



Background Document for
Roseate tern *Sterna dougallii*



OSPAR Convention

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the “OSPAR Convention”) was opened for signature at the Ministerial Meeting of the former Oslo and Paris Commissions in Paris on 22 September 1992. The Convention entered into force on 25 March 1998. It has been ratified by Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Portugal, Sweden, Switzerland and the United Kingdom and approved by the European Community and Spain.

Convention OSPAR

La Convention pour la protection du milieu marin de l'Atlantique du Nord-Est, dite Convention OSPAR, a été ouverte à la signature à la réunion ministérielle des anciennes Commissions d'Oslo et de Paris, à Paris le 22 septembre 1992. La Convention est entrée en vigueur le 25 mars 1998. La Convention a été ratifiée par l'Allemagne, la Belgique, le Danemark, la Finlande, la France, l'Irlande, l'Islande, le Luxembourg, la Norvège, les Pays-Bas, le Portugal, le Royaume-Uni de Grande Bretagne et d'Irlande du Nord, la Suède et la Suisse et approuvée par la Communauté européenne et l'Espagne.

Acknowledgement

This report has been prepared by Dr Nigel Varty and Ms Kate Tanner for BirdLife International as the lead party for the Roseate Tern.

Photo cover page: Roseate tern, Wikipedia

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Background Document for Roseate tern *Sterna dougallii*

Executive Summary

This background document on the Roseate tern – *Sterna dougallii* - has been developed by OSPAR following the inclusion of this species on the OSPAR List of threatened and/or declining species and habitats (OSPAR agreement 2008-6). The document provides a compilation of the reviews and assessments that have been prepared concerning this species since the agreement to include it in the OSPAR List in 2003. The original evaluation used to justify the inclusion of *Sterna dougallii* in the OSPAR List is followed by an assessment of the most recent information on its status (distribution, population, condition) and key threats prepared during 2008 – 2009. Chapter 7 provides recommendations for the actions and measures that could be taken to improve the conservation status of the species. On the basis of these recommendations, OSPAR will continue its work to ensure the protection of *Sterna dougallii*, where necessary in cooperation with other organisations. This document may be updated to reflect further developments.

Récapitulatif

Le présent document de fond sur la *Sterne de dougall* a été élaboré par OSPAR à la suite de l'inclusion de cette espèce dans la liste OSPAR des espèces et habitats menacés et/ou en déclin (Accord OSPAR 2008-6). Ce document comporte une compilation des revues et des évaluations concernant cette espèce qui ont été préparées depuis qu'il a été convenu de l'inclure dans la Liste OSPAR en 2003. L'évaluation d'origine permettant de justifier l'inclusion de la *Sterne de dougall* dans la Liste OSPAR est suivie d'une évaluation des informations les plus récentes sur son statut (distribution, population, condition) et des menaces clés, préparée en 2008 – 2009. Le chapitre 7 recommande des actions et mesures à prendre éventuellement afin d'améliorer l'état de conservation de l'espèce. OSPAR poursuivra ses travaux, en se fondant sur ces recommandations, afin de s'assurer de la protection de la *Sterne de dougall*, le cas échéant en coopération avec d'autres organisations. Le présent document pourra être actualisé pour tenir compte de nouvelles avancées.

1. Background Information

Name of species

Sterna dougallii, Roseate Tern

Ecology and breeding biology

In the OSPAR Region this species breeds in Ireland, the UK, France and the Azores. Roseate Terns spend only a few months of the year in their European breeding grounds, and the winter months in West Africa. Nest sites tend to be concealed amongst rocks, vegetation or artificial cover on isolated marine islands. The birds forage in small groups generally further offshore than other terns, but over shallow water, hydrographic features, or in association with large predatory fish such as tuna. *S. dougallii* generally feed on pelagic fish species e.g. *Sardinella aurita*.

2. Original Evaluation against the Texel-Faial selection criteria

List of OSPAR Regions and Dinter biogeographic zones where the species occurs

OSPAR Regions: II, III, IV, V

Dinter biogeographic zones: Warm-temperate waters, Cold-temperate waters, Azores shelf, Lusitanian (Cold/Warm), Lusitanian-boreal, Cold-temperate pelagic waters, Boreal-lusitanian, Boreal.

List of OSPAR Regions where the species is under threat and/or in decline

All where it occurs

Original evaluation against the Texel-Faial criteria for which the species was included on the OSPAR List

Regional importance: In the OSPAR Maritime Area, *S.dougallii* breeds in the Azores, France, Ireland, and the UK. At the time of listing (2003), there were estimated to be 70 pairs in France, 618 pairs in Ireland, and 50 pairs in the United Kingdom (Mavor *et al.*, 2001). An estimated 379–1,051 pairs nested in the Azores between 1985 and 2000, which represented the bulk of the OSPAR population at that time.

Decline: Within the OSPAR area, long-term declines of *S.dougallii* have been well documented in Britain, Ireland, and France (Lloyd *et al.*, 1991). For example, the numbers in Britain and Ireland fell by 70–75 % between 1969 and 1985, and annual counts of 1,051, 853, 750, 379 and 547 breeding pairs between 1990-1994, indicated a downward trend in the Azores (Monteiro *et al.*, 1996a)¹.

Rarity: At the time of listing, the total breeding population of *S.dougallii* in the OSPAR Maritime Area was estimated at no more than 1,600 pairs and the species was considered as rare.

Sensitivity: *S.dougallii* was listed as sensitive due to their concentration at only few breeding locations, mostly within one biogeographic region.

Threat: *S.dougallii* was considered threatened by trapping of birds on their wintering grounds in West Africa², and predation of birds and/or eggs at the breeding colonies (by foxes, rats, gulls, egg collectors, peregrine falcons, common buzzards, yellow-legged gulls and European starlings).

3. Current status of the species

Distribution in OSPAR maritime area

The species' distribution in the OSPAR area has not changed much since the original evaluation of the species by OSPAR. Within the OSPAR Maritime Area, the Atlantic race *S. d. dougallii* still breeds only in Britain, Ireland, France, and the Azores (Gochfeld, 1983), and the OSPAR region accounts for a tiny proportion of the species' global breeding range. There is evidence to suggest that the breeding colonies in Britain, Ireland and France act as components of a north-west Europe metapopulation – with movement of individuals between these breeding colonies (Ratcliffe and Merne, 2002)³. See Figure 1 below for a distribution map for north-west European colonies. In the Azores, *S.dougallii* have

¹ Counts vary considerably from year to year and it is not clear how much of the variation is attributable to counting difficulties, and how much to birds choosing not to breed in some years, perhaps in response to food availability. Certainly, the distribution of pairs around the Azores can change considerably from year to year, suggesting that birds are responding by moving site according to conditions. This may also be influenced by predation impacts at particular colonies.

² This activity takes place outside the OSPAR Maritime Area but there was strong evidence at the time of listing to implicate it as the primary cause of population decline (Lloyd *et al.*, 1991).

³ For instance, most, if not all, of the decrease in UK breeding numbers is thought to be due to a change in distribution, since the colony at Rockabill, in the Irish Republic, has shown a corresponding increase in numbers. The reasons for this re-distribution are not well known. Productivity at this colony is good and has been a major factor in the recent increase in the north-west European population as a whole.

bred at 49 different sites spread across the nine islands of the archipelago. However, most colonies are small and are rarely used and most of the Azores population has bred consistently in only five colonies: see Figure 2 below for map.

S.dougallii in north-west Europe spend only a few months of the year at their breeding grounds, fledging their chicks in July. After breeding, these birds migrate south along the Atlantic seaboard to spend the early non-breeding season in the Gulf of Guinea, along a relatively short stretch of coastline off Ghana, Togo and Ivory Coast (Ratcliffe and Merne, 2002; Ratcliffe *et al.*, 2004). Ringing recoveries suggest that some Azorean Roseate Terns winter in the same area (Monteiro *et al.*, 1996b; Ratcliffe and Merne, 2002), and some in South America (Hays *et al.*, 2002).

Large scale future changes in distribution seem unlikely and are not anticipated, though attempts are being made to expand the range of this species to encompass former breeding colonies.

Population

The OSPAR breeding population of *S.dougallii* is still recovering gradually from the dramatic declines seen during the 1970s and 1980s. Numbers of breeding pairs in northwest Europe have been stable or gradually increasing from the mid-1990s (albeit with fluctuations). The Azores hold some 50 – 60% of the OSPAR population of this species, though the Azores population has fluctuated between around 400 and 1100 pairs over the last 10 years (V R Neves *in litt.* – see also graph in Figure 3 below).

For the 2007 breeding season, there were 909 breeding pairs in Ireland, and 79 breeding pairs in the UK. Numbers for Brittany showed a recovery from a low 25 – 40 breeding pairs in 2006⁴, to 63 pairs in 2007. Breeding numbers in the Azores also increased, from 646 breeding pairs in 2006 to 1100 in 2007. The total breeding population of *S.dougallii* in the OSPAR Maritime area for 2007 is therefore estimated at 2151 pairs, more than for 2006 (1671 – 1686) or for the estimate at the time of listing of not more than 1600 pairs. The global population of *S.dougallii* is estimated at 120 000 – 130 000 (Newton, 2004).

Large-scale future changes in population size are not anticipated for this species.

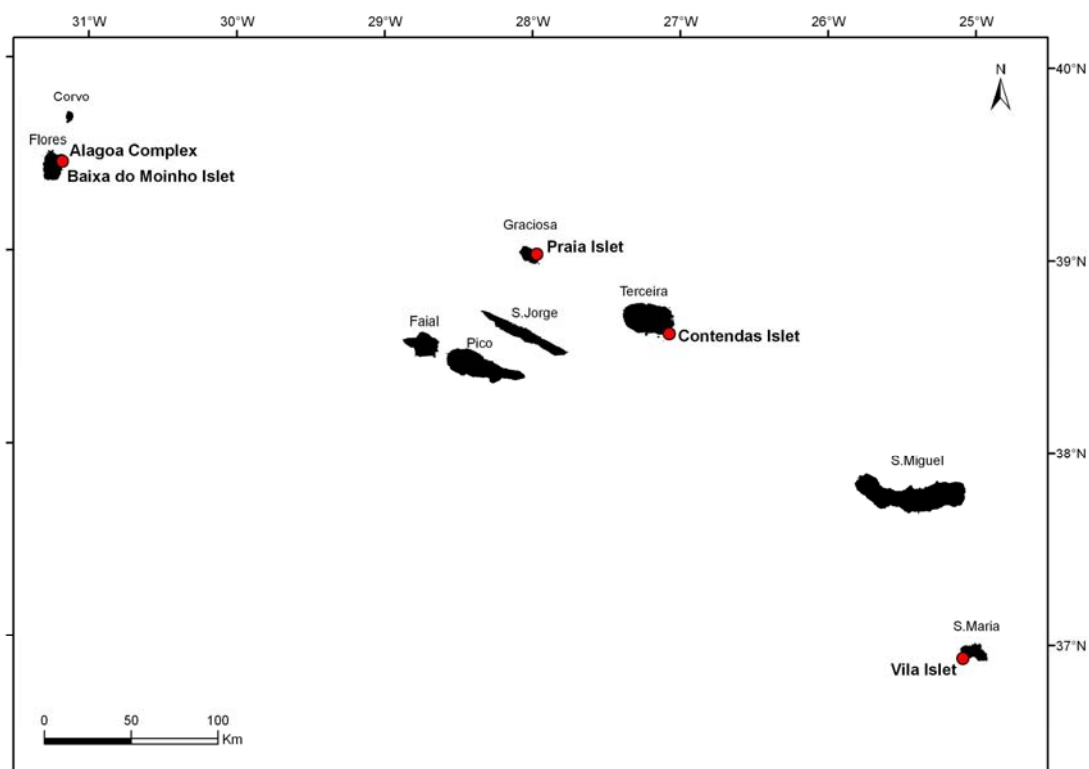
⁴ Thought to be due to a combination of adverse weather and predation (B. Cadiou, *pers. comm.*)

Figure 1. Map showing the locations of Roseate Tern colonies in north-west Europe that have held over ten pairs for at least five years since 1968 (from Ratcliffe *et al.*, *in press*)

Key to site codes: FOR – islands in Firth of Forth, FAR – Farnes Isles, COQ - Coquet Island, IAD – Isle aux Dames, SCI – Scilly Isles, LIL – Inish Island in Lady's Island Lake, TEI – Tern Island in Wexford Harbour, ANG – islands along the west coast of Anglesey, ROC – Rockabill, CAR, STR and LAR – islands in Carlingford, Strangford and Larne Loughs. It should be noted that not all of these colonies hold breeding pairs at present.



Figure 2. Map showing the 5 main Roseate Tern colonies in the Azores (Ricardo Medeiros)



Condition (current/trends/future prospects)

Data on productivity is available for some colonies in UK and Ireland up to 2006, showing that total breeding success here has been generally high since at least 2000, and consistently above the 10yr mean (see Table 1). Productivity is consistently better on Rockabill (Ireland) than other sites - in no small part due to management efforts at this colony.

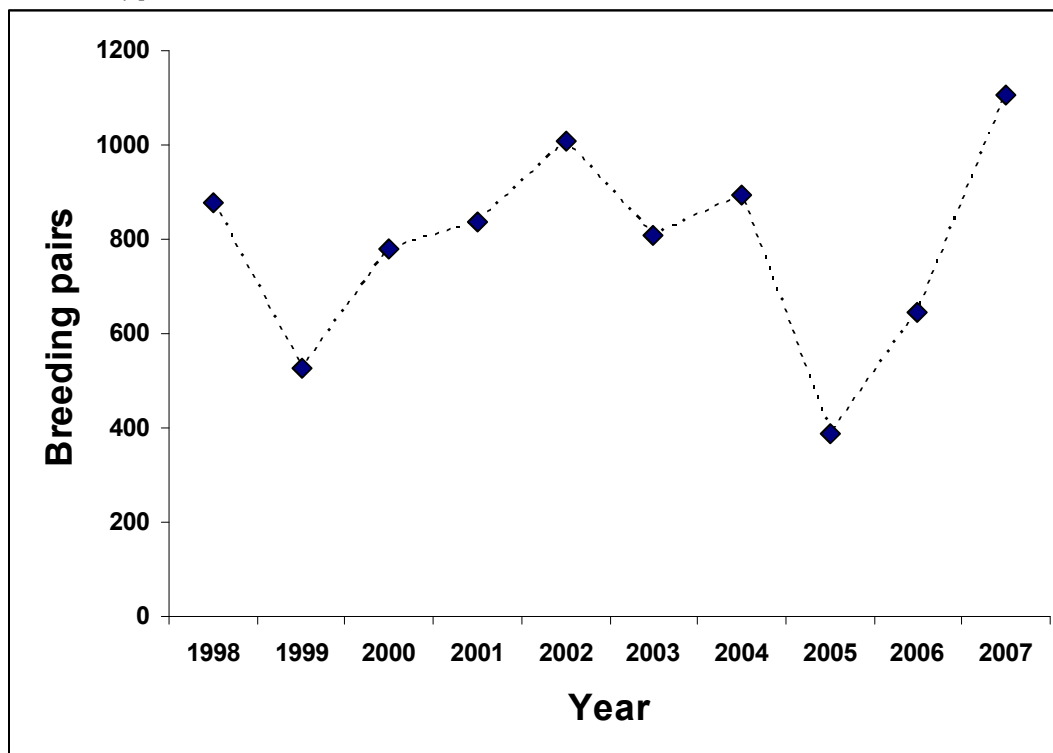
Table 1. Productivity data for UK & Ireland

[Data taken from Seabird Monitoring Programme (SMP) Annual Reports: "Seabird numbers and breeding success in Britain and Ireland" - JNCC – 2001 to 2006 (the latter only published in 2008)]

Year	Population Size (breeding pairs)	Productivity (chicks fledged/pair)	10 yr mean
2006	1000	1.32	1.29 se±0.06
2005	837	1.41	1.22 se±0.07
2004	842	1.40	1.27 se±0.06
2003	818	1.50	1.27 se±0.06
2002	758	1.32	1.29 se±0.07
2001	709	1.37	
2000	>750	1.45	

Figure 3. Graph showing numbers of breeding pairs in the Azores, 1998 –2007 (Graph provided by V R Neves)

[Census work funded by MARMAC II – *Conhecimento, promoção e valorização para o uso sustentável dos ecossistemas e da biodiversidade marinha na Macaronésia* – Fase II (Interreg IIIb – 05/MAC/4.2/A4).]



Productivity at Rockabill in 2006 was high for the eighth consecutive season, although slightly below average (1990-2005 mean 1.41 chicks per pair, s.e. ± 0.05). The overall productivity in 2007 was estimated at 1.20 fledglings/egg-laying pair⁵, based on a sample of 184 nests (Hulsman *et al.*, 2007). Chicks first to hatch had a greater survival (97.03%) than chicks that hatched second (25.86%).

Table 2. Productivity at Rockabill, Republic of Ireland [Data taken from Hulsman *et al.* (2007)]

Year	Nests studied	Mean clutch size	Productivity (chicks fledged/pair)
2007	184	1.78	1.20
2006	305	1.51	1.36
2005	186	1.71	1.33
2004	129	1.82	1.48
2003	110	1.85	1.54
2002	93	1.72	1.39
2001	105	1.82	1.50

At Lady's Island Lake (Ireland), productivity in 2006 and 2007 was slightly below that in 2005 but well above the colony average (1990-2005 mean 0.94, s.e. ± 0.12) – see Table 3.

⁵ Apart from 102 intensively studied nests this included another 82 nests that were not monitored so intensively, some of which were in relatively unenclosed study areas and fledging success may have been overestimated (Hulsman *et al.* 2007).

Table 3. Productivity at Lady Island Lake, Republic of Ireland [Data taken from Daly *et al.* (2007)]

Year	Nests	Mean clutch size	Success rate (%)
2007	89	1.72	76.42
2006	93	1.52	88.7
2005	74	1.77	80.9
2004	66	1.79	69.5

Productivity in France appears to be lower - between 0.5 and 1.0 young fledged per breeding pair (B.Cadiou) Some projects are working to increase it at colonies e.g. at Iles aux Dames, Brittany.

Nisbet (1981) concluded that, in the absence of predation, breeding success is consistently very high for this species. *S.dougallii* tends to have high productivity as they only nest at optimal sites, which consequently limits overall population size and range. *S.dougallii* survival rates are low compared to other tern species, though the reasons behind this difference are as yet undiscovered. No large-scale changes in productivity in the coming years are predicted.

Limitations in knowledge

Availability of information for this species within the OSPAR Area is high. As the breeding locations for this species are restricted, and the *S.dougallii* is well recognised as a species of conservation concern, the individual breeding colonies are well known and described, and most in the OSPAR area are already monitored regularly. However, little is known about the factors driving fluctuations in population size, or the potential for future threats, especially the role of food availability in the face of climate change, to this rare species.

S.dougallii may move among colonies between years in response to predation or habitat change and so a census of a population should ideally survey all colonies within a single year to avoid double-counting or missing some pairs.

4. Evaluation of threats and impacts

S.dougallii have comparatively low adult survival rates (Green, 1995), and therefore need to maintain exceptionally high productivity to achieve population stability (Newton, 2004). They need high quality nesting sites, out of range of tidal flooding (flooding has been known to be a problem at some sites) and within foraging range (c. 15km) of dense shoals of herring, sprat, or sandeels. Sites also require the presence of other breeding tern species, absence or scarcity of mammalian predators (so are often on offshore islands) and gull competitors, and minimal levels of uncontrolled human disturbance (Ratcliffe *et al.*, 2004). The key known threats affecting *S.dougallii* are therefore those that limit the number and quality of suitable nesting sites available to the species, and their specific requirements leave them vulnerable to loss of habitat through erosion, vegetation encroachment and competition for nest sites with other species e.g. gulls. The fact that Roseate Terns are confined to so few breeding colonies is cause for concern, as it increases the vulnerability of the species to localised, stochastic events.

Predation is a key threat at the breeding colonies. Colonies in Britain and Ireland have been subject to predation by Foxes *Vulpes vulpes*, Brown Rats *Rattus norvegicus*, Mink *Mustela vison* and other mustelids, corvids, gulls and Peregrine Falcons *Falco peregrinus* (Ratcliffe *et al.*, 2004). The French colony at Iles aux Dames has suffered badly from Mink predation in the past (Cadiou and Thomas, 2004), including during the 2006 breeding season. For the colonies in the Azores, predation by avian predators such as Yellow-legged Gulls *Larus cachinnans*, European Starlings *Sturnus vulgaris* (at two

of the main colonies, Vila and Praia Islets⁶), Turnstones *Arenaria interpres* and Buzzards *Buteo buteo* is a problem, as well as rat predation (Neves *et al.*, 2005; Neves *et al.*, 2006). Cat predation of adults can occasionally be a problem (e.g. Capelinhos colony (Faial) during the 1998 breeding season).

Uncontrolled disturbance at the breeding colonies can be problematic. Nesting Roseate Terns are very sensitive to disturbance by predators or humans (including low flying aircraft), and can lead to abandonment and long-term disuse of sites (Monteiro *et al.*, 1996a). All large colonies in Britain, Ireland and France are warded during the breeding season in an attempt to reduce the effects of disturbance. Although colonies in the Azores are legally protected and warded, the wardens are responsible for large areas and have many other tasks, and therefore disturbance is considered a particular problem for colonies in the Azores.

S.dougallii also faces threats away from the breeding colonies – for example, the large numbers of terns deliberately trapped in Ghana, for sport or food. This was held largely responsible for the declines seen in *S.dougallii* populations during the 1970s and 1980s. Unfortunately, recent studies in Ghana have uncovered a resurgence in trapping activity (Ghana Wildlife Society, *unpubl.*).

The availability of food during the breeding season is not known to have played a significant part in the historical decline of *S.dougallii*. However, this factor may be of increasing importance in the future, given predicted climate change, associated sea warming, and knock-on effects on the distribution and abundance of prey fish species e.g. *Sardinella aurita*⁷.

5. Existing Management measures

S.dougallii is listed under Annex I of the EU Birds Directive, Annex II of the Bern Convention and Annex II of the Bonn Convention. In Britain, the species is also protected under Schedule 1 of the Wildlife and Countryside Act 1981 and Schedule 1 of Wildlife (Northern Ireland) Order 1985. In France, the species has been protected since 1962 and this status was re-confirmed in 1981 with the “Arrêté du 17 avril 1981 fixant les listes des oiseaux protégés sur l'ensemble du territoire” (*Journal Officiel* 19-05-1981 p. NC 4758-4760). In Portugal (Azores), the species is protected under D.L. 140/99 de 24 de Abril rectificado pelo D.L. 49/2005 de 24 de Fevereiro and under adoption of the Bonn Convention (*Resolução da Assembleia da República no 69/2003: Aprova o Acordo para a Conservação das Aves Aquáticas Migradoras Afro-Euroasiáticas, concluído em Haia em 15 de Agosto de 1996*).

An International (East Atlantic) Action Plan for Roseate Tern *Sterna dougallii* was prepared by BirdLife International on behalf of the European Commission in 1999 (BirdLife International, 1999). Species action plans for the Roseate Tern exist for the UK under the UK Biodiversity Action Plan⁸ and a draft conservation strategy (the focus for a PhD) has been produced for the Azores (Neves, 2005).

Management of this species within the OSPAR Area has focused on active management at the breeding colonies, including removal of predators (such as gulls, and brown rats), protection against disturbance, maintenance of suitable nesting habitat for the birds at existing colonies, and creation of new potential breeding sites.

⁶ Predation rates by European starlings *Sturnus vulgaris* were 73.1 and 90.2% in 2002 and 2003, respectively (Neves, 2005)

⁷ Long-term changes in sea surface temperature may be partly responsible for the consistent and continued decline of fish stocks, eg *Sardinella*, in coastal West Africa and the Gulf of Guinea. As the winter progresses, *Sardinella* become less available to terns in this region and the whereabouts of Roseate Terns and the composition of their diet in the December to May period remain largely unknown.

⁸ See <http://www.ukbap.org.uk/UKPlans.aspx?ID=587>

Wardens have also been used to prevent human disturbance e.g. preventing tourists from landing at Iles aux Dames (France), and Rockabill and Lady's Island Lake (both Ireland) during the breeding season.

Habitat management has been successfully employed at several colonies. *S.dougallii* has quite specific habitat requirements, needing open areas to land in with adjacent dense, low vegetation to nest under. Several sites have found that creating open terraces and deploying nest boxes is a successful way of getting Roseate Terns to nest. Vegetation at breeding sites needs careful management, e.g. scrub clearance, as even though Roseate Terns prefer to nest undercover, they do not nest at high densities in thick, overgrown vegetation, or under vegetation with a tall canopy.

Some attempts have also been made to attract Roseate Terns back to currently unoccupied nesting sites, or to create entirely new sites, with deployment of nest boxes, decoy Roseate Terns and tape recordings of courtship calls used to attract birds to the sites, but results have been mixed. Decoys and recordings of courtship calls have been used on both the Skerries (Anglesey, Britain) and on Dalkey Island (Co. Dublin, Ireland) where Roseate Terns colonised the latter but not the former, although the contribution made by the attractants is not known (Newton and Crowe, 2000; N Ratcliffe, *pers comm.*).

The most important roseate tern colonies in the UK, Ireland, France and the Azores are now within nature reserves and a number of the sites have been designated as SPAs or occur within SACs⁹. Within the key OSPAR countries for this species, BirdLife International (2008) lists Roseate Terns as occurring at 3 Important Bird Areas (IBAs) in France, 2 in Ireland, 15 in Portugal (list of IBAs for the UK not provided here)¹⁰.

An education programme was implemented in Ghana in the mid-1980s to tackle the problem of deliberate trapping of wintering Roseate Terns. Immature survival rates increased as a result during the 1990s – and increases in recruitment rate may have contributed to the population recovery (Newton, 2004). Education and policing finished in 1994, but further research in 2001/2002 (N. Ratcliffe, *unpubl.*) showed that tern trapping still occurred. There is still a need therefore to monitor trapping levels and to build conservation capacity and enforcement along this coast.

⁹ For instance, Rockabill Island was designated as a Special Protection Area (SPA) under the EU Birds Directive in 1988, and a Statutory Refuge for Fauna under the 1976 Wildlife Act. In France, the Bay of Morlaix (where the main colony of Iles aux Dames is located) is a Special Area of Conservation (SAC) designated under the Habitats Directive. In addition, Notre Dame island, Colombière island, Tregor-Goëlo (Trieux-Jaudy), Trevoc'h islands and Moutons island are Special Protected Areas (SPA) designated under the Birds Directive (codes FR5312002, FR5310052, FR5310070, FR5310054, FR5310057, respectively). In addition, a pre-migratory roosting area exists in the Gulf of Morbihan (southern Brittany), located in a Special Protected Area (code FR5310086). Also, the Etel river has been proposed as Marine NATURA 2000 Area under the Habitats Directive. Moreover tern colonies in Bay of Morlaix and Etel river are protected under "*arrêté préfectoral de protection de biotope*" legislation. In Portugal, Roseate Terns are listed for the following SPAs and SACs: Costa e Caldeirão do Corvo (SPA PTZPE0020), Costa Nordeste (Flores, SPA-PTZPE002, Costa Sul e Sudoeste (Flores, SPA - PTZPE0021), Caldeira e Capelinhos (Faial, SPA - PTZPE0023), Ilhéu de Baixo (Graciosa, SPA - PTZPE0029), Ilhéu da Praia (Graciosa, SPA - PTZPE0030), Ponta das Contendas (Terceira, SPA - PTZPE0031), Furnas / Santo António (Pico, SPA - PTZPE0026), Ilhéu do topo e Costa adjacente (S. Jorge, SPA - PTZPE0028), Ilhéu da Vila (Sta. Maria, SPA - PTZPE0034), Ponta do Castelo (Sta. Maria, SAC - PTSM0022), Ponta da Ilha (Pico, SPA - PTZPE0025).

¹⁰ The IBAs listed for France are: Baies de Morlaix & de Carantec, Ile de Goulmedec and Iles de la Colombière and de la Nellière et des Haches; for Ireland are: Lady's Island Lake, Rockabill; and for Portugal are: Capelinhos, Contendas, Costa das Flores, Costa do Corvo, Furnas - Santo António, Ilhéu da Praia, Ilhéu da Vila, Ilhéu das Lagoinhas e Costa Adjacente, Ilhéu de Baixo e Costa Adjacente, Ilhéu do Topo e Costa Adjacente, Ponta da Ilha e Terra Alta, Ponta de São Lourenço, Porto Santo Oeste, Ribeirinha, and Serra Branca.

6. Conclusion on overall status

Roseate Terns were originally nominated to OSPAR with strong evidence for comprehensive long term declines within the OSPAR Area. Evidence was presented for long-term declines in Britain, Ireland and France, and there was also a downward trend in the Azores. Trends since the early 1990s across the OSPAR area have generally been positive, with some fluctuations, but numbers are still very much below (on average, less than half) what they were before the catastrophic declines of the 1970s in north-west Europe. The consistently high productivity and relatively low adult survival means that the population is more sensitive to changes in first year survival compared to other seabird species. First year survival is also very variable among years compared to the other two parameters.

Roseate Terns still qualify as rare, sensitive and with a localised distribution (regional importance), and are still threatened by predation and disturbance at the breeding colonies in particular. With breeding restricted to so few locations, the OSPAR population of this species is still vulnerable to stochastic events and any loss of breeding habitat, and is still evaluated as rare. Although the declines of the 1970s and 1980s appear to have been halted, there has been little evidence yet of significant and long-lasting increases in numbers of this species, and still little is known about the factors driving the population fluctuations.

7. What action should be taken at an OSPAR level?

Action/measures that OSPAR could take, subject to OSPAR agreement

OSPAR Actions

Communication: OSPAR should contact the European Commission and NEAFC and other relevant authorities to:

- a. notify them of the listing under OSPAR, threats facing the species, and the willingness of OSPAR to co-operate in developing conservation measures;
- b. request information on the effectiveness of any measures taken for the protection of this species.
- c. highlight the need for protection from predation and disturbance at breeding colonies e.g. by presence of wardens throughout breeding season, control of predators.

Awareness raising: OSPAR should work with relevant Contracting Parties (see Table 4) to raise awareness of status and threats to the species among both management authorities and general public¹¹.

Information exchange: OSPAR should work with relevant Contracting Parties to improve communication and information exchange between Roseate Tern researchers and authorities, particularly between islands in the Azores (e.g. email list and regional newsletter).

Monitoring and assessment: OSPAR should work with relevant Contracting Parties to facilitate development of a monitoring and assessment strategy for *S. dougallii* for the OSPAR Area, involving relevant international authorities, and deliver to national contacts. This should build upon the starting point provided later in this section and take into account the need to continue and expand existing monitoring of breeding colonies to include at least data collection on breeding numbers and

¹¹ This could perhaps best be achieved, at least initially, through a brochure and accompanying web site that lists all OSPAR Listed features, the threats they face, and recommended conservation actions.

productivity for all occupied colonies in Britain, Ireland and France, and for the five major colonies in the Azores. OSPAR's work on coordination of assessment and monitoring should address this need.

Further research: OSPAR should emphasise to relevant scientific funding bodies the following research needs with respect to *S.dougallii*:

- a. further research into the effect of food availability on survival, productivity, and movements.
- b. further data collection to augment the baseline data collection at the colonies where resources allow (e.g. covering management effectiveness, threats and impacts, and parameters such as diet, feeding ecology, chick provisioning rates, chick survival and growth rates).

Actions/measures for relevant Contracting Parties

OSPAR should recommend that relevant Contracting Parties undertake the following actions and measures, and establish a mechanism by which Contracting Parties report back on the implementation of these actions and measures, and the implementation of the monitoring and assessment strategy, so that the progress can be evaluated in conjunction with the future assessment of the status of the species:

- a. Breeding colony protection: protect breeding colonies from predation and disturbance e.g. by presence of wardens throughout breeding season, control of predators;
- b. Habitat conservation/enhancement: maintain suitable nesting habitat at all existing colonies, and further creation or enhancement of suitable nesting habitat to increase number of occupied colonies;
- c. MPAs: protect sites important to this species as OSPAR MPAs, with management plans for these MPAs that include conservation of *S. dougallii* e.g. feeding grounds of prey fish species;
- d. Monitoring and Assessment: develop and implement the above monitoring and assessment strategy in the OSPAR area.

Brief summary of the proposed monitoring system (see Annex 2)

Monitoring information from relevant Contracting Parties should be drawn together, to give the picture for the OSPAR population of this species. Relevant Contracting Parties should be encouraged to report to OSPAR on:

- Annual colony monitoring, including at least data collection on breeding numbers and productivity for all occupied colonies in Britain, Ireland and France, and for the five major colonies in the Azores.
- Continuation and expansion of the ringing of chicks at colonies – including the special ringing scheme.
- Further data collection at the colonies where resources allow (e.g. covering diet, feeding ecology, chick provisioning rates, chick survival and growth rates).

Table 4: Summary of key threats and existing protection for *Sterna dougallii*

Key threats	<p>Predation at breeding colonies</p> <p>Disturbance at breeding colonies (by humans/other predators)</p> <p>Trapping at wintering grounds e.g. in Ghana</p>	
Relevant Contracting Parties	UK, Ireland, France, Portugal	
Other responsible authorities	<p>EC</p> <p>NEAFC</p>	
Already protected? Measures adequate?	<p>Birds Directive Annex I</p> <p>Bern Convention Annex II</p> <p>Bonn Convention Annex II</p> <p>CMS Appendix II</p> <p>AEWA Annex II</p> <p>SPEC Category 3 (and Category 3 in 1994 evaluation)</p>	<p>Colonies in the UK, Ireland and France have good protection and monitoring, but colonies in the Azores require greater conservation measures, particularly for the five main colonies. Predation and disturbance are still a problem at many colonies.</p> <p>Conservation status appears to be stable but at low numbers and little is known about the factors driving population fluctuations.</p> <p>Outreach and education work in Ghana in the 1980s and 1990s may have assisted population recovery, but work in Ghana lapsed. There is some indication that there is now a resurgence of trapping activity.</p>

Annex 1: Overview of data and information provided by Contracting Parties

Contracting Party	Feature occurs in CP's Maritime Area*	OSPAR nominated Contact Point (in bold), or other contributor providing information	Contribution made to the assessment (e.g. data/information provided, national reports, references or weblinks)
<i>Belgium</i>	Vagrant		
<i>Denmark</i>	Vagrant		
<i>European Commission</i>			
<i>France</i>	Yes	Bernard Cadiou, Bretagne Vivante conservation.bretagne-vivante@wanadoo.fr	<p>Data on population size and trends over last few years; significant threats; colony monitoring; legal protection; existing management and recommended future management provided</p> <p>Cadiou B. & Drunat E. 2007. Sterne de Dougall. In Riegel J. et les coordinateurs espèce. Les oiseaux nicheurs rares et menacés en France en 2005 et 2006. <i>Ornithos</i> 14 : 137-163.</p> <p>Cadiou B. & Thomas A. 2004. Sterne de Dougall. In Cadiou B., Pons J.-M. & Yésou P. (éds) <i>Oiseaux marins nicheurs de France métropolitaine (1960-2000)</i>. Éditions Biotope, Mèze, 218 p.</p> <p>Drunat É. & Cadiou B. 2006. <i>Sternes de Bretagne – Observatoire 2006</i>. Contrat nature « oiseaux marins 2003-2006 / LIFE nature « conservation de la sterne de Dougall en Bretagne ». Bretagne Vivante – SEPNEB, 55 p.</p> <p>Le Nevé A. 2005. La conservation des sternes en Bretagne : 50 ans d'histoire. <i>Alauda</i> 73: 389-402.</p> <p>See also:http://www.life-sterne-dougall.org/accueil_sterne.php</p>
<i>Germany</i>	Vagrant		
<i>Iceland</i>	?		
<i>Ireland</i>	Yes	Dr Eamonn Kelly (DEHLG) eamonn.kelly@environ.ie	<p>Provided information via David Tierney david.tierney@environ.ie</p> <p>Information on national protection measures, conservation planning, protected areas and breeding colony management provided.</p>

			<p>Hulsman, J., Reddy, N., and Newton, S. (2007). Rockabill Tern Report 2007. BirdWatch Ireland, National Parks & Wildlife Service (of the Department of Environment, Heritage & Local Government) & the Royal Society for the Protection of Birds. [Rockabill reports for 2004 and 2006 also provided]</p> <p>Daly, D., Wilson, C. and Murray, T. (2007). Lady's Island Lake Tern Report 2007. Unpublished report, National Parks & Wildlife Service, North Slob, Wexford, Ireland. [Lady's Island Lake report for 2005 also provided]</p>
		<p>Steve Newton, Birdwatch Ireland mailto:snewton@birdwatchireland.ie</p>	<p>Information on distribution, population size and trends over recent years, threats, monitoring and current management at key sites (Rockabill and Lady's Island Lake) provided.</p> <p>Also Rockabill annual reports for 2001,2002, 2003, 2007; Lady's Island Lake annual reports for 2005, 2007.</p>
Netherlands	Vagrant		
Norway	Vagrant		
Portugal	Yes (Azores)	<p>Veronica Neves neves_veronica@yahoo.com</p>	<p>Data on distribution, population size and trends over recent years, threats, monitoring and current management as well as future recommendations provided. Also map and graph of Azores breeding numbers (Figs. 2 and 3).</p> <p>Neves V. C. (2005). Towards a Conservation Strategy of the Roseate Tern in the Azores Archipelago. PhD Thesis, University of Glasgow.</p> <p>Neves V. C., Murdoch N and Furness RW (2006). Population Status and Diet of Yellow-Legged Gull in the Azores. <i>Arquipélago Life and Marine Sciences</i> 23: 59-73.</p> <p>Neves V. C., Panagiotakopoulos S, Furness RW (2006a). A control taste aversion experiment on predators of roseate tern (<i>Sterna dougallii</i>) eggs. <i>European Journal of Wildlife Research</i> 52: 259-264.</p>

		Pedro Geraldès (SPEA) pedro.geraldes@spea.pt	Additional information on national conservation legislation, conservation plans and protected areas (SPAs) provided.
<i>Spain</i>	Yes	Ricardo Calmaestra/ Javier Pantoja (DG Biodiversity- Min. Environment) Jpantoja@mma.es	Information on legal protection and presence of SPAs, and conservation measures in the Canaries (outside of OSPAR Region) provided.
<i>Sweden</i>	Vagrant		
<i>UK</i>	Yes	Norman Ratcliffe (RSPB) – contact mark.bolton@rspb.org.uk	Data on population size and trends and UK and Ireland colonies; significant threats; colony monitoring; existing management and recommendations for future management provided. Also map of NW European colonies (see Fig. 1).

* - Information from BirdLife International (2008); ‘?’ signifies occurrence information not available from BirdLife International’s database.

Pagophila eburnea was nominated for inclusion in the OSPAR List in 2001 by BirdLife International.

Contact person: Kate Tanner, BirdLife International, c/o Royal Society for the Protection of Birds, The Lodge, Sandy, Bedfordshire, SG19 2DL. UK.

Summaries of country-specific information provided

Britain: The Roseate Tern population in Britain (and Ireland) experienced the most dramatic decline of any seabird species between Operation Seafarer (1969 – 70) and the SCR Census (1985 – 88). Numbers peaked at 3812 pairs in 1968, but declined rapidly to just 521 pairs in 1985. The population stabilised at around 500 pairs until 1992 when it staged a slow recovery.

In the UK, the most important colonies are found on the north-east coast of England (principally at Coquet Island, and sometimes also the Farne Islands). For the 2007 breeding season, there were a total of 79 breeding pairs in the UK in total.

All UK colonies are wardened, and monitored annually. Predator control at these colonies has included measures such as patrolling by wardens to keep away foxes (Anglesey, Britain), to leave colonies clear of ground predators for the Roseate Terns’ arrival. Several sites (Coquet Island and the Farne Islands, Britain) have also attempted gull control (e.g. nest destruction, culling) to keep gulls away from Roseate Tern nesting areas.

Ireland: In Ireland, Roseate Terns are found principally at Rockabill (Co. Dublin) and Lady’s Island Lake (Co. Wexford), with the largest colony by far being Rockabill. For the 2007 breeding season, there were 909 breeding pairs between these two colonies - 820 of these at Rockabill (mean clutch size 1.76, 1.11 chicks fledged per nest) and 89 at Lady’s Island Lake (mean clutch size 1.72).

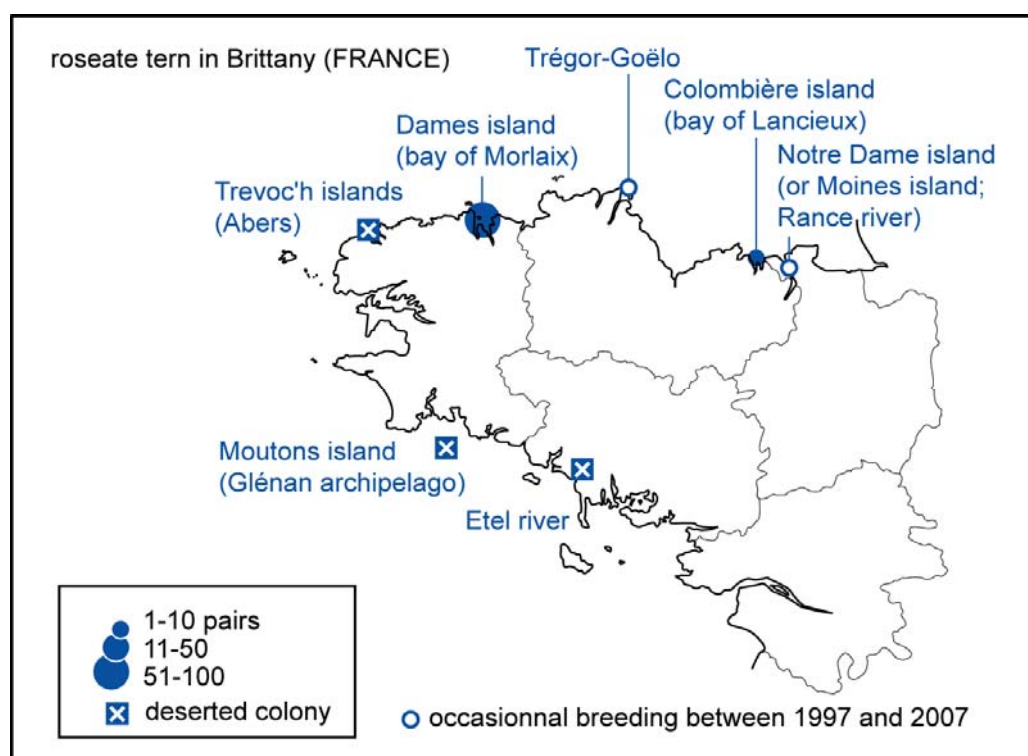
There is also a colony at Dalkey Island – the only *new* colony ‘created’ by proactive management in Europe. Over the last 6 years, numbers at this colony have fluctuated between 1 and 11 pairs. Also in 2007, 2 pairs nested in one colony in County Kerry, SW Ireland – perhaps a sign of a return to long-vacant west coast nesting areas.

All existing colonies in Ireland are warded, and monitored annually. Predator control at the Irish colonies has included measures such as pre-season baiting for rats (Lady's Island Lake) and gull clearance (Rockabill) – involving nest destruction and culling to keep gulls away from nesting areas. The latter was undoubtedly a major contributor to the massive increase in numbers seen there (N Ratcliffe, *pers. comm.*).

The conservation of Roseate Terns on Rockabill is a joint project of BirdWatch Ireland, National Parks & Wildlife Service (of the Department of Environment, Heritage & Local Government) and the Royal Society for the Protection of Birds. It is co-ordinated by BWI and NPWS and funded by NPWS and the RSPB. The main objectives of the project are to protect and monitor breeding seabirds on Rockabill Island, in particular to manage their nesting habitat and to minimise disturbance throughout the season. The project also aims to continue research on the breeding biology, feeding ecology and population dynamics of the terns, in particular the Roseate Tern, to improve future conservation actions for this priority species.

France: The entire French population of Roseate Terns is located in Brittany (Figure 4). Since the late 1980s the colony on Iles aux Dames (Bay of Morlaix) has held the majority of the breeding birds, with a few additional pairs found on one or two nearby islands. Predation and adverse weather in 2006 induced dispersal from Dames Island to other islands and only 25 – 40 breeding pairs¹² (Table 5) were recorded in Brittany. Fortunately a mixed tern colony was re-established on Dames Island in 2007 (Sandwich, Roseate and Common Terns), and 56 pairs of Roseate Terns breed there with an additional 7 pairs on Colombière Island, giving the total for France for 2007 as 63 breeding pairs.

Figure 4. Distribution of breeding sites of Roseate Terns in Brittany (from B.Cadiou)



¹² Uncertainty about the precise number of breeding pairs was due to possible movements of failed breeders between colonies and replacement clutches.

Table 5. Number of breeding pairs of Roseate Terns in Brittany, France from 1998 – 2007 [Data from annual reports “*Observatoire des sternes de Bretagne*” published by Bretagne Vivante and also published in Cadiou B. & Drunat E. 2007]

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Breeding pairs	68-72	85-90	71-91	91-92	72-83	72-80	72-73	76-76	25-40	63

The Iles aux Dames colony suffered badly in 1997 from American mink predation, with a total of 49 (out of 110) adult birds killed. This limited breeding output that year – numbers in France have still not fully recovered from this reduction. Breeding numbers for France were low in 2006, in part due to the effects of mink and peregrine predation at the Iles aux Dames colony (B Cadiou). Predator control has included measures such as mink capture before the breeding season in late winter and spring, gull control (e.g. nest destruction, culling) to keep gulls away from Roseate Tern nesting areas, and rat trapping. Human disturbance (yachting or other recreational activities) is the other main threat with interactions with Lesser Black-backed, Herring and Great Black-backed Gulls (spatial competition and predation) as well as with Peregrine Falcon (colony disturbance and predation) forming additional threats. The colonies are warded daily during the breeding season to reduce human disturbance, and other management measures include control of vegetation.

There is currently an EU-LIFE funded project running in Brittany¹³ to conserve the Roseate Tern which aims to increase the population by improving productivity, and to increase the current distribution in Brittany by the management of existing colonies, and create new potential breeding sites, promoting public awareness and ringing adults and chicks to follow their movements and dispersal.

Colonies are monitored annually for breeding numbers and productivity. Tern monitoring in Brittany involves several organisations but the monitoring of Roseate Terns is mainly carried out by the NGO Bretagne Vivante-SEPNB because the species generally breeds on ornithological reserves managed by Bretagne Vivante-SEPNB.

Azores: The Azores hold around half of the OSPAR population of this species, though the Azores population has fluctuated from around 308 in 2005 and 1100 pairs in 2007 (Verónica Neves). Roseate Terns have nested at 49 different sites spread across the nine islands of the archipelago. Of these, 23 are located on the mainland (mainly cliffs, rocky beaches and lagoons) and 26 on islets. However most colonies have had small breeding numbers and have only rarely been used. The bulk of the population has consistently bred in five colonies - Vila islet (off Santa Maria), Contendas islet (off Terceira), Praia islet (off Graciosa), Alagoa complex (off Flores) and Baixa do Moinho islet (also off Flores) - that over the period 1995 – 2005 held on average about 80% of the breeding population (see Table 6). Maps showing distribution of breeding roseate tern colonies in the Azores are given in Neves (2007).

¹³ “Conservation of the Roseate Tern in Brittany” which has two main objectives - to maintain or increase the actual population level and to increase the current distribution – and runs from 2006 to 2010. See http://www.life-sterne-dougall.org/accueil_sterne.php. Annual reports on tern monitoring in Brittany can be downloaded on the website. An annual newsletter (Skragig Dougall; <http://www.life-sterne-dougall.org/plaquettes-et-lettres-dinformati.php>) is produced as part of awareness-raising activities, and a movie on the LIFE programme was shot in 2006 and 2007 in Brittany (<http://www.life-sterne-dougall.org/le-film-documentaire.php>).

Table 6. Number of breeding pairs at the main Azorean colonies over the last decade.

Year	Alagoa	Baixa do Moinho	Praia	Contendas	Vila	% Azores Total
1995	321	265	0	114	236	91.1
1996	147	163	0	84	141	44.7
1997	198	232	0	120	135	70.0
1998	135	135	0	188	198	75.1
1999	83	119	0	125	167	95.7
2000	136	125	31	351	90	94.2
2001	110	113	25	342	95	84.2
2002	172	179	133	269	201	96.3
2003	68	105	231	58	134	79.3
2004	176	151	402	32	0	85.3
2005	23	66	128	0	92	79.4
2006						
2007	190	201	140	0	42	52.1

In 2007, the population was estimated at 1100 pairs and mean clutch size was 1.6 (n=569). Flores Island held the largest percentage of the Roseate Tern population – just over 40%. The total number of colonies detected in 2007, 30 in total, was similar to previous surveys. However, a large number of new colonies were found with Roseate Terns breeding for the first time in 13 new sites (4 in Santa Maria, 2 in Graciosa, 2 in São Jorge, 2 in Flores, 2 in São Miguel and 1 in Terceira). These previously undetected breeding sites accounted for a total of 299 pairs. Unfortunately, high levels of predation were detected at several colonies, including two of the main breeding sites at Praia islet off Graciosa Island and Vila islet off Santa Maria Island. In 2008, the numbers of Roseate Terns was also high with over 1000 breeding pairs, but two of the main colonies (Praia and Vila islet) again had major predation and productivity levels were very low (Neves *in litt.* 2008).

Census results have revealed that numbers of breeding pairs of Roseate Terns fluctuates from year to year, sometimes dramatically, e.g. from 1000 pairs in 1991 to 750 in 1992, and down to 380 breeding pairs in 1993, and from 389 pairs in 2005 to 646 pairs in 2006 and 1,100 pairs in 2007 (Table 7).

Predation is a significant threat affecting Roseate Terns nesting in the Azores. Yellow-legged Gulls have increased at a rate of over 2.3% per annum over the last 20 years, and have begun to breed in colonies that were traditionally used exclusively by terns (Neves *et al.*, 2006). Roseate Tern clutches are also vulnerable to egg predation by European Starlings e.g. at Vila islet (Neves, 2005) and at Praia Islet (V R Neves, *pers comm.*), and chicks have been taken by Buzzards and Yellow-legged Gulls at Vila islet. Predation of eggs by rats has also been detected at Contendas and Caloura islets in the Azores and predation of adults by cats has been detected at the Capelinhos colony. Rats were trapped in Contendas in 2005 and 2006 (V R Neves, *pers. comm.*). In 2007, rat traps were deployed at the Contendas colony (Terceira island) where predation by rats has been observed in the past but no rodents were caught (Pedro Geraldès *in litt.* 2008). During 2007, egg predation was intense at Praia islet and probably due to Starlings and Turnstones. Predated eggs have also been found in several other Azorean colonies such as Topo islet, St António islet and coastal colonies on São Jorge island (V R Neves). In 2007, nest boxes were used by Roseate Terns for the first time (one box out of 50 used), and if deployed on the Praia, Vila and Contendas islets where predation pressure is stronger, could increase breeding success. So far nest boxes have only been deployed on Praia islet, never at other sites – and only small numbers have been used (around 50 – compared to 650 used at Rockabill).

Table 7. Number of Roseate Tern breeding pairs in the Azores eastern, central and western group of islands during the period 1989-2007 (V R Neves, *pers comm.*)

Year	Western	Central	Eastern	Total
1989	480	396	116	992
1990	474	357	220	1051
1991	468	325	102	895
1992	316	155	279	750
1993	122	34	223	379
1994	249	57	241	547
1995	599	228	266	1093
1996	502	306	380	1188
1997	489	175	356	1020
1998	432	244	198	874
1999	216	132	167	515
2000	262	402	114	778
2001	315	404	95	814
2002	380	404	207	991
2003	185	308	259	752
2004	391	443	33	867
2005	141	150	17	308
2006	2	517	127	646
2007	442	397	261	1100

Disturbance is also a particular problem for colonies in the Azores, with several colonies prone to human disturbance, especially from fishermen fishing from the islets holding important Roseate Tern colonies. Of the five main colonies in the Azores only Praia islet has received regular surveillance during the breeding season (warden employed by the *Secretaria Regional do Ambiente e do Mar*), but even in this case the island is sometimes left without a warden for several consecutive days during the breeding season as the warden has to work on other parts of Graciosa apart from Praia Islet (Groz and Gomes, 1997; V R Neves).

Several EU LIFE/Interreg funded projects have contributed to research and management of Roseate Terns within the Azores. These include a habitat restoration project on Praia Islet, Azores (1995-8), which focused on reintroduction of endemic plants, extermination of rabbits, and the construction of dams/dykes to prevent ongoing soil erosion from the site, and deployment of artificial nests. There was also a concurrent LIFE funded project looking at the diet and feeding ecology of several species of seabird, including the Roseate Tern, and another LIFE project which ran from 1998 – 2002 that included conservation action for turtles, cetaceans and seabirds (Maré project - “Integrated management of coastal and marine areas in the Azores”)¹⁴.

Monitoring of the species is conducted annually, since 1989, by the University of the Azores, with the framework of project MARMAC II – *Conhecimento, promoção e valorização para o uso sustentável dos ecossistemas e da biodiversidade marinha na Macaronésia – Fase II* (Interreg IIIb – 05/MAC/4.2/A4). For a review of the state of knowledge on this species in the Azores and recommended conservation measures, see Neves (2005).

¹⁴ LIFE Natureza B4-3200/98-509. For more information on this project, see: www.horta.uac.pt/projectos/macmar/life/resing.html

Spain: Small numbers of non-breeding Roseate Terns are recorded in Spain, and the species is protected under state legislation 'State Catalogue of Threatened Species: "Special Interest" (Order 9th of July 1998)' and Law 42/2007: Annex IV (as well as regional legislation covering the Canary Islands). In addition, the species is recorded at the following SPAs – Doñana (ES 0000024), Cabo Busto Luanco (ES0000318) and Marismas del Rio Palmones (ES6120006).

Annex 2: Detailed description of the proposed monitoring and assessment strategy

Rationale for the proposed monitoring

The species is no longer in catastrophic decline, but is undoubtedly rare and at risk because of restricted breeding range, e.g. with 95% of the NW European breeding pairs found within only four colonies (N.Ratcliffe). The population is fluctuating, and has not recovered from former, severe declines. Good monitoring programmes are already in place for most breeding colonies (including all the major colonies), under several different projects and initiatives. Therefore for OSPAR monitoring and assessment purposes it will be necessary to bring together an overview of these separate efforts at the level of the OSPAR Region.

Use of existing monitoring programmes

As the breeding locations for this species are so restricted, the individual colonies are relatively well known, and most are already monitored. Most Roseate Tern colony monitoring schemes collect data on numbers of breeding pairs and productivity. Several schemes (particularly for the larger colonies) collect additional data on diet, feeding ecology and chick provisioning rates. Some colony monitoring schemes have also collected information on parameters such as clutch size, egg dimensions, hatching success, chick survival and chick growth. Any OSPAR monitoring strategy for this species will therefore essentially be to bring together the outputs of the various ongoing monitoring, assessment and research efforts across the OSPAR area, ensuring at the same time that any significant gaps are filled.

All currently occupied colonies in Britain and Ireland are monitored annually (by a variety of different organisations) and have been since 1969. All British and most Irish colonies are managed as nature reserves by various statutory and non-governmental organisations (Avery and del Nevo, 1991). These colonies are all wardened, and the monitoring at these sites is funded by the owners/managers of the nature reserve (e.g. BirdWatch Ireland and the National Parks and Wildlife Service monitor colonies at Lady's Island Lake and Rockabill in Ireland; the Royal Society for the Protection of Birds – RSPB – monitors those on Anglesey and Coquet Island in Britain). The UK's Joint Nature Conservation Committee (JNCC) collate the results of this monitoring for all British and Irish colonies, which are then published as part of the annual Seabird Monitoring Programme (SMP) report for Britain and Ireland.

In France, breeding colonies are generally found on ornithological reserves managed by the non-governmental organisation Bretagne Vivante-SEPNB, which carries out annual monitoring of breeding numbers and productivity. Funding for this monitoring comes from a specific EU Life-Nature programme "Conservation of the Roseate Tern in Brittany" (2006 – 2010). Counts of breeding numbers of Roseate Terns in France are available since 1960, though not for all years. Data for more recent years have been published by Bretagne Vivante-SEPNB in annual reports "*Observatoire des sternes de Bretagne*" (e.g. Drunat and Cadiou, 2006).

Monitoring of Roseate Tern breeding colonies is also conducted in the Azores. The first census of the species in the Azores was conducted with the support of the RSPB in 1984 (Dunn, 1989). The census was repeated in 1989 and from then onwards the population size has been monitored every year under the supervision of the University of the Azores with the collaboration of RSPB, University of Glasgow and the Great Gull Island Project from the American Museum of Natural History (V R Neves). Many of the Azores colonies are small and inaccessible, making comprehensive and accurate counts

extremely difficult. Logistical constraints and accessibility issues for the more remote colonies make it impractical to visit all of the Azores colonies for monitoring every year. The five most important Roseate Tern colonies in the Azores are currently within nature reserves, and the majority have been designated as SPAs. Breeding numbers have been monitored annually at these sites since 1989 (Neves, 2005). Monitoring in the Azores is currently funded by an EU Interreg project MARMAC (until July 2008), although it is uncertain how monitoring will be funded after the end of this project.

Data have also been collected since 1992 through a special ringing scheme for Roseate Terns. Under this scheme, Roseate Terns are ringed with two rings – one from the standard national scheme for the relevant country, the other a special, field-readable ring (printed with four digits that can be read using a telescope). This allows the collection of far more data on bird survival and movements between colonies, as it is easier to get a re-sighting of an individual ringed with a field-readable ring than it is to get a recapture with the traditional rings. Roseate Terns are ringed almost exclusively as chicks at the colonies, as national restrictions may be placed on the trapping of nesting adults. The special rings are used at Roseate Tern colonies across the OSPAR Area – particularly at colonies in Britain and Ireland, and more recently also at colonies in Brittany. Coverage is patchy in the Azores, due to difficulties caused by a lack of trained manpower and colony accessibility issues. The data (number and location of birds ringed and number and location of birds re-sighted) are collated centrally into a database. The data are then used to analyse age-dependent survival and movement rates within the north-west European metapopulation.

Results from Roseate Tern colony monitoring and other research programmes are not formally coordinated or reported on across the OSPAR area at present. A Roseate Tern Newsletter, drawing together information on breeding colony survey results along with details of other relevant research and events, was published annually from 1987 until 2002 (skipping a year in 1994). The more recent issues were global in coverage, and included information from most of the colonies within the OSPAR Area.

Workshops, bringing together scientists and managers working with Roseate Terns, have been held every few years, although the last full workshop was held five years ago in 2003 (Wexford, Ireland). In November 2007 the Roseate research community organised a symposium on comparative demography (survival rates) around the world, as part of the Waterbird Society's Annual Conference in Barcelona, Spain. Another workshop is due to be held in 2009 as part of the French LIFE-Nature project "Conservation of the Roseate Tern in Brittany" (http://www.life-sterne-dougall.org/accueil_sterne.php).

Since there is already considerable monitoring effort for this species, for monitoring and assessment purposes under OSPAR, the focus should be on ensuring that the resulting available information is captured for this species at the OSPAR level. Therefore, the relevant Contracting Parties (France, Ireland, Portugal [Azores], and the UK) should report monitoring data to OSPAR. It may be necessary for OSPAR to consider how best to ensure consistency of monitoring effort, particularly in the Azores.

Synergies with monitoring of other species or habitats

There is little or no opportunity for synergy with monitoring of other OSPAR-listed seabird species, as the Roseate Tern does not nest in the same breeding colonies with these species.

Assessment criteria

Work needs to be done to set assessment criteria for the monitoring of this species at an OSPAR level. These criteria should be used to interpret the collected data, with some indication of at what point action e.g. additional monitoring, actions and measures, should be taken beyond the minimal requirements.

Techniques/approaches:

- Annual colony monitoring including at least data collection on breeding numbers and productivity for all occupied colonies in Britain, Ireland and France, and for the five major colonies in the Azores.
- Further data collection to augment the baseline data collection at the colonies where resources allow (e.g. covering management effectiveness, threats and impacts, and parameters such as diet, feeding ecology, chick provisioning rates, chick survival and growth rates).
- Continue with national and special ringing schemes at breeding colonies in Britain, Ireland and France. Ensure that ringing is routine for at least the five major colonies in the Azores – expand to smaller colonies if time/resources permit.

[Refer also to Ratcliffe and del Nevo, 1995]

Selection of monitoring locations

Roseate Terns should be monitored at all occupied colonies in Britain, France, and Ireland. Efforts in the Azores should be concentrated at the five main colonies: Vila islet (off Santa Maria), Contendas islet (off Terceira), Praia islet (off Graciosa), Alagoa complex (off Flores) and Baixa do Moinho islet (also off Flores), with some attention also paid to other, smaller colonies throughout the archipelago.

Timing and Frequency of monitoring.

Monitoring at the breeding colonies should take place annually, during the breeding season (roughly May – July) for all colonies in Britain, France and Ireland, and for the five main Azores colonies. Monitoring of the smaller breeding colonies in the Azores should be undertaken at least every 5 years, more frequently if resources/logistics allow.

Data collection and reporting

The basic data categories to be recorded at the colonies are breeding numbers and productivity. Additional data can be recorded to cover diet, feeding ecology, chick provisioning rates, chick survival and growth rates. Data collection and reporting should follow the fieldwork manual for Roseate Terns in Europe (Ratcliffe and del Nevo, 1995).

Quality assurance

Refer to Ratcliffe and del Nevo, 1995.

Annex 3: References

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