

1 **Toothless wildlife protection laws**

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39 *Body text*

40 Granting legal protection to an endangered species has long been considered a
41 major milestone for its conservation and recovery. A multitude of examples such as
42 wolves in the contiguous USA (Boitani 2003) or many large carnivore populations
43 in Europe (Chapron et al. 2014) have revealed how instrumental wildlife
44 protection laws can be for species recovery. However, legal obligations to conserve
45 endangered species may be useless if the rule of law is not properly enforced. Such
46 situation is not exclusive to countries with political instability or weak institutional
47 capacities but can also be relevant, for instance, to member states of the European
48 Union and therefore bound to European legislation on nature conservation.

49 The fate of the now critically endangered and isolated wolf (*Canis lupus*)
50 population in Sierra Morena, southern Spain (Andalusia and Castilla-La Mancha
51 Autonomous Regions), well illustrates this lack of compliance with law when
52 preserving contentious species. In 1988, this population was estimated to number
53 between 6 and 10 packs (Blanco et al. 1990). The population was granted both
54 regional (Andalusia, Andalusian Regulation 4/86, January 22; Regional
55 Government of Andalusia 1986; Castilla-La Mancha, Regulation 33/1998, May 5;
56 Regional Government of Castilla-La Mancha 1998) and national protection in 1986
57 (Bern Convention; ratified by Spain in 1986; Spanish Official Bulletin 235, October
58 1, 1986, including the Iberian wolf in annex III: “*protection of fauna species*”;
59 European Commission 1979), and later European protection under the Habitats
60 Directive 92/43/EEC (annexes II and IV) in 1992. Despite this comprehensive and
61 strict legal protection, the implementation of recovery actions by Andalusian
62 authorities since 2003 (i.e. implementation of damage prevention measures and
63 compensation systems; Andalusian Wolf Conservation Program;

64 www.juntadeandalucia.es) and the approval by Spanish authorities in 2005 of a
65 short-term recovery goal of 15 packs (Spanish Wolf Working Group 2005), all
66 legally required conservation initiatives, have either failed or not been considered.
67 For example, no population reinforcement has ever been implemented.

68 While no detailed information exists about the incidence of inbreeding
69 (Ferrand et al. 2005) or infectious diseases on this population, multiple facts still
70 suggest that, in the absence of efficient human persecution, population growth and
71 recovery should have occurred. Wolves are known to exhibit a high biological
72 resilience as illustrated by high growth rates even in very small and inbred
73 populations (Vilà et al. 2003). When protection was granted, this population was
74 large enough (6-10 packs; Blanco et al. 1990) to escape stochastic events and
75 benefited from a good amount of wild prey and vegetation cover (Azorit et al.
76 1998; Blanco 2001). The population further occurs in an area with very few paved
77 roads (0.16 km/km²) and a remarkable low and decreasing human population (ca.
78 3 inhabitants/km²) (Muñoz-Cobo et al. 2000; Blanco 2001; Muñoz-Cobo et al.
79 2002). Conflict with farmers has also remained at low intensity, with for example, a
80 mean annual number of compensated livestock attacks attributed to wolves equal
81 to 15.5 attacks between 1986 and 2012 in Andalusia (range 1-42; after a period of
82 very low mean annual number of attacks between 1986 and 1994 -2.8 attacks-,
83 this number increased to a mean of 25.8 attacks between 1995 and 2008, and
84 dropped again to 1.8 attacks between 2009 and 2012; Andalusian Wolf
85 Conservation Program; www.juntadeandalucia.es). Finally, Sierra Morena habitat
86 could in fact be considered as more suitable than other areas with wolves in the
87 Iberian Peninsula (Llaneza et al. 2012).

88 However, contrary to all other European wolf populations sharing similar or
89 even weaker legal status, where population stability or increase are the norm
90 (Chapron et al. 2014), this population has, after 28 years of protection, not
91 recovered but instead declined with only 1 pack in 2012 (Kaczensky et al. 2013). It
92 is worth mentioning that, in July 2014 in the region of Sierra Morena of Castilla-La
93 Mancha, bordering with the Andalusian wolf range, twenty-five livestock breeders
94 handling ca. 7,500 livestock heads (mainly sheep, 7,150 heads) in semi-extensive
95 regimes reported not to have suffered any damage attributed to wolves nor having
96 any evidence of wolf presence at least during the last decade (J.C. Blanco, com.
97 pers.).

98 Unless effective actions are implemented, this population will be the first
99 wolf population to become extinct in Europe in modern times. Despite wolf range
100 here largely occurs in places legally listed as Sites of Community Importance
101 within the Natura 2000 network (under the Habitats Directive) or even nature
102 reserves, the main land use is large fenced private properties (covering 85% of the
103 estimated wolf range in 2002; Muñoz-Cobo et al. 2002) running recreational big
104 game hunting businesses through intensive game ranching (hunting business
105 started in the 1970s and reached the dominance among land uses in less than 15
106 years). Game management causes red deer density to approach the highest figures
107 in Europe (usually ranging between 20 and 60 heads/km², but up to ca. 100
108 heads/km²; Azorit et al. 1998; Blanco 2001). The most traditional way of hunting
109 here, namely *montería*, is based on the previous selection of dense vegetation
110 patches where dogs are released to drive game ungulates to the surrounding open
111 areas, where hunters are placed. In addition, apart from this commercial hunting,
112 where hunters demand high hunting bags, other selective *monterías* are also

113 carried out in order to increase trophy quality in the deer population of each
114 estate.

115 Such intense game management (e.g. game ungulates are provided with
116 food and water) facilitates predation on game ungulates by wolves, but also have
117 triggered strong wolf persecution because of competition for game species and
118 other economic loss associated to this hunting business (Blanco et al. 1990, 1992;
119 Blanco 2001; Muñoz-Cobo et al. 2002). Predation impact of this small wolf
120 population on the red deer population has been estimated to be negligible
121 (between 0.3 and 0.7 % of total deer biomass; Blanco et al. 1992). However, the
122 renown of *monterías* depends on the number and quality of animals shot. The fact
123 that wolves can displace game ungulates from the selected vegetation patches for
124 the *montería* to other areas where hunting was not programmed impact on the
125 profitability of the hunting. Although virtually no data have been collected on the
126 strength of the conflict that wolves have likely prompted on big-game raisers,
127 today's wolf quasi-extinction suggest that the current situation is not only
128 culturally driven, but also as a consequence of the perception that wolves are
129 hardly compatible with this hunting business, in which game ungulates are
130 handled like extensive livestock.

131 The Sierra Morena wolf case exemplifies how even comprehensive and
132 strict protection laws can be toothless and fail to protect wildlife on a long term
133 perspective when confronted with hostile particular interests; illustrating how
134 legal protection can be an insufficient, albeit necessary, tool when conserving
135 conflicting species. The successful conservation of biodiversity requires adequately
136 monitoring not only the status of species and the effectiveness of implemented
137 conservation actions but also the enforcement of the rule of law. In the case of

138 wolves in Sierra Morena, proactive measures would include an intensive
139 monitoring program using non-invasive DNA and animal collaring techniques to
140 estimate the number of wolves remaining in this population, an effective strategy
141 to detect and reduce the illegal killing of wolves (including educational programs
142 or generating peer pressure for not poaching wolves) and, possibly, a population
143 restocking. Such law enforcement may also require solving confronted sectoral and
144 private interests.

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196 One of the last graphic evidence of wolves in Sierra Morena from 2006. Photo
197 courtesy of Francisco José García.

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