

**MONITORING DEMOLITION TRAINING IMPACTS IN
MILITARY TRAINING AREA WQ ON SEA LIONS IN THE
RACE ROCKS ECOLOGICAL RESERVE, BRITISH COLUMBIA**

PROGRESS REPORT #1 REVISED



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OVERVIEW¹

LGL Limited successfully completed 5 days of monitoring (28–30 November and 1–2 December 2010) of demolition training (Officer's Course) in Exercise and Training area WQ. Monitoring comprised a day of pre-blasting, 3 days with blasting, and a day of post-blasting. We have not yet reviewed information on the sizes of the projects that were detonated, but expect that all were ≤ 4 slabs of C4 as per past courses. Projects within a run were spaced at a minimum interval of 5 min. Time between runs varied considerably (~ 0.4 – 3.2 hrs). All other ranges in WQ were inactive during monitoring. Weather was modestly overcast and unsettled. Although a gale warning was in effect for local waters during the first few days of the session, winds only reached 20 knots on one day (30 November); they were mostly below 10 knots for the session. Light rain fell at times, and swell height was moderate and high for most of the session. Seas were Beaufort 1–3. Air temperature ranged from 5–8 °C.

As per the table below, numbers of sea lions fluctuated considerably within and between days in response to natural and human-caused disturbances. There were no California sea lions in the Reserve and only 1 northern elephant seal. Significant displacement of sea lions from a haulout was observed in response to a single ecotour boat on the pre-blasting day and in response to blasting on days when the range was active. Only one ecotour boat was observed during the 5-day session, but that boat caused a disturbance that saw all sea lions become active (heads up) and most (~ 100) animals scramble off the haulout. Steller sea lion response to blasting ranged from modest increases in activity to complete haulout abandonment. The number of sea lions hauled out in the Reserve at the end of the session (i.e., at the end of the post-blast monitoring day) was practically identical to the number at the beginning of the session (i.e., 130 cf. 131). The total at the end of the session was off by a modest 20 animals from the peak count during activity samples (i.e., 150) – a difference that could be accounted for by animals not in view from the tower at their new location atop Area 2–5 at the end of the session and animals swimming near the haulouts. Although nearly all animals were on haulout Area 2–5 at the beginning and end of the session, they had shifted their position to the highest part of the haulout in response to large swells that inundated the lower reaches of the haulout. As of 7 December, the upper reaches of Area 2–5 continued to be used by most of the sea lions in the Reserve (as evident from the LBPC web cam).

No further monitoring is anticipated until summer/fall 2011.

Daily Summary

November 28

This was a pre-blast monitoring day (i.e., no detonations). Weather conditions were calm: windspeed to 4 knots; seas to Beaufort 2 with a low and moderate swell; mostly overcast skies; drizzle in the morning; air temperature 5–7 °C.

¹ Information presented in this and all other progress reports on this research is to be considered preliminary, pending more detailed analysis of the data as will be done during final reporting.

A total of 130 Steller sea lions were counted in the Reserve during the first census. A maximum of ~150 animals were counted during the activity samples through the day. Activity levels of those animals remained low through the day until just after 14:00 when an ecotour boat approached Area 2–5 from the south, against the strong current. Although the distance and speed of approach of that boat was not notably different from what we've observed on numerous past occasions to have not elicited any responses, all Steller sea lions became active (heads up) and most (~100) fled the haulout in response to the boat. Despite this obvious disturbance, the boat lingered in the area, circling around the north side of Area 2–5, after which it drifted with the current, past the west side of the haulout. Animals began returning to the haulout shortly after the boat left the area, but numbers did not return to pre-disturbance levels prior to our last count of the day (~15:00).

By the end of the monitoring day, the falling tide resulted in the highest number (62) of harbour seals hauled out in the Reserve during the session.

Refer to Photo 1 through Photo 2 for an indication of numbers and behaviour of Steller sea lions on Area 2–5 that day.

November 29

This was the first demolition monitoring day. Weather conditions were moderate: windspeed to 10 knots; seas to Beaufort 3 with a moderate swell; overcast skies; no precipitation; air temperature 5–6 °C. High tide and high swells flooded many main haulout areas. Two projects in two runs were detonated (total of 4 explosions). Projects were spaced at minimum 5 minute intervals, and runs were ~3.2 hours apart.

The number of Steller sea lions hauled out on Area 2–5 had recovered substantially following the ecotourism disturbance on the 28th. All blasts were clearly audible to us in the tower. The first blast of the day caused all sea lions on 2–5 to raise their heads, and a ~30 fled to the water. Just after the second blast of the first run, ~50 more animals left the haulout (48 remained). Prior to the second run, the number of sea lions on 2–5 had recovered to ~95. The first blast of second run caused all sea lions on 2–5 to raise their heads, and a ~40 fled to the water. Just after the second blast of the second run, ~14 more animals left the haulout (42 remained). Animals began hauling out after that blast, but there was not much time left in the monitoring day to document the extent of the recovery that day.

By the end of the monitoring day, the falling tide resulted in a modest number of harbour seals hauled out in the Reserve. No ecotour boats were observed.

Refer to Photo 3 and Photo 4 for an indication of sea conditions and numbers of Steller sea lions on Area 2–5.

November 30

This was the second demolition monitoring day. Weather conditions were moderate: windspeed to 10 knots; seas to Beaufort 3 with a moderate and high swell; overcast skies; periods of fog, drizzle, and light rain; air temperature 5–6 °C. High tide and high swells flooded many main haulout areas. Eight projects in 4 runs were detonated (first run had 3 projects, second had 2, third had 1, fifth had 2). Projects were spaced at minimum 5 minute intervals, and runs were ~0.4–2.3 hrs apart. All blasts were clearly audible to us in the tower.

The number of Steller sea lions hauled out on Area 2–5 prior to blasting was low, likely as a result of swell and tidal influences that reduced availability of some parts of the haulout.

The first blast of the day caused all sea lions (43) on 2–5 to flee to the water. Animals began hauling out ~50 min later. The first blast of the second run cleared the haulout of the 26 animals that had returned. A few animals (6) hauled out after the second run, but all were displaced by the single blast of the third run. Animals resumed hauling out and just prior to the fourth run there were 27 on the haulout. The first blast of the fourth run displaced 18 of 27 animals to the water. The second and third blasts did not seem to have much effect on the few remaining animals.

By the end of the monitoring day, the falling tide resulted in a modest number of harbour seals hauled out in the Reserve. No ecotour boats were observed.

Refer to Photo 5 and Photo 6 for an indication of sea conditions and numbers of Steller sea lions on Area 2–5.

December 1

This was the third demolition monitoring day. Weather conditions were calm-moderate: windspeed to 9 knots; seas to Beaufort 2 with a moderate and high swell diminishing to low later in the day; overcast skies; no precipitation; air temperature 7–8 °C. High tide and high swells flooded many main haulout areas. Blasting comprised 3 runs, with 1 project in the first 2 runs and 2 in the third (total of 4 blasts). Projects were spaced at minimum 5 minute intervals, and runs were at ~0.7–2.6 hrs apart. All blasts were clearly audible to us in the tower.

The number of Steller sea lions hauled out on Area 2–5 prior to blasting had recovered to 87, despite swell and tidal influences that reduced availability of some parts of the haulout.

Animal activity prior to blasting was fairly high as a result of the swells washing over much of the haulouts (both Area 2–5, and for the first time this session, Area 6–7 were occupied by Steller sea lions). Animals were displaced off the haulout by swells prior to and after blasting. The first blast of the day displaced a total of ~15 animals off the two haulout areas. The second blast (second run), ~47 min later, caused all (22) animals to leave haulout 2–5 and 7 of 29 left haulout 6–7. Thereafter, animal numbers on the haulouts increased. The first blast of the third run caused an increase in activity level (proportion with heads up) of the 84 animals on 2–5 and 33 on 6–7, but no movement to water was detected. The second blast of that run (final of the day) displaced a total of ~10 animals of the two haulouts combined. After the last census of the day, large swells displaced many animals from the haulouts.

By the end of the monitoring day, the falling tide resulted in a modest number of harbour seals hauled out in the Reserve and the number of sea lions was greater than prior to blasting that day. No ecotour boats were observed.

Refer to Photo 7 and Photo 8 for an indication of sea conditions and numbers of Steller sea lions on Area 2–5 and 6–7.

December 2

This was the post-demolition monitoring day (i.e., no blasting). Weather conditions were moderate: windspeed to 12 knots; seas to Beaufort 2 with a high swell diminishing to moderate later in the day; mostly overcast skies; no precipitation; air temperature 5–6 °C. High tide and high swells flooded many main haulout areas.

The number of Steller sea lions hauled out on Area 2–5 prior to blasting had declined from the previous afternoon, likely due to the high swells that washed over the haulouts. Those that did remain hauled out were on the highest part of the haulout (Area 2–5) for the first time this session; the lower part of haulout 2–5 was repeatedly inundated by large swells. Aside from high swell conditions, no disturbance events were observed, and animal numbers on the haulout (on 2–5 was occupied) built during the day, reaching ~130 by the end of the day. This was the same number as counted during the first census on the pre-blast monitoring day four days before. As a result of a lower tide, reduced swell, and no disturbance, animal activity (i.e., proportion with heads up) was greatly reduced as compared with most times during the previous days.

By the end of the monitoring day, the falling tide and reduced swell height resulted in a modest number of harbour seals hauled out in the Reserve. No ecotour boats were observed.

Refer to Photo 9 and Photo 10 for an indication of sea conditions and numbers of Steller sea lions on Area 2–5.

Total numbers of pinnipeds hauled out in the Race Rocks Ecological Reserve during morning and afternoon counts on 2 days. Bold italics indicates a blasting day. The first (AM) count on a blasting day occurs prior to any demolitions that day.

Date	Survey	Elephant Seal	Harbour Seal	California Sea Lion	Steller Sea Lion
28-Nov-10	AM	1	16	0	130
28-Nov-10	PM	1	62	0	70
<i>29-Nov-10</i>	<i>AM</i>	<i>1</i>	<i>16</i>	<i>0</i>	<i>117</i>
<i>29-Nov-10</i>	<i>PM</i>	<i>1</i>	<i>36</i>	<i>0</i>	<i>48</i>
<i>30-Nov-10</i>	<i>AM</i>	<i>1</i>	<i>6</i>	<i>0</i>	<i>35</i>
<i>30-Nov-10</i>	<i>PM</i>	<i>1</i>	<i>12</i>	<i>0</i>	<i>12</i>
<i>1-Dec-10</i>	<i>AM</i>	<i>1</i>	<i>6</i>	<i>0</i>	<i>87</i>
<i>1-Dec-10</i>	<i>PM</i>	<i>1</i>	<i>29</i>	<i>0</i>	<i>103</i>
2-Dec-10	AM	1	0	0	44
2-Dec-10	PM	1	28	0	131

Photo 1. All Steller sea lions hauled out on Area 2–5; during morning census 28 November 2010 (time of photo 09:58:44)



Photo 2. All Steller sea lions hauled out on Area 2–5; 28 November 2010, minutes after disturbance by an ecotour boat (time of photo 14:12:06)



Photo 3. All Steller sea lions hauled out on Area 2–5; 29 November 2010, prior to any disturbance and minutes before the first blast of the first run (time of photo 10:59:22)



Photo 4. Area 2–5; 29 November 2010, minutes after the second blast of the first run (time of photo 11:27:22)



Photo 5. All Steller sea lions hauled out on Area 2–5; 30 November 2010 at the beginning of the day prior to any blasting (time of photo 09:01:24).



Photo 6. All Steller sea lions hauled out on Area 2–5; 30 November 2010 after the final blast of the day (time of photo 14:49:46).



Photo 7. All Steller sea lions hauled out on Area 2–5 (top) and 6–7 (bottom); 1 Dec 2010 prior to any blasting that day (time of photo 08:58:56 and 08:59:08).



Photo 8. Steller sea lions hauled out on Area 2–5 (top) and 6–7 (bottom); 1 Dec 2010 after all blasting that day (time of photo 14:57:00 and 14:57:06).



Photo 9. All Steller sea lions hauled out on Area 2-5; 2 Dec 2010 morning census (time of photo 10:11:02).



Photo 10. All Steller sea lions hauled out on Area 2-5; 2 Dec 2010 afternoon census (time of photo 14:44:00).

