

Monitoring Factsheet: Seabirds

October 2015

1. Subject: Seabirds

The EU Marine Strategy Framework Directive calls for assessment of status of 'seabirds', a term which is commonly used to distinguish certain types of marine birds (Petrels, Gannets, Cormorants, Skuas, Gulls, Terns and Auks) from water-birds (waders, herons, egrets, ducks, geese, swans, divers and grebes)¹. According to Cochrane *et al.* (2010)², the Directive's Good Environmental Status Descriptor 1 however encompasses both seabirds and waterbirds.

For the purposes of ensuring a pragmatic, risk-based selection of components to assess the state of biodiversity, Cochrane *et al.* (2010)³ recommend the use of ecotypes⁴ of groups of mobile species and/or species listed under European Community legislation and international conventions. The Commission Staff Working Paper⁵ lists the following 'functional groups' or 'ecotypes' for seabirds:

- Offshore surface-feeding birds
- Offshore pelagic-feeding birds
- Inshore surface-feeding birds
- Inshore pelagic-feeding birds
- Subtidal benthic-feeding birds

Seabirds occurring on the Maltese Islands can be separated into inshore feeding and offshore feeding birds.

¹ Cochrane S.K.J., Connor D.W., Nilsson P., Mitchell I., Reker J., Franco J., Valavanis V., Moncheva S., Ekeboom J., Nygaard K., Serrao Santos R., Naberhaus I., Packeiser T., van de Bund W., Cardoso A.C. (2010). Marine Strategy Framework Directive Task Group 1 Report – Biological diversity. Publications Office of the European Union, Luxembourg. EUR 24337 EN – 2010

² Cochrane S.K.J., Connor D.W., Nilsson P., Mitchell I., Reker J., Franco J., Valavanis V., Moncheva S., Ekeboom J., Nygaard K., Serrao Santos R., Naberhaus I., Packeiser T., van de Bund W., Cardoso A.C. (2010). Marine Strategy Framework Directive Task Group 1 Report – Biological diversity. Publications Office of the European Union, Luxembourg. EUR 24337 EN – 2010

³ Cochrane S.K.J., Connor D.W., Nilsson P., Mitchell I., Reker J., Franco J., Valavanis V., Moncheva S., Ekeboom J., Nygaard K., Serrao Santos R., Naberhaus I., Packeiser T., van de Bund W., Cardoso A.C. (2010). Marine Strategy Framework Directive Task Group 1 Report – Biological diversity. Publications Office of the European Union, Luxembourg. EUR 24337 EN – 2010

⁴ Defined by Cochrane *et al.* (2010) as: 'An ecologically-relevant set of species, applied here to the following (highly) mobile species groups: birds, reptiles, marine mammals, fish and cephalopods. Each ecotype represents a predominant ecological niche (e.g. offshore surface feeding birds, demersal fish) within the species group.'

⁵ Commission Staff Working Paper: Relationship between the initial assessment of marine waters and the criteria for good environmental status. SEC(2011)1255 final

2. Monitoring Requirements

2.1. Marine Strategy Framework Directive (2008/56/EC)

2.1.1. *Annex III characteristics/pressures/impacts*

The MSFD calls for an assessment of the environmental status based on a list of characteristics listed in Table 1 of Annex III to the Directive, and pressures and impacts listed in Table 2 of the same Annex.

Implementation of this monitoring factsheet will enable a description of the population dynamics, range and status of species of seabirds as per Table 1 of Annex III. This monitoring factsheet will also address some pressures on seabirds as listed in Table 2 of Annex III, in particular 'Biological disturbance': selective extraction of species, including incidental non-target catches (e.g. by commercial and recreational fishing).

2.1.2. *Annex I Good Environmental Status Descriptors*

MSFD Annex I descriptors of Good Environmental Status and the associated criteria and indicators established by MSFD Commission Decision 2010/477/EU for assessment of progress towards the achievement of GES in terms of seabirds, and which will be addressed by this monitoring factsheet, are listed hereunder:

Descriptor 1: Biological Diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions

- 1.1 Species Distribution
 - Distributional Range (1.1.1)
- 1.2 Population Size
 - Population Abundance and/or biomass as appropriate (1.2.1)
- 1.3 Population Condition
 - Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates) (1.3.1)

2.2. EC Birds Directive (2009/147/EC)

Council Directive on the Conservation of Wild Birds in 1979 (79/409/EEC), as later codified by Directive 2009/147/EC, is the main European legislation targeted at the conservation and protection of bird species. This Directive was transposed into national legislation through Legal Notice 79 of 2006 entitled 'Conservation of Wild Birds Regulations'.

The Birds Directive calls for the protection and management of all naturally occurring birds, their eggs, nests and habitats within all EU Member States. Within this context,

Member States shall take the requisite measures to maintain the population of these species at a level which corresponds in particular to ecological, scientific and cultural requirements. Member States are also required to establish a network of Special Protection Areas (SPAs) harbouring important habitats for all breeding, wintering and migrating birds listed in Annex I of the Directive. Such Special Protection Areas would form part of the Natura 2000 European Network of protected sites.

Member States should report on all regularly occurring breeding species and on all regularly occurring wintering waterbirds, especially migratory wildfowl and waders. The 'Bird species status and trends report' required under the Birds Directive includes the following information for these species⁶:

- (i) species information
- (ii) population size
- (iii) population trend
- (iv) breeding distribution map and range size
- (v) breeding range trend

Trends in both population and range size, should be reported as 'short-term trends' (over the last 12 years) and long-term trends (since c. 1980).

Information on main pressures and threats and SPA coverage and conservation measures should only be reported for Annex I and key migratory species (or subspecific populations) listed in the 'Checklist of SPA trigger species'.

2.3. Barcelona Convention and the Ecosystem Approach

The Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) was adopted in 1976 and came into force in 1978. The principal aim of the Barcelona Convention and its protocols is to reduce pollution in the Mediterranean Sea and to protect and improve the marine environment in the area, thereby contributing to its sustainable development. The Barcelona Convention/MAP are working towards an Integrated Monitoring Programme and an Integrated Policy of Assessments to be established by 2015. The Integrated Monitoring Programme should be able to provide all the data needed to assess whether 'Good Environmental Status' defined through the EcAp process⁷ has been achieved or maintained.

The list of bird species which would be subject to EcAp monitoring through the Integrated Monitoring Programme is under discussion at the time of compiling this monitoring factsheet. At this stage, the list includes⁸:

- *Larus audouinii* (Payraudeau, 1826)

⁶ European Commission (2011) Assessment and reporting under Article 12 of the Birds Directive: Explanatory Notes & Guidelines for the period 2008-2012

⁷ Ecosystem-based approach undertaken as part of the Barcelona Convention.

⁸ UNEP(DEPI)/MED WG.400/4

- *Phalacrocorax aristotelis* (Linnaeus, 1761)
- *Puffinus mauretanicus* (Lowe, PR, 1921)
- *Puffinus yelkouan* (Brünnich, 1764)
- *Sterna albifrons* or *Sterna nilotica* (Gmelin, JF, 1789) or *Sterna sandvicensis* (Latham, 1878)

2.4. The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)

The Council of Europe's Bern Convention aims at the conservation of European wild flora and fauna and their natural habitats, with a particular focus on the protection of endangered natural habitats and species, including migratory species, while promoting European co-operation in this field. The European Community is also a Contracting Party to the Bern Convention.

Bird species under consideration by this monitoring factsheet are listed in Appendix II of the Bern Convention as strictly protected fauna species. Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the special protection of the wild fauna species specified in Appendix II. The Contracting Parties should also encourage and coordinate research related to the purposes of this Convention.

Specific recommendations issued under the auspices of the Bern Convention call for monitoring of species. Recommendation No. 59 (1997) on the Drafting and Implementation of Action Plans of Wild Fauna Species calls for the identification of species requiring Species Action Plans which plans should take into consideration biological data, including distribution, habitat, population size estimates, trend, and other demographic data, migratory and dispersal patterns (if applicable), genetics, taxonomy, and ecological and ethological studies.

2.5. Convention on Conservation of Migratory Species of Wild Animals (Bonn Convention)

This Convention aims at the conservation of migratory species and their habitats. It calls on Parties to acknowledge the need to take action to avoid any migratory species becoming endangered through promoting, cooperating in and supporting research related to migratory species.

Species listed in Appendix I of this Convention are migratory species deemed to be in danger of extinction throughout all or a significant proportion of their range. Appendix II of the Convention lists migratory species that have an unfavourable conservation status or would benefit significantly from international co-operation. The Convention encourages the contracting parties to conclude global or regional agreements for the conservation and management of individual species or, more often, of a group of species listed on Appendix II. Agreements should provide for, *inter alia*, periodic review of the conservation status of the migratory species

concerned and the identification of the factors which may be harmful to that status, and research on the ecology and population dynamics of the migratory species concerned, with special regard to migration.

2.6. Common Fisheries Policy

The Common Fisheries Policy (CFP) reform was approved in a final plenary vote in December 2013. The Council and European Parliament concluded political agreements on the basic regulation of the Common Fisheries Policy and the Council adopted the texts as their first reading position in October 2013. The Parliament also adopted the Council's first reading position without changes.

Article 25 of the approved legislative text of the basic regulation is of relevance to monitoring of marine reptiles and marine mammals. This article states the following:

“Member States shall, in accordance with the rules adopted in the area of data collection, collect biological, environmental, technical, and socio-economic data necessary for fisheries management, manage those data and make them available to end-users, including bodies designated by the Commission. The acquisition and management of such data shall be eligible for funding through the European Maritime and Fisheries Fund in accordance with a future Union legal act establishing the conditions for the financial support for maritime and fisheries policy for the period 2014–2020. Those data shall, in particular, enable the assessment of:

(a) the state of exploited marine biological resources; (b) the level of fishing and the impact that fishing activities have on the marine biological resources and on the marine ecosystems; and (c) the socio-economic performance of the fisheries, aquaculture and processing sectors within and outside Union waters”.

3. Targets

This section includes targets set by policies in relation to seabirds.

Implementation of this monitoring factsheet will enable assessment of progress towards the achievement of targets adopted by Malta as part of the EU Marine Strategy Framework Directive⁹. Such monitoring may also apply in assessing progress towards targets articulated through other processes.

Policy	Status to be achieved	Targets
Marine Strategy Framework Directive	Good Environmental Status: <i>The natural range and extent of marine habitats and species are stable, or otherwise in line with the physiographic and climatic conditions, taking into consideration the sustainable use of the marine environment.</i>	Efforts are undertaken, through conservation measures or existing permitting and licensing procedures, to ensure that the distributional range of breeding sites of <i>Puffinus yelkouan</i> , <i>Calonectris diomedea</i> and <i>Hydrobates pelagicus</i> is stable, with no loss of breeding sites due to anthropogenic disturbance.
	Good Environmental Status <i>The population abundance of key marine species is stable and their population dynamics are indicative of long-term viability</i>	Population abundance of breeding seabirds is stable over a period of twelve years, taking into consideration the natural variability of the species population and their ecology. [applies to <i>Puffinus yelkouan</i> , <i>Calonectris diomedea</i> & <i>Hydrobates pelagicus</i>]
		Longline Fisheries are adequately using mitigation measures aimed at reducing seabird bycatch [applies to <i>Calonectris diomedea</i>]
		Efforts are undertaken to control the population of the yellow-legged gull on the islet of Filfla [applies to <i>Hydrobates pelagicus</i>]
		Efforts are undertaken to reduce current levels of pressures originating from light pollution and predation by rats in areas to be selected [applies to <i>Puffinus yelkouan</i> & <i>Calonectris diomedea</i>]

⁹ Unless the targets are more adequately assessed through implementation of the MSFD Programme of Measures.

		Marine Special Protection Areas are designated within the framework of the Birds Directive to include marine areas used by seabirds throughout their life cycle [applies to <i>Puffinus yelkouan</i> , <i>Calonectris diomedea</i> & <i>Hydrobates pelagicus</i>]
Nature Directives (Birds and Habitats Directive)	All species of naturally occurring birds in the wild state in the Member States' European Territory at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or to adapt the population of these species to that level.	
Barcelona Convention: ECAP Process	Operational Objective: Species distribution is maintained <i>Common Indicator¹⁰:</i> <i>Species distributional range</i> Good Environmental Status defined as: The species continues to occur in all their Mediterranean natural habitat	State No significant shrinkage in the population distribution in the Mediterranean in all indicator species, and for colonial-breeding seabirds (i.e. most species in the Mediterranean): new colonies are established and the population is encouraged to spread among alternative breeding sites.
	Operational Objective: Population size of selected species is maintained <i>Common Indicator¹¹:</i> <i>Population abundance of selected species</i> (seabirds) Good Environmental Status defined as: The species population has abundance levels allowing to qualify to Least Concern Category of IUCN	No human induced decrease in population abundance. Population recovers towards natural levels where depleted. The total number of individuals is sparse enough in different spots.
	Operational Objective: Population size of selected species is maintained <i>Indicator:</i> <i>Population Density</i>	State: Continual recovery or maintenance of population density in enough different spots to allow resilience. No decrease in population density in new/recolonised critical habitat (for

¹⁰ UNEP/MAP 2014. Working document on Common Indicators for the Mediterranean. Integrated Correspondence Groups of GES and Targets Meeting, Athens (Greece), 17-19 February 2014, UNEP(DEPI)/MED WG.390/3

¹¹ UNEP/MAP 2014. Working document on Common Indicators for the Mediterranean. Integrated Correspondence Groups of GES and Targets Meeting, Athens (Greece), 17-19 February 2014, UNEP(DEPI)/MED WG.390/3

	Good Environmental Status defined as: Population density allows to achieve and maintain a favourable conservation status	recovered populations).
	Operational Objective: Population condition of selected species is maintained <i>Common Indicator¹²: Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates)</i> Good Environmental Status defined as: Species populations are in good conditions: Natural levels of breeding success and acceptable levels of survival of young and adult birds.	Populations of all taxa, particularly those with IUCN threatened status are maintained in long term following the indication of population models. Incidental catch mortality is at negligible levels, particularly for species with IUCN threatened status.

4. Competent Authorities

Policy	Competent Authority
MSFD	Office of the Prime Minister (delegation of technical implementation to the Malta Environment and Planning Authority)
Birds Directive	Wild Birds Regulation Unit
Barcelona Convention	Malta Environment and Planning Authority

¹² UNEP/MAP 2014. Working document on Common Indicators for the Mediterranean. Integrated Correspondence Groups of GES and Targets Meeting, Athens (Greece), 17-19 February 2014, UNEP(DEPI)/MED WG.390/3

5. Spatial Extent of monitoring requirements

Policy	Extent of marine waters
MSFD	Extent of waters to be monitored depends on relevance and established GES and targets.
Birds Directive	Limited to terrestrial area
Barcelona Convention	Regional

6. Monitoring Approach

This monitoring factsheet includes five monitoring subprogrammes listed hereunder:

Monitoring sub-programme	Title	Monitoring Purpose
1	Mobile species – seabirds – breeding distribution and abundance	State
2	Mobile species – seabirds - population characteristics	State
3	Mobile species – seabirds - distributional range	State
4	Mobile species – seabirds – incidental mortality/injury rates from fisheries	Impact
5	Information on relevant anthropogenic activities	Activity

The monitoring programme focuses on the assessment of the breeding distribution and abundance of breeding/wintering seabirds in Malta, as well as assessment of demographic characteristics for species with relatively accessible nests. Monitoring at sea as per monitoring sub-programme 3 will only be undertaken in conjunction with monitoring of marine reptiles and marine mammals.

The monitoring programme also includes assessment of interactions with anthropogenic activities for selected species.

The methodologies outlined in this monitoring programme need to be verified through regional cooperation. Furthermore, monitoring processes as described in this factsheet, including monitoring areas, are to be updated following the outcome of the EU LIFE+ Malta Seabird Project which project is employing a variety of

standardised research protocols and latest tracking technology to gain a comprehensive picture of key areas of importance to the study species.

6.1. Selection of species

Selection of species for monitoring is based on the reporting requirements of the Birds Directive pursuant to which information on all regularly occurring breeding species and on all regularly occurring wintering waterbirds should be reported. Within this context, selected species grouped in accordance with the functional groups defined by the MSFD Commission Staff Working Paper¹³ are listed hereunder:

Offshore-feeding seabirds breeding in Malta:

- i. *Calonectris diomedea* (Scopoli's Shearwater)
- ii. *Puffinus yelkouan* (Yelkouan Shearwater)
- iii. *Hydrobates pelagicus* (European storm-petrel)

Inshore-feeding seabirds breeding in Malta:

- iv. *Larus michahellis* (Yellow-legged gull)

In addition to the above, there is a limited number of inshore-feeding species constituting irregular breeding/wintering birds in Malta. These species, which are generally associated with coastal wetlands, are also being considered for the purposes of this monitoring factsheet:

Inshore-feeding water-birds¹⁴:

- v. *Gallinula chloropus* (Moorhen)
- vi. *Tachybaptus ruficollis* (Little Grebe)¹⁵
- vii. *Fulica atra* (Common Coot)¹⁶

¹³ Commission Staff Working Paper: Relationship between the initial assessment of marine waters and the criteria for good environmental status. SEC(2011)1255 final

¹⁴ Other water-bird species occur in Malta including (i) *Charadrius dubius* (Little Ringed Plover) and *Acrocephalus scirpaceus* (Reed Warbler), regular breeders which although breed in coastal wetlands are also associated with freshwater bodies and are hence not being included for the purposes of seabird monitoring; (ii) *Ixobrychus minutus minutus* (little bittern) for which Malta has only two breeding records so far and *Egretta garzetta* (little egret) of which recent breeding was associated with the presence of aviaries.

¹⁵ The Little Grebe is a new breeder, which first started to breed in Malta in 2006.

¹⁶ The Common Coot is a wintering species in Malta

7. Assessment of status

Status of individual bird species and functional groups as defined in the MSFD Commission Staff Working Paper¹⁷ is based on trends in:

- breeding distribution and range size,
- breeding population size;
- breeding success (for *Puffinus yelkouan* and *Calonectris diomedea* only)

Stable or increasing trends in these parameters would be indicative of 'Good Status'.

With reference to MSFD target "*Efforts are undertaken to control the population of the yellow-legged gull on the islet of Filfla*", trends in breeding population size of *Larus michahellis* and *Hydrobates pelagicus* on Filfla will be assessed with a view to verify interactions between the two species. The need for management measures to control the population of the yellow-legged gull will be evaluated on the basis of long-term data of the two species' populations on the island.

¹⁷ Commission Staff Working Paper: Relationship between the initial assessment of marine waters and the criteria for good environmental status. SEC(2011)1255 final

8. Monitoring Sub-Programme 1: *Mobile species – seabirds – breeding distribution and abundance*

8.1. Monitoring Parameters

The monitoring parameters for selected seabird and waterbird species are listed in Table 1. Definitions of relevance to the implementation of this monitoring sub-programme are listed hereunder:

- Population size is defined as the number of individuals present in a subjectively designated geographic range. For seabirds, population size is measured in 'breeding pairs'

Table 1: Indicators and parameters for breeding distribution and abundance to be monitored per selected species

Species	Indicator	Parameter	Policy		
			BD	MSFD	EcAp
<i>Calonectris diomedea</i> ; <i>Puffinus yelkouan</i> ; <i>Hydrobates pelagicus</i>	Species Distributional Range	Distribution of breeding areas including: - location of breeding colonies on the coast - Breeding distribution map and range size: Map plotted on 1kmX1km ETRS grid showing breeding occurrence (presence/absence)	✓	✓	
	Population Abundance	Number of breeding pairs	✓	✓	
<i>Larus michahellis</i>	Species Distributional Range	Distribution of breeding areas including: - location of breeding colonies on the coast - Breeding distribution map and range size: Map plotted on 1kmX1km ETRS grid showing breeding occurrence (presence/absence)	✓	✓	
	Population Abundance	Number of breeding pairs on a National scale	✓	✓	
		Number of breeding pairs on Filfa		✓	

Species	Indicator	Parameter	Policy		
			BD	MSFD	EcAp
<i>Gallinula chloropus</i> ; <i>Tachybaptus ruficollis</i> ;	Species Distributional Range	Distribution of breeding areas: Breeding distribution map and range size: Map plotted on 1kmX1km ETRS grid showing breeding occurrence (presence/absence)	✓	✓	
	Population Abundance	Number of breeding pairs	✓	✓	
<i>Fulica atra</i>	Population Abundance	Number of wintering individuals	✓	✓	

8.2. Monitoring methodologies

Methodologies for monitoring breeding seabird colonies should follow those stipulated in Walsh *et al.* (1995)¹⁸ as applied to the species under consideration.

In general, the location of the breeding population and the breeding population size are assessed through a visual census of the breeding population within selected coastal stretches. Breeding pairs or occupied nests within selected areas are counted. Exact estimates of the breeding population size may not be possible and this parameter can be reported as a range in population size. Breeding distribution maps are plotted in line with European Commission (2011)¹⁹.

For *Gallinula chloropus* and *Tachybaptus ruficollis*, localities used by the species for breeding purposes will be monitored with a view to count number of breeding pairs. For *Fulica atra* wintering individuals are counted in specific localities.

¹⁸ Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W., & Tasker, M.L. 1995. *Seabird monitoring handbook for Britain and Ireland*. Published by JNCC / RSPB / ITE / Seabird Group, Peterborough.

¹⁹ European Commission (2011) Assessment and reporting under Article 12 of the Birds Directive: Explanatory Notes & Guidelines for the period 2008-2012

8.3. Monitoring areas

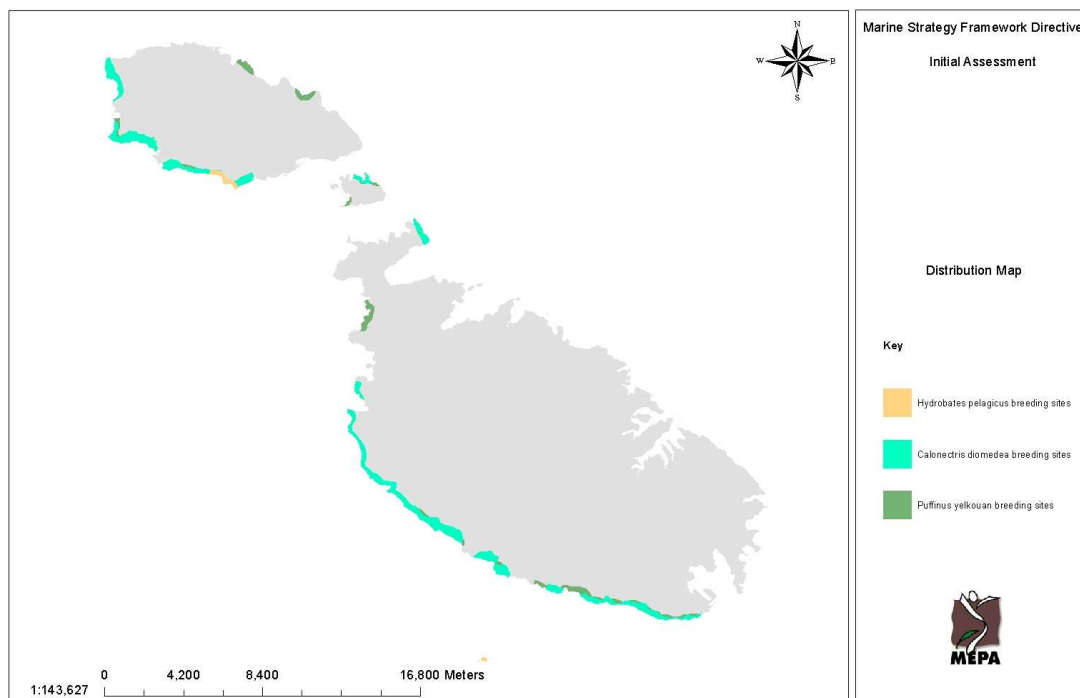
8.3.1. *Calonectris diomedea*, *Puffinus yelkouan*, *Hydrobates pelagicus* & *Larus michahellis*

The first monitoring episode will select sampling plots or sections of coastline to be monitored for each seabird species under consideration from areas known to harbour breeding colonies indicated in Figure 1 (except for *Larus michahellis*).

Selection of sampling plots/sections of coastline will be done on the basis of the guidance provided in Walsh *et al.* (1995)²⁰. Potential plots should be initially identified. These should ideally cover all breeding colonies, however in practice some may have to be excluded due to safety considerations, excessive disturbance to birds or otherwise locations which are difficult to study. Study-plots are then selected from the potential plots by non-subjective means through 'stratified random sampling' or 'systematic sampling' as described in Walsh *et al.* (1995)²¹.

The geographical position of the selected plots should be recorded with a view to be used in subsequent monitoring episodes.

Figure 1: Distributional Range of *Calonectris diomedea*, *Puffinus yelkouan* and *Hydrobates pelagicus* as reported in the MSFD Initial Assessment report on seabirds.



²⁰ Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W., & Tasker, M.L. 1995. *Seabird monitoring handbook for Britain and Ireland*. Published by JNCC / RSPB / ITE / Seabird Group, Peterborough.

²¹ Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W., & Tasker, M.L. 1995. *Seabird monitoring handbook for Britain and Ireland*. Published by JNCC / RSPB / ITE / Seabird Group, Peterborough.

8.3.2. *Gallinula chloropus*, *Tachybaptus ruficollis* & *Fulica atra*

Monitoring of the breeding population of *Gallinula chloropus* and *Tachybaptus ruficollis* and of the wintering individuals of *Fulica atra* shall be restricted to two managed coastal wetlands on Malta: Għadira and Simar.

8.4. Monitoring frequency

Indicators	Species	Monitoring Frequency
Breeding Distribution, Breeding Population Size	<i>Calonectris diomedea</i> , <i>Puffinus yelkouan</i> , <i>Hydrobates pelagicus</i> & <i>Larus michahellis</i>	Yearly (April-June) during the first monitoring year – monitoring frequency to be determined following the first monitoring year
	<i>Gallinula chloropus</i> , <i>Tachybaptus ruficollis</i> & <i>Fulica atra</i>	As needed

9. Monitoring Sub-Programme 2: *Mobile species – seabirds – population characteristics*

9.1. Monitoring Parameters

Table 2: Indicators and parameters for population characteristics to be monitored per selected species

Species	Indicator	Parameter	Policy		
			BD	MSFD	EcAp
<i>Calonectris diomedea</i> ; <i>Puffinus yelkouan</i>	Population demographic characteristics	Breeding success of seabird species as measured by hatching and fledging success: % rate of hatched eggs and % hatched eggs successfully fledged		✓	

9.2. Monitoring methodologies

Monitoring of occupied nests is undertaken with a view to determine the number of hatched eggs and the number of hatched eggs successfully fledged.

9.3. Monitoring areas

Monitoring areas are described in Section 8.3.1.

9.4. Monitoring frequency

Indicators	Species	Monitoring Frequency
Breeding Success	<i>Calonectris diomedea</i> , <i>Puffinus yelkouan</i>	Yearly (April-June) during first monitoring year – monitoring frequency to be determined following the first monitoring year

10. Monitoring Sub-Programme 3: *Mobile species – seabirds – Distributional Range*

10.1. Monitoring Parameters

The monitoring parameters for seabirds in terms of distributional range are listed in Table 3. Definitions of relevance to the implementation of this monitoring sub-programme are listed hereunder:

- Distributional Range of a species is the outer limits or the overall area in which a species is found at present. It can be considered as an envelope within which areas actually occupied occur.

Table 3: Indicators and parameters for distributional range

Species	Indicator	Parameter	Policy		
			BD	MSFD	EcAp
<i>Calonectris diomedea</i> ; <i>Puffinus yelkouan</i> ; <i>Hydrobates pelagicus</i> ; <i>Larus michahellis</i>	Species Distributional Range	Range maps on 1kmX1km ETRS grid	✓	✓	

10.2. Monitoring methodologies

Methodologies for monitoring breeding seabirds at sea should follow those used by the European Seabirds at Sea Database group (ESAS) as outlined in Tasker *et al.* (1984)²² and reviewed in Camphuysen *et al.* (2004)²³. A general description extracted from Camphuysen (2004)²⁴ is included below. This methodology is subject to revision following the outcome of the EU LIFE+ Malta Seabird Project which is

²² Tasker, M. L., Jones, P. H., Dixon, T. J. and Blake, B. F. (1984) Counting seabirds at sea from ships: a review of methods employed and a suggestion for a standardized approach. *Auk*, 101, 567-577.

²³ Camphuysen, K. J., Fox, A. D., Leopold, M. F. and Petersen, I. K. (2004) Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K.: a comparison of ship and aerial sampling methods for marine birds, and their applicability to offshore wind farm assessments (PDF, 2.7 mb), NIOZ report to COWRIE (BAM – 02-2002), Texel, 37pp.

²⁴ Camphuysen, K. J., Fox, A. D., Leopold, M. F. and Petersen, I. K. (2004) Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K.: a comparison of ship and aerial sampling methods for marine birds, and their applicability to offshore wind farm assessments (PDF, 2.7 mb), NIOZ report to COWRIE (BAM – 02-2002), Texel, 37pp.

employing a variety of standardised research protocols and latest tracking technology to gain a comprehensive picture of key areas of importance to the study species²⁵.

- Linear transects are conducted by qualified observers on dedicated ships. The method involves a 300m wide band or strip-transect operated on one side or on each side of the ship²⁶, at 5 or 10 minute intervals, in a continuous series to sample short stretches of water with known surface area and known location. For each time-interval a central geographical position is recorded.
- The 300m transect is subdivided into narrower distance strata as follows: A = 0-50m away from the ship; B = 50-100m; C = 100-200m, D = 200-300m and E=>300m).
- All birds within 300m perpendicular to the ship's trackline are identified and counted. Data collected includes species, counts and behaviour of birds (feeding/resting). Population density estimates are calculated as per Camphuysen (2004)²⁷.
- Data collected from monitoring at sea is combined with monitoring data for breeding population (Section 8) to determine distributional range and create range maps on 1kmX1km ETRS grid.

10.3. Monitoring stations/areas

Monitoring at sea will only be undertaken in conjunction with monitoring of marine reptiles and marine mammals and is carried out within the 25 nautical mile Fisheries Management Zone.

10.4. Monitoring frequency

Monitoring frequency indicated hereunder is subject to revision following the initial monitoring episodes.

Indicators	Species	Monitoring Frequency
Species Distributional Range	<i>Calonectris diomedea</i> , <i>Puffinus yelkouan</i> , <i>Hydrobates pelagicus</i> & <i>Larus michahellis</i>	6-yearly (summer period)

²⁵ <http://maltaseabirdproject.wordpress.com/>

²⁶ Method employed depends on sighting conditions

²⁷ Camphuysen, K. J., Fox, A. D., Leopold, M. F. and Petersen, I. K. (2004) Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K.: a comparison of ship and aerial sampling methods for marine birds, and their applicability to offshore wind farm assessments (PDF, 2.7 mb), NIOZ report to COWRIE (BAM – 02-2002), Texel, 37pp.

11. Monitoring Sub-Programme 4: *Mobile species – seabirds – incidental mortality/injury rates from fisheries*

11.1. Monitoring Parameters

Table 4: Indicators and parameters for incidental mortality

Species	Indicator	Parameter	Policy		
			BD	MSFD	EcAp
<i>Calonectris diomedea</i>	Mortality rate from by-catch	Number of birds per number of hooks per duration (no of days; soaking time) for drifting long-lines; data to be aggregated per year		✓	

11.2. Monitoring methodologies

Data on by-catch from drifting long-lines targeting large pelagic fish will be collected from quarterly trips during the respective fishing seasons, following Malta's yearly National Programme for Fisheries Data Collection, based on the EU's Data Collection – Multi Annual Programme. The collected data will be raised to the drifting long-line fleet population level. The Catch per Unit Effort (catch per 1000 hooks per hour) can be estimated from such data.

11.3. Monitoring frequency

Indicators	Species	Monitoring Frequency
Mortality rate from by-catch	<i>Calonectris diomedea</i>	Other: frequency depends on occurrence of seabird by-catch during the relevant fishing season; data on by-catch will be aggregated to report number of by-catch per year.

12. Monitoring Sub-Programme 5: *Information on relevant anthropogenic activities*

Information is collected on activities with potential impacts on seabirds, specifically:

Fisheries:

- Fishing intensity for surface and bottom long-lining with a view to determine Catch per Unit Effort (CPUE) of seabirds in drifting longlines and to maintain information on the extent of potential pressures on seabirds from fisheries.

Bunkering activities:

- Number of bunkering activities per month in bunkering areas 1 and 6 located in proximity of breeding colonies of *Puffinus yelkouan* with a view to determine the extent (if any) of the pressure which could be caused by such operations.

13. Links to monitoring processes

Monitoring in terms of this factsheet is linked with monitoring or related processes as follows:

- Monitoring at sea is linked to monitoring at sea for Reptiles and Marine Mammals.
- Monitoring of by-catch is linked to monitoring pursuant to Council Regulation 199/2008 concerning the establishment of a '*Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy*' and Commission Decision 2008/949/EC outlining a multiannual Community programme pursuant to Council Regulation 199/2008.

14. Quality Assurance & Quality Control

Standard methodologies in particular those listed hereunder should be taken into consideration when monitoring seabird populations.

- Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W., & Tasker, M.L. 1995. *Seabird monitoring handbook for Britain and Ireland*. Published by JNCC / RSPB / ITE / Seabird Group, Peterborough.
- Tasker, M. L., Jones, P. H., Dixon, T. J. and Blake, B. F. (1984) Counting seabirds at sea from ships: a review of methods employed and a suggestion for a standardized approach. *Auk*, 101, 567-577.
- Camphuysen, K. J., Fox, A. D., Leopold, M. F. and Petersen, I. K. (2004) Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K.: a comparison of ship and aerial sampling methods for marine birds, and their applicability to offshore wind farm assessments (PDF, 2.7 mb), NIOZ report to COWRIE (BAM – 02-2002), Texel, 37pp.
- Voříšek, P., Klvaňová, A., Wotton, S. & Gregory, R.D. (2008). *A best practice guide for wild bird monitoring schemes*. CSO/RSPB.
- <http://www.ebcc.info/index.php?ID=559>

Furthermore observers are to be well-trained both in terms of their identification skills as well as in their capacity to deploy the required survey technique.

15. Data collection, storage and dissemination

All data should be collected and stored in accordance with the INSPIRE Technical Specifications listed in this section and/or any other relevant INSPIRE standard as identified through the Marine Pilot Project²⁸. Processed data to be uploaded in a geoportal.

- D2.8.III.19 Data Specification on Species Distribution – Technical Guidelines²⁹

16. Responsible organisations

Monitoring sub-progreamme	Species/activity	Responsible authorities
Breeding Distribution, Breeding Population Size	<i>Hydrobates pelagicus</i> & <i>Larus michahellis</i> , <i>Gallinula chloropus</i> , <i>Tachybaptus ruficollis</i> & <i>Fulica atra</i>	WBRU
Breeding Success	<i>Calonectris diomedea</i> , <i>Puffinus yelkouan</i>	WBRU, MEPA
Species Distributional Range (including monitoring at sea)	<i>Calonectris diomedea</i> , <i>Puffinus yelkouan</i> , <i>Hydrobates pelagicus</i> & <i>Larus michahellis</i>	To be determined
Mortality rate from by-catch	<i>Calonectris diomedea</i>	Fisheries
Activities	Fishing effort of long-line fishing	Fisheries
	Bunkering Activities	Transport Malta

17. Gaps and Research Needs

Gaps	Plans to address gaps
Transboundary impacts on seabirds are as yet not known.	Implementation of this monitoring factsheet, while focusing on collection of data at a local scale, could also help in identifying potential impacts of transboundary nature.

²⁸ <https://circabc.europa.eu/w/browse/bc33dff1-0f8c-467a-8382-7724c5f79d45>

²⁹ <http://inspire.ec.europa.eu/index.cfm/pageid/2>

18. Main Sources

- AAE Consortium (ADI Associates Ltd, Ecoserv Ltd and E Cubed Consultants). 2014. Long Term Monitoring Strategy for the Marine Environment of the Maltese Islands under the Marine Strategy Framework Directive. Service Contract for the development of a long-term monitoring strategy for the marine environment, a social and economic analysis of the use of marine waters and costs of degradation, and baseline sediment survey in inland waters (MEPA tender ref: CT3048/2012). ERDF156 - Developing national environmental monitoring infrastructure and capacity. Malta, unpublished report, 252 pp.
- AAE Consortium (ADI Associates Ltd, Ecoserv Ltd and E Cubed Consultants). 2014. Long Term Monitoring Programme for the Marine Environment of the Maltese Islands under the Marine Strategy Framework Directive. Service Contract for the development of a long-term monitoring strategy for the marine environment, a social and economic analysis of the use of marine waters and costs of degradation, and baseline sediment survey in inland waters (MEPA tender ref: CT3048/2012). ERDF156 - Developing national environmental monitoring infrastructure and capacity. Malta, unpublished report, 346 pp.
- UNEP/MAP (2014) Monitoring Guidance on Ecological Objective 01: Biodiversity. UNEP(DEPI)/MED WG.400/4