

## Status of Golden Eagle *Aquila chrysaetos* nesting pairs in Sardinia

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This research aims to fill a knowledge gap on the current status and distribution of the Golden Eagle's *Aquila chrysaetos* nesting pairs in Sardinia. To date, no recent data or censuses in the scientific bibliography about the situation of this raptor in Sardinia exist (Fasce & Fasce 1992, Asuni *et al.* 2003, 2004-2005, Brichetti & Fracasso 2003, Grussu 1995-1996). The only scientific reference is that by Helmar Schenk, dating back to 1976, who estimated the Sardinian population of Golden Eagle at a minimum of 25 pairs and a maximum of 38 (Schenk 1976). This species was considered to be at risk, mainly because of direct threats by farmers due to the supposed damage caused to their livestock (Fasce & Fasce 1984).

More recently, several authors documented a much higher number of pairs, estimating 40/50 pairs of Golden Eagles breeding in Sardinia (Schenk 1995, Asuni *et al.* 2003, Fasce & Fasce 2003). These estimates are mostly based on generic assumptions, without precise territorial references, with the exception of some investigations, carried out with rigor and over a period of several years but concerning only limited portions of the island territory.

The most recent report related to a specific geographic area is dated 2009 and covers the territory of the former Province of Olbia Tempio, where 7 nesting pairs were censused and 8-10 probable pairs were estimated (Trainito 2009). The data provided in this report covers about 80% of the island's territory, corresponding to perfectly identified geographic areas, and are the result of direct field research about the observation of pairs during the courtship period, the verification of the occupied nests, the successful outcome of chick rearing, the analysis of the behavior of young immediately after their fledging, as well as the estimation of the occasional groupings of more "families" in the autumn period. Unpublished data originate from direct observations and from verified testimonies.

Compared to 1976 (Tab. 1), the remarkable increase

in the Golden Eagle's population is the direct consequence of the progressive, and often irreversible, abandonment by farmers of the mountainous regions and other wild areas in Sardinia, as well as a result of a larger number of experienced researchers involved in the census. This territory abandonment drastically reduced the direct and indirect retaliations by farmers against the Golden Eagles due to the damages caused by this raptor to their livestock. In fact, despite the absence of precise estimates on the predation carried out by the Golden Eagle against livestock, the testimonial evidences collected in the decades of pasture in mountainous areas do not leave any doubt about this. The favorite prey were piglets and lambs but also older animals, such as calves or foals that, being terrified by the simultaneous attacks from several eagles near cliff-faces, ended up falling and crashing on the rocks below. The most frequent retaliation by shepherds against this raptor was the shooting or killing of chicks in the nest. In the 1980s, following indications by an old farmer at Supramonte di Orgosolo, I found the remains of a rudimentary perch atop a hundred-year-old holm-oak in front of a nest from which one could shoot the chick before it flew. Sometimes they also lowered into the nest lighted torches to burn the chick in the nest. At Mt. Albo di Lula, during a survey in search of food remains in the nest after fledging, a half-burnt beam was found trapped in the rock, tightly held by steel cables, at least thirty meters long.

On the conflicting relationship of farmers with the Golden Eagle, particular attention is directed towards an ancient ritual, "*Sos verbos*", a shamanic prayer capable of harnessing the raptor and preventing it from harming man. In an archaic mixture of faith and paganism, farmers worried about the presence of the Golden Eagle were addressed to an elder farmer, recognized as the depositary of "*Sos verbos*" and to whom an old man had revealed at a precise moment the sacred formula which in turn would

**Table 1.** Censused and probably nesting pairs of Golden Eagle in North, Central and South Sardinia.

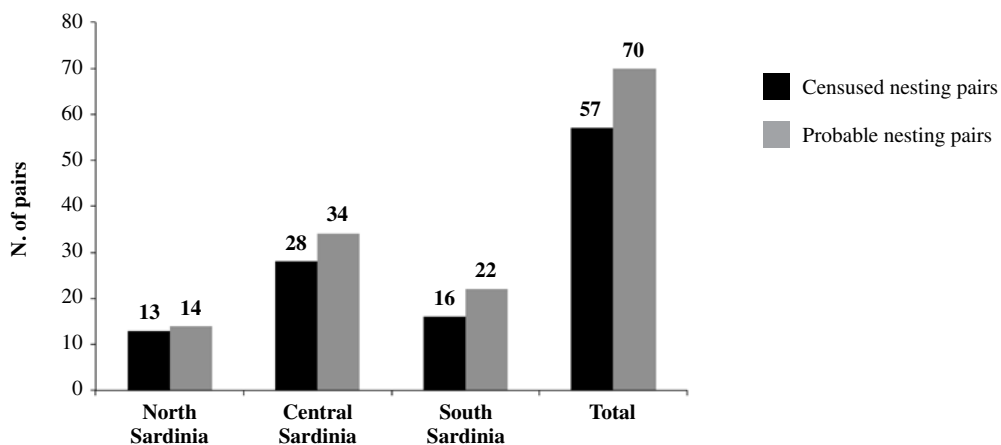
Areas	Censused nesting pairs	Probable nesting pairs
North Sardinia	13	14
Central Sardinia	28	34
South Sardinia	16	22
<b>Total</b>	<b>57</b>	<b>70</b>

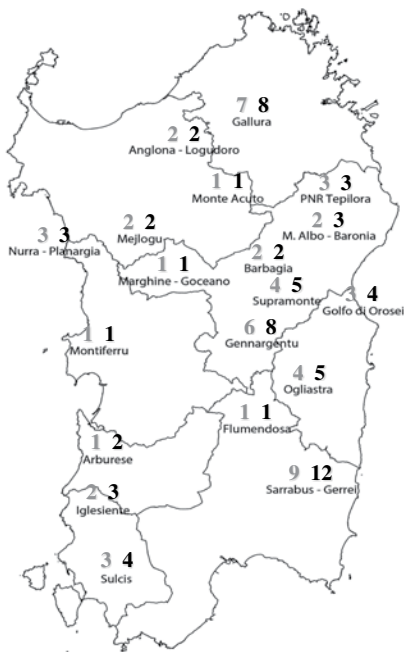
be passed on to a person whose trust has been gained. The prayer was recited in different ways and required different superstitious rituals, such as tying as many knots on a string as the number of animals to be protected, or reciting the prayer with the feet immersed in water and the shoulders facing towards the place of birth, or to offer symbolically the best “new born” from the herd to this raptor. All these different rituals had in common the fact that the man who used “*Sos verbos*” had in turn to respect both the eagle and the goods of other people, otherwise the prayer would be futile (Ruiu *pers. obs.*). Apart from the fascination of this tradition, the most important issue remains the fact that many raptors were not slaughtered thanks to “*Sos verbos*”.

The abandonment of the Sardinian mountains by farmers has reached proportions of real exodus from the 1960s until about the mid-1970s, when the last farmers, due to old age, left the ancient sheepfolds without any generational replacement (except for limited exceptions). The loss of pressure due to the grazing of herds, together with the termination of the wildfires necessary to “keep clean and renew” the pastures, had as immediate consequence a marked change in the environmental characteristics of the territory, with a considerable increase of the Mediter-

anean maquis that covered the bare soils, preparing the advent of the new forest. This meant a remarkable increase in species like wild boars *Sus scrofa* and red deers *Cervus elaphus* with a consequential marked decrease in those species typical of open areas, like the Sardinian Partridge *Alectoris barbara*, Sardinian Hare *Lepus capensis* and wild Rabbit *Oryctolagus cuniculus*. In addition to the disappearance of the young wild cattle, that represented one of the most important food sources for the Golden Eagle, even its most common prey drastically diminished. Nonetheless, the population of this great raptor not only had no inflections compared to the supposed estimates, but locally it also increased, in some cases in an absolutely unexpected way. This new situation is attributed to the disappearance or significant reduction of direct persecution (although there are episodes of animals shot down, a young specimen was recovered injured in November 2016 in the countryside of Decimopuzzu, near Cagliari), to the radical change of attitude by farmers (e.g. farmers proud of hosting Golden Eagles in their territories), and especially to the progressive adaptation to new food strategies by this raptor. If in the past the eagle fed predominantly on the captured prey, and only exceptionally on dead animals, recently the observations of eagles feeding on carrion are increasingly frequent; in November 2014 in the Gennargentu Mts I observed eight eagles around the remains of a goat, with at least three other individuals flying around.

In the North-west coast, the historical territory of the only Griffon Vulture *Gyps fulvus* colony remaining in Sardinia, the Golden Eagle is increasing its competition with the vultures for the same carrion (Campus 2012). In addition, young and immature specimens have taken both space and food from the Common buzzard *Buteo buteo*, and feed on what they find in the countryside. This behav-

**Figure 1.** Status of Golden eagles' pairs in Sardinia.



**Figure 2.** Minimum and maximum numbers of censused nesting pairs of Golden Eagle in Sardinia. Minimum number of censused nesting pairs: 57; maximum probable number of nesting pairs: 70.

ior has occasionally been observed even by the adults; it is significant in this regard the example of an eagle that carried to the nest a transparent plastic bag containing chicken livers, probably found in a landfill (Ruiu *pers. obs.*).

Important confirmations of the growth of the Golden Eagle's population (in more than thirty years of observations, this increase is estimable in at least 35-40% of cases) are given by the occupation of territories and historical nests that had been abandoned for several decades; by the rearing of both chicks; by the growing attendance of new areas by young and immature individuals often viewed in the outskirts of villages or even large cities (Sassari-Nuoro) (M. Sanna *pers. comm.*). In the latter part of this paper we will consider the causes that currently can create disturbance or even threaten the species: the direct killing with firearms (four confirmed cases in the last six years) and death or serious poisoning by toxic baits (about ten cases in the last eight years). Generally poison is not used by farmers against birds of prey, but it is used to eliminate stray dogs that locally represent a very serious problem, often underestimated or dealt with inappropriate methodologies.

Nature photography near nesting sites can be a problem for this species, especially when carried out irresponsibly. With the advent of digital devices, many people have approached nature photography without the necessary preparation and knowledge of the environmental dy-

namics. The spasmodic search for the exceptional photograph often does not take into account the respect due to animals. In Sardinia, this phenomenon has even led to situations of conflict among photographers in the vicinity of well-known nests, resulting in considerable disruption of such nests.

Even the practice of canoeing and extreme trekking, which in recent years have both experienced a considerable increase in the number of practitioners, can create problems to the Golden Eagle. Double rope-climbing are sometimes held at a short distance from nesting sites, that are often unknown to practitioners; in the delicate courtship period this can result in the abandonment of the nesting site, like what happened in two consecutive seasons at a historic nestsite in Mt. Albo, central Sardinia. It is therefore urgent that the Sardinia Regional authority carries out a detailed map of the breeding areas of large birds of prey, so as to be able to regulate these activities that can be carried out in these areas.

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