Large scale Arctic raptors monitoring as an alternative to the Ecosystem-based approach

Olga Kulikova, Arctic Research Center of the Yamal-Nenets autonomous district, Russia; University of Konstanz, Germany

Nadia French, PRPI/Birmingham University; UK

the set of the street

ECOSYSTEM APPROACH TO THE ARCTIC

- Marine ecosystems have been a flagship of the approach, however representation of marine vs terrestrial cases have been greatly disproportionate. This could be due to both - profound difference between the ecosystems and the international governance potential
- In theory: EA "considers the integrity of entire ecosystems and their interaction with other ecosystems. Although the complexity and data/analysis requirements far exceed those of the species approach, the rewards of the ecosystem-based approach are significant." CAFF
- In reality: Focal Ecosystem Components "critical to the functioning and resiliency of Arctic ecosystems and/or reflect the vital importance to the subsistence and economies of northern communities

OBSTACLES TO EA

- research [data deficiency, data collection and analysis methods, lack of interdisciplinarity, high costs, difficulty in achieving consensus, etc.]
- governance [stakeholders, research funding and commissioning, science-policy interface, etc.]
- nature [heterogenous biome, seasonality, dynamic interspecies interactions, etc.]
- Seasonal variation (E.g. distinction between breeding and foraging grounds, with migratory routes inbetween)
- External interannual trends (E.g. climate change, habitat loss, degradation)
- Internal interannual trends (E.g. population dynamics)
- Intrinsic stochasticity of real (as opposed to modelled) ecosystems (e.g. complexity of reality vs simplicity of research output)
- Variability and uncertainty, BUT relative simplicity

What could be done to improve the situation?

In order to implement the ecosystem approach (humans and all), certain fundamental changes need to be made, such as:

• overhaul of environmental research framework (whether through a more complex study design, an addition of a higher level interpretation or an interdisciplinary compilation),

• potential changes in funding system, collaboration structure, legal framework, etc.

• And even so, by the time we manage to collect baseline data sufficient to assess and evaluate "ecosystem services", we might be already far past the sustainability threshold with no nature to preserve.

So what are the alternatives?

Typical three level tundra food-web

(Ims and Fuglei **2005)**



Why do we focus on a species only when it becomes rare?

What if we take a species that is:

- Rather common
- Has a circumpolar distribution
- Breeds in most of terrestrial tundra biomes
- Is a top-predator
- Has an opportunistic diet
- Other parameters?

And try to use it as an indicator of change...

What are the main obstacles for rough-legged buzzard to be taken as an indicator species?

- Is it an obligate rodent-eater?
- Is it a nomad raptor roaming along all tundra in search for resource-rich site each spring?

Or rather :

Opportunistic

 Having a decent level of site-fidelity

 obtaining population level mechanisms to survive through bad years

The International Breeding Conditions Survey on Arctic Birds

- Covers period from 1978 to 2017
- Includes results of the surveys done by the researchers who performed their fieldwork in tundra regions
- Gives quality data on the abundance of rodents: high, average, low
- And amount of buzzards: rare, common, abundant
- Also the breeding performance of the buzzards
- b buzzards breeding
 n buzzards not breeding
 h chicks hatched from the eggs
 f chicks fledged from the nests

715

records with data on both rodents and buzzards present







Low rodents and breeding buzzards 2008-2017



Could it be just rare events?

• Examples from long-term studies on different sites

Bludnaya River mouth, Taimyr, 17 years, during which RLB is 'rare'





b - buzzards breeding

- n buzzards not breeding
- h chicks hatched from the eggs
- f chicks fledged from the nests



The field data on RLB diet

 Kolguev Island - a totally rodent absent) ecosystem with high goose densities

Malozemelskaya tundra



Tracking data proves the site fidelity of RLB

 Kolguev island phenomena - Enormous goose population Stable population of RLB with high nesting site fidelity (90%) and very high nestling survival rate (close to 100%)



Not a unique one...

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Demographic responses of a site-faithful and territorial predator to its fluctuating prey: long-tailed skuas and arctic lemmings

Frédéric Barraquand¹*, Toke T. Høye^{2,3}, John-André Henden¹, Nigel G. Yoccoz¹, Olivier Gilg^{4,5}, Niels M. Schmidt^{2,6}, Benoît Sittler^{7,5} and Rolf A. Ims¹

¹Department of Arctic and Marine Biology, University of Tromsø, Tromsø 9037, Norway; ²Arctic Research Centre, Aarhus University, Aarhus DK-8000, Denmark; ³Department of Bioscience, Aarhus University, Rønde DK-8410,

 The example of the long-tailed skua mitigating long term food depletion by population mechanisms...

So every species has it's own way...



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Study of " " species within each trophic level as alternative or complimentary to EA – possible?

Advantages

 Easier to establish circumpolar
 How to decide on the species monitoring

 Possible to make field protocol easy to implement

(or group of species) to focus on?

Threats

 We need to know the structure of food web really well=> need more research on it

• More probable to have long-term funding (a lot less money)

• Other?

Thank you! Any questions?

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Olga Kulikova gaerlach@gmail.com

Nadia French nadinfrench@gmail.com