

Saimaa ringed seal (*Phoca hispida saimensis*) and global warming

The Saimaa ringed seal (*Phoca* or *Pusa hispida saimensis*) is one of the subspecies of the ringed seal and lives only in the lake complex Saimaa in the eastern Finland. It's a relic that got trapped in Saimaa after the last ice age round 8000 years ago. It is one of the rare seal species that is completely adapted in the fresh water living. Today there is only some 260 individuals left and it's listed in the Red List of Threatened Animals by IUCN and so regarded as endangered. Ice cover and snow are of crucial importance in the breeding of this seal. They build lairs on the ice cover where they breed and in which the pup spends its first few weeks safe from predators and winter climate, feeding on milk and developing a layer of subcutaneous fat (blubber).

Latest researches (IPCC, fourth assessment report, 2007) show that the climate is getting warmer around the world. The visible effects of this are for example that: Amount and surface area of glacier lakes is increasing, spring floods happen earlier, and the temperature of lakes and rivers seems to be rising in many areas, just to mention few.

The Saimaa ringed seals have always had hard time. In Finland they don't really have any other significant enemy, except humans. Because of human actions the seal almost was hunted to extinction during last century, but finally was protected by law in 1955. After that the pollution in the lake (mercury) caused problems in breeding and high pup mortality caused further decline in their number. Because of their small number they are also very prone to different disease epidemics. Fishing is a cause of lots of deaths, especially young seals often get entangled and drown in the fishing nets. This is one of the biggest threats to this subspecies among the disturbance during breeding season and the global warming.

The situation definitely doesn't look good, will they be extinct?

A research done by Tero Sipilä tries to solve how to avoid the extinction of the Saimaa seal and how to protect the biodiversity of the population. According to him it is important to have reliable population data in order to be able to be successful in the conservation. This data should be collected on yearly basis. In this study the information was gathered by classifying and counting lairs, by video-recording the sites from helicopter with an infrared video camera. Tapes were then analyzed with computer program. Natal hair and remains of delivery were gathered as well. To estimate the size of the population, more aerial

surveys were made and annual numbers of pups born were estimated from the number of birth lairs and dead pups. Dead seals were collected for determining the cause of death, sex, age, weight etc.

The results show that the Saimaa ringed seal has high site fidelity and quite small home range, so safe place for the lair is very important. It can be easily disturbed by human actions (e.g. Shipping lanes, recreational houses) but it is clearly shown that the number of lairs increase the further away they are from the source of disturbance. However, if the seal is disturbed during lairing it's possible that the pup will be weaned too early and this way is too small. This leads to bigger mortality among pups. All this underlines the necessity of the protection of the suitable breeding habitat of the lake. Sipilä writes that if this seal faces extinction, it will probably be caused by changes in the environment not by genetic problems.

The IPCC, fourth assessment report, 2007, estimates warmer future. The climate system is getting warmer, observations show that the temperatures are rising, in average 0,13 degrees per decade (1956- 2005) which is nearly twice that for the 100 years (from 1906- 2005, 0,74 degrees). If this continues the same way, in the future it is expected that:

The temperatures of the most extreme cold nights and days are likely to increase. Heavy rains and heat waves will become more frequent. Snow cover area shrinks, and in some projections the arctic late summer sea ice disappears completely. Due to all that melting of ice, the sea level would rise as well. The average temperature in Finland would then rise so much that the white winters would be history.

In reference, I studied Meier, Döscher and Halkkas research where they investigated the consequences of climate warming in the Baltic ringed seal. This was a simulated research where they used a regional climate model developed at Rossby Centre of Swedish Meteorological and Hydrological Institute to calculate the future climate in the Baltic Sea. They prepared series of six 30- year long time slice experiments, that have different scenarios of the future. Then they selected parts of known breeding areas, and studied the probability of ice days and –cover.

The results showed that the mean annual maximum ice volume, length of ice season, and mean annual maximum ice thickness reduced so that the successful breeding of the Baltic ringed seal would in most years probably be possible only in the northernmost Baltic Sea (Bay of Bothnia). This would mean that the southern populations would be in danger to be extinct.

In Finland The Metsähallitus counts the population of Saimaa seals every year. In 2008 51 pups were counted from which 5 were dead. This is an average result, although the ice season on the lake was shorter than normal. Still, it's worrying that the population is declining in the north and south Saimaa, and despite of all the efforts made in the conservation of this species, the growth of the population has only been few % yearly. To be able to say that the population is not in immediate danger to extinct, the amount of individuals should be closer to 400. To preserve the Saimaa seal, all the risks caused by human actions have to be minimized. This is the only way to reduce the effects of the climate change on the Saimaa ringed seal, in case the climate change affects the Saimaa lake complex in a same way as the Baltic Sea.

On my opinion it would be very sad if this rare seal would disappear from the world. I think we should do everything we can to help the seals to survive. And maybe start with the biggest threat the Saimaa ringed seals have; us. It is important to make people understand that even though they might cause damage to fishing gear and fish, these seals should be protected, not killed.

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