

Natural resources and bioeconomy studies 90/2025

Synthesis report: Wildlife as part of a conflict – experiences and recommendations

Madeleine Nyman, Anssi Ahtikoski, Iina Ala-Kurikka, Jukka T. Forsman,
Inari Helle, Juha Hiedanpää, Mikko Jokinen, Artti Juutinen, Meri Kallasvuo,
Tuija Lankia, Esa Lehtonen, Ari Leskelä, Jani Pellikka, Eija Pouta, Pekka Salmi,
Annika Tienhaara and Riikka Venesjärvi

Synthesis report: Wildlife as part of a conflict – experiences and recommendations

**Madeleine Nyman, Anssi Ahtikoski, Iina Ala-Kurikka, Jukka T. Forsman,
Inari Helle, Juha Hiedanpää, Mikko Jokinen, Artti Juutinen, Meri Kallasvuo,
Tuija Lankia, Esa Lehtonen, Ari Leskelä, Jani Pellikka, Eija Pouta, Pekka Salmi,
Annika Tienhaara and Riikka Venesjärvi**



The report has been produced partly by the LIFE BOREALWOLF project. The project received funding from the European Union's LIFE programme (LIFE BOREALWOLF, LIFE18 NAT/FI/000394). The project takes full responsibility for the content it has produced. Neither the European Commission nor CINEA is responsible for the material or the use of the information it contains.

Referencing instructions:

Nyman, M., Ahtikoski, A., Ala-Kurikka, I., Forsman, J.T., Helle, I., Hiedanpää, J., Jokinen, M., Juutinen, A., Kallasvuoto, M., Lankia, T., Lehtonen, E., Leskelä, A., Pellikka, J., Pouta, E., Salmi, P., Tienhaara, A. & Venesjärvi, R. 2025. Synthesis report: Wildlife as part of a conflict : experiences and recommendations. Natural resources and bioeconomy studies 90/2025. Natural Resources Institute Finland. Helsinki. 47 pp.

Madeleine Nyman ORCID ID, <https://orcid.org/0009-0008-3297-9125>



ISBN 978-952-419-136-4 (Online)

ISSN 2342-7639 (Online)

URN urn.fi/URN:ISBN:978-952-419-136-4

Copyright: Natural Resources Institute Finland (Luke)

Authors: Madeleine Nyman, Anssi Ahtikoski, Iina Ala-Kurikka, Jukka T. Forsman, Inari Helle, Juha Hiedanpää, Mikko Jokinen, Artti Juutinen, Meri Kallasvuoto, Tuija Lankia, Esa Lehtonen, Ari Leskelä, Jani Pellikka, Eija Pouta, Pekka Salmi, Annika Tienhaara and Riikka Venesjärvi

Publisher: Natural Resources Institute Finland (Luke), Helsinki 2025

Year of publication: 2025

Cover picture: Virpi Oinonen, Business Illustrator

Synthesis report: Wildlife as part of a conflict – experiences and recommendations

Madeleine Nyman, Anssi Ahtikoski, Iina Ala-Kurikka, Jukka T. Forsman, Inari Helle, Juha Hiedanpää, Mikko Jokinen, Artti Juutinen, Meri Kallasvuo, Tuija Lankia, Esa Lehtonen, Ari Leskelä, Jani Pellikka, Eija Pouta, Pekka Salmi, Annika Tienhaara and Riikka Venesjärvi

Key messages of this report:

At worst, conflicts between humans and wildlife can be multidimensional, multilevel, unpredictable, and difficult to manage. They can also have an impact on society as a whole.

Successful conflict management is based on a broad and shared knowledge base that takes the ecological, social, and economic aspects into account.

Practical measures such as designated fields for goose feeding and seal-safe fishing gear are key means to mitigate conflicts and secure biodiversity.

Attitudes and participation play a crucial role in conflict management, as a transparent exchange of information and dialogue promotes understanding and commitment between different parties.

A multidisciplinary knowledge base and assessment of the effectiveness and impact of the management make it possible to adapt to changing conditions and develop more efficient and long lasting solutions

Abstract

Madeleine Nyman, Anssi Ahtikoski, Iina Ala-Kurikka, Jukka T. Forsman, Inari Helle, Juha Hiedanpää, Mikko Jokinen, Artti Juutinen, Meri Kallasvuo, Tuija Lankia, Esa Lehtonen, Ari Leskelä, Jani Pellikka, Eija Pouta, Pekka Salmi, Annika Tienhaara and Riikka Venesjärvi

Natural Resources Institute Finland (Luke), Latokartanonkaari 9, Helsinki

This synthesis report addresses the management of human-wildlife conflicts in Finland. It describes the solutions that reconcile the conservation of biodiversity and the protection of livelihoods. Effective conflict management has positive impacts on the well-being of both wildlife and people.

The report describes different examples that have been successful in conflict mitigation. For example, the accommodation fields have been a working solution to mitigate the conflict between the barnacle geese and humans. Further, tools have helped in coordinating the reindeer herding with other land use. In conflict mitigation work on case of the Saimaa ringed seal, changing attitudes of local people and developing seal-safe fishing gear have been important.

The work demonstrates that successful conflict management is based on a shared knowledge base, which allows the understanding of root causes and identifying possible solutions. Ecological, social, and economic perspectives should be always considered. Collaboration between different actors is essential, creating a foundation for open and clear communication, and enabling long-term commitments.

The report provides six development proposals that can be used to prevent and resolve human-wildlife conflicts. The proposals emphasize the need for support for dialogue and collaboration, requiring the creation of peer support networks. A multidisciplinary knowledge base and an evaluation tool for assessing the management impacts enables the adaptation of the management system to the changing environment. The development proposals are:

- 1) More research on the impacts of conflict species on ecosystems, natural resources, and human activities
- 2) More participatory, interdisciplinary and crossdisciplinary research
- 3) Improve the knowledge and competence of scientists, decision-makers, stakeholders
- 4) Increase the peer support for those working in human-wildlife conflicts
- 5) Develop the collaboration between authorities and civil society
- 6) More impact assessment and research on conflict management

Keywords: conflict management, biodiversity, human-centered approach, interdisciplinary research

Tiivistelmä

Madeleine Nyman, Anssi Ahtikoski, Iina Ala-Kurikka, Jukka T. Forsman, Inari Helle, Juha Hiedanpää, Mikko Jokinen, Artti Juutinen, Meri Kallasvuo, Tuija Lankia, Esa Lehtonen, Ari Leskelä, Jani Pellikka, Eija Pouta, Pekka Salmi, Annika Tienhaara ja Riikka Venesjärvi

Luonnonvarakeskus, Latokartanonkaari 9, Helsinki

Synteesiraportti käsittelee ihmisten ja luonnonvaraisten eläinten välisten konfliktien hallintaa Suomessa. Se kuvaa ratkaisuja, joiden avulla on pyritty yhteensovittamaan luonnon monimuotoisuuden suojelua ja elinkeinojen turvaamista. Pitkittyneiden konfliktien hallinnalla ja purkamisella on merkittäviä myönteisiä vaikutuksia ympäröivän luonnon ja ihmisen hyvinvoinnille.

Raportti kokoaa erilaisia rinnakkaiseloon liittyviä keinoja, joilla ristiriitoja on onnistuttu lieventämään. Esimerkiksi valkoposkihanhen kohdalla hanhipellot, karkotustoimenpiteet ja korvaukset ovat lisänneet hanhien hyväksymistä ja turvanneet ruoantuotantoa. Poronhoitoon on kehitetty työkaluja, joilla poronhoitoa ja muuta maankäyttöä on onnistuttu yhteensovittamaan. Saimaannorpan suojelussa taas merkittävää on ollut paikallisten asukkaiden asenteiden muokkaaminen ja norppaturvallisten pyydysten kehittäminen.

Raportti osoittaa, että onnistunut konfliktinhallinta perustuu yhteiseen tietopohjaan. Se mahdollistaa ristiriitojen perusteiden ymmärtämisen ja jaetun tahtotilan. Myös ratkaisumahdollisuuksien tunnistaminen helpottuu. Ratkaisumalleja kehittäessä on otettava huomioon ekologiset, sosiaaliset ja taloudelliset näkökulmat. Keskeistä on eri toimijoiden välinen yhteistyö, joka luo pohjan avoimelle ja selkeälle viestinnälle ja mahdollistaa pitkäjänteisen sitoutumisen.

Raportti tarjoaa kuusi kehitysehdotusta, joiden avulla voidaan ehkäistä ja ratkaista pitkittyneitä ihmis-eläinkonflikteja. Ehdotuksissa korostetaan vuorovaikutuksen ja yhteistyön tukemista, mikä edellyttää toimijoiden tukea ja vertaistukiverkostojen luomista. Monitieteinen tietopohja ja hallinnon vaikuttavuuden arviointi taas mahdollistavat sopeutumisen muuttuviin olosuhteisiin. Kehitysehdotukset ovat:

- 1) Lisätään tutkimusta konfliktilajien vaikutuksista ekosysteemeihin, luonnonvaroihin ja ihmistoimintaan
- 2) Lisätään osallistavaa, moni- ja poikkitieteellistä tutkimusta
- 3) Lisätään tutkijoiden, päätöksentekijöiden, toimeenpanevien tahojen ja sidosryhmien edustajien tietotaitoa ja osaamista
- 4) Lisätään ihmis-eläinkonfliktien parissa työskentelevien vertaistukea
- 5) Kehitetään viranomaisten ja kansalaisyhteiskunnan vuorovaikutusta
- 6) Lisätään vaikuttavuusarviointia ja tutkimusta konfliktien purkamisesta

Asiasanat: konfliktinhallinta, luonnon monimuotoisuus, ihmislähtöisyys, poikkitieteellinen tutkimus

Sammanfattning

Madeleine Nyman, Anssi Ahtikoski, Iina Ala-Kurikka, Jukka T. Forsman, Inari Helle, Juha Hiedanpää, Mikko Jokinen, Artti Juutinen, Meri Kallasvuori, Tuija Lankia, Esa Lehtonen, Ari Leskelä, Jani Pellikka, Eija Pouta, Pekka Salmi, Annika Tienhaara och Riikka Venesjärvi

Naturreesusinstitutet (Luke), Ladugårdsbågen 9, Helsingfors

Syntesrapporten behandlar hanteringen av konflikter mellan människor och vilda djur i Finland. Den beskriver lösningar som har använts för att sammanjämka å ena sidan bevarandet av biodiversiteten och å andra sidan säkerställandet av befolkningens försörjningsmöjligheter. Hanteringen och lösningen av utdragna konflikter har betydande positiva effekter på välbefinnandet för både djurlivet och människorna.

I rapporten sammanställs en rad åtgärder för att befrämja en samexistens, som har varit framgångsrika när det gäller att mildra konflikter. När det gäller vitkindad gås har till exempel gåsförbud, skrämselfångst och ekonomisk kompensation ökat acceptansen för gäss och säkrat livsmedelsproduktion. Verktyg för renskötsel har utvecklats för att sammanjämka renskötseln med annan markanvändning. När det gäller Saimenvikaren har man gjort en insats för att påverka lokalbefolkningens attityder och utvecklat fiskeredskap som är säkra för vikaren.

Rapporten visar att en framgångsrik konflikthantering bygger på en gemensam kunskapsbas. Den möjliggör en förståelse för de underliggande orsakerna till konflikter och de olika målsättningarna. Den underlättar också identifieringen av möjliga lösningar. Ekologiska, sociala och ekonomiska aspekter måste beaktas då lösningar tas fram. Samarbete mellan de olika aktörerna är viktigt för att skapa en grund för öppen och tydlig kommunikation och ett långsiktigt engagemang.

I rapporten ges sex rekommendationer för utveckling för att förebygga och lösa utdragna konflikter mellan människor och djur. De betonar vikten av att stödja dialog och samarbete, vilket kräver stöd från aktörer och skapandet av nätverk för personalstöd. En tvärvetenskaplig kunskapsbas och ett instrument för utvärdering av hur effektiv konflikthanteringen är kommer att möjliggöra anpassning till förändrade omständigheter. Rekommendationerna är följande:

- 1) Mer forskning om hur olika typer av konflikter påverkar ekosystem, naturresurser och mänsklig verksamhet.
- 2) Öka deltagarbaserad, tvärvetenskaplig och mångvetenskaplig forskning
- 3) Öka kunskaperna och kompetensen hos forskare, beslutsfattare, genomförare och intressenter
- 4) Öka stödet för dem som arbetar med konflikter mellan människor och djur
- 5) Utveckla samverkan mellan offentliga myndigheter och det civila samhället
- 6) Utveckla ett instrument för utvärdering av konflikthanterings inverkan i samhället och nya redskap kring konfliktlösning

Nyckelord: konflikthantering, biologisk mångfald, människan i fokus, tvärvetenskaplig forskning

Contents

1. Conflicts between humans and wildlife	8
1.1. Background.....	8
1.1.1. Interaction between humans and wildlife.....	8
1.1.2. Conflicts between groups of people.....	8
1.1.3. Human-wildlife conflicts can be wicked problems.....	10
1.2. Purpose of the synthesis report.....	12
2. Experiences of successful conflict management.....	15
2.1. Flying squirrel: Urban forests enable reconciliation of conservation and land use.....	15
2.2. Reindeer: New tools for reconciling reindeer herding with other land uses.....	17
2.3. Barnacle geese: Goose fields, repellents, and compensation boost tolerance and secure production.....	20
2.4. Saimaa ringed seal: Finns support the protection of the Saimaa ringed seal, and the development of seal-friendly fishing gear supports the protection.....	23
2.5. Baltic seals: Co-development mitigates the negative effects of seals on coastal fishing.....	25
2.6. Wolves: Communication increases the cooperation in game management.....	28
3. The status of the Human-wildlife Conflict Management in Finland	32
3.1. The Population Management Plans as a tool in Conflict Management.....	32
3.2. Promoting coexistence between humans and wildlife	34
4. Conclusions and development proposals	37
References.....	43

1. Conflicts between humans and wildlife

1.1. Background

1.1.1. Interaction between humans and wildlife

Humans and wildlife share habitats in cities and rural areas, with mostly neutral interaction between them. Humans also utilize wildlife by breeding or domesticating animals for nutrition or in other ways. Yet humans compete with wildlife for shared landscapes, nutrition, and natural resources. Some species may cause worry and fear, financial damage and even human deaths.

Various human activities and the resulting pressures can adversely affect wildlife and their living conditions. Many species become endangered through the loss and degradation of their habitats. Agriculture, forestry, construction, pollution, and climate change are the most significant threats to species and habitats in Finland (Auvinen et al. 2020). Transport and energy production can also be harmful and may cause animal deaths. The use and disposal of wildlife has led to the extinction or population loss of numerous animal species.

Negative interactions between humans and wildlife can lead to long-lasting and serious conflicts. Human-wildlife conflicts pose a challenge to the sustainable use of natural resources, food security, and nature conservation both in cities and rural areas. Human interaction with wildlife should therefore aim for successful coexistence through sharing the common landscape sustainably (IUCN 2023).

1.1.2. Conflicts between groups of people

People may have varying opinions on decisions concerning wildlife, which in turn may lead to conflicts between different groups of people (Peltonen & Kangasoja 2015). According to the International Union for Conservation of Nature (IUCN) species specialist group on human-wildlife conflicts and coexistence, conflicts between humans and wildlife (henceforth "human-wildlife conflicts" or HWC) arise when the presence or behaviour of wildlife causes real damage or perceived, direct, or recurrent threats to human interests or needs, leading to disagreements between groups of people or negative impacts on humans and/or wildlife (IUCN 2023). HWC can be described as: 1) it is recurring; 2) it is almost always caused by disagreements between groups of people on the management of a certain animal population; and 3) it often, but not always, concerns species that are in need of protection but also cause negative impacts on humans (IUCN 2023).

Hunting, fishing, and other use of natural resources are often associated with conflicts concerning values and disagreements between stakeholders (Holma et al. 2014). Conflicts may also arise areal planning if the interests and objectives of environmental protection and land-use are contradictory. Examples include the increasing pressure of land use and the need to protect the flying squirrel (described in more detail in Chapter 2, Haila et al. 2007), as well as the increasing pressure of the use of the sea floor in marine areas and the need to protect underwater species and habitats (Virtanen & Moilanen 2023).

Wildlife can cause financial damage to many industries, and some HWC have developed as a result of changes in the society. Large carnivores such as bears, wolves, lynxes and wolverines, may share the same landscapes as human settlements, which can cause challenges for the local residents' daily lives and livelihoods. For example, large carnivores can cause damages to domestic animals or worry and fear among the residents. Residents' concerns and fears towards the large carnivores has elevated negative attitudes towards these species. Wolves in particular are a concern for hunters, as they may harm hunting dogs (Hiedanpää & Ratamäki 2015, Niemi et al. 2014, Ratamäki 2009).

Other wildlife may also be detrimental to agriculture. For example, abundant corvids such as jackdaws may damage farmers' crops and bales and be a hygiene hazard. Increased populations of geese, cranes, and swans also cause damage to farmers, as they eat, trample, and damage crops when they gather in fields during their migration. Dense populations of white-tailed deer and wild boar may cause substantial damage on farms leading to financial losses for the farmers (Matala et al. 2021). Tensions and mistrust between farmers and other parts of society may flame up as a HWC or elevate the conflict (Hiedanpää et al. 2023, Salo et al. 2021).

Growing populations of cormorants and grey seals along the coast affect the profitability of coastal fishing in the Baltic Sea. Birds and seals damage the caught fish and the fishing gear and affect local fish stocks, which challenges the fishing business (Söderkultalahti & Moilanen 2023, Hauhia et al. 2023). Fishing restrictions imposed in inland waters to protect the Saimaa ringed seal affect the fishing industry and leisure fishing. These restrictions have given rise to opposition and conflict (Peltonen & Sivonen 2022).

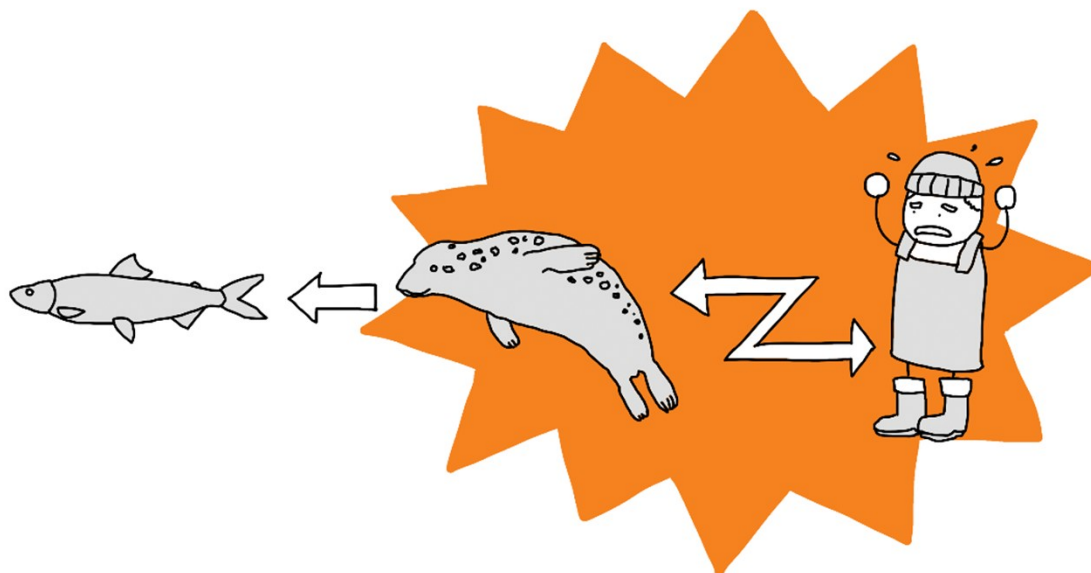


Figure 1. An example of a human-wildlife conflict, described in more detail in Chapters 2.4 and 2.5.

1.1.3. Human-wildlife conflicts can be wicked problems

At worst, HWC are multidimensional, multilevel, difficult to resolve, and unpredictable, i.e. wicked problems. According to Alford and Head (2017), wicked problems arise from many different problems for which there is no solution, and the future of which is impossible to predict. With such a problem, it is unrealistic to seek a full resolution to the conflict. Instead, the goal can be to mitigate and properly manage the conflict, reduce its negative impacts, and promote coexistence.

It is challenging to find socially and economically sustainable solutions to such a conflict. Each conflict has a depth of its own, with separate histories and specific challenges. This makes it difficult to apply general solutions on a larger scale. In addition to private interests, it is important to consider different aspects of the public interest, such as the protection of natural values, and the perspective of future generations (Peltonen & Kangasoja 2015).



Figure 2. At worst, HWC are multidimensional, multilevel, difficult to resolve, and unpredictable, i.e. wicked problems.

Abundant and widespread animal populations allow the sustainable use of them. At the same time, they may irritate landowners and businesses, as they may cause detrimental damage to arable land, commercial forests, and gardens. Abundant animal populations can also threaten rare plant populations and habitats through overgrazing.

The increasing human population, the accelerating use of natural resources, changes in the economic structure, and urbanisation are all affecting the level of HWC in the society. In some cases, the protection requirements set by the European Union (EU) and international

agreements have resulted in a reduced national decision-making power, which in turn has elevated conflicts between the objectives of environmental protection on one hand and the sustainable use of natural resources on the other.

Varying expectations and wishes between different groups of people make it difficult to manage HWC. Two HWC components should be distinguished from each other: the direct effects of an animal on humans, other animals, or habitats, and the conflict between humans, which is usually a conflict between conservationists and those who oppose environmental protection (Redpath et al. 2013). It is usually more difficult to influence interpersonal relationships than the direct negative effects caused by an animal. As the management of conflicts over wildlife often involves disputes between people, it is crucial to know and understand the parties' values and perspectives (Klenke et al. 2013).

HWC render from people's experiences and acceptability of the effects of management decisions and measures (Eriksson et al. 2024). Generally, the conflict is based on mistrust, varying needs and values between the stakeholders, and on a lack of trust towards the management system in general. Conflicting animal species may also be used as a political tool to put forward other societal problems and challenges, such as the threats towards some rural sectors. HWC are also inherited through generations, and intertwined with past grievances and polarised local opinions, which may only have an indirect link to the HWC in question.

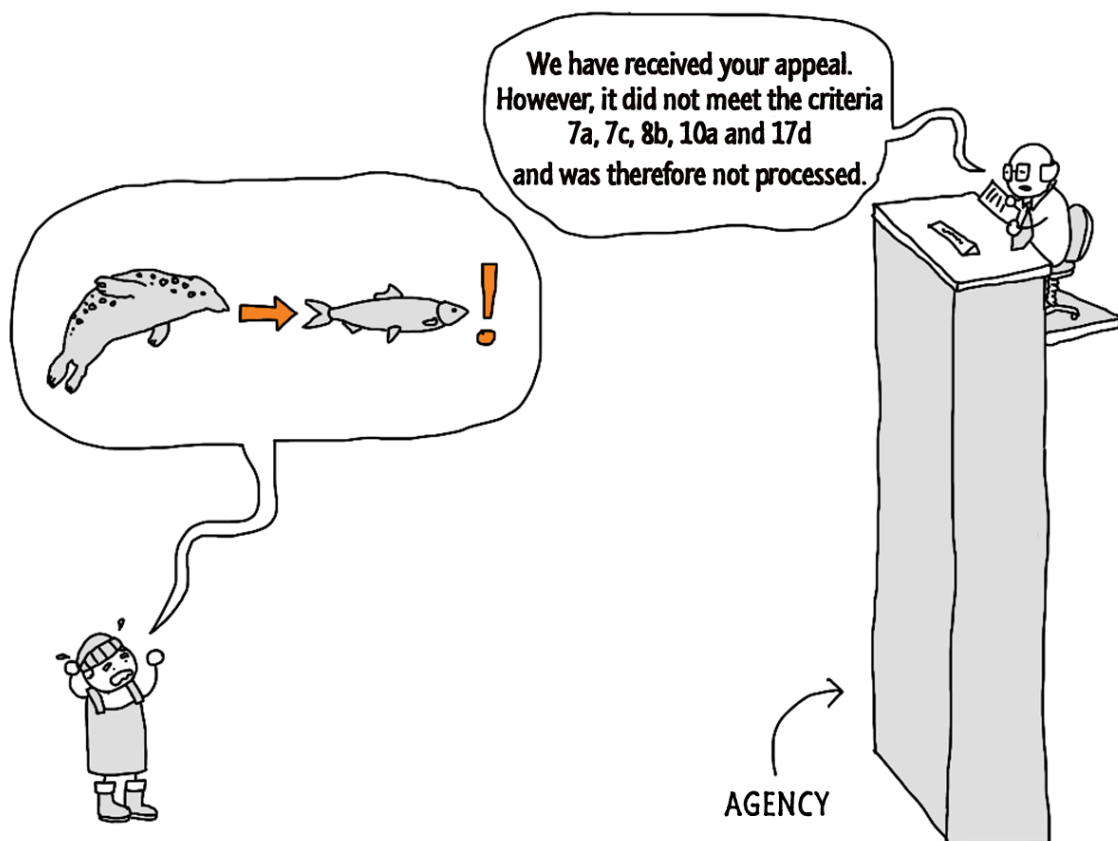


Figure 3. Decisions and policies that people perceive as unfair undermine their trust in the governance and management system.

In Finland, efforts have been put into the HWC management through administrative and legal regulation, financial support, information sharing and dialogue, planning, coordination and through self-management (Sairinen 2002). The aim has been to find a balance between the needs of humans and wildlife, so that nature does not deteriorate, and people consider their living environment safe and one that promotes wellbeing. The management aims at balancing economic needs, social factors and the nature protection. Experts in Finland have developed structures, processes, and tools to minimise the harm caused by wildlife. Many of these have resulted in a successful balance between the needs for nature protection and co-existence.

However, many deep rooted HWC remain, and unsuccessful management efforts have resulted in negative outcomes for both humans and wildlife. Prolonged stalemates and legal processes have added to people's experience of injustice and the authorities' indifference to hear and engage with victims through dialogue and action. Ineffective conservation measures may have resulted in no change in or even deterioration of a species' endangered status. Mistrust towards authorities and the scientific process has affected the general climate and has increased the polarised debate in the society. The conflict is often divided by a line between people who live in rural versus urban environments. HWC pose significant challenges to the public bodies seeking to find a common ground for the objectives of the conservation and for the sustainable use of wildlife, as they also need to consider other pressures such as the growing need for land use in finding the resolution. Finland uses substantial resources to manage animal populations. As an example: the state reimbursed farmers, hunters and reindeer herders with approximately EUR 9.7 million for reindeer, agricultural, and livestock damage caused by large carnivores alone in 2024 (Register of Game Animal Damage, <https://riistavahingot.fi/#/riistavahingot>).

1.2. Purpose of the synthesis report

The aim of this synthesis report is to describe efforts made by the Natural Resources Institute Finland (Luke) to manage and mitigate HWC. We examine the role of Luke in conflict management and consider the role of research in mitigating and resolving conflicts. In Chapter two, we demonstrate HWC projects conducted by Luke and the experiences gained from them. In Chapter three, we examine the links between HWC management and game management in Finland and consider the need for further research. Finally, based on our experiences, we provide recommendations to promote the management and research of human-animal conflicts in Finland.

Info box 1

Game management. Population management of game species includes several connected processes from protecting a species or its habitats to enabling its sustainable use as natural resources. Sustainable population management requires a holistic approach that takes ecological, social, cultural, health, and economic aspects into account.

Protection, restoration, and sustainable use of species. Population management includes measures to protect endangered and threatened species, and to contribute to the recovery of their populations. Population management also includes the sustainable use of animal populations when they can be utilised appropriately. It may include species-specific management plans, conservation of genetic resources, initiatives to restore habitats, and actions to address threats such as poaching, habitat destruction, and climate change. Strategies are often developed in collaboration with experts, stakeholders, interest groups, and local communities.

Regulation of the use of species. Governance structures regulate the sustainable use of natural resources, such as hunting, fishing, and tourism. Regulation aims to prevent overuse, minimise negative impacts on wild animal populations, and ensure equal treatment. For some species, there is an administrative effort to reduce the population size due to adverse impacts on the ecosystem or on human livelihoods.

Political and legal framework. Population management begins with the creation of policies and legal frameworks at the local, national, and international levels. These frameworks define the rights, obligations, and provisions concerning species conservation and management. They may include laws on hunting, trade, and the protection of habitats or species.

Institutional structures. Effective population management requires institutions responsible for policy implementation and natural resources management. These institutions may include government agencies, organisations within hunting or nature conservation, indigenous groups, and community organisations. A clear allocation of roles and responsibilities between these institutions is important for effective game population management.

Game population assessment. Population management includes the monitoring of animal populations and changes therein. This includes research on the development of the distribution and abundance of species, monitoring the status of habitats, and population assessment. Scientific output provides a sound basis for informed operative decisions and assessments of the effectiveness of the management measures.

Habitat conservation and restoration. Habitat conservation and restoration are an integral part of species management. Activities include identifying important habitats, establishing protected areas, preventing the deterioration of habitats and implementing measures to improve them. The aim of habitat conservation and restoration is to maintain the ecosystem health and support viable animal populations.

Engaging and involving the civil society. Effective population management often involves including local communities, indigenous peoples, and stakeholders in decision-making processes. Community-based approaches allow locals to participate in conservation activities, share traditional knowledge, and benefit from the sustainable use of natural resources and the environment. Collaborative management models promote sustainability and support conservation goals.

International collaboration. Game management extends beyond national borders, which requires international collaboration to address transboundary challenges. International agreements provide a sound basis for collaboration, for example, controlling invasive alien species, combating illegal trade of wildlife, and habitat protection. Multilateral initiatives promote shared responsibility for the global protection of biodiversity.

Info box 2

Parties responsible for wild animal population and other expert organisations

The Ministry of Agriculture and Forestry is responsible for national policies and legislation on the protection, hunting, and habitat management of game species subject to the Hunting Act. It is also responsible for the national implementation of EU directives.

The Ministry of the Environment is responsible for the protection of wild species under the Nature Conservation Act, national and international policies, and legislative work.

The Finnish Wildlife Agency is a public body responsible for the management and protection of game species. It implements national policies and regulations on hunting, game management, and protection of species. They grant hunting licenses.

The Finnish Forest Centre is a governmental organisation under the Ministry of Agriculture and Forestry. Its task is to promote forest-based livelihoods, implement forest legislation, and maintain forest information.

Metsähallitus is a governmental consortium of different enterprises and public bodies, including the parks and wildlife services division, that promotes hunting and fishing in state owned areas. It also leads and implements the wildlife surveillance and enforcement of wildlife crime in these areas.

ELY Centres are part of the regional administration. They are responsible for the management and protection of wildlife that are not included in the Hunting Act. They implement national policies at the regional level, grant derogations related to protected animal and plant species and provide advice to local stakeholders and citizens.

The European Union (EU) is an important platform for international collaboration concerning species conservation and policy, as many species are distributed in areas covering many nations. The EU legislation is influenced by many of the Union's strategies. International legislation and global conventions also apply in Finland. The Birds and Habitats Directives are the most important pieces of nature conservation legislation in the EU.

Natural Resources Institute Finland is a research institute governed by the Ministry of Agriculture and Forestry. It carries out scientific research and innovation and produces information and provides policy advice for decision-making and management.

The Game Consortium is a platform for the public bodies responsible for the game management in Finland. It discusses strategic initiatives such as species and habitat-specific management plans. The members of the game consortium are the Ministry of Agriculture and Forestry, the Finnish Wildlife Agency, game management associations, Natural Resources Institute Finland, the Parks and Wildlife Services of Metsähallitus, and the Finnish Food Authority.

2. Experiences of successful conflict management

2.1. Flying squirrel: Urban forests enable reconciliation of conservation and land use

Artti Juutinen, Anssi Ahtikoski, & Jani Pellikka

What is it about?

Flying squirrels are found in the boreal forests zone of Eastern Siberia and Japan, which extends to Finland and Estonia. In Finland, the species is mainly found south of the Oulu-Kuusamo line. The typical habitat of the flying squirrel is a mature, spruce-dominated mixed forest (Mönkkönen et al. 1997, Hanski 1998). Flying squirrels are also found in urban areas in Finland, which often feature suitable mixed forests (Mäkeläinen et al. 2015).

According to the latest threat assessment, the flying squirrel's population has decreased by more than 30% since the last assessment ten years ago (Hyvärinen et al. 2019). Its conservation status is therefore vulnerable (VU). The flying squirrel is a strictly protected species under the EU Habitats Directive and protected under the Nature Conservation Act (1096/1996). The main reason for the population decrease is habitat loss and isolation of individuals due to intensive forest management (Hyvärinen et al. 2019). Various changes in land use, such as construction projects, have also caused habitat loss at a local level (Haila et al. 2007).

Forest owners are often required to include the requirements of the flying squirrel into their forest management planning without any compensation of income loss. Also urban planners and builders are obliged to take the requirements of the flying squirrel into consideration in their planning of land use. However, they find it difficult due to the challenging monitoring of their occurrence as the species is nocturnal. Monitoring results are not available for every location. Flying squirrel habitats may also come as a surprise to land users, which in part may increase the conflict between protection and land use (Nygren & Peltola 2020). To mitigate these conflicts, it is important to understand the citizens' opinions on the issue, as well as to share information on the species and on squirrel-friendly forest management methods, and good urban planning practices.

What has been done?

The Flying Squirrel LIFE project (2018-2025) was coordinated by Metsähallitus and funded by the EU LIFE programme. The project involved 18 organisations from different sectors in both Finland and Estonia. It aimed at promoting the protection of flying squirrels in Europe through securing the network of suitable habitats that are essential to protect the species. The project developed and harmonised operative models to reconcile the protection of the flying squirrel and land-use needs. For example, the project prepared forest plans for forest owners, organised training sessions, produced guides, and built artificial passageways for flying squirrels in the urban environment.

In the project, Luke produced research data to support decision-making by participating in developing prognostic charts of flying squirrel habitats (available at species.fi), and in the assessment of the biological and socioeconomic impacts of the habitat protection.

Action 1: Forestry and conservation of flying squirrels in urban forests

We investigated how the management of urban recreational forests affected the flying squirrel's habitats and their connectivity (Ahtikoski et al. 2023). The study was conducted in the Laajavuori recreational forest in Jyväskylä. We simulated different treatment and management options in the forest stands that enhance the flying squirrel protection.

The results show that promoting recreational values in urban forest management also enhances the flying squirrel protection. To protect the flying squirrel, cost-effective management practices include avoiding clearcutting and avoiding cutting in stands with large-diameter aspen. It is more cost-effective to incorporate measures to protect the flying squirrel into the management of urban forests that are already managed for recreational use.

Action 2: Resident attitudes towards the flying squirrel protection

In cities, the presence of flying squirrels is sometimes only apparent when a building project is already in progress, which may cause a considerable delay in the project. For a local resident, this situation might occur during construction or restoration projects of a house or when cutting down trees. The attitudes towards the flying squirrel and its protection vary in the society. It is important to consider different perspectives in urban planning to enable protection and to avoid an increasing tension between different social groups.

We studied the attitudes of local residents towards flying squirrel protection in the cities of Espoo, Jyväskylä, and Kuopio (Juutinen et al. 2023). Responses were collected through random sampling and with an open invitation in Yle's online news. Respondents were asked for their opinion on statements about the flying squirrel and its protection.

We identified four groups of distinct attitudes:

- 1) clearly in favour of protection (32%)
- 2) neutral to protection (36%)
- 3) somewhat opposed to protection (26%)
- 4) clearly opposed to protection (6%).

Residents over the age of 60 and forest owners were more likely to belong to groups with varying degrees of oppositional attitudes towards protection. This group also included residents who had experienced negative impacts of the squirrel protection. The group with strictly opposing attitudes did not find that they had been provided with insufficient information on squirrel protection – on the contrary, this group most often felt that sufficient information had been shared. In general, the residents who were most opposed to the protection of flying squirrels rarely had information about flying squirrel populations in their own city's forests, while residents most in favour of protection did have the information. A majority of the residents participating in the open survey were in favour of squirrel protection in general.

What did we achieve?

The results show that urban forest management for recreational use promotes the protection of the flying squirrel and safeguards biodiversity. The management of urban forests should aim for mutual benefits instead of conflict. It is possible to improve the urban forest management to promote the flying squirrel's habitat by protecting stands with large-diameter aspen,

for example. The project's results provide a model for cost-effective management of urban forests, while promoting both flying squirrel protection and recreational use.

Resident attitudes towards the Flying squirrel protection are divided. Understandably, residents whose income has been negatively affected have a particularly negative attitude towards protection. Residents who are aware of the presence of flying squirrel in their urban forests have a more positive attitude. We cannot directly conclude from this that communication boosts positive attitudes, but it does contribute to a fact-based discussion.

Generally, urban planning and its acceptability are enhanced using inclusive planning through hearings and discussions for residents, for example. The participants of these events and respondents to the open surveys were more prone to support squirrel protection. An assessment using multiple qualitative and quantitative data collecting methods could provide a more detailed and representative picture of the resident's attitudes of the flying squirrel and its protection.

The project enhanced the use of scientific information in different ways. Its surveys were planned and carried out in cooperation with stakeholders. The material collected in the project was handed over to the stakeholders' and the results were shared with them in organised seminars. The results were also presented to targeted stakeholders in discussion sessions. Scorecards and their descriptions were published on the project website. In addition, the results were written into scientific articles and reports in Finnish.

Insights

- 1) Urban forests provide good conditions for reconciling different goals.
- 2) It would be possible to cost-effectively improve the habitats of the flying squirrel in urban forests.
- 3) Resident attitudes towards the protection of flying squirrels are divided. Efforts can be made to improve acceptability of flying squirrel protection by supporting interaction and communication between actors.
- 4) It is important to increase residents' participation in planning, and to achieve this, it is necessary to consider new methods.

2.2. Reindeer: New tools for reconciling reindeer herding with other land uses

Mikko Jokinen & Juha Hiedanpää

What is it about?

Tensions, disputes, and conflicts between reindeer, reindeer herding, and other human activities have been going on for centuries in the Finnish reindeer husbandry area. Reindeer herders have been increasingly forced to adapt to the expansion of other livelihoods, land uses, and construction of housing and holiday homes in important reindeer grazing areas. For example, in the Kuusamo region, relations between reindeer herders and farmers are tense, and as their conflicts have escalated, there have even been demands to abolish free reindeer grazing rights and to decrease the official reindeer husbandry area.

What has been done?

The PALOMA project (2019–2020), funded by the Lapland ELY Centre, studied the causes and effects of problems and conflicts between reindeer herders, farmers, and stakeholders advocating for more construction of housing and holiday homes in Kuusamo. It produced proposals to manage and prevent these problems (Hiedanpää et al. 2020).

The project carried out a process analysis in which the approach was to identify conflicts and consider solutions.

Action 1: Situation mapping

To provide context for the situation, we studied the changes and availability of the grazing areas through spatial data. We also organised individual interviews and focus group discussions.

There were significant differences in attitudes towards reindeer husbandry within the groups of farmers, and holiday and permanent residents. Some reacted strongly against keeping pet in the housing premises, while others were neutral or even thought of them as an exotic add to their holiday. In part, tensions arise from direct damage caused by reindeer. Without proper functional fencing, barriers and repellents, reindeer will end up on farmed land causing crop damages. Also pet reindeer are sometimes seen as a problem, as they eat and dig through garden plants, and defecate in yards and on terraces. As a rule, the premises of holiday homes and detached houses lack fences, and the law does not require the reindeer herding cooperative to put fences around them.

However, the dispute in Kuusamo only applies to a minority of the citizens, with the majority of people getting along with each other. Additional factors influence the reindeer dispute in Kuusamo that are independent of the activities or relationships of the parties. Significant changes and expansions in land use have occurred, and the regional reindeer herders face a significant predator pressure from large carnivores. In addition, weather conditions and insect's occurrence affect the reindeer's behaviour and the damage they are perceived to cause.

Action 2: Reindeer Watch Service

The PALOMA project collected information about reindeer encounters, such as times and locations, in Kuusamo during the summer of 2019 through the Reindeer Watch service. The service included the Reindeer Watch hotline and an online information site with a possibility to send information. The aim of the study was to collect experiences and to support problem-solving. The service documented cases and forwarded them to the reindeer herding cooperative. In turn, the cooperatives reported on necessary and completed measures.

The Reindeer Watch service was open from 22 May to 30 September 2019. During this time, the service received 491 reports, with July being the busiest reporting month. Nearly half the reports concerned reindeer in the yards of residential buildings. The remaining reports were divided fairly evenly between farmland and holiday resort areas. Based on the reports, the reindeer disturbances were concentrated in a few areas. The most common reason for submitting a report was that reindeer had made a mess with their droppings. Damage to yards and gardens, and crops were also common reasons for submitting a report. The Reindeer Watch service was perceived as a neutral intermediary that helped gather and communicate

information. Both the submitters of reports and the reindeer herders hoped the service would continue in Kuusamo after the project had ended.

Action 3: Local Collaboration Group

To create permanent solutions, we established a local collaboration group. The group provided an opportunity for communication, and for the parties to meet and have constructive discussions. Its priorities became the identification of problems, the exploration of different solutions, and the prevention of conflicts. The collaboration group discussed its operating principles and rules and formed an action and communications plan. The group met six times. The group's position was that this model of collaboration should continue, but that it would be important for a rational and effective operation to include all key parties such as farmers to engage in the discussions and to search for workable solutions. The City of Kuusamo convened a broad-based group of key stakeholders to continue the discussion that the collaboration group had established on collaborative activities.

What did we achieve?

The project's results have practical significance for reindeer herding, land-use planning, and the governance of the reindeer herding livelihood. Since the project, a service modelled on Reindeer Watch has continued to operate in Kuusamo, with a significant material bank on common and specific problems and practical solutions. The project provided the reindeer herding cooperatives with comprehensive information about why and where in Kuusamo reindeer are considered problematic. For residents, the study produced information about how and why reindeer herders reacted to their reports. The city gained more information and contacts for developing its urban and land-use planning. The project resulted in better communication and dialogue between parties. Obviously, there are tensions between some farmers and reindeer herders, but this does not apply to everyone. The futures of the Reindeer Watch service, and the cooperation group were open at the end of the project, but a clear need for them has been acknowledged.

Insights

- 1) The Reindeer Watch telephone service and collaboration between actors are effective tools to improve the dialogue and to solve problems.
- 2) A robust shared knowledge base makes it easier to understand the background of a conflict, test solutions to problems, and plan land use.
- 3) Interpersonal histories and relationships between groups of people largely determine the types of opportunities for collaboration in creating and deploying new methods.

2.3. Barnacle geese: Goose fields, repellents, and compensation boost tolerance and secure production

Jukka T. Forsman, Mikko Jokinen, & Juha Hiedanpää

What is it about?

A conflict between barnacle geese and local farmers has escalated in the areas of North and South Karelia as a result of an increasing number of geese migrating from the Arctic through Finland. The barnacle goose is a model of a successful species protection that has later evolved into a conflict that affects the whole Northern European area. In the 1970s, the barnacle goose population in the Arctic had decreased to just a few tens of thousands of birds. Successful conservation efforts have resulted in the population growing to about 1.5 million. For a long time, barnacle geese nesting in the Russian Arctic were rarely seen in Finland, but in the 2010s, their migration route changed to cross Finland. Barnacle geese feed mainly on crops in their wintering areas and on their migratory routes. Agricultural damage has become by far the largest item of compensation paid due to damage caused by wildlife under the Nature Conservation Act in Finland.

Unlike many other European countries, the barnacle goose is protected in Finland by the Nature Conservation Act. Strict national and international protection restricts the use of methods for repelling geese and mitigating agricultural damage. Local citizens and farmers suffering from these damages have had a difficulty in apprehending the set restrictions. The affected farmers have felt that their voicing on their wellbeing and on the impact of grazing on the profitability of the farms has not been heard or believed. In addition, goose damage prevention procedures have lacked both tried-and-tested, cost-effective damage prevention methods and a comprehensive long-term plan for goose damage prevention measures.

What has been done?

Luke launched a study on agricultural damage caused by barnacle geese, funded by the Ministry of Agriculture and Forestry, in 2019–2020, after which it continued in a project with funding from the Ministry of the Environment in 2021–2023. The new projects were carried out in close partnership with the North Karelia ELY Centre and the University of Turku. The projects have produced research data in natural and social sciences, practical solutions, and policy recommendations for mitigating geese damage and managing the conflict (Hiedanpää et al. 2023, Heim et al. 2022, Salo et al. 2021).

The projects studied the extent of the damage, cost-effective repellent methods, and goose behaviour. In addition, they studied public opinion and the willingness of affected farmers to voluntarily set up goose fields where geese could graze freely. Local observers were hired to examine goose behaviour and collect research data. The projects focused on collecting scientific data and identifying societal impacts. In addition, they developed the dialogue between parties in cooperation with the ELY Centres of North Karelia and Southwest Finland, and the Ministry of the Environment.

Action 1: Continuous dialogue with landowners suffering from damage and with local actors

Conflict situations often arise from a perceived lack of empowerment, which breeds anger and frustration towards the administration responsible for permits. We also identified this state of affairs in this study.

To understand the situation, we interviewed farmers affected by grazing barnacle geese. Interviews and face-to-face meetings with the affected landowners created a mutual trust that genuine efforts were being made to find and create science-based practical solutions to the problem. Concurrently, we established a network of operators who could plan and implement trials in the farmers' fields. The project showed that a continuous dialogue developed faith in that practical solutions could emerge. During the field season, the project staff visited the area daily sharing information and experiences with the locals. Mobilising the researchers to interact with locals was important.

In addition to interviews and meetings, various informal face-to-face encounters were significant for the success of the project. They increased dialogue and trust between researchers, the research subject, and stakeholders. This is also important for the reputation and public image of the research institute (Luke).

Action 2: Communication

Before the projects, citizens mainly received information about barnacle geese from traditional and social media, and this information was often significantly polemic and opinionated. The project of the Ministry of the Environment established a ministry-led group which was responsible for national official communications on barnacle geese. The group compiled a list of frequently asked questions and worked together to prepare scientifically based answers. Weekly press releases were prepared on the migration of barnacle geese, and the movements of geese, tagged with GPS transmitters, were shared with citizens on the website laji.fi (refernssi löytyy FI versiosta!) 1 Satelliittilinnut | Laji.fi

The project organised meetings and excursions in the damaged and test areas for the steering group. During these events, farmers could share their experiences and perceived shortcomings with representatives from the ministries (Ministry of the Environment and Ministry of Agriculture and Forestry) and permit authorities (ELY Centre for Southwest Finland). The project organised press conferences in connection with the events.

Action 3: Scientific knowledge on management methods

Prior to the projects, barnacle geese had been repelled with passive methods such as balloons or hawk kites. The study showed that these passive repellents were ineffective. Using repellents to direct geese to feed on fields that have been set aside for them was shown to be a more effective method. Goose fields and the associated repelling fields were designed with landowners. In the field trials of the repellent methods, locals were able to participate in the study and gather material.

What did we achieve?

Cooperation with locals started with a few farmers who were amenable to the projects. With good experiences and face-to-face meetings, the collaboration expanded to a few dozen

people. With very few exceptions, the feedback was very positive, and our work received praise from both farmers and birdwatchers. In 2022, the North Karelian Ornithological Society selected our project as the Bird Act of the Year.

The media was initially sceptical about our projects. On social media, the project and the recruited locals were even mocked. After we produced results and communicated them, attitudes became more objective. The communication group's proactive communication on the science and active reporting of the results left little room for rumours.

Encouraged by the results, thousands of hectares of goose fields (feeding and repelling fields) have been established in 2023 in North Karelia. In addition, subsidies for the activity are now in place. This transforms victims and locals into active participants in preventing goose damage. Farmer attitudes towards goose fields as part of the solution became more positive during the project.

Insights

- 1) Continuous, open, and personal dialogue with stakeholders, and especially with locals, is the most important key to resolving a conflict. Getting to know one another makes it easier to work together, reduces tension, and creates trust.
- 2) It is central to find the key persons locally in order to be able to achieve the set goals.
- 3) Collaboration helps in understanding scientific methods and results.
- 4) Communication must be coordinated with a strong foundation. Researchers must also be able to answer questions outside their own expertise.
- 5) Trust in research and scientific information grows when locals are given the opportunity to comment and offer their own expertise to support the research.

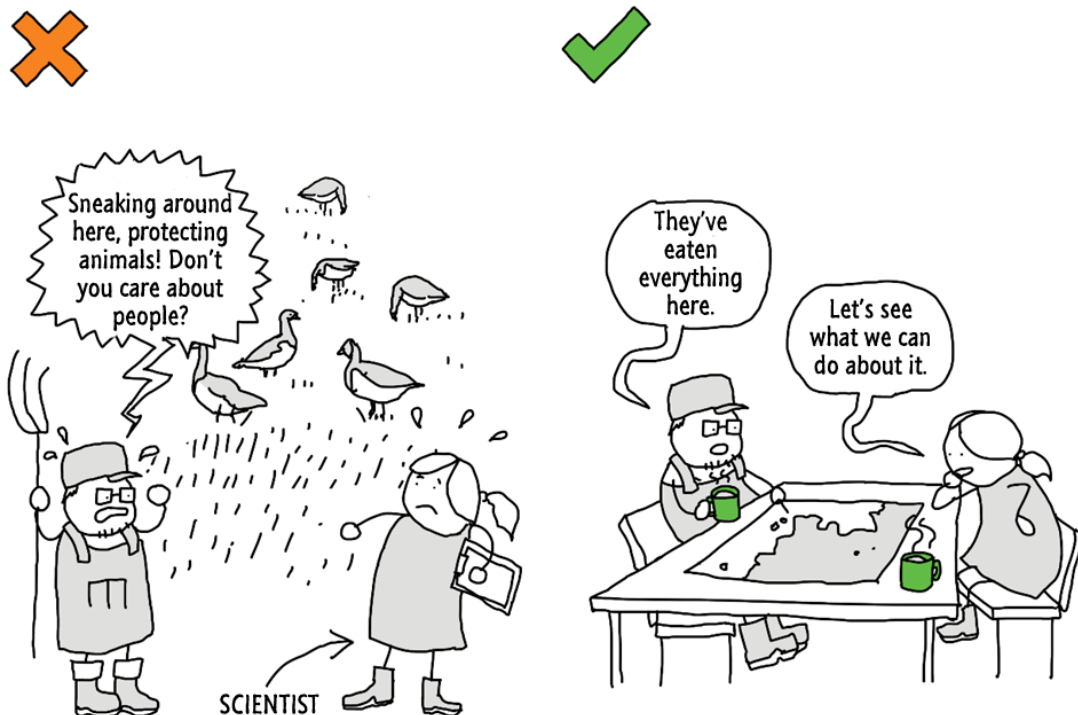


Figure 4. Continuous, open, and personal interaction with stakeholders, and especially with locals, is an important tool for conflict resolution.

2.4. Saimaa ringed seal: Finns support the protection of the Saimaa ringed seal, and the development of seal-friendly fishing gear supports the protection

Tuija Lankia, Ari Leskelä, Eija Pouta, & Annika Tienhaara

What is it about?

Hunting caused the Saimaa ringed seal population to decline in the first half of the 20th century. The Saimaa ringed seal was protected by law in 1955. Although its population has started to grow, several factors such as fishing and climate change still threaten it. The most obvious and long-lasting conflict resulting from the protection of the seal population concerns fishing restrictions. The fishing restrictions prohibit the use of certain fishing gear that is particularly detrimental to the seals and regulate net fishing in the early summer, when the seal pups are particularly prone to getting caught in the nets.

As the seal population is growing and dispersing over wider areas of Lake Saimaa, the area with fishing restrictions is increasing. Fishermen feel that the restrictions are partly excessive or unnecessary. As the restrictions are based on the size and threat classification of the population, fishermen question the accuracy of the population estimate. Acceptance of stricter fishing restrictions has been hampered by concurrent changes in the fish stocks and in the market value of the fish species.

Protection efforts have been met with opposition and conflict (Peltonen & Sivonen 2022). The reconciliation of different perspectives is considered key to the solution. Reconciliation could be possible through increasing the knowledge base, clarifying the conservation objectives, and using conflict resolution and consensus-based decision-making (Peltonen & Sivonen 2022).

What has been done?

Efforts were made to alleviate the conflict by developing seal-friendly fishing gear and identifying citizens' attitudes in the Saimaa Seal LIFE (2013–2018) and Our Saimaa Seal LIFE (2020–2025) projects.

Action 1: Development of seal-friendly fishing gear

In collaboration with several operators, we developed a seal-friendly trap net for the commercial fisheries. Local commercial fishermen and their stakeholders were engaged in the development work throughout the project. The aim was to improve not only the safety of the seals but also the performance of the trap. Seal-friendly trap nets are currently being developed also for recreational fishermen. These traps are smaller, more affordable, and easier to use than the traps developed for commercial fishing.

Seal-friendly fishing gear solutions for commercial fishermen were communicated in cooperation with the Eastern Finland Fisheries Group. Engaging fishermen in the development of new fishing gear was probably the most effective way to ensure that information was communicated to the commercial fishermen. Gear intended for recreational fishers was communicated at various fish markets and other events, as well as on social media.

Action 2: Survey on attitudes towards ringed seals, values, and preferences for protection

The survey was set to determine what kinds of views and attitudes Finns have towards the Saimaa ringed seal and its protection. The Survey conducted in 2022 collected information about the recreational use of the Saimaa area, values ascribed to the seal, and perceptions regarding its protection. The number of respondents (1,500 people) was a representative sample of Finns, with an emphasis on residents of the Saimaa region (more than 500 people).

The valuation study was used to discover the attitudes of different population groups towards protection. It was also used to determine the monetary benefit of protection, thereby achieving a common measure for the economic costs. The results can be used in decision making on the protection of the population, as well as in the choice of protective measures.

The survey provided information about the different attitudes of population groups towards the seal. The Saimaa ringed seal is seen as a symbol of both nature protection and the Saimaa Lake region. The value of the ringed seal's existence was most often emphasised by young and highly educated people who had never visited the Saimaa area. On the other hand, landowners in the area did not feel that the existence or presence of the ringed seal was as important. While residents or visitors of the area felt that the ringed seal was important, 4 % of locals had negative experiences of the Saimaa ringed seal.

Respondents were broadly in favour of protective measures to boost the seal population. The survey used different scenarios to discover the respondents' opinions on increasing the size of the seal population. As a protective measure, the extension of the net fishing ban and restrictions on beach construction highlighted different views between recreational users of the area and citizens from elsewhere. The recreational users were in favour of more protective measures in general together with other citizens, but they would be satisfied with more moderate measures. They were also in favour of a more moderate growth of the seal population. There was unanimous support for a moderate extension of the ban on motorised traffic on ice.

What did we achieve?

As a result of the fishing gear development in the Saimaa Seal LIFE project, fishing with bottom traps was also allowed in ringed seal areas (Government 2021). The change in the regulation and the introduction of bottom traps allowed commercial fishing for pikeperch and perch in areas and seasons that prohibit net fishing.

With the development of new fishing gear, trap net fishing by commercial fishermen has become more common. Both pikeperch and perch catches caught with trap nets and the number of fishermen using them have increased. Since the project, commercial fishermen have continued to develop seal-friendly trap nets. Awareness of alternatives to nets has also spread to recreational fishermen.

The number of seals caught in trap nets is decreasing, despite expectations that trap deaths would increase with the growing population. The development and deployment of trap nets reduce seal deaths and damages in fishing gear. In addition to the development of alternative fishing gear, fishing restrictions are among the factors contributing to the decrease in fishing gear deaths.

The survey results were discussed in the media. They serve as a basis for protective measures and policy planning.

Insights

- 1) There is a lot of enthusiasm and a desire to experiment in developing new gear, but that sentiment may disappear quickly without results.
- 2) Citizens' attitudes towards stricter protection can be assessed through a survey.
- 3) Active communication about positive protection attitudes creates a foundation for strengthening them.
- 4) The results of the valuation study can be used for population management policies and for protective measures.

2.5. Baltic seals: Co-development mitigates the negative effects of seals on coastal fishing

Pekka Salmi & Esa Lehtonen

What is it about?

Baltic seals, especially the grey seal, are considered the biggest challenge for the coastal fisheries and its development (Svels et al. 2019, 2022). Seals affect the industry in many ways by damaging catches and gear and repelling fish, for example. Many fishermen have reacted to these challenges by changing fishing grounds or fishing methods, targeting different species, or by shifting focus from fishing to processing and direct sales. Some have ceased their livelihood due to a decline in profitability.

The long-lasting seal conflict in the Baltic Sea is multifaceted, requiring close cooperation both locally and at different levels of the management of the fisheries organisation and the environmental administration (Salmi et al. 2022). Technical development of fishing gear to reduce the seal conflict has been widely regarded as an acceptable and recommended means of management.

What has been done?

Action 1: Seal friendly fishing gear

The coastal fisheries business has put its efforts into reducing gear and catch damage caused by seals by changing the structure and materials of the fishing gear. In particular, trap nets can be built to efficiently refrain seals from entering the trap and destroying the catch (Salmi et al. 2022).

Luke and the former Finnish Game and Fisheries Research Institute (RKTL) have carried out numerous research and development projects with fishermen to improve the seal resistance of trap nets.

In the Baltic Sea region, the key technical breakthrough has been the pontoon trap net, which was developed in Sweden in the late 1990s. It was imported to Finland in the early 2000s for coastal salmon fishing. The use of Pontoon tarp nets spread quickly along the entire coastline. The pontoon trap net has subsequently undergone a variety of improvements, with the

creation of different versions for catching different species (including whitefish, herring, and pikeperch).

Action 2: Repelling seals with acoustic deterrent

Making a seal-resistant trap nest is not a sufficient measure, despite its significant reduction in fish damage. It is also important to prevent seals from approaching the trap nets. Sound-wave-based underwater seal repellents have been tested along the coasts of Finland and Sweden since the early 2000s. In recent years, Luke has been testing a new generation of sound repellents with promising effects from fishermen's perspective (Lehtonen et al. 2022).

The advantage of modern repellents is that they emit sound at different wavelengths and frequencies with varying time gaps. This prevents seals from becoming accustomed to the repellent. The devices can be used for both trap nets and net fishing. In recent years, a new approach of mitigating seal damages by closing entire water areas from the seals has received great attention along the coastline (Lehtonen et al. 2023, Suuronen et al. 2025). This would allow active year around fishing in these areas without seal damages.

Action 3: Collaboration with professional fishermen

Fishermen have extensive knowledge of their fishing grounds, fish behaviour and migration routes, as well as long-term experience of suitable fishing methods and techniques. Combining this experience and knowledge with scientific data has been important for the success of projects that support the industry and has required mutual trust. It has been particularly important to build up a relation of mutual respect and trust between the fishermen and scientists, to reach the common goals. The fisheries partners who have succeeded in building this trust have contributed to several projects during an extensive time.

In the early stages of the projects, events were organised to convene scientists and coastal fishermen to discuss the content, objectives, and benefits of working together. The knowledge and experience of the fishermen was included in the project planning on the research topics and on details of developing fishing gear. The fishermen felt included in the project through this engagement process. In addition, the partners were provided with seal repellent devices developed in the Fisheries Innovation Programme, and in return, they kept records of their catch, observations, and the impact of the seal repellent on the catch (Ruokonen & Keskinen 2023).

Long-term collaboration based on personal interaction with several fishermen in different coastal areas has created a partly self-directing approach. Fishermen record the observations, measure the catch fish, and report them as agreed. During the project, the fisheries' associations and Luke organised events for assessing the results and the suitability of the methods for different fishing areas. Knowledge of the new jointly developed methods has spread rapidly through social media. Opinion leaders have played a key role in sharing the information. Proactive information sharing by Luke at various events of the fisheries sector has also been an important channel of spreading information.

What did we achieve?

The development of seal-resistant fishing gear has made it possible for many coastal fishermen to continue with their livelihood. The raised investment support (up to 80%) available to

coastal fishermen allows them, among other things, to replace pontoon trap nets with new ones, which increases their fishing capacity compared to old traps.

Seal repellents have potential for reducing seal damage in both fishing and fish farming. They do not affect the number of seals, but they can limit local damage in the vicinity of the traps. Coastal fishermen's experiences of using seal repellents in salmon trap net fishing have been promising. Repellents have reduced seal damage compared to traps without a repellent (Suuronen et al. 2024). The study also provided indications that the seals' negative experiences with the repellent reduce their presence near traps (Lehtonen et al. 2022). Seal repellents have also produced promising results in rivers in protecting spawning grounds from seals, for example (Veneranta et al. 2023).

Close cooperation and interaction between Luke and the commercial fishermen have aimed to safeguard the fishing industry and has created mutual trust and developed mutual learning. The administration of the fisheries industry has significantly financed both the collaborative development work and the investments in new equipment and methods. Research projects aimed at reducing seal damage during the new EU programme period are also open to interested fisheries partners who wish to develop and improve their fishing methods.

Close cooperation between Luke and traders has created functional and practical new solutions for safeguarding the industry's operating conditions. Technical mitigation measures have not resolved the seal conflict, but they have often enabled coastal fishermen to continue with their livelihood. As a result of tangible and long-lasting co-development to mitigate the seal conflict, increased confidence is also likely to support wider opportunities and the higher quality of Luke's research and data collection. As the climate of trust grows, it will become possible to use local knowledge seamlessly in research, allowing joint assessments of the practical applications and conclusions of the research results.

Conflicts related to fishing often stem not only from differing goals and values but also from the kind of knowledge base used to make decisions related to the management of fisheries, and whether the knowledge base used is considered adequate and valid (Salmi & Setälä 2022). Through co-creation, the seal-fishing conflict has been able to tap into the silent knowledge of fishermen for the benefit of both the industry and science. Long-term and extensive cooperation networks are needed to mitigate conflicts, to which scientist and experts need to join with an open mind.

Insights

- 1) The technical solutions developed through the cooperation between scientists and fishermen have succeeded in alleviating the human-seal conflict.
- 2) Using the co-development approach, it is possible to combine the local knowledge of the fishermen with research data and use the combined information to benefit both the industry and science.
- 3) Increased trust built through co-development and balanced interaction also provides broader support for research and data collection.
- 4) The promotion of positive cooperation between natural resource users and scientists can be an important way to reduce unnecessary suspicions and conflicts

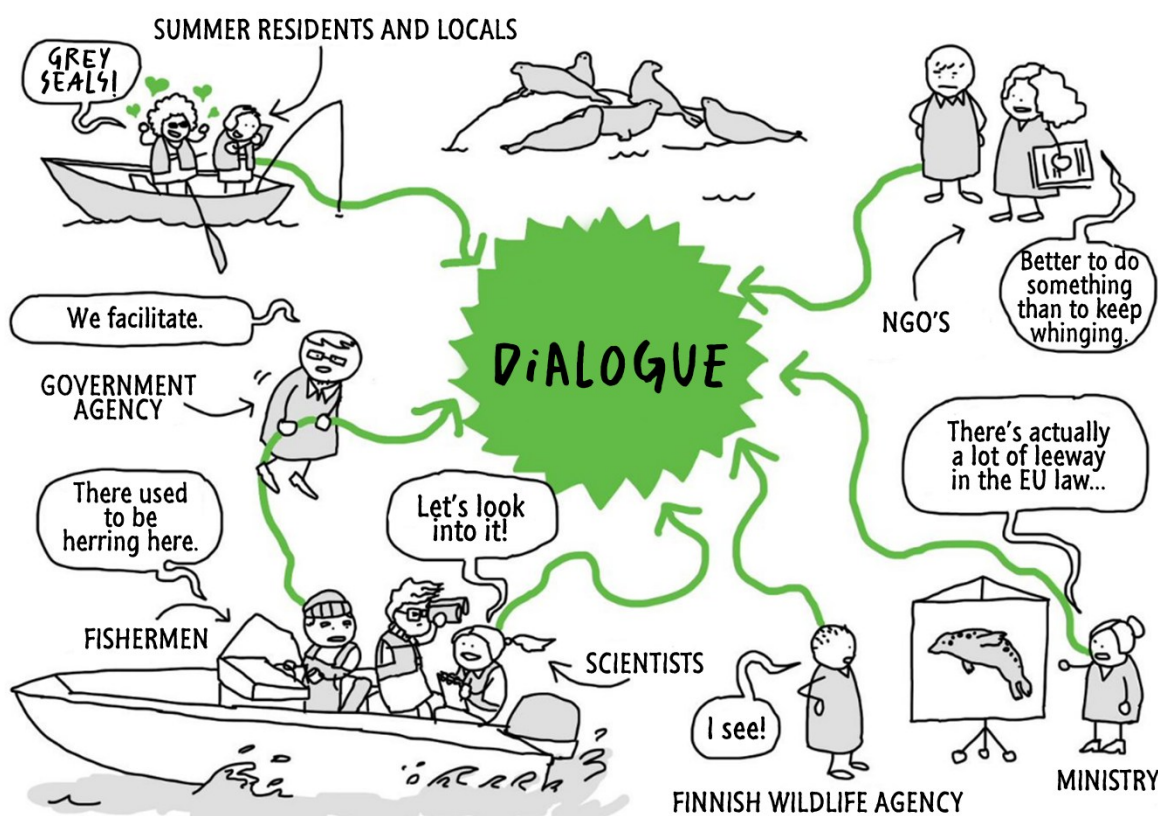


Figure 5. Co-creation and balanced interaction are important tools for creating trust and promoting cooperation.

2.6. Wolves: Communication increases the cooperation in game management

Iina Ala-Kurikka & Madeleine Nyman

What is it about?

There are conflicts related to knowledge, interests, and values around wolves, of which communicators get their share. Even neutral and fact-based communication may raise powerful emotions and fierce comments on social media. Too broad and general communication can easily lead to controversy and affect an organisation's reputation. Experts who speak in public may even receive threats.

Difficulties have shaped communication of the authorities responsible for managing the wolf population and related scientists. The organisations report on wolves with caution, and they avoid commenting on matters strictly outside their own areas of responsibility. Not all experts dare to speak in public due to the negative discourse.

Understandably, as the topic is controversial, the public demands absolute transparency. However, producing generalized information is difficult as it requires summaries and consideration of various aspects. Resources are not always available to communicate about wolves. This leads to reactive communication, focusing on extinguish the "fires" instead of preventing them.

There is a huge need for factual information. The development of wolf communication was seen as an important measure for the wolf population management plan in 2019 (Ministry of Agriculture and Forestry 2019). Stakeholders also raised the importance of communication during the referral round of the development of the management plan.

What has been done?

The LIFE BOREALWOLF project (2019-2025) aimed at mitigating the human-wolf conflict. The partners (Luke, the Finnish Wildlife Agency, Metsähallitus Wilderness Services, the Eastern Finland Police Department, and the Uusimaa District of the Finnish Association for Nature Conservation) formed a unified communication strategy and core messages. The project partners established a communication group for the project, with a member from each. The communication group would read and comment on all products published in the project, except for small and routine social media updates. Luke recruited a full-time communicator for coordinating the external communication of the whole project.

The project determined that its communications would be interactive and fact-based. The project would focus on open communication, dialogue, and cooperation. The project communicated face to face in the field, at events, and online. Its communication channels included websites, social media, and a newsletter. In addition, the project made use of its partners' communication channels.

Action 1: Interfaces for interaction with citizens

There are heated discussions on wolves in the media, social media groups, and in Parliament's plenary sessions. At the core of the conflict are citizens who feel their fears and concerns are not being heard.

No number of websites or social media accounts can replace real encounters between people. The most important communication was made by the project workers, who come into contact with local citizens sharing the same landscape with wolves. Most of the encounters were calm. The most difficult ones were in field inspections of wolf damage where the staff had to face the strong feelings caused by the loss. The challenge of the working staff is to be able to cover the vast areas of wolf occurrence in the country. The project therefore used local volunteers, such as large carnivore observers, as communicators in the field.

The project also trialled new avenues for dialogue with the citizens. Online discussions on the Suomi24 forum brought citizens and game management experts together. The project took several measures to make discussion on social media more constructive: clear rules; comment moderation; interactions with followers; and following closely current topics and tackling them proactively through the different communication channels.

Action 2: One-stop shop for answers to questions about wolves

The project developed a process that allowed people to get an answer to their questions about wolves at a one-stop shop using a wide range of experts within the project staff. Questions came in through email and social media.

The one-stop-shop process started with gathering a small group of experts to prepare an answer to the questions with the support of the communication coordinator. If necessary, the group asked for assistance in preparing a response from outside the project (such as from

the Ministry of Agriculture and Forestry). Each expert included their own perspective in their answer. The responses were collected and stored for possible use in other contexts. Only questions around wolf hunting were excluded, as it was a topic outside the scope of the project.

Action 3: Aggregate, shared communications for important target groups

The project identified central stakeholders and target groups to include in discussions and collaborative activities through a stakeholders' assessment. The chosen groups included politicians (such as the MEPs), schools, journalists, scientist, managers, decision makers and several NGO's. In the past, authorities responsible for managing the wolf population and related scientists have communicated more or less independently in sharing information about the wolves to their target groups. This has often resulted in mismatched messages and an elevated tension in the public debate.

The partner organisations collectively compiled topics and edited the essential information to suit each target group. Thus, for example, DNA monitoring, wildlife surveillance and predator safe fences could be covered in one meeting. Focused events were organised annually for the MEPs and others for journalists. The project also produced material on large carnivores to be used in schools.

What did we achieve?

We have received positive feedback on face-to-face encounters with locals and when given concrete support and guidance. For example, the positive feedback is reflected in articles in local newspapers, in which locals have reported on the help they have received from the project to protect domestic animals from wolves.

Partner organisations have learned from each other, which has deepened their mutual understanding and trust. Information is exchanged between actors at different levels, from locals all the way to ministries. Providing "customer service" through collaborative communication is a cost-efficient approach for the management authorities and scientists. Clarity and understandability are important elements of successful communications around difficult themes. We have received positive feedback on our varied and well-prepared answers to citizens' questions. Interaction and a customer-first attitude have built up a common praxis and trust between the project partners and the authorities in charge of the wolf management at large.

Collaboration is important especially in crisis communication. Having several pairs of eyes and perspectives results in more neutral, effective and focused messaging. Through the collaborative approach, the project partners gained a more extensive view of the communication environment and became more capable of anticipating future topics of discussion. The project's proactive communication on a controversial topic has been encouraging also for the media. As a result, journalists and other actors have been inspired to take a more active approach in sharing wolf-related information.

Insights

- 1) Opportunities to encounter locals play a key role in building trust.
- 2) Preparing communication on a controversial topic requires enough time for producing a common message.
- 3) A joint strategy and jointly defined core messages support the communication of individual organisations.
- 4) Communication essentially includes interaction and listening when dealing with a controversial topic.

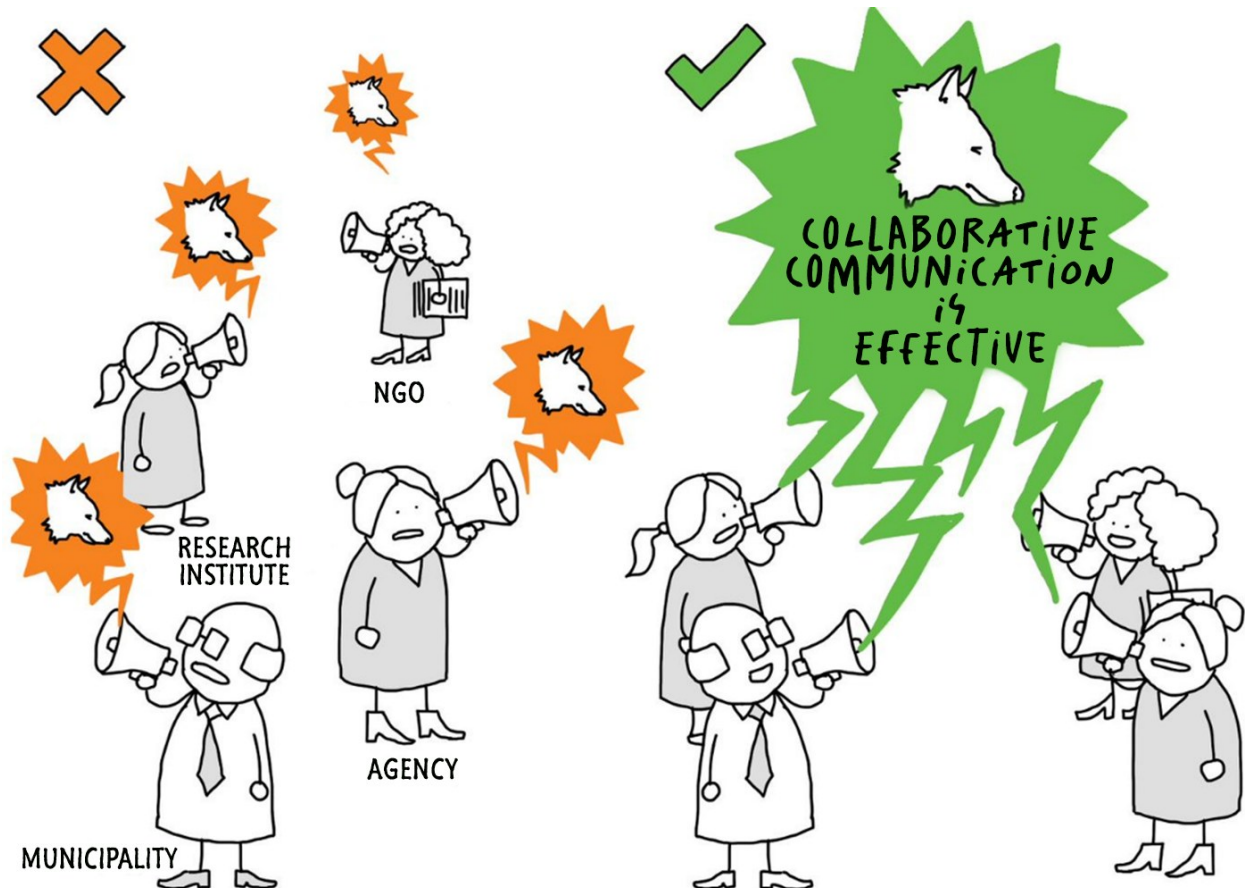


Figure 6. Collaborative communication is an effective conflict management tool that mitigates polarisation and builds trust.

3. The status of the Human-wildlife Conflict Management in Finland

3.1. The Population Management Plans as a tool in Conflict Management

A recent scientific report has compared the success of the game management of conflict-prone species in the Nordic countries (Nilsson et al. 2023). According to the report, it is essential to understand the objectives and methods of population management, as well as the systems and processes in the society within which the objectives and methods are defined and operated.

Population management plans lay the ground for implementing the management of large carnivores and other game species on a long-term basis, all aiming to reach and maintain a favourable conservation status for each species. The management plans describe research-based population management measures and seek to reconcile the views of different stakeholders. In Finland, experts are consulted in the preparation of management plans, stakeholders are heard, and regional hearings are held. The Finnish Wildlife Agency prepares the plans under the leadership of the Ministry of Agriculture and Forestry.

The development of the forest reindeer population is an example of a successful implementation of a population management plan. Among other tasks, it has restricted the hunting of the species and targeted large carnivore control in the distribution range of wild forest reindeer. As a result, the reindeer population has increased and dispersed into new areas through natural migration and introduction (MMM 2023, Hiedanpää & Pellikka 2017).

Population management plans have also proven to be key tools for long-term conflict mitigation, but sometimes they can cause tension or even conflict (Peltola et al. 2022). In such a case, the population management might have been successful, but the conflict management has not. An example of this from Finland are the growing cormorant and grey seal populations, which is a management success. The increasing negative effects have been mitigated with technological and economic means, as well as by locally regulating the animal populations (described in Chapter 2, Söderkuntahti & Moilanen 2023, Hauhia et al. 2023). Still, the conflict between different actors remain unchanged.

Finland has also seen examples of how social or international changes and phenomena can affect the level of the conflict in the society. For example, in 2009, the EU imposed a trade ban on seal products (EU 2009). At the same time, one of the main objectives of the seal population management plan was to improve the coexistence of humans and seals by promoting the development and marketing of seal products (Ministry of Agriculture and Forestry 2007). This action was however not possible to pursue due to the EU ban. Problems in the management of conflict-prone species may arise from conflicts between national and international objectives. It may therefore be difficult to achieve the objectives, even if they have been set jointly and unanimously when preparing the population management plan (Nilsson et al. 2023).

There have been efforts in Finland and the other Nordic countries to resolve the conflict with tools aimed at very practical problems, targeting mainly the human-animal interactions.

Problems have been considered, tools and operating methods have been widely adopted, and the situation has largely been brought under control. However, conflicts between people still exist and may even grow or deepen along with increasing animal populations. The management has not succeeded in solving all problems and conflicts, resulting in a mistrust of the management system and a lack of engagement among the stakeholders and NGO's (Pelto et al. 2022).

The management of conflict-prone wildlife populations has developed significantly in Finland over the last decade, with an increasing focus on managing human-human conflicts. Efforts have been put into mitigating and managing conflicts through collaborative actions between parties, focusing on encountering, interaction, communication, and the joint production of information and its evaluation. These measures have been aimed at building trust and creating a common understanding of the causes and nature of and possible solutions for the conflict. One example of a measure aimed at alleviating a conflict between the administration, researchers, and citizens is the volunteer observation of species to produce data for monitoring animal populations. Participation in the production of data for population assessment engages citizens in building a shared knowledge base, while at the same time building trust in and acceptance of the population management system.

In Finland, the population monitoring and management of many game species depend on volunteers. For example, monitoring of waterfowl and small game relies mainly on information that volunteers collect. It is however a challenge to keep the volunteers committed and motivated in the long term. For example, if about 2,500 voluntary large carnivore observers would cease their input, the population assessments, policy and operative management would suffer from a substantial information depletion. The maintenance, coordination, and development of the volunteer work is annually resourced, but not sufficiently to fulfil the needs. Willingness to become a volunteer or to stay on as a volunteer is sensitive to changes and phenomena in the surrounding society. Decisions regarding the large carnivore management such as changes to the hunting rules may promote a local "strike" among the observers. For example, the decisions of the Supreme Administrative Court to overturn the derogations granted to lynx and bear hunting may well affect the volunteer work in the short and long term (KHO:2023: 99, KHO: 2023: 100, KHO:2022:48).

In general, Finns trust the governmental administration. However, polarised conversations about conflicts within the wildlife management in traditional and social media shows clear a lack of trust towards the system. For example, major changes in the population size and distribution of large carnivores and seals and their economic and social impacts have raised questions in the media on the objectives of the population management for these species (Huitu et al. 2023). This is reflected in a lack of engagement to interactive research and monitoring actions, as well as taken to the extreme, illegal activities and attempts to increase resistance to the volunteers' engagement. This lack of trust may arise from the frustration of those involved not seeing results that are aligned with their own goals, despite participation in the process (Nilsson et al. 2023). Local residents may find it difficult to accept national policies that are often based on international treaties and regulations, which may lead to conflict with locals' state of mind and how they define the problem.

3.2. Promoting coexistence between humans and wildlife

Managing conflict-prone wildlife populations requires the development of adaptable, effective, and equitable tools that help in adapting to changes in society and the environment. In addition, these tools must aim to contribute to the achievement of the objectives. Good tools also include structures for collaboration and dialogue, and they must have the approval and support of stakeholders (Nilsson et al. 2023).

Successful tangible conflict management takes at least the following factors into account:

- 1) Situation picture: Obtain scientific data on the situation, impacts, and people's opinions, attitudes, values, and needs.
- 2) Conflict prevention: Develop the kinds of practical measures that, based on scientific data, reassure citizens that their concerns are being taken seriously, and that they are being heard.
- 3) Communications: Quash rumours and false information with scientific knowledge on the management methods and their effectiveness.
- 4) Interaction: Develop and maintain continuous collaboration between researchers, the administration, stakeholders, and citizens.

The success of the wildlife management can be assessed through 1) the achieved objectives, 2) resources used, 3) collaboration between the authorities, and 4) the approval and trust of various stakeholders (Nilsson et al. 2023). A possible human-wildlife conflict may also affect all these factors.

Typically, the management of conflict-prone species requires extensive expertise and close collaboration between the parties that carry out the management of the species (Redpath et al. 2013). These parties play a key role in the implementation, development, and evaluation of the measures. It is important for the authorities in charge, the implementing parties, and research and expert bodies to understand the complexity of wildlife management and its challenges. The success of the wildlife management of conflict prone species should be evaluated in its whole complexity in Finland. A well-functioning wildlife management system relies on a staff with a high competence in conflict management including an understanding of and expertise in dialogue, and assessing ecological, economic, and societal impacts.

In Finland, parties responsible for the wildlife management have traditionally relied on natural sciences to do their work. The information and knowledge have mainly revolved around animal ecology, the size of animal populations, and the desired effects of management plans. The perspectives of human and social sciences have received less attention. Decision-makers need interdisciplinary participatory scientific outputs to help build up a holistic understanding of the backgrounds, impacts, and resolution potential of long-term human-wildlife conflicts. A comprehensive understanding of the role of citizens and stakeholders in the conflict is important.

The Natural Resources Institute has prepared a wildlife research roadmap for 2024–2030 (Huitu et al. 2023), stating that more research is needed to increase our understanding of the impact of international policy on wildlife species and on the societal preconditions to manage wildlife sustainably. Scientifically based knowledge is also needed on human-wildlife conflicts on large carnivores, ungulates and seals to increase the understanding of the deep layered conflicts, and of managing and resolving them.

Wildlife management requires collaboration between different parties. Key actors in Finland include government agencies, non-governmental organisations, indigenous communities, and local stakeholders. Collaboration provides citizens and NGOs with an opportunity to strengthen the sense of engagement, boost the sense of belonging and commitment to managing a common cause, and strengthen the sense of having a say in matters that concern them (Anheier et al. 2019). Collaboration relieves tension between participants. An example of a successful collaboration was a project that developed practical solutions and policy advice to mitigate goose damage and manage the conflict in a collaboration between farmers, the administration, and scientists (see Chapter 2, Hiedanpää et al. 2023, Heim et al. 2022, Salo et al. 2021). The intensified collaboration between sheep farmers and the wildlife management in the LIFE BOREALWOLF project resulted in a collaborative development new damage prevention tools and processes.

Well established best practices for inter-agency collaboration are used in Finland in many different fields. Within the wildlife management administration examples are collaboration between enforcement authorities in wildlife surveillance and combatting wildlife crime, the large game assistance network (SRVA), and the collaboration between the ELY Centres and the Finnish Wildlife Agency in supporting sheep farmers in damage prevention. An active collaboration provides a platform for continuous interaction and exchange of information, and an increased understanding of the common goal. An intensified inter-agency collaboration on a local level is also cost-efficient and minimizes overlapping operative actions.

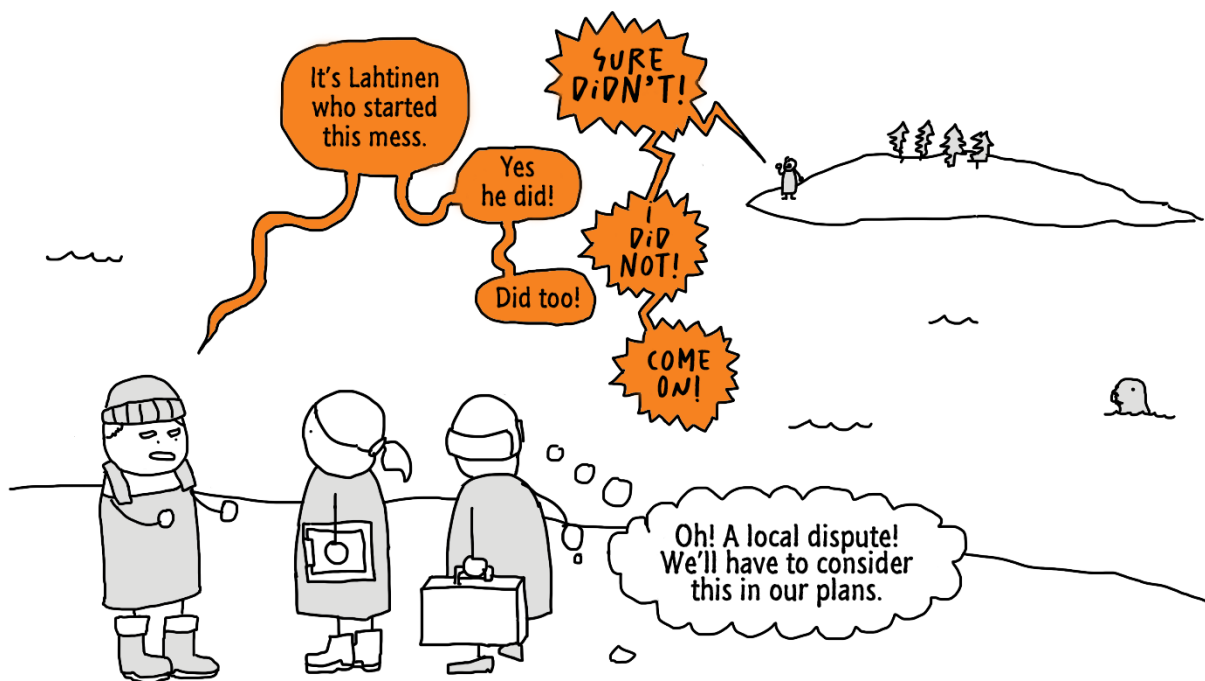


Figure 7. In managing human-wildlife conflict, it is important to understand the underlying needs and attitudes behind the conflict and to seek tools for resolving the human-human conflicts through inter- and transdisciplinary research.

Many successful projects have brought actors together when developing their collaborative and interdisciplinary approaches across sectors. Bringing all actors together in these processes would benefit the experts operating in various conflicts through more peer support, networking, and discussion. A possible tool could be roundtable discussions where the parties could come together and discuss in a climate of trust, and together plan the necessary measures.

4. Conclusions and development proposals

Human-wildlife conflicts are wicked problems that affect the whole of society. Thus far, the Finnish wildlife scientists and administration have focused mainly on interactions between humans and wildlife, such as damages caused by large carnivores, although the roots of the conflict are often found in conflicts between different groups of people. The scope and intensity of human-wildlife conflicts vary from location to location and over time, making it necessary to use tailored approaches and tools to manage them.

The Natural Resources Institute's research on species and their habitats, as well as their impact on livelihoods, has been used to manage various conflicts, to boost a common understanding, and in solving tangible problems. Many examples in this synthesis report have made use of participatory methods tailored to the specific situation and by working with the various parties to the conflict.

Success in conflict management has been more likely in cases where local views and values, as well as historical and cultural backgrounds, have been taken into account. Continuous, open and personal interaction with stakeholders, and especially with local residents, have been incredibly important for conflict resolution. Transparency, building trust, and effective coordination are the foundations of successful dialogue and interaction. Getting citizens and stakeholders involved has also been beneficial for research. At its best, the established trust between the administration and the stakeholders and local citizens has made it possible for the collaboration to last for decades.

Research and development at Natural Resources Institute Finland has produced numerous recommendations, identified best practices, and developed innovative new methods. Recommendations have been made to promote and coordinate collaboration, activities, and citizen observations and co-developing solutions.

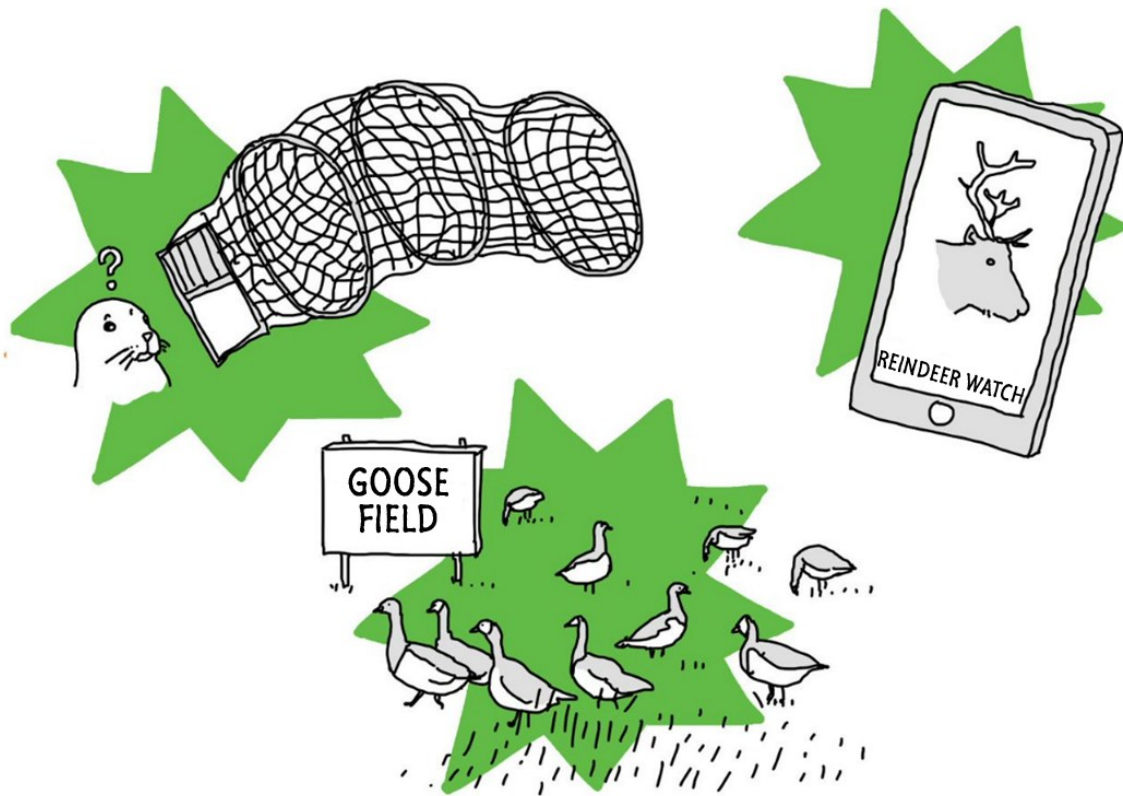


Figure 8. Through transparent and interactive research and development, Natural Resources Institute Finland has created recommendations, best practices, and innovative new methods such as new seal repellents, the Reindeer Watch service, and the Goose Field protection concept.

In Finland, the network of actors of the human-wildlife conflicts is made up of the decisionmakers, policymakers, the authorities, scientists, the media, tradesmen, NGOs, and local citizens. It is important for each group to provide sufficient information about the underlying problems, the constraints of management, policy solutions such as incentives, and research-based models and tools for promoting coexistence. Natural Resources Institute Finland has published summaries of the possible and existing management methods for alleviating human-wildlife conflicts – for example, in relation to fishing and agriculture (e.g. the seal-fisher conflict (Salmi et al. 2022), the cormorant-fisher conflict (Salmi et al. 2023), and goose fields (Forsman et al. 2024).

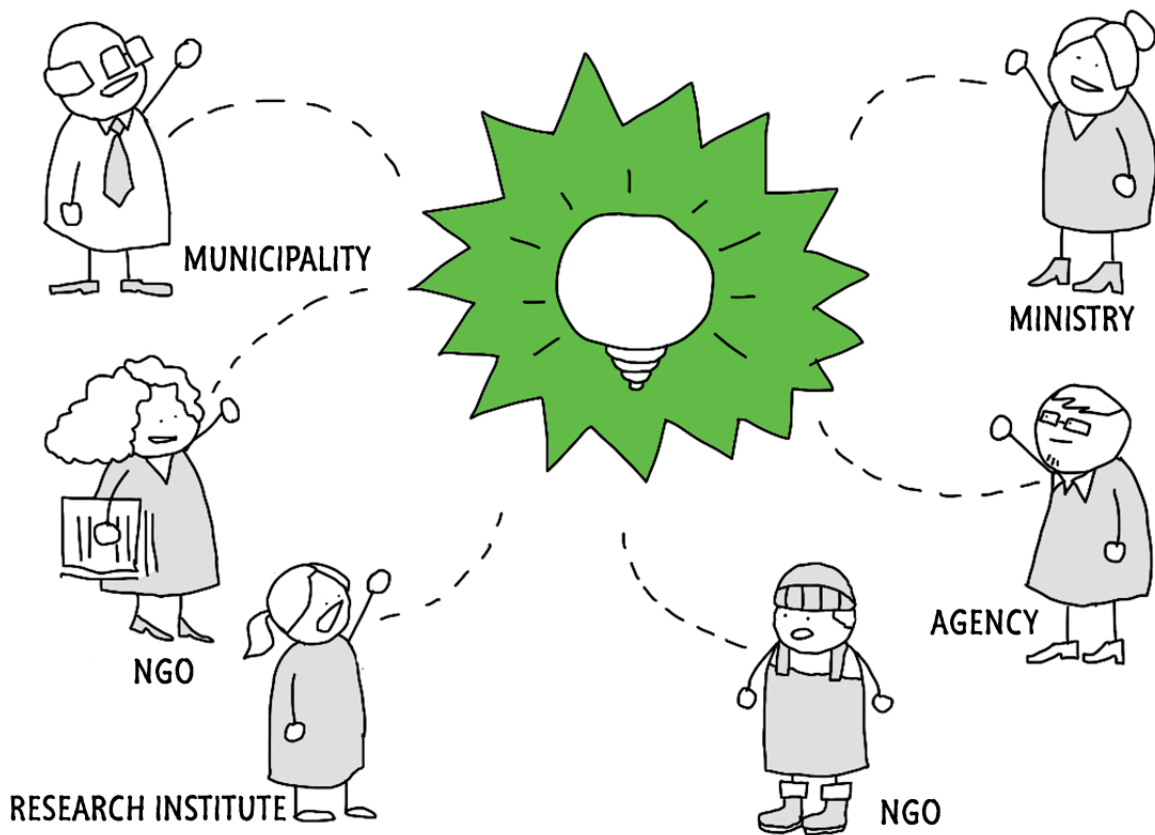


Figure 9. Interaction and collaborative information sharing among scientists, the administration, and citizens strengthen the knowledge base and trust, and prevent information-based conflicts.

Possible failures in conflict management are likely to increase mistrust among stakeholders and local citizens towards the authorities in charge. A lack of trust between citizens, societal actors such as the nature conservation associations and representatives of the natural resource sectors (forest, food, game, and fish sectors) is typical of human-wildlife conflicts. A successful conflict management requires a case specific approach of collaboration, as well as an active, respectful, and mutually appreciative dialogue. Experts working within human-wildlife conflicts often left on their own with a very challenging task. There is a need to build a peer support network for them to share their experiences, and to grow a mutual understanding and competence. In addition, there is a need for participatory, multidisciplinary, and interdisciplinary research, an understanding of the backgrounds that underlie conflicts, and new tools to manage them.

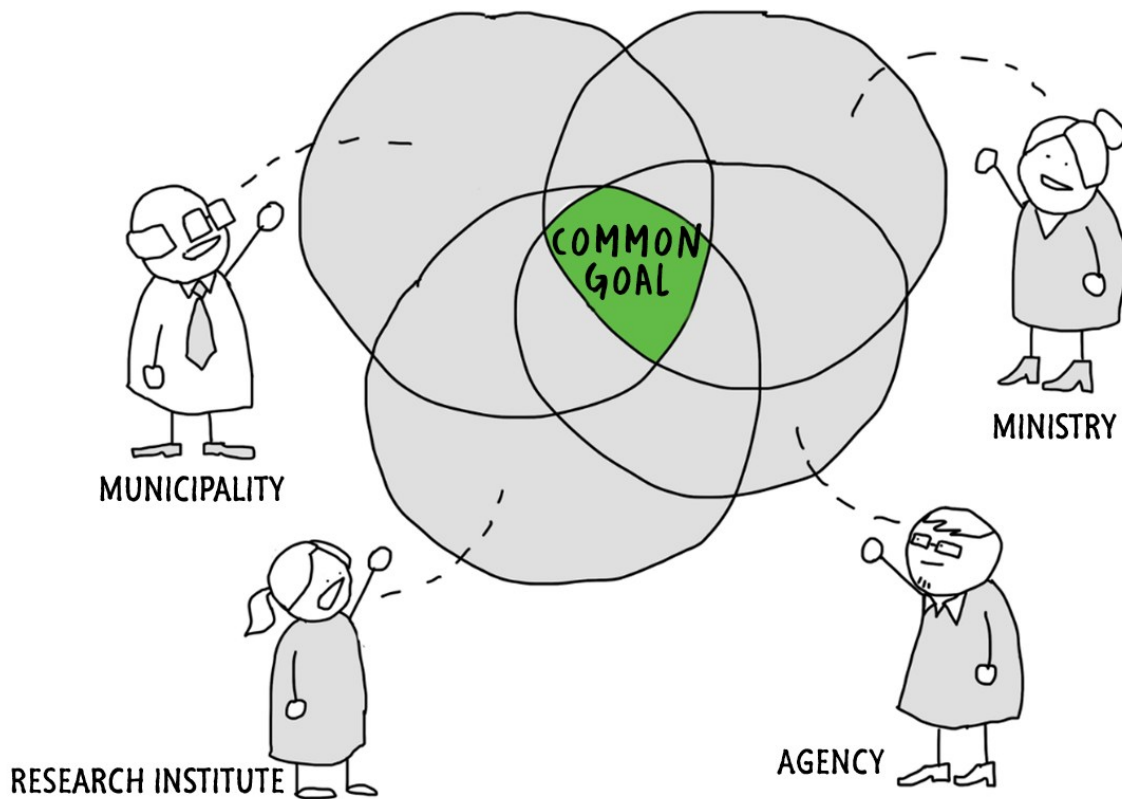


Figure 10. The actors implementing the wildlife management and human-wildlife-conflict management need a peer support network to promote dialogue and collaboration.

Although there are many examples of a successful management of conflict-sensitive wildlife populations, especially resolving tangible problems, there are still many efforts that have failed to achieve the jointly set objectives for a species. The reason for this mainly lies in the parties' conflicting values and needs, as well as in the changes that have taken place in the surrounding society that have affected management system. The fails have often been rooted in a lack of transparency, trust, and acceptance among parties. In conflict management, it is not constructive to try and reconcile the different goals of the parties but rather set new goals in a collaborative manner.

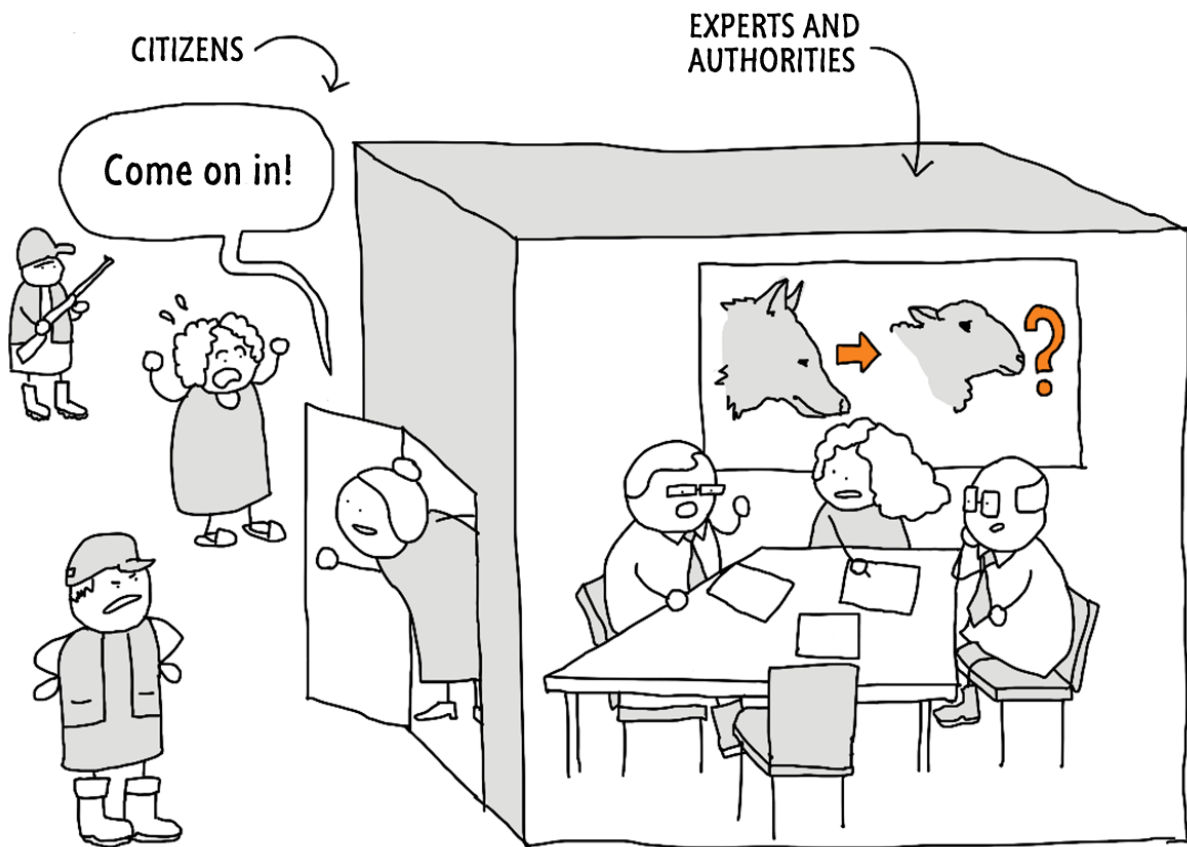


Figure 11. A continuous and open dialogue between the authorities and civil society provides a solid base for building a common understanding of the management challenges and for setting common goals.

The core of a human-wildlife conflict is typically a long lasting and deep conflict between people on wildlife. In the future, it would be important to integrate the approaches of the humanities and social science into conflict resolution processes. We propose the following research objectives and measures for development:

1. **Increase research on the impact of conflict species on ecosystems, natural resources, and human activities.** The abundance and diversity of wildlife species are constantly changing, and their distribution may cause concerns about safety, financial losses, and a loss of recreational value and biodiversity. Population growth and expanding ranges can cause conflicts. Conflicts are often based on insufficient information about animal behaviour and its effects on people, livelihoods, and ecosystems. A study of the inter-species interactions is also needed.
2. **Increase participatory, multidisciplinary, and interdisciplinary research.** In research, the perspectives of the humanities and social sciences in particular are necessary to understand conflicts between people and to develop new tools for conflict management and resolution. Integrative modelling needs to be developed, and socio-economic perspectives should be added to existing ecological models. Dialogue and a collaborative production of information among researchers, the administration, and citizens combine local knowledge with science. Strengthening the knowledge base and trust prevents information-related conflicts.

3. **Boost the competence of researchers, decision-makers, implementing bodies, and stakeholders** by developing and organising multidisciplinary training and creating safe operating environments for experimenting with new approaches. Explain the positive meaning of citizen science to the people as part of population management plans.
4. **Increase peer support for experts working in human-wildlife conflicts.** A peer support network would increase dialogue and a common understanding of values and needs behind the conflicts and would promote an incentive for developing new approaches. Decision-makers, the authorities, and other professionals, as well as scientists from different disciplines should be invited to participate in the network.
5. **Develop the dialogue between the administration and civil society** by shifting the focus from wildlife to humans and providing more transparency on the discussion of frameworks for managing human-wildlife conflicts and opportunities to promote common incentives and development proposals.
6. **Develop impact assessments and research on conflict resolution.** Regularly monitor the implementation of management plans and other administrative policies and systematically evaluate their effectiveness, efficiency and impact in society. Suitable indicators must be developed to achieve this. More research-based knowledge is needed on how to resolve conflicts.

Acknowledgments

We thank all the people who commented on the manuscript of the report for their valuable comments and observations. We also thank the funders and partners of the projects presented in the report. The report was produced partly by the LIFE BOREALWOLF project, which received funding from the European Union's LIFE programme (LIFE BOREALWOLF, LIFE18 NAT/FI/000394).

References

- Alford, J. & Head, B. 2017. Wicked and less wicked problems: a typology and a contingency framework. *Policy and Society* 36: 397–413.
- Anheier, H., Lang, M. & Toepler, S. 2019. Civil society in times of change: shrinking, changing and expanding spaces and the need for new regulatory approaches. *Economics* 13: 1–27.
- Auvinen, A.-P., Kemppainen, E., Jäppinen, J.-P., Heliölä, J., Holmala, K., Jantunen, J., Koljonen, M.-L., Kolström, T., Lumiaro, R., Punttila, P., Venesjärvi, R. & Ahlroth, P. Suomen biodiversiteettistrategian ja toimintaohjelman 2012–2020 toteutuksen ja vaikutusten arviointi. Valtioneuvoston selvitys- ja tutkimustoiminnan julkaisusarja 2020: 36. 337 s.
- Ahtikoski, A., Nikula, A., Nivala, V. & Haikarainen, S. 2023. Cost-efficient forest management for safeguarding Siberian flying squirrel (*Pteromys volans*) habitats in Central Finland. *Scandinavian Journal of Forest Research* 38: 197–207.
- Eriksson, L., Johansson, M., Månsson, J., Sandström, C., Liljebäck, N. & ElMBER, J. Novel insights into the cognitive, emotional, and experiential dimensions of stakeholder acceptance of wildlife management. *Scientific Reports* 14: 29479.
- Euroopan unioni (EU) 2009. Euroopan parlamentin ja neuvoston asetus (EY) N:o 1007/2009. Asetus hyljetuotteiden kaupasta 16.9.2009. <https://eur-lex.europa.eu/legal-content/FI/ALL/?uri=CELEX%3A32009R1007>
- Forsman, J., Jokinen, M., Heikkinen, J., Hiedanpää, J., Juutinen, A., Laaksonen, T., Laurila, M., Liu, X., Piha, M., Pellikka, J., Salo, M., Seimola, T., Seltmann, M., Store, R. & Ylitalo, A.-K. 2024. Hanhipellot ihmisten ja hanhien välisen ristiriidan lievittäjänä. *Luonnonvara- ja biotalouden tutkimus* 12/2024. Luonnonvarakeskus. Helsinki. 57 s.
- Haila, Y., Kousis, M., Jokinen, A., Nygren, N. & Psarikidou K. 2007. Luottamuksen rakentaminen kansalaisten osallistumisen kautta: oppiminen konflikteista Habitats-direktiivin toteuttamisen yhteydessä. PAPANINI-työpaketti 4. Osallistava hallinto ja institutionaalinen innovaatio.
- Hanski, I.K. 1998. Home ranges and habitat use in the declining flying squirrel *Pteromys volans* in managed forests. *Wildlife Biology* 4: 33–46.
- Hauhia, V., Niukko, J. & Kankainen, M. 2023. Riistakameraseuranta kalankasvatustiluksilla Saaristomerellä: Merimetson (*Phalacrocorax carbo*) ja harmaahaikaran (*Ardea cinerea*) seurantatarkoitukseen. *Luonnonvara- ja biotalouden tutkimus* 32/2023. Luonnonvarakeskus. Helsinki. 41 s.
- Heim, W., Piironen, A., Heim, R.J., Piha, M., Seimola, T., Forsman, J.T. & Laaksonen, T. 2022. Effects of multiple targeted repelling measures on the behaviour of individually tracked birds in an area of increasing human–wildlife conflict. *Journal of Applied Ecology* 59: 3027–3037.

- Holma, M., Lindroos, M. & Oinonen, S. 2014. The economics of conflicting interests: Northern Baltic salmon fishery adaption to gray seal abundance. *Natural Resource Modeling* 27(3): 275–29.
- Hiedanpää, J. & Pellikka, J. 2017. Metsäpeuran palautusistutuksen sosiaalisten vaikutusten arviointi Seitsemisen kansallispuistossa ja lähiympäristössä. *Luonnonvara- ja biotalouden tutkimus* 34/2017. Luonnonvarakeskus. Helsinki. 20 s.
- Hiedanpää, J., Salo, M., Jokinen, M., Pellikka, J., Store, R., Laaksonen, T., Pirinen, M., Wieland, H., Piironen, A., Mikander, N., Lohilahti, H. & Forsman, J.T. 2023. Amidst the flyway: Co-designing accommodation fields for the barnacle goose in south-eastern Finland. *Geography, Planning and Tourism* 2023: 367–383. Edward Elgar.
- Hiedanpää, J., Rasmus, S., Kontio, P., Landauer, M., Jokinen, M., Oinonen, K., Naskali, A., Haveri-Heikkilä, J. & Kumpula, J. 2020. Poron paikka Kuusamossa: poronhoidon, asutuksen, lomarakentamisen ja maatalouden väliset ristiriidat ratkaisuihin. *Luonnonvara- ja biotalouden tutkimus* 87/2020. Luonnonvarakeskus. Helsinki. 47 s.
- Hiedanpää, J. & Ratamäki, O. (toim.) 2015. *Suden kanssa*. Lapin yliopistokustannus. 302 s.
- Huitu, O., Forsman, J., Helle, I., Herrero, A., Matala, J., Melin, M., Nyman, M., Pekkarinen, A. & Venesjärvi, R. 2023. *Luonnonvarakeskuksen riistantutkimuksen tiekartta 2024–2030*. *Luonnonvara- ja biotalouden tutkimus* 82/2023. Luonnonvarakeskus. Helsinki. 40 s.
- Hyvärinen, E., Juslén, A., Kemppainen, E., Uddström, A. & Liukko, U.-M. (toim.) 2019. *Suomen lajien uhanalaisuus 2019*. Ympäristöministeriö & Suomen ympäristökeskus. Helsinki. 704 s.
- International Union for Conservation of Nature (IUCN) 2023. *IUCN SSC guidelines on human-wildlife conflict and coexistence*, 1. painos. IUCN, Gland, Sveitsi. 243 s.
- Juutinen, A., Ilvonen, S., Haltia, E., Kangas, K.M., Pellikka, J.P., Rana, P. & Tolvanen, A. 2023. Citizens attitudes toward the protection of flying squirrels in urban areas. *Ecology and Society* 28(4): 19.
- KHO:2023:99. Ennakkopäätös, Korkein hallinto-oikeus 30.11.2023. <https://www.kho.fi/fi/index/maatokset/ennakkopaatokset/1698309665993.html>
- KHO:2023:100. Ennakkopäätös, Korkein hallinto-oikeus 30.11.2023. <https://www.kho.fi/fi/index/maatokset/ennakkopaatokset/1698314222998.html>
- KHO:2022:48. Ennakkopäätös, Korkein hallinto-oikeus 12.4.2022. <https://www.kho.fi/fi/index/maatokset/ennakkopaatokset/1649324951374.html>
- Klenke, R.A., Ring, I., Kranz, A., Jepsen, N., Rauschmayer, F. & Henle, K. (toim.) 2013. *Human -wildlife conflicts in Europe: Fisheries and fish-eating vertebrates as a model case*. Springer. 347 s.
- Korhonen, K.T., Ihalainen, A., Miina, J., Saksa, T. & Viiri, H. 2010. Metsänuudistamisen tila Suomessa VMI10:n aineistojen perusteella. *Metsätieteen aikakauskirja* 4/2010: 425–478.

- Lehtonen, E., Lehmonen, R., Kostensalo, J., Kurkilahti, M. & Suuronen, P. 2022. Feasibility and effectiveness of seal deterrents in coastal trap-net fishing – development of a novel portable deterrent. *Fisheries Research* Vol 252.
- Lehtonen, E., Lehmonen, R. & Suuronen, P. 2023. Potential of creating seal-free fishing areas with seal deterrents. *Fisheries Research* Vol 264.
- Maa- ja metsätalousministeriö (MMM) 2023. Metsäpeurakannan hoitosuunnitelma Suomen metsäpeurakannan hoidon ja suojelun toimenpiteet ja tavoitteet. Maa- ja metsätalousministeriön julkaisuja 2023:21.
- Maa- ja metsätalousministeriö (MMM) 2019. Suomen susikannan hoitosuunnitelma. Maa- ja metsätalousministeriön julkaisuja 2019:24.
- Maa- ja metsätalousministeriö (MMM) 2007. Itämeren hyljekantojen hoitosuunnitelma. Maa- ja metsätalousministeriön julkaisuja 4/2017.
- Matala, J., Nikula, A., Pellikka, J., Aikio, S., Forsman, J., Henttonen, H., Holmala, K., Huitu, O., Jauni, M., Kojola, I., Melin, M., Paasivaara, A. & Pusenius, J. 2021. Hirvieläinten vaikutuksia yhteiskuntaan, elinkeinoihin ja ekosysteemiin. *Luonnonvara- ja biotalouden tutkimus* 38/2021. Luonnonvarakeskus. Helsinki. 142 s.
- Mönkkönen, M., Reunanen, P., Nikula, A., Inkeröinen, J. & Forsman, J. 1997. Landscape characteristics associated with the occurrence of the flying squirrel *Pteromys volans* in old-growth forests of northern Finland. *Ecography* 20: 634–642.
- Mäkeläinen, S., Schrader, M. & Hanski, I.K. 2015. Factors explaining the occurrence of the Siberian flying squirrel in urban forest landscape. *Urban Ecosystems* 18: 223–238.
- Niemi, M., Pellikka, J. & Hiedanpää, J. 2014. Metsästyskoirien suojaaminen susilta. *RKTL: n työraportteja* 49/2014.
- Niemi, M. 2016. Animal-vehicle collisions: from knowledge to mitigation. *Dissertationes Forestales* 213. Helsingin yliopisto, Maatalous-metsätieteellinen tiedekunta, Metsätieteiden laitos. 35 s.
- Nilsson, J., Sandström, A. & Sandström, C. 2023. Adaptiva, effektiva och legitima förvaltnings-system? En syntes av aktuell forskning om viltförvaltningen i Fennoskandia. *Naturvårdsverket, Rapport* 7118. 58 s.
- Nygren, N. & Peltola, T. 2020. Surprise, Surprise – A Flying Squirrel! Learning to Protect the Unexpected. *Conservation and Society* 18: 378–386.
- Peltola, T., Arpin, I., Leino, J., Peltonen, L., Ratamäki, O. & Salmi, P. 2022. Management plans as resources in conservation conflicts. *Environmental Policy and Governance* 33: 206–218.
- Peltonen, L. & Sivonen, M. 2022. Kalastuksen ja saimaannorpan suojelun yhteensovittaminen Haasteet ja kehittämistarpeet. Maa- ja metsätalousministeriön julkaisuja 2022:18.
- Peltonen, L. & Kangasosa, J. 2009. Konfliktien kartoitus suunnittelun apuvälineenä. *Yhdyskuntasuunnittelu* 47: 88–97.

- Ratamäki, O. 2009. Yhteiskunnallinen kestävyys ja hallinta suomalaisessa susipolitiikassa. Väitöskirja. Joensuun yliopisto. 173 s.
- Redpath, S., Young, J., Evely, A., Adams, W., Sutherland, W., Whitehouse, A., Amar, A., Lambert, R., Linnel, J., Watt, A. & Gutiérrez, R. Understanding and managing conservation conflicts. *Trends in Ecology & Evolution* 28: 100–109.
- Ruokonen, T. & Keskinen, T. (toim.) 2023. Tutkimuksen ja kalastajien kumppanuusohjelma: Kalatalouden innovaatio-ohjelman loppuraportti. Luonnonvara- ja biotalouden tutkimus 72/2023. Luonnonvarakeskus. Helsinki. 11 s.
- Sairinen, R. 2002. Environmental governmentality as a basis for regulatory reform: The adaptation of new policy instruments in Finland. Teoksessa Mol, A. & Buttel, F. (toim.). *The Environmental State Under Pressure. Research in Social Problems and Public Policy* Vol. 10). Emerald Group Publishing Limited. Leeds. ss. 85–103.
- Salmi, P. & Setälä, J. 2022. Kestävyyttä edistävä päätöksenteko vaatii monipuolista tietoa. Julkaisussa: Vehmasto, E., Salo, M. & Soini, K. (toim.). *Kestävyyden kehykset : Luonnonvaratutkimus kestävyysmuutoksessa. Luonnonvara- ja biotalouden tutkimus 74/2022.* Luonnonvarakeskus. Helsinki. s. 82–85.
- Salmi, P., Suuronen, P., Svets, K., Lehtonen, E. & Veneranta, L. 2022. Hylkeiden ja kalatalouden välisten konfliktien lieventämiskeinot. *Luonnonvara- ja biotalouden tutkimus 81/2022.* Luonnonvarakeskus. Helsinki. 51 s.
- Salmi, P., Pellikka, J., Veneranta, L., Svets, K. & Lehtonen, E. 2023. Merimetson ja kalatalouden välisten konfliktien lieventämiskeinot. *Luonnonvara- ja biotalouden tutkimus 79/2023.* Luonnonvarakeskus. Helsinki. 68 s.
- Salo, M., Seimola, T., Pirinen, M., Laaksonen, T., Hiedanpää, J., Piironen, A., Jokinen, M. & Forsman, J.T. 2021. Arktiset valkuposkihanhet ja maatalousvahingot – löytyykö ratkaisu hanhipelloista? *Linnut – vuosikirja 2021. BirdLife Suomi.* s. 152–161.
- Suuronen, P., Lehtonen, E., Lehmonen, R., Hopkins, J. & Helminen, J. 2024. Hyljekarkottimet kalastuksessa: mahdollisuudet ja soveltuvuus hylkeiden kalastukselle aiheuttamien vahinkojen torjunnassa. *Luonnonvara- ja biotalouden tutkimus 16/24.* Helsinki. 68 s.
- Suuronen, P., Lehtonen, E., Lehmonen, R., Helminen, J. & Hopkins, J. 2025. New ways to use seal deterrents to protect fisheries. *Natural resources and bioeconomy studies 21/2025.* Helsinki. 19 p.
- Svets, K., Salmi, P., Mellanoura, J. & Niukko, J. 2019. The impacts of seals and cormorants experienced by Baltic Sea commercial fishers. *Natural resources and bioeconomy studies 77/2019.* Natural Resources Institute Finland, Helsinki. 50 p.
- Svets, K., Salmi, P., Suuronen, P., Coelho, N.F., Waldo, Å., Königson, S., Lunneryd, S., Eriksson, V., Vetemaa, M., Lehtonen, E., Dyrendom Graugaard, N. & Johansson, M. 2022. Mitigating a social conflict between seal, conservation and fisheries in the Baltic Sea: multilevel and synergistic approaches. *The Nordic Council of Ministers. TemaNord 2022:569.* 64 p.

Söderkultalahti, P. & Moilanen, P. 2023. Hylkeiden kalankasvatukselle aiheuttamat vahingot vuonna 2022. Luonnonvara- ja biotalouden tutkimus 105/2023. Luonnonvarakeskus. Helsinki. 13 s.

Valtioneuvosto. 2021. Valtioneuvoston asetus eräistä kalastusrajoituksista Saimaalla vuosina 2021–2026 6.5.2021. https://mmm.fi/documents/1410837/1789418/Asetus_Saimaan_kalastusrajoituksista_2021.pdf/d1b638e0-7903-8a2b-db2c-f8691f29cf0a/Asetus_Saimaan_kalastusrajoituksista_2021.pdf?t=1620289447721

Veneranta, L., Lehtonen, E., Lehtonen, T. & Suuronen, P. 2023. Hyljekarkotin vaellussiian mädinhankinnan suojaamisessa lijoella. Luonnonvara- ja biotalouden tutkimus 88/2023. Luonnonvarakeskus. Helsinki. 43 s.

Virtanen, E. & Moilanen, A. 2023. High focus on threatened species and habitats may undermine biodiversity conservation: Evidence from the northern Baltic Sea. *Diversity and Distributions* 29(8): 979–985.



**You can find us
online**

luke.fi



Natural Resources Institute Finland (Luke), Latokartanonkaari 9, 00790 Helsinki, Finland