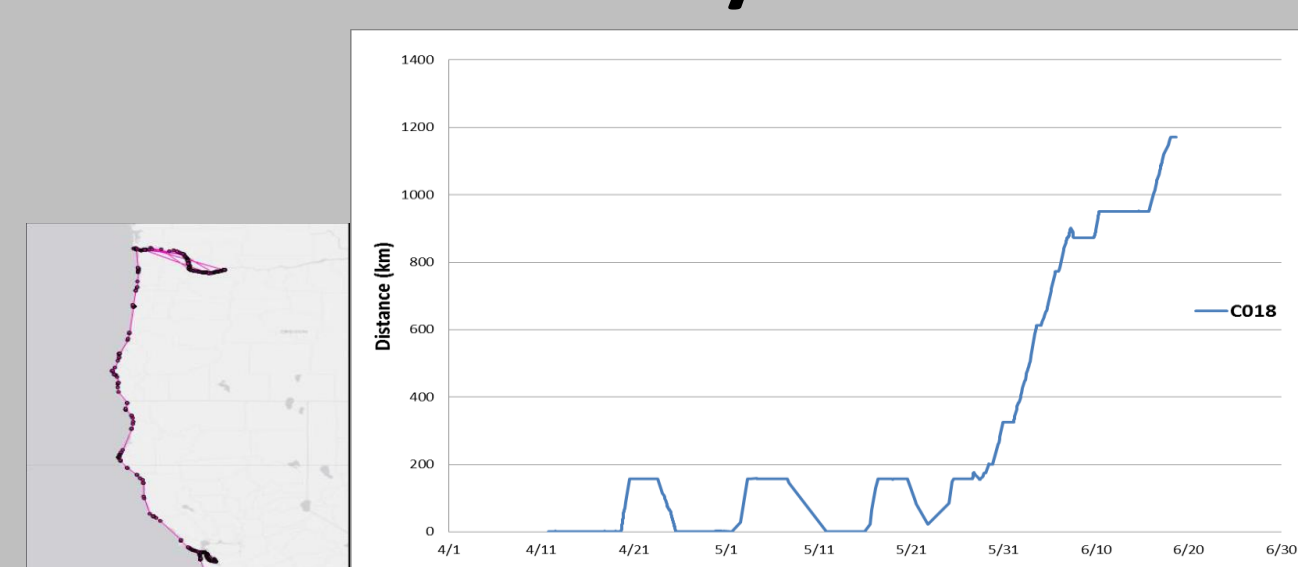
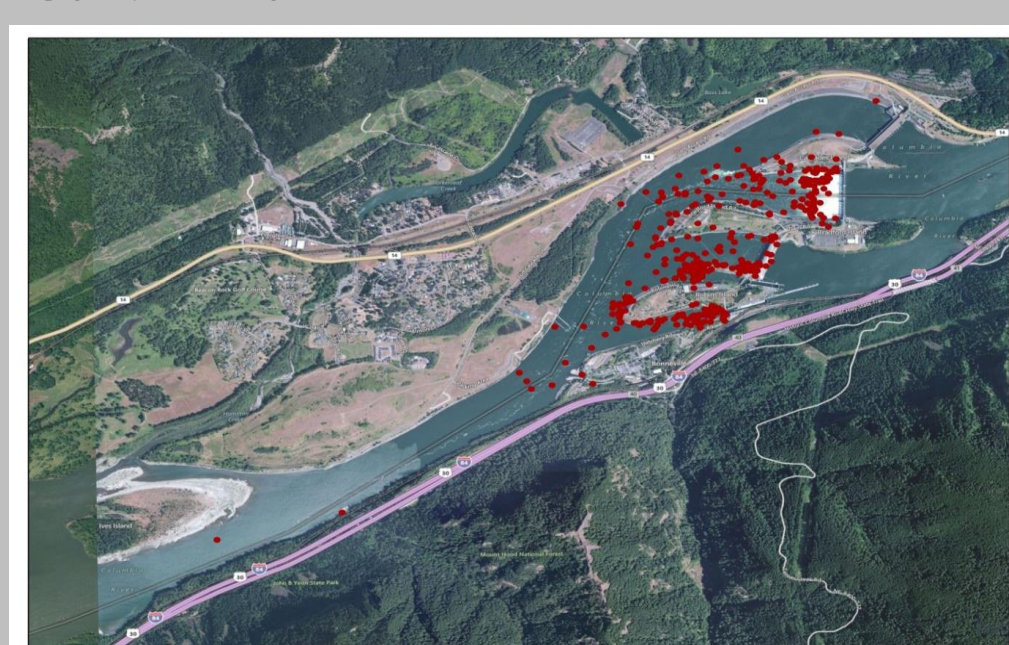
Fine and course scale movements of 3 different California sea lions tagged with GPS/Phone tags at Bonneville Dam.

Each dot represents a GPS fix within 5km of Bonneville Dam.

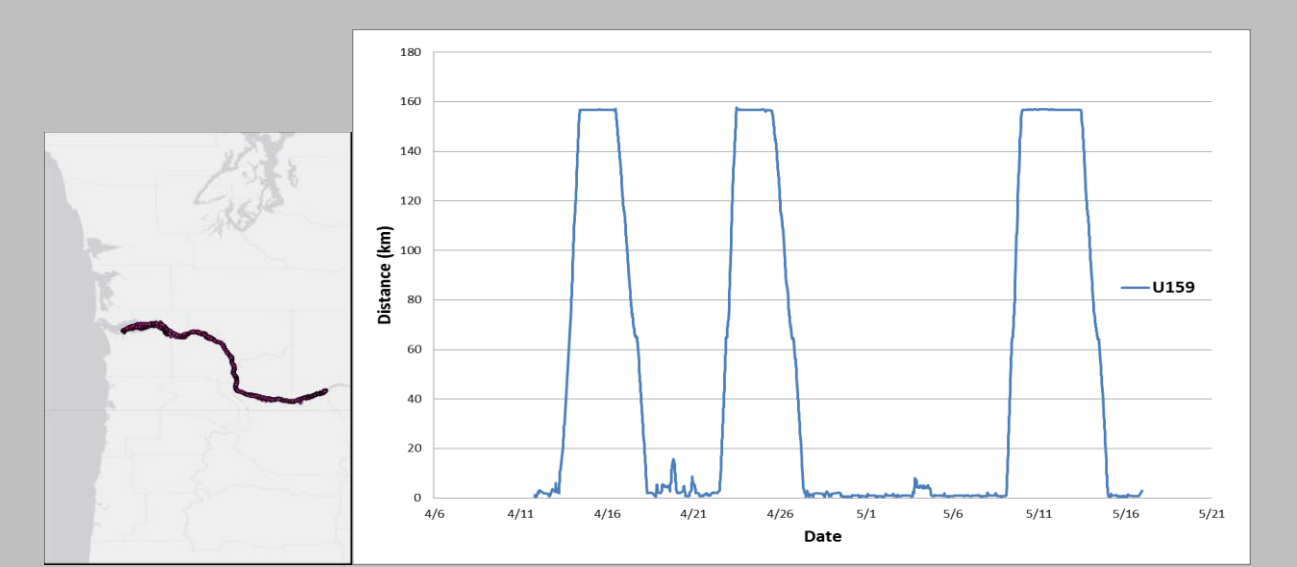
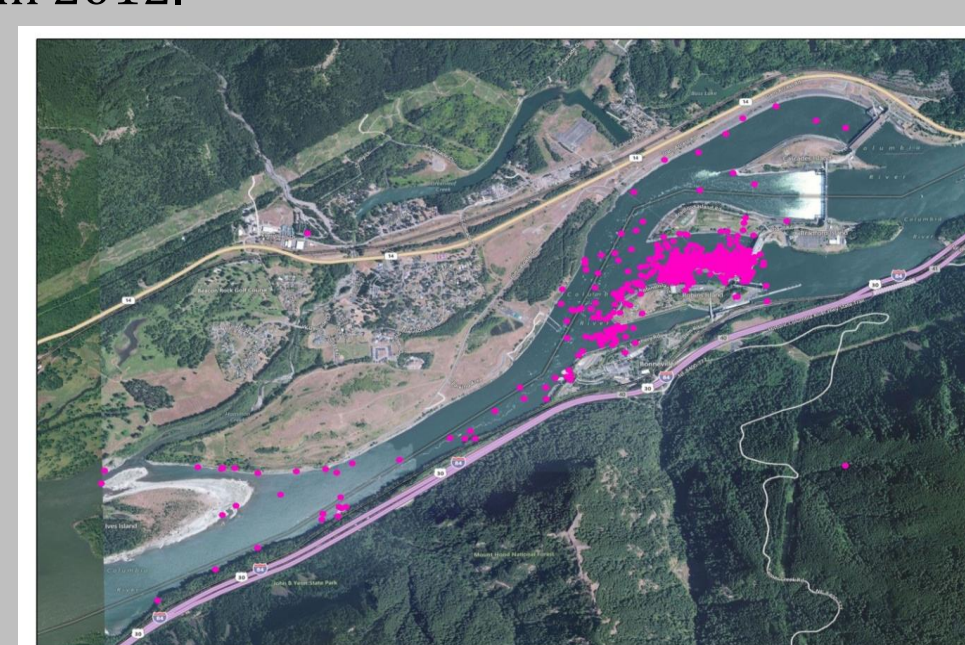
## California Sea lion Telemetry



Fine and course scale GPS tracks of California sea lion C019 in 2012.



Fine and course scale GPS tracks of California sea lion C018 in 2012.



Fine and course scale GPS tracks of California sea lion U159 in 2012.

