# 1. Ship-related pollution

| Technologies / GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys) | Analytical Techniques (chemical)[d] | Biological Indicators | Prognostic Modelling[e] | Data Assimilation[f] | GIS | Expert System | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air[a] | Space[b] | Sea[c] | Land | | | | | | | | |
| **Transboundary Diagnostic Analysis** | | | | | | | | | | | | |
| • monitoring / modelling / assessment | 2 | 1 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| • priority setting | | | | | | 1 | 1 | | | | | |
| | | | | | | | | | | | | |
| **Strategic Action Programme** | | | | | | | | | | | | |
| • targets & activities / interventions | | | | | | 1 | 1 | 2 | 2 | 2 | 1 | 2 |
| • institutional arrangements | | | | | | | | | | | | |
| • gaps / uncertainties | | | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| • monitoring evaluation | 1 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

[a] identification of polluting ships

[b] identification of impacts

[c] dispersion and transport characteristics; generation of data for models

[d] oil and chemical indicators

[e] predicting where pollutants go

[f] as support for modelling

Scores:

1 **high priority**; technologies proven to be in use

2 **moderate priority**; technologies may be in use but not yet fully operational or may be proven but not given high priority

3 **low priority**; optional technologies which are not seen to play a major part

## *2. Land-based pollution*

| Technologies<br><br>GEF-supported interventions | Remote Sensing | | | | Autonomous<br>Instruments<br>(incl. buoys) | Analytical<br>Techniques<br>(chemical) | Biological<br>Indicators | Prognostic<br>Modelling | Data<br>Assimilation | GIS | Expert<br>System | Information<br>Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air | Space | Sea | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| • monitoring / modelling / assessment | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| • priority setting | | | | | | 1 | 1 | 1 | | | | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| • targets & activities / interventions | | | | | | 1 | 1 | 2 | 2 | | 2 | 2 |
| • institutional arrangements | | | | | | | | | | | | |
| • gaps / uncertainties | | | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |
| • monitoring evaluation | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 |

Scores:

1 **high priority**; technologies proven to be in use

2 **moderate priority**; technologies may be in use but not yet fully operational or
may be proven but not given high priority

3 **low priority**; optional technologies which are not seen to play a major part

## 3. Ecosystem/habitat degradation

- **coral reefs**
- **mangroves**
- **seagrass beds**
- **wetlands**
- **freshwater habitats**
- **breeding/spawning grounds**

| Technologies / GEF-supported interventions | Remote Sensing Air[a] | Remote Sensing Space[b] | Remote Sensing Sea | Remote Sensing Land | Autonomous Instruments (incl. buoys) | Analytical Techniques (chemical)[c] | Biological Indicators[d] | Prognostic Modelling[e] | Data Assimilation[f] | GIS[g] | Expert System | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| • monitoring / modelling / assessment | 1 | 1 | | | 1 | 1 / 2 | 1 | 2 | 2 | 1 | | |
| • priority setting | | | | | | | | | | 1 | 1 / 2 | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| • targets & activities / interventions | | | | | | | | 1 | | 1 | 1 | |
| • institutional arrangements | | | | | | | | | | 1 / 2 | | ? |
| • gaps / uncertainties | 1 | 1 | | | | 1 / 2 | 1 | 1 / 2 | 1 / 2 | 1 | | |
| • monitoring evaluation | 1 | 1 | | | 1 | 1 | 1 | 2 | 2 | 1 | 1 | |

[a]  locating impacted areas

[b]  gross assessment

[c]  identification of toxic pollutants

[d]  indicator organisms

[e]  predictions

[f]  as support for modelling

[g]  for decision support

Scores:

1  **high priority**; technologies proven to be in use

2  **moderate priority**; technologies may be in use but not yet fully operational or may be proven but not given high priority

3  **low priority**; optional technologies which are not seen to play a major part

## 4. Overfishing

| Technologies \ GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys)[b] | Analytical Techniques (chemical) | Biological Indicators[c] | Prognostic Modelling | Data Assimilation | GIS | Expert System | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air[a] | Space | Sea | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| • monitoring / modelling / assessment | -2 | -2 | 1 | | | | 1 | 2 | 2 | 2 | 1 | |
| • priority setting | | | | | | | 1 | 2 | 2 | 2 | 1 | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| • targets & activities / interventions | 1 | | 1 | | | | 1 | | | | | 1 |
| • institutional arrangements | | | | | | | | | | | | 1 |
| • gaps / uncertainties | | | | | | | | 2 | 2 | | | |
| • monitoring evaluation | -2 | -2 | 1 | | 1 | 1 | 1 | 2 | 2 | 2 | 1 | |

[a]    prevention of overfishing; real time assessment

[b]    monitoring of anoxia

[c]    phytoplankton/zooplankton

Scores:

1    **high priority**; technologies proven to be in use

2    **moderate priority**; technologies may be in use but not yet fully operational or may be proven but not given high priority

3    **low priority**; optional technologies which are not seen to play a major part

*Special note:  a negative score  indicates that the application of the technology is discouraged*

## 5. Freshwater basin issues
## Point source pollution

| Technologies / GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys) | Analytical Techniques (chemical) | Biological Indicators | Prognostic Modelling | Data Assimilation | GIS | Expert System | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air | Space | Sea | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| ● monitoring / modelling / assessment | 1 | 2 | | | 1 | 1 | 1 | 1 | 1 | 3 | | |
| ● priority setting | | | | | | | | 1 | | 2 | 2 | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| ● targets & activities / interventions | | | | | | | | 1 | | 2 | 2 | |
| ● institutional arrangements | | | | | | | | | | | | |
| ● gaps / uncertainties | 1 | 2 | | | 1 | 1 | 1 | 1 | 1 | 3 | | |
| ● monitoring evaluation | | | | | 1 | 1 | 1 | 1 | 1 | 2 | 2 | |

Scores:

1  **high priority**; technologies proven to be in use

2  **moderate priority**; technologies may be in use but not yet fully operational or
may be proven but not given high priority

3  **low priority**; optional technologies which are not seen to play a major part

## *5. Freshwater basin issues*

## <u>Non-point source pollution</u>

| Technologies / GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys) | Analytical Techniques (chemical) | Biological Indicators | Prognostic Modelling | Data Assimilation | GIS | Expert System | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air | Space | Sea | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| ● monitoring / modelling / assessment | 2 | 1 | | | 1 | 1 | 1 | 1 | 1 | 1 | | |
| ● priority setting | | | | | | | | 1 | | 1 | 1 | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| ● targets & activities / interventions | | | | | | | | 1 | | 1 | 1 | |
| ● institutional arrangements | | | | | | | | | | | | |
| ● gaps / uncertainties | 2 | 1 | | | 1 | 1 | 1 | 1 | 1 | 1 | | |
| ● monitoring evaluation | 2 | 1 | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |

<u>Scores:</u>

1    **high priority**; technologies proven to be in use

2    **moderate priority**; technologies may be in use but not yet fully operational or
may be proven but not given high priority

3    **low priority**; optional technologies which are not seen to play a major part

## *5. Freshwater basin issues*
## Ecosystem/habitat degradation

| Technologies GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys) | Analytical Techniques (chemical) | Biological Indicators | Prognostic Modelling | Data Assimilation | GIS | Expert System | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air | Space | Sea | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| ● monitoring / modelling / assessment | 1 | 2 | | | | 2$^a$ | 1 | 2$^b$ | | 2 | | |
| ● priority setting | | | | | | | 1 | 2 | | 2 | | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| ● targets & activities / interventions | | | | | | | 1 | 2 | | 2 | 2 | |
| ● institutional arrangements | | | | | | | | | | | | |
| ● gaps / uncertainties | 1 | 2 | | | | | 1 | 2 | | 2 | | |
| ● monitoring evaluation | 1 | 1 | | | | | 1 | | | 2 | 2 | |

a   water quality / modelling, if needed
b   ecological modelling, if pertinent

Scores:

1   **high priority**; technologies proven to be in use

2   **moderate priority**; technologies may be in use but not yet fully operational or
    may be proven but not given high priority

3   **low priority**; optional technologies which are not seen to play a major part

## *5. Freshwater basin issues*

## **Water conflicts**

| Technologies / GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys)[a] | Analytical Techniques (chemical)[b] | Biological Indicators | Prognostic Modelling | Data Assimilation | GIS | Expert System | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air | Space | Sea | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| ● monitoring / modelling / assessment | 1 | | | | 1 | 1 | 1 | 1 | 1 | 1 | | |
| ● priority setting | | | | | | | | 1 | | 1 | 1 | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| ● targets & activities / interventions | | | | | | | | 1 | | 1 | 1 | |
| ● institutional arrangements | | | | | | | | | | | | |
| ● gaps / uncertainties | 1 | | | | 1 | 1 | 1 | | 1 | 1 | | |
| ● monitoring evaluation | 1 | | | | 1 | 1 | 1 | | 1 | 1 | 1 | |

[a] hydrology ; water quality
[b] water quality

Scores:

1  **high priority**; technologies proven to be in use

2  **moderate priority**; technologies may be in use but not yet fully operational or may be proven but not given high priority

3  **low priority**; optional technologies which are not seen to play a major part

## *5. Freshwater basin issues*
## Land degradation

| Technologies GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys) | Analytical Techniques (chemical) | Biological Indicators[b] | Prognostic Modelling | Data Assimilation | GIS | Expert System | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air[a] | Space | Sea | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| ● monitoring / modelling / assessment | 1 | 1 | | | | 1[c] | 1 | | | 1 | | |
| ● priority setting | | | | | | | 1 | | | 1 | 1 | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| ● targets & activities / interventions | | | | | | | 1 | | | 1 | 1 | |
| ● institutional arrangements | | | | | | | | | | | | |
| ● gaps / uncertainties | 1 | 1 | | | | | 1 | | | 1 | 1 | |
| ● monitoring evaluation | 1 | 1 | | | | | 1 | | | 1 | 1 | |

[a]   land use; land status
[b]   vegetation; farms
[c]   standard soil and chemical determination

Scores:

1   **high priority**; technologies proven to be in use

2   **moderate priority**; technologies may be in use but not yet fully operational or
     may be proven but not given high priority

3   **low priority**; optional technologies which are not seen to play a major part

## *6. Multiple focus*

## **Biodiversity**

| Technologies / GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys)[c] | Analytical Techniques (chemical) | Biological Indicators[d] | Prognostic Modelling[e] | Data Assimilation | GIS[f] | Expert System[g] | Information Highway |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air[a] | Space[b] | Sea | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| ● monitoring / modelling / assessment | 2 | 2 | | | 1 | | 2 | 2 | | 1 | 2 | |
| ● priority setting | | | | | | | 1 | | | 1 | 1 | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| ● targets & activities / interventions | | | | | | | | | | | | |
| ● institutional arrangements | | | | | | | | | | | | |
| ● gaps / uncertainties | | | | | | | | | | | | |
| ● monitoring evaluation | 1 | 1 | 3 | | 1 | | 1 | 2 | | 1 | 1 | |

[a] colour
[b] colour
[c] plankton; optical
[d] biodiversity indicators
[e] ecosystem
[f] mapping indicators
[g] consequences of indicator changes

Scores:

1    **high priority**; technologies proven to be in use

2    **moderate priority**; technologies may be in use but not yet fully operational or may be proven but not given high priority

3    **low priority**; optional technologies which are not seen to play a major part

*Various notes:*
     *ozone depletion  -  plankton damage*
     *biodiversity   -   indicators, expert system*

## *6. Multiple focus*

## **Climate**

| Technologies / GEF-supported interventions | Remote Sensing | | | | Autonomous Instruments (incl. buoys)<sup>c</sup> | Analytical Techniques (chemical) | Biological Indicators | Prognostic Modelling<sup>d</sup> | Data Assimilation<sup>e</sup> | GIS | Expert System | Information Highway<sup>f</sup> |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Air | Space<sup>a</sup> | Sea<sup>b</sup> | Land | | | | | | | | |
| Transboundary Diagnostic Analysis | | | | | | | | | | | | |
| ● monitoring / modelling / assessment | | 1 | 2 | | 1 | 3 | | 1 | | 3 | 3 | 1 |
| ● priority setting | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| Strategic Action Programme | | | | | | | | | | | | |
| ● targets & activities / interventions | | | | | | | | | | | | |
| ● institutional arrangements | | | | | | | | | | | | |
| ● gaps / uncertainties | | | | | | | | | | | | |
| ● monitoring evaluation | 3 | 1 | 1 | | 1 | 3 | | 1 | | | | 1 |

<sup>a</sup>　altimeter, scatter SST

<sup>b</sup>　data for models

<sup>c</sup>　hydrography

<sup>d</sup>　coupled global models

<sup>e</sup>　coupled global models

f 　data for models

Scores:

1　**high priority**; technologies proven to be in use

2　**moderate priority**; technologies may be in use but not yet fully operational or
　　may be proven but not given high priority

3　**low priority**; optional technologies which are not seen to play a major part

*Various notes:*
　　*climate　-　coupled ocean-atmosphere GCMs, sea level, ENSO*