

# EL ÁGUILA DE BONELLI TIENE FUTURO EN CERDEÑA: AQUILA A-LIFE

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## ✦ CURRENT DISTRIBUTION OF BONELLI'S EAGLE IN ITALY

Bonelli's eagle is among the most threatened species in Italy. Once widespread and relatively abundant in Sicily, Sardinia and in the southern regions of Italy, the species was considered rare and irregular in central and northern Italy (Moltoni 1945). It is currently breeding only in Sicily, while there are no valid reports of breeding attempts or sightings for Sardinia since few decades. In Sicily, 44 territorial pairs have been reported in 2016, with 28 fledged young (2016, LIFE14 NAT/IT/1017 – ConRaSi). It is reported as rare and irregular in Calabria, with no confirmed territorial pairs. The sharp decline of the species in Italy has been due to direct persecution, which is still a well documented threat in Sicily, mainly for collection purposes and falconry. Illegal trade of eggs and chicks taken from Sicilian pairs has been reported several times in recent years. Other causes are the decline of prey species, direct persecution as pest species until its full protection (1977), use of biocides in agriculture (Massa 1976). The species is presently reported as critically endangered in the "Red List of Italian Vertebrates" (Rondinini *et al.* 2013).

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## ✿ SARDINIA, A NEW CHANCE FOR THE SPECIES

Sardinia is located in the Tyrrhenian sea, approximately 188 km far from mainland Italy and only 11 km from Corsica (France). It is the second largest island of the Mediterranean (24.000 km<sup>2</sup>) after Sicily. It is 270 km long and 145 km wide and it encompasses a variety of habitats. Lowlands and rocky uplands occupy 18% of the territory while 68% is hilly with variable morphology and 14% is mountainous, with elevation up to 1834 m asl (Gennargentu Massif, Camarda et al. 2015).

Bonelli's eagle was once widespread and the species was considered very common (Cara 1842) in the island (Fig.1 and table 1). In the first half of the 1900 the species is reported in the south-eastern part of the island. Later, sightings cover approximately the whole island, even if an increase of interests in the species might have improved the knowledge of its distribution. In 1972, Schenk reported a population of 30 pairs for the island. The last confirmed observation is dated 1990, even if it is possible that few remaining individuals were still present in the island at that time. Extinction causes are not well known: according to Schenk (1976) direct persecution by shepherds and hunters has been a key factor leading to the decline of the species, along with the removal of chicks and eggs for collection. However, a change in attitude has occurred in the island as demonstrated also by the lack of persecution against the Golden Eagle (*Aquila chrysaetos*), whose population has shown a significant recovery from previous periods and has considerably increased in the last decades.

## ✿ THE REINTRODUCTION OF BONELLI'S EAGLE IN SARDINIA: LIFE PROJECT "AQUILA A-LIFE - ACCOMPLISH WESTERN MEDITERRANEAN BONELLI'S EAGLE RECOVERY BY WORKING TOGETHER FOR AN ELECTRICITY GRID SUITABLE FOR BIRD".

The reintroduction of Bonelli's eagle in Sardinia: Life project "Aquila a-LIFE - Accomplish Western Mediterranean Bonelli's Eagle recovery by working together for an electricity grid suitable for bird".

The Life project "Aquila a-Life" is aimed at increasing the extent of occurrence of the Bonelli's Eagle population in the west Mediterranean, improving its conservation status and contributing to the restoration of the

ecosystems where it once lived. The reintroduction of the species in Sardinia is foreseen in suitable sites, chosen within local Special Protected Areas (SPA), in the Natura2000 network. This action will benefit from all the recent experiences derived from the reintroduction of the species carried out in Spain and elsewhere in the species distribution range (this volume). The most relevant step is the choice of suitable release sites. To achieve this goal, the following relevant aspects will be taken into account:

- Electricity grid. Due to the vulnerability of the species to electrocution a risk assessment map will be produced for each possible release site. The electric line network in Sardinia is less developed if compared to other regions of mainland Italy and many areas are characterized by a limited coverage.
- Presence of the Golden Eagle, notably in relation to nesting sites. The Golden Eagle might interfere with the re-colonization and nesting of Bonelli's eagle through direct competition for nesting cliffs. In Sardinia, 57 golden eagle nesting pairs have been reported (max estimate 70), mainly located in central Sardinia (25 pairs, Ruiu 2017). Therefore, the location of golden eagle nesting sites will be duly considered when choosing release sites.
- Prey availability. Several prey species suitable for Bonelli's eagle are present in Sardinia: Hooded Crow (*Corvus cornix*) which is also heavily controlled through shooting and trapping, Barbary Partridge (*Alectoris barbara*), Sardinian Cape Hare (*Lepus capensis mediterraneus*) and European Rabbit (*Oryctolagus cuniculus*).

All possible release sites will be ranked according to a suitability index, in order to choose the best ones for the release of eagles. Reintroduction of Bonelli's eagle will start in 2018 and will last five years; the release of at least 5 individuals per year is foreseen.

The project is coordinated by GREFA (Grupo para la rehabilitación de la fauna autóctona e su hábitat) in partnership with Diputación Foral de Álava – Arabako Foru Aldundia, Fundació Natura Parc, Gestión Ambiental de Navarra S.A., Ligue pour la Protection des Oiseaux and Ispra (*Istituto Superiore per la Protezione e la Ricerca Ambientale*) who is responsible for the actions planned in Italy.

The reintroduction of Bonelli's eagle in Sardinia is supported by the Regional Administration and by the Italian Ministry of Environment.



Figura 1.- Distribution map of Bonelli's Eagle in Sardinia (data in Tab.1, Nissardi S., Zucca C. and Sirigu G., 2016, based on literature and unpublished observations). Green dots: observation from 1895 to 1940; orange dots indicate observation dated from 1941 to 1990. SPA: Special Protected Areas (Natura2000 network), candidates for reintroduction.

N Site	Provinze	Date	Year	Collection/References
1 Elmas	Cagliari	5/04/1896	1896	Coll. Arrigoni degli Oddi, Roma
2 Lanusei	Nuoro	20/12/1897	1897	Coll. Arrigoni degli Oddi, Roma
3 San Pantaleo	Cagliari	15/6/1898	1898	Coll. Arrigoni degli Oddi, Roma
4 San Pantaleo	Sassari	15/6/1898	1898	Coll. Arrigoni degli Oddi, Roma
5 Pula	Cagliari	10/9/1900	1900	Coll. Arrigoni degli Oddi, Roma
6 Assemini	Cagliari	8/10/1900	1900	Coll. Arrigoni degli Oddi, Roma
7 Lanusei	Nuoro	10/10/1900	1900	Coll. Arrigoni degli Oddi, Roma
8 Stagno di Villarios	Cagliari	feb-01	1901	Coll. Arrigoni degli Oddi, Roma
9 Siniscola/Torpé	Nuoro	feb-01	1901	Coll. Arrigoni degli Oddi, Roma
10 Gennargentu	Nuoro	31/8/1906	1906	Coll. Arrigoni degli Oddi, Roma
11 Lanusei	Nuoro	15/10/1936	1936	Ragionieri - Coll. Foschi ,Forlì
12 Muravera	Cagliari	25/5/1939	1939	Ragionieri - Coll. Foschi, Forlì
13 Cagliari surroundings	Cagliari	9/2/1895	1895	Natural History Museum, Milan
14 Cagliari	Cagliari	14/1/1902	1902	Moltoni E., 1971
15 Cagliariitano	Cagliari	gen-06	1906	Moltoni E., 1971
16 Lanusei	Nuoro	19/1/1907	1907	Ispra Zoological Collection, Ozzano Emilia
17 Monti di Sinnai	Cagliari	30/9/1908	1908	Ispra Zoological Collection, Ozzano Emilia
18 Lotzorai	Nuoro	7/5/1915	1915	Moltoni E., 1971. Atti Soc. It. Sci. Nat., 1926, pag. 161, quoted by Moltoni
19 Sardegna	-	-	1921-1926	Moltoni E. e Sciacchitano J., 1926
20 Cagliari	Cagliari	1930	1930	Zoological Museum, Cagliari University; Bollettino Soc. Sarda Sci. Nat.; Cara G., 1842
21 Jerzu	Nuoro	6/2/1934	1934	Ispra Zoological Collection, Ozzano Emilia
22 Lanusei	Nuoro	21/2/1934	1934	Ispra Zoological Collection, Ozzano Emilia

Table 1.- Observations of Bonelli's eagle in Sardinia (Nissardi S., Zucca C. and Sirigu G., 2016, based on literature and unpublished observations). For earlier data, reported provinces do not correspond to the current ones.

N	Site	Provinze	Date	Year	Collection/References
23	M. Is Caravius (Siliqua)	Cagliari	27/3/1956	1956	Bezzel E., 1957
24	Seui Cantoniera (Arqueri)	Nuoro	24/6/1957	1957	Moltoni E., 1971
25	Villagrande	Nuoro	27/6/1957	1957	Moltoni E., 1971
26	Gennargentu, Desulo	Nuoro	19/4/1962	1962	Kunkel P., 1963
27	M. Ortobene	Nuoro	20/4/1962	1962	Kunkel P., 1963
28	S. Barbara (Ulassai)	Nuoro	10/4/1965	1965	Sudhaus W., 1966
29	Tavolara (Passo Malo)	Olbia Tempio	27/2/1966	1966	Moltoni E., 1971
30	Tavolara	Olbia Tempio	21/9/1967	1967	Moltoni E., 1971
31	Senorbi	Cagliari	3/12/1970	1970	Mocci Demartis A. & Restivo De Miranda M.A., 1978
32	Brunco Spina (Gennargentu, Desulo)	Nuoro	29/9/1970	1970	Toso S., 1972
33	Punta Cristallo	Sassari	Nov-74	1974	Torre A., 1980
34	Punta Cristallo	Sassari	19/6/1976	1976	Torre A., 1980
35	Molentargius	Cagliari	13/3/1978	1978	Mocci Demartis A., 1980
36	Capo Marrargiu, Bosa	Oristano	Jul-83	1983	G. Sirigu, ined.
37	Tavolara	Olbia Tempio	-	60ties	G. Sirigu, ined.
38	Monti di Capoterra (Conca d'Oru)	Cagliari	-	70ties	G. Sirigu, ined. (reported sightings)
39	Gallura	Olbia Tempio	-	70ties	G. Sirigu, ined.
40	Bosa-Montresta	-	-	70-'80	G. Sirigu, ined.
41	From Arbus to Portoscuso (south western Sardinia; Capo Pecora, Is Arenas, Flumini-maggiore, Capo Altano, Monte Arcuentu, area Nebida-Masua)	-	-	80-'90	G. Sirigu, ined.

Table 1.- Continuation.

N	Site	Provinze	Date	Year	Collection/References
42	Nurra di Alghero (Argentiera)	Sassari	-	70-'80	G. Sirigu, ined. (reported sightings)
43	Mountains of Teulada	Cagliari	-	before 1952	Steinbacher, 1952
44	Osilo	Sassari	-	before 1960	Martorelli, 1960 quoted by Schenk, 1976
45	Salto di Quirra (military area, Monte Cardiga, Murdega and Baccu Locci)	Ogliastra	-	before 1980	G. Sirigu, ined.
46	Gennargentu, Girgini (Aritzo-Desulo)	Nuoro	-	before 1980	G. Sirigu, ined.
47	Sarcidano (Orroli, Nurri, Lago del Flumendosa, Lago Mulargia)	Cagliari	-	before 1990	G. Sirigu, ined
48	Punta Falcone (Stintino? O Santa Teresa)	Sassari	31/5/1964	1964	Moltoni E., 1971
50	Ogliastra: Ierzu, Ulassai, Marina di Gairo (Capo Serracavallo)	Ogliastra	-	before '80-'90	G. Sirigu, ined.
51	Supramonte (Orgosolo, Urzulei)	Nuoro-Ogliastra		before '80-'90	G. Sirigu, ined.
52	Baunei (Codule)	Ogliastra	-	before '80-'90	G. Sirigu, ined.
53	Cala Luna	Nuoro	3/1/1984	1984	Bogliani ined.
54	Settefratelli	Cagliari	4/1/1984	1984	Bogliani ined.

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