EBM5: Species specific conservation actions in the time of ecosystem-based management Ecosystem drivers and adaptive management of the critically endangered arctic fox in northeastern Norway





MILIØ

DIREKTORATET



Dorothee Ehrich, Rolf A. Ims, Siw T. Killengreen

> Arctic Biodiversity Congress Rovaniemi 11.10.2018

Arctic fox in Finnmark



- Early 20th century: Finnmark was a core area for arctic fox in Norway
- Decline of arctic foxes in all Fennoscandia for almost a century, despite protection in 1930
- 2004: initiation of arctic fox research on Varanger peninsula as part of the arctic fox conservation program of the Norwegian Environmental Agency

Arctic fox in Finnmark: aims

- Document the state of the arctic fox in eastern Finnmark
- Study the structure and dynamics of ecosystem components likely to affect the arctic fox
- Assess whether the management action of culling red foxes on Varanger Peninsula released the arctic fox from competitive pressure

Conceptual model:

Ecosystem-based

Adaptive management





Predator community



Arctic fox and red fox





+ Disturbance on dens in spring

PCQAA HVPFRFIRF PRA

Red fox culling



What supports the expansion of red foxes?





What supports the expansion of red foxes?

Genetic analyses (microsatellites) show waves of immigration in lemming peak years





Arctic fox and red fox culling





(Ims et al. 2017, polar Research)

Possible reasons:

- Low initial population size made the population prone to demographic and environmental stochastic
- Red fox culling alone is not sufficient as conservation measure
- Population not rescuable given the current state of the ecosystem







ARCTIC FOXES AND CLIMATE CHANGE

Out-foxed by Arctic warming



C Mark McLaughlin

Summary

 The Arctic Fox is one of the top land-dwelling predators of the Arctic region. It is thought to be one of the first mammals to have colonised Sweden and Finland following the last ice-age.

 As the Arctic region warms, tundra habitat may slowly be replaced by boreal forest from the South.
Forest habitat is unsuitable for Arctic Foxes.

 Red Foxes prey on and are superior hunters to Arctic Foxes. Northward encroachment of Red Foxes into the Arctic Fox's range has already been documented and is likely to continue as the tundra warms.

 Arctic Foxes prey largely on lemmings and voles.
Milder and shorter winters are predicted to cause declines in the regularity of these rodents' population cycles, as well as decreases in their overall numbers.

 These factors are likely to cause declines in Arctic Fox numbers and range size. Arctic Foxes highlight the impacts of climate change on the ways that species interact with each other, both through competition and via changes in predator-prey relationships.





Handlingsplan for fjellrev

(Vulpes lagopus) Norge – Sverige 2017–2021



The IUCN Red List of Threatened Species*

«Climate-Ecological Observatory for Arctic Tundra»



Science Plan for COAT: Climate-Ecological Observatory for Arctic Tundra



A monitoring system for changes in tundra ecosystems in the Norwegian Arctic under the influence of climate change

The development builds on

- Arctic fox in Finnmark
- 3 other projects

Web page: www.coat.no

Lead by Rolf A. Ims, Department of Arctic and Marine Biology (UiT)



The arctic fox module in Varanger

78° N

COAT implements adaptive monitoring





Arctic fox module in COAT: updated conceptual model



Feeding stations and release of captive bread individuals

- Collaboration with the Norwegian Institute for Nature Research
- 27 pups released on 4 dens in February 2018, and more to come
- Continued careful monitoring of the population



Predictions of a theoretical model

- Competition by red fox decreases the growth rate of arctic foxes.
- The effect is stronger for red foxes supported by constant subsidies, such as reindeer, than for red foxes exploiting a fluctuating resource such as lemmings





EBM5: Species specific conservation actions in the time of ecosystem-based management

- How did the focus on the threatened species in your case study originate?
- Does the conservation initiative apply ecosystem-based management?
- When and how did an ecosystem perspective appear?
- What did or what could and ecosystem-based approach add with regard scientific understanding? And with regard to management?
- Did the case benefit from the species-specific focus?

Thank you!

Arne Petter Sarre, Alfred Ørjebu (SNO Vadsø) Bjørn-Hugo Kristoffersen, Astrid Bye (SNO Tana) Arild Landa (NINA)





MILIØ



John-Andre Henden (UiT)

Øystein Flagstad (NINA) All field and lab assistents participating over the years All red fox hunters involved in the project

