Good Environmental Status and Environmental Targets:

Descriptor 5

1.1 Introduction

This report outlines the Good Environmental Status (hereinafter referred to as 'GES') and environmental targets established in terms of MSFD Descriptor 5 reproduced hereunder:

Descriptor 5: Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms and oxygen deficiency in bottom waters

1.2 Selection of relevant criteria and indicators

Determination of GES was made in consideration of the criteria and indicators stipulated by Commission Decision 2010/477/EU for Descriptor 5, listed hereunder:

- Criterion 5.1: Nutrient Levels
  - Nutrient concentration in the water column (5.1.1)
  - Nutrient ratios (silica, nitrogen and phosphorous), where appropriate (5.1.2)

- Criterion 5.2: Direct effects of nutrient enrichment
  - Chlorophyll concentration in the water column (5.2.1);
  - Water transparency related to increase in suspended algae, where relevant (5.2.2)
  - Abundance of opportunistic macroalgae (5.2.3)
  - Species shift in floristic composition such as diatom to flagellate ratio, benthic to pelagic shifts, as well as bloom events of nuisance/toxic algal blooms (e.g. cyanobacteria) cause by human activities (5.2.4)

- Criterion 5.3: Indirect effects of nutrient enrichment
  - Abundance of perennial seaweeds and seagrasses (e.g. fucoids, eelgrass and Neptune grass) adversely impacted by decrease in water transparency (5.3.1)
  - Dissolved oxygen, i.e. changes due to increased organic matter decomposition and size of the area concerned (5.3.2)

1.3 Good Environmental Status

As indicated by the MSFD Initial Assessment report on 'Nutrient Enrichment' most of the data available to date was generated through the baseline surveys carried out in Malta as part of the monitoring requirements of the EU Water Framework Directive. Limitations in trend data hampered assessment of current status in terms of the criteria or indicators stipulated by Commission Decision 2010/477/EU and articulation of the desired status at the criterion or indicator level is not possible at this stage. The proposed GES for MSFD Descriptor 5, thus attempts to address the criteria/indicators collectively, with the broad aim of safeguarding functions of marine ecosystems from the adverse effects of eutrophication. Parameters or indicators which will be used for assessing progress towards achieving this GES should be selected on the basis of a risk-based approach and sound baseline data.

The current data scenario, albeit limited, is indicative of an overall oligotrophic nature of the marine environment in the assessment area, with eutrophic conditions limited to localised areas such as harbours. Occurrence of eutrophication in localised areas would not hamper achievement of the Good Environmental Status at the scale of the assessment area, as long as the general ecosystem functions are safeguarded and sustainable use of marine resources is secured.

Table 1: Proposed Good Environmental Status and related criteria and indicators

Proposed GES	Related Criteria	Indicators
Nutrient levels (or ratios as applicable) and chlorophyll-a levels in the marine environment do not depart significantly from natural levels of the Mediterranean Sea.	5.1 Nutrient Levels	Nutrient concentration in the water column (5.1.1)
		Nutrient ratios (silica, nitrogen and phosphorous), where appropriate (5.1.2)
	5.2 Direct effects of nutrient enrichment;	Chlorophyll concentration in the water column (5.2.1)
Biological communities (assessed at relevant scales) are indicative of either undisturbed conditions or of slight or localised changes associated with nutrient enrichment.	5.2 Direct effects of nutrient enrichment;	Water transparency related to increase in suspended algae, where relevant (5.2.2)
		Abundance of opportunistic macroalgae (5.2.3)
		Species shift in floristic composition such as diatom to flagellate ratio, benthic to pelagic shifts, as well as bloom events of nuisance/toxic algal blooms (e.g. cyanobacteria) cause by human activities (5.2.4)
	5.3 Indirect effects of	Abundance of perennial

	nutrient enrichment	seaweeds and seagrasses (e.g. fucoids, eelgrass and Neptune grass) adversely impacted by decrease in water transparency (5.3.1)
		Dissolved oxygen, i.e. changes due to increased organic matter decomposition and size of the area concerned (5.3.2)

1.4 Environmental Targets and Associated Indicators

Measures to reduce nutrient input into the marine environment from land-based sources of pollution are already established at a National scale pursuant to the Nitrates Directive (91/676/EEC), the Urban Waste Water Treatment Directive (91/271/EEC) and the Water Framework Directive (2000/60/EC).

The Water Catchment Management Plan (2011) (hereinafter referred to as 'WCMP') prepared as part of the requirements of the Water Framework Directive, puts forward measures aimed at reducing nutrient input into the marine environment by building on the requirements of the Nitrates Directive and the Urban Waste Water Treatment Directive (UWWT Directive). The WCMP measures address the main anthropogenic sources of nutrient enrichment in Malta as indicated in the MSFD Initial Assessment, namely sewage discharges, agricultural run-off and offshore fish farms. The measures are listed hereunder for ease of reference, however further details can be viewed at: http://www.mepa.org.mt/topic-wcmp

WCMP measures in relation to Agriculture:

- Farmers to keep a record on the use of organic and inorganic fertilisers and their application to land;
- Reduce point source nitrate contamination from livestock units;
- Farmer to draw up and comply with a nutrient management plan;
- Complete a comprehensive database of farm holdings;

WCMP measures in relation to Urban Waste Water Treatment:

- Treatment of all urban waste water produced in the Maltese Islands;
- Use of a pipe diffuser for discharge of treated waste water into the coastal environment;

WCMP measures in relation to Aquaculture:

- Define and implement operational guidance for aquaculture;

The Nitrates Action Programme (2011) (hereinafter referred to as 'NAP') prepared pursuant to the requirements of the Nitrates Directive, further specifies measures targeted at the input of nutrients from agricultural run-off and establishes:

- periods when land application of fertilisers is prohibited;
- requirements as to the manner of land application of fertiliser;
- limits on land applications of fertilisers;
- the need for storage facilities for livestock manure, including location and manner of storage;
- measures related to land management practices and farm management practices.
- Record keeping on use of fertilisers;

The effectiveness of the NAP will be assessed through the data collated in the National Nitrates Database and monitoring of surface waters (including coastal waters) following the development of assessment methods for surface waters within the context of the Nitrates Directive and the Water Framework Directive.

The general objective of the Urban Waste Water Treatment Directive is to protect the environment from the adverse effects of sewage discharges from urban and industrial conglomerates. Since 2011 all waste water discharged to the marine environment is treated, significantly reducing the nutrient load contribution from such emissions.

In addition to the above, the aquaculture strategy for Malta[1] also discusses and addresses the potential effects of nutrient enrichment from aquaculture.

The measures described above are deemed to encompass the necessary action for addressing nutrient enrichment in the marine environment based on current level of knowledge. Nevertheless, the effectiveness of such measures still needs to be assessed. The environmental target which is being proposed pursuant to Article 10 of the MSFD is linking monitoring in relation to nutrient enrichment in the marine environment with the assessment of effectiveness of existing measures, based on which, further measures might need to be considered in the future through existing mechanisms.

The proposed target is included in Table 2.

[1] http://www.mrra.gov.mt/loadfile.ashx?id=1bb77c1f-f3a5-43fd-974d-23b46d44f605

Table 2: Proposed Target in relation to MSFD Descriptor 5.

Good Environmental Status	Environmental Target	Feature	Indicators
Nutrient levels (or ratios as applicable) and chlorophyll-a levels in the marine environment do not depart significantly from natural levels of the Mediterranean Sea.	**Long-term data on nutrient levels in the marine environment, or on direct or indirect effects of nutrient enrichment (as relevant), in relation to the main sources of nutrient input, is indicative of the effectiveness of existing mechanisms addressing nutrient input in the marine environment.**	Nutrient levels or effects of nutrient enrichment (as relevant) in relation to main sources of nutrient input and existing mechanisms to address them.	Nutrient levels in the marine environment OR Indicators on the direct or indirect effects of nutrient enrichment as relevant (to be developed)
Biological communities (assessed at relevant scales) are indicative of either undisturbed conditions or of slight or localised changes associated with nutrient enrichment.			