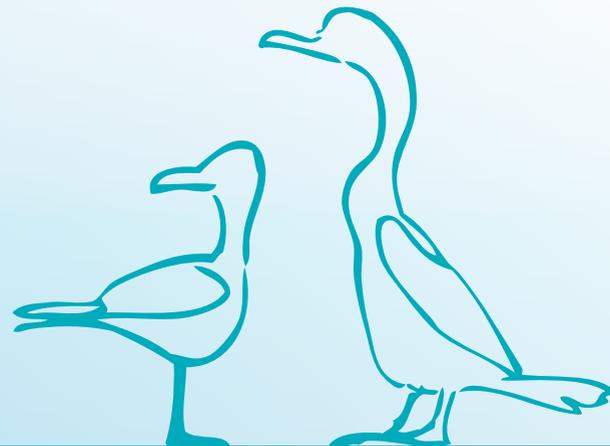


LIFE-Nature Project

Concrete conservation actions
for the Mediterranean Shag
and Audouin's Gull in Greece,
including the inventory
of relevant marine IBAs

LIFE07 NAT/GR/000285

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Layman's Report



Project identity card

Project Title: Concrete Conservation Actions for the Mediterranean Shag and Audouin's Gull in Greece, including the inventory of relevant marine IBAs

Project code: LIFE07 NAT/GR/000285

Duration: 1/1/2009 – 31/12/2012

Coordinating beneficiary: the Hellenic Ornithological Society

Associated beneficiaries:

The Hellenic Society for the Study and Protection of the Monk Seal (MOM)

The Hellenic Centre for Marine Research (HCMR)

The Technological Educational Institution (TEI) of Ionian Islands

The Portuguese Society for the Study of Birds (SPEA/ BirdLife Portugal)

Project sites:

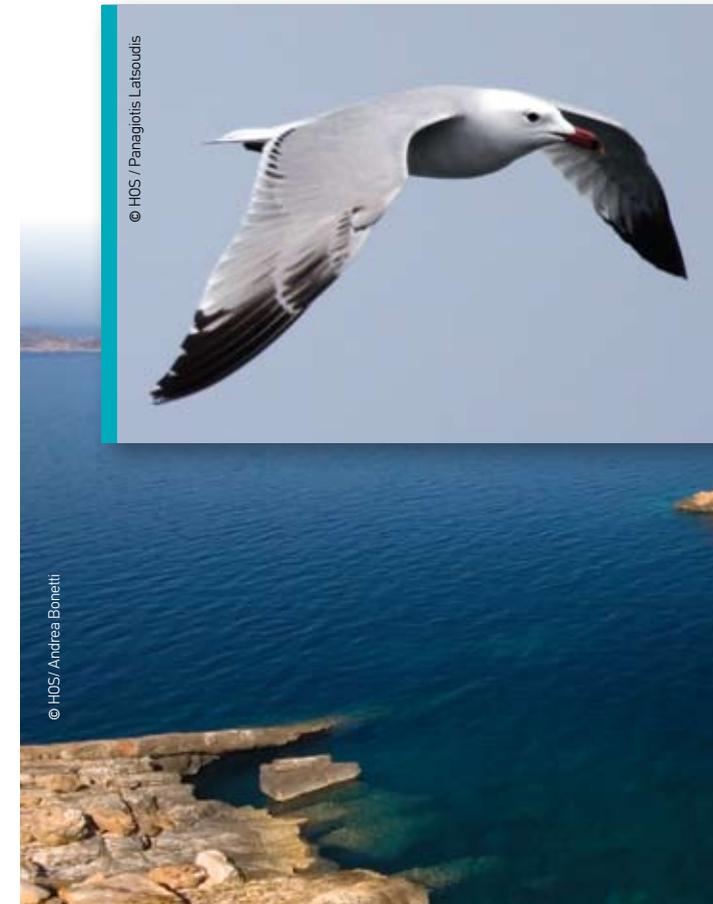
17 Special Protected Areas on islands in the Aegean and Ionian Sea in Greece

Funded by: European Commission, A.G. Leventis Foundation

Total budget: 2,357,922 €

European Commission contribution: 1,768,442 € (75%)

The Aegean and Ionian Sea: unique archipelagos



LIFE Nature and Biodiversity is one of the main strands of the European Union's funding programme for the environment. It supports projects that contribute to the implementation of the EU's Birds and Habitats Directives, the Natura 2000 network and that contribute to the EU's goal of halting the loss of biodiversity.



Natura 2000 is an EUwide network of nature protection areas established in 1992. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) designate under the Birds Directive. The Project has been implemented in 17 Special Protected Areas on islands in the Aegean and Ionian Sea in Greece.

An archipelago, with its dispersed islands and islets is an ideal place for seabirds, where they can find food at sea and safety for their young on uninhabited islets. A combination of shallow and deep waters with numerous flat and steep island and islets makes the Aegean and Ionian archipelagos unique. Audouin's Gulls, Mediterranean Shags, thousands of other seabirds, as well as 85% of the world's population of the Eleonora's Falcon nest here.

Many of the islands and islets are already part of the Natura 2000 Network, which assembles the most important European areas for the conservation of biodiversity.

Unfortunately, several human activities affect these archipelagos and their seabirds. People can now easily reach even the most remote areas and cause disturbance either at seabird colonies or at sea. On the islets, unintentionally introduced rats prey on eggs and nestlings that cannot fly. Oil spills, plastic waste, overfishing and entanglement in fishing nets and longlines are only some of the threats at sea the seabirds are facing.



The Audouin's Gull & the Mediterranean Shag



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The **Audouin's Gull** *Larus audouinii* is a medium-sized seabird which, unlike other gull species in Greece, is more closely associated with the sea than with the land. It flies slowly, just above the waves and catches small-sized fish from the sea surface. The Aegean Sea comprises its main breeding area in the Eastern Mediterranean. After the breeding season most birds disperse to the rest of the Mediterranean Sea before returning back to their breeding sites the following spring. The national population of the Audouin's Gull in Greece has declined during the last decade from 700-900 pairs to 350-500. The combination of all the above place the Audouin's Gull as a flag seabird species of the insular area, but sadly also the most threatened.

The **Mediterranean Shag** *Phalacrocorax aristotelis desmarestii* prefers rocky coasts, rarely moving far from them. It feeds on small-sized fish, catching them close to the sea bed with deep dives, propelled by its strong feet. Once it satisfies its hunger, it rests on coastal rocks with its wings half-open. It does not migrate and breeds early on, starting as early as December, on steep rocky cliffs, islets, as well as large caves and crevices. It is common to islands throughout Greece. Its national breeding population is estimated at 1,300-1,450 pairs and is mostly concentrated in the central and Northern Aegean Sea, where the largest colonies are located.

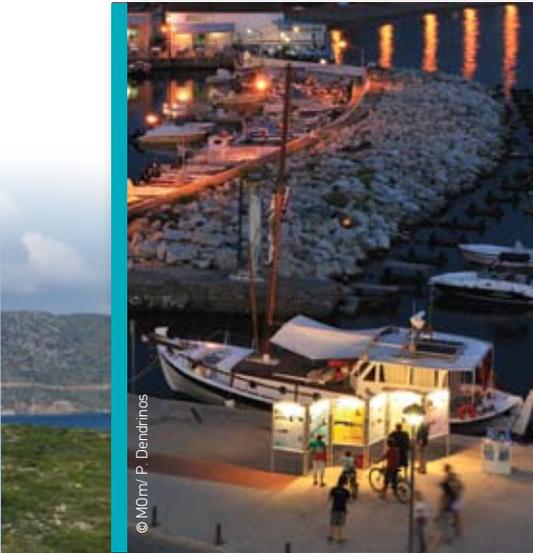


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Threats



© HOS/ Roula Trigou



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Project sites

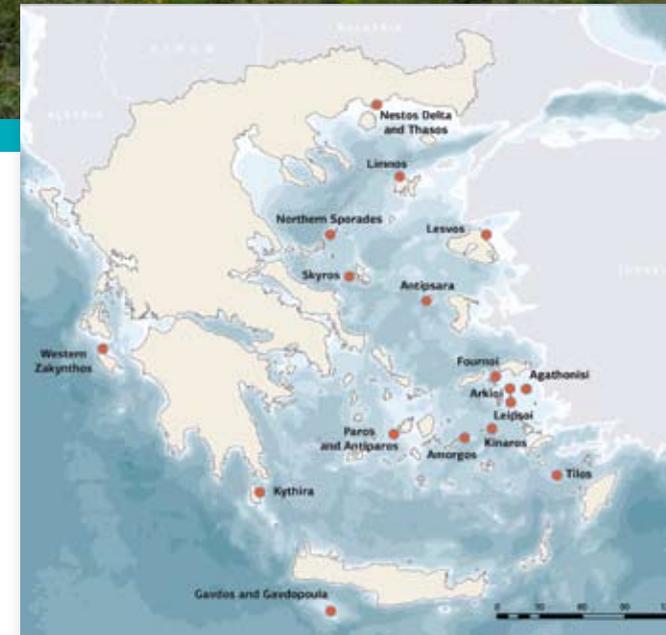
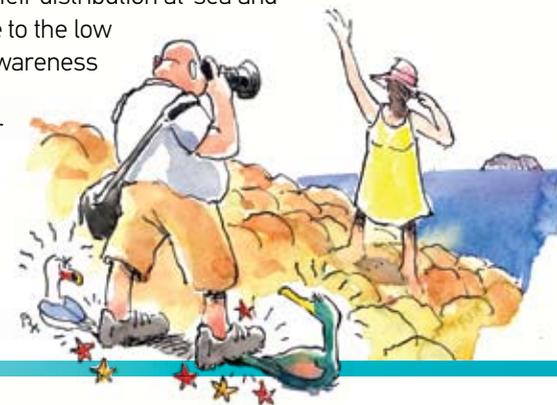
The Audouin's Gull and Mediterranean Shag face numerous threats in the terrestrial environment, where they breed and rest, and at-sea where they feed and spend the rest of their life.

The main threats include:

- Egg and chick predation by rats leading to decreased breeding success
- Competition and predation by superabundant Yellow-legged Gulls, causing reduced food and nest availability and lower breeding success
- Mortality due to accidental trapping (bycatch) of seabirds in fishing gear
- Chemical pollution at sea, affecting breeding performance and survival

Apart from these threats the seabirds are also affected by:

- Inadequate protection which results from our insufficient knowledge on their distribution at-sea and
- Disturbance due to the low level of public awareness about seabirds and their insular and marine environment.



The LIFE Project "Concrete conservation actions for the Mediterranean Shag and Audouin's Gull in Greece, including the inventory of relevant relevant marine IBAs" was implemented in 17 of the most important Special Protected Areas (SPA) for the two target seabird species in Greece, which are dispersed throughout the Aegean and Ionian Sea.

The project sites incorporate numerous aspects of the insular and marine environment, including islets and islands where seabirds breed, the surrounding sea where they feed and larger inhabited islands where major ports and towns are found.

Project objectives

How did the LIFE project attempt to help seabirds and their environment?



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The project aimed to significantly improve the conservation status of the Audouin's Gull and Mediterranean Shag in Greece by:

- Identifying the most important marine areas for the Audouin's Gull and the Mediterranean Shag through the production of the marine Important Bird Area (IBA) inventory
- Implementing a series of rat eradication operations to improve the breeding success of seabirds, on those islets identified as of principal importance for their conservation. Genetic techniques were additionally used to determine the islet complexes where eradication should be carried out and take measures to prevent rat reinvasions

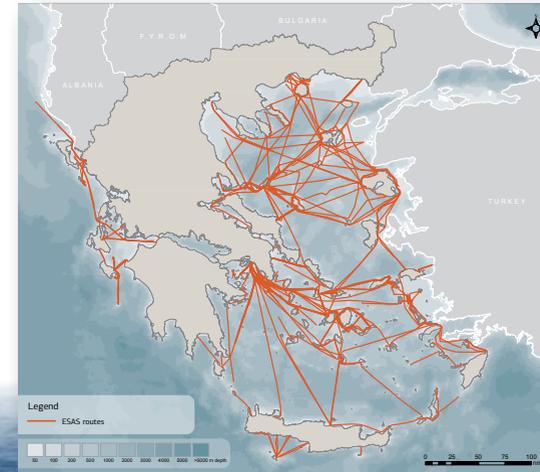
- Implementing pilot Yellow-legged Gull population control operations in order to reduce their local populations affecting the breeding populations of the project target species
- Assessing seabird bycatch in the Aegean and Ionian Sea in order to determine the extent of these incidents and to propose appropriate mitigation measures
- Assessing chemical pollution affecting seabirds
- Implementing a series of communication and environmental education actions to increase public awareness and disseminate information to the general public and specific social groups (e.g. fishermen, tourists, local inhabitants).



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Identifying the Important Areas for Seabirds in Greece

Marine surveys



Surveys from land and tracking of individual birds



© HOS/ Jakob Fric



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Marine surveys provided the main source of information with respect to seabird distribution, abundance and their behaviour at-sea during the breeding and non-breeding season.

European Seabirds At Sea (ESAS) surveys:

This is a standardized boat-based method (ESAS) used to record seabirds and other marine fauna and their behaviour while at-sea. In the case of the current project, this method was carried out from project vessels and ferry boats.

Line transects along the coastline:

Audouin's Gulls and Mediterranean Shags are mainly coastal species so their movements in the coastal marine and terrestrial areas were recorded from survey vessels moving parallel to the coastline, thus complementing data gathered through the ESAS method.

A total distance of 11,428 nautical miles (21,165 km) of marine surveys was covered in the Aegean and Ionian Sea, recording almost 1,400 Audouin's Gulls and more than 7,800 Mediterranean Shags, mostly in coastal waters.

Tracking techniques and state-of-the-art telemetry devices, such as radiotransmitters, GPS dataloggers and geolocators, were vital for the assessment of the movements of individual birds breeding at selected colony sites in the Aegean Sea.

Coastal counts from coastal vantage points using telescopes and binoculars were carried out to study how seabirds use coastal waters adjacent to their colonies, as well as other coastal areas where they concentrate in significant numbers.

In addition, birds -both adults and juveniles- were marked with plastic colour rings to allow their future identification and thus, the determination of their dispersal movements within the Aegean and Ionian Sea but also throughout the Mediterranean Sea.



© HOS/ Aris Christidis

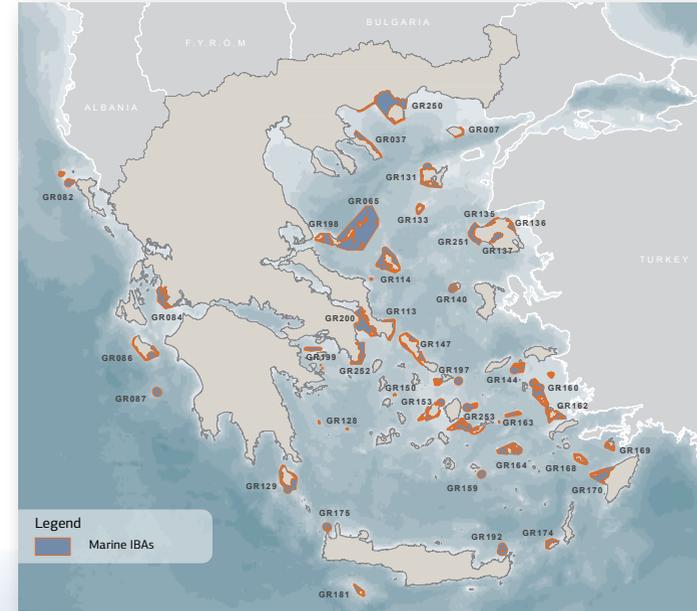
What do seabirds feed on?



Which marine areas are used by seabirds is highly dependent on their diet. Conventional analysis of otoliths and genetic analysis of diet remains, such as pellets and regurgitates, were used to determine the composition of Mediterranean Shag and Audouin's Gull diet. This was then compared with the distribution of prey species in order to identify which marine areas are used by seabirds to feed. The results of the diet analysis revealed that the target seabird species feed primarily on benthic and coastal fish, the distribution of which coincides with the coastal distribution of the Mediterranean Shag and Audouin's Gull. This study also helped to demonstrate that modern molecular methods are an increasingly useful tool for analysing seabird diet.



Marine IBA Inventory



The identification and delineation of the main Mediterranean Shag and Audouin's Gull marine hotspots in Greece was carried out by using the BirdLife International's standardized approach whereby all available data were analysed statistically and by modelling. The results were verified against IBA criteria, before identifying an area as part of the marine Important Bird Areas (marine IBAs) inventory. All available data collected during the current project together with those from other previous projects were compiled, allowing for the identification of marine IBAs within the 17 project sites, but also to finally designate a total of 41 marine IBAs spread over the Aegean and Ionian Sea. These areas were determined primarily for the Mediterranean Shag and Audouin's Gull, but also for three more

seabird species of conservation concern in Greece, namely the Yelkouan Shearwater (*Puffinus yelkouan*), the Cory's Shearwater (*Calonectris diomedea*) and the European Storm-petrel (*Hydrobates pelagicus*). In total, the marine IBA inventory covers an area of 9,943 km², which is equivalent to approximately 8,7% of the national territorial waters of Greece. The project, together with its sister Portuguese project LIFE07 NAT/P/000649 "Safe Islands for Seabirds", supported the international cooperation of BirdLife partners on marine issues, facilitated the creation of the BirdLife's Marine Task Force, as well as the coordination and international approach in tackling issues regarding marine IBA identification, alien species-eradication, seabird bycatch and island management.

Seabird bycatch

Assessment of seabird bycatch and chemical pollution

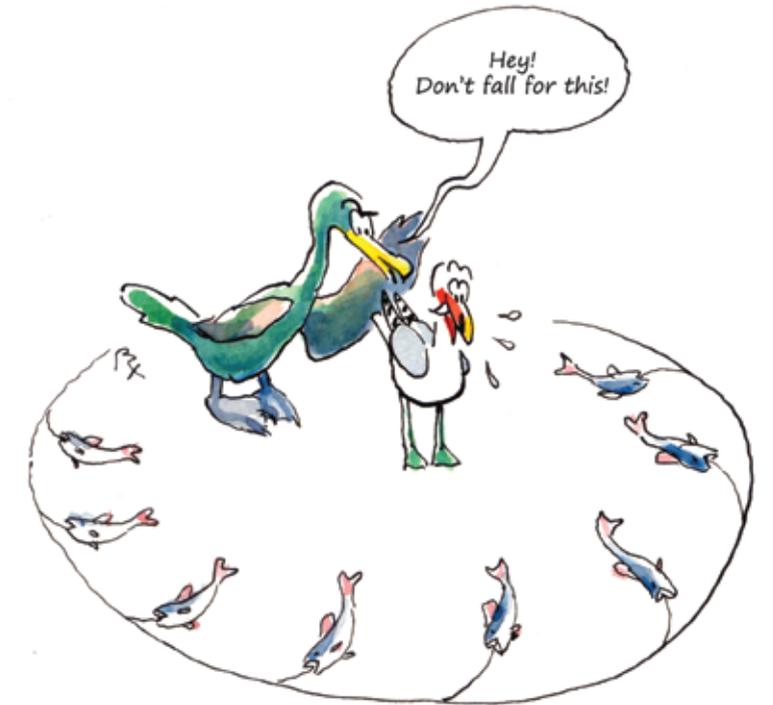


Different methods were used to collect data on the accidental trapping of Mediterranean Shags and Audouin's Gulls, as well as other seabird species in different types of fishing gear used in Greece. These included mainly: a) observations on-board fisheries targeting large pelagic species and small scale fisheries in the Aegean and Ionian Sea, b) specially designed questionnaires for fishermen and c) direct records of seabirds caught in longlines that were found either at sea or on their colonies. This study revealed that all seabird species in Greece, apart from the European Storm-petrel, are susceptible to seabird bycatch. Audouin's Gull are caught primarily in bottom longlines, Mediterranean Shag

in nets but to a lesser degree, while the most common victims of bycatch are Cory's and Yelkouan Shearwaters which mostly get caught in bottom longlines. Chemical pollution levels were assessed in both the Mediterranean Shag and Audouin's Gull. Various heavy metal and pesticide residues were found in seabird tissues, including mercury, cadmium, zinc, copper, chromium, lead, as well as organochlorines (OCs) and polychlorinated biphenyls (PBCs). Nevertheless, the level of pollutants detected is unlikely to cause severe effects on the seabird populations studied.



Seabird bycatch mitigation measures



Based on the main types of fishing gear identified to be responsible for seabird bycatch and the seabird species affected by it, a series of mitigation measures to reduce bycatch rates has been identified and is being proposed to fishermen for implementation. The implementation of these measures is considered to be particularly important for the protection of seabird species such as the Audouin's Gull and the Yelkouan Shearwaters, the populations of which have declined on the national and Mediterranean level, respectively. The proposed measures have been identified in collaboration with the fishermen and are already being implemented to a certain degree at fishermen's own initiative.

Proposed measures for mitigating seabird bycatch

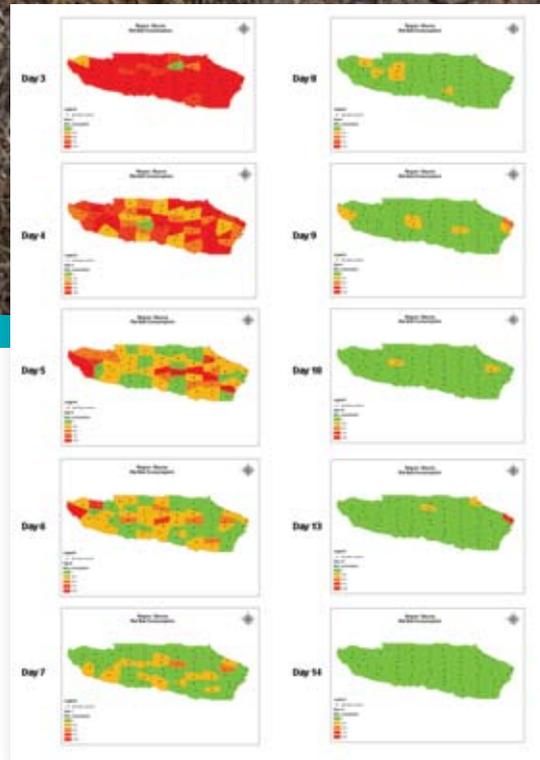
- Night-setting of longlines and reduced light on deck
- Avoid setting longlines in areas with large concentrations of Yelkouan and/or Cory's Shearwaters, particularly during spring and summer
- Use of colourful buoys or bird-scaring lines to deter seabirds during longline setting
- Scaring birds with noise when approaching longlines during setting
- Additional weighting of bottom longlines to increase sinking speed
- Use of defrosted bait to increase sinking speed
- Avoid setting nets in areas where large concentrations of Mediterranean Shags and Yelkouan Shearwaters are formed at-sea or on the coast, particularly during evening hours

Improving the nesting sites of the Audouin's Gull and Mediterranean Shag

Rat eradication operations



© HGS/ Jakob Eric



Example: Progress of rat eradication on islet

Mediterranean Shags and Audouin's Gulls are significantly affected by rats which predate on their eggs and chicks. Therefore, in order to improve the breeding success of these two species, a series of rat eradication operations was carried out after the initial assessment and prioritization of 83 different islet complexes within the 17 project SPA sites. Rats were removed from a total of 9 complexes, consisting of 19 uninhabited islets with a total surface area of 250 hectares. It is estimated that 12-16% and 13-52% of the national populations of the Mediterranean Shag and Audouin's Gull respectively, benefited from these operations. In addition, on which islets the rats should be eradicated and the risks of rat re-invasion were determined using molecular methods on the one hand to ensure complete removal of rats, and on the other, to determine the mitigation measures needed to prevent rat re-invasion.

Yellow-legged Gull population control



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Pilot Yellow-legged Gull population control operations were carried out at selected colonies after the assessment of 144 colony islands and of different potential population control methods. The aim was to determine their applicability in Greece and to improve the breeding success of the project's two target species. Among different control methods available, such as disturbance at nesting sites, egg and nest management and even lethal control, Yellow-legged Gull egg-oiling and egg-removal were considered the most suitable, and were thus applied on a total of 736 nests. Both methods proved to successfully reduce Yellow-legged Gull breeding success and to discourage nesting at treated sites. These methods are considered to be a useful tool for the management of larger Yellow-legged Gull populations, in particular when associated with the reduction of available food sources e.g. closure of rubbish dumps.



Raising awareness for seabird conservation

Public awareness and environmental education



Most threats facing the project's target species are related to human activities. Therefore, public awareness was a priority throughout the implementation of the project. Over the four years of the project, numerous communication and educational activities addressed a wide variety of target audiences and stakeholders, such as fishermen, island inhabitants and visitors alike, as well as local schoolchildren. Like seabirds, these activities went further than just the sites of the project, covering almost all inhabited islands of the Aegean and Ionian Seas. The "Red-billed Gull" and the "Black figured seabird" that accompanied the project's activities in the Greek archipelagos truly resonated with the younger generations, creating optimism over the continuation of the project's impacts through a real change in people's awareness for seabirds.



Life after LIFE...



Our greatest achievements...



This project achieved a major step forward in the study for seabirds and their habitat conservation in Greece. Its products, including the marine IBA inventory, assessment of seabird bycatch, communication and environmental education material, as well as all the knowledge and expertise acquired during its implementation, are already applied beyond the scope of the project: it has contributed baseline information for the extension of the Natura 2000 Network in the marine environment, supported BirdLife partners in neighbouring countries with their marine IBA identification programmes, and implemented rat eradication and Yellow-legged Gull control operations in other projects. All these conservation actions, in association with extensive and constant communication and environmental education work make this LIFE project... more "alive" than ever.



- the first Marine IBA inventory in Greece and eastern Mediterranean
- the most extensive series of rat eradication operations on uninhabited islets in Greece (9 islet complexes)
- successful implementation of pilot Yellow-legged Gull population control operations
- the first assessment of seabird bycatch in all major types of fishing gear in Greece and of chemical pollution affecting the two target species
- proposal for bycatch mitigation measures

- update of national population estimates for the Mediterranean Shag and the Audouin's Gull
- support and cooperation on regional (eastern Mediterranean and Black Sea) and European level
- extensive cooperation and networking among environmental, research and academic organisations and institutions in Greece
- a nation-wide public awareness campaign targeting all major social groups on the Greek islands
- adoption of project's environmental education material by local education communities all over Greece

Acknowledgements

LIFE is a team work. The implementation of the current project and accomplishment of its results would have been impossible without the dedicated contribution of numerous people from all over Greece and abroad.

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- all the teachers, professors and students that participated in the implementation of the project Environmental Education activities all over Greece

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