Relative Frequencies of Seal Wounds: A Case Study on Mount Desert Rock, Maine

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(Photo Credit: Michael Cornish)

Introduction

Mount Desert Rock (MDR) is a small island that lies about 45 km offshore of Mount Desert Island, ME. This small island hosts a colony of grey seals (*Halichoerus grypus*) and harbor seals (*Phoca vitulina*) that haul out in large numbers, a maximum of 621 harbor seals and 183 grey seals at one time in 2016, and often display wounds severe enough to be viewed with binoculars from the light tower on the island.

Major seal wound studies have largely focused on entanglement rates, which range from 0.1% to 7.9% (Boren et al. 2006; Page et al. 2004; Donohue et al. 2001; Croxall et al. 1990; Fowler 1987; Stewart and Yochem 1987; Shaughnessy 1980; Harcourt et al. 1994). Locally, Olivia Bolus and Margaret Maiorana started a project in 2013 to identify the types of wounds on seals that haul out at MDR. The project was then continued by Grace Shears in 2014 and Mamiko Yamazaki in 2015. This study builds on these past projects to quantify the relative frequencies of wounds in the seal populations that haul out on MDR.



View from the seal blind at high tide and low tide (KRC)

Methods

Seal counts were conducted from the light tower, which stretches over 21 meters above sea level. Using binoculars, researchers counted every visible harbor and grey seal on the island. I then counted every visible ventral side of each species (about 11% of the harbor seals and about 9% of the grey seals), determined how many exhibited visible wounds, and recorded the wound type and severity.

Wound types were divided between lacerations, abrasions, entanglements, and other small wounds; severity rankings ranged from (1) wounds within the skin or blubber layer, (2) wounds within the muscle layer, and (3) wounds showing bone or neck entanglements.

Examples of Wound Types

Entanglement



P. vitulina at low tide on 18 Aug. 2016 (KRC)

Laceration



P. vitulina at low tide on 16 July 2016 (KRC)

Abrasion



P. vitulina at low tide on 19 July 2016 (KRC)

Other Small Wounds



P. vitulina at high tide on 22 July 2016 (KRC)

Results

Overall, for both seal species a minority of the population had identifiable wounds, with harbor seals having a significantly higher rate of wounds (19%) compared with grey seals (13%; Fisher's exact test, $p<0.005$; Figure 1).

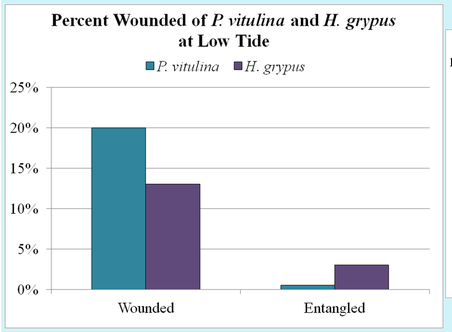


Figure 1

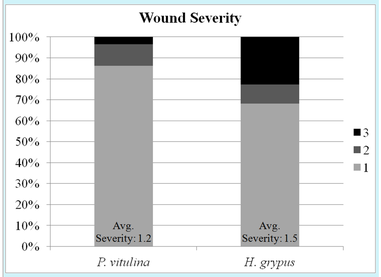


Figure 2

The two species also varied in the relative proportions of the different types of wounds that were observed; for instance, grey seals were entangled about 5.7 times more often than harbor seals. In total, 0.5% of harbor seals and 2.9% of grey seals were entangled, and entanglements accounted for 3% of harbor seal wounds and 29% of grey seal wounds (Fisher's exact test, $p<0.001$; Figure 3).

Entangled Grey Seals on MDR



Entangled *H. grypus* at low tide on 30 July 2016 (KRC)



Entangled *H. grypus* at high tide on 30 July 2016 (KRC)

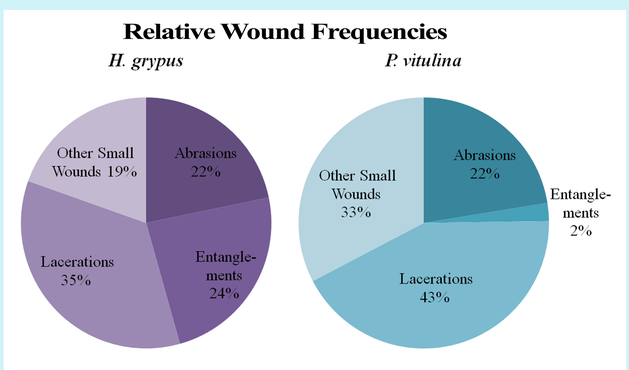


Figure 3

This higher rate of entanglement in grey seals contributed to the overall pattern of severity with grey seals having more severe wounds on average than harbor seals (two-sample t-test, $p<<0.001$; Figure 2).

The overall rate of wounds and the severity of those wounds were not correlated to the tidal height at which the data were collected.

Discussion

The lower observed percentage of wounds in grey seals could be a result of grey seals being much darker than harbor seals and typically hauling out on ledges further from the light tower. This made identifying wounds more challenging, potentially underestimating the percentage of wounded grey seals. Their larger size and thicker blubber layer could also mean that smaller wounds, which would have been recorded for harbor seals, were less detrimental for grey seals.

The entanglement rates for both species fall within the range of entanglements seen in other pinniped populations, although the rate for grey seals is the third highest of the consulted studies (Figure 4). This higher rate of entanglement in grey seals could potentially mean that grey seals are more capable of surviving entanglements because of their larger size or some other factor. While both entanglement rates are fairly low, we do not have a complete understanding of how these wounds could be affecting the health of the overall population. Further research in this area is needed to fully understand human impacts on local seal populations.

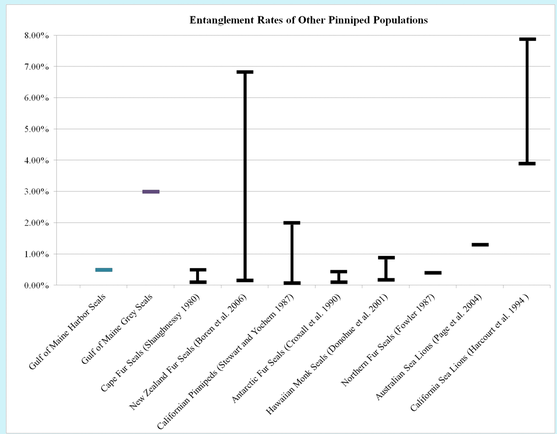


Figure 4: Black bars show the rate or range of rates for other pinniped populations

Acknowledgements

This project was made possible by the Maine Space Grant Consortium, the Steve Katona Chair Fund, Allied Whale, and College of the Atlantic. I would especially like to thank everyone on the 2016 Mount Desert Rock field team for their support and feedback.

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