Improving nesting habitats for the Eleonora's Falcon and seabirds

J. Fric[1*], A. Evangelidis[2], T. Dimalexis[1], N. Tsiopelas[2], S. Xirouchakis[1,4], C. Kassara[3], S. Giokas[3]

[1]Nature Conservation Consultants (NCC) Ltd., Chalandri, Greece, *e-mail: jakobfric@n2c.gr

[2]Hellenic Ornithological Society, Athens, Greece

[3]University of Patras, Department of Biology, Patras, Greece

[4]Natural History Museum of Crete, University of Crete, Heraklion, Greece

Objective

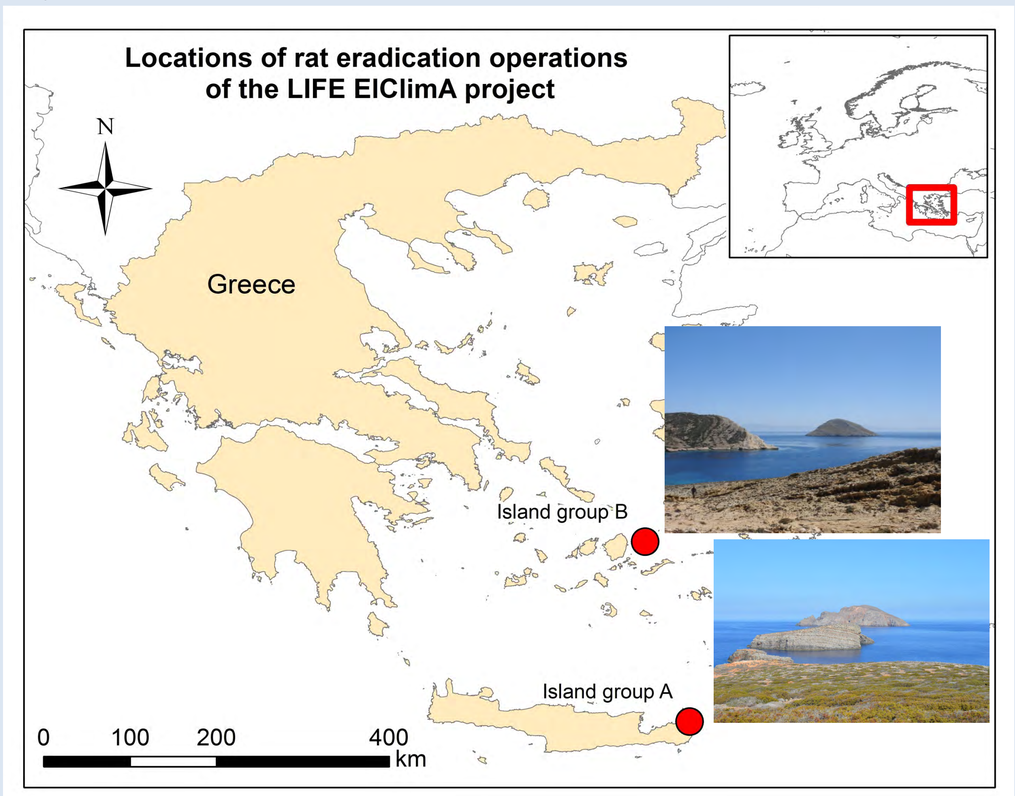
Implementation of rat eradication operations on 2 groups of islets, hosting approximately 6% of the Eleonora's Falcon (*Falco eleonorae*) national breeding population in Greece to:

- improve quality of the Eleonora's Falcon breeding habitat and breeding performance,
- enhance local Eleonora's Falcon populations' resilience and adaptation to the climate change,
- simultaneously create optimal benefits to the ecosystems of the target islets with special reference to the local populations of seabird species and large raptors, as well as their prey species.

Introduction

Rat invasion is considered a major environmental issue regarding the Aegean islands (Greece), which are characterized by a rich biodiversity of faunistic and floristic taxa of high conservation concern. One of the most emblematic bird species at national level, **Eleonora's falcon (*Falco eleonorae*)**, is severely affected by rat invasion. The islands of the Aegean Sea constitute the core of its breeding range, holding more than 80% of the species' breeding population.

The **LIFE Nature project "LIFE ElClimA" (LIFE13 NAT/GR/000909)** aims to facilitate the adaptation of the Eleonora's Falcon to the ongoing and future climate change by increasing the species breeding performance with one of the main measures being rat eradication operations at two island groups in the Aegean Sea (labelled A and B), which are part of the Natura 2000 network of protected areas.



Map 1: Locations of rat eradication sites

The island groups A and B consist of 4 and 3 islands, respectively, which range in size from 4.6ha to 298ha. Their total area is 705ha.

Apart from important Eleonora's Falcon colonies, the target islands also host large colonies of **Yelkouan Shearwater (*Puffinus yelkouan*)** and **Scopoli's Shearwater (*Calonectris diomedea*)**, as well as raptors of conservation concern i.e. **Bonelli's Eagles (*Aquila fasciata*) and Long-legged Buzzards (*Buteo rufinus*).** The main prey species these raptors are Chukar Partidge (*Alectoris chukar*) and European Rabbit (*Oryctolagus cuniculus*).

Methods

Based on the distances between neighbouring islands 3 eradication units were identified, where the distances neighbouring islands is lower than 1km. Rat eradication operations at these units started separately in spring 2016, autumn 2016 and winter 2017.

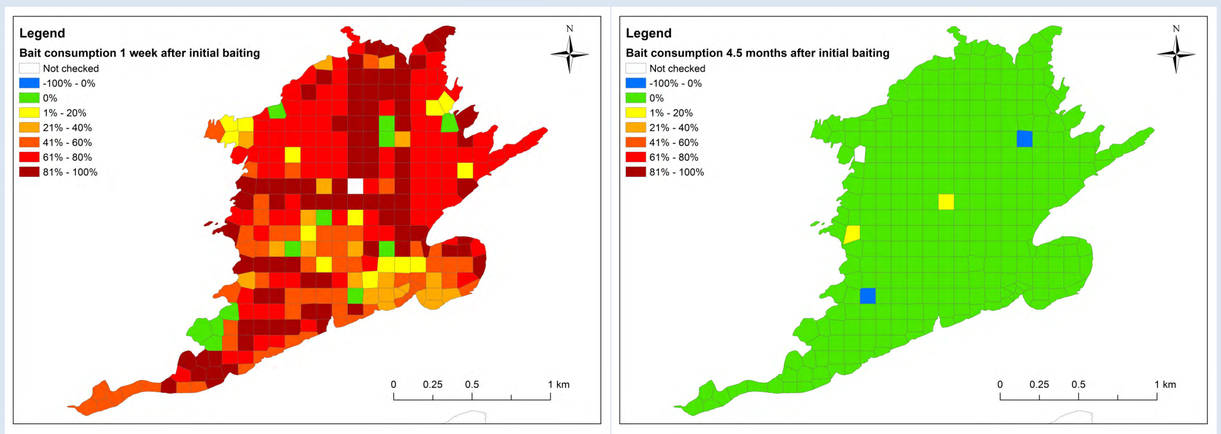
The basic characteristics of the eradication method were:

- deployment of Brodifacoum-based rodenticide baits in a total of **776 bait stations at all accessible areas** of the target islets. Bait consumption in the bait stations was regularly recorded to assess the eradication progress.
- initially planned aerial broadcast at island group A was substituted with bait station method to minimize negative impacts on the local populations of Chukar Partidge and European Rabbit and consequently on the food availability of large raptors.
- close cooperation with regional and local stakeholders aiming to ensure optimal involvement of local communities and authorities as well as minimal risk of future rat reinvasion

Figures 1: Rat eradication field work.

Results

Up to date **rat activity has stopped on 6 out of 7 target islands**, while only minor rat activity has been recorded in spring 2017 on the remaining island, where baiting still continues. Post-eradication monitoring continues on all islands where rats are considered to have been eradicated. The time **period required for the bait consumption by rats to cease varied between 1 and 4.5 months**.



Maps 2: Comparison of bait consumption per bait station 1 weeks and 4.5 months after the initial baiting on one of the target islands. The discrepancies from zero consumption during final stages were due to (A) consumption of individual baits by beetles, (B) removal by wind and (C) bait miscounting.

Figure 2: Field work tracks.

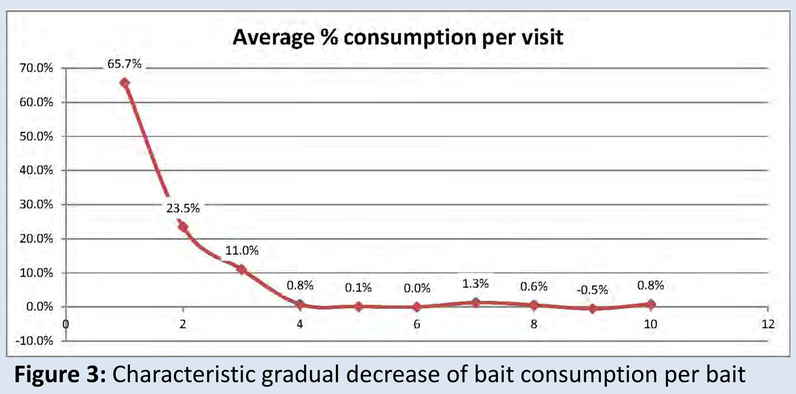


Figure 3: Characteristic gradual decrease of bait consumption per bait station monitoring visit (total duration 7 months).

Other **preliminary results** of the rat eradications are:

- Only a few (~15) rat corpses were found and appropriately disposed of, indicating **the threat of raptor secondary poisoning was minimal**. **No significant impacts** have been observed **on any of non-target species**, including rabbits and partridges.
- There are **indications of Eleonora's Falcon breeding success improvement** within the same year of rat eradication initiation.
- The removal of rats **did not affect the breeding performance of the Bonelli's Eagle** on one of the target islands, indicating that the removal of rats, while retaining rabbits did not have significant impact on the food availability of the local Bonelli's Eagles.

Figures 4: Rat eradication field work and recording of rat attendance of a bait station.

Conclusions

The current project consists **the most ambitious rat eradication attempt ever carried out in Greece**. The rat eradication operations implemented in the framework of the current project are expected to contribute to the preservation of the high ecological value of the two island groups in general, and in particular, to the improvement of the nesting habitat and conservation status of important bird species in the area. If successfully, they will eliminate rat predation on eggs and chicks for approximately **6% of the national population of the Eleonora's Falcon**, as well as for the **10% of the national populations of both, Yelkouan and Scolopi's Shearwaters**. Future local long-term effects on these species will be established by monitoring their breeding performance.

Following the removal of rats, **additional management measures to improve the breeding and foraging habitats of the species of conservation concern** are either already being implemented i.e. the construction of artificial nests for the Eleonora's Falcon, or are planned to be carried out in the future e.g. restoration of water supply systems and revitalization of abandoned agricultural areas.

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