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Agenda item 3: Offshore Monitoring Programme

List of IMAP indicators relevant to the Offshore Monitoring Programme and related draft guidance fact sheets

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List of IMAP indicators relevant to the Offshore Monitoring Programme and related draft guidance fact sheets

Objective

The objective of the present document, in the context of the development of a Mediterranean Monitoring Procedures and Programmes is to provide a list of qualitative indicators relevant to the Offshore Monitoring Programme and related Guidance fact sheets of the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria (IMAP).

To this effect, the present document proposes recommendation for the Quality Indicators, relevant for each Common and Candidate Indicator (CIs) pertinent to the Offshore Monitoring Programme. These are presented as spatial, temporal, and methodological recommendations.

In **Annex** to the present document specific scientific input on the Guidance Factsheets are provided for further consideration.

Quality Indicators

The Quality Indicators are succinct qualitative descriptions that clearly specify the conditions which must be fulfilled for an Indicator to be considered to be in Good Environmental Status. The nineteen (19) Quality Indicator descriptions are reproduced here for ease of reference:

1. Common Indicator 1: Habitat distributional range, to also consider habitat extent as a relevant attribute (EO1);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a semi-annual (every 6 months) basis for sensitive habitats, and annual (every 12 months) for the broad area. This frequency takes into account the temporal range of scales, on which disruptional activities are carried out, as well as on the rate of change of the habitat. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored at at least 12 field-specific stations. These field-specific stations should be established using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from the offshore platform, or extend to any other distance specified by the Competent Authority. Stations less than 250 m from the installations should be established if practicable and acceptable in terms of safety during operations. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting

information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. The damaged or lost area per habitat type must not exceed 15% of the baseline value.

2. Common Indicator 2: Condition of the habitat's typical species and communities (EO1);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a semi-annual (every 6 months) basis for sensitive habitats, and annual (every 12 months) for the broad area. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored at at least 12 field-specific stations. These field-specific stations should be established using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from the offshore platform, or extend to any other distance specified by the Competent Authority. Stations less than 250 m from the installations should be established if practicable and acceptable in terms of safety during operations. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Expected

Assessment Outputs must be produced at the recommended sampling frequency specified within the Common Indicator Factsheet.

3. Common Indicator 3: Species distributional range (related to marine mammals, seabirds, marine reptiles) (EO1);

Marine Mammals:

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a quarterly (every 3 months) basis for habitats with no previous data, and semi-annual (every 6 months) for the previously sampled areas. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring marine mammals.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Distribution maps, trend and statistical analyses must be produced at the recommended sampling frequency specified within the Common Indicator Factsheet.

Reptiles:

Temporal Recommendation

Monitoring and recording the indicator targets (breeding, wintering, feeding/developmental ranges) should occur on a monthly basis. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring sea turtles.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED

IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Distribution maps, temporal trend analyses must be produced at the recommended sampling frequency specified within the Common Indicator Factsheet.

Seabirds:

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a monthly basis over habitats with no previous data, and quarterly (every 3 months) for previously sampled areas. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring seabirds.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Temporal trends and distribution maps must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

4. Common Indicator 4: Population abundance of selected species (related to marine mammals, seabirds, marine reptiles) (EO1);

Marine Mammals:

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a quarterly (every 3 months) basis for habitats with no previous data, and semi-annual (every 6 months) for the previously sampled areas. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring marine mammals.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Density maps, trend and statistical analyses must be produced at the recommended sampling frequency specified within the Common Indicator Factsheet.

Reptiles:**Temporal Recommendation**

Monitoring and recording the indicator targets (size/age classes and sexes at nesting, wintering, and foraging/developmental habitats) should occur on a monthly basis between April and September for the nesting areas, between October and April for the wintering areas, as well as on a monthly basis for foraging/developmental habitats. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring sea turtles.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Models providing estimates of abundance and temporal trends in abundance must be produced at the recommended sampling frequency specified within the Common Indicator Factsheet.

Seabirds:**Temporal Recommendation**

Monitoring and recording the indicator targets should occur on a monthly basis over habitats with no previous data, and quarterly (every 3 months) for previously sampled areas. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during

operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring seabirds.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Yearly indices and totals for each species must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

5. Common Indicator 5: Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates related to marine mammals, seabirds, marine reptiles) (EO1);

Marine Mammals:

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a quarterly (every 3 months) basis for habitats with no previous data, and semi-annual (every 6 months) for the previously sampled areas. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring marine mammals.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should

be awarded by the certified accreditation body in their country or region, as applicable. Population models, providing age structure, sex ratio, fecundity, and mortality, must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

Reptiles:

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a monthly basis between April and September for the nesting areas, between October to April for the wintering areas, as well as on a monthly basis for foraging/developmental habitats. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring sea turtles.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Population models, providing age structure, sex ratio, fecundity, and mortality, must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

Seabirds:

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a monthly basis over habitats with no previous data, and quarterly (every 3 months) for previously sampled areas. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring seabirds.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be

followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Population Viability Analysis (PVA) must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

6. Common Indicator 6: Trends in abundance, temporal occurrence, and spatial distribution of non-indigenous species, particularly invasive, non-indigenous species, notably in risk areas (EO2, in relation to the main vectors and pathways of spreading of such species);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a semi-annual (every 6 months) basis at hot-spots and stepping stone areas, and annual (every 12 months) for the broader area. Monitoring at annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored a localised scale, at predefined hot-spots and stepping stone areas. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Distribution maps, national inventories, and time series graphs of the calculated metrics must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

7. Common Indicator 7: Spawning stock Biomass (EO3);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a monthly basis at hot-spots and stepping stone areas, and quarterly (every 3 months) for the broader area. Monitoring at annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

Stock assessments should follow the GFCM protocols and be carried out the predefined GFCM areas of application (GFCM/33/2009/2).

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. SSB trends, stock performance, and other predefined assessment outputs must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

8. Common Indicator 9: Fishing Mortality (EO3):**Temporal Recommendation**

Monitoring and recording the indicator targets should occur on a monthly basis at hot-spots and stepping stone areas, and quarterly (every 3 months) for the broader area. Monitoring at annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

Stock assessments should follow the GFCM protocols and be carried out the predefined GFCM areas of application (GFCM/33/2009/2).

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Fishing

mortality trends and other predefined assessment outputs must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

9. Common Indicator 12: Bycatch of vulnerable and non-target species (EO1 and EO3);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a quarterly (every 3 months) basis at hot-spots and stepping stone areas, and semi-annually (every 6 months) for the broader area. Monitoring at annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

Data collection should follow the GFCM protocols and be carried out the predefined GFCM areas of application (GFCM/33/2009/2).

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Incidental catches current fishing practices, trend analyses, and other predefined assessment outputs must be produced and updated at the recommended sampling frequency specified within the Common Indicator Factsheet.

10. Common Indicator 13: Concentration of key nutrients in water column (EO5);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a monthly basis for sensitive habitats, and quarterly (every 3 months) basis for the broad area. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored at at least 12 field-specific stations. These field-specific stations should be established using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from

the offshore platform, or extend to any other distance specified by the Competent Authority. Stations less than 250 m from the installations should be established if practicable and acceptable in terms of safety during operations. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Nutrient concentrations, nutrient ratios, and indications of eutrophication must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

11. Common Indicator 14: Chlorophyll-a concentration in water column (EO5);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a bi-monthly (every 2 months) basis for sensitive and coastal habitats, and semi-annually (every 6 months) basis for the broad area. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored at at least 12 field-specific stations. These field-specific stations should be established using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from the offshore platform, or extend to any other distance specified by the Competent Authority. Stations less than 250 m from the installations should be established if practicable and acceptable in terms of safety during operations. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory

assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Chlorophyll-a concentrations, GES thresholds, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

12. Common Indicator 15: Location and extent of the habitats impacted directly by hydrographic alterations (EO7);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a quarterly/seasonal (every 3 months). Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored at at least 12 field-specific stations. These field-specific stations should be established using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from the offshore platform, or extend to any other distance specified by the Competent Authority. Stations less than 250 m from the installations should be established if practicable and acceptable in terms of safety during operations. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should

be awarded by the certified accreditation body in their country or region, as applicable. Trend analyses, distribution maps, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

13. Common Indicator 17: Concentration of key harmful contaminants measured in the relevant matrix (EO9, related to biota, sediment, seawater);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a semi-annual (every 6 months) basis for sensitive habitats, and annually for the broad area. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored at at least 12 field-specific stations. These field-specific stations should be established using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from the offshore platform, or extend to any other distance specified by the Competent Authority. Stations less than 250 m from the installations should be established if practicable and acceptable in terms of safety during operations. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place, must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Trend analyses for chemical contaminants, distribution levels, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

14. Common Indicator 18: Level of pollution effects of key contaminants where a cause and effect relationship has been established (EO9);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a semi-annual (every 6 months) basis for sensitive habitats, and annually for the broad area. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored at at least 12 field-specific stations. These field-specific stations should be established using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from the offshore platform, or extend to any other distance specified by the Competent Authority. Stations less than 250 m from the installations should be established if practicable and acceptable in terms of safety during operations. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place, must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Trend analyses, distribution levels, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

15. Common Indicator 19: Occurrence, origin (where possible), and extent of acute pollution events (e.g. slicks from oil, oil products and hazardous substances) and their impact on biota affected by this pollution (EO9);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a continuous basis as pollution incidents from ships can occur unexpectedly. Monitoring should continue for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring acute pollution events.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and

interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Temporal trend analyses, distribution maps, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

16. Common Indicator 20: Actual levels of contaminants that have been detected and number of contaminants which have exceeded maximum regulatory levels in commonly consumed seafood (EO9);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a semi-annual (every 6 months) basis for sensitive habitats, and annually for the broad area. Monitoring at semi-annual intervals for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

At least 3 regional reference stations should be established to provide a general picture of background conditions in the region. The regional reference stations should be established within a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority. The regional stations should therefore be located in areas that are not expected to be affected by discharges from the project activity, either at the time or later (they should be as representative as possible of background conditions on the field). These 3 regional reference stations, must cover all the main types of seabed (sand, clay, etc.), with a main emphasis on seabed impacted areas from project activities. Indicators/targets must be monitored at a minimum of 12 field-specific stations. These field-specific stations should be established using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from the offshore platform, or extend to any other distance specified by the Competent Authority. Stations less than 250 m from the installations should be established if practicable and acceptable in terms of safety during operations. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Trend analyses, distribution levels, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

17. Common Indicator 23: Trends in the amount of litter in the water column including microplastics and on the seafloor (EO10);

Temporal Recommendation

Monitoring and recording the indicator targets (at the surface, in the water column and on the seafloor) should occur on quarterly (every 3 months) basis. Monitoring on a quarterly basis should continue for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

An area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority should be established for monitoring acute pollution events. Sampling should occur using a radial transect design that is expected to be permanent for the monitoring surveys of the field. The stations are to be placed at increasing distances from the discharge point (according to the geometric series 250 m, 500 m, 1000 m, 2000 m, etc) and within a distance of 4 kilometres (~2.16 nautical miles) from the offshore platform, or extend to any other distance specified by the Competent Authority, down to a depth of 800m. The orientation and surface of the station network should be determined based on the expected area of impact from project activities estimated with the help of likely discharge quantities and dispersal modelling.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Any laboratories used for data analyses, must have ISO 17025 accreditation for the methods they use. The certification should be awarded by the certified accreditation body in their country or region, as applicable. Temporal trend analyses, distribution maps, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

18. 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 (EO11);

Temporal Recommendation

Monitoring and recording the indicator targets should occur on an annual basis. Monitoring should continue for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

A regular spatial grid should be established in an area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory

assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Trend analyses, distribution maps, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

19. Candidate Indicator 27: Levels of continuous low frequency sounds with the use of models as appropriate (EO11).

Temporal Recommendation

Monitoring and recording the indicator targets should occur on a continuous basis. Monitoring should continue for a minimum of 2 years (if there were no upset conditions reported during operations) and up to 5 years post-operation, or as otherwise required by the Competent Authority must be conducted.

Spatial Recommendation

Monitoring stations with acoustic devices should be established in an area extending to a minimum distance of 4 kilometres (~2.16 nautical miles) from the offshore platform and extend to any other distance specified by the Competent Authority.

Methodological Recommendation

Methodologies identified within the common indicator factsheet must be followed to ensure that appropriate procedures and techniques are developed (or adopted from other sources) for collecting information, QA, and interpretation and assessment of data. Existing international regulatory assessment criteria and procedures in place must be taken into account. Consistent methods for monitoring across a region/sub-region are required. Some methods are described by international standard guidelines, such as the International Standards Organisation (ISO) and the European Committee for Standardization (CEN). Where suitable guidelines exist (i.e., UNEP(DEPI)/MED IG.22/Inf.7, Norway TA2849/2011, NPDES GMG290000, OGP Report. 457), these should be followed, provided they are appropriate for the objective of the monitoring (i.e. to assess the criteria in relation to the targets and reference conditions). Where these are not available, the procedures used should be compatible with methods described in the scientific literature for the relevant indicators or components and those specified within the Common Indicator Factsheet. Trend analyses, distribution maps, and other specified assessment outputs must be determined at the recommended sampling frequency specified within the Common Indicator Factsheet.

Guidance Factsheets

Whilst the Guidance Factsheets of the nineteen (19) Common and Candidate Indicators relevant to Offshore Monitoring have been reviewed, the scientific input, in terms of the proposed target limits, presented in **Annex** concerns only Candidate Indicators 26 and 27, as the proposed amendments for the other Guidance Factsheets, which have been communicated to the Secretariat and the Consultants in charge of the respective Guidance Factsheets for their consideration, are only editorial. To provide a complete set of information the 19 Revised IMAP Indicator Guidance Factsheets relevant to offshore activities have been reproduced in the information document UNEP(DEPI)/MED WG.434/Inf.3.

The updated Guidance Factsheets for Candidate Indicators 26 and 27 are reproduced in Annex of the present document for the consideration of the Meeting.

Actions requested by the Meeting

The Meeting is invited to:

- .1 **take note** of the information provided in the present document; and
- .2 **review and comment** upon the list of IMAP indicators relevant to the Offshore Monitoring Programme and related draft guidance fact sheets.

Annex

Updated Guidance Factsheets for the Candidate Indicators 26 and 27

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 (EO11);

Indicator Title	Common 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	
Relevant GES definition	Related Operational Objective	Proposed Target(s)
Noise from human activities causes no significant impact on marine and coastal ecosystems.	Energy inputs into the marine environment, especially noise from human activities, are minimized	<ul style="list-style-type: none"> • Not more than 100 days per year • Not more than 25% of Mediterranean Sea area • Not within feeding/breeding grounds
Rational		
Justification for indicator selector		
<ul style="list-style-type: none"> - Easy to implement (No need to implement complex acoustic methodologies) - Cost-effective (no field work required, no deployment of sound recorders) - Takes into consideration the impact of impulsive noise on representative cetacean species of the Mediterranean - Consistent with the MSFD-D11 (Impulsive noise indicator) 		
Scientific References		
<p>Dekeling, R.P.A., Tasker, M.L., Van der Graaf, A.J., Ainslie, M.A, Andersson, M.H., André, M., Borsani, J.F., Brensing, K., Castellote, M., Cronin, D., Dalen, J., Folegot, T., Leaper, R., Pajala, J., Redman, P., Robinson, S.P., Sigray, P., Sutton, G., Thomsen, F., Werner, S., Wittekind, D., Young, J.V., 2014. Monitoring Guidance for Underwater Noise in European Seas, Part I: Executive Summary, JRC Scientific and Policy Report EUR 26557 EN, Publications Office of the European Union, Luxembourg, 2014, doi: 10.2788/29293</p> <p>Dekeling, R.P.A., Tasker, M.L., Van der Graaf, A.J., Ainslie, M.A, Andersson, M.H., André, M., Borsani, J.F., Brensing, K., Castellote, M., Cronin, D., Dalen, J., Folegot, T., Leaper, R., Pajala, J., Redman, P., Robinson, S.P., Sigray, P., Sutton, G., Thomsen, F., Werner, S., Wittekind, D., Young, J.V., 2014. Monitoring Guidance for Underwater Noise in European Seas, Part II: Monitoring Guidance Specifications, JRC Scientific and Policy Report EUR 26555 EN, Publications Office of the European Union, Luxembourg, 2014b, doi: 10.2788/27158</p> <p>Dekeling, R.P.A., Tasker, M.L., Van der Graaf, A.J., Ainslie, M.A, Andersson, M.H., André, M., Borsani, J.F., Brensing, K., Castellote, M., Cronin, D., Dalen, J., Folegot, T., Leaper, R., Pajala, J., Redman, P., Robinson, S.P., Sigray, P., Sutton, G., Thomsen, F., Werner, S., Wittekind, D., Young, J.V., 2014. Monitoring Guidance for Underwater Noise in European Seas, Part III: Background Information and Annexes, JRC Scientific and Policy Report EUR 26556 EN, Publications Office of the European Union, Luxembourg, 2014 c, doi: 10.2788/2808</p>		
Policy Context and targets		
Policy context description		
Underwater noise is concretely being considered by the Contracting Parties to the UNEP/MAP Barcelona Convention for the first time under the Ecosystems Approach process (Decision 17/6 and 20/4, COP17).		

Indicator Title	Common 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
<p>Decision 21/3 (COP18) considered that many aspects of noise monitoring and the impact of noise on the marine environment are not yet sufficiently understood to allow a proper definition of Good Environmental Status (GES) related to Ecological Objective 11 (Energy including Underwater Noise)</p> <p>In 2014-2015 ACCOBAMS in cooperation with the UNEP/MAP Secretariat developed the “Basin-wide Strategy for underwater noise monitoring in the Mediterranean” thanks to its working group on noise (Joint ASCOBANS/ACCOBAMS/CMS Noise Working Group).</p> <p>This strategy was included in the Integrated Monitoring and Assessment Programme (IMAP) during the CORMON Meeting in Athens (March 30 – April 01, 2015), which was finally adopted by Parties during the COP19.</p> <p>Finally, during the COP19, ACCOBAMS and the UNEP/MAP signed an MoU covering the issue of underwater noise.</p>	
Targets	
No target proposed yet	
Policy documents	
<i>List and url's</i>	
<p>Report of the following Meetings: COP17-18-19 http://www.unepmap.org/index.php?module=events&action=detail&id=65 http://rac-spa.org/nfp12/documents/reference/13ig21_9_eng.pdf http://195.97.36.231/dbases/MEETING_DOCUMENTS/12IG20_8_Eng.pdf</p> <p>Reports of the 4th and 5th EcAp Coordination Unit (this last not available online) http://195.97.36.231/dbases/MEETING_DOCUMENTS/14WG401_8_ENG.pdf</p> <p>Report of the Meeting of the CORMONS, Athens 30 March – 01 April 2015 (<u>not available online</u>)</p> <p>Report of the Meeting of MEDPOL and joint-session MEDPOL/REMPEC, Malta 16-19, June 2015. http://195.97.36.231/dbases/MEETING_DOCUMENTS/15WG417_17_ENG.pdf</p>	
Indicator analysis methods	
Indicator Definition	
Number of days over a year and number of cells over a grid in which noise exceeding given thresholds occurs	
Methodology for indicator calculation	
Computing the indicator units through a GIS software over a spatial grid of 20x20 km resolution ¹	
Indicator units	
<i>pulse-block days</i> : the number of days that a certain threshold (pulse) is exceeded in an area (block)	
List of Guidance documents and protocols available	
ACCOBAMS, 2015. A basin-wide strategy for underwater noise monitoring in the Mediterranean. Report prepared by Alessio Maglio, Manuel Castellote and Gianni Pavan.	

¹ The current recommendation for the spatial grid resolution is 20x20 km but this is subject to changes until the development of the Mediterranean register of noise sources is completed.

Indicator Title	Common 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
Data Confidence and uncertainties	
<p>Data confidence is expected to be high due to the simplicity of the data themselves (location, period and intensity of noise sources used)</p> <p>The main uncertainty is GES definition and therefore the establishment of thresholds : what spatial and temporal coverage from noise sources is considered as acceptable? In other words: below how many <i>pulse-block days</i> and in how many blocks (grid cells) do we consider the indicator as being in GES?</p> <p>Further uncertainty is given by the spatial grid: current proposal is 20x20 km resolution but other options are on the table (see footnote 2)</p>	
Methodology for monitoring, temporal and spatial scope	
Available Methodologies for Monitoring and Monitoring Protocols	
<p><u>Monitoring Methodology</u>: A register of the use of noise sources is the necessary tool enabling a monitoring programme. The register is a database with data on the use of underwater noise sources: location, period and intensity at least.</p> <p><u>Monitoring Protocol</u>: Data on the use of impulsive noise sources (location, period, and intensity at least) are entered in the register on a regular basis (once, twice or more times per year). This is done by a selected contact person in each country.</p>	
Available data sources	
<p>ACCOBAMS Noise Register (currently at early stage development)</p> <p>National data repositories available for some countries for specific activities (e.g. licensing areas for seismic exploration). Some examples:</p> <p>http://unmig.mise.gov.it/; http://www.minetur.gob.es http://www.ifremer.fr/sismer http://bo.ismar.cnr.it http://unmig.sviluppoeconomico.gov.it http://energy.gov.il http://www.sigetap.tn http://www.ypeka.gr http://www.beph.net</p>	
Spatial scope guidance and selection of monitoring stations	
<p>No monitoring stations needed</p> <p>Spatial scope: regular spatial grid (see footnote 2)</p>	
Temporal Scope guidance	
<p>Analysis is to be done once a year, i.e 1 computation of <i>pulse-block days</i> per grid cell per year. Data can be entered several times a year in the register. No fixed periodicity proposed.</p>	
Data analysis and assessment outputs	
Statistical analysis and basis for aggregation	

Indicator Title	Common 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
<p>Basic descriptive statistics are needed to compute the indicator (see Methodology for indicator calculation and Indicator units above in this table)</p> <p>One data repository (noise register) is established by country. Data from single countries are aggregated through the ACCOBAMS Noise Register</p>	
<p>Expected assessments outputs (I.e. trend analysis, distribution maps, etc. and methods used)</p> <p>The assessment outputs are the following:</p> <ul style="list-style-type: none"> - a GIS map showing the spatial and temporal distribution of noise sources over a year; the value associated to each grid cell (block) in such map is the total number of <i>pulse-block days</i> for that year - Noise source coverage values: Number of grid cells and % of the total cell number with # of <i>pulse-block days</i> > 0 - Trend analysis is possible across years 	
<p>Known gaps and uncertainties in the Mediterranean</p> <p>No particular gap or uncertainty concerning data analysis and assessment outputs</p>	
Contacts and version Date	
<p>Key contacts within UNEP for further information</p> <p>The joint CMS/ACCOBAMS/ASCOBANS Noise Working Group, through the ACCOBAMS Secretariat Jardin de l'UNESCO Terrasses de Fontvieille 98000 Monaco Tel : +377 98 98 20 78</p>	

Candidate Indicator 27: Levels of continuous low frequency sounds with the use of models as appropriate (EO11).

Indicator Title	Common indicator 27: Levels of continuous low frequency sound with the use of models as appropriate	
Relevant GES definition	Related Operational Objective	Proposed Target(s)
Noise from human activities causes no significant impact on marine and coastal ecosystems.	Energy inputs into the marine environment, especially noise from human activities, are minimized	<ul style="list-style-type: none"> • Not more than 100 days per year • Not more than 25% of Mediterranean Sea area • Not within feeding/breeding grounds
Rational		
<p>Justification for indicator selector</p> <ul style="list-style-type: none"> - Addresses the main contributors to continuous low frequency noise levels (ships) - Addresses the potential masking effect of anthropogenic continuous noise on representative cetacean species of the Mediterranean - Consistent with the MSFD-D11 (Ambient noise indicator) 		
<p>Scientific References</p> <p>Dekeling, R.P.A., Tasker, M.L., Van der Graaf, A.J., Ainslie, M.A, Andersson, M.H., André, M., Borsani, J.F., Brensing, K., Castellote, M., Cronin, D., Dalen, J., Folegot, T., Leaper, R., Pajala, J., Redman, P., Robinson, S.P., Sigray, P., Sutton, G., Thomsen, F., Werner, S., Wittekind, D., Young, J.V., 2014. Monitoring Guidance for Underwater Noise in European Seas, Part I: Executive Summary, JRC Scientific and Policy Report EUR 26557 EN, Publications Office of the European Union, Luxembourg, 2014, doi: 10.2788/29293</p> <p>Dekeling, R.P.A., Tasker, M.L., Van der Graaf, A.J., Ainslie, M.A, Andersson, M.H., André, M., Borsani, J.F., Brensing, K., Castellote, M., Cronin, D., Dalen, J., Folegot, T., Leaper, R., Pajala, J., Redman, P., Robinson, S.P., Sigray, P., Sutton, G., Thomsen, F., Werner, S., Wittekind, D., Young, J.V., 2014. Monitoring Guidance for Underwater Noise in European Seas, Part II: Monitoring Guidance Specifications, JRC Scientific and Policy Report EUR 26555 EN, Publications Office of the European Union, Luxembourg, 2014b, doi: 10.2788/27158</p> <p>Dekeling, R.P.A., Tasker, M.L., Van der Graaf, A.J., Ainslie, M.A, Andersson, M.H., André, M., Borsani, J.F., Brensing, K., Castellote, M., Cronin, D., Dalen, J., Folegot, T., Leaper, R., Pajala, J., Redman, P., Robinson, S.P., Sigray, P., Sutton, G., Thomsen, F., Werner, S., Wittekind, D., Young, J.V., 2014. Monitoring Guidance for Underwater Noise in European Seas, Part III: Background Information and Annexes, JRC Scientific and Policy Report EUR 26556 EN, Publications Office of the European Union, Luxembourg, 2014 c, doi: 10.2788/2808</p>		
Policy Context and targets		
<p>Policy context description</p> <p>Underwater noise is concretely being considered by the Contracting Parties to the UNEP/MAP Barcelona Convention for the first time under the Ecosystems Approach process (Decision 17/6 and 20/4, COP17).</p> <p>Decision 21/3 (COP18) considered that many aspects of noise monitoring and the impact of noise on the marine environment are not yet sufficiently understood to allow a proper definition of Good Environmental Status (GES) related to Ecological Objective 11 (Energy including Underwater Noise)</p> <p>In 2014-2015 ACCOBAMS in cooperation with the UNEP/MAP Secretariat developed the “Basin-wide Strategy for underwater noise monitoring in the Mediterranean” thanks to its working group on noise (Joint ASCOBANS/ACCOBAMS/CMS Noise Working Group).</p>		

Indicator Title	Common indicator 27: Levels of continuous low frequency sound with the use of models as appropriate
<p>This strategy was included in the Integrated Monitoring and Assessment Programme (IMAP) during the CORMON Meeting in Athens (March 30 – April 01, 2015), which was finally adopted by Parties during the COP19.</p> <p>Finally, during the COP19, ACCOBAMS and the UNEP/MAP signed an MoU covering the issue of underwater noise.</p>	
Targets	No target proposed yet
Policy documents <i>List and url's</i>	<p>Report of the following Meetings: COP17-18-19 http://www.unepmap.org/index.php?module=events&action=detail&id=65 http://rac-spa.org/nfp12/documents/reference/13ig21_9_eng.pdf http://195.97.36.231/dbases/MEETING_DOCUMENTS/12IG20_8_Eng.pdf</p> <p>Reports of the 4th and 5th EcAp Coordination Unit (<u>this last not available online</u>) http://195.97.36.231/dbases/MEETING_DOCUMENTS/14WG401_8_ENG.pdf</p> <p>Report of the Meeting of the CORMONs, Athens 30 March – 01 April 2015 (<u>not available online</u>)</p> <p>Report of the Meeting of MEDPOL and joint-session MEDPOL/REMPEC, Malta 16-19, June 2015. http://195.97.36.231/dbases/MEETING_DOCUMENTS/15WG417_17_ENG.pdf</p>
Indicator analysis methods	
Indicator Definition	Annual mean sound pressure level and 33% exceedance level in selected frequency bands (third-octave bands centered at 20, 63, 125, 250, 500, 2000)
Methodology for indicator calculation	<p>Calculating through appropriate software:</p> <ul style="list-style-type: none"> - the arithmetic mean sound pressure level of a given number of sound recordings of a fixed duration over a year; - the sound pressure level exceeded during 1/3 of a year (33% Exceedance level)
Indicator units	dB re 1µPa RMS
List of Guidance documents and protocols available	ACCOBAMS, 2015. A basin-wide strategy for underwater noise monitoring in the Mediterranean. Report prepared by Alessio Maglio, Manuel Castellote and Gianni Pavan.
Data Confidence and uncertainties	<p>Data confidence depends mainly on the characteristics of the sound recorder used, on its calibration, on the mooring conditions, and on the location.</p> <p>Also, the southern Mediterranean areas are less covered by the AIS system which provide one of the data type necessary for acoustic modelling and mapping. This certainly affects the quality of monitoring through models and mapping</p>

Indicator Title	Common indicator 27: Levels of continuous low frequency sound with the use of models as appropriate
<p>A great uncertainty arises by the standardisation of methodologies for sound recording and analysis</p> <p>GES definition is also uncertain: what continuous noise levels are acceptable (GES)?</p>	
Methodology for monitoring, temporal and spatial scope	
Available Methodologies for Monitoring and Monitoring Protocols	
<p><u>Monitoring Methodology</u>: continuous sound recording at fixed sites through sound recording stations and acoustic modelling and mapping through simulated data validated through field measures.</p> <p><u>Monitoring Protocol</u>: recordings are stored in a storage facility (server) during the year. These can be retrieved manually or automatically transmitted through appropriate networks (wi-fi, GPRS, Satellite) from the station to the server. Cabled sound recorders, directly connected to land, can also be used. Fieldwork is limited to deployment and maintenance of sound recorders. Data are analysed once a year over the whole acoustic dataset obtained. Models and mapping are computed through appropriate software once a year.</p>	
Available data sources	
<p>EMSO-ESONET, LIDO (for recordings)</p> <p>Input data for acoustic modelling (depth, seafloor, temperature and salinity profiles, etc.) available at many freely available data repositories (e.g. My-Ocean project in the EU; rich data from NOAA also for the European waters)</p> <p>AIS databases for ship parameters (position, speed, vessel type, etc.)</p>	
Spatial scope guidance and selection of monitoring stations	
<p><u>Spatial scope</u>: Contracting Parties (CPs) should consider the whole maritime space under their jurisdiction for placing the acoustic devices, following the guidelines hereafter for selecting the location.</p> <p><u>Location of monitoring stations</u>: areas of low shipping density for deep areas; more hydrophones in complex coastal landscapes (islands, archipelagos, jagged coastlines); avoid trawling areas; avoid areas with strong tidal effects; avoid locations close to sound producing activities other than shipping</p>	
Temporal Scope guidance	
<p>Monitoring stations should be able to continuously record underwater sound, all year long</p>	
Data analysis and assessment outputs	
Statistical analysis and basis for aggregation	
<p>Basic descriptive statistics are needed to compute the indicator (see Methodology for Indicator Calculation earlier in this table)</p> <p>Aggregation could be done through transboundary cooperation at the sub-regional level</p>	
Expected assessment outputs	
<p>(I.e. trend analysis, distribution maps, etc. and methods used)</p> <p>The assessment outputs are the following:</p> <ul style="list-style-type: none"> - Trend analysis across years (any robust statistical technique able to detect a trend can be used) - Map of mean sound pressure level over a year - Map of 33% exceedance level over a year 	

Indicator Title	Common indicator 27: Levels of continuous low frequency sound with the use of models as appropriate
Known gaps and uncertainties in the Mediterranean	
Lack of standardisation in data analysis could affect the assessment.	
Contacts and version Date	
Key contacts within UNEP for further information	
The joint CMS/ACCOBAMS/ASCOBANS Noise Working Group, through the ACCOBAMS Secretariat Jardin de l'UNESCO Terrasses de Fontvieille 98000 Monaco Tel : +377 98 98 20 78	