Brief report on European Seabirds at Sea (ESAS) Recordings in Greece

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Introduction

Recording of seabird distribution and activities by European Seabirds at Sea (ESAS) method is being systematically applied through projects "Concrete conservation actions for the Mediterranean Shag and Audouin's Gull in Greece, including the Inventory of relevant Marine IBAs", LIFE07NAT/GR/000285 and "Survey and Conservation of Seabird in Greece" to determine the distribution, the use of marine environment and finally designate Marine IBAs for 4 priority seabird species, Mediterranean Shag (*Phalacrocorax aristotelis*), Audouin's Gull (*Larus audouinii*), Cory's Shearwater (*Calonectris diomedea*) and Yelkouan Shearwater (*Puffinus yelkouan*).

Methods

A standardized European Seabirds at Sea method, adopted to Mediterranean conditions was used for recording seabirds, marine fauna and human activities at sea. Recordings were carried out primarily on board ferry boats and research Vessels as well as fishing vessels. A GIS compatible Access database was developed to allow for direct data input from electronic datasheets, filled by observers and allowing for immediate data processing and analysis. ArcGIS was used to analyse recorded seabird distribution and MaxEnt software to model predicted seabird distribution based on correction between ESAS records and oceanographic and marine biological datasets.

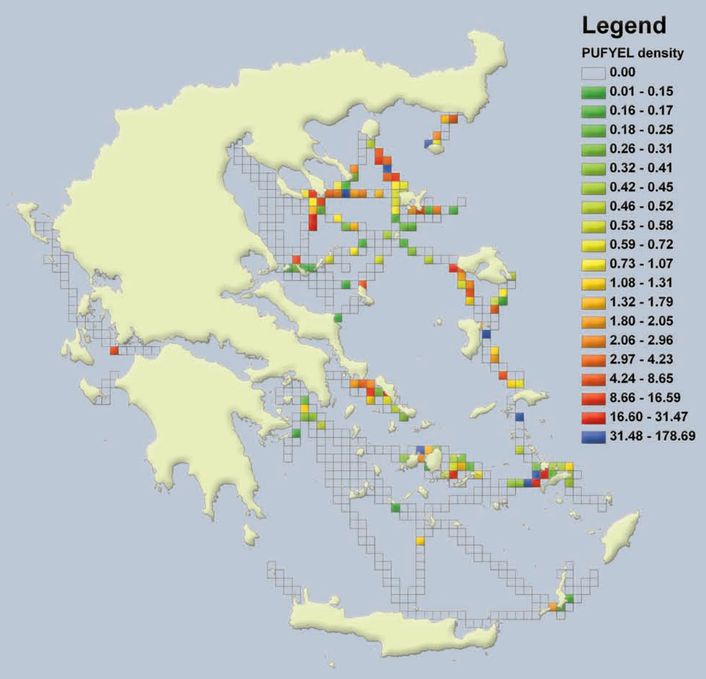

Figure 2: Recorded *P. yelkouan* summer distribution on 10x10km grid in ind./km^2.

Results

Up to date 103 routes of total distance over 8300km were carried out by 28 observers, out of which 16 volunteers, covering more than 3000 km^2 of marine areas in Aegean and Ionian Sea (Figure 1). Along these routes almost 26000 seabirds of primary concern were recorded:

Species	Recorded ind.
Phalacrocorax aristotelis	996
Larus audouinii	9
Calonectris diomedea	5228
Puffinus yelkouan	8749
Hydrobates pelagicus	7
Larus michahellis	11008
Total	**25997**

In addition, 2617 individuals of other bird or marine fauna species were recorded.

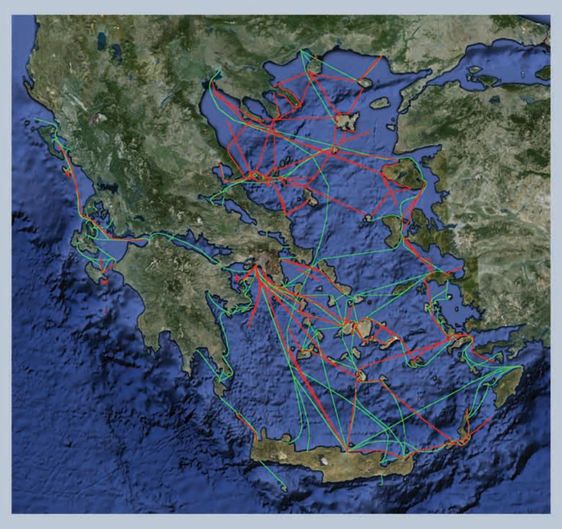

Figure 1: Comparison between total area covered (red) with ferry boat network (green).

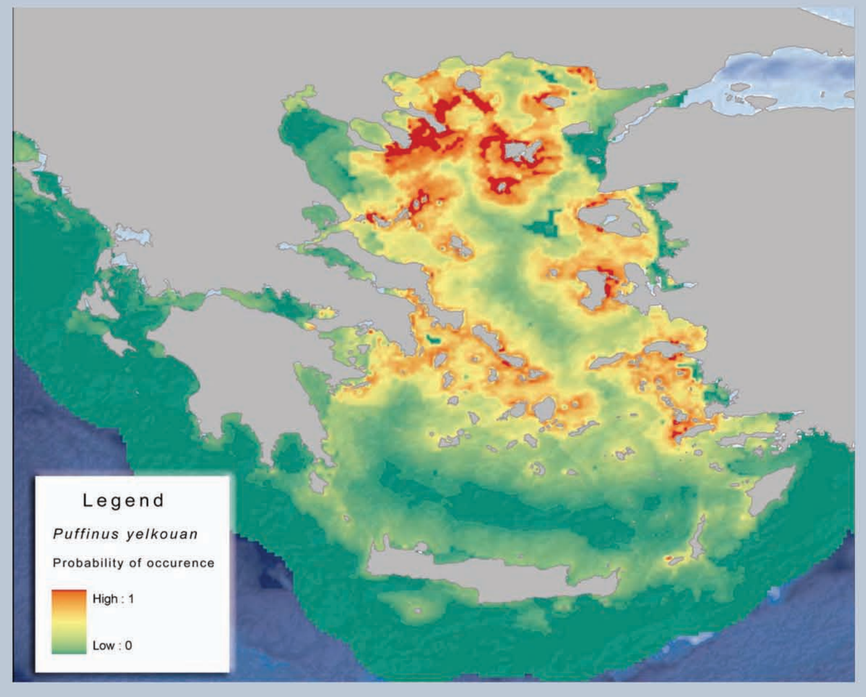

Figure 3: Predicted distribution of *P. yelkouan* for the summer of 2009 as inferred by the Maximum Entropy model.

Discussion

ESAS has proved to be the main and most effective tool for the assessment of seabird distribution in Greece. Data gathered so far already provides a rough image of at-sea distributions of main seabird species and their trends, as well as highlights hot-spots of high seabird concentrations. Models using recorded seabird data in association with static and dynamic oceanographic data provide predicted distribution maps which are used for focusing limited sampling efforts to areas which are likely to host seabirds and in further clarification of marine important bird areas for seabirds.

On the basis of the ESAS recordings during the summer of 2009, the model predicts the distribution for *P.yelkouan* for the rest of the marine regions as seen on figure 3. Such results will be used for more focused future surveys and for groundtruthing of the model.

Acknowledgements

We would like to thank all the people involved in ESAS recordings and especially our volunteers for their effort and time.