



# Wolf Conservation and Management in Spain, An Open Debate

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Wolf management in Spain is remarkably different at regional scales. South of Douro river, wolves are protected, north of Douro wolves can be hunted, and culling occurs on both sides. After a formal request to include wolves in the Spanish Red List of Threatened Species, wolves have been “listed,” but not as a vulnerable species. Recreational hunting will no longer be a wolf management option, while culling is still allowed. We describe the process to raise wolf protection at the state level, and the factors that should be relevant to guide apex-predator management. Restricting lethal control and favoring predator-prey interactions by reducing livestock depredation should be more feasible with an overarching policy that is binding over the whole range of the species in Spain.

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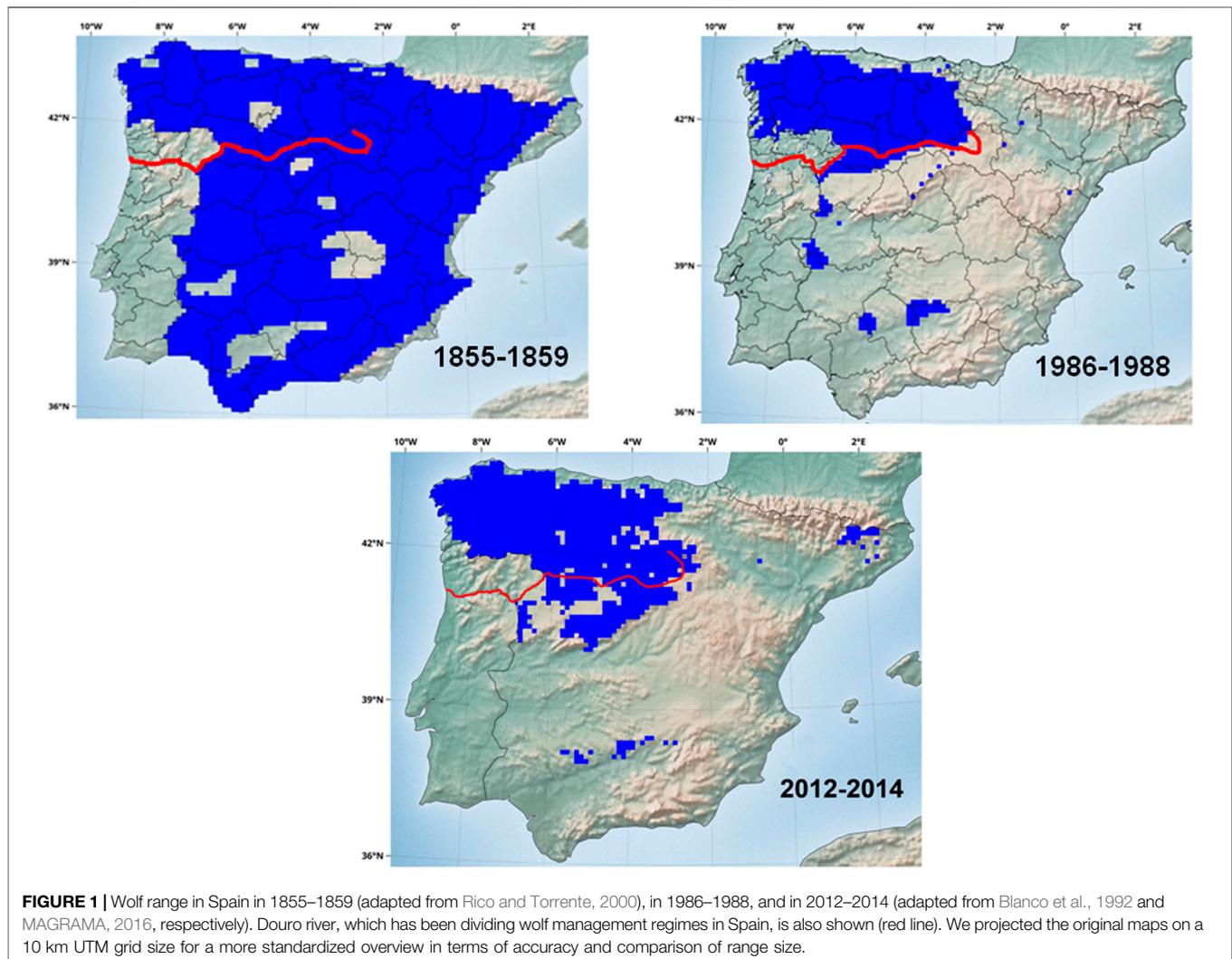
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## INTRODUCTION

Large carnivores are recolonizing former grounds in Europe (Chapron et al., 2014) and North America (Bruskotter and Shelby, 2010), yet carnivore recovery pace and success vary across regions. In central Europe, wolf recovery has been quite fast in Germany (Reinhardt et al., 2019), and wolves even reproduced in Denmark for the first time in ~200 years, although poaching may prevent further expansion (Sunde et al., 2021). In northern Europe, the Scandinavian wolf population started its recovery in the 1990s, but nowadays wolves are more numerous in Sweden than in Norway due to differences in policy (Bischof et al., 2020).

In southern Europe, wolves were eradicated from many countries and, where they persisted, they reached historical minimums and population bottlenecks in the 20th century. Wolves were at their nadir in ~1950–1970 in Italy (Zimen and Boitani, 1975) and Spain (Quevedo et al., 2019). Recently, wolves have shown a faster recovery in Italy, expanding into neighboring countries (Galaverni et al., 2016), while the Iberian wolf population of Portugal and Spain has shown a different trend (Torres and Fonseca, 2016; Quevedo et al., 2019).

In Portugal, wolves are still declining (Torres and Fonseca, 2016). In Spain, a wolf population estimate in 1986–1988 counted 294 packs in ~100,000 km<sup>2</sup> (Blanco et al., 1992), and a study in 2012–2014 reported 297 packs in a similar range, beyond some variation in the south of Douro river (MAGRAMA, 2016). In any case, the range is far from the ~440,000 km<sup>2</sup> (most of the Iberian Peninsula) occupied by the species until the 19th century (Rico and Torrente, 2000) (**Figure 1**). The wolf population in Spain, ~80% of the Iberian population, partially recovered in the 1970–1980s, but the expansion and recovery pace has stagnated compared to the recent and faster recovery in other European areas. The last wolves in southern Spain are likely extinct, and the NW Iberian population is isolated from other European populations (Quevedo et al., 2019).



Wolf management in the Iberian Peninsula is very fragmented and complex. Wolves are protected in Portugal, whereas different management regimes occur in the administrative regions of Spain that support wolves. Spain is divided into 17 regions (and two autonomous cities), a political and administrative division after the Spanish Constitution of 1978, with implications at multiple levels. There are national laws on, for instance, education, public health, and environmental management, but regional governments have independence and the responsibility to make their own regulations. South of Douro river, wolves are listed in Annex II and IV of the EU Habitats Directive, whereas wolves are listed in Annex V north of Douro (Quevedo et al., 2019). Legal hunting in some regions and culling both north and south of Douro occur, e.g., 623 wolves were legally killed in Spain in 2008–2013, 29 of them in areas with strict protection. In contrast, no wolf was legally killed in 2008–2013 in Portugal (Quevedo et al., 2019), but poaching occurs (Torres and Fonseca, 2016). Lethal management of wolves in Spain may limit wolf dispersal and population expansion (Quevedo et al., 2019).

In this scenario, there has been a formal request by an NGO (*Association for the Conservation and Study of Iberian wolves*, ASCEL) to the Spanish government, to include wolves in the Spanish Red List of

Threatened Species as a “vulnerable” species or, alternatively, as “listed” (details below). This would eliminate the fragmented management scenario and would apply the protection of wolves to all of Spain. If wolves were granted that national protective status, 1) lethal control and recreational hunting would not be a wolf management option any longer and, 2) the inclusion in that List should trigger the drafting of a Wolf National Conservation Plan to promote long-term wolf viability.

We explain the process following the request to consider wolves as a vulnerable species, describing the reasoning for the request and the reactions from various stakeholders. We also highlight the factors and scientific data that in our opinion should be most relevant to guide the conservation-oriented management of an apex predator.

## INSIGHTS INTO THE LEGAL FRAME OF WOLF MANAGEMENT IN EUROPE AND SPAIN

Conservation and management plans based on the trophic importance and key ecological role of large carnivores (and wolves in particular) have gained support in different ecosystems

(Hebblewhite et al., 2005; Terborgh and Estes, 2010; Ordiz et al., 2021). In Europe, the Bern Convention (Council of Europe 1979) and the Habitats Directive (European Union 1992) set the stage for wolf management in EU countries, which must use those rules to guide the drafting of national legislation.

In theory, wolves have been a protected species in Spain since it joined the European Union and Bern Convention in 1986. As an EU member, Spain also implemented the Habitats Directive (1992) that used the Douro river as the boundary between two distinct management zones, but there was not a Spanish national law drafted from the Directive until 2007 (Ley 42/2007). This law also created a Spanish Red List of Threatened and Protected Species (Royal Decree 139/2011). That list includes 77 mammals; 25 are “Vulnerable” and eight are in the “Endangered/Extinction risk” category, thus they are subject to more proactive protection, while 44 species are just “Listed” and their management follows less stringent regulation. For instance, the “Endangered” and “Vulnerable” categories of the IUCN Red List are included under the Spanish law, whereas being listed in Spain is not equivalent to other IUCN categories, such as Least Concern or Data Deficient.

Wolves in Spain were only “Listed” in some specific regions-provinces (most Spanish regions include several provinces). In 2011, the Sierra Morena (southern Spain) wolf subpopulation was listed and later (2019), the entire wolf range south of Douro river was also listed. North of Douro, wolves have not been listed until now, and management regimes vary widely among regions. Wolf hunting, hunting and culling, only culling, or no lethal management occur in different regions north and south of Douro, with varying management laws at the regional level (Quevedo et al., 2019). A reason for such complexity, which causes many wolf packs in mountain ranges between regions to be both protected and subject to hunting simultaneously (merely depending on the side of the mountains where they are roaming at a time), is that the national government holds the responsibility to interpret EU laws and set main guidelines at the state level, but regional governments are responsible for the actual management of biodiversity, including wolf management.

## REASONS TO REQUEST THE LISTING OF SPANISH WOLVES AS VULNERABLE SPECIES

In Spain, any citizen or association can promote the inclusion of a species in one of the specific categories of protection under “Ley 42/2007,” providing supportive arguments. The proposals are addressed to the corresponding Spanish ministry (*Ministerio para la Transición Ecológica y el Reto Demográfico*, MITECO). A form to fill in the request is available at the website of the ministry. It includes compulsory fields and additional ones (see **Supplementary Table S1**).

The legal criteria to include a species on the Spanish Red List were approved in 2017 and are based on the IUCN requirements to classify endangered species. The association (ASCEL) that requested the national protection of wolves in Spain argued that the species fulfills the sub-criterion B3, which states that a species must be included as “Vulnerable” in the list when it has experienced a strong range

reduction in historical times (>50% loss of its historical range in the last 100 years), and when there is available habitat for its occurrence, the species is recovering, but it does not occupy 50% of the historical range yet (Spanish Official Bulletin 65).

## OFFICIAL STEPS AND REACTIONS TO THE REQUEST

### The Official Process and Its Outcome

The administrative process to be listed under RD 139/2011 is defined by law and includes several steps, and the competence to assign or modify the protection category of a species lies with the ministry (MITECO). Two committees, two commissions, public consultation processes, and representatives of the different regions are involved in the assessment process. First, the request by ASCEL (October 2019) was evaluated by a national scientific committee, which includes 19 researchers and biodiversity specialists designated by the Spanish government. This committee is an advisory group for MITECO, for the different regions, and for another committee. The scientific committee recommended (February 2020) the listing of wolves in Spain, but abstained from recommending its inclusion as a vulnerable species. The decision was based on a lack of peer-reviewed papers that analyzed the historical change in wolf range in Spain in the 20th century. Based on that assessment and according to the established process, MITECO arranged a technical report and made a decision (March 2020) that agreed with that of the scientific committee: the entire wolf population in Spain would be “Listed” (thus expanding the listing of wolves south of Douro river to the northern portion of the population), but without granting the species the more protective, “Vulnerable” status.

MITECO had to present that wolf listing proposal to the second committee, the “National Wildlife Committee,” with members of public agencies, and to a third one, the “National Commission for the Natural Heritage and Biodiversity.” The latter includes one representative of MITECO and one from each regional government and autonomous city (i.e., one member from MITECO and 19 from regions and cities). A lack of consensus on wolf listing by that commission (February 2021) triggered two voting processes, which ultimately decided wolf listing (nine supportive votes, eight against it, one abstention, and two did not vote). The regions with ~90% of the Spanish wolf population (Galicia, Asturias, Castille and Leon, and Cantabria), whose wolf management is largely based on lethal control, *via* culling and/or hunting, voted against wolf listing. Basque Country, where wolves are protected since 2020, also voted against it. Three regions (Catalonia, La Rioja and Aragón) with sporadic wolf presence and regions without wolves voted for wolf listing.

Next and to accomplish the Law 50/1997, MITECO submitted the wolf listing decision to a first, public consultation; a mandatory, yet not binding step. There were 5,635 responses; 2,446 private persons plus legal entities supported wolf listing, 3,138 were against it, 51 were classified as no preference, and the rest were out of date. Afterwards, MITECO submitted the wolf listing decree draft to the “National Council for the Natural Heritage and Biodiversity” (May 2021) to collect opinions and update the draft. This council includes 57 members of the Spanish and regional governments and

stakeholders, including farmers, hunters, conservation and environmental associations, unions, professional associations, etc. In May 2021, MITECO launched a new public consultation process to assess the wolf listing decree draft, receiving 84 responses; 29 from legal entities (political parties, private companies, agricultural-farming unions, NGOs, and regional and local administrations), and 55 from citizens. The regions that include virtually all Spanish wolves submitted statements to discard the wolf listing decree. In July 2021, MITECO requested opinions about the wolf listing decree draft to its Technical General Secretary and other governmental agencies, collecting responses from the Ministry of Territorial Policy and Public Function and the Ministry of Agriculture, Fisheries, and Food. Finally, MITECO requested a judgment from the “Spanish Kingdom Council,” the highest advisory board, which assesses if rules are in accordance with the overarching Spanish Constitution. As of 20 September 2021, the wolf listing order has been published by MITECO (*Orden TED/980/2021*), modifying RD 139/2011 to include the whole wolf range in Spain as Listed. The rule has been in force since 22 September, and it implies that wolf recreational hunting is no longer a management option. That rule includes two additional provisions: 1) removal of individuals may be granted by regions if depredation preventive actions did not work, control does not negatively affect the favorable conservation status of the species, and the occurrence of significant damage to livestock on the affected farms is justified, taking into account possible recurring or significant damage; and, 2) The Strategy for the conservation and management of wolves in Spain will be approved before 31 December 2021, publishing it in the website of the ministry and in the Spanish Official Bulletin, as requested by Ley 42/2007.

## Social Reactions

Interactions between wildlife and people are often named “human-wildlife conflict.” However, conflicts often involve groups of people with different opinions on wildlife, i.e., they are rather “human-human” conflicts over conservation goals (Redpath et al., 2013). Large carnivores can affect some human activities and trigger mixed perceptions from stakeholders (Redpath et al., 2013; Ordiz et al., 2021). Large carnivore management, especially wolf management, plays out in heated debates over the range of the species (Mech, 1995; Clark et al., 1996; Skogen and Krange, 2003; Treves and Karanth, 2003; Bergstrom et al., 2009; Redpath et al., 2017), and Spain is no exception.

Some hunters, farmers, and regional administrations overlapping the wolf’s range oppose the Spanish wolf listing, and some stakeholders have claimed they would fight in court against a listing decision. According to them, wolves do not need further protection, the MITECO decision is random, there is no scientific or legal evidence supporting wolf listing, the ongoing regional wolf management plans secure long-term wolf conservation, and the Spanish wolf population shows a “favorable conservation status.” The latter is not true according to the last EU Commission report (EU, 2019). Altogether, they claim that the national protection of wolves would lead to “overpopulation” and would increase livestock damage. Nowadays, ~7,000 wolf attacks affecting ~11,000 livestock heads are claimed annually in Spain and ~2.5 million € are paid to compensate presumed losses (data extracted from regional sources,

e.g., from technical reports and online information), with huge variation among regions. Only some regions compensate depredation (Fernández-Gil et al., 2016).

There is also a fragmented scenario among wolf conservation supporters, further illustrating the human-human nature of these issues. Some seek for wolf classification as “Vulnerable,” as ASCEL had requested, to stop lethal control by hunting or culling, while others support the wolf “listing” to avoid recreational hunting, but would permit culling of individuals (as stated in the additional provisions of the recently approved rule), and still others oppose rising wolf protection, arguing that it might increase poaching in retaliation, eventually causing collateral damage to other species.

## WHAT SHOULD ACTUALLY MATTER TO MANAGE AN APEX PREDATOR?

Large carnivore persistence or recovery in human-dominated landscapes has resulted from a mixture of carnivore resilience to persecution, conservation-oriented legislation, and socio-economic changes in human societies in recent decades that led to abandonment of rural areas, among other factors (Chapron et al., 2014; Cimatti et al., 2021). In this context, top-down application of legislation that remains consistent after the successive interpretation from European to national and then regional levels, and solid methods for population monitoring and forecasting (Bischof et al., 2020), seem crucial for conservation and management. Reliable numbers should help soften the crossfire among stakeholders typically engaged in large-carnivore debates.

Large carnivores are keystone species that can trigger multiple effects on ecosystems, with predation being the mechanism driving that ecological role. For wolves to play it, populations should be as close as possible to their ecological carrying capacity, because single individuals should not be expected to play an equivalent function as that of populations (Ordiz et al., 2013; Ordiz et al., 2021 and references therein). Nevertheless, large carnivores are often considered to be conflict-prone species, and human factors play an important role in the decision-making process and management of carnivore populations (Olson et al., 2015; van Eeden et al., 2018; Marino et al., 2021; Salvatori et al., 2021). Scientific data for carnivore management is a must, but it is not enough to manage predators effectively; social acceptability and multidisciplinary approaches are equally important (Brewer and Clark 1994; Wallace, 2003; Treves et al., 2009; Woodroffe and Redpath, 2015), as illustrated by the long administrative process triggered by the request to rise wolf protection in Spain. Indeed, a list of overarching variables to be considered in a proper problem definition of the large-carnivore conservation issue includes: the cultural history involved in carnivore-human coexistence, the valuation and attitudes towards carnivores, the ecology of the species, the management systems and jurisdictions, and the policy process (see Clark et al., 1996 for a detailed list of subvariables). We envision an analysis with these variables in a theoretical policy framework as a next step, because it would be useful to forecast future trends of the wolf-human context and to guide management plans.

These premises set a trade-off for apex predator management. It should imply the least human intervention on the species, while reducing conflict with human interests to the largest possible extent. From a demographic perspective, large carnivore management should aim at minimizing lethal control. Even hunted populations can be close to carrying capacity, but that likely depends on the arrival of immigrants from neighboring areas (Suba et al., 2021), which is not feasible for isolated populations, such as wolves in the Iberian Peninsula. Granting wolves in Spain a level of protection that prevents the regular use of hunting as a management tool should favor self-regulation of the population. Reducing lethal management should improve wolf conservation status and favor connectivity within the Iberian Peninsula and beyond (Quevedo et al., 2019). Connectivity and dispersal would favor genetic recovery of European wolf populations, which have suffered severe bottlenecks and still have low effective population sizes (Sastre et al., 2011; Hindrikson et al., 2016), a conservation problem shared elsewhere with other species (e.g., Taron et al., 2021).

Furthermore, prevention of damage to livestock is crucial to avoid conflict and reduce social pressure for carnivore lethal management (Ordiz et al., 2021). Lethal control does not necessarily reduce depredation, as shown in different areas, including Spain (Fernández-Gil et al., 2016). Accessibility to free-ranging livestock favors wolf attacks in Spain, thus efficient livestock protection should be compulsory if extensive grazing continues to be promoted by European Union's Common Agricultural Policy (CAP) (Recio et al., 2020). Besides reducing conflict, livestock protection would also allow densities of natural prey and predator-prey interactions to become main determinants of wolf carrying capacity and the population size needed for them to play their ecological role (Ciucci et al., 2020).

## CONCLUSION

Large carnivores and their management are controversial worldwide, as illustrated by the long-term wolf delisting process in USA (Bergstrom et al., 2009; Barber-Meyer et al., 2021; Treves et al., 2021). Lethal control of wolves is often used as a "biopolitical" action to affect social values, supposedly producing social tolerance for wolves (Anderson, 2021). Yet, granting wolf hunting does not necessarily favor wolf acceptance (Pepin et al., 2017). In some areas, social values that traditionally considered predators as vermin still allow lethal management of wolves, even in small populations dependent on immigration from neighboring areas (Sollund and Goyes, 2021).

Hunting and culling of wolves and economic compensation for damages attributed to the species are the main tools of wolf management in Spain, omitting, deliberately or not, demographic and ecological components that should also matter for apex predator conservation. The present case in Spain highlights the factors that are arguably important for carnivore conservation and management in human-dominated landscapes. Besides sociological aspects (to improve acceptability by the public and to include sociological

variables that go beyond the ecology of the target species) and demographic considerations (to collect reliable data on population size and trends), other important issues include: 1) recovering historical ranges (which are far from being recolonized by wolves in Spain, a key issue in relation to the national rule of the protective request to consider the species as "vulnerable"), 2) considering the ecological function of apex predators from a holistic point of view for ecosystem recovery and, 3) avoiding fragmentation and a too flexible application of environmental regulations at progressively lower administrative levels. Under an unambiguous legal framework, all of these factors should be included in a multidisciplinary, theoretical framework that would favor practical management and, ultimately, the long-term population viability of wolves.

Although conservation and management plans based on the ecological role of wolves have gained support in different ecosystems (Hebblewhite et al., 2005; Ordiz et al., 2021), further steps are needed to put theory in practice, a concern that applies for wolves in Spain and for this and other species elsewhere. Restricting wolf lethal control and favoring natural predator-prey interactions by reducing depredation on properly protected livestock should help achieve the goals mentioned above; namely, favoring the recovery of the species and its role in nature and its acceptability by the general public. For wolves in Spain, these goals should be more feasible with an overarching Spanish wolf policy that is binding over the whole range of the species. The recently approved listing decision raises wolf protection to the national level, but preventing livestock depredation will be crucial to avoid conflict and, in turn, that the culling continues to be widespread over wolf range.

## AUTHOR CONTRIBUTIONS

AO conceived the idea with input from DC and JE and wrote a first draft of the manuscript, with some sections further elaborated by JE. AO, DC, and JE wrote and revised subsequent versions of the manuscript and approved its submission.

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## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fenvs.2022.781169/full#supplementary-material>

**Supplementary Table 1** | Compulsory fields required in a formal request to include a species in the Spanish lists of protected species or to modify its protection status (left column), and summary of the information included in the request to rise wolf protection (right column). Source of the official form (left column): Spanish *Ministerio para la Transición Ecológica y el Reto Demográfico (MITECO)*. Source of the wolf information (right column): Request submitted by the *Association for the Conservation and Study of wolves (ASCEL)* to include wolves on the list.

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