Appendix 16. Decision trees for the assessment of species sensitivity to environmental factors

**Factor:** Substratum loss  
**Description:** The physical removal of the substratum inhabited or required by the species or community in question.  
**Benchmark:** All of substratum occupied by the species or biotope under consideration is removed. A single event is assumed for sensitivity assessment. Once the activity or event has stopped (or between regular events) suitable substratum remains or is deposited. Species or community recovery assumes that the substratum within the habitat preferences of the original species or community is present.

**Environmental position:**  
Is the species benthic (epifaunal / floral, infaunal or interstitial)?

- **No**  
  - **Not relevant**

- **Yes**  
  - **Mobility**
    - **Is the species mobile?**
      - **No**  
        - The species is fixed to or embedded in the substratum.
        - **High** (Record this value)
          - **Go to next section**
      - **Yes**  
        - How likely is the species to avoid the factor?
          - **High** (Record this value)
            - **Fast moving (swimmer, rapid crawling) and will escape.**
              - **Go to next section**
          - **No**  
            - **Slow moving (crawling, burrowing). Some likely to escape factor?**
              - **Intermediate** (Record this value)
                - Sensitivity value for this section.
                  - **……..**

- **Not relevant** (Record this value)

Continued….
Dependence on other species:

- **Mode of life:** Is the species dependent on a sensitive species?
  - Yes ➔ **High / Intermediate** (Record this value)
  - No ➔ **Not sensitive** (Record this value)

- **Typically feeds on:** Is/are the species food organism(s) likely to be destroyed?
  - Yes ➔ Can the species feed on alternative prey/food organism?
    - Yes ➔ **Low** (Record this value)
    - No ➔ **High** (Record this value)
  - No ➔ **Not sensitive** (Record this value)

* Similar sensitivity to that of the host or food species

Sensitivity value for this section.

……..

Overall sensitivity value for substratum loss (worst case value) ……. 
**Factor:** Smothering  
**Description:** The physical covering of the species or community and its substratum with additional sediment (silt), spoil, detritus, litter, oil or man-made objects.  
**Benchmark:** All of the population of a species or an area of a biotope is smothered by sediment to a depth of 5 cm above the substratum for one month. Impermeable materials, such as concrete, oil or tar, are likely to have a greater effect.

**Environmental position:**  
Is the species benthic (epifaunal / floral, infaunal or interstitial)?  
- No: Not relevant  
- Yes:  
  **Environmental position:** Interstitial, infaunal species likely to move through new sediment rapidly.  
  - No: Not relevant  
  - Yes: Low (Record this value)

**Mobility**  
Is the species mobile?  
- Yes:  
  How likely is the species to avoid the factor?  
  - Low (Record this value)  
  - Not relevant (Record this value)  
  
  Slow moving (crawling, burrowing)?  
  - No: Not relevant (Record this value)  
  - Yes:  
    Is the species able to burrow / crawl up through permeable soft material?  
    - No: Go to next section  
    - Yes: Low (Record this value)

- No: Go to next section

**Sensitivity value for this section.**  
..........

**Sensitivity value for this section.**  
..........

Continued….
Feeding method

Will factor block or interfere with feeding, respiratory or photosynthetic apparatus?

Yes

Feeding, respiratory or photosynthetic apparatus cleared (at energetic cost)?

Yes

Low
(Record this value)

No

Photosynthesis or feeding prevented or reduced?

No

Go to next section

High
(Record this value)

Will a proportion of the population survive anoxia or without light?(*)

Yes

Intermediate
(record this value)

No

Intermediate
(record this value)

* For duration see benchmark, and refer to oxygenation.

Dependence on other species

Mode of life:
Is the species dependent on a sensitive species?

Yes

* High / Intermediate
(Record this value)

No

Typically feeds on:
Is/ are the species food organism(s) likely to be destroyed?

Yes

Can the species feed on alternative prey/food organism?

No

High
(Record this value)

No

Not sensitive
(Record this value)

No

Low
(Record this value)

* Similar sensitivity to that of the host or food species

Sensitivity value for this section.

.........

Overall sensitivity value for smothering
(worst case value)

..........
Factor: Changes in suspended sediment

Description: Changes in the concentration of suspended matter in the water column. The rate of siltation is dependent on the availability of suspended sediment, its particle size range and the water flow rate.

Benchmark: An arbitrary short term, acute change in background suspended sediment concentration e.g., a change of 100mg/l for 1 month. The resultant light attenuation effects are addressed under turbidity, and the effects of rapid settling out of suspended sediment are addressed under smothering.

Biological zone:
Is the factor likely to occur in the species’ preferred zone? E.g., suspended sediment is unlikely in the supralittoral.

Yes

No

Not relevant

Environmental position:
Is the species benthic (epifaunal / floral, infaunal or interstitial)?

Yes

No

Not relevant

Mobility:
Is the species sufficiently mobile to be able to avoid change in factor?

Yes

No

Not relevant

Feeding method

Will factor block or interfere with feeding, respiratory or photosynthetic apparatus?

Yes

Feeding, respiratory or photosynthetic apparatus cleared (at energetic cost)?

Yes

Low (Record this value)

No

Go to next section

Not sensitive (Record this value)

No

Will suspended sediment benefit feeding?

Yes

Photonsynthesis, respiration or feeding prevented or reduced?

Reduced

Intermediate (record this value)

Prevented

High (Record this value)

No

Go to next section

Not sensitive * (Record this value)

Sensitivity value for this section.

……...

……...
**Dependence on other species:**

- **Mode of life:** Is the species dependent on a sensitive species?
  - Yes: *High / Intermediate* (Record this value)
  - No

- **Typically feeds on:** Is/are the species food organism(s) likely to be destroyed?
  - Yes: Can the species feed on alternative prey/food organism?
    - Yes: Low (Record this value)
    - No: High (Record this value)
  - No: Not sensitive (Record this value)

**Sensitivity value for this section.**

**Overall sensitivity value for suspended sediment (worst case value).**
Factor: Desiccation
Description: The removal of water or drying.
Benchmark: 1). A normally subtidal, demersal or pelagic species including intertidal migratory or under-boulder species is continuously exposed to air and sunshine for 1 hour.
2). A normally intertidal species or community is exposed to a change in desiccation equivalent to a change in position of one vertical biological zone on the shore, e.g., from upper eulittoral to the mid eulittoral or from sublittoral fringe to lower eulittoral.

**Biological zone:**
Is the factor likely to occur in the species’ preferred zone?
E.g., desiccation is unlikely in the circalittoral.

**Environmental position:**
Is the species interstitial or infaunal?

**Mobility, Growth form and Size**
**Growth form and size:**
Does the species have a size and growth form that would be easily desiccated?

- Soft bodied and/or large S.A.: Vol.
- Hard bodied and/or low S.A.: Vol.

**Mobility:**
Is the species mobile?

- Yes
  - Slow moving (crawling, burrowing)? Some likely to escape factor?
  - The species is fast moving (swimmer, rapid crawling). All will avoid the factor.

- No
  - The species is fixed

**Sensitivity value for this section:**

- Low (Record this value)
- Intermediate (Record this value)
- Not relevant (Record this value)
- Not relevant

**Go to next section**

**Not relevant**

**Sensitivity value for this section.**

Continued….
Dependence on other species:

Mode of life:
Is the species dependent on a sensitive species?

Yes

* High / Intermediate
(Record this value)

No

Typically feeds on:
Is/ are the species food organism(s) likely to be destroyed?

Yes

Can the species feed on alternative prey/food organism?

No

High
(Record this value)

Yes

Not sensitive
(Record this value)

Low
(Record this value)

* Similar sensitivity to that of the host or food species

Overall sensitivity value for desiccation
(worst case value)

Sensitivity value for this module.

……..
Factor: Changes in emergence regime
Description: The time spent emersed and exposed to air.
Benchmark: A 1 hour change in the time covered or not covered by the sea for a period of 1 year.

Biological zone:
Is the factor likely to occur in the species’ preferred zone? 
E.g., emergence is very unlikely in the circalittoral.
No → Not relevant
Yes → Sensitivity value for this section. .........

Mobility:
Is the species sufficiently mobile to avoid a change in emergence?
No → Not relevant
Yes → Not relevant

Environmental limits:
Some or all exposed to factor. Does the change in factor expose the species to conditions outside its habitat requirements (physiological or behavioural adaptations, or competition)?
Yes → Sensitivity value for this section. .........
No → Not sensitive (Record this value)

Viability impaired
Low (Record this value)
Intermediate (Record this value)
High (Record this value)

All die
Some die

Go to next section

For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement.

Continued…. 
Factor: Changes in water flow rate
Description: The movement of water associated with the rise and fall of the tide (tidal streams), prevailing winds and ocean currents.
Benchmark: A change of two categories in water flow rate for one year (see MarLIN glossary) for 1 year. For example from moderately strong (1-3 knots) to very weak (negligible).

Biological zone:
Is the factor likely to occur in the species’ preferred zone? E.g. water flow is very unlikely in the supralittoral fringe.

No → Not relevant

Yes → Sensitivity value for this section.

……..

Mobility:
Is the species sufficiently mobile to avoid the change in water flow rate?

No → Not relevant

Yes → Not relevant

Attachment
Is the species fixed to the substratum permanently?

No → Sensitivity value for this section.

……..

Is the temporary attachment sufficiently strong to prevent the species being washed away by an increase in water flow?

Yes → Go to next section

Intermediate (Record this value)

No → High (Record this value)

Go to next section
**Size, growth form and flexibility**

Does the species have a size and growth form that protrudes significantly above the substratum?
- No
  - Not sensitive (Record this value)
- Yes
  - Do the species have sufficient flexibility to bend and sway under the wave action? E.g. is flexibility >45 degrees.
    - No
      - Not sensitive (Record this value)
    - Yes
      - Will a proportion of the population be damaged?
        - No
          - Not sensitive (Record this value)
        - Yes
          - Low (Record this value)

**Feeding and respiration**

Will the change in water flow interfere with the ability to feed or the supply of food or nutrients (including oxygen)?
- Yes
  - Is feeding or respiration prevented or reduced?
    - Low
      - Low (Record this value)
    - High
      - High (Record this value)
- No
  - Not sensitive (Record this value)
**Water flow rate**

Does the change in water flow rate result in the species being exposed to conditions outside its habitat preferences or additional competition?

- **Yes**
  - Intermediate (Record this value)
  - Sensitivity value for this section. 
  
- **No**
  - Not sensitive (Record this value)
  - Go to next section.

**Dependence on other species:**

* Similar sensitivity to that of the host or food species

- **Mode of life:**
  - Is the species dependent on a sensitive species?
    - **Yes**
      - * High / Intermediate (Record this value)
      - Sensitivity value for this section.
      
    - **No**
      - Not sensitive (Record this value)

- **Typically feeds on:**
  - Is/ are the species food organism(s) likely to be destroyed?
    - **Yes**
      - Can the species feed on alternative prey/food organism?
        - **Yes**
          - Low (Record this value)
        - **No**
          - High (Record this value)
    - **No**
      - Not sensitive (Record this value)

Overall sensitivity value for changes in water flow rate (worst case value).
Factor: Changes in temperature
Description: A change in the ambient temperature of seawater, or in air temperature during emersion
Benchmark:
1) A short term, acute change in temperature; e.g., a 5 °C change in the temperature range for 3 consecutive days. This definition includes ‘short term’ thermal discharges.
2) A long term, chronic change in temperature; e.g. a 2 °C change in the temperature range for a year. This definition includes ‘long term’ thermal discharges.

For intertidal species or communities, the range of temperatures includes the air temperature regime for that species or communities.

Environmental limits:
Some or all exposed to factor. Does the change in factor expose the species to conditions outside its habitat requirements (physiological or behavioural adaptations, or competition)?

Yes
All die
High (Record this value)

Yes
Some die
Intermediate (Record this value)

Yes
Viability impaired
Low (Record this value)

No
Not sensitive (Record this value)

Go to next section

For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement.

Continued….
Identifying species and ecosystem sensitivities

Overall sensitivity value for changes in temperature (worst case value)  

Mode of life:  
Is the species dependent on a sensitive species?  

Yes  

* High / Intermediate  
(Record this value)  

No  

Typically feeds on:  
Is/are the species food organism(s) likely to be destroyed?  

Yes  

Can the species feed on alternative prey/food organism?  

Yes  

Low  
(Record this value)  

No  

High  
(Record this value)  

Not sensitive  
(Record this value)  

Dependence on other species:  

* Similar sensitivity to that of the host or food species  

Sensitivity value for this section.  

........
Factor: Changes in turbidity
Description: The turbidity (clarity or opacity) of water is dependent on the concentration of substances that absorb or scatter light; for example, inorganic or organic particulates (suspended matter), plankton and dissolved substances.

Benchmark: 1) A short term, acute change; e.g., two categories of the water clarity scale (see glossary) for one month, i.e. from medium to extreme turbidity.
2) A long term, chronic change; e.g., one category of the water clarity scale (see glossary) for one year, i.e. from low to medium turbidity.

### Biological zone
Is the factor likely to occur in the species’ preferred zone? E.g., turbidity is unlikely in the supralittoral fringe.

- **Yes** → **Not relevant**
- **No** → **Not relevant**

### Depth
Does the species only occur at a depth where light effectively does not penetrate? E.g. where light levels are below 0.01% of surface light.

- **Yes** → **Not relevant**
- **No** → **Not relevant**

### Environmental position
Does the species live in an environmental position where light is not transmitted? Is it infaunal or interstitial?

- **Yes** → **Not relevant**
- **No** → **Not relevant**

### Mobility
Is the species sufficiently mobile to be able to avoid the turbidity change?

- **Yes** → **Not relevant**
- **No** → **Not relevant**

### Feeding
Will the change in turbidity interfere with the species ability to photosynthesize or its food supply?

- **Yes** →
  - Is photosynthesis or food supply prevented or reduced
    - **Reduced** → **Low** (Record this value)
    - **Prevented** → **High** (Record this value)
  - Sensitivity value for this section.
    - **Low** (Record this value)
    - **High** (Record this value)
- **No** → **Not sensitive** (Record this value)

Go to next section

Continued….
Dependence on other species:

**Mode of life:**
- Is the species dependent on a sensitive species?
  - Yes § *High / Intermediate (Record this value)*
  - No

**Typically feeds on:**
- Is/are there species food organism(s) likely to be destroyed?
  - Yes § Can the species feed on alternative prey/food organism?
    - Yes § Low (Record this value)
    - No § *High (Record this value)*
  - No § Not sensitive (Record this value)

Sensitivity value for this section.

Overall sensitivity value for changes in turbidity (worst case value) ......

* Similar sensitivity to that of the host or food species
Factor: Changes in wave exposure
Description: Exposure on an open shore is dependent upon the distance of open seawater over which wind may blow to generate waves (the fetch) and the strength and incidence of the winds.
Benchmark: A change of two ranks on the wave exposure scale (see glossary) e.g. from Exposed to Extremely exposed for a period of 1 year.

Biological zone:
Is the species found in areas subject to wave action? E.g. wave exposure is unlikely to occur in the pelagic.

Depth:
Does the species exist only below a depth of 80m where wave action is likely to be negligible?

Mobility:
Is the species sufficiently mobile to be able to avoid exposure to wave action?

Attachment
Is the species fixed to the substratum permanently?

- Yes
  - Go to next section
- No
  - Is the temporary attachment sufficiently strong to prevent the species being washed away by an increase in wave action?
    
    - Yes
      - Intermediate (Record this value)
      - Sensitivity value for this section...
    
    - No
      - Go to next section
  
  - Go to next section

Intermediate (Record this value)
Sensitivity value for this section...

Continued.....
### Size, growth form and flexibility

**Does the species have a size and growth form that protrudes significantly above the substratum?**

- **Yes**: Is the species sufficiently flexible to bend and sway under the wave action? (E.g. is flexibility >45 degrees).
  - **Yes**: Is the species made of sufficiently hard material or firmly attached enough not to be damaged / removed by wave action?
    - **Yes** (Record this value)
    - **No**: Is the population damaged or removed?
      - **Yes**: Intermediate (Record this value)
      - **No**: Will a proportion of the population survive (e.g. particular size classes or juveniles).
        - **Yes**: High (Record this value)
        - **No**: Go to next section

- **No**: Will a proportion of the population be damaged?
  - **Yes**: Not sensitive (Record this value)
  - **No**: Go to next section

### Feeding and respiration

**Will the change in wave action interfere with the ability to feed or the supply of food or nutrients (including oxygen)?**

- **Yes**: Is feeding or respiration prevented or reduced?
  - **Yes**: Reduced
  - **No**: Prevented

- **No**: Not sensitive (Record this value)

**Sensitivity value for this section. **

.........

**Sensitivity value for this section. **

.........

Continued…..
Overall sensitivity value for changes in wave exposure (worst case value)
**Factor:** Noise

**Description:** Generally defined as unwanted or disruptive sound.

**Benchmark:**
- **Underwater noise levels:** e.g., the regular passing of a 30 metre trawler at 100 metres or a working cutter-suction transfer dredge at 100 metres for 1 month during important feeding or breeding periods.
- **Atmospheric noise levels:** e.g., the regular passing of a Boeing 737 passenger jet 300 metres overhead for 1 month during important feeding or breeding periods.

---

**Disturbance:**

- **Will the disturbance interfere with essential behaviour, feeding or breeding?**
  - **Yes**: Low (Record this value)
  - **No**: Not sensitive (Record this value)

---

**Mobility:**

- Is the species sufficiently mobile to be able to avoid the noise disturbance?
  - **Yes**: Not relevant
  - **No**: Not sensitive (Record this value)

---

**Is the species likely to be able to detect environmental noise at levels sufficient to cause disturbance?**

---

**Is the shock sound wave likely to cause physical damage?**

---

**Sensitivity value for this section.**

---

**Sensitivity value for this section.**

---

**Go to next section**
Dependence on other species:

Mode of life: Is the species dependant on a sensitive species?
- Yes → *High / Intermediate (Record this value)
- No → Typically feeds on: Is/are the species food organism(s) likely to be destroyed?
  - Yes → Can the species feed on alternative prey/food organism?
    - Yes → Low (Record this value)
    - No → High (Record this value)
  - No → Not sensitive (Record this value)

* Similar sensitivity to that of the host or food species

Overall sensitivity value for noise (worst case value)
Factor: Visual disturbance

Description: This benchmark applies only to species that have sufficient visual acuity to resolve moving objects or at least differentiate between rapid changes in light intensity (as in a moving shadow).

Benchmark: The continuous presence for one month of moving objects not naturally found in the marine environment (e.g., boats, machinery, and humans) within the visual envelope of the species or community under consideration.

Mobility:
Is the species sufficiently mobile to be able to avoid the visual disturbance?

Yes → Not relevant

No → Is the species likely to be able to detect movement sufficiently well to be susceptible to disturbance?

Yes → Not sensitive (Record this value)

No → Sensitivity value for this section.

Disturbance:
Will the disturbance interfere with essential behaviour, feeding or breeding?

Yes → Low (Record this value)

No → Not sensitive (Record this value)

Sensitivity value for this section.

……..
Overall sensitivity value for visual disturbance (worst case value)
Identifying species and ecosystem sensitivities

Factor: Abrasion and physical disturbance

Description: The mechanical interference or rubbing of the organism of interest.

Benchmark: This factor includes mechanical interference, crushing, physical blows against, or rubbing and erosion of the organism or habitat of interest. Force equivalent to a standard boat anchor landing on or being dragged across the organism e.g., a 5 -10 kg anchor and its chain (used by a 7-8m boat). A single event is assumed for assessment.

Where trampling is relevant, the evidence and trampling intensity will be reported in the rationale.

Mobility:
Is the species sufficiently mobile to be able to avoid the abrasive factor?

No

Environmental position:
Is exposure to abrasion unlikely? Is the species infaunal or interstitial?

Yes

Not relevant

Sensitivity value for this section.

Size, growth form and flexibility

Does the species have a size and growth form such that it is exposed to abrasion or physical disturbance?

Yes

No sensitive (Record this value)

No

Is the species made of sufficiently hard material to withstand the abrasion or physical disturbance? E.g. is flexibility >45 degrees.

Yes

No

Is the species sufficiently flexible to give under the abrasion or physical disturbance? E.g. is flexibility >45 degrees.

Low (Record this value)

Go to next section

Intermediate (Record this value)

High (Record this value)

The population is damaged or removed?

Yes

No

Will a proportion of the population survive (e.g. particular size classes or juveniles).

Intermediate (Record this value)

......
Overall sensitivity value for abrasion and physical disturbance (worst case value) .......

Dependence on other species:

- Mode of life: Is the species dependant on a sensitive species?
  - Yes -> *High / Intermediate (Record this value)*
  - No -> Typically feeds on: Is/are the species food organism(s) likely to be destroyed?
    - Yes -> Can the species feed on alternative prey/food organism?
      - Yes -> Low (Record this value)
      - No -> High (Record this value)
    - No -> Not sensitive (Record this value)

* Similar sensitivity to that of the host or food species

Sensitivity value for this section. .......

Identifying species and ecosystem sensitivities Final Report
**Factor:** Displacement

**Description:** Physical removal or transportation of the species or community of interest.

**Benchmark:** Removal of the organism from the substratum and displacement from its original position onto a suitable substratum. A single event is assumed for assessment.

---

**Mobility:**

- **Is the species mobile?**
  - Yes → **Not relevant**
  - No → **Does the species have a temporary attachment?**
    - Yes → Can it reestablish the attachment on displacement?
      - Yes → **Low** (Record this value)
      - No → **High** (Record this value)
    - No → **The species is permanently fixed**

**Sensitivity value for this section.**

**Dependence on other species:**

- **Mode of life:** Is the species dependant on a sensitive species?
  - Yes → *** High / Intermediate** (Record this value)
  - No → **Typically feeds on:** Is the species food organism(s) likely to be destroyed?
    - Yes → Can the species feed on alternative prey/food organism?
      - Yes → **Low** (Record this value)
      - No → **High** (Record this value)
    - No → **Not sensitive** (Record this value)

**Sensitivity value for this section.**

---

**Overall sensitivity value for displacement** (worst case value)

...
Factor: Synthetic compound contamination
Description: Synthetic chemicals are by definition man-made and include, for example, organotins (tributyl tin, triphenyl tin), pesticides (lindane, atrazine, dichlorvos, DDT), organochlorides, organophosphates, solvents (carbon tetrachloride, chloroform) and poly-chlorinated biphenyls (PCBs).

Benchmark: Sensitivity is assessed against the available evidence for the effects of contaminants on the species (or closely related species at low confidence) or community of interest. For example:
- evidence of mass mortality of a population of the species or community of interest (either short or long term) in response to a contaminant will be ranked as high sensitivity;
- evidence of reduced abundance, or extent of a population of the species or community of interest (either short or long term) in response to a contaminant will be ranked as intermediate sensitivity;
- evidence of sub-lethal effects or reduced reproductive potential of a population of the species or community of interest will be assessed as low sensitivity.

The evidence used is stated in the rationale. Where the assessment can be based on a known activity then this is stated. The tolerance to contaminants of species of interest will be included in the rationale when available, together with relevant supporting material.

Environmental limits:

<table>
<thead>
<tr>
<th>Some or all exposed to factor. Does the change in factor expose the species to conditions outside its habitat requirements (physiological or behavioural adaptations, or competition)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>All die</td>
</tr>
<tr>
<td>High (Record this value)</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Some die</td>
</tr>
<tr>
<td>Intermediate (Record this value)</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Viability impaired</td>
</tr>
<tr>
<td>Low (Record this value)</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Not sensitive (Record this value)</td>
</tr>
</tbody>
</table>

For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement.

Continued….
**Dependence on other species:**

<table>
<thead>
<tr>
<th>Mode of life:</th>
<th>Is the species dependant on a sensitive species?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>* High / Intermediate (Record this value)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Typically feeds on:</th>
<th>Is/ are the species food organism(s) likely to be destroyed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Can the species feed on alternative prey/food organism?</td>
</tr>
<tr>
<td>No</td>
<td>High (Record this value)</td>
</tr>
</tbody>
</table>

| Not sensitive (Record this value) |

**Overall sensitivity value for synthetic contaminants**

(worst case value)
Factor: Heavy metal contamination
Description: Heavy metals include, for example, Arsenic (As), Cadmium (Cd), Mercury (Hg), Lead (Pb), Zinc (Zn) and Copper (Cu).
Benchmark: Sensitivity is assessed against the available evidence for the effects of contaminants on the species (or closely related species at low confidence) or community of interest. For example:
• evidence of mass mortality of a population of the species or community of interest (either short or long term) in response to a contaminant will be ranked as high sensitivity;
• evidence of reduced abundance, or extent of a population of the species or community of interest (either short or long term) in response to a contaminant will be ranked as intermediate sensitivity;
• evidence of sub-lethal effects or reduced reproductive potential of a population of the species or community of interest will be assessed as low sensitivity.
The evidence used is stated in the rationale. Where the assessment can be based on a known activity then this is stated. The tolerance to contaminants of species of interest will be included in the rationale when available, together with relevant supporting material.

Environmental limits:

Some or all exposed to factor. Does the change in factor expose the species to conditions outside its habitat requirements (physiological or behavioral adaptations, or competition)?

Yes

All die

High (Record this value)

Intermediate (Record this value)

Low (Record this value)

Not sensitive (Record this value)

No

Viability impaired

Some die

Go to next section

Sensitivity value for this section.

........

For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement.

Continued….
**Dependence on other species:**

- **Mode of life:** Is the species dependant on a sensitive species?
  - Yes: *High / Intermediate (Record this value)*  
  - No: 
    - **Typically feeds on:** Is/are the species food organism(s) likely to be destroyed?
      - Yes: Can the species feed on alternative prey/food organism?
        - Yes: Low (Record this value)
        - No: High (Record this value)
      - No: Not sensitive (Record this value)

  - *Similar sensitivity to that of the host or food species*

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**Overall sensitivity value for heavy metal contamination** (worst case value)
Factor: Hydrocarbon contamination
Description: Hydrocarbons include, for example, oils (crude and fuel oils) and poly aromatic hydrocarbons (PAHs).
Benchmark: Sensitivity is assessed against the available evidence for the effects of contaminants on the species (or closely related species at low confidence) or community of interest. For example:

- evidence of mass mortality of a population of the species or community of interest (either short or long term) in response to a contaminant will be ranked as high sensitivity;
- evidence of reduced abundance, or extent of a population of the species or community of interest (either short or long term) in response to a contaminant will be ranked as intermediate sensitivity;
- evidence of sub-lethal effects or reduced reproductive potential of a population of the species or community of interest will be assessed as low sensitivity.

The evidence used is stated in the rationale. Where the assessment can be based on a known activity then this is stated. The tolerance to contaminants of species of interest will be included in the rationale when available, together with relevant supporting material.

For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement.

Continued….
Overall sensitivity value for hydrocarbon contamination (worst case value)
Factor: Radionuclide contamination

Description: Isotopes of elements that emit alpha, beta or gamma radiation.

Benchmark: Sensitivity is assessed against the available evidence for the effects of contaminants on the species (or closely related species at low confidence) or community of interest. For example:

- evidence of mass mortality of a population of the species or community of interest (either short or long term) in response to a contaminant will be ranked as high sensitivity;
- evidence of reduced abundance, or extent of a population of the species or community of interest (either short or long term) in response to a contaminant will be ranked as intermediate sensitivity;
- evidence of sub-lethal effects or reduced reproductive potential of a population of the species or community of interest will be assessed as low sensitivity.

The evidence used is stated in the rationale. Where the assessment can be based on a known activity then this is stated. The tolerance to contaminants of species of interest will be included in the rationale when available, together with relevant supporting material.

Environmental limits:

Some or all exposed to factor. Does the change in factor expose the species to conditions outside its habitat requirements (physiological or behavioral adaptations, or competition)?

Yes

All die

High
(Record this value)

Low
(Record this value)

Intermediate
(Record this value)

Some die

No

Viability impaired

Not sensitive
(Record this value)

Go to next section

For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement.

Sensitivity value for this section.

……..

Continued….
Dependence on other species:

Mode of life:
Is the species dependant on a sensitive species?

No

Typically feeds on:
Is/are the species food organism(s) likely to be destroyed?

Yes

Can the species feed on alternative prey/food organism?

No

High (Record this value)

Yes

Low (Record this value)

Not sensitive (Record this value)

* High / Intermediate (Record this value)

* Similar sensitivity to that of the host or food species

Sensitivity value for this section.

……..

Overall sensitivity value for radionuclide contamination (worst case value)

……..

……..
Factor: Changes in nutrient levels
Description: Nutrients include substances required for growth, for example, nitrogen, phosphorus, silicon, and micro-nutrients (heavy metals and vitamins).
Benchmark: A change of total nitrogen of 3 mg/l and/or phosphorus of 0.3 mg/l as an annual average. Alternatively, a 50% increase of nutrients as an annual average.

**Feeding and respiration**

- Does growth of the organism depend on nutrient availability?
  - Yes
    - Low (Record this value)
    - Sensitivity value for this section. 
  - No
    - Not sensitive (Record this value)
    - Go to next section

**Mobility**

- Is the species sufficiently mobile to be able to avoid the changes in nutrients?
  - Yes
    - Not relevant
    - Sensitivity value for this section.
  - No

**Nutrient levels**

- Does the change in nutrient levels result in the species being exposed to conditions outside its habitat preferences or additional competition?
  - Yes
    - *High / Intermediate* (Record this value)
    - Sensitivity value for this section.
  - No
    - Not sensitive (Record this value)
    - Go to next section

* For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement concerning indirect effects, e.g. competition, eutrophication, anoxia or algal blooms.

Continued….
Dependence on other species:

- **Mode of life:** Is the species dependant on a sensitive species?
  - Yes → **High / Intermediate** (Record this value)
  - No → **Typically feeds on:**
    - Is/ are the species food organism(s) likely to be destroyed?
      - Yes → Can the species feed on alternative prey/food organism?
        - Yes → **Low** (Record this value)
        - No → **High** (Record this value)
      - No → **Not sensitive** (Record this value)

- **Sensitivity value for this section.**

Overall sensitivity value for changes in nutrient levels (worst case value)

* Similar sensitivity to that of the host or food species
Factor: Changes in salinity
Description: Salinity is a measure of the amount of dissolved salts in the water.
Benchmark: 1) A short term, acute change; e.g., a change of two categories from the MNCR salinity scale for one week (see MarLIN glossary) i.e. from full to reduced.
2) A long term, chronic change; e.g., a change of one category from the MNCR salinity scale for one year (see MarLIN glossary) i.e. from reduced to low.

Biological zone:
Is the factor likely to occur in the species’ preferred zone? E.g., salinity is unlikely in the supralittoral fringe.

Mobility:
Is the species sufficiently mobile to be able to avoid the changes in nutrients?

Environmental limits:
Some or all exposed to factor. Does the change in factor expose the species to conditions outside its habitat requirements (physiological or behavioural adaptations, or competition)?

For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement.
**Dependence on other species:**

- **Mode of life:** Is the species dependant on a sensitive species?
  - Yes → *High / Intermediate* (Record this value)
  - No →
    - **Typically feeds on:** Is/are the species food organism(s) likely to be destroyed?
      - Yes → Can the species feed on alternative prey/food organism?
        - Yes → **Low** (Record this value)
        - No → High (Record this value)
      - No → **Not sensitive** (Record this value)

*S Similar sensitivity to that of the host or food species

**Sensitivity value for this section.**

**Overall sensitivity value for changes in salinity (worst case value).**

........
Factor: Changes in oxygenation
Description: Oxygenation is a measure of the amount of dissolved oxygen in water.
Benchmark: Exposure to dissolved oxygen concentration of 2 mg/l for 1 week.

Biological zone:
Is the factor likely to occur in the species’ preferred zone? E.g., changes in oxygenation are unlikely in the supralittoral fringe.

Yes

No

Mobility:
Is the species sufficiently mobile to be able to avoid the changes in oxygenation?

Yes

Not relevant

No

Environmental limits:
Some or all exposed to factor. Does the change in factor expose the species to conditions outside its habitat requirements (physiological or behavioural adaptations, or competition)?

Yes

All die

Yes

Some die

Yes

Viability impaired

No

Not sensitive (Record this value)

Go to next section

For this part of the assessment there are no fields in the database that give guidance. Assessment is based on evidence in the literature or informed judgement.

Sensitivity value for this section. ........
Overall sensitivity value for changes in oxygenation (worst case value)
Factor: Microbial pathogens / parasites

Description: By definition, disease causes a reduction in fitness of the organism so all species automatically score as sensitive to disease.

Benchmark: Sensitivity can only be assessed relative to a known, named disease. Likely to cause partial loss of a population and will be assessed of intermediate sensitivity.

An assessment can only be made for known parasites or diseases that a species can contract. No fields in the database can be used for further guidance. Assessment based on literature, pers. comm., expert judgement etc.
Factor: Introduction of non-native species
Description: Sensitivity is assessed against a specific alien or non-native species that already occurs in Britain and/or Ireland that is most likely to have an adverse effect and indicate the species being considered in the ‘notes’ section.
Benchmark: Sensitivity assessed against the likely effect of the introduction of alien or non-native species in Britain or Ireland.

An assessment can only be made for known alien species that affect the species. No fields in the database can be used for further guidance. Assessment based on literature, pers. comm., expert judgement etc.
Factor: Selective extraction of this species
Description: A species is bound to be sensitive to its removal and will automatically be assessed as ‘intermediate’.
Benchmark: Extraction removes 50% of the species from the area under consideration. The habitat remains intact or recovers rapidly.

This factor is automatically assessed as intermediate

Intermediate
(Record this value)

Overall sensitivity value for selective extraction of other species (worst case value)
Factor: Selective extraction of other species

Description: The species will be regarded as sensitive if the targeted species is a host for the species being considered, an obligate food source, or if it creates the habitat required by the species or community under consideration.

Benchmark: A species that is a required host or prey for the species under consideration (and assuming that no alternative host exists) or a keystone species in a biotope is removed.

Dependence on other species:

**Mode of life:**
Is the species dependant on a sensitive species?

- **Yes**
  - **Typically feeds on:**
    Is/are the species food organism(s) likely to be destroyed?
      - **Yes**
        - Can the species feed on alternative prey/food organism?
          - **Yes**
            - **Low** (Record this value)
          - **No**
            - **High** (Record this value)
      - **No**
        - **Not sensitive** (Record this value)

- **No**

*Similar sensitivity to that of the host or food species

**Sensitivity value for this section.**

**Overall sensitivity value for changes in oxygenation (worst case value)**