



Department of the Environment,
Sustainability, Climate Change
and Heritage

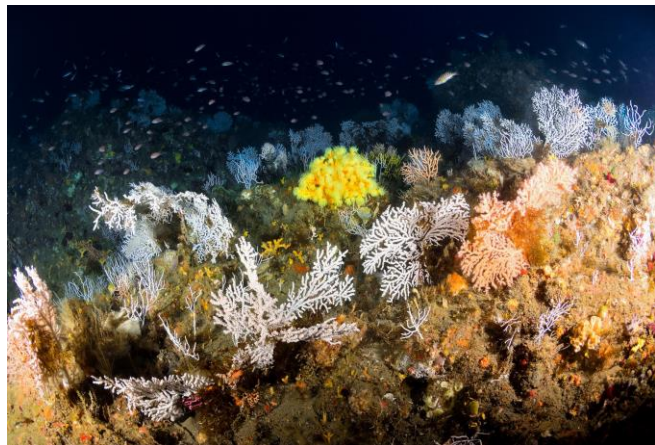
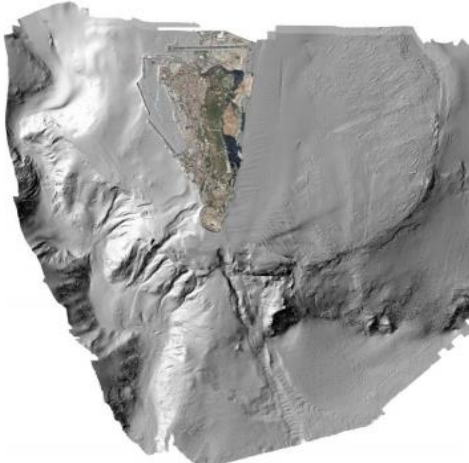
HM Government of Gibraltar

MARINE STRATEGY FRAMEWORK DIRECTIVE

**UPDATED ASSESSMENT AND GOOD ENVIRONMENTAL STATUS FOR
BRITISH GIBRALTAR TERRITORIAL WATERS**

FINAL REPORT

September 2020



Front cover: Top left: High-resolution bathymetry of BGTW. Top right: Deep water reef habitat in Europa Reef (Southern Waters of Gibraltar SAC/SPA) ©Shaun Yeo. Bottom right: Scopoli's Shearwater *Calonectris diomedea* feeding ©Nicholas Ferrary. Bottom left: Loggerhead turtle *Caretta caretta* migrating through BGTW© EPRU.

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1. INTRODUCTION

1.1 Context

The Marine Strategy Regulations 2011 transpose the EU Marine Strategy Framework Directive (MSFD)¹ and require Her Majesty's Government of Gibraltar (HMGoG) to implement the necessary measures to achieve or maintain Good Environmental Status (GES) for British Gibraltar Territorial Waters (BGTW) by 2020. This document sets out Gibraltar's updated assessment building on the 1st assessment published in 2012. It includes an analysis of progress made towards the achievement of GES for BGTW and sets out revised targets that will be used over the next six years for the different descriptors that define GES.

The Marine Strategy Regulations 2011 form part of a series of national legislative instruments that protect the marine environment in Gibraltar. Other relevant legislation includes the Nature Protection Act (1991), Public Health (Pollution of the Aquatic Environment) Rules 1994, Public Health (Water Framework Rules) 2004, Environment (Quality of Bathing Water Regulations (2009) and the Marine Protection Regulations (2014). Furthermore, the Maritime Spatial Planning (MSP) Directive² has been transposed in Gibraltar by means of the Environment (Maritime Spatial Planning) Regulations 2016. A revised maritime spatial plan (MSP) will be established in BGTW before the 31st March 2021 and reviewed at least every 10 years. Work on the MSP is ongoing and this updated assessment takes into account some of the latest policies adopted within BGTW.

Within coastal waters, there is an overlap between the scope of the Water Framework Directive (WFD)³ and the MSFD. Maritime Spatial Plans are also particularly relevant to nearshore coastal areas. Their aim is to ensure that human activities at sea take place in an efficient, safe and sustainable way. This overlap is factored into the MSFD assessment which recognises the common frameworks established under EU Directives including the Habitats and Birds Directives. For example, the WFD informs the MSFD through the reporting of coastal water quality data whereas the MSFD assessment is informing the Maritime Spatial Plan for BGTW.

BGTW are located within the Western Mediterranean region as characterised by the MSFD. This marine region is also covered by the Barcelona Convention for the Protection of the Mediterranean Sea and subsequent Protocols therein⁴. Although Gibraltar is not yet formally a signatory of the Barcelona Convention, HMGoG continues to actively pursue becoming a Contracting Party through the UK using established diplomatic channels. In doing so, the necessary legislative powers to transpose the Barcelona Convention in Gibraltar law have been drafted and are ready for enactment. Notwithstanding, efforts are being made to increase involvement, cooperation and alignment with policies and methodologies identified at a regional level as demonstrated in this latest assessment.

The Initial Assessment (Article 8), determination of GES (Article 9) and setting of environmental targets (Article 10) were initially completed in 2012 and contained within the Gibraltar Initial Assessment Report⁵. This was based upon the criteria for GES laid out by the EU Commission in 2010⁶. Since then, criteria for GES have been updated (2017)⁷ and are expected by the European Commission to be used, or at least considered, in the latest MSFD assessment update.

According to Article 17 of the MSFD, the information reported on articles 8, 9 and 10 in the first cycle of the MSFD (2012) needs to be updated in 2018, taking account of progress made, including:

¹ Available at: <https://eur-lex.europa.eu> [Accessed 18/07/19]

² Available at: <https://publications.europa.eu> [Accessed 18/07/2019]

³ Available at: <https://eur-lex.europa.eu> [Accessed 18/07/19]

⁴ Coordinated by UNEP <http://web.unep.org/unespmap/>

⁵ Department of Environment, Heritage and Climate Change (DEHCC) (2012) Initial Assessment and Proposals for Good Environmental Status in British Gibraltar Territorial Waters. Available at: <https://www.gibraltar.gov.gi> [Accessed 18/07/19].

⁶ 2010/477/EU: Commission Decision of 1 September 2010 on criteria and methodological standards on good Environmental status of marine waters (notified under document C (2010) 5956). Available at: <https://eur-lex.europa.eu> [Accessed 18/07/19]

⁷ Commission Decision (EU) 2017/848 of 17 May 2017 laying down criteria and methodological standards on good environmental status of marine waters and specifications and standardised methods for monitoring and assessment, and repealing Decision 2010/477/EU. Available at: <https://eur-lex.europa.eu> [Accessed 01/04/2019]

- a) The outcomes of the European Commission's assessment of the 2012 reports;
- b) Establishment of monitoring programmes (Article 11) in 2014 which aim, inter alia, to collect data and information to assess progress towards achieving GES and targets;
- c) New 2017 GES criteria and methodological standards;
- d) Commission Directive (EU) 2017/845 which amends the MSFD by replacing its Annex III;
- e) Relevant assessments undertaken under other EU policies and international conventions; and
- f) Advancements in scientific and technical knowledge and in methods for assessment.

Box 1 provides an overview of key terms introduced by the MSFD and used throughout this report for ease of reference.

Box 1 - Key terms used in this report.

- **Good Environmental Status (GES):** environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas, which are clean, healthy and productive, and the use of the marine environment is sustainable.
- **Descriptor:** qualitative component of the GES; assists in assessing progress against GES. There are 11 different descriptors used to describe GES:
 - o D1 - Biological diversity
 - o D2 - Non-indigenous species
 - o D3 - Commercially-exploited fish and shellfish
 - o D4 - Food webs (cetaceans, seals, birds, fish and pelagic habitats)
 - o D5 - Eutrophication
 - o D6 - Sea-floor integrity (pelagic habitats and benthic habitats)
 - o D7 - Hydrographical conditions
 - o D8 - Contaminants
 - o D9 - Contaminants in fish and other seafood for human consumption
 - o D10 - Litter
 - o D11 - Introduction of energy, including underwater noise
- **Criteria:** a standard to be used by the MS to determine the GES of their marine waters and to guide their assessments associated with the MSFD.
 - o *Primary Criteria* - criteria used to ensure consistency across the Union, which must be looked at.
 - o *Secondary Criteria* - flexible criteria, where its use should be decided by MS, where necessary, to complement a primary criterion or when, for a particular criterion, the marine environment is at risk of not achieving or not maintaining GES.
- **Standard Methodologies:** set out the geographical scales for assessment and how the criteria should be used, ensuring consistency and allowing for comparison between marine regions, or sub-regions, to be made.
- **Target:** desired goal based upon the criteria for GES laid out by the EU Commission in 2010, updated every six years, as required.
- **Indicators:** metrics used to assess progress towards achieving GES targets.
- **Monitoring Programme:** monitoring actions used to monitor progress against targets and indicators. In Gibraltar, the MSFD Monitoring Programme was published in 2015.
- **Programme of Measures:** actions defined as required to achieve GES. In Gibraltar, the Programme of Measures was published in 2017.

1.2 Consultation

In keeping with the requirements of the MSFD, the Department of the Environment, Sustainability, Climate Change and Heritage (DESCCH) gathered feedback on the Assessment Update for BGTW with a focus on the following questions:

- Does the Assessment Update for BGTW provide an accurate reflection of the state of BGTW?
- To what extent are the proposed new criteria and associated targets sufficient to guide progress towards achievement of GES?
- To what extent are the proposed targets sufficient to achieve GES?
- Where gaps have been identified do you have suggestions on how these could be filled?

The consultation deadline ended on the **4th September 2020**.

Copies of responses received can be made available to the public on request unless the consultee requested that their submission not be disclosed.

2. METHODOLOGY

2.1 Assessment Requirements

The MSFD Guidance⁸ requires Member States to complete the assessment updates in relation to three different elements:

- a) An analysis of the predominant essential features and characteristics, and the **current environmental status of their marine waters** (Article 8(1a)). This analysis should be based on the indicative list of characteristics set out in Table 1 of the revised Annex III of the Directive. The analysis should cover the physical and chemical features, habitat types, biological features and hydro-morphology;
- b) An **analysis of the predominant pressures and impacts** including human activity on the environmental status of those waters (Article 8(1b)) based on the list of elements in Table 2 of the revised Annex III of the Directive (including the updated list of pressures in Table 2a and the new list of uses and human activities in Table 2b); and
- c) An **economic and social analysis of the use of the marine waters and of the cost of degradation of the marine environment** (Article 8(1c)) based on the list of uses and human activities marked with an * in Table 2b of the revised Annex III.

The approach and data sources used in this report are further described in Sections 2.2, 2.3 and 2.4.

2.2 Current Environmental Status of BGTW: Methodology

For each of the 11 MSFD descriptors, the assessment update relies on new data and/or sources of information identified in consultation with relevant stakeholders, including information collated for reporting requirements under Gibraltar's different surveillance monitoring programmes such as the latest Gibraltar River Basin Management Plan (RBMP) 2015 – 2021⁹, Habitats Directive Article 17 Report and the Birds Directive Article 12 report amongst others.

In addition, the assessment update has considered regional sources of data including the Mediterranean 2017 Quality Status Report¹⁰ as well as publicly available research literature and data. This aforementioned report assesses the general status of the Mediterranean Sea Ecosystem and the achievement of GES developed by the Mediterranean Action Plan for the Barcelona Convention area.

Under each of the descriptor components / sub-components, the following structure has been used:

- a) Scope of the assessment and criteria used, justifying components and criteria assessed as well as data sources used to inform the assessment (also referred to as indicators);
- b) Main pressures considered to affect each descriptor component / sub-component;
- c) Results from the MSFD Assessment structured around relevant criteria used; and
- d) Overall Assessment and Perspective for 2018 - 2024.






















Following the UK approach to GES classification, the overall assessment has been tabulated as shown in Table 2-1 and is presented in Section 4.

⁸ Reporting on the 2018 update of articles 8, 9 & 10 for the MSFD. MSFD Guidance Document 14. Available at: <https://cdr.eionet.europa.eu>

⁹ Available at: <https://www.gibraltar.gov.gi> [Accessed on 15/07/19]

¹⁰ Available at: <https://www.medqsr.org> [Accessed on 15/07/19]

Table 2-1: Format used to present GES assessment for each descriptor component / subcomponent.

Qualitative descriptor for determining GES	High level objective for achieving GES, as defined in the MSFD For some assessments more than one qualitative descriptor applies.																
Current Environmental Status (2019)	<p>Summary of the assessment findings for the descriptor component / subcomponent and the trends towards achieving GES using the following key:</p> <table border="0"> <tr> <td></td> <td>GES achieved</td> <td></td> <td>Improvement observed in relation to the 2012 assessment</td> </tr> <tr> <td></td> <td>GES partially achieved</td> <td></td> <td>No change observed in relation to the 2012 assessment</td> </tr> <tr> <td></td> <td>GES not achieved</td> <td></td> <td></td> </tr> <tr> <td></td> <td>GES uncertain</td> <td></td> <td>Deterioration observed in relation to the 2012 assessment</td> </tr> </table>		GES achieved		Improvement observed in relation to the 2012 assessment		GES partially achieved		No change observed in relation to the 2012 assessment		GES not achieved				GES uncertain		Deterioration observed in relation to the 2012 assessment
	GES achieved		Improvement observed in relation to the 2012 assessment														
	GES partially achieved		No change observed in relation to the 2012 assessment														
	GES not achieved																
	GES uncertain		Deterioration observed in relation to the 2012 assessment														
Mediterranean GES Targets	Defined in the Mediterranean 2017 Quality Status Report and categorised by data sources / indicators used.																
Gibraltar GES Targets	Revised from those initially defined in 2012 and given a reference number to facilitate future assessments.																
Criteria for measuring progress towards GES in future	Sets out proposed criteria and data sources (used for indicators) to be used in future assessments building on the Monitoring Programme established in 2015.																
Measures	Listed on the basis of those defined in the Programme of Measures (2017) and given a reference number to facilitate future assessments.																
Going forward	Key priorities in terms of improving knowledge / understanding for a given descriptor component / sub-component and its assessment or anticipated changes that may affect future assessments.																

2.3 Analysis of Predominant Pressures and Impacts in BGTW: Methodology

An overview of main pressures is provided in the assessment of the current environmental status of BGTW presented in Section 4 for each of the components and sub-components that comprise the 11 MSFD descriptors. The economic and social analysis of BGTW presented in Section 3, identifies marine uses / activities relevant to Gibraltar and provides a high-level description of the pressures that can be associated with them.

It should be noted that pressures and impacts are largely described qualitatively. Work on including quantitative thresholds to give a more robust assessment of GES is also being pursued and will be elaborated in the revised Programme of Measures.

2.4 Economic and Social Analysis of BGTW: Methodology

The economic and social analysis presented in Section 3 follows the MSFD Guidance published by the European Commission in 2018¹¹. This guidance sets out steps for the economic and social analysis to be conducted as part of the initial assessment. The choice of approach has taken into account data availability and consolidates current knowledge on marine uses and human activities in Gibraltar. The MSFD requires the analysis to comprise two different elements: the use of marine waters and the cost of degradation.

¹¹ European Commission (2018) Economic and social analysis for the initial assessment for the Marine Strategy Framework Directive. DG Environment, Brussels. pp 66 (MSFD Guidance Document 1)

2.4.1 Economic and Social Analysis of the Use of Marine Waters: Methodology

The MSFD Guidance describes two potential approaches with different starting points, ambition levels and data requirements although other approaches may be considered.

- a) **Ecosystem services approach.** This approach takes the ecosystem services¹² obtained from marine waters as a starting point and comprises the following steps:
- Identify ecosystem services of the marine areas in cooperation with the analysis of status (Art. 8.1 (a) MSFD) and the analysis of pressures and impacts (Art. 8.1(b) MSFD);
 - Identify and if possible, quantify and value the welfare derived from the ecosystem services using different methods to estimate the use and non-use values of these services; and
 - Identify the drivers and pressures affecting the ecosystem services.

The ecosystem services approach requires a detailed assessment of the baseline condition of current ecosystem services associated with BGTW and quantification / valuation of their welfare, which can be subject to a high degree of uncertainty. In addition, significant data gaps exist at present that would limit the ability to provide quantitative and monetary estimates. However, given the growing adoption of the ecosystem services in European Policy¹³, identification of relevant ecosystem services in BGTW has been completed and appended to this report for future reference (Appendix 2).

- b) **Marine water accounts approach.** This approach requires the identification and quantification of the economic benefits derived from the economic sector's use of marine waters in terms of production value, intermediate consumption (goods bought from and sold to other businesses), value added (profits), number of employees (employment) and compensation of employees (salaries etc.). The approach also requires identifying and, if possible, quantifying impacts generated by these sectors (e.g. CO₂ emissions).

Given the insufficient socioeconomic baseline and availability of data for some of the indicators relevant to BGTW, this assessment follows a marine water accounts approach, comprising the following steps:

- Identification and description of each marine use / activity, reflecting on any changes that may have taken place within the last six years, current situation and future prospects;
- Qualitative or quantitative assessment of direct socioeconomic contribution of each marine use / activity, using the following indicators (where available):
 - o Gross Trading Profit (GTP) data¹⁴ given that the net contribution of marine uses to the Gross National Product of Gibraltar (Gross Value Added¹⁵) is not systematically recorded at present;
 - o Employment count (full-time jobs);
 - o Qualitative assessment of indirect benefits of each marine use / activity; and
 - o Qualitative description of the pressures caused by each marine use / activity.

Table 2-2 provides an overview of the categories of marine uses / human activity included in the analysis (see Section 3.2 below), in line with the MSFD requirements, as well as indicators used in the assessment of the direct / indirect socio-economic contribution of each marine use / activity.

¹² Ecosystem services are defined as goods and services – benefits – that the ecosystem provides to human beings.

¹³ Bouwma, I., Schleyer, C., Primmer, E., Winkler, K.J., Berry, P., Young, J., Carmen, E., Spulerova, J., Bezak, P., Preda, E., Vadineanu, A. (2018) Adoption of the ecosystem services concept in EU policies. *Ecosystem Services* 29 (B), 213 – 222. <https://doi.org/10.1016/j.ecoser.2017.02.014>

¹⁴ Adjusted for GDP purposes, i.e. before deduction of the consumption of fixed capital or depreciation and the accounting period used is a financial year

¹⁵ Gross value added is the difference between the sale price of a product and the total costs of production. To measure this, both the inputs and outputs of production need to be measured.

Table 2-2: Socio-economic analysis approach adopted for each category of marine use / human activity defined in the MSFD relevant to BGTW. ✓ Data available, X Insufficient data – data collection in progress.

Marine Use / Human Activity	Marine Water Accounts Approach				
	Benefits			Pressures and Impacts	
	GTP	Employment	Other data	Qualitative	Quantitative
Coastal defence and flood protection	X	X	Public expenditure	✓	X
Restructuring of seabed morphology	X	X	X	✓	X
Extraction of water	X	✓	Private and public expenditure and government revenue. OPEX and CAPEX for desalination plants	✓	X
Renewable energy generation	X	✓	X	✓	X
Transmission of electricity and communications	X	X	X	✓	X
Fish and shellfish harvesting (professional, recreational)	X	X	X	✓	X
Transport -infrastructure	✓	✓	Private and public expenditure and government revenue associated to transport infrastructure	✓	X
Transport - shipping	X	X	X	✓	X
Waste treatment and disposal – wastewater	X	X	OPEX and CAPEX for proposed plant and pumping stations	✓	X
Waste treatment and disposal – port waste	X	X	X	✓	X
Tourism and leisure infrastructure	X	X	X	✓	X
Tourism and leisure activities	X	X	X	✓	X
Research, survey and educational activities	X	X	X	✓	X

Given the gaps identified in the information / data collated, conclusions made by the analysis should be considered as a conservative interpretation of the socio-economic contribution of each marine use / activity. Planned improvements for future data gathering and to expand the scope of the assessment are also included at the end of each section.

2.4.2 Cost of Degradation: Methodology

The MSFD also requires the economic and social analysis of the cost of degradation¹⁶ for the marine environment and suggests three approaches:

- a) **Ecosystem Service Approach:** This approach requires the valuation (qualitative, quantitative or monetary) of ecosystem services calculated as the potential difference between ecosystem services (and associated benefits) when GES is achieved and the level of ecosystem level provision in the absence of measures to obtain GES (i.e. ecosystem service loss can be interpreted as the cost of degradation). The potential loss of ecosystem service benefits can later be compared to the cost of reaching MSFD targets when the programme of measures is specified.

The ecosystem services approach requires a detailed assessment of the baseline condition of current ecosystem services associated with BGTW and projections about their future condition in the MSFD scenario which can be subject to a high degree of uncertainty.

- b) **Thematic Approach:** This approach is based on estimating, qualitatively or quantitatively, present costs, expenses and loss of benefits related to the current degradation of the marine environment, including costs associated with expenditure for environmental protection and

¹⁶ To be measured qualitatively, quantitatively or in monetary terms. The guidance clarifies that describing the values qualitatively will in many circumstances be sufficient though it would normally be desirable to quantify or monetize the degradation where the data are available and sufficiently good.

prevention, abatement and transaction costs as well as opportunity costs (i.e. lost benefits for activities that suffer from environmental degradation).

The application of this approach requires socioeconomic data for marine uses / human activities including details on government expenditure on environmental protection and prevention, abatement and transaction costs.

- c) **Cost-based approach:** This approach is based on estimating the current cost of degradation of the marine environment by focusing only on incurred expenditures on measures currently implemented to prevent its degradation (i.e. revealed values). It is based on the assumption that current costs for measures to prevent environmental degradation would only have been made if the value obtained (environmental damage avoided) is higher than the cost of measures therefore current costs can be seen as a lower bound estimate for costs of degradation. It provides insight over the existing financing structure for the protection of the marine environment which can include both the private sector (e.g. investments made to comply with certain environmental requirements) and the public sector (e.g. investments, subsidies, monitoring programmes, etc.). In contrast with the two previous approaches, this approach does not include a reference condition and is not intended to present benefits of future measures to achieve MSFD. The application of this approach requires details on government expenditure on environmental protection and prevention.

In line with the approach followed in the UK MSFD assessment update¹⁷, an indicative cost of degradation is provided by comparing the "Business as Usual (BAU) Scenario" (expected state of BGTW by 2020 without the implementation of MSFD targets or measures) and "GES scenario" (in which MSFD GES targets are met for BGTW by 2020). The gap between BAU and GES is the "cost of degradation", which ideally is estimated by valuing the ecosystem services between these two scenarios (Ecosystem Service Approach described above). However, due to uncertainties associated with how the current measures will meet the GES targets, the costs of degradation are presented only indicatively in the final section (Section 5).

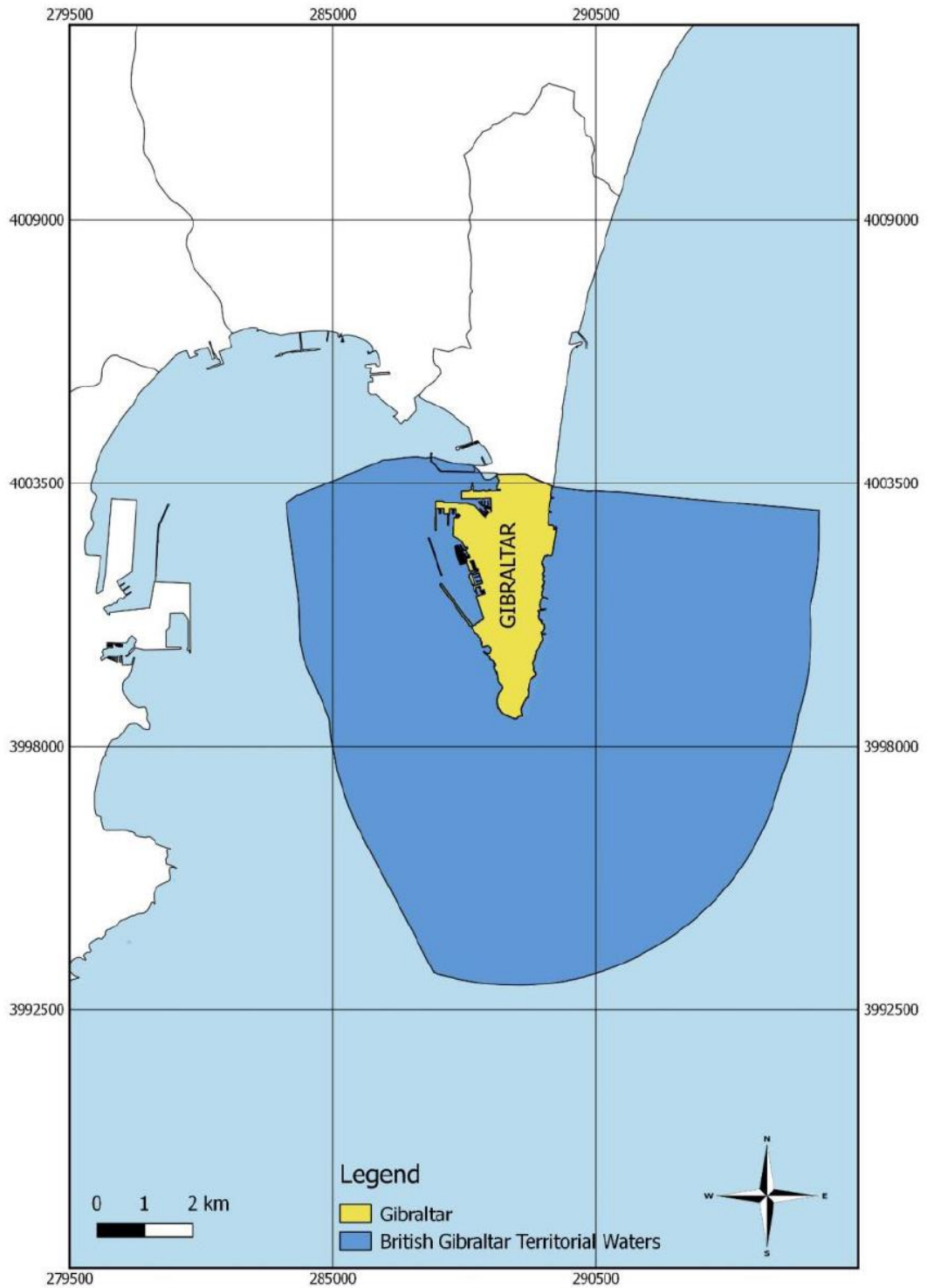
¹⁷ DEFRA (2019) Marine Strategy Part One: UK Updated Assessment and Good Environmental Status. Available at: <https://consult.defra.gov.uk> [Accessed 15/3/20].

3. BRITISH GIBRALTAR TERRITORIAL WATERS

3.1 Introduction

British Gibraltar Territorial Waters (BGTW) extend out to 3 nm to the East and South and along the median line to the West in the Bay of Gibraltar as depicted in Figure 3-1.

Figure 3-1: British Gibraltar Territorial Waters.



BGTW are recognised as an important marine area due to its rich diversity in species and habitats as well as its location within the wider migratory corridor of the Straits of Gibraltar. Sea cliffs, caves, reefs and sandy marine habitats all form part of the marine ecosystems found along and off the shores of Gibraltar. The abundance and richness of species are largely influenced by the strong currents and upwellings that are characteristic of the Straits of Gibraltar. Due to their strategic location between the Mediterranean Sea and Atlantic Ocean, a multitude of pelagic and predatory fish along with cetaceans frequent BGTW. A wide range of activities including shipping, recreational fishing and tourism take place in BGTW with shipping services fees¹⁸ estimated to account for 25% of Gibraltar's GDP. This section presents the economic and social analysis of BGTW which was lacking in the 2012 Initial Assessment.

3.2 Economic and Social Analysis of BGTW

Table 2b of the MSFD's Annex III lists a number of uses and human activities that have potential to affect the marine environment and that should be considered in MSFD Assessments. Those relevant to Gibraltar have been identified and analysed in Sections 3.2.1 - 3.2.17 below. Table 3-1 provides a summary of the MSFD uses and activities that need to be subject to the socioeconomic analysis and their overall socioeconomic contribution. A matrix showing how pressure categories can be related to uses and human activities is presented as Appendix 2.

Table 3-1: Socio-economic analysis results for each category of marine use / human activity. X No data available. Categories from Table 2b of the MSFD's Annex III subject to socioeconomic analysis.

Use / Activities relevant to BGTW	GTP	Employ.	Other data	Overall contribution
Coastal defence and flood protection	X	X	Expenditure between 2012 – 2019 £12,310,000	High
Restructuring of seabed morphology	X	X	Not available	Negligible
Extraction of water	X	60 FTE	- Increase in OPEX and CAPEX for sea water supply. And increase in OPEX but reduction of CAPEX in potable water supply. - Government expenditure in 2018/2019 - £6m - Estimated revenue in 2018/2019 - £28m	High
Renewable energy generation	X	1 FTE	Expenditure - £400,000	Negligible
Transmission of electricity and communications	X	X	Not available	Low
Fish and shellfish harvesting (professional, recreational)	X	X	- Max catches of 3,700 / year (recreational)	Low
Transport -infrastructure	95% increase	1,120 FTE	- Government expenditure in 2018/2019 - £8.4m - Estimated revenue in 2018/2019 - £7.54	High
Transport - shipping	X	X	Not available	High
Waste treatment and disposal – wastewater	X	40 FTE	- Increase in OPEX and reduction in CAPEX between 2012 – 2018 (sewage pumping)	High
Waste treatment and disposal – port waste	X	X	Not available	Low
Tourism and leisure infrastructure	X	X	- Approx. 10,000 visitors daily during high season. - Government expenditure in 2018/2019 - £24m	High
Tourism and leisure activities	X	X	- Number of cruise passengers has increased by 39% between 2012 and 2018.	High
Research, survey and educational activities	X	X	Not available	Moderate

¹⁸ See <https://www.gibraltarfinaance.gi> [Accessed on 15/10/19]

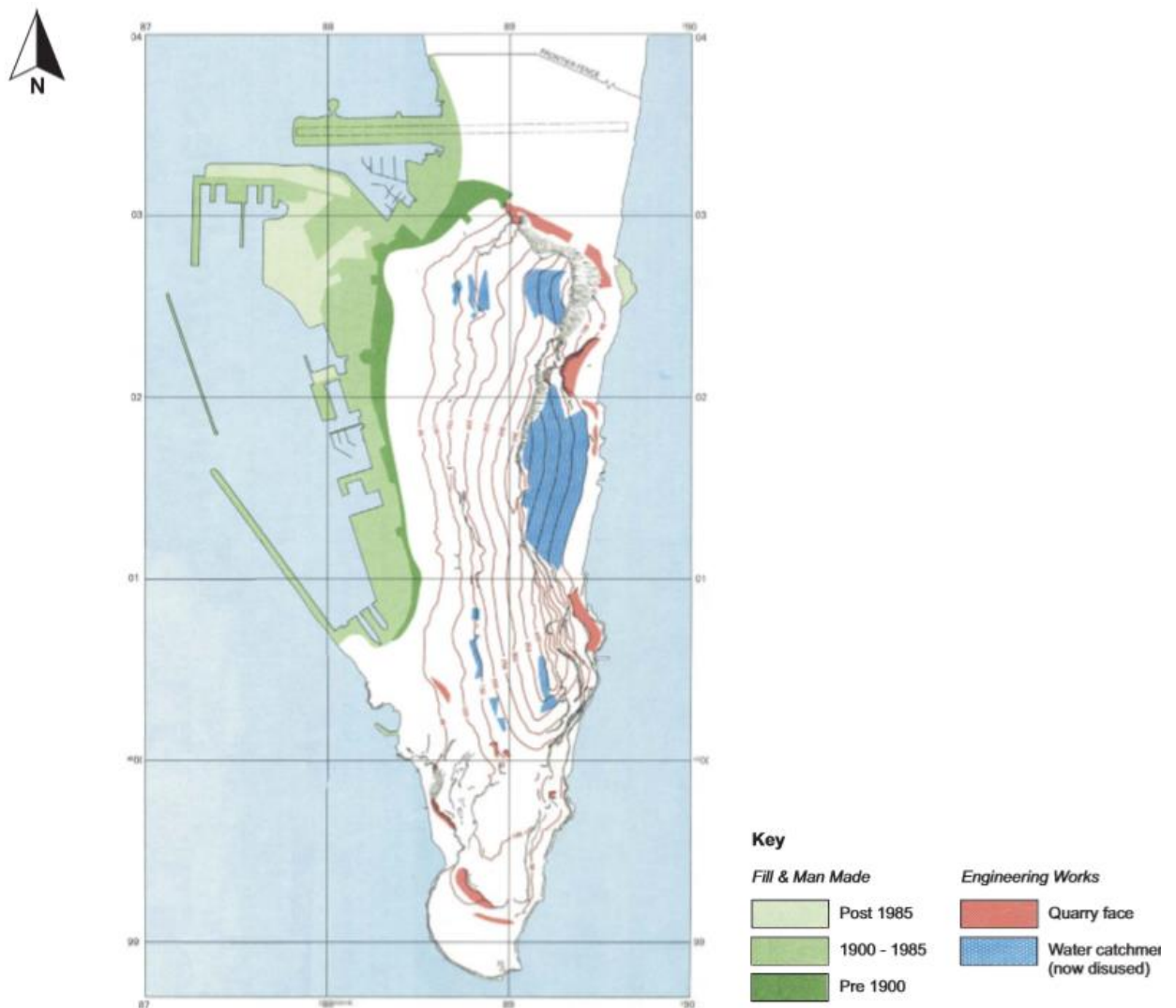
3.2.1 Reclaimed land

a) Reclaimed land - Background

Current use/activity:

Gibraltar has relied on land reclamation activities to facilitate urban development, growth and reduce pressures on the natural and built heritage on land. Reclaimed land currently comprises approximately one tenth of Gibraltar's total land area.

Figure 3-2: Man made modifications completed in Gibraltar up to 1991 (from Rose and Rosenbaum, 1991).



The last major reclamation works were completed in 2009 / 2010 as part of the Mid Harbour project (providing over 500 residential units at a cost of £50,000,000¹⁹) which created some additional 3.45ha of land²⁰.

The 2012 census report²¹ recorded a total population of 31,604 people of which 13,356 lived in the reclaimed land. This corresponds to 42.26% of the total population making the reclaimed area the most densely populated district in Gibraltar (Table 3-2).

¹⁹ See www.emcl.gi [Accessed 10/09/19]

²⁰ HMGOG (2009) Gibraltar Development Plan. Parts I and II. Available at: <https://www.gibraltar.gov.gi> [Accessed 10/09/19]

²¹ GoG (2012) Census of Gibraltar 2012. Available at: <https://www.gibraltar.gov.gi> [Accessed on 10/09/19]

Table 3-2: Population by major residential area in 2012.

District	Population	%
East side	526	1.66%
North District	4,267	13.50%
Reclamation Areas	13,356	42.26%
Town Area	3,264	10.33%
Upper town	2,457	7.77%
Sandpits Area	2,053	6.50%
South District	5,681	17.98%
Total	31,604	

It is likely that the proportion of Gibraltar population residing in reclaimed areas has increased over the last six years due to recent developments made up of extensive residential blocks including Europort and Kings Wharf among others.

Future use/activity:

Although the Gibraltar Development Plan (GDP)²⁰ makes reference to reclamation projects on the Eastside and off the area of Western Beach, these have not been pursued and there has been no major land reclamation work undertaken over the last six years. However, there are plans to reclaim an area of approximately 60,000m² within the harbour waters next to Coaling Island (i.e. the Victoria Keys development) which will provide new space for future residential and commercial development. Heavily The proposed reclamation is located within a designated Heavily Modified Water Body (HMWB) in line with the requirements of the Water Framework Directive. An Environmental Impact Assessment (EIA)²² was produced in 2019 and it providing details of the proposed design and construction of the reclamation as well as any potential localised significant effects, mitigation and management. Subject to the proposed development being granted planning permission, it is anticipated that reclamation works would take up to two years to be completed.



Figure 3-3: Proposed Coaling Island Reclamation Works.

²² Engain (2019) Proposed Reclamation, Coaling Island, Gibraltar. Environmental Statement. Available at: <https://www.egov.gi> [Accessed on 10/09/19]

b) *Reclaimed land - Economic and Social Analysis*

Benefits:

Based on the above, reclaimed land is considered to have a **high** direct and indirect contribution to Gibraltar's socio-economic growth. However, given that this category of marine use / activity is not included within the scope of the MSFD socioeconomic analysis, no socioeconomic data related to existing and proposed land claims have been collated.

Pressures and Impacts:

Environmental pressures related to reclamation activities include potential marine and coastal habitat loss and disturbance to associated species through underwater noise, sediment mobilisation, etc., although significance will depend on the abundance and importance of habitats and species present within the footprint of reclamation activities and methods used. In addition, land claim has the potential to interfere with local sediment transport and increase residence times thus increasing pollutant levels in specific areas. An informed design that avoids / minimises these impacts would limit the pressures and would have the potential to significantly contribute to socioeconomic growth by providing new land for development.

3.2.2 Coastal Defence and Flood Protection

a) *Coastal Defence and Flood Protection - Background*

Current use/activity:

The Preliminary Flood Risk Assessment prepared in 2011²³ identifies flooding from the sea as one of the main sources of potential flooding both along the west and east coastlines of Gibraltar as a result of storm surges, wave action, refraction or a combination of these factors with high tides.

The report identifies existing sea defences (Figure 3-4) noting that the risk of these failing is considered minimal. Flood risk areas due to storm surges are identified along the coast but are not anticipated to have a significant impact potential (classified as Level 1 Land Inundation Areas). No Level 2 Significant Flood Risk Areas have been identified for Gibraltar.

²³ GoG (2011) Preliminary Flood Risk Assessment. Available at: <https://www.gibraltar.gov.gi> [Accessed on 10/5/20].

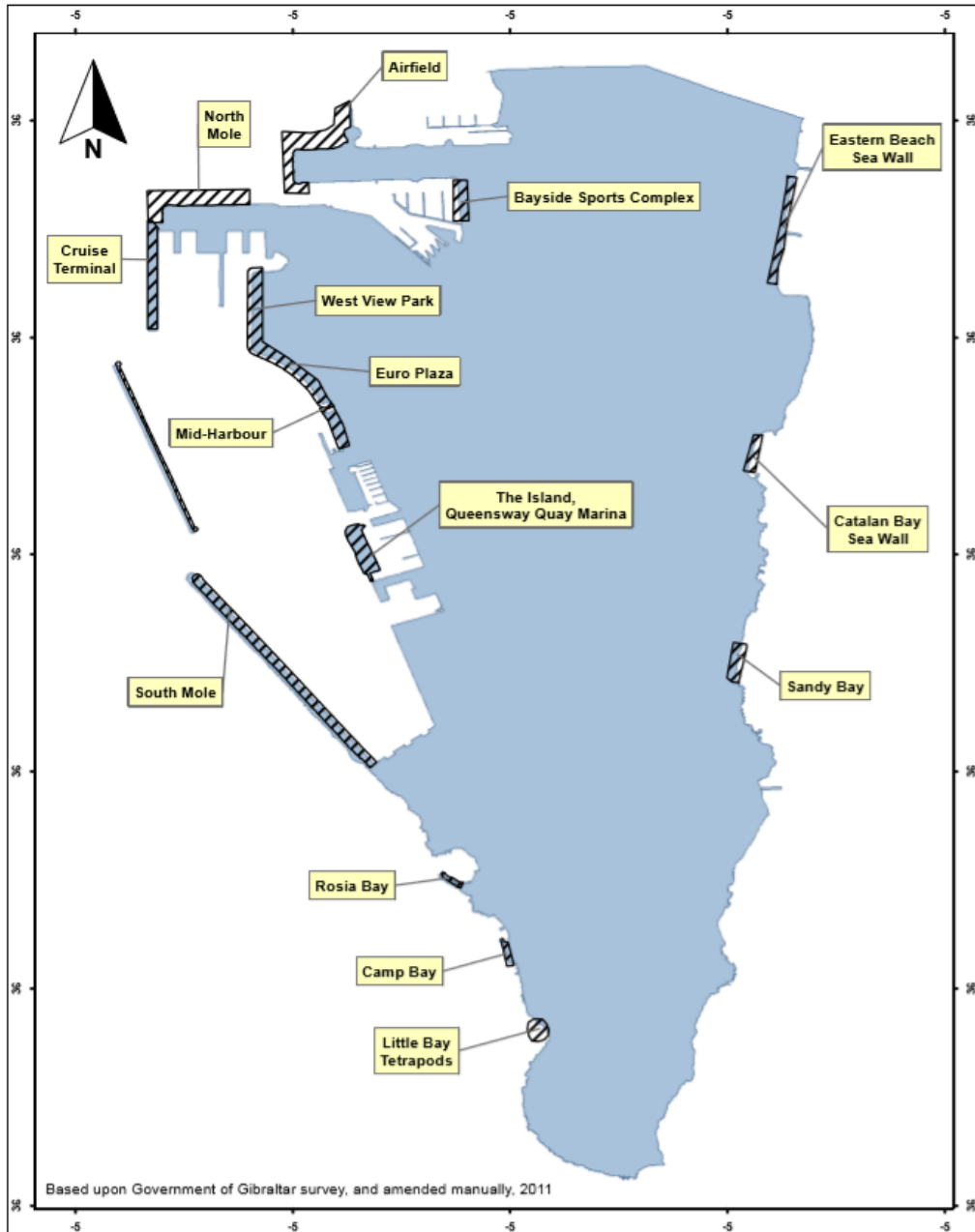


Figure 3-4: Indicative Locations of Main Flood Defences. Source: HMGOG (2011) Preliminary Flood Risk Assessment.

The North and South Moles that form the outer edge of the harbour area have provided protection from storm surges since the early 1920s when they were initially built. Additional sea defences have been constructed at numerous locations around the coastline, including rock revetments and seawalls in the mid harbour, Little Bay, Camp Bay, Eastern Beach and Catalan Bay. More recent rock armour projects include those carried out as part of the beach replenishment works for Sandy Bay in 2011 and rock Gabions for the Gorham’s Cave Complex World Heritage Site on the South East side of Gibraltar. At least two artificial structures created namely the Sandy Bay and the mid-harbour rock armour revetments are designated as No-take Micro-Marine Reserves (MMR) and legally protected under the Marine Protection Regulations 2014. Additional MMRs are currently being considered. This innovative statutory marine designation is unique in the region and tailored to meet the conservation requirements of threatened species such as *Patella ferruginea*.

Future use/activity:

No future uses or investments reported.

*b) Coastal Defence and Flood Protection – Economic and Social Analysis***Benefits:**

- GTP and Employment. No data on employment or GTP were available in order to quantify the direct socioeconomic contribution of coastal defence and flood protection activities. Maintenance works are usually performed by local labour already employed in the construction industry so there is a minimal contribution to job creation²⁴.
- Other economic data: Construction and maintenance costs - In 2012, costs associated with the construction of existing groynes and replenishment works at Sandy Bay totalled approximately £12,000,000. In addition, the Technical Services Department (TSD), responsible for sea defence maintenance, repair and construction works, stated that maintenance works are limited and budget-dependent, varying each year. In 2014, works were carried out to upgrade the existing revetment at Camp Bay at a cost of approximately £60,000. This structure was upgraded again in 2018 at a cost of £250,000²⁵.

Based on the above, although coastal defence and flood protection may not be considered a major source of employment or income, it has a **high** indirect contribution to Gibraltar's socioeconomic growth by effectively protecting Gibraltar's assets, infrastructure and population. It could also be regarded as having high value from a habitat creation perspective.

Pressures and Impacts:

Environmental pressures related to the construction of coastal defence and flood protection works depend on their location. Nature based solutions, where feasible, reduce environmental pressures whilst maximising environmental and socioeconomic benefits and should be considered as part of any selection of alternatives. Given their localised and short-term nature, maintenance works are unlikely to exert major environmental pressures.

3.2.3 Restructuring of seabed morphology including dredging and depositing of materials*a) Restructuring of Seabed Morphology - Background***Current use/activity:**

The Gibraltar Port Authority (GPA) carry out regular bathymetry surveys to identify the need for dredging operations inside the harbour waters with the purpose of maintaining existing navigation channels. However, it is noted that dredging has only rarely been required and navigation channels require minimal intervention. On the other hand, depositing of dredged material has historically been brought to land, with no disposal sites designated within BGTW other than for targeted land reclamation.

There are no records of dredging activities taking place within the last six years.

²⁴ Technical Services Department. HMGOG.

Future use/activity:

If required, dredging activities are likely to be limited to take place within harbour waters which is classified as a HMWB and affected by historical sediment pollution (see Section 4.6 - Contaminants). Dredging within Protected Areas or BGTW as a whole is no longer allowed.

*b) Restructuring of Seabed Morphology - Economic and social analysis***Benefits:**

No socioeconomic data are available at present to quantify the socioeconomic contribution of this activity, although based on the above, it is considered to be negligible.

Pressures and Impacts:

Environmental pressures associated with dredging activities include seabed disturbance, habitat loss and remobilisation of sediments. Other impacts include potential effects on water quality, local sediment transportation and hydrodynamics. Controlled dredging operations with appropriate sediment management practices in place do, however, have the potential to significantly contribute to socioeconomic growth by maintaining existing navigation channels.

3.2.4 Extraction of Water*a) Extraction of Water - Background***Current use/activity:**

Seawater in Gibraltar is extracted both for direct use (saline water supply used for sanitary purposes and fire protection) and potable water supply by means of desalination. Desalination plants are run by AquaGib and to a smaller extent by the Ministry of Defence (MoD). The current production capacity of AquaGib is 6,300m³ / day, including²⁶:

- 4 No. 1,200m³ / day by four reverse osmosis plants installed at Governors Cottage Camp; and
- 1 No. 1,500m³ / day by one reverse osmosis plant at Waterport.

Both saline and potable water are stored in reservoirs within the Rock of Gibraltar before being distributed. As shown in Figure 3-5, the supply of potable water has increased steadily over the years. There has been a 16.5% increase in the period 2012-2018.

²⁶ Gibraltar Water Supply History available at <https://www.aquagib.gi/history> [Accessed 23/4/20]

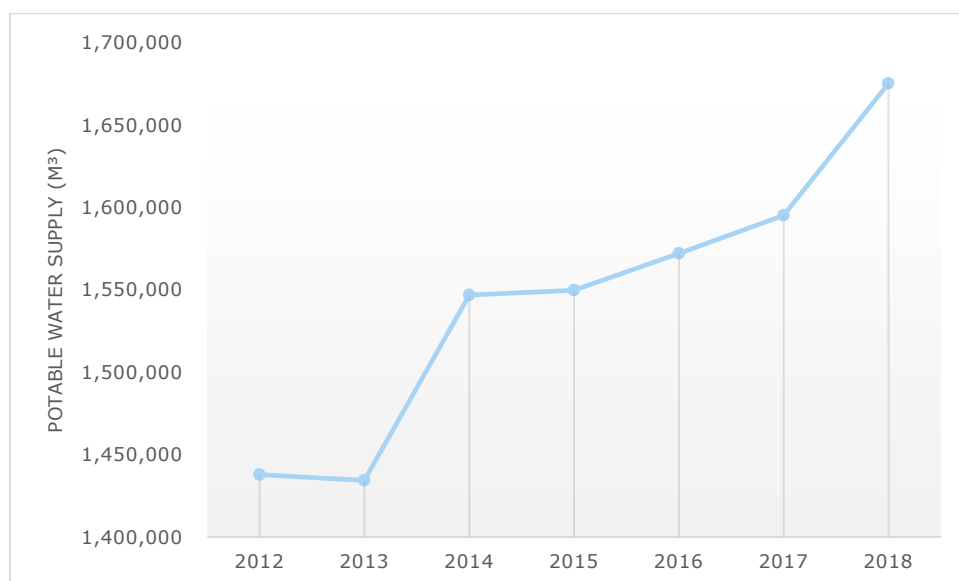


Figure 3-5: Potable water supply (m³). Source: AquaGib.

Future use/activity:

No investments or operational changes reported.

b) Water Extraction - Economic and Social Analysis

Benefits:

- GTP and Employment. AquaGib currently employs 100 people who are divided into four different departments. The department of water production and the department of water network are both directly involved in the production and supply of water and have 60 staff. Whilst aggregated data on the GTP attributed to the extraction of marine water abstraction were not available, other economic data on private and public expenditures and Government revenue associated with water supply are presented below.
- Other economic data: CAPEX and OPEX. Operating and capital expenditures associated with the supply of potable and seawater are summarised in Table 3-3 and compared with figures presented in the Initial MSFD Assessment (2012).

Table 3-3: Operating Expenditures (OPEX) and Capital Expenditures (CAPEX) associated with water supply

Costs	Potable Water			Sea Water		
	2009/10	2018/19	Variation (%)	2009/10	2018/19	Variation (%)
OPEX	£5,625,248	£7,130,000	+27%	£1,771,739	£2,607,000	+47%
Payroll	£2,736,322	£3,543,000	+29%	£1,008,634	£1,302,000	+29%
Energy & Fuel Costs	£1,370,395	£808,000	-41%	£82,516	£249,000	+202%
Purchases of Material etc	£699,130	£784,000	+12%	£202,799	£309,000	+52%
Repairs & Maintenance	£61,103	£152,000	+149%	£27,045	£55,000	+103%
Other Operating Costs	£758,298	£1,843,000	+143%	£450,745	£692,000	+54%
CAPEX	£448,182	£382,238	-15%	£317,692	£384,841	+21%

Operating costs have significantly increased over the last 8-9 years by an average of 27% and 47% for potable and sea water supply respectively, with both sectors increasing payroll costs by 29%. Repair and maintenance costs as well as other operating costs also contribute

significantly to water supply costs, with a significant increase observed in relation to 2009/10 data. The main factor influencing energy and fuel cost reduction in potable water supply is the switch to reverse osmosis desalination with all plants connected to the main grid since 2009. Over the last 2-3 years, the production plant's system has also been upgraded to a more energy-efficient system. Similarly, capital costs in the potable water supply sector have been reduced by 15%, in contrast with the increased 21% capital costs reported for seawater supply.

- Other economic data: Government expenditure and revenue from water supply. The 2018/2019 Gibraltar budget estimated an approximate expenditure of £6m on AquaGib contracts (0.96% of total estimated expenditure) and an estimated revenue of £28m on general rates and salt water charges which include water supply rates (4.29% of total estimated revenue). Estimates identified in the 2019/2020 Gibraltar budget are similar (0.91% of total estimated expenditure, and 4.02% of total estimated revenue).

Based on the above, and the fact that sea water extraction is the main form of potable and utility water supply, it is considered that this use / activity has a **high** indirect contribution to Gibraltar's socioeconomic growth by effectively providing Gibraltar with potable and utility water supply.

Pressures and Impacts:

Environmental pressures from water extraction can be associated with the disposal of by-products (i.e. brine) back to the marine environment and potential entrapment of organisms within extraction units. However, regular water quality monitoring carried by the DESHCC has not identified any issues with water quality / entrapment of marine organisms.

3.2.5 Marine Renewable Energy Generation

a) Marine Renewable Energy Generation - Background

Current use/activity:

In March 2016, Eco Wave Power successfully completed the first stage installation of a wave energy plant off the east coast of Gibraltar. This first stage of the device is composed of eight ocean energy converter units connected to the grid that supply 100kW. More recently, a joint research collaboration between DESHCC and the University of Highlands and Islands has been setup to explore the marine renewable energy potential of BGTW particularly current and tidal energy.

Future use/activity:

Gibraltar's peak electricity demand is anticipated to increase from around 42MW (2017) to 51MW in 2027 – an increase of just over 20%. Gibraltar has adopted the target of 20% of total final energy consumption to come from renewable energy by 2020 and increase this to 50% by 2030. Solar PV and low-temperature solar thermal (solar water heating, SWH) represent suitable avenues to achieving its targets, including the possibility of power storage from renewables, while additional scope exists for wave energy, tidal stream and offshore wind²⁷. Eco Wave Power secured a Power Purchase Agreement (PPA) for a full scale project to be further developed in the near future should the technology prove to be successful.

²⁷ DEHCC (2015) National Renewable Energy Action Plan for Gibraltar. Available at: <https://www.gibraltar.gov.gi>.

b) *Marine Renewable Energy Generation - Economic and Social*

Benefits:

No GTP data were available for the first stage installation. The station currently employs one employee (station manager). Based on the above, it is considered that at present, marine renewable energy generation has a **negligible** contribution to Gibraltar's socioeconomic growth although this may change in the medium-term.

Pressures and Impacts:

Given that only wave energy is currently harnessed in Gibraltar, environmental pressures are identified in relation to this sector which depend on location, construction and operational requirements and dimensions. They have potential to cause coastal erosion and affect sediment transportation locally and exert disturbance on habitats and associated species. With appropriate management and mitigation, wave energy has potential to contribute to the provision of reliable and clean energy thus diversifying energy generation in Gibraltar.

3.2.6 Non-renewable Energy Generation

a) *Non-renewable Energy Generation - Background*

Current use/activity:

Electricity supply in Gibraltar has historically relied on diesel-powered generators distributed across Gibraltar. A new power station was commissioned in 2019²⁸ on the North Mole within Gibraltar Harbour²⁹ together with a Liquefied Natural Gas (LNG) hub (with total capacity of 80 MW) to secure a reliable gas provision for Gibraltar³⁰. The terminal will receive, store (up to 5,000m³) and regasify LNG arriving at the terminal ready for use in the power plant. The terminal includes a berth for a small LNG carrier of 117m in length to dock and five storage tanks on the adjacent land. LNG is currently being delivered to the terminal by ship twice a month and at night, minimising disruption to the neighbouring port and airport.

Future use/activity:

No future uses or investments reported.

b) *Non-renewable Energy Generation - Economic and Social Analysis*

Benefits:

Based on the above, non-renewable energy generation is considered to have a **high** contribution to Gibraltar's socio-economic growth as it is the main source of energy supporting all socioeconomic activities in Gibraltar. The transition towards the reliance on the new LNG Power Station will continue to have a strong marine dependency. However, given that this category of marine use / activity is not included within the scope of the MSFD socioeconomic analysis, no socioeconomic data related to existing and future scenarios for non-renewable energy (other than those indicated above) have been collated to date.

²⁸ New LNG terminal feeds Gibraltar's power plant available at <https://gastopowerjournal.com> [Accessed 04/09/19]

²⁹ New Power plant for Gibraltar's Rock available at <http://www.gibelec.gi> [Accessed 04/09/19]

³⁰ Gibraltar Liquefied Natural Gas Project Outline available at <http://www.gibelec.gi> [Accessed 04/09/19]

Pressures and impacts:

Environmental pressures related to the new power station include deposition of pollutants in the marine environment and the potential for accidental spills.

3.2.7 Transmission of Electricity and Communications (cables)**a) Transmission of Electricity and Communications - Background***Current use/activity:**

There are presently no submarine electricity cables in BGTW, however submarine telecommunication cables do exist and include: FLAG Europe-Asia (FEA); Europe India Gateway (EIG); and SeaMeWe-3. Both FEA and EIG run into a cable station on the mainland of Gibraltar³¹. FEA is a fibre optic submarine telecommunications cable system with multiple landing points around the globe including Egypt, Jordan, Spain, United Arab Emirates, Saudi Arabia, Hong Kong, Japan, India, Italy, Malaysia, United Kingdom, Thailand and China³². EIG is also used for telecommunications and spans 15,000km between Europe, the Middle East and India³³.

Future use/activity:

In addition to existing submarine telecommunication cables, the proposed Quantum Cable is expected to pass near BGTW. HMGOG has expressed an interest for this fibre-optic high-speed data cable project to land at Gibraltar to boost telecoms capacity.

*b) Transmission of Electricity and Communications - Economic and Social Analysis***Benefits:**

Data on GTP or employment associated with communications are scarce and there are no socioeconomic data available related to the installation / maintenance of communication subsea cables yet it is generally considered to be negligible. However, the indirect socioeconomic benefit of subsea cables is considered **high** as it supports most socioeconomic activities in Gibraltar. For reference, a recent study conducted in the UK³⁴ identified benefits to businesses and households from digital communication as well as reliability of internet connectivity, translated into improved business efficiency, improved ability to manage people and processes, as well as improved opportunities for the international communication of product and process innovations.

Pressures and Impacts:

Environmental pressures associated with the installation and maintenance of telecommunication cables are considered minimal and mainly relevant to the pre-installation (survey, routing) and installation phase which have potential to disturb habitats and associated species during cable burial / placement operations.

³¹ Submarine cables available at <https://www.submarinecablemap.com> [Accessed 03/09/19]

³² FLAG Europe Asia available at <http://www.fiberatlantic.com> [Accessed 04/09/19]

³³ Europe India Gateway submarine cable system available at <https://www.vodafone.com> [Accessed 04/09/2019]

³⁴ Caroline, E., Al-Tabbaa, O., Semeyutin, A. and Tchouamou, E., 2016. An Economic and Social Evaluation of the UK Sub-sea Cables Industry. European Subsea Cables Association (ESCA).

3.2.8 Fish and Shellfish Harvesting (professional, recreational)

a) *Fish and Shellfish Harvesting - Background*

Current use/activity:

Gibraltar has no industrial or registered commercial fishing fleet³⁵. Specific fishing methods employed by commercial fisheries are proscribed under the Nature Protection Act 1991 and permits from the DESCCH are required for recreational fishing, spearfishing and fishing with small-scale longlines. There is however some small-scale illegal fishing with nets from foreign vessels but this has been generally reducing.

There are a number of recreational/sport fishing associations³⁶ in Gibraltar, including but not limited to:

- European Federation of Sea Anglers Gibraltar (EFSA);
- Mediterranean Shore Angling Club (MedSAC);
- Tarik Deep Sea Anglers Association;
- Gibraltar Big Game Fishing Club;
- Gibraltar Tuna Fishing Club.

In addition, Sports Fishing Charters also operate from Marina Bay. For the past 3 years, Atlantic Bluefin tuna quotas have been restricted to 15.5 tonnes, however, in August 2019 the quota was increased to 16.74 tonnes.

Future use/activity:

No future uses or investments reported.

b) *Fish and Shellfish Harvesting - Economic and Social Analysis*

Benefits:

As presented in Section 4.2.1.4, catch data has only been obtained from MedSAC, showing max catches of 3,700 fish per year. An assessment of the direct and indirect social and economic contribution of angling in Gibraltar has not been conducted (e.g. annual expenditure on fishing permits, tackle, travel, accommodation and other costs directly associated with fishing outings) and no additional socioeconomic data is available. The contribution of this use / activity to the economy is classified as **low**.

Pressures and Impacts:

Environmental pressures associated with fish and shellfish harvesting include the direct extraction of fish / shellfish species and by-catch mortality. If undertaken from powered fishing vessels, underwater noise levels can also be increased in sensitive areas. The discard of illegal fishing nets from neighbouring countries and fishing gear can also contribute to marine litter.

³⁵ Gibraltar Marine Reserve Management Plan. 2019. DESCCH.

³⁶ Tydeman, C. and Lutchman, I. (2012) The Management of Marine Living Resources in the waters around Gibraltar. Report to HM Government of Gibraltar.

3.2.9 Transport Infrastructure

a) Transport Infrastructure - Background

Current use/activity:

Gibraltar is a major commercial centre and bunkering port. Approximately 60,000 vessels transit the Strait each year³⁷ and the shipping sector accounts for approximately 25% of Gibraltar's GDP.

The Port of Gibraltar is delimited by a system of sea defences, which include the Western Arm of the North Mole (500m), the Detached Mole (800m) and the South Mole (1,100m).

The port can be divided into three sectors³⁸:

- The commercial port in the northern sector with nearly 2,300m of quay on the North Mole and Western Arm for cruise (the GPA is a member of the Association of Mediterranean Cruise Ports), cargo handling and bunkering operations;
- A complex of yachting facilities in the central sector;
- Gibdock shipyard available for commercial repair and conversions with three drydocks and sheltered deep water facilities for repairs; and Royal Naval Base in the southern sector.

The port also has two anchorage zones, one in the Bay of Gibraltar (western anchorage) and the other on the eastern side of the Rock.

Future use/activity:

No future uses or investments reported.

b) Transport Infrastructure - Economic and Social Analysis

Benefits:

Table 3-4 provides an overview of FTE and GTP (in relation to fiscal years) relevant to the shipping sector between 2012 and 2018.

Table 3-4: FTE and Gross Trading Profit for Shipping sectors. Source: Income Tax Office Records and Employment Surveys

	2012	2013	2014	2015	2016	2017	2018	
FTE								
Cargo handling and other supporting activities	471	512	520	616	642	707	764	
Wholesale of petroleum and associated products*	117	129	134	113	140	134	133	
Shipbuilding / repair	231	271	218	293	319	234	223	
Total	819	912	872	1,022	1,101	1,075	1,120	
% variation between 2012 and 2018							37% increase	
GTP (in 000' £)								
Cargo handling and other supporting activities	-	3,893	45,194	4,659	5,985	15,872	15,863	
Wholesale of petroleum and associated products	6,741	-20,927	3,450	4,762	6,095	4,694	4,694	
Shipbuilding / repair	574	4,833	3,774	2,270	4,328	3,790	3,678	
Total	7,314	-12,201	12,418	11,691	16,409	24,357	24,236	
% variation between 2014 and 2018							95% increase	

*May include land-based uses / activities

³⁷ Port information for Gibraltar available from <https://www.gibraltarport.com> [Accessed 04/09/19]

³⁸ Compass Publication Ltd (2017) The guide to yachting facilities and services. Destination Gibraltar. Published in association with the Gibraltar Maritime Authority. Available at: <http://www.compass-publications.co.uk> [Accessed 01/11/19]

Employment in 2018 is observed to have increased around 37% in comparison to 2012. Data shows that bunkering operations and shipbuilding and repair works have employed between 113-140 and 218-319 people between 2012 and 2018 with 2016 showing the highest numbers and 2018 showing a slight decline. On the other hand, employment in the cargo handling sector has gradually increased over the last six years with a 62% growth observed between 2012 and 2018. GTP shows a 95% increase when comparing 2018 and 2012 data. However, given that it excludes employee costs and cost of sales, among others, it does not capture the full contribution of the sector to Gibraltar's economy. The 2018/2019 Gibraltar budget estimated an approximate expenditure of £8.4m on the GPA and other maritime works (1.34% of total estimated expenditure) and an estimated revenue of £7.54m from port fees (1.16% of total estimated revenue). Estimates identified in the 2019/2020 Gibraltar budget are similar (1.28% of total estimated expenditure and 1.09% of total estimated revenue).

Based on the above, the overall socioeconomic contribution of transport infrastructure in Gibraltar is considered as **high** which will likely be maintained or reinforced in the future.

Pressures and Impacts:

Environmental pressures related to the development of transport infrastructure (i.e. port extension works) include potential disturbance to habitat and associated species through habitat loss as most require some form of land reclamation and potential interference in sediment transport via the introduction of fixed structures.

3.2.10 Transport (Shipping)

a) Transport (Shipping) - Background

Gibraltar's Vessel Traffic Services (VTS) is part of the GPA and oversees and coordinates vessel movements in BGTW. The VTS operates as an Information Service (INS), Traffic Organisation Service (TOS) and when required a Navigational Assistance Service (NAS) for all ships in Gibraltar's waters.

Various shipping vessels use the Strait of Gibraltar daily, including cargo vessels, tankers, passenger vessels and pleasure crafts³⁹. Since 2012, there has been an overall decline in vessel numbers entering the harbour waters, on the western side of Gibraltar, with a peak observed in 2017, when a total of 8,262 vessels were registered. The number of vessels recorded on the Eastern side and off port limits are significantly lower and have remained stable over the last 6 years.

Regarding vessel types / operations, the GPA data registers number of ships using bunkering, cargo or repair services, as well as number of cruises and "other"⁴⁰ uses / services since 2014. Gibraltar is considered to be one of the Mediterranean's leading bunker ports. Cepsa Gib is the main importer and distributor of marine bunker fuels in Gibraltar with a turnover of over 3,000 ships annually. They account for approximately 40% of the Port of Gibraltar's market⁴¹. The capacity of the company's bunker barges range from 1,000 to 6,000 tonnes. While commercial ships are generally supplied by bunkering barges, ex-pipe deliveries are generally arranged for yachts. As presented in Figure 3-6, data show that the number of bunkering operations in 2017 were 9% higher than in 2012, however, the level of activity reduced in 2018 and only registered a 1% increase in operations compared 2012 totalling 5,829. In 2019, Gibraltar carried out the first LNG bunker supply within BGTW⁴². Bunkers are

³⁹ Live map of Marine Traffic available at <https://www.marinetraffic.com> [Accessed 04/09/19]

⁴⁰ Other services / uses include STS commercial operations, repair, cargo, crew changes, adverse weather, arrested vessels, bunker surveys, cargo sampling, change of name, charts, class survey, compass adjusting, debunkers, gas free certification, ferry calls, laid up, lube oil delivery and receipt, medical assistance, MOD movements, owners change, pratique notes, recovery of lost anchor, seal trials, slops discharge, towing, underwater cleaning - inspection and survey, waste discharge and delivery, yacht loading and unloading and visits.

⁴¹ Cepsa Gib available at <http://www.cepsagib.com/about/bunkering> [Accessed 04/09/19]

⁴² See: <https://www.gibraltarport.com> [Accessed on 15/10/19]

normally delivered by barge whilst the vessels stay anchored in the Bay. Strict regulations on these activities are enforced by the GPA in line with the Bunkering Code of Practice.

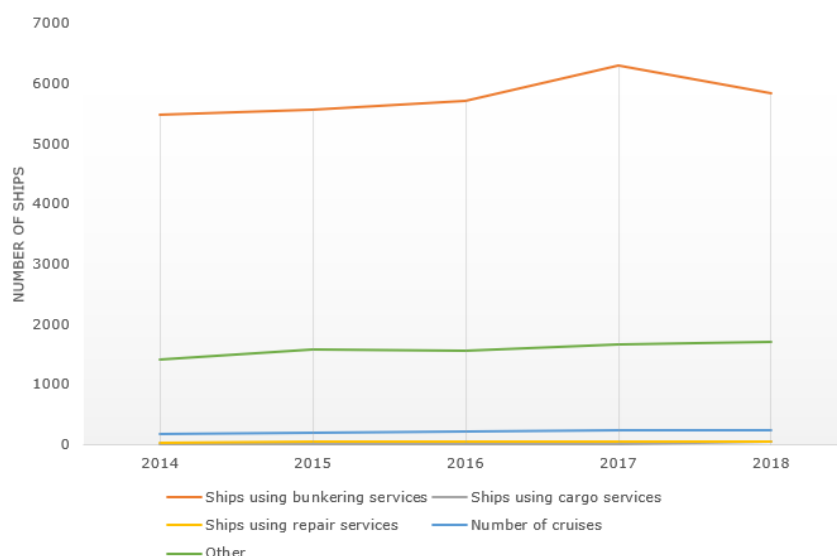


Figure 3-6: Number of ship services / uses recorded between 2014 and 2018. Source: Gibraltar Statistics Website

On the other hand, the number of cruises observed in 2018 (243) was 35% higher than in 2014 (180). The most popular months for cruises have consistently been shown to be April, September and October across all years (2014 – 2018) with an average of 30, 29 and 33 for each month respectively.

The Gibraltar Yacht Registry (GYR) run by the Gibraltar Maritime Administration (GMA) is the nexus for maritime services in Gibraltar and ensures that registered vessels comply with relevant conventions and safety standards. There are more than 800 pleasure yachts on the Gibraltar registry⁴³. The Gibraltar Yachting Business Development Association (GYBDA)⁴⁴ was set-up in 2016 and brings together representatives of the agency, marinas, fuel supply, insurance, finance, brokerage, crewing/training, registration and other sectors serving the super-yachting sector.

Table 3-5 presents the total number of yachts registered per month, showing an apparent decline over the last six years.

Table 3-5: Number of yacht arrivals by month and year between 2012 and 2019. Source: Gibraltar Statistics Website

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2012	89	114	143	223	330	353	416	501	322	317	189	93	3,090
2013	65	87	129	190	266	280	332	378	224	259	163	79	2,452
2014	56	78	126	190	211	291	306	328	249	248	182	108	2,373
2015	68	65	130	154	293	306	368	338	244	237	180	89	2,472
2016	67	76	142	215	285	314	72	104	82	85	59	22	1,523
2017	12	23	28	44	83	98	331	102	107	78	42	21	969
2018	7	17	-	-	-	97	99	81	66	54	54	25	500
2019	-	30	33	60	74	-	-	-	-	-	-	-	197
Total	364	490	731	1,076	1,542	1,739	1,924	1,832	1,294	1,278	869	437	13,576

b) Transport (Shipping) - Economic and Social Analysis

Benefits:

No data on employment or GTP were available in order to quantify the direct socioeconomic contribution of shipping activities. However, given the importance of the shipping sector in Gibraltar

⁴³ Gibraltar Yacht Registry Website. Available at: <http://www.gibraltaryacht.com/> [Accessed 01/11/19]

⁴⁴ <https://www.gybda.com/>

and growth observed over the last years, the overall socioeconomic contribution of this use / activity is considered as **high**.

Pressures and impacts:

Environmental pressures related to shipping include increased underwater noise levels and potential disturbance to marine species particularly when navigation occurs through important habitats for feeding / breeding. The potential for contaminant release is considered limited given the number of protocols and operational codes that vessels and bunkering operations are subjected to. Potential ballast water discharges and anchoring have been identified as a pressure.

3.2.11 Transport (Air)

a) Transport (Air) - Background

The Gibraltar International Airport (GIA) is used by more than 0.5 million passengers a year⁴⁵.

b) Transport (Air) - Economic and Social Analysis

Benefits:

Although the runway is surrounded by the sea and there is a need for occasional maintenance works on the existing breakwater, the airport is serviced from land and there are no socioeconomic data available with relevance to marine works. The indirect socioeconomic contribution of the GIA is considered **high**.

Pressures and Impacts:

Refer to Section 3.2.1 above for an overview of pressures and impacts associated to land reclamation.

3.2.12 Waste Treatment and Disposal (Wastewater)

a) Waste Treatment and Disposal (Wastewater) – Background

Current use/activity:

At present, Gibraltar has no advanced wastewater treatment facilities and maintains a network of approximately 28 pumping stations that pump wastewater to a sea outfall at Europa Point where it is discharged in a highly dispersive marine environment.

Future use/activity:

There are plans in place for the construction and operation of a wastewater treatment plant and an EIA⁴⁶ was completed in 2019 to inform its design, construction and operation. The current programme is for construction to begin before 2022. The EIA reported that a maximum on site manpower of around 70 would be expected during construction works and that approximately five Operation and Maintenance personnel would be employed at the site on a shift basis.

⁴⁵ Gibraltar Airport available at <https://www.arrivals-departures.co.uk> [Accessed 04/09/19]

⁴⁶ Ramboll (2019) Wastewater Treatment Plant. Environmental Statement. Available at: <https://www.egov.gi> [accessed on 10/09/19]

b) *Waste Treatment and Disposal (Wastewater) – Economic and Social Analysis*

Benefits:

- GTP and Employment. Approximately 60 staff employed by AquaGib are responsible for the operation and maintenance of pumping stations and distribution network in Gibraltar. Whilst aggregated data on the GTP attributed to the treatment and disposal of wastewater were not available, other economic data on private expenditures of relevance are presented below.
- Other economic data: CAPEX and OPEX. Operating and capital costs associated with the operation of the current wastewater pumping system network are summarised in Table 3-6 and compared with figures presented in the Initial MSFD Assessment (2012).

Table 3-6: Operating and Capital costs associated with sewage pumping.

Sewage Pumping			
Costs	2009/10	2018/19	Variation (%)
Operating Costs	£989,815	£2,016,000	+104%
Payroll	£573,617	£973,000	+70%
Energy & Fuel Costs	£57,978	£217,000	+274%
Purchases of Material etc	£135,141	£246,000	+82%
Repairs & Maintenance	£46,201	£42,000	-9%
Other Operating Costs	£176,878	£538,000	+204%
Capital Costs	£125,239	£45,230	-64%

Data, for both time periods considered, show that the main contributing factor to operating costs is associated with payroll which has increased around 70% when comparing to 2009/10 figures. Energy and fuel costs, as well as other operating costs seem to have quadrupled mainly related to the increased level of water usage (see Section 3.2.4) and the increased number of pumping stations, with repair and maintenance costs reported to be similar in both years. On the other hand, capital costs seem to have significantly reduced by 64%.

The overall socioeconomic direct contribution of wastewater treatment is considered to be low, but has a **high** indirect benefit, providing primary infrastructure to Gibraltar.

Pressures and impacts:

Environmental pressures related to wastewater discharges can include deterioration of water quality and impact on associated marine habitats and species. Although discharges of untreated wastewater have historically not been associated with water quality issues in Gibraltar, the treatment of wastewater is a legal requirement under European and Gibraltar legislation.

3.2.13 Waste Treatment and Disposal (Port Waste)

a) *Waste Treatment and Disposal (Port Waste) - Background*

Current use/activities:

The GPA implements a Port Waste Management Plan⁴⁷ in accordance with the requirements of the Merchant Shipping (Port Waste Reception Facilities) Regulations 2002 (PWRF) and Directive

⁴⁷ GPA (2019) GPA Port Waste Management Plan for Ship Generated Waste. Available at: <https://www.gibraltarport.com> [Accessed 11/09/19]

2000/59/EC on port reception facilities for ship generated waste and cargo residues⁴⁸. All ships must notify the GPA of the type and amount of waste they intend to land in the Port at least 24 hours before arrival. The reception facilities are available for oily wastes, cargo residues, noxious liquid substances, sewage, garbage and other hazardous wastes for all ships visiting the Port⁴⁸.

Future use/activity:

No future uses or investments reported.

b) Waste Treatment and Disposal (Port Waste) - Economic and Social Analysis

Benefits:

There are presently no socioeconomic data available related to port waste management and its socio-economic contribution is therefore unknown but likely to be **low**.

Pressures and impacts:

Environmental pressures related to port waste management are related to accidental spillages and transportation with some of the waste streams likely to be transported by road / ship to appropriate treatment facilities.

3.2.14 Tourism and Leisure Infrastructure

a) Tourism and Leisure Infrastructure (Bathing Areas) - Background

Current use/activity: Bathing Areas

Gibraltar has six EU designated bathing areas namely Camp Bay, Catalan Bay, Eastern Beach, Little Bay, Sandy Bay and Western Beach, as shown in Figure 3-8. Additional bathing areas are presently being considered by the DESHCC including Rosia Bay.

⁴⁸ Gibraltar Port Authority Port Waste Management Plan for Ship Generated Waste (2019) available at <https://www.gibraltarport.com> [Accessed 04/09/19]



Figure 3-7: Designated Bathing Waters in Gibraltar.

Water quality in these bathing areas is routinely monitored by the Gibraltar Environmental Agency on a fortnightly basis from the 15th April to 30th October each year⁴⁹ (see Section 4.6 for an overview of records).

Future use/activity: Bathing Areas

No major plans/programmes or investments reported.

b) Tourism and Leisure Infrastructure (Bathing Areas) - Economic and Social Analysis

Benefits:

An estimate of the maximum daily number of bathers during the high season activities are provided in the Bathing Water Profiles⁵⁰ for each designated bathing area.

Table 3-7: Estimated number of bathers and activities recorded in Gibraltar bathing areas based on the updated Bathing Water Profiles .

Bathing Area	Max daily number of bathers	Activities recorded
Camp Bay	1,200	Fishing (restricted to certain times of the year and with a valid fishing license), standup paddle, diving and snorkelling.
Catalan Bay	2,000	Fishing, (restricted to certain times of the year), snorkelling, surfing (restricted to certain times of the year) standup paddle & canoeing.
Eastern Beach	5,000	Fishing (restricted to certain times of the year and with a valid fishing license), snorkelling, surfing (restricted to certain times of the year) standup paddle & canoeing.
Little Bay	300	Fishing (restricted during certain times of the year), standup paddle, diving and snorkelling
Sandy Bay	1,000	Standup paddle, snorkelling and diving. Fishing is restricted due to the beach being designated as a No-take Micro-Marine Reserve.
Western Beach	150	Windsurfing (restricted during certain times of the year except outside buoyed area) & Sailing

The overall socioeconomic contribution of tourism and leisure infrastructure (bathing areas) requires further quantitative analysis but given the overall importance of the tourism sector, it is likely to be **high**.

⁴⁹ Available from <https://www.gibraltar.gov.gi/environment/water> [Accessed 05/04/20].

⁵⁰ Available at <https://www.gibraltar.gov.gi>.

Pressures and impacts:

Bathing areas in Gibraltar are subject to visitor and tourist pressure particularly during the summer months, which can generate marine litter and disturbance to marine and coastal ecosystems.

*c) Tourism and Leisure Infrastructure (Berthing) - Background***Current use/activity:**

Gibraltar has three marinas offering berthing for visiting and long-term yachtsmen:

- Ocean Village and Marina Bay, which have 95 and 209 berths respectively. Long-established chandlers provide boatyard services and specialist marine supplies. There are also several sailing schools. The five-star superyacht hotel Sunborn Gibraltar has been berthed in Ocean Village since 2014;
- Queensway Quay Marina which provides 200 fully serviced yacht berths, accommodating boats up to 40m in length, with a 75m berth dependent on draught; and
- Mid-harbour Marina, which opened in 2016 and provides berths for 700 small boats. It has been designed to incorporate a 500m deepwater berth for superyachts on the outside quay which could accommodate at least three 100m yachts.

Over the last six years the number of berths has therefore increased by 139%.

Future use/activity:

No major plans/programmes or investments reported.

*d) Tourism and Leisure Infrastructure (Berthing) - Economic and Social Analysis***Benefits:**

No data on employment or gross trading profit were available in order to quantify the direct socioeconomic contribution of berthing activities. However, the 2019/2020 budget indicates that circa. £24m were invested in the construction of the Mid-harbour Marina.

The overall socioeconomic contribution of tourism and leisure infrastructure (berthing) is unknown but given the overall importance of the tourism sector it is likely to be **high**.

Pressures and impacts:

Environmental pressures related to the development of berthing facilities include potential disturbance to species due to increased vessel traffic, interference with sediment transportation and hydrodynamic patterns and potential impacts on nearshore coastal species.

3.2.15 Tourism and Leisure Activities

In the period of 2012-2017, tourism numbers have slightly decreased from around 11.78 million to approximately 10.54 million visitors. In the year 2017, the period from May through to October received the largest number of visitors peaking at over 1 million in August. In this same year, the total tourist expenditure was around £252.02 million, which accounted for around 11.5% of Gibraltar's GDP. The estimated expenditure of excursionists from cruises and yachts in 2017 was estimated at £16,265,000 and £584,000.00 respectively, approximately 7% of total tourism expenditure although this does not include potential accommodation expenses. In comparison to 2012 figures, it shows that

expenditure has increased by 54% for cruise visitors and reduced by 19% for yacht visitors respectively⁵¹.

Tourism and leisure activities directly related to the marine environment are further described below:

a) Tourism and Leisure (cetacean tours) - Background

Current use/activity:

There are two different operators offering dolphin watching excursions in Gibraltar, both of which depart from Marina Bay namely Dolphin Adventure with capacity for up to 70 people and Dolphin Safari with capacity for up to 25 people.

Future use/activity:

No major plans/programmes or investments reported.

b) Tourism and Leisure (cetacean tours) - Economic and social Analysis

Benefits:

No data on employment or GTP were available in order to quantify the direct socioeconomic contribution of dolphin and whale watching and given the small scale nature of the sector, its overall socioeconomic contribution to Gibraltar is considered **Low**.

Pressures and impacts:

Although dolphin and whale watching tours provide a great opportunity for locals and visitors to learn more about local marine fauna and develop an interest in protecting the marine environment, the activity can also exert pressures on local marine fauna particularly if the required distances are not respected. With the aim of minimising potential disturbance to marine mammal populations within BGTW from watching tours or other boats / ships, HMGoG enacted the Cetacean Protocol under the Marine Protection Regulations 2014.

c) Tourism and Leisure (Water Sports) - Background

Current use/activity

The sheltered waters in the Bay of Gibraltar provide an ideal location for water-sports including sailing, jet skiing and power boating.

Future use/activity

No major plans/programmes or investments reported.

d) Tourism and Leisure (Water Sports) - Economic and Social Analysis

Benefits:

No data on employment or GTP were available in order to quantify the direct socioeconomic contribution of water sports and given the small scale of the sector, its overall socioeconomic contribution to Gibraltar is considered as **low**.

⁵¹ Tourism Survey Report 2017. Available from: <https://www.gibraltar.gov.gi> [Accessed 05/09/19]

Pressures and impacts:

Environmental pressures associated with water sports are mainly related to the use of powered boats which increase underwater noise and emit pollution. Anchorage over a protected habitat can also be an issue. Other water sports are unlikely to exert significant environmental pressures, although access to effective Codes of Conduct will assist in minimising conflicts between users.

e) Tourism and Leisure (Cruises) - Background

Current use/activity:

More than 20 cruise lines offer itineraries and schedules to and from Gibraltar. There is a cruise ship port located at the end of North Mole Road next to a Marina and the airport. Cruise ships can berth alongside both sides of the Cruise Terminal within an hour of leaving the main shipping lane in the Strait⁵². A total quay length of 940 metres allows up to four medium sized or two large sized vessels to berth alongside simultaneously. The Terminal has a range of facilities including telephones, bar/cafeteria, arts and craft shops, display areas and a Tourist Board Information office⁵².

Future use/activity:

No major plans/programmes or investments reported.

f) Tourism and Leisure (Cruises) - Economic and Social Analysis

Benefits:

No data on employment or GTP were available in order to quantify the direct socioeconomic contribution of cruises.

Figure 3-9 presents the number of cruise passengers recorded between 2012 and 2019 showing a gradual increase over the last six years. The total number of cruise passengers recorded in 2018 (406,998) was 39% higher than those recorded in 2012 (291,880).

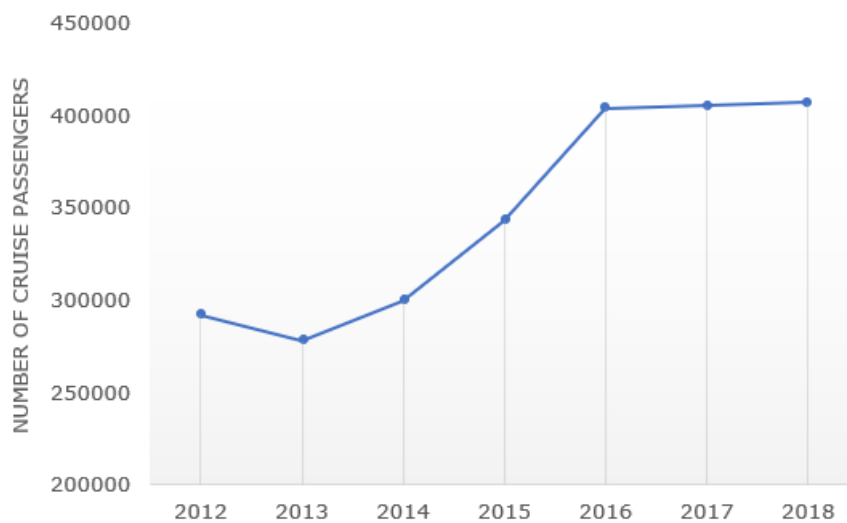


Figure 3-8: Number of cruise passengers recorded between 2012 and 2019.

⁵² Gibraltar Port Authority Cruise Facilities. Available from <https://www.gibraltarport.com/facilities> [Accessed 05/09/19]

Considering the overall level of expenditure (see Section 3.2.15) and growing trend in cruise visitors, the overall socioeconomic contribution of cruises is considered to be **high** and likely to increase in the future.

Pressures and impacts:

Environmental pressures associated with cruises are generally the same as those generally identified for shipping activities (Section 3.2.10). However, given that their purpose is to bring a high number of visitors to a given site at the same time, the pressure visitors can exert to those areas accessible to visitors, and on land-based infrastructure should be highlighted. Visitor management would benefit from a better understanding of the carrying capacity of certain areas targeted by visitors.

g) Tourism and Leisure - Overview of Socioeconomic Contribution

The overall socioeconomic contribution of marine-based tourism and leisure activities cannot be estimated in detail but is likely to be **high**.

3.2.16 Military Operations

a) Military Operations - Background

Current use/activity:

The Royal Naval operates from the southern section of the South Mole located within the Gibraltar Harbour in Admiralty Waters. The berths utilised on the South Mole includes Piers 48, 49, and 50. The US Navy also keeps a number of submarines in the European regions and some of these submarines may dock at the Z Berth in the naval base at Gibraltar.

Future use/activity:

No major plans/programmes or investments reported.

b) Military Operations - Economic and Social Analysis

Benefits:

This category of marine use / activity is not included within the scope of the MSFD socioeconomic analysis, however, its socioeconomic impact is likely to be **high**.

Pressures and Impacts:

Pressures and impacts associated with military operations are mainly related to shipping (see Section 3.2.10) and the cargo of dangerous goods (and associated accidental pressures).

3.2.17 Research, Survey and Educational Activities

a) Research, Survey and Educational Activities - Background

Current use/activity:

The DESCCH coordinates the implementation of the MSFD Monitoring Programme and research within BGTW. In addition, the University of Gibraltar recently launched research programmes on Maritime Science (nautical, engineering), Marine Science and Climate Change⁵³. These programmes have

⁵³ <https://www.unigib.edu.gi> [Accessed 06/09/19]

significantly increased the amount of research activity carried out within BGTW. Independent research is also possible as long as authorisation is given by the Ministry for the Environment and all research carried out is in line with the requirements of the Nature Protection Act 1991 and the Marine Protection Regulations 2014.

Educational activities highlighting the value of the marine environment and its protection are also carried out by the DESCCH and Non-Governmental Organisations such as the Gibraltar Ornithological and Natural History Society (GONHS), the Nautilus Project, Environmental Safety Group (ESG) and the Gibraltar Heritage Trust (GHT) among others. The Nautilus Project is presently taking a leading role in terms of marine stewardship education amongst the NGOs.

Future use/activity:

These activities are expected to continue increasing in frequency in BGTW.

b) Research, Survey and Educational Activities - Economic and Social Analysis

Benefits:

A limited amount of socioeconomic data related to educational activities exists e.g. business initiatives spearheaded by the Nautilus Project targeting single-use plastic reduction, re-fill stations, etc. However, there is presently not enough data on the contribution of marine research to the economy in order to ascertain direct and indirect benefits arising from e.g. student spending off-campus, spending of marine researchers and university staff, development of existing workforce and job creation. Notwithstanding, there are a number of public engagement opportunities that can be considered to have a positive social impact and therefore its overall contribution is rated as **moderate**.

Pressures and impacts:

















Pressures on the marine environment associated to research, survey and educational activities may be related to access and disturbance to certain habitats, but are overall considered negligible.

4. CURRENT ENVIRONMENTAL STATUS OF BGTW

4.1 Introduction

Sections 4.2 - 4.8 present the assessment of BGTW current environmental status for each of the MSFD descriptors. The main findings of the assessment update are summarised in Table 4-1

Table 4-1: Updated Assessment 2018 - Current Environmental Status

MSFD Assessment Update		
Species		
Seabirds (D1)	 	Gibraltar has achieved its aim of GES for seabirds. Stable population numbers were recorded for both indicator breeding seabird species (Mediterranean Shag) and foraging and/or migrating seabirds (Cory's, Scopoli's Shearwater and Balearic Shearwaters) since 2012.
Marine Mammals (D1)	 	Gibraltar has partially achieved its GES for marine mammals. Adequate data on abundance and distribution of indicator species exist (i.e. Striped Dolphin, Common Dolphin and Bottlenose Dolphin) and there has been a significant increase in Fin Whale abundance in BGTW recently. However, human pressures could be affecting the achievement of GES.
Marine Reptiles (D1)	 	Gibraltar has partially achieved its GES for marine reptiles. Numerous indicators are considered favourable and there appears to be an increase in the abundance of indicator species (Loggerhead turtles) since the last assessment. However, more information is required to better assess if there have been any significant impacts from natural or human-induced factors.
Fish and shellfish (D1, D3)	 	The extent to which Gibraltar has achieved its GES for fish and shellfish species is uncertain. Although some species are showing signs of recovery (e.g. Atlantic Bluefin tuna, Grouper, Meagre, etc.) there is not sufficient information to assess overall changes in abundance and distribution of all key species targeted in BGTW.
Habitats		
Pelagic Habitats (D1)	 	Gibraltar has achieved its aim of GES for pelagic habitats. Chlorophyll <i>a</i> average levels consistently recorded above High / Good status during the period between 2014 and 2019.
Benthic Habitats (D6)	 	Although some benthic habitat types have a favourable conservation status and there has been no reduction in physical extent, the degree to which Gibraltar has achieved GES for benthic habitats overall is uncertain. There is presently not enough information to assess changes in the condition of all key benthic habitats types found in BGTW.
Ecosystems		
Marine Food Webs (D4)	 	Seabird, cetacean and marine reptile numbers are stable and/or increasing but there is still uncertainty in other trophic guilds e.g. fish. The extent to which Gibraltar has achieved GES for food webs is therefore uncertain. More indicators and data are required to develop a robust assessment of anthropogenic impacts on food webs in BGTW. Harmonisation with indicators being developed at a regional level is also required.
Non-Indigenous Species		
(D2)	 	Gibraltar has not reached its aim of GES for NIS. The number and abundance of NIS identified within BGTW has increased over the last six years. However, the ability to detect new NIS has improved significantly.

MSFD Assessment Update

Eutrophication (D5)



Gibraltar has achieved its GES for Eutrophication. High quality conditions have been consistently reported for DIN, Chlorophyll *a*, DO and BOPA index.

Hydrographic Conditions (D7)



Gibraltar has achieved GES for hydrographic conditions. Both habitats and species have not been affected by significant hydrographical changes during the assessment period.

Contaminants (D8, D9)



GES has largely been achieved. Water quality data collected since 2014 shows that concentrations of chromium VI, copper, zinc, benzene, DEHP, lead and nickel have consistently been recorded below threshold values. TBT concentrations in water have also been observed to be gradually decreasing. Values for microbial contamination have shown no significant changes in relation to previous assessments with excellent water quality recorded for all bathing sites except for Western Beach. Some contaminants in edible tissue were detected above max. levels and this requires further monitoring moving forward, including the use of different indicator species, to better improve future assessments.

Marine Litter (D10)



The extent to which Gibraltar has achieved GES for marine litter is uncertain. There is an indication that the amount of beach litter since 2012 has remained the same. Longer-term baseline data are insufficient at this stage to better assess changes in abundance, distribution and composition of marine macro and micro-litter. In addition, data on sea floor and micro-litter are presently lacking. Based on the data available so far, together with evidence from regional monitoring programmes, it is unlikely that this descriptor will achieve GES in the near future.

Underwater Noise (D11)



The achievement of GES for underwater noise in BGTW is uncertain. Proxy data based on maritime activity in the western anchorage seems to have decreased over the last six years although there has been an increase in nearshore recreational vessel activity which might have resulted in an intermittent and localised deterioration of underwater noise levels in some coastal areas. There have been no significant changes in land-based sources of underwater noise. Overall, there are limited baseline data available to assess general changes in underwater noise conditions.

4.2 Biodiversity (Descriptors 1, 3, 4 and 6)

Annex III of the MSFD provides a list of ecosystem elements and indicates what structure, functions and processes should be considered in MSFD assessments, highlighting the relationship between the following descriptors: D1 (biological diversity), D3 (commercially exploited fish and shellfish), D4 (marine food webs) and D6 (seafloor integrity):

- a) **Species** (D1, D3), including species groups of marine birds, mammals, reptiles, fish and cephalopods of the marine region or sub-region characterised by:
- distribution, abundance and/or biomass
 - size, age and sex structure
 - fecundity, survival and mortality/injury rates
 - behaviour including movement and migration
 - habitat for the species (extent, suitability)
 - Species composition of the group

b) **Habitats** (D1, D6), including broad habitat types of the water column (pelagic) and seabed (benthic), or other habitat types, including their associated biological communities throughout the marine region or subregion. Characterised by:

- habitat distribution and extent (and volume, if appropriate)
- species composition, abundance and/ or biomass (spatial and temporal variation)
- size and age structure of species (if appropriate)
- physical, hydrological and chemical characteristics

Additionally, for pelagic habitats:

- chlorophyll *a* concentration
- plankton bloom frequencies and spatial extent

c) **Ecosystems** (D1, D4), including ecosystem structure, functions and processes, comprising physical, hydrological, chemical and biological characteristics, as well as functions and processes. Assessed in relation to existing marine food webs and associated trophic guilds.

This section has been structured around the three themes listed above.

4.2.1 Species

The criteria defined by the MSFD relevant to all species is presented in Table 4-2. However, for each species / species group within BGTW, the application of the criteria has been subject to data availability, as further justified in sections 4.2.1.1 to 4.2.1.4 below.

Table 4-2: Biodiversity (Descriptor 1) criteria defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
D1C1 (Primary) – Species of birds, mammals, reptiles and non-commercially-exploited species of fish and cephalopods, which are at risk from incidental by-catch in the region or subregion.	The mortality rate per species from incidental by-catch is below levels that threaten the species, such that its long-term viability is ensured.
D1C2 (Primary) – Species groups	The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured.
D1C3 (Primary / Secondary) – Species groups	Primary for commercially-exploited fish and cephalopods and secondary for other species: The population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity, and survival rates) of the species are indicative of a healthy population which is not adversely affected due to anthropogenic pressures.
D1C4 (Primary / Secondary) – Species groups	Primary for species covered by Annexes II, IV or V to Directive 92/43/EEC and secondary for other species: The species distributional range and, where relevant, pattern is in line with prevailing physiographic, geographic and climatic conditions.
D1C5 (Primary / Secondary) – Species groups	Primary for species covered by Annexes II, IV and V to Directive 92/43/EEC and secondary for other species: The habitat for the species has the necessary extent and condition to support the different stages in the life history of the species.

There is no list of species of birds, mammals, reptiles and non-commercially-exploited species of fish and cephalopods agreed at regional level, and accordingly, the assessment has been undertaken on the basis of species groups. The species groups to be considered are defined in Annex III of the MSFD⁵⁴, to be selected based on the relevance to each Member State, and include:

- **Birds** (grazing birds, wading birds, surface-feeding birds, pelagic-feeding birds, benthic-feeding birds) (Section 4.2.1.1);
- **Marine Mammals** (small toothed cetaceans, deep-diving toothed cetaceans, baleen whales, seals) (Section 4.2.1.2);
- **Marine Reptiles** (turtles) (Section 4.2.1.3);

⁵⁴ Part II, Table 1 in the GES Criteria 2017 document

- **Fish**⁵⁵ (coastal fish, pelagic shelf fish, demersal fish, deep-sea fish), this includes commercially-exploited fish and shellfish (Section 4.2.1.4); and
- **Cephalopods**⁵⁵ (coastal/shelf, deep-sea cephalopods).

The MSFD notes that assessments made under the Habitats Directive⁵⁶, Birds Directive⁵⁷ and the Common Fisheries Policy (CFP)⁵⁸ shall be used for the purposes of the MSFD Assessment update. However the CFP is not applicable to Gibraltar and has not been considered further⁵⁹. In the absence of commercially-exploited fish and cephalopods data, recreational fisheries data and expert judgement based on ongoing marine surveillance programmes have been used instead.

4.2.1.1 Seabirds

a) Seabirds - Scope of the Assessment and Criteria

Thousands of birds pass through the Straits of Gibraltar each year in each direction hence the reason why the Southern Waters of Gibraltar Special Area of Conservation (SAC)/Special Protected Area (SPA), along with the wider Straits of Gibraltar, have been identified as an Important Bird Area (IBA). One of the more unique seabird species found breeding within the Southern Waters of Gibraltar SAC/SPA is the Mediterranean Shag (*Phalacrocorax aristotelis desmarestii*), with the Gibraltar population being one of the few remaining populations in the Iberian Peninsula. The Southern Waters are also an important feeding ground and migratory route for the threatened Balearic Shearwater (*Puffinus mauretanicus*) and Audouin's Gull (*Larus audouinii*). Scopoli's Shearwaters (*Calonectris diomedea*) regularly forage in the Southern Waters of Gibraltar during its breeding season, with other species, such as Gannets (*Sula bassana*) and Sandwich Terns (*Thalasseus sandvicensis*), utilising the nutrient-rich waters during the Winter season.

In keeping with and building on the Conservation Objectives established for the Gibraltar Marine Reserve and the Southern Waters of Gibraltar SAC/SPA⁶⁰, this section focuses on target indicator seabird species that breed or regularly forage in BGTW. These include the Mediterranean Shag (*Phalacrocorax aristotelis desmarestii*), Cory's Shearwater (*Calonectris borealis*), Scopoli's Shearwater (*Calonectris diomedea*) and Balearic Shearwater (*Puffinus mauretanicus*).

Data and information used to assess this species group has largely been obtained from the Gibraltar Ornithological & Natural History Society (GONHS)⁶¹ who actively maintain a database of avian records observed in Gibraltar at different sites along the coast and on land. These are published in the annual Gibraltar Bird Reports online. Seabird observations are conducted from the Straits of Gibraltar Bird Observatory at Europa Point throughout the year and on a frequent basis. Reference has also been made to seabird data and information contained in the Gibraltar Marine Management Plan and monitoring reports produced in compliance with the Habitats (Article 17) and Birds Directives (Article 12). Regional reports, such as the Mediterranean 2017 Quality Status Report have also been used as part of the assessment.

⁵⁵ For commercially-exploited fish and cephalopods, the overall status shall be presented under Descriptor 3, but assessments under Descriptor 3 shall be used for Descriptor 1 purposes, using criterion D3C2 for D1C2 and criterion D3C3 for D1C3

⁵⁶ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Available at: <https://eur-lex.europa.eu>

⁵⁷ Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds. Available at: <https://eur-lex.europa.eu>

⁵⁸ Regulation (EU) No 1380/2013 of the European Parliament and of the Council of 11 December 2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC. Available at: <https://eur-lex.europa.eu>

⁵⁹ As a consequence of Gibraltar being outside of the Common Agricultural Policy. See: <http://www.gibraltarlawoffices.gov.gi>

⁶⁰ Department of the Environment, Heritage and Climate Change. 2017. Southern Waters of Gibraltar SAC/SPA. Conservation Objectives. Version 2. Available from https://www.gibraltar.gov.gi/new/sites/default/files/HMGoG_Documents/SWOG%20Conservation%20Objectives_FINAL_23.1.18.pdf [Accessed 12/12/19].

⁶¹ See more information about GONHS at: <https://www.gonhs.org/> [Accessed on 20/08/19]

Regarding the MSFD 2017 criteria, D1C1 (primary) Bycatch mortality, D1C2 (primary) Population abundance, D1C4 (secondary) Distributional range, D1C5 (secondary) Habitat Condition and D1C3 (secondary) Population Demographic Characteristics have all been applied to seabird species. The Mediterranean 2017 Quality Status Report applied three common indicators to seabirds and the approach adopted in BGTW is also consistent with these. These include:

- Common Indicator 3: Species distributional range – Seabirds⁶²;
- Common Indicator 4: Population and abundance of selected species – Seabirds⁶³; and
- Common Indicator 5: Population demographic characteristics - Seabirds⁶⁴.

b) *Seabirds - Main pressures*

Seabirds are particularly vulnerable to fishing by-catch, marine litter, physical disturbance, invasive species, noise and light pollution. Seabirds are also vulnerable to chemical contamination since this can affect their prey or the animals directly e.g. oil spills. However, no significant incidents have been reported within the last six years in relation to these pressures in BGTW that could affect the viability of breeding or foraging and migrating birds.

c) *Seabirds - MSFD Assessment*

- **D1C2 (population abundance)**

The Gibraltar 2012 Initial Assessment highlighted that the breeding population of the Mediterranean Shag is made up of a small colony of approximately 5-10 pairs. It also found that the population was considered stable at the time the assessment was carried out. Surveys conducted thereafter between the period 2012 and 2018^{65,66,67,68,69,70} show that Mediterranean Shags are consistently recorded during the winter (ranging between 3-10 individuals on a given survey) and summer (ranging between 5-14 on a given survey). A maximum number of 16 individuals have been recorded on a single survey from the Straits of Gibraltar Bird Observatory. More importantly, bird counts during successive breeding seasons have remained stable over the monitoring period.

Abundance data for indicator foraging and migrating birds namely Cory's, Scopoli's and Balearic Shearwaters were also considered stable throughout the monitoring period. Peak numbers were generally recorded in May/June and November for migrating Balearic shearwaters and February/March and mid-October for Scopoli's Shearwaters. Approximately 10,000 Balearic Shearwaters are estimated to migrate through BGTW. Foraging Cory's Shearwaters were also present in good numbers (estimated 500-1000 individuals) in successive breeding seasons within BGTW particularly the Southern Waters SAC/SPA⁷¹.

- **D1C4 (Species distributional range)**

Mediterranean Shags nest in the cliffs near sea caves found within the Southern Waters of Gibraltar SAC/SPA specifically in the Gorham's Cave Complex World Heritage Site. Their nesting and main foraging habitat is protected under a number of designations (see D1C5 below). Over the last six years, GONHS bird reports indicate that Mediterranean Shags are mainly recorded along the coast of Little

⁶² Available at: <https://www.medqsr.org> [Accessed on 22/08/19]

⁶³ Available at: <https://www.medqsr.org> [Accessed on 20/08/19]

⁶⁴ Available at: <https://www.medqsr.org> [Accessed on 20/08/19]

⁶⁵ GONHS (2013) Gibraltar Bird Report 2012. Number 12. Available at: <https://drive.google.com> [Accessed on 19/08/19]

⁶⁶ GONHS (2014) Gibraltar Bird Report 2013. Number 13.

⁶⁷ GONHS (2015) Gibraltar Bird Report 2014. Number 14. Available at: <https://drive.google.com> [Accessed on 20/08/19]

⁶⁸ GONHS (2016) Gibraltar Bird Report 2015. Number 15.

⁶⁹ GONHS (2017) Gibraltar Bird Report 2016. Number 16. Available at: <https://drive.google.com> [Accessed on 20/08/19]

⁷⁰ GONHS (2018) Gibraltar Bird Report 2017. Number 17. Available at: <https://drive.google.com> [Accessed on 28/08/19]

⁷¹ DEHSCC (2019) Birds Directive Article 12 Report.

Bay, Seven Sisters, Governor's beach and Europa Point. Their distribution likely extends beyond BGTW and is considered to be in line with prevailing physiographic, geographic and climatic conditions (see D1C5 below).

The distribution of Cory's, Scopoli's and Balearic Shearwaters generally extends throughout BGTW although most sightings are observed in the Southern Waters SAC/SPA and the Eastern shelf of Gibraltar.



- D1C5 (Habitat condition)

The sea cliffs where the Mediterranean Shag breeds have been classified as Habitat 1240 (Vegetated sea cliffs of the Mediterranean coasts with endemic *Limonium spp*) within the designated Rock of Gibraltar Special Area of Conservation (SAC)/Special Protection Area (SPA)⁷² listed under Annex I of the Habitats Directive. These cliffs are also within the Gibraltar Nature Reserve and Gorham's Cave Complex World Heritage Site (WHS) boundaries. The cliffs to the east side of the Rock rise to 30 m above sea-level from Europa Point running north for several hundred metres. Given the limited accessibility of these to human presence and their protection status, their good condition is considered to have been maintained stable over the last six years.

The Mediterranean Shag is also known to nest in or near partially submerged sea caves which are classified as Habitat 8330 (Submerged or partially submerged sea caves) within the Southern Waters of Gibraltar SAC/SPA⁷³ and listed under Annex I of the Habitats Directive. Caves are found in a stretch of approximately 4.5 km of coastline in the Southern Waters of Gibraltar. As in the case of vegetated cliffs, sea caves are not generally considered to be subjected to significant human disturbance and their condition is considered to have remained good and stable over the last six years.

Given the stability of Gibraltar's colony of Western Mediterranean Shag, it is considered that habitat conditions have been maintained favourably over the last six years. Foraging habitat for Cory's, Scopoli's and Balearic Shearwater are also considered good and stable.

Table 4-3: Seabirds – Overall Assessment and Perspective for 2018 - 2024

Qualitative descriptor for determining GES	D1 - 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	
Current Environmental Status (2019)	 	Gibraltar has achieved its aim of GES for seabirds. Stable population numbers were recorded for both indicator breeding seabird species (Western Mediterranean Shag) and foraging and/or migrating seabirds (Cory's, Scopoli's and Balearic Shearwaters) since 2012.
Mediterranean GES Targets	(Distributional range)	
	<ul style="list-style-type: none"> - 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 several alternative breeding sites. 	
	(Population abundance)	
<ul style="list-style-type: none"> - No human induced decrease in population abundance. - Population recovers towards natural levels where depleted. 		
(Demographic characteristics)		
<ul style="list-style-type: none"> - Populations of all taxa, particularly those with IUCN threatened status are maintained in the long term following the indication of population models. 		

⁷² DEHCC (2017) Rock of Gibraltar SPA/SAC. Conservation Objectives and Measures. Consultation Draft. Available at: <https://www.gibraltar.gov.gi> [Accessed on 20/08/19]

⁷³ DEHCC (2017) Southern Waters of Gibraltar SAC/SPA. Conservation Objectives. Working Document. Version 2. Available at: <https://www.gibraltar.gov.gi> [Accessed on 21/08/19]

	<ul style="list-style-type: none"> - Pressure: Incidental catch mortality is at negligible levels, particularly for species with IUCN threatened status.
Gibraltar GES Targets*	D1T1 – Nesting, foraging and migrating seabird population numbers and distribution are maintained.
	D1T2 – No seabirds are reported to be significantly affected by bycatch, oil spills, invasive species, noise, light pollution, disturbance and marine litter particularly floating litter.
	Note: These Targets are consistent with the Conservation Objectives established for the Southern Waters of Gibraltar SAC/SPA.
Criteria and data to be used for measuring progress towards GES	D1C1 (primary) Bycatch mortality <ul style="list-style-type: none"> - By-catch data collected through established incident reporting mechanisms in consultation with relevant stakeholders e.g. Environmental Protection & Research Unit (EPRU) and recreational fishing clubs.
	D1C2 (primary) Population abundance <ul style="list-style-type: none"> - Publicly available data collected within the Barcelona Convention area - Monitoring data obtained from Gibraltar Bird Reports (published by GONHS) - Surveillance monitoring data collected by the EPRU.
	D1C3 (secondary) Population demographic characteristics <ul style="list-style-type: none"> - Equivalent to C1D2.
	D1C4 (secondary) Distributional range <ul style="list-style-type: none"> - Equivalent to C1D2.
	D1C5 (secondary) Habitat Condition <ul style="list-style-type: none"> - Data / information reviewed to inform "Habitats" (see Section 4.2.2, 4.2.2.1 and 4.2.2.2)
Measures**	D1M1 – Continued implementation of existing legislation and management plans in place, including in relation to: <ul style="list-style-type: none"> - Habitat and Birds Directives and associated site protection measures within and outside designated sites in Gibraltar - Marine Protection Regulations 2014⁷⁴ - Nature Protection Act 1991⁷⁵ - Gibraltar Marine Reserve Management Plan⁷⁶ - Gibraltar River Basin Management Plan
	D1M2 – Continued implementation of voluntary citizen science marine monitoring programme (running since 2017) to raise environmental awareness and collate relevant data.
	D1M3 – Continued efforts to seek a more active involvement in the Barcelona's Convention Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes.
	D1M4 – Regular seabird monitoring to update population estimates, distribution, demographic data and pressures.
Going forward	Further develop our knowledge of breeding populations and the impact of human pressures on seabirds. It is anticipated that GES targets for seabirds will be maintained between 2018 – 2024.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

⁷⁴ Available at: <http://www.gibraltarlaws.gov.gi> [Accessed on 28/08/19]

⁷⁵ Available at: <https://www.gibraltarlaws.gov.gi> [Accessed on 28/08/19]

⁷⁶ Available at: <https://www.gibraltar.gov.gi> [Accessed on 28/08/19]

4.2.1.2 Marine Mammals

a) Marine Mammals - Scope of the Assessment and Criteria

The bathymetry and sheltered areas of the Bay of Gibraltar along with the easy access to deep offshore waters provides good habitat for numerous marine mammal species as recognised by the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS) which has designated the wider region as an Important Marine Mammal Area (IMMA)⁷⁷. The Bay itself is particularly important for populations of Striped Dolphin (*Stenella coeruleoalba*), Common Dolphin (*Delphinus delphis*) and Bottlenose Dolphin (*Tursiops truncatus*) with their Mediterranean subpopulations classified as 'Vulnerable'⁷⁸, 'Endangered'⁷⁹ and 'Vulnerable'⁸⁰ respectively in the IUCN red list.

BGTW and the wider Straits of Gibraltar are also important for numerous larger species of cetaceans moving between the Mediterranean and Atlantic including the Minke Whale (*Balaenoptera spp.*), Long-finned Pilot Whale (*Globicephala melas*), Sperm Whale (*Physeter microcephalus*), Cuvier's Beaked Whale (*Ziphius cavirostris*), Fin Whale (*Balaenoptera physalus*), Humpback Whale (*Megaptera novaeangliae*) and the Killer Whale (*Orcinus orca*). Some of these species use BGTW at different times of the year for feeding especially those that are resident in the Strait e.g. Sperm whale. All above-mentioned species are listed in Annex IV of the Habitats Directive, with Bottlenose dolphins also listed in Annex II of the same Directive.

This section predominantly focuses on indicator breeding species within BGTW namely Striped, Common and Bottlenose Dolphins. However, data on foraging and migrating cetaceans e.g. Sperm and Fin Whales have also been considered. The assessment is largely based on data collected during local opportunistic surveys conducted between 2017 and 2018^{81,82} and stranding data⁸² gathered by the Marine Mammal Information, Research & Conservation Group (MMIRC)⁸³ commissioned by the DESCCH. Surveillance monitoring data routinely collected by the EPRU during the reporting period have also been used. Reference is also made to data collected at a regional level particularly as a result of initiatives under ACCOBAMS⁸⁴ and the Mediterranean 2017 Quality Status Report.

Regarding MSFD 2017 criteria, D1C1 (primary) Bycatch mortality, D1C2 (primary) Population abundance, D1C4 (secondary) Distributional range, D1C5 (secondary) Habitat Condition and D1C3 (secondary) Population demographic characteristics have been used. However, due to an insufficient amount of data to make accurate conclusions, it has not been possible to fully assess all sub-criteria for D1C3 e.g. reproductive and mortality rates.

Regarding regional assessments, the Mediterranean 2017 Quality Status Report applied three common indicators to marine mammals:

- Common Indicator 3: Species distributional range – Marine Mammals⁸⁵, which includes reference all three species;
- Common Indicator 4: Population and abundance of selected species – Marine Mammals⁸⁶, which includes reference to all three species; and

⁷⁷ See <https://www.marinemammalhabitat.org> [Accessed on 27/08/19]

⁷⁸ See <https://www.iucnredlist.org> [Accessed on 27/08/19]

⁷⁹ See <https://www.iucnredlist.org> [Accessed on 27/08/19]

⁸⁰ See <https://www.iucnredlist.org> [Accessed on 27/08/19]

⁸¹ Marine Mammal Information, Research & Conservation [MMIRC] (2017) Cetaceans sighted in Gibraltar: Opportunistic surveys in British Gibraltar Territorial Waters. March – November 2017. Report prepared for the DEHCC.

⁸² MMIRC (2018) Monitoring Cetaceans in BGTW: Opportunistic Surveys (April – December 2018) and Strandings Report (February 2017 – December 2018). Report prepared for the DEHCC.

⁸³ See: <https://www.mmirc.com/> [Accessed 27/08/19]

⁸⁴ See <http://www.accobams.org> [Accessed on 23/08/19]

⁸⁵ Available at: <https://www.medqsr.org> [Accessed on 22/08/19]

⁸⁶ Available at: <https://www.medqsr.org> [Accessed on 20/08/19]

- Common Indicator 5: Population demographic characteristics - Marine Mammals⁸⁷, which only makes reference to Bottlenose Dolphin in the northern Adriatic Sea.

b) *Marine Mammals - Main pressures*

Marine mammals, particularly dolphin species, are exposed to a number fishing practices in BGTW notably illegal commercial fishing from foreign vessels using nets and rod and line recreational/sports fishing employing 'popping' techniques. Marine mammals are also vulnerable to changes in water quality, underwater noise, marine litter, disturbance/collisions caused by shipping and tourism/leisure activities e.g. regulated and unregulated whale/dolphin watching and small recreational craft.

c) *Marine Mammals - Results from the MSFD Assessment*

Striped Dolphin (*Stenella coeruleoalba*)

- **D1C1 (mortality rate from incidental by-catch)**

Stranding data are collected and reported by the DESHCC. In the case of the Striped Dolphin, a total of four and five individuals were recorded stranded in 2017 and 2018 respectively, half of which occurred during the Winter months. It should be noted that no evidence could be found on whether these strandings had been caused by fishing by-catch within BGTW and whether these individuals were local breeders.

- **D1C2 (population abundance)**

The Mediterranean 2017 Quality Status report indicates that comprehensive basin-wide estimates of density and abundance are lacking for Striped Dolphins across the Mediterranean region. Ship and aerial surveys conducted in the Central and Western Mediterranean basin show seasonal, annual and geographical patterns with an estimated population of 95,000 individuals found in the North-Western Mediterranean Sea. Values decrease during the winter and towards the Southern and Eastern sectors.

Boat-based surveys conducted between March and November 2017 reported 26 sightings of cetaceans, including four of Striped Dolphins, and estimated an average group size of 90 individuals with highest group sizes recorded in July and August. Boat-surveys conducted between April and December 2018 reported two sightings of Striped Dolphins and estimated an average group size of 31 individuals. Ongoing monitoring suggests that the current estimate of Striped Dolphins in the Bay and Southern Waters SAC/SPA is approximately 200 individuals although exact numbers could be higher if transient individuals are also included⁸⁸.

- **D1C4 (Species distributional range)**

The Mediterranean 2017 Quality Status report indicates that Striped Dolphins are the most abundant cetacean species in the Mediterranean Sea, mainly using offshore deep waters, from the Levantine Basin to the Strait of Gibraltar. During the 2017 and 2018 surveys, Striped dolphins were regularly observed in the deep waters of the Bay of Gibraltar submarine canyon and most were recorded travelling. This highlights how BGTW can be used as an important corridor into feeding / nursing / breeding / resting areas. Their distributional range is therefore considered to be in line with prevailing physiographic, geographic and climatic conditions.

- **D1C5 (Habitat condition)**

Given their preference for deeper areas, Striped Dolphins are subject to lower levels of human pressure than other dolphin species and data and evidence suggest that habitat conditions are sufficiently adequate to maintain Striped Dolphin populations locally stable.

⁸⁷ Available at: <https://www.medqsr.org> [Accessed on 20/08/19]

⁸⁸ DESCC (2019) Habitats Directive Article 17 Surveillance Monitoring Report.

Common Dolphin (*Delphinus delphis*)- **D1C1 (mortality rate from incidental by-catch)**

Data collected within BGTW during the reporting period did not record any stranding of Common Dolphins from incidental by-catch.

- **D1C2 (population abundance)**

The Mediterranean 2017 Quality Status Report indicates that Common Dolphins used to be very common in the Mediterranean Sea and the species was subject to a large decline during the 20th century which drastically reduced its population. According to the IUCN, accurate population abundance estimates are not available for the Mediterranean Sea apart from localized areas⁸⁹. It is worth noting that Alboran IMMA criteria states that the Alboran Sea has the largest concentration of the Common Dolphin subpopulation within the whole Mediterranean. The most recent abundance estimate of Common Dolphin in part of the proximal region of the Alboran Sea is 19,082 individuals (CV=4.7%).

Boat-based surveys conducted within BGTW between March and November 2017 reported 16 sightings of Common Dolphin and estimated an average group size of 97 individuals with highest group sizes recorded in July and August. Interestingly, two hybrid individuals (Bottlenose and Common Dolphins) were also recorded during this survey considered the result of ongoing interaction (>10 years) between a female Bottlenose Dolphin and Common Dolphins⁹⁰. Boat-surveys conducted between April and December 2018 reported six sightings of Common Dolphin and estimated an average group size of 57 individuals. Ongoing monitoring suggests that an estimated 390 Common Dolphins are regularly present in the Bay and Southern Waters SAC/SPA although the number of resident and transient individuals recorded in the wider Straits area exceeds 1800⁹¹.

- **D1C4 (Species distributional range)**

Common Dolphins are distributed throughout BGTW with the highest concentrations typically found in the Southern Waters SAC/SPA. Their range is considered favourable.

- **D1C5 (Habitat condition)**

Common dolphins in particular are reported to suffer from elevated levels of human pressure in the Bay and the wider Straits of Gibraltar particularly due to commercial fishing and 'popping' techniques employed by recreational fishermen. The main Common Dolphin breeding/nursery ground in the North-West section of BGTW was designated as a Dolphin Protection Zone in 2018⁹² to curtail this pressure. The ban on popping within the Dolphin Protection Zone is enforced by the DESCCH's Environmental Protection and Research Unit (EPRU).

Bottlenose Dolphin (*Tursiops truncatus*)- **D1C1 (mortality rate from incidental by-catch)**

Data collected during the monitoring period did not record any strandings of Bottlenose Dolphins.

⁸⁹ Bearzi, G. 2003. *Delphinus delphis* (Mediterranean subpopulation). The IUCN Red List of Threatened Species 2003: e.T41762A10557372. <https://dx.doi.org/10.2305/IUCN.UK.2003.RLTS.T41762A10557372.en>.

⁹⁰ Espada R, Olaya-Ponzzone L, Haasova L, Martín E, García-Gómez JC (2019) Hybridization in the wild between *Tursiops truncatus* (Montagu 1821) and *Delphinus delphis* (Linnaeus 1758). PLoS ONE 14(4): e0215020. <https://doi.org>

⁹¹ DESCCH (2019) Habitats Directive Article 17 Surveillance Monitoring Report.

⁹² DESCCH (2019) Press release. Available at: <https://www.gibraltar.gov.gi> [Accessed on 4/09/18]

- **D1C2 (population abundance)**

The IUCN assessment for the Mediterranean population of Bottlenose dolphin indicates that less than 10,000 Bottlenose Dolphins are present in the Basin. The Alboran IMMA criteria⁷⁷ also indicates that the Alboran Sea has relatively large concentrations of Bottlenose Dolphins. The latest abundance estimate of Bottlenose dolphin numbers in proximal areas of the Alboran Sea is 2,150 animals (CV=24.3).

Bottlenose Dolphins have a significant presence in BGTW, particularly during the Spring and Summer, when they use the Southern Waters and the Bay of Gibraltar generally, as a breeding and feeding ground⁹³. Latest data collected during vessel-based photo ID surveys reveal that approximately 30 individuals are regularly observed in the Bay although exact numbers could be as high as 90 and over 400 in the wider Straits of Gibraltar⁹⁴.

- **D1C4 (Species distributional range)**

Bottlenose Dolphins are distributed throughout BGTW particularly in the Southern Waters SAC/SPA. Their range is considered favourable.



- **D1C5 (Habitat condition)**

Habitat conditions are sufficiently adequate to maintain Bottlenose Dolphin population numbers stable in BGTW. The abundance and diversity of typical prey species are also considered favourable and these include benthic fish such as the European Conger (*Conger conger*), European Squid (*Loligo vulgaris*), Common Octopus (*Octopus vulgaris*), Horse Mackerel (*Trachurus spp.*) and crustaceans.

d) *Marine Mammals – Overall Assessment and Perspective for 2018 – 2024*

Table 4-3 provides an overview of the overall assessment and perspective for 2018 – 2024 for marine mammals.

Table 4-4: Marine Mammals – Overall Assessment and Perspective for 2018 - 2024

Qualitative descriptor for determining GES	D1 - 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	
Current Environmental Status (2019)	 	Gibraltar has partially achieved its GES for marine mammals. Adequate data on abundance and distribution of indicator species exist (i.e. Striped Dolphin, Common Dolphin and Bottlenose Dolphin) and there has been a significant increase in Fin Whale abundance in BGTW recently. However, human pressures could be affecting the achievement of GES.
Mediterranean GES Targets	(Distributional range) <ul style="list-style-type: none"> - Human activities having the potential to exclude marine mammals from their natural habitat within their range area or to damage their habitat are regulated and controlled. - Conservation measures implemented for the zones of importance for cetaceans. - Fisheries management measures that strongly mitigate the risk of incidental taking of cetaceans during fishing operations are implemented. <hr/> (Population abundance) <ul style="list-style-type: none"> - (Cetaceans): Populations recover towards natural levels. <hr/> (Demographic characteristics) <ul style="list-style-type: none"> - Decreasing trends in human induced mortality. 	

⁹³ Shaw, E. 1998. Dolphins in the Bay of Gibraltar. Almoraima, 19: pp. 161-71.

⁹⁴ Marine Mammal Information, Research & Conservation [MMIRC] (2017) Cetaceans sighted in Gibraltar: Opportunistic surveys in British Gibraltar Territorial Waters. March – November 2017. Report prepared for the DEHCC.

	<ul style="list-style-type: none"> (Cetaceans): Appropriate measures implemented to mitigate incidental catch, prey depletion and other human induced mortality.
Gibraltar GES Targets*	D1T3 – Indicator marine mammal species distribution and abundance are maintained.
	D1T4 – Zero by-catch mortality of indicator cetacean species.
	D1T5 – Ensure that disturbance and pressures caused by human activity are below levels that can have a significant impact on feeding and migratory patterns, reproductive success, physiological health and/or long-term trends in behaviour. Specific pressures to assess include physical injury, chemical contamination, marine litter and underwater noise.
	Note: These Targets are consistent with the Conservation Objectives established for the Southern Waters of Gibraltar SAC/SPA.
Criteria and data to be used for measuring progress towards GES	D1C1 (primary) Bycatch mortality <ul style="list-style-type: none"> Data collected via EPRU incident reporting mechanism including NGO and citizen monitoring platforms
	D1C2 (primary) Population abundance <ul style="list-style-type: none"> Publicly available data within Barcelona Convention area Alboran Sea IMMA data Systematic monitoring data collected by EPRU in BGTW (seasonal marine mammal surveys) including citizen science data
	D1C3 (secondary) Population demographic characteristics <ul style="list-style-type: none"> Equivalent to D1C2.
	D1C4 (secondary) Distributional range <ul style="list-style-type: none"> Equivalent to D1C2.
	D1C5 (secondary) Habitat Condition <ul style="list-style-type: none"> Data / information reviewed to inform “Habitats” (see Section 4.2.2, 4.2.2.1 and 4.2.2.2) Evidence on existing human pressures.
Measures**	D1M1 – Continued implementation of existing legislation and management plans in place: <ul style="list-style-type: none"> Habitat and Birds Directives and associated site protection measures within designated sites in Gibraltar; Marine Protection Regulations 2014 particularly the Cetacean Protocol developed for BGTW (Schedule 3 of the Marine Protection Regulations. See: http://www.thinkinggreen.gov.gi/uploads/biodiversity/2018-Cetacean_Protocol.pdf; Tuna Preservation Regulations 2014; Dolphin Protection Zone Regulations 2018; Nature Protection Act 1991; Gibraltar Marine Reserve Management Plan; Gibraltar River Basin Management Plan.
	D1M2 – Continued implementation of voluntary citizen science marine monitoring programme (running since 2017) to raise environmental awareness and collate relevant data.
	D1M3 – Continued efforts in seeking a more active involvement in the Barcelona’s Convention Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes.
	D1M5 – Enforcement within Dolphin Protection Zone and wider BGTW
	D1M6 – Increase environmental awareness among recreational fishing groups with particular emphasis on the impacts of ‘popping’.
Going forward	Further develop our knowledge of breeding populations and understanding of the impact of human pressures on marine mammals. Data and

information on marine mammal populations relevant to BGTW will continue to be gathered facilitating future assessments of GES.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number.

4.2.1.3 Marine Reptiles

a) *Marine Reptiles - Scope of the Assessment and Criteria*

There are three sea turtle species that have been previously recorded within BGTW. These include the Green (*Chelonia mydas*), Loggerhead (*Caretta caretta*) and Leatherback turtles (*Dermochelys coriacea*) which are classified as 'Endangered'⁹⁵, 'Vulnerable'⁹⁶ and 'Vulnerable'⁹⁷ respectively in the IUCN Red List. These animals are migratory visitors with no marine turtle nesting sites identified along the coast of Gibraltar to date. This section focuses on the Loggerhead turtle which is the only regularly occurring marine reptile in BGTW. Reference is also made to regional data reported under ACCOBAMS and the Mediterranean 2017 Status Report.

Regarding MSFD 2017 criteria, D1C1 (primary) Bycatch mortality, D1C2 (primary), Population abundance, D1C4 (secondary) Distributional range, D1C5 (secondary) Habitat Condition and D1C3 (secondary) Population demographic characteristics have been used. However, due to an insufficient amount of data to make accurate conclusions, it has not been possible to fully assess all sub-criteria for D1C3 e.g. reproductive and mortality rates. This limitation is further compounded by the fact that Loggerhead turtles recorded in BGTW are either foraging and/or migratory and therefore transient.

Regarding regional assessments, the Mediterranean 2017 Quality Status Report applied three common indicators to marine reptiles:

- Common Indicator 3: Species distributional range – Marine Reptiles⁹⁸, which includes reference to loggerhead and green turtles but only provides data about distribution in the central and eastern basins, with limited evidence for the western Mediterranean basin;
- Common Indicator 4: Population and abundance of selected species – Marine Reptiles⁹⁹, which includes reference to Green and Loggerhead Turtles; and
- Common Indicator 5: Population demographic characteristics - Marine Reptiles¹⁰⁰, which makes reference to Green and Loggerhead turtles but only to confirm the lack of data for Mediterranean sites outside the Eastern Basin.

b) *Marine Reptiles - Main pressures*

Marine reptiles are particularly vulnerable to marine litter, especially plastic pollution, fishing by-catch, collisions with high-speed vessels and contamination.

c) *Marine Reptiles - Results from the MSFD Assessment*

Loggerhead Turtle (*Caretta caretta*)

- **D1C1 (mortality rate from incidental by-catch)**

Both surveillance monitoring and stranding data collected by the EPRU show that foreign commercial fishing vessels, which are illegally using nets in BGTW, can result in by-catch of Loggerhead turtles

⁹⁵ See <https://www.iucnredlist.org> [Accessed on 27/08/19]

⁹⁶ See <https://www.iucnredlist.org> [Accessed on 27/08/19]

⁹⁷ See <https://www.iucnredlist.org> [Accessed on 27/08/19]

⁹⁸ Available at: <https://www.medqsr.org> [Accessed on 22/08/19]

⁹⁹ Available at: <https://www.medqsr.org> [Accessed on 20/08/19]

¹⁰⁰ Available at: <https://www.medqsr.org> [Accessed on 20/08/19]

particularly when trammel and drift nets are used. There is also evidence of physical collisions due to shipping in the Strait particularly with high-speed craft.

- **D1C2 (population abundance)**

The Mediterranean 2017 Quality Status Report indicates that there are over 100 sites around the Mediterranean hosting Loggerhead turtle nests with Greece and Turkey alone hosting more than 75% of all the known nests in the Mediterranean Basin. The Strait of Gibraltar, including BGTW, are used during passage between the Atlantic and the Mediterranean as highlighted by the 2018 ACCOBAMS survey¹⁰¹.

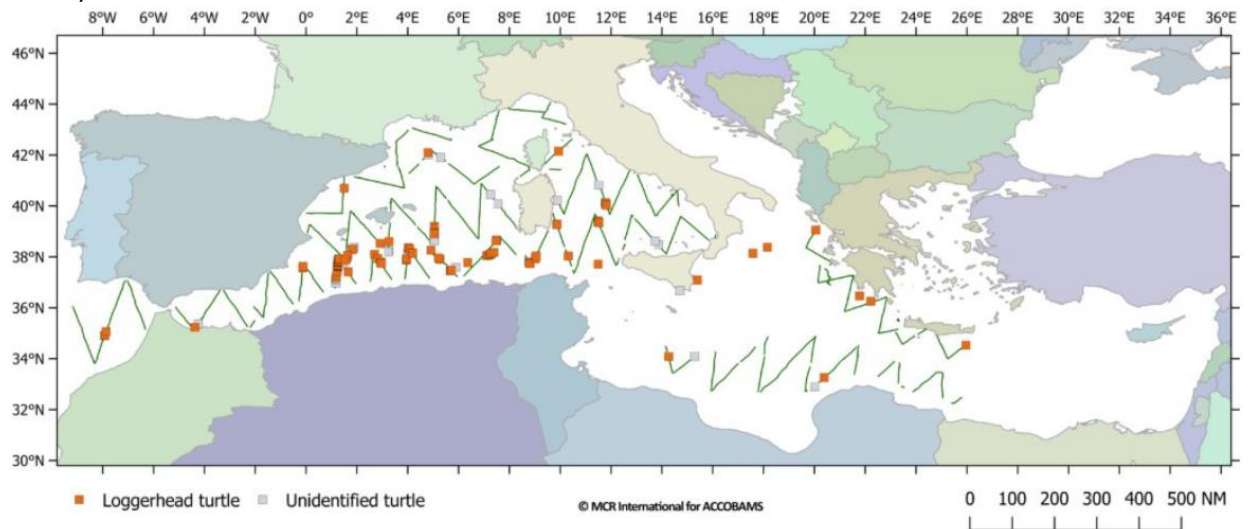


Figure 4-1: Transects covered by 2018 ACCOBAMS survey.

Loggerhead turtle numbers in BGTW are routinely recorded as part of the DESHCC's surveillance monitoring programme which includes the use of citizen science monitoring platforms such as the NEMO application developed by the Nautilus Project. Data collected shows that the species has a regular presence in BGTW, particularly during the Spring and Summer, when they use the Southern Waters and the wider Straits of Gibraltar. Latest estimates suggest that approximately 30 (minimum) to 100 (maximum) Loggerhead turtles are observed foraging within BGTW¹⁰². Data collected during the assessment period indicate that there may be an increasing number of foraging and/or migratory Loggerhead turtles recorded in BGTW. Further research is required.

- **D1C4 (Species distributional range)**

Loggerhead turtles are found throughout BGTW particularly in the Southern Waters SAC/SPA. Their range is therefore considered favourable.


- **D1C5 (Habitat condition)**

Habitat conditions are considerable favourable for foraging/migrating Loggerhead turtles in BGTW. The abundance and diversity of typical prey species are also considered favourable.

¹⁰¹ Preliminary results available at: <http://www.accobams.org> [Accessed on 4/09/19]

¹⁰² DEHCC (2019) Habitats Directive Article 17 Surveillance Monitoring Report.

d) *Marine Reptiles – Overall Assessment and Perspective for 2018 – 2024***Table 4-5: Marine Reptiles – Overall Assessment and Perspective for 2018 - 2024**

Qualitative descriptor for determining GES	D1 - 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.	
Current Environmental Status (2019)		Gibraltar has partially achieved its GES for marine reptiles. Numerous indicators are considered favourable and there appears to be an increase in the abundance of indicator species (Loggerhead turtles) since the last assessment. However, more information is required to better assess if there have been any significant impacts from natural or human-induced factors.
Mediterranean GES Targets	(Distributional range)	
	<ul style="list-style-type: none"> - Turtle distribution is not significantly affected by human activities. - Turtles continue to nest in all known nesting sites. - Protection of known nesting, mating, foraging, wintering and developmental turtle sites. - Human activities having the potential to exclude marine turtles from their range area are regulated and controlled. - The potential impact of climate change is assessed. 	
	(Population abundance)	
Gibraltar GES Targets	<ul style="list-style-type: none"> - No human induced decrease in population abundance. - Population recovers towards natural levels where depleted. 	
	(Demographic characteristics)	
Criteria and data to be used for measuring progress towards GES	D1T6 – Zero by-catch mortality of Loggerhead turtles	
	D1T7 – Loggerhead turtle distribution and abundance are maintained.	
	D1T8 - Ensure that disturbance and pressures caused by human activity are below levels that can have a significant impact on feeding and migratory patterns, physiological health and/or long-term trends in behaviour. Specific pressures to assess include physical injury, chemical contamination, marine litter and underwater noise.	
	Note: These Targets are consistent with the Conservation Objectives established for the Southern Waters of Gibraltar SAC/SPA.	
	D1C1 (primary) Bycatch mortality	- Data collected via EPRU incident reporting mechanism including NGO and citizen monitoring platforms.
	D1C2 (primary) Population abundance	- Publicly available data within Barcelona Convention area - Alboran Sea IMMA data - Systematic monitoring data collected in BGTW by EPRU (sightings and strandings) including citizen science data
D1C3 (secondary) Population demographic characteristics	- Equivalent to D1C2.	
D1C4 (secondary) Distributional range	- Equivalent to D1C2.	
D1C5 (secondary) Habitat Condition	- Data / information reviewed to inform "Habitats" (see Section 4.2.2, 4.2.2.1 and 4.2.2.2) - Evidence on existing human pressures.	
Measures**	D1M1 – Continued implementation of existing legislation and management plans in place including: <ul style="list-style-type: none"> - Habitat and Birds Directives and associated site protection measures within designated sites in Gibraltar; 	

	<ul style="list-style-type: none"> - Marine Protection Regulations 2014; - Nature Protection Act 1991; - Gibraltar Marine Reserve Management Plan; - Gibraltar River Basin Management Plan.
	D1M2 – Continued implementation of voluntary citizen science marine monitoring programme (running since 2017) to raise environmental awareness and collate relevant data.
	D1M3 – Continued efforts in seeking a more active involvement in the Barcelona’s Convention Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes.
Going forward	Further develop our understanding of foraging and migratory patterns of marine reptiles and potential impact of human pressures in BGTW.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

4.2.1.4 Fish and shellfish

a) *Fish and shellfish - Scope of the Assessment and Criteria*

Gibraltar has no industrial commercial fishing fleet but small-scale (cottage) fishing and recreational fishing does take place. Although commercial fishing using specific fishing methods listed under the Nature Protection Act 1991 is prohibited, illegal commercial fishing activities from Spanish registered commercial vessels does occur in BGTW and within the Southern Waters of Gibraltar SAC/SPA. These incidents are challenged and reported by the Department of the Environment’s Environmental Protection and Research Unit (EPRU) and the Royal Gibraltar Police. Similarly, there are no commercial shellfish fisheries operating from Gibraltar and methods used to obtain shellfish, such as raking the seabed, are illegal under the Nature Protection Act 1991. The extent to which illegal raking activities in BGTW carried out by Spanish registered commercial vessels are affecting shellfish abundance is presently unknown and requires further research.

Fish species targeted within BGTW and in adjacent waters are a mixture of local stocks and regional/shared stocks. Highly migratory stocks also pass through Gibraltar’s waters from the Atlantic through the Straits of Gibraltar and from the Mediterranean. Notably recreational/sports fishing quotas are implemented for the Atlantic Bluefin Tuna (*Thunnus thynnus*) in Gibraltar. Catch data are being provided to the International Convention on the Conservation of Atlantic Tuna (ICCAT) Secretariat although Gibraltar is not part of the ICCAT at present. The Atlantic Bluefin Tuna, classified as “endangered” by the IUCN¹⁰³, is one of the main commercial fish species in the Mediterranean. The quota for Atlantic Bluefin Tuna was increased from 15.5 tonnes to 16.74 tonnes in 2019, reflecting the parallel increase in quotas allowed by ICCAT. The increase in Atlantic Bluefin tuna quota has in turn resulted in increased sports/recreational fishing activity in BGTW during the assessment period.

A fishing ban on all species of sharks, skates and rays is currently enforced in Gibraltar making it one of the few jurisdictions in Mediterranean with a total ban on the capture of elasmobranchs. Yearly moratoria along with catch restrictions are also in place for other species such as the Common Octopus (*Octopus vulgaris*) where a 5kg limit is currently in place for temporary recreational fishing licenses. A range of other species, as listed under Schedule 2 of the Marine Protection Regulations, are also afforded strict protection whereby only specimen can be landed by an angler. These include:

Xiphias gladius (Swordfish)

Makaira spp. (Marlins)

Tetrapturus spp. (Spearfish)

Istiophorus albicans (Atlantic Sailfish)

Merluccius merluccius (European Hake)

¹⁰³ Available at: <https://www.iucnredlist.org> [Accessed on 02/09/19]

Argyrosomus regius (L.) (Meagre)
Homarus gammarus (European Lobster)
Palinurus spp. (Lobster spp.)

Minimum sizes for a wide variety of fish species targeted by cottage and recreational anglers are also implemented in BGTW and these are included in Schedule 4 of the Marine Protection Regulations 2014.

As Gibraltar has no commercial fishing fleet, only limited fish landing data are available. However, data on recreational fishing catches are available and can serve as a good indicator of the fish abundance and diversity. Accordingly, this assessment used the latest dataset obtained from local recreational angling clubs in Gibraltar.

Regarding MSFD 2017 criteria, the following criteria have not been used as part of this reporting cycle although monitoring programmes are being implemented to help better inform future assessments.

- D1C3 (secondary) Population demographic characteristics – there is not sufficient data available at local or regional level to inform population demographic characteristics;
- D1C4 (secondary) Distributional range, there is not sufficient data available at local and regional level to confirm distribution of key commercial fish species.

The 2017 MSFD criteria also includes specific primary criteria relevant to commercially exploited species including D3C1 - Fishing mortality rate in relation to maximum sustainable yields (MSY), D3C2 - Spawning Stock Biomass in relation to MSY and D3C3 - age and size distribution of individuals. However, given that there is no commercial fishing fleet in Gibraltar and the lack of available data on any of the above, these criteria have not been applied in this section.

Regarding regional assessments, the Mediterranean 2017 Quality Status Report provides an overview of aquaculture and fisheries operations in the Mediterranean¹⁰⁴ and applies the following common indicators to commercially exploited fish and shellfish species:

- Common Indicator 7: Spawning stock Biomass¹⁰⁵
- Common Indicator 8: Total landings¹⁰⁶
- Common Indicator 9: Fishing Mortality¹⁰⁷

b) Fish and shellfish - Main pressures

Fish species are vulnerable to extraction through recreational fishing practices and illegal foreign commercial fisheries. There is also potential for fish and shellfish species to be affected by water quality changes (e.g. as a result of seabed disturbance), marine litter, invasive species and underwater noise (e.g. produced by shipping traffic).

c) Fish and shellfish - Results from the MSFD Assessment

- **D1C1 (primary) Bycatch mortality**

There are presently no data to suggest that cottage and/or recreational fishing practices carried out in BGTW are resulting in bycatch mortality which could threaten the long-term viability and recovery of fish populations. However, additional data and research are required to better assess this descriptor in future reporting cycles.

- **D1C2 (population abundance)**

¹⁰⁴ Available at: <https://www.medqsr.org> [Accessed on 28/08/19]

¹⁰⁵ Available at: <https://www.medqsr.org> [Accessed on 28/08/19]

¹⁰⁶ Available at: <https://www.medqsr.org> [Accessed on 28/08/19]

¹⁰⁷ Available at: <https://www.medqsr.org> [Accessed on 29/08/19]

The Mediterranean 2017 Quality Status Report indicates that about 85% of Mediterranean and Black Sea stocks assessed are fished at biologically unsustainable levels. Demersal stocks experience higher fishing mortality rates while small pelagic stocks show average fishing mortality rates close to the target. Sub-regional analysis revealed that in the Western Mediterranean most stocks were at low or intermediate biomass levels, with a small representation of high biomass stocks (23%). In the Western Mediterranean, marine landings, by main group of species, reached a peak of about 432,493 tons in 2006. This was followed by a significant downward trend all the way up to 2014. This peak was particularly observed in the small pelagic landing group which includes sardines and anchovies which accounts for approximately 60% of the total Western Mediterranean landings.

The Management of Marine Living Resources in the Waters around Gibraltar (2012) provided a summary of species caught in BGTW between 1998 and 2012. These data were obtained from the three main fishing clubs based in Gibraltar (see Section 3.2.8). Table 4-6 shows the top 12 species caught by the Medsac recreational fishing club between 2012 and 2017. The total number of fish caught varied between 2,645 (2017) and 3,710 (2016) and given the recreational nature of fishing, releases ranged between 24% (2013) and 45% (2017)¹⁰⁸.

More recent surveillance monitoring efforts carried out by the DESHCC and EPRU indicate that sightings and catches of some species have increased e.g. Atlantic Bluefin tuna (*Thunnus thynnus*), Dusky Grouper (*Epinephelus marginatus*), Golden Blotch Grouper (*Epinephelus costae*), Meagre (*Argyrosomus regius*), Common Dentex (*Dentex dentex*) and European lobster (*Homarus gammarus*) whereas others may have recently decreased in numbers locally e.g. European Seabass (*Dicentrarchus labrax*).

Table 4-6: Fish catches recorded by MedSac between 2012 and 2017.

Species	2012	2013	2014	2015	2016	2017
Gilthead seabream (<i>Sparus aurata</i>)	225	479	266	252	386	396
White seabream (<i>Diplodus sargus</i>)	386	427	413	391	559	394
Saddled seabream (<i>Oblada melanura</i>)	408	224	546	500	466	337
Bogue (<i>Boops boops</i>)	102	91	120	197	271	325
Testa Negra (<i>Diplodus vulgaris</i>)	238	389	360	264	278	321
Comber (<i>Serranus cabrilla</i>)	292	352	180	147	109	290
Black seabream (<i>Spondyliosoma cantharus</i>)	363	234	142	86	107	165
Ballan wrasse (<i>Halichoeres pictus</i>)	12	24	12	48	65	68
Common seabream (<i>Pagrus pagrus</i>)	54	50	56	48	81	47
Scorpion fish (<i>Scorpaena scrofa</i>)	40	29	24	18	22	37
Mackerel (<i>Scombridae</i>)	288	90	71	144	133	34
Mediterranean rainbow wrasse (<i>Coris julis</i>)	72	61	42	31	18	23

- D1C5 (Habitat Condition)



Habitat conditions are generally considerable favourable for sandy substrates and most deep water reefs surveyed in BGTW, although specific conditions for different habitat types or locations can vary. Shallow water coralligenous reefs are being particularly affected by the invasive alga *Rugulopterix okumurae* throughout BGTW and this could be having a detrimental impact on fish species abundance and diversity aside from the habitat itself.

d) Fish and shellfish – Overall Assessment and Perspective for 2018 – 2024

Table 4-7: Fish and shellfish – Overall Assessment and Perspective for 2018 – 2024.

Qualitative descriptor for determining GES	D1 - 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.
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¹⁰⁸ Excludes 2012 fish catches, as there is no data on total fish caught and proportion released.

	D3 - Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.	
Current Environmental Status (2019)	 	The extent to which Gibraltar has achieved its GES for fish and shellfish species is uncertain. Although some species are showing signs of recovery (e.g. Atlantic Bluefin tuna, Grouper, Meagre, etc.) there is not sufficient information to assess overall changes in abundance and distribution of all key species targeted in BGTW.
Mediterranean GES Targets	<p>Spawning stock biomass</p> <hr/> <p>Total landings:</p> <ul style="list-style-type: none"> - Long term high yields; - Maximum Sustainable Yields; - Reduction of Illegal, Unreported and Unregulated fishing (IUU) catch; - Minimisation of discarding and incidental catch of vulnerable species. <hr/> <p>Fishing Mortality:</p> <ul style="list-style-type: none"> - F_{MSY} (fishing mortality that produces the maximum sustainable yield) - Pressure: $F_{0.1}$ a proxy of F_{MSY} (more precautionary) 	
Gibraltar GES Targets	<p>D1T7 - Fish species distribution, population size and community composition are maintained.</p> <p>D1T8 - Incidental by-catch is below levels that can threaten the long-term viability and recovery of fish populations.</p>	
Criteria and data to be used for measuring progress towards GES	<p>D1C1 (primary) Bycatch mortality</p> <hr/> <p>D1C2 (primary) Population abundance</p> <hr/> <p>D1C3 (secondary) Population demographic characteristics</p> <hr/> <p>D1C4 (secondary) Distributional range</p> <hr/> <p>D1C5 (secondary) Habitat Condition</p> <hr/> <p>D3C3 (primary) age and size distribution of individuals</p>	<ul style="list-style-type: none"> - Regional fisheries data e.g. GFCM; - Cottage, sport and recreational catch data collected in BGTW by the DESHCC. <hr/> <ul style="list-style-type: none"> - Regional fisheries data e.g. GFCM; - Cottage, sport and recreational catch data collected in BGTW by the DESHCC - Fishing pressure in different locations of BGTW; - Tagging programmes and other research studies implemented by the DESHCC in conjunction with local fishing clubs. <hr/> <ul style="list-style-type: none"> - Equivalent to D1C2. <hr/> <ul style="list-style-type: none"> - Equivalent to D1C2. <hr/> <ul style="list-style-type: none"> - Data / information reviewed to inform "Habitats" (see Section 4.2.2, 4.2.2.1 and 4.2.2.2) - Evidence on existing human pressures. <hr/> <ul style="list-style-type: none"> - Equivalent to D1C2.
Measures**	<p>D1M1 – Continued implementation of existing legislation and management plans in place, including in relation to:</p> <ul style="list-style-type: none"> - Habitat and Birds Directives and associated site protection measures within designated sites in Gibraltar - Marine Protection Regulations 2014 - Tuna Preservation Regulations 2014 - Nature Protection Act 1991 - Gibraltar Marine Reserve Management Plan - River Basin Management Plan 	

	D1M2 – Continued implementation of voluntary citizen science marine monitoring programme (running since 2017) to raise environmental awareness and collate relevant data, including in relation to fish and shellfish species
	D1M3 – Continued efforts in seeking a more active involvement in the Barcelona’s Convention Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes aimed at protecting fish and shellfish species
Going forward	Further develop our understanding of fish and shellfish populations in Gibraltar as well increased involvement with regional fisheries organisations such as the GFCM. Engagement with local angling clubs will be maintained to monitor catches within BGTW between 2018 and 2024 facilitating future GES assessment.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

4.2.2 Habitats

The criteria relevant to habitats is presented in Table 4-2. The application of these criteria has been subject to data availability for each habitat type and their use is further clarified in Sections 4.2.2.1 and 4.2.2.2 below.

Table 4-8: Biodiversity (Descriptor 1) and Seafloor Integrity (Descriptor 6) criteria relevant to Habitats defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
Pelagic broad habitat types	D1C6 (Primary) – The condition of the habitat type, including its biotic and abiotic structure and its functions (e.g. its typical species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), is not adversely affected due to anthropogenic pressures.
Benthic broad habitat types	D6C4 (Primary) – The extent of loss of the habitat type, resulting from anthropogenic pressures, does not exceed a specified proportion of the natural extent of the habitat type in the assessment area.
	D6C5 (Primary) – The extent of adverse effects from anthropogenic pressures on the condition of the habitat type, including alteration to its biotic and abiotic structure and its functions (e.g. its typical species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), does not exceed a specified proportion of the natural extent of the habitat type in the assessment area.
Physical loss of the seabed (including intertidal areas).	D6C1 (Primary) – Spatial extent and distribution of physical loss (permanent change) of the natural seabed.
Physical disturbance to the seabed (including intertidal areas).	D6C2 (Primary) – Spatial extent and distribution of physical disturbance pressures on the seabed.
Benthic broad habitat types or other habitat types, as used under Descriptors 1 and 6.	D6C3 (Primary) – Spatial extent of each habitat type which is adversely affected, through change in its biotic and abiotic structure and its functions (e.g. through changes in species composition and their relative abundance, absence of particularly sensitive or fragile species or species providing a key function, size structure of species), by physical disturbance.

4.2.2.1 Pelagic Habitats

a) *Pelagic Habitats - Scope of the Assessment and Criteria*

Pelagic broad habitat types include coastal waters and those within and beyond the limits of the continental shelf and their status can be assessed on the basis of plankton communities and biomass.

This section focuses on the review of chlorophyll *a*, an indicator of phytoplankton biomass, which is regularly measured in BGTW. Reference is also made to regional data provided in the Mediterranean 2017 Status Report. For chlorophyll *a*, the Intercalibration Decision (2013/480/EU)¹⁰⁹ provides standard concentrations to assess chlorophyll *a* concentration. Those applied to BGTW are the standards adopted by the Northeast Atlantic Geographical Intercalibration Group applied in the Western Iberian region:

Table 4-9. Chlorophyll *a* concentration standards agreed by the Northeast Atlantic Geographical Intercalibration Group.

High-Good (ug/l)	Good-Moderate (ug/l)
5	10

Regarding MSFD 2017 criteria used, D1C6 (primary) Condition of habitat type has been applied to pelagic habitats. The Mediterranean 2017 Quality Status Report applied one common indicator associated with phytoplankton abundance:

- Common Indicator 14: Chlorophyll *a* concentration in the water column¹¹⁰, which includes reference to nutrient regimes and chlorophyll levels across the Mediterranean.

b) Pelagic Habitats - Main pressures

Pelagic habitats are particularly vulnerable to changes in water quality that, within BGTW, have the potential to be introduced via the input of nutrients, organic matter (originated by wastewater discharges) or other substances (created by other human activities, such as shipping, port activities, tourism and leisure).

As indicated in section 4.4, the input of nutrients and organic matter has the potential to lead to eutrophication episodes and affect chlorophyll *a* levels.

c) Pelagic Habitats - Results from the MSFD Assessment

- D1C6 (condition of habitat type)

The Mediterranean 2017 Quality Status Report indicates that existing knowledge of the pelagic habitats for the Mediterranean Sea is generally limited to coastal areas for which several long-term monitoring stations exist for both zooplankton and phytoplankton.

The trophic status of the Mediterranean Sea is reported to be controlled by the highly populated coastal zone and the riverine input from a draining area of 1.5 million km² that induce eutrophic trends in coastal areas. The offshore waters of the Mediterranean have been characterized as extremely oligotrophic with an increasing tendency for oligotrophy eastwards. The nutrient regime and primary productivity in the Western Mediterranean Sea is relatively higher compared to the Eastern Mediterranean Sea. Although there are a number of chlorophyll *a* monitoring stations distributed across the Mediterranean, none are located within the vicinity of BGTW.

Satellite data (1998-2014) collated across the Mediterranean indicate that chlorophyll *a* variations in coastal areas present a more complex scenario compared to oceanic regions. This is especially evident in the northern Alboran Sea, where the contribution of high frequency to total variance is >60%. Positive trends in the western Mediterranean intensify in the northern Alboran Sea¹¹¹.

The Gibraltar 2012 Initial Assessment reported the presence of diatoms (most commonly recorded type of phytoplankton) and an abundance of microflagellates. Constant levels of chlorophyll *a* were

¹⁰⁹ Directive (2013/480/EU) available at <https://publications.europa.eu> [Accessed 29/08/19]

¹¹⁰ Available at: <https://www.medqsr.org>

¹¹¹ Salgado-Hernanza, P.M., Racault, M.F., Font-Muñoz, J.S., Basterretxea, G. (2019) Trends in phytoplankton phenology in the Mediterranean sea based on ocean-colour remote sensing. *Remote Sensing of Environment* 221, 50-64

also reported, with very short-lived blooms identified in February, during the summer months and November. It was subsequently concluded that recorded levels of chlorophyll *a* indicated a high ecological status at all sites which coincides with the 2015 assessment presented in the Gibraltar RBMP (2015 - 2021). Chlorophyll *a* concentration measured between 2014 to 2019 at four monitoring sites (see Section a for more details on coastal monitoring within BGTW) are shown below.

Table 4-10: Annual Average concentration for Chlorophyll *a* recorded at each monitoring site between 2014 and 2019.

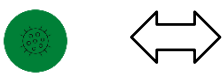
Monitoring Site		2014 (six surveys)	2015 (three surveys)	2016 (three surveys)	2017 (three surveys)	2018 (four surveys)	2019 (two surveys)
Site 1 - Sandy Bay	AA ($\mu\text{g/l}$)	2.694	1.367	1.034	0.813	1.888	<0.02
	% exceedances	17%	0%	0%	0%	25%	0%
Site 2 - Camp Bay	AA ($\mu\text{g/l}$)	1.822	1.340	0.650	0.820*	1.975	<0.02
	% exceedances	0%	0%	0%	0%	0%	0%
Site 3 - Runway (northwest)	AA ($\mu\text{g/l}$)	1.777	1.533	0.714	0.837	1.250	<0.02
	% exceedances	0%	0%	0%	0%	0%	0%
Site 4 - Mid-Harbour	AA ($\mu\text{g/l}$)	2.105	1.367	0.657	0.837	1.250	<0.02
	% exceedances	25%	0%	0%	0%	0%	0%

*Only two surveys were conducted in 2017 at Camp Bay

Although there were some exceedances recorded at Site 1 and 4, all average concentrations recorded meet the high quality thresholds (5 $\mu\text{g/l}$). It should also be noted that no harmful algal blooms have been reported within BGTW by the DESCCH between 2012 and 2019. Further work on vertical Chlorophyll-*a* profiles is required to better assess this specific Descriptor as well the integration of a wider range of phytoplankton metrics particularly in relation to abundance and diversity.

d) *Pelagic Habitats – Overall Assessment and Perspective for 2018 – 2024*

Table 4-11: Pelagic Habitats – Overall Assessment and Perspective for 2018 - 2024

Qualitative descriptor for determining GES	D1 - 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	
Current Environmental Status (2019)		Gibraltar has achieved its aim of GES for pelagic habitats. Chlorophyll <i>a</i> annual average levels consistently recorded above High / Good status during the period between 2014 and 2019.
Mediterranean GES Targets	<ul style="list-style-type: none"> - Chlorophyll <i>a</i> concentration in high-risk areas below thresholds - Decreasing trend in Chlorophyll <i>a</i> concentration in high risk areas affected by human activities 	
Gibraltar GES Targets	D1T9 – Achievement of good water quality status in relation to chlorophyll <i>a</i> and algal blooms in line with relevant thresholds;	
Criteria and data to be used for measuring progress towards GES	D1C6 (primary) Condition of habitat type	<ul style="list-style-type: none"> - Chlorophyll <i>a</i> monitoring data recorded as part of the WFD monitoring programme; - Changes in plankton communities; - Changes in plankton biomass; - Detection and reporting of algal blooms should these occur.
Measures**	D1M1 – Continued implementation of existing legislation and management plans in place, including in relation to:	

	<ul style="list-style-type: none"> - Habitat and Birds Directives and associated site protection measures within designated sites in Gibraltar; - Marine Protection Regulations 2014; - Nature Protection Act 1991; - Tuna Preservation Regulations 2014; - Gibraltar Marine Reserve Management Plan; - Gibraltar River Basin Management Plan.
	D1M3 – Continued efforts in seeking a more active involvement in the Barcelona’s Convention Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes
Going forward	Increase the number of depth stations to better assess vertical chlorophyll <i>a</i> profiles, particularly in deeper/offshore locations within BGTW, as well as integrate additional (and regionally harmonised) metrics into future assessments in relation to phytoplankton diversity and abundance. It is anticipated that GES targets for pelagic habitats will be maintained between 2018 – 2024.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

4.2.2.2 Benthic Habitats

a) *Benthic Habitats - Scope of the Assessment and Criteria*

Benthic broad habitat types include those classified by EUNIS¹¹², which provides broad scale habitat maps based on a compilation of habitat surveys conducted as part of the EMODnet Seabed Habitats project¹¹³. This section focuses on the broad habitat types identified within BGTW and makes reference to regional assessments compiled in the Mediterranean 2017 Quality Status Report. The latter report applied two common indicators to benthic habitats¹¹⁴ both of which review the latest projects implemented by the Regional Activity Centre for Specially Protected Areas (RAC/SPA)¹¹⁵.

- Common Indicator 1: Habitat distributional range;
- Common Indicator 2: Condition of the habitat’s typical species and communities.

b) *Benthic Habitats - Main pressures*

Further to the initial assessment carried out in 2012, the main pressures on benthic habitats in BGTW continue to be coastal development, fishing, shipping and contamination.

c) *Benthic Habitats - Results from the MSFD Assessment*

- **D6C3 and D6C5 (Spatial extent and condition of habitat types affected by anthropogenic pressures)**

The Mediterranean 2017 Quality Status Report indicates that the highest proportion of threatened habitats in the European Union is in the Mediterranean Sea (32%) and almost half of the Mediterranean habitat types (23) are data deficient with the remainder assessed as being of conservation concern (83%) or threatened to some degree (63%). The Gibraltar 2012 Initial Assessment provided an overview of main habitats found within BGTW which include:

¹¹² Evans, D. (2016). Revising the marine section of the EUNIS Habitat classification — Report of a workshop held at the European Topic Centre on Biological Diversity, 12 & 13 May 2016. ETC/BD Working Paper No A/2016

¹¹³ The project aims to provide a single access point to European seabed habitat data and products by assembling individual point datasets, maps and models from various sources and publishing them as interoperable data products for assessing the environmental state of ecosystems and sea basins. See EMODNET Map viewer. available at: <https://www.emodnet-seabedhabitats.eu> [Accessed on 15/08/19]

¹¹⁴ Available at: <https://www.medqsr.org> [Accessed on 28/08/19]

¹¹⁵ Namely the MedMPA network (<http://rac-spa.org/medmpanetwork>) and Medkeyhabitats (<http://rac-spa.org/medkeyhabitats>)

- **Intertidal habitats**, all of which are influenced by a tidal range limited to 1 m. 60% of these habitats were reported as present in a natural state with the rest comprised of the harbour / port area, airport and reclaimed land. Intertidal habitats include:
 - o Vertical limestone cliffs and artificial structures (e.g. harbour);
 - o Rocky (natural and artificial) intertidal shoreline rich in biodiversity including European protected species such as the Ribbed Mediterranean Limpet (*Patella ferruginea*) and Date Mussels (*Lithophaga lithophaga*);
 - o Sand and gravel/pebble beaches.
- **Sea caves**, submerged and partially submerged, used as nesting sites by seabirds and hosting a variety of sponges and tunicates (with status assessed as favourable);
- Subtidal habitats made up of **soft sand/maerl/gravel** substrate;
- **Reefs**, both natural and artificial, most of them located on the south and east side of BGTW, supporting a diversity of fish, mollusc, echinoderm and coral species. The most significant rocky outcrop is Europa Reef, extending from the shoreline over 300 m and hosting the highest levels of marine invertebrate biodiversity. Other notable reefs include Governor’s Beach Reef, Sandy Bay Reef and Eastern Beach Reef, along with the Two-Mile reef and numerous other rocky outcrops (with status assessed as stable). The Sun Swale Artificial Reef, which is part of the DESHCC’s Artificial Reef Programme was created in 2015 and is located within the vicinity of the South Mole adjacent to the Seven Sisters Beach¹¹⁶.

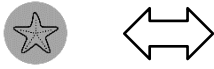
Benthic habitat restoration programmes have also been implemented since the last reporting cycle including a programme aimed to restore the population of Oysters (*Ostrea edulis*) and historical *Cymodocea nodosa* seagrass beds in the Bay. However, survival rates for the latter programme have been very low so far¹¹⁷ and therefore additional work is required.

Overall, benthic habitat conditions are generally considered favourable for sandy substrates and most deep water reefs surveyed in BGTW, although specific conditions for different habitat types or locations can vary. There has been no significant reduction in benthic habitat extent for any of the habitat types present in BGTW since the last reporting cycle.

Although there has been no significant reclamation or dredging activities in BGTW since the 2012 reporting cycle, coastal works within the harbour have taken place albeit with no significant negative effect notably the creation of a new 700 berth marina. Shallow water coralligenous reefs are being particularly affected by the invasive alga *Rugulopterix okumurae* throughout BGTW and the surrounding region. This could be having a detrimental impact on shallow water reef habitat in particular.

d) *Benthic Habitats – Overall Assessment and Perspective for 2018 – 2024.*

Table 4-12: Benthic Habitats – Overall Assessment and Perspective for 2018 - 2024

Qualitative descriptor for determining GES	D1 - 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.	
Current Environmental Status (2019)		D6 - Sea floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular are not adversely affected.
		Although some benthic habitat types have a favourable conservation status and there has been no reduction in physical extent, the degree to which Gibraltar has achieved GES for benthic habitats overall is uncertain. There is presently not

¹¹⁶ DEHCC (2015) Sun Swale Artificial Reef – Briefing Paper

¹¹⁷ CCMAR (2015) Restoration of seagrass habitats in Gibraltar. Intermediate Report 1.

	enough information to assess changes in the condition of all key benthic habitats types found in BGTW.
Mediterranean GES Targets	Habitat distributional range: <ul style="list-style-type: none"> - The ratio Natural / observed distributional range tends to 1. - Decrease in the main human causes of the habitat decline.
	Conditions of the habitat's typical species and communities: <ul style="list-style-type: none"> - No human induced significant deviation of population abundance and density from reference conditions; - The species composition shows a positive trend towards reference condition over an increasing proportion of the habitat (for recovering habitats).
Gibraltar GES Targets	D1T10 - No deterioration in qualifying features of designated sites, including a reduction of extent, in line with targets applied in hard and soft substrate habitats covered by the Habitats Directive;
	D6T11 – No habitat loss caused by human activity;
	D6T12 - The species composition of benthic habitat shows a positive trend, with an increased number of specimens /diversity/ abundance.
Criteria and data for measuring progress towards GES	<p>D6C1 (Primary) Spatial extent and distribution of physical loss (permanent change) of the natural seabed</p> <ul style="list-style-type: none"> - Systematic benthic ecology surveys (e.g. habitat mapping, species assessments) collected by DESHCC in BGTW including citizen science data; - Project-based surveys and impact assessments (e.g. EIAs) conducted to ascertain potential habitat loss; - Surveillance monitoring and quantitative analysis of individual pressures affecting benthic habitats e.g. % coverage invasive species, % area affected by anchoring activity, % area affect by marine macro-litter etc.
	<p>D6C2 (Primary) Spatial extent and distribution of physical disturbance pressures on the seabed</p> <ul style="list-style-type: none"> - Equivalent to D6C1.
	<p>D6C3 (Spatial extent of each habitat type which is adversely affected by physical disturbance)</p> <ul style="list-style-type: none"> - Equivalent to D6C1.
	<p>D6C4 (Primary) Extent of loss of the habitat type</p> <ul style="list-style-type: none"> - Equivalent to D6C1.
	<p>D6C5 (extent of adverse effects from anthropogenic pressures on the condition of the habitat type)</p> <ul style="list-style-type: none"> - Equivalent to D6C1.
Measures**	<p>D1M1 – Continued implementation of existing legislation and management plans in place, including in relation to:</p> <ul style="list-style-type: none"> - Habitat and Birds Directives and associated site protection measures within designated sites in Gibraltar; - Marine Protection Regulations 2014; - Nature Protection Act 1991; - Gibraltar Marine Reserve Management Plan; - Gibraltar River Basin Management Plan.
	<p>D1M2 – Continued implementation of voluntary citizen science marine monitoring programme (running since 2017) to raise environmental</p>

	awareness and collate relevant data, including in relation to benthic habitats and species
	D1M3 – Continued efforts in seeking a more active involvement in the Barcelona Convention’s Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes aimed at protecting benthic habitats
Going forward	Further develop our knowledge of the extent and abundance of key benthic habitats and species composition through regular monitoring and habitat mapping and understanding of human pressures. New data and information on benthic habitats relevant to BGTW will be gathered between 2018 and 2024, facilitating future assessment of GES.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

4.2.3 Ecosystems

According to Commission guidance, the status of ecosystems shall be assessed in relation to the food chain and trophic guilds identified at regional / sub-regional levels. The trophic guilds¹¹⁸ selected under criteria elements should take into account the list of trophic guilds identified by the International Council for the Exploration of the Sea (ICES)¹¹⁹ and shall meet the following conditions:

- include at least three trophic guilds;
- two shall be non-fish trophic guilds;
- at least one shall be a primary producer trophic guild; and
- preferably represent at least the top, middle and bottom of the food chain.

The criteria relevant to ecosystems is presented in Table 4-13.

Table 4-13: Ecosystems, including food webs (Descriptor 4) criteria defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
Trophic guilds of an ecosystem (established at regional level)	D4C1 (Primary) – The diversity (species composition and their relative abundance) of the trophic guild is not adversely affected due to anthropogenic pressures
	D4C2 (Primary) – The balance of total abundance between the trophic guilds is not adversely affected due to anthropogenic pressures.
	D4C3 (Secondary) – The size distribution of individuals across the trophic guild is not adversely affected due to anthropogenic pressures.
	D4C4 (Secondary) – Secondary (to be used in support of criterion D4C2, where necessary): Productivity of the trophic guild is not adversely affected due to anthropogenic pressures.

Ecosystems - Scope of the Regional Assessment and Criteria

There is no availability of Common Indicators to assess food webs at a regional level and this topic was specifically excluded from the Mediterranean 2017 Quality Status Report.

a) Ecosystems - Main pressures

There are a number of pressures that could affect food webs within BGTW such as introduction of NIS, contamination, marine litter, recreational and illegal commercial fishing. However, the extent to which these can affect the functioning of ecosystems will depend on the scale / intensity of such pressures and the location and resilience of ecosystem components. Further work is therefore required to assess the significance of each of the different pressures in BGTW particularly in view of the fact that ecological relationships are changing in BGTW as a result of natural (e.g. oceanographic variability) and anthropogenic factors (e.g. NIS).

¹¹⁸ Group of species that exploit the same resources, or that exploit different resources in related ways.


¹¹⁹ ICES Advice (2015) Book 1, ICES special request advice, published 20 March 2015.

b) *Ecosystems - Results from the MSFD Assessment*

The 2012 Initial Assessment identified the long-term need to understand energy flows within existing food webs and structure of food webs (size and abundance). Since then, there has been progress in assessing food webs in BGTW based on indicators and associated targets covering Descriptors 1 (Biological Diversity) and 3 (Fish/Shellfish) which include seabirds, fishes, pelagic habitats, cetaceans and marine reptiles specifically. However, further work is required to better understand the complex nature of the relationships between the different trophic guilds and allow a more accurate assessment of the state of food webs in BGTW. Progress made since the 2012 assessment has allowed the DESHCC to identify the key monitoring and management actions for the achievement of GES including the need to develop new indicators in harmonisation with regional tools and thresholds therein.

c) *Ecosystems – Overall Assessment and Perspective for 2018 – 2024*

Table 4-14: Ecosystems – Overall Assessment and Perspective for 2018 – 2024.

Qualitative descriptor for determining GES	D4 - All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity.	
Current Environmental Status (2019)		The extent to which Gibraltar has achieved GES for food webs is uncertain. Although seabird, cetacean and marine reptile numbers are stable and/or increasing, there is still uncertainty in other trophic guilds e.g. fish. More indicators and data are required to develop a robust assessment of anthropogenic impacts on food webs in BGTW. Harmonisation with indicators being developed at a regional level is also required.
Mediterranean GES Targets	No targets have been established yet at regional level.	
Gibraltar GES Target	D4T13 - The health of the marine food web is not significantly adversely affected by human activities in BGTW. Note: Targets and indicators in place for Seabirds, Fish, Cetaceans, Marine Reptiles and Pelagic Habitats will also be used to help assess Descriptor 4.	
Criteria and data for measuring progress towards GES in future	D4C1 (diversity of the trophic guild is not adversely affected due to anthropogenic pressures)	- Data collated to assess D1, D3 (Focusing on Seabirds, Fish, Cetaceans, Marine Reptiles and Pelagic Habitats).
	D4C2 (balance of total abundance between the trophic guilds is not adversely affected due to anthropogenic pressures)	- Equivalent to D4C1.
	D4C3 (size distribution of individuals across the trophic guild is not adversely affected due to anthropogenic pressures)	- Equivalent to D4C1.
	D4C4 (Productivity of the trophic guild is not adversely affected due to anthropogenic pressures)	- Equivalent to D4C1.

Measures**	D1M1 – Continued implementation of existing legislation and management plans in place, including in relation to: <ul style="list-style-type: none"> - Habitat and Birds Directives and associated site protection measures within designated sites in Gibraltar; - Marine Protection Regulations 2014; - Tuna Preservation Regulations 2014; - Nature Protection Act 1991; - Gibraltar Marine Reserve Management Plan.
	D1M2 – Continued implementation of voluntary citizen science marine monitoring programme (running since 2017) to raise environmental awareness and collate relevant data, including in relation to ecosystem components (habitats and species).
	D1M3 – Continued efforts to seek a more active involvement in the Barcelona Convention’s Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes and development of common indicators to assess food webs.
	D1M7 – Regular review of trophic guild groups and identification of indicators and data sources to facilitate future assessments.
Going forward	Further develop our understanding of existing food webs and structure of food webs (size and abundance) to better inform targets and future assessments.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

4.3 Non-Indigenous Species (Descriptor 2)

a) Non-Indigenous Species - Scope of the Assessment and Criteria

The criteria relevant to NIS is presented in Table 4-16.

Table 4-15: NIS (Descriptor 2) criteria defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
Newly introduced NIS	D2C1 (Primary) – The number of non-indigenous species which are newly introduced via human activity into the wild, per assessment period (6 years), measured from the reference year as reported for the Initial Assessment is minimised and where possible reduced to zero
Established NIS (particularly invasive species)	D2C2 (Secondary) - Abundance and spatial distribution of established NIS, particularly of invasive species, contributing significantly to adverse effects on particular species groups or broad habitat types.
Species groups or broad habitat types that are at risk from NIS (selected from those used for D1 and D6)	D2C3 (Secondary) - Proportion of the species group or spatial extent of the broad habitat type which is adversely altered due to non-indigenous species, particularly invasive non-indigenous species.

This section focuses on the Non-Indigenous Species (NIS) identified by the DESCCH as prevalent in Gibraltar or newly introduced since 2012. Regarding regional assessments, the Mediterranean 2017 Quality Status Report applied one common indicator relevant to NIS:

- Common Indicator 6: Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species¹²⁰.

b) Non-indigenous Species - Main pressures

It is estimated that 76% of all NIS introductions in Europe have been initially reported in the Mediterranean Sea with species primarily originating from the temperate North Pacific realm (linked mostly to aquaculture), Western Indo-Pacific and Tropical Atlantic regions (mainly linked to shipping)¹²¹. Given the lack of aquaculture activities within BGTW, NIS are considered to be mainly introduced through colonisation from adjacent areas or shipping traffic which is particularly intense in

¹²⁰ Available at: <https://www.medqsr.org> [Accessed on 06/09/2019].

¹²¹ Tsiamis, K., Zenetos, A., Deriu, I., Gervasini, E. and Cardoso, A.C. (2018) The native distribution range of European marine non-indigenous species. Aquatic Invasions 13 (2), 187 – 198. Available at: <http://www.aquaticinvasions.net>

the Bay of Gibraltar and the wider Strait of Gibraltar connecting the Atlantic Ocean to the Mediterranean Sea.

Due to the large volume of international shipping in and near BGTW, the achievement of GES will be to some extent dependent on all flag states adopting international controls that prevent the introduction of NIS such as the International Ballast Water Control Standards of the Ballast Water Convention.

c) *Non-indigenous Species - Results from the MSFD Assessment*

- **D2C1 (Newly introduced NIS)**

The Mediterranean 2017 Quality Status Report indicates that there is an increasing trend in the rate of NIS introductions in the Mediterranean Sea with shipping and aquaculture being the main route of entry. A total of 1,057 NIS have been reported in the Mediterranean Sea of which 618 are considered established. Of those established species, 106 have been flagged as invasive. Within the Western Mediterranean, a total of 215 NIS have been established and most of these are within the macrophyta and crustacea taxons.

The Gibraltar Initial Assessment (2012) reported that there was insufficient information to properly assess the current status of NIS in BGTW. It identified several NIS within the wider Mediterranean area and one species being particularly prevalent in BGTW namely the marine red algae *Asparagopsis armata*. Since then, NIS monitoring has started to be integrated into surveillance monitoring programmes for Descriptor 1 including the development of a watch list, in conjunction with the GB Non-Native Species Secretariat, of species that could affect BGTW.

An algal species with significant impacts on native species has been identified as a NIS within BGTW since the last assessment; the brown alga *Rugulopteryx okamurae* which has been spreading quickly in the Straits region since 2016. Two fish species, the silver-cheeked toadfish *Lagocephalus sceleratus*¹²² and Blue spotted-cornet fish *Fistularia commersonii* are also being infrequently recorded in BGTW during ongoing NIS surveillance monitoring campaigns although no significant impacts have been documented so far.

Rugulopteryx okamurae originates from the North Pacific. It was likely introduced to the Mediterranean in 2002 and spread to the Strait of Gibraltar in 2015¹²³. It has now become a dominant species in coastal rocky bottoms in the Strait of Gibraltar¹²⁴ including BGTW. The species is considered to pose a serious ecological impact on native communities mainly due to its toxicity and ability to outcompete other benthic species. *Rugulopteryx okamurae* was first identified as a NIS in Gibraltar in 2015. It was initially distributed in the North section of the Bay of Gibraltar, including Western beach and Playa del Poniente (La Línea de la Concepción, Spain) as well as off Camp Bay and Seven Sisters¹²⁵. Surveillance monitoring now shows that the species is distributed throughout the nearshore coastal environment in BGTW. The presence of this NIS on beach environments in Gibraltar also having an effect on water quality, tourism, recreational use and fishing. The latter activity has become particularly affected by *Rugulopteryx okamurae* in the neighbouring Member State¹²⁶.

With regards to fish species identified, the silver-cheeked toadfish first spread into the Mediterranean in 2002. The species originated from the Indian and Pacific Oceans and travelled to the Mediterranean

¹²² Invasive species (2018) Available at: <https://thegibraltarmagazine.com> [accessed on 21/08/19]

¹²³ Sempere-Valverde, J., Garcia, J.C., Valriberas, E.O. (2019) Expansion of the exotic brown algae *Rugulopteryx Okamurae* in the Strait of Gibraltar. Proceedings of the 1st Mediterranean symposium on the non-indigenous Species. Available at: <https://www.researchgate.net> [Accessed on 16/08/19]

¹²⁴ Navarro-Barranco, C. (2019) Can invasive habitat-forming species play the same role as native ones? The case of the exotic marine macroalga *Rugulopteryx okamurae* in the Strait of Gibraltar. Biological invasions. Available at: <https://link.springer.com>

¹²⁵ Gibraltar monitors invasion of the invasive algae (2016) Available at: <https://news.algaeworld.org> [Accessed on 16/08/19]



¹²⁶ Afonso-Carrillo, J. (2016) Massive proliferation of a dictyotalean species (Phaeophyceae, Ochrophyta) through the Strait of Gibraltar. Available at: <https://www.researchgate.net> [Accessed on 22/08/19]

through the Suez Canal. The silver-cheeked toadfish has the potential to have a significant effect on marine life due to its highly toxic nature¹²⁷. However, although its presence is widespread in the Mediterranean, there is currently no evidence that this species is well established in BGTW. In addition, the Blue spotted-cornet fish spread into the Mediterranean in 2000¹²⁸ via the Suez Canal¹²⁹. This species naturally has a wide range and is mainly found in the inter-tropical zone between the Tropical Eastern Pacific and the Red sea. Continued NIS surveillance monitoring will help determine whether these, and other NIS species identified in BGTW, can impact native species.

d) *Non-indigenous Species – Overall Assessment and Perspective for 2018 – 2024*

Table 4-16 provides an overview of the overall assessment and perspective for 2018 – 2024 for NIS.

Table 4-16: Non-indigenous species – Overall Assessment and Perspective for 2018 – 2024.

Qualitative descriptor for determining GES	D2 - Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem	
Current Environmental Status (2019)	 	Gibraltar has not reached its aim of GES for NIS. The number and abundance of NIS identified within BGTW has increased over the last six years. However, the ability to detect new NIS has improved significantly.
Mediterranean GES Targets	<ul style="list-style-type: none"> - Abundance of NIS introduced by human activities reduced to levels with no detectable impact; - Impacts of NIS are reduced to a minimum. 	
Gibraltar GES Targets*	D2T14 - Reduced number of new NIS identified within BGTW; D2T15 - Decrease abundance and spread of established invasive NIS within BGTW.	
Criteria and data for measuring progress towards GES in future	D2C1 (primary) Newly introduced NIS	<ul style="list-style-type: none"> - Regional monitoring platforms and data sources created under the Barcelona Convention's Mediterranean Action Plan (MAP); - Targeted NIS survey data collected as part of ongoing surveillance monitoring programmes.
	D2C2 (secondary) Abundance and spatial distribution of established non indigenous species	<ul style="list-style-type: none"> - Equivalent to D2C1.
	D2C3 (secondary) Proportion of species group or spatial extent	<ul style="list-style-type: none"> - Equivalent to D2C1.
Measures**	D2M1 – Continued implementation of voluntary citizen science marine monitoring programme (running since 2017) to raise environmental awareness and collate relevant data, including in relation to NIS.	
	D1M2 – Continued efforts in seeking a more active involvement in the Barcelona's Convention Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes aimed at managing NIS.	
	D2M3 – Adhere to the requirements of the International Convention for the Control and Management of Ship's Ballast Water and Sediment Ballast Water.	
	D2M4 – Monitoring of regional alerts on Invasive Alien Species.	
	D2M5 – Development and implementation of NIS species-specific action plans in 2020.	
Going forward	Continue to improve knowledge of the abundance, distribution and impacts of established NIS to inform future assessments as well as encourage regional	

¹²⁷ Coro, G. (2018) Forecasting the ongoing invasion of *Lagocephalus sceleratus* in the Mediterranean Sea. Ecological Modelling. Available at: <https://www.sciencedirect.com> [accessed on: 22/08/19]

¹²⁸ Golani, D. (2000) First record of the bluespotted cornetfish from the Mediterranean Sea. Journal of Fish Biology, 56, 1545-1547.

¹²⁹ Jackson, A.M. (2014) Phylogeography of the bluespotted cornetfish, *Fistularia commersonii*: a predictor of bioinvasion success? *Marine ecology*.

cooperation to tackle NIS. GES unlikely to be achieved in 2020 due to anticipated persistence of NIS.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number.

4.4 Eutrophication (Descriptor 5)

a) Eutrophication - Scope of the Assessment and Criteria

Eutrophication is defined as the enrichment of water by nutrients particularly due to elevated levels of nitrogen and phosphorous. Enrichment causes accelerated growth in algae and plants which can cause an imbalance of organisms present and a reduction of water quality.

The criteria relevant to eutrophication are presented in Table 4-17.

Table 4-17: Eutrophication Conditions (Descriptor 5) criteria defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
Nutrients in the water column: Dissolved Inorganic Nitrogen (DIN), Total Nitrogen (TN), Dissolved Inorganic Phosphorus (DIP), Total Phosphorus (TP) within coastal waters, as used under the WFD	D5C1 (Primary) - Nutrient concentrations are not at levels that indicate adverse eutrophication effects.
Chlorophyll <i>a</i> in the water column	D5C2 (Primary) – Chlorophyll <i>a</i> concentrations are not at levels that indicate adverse effects of nutrient enrichment.
Harmful algal blooms (e.g. cyanobacteria) in the water column	D5C3 (Secondary) – The number, spatial extent and duration of harmful algal bloom events are not at levels that indicate adverse effects of nutrient enrichment.
Photic limit (transparency) of the water column	D5C4 (Secondary) - The photic limit (transparency) of the water column is not reduced, due to increases in suspended algae, to a level that indicates adverse effects of nutrient enrichment.
Dissolved oxygen in the water column	D5C5 (Primary) - The concentration of dissolved oxygen is not reduced, due to nutrient enrichment, to levels that indicate adverse effects on benthic habitats (including on associated biota and mobile species) or other eutrophication effects.
Opportunistic macroalgae of benthic habitats	D5C6 (Secondary) - The abundance of opportunistic macroalgae is not at levels that indicate adverse effects of nutrient enrichment.
Macrophyte communities (perennial seaweeds and seagrasses such as fucoids, eelgrass and Neptune grass) of benthic habitats	D5C7 (Secondary) - The species composition and relative abundance or depth distribution of macrophyte communities achieve values that indicate there is no adverse effect due to nutrient enrichment including via a decrease in water transparency.
Macrofaunal communities of benthic habitats	D5C8 (Secondary) - The species composition and relative abundance of macrofaunal communities, achieve values that indicate that there is no adverse effect due to nutrient and organic enrichment.

According to the 2017 EU Commission Decision 2017/848, the scale of assessment for eutrophication shall take into account coastal waters assessed and monitored as part of the WFD, reported within River Basin Management Plans (RBMP)¹³⁰ which, for Gibraltar, includes two marine water bodies:

- The 'Coastal Water Body', for waters outside the harbour up to one mile from the coast (UKGIB6903). Monthly water quality monitoring within this water body is conducted at three locations:
 - o Site 1 (Sandy Bay)
 - o Site 2 (Camp Bay)
 - o Site 3 (Runway – northwest), outer Harbour, north east of the North Mole and north of the airport runway
- The 'Gibraltar Harbour and Marina Bay' Heavily Modified Coastal Water Body (HMWB), comprising the harbour and marina bay (UKGIB6901). Monthly water quality monitoring is conducted at one location:
 - o Site 4 (Mid-Harbour)

¹³⁰ DEHCC (2015) Gibraltar River Basin Management Plan 2015 – 2021. Main Report Water Framework Directive. Available at: <https://www.gibraltar.gov.gi> [Accessed on 28/08/19]

Accordingly, this section of the report focuses on the assessment of parameters covered in the latest RBMP (2015-2021) for the locations listed above with an updated assessment where additional data are available. The same thresholds as used in the RBMP are applied in this document (Table 4-18).

Table 4-18: Eutrophication Thresholds Applied in the RBMP (2015)

Element	Individual Element/(Criteria)	Assessed within RBMP (2015) Threshold used	2015 Coastal Water Body status	2015 HMWB status	Assessed in this Report
Biological	Phytoplankton (chlorophyll <i>a</i>) (D5C2)	Intercalibration Decision (2013/480/EU) ¹³¹ for threshold values	Good	Good	Yes (D5)
	Benthic macro-invertebrate (D5C8)	BOPA Index as informed by the WFD Intercalibration Phase 2, Milestone 3 Report and implemented in Intercalibration Decision (2013/480/EU) ¹³¹ .	Good	Good	Yes (D5)
Physico-chemical	Dissolved oxygen (D5C5)	River Basin District Typology Directions 2010 ¹³² .	High	High	Yes (D5)
	Dissolved inorganic nitrogen (DIN) (winter mean) (D5C1)	River Basin District Typology Directions 2010 ¹³² .	High	High	Yes (D5)

It has not been possible to assess the remaining criteria listed in Table 4-17 for the following reasons:

- D5C3 (secondary) harmful algal blooms – Due to insufficient availability of historical data, it is not possible to assess the frequency and extent of any algal blooms that may take place within BGTW, although these are considered to be rare and localised¹³³. Monitoring now in progress.
- D5C4 (secondary) photic limit – Due to insufficient availability of historical data. Monitoring now in progress.

Regarding regional assessments, the Mediterranean 2017 Quality Status Report applied two common indicators for eutrophic conditions:

- Common Indicator 13: Concentration of key nutrients in water column¹³⁴, which mainly reports data collected from stations located in the Eastern Mediterranean Sea, with the only western station located south of France and Sardinia; and
- Common Indicator 14: Chlorophyll *a* concentration in water column, which includes reference to nutrient regimes and chlorophyll levels across the Mediterranean.

b) Eutrophication - Main pressures

Eutrophication is a widespread phenomenon in coastal areas and estuaries as well as in lakes and reservoirs. It can be created through natural processes but also through the introduction of excessive amounts of nutrients by human activities¹³⁵. Within BGTW, the only activity that could lead to eutrophication is wastewater discharge, which inputs nutrients and organic matter. However, eutrophication episodes are uncommon and have not been reported within the last six years. The consequences of eutrophication include a reduction in water quality (colour, odour, reduced levels of oxygen, etc.) that could lead to algal blooms, hypoxia or even anoxia, affecting ecosystems and socioeconomic activities.

¹³¹ Directive (2013/480/EU) available at <https://publications.europa.eu> [Accessed 29/08/19]

¹³² The River Basin Districts Typology, Standards and Groundwater threshold values (WFD) (England and Wales) Directions 2010 available at <https://gweddill.gov.wales/docs> [Accessed 29/08/19]

¹³³ C. Crisp (DESCCH), personal communication, September 2019

¹³⁴ Available at <https://www.medqsr.org> [Accessed 29/08/19]

¹³⁵ Cuzado, A. (2012) Eutrophication in the Mediterranean Sea. Life in the Mediterranean Sea. A look at habitat changes.

c) *Eutrophication - Results from the MSFD Assessment*

- **D5C1 (nutrients in the water column)**

The Mediterranean 2017 Quality Status Report indicates that no general assessment criteria have been agreed at a regional level within the Mediterranean for key nutrient concentrations in the water column and only geographical variability of some key nutrients (DIN and TP) have been reported based on data collected for the Eastern Mediterranean Sea and South of France / Sardinia (within the Western Mediterranean Sea). Overall, coastal waters in the Western Mediterranean, within which BGTW are located, have a relatively higher nutrient regime and primary productivity rate compared to the Eastern Mediterranean.

The Gibraltar 2012 Initial Assessment noted that the main source of nutrient input in BGTW were point source sewage discharges. The RBMP (2015) assesses coastal waters as having 'good' levels of nutrients which can be explained by the high dispersion rates experienced within BGTW plus high water exchange with adjacent water bodies. This is particularly the case at Europa Point, where the main point source discharge of sewage effluent is located.

Nutrient data collected at the four coastal monitoring sites in BGTW between 2014 and 2019 recorded concentrations of DIN (ammoniacal nitrogen, nitrite, nitrate), nitrogen and phosphorus. However, given that there are no quality thresholds for Total Nitrogen and Total Phosphorus, only DIN has been considered further as part of this assessment.

Dissolved Inorganic Nitrogen (DIN)

The threshold values used in the assessment of D5C1 are derived from the River Basin District Typology Directions 2010 report, which was used to inform the classifications presented in the RBMP 2015. The standards for DIN are dependent upon salinity with two classifications being provided in the Directions report (25 and 30-34.5). The salinity of waters within the BGTW generally range between 34.5 and 37.5. The standards for DIN for the 30-34.5 salinity range have therefore been utilised as shown in Table 4-19.

Table 4-19 DIN concentration standards from the River Basin District Typology Directions 2010 report.

* as defined in the WFD

The average concentrations of DIN recorded between 1st November and 28th February at the four coastal sites between 2014 and 2019 are listed in Table 4-20. The use of the winter concentrations ensures a reliable comparison with the River Basin District Typology Directions 2010 report.

Table 4-20. Average of DIN measurements recorded in Gibraltar Waters 1st November to 28th February for the years 2014-2019.

Site	Inorganic Nitrogen (winter means) mg/l
Site 1 - Sandy Bay	0.489
Site 2 - Camp Bay	0.479
Site 3 - Northwest	0.478
Site 4 - Mid-Harbour	0.479

Comparison of the monitored results against the WFD standards indicates that the DIN concentrations in BGTWs are of high status. Additional monitoring of deeper water DIN concentrations are required to better assess this Descriptor moving forward.

- **D5C2 (Chlorophyll a)**



See Section 4.2.2.1 for an overview of Chlorophyll a concentration assessment.

- D5C5 (Dissolved oxygen)

The initial assessment (2012) reported levels of DO as 'high'. DO standards for coastal waters with salinities normalised to 35 are categorised as high (5.7 mg/l), good (4 mg/l), moderate (2.4 mg/l), and poor (1.6 mg/l). Review of DO data collected between Feb 2015 and Aug 2019, at all four monitoring sites indicates that DO concentrations are consistently measured above 6.91 mg/l (the minimum value recorded), indicating high quality conditions. Additional monitoring of deeper water DO concentrations are required to better assess this Descriptor moving forward.

d) Eutrophication – Overall Assessment and Perspective for 2018 – 2024

Table 4-21: Eutrophication – Overall Assessment and Perspective for 2018 – 2024.

Qualitative descriptor for determining GES	D5 - Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.	
Current Environmental Status (2019)	 	Gibraltar has achieved GES for Eutrophication. High quality conditions have been consistently reported for DIN, Chlorophyll <i>a</i> , and DO.
Mediterranean GES Targets	<ul style="list-style-type: none"> - Reference nutrients concentrations according to the local hydrological, chemical and morphological characteristics of the un-impacted marine region 17; - Decreasing trend of nutrients concentrations in water column of human impacted areas statistically defined; - Reduction of BOD emissions from land-based sources; - Reduction of nutrients emissions from land-based sources. 	
Gibraltar GES Targets	D5T16 – Nutrient, DO and chlorophyll <i>a</i> concentrations do not exceed relevant thresholds.	
Criteria and data for measuring progress towards GES in future	D5C1 (primary) nutrient concentrations	- Monitoring data collected as part of the WFD coastal sampling programme for BGTW.
	D5C2 (primary) chlorophyll <i>a</i> concentration	- Equivalent to D5C1.
	D5C3 (secondary) harmful algal blooms	- Equivalent to D5C1 including monitoring and reporting of any detected algal blooms should these occur in BGTW.
	D5C4 (secondary) photic limit	- Equivalent to D5C1.
	D5C5 (primary) dissolved oxygen	- Equivalent to D5C1.
	D5C6 (secondary) opportunistic macroalgae	- Equivalent to D5C1.
	D5C7 (secondary) macrophyte communities	- Equivalent to D5C1.
	D5C8 (secondary) macrofaunal communities	- Equivalent to D5C1.
Measures**	D5M1 – Implementation of River Basin Management Plans and associated measures.	
	D5M2 – Commissioning of Gibraltar Wastewater Treatment Plant, anticipated to be constructed in 2022.	
	D5M3 – Definition of appropriate nutrient emission limits through the Industrial Emissions Directive (2010/75/EU)	
	D5M4 – Continued Implementation of National Emissions Ceiling Directive (2001/81/EC), setting emission ceilings on forms of nitrogen.	

	D5M5 – Continued Implementation of Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2008 to control Nitrogen Oxides.
	D5M6 – Continued efforts in seeking a more active involvement in the Barcelona Convention’s Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes aimed at controlling eutrophication.
Going forward	<ul style="list-style-type: none"> - Increase the number of depth stations to better assess vertical nutrient and oxygen profiles; - Construction of the Gibraltar Wastewater Treatment Plant is planned in 2021/22. Continue with the implementation of monitoring associated with the WFD. <p>It is anticipated that GES targets for eutrophication will be maintained between 2018 – 2024.</p>

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

4.5 Hydrographic Conditions (Descriptor 7)

a) Hydrographic Conditions - Scope of the Assessment and Criteria

Hydrographic conditions are influenced by tidal regimes, sediment and freshwater transport, currents and wave action. All these parameters can be permanently altered by human activities. Alterations in these conditions can cause changes in the physical and chemical characteristics of water bodies and associated ecosystems including socioeconomic impacts.

The criteria relevant to hydrographic conditions is presented in Table 4-22.

Table 4-22: Hydrographic Conditions (Descriptor 7) criteria defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
Hydrographical changes to the seabed and water column (including intertidal areas)	D7C1 (Secondary) – Spatial extent and distribution of permanent alteration of hydrographical conditions to the seabed and water column, associated in particular with physical loss of the natural seabed
Benthic broad habitat types or other habitat types, as used for descriptors 1 and 6.	D7C2 (Secondary) - Spatial extent of each benthic habitat type adversely affected due to permanent alteration of hydrographical conditions

This section focuses on any potential alterations to hydrographic conditions that may have been introduced over the last six years in BGTW. Regarding regional assessments, the Mediterranean 2017 Quality Status Report applied two common indicators to hydrographic conditions:

- Common Indicator 15: Location and extent of the habitats impacted directly by hydrographic alterations¹³⁶ and;
- Common Indicator 16: Length of coastline subject to physical disturbance due to the influence of manmade structures¹³⁷.

b) Hydrographic Conditions - Main pressures

Hydrographic conditions within BGTW have the potential to be altered in some localised areas through ongoing physical interventions in coastal areas due to land reclamation, introduction of new defence / flood protection structures, dredging operations or the development of new coastal infrastructure such as port extensions or new marinas within and outside of BGTW i.e. the wider Bay of Gibraltar.

c) Hydrographic Conditions - Results from the MSFD Assessment

¹³⁶ Available at: <https://www.medqsr.org> [Accessed on 10/09/19]

¹³⁷ Available at: <https://www.medqsr.org> [Accessed on 10/09/19]

- **D7C1 (spatial extent and distribution of hydrographic condition alterations)**



The Mediterranean 2017 Quality Status Report indicates that there are insufficient data to derive conclusions or trends on regional, sub-regional or national level impacts of habitats affected by hydrographic alterations. It also states the requirement for cause-consequence relationship between hydrographic alterations due to new structures and habitat deterioration.

The Gibraltar 2012 Initial Assessment noted that coastal developments were considered unlikely to alter or impact on the large-scale currents operating within BGTW, and beyond, but that they had the potential to alter the natural shape of the coastline and cause localised impacts in some areas e.g. sections of Gibraltar Harbour. Ongoing physico-chemical monitoring carried out as part of the WFD coastal monitoring programme (e.g. sea surface temperature, salinity, turbidity, etc.) as well as navigational (depth) monitoring carried out by the Gibraltar Port Authority, has shown that there have been no significant changes to hydrographical conditions or indeed species and habitat conditions caused by human alterations in BGTW over the past six years. Similarly, no major coastal developments or reclamation operations have been undertaken during the assessment period. An exception is the new Mid-Harbour Small Boats Marina constructed in 2015 within Gibraltar Harbour although mitigation measures were incorporated into the marina design.

d) *Hydrographic Conditions – Overall Assessment and Perspective for 2018 – 2024*

Table 4-23 provides an overview of the overall assessment and perspective for 2018 – 2024 for Hydrographic Conditions.

Table 4-23: Hydrographic Conditions – Overall Assessment and Perspective for 2018 - 2024

Qualitative descriptor for determining GES	D7 - Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems	
Current Environmental Status (2019)	 	Gibraltar has achieved GES for hydrographic conditions. Neither habitats nor species have been affected by significant hydrographical changes during the assessment period.
Mediterranean GES Targets	Planning of new structures takes into account all possible mitigation measures in order to minimize the impact on coastal and marine ecosystem and its services integrity and cultural/historic assets. Where possible, promote ecosystem health.	
Gibraltar GES Targets	D7T17 – No impacts on biological components considered under Descriptors 1, 4, and 6 reported to be caused by hydrographical changes in BGTW.	
Criteria and data for measuring progress towards GES in future	D7C1 (secondary) spatial extent and distribution of hydrographic condition alterations	- Monitor planning applications for major coastal / marine developments with potential to alter hydrographic conditions and use data / info provided to demonstrate lack of impact / mitigation proposed.
	D7C2 (secondary) spatial extent of affected habitat types	- Use assessments conducted under D1, D6
Measures**	D7M1 – Continued implementation of existing legislation and management plans in place, including in relation to: <ul style="list-style-type: none"> - Habitat and Birds Directives and associated site protection measures within designated sites in Gibraltar; - EIA Directive obligations which require assessments to be provided in relation to new developments; - Marine Protection Regulations 2014; - Nature Protection Act 1991; - Gibraltar Marine Reserve Management Plan; - Gibraltar River Basin Management Plan; - Building Control Regulations; - Town Planning Act; 	

	- Development and Planning Commission (DESCCH is a statutory consultee).
	D7M2 – Continued efforts to seek a more active involvement in the Barcelona Convention’s Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes aimed at protecting marine reptiles.
Going forward	Further develop our understanding of habitats and associated species that could be affected by hydrographical alterations particularly larger scale reclamations planned within the next five years.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number.

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number.

4.6 Contaminants (Descriptor 8 and 9)

a) Contaminants - Scope of the Assessment and Criteria

Contaminants considered under the MSFD include hazardous substances, oil contamination, radionuclides and microbial contamination.

The criteria relevant to contaminants is presented in Table 4-24.

Table 4-24: Contaminants (Descriptor 8 and 9) criteria defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
Concentrations of contaminants	D8C1 (Primary) – the concentrations of contaminants do not exceed the stated threshold values
The health of species and the conditions of habitats	D8C2 (secondary) - The health of species and the condition of habitats (such as their species composition and relative abundance at locations of chronic pollution) are not adversely affected due to contaminants including cumulative and synergetic effects
Significant acute pollution events	D8C3 (Primary) - The spatial extent and duration of significant acute pollution events are minimised
Adverse effects of significant acute pollution events	D8C4 (Secondary) – The adverse effects of significant acute pollution events on the health of species and on the condition of habitats (such as their species composition and relative abundance) are minimised and, where possible, eliminated
Contaminants in edible tissues	D9C1 (Primary) – The level of contaminants in edible tissues (muscle, liver, roe, flesh or other soft parts, as appropriate) of seafood (including fish, crustaceans, molluscs, echinoderms, seaweed and other marine plants) caught or harvested in the wild (excluding fin-fish from mariculture) does not exceed maximum levels.

According to the 2017 EU Commission Decision 2017/848, the scope of the assessment for contaminants shall be in line with that conducted under the WFD which is mainly informed by the coastal water monitoring programme (quarterly monitoring) conducted at the four coastal monitoring sites in Gibraltar. These are identified in Section 7.

Accordingly, this section focuses on the assessment of parameters covered in the latest RBMP (2015) as well as additional and more recent data collected where available. The same thresholds applied in the RBMP (2015) are used in this document (Table 4-25). Analysis results from the bathing waters monitoring programme conducted over the last three years and tissue samples collected during four surveillance monitoring surveys conducted in May 2014, October 2014, September 2014 and May 2015 have been also been reviewed as part of the assessment. The threshold values for tissue samples have been extracted from Regulation (EC) No 1881/2006¹³⁸ and the review has focused on the contaminants listed in the regulation. The assessment of radionuclide concentrations, specifically Radium-226, was based on a bi-yearly monitoring programme conducted on potable water supply in Gibraltar obtained by desalination.

¹³⁸ Available at: <https://eur-lex.europa.eu> [Accessed on 26/09/19]

Table 4-25: Thresholds applied in the RBMP (2015) including conclusions made in relation to the Coastal Water Body (CWB) and Heavily Modified Water Body (HMWB) status.

Element	Assessed within RBMP (2015)			2015 CWB status	2015 HMWB status	Assessed in this Report (using new data collected since 2015)
	Individual Element	Threshold used				
Specific Pollutants ¹³⁹	Ammonia (NH ₄)	River Basin District		Good	Good	
	Chromium VI (CrO ₂)	Typology Directions 2010.		Good	Good	✓
	Copper (Cu)	UKTAG (2014) Updated Recommendations on		Good	Good	✓
	Zinc (Zn)	Environmental Standards, River Basin management (2015-21).		Good	Good	✓
Priority Substances ¹⁴⁰	Benzene (C ₆ H ₆)	WFD Daughter Directive (2008/105/EC) ¹⁴¹		Good	Good	✓
	Di(2-ethylhexyl)phthalate (DEHP)			Good	Good	✓
	Lead (Pb)			Good	Good	✓
	Nickel (Ni)			Good	Good	✓
	Nonylphenols (C ₁₅ H ₂₄ O)			Good	Good	
	Tributyl tin (TBT)			-	Poor	✓

Regarding MSFD 2017 criteria, D8C1 (concentrations of contaminants), D8C3 (significant acute pollution events), D8C4 (secondary) adverse effects of significant acute pollution events and D9C1 (contaminants in edible tissues) have been applied. The exclusion of other criteria is justified as follows:

- D8C2 (secondary) health of species and habitat condition – Due to insufficient availability of data, it is not possible to provide a robust assessment of the impact of any potential contamination on habitats and species with the exception of individuals sampled to inform D9C1.

Regarding regional assessments, the Mediterranean 2017 Quality Status Report applied five common indicators to contamination conditions:

- Common Indicator 17: Concentration of key harmful contaminants measured in the relevant matrix¹⁴² which provides an overview of evaluations completed at regional level for heavy metals (Hg, Pb and Cd). Data are available through the MED POL database¹⁴³.
- Common Indicator 18: Level of pollution effects of key contaminants where a cause and effect relationship has been established¹⁴⁴ which presents the integrated evaluation of the biomarkers monitored regionally namely Acetylcholinesterase activity (AChE), Lysosomal membrane stability (LMS) and Micronuclei frequencies (MN). However, results are not conclusive, and given that these biomarkers are not monitored in Gibraltar, reference to these are not made.
- Common Indicator 19: Occurrence, origin (where possible), extent of acute pollution events (e.g. slicks from oil, oil products and hazardous substances), and their impact on biota affected by this pollution¹⁴⁵ which reviews data collected through pollution reports (POLREP) issued by members to the Barcelona Convention.
- Common Indicator 20: Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood¹⁴⁶ which presents statistics on the number of detected contaminants and their deviations from legal permissions in commercial fish species set by relevant regulations within Mediterranean countries.

¹³⁹ Pollutants that are considered to be of concern at a national level set by member states rather than the EU.

¹⁴⁰ Substances that pose a significant risk of harm to or via the aquatic environment across the EU. The EU's aim is to reduce pollution of surface waters by these pollutants by progressively reducing emissions of them.

¹⁴¹ WFD (Standards and Classification) Directions (England and Wales) 2015 available at <http://www.legislation.gov.uk> [Accessed 29/08/19]

¹⁴² Available at: <https://www.medqsr.org> [Accessed on 09/09/19]

¹⁴³ The MED POL Programme (the marine pollution assessment and control component of Mediterranean Action Plan) is responsible for the follow up work related to the implementation of the LBS Protocol, the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities (1980, as amended in 1996), and of the dumping and Hazardous Wastes Protocols.

¹⁴⁴ Available at: <https://www.medqsr.org> [Accessed on 09/09/19]

¹⁴⁵ Available at: <https://www.medqsr.org> [Accessed on 09/09/19]

¹⁴⁶ Available at: <https://www.medqsr.org> [Accessed on 09/09/19]

- Common Indicator 21: Percentage of intestinal enterococci concentration measurements within established standards¹⁴⁷ which could not provide a conclusive assessment at regional level.

b) Contamination - Main pressures

Contamination reduces water quality and has the potential to affect ecosystems and species particularly if toxic levels are reached. Potential and actual sources of contamination in BGTW include shipping and port activities, which can increase the risk of mobilising contaminated sediments or introduce synthetic and non-synthetic substances (such as lubricants, cleaning products, oils, etc.); waste treatment and disposal (i.e. port waste management and wastewater discharges); tourism and leisure activities i.e. one of the activities that can introduce marine litter.

It should be noted that heavy industries are also found outside of BGTW yet within the Bay of Gibraltar in mainland Spain (e.g. petrochemical installations such as a major oil refinery, stainless steel manufacturing plant, paper mills, ironworks and a thermal power stations). These are also known sources of both air and marine pollution in the Bay.

c) Contamination - Results from the MSFD Assessment

- **D8C1 (concentrations of contaminants)**

Priority Substances and Specific Pollutants

Regionally, the Mediterranean (2017) Quality Status Report indicates that MED POL datasets for heavy metals showed non-compliant entries for cadmium (4%), lead (15%) and mercury (53%) in sediment samples, see Figure 4-2 for spatial distribution of these.



¹⁴⁷ Available at: <https://www.medqsr.org> [Accessed on 09/09/19]

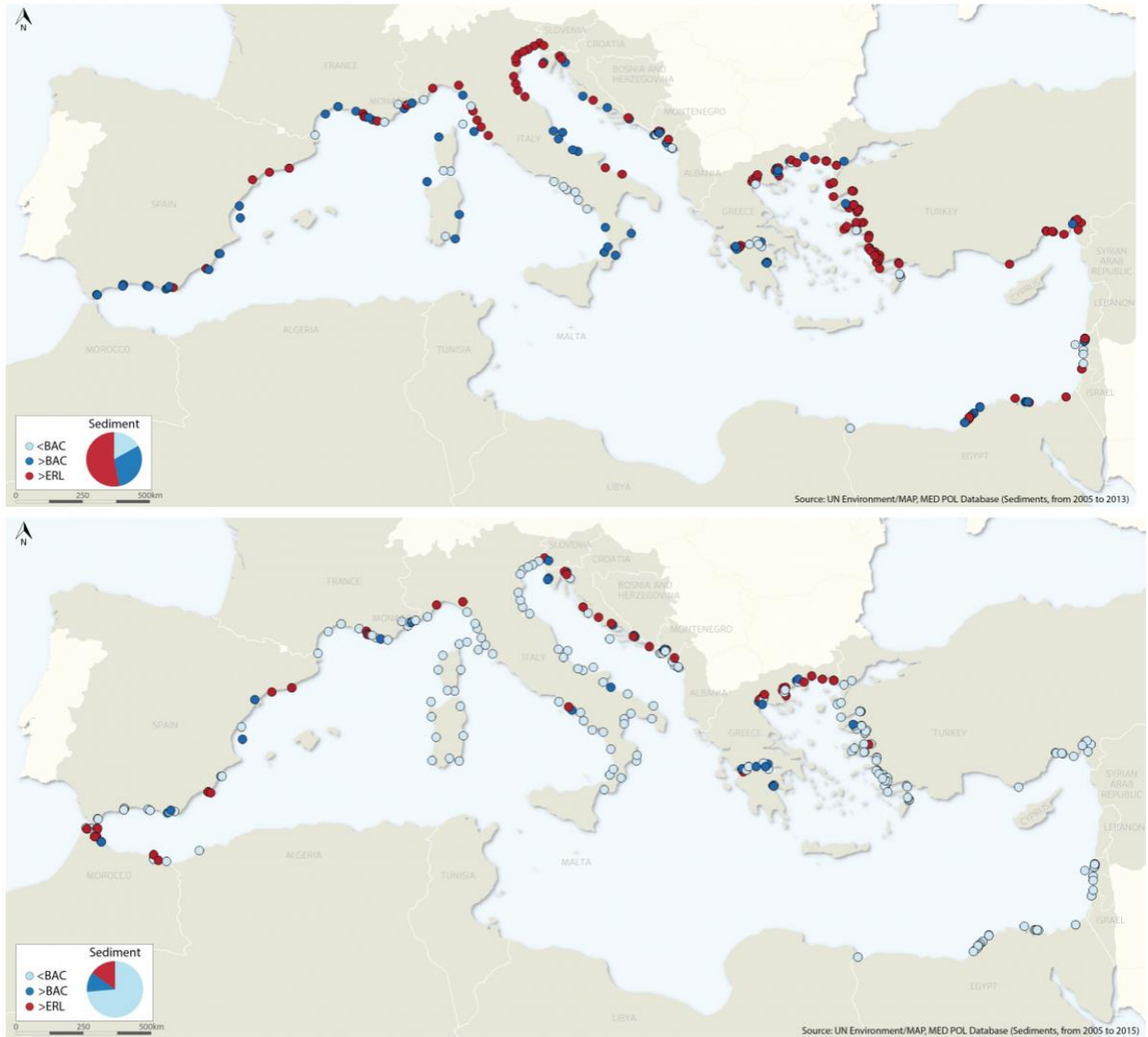


Figure 4-2: Regional cadmium (top), mercury (middle) and lead (bottom) levels assessment against EC criteria in sediment samples. Source: Common Indicator 17 Assessment. Mediterranean Quality Status Report 2017.

Persistent organic pollutants (POPs), which include certain chlorinated pesticides and industrial chemicals, such as polychlorinated biphenyls (PCBs) were reported at very low levels in 2011. However, no update could be performed as part of 2017 assessment.

The Gibraltar initial assessment (2012) reported that sediment sampling indicated signs of contamination within the harbour due to elevated levels of di- and tri-butyl tin (DBT and TBT). These are known to originate from the historical use of anti-fouling paints. The same conclusion was presented in the RBMP (2015) which highlighted the ‘poor’ chemical status in parts of the HMWB. However, a ‘good’ status was reported in relation to all other parameters measured in both the Coastal Water Body and the HMWB.

- **Chromium VI** (CrO₂) (AA ‘Good’ EQS 0.6 µg/l; MAC ‘Good’ EQS 32 µg/l). Monitoring results show that AA concentrations have consistently been recorded below EQS thresholds over the last three years and it is unclear whether concentrations reported in 2014 and 2015 were at the same level or higher (as 30 µg/l seems to have been used as limit of detection). GES is therefore considered achieved.

Table 4-26: Chromium VI concentrations recorded between 2014 and 2018 including both Annual Average (AA) and Maximum Admissible Concentrations (MAC).

Monitoring Site		2014 (four surveys)	2015 (four surveys)	2016 (two surveys)	2017 (three surveys)	2018 (one survey)
Site 1 - Sandy Bay	AA ($\mu\text{g/l}$)	<30	22.5775	<0.3	<0.3	<0.3
	% exceedances of MAC	Unknown	at least 25%	0	0	0
Site 2 - Camp Bay	AA ($\mu\text{g/l}$)	<30	<30	<0.3	<0.3	<0.3
	% exceedances of MAC	Unknown	Unknown	0	0	0
Site 3 - Runway (northwest)	AA ($\mu\text{g/l}$)	<30	<30	<0.3	<0.3	<0.3
	% exceedances of MAC	Unknown	Unknown	0	0	0
Site 4 - Mid-Harbour	AA ($\mu\text{g/l}$)	<30	<30	<0.3	<0.3	<0.3
	% exceedances of MAC	Unknown	Unknown	0	0	0

- **Copper (Cu)** (AA 'Good' EQS 3.76 $\mu\text{g/l}$; MAC threshold not defined). Monitoring results show that AA concentrations have consistently been recorded below EQS thresholds since 2014. GES is therefore considered achieved.

Table 4-27: Copper concentrations recorded between 2014 and 2018, based on Annual Average (AA).

Monitoring Site		2014 (four surveys)	2015 (four surveys)	2016 (two surveys)	2017 (three surveys)	2018 (one survey)
Site 1 - Sandy Bay	AA ($\mu\text{g/l}$)	0.278	0.286	<0.2	1.221	0.343
Site 2 - Camp Bay	AA ($\mu\text{g/l}$)	0.451	0.528	0.248	0.251	<0.2
Site 3 - Runway (northwest)	AA ($\mu\text{g/l}$)	0.442	0.894	0.347	0.384	0.338
Site 4 - Mid-Harbour	AA ($\mu\text{g/l}$)	1.01	1.24	0.674	0.62	0.989

- **Zinc (Zn)** (AA 'Good' EQS 6.8 $\mu\text{g/l}$; MAC threshold not defined). Monitoring results only show exceedances recorded within Site 2 in 2014 and 2015. However, since 2015, concentration have been observed to gradually reduce below relevant thresholds. GES is therefore considered achieved.

Table 4-28: Zinc concentrations recorded between 2014 and 2018, based on Annual Average (AA).

Monitoring Site		2014 (four surveys)	2015 (four surveys)	2016 (two surveys)	2017 (three surveys)	2018 (one survey)
Site 1 - Sandy Bay	AA ($\mu\text{g/l}$)	1.900	2.583	2.575	2.772	1.79
Site 2 - Camp Bay	AA ($\mu\text{g/l}$)	9.498	7.91	1.795	1.48	0.693
Site 3 - Runway (northwest)	AA ($\mu\text{g/l}$)	4.897	5.44	1.753	1.553	4.897
Site 4 - Mid-Harbour	AA ($\mu\text{g/l}$)	2.743	3.142	2.095	1.333	2.743

- **Benzene (C₆H₆)** (AA 'Good' EQS 8 $\mu\text{g/l}$; MAC 'Good' EQS 50 $\mu\text{g/l}$). Monitoring results show that AA concentrations have consistently been recorded below detection limits (0.1 $\mu\text{g/l}$). GES is therefore considered achieved.
- **DEHP** (AA 'Good' EQS 1.3 $\mu\text{g/l}$; MAC threshold not defined). Monitoring results show that AA concentrations have consistently been recorded below limit thresholds since 2014. GES is therefore considered achieved.

Table 4-29: DEHP concentrations recorded between 2014 and 2018, based on Annual Average (AA).

Monitoring Site		2014 (four surveys)	2015 (four surveys)	2016 (two surveys)	2017 (three surveys)	2018 (one survey)
Site 1 - Sandy Bay	AA ($\mu\text{g/l}$)	0.35	0.3	<0.2	<0.2	<0.2
Site 2 - Camp Bay	AA ($\mu\text{g/l}$)	0.35	0.3	<0.2	<0.2	<0.2
Site 3 - Runway (northwest)	AA ($\mu\text{g/l}$)	0.35	0.3	<0.2	<0.2	<0.2
Site 4 - Mid-Harbour	AA ($\mu\text{g/l}$)	0.35	0.3	<0.2	<0.2	<0.2

- **Lead (Pb)** (AA 'Good' EQS 1.3 $\mu\text{g/l}$; MAC 'Good' EQS 14 $\mu\text{g/l}$). Monitoring results show that AA concentrations have consistently been recorded below limit thresholds since 2014. GES is therefore considered achieved.

Table 4-30: Lead concentrations recorded between 2014 and 2018, including both Annual Average (AA) and Maximum Admissible Concentrations (MAC)

Monitoring Site		2014 (four surveys)	2015 (four surveys)	2016 (two surveys)	2017 (three surveys)	2018 (one survey)
Site 1 - Sandy Bay	AA ($\mu\text{g/l}$)	0.079	0.039	0.020	0.077	0.137
	% exceedances of MAC	0	0	0	0	0
Site 2 - Camp Bay	AA ($\mu\text{g/l}$)	0.101	0.077	0.060	0.141	<0.04
	% exceedances of MAC	0	0	0	0	0
Site 3 - Runway (northwest)	AA ($\mu\text{g/l}$)	0.127	0.281	0.081	0.135	0.794
	% exceedances of MAC	0	0	0	0	0
Site 4 - Mid-Harbour	AA ($\mu\text{g/l}$)	0.352	0.316	0.137	0.288	0.137
	% exceedances of MAC	0	0	0	0	0

- **Nickel (Ni)** (AA 'Good' EQS 8.6 $\mu\text{g/l}$; MAC 'Good' EQS 34 $\mu\text{g/l}$). Monitoring results show that AA concentrations have consistently been recorded below limit thresholds since 2014. GES is therefore considered achieved.

Table 4-31: Nickel concentrations recorded between 2014 and 2018 including both Annual Average (AA) and Maximum Admissible Concentrations (MAC).

Monitoring Site		2014 (four surveys)	2015 (four surveys)	2016 (two surveys)	2017 (three surveys)	2018 (one survey)
Site 1 - Sandy Bay	AA ($\mu\text{g/l}$)	0.301	<0.3	0.368	<0.3	0.314
	% exceedances of MAC	0	0	0	0	0
Site 2 - Camp Bay	AA ($\mu\text{g/l}$)	0.642	0.300	0.302	<0.3	<0.3
	% exceedances of MAC	0	0	0	0	0
Site 3 - Runway (northwest)	AA ($\mu\text{g/l}$)	0.309	0.328	0.328	<0.3	<0.3
	% exceedances of MAC	0	0	0	0	0
Site 4 - Mid-Harbour	AA ($\mu\text{g/l}$)	0.331	0.306	0.338	0.326	<0.3
	% exceedances of MAC	0	0	0	0	0

- **TBT** (AA 'Good' EQS 0.0002 $\mu\text{g/l}$; MAC 'Good' EQS 0.0015 $\mu\text{g/l}$). Within Sites 1, 2 and 3, monitoring results show exceedances in 2014 and 2015. The rest of the records assessed were below the detection limit of 0.0005 $\mu\text{g/l}$ and it is therefore not possible to know whether these are below the threshold value of 0.0002 $\mu\text{g/l}$. Monitoring results for Site 4 show that AA concentrations have consistently been recorded above limit thresholds since 2014, however, there is an improvement observed which may be an indication that, overall, the concentration of TBT in water is slowly reducing.

Table 4-32: TBT concentrations recorded between 2014 and 2018, including both Annual Average (AA) and Maximum Admissible Concentrations (MAC).

Monitoring Site		2014 (four surveys)	2015 (four surveys)	2016 (two surveys)	2017 (three surveys)	2018 (one survey)
Site 1 - Sandy Bay	AA ($\mu\text{g/l}$)	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	% exceedances of MAC	0	0	0	0	0
Site 2 - Camp Bay	AA ($\mu\text{g/l}$)	<0.0005	0.000525	<0.0005	<0.0005	<0.0005
	% exceedances of MAC	0	0	0	0	0
Site 3 - Runway (northwest)	AA ($\mu\text{g/l}$)	0.000605	0.000873	<0.0005	<0.0005	<0.0005
	% exceedances of MAC	0	25%	0	0	0
Site 4 - Mid-Harbour	AA ($\mu\text{g/l}$)	0.002485	0.003043	0.001375	0.001193	0.00064
	% exceedances of MAC	75%	100%	50%	33%	0%

TBT analyses conducted on sediment samples from Site 4 (Table 4-33) show a large degree of variability. This variability does not correlate with water quality data which shows a decreasing trend and which may be indicative of recent background water quality conditions rather than historic conditions at a specific location.

Table 4-33: TBT concentrations recorded between 2014 and 2017 in sediment samples collected within Site 4

	2014 (two surveys)	2015 (four surveys)	2016 (two surveys)	2017 (two surveys)
Annual Average of TBT concentration recorded in sediment samples ($\mu\text{g}/\text{kg}$)	14.8	196.9	83	13.45

Oil contamination

See D8C3.

Radio-nucleotides

The Mediterranean 2017 Quality Status Report made no reference to radio-nucleotides. The Gibraltar Initial Assessment (2012) made reference to the absence of major sources of radioactive pollution in BGTW.

Microbial contamination

The Mediterranean 2017 Quality Status Report lacked data to present a conclusive assessment on microbial contamination at a regional level. As indicated in Section 3.2.14, Gibraltar has six designated bathing waters. The Gibraltar Initial Assessment (2012) reported the failing of EC guideline values for total coliforms, e-coli and faecal streptococcus at Western Beach. This coincides with the assessment carried out as part of the RBMP (2015) which continues to be caused by an untreated wastewater discharge located in a neighbouring Member State.

The following water quality standards apply at these bathing waters as defined under the Environment (Quality of Bathing Water) Regulations 2009¹⁴⁸:

Table 4-34: Standards for Coastal and Transitional Waters

Parameter	Excellent	Good	Sufficient
Escherichia coli ¹	250 ²	500 ²	500 ³
Intestinal enterococci ¹	100 ²	200 ²	185 ³

¹ Colony forming units per 100 ml (cfu/100 ml)

² Based upon a 95-percentile evaluation

³ Based upon a 90-percentile evaluation

Water quality data collected by the Gibraltar Environmental Agency between 2016 and 2018 are summarised in Table 4-35.

Table 4-35: Annual average water quality results recorded between 2016 and 2018 at all six bathing sites

		2016	2017	2018
Camp Bay	E. Coli / 100 ml	25.35	16.88	41.06
	% exceedances	0%	0%	0%
	Intestinal enterococci / 100 ml	6.57	5.35	7.38
	% exceedances	0%	0%	0%
Little Bay	E. Coli / 100 ml	23.16	22.81	27.32
	% exceedances	0%	0%	0%
	Intestinal enterococci / 100 ml	14.12	11.57	11.94
	% exceedances	2%	0%	2%
Catalan Bay	E. Coli / 100 ml	62.65	150.53	36.04
	% exceedances	0%	2%	0%
	Intestinal enterococci / 100 ml	25.06	48.02	16.63

¹⁴⁸ Environment Regulations - Quality of Bathing Water (2009)

		2016	2017	2018
	% exceedances	2%	2%	0%
Sandy Bay	E. Coli / 100 ml	62.74	26.38	32.45
	% exceedances	2%	0%	0%
	Intestinal enterococci / 100 ml	24.94	21.60	16.92
	% exceedances	2%	0%	0%
Eastern Beach	E. Coli / 100 ml	316.47	8.64	17.54
	% exceedances	4%	0%	0%
	Intestinal enterococci / 100 ml	17.06	8.44	6.73
	% exceedances	1.96%	0%	0%
Western beach	E. Coli / 100 ml	1,730.88	411.53	4,241.45
	% exceedances	32%	11%	24%
	Intestinal enterococci / 100 ml	1,215.52	79.37	917.60
	% exceedances	27%	9%	23%

Results show how Western Beach has consistently failed to achieve a “sufficient” quality standard with annual average concentrations significantly exceeding standard values for both *E. Coli* and *I. Enterococci*. This failure is attributed to a point source sewage overflow located in the neighbouring city of La Linea (Spain) which discharges directly into the Western Beach basin. The average annual concentrations for all other bathing waters have been observed to achieve “excellent” water quality status and although some exceedances were recorded, these are well below 10% of all measurements taken. This is in line with previous assessments and demonstrates how the existing wastewater discharge at Europa Point does not appear to affect compliance with bathing water quality standards.

- **D8C3 (significant acute pollution events)**

The Mediterranean 2017 Quality Status Report indicates that the historical levels of petroleum hydrocarbons resulting from certain urban, industrial and maritime activities in the marine environment have been reduced compared to previous decades. In particular, a decrease in the number of major oil spills has been recorded.

The Mediterranean Alerts and Accidents Database indicates that between 1 January 1994 and 31 December 2013 approximately 32,000 tonnes of oil entered into the Mediterranean Sea as a result of accidents. In terms of accidents causing pollution, the percentage of accidents recorded as resulting in an oil spill dropped from 56% of the total number of accidents for the period 1977–1993 to 40% for the period 1994–2013. In 2016, the CleanSeaNet platform of the European Maritime Safety Agency (EMSA) detected a total of 1,073 occurrences of probable pollution events of which 1,060 occurrences stemmed in the area covering the Mediterranean Sea and the Atlantic Ocean coasts of Morocco, Portugal, Spain and France.

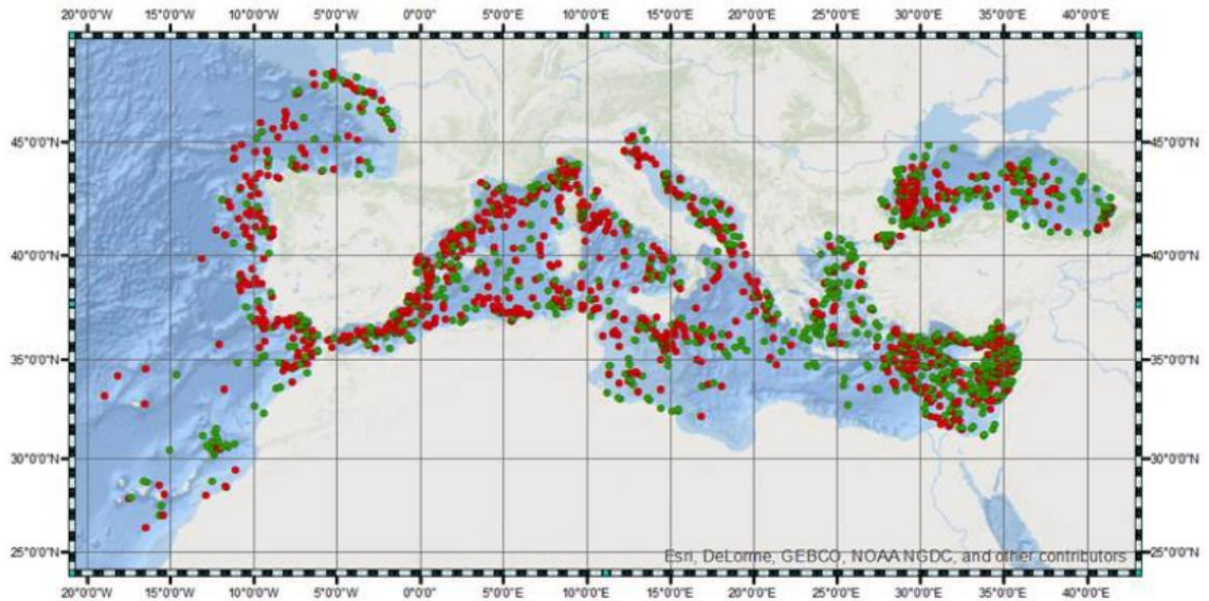


Figure 4-3: Number of oil spills detected in 2016 by satellite imagery (Source: CleanSeaNet, EMA, 2016). Source: Common Indicator 19 (Mediterranean 2017 Quality Status Report).

The Gibraltar Initial Assessment (2012) reported that there had been no significant oil spills recorded in relation to bunkering operations within BGTW although very minor oil spills had been detected in the Port of Gibraltar as well as other spills associated with maritime activity in the wider Bay of Gibraltar area. Hydrocarbon concentrations were reported as elevated in coastal sediments. Since the last assessment was carried out, there have been no significant acute pollution events (i.e. oil or chemical spills reported within BGTW which have exceeded 1km² in surface area). However, given the large levels of shipping activity (see Section 4.8) the risk of hydrocarbon spillage is still present although strict operational measures and spill response plans are in place and are regularly reviewed by the Gibraltar Port Authority in consultation with stakeholders.

- **D9C1 (contaminants in edible tissues)**

The Mediterranean (2017) Quality Status report indicates that MED POL datasets for heavy metals show that over 92% of monitoring stations recorded acceptable levels¹⁴⁹ of cadmium, lead and mercury in biota (bivalves and fish) and only 8% of stations were observed to exceed acceptable levels of lead in mussels. Regional assessments in biota are illustrated in Figure 4-4.

¹⁴⁹ The Mediterranean (2017) Status Report indicates that accurate environmental assessment criteria (EACs) defining acceptable or non-acceptable environmental chemical status in the Mediterranean Sea from an environmental perspective have not been determined yet. However, for indicative purposes, thresholds have been applied adopted by the COP19 in February 2016 for the Mediterranean Sea (UNEP/MAP, 2016) that are based on European policy for biota (EC/EU 1881/2006 and 629/2008 Directives for maximum levels for certain contaminants in foodstuffs) and US ERL values (US Effects Range Low sediment toxicological criteria) for sediments.

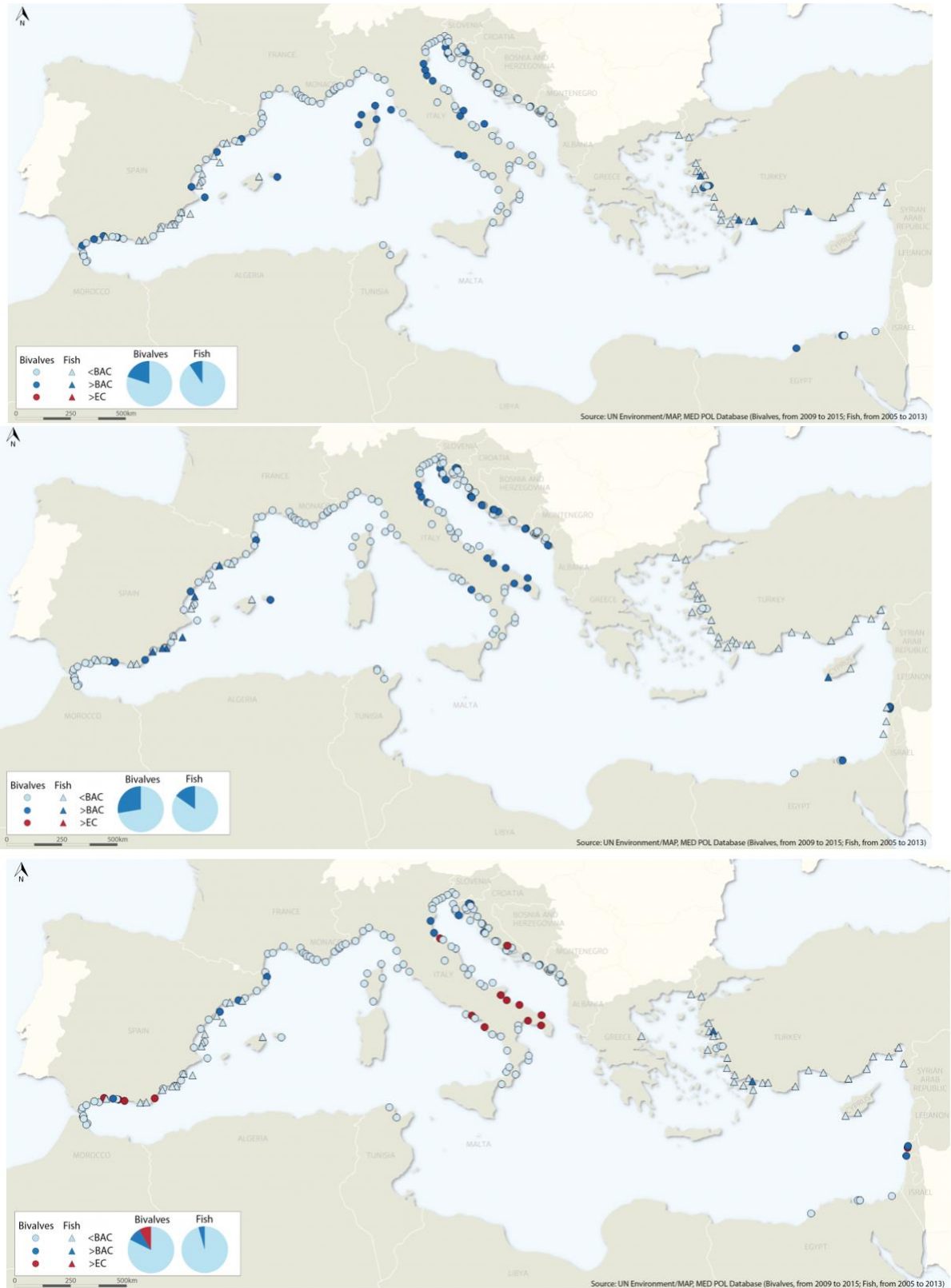


Figure 4-4: Regional cadmium (top), mercury (middle) and lead (bottom) levels assessment against EC criteria in bivalves and fish species. Source: Common Indicator 17 Assessment. Mediterranean Quality Status Report 2017.

The Gibraltar Initial Assessment (2012) reported that contaminant levels in fish and seafood had rarely exceeded maximum levels specified in the applicable legislation. Since then, tissue sampling has continued to be conducted as part of targeted surveys at different sites along the coastline focusing on the White Seabream (*Diplodus sargus*) and Mediterranean Mussel (*Mytilus galloprovincialis*).

The Commission Regulation (EC) No. 1881/2006 sets maximum levels for certain contaminants in food and those relevant to fish and seafood are listed in Table 4-36.

Table 4-36: Maximum level of contaminants in fish and bivalve molluscs defined in the Commission Regulation No. 1881/2006

	Fish (muscle tissue)	Bivalve molluscs
Lead max levels	0.3 mg/kg wet weight	1.5 mg/kg wet weight
Cadmium max levels	0.05 mg/kg wet weight	1.0 mg/kg wet weight
Mercury max levels	0.5 (1.0 for seabream) mg/kg wet weight	0.5 mg/kg wet weight
Sum of dioxins (WHO-PCDD/F-TEQ) max levels	4.0 pg/g wet weight	4.0 pg/g wet weight
Sum of dioxins and dioxin-like PCBs (WHO-PCDD/F-PCB-TEQ) max levels	8.0 pg/g wet weight	8.0 pg/g wet weight
Benzo(a)pyrene max levels	2.0 µg/kg wet weight	10.0 µg/kg wet weight

The contaminants analysed in the fish and bivalve tissue samples collected in 2014 and 2015 were classed within the following groups:

- Metals;
- Organotins;
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Lipid Hexachlorobenzene and Polychlorinated Biphenyls (HCB and PCBs);
- Polybrominated diphenyl ethers and Hexabromocyclododecane (PBDEs and HBCD);
- Perfluorinated compounds (PFCs);
- Dioxins;
- Dioxin-like Polychlorinated Biphenyls (DL-PCBs);
- Dioxins furans and Polychlorinated Biphenyls.

Results for metals show that all average values were recorded below maximum levels except for cadmium in fish where 7% of samples collected at Rosia Bay were observed to exceed maximum levels. Results for dioxins/furans and Polychlorinated Biphenyls show that average values were generally recorded below maximum levels except for 20% of fish samples collected from Rosia Bay and 7% of fish samples collected on the Eastside which were observed to exceed maximum levels. No other exceedances were detected in all the samples analysed. A summary of the results obtained from the 2014 and 2015 surveys is presented in Table 4-37.

Table 4-37: Summary of contaminants analysed in fish and bivalve samples.



Contaminants (group)	White Bream		Mediterranean Mussel	
	Rosia Bay	Eastside	Blackstrap Cove	Rosia Bay
Metals	Results for metals show that all average values were recorded below maximum levels except for cadmium, for which 7% of samples collected were observed to exceed maximum levels.	No exceedances detected.	No exceedances detected.	No exceedances detected.
Organotins	No exceedances detected.	No exceedances detected.	No exceedances detected.	No exceedances detected.
Polycyclic Aromatic Hydrocarbons (PAHs)	No exceedances detected.	No exceedances detected.	No exceedances detected.	No exceedances detected.
Lipid Hexachlorobenzene and Polychlorinated Biphenyls (HCB and PCBs)	No exceedances detected.	No exceedances detected.	No exceedances detected.	No exceedances detected.

Polybrominated diphenyl ethers and Hexabromocyclododecane (PBDEs and HBCD)	No exceedances detected.	No exceedances detected.	No exceedances detected.	No exceedances detected.
Perfluorinated compounds (PFCs)	No exceedances detected.	No exceedances detected.	No exceedances detected.	No exceedances detected.
Dioxins	No exceedances recorded.	No exceedances detected.	No exceedances detected.	No exceedances detected.
Dioxin-like Polychlorinated Biphenyls (DL-PCBs)	No exceedances detected.	No exceedances detected.	No exceedances detected.	No exceedances detected.
Dioxins furans and Polychlorinated Biphenyls	20% of the samples collected were observed to exceed maximum levels.	7% of the samples collected were observed to exceed maximum levels.	No exceedances detected.	No exceedances detected.

d) Contamination – Overall Assessment and Perspective for 2018 – 2024

Table 4-37 provides an overview of the overall assessment and perspective for 2018 – 2024 for contamination.

Table 4-37: Contamination – Overall Assessment and Perspective for 2018 - 2024

Qualitative descriptor for determining GES	<p>D8 - Concentrations of contaminants are at levels not giving rise to pollution effects</p> <p>D9 - Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards</p>	
Current Environmental Status (2019)	 	<p>GES has largely been achieved. Water quality data collected since 2014 shows that concentrations of chromium VI, copper, zinc, benzene, DEHP, lead and nickel have consistently been recorded below threshold values. TBT concentrations in water have also been observed to be gradually decreasing. Values for microbial contamination have shown no significant changes in relation to previous assessments with excellent water quality recorded for all bathing sites except for Western Beach. Although data are limited, some contaminants in edible tissue were detected above max. levels and this requires further monitoring moving forward, including the use of different indicator species to better improve future assessments.</p>
Mediterranean GES Targets	<p>Concentration of key harmful contaminants:</p> <ul style="list-style-type: none"> - Concentrations of specific contaminants below EACs or below reference concentrations; - No deterioration trend in contaminants concentrations in sediment and biota from human impacted areas, statistically defined; - Reduction of contaminants emissions from land-based sources. <hr/> <p>Level of pollution effects:</p> <ul style="list-style-type: none"> - Contaminants effects below threshold; - Decreasing trend in the operational releases of oil and other contaminants from coastal, maritime and off-shore activities. <hr/> <p>Acute pollution events:</p> <ul style="list-style-type: none"> - Decreasing trend in the occurrences of acute pollution events. <hr/> <p>Level of contaminants in seafood:</p> <ul style="list-style-type: none"> - Concentrations of contaminants are within the regulatory limits set by legislation. <hr/> <p>Percentage of intestinal enterococci:</p> <ul style="list-style-type: none"> - Increasing trend in the percentage of intestinal enterococci concentration measurements within established standards. 	

Gibraltar GES Targets	<p>Hazardous substances: D8T18 - Concentrations of contaminants in water, sediment or biota are kept within agreed levels, according to the WFD, and these concentrations are not increasing;</p> <p>D8T19 - Concentrations of substances identified within relevant legislation and international obligations are below the concentrations at which adverse effects are likely to occur (e.g. are less than Ecological Quality Standards applied within the Water Framework Directive).</p> <hr/> <p>Oil contamination: D8T3 - Decreasing trend in the occurrences of acute pollution events .</p>
Criteria and data for measuring progress towards GES in future	<p>D8C1 (primary) concentrations of contaminants</p> <ul style="list-style-type: none"> - Regional monitoring platforms and data sources created under the Barcelona Convention's Mediterranean Action Plan (MAP); - Monitoring data collected under WFD; monitoring programme. <hr/> <p>D8C2 (secondary) species health and habitat condition</p> <ul style="list-style-type: none"> - Equivalent to D8C1 and additional monitoring using new indicators (e.g. Acetylcholinesterase activity (AChE), Lysosomal membrane stability (LMS) and Micronuclei frequencies (MN)); - Data collated to assess D1, D6. <hr/> <p>D8C3 (primary) significant acute pollution events</p> <ul style="list-style-type: none"> - Regional monitoring platforms and data sources created under the Barcelona Convention's Mediterranean Action Plan (MAP); - Continued reporting of significant acute pollution events in coordination with the Gibraltar Maritime Administration & Gibraltar Port Authority. <hr/> <p>D8C4 (secondary) adverse effects of significant acute pollution events</p> <ul style="list-style-type: none"> - Equivalent to D8C2. <hr/> <p>D9C1 (primary) contaminants in edible tissues</p> <ul style="list-style-type: none"> - Equivalent to D8C1.
Measures**	<p>D8/9M1 – Continued efforts in seeking a more active involvement in the Barcelona Convention's Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes.</p> <hr/> <p>D8/9M2 – Continued review of long-term datasets to identify trends and determine the need for contaminant-specific measures.</p> <hr/> <p>D8/9M3 – Continued implementation of existing legislation and management plans in place, including in relation to:</p> <ul style="list-style-type: none"> - Industrial Emissions Directive (2010/75/EU) - Marketing and Use Directive (76/769/EEC) - Directive on ship-source pollution (2009/123/EC) - Environmental Quality Standards Directive (2008/105/EC) - Other EU and International regulations / standards - Gibraltar River Basin Management Plan, which includes the following measures: <ul style="list-style-type: none"> *Environmental permitting (setting max allowable limits of chemicals in discharges / emissions) *Implementation of statutory codes of practice *Pollution prevention advice *Definition of environmental quality standards

Going forward

Further develop our understanding of contamination impacts on habitats and species. Continue with the implementation of monitoring associated with the WFD. It is anticipated that GES targets for contaminants will be achieved between 2020 – 2024.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

4.7 Marine Litter (Descriptor 10)

a) Marine Litter - Scope of the Assessment and Criteria

Marine litter includes any persistent, manufactured or processed solid material that is discarded, disposed, abandoned or lost in the marine environment. Marine litter can refer to macro-litter and micro-litter (<5 mm) including that ingested by marine species. The criteria relevant to Marine Litter are presented in Table 4-38.

Table 4-38: Marine Litter (Descriptor 10) criteria defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
Composition, amount and spatial distribution of litter	D10C1 (Primary) - The composition, amount and spatial distribution of litter on the coastline, in the surface layer of the water column and on the seabed are at levels that do not cause harm to the coastal and marine environment. *Excludes micro-litter
Composition, amount and spatial distribution of micro-litter	D10C2 (Primary) - The composition, amount and spatial distribution of micro-litter on the coastline, in the surface layer of the water column and in seabed sediment are at levels that do not cause harm to the coastal and marine environment.
The amount of litter and micro-litter ingested	D10C3 (Secondary) - The amount of litter and micro-litter ingested by marine animals is at a level that does not adversely affect the health of the species concerned.
The number of individuals of each species which are adversely affected due to litter	D10C4 (Secondary) - The number of individuals of each species which are adversely affected due to litter, such as by entanglement, other types of injury or mortality, or health effects.

Due to the lack of data available on micro-litter at present, this section focuses on macro-litter and largely relies on data collected by The Nautilus Project¹⁵⁰ and the Environmental Safety Group, as well as surveillance monitoring and marine stranding data collected by the DESHCC. Reference is also made to regional sources of information as well as trends observed in adjacent waters outside BGTW.

Regarding MSFD 2017 criteria, D10C1 (primary) composition, amount and distribution of litter, D10C3 (secondary) amount of litter / micro-litter ingested and D10C4 (secondary) number of individuals of species affected by litter have been used. Criterion D10C2 (primary) composition, amount and distribution of micro-litter was not used since there are presently not enough data available on abundance and composition of micro-litter within BGTW to provide a robust assessment for this particular criterion.

Regarding regional assessments, the Mediterranean 2017 Quality Status Report applied two common indicators relevant to marine litter:

- Common Indicator 22: Trends in the amount of litter washed ashore and/or deposited on coastlines including analysis of its composition, spatial distribution and, where possible, source)¹⁵¹.
- Common Indicator 23: Trends in the amount of litter in the water column including microplastics on the seafloor¹⁵².

¹⁵⁰ More information about The Nautilus Project at: <https://www.thenautilusproject.co/> [Accessed on 11/09/19]

¹⁵¹ Available at: <https://www.medqsr.org> [Accessed on 09/09/19]

¹⁵² Available at: <https://www.medqsr.org> [Accessed on 09/09/19]

b) *Marine Litter - Main pressures*

Litter enters the marine environment in BGTW via a number of channels with transboundary litter, shipping and recreational activities (e.g. litter left behind on Gibraltar's main beaches and other hotspots) being the most likely sources within BGTW. Due to the relatively small size of Gibraltar and its dense population, waste management does pose its challenges with limited space being available for processing or end-disposal of waste materials. Many of the solutions found in other countries are simply not possible in Gibraltar and therefore Gibraltar currently exports all of its waste streams to dedicated recycling, reuse or end-disposal facilities in Spain. A new municipal waste sorting and transfer facility is currently being designed which will help manage and better contain any land-based sources of litter.

c) *Marine Litter - Results from the MSFD Assessment*

- **D10C1 (Composition, amount and spatial distribution of litter)**

The Mediterranean 2017 Quality Status Report provides an overview of marine litter trends identified across the Mediterranean. It notes that the main components of marine litter are cigarette butts, food wrappers and plastic bags with their abundance dependent on adjacent urban activities as well as winds and currents. Abundance trends also show a seasonal pattern with an increased amount of litter observed during summer months mainly due to tourism. A review by Cincinelli *et al* (2019) describes the distribution and composition of microplastics as heterogeneous with marked geographical differences between Mediterranean sub-basins¹⁵³ however plastic remains the most abundant material. Deudero and Alomar (2015) suggested that almost 134 species were affected by marine litter within the Mediterranean basin¹⁵⁴.

Monitoring results used for the 2nd cycle assessment for Gibraltar appear to show similar temporal and compositional patterns to the wider Mediterranean Basin. The Environmental Safety Group organise annual clean-up campaigns in Gibraltar with the main aim of increasing environmental awareness and highlighting the different coastal areas affected by litter. Litter volumes, composition and distribution data collected during these campaigns are recorded and submitted to the DESCCH for review and analysis. The predominant marine litter material found is plastic. The Nautilus Project has recently become established as the most prominent NGO that carries out more regular beach clean-ups across different marine sites in Gibraltar and collects finer-scale marine litter data. Together with data collected by the ESG, these have helped provide a better indication of the spatial distribution and abundance of marine macro-litter in BGTW. Between February 2017 and August 2019 for example, 47 different beach cleans were conducted by the Nautilus Project in different parts of Gibraltar's coastline. The weight of marine litter collected in the period May 2018-August 2019 totalled 1,845 kg as depicted in Figure 4-5.

¹⁵³ Cincinelli, A., Martellini, T., Guerranti, C., Scopetani, C., Chelazzi, D. and Giarrizzo, T., 2018. A potpourri of microplastics in the sea surface and water column of the Mediterranean Sea. *TrAC Trends in Analytical Chemistry*.

¹⁵⁴ Deudero, C. Alomar. Mediterranean marine biodiversity under threat: reviewing influence of marine litter on species. *Mar. Pollut. Bull.*, 98 (2015), pp. 58-68,

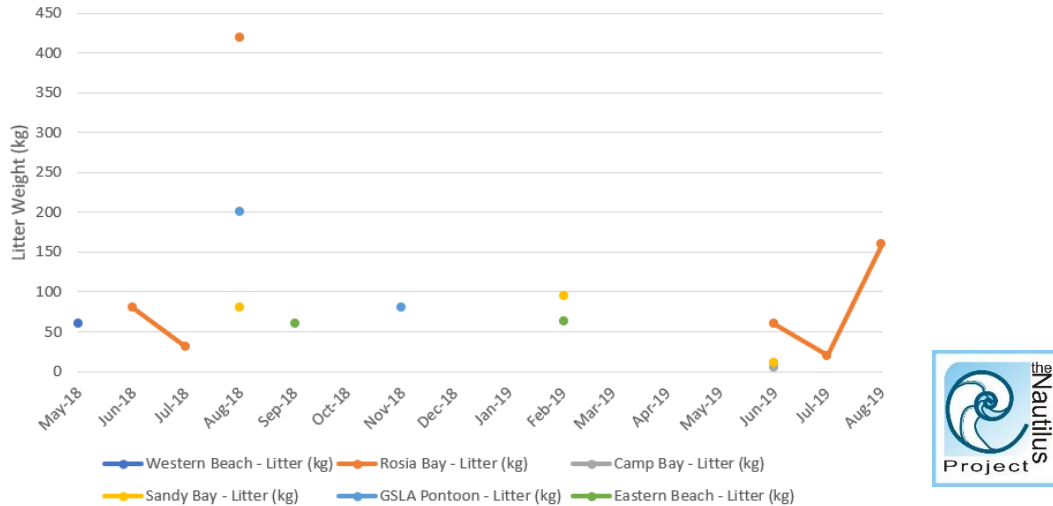


Figure 4-5: Marine macro-litter (kg) collected during 20 beach cleans conducted between May 2018 and August 2019.

- **D10C3 (Amount of litter and micro-litter ingested by marine animals) and D10C4 (number of individuals of each species which are adversely affected by litter).**

Stranding data including stomach content observations have been recorded on the following species groups in BGTW:

1. Cetaceans;
2. Marine reptiles;
3. Seabirds;
4. Fish.

Further work is required to refine the indicators used for D10C3 and D10C4. However, observations to date indicate that there are intermittent signs of marine macro-litter affecting at least 3 groups although it is not possible to determine the exact frequency, source and significance of this pressure at this stage. Individual species that have been considered and assessed include the Loggerhead turtle (*Caretta caretta*), Common (*Delphinus delphis*) and Striped dolphins (*Stenella coeruleoalba*), Northern Gannet (*Morus bassanus*), Yellow legged gull (*Larus michahellis*), Bluefin tuna (*Thunnus thynnus*) and Grey Triggerfish (*Balistes capriscus*).

d) Marine Litter – Overall Assessment and Perspective for 2018 – 2024.



In 2018, HM Government of Gibraltar became the 45th Government to join the UN Environment Clean Seas Campaign and contribute to the goals of the Global Partnership on Marine Litter. This is a voluntary open-ended partnership of international agencies, governments, businesses, academia, local authorities and non-governmental organizations hosted by UN Environment. By signing the pledge, Gibraltar committed itself to taking legal and community action towards reducing plastic pollution.

Building on the work that began in 2017 with an amendment to the Imports and Exports (Control) Regulations 1987, which prohibits the commercial importation of cosmetic or personal care products containing microbeads, HM Government pledged to do more. In 2019, the Imports and Exports (Control) (Amendment No.2) Regulations were launched. These Regulations restrict and prohibit the importation of certain single use plastic products into Gibraltar with the aim of reducing litter on land and sea. The Imports and Exports (Control) (Amendment No.3) Regulations 2019 also prohibit the importation into Gibraltar of unused plastic bags made wholly or partly from plastic of a thickness of less than 100 microns with limited exceptions. HM Government of Gibraltar also took action to introduce regulations prohibiting the release of balloons. In June 2019, HM Government issued Regulations under the Nature Protection Act prohibiting the sale or distribution of drinks in plastic

bottles within the Gibraltar Nature Reserve. Greater efforts have also been made to provide appropriate recycling or refuse facilities in coastal areas. Sea bins have also been trialled in two marinas as part of wider efforts to curb marine litter. HM Government of Gibraltar has also demonstrated its commitment to clamping down on litter through a variety of other strategies. This includes the development of a multi-agency Litter Committee that is represented by Government officials, agencies, contractors and Non-governmental organisations.

Table 4-39 provides an overview of the overall assessment and perspective for 2018 – 2024 for marine litter.

Table 4-39: Marine Litter – Overall Assessment and Perspective for 2018 - 2024

Qualitative descriptor for determining GES	D10 - Properties and quantities of marine litter do not cause harm to the coastal and marine environment	
Current Environmental Status (2019)	 	The extent to which Gibraltar has achieved its GES for marine litter is uncertain although there is an indication that the amount of beach litter has remained the same since 2012. There are limited long-term baseline data available at this stage to assess changes in abundance, distribution and composition of marine macro-litter. In addition, data on sea floor and micro-litter are poor or lacking respectively. Based on the data available so far, together with evidence from regional monitoring programmes, it is unlikely that this descriptor will achieve GES in the near future.
Mediterranean GES Targets	<ul style="list-style-type: none"> - (Marine litter) Decreasing trend in the number of/amount of marine litter (items) deposited on the coast; - (Marine micro-litter) Decreasing trend in the number/amount of marine litter items in the water surface and the seafloor; 	
Gibraltar GES Targets*	<p>D10T20 - The amount of litter and its degradation products on coastlines is reduced;</p> <p>D10T21 - A decrease in the number of items of litter on the seabed;</p> <p>D10T22 - A downward trend in the amount of marine macro-litter found in marine reptiles, mammals, birds and fish;</p> <p>D10T23 - Develop an appropriate indicator to monitor trends in the amount, distribution and composition of micro-litter.</p>	
Criteria and data for measuring progress towards GES in future	D10C1 (primary) composition, amount and distribution of litter	<ul style="list-style-type: none"> - Regional monitoring platforms and data sources created under the Barcelona Convention's Mediterranean Action Plan (MAP); - Coastline macro-litter data collected by NGOs such as the ESG and Nautilus Project; - Floating and seafloor macro-litter surveys.
	D10C2 (primary) composition, amount and distribution of micro-litter	<ul style="list-style-type: none"> - Regional monitoring platforms and data sources created under the Barcelona Convention's Mediterranean Action Plan (MAP); - Micro-plastic particle levels in the water column and sediment.
	D10C3 (secondary) amount of litter / micro-litter ingested	<ul style="list-style-type: none"> - Systematic monitoring data collected in BGTW by EPRU (sightings and strandings) including citizen science data; - Micro-plastic particle levels in fish.
	D10C4 (secondary) number of individuals affected by litter	<ul style="list-style-type: none"> - Systematic monitoring data collected in BGTW by EPRU (sightings and strandings) including citizen science data;
Measures**	<p>D10M1 - Continued implementation of existing legislation and management plans in place, including in relation to:</p> <ul style="list-style-type: none"> - Waste Management (including single use plastic bans) - Port / Marina Waste Reception Facilities. 	

	D10M2 – Continued implementation of voluntary citizen science marine monitoring programme (running since 2017) to raise environmental awareness and collate data in relation to marine litter.
	D10M3 – Continued efforts to seek a more active involvement in the Barcelona Convention’s Mediterranean Action Plan (MAP) to ensure consistency with other regional programmes aimed at reducing marine litter / monitoring its distribution.
	D10M4 – Support beach clean-up campaigns, continue raising marine litter awareness and expand macro and micro-litter abundance, distribution and composition monitoring programme.
Going forward	- Improve and expand quantitative marine litter monitoring capability (surface, biota, water column and benthic habitat). We will also ensure that indicators used are comparable with those used in the Western Mediterranean.

*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number

**Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number.

4.8 Underwater Noise (Descriptor 11)

a) Underwater Noise - Scope of the Assessment and Criteria

The criteria relevant to Descriptor 11 is presented in Table 4-40.

Table 4-40: Underwater Noise (Descriptor 11) criteria defined in the Commission Decision (EU) 2017/848 (MSFD 2017 criteria)

Criteria elements	Criteria (Indicator)
Anthropogenic impulsive sound source	D11C1 (Primary) – The spatial distribution, temporal extent, and levels of anthropogenic impulsive sound sources do not exceed levels that adversely affect populations of marine animals.
Anthropogenic continuous low-frequency sounds	D11C2 (Secondary) – The spatial distribution, temporal extent and levels of anthropogenic continuous low-frequency sound do not exceed levels that adversely affect populations of marine animals.

Regarding regional assessments, the Mediterranean 2017 Quality Status Report did not apply any common indicators but proposed two candidate indicators to be used in regional noise monitoring programmes in the future. These are considered to be more closely related to the acoustic biology of key marine mammal species of the Mediterranean:

- Candidate Indicator 26: Proportion of days and geographical distribution where loud, low, and mid-frequency impulsive sounds exceed levels that are likely to entail significant impact on marine animals; and
- Candidate Indicator 27: Levels of continuous low frequency sounds with the use of models as appropriate.

These were developed in collaboration with ACCOBAMS who have developed guidance on their implementation¹⁵⁵ and provide information on the sensitivity of Mediterranean marine mammal species to underwater noise.

b) Underwater Noise - Main pressures

As indicated in the 1st cycle assessment, shipping continues to be the main source of underwater noise in BGTW, which are transited by various types of vessels including large vessels (e.g. cruise liners, cargo ships, tankers, etc.) as well as high-speed ferries. Due to their size and propulsion power, the latter types of vessels create loud continuous sounds which tend to be in the low frequency bracket (>500 Hz) but have relatively large broadband source levels of 180-190 dB re 1µPa. These frequencies

¹⁵⁵ Available at: <https://www.accobams.org> [Accessed on 13/09/19]

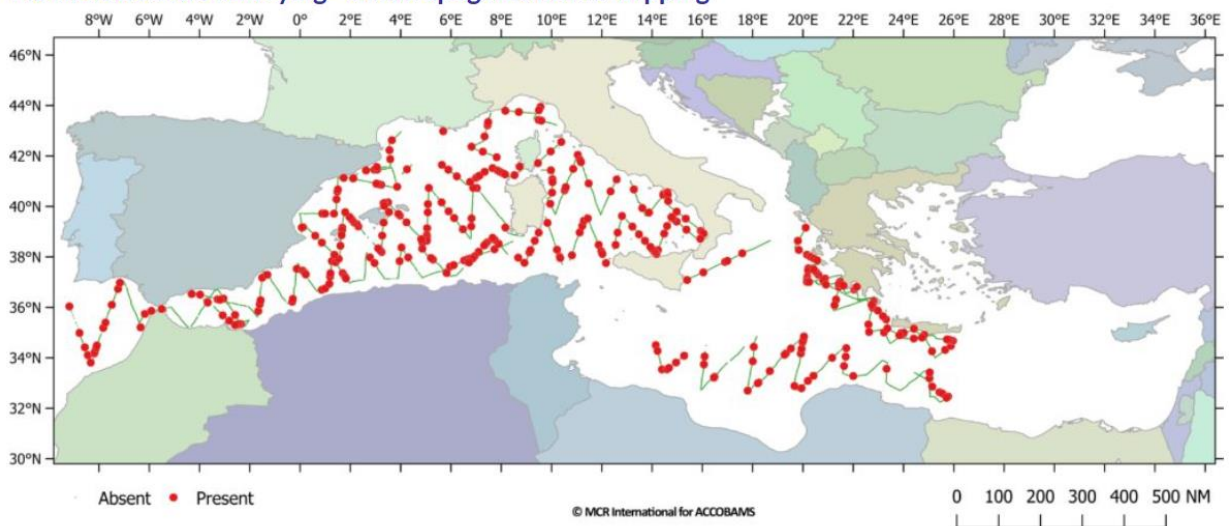
and amplitudes have the potential to interfere with biological signals used by some large whales such as Fin Whales that regularly migrate through BGTW. Smaller leisure vessels are also very common in BGTW and their use has increased following the construction of a new 700 berth marina inside the Gibraltar harbour. These vessels produce higher frequency noises ($\sim 10\text{kHz}$) from cavitation bubbles created by propeller movement. Underwater noise can mainly affect marine mammal and fish species by inducing behavioural responses or causing physical damage to sensory organs.

c) Underwater Noise - Results from the MSFD Assessment

There are currently a lack of baseline data on underwater noise levels in BGTW to provide a robust assessment although monitoring programmes have now been designed and are being implemented within the 2018-2024 cycle. Notwithstanding, this assessment focuses on published underwater noise data collected at a regional level, including the Strait of Gibraltar along with proxy data based on vessel activity in BGTW thus providing a partial assessment of this descriptor.

Underwater noise readings obtained during 2008 in the Strait of Gibraltar indicated that the most intense noise levels were concentrated inside the narrowest and shallowest part of the Strait¹⁵⁶. A more recent initiative by ACCOBAMS created a noise register for the Mediterranean Sea and surrounding regions¹⁵⁷. ACCOBAMS coordinated a large-scale survey of marine species and underwater noise in the Mediterranean Sea during the summer of 2018. Anthropogenic noise emanating from shipping activities and seismic activities were recorded using a passive acoustic recorder¹⁵⁸ (see Figure 4-6). Future surveys will serve as a useful comparative to more localised surveys carried out in BGTW and will also help inform new assessments. Outputs from the EU-funded quietMED Project¹⁵⁹, which aims to improve the level of coherence and comparability in relation to Descriptor 11 (underwater noise), will also be relied upon moving forward. The project aims to facilitate cooperation among Member States in developing methodologies and best practices for underwater noise monitoring relevant to BGTW.

Passive Acoustic surveying - Anthropogenic noise: shipping



¹⁵⁶ Folegot, T. (2012) Ship Traffic Noise Distribution In the Strait of Gibraltar: An exemplary case for monitoring global ocean noise using real-time technology now available for understanding the effects of noise on marine life. *The Effects of Noise on Aquatic Life* (Ed. Popper, A.N. and Hawkins, A.). *Advances in Experimental Medicine and Biology* 730.

¹⁵⁷ Noise Register available at <http://accobams.noiseregister.org/> [Accessed 21/08/19]

¹⁵⁸ ASI 2018 Summer Survey available at <https://www.accobams.org> [Accessed 21/08/19]

¹⁵⁹ See <http://www.quietmed-project.eu/> [Accessed 21/08/19]

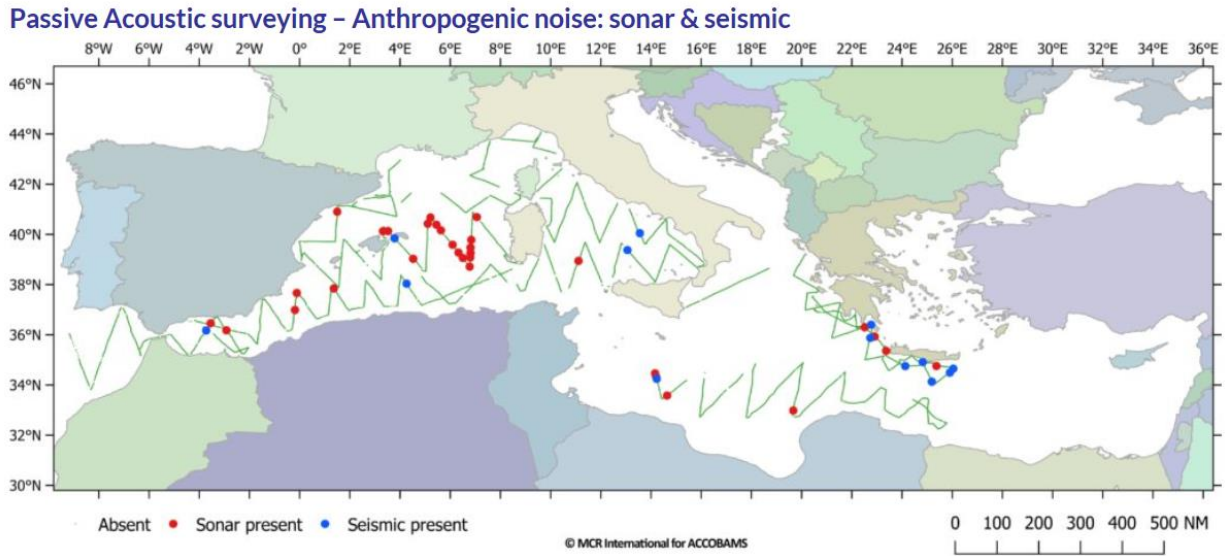


Figure 4-6: ACCOMBAM Survey points where underwater noise sources were detected.

Analysis of shipping movements, including the level and number of recreational vessel activity, can provide an indication of potential changes that may have been experienced over the last six years. In addition, the level of construction activities undertaken in nearshore coastal areas such as those required to maintain or construct coastal defences/infrastructure can also provide an indication of more localised underwater noise levels.

Gibraltar Port Authority (GPA) Ship Activity data were reviewed as part of the assessment to help understand any overall trends in shipping activity within BGTW. In the period 2012-2018, there was a general decrease in the number of large vessels entering and anchoring in Bay on the western side of Gibraltar. The number of vessels recorded on the Eastern side and off port limits were significantly lower and have remained stable over the last 6 years. However, the level of activity from recreational vessels has increased during the assessment period indicating that there may have been an intermittent and localised deterioration since the last assessment. Aside from shipping, there have been no dredging activities in BGTW or other significant and prolonged sources of underwater noise emanating from land-based construction activities.

d) Underwater Noise – Overall Assessment and Perspective for 2018 – 2024.

Table 4-41 provides an overview of the overall assessment and perspective for 2018 – 2024 for Underwater Noise.

Table 4-41: Underwater Noise – Overall Assessment and Perspective for 2018 – 2024.

Qualitative descriptor for determining GES	D11 - Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.
Current Environmental Status (2019)	<div style="display: flex; align-items: center; justify-content: center;"> </div> <p>The achievement of GES for underwater noise in BGTW is uncertain. Maritime activity in the western anchorage seems to have decreased over the last six years although there has been an increase in nearshore recreational vessel activity that might have resulted in an intermittent and localised deterioration of underwater noise levels in some coastal areas. There have been no significant changes in land-based sources of underwater noise. Overall, there are limited baseline data available to assess general changes in underwater noise conditions.</p>
Mediterranean GES Targets	- Noise from human activities cause no significant impact on marine and coastal ecosystems





Gibraltar GES Targets*	D11T24 - Loud, low and mid-frequency impulsive sounds introduced into the marine environment through anthropogenic activities are managed below regionally agreed levels; D11T25 - Continuous low-frequency sound inputs are managed below regionally agreed levels.
Criteria and data for measuring progress towards GES in future	D11C1 (Primary) – anthropogenic impulsive sound sources <ul style="list-style-type: none"> - Systematic underwater noise monitoring data used to compile Underwater Noise Register. - Commercial and recreational vessel activity data for BGTW; - EIA underwater noise monitoring data; - Regional monitoring platforms and data sources e.g. ACCOBAMS. <hr/> D11C2 (Secondary) anthropogenic continuous low-frequency sound <ul style="list-style-type: none"> - Equivalent to D11C1.
Measures**	D11M1 – Monitoring of all building applications in the nearshore and coastal environment with the potential to increase ambient underwater noise levels. D11M2 – Development of Gibraltar Underwater Noise Register.
Going forward	Improve data on baseline underwater noise conditions and sources in BGTW in order to better inform future assessments. We will also liaise with regional bodies to ensure harmonisation of the monitoring programme with neighbouring countries.













*Targets revised in 2019 using those originally listed in 2012 (Initial Assessment) provided with reference number
 **Measures identified in the Gibraltar Programme of Measures (2017) provided with reference number

5. Summary of progress and targets for achieving GES

Table 5-1 below provides a summary of the current status of BGTW, the cost of degradation identified for each descriptor together with revised targets.

Table 5-1: Overview of BGTW current status, cost of degradation and targets for the period between 2018 - 2024

Descriptor	Current Status (2019)	Cost of Degradation	Targets (2018 – 2024)
Status Descriptors			
Seabirds (D1)			D1T1 – Nesting seabird populations distribution and abundance are maintained.
			D1T2 – No seabirds are reported to be significantly affected by bycatch, oil spills, invasive species, noise, light pollution, disturbance and marine litter particularly floating litter.
Marine Mammals (D1)			D1T3 – Indicator marine mammal species distribution and abundance are maintained.
			D1T4 –Zero by-catch mortality of indicator cetacean species. D1T5 - Ensure that disturbance and pressures caused by human activity are below levels that can have a significant impact on feeding and migratory patterns, reproductive success, physiological health and/or long-term trends in behaviour. Specific pressures to assess

Descriptor	Current Status (2019)	Cost of Degradation	Targets (2018 – 2024)
			include physical injury, chemical contamination, marine litter and underwater noise. D1T6 – Zero by-catch mortality of Loggerhead turtles D1T7 – Loggerhead turtle distribution and abundance are maintained. D1T8 - Ensure that disturbance and pressures caused by human activity are below levels that can have a significant impact on feeding and migratory patterns, physiological health and/or long-term trends in behaviour. Specific pressures to assess include physical injury, chemical contamination, marine litter and underwater noise.
Marine Reptiles (D1)	 	GES partially achieved. No cost of degradation identified.	D1T9 - Fish species distribution, population size and community composition are maintained. D1T8 - Incidental by-catch is below levels that can threaten the long-term viability and recovery of fish populations.
Fish and shellfish (D1, D3)	 	GES achievement uncertain. Cost of degradation cannot be identified.	D1T9 – Achievement of good water quality status in relation to chlorophyll <i>a</i> and algal blooms, in line with relevant thresholds.
Pelagic Habitats (D1)	 	GES achieved. No cost of degradation identified.	D1T10 - No deterioration in qualifying features of designated sites, including a reduction of extent, in line with targets applied in hard and soft substrate habitats covered by the Habitats Directive; D6T11 – No habitat loss caused by human activity; D6T12 - The species composition of benthic habitat shows a positive trend, with an increased number of specimens /diversity/ abundance.
Benthic Habitats (D6)	 	GES achievement uncertain. Cost of degradation cannot be identified.	D4T13 - The health of the marine food web is not significantly adversely affected by human activities in BGTW. Note: Targets and indicators in place for Seabirds, Fish, Cetaceans, Marine Reptiles and Pelagic Habitats will also be used to help assess this Descriptor.
Marine Food Webs (D4)	 	GES achievement uncertain. Cost of degradation cannot be identified.	D2T14 - Reduced number of new NIS identified within BGTW;
Non-Indigenous Species (D2)	 	GES not achieved. Insufficient data on NIS abundance and distribution and associated impacts on the local environment (benthic habitats) and socioeconomic activities	



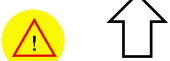


Descriptor	Current Status (2019)	Cost of Degradation	Targets (2018 – 2024)
		(recreational fishing and tourism). Cost of degradation cannot be quantified.	D2T15 - Decrease abundance and spread of established invasive NIS within BGTW.
Eutrophication (D5)		GES achieved. No cost of degradation identified.	D5T16 - Nutrient, DO and chlorophyll <i>a</i> concentrations do not exceed relevant thresholds.
Hydrographic Conditions (D7)		Gibraltar has achieved GES for hydrographic conditions. Both habitats and species have not been affected by significant hydrographical changes during the assessment period.	D7T17 - No impacts on biological components considered under Descriptors 1, 4, and 6 reported to be caused by hydrographical changes.
Contaminants (D8, D9)		GES partly achieved. However, no environmental or socioeconomic implications associated with TBT have been reported as cost of degradation is likely to be minimal.	D8T18 - Concentrations of contaminants in water, sediment or biota are kept within agreed levels, according to the WFD and these concentrations are not increasing. D8T19 - Concentrations of substances identified within relevant legislation and international obligations are below the concentrations at which adverse effects are likely to occur (e.g. are less than Ecological Quality Standards applied within the Water Framework Directive).
Marine Litter (D10)		GES achievement uncertain. Cost of degradation cannot be identified.	D10T20 - The amount of litter and its degradation products on coastlines is reduced; D10T21 - A decrease in the number of items of litter on the seabed; D10T22 - A downward trend in the amount of marine macro-litter found in marine reptiles, mammals, birds and fish; D10T23 - Develop an appropriate indicator to monitor trends in the amount, distribution and composition of micro-litter.
Underwater Noise (D11)		GES achievement uncertain. Cost of degradation cannot be identified.	D11T24 - Any loud, low and mid-frequency impulsive sounds introduced into the marine environment through anthropogenic activities are managed below regionally agreed levels; D11T25 - Continuous low-frequency sound inputs are managed below regionally agreed levels.

Table 2b of Annex III		
Theme	Use / Activity	
		Biological Pressures
		Physical Pressures
		Substances, litter and energy
		<p>Present within BGTW?</p> <p>Input or spread of NIS</p> <p>Input of microbial pathogens</p> <p>Input of genetically modified species and translocation of native species</p> <p>Loss of, or change to, natural biological communities due to cultivation of animal or plant species</p> <p>Disturbance of species (e.g. where they breed, rest and feed) due to human presence</p> <p>Extraction of, or mortality/injury to, wild species</p> <p>Physical disturbance to seabed (temporary or reversible)</p> <p>Physical loss (due to permanent change/extraction of seabed substrate or morphology)</p> <p>Changes to hydrological conditions</p> <p>Input of nutrients – diffuse sources, point sources, atmospheric deposition</p> <p>Input of organic matter – diffuse sources and point sources</p> <p>Input of other substances (e.g. synthetic/non-synthetic substances, radionucleotids) diffuse/point sources</p> <p>Input of litter (solid waste matter, including micro-sized litter)</p> <p>Input of anthropogenic sound (impulsive, continuous)</p> <p>Input of other forms of energy (including electromagnetic fields, light, heat)</p> <p>Input of water – point sources (e.g. brine)</p>
Education and research	Research, survey and educational activities*	✓

*Marine uses and human activities that shall be subject to socioeconomic analysis and assessment of cost of degradation.