



Biodiversidad Aragonesa

INTRODUCTION

The aim of this paper is to propose conservation strategies to **preserve the Pyrenean brown bear population**, which is considered to be in a critical status. It has experienced a significant reduction this last century, going from 150 bears in 1900 to 25-30 in 2012 (Palazon et al. 2012). Further, it is divided in two subpopulations.

The major decline has been attributed to anthropogenic factors: overhunting, habitat reduction and fragmentation, direct persecution, poisoning, etc. yet, the actual lack of recovery seems to be consequence of an increased habitat fragmentation, leading to inbreeding depression, isolation and/or sexually selected infanticide.

Here I **evaluate two conservation strategies**: first I will assess the **success of past translocations** in the Pyrenees, suggesting the possibility of a **future bear release**. Then, I will discuss the **connectivity chances between both subpopulations through a corridor**, which could be increased if **habitat quality improvements occurred**.

A FUTURE BEAR TRANSLOCATION

Reintroductions are necessary to accelerate bear recolonization processes, which happen slowly due to relatively low reproductive rates. To date, two successful bear translocations have been achieved in the central Pyrenees, both with bears captured in Slovenia:

➤ **1996-1997** : Ziva, Melba (1996) and Pyros(1997)

They showed similar postrelease movement pattern (Fig.1), consistent with the spatial behavior of 8 reintroduced brown bears in the Italian Alps. Also, they could find **enough available resources**, because both females gave birth the following spring. Pyros has given at least 23 cubs in 15 years.

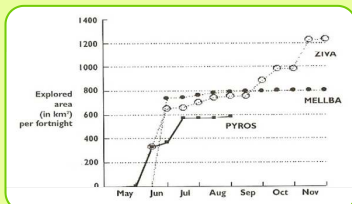


Fig. 1. Ziva, Melba and Pyros spatial behavior: a rapid increase in home range during the first weeks and then stabilization around the area they first explored (Quenette et al. 2000)



European Wildlife

➤ **2006**: Hvala, Sarousse, Palouma, Francka and Balou

Hvala and Sarousse have also bred several times after being released, contributing to the **increasing trend** shown by the Central subpopulation since the first translocation program (Fig. 2). Nonetheless, the decline persisted in the Western subpopulation losing its last female on November 2004.

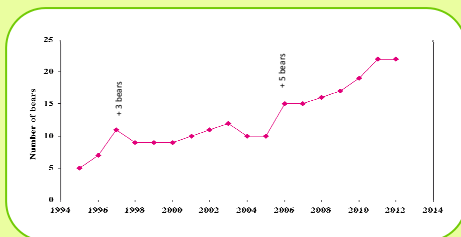


Fig. 2. Evolution of the minimum number of bear effectives in the Pyrenees after 1995 (Camarra et al. 2012)

Under the IUCN definition of viable population (population extinction probability <10% in 100 years), Chapron et al. 2009 assessed the minimum number of individuals that should have been translocated for 2005:

- Western subpopulation: 10 females + 3 males
- Central subpopulation: 3 females + 1 male

These numbers should be updated, since there is no females in the Western subpopulation, and the demographics in the Central may have changed.

HABITAT QUALITY AND POTENTIAL CORRIDORS

To evaluate the bear habitat suitability, it was used data collected on habitat preferences of the Pyrenean brown bear (Table 1). For each category in Table 2, it was created a vectorial cover of buffers, as bears showed a tradeoff between human presence and food resources.

Selection	Elevation (m)	Vegetation cover
-	1801-2300	Shrub, Pastures, Cultivation areas and urban areas, Non alpine bare rocks
+	801-1300	Oak/Beech, Hazel (spring), Mountain Pine (autumn)
++	1301-1800	Silver fir

Table 1. Habitat use of the translocated brown bears in the central Pyrenees. (+ and - : indicates positive and negative significant selection) (Palazon et al. 2002)

Selection	Distances to urban areas (m)	Distances to roads (m)	Distances to anthropogenic areas (m)
-	0-1000		
-		0-500	
+	1000-2500	500-1000	100-1000
++		2000-3000	
++		1000-2000	

Table 2. Habitat use of the translocated brown bears in the central Pyrenees. (+ and - : indicates positive and negative significant selection) (Palazon et al. 2002)

Results show that there is **still suitable habitat for bears** in the Pyrenees (Fig. 3). Besides, that good habitat could likely **support more than 110 individuals** (based on the observed density of the Cantabrian bear population, Martin et al. 2012).

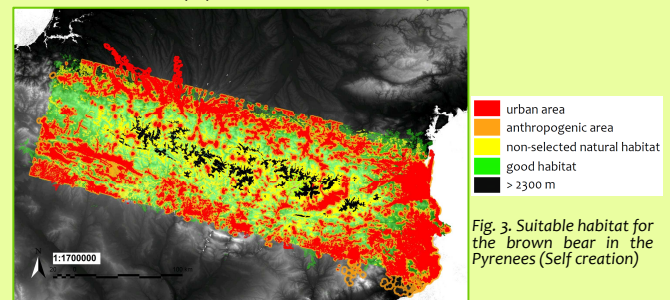


Fig. 3. Suitable habitat for the brown bear in the Pyrenees (Self creation)

3 potential corridors could connect the Western and Central subpopulations as well as the suitable areas (Fig.4). From those, the northern corridor would be the best option, supported by the dispersion of a Male through the northern French Pyrenees in 2000.

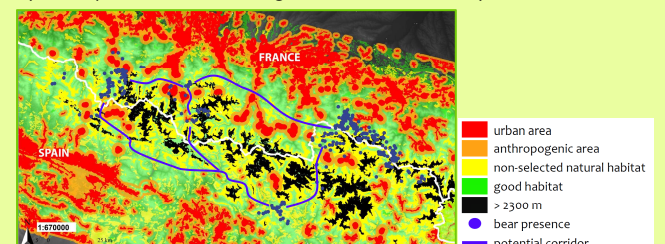


Fig. 4. Potential corridors to connect the Central subpopulation and the Western subpopulation of the Pyrenean brown bear population (Self creation)

CONCLUSIONS

- The two bear translocations achieved on the central Pyrenees have been successful. Since then the Central subpopulation has shown an increasing trend. However, the native Western subpopulation is still in a critical status.
- A female translocation is urgent in the Western subpopulation, which should be done soon if native genes are wished to be preserved. This would also increase genetic variability in the whole population.
- The potential corridor proposed here could connect the two subpopulations if habitat improvements and management actions are implemented
- Increasing the suitable bear habitat would enhance survival rates from the actual population, as well as increase success chances if a further translocation is achieved.

References:

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