



RESPONSIBLE  
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**IFFO RS**  
Global Standard for Responsible Supply  
of Marine Ingredients

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# Global Standard for Responsible Supply of Marine Ingredients Fishery Assessment Methodology and Template Report V2.0



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of Marine Ingredients



|                                 |                                                         |
|---------------------------------|---------------------------------------------------------|
| <b>Fishery Under Assessment</b> | <b>Round Sardinella <i>Sardinella aurita</i> FAO 34</b> |
| <b>Date</b>                     | <b>January 2019</b>                                     |
| <b>Assessor</b>                 | <b>Jim Daly</b>                                         |

| Application details and summary of the assessment outcome |                  |                 |                                  |                        |
|-----------------------------------------------------------|------------------|-----------------|----------------------------------|------------------------|
| Name: Laayoune Proteins                                   |                  |                 |                                  |                        |
| Address:                                                  |                  |                 |                                  |                        |
| Country: Morocco                                          |                  | Zip:            |                                  |                        |
| Tel. No.:                                                 |                  | Fax. No.:       |                                  |                        |
| Email address:                                            |                  | Applicant Code  |                                  |                        |
| Key Contact:                                              |                  | Title:          |                                  |                        |
| Certification Body Details                                |                  |                 |                                  |                        |
| Name of Certification Body:                               |                  | SAI Global Ltd  |                                  |                        |
| Assessor Name                                             | Peer Reviewer    | Assessment Days | Initial/Surveillance/Re-approval | Whole fish/ By-product |
| Jim Daly                                                  | Virginia Polonio | 0.5             | Initial                          | By-product             |
| Assessment Period                                         | 2018             |                 |                                  |                        |

| Scope Details                        |                                                                           |
|--------------------------------------|---------------------------------------------------------------------------|
| Management Authority (Country/State) | Ministre de l'Agriculture et de la Pêche maritime (Maroc); EU; Russia     |
| Main Species                         | Round sardinella, False sardine, Spanish sardine <i>Sardinella aurita</i> |
| Fishery Location                     | FAO 34                                                                    |
| Gear Type(s)                         | Seine, pelagic trawl, artisanal                                           |
| Outcome of Assessment                |                                                                           |
| Overall Outcome                      | PASS                                                                      |
| Clauses Failed                       | Clause C1.2 re-assessed under Clause D                                    |
| Peer Review Evaluation               | Agree                                                                     |
| Recommendation                       | Pass under Clause D                                                       |

| Assessment Determination                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>For assessment purposes, the FAO considers a single stock unit ranging from south of Senegal to Morocco's northern border. Round sardinella are exploited in the artisanal and industrial small pelagic fisheries of Morocco, Mauritania, Senegal and Gambia. In Morocco the small pelagic fishery has a range of target species of which sardine is by far the most important.</p> <p>The sardinella fishery is managed as a multi-species fishery with two management zones:<br/> a) The zone 'Atlantique centre' (central zone, zones A+B) and b) The zone 'Atlantique sud' (south zone, zone C) (<b>Figure 1</b>).</p> <p>Three fleets prosecute this fishery: The coastal seiner fleet (all zones); the Refrigerated Sea Water (RSW) trawler fleet (zone C) and the EU / Russian freezer trawler fleet operating under agreements with Morocco (zone C).</p> <p>The fishery in zone C is managed under a plan which includes a TAC (all pelagic species combined), bycatch limits, species restrictions, spatial zoning and closed areas. The fishery in zones A+B is also managed via a management plan, but using limits on effort rather than a TAC. There are also regulations in place to limit landings of bycatch and to protect endangered species (monk seals, some sharks). Management measures are applied to the fishery but it is not clear the extent to which these are species-specific.</p> <p>Landings data are collected such that the fishery-wide removals of this species are known <b>so the species passes Clause 1.1 of the assessment.</b></p> <p>Sardinellas are considered overfished throughout the entire West African region. Additional reference points for <i>Sardinella aurita</i> were not available. It was not possible to determine if the species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy). <b>The species therefore fails clause C1.2 of the assessment.</b></p> |

The comparative lack of scientific information on the status of the population in the assessment area means that a risk-assessment style approach must be taken. The fishery was assessed using the risk-based Productivity, Susceptibility Analysis (PSA) as per IFFO-RS v 2.0 procedures for Category D species. The species has passed this risk-based assessment (**Table D1**) due to high productivity (high fecundity, rapid growth) and low susceptibility (depth range avoids demersal trawls, global distribution) attributes.

Round sardinella is a species of least concern (IUCN Red List) and is not on the current list of CITES endangered species (websites accessed 31.01.19)

Round sardinella is approved by the assessment team for the production of fishmeal and fish oil under the IFFO-RS v 2.0 standard (by-products).

|                                  |
|----------------------------------|
| <b>Peer Review Comments</b>      |
|                                  |
| <b>Notes for On-site Auditor</b> |
|                                  |

Note: This table should be completed for whole fish assessments only.

## Species-Specific Results

| Category   | Species                                                                   | % landings | Outcome (Pass/Fail)    |  |
|------------|---------------------------------------------------------------------------|------------|------------------------|--|
| Category A |                                                                           |            | A1                     |  |
|            |                                                                           |            | A2                     |  |
|            |                                                                           |            | A3                     |  |
|            |                                                                           |            | A4                     |  |
| Category B |                                                                           |            |                        |  |
| Category C | Round sardinella, False sardine, Spanish sardine <i>Sardinella aurita</i> | N/A        | <b>FAIL Clause 1.2</b> |  |
| Category D | Round sardinella, False sardine, Spanish sardine <i>Sardinella aurita</i> |            | <b>PASS</b>            |  |

[List all Category A and B species. List approximate total %age of landings which are Category C and D species; these do not need to be individually named here]

## HOW TO COMPLETE THIS ASSESSMENT REPORT

This assessment template uses a modular approach to assessing fisheries against the IFFO RS standard.

### Whole Fish

The process for completing the template for a **whole fish** assessment is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table, to determine which categories of species are present in the fishery.
2. ALL ASSESSMENTS: Complete clauses M1, M2, M3: Management.
3. IF THERE ARE CATEGORY A SPECIES IN THE FISHERY: Complete clauses A1, A2, A3, A4 for **each** Category A species.
4. IF THERE ARE CATEGORY B SPECIES IN THE FISHERY: Complete the Section B risk assessment for **each** Category B species.
5. IF THERE ARE CATEGORY C SPECIES IN THE FISHERY: Complete clause C1 for **each** Category C species.
6. IF THERE ARE CATEGORY D SPECIES IN THE FISHERY: Complete Section D.
7. ALL ASSESSMENTS: Complete clauses F1, F2, F3: Further Impacts.

A fishery must score a pass in **all applicable clauses** before approval may be recommended. To achieve a pass in a clause, the fishery/species must meet **all** of the minimum requirements.

### By-products

The process for completing the template for **by-product raw material** is as follows:

1. ALL ASSESSMENTS: Complete the Species Characterisation table with the names of the by-product species and stocks under assessment. The ‘% landings’ column can be left empty; all by-products are considered as Category C and D.
2. IF THERE ARE CATEGORY C BYPRODUCTS UNDER ASSESSMENT: Complete clause C1 for **each** Category C by-product.
3. IF THERE ARE CATEGORY D BYPRODUCTS UNDER ASSESSMENT: Complete Section D.
4. ALL OTHER SECTIONS CAN BE DELETED. Clauses M1 - M3, F1 - F3, and Sections A and B do not need to be completed for a by-product assessment.

By-product approval is awarded on a species-by-species basis. Each by-product species scoring a pass under the appropriate section may be approved against the IFFO RS Standard.

## SPECIES CATEGORISATION

The following table should be completed as fully as the available information permits. Any species representing more than 0.1% of the annual catch should be listed, along with an estimate of the proportion of the catch each species represents. The species should then be divided into Type 1 and Type 2 as follows:

- **Type 1 Species** can be considered the ‘target’ or ‘main’ species in the fishery. They make up the bulk of annual landings and are subjected to a detailed assessment.
- **Type 2 Species** can be considered the ‘bycatch’ or ‘minor’ species in the fishery. They make up a small proportion of the annual landings and are subjected to relatively high-level assessment.

**Type 1 Species must represent 95% of the total annual catch. Type 2 Species may represent a maximum of 5% of the annual catch (see Appendix B).**

Species which make up less than 0.1% of landings do not need to be listed (NOTE: ETP species are considered separately). The table should be extended if more space is needed. Discarded species should be included when known.

The ‘stock’ column should be used to differentiate when there are multiple biological or management stocks of one species captured by the fishery. The ‘management’ column should be used to indicate whether there is an adequate management regime specifically aimed at the individual species/stock. In some cases it will be immediately clear whether there is a species-specific management regime in place (for example, if there is an annual TAC). In less clear circumstances, the rule of thumb should be that if the species meets the minimum requirements of clauses A1-A4, an adequate species-specific management regime is in place.

NOTE: If any species is categorised as Endangered or Critically Endangered on the IUCN Red List, or if it appears in the CITES appendices, it **cannot** be approved for use as an IFFO RS raw material. This applied to whole fish as well as by-products.

### TYPE 1 SPECIES (Representing 95% of the catch or more)

**Category A:** Species-specific management regime in place.

**Category B:** No species-specific management regime in place.

### TYPE 2 SPECIES (Representing 5% OF THE CATCH OR LESS)

**Category C:** Species-specific management regime in place.

**Category D:** No species-specific management regime in place.

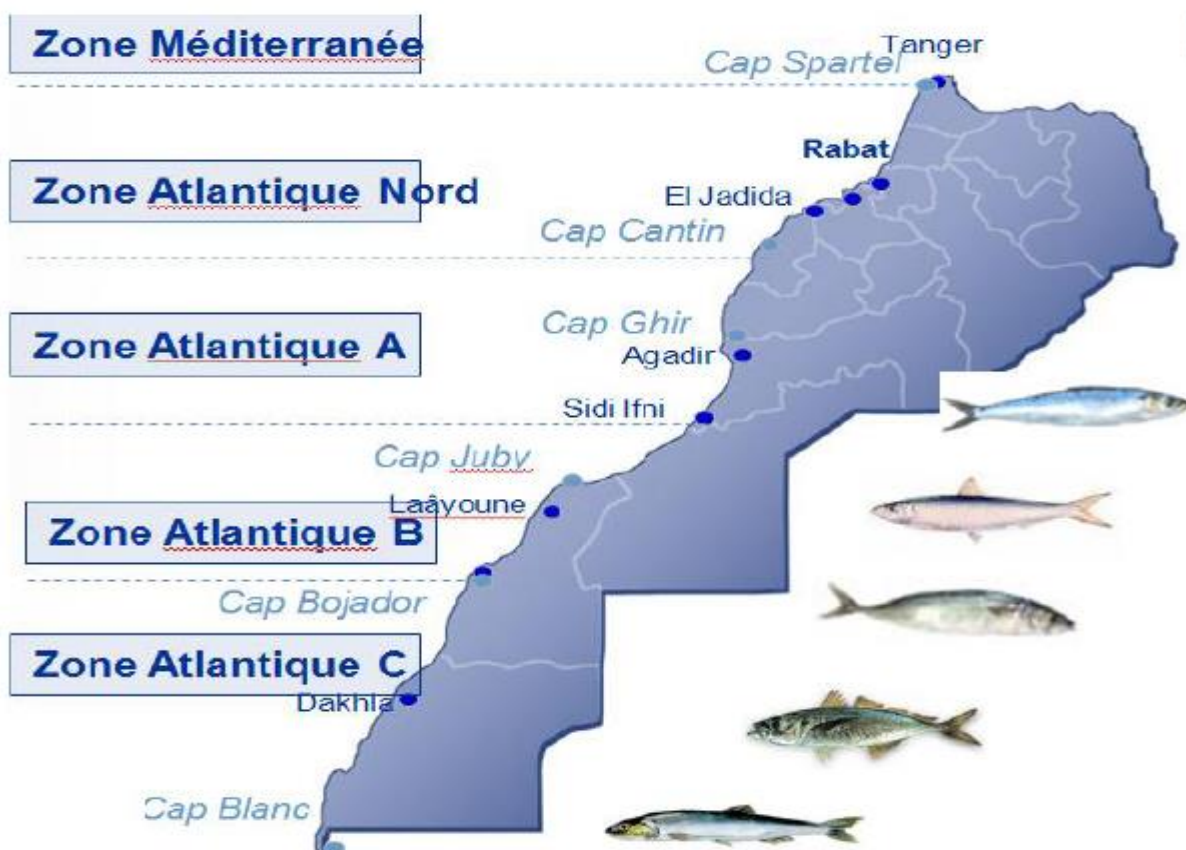
| Common name                                      | Latin name               | Stock  | % of landings | Management                                                            | Category |
|--------------------------------------------------|--------------------------|--------|---------------|-----------------------------------------------------------------------|----------|
| Round sardinella, False sardine, Spanish sardine | <i>Sardinella aurita</i> | FAO 34 | N/A           | Ministre de l’Agriculture et de la Pêche maritime (Maroc); EU; Russia | C, D     |

## CATEGORY C SPECIES

In a whole fish assessment, Category C species are those which make up less than 5% of landings, but which are subject to a species-specific management regime. In most cases this will be because they are a commercial target in a fishery other than the one under assessment. In a by-product assessment, Category C species are those which are subject to a species-specific management regime, and are usually targeted species in fisheries for human consumption.

Clause C1 should be completed for **each** Category C species. If there are no Category C species in the fishery under assessment, this section can be deleted. A Category C species does not meet the minimum requirements of clause C1 should be re-assessed as a Category D species.

| Species Name |                                                       | Round sardinella, False sardine, Spanish sardine <i>Sardinella aurita</i>                                                                                                                                                                 |
|--------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C1           | <b>Category C Stock Status - Minimum Requirements</b> |                                                                                                                                                                                                                                           |
|              | C1.1                                                  | Fishery removals of the species in the fishery under assessment are included in the stock assessment process, OR are considered by scientific authorities to be negligible. PASS                                                          |
|              | C1.2                                                  | The species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy), OR removals by the fishery under assessment are considered by scientific authorities to be negligible. FAIL |
|              |                                                       | <b>Clause outcome: FAIL</b>                                                                                                                                                                                                               |



**Figure 1** Fishing zones for management purposes off the Moroccan Coast R6

## Evidence

### C1.1:

Licensed vessels are required to submit logbooks and landings declarations, and there appear on this basis to be good statistics on catch and effort. There is no evidence of significant problems of fishing by unlicensed vessels. One issue may be the under-declaration of catch by the artisanal fleet, which is usually very difficult to monitor (small vessels landing mixed catches at many small landing sites). There is also regular sampling of length composition in the catch.

Annual acoustic surveys are conducted by the Moroccan research vessel N/V Al Amir Moulay Abdellah (Institut National de Research Halietique (INRH). There have also been international research surveys carrying out other biological work such as estimates of recruitment. Russian scientists have worked on size-age relationships in this stock, via analysis of otoliths (INRH 2012 and 2015, CECAF 2012). There are however no data on fishing mortality, SSB or other reference points for *S.aurita*.

The Committee for Eastern Central African Fisheries (CECAF) and INRH use a Schaefer dynamic production model to evaluate stocks, but have also experimented with other models and may expand to use more up-to-date Bayesian analysis techniques in the future.

Landings data are collected such that the fishery-wide removals are known. Landings data is collected by INRH and by zone so that fishery- wide removals are known:

**Table 1:** Landings data (small pelagic fishery) Morocco 2014 R5

| Species        | landings by zone 2014 (t) |         | % of total landings for the zone made up by each species, 2014 |       |        |
|----------------|---------------------------|---------|----------------------------------------------------------------|-------|--------|
|                | Centre                    | Sud     | Centre                                                         | Sud   | Both   |
| sardine        | 573 904                   | 283 096 | 93 %                                                           | 48 %  | 71 %   |
| mackerel       | 24 340                    | 204 913 | 3.9 %                                                          | 35 %  | 19 %   |
| sardinella     | 285                       | 58 640  | 0.05 %                                                         | 10 %  | 4.9 %  |
| horse mackerel | 9 436                     | 39 296  | 1.5 %                                                          | 6.7 % | 4.0 %  |
| anchovy        | 11 327                    | 19      | 1.8 %                                                          | 0 %   | 0.94 % |

Fishery removals of the species in the fishery under assessment are included in the stock assessment process.

### The species passes clause C.1.1

### C1.2:

The total biomass of small pelagic (sardines, anchovies, horse mackerels, mackerels and sardinella) in the Moroccan EEZ, estimated in autumn 2015, amounted to 7.45 million tons. The volume of catches made on this biomass in 2016 was around 1,457,000 tons, rising by 11% in 2016 compared to the previous year. Biomass of small pelagic stocks in the two central and southern zones was estimated at 4.45 million tons, showing a decrease of 30% compared to autumn 2015. Sardine (*S.pilchardus*) biomass alone accounted for 67% of total small pelagic stock in these zones.

In the Central Atlantic (Zones A&B **Figure 1**) total biomass (2016 data) of Round sardinella was estimated at 3,000 tonnes; in the Southern Atlantic Zone (C) total combined biomass of both sardinella species (*S.aurita* and *S.maderensis*) was estimated at 0.87 million tons comprised of approximately 1.46 billion individuals. Of this amount 0.4 million tons (0.146 billion individuals) was assigned to *S.aurita* (2016 data).

Sardinellas are considered overfished throughout the entire West African region. Additional reference points for *Sardinella aurita* were not available. It was not possible to determine if the species is considered, in its most recent stock assessment, to have a biomass above the limit reference point (or proxy). **The species therefore fails clause C1.2.**

The comparative lack of scientific information on the status of the population in the assessment area means that a risk-assessment style approach must be taken. The fishery was assessed using the risk-based Productivity, Susceptibility Analysis (PSA) as per IFFO-RS v 2.0 procedures for Category D species. The species passed this risk-based assessment (**Table D1**) due to high productivity (high fecundity, rapid growth) and low susceptibility (depth range, global distribution) attributes.

#### References

- R1** FAO Fishery and Aquaculture Profiles <http://www.fao.org/fishery/facp/MAR/fr>  
**R2** Fishsource S.aurita [https://www.fishsource.org/stock\\_page/2241](https://www.fishsource.org/stock_page/2241)  
**R3** Ministre de l'Agriculture et de la Pêche maritime <http://www.agriculture.gov.ma/>  
**R4** Institut National de Research Halietique (INRH) 2016. Etat des stocks et des pêcheries Marocaines <http://www.inrh.ma/fr/publications/etat-des-stocks-et-des-p%C3%ACheries-marocaines-2016>  
**R5** FAO Casablanca Morocco (2011) Working group on the assessment of small pelagic fish off northwest Africa 267pp <http://www.fao.org/docrep/017/i3135b/i3135b.pdf>  
**R6** Jo Gascoigne Moroccan Sardine FIP Assessment in relation to the MSC Standard (2016) 28pp pdf  
*Standard clauses 1.3.2.2*

## CATEGORY D SPECIES

In a whole fish assessment, Category D species are those which make up less than 5% of landings and are not subject to a species-specific management regime. In the case of mixed trawl fisheries, Category D species may make up the majority of landings. In a by-product assessment, Category D species are those which are not subject to a species-specific management regime. In both cases, the comparative lack of scientific information on the status of the population of the species means that a risk-assessment style approach must be taken.

The process for assessing Category D species involves the use of a Productivity-Susceptibility Analysis (PSA) to further subdivide the species into 'Critical Risk', 'Major Risk' and 'Minor Risk' groups. If there are no Category D species in the fishery under assessment, this section can be deleted.

Productivity and susceptibility ratings are calculated using a process derived from the APFIC document "Regional Guidelines for the Management of Tropical Trawl Fisheries, which in turn was derived from papers by Patrick *et al* (2009) and Hobday *et al* (2007). Table D1 should be completed for each Category D species as follows:

- Firstly, the best available information should be used to fill in values for each productivity and susceptibility attribute.
- Table D2 should be used to convert each attribute value into a score between 1 and 3.
- The average score for productivity attributes and the average for susceptibility attributes should be calculated.
- Table D3 should be used to determine whether the species is required to meet the requirements of Table D4. A species which does not need to meet the requirements of D4 is automatically awarded a pass.
- Table D4 should be used to assess those species indicated by Table D3 to determine a pass/fail rating.
- Any Category D species which has been categorised by the IUCN Red List as Endangered or Critically Endangered, or which appears in the CITES appendices, automatically results in a fail.

D1

|                                             |                                           |       |  |
|---------------------------------------------|-------------------------------------------|-------|--|
| Species Name:                               | Round sardinella <i>Sardinella aurita</i> |       |  |
| Productivity Attribute                      | Value                                     | Score |  |
| Average age at maturity (years)             | <1                                        | 1     |  |
| Average maximum age (years)                 | 7                                         | 1     |  |
| Fecundity (eggs/spawning)                   | Min 14,000                                | 1     |  |
| Average maximum size (cm)                   | 36                                        | 1     |  |
| Average size at maturity (cm)               | 14                                        | 1     |  |
| Reproductive strategy                       | Broadcast                                 | 1     |  |
| Mean trophic level                          | 3.4                                       | 3     |  |
| Average Productivity Score                  |                                           | 1.28  |  |
| Susceptibility Attribute                    | Value                                     | Score |  |
| Overlap of adult species range with fishery | No data                                   |       |  |
| Distribution                                | Global                                    | 1     |  |
| Habitat                                     | Not used                                  |       |  |
| Depth range                                 | 0-350m                                    | 1     |  |
| Selectivity                                 | >2 mesh                                   | 3     |  |
| Post-capture mortality                      | Short tows                                | 2     |  |
| Average Susceptibility Score                |                                           | 1.75  |  |
| PSA Risk Rating (From Table D3)             |                                           | PASS  |  |
| Compliance rating                           |                                           |       |  |

References

R7 Fishbase *S.aurita*:

<https://www.fishbase.de/Summary/SpeciesSummary.php?ID=1043&AT=round+sardinella>

Standard clauses 1.3.2.2

Table D2 - Productivity / Susceptibility attributes and scores.

| Productivity attributes         | Low productivity/<br>High risk                                | Medium productivity/<br>Medium risk | High productivity/<br>Low risk |
|---------------------------------|---------------------------------------------------------------|-------------------------------------|--------------------------------|
|                                 | Score 3                                                       | Score 2                             | Score 1                        |
| Average age at maturity (years) | >4                                                            | 2 to 4                              | <2                             |
| Average maximum age (years)     | >30                                                           | 10 to 30                            | <10                            |
| Fecundity (eggs/spawning)       | <1 000                                                        | 1 000 to 10 000                     | >10 000                        |
| Average maximum size (cm)       | >150                                                          | 60 to 150                           | <60                            |
| Average size at maturity (cm)   | >150                                                          | 30 to 150                           | <30                            |
| Reproductive strategy           | Live bearer, mouth brooder or significant parental investment | Demersal spawner "berried"          | Broadcast spawner              |
| Mean trophic level              | >3.25                                                         | 2.5–3.25                            | <2.5                           |

| Susceptibility attributes |                                                | High susceptibility/<br>High risk                                                                               | Medium susceptibility/<br>Medium risk                                                                     | Low susceptibility/<br>Low risk                                                                              |
|---------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|                           |                                                | Score 3                                                                                                         | Score 2                                                                                                   | Score 1                                                                                                      |
| Availability              | 1) Overlap of adult species range with fishery | >50% of stock occurs in the area fished                                                                         | Between 25% and 50% of the stock occurs in the area fished                                                | <25% of stock occurs in the area fished                                                                      |
|                           | 2) Distribution                                | Only in the country/fishery                                                                                     | Limited range in the region                                                                               | Throughout region/global distribution                                                                        |
| Encounterability          | 1) Habitat                                     | Habitat preference of species make it highly likely to encounter trawl gear (e.g. demersal, muddy/sandy bottom) | Habitat preference of species make it moderately likely to encounter trawl gear (e.g. rocky bottom/reefs) | Depth or distribution of species make it unlikely to encounter trawl gear (e.g. epi-pelagic or meso-pelagic) |
|                           | 2) Depth range                                 | High overlap with trawl fishing gear (20 to 60 m depth)                                                         | Medium overlap with trawl fishing gear (10 to 20 m depth)                                                 | Low overlap with trawl fishing gear (0 to 10 m, >70 m depth)                                                 |
| Selectivity               |                                                | Species >2 times mesh size or up to 4 m length                                                                  | Species 1 to 2 times mesh size or 4 to 5 m length                                                         | Species <mesh size or >5 m length                                                                            |
| Post capture mortality    |                                                | Most dead or retained<br>Trawl tow >3 hours                                                                     | Alive after net hauled<br>Trawl tow 0.5 to 3 hours                                                        | Released alive<br>Trawl tow <0.5 hours                                                                       |

**Note:** Availability 2 is only used when there is no information for Availability 1; the most conservative score between Encounterability 1 and 2 is used.

| D3                         |             | Average Susceptibility Score |             |             |
|----------------------------|-------------|------------------------------|-------------|-------------|
|                            |             | 1.00 – 1.75                  | 1.76 – 2.24 | 2.25 – 3.00 |
| Average Productivity Score | 1.00 – 1.75 | PASS                         | PASS        | PASS        |
|                            | 1.76 – 2.24 | PASS                         | PASS        | TABLE D4    |
|                            | 2.25 – 3.00 | PASS                         | TABLE D4    | TABLE D4    |