

The Effect of Research-related Disturbance on Steller Sea Lion (*Eumetopias jubatus*) Mother-pup Activity on Rookeries at Dolgaya Rock and Tuleny Island, Russia

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Introduction

Since the late of 1970s the Western stock of Steller sea lions (SSL, *Eumetopias jubatus*) has decreased dramatically. The reasons for this decline are still unknown. Hot-iron branding is a widely used method to mark SSL pups with a life-time individual mark. The effect of hot-iron branding and its associated disturbance on rookeries, is not well known, however. We present data from behavioral observations of individually recognizable SSLs on two rookeries in the Russian Far East.

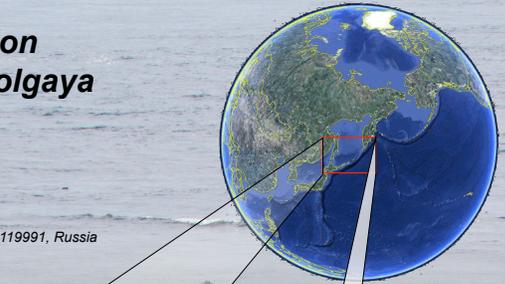


Figure 1. Study area

Objectives

- Document research-related disturbance on mother-pup activity and behavior
- Investigate development of mother-pup interactions on different rookeries

Methods

We observed two separate sea lion rookeries: Dolgaya Rock (48°33'00"N, 153°51'00"E, Kuril Islands) in 2005, and Tuleny Island (48°29'00"N, 144°38'00"E, Sakhalin Island) in 2009 (Fig. 1). One hundred pups were hot-iron branded at Dolgaya Rock on 4 July 2005 with series Л600 through Л699 marks and 175 pups were hot-iron branded at Tuleny Island on 1 July 2010 with series Г0 through Г174 marks for demographic studies. We recorded the time and place of mother-pup reunions following branding at each site. Behavior was monitored for 3-4 weeks after branding.



Results

On Dolgaya Rock, 29% of mother-pup pairs were reunited on the first day, 37% on the 2nd day, 19% by the 3rd day; 15% reunited in the later days. On Tuleny Island, 66% pairs were reunited on the 1st day, 21% on the 2nd day, about 10% on the 3rd day; only 5% reunited in the following days (Fig. 2). Thus, on both rookeries, most pairs reunited during the first 2 days following the disturbance caused by branding. At the same time, 15% of the pairs at Dolgaya Rock and 5% of the mother-pup pairs at Tuleny Island were not reunited until the 4th day or later. We also documented three pairs (2%) on Tuleny Island that never reunited and the pups died later that season. We do not know if those pups had been abandoned prior to branding however.

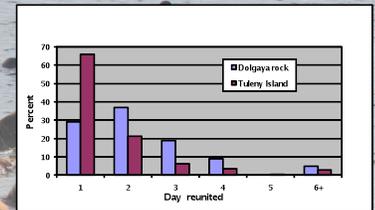


Figure 2. Reunion of mother-pup pairs after strong disturbance

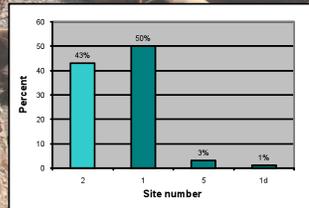


Figure 3. Relocation of mother-pup pairs after disturbance at Dolgaya Rock.

Out of 100 SSL branded at Dolgaya Rock, 43 mother-pup pairs reunited at the natal site (Fig. 3, site 2), and about 50 reunited on a nearby site (Fig. 3., site 1); 4 pairs reunited at other distant sites. Out of 43 the pairs that reunited at the natal site, only 23 pairs stayed there, while the others moved to an adjacent part of the rookery. The majority of SSL left the natal site soon after the disturbance caused by pup branding – 33 during the night and 16 during the next day. On Tuleny Island all mother-pup pairs reunited at the natal site and the majority of them remained on the site until the end of our observations. Only 5 pairs (3%) went to adjacent territory on the rookery.

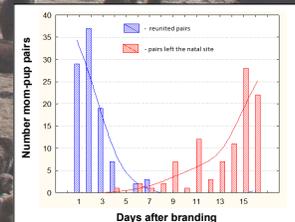


Figure 4. Mother-pup movement activity at Dolgaya Rock

The increased SSL movement activity on Dolgaya Rock continued for 2-3 days after the branding-associated disturbance and then decreased. On the 8 day after branding, movement of mother-pup pairs increased again, but most likely was associated with the normal rookery depopulation that occurs after the breeding season (Fig. 4). Only 22 of 100 mother-pup pairs remained on the natal site two weeks after branding. On Tuleny Island, mother-pup pair movement activity also increased 2 weeks after branding, but most of the pairs stayed on the natal site for one month after branding.

Conclusions

We observed that the hot-iron branding procedure and associated rookery disturbance had a noticeable effect on mother-pup pair behavior and activity but most pairs on both rookeries reunited in the first two days following the disturbance. This reunion was slower to occur and mother-pup pairs displaced more widely on Dolgaya Rock than on Tuleny Island.

Three pairs did not reunite and the pups died during our observation but it was not clear if the separation occurred before or after pup branding, because other human related disturbance had occurred few days prior to branding, and mother-pup separation is known to occur on rookeries even without any disturbance.

The differences we observed in mother-pup behavior following the branding-related disturbance on the two sites could be explained by local geographical features of the rookeries and surrounded areas.

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