ALBATROS PROJECT MONOGRAPH 2012

The Cory's Shearwater

Calonectris diomedea diomedea,

Updated state of knowledge and conservation of the nesting populations of the small Mediterranean islands

Lorraine ANSELME (CEN PACA) ; Jean-Patrick DURAND (CEN PACA) ;

Le Conservatoire d'Espaces Naturels de Provence-Alpes Côtes-d'Azur

With the collaboration of :

Reviewers and data providers:

Clara Péron (CEFE-CNRS)
Pascal Gillet (Port-Cros National Park)
Joe Sultana (BirdLife Malta)
John J. Borg (BirdLife Malta)
Pep Arcos (SEO Birdlife)
Danae Portolou (HOS-BirdLife Greece)
Bernard Cadiou (Bretagne Vivante & GISOM)
Joan Mayol Serra (Conselleria de Medi Abient)

With the support of :

Conservatoire du littoral

Citation of document

For bibliographical purposes, the present document is to be cited as follows:

Anselme L. & Durand J.P., 2012, *The Cory's Shearwater Calonectris diomedea diomedea, Updated state of knowledge and conservation of the nesting populations of the small Mediterranean islands. Initiative PIM. 23p*

CONTEXT

The Mediterranean Small Islands Initiative

The Conservatoire du Littoral has been coordinating, since 2005, an international programme for the promotion and assistance for the management of Mediterranean insular micro-spaces, known as the PIM Initiative for the Mediterranean Small Islands, which is financed by the Fonds Français pour l'Environnement Mondial (FFEM) (French Global Environment Facility), the Agence de l'Eau Rhone Méditerranée-Corse and the city of Marseilles. The PIM Initiative is developing a mechanism for the exchange and sharing of knowledge which is necessary for the emergence of good management practices of exceptional spaces. The Albatross project was been set up within the framework of this programme to enhance the knowledge of Mediterranean nesting bird species. To update the knowledge on these species, the PIM Initiative has coordinated the preparation of monographs which finally are to serve as a guiding document for reflecting on the conservation of these species in the Mediterranean.

……

SUMMARY

GENERAL DATA

Scientific name of the Mediterranean subspecies: *Calonectris diomedea diomedea*
French name : Puffin cendré
Spanish name : Pardela cenicienta
Italian name : Berta maggiore

Protection Codes

Barcelona convention : Annex II
Berne convention : Annex II
Birds Directive : Annex I
IUCN redlist: Least concerned

DESCRIPTION OF SPECIES

Cory's Shearwater, *Calonectris diomedea* is represented by three sub-species : the nominal form *C. d. diomedea* (Scopoli, 1769) present throughout the Mediterranean, *C. d. borealis* (Cory, 1881) in the Macaronesian islands and *C. d. edwardsii* (Oustalet, 1883) in the Cape Verde islands but whose taxonomic status is still uncertain (Thibault *et al.* 1997).

This pelagic bird of the *Procellariidae* family is the largest of this family nesting in Europe. It is 45 to 56 cm long with a 110 to 125 cm span. The adult average weight is 650g.

The females are slightly smaller than the males but at sea gender and age cannot be recognized. The age of the individuals can be ascertained when the young birds take to flight as their plumage is complete and contrasted whereas the adults have molted primaries and dull plumage at this time of the year.

Cory's Shearwater has a strongly contrasting plumage between the back and the underside. The bird's upper part is brown to grey-brown whereas the lower area is white. The breast, neck and head are grey.

When the young bird starts flying it has the « adult » type of plumage.

The beak is yellow, light coloured at the base and dark at its extremity, with tubular nostrils. It has pink webbed feet.

Like most Shearwaters, Cory's Shearwater flies close to the water and when the weather is calm, its flight is nonchalant. When the wind rises, it glides for a long while close to the water, is very rapid and agile.

Cory's Shearwater vocalizes in flight and on the ground, basically at the beginning and end of the night when the birds arrive at the colonies and take off again. Males and females vocalize differently so that they can be distinguished. Their cries are plaintive, raucous and noisy and similar to the crying of new-borns or lamentations. The females make more low-pitched sounds than the males. Mated birds sing as a duo when they are in the nest

before laying eggs and for quite a while during the breeding period. The colonies, however, become less noisy towards the end of the raising period as the adults become quieter and the non-breeding birds had left the sites.

Shearwaters' droppings are recognizable on the ground as they are quite liquid and whitish.

ECOLOGY and HABITAT

Cory's Shearwater breeds exclusively on islands and islets. The species nests in crevices, caves and in burrows dug out by other species and which the birds arrange to suit them. The birds can also nest on the ground under the vegetation, under roots and in artificial sites (holes in walls). This type of hypogenous nesting ensures protection against predators and the heat.

This species lays one single egg per year which is completely white and which is not replaced in case of failure. Synchronized egg laying takes place at the end of May and hatching at the beginning of July (Late July for the Balearic colonies and Italy). The average incubation and chick raising period is 52 and 89 days respectively.

The breeding adults usually form colonies of variable size, mono-specific mixed (in association with the Yelkouan Shearwater). The adults are faithful to their partners and to their breeding sites (philopatry) (Thibault 1994).

Sexual maturity is reached after 4-5 years. The young immature individuals or those ready to mate return to the colonies of their birth during the breeding period. They do a bit of prospection to find a burrow and a partner.

Cory's Shearwater spends most of its time at sea, returning to land only for breeding at the end of February to mid-October. In the colonies the birds are active only at night when searching for a burrow or for mating, taking over for incubation or for feeding the young. In general the adults are found in burrows during the day only during incubation and a few days after hatching, until the thermal emancipation of the young chick.

The Shearwater colonies are particularly active during moonless nights which are also known as « dark moon » nights. They are considerably less active when the moon is shining brightly doubtlessly to limit the risks of predation (Mougeot & Bretagnolle 2000).

During the breeding season, the breeding adults make short trips to the sea generally for a day (1 – 6 days) to feed themselves and to provide their young with food. Both male and female feed the chicks.

At sea, the individuals congregate to fish with their own kind or with other species. They are often observed in association with marine mammals (dolphins) or large pelagic fish (tuna). Before sunset, at sea they form large "rafts » comprising several hundreds, up to thousands of individuals before returning to the breeding sites.

They eat mostly small species of pelagic crustaceans, fish and cephalopods. Cory's Shearwater feeds basically by fishing close to the surface of the sea or during shallow dives of short duration. (Monteiro *et al*. 1996, Mougin and Mongin 1998). It frequently follows the trawlers to catch the waste thrown into the sea when the fish are being discarded and also the long-lines to catch the bait (Sanchez & Belda 2003). Only few birds winter in the Mediterranean (Borg *et al*. 1999). Most of them fly to the Atlantic Ocean rapidly once the young birds have flown away, going through Gibraltar between mid-October and mid-November (Telleria 1980, Finlaysson 1992). The birds return to the Mediterranean via Gibraltar in February and March (Corés *et al.* 1980) to get back to their colonies from the second week in February onwards.

The wintering zones are little known and the available data suggests that they overwinter in the Atlantic Ocean and could go as far as the Indian Ocean (Mougin *et al.* 1988 ; revue in Thibault et al. 1997). Data obtained through telemetry and geo-location indicate that the Mediterranean Cory's Shearwaters overwinter in the Atlantic, mainly to the north of the equator ; near the current of the Canaries, near Mauritania and Senegal, in the Gulf of Guinea and near Brazil (Ristow *et al.* 2000, Bretagnolle and Thibault 2001)

The CNRS (National Scientific Research Centre) is at present implementing a programme in France (in Corsica, the Hyères islands and the Marseilles islands) to identify the marine habitats of Cory's Shearwaters during the breeding period as well as their wintering areas.

DISTRIBUTION OF POPULATION NUMBERS

This nominal sub-species of Cory's Shearwater is the only one present in southern Europe and thus in the Mediterranean. Its distribution area stretches from the Greek islands to the Chafarinas islands but most of the bird numbers are concentrated in the Straits of Sicily.

Until 2010, the total population of the species was estimated at approx. 80 000 pairs. A census via distance sampling in 2010 within the framework of the Mediterranean Small Island programme made it possible to estimate a population of over 100 000 nesting pairs just on the Zembra island (Tunisia), thus indeed questioning the information on the numbers of the species.

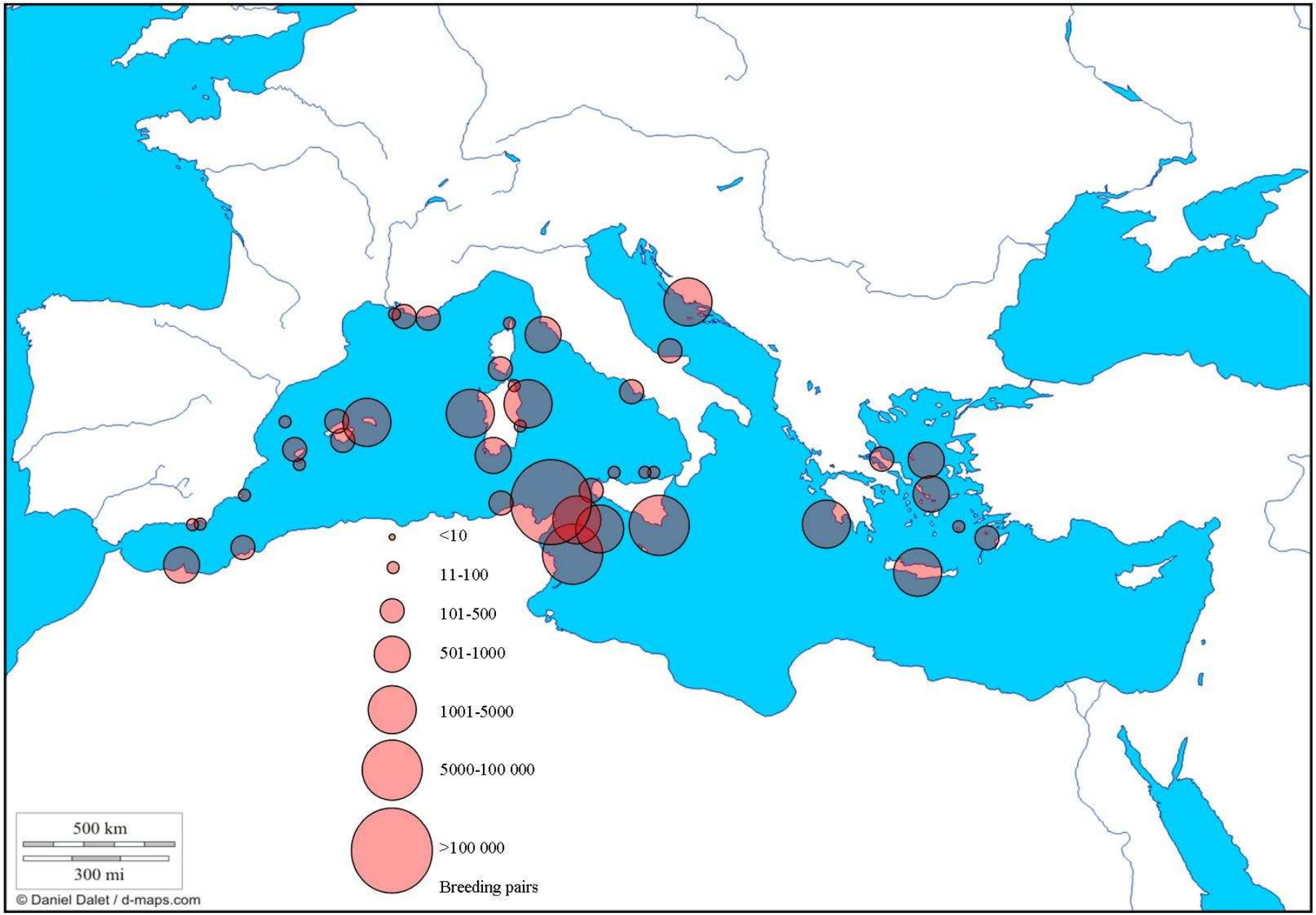
Table 1: Table of numbers of breeding Cory's Shearwaters in the Mediterranean. (*Calonectris diomedea diomedea*)

Data location		Number of breeding couples	References
Country	**Archipelago / Island or islet**		
France	Riou archipelago	280-300	CEN PACA 2010 *com. pers.*
	Frioul archipelago	70	
	Hyères islands archipelago	180-370	Pascal Gillet, PN Port-Cros *com. pers.*
	South Corsica	300-400	Association of friends of the PNR of Corsica - 2010
	North Corsica	38-40	
	Total France	**868-1180**	
Italie	Tremiti islands	300-400	Brichetti & Fracasso 2003, Baccetti *et al.,* 2009
	Archipelago of the Pontine islands	220-345	Baccetti *et al.,* 2009
	East Sardinia	40-150	
	West Sardinia	750-2450	
	Tavolara archipelago	10-50	
	Maddalena archipelago	615-1545	Fozzi *et al.*,1998; Baccetti *et al.,* 2009; Rabouam *et al.*, 1995; Casaraccio & Racheli 1993
	Sulcis archipelago	505-1050	Martin *et al.,* 2000, *Baccetti et al.,* 2009
	Aeolian or Lipari islands archipelago	30-80	Baccetti *et al.*, 2009
	Ustica (Sicily)	15-20	
	Egadi islands archipelago	60-150	
	Pelagie islands archipelago	10070-10120	
	Pantelleria (Sicily)	500-5000	
	Tuscan archipelago	230-505	
	Total Italy	**13 345-21 865**	
Malta	Malta	1550	

	Comino	15-20	Sultana *and al.*, 2011
	Filfla	200	
	Gozo	2300	
	Total Malta	**4100**	
Algeria	Habibas islands archipelago	350-500	Mante *et al.,* 2007 ; PIM initiative
Tunisia	Zembra archipelago	113 720-176 750	Pierre Defos Du Rau *et al.,* 2012 ; PIM initiative *in prep.*
	la Galite archipelago	250-500	Vidal & Tranchant, 2008 ; PIM Inititiative
	Total Tunisia	**113 970-177 250**	
Spain	Columbretes archipelago	50	D.G. Medio Natural, Conselleria de Medio Ambiente
	Cabrera archipelago	922	Joan Mayol Serra *pers. com.* Govern de les Isles Baleares.
	Formentera	<50	
	Ibiza and islets	200-500	
	Majorca islands & islets	220-230	
	Minorca islands & islets	950-1700	
	Isla de Terreros and Isla Negra	30	Arcos *and al.,* 2009
	Isla de las Palomas	100	Garcia *et al*., 2009
	Islotes de Murcia	67-123	
	Chafarinas	800-1000	Arcos *et al.,* 2009
	Total Spain	**3389-4705**	
Croatia	**Total Croatia**	**1200-1750**	Budinski *et al.,* 2010
Greece	Crete	1245-2010	Hellenic Ornithological Society –BirdLife Greece. *Pers. comm.*
	Agean	890-1295	
	Cyclades	760-1395	
	Ionian	2060-3100	

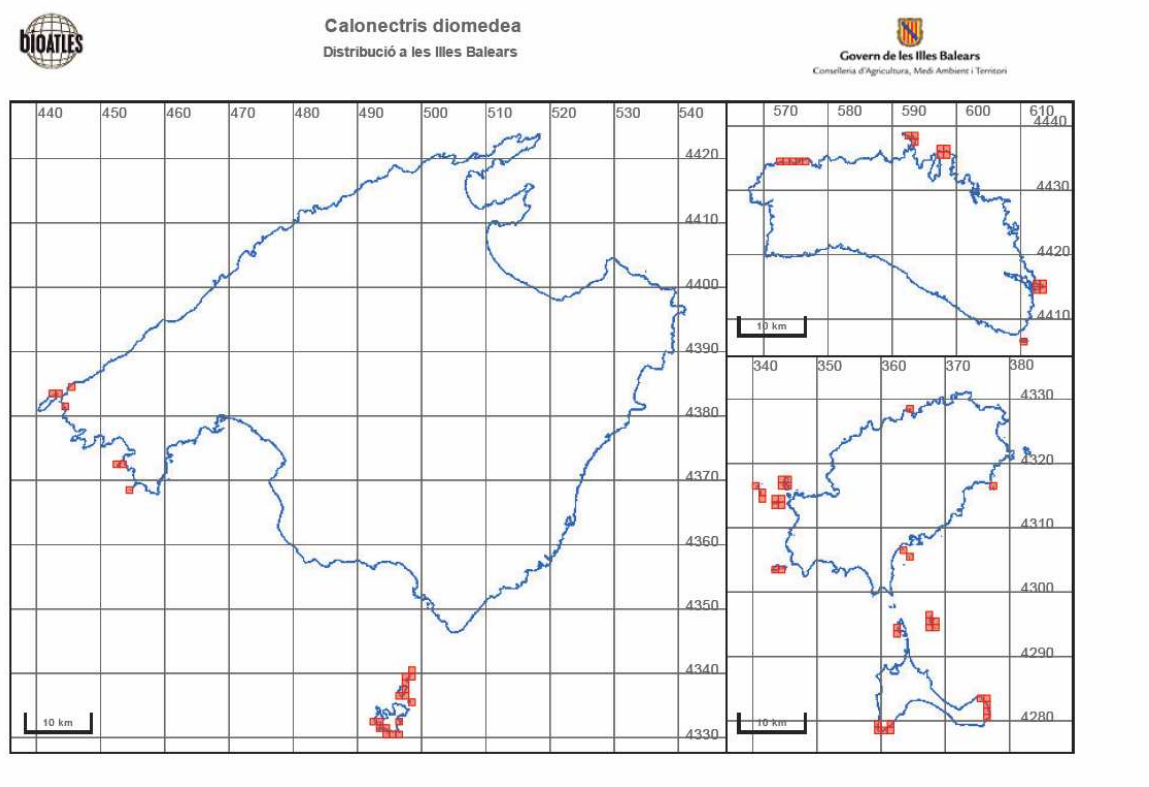
	Dodecanese	125-250	
	Eyvoia	81-156	
	Sporades	30-80	
	Total Greece	**5191-8275**	
	TOTAL	**142 063-217 375**	

- **Next page is presented a map elaborated with the previous data.**



Calonectris diomedea diomedea- Geographical distribution of Mediterranean breeding populations (PIM- 2012)

In addition, the following map is outlining the localization of *Calonectris diomedea diomedea* breeding pairs in the Balearic Islands (data provided by the species protection department, Govern islas Balear)



Balearic archipelago, *Calonectris diomedea diomedea* breeding pairs localization
Majorca and Cabrera (left map) Minorca (upper right) Ibiza and Formentera (lower right)

- **Breeding Phenology:**

	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct
Mating												
Egg laying												
Hatching												
Incubation												
Fledging												

- **Table of field work periods**

The Shearwater colonies are particularly active during moonless nights which are also known as the « dark moon » nights. Moonlight (and any other source of quite a strong light) affects the activity and the presence of the birds in the colonies. Thus the best results for capturing and ringing the adults is during the previous week and during a moonless night, and this is more efficient during the period of the waning crescent moon.

	Mar	Apr	May	June	July	Aug	Sept	Oct
Control of reproduction				Laying		Hatching		Fledging
Ringing	Adult	Adult				Adult	Adult	Young

- **State of population dynamics**

The species population dynamics in the Mediterranean is still difficult to evaluate. This has become even more difficult due to the recent census of Zembra island (Tunisia) population which showed almost 140 000 nesting pairs on just this island, thus questioning the information on the numbers in the Mediterranean which so far had been estimated at under 80 000 pairs.

The breeding success is highly variable from one site to another and depends on the existing threats and the management actions which have been set up. For example, the breeding success of the Marseilles islands is 0,5 young fledged per pair which reproduced in 2003 whereas it is higher than 0,85 since 2004, a year during which management actions had been strengthened (getting rid of rats namely) thanks to the Life programme “Conservation of the marine bird populations of the Marseilles islands”.

In the North African islands the breeding success is generally very low (between 0 and 0,3 fledging per breeding pair). It would be important to undertake long-term demographic monitoring of these islands. The apparent stability and maintenance of these colonies is due to the long longevity of these birds (over 30 years) but long-term monitoring could in fact show a decline of the population on these sites.

Even though it is difficult to study the population dynamics on a Mediterranean scale, two types of populations can nevertheless be distinguished; those that benefited from management actions and which are stable and even increasing slightly, and those submitted to strong pressures with no conservation actions and which are declining or which maintain themselves in the « short term » due to the number of adult birds.

MAIN THREATS IDENTIFIED IN THE INSULAR ENVIRONMENT

The threats identified can be of different origin:

- **Threats acting outside of the breeding sites, in direct or indirect connection with fishing activities, food source, climate phenomena or eventual pollution. These types of threats are difficult to identify and quantify.**
- ***in situ* threats,** mainly predation or disturbances caused by introduced or indigenous species. The greatest threat is the predation of eggs and chicks by introduced mammals (black rats and feral cats) and light/noise pollution.

The following table shows the different threats identified for Cory's Shearwater at sea and on land in the breeding sites:

Threats		Zone studied	Impact of threat
On reproduction sites			
Introduced mammals	Feral cat (*Felix catus*)	Hyères islands and Frioul archipelago (France) Pontine islands, Tavolara, Maddalena archipelago (Italy) Zembra and Galite islands (Tunisia) Malta Linosa	Predation of prospecting and breeding adults , killing of chicks
	Black rat (*Rattus rattus*)	Almost all archipelagos	Predation of eggs and young chicks in the burrow
	Lapin de Garenne (rabbit) (*Oryctolagus cuniculus*)	I Marseilles islands (France)	Competition for the habitat, direct or indirect destruction of the burrows
	Wild dogs	Frioul archipelago (France) Pelagie and Egades islands archpelago (Italy) Malta Linosa	Disturbance in breeding colonies , killinf fledgings
	Common Genet (*Genetta genetta)*	Cabrera	Predation
	European pine Marten (*Martes martes*)	Minorque	Predation
Indigenous species	Eurasian eagle-owl (*Bubo bubo*)	Riou archipelago(France)	Predation of adults
	Yellow-legged gull (*Larus michahellis*)	Hyères and Marseilles islands (France) At Pantaleu colony (Mallorca, Spain)	Disturbance of the adults, Egg predation (limited impact)
	Peregrine falcon (*Falco*	Corsica	Chick predation

	peregrinus)		
Anthropogenic origin	Lighting	Hyères islands (France) Malta	Disorientation of birds due to public lighting
	Human activities & tourism	Hyères islands (France) Balearic islands (Spain) Linosa island (Italy) Malta	Collapse of burrow due to visitors passing by Disturbed return of birds which are also disturbed by boats mooring nearby Light and noise disturbance Collision with telephone and electric wires
	Taking of eggs	Maddalena archipelago (Italy) Linosa island (Italy)	Pratice which tends to disappear
	Poaching of adults	Malta	Mortality of adults
At sea			
Human activities	Disturbance on rafting areas	Mediterranean	Behavioural disturbance
Fishing activity	By-catch in fishing nets	South-East of French coasts	Mortality of adults due to drowning
	By-catch through long-lines	Columbretes & Balearic islands (Spain), Gulf of Lion, Bonifacio detroit,Italian and Maltese waters	Mortality of adults captured through drowning
	(Diminution of fish stocks) →not demonstrated		Impossible for adults to properly feed their young
Pollution due to hydrocarbons & chemicals			Contamination of birds
Climate phenomena			Modification of trophic quality in wintering zones, more frequent storms

In view of the threats as explained, the conservation challenges for Cory's Shearwater on a Mediterranean scale are as follows:

- Complete the data on the distribution of the species
- Enhance the knowledge on the biology and ecology of the species
- Assess the state of health of the populations
- Clearly identify the threats and their impact on the breeding sites and on the wintering areas
- Limit the causes of mortality and disturbance
- Maintain favourable conditions for breeding and the development of the colonies
- Promote successful breeding

A number of conservation actions have been carried out so far for this species. Here are some examples:

- Census campaigns (France, Spain , Italy, Malta, Tunisia, Greece, Algeria)
- Study of the biology and ecology of the species (France, Malta, Greece and Spain)
- Monitoring of the populations (breeding monitoring of and ringing)
- Regulation or eradication of introduced mammal populations (France, Malta, Italy, Tunisia)
    - Providing artificial nesting sites (France, Spain)
    - dynamisation of colonies free from disturbances by installing vocal bird call systems. (France)
- Public awareness creation campaigns (France, Malta, Spain)
- Organisation and management of frequentation to reduce disturbance to colonies (France)
- Creation of protected areas

▪ Ringing campaign underway

Ringing programmes have been set up in France (Marseilles islands, Hyères islands, Corsica) in Spain (Chafarinas islands, Columbretes, Balearic Islands). The ringing of Cory's Shearwaters (breeding adults, prospectors and young before they fledge) is essential for the acquisition of knowledge on the biology and ecology of the species. This makes it possible to identify the individuals and enhance knowledge on the demography of the species. Ringing makes it possible to know the rate of recruitment and exchanges between the different colonies, to estimate the birds' longevity, age of sexual maturity and to obtain data on the birds' behaviour such as faithfulness to the reproduction site and to the partner.

▪ Monitoring techniques used generally for this species :

➢ Breeding monitoring: three controls are carried out during the breeding period. One control of egg laying, a control a few days after the hatching of the chicks and a control just before the young fledge. This monitoring is done during the day and each burrow/nest is inspected using a lamp so as to determine the number of breeding pairs, the breeding success and to detect any eventual failures and at what stage of the breeding they occur.

➢ Ringing of adults: the birds are captured directly in the burrows when these are accessible (burrows which are not too deep or artificial nests) or else enticed outside the burrow thanks to the use of a vocal call system. This operation takes place at night.

➢ Ringing of young birds before they fledge: young birds do not react to the vocal call system and only accessible individuals (burrows which are not too deep or artificial nests) are ringed. This operation can take place during the day or at night.

CONSERVATION ACTIONS ADVOCATED FOR THE SMALL MEDITERRANEAN ISLANDS

References:

- CEEP. 2007. Cahier de gestion des populations d'oiseaux marins sur les îles de Marseille, programme LIFE Nature 2003-2007 "Conservation des populations d'oiseaux marins des îles de Marseille", Commission européenne. 80 pages.
- BirdLife International. 2011 Cory's Shearwater species account *in prep.*

Thematic issue 1: Set-up a international network of actors

- Set-up a working group of actors for the prioritization of conservation action at regional scale
- Elaborate monitoring protocols for the specie (census and breeding monitoring) harmonized at Mediterranean scale

Thematic issue 2: Improvement of the knowledge concerning the species

- Study the ecology of the species at sea during breeding period. The utilization of telemetry (GPS, TDR and Argos tags) already has been used by the CEFE-CNRS and provide very interesting on movements and foraging area identification
- Study the movement during inter nuptial period using GLS devices for example,
- Set-up census missions on the area where the distribution of the specie is not known: Algeria, NW Minorca.

Thematic issue 3 : Local conservation actions

- Reduce locally the impact of human terrestrial activities,
  - Evaluate the importance of the frequentation, and manage it,
  - Set-up communication tools for public awareness outlining the threats identified on the specie and the necessity of its conservation,
- Reduce the impact of Yellow-legged Gulls *Larus michahellis* on the colonies,
  - Culling of Yellow-legged gull when the impact of this specie is proved on Shearwater,
  - Elimination of Yellow-legged Gull nests present on Shearwaters colonies,

  (→This measure can be useful and costly, Yellow legged Gull are part of the eco-system (*com.pers*. D. Oro))
  - stop illegal harvest

- Reduce the impact of Black Rat *Rattus rattus*, of Feral Cat *Felis silvestris*, and European rabbit *Oryctolagus cuniculus*
  - (Raét eradication operations)
  (This operation can be considered as useful only in the short term (Igual *et al.* 2009))
  - Control of rabbit and cat populations
  - Public awareness operation concerning the impact of introduced mammals on Shearwaters colonies.

AGUILAR J. S. 1991. Atlas de las aves marinas de Baleares. Convenio de Vidal Silvestre CAIB-ICONA, Palma de Mallorca, 57 p.

ARCOS, J.M., J. BECARES, B. RODRIGUEZ y A. RUIZ. 2009. Áreas Importantes para la Conservación de las Aves marinas en España. LIFE04NAT/ES/000049-Sociedad Española de Ornitología (SEO/BirdLife). Madrid.

BACCETTI N., CAPIZZI D., CORBI F., MASSA B., NISSARDI S., SPANO G. & SPOSIMO P. 2009. Breeding Shearwaters on Italian islands: population size, island selection and co-existence with their main alien predator, the black rat. *Rivista Italiana di Ornitologia* 78: 83–100.

BIRDLIFE INTERNATIONAL 2004. Birds in Europe II. Population Estimates, Trends and Conservation Status. BirdLife International Conservation Series 12.

BIRDLIFE INTERNATIONAL 2011. Cory's Shearwater specie account. BirdLife, *in prep.*

BORG J.J. & SULTANA J. 2002. Status and distribution of the breeding Procellariiformes in Malta. *Il-Merill* 30: 10-15.

BORG J.J. & SULTANA J. 2004. Important Bird Areas of EU Importance in Malta. BirdLife Malta, Malta.

BOURGEOIS K. & VIDAL E. 2009. Suivi des populations de puffins des iles d'Hyères : Bilan 2003-2009 et notes méthodologiques. 31 p.

BRETAGNOLE V. & THIBAULT J.C. 2001. Suivi des déplacements de puffins cendrés par satellite-tracking - rapport

BRICHETTI P. & FRACASSO G. 2003. Ornithologia Italiana, Vol. 1: Gaviidae-Falconidae. Alberto Perdisa, Bologna, Italia.

BRICHETTI P. & FRACASSO G. 2003-2006 Ornitologia italiana. Vols. 1-3. Perdisa, Bologna.

CADIOU B., PONS J.M., YESOU P., 2004. Oiseaux marins nicheurs de France métropolitaine (1960-2000) Ed. Biotope, Mèze, 218 p.

BUDINSKI, I., ČULINA, A., MIKULIČ, K., JurinoviČ, L. (2010): Izrada akcijskog plana zaštiteptica iz porodice zovoja (Procellaridae) u Hrvatskoj; Izvještaj za 2010. Udruga za biološka istraživanja − BIOM. Zagreb.

CADIOU B., *et al*. 2011. Cinquième recensement national des oiseaux marins nicheurs en France métropolitaine 2009-2011. 1ère synthèse : bilan intermédiaire 2009-2010. Groupement d'Intérêt Scientifique des Oiseaux Marins et Agence des Aires Marines Protégées. 62p.

CADIOU B., BARBRAUD C., CAMBERLEIN P., DEBOUT G., DENIAU A., FORTIN M., LE NUZ M., SADOUL N., TRANCHANT Y., YESOU P. 2009. Méthodes de suivi des colonies d'oiseaux marins : dénombrement de l'effectif nicheur et suivi de la production en jeunes. Document de travail GISOM (non publié).

CEEP. 2007. Cahier de gestion des populations d'oiseaux marins sur les îles de Marseille, programme LIFE Nature 2003-2007 "Conservation des populations d'oiseaux marins des îles de Marseille", Commission européenne. 80 pages.

CEEP. 2010. Parc Maritime des Îles du Frioul, Bilan d'activités 2010. Conservatoire-Études des Écosystèmes de Provence/Alpes du Sud,Marseille. 100 p.

CEEP. 2010. Réserve Naturelle de l'archipel de Riou, rapport d'activité 2010. Conservatoire-Études des Écosystèmes de Provence/Alpes du Sud,Marseille. 94 p.

COOPER J., BACCETTI N., BELDA E.J., BORG J.J., ORO D., PAPACONSTANTINOU C. & SÁNCHEZ A. 2003. Seabird mortality from longline fishing in the Mediterranean Sea and Macaronesian waters: a review and a way forward. Scientia Marina 67: 57-64.

DEFOS DU RAU P., BOURGEOIS K., RUFFINO L., DROMZEE S., OUNI R. , ABIADH A., ESTEVE R., DURAND J.P., ANSELMEL., FAGGIO G., YAHYA J.B., PETERS P., RGUIBI H., RENDA M., MILADI B., HAMROUNI H., ALILECH S., BEN DHAFER A., NEFLA A., JAOUADI W., AGREBI S., RENOU S. The Mediterranean Cory's Shearwater is still threatened by fishery by-catch despite much higher population size estimate. *In preparation*. 2011

DE JUANA E., VARELA J.M., WITT H. 1980. Le Puffin cendre *Calonectris diomedea* nicheur aux iles Chaffarines. Alauda 48 (1). 27-31.

FAGGIO G. JOLIN C. 2010 Suivi des Puffins cendrés sur l'île de Giraglia en 2010. 8 p.

FLITTI A., KABOUCHE B., KAYSER Y. & OLIOSO G. 2009. Atlas des oiseaux nicheurs de Provence-Alpes-Côte d'Azur. LPO PACA, Éditions Delachaux et Niestlé, Paris, 182 p.

GUYOT I., LAUNAY G. & VIDAL P. 1985. Oiseaux de mer nicheurs du Midi de la France et de Corse: évolution et importance des effectifs d'oiseaux marins nicheurs du Midi et de la Corse. Annales C.R.O.P. 2, 31-47.

IGUAL J.M., FORERO M.G., GOMEZ T., ORUETA J.F. & ORO D. 2006. Rat control and breeding performance in Cory's Shearwater (Calonectris diomedea): effects of poisoning effort and habitat features. Animal Conservation 9: 59-65.

Igual JM, Tavecchia G, Jenouvrier S, Forero MG, Oro D (2009) Buying Years to Extinction: Is Compensatory Mitigation for Marine Bycatch a Sufficient Conservation Measure for Long-Lived Seabirds? PLoS ONE 4(3): e4826. doi:10.1371/journal.pone.0004826

LÓPEZ-JURADO C. *et al.* 1992. Contribució a l'estudi de les colònies de virot (Calonectris diomedea) i noneta (Hydrobates pelagicus) de l'arxipèlag de cabrera - A. O. B. vol. 7, 29-38

MANTE, A., VIDAL, P. et PEYRE, O, Observation naturalistes sur les îles Habibas, PIM Initiative, 2007.

MADROÑO A., GONZÁLEZ C. & ATIENZA J. C. 2004. Libro Rojo de las Aves de España. Dirección General para la Biodiversidad-SEO/BirdLife, Madrid.

MARTÍ R. & DEL MORAL J.C. 2003. Atlas de las aves reproductoras de España, SEO/BirdLife, Madrid.

MNHN Rapport SNPN. 2010 / 4. Note de synthèse sur les captures accidentelles d'oiseaux marins par les engins de pêche. 8 p.

MONTEIRO, L R, RAMOS, J A, FURNESS, R W & DEL NOVO, A J 1996. Movements, morphology, breeding, molt and feeding of seabirds in the Azores. Colonial Waterbirds 19 : 82-97.

MOUGEOT F. & BRETAGNOLLE V. 2000. Predation risk and moonlight avoidance behaviour in nocturnal seabirds. Journal of Avian Biology 31: 376-386.

MOUGIN J.L., JOUANIN C. & ROUX F. 1988. Les migrations du Puffin cendré *Calonectris diomedea*. L'oiseau et RFO, 58 : 303-319.

MOUGIN J.L., MOUGIN M.C. 1998. Les profondeurs maximum atteintes en plongée par le puffin cendré Calonectris diomedea au cours de ses voyages alimentaires de la période d'incubation = Maximum diving depths of Cory's Shearwater in the course of its feeding trips during incubation. Revue d'écologie vol. 53, n°1, pp. 69-76 (1 p.1/4).

RADOVIC D., KRALJ J., TUTIS V. & CIKOVIC D. 2003. Red Data Book of Birds of Croatia. Ministry of Environmental Protection and Physical Planning, Zagreb.

RADOVIC D., KRALJ J., TUTIS V.,RADOVIC J. & TOPIC R. 2005. National Ecological Network - areas important for birds in Croatia. State Institute for Nature Protection, Zagreb.

RISTOW D. *et al.* 2000. Satellite tracking of Cory's Shearwater migration. Condor, 102 : 696-699.

RISTOW D., FELDMANN F., SCHARLAU W., WINK C. & WINK M. 1991. Population dynamics of Cory's Shearwater (Calonectris diomedea) and Eleonora's falcon (Falco eleonorae) in Eastern Mediterranean. In: Seitz, A. & Loeschcke, V. (eds.) Species conservation: A Population – Biological Approach. Birkhauser Verlag, Basel. pp. 199-212

RUFFINO L., BOURGEOIS K., VIDAL E., DUHEM C., PARACUELLOS M., ESCRIBANO F., SPOSIMO P., BACCETTI N., PASCAL M. & ORO D. 2009. Invasive rats and seabirds: a global review after 2,000 years of an unwanted coexistence on Mediterranean islands. Biological Invasions 11: 1631-1651.

SÁNCHEZ, A. & BELDA, E.J. 2003. Bait loss caused by seabirds on longline fisheries in the northwestern Mediterranean: is night setting an effective mitigation measure ? Fisheries Research 60: 99-106.

SULTANA, J., BORG, J.J., GAUCI, C. & FALZON, V. 2011. The Breeding Birds of Malta, BirdLife Malta, Malta.

STIPČEVIĆ M. & LUKAČ G. 2001. Status of tubenose seabirds Procellariiformes breeding in the eastern Adriatic. Acrocephalus 22: 9–21.

TELLERIA, J.L. 1980. Autumn migration of Cory's Shearwater through the Straits of Gibraltar. Bird Study 27 : 21-26.

THIBAULT J.C. 1994. Nest_site tenacity and mate fidelity in relation to breeding success in Cory's Shearwater (Calonectris diomedea). Bird Study, 41:25-28.

THIBAULT J.-C., BRETAGNOLLE V. & RABOUAM C. 1997. Cory's Shearwater. B W P Update. (The Journal of Birds of the Western Palearctic) 1 : 75-98.

TRANCHANT Y. & VIDAL P. 2006. Observations ornithologiques sur l'archipel de la Galite. Rapport de mission PIM, Conservatoire-Etudes des Ecosystèmes de Provence/AlpesduSud, Marseille.

VIDAL P. & Tranchant Y. 2008. Observation ornithologiques sur l'Archipel de la Galite, PIM Initiative.