

Policy Support Statements of the Large Carnivore Initiative for Europe (LCIE).

Policy support statements are intended to provide a short indication of what the LCIE regards as being good management practice with respect to certain aspects of large carnivore conservation.

Studying large carnivores with telemetry for their conservation in Europe

Background

There are six large carnivore species in Europe: bear, wolf, Eurasian lynx, Iberian lynx, golden jackal, and wolverine. All of them are offered varying degrees of protection under European and national legislation. All six species live at low densities, maintain large home ranges and are among the most challenging group of species to conserve in the human-dominated European landscape because of frequent conflicts with human interests and the large-scale impact of human activity and land-use on large carnivores. Accordingly, there is often a great need for accurate knowledge about their status, ecology and behaviour to inform conservation planning and thereby promote coexistence. Researchers and managers aim to provide the best available science to governments, institutions, and policy makers, as well as to the general public, so they all have access to the best possible knowledge basis for communication and decision making. The advancement of scientific knowledge on large carnivores is also important to increase understanding, awareness and tolerance towards these species among the public.

Knowledge needs for large carnivores

Studying large carnivores is not an easy task as all these species are nocturnal and elusive, they utilize large home ranges, and are capable of long-distance movements. A range of modern non-invasive methods (i.e. that do not require capturing and handling wild animals) allow the analysis of scats for diet, the identification of individuals from DNA obtained in hairs or scats, and the detection of individuals using camera traps. Between them, these methods allow researchers to learn a great deal about these species. However, these methods are insufficient to gain knowledge about certain specific parameters such as (1) movement rates, (2) activity patterns (3) home range sizes, (4) habitat utilization, (5) predation rates, (6) the identification of reproductive rates and mortality causes, (6) interactions with humans, and (7) the fine scaled movements that are often needed to understand conflicts or design mitigation measures, including ecological corridors. Without this knowledge it is far harder to correctly inform conservation planning.

Radio and GPS telemetry

To obtain such knowledge it is often necessary to mark a sample of individual animals with devices that allow researchers to remotely track them in their natural environment. Telemetry methods (earlier using VHF transmitters and now using GPS technology with remote real-time downloads) have been essential to allow researchers to accumulate knowledge on these species over the last 40-50 years. However, because of the diversity of contexts within which European large carnivores live, there is an ongoing need to conduct studies across a wide range of landscapes. Furthermore, because the European landscape and human activity is constantly changing there is a reoccurring need to update knowledge and understand how large carnivores respond

to novel challenges. Finally, there are some questions that can only be addressed through long-term studies of marked individuals. Therefore, the LCIE believe that the need for targeted studies using telemetry is likely to continue for the foreseeable future.

The three R's of research animal welfare

However, capturing large carnivores for telemetry studies, taking biological samples, and equipping them with collars or implants is an invasive process such that animal welfare considerations must be taken very seriously. The three Rs (Replacement, Reduction, Refinement) are a central animal welfare concept to consider when planning research.

Replacement refers to substituting other methods to replace invasive studies of animals. As outlined above, we currently have a range of new methods that permit the collection of data about the distribution and identity of carnivores, which is especially suitable for monitoring populations. However, as we have argued above, there are many questions that can only be answered using telemetry, such that complete replacement will never be possible.

Reduction implies minimizing the number of animals used, while ensuring that sample sizes are large enough to obtain robust results. The logistical challenges and costs associated with working with large carnivores imply that sample sizes are almost always kept to a minimum. However, it is important that researchers take steps to more formally calculate required sample sizes through conducting power analyses and defining the required precision of parameters. Studies should also be carefully planned and designed so as to ensure that as much information as possible is extracted from each marked animal. Data and metadata should also be made available for reuse by other researchers, for example through databases like MoveBank, to reduce the need to mark too many animals.

Refinement refers to the process of improving handling procedures, duration and equipment to minimize the risk and impact on the study animals. Experience shows that the greatest risks are associated with animal capture and anaesthesia. It is essential that researchers interact with experienced colleagues to ensure that they are using the most humane capture methods, including the best trapping / capture equipment and the state of the art immobilization drugs. The weight of collars should also be kept to a minimum and the design should be optimized for the animal depending on the species and individual morphology. Automatic, or remote-release, drop-offs, or weakness zones (e.g. cotton spacers), should become standard. Researchers should communicate and publish their experience to share best-practices and lessons learnt.

Regulations

All procedures associated with capture and marking large carnivores fall within the range of activities covered by Directive 2010/63/EU on the *Protection of Animals Used for Scientific Purposes* from 2010 which is binding in the EU and EEA countries. The directive includes many details about the required regulatory system that should govern the evaluation and approval of research procedures at a national or regional level. Of note is the mention of the 3 Rs (Article 4) and the explicit recognition of “the protection of the natural environment ...” and “research aimed at preservation of species” (Articles 5(d) and 5(e)) as legitimate purposes for conducting field research. It is also important to note that Article 7 places extra restrictions on large carnivore research because they are threatened.

Where large carnivores are subject to the strict protection regimes of the Bern Convention on the Conservation of European Wildlife and Natural Habitats and/or Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, their capture and marking also require the application of the derogation clauses in Article 9 of the Bern Convention and Article 16 of the Habitats Directive.

Other considerations

Because large carnivores are both charismatic and controversial there are a number of additional aspects that need to be carefully considered. Firstly, there will be a need to consider public sensibilities concerning the capture and handling of these species. This will require extra attention to communicating the motivations for conducting the studies and information about the potential welfare risks and steps taken to minimise them. On the other hand, marked animals provide a unique possibility for communication activities because they allow researchers to tell stories about individual animals. This is clearly one important spin-off benefit of these research activities. Secondly, there is a need to consider the potential for abuse of the information being obtained. Possible issues here include the potential for poachers to use radio-frequencies to locate and illegally kill marked animals (less of a risk with modern GPS collars), the potential misuse of location information made public, or the potential insistence of government agencies to use location information to kill an individual in response to conflict. These issues all need to be considered during the cost-benefit analysis required by the directive, and during negotiations with the respective national regulatory authorities.

Conclusions

Because of the human-dominated nature of their habitat in Europe, a solid base of scientific knowledge is essential for the development of conservation plans that will secure the future of large carnivores and promote coexistence with humans. Although non-invasive methods can now help researchers answer many questions, including those associated with routine monitoring, we believe that there will always be a need to complement these with targeted studies that avail of VHF / GPS telemetry. These involve the live-capture and handling of animals and equipping them with collars or implants. It is essential that these procedures are conducted to the highest standards of animal welfare promoted by current European legislation and with a firm commitment to the 3 Rs. Evaluating the relative welfare costs against benefits obtained is a central tenant of modern animal welfare legislation with respect to research. Although telemetry incurs certain short-term costs for individual carnivores the knowledge obtained is crucial to ensure the long-term persistence and welfare of populations of the species, the ecosystems where they live, and the humans with whom they share the landscape.

The Large Carnivore Initiative for Europe is a Specialist Group of the IUCN's Species Survival Commission.