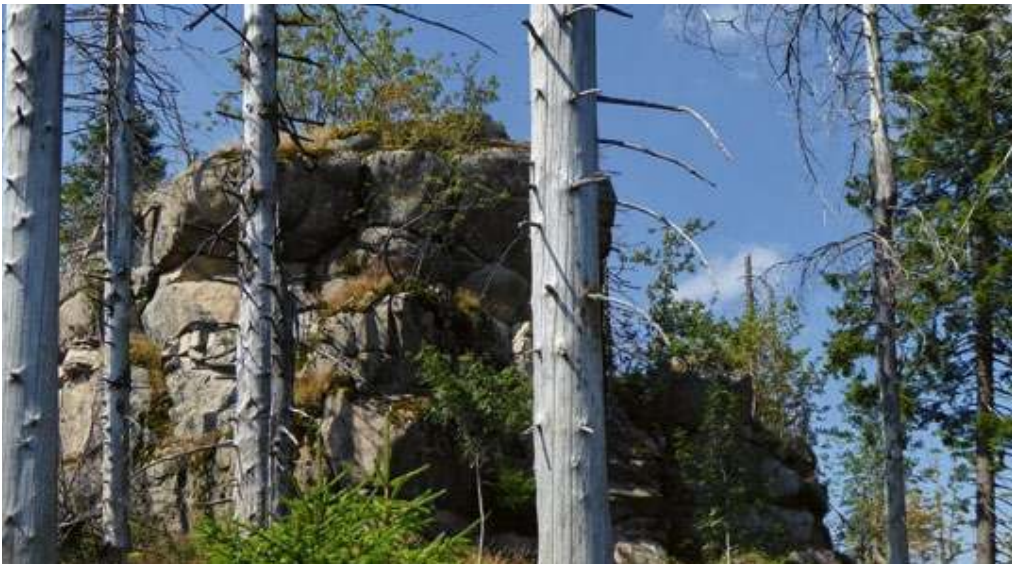
Pathways Europe 2018: Resurrecting the Wild!? Book of Abstracts



PATHWAYS
human dimensions

September 16-19, 2018
Goslar, Germany

HUMAN DIMENSIONS OF NATURAL RESOURCES
COLORADO STATE UNIVERSITY

Alfred Toepfer Akademie für Naturschutz

WWF

Leibniz Institute for Zoo and Wildlife Research
IN THE FORSCHUNGSVERBUND BERLIN E.V.

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Life

Contributions to the

Pathways Europe 2018 - Human Dimensions of Wildlife: Resurrecting the Wild!?

September 16-19, 2018
Goslar, Germany

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Seabirds and humans in close encounter: Do social norms regulate birder behaviour

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A survey among birding tourists in 2017 to the birdcliff Hornøya in northeast Norway was conducted in the winter of 2018. The objective was to investigate the role of assumed consequences and social norms on birders' behavior towards seabirds nesting in a birdcliff. At Hornøya, birders are able to get close to birds and birds not necessarily leave their nest or nest area even if people get close. Yet, studies show reduced recruitment success of birds nesting close to areas open to visitors. We analyse the importance of assumed consquences, as well as social norms on regulating birders' behavior toward birds, for instance to the extent they choose to move into areas closed to visitors or standing (very) close to birds. Implications of findings for management of the area including how to combine tourism and Conservation will be discussed.

(At the moment I cannot be more specific about the results as the survey has just recently been sent out and analyses will be conducted in the summer).

Local evaluation of the effectiveness of the strategies against wildlife crop depredation

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Crop depredation represents a serious conflict around protected areas. Its recurrence undermines local support for long term conservation. Though studies have focused on aspects such as the economics, spatio-temporal and vulnerability of farms to crop depredation, little attention has been given to the local evaluation of the effectiveness of the strategies. This paper aimed at investigating the effectiveness of the strategies around Bui National Park. Data was collected using in-depth interviews, involving 17 participants in a farming community called Makala, Ghana. The results indicated that the strategies are generally less deterrent and ineffective in the long-term based on the recurrence of the conflict, though short-term and temporary success with some of the strategies were observed, particularly with those lethal strategies, as they pose threat to wildlife conservation. Understanding the effectiveness of the strategies provides knowledge about how the strategies could be made effective against crop depredation, and enhance co-existence.

Waterfowl hunters have imperfect waterfowl identification skills

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Waterfowl management in North America is informed by detailed harvest data including the number, sex, and species of all waterfowl harvested. These data are often self-reported by waterfowl hunters via online surveys or harvest report forms. For harvest management programs to be successful, it is critical that self-reported harvest data are precise and accurate. If this assumption is not met, harvest data may be biased and subsequent management efforts (e.g., sex and species harvest limits) may be misinformed. We surveyed waterfowl hunters in Kansas, USA immediately after the 2017-2018 waterfowl season to assess their ability to identify waterfowl species and sex. Hunters were asked to complete an online survey via a handheld device at multiple non-profit events that were focused on waterfowl hunting. Our survey included photographs of breeding-plumage ducks that are commonly harvested in the Central Flyway in North America. Respondents had imperfect identification skills that were not influenced by hunter age or number of years hunting waterfowl. Identification was imperfect for all species and sexes, with ring-necked duck (*Aythya collaris*) and lesser scaup (*Aythya affinis*) having the greatest misidentification rates. Because our survey included high-definition photographs of breeding plumage waterfowl, or results likely underestimate true misidentification rates. Our results suggest there may be a potential bias in self-reported waterfowl harvest data. Future research should focus on incorporating potential bias estimates into hunter-harvest models.

Impacts and Economics of Wildlife-Cattle browsing in communities around and on Kainji Lake National Park, Nigeria

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Management of native wild animals and cattle in farmlands and on a protected area is a contentious issue for farmers and the government. In 2016, the use of pesticides to poison wild animals and cattle began in southwestern Nigeria. Many farmers believe that the impact of browsing by native wild animals and cattle on food crops and pastures is significant and results in a considerable financial loss. Hence, the study was undertaken to quantify the browsing impact. Methods used to poison wild animals and cattle include the introduction of tempting carcasses, making salt licks from pesticides, soaking grains in pesticides and soiling waterholes. The wild animals examined include Buffalo *Syncerus caffer*, Roan Antelope *Hippopotragus equinus*, Senegal kob *Kobus kobus*, Western hartebeest *Alcelaphus buselaphus*, Hippopotamus *Hippopotamus amphibious*, Olive baboon *Papio anubis*, Bushbuck *Tragelaphus sylvaticus*, Red Flanked duiker *Cephalophus rufilatus*, Lion *Panthera leo*, and Oribi *Ourebi ourebi*.

Results indicated significant ($p>0.05$) browsing damage to food crops mostly the yams-maize-cocoyams-cassava farm system interspersed with oil palm, cacao, rubber plantations and improved pasture such as *Andropogon gayanus*, *Andropogon schirensis*, *Andropogon tectorum*, *Annona senegalensis*, *Afzelia africana* and *Borassus aethiopum* that are in close proximity to bush boundaries resulting in large economic costs. Browsing damage seems to decline as distance from bush boundary increases. Wildlife and cattle appear to be preferentially browsing the food crops with a preference shown for perennial food crops. Feed availability has been found to be a determinant regarding the distance and direction wildlife and cattle will travel to browse. These results provide important information to stakeholders and better equip them to manage wildlife and cattle not only at protected area but also at the farmlands.

Natura 2000 Network in Poland - a barrier or a benefit for conservation needs?

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Local communities' participation in nature conservation has been widely recognized as improving conservation outcomes. This is especially important for biodiversity conservation in Europe, where many habitats were shaped by the humans' traditional, extensive land use. Areas included into the Pan-European ecological network Natura 2000 (N2000) largely cover such habitats, which depend on human activity. Although the N2000 program is promoted as a chance for halting biodiversity loss and local communities' sustainable development, in the majority of the EU member states, effective implementation of the network met various obstacles, mainly of socio-economic nature. Here, we present a comprehensive insight into N2000 functioning in Poland, a representative of Central Eastern European (CEE) countries, so that meeting challenges of different social, cultural and historical contexts than the EU-15.

Disputed research comprises the results of longitudinal studies, conducted in the entire country over the last 15 years, during the following phases of N2000 designation (site selection, the monitoring of endangered species and habitats and the development of management plans) by a mix-mode methodology (inventory, questionnaire, Q-methodology, in-depth & focus interviews, presents how public participation GIS). Authors assess, using various case studies, what factors actually shape perception of N2000 – its coverage of local areas, modes of implementation, stakeholders' fears and hopes, or several local socio-economic conditions - as well as - how performance of participatory approach may enrich and shape a final format of N2000 governance. Mismatches between the type of public engagement activities (public consultation, mediation, home advisors, public participation GIS) and actual needs of conservation are further elaborated which might give the practitioners and decision-makers a useful guidance on practical application of the general findings in the specific European context of N2000 and its main funding mechanism. Moreover, findings lay the foundation for further exploring the potential in various stakeholders groups' characteristics to undertake actions and for making conservation at Natura 2000 Network sites more effective.

Information shapes attitudes and matters for human-carnivore coexistence

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Understanding how exposure and information affects public opinion towards returning large carnivores in Europe is critical for human-carnivore coexistence, especially for developing efficient and de-escalating communication strategies. We conducted a phone survey (n=1250) in Germany to understand how information sources on wolves and exposure to wolves (Canis lupus) could affect people's attitudes in Germany as a whole, and in the specific region where wolves initially recolonized and have been present since 2000. We found significant differences in attitudes and knowledge about wolves as well as in the use and frequency of information sources between the two population samples of the phone survey. Higher knowledge, information from books, films and science-based information, and higher trust in information sources related positively with tolerance towards wolves. Comparatively, information from press or TV news were associated with more negative opinions. Our results highlight the important role of information in a specific context of coexistence with wolves. We recommend monitoring people's perception of carnivore-related risks since information can be diffused and received differently across cultures, as shown by a complementary assessment of the media coverage of a carnivore-related fatality. Thus, scientists and practitioners should actively engage with journalists and the media in order to provide science-based information and build trust among the public, as a process to dampen extreme opinions and foster human-carnivore coexistence.

Accounting for heterogeneous angler behaviours in integrated fish-angler simulation models designed to analyse the social-ecological outcomes of management interventions

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Human behavior constitutes a dynamic component of social-ecological fisheries systems. It is important to account for the adaptive behavior of resource users if managers want to analyse the possible outcomes of management interventions. We present two applications of coupled social-ecological models of recreational fisheries where the adaptive behavior of natural resource users is modelled based on results from stated choice experiments that account for trade-offs among a range of attributes that guide fishing decisions. In one application, the landscape-level behavior of heterogeneous anglers is simulated in terms of their movement across a large family of fisheries. The model suggests that lack of accounting of heterogeneous anglers severely underestimated ecological impacts and recreational fishing. In the second example, a single fishery bio-economic model with heterogeneous angler is presented. The recreational fisheries simulator allow simulating fisheries, conservation, social and economic outcomes to be expected for a range of harvest regulations (minimum-length limits, harvest slots, bag limits) and stocking policies (which vary by amount and size of fish released), while accounting for the behavioural response of a heterogeneous angler population. The fish population ecology follows an age and size-structured population biology with multiple size- and density dependent feedback processes. The anglers simulated in the model follow a multi-attribute utility function calibrated to the behaviour of German anglers. The user of the simulation softare that is freely available on the internet can represent different angler types to understand the relevant of regulations and stocking for heterogeneous angler populations. The software offers parameter settings for a range of freshwater fish species that are either naturally recruiting or culture-based. The software can be used to compare the likely outcome of a range of harvest regulations and stocking policies against a set of management objectives. The innovation of both model is the explicit accounting of adaptive behavior of resource users, thereby linking human dimensions of natural science within an adaptive management framework.

Visual impacts of bark-beetle infested forests on recreation

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Extensive outbreaks of introduced and native forest insects are globally increasing and can result in both tourism revenue and timber value losses. Little research exists on visitor response to visual changes in forest recreation settings. Few, if any, studies have examined how forest visitors weigh trade-offs between social factors such as visitor numbers and physical factors of bark beetle-impacted forests and how these vary nationally or internationally. This study examines these trade-offs in Germany, Austria and the USA.

This study used a stated preference approach. A discrete choice experiment employed digitally-calibrated images to simulate forest stands with varying levels of bark beetle outbreaks, different management practices in response to the infestation, and varying visitor uses. On-site surveys with more than 750 visitors were conducted in 2014.

Results revealed the condition of the immediate forest surrounding was the most important attribute for visitors' landscape choices. Visitors preferred vital, mature and mixed forest stands, and disliked scenarios with substantial dead wood. The number of visitors was the most important social factor for visitors' choices. Differences between study sites were observed. This study shows that forest insects have a negative impact on cultural ecosystem services, in this case, on landscape preferences and recreation. Study results provide implications for protected area, forest and visitor management.

Wildlife management based on science, monitoring and participation

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The federal state of Baden-Württemberg in southwestern Germany is a highly populated region with an intensive land use and a high demand for infrastructure. At the same time, it comprises unique habitats for a diversity of wildlife species. Some of these species are rare and endangered; others form high population densities and cause damages. Therefore, a growing demand of a refined wildlife management is obvious in order to conserve wildlife diversity as well as to mitigate human-wildlife conflicts.

A network of governmental and University based institutions, namely the Wildlife Research Unit of Baden-Wuerttemberg (WFS), the Forest Research Institute of Baden-Württemberg (FVA) and the University of Freiburg, have developed several monitoring and research projects aiming to tackle the various issues related to the close neighborhood of wildlife and humans. In the last decades, a strong network of different stakeholders has formed a solid basis for a constructive wildlife management. This participatory approach enables a link between landowners, hunters, nature conservationists, local alliances, skilled individuals and governmental professionals.

The participatory processes, the integration of applied science and the monitoring schemes were anchored in a federal law of hunting and wildlife management unique to Germany (*Jagd- und Wildtiermanagementgesetz Baden-Württemberg*) since 2015. For the first time, management decisions are based by law on monitoring and wildlife research outcomes. Decision making is hence bound to solid monitoring schemes and best practice examples. Results and recommendations are presented every three years in a wildlife report, a regulatory instrument for decision making and enforcement of wildlife management. Contents of the wildlife reports, issues and trendsetting management decisions are discussed and agreed on in several participatory groups that also reflect the participatory approach:

- a steering committee involving governmental institutions (hunting and nature conservation authorities), wildlife research institutions and non-governmental organizations (hunting association),
- an advisory board focused on hunting and wildlife management, and
- an advisory board focused on development of wildlife research and wildlife monitoring.

Currently following projects are conducted to strengthen networks and to foster a sustainable wildlife management for conservation and use of wildlife: Alliance for small game, Round table wild boar, Grouse working group, Red deer working group, Working group lynx and wolf, just to name a few.

Here, we give an example how wildlife management could be improved with a foundation by law and how human dimension issues can be solved by participatory approaches.

Two decades of European Hare (*Lepus europaeus*) census

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Some decades ago the European hare (*Lepus europaeus*), a characteristic inhabitant of an extensive agriculture landscape, was common in Central Europe. Since then habitat changes, such as an intensification of land use practices accompanied by a significant decrease in fallow land and structural diversity, are thought to be the main drivers of a dramatic decrease of European hare numbers throughout Europe.

Since 1997 European hare populations are monitored in Baden-Württemberg, southwestern Germany, where hares are hunted cautiously. Hunting bag statistic in the hunting year 2016/2017 comprises 7.157 individuals, including 35 % individuals killed by road accidents or found dead. The census is an important part of the state-wide small game census conducted by the Wildlife Research Unit of Baden-Württemberg (WFS).

Spot light counts are conducted on a voluntary basis by local hunters in their hunting districts, initially instructed by an expert of the WFS in order to ensure data collection quality and long-term commitment. Hunters drive by car on determined routes, lighting on open fields and meadows and count every hare they spot. By knowledge of the lighting range and the route length, relative hare densities per unit (e.g. individuals per 100 ha field area) can be calculated. Counts are conducted twice in spring and in autumn, which also enables to determine annual population growths rates. Data are gathered and analyzed by the WFS and reported on a regular basis, such as the annual hunting bag statistic report (Jagdbericht Baden-Württemberg), the three-year published wildlife report (Wildtierbericht Baden-Württemberg) or hunting magazines. The project is conducted in cooperation with the Hunters' Association of Baden-Württemberg (Landesjagdverband Baden-Württemberg). Currently 190 hunting districts take part in the small game census, starting with initially only a hand full in 1997

Analyses of the data show that hare densities fluctuated considerably during the whole census period (considered years 2003 – 2017), ranging from 10.0 to 13.2 hares/ km^2 (median) in spring and 9.2 to 13.5 hares/ km^2 (median) in autumn. 15-years average mean population densities were stable on a relatively low level (mean: 11.0 hares/ km^2 (median) in spring and 11,2 hares/ km^2 (median) in autumn. Yearly growth rates differed each year, ranging from -8.6 to 23,9 % (median). 15-years average growth rate was 6.3 percent (median).

The continuous census shows trends in hare population densities as well as reproduction and mortality. The analyses provide the basis for management guidelines for the conservation and

sustainable use of European hare populations in Southwestern Germany. Further, this long-term study enables to provide and to refine exact guidelines and recommendations of European hare censuses for scientists and practitioners.

Mediating Nature: Technology and (dis)connecting to the outdoors

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Digital technology is playing an increasingly important role in human-nature interactions. Not only are nature conservation organisations using technologies such as GIS or camera traps for monitoring and evaluation, digital technology has also become an important tool to reach the wider public. However, in both academic and popular literature, concerns are expressed regarding people's day-to-day technology use. In particular, our increased interaction with technological devices is often seen as a contributing factor to a growing disconnection from nature. This presentation explores people's everyday use of digital technologies when visiting nature, in order to develop a better understanding of the relations between technology, people and natural places.

At the moment we lack empirical understanding about how digital technology is used in natural environments and how virtual engagement (through internet and media) links to everyday practices. The study discussed in this presentation obtained qualitative data through in-depth interviews. Participants of different age groups revealed the ways in which they use technology when performing activities outdoors and how they relate to nature when indoors. I will present an examination of the character of relevant technologies, the types of places that my interviewees related to (with or without the use of technology) and the diverse ways of using digital technologies.

These interactions are subsequently explored in a larger context of debates on place and 'placelessness'. These debates go back to the discomfort human geographers in the 1970s expressed about technology and its contribution to a disembodied experience of place. However, other academics have argued for a more open and fluid account of place, in which the local and the global are connected. Reflecting on the empirical data gathered in my study, I critically discuss the extent to which technology fosters distraction and loss of nature-based connections or offers possibilities for linking networks of local and global (natural) places and identities. This improved understanding of the ways in which technology enables dis- and/or reconnection to nature is used as the basis to reflect on current strategies for conservation management.

Can we agree on numbers? Lessons from stakeholder involvement in large carnivore population monitoring in Norway

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In 2004, the Norwegian Parliament agreed on a new policy for Norwegian large carnivore management. This implies, among other things, very precise objectives for relative population sizes of the different species and how the populations should be distributed in the various carnivore regions. The main reason for stating precise objectives was that it would be predictable for those who have free-ranging sheep and reindeer, and thus reduce the level of conflict.

In the years preceding 2004 much of the conflict was due to government and local citizens diverging assessments of the population size. In order to reduce these types of conflicts it is imperative that a common knowledge and understanding of population sizes is shared between stakeholders.

The Parliament has also been very concerned that the various stakeholder interests will be considered in the population monitoring and that local knowledge will be utilized in this work.

In order to create this, unity, transparency about methods and the basis of the data is of pivotal importance. It has also been important that the data is verifiable. Consequently, field activities and verification in fields were added to the Norwegian Nature Inspectorate as a neutral and unbiased actor, and all data has been entered into a common database (www.rovbasse.no) with a web solution that provides a fully open access to data. Implementation of DNA technology as part of the monitoring has been the largest single method development contributing to reduced conflict.

Norway has in many ways been successful in creating a common knowledge platform about population sizes. Nevertheless, it is seen that the level of conflict between the administration and the various stakeholders is constant. However, the conflicts have shifted. The relatively low, but very precise, population objectives have in themselves become the biggest source of political conflict, as "one too many" or "one too little" in the eyes of various stakeholders or politicians is a major deviation from the goal. This again leads to a debate about the use of means to reach the target goals (up or down). A big challenge now is to get an understanding that it is biologically impossible to meet the exact goal at all times, and that there is no "quick fix" to reach the goals.

Local Perceptions of Dolphins in Eastern Nigerian Inshore Atlantic: Effort for Community-Based Conservation Strategy

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The study assessed perception of bonga purse seine fishermen on dolphin with the view to raising awareness on the need for conservation of dolphin in tropical marine water. The study was conducted at Ibaga fishing community located in Akwa Ibom State, southern Nigeria. Purposive sampling technique was adopted for selection of the fishermen. Structure questionnaire and focus group discussion were used for data collection. The fishermen were sampled at the shore after they have returned from the fishing trips, especially when they were carrying out repair of their nets. The fishermen carry out fishing activities at onshore, nearshore and offshore depending on the season of the year. Dolphin is eaten by some people, and at the same time dislike but some people. Among the negative perceptions and believe of the fishermen on dolphin is that it is a spiritual (and sometimes evil possessed) aquatic animal, and that it brings bad luck to fishermen. Dolphin is believed to have some human resembled features such as blood, blood vein and internal organs. Also, dolphin is believed to be an emotional animal and shed tears (cry) like human. The fishermen did not deliberately catch dolphin unless it finds its way into the net during the process of hauling. All the sampled fishermen have killed dolphins in the previous years. Dolphin was tagged “bad luck” to fishermen because when it accidentally enters a net meant to catch bonga fish, it normally damage and destroy the net causing other fish already caught to escape. There is urgent need for formulation of conservation law and imposition of restriction against killing of dolphins and other threaten aquatic animals in the study area.

Above all, there is need for wide conservation education targeted at dolphins as well as awareness and sensitization on the true nature of dolphins to correct the wrong perceptions of the fishermen. Since dolphins cause damages to nets during incidental catch, there should be an incentive for the fishermen to facilitate repair of such nets. Also, fishermen should be instructed to return any dolphin that are accidentally caught in their nets rather than killing.

Disentangling economic, cultural and nutritional motives behind West Africa's hidden bushmeat commodity chain

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The ongoing commercialisation of bushmeat hunting threatens biodiversity and food security in the global south. The value chain involves distinct actor groups, each with unique histories and socio-economic backgrounds. Understanding the organisation of this complex value chain is essential for designing targeted interventions, but it is commonly inhibited by the secrecy of the trade. We encountered a radically different situation during the West African Ebola crisis in 2015, where trade in bushmeat ceased due to fear of infection, and actors spoke openly about their former involvement. In this unusual situation, we aimed to identify entry points for health and conservation related interventions. We non-randomly selected and interviewed 348 hunters, 202 bushmeat traders and 190 restaurant owners, and randomly selected and interviewed 985 consumers in 47 urban and rural settings around the Taï National Park, Côte d'Ivoire. First, we evaluated structural traits of the value chain by evaluating patterns of source and destination of bushmeat through network analyses. Second, using Generalized Linear Mixed models, we disentangled the economic, cultural and nutritional drivers at the level of production (hunters), distribution (bushmeat traders) and consumption (households). Our analyses revealed that most commercial hunters supplied retailers, mainly restaurants, whereas local consumers independently sourced bushmeat from their fields. Economic drivers, like landlessness, determined hunting, whereas trading was associated with economic and cultural drivers, such as livestock ownership and religion, and consumption patterns were influenced by cultural habits and beliefs, i.e. taste, religion, and environmental awareness. Overall, we propose that consumers, particularly in urban areas, represent the most effective point of entry for interventions, such as information campaigns. Considering the interdependencies within this complex social-ecological system, any such consumer level intervention should, however, be supported by programs providing hunters and traders alternative livelihoods to maintain ecological and socially sustainable change.

Mother pub bond of harbour and grey seals and the difference of european seal rehabilitation. And different reasons, that caused problems in the seal population

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There are two species of seals in the wadden sea, harbour seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*). Observations show harbour seals have world wide one of the strongest and closest bond between mother and their pups.
The first 2 weeks the mother does not even feed, because the risk of separation from mother and baby is too high!
Even after that time the harbour seal mothers have a close eye on their pups and mostly stay in body contact with them. If this contact is broken because of a disturbance the helpless young seals have no chance and become huilers.
The grey seals give birth to their pups in winter time and in difference to harbour seals on water save places for example in dunes or other higher beach parts. Also, the kind of raising their pups is complete different to common seals.
Seal research and rehabilitation is varies across European countries.
There is no rehabilitation in Denmark and in Germany the admission of seals to rehabilitation centres is decided by hunters
The seal rehabilitation centers are non profit organisations.
We are running a first aid station for motherless seal pubs and the once they need help. We are based on Foehr. An island in the northsea and near by a birth area of harbour seals.
Since some years “The Seal Rehabilitation and Research Centre Lenie´t Hart” observed harbour seals during the pupping seasons.
The results demonstrate that there is a very strong bond between mothers and pubs. Disturbance and occasionally extreme weather conditions lead to the seperation of mothers and their pups.
A research project to study the bond between mothers and pubs in the German Wadden Sea has now started.
In this area, several factors cause disturbance to all seals but mothers and pups are mostely affected from this.
Including tourism, water sports, motor boats, kite surfing, fishing aso. Current legislation.
Thats not helpful to improve animal welfare.To complete the imagine of the pups, behavior also animals in a park bear the west coast is studied.
Also, there are diffenrent disturbance, that caused problems in the seals population. Tourism, watersports, motor boats, kitesurfing, fishing nets..
The power point presentation should give an overview of this work and also show how to deal with this.

Veterinary Work in a Seal Rehabilitation Centre: Motherless pups, lungworms and other diseases in seals

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There are different Marine Mammal Rehabilitation Centres around the world that admit seals for rehabilitation. The patients are predominantly motherless pups, which would perish on their own; but also traumatized adult animals, which are injured due to being caught up in fishing nets or other human interference.

Dealing with animals, especially wildlife and their various problems makes every day a special day in a Vet's working life.

This presentation is aimed to reflect the every day work in a rehabilitation centre for seals and general wildlife and the extraordinary situations we are faced with on a daily basis. It also explains why the rehabilitation of wildlife has become a necessity. It shows the treatments available to weak, dehydrated or injured animals or those that suffer from infections. Finally, it depicts individual steps of care, which are applied in pursuit of our ultimate goal, the animal's health and release into its natural habitat.

Over the past five to four years, an increasing number of North Sea seals have been found suffering from lungworm infections, especially those in the tidal areas. The infection is predominantly affecting Common Seals, but it is quickly spreading to Grey Seals also. Lungworm infections are quite common in wildlife, but the number of severely infected animals has never been as great as it is at present. Two main species of worms, small and large, have been separated and identified as: Ostrongylus circumlitus and parafilaroides gymnurus. This is a very serious and highly dangerous infection, which could have a devastating effect on the complete population of seals. Studies in Great Britain have revealed that even seals with a healthy weight have a very sensitive and delicate immune system. So far, research has not revealed any definite results of the cause for the sudden increase and intensity of this type of infection. The experts are, however, certain that the reasons are due to human intervention and the disturbance our modern way of life causes to the wildlife and their habitats. Overfishing, global warming, pollution of the seas and the environment – it all takes its toll.

Therefore, the rehabilitation of wildlife is an absolute necessity today and sadly, will most probably become ever more important in the future. This presentation is designed to provide you with an overview of a complete rehabilitation programme, from applying First Aid, treatment and recovery right through to the release of the animal into its natural habitat.

Clines in brown bear acceptance by teenagers

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We analyzed differences in brown bear acceptance by teenagers in four countries characterized by differing brown bear population statuses - two no-bear countries: Latvia (no breeding records) and Lithuania (no permanent population, but increasing numbers of registrations in recent years); along with two bear-inhabited countries, both having high bear densities: Bulgaria (about 600 animals) and Turkey (up to 4000 animals). In all countries, the bears are protected, but poaching levels differ (probably higher in Turkey). As a result of our analysis of differences in brown bear acceptance among teenagers in these four countries, we consider that bear-related education in Latvia and Lithuania would prevent fear of these animals and sustain their acceptance, while human-wildlife conflict management measures in Bulgaria and Turkey would be recommended to boost species appreciation.

We used anonymous questionnaires with mostly close-ended questions, completed under informed consent by schoolchildren. The sample size was about 1800 respondents, with gender distribution near 1:1 and urban vs. rural distribution from 1:2 to 1:3, with no significant difference between countries in either parameters. The range of respondent age was 10–18 years. In general, respondents at either end of this age range were less positive towards bears (the difference significant only in Latvia). Our aim was to characterize drivers of species acceptance, described as clines in the rural–urban inhabitation of respondents, in particular their relationship to nature, as well as their familiarity and encounters with bears (cognitive aspect).We tested several hypotheses: H1 was that bear acceptance is higher in the countries where they are constantly present compared to so-called no-bear countries; H2 stated that urban inhabitants would better accept the species; H3 tested whether lower acceptance was related to fear of the species. H1 was rejected as negative opinion regarding bears was significantly stronger in Bulgaria (11.4% of respondents) and Turkey (16.5%) than in the non-bear countries (4.6–5.4%). H2 was confirmed (chi^2, $p<0.001$), especially for countries with bear populations, where negative opinion was about two times stronger in rural respondents compared to 1.6 times stronger in non-bear countries ($p=0.057$). H3 was confirmed for both bear and non-bear countries (both $p<0.001$), with negative opinion 4–7 times more expressed among those who feel fear of the bears. Predictably, future existence of bears in the region was seen more positively in no-bear countries (from 25.7% of respondents in Turkey to 74.4% in Latvia). Factor analysis revealed that factors important to brown bear acceptance among teenagers included the country of the respondent and country-related aspects, familiarity or contact with bears, experiences in human-wildlife conflict, gender-age differences and, in particular, the respondent's relationship to nature and the origin of their knowledge of the species. Notably, over 70% of teenagers in all investigated countries would like to know more

about brown bears, irrespective of species status and the different ways they gained information about these animals. Thus, in order to achieve a better acceptance of brown bears, awareness-raising campaigns are considered likely to be effective.

Do we wish to continue to just study people? Or are we willing to work with people to achieve conservation? Let's move from current practices to best practices in human dimensions in wildlife management.

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Human dimensions as an applied and research field has been around for approximately 50 years; are we in a mid-life crisis? Or perhaps worse, are we continuing to do what we believe we should do, abandoning solving conservation problems to instead build an academic discipline and individual careers? Yes, are we in a rut? In many ways does our current field resemble the same characteristics of traditional biological disciplines that we criticized so vehemently, and many of us still do, as doing "great" research studying things, in our case people, but not addressing the needs of decision-makers nor the current conservation challenges? Have we become comfortable with our current practices and thus not willing to challenge what we are doing and more importantly embrace instead what we should be doing? In planning there are three stages: normative stage – what ought to be done, strategic stage – what could be done, and the operational stage – what will be done. In too many studies our field is doing research, sometimes thinking of alternatives, but rarely asking what ought to be done. It is time to build an HD ethic requiring that we always work with people, share results with our respondents, seek to solve problems, ensure we are listening effectively and thus achieving honest and useful answers. Let's start today!

Conserving "Wildness:" Genomic Science and the Changing Management of Salmon in the Pacific Northwest

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The Pacific regions of Canada and the United States are currently faced with an ecological crisis: many Pacific salmon species are in a continual decline and the number of endangered and extirpated salmon runs is growing despite conservation efforts. Pacific salmon are ecological and cultural keystone species, as well as key contributors to the commercial and recreational fishing economies in the region. For decades, hatcheries have released millions of juvenile salmon annually to sustain fisheries and rebuild dwindling salmon runs. However, hatcheries remain controversial management tools as recent genomic research suggests that a hatchery rearing environment may have distinct and transferrable epigenetic effects related to domestication. These considerations raise fundamental issues not only about the nature of 'wildness' and the survival of salmon species, but also the role of new scientific approaches and knowledge in the context of current institutional and organizational practices. In this paper, we investigate hatcheries as sites where scientific knowledge intersects with local knowledge, institutional norms, and the tensions between conservation and economic development. Specifically, we ask: How is genetic science concerning the "wild" status of salmon evaluated by natural resource managers and incorporated into management strategies, or rejected? Our analysis is supported by data from interviews conducted with 75 genomicists, government representatives, and hatchery staff as part of a multi-disciplinary study that integrates social scientists with biologists. We find that acceptance or resistance to genomic research regarding at the hatchery level is mediated by demographic factors (age, education), institutional factors (local knowledge, norms and practices) and organizational factors (financial and operational capacity). These factors may impede the implementation of science in practice even in cases where resource managers were supportive of science advice. Uncertainty regarding the extent and permanence of genetic concerns related to salmon hatcheries are discussed alongside conflicting approaches to managing "wildness." The findings of this study are relevant for researchers and practitioners working at the intersections between human and ecological systems.

Fencing for Conservation: Wildlife, Communities, and Forests in Kenya

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The use of fencing as a conservation tool to conserve and protect forests is becoming increasingly popular in Kenya as the government aims to reach 10% forest cover by 2030. This comparative study of two fenced forest locations and two non-fenced forest locations uses household survey data in conjunction with forest transect data to investigate how fences impact local livelihood activities and community perceptions of wildlife and forest conservation. The forests in this study are home to the last known remaining populations of the critically endangered eastern mountain bongo, of which there are thought to be less than 100 left in the wild. The communities are being targeted for conservation efforts to bring about awareness of forest and habitat conservation not only for the bongo, but also for other forest wildlife and resources. The study finds that using electric fences for conservation has a significant negative impact on nearby households by limiting access to forest resources, such as fuelwood and water, and has the potential to further marginalize already marginalized people groups. However, overall perception of community members concerning conservation initiatives is positive. These seemingly contradictory statements provide an opportunity not only for discussion, but also for action, among conservationists and researchers to take responsibility for the potential negative impacts of conservation initiatives on nearby communities, whose participation in conservation activities is necessary for successfully sustaining conservation efforts.

Integrating Conservation and Development in Western Ghats, India

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Communities living in and around Protected Areas (PAs) have traditionally remained poor due to restricted traditional forest resource use and inadequate access to development opportunities. Integrated Conservation and Development Projects (ICDPs) have been trying to search for alternative approaches that can reduce the resource use pressures on PAs and provide livelihood opportunities to local communities, simultaneously building local support for protection of these areas. Ecodevelopment, otherwise known as ICDP in other parts of the world, has been used as a tool for biodiversity conservation and livelihood support for local communities in and around PAs in India. However, given the social, economic and ecological ramifications of this approach at various spatial scales, the need to evaluate what is working and what is not is becoming increasingly important. The present study undertaken in three landscapes in southern Western Ghats, India examines the linkages between ecodevelopment initiatives & biodiversity conservation and livelihood security of local people. Study also tries to look at the contributions of these initiatives into changing paradigms of development in these areas.

Archival research and survey of all the Village Ecodevelopment Committees (VECs) involved in the programme in these landscapes formed the backdrop of the study. Stratified random sample of VECs and households was carried out and information on the resource use patterns, sources of livelihood, socioeconomic conditions of local people, people-Park conflict, attitudes of local communities and strength of local institutions to sustain ecodevelopment initiatives was gathered. Information about impact of the programme on health, education and community empowerment was also gathered so as to look at process of development. As an outcome of ecodevelopment, the incomes of the VECs increased significantly and the income disparities among various sections within the community were reduced. Share of the income from forest resource use came down while share of non-consumptive and non forest activities went up. On the other hand, due to significant support provided by VECs in protection programmes, improved participatory PA governance systems have evolved in these areas. Study also reveals that these initiatives have lead to significant change among the communities with respect to awareness about health, education, community empowerment and social capital. While looking at the length of ICDP programme in three landscapes, it is revealed that the mainstreaming process of the local communities requires reasonable period of handholding which is critical for establishment of resilient institutional and governance mechanisms to support new conservation-development paradigms.

Landscape Conservation Initiatives in India: Challenges and Opportunities

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Protected Areas (PAs) in India are small in size and are surrounded by an ocean of human population. Exclusive approach of management of these areas has often led to conflicts between the Park Managements and local communities. In response to these conflicts, inclusive management initiatives in the form of Integrated Conservation Development Programmes (ICDPs), known as ecodevelopment in India, have been implemented in and around PAs of India for the last three decades. In the light of growing recognition of this approach, some PAs have successfully evolved as models of conservation and development. However, it is now increasingly realized that PAs alone cannot achieve the larger objectives of biodiversity conservation and human well being and such initiatives have to be addressed at the level of large landscapes, PAs being a part of overall land-use planning. The major challenges for landscape conservation lie in securing of corridors and connectivities outside the boundaries of PAs, integration of conservation and development programmes through continuous engagement of stakeholders and enabling institutional mechanisms for mainstreaming conservation into developmental processes.

The present study is based on previous research work of the authors and on-going action research programme for Agasthyamalai landscape of Southern Western Ghats of Kerala, India. Studies on ecodevelopment programme of Periyar Tiger Reserve, which is one of the important PA of the landscape, reveals that there has been evolution of new paradigms of conservation and development in this area where the dependence of consumptive forest resources of the local communities have come down due to development of alternative livelihoods, protection of the PA has improved and new institutional framework have been put in place for supporting the PA and surrounding communities. Expansion of these programmes to Agasthyamalai landscape has been initiated in the form of engagement with the communities and prominent stakeholders. The process of ecological mapping has been completed and the microplanning for village level institutions has been initiated. The results from the current action research project reveal that there is need to rationalize the landuse planning process within the forested areas. This requires a planned approach of eco-restoration of the landscape by management of areas with failed plantation and invasive species. Simultaneously, the microplanning for village communities through technical support teams will be necessary for initiating livelihood programmes of the communities so as to provide them socio-economic and ecologically empowerment and also to equip them adapt to the impacts of climate change. The study also reveals that major challenges for landscape approach are continuous engagement of the stakeholders and to put in place dynamic governance mechanism for anchoring these long term initiatives.

Seeking collaboration in wind energy and wildlife conservation

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In the U.S., 'collaboratives' play a fundamental part in wildlife conservation and land use management to overcome cooperation barriers or deal with 'wicked problems' (Inness & Booher 2010). Collaborative action of wildlife conservationists and the renewable energy sector has shaped a variety of US-American initiatives, e.g. the *National Wind Coordinating Collaborative* (NWCC), *Bats and Wind Energy Cooperative* (BWEC), and state-level collaboratives. This allows various stakeholders (e.g. from industry, agencies, research, consultants, and the civil society) to see opportunities even in crises, to make use of the innovation paradigm, and invent solutions together (Wondolleck & Yaffee, 2000).

Our contribution aims at retracing reasons why collaborative governance seems to be well established in contemporary US-American wind and wildlife conservation practice, whilst no comparable collaborative action has been achieved in the relevant German setting so far. Research was conducted in 2017 at the nexus of wildlife conservation, planning and technologies, and social issues. Funded by the German Federal Environmental Foundation (DBU), we established a horizon scan of emerging issues in sustainable wind energy development. We applied a multi-faceted, inclusive, and peer-reviewed research process, building on the relevant state of research and 50 explorative expert interviews. Interviewees ranged across academia, agencies, consultants, wind developers, associations, and environmental groups. The horizon scan yielded 18 emerging issues that would often require collaborative approaches. In the aftermath, we raised preliminary hypotheses as to why German stakeholders might still struggle in facilitating collaborative action, e.g.:

Collaborative governance of socio-ecological systems (SES) requires creating trust and *win-win* situations for all stakeholders involved; yet, interviewees revealed that the German wind and wildlife community seemed to struggle with suspect of partiality and mistrust among stakeholders.

Incentives for US-American stakeholders in co-operating with each other seem stronger than in the German setting. To avoid listing of species under the Endangered Species Act, which would require 'incidental take permits' for individual projects and could trigger a National Environmental Policy Act Review process, the wind energy sector benefits from seeking consensus and envisaging collaborative approaches. Wildlife conservationists often collaborate to achieve a good conservation status of non-listed species: For instance, the protection of bat species underlies a patchwork of federal and state laws where only 9 out of 47 species are federally listed.

The German interpretation of the European directives for species protection provides a robust regulatory regime in focusing on the generic protection of an individual animal. German associations are legally entitled to appeal in environmental matters (*Verbandsklagerecht*), e.g. in wind project

licensing procedures. Often wind projects are subject to litigation, both pertaining to wildlife conservation aspects and social concerns.

As collaborative planning is apt to dealing with complex, fragmented, and changing systems (Inness & Booher 2010), it can assist in building bridges. In focusing on the problem and not who to blame, collaboration can foster trust among different stakeholders and engender ownership of processes (Wondolleck & Yaffee 2000). Similar formats to the US-American 'collaboratives' could be road-tested in Germany to overcome *the great divide* in collaborative wind energy and wildlife planning.

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Wild minds seeking cohabitation

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"How to live with wildlife" is a current and an urgent issue as a result of the ongoing worldwide increase in conflicts between humans and wild animals. Cohabitation between humans and wild animals, as a suggested alternative to permanent control of wild animals and the creation of short-term solutions to human-wildlife conflicts, requires a rethinking of prevailing wildlife management practices. Seeking insight into cohabitation and cohabitation strategies is an underexplored area. This research attempts to advance insight into wildlife management practices that deal with human-wildlife conflicts and explore ways in which cohabitation might be achieved. Cohabitation in this research pertains to an emphasis on relations and interactions between humans and wild animals. Through this relational approach, including the use of such concepts as mutual multisensory communication, and mutual affective learning, the concept shifts attention to the ongoing interactions and the complex of activities that take place between human, wild animal, and landscape. The investigation draws on an interpretive multispecies research approach. The methodological challenge of this research was to include and account for wild animal presences in managing human-wildlife conflict situations. Therefore the research has employed a multispecies-ethnography, in which the emphasis was on human-wild animal interactions. The cases this research draws on were, respectively, black bear management on the Colorado Front Range of the Rocky Mountains, USA, and wild boar management at the Veluwe, the Netherlands. Data collection consisted of in-depth interviews, participant-observations, focus groups, and documents. The empirical cases illustrate that a management approach based on controlling wild animals and separating them from humans is no longer tenable and management based solely on models and quantitative data has proved to be a too simple approach in managing human-wild animal interactions and, in addition, is often contested. Specifically, the taken-for-granted acceptance of particular categories when establishing management strategies, and the persistence of management based on rigid boundaries and universal assumptions are problematic in the practice of managing human-wildlife interactions. In fact, the respective wild animals are often known to be active, minded and affective beings in the examined field practices, and contributors to the production of knowledge assisting the employment of management strategies. Subsequently, five cohabitation strategies have been identified; zoning, human-wild animal education, regulatory strategy, joint usage, and letting go. The three central insights of this research to further cohabitation in wildlife management are: focus on mutuality; highlight differences between humans and wild animals; and regulate their interactions based on detailed multisensory and affective knowing. I argue that to reveal the main processes and principle causes of human-wildlife conflicts and promote cohabitation, this knowledge is required and can be gained by an in-depth understanding of wildlife management practices, including the human-wildlife-landscape interactions. In conclusion, I propose an affirmative management approach that has the potential to generate so-called micro-geographies of multispecies cohabitation.

Promoting Fertility Control to Mitigate Human-Wildlife Conflicts

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As human populations and urbanization expand, conflicts between humans and wildlife increase. Traditional methods to resolve such conflicts focused primarily on lethal management including culling with firearms, trapping and toxicants. In response to human health and safety, animal welfare and environmental concerns associated with lethal wildlife management practices, in the late 20th century researchers began exploring the possibility of mitigating conflicts by using fertility control to manage wildlife populations. Since then, scientists from around the world have been developing and testing field applications of a wide array of contraception and sterilization methods for both free-roaming wildlife and feral populations of animals. Significant progress has been made in the development of both agents and delivery systems. Some challenges remain, mainly related to feasibility, costs and sustainability, and these must be surmounted in order to supply the increasing demand from the public and wildlife managers for effective, nonlethal wildlife management tools.

The Botstiber Institute for Wildlife Fertility Control was established in 2016 by the Dietrich W. Botstiber Foundation in partnership with The Humane Society of the United States to advance the use of humane, sustainable, non-lethal fertility control methods to manage wildlife populations worldwide. To achieve this goal, the Institute educates policymakers, wildlife professionals and the public by: 1) fostering information sharing, networking and collaboration through the continuation of the International Conference on Fertility Control in Wildlife series and by hosting workshops and symposiums; 2) awarding grants to support projects that promote and advance the expansion of practical applications and public policies on wildlife fertility control; and, 3) serving as a scientific resource center by maintaining a repository of information on the field of wildlife fertility control.

The proposed presentation will report on Institute activities from 2017-2018, including highlights from the 8th International Conference on Wildlife Fertility Control held in Washington D.C. in July 2017. The conference convened over one hundred attendees from twelve countries. Participants included scientists, veterinarians, managers, policy-makers and non-governmental organizations. Presentations focused on the progress and challenges associated with the use of fertility control in a variety of species including bison, donkeys, feral cattle, deer, elephants, wild horses, kangaroos, koalas, wild pigs, commensal rodents, and squirrels. The proposed presentation will also feature highlights from the Institute's upcoming Urban Deer Fertility Control Workshop to be held in Westchester County, New York in May 2018 and the Wild Horse Fertility Control Workshop to be held in Reno, Nevada in November 2018 as well as updates on projects supported by the Institute's 2017-2018 grants program and future Institute activities.

EU Platform on Coexistence between People and Large Carnivores

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Roughly one third of Europe's land surface is populated by at least one of four European large carnivore species: the Eurasian lynx, the wolf, the brown bear and the wolverine. The four species have large transboundary ranges and occur in human dominated landscapes. The conservation status of these species vary: while some populations are healthy and increasing in size, others are still critically endangered.

Protective legislation and the support from civil society has contributed to the recovery of most large carnivore populations in Europe. However, their presence can create serious conflicts with human activities such as farming, hunting and recreation, especially in areas where carnivore numbers have only recently increased and for successful coexistence, these conflicts must be addressed.

To this end, an open dialogue between different interest groups interested in or affected by large carnivores is needed. The EU Platform on Coexistence between People and Large Carnivores exists to ensure this dialogue takes place.

The Platform was launched in June 2014, with the support of the European Commission and the organisations who had signed up to become members. The Platform members are transnational organisations and associations representing different stakeholder groups who have agreed to the mission: “ways and means to minimize, and wherever possible find solutions to, conflicts between human interests and the presence of large carnivore species, by exchanging knowledge and by working together in an open-ended, constructive and mutually respectful way”. The following seven stakeholder organisations are members: the European Landowners’ Organization(ELO), the Joint representatives of Finnishand Swedish reindeer herders, the European Federation of Associations for Hunting & Conservation(FACE), the International Council for Game and Wildlife Conservation(CIC), theInternational Union for Conservation of Nature (IUCN) - Species Survival Commission (LCIE), the Worldwide Fund for Nature (European Policy Office)and the EUROPARC Federation.

The Platform gathers and analyses case studies demonstrating good practice for coexistence with large carnivores and presents them on its website and at events. To give stakeholders an opportunity to share their experiences and expertise, as well as to discuss problems and potential solutions, the EU Large Carnivore Platform regularly organises meetings. As a “one size-fits-all” approach to large carnivore management across Europe is not possible and innovative solutions are needed to solve conflicts, workshops to promote dialogue among stakeholders in regions with high conflicts are organised. The EU Platform model is now being adopted elsewhere, with the roll-out of several regional platforms in areas with ongoing conflicts caused by large carnivore presence.

Presenting authors: Secretariat of the EU Large Carnivore Platform

Application of Tightness – Looseness to Understanding Cultural Differences in Values and Preferences for Wildlife Management

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Research in the 21st century has conceptualized and supported the study of fundamental values and their orientation toward wildlife and wildlife management. In the United States, values toward the natural environment, and wildlife in particular, have historically represented a domination orientation. That is, nature, and in turn, wildlife were resources to be dominated, or mastered, for the purpose of human survival, safety, and use. With increases in urbanization, education, and modernization; human relationships with wildlife have evolved to include a mutualistic orientation, whereby wildlife is viewed by many as having similar, or equal rights as humans. This has resulted in state wildlife management agencies across the United States having to respond to a greater diversity of public preferences for how wildlife resources should be managed. Furthermore, the extent to which this diversity of values toward the environment and wildlife differs across regions and states of the U.S., making wildlife management across the U.S. complicated and complex.

A concept that has been addressed to explore differences across societies, cultures, and geographic regions is "Tightness – Looseness." "Tight" societies hold strong social norms and exhibit low tolerance for behavior that does not conform to those norms. "Loose" societies, on the other hand, hold relatively weak social norms and exhibit high tolerance for behaviors that may differ from those norms. In a study of 33 nations, Gelfand et al (2011) supported the hypotheses that the tight or loose characteristic of a culture is influenced by ecological and historical factors. Tightness tended to be a characteristic of cultures that are vulnerable to factors such as natural disasters, disease, resource paucity, and external threats, whereby cultures that are less vulnerable to these factors showed a proclivity toward looseness. Harrington and Gelfand (2014) found that the diversity in ecological and historical conditions among the 50 states of the U.S. is also manifested in differences in cultural tightness – looseness.

Exploring cultural tightness – looseness can further explain differences among cultures in how they view wildlife and wildlife management, and ultimately support the agencies and the policies that, ideally, broadly represent the diverse values of their constituents. It is hypothesized here that the relative tightness – looseness of a state and/or region of the U.S. will relate to the prevalence of Domination and Mutualistic wildlife value orientations of that state or region, attitudes toward specific wildlife management actions enacted in that region, as well as perceptions of and trust in the wildlife management institution of that region. From an applied perspective, this approach can 1) enhance management's understanding of the complexity of its public's perceptions and support of wildlife management issues, and 2) shed light on the differences in values, wildlife value orientations and attitudes toward specific policies across and within states and regions. From a theoretical perspective, exploring the role of tightness – looseness from a cultural perspective enhances the understanding of the social – ecological conceptual approach to which values play a role, both motivational and descriptive of the evolution of a society's material culture.

Social Change and the Future of Carnivore Conservation in Post-Industrial Societies

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Evidence indicates we are now in the midst of a sixth mass extinction—a crisis brought about largely by human activities. Indeed, numerous studies point to human populations and our activities as the primary causes of biodiversity loss and extinction risk for a wide variety of fauna. A well-known example is human persecution of large, terrestrial carnivores, which led to rapid declines for many carnivore species. Human persecution of carnivores occurs globally, has resulted in localized eradications of numerous species, and more recently, has been facilitated by technological innovations that make wildlife easier to find and kill. Given this backdrop, it is perhaps not surprising that modernization of human societies is often viewed negatively by the conservation community.

Nevertheless, increasing evidence indicates that modernization may also be responsible for a host of social and ecological changes that can actually facilitate conservation of large mammals, including carnivores. Perhaps the most well-known of these changes are global shifts in human values that have been associated with greater support for environmentally protective policies, and ideologies that reflect greater care and compassion of non-human organisms. Moreover, evidence indicates that some carnivore species are showing remarkable behavioral plasticity—adapting their behavior to minimize risks when living proximate to human populations.

This symposium will bring together a diverse group of scholars who have examined human-carnivore interactions and relationships across Europe and North America. Our aims are to show: (i) how modernization is changing human perception and behavior, (ii) how carnivores are adapting to humans in human-dominated landscapes, (iii) how these changes may affect conservation efforts in the future.

Conserving Large Carnivores in a Modern World

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Human beings and our associated activities are arguably the most important factor limiting the success of carnivore conservation. Human populations limit carnivore populations both indirectly, through habitat modification and competition for shared prey, and directly, through regulated and illegal hunting of carnivores. The variability in the types and extent of human impacts suggests conservation successes may be facilitated by a wide variety of human interventions. In some cases, successful conservation will likely require perpetual efforts to promote and steward carnivore populations; in others, successful conservation may require only modest restraint from the most damaging types of interactions (e.g., limiting intentional killing of carnivores). In addition to active management efforts such as reintroductions, and depredation management, successful conservation might also be indirectly facilitated by social changes, especially those that make human populations more tolerant of carnivores. We first describe how social and ecological changes associated with societal modernization have created environments more conducive to the conservation of carnivores, and propose two mechanisms (i.e., value shift, risk/interaction reduction, increased tolerance) that ultimately serve to facilitate successful conservation outcomes. Next, and paradoxically, we explain how these changes are currently challenging carnivore conservation efforts—i.e., the same mechanisms that ultimately promote successful conservation are likely to increase social conflicts concerning carnivore management. These analyses point toward the need to find means of reducing social conflicts surrounding large carnivores without jeopardizing their conservation.

Integrating Values and Identity to Understand Conservation Conflicts

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Psychological research on human values and identity provide important insights for understanding conservation conflicts. However, these theoretical traditions rarely intersect; thus, it is not clear how conservation professionals should integrate such insights. Values theory holds that values are formed early in life, stable throughout one's lifetime, and important determinants of how people think and behave. Value differences are often cast as the ultimate determinants of social conflict. However, because values are viewed as relatively fixed, values theory implies that conflicts will persist as long as value differences persist. In contrast to the fixed, stagnant view of values, identity theory holds that human attitudes, norms and behaviors are shaped profoundly by the social context in which they occur. How individuals think and behave is a function both of the inter-group context (e.g., extent of group conflict) and the extent to which individuals identify with relevant groups, which affects their motivation to comply with group expectations. Here we use data from three studies to explore the relationship between individuals' social identities (the extent to which individuals identify with environmentally-relevant interest groups) and their wildlife value orientations (WVOs). We find moderate-strong relationships between identities and WVOs, and show how both WVOs and identities help explain opposition to a variety of conservation actions. We discuss how theory on values and identity might be integrated to better understand conservation conflicts.

Water Allocation: Segmenting Public Beliefs toward Water Conservation

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Global population shifts have put increasing pressure on water resources. As a result, the availability, use, and allocation of has become the source of conflict and contention. Dwindling surface and ground water supplies, increasing demands for municipalities, industry and commerce, agriculture, natural resource and recreational water uses, and decreasing water quality assure the continuation of conflicts among private and public stakeholders, with the potential for far-reaching social, economic, and environmental consequences. This growing conflict emphasizes the need to understand the diversity of values, beliefs, and attitudes that members of the public hold about the allocation of water resources. Using data collected from an internet-based survey, dimensions for basic beliefs about water conservation were developed. Respondents were clustered based on their level of agreement to these basic belief dimensions. These clustered respondents were then compared on attitudinal preferences regarding priorities for water allocation and municipal strategies for water conservation. Results supported the existence of distinct segments based on value-laden basic beliefs about water conservation and the connection of these segments with preferences toward specific water management strategies.

Of the 557 respondents (76% response rate), all segments were quite positive toward voluntary conservation of water by households. The Economy-Centered segment appeared to be more politically conservative, reflected in a negative basic belief regarding the use of government regulation to conserve water and preferred an economic emphasis to an environmental emphasis in water conservation. The Environment-Centered segment appeared more politically liberal in their belief in government regulation of water conservation and preferred emphasizing the natural environment to the economy in water conservation. The Neutral-Focused segment did not hold strong basic beliefs regarding government regulation and biocentrism (economy versus environment).

Values-based segmentation, when connected with specific preferences for management actions, can help inform water managers when making future water conservation and policy decisions. Successful water management is essential to ensuring an adequate and sustainable supply of water for commercial, agricultural, and municipal uses. To manage the allocation of water resources across a complex social landscape, water managers and scientists alike must gain an understanding of the concerns and values of diverse and often-competing stakeholders.

The Conservation Revolution: Radical Ideas for Saving Nature beyond the Anthropocene

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A revolution is brewing in conservation. Not necessarily an event that makes everything different, but an underground pressure building towards radical change. The trigger is the arrival of the Anthropocene - our alleged new phase of world history in which humans dominate the earth-system and the concept of nature has become obsolete. This arrival seems to have upped the ante dramatically; the choices facing the conservation community have now become particularly stark. It is therefore no surprise that we have recently seen several radical proposals for revolutionising conservation and heated debates around them. One proposal, the 'new' conservation, asserts that humans must take their 'earth domination' seriously and manage this to maximize sustainability and economic development. The response has been a radical resurgence of 'neoprotectionism'. This view aims to separate development from conservation and calls (again) for a drastic expansion of protected areas, even up to half the planet.

This book is the first to provide a sustained reflection on these radical conservation proposals and their implications for thinking about development. We argue that both proposals hold important seeds for radical change but that each on its own contains untenable, even dangerous contradictions. The reason: they do not take the analysis of capitalism seriously enough. In-depth analysis of the contradictions reveals that to do justice to the debate's radical implications we need to take it out of the Anthropocene and place it more appropriately within the Capitalocene. Humans, after all, cannot overcome the age of humans; we can –indeed we must - overcome the age of capital.

Inspired by political ecology and real-world examples of saving nature differently, we build on the analysis to develop an alternative position we call 'convivial conservation'. Convivial conservation allows radical seeds to grow into a realistic and positive way forward for reconciling global conservation and development imperatives; it allows for a post-capitalist approach to conservation that dissipates the increasing pressures of the Capitalocene. And perhaps, it might spark a conservation revolution; one where conservation is fully integrated into an overarching movement to create a more equal and sustainable world.

Are Carnivores Considered Equal by Romanian Hunters?

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Since 2016, the ban on trophy hunting of large carnivores in Romania has caused emotions to run high and attitudes to change amongst the Romanian hunter population. The country has always known as an area with the highest densities of brown bears (*Ursus arctos*), gray wolves (*Canis lupus*), Eurasian lynx (*Lynx lynx*) and wildcats (*Felis silvestris*) in Europe. Romanian hunters pride themselves on sustaining a resource, wherein many parts of Europe, large carnivore numbers were severely reduced. The ban on trophy hunting, a relatively quick decision by the Romanian Ministry of Environment, has angered Romanian hunters, as they feel these animals are not valued and management of the species to reduce property damages has been taken out of the hunters' hands. Understanding hunters' attitudes toward wildlife has long been a central theme to human dimensions (HD) research, but little is known of hunters' views in Romania. Given this context, there is a huge need to give hunters a voice in the debate by documenting their attitudes, beliefs, and values toward brown bears, gray wolves, Eurasian lynx, and wildcats. Usually, HD researchers have focused on understanding a specific interest group's attitudes toward a single species. In this paper, we will focus on understanding how attitudes vary across four species in order to explore whether hunters value all carnivores the same. Data was collected from hunters who live in the immediate area of the Făgăraș Mountains, a mountain range in the heart of the Carpathians where all four carnivores exist. A mixed-methods approach was used to collect data from hunters. Semi-structured interviews were conducted with presidents of the various hunting associations around Făgăraș Mountains to explore key themes and concerns about the four species. This qualitative research offered guidance to develop a quantitative research instrument that focuses on the most important issues. The quantitative research instrument consisted of 186, items exploring wildlife value orientations and identical items regarding perceptions of impacts, attitudes, and beliefs toward gray wolves, brown bears, Eurasian lynx, and wildcats. The self-administered questionnaire was distributed to members' hunting association presents in the study area and who held a wild boar license during the 2017-2018 hunting season.

This presentation will explore Potential for Conflict Index$_{2,}$ the differences in hunter views across the four species regarding attitudes, and the support/opposition for various lethal management actions. From the results of the responded questionnaires (n=500), hunters' attitudes toward the four carnivores do differ. In contrast to previous research, where gray wolves have been perceived as extremely negative, we found that hunters held the most negative attitudes toward brown bears. The brown bear symbolizes the most income for Romanian hunters and causes the most human-wildlife conflict which we suggest explains this predominately negative view. As the trophy hunting ban continues within Romania, we fear these attitudes may only become more negative, and the values (perceived and economical) of carnivores will deteriorate in the view of Romanian hunters.

Stakeholders acceptance for wild boar in Flanders (Belgium)

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Wild boar reappeared in Flanders (Northern Belgium) in 2006, after several decades of absence. The original management goal was to eradicate the limited number of local small populations, before a viable wild boar population would re-establish in Flanders. However, due to the lack of support for both this management objective as for the management actions required to achieve this goal, the authorities were quickly forced to abandon this policy. In 2011 the Flemish authorities decided that wild boar, being a native game species, should be managed,based on local stakeholders acceptance capacity and the principles of adaptive impact management (Riley et al. 2003). For this purpose 10 game management zones (GMZ) were delineated, covering the whole region, and local stakeholder groups were asked to collaborative determine the management objectives within each of these GMZs.

The Research Institute for Nature and Forest (INBO) was given the tasks to (1) provide annually for each GMZ the available data on wild boar impacts and, (2) to report the stakeholders acceptance for these impacts as well as for the current policy goals and management tools. For this last purpose, INBO performed two surveys. The first questionnaire targeted the three main stakeholder groups (nature conservation NGOs, hunters, farmers) inquiring their acceptance of the current impacts, their support for the current policy priorities and, for the currently available management tools for wild boar management in Flanders. The second survey questioned the (general) public attitudes towards wild boar, and their support for the current wild boar policy and acceptance of management tools.
Our presentation focuses on the outcomes of the stakeholder group survey. Results reveal a moderate agreement among the different stakeholders about prior impacts for wild boar management, being, different forms of damage to crops and gardens, car collisions and, to a lesser extend the negative impacts on biodiversity. Stakeholder groups strongly differ in supporting the current management tools. It appears that institutional roles and ethical reasons are defining one's position, rather than the nature of the impacts itself.

Hunter-perceived wolf-lynx-deer interactions in Lower Saxony

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Wolf and lynx populations have been recolonising the federal state of Lower Saxony, North Germany, continuously. The spreading has been monitored by a wildlife survey performed by hunters and Harz National Park. The hunters in Lower Saxony have mainly accepted the return of the wolf and lynx. Important reasons for this are the hunters' involvement in the monitoring of the natural wolf repopulation and the reintroduction of the lynx in the Harz. However, the potential influence of predators on the ungulates and resulting disadvantages for the hunters are controversial as there is a lack of information about the effects of carnivores on the cultural landscape.

A citizen science program, the wildlife survey of Lower Saxony (WTE), has been continuously monitoring several game species since 1991. The holders of the hunting districts have provided estimates of wildlife; the hunting bag and the occurrence in their hunting ground (mean 474 ha) for a number of species. Furthermore, the hunters were questioned about diseases, road kills and other topics, as well as on the human dimension, e.g. hunters' opinions and attitudes. The participation of hunting district holders was high throughout the years 1991–2017; more than 90 % of the huntable area of Lower Saxony was recorded.
In this study the opinions, moods and the observations of the hunters on the roe and red deer are to be analyzed in the areas with and without wolf and / or lynx occurrences. Furthermore, the hunting bags in these areas are compared.

In addition to the occurrence of the two predators, the opinion of the hunters on the effects of wolf and lynx on roe and red deer was polled. In recent years, there was a much lower visibility of roe deer in the hunting districts where the wolf or lynx permanently or frequently occurred. In the hunting areas with lynx occurrences, 44 % of the hunters believe to observe fewer roe deer, compared to 16 % without lynx. In the wolf areas, the opinions are comparable (49 % with wolf, 10 % without wolf).

Whether these observations are actually attributable to the presence of wolves, or can be attributed to other factors (diseases, misjudgments, etc.), will continue to be open to discussions.
For the years 2009–2014, the preliminary statistical analysis in R (mixed models with hunting district as random factor) of the roe deer hunting index in areas with and without wolf or lynx occurrences show partly significant decreases in the hunting bags. In the Lueneburg Heath region in hunting districts with regular wolf occurrences, the hunting bag decreases more than in areas without wolf. Because wolves and lynx are increasingly found in the hunting districts, surveys are especially valuable

for monitoring the connection between hunting statistics and population data. Using this data, it can be assessed which effects occur over large areas, and which are in fact due to the presence of predators, as well as what influences the "perceived" effects have. Both are crucial for the acceptance of carnivores among rural actors.

Did we ask wolves whether they consent to be managed?

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There is an increasing focus on collaborative governance to enact wildlife conservation policies, where non-state stakeholders engage in collective, consensus oriented and deliberative decision-making processes. This form of governance, it is argued, will increase the legitimacy of conservation policies. However, while this governance is presented as being truly democratic, inclusive and participatory, it is systematically grounded on the exclusion of one party: wildlife itself. John Rawls did acknowledge in A Theory of Justice that his social contract "is not a complete contract theory" and that it "fails to embrace all moral relationships" and left out "how we are to conduct ourselves toward animals and the rest of nature". For wildlife governance, this deliberate omission has important consequences for the ability of policies to conserve and fully restore wildlife populations. Because the current social contract remains strictly between human agents or institutions, policies built on successions of compromises will never establish lasting safeguards that can protect nature under a growing human population and economy. The crux of the problem lies in the fact that nature does not have rights on its own. Having rights carries profound governance implications for the importance given to a party's recognition, procedural access, and distribution of benefits and costs. The party's own interests need to be explicitly taken into account and are no longer what other parties exclusively and arbitrarily decide they can afford. Legal personhood further implies that the party can initiate legal actions on its own, that the court must consider the injury suffered by that party and that relief must run to the benefit of the party. Human societies have for centuries extended the scope of legal personhood to include more human beings (e.g. prisoners, aliens, women, people of color or indigenous people) or inanimate agents (e.g. nation states, churches, municipalities, corporations). In Should Trees Have Standing?, Christopher Stone explained that proposals to confer rights to some new entity – such as trees and forests – are often met with laughter or fear, because until the rightless thing receives its rights, it is only a thing for the use of the right holders at the time. Resistance to giving the thing rights is expected until it can be valued for itself; however valuing it for itself is hard until the right holders give it rights. We encourage conservation researchers and practitioners to revisit their actions and practices by giving and enforcing rights to species, populations and ecosystems.

Transitions among sportsperson permit holders and the influence of cross-buying behavior

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Human dimension inquiries are an essential component of wildlife and fisheries management. Though a lot of information can be gained through surveying constituents, we can also begin to understand sportspersons by using techniques developed for "big data" and marketing analyses. We tracked permit holders from the Nebraska Game and Parks Commission fishing- and hunting-permit database that purchased permits in 2010 through 2016 to evaluate the transitions between fishing only (i.e., fishing permit and paddlefish tags), hunting only (i.e., small game, big game, and turkey), hunting-and-fishing combination, and inactive (i.e., no permits) states. There are approximately 264,070 individuals purchasing a these permits in a given year in Nebraska. On average permit holders in the fishing-only state purchased 1.0 fish permit, hunting-only state purchased 1.4 permits, and combination state purchased 2.9 permits during a given year; these three states represent a gradient of increasing cross buying (i.e., individuals buying multiple types of hunting and fishing permits). We observed relatively little transition of permit holders between the hunt-only state and fish-only states (hunt to fish $p = 0.02$; fish to hunt $p = 0.01$). Permit holders were more likely to transition to a combination state from hunt-only state ($p = 0.14$) than from fish-only state ($p = 0.05$). Permit holders in the fish-only state were more likely to become inactive ($p=0.34$) than those in hunt-only ($p = 0.18$) or combination states ($p = 0.09$). Once permit holders transitioned to the inactive state, there was a high probability ($p = 0.80$) of remaining inactive. Further, cross-buying behavior was influential in decreasing the probability of becoming inactive, with single permit type purchasers having a 35% greater chance of going inactive than cross-buying permit holders. Understanding cross-buying patterns and future purchase tendencies among permit holders will aide in development of strategic plans for recruitment and retention of sportspersons.

Health status and condition of invasive alien turtles captured in eastern Poland

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Invasive alien species (IAS) turtles pose big environmental problem. They compete for food and territory to autochthonous species, *i.e.* strictly protected European pond turtle (*Emys orbicularis*). They can carry or transfer pathogens for other reptiles, amphibians, fish, and humans.

The objectives of the study was evaluation of IAS turtles population size captured from natural environment in Lublin area (eastern Poland) and assessment of health status and condition of IAS turtles in Polish climate conditions. Trapping with floating platforms with pitfall cages and ramps (Epicrates Turtle Traps - ETT) was held for three years (2015-2017) from April to October. Some turtles were delivered by citizens (i.e. fishermen). All captured animals were submitted to clinical examination and measurements. Species, sex, weight, and size of an individual was recorded. Condition was quantified with numerical index (1 – 3) for locomotion, aggressiveness, muscle strength. Common physical examination questionnaire was developed to harmonise data collection and score parameters by quantitative (absent – present) or semi-quantitative way (bad – poor – intermediate – good – very good;) to asses clinical status of head, eyes, ears, mouth, nares, integument, limbs, prefemoral fossae, tail, cloaca, and shell. The score for no clinical abnormalities reached 10 points. Detailed description and photo documentation of findings was conducted.

Majority of 120 turtles captured represented subspecies of *Trachemys scripta*: red-eared slider (*Trachemys scripta elegans*; n = 73), Cumberland slider (*Trachemys scripta troosti*; n = 11), yellow-bellied slider (*Trachemys scripta scripta*; n = 31). The remaining chelonians were false map turtle (*Graptemys pseudogeographica*; n = 3) and single common snapping turtle (*Chelydra serpentina*) and hybrid of different slider species. Seventy-eight turtles (65%) were female and 42 (35%) males.

Twenty-eight turtles (23,3%) showed no clinical signs (10/10 score). The lowest score 5/10 was achieved in single individual (0,8%). Two individuals were found dead prior examination: one collected dead from ETT, the other deceased during quarantine. Abnormalities were mostly observed in carapace (51,6 %) and plastron (37,5 %): metabolic disorders, excess scutes, and erosions were mainly seen. Skin disorders were found in 28,3% of turtles. Altogether, different forms of Septicemic Cutaneous Ulcerative Disease (SCUD) might have been assumed. Several animals (10,8%) showed problems with eyes (clarity and brightness, conjunctiva, cornea), and mouth (peak, mucosa, tongue, glottis, Eustachian tubes abnormalities). The other symptoms were affected limbs/joints (8,3%) and respiratory tract disease (nares exudation; 3,3%). No cloaca or ears pathology or ectoparasites were noted. Missing digits or effect of aggressive conflicts or predator attacks were seen. With few

exceptions the turtles were in perfect condition: aggressive, uncooperative and opposing strongly during examination.

Our study shows that captured invasive alien turtles show generally good health status and condition as well as they strongly adopted to non-autochthonous natural environment of eastern Poland.

This work was supported by the National Science Centre project “Invasive turtle species as a source and vector of animal and human pathogens” (Grant No. 2013/11/B/NZ7/01690).

The complex relationship between levels of management in Swedish predator management

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Frontline managers, i.e. managers who are positioned at the interface between citizens and the state, have the opportunity to affect the delivery of public policies. They convert political decisions into action and they form the core of many public decisions, through interaction and communication with both recipients of public policy decisions and upper management levels. This study focuses on the interaction between levels of management in large carnivore management in Sweden. It takes theoretical departure in Kaufman's (1960) capital study of administrative behaviors steering the US Forest Service of the 1950s. Kaufman found that, despite multiple objectives and tasks, the forest management efficiently performed the goals set by central top leadership. This was possible through a management system which monitored and controlled the decision making process, and corrected deviations and provided identification with the beliefs and values of the central organization. Since 1970, several factors have contributed to change the dynamics of interaction between levels of management. The most relevant is the entry of public participation. Previously, decisions were made based on shared values, or decision premises, among members. In recent years, diverse, powerful, and active outside audiences are now taking part of the decision making. In such environment, the work of frontline managers becomes crucial in order to balance and align policy goals with the need to enhance public involvement. The study deals with how wildlife managers handle the translation of political goals and strategies into local administrative praxis, focusing particularly on how collaborative measures impact on their work and how they solve the challenges and dilemmas arising from balancing different interests and demands.

Applying the North American model of wildlife conservation to hunting behavior – it's not as simple as it sounds

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In North America, wildlife are managed as a public trust resource. This means that wild animals are owned by no single person; rather, they belong to the public and policy is discharged by trust managers (e.g., wildlife biologists), such that current and future generations benefit. The origin of public ownership is rooted in 6th century Roman civil law that was reaffirmed by the English Magna Carta, and later carried to the United States colonies and legalized through 19th Century common law. The North American Model of Wildlife Conservation, which provides the foundation for contemporary wildlife management, was originally described in the mid-1990s. The "model" ascribes 7 pillars, 1) Wildlife as a public trust resource; 2) Elimination of markets for wildlife; 3) Allocation of wildlife is by law; 4) Wildlife can only be killed for a legitimate purpose; 5) Wildlife is considered an international resource; 6) Science is the proper tool for discharge of wildlife policy; and 7) Democracy of hunting is maintained. In North America, science is generally used to help inform policy regarding how individual populations should be managed. Although we recognize that wildlife management has both biological and sociological considerations, it should be considered "messy" in that there are often no clearly defined solutions. For example, United States hunters are regarded as conservationists due to a history of leadership in wildlife management funding and the resulting financial contributions of hunting license fees and excise taxes paid on sporting arms and ammunition. Although these stakeholders provide the majority of funding, they often oppose decisions that are counter to their personal belief system. Because public (primarily hunter) support is necessary, policy decisions operate within a human dimensions framework. To address management issues, agencies often use human dimensions surveys to elucidate stakeholder opinions about a particular game species and, due to their influence on agency funding and management activities, hunters are often the population of interest. These surveys generally include a range of questions including attitudes towards management actions and perceptions of trust in agency staff regarding decision-making. The latter is closely tied to hunter satisfaction and perceptions in game population size. In Minnesota, a 2005 survey of white-tailed deer (*Odocoileus virginianus*) hunters, which coincided with the highest deer populations ever recorded, trust in agency decision-making was above the midpoint of a 5-point scale. However, follow-up surveys of deer hunters completed 2015-2017 after generally meeting publicly established population goals statewide (i.e., during a time of lower deer populations), trust had declined. To address the challenge of maintaining hunter support while managing wildlife as a public trust, researchers and agencies are increasingly relying on attitude surveys of various populations (hunters, landowners, general public) and more structured decision-making techniques to identify preferences and support for management. However, changing stakeholder attitudes, lack of hunter support for publicly-established goals, and the discovery of chronic wasting disease have challenged the notion that hunters can effectively manage deer populations for societal benefit and, ultimately, the durability of the North American Model for wildlife management.

Human Dimensions in Mitigating Elephant Crop Raiding in Bia Conservation Area, Ghana.

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The New England Biolabs Foundation supported key stakeholders in a project to mitigate elephant crop raiding in Bia Conservation Area in western Ghana as a means of conserving elephants and improving food security in the area. This collaborative form of managing crop raids involved training local farmers from affected communities to demonstrate the efficiency of several crop raiding mitigation strategies on their farms. Farmers were supplied with start-up materials to apply the knowledge on their farms in 2016. Comparison of crop raids indicated a significant reduction in raids after start of the project, with the chilli (hot pepper) grease method being the most deterrent to elephants. The low levels were assessed to peak in June where elephants only targeted large farms with matured crops. This observation is in contrast with previous studies where raiding incidences were associated with proximity of farms to park boundary or diversity of food crops on farms. The fact that elephants were restricted in selecting nearby and diverse crop farms could be attributed to the general improvement in elephant repellent methods on farms during the project period. However, the general difficulty to effectively surround and safeguard large farms with the chilli-grease fences may explain their relative preference to be raided by elephants. Given that most farmers are incapable of resettling and farming elsewhere, farmers should be encouraged to limit their farm sizes and grow less attractive crops that have low crop-raiding risk. In future, farmers should also invest towards establishing longer and more effective communal fences.

Attitudes towards European Rabbits (*Oryctolagus cuniculus*) in farmland areas within Spain

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Conflicts over the management of wildlife have notably increased during the last decades, and constitute an important risk for wildlife species conservation. The human dimension of such conflicts has received little attention by researchers to date, although it is increasingly acknowledged that understanding stakeholders' views and attitudes is essential to mitigate such conflicts. In Spain, the management of European rabbits (*Oryctolagus cuniculus*) is usually conflictive as this native lagomorph plays several different, contrasting roles. On one hand, European rabbits are one of the main small game species; ~6 million rabbits are hunted annually. On the other hand, they are a multifunctional keystone species, acting as ecosystem engineer and serving as prey for 40 predator species, including some of conservation concern. In addition, rabbits cause intensive crop damage in some farmland areas. In this context, the interests of stakeholders involved in the management of rabbit populations are often opposite. For instance, farmers generally aim to eradicate rabbits to reduce crop damage, while hunters intend to boost rabbit numbers to increase game availability. In this study, our main aim was to assess the attitudes of different stakeholders towards the management of European rabbits in Spanish farmland areas. To achieve this goal, we conducted personal in depth interviews with farmers (n=6), hunters (n=6) and people from governmental agencies responsible for environmental and farming management (n=11) in two distant study areas (south and north-eastern Spain), in which notable rabbit damage to crops had been reported. Beside this, 3 focus groups with hunters and 3 with farmers were conducted in the study areas. Interviews and focus groups were digitally recorded and transcribed into text material. Data analysis consisted of reading and re-reading text material to identify main themes, ideas and topics. According to our results, most participants agreed that in the past there were tensions between stakeholders about crop damage caused by rabbits. Most of them perceived that this conflict has been reduced recently, mainly as a consequence of the decline in rabbit numbers (and therefore crop damage) caused by rabbit diseases. Nevertheless, it was often believed that the problem will come back again in the future, and therefore tensions were somehow latent. In general, clashes took place between farmers and hunters and the former and policy makers, depending on the study area. In addition, there were many references along the interviews and focus groups to the perceived inefficacy of the current management system, which is based on hunting, to control rabbits and their damage. The qualitative thematic approach used in this study is very useful to describe stakeholders' attitude towards wildlife. Overall, our findings suggest that it is essential bringing all the stakeholders together to find solutions for rabbit damage that are acceptable to all

parties. In this sense, new approaches to manage rabbit damage should be explored, and ideally this should be done with the participation of all involved stakeholders.

Attitudes of hunters and the public towards the reintroduction of the Iberian lynx before and after releases

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The Iberian lynx (*Lynx pardinus*) is the most endangered large carnivore in Europe. It dramatically declined during the second half of the 20th century, mainly as a consequence of habitat loss, illegal killing by hunters, and the decline in its main prey, the European rabbit (*Oryctolagus cuniculus*). In this context, a reintroduction program was launched with the first captive-bred lynx released in 2009. The social context is critical to the success of any reintroduction program, and particularly in the case of predators like the lynx, since these may have a detrimental impact on human livelihood. In this study, our main aim was to evaluate the attitudes towards the reintroduction of lynx in two areas in southern Spain. We assessed differences in attitudes of >750 hunters and >1500 of the general public before (2007-2008) and after (2015-2016) the release of the cats. Interviews were conducted by phone. Both groups showed a high level of support for lynx reintroductions before the release of the cats (>90% and >80%, respectively). At this time the general public associated lynx reintroduction with intrinsic and ecological value. It was also thought that lynx reintroduction would attract tourists and help reduce poaching. In contrast, hunters mostly focused on aspects related to hunting activity like for example a decrease in the number of other predator species, an improvement in the quality of game animals or a reduction in poaching. In general, interviewees' expectations were not met after lynx releases; only a higher control of poaching was noticed by hunters. Before the release of the lynxes, ~40% hunters linked the reintroduction program to at least one potential problem for their collective, like a decrease in rabbit numbers and constraints for practicing hunting. After lynx releases, hunters confirmed their fear that rabbit abundance declined, although they attributed this mostly to the incidence of diseases rather than lynx. After the releases, most participants thought that the reintroduction program had been relatively successful. In opinion of general public and hunters, road-kills were the main lynx mortality cause, although the former also cited often illegal practices associated with hunting like snaring or poisoning. Hunters but not general public viewed rabbit scarcity as a serious threat for lynxes. Interestingly, this concern of hunters decreased after lynx reintroduction. In summary, our findings suggest a favourable social context for the reintroduction program, which was considered mostly successful after the release of the animals. There was some variation in the benefits and costs associated with the reintroduction by general public and hunters. However, neither most of the expected benefits nor most of their fears were confirmed after lynx releases.

A dynamic view of wildlife value orientations

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Abstract: Conflicts over the conservation and management of wildlife present persistent problems for policy-makers and managers alike. Researchers often trace such conflict back to fundamental differences in values held by various stakeholder groups. One of the primary research approaches that aim to address such challenges tends to focus on individual group members and characterizations of their values, beliefs, or policy preferences. However, such an approach reduces values to static properties that act as a source of conflict at either the individual or group level. Our conceptualization of values takes a systems approach-one that views values as existing within a multi-level social structure inclusive of individuals who are nested within myriad groups, organizations, cultures, and societies. The application of systems theory to understanding values provides a means for understanding how values operate and interact at various levels, and helps to address questions such as "how are values formed and how do they change?", "how are they embedded in human cultural systems?", and "how can an understanding of values as a system guide wildlife conservation and management practices?". This talk applies a multi-level, dynamic, and adaptive conception of values that helps to explain how they can be relatively immune to change given stable social-ecological conditions, yet subject to shifting when presented with extreme disruptions in the context of life.

Anthropomorphism and Mutualist Wildlife Value Orientations: Conceptual refinements

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Previous study in the United States has identified modernization as a key factor contributing to the emergence of mutualist wildlife value orientations. This phenomenon represents a cultural shift from the more domination-oriented values that had characterized U.S. society since colonization by Europeans began centuries ago. It has been proposed that lifestyle changes inherent to modernization (e.g., urbanization, higher living standards) have limited humans' direct contact with wildlife, risks posed by such contact, and needs/desires to take possession of wildlife for utilitarian purposes. This fundamental change to the human predisposition toward wildlife parallels an increasing emphasis on human needs beyond those associated with basic survival (e.g., belongingness, inclusiveness, and self-expression). The perceived role of wild animals in many humans' lives has thus been transformed. Longstanding views of wildlife as adversary and subjugate have often been replaced with a view of wildlife as individual moral beings deserving of rights similar to those afforded to conspecifics within a social network. Within this context of change, wildlife management institutions in the U.S. face a broader scope of demands and increased discord among the public with regard to the appropriateness of wildlife management strategies. Mutualist wildlife value orientations may increasingly provide a foundation for social conflict over wildlife management and, as such, warrant continued research consideration.

A recent assessment of wildlife value orientations in the U.S. provided an opportunity to pursue additional conceptual refinements. Specifically, we investigated a hypothesized connection between mutualism and anthropomorphism (the human tendency to assign human characteristics, motives, behaviors, and abilities to non-human agents). Throughout prehistory, anthropomorphic thought about wildlife is believed to have provided an adaptive advantage to humans by enhancing their ability to understand and predict animal behavior. Cultural variations of anthropomorphic thought, and its effect on modern human cognition have received extensive research attention. However, the concept has yet to be viewed in light of its potential relationship with wildlife value orientations. We propose that modern cultural and social conditions such as those described above have stimulated an 'unblocking' of anthropomorphic attributions to wild animals that contributes to the development of a mutualist wildlife value orientation.

Through analysis of results from a recent survey of U.S. residents, we will provide empirical support for the linkage between anthropomorphism and wildlife value orientations. Further, we test the idea that anthropomorphism and mutualism interact to heavily influence attitudinal positions concerning the treatment of wildlife. These results will be discussed in the context of their contribution to the

conceptual understanding of wildlife value orientations and with regard to what they may portend for future scenarios relevant to public interest in and social conflict over wildlife management in the U.S.

Interaction between forest management and wolf conservation

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Forestry is one of the main sectors of the Latvian economy. Forest management practices such as clear cuts, pre-commercial thinning and forest regeneration with different tree species significantly increase foraging habitats for ungulates. Scots pine (*Pinus sylvestris*) is one of the most important commercial tree species and every year almost 20% of the total clear cut area is replanted with this species. However, pine is one of the most preferred forage of ungulates in winter, and damages like browsing and bark stripping significantly delay recovery of forest stands and reduce timber quality and future value. Joint Stock Company "Latvia's State Forests" (LSF) spends considerable resources to protect pine stands by using plastic spirals, repellents etc. At the same time, they lease the rights to hunt in state forests and supervise wildlife control by signing agreements with hunting clubs and associations. Besides economic and social values, forests provide important ecological values including habitats for species diversity. Large carnivores, especially grey wolf (*Canis lupus*) is among most remarkable, often considered as a top indicator of ecosystem status, functionality and sustainable use.

In this study we tested the applicability of economic arguments to wolf conservation policy, taking into account that wolves as predators may impact ungulate abundance and change their behavior thus diminishing browsing pressure on regenerated stands. We used survey data from 2017 on freshly browsed pine trees in young pine, spruce and aspen stands, and relative ungulate abundance indices measured by counts of winter fecal pellet groups across the same forest stands. In addition, these data were compared with the so called ungulate damage risk zones designated by LSF managers and harvest statistics of moose (*Alces alces*), red deer (*Cervus elaphus*) and wolf provided by the State Forest Service. Differences in pine browsing intensity between risk and non-risk zones were 10.7%±2.1 and 6.7%±0.7, respectively (almost significant, $p=0.06$). Moose pellet group numbers per 1 hectare in these zones were 47.2±9.1 and 33.9±2.8, red deer – 67.1±12.3 and 35.7±3.5, respectively (significant for red deer, $p=0.004$). The numbers of hunted moose per 1000ha in risk zones in season 2016/2017 were 1.04±0.08 and in non-risk zones 1.1±0.03. For red deer these numbers were 3.26±0.4 and 2.3±0.1, respectively, and the difference was statistically significant ($p=0.007$). No statistical differences in hunted wolf numbers between these zones over the last 3 hunting seasons were observed. Wolf is a game species with a fairly stable total hunting bag (250-300 animals annually).

We conclude that hunters are interested in concurrently maintaining high ungulate abundance and low carnivore numbers, which could be a reason for the lack of success in avoiding serious damage to pine stands, and this could pose a future risk to the economy. Increased acceptance of the wolf as a predator on deer in commercially managed forests could ease the increasing conflict between game and forest management in Latvia.

Human-carnivore coexistence in cultural landscapes

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Cultural landscapes are hotspots of human-carnivore interactions and conflicts, since humans live closely connected to habitats in which carnivores are abundant. Human-carnivore conflicts can result in severe impacts on both biodiversity and human well-being. Facilitating human-carnivore coexistence is therefore a major conservation concern worldwide. To design effective tools that facilitate coexistence, we need to not only understand the biophysical environment but also the complexity of social factors that shape coexistence. To this end, useful insights can be gained by studying the dynamics of human-carnivore interactions in landscapes where carnivores and humans have co-occurred for a long time. We combined data from our ecological and social studies to understand bear distribution, trophic cascades, and coexistence of the brown bear (*Ursus arctos*) with humans in Transylvania, Romania. Combining data on species' occurrence from 3042 camera days at 138 locations and hunting records, we found that while carnivores still suppressed lower trophic levels in cultural landscapes, direct and indirect top-down effects of humans affected ecosystems more strongly. Using questionnaires with 445 local people and connectivity analysis based on 554 km of sign surveys, we demonstrated that coexistence between people and bears was relatively peaceful in the region. Coexistence was supported by the availability of large and well-connected forest patches, traditional livestock management with shepherds and guarding dogs, and high tolerance levels of shepherds to occasional conflict. Finally, we conducted 71 semi-structured interviews with local people and used qualitative content and discourse analysis to construct three socially mediated pathways to human coexistence with bears. These represented different ways in which perceived interactions between people, bears, the environment and bear management can shape coexistence. We showed that the genuine connection between local people and the natural system, including knowledge and acceptance of both benefits and disadvantages, is a likely key factor facilitating coexistence. Major challenges for places to facilitate coexistence are: 1) understanding the implications of simultaneous effects of humans and carnivores on multiple trophic levels; and 2) to reinstate both practices and attitudes that facilitate coexistence.

Adaptive capacity within a multi-level governance system

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Sustainable wildlife management is a major challenge around the globe. Management regimes have to account for the fact that wildlife is part of complex social-ecological systems, which are prone to change. Diverse multi-use landscapes, changing wildlife populations and other external stressors (e.g. wildlife diseases) can create new challenges. Thus, management and existing institutions have to develop over time. Adaptive capacity allows the system and involved actors to react successfully to social-ecological changes and to develop even in times of no eminent change. Using the ecosystem based management for moose in Sweden as a case; we assessed moose managers' perceived adaptive capacity (*PAC*). We used a psychometric approach to compare which factors contribute to managers' *PAC* at two levels of the management system. A web-based survey was administered to all moose management groups (n=765, response rate=81%) and moose management units in four counties (n=1380, response rate=72%). Using structural equation modelling, we measured the relative importance of governance aspects (i.e. fairness and legitimacy), social capital (i.e. trust, communication, and collaboration), as well as human and physical capital (i.e. knowledge and resources) on *PAC*. Our results show that on the higher level (moose management groups) knowledge (β = .17), resources (β = .11), and input from local collaboration (β = .16) had significant positive effects on managers *PAC*. Managers perception of the governance system to be fair (β = .18), and social trust to the county administration (β = .17) contributed positively to their *PAC*. On the lower level (moose management units) the perception of fairness (β = .35), trust to the county administration (β = .15) and the moose management groups (β = .18), as well as input from local collaboration (β = .13) had a significant positive influence on *PAC*. Our results suggest that for both groups trust to the management levels above and input from the level below give managers the feeling of being prepared to handle future challenges in moose management. However fairness in decision making seems to be a more critical factor at the lower level. These results can contribute to a future improvement of the governance system by targeted adjustments on different levels.

Stakeholder Reaction to a Proposed Pine Marten Reintroduction

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The pine marten (*Martes martes*) is an omnivorous mustelid native to Britain. Once common throughout forested areas, pine marten suffered local extinctions with the rise of sporting estates and increased persecution by gamekeepers. This persecution in combination with habitat loss and fragmentation reduced the species' range to north-west Scotland and small, isolated pockets of upland England and Wales. A reduction in trapping pressure and the introduction of legal protection in 1988 has since allowed populations to recover in parts of Scotland, yet the species remains absent from much of its historic range. Where present, pine martens can stimulate local economies by attracting wildlife enthusiasts hoping to witness and photograph these elusive creatures. Recent research has also suggested that pine martens can assist in the control of the non-native, invasive grey squirrel (*Sciurus carolinensis*). In the hope of realising such benefits, some groups are now considering reintroducing pine martens back into their former range. However, there are question marks over whether a reintroduction would be supported by local stakeholders, or whether it would be perceived as a threat to certain locally significant businesses and species. This research assesses the social feasibility of a proposed pine marten reintroduction in Gloucestershire's Forest of Dean – a region where the recent illegal release of wild boar (*Sus scrofa*) occurred without consultation, and led to starkly polarised local opinions. Through semi-structured interviews with nineteen local stakeholders representing local businesses, wildlife groups, landowners and governing bodies, we assessed knowledge of the species, expected impacts of a reintroduction, management preferences, and attitudes towards the broader notion of rewilding. Few stakeholders had direct experience with pine marten and their knowledge of the species varied. There was widespread belief that knowledge among the area's general public would be very low, and that contention surrounding the area's feral wild boar population may undermine wider support for any additional reintroductions. Perceived benefits of a pine marten reintroduction included an existence value linked to a return to a more natural ecological state, and economic benefits for the timber and tourism industries. Conversely, concerns surrounding detrimental impacts on businesses, property and other protected species emerged. Interestingly, there was also a concern for the welfare of the pine martens themselves. Threats from road vehicles and human persecution - including illegal killing by gamekeepers and hunters - were among the most commonly voiced potential endangerments. Despite these concerns, the majority of the stakeholders were supportive of a local reintroduction of pine martens and the principles of rewilding. However, this support came with the caveat that an ecological assessment should first demonstrate no meaningful negative implications for locally rare species, and that subsequent efforts to monitor the reintroduced pine marten population would be assured.

Wildlife Tourists' reactions to not seeing the animal they would like to see – Polar Bear Tourism as a case study

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Wildlife Tourism providers continuously need to balance the needs of their customers and how their products affect the environment and wildlife. As products are often based on interactions with wild animals, it is not always possible to guarantee that the main attraction will be found. In my study, using Polar Bear Tourism as an example, the focus is on Wildlife Tourist's attitudes towards the uncertainty surrounding wildlife watching experiences, as well as their reactions when not being able to see the animal they would like to see. To gather in-depth information about visitors' opinions on unpredictable wildlife, and how not encountering polar bears affect their overall experiences, content analysis has been utilized. 926 Tripadvisor reviews about Polar Bear Tourism Experiences in Svalbard (Norway), Manitoba (Canada), Wrangel Island (Russia) and Alaska (the US) have been collected. Initial analyze provided 71 reviews that are reactions from customers that did not see (enough) polar bears, as well as 77 reviews that comment on the unpredictable nature of wildlife. Initial results show that it is possible for customers to enjoy their wildlife experience, even if they do not encounter the animal they would like to see, in this case the polar bear. Factors such as staff behavior, signs of polar bears in the area and encounters with other wildlife can often improve the experience. Furthermore, 56 reviews comment on the importance of respecting the animals, and environmental concerns are expressed in 29 reviews. These reviews indicate that while encountering wildlife is important to most customers, many of them are also environmentally conscious and prefer environmentally friendly tour operators. Further analysis of these reviews, as well as content analysis of the companies that offer Polar Bear Tourism in my case areas' websites will provide insight on how Wildlife Tourism operators can manage customers' expectations, and improve customers' experiences in cases when the desired animal cannot be seen.

Socio-ecological predictors of human-carnivore conflict in Tanzania

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We investigated the socio-ecological variables associated with attacks on livestock by wild carnivores in Tanzania and use our findings to highlight possible approaches to reduce livestock depredation and hence human-wildlife conflict. We used standardized questionnaires and interviews to obtain data on 1) attacks by wild carnivores (spotted hyenas, lions and leopards) from households in villages along the western and northwestern edge of the Serengeti National Park and 2) by African wild dog along the southern boundary of the Ruaha National Park. Enclosures used to hold livestock at night (bomas) were surveyed as was household waste disposal. We used the data collected to quantify the claimed livestock losses per household caused by wild carnivores and the economic loss these caused. Additionally we calculated the economic losses that resulted from the reported losses of livestock to diseases. We determined which households claimed to have conducted retaliatory killing of carnivores following a predator attack, whether these were successful and what methods were used. We quantified the abundance of 'natural' wild ungulate prey and domestic stock available to wild carnivores in village areas outside National Parks. Our results revealed that livestock losses cause by diseases are a far larger economic loss to households than depredation by wild carnivores. Most losses of small livestock (sheep and goats) were attributed to spotted hyena attacks on small livestock in night bomas within villages. Attacks by lions on highly prized and economically valuable cattle occurred predominately during the day, when cattle were herded to grazing areas away from villages. African wild dogs also attacked small livestock in grazing areas away from villages. Retaliatory killing of wild carnivores mostly occurred when cattle were attacked. The disposal of household waste within villages attracted spotted hyenas to villages at night and the large number of small livestock held in non-predator proof bomas probably explains why attacks on small livestock by this species at night occur relatively frequently. Better disposal of household waste within villages, or its disposal outside villages might help to decrease the number of spotted hyenas attracted to villages at night. The very low abundance of natural wild ungulate prey in areas surrounding villages compared to the high abundance of domestic stock held in villages at night is probably a key factor driving depredation by spotted hyenas. Improved veterinary services to reduce livestock losses to disease would increase meat production and the income of farmer and the construction of predator proof night bomas would decrease depredation of livestock at nigh be hyenas and leopards. Tighter controls on the availability of highly toxic agricultural pesticides would reduce poisoning of wild carnivores

Linking value orientations, acceptance capacity and management

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Issues about large herbivore management contribute to human-wildlife conflicts worldwide. Stakeholders collide, who have to be examined to understand socio-psychological processes and to predict the success of management decisions. To analyze stakeholders, concepts such as wildlife value orientations (WVOs) and wildlife stakeholder acceptance capacity (WSAC) should be linked and compared across different cases and cultural contexts. Therefore, the present study aims to test coherences between WVOs, WSAC and management instruments and to examine applicability and characteristics of WVOs and WSAC in a German case study. We selected an area of 105,000 ha in the Black Forest, including a national park, for which a conception for red deer management is developed aiming to implement a sustainable approach. A questionnaire, including WVOs, WSAC, possible management instruments and demographics was send to 1,995 people, encompassing all state-employed foresters, private hunting tenants, mayors, local councils, nature conservation organizations and hunting organizations in the area as well as a sample of forest owners and farmers. 815 questionnaires were send back. Data was analyzed using exploratory factor analysis, principal component analysis, reliability analysis and correlations.

WVO belief statements loaded moderately or highly on both WVOs (domination, mutualism) and on their respective belief dimensions (use, hunting; social affiliation, caring). Both WVOs and the belief dimensions showed moderate internal consistency. The WSAC attitude scale showed high internal consistency. Mutualism, mutualism-social affiliation, mutualism-caring and attitude correlated positively with each other as well as with instruments aiming to increase red deer's living conditions, protective measures for forestry and touristic creation of value through red deer. Likewise, they were negatively correlated with the perception that red deer populations and wildlife damage had increased in the past ten years and positively correlated with the wish of increasing deer populations. Regarding domination, differences appeared in comparison of domination-use and domination-hunting. Correlations of domination-use were directly contrary to those of the mutualistic and attitude scales, but domination-hunting showed far less negative correlations with most statements about increasing red deer populations, wildlife damage, management instruments and attitude.

The differences between the domination belief dimensions might point to different perspectives. People oriented towards domination-hunting might assess hunting positive and be interested in using nature, but might also have a positive attitude towards animals and be interested in managing wildlife in a way that ensures hunting activities and a sustainable development of wildlife. People oriented towards domination-use might be interested in securing use of natural resources and view wildlife in terms of negative impacts. Their most important interest might be defending impacts endangering future use of resources and control of wildlife and its impacts. The findings can be used to adapt development of the management conception and to recognize perspectives in communication with

stakeholders. WVO and WSAC proved to be reliable concepts to be applied in the German case study. Combination of these scales with local management issues revealed that people sharing the same WVO can differ in their attitude and evaluation of management decisions and therefore provides the opportunity to gain additional knowledge about stakeholders' perspectives.

Potential for conflict in carnivore management and conservation

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Large carnivore conservation in the Swedish multi-use landscapes can only be successful if carnivores can share the landscape with human activities. Interventions to reduce the risk of brown bear, lynx, wolf, and wolverine attacks on domestic animals have become a core element in carnivore management. Whereas the intention is that interventions mitigate human-carnivore interactions, the interventions also have the potential to create conflict within or between groups of people with different views on their use. This study aims to investigate the intention to oppose-accept the use of various interventions, both among owners of domestic animals and the general public. We graphically illustrate the tendency of oppose-accept intention for the most commonly discussed interventions, and compare stakeholders' views, as the potential for conflict (PCI, Manfredo *et al.* 2003).

A web-based quantitative questionnaire, to investigate stakeholder intention to oppose-accept various interventions, was distributed during the fall and winter of 2017-2018. Recipients were a total of 1578 sheep owners registered with the Board of Agriculture or members in the Sheep Breeders Society, 894 dog owners registered with the Swedish Kennel Club, and 1155 hunting dog owners registered with the Swedish Kennel Club within the core Swedish wolf range. The survey was also distributed to all 220 Swedish free range farmers registered with the Board of Agriculture. The general public was sampled through a Norstat panel survey, with 1000 responses collected nationally and 500 responses collected within the counties that have permanent wolf populations. Response rates to our survey varied from 25 % among general dog owners, 30 % among sheep owners, 40 % among free range farmers, to 87 % among hunting dog owners. The response rates may indicate the relevance of the issue to the stakeholder groups, which is also indicated by the qualitative research that constituted the first empirical work of this study. Our study can illustrate what interventions have a higher average acceptance among stakeholders and the general public, thus are less likely to spur conflict over carnivore management were they implemented. We also illustrate which interventions generate ambiguity among respondents such that implementation could generate conflict between groups of people over carnivore management in the country.

Building a citizen science network among UK waterfowl hunters

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Duck and goose wings can provide invaluable information on the age and sex ratios in duck and goose harvests. This in turn can be used to provide trends on breeding success. Currently only a small number of countries in Europe conduct wing surveys, and until 2002 there was a successful and long running scheme in the UK. Hunters play a central role in the success of these studies. During the 2017/18 season BASC encouraged hunting and shooting clubs to collect duck and goose wings once again. Wings were collected at the annual BASC Wildfowling Conference aged, and sexed, and photographed. Photographs of wings aged and sexed in the hand were distributed to a small group of experts and the results of aging and sexing by photo, and in the hand were compared. The suitability of using digital techniques for parts collection surveys will be discussed, and the prospects for increasing engagement through such methods will be reviewed. This study provides an example of how hunters, as citizen scientists, help in the conservation and sustainability of wildfowl populations.

Hunting communities of practice: what do hunter types mean?

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Hunting has always been internally segregated as well as gate-kept by certain demographics to restrict the rights and access of others to game animals. This has commonly been done through appeal to what constitutes 'real hunting' and, with it, the privileging of a particular ethos, aesthetic, modus operandi or quality to the hunt. As contemporary sport hunting has become increasingly multifunctional, catering to a diverse range of new demographics, the need to internally segregate hunter types has arguably never been so strong. Today several axes of differentiation exist among hunters and unlike in historical times where some classes were excluded from hunting, these mostly co-exist. In some cases, these hunter types may coalesce or conflict as when competing over the same game, but there are also relatively discrete *communities of practice* of hunters with little engagement with each other.

A moose hunter venturing back to his countryside once a year, for example, may constitute himself as a breed apart from habitual, opportunistic small-game hunters with permanent residence in the countryside, just as a wildlife management oriented hunter will frown upon being put in the same category as a trophy hunter. In this paper, a comprehensive review of hunter types is outlined from the contemporary European context as a result of pooling findings from the Hunting Anthropologists of Europe Network. I show how axes of differentiation across hunters range from 'type of landscape' and 'type of game' to motivation and modality as well as how these have come about. The blurring of ideal types and graduation of hunters into different profiles across their hunting careers is also discussed.

In the second part of the paper, I engage a functionalist sociological analysis that argues that when hunters typologize one another, or are subject to external classification along these lines, they do so as part of defensive localism in restricting access to game; as status, belonging and identity positioning and to protect the frail social legitimacy of hunting in modern society. I critique external classifications for their static limitations and for frequently being grounded in market segmentation to inform business opportunities catering to different profiles and their demands for recreation, consumption and tourism. I conclude by considering the implications of this phenomenon on what we understand as the 'essence' of hunting, asking whether increased differentiation circumscribes the common experience of hunters, or if hunting is becoming more inclusive by opening to newly emerging types.

Changing land governance in Scotland - game management between adaptation and resistance

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In Scotland, there is a close association between land management and property rights through the traditional sporting estate, which governs much of the sporting culture and economy. However, recent policy changes at both national and European levels that reflect a turn towards multi-level, multi-actor governance have resulted in a growing diversity (and an increasingly explicit divergence) of public and private land management objectives. This has led to the creation of new formal institutions governing land and game management, which assign influential roles to public bodies and NGOs who have previously not had much say in how land and game are managed. They are complemented by voluntary, collaborative arrangements that are hoped to foster innovation and cooperation at the landscape scale.

Here, we explore how land managers respond to these changes. We draw on two sets of in-depth interviews, conducted in 2010 and in 2017/18. In our first study, the development towards a more inclusive, multi-actor governance of the natural environment and the resulting discourse that promoted multifunctionality and the need to involve a wider range of actors in decision-making, together with concomitant counter-urbanisation and urban mobility, were interpreted as a threat by our study participants, and met with a counter-discourse that cast traditional land users as a threatened and autochthonous minority. This counter-discourse posited that decisions on land use needed to be based on appropriate knowledge, which was argued to be held exclusively by the land managers themselves, and could not be learnt or otherwise acquired. As a consequence, any legislation resulting from the new governance arrangements was considered illegitimate.

Our second set of interviews – eight years later – explored land managers' decision-making practices in this complex field, with evolving debates on the regulation of game management, everchanging funding incentives (e.g., for woodland expansion), and against the background of Scottish Land Reform. Our findings suggest that collaborative arrangements, promoted by the national park authority as an alternative way to achieve change, tended to be seen as (and in some cases were actively rendered) ineffective. Estates seemed to respond to the emerging governance changes through a mix of adaptation and resistance, and we will present examples of how these two approaches were combined in practice in intricate ways.

We will conclude by reflecting on the implications of our observations for the discourses and practices around land management in the early 21st century.

Quantifying socio-economic and biological services of African vultures

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The problem: Vulture numbers are falling across the globe, and the current African vulture crisis has emerged on the tail of recent events in Asia, which saw the near-total collapse of wild vulture populations due to use of the veterinary drug Diclofenac. African vultures are now at risk of a similar crash as they suffer from unrelenting purposeful and unintentional poisonings; e.g. as unintended victims of mammalian carnivore persecution via livestock carcass poisoning, or targeted by poachers poisoning carcasses to prevent vulture facilitation of poaching site detection by wildlife authorities or anti-poaching patrols. These and other forms of persecution have caused African vulture populations to drop by up to 85% in some areas, leaving important ecological roles vacant.

Vultures are thought to provide important services to ecosystems and humans, but little evidence currently exists to quantify vulture value to humans on either economic or social scales. The ecosystem services vultures provide relate to their rapid removal of decomposing carrion from the environment. However, the lack of a detailed understanding of their ecological role in an African context makes prediction of the exact scale and consequences of vulture loss extremely difficult to predict or avert. Filling this knowledge gap is therefore identified as one of 17 essential actions for successful implementation of the "Multi-species action plan to conserve African and Eurasian vultures", published by the Convention on the Conservation of Migratory Species of Wild Animals in 2017.

Methods: This project seeks to provide reliable evidence of the ecosystem services provided by Africa's vultures, and to quantify their socio-economic value. In collaboration with the CMS MsAP and IUCN Vulture Specialist Group coordinators, we will follow a two-pronged approach:

1. A meta-analysis of the scientific literature and existing datasets will provide an overview of current knowledge, and of what evidence from the study of vultures in Eurasia and the Americas is also relevant in an African context. We will study the methods used so far and gain insights from the vulture and conservation experts with whom we collaborate, to plan our own field research so that we might overcome the barriers which have hindered previous research attempts.
2. Our field work will produce the additional data needed to evaluate the ecosystem services that vultures perform, and to demonstrate via modelling or empirical testing the consequences of losing these birds to humans and to African ecosystems.

Preliminary results: This project is in its initial planning stage. Endorsement and support has been secured from key organisations such as the CMS Raptors MoU, IUCN VSG, and we are in discussion with potential collaborators from BirdLife International, The Peregrine Fund and other researchers in range states. Through Pathways 2018 attendance, we plan to expand our collaborative network and seek expert feedback on proposed methodology.

Conclusion: The findings of this project will be utilised in the development of future research and conservation initiatives, and incorporated into on-going programmes aiming to incentivising support and action for vulture conservation at national and international levels, across the African continent.

Producing a new 'wild': the socio-political dimensions of rewilding in the Scottish Highlands

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Rewilding is gaining strong momentum in Europe as a means to achieve biodiversity conservation, with growing prominence in both scientific and popular debates. Its influence is increasingly translating into activities and programmes on the ground, which are underlined by their ambition and scale. In the UK the Scottish Highlands are consistently mentioned as a viable location for rewilding initiatives, owing to their low-population density and already established 'wild' character. This PhD research project has two objectives. Firstly, it seeks to illustrate how rewilding initiatives are shaped, in terms of spatial configuration, management and operations, by wider politics, history and socio-cultural values around land-use and conservation. Secondly, it seeks to provide an account of how these same factors can determine both varying local social support for rewilding, and the distribution of benefits and burdens around rewilding projects.

Rewilding in the Highlands has been integrated within and bolstered by an already existing movement to reforest Scotland, which maintains high national social and political support. It has also been associated with growing support for and increasing prevalence of species reintroduction initiatives. Changes in subsidy regimes have increased declines in livestock farming, accelerating the processes of agricultural land abandonment associated with rewilding. This is part of a wider move to a post-productivist countryside based around tourism and conservation. However, ideas of a new Scottish 'wild' can undermine and conflict with still enduring cultural landscapes which privilege traditional and customary land-uses, most significantly crofting, a form of traditional small-scale farming practised in the Highlands. Crofting communities are at the heart of the movement for Highlands renewal and land reform, which seeks to revitalise local communities and economies through greater control of land and natural resources. Visions of a wild, unpeopled and un-worked land can sit uncomfortably with these alternative ideas of future landscapes.

This project explores the above socio-political dimensions of rewilding in the Scottish Highlands through research in two sites where crofting and rewilding initiatives are taking place. In Assynt in the North-West of Scotland landscape-scale woodland regeneration and restoration across different forms of land-ownership and land-use is taking place in an area with a large crofting community. In the South of the Isle of Skye reintroduced white-tailed eagles are now strongly established. With local crofters facing increasing predation of lambs significant human-wildlife conflict is occurring, but at the same time the eagles are being attributed to rising income from tourism. The research utilises social methods, primarily semi-structured interviews, questionnaires, focus groups and participant observation. Preliminary findings demonstrate that social conflict around and support for rewilding at these sites is significantly determined by differing values and norms associated with what constitutes 'wild', contestations over which forms of nature are appropriate in the social context of the Highlands, and the ways in which different social groups use land, for example recreational or production. These same cleavages also shape the distribution of benefits and burdens resulting from rewilding projects.

Voluntary investments by civilians into Salmonid stocking and habitat

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Understanding what drives people to invest in sustainable environmental practices is crucial for sustainability and the derivation of policy levers. An interdisciplinary framework is required to determine the key features that encourage specific pro-environmental outcomes within and across contexts. We apply the Ostrom social-ecological systems framework (SESF) to study investment into freshwater ecosystems by recreational angling clubs with authority to manage their water bodies. Using an extensive survey of polycentric resource governance of fisheries managers under varying regulatory and geographical contexts in Germany (n = 1,222) and France (n = 536) we constructed indicators for each of the relevant second-tier variables of the SES framework and used them to understand decision-making into stocking Salmonids investing into habitat enhancement for fisheries. We separately evaluate stocking behavior depending on whether the Salmonids are native or not. Given the expected complexity of relationships between the second-tier variables, we used the relatively new machine learning method of non-parametric boosted regression trees, as well as hierarchical linear models. Our results demonstrate the relative strength of context, both environmental and governance-related, for determining resource investment behavior. We found voluntary investment driven more by contextual factors than by environmental knowledge or individual psychological disposition. Continued application of the SESF will help to answer whether our findings hold across other natural resource contexts where members of civil society manage natural resources.

Managerial implications of the enduring WVO concept

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We initiated research on wildlife value orientations (WVO) to assist in developing long-range planning for fish and wildlife resources. Planning and management requires an integration of descriptive and normative information to establish goals and objective to direct action. From a normative planning perspective, goals and objectives are a restatement of human values addressing what future conditions should be and how these conditions should be achieved. For this reason, WVO are a crucial concept in fisheries and wildlife planning and management. Research findings using the WVO concept provide relevant implications for fish and wildlife planning and decision-making. Research findings demonstrate the WVO are closely correlate to preference for management policies, outcomes, and actions. Such information could be used by agencies to help craft policies that have broad support. A detectable shift in WVO from domination-oriented to mutualistic is occurring within the U.S. and possibly in other countries. But, the shift is slow and values and related WVO are maintained across generations. For this reason, a plurality of WVO is likely to persist during the next several decades. Diverse segments of the general public and stakeholders with contrasting WVO will be present in the broader society and management environment. Conflicts based in differences in WVO among these diverse segments will define fisheries and wildlife conservation issues. In addition, the gaps in WVO between the institutions with formal responsibility for fish and wildlife management and the general public and key stakeholder groups will likely intensify. Agreement on the goals and objectives for fish and wildlife conservation and management across these diverse segments of society will be increasingly difficult to achieve. In addition, contrasting WVO in different geographic regions of states, regions and nations and across different levels of social organization will exacerbate land-scape level planning efforts such as those involving migratory species. Developing collaborative decision processes and goverance structures that help enhance trust in the agencies and across the diverse segments of society could assist managers navigate the complexities of managing conflict inherent with conflicting WVO. A program of applied research that focuses on increasing our understanding of multi-level WVO within social-ecological systems could prove invaluable to fish and wildlife managers in the task of improving decision-processes and enhancing trust in the next few decades. Currently, most agencies do not have the capabilities to incorporate such basic social science information into their decision-processes. To do so might require fundamental changes in organizational structures.

Managing human-deer conflicts: Ethical dilemmas of non-lethal control

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The control of wildlife in suburban setting is a vexing question for wildlife managers and other professionals, as effective control is elusive, and there are heated public debates about all available strategies. This paper explores ethical issues raised by the use of non-surgical, pharmaceutical fertility control to manage reproduction using the case of white-tailed deer (WTD) in the Eastern USA. A high density of WTD has led to human-deer conflicts which traditionally have been solved by hunting. Recently, however, there has been a push towards non-lethal control, especially fertility control. Although the scientific and technical aspects are beginning to be better understood, the underlying value issues require further exploration. The paper analyses the ethical issues raised – as seen from the perspectives of animal rights, utilitarianism and, notably, concern for wildness – by three main avenues for addressing perceived problems caused by WTD populations: (a) attitudinal and behavioural changes in humans: including efforts to keep deer and humans apart, risk-avoiding behaviour, or trying to change attitudes to deer; and/or (b) actual changes in the deer population, by means of lethal control (e.g. culling/sport hunting); and/or (c) by non-lethal control, primarily pharmaceutical methods of fertility control. The conclusion is that stakeholders with different ethical concerns and deeply held values are likely to understand the nature of the problem very differently and likely to defend different ways of resolving it. Nonetheless, changes in human behaviour rather than pharmaceutical fertility control to reduce deer populations seem preferable from all three ethical perspectives. In addition, it is concluded that it is less clear how pharmaceutical population control compares in ethical terms with hunting. Finally, although changes in human behaviour may seem the ethically preferable option, practical issues seem, if not formidable, then at least considerable.

Hunting for the 'good' hunt – alignment of recreational hunting with ethics

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This paper examines how differences and shifts in ethical norms and pluralism regarding standards of hunting may constitute a challenge to recreational hunting in many Western countries, as seen by the case of Denmark. Hunting is a popular leisure activity in many European countries as well as in the US, parts of Africa and Australia and New Zealand. At the same time, hunting has come under pressure, and objections have been raised against e.g. modes of hunting and purported breaches of animal welfare. Taking the Danish case, a highly urbanized, affluent society with a relatively high proportion of hunters (3% of the population), where many are new to hunting, and where hunting is relatively accepted but also increasingly questioned, the Danish Hunters Association has stated that "hunting should take place with a broader ethical view". Non-legally binding, so-called "Hunting Ethical Rules" are in place to guide participants. The paper examines these rules and tries to see which ethical perspectives and key values they may espouse and discusses the rules in the light of existing knowledge of public values regarding wildlife, and in view of recent developments in wildlife migration and wildlife management in Denmark. The paper argues that if recreational hunting should be more 'robust' viewed in light of uncertainties and value based disagreements, it probably needs more than a code of conduct; hunters also need to address underlying ethical questions of hunting. Evidently, these questions are also something those opposing recreational hunting should be willing to take up, if a mutually beneficial dialogue should persist.

Contributions of social science research to conservation conflict management: The case of the eel fishing in Southern Spain

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This presentation examines the contribution of social research for understanding and managing conservation conflicts and fostering negotiated solutions in which the demands of all parties are met, at least in part. To this end, the results of a study on the opinions and attitudes of stakeholders and the community of the areas affected by the moratorium on eel (Anguilla anguilla) fishing in the Guadalquivir marshlands declared by the Regional Government of Andalusia in 2010 are presented. The article defends the utility of social research using qualitative methods to gain deeper insight into social perceptions and views in a more contextualized manner, which enables exploring the reasons and logic in which they are framed. Qualitative sociological studies can be especially relevant when the positions of the stakeholders involved are especially distant or radicalized. Indeed, this methodology become essential when many of the members of one of the groups involved, the fishermen, continued fishing illegally, losing the legitimacy necessary to be recognized as interlocutors by the Administration responsible for fisheries management.Our results show that qualitative Social research can contribute to the dynamics or processes of negotiated management of conservation conflicts by bringing to light conflicting positions and promoting dialogue between the parties. Additionally, it can also be useful under certain conditions as an alternative mechanism to achieve the intermediate solutions characteristic of negotiation processes given the difficulty in undertaking such processes. In this way social research contributes to apply more effective measures to solve these conflicts and promote a more positive attitude towards the measures adopted.

Coyote behavioral response to urbanization in the Chicago metropolitan area

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In recent years, coyotes (*Canis latrans*) have colonized major metropolitan areas across North America, representing the largest mammalian carnivore residing within heavily-urbanized landscapes. For the past 17 years, we have captured and marked over 1,000 individuals in the Chicago area to determine how coyotes function in the urban system, and how the urban system influences their behavior. Coyotes adjust behaviorally to increasing urbanization by restricting their activity to nocturnal hours and by exploiting linear edges for traveling and foraging. Their diet remains highly variable, but there is a shift toward more use of anthropogenic foods in the urban core. Nevertheless, most (71%) coyotes continued to consume natural prey, such as rodents and rabbits, even in the most developed parts of the city. Physically, coyotes maintained body condition and overall health throughout the urban area. The colonization of Chicago by coyotes illustrates the plasticity of the species and their ability to function as predators despite living among millions of people.

Predation Services: a Framework for Studying the Societal Costs and Benefits of Carnivores and Their Prey

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The costs of carnivores to society are relatively well known, and are typically presented as the societal sacrifice necessary for receiving the ecological benefits of carnivores, such as increases in biodiversity. However, carnivores may also have direct and indirect socioeconomic benefits to society, which are not well studied. Direct benefits include increased ecotourism and existence values, while indirect benefits are accrued through predation, via the avoided costs of prey. Such "predation services" include, for example, removal of carcasses that could transmit disease, decreased prey-vehicle collisions, and reduced prey damage to crops and forestry. Here, we use a predator-prey-economic model to examine when carnivores are likely to be a net cost or benefit to society. We find that proximity to prey carrying capacity has a strong effect on net carnivore cost/benefit, indicating that transferring the socioeconomic values of a carnivore species from one ecosystem to another may be problematic unless prey density dependence is accounted for. Including both costs and benefits of carnivores to society by quantifying predation services could improve both conservation and management outcomes by increasing effective communication to diverse stakeholders, but should be approached in a more nuanced and ecologically-informed way.

Human wildlife interactions: turning conflict into coexistence

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For some, the discussion of conflict or coexistence may be a matter of semantics. In terms of working toward solutions, concentrating on mechanisms of coexistence is more positive than mitigating conflicts. However, shifting from conflict to coexistence may not be enough. The conflict-coexistence continuum spans from negative to positive attitudes and/or behaviors, which defines the different degrees of conflict, coexistence, and tolerance that characterize human-wildlife interactions. This framework is the leitmotiv of the session and will set the stage for the other presentations within this session.

The first two presentations focus on conceptualizing coexistence, analysing human-wildlife interactions looking at emotions (Jacobs) and tolerance (Bruskotter) using case studies. Understanding the place wildlife holds in different landscapes is another key theme explored through a carnivore example (Skogen). Finally, the last two presentations will present socio-ecological and landscape approaches (Carter), and planning for coexistence (Marchini) from a social science standpoint to implement coexistence with wildlife. At the end of these presentation there will be a panel discussion regarding the conflict-coexistence continuum and the integration of coexistence in the human wildlife interactions.

1. Understanding emotions as opportunities for and barriers to co-existence with wildlife

This presentation (a) uses generic emotion theory to create an understanding of the mechanisms that explain wildlife-related emotions, (b) provides an overview of research into human emotions towards wildlife to identify both knowledge and knowledge gaps, and (c) discusses opportunities for breaking down barriers to human-wildlife co-existence from the perspective of emotion.

2. Tolerance for Wildlife: A Psychological Perspective

The concept of tolerance for wildlife is explain by drawing upon theory and empirical research from psychology, and interpersonal mechanisms that foster tolerant attitudes and behaviours using wolves in United States as case study.

3. Predators in Human Landscapes

Attitudes toward large carnivores are often embedded in people's understandings of the landscape. Predators stir controversy in areas where their material impact is less than dramatic, and people who have no personal experience with these species may still be strongly involved in conflicts over them. These conflicts, while social in origin, may have serious consequences for wildlife. Studies in Norway and India have shown that interpretations of landscape change exert a strong influence on willingness to accept large carnivores.

4. Toward an operational framing of coexistence between humans and wildlife through coadaptation.

We present a conceptual framing that emphasizes the importance of adaptive capacities in ecological, social, and institutional systems to achieve human-wildlife coexistence. Disparate epistemologies are integrated to elaborate measurable indicators of coexistence that can guide future conservation decision making. Examples from the around the world are employed to illustrate the utility of our conceptualization of coexistence.

5. Planning for Coexistence in a Complex Human-Dominated World

We address the potential application of strategic planning, combined with the growing fields of scientific modelling and data science, to inform decisions regarding the conflict-to-coexistence continuum and propose a framework for integrating data and stakeholders - planners, researchers, modellers, policy-makers, managers and citizens - in the process of planning for coexistence.

First Things First – Empiricism, Ethics, and Conservation Banking

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To manage conflicts between human dimensions and wildlife, many governments have implemented impact mitigation frameworks to avoid, minimize, and compensate adverse impacts of development on biodiversity. Such approaches can have social, ethical, ecological and economic consequences that need to be considered in policy design and implementation. In the United States, one way to compensate for impacts under the Endangered Species Act is the use of conservation banks; owners conserve and manage sites to provide ecological benefits, for which they receive credits that can later be sold to developers to compensate for impacts to the same species. Offsets and biodiversity banks are associated with some risks, such as allowing otherwise impermissible impacts, spatial redistribution of nature, and with it the associated benefits for humans (leading to inequity), and ineffectiveness in conserving resources. Many researchers have discussed a number of design safeguards to negate such risks, including adhering to the mitigation hierarchy, ensuring equivalence of impact and compensation, and strict monitoring to ensure compliance.

Based on a thorough review of scientific and grey literature, reports, and legislation and guidelines concerning compensation, this paper establishes criteria for the design of an effective biodiversity banking framework. In a second step, I conduct a criteria-based analysis to find out if these design safeguards are required in conservation banking legislation and implementation, and highlight where empirical evidence of these safeguards and their benefits is missing. Results show that many design safeguards are legally required in U.S. conservation banking. However, a lack of empirical research in the field shows that actual compliance in practice is unclear. For example, the strictness of the avoidance requirement before resorting to compensation is an open question, and evidence of compliance and the success of banks is also lacking.

Overarching socio-economic and ethical questions are largely excluded from U.S. offset design, such as implications of redistributing ecosystem services, and of commodifying nature under neoliberal paradigms. This contribution provides an overview of conservation banking and highlights open questions regarding its risks, and its effectiveness in conserving species and the habitat on which they depend. Before banking is promoted further as a tool that combines development with species conservation, further empirical research concerning its successful implementation, as well as a framework considering social, ethical, and economic aspects, are needed. Findings can also be used to discuss the future application of similar approaches to further the goals of EU Natura 2000 site and species protection.

Including communities in evidence-based conservation

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Integrating local communities into conservation research and management is widely recognized as important by scientist and practitioners. As many conservation problems are social in nature, stakeholders affected by such issues need to be considered. But what does participation of local communities actually mean and how can local communities be truly integrated in all stages of research, planning and management? And how can complex social aspects be integrated into decision making based on evidence?

In this session we discuss the importance of integrating socio-economic aspects in conservation research and planning, going beyond the collection of quantitative data. We emphasize the necessity of integrating indigenous, traditional or local knowledge into conservation projects and recognise policy as an influencing factor that must be considered. Understanding values and traditions of local communities affected by conservation endeavours and understanding the utilization of natural resources by these people is inevitable if conservation shall be successful in long-term. However, as conservation research and management projects are dealing with high complexity, understanding direct and indirect effects becomes difficult. For answering the question “what works” different perspectives and levels of answers need to be taken into consideration. In this organised session we will discuss the significance participation of local communities can bring to conservation science and management. Case studies from African, Asian and European countries will highlight how communities and other local stakeholders can be included in different phases of research and management project and evidence that has been created through such approaches. All presented studies are following evidence-based conservation practices, based on social and ecological data and information.

Session themes:

- Participatory approaches to conservation
- Using social sciences for achieving conservation goals
- Understanding and using local expertise for sustainable conservation approaches

Changing perspectives: Using local knowledge for finding solutions to human-elephant conflicts in Zambia

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Crop damages caused by elephants on farms located within conservation landscapes, are an important source for human-elephant conflicts (HECs). In the Luangwa Valley of Zambia elephants (*Loxodonta africana*) are not only massively damaging maize fields but also grain stores and houses. On the other hand elephants are increasingly killed due to poaching but also in retaliation. In the Game Management Area Lupande, adjacent to the South Luangwa National Park, new strategies for crop protection were co-designed by local stakeholders and NGOs.

As farmers stated that medicinal and aromatic plants were not consumed by elephants, a field experiment was conducted in 2010/2011 to proof this hypothesis. We tested the attractiveness of ginger, lemon grass, garlic and onion compared to a control plot of maize. The results revealed that three of the test crops were less attractive than maize, however not totally unpalatable. Lemon grass and ginger produced high yields and a high potential for income generation, providing that market access was available. Furthermore, the design of a traditional grain store, which was frequently damaged by elephants, was used to develop it into an elephant safe alternative. After a successful trial phase, including regular monitoring, over 100 enforced grain stores were constructed from 2011 to 2017 and have proven safe against elephants. Another crop protection device that was developed through the use of local knowledge, was the chilli bomber. Farmers and local hunters had started to use muzzle loading guns filled with chilli powder, instead of lead shot, to scare away elephants from fields. Due to conservation and health concerns NGOs did not want to support this method. Together with potential users and external experts a chilli bomber was created, that fits the local needs and operates very reliable. This simple, self-constructed device is used to shoot ping-pong balls, filled with a liquid chilli-oil extract, against elephants. In a trial phase in 2016/2017 nearly 1000 elephant encounters were recorded with a deterrent rate of 83%.

Co-designing human-wildlife conflict mitigation strategies together with those primarily involved in the conflict situation, bears a strong potential for successful and sustainable solutions. Success and failure, however, can only be revealed reliably, by thorough monitoring and evaluation.

Explaining the acceptance of limitations to ski touring

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The practice of outdoor sports has massively increased since the end of the 20th century. According to a study led in France in 2010, 25 million people practice an outdoor sport activity (Thiery 2013). This rise of human presence in the wild is therefore causing more pressure on the environment, including on wildlife. Indeed, habitat use and physiological and behavioural responses appear to be modified by human presence. As managers start to organize and take this emerging issue into consideration, land use restrictions and other awareness campaigns flourish in mountain territories. However, there is only little feedback on the way they are perceived and accepted by visitors.
This talk will rely on an ongoing study on ski touring and snow-shoeing led in three French Alpine mountain ranges during winter 2018. The data was collected through a questionnaire survey (n=670) in natural areas of high human pressure: A Natural Reserve and a Game Preserve (high restrictions), and ordinary nature (no restriction). Amongst other topics, the survey questions (1) visitors' knowledge of the natural area (fauna and protection statuses), (2) acceptance of the various restrictions aiming to reinforce wildlife protection, such as spatial limitations to ski touring in resting areas for wildlife, (3) visitors' attitudes towards wildlife. In order to assess these attitudes, we used Fulton et al.'s Wildlife Value Orientation scale (1996). The work of Sterl et al. (2010) on ski touring and attitude towards environmental management in Austria was also adapted and added to Fulton's scale. This new scale will permit to divide the respondents into profiles defining different degrees of attitude towards wildlife.

We offer to present ski tourers' knowledge of their playground's local fauna and protection statuses, as well as their acceptance of spatial restriction to their practice. It will also introduce the different profiles of ski tourers determined thanks to the revised Wildlife Value Orientations scale. The aim is to discuss whether or not attitudes towards wildlife influence the perception of spatial limitations to an outdoor activity. Furthermore, in a sociological perspective, all the above mentioned variables will be studied in the light of the panel's sociodemographic data.

As data is still being collected, we cannot present final results at the moment. However, results that will be presented is September are expected to include a strong correlation between attitudes towards wildlife and the compliance to spatial limitation. Besides, strong interrelations between sociodemographic data (in particular geographical origins, education and profession) and all the above mentioned variables (knowledge, acceptance and attitude) should also be expected.

Fulton, D. C., Manfredo, M. J., & Lipscomb, J. (1996). Wildlife value orientations: A conceptual and measurement approach. *Human dimensions of wildlife*, *1*(2), 24–47.

Sterl, P., Eder, R., & Arnberger, A. (2010). Exploring factors in influencing the attitude of on-site ski mountaineers towards the ski touring management measures of the Gesäuse National Park. *eco. mont-Journal on Protected Mountain Areas Research*, *2*, 31–38.

Thiery, P. (2013). Les sports de nature en France en 2011. *Stat-Info*, *13-04*.

Meeting your new neighbors: challenges in carnivore conservation

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During the last two decades large carnivores such as wolf (*Canis lupus*) or lynx (*Lynx lynx*) have been returning to central Europe where they had been largely depleted by the end of the 19th century. Although a vast majority of the human population seems to be positive or indifferent towards their return, large carnivores are not welcome everywhere. Interestingly enough, Europeans are usually willing to protect wildlife all around the world, but when it comes to protecting wildlife in their own backyards, this willingness seems to change entirely. While the large carnivores make themselves at home and readily adapt to Europe's modified landscapes, it is the humans that struggle with their new neighbors. In many areas large carnivore species trigger massive, emotionally heated social and political debates that often go beyond actual conflicts such as livestock depredation; large carnivores frequently make the news and may even affect the fate of government elections. Despite these new dimensions, conservationists struggle to adjust and keep putting their main efforts into "classic" protection and management approaches largely based on ecological knowledge, while providing rather general, unspecific information to the public. Hence, the range of people's attitudes, perceptions and fears towards large carnivores are rarely integrated into applied nature conservation and communication strategies. Moreover, cultural, psychological, social or economic factors shaping these attitudes are even less considered. Whereas vast literature exists internationally (e.g. US) or for parts of Europe (e.g. Scandinavia), central Europe remains highly underrepresented and lacks vital interdisciplinary exchange on the human dimensions of wildlife. However, this may be the crucial way forward in facing new challenges in large carnivore conservation.

In this literature review, I conducted a thorough search of both scientific and gray literature to identify currently available studies with a main focus on attitudes or perceptions of various stakeholders towards large carnivores, particularly the "big three" of Europe, i.e. wolf, lynx and bear (*Ursus arctos*). In this I compiled more than 100 sources from all over Europe, but focused on the larger area of central Europe (e.g. Germany, Poland, Slovakia) for in-depths analysis and reviewed papers and reports (n=57) from 1999 to 2018 across 18 countries.

From each selected study I extracted and grouped information on 1) geographical region, 2) methods used, 3) stakeholders involved and 4) main problem addressed or main questions asked; and for each study I identified and categorized key findings with a particular focus on possible attitudes and perceptions towards wolf, lynx and bear. Moreover, for each study I assessed if and which underlying factors (e.g. social, economic) were investigated in relation to attitudes or perceptions, I derived potential recommendations and solutions for nature conservation if provided and identified knowledge gaps to point out opportunities for future work. I summarize and compare my findings in a comprehensive overview, one of the first of its kind for central Europe, which may increase awareness for the importance of integrating human dimensions of wildlife, while serving as a valuable information tool for nature conservationists, wildlife managers and conservation scientists.

The Otter Way of Wildlife Management - Fish-eating Predators and Fisheries

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Once, European otters (*Lutra lutra*) were distributed all over Germany and most European countries. For centuries, this species was mainly seen as a threat of fish stock and therefore, hunting otters was quite common. In addition, the manmade destruction of its habitat, especially destroying the natural course of many rivers by straightening them, together with water pollution, contributed to the fact that the otters were nearly brought to extinction in Germany in the 1970s.

Then this species became strictly protected via the FFH-Directive all across Europe. Since then, thanks to a huge amount of habitat-improving river projects, otter habitats could be restored in many parts of Germany and otters again slowly recolonize former distribution areas. This process can be called a huge success in the European otter conservation. But this recolonization does in turn also lead to conflicts with fish stock, fisheries and anglers. Additionally, other fish-eating predators like the great cormorant, kingfishers, European sea eagles and ospreys also show increasing trends in their populations. Thus, solutions for conflicts between fish-eating predators and human use of fish are needed. In this session we want to bring scientists, conservationists and fishermen together to get an overall view on the status quo of management and conservation of fish eating predators across Europe. We therefore encourage all participants of the session to bring information on otter distribution, conflicts and management in their countries. We want to talk about best practice, solutions and still unsolved problems in the management of fish eating predators.

The Otter Way of Wildlife Management--Developing Otter-Friendly Exits from Fish Traps in Collaboration with Stakeholders

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In most parts of Europe, the European otter (*Lutra lutra*) has been eradicated due to intensive habitat destruction and hunting. In the early 70ies, the otter became protected by law in Germany and restoration of habitats became more and more common. Thus, this species started to recolonize most parts of its former distribution area. The otter population slowly but constantly spreads out from the eastern parts to the western parts of the country. Consequently, human-wildlife conflicts are arising. Otters are at risk of getting trapped in fish traps, which are commonly used in fishery in northern Germany. To date there is no possibility for otters to escape from conventional fish traps. Thus, an otter-friendly way of using fish traps is needed.

In the past, fishers were supposed to use so called fish trap grids. These grids were placed at the entry of the fish trap and prevented otters from diving into it, at the cost of reduced fishing outcome.
We evaluated other possibilities to prevent otters from drowning in fish traps. We tested two different exit systems to be integrated into the third section of a common fish trap. The first system is constructed as a rubber band tear seam. The second system consists of two metal holders that are held together with a spring. Both exit systems are supposed to open at working loads bigger than 1.3 kg. Otters are known to bring up such working load and shall be able to escape, but fish are expected to stay in the fish trap.

We used N=12 otters in a total of fourteen trials – five trials for the tear seam and seven trials for the metal holder exit. The fish trap was placed in the pool of an otter exhibit and the animals swam in the fish trap via a net tube. It is known for sure, that otters can stay under water for more than two minutes. That's why every trial was limited to max 120 seconds. In twelve trials, otters escaped easily from the fish trap after a time period ranging from 11 seconds up to 70 seconds with an average escape time of 21,29 seconds for the tear seam and 32,8 seconds for the metal holder. Two trials had to be cancelled because the animal showed abnormal behavior.

Both exit types were proofed to be useful to prevent otters from drowning in fish traps. As all those tests were conducted together with the stakeholders, we hope that these exits will be accepted and used wide spread in fishery.

Dialogue and conflict in predators-reindeer management

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This paper present a study of the communication in the "dialogue forums" which aim to find solutions regarding the conflict of interest between preserving viable predator populations versus reducing predation losses in domestic reindeer husbandry in Sweden. About 20 "dialogue meetings" between representatives of state agencies and Sami villages were observed and recorded. The material was analysed with symbolic interactionism and social practice theory to explore how disagreements and agreements occur and are dealt with and how norms on how and what to talk about are created and contested. We found that the communicative norms in these dialogue forums did not support joint investigation of disagreements. Although the actors in interviews indicated disagreements, these were rarely articulated in meetings, and when they were it often resulted in communicative uncertainty and what we call doubts of inter-subjectivity and subsequently reduced communicative capacity. Instead disagreements and goal interference were visible as passive, unarticulated resistance against the formal logic of the dialogue procedure. Further, we found that the knowledge and solutions developed in the dialogue forums had low legitimacy in external decision making bodies which inhibited decisions from being implemented. We think this was due to the design of the dialogue procedure did not take the situated character of knowledge and values into consideration, but assumed knowledge to be automatically transmitted between different levels in the decision making system.

Impact of large carnivores on Norwegian grazing industry

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Around 2 million ewes and lambs are grazing in Norwegian rangeland every summer. In 2017, compensation was paid for 18 350 (0.9 %) of these as taken by protected large carnivores. 17 374 semi-domestic reindeer were also compensated. Most sheep are depredated by wolverines and lynx, whereas wolverines, lynx and golden eagle kill the most reindeer.
Norwegian large carnivore policy has a two-folded goal: To ensure both viable carnivore populations and sustainable grazing industries. The method is a geographically differentiated management strategy. Management zones offering protection for lynx, wolverine, bear and wolf now cover 55 % of the Norwegian mainland. 30 % of the sheep and 50 % of the Saami reindeer grazing areas are found inside this management area. The utilization of the outfield grazing capacity is 59 % in outside, but only 26 % inside the carnivore management zones. The utilization of outfield pasture resources is very low in bear and wolf management zones.

The loss of grazing livestock due to predation by large carnivores in Norway has decreased over the last years, also within carnivore management zones. However, documented losses due to wolf and golden eagle are increasing. Sheep and reindeer farmers in regions falling within zones of three or more carnivore species are most prone to livestock damages. The total carnivore pressure on the grazing industry is linked to the sizes of the carnivore populations, the combination of carnivore species and the distance to Sweden, where populations of wolves and bears are far bigger.
Within carnivore zones, especially in regions with wolves or bears, the number of sheep on free range is decreasing. Additionally, mitigation measures that separate livestock and carnivores in time and/or space are implemented, e.g. electric fencing, infield pasturing and early gathering. In areas with less carnivore pressure, sheep farming is increasing. Consequently, most of the sheep (and reindeer) losses due to carnivores are found as a spill-over effect in the border areas, 30 - 50 km outside the carnivore zones, where sheep are still grazing at open mountain and forest ranges. Thus, there is a need for more effective mitigation measures in the border areas around the management zones.

Although there is inadequate data on number of semi-domestic reindeer killed by large carnivores, there is concurrence between the presence of large carnivores and the most vulnerable periods for the reindeer, particularly during calving season and late winter when the grazing access is low.
There is a need for more exact carnivore population monitoring to quantify the carnivore pressure, better documentation of reindeer losses and higher acceptance of mitigation measures amongst stakeholders. Furthermore, we suggest exclusion of the best alpine sheep grazing areas and reindeer calving areas from the lynx management zones, more formalized boarder zones and management of these, considerations of compensation for not being able to use outfield pastures, as well as increased involvement of social sciences as helpful measures.

Effectiveness of Fences as Livestock Protection

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Traditionally fences are used to keep livestock inside and not to keep predators out. But since they do offer protection under certain conditions, it might in many cases be the simplest solution for many farmers. Even though livestock protection is such a present and politically important topic, studies about fences as protection against predation are quite rare. Most consultative papers, codes of practice and also the political thresholds of predator-proof-fence characteristics, are based on empirical values and common sense. The pressure on the fence is depending on many factors, as the presence of wolves and presence of prey, if single or in a pack, its experience with fences, vicinity to settlements and time of the day, to list just a few. With this huge amount of factors influencing each other, changing fast and some almost impossible to measure, it is difficult to define a wolf-proof fence through empirical values. Experiments with kept wolves, which could erase those variables, however are criticized, since the animals might act differently than their wild relatives, since they are used to get their feed provided. Although both approaches have their disadvantages they can give an overview and lead to best practice solutions on how the risk can be minimized.

In one setup, done by AGRIDEA in 2016, two wolf packs in a zoo were starved for a week before trying to lure them with food over different fence types. Although physically capable, no wolf jumped over a fence, even at a height of only 65cm. With wire heights of 35 and 80 cm, the standard cattle-fence, the animals always passed the fence below. With the lowest wire at 25 cm no wolf passed under the fence. When investigating the fence, the animals mostly kept their head lower than shoulder height, what suggests, that they check for flaws mainly on the ground. After failed attempts, the frequency of investigating the fence declined, even though hunger increased.

A second study regarding fence efficiency is still going on. It is based on several approaches: Interviewing experts on the topic, checking happened wolf-attacks for the fence system, and thirdly visiting farms in three wolf-populated regions and collecting data about the used fence types, fencing problems and other characteristics, which could be related to predation risk. First results show, that most of the attacks in the last two years happened in non-electrified pastures. The few cases with electric fence systems usually had serious flaws, like a high lowest wire, low electricity or non-electrified fence parts (i.e. gates). When looking at the different regions, it is interesting, that the Calanda-pack, the oldest wolf pack in Switzerland, which reproduces every year, hardly did any damage on livestock. All farmers there used exclusively flock nets, most with the standard height of 90cm.

The results of both studies confirm AGRIDEA`s presumptions, that the standard 90cm electric fences are sufficient for livestock protection. Since the wolf is an intelligent animal, individuals can learn how to overcome protection, and there is no risk-free solution.

Social contracts in hunting: Path dependency in a Swedish context

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In modern societies, social contracts have helped structure the relationship between the state and its citizens, defining the rights and duties of each. Hunting and the management of wildlife is no exception to this political order, where the hunters and, in some countries, land owners have consented to surrender some of their freedom in order for the state to set up rules and regulations to manage collective problems, e.g. roaming wildlife. In Sweden, a social contract between hunters and the state was set up in the 1930s with the aim of achieving a more sustainable wildlife management. However, the contract which has been exceptionally successful in terms of increasing number of wildlife populations is increasingly challenged by societal changes such as individualization, urbanization, but also changing attitudes to nature, impacting not only upon the role of hunting, the recruitment and retention of hunters, but also on the role of the hunting community as a legitimate partner to the state. The aim of this paper is, based on an institutional analysis, to examine the development of the social contract between the hunters and the state, with the purpose to analyze the abilities among the involved actors to cope with and adjust to social and environmental changes. Tentative results show that the contract has been re-negotiated on a regular basis over time. Current challenges, however, seems far more difficult to handle compared to previous challenges, which calls for deepened negotiations.

Ecological reasoning and understanding social conflict in small-scale salmon hatcheries in Wales

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Over the last several decades, stocking of salmonids by private groups for conservation purposes has become a contentious issue in Europe. Despite the shared interest of all actor groups in wildlife conservation, these conflicts have long-lasting, disruptive effects on the cooperative relationships between of actors working to protect freshwater biodiversity. Using the termination of Welsh stocking projects in 2014, we analyze the causes and drivers of stocking conflict over time, and suggest avenues for conflict resolution. We perform a critical discourse analysis of interview data, online print media, social media, and policy documents and examine how stocking projects were shaped by two major discourse coalitions promoting either a pro- or an anti-hatchery argument. We found that conflict between the discourse coalitions was formulated around ecological reasoning about the outcomes of salmon stocking, opposing views on economic efficacy in conservation projects, challenges to governance systems, and personal conflicts between stakeholders. The analysis suggested that the discourse favoring habitat improvement dominates the discourse that preferred stocking or a combination of methods and that this change occurred in parallel with changing power dynamics between fishery stakeholders, driven by European policies and changes in the national government structures. The decision to end salmon stocking institutionalized this dominant discourse and led to undesired social side effects such as a secondary conflicts and alienation of some stakeholder groups. We conclude that salmon governance in this case exhibits many characteristics of a wicked management problem and recommend a management approach that takes into consideration multiple management goals.

A benefits approach to voluntary salmon hatcheries

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Voluntary hatcheries, or hatcheries operated privately by local anglers and fishery owners, are a historical part of salmonid conservation and enhancement efforts in Europe. However, these types of hatcheries have faced increasing scrutiny over the last several decades because of the potential negative ecological impacts created by stocking salmon into wild (albeit declining) populations. We hypothesized that hatchery programs provide value to communities well beyond the possible conservation contribution to local salmon. Utilizing a qualitative ethnographic approach, we identified and classified a range of benefits produced by voluntary salmon hatcheries within three case studies in Norway, Wales, and Germany. Across all cases, voluntary hatcheries facilitated or provided diverse social, psychological, and conservation benefits to individuals and groups of cultivators, as well as to the river environment. Voluntary hatcheries can be considered as a visible means of environmental stewardship and are perceived by many operators as an important means for mitigating human obstacles to wild salmon conservation. Based on the multiple benefits that voluntary hatcheries create for the people engaged in hatchery activities, we lay out alternative views that add to the traditionally black-and-white, pro or anti-hatchery perspectives. Improved incorporation of multiple social-psychological hatchery benefits into future fisheries management decisions, outreach, and communication will provide a more holistic approach to sustainable hatchery management, reduce stakeholder conflict, foster civil engagement in salmon conservation, and enhance environmental stewardship.

The Experiences and Adaptations of Sheep Farmers to Large Carnivores in their Backyard.

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Current policy in Norway promotes a 'two-fold objective' of ensuring sustainable carnivore populations while concurrently sustaining active and viable grazing. As only three percent of the total land area is arable, outfield grazing has been and still is crucial for animal husbandry. In many regions, sheep farmers experience high losses due to large carnivores. The adaptive capacities and adaption strategies of the grazing industries are thus of core interest. We have studied the experiences of farmers and their adaptations using in-depth interviews with twenty sheep farmers from the regional county of Hedmark, an area of heavy predation with three to four active large carnivore species. The sample of farmers was selected to cover a range of situations, such as: farmers within carnivore prioritized areas and grazing prioritized areas, various age groups (<40, 40 - 55, 55<) and farm size/number of sheep. The farmers interviewed ranged in age from 29 to 70 years old.

Interview data reveals various adaptation strategies:

- A majority take part in systematic herding collaboration.
- Exploration of technological solutions: Half of the farmers are using technological devices with GPS, which has eased herding and finding cadavers, but it cannot prevent carnivore attacks.
- Ending/reducing outfield grazing: Within prioritized carnivore areas farmers were obliged to end outfield grazing and move the sheep to infield (fenced-in) grazing. Due to high losses, also within grazing prioritized areas, several farmers have either reduced the period of outfield grazing or ended outfield grazing and often reduced the size of the herd. They experience more work input, poorer animal health, higher expenses (medication, buying of additional feed), and they believe they will be the last generation of sheep farmers.
- Changing to other types of production: Some do have other alternatives, and some are entitled to subsidies for conversion to other types of production. However, for many, utilization of the outfield resources is of crucial importance.
- Maintaining sheep farming as a resistance strategy: some want to defend their outfield grazing rights. Without exercising their grazing rights, they fear they eventually will be lost.

Some cannot handle the psychological strain and quit. Several reported sleep deprivation, anxiety and reduced life quality. Available time for farm maintenance is reduced because of the increased workload from looking for injured (the most difficult task) and dead animals and reporting it to the authorities. Previously, collecting the livestock in autumn was a major family event, now children are kept away from the gathering.

Sabotage, harassment and a variety of threats from carnivore conservationists were reported. Many farmers find themselves in the frontline of a struggle between conservationists having little to lose personally and families that have their basis for existence or way of life at stake. The lack of

acknowledgement of their situation as the ones who carry the costs of society's conservation policies becomes an additional burden.

Applying the positive deviance approach to conservation management

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With continuous human population growth, humans and wildlife are increasingly living in proximity to one another, which often results in greater pressures on wildlife survival due to habitat destruction or direct hunting. However, some species are able to persist and co-exist with humans in specific social-ecological settings. To identify such favorable settings, it has been suggested that one key idea of the positive deviance approach, a framework originally developed to find beneficial nutritional behaviors practiced within a community, could be applied to conservation management. Namely, to focus on cases of success and determine which conditions enable a species to survive. We applied this framework to western chimpanzees (Pan troglodytes verus), screening the landscape for social-ecological settings in which chimpanzee populations persist. While this subspecies declined by 80% over the last two decades, it remained stable in the Fouta Djallon, West Africa. To identify the characteristics of this positive deviant area in contrast to the rest of the region, we compiled 52 nest count surveys via the IUCN SSC A.P.E.S. database with a total survey effort of approx. 11,000 km, and extracted publicly available datasets capturing factors relevant for chimpanzee abundance, such as habitat, topography and socio-economic context. Using Generalized Linear Mixed Models we found that forest loss had a negative effect on chimpanzee densities, whereas chimpanzees persisted in areas with a high prevalence of hunting taboos, steep terrain, and low intensity of 'human activity'. This study showed that a special human behavior, i.e., not hunting chimpanzees, was an important factor that enabled this species to persist in the positive deviant region. While hunting taboos cannot be transferred to other areas, we propose that tools focusing on behavioral change could be used to reduce hunting pressure. This can complement commonly implemented conservation interventions, such as protected areas and law enforcement. The concept of positive deviance can be used in different social and ecological contexts to guide the design of effective conservation interventions by mimicking key attributes of successful settings.

EDU-Wildlife – Large carnivores in focus of education

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Due to our cultural landscape, the presence and the return of large carnivores leads to a field of tension in social, ecological and economic dimensions. Discussions about large carnivores, livestock loss and possible attacks on humans are often charged with emotions. With the increasing occurrence of large carnivores in Europe, there is also a growing need for objective information to raise awareness and to find constructive solutions. Non-sustainable regional development and intensive land-use may lead to increasing territorial conflicts between humans and wildlife.
The educational project "EDU-Wildlife" addresses the above-described conflicts. The objective of the project is to generate knowledge by analysing different communication strategies dealing with large carnivores in Europe and developing innovative and transferable educational materials on conservation, awareness and acceptance. It runs from August 2017 until January 2020.
Utilising education for sustainable development (ESD), the project aims at raising young people's awareness for a coexistence with large carnivores and deepening the ESD understanding and ESD in practice of several European actors, resulting in the development of effective educational tools. Due to limited practice with large carnivores in Germany and significantly different experience in other European regions, one of the most valuable aspects of the project lies within the international and interdisciplinary exchange. All materials and contents will be developed collaboratively with direct partners in Romania.

The content focus lies on the species wolf, bear and lynx, as they have the most widespread distributions on the continent. Alongside with the development of educational offers for pupils goes the development of a massive open online course (MOOC) to enable educators to participate in the project using interactive tools for learning. Moreover, selected environmental educators from Romania and Germany will be trained in the developed program as multipliers for the purpose. These specially trained educators will then conduct an awareness-raising campaign with young people in schools but also in extracurricular wildlife clubs and project weeks where the students develop specific values concerning wildlife and learn creative methods for promoting coexistence between large carnivores and humans.

As future decision-makers, pupils need to be empowered to reflect the different aspects behind divergent perspectives and to acquire knowledge, skills, attitudes and values necessary to shape a sustainable future. The project culminates in an international conference of education and communication in autumn 2019 where young people will participate, sharing and comparing their experience with other people across Europe.

The project's direct implementation of both current research and European knowledge about large carnivores in educational material in cooperation with more than 20 partners from the contexts of

environmental education, university, conservation, forestry, politics, public entities and national parks meets the interdisciplinary demands of present activities in sustainability sciences.

Swiss livestock guardian dogs

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Especially for the vast and steep alpine pastures in Switzerland, livestock guardian dogs offer great protection service. Since the alpine pastures are also very attractive for tourists, the free-running dogs can pose a risk. To ensure optimal conditions for all stakeholder, dogs included, Switzerland has come up with a special breeding, testing, placing and counselling system funded by the environmental agency of Switzerland (BAFU).

One breeding club (HSH-CH) is assigned for breeding and training the guardian dogs. In Switzerland, besides a small pilot project with Kangals, only the breeds Maremmano Abruzzese from Italy and Montagne des Pyrénées (Patou) from France are reared. Quality traits are fitness and protection instinct, but also calm and confident characters. Good socialization is a very important goal during the training. Dogs should learn, that humans are generally not a threat. With about 1.5 years, each dog has to go through a 24hrs test, before becoming an official certificated guardian dog. In the examination, the dog is tested for staying with the flock, reactivity and tolerance towards humans and other dogs as well as stress resistance. Numbers of certificated dogs are still on the rise, with around 220 dogs working right now.

When a farmer needs livestock protection, he first addresses the Cantonal livestock protection counsellor. The Cantonal counsellor visits the farm and if he comes to the conclusion, that guardian dogs would be a good solution for that specific farm, he informs the specialist department for livestock guardian dogs (AGRIDEA). The farmer has to attend a course about handling those dogs, if he is afterwards still interested, a consultant from the specialist department again visits the farm and checks it for suitability. The Canton of the farm and the alpine pasture have a veto right for the placement of the dog. If everything is cleared, the placement of the dog is done by the specialist department, which tries to find the best dog for the specific farm structure. Since demand for guardian dogs is still higher than the supply, farmers need to wait up to one year to get a certified dog. The purchase has to be paid by the farmer, but afterwards a monthly contribution by BAFU subsidizes the running costs.

After the placement of the dog, AGRIDEA is responsible for all further actions, like monitoring the dogs, the monthly payments, critical incidents with third parties, etc. If biting incidents happen, experts analyse the situation. A dog can lose his certification if showing unwanted behaviour.

AGRIDEA has also come up with an extensive tourist information system. When planning a hike, tourists can check on a map online where guardian dogs are present. There are also remarks concerning if dogs are running free or fenced in and around what time they are in which section of the pasture. People who are scared of dogs or want to bring their companion dog with them can avoid these areas. Additionally to that, AGRIDEA is giving out brochures to tourist informations and putting up signs with important behavioural advices on the entrance of the protected alpine pastures.

Sportsperson's Motivations and Their Barriers Toward Waterfowl Hunting

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The funding model of wildlife management agencies in the United States is largely based on selling licenses and stamps and thus is sensitive to the recruitment, retention, and reactivation (R3) of hunters. Hunting migratory birds has precipitously declined since the 1990's in the United States, with losses of over 500,000 hunters. The North American Waterfowl Management Plan (NAWWP) created a specific objective of increasing waterfowl hunters and others who enjoy and actively support waterfowl and wetland conservation. However to increase waterfowl hunters, there must be a greater understanding and assessment of the similarities in motivations among hunter groups (e.g., small game, big game hunters) to waterfowl hunters and identify what may prevent them from participating in waterfowl hunting. We sent invitations to a web-based survey of anglers and hunters spanning from nine states in the central United States. Questions sought to identify motivations, hunting preferences, and barriers to waterfowl hunting and used combinations of five-point Likert-type scale and best-worst scaling. In general, big game hunters ranked waterfowl hunting greater than small game hunters, and anglers. Sporadic waterfowl hunters (hunted waterfowl <2 out of 5 years) ranked access as the most limiting barrier, where anglers may ranked waterfowl hunting identification, rules and regulations, and access. All individuals regardless of group, ranked spending time outdoors as the highest motivation. Differences on the extent that factors were limiting varied among states and regions sampled. Understanding the constituent and how they view certain aspects of their outdoor recreation experiences will better influence how state agencies can target and market waterfowl hunting to them. In turn, this will allow for the state wildlife agency to revamp their R3 efforts and pass on valuable information to their counterparts in states that did not participate in the study.

It's a class-war, nothing else" – The gamekeepers' response to the changing perception of the driven grouse shooting industry in Scottish modern society

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The sport of grouse shooting is a prominent feature of Scotland's history. Having begun as a past-time for the wealthy landowners and royalty of the country, it continues into present day as a source of revenue, with a large proportion of Scotland's privately-owned land still managed to support red grouse Lagopus lagopus scotius. Gamekeepers are employed by shooting estates to carry out this form of land management, and traditionally live in tied-in accommodation supplied by their employer. It was also common for keepers to remain close to the area in which they were born, following in the footsteps of their fathers and grandfathers. Gamekeeping was therefore seen as a traditional and respectable profession for those living in such communities, holding both cultural and economic value for rural areas.

However, grouse moor management – and the way in which it is viewed – has changed, especially in recent decades. Land management mainly to support driven shoots – which require higher numbers of grouse - has intensified. Improved accessibility and advances in technique have led to more efficient muirburn, the introduction of medicated grit to combat parasites, and increased predator control. Furthermore, factoring agencies, with the purpose of increasing profitability, are increasingly being brought in to "save" failing estates - viewed by some as a movement away from the more 'traditional' practices. Alongside this, outside parties – particularly the conservation sector – have expressed feelings of concern and even anger towards some management practices, making claims of environmental damage and illegality. Specifically, concerns regarding the illegal killing of protected raptor species – which evidence suggests is linked to driven grouse moors – has strengthened negative perceptions of the industry, and has been the driving force behind public protests and campaigns calling for regulation of shooting practices, or even a complete blanket ban of the sport. Driven grouse shooting has become, for many, an "unacceptable" form of land use, and one that has no place in modern society. We conducted in-depth, semi-structured interviews with ten gamekeepers from across Scotland, and examined how they responded to the challenges made against their industry. We identified five key narratives that denote the ways in which keepers react to this pressure: 1) the 'despondent' narrative, conveying a loss of hope; 2) 'defence' of their way of life and the integrity of the profession; 3) 'resistance' to the perceived dominance of conservation organisations and the pressure to change; 4) 'compliance' - e.g. "The industry needs to change"; and 5) 'blame', accusing others of causing the negative perception of the industry. This latter narrative is also tied in with internal conflicts – the need to distinguish themselves from "bad" keepers, and feelings of frustration at being labelled as one entity. We provide a unique and before unexplored insight into the responses of gamekeepers towards the challenges made to their industry, and argue that it is only through examining these responses that we may begin to understand important behaviours – such as unwillingness to collaborate and illegal activity.

Stakeholder participation and evidence-based conservation: what are conservation scientists or practitioners afraid of?

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This talk introduces the session on integrating communities in evidence-based conservation. Its starting point is my personal experience and first-hand observations of the implementation of development aid projects and conservation projects in Eastern and southern Africa and the challenges that conservation projects in Europe regularly face. Such projects often make attempts to implement an element of "participation" by some local people affected by or targeted by the project. In many cases, it is unclear who should participate, how the participants will be selected and by whom, what the purpose of the participation should be, how far such participation should go and whether the appropriate stakeholder groups are actually being consulted (often a gender issue). Perhaps most importantly, but rarely explicitly discussed, there is the question whether project staff and coordinators genuinely expect such participation to aid the success of the project, or whether it is more likely to be viewed as a damage-limitation exercise without which the project would not have been granted funding in the first place.

In this session we will present examples from work with tigers, apes, elephants, raptors and firewood where such project participation is essential to the success of research projects and conservation-related projects with a human dimension in wildlife. Our examples and our review will demonstrate that it matters when such participation is solicited, who does so and for which purpose. A core component of participation solicitation is trust, a trust which project leaders first have to gain from their potential partners and participants. Our review of past research projects in a human dimensions of wildlife context demonstrates that a crucial step is the time point and purpose at which stakeholders are first asked to participate. In particular, if they can provide input at the design stage of a project (the "co-design" principle), then they understand how the topics or questions to be addressed were selected, why the study was undertaken and which aspect of human dimensions in wildlife it is supposed to address. This strengthens the credibility of such projects and the acceptance of unexpected and potentially unpalatable outcomes. Co-design could be facilitated if funding agencies made provisions for such interactions at the design stage, which are currently often not available. It also forces the project coordinators to be somewhat open to the selection of topics and flexible in the design of the putative project work, i.e., they have to accept an element of losing control as to where the journey is likely to go – and such loss of control is not palatable to some scientists or project staff.

Forseeing the potential for conflict by understanding determinants of utility and satisfaction of recreational anglers - a meta-analytical approach

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Goal interference is a cause of perceived conflicts by outdoor recreationists. The goals sought by outdoor recreationists, such as anglers, can be conceptualized as expected utility following an economic research branch and expected psychological benefits following a social-psychological research tradition. Goal interference can be expected when outdoor experiences affect and reduce desired utility components and constrain the meeting of expected benefits, which is defined as user (dis)satisfaction. Given its recreational nature, recreational fishing experiences involve both catch and non-catch related components, but the relative importance of both for utility and satisfaction is debated. We conduced meta-analyses of revealed and stated preference studies focusing on utility and correlational studies focusing on angler satisfaction. Regarding the utility studies, we reviewed economic-based studies published between 1992 and 2017 that examined anglers' decisions about where to fish. From 92 unique data sets representing 109 studies and 186 distinct models of angler behaviours, seven key attributes affecting where anglers fish were identified including costs (such as travel costs or licence costs), catch-related fishing quality (in relation to harvest rate, catch rate, or size of captured fish), environmental quality (e.g., fish health, visibility, and aesthetics), facility quality (e.g., boat launch), harvest regulations, congestion, and the fishing destination size (e.g., hectares of lake or km of coastal shoreline). Of these attributes, cost was always negatively related to utility by anglers. Catch-related fishing quality, fishing destination size, facility quality, and environmental quality were also important attributes that positively impacted the perceived utility of anglers. Catch, however, was often more important than these other attributes when importance was measured by economic value for key groups of marine and recreational fish species. The importance of regulations and congestion to anglers varied across the studies and congestion was more important in stated (hypothetical behaviours) than revealed (reported behaviours) preference studies. To study the relevance of satisfaction-surrogates across a large range of contexts, a global meta-analysis on the determinants of angler satisfaction based on aggregated effect size metrics was conducted. Based on data derived from 17 independent studies, it was found that angler satisfaction was a function of both the catch and non-catch components of angling, forming a multi-dimensional experience. Two non-catch components – the possibility to express freedom in site choice and lack of crowding – positively contributed to satisfaction, followed by a range of catch aspects of the fishing experience related to catch rates, harvest rates and the size of fish. In addition, facility quality as well as social aspects and environmental quality contributed to angler satisfaction, but effect sizes were smaller than the above-mentioned components. Our reviews of published studies underscore that angling has both a non-catch and a catch component, but in contrast to motivation studies catch features strongly in both utility and satisfaction. Based on our finding, we predict increasing costs, constrained "freedom" of choice and alteration to expected harvests and catches are bound to lead to goal interference and create conflict with anglers.

A cross-cultural comparison of wildlife value orientations

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Wildlife conservation concerns transcend nations. Typically, wildlife does not mind about national borders. For instance, wolves have migrated from Poland to Germany in the recent past, and currently continue to explore The Netherlands. Also, concerns about conservation are not limited to those who are directly geographically affected. Many people living in nations without tigers are compassionate about, and financially contribute to, tiger conservation. In this context, research that addresses differences in thought about wildlife across nations can contribute to conservation science, knowing that public support is ultimately crucial to conservation success and effectiveness.
The present study measured wildlife value orientations in seven nations: The Netherlands, Canada, Malaysia, Germany, Serbia, Japan, and Australia. Wildlife value orientations are patterns of basic beliefs that give direction and meaning to fundamental values in the context of wildlife. The concept is useful because it reflects general thought about human-wildlife relationships. Associated measurement scales have been previously applied in different nations, which suggest satisfactory reliability and predictive potential for a variety of specific variables, such as acceptability of management actions and conservation support. The aims of this presentation are to (a) assess the reliability of wildlife value orientation measurement across nations, and to (b) estimate differences in wildlife value orientations across nations.

Questionnaires were distributed amongst university students, with sample sizes ranging from 208 (Canada) to 391 (Malaysia) (Total N = 2176). Domination was measured based on appropriate use beliefs (six items) and hunting beliefs (four items). Mutualism was measured based on social affiliation beliefs (four items) and caring beliefs (five items). Items were all coded on seven-point scales (-3 strongly disagree to +3 strongly agree with 0 as a neutral point).

Reliability of the measurement of all basic beliefs was acceptable in all nations (i.e. Cronbach's alpha ≥ .65), except of hunting beliefs in Japan (alpha = .54). Acceptable reliability levels within nations suggest that the measurement scales are feasible for cross-cultural research.
Multilevel modelling was used to estimate the effect of nation (group level variable) on wildlife value orientations, while controlling for sex, and size of village or city people grew up in (individual level variables). Nation explained 14% of the variance in domination, and 32% of the variance in mutualism. Students in Serbia were more domination oriented (mean = .41) and less mutualism orientated (mean = -.69) than students in other nations. Students in Australia were less domination orientated (mean = - 1.11) and more mutualism oriented (mean = 1.73) than students in other nations.

Theory frames wildlife value orientations as cultural ideologies. Individuals in different nations are socialized into adopting these ideologies during their formative years. Indeed, the findings indicate

that differences across nations are considerable. Nation explains a larger amount of variability in wildlife value orientations than individual level demographics, the latter having been reported in the literature. This underlines the importance of cross-cultural research in the context of global conservation challenges.

Connecting Ecosystem Services to Human & Wildlife Resiliency

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Natural landscapes and organisms serve our wellbeing in a great variety of ways: water purification, flood protection, aquifer recharge, protection from damage by storms and hurricanes, pollution reduction, carbon capture, recreation and wildlife enhancement. Identifying and understanding the services provided by local ecosystems can lead to cost-effective solutions to infrastructural and environmental problems while also creating enhanced wildlife habitat in urban/suburban areas. For the storm-prone 8-County Galveston Bay-Houston region, which encompasses 10 distinct ecoregions, there is a critical need to better connect the ecosystem services contained in the diverse assemblages of forests, prairies, bottomlands, wetlands, riparian waterways and shorelines to maximize the economic and social benefits to humans and wildlife which rely heavily on those services. These diverse ecosystems provide habitat to many key species including thousands of migratory birds and butterflies, native alligators, bats, deer, armadillos, and five endangered species. This presentation is based upon Houston Wilderness' *Ecosystem Services Primer* which discusses ways for determining ecosystem service land-use analysis/values using 6 different study/valuation methods depending on the goals and/or impacts of a decision-maker. Local and regional Gulf of Mexico area case examples are discussed, where ES valuation options between gray and nature-based infrastructure were analyzed and the natural solutions were chosen and implemented. Case examples include corporate use of tertiary treatment wetlands, increased use of native filtering features in major waterways, levee-based wetlands implemented for hurricane and erosion protection and large-landscape prairie lands for water absorption and flood prevention. Each of these examples of nature-based infrastructure creation and enhancement also provide additional habitat for the native and migratory wildlife. In an expanding urban core such as the 8-County Galveston Bay-Houston Region, which is larger than the entire State of New Jersey in America. There is a critical need to: (1) Engage in more region-based studies on ecosystem services to better understand the value of natural benefits and the cost-effective infrastructure policies; (2) Compare the economic value of ecosystem services to other alternative approaches when making public policy decisions regarding land-use and infrastructure; and (3) More fully incorporate ecosystem services into infrastructure decisions. The presentation will also briefly discuss the eight-county *Gulf-Houston Regional Conservation Plan* and its recent kickoff of a "*24% By 2040 Land-Use Strategy*" to improve ecological and economic resiliency in the 8-County region through preservation/enhancement of 24% of undeveloped land in the 4.8 million acres of land cover by the year 2040 – an additive of 15% over the current 9% in preserved green space in this region (See maps and more information at www.GulfHoustonRCP.org, and see the Ecosystem Services Primer at http://houstonwilderness.org/ecosystem-services/.)

Spatio –Temporal Assessment and Management of Human- Wildlife Conflicts in the part of Northern Western Ghats

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Western Ghat is rich in biodiversity, but presently recognised 'Biodiversity Hotpot' due to irreversible degradation caused by excessive anthropogenic interfere such as dams construction, roads, forest fires, deforestation, changing cropping pattern etc. These activities have affected in the form of habitat loss, fragmentation and higher disturbance. It resulted as losing prey base and food base available in the forest. This escalated Human-wildlife conflict in the region. Human Wildlife Conflict (HWC) is a common phenomenon in the human inhabitations that are close to forests and wilderness areas. Hence, the study area is selected for the research work is Junner forest division, located in northern part of the Western Ghat in Pune district, India. It reported HWC in the form of crop depredation, livestock kills by carnivores, damage to property, and chance encounters resulting in death or injury to people and to wildlife as well. It reduces support for conservation of the wildlife among the affected population and the forest department is often at the receiving end of people's anger. Therefore, the objectives of the paper are to assess spatio-temporal dimension of Human-wildlife conflicts in the study region; to assess the conservation and management implications of human - wildlife conflict on wildlife and suggest management strategy for prevention and conservation of wildlife animal species. To achieve the objectives, methodologies involves NDVI and landuse – land cover studies to understand spatio–temporal change in extent and form of the natural resources with help of Geo-informatics technique. The quantitative techniques used for data received from the department of forest. The results are validated through field assessment such as interview, discussion and questionnaire methods. It also validated with help of secondary resources like previous research work, reports and articles on the issues obtained from previous research work done on similar topic as well as from same area.

The analysis revealed that the incidences of illegal grazing, forest fire, illegal cutting and other factors have been increased and its effect is over the period increasing into the habitat loss. The GPS location of the human-wildlife conflict marked almost 100-150 km away from the original habitat. The animals responsible for the conflicts are types of deer, fox, hyena, leopard, monkey, peacock, wildcat etc. The crop depredation and livestock depredation has been increased during last one decade. The wildlife attacks on human are fluctuating but very less compare to the human attacks on wildlife as it temporally increasing because of fear psyche of people about attack. The concerned authorities have executed different management strategies to deal issues related to the human-wildlife conflict, which are found less constructive. It includes translocation, shooting, random trapping, compensation to affected people is meager and delay in its receiving. The work recommended that the problem should be considered on the bases of natural regions. The management involves regular monitoring of the conflict, habitat enrichment, no further fragmentation, cooperative community guarding, people awareness regarding prevention and mitigation of the problem, scientifically managed conservation centers near forest area and efficient and reasonable compensation.

View of wildlife influences landscape conservation actions

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This paper examines stated wildlife value orientations of landowners and revealed landscape conservation actions. A recurrent argument offered by hunters and the European Federation of Associations for Hunting and Conservation (FACE) is that hunting help promoting biodiversity, and more broadly, landscape conservation. Recreational hunting has been shown to be instrumental in shaping the landscape – either by the landowner hunting the holding, by letting others hunt the holding for free, by renting the holding for hunting, or not allowing any hunting. However, there are no studies connecting wildlife value orientations of the landowners and the landscape conservation actions (combined studies where stated or revealed behavior or preferences are recorded on the same population whose wildlife value orientations are gauged). This study, using a nationally representative data-set of landowners in Denmark, makes this connection. Clear patterns of variation are found which in turn relate to whether more 'narrow' (focusing entirely on game species) or 'broader' (including benefits for other species groups as well), conservation and nature management actions, such as creating pheasant cover, planting hedges, establishing hedge banks and ponds, or making reservoirs, are carried out, or whether there is focus on longer-term or shorter-term changes. Combined, these characteristics can be said to influence the potential for biodiversity and landscape conservation. Findings show that while mutualists and distanced wildlife value orientations dominated in the public; most Danish landowners (especially full-time farmers) were utilitarian followed by pluralist (using the utilitarian-pluralist-mutualist-distanced orientation scale). When it comes to wildlife value orientations in relation to the utilization of the hunting opportunity at the holding, we e.g. see relative more pluralists among landowners who utilize the opportunity themselves and more mutualists and distanced when no hunting occurs at the holding. At the same time, we find the likelihood of at least one landscape change is higher on holdings hunted by the owner compared to holdings where no hunting takes place. Seen from management and policy perspectives, the long-term, broader landscape changes are likely to invoke less public/stakeholder opposition than the narrower, more hunting orientated changes. This is in line with earlier studies showing management initiatives related to rear and release of game birds to have the most negative impact on (hunting) attitude. In a broader perspective the results can, maybe, be used help to predict which changes in the rural landscape can be expected because of developments in the agricultural sector, and in wildlife value orientations.

The condition of a community and effective crop damage management: A mail survey of farmers in Chiba Prefecture, Japan

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Although there are many discussions on how farmers manage crop-raiding at the community level, many of communities cannot manage it effectively. To make management effective, we should discuss not only their natural environmental condition but also social-economic condition. Previous studies have examined farmers' intentions regarding the kind of management which they considered implementing, or the effect of management plans they have carried out. However, no studies are examining the kind of community management which could be carried out based on the situation of each community.

We aimed at one of the management, fencing, to reduce crop damage by wild boars. For the use of fences to be efficient, farmers must check them periodically, although in many communities could not maintenance them at the needed frequency. We surveyed natural and social-economic features of communities both conducting high and low-frequency fence maintenance.
The study area was nine cities in southern Chiba Prefecture which was wild boar habitat, and where farmers used fencing to reduce crop damage. We sent a mail survey to a community leader of a region where crop raiding by wildlife occurred from February to August 2016. The survey asked about the crop raiding situation, the kind of community-based management used and about their social conditions, for example regarding their activity and whether or not they connected to a public servant or volunteer. We also sent mail survey to each city public servant in charge of wildlife management to identify their wildlife management policy and grant that farmers could use to fencing as a reference.

We sent 1,500 questionnaires and received 944 responses (62.9%). Out of these, 656 respondents (69.6%) indicated that they experienced crop raiding by wildlife, and 307 respondents (46.8%) conducted community-based management. We analyzed the survey using a decision tree model for identifying social and environmental factors that define the frequency of maintenance. We used the frequency of maintenance as the objective variable and investigated which factor affected this frequency.

The results showed that communities that conducted high-frequency fence maintenance had a greater willingness to be trained in the management and higher community event. They also responded that a short of hands was a future concern. On the other hand, communities that conducted lower frequency fence maintenance had a higher percentage of inhabitants aged 65 and older and also believed that fences could not reduce crop damage. In conclusion, more active communities could start and continue with management, but that more hands were required. Communities that could not begin the management must be motivated to study or conduct management by beginning with what they had already been doing.

Social Barriers to a Fish Habitat Conservation Project in Turkey

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Conserving critical habitats and maintaining traditional harmony between humans and wildlife in working landscapes of less developed regions is an ongoing challenge. Deeply embedded customs and strict belief systems of traditional societies often constitute serious barriers for conservation efforts. And when such efforts attempt to introduce innovative instruments or suggest new methods of practice the resistance is even greater.

A habitat conservation project was developed in a sensitive aquatic habitat of a typical Mediterranean working landscape in the Köprülü Kanyon National Park in South Turkey. The essence of the project was to collaborate with locals to irrigate responsibly by preventing fish par from swimming into dead-end irrigation channels during their reproduction cycle.

The project consisted of two dimensions: one being physical - implementation of an innovative fish filtering device to prevent fish par from swimming into the agricultural trenches, and the second a social dimension - collaborating with the local people who acquire irrigation water from the aquatic habitat. The project was successfully implemented and operated for a couple of years in its physical dimension. Although the social dimension seemed to be satisfactory at the initiation of the project it eventually failed due to the eminent sociocultural barriers of a closed society. The project lost its local support and failed entirely due to: a) the strict Islamic life style that prevented the project from involving the women of the village; b) locals were wary because of earlier top down management issues between the National Park; c) they had lost their trust in outsiders in general since they did not believe anyone would do anything good for them for free.

This project is a good case to demonstrate that bio-physical solutions are in vain without strong support of social and cultural foundation. Although the project is being further developed on its physical aspects' the next phase is heavily concentrated on collaborating with the local communities first.

Cattle selectivity and mitigation of human-leopard (*Panthera pardus*) conflicts over depredation

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Human-carnivore conflicts over livestock depredation are widespread and awaiting for effective and creative solutions. Selective depredation is an important, but poorly studied, phenomenon which may allow reducing livestock losses by identifying and targeting most vulnerable livestock species or intraspecific categories (age, sex, coloration and breed). Livestock selectivity by carnivores should be consistent from large scales (study areas) to fine scales (households) to make strong inferences to loss mitigation. In this study, we compiled and analyzed an individual-based database of cattle grazing in forest habitats (n = 932) and being killed (n = 70) by leopards (*Panthera pardus*) in the Hyrcanian forest, northern Iran. We calculated Jacobs' selectivity index (I_j) for cattle age, sex and coloration across the study area, three sites, nine villages and 60 cattle owners. Naturally colored (red, red-and-white, yellow-and-white and grey) cattle were significantly preferred by leopards in the study area, sites and villages in comparison with black and black-and-white cattle (I_j varied from 0.36 to 0.42, significantly different from zero at $p < 0.05$). This pattern was strong also in households, except from some owners who kept very few naturally colored cattle which were not killed ($I_j = 0.73$, $p < 0.001$). Leopards also significantly preferred males ($I_j = 0.39$) and juveniles ($I_j = 0.20$), but only in the study area due to low numbers of these individuals in forest and high variability of their selectivity indices at finer scales. To our knowledge, this is the first description of selective depredation by carnivores based on livestock coloration. We suggest that naturally colored cattle are preferred due to their higher visibility and detectability and recommend local cattle owners to replace their naturally colored cattle by black and black-and-white cattle to reduce losses. This replacement should be easy as the black and black-and-white stock makes almost 80% of sampled holdings. We also urge owners to limit access of males and juveniles to forest. Although their selectivity is not shown at fine scales, loss of a single male or juvenile can undermine the whole family income because of their economic value. We appeal for careful consideration of phenotypic and biological characteristics of livestock as the important prerequisites for depredation by carnivores.

Human-Carnivore Conflict: Using Tradition and Innovation to Co-exist

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Facilitating coexistence between people and carnivores is one of the thorniest conservation issues we face today. WWF recognizes the need for people living alongside carnivores to be critical allies in their conservation, but this requires effective mitigation of the negative impacts of these species on their lives and livelihoods. Traditional approaches to human carnivore conflict have included predator removal, preventative measures such as fencing and herding, simple deterrents like noise and guard dogs, and basic financial incentives. These approaches have become more innovative over time, using SMART patrolling, geo-fencing, solar-powered blinking lights, and credits for living with wildlife. All of these approaches work to varying degrees but for most, we do not have experimental data to adequately assess their effectiveness. Additionally, approaches can be context specific and each on its own may not entirely solve the problem. In this talk, I provide examples of single solution approaches – some traditional, some more advanced – promoted by WWF worldwide. I then describe an innovative, holistic approach to human carnivore conflict (SAFE) modelled on a successful method for minimizing road traffic accidents.

A practitioner`s view on recreational angling and Natura 2000

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Natura 2000 is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types. Stretching over 18 % of the EU's land area and 6 % of its marine territory, it is the largest coordinated network of protected areas in the world. Natura 2000 is not a system of strict nature reserves from which all human activities would be excluded. Indeed, most of the land remains privately owned and the initial approach to conservation and sustainable use is to center on people working with nature rather than against it. Starting 2016 the Federal State of Lower Saxony was forced by the EU to accelerate the designation of about 280 Natura 2000 network areas including conservation aims, valuable species and habitats, and the formulation of individual management plans by the end of 2018. Designation of nature reserves is not necessarily needed for this process but was preferred by nature conservation authorities. As a consequence of this pressure, the supreme nature conservation authority published a standardized guideline for nature reserve regulations aiming to facilitate and fasten this process. This standardized guideline includes the possibility to strongly restrict all forms of land use, particularly with respect to angling, hunting and all forms of agriculture and is now used by many regional nature conservation authorities to designate regulations in protected areas. For example, shoreline access for anglers can be strongly limited and night-fishing and prebaiting of fish is prohibited in order to not disturb rare mammals like otters (*Lutra lutra*), a range of nesting birds and bats or destroy rare habitats. Multifaceted conflicts arose as a consequence of this practice because restrictions are often not well grounded and anglers claim a missing connection between restrictions and nature protection goals. These unresolved conflicts take place at different levels. Umbrella organisations of anglers, hunters and agriculturists federalised at the state level aiming to eliminate standardized guidelines for reserve regulations. At the local level, individual reserve regulations are intensively discussed by angling clubs, farmers and hunters. Whereas local nature protection authorities claim a transparent process of participation, most land users often feel overlooked and powerless to influence or prevent restrictions. We present three examples of conflicts between anglers and nature protection authorities with respect to Natura 2000. In a first case local conflict resolution was possible on the basis of transparent discussions whereas in a second case anglers and fishermen filed a complaint against reserve regulations at the court for administrative issues. Finally, one example shows how umbrella organisations of anglers and other land users fraternised to influence politics at the state level. From our practitioner`s perspective angling and aims of Natura 2000 are generally compatible. Conflicts arise when restrictions aim to ban angling activities, in all cases without evidence of angling-induced disturbances of wildlife or protection proposes, and when threatened species already developed positively under the presence of angling activities. Conflicts can be solved through transparent processes of participation, fact based reserve regulations and minimisation of restrictions.

Conflicts in wild boar management in the UK

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The Forest of Dean is the second largest crown forest in the UK, a 42.5 square mile area of woodland in Gloucestershire, near the border between England and Wales. Wild boar (*Sus scrofa*) have been established in the Forest of Dean for almost twenty years after an absence for 700 years. From a small population of 60, the population has grown to approximately 1500, despite management efforts. Wild boar are increasingly seen roaming outside of the Forest of Dean and into the surrounding farmland, countryside and even nearby towns and villages. The Forest of Dean is a national tourism hot-spot, with many paths dissecting the woodland, and outdoor activity centres and holiday rental properties located within and around the forest. Consequently people-boar interactions have increased in recent years. There is growing concern among local residents, and increasingly residents and local authorities, charged with managing the boar, are in conflict with each other. Using data from (i) semi structured interviews with residents and other users of the Forest of Dean and (ii) an online questionnaire survey I examine these conflicts, discuss possible mitigation strategies proposed by participants, and explore the feasibility of these proposals.

Interview and questionnaire data show that all but a few participants have experienced a negative interaction with wild boar. Interactions range from road traffic accidents, being charged, and even knocked over by boar, to boar blocking people's path when out walking. Despite these negative interactions, many participants expressed the view that the wild boar should be kept in the Forest of Dean, with only a few expressing a need for extermination. Due to boar numbers increasing despite culling efforts, residents near or inside the Forest of Dean exhibit some distrust towards the authorities managing the fauna and flora inside the Forest of Dean. Interviewees indicated they thought the current control killing is ineffectual at managing boar numbers. Participants proposed a number of possible management strategies, including lethal methods (gun hunting, bow hunting, extermination with the Forest of Dean) and non-lethal methods (fencing a population of wild boar), and methods relying on biological management through contraception, and introducing new species – nematodes to control food supply, and wolves to act as a predator.

All current and suggested management strategies have inherent flaws, linked both to the Forest of Dean as an area and wild boar biology. My findings suggest that culling of wild boar is the most feasible option for the Forest of Dean population, but current methods are not suited to the Forest of Dean environment and people living within the Forest of Dean. Changes to implement would include a closed season when young are dependent on sows, culling from the edges of the forest to encourage the boar to stay inside the forested area rather than current methods of culling from within the forest, and allowing cull-free zones for boar deep within the forested area away from human settlement. Such changes would meet current concerns over wild boar management and lower the number of people-boar interactions.

Migratory fish species

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In freshwater ecosystems, migratory fishes are often the most emblematic species with a high economic and cultural importance for commercial and recreational users. Their complex life cycle and a combination of environmental challenges have led to a decline of many populations and a loss of ecosystem services. In an effort of "resurrecting the wild", large state-sponsored and small privately funded initiatives in Europe and North America try to support remaining populations and bring back lost species to their rivers. Other aquatic species and river systems have benefited from these efforts.

Conservation of migratory fish species and their surrounding ecosystems can only be successful if the actions and motivations of stakeholders and the wider public are well understood and incorporated into management decisions. However, social science lessons from other areas of conservation often do not fully apply to fish because of the unique features of aquatic environments and the emotional distance between people and underwater species. Recognizing the particular characteristics of aquatic wilderness, there have been recent research collaborations considering different fish species (e.g. http://www.impress-itn.eu/) and different geographical regions. Most prominently, the North Atlantic Salmon Conservation Organization and the North Pacific Anadromous Fish Commission have named 2019 the *International Year of the Salmon* to share experiences and increase public awareness.

Considering the socioeconomic and ecological importance of migratory fishes while recognizing the particularities of the conservation of aquatic species, we propose a session on the human dimension of migratory fish species. In the proposed session, we aim at reuniting recent studies on salmonids, eel and sturgeon species by showcasing a variety of qualitative and quantitative approaches from the social sciences. We consider the human dimension on the level of the general public and engaged stakeholders and address questions such as: when does the public care about migratory fish species? How can we increase the public interest for the conservation of wild fish populations? Why do angling clubs stock certain fish species? What are the social, psychological and wider ecological benefits of migratory fish conservation?

By taking stock of migratory fish conservation science, we hope to clarify research and management priorities and contribute to social fisheries research viewing freshwater ecosystems as coupled social-ecological systems. The importance of iconic migratory fish species for freshwater ecosystems and the wide range of research methods should also make this session interesting for conference participants working on conservation issues for other species.

This session has four contributed papers presenting cross-country comparisons on the role of angling clubs for migratory fish conservation and the perceptions and values of the general public. We very much welcome contributions from the general submissions to round out this important and timely

session.

Hannah L. Harrison, Norwegian University of Life Sciences: “A benefits approach to voluntary salmon hatcheries”

Marie Fujitani, Leibniz Center for Tropical Marine Research: “Understanding voluntary investment into renewable natural resources”

Robert Arlinghaus, Humboldt Universität Berlin: “Economic value of river conservation in four countries”

Sophia Kochalski, Leibniz-Institute of Freshwater Ecology and Inland Fisheries: “How to change public perceptions of migratory fishes?”

Understanding conflict

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Conflict is omnipresent in the management of natural resource and wildlife conservation. Conflict may occur because people have different values and worldviews, they disagree about management measures, they have different information, they are using the same resource as other people or wildlife, or they feel threatened by predators. Conflict may take place between two or more groups, and it may stay latent for years and suddenly escalate. Personal relationships clearly play a role, and sometimes conflicts become detached from the original issue and take on a life of their own. Despite these many forms of conflict and their numerous descriptions, conflict remains analytically and theoretically understudied in the context of wildlife conservation and natural resources.

In this session, we want to explore whether conflict can be used as an analytical perspective to further our understanding of the dynamics of social-ecological systems and to improve their management. The session aims to unite contributions that address the following questions: why is conflict a common feature of social-ecological systems? What are the reasons for conflicts? How does conflict evolve over time? Can and should conflict be avoided? What are potentially successful methods of conflict resolution? How can conflict be assessed qualitatively and quantitatively? What is the relationship between conflict and other key concepts such as sustainability and resilience?

All contributors will be asked to comment on causes of conflict, dynamics of conflict over time, and possible conflict resolution mechanism for their cases. Thes session is meant to open a new perspective on social-ecological systems research and stipulate new ideas as well as interdisciplinary research opportunities. Conservation scientists, managers and practitioners often face conflicts themselves, so this session should be appealing to a wide range of conference participants.

We have five presentations confirmed for this session, of which one is the view of a practitioner and four are scientific studies. As last presentation, we suggest that the session chairs shortly summarize the causes and dynamics of conflict and give an analytical and theoretical outlook on the topic. The proposed presentations cover conflict (I) within and (II) between user groups and (III) between users and the general public. The methods include different forms of discourse analysis, a discrete choice experiment, and an application of the social-ecological systems framework. All presenters have committed to submit an abstract for this session by the end of February. Additionally, we would like to welcome contributions from the general submissions that address conflict in the aquatic or terrestrial realm.

1 - Thomas Klefoth, Angling Association of Lower Saxony: “A practitioner’s view on angling and Natura 2000”

2 - Hannah L. Harrison, Norwegian University of Life Sciences: “Ecological reasoning and social conflict over salmon hatcheries”

3 - Seraphina Siebert, Humboldt Universität Berlin: “Deconstructing media discourses on hydropower and salmon conservation”

4 - Jürgen Meyerhoff, Technische Universität Berlin: “Gravel pits: recreational conflicts perceived by anglers”

5 - Robert Arlinghaus, Humboldt Universität Berlin: “Understanding conflict over C&R using the SES Framework”

+ Session summary

How to change public perception of migratory fishes?

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The support of the general public is essential for the effective conservation of wildlife. However, previous surveys suggest that the public tends to lack interest for non-charismatic animals such as fishes. Providing and framing relevant information is a common approach to enhance the interest of the public in an environmental topic and to stipulate pro-environmental behaviour. The aim of this study was to contribute to our knowledge of how to best frame messages with relevance for the conservation wild fish populations. For this purpose, we conducted a before-after-control-impact analysis of the general public in Germany (N = 501), France (N = 337), Norway (N = 396) and Sweden (N = 387). In an online questionnaire, the members of the public in the four European countries were asked in autumn 2015 about their knowledge about native and non-native fish species, their values and personal norms, and their beliefs and attitude towards migratory fish species and conservation issues. Simulating natural conditions, the respondents received the invitation to read an online information sheet in summer 2016. For the information sheet, we selected three comparably charismatic migratory fish species, which have seen significant declines in their populations in Europe: Atlantic salmon (*Salmo salar*), European eel (*Anguilla anguilla*) and European sturgeon (*Acipenser sturio*). We designed a problem-oriented 4-page information sheet and another sheet that contained the same information and the same visuals, but anthropomorphized the fishes. Respondents were randomly assigned either the problem-oriented information, the anthropomorphized information, or a 2-page "placebo" information sheet that did not make explicit reference to migratory fish species. In autumn 2016, the respondents were asked again about their knowledge, perception and valuation of freshwater biodiversity. Their scores were then compared for before and after having read the information sheet. The results of the study will be helpful in order to identify the most-effective way of tailoring conservation messages to engage the public.

Where wolves are few and human densities low: challenges in conservation of wolf populations in Northern Europe

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Due to anthropogenic activities and human population increase, habitats for large carnivores have been gradually shrinking at the global level. However, once exterminated large carnivores such as the grey wolf have been recently making a comeback to many European countries and northern U.S. states. Wolves returned as constant breeding populations to Fennoscandia during the 1990s. Population sizes have remained small (currently 40-45 family packs in Scandinavia, 20-25 packs in Finland) although human densities are low and prey basis sufficient to sustain far bigger populations. Wolf-human co-existence is shaded by the loss of sheep, domestic reindeer and dogs to wolves, and human safety concerns deriving from wolf sightings in residential areas which is most common in human-dominated wolf territories. Compensation payments for damages – even if they are generous - do not seem to be an effective tool to reduce conflict (?) although they might be a necessity for conservation of wolf populations in wealthy Nordic countries where people have been used to get full compensations. In Scandinavia and Finland where dogs have a key role in hunting, hunting dogs are often considered members of the family. Illegal killing of wolves has been the primary determinant of population size although legal hunting has been practiced to mitigate wolf-human conflicts. Wilderness areas do not give shelter to wolves because the risk of getting killed by poachers is high in hinterlands where surveillance is just occasional. To improve wolves' conservation status, research-based, regionally tailored recipes are needed to improve acceptance for human-wolf co-existence.

Pathway to success: The Oberallgäu Way

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The south German mountain forest is extremely important as a protection forest preventing or mitigating the impact of avalanches, debris flow and falling rocks. The Bavarian State Forestry Administration is responsible for maintaining the mountain forests in good condition. At the same time, the forests are home to red deer, chamois and roe deer. In some areas, these animals prevent the natural regeneration of the mountain forests. Because hunting laws and the laws governing the right to hunt in Germany are linked to land, the Forestry Administration has no direct means of influencing the spatial distribution of the game or the level of the hunting bag. The district hunting authorities are responsible for the latter. This state of affairs leads to the conflict of interests known in Germany as the “forest-game conflict”.

In order to solve this forest-game conflict, which is in fact a conflict of interest between different groups of people, people in the Oberallgäu region have taken a new approach, different to the rest of Germany.

The settlement that has been arrived at between the interests of the forestry industry and the game industry is based on a scientific report compiled by Schröder et al. (2012). Since its publishing, the hunting bag plan is no longer driven from the bottom upwards, as is usual, but from the top downwards. The basis for this is an annual assessment of the population numbers and expected increase in numbers for the most important type of game, the red deer, on the basis of the hunting bag realised and annual counts. These results are discussed in a project group made up of representatives of the forestry industry and hunters, and the information is passed on down the line by them. Unlike the “normal” planning of the level of the hunting bag in Germany, in the Oberallgäu region, both the district hunting advisory committee and the project group that has been set up are closely involved with the planning at all stages. In order to guarantee the involvement of all parties, 1 or 2 excursions are carried out in addition to the committee meetings, during which issues and solutions to problems are discussed on site with land-owners, forest-owners, Alpine farmers, foresters, hunters and conservationists.

The talks are coordinated and led by a wildlife biologist, the first of his kind in Germany. As well as providing expertise on game and wildlife, he plays a key role in maintaining the communication between the different interest groups in the Oberallgäu region throughout all planning and talks. He can also draw on the assistance of wildlife experts from the TUM.

All in all, the Oberallgäu method is a complete success. Instead of confrontation between hunters and foresters, the intensive dialogue between the different interest groups has led to a balancing of the different interests.

References:

Schröder, W., Janko, C., Wotschikowsky, U. & König, A. (2012): Schalenwild und Bergwald. Ein Managementplan für den Bereich der Hochwildhegegemeinschaft Sonthofen. TUM, Wildbiologie und Wildtiermanagement, Freising

Quantifying human-wildlife conflicts: Reconstructing the fate of a reintroduced lynx population in Central Europe to estimate mortality

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Human-wildlife conflicts are exacerbated when concerning large carnivores. Although strictly protected by law in many countries of the world, large carnivores are still vulnerable due to habitat loss and illegal killing. The lynx population of the Bohemian Forest Ecosystem (BFELP) is an example for a reintroduced carnivore population in Central Europe expanding rapidly in the 1980´s (phase I), but then contracted and stagnated at a low population size (phase II). There is some evidence that illegal killing might have caused this development; however, there is no reliable data on the intensity of illegal killing available, and hence long-term consequences for the population cannot be assessed. We used an existing spatially-explicit individual-based dispersal and population model to inversely fit mortality probabilities to long-term monitoring data integrating chance observations and telemetry data, while separating other sources of mortality. During phase I the estimated additional mortality ranged between 3–4%, while in phase II it reached ~15-20 %, preventing the animals from colonizing new habitat patches. This corresponds with an approximate number of 9-15 lynx annually as a model result. Up to 8 cases of illegally killed lynx per year are reported from the study area. The probability of extinction in phase II ranged between 13–74%, thereby reaching a tipping point at which additional poaching of few animals could drive the population to extinction. Therefore the highest priority for the conservation of the BFELP should be the prevention of illegal killing in the national parks and their immediate surroundings.

Valuing Nature Conservation: Approaches and Theories from the Social Sciences

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"Nature deficit disorder", a term coined by Louv in 2005, is a serious condition, however, without professional medical acknowledgement. It describes the state in which children as well as adults do not know or care anymore where, for example, milk, cheese, eggs and chicken wings come from. Nature deficit disorder also goes beyond the awareness of food production and the impact it has on nature. It can lead to a lack of understanding about how ecosystems function and, more importantly, insecurity about whether or how they should be 'managed'. One way of approaching this 'disorder' is through nature education, indoors as well as outdoors, and good communication. But how can that be done effectively, publicly and by whom?

In recent years, it became obvious that inter-disciplinary approaches, can play an important role "to raise awareness and motivate people from all walks of life to embrace nature and its values, to facilitate opportunities for all to experience and connect with nature, and to create transformational moments that become pathways to lifelong personal connections and commitments to conservation action" as stated by IUCN in their 'Nature for All' report (2016). Nature education and communication is one of the most important tools to combat ongoing biodiversity loss, but it is increasingly difficult to grasp the attention of millions of media savvy people about a cause that does not appear to impact their everyday lives - yet. Furthermore, environmental issues have to compete in the media with "real problems" such as finding work, health, terrorism and human rights issues.
This presentation draws on existing studies and theories from the social sciences in order to help understand what makes people not only aware, but engage more with environmental issues, such as biodiversity loss and wildlife conservation. These are predominantly from social psychology, in particular environmental and consumer psychology, linguistics, and educational studies. Besides giving an overview of existing evidence-based approaches, e.g. 'storytelling' and nature education from a young age onwards, this presentation discusses the responsibility of educators as well as the role of NGOs and concludes with suggestions regarding how to ensure that society values and understands the need to take action for nature conservation.

Success through integration: Solving the problem of lead intoxication by integrating stakeholders in the research process

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Lead poisoning from hunting ammunition in avian top predators has been a major source of concern over the last decade or so. After the detection of the magnitude of the problem for the White-Tailed Sea Eagle as a model species in Germany, we initiated a workshop where we discussed our scientific findings and hypotheses with all relevant stakeholders. Representatives of hunting organisations, nature conservation agencies, NGOs and ammunition industry actively supported the discussion on questions to be solved to better understand the "lead problem" for raptors. Following this first workshop a joint research project was initiated in which social and natural scientists worked together to better understand the causes and consequences of oral lead intoxication in the eagles. Veterinarians and biologists concentrated on elucidating key issues of the biology of the White-tailed Sea Eagle, such as diet choice, feeding behaviour, home range use and size, habitat use, effects of lead intoxication on population dynamics and the performance of alternative lead-free ammunition. Social scientists analysed information use and attitudes of hunters as well as conflicts between representatives of different interest groups. During the whole project knowledge was quickly transferred to stakeholders by producing printed matters, a webpage, several meetings and workshops. At the final international conference, a joint declaration called upon the relevant ministry in charge to investigate the last remaining questions. These were to support safety related tests of lead-free ammunition and to evaluate eco-toxicological aspects of lead for consumers of shot wildlife meat. The results of these last investigations demonstrated the suitability of lead-free ammunition under hunting conditions with no severe safety related aspects and illustrated the risk of adverse health aspects for consumers eating wildlife meat with contaminated lead particles.

In total the whole process not only achieved a substantial scientific output, it also strongly increased the awareness of the problem amongst all stakeholders. Crucially, it furthered the perception among the involved stakeholders as well as decision makers that an evidence-based approach was the only viable option forward. Nowadays, lead-based rifle bullets are forbidden in four federal states, in forest lands owned by the federal government and in smaller administrative districts such as cities or hunting grounds owned by nature conservation agencies. Project communication accomplished a widespread distribution of the knowledge, challenging the actors in the political realm to implement a lead-free based solution in the rest of Germany and in other European countries. Without the early involvement of relevant stakeholders, this success would not have been possible.

Knowledge in adaptive co-management of White-tailed eagle conflict

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Adaptive co-management is increasingly advocated in natural resource management to reduce complexity and enhance collaboration through joint development, trialling and adapting management actions in a dynamic cycle of learning-by-doing. The approach offers considerable potential in conservation conflicts where such collaborative decision-making processes that foster the exchange of different knowledge, learning and shared responsibilities are thought to deliver sustained outcomes and conflict mitigation. Yet, evidence on its application in conservation conflicts is limited. We address this gap by studying the process of adaptive co-management implemented through cross-scale and multi-level partnerships in a long-term conflict between the re-introduction of White-tailed eagle and sheep farming in Scotland. Combining participant observation, document analysis, and in-depth interviews with members of two existing partnerships, we explore how knowledge co-production is used to address competing claims over the extent of eagle predation of lambs that escalated the conflict.

We analyse the co-production process in relation to four dimensions: knowledge integration, generation, interpretation and application. Preliminary findings indicate that sharing and fairer representation of diverse knowledge improved perceptions on the legitimacy of the management approach that had been dominated by scientific evidence, and enhanced mutual understanding of issues central to the conflict. Whilst local knowledge, previously considered biased and unreliable, was recognised and integrated in jointly formed management plans, efforts to generate new knowledge led to disputes over who had expertise to produce credible and reliable data and interpretation. This reinforced continuing struggles over power imbalances, trust building and transparency. The absence of a monitoring plan reduced opportunities to capture such unintended outcomes of the co-production process, and promote learning and reflection, critical components of adaptive co-management, that could, in turn, improve stakeholders' ability to respond to change and redefine problems. We discuss these findings in the light of broader debates on the importance of collaborative forms of monitoring and practical evaluative frameworks for conflict and adaptive management to help natural resource practitioners develop more appropriate and effective interventions.

Integrating traditional knowledge in conservation of Manas Landscape, India

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Manas National Park (MNP) is a unique protected biodiversity hotspot in the Eastern Himalayas of Assam, India. As a national park the area falls under the legal framework of the Indian Wildlife Protection Act, which restricts extraction of natural resources from inside the park.
The villages around MNP are dominated by the indigenous Bodo tribe. The Bodo are closely associated with the forest, they worship nature with its five elements and they practice a traditional irrigation system. The majority of the Bodo people maintain homestead gardens, containing a high level of agrobiodiversity, and, if managed as defined by traditional knowledge, these gardens also bear the potential for a fuel wood support.

However, with the Bodo agitation in the late 1980s, two decades of civil unrest started, leading to insecurity and extreme poverty of many households. During this time people took advantage of the instable situation, occupied land within MNP or went for timber collection and poaching within the protected area. As a consequence MNP was listed as a World Heritage Site “in Danger” (1992-2011). As the park was easy to access by the fringe villagers people could readily collect natural resources, such as, fuel wood, thatch, reeds, fish, and wild vegetables, leading to a massive degradation of the natural habitats. With the change of the socio political situation and initiatives taken by Bodoland Territorial Council, park authority and non-governmental organisation’s efforts, law enforcement through regular patrolling inside the park has lead to entry restriction of villagers.
Since 2015 the integrated “Manas Tiger Conservation Programme” is being implemented by Aaranyak and partners. It aims at reducing the pressure on Manas through a “push and pull” approach, involving strengthened law enforcement within MNP and the simultaneous provision of livelihood options and conservation education outside the park. Up to now, the project has reached out to 1400 households covering 31 fringe villages through various skill trainings and small scale technical support.

Integrating those community members, who are highly dependant on the natural resources of MNP, is vital for this project. Target communities have been involved in all project phases. In the beginning participatory tools were used to identify major issues and challenges in the villages, followed by a detailed socio-economic survey involving community members. Based on the socio-economic information livelihood interventions were planned. Potential users were asked to incorporate their views, needs and choices, taking into consideration ecological settings and cultural systems. For example women, primarily using fire wood for cooking, participated in developing and designing improved cooking stoves to reduce fuel wood consumption without changing their cooking habits. Selected project beneficiaries have been providing information about their progress on different livelihood options on a weekly basis. Such information are very crucial for taking corrective measures. Furthermore, local communities were involved in developing an action plan to mitigate impacts from access restriction.
Understanding values and traditions of local communities affected by conservation endeavours and understanding the utilization of natural resources by these people is inevitable, if conservation shall be successful in long-term.

Specialization, constraints in snow goose hunting and harvest

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North American snow goose populations are over-abundant. To address this problem the U.S. Fish and Wildlife Service established conservation orders permitting hunters unlimited take during certain periods in winter and spring using previously unlawful methods (i.e., use of electronic calls, unlimited shell capacity, and hunting after sunset). Success of this conservation order in achieving targeted reductions of snow goose populations is a function of hunters' abilities to harvest geese. Understanding factors that determine hunters' participation and harvest during the conservation order is needed. In this study we drew on recreation specialization and constraints theories to conceptualize and measure indicators of snow goose hunting participation and harvest. Data were drawn from a statewide assessment of snow goose hunter harvest in the state of Illinois, USA, conducted following the 2017 spring conservation order hunt (n=871). Data were limited to hunters who participated during the conservation order. Specifically, we hypothesized that snow goose hunting participation, operationalized as number of days hunted during the conservation order, is a function of hunters' psychological involvement in waterfowl hunting, perceived skill as a snow goose hunter, and constraints to participation. In turn we hypothesized that successful snow goose harvest can be modeled as a function of number of days hunting snow geese, involvement, perceived skill, constraints to participation, and use of specialized equipment that facilitates harvest permitted during the conservation order. Following the specialization literature, involvement in waterfowl hunting and perceived skill were found to positively influence hunting participation. While constraints were found to have a negative effect. In turn hunting participation accounted for a substantial proportion of the variance in snow goose harvest. However, subjective skill, perceived constraints, and specialized equipment use all exerted independent effects on snow goose harvest, and accounted for meaningful amounts of variance. Opportunities for fostering participation, increasing harvest, and furthering snow goose conservation efforts are revealed.

Cognitive and affective predictors of risks from wolves

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Wolf populations are growing across the Midwestern United States. Consequently, wildlife managers have been pressed to develop management strategies that address growing public concerns. Understanding the psychological mechanisms that underpin the public's perceived risks from wolves will help to develop strategies that address these risks, and elucidate areas where outreach efforts may shift attitudes. In this study we test a model, rooted in the cognitive hierarchy, examining the psychological antecedents to perceived risks from wolves among residents of Illinois, USA. Specifically, we hypothesize that individuals' perceived risks are function of specific beliefs about wolves, negative affect toward wolves, and underlying wildlife value orientations. Data for this study were drawn from a statewide survey of the Illinois public (n=2,500) conducted from November, 2015 through February, 2016. Hypotheses were tested using structural equation modeling. Results revealed that specific beliefs about wolves and negative affect toward wolves are direct antecedents to perceived risks to humans and animals. Wildlife value orientations were found to predict specific beliefs about wolves and negative affect toward wolves. Negative affect was revealed to predict specific beliefs. Wildlife value orientations were also found to have a direct effect on perceived risks. The model accounted for 54% of the variance in specific beliefs about wolves, 27% of the variance in negative affect, and 33% and 40% of the variance in perceived risks to animals and humans respectively. The results of this study add to a growing body of knowledge surrounding the psychological antecedents to risk, especially the role of emotion in risk perceptions associated with predators.

Management of large carnivores in Norway: legal framework, population goals, carnivore management zones and culling

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The management of protected predators in Norway includes wolf, wolverine, bear, lynx and the golden eagle.

In Norway, lynx, wolverine, bear and wolf are endangered species. The Norwegian management regime for large carnivores varies according to region and area. In some parts of the country large carnivores are prioritised to meet population targets, whilst in other areas sheep and domestic reindeer production are prioritised.

The large carnivores have a natural place in the Norwegian fauna, and it is the task and responsibility of Norwegian nature management authorities to ensure their conservation. Moreover, we budget for considerable sums of money for mitigation measures and payments of damages.

All wildlife management in Norway must comply with the Norwegian Nature Diversity Act. In addition, the management must be carried out within the framework of the Convention on the Conservation of European Wildlife and Natural Habitats. The management must also in accordance with the two by-laws agreed by the Parliament in 2004 and 2011, as well as the parliament's decision on the management of wolves in 2016.

The Norwegian parliament has established national goals for yearly reproduction for the protected predator species:

- 65 litters of lynx
- 39 litters of wolverine
- 13 litters of bear
- 4-6 breeding pairs of wolves, a minimum of 3 packs must have their territory wholly on the Norwegian side of the border. Cross-border packs are counted with a factor of 0.5 (Norwegian/Swedish border)
- 850-1200 pairs of nesting golden eagles

At a national level, the Norwegian Ministry of Climate and Environment has overall responsibility for the management of large carnivores and golden eagles. The Norwegian Environment agency is the competent national authority.

There are eight regional predator management areas. A regional large carnivore committee comprising regional politicians and representatives appointed by of the Sami Parliament manages each one. The regional carnivore committees work with the regional governors and are responsible for meeting the national population targets for each species.

The zoned management of protected predators is key to Norwegian practice. The committees decide which areas are prioritised for grazing livestock and where protected predators will be prioritised. It is

important that each zone is large enough to secure each interest. In the grazing animal zones, there will be a low threshold for culling predators, whilst this threshold is high in the areas prioritised for wildlife.

Population management is carried out through annual culling in order to reach the population goals for each species. It is an absolute requirement that culling must not threaten the survival of the population and where there are other measures that may achieve the same result.

Using Q-methodology for understanding conservation conflicts: common voles in Spanish farmlands

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The importance of social insights in conservation is often underestimated by decision-making and is one of the main obstacles for the implementation of efficient management. Conservation conflicts occur when there exist social tensions due to restricted access to natural resources for conservation purposes, or economic losses generated by some wildlife species of conservation concern. Such conflicts are often highly complex and understanding the viewpoints of the variety stakeholders can be of great help for decision-making. Q-methodology, a framework that stands between qualitative and quantitative social research, providing precision and statistical robustness to explore human subjectivity, is increasingly used in this context. Here, we interviewed 64 farmers, employees of farming associations, conservationists, hunters and agents of the regional government to analyze their views on the problems associated with common vole (*Microtus arvalis*) outbreaks and their management in farmland areas of northwestern Spain. In this area, common voles invaded farmland lowlands in the last 30 years, since when they recurrently experience population outbreaks leading to significant crop damages. How vole outbreaks are managed, including through chemical and mechanical treatments of habitat, has deep conservation implications that are at the root of an important social conflict. Applying Q-methodology, we identified five main discourses about the vole issue. One discourse was built around blaming the position of conservationists and of the government as the root of the problem, minimizing the influence of farmers and the ecological implications of management. A second one focused in seeing the agricultural system as responsible for the vole presence, and on the ecological negative implications of current management. A third one placed emphasis on the communication and empathy limitations between stakeholders. Finally, one outlined that the issue is a matter of public concern that goes beyond agriculture, and the other one highlighted simultaneously the perceived responsibilities of government and conservationists, whilst acknowledging the ecological implications of the management. Farmers had a wide variety of opinions, and the socio-economic classification is not sufficient to determine the type of discourse that one could defend. Interpreting the different viewpoints revealed that the most antagonistic opinions were driven by conservationists and by farmers' syndicates rather than by the majority of farmers or by the cooperatives employees that advise them. The analyses highlight the central position of decision makers along this main conflictual axis, and outline consensus about the lack of cooperation between stakeholders, and about the lack of technical information delivered to the farmers. All discourses shared a rejection of the use of poison as "the only solution" and plaid for more biological control to reduce vole numbers and their damage (i.e. use of birds of prey). These results could be useful to implement future socially accepted management. Through this case study, we promote Q-method as

an efficient tool to investigate human dimensions of wildlife management and thus to help decision-making in any conservation conflict.

Mapping tolerance and risk to manage conflict hotspots

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One of the most pressing and intractable issues for conservation is the mitigation of conflict around the management of carnivores. Large carnivores can have negative impacts on human activities, but their conservation is a priority, given their roles within ecosystems and, often, small and vulnerable populations. Approaches used to handle carnivore conflict management include assessment of what have been called 'conflict hot-spots', by producing spatially explicit models that correlate landscapes attributes with the occurrence of livestock depredation and then map the risks of impacts on humans. However, the use of the term 'conflict' here is misleading, as conflict surrounding carnivore conservation is distinct from typical ecological parameters (e.g. animal behavior, population dynamics, or species richness) in that it is as much a social phenomenon as it is an ecological phenomenon. Missing from this 'conflict hot-spot' approach is a measure of the social aspects of conflict, most notably the attitudes and perceptions of people. Differing beliefs and attitudes towards wildlife and the actions of wildlife held by individuals will influence their perceptions of what is or is not deemed conflict. Fear of carnivores could be an important predictor of the tendency of people to retaliate after a predation event. Here I propose to associate the notion of 'fear' with two measures, tolerance and perception of risk, which are anticipated to vary between individuals. In fact, although the real risk of predation events may be high and frequent, if local actors have a low perception of risk and a high tolerance towards a species, it is unlikely that they will retaliate and come into conflict with the organisations responsible for wildlife management. On the other hand, in communities where the actual risk of predation is low, but the perception of risk is high and the tolerance low, local actors may be inclined to retaliate after a single event of predation. I propose here to redefine what has been called conflict hot-spots. By exploring the meanings of tolerance and perceptions of risk, as well as multiple ways to measure them, I suggest a new approach to include these aspects in spatially explicit models to illustrate a more realistic conflict landscape. This will allow us to prioritize potential conflict zones and guide appropriate conservation management actions. Whilst a high real risk of predation requires the implementation of mitigation measures such as electric fences to protect herds, a high level of fear (high-risk perception and low tolerance) requires more collaborative approaches that address social aspects. In such cases, we need to work with local actors to understand their perceptions and sources of tolerance, enabling us to develop dialogue, educational programs and other tools as appropriate.

Involving affected interest groups in wolf monitoring

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In the intensely used and densely populated cultivated landscape of Lower Saxony, Germany, an efficient management of wildlife species is the basis of a low-conflict coexistence between wildlife and humans. Efficient management requires reliable data.

Since 2011 the return of the conflictual wildlife species wolf (*Canis lupus*) is officially and scientifically documented by the Hunting Association of Lower Saxony (Landesjägerschaft Niedersachsen e.V.). The Hunting Association of Lower Saxony is an accredited nature conservation association and therefore has an unique position in nature conservation issues in Lower Saxony.
The wolf monitoring in Lower Saxony is primarily passive. The reporting of probable wolf presence is done by hunters, trained volunteers or the public. Active measures, for example camera trap monitoring or surveying for wolf feaces, complement the monitoring and help to analyze the local wolf distribution. The documentation according to nationwide standards (SCALP - Status and Conservation of the Alpine Lynx Population) allows national comparability and scientific validity.
The number of wolf monitoring records reported increased with the growing wolf population. The number of 140 reports of probable wolf presence in the monitoring year 2011/2012 increased to 2420 reports in the monitoring year 2016/2017. Since the beginning of wolf monitoring 8237 reports have been processed so far. Out of these reports, 46% came from hunters, 9% from non-hunters and 45% from people who cannot be assigned to either group based on the available information. From these 8237 reports, 2648 reports are categorized as confirmed evidence of wolf presence. Evaluation shows that 64% reports of confirmed evidence of wolf presence was done by hunters, 8% from no-hunters and 28% from people who cannot be assigned to either group based on the available information.

The results show that hunters make a significant and important contribution to the wolf monitoring in Lower Saxony. This is due to the widespread distribution of hunters in the whole of Lower Saxony, as well as local networking of their established associations and their trust in the association to report to. Furthermore the experience of working with the hunters show the value of the support because of their knowledge of the local occurrence of wildlife through their hunting activity. The system in Lower Saxony is exemplary for the fact that for the monitoring of conflicting wildlife species the inclusion of affected interest groups is not only acceptance enhancing but plays an essential role for comprehensive monitoring.

Favouring human-large carnivore coexistence

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Policy and management of large carnivores has shifted dramatically over the last century. Once viewed as vermin, with active attempts at eradication, these species today are protected, or classified as game animals throughout much of the world. How best to conserve these species in an increasingly human-dominated world is an ongoing challenge worldwide. While large carnivores show capabilities to adapt to human-dominated ecosystems, which supports the idea that separation is not a necessary condition for large carnivore conservation, the challenge remains whether human societies can accept and adapt to predator-inhabited landscapes. Here, on one hand, we present multiple cases of large carnivore adaptation to human-dominated landscapes around the world; on the other hand, we argue that favouring coexistence between large carnivores and modern societies requires multiple actions at the institutional, societal and individual levels, in order to legitimate coexistence approaches. These actions include removing or reducing the symbolic values of large carnivores, promoting adaptation of human behaviour to reduce risks and costs of coexisting with large carnivores, and recognizing not only costs, but also benefits of these species. Several elements important to achieving successful carnivore conservation outcomes and keeping a land-sharing model of large carnivore conservation are discussed.

Transforming Complex, Deep-Rooted Conflict: An Orientation Workshop

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Do you have a complex conservation challenge? Is social conflict complicating or impeding your efforts to create positive change? Have you been wondering what Conservation Conflict Transformation (CCT) is all about? This workshop is your chance to get orientated to the theory, principles, and practice of CCT! The Center for Conservation Peacebuilding (CPeace, formerly the Human-Wildlife Conflict Collaboration) offers capacity-building workshops at both 'fundamentals' and 'advanced' levels; each workshop is typically 5 days. This Pathways Europe workshop will provide an introduction to CCT, which draws from diverse disciplines ranging from neurology, psychology, and anthropology to behavioral economics, systems practice, and complexity science. This workshop will also give you an opportunity to explore whether and how CCT is applicable to your conservation challenge and why addressing the deep-rooted, underlying issues of social conflicts around wildlife and conservation issues may be critical to creating a path toward lasting solutions that benefit people and wildlife.

Around the world, conservation conflicts, including so-called "human-wildlife conflicts," are detrimental to livelihoods, community way of life, and conservation efforts alike. (Often, these are conflicts *between* people *about* wildlife.) Regardless of where they occur, social conflicts around conservation issues can erode efforts to promote shared wins between communities, conservationists, and governments. If deep-rooted conflicts are not sufficiently reconciled through strategic process and relationship changes, conservation efforts stall, fail, or regress—or they ultimately falter from the unintended consequences resulting from conservation "wins." CCT provides a way of thinking about, understanding, and addressing such conflicts. In this workshop, CPeace will outline the basics of CCT, giving you an opportunity to explore how it could be applied to your efforts.

As the pioneer and global leader in CCT, CPeace has a proven track record in leading and empowering CCT-integration efforts in a variety of conflicts and at different scales. Originally known as the Human-Wildlife Conflict Collaboration (HWCC), the organization formed in 2006 based on recommendations from conservation, community engagement, and peacebuilding professionals seeking a better way to address intractable conflicts in wildlife conservation. Since then, CPeace has worked to harness, develop, and improve upon best practices, and apply them in ways that have supported thousands of stakeholders, leaders, and practitioners in their efforts to prevent and reconcile conflict. Join us in this workshop to explore how CCT may be of service to you, too!

Wolves in Washington: Insights for Rewilding in Europe

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The Center for Conservation Peacebuilding (CPeace, formerly the Human-Wildlife Conflict Collaboration) serves as a Third Party Neutral in seemingly-intractable conflicts over wildlife. For the last three years, CPeace has intervened in a social conflict over wolves in one of the most polarized states in the USA: Washington. With millions of stakeholders, the social conflict surrounding wolves in Washington state involves numerous and varied constituencies, including livestock producers, conservation organizations, hunters, government agencies, local, state, and national elected officials, scientists, wildlife sanctuaries, community groups, and others. One of the most pronounced schisms in the state is between urban, liberal communities (primarily in Washington's western region) and rural, conservative communities (primarily in the state's east), resulting in a literal left-right divide across the Cascade Mountain Range. However, by engaging in CPeace's Conservation Conflict Transformation (CCT) processes, these constituencies have used wolves as a bridge across that divide by co-developing (along with their government) shared solutions based on mutual respect, earned trust, and a deeper understanding of the needs and values of 'the other.' They have coalesced around and adapted shared policies and legislation, and have expanded beyond wolves to collaboratively address other wildlife, environmental, and social issues in the state.

Similar to Europe, conservation efforts for large carnivores in the USA are characterized by politically-, culturally-, economically-, and symbolically-divisive conflicts. Hallmarks of these conflicts include urban-rural and liberal-conservative divides; vehement disagreement over science and knowledge; a cycle of legal and illegal reactions; feelings of persecution (of communities and wildlife), marginalization, oppression, imposition, power imbalances, anger, frustration, and fear; persistent dehumanization of 'the other'; intra-group conflict that fuels inter-group conflict; and the role of media in the conflict, to name a few.

As many societies progress toward goals of rewilding and coexistence, mutual learning among neighbors may provide insights into how and where we can each improve our understanding, practice, dialogue, and decision-making. This presentation will explore the theories and analyses that shape CPeace's understanding of conservation conflicts locally and globally, as well as provide insights and lessons learned from our intervention work on the conflict over wolves in Washington and results to date from this intervention.

CPeace is a nonprofit organization working globally to transform deep-rooted social conflict in order to create enduring solutions for people and wildlife. Since its inception, CPeace has engaged thousands of stakeholders in social conflicts around gorillas, tigers, elephants, prairie dogs, sharks, wolves, parrots, and many other species. Utilizing CCT theory, processes, and practices in a variety of geographic locations and settings, CPeace has learned invaluable lessons from each conflict. Whether attempting to reduce poaching in Africa or rewild Europe, the principles behind CCT (drawn from numerous disciplines, including neurology, psychology, anthropology, behavioral economics, and systems practice) are applicable and universal.

Refocusing the Concept of Wildlife Value Orientations

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The concept of wildlife value orientations (WVO) was introduced more than 25 years ago to provide a theoretical foundation for understanding the diversity of public interest in fish, wildlife, and their management in North America. Since that time period, it has been applied across Europe, Australia, South America and the U.S. to address a myriad of fish and wildlife issues. In this session, we hope to address current thinking on how the WVO concept has evolved and provide recent findings from a national level project. In particular, the session will provide a systems view of WVO that is a departure from the introductory belief hierarchy concept. WVO are discussed as dynamic, changing slowly over long time periods, but punctuated by abrupt change due to social ecological disruption. The role of anthropomorphism , a universal brain process, provides the foundation for emerging mutualistic WVO. WVO are cast in a multi-level context that encompasses individuals, agencies, and states that move across time with cross-level interactions. It will look at the role of WVO in defining groups that emerge around wildlife issues. The session will be capped by a presentation on how the WVO are useful in a management context. Conceptual advances and management implications will be illustrated using data recently collected for all 50 US states in the *America's Wildlife Values*project. Presentations by members of the *America's Wildlife Values* research team will be followed by a panel discussion that will talk about the need for future research.

Following a Systems View in Understanding Wildlife Values

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This presentation provides the context for other presentations in the session. Prior values concepts have been described as using an "entity approach" in which values are conceptualized as learned beliefs encapsulated and external to the attitudes and behaviors they are theorized to affect. VAB, popularly used in the area of human dimensions of wildlife, illustrates this approach. A systems approach emphasizes values are loosely organized, causally connected meanings, practices, and associated mental processes and responses. Values are not important because they are endorsed by many people in a society, but because they have shaped the cultural system, including social institutions, routines, practices, as well as the material world we inhabit. That is, they are embedded in everything around us. A systems view of values emphasizes they are multi-level, dynamic, and adaptive. This suggests important directions for building upon prior values research which has focused primarily on description of cultural groups or behavioral prediction. First, a multi-level view urges a better understanding of cross level influences. How do groups and organizations form from the interests of individuals and how do these higher levels act as "social beings" to perpetuate their own interests? In particular, how do groups hold influence over individuals? In research we are conducting, we are attempting to understand the values of fish and wildlife organizations, their unifying principles, and control over participants. We are examining whether these organizations change as society's values change. We are also examining the role of group identity as a mechanism that solidifies values among individuals. Values are seen as the result of human adaptation and research suggests that social-environmental provide the impetus for this. We have proposed that, for example, anthropomorphic tendencies, a human universal and early hominid adaptation, is critical in stimulating wildlife value shift in contemporary societies. We are also examining whether wildlife values in the US are associated with the overall normative structure within a social group, whether is strict/tight or relaxed/loose. Tight structures within the U.S. and across countries, have been associated with threatening natural environments. Finally, we are examining the dynamic nature of values, tracking their past and asking whether or not wildlife values are changing due to modernization. In the presentations that follow, we provide findings from the investigations mentioned here and conclude with an overview of why this research tradition has important ramifications for management.

Attitudes towards wolves under different governance systems

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As large carnivore populations are recovering in Europe and recolonizing areas where they have been absent for decades, understanding human conflicts over their management is of paramount importance in order to achieve functional coexistence. In Spain, wolf management is decentralized to the regional level, meaning that the management of different segments of the same wolf population differs considerably across short distances. We studied the social, cultural and political drivers of conflict and coexistence with wolves under different governance systems across the Cantabrian Mountains. We focused on the impact of governance on farmers' and hunters' attitudes towards wolves, and on farmer's adoption of strategies to prevent livestock depredations by wolves. We collected quantitative and qualitative data across four study sites through face to face interviews with a representative sample of livestock farmers and hunters (n=400). The sites were chosen based on the different hunting, damage compensation and land ownership systems in place, representing a spectrum of governance systems ranging from centralized to relatively devolved forms of management. Quantitative measures of attitudes were complemented with a thematic analysis of qualitative data collected from the same respondents as well as from key informants (n=60). The qualitative analysis provides a deeper understanding of the underlying drivers of conflict and explores how local perceptions of rights to land and wildlife use vary across the study sites. Stakeholders' perceptions of wolf hunting and damage compensation systems are discussed within the broader governance context, and notions of equity and justice regarding the distribution of the costs and benefits of wildlife are explored. Our findings support the idea that conflict over large carnivore management is representative of much deeper issues regarding contested access to and ownership of land, notions of sovereignty and of self-determination. Results point to the need to develop management strategies that are culturally sensitive down to a very fine scale and highlight the challenges that this presents, as managers attempt to balance locally specific management strategies with conservation goals and greater public interests. The conclusions we draw are specific to wolf management in the Cantabrian Mountains but they are also relevant to highland Europe at large, where similar trends of depopulation and loss of political influence are taking place, and where the topic of centralized vs. devolved forms of carnivore management is intensely debated.

Conservation through education in remote villages of the Dja Reserve, Cameroon

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The Dja Biosphere Reserve, 526000 ha, is one of the largest protected areas in Cameroon and is home to many wildlife populations including endangered species such as gorilla, chimpanzee and elephant. Many local villages are found in both the reserve and its periphery and the human population is increasing. The villages are remotely located with very limited access to roads. Villagers are poor and rely mostly on forest resources to meet their daily needs. The increasing human pressure on forest resources is threatening wildlife populations, especially with increasing commercial hunting.

Many government schools are abandoned and education of this local population is a huge challenge. The few existing schools are poorly managed; not only is education material lacking but teachers as well. Generations of children grow up in these remote villages without educational knowledge and consequently do not acknowledge the importance of the surrounding natural resources and the urgent need to protect them. Without this educational knowledge, the growing generation turns to rely on forest resources for income, without any possibility for future employment.

Delivering primary school education to villagers of Doumo Pierre, at the northern periphery of the reserve is therefore the aim of the school - “Ecole Jean-Marc Vichard pour les Gorilles” run by Awely, Wildlife and People in collaboration with Projet Grands Singes (PGS) and Centre for Research and Conservation (CRC), Antwerp Zoo. The school was constructed in 2012 and has since then been yielding positive results. Since 2014, the school has recorded the best results in the area, scoring 100% in the four public exams. It is the best primary school so far in the area and has 97 pupils from more than 10 local villages in and around the Dja reserve.

Besides the nationally-recognised primary school syllabus, two environmental educators conduct weekly lessons with pupils to sensitise them on the importance of the tropical forest ecosystem both locally and globally, and on the impacts and consequences of unsustainable forest use. They also initiate alternative income activities with pupils to reduce the human pressure on forest resources. Through pre- and post-tests with pupils we were able to show that this school and its environmental education programme has led to a change in knowledge and attitude towards the forest ecosystem, protected species and conservation activities.

Simultaneously, a nutritional survey with a focus on bushmeat, which was conducted in 2011 and repeated in 2016 with many households in surrounding villages, has also revealed positive trends regarding the use of natural resources in the project area.

The growing evidence of the positive impacts of our simultaneous conservation and education programmes demonstrates the importance and value of including communities in conservation efforts and that investment in the people can lead to benefits to nature.

Drivers of human-wildlife conflicts in Iran's Hyrcanian forests

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Human-wildlife conflicts are a growing problem in Iran and pose a notable challenge to conservation efforts in its Hyrcanian forest region – an important biodiversity hotspot of West Eurasia. Knowing about socio-economic and ecological factors, that may influence conflicts, and biological traits of conflict species helps to identify core conservation challenges and key solutions in this landscape. We surveyed 162 households in 45 villages in six study sites across the Hyrcanian forests to understand drivers of human-wildlife conflicts, people's perceptions and attitudes to these conflicts, and to suggest appropriate conflict mitigation measures. By using generalized linear and generalized linear mixed models, we analysed socio-economic and ecological variables to find key determinants of the main conflict types around seven species of mammals. Wild boar (*Sus scrofa*) and grey wolf (*Canis lupus*) were found to be the primary conflict species in regard to reported levels of severity; and crop loss by wild boars was reported by 97% of households. Analysis shows these conflicts were positively influenced by the variety of cultivated crop species and the size of land under cultivation. Human-wild boar conflicts increased in areas with lower human density, vegetation cover and distance to protected areas. Wolf conflicts were most frequently in the form of sheep attacks (81%) compared to goat (11%) and cattle (8%) attacks. Data shows that the attacks were positively influenced by village and landscape elevation and increased in areas with lower prey richness and those located closer to, or inside, protected areas. Our results show that negative encounters with these species may result in irreplaceable crop and livestock losses across a large-scale landscape. We found that public support to reduce wildlife conflicts as well as compensation payments are lacking and the majority of respondents urgently demanded on governmental assistance to mitigate wildlife conflicts. Mitigation measures applied by farmers, such as physical barriers, are limited in their success and need revision. To properly resolve and manage human-wildlife conflicts on the ground we propose several cost-effective, integrative and adaptive mitigation measures. These include avoiding planting of palatable seasonal crops near protected areas and establishing physical barriers around crop fields to lower large-scale crop damage by wild boars. To reduce livestock predation by wolf, it will be essential to address the restoration of the wild prey community and efficiency of animal husbandry practices. Conflict mitigation approaches should primarily focus on non-lethal control methods as they can offer a proactive and "green" tool to allow the co-existence of farming activities and wildlife. Direct and indirect implications should be used complementarily and require knowledge on species-specific biological traits, stakeholder commitment, capacity building, appropriate law enforcement, operated conservation policies and mutual benefits between conservationists and local farmers.

Gravel pits: recreational conflicts perceived by anglers

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In many areas of Germany, so-called gravel pits - small water bodies (1 – 30 ha of extension) artificially created by excavation of non-renewable natural resources such as sand, clay or gravel - constitute the most numerous lake ecosystems. These novel ecosystems provide secondary habitats for colonization by a diverse natural community of animals and plants, and they provide a wide range of ecosystem services, especially cultural services related to recreation. In Germany, many gravel pits are managed for fisheries by anglers who focus their initiatives on managing fish stocks and littoral zones. Other recreational activities commonly present at gravel pits include swimming/sun bathing, pleasure boating, wildlife viewing and walking. These outdoor recreational activities may reduce the value of the ecosystem service of angling if anglers perceive the presence of other user groups negatively. Our objective was to assess the ecosystem services generated by gravel pits as perceived by anglers, while investigating the (dis)benefits to anglers generated by the presence of endangered biodiversity and other recreational users. To that end, we designed a stated choice experiment (CE) using a novel spatial choice task that described key attributes of possible importance to anglers using visually varying attributes. We invited a random sample of 5,500 anglers from 10 fishing clubs in Lower Saxony to respond to the choice experiment regarding the future management of these lakes (40% response rate). We asked both for discrete preferences and hypothetical allocation of days to the various options to separate preferences from behavioural consequences as perceived by anglers. N = 1900 Respondents preferred lakes hosting abundant forage and predatory fish stocks as well endangered species (both fish and other - aquatic and non-aquatic - species). The perceived utility of the presence of endangered fish was larger than the utility of endangered other organisms, but the presence of endangered non-fish organisms at or around the lake (birds, amphibians etc.) would reduce the use intensity of the lakes by anglers. Regarding recreational uses, a strong potential for conflict especially with bathers was revealed. Also walking around the shores and using pleasure boats on average reduced the quality of gravel pits for anglers, but only the presence of swimmers and pleasure boaters would reduce the actual visitation rates. However, preference heterogeneity was revealed using latent class models in relation to aversion of alternative outdoor recreation uses. Of the three angler types, one expressed a preference towards allowing walking and boating on the small lakes, revealing much more tolerance towards other recreational uses than two other angler classes. Overall, our study suggests that optimizing outdoor recreational experiences for anglers would involve constraining other water body users. Thus, optimizing the total bundle of ecosystem services produced by a landscape of gravel pit lakes probably involves a zoning approach.

Hunters, Hunting, and Wildlife Conservation

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Hunters play a crucial role in wildlife conservation. Hunting is used by federal and state/provincial agencies to manage wildlife species by protecting and maintaining native populations, controlling over-abundant species, limiting crop and property damage, and addressing diseased outbreaks, to name a few examples. We share similar successes and problems with wildlife throughout the world. Hunting provides outdoor recreation to millions of people, contributes millions of dollars and euros to local economies, and provides healthy, sustainable food. This symposium will provide a forum for presentations and discussion surrounding international issues regarding hunters, hunting, and wildlife conservation emphasizing similar problems and successes while highlighting approaches used in different national and regional contexts. The symposium will consist of presentations from researchers, agency managers, and non-governmental organizations representing single nations and from those representing multinational organizations.

Hunters as citizen-scientists: The case of archery deer hunters in Illinois, U.S.A.

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Hunters can play important roles in wildlife conservation beyond managing populations of individual species through harvests. A long-term project in Illinois, begun in 1992, has engaged archery deer hunters to record numbers and species of ten mammals and birds observed during their days afield. This study relies on the same 4,000 archery deer hunters. Hunters were initially selected at random and (to address attrition) replaced with randomly selected hunters when necessary. Observations reported are used in conjunction with other population studies to provide population trends in the state. Through the course of the project hunters' sightings have been consistent with biological field studies denoting trends for bobcat, coyote, white-tailed deer, gray fox, raccoon turkey, and squirrel populations. For example, during the 1992 archery season 1,239 hunters observed an average of .5 bobcats for the year. By 2015 that average had increased to 11.1 bobcats, mirroring the trend in data collected through road kills, radio tracking, and other methods. Conversely, for the 1991 season hunters reported an average of 2.5 gray fox sighted; however, the number sighted during the 2016 season had declined to .3. This decline was reflective of data collected by other means (e.g., trapper harvest, road kill collections). Hunters in this study are providing field reports and are therefore serving in the role of citizens-scientists. Discussion will focus on other roles in which hunters can serve to further wildlife management data collection and program evaluation, and enhance wildlife conservation.

To comply or not to comply? Recreational boaters' compliance with right whales' regulations in the southeastern US

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This study seeks to understand the factors that influence recreational boaters' intentions to comply with a regulation that restricts vessels from approaching and remaining within 460-m of the North Atlantic right whale (*Eubalaena glacialis*). Using the Theory of Planned Behavior (TPB) as a framework, we developed a questionnaire that was mailed to recreational vessel owners using the offshore waters of the southeastern United States, which corresponds with the southern portion of the right whales' calving and nursing grounds. Recreational vessels encompassed 86% of the traffic observed transiting the main inlets in the study area during the winter months (December–March). We conducted analysis using information from 438 questionnaires. Structural equation modeling was used to assess whether the TPB helps to explain the intention to comply with the 460-m rule and to measure the strength of the relationship of the different theoretical constructs being evaluated using composite scores. We found that two constructs of the TPB significantly explained 58% of the intention to comply with the regulation: (1) the more positive one's attitude toward the regulation; and (2) the stronger the belief that other people are complying, the greater the intention to comply with the regulation. Boaters recommended increasing knowledge about whales could improve compliance, but they were divided with respect to increasing fines for violators to increase compliance. This information can be used by managers designing outreach strategies to protect right whales.

Limitations of current policy in Spanish hunting for the conservation of European-Turtle dove

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Halting the decline of European turtle doves (*Streptopelia turtur*) is a great challenge in conservation and sustainable management in the XXI century. The turtle dove is a migrant bird having suffered a severe decline in recent decades, specially marked in the western part of Europe. The birds that use the western flyway to reach the wintering grounds in Africa are susceptible to be hunted in Spain, the country where the greatest amount of turtle doves are hunted within Europe (>900.000 birds shot each year). Additionally, recent analyses suggest that current hunting levels are unsustainable for the species. For this reason, policies regulating the hunting of this species in Spain are especially relevant for the conservation of the species and for sustainable hunting management. Overall, turtle doves may be hunted in Spain from 15 August to end of September. However, hunting policies in Spain are decided at the regional level, so each region can modify general regulations, e.g. determining the start or end date of the hunting season, and the number of hunting days within a week, for each province within the region. Therefore, total number of hunting days in a year, or how many of these hunting days are earlier in the summer, varied across regions and across years for the same region. Since 2007, additionally, various regions have implemented stricter regulations (e.g. implementing daily quotas per hunter) in response to the population declines. We analyzed the effectiveness of hunting policy in reducing the number of turtle dove captures. We used generalized linear mixed models (GLMMs) to compare provincial hunting bags each year (from 2007 to 2015) in relation to the number of hunting days in the hunting season, the number of hunting weekends in August, and before and after the implementation of a daily quota. For this analysis we used the more up-to-date and complete information of annual turtle dove captures per province. We show not significant differences in captures in relation to modifications of the start date of the hunting season, or total number of hunting days. Additionally, no significant differences were found between before and after applying daily quotas per hunter. Our results suggests that none of the hunting policy changes implemented so far seem to reduce the number of turtle dove hunted. The reason for this inefficiency could be that the measures are inadequate for the management of the hunting of this species, or that they have not been implemented adequately, e.g. ensuring the compliance of the regulation. These results are crucial in the context of this species, due to the importance of finding suitable policy changes to regulate hunting and that promote sustainable hunting and conservation of the species, and highlight that it is important to look for better governance to allow the coexistence of hunting and conservation goals.

How far are you willing to go?

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Recreationists are motivated to participate in activities (such as hunting, fishing, wildlife viewing) in preferred settings to realize desired experiences or outcomes. Recreationists have different motivations for conducting their activities such as; excitement, developing or testing skills and abilities, family bonding, enjoyment of nature, or even subsistence. Preferred settings are the biophysical, social and managerial environments in which people seek their desired experiences. Recreationists will have different preferred social situations (ability to have large groups, solitude, family) and different preferences for facilities (developed, primitive) and management (degree of regulation, management presence). Critical attributes of the biophysical setting that recreations may have preferences about include the vegetation cover (forest cover, lake size), the fauna (number, size, species of target hunted/fished/viewed) and other factors including physical access to areas (roads and trails, safe parking). Finally, a critical element is the distance an individual needs to travel to access the recreation setting. The distance to a site impacts the cost and time available to recreate, which are some of the most frequently mentioned constraints to outdoor recreation. This combination of setting attributes and spatial location have implications for frequency of participation and site selection. Therefore, it is critical to understand the recreationists' preferences as a spatially explicit. Understanding systems of recreation opportunities that an individual has to choose from can help us to better frame recreational choices and understand participation rates. Two outdoor recreation surveys were distributed using a modified Tailored Design method. In 2015, 3,000 anglers were asked about their recent (how many in the last year) and past visitation (last 5 years) to Alabama's system of State Lakes. In 2018 (spring) 4,000 hunters were also asked about their recent (within the last year) and past (last 5 years) visitation to Alabama's system of Wildlife Management Areas. Participants were provided a map of the locations of the relevant opportunity settings and were asked about preferences and costs associated with their most recent trip. Analysis is being conducted on participation rates, number of visits to different sites, distances traveled for each trip they took in the last year, setting attributes, expenditures by setting and distance. Regressions will be conducted to determine the most important drivers of site selection; spatial modeling will be conducted to visually express 'draw' to different locations across the state, and economic analysis will be conducted to identify cost thresholds and economic impacts of different settings. In addition to the results of these aforementioned analyses, a comparative distance/attribute/cost analysis of the different activities (hunting and fishing) will be presented.

(Re)Creating identities, place and time through fishing laws

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Many of the rules and assumptions in fishing laws contrast with local traditions. Yet it is still under-researched how local communities respond to them and whether, in turn, the laws are able to create spaces of reflexivity in which new meanings, actions and identities may emerge. A psychosocial model for the analysis of policy-legal frameworks in ecological conservation is presented, characterizing how rules and assumptions in the laws can be considered when examining the dynamics between the policy and the community spheres. As each of these components may be more or less in conflict with current local actions and desires for change, their detailed examination contributes for a better understanding of why support to conservation laws is highly variable within communities and across contexts.

To illustrate this model, a comparative case study design, still uncommon in the literature, is presented. The study examines the sense-making of recent laws regulating fishing practices in two communities with distinct histories of contesting the new fishing laws: a coastal one, where some of the new laws have been successfully contested and changed, and an inland riverine community where the new laws remained unchanged. Interviews (n=34) in two communities in protected areas in the South of Portugal explored the contents and discursive formats used for making sense of the rules (who, where, when people can fish) and and the (epistemic and value-based) assumptions in the laws. The analysis focused specifically (1) on the prevalence, in each community, of accounts of opposition, negotiation and acceptance of the rules and assumptions in the laws; (2) on whether and how local knowledge and norms were mobilized for position-taking.

The findings indicate a higher acceptance of the assumptions of fish scarcity in the laws in the coastal community, while in the inland riverine area the laws are still being debated and negotiated, in a combination of resistance and reflexive questioning to its assumptions. Concerning the rules in the laws, only the definition of closed no-fishing periods had some acceptance in the coastal area. Local norms and knowledge were often used to contest and resist the distinctions created by the rules and to defended old (now illegal) fishing practices as legitimate. Few new actions were presented as already being part of fishers' local norms. Yet, local norms of excessive fishing were sometimes criticized and the limits ruled by the laws endorsed based on local knowledge about the species.
It is discussed how local knowledge and norms are flexible cultural resources of sense making mobilized both for resisting and endorsing specific aspects of fishing laws. This is linked to how laws sometimes are able to create spaces of reflexivity in the community, in which new meanings, actions and identities may emerge. The results suggest also that the debate of the laws in the public sphere (as happened in the coastal area) can lead to a faster integration of policy sphere/science-based assumptions with local knowledge and norms.

When conservation interests of carnivore and prey collide

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The reintroduction preparations of a native wild forest reindeer (Rangifer tarandus fennicus) to its historical range in SW Finland have been started. The world population of only ~4000 individuals of this wild reindeer subspecies dwells in Finland and in Russian Karelia. The most viable Finnish subpopulation in central parts of the country is of reintroduction origin from the 1980s. It has been increasing with varying rate right from the start, and it is now 1450-1500 strong. The original remnant population across the Finland-Russia border, however, has been showing a decreasing trend in the past decades. Research evidence indicates that in the Finnish side of the border the most important proximate causes of mortality are predation and traffic. In Russian side, signs of considerable poaching have been detected. The recently started SW Finland reintroduction is a part of an EU Life project. The procedure includes a five-year period of captive breeding in on-site enclosures during 2017-2021, and soft-releases of offspring and acclimatized adults directly from the enclosures from 2019 on. The costs of this five-year reintroduction effort on two sites are budgeted to be 1 M€, which will be covered with public funds. Extensive analyses of social aspects of the planned reintroduction have been carried out among the local and regional stakeholders prior to the onset of activities, and apparently a consensus among the stakeholders prevails about the importance of the reintroduction. The conservation objective of wild reindeer reintroduction is considered justified among the stakeholders, and the situation appears to be free of conflict. Experts assume that while the number of free-ranging released animals is still critically low, the most severe risk for failure in the reintroduction is going to be predation by large carnivores (particularly wolf), which are strictly protected by the EU Habitats Directive. To manage the predation risk, the Finnish game administration has defined science-based courses of conduct in the national management action plans of large carnivores and of the forest reindeer itself. The action plans describe a need for temporary but effective carnivore control via derogations in and around the reintroduction area, particularly in the beginning of the reintroduction activity. Only recently, however, the first derogation application on preventive removal of a newly established wolf pack (based on Habitats Directive article 16.1.a) in the area was rejected. The wording in the rejecting document imply that an actual threat towards this wild reindeer conservation effort needs to materialize before a derogation can be justified. In other words, irrespective of a very low number of released wild reindeer at the start, and the supposed high risk of predation, preventive control of wolves might not take place beforehand. In addition to describing the status quo of this significant conservation action, the purpose of this presentation is to gather researchers' and managers' view about this arrangement, where conservation interests of carnivore and its prey collide, and where also carnivore conservation and responsible use of public funds are in a collision course.

Evaluation of Macaque Management Policy in Japan

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As a result of recovery of Japanese macaques (Macaca fuscata) in recent years, crop damage by macaques becomes a serious agricultural problem in Japan. As the damage amount reached 1.3 billion yen in 2010, the number of macaques culled has been increasing, which reaches 25,000 macaques culled in a year. To facilitate individual action and cooperation among landowners and local residents, and public support by local governments in terms of crop damage prevention and wildlife control, Ministry of Agriculture, Forestry and Fisheries provides subsidies for municipalities. The subsidies are supposed to be used for setting electric fences, culling macaques with guns and traps, giving a lecture toward landowners and residents, employment wildlife control specialists, and other related purposes. In addition, Ministry of the Environment promote to municipalities to develop a management goal for each macaque troop based on the distribution of macaque troop. However, there is no research proving the validity that those financial support and guidelines by Japanese government are effective in decreasing crop damage by macaques. The purpose of our study is to review the control methods which are valid to decrease crop damages by macaques, while the macaque management policy promoted by Japanese government is in the phase of penetration. We evaluated social factors influencing recent decline of crop damage, using a questionnaire survey for nationwide municipalities conducted by Ministry of the Environment in October 2017. The questionnaire is consisted of categorical variables as to whether each damage prevention methods had implemented or not at each municipalities. We had 762 respondents out of 867 municipalities with macaque troops inhabited, according to the survey 2 years ago. Among the responses, we analyzed 460 municipalities where macaque troops inhabited, using a J48 decision tree. The major findings of this study are as follows: (1) the crop damage has not decreased at the municipality where electric fences are not effectively used; (2) the crop damage has not decreased at the municipality where promote shooting as the method of culling; (3) the tree model indicated that the classification accuracy was high at 93.9% when crop damage has not decreased, while the other was low because classification rules were not insufficient. Our study suggests that priority to use each control methods should be considered in each municipalities as there are many methods for crop damage prevention and macaque control.

People and jaguars (*Panthera onca*) in the Bolivian Amazon: diagnosing the conflict to develop effective outreach strategies

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The Human-Jaguar conflict has been researched in several areas throughout the felid's distribution range, although most frequently with a focus on mitigating depredation on livestock. Here, we present one of the first studies that approach human-jaguar conflict in an area where cattle ranching is only a residual activity, situation that could represent a more "pristine" form of conflict. Understanding behaviours and attitudes in this context could provide important insights on the precursors of conflict between humans and this endangered carnivore. In the Bolivian Amazon, local communities live immersed in the forest and interact with wildlife constantly. We evaluated the conflict between jaguars and people through 528 face-to-face interviews in three different locations: Manuripi National Amazonian Wildlife Reserve, Tacana II Indigenous Territory and Santa Rosa de Abuná Municipality. Using the Likert scale, we evaluated several psychometrics by gender, namely perceptions and beliefs of risk attack, attitudes, emotions and tolerance towards jaguars, and social norms around jaguar killing. We also asked about experience in jaguar killing. We detected significant differences in risk beliefs, risk perceptions, emotions and tolerance between the two genders, with women presenting a higher rate of misbelieves, of perception of jaguar attack, negative emotions and lower tolerance towards the species, while men were more neutral (X2 test, $p<0.05$). Our findings also revealed differences between locations. Although communities at Tacana II and Manuripi Reserve showed lower risk perception their tolerance to the jaguar presence was lower and the prevalence of misbeliefs was higher (X2 test, $p<0.05$). People in Tacana believe that more fellow community members kill jaguars that interviewees in Manuripi and Santa Rosa de Abuná. Of the total number of men interviewed 41% claimed to have killed jaguars in their lifetime. Based on our results, we developed several educational/outreach activities in Manuripi Reserve to address some of the misconceptions about jaguar ecology, the risk of jaguar attacks and jaguar abundance in the area. Post activities survey (51% of the people interviewed for diagnose) revealed increased positive feelings towards jaguars, decreased perception of risk, and tolerance. Nevertheless, behaviour intention (killing jaguar) wasn't significantly different when comparing people that participated in our activities with the one's that didn't. In the end communities identified activities that ultimately would reduce conflict and formally pledge, with a photo, to work in favor of coexistence with the jaguar under an action plan.

Assessing public attitudes towards bears and their management

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Increasing global bear populations and human-bear conflicts have made it more imperative to understand public attitudes towards bears and management interventions. These conflicts can take different forms, including livestock and crop depredation, attacks on humans and pets, and damage to property, and are increasing in frequency due to human encroachment and loss of habitat due to development. Presented with the challenges of weighing conflict and protection of bear populations, wildlife managers employ a variety of management interventions, such as public education initiatives and actions targeting nuisance bear behavior. Attitudes towards management interventions are important in determining whether the public will support such policies, as lack of support can lead to a breakdown in social trust and conflict between the public and managers. To address this need for greater understanding of public attitudes across different scales, we will be conducting a quantitative study in two phases, (1) a meta-analysis examining public attitudes towards bears and their management and human-bear conflict from studies around the world and (2) a survey of students at the University of Wisconsin-Stevens Point (UWSP), as these students will become the next stakeholders and policymakers. The objectives of our study are to (1) synthesize and assess the global differences in public attitudes towards bears and their management and determine the factors associated with these trends, including personal experience with bears, socio-cultural influences, and stakeholder group membership and (2) evaluate university student attitudes towards bears and their management, and compare those attitudes to the meta-analysis results. Stakeholder group membership, personal experience with bears, socio-cultural factors, and residential status are hypothesized to influence attitudes towards bears and their management. The meta-analysis will be conducted using a strict search protocol and coding process to identify relevant primary studies. The survey will sample from the undergraduate and graduate student population at UWSP over a period of several months. Attitudes will be assessed through responses to proposed scenario questions and demographic information will be collected, including major, personal experience with bears, and stakeholder group membership. The results of this study will contribute to the greater body of literature that can be used to inform the best management options for bears and other large carnivores in a particular socio-demographic context.

A paper review of efficacy of decentralized wildlife management using the Wildlife Management Areas Approach in Tanzania.

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Poaching is a common problem in most of Tanzania's Protected Areas. This problem has resulted into dwindling wildlife population and environmental degradation.
In reviewing poaching problem in United Republic of Tanzania respective peer reviewed articles and reports were referenced.

Poaching is partly attributed to the style of Wildlife Management . During the pre-colonial era wildlife management were governed by cultural rituals and norms in which the extraction of some wildlife species was restricted. Despite such restrictions trade in some of Wildlife trophies was allowed. The arrival of colonists changed the style of Wildlife Management by establishing protected areas which were set aside exclusively for big game hunting by the colonists alienating the local communities from accessing and utilizing wildlife resources. In addressing the poaching problem, the government of the United Republic of Tanzania promulgated the Wildlife Policy in 1998 which envisaged at establishing the Community Based Natural Resources Management Projects. Such projects in the Wildlife Sector are termed as Wildlife Management Areas (WMAs). Up to 2012 there were 17 WMAs established with objectives of enhancing community participation in natural resources management, increasing the capacity of community to deliver environment benefits and increased environmental conservation. Reports from the Wildlife Management Areas have revealed positive impacts of their establishment since there has been an increase of area under conservation up to 27,430 km^2 to the total land area under protection for wildlife in Tanzania—a contribution of more than 3% of the country's total land area, increased the number of people working to conserve wildlife nationally.

In conclusion the WMA approach in Tanzania has greatly enhanced environmental, social and economic development. This imply that engagement of multi-stakeholders in biodiversity conservation could greatly enhance biodiversity conservation. However further research is required to assess the efficacy of Wildlife Management Areas in comparison to other community wildlife management initiatives such as Community Conservancies of Namibia.

A paper review of Charcoal Production and Use in Tanzania: Implication of environmental and health burdens and relevant policy options.

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The increased trend of Tanzania's population has posed a huge demand of wood fuel (Charcoal). During its independence in 1961 the population of Tanzania was approximated to be 9 Million. Currently, it is estimated to be 54 Million.
In reviewing the charcoal production and use in Tanzania respective peer reviewed articles and report were referenced.

The demand of charcoal in most households in Tanzania is high. According to the World Bank, it is estimated that 90 percent of Tanzania's energy needs are satisfied through the use of wood fuel including charcoal. The determinant factors for the increased demand of charcoal includes its low price, easiness of transport, distribute and storage, higher calorific value per unit weight, and its resistance against insects and fungi. In Tanzania charcoal is produced in rural areas using Earth Kilns. The raw materials for charcoal production includes dry woodlands comprising *Brachystegia Julbenardia* (miombo) , savanna woodland and Acacia. The charcoal production is mostly conducted by uneducated men and varies between wet and dry seasons. Conversely, consumption areas are urban areas including the city of Dar es Salaam. The improved road network has triggered transportation of charcoal from rural to urban areas.. Despite of being a reliable source of household energy in urban areas in Tanzania, charcoal production and use is accounted for environmental and health burdens.

In Tanzania, charcoal production was responsible for degradation of 29,268 hectares (24.6 %) of closed woodland and deforestation of 23,308 hectares (58 %) of closed woodland and 92761 hectares (50.8%) of open woodland in the catchment area to the west and North of Dar es Salaam that supplied charcoal to Dar es Salaam City. Among the impacts of the forest loss is degradation of water sources, reduction in soil quality and hence decreases in agricultural productivity, damaged habitat, diminishing biodiversity, increase of human wildlife conflict, and reduced sequestration of carbon dioxide by trees. Further to deforestation and forest degradation in health perspective charcoal production is accounted for indoor air pollution.

In conclusion, the contemporary charcoal production and use in Tanzania is unsustainable since it is associated with deforestation. Obviously, there is a need of reversing the status quo by adopting to sustainable environmental policies like the participatory forest management (PFM), reduced emissions from deforestation and forest degradation (REDDs), reforestation program and instigating income generating projects. Moreover, further researches on population increase and energy use as well impact of deforestation to the tropical woodlands should be done.

Why have the wolves migrated to Germany? Socio-political transformations and wolf politics in Poland

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Wolf populations in Central and Eastern Europe are expanding both in terms of their numbers and their range. Recently, there have been accounts of new populations in countries, such as Denmark, where wolves went extinct hundreds of years ago. The literature suggests that this process was facilitated by the EU legislation, favourable changes in land use and improved wildlife governance. However, there has been little attention devoted to the socio-political aspects of wolf expansion. In this paper I investigate strategies, narratives and institutional changes of actors involved in wolf governance in Poland – the first country in Central and Eastern Europe with stable wolf populations to introduce the strict protection of the species and the source country for wolf migration to Germany. Based on the data from semi-structured interviews with key figures involved in decision-making I reconstruct the history of the species in the second half of the 20th century and identify watershed events. I suggest that listing the species as protected in the late 1990s was possible due to the favourable political conditions connected with socio-political transformation started in 1989 and with the prospect of the EU accession. However, agency of environmental NGOs and collaborating natural scientists proved essential for taking advantage of the window of opportunity and for introducing new formal rules, which subsequently contributed to the growth of wolf populations and their migration to Germany.

Stakeholder attitudes towards and wildlife acceptance capacity for elk (*Cervus elaphus*) in Kansas, U.S.A.

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Elk in Kansas were an abundant tallgrass prairie species prior to European settlement. Elk were extirpated in the 1870s and experimentally reintroduced in the late 1980s. After three decades, wild populations continue to be low in spite of good biological conditions. Broad, low stakeholder acceptance, or the perception of low acceptance, is a suspected population limiting factor. This study investigates the attitudes of Kansans towards wildlife and elk acceptance. Wildlife stakeholder acceptance capacity (WSAC) and tolerance models helped to frame results from an internet based survey (n=460) directed to all Kansas counties. Respondents reported high mean positive wildlife values, acceptance for elk population increase, and significantly ($p<0.05$) higher personal acceptance for elk than the level of acceptance they perceived in others. Encountering wild elk in Kansas was unrelated to acceptance but strongly related to providing wildlife habitat on private land. Hunters reported the strongest general wildlife attitudes but this result did not apply to elk acceptance. Intangible benefits (e.g. positive meaningful experiences) strongly affected ($p<0.00$) wildlife attitudes and elk acceptance. Tangible benefits (e.g. money) was unrelated to wildlife values but respondents who reported tangible benefits from four or more wildlife species showed higher acceptance for elk on personal property than groupings based on other variables. WSAC theory suggests social carrying capacity for elk is significantly above the current population and Kansans are more accepting of wildlife than previously thought. Wildlife managers may be encouraged by these results to conduct their own social feasibility study regarding increasing the elk population beyond an experimental level to a more ecologically robust level.

Population estimates and pattern of behavior of Mona Monkeys

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The mona monkeys (*Cercopitecus mona*) of Lekki Conservation Centre Nature Reserve (LCC), Lagos, Nigeria, is of special ecological and touristic interest which confer exceptional prestige of sighting wild animals in a sprawling urban Centre of one of the most populous cities of West Africa. Five censuses of the animal were carried out in the wet season of August 2016 to determine the population of mona monkeys of the reserve as well as to ascertain the extent of interaction within and around the built environment of the animals with the residents around the Centre. Twelve distinct groups of mona monkeys were observed. The estimated number per group ranges from 11 individuals to as much as 32 individuals with a mean group size of 20.3 ±1.9. A total of 247 ± 7 weaned mona monkeys were estimated to be present in the Conservation Centre. Observable features peculiar to the animal at LCC do not suggest that the monkey populations are at risk. Much of the daily activities of the animal were devoted to resting (26%), grooming (14%) and mating (6%). These are evidences of healthy population and a proof that mona monkey populations could continue to grow and be sustained at LCC. The fact that some individuals of the mona monkeys scavenge and at times snatch or ask for food from visitors may not be taken as sufficient proof to establish that there is over-population but such behavior are learned instinct that the animal share with humans as a result of their habituation. However, this is not general to all the groups. Some of the groups found around the southernmost end of the Nature Reserve are still very shy and runaway at the slightest interference of human.

It is therefore important that the monkeys be protected from interacting with humans so as to prevent transmission of diseases from monkeys to man and vice versa.

White-Throated Monkey Perceptions around Okomu National Park

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White-Throated Monkey (WTM) populations like that of most other primate species are faced with threats in all parts their range. This is majorly due to various anthropogenic activities among others. Therefore the need to sustain conservation actions. Despite recent efforts at conservation, the population of this primate species continues to dwindle at a rapid rate in many parts of its known range. Which stretches from Nigeria to Togo in a discontinuous belt. The Okomu National Park (ONP) Nigeria, which was reported as the best location for its conservation WTM in its range, is therefore a good location to assess residents' attitudes to hunting, consumption, crop damage and conservation efforts of stakeholders. Multistage random sampling technique was used in the selection of one hundred and seventy seven (177) respondents who were adult residents in four (4) out of the seventeen (17) communities surrounding ONP.

Majority (58.8%) of respondents were farmers, 45.2% earned monthly incomes of between $255.94 - $501.84. While most respondents (81.36%) knew a neighbor who hunted WTM, 67.8% hunted within their farms, which were mostly located 500-1000m to ONP boundary, 63.2% of respondents hunt throughout the year; however 96.5% were aware of laws prohibiting hunting of WTM. Park Activities (68.1%) was the most common source of information on these laws. Most respondents (84.7%) were willing to stop hunting WTM, though 65% of them consumed WTM, while its preference over other meats was low at 14.8%. Perception of WTM as a major pest of farm produce was high at 75.1% and notable was banana/plantain (46.3%). Respondents were of the opinion that the efforts of individuals (62.2%); communities (89.3%) and ONP Management (63.8%) at conserving WTM were adequate.

Findings in this study suggested that hunting and consumption of white throated monkey was high around Okomu National Park, however many residents were willing to stop hunting the primate species.

Keywords: Anthropogenic activities, protected area, white throated monkey, primate conservation.

Protected areas for local societies well-being

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According to the IUCN definition, protected areas are established for the conservation of particular space, not only because of their natural values or ecological significance, but also as providing variety of environmental, social and economic benefits to people. When justifying the need for nature conservation, environmentalists refer to values, benefits, resources, future generations, well-being and happiness and lately – ecosystem services. Yet, scientific evidence of how local societies perceive benefits from protected areas and their influence on inhabitants' well-being are limited.

We present the results of the 13 participatory mapping workshops completed with the professionals of spatial planning and nature conservation and local communities representatives not professionally involved in nature conservation. The aims of the workshops were to (1) identify "benefits from nature" perceived as the most important for the local societies well-being, (2) identify areas providing those benefits and (3) recognize the differences in perception of those "benefits" between the professionals and local representatives. Our research was performed on five study sites in Poland, covering both Natura 2000 sites and neighboring, unprotected areas within administrative units borders. Study sites were purposively selected to vary in size, landscape and dominant habitats' character, conservation regime, and socio-economic context. At five sites we conducted participatory mapping workshops with local representatives and professionals separately. Participants were asked to identify five "benefits from nature" (out of the list of 25) perceived as crucial for the local societies well-being, and consecutively to sketch the borders of areas providing those benefits. Finally, in three (out of the previous five) study sites we reorganized the participatory mapping workshops, following the same methodology, yet with a mixed group of both, professionals and local representatives working jointly.

Although participants were asked to refer to "benefits from nature", we translated those benefits into various categories of ecosystem services (following the CICES classification). While conservation professionals perceived mostly provisioning (food, water, material provision) and cultural services (experiencing nature, recreation) as important for well-being of local societies, local representatives selected mostly cultural ones (aesthetic values, heritage, experiencing nature). This choice was also reflected in qualitative analyses of interviews. Both groups recognized regulating services (micro-climate regulation, flood protection or mediation of noise). We prepared maps of the five selected benefits for each site and each group. The coverage of the NATURA 2000 areas mapped as providing the "benefits from nature" within the study site varied from 45% in the mountainous study site up to only 7% in the urban study site. Although the local representatives did not easily recognize the idea of „nature as benefits provider", they noticed its cultural value and the importance of regulatory

processes for their own well-being. The experts though often concentrated on technicalities and definitions.

Our study shows how important it is to explore the perception of natural values, benefits and services provided by protected areas, as well as conservation professionals' and local inhabitants' needs concerning those areas. This kind of knowledge is important and useful for comprehensive management of the natural areas, both protected and non-protected.

Threat to Red capped Mangabey in Southwest Nigeria.

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Protected-areas are assumed to be the last refuge for wildlife, yet the uneven competition between wildlife and man for this habitat has been of great concern to conservationists in relation to the continued survival of the animals in their natural habitat. This study used line transect method to assess the extent of human/wildlife conflict within Idanre Forest reserve and Omo Biosphere reserve, Southwest Nigeria. A total of eighteen (18) transects comprising of 9 transects each and totaling 103.4 km were traversed in both Idanre Forest Reserve (52.8 km) and Omo Biosphere Reserve (50.6 km) between January 2014 and November 2015. Data were collected on human activity-encounters in five major categories: Poaching/hunting; Logging; Farming; Collection of Non-Timber Forest Products and Human settlements and analyzed into frequency counts and percentages. The result of encounter-rate observations of human activities shows that Farming was predominant in Idanre Forest reserve withstanding crop, harvested land, farmers seen,bush burning and land clearing at 20.75, 18.32, 14.02, 12.02 and 10.84 observations per kilometer respectively.Poaching/hunting was predominant in Omo Biosphere reserve with animal kill, hunters seen/gunshot heard, spent cartridges, traps/snares and ash deposits/spent batteries seen at 1.11, 0.66,0.23, 0.14 and 0.07 observations per kilometer respectively. These human activities which have implications for habitat loss and degradation were more prevalent in IFR than in OBR. Therefore, it is necessary to step up conservation and protection measures in the reserves to reduce the impact of human activities.

Incorporating social-ecological concepts into flagship species selection: A case study using the North American river otter

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Governmental and private conservation organizations often use flagship species (ambassadorial species that act as rallying points to stimulate conservation awareness and action) to achieve conservation goals. The ability of flagship species to raise awareness, increase knowledge and trigger behavioral changes makes this approach valuable to conservation campaigns, especially during this time of large-scale environmental concerns. The North American river otter (*Lontra canadensis*), a top aquatic predator, has many physical, behavioral and ecological attributes indicative of a flagship species. For example, the river otter has been popularized through media portrayals as being charismatic, cute, and playful. Such portrayals engender public support, interest and awareness of the river otter, which contribute to enhanced recognition that the species has an obligate dependence on healthy aquatic environments. However, because the river otter is a fish-eating predator, it can sometimes elicit negative attitudes among certain stakeholders involved in commercial rearing of fish or angling, potentially diminishing its positive impact as a flagship species. This presentation will provide social science data from fish-rearing facility managers, anglers, and other aquatic recreationists throughout the United States as part of the basis for assessing the virtues and liabilities of using the river otter as a flagship species to promote aquatic conservation in the United States.

Developing Wildlife Management Strategies for Urban Areas

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The majority of all-day human-wildlife interactions take place in urban areas. A broad variety of wildlife species benefit from rich habitat resources in cities and towns worldwide. The close neighbourhood of human affairs and wildlife implies a variety of impacts: On the one hand, human-wildlife conflicts like damages to houses, vehicles and green spaces as well as the risk of zoonotic disease transmission, or even wildlife attacking humans or pets. On the other hand, to many citizens urban wildlife carries aesthetic and emotional value. For many persons, interaction with urban wildlife is the only wildlife interaction they experience in real life and not through media. The role of wildlife management in urban areas is to reduce negative impacts and increase positive impacts of urban wildlife with methods which are accepted by urban societies. To many German communities, urban wildlife management is a new task, since game species are traditionally managed by hunters in rural areas. In this poster, we present the case of the German state Baden-Württemberg, where we developed guidelines for wildlife management in urban areas from 2010 to 2016. We analyzed the initial situation with semi-structured interviews among stakeholders, a telephone survey among citizens of Baden-Württemberg and qualitative analyses of press articles. Results showed that there is a high demand for urban wildlife management, since cases of conflicts were frequent and involved a variety of species. The majority of citizens needed support in case of human-wildlife conflicts, but lacked clear contact persons and available, correct information. Urban wildlife management tasks were not clearly distributed among authorities, and the legal situation was confusing. Basically, urban wildlife management was not on the agenda of urban administrations. In a second step, we organized two subsequent expert workshops in all four administrative districts of Baden-Württemberg with persons involved in urban wildlife management (hunters and hunting authorities, veterinarians, animal welfare groups, conservation authorities, police, etc.) to develop strategies for improving urban wildlife management. We defined the following management goals: educe threats to health and security, reduce damages caused by wildlife, protect wildlife from unnecessary suffering, maintain and improve citizen's experience of nature, support and conserve threatened wildlife species. Workshop participants came to identify five different management aspects, where action should be taken to improve urban wildlife management: Management structures, capacity building, public information, urban habitats and acceptance of wildlife. Based on these results, we developed guidelines for districts and communities in Baden-Württemberg. In a follow-up project, these concepts are implemented in two model regions in Baden-Württemberg until 2019.

Typology of activities among Finnish grouse hunting tourists

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Similar to other recreational activities, hunters include diverse participant subgroups with varying backgrounds, skills and equipment. The available HDW-literature explains their variation, for example, by personal motivation (orientation) and the extent of prior hunting experience. In this study we explore and characterize the variety of grouse hunting tourists' activity-specific styles or behaviors under opportunities provided and resources constrained. We hypothesize that different hunting activity subgroups exist that differs in their personal background, motives, experiences and impacts in the social-ecological hunting landscape. We also assume that hunting tourists' activity styles are associated, in addition to the specific experiences gained in a given trip, to perceived satisfaction with the trip.

We collected survey data among all the Finnish hunting tourists who bought grouse hunting permits to state-owner land in 2017. The response rate after two remainders was 43% (n=5727). We used eight binary responses, each reporting the hunting tactics or technique used, as indicators in latent class analysis (LCA) for defining grouse hunters' activity styles. We used multiple covariates (e.g. variety of demographic variables, hunting region id, extent of lifetime hunting experience and past year activity, and experiences from the last trip associated with the frequency of encountering other hunters or game birds in the field, and with the reported personal bagging of bird(s)) to predict membership in identified segments. We used both the activity styles and it's predictors as independent variables to explain the subgroups' members' level of perceived satisfaction with the most recent hunting trip to state-owned land.

Based on the data, the Finnish grouse hunter tourists could be reasonably identified at minimum into four activity-style-subgroups. We named the largest subgroup (39%), consisting of persons hunting without dog and in solitary or in small-group, as specialized "active grouse-searchers without dog". The second largest subgroup (26%), named as "avid generalists", had a probability higher than 70% to apply at least four technics and tactics, including the active searching of game birds by walking, or in contrast, standing with or without decoys around the black grouse lekking (display) sites. Other two major subgroups were specialized to actively searching for the game birds on the hunting ground with certain breed of dogs (namely "hunters with pointing dogs" (18%) or "hunters with spitz-type dogs" (17%).

The prevalence of the two subgroups that specialized to hunting with dogs showed distinctive regional pattern. As hypothesized, there existed also many characteristics in the hunters' background and experiences distinct from all the other subgroups. The extent that activity style subgroups perceived the last grouse hunting trip to state land as satisfactory showed differences, but varied only to minor extent between the subgroups.

The results demonstrate the diversity and the context-specificity for the prevalence of the hunter activity types. The subgroups identified varied in their probability for encountering other hunters and game birds, and also bagging birds. The results indicate that subgrouping of hunting styles may serve valuable information in attempting to meet the Finnish tourists' needs and ensuring of the sustainable harvesting in the state land.

Amur tiger conservation practices on the Russian Far East: Cooperation of Government Agencies and Civil Society Organizations

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The Amur tiger is the world most northern sub-species of tigers. In the early 19th century, the animal was present in most of the Far Eastern regions in Russia, as well as in the Greater Khingan Mountains and west Wandanshan Mountains in China. Due to unregulated hunting and poaching, Amur tigers were significantly extirpated across the most of its range, until a total ban on tiger hunting was introduced in Russia in 1947 and massive restoration activities were launched in Russia in the 1950-s and later in China. Currently, the Amur tiger population has restored its previous range across Sikhote-Alin in Russia and in the forested areas of Heilongjiang and Jilin Provinces in China. The latest entire range Tiger census in 2015 (organized once every 10 years) showed that the population has increased to as many as 540 animals in Russia (WWF 2015). However, there still remain threats to the species' survival, such as poaching; natural habitat degradation and destruction, exacerbated by prey depletion. The talk will focus on general Amur tiger conservation measures taken in Russia, focusing on the problem of tiger poaching and trade in Russia and China, as well as measures taken in both countries to address the problem. Successful collaboration of law enforcement and nature conservation agencies among themselves and with the local nature protection civil society organizations is the key to successful conservation of the Amur Tiger population.

What is wild? Narratives in conservation policy

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While there are many initiatives and ongoing policy programs to protect or restore wildlife, there is no common agreement on what and how should be protected or restored. Yet, every conservation initiative relates (often implicitly) its goals to the normative vision of what is a 'natural' or 'wild' state, it also usually specifies what actions should be taken to reach the given goals. So, does 'wilderness' imply or should imply protecting biophysical characteristics of the land or the autonomy of natural processes? And which conservation interventions should be undertaken by societies to efficiently protect wild nature?

Actors at a policy arena have many different answers for these questions stemming from their different ideas of wilderness. The role of ideas (referred to as beliefs, ideologies, paradigms) is, along with power, crucial in policy processes and outcomes. Persuasion and arguments articulating the ideas are the key tools used by policy participants in the policy processes, especially when the scientific evidence is inconclusive or incomplete which is often the case in nature conservation policy.
The poster provides a theoretical background on the role of ideas in shaping policy processes in the context of nature conservation and management. More importantly, it is intended to foster a discussion on how conservation scientists understand the notion of wild nature. The poster is planned as an interactive space to elicit the ideas on what wild nature means to conference participants. What are the determinants of wilderness? How public policy should address the need to protect wild nature – namely, which interventions are needed, and which are too intruding or far-reaching? The plurality of answers for these questions given by conference participants during the poster session might be a first step to reflect on the directions and means of conservation policy. It will also provide a valuable input into a preliminary phase of the authors' research project on beliefs and narratives among people involved in nature conservation. Lastly, the poster content and final, co-created form will illustrate the significance of social science research input in designing wildlife management and explaining to date failures or successes.

Collective psychological ownership in large carnivore conflicts

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The theoretical concept of psychological ownership has been introduced to large carnivore management to improve the understanding of conservation conflict situations. We examined the emergence of collective psychological ownership among established stakeholders in large carnivore conflicts; conservationists, hunters and primary producers. The journal articles of these stakeholders were collected from the three three-year periods; 1993-1995, 2003-2005 and 2013-2015 to reveal the manifestation of three routes leading to the feeling of psychological ownership, i.e. controlling the target, gaining intimate knowledge of it, and investing oneself in it. These three time-periods enable the comparison of the manifestation of PO in different normative and legislative surroundings. We could show via media texts how stakeholders supported and strengthened these routes that build up the sense of collective psychological ownership towards large carnivores. In the second phase, we examined how psychological ownership manifested in media texts in conflict situations. Primary producers supported the psychological ownership of hunters whereas PO of hunters and PO of conservationists were in conflict. Hunters and conservationists expressed defensive territorial behavior and knowledge hoarding to retain control over wolves and to maintain group's wolf related identity. This has impeded cooperation and hindered conservation efforts. Whose ownership feelings are respected and supported by laws and norms is ultimately a political choice. It has to be noted, though, that laws and norms may just be brakes or challenges but not actual barriers to developing or maintaining psychological ownership towards species.

Returning wolves in the European Alps. A threat for outdoor recreation and tourism?

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Wolf density has been steadily increasing in Europe in recent decades (Chapron et al., 2014). Due to the strict legal protection regulations by the European Habitat directive (Annex II and IV) wolves extend their habitat into areas where they were considered extinct for more than hundred years. Currently individual wolves from different source populations in and around the Alpine region regularly immigrate to Austria. A habitat suitability analysis for Austria (Georgy 2011) shows that suitable habitats for the wolve exist. Beside these individual wolves, in 2016, after more than 100 years, a reproducing couple was found again in Austria for the first time, producing four young wolves in the military training area Allentsteig in Lower Austria (Kubitschka 2017).

The returning wolves are a challenge for the traditional alpine land use. Especially alpine farming is affected. Every year more than 300,000 cattle, 100,000 sheep, 10,000 goats and 8,800 horses are on more than 8,000 pastures in Austria (Obweger 2017). For wolves, these livestock represent a relatively easy prey, which is why various herd protection measures and compensation models are discussed. In addition to economic impacts on hunting, some anticipate that wolves could impact tourism in the Alps. which is a main source of income in the Alps. Possible encounters with wolves, as well as livestock protection dogs, may elicit fear -ultimately impacting visitation behavior. Some experts also expect indirect negative effects on tourism by landscape change, if alpine pasture might be abandoned in the future.

The presented results will focus on behavioral intentions and the likelihood of behavioral changes. The findings are based on a representative online questionnaire for Austria about outdoor recreation activities and destination choices. The main method is a choice experiment, embedded into the questionnaire. This allows us e.g. to differenciate between the proved existance of wolves, the likelihood of its presence or its absence on destination choice.

Finally we also asked the respondents about prefered management options and spatial concepts.

Literature

Chapron G, et al. 2014. Recovery of large carnivores in Europe's modern human-dominated landscapes. Science 346: 1517-1519

Georgy N. 2011. Habitateignung und Management für den Wolf (*Canis lupus*) in Österreich. Masterarbeit, Institut für Wildbiologie und Jagdwirtschaft, Universität für Bodenkultur Wien.

Kubitschka C. 2017. Der Wolf im Waldviertel am Truppenübungsplatz Allentsteig. In: Höhere Bundeslehr- und Forschungsanstalt für Landwirtschaft Raumberg-Gumpenstein (Hrsg.) Bericht über die 23. Österreichische Jägertagung 2017 zum Thema Naturnutzung zwischen Wunsch und Wirklichkeit – Wo stehen Wild und Jagd?: 25-28

Obweger J. 2017. Großraubwild aus der Sicht der Almwirtschaft. In: Höhere Bundeslehr- und Forschungsanstalt für Landwirtschaft Raumberg-Gumpenstein (Hrsg.) Bericht über die 23.Österreichische Jägertagung 2017 zum Thema Naturnutzung zwischen Wunsch und Wirklichkeit – Wo stehen Wild und Jagd?: 37-38

Ethno-Geographical Relation to Wildlife Crime in Nepal: Analysis of Case Reported in National Print Media

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The wildlife crime has escalated rapidly, which is one of the most serious threats for survival of globally threatened species. There are very few studies about illegal wildlife trade in Nepal, where media related study is virtually none. Hence, the reported cases of the wildlife crime on national print media i.e. Kantipur and Gorkhapatra of the last five years in Nepal were collated to understand coverage of wildlife crime in Nepal. The study followed the content analysis methods on analysis of information. Altogether 193 wildlife crime cases were recorded over the last five years in two national print media where 370 individuals including 30 foreigners were involved. The dominance suspected group involving in the crime are of Janajati mostly Tamang, and followed by Chhetri, Bramin, Madeshi, Dalit and Chepang. Tatopani-Sindhupalchok, Kimathanka-Sankhuwasabha, and Tinkar-Darchula boarders are frequently used as an exit point for illegal wildlife trade in North where as Chadani Dodhara-Kanchanpur border in southern belt. The coverage of wildlife related news in print media is very low; only 2 cases/month; and received less importance. The media are not in the forefront to report wildlife related crimes and does not remain in their priority reporting too. Media personnel should be sensitized to increase their attention towards conservation issues so that wildlife authorities can implement wildlife laws effectively to mitigate wildlife crime in Nepal.

Conflicts between horse owners and wolves in Lower Saxony, Germany

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Lower Saxony became the first of the „old states" of Germany to be reinhabited by wolves in 2006. While their return to Germany's eastern states went smoothly for horse keepers, it triggered controversial discussions in Lower Saxony where more than 200,000 often valuable horses are kept. Equestrianism and breeding are economically important in rural areas. Even if there wasn't a single proved incident in Lower Saxony so far, fear and reservations run high.

A survey of the horse keeper's attitudes towards wolves was undertaken in a joint venture by the governing body of Lower Saxony breeder's associations, Germany's Nature and Biodiversity Conservation Union (NABU) and Hildesheim University. The goal of the study was to contribute towards a conflict-free coexistence of horses and wolves. A moderator led three focus groups hosting 11 persons from the target group. The transcripts were utilised for a qualitative content analysis. An online questionnaire based on those results was later distributed to the target group.

Results: Focus groups

The majority has all in all accepted the return of wolves but sees a potential for conflicts in regard to their horse keeping practice and fears incidents in the future. Others doubt the compatibility of the cultural landscape with the habitat requirements of wolves. A minority strongly opposes any wolf presence. In general, there is a strong reservation against political decision makers, nature conservation associations and the current management of wolves. Many horse keepers feel themselves powerless, having no say within the political decision making processes. Some even suspect that the comeback of the wolves is part of a hidden political agenda to further undermine already weakened rural regions. The horse keepers mostly fear panic reactions on pastures and riding outs and accidents when horses escape from pastures. Direct attacks of wolves on horses are seen as less a problem.

Questionnaires

Overall, 1390 questionnaires were completed. About half of the respondents have positive attitudes towards wolves, view them as a gain for the native fauna and ascribe wolves an important role within the ecosystem. The other half views the comeback not as any gain, but as a threat for horse keeping and a danger for humans alike. Independent of their attitudes towards wolves, the respondents share some strong opinions: Political decision makers lack an understanding of rural every-day life and city dwellers lost their connectedness to country living. There also was strong support for the statement that the wolf management in Lower Saxony is insufficient. In general, the respondents view politics, the wolf management and the relationship between urbanites and the rural population equally sceptical. The target group has a strong rural identity and isolates themselves from urbanites.

Self-initiative solutions are seen sceptically and it is called upon the state instead. Since there is a strong distrust against other stakeholders, the established communication channels are insufficient and new concepts are needed. New ways for safeguarding domestic animals and the state's practice of financial compensation play a pivotal role for a broader wolf acceptance.

Volunteers promote wolf and livestock coexistence

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Wolves pose problems for livestock farmers, especially when returning after being absent for long periods of time because traditional defence mechanisms against wolf attacks as livestock guardian dogs or shepherds aren't in use anymore. Wolves made their first reappearance in Lower Saxony, Germany in 2008 and have since then established themselves quite quickly, forming 14 reproducing wolf packs, 2 territorial pairs and 1 residential individual to the end of 2017. Although the government of Lower Saxony reacted to the new situation by establishing the so-called 'Wolfsbüro' in 2015 and appointed roughly one hundred voluntary wolf consultants, the now statewide presence of wolves and the sheer size of Lower Saxony with several ten thousands of livestock farmers and hobby keepers calls for broader societal assistance to safeguard wolves and grazing livestock alike. The new livestock protection programme -'Herdenschutz Niedersachsen'- of Lower Saxony's Nature and Biodiversity Conservation Union (NABU) supports livestock farmers from hobbyists to full-time breeders by providing volunteers to assist them when protective measures against wolf attacks on livestock are necessary. This new form of collaboration between two groups often at odds when nature conservation is concerned was examined during its start in 2017. Semi-structured interviews were conducted with 9 sheep farmers (hobbyist, sideline to full-time breeders) and 10 participating volunteers (WikiWolves, NABU). Volunteers in general are attracted by wolves but see livestock farmers as a group especially threatened by their return. They see their personal engagement rewarded by practical work in the open and positive outdoor and group experiences. Sheep farmers feel especially threatened by wolves. Some see their way of living jeopardized and obliged by society to cope with the returning wolves even when they personally wish otherwise. Wolves mean a new hardship for them in their everyday work as livestock owners. Especially hobbyists appreciate the help by volunteers whereas full-time sheep farmers see themselves both as individualistic and highly specialised. This self-conception combined with unpredictable daily working routines leads them to doubt the success of volunteer programmes as mitigation strategy for their extra work due to wolves. The ongoing challenge of volunteer programmes will be to balance volunteer motivation and positive rewards from their work with sheep farmer's demands and often negative disposition in regard to the future of sheep farming in general and especially under wolf presence.

Economic value of river conservation in four countries

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Ecosystems and biodiversity produce benefits to society, but many of them are hard to quantify. For example, it is unclear whether European societies gain (non-market) benefits from experiencing rivers that are in a good ecological status. Without such knowledge, investments of scarce resources into ecological river restoration programs are difficult to justify. The objective of this study was to reveal how the public of different European countries perceive and value ecological characteristics of domestic rivers and their potential improvements as long-term outcomes of hypothetical river basin management plans designed to improve river ecosystems according to the European Water Framework Directive (WFD). To that end, we conducted a web-based discrete choice experiment among the general populations in two pairs of biogeographically similar countries (Norway and Sweden vs. Germany and France; n=1,000 per country). We found that non-biological river attributes (increased accessibility of the river banks, improved bathing water quality, decreased river fragmentation due to dams) increased river utility in these countries as indicated by positive willingness-to-pay (WTP). By contrast, the fish species occurring in a river contributed differently to a river's utility in each of the countries. Native species, particularly salmonids, were preferred in Germany, Norway and Sweden, while non-native salmonids also generated utility in Scandinavia. The abundance of a particular species and the degree of native biodiversity additionally increased the benefits derived from domestic rivers. Hypothetical river development scenarios focussing on fisheries for native salmonids and on ecosystem conservation produced societal benefits in all four countries, although Scandinavians benefitted more than the French and German citizens. A scenario focusing on hydroelectricity production generated the lowest utility in all countries. Our results show that ecological river restoration produces societal benefits in the four European countries, though more through managing non-biological river attributes than through restoring species or conserving river biodiversity.

Flexibility in reindeer husbandry to carnivore governance in Nordland, northern Norway

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This paper investigates how changes in pastoral access and flexibility affect the adaptive capacity within reindeer husbandry in Nordland, northern Norway. Large carnivores (wolf, brown bear, wolverine, lynx, golden eagle) that historically inhabited mountain regions were almost eradicated by the beginning of the 20th century. These populations have dramatically increased again in Fenno-Scandinavia due to international and national commitments towards protecting large carnivores. Moreover, climate change has increasingly locked winter pastures for reindeer during the past 30-50 years. Presently, the Carnivore Management Plan for the Nordland region is under revision. The national government expects this revision to harmonize conflicting interests, expressed in a 'double objective' of safeguarding sustainable carnivore populations, and maintaining local pastoralist livelihoods. 'Clear zoning' is defined as the basic management instrument – to achieve established 'population goals' for carnivores. Still, increased carnivore pressure together with a rapidly changing context of encroachment from urbanization, mining and infrastructure such as railways and roads is reducing the ability of herders to handle the pressing challenge of climate change.

In this study, we analyse how these cumulative effects impact upon reindeer herders' flexibility and pastoral mobility. In the analysis, we examine the existing, official reindeer land use maps and compare these to the reindeer herders' accounts and perspectives, drawing on their knowledge to visualize lost pastures, migration- and herding routes. We draw on observations, interviews, focus groups, participatory mapping and document studies.

Large carnivores: Local dimensions, management solutions and dilemmas

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Conservation designations protecting large carnivores have been a success in terms of a strong increase in carnivore numbers and an extension of their range in Europe after 100 years of near extinction. This conservation success raises dilemmas and challenges. In their absence, agriculture have adapted to a more or less carnivore-free environment with lifestyles, livestock and economies dependent on a low degree of carnivore pressures.

The dilemmas involve questions of rural sustainability, indigenous aspects such as Sámi reindeer herding; it involves ideologies and policies concerning the rural as wilderness and arena for rewilding processes, versus the rural as countryside, cultural and worked landscapes, and the potential of developing rural economies. Foremost it involves how conservation strategies, management and attached conflicts are played out locally, and how to maintain or develop legitimacy for policies, management, and trust. Legitimacy and trust relate closely to issues of knowledge production, and acknowledgement of the different life worlds and ways of life that are challenged or vigorated in the situation of increasing numbers of carnivores. In a European context bears, wolves, lynx and wolverines, and also eagles, are the focus, but the related conflicts, dilemmas, governance and management issues are relevant across many contexts.

The session is divided into two subtopics: a) Local Dimensions and b) Solutions through management and governance, and encourages a variety of methodological approaches and aspects such as:

a) Local Dimensions, focusing on controversy and local experience of living with large carnivores

What are the experiences of living with the majority's decision making and international obligations on the local level? What adaptation strategies do varios actors choose? How do local conflicts relate to place, identity and power relations*?* Threats, heated public speech and harassment is part of conflicts related to large carnivores. What role does local or collective psychological ownership play, what is their importance for resistance*?* How could they be understood and how could they possibly be handled to develop constructive strategies for communication, co-existence, cooperation and management? We also welcome papers that investigate connections between carnivores and overall development patterns, structural changes, spatial effects, and future perspectives of land use and local communities in carnivore affected communities.

b) Solutions through management and governance. Experiences with how to handle conflicts and solution outcome

Experiences of central versus combined, local governance and management approaches. Governance as top-down or collaboration strategies? What may transboundary approaches to population management and stakeholder engagement imply, and what are the impacts?

What are effectiveness and perceived legitimacy of various forms of adaptation and mitigation measures applied in different countries and contexts when it comes to eg adaptive capacity of livestock owners, and potential for co-existence between people and wildlife?

How can different knowledge systems – local/indigenous/experience based knowledge along with scientific knowledge be better integrated in both management and research? Mapping, conservation designations and borders, are often powerful tools, empowering the dominating worldviews. How can we improve methods for doing so? Best practices on large carnivore management and conflict resolution – what do they entail?

Differences in the support of Eurasian Lynx reintroduction in Lower Saxony between non-hunters and the hunting community

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The Eurasian Lynx (*Lynx lynx*) has been reintroduced to the Harz National Park region in Lower Saxony since 2000. For more than a decade, the population has reproduces successfully and now slowly disperses to other regions. This trend preceded ed the return of the wolf by several years, moreover lynx presence appears to be much more covert. Nevertheless, the return of a predator does not come unnoticed among those communities who spend a lot of time outdoors - the hunters. The state hunting association of Lower Saxony with its 53,000 members is a cooperating partner of the lynx reintroduction project.

Given the potential moral conflict between looking for an optimal hunting experience while having to adapt to the presence of a competitor - large carnivores have been absent to Germany for more than 100 years - this research focused on three key research questions:

1. Are there differences in the public support for lynx reintroduction when comparing the hunting community with the general public? Among hunters, is there also a difference in support when comparing those hunting in lynx territory with those who are hunting elsewhere?
2. What are the main impairments hunters either perceive or actually are affected by given the lynx presence in their hunting territory?
3. What solutions can be found to mitigate these potential conflicts and how can communication about the lynx project be improved? Are hunters even perceived as conservation protagonists in this context?

To answer these and other questions, on online survey was conducted in February and March 2013. The total sample size of completed surveys with a Lower Saxon postal code was n = 1,196 of which 425 participants were actual hunters. Overall attitudes towards the lynx and support for its reintroduction are mainly positive among both sample groups, but with the non-hunting group expressing an even higher support.

Among the drawbacks perceived from lynx presence, diminution of a positive hunting experience and the potential impact on the roe deer population - the lynx' main prey and hunters' "bread and butter" game were most commonly mentioned by more than half of the hunters queried. In addition, many hunters feared that they would have increased problems to fulfill their local game management plan requirements.

In regards to the general perception of the lynx reintroduction project, the hunters' association's involvement and contribution to the project was the least know of all project partners.
In conclusion, the survey demonstrates that in spite of potential negative impacts on traditional hunting, support for the lynx reintroduction is high among the hunting community. Not surprisingly, it

is even higher among non-hunters. Several of the potential conflicts may be addressed through intensified communication with affected hunters, especially when using peer-to-peer formats. Long-term monitoring needs to address potential decreases in hunting yields and consequences for leaseholds. Project communication needs to put a better focus on hunters' contributions to conservation.

Lynx, barkbeetle and forest dynamics: Five years of visitor perceptions on Harz National Park conservation objectives

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Harz National Park lies in Northern Germany and is adjacent to the Pathways Europe 2018 site. Since its designation in 1990, conservation objectives and visitor management in the park have been often subject to a heated controversy. Bark beetles have taken over forest management from the foresters in the park's core zone and are introducing changing forest dynamics which are contradicting the traditional view of a German forest by national park visitors. The lynx has been successfully reintroduced to an area where predators other than hunters have been absent for well over a century.

Between 2011 and 2015, various research undertakings in an international context funded through the EU's Erasmus Lifelong Learning Programme have focused on the interactions between Harz National Park management (and managers) and the general public, mainly the visitors to the park. In this organized session, selected results from various studies will be presented by several participants of these efforts. The session will be in a 90-minute format and include these four presentations:

1. Introduction to natural resource management at Harz National Park and its conflict potentials - Eick von Ruschkowski, Arne Arnberger, Robert Burns & Thomas E. Fish
2. Visual impacts of bark-beetle infested forests on recreation - Arne Arnberger, Ingrid Schneider, Stuart Cottrell, Eick von Ruschkowski, Robert Venette, Stephanie Snyder & Paul Gobster
3. Differences in the support of Eurasian Lynx reintroduction in Lower Saxony between non-hunters and the hunting community - Eick von Ruschkowski
4. Visitor perceptions on Harz National Park management objectives - Thomas Fish, Robert Burns, Arne Arnberger & Eick von Ruschkowski

The remainder of the session time will be used to engage in a discussion with Harz National Park managers on the necessities for human dimensions-related research to improve park management. There may be another presentation submitted by Harz National Park, we would then extend the session from 90 to 120 minutes.

Mapping the conflict of raptor conservation and recreational shooting in the Batumi Bottleneck, Republic of Georgia

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Illegal use of natural resources threatens biodiversity and often leads to conservation conflicts between affected parties. Such a conflict is emerging in the Batumi Bottleneck in the Republic of Georgia, where every autumn more than one million migrating birds of prey funnel above a handful of villages. This spectacle attracts not only birdwatchers and ornithologists from around the world, but also local people with shotguns. Knowledge about the illegal autumn hunting of raptors here is still emerging, and there is no appropriate policy and practice in place to manage the situation. As a first step towards resolving this conflict, utilising semi-structured interviews, we mapped the goals and opinions of relevant stakeholders associated with raptor migration in the bottleneck. Our results show that most stakeholders, except some local hunters, are on common ground considering the shooting unacceptable, but articulate different preferences concerning a solution, which hinged on issues of institutional and enforcement issues. The responses of many interviewed hunters diverged greatly from those of other stakeholders, and were analysed separately in more depth. We found that hunters (1) largely see raptor hunting as a source of amusement and food; (2) distinguish raptors only on higher taxonomic groups, and not on species level; and (3) prioritise shooting larger and/or lighter coloured birds. The most urgent issues to be addressed via conservation actions are the wide scale lack of awareness of the conflict, the potential loss of species, and the risk of conflict escalation.

Climate change responses of Mediterranean fishes: Fishers' knowledge

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Climate change is driving species ranges toward the poles, with substantial consequences on the structure and the functioning of marine communities. These changes are partially documented in the Mediterranean Sea, a semi-enclosed and densely populated marine region, which urgently needs social and ecological information to appropriately conceive adaptation and mitigation measures. Here we present the results of a local ecological knowledge (LEK) survey aimed to investigate climate-related responses of Mediterranean fishes, in terms of spatial-temporal changes of abundance and distribution. The study was developed in 79 Mediterranean locations from 11 countries. Using a previously tested semi-structured questionnaire, 726 fishers were interviewed by asking the following main questions: *what fish species increased in abundance in the last decades? Can you reconstruct your yearly catches for each of these species?* The species whose abundance was perceived in increase (i.e. including new species arrived for the first time) were annotated and then fishers` perceptions on their yearly historical catches were reported in ranks (0-5) building a species-specific time series ranging from 1970 to 2016. Time series were subsequently analysed using breakpoint analysis to highlight years of significant structural changes. Overall, a total of 589 fishers (81%) answered that at least one species increased its abundance in the last decades, for a total of 1325 observations across 79 taxa. Non indigenous species of tropical origin represented 33% of observations (13 taxa in total), whilst indigenous species which already showed signs of northward expansion represented 52% of observations (20 taxa in total). Interestingly, in the North-western Mediterranean areas, perceived increases in abundances are mostly related to indigenous thermophilic taxa, whilst South-western areas are mostly characterized by the increase of non-indigenous species. Breakpoint analyses indicated significant positive breaks (i.e. sharp increases in perceived abundance) in 66% of time series across 48 taxa. Results indicated clear spatial-temporal dynamics of northwards expansion in species such as the bluefish *Pomatomus saltatrix* and the yellowmouth barracuda *Sphyraena viridensis*. For example, fishers reported a sharp increase of *P. saltatrix* in the Northwest of Sardinia around 1998 whilst in the north Adriatic Sea, such increase is reported only eleven years later (2009). A similar pattern emerged for *S. viridensis*, in fact the increase in its abundance between the Sicily strait and the North Tyrrhenian has been perceived with a delay of 12 years (i.e. from 1995 to 2007, respectively). The coherence and magnitude of these perceived signals provide a clear evidence of large scale responses of the Mediterranean biota, and agree with the expected consequences of climate change. It should be also highlighted that, the local ecological knowledge approach demonstrated to be effective in collecting data across different countries with considerable cultural diversities, demonstrating that LEK surveys can be successfully applied beyond the local scale, consolidating a standard methodology for monitoring current biotic responses to climate change.

Hunting's contribution to biodiversity conservation in Europe

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Hunting is a highly popular form of nature recreation, an activity enjoyed by approximately 7 million people in Europe. It is one of the oldest forms of consumptive use of renewable natural resources and provides significant social, cultural, economic and environmental benefits in different regions of Europe. In order to gain an understanding of the contribution of hunting to biodiversity conservation in Europe, the European Federation for Hunting and Conservation (FACE) established the Biodiversity Manifesto (BDM). Along with promoting FACE's position or 'manifesto' on sustainable hunting and conservation, the BDM relies on an online survey to gather information on hunting related-conservation projects throughout Europe. This presentation aims to provide an overview of the 300+ hunting-related conservation already captured in the BDM in terms of their geographic distribution, the types of actions undertaken, the habitats and species engaged with, and the stakeholders involved. It will attempt to demonstrate how these projects contribute to current EU and international policy goals including by discussing, for example, the types and quantity of projects undertaken within protected areas and those which contribute to the conservation of threatened species. The paper will conclude with a set of recommendations on how to better understand and promote the contribution of hunting to biodiversity conservation in Europe.

Long-term engagement for citizen science and conservation: Bird counters in the Wadden Sea

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The world heritage site Wadden Sea is the largest intertidal soft sediment wetland in the world. It is an essential stop-over site for long distant migratory birds on their journeys between Africa and the Arctic. Furthermore, this wetland is an important breeding and wintering site for birds. It is estimated that yearly 10 – 12 million birds visit this wetland. Counting birds in the Wadden Sea by volunteers has a long tradition, starting with estimating breeding bird numbers at the beginning of the 20th century. In 1980, a system of coordinated migratory bird count for the whole Wadden Sea was initiated, involving over the years c. 3000 amateur and professional counters for covering a coastline of 500 km length. This long-term programme with massive involvement of volunteers is the largest citizen science program in the Wadden Sea and compares to other successful long-term programmes like WeBS by the BTO in Great Britain. It has enabled the calculation of long-term trends in bird numbers, which are extremely important for the conservation of the area. The results are fed into science, as well as the conservation and management of the area.

The intensive experience as volunteer bird counter or as volunteer warden, partly organised in programmes like alternative civilian service or voluntary year of environmental service results in a long-term engagement for the conservation of the Wadden Sea. In Lower Saxony, which coastline comprises 1/3 of the Wadden Sea, a self organised network, Watt°N, was established, which keeps former volunteers the opportunity to stay in close contact with the area. The network is of mutual benefit for members and the management of the Wadden Sea National Park. Network members continue to contribute to conservation activities and in many cases to bird counts.

To inform the public and further interested citizens on the importance of the Wadden Sea for migratory birds, each October a large bird festivity, the migratory bird days, spanning 10 days with more than 250 events is organised by the Lower Saxon Wadden Sea National Park Authority. Volunteer bird counters contribute to these events, bringing their enthusiasm for birds and nature to visitors and grab people's attention for the conservation of the area.

In all, volunteers have a big impact on the conservation of the Wadden Sea, have a big contribution to bird monitoring. Important is a good feedback and acknowledgement by the management agencies and giving the opportunity for intensive nature experience in a conservation context.

Civilian service as support in livestock damage prevention

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Young Swiss males, who don't want to serve the military have the possibility to do civilian service instead. Most civilian services are carried out in the health- and social sector as well as in environmental protection. Since this alternative becomes more and more popular and the served time is 1.5 times the military service, there are many hours to be filled with a good purpose.

Since 2010 young men can also do some time of their service for AGRIDEA, which coordinates assignments on alpine pastures, which need extra workers due to predation pressure. Especially of course from May until mid-October, farmers and alpine herdsmen are desperate for help.

Service time is between two and six months, but the assignments on the alps can vary between couple of days and a couple of weeks. Civilian servers assist the farmers and herdsmen mainly with fence set-up, -maintenance and -break down, checking the flocks, feeding the guardian dogs or clearing shrubs. Urgent help is often needed when using night pens, after predation attacks.

Experience on alpine pastures or special expertise is not necessary. But a good physical condition, flexibility and knowing two Swiss languages is desired. Interested men apply at AGRIDEA during the winter and have to do a three-day course on assisting a herdsmen organized by VösA (association for an ecological and safe alpine pasture management). Before sent up the mountains, they also have to do a short hands-on training at a farm with livestock guardian dogs. Coordination and administration is done by AGRIDEA, but the farmers have to pay for board and lodging. They are also responsible for sound work instructions. The person doing the civil service is required to list his works in a specification sheet and he and the farmer have to sign a work agreement beforehand.

In 2017 only four men did their civil service with AGRIDEA, which adds up to 288 served days. This is far less than the years before (i.e. 2016 with 7 servers and over 500 days), but 2018 is again more popular. Requests from farmers and herdsmen are always rising, since for them it is cheap support in hard times. A small survey has also shown, that they are very pleased with their work. All farmers were always or mostly content with the young men's help, effort, motivation, reliability, flexibility, punctuality and knowledge. Very rarely, the physical and mental condition was a problem in the rough alpine terrain, and one farmer said he wished the helper worked more autonomously.

European wildcat protection - Connecting habitats and people

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The restoration of Central Europe's network of wildlife corridors is one of the most significant challenges for nature conservation. The environmental NGO Bund für Umwelt und Naturschutz Deutschland (BUND/ Friends of the Earth Germany) initiated a comprehensive project on biotope networking called "The Safety Net for the European Wildcat" in 2004. The ambitious aim of the project is to establish a continuous forest network throughout Germany. Isolated forests are reconnected by planting trees and bushes alongside suitable corridor routes. Although the wildcat (*Felis silvestris silvestris*) is the target species of the initiative many other species benefit, thereby improving the stability of entire forest ecosystems. Today the BUND has implemented 23 green corridors in five federal states and is currently working on several more. Another focus of the project is to establish a nationwide genetic database for the wildcat in collaboration with the Senckenberg Institute in Gelnhausen. Wooden sticks treated with valerian serve as lures, attracting wildcats to leave some hair for genetic analysis. So far, the database contains almost 2900 samples of more than 800 individual wildcats – a unique data treasure of worldwide relevance. Based on this genetic data it is possible to draw inferences about migratory movements, the impact of landscape barriers on the animals and most urgent regions for new corridors.

Central factor for the success of the project is the participation and support of a broad variety of people – stakeholders as well as volunteers. The implementation of corridors implicates a high potential for conflicts with land users due to the high competition for land by further infrastructural development, agriculture and nature conservation. Therefore, the basic prerequisite is a good collaboration among nature conservationists, the public authorities, landowners, farmers and hunters. To achieve this, all concerned stakeholders are actively involved in the discussions from the outset and a steady dialogue is established. In the context of the genetic monitoring of wildcats numerous people dedicated to the European wildcat have been connected by the BUND. Focus of commitment is the involvement of volunteers in the supervision of lure sticks and the collection of hair samples. With more than 52,000 inspections of lure sticks, more than 800 people have contributed to the genetic database so far. The participation of voluntary nature conservationists in this research is an applied example of "citizen science". In 2016 an evaluation of the involvement of volunteers engaged in wildcat monitoring was conducted with the aim to investigate the motivations, findings and experiences of the volunteers and to derive success factors for comparable projects. The survey verified that the interest in science was the most important motivation factor for voluntary involvement in this project. Therefore the communication about the positive impact of voluntary commitment and the scientific results was significant for the participants. Furthermore, a well-designed framework for participation and the availability of responsible persons was of special importance for the volunteers

Detection of TBE-virus in the European hedgehog

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European hedgehogs (*Erinaceus europaeus*) are often infested by ticks, leading to the conclusion that they can also carry tick-borne pathogens, which may not only be relevant to the health of the animals, but may also pose a zoonotic risk. In Switzerland, tick-borne encephalitis (TBE) is an important zoonotic disease caused by the flavivirus tick-borne encephalitis-virus (TBEV). Not much is known about its presence in hedgehogs. In this study, 65 European hedgehogs (*Erinaceus europaeus*) and its ticks were analysed in order to receive first indications on the presence of TBEV in this species. For the detection of viral RNA, lungs, liver, spleen and kidney of 56 hedgehogs as well as 114 ticks were analysed by real-time RT-PCR while antibodies were measured in 19 serum samples using an ELISA. The present study detected for the first time antibodies against TBEV in an European hedgehog (*Erinaceus europaeus*). The lung and spleen of the same animal were weak-positive for viral RNA. In addition, the affected hedgehog showed neurological symptoms. The virus could not be detected in any of the ticks.

Rise and Fall: 12 Years Experiences from Co-Management of Large Carnivores in Germany

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Large Carnivores challenge the political system in many countries. Divergent values and a high media interest in the issue regularly overcharge the capacity and the competences of responsible administrations. Adaptive Co-Management is often suggested by scholars as the academic answer to the existing dilemmas of the bureaucracy. Anyhow in many administrations other role models have a long tradition and are well represented and trained. New participatory approaches compete with the established self-concept of bureaucracy: to struggle for power and resources.

The authors facilitated and evaluated for twelve years an approach of co-management of lynx and wolf in Germany. The process was evaluated regularly based on a feedback system, open for participants and empirical studies, carried out by academics from different disciplines. The presentation summarizes personal insight in the facilitation process and empirical data from different studies that have been carried out in the last years on this case. The evaluation design includes interviews with stakeholders on the participatory process, group discussions with farmers and hunters, interviews with volunteers in the monitoring system (Citizen Science) and a survey among the broader public. Most of the studies are based on theories on risk perception and risk management, offering useful concepts for the analysis and the facilitation process. They document the options of common learning processes and the high acceptance of co-management approaches among most of the NGOs, even if their field of interest is diverse. Some state actors challenge the process because of their problems to act as a reliable partner.

Based on this multiple perspectives the authors describe and explain the rise, the decline and the reestablishment of a co-management system for large carnivores. Several conclusions on success and failure of co-management approaches are drawn.

Evidence for participatory community conservation approaches in Nepal

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The conservation of shrinking natural habitats and biodiversity, through the establishment and protection of National Parks is the backbone of today's nature conservation. However, due to a competition for land and natural resources, conflicts with local people can occur. This is the case especially in areas where people have a long tradition in using natural resources from their surrounding environment, and alternatives to this utilization are rare.

Such a situation is found in the Suklaphanta National Park, in the lowlands of Nepal. The intensive collection of fire wood and the overgrazing by free ranging cattle, inside the National Park is causing massive threats to the forest and grassland ecosystems. To decrease the anthropogenic pressure on the National Park, and at the same time create viable alternatives for community members being strongly dependent on these natural resources, a community-based conservation approach was established by a collaboration of international and national conservation organizations in 2010. Besides contributing to local livelihood development and providing conservation education, one aim of this project was to decrease the extraction of fire wood from the National Park. Therefore, improved, energy efficient cooking stoves, as well as small biogas plants were installed in selected target groups.

To provide evidence for the success of the project, socio-economic surveys were executed on a household and User Group level. To analyse the achievement of this attempt, target and control groups were interviewed in 2010, before interventions were started, and again in 2016, after five years of project activities. The findings of the User Group surveys identified a decrease in the fire wood consumption by 27.9%. The collection of fire wood from the National Park declined by 48.95%, which can additionally be verified by the outcome of the household levelled surveys ($p < 2.2e^{-16}$). An increase of improved cooking stove installations, implicated by the execution of the project, could be the reason for these declines. Yet, the evaluated growth in liquid petroleum gas (LPG) use and fire wood rates, supplied by private lands and markets, are also potential causes. Surprisingly, the use of biogas by the target groups decreased, which again could be linked to an increased use in LPG. In control groups the identified trends were mostly similar as in target groups, yet less distinctive.
As an overall conclusion it can be stated, that the project was effective in reducing the use of fire wood and increasing the use of more sustainable cooking devices. However, in socio-economic systems multiple factors influence the choice of people, and results cannot be attributed to the project activities, only. Furthermore, the influence of the project may not only be limited to the selected target groups, as knowledge is being passed on independently. Further evaluation of project outcomes and behavioral changes may shade a light on such side effects.

Citizen science: Wolf monitoring involving volunteers provides important results

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After an absence of 150 years, the wolf returned to the German federal state of Lower Saxony in 2008. By the end of 2017, 14 reproducing packs, two territorial pairs and one residential individual were confirmed by the "wolf bureau", an office established by the state government/ministry of environment. Confirmation was based on records found by a standardised wolf sign monitoring methodology. Records were obtained passively by specially trained local wolf advisors and hunters (in Lower Saxony the state hunting association is tasked with maintaining the official wolf sign database). In 2017, citizen science NGO Biosphere Expeditions, the state wolf bureau and NABU (Nature and Conservation Union) started a cooperation to provide international citizen scientists for active monitoring of wolf sign and to supplement the existing database. A total of 49 citizen scientists actively monitored the state for wolf signs from 17 June to 21 July 2017. In total 1,100 km were covered on public footpaths and bridleways, which is where wolves also like to walk, patrol and mark their territories. All signs found were recorded following the strict scientific protocol of the state's official wolf monitoring programme. Over the course of four weeks almost 80 wolf scats and as many other wolf signs again were found and passed onto the wolf bureau for further dietary and DNA analysis, thereby significantly boosting the official database. The project serves as a showcase of how international citizen scientists can make a significant contribution to regional wildlife conservation efforts.

How to resurrect big wildlife in Northern Germany!?

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Between Hamburg Metropolitan Region and Denmark is the home of Stiftung Naturschutz Schleswig-Holstein, Germany's largest Nature Conservation Foundation owning > 2 % of the whole federal state. Schleswig-Holsteins landscape is intensively used, highly dissected by major traffic routes and very poor of (semi-)natural areas, especially in the southern part. Here large mammals with a high conflict potential are present but mostly within fragmented populations (red deer) or recently re-establishing (wolves, beaver and otter). There are ongoing high public investments for the improvement and re-connection of their habitats, e.g. by means of the construction of fauna passages over motorways and the installation of habitat corridors: From 2006 on six fauna bridges were realised and different projects funded by the Federal Agency for Nature Conservation (BfN) were conducted to optimize and connect habitats surrounding three of the fauna bridges. Today we very well know, what must be done and how much money must be spent for the defragmentation of landscapes as a key management strategy for the survival of big wildlife:

- The installation of fauna passages at the most important places is needed, each of them costs 2.5 – 5 Mio €.
- The purchase or at least protection of land and additional conservation actions are needed to optimize and reconnect habitats for most demanding species, according to our experiences it costs at least another 1 Mio € at each fauna passage.
- Information of local society is essential for the increase of acceptance and finally for the willingness to sell private land for conservation purposes.

In the northern part of the federal state the nature conservation foundation owns several thousand hectares of semi-natural biotopes and re-wildering areas being surrounded by farmland and forests, where large mammals can cause serious damages. In this region big wildlife was completely extinct for many decades and only very recently started to recover. We believe here the resurrection of big wildlife is less depending on investments into habitats, but more depending on the management of society as well the spatio-temporal regulation of wildlife populations:

- Investments are needed into stakeholder's acceptance and social attitude towards changes in parts of their home landscapes ("from rural to re-wildering areas"). Intensive collaboration between most relevant stakeholders, in our case hunters association, state forestry and nature conservation foundation have formed a project group with a common projects aim.
- The scientific database for the spatio-temporal habitat demands of mainly red deer is needed and as an output there must be a large-scale master plan to enable both, the prevention of arable land from damages, as well as the survival and migration of big wildlife inside and through cultural landscapes.
- A widely accepted and commonly implemented small-scaled population management and hunting plan must be developed to safeguard especially a) the minimum viable population sizes

of wildlife b) the supply of year-round habitat demands c) the functioning population regulation by means of hunting d) the usage of red deer's bio-engineer services e) the overall acceptance of the new role of wilderness in formerly used landscapes.

The Virtues and Liabilities of Using Otters as Flagships for Aquatic Conservation

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A "flagship" is defined as a species that possesses charismatic qualities that can promote conservation awareness and facilitate conservation action. Flagship species are likened to wildlife icons, specifically within the ecotourism industry, and often have high positive public profiles. For a species to be an effective flagship of their local environment, the perceptions and attitudes of local stakeholders and visiting tourists towards that species must be positive. A charismatic species that receives support from far-removed stakeholders but engenders local ambivalent attitudes may not serve as an effective flagship species for stimulating local conservation efforts. The world's 13 species of otters are distributed among 5 continents, are dependent on aquatic environments, and several of these species are known to be popular with the public and important to local ecotourism industries. However, predation of fish by otters is sometimes viewed by anglers in local communities as detrimental to the fish populations and thus a threat to their livelihood. In fact, conflict between otters and recreational anglers is becoming a substantial conservation concern for recovering populations in Europe, but is also becoming an increasing topic with other otter species in other regions of the world. Further, negative interactions of otters by fish-rearing industries can also promote negative attitudes, and contribute to an "adversarial flagship." Speakers in this session will examine the overall value and concerns of otters to serve as flagships ("Ambassadors for Aquatic Conservation") by reviewing the criteria necessary for a species to serve as an effective flagship and critically assess these criteria within the context of otters serving as flagships to promote aquatic conservation. Examples will be used from all 13 otter species, some of which are already serving as flagships, and some species that have not been recognized for such purpose but seemingly possess qualities of a flagship, and circumstances where otter conflicts with humans may hinder further development of otters as flagships. Speakers are experts in otter conservation versed with all the world's otter species.

Eurasian Otters in Scotland, Spotted-necked Otters in Africa, and River Otters in North America: Cultural and Institutional Differences and Commonalities in these Species Serving as Ambassadors for Aquatic Conservation

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Worldwide thirteen species of otters respectively define a variety of ecological niches in aquatic habitats. The role of otters as a top predator in aquatic ecosystems, widespread distribution, and the perception of them being attractive and possessing a playful, appealing nature are characteristics that seemingly equate well to them being an ideal flagship species to promote aquatic conservation. However, human perceptions of the virtues of a species may vary considerably within and among cultures, or among species possessing seemingly similar characteristics. Comparisons of perceptions about otters rarely have been conducted, especially in the context of assessing their potential as flagships. We developed a five-element conceptual model for assessing and developing the potential for otters to serve as flagships. We assess the model based on comparison of an integration of sociological and ecological studies of three species of otters from disparate areas in the world: the Eurasian otter in Scotland; the spotted-necked otter in Rubondo Island National Park, Tanzania, and North American river otter in Pennsylvania, USA. We compare commonalities and disparities in the virtues and liabilities of the conceptual model for application in developing the respective otters as aquatic flagships.

Stakeholder characterization in a human-carnivore context

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The return of the wolf (*Canis lupus*) in Germany is leading to conflicts between humans and large carnivores that result in contesting views on conservation management actions. Successful conservation management depends on a profound understanding of human-carnivore relations to increase acceptance and reduce conflicts. One of the first steps required to understand human-carnivore relations is to determine and characterize those social actors having a stake or interest in carnivore management or may be affected by carnivore populations and by current policies regarding carnivores.

In this study, we aim to identify and classify relevant social actors involved in human-carnivore relations by conducting semi-structured interviews and following a data saturation approach. The study-site, Lüneburger Heide in Northern Germany, is a densely populated region facing recent return of wolves. This leads to numerous conflicts, such as attacks to livestock and pets. In this work-in-progress, we apply the importance-influence matrix commonly used in business-oriented research of actor analysis to a human-carnivore context. In doing so, we consider not only 'influence on wolf management actions', but also attitudes towards wolves, personal affection, related emotions and cross-scale patterns. The results are expected to shed light on actors' opinions as well as behaviour and decisions regarding existing wolf management.

Preliminary analysis has revealed that the different social actors identified in Lüneburger Heide have contested attitudes towards the return of wolves. The unequal influence distribution in shaping wolf management as well as across spatial scales increase the tensions to be reduced by policies and dialogue. Structured results from stakeholder analysis in human-carnivore research can contribute to improved carnivore management, by providing new insights for conflict resolution and support for the design of management actions, that equally account for contested interests.

How do local conflicts relate to place, identity and power relations?

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The recovery of the Scandinavian wolf population continuous to be contested. Although the population is steadily increasing and policy actions are taken to minimize social conflicts, current management continuous to be characterized by multiple competing interests and values, polarization among actors, political and social distrust, as well as ideological attributes and factions. Using the controversial case of wolf presence as an example it will be d iscussed how collectively shared and transmitted memories of past generations (e.g., stories of how wolves could cause starvation, by attacking and killing a crofter's only cow) as well as social and cultural constructions of the landscape, place, and identity linger beside the implementation of political strategies for the enhancement of biodiversity, for example, protective measures and a legislative framework for preserving the wolf. Through the results of participant observations and semi-structured interviews undertaken in situ or over the phone (with people living in wolf areas, administrators, managers, politicians, stakeholder representatives), survey data, and document analysis, it will be highlighted how environmental controversies must be approached as continuously reflecting immanent social, cultural, and political norms and values.

Why participate? Stakeholder perspectives and interpretations

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Until the middle of the 19th century, there were large populations of the four mammalian carnivores – brown bear, wolverine, lynx and wolf – throughout much of Fennoscandia. All four species were, however, persistently hunted, and bounties were paid to encourage hunting. As a result, by the 1960s, large parts of the populations were almost exterminated or profoundly reduced. Today, the populations are increasing but their presence highly disputed by certain stakeholder groups and environmental collaborative measures are implemented to deal with conflicting goals and encourage shared responsibility, exchange of perspectives, experiences and knowledge, and mutual learning. This study of collaborative governance in large carnivore management explores the motivations for participating. It explores the tangible and associative values of those concerned and involved, and the circulating discourses, multiple contestations and regimes of power enacted and confirmed within. The study, implemented using qualitative methods, takes departure in how the mobilization of a broader array of state and non-state actors in dealing with issues of collective concern and seeking acceptable outcomes, stages tensions, agendas and values of the parties involved. Conflicting views about merits or short-comings of certain programs and policies have to be negotiated, and the dialogue process as built around circulating discourses, multiple contestations and regimes of power. To highlight the flow and content of ideas, concepts and threads of meaning communicated in the participatory forums, anthropological theory building emphasizing the plurality of meanings in policy work will be employed.

Hunting in Late Modernity

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Hunters are considered crucial stakeholders in wildlife management in many countries. In North-America and some European countries, hunting is seen as an important management tool and hunting fees provide revenue for agencies. In North America in particular, participation in hunting has decreased in recent years, causing concern about agency funding as well as the future of hunting as a tool for management.

However, decreasing participation is only one of the changes that affect hunting in modern societies, and other changes may be just as consequential for wildlife management and conservation. For centuries, subsistence hunting has been paralleled by (and sometimes in conflict with) recreational hunting by nobility and eventually a wealthy upper class. While this is a long-standing dualism, a crucial change in post-WW2 developed nations has been an almost total shift away from satisfying subsistence needs to all hunters being recreationally motivated. To hunting critics, this means hunting has become "a brutal anachronism that has outlived its utility". The subject of this session/panel will be the coping responses by contemporary hunters in the face of their increasingly challenged activity, and the ways in which they utilize hunting in collective identity projects inherent in late modernity. Modernization is not only changing the character of hunting, but brings with it new globalization influences, ranging from global biodiversity conservation policies, commodification of wildlife to the influx of new demographics in the hunting community.

Significantly, hunters respond to the challenges of modernity in unanticipated ways, and it is these responses we are interested in interrogating. Hunters come from diverse social and cultural backgrounds, and hunting may be embedded in a corresponding variety of sociocultural contexts. Like many other activities, hunting as production of social meaning can be divided e.g. along lines of class and rurality. In some contexts, for example, hunting communities have responded to modernization by re-asserting traditional identities, defensive localism and exhibiting forms of everyday resistance toward the state and broader society. This could be seen as a form of "infrapolitics". Illegal hunting may be one extreme instance of such resistance.

Modernization forces affect hunters not only from the outside; *within* the hunting institution hunters cope with the changing contours of hunting by imparting divisions among themselves resulting in sub-groupings, stereotyping, peer policing and 'internal' politics. Various forms of hunting may support different identity projects, rooted in different social and cultural contexts. Notably, as hunting has been detached from its role as a form of material production to now fulfilling late-modern society's range of socio-psychological needs of self-realization, leisure and spirituality, hunters face emerging trends of cosmopolitan hunting, canned hunting, 'urban outsiders' desiring fast action, rising lease costs on land, influx of new technology that increasingly shifts the balance of fair chase between the hunter and the quarry and more. They result in new and diverse politics, social identities and attitudes

regarding wildlife. We argue this has profound implications on the role of hunting in modern societies, and consequently for the role of hunters in wildlife management and nature conservation.

Hunting as defiant subculture

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Hunting has been an important activity for many working-class men in rural Norway. Paradoxically, hunting has emerged as a staple element in male working-class (WC) culture mainly after WW2, when the subsistence element gradually lost its significance, and leisure activities generally gained importance because of more leisure time, better economy, and better access to hunting on private land. From the 1970s onwards, traditional male working-class culture has seen its material base in the production sector shrink and crumble, and the leisure sphere has taken on increased significance for the reproduction of a WC culture – including an element of resistance against a hegemonic and incessantly expanding middle-class culture. As has been elegantly shown in British studies of youth subcultures, this is by no means an exclusively rural phenomenon. However, in rural areas the middle-class (MC) cultural expansion also entails new perspectives on nature as a resource base and arena for consumptive leisure activities like hunting, adding to the pressure on traditional male WC culture. Consequently, we see indications that some hunting milieus develop the characteristics of defiant subcultures, and not only in typically rural areas. As a striking parallel to the British subculture studies from decades ago, we have seen in our research that young men with a WC background cherish the aspects of hunting that links to the traditional male WC culture. It is typically informal, collective, has a certain element of physical machismo, and represents a "productivist" perspective on human relations to nature. It entails the mastery of tools like guns, GPS-units and even dogs. Young hunters have expressed a deep admiration for their fathers and other male relatives and their lifestyle, and exposed a strong sense of continuity across generations, unlike the popular notions of class-less, reflexive identity projects in the "post-industrial" era. Hunting may form a bridge to the disappearing culture of physical resource extraction. The intrusive cultural influx of the modern MC with its government and media power base then triggers various forms of *cultural resistance*. Cultural resistance is not launched openly against institutionalized power, nor does it normally imply a desire for fundamental social change. It should rather be seen as a struggle for autonomy – to be able to realize a preferred lifestyle and cultivate the worldview that goes with it, in the face of political correctness and MC values. It may also entail forms of everyday resistance toward the state and social groups perceived as powerful and threatening. This could be seen as a form of "infrapolitics", borrowing a term for James C. Scott. Illegal hunting, e.g. of large carnivores, may be one extreme instance of such resistance, but other, less dramatic, forms of non-compliance are more common. Yet, even if a degree of autonomy is achieved, it seldom leads to influence outside the cultural (lifestyle) realm, and hunting subcultures – and male WC culture generally – may be caught in a downward spiral where autonomy (as detachment) leads to more marginalization, and where resistance may become more desperate, and thus dangerous.

Feeding Ecology of Wolves (*Canis lupus*) in Lower Saxony, Germany

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It is obvious, that successful coexistence of large carnivores with human populations is particularly challenging, where the animals have been absent after extirpation for decades, where ecosystems are strongly modified by humans and where the latter have lost adaptions for coexistence.
The return of large carnivores to modern and cultivated landscapes, as you find them particular in Europe, is not only complicated by emotional, political and socioeconomic interests - making the management of large carnivore populations challenging - but also controversial. One of the main disputed topics is the diet of large carnivores.

Dietary studies yield qualitative and quantitative information about the actual prey spectrum and therefore contribute to the substantiation of the discussion and a mitigation of the “human-large carnivore-conflict”. The integration of study results within public information policy is one of the management tools, aiming to dispel widespread misperceptions in regard to feeding habits of large carnivores. As emotional aspects, in the form of retaliation for real and perceived losses of livelihood, are inter alia assumed to be the motivation for intolerant behavior of humans towards predators, dietary studies contribute to the conservation of large carnivores.
In the frame of the study, dietary data of wolves in Lower Saxony was gathered. The study goal was to identify on which prey species wolves in Lower Saxony do prey on. Furthermore, to find out if they prefer certain prey species or species groups, if the analysis reflects the local offer and if there are temporal and / or spatial differences in the prey spectrum. As data base, more than 400 wolf scats were available, collected with human involvement in the framework of the wolf monitoring with witch the Hunting Association of Lower Saxony is assigned. Trained volunteers collected the sample between 2013 and 2017 by chance and according to nationwide standards in different parts of the country.
The sample was prepared and analyzed according to standardized procedures. Scats were examined macro- and microscopical. Species- or group-specific characteristics of the medulla and the cuticula of prey hair were investigated and rated, using reference material and determination keys. Prey items were grouped into categories. The analysis results are going to be quantified as Frequency of Occurence and as Estimated Biomass. Based on this, selectivity and specialization will be examined with Ivlev's Electivity Index and Levins' formula. The calculation will include supply (data from the recording of wild ungulates and annual hunting bags) and demand (biomass ratios in the sample).
Preliminary results show that roe deer (*Capreolus capreolus*) appears most often in the sample, followed by wild boar (*Sus scrofa*). Only two domestic species could be identified: One sheep and one

cattle of about one month. Parts of a cats' mandible were found in one case. Whether these belong to the domestic cat (*Felis silvestris catus*) or the wild cat (*Felis silvestris*), can not be predicted.
This interim conclusion coincides with previous studies in Germany and confirms worldwide observations that wolves mainly feed on wild ungulates, if the supply is available.

Managing European Wolves – Views of Future Decision Makers

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Wolves have been recolonizing in Germany since the beginning of this millenium and have recently started to move back into the Netherlands. Management strategies are required in both countries to protect wolves as required by legislation and also to mitigate potential human-wolf conflicts. However, management interventions are often controversial and their support varies among stakeholder groups. This study explored views held by young people (mean age = 22 years) in both countries given that their opinions will inform future wildlife policy directions. An 8-page survey was designed to test i) the acceptability of management interventions across different problem levels presented by wolves, ii) to what extent wildlife value orientations and emotions (valence and arousal) predict acceptability of wolf management interventions; and to iii) estimate discrete emotions towards wolves. University students were surveyed from courses in natural, environmental and social sciences from the Netherlands (n= 369) and Germany (n = 229). In both countries, we found that acceptability of wolf management interventions varied across three different scenarios (wolf is seen; wolf kills sheep; wolf kills human); depending on the severity of the situation. Lethal control was very unacceptable (in the scenario wolf is seen) to moderately unacceptable (wolf kills human). Educating the public was moderatly acceptable (wolf kills sheep) to very acceptable (wolf is seen and wolf kills human). Doing nothing was not considered to be acceptable in all three scenarios. Wildlife value orientations predicted acceptability of lethal control (R^2 = .25), with domination (Beta = .36) having a larger predictive value than mutualism (Beta = -.21). The emotion dimension 'valence' showed a stronger predictive value for the acceptability of lethal control (Beta = -.25) than mutualism. For the acceptability of doing nothing, valence was the only significant predictor (Beta = .23). In both countries, negative emotions of anger, sadness and disgust were hardly felt towards wolves while positive emotions of joy and interest, as well as surprise, were moderately to strongly felt. Fear was the only negative emotion that was moderately felt, yet less strongly than the positive emotions. Our results show that management interventions are clearly desired by students likely to work in wildlife management or related fields in the future. Further, emotions (valence) held by stakeholders can help us understand the acceptability of management interventions next to cognitions (wildlife value orientations). Lastly, while managers and policy makers tend to predominantly address negative emotions in relation to wolves, positive emotions are often overlooked which calls for critical reflection on how people view wildlife and how best to manage complex wildlife management issues.

A Multilevel View of Fish and Wildlife Agency Governance

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A systems approach to understanding conservation values requires being able to measure characteristics of individuals, groups, and societies. At these secondary levels, however, characteristics become more complex and tend to take on the qualities of an "invisible hand" that is both shaped by and actively shaping other component pieces of the system. In this presentation, we offer a model for understanding organizational-level characteristics through an analysis of the perceptions of the individuals who comprise them. We propose that individuals and groups are in dynamic interchange, and that the characteristics of each can best be understood through a systems framework that views traits as interacting across levels. We illustrate this point by exploring the characteristics of state fish and wildlife agencies in the United States using perceptions of group-level characteristics by agency employees. As societal shifts in social values create space for organizational change, exploring the multilevel relationship between individuals and the groups they are a part of can be a useful practice for understanding the core identity of conservation agencies and gaining insight into what may drive the evolution of these groups over time.

Protected Areas and Poverty: Causal Evidence from India

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Protected Areas (PAs) have proliferated in recent decades, especially in developing countries. However, there is often substantial overlap between biodiversity hotspots and incidence of poverty. Furthermore, rural communities in developing countries, often extensively dependent on forests for sustainable livelihoods, bear the cost of global preservation of natural resources. For instance, over 70% of population in India lives in rural areas with some form of direct dependence of households on forest-based natural resources varying between 40-80% in villages. Thus, it is imminent to ask if PAs exacerbate or alleviate poverty. Focussing on IUCN type I and II PAs in India, the objective of this paper is two-fold: (a) to determine if forests are being converted to PAs in regions with greater poverty, and (b) to examine how regions with PAs have performed on inequality and poverty indices over the last three decades as opposed to their counterparts i.e. similar regions but without PAs. Controlling for non-random nature of site selection of PAs, we generate counter-factual districts within states using propensity scores matching method. We estimate Atkinson, Gini and Theil indices using nationally representative systematic consumption data collected by National Sample Survey Organization from 1980 to 2010. We also combine consumption and asset data to determine chronically poor, transient rich and transient poor households. Results of the fixed effects model suggest that districts with PAs have had better economic outcomes than the counter-factual districts. While PAs restrict opportunities for land-use, they generate new incomes by tourism and allied infrastructure development and increasing flows on economically significant environmental services. We posit that our counter-intuitive results are largely driven by tourism-related revenue. An inference of this causality has significant bearings on conservation policies, especially for the developing nations rich in biodiversity but poor in public welfare outcomes.

Social aspects of managing free-ranging bison in Poland

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The history of European bison (*Bison bonasus*) – the largest terrestrial European mammal – is one of the most amazing and successful stories of saving a species that was literally facing the extinction. Currently, about ¼ of the world's bison population (out of ~6500 individuals in the world) live in Poland, mainly in free ranging herds (~1500 wild individuals) in five distinct regions of the country. These regions varies in land cover, land use and density of human settlements. The number of wild, free ranging populations and its location at the interface with land occupied and used by people results in interaction between bison and people, with consequences for rising potential conflicts while bison conservation, as well as benefits that can be derived from the presence of the species and its role in local cultures and social life. Here we want to contribute to a debate on rewilding by assessing attitudes towards reintroduced European bison, its management and the importance of rewilding process to local societies. The research consisted of qualitative interviews and quantitative questionnaires with various stakeholders (researchers, NGOs engaged in bison conservation, public administration, foresters, local residents, hunters, farmers).

The presence of bison has become or is currently becoming a regular part of everyday life for local residents, farmers and foresters. They do not necessarily admire the heroic efforts of saving European bison, or even have knowledge about this process. In particular, this research shows that local residents know more about the animal itself (its biology – size and weight; and behavior – preferences in food and feeding areas) than about its current protection programs or historical population range. Stakeholders discussing various management options raised a number of problematic issues such as feeding, compensation for damage to crops, or hunting, that need to be addressed by decision makers. Locations where European bison was reintroduced differ in scope and character of potential conflicts over the bison conservation, as well as potential benefits (such as incomes from tourism) that local society can derive from the presence of the free-ranging herds and the role of bison in local culture. Overall, analysis of reintroduction of bison in Poland, as an example of the rewilding approach in conservation, brings the attention to the issue of the scope of specific conservation measures that are either demanded or objected by stakeholders. Stakeholders preferences towards bison management are related not only to their attitudes towards the species, but also general perception of the role of nature for them individually and for the local society.

Undesirable effects of threatening climate change information: a psychological perspective

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Environmental campaigns and policy makers often try to promote pro-environmental behavior by giving threatening information about the devastating consequences of climate change. However, according to the *General model of threat and defense* (Jonas et al., 2014), psychological threats initially lead to anxiety, and a motivation to overcome these negative states by engaging in approach-related behavior. That behavior can either be directly related to the problem (i,e, pro-environmental), or symbolic, with no connection to climate change at all (e.g. ethnocentrism). We present research focusing on peoples' response after a confrontation with information about climate change. In different experiments (N=122; 243) we tested the impact a climate change threat (=experimental group) versus neutral information (=control threat) on threat reactions (direct and symbolic response) using questionnaires. Reading threatening climate change information did either have no impact on pro-environmental behavior intention (Uhl et al., 2016) or even reduced it (i.e. direct response; Uhl et al., 2017). Only for people with a high environmental self-identity the climate change facts served as a boost. Compared to environmental friendly individuals who read the neutral information they had a higher willingness to engage in climate-friendly behavior (Uhl et al., 2016). However, the climate change threat mainly resulted in undesirable side-effects. Both, high and low environmental friendly individuals displayed symbolic responses after reading the threatening information (i.e. higher level of ethnocentrism, derogation of outgroups). For that reason, we recommend a careful usage of threatening facts in the domain of climate change communication. We will discuss theoretical and practical implications for optimizing international climate change communication.

Farmers' beliefs, understanding Livestock-Wildlife Conflict in the Andes Mountain

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Solutions to Human-Wildlife conflict must be based on a nuanced understanding of the complexity of the issues, rather than a simple reduction of the problem to its basic parts. In reality, the underlying drivers of conflict are often deeply embedded in cultural, historical, political and sociological factors. In Central Chile the last decade, conflict between guanaco (*Lama guanicoe*) and livestock farmers has intensified dramatically, as demonstrated by increases in the number of complaints by stock breeders that guanacos negatively impact their herds. This conflict is based on a perception that guanacos are competing with livestock for summer grazing resources. The solutions proposed by government institutions do not meet livestock farmers' needs. In addition, a lack of true dialogue and understanding on both sides has resulted in conflict resolution efforts stagnating. This study examined conservation conflict involving livestock farmers and the guanaco in Central Chile, applying a novel approach that engages with farmers' subjective theories to better understand the origins of conflict, and identify, from their explanations, effective conservation measures. Subjective theories are beliefs that function as personal ideologies guiding people's actions; this concept has proven useful in the fields of education, learning, health and instruction, and ecological projects, but to the best of our knowledge, there has been no research exploring its application in the context of conservation conflict. Understanding how livestock farmers turn to personal beliefs to explain conflict can be key to identifying better conflict mitigation measures. Sixteen semi-structured interviews were conducted with farmers in Petorca Province, in Chile's Valparaíso Region. The interviews were codified according to some of the grounded theory procedures and specific analyses for Subjective Theories. Our results indicate that farmers understand the origin of the current problem to be linked to a "change in climate towards increasingly arid conditions". Two problems associated with climate were observed, 1) decreases in rainfall negatively impact forage availability, and 2) decreases in snow intensity (a natural population control factor) lead to increases in the growth rate of the guanaco population. This provides a more complete understanding of ecological relations than previous reports, which identify only the abundance of guanaco as the source of the conflict with livestock farmers. Additionally, given that they see the origin of the problem as an "external" cause (change in climate), farmers claim to be more vulnerable, and argue that State intervention is needed to achieve a real solution. Economic compensation is the most commonly requested form of intervention. Results also suggest that, in this context, conflict is not only an ecological issue linked to resource competition, but also a symbol to communicate difficulties and negotiate with governmental institutions. With improved understanding of the drivers of conflict, future research should focus on identifying solutions that enhance the sustainability of guanaco/livestock coexistence.

Rewilding and socio-ecology of guanaco repopulation in Chile

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One of the most important questions for rewilding is how to succeed. With few rewilding experiences there is little information to guide how to overcome ecological and social limitations to the process. To fill this need, a natural proxy for rewilding would be current population increases and redistribution of wildlife, that serves as an example for ecological conditions and human perceptions about the process of wildlife repopulation. This is the case of the guanaco (Lama guanicoe), a South American camelid, that has recovered part of its populations in central and southern Chile. The guanaco recovery has raised concerns on farmers that use the same rangelands for livestock grazing. The aim of this work was to assess negative perceptions of ranchers about guanaco population increase as a proxy for repopulation. For this we used information combined from two projects in distant areas of Chile: Central Andes and Magallanes region. We used individual and group interviews with commercial and communal ranchers to identify expressions of disconformity with the local guanaco population increase or with agencies managing the local guanaco population. In addition, information on the historical context was collected from relevant governmental institutions.
The trend of natural increase of guanaco populations was acknowledged by all of the interviewees. Apparently, there are no memories in both places of such guanaco population levels. This trend is perceived as a threat to domestic livestock in both areas, regardless of the population. Emergent management options were drastically reducing guanaco populations, control of guanaco population, and a commercial guanaco harvest. Especially for the latter, we identified formal and informal connections between our study areas. Nonetheless, the harvest has not resolved the conflict with guanacos in Magallanes, and to date it has not being adopted in the Central Andes. Currently, socioecological research promoting community and government involvement in Central Andes seems to be a first step to guanaco management. In the same line, socioecological research being developed in Magallanes intend to understand social processes regarding guanaco management. In this context, the socioecological change represented by guanaco repopulation may need support to promote people's adaptation to current population levels if repopulation or rewilding occurs in human dominated areas.

We stress the need for interdisciplinary socio-ecological research that attends societal adaptation to recovering guanaco and other wildlife populations in Chile and elsewhere. Without proper understanding of the social and ecological context current disciplinary solutions are blind to local processes and conservation opportunities such as rewilding.

DifesAttiva: Carnivore Damage Prevention - From a network to an association of livestock farmers

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DifesAttiva is a formal institution with corporate bodies and roles that was founded to put in touch farmers, who had received livestock guardian dogs (LGD) by the Project Life Medwolf.
This project was implemented from september 2012 to November 2017, and took place in the Guarda and Castelo Branco districts in Portugal and in the Province of Grosseto in Italy.
This provinces are rural areas characterized by local economies mainly based on livestock breeding, in particular sheep. The province of Grosseto has the lowest density of human presence in Italy and it is known for the production of “Pecorino Toscano cheese”. There are more than 1,000 sheep farms and about 200.000 sheep, but the trend is negative: In 2006 there was more livestock in Grosseto province than inhabitants but now the situation is different: 25,000 sheep less than the local population of humans.
In this area with a high density of livestock, the wolf's range expansion and the increase of predation events have caused a deep conflict not only between prey and predators, but mainly between people, who like wolves and people, who dislike wolves. The conflicst are diverse: economic, on one hand, and social, on the other hand.

Life Medwolf had different goals:

- promotion and adoption of damage prevention measure among livestock owners;
- increase awareness among people about wolf conservation and managment;
- discourage illegal acts against wolves

DifesAttiva was formalised in January 2017 and till now it has 26 members (all livestock breeders) and a technician.

First of all it was very difficult to win the famers' trust, because they felt discouraged and alone with their problems. There wasn't any network among shepherds, who faced simmilar problems.

There were other challenges such as:

- no brand of quality
- little knowledge about LGDs behavior
- no evaluation of LGD costs
- a communication campaign based on negative and alarmist events.

DifesAttiva has these goals:

- Promote and facilitate the adoption of damage prevention measures and provide support for their correct use
- Provide guidelines for best practice in raising LGDs
- Promote the exchange of information and experience among farmers facing predation events
- Promote high quality standards of management approaches at associated farms through awareness raising, tourism and information activities

Magazine coverage of wolves in Germany

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The return of the wolf to densely populated Germany is a controversial and emotionally discussed topic, that affects many people directly or indirectly and thus involves many different aspects. Moreover, these aspects may vary among stakeholders, such as hunters, shepherds, environmentalists and citizens. Emotionally charged topics such as the welcoming of the wolf in Germany, attacks on livestock by the wolf and fear of citizens to engage in recreational activities in forests where wolves are present, are often taken up in newspapers and magazines. Newspapers and magazines reach a large audience and they can influence human perspectives towards wildlife, but they also represent how people perceive and think about wildlife. Therefore, analysing media articles provides a powerful tool to understand people's perceptions towards wildlife. In this study, we aim to understand stakeholder's perceptions towards wolves by analysing media coverage of specific stakeholder magazines in Germany in 2017.

To address this objective, we searched for those articles referring to wolves that were published in five magazines and newspapers representing four different stakeholders – i.e. hunters (Jäger), farmers (Schafzucht), environmentalists (Naturschutz heute and BUNDmagazin) and civil society (Landeszeitung für die Lüneburger Heide). We applied standard content-analysis procedures and coded the content of 249 articles following asocial-ecological research approach. We particularly recorded aspects regarding ecological aspects of wolves and the ecosystem, the importance of wolves for humans by represented values, nature's contribution to people provided by wolves and their habitat, conflicts caused by wolves, the stakeholders involved, the emotions represented and management measures. We also recorded word length to indicate the importance of the article, and the presence and description of photographs presented by the article in order to get a comprehensive picture of the represented wolf topic.

This study contributes to build understanding of the current, and often contested, perceptions of stakeholders towards the wolf shaped by the media in Germany.

The role of democracy, technocracy and politics in wildlife management: A case study of wolf (*Canis lupus*) hunting in Michigan, United States

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The development of sound carnivore conservation requires apt handling of technical information that is often beyond the capacity of most citizens. Carnivore conservation also rightly depend on the application of basic values. Every citizen has a stake in the application of values to public decisions and technocrats may not be especially facile at handling those values. We explore these themes in the context of the decision process which led to wolf hunting in Michigan in 2013. We evaluate that process using 2 basic tenets of wildlife management. The 1st tenet is the North American Model of Wildlife Conservation, which is held in high regard by many hunting organizations, wildlife professionals, and state agencies. While that tenet is North American in origin, its constituent elements – invoking ideals such as science, democracy, and public trust – are broadly appreciated. The 2nd tenet pertains to the ability to answer 3 fundamental questions: What is the purpose or goal of a management action? How will the management action meet the purpose or goal of the actions? Why are the purpose and goals appropriate? Plans for hunting wolves in Michigan appear not to meet the principles of either tenet. This conclusion suggests that either wolf hunting as it has been planned in Michigan is inappropriate or both sets of standards for evaluating wildlife management are inappropriate. Better understanding of issues like this will require reflecting on the fundamental nature of wildlife management and its guiding principles.

Fishing villages fearing seals

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The current presence of three species of seals along the Baltic coast; the grey seal (*Halichoerus grupys*), the harbor seal (*Phoca vitulina*) and the ringed seal (*Pusa hispida*) is a result of successful conservation management. However, seals cause severe economic losses to small-scale fisheries and are considered to threaten traditional fishing communities and thereby cultural values, tourism, and employment opportunities. Based on theory of emotional appraisal this study investigates the local populations' appraisal of the situation in three fishing villages along the coast and provides an in-depth understanding of the fishermen's concerns. A questionnaire survey (N = 357) assessing appraisal of relevance and implication of the current situation show that there is a strong and unanimous view that the small-scale fisheries is important to all of the three villages, but the appraisal of the seal as threat to the fisheries significantly differs between the villages (one-way ANOVA, $F(2, 332)= 3.76$, $p = 0.02$). The strongest fears are expressed among residents in the village highly profiled by professional fishery. These fears also reflect those expressed in in-depth interviews with five fishermen based in the harbours of the same villages. The fishermen appraise the current situation as very threatening to small-scale fisheries, but also to the local heritage and their personal life-style. Their anxiety is reinforced by a lack of trust national authorities. It is concluded that there is urgent need for strong and effective policy and management strategies. These should be adapted to both local social and ecological contexts of coastal areas.

Wolf recolonization and livestock depredation in Brandenburg, Germany

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Since their return to Germany in 2000, the first territorial wolves have settled in the state of Brandenburg, in Northeastern Germany, in 2007. The species is strictly protected by national and EU law and profits additionally from high prey densities in Brandenburg, which is the state that hosts the highest number of wolves in Germany since 2017. While the wolves´ expansion and rapid increase in numbers is a great success for nature conservation, it leads to significant challenges especially for livestock keepers. Despite early implementation of subsidies for preventive measures, depredation on livestock has increased continuously and lately affects husbandry of suckler cows. Increasing conflicts between stakeholders, i.e. strict conservation vs. hunting and livestock husbandry, have called this topic on the political agenda, requesting for evidence-based decision support. In our study, we investigate the spatio-temporal expansion of wolves in Brandenburg state from 2010 to 2017 and corresponding livestock depredation. We hypothesized that effective preventive measures have been primarily adapted by professional livestock keepers and for sheep, whereas non-commercial livestock keepers and suckler cow keepers are less well equipped, which causes over time an increased depredation risk for the latter livestock husbandry methods. In Brandenburg, there is extensive free-range suckler cow husbandry, for which the introduction of preventive measures remains difficult due to the large-scale pasture structures. This challenge will increase with a growing wolf population and migration into northern parts of Brandenburg, where suckler cow husbandry and non-commercial sheep keeping are especially high in numbers. To provide evidence for a facts-based discussion of future management scenarios and identify situations of increased risk, we analyzed the correlations between observed wolf presence, the occurrence of livestock depredation and related factors (land use characteristics, animal species, distance to buildings). For this purpose, a multi-factor analysis based on the state´s wolf monitoring data and reports on livestock killings was carried out. Results have shown an increased risk for livestock losses in the vicinity of wolf territories and forest, which suggests that subsides for livestock protection should be focused on these regions. Additional research and especially experimental studies on the effectiveness of different livestock protection methods, which could not be taken into account in this study, are required.

Prioritising stakeholder engagement for forest conservation during austerity

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Conservation is essential to maintain biodiversity and ecosystem services, but also to protect places that define communities, support livelihoods, enable outdoor activities and (merely?) to know that nature is flourishing. The perceived needs and priorities for conservation and forms of management strategies will thus differ depending on an individual's role, culture and experience. 'Participation' and 'stakeholder engagement' are widely understood to offer better conservation options, enhance buy in, develop shared learning and create a stronger democratic dialogue. However, in an era of austerity, resources are limited, despite the need to prioritise collaborative processes. In this study we ask: with whom, why and how should we engage across spatial, temporal and governance scales and with limited resources to achieve philosophical and practical goals regarding conservation? How do we prioritise engagement efforts to obtain 'best value'? We draw on empirical data from two projects, both addressing tree health as an aspect of forest management and conservation in UK. We both used and explored the concept of 'stakeholder engagement', firstly, in a project investigating the concept of resilience with tree health stakeholders; secondly, examining how stakeholder engagement can enhance technology development for the early detection of tree pests and pathogens. Tree health offers particular challenges for stakeholder engagement. A wide range of stakeholders are potentially involved, stakeholders are present at different spatial scales (local, regional, national and global) and they need to be engaged over different temporal scales, sometimes to develop crisis interventions but also for long term planning. Hence, we need to know not only with whom we *could* engage, but also with whom we *must* engage. We conducted a total of 33 interviews, 3 focus groups and experiential interactive activities and ran workshops and collaborative field trips with a range of stakeholders. We found that stakeholders did not align with single roles; rather individuals moved across roles and hybrid organisations spanned traditional public/private/third sector divisions. This complex network of stakeholders was overlaid on a *projectscape* comprising research, management and policy initiatives. As well as project specific engagement, it proved important to support the development of networks and alliances to facilitate collaboration. Interactive, experiential and creative modes of engagement were more effective, such as fieldtrips to plant nurseries and inspections at ports. However, conversation and communication costs money! State bodies with constrained budgets have tried to devolve responsibility, but we found that structural constraints, resource restrictions and knowledge gaps limit the capacity of other stakeholders to meet conservation needs. We conclude that, despite the current era of austerity, we need to continue to invest in relationships and networks, support normative and substantive forms of engagement and recognise the value of innovative, human centred interactions, rather than aiming only for instrumental, easily measurable, specific gains. These lessons have wider implications for other conservation contexts.

Hunters on the Fringe

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Hunting can be seen as an expression of a cultural values. As a discrete cultural element, it can be theorized that hunting is linked to the values that a person possesses on the individual and group level. Research shows that values dictate behavior, reinforce cultural traditions, and transmit across generations (Kluckholn, 1951). Values structure the relationships that humans have with their environment, with other humans, and societal institutions (Schwartz, 2006). As individual behaviors aggregate within a culture they become a broader cultural activity.

Values research in the US has shown that the cultural activity of hunting is tied to a domination wildlife value orientation (WVO), and much less so for mutualism WVO (Manfredo and Teel, 2004). Broadly, classified mutualists exhibit behaviors that are welfare-enhancing for wildlife and less prone to support, much less participate in, behaviors that could result in harm to wildlife. A mutualist who also hunts is confounding, as the scale items they respond positively to do not align with the activity of hunting. How does an individual strongly agree with statements such as, “Hunting does not respect the lives of animals” or “Animals should have rights similar to the rights of humans” and still actively participate in hunting? These individuals are participating in behavior that is counter to their values.

Recent research conducted through the *America’s Wildlife Values* project has found that there is a growing phenomenon of persons that are categorized as mutualists that are also active hunting participants. These individuals are intriguing as they are an anomaly and require further consideration.

We explore characteristics in this presentation of people who score high on mutualism WVO and hunt. These individuals would be both typified mutualists (high on mutualism, low on domination) and pluralists (high on mutualism, high on domination). Is it possible that people are compartmentalizing their lives and placing different species into different categories, as they respond in a global sense and feel differently about some animals? Is this a vestige of the cultural tradition of hunting overcoming values, is it a change in meaning in hunting, or a shift in behavioral motivations? One such motivation noted in recent research is the growing public interest in the locavore food movements. A movement that prioritizes locally sourced, grown or produced food over food that has traveled greater distances. Further research is needed to determine additional motivations, individual psychological states (i.e. cognitive dissonance), and the continuance of behavioral intention to hunt.

Influence of social media on human-carnivore conflict in Namibia

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Feral Namib horses (*Equus caballus*) and spotted hyaenas (*Crocuta crocuta*) co-occur in the south-eastern corner of the Namib Naukluft Park in Namibia. The current drought and predation on horses has contributed to their drastic decline in numbers and public concern for the horses survival, raised through social media, has led to the start of a diversionary feeding programme for spotted hyaenas. Predation on horses continued and there are indications that the sudden, significant overabundance of supplemented food increased overall spotted hyaena density and reproductive rate and that the localised feeding of spotted hyaenas and horses close to each other caused shifts in activity centres towards the eastern boundary of the National Park. Conflict related killing of spotted hyaenas on farms has been recorded since, and border crossings, attacks on livestock and increased spotted hyaena activity on farmland have been observed. This study highlights that any feeding programmes should be well structured, planned in detail and specialists should be consulted to avoid unintended shifts of conflict.

The Wadden Sea & Climate Change - a Touristic Resurrected Wild

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Nature Tourism and Natural Heritage Tourism are booming sectors of global tourism. But with Climate Change and Global Warming there are growing risks and threats for natural environments and there traditional and modern sustainable economic use. Traditional coastal fishery for instance usually relies on sunstainable fishing technologies to ensure economic income for several generations of fishermen families.

In the (European) Wadden Sea a complex ecosystem developed under the specific conditons of high and low tide with times of floding and times of falling dry. The very special mixture of tides-related parttime land conditons and parttime sea conditons created a traditonal economic usage and cultural heritage of usage of varied natural ressources like seals, fish, crabs, mussles or shrimps. Like few other fast eveolving developments in regional human history climate change and global warming force the natural environment to adapt to external impacts and influxxes.
The emigration of species is a complex and one of the most important consequence of the adaptation process in the natural environment. But while there is emigration due to warmer conditons there is immigration too. Other species of fish, crabs, mussles, algies et cetera are entering the Wadden Sea. But do they mean new ressources for traditonal economic usage like fishery too. And what about more modern economic usage of the areas like in the tourism industry as natural attraction?

In the local societies of the island and costal areas of the Wadden sea are many concerns about unstable and uncertain times ahead. This presentaion provides critical and discursive views on potentials and threats of the ongoing adaptation processes of the natural and cultural systems in the Wadden Sea area. The paper outlines examplifarily some of the regional potential solutions of the economic crisis relates to climate change and global warming. In additionto that it exemplifies how traditional economic heritage can be used for modern educational forms af heritage tourism that provide a deaper understanding of the manyfold dimensions of regional consequences of climate change and global warming.

Are carnivores driving farm succession failure in Norway?

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Recent reports in Norwegian newspapers have suggested that the increasing carnivore populations in Norway could have a serious impact on farm succession in family farms as farmers are put under economic and psychological pressure by predation of their livestock. With farmers experiencing a variety of other economic stressors as well as pressure from government to increase herd sizes (making ensuring stock safety more difficult), increased or even sustained levels of predation could well be the proverbial "straw that broke the camel's back". However, despite strong expressions of concern from the farmers' organizations and other sources there is, as yet, no scientific evidence directly connecting carnivore predation to the loss of farms in Norway.

This poster presents results from the Local Carnivore study – a research project that examines the relationship between carnivores, farmers and rural communities in Norway. We examine the relationship between carnivores, farm succession, production change and farm closure. The analyses are based on data from "Trends in Norwegian Agriculture 2018" a biennial survey of Norwegian farmers covering sociocultural and structural aspects of agriculture. We supplement the survey data with (a) municipality level data from the Norwegian Environment Agency's "Rovbase" (containing all registered livestock deaths in Norway) and (b) registered carnivore observations from Skandobs - the Scandinavian reporting system for lynx, wolverine, brown bear and wolf (Skandobs). Using multilevel and spatial regression analyses, we assess the extent to which proximity to observed carnivore attacks and presence of carnivores correlates with farm succession, production changes and farm closure. We also examine other known drivers of succession failure (such as the economic condition of the farm and farm size) and assess whether proximity to predators is an important additional contributing factor. Does adding proximity to predators to the model affect its ability to predict succession failure?

Public acceptance of wildlife management interventions in Malaysia

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One of the practical objectives of conservation social science is to assist wildlife managers and policy makers dealing with the public, by examining public reasoning about wildlife and thus providing a knowledge base to inform problem identification, decision-making, implementation, and communication. Research has demonstrated that the concepts of wildlife value orientations, emotions towards wildlife, and wildlife risk perceptions have predictive validity across a range of more specific outcome variables. Yet, existing research has not combined these concepts in one study. The present research examined wildlife value orientations, valence towards wildlife, and wildlife risk perceptions, to explain public acceptability of different management actions. Data were collected through a drop-off survey, distributed in the state of Johor, Malaysia (n=1062). Initial confirmatory factor analysis suggest modifications on items reflecting domination. Structural equation modelling was used to estimate relationships between variables in three models: (1) a model predicting acceptability of doing nothing, (2) a model predicting acceptability of drive shooting, and (3) a model predicting acceptability of lethal control. The three models have acceptable goodness-of fit indexes, indicating the models fit well with the sample data. Domination, valence and wildlife risk perceptions predicted acceptability of hands-off management to problem wildlife. Domination predicted acceptability of drive shooting, and none of the other concepts were significant predictors. Domination and mutualism predicted acceptability of lethal wildlife control, while valence and risk perceptions did not. The explained variance of acceptability of lethal control was larger (R^2 = .114) than the acceptability of the other two management actions. The results suggest that the set of concepts that are statistically significant predictors for acceptability, depends on the type of management action. This raises an important discussion whether an overarching theory can adequately explain a variety of specific outcome variables, or whether different tailor-made theories are needed to understand different outcome variables.

Assessment of the movement of the invasive alien turtle species in local ecosystems in Poland using telemetric studies

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The natural environment of each country is inhabited by native animals. Sometimes the balance is disturbed by the introduction of invasive alien species (IAS) originated from different parts of world. This also applies to freshwater turtles, which are often released to local rivers and other water reservoirs. They have become IAS, causing serious damage to ecosystems, crops and autochthonous species (e.g. European pond turtle *Emys orbicularis*). Moreover, they can be both the reservoir and vector of microorganisms pathogenic for animals and humans.

The aim of the study was the assess the movement of the invasive turtle species in local ecosystems in Eastern Poland using the telemetry method.

Turtles (*Trachemys scripta elegans*, n=6 and *Trachemys scripta trootsii*, n=1) caught in different parts of Lubelskie voivodship (Eastern Poland) were selected for telemetric research. The animals were equipped with GPS/GSM transmitters (Saker-T, Ecotone Telemetry, Poland) and released to the environment (rivers and an artificial lake) at original trapping sites.

The signals were collected and transferred to maps using ArcGIS (ESRI) and Google Earth. Geographical coordinates of the turtles no 113, 203, 204 and 309 showed that the animals did not move away from the trapping site. In case of the remaining turtles, the duration of signal transmission varied from a few days to several months. Geographical coordinates of the turtle 101 showed a significant distance of movement downstream the Bystrzyca river, interrupted with periods of long stopovers. During the observation period the turtle moved forward about 4.18 km from the place of release in a straight line. Interestingly, the turtle 101 transmitted signals from 12.08.2015 to 24.09.2015 and then, unexpectedly, resumed transmission from 05.04.2016 to 02.10.2016. The interim period coincided with the decrease of temperatures below 5-10°C and the disappearance of signal can be explained by the hibernation of the turtle in the environment. The analysis of movement range in 2016 clearly suggested that the turtle was alive. The movement range of the turtles 228 and 332, released to the Vistula and Wieprz rivers, varied from 1.87 to 2 km in a straight line.

The conducted unique telemetric studies showed that the invasive turtles native to North and Central America can survive winter in Eastern Europe. They are sedentary but occasionally can show mobility, especially in rivers, thus posing threat to the balance of local ecosystems.

This work was supported by the National Science Centre project “Invasive turtle species as a source and vector of animal and human pathogens” (Grant No. 2013/11/B/NZ7/01690)

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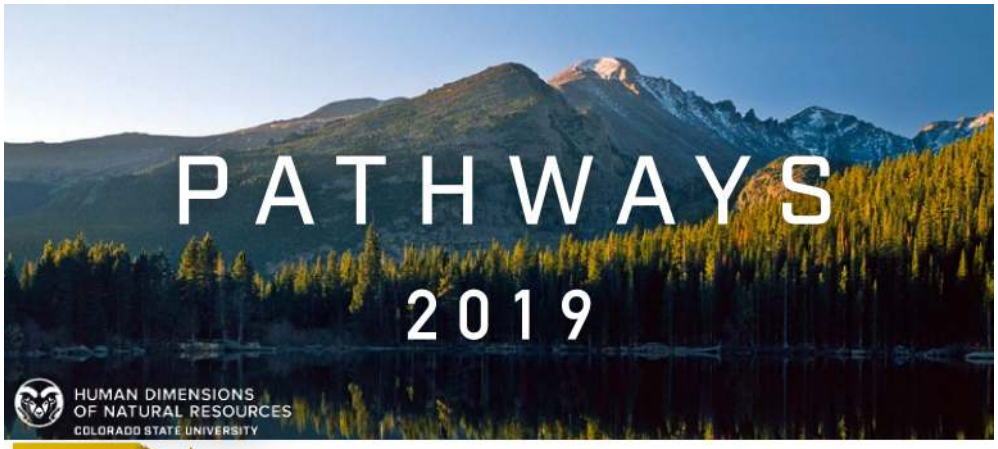

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