

Golden Eagles in the Alps.

A historical population trend analysis.



Introduction

The golden eagle (*Aquila chrysaetos*) is an iconic animal of the Alpine range. Captures and hunts of these animals, which in 1939 were still considered noxious according to Italian law, led however probably to a tendential reduction of their area of distribution.

There are still few data available regarding the actual historical development of the golden eagle population in the Italian Alps. Here an attempt is made to depict the evolution of the spatial distribution of golden eagles in Trentino (Fig. 1) in the 20th century.

Golden eagles live in couples, within extensive hunting areas in which they do not tolerate the presence of other eagles. Each couple owns more than one nest (3-4 in the average), concentrated in a small part of the hunting area termed nesting area. The hunting areas' surfaces vary greatly according to the availability of prey: the mean distance between the main nests of neighbouring couples in Trentino was, in 1984, of about 12 km. Young eagles instead are not sedentary and move freely over great distances (Pedrini 1986, 2-4, 49).

Analysis

The references to eagle hunts and captures in the Alps of Trentino between 1880 and 1930 (Fig. 2) and the censuses of 1954 (brown dots) and 1983-85 (blue dots) (Fig. 3) have been geo-located, mapped and compared, as detailed in the *Methods and sources* section, as to determine the changes in spatial distribution of golden eagles over time.

Analysing Fig. 3 we can see how over a 30 years period there has been a certain consistency in the spatial distribution of eagles in Trentino. In particular three areas present a particularly high and consistent rate of sightings: the western region of the Parco Naturale Adamello-Brenta, the Valsugana, immediately at the east of Trento, and the Val di Fassa, in the extreme north-eastern corner of the province. No significant data are instead given by the 1954 census for the north-western Stelvio National Park, created in 1935, but for at least 20 years rather ineffective as regards its preservation tasks (Graf von Hardenberg, 2010).

Looking at Fig. 2 we can instead notice how the hunts of the pre-WWII era were concentrated in the highly anthropised valley around Trento – not so much because of a greater presence of eagles in that area, but for the increased chances to be sighted, and thus hunted, by humans. The distribution pattern shows however also a good number of eagles hunted at the outskirts of the three areas mentioned above, proving that there are good chances that these have historically been the regions within Trentino with a stable eagle population.

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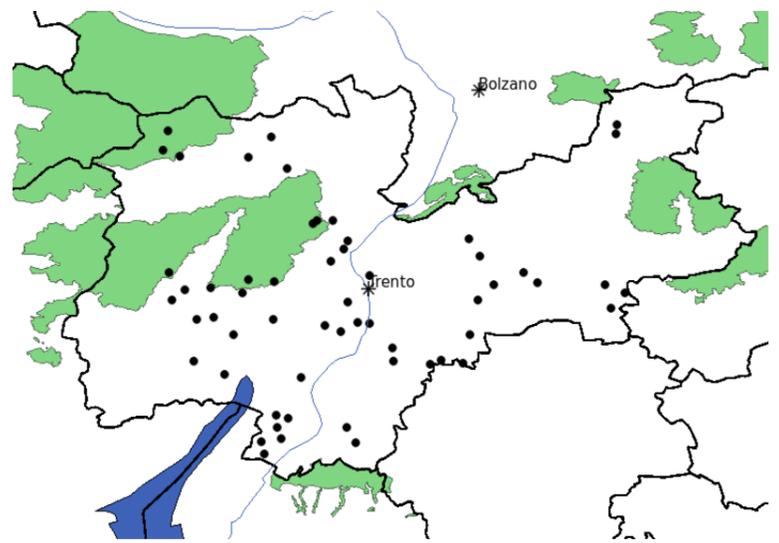


Fig. 2 Eagles hunted and captured 1880-1930

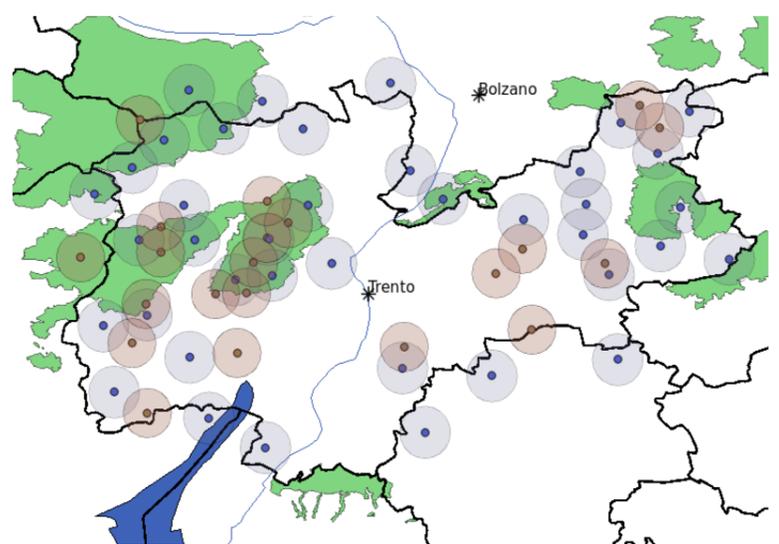


Fig. 3 Eagle censuses in 1954 (brown dots) and 1983-85 (blue dots). Circles: approximate hunting areas.



Fig. 1 Location of Trentino within the Alps - modified from NASA (<http://visibleearth.nasa.gov>)

References, Credits and Acknowledgments

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Methods and sources

The available data on eagle sightings, hunts and captures have been mapped and compared using the QGIS software.

The main issue has been the geo-localization of references extracted from historical documents, which are often ambiguous. To ease the task the data regarding the hunts since the 19th century and the map of the census of 1983-85 have thus been extracted from Pedrini (1986). The data of 1954, gathered from the answers of the local forestry departments to a survey of the Italian National Research Council (Direzione regionale dei Servizi Forestali, 1954), located the eagles giving only place names, and using often obsolete, disused or plainly wrong toponyms. I have attempted to geo-locate and disambiguate them as precisely as possible using an array of web sources (e.g. <http://www.geonames.org>, <http://openstreetmaps.org>, <http://maps.google.com>), personal knowledge of the territory and cross-references to current and historical descriptions of the area. A certain grade of inaccuracy and vagueness is however inevitable. Circles have been drawn around the sighting points to approximate the couples' hunting areas; the circles' diameters have been calculated on the basis of the observed mean distance between the nearest neighbours, which proved to be very similar in the two datasets. To clean up the 1954 data from false positives and noise, when the circles overlapped for more than 50% I assumed that the sightings referred to nests of the same territorial couple or to a roving young eagle and have chosen to keep only the median point.