Project information

Keywords
Sustainable harvesting, Climate change, Management, Stakeholder involvement

Project title
Sustainable management of renewable resources in a changing environment: an integrated approach across ecosystems (SUSTAIN)

Year
2019

Project leader
John-André Henden

Geographical localization of the research project in decimal degrees (max 5 per project, ex. 70,662°N and 23,707°E)
69.472 and 25.511

Participants

Torkild Tveraa and Audun Stien at NINA, Rolf A Ims, Nigel G Yoccoz, Jarad P Mellard and John-A Henden at UiT and Eva Fuglei and Åshild Pedersen at NP

Flagship
Terrestrial

Funding Source

NRC funds the SUSTAIN project until the end of 2019

Summary of Results

The project had its start in January 2016 with a user panel meeting (cf. The Strategic Foresight protocol) where all the researchers in the project, end-users and stakeholders met to discuss what should be the focus of the research within the project. This meeting initiated the contact between the different interest groups within the different focal case studies in the project, which spearheaded further discussions and meetings throughout 2016-2018. This has ended up in agreed-upon focus for the scientific work, such that its focus has relevance for end-users and stakeholders in the future. The additional funding that the project received from FRAM ensured that researchers from NINA in Tromsø could attend these meetings as well as be actively involved in the ongoing discussions, analyses and writing of scientific publications. This has been vital, given their long-term research and knowledge about reindeer husbandry in Norway (Reindeer case study), one of the main end-users/stakeholders in the project, as well as Audun's long-term research and knowledge from Svalbard in the high Arctic (Svalbard case study).

Both have also been vital actors in the work on the evaluation of management actions implemented to change the fate of endangered Lesser white-fronted goose in Norway. This work has shown that the increase in the population of geese in Finnmark after the red fox decimation program was initiated, is not likely due to the management action, but due to indirect food web interactions with small rodents and availability for predators of reindeer carcasses, both of which has increased the last decade. This work highlights the importance of a proper evaluation of management actions, by assessing possible other drivers of change (food web approach).

Both researchers have also been part of the work on drivers of change in willow ptarmigan dynamics the last decades. This work show that the population growth rate of ptarmigan has decreased since the start of the millennium (2000). By adopting a food web approach, we have shown that climate change act on ptarmigan both directly (local climate) and indirectly (through small rodents, carcasses and predators). One of the strongest drivers have been the effect of delayed onset of winter, likely leading to higher predation pressure on ptarmigan due to a mismatch in plumage color and snow cover.

Both researchers are vital in an ongoing work looking at drivers of reindeer production in the reindeer husbandry in Finnmark. Here we have found that the fecundity of reindeer (proportion of females with calves in spring) is affected by the amount of snow in April, body condition of females' pre mating, density dependence, time of spring start and to a smaller degree plant productivity in late spring/early summer. We have further used this model framework to predict production in the form of the number of calves produced the next breeding season and fecundity, information that has great value for reindeer herders concerning e.g. planning harvest outtake. Predictions show that our model is able to predict reindeer production quite well, though there at some differences between districts and regions in Finnmark.

Master and PhD-students involved in the project

Several master and PhD student involved, e.g. Filippo Marolla (PhD student at UiT)

For the Management

Results are continuously communicated to the end-users and stakeholders through the project.

Published Results/Planned Publications

JA Henden, RA Ims, E Fuglei, ÅØ Pedersen. (2017). Changed Arctic-alpine food web interactions under rapid climate warming: implication for ptarmigan research. Wildlife Biology, wlb.00240

F Marolla, T Aarvak, IJ Øien, JP Mellard, JA Henden, S Hamel, A Stien, T Tveraa, NG Yoccoz, RA. Ims. (2018) Assessing the effect of predator control on an endangered goose population subjected to predator-mediated food web dynamics. Journal of Applied Ecology 56 (5), 1245-1255

A. Stien. 2017. Blood may buy goodwill - no evidence for a positive relationship between legal culling and poaching in Wisconsin. Proceedings of the Royal Society of London, Ser. B. 284: 20170267, http://dx.doi.org/10.1098/rspb.2017.0267.

RA Ims, NG Yoccoz. (2017). Ecosystem-based monitoring in the age of rapid climate change and new technologies. Current Opinion in Environmental Sustainability. Volume 29. ISSN 1877-3435.s 170 – 176.s doi: 10.1016/j.cosust.2018.01.003.

Kleiven, E. F., Henden, J-A., Ims, R.A. and Yoccoz, N.G. Seasonal difference in temporal transferability of an ecological model: near-term predictions of lemming outbreak abundances (2018). Nature Scientific Reports 8(1): 15252.

RA. Ims, JA Henden, AV Thingnes, MJ Garmo, MA Strømeng, JU Jepsen. (2019) Risky greenness: Primary productivity and bird nest predation risk across tundra ecotones. In Review Nature Climate Change 9 (8), 607-610

Henden, J.-A., Ims, R.A., Yoccoz, N.G., Asbjørnsen, E., Stien, A., Mellard, J.P., Tveraa, T., Marolla, F. and Jepsen, J. (MS). End-user involvement to improve predictions and management of populations with complex dynamics and multiple drivers. In review in Ecological Applications.

Fuglei, E., Henden, J-A., et al. Circumpolar status of arctic ptarmigan: Population dynamics and trends (2019). Ambio: Online Early

Communicated Results

F Marolla, T Aarvak, IJ Øien, JP Mellard, JA Henden, S Hamel, A Stien, T Tveraa, NG Yoccoz, RA. Ims. (2018). Contrasting effect of small rodents and reindeer carcasses on an endangered Arctic-nesting goose species: implications for management. 2018 Nordic Oikos Meeting. Trondheim. Norway.

F Marolla, T Aarvak, IJ Øien, JP Mellard, JA Henden, S Hamel, A Stien, T Tveraa, NG Yoccoz, RA. Ims. (2018). The need of evidence-based management: the case of the of the Lesser White-Fronted Goose in Northern Norway. 5th European Congress of Conservation Biology. Jyväskylä. Finland.

E Bellier, BE Sæther, S Engen. (2018) Sustainable harvest of predators and prey in a fluctuating environment. ESA Annual Meeting. New-Orleans, LA. USA

JP Mellard, S Hamel, JA Henden, RA Ims, F Marolla, A Stien, T Tveraa, NG Yoccoz. (2018) Effect of carcass availability on food web dynamics. Nordic OIKOS conference. Trondheim Norway, February.

Henden, J-A. Exploring the predictive ability of state-space models to aid management of

ptarmigan populations with transient dynamics and complex drivers. AMINOR Forum

Discussions, 2019.

Popular/management:

JA Henden, RA Ims. (2018) Forskning og forvaltning av småvilt. Utfordringene i lys av de store og raske miljøendringene krever en økosystem-basert tilnærming. Småvilforvaltning: møte med FOU-miljøene, NJFF og Miljødirektoratet for innspill til fremtidens småviltforvaltningen, Gardermoen (Juni).

JA Henden, RA Ims. (2017) Sustain Rype-case – diskusjon, tolkning og betydning av foreløpige resultater for forvaltningen. Møte med FEFO, NJFF samt lokale interessenter i Finnmark for diskusjon av Rype casen. November (Lakselv).

JA Henden, E Fuglei and RA Ims. (2019) Populasjonssykluser hos rype – stor variasjon i rom og tid. Naturen, 03/2019, volum 143.

Nedgangen i fuglebestander i Arktis kan skyldes grønnere tundra. Artikkel på Framsenteret.no (https://framsenteret.no/2019/07/nedgangen-i-fuglebestander-i-arktis-kan-skyldes-gronnere-tundra/)

Eggplyndring kan ødelegge rypebestand. Artikkel på forskning.no (https://forskning.no/dyreverden-fugler-partner/eggplyndring-kan-odelegge-rypebestand/1356536)

NB: Results are continuously communicated to the end-users and stakeholders through the project and through meetings and workshops

Budget in accordance to results

All the funding has been used on the vital participation of the two NINA researchers, as planned.

The additional funding from the FRAM centre has assured the crucial involvement and participation of two researchers at NINA in Tromsø, i.e. Torkild Tveraa and Audun Stien, costs which was not included in the project financed by the NRC. Flagship funding have therefore complemented the funding from NRC and assured that the researchers from NINA have had some research time and mental involvement devoted to the project.

Could results from the project be subject for any commercial utilization

No

Conclusions

The additional funding that the project received from FRAM ensured that researchers from NINA in Tromsø could attend these meetings and be actively involved in the ongoing discussions and evolution of the projects focus. This has been vital, given their long-term research and knowledge with regards to reindeer husbandry in Norway, one of the main end-users/stakeholders in the project, as well as Audun's long-term research and knowledge from Svalbard in the high-arctic. Their involvement has been vital for the finalization of the project at the Tromsø node of Sustain, especially their contribution to publications.