

## Time-lapse photo monitoring of the Round Island Steller sea lion haul-out in Bristol Bay, Alaska

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Steller sea lions (*Eumetopias jubatus*; SSLs) have been the focus of extensive research in recent years as a result of decreased numbers. Since SSLs typically inhabit remote areas over a broad range, they are difficult to study at a fine temporal scale. The lack of detailed haulout attendance and usage data in Bristol Bay, Alaska requires alternative methods to assess SSL activity. With recent technological advances in remote monitoring, continuous data collection is feasible. We hypothesize that by using the Steller Watch II remote time-lapse photo monitoring camera to photograph the Round Island haul-out, we can test its efficacy and further examine fine temporal patterns in SSL haulout usage with respect to diurnal changes and/or trends throughout the season. Digital photographs were taken at 30 minute intervals for 78 days. The resulting 3300 images were imported to ArcGis, where a feature layer was created by manually digitizing a point feature at the location of each animal observed. This method avoided duplicating or missing animals, and permitted later inspection and count replication. Concurrent manual observer counts were made at sporadic intervals. The camera undercounted observer counts by  $28\pm 5\%$  ( $n=27$  comparisons) because observers were able to look behind obstructions by moving around. This suggests that multiple cameras are required to completely observe this haul-out. However, several trends of relative SSL haulout usage became apparent. Large groups of sea lions hauled-out continuously for days at a time, and vacated the haulout *en masse* within one hour, suggesting group foraging or travel. SSL counts decreased after mid-evening and increased after sunrise, a characteristic suggested by previous SSL observational work to indicate nocturnal foraging. This study shows that the use of remote cameras may provide insight into fine-scale haul-out usage patterns.

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