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# International Species Action Plan for the Balearic shearwater, *Puffinus mauretanicus*

**Submitted by: Secretariat**

# International Species Action Plan for the Balearic shearwater, *Puffinus mauretanicus*

***Prepared by:***

BirdLife INTERNATIONAL

SEO/BirdLife

**On behalf of the European Commission**

**International Species Action Plan for the Balearic shearwater,**
***Puffinus mauretanicus***

The present action plan was commissioned by the European Commission and prepared by BirdLife International as subcontractor to the "N2K Group" in the frame of Service Contract N#070307/2007/488316/SER/B2 "Technical and scientific support in relation to the implementation of the 92/43 'Habitats' and 79/409 'Birds' Directives".

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**Milestones in the production of the plan**
First SAP was adopted by the EU in 1999
Workshop for the revision of the SAP: 17-18 June 2010, Palma de Mallorca
1st draft sent to contributors & EC: 31 July 2010
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This plan should be reviewed and updated in every ten years. An emergency review will be undertaken if sudden major environmental changes, liable to affect the species, occur within its range of distribution.

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## Geographical scope of the action plan

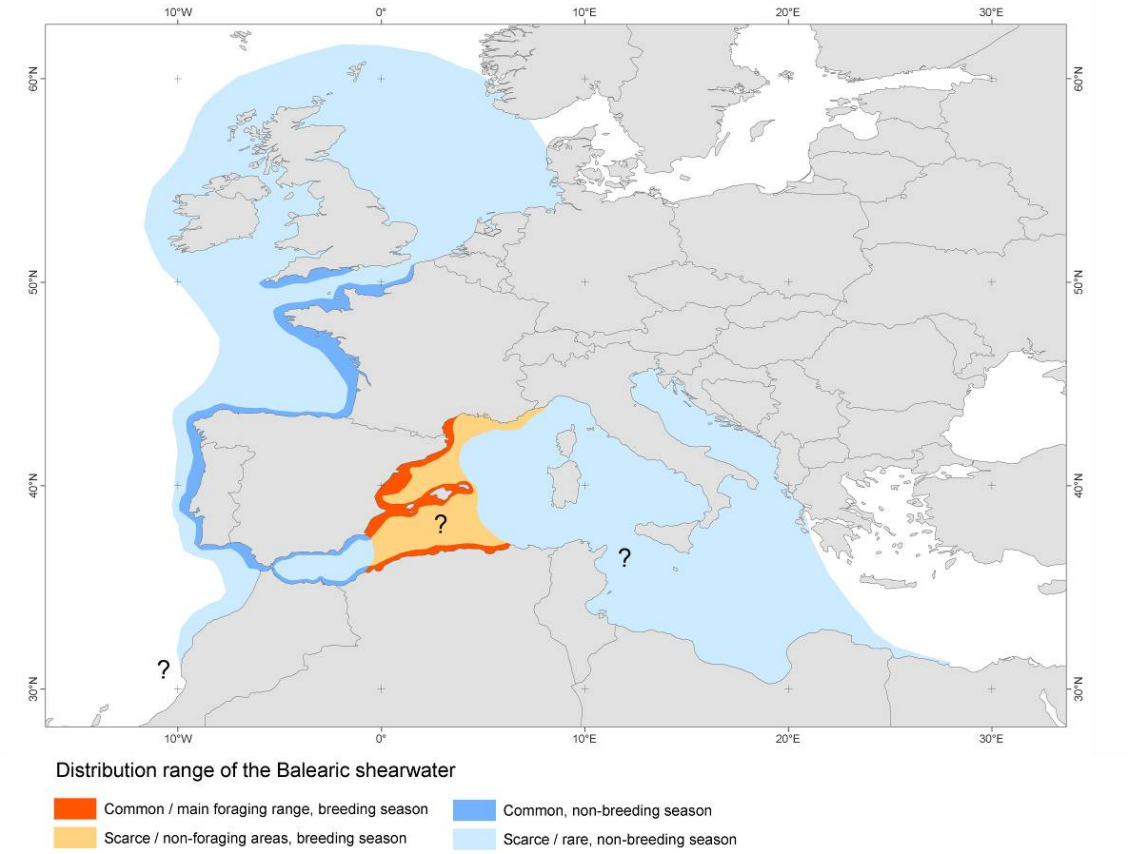


**Figure 1. Regular distribution range of the Balearic shearwater (compiled by SEO/BirdLife, from several sources – see reference list).**

**Table 1. European states where this action plan is relevant. The states listed in bold are those where the plan should be implemented.**

| Breeding season, regular | Non-breeding, regular | Non-breeding (scarce)[1] |
|---|---|---|
| ***France (marine)*** | ***Algeria*** | *Belgium* |
| ***Algeria (marine)*** | ***France*** | *Germany* |
| ***Spain (breeding colonies + marine)*** | ***Morocco*** | *Greece* |
| | ***Portugal*** | *Ireland* |
| | ***Spain*** | *Italy* |
| | ***UK*** | *Lybia* |
| | | *Netherlands* |
| | | *Tunisia* |

[1] The species also occurs in other countries, as revealed by the map (also beyond), but it only occurs there on very low numbers/occassionally, and/or its status is poorly documented.

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## *0 - EXECUTIVE SUMMARY*

The Balearic shearwater has been long considered as a subspecies of either the Manx shearwater *Puffinus puffinus* or the Yelkouan shearwater *Puffinus yelkouan*, but was recognised as a distinctive species about ten years ago. As such, this shearwater has been catalogued globally as Critically Endangered following IUCN criteria, on the basis of both its extremely rapid population decline (-7.4% per year) and its small population size, which taken together could lead to the extinction of the species in less than 3 generations (average extinction risk of 40 years). Moreover, the global breeding population is restricted to the Balearic Islands, with an effective breeding range of less than 100 $km^2$. This alarming situation has led to its inclusion in several international lists and conventions. This action plan updates and revises the previous Species Action Plan (Aguilar 1999), and covers the whole distribution range of the species.

The species breeds exclusively in the Balearic Islands and primarily forages, during the breeding season (March-July), off eastern Iberia and (most likely) also off Algeria. After the breeding period the bulk of the population abandons the Mediterranean and congregates in the Atlantic waters of W Europe up to S UK. The return passage takes place mostly between September and December, and the species mainly congregates off the NE and E Iberian coasts during the winter, where often forms large congregations of up to several thousands of birds associated to concentrations of small pelagic fish.

The breeding population has been estimated at around 2,000 breeding pairs across the last decade, although a recent reassessment (due to both the discovery of new sites and the change of methodological census assumptions for some colonies) provide a new figure of 3,193 pairs. Alternative estimates at sea suggest either an even larger figure or an unusually large non-breeding population. Nevertheless the species is severely declining according to the existing demographic data, primarily as a result of an unusually low survival rate for adults (0.78 vs. expected values over 0.90 in Procellariiforms). This parameter was estimated using data from colonies free of terrestrial predators (at least the most harmful ones, carnivores), and therefore must be taken as conservative. Still, using these data (but also the former estimate of about 2,000 breeding pairs), a Population Viability Analysis (PVA) carried out in 2004 predicted a high probability of extinction risk, of over 50% in 40 years. An updated PVA is necessary to re-evaluate the status of the species, taking into account the new population estimates and improved demographic data.

The main threats identified are the predation of adults at colonies by introduced carnivores (feral cats, genets and pine martens) and most probably the bycatch in fishing gear at sea, both factors affecting adult survival. Acute pollution events, such as oil spills, also pose a very serious threat for the species, as its highly congregatory behaviour could result in a large number of casualties in case that a spill occurred in a congregation area. Other threats include the reduction of prey due to fishing overexploitation and/or anthropogenic environmental change, habitat degradation and

disturbance in the breeding grounds, background pollution, human harvesting (nowadays a relict activity), and the development of marine windfarms.

The **aim** of the plan is to stop the negative population trend of the Balearic shearwater, and revert it if possible, while ensuring the conservation of its habitat. **Objective 1** of the plan is to get a population growth rate (lambda, $\lambda$), such that $\lambda \geq 1$ within 10 years (i.e. no population decline), out of current value of $\lambda = 0.952$. To evaluate this, it is very important to set an annual monitoring scheme in a sufficient number of representative colonies that will allow assessing with confidence the population trend of the species. And to accomplish this target, action must be focused on those threats causing significant adult mortality, i.e. predation by introduced carnivores and fishing bycatch. **Objective 2** is directed at keeping or improving the good environmental status of the current breeding colonies and main marine hotspots through effective site protection and adequate management plans implemented, including habitat restoration if appropriate.

*1 - BIOLOGICAL ASSESSMENT*

## Taxonomic remarks

Phylum: Chordata
Class: Aves
Order: Procellariiformes
Family: Procellariidae
Genus: *Puffinus*
Species: *Puffinus mauretanicus* Lowe, 1921

The taxonomic status of the Balearic Shearwater *Puffinus mauretanicus* has long been disputed. It was regarded as a subspecies of the Manx shearwater *Puffinus puffinus* until the late 1980s, and then considered to form a separate species along with the Yelkouan shearwater *Puffinus yelkouan* (also called Levantine or Mediterranean shearwater), i.e. *Puffinus yelkouan mauretanicus* (Bourne *et al.* 1988). Afterwards, paleontological (Walker *et al.* 1990, Altaba 1994) and molecular evidence (Heidrich *et al.* 1998), as well as morphological, ecological and behavioural considerations, led to consider *Puffinus mauretanicus* as a distinctive species (Snow & Perrins 1998, Mayol-Serra *et al.* 2000, Sangster *et al.* 2002). This last position has been questioned recently (Yésou 2006), after the discovery that the population breeding in Menorca showed intermediate phenotypical and genotypical characters between *mauretanicus* and *yelkouan*, due to hybridization of both taxa in historical times (Ruiz & Martí 2004, Genovart *et al.* 2005, 2007). Nevertheless, current evidence suggests that the birds from Menorca are most closely related to *mauretanicus* (Genovart *et al.* 2007), and in the absence of further evidence *yelkouan* and *mauretanicus* should be treated as a distinct species for now (Genovart *et al. in prep*.).

## Distribution throughout the annual cycle

The Balearic shearwater breeds exclusively in the Balearic Islands, Spain, where colonies are distributed throughout the 5 main island groups of the archipelago (Menorca, Mallorca, Cabrera, Ibiza and Formentera).

During the breeding period (March-July; Ruiz & Martí 2004) the main foraging areas are located along the Mediterranean shelf of the Iberian Peninsula, mainly around the central Catalan coast, the Ebro Delta-Columbretes area and the Cape Nao (Abelló & Oro 1998, Arcos & Oro 2002a, Abelló *et al.* 2003, Ruiz & Martí 2004, Louzao *et al.* 2006b, Arcos *et al.* 2009). The species also forages within the Balearic archipelago, particularly in the Menorca-Mallorca channel, the south of Mallorca and the area surrounding Formentera and S Ibiza (Ruiz & Martí 2004, Louzao *et al.* 2006b, Arcos *et al.* 2009, Louzao *et al*. 2011a). Finally, the Algerian coast also appears to represent an important foraging ground for the species during the breeding period, according to the (limited) satellite tracking data available, although further research is needed to

confirm this point (Ruiz & Martí 2004). At this time of year, observations ob birds also occur regularly in the typically non-breeding areas (see Fig. 1 and below), usually in low numbers (e.g. Mouriño *et al.* 2003).

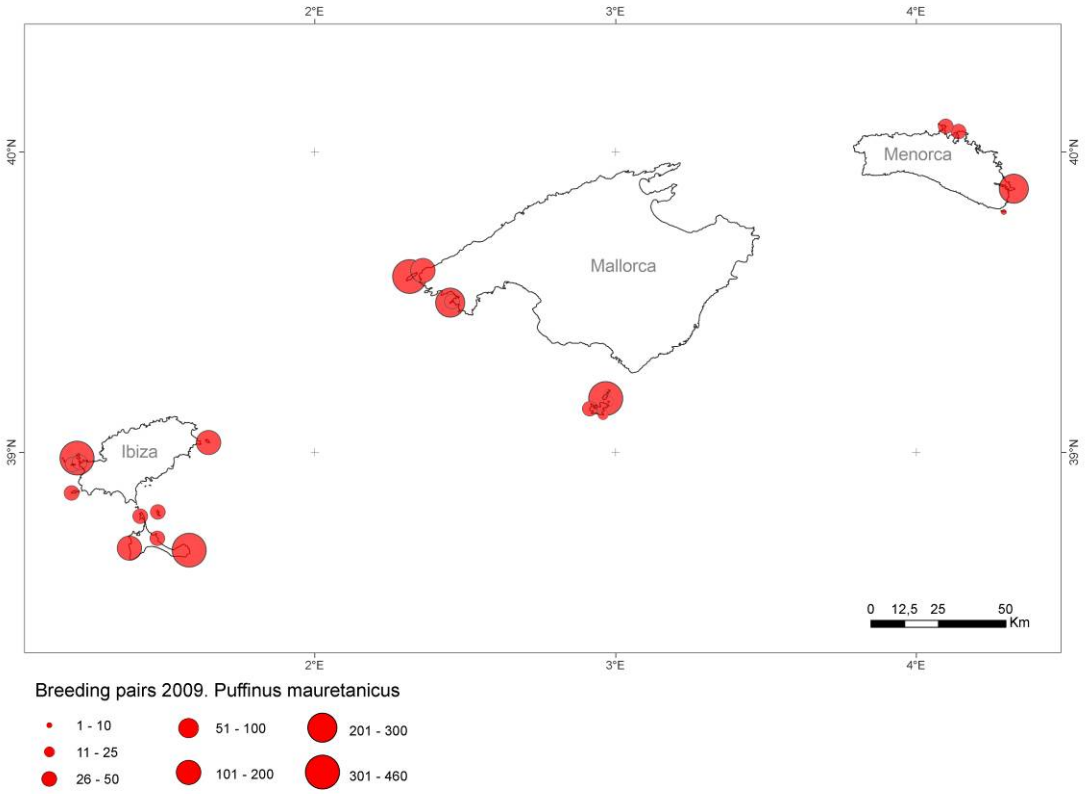



**Figure 2. Location of the known breeding colonies of Balearic shearwater, and population size. Elaborated from data courtesy of Skua SLP and the Conselleria de Medi Ambient – Govern de les Illes Balears (CMA 2010). (See also Table 3).**

After the breeding period the bulk of the population leaves the Mediterranean and moves to the more productive Atlantic waters of W Europe (Le Mao & Yésou 1993). Non-breeders move into the Atlantic first, from May onwards (Ruiz & Martí 2004, Arroyo *et al. in press*), and the outflow extends through June to mid-July, when most of the global population has left the Mediterranean (Ruiz & Martí 2004, Arroyo *et al. in press*). During late spring and summer the species is particularly common off Atlantic Iberia, from the Gulf of Cádiz to Galicia (Mouriño *et al.* 2003, Ramírez *et al.* 2008, Arcos *et al.* 2009). High numbers gather in the Bay of Biscay and off W France, usually close to the coast, during summer (Le Mao & Yésou 1993). Although there seems to have been a northwards shift during the last decade (Yésou 2003), recent surveys show that large numbers are still present in summer in the Bay of Biscay. The increase of observations northwards has been related to changes in the marine environment resulting from the observed global increase in surface temperature (Wynn & Yésou 2007, Wynn *et al.* 2007), although alternative explanations cannot be discarded, including observer bias and changes in fishing practices (Votier *et al.* 2008).

Most of the population returns to the Mediterranean in autumn (mainly September-November), and concentrates along the Iberian coast during the winter (Gutiérrez & Figuerola 1995, Arcos 2001a,b, Ruiz & Martí 2004, Arcos *in press*), although some birds remain in Atlantic waters at this time of the year (Mouriño *et al*. 2003, Poot 2005, Ramírez *et al*. 2008, Arcos *et al*. 2009, Plestan *et al.* 2009).

## Habitat requirements

The Balearic shearwater breeds in caves, burrows and crevices on islets and coastal cliffs in the Balearic Islands, sometimes at considerable height above the sea level (up to 150 m in some coastal cliffs; Rodríguez & McMinn 2002). Breeding colonies are relatively small, from isolated nests to loose aggregations of a few 100s of breeding pairs (Ruiz & Martí 2004). The current location of colonies could have been shaped by the presence of introduced carnivores, which cause a major impact on the species and could have displaced breeding birds from more accessible sites, whereas rodents appear to have coexisted with the shearwaters for millennia (Alcover *et al.* 1994, Rodríguez & McMinn 2002, Ruiz & Martí 2004, Ruffino *et al.* 2009).

At sea, it has a rather coastal distribution, and tends to select productive shelf areas, most often related to oceanographic frontal systems (Louzao *et al*. 2006b), which are rich in their main prey, small pelagic fish (Palomera *et al.* 2007, Bellido *et al*. 2008). The species appears to be more coastal during the non-breeding period (Arcos 2001a, Arcos *et al.* 2009), forming large aggregations that vary in location between (and within) years, presumably due to fluctuations in the availability of small pelagic fish (Gutiérrez & Figuerola 1995).

## Survival and productivity

Estimates of demographic parameters are limited to a very few colonies subject to mid to long term monitoring (especially sa Cella and Conills de Malgrats, but also Malgrats, Cabrera and Mola de Maó). These data have to be taken with caution, as the low number of study colonies at present could introduce biases (Tavecchia *et al*. 2007). In particular, most of these colonies are free of predators (in some cases after rat eradication campaigns), so the inferred parameter estimates should be taken as very conservative.

Estimates of adult survival based on capture–recapture data are unusually low for a Procellariiforme: 0.78 (95% Confidence Interval = 0.74-0.82; n = 336 individuals from 2 colonies in Mallorca, 1997-2004), compared to usual values of survival ≥0.90 for this group of seabirds (Oro *et al.* 2004). Given the sensitivity of long-lived organisms such as Procellariiformes to adult survival (Weimerskirch 2002), this low value highlights it as the most critical demographic parameter for the species, driving the population growth rate (Oro *et al*. 2004). The two study colonies were free of

terrestrial predators (with rats eradicated in one of them, Conills de Malgrats), and therefore the estimates could be even worse if colonies with predators were included in the analyses. Reliable estimates of survival for juveniles and immature birds are lacking, but presumably are far lower than for adults (Oro *et al*. 2004). The age of first reproduction is of 3 years, although a considerable fraction of birds (70%) start breeding at older ages (Oro *et al.* 2004).

Breeding productivity shows inter-annual variability, suggesting that food availability at common foraging grounds could influence this parameter (Louzao *et al*. 2006a). Ruiz & Martí (2004) also reported inter-colony differences in breeding performance that were attributed to the presence of predators (especially the more impacting carnivores; see below). Using data from colonies free of carnivores (and in most cases also free of rodents), Louzao *et al.* (2006a) did not detect significant inter-colony differences in breeding productivity. Results presented by these authors were within "normal" for a Procellariiforme (range 0.33-1.00), and therefore are not of particular concern (again, the situation could change if colonies with carnivores were considered).

Another important parameter to take into account is the rate of sabbatical years taken by adults, i.e. the probability that an adult skips breeding, which would influence productivity. According to Oro *et al.* (2004) this parameter is relatively high, 0.26, but similar to what was found recently for Cory's shearwaters *Calonectris diomedea* using reliable methods (Sanz-Aguilar *et al.* 2011)

**Population size and trend**

The breeding population of the Balearic shearwater was last estimated in 2009 at 3,193 breeding pairs (CMA 2010; see Table 3). This figure is significantly larger than those of previous estimates (Table 2), but this is primarily due to increased survey effort (better prospecting of known breeding sites plus finding of new sites), and therefore does not reflect a real increase of the population. In fact, it seems clear from demographic data (Oro *et al.* 2004) that even those areas where the population estimate has increased show a negative population trend (Oro *et al.* 2004). For other areas the decline is obvious even considering census data, as is the case for the main historical stronghold of the species, Formentera. Colonies on this island have experienced a strong decline in recent years, from more than 1,500 breeding pairs in the early 1990s to less than 1000 pairs in 2001 (Ruiz & Martí 2004) and 692 pairs in 2003-2006 (CMA 2010).

Overall, absolute figures and their direct use to infer population trends should be taken with caution, as breeding sites are most often inaccessible, and therefore their census relies on indirect methods (e.g. counts of rafts, vocalisations, etc.) that are subject to strong biases and inaccuracy. For instance, slight changes in the census method seem to be the main reason for the discrepancies in the estimates for 1999 (2,190-4,414 pairs) and 2001 (1,750-2,125 pairs), which were conducted within the same project

(Ruiz & Martí 2004). Under this scenario, population trends should not be based on the comparison of total counts from different periods; trends should be better established on the basis of data from well-monitored colonies (see PVA below), while taking into account the need of a well-designed, thorough (and expense) global population census to get robust estimates of the population size.

**Table 2. Estimates of the Balearic shearwater breeding population in the last two decades.**

| Year | Estimate (breeding pairs) | Source |
|---|---|---|
| 2009 | 3,193 | CMA 2010 |
| 2007 | >2,135-2,185 | CMA 2010 |
| 2005 | c.2,400 | Rodríguez-Molina & McMinn-Grivé (2005) |
| 2001 | 1,750-2,125 | Ruiz & Martí (2004) |
| 1999 | 2,190-4,256 | Ruiz & Martí (2004) |
| early 1990s | c. 3,300 (2,083-4,114) | Aguilar (1997), Ruiz & Martí (2004) |
| 1988 | 2,000-5,000 | Capellà (1988) |

In the last few years there have been some attempts to obtain estimates of the global population of the Balearic shearwater based on censuses outside the breeding colonies, as complement to the estimates of the breeding population. Two methodological approaches are particularly appropriate, and present similar results: (1) systematic boat-transect censuses at sea covering the Mediterranean Iberian shelf in late autumn (when most birds are concentrated in that area) (Arcos *in press*); and (2) land-based counts of migration through the Straits of Gibraltar during late spring and early summer, coinciding with the post-breeding outflow to the Atlantic (Arroyo *et al. in press*). Both approaches provide similar estimates, around 25,000 individuals or more. If such figures are correct, the breeding population could be currently underestimated, most likely as a consequence of biases in the counts of known colonies and/or the existence of undetected colonies; alternatively, the proportion of non-breeders population should be unusually large even for a Procellariiform (Arcos *in press*).

**Table 3. Population size of the currently occupied colonies of Balearic shearwater (CMA 2010).**

| Main Island | Colony | Population (breeding pairs) | Year(s) of the estimate | Quality | Pop_author |
|---|---|---|---|---|---|
| Menorca | Illa de l'Aire | 5 | 2008 | Poor | R. Escandell |
| | Fornells | 50 | 2008 | Poor | S. Catchot & CMA |
| | Caballería | 50 | 2008 | Poor | S. Catchot & CMA |
| | Mola Maó | 300 | 2009 | Poor | CMA |
| | **Menorca_Total** | **405** | | | CMA |
| Mallorca | Conills | 50 | 2009 | Reliable | CMA |
| | Cella | 200 | 2009 | Reliable | CMA |
| | Malgrats | 250 | 2009 | Incomplete | CMA |
| | Dragonera | 400 | 2009 | Poor | CMA |
| | **Mallorca_Total** | **900** | | | CMA |
| Cabrera | na Pobra | 4 | 2008 | Incomplete | CMA |
| | Redona | 20 | 2008 | Poor | CMA |
| | Imperial | 25 | 2008 | Poor | CMA |
| | Picamosques | 50 | 2008 | Poor | CMA |
| | Blanquer-Corrals-Escala | 350 | 2008 | Poor | CMA |
| | **Cabrera_Total** | **449** | | | |
| Ibiza | Vedranell | 10 | 2003 | Poor | CMA |
| | Bosc | 37 | 2003 | Reliable | Igual *et al.* (2004) |
| | Vedra | 50 | 2003 | Poor | CMA |
| | Espartar | 50 | 2003 | Poor | CMA |
| | Tagomago | 200 | 1995 | Poor | CMA |
| | Conillera | 400 | 2004 | Poor | CMA |
| | **Ibiza_Total** | **747** | | | |
| Formentera | Espalmador | 32 | 2006 | Reliable | CMA |
| | Espardell | 40 | 2006 | Reliable | CMA |
| | Punta Prima | 50 | 2003 | Poor | CMA |
| | Barbaria | 110 | 2003 | Poor | CMA |
| | Mola | 460 | 2003 | Poor | CMA |
| | **Formentera_Total** | **692** | | | |

## *2 - THREATS*

### General overview

The main threats for the Balearic shearwater are those that directly affect adult survival, both in the breeding grounds and at sea. Predation by carnivores (breeding colonies) and fishing bycatch (at sea) have been identified as the two most serious ones. Acute pollution (e.g. oil spills) also poses a serious potential threat, as the highly gregarious behaviour of this shearwater at sea could result in the death of large numbers of birds with an acute pollution event. Harvesting for human consumption used to be an important threat influencing both survival and productivity, but this practice is illegal nowadays and practically eradicated.

Other threats affecting breeding performance or even (indirectly) adult survival are reduced food availability due to fisheries overexploitation and/or human-induced environmental change, predation by rats, breeding habitat degradation and background chemical pollution. Increasing research is necessary to assess the effect of these threats at the population level, as well as the impact of new potential threats, such as marine windfarms.

Most threats coincide with those identified in the previous action plan (Aguilar 1999), although some have been merged for the sake of synthesis and clarity, and others have been neglected given lack of information (see Annex 1). As in 1999, predation by carnivores is one of the main threats, but to this it has been added the mortality caused by fishing gear (i.e. fishing bycatch), which was considered low previously due to lack of data. On the other hand one of the main threats reported in 1999, the lack of protection in the breeding grounds, has been disregarded here as almost the 100% of the breeding sites have been designated under legal protection; however, management plans are still pending and several colonies require urgent conservation action to address the threats mentioned above.

### List of critical and important threats

***Predation at colonies***

Predation by introduced carnivores (feral cats *Felis catus*, genet *Genetta genetta*, pine marten *Martes martes*) has likely shaped the current distribution of the species, restricted to small islets and coastal cliffs of difficult access (Alcover *et al.* 1994, Rodríguez & McMinn 2002, Ruiz & Martí 2004). At present, carnivores occur in the formerly strongholds of the species, in Formentera, as well as in sites of Menorca, Cabrera and Ibiza (Fig. 3). Where present, these predators can kill several birds, e.g. 21 non-juvenile individuals were reported killed by cats in a 1-month period in a single cave in Mola de Maó (Menorca), in 2000 (Ruiz & Martí 2004); all monitored nests in the same site in 2006 and 2007 were lost due to predation (CMA 2010). Overall, 1/3 of the Balearic shearwater population breeds in colonies with presence of carnivores according to current data (CMA 2010). Local extinctions due to the

pressure of carnivores have been reported in Cabrera (Aguilar 1999).

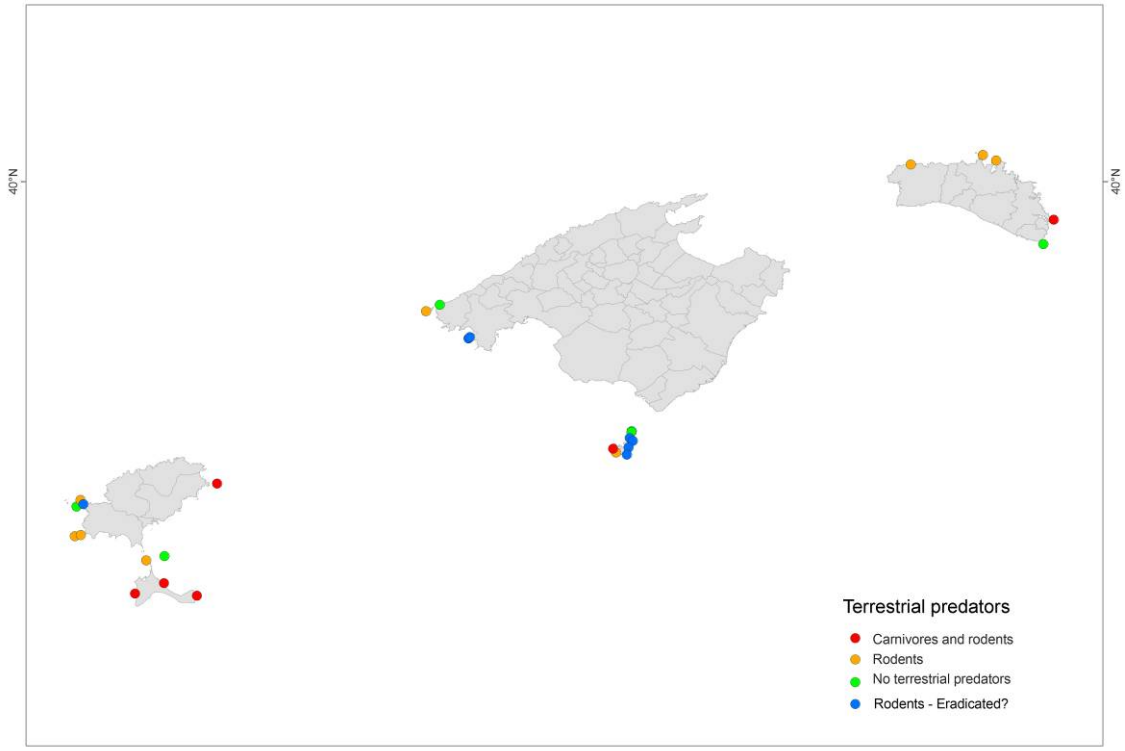



**Figure 3. Presence/absence of predators in colonies of Balearic shearwater. Carnivores are treated separately, given their higher impact on the species. Several colonies with rodents have been subject to eradication actions; those of them that were apparently successful (though no monitoring has been carried out afterwards) are indicated separately (blue dots). Elaborated from data courtesy of Skua SLP and the Conselleria de Medi Ambient – Govern de les Illes Balears (CMA 2010).**

Predation by rodents, mainly by black rat *Rattus rattus*, represents a less important threat, not alarming at present, as these animals primarily prey on eggs and chicks, thus affecting breeding productivity rather than adult survival. This is why rats and shearwaters have shared the same sites for centuries and even millennia in the Mediterranean (Ruffino *et al.* 2009). However, the prevalence of this threat is far more extended than that of carnivores, with over 90% of the known breeding population nesting in colonies with presence of rats (plus mice *Mus musculus* and/or garden dormouse *Eliomys quercinus*) (CMA 2010; see Fig.3). Some of these colonies have been subject to eradication campaigns in recent years, either effective or not (Fig. 3).

Eradication of predators, particularly carnivores, is urgently needed to reduce the impact of this threat. These measures should be conducted taking into account their effects on the whole island ecosystem, ideally within the frame of island restoration projects (e.g. Drake & Hunt 2009).

Finally, predation on adults by the autochthonous peregrine falcon *Falco peregrinus* and yellow-legged gull *Larus michahellis* has been locally reported, though its impact is likely low, local, and not directly due to human factors (though indirect effects can arise, e.g. enhancement of predation opportunities by light pollution; Arcos & Oro 2004, García 2009, Wynn *et al.* 2010).

***Impact: Critical***

***Bycatch in fishing gear***

Quantitative data on fishing bycatch of Balearic shearwaters is very limited and patchy, but there is increasing evidence that this occurs on a regular basis through most of the species' distribution range, and that it is caused by different fishing gear, especially by demersal longlining (Louzao & Oro 2004, Dunn 2007, Arcos *et al*. 2008, ICES 2008, Louzao *et al. in press*). Observer programmes often report low rates of bycatch for this species (e.g. Belda & Sánchez 2001, Laneri *et al*. 2010), which has hidden the occurrence of irregular, large-scale bycatch events, that can affect up to over 100 birds in a single line, due to the gregarious behaviour of the species. Such massive catches have been reported for demersal longline vessels in the Mediterranean (Arcos *et al.* 2008, ICES 2008, Louzao *et al. in press*) and for purse-seiners in Portugal (Universidade do Minho & SPEA, unpublished data-2010), and most likely also occur in other areas. Gillnets were estimated to kill several hundred 'Yelkouan' shearwaters (which could involve Balearic birds) per year in the French Mediterranean in the early 1970s, after the introduction of nylon in the fabrication of these nets (Besson 1973), though there is no updated information available. Finally, occasional bycatch by trawlers could also *occur* (Ruiz & Martí 2004). García-Barcelona *et al*. (2010) and Laneri *et al.* (2010) have reported higher rates of seabird bycatch in both pelagic and demersal Mediterranean longline vessels when trawlers are not operating (i.e. less discards are available), pointing towards the need of an integrated multi-fisheries management approach, trawling and longlining in this particular case.

The existing evidence, though patchy, points to a serious threat posed by fishing bycatch, as has been shown for other seabirds such as Cory's shearwater (Igual *et al*. 2009). Indeed, only considering the 'irregular' (but not so infrequent) events of mass mortality (10s of birds or more), this represents an unquestionable impact for a population of only a few thousand breeding pairs, for which adult survival is the most sensitive demographic parameter. The impact likely affects the whole population, as it is reported at the foraging grounds throughout most of the distribution range and throughout the whole year. However, during the breeding period birds from different breeding areas appear to show preference for different foraging areas (Louzao et al. 2011b), and this could result in differential bycatch at this time of year.

***Impact: Critical***

***Acute pollution***

Events of acute (or point-source) pollution such as oil spills can cause significant impacts on seabird populations, primarily by causing the death of large numbers of

birds (thus affecting adult –and immature/young- survival) but also productivity (through affecting body condition, food availability, sex ratio, etc.) (e.g. Peterson *et al*. 2003, Carter *et al*. 2011). The Balearic shearwater is particularly sensitive to such events, for two main reasons (Arcos & Oro 2004, Ruiz & Martí 2004): (1) its highly congregatory behaviour could result in a large number of casualties in case that a spill occurred in a congregation area; and (2) the diving abilities of the species, as seabirds showing more aerial foraging behaviour interact to a lower extent with the water column.

Oil spills are the best known exponent of this type of pollution, but other types of point-source events can also be important (e.g. spills of other chemicals). Attention should be also paid to "natural" events enhanced by human degradation of the marine environment. In particular, algae blooms, which are related to water eutrophication, have been reported to cause Balearic/Yelkouan shearwater mortality by intoxication up to at least 50 individuals in a single event (Gutiérrez 2007).

***Impact: (potentially) High***

***Low foraging opportunities (decreasing fish stocks)***

The Balearic shearwater feeds largely on small pelagic fish throughout its distribution range, also making substantial use of fisheries discards (LeMao & Yésou 1993, Arcos & Oro 2002a,b, Louzao *et al.* 2006a, Navarro *et al.* 2009, Käkelä *et al*. 2010). The former are subject to fluctuations over time and space, but overall show a tendency towards reduction due to fishing overexploitation (Arcos *et al.* 2008, Coll *et al.* 2008). Human-induced environmental change could also drive changes on small pelagic fish (and other prey) availability (Agostini 2000). Discards are considered as a secondary food resource for the Balearic shearwater (Arcos & Oro 2002a, Navarro et al. 2009, Käkelä *et al*. 2010), although their availability can even influence its foraging movement behaviour (Bartumeus *et al*. 2010). Current fishing policies have among their priorities the reduction of this fishery waste (Penas 2007), thus predicting a reduction of this food resource for seabirds that in the long term will benefit them (through ecosystem recovery), but that could affect negatively the Balearic shearwater in the short term if alternative food sources keep declining (food shortage; increased interactions with scavenging species) (Arcos *et al.* 2008). Therefore, plans to reduce discards should try to minimise negative effects on seabird communities in general and the Balearic shearwater in particular.

Food availability during the breeding season has been identified as a factor influencing breeding productivity (Louzao *et al.* 2006a). The same could apply for food availability during the non-breeding period, as food scarcity during this time of years could affect body condition and ultimately influence the decision of whether to breed or not, and the success of a breeding attempt. Moreover, adult survival of Balearic shearwaters could be influenced by food availability, as shown for other seabird species (e.g. Sandvik et al. 2005, Fort et al. 2009).

***Impact: Medium***

***Degradation of breeding habitat***

The breeding range of the Balearic shearwater is very restricted, and habitat availability could pose a problem. Terrestrial predators, particularly carnivores, represent an important limiting factor (see above), which could explain the disappearance of breeding sites in historical times and the recent extinction of a few small colonies, thus influencing the current distribution of breeding sites (Ruiz & Martí 2004). In addition, coastal proliferation of human settlements and the associated degradation of the habitat is also a key limiting factor, and poses a threat for the species (Arcos & Oro 2004, Ruiz & Martí 2004). At present practically all colonies are protected as Special Protection Areas (SPAs), which reduces the risks associated to human development. However, human settlements are very close to some colonies, and could still have a negative impact on them (e.g. by favouring the presence of cats and other introduced predators). Human disturbance at or near colonies could also affect the breeding performance of the birds (e.g. through reducing social behaviour, adding stress, etc.), and is not properly regulated at present. Finally, a particular issue related with human settlements is light pollution, which has been reported as an important threat for Procellariiformes in other regions, causing collisions due to disorientation and facilitation of aerial predation at night (e.g. Le Corre *et al.* 2002, Rodríguez & Rodríguez 2009). This problem appears to be very local in the case of the Balearic shearwater, but has been shown to influence social behaviour (Ruiz & Martí 2004) and predation by peregrine falcons in some colonies (Wynn *et al.* 2010), and might also enhance predation by yellow-legged gulls *Larus michahellis* (CMA 2010), as described for the European storm-petrel *Hydrobates pelagicus* (Oro *et al*. 2005).

***Impact: Medium***

***Background pollution***

Pollutants affect seabirds in many different ways, at both individual and population levels. Excluding point-source events (see above), the effects of pollution in the environment are very difficult to assess, but high levels of pollutants accumulated in adults and chicks can affect development, physiology and behaviour, and ultimately reproductive performance and survival rates (Burger & Gochfeld 2002). In addition, pollutants can affect seabirds indirectly by altering their habitat and prey availability.

Given high background levels of pollutants in the enclosed and highly impacted Mediterranean Sea, pollution can pose a threat for the Balearic shearwarter. Levels of mercury and selenium have been reported to be particularly high in this species (Arcos *et al.* 2004, Ruiz & Martí 2004, Oro *et al.* 2008). Other pollutants show relatively lower levels and apparently do not pose any threat at present (Ruiz & Martí 2004). Plastic debris are often ingested by Procellariiformes (Hyrenbach *et al.* 2009), and likely affect the Balearic shearwater. Negative effects by pollutants have still to be proven, but so far little work has been conducted to assess this particular point.

***Impact: Low (unknown)***

***Windfarms***

The exploitation of wind energy at sea is a promising developing field that will likely

result in the rapid proliferation of marine windfarms throughout the distribution range of the Balearic shearwater within the next few years (European Commission 2008). The impact of these structures on seabirds has received little attention so far, and the existing studies have been conducted in areas where shearwaters and other Procellariformes are scarce, where the first experiences have been implemented (e.g. BirdLife International 2010a). However, the Balearic shearwater could be affected both directly (collisions causing mortality) and indirectly (e.g. habitat fragmentation and associated reduction on prey availability), and a precautionary approach should be adopted given the delicate conservation status of the species.

***Impact: Unknown***

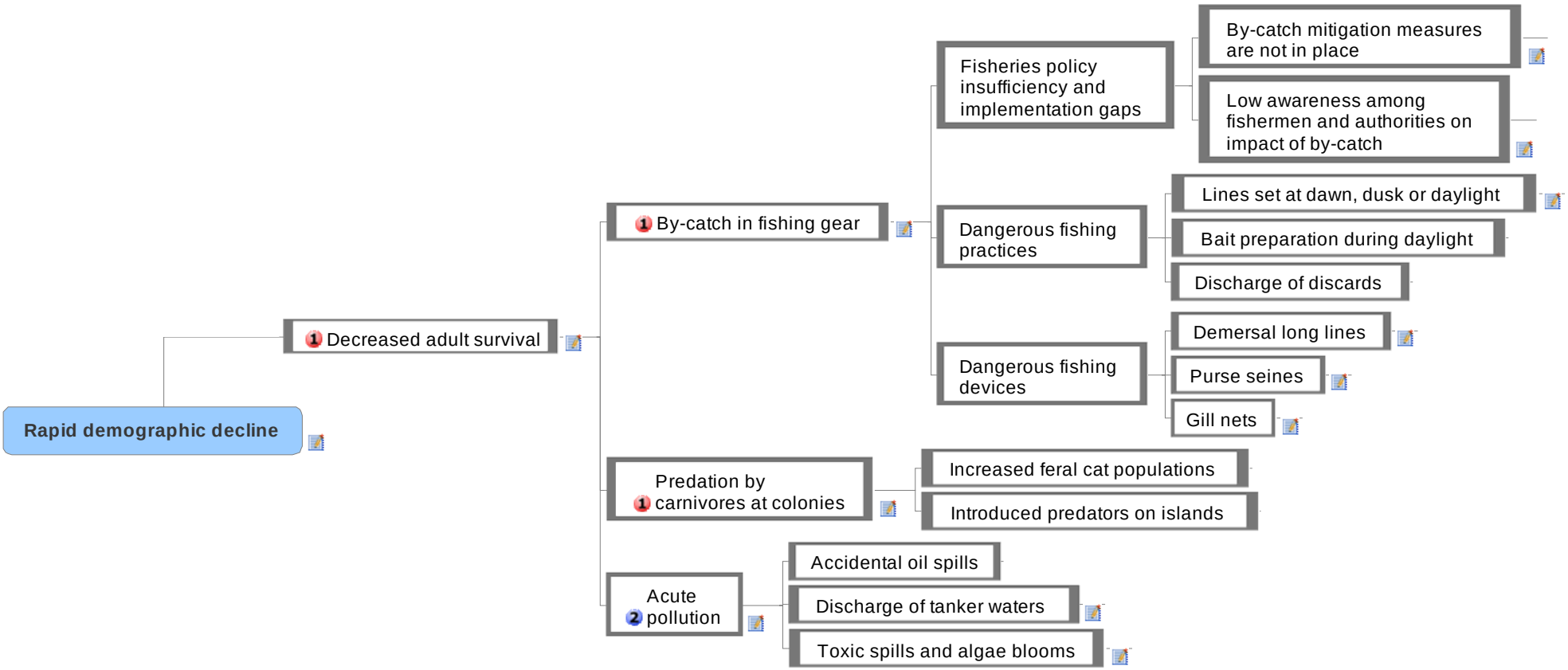
**Population Viability Analysis (PVA)**

The unique existing PVA was conducted by Oro *et al.* (2004). Taking the demographic information available (from two predator-free colonies of Mallorca, see details above), and assuming a breeding population of 2000 breeding pairs, these authors estimated a declining trend for the species (population growth rate $\lambda$=0.952), with a projected 7.4% rate of decline per year, that would result in a mean extinction time of 40.4 years (i.e. less than 3 generations, 54 years). The main parameter explaining this trend was adult survival (estimated at 0.78), whereas breeding productivity would need to improve over normal values for a Procellariiform to reach a value of $\lambda \geq 1$ (Louzao *et al.* 2006a).

As stated above, these data have to be taken with caution given the low number of study sites (Tavecchia *et al*. 2007). However, demographic information came from colonies free of carnivores (and in most cases also of rodents), and should be taken as conservative. The lack of predators also suggests that the source of mortality for the birds breeding in these colonies is probably operating out at sea, most likely fishing bycatch (Oro *et al.* 2004, Arcos *et al.* 2008).

It is important to conduct new PVAs taking into account the new information on population figures, which could bring more optimistic predictions. However, caution is required as information on population numbers is still uncertain. Moreover, many of the assumptions of the 2004 PVA were very conservative (relatively high young and immature survival rates assumed, adult survival estimated from predator-free colonies, etc.). Accurate monitoring of a handful of representative sites, on different islands and including colonies exposed to predation by carnivores, is necessary to update demographic parameters and to make the estimates more representative of the whole population (cf. Oro 2003, Oro *et al*. 2004). In addition, reliable estimates for the whole Balearic shearwater population are necessary to set the basis of any consistent PVA.

**Figure 4. Problem tree showing the most important threats causing the population decline of Balearic shearwater**[1]




[1] Only the priority threats are shown, i.e. those directly affecting adult survival rates. Other threats would primarily affect breeding performance (wich is a less sensitive parameter), although could also affect adult survival indirectly.

## 3 - POLICIES AND LEGISLATION RELEVANT FOR MANAGEMENT.

### International conservation and legal status of the species

The Balearic shearwater is considered globally as Critically Endangered following the IUCN classification (IUCN threat codes: A4bce, B2a+b(ii, iii, iv, v)) based on tiny effective breeding range (<100 $km^2$) and, most important, a small population which is undergoing an extremely rapid decline according to the available data (BirdLife International 2010b). In Europe, the species is also classified as Critically Endangered based on the same criteria (BirdLife International 2004).

The species is included in several international lists and conventions: Bern Convention on the Conservation of European Wildlife and Natural Habitats (Appendix II), Convention on Migratory Species (CMS, Appendix II), EC Birds Directive (Annex I), Mediterranean SPA/BD Protocol (Annex II), and OSPAR Commission. The species has also been proposed as a firm candidate to the Agreement on the Conservation of Albatrosses and Petrels (ACAP), and could become the first Northern Hemisphere seabird to be listed under that agreement (see Cooper & Baker 2008), but regrettably its final inclusion has been postponed for more than two years despite initially favourable assessment by ACAP in 2008.

A European Species Action Plan was produced under the auspices of the European Commission in 1999 (Aguilar 1999). The present document is a thorough review of that plan.

### National policies, legislation and ongoing activities

The Balearic shearwater is legally protected across its main distribution range in Europe: Spain, Portugal, France and the UK. It is important to urge protection in the other relevant countries outside Europe: Algeria and Morocco.

The Spanish National Strategy for the Conservation of the Balearic shearwater was approved in July 2005 (MARM 2005), and the conservation status of the species should be evaluated periodically according to Law 42/2007 on Natural Patrimony and Biodiversity. National legislation also forces regional administrations to develop Recovery Plans for the species, as it is listed as "Endangered" in the National Catalogue of Endangered Species, although only the Balearic Islands have formalised such a plan. In fact the latter preceded the National Strategy, being first approved in 1997 (Aguilar 1997), and then thoroughly reviewed in 2004 (http://boib.caib.es/pdf/2004097/mp78.pdf); a new revision is due for 2010. Recovery Plans should also be produced by the Spanish regional administrations where the Balearic shearwater occurs regularly at sea, although competences on marine issues largely rely on the Spanish Government.

All breeding sites are currently protected as Special Protection Areas (SPAs) under the Natura 2000 network, with the unique exception of the colony of Punta Prima in Formentera, where new information has revealed that the prevailing colony (50 pp.)

lays right outside the SPA (and the overlapping Important Bird Area, IBA) designated for this species. However, the management plans for the Balearic SPAs have not been implemented yet. Management plans are therefore limited to colonies covered by other figures of protection, such as the National Park of Cabrera and the Natural Park of Sa Dragonera. These last two sites have among their priorities the removal of carnivores (Cabrera archipelago) and rats (Sa Dragonera island).

Regarding the marine environment, the designation of sites at sea is far from sufficient (BirdLife International 2010c). Spain (Arcos *et al*. 2009) and Portugal (Ramírez *et al.* 2008) have recently concluded their marine Important Bird Area (IBA) inventories, identifying 22 (>36,000 $km^2$) and 3 (almost 4,000 $km^2$) marine IBAs specifically for the Balearic shearwater, respectively. In Spain, only a few small coastal sites have been already designated as marine SPAs by the Regional Governments, with slightly over 4% of overlap with the proposed IBAs for the Balearic shearwater (see Annex 2). However, the Spanish Government has adopted the marine IBA inventory as the model for the designation of marine SPAs, and has already initiated the designation process, starting by those sites relevant for the Balearic shearwater. In the case of Portugal, the current overlap of the IBAs proposed for the species with SPAs is of about 3%, although current work to enlarge the marine SPA of Ilhas Berlengas would increase this percentage; the other two marine IBAs have not been addressed yet. Finally, France has recently declared an ambitious network of marine SPAs (Agence des Aires Marines Protégées 2009, INPN 2010, MEDDTL 2010). Among them, 25 SPAs (>24,000 km²) where Balearic shearwaters are present outside the breeding season, and 6 SPAs (3,400 km²) on the Mediterranean coast which are regularly visited during the breeding season. Huge marine IBAs were also proposed, with up to 55,000 $km^2$ claimed for the Balearic shearwater, which have been partly designated as SPAs (Deceuninck & Micol 2008, BirdLife International 2010c). These French initiatives were primarily based on review work, and further information will help to refine the network of both IBAs and SPAs. Neither marine SPAs nor other figures of legal protection have been designated elsewhere (BirdLife International 2010c). In addition to designation, the implementation of management plans for the marine sites is pending and should be urgently addressed.

**Ongoing activities for conservation of the species**

The concern on the conservation status of the Balearic shearwater substantially rose at the end of the 1990s, coinciding with its recognition as a distinct species. This also coincided with the execution of LIFE *Project Recovery plan of* Puffinus p. mauretanicus *in SPA's of the Balearic Islands* (LIFE97 NAT/E/004147; 1998-2001), granted to the Balearic Government and largely conducted by SEO/BirdLife, which allowed an update of the information on this species, including work on colony surveys and monitoring, assessment of threats, conservation and policy action, and raising awareness, principally at the breeding grounds but also dealing with the marine environment (coastal network of census points, assessment of threats at sea, satellite tracking, etc.) (Ruiz & Martí 2004). At the same time, and partly conducted on a collaborative basis, extensive research work was initiated on the species by some research centres, mainly the Institut Mediterrani d'Estudis Avançats (IMEDEA, CSIC-

UIB), but also the University of Barcelona (UB), the Institut de Ciències del Mar de Barcelona (ICM, CSIC), the Estación Biológica de Doñana (EBD), the University of Glasgow, the Instituto Español de Oceanografía (IEO) and others. This research has covered demography and population dynamics, genetics, pollutants, breeding ecology, foraging ecology and distribution patterns at sea, and has been supported by a handful of projects, most of them small. Special mention deserves EU funded project DISCBIRD *Effects of changes in fishery discarding rates on seabird communities*, led in Spain by IMEDEA, which supported, among other work, the first PhD thesis fully devoted to the Balearic shearwater (Louzao 2006; see also Louzao *et al*. 2007).

One of the main achievements of the 1998-2001 LIFE Project was the designation of SPAs for all the breeding sites of the Balearic shearwater. The project also prompted the creation of a national working group for the species, leaded by the Ministry of Environment and Rural and Marine Affairs (MARM) in coordination with the regional administrations and with input from scientific experts and NGOs. The group has remained inactive since the approval of the Spanish National Strategy for the Balearic shearwater in 2005.

In recent years work on the breeding grounds, commended by the Balearic Government (CMA) and with initial support of the Spanish Government (MARM), has included the survey of new colonies, low-intensity monitoring of some breeding sites, and costal sea counts. Mitigation of threats related with introduced predators has also been addressed in some colonies (primarily rats, but also carnivores, see Fig. 3), although several sites remain unmanaged. The intensity of research work at colonies has been low in the last few years, due to the concern of the Balearic Government on the potential impact of human disturbance.

Most recent work at sea has been focused on the identification of marine hotspots and their designation as Marine Protected Areas (MPAs). SEO/BirdLife and SPEA led this initiative through two sister LIFE Projects (2004-2008/2009) to identify marine IBAs in Spain and Portugal (Arcos *et al*. 2009 and Ramírez *et al.* 2008, respectively). Both projects allowed identifying the best sites for the Balearic shearwater at sea, accounting for activity around colonies (seaward extensions), foraging (areas of concentration at sea) and migration (migration hotspots). These sites now require assessment of threats and the development of appropriate management plans, a work that is contributed by SEO/BirdLife through LIFE+ Project INDEMARES (2009-2013), and by several BirdLife partners (RSPB, BirdWatch Ireland, LPO, SPEA and SEO/BirdLife) through InterReg Project FAME (Future of the Atlantic Marine Environment, 2010-2013), which includes an action to track Balearic shearwaters in Atlantic waters. Also SEO/BirdLife and SPEA have been supported by BirdLife International as Species Guardians of the Balearic shearwater (2008-2009). Finally, there are an increasing number of initiatives to monitor the species from coastal vantage points, with networks such as SeaWatch (UK), RAM (Spain & Portugal), Migraction (France) and Trektellen (W Europe), and local but key initiatives such as those of Migres in the Strait of Gibraltar and the Xunta de Galicia & Terranova S.L. in Estaca de Bares (Galicia).

## *4 - FRAMEWORK FOR ACTION*

### Aim

Stop the negative population trend of the Balearic shearwater, and revert it if possible, while ensuring the conservation of its habitat.

### Objectives

Objective 1. Within 10 years, stop or reverse population decline such that population growth rate is positive ($\lambda \geq 1$).

Sub-objective 1.1. Within 10 years, set a monitoring scheme that allows assessing with confidence the population trend of the species.

Objective 2. Within 5 years, keep or improve the good environmental status of the current breeding colonies and main marine hotspots.

### Results

Result 1.1. Average adult survival rate is close to or over 90% (by addressing most significant threats)
Result 1.2. Breeding productivity is kept equal or over known current levels.
Result 1.3. Knowledge gaps filled.
Result 2.1. Conservation of breeding habitat is ensured.
Result 2.2. Conservation of marine habitat is ensured.

**Table 4. Actions corresponding to the results and ranked according to their importance, following from the problem tree.**

**Result 1.1. Average annual adult survival rate is close to or over 90%**

| *Action* | *Priority* | *Time scale* | *Organisations responsible* |
|---|---|---|---|
| 1.1.1. Reduce predation at colonies by carnivores, by implementing eradication campaigns, fencing (where appropriate, locally) and control of human refuse. Create a regulatory framework for predation control in islands. Work on raising awareness of the problem.<br><br>This action should take into account impact at the ecosystem level, and therefore should be conducted along with actions 1.2.1 and 2.1.2 (see below).<br><br>**Applicable to: Balearic Islands** | Essential | Short-medium (partly ongoing) | Balearic Government, Spanish Government, site managers. Involve research bodies and NGOs. |
| 1.1.2. Promote the elaboration and implementation of a EU Seabird Action Plan to reduce bycatch (Seabird PoA). Ensure adequate evaluation of impact through the whole distribution range and considering different fishing gear (observer programmes, questionnaires, etc.; see also action 1.3.4). Promote the incorporation of the most appropriate mitigation measures, ensuring an ecosystem-based & multi-fisheries approach. Implement Seabird PoA at national level and rise awareness among fishermen and authorities.<br><br>**Applicable to: EU (especially ES, PT, FR, UK); also Algeria & Morocco.** | Essential | Short (partly ongoing) | EU, national and regional authorities, NGOs, fishing sectors (RFMOs, fishing industry, artisanal fishing communities), research bodies. |

| *Action* | *Priority* | *Time scale* | *Organisations responsible* |
|---|---|---|---|
| 1.1.3. Promote the incorporation of bycatch mitigation measures in SPA/MPA management plans.<br><br>**Applicable to: ES, PT, FR, UK, Algeria, Morocco.** | High | Short-medium (partly ongoing) | EU, national and regional authorities, site managers, fishing sectors (RFMOs, fishing industry, artisanal fishing communities), NGOs, research bodies. |
| 1.1.4. Study the viability of market-based approaches (e.g. eco-labelling) to help reducing seabird bycatch<br><br>**Applicable to: EU (especially ES, PT, FR, UK); also Algeria & Morocco.** | Medium | Medium | EU, national authorities, NGOs, fishing sectors (RFMOs, fishing industry, artisanal fishing communities). |
| 1.1.5. Carry out risk assessment of sensitive areas to acute pollution events, especially oil spills, and develop contingency plans (pay special attention to SPA/MPAs). Work on capacity building for local authorities and organisations for support actions in case of spills.<br><br>**Applicable to: EU (especially ES, PT, FR, UK); also Algeria & Morocco.** | Medium | Medium | EU, national and regional authorities, shipping companies, oil industry, NGOs, research bodies. |
| 1.1.6. Promote strict policies and surveillance to minimise acute oil spills (e.g. increasing control, higher fins).<br><br>**Applicable to: EU (especially ES, PT, FR, UK); also Algeria & Morocco.** | Medium | Medium | EU, national and regional authorities, shipping companies, oil industry, NGOs. |
| 1.1.7. Ensure surveillance of breeding colonies to avoid an upsurge of illegal human harvesting.<br><br>**Applicable to: Balearic Islands (breeding sites)** | Low | Ongoing | Balearic Government, site managers. |

**Result 1.2. Breeding productivity is kept equal or greater than known current levels**

| *Action* | *Priority* | *Time scale* | *Organisations responsible* |
|---|---|---|---|
| 1.2.1. Include the eradication of rodents as part of the wider approach of colony/island restoration initiatives (see action 2.1.2, and also 1.1.1).<br><br>**Applicable to: Balearic Islands (breeding sites)** | Medium | Medium (ongoing) | Balearic Government, site managers. |
| 1.2.2. Increase the regulation and control of human presence in or near colonies, promote code of conduct to approach rafts.<br><br>**Applicable to: Balearic Islands (breeding sites)** | Medium | Medium | Balearic Government, site managers, NGOs. |
| 1.2.3. Promote mitigation measures to reduce the impact of lights near colonies, especially regarding public lighting.<br><br>**Applicable to: Balearic Islands** | Low | Medium | Balearic Government, site managers, NGOs, research bodies. |
| 1.2.4. Promote ecosystem-based, sustainable policies for fishing practices, to allow fish stocks to recover. Minimise the impact of the (supported) reduction of fishing discards on seabird communities in general, and on the Balearic shearwater in particular.<br><br>**Applicable to: EU (especially ES, PT, FR, UK); also Algeria & Morocco.** | Medium | Short-medium | EU, National and regional authorities, site managers, fishing sectors (RFMOs, fishing industry, artisanal fishing communities), NGOs, research bodies. |

**Result 1.3. Knowledge gaps filled.**

| *Action* | *Priority* | *Time scale* | *Organisations responsible* |
|---|---|---|---|
| 1.3.1. Design and implement a monitoring scheme that enables gathering of robust estimates of demographic parameters. This should be conducted on an annual basis, and should include a set of colonies considered to be representative of the whole breeding population. The design should be based on scientific assessment.<br><br>**Applicable to: Balearic Islands (breeding sites)** | Essential | Short | Balearic Government, Spanish Government, EU, NGOs, research bodies. |
| 1.3.2. Design and conduct exhaustive and well coordinated censuses of the breeding population, using the most accurate methods available. Look for potential new breeding sites. The cost of this initiative is expected to be high, and should count with the support and coordination of several institutions. The initiative should be repeated at intervals of 5 years.<br><br>**Applicable to: Balearic Islands (breeding sites)** | Essential | Short | Balearic Government, Spanish Government, EU, NGOs, research bodies. |
| 1.3.3. Assess the impact of bycatch (where, when, which type of gear, how much) throughout distribution range (questionnaires to fishermen, observer programmes, etc.). Put emphasis on SPA/MPAs.<br><br>**Applicable to: EU (especially ES, PT, FR, UK); also Algeria & Morocco.** | Essential | Short | EU, national and regional authorities, NGOs, research bodies, fishing sectors (RFMOs, fishing industry, artisanal fishing communities) |

| *Action* | *Priority* | *Time scale* | *Organisations responsible* |
|---|---|---|---|
| 1.3.4. Promote the identification of marine hotspots for the species, and other studies to better document habitat use and understanding of its behaviour at sea, as well as to keep an alternative approach for population estimates. Keep current monitoring work based on boat surveys and coastal counts (the latter particularly at key vantage sites such as Gibraltar), and promote tracking studies.<br><br>**Applicable to: all distribution range, especially where main gaps occur (Algeria, Morocco)** | High | Ongoing | EU, national and regional authorities, NGOs, research bodies. |
| 1.3.5. Asses the impact of little understood or potential threats, such as the decline in food availability (overfishing and/or human-induced environmental change), background chemical pollution and marine windfarms.<br><br>**Applicable to: ES, PT, FR, UK, Algeria, Morocco.** | High | Medium | EU, national and regional authorities, NGOs, research bodies, energetic industry, fishing sectors (RFMOs, fishing industry, artisanal fishing communities). |
| 1.3.6. Promote the creation of national working groups, with coordination also at international level, including interdisciplinary sub-groups for issues of particular relevance, such as seabird-fishery interactions, predator control, etc. Promote information flow and the fast dissemination of results (e.g. regular publication of work at colonies).<br><br>**Applicable to: EU (especially ES, PT, FR, UK); also Algeria & Morocco.** | High | Short | EU, national and regional authorities, NGOs, research bodies |

**Result 2.1. Conservation of breeding habitat.**

| *Action* | *Priority* | *Time scale* | *Organisations responsible* |
|---|---|---|---|
| 2.1.1. Implementation of management plans in the SPAs covering the whole of the breeding colonies. Lobby to designate as SPA the unique colony which is not yet protected (Punta Prima).<br><br>**Applicable to: Balearic Islands (breeding sites)** | High | Short | Balearic Government, site managers, NGOs, research bodies. |
| 2.1.2. Develop ecological restoration plan for seabird islands, from an ecosystem-based approach. This should integrate actions of eradication of (introduced) terrestrial predators.<br><br>**Applicable to: Balearic Islands (breeding sites)** | Low | Medium-long | Balearic Government, Spanish Government, site managers, NGOs, research bodies. |

**Result 2.2. Conservation of marine habitat.**

| *Action* | *Priority* | *Time scale* | *Organisations responsible* |
|---|---|---|---|
| 2.2.1. Promote the designation of Marine Protected Areas (SPAs and others) for the species.<br><br>**Applicable to: all distribution range, especially where main gaps occur (Algeria, Morocco)** | High | Ongoing | National and regional authorities, EU, NGOs, research bodies. |
| 2.2.2. Design and implement management plans for the MPAs (SPAs and others), and also promote appropriate conservation measures at a wider scale, regarding the Balearic shearwater.<br><br>**Applicable to: EU (especially ES, PT, FR, UK); also Algeria & Morocco.** | High | Short | National and regional authorities, EU, NGOs, research bodies. |

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*ANNEX 1: threats*

**Effects and score of the different threats as assessed in both the first Species Action Plan (Aguilar 1999) and in the current revision.**

| Threat | Effect[1] | Threat score 1999 | Threat score 2010 |
|---|---|---|---|
| **Predation at colonies (alien species)** | **Survival** (adults+), productivity | High (medium-high for rats) | **Critical** |
| **Fishing bycatch** | **Survival** (adults+) | Low | **Critical** |
| **Acute pollution** | **Survival** (adults+) | Potentially high | **(Potentially) high** |
| **Food availability** | Productivity (+ survival) | High | **Medium** |
| **Degradation of breeding habitat** | Productivity | Low | **Medium** |
| **Background (chemical) pollution** | Productivity (+ survival) | Unknown | **Low (unknown)** |
| **Human harvest** | Productivity, survival | Low, locally high | **Low** |
| **Windfarms** | Survival? | - | **Unknown** |
| Protection of colonies | Productivity, survival | High | - |
| Competition with other species | Productivity? | Unknown | - |
| Predation/kleptoparasitism by gulls | Productivity? | Unknown | - |

[1] Effect = main demographic parameter(s) affected.

**Intensity of threats in the most relevant countries**[1][2]

| Threat | Balearic Islands | Spain (Iberia) | Algeria | Morocco | Portugal | France | UK |
|---|---|---|---|---|---|---|---|
| Predation at colonies (alien species) | Critical | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Fishing bycatch | High-critical | Critical | Critical? | Critical? | High-critical | High | High |
| Acute pollution | Low-medium | High | Medium? | High | High | Medium | Medium |
| Food availability | Low | High | Medium? | Low | High | High | High |
| Degradation of breeding habitat | Medium | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Background (chemical) pollution | Low | Low-medium | ? | ? | Low-medium? | Low | Low |

[1] Data according to the questionnaires fulfilled by the contributors plus input during the workshop. (n.a. = not applicable).
[2] For Spain, information for the breeding colonies is presented separately.

*ANNEX 2: Key sites for conservation of the species (Important Bird Areas) in the EU and their protection status*

**Colony sites (all restricted to the Balearic Islands, Spain)**

| National site name (IBA)[1] | IBA Code | Estimate (breeding pairs)[2] | Year | Accuracy[3] | IBA area (km$^2$) | SPA code | % of colony protected (SPA)[4] |
|---|---|---|---|---|---|---|---|
| Islotes de Vedrá y Vedranell | ES307 | 60 | 2003 | C | 0.8 | ES0000078 | 100 |
| Isla Conejera e islotes de Bledes y Espartar (Ibiza) | ES308 | 487 | 2003 | C | 1.6 | ES5310023 | 100 |
| Isla de Tagomago | ES310 | 200 | 1995 | D | 0.6 | ES0000082 | 100 |
| Salinas de Ibiza y Formentera e islotes de Freus | ES312 | 72 (+50)[5] | 2006 | B | 143.2 | ES0000084 | 70 |
| Cabo de Barbaria | ES313 | 110 | 2003 | C | 1.6 | ES5310025 | 100 |
| La Mola de Formentera | ES314 | 460 | 2003 | C | 18.4 | ES5310024 | 100 |
| Isla Dragonera-La Trapa | ES315 | 600 | 2009 | C | 9.8 | ES0000222 | 100 |
| Acantilados costeros entre las Islas Malgrats y Cala Figuera | ES323 | 300 | 2009 | B | 4.3 | ES0000074 | 100 |
| Archipiélago de Cabrera | ES324 | 449 | 2008 | C | 100.3 | ES0000083 | 100 |
| Costa Norte y Este de Menorca e Isla del Aire | ES325 | 405 | 08-09 | D | 19.6 | ES5310035, ES5310073, | 100 |

[1] Some IBAs include different shearwater colonies.
[2] According to last surveys (CMA 2010; see Table 3 for further details).
[3] Reliability of estimates adopted from CMA (2010) to standards of IBA inventories: A - Reliable (accurate to within 10%); B – Incomplete (accurate to within 50%); C – Poor (less than 50% accuracy); D – Unknown.
[4] % of breeding pairs in the colony/IBA that are covered by SPAs.
[5] The colony of Punta Prima, in Formentera, is located just out of the border of this IBA, according to the most recent information. This is being revised and the IBA will be extended accordingly in the review of the Spanish inventory. It is also necessary to extend the surface of the SPA.

**Marine sites in the Balearic Islands**

| National site name[1] | IBA Code | Estimate (individuals)[2] | Year | Season | Main use of IBA[3] | Accuracy[4] | IBA area ($km^2$) | SPA code | % of IBA protected/ overlap[5] |
|---|---|---|---|---|---|---|---|---|---|
| Aguas del sureste de Menorca | ES419 | 915 | 08-09 | breeding | CE | D | 250.7 | - | 0 |
| Aguas del norte y oeste de Menorca | ES418 | 300 | 2008 | breeding | CE | D | 1,704.0 | - | 0 |
| Aguas del norte de Mallorca | ES417 | >1,000 | 2009 | breeding | ACS | D | 1,096.0 | ES0000227 | 5.5 |
| Aguas del poniente de Mallorca | ES416 | 2,700 | 2009 | breeding | CE | C | 504.5 | ES0000221, ES0000222 | 2.1 |
| Aguas del sur de Mallorca y Cabrera | ES415 | 1,347 | 2008 | breeding | CE | D | 672.2 | ES0000081, ES0000083 | 34.1 |
| Aguas del levante de Ibiza | ES414 | 600 | 1995 | breeding | CE | D | 205.6 | ES0000082, ES0000242 | 2.8 |
| Aguas del Poniente y norte de Ibiza | ES413 | 1,641 | 2009 | breeding | CE | D | 521.3 | ES0000078, ES5310023 | 5.9 |
| Aguas de Formentera y sur de Ibiza | ES412 | 2,072 | 2009 | breeding | CE, ACS | C | 658.5 | ES0000084, ES5310024, ES5310025 | 26.0 |

[1] Marine IBAs as described in Arcos et al. (2009). In this case all IBAs are exclusively marine, though seaward colony extensions are associated with terrestrial counterparts where the breeding colonies are located. In occasions a marine IBA can be associated to different terrestrial IBAs, or vice-versa.
[2] For colony extensions (CE) figures are estimated out of the breeding numbers in the adjacent colonies: nb individuals = 3* nb breeding pairs (following BirdLife International standards). Otherwise, estimates are derived from censuses at sea.
[3] Main use of the area by the Balearic shearwater: CE – Seaward colony extension; ACS – Area of concentration at sea (mainly for foraging); MC – Migration corridor.
[4] Reliability of estimates, taken from Arcos et al. (2009), following standards of IBA inventories: A - Reliable (accurate to within 10%); B – Incomplete (accurate to within 50%); C – Poor (less than 50% accuracy); D – Unknown.
[5] Overlap with SPAs irrespective of the SPA being declared for the Balearic shearwater or not.

**Marine sites off Mediterranean Iberia**

| National site name[1] | IBA Code | Estimate (individuals)[2] | | Year | Season | Main use of IBA[3] | Accuracy[4] | IBA area ($km^2$)[5] | SPA code | % of IBA protected/ overlap[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Min. | Max. | | | | | | | |
| Mar del Empordà | ES411 | 143 | 5,140 | 99-07 | Breeding | ACS | A | 1,061.0 | ES0000019, ES5120007, ES5120015, ES5120016 | 13.38 |
| | | 67 | 467 | 03-07 | non-breeding | | A | | | |
| Aguas del Baix Llobregat-Garraf | ES410 | 819 | 5,408 | 99-07 | Breeding | ACS | B | 706.8 | ES5110020 | 36.89 |
| | | 66 | 485 | 03-07 | non-breeding | | B | | | |
| Plataforma marina del delta del Ebro-Columbretes | ES409 | 7,121 | 13,889 | 99-07 | Breeding | ACS | A | 10,314.0 | ES0000020, ES0000061, ES0000444, ES0000447, ES0000467 | 5.42 |
| | | 9,757 | 29,181 | 03-07 | non-breeding | | A | | | |
| Albufera de Valencia | ES159 | 0 | 615 | 99-07 | non-breeding | ACS | C | 158.0 | ES0000023 | 53.25 |
| Plataforma-talud marinos del cabo de la Nao | ES408 | 585 | 3,549 | 99-07 | breeding | ACS | A | 2,773.0 | - | 0 |
| | | 281 | 1,378 | 03-07 | non-breeding | | A | | | |
| Tabarca-Cabo de Palos | ES407 | 121 | 540 | 99-07 | breeding | ACS | B | 1,524.0 | ES0000214 | 9.00 |
| | | 1,813 | 5,189 | 03-07 | non-breeding | | B | | | |
| Bahía de Almería | ES406 | 849 | 2,630 | 03-06 | non-breeding | ACS | B | 1,353.0 | ES0000046 | 2.67 |
| | | 85 | 359 | 99-07 | breeding | | A | | | |
| Bahía de Málaga-Cerro Gordo | ES405 | 0 | 236 | 03-06 | non-breeding | ACS | C | 718.5 | ES6170002 | 1.77 |
| Estrecho de Gibraltar | ES404 | 12,864 | 27,631 | 2007 | passage | MB | B | 2,569.0 | ES0000337, ES6120008, ES6310001 | 3.89 |

[1] Marine IBAs as described in Arcos et al. (2009).
[2] Estimates based on transect surveys from boats (Arcos et al. 2009).
[3] Main use of the area by the Balearic shearwater: CE – Seaward colony extension; ACS – Area of concentration at sea (mainly for foraging); MC – Migration corridor.
[4] Reliability of estimates, taken from Arcos et al. (2009), following standards of IBA inventories: A - Reliable (accurate to within 10%); B – Incomplete (accurate to within 50%); C – Poor (less than 50% accuracy); D – Unknown.
[5] For those IBAs with marine and terrestrial component, only the marine area has been considered here.
[6] Overlap with SPAs irrespective of the SPA being declared for the Balearic shearwater or not.

**Marine sites off Atlantic Iberia (Spain & Portugal)**

| Country | National site name[1] | IBA Code | Estimate (individuals)[2] | | Year | Season | Main use of IBA[3] | Accuracy[4] | IBA area (km$^2$)[5] | SPA code | % of IBA protected / overlap[6] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min. | Min. | | | | | | | |
| Spain | Golfo de Cádiz | ES403 | 5,346 | 11,838 | 05-07 | passage | ACS | C | 2,366.0 | - | 0 |
| | Entorno marino de las Rías Baixas | ES402 | 537 | 3,623 | 05-06 | non-breeding | ACS | B | 2,469.0 | ES0000001, ES0000087, ES0000254 | 1.2 |
| | Costa da Morte | ES004 | 13,849 | 13,849 | 99-04 | passage | MC | B | 3543.0 | ES0000176 | |
| | | | 240 | 4,918 | 05-07 | non-breeding | | B | | | 1.3 |
| | Punta de Candelaria-Ría de Ortigueira-Estaca de Bares | ES006 | 20,384 | 42,504 | 04-08 | passage | MC | B | 900.2 | ES0000086, ES0000372 | 4.2 |
| | Cabo Busto-Luanco | ES017 | 19,738 | 33,735 | 06-08 | passage | MC | B | 403.2 | ES0000318 | 8.2 |
| Portugal | Figueira da Foz | PTM01 | 1,100 | 3,000 | 02-03 | non-breeding | ACS | C | 1,067.0 | PTZPE0004 | 1.14 |
| | Berlengas | PTM02 | 1,200 | 1,400 | 2005 | non-breeding | ACS | C | 2,073.0 | PTZPE0009 | 4.8[7] |
| | Cabo Raso | PTM03 | 1,200 | 4,300 | 2007 | non-breeding | ACS | C | 589.0 | - | 0 |

[1] Marine IBAs as described in Ramírez et al. (2008) and Arcos et al. (2009), for Portugal and Spain respectively.
[2] Estimates based on coastal censuses and transect surveys from boats (Ramírez et al. 2008, Arcos et al. 2009).
[3] Main use of the area by the Balearic shearwater: CE – Seaward colony extension; ACS – Area of concentration at sea (mainly for foraging); MC – Migration corridor.
[4] Reliability of estimates, taken from Ramírez et al. (2008) and Arcos et al. (2009), following standards of IBA inventories: A - Reliable (accurate to within 10%); B – Incomplete (accurate to within 50%); C – Poor (less than 50% accuracy); D – Unknown.
[5] For those IBAs with marine and terrestrial component, only the marine area has been considered here.
[6] Overlap with SPAs irrespective of the SPA being declared for the Balearic shearwater or not.
[7] After the enlargement of this SPA, currently under revision, the % of IBA protected/overlap will be 49.7%.

**Marine sites off France (Atlantic & Mediterranean)**

| National site name[1] | IBA Code | Season | Main use of IBA[2] | IBA area ($km^2$)[3] | SPA code | % of IBA protected/ overlap[4] |
|---|---|---|---|---|---|---|
| Cap Gris-Nez | NC04 | Non-breeding | MC | 89.6 | FR3110085 : 557.4 sq km | 100 |
| Cap fagnet | HN01 | Non-breeding | ACS | 53.9 | FR2310045 : 1479.9 sq km | 100 |
| Bretagne à Manche | BT23 | non-breeding | ACS/MC | 4,143.0 | FR2510037, FR5310011, FR5310050, FR5310070, FR5310095 | 50.9 |
| Ile Saint-Marcouf | BN03 | Non-breeding | ACS | 15.5 | FR2510047 : 442.5 sq km | 100 |
| Finistère Sud | BT21 | non-breeding | ACS/MC | 3,041.0 | FR5312009, FR5310057, FR53112010 | 34 |
| Mor-Braz-Yeu | PL15 | non-breeding | ACS | 7,026.0 | FR5212013, FR5212015, FR5312011 | 38.7 |
| Aquitaine à Vendée | PC23 | non-breeding | ACS | 7,709.0 | FR5412026, FR5212015, FR7212016, FR7212018, FR7212017 | 44.4 |

[1] Marine IBAs as described in Deceuninck & Micol (2008).
[2] Main use of the area by the Balearic shearwater: CE – Seaward colony extension; ACS – Area of concentration at sea (mainly for foraging); MC – Migration corridor.
[3] For those IBAs with marine and terrestrial component, only the marine area has been considered here.
[4] Overlap with SPAs irrespective of the SPA being declared for the Balearic shearwater or not.

*ANNEX 3: Policy and conservation action*

**National legal status**[1]

| Country | Legal protection |
|---|---|
| Algeria | Not protected? |
| France | Protected |
| Morocco | Not protected? |
| Portugal | Protected |
| Spain | Protected from killing; protection covers nest destruction and disturbance. |
| UK | Protected |

[1] Only for countries marked with bold in Table 1.

**Recent conservation measures**

| Country | Is there a national action plan for the species? | Is there a national project / working group? |
|---|---|---|
| Algeria | No | No |
| France | No | Yes |
| Morocco | No | No |
| Portugal | No | Yes |
| Spain | Yes | Yes |
| UK | No | Yes |

**Ongoing monitoring schemes for the species**

| Country | Is there a national survey / monitoring programme? | Is there a monitoring programme in protected areas? |
|---|---|---|
| Algeria | No | No |
| France | No | Yes |
| Morocco | No | No |
| Portugal | Yes | No |
| Spain | Yes | Yes (breeding sites, incomplete) |
| UK | Yes | No |

**Overview of the coverage of the species in networks of sites with legal protection status**

| Country | National population size | Percentage of national population included in IBAs | | Percentage of population included in Ramsar sites[1] | Percentage of national population included in SPAs[1] | Percentage of national population included in protected areas under national law[1] |
|---|---|---|---|---|---|---|
| | | Terrestrial | Marine[1] | | | |
| Algeria | ? | N/A | 0 | ? | 0 | ? |
| France | 1,000-6,000 ind. | N/A | 50-90% | 0-10% | 50-90% | 50-90% |
| Morocco | ? | N/A | 10-50% | ? | 0 | ? |
| Portugal | 1,100-4,300[2] ind. | N/A | 50-90% | ? | 0-10+% | 0-10+% |
| Spain | 3,193 pp./25,000+ ind.? | 98.4% | 100% | 0-10% | 98.4% (colonies); 10-50+% at sea | 98.4% (colonies); 10-50+% at sea |
| UK | 145-5,200 ind. | N/A | N/A | 0 | 0 | 0 |

[1] For marine sites (IBAs, SPAs and others), % of birds visiting the area is considered high due to a high rate of turn-over. A snap-shot count would report lower % for the whole network of IBAs/SPAs.
[2] Population estimated for the 3 marine IBAs without considering turn-over. Most likely the number of birds passing through the country is larger.