Rights at risk: Arctic climate change and the threat to Sami culture

The Arctic is warming twice as fast as the rest of the world. This is putting its unique ecosystem at risk, and with it the existence of Europe's only recognised indigenous people, the Sami, who have lived in the Arctic for millennia. Increasingly unpredictable and extreme weather is jeopardising Sami livelihoods and their rights as indigenous people. The Sami have a clear message for decision makers, from the front lines of climate change: now is the time to act.

A briefing by the Environmental Justice Foundation

ENVIRONMENTAL JUSTICE FOUNDATION
Protecting People and Planet

The Sami of Sápmi

The Sami, the only recognised indigenous people of Europe, are native to Sápmi, which spans the northernmost parts of Sweden, Norway, Finland and Russia.

This region is an important habitat for Arctic and sub-Arctic wildlife; polar bears, moose, seals, walruses, whales and birds have all evolved to survive in the harsh climate of the lowland tundra, mountains and forests.

Sápmi is home to an estimated 80,000-100,000 Sami, with 20,000 – 40,000 in Sweden, 50,000 – 65,000 in Norway, 8,000 in Finland and 2,000 in Russia.[1] They identify as one distinct people irrespective of the national borders now in place across their land.[2] They have existed in harmony with nature as far back as recorded history, through sustainable use of their land and natural resources.[3/4]

2017 Traante Sami council declaration:

"The Sami are an independent people, like other people, we have the right to our lives and to decide on matters concerning us. The basis for Sami life is Sápmi the legacy of our mother the Sun and our father the Earth. Lands and waters where we have lived in all times, before national boundaries divided our country. The Sami language – the golden language – carries and consolidates our connection to our land and our people. The Sami have, during long-term use, acquired the right to manage their territory, and we have the knowledge and cognizance of the conditions of life in these areas. This knowledge will constitute the basis for the management of the area's resources. The prerequisite for our society and our life to survive and develop is management based on our needs and values.[5]"

The Sapmi: the Sami land, which spans Norway, Sweden, Finland and Russia. Sápmi is home to an estimated 80,000-100,000 Sami who identify as one distinct people irrespective of the national borders now in place across their land.

Sami identity and culture are anchored in the traditional practice of reindeer herding. They live semi-nomadically, following the seasonal migration patterns of reindeer as they move between winter and summer grazing grounds. This is the cornerstone of Sami culture and, for many Sami communities, the only way to survive in the Arctic.

Profile

Kenneth Pittja's family have been Sami reindeer herders for generations. He lives in Jokkmokk during the winter with his herd and undertakes a 100 km journey to Ruokto and Unna Tjerus each spring and summer.

"[Reindeer] are my life. It's as simple as that. I live for the reindeer and they mean everything to me. ... I have grown up and been with them all my life.

To be in the nature, with the animals, it's okay for me. I don't need anything else. I am Sami, it's me. And I'm proud of it.

They [the reindeer] are very suspicious when there are new people. But when it's me, they all come. In the morning, I can hardly ride through with my snowmobile.

It's hard for me to really know what the rest of the world should do. But if we all stop chasing something far away, and just start to be, I think it would be a good start. Because the nature and the animals show us a lot... all over the world, it's all the same.

The day you are leaving this life, you won't take anything with you. Everything that you have earned in a lifetime will stay here.

I hope folks start thinking. And I think it's the only way that we're going to change anything at all. That people all over the world start to think about what we are doing.

If you travel around and see other places, and talk to people all over the place, you learn a lot, and it's easier to understand how it is on this side or on some other side somewhere."

Kenneth Pittja © EJF

While Sami livelihoods have become more diverse, reindeer husbandry remains important to their identity and rights. Moreover, they have a unique way of 'listening' to the reindeer – they are strongly attuned to different reindeer behaviours and how they represent changes in the environment.[6]

The particular relationship of reindeer husbandry represents a true connection between people, environment and wildlife that has persisted with the Sami for millennia. Now, it is threatened by climate change.

"If I can't live like this, then what do I do? I have to change my way of life. And if I change my way of life, the culture and the way of doing things is going to change. It's my job, but also my life."

Aslat Simma, Sami reindeer herder

The changing outlook

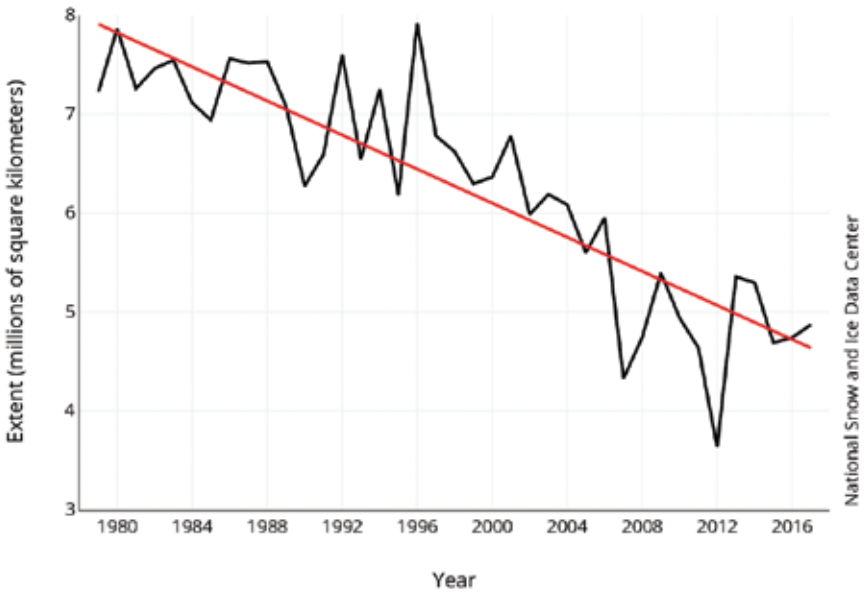
The Arctic is warming almost twice as fast as the global average.[7/8/9] This is known as 'Arctic amplification' and is projected to strengthen in coming years[10/11], mainly due to sea ice melt feedback loops[12/13/14]. Sea ice plays an important role in moderating the Earth's temperature because of its high reflectivity – ice reflects 80% of the solar radiation that reaches it back into space and away from the planet.[15] As global temperatures rise, sea ice melts and gives way to open ocean, which is 70% less reflective.[16]

Arctic sea ice is decreasing rapidly, in both extent and thickness, and the latest report from the Intergovernmental Panel on Climate Change (IPCC) projects that this will continue. Under the worst-case climate change scenario from the IPCC – in which economic growth continues unabated and increasing greenhouse gas emissions do not stabilise – summer sea ice in the Arctic ocean will likely be virtually non-existent by mid-century.[17]

"What is different nowadays is that in short periods of time, you get very cold weather, and then within two hours you have very warm weather, and when it goes so fast – for the animals, the plants, nature – it's very difficult to adapt to that."

Aslat Simma, Sami reindeer herder

Average Monthly Arctic Sea Ice Extent | September 1979 - 2017



The melting of Arctic sea ice not only accelerates global warming, it threatens the foundation of marine ecosystems.

Decline of Arctic sea ice since 1979 © US National Snow and Ice Data Center[18].

The melting of Arctic sea ice not only accelerates global warming, it threatens the foundation of marine ecosystems. Phytoplankton – micro-algae that form the basis of the food webs for many marine animals – have drastically decreased in abundance as a result of sea ice melt[19]. This threatens a diverse group of wildlife, from shrimp to whales.

In addition, many animals, such as seals, walruses, birds and polar bears, rely on sea ice as a place to rest, reproduce or escape predators.[20] In particular, polar bears, which are classified as vulnerable to extinction by the International Union for Conservation of Nature (IUCN), are completely reliant on sea ice as a habitat[21].

Along with the impacts on sea ice, warmer weather in the Arctic also affects terrestrial ecosystems. Melting snow causes the collapse of the spaces between the ground and snow, for instance, which are a key habitat for small animals such as lemmings and voles, leaving them without a space to live and forage.[22] Declines in these populations have repercussions which multiply up the food chain, impacting predators such as snowy owls and others (see box).[23]

Arctic wildlife under threat

Reindeer are far from the only species affected by changes in the Arctic; the entire ecosystem is strongly connected, and impacts are felt throughout the food web.

Polar bears have long been a symbol for the impact of climate change on Arctic wildlife. The estimated 26,000 polar bears left depend heavily on sea ice to hunt seals – the main component of their diet.[24/25] Satellites show that sea ice has now shrunk by approximately 770,000 square miles since the average of 1981 - 2010.[26] As the Arctic continues to lose its ice, hunting for food becomes enormously difficult for polar bears.

Another top predator, the snowy owl, is also suffering. In 2017 the IUCN added the snowy owl to their Red List of Endangered Species, classifying the species as 'vulnerable' for the first time.[27] This is due in part to reduced availability of prey; the owls feed on small rodents such as lemmings, who tunnel through the snow for food and warmth. Changes to the snowpack and melt dynamics caused by fluctuating temperatures are increasingly affecting the availability and distribution of this important prey species.[28]

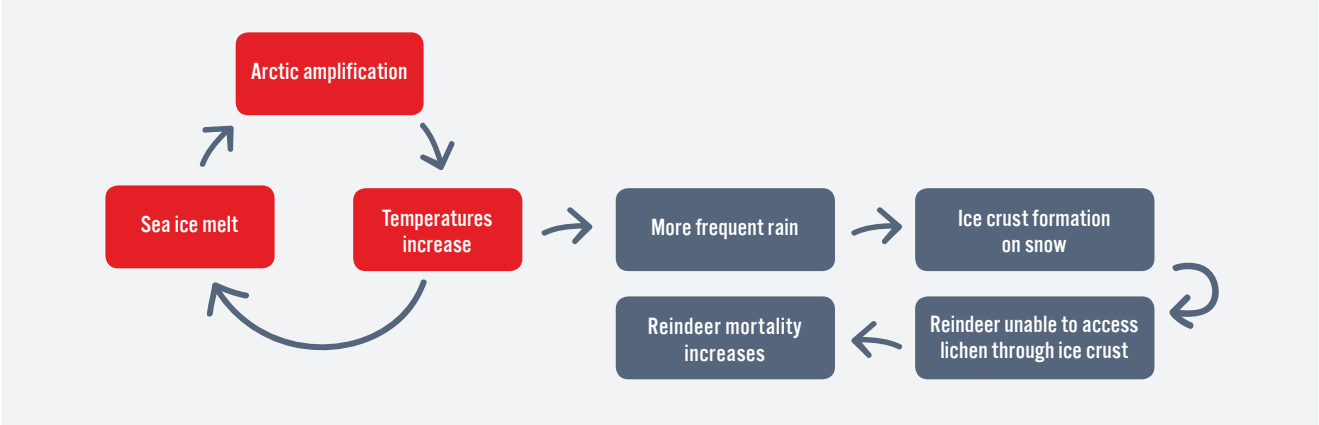
The decline in lemming populations also affects the Arctic fox.[29] In addition, this species is losing out on another food source: seal carcasses, left on the sea ice by polar bears. With sea ice shrinking and lemming populations declining, competition for food in the Arctic will become fierce.

Climate change is affecting the prey of the snowy owl, and as a result this top predator has been listed as vulnerable for the first time.

Photo credit: Dustan Sept

When precipitation falls as rain rather than snow, as it does increasingly as a result of global warming[30], the result is the formation of a thick layer of ice on the snow, preventing grazing herbivores such as moose or reindeer from reaching the vegetation they need for food.[31]

The Arctic permafrost – perennially frozen ground – traps vast quantities of methane, a greenhouse gas with thirty times the global warming impact of CO2.[32] The melting of Arctic permafrost could result in a sudden and massive release of methane, with potentially catastrophic effects for climate.[33/34/35]



What does this mean for the Sami?

Indigenous people tend to feel the effects of climate change first, as their livelihoods often depend on natural resources. Not only are Sami livelihoods, culture and identity fundamentally linked to reindeer husbandry, but it also forms the basis for their rights as an indigenous people in Sápmi (see box)[36] It is vital for the Sami that reindeer survive the changing climate.

Climate change means that precipitation often falls as rain, rather than snow, which then freezes to form a layer of ice. The reindeer unable to break through the ice to the lichen below starve to death. In 2013 alone, a total of 61,000 died as a result of these conditions in Arctic Russia.

Climate change and indigenous rights

The decline of reindeer populations as a result of climate change, along with threatening Sami livelihoods, may also mean the loss of important rights to land access.

The Swedish Reindeer Herding Act (1971: 437) stipulates that, while all Sami are entitled to basic rights as an indigenous people, in order to exercise the full breadth of these rights – including rights to land – they must be part of a herding community and practise reindeer herding.

> *"In practice, Sami rights in Sweden are strongly tied to the reindeer herding practice. This narrow construction of Sami identity and rights is a direct consequence of the colonial politics that have characterized the issue since the late 1800s. At that time, state policy was of a dual character – assimilate (non-herding Sami were stripped of their rights and language) and segregate (Sami herders were to maintain what the state viewed as traditional ways of living)."*

– Annette Löf, Researcher, Centre for Sami Research, Umea University[37]

There is a distinct lack of regional co-operation between Sweden, Norway, Finland and Russia on Sami rights, resulting in a lack of legislation that is common to the whole of Sápmi.

Sami rights across Sápmi must be fully addressed by the four governments in control of Sápmi land, through consultation with Sami representatives such as the Sami Council and parliaments.[38]

In the Arctic there are approximately 2.5 million reindeer,[39] a species supremely adapted to its environment, with feeding behaviours aligned to the seasonal changes in forage availability. They consume substantial amounts of grass in summer months to prepare for winter and can migrate distances of over 900 km to winter grazing grounds where conditions are best for lichen – their winter food source[40]. Incredibly, they have also evolved to see in the ultraviolet spectrum, which enables them to locate lichen through heavy snow, as it grows on the ground and trees.[41]

Reindeer are specially adapted to an environment that has met their needs for millennia. Now, as a result of human-driven climate change, their world is changing much faster than they can.

Unusually high temperatures above freezing are causing more frequent rain, which freezes on the ground into ice. Reindeer, trying to break through this ice layer to access the lichen, expend large amounts of energy which they can ill afford at this harsh time of year.[42/43] Often, they fail entirely to break the ice, and starve to death. In 2013 alone, a total of 61,000 died as a result of these conditions in Arctic Russia.[44]

Worryingly, female reindeer nutrition in the winter is a crucial factor for calf health; if females feed poorly over winter then calves are born with smaller chances of survival.[45] Warmer summers are also leading to greater numbers of parasitic and disease-spreading insects and widespread melting of ice-covered rivers, which are usually crossed during the seasonal migration.[46]

In order to survive in the changing climate, Sami herders are purchasing feed pellets to sustain their herds through winter, assisted by the Emergency Fund from the Sami Parliament. However, this supplementary feeding is less than ideal. Not only have reindeer herders observed higher instances of disease among reindeer fed with pellets, but as it is expensive and requires external resources, this practice also makes herding a less economically and environmentally sustainable way of life[47].

The sharp decline in reindeer numbers in recent years is threatening Sami herders and the situation is only growing worse as temperatures increase.

Sami people and mental health

Mental health issues among the Sami people are becoming prevalent, with the threat of climate change to their traditional way of life cited by many as a cause of stress.[48]

Half of Sami adults in Sweden suffer from anxiety and depression, and 1 in 3 young indigenous reindeer herders have contemplated suicide.[49] Suicide rates in Sweden among the Sami people can be up to four times higher than the national average.[50]

Profile

Maxida Märak, a Sami activist and artist, grew up in Jokkmokk in Sápmi, and currently lives in Stockholm. She fights for the rights of her people through her songs, videos and interviews.

Maxida Märak © EJF

"I am a Sami activist mainly because I have no choice. I feel a huge responsibility to use [my] voice for my people and the important issues that we struggle with.

I grew up in a culture where I am used to spending five or six weeks every summer up in the mountains where you have nothing. In Spring, we [gather] wood and food, so that if the fishing is bad we can still live there for five to six weeks when we follow the reindeer.

For Sweden, having a culture that is so far from the Swedish people, I think it is scary. [They] do not teach kids in school about the Sami culture and history, because what you don't know, you won't fight for.

When I meet people who have never heard about the Sami, the issues or the political problems, [they] get upset. A lot of people are good people, but as long as you keep them not knowing, it's so much harder for us to keep on fighting.

If we don't start to really take the climate issue seriously, the future is not bright for anyone. We will probably be the first ones that get really affected by it. But I do see hope, my generation is the first that is allowed to get into powerful positions [and can] speak for ourselves."

Interacting pressures

The Sami also face encroachments onto their land from mining, energy generation, forestry and tourism. This competition for land use hampers their ability to be flexible and adapt to changing circumstances, such as searching for better summer grazing areas. It also often permanently alters the ecosystem.[51] As well as physical infrastructure, the impacts on Sami lands come in the form of pollution. Cryoconite – a toxic dark heavy metal dust –is emitted by industrial operations and once deposited on snow it restricts lichen growth[52].

"And where [does the black] snow come from? I have no idea. But it comes from the South-East. My theory is that it comes from the continent. The clouds are coming from big industry areas, that's why it's black."

Aslat Simma, Sami reindeer herder

The Sami depend on rights over their lands and resources in order to continue to exist as a distinct people, and it is clear that those rights are not sufficiently protected, as asserted by the UN Special Rapporteur on the rights of indigenous peoples[53].

In the case of Jouni E Lansman *et al. versus* Finland, the Human Rights Committee found that although individual development projects, in this instance a quarry site, may not violate internationally agreed human rights laws, multiple projects taken together may jeopardise the Sami way of life and therefore erode the human right of the Sami to continue to exist as a culture.[54] This points to the importance of taking a holistic, cross-border view when considering the impact of land-use projects on the Sami.

"To cope with bad winter grazing, then we need to be allowed to use the traditional lands with flexibility – the old forests with tree lichens, good pastures and free paths for migrating. If we cannot move the reindeer to a pasture that has good grazing, then they will die – not immediately, but later on in the winter, because it didn't have the chance, when there was good grazing, to be grazing in peace."

Aslat Simma, Sami reindeer herder

The Sami are acutely aware of climate change and the compounding competition for land use. Through the Sami Council and Parliament, they are calling for flexibility in their use of Sápmi, in order to keep their herds alive. While these adaptation measures are necessary to allow indigenous peoples to cope with climate change, there also needs to be an international focus on the core issue: to protect Sami culture and the unique ecosystems of the Arctic, urgent international action is needed to address anthropogenic climate change.

The sharp decline in reindeer numbers of recent years is threatening Sami herders and the situation is only growing worse as temperatures increase.

The legal framework

Adaptation strategies, such as supplementary feeding, do not address the root cause of the problem for the Sami people. Not only are they imposed upon the Sami as a solution without consultation, they do nothing to address the systematic destruction of this important culture.

The four nations must put in place legal protections for Sami in the event that they can no longer herd reindeer. The world must strengthen its commitment to combatting climate change and keeping warming to an absolute maximum of 1.5°C, as emphasised in the latest IPCC report.

EJF's recommendations

- All countries must rapidly and fully implement the global climate change agreement established in Paris in December 2015, and support efforts to raise their emission reduction pledges over time keeping the global temperature level below 1.5°C above pre-industrial levels.
- Sweden, Norway, Finland and Russia should collaborate to create a legally binding agreement to allow the Sami flexible migration routes and safeguard their rights regardless of whether they are directly engaged in reindeer herding.
- Oil and gas exploration and drilling in the Arctic must be immediately stopped and a moratorium on any further exploration agreed.
- The EU should initiate the creation of a high-profile, fully resourced, inter-agency taskforce to coordinate the work of the multiple bodies in the Commission, including (but not limited to) Environment, Climate Action, Migration and Humanitarian Affairs, International Cooperation and Development as well as the High Representative of the Union for Foreign Affairs and Security Policy, in order to drive a more effective, integrated approach into wider international responses to climate change.
- A UN Special Rapporteur on Human Rights and Climate Change should be established.
- All stakeholders should be included in ongoing and future climate deliberations and negotiations, with special reference to local communities, indigenous peoples and the most vulnerable and disenfranchised on our planet. It is essential that marginalised communities are given a voice.

References

1 Sweden, 26.06.2018, 'Sami in Sweden', accessed 22 November 2018, https://sweden.se/society/sami-in-sweden/

2 Saami council, 2017, 'Tråante declaration', accessed 14 November 2018, http://www.saamicouncil.net/en/documents/samiradi-julggastusat/

3 Sweden, 26.06.2018, 'Sami in Sweden', accessed 14 November 2018, https://sweden.se/society/sami-in-sweden

4 United Nations Special Rapporteur, 9.08.2016, 'Report of the Special Rapporteur on the rights of indigenous peoples on the human rights situation of the Sami people in the Sapmi region of Norway, Sweden and Finland', accessed 14.11.2018, http://unsr.vtaulicorpuz.org/site/images/docs/country/2016-sapmi-a-hrc-33-42-add-3-en.pdf

5 Saami council, 2017, 'Tråante declaration', accessed 14 November 2018, http://www.saamicouncil.net/en/documents/samiradi-julggastusat/

6 Riseth, J. A., Tommervik, H., Helander-Renvall, E. and Labba, N. (2011) Sami traditional ecological knowledge as a guide to science: snow, ice and reindeer pasture facing climate change. *Polar record*, 47: 3, pp. 202-217

7 NASA, 04.06.2011. 'What's causing the poles to warm faster than the rest of the Earth?', accessed 14 November 2018, https://www.nasa.gov/topics/earth/features/warmingpoles.html

8 Vaughan, D.G., J.C. Comiso, I. Allison, J. Carrasco, G. Kaser, R. Kwok, P. Mote, T. Murray, F. Paul, J. Ren, E. Rignot, O. Solomina, K. Steffen and T. Zhang, 2013: Observations: Cryosphere. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

9 Screen, A. J. and Simmonds I. (2010) The central role of diminishing sea ice in recent Arctic temperature amplification. *Nature*, 464, pp. 1334 - 1337

10 Serreze M. C. and Barry R. G. (2011) Processes and impacts of Arctic amplification: A research synthesis. *Global and planetary change* 77 (1 – 2): pp. 85 - 96

11 National Snow and Ice Data Centre, Quick facts on Arctic sea ice, accessed 14 November 2018 https://nsidc.org/cryosphere/quickfacts/seaice.html

12 Screen, J. A. and Simmonds, I. (2010) The central role of diminishing sea ice in recent Arctic temperature amplification. *Nature* 464, pp. 1334 - 1337

13 Serreze M. C. and Francis J. A. (2006) The Arctic Amplification Debate. *Climatic change* 76 (3 – 4) pp. 241 - 264

14 NASA, 28.05.2018, 'Arctic amplification', accessed 14 November 2018, https://climate.nasa.gov/news/927/arctic-amplification/

15 National Snow and Ice Data Centre, Quick facts on Arctic sea ice, accessed 14 November 2018 https://nsidc.org/cryosphere/quickfacts/seaice.html

16 National Snow and Ice Data Centre, Quick facts on Arctic sea ice, accessed 14 November 2018 https://nsidc.org/cryosphere/quickfacts/seaice.html

17 Vaughan, D.G., J.C. Comiso, I. Allison, J. Carrasco, G. Kaser, R. Kwok, P. Mote, T. Murray, F. Paul, J. Ren, E. Rignot, O. Solomina, K. Steffen and T. Zhang, 2013: Observations: Cryosphere. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA

18 National Snow & Ice Data Center, Arctic sea ice 2017: Tapping the brakes in September, accessed 21 November, http://nsidc.org/arcticseaicenews/2017/10/arctic-sea-ice-2017-tapping-the-brakes-in-september/

19 AMAP (2017). Snow, Water, Ice and Permafrost in the Arctic (SWIPA) 2017. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. 269 pp.

20 AMAP (2017). Snow, Water, Ice and Permafrost in the Arctic (SWIPA) 2017. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. 269 pp.

21 Wiig, Ø., et al. (2015) [online], *Ursus maritimus*, The IUCN Red List of Threatened Species, http://www.iucnredlist.org/details/22823/0

22 GreenFacts, Arctic Climate Change, last accessed 20 November 2018, https://www.greenfacts.org/en/arctic-climate-change/l-2/5-arctic-animals.htm

23 Schmidt, N.M., Ims, R.A., Høye, T.T., Gilg, O., et al. (2012) Response of an arctic predator guild to collapsing lemming cycles. *Proceedings of the Royal Society B* 279 (1746)

24 Whiteman, P. (2018) Out of balance in the Arctic. *Science* 359 (6375), pp. 514 - 515

25 The Guardian, 1 Feb 2018, 'Polar bears could become extinct faster than was feared, study says', last accessed 23 November 2018, https://www.theguardian.com/us-news/2018/feb/01/polar-bears-climate-change

26 National Geographic, last accessed 23 November 2018, https://news.nationalgeographic.com/2018/02/polar-bears-starve-melting-sea-ice-global-warming-study-beaufort-sea-environment/

27 IUCN Red List, 01 October 2017, 'Snowy Owl', accessed 22 November 2018, https://www.iucnredlist.org/species/22689055/127837214

28 Birdlife, 4 January 2018, 'Snowy Owl faces frosty future: classed as Vulnerable for the first time', accessed 22 November 2018, https://www.birdlife.org/worldwide/news/snowy-owl-faces-frosty-future-classed-vulnerable-first-time

29 Centre for Biological Diversity, 'Arctic Fox', last accessed 23 November 2018, https://www.biologicaldiversity.org/programs/climate_law_institute/the_arctic_meltdown/slideshow_text/arctic_fox.html

30 Hansen, B. B., Aanes, R., Herfindal, I., Kohler, J. and Sæther B. -E. (2011) Climate, icing, and wild arctic reindeer: past relationships and future prospects. *Ecology* 92 (10) pp. 1917 - 1923

31 Descamps, S., Aars, J., Fuglei, E., Kovacs, K. M., Lydersen, C., Pavlova, O., Pedersen, Å. Ø., Ravolainen, V. and Strøm, H. (2017) Climate change impacts on wildlife in a High Arctic archipelago – Svalbard, Norway. *Global change biology* 23, pp. 490 - 502

32 US EPA, No Date, 'Understanding global warming potentials', accessed 14 November 2018, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials

33 Lenz, J. , Walter Anthony, K. M. , Winkel, M. , Liebner, S. , Fuchs, M. , Strauss, J. , Maio, C. V. , Jones, B. M. and Grosse, G. (2018): Carbon accumulation in thermokarst lakes: A biogeochemical comparison between Alaskan boreal and tundra lake deposits , 5th European Conference on Permafrost, Chamonix Mont-Blanc, France, 23 June 2018 - 1 July 2018.

34 Anthony, K. W., Schneider von Deimling, T., Nitze I., Frolking, S., Emond, A., Daanen, R., Anthony, P., Lindgren, P., Jones, B. and Grosse, G. (2018) 21st-century modelled permafrost carbon emissions accelerated by abrupt thaw beneath lakes. *Nature communications*, 9:1, pp. 3262

35 UK Parliament, 2015, Committee on the Arctic – Report of Session 2014 – 15, accessed 20 November 2018, https://publications.parliament.uk/pa/ld201415/ldselect/ldarctic/118/11805.html

36 Kirchner, S. and Frese, V. M. (2016) Sustainable indigenous reindeer herding as a human right. *Laws* 5: 24

37 Annette Löf, personal correspondence. For further information, see; (1) Löf, A. (2016) Locking in and locking out: a critical analysis of the governance of reindeer husbandry in Sweden, *Critical policy studies* 10 (4), pp. 426 – 447 and (2) Lantto, P. and Mörkenstam, U. (2008) Sami rights and Sami challenges, *Scandinavian journal of history* 33 (1), pp. 26 - 51

38 Josefsen, E. (2010) The Saami and the national parliaments: channels for political influence. *Resource centre for the rights of indigenous peoples*.

39 ScienceNews (2016) World's largest reindeer population may fall victim to climate change, accessed 22 November 2018, https://www.sciencenews.org/blog/wild-things/worlds-largest-reindeer-population-may-fall-victim-climate-change

40 Kirchner, S. and Frese, V. M. (2016) Sustainable indigenous reindeer herding as a human right. *Laws* 5: 24

41 Hogg, C., Neveu, M., Stokkan, K.-A., Folkow, L., Cottrill, P., Douglas, R., Hunt, D. M. and Jeffery G. (2011) Arctic reindeer extend their visual range into the ultraviolet. *Journal of experimental biology* 214: pp. 2014 - 2019

42 Joly, K., Jandt, R. R. and Klein, D. R. (2016) Decrease of lichens in Arctic ecosystems: the role of wildfire, caribou, reindeer, competition and climate in north-western Alaska. *Polar research* 28 (3): pp. 433 - 442

43 Bartsch A., Kumpula T., Forbes B. C. and Stammler F. (2010) Detection of snow surface thawing and refreezing in the Eurasian Arctic with QuickSCAT: implications for reindeer herding. *Ecological applications* 20 (8): 2346 - 2358

44 New Scientist, 2016, 80,000 reindeer have starved to death as Arctic sea ice retreats, last accessed 20 November 2018, https://www.newscientist.com/article/2112958-80000-reindeer-have-starved-to-death-as-arctic-sea-ice-retreats/

45 Mallory, C. D. and Boyce, M. S. (2017) Observed and predicted effects of climate change on Arctic caribou and reindeer. *Environmental reviews* 26 (1), pp. 13 - 25

46 Horstkotte, T. (2013) Contested landscapes: social-ecological interactions between forestry and reindeer husbandry. *Department of Ecology and Environmental Science, Umea University*

47 EJF 2018 – filmed interview with Annette Löf

48 Schreiber, M., 11.12.2016, 'In a land of thundering reindeer, suicide stalks the indigenous Sami', *PBS*, https://www.pbs.org/newshour/world/sami-indigenous-reindeer-suicide

49 Ibid.

50 Omma, L., et al. (2013). Suicidal expressions in young Swedish Sami, a cross-sectional study. *International Journal of Circumpolar Health*, 72 (10)

51 Kivinen, S., Moen, J., Berg., A and Eriksson, Å. (2010) Effects of modern forest management on Winter grazing resources for reindeer in Sweden. Ambio 39 (4), pp. 269 – 278

52 Singh, S.M., Sharma, J., Gawas-Sakhalkar, P. et al. (2013) Atmospheric deposition studies of heavy metals in Arctic by comparative analysis of lichens and cryoconite, *Environmental Monitoring and Assessment*, 185, pp. 1367-1376

53 Tauli-Corpuz, V. (2016) *Report of the Special Rapporteur on the rights of indigenous peoples on the human rights situation of the Sami people in the Sápmi region of Norway, Sweden and Finland* (Vol. 16) A/HRC/33/42/Add. 3. Retrieved from http://unsr.vtaulicorpuz.org/site/index.php/documents/country-reports/155-report-sapmi-2016

54 Kirchner, S. and Frese, V. M. (2016) Sustainable indigenous reindeer herding as a human right. *Laws* 5: 24

ENVIRONMENTAL JUSTICE FOUNDATION
Protecting People and Planet

Environmental Justice Foundation (EJF), 1 Amwell Street, London, EC1R 1UL, UK
Tel: +44(0) 207 239 3310, info@ejfoundation.org, www.ejfoundation.org