Dietary Analysis of Sea Lion Consumption of Salmonid Populations Along the Pacific Northwest Coast Using qPCR and Fluorescent Species Specific Probes

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The purpose of this study was to analyze the dietary patterns of Sea Lion predation on Salmonids. Salmon species are protected under the Endangered Species Act and Sea Lions are protected under the Marine Mammal Protection act, causing a clash in management priorities. It is therefore important to assess which species Sea lions are preying on, in order to effectively manage both species. Scat was collected from both Eumpetopias jubatus (Stellar) and Zalophus californianus (California) Sea Lions, and bone samples from the scat were sterilized, predigested using a Proteinase-K, Urea, and EDTA mixture, ran through Silica bone extraction (Qiagen QIAquick columns). DNA was then processed through multiplex presence/absence quantitative PCR using species specific primers to identify the Salmonid species(Oncorhynchus including Keta (Chum), Tshawytschs (Chinook), Kisutch(Coho), and Mykiss (Rainbow (steelhead)), alongside endangered Oncorhynchus Nerka (Sockeye) and unthreatened Oncorhynchus Gorbuscha (Pink)). 30 samples were positively identified: 20 Coho, 7 Chum, 1 Rainbow and 1 Sockeye. Chi Squared analysis allows for the analysis of ideal consumption distribution when assuming normally distributed predation patterns. The population of Coho and Chinook Salmon according to the intake by fisheries should result in equal consumption rates if no prey bias exists within these Sea Lion populations; however, the results challenge this. The thirty effectively processed fish species resulted in a Chi Squared value of 59 with a 0.01 probability that this preference is reliant upon normal sampling variation, suggesting that there is a 0.99 statistical probability that Sea Lions thus far analyzed target Coho populations.

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