The IUCN Red List of Threatened Species™
ISSN 2307-8235 (online)
IUCN 2015: T12520A174111773
Scope(s): Global, Europe, Mediterranean
Language: English

Lynx pardinus, Iberian Lynx

Errata version

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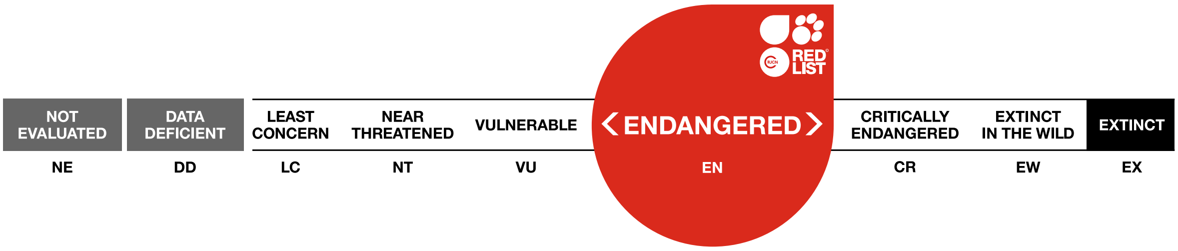

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Citation: Rodríguez, A. & Calzada, J. 2015. *Lynx pardinus* (errata version published in 2020). *The IUCN Red List of Threatened Species* 2015: e.T12520A174111773. https://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T12520A174111773.en

Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Carnivora	Felidae

Scientific Name: *Lynx pardinus* (Temminck, 1827)

Common Name(s):

- English: Iberian Lynx, Pardel Lynx, Spanish Lynx
- French: Lynx d'Espagne, Lynx pardelle
- Spanish; Castilian: Lince Ibérico

Taxonomic Notes:

Was previously considered conspecific with *Lynx lynx* by some authorities, but is currently accepted as a distinct species on the basis of both genetics (Johnson *et al.* 2006, Eizirik *et al.* submitted) and morphology (Werdelin 1981, Wozencraft 2005).

Assessment Information

Red List Category & Criteria: Endangered D ver 3.1

Year Published: 2015

Date Assessed: April 15, 2014

Justification:

After six decades of decline and pronounced range contraction, between 2002 and 2012 population size of the Iberian Lynx has continuously increased to 156 mature individuals in the two remaining wild subpopulations (Simón et al. 2012). Likewise, the area of occupancy experienced a three-fold increase to reach 1,040 km². One subpopulation contains 68% of all mature individuals. Twelve mature individuals survive in two additional localities where reintroductions are currently under way (Simón et al. 2012). As a result of the increasing population size, the Iberian Lynx no longer qualifies for Critically Endangered status and is therefore listed as Endangered under criterion D. The improved status of this species is all due to intensive ongoing conservation actions.

Detailed demographic projections suggest that future range expansion and population increase depend upon continued reintroductions. In the absence of reintroductions, a marked decline would quickly re-occur and extinction is predicted to occur within 35 years (Fordham *et al*. 2013). Major future threats include uncertainty about the identity and intensity of environmental drivers on lynx prey in regions where conservation efforts are currently concentrated, and uncertainty about the suitability of these regions for lynx under future climate change (Fordham *et al*. 2013).

Previously Published Red List Assessments

2008 – Critically Endangered (CR)

2006 – Critically Endangered (CR)

2002 – Critically Endangered (CR)

1996 – Endangered (EN)

1994 – Endangered (E)

1990 – Endangered (E)

1988 – Endangered (E)

1986 – Endangered (E)

1965 – Unknown (N/A)

Geographic Range

Range Description:

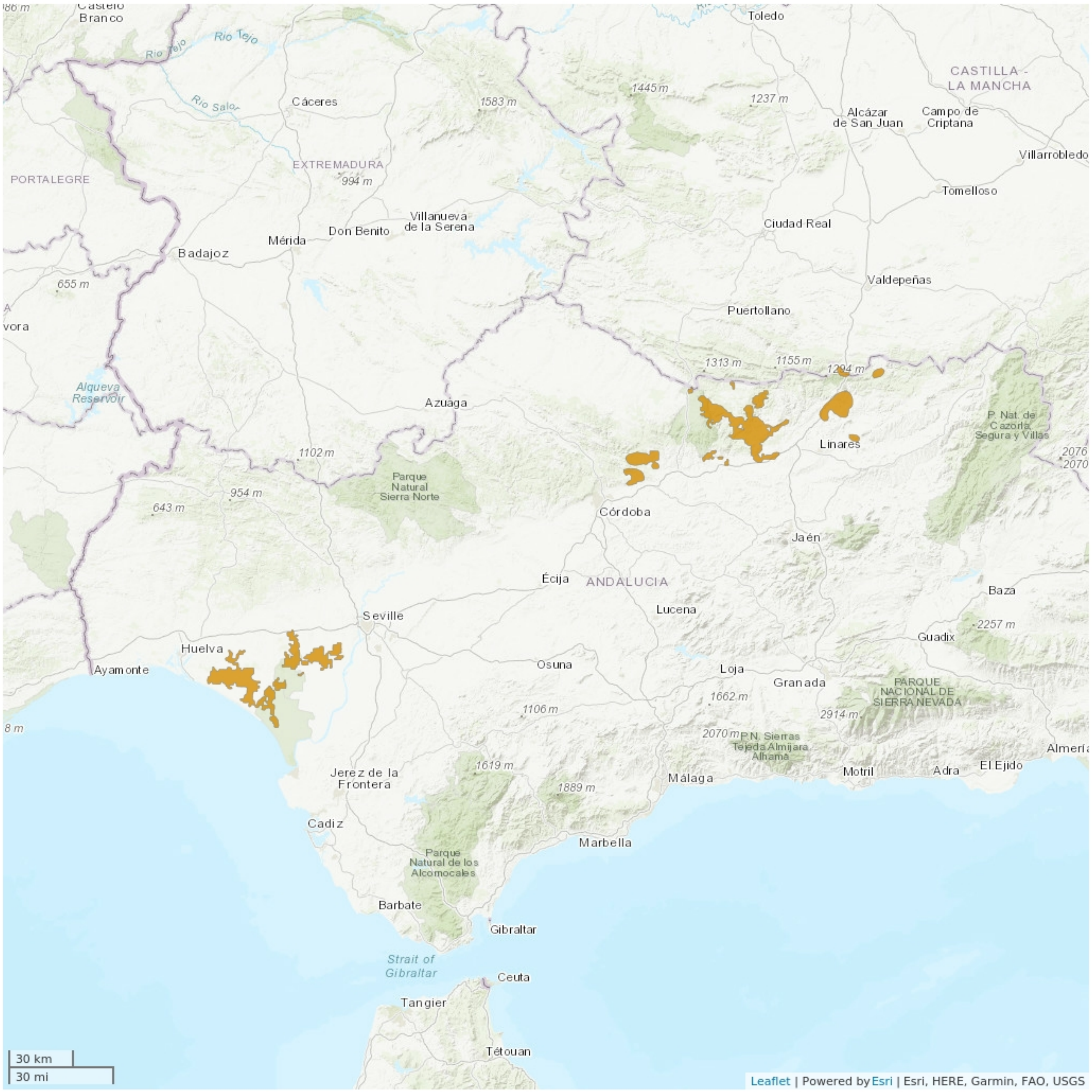
The Iberian Lynx is restricted to two separate regions of southwestern Spain, namely eastern Sierra Morena and the coastal plains west of the lower Guadalquivir. These isolated subpopulations have been named by Simón *et al*. (2012) as Andújar-Cardeña and Doñana-Aljarafe, respectively. Two new nuclei are being founded though reintroduction 30 km southwest (Guadalmellato) and northeast (Guarrizas), respectively, of the existing Sierra Morena subpopulation, and contained a few breeding females in 2012 (Simón 2013). Five additional sites in four Spanish regions (Andalusia, Castilla-La Mancha, Extremadura, Murcia) and Portugal are being prepared for reintroduction; the first release in Portugal happened in late 2014 (Iberlince LIFE project 2014).

Country Occurrence:

Native, Extant (resident): Spain

Extant & Reintroduced (resident): Portugal (Portugal (mainland))

Distribution Map

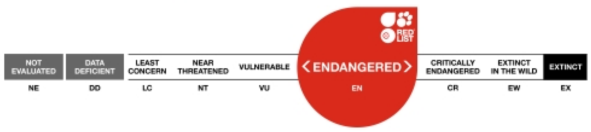


Legend

EXTANT (RESIDENT)

Compiled by:

Iberlince / EU LIFE Programme; www.iberlince.eu 2015



The boundaries and names shown and the designations used on this map do not imply any official endorsement, acceptance or opinion by IUCN.

Population

The extensive survey by Guzmán *et al.* (2004), carried out primarily during 2001, yielded an estimate of 26-31 breeding territories which could correspond to a maximum of 62 mature individuals. According to estimates produced in the framework of successive European Union LIFE Nature conservation projects, population size tripled from 52 mature individuals in 2002 to 156 in 2012 (Simón *et al.* 2012, Simón 2013).

Current Population Trend: Increasing

Habitat and Ecology (see Appendix for additional information)

The Iberian Lynx is a strict feeding specialist; the European Rabbit (*Oryctolagus cuniculus*) accounts for 80-99% of its diet (Ferreras *et al.* 2010). The Iberian Lynx is also a habitat specialist that breeds only in Mediterranean shrubland containing dense rabbit populations (Palomares *et al.* 2000, Palomares 2001). Threshold rabbit densities for lynx reproduction are 4.5 ind./ha during the annual population peak and 1.0 ind./ha during the annual trough (Palomares *et al.* 2001). Productive breeding territories also contain a high density of scrub-pasture ecotones which favour both ecological conditions for rabbits and a structure suitable for lynx hunting (Palomares 2001, Fernández *et al.* 2003). Other essential habitat elements include natural cavities that are used as natal dens (Fernández *et al.* 2002, 2006). On the other hand, forestry landscapes, farmland or other open land devoid of native shrubs are rarely used by resident lynx (Palomares *et al.* 1991) but occasionally used by subadults during natal dispersal (Palomares *et al.* 2000).

Systems: Terrestrial

Threats (see Appendix for additional information)

During the 20th century hunting and trapping were major sources of mortality associated with predator control and exploitation of wild rabbits (Rodríguez and Delibes 2004). Whereas the importance of this factor as a threat for Iberian Lynx has decreased (Ferreras *et al*. 2010), during the last years some lynx have been shot or caught with illegal traps (Iberlince LIFE Project 2014). Road casualties typically produce several losses each year (Simón *et al*. 2012, Iberlince LIFE Project 2014), as the length of paved or widened roads, as well as average traffic loads, have significantly increased in and around lynx areas (Ferreras *et al*. 2010).

Homogenization of mosaic cultural landscapes due to agricultural and silvicultural intensification during the 20th century conceivably contributed to lynx decline (Rodríguez and Delibes 2002, Ferreras *et al*. 2010). Continued trends of abandonment of marginal livestock farming and loss of small game, sometimes followed by afforestation, further reduce the amount of potentially suitable habitat for reintroduction. Without viable land uses, maintaining suitable mosaic landscapes for the Iberian Lynx would require enduring and expensive intensive management (Rodríguez 2013). Even in landscapes with suitable structure and subject to intensive conservation management, rabbit abundance exhibits large temporal variability closely tracked by the probability of lynx breeding (Palomares *et al*. 2001, Fernández *et al*. 2007, Iberlince LIFE project undated).

Effective population size does not exceed 25 for each isolated subpopulation (Casas-Marcé *et al*. 2013), announcing further losses of genetic diversity and accumulation of inbreeding through genetic drift.

Indeed, persistent small population size over lynx generations, especially in the lowlands of the Doñana region, have produced signs of both demographic and genetic deterioration, including biased sex-ratios, decreased age of territory acquisition and litter size, and increased mortality due to disease and other natural causes (Palomares *et al*. 2012). Lowered demographic and genetic performance could positively interact in the form of an extinction vortex (Palomares *et al.* 2012).

As a manifestation of global change, human-assisted spread of virulent diseases affecting European Rabbits had catastrophic effects on Iberian Lynx populations in the past (Ferreras *et al*. 2010). Although rabbits could eventually develop resistance, viral diseases remain a recurrent threat as the arrival of new strains may cause again a lasting depression of food availability for the Iberian Lynx. Moreover, the prevalent rabbit lineage in southwestern Iberia, where rabbit restocking and other conservation measures take place, might be more vulnerable to rabbit haemorrhagic disease (RHD) than the northeastern lineage (Real *et al.* 2009). For example, a new RHD strain has been blamed for an annual 62% decrease in productivity (average number of kittens per territorial female) in Andújar-Cardeña subpopulation (Iberlince LIFE project, undated). Likewise, diseases affecting felids also spread, sometimes with the help of uncontrolled pets that become feral or visit lynx areas from nearby towns. For example, in 2007 a feline leukaemia outbreak killed a substantial fraction of lynx in Doñana (López *et al*. 2009, Palomares *et al*. 2011a). Finally, detailed models combining ecological niche and metapopulation dynamics show that, without intensive intervention, climate change will rapidly decrease lynx populations and would probably lead to Iberian Lynx to extinction within 35 years (Fordham *et al.* 2013).

Conservation Actions **(see Appendix for additional information)**

Conservation actions undertaken during the last decade have been reviewed by Ferreras *et al*. (2010), Palomares *et al*. (2011b) and especially Simón *et al*. (2012).

The main goal of habitat management is increasing prey density. Food management includes supplementation of rabbits within enclosures and boosting wild rabbit populations. Attempts to augment rabbit numbers are carried out basically through restocking in or out predator-proof enclosures, but also acquiring rabbit hunting rights or enhancing pastures and refuge for wild rabbits. Other important resources for lynx that may be in short supply in some localities, such as cavities usable as breeding dens or artificial water spots, are provided. Management is applied to sites where suboptimal habitat quality may preclude settlement of subadults born nearby.

Although hunting or trapping might not be as important a mortality factor as it was in the past, lynx areas are regularly monitored for illegal traps. Measures for traffic calming and some crossing facilities have been implemented especially in road black spots. Awareness campaigns systematically performed in and around lynx areas as well as in reintroduction sites warn about the drastic effects of poaching on small populations, and informs on the conservation benefits and ecosystems services associated with Iberian Lynx preservation. Parallel education programmes target schools and the general public, which may be also engaged as volunteers.

Several NGOs and public administrations acquire rights on specific land uses, or help landowners to maintain their properties compatible with the conservation of the Iberian Lynx by compensating economic losses in which owners incur as a result of conservation action.

Some adult lynx have been translocated in order to alleviate the effects of inbreeding in the Doñana subpopulation. Additional wild individuals have been translocated some 30 km away as founders of two ongoing reintroduction attempts in Sierra Morena. A few captive-born individuals have also been used in reintroductions, after the first births of the captive-breeding programme took place in 2005 (Vargas *et al*. 2009). To date the *ex situ* conservation programme for the Iberian Lynx have produced over 270 individuals, and as the captive population has been built, captive-born animals are expected to be regularly used for reintroduction (Iberian Lynx Ex-situ Conservation Programme 2014). Recent models show that, to be effective, reintroductions should take into account the joint effects of climate change, prey abundance and habitat connectivity (Fordham *et al*. 2013).

The Iberian Lynx is fully protected in Spain and Portugal, listed on CITES Appendix I, and on Appendix II of the Bern Convention, and Annexes II* and IV of the EU Habitats and Species Directive.

Future actions

Two main avenues can be envisaged for lynx conservation, namely consolidation of existing populations and recolonization, either natural or assisted.

Continued intensive management, mainly in the form of habitat enhancement and increased prey density (Ferreras *et al*. 2010, Simón *et al*. 2012), has been suggested to resist the progressive effects of an extinction vortex whose symptoms can be noted at least in the Doñana population (Palomares *et al*. 2012). Other components of intensive management include reduction of mortality rates from road casualties or game management (Rodríguez and Delibes 2004), and prevention of disease outbreaks transmitted by domestic animals or wildlife reservoirs (Millán *et al*. 2009).

Natural recolonization requires increasing the chances for floaters to survive and establish in large areas surrounding occupied nuclei (Rodríguez and Delibes 2003, Palomares *et al*. 2011b, Rodríguez *et al*. 2012). These areas may be too large for intensive species-based management to be an option, but a shift to area-based, softer management could be considered. Such management could include tax incentives for small game management, reduced transportation, industrial or urban developments, enforcement of regulations on predator control, and awareness campaigns directed to local people.

Regarding assisted recolonization, so far wild lynx made the bulk of founders for reintroduced populations. Continued extraction of wild lynx might not be sustainable in the long term if consolidation of existing nuclei is aimed and if extractions reduce the chances of natural colonization by surplus dispersing lynx. Individuals produced by the captive breeding programme may progressively increase their proportion in the groups of founders. This may be accompanied by an improvement of the performance (survival and eventually reproduction) of released captive-bred individuals, perhaps by raising them in semi-natural conditions. Design of the genetic composition of founders should alleviate the markedly low genetic diversity of wild populations (Casas-Marcé *et al*. 2013). Adaptive selection of new reintroduction sites should also consider both present and forecast ecological suitability (Fordham *et al*. 2013).

Credits

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Authority/Authorities: IUCN SSC Cat Specialist Group (wild cats)

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External Resources

For Supplementary Material, and for Images and External Links to Additional Information, please see the Red List website.

Appendix

Habitats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Habitat	Season	Suitability	Major Importance?
3. Shrubland -> 3.8. Shrubland - Mediterranean-type Shrubby Vegetation	Resident	Unknown	-

Threats

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Threat	Timing	Scope	Severity	Impact Score
1. Residential & commercial development -> 1.1. Housing & urban areas	Ongoing	-	-	Low impact: 3
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.1. Annual & perennial non-timber crops -> 2.1.3. Agro-industry farming	Ongoing	-	-	Low impact: 3
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
2. Agriculture & aquaculture -> 2.2. Wood & pulp plantations -> 2.2.2. Agro-industry plantations	Ongoing	-	-	Low impact: 3
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		
4. Transportation & service corridors -> 4.1. Roads & railroads	Ongoing	-	-	Low impact: 3
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.2. Species disturbance		
5. Biological resource use -> 5.1. Hunting & trapping terrestrial animals -> 5.1.2. Unintentional effects (species is not the target)	Ongoing	-	-	Low impact: 3
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
8. Invasive and other problematic species, genes & diseases -> 8.5. Viral/prion-induced diseases -> 8.5.1. Unspecified species	Ongoing	-	-	Low impact: 3
	Stresses:	2. Species Stresses -> 2.1. Species mortality 2. Species Stresses -> 2.3. Indirect species effects		
8. Invasive and other problematic species, genes & diseases -> 8.5. Viral/prion-induced diseases -> 8.5.2. Named species	Ongoing	-	-	Low impact: 3
	Stresses:	2. Species Stresses -> 2.1. Species mortality		
11. Climate change & severe weather -> 11.1. Habitat shifting & alteration	Ongoing	-	-	Low impact: 3
	Stresses:	1. Ecosystem stresses -> 1.1. Ecosystem conversion 1. Ecosystem stresses -> 1.2. Ecosystem degradation		

Conservation Actions in Place

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Action in Place
In-place research and monitoring
Action Recovery Plan: Yes
Systematic monitoring scheme: Yes
In-place land/water protection
Conservation sites identified: Yes, over entire range
Percentage of population protected by PAs: 81-90
Area based regional management plan: No
Occurs in at least one protected area: Yes
Invasive species control or prevention: Not Applicable
In-place species management
Harvest management plan: No
Successfully reintroduced or introduced benignly: Unknown
Subject to ex-situ conservation: Yes
In-place education
Subject to recent education and awareness programmes: Yes
Included in international legislation: Yes
Subject to any international management / trade controls: Yes

Conservation Actions Needed

(http://www.iucnredlist.org/technical-documents/classification-schemes)

Conservation Action Needed
1. Land/water protection -> 1.1. Site/area protection
1. Land/water protection -> 1.2. Resource & habitat protection
2. Land/water management -> 2.1. Site/area management
2. Land/water management -> 2.3. Habitat & natural process restoration
3. Species management -> 3.2. Species recovery
3. Species management -> 3.3. Species re-introduction -> 3.3.1. Reintroduction
3. Species management -> 3.4. Ex-situ conservation -> 3.4.1. Captive breeding/artificial propagation
3. Species management -> 3.4. Ex-situ conservation -> 3.4.2. Genome resource bank

Conservation Action Needed
4. Education & awareness -> 4.3. Awareness & communications
5. Law & policy -> 5.2. Policies and regulations
5. Law & policy -> 5.3. Private sector standards & codes
5. Law & policy -> 5.4. Compliance and enforcement -> 5.4.3. Sub-national level
6. Livelihood, economic & other incentives -> 6.4. Conservation payments
6. Livelihood, economic & other incentives -> 6.5. Non-monetary values

Additional Data Fields

Distribution
Extreme fluctuations in area of occupancy (AOO): No
Lower elevation limit (m): 0
Upper elevation limit (m): 1,300
Population
Number of mature individuals: 156
No. of subpopulations: 2
No. of individuals in largest subpopulation: 106

Errata

Errata reason: The lower elevation limit was corrected from 400 m to 0 m.

The IUCN Red List Partnership

The IUCN Red List of Threatened Species™ is produced and managed by the IUCN Global Species Programme, the IUCN Species Survival Commission (SSC) and The IUCN Red List Partnership.

The IUCN Red List Partners are: Arizona State University; BirdLife International; Botanic Gardens Conservation International; Conservation International; NatureServe; Royal Botanic Gardens, Kew; Sapienza University of Rome; Texas A&M University; and Zoological Society of London.