Human intervention can help endangered Saimaa ringed seal adapt to climate change

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Piling a man-made snowdrift in the breeding habitat of the ringed seal in Lake Saimaa, Finland. Credit: Mervi Kunnasranta

Humans can help the critically endangered Saimaa ringed seal to cope with climate change. Man-made snow drifts developed in a recent study

from the University of Eastern Finland improved the breeding success of seals during winters with poor snow conditions.

Lake Saimaa in Finland is home to the critically endangered subspecies of the ringed seal, the Saimaa ringed seal (Phoca hispida saimensis). The Saimaa ringed seal is heavily ice-associated and its breeding success depends on sufficient ice and snow cover. The loss of snow and ice caused by the ongoing climate change poses a direct threat to the subspecies, and climate change induced changes to the environment may have indirect effects, too.

Man-made snow drifts improved breeding success

While the effects of human activity on the seal population can be detrimental - for example through a high rate of fishing bycatch mortality as observed on Lake Saimaa - a novel conservation method can help the seal population to cope with climate change. A recent study completed at the University of Eastern Finland developed novel methods for the monitoring and conservation of the Saimaa ringed seal. In her PhD thesis, Miina Auttila, MSc, created a method for building man-made snowdrifts, which proved to be successful in improving seals' breeding success during winters with poor snow conditions. These snowdrifts were designed to mimic wind-drifted snow and they were piled using shovels and pushers at seals' lair sites before the breeding season. A study based on the morphometry of seals showed that successful nursing enables the rapid growth of the pup, which is essential for its survival. Typically, a snow lair provides good shelter, but poor snow conditions expose pups to predation, harsh climate and disturbance by humans, elevate the risk of mortality, and may hamper growth.

The study also developed novel non-invasive monitoring methods such as camera traps and underwater surveys for monitoring lair sites and for making better estimations of natality and perinatal mortality. The

perinatal mortality appeared to be higher than was estimated earlier, but the causes of the mortality are not fully known. The camera traps also provided valuable information on human and predator activity at lair sites.

Population growth essential for survival

Altogether, decline in pup survival seems to be the most acute threat to the Saimaa ringed seal posed by climate change and the seal's adaptation to climate change is hindered by its small population size and additional human-induced mortality. In the long term, the most efficient way to help this critically endangered seal is to ensure a rapid growth of the population. Conservation efforts should be focused on the most acute factors affecting the seal's survival, such as minimizing bycatch mortality and disturbance during the breeding season.

The results were originally published in *Marine Mammal Science* and *Annales Zoologici Fennici*.

More information: Miina Auttila et al. Morphometrics, body condition, and growth of the ringed seal ( ) in Lake Saimaa: Implications for conservation , *Marine Mammal Science* (2015). DOI: 10.1111/mms.12256

Miina Auttila et al. Diet composition and seasonal feeding patterns of a freshwater ringed seal ( ) , *Marine Mammal Science* (2015). DOI: 10.1111/mms.12133

Miina Auttila et al. Estimating and Mitigating Perinatal Mortality in the Endangered Saimaa Ringed Seal ( ) in a Changing Climate , *Annales Zoologici Fennici* (2014). DOI: 10.5735/086.051.0601

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