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Management of bold wolves at the alpine scale

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Management of bold wolves at the alpine scale: terminology and protocol

Wolves are currently recolonizing parts of Europe expanding in new areas including lowland, fragmented and densely human populated landscapes (Chapron et al. 2014). This scenario is becoming increasingly common in Italy, France, Slovenia and Austria where nowadays wolves can also live close to large human settlements.

Although wolves are usually wary of humans and avoid direct contact (Carricondo-Sanchez et al. 2020), interactions between wolves and people are possible in a landscape where they coexist. These interactions range from the more frequent indirect observations (e.g., signs of presence, photographs from camera traps) to the less frequent direct encounters. Wolves move close to roads and settlements especially in fall and winter (Ciucci et al 1997, Mancinelli et. 2019, Carricondo-Sanchez et al. 2020), and this wolf habit can increase the probability of direct and indirect encounters with humans.

Encounters can increase in landscapes intensively used by humans, relative to uninhabited areas, because it is difficult for wolves to avoid human contact while living in proximity to settlements where human density is high and suitable habitat for wolves is fragmented (Kojola et al. 2016). Wolves living in human-modified landscapes respond to human activity by adapting their behaviour to the spatial and temporal distribution of perceived interference by humans (Mancinelli et. 2019).

The widespread use of cameras (cell phones, video surveillance cameras and camera traps) in the last decade has and continues to allow for a greater documentation of direct sightings of wolves, especially in densely populated areas. Social media amplifies these events through the sharing of videos/photos that might sometimes lead to scaremongering among citizens. Wolf experts and public authorities have to provide correct and coordinated information in response to people's concerns so as to prevent such misinformation from spreading unchallenged.

At a local scale, the greater visibility of wolves and more direct experiences with the animal can enhance social conflicts and a change of attitude toward wolves motivated by the fear of aggression (Eriksson et al. 2015). Yet wolf attacks on humans are extremely rare (Linnell et al. 2021, Linnell and Alleau 2016, Linnell et al. 2002). In most cases, confirmed aggressions were motivated by strong habituation of wolves to humans due to the positive food conditioning resulting from inappropriate human behaviour, i.e. people feeding wolves (Novak et al. 2021, Linnell et al. 2021). Although the fear of being attacked by wolves is out of proportion to the objective risk of this ever happening, such public perceptions have to be taken seriously by managers and public authorities.

For these reasons, specific recommendations on how to behave responsibly in areas where wolves have settled are always useful in order to guarantee both public safety and wolf conservation. Awareness campaigns on wolf ecology and best practices to maintain wolf

populations in a favourable state of conservation can help further wolf-human coexistence, especially in areas recently colonized by wolves and densely inhabited by humans.

Emphasis should be placed on preventing wolves from developing habituation and bold behaviour by informing people that wolves should be treated according to the general principle of “do not approach, do not feed”! People need to know the recommendations for avoiding inappropriate situations (e.g. intentional feeding or illegal captivity) in order to keep wolves as wild animals.

Sharing management protocols with local institutions should thus be a priority to deal efficiently with controversial situations when uncommon wolf behaviour is reported by people. Management interventions in such cases must be carefully evaluated by large carnivore experts and responsible authorities by considering both the preservation of public safety and the conservation of the wolf population.

It is abusive to consider as bold a wolf that is simply seen in proximity of inhabited houses or when sporadic close encounters are documented. Wolves can move close to human settlements, especially in alpine valleys during fall and winter, and even in daylight. Close sightings from a car or sporadic encounters under particular environmental conditions (e.g. upwind) should not be cause of concern. On the other hand, when a wolf shows uncommon behaviour that suggests strong habituation to humans even at close range, careful analysis is required to assess whether such behaviour by the wolf is repeated over time.

What constitutes natural behaviour for a wolf and when should it be considered unusual? How to avoid human habituation of wolves which could affect the safety of humans? When is an animal considered a bold wolf? How to deal with bold wolves?

To assist wildlife managers grappling with these questions and under pressure to make decisions, the Large Carnivore Initiative for Europe (LCIE), an IUCN specialist group, have developed a policy support statement on “The Management of Bold Wolves” ([The Management of Bold Wolves - LCIE, 2019](#)) which provides general guidance and recommendations to public authorities for good management practices of bold wolves. It defines the terminology frequently used in this context, summarizes the current state of knowledge relating to the danger posed by wolves and describes the causes for the development of bold behaviour. General recommendations on how to react to reports of bold wolf sightings are also given.

Following the LCIE document, we hence adopt the standard definition for “bold wolves” as being an individual that repeatedly approaches people within 30 m and/or repeatedly tolerates close distance (<30m) to recognizable humans. Moreover, detailed analysis is recommended each time a wolf is seen over several days in proximity to inhabited houses or

people (< 30 m) in order to define the main cause of such behaviour and prevent the wolf's habituation to humans due to positive conditioning (via access to an easy source of food).

The LCIE documentation, drafted by wolf experts and well-structured in terminology and definition of interventions, represents the most relevant source for the management of bold wolves. It is the starting point for standardizing terminology and definitions as well as coordinating actions on the management of bold wolves among LIFE WOLFALPS EU partners at the international level. Hence, in the framework of the LIFE WOLFALPS EU, we adopt this protocol (Annex A) in the scope of Action A7, assuring a complete coordination on the topic among countries and Italian Alpine Regions.

In practical terms, the protocol will be applied according to the national regulations: intervention procedures and tasks of the authorities responsible for the management of wolves will be defined in specific protocols at the national or regional level (the public policy applied in each country regarding the management of bold wolves is reported in Table 1). Every country involved in LIFE WOLFALPS EU is hence free to adjust the implementation of the general principles of the LCIE protocol according to the specific needs arising during implementation of the project. For example, in Italy where coordination on this issue was needed among Italian partners, a common operational strategy for case documentation and management of bold wolves has been provided.

Table 1 - Policies on the management of bold wolves per LWA EU country. Links to the national management plan of the countries involved are provided in the notes at the bottom of the page.

Population	Country	Policy
Alpine, Dinaric-Balkan, Central European Lowland	Austria	Wolf Management Recommendations (2021) ¹
Alpine	France	2018-2023 National Action Plan on the wolf and stock-rearing activities, action 7.6. ²
Alpine	Italy	None
Dinaric-Balkan	Slovenia	Strategy for the management of wolf (<i>Canis lupus</i>) in Slovenia (2009) ³ Action plan for the management of the wolf population for the period 2013-2017 ⁴

¹ Österreichzentrum Bär, Wolf, Luchs, 2021: Wolfsmanagement in Österreich. Grundlagen und Empfehlungen. Aktualisierte Version 2021. 37 S. [Wolf Management Recommendations \(2021\)](#). Be aware that these recommendations are not legally binding for the Austrian federal states.

² English version available for download at: [2018-2023 National Action Plan on the wolf and stock-rearing activities, action 7.6.](#)

³ Available for download at: <http://www.pisrs.si/Pis.web/pregledPredpisa?id=STRA48>
[Strategy for the management of wolf \(*Canis lupus*\) in Slovenia \(2009\)](#)

⁴ Available for download at: [Action plan for the management of the wolf population for the period 2013-2017](#)

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- **ANNEX A** -

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.

Management of bold wolves

Background

Wolves are currently re-colonizing parts of Europe from which they have long been absent. In many areas where wolves return, both the public and the authorities are uncertain as to what kind of behavior can be considered as “normal” wolf behavior and which kind of behavior may become problematic. Wolves are intelligent and adaptable and may display a wide range of behaviors, depending on underlying personality, situational circumstances and individual experience. Situations where humans express fear because of the behavior of wolves can be broadly divided into two types: (1) situations where wolves really have acted in an unusual bold manner, and (2) situations where human expectations of what constitutes normal wolf behavior do not correspond to how wolves normally behave. The latter situation is far more common than the first one.

Knowledge about when a specific situation with wolves can potentially escalate, and thus require intervention, is largely anecdotal and the assessment is often based on personal opinions. The same is true regarding the effectiveness of different intervention actions, such as deterrent measures, in order to achieve a behavioral change. The lack of formal scientific studies is primarily due to the fact that wolves only rarely develop behavior that might become relevant for human safety. In addition, there is a lack of detailed documentation of these rare cases and a lack of a clear terminology of what is meant when talking about “bold” or “dangerous” wolves.

In consequence, we use the available experience from wolf-human encounters, our general understanding of wolf ecology and experience from similar issues with other species (coyotes, dingoes, bears) to introduce a clear terminology, and make a preliminary assessment of what kinds of wolf behavior can be considered as not dangerous and which behaviors may need attention because it might become relevant for human safety (Table 1). We outline which actions should be taken in regard to bold wolves and how data should be collected in order to allow for future analyses and potentially more targeted and evidence-based decisions in the future. Finally, we summarize research priorities with the goal of gaining a better understanding in the future about how often bold behavior occurs in European wolves, which factors trigger the development of bold behavior in wolves, and what actions can be recommended to effectively prevent wolves from developing such unwanted behavior.

Terminology

Habituation: is a learning process where an animal gets used to repeatedly occurring stimuli, that have neither positive nor negative consequences. Habituated wolves have learned that humans pose no threat to them and become used to the presence of humans. This level of

habituation is not problematic if wolves tolerate people, their structures, vehicles and activities at a certain distance without taking any direct interest in people themselves. In fact, a certain degree of habituation is vital for wild animals living in the human dominated landscapes of Europe. However, habituation is an adaptive process and a *strong habituation* where wolves tolerate the immediate presence of people at close distance is a behavior that may become problematic.

Close encounters: are encounters between wolves and humans within 30m where the human can clearly be recognized as such by the wolf (not people in cars, on hunting stands, on horses, etc.). Most close encounters end up with the wolf retreating immediately. Events where wolves tolerate people within a distance of 30m without fleeing may indicate a strong habituation or positive conditioning. The 30m distance is somehow arbitrary, however studies have shown that in general wolves retreat immediately when encountering humans at this distance. In addition, this is the maximum distance for applying deterrent methods like shooting with rubber bullets.

Positive conditioning: occurs when a behavior is reinforced due to a positive stimulus. The positive stimulus might be food, an interesting object, or just an enjoyable experience (e.g. playing). *Food conditioning* is a form of positive conditioning where animals connect the presence of humans or places of human presence (e.g. camping grounds, backyards) with the availability of food.

Negative (aversive) conditioning: occurs if a behavior or a certain situation is linked with negative experiences. In consequence, animals normally avoid this behavior or avoid getting into these situations. Negative conditioning may be achieved through the use of different deterrent methods like shooting with rubber bullets or fire crackers.

A *bold wolf* is a wolf that repeatedly tolerates people (being recognizable as people) within 30m, or even actively approaches people repeatedly within this distance. A prerequisite for bold behavior is strong habituation. Bold behavior might be linked to and reinforced by positive conditioning.

Wolves that are repeatedly seen close to inhabited houses are often perceived as bold. However, it is important to distinguish between wolves approaching / tolerating people at close distance (where the wolf sees the person and knows that the person sees them) and wolves approaching a house (where people are not visible directly, and where they don't know that they are being seen). We call these *wolves tolerant to houses*.

Wolves in cultural landscapes

In most parts of Europe wolves inevitably live in human-dominated landscapes. Having large territories of often several hundred square kilometers, most wolf territories are fragmented by numerous roads and human settlements. For wildlife living in such landscapes it is vital to adapt to a certain degree of human structures, activities and presence. Most wild animals avoid direct encounters with humans, but they cannot avoid all human structures that are part of their environment. For wolves in Europe it is normal and inevitable to occasionally pass through, or close to, villages at night, search for food on the outskirts of villages, or sporadically walk in sight of inhabited buildings during the day. Experience shows that such a behavior usually does not pose a threat to humans as attacks by wolves on humans are exceptionally rare.

In today's Europe the most likely cause for a problematic behavior of wolves toward humans is seen in a strong habituation to the immediate presence of humans in connection with a

positive conditioning (like food conditioning). Most of the few reported wolf attacks since the middle of the last century in Europe and northern America had a history of wolves showing signs of strong habituation. Therefore, in regard to the potential danger wolves pose to humans the focus is on wolves developing a fearless behavior and tolerating the immediate presence of people at close distance. Besides food, dogs can be a strong attractant for wolves. There are numerous examples where wolves approach people but are actually targeting the dog beside the person and simply ignore the nearby human.

Young wolves may have a lower flight distance even without a former habituation just because they are more curious and naiver than adults. However, because young animals are more attracted to new stimuli, they are also more prone to acquire a stronger habituation than adults. Therefore, it is not surprising that wolves displaying bold behavior are often pups or yearlings. In human dominated landscapes this carries the danger of pups getting intentionally or unintentionally used to immediate human presence.

Although often claimed, there is no scientific evidence that wolves in non-hunted populations become more dangerous toward humans than wolves in hunted populations. Boldness is known to have a hereditary component in animals and hunting may result in bolder individuals being harvested first. In consequence more cautious, neophobic individuals may have a higher reproductive success in hunted populations than more curious ones. In this way hunting may select for cautiousness. But, even though animals in a non-hunted population may be less wary, they do not automatically become bold and interested in humans or represent a greater threat. As long as wolves do not receive positive stimuli most of them ignore humans.

Management of bold wolves

Behaviour is influenced by many factors including genetics, own experience, age, sex, degree of hunger, maternal influences and sibling influences. This makes it very challenging to understand exactly which factors have predisposed an individual wolf to behave in a certain way in a given situation. As a result management actions will have to be based on broad general principles that respond to diverse problematic situation often in an absence of a detailed knowledge of all the specific causes.

Prevention

Even though we lack a detailed understanding of the actual risk posed by bold wolves, there are a few known events from North America where wolves displaying bold behavior have injured or killed people. There are also multiple known cases for dingoes from Australia and coyotes from North America. Therefore, in order to be proactive, emphasis should be placed on preventing wolves from developing bold behavior. It is crucial to avoid wolves becoming strongly habituated and / or positively conditioned due to human misbehavior. Wolves should be treated according to the principle: do not approach, do not feed! (Similar to the well-known bear slogan "a fed bear is a dead bear!").

Documentation

Situations when bold wolves or wolves tolerant to houses are reported should be documented in a way that enables future pan-European analyses. A case file can keep track of the development of each case concerning wolves that are perceived as being bold. We recommend opening a case file each time a bold wolf behavior is reported. Thus, we can eventually gain sufficient knowledge to better predict when a situation with bold wolves (or wolves that are perceived as bold) can be expected to escalate and when intervention might

be needed. Only first-hand information should be included in the case files and used for further analyses. Every report of bold wolves should be verified in the field and analyzed by experts, and information should be shared between regions and countries.

Interventions

In the early stages of the development of bold behavior, or wolves displaying tolerance to houses, the rapid removal of potential attractants may stop this behavior. If attractants cannot be found, or if their removal does not result in a change of behavior, deterrent measures may be used in order to achieve aversive conditioning. Deterrent actions should be documented in a way that enables future analyses of which actions can be considered effective in certain situations. If the phenomenon does not cease over time, and other measures are not successful, the removal (capturing or in most cases shooting) of the wolf is the final option. Non-lethal removal (capturing) of the target animal will in most cases be much more difficult than lethal removal. How quickly, and in which way, authorities will intervene toward bold wolves should be linked to experience, population status, local levels of fear and attitudes towards wolves, and respect the limits of applicable (inter)national conservation and animal welfare legislation.

Information

Public attitudes towards wolves, and their relative acceptance of lethal vs. non-lethal measures, vary widely across Europe. Therefore, it is likely that different countries may adopt different responses to the same situations. However, in all cases it is important to inform the public from the beginning about the assessment of the wolf's behavior and explain the logic of why different measures are being taken. It is also crucial to manage the public's expectations concerning wolf behavior, underlining that the mere presence of wolves in modern-day European landscapes is not a sign of problematic or risky behavior, but rather a testimony to the adaptability of the species.

Research priorities:

- Accumulate case files: case files should be kept by any institution dealing with bold wolves. They will allow future analysis of when situations are likely to escalate or cease over time.
- Further investigate the role of genetics, personalities and age vs. learning for the development and consistency of bold behavior in wild wolves.
- Analyze the effect of hunting vs. non-hunting management regimes in relation to the intensity of human landuse on the frequency and likelihood that bold behavior occurs in a population.
- Analyze the effectiveness of different deterrent methods.

As our knowledge of the underlying causes and the effectiveness of different reactions increases these guidelines will be updated.

Table. 1: Assessment of wolf behavior and an assessment of the risk it may pose for human safety with recommendations for action.

Behavior	Assessment	Recommendation for action
Wolf passes close to settlements in the dark.	Not dangerous.	No need for action.
Wolf moves within sighting distance of settlements / scattered houses during daylight.	Not dangerous.	No need for action.
Wolf does not run away immediately when seeing vehicles or humans. Stops and observes.	Not dangerous.	No need for action.
Wolf is seen over several days <30m from inhabited houses (multiple events over a longer time period).	Demands attention. Possible problem of strong habituation or positive conditioning.	Analyze situation. Search for attractants and remove them if found. Consider aversive conditioning.
Wolf repeatedly allows people to approach it within 30m.	Demands attention. Indicates strong habituation. Possible problem of positive conditioning.	Analyze situation. Consider aversive conditioning.
Wolf repeatedly approaches people by itself closer than 30m. Seems to be interested in people.	Demands attention / critical situation. Positive conditioning and strong habituation may lead to an increasingly bold behavior. Risk of injury.	Consider aversive conditioning. Remove the wolf if appropriate aversive conditioning is not successful or practical.
Wolf attacks or injures a human without being provoked.	Dangerous.	Removal.

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