



## **Destructive Fishing: an expert-driven definition and exploration of this quasi-concept**

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1 **Title:** Destructive Fishing: an expert-driven definition and exploration of this quasi-concept

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## 98 **Abstract:**

99 Numerous policy and international frameworks consider that ‘destructive fishing’ hampers  
100 efforts to reach sustainability goals. Though ubiquitous, ‘destructive fishing’ is undefined and  
101 therefore currently immeasurable. Here we propose a definition developed through expert  
102 consultation: “Destructive fishing is any fishing practice that causes irrecoverable habitat  
103 degradation, or which causes significant adverse environmental impacts, results in long-term  
104 declines in target or non-target species beyond biologically safe limits and has negative  
105 livelihood impacts.” We show strong stakeholder support for a definition, consensus on many  
106 biological and ecological dimensions, and no clustering of respondents from different sectors.  
107 Our consensus definition is a significant step towards defining sustainable fisheries goals and  
108 will help interpret and implement global political commitments which utilise the term  
109 ‘destructive fishing’. Our definition and results will help reinforce the FAO Code of Conduct and  
110 meaningfully support member countries to prohibit destructive fishing practices.

## 111 Introduction

112 Fisheries are fundamental to global food security (including nutrition security): approximately  
113 22% of global animal meat production is extracted from the ocean each year<sup>1</sup>01/03/2024  
114 08:46:00. In 2020, global capture fisheries produced 90.3 million tonnes, of which 78.8 million  
115 tonnes (87%) came from marine waters<sup>2</sup>. Across fisheries and aquaculture, approximately 600  
116 million livelihoods depend, at least partially, on fishery sectors and resources<sup>3</sup>, especially in  
117 coastal regions and on islands. Further, small-scale fisheries employ 60 million people and  
118 provide 40% of global catch<sup>2</sup>. Addressing unsustainable aspects of fisheries would help secure  
119 livelihoods and economic stability, maintain good ecosystem functioning, and preserve cultural  
120 and spiritual values of the ocean (particularly for Indigenous Peoples, small-scale fishers and  
121 local communities)<sup>4-7</sup>. Sustainable fishing is promoted under multiple Sustainable Development  
122 Goals (SDG)<sup>4</sup>, particularly targets 14.4 (‘effectively regulate harvesting’) and 14.6 (‘prohibit  
123 certain forms of fisheries subsidies’), which refer to ‘overfishing’, ‘illegal, unreported and  
124 unregulated fishing (IUU)’ and ‘destructive fishing practices’<sup>8</sup>.

125  
126 Whilst established indicators enable managers to monitor progress towards ending ‘overfishing’  
127 and ‘IUU fishing’<sup>9,10</sup>, no globally-agreed definition or indicator exists for ‘destructive fishing’<sup>11</sup>.  
128 The Food and Agricultural Organization’s (FAO) Code of Conduct for Responsible Fisheries  
129 1995 (CCRF) recommends: “States should prohibit dynamiting, poisoning and other comparable  
130 destructive fishing practices” (art. 8.4.2)<sup>12</sup>. However, a review of academic literature, media  
131 articles and policy documents (published 1976-2020) showed considerable vagueness in how and  
132 when the term is used, including within five multilateral policy frameworks which refer to  
133 destructive fishing<sup>11</sup>.

134  
135 The vagueness of the term in global treaties has rendered it a quasi-concept undermining  
136 consistent implementation<sup>13,14</sup>. A clear definition will enable managers to monitor change in the  
137 scale and prevalence of destructive practices; to determine if policies and management practices  
138 are effective and, ultimately, help restore and conserve biodiversity. Further, a definition will  
139 align with international legal instruments such as the United Nations Convention on Biological  
140 Diversity (CBD)<sup>15</sup> and the High-Seas Treaty which calls for “the need to address... biodiversity  
141 loss and degradation of ecosystems... due to... unsustainable use” (paragraph 3, Preamble)<sup>16</sup>.

142  
143 By synthesising expert knowledge from individuals in diverse fishing-related fields, we aimed to  
144 understand the utility of a definition, uncover consensus (or dissensus) on what constitutes  
145 ‘destructive fishing’, and propose a starting definition.

## 146 **Methods**

147 We aimed to address the following objectives:

- 148 1) Explore whether a definition would be useful
- 149 2) Explore the meaning of the term ‘destructive fishing’ and co-create a new definition
- 150 3) Identify the impacts (i.e. environmental, social or economic changes) most associated  
151 with the term ‘destructive fishing’
- 152 4) Gather perceptions around how potentially destructive major fishing gear groups are (i.e.  
153 when not used responsibly)

### 154 **Expert survey and consultation**

155 In this study, the Delphi technique was used to synthesise the opinions of fisheries experts  
156 (academics, practitioners in NGOs, fishing industry and associated fields) regarding the term  
157 ‘destructive fishing’. We used the classical Delphi technique (an anonymous, iterative process of  
158 expert consultation) for this study because it is most suitable for finding consensus in complex  
159 issues where there are several contrasting views<sup>17</sup>. Due to its anonymous nature, the Delphi  
160 technique allows for the true opinion to emerge which is not impacted by psychological biases  
161 such as the Halo effect, Dominance effect and Groupthink<sup>17</sup>. The Delphi process went through  
162 three rounds (R1, R2 and R3) of consultations (SM1) delivered in English, French and Spanish.  
163 The first round (R1) was mostly open-ended questions (Table S1). Based on thematic analysis of  
164 R1 responses, we developed agree/disagree statements which formed subsequent survey rounds  
165 (R2 and R3, see Tables S2 and S3). We set the consensus threshold at 70% of agreement or  
166 disagreement; the desired level is context-dependent<sup>17</sup>. Percentage agreement is the most  
167 commonly used definition of consensus in Delphi studies<sup>18</sup>.

168 Participant selection:

169 A two-page flyer explaining the project was distributed to 84 representative entities from marine  
170 or fisheries-focused organisations (including alliances, associations, and multilateral  
171 governmental fora) with a multitude of members or signatories; these entities represented 1,054  
172 individual organisations. Represented organisations included: 185 national governments  
173 represented by 72 inter-government secretariats (of Regional Fisheries Management  
174 Organisations and Regional Seas Conventions and Action Plans); 150 small-scale fishery groups;  
175 426 civil society organisations, 83 academic institutions; 138 seafood sector corporates (various  
176 parts of supply chains). The 84 representative entities put forward experts for the survey or  
177 directed us to member organisations or individuals who they judged would be most suitable. The  
178 demographic spread of the initial contacts were analysed to ensure that a wide range of  
179 nationalities, countries of work and industries were included. We actively sought further  
180 participants in regions that were under-represented in our initial expert pool (see SM2 and SM3  
181 for ethics clearance, participant information sheets and consent forms).

182 Drivers of differences in quantitative responses:

183 Given that divergence of opinion could be driven by a range of factors, we collected the  
184 following information from the respondents: sector, nationality, countries and organisations  
185 where they have worked, academic and/or professional qualifications relevant to fisheries, years  
186 of experience in marine fisheries or wider marine issues, familiarity with major ocean regions  
187 and experience with fishing gears (Tables S1, S2). To assess whether these factors influenced the  
188 results we conducted a Principal Components Analysis<sup>19,20</sup> and tested for clusters (Hopkins  
189 statistic, Silverman-PCA, Dip-PCA, Dip-dist)<sup>21</sup> within the results of the quantitative questions in  
190 R1 (classification of different fishing gears on degree of destructiveness), and the responses to  
191 statements in R2 and R3.

192 Workshop

193 The Delphi survey was complemented by an online workshop held online on 20th October 2022.  
194 The 25 participants included a mixture of experts who had previously taken part in one or more  
195 rounds of the Delphi process and those new to the project who were invited to increase  
196 geographic and sectoral representation. The project team and a professional facilitator guided

197 discussion in three sessions with prior grouping of participants into break out rooms to reduce  
 198 “Dominance effect” as best as possible.  
 199

## 200 Results

### 201 Demographic and sector-wide information

202 We received 80 responses to the first round (R1) (74 in English, six in Spanish). Respondents  
 203 came from 32 nationalities (Table 1) and had worked across 36 countries. Experts had, on  
 204 average, 21 years of experience in their field, ranging from six to 50. The dominant groups were  
 205 civil society/environmental NGOs (20%), academia (15%), government fisheries management  
 206 (13%) and the commercial fishing industry (12%) (Table 2). Experts had worked in all listed  
 207 ocean regions and 48% of respondents had worked in multiple regions (Figure S1). Respondents  
 208 noted experience in fishing gears or categories, most frequently trawls (54%), longlines (33%)  
 209 and gillnets (29%). Most had experience in small-scale fisheries followed by industrial or  
 210 commercial and some mentioned recreational or deep-sea fisheries. One fifth indicated a fishery  
 211 target species (tuna most frequently, followed by shellfish and crustaceans).

212 Of the 80 respondents in R1, 54 completed R2 (51 in English, 3 in Spanish) and 42 completed  
 213 R3 (40 in English, 2 in Spanish). The spread of responses from different sectors was similar in  
 214 R2 and R3. A Principal Component Analyses and cluster analysis found no differences between  
 215 sectors (Figures S2, S3, S4).

216 **Table 1:** Number of respondents working in and from different countries from each survey round.  
 217 Countries are grouped by region and assigned World Bank income classification  
 218 (<https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2022-2023>).

Region	Country	Income	# Respondents Working in			# Respondents from		
			R1	R2	R3	R1	R2	R3
Europe & Central Asia	United Kingdom	High	27	16	10	27	18	11
	Portugal	High	3	3	3	3	2	2
	Austria	High	1	0	0	0	0	0
	Belgium	High	1	1	0	0	0	0
	Denmark	High	1	0	0	1	0	0
	France	High	1	2	2	1	2	2



	Netherlands	High	1	1	1	3	3	3
	Germany	High	0	0	0	1	0	0
	Italy	High	0	0	0	1	1	1
	Luxembourg	High	0	0	0	1	1	1
	Spain	High	0	0	0	3	3	2
East Asia & Pacific	New Zealand	High	5	4	3	4	4	3
	Hong Kong	High	3	2	2	0	0	0
	Thailand	Upper middle	2	1	1	2	1	1
	Australia	High	1	1	1	4	3	2
	Cambodia	Low	1	1	1	1	1	1
	Fiji	Upper middle	1	1	1	1	1	1
	Indonesia	Lower middle	1	0	0	1	0	0
	Malaysia	Upper middle	1	1	1	0	0	0
	Marshall Islands	Lower middle	1	1	0	0	0	0
	Papua New Guinea	Lower middle	1	1	0	0	0	0
	Philippines	Lower middle	1	1	1	0	0	0
	Taiwan	High	1	0	0	1	0	0
	Timor-Leste	Lower middle	1	1	0	0	0	0
North America	United States	High	6	3	3	4	2	2
	Canada	High	1	1	0	3	2	0
Latin America & Caribbean	Argentina	Upper middle	2	1	1	2	1	1
	Chile	High	1	1	1	1	1	1
	Colombia	Upper middle	1	1	1	1	1	1
	Ecuador	Upper middle	1	0	0	1	0	0
	Mexico	Upper middle	1	0	0	1	0	0
	Peru	Upper middle	1	0	0	1	0	0
	Uruguay	High	1	1	1	1	1	1
	Paraguay	Upper middle	0	0	0	1	1	0
Sub-Saharan Africa	Mozambique	Low	2	1	1	1	1	1
	Cameroon	Lower middle	1	1	1	1	1	1
	Kenya	Low	1	1	1	0	0	0
	Seychelles	Upper middle	1	1	0	0	0	0
	South Africa	Upper middle	1	0	0	3	1	1
	Namibia	Upper middle	0	0	0	1	0	0
South Asia	Bangladesh	Lower middle	1	0	0	1	0	0

	India	Lower middle	1	1	1	1	1	1
No answer	No answer	No answer	2	2	3	1	1	2

219

220 **Table 2:** Number of respondents working in various sectors associated with fishing. Note, in R1  
 221 respondents were able to select as many sectors as they felt were relevant, hence the total number of  
 222 responses is greater than the number of respondents. In R2 and R3 respondents selected a single sector  
 223 that best represented their career.

Sector	# Responses		
	R1	R2	R3
Civil society (environmental NGO)	36	22	15
Academia	24	5	5
Government (fisheries management)	18	6	6
Industry (commercial fishing)	17	5	5
Civil society (other NGO)	12	2	1
Government (environment)	12	0	0
Industry (other)	10	5	7
Intergovernmental body	10	6	2
Civil society (Small-scale fisheries/Rights holder institution)	6	3	1

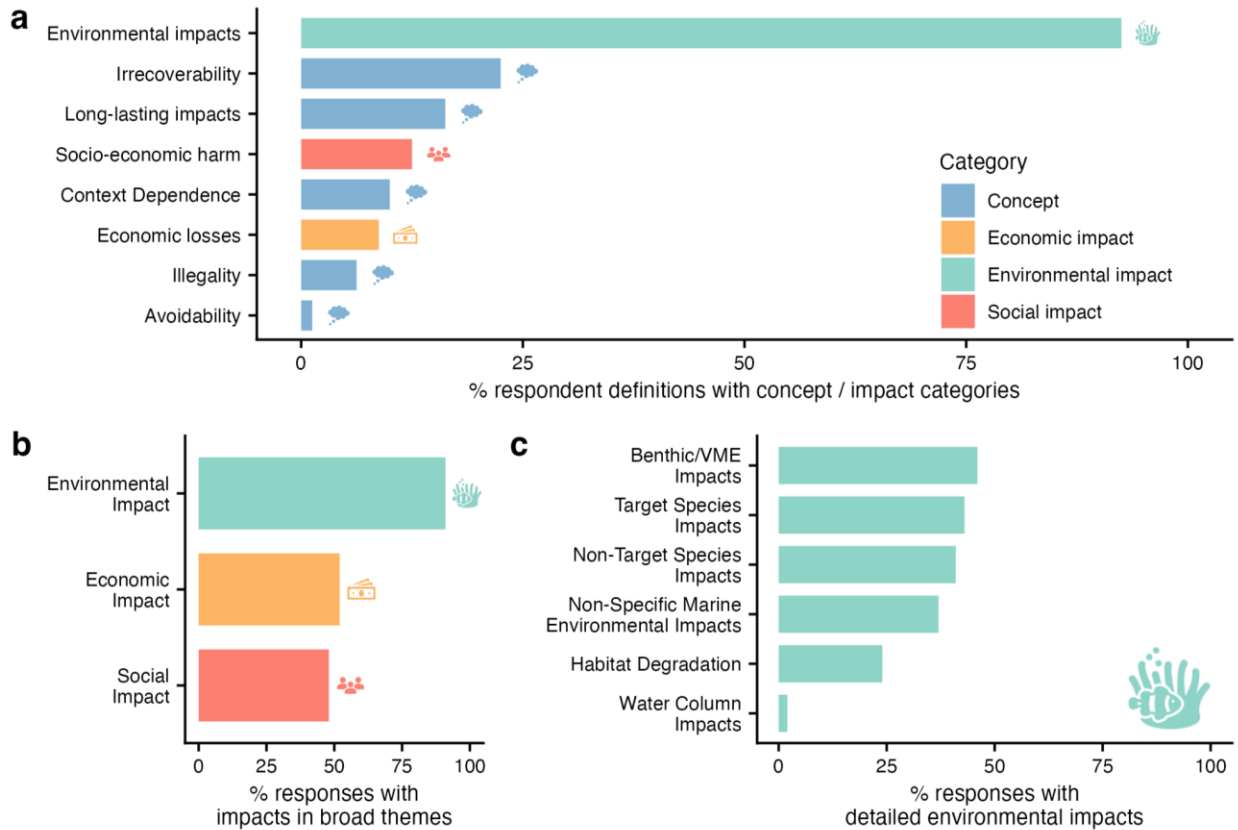
224

225 **Support for a new definition**

226 Over half (59%) of the respondents supported a new definition of 'destructive fishing' (Table S4).  
 227 Most respondents (86%) identified at least one potential consequence: 12 benefits and 9 risks.  
 228 The most common potential benefits were “improve[d] consistency, clarity and standardisation  
 229 of use” (21%) and “contribut[ion] to more meaningful implementation of global goals” (16%).  
 230 The most common potential risks were that a definition could “fail to accommodate context  
 231 dependency” (14%) and “oversimplify complexity of term and related concepts” (11%).  
 232 ‘Destructive fishing’ was most consistently classified as an activity that causes ‘irrecoverable  
 233 habitat degradation’ (combination of: habitat degradation as the most common impact category  
 234 [54%] and ‘irrecoverability’, or transformative ecological change, as the most prevalent concept  
 235 [23%]).

236 **Meaning of ‘destructive fishing’ and associated impacts**

237 Participant-provided meanings of ‘destructive fishing’ included a range of conceptualisations and  
 238 examples of environmental, social, and economic impacts; 92.5% of definitions included  
 239 environmental impacts (Figure 1a).



240  
 241 **Figure 1:** a) The meaning of ‘destructive fishing’ in R1 was illustrated by examples of impacts as well as  
 242 a range of concepts linked to the term, including irrecoverability and transformative scale of the  
 243 ecosystem (23% of answers), long-lasting impacts (16%), context dependence (10%), illegality (6%),  
 244 avoidability/unnecessary damage (1%). b) When asked to detail potential impacts (Table S5), almost all  
 245 included an environmental impact (91%), followed by economic impacts (52%) and social impacts  
 246 (48%). c) The environmental impacts fell into a range of broad categories, based on specific impacts  
 247 experts highlighted, for example specific benthic or sensitive habitats such as coral reefs. VME =  
 248 Vulnerable Marine Ecosystem.

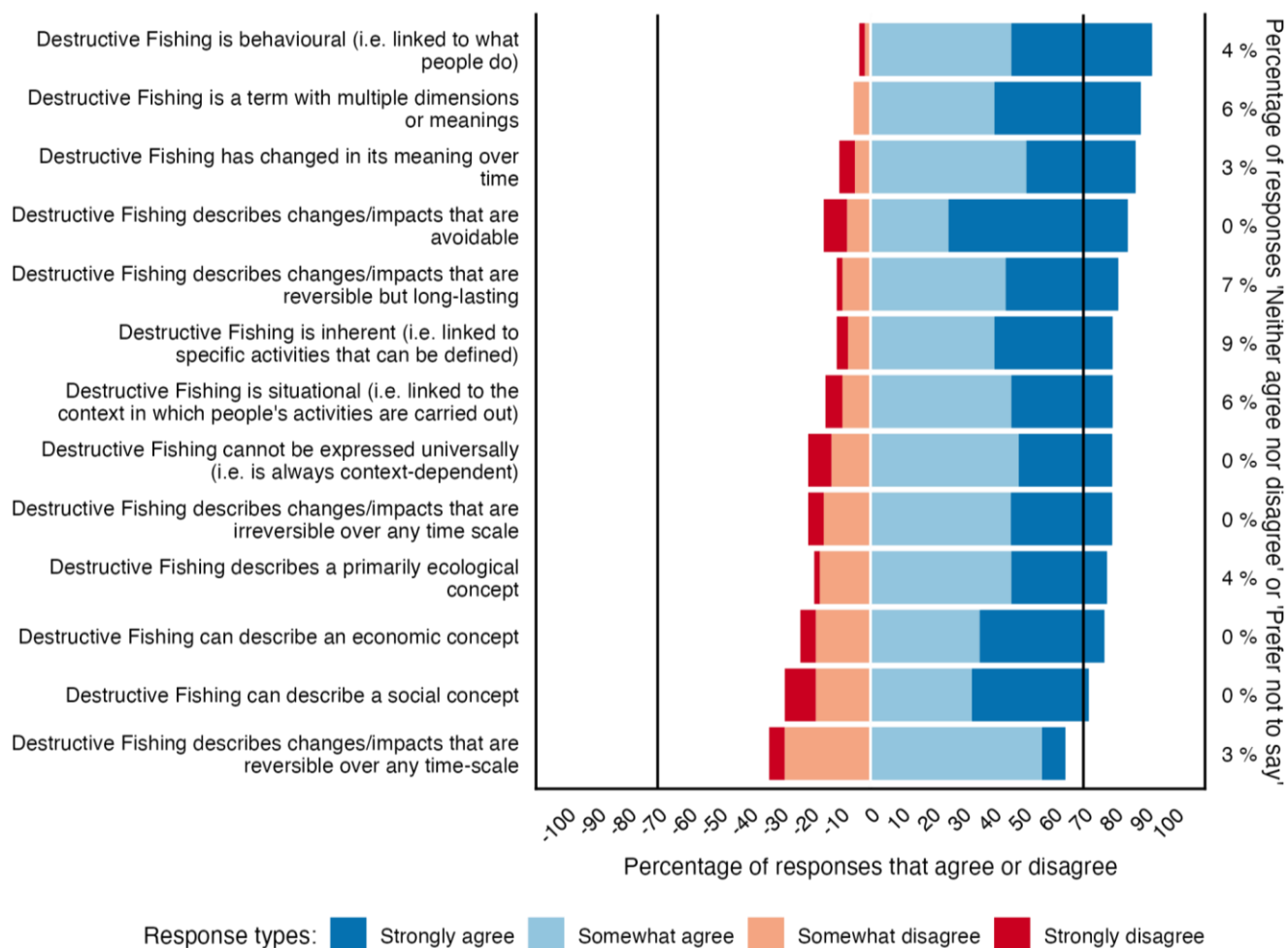
249  
 250 In R1, respondents most associated ecological impacts (91% of responses) with ‘destructive  
 251 fishing’, but economic (52%) and social (48%) impacts were also acknowledged (Figure 1b).  
 252 Negative impacts to benthic habitats / Vulnerable Marine Ecosystems (VMEs, 46%), non-target  
 253 species (43%) and target species decline (41%) were commonly described (Figure 1c). Overall,

254 we identified 16 impact categories (6 environment, 6 social, 4 economic), with 47 specific  
 255 impacts (Table S5). These were categorised into statements which were scored in R2 and R3.

256 Participants scored 13 concept statements; 12 reached consensus by R3 (Figure 2). The statement  
 257 “describes changes/impacts that are reversible over any time scale” was the only concept  
 258 statement without consensus at the end of R3.

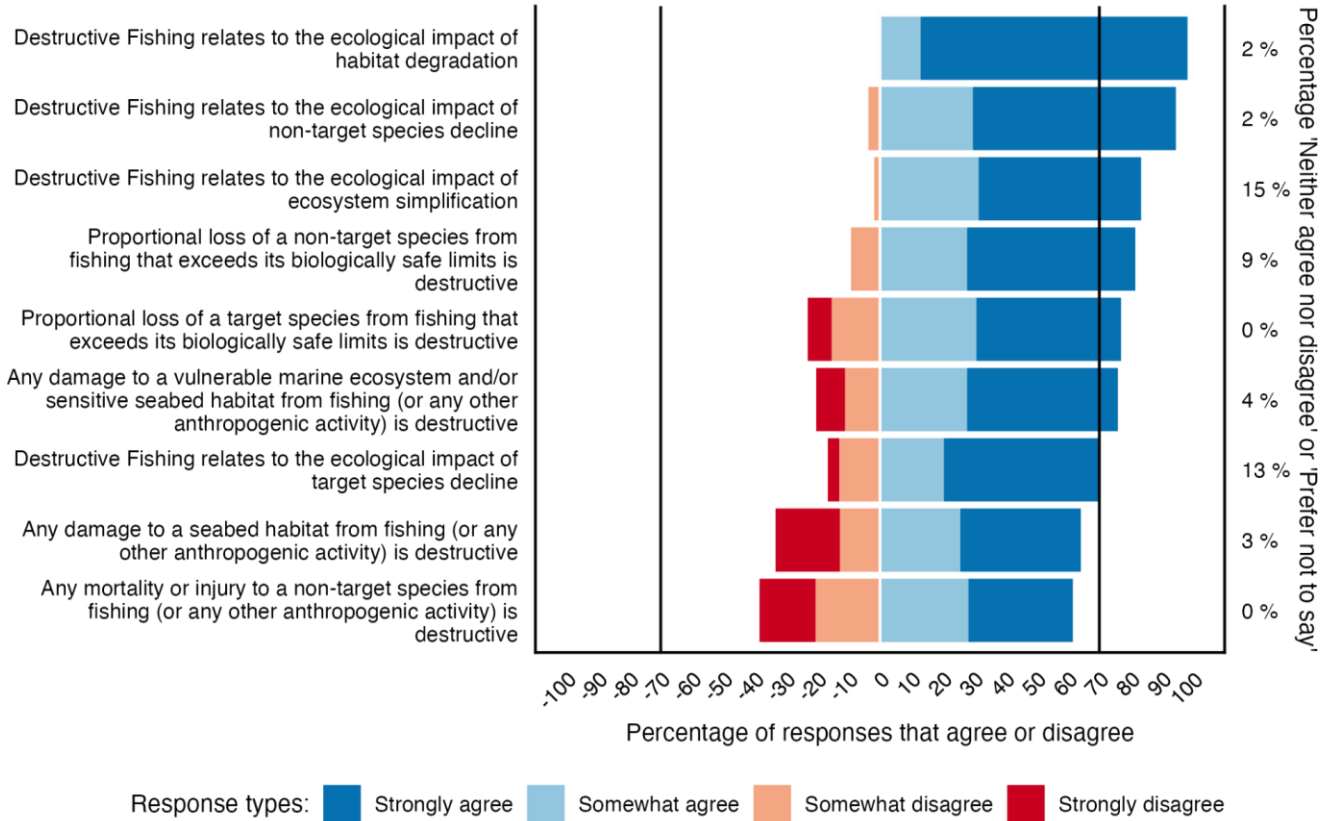
259 Participants scored 16 statements relating to impacts of ‘destructive fishing’ (environmental: 9  
 260 statements, social and economic impacts: 7 statements). Seven of the nine environmental  
 261 statements reached consensus by R3 (Figure 3). In contrast, none of the social and economic  
 262 statements reached consensus by R3 (Figure 4). There was no significant difference between the  
 263 different sectors (Figures S3, S4).

264



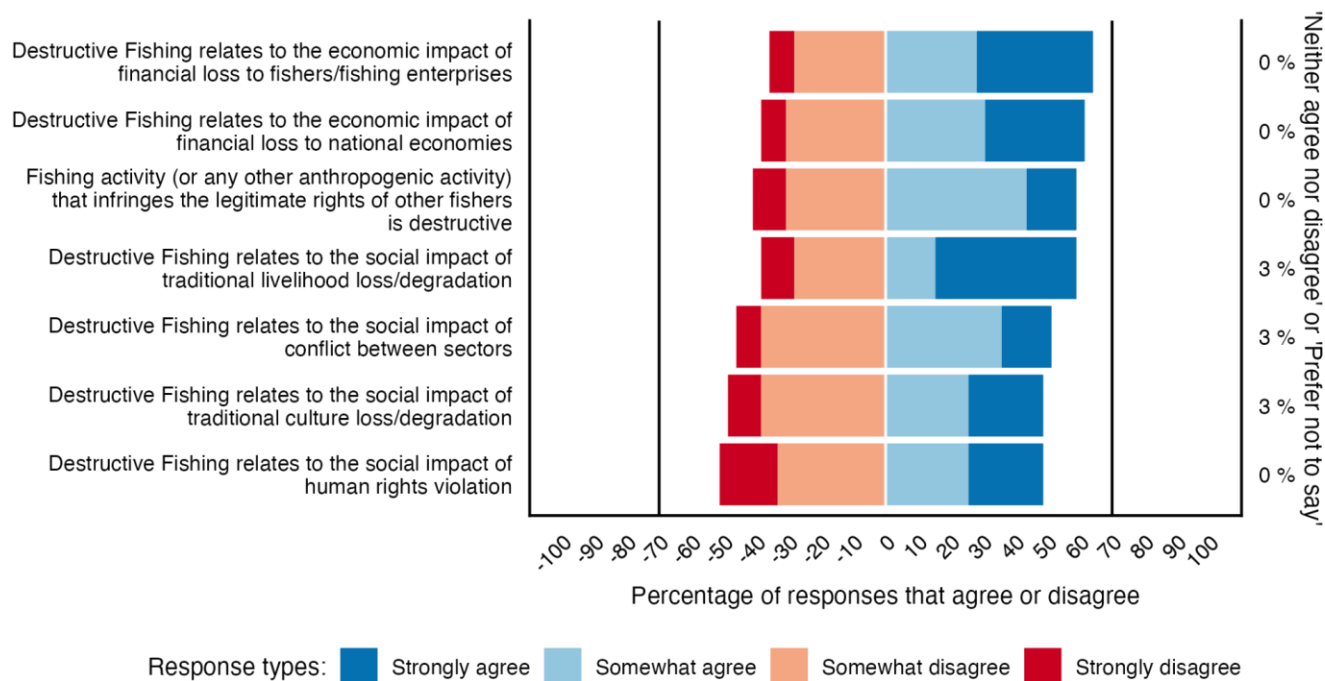
265 **Figure 2:** Percentage of survey respondents that agreed or disagreed with statements related to  
 266 ‘destructive fishing’ as an overarching concept. Line indicates the 70% consensus threshold. Middle  
 267 options of “Neither agree nor disagree” (R2) and “Prefer not to say” (R3) are displayed on the right side  
 268 of the figure.  
 269

270



271

272 **Figure 3:** Percentage of survey respondents that agreed or disagreed with statements related to the  
 273 environmental impacts of ‘destructive fishing’. Line indicates the 70% consensus threshold. Middle  
 274 options of “Neither agree nor disagree” (R2) and “Prefer not to say” (R3) are displayed on the right side  
 275 of the figure.

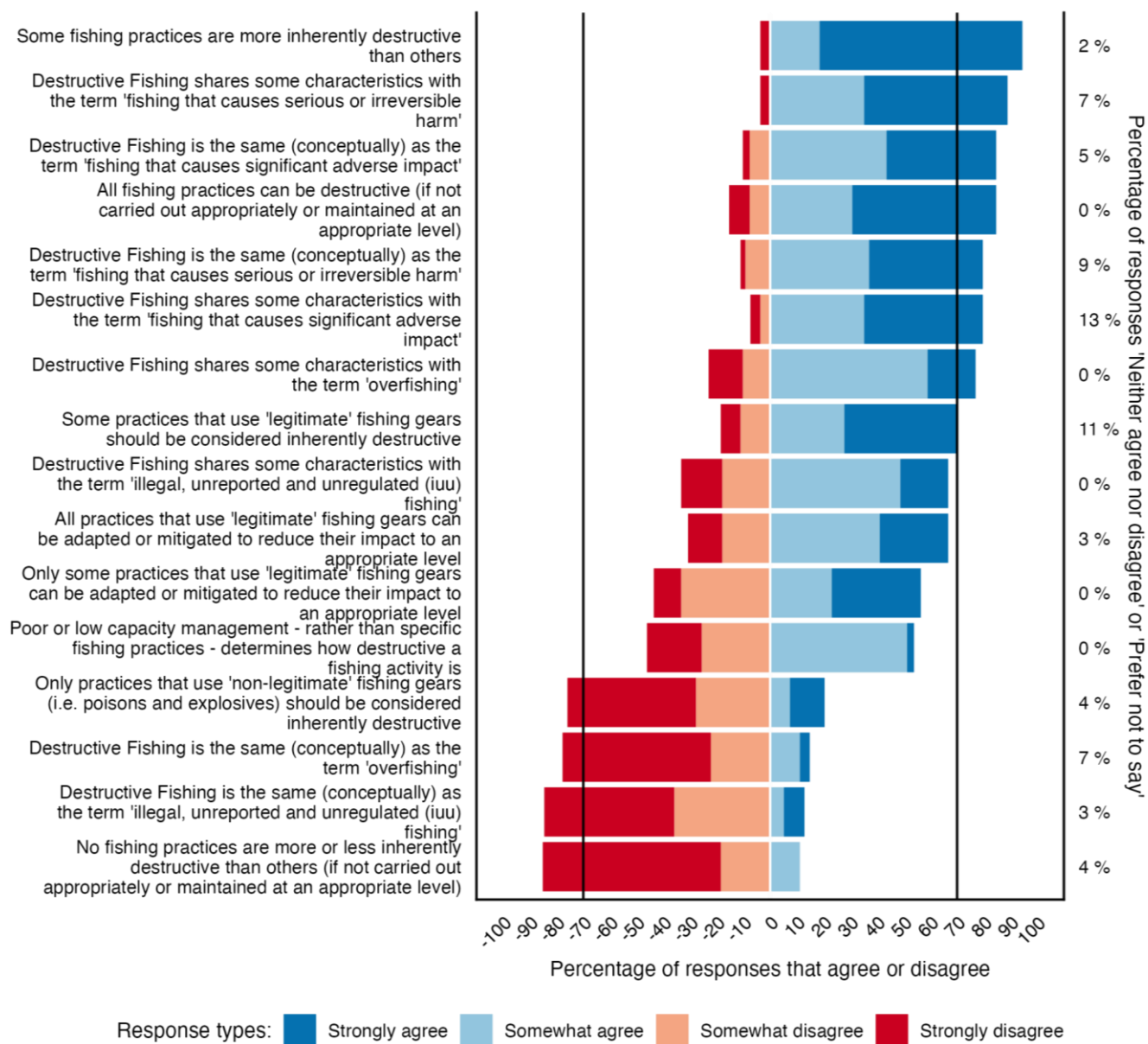


277 **Figure 4:** Percentage of survey respondents that agreed or disagreed with statements related to the  
 278 economic and social impacts of ‘destructive fishing’. Line indicates the 70% consensus threshold.  
 279 Responses here are from R3. Middle options of “Neither agree nor disagree” (R2) and “Prefer not to say”  
 280 (R3) are displayed on the right side of the figure.  
 281

282 Scope of ‘destructive fishing’

283 Of the 16 scope statements, 12 reached consensus by R3 (Figure 5). Respondents agreed that  
 284 behaviour and management play critical roles in the destructiveness of a practice (recognising  
 285 that some are almost universally considered destructive), and that ‘destructive fishing’ could be  
 286 avoided (Figure 5). While overlapping conceptually with ‘IUU fishing’ and ‘overfishing’,  
 287 respondents disagreed that ‘destructive fishing’ is the same as these terms. Respondents agreed  
 288 that ‘destructive fishing’ is the same as fishing that causes ‘serious or irreversible harm’ and  
 289 ‘significant adverse impact’ (Figure 5).

290  
 291 Participants who answered “Strongly Agree” or “Strongly Disagree” to any statement in R2,  
 292 were invited to justify their answer, which provided further detail about impacts, concepts and  
 293 scope of ‘destructive fishing’ (Table S9).



295 **Figure 5:** Percentage of survey respondents that agreed or disagreed with statements related to the scope  
 296 of the term 'destructive'. Line indicates the 70% consensus threshold. Middle options of "Neither agree  
 297 nor disagree" (R2) and "Prefer not to say" (R3) are displayed on the right side of the figure.

298 **New definition**

299 Expert-suggested definitions (R2) were categorised into themes using thematic analysis. Habitat  
 300 degradation was the most common theme (62%) (Table S8). Other common themes were: 1)  
 301 scale of damage, with significant/extensive damage being a key factor of destructiveness (24%);

302 2) activities that are beyond acceptable thresholds of management/mitigation (12%); 3) the  
303 consequences of poor management (8%), although this concept remained ambiguous.

304

305 The themes were presented to the workshop participants to create a consensus definition.  
306 Participants agreed that a definition should include spatio-temporal and intensity components  
307 (e.g. ‘long-lasting impacts’ or ‘significant adverse effects’), which could be defined at a local  
308 level or using existing frameworks. Based on results from the Delphi process, the workshop, and  
309 subsequent discussions amongst experts (SR4), the proposed new definition is as follows:

310

311 *“Destructive fishing is any fishing practice that causes irrecoverable habitat degradation, or*  
312 *which causes significant adverse environmental impacts, results in long-term declines in target*  
313 *and non-target species beyond biologically safe limits, and has negative livelihood impacts.”*

314

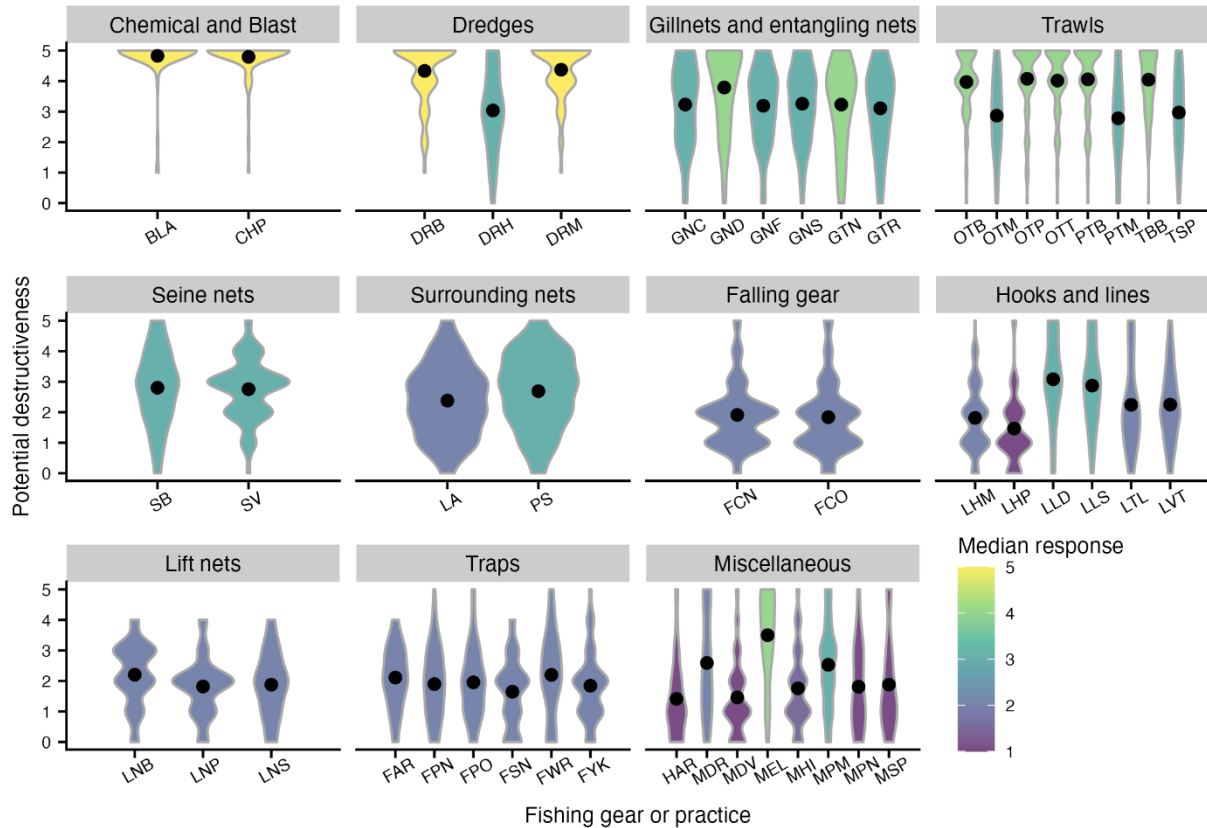
315 We acknowledge that our proposed definition requires further qualification or refinement to  
316 create a usable definition. Specifically, under all ‘and’/‘or’ combinations, we foresaw scenarios  
317 that either should be considered ‘destructive’ but would not be under this definition (e.g. because  
318 a practice is bioecologically but not socioeconomically destructive), or vice versa. Perhaps final  
319 users of the definition may specify whether they use ‘and’ or ‘or’ and if a practice is  
320 bioecologically or socioeconomically destructive or both.

### 321 Gear types

322 Respondents scored 48 gears and practices in 11 categories (Figure 6, Table S6) on their  
323 potential destructiveness. Across the 0 (“not at all potentially destructive”) to 5 (“highly  
324 potentially destructive”) scale, the mean score across all gear types was 2.76. The four highest  
325 scores were blast/dynamite fishing (4.83), chemicals/poisons (4.79), mechanised dredges (4.37),  
326 and towed dredges (4.33); and the three lowest scores were harpoons (1.41), diving (1.46) and  
327 handlines (1.47). Overall, the negative impact of gear types on environmental factors (mean  
328 3.01) were considered worse than impacts on social (2.62) or economic (2.72) factors. Nearly  
329 50% of respondents answered ‘Don’t know’ for the impacts of gear types on social and  
330 economic factors, in contrast to just 30% for environmental factors (Table S6). Further results on  
331 drivers are in Supplementary Results SR2, Table S7, Figure S5.

332





333

334 **Figure 6.** The extent to which fishing gears and practices can be considered ‘potentially destructive’  
 335 according to survey respondents, 0 is least destructive and 5 is most destructive. Each gear or practice is  
 336 represented by a violin plot, grouped by the broader category (as per FAO Gear Classification<sup>22</sup>, plus blast  
 337 and chemical fishing, see Table S6 for full description). Black dots and colour reflect the mean and  
 338 median scores, respectively. BLA = blast/explosives/dynamite, CHP = chemicals/poisons/synthetic  
 339 toxins, DRB = towed dredges, DRH = hand dredges, DRM = mechanized dredges, GNC = encircling  
 340 gillnets, GND = drift gillnets, GNF = fixed gillnets, GNS = set gillnets, GTN = combined gillnets-  
 341 trammel nets, GTR = trammel nets, OTB = single boat bottom otter trawls, OTM = single boat midwater  
 342 otter trawls, OTP = multiple bottom otter trawls, OTT = twin bottom otter trawls, PTB = bottom pair  
 343 trawls, PTM = midwater pair trawls, TBB = beam trawls, TSP = semipelagic trawls, SB = beach seines,  
 344 SV = boat seines, LA = surrounding nets without purse lines, PS = purse seines, FCN = cast nets, FCO =  
 345 cover pots/lantern nets, LHM = mechanized lines and pole-and-lines, LHP = handlines and hand-  
 346 operated pole-and-lines, LLD = drifting longlines, LLS = set longlines, LTL = trolling lines, LVT =  
 347 vertical lines, LNB = boat-operated lift nets, LNP = portable lift nets, LNS = shore-operated stationary lift  
 348 nets, FAR = aerial traps, FPN = stationary uncovered pound nets, FPO = pots, FSN = stow nets, FWR =  
 349 barriers, fences, weirs, etc., FYK = fyke nets, HAR = harpoons, MDR = drive-in nets, MDV = diving,  
 350 MEL = electric fishing, MHI = hand implements (wrenching gear, clamps, tongs, rakes, spears), MPM =  
 351 pumps, MPN = pushnets, MSP = scoopnets.  
 352

## 353 Discussion

### 354 Policy implications

355 Several international treaties and policy frameworks refer to ‘reducing’ or ‘ending’ destructive  
356 fishing. In this context, defining and measuring ‘destructive fishing’ in both biological and  
357 human dimensions will be critical for future action. We show that experts in this study  
358 considered ‘destructive fishing’ to be distinct from ‘overfishing’ and ‘IUU fishing’. For example,  
359 managing a fishery at maximum sustainable yield for one target stock, could still be destructive  
360 for by-catch species or have destructive social impacts. Further, our respondents felt ‘destructive  
361 fishing’ may be avoidable through improved fisheries management. Therefore, delivering global  
362 goals to ‘end’ or ‘reduce’ ‘destructive fishing’ requires dedicated policy targets rather than  
363 relying entirely on existing ones.

364 Our proposed definition could facilitate the development of metrics to assess implementation  
365 progress of associated goals, including SDG target 14.4 and aligns with research suggesting a  
366 unified definition would foster more meaningful and consistent management of destructive  
367 fishing in line with global ambitions, and would address the consequences of its vagueness<sup>11</sup>. We  
368 suggest operationalizing our definition, first through refinement in policy fora, and secondly  
369 using an indicator framework that captures greater nuance from our results. We further suggest  
370 that such efforts capitalise on existing, readily-usable indicators and targets wherever possible.

### 371 Operationalising the definition

372 To be operationalised, our proposed definition requires strengthening and refinement in policy  
373 fora and connection to metrics or indicators that could measure progress towards eliminating  
374 ‘destructive fishing’. Our proposed definition may promote the development of technical  
375 guidelines on measuring ‘destructive fishing’ under the FAO which would help to raise this issue  
376 on an international scale, reinforce the FAO Code of Conduct and meaningfully support member  
377 countries to prohibit these practices. The recently formed FAO Sub-committee on Fisheries  
378 Management<sup>23</sup> may present a forum to evaluate how the goal of ending destructive fishing is  
379 reported, perhaps supporting the Committee on Fisheries (COFI) in its role as the FAO decision-  
380 making body responsible for the CCRF. In addition, in 2025, a comprehensive review<sup>24</sup> of the

381 SDG indicators is being conducted, and the current definition could be fed into this review to  
382 help support development of a new indicator to address the critical issue of destructive fishing.

383  
384 A range of metrics could be used to quantify progress towards ending ‘destructive fishing’.  
385 While the specific metrics selected will need to be adapted to reflect local priorities and context,  
386 some of the metrics that could be considered include existing indicators and methodologies. An  
387 indicator framework could include metrics measuring: 1) impacts on habitat structure (e.g. swept  
388 area seabed impact, extent of physical damage, and fishing activities within VMEs); 2) impacts  
389 on non-target species (e.g. stock assessments of bycatch species, bycatch as a proportion of total  
390 catch); and 3) impacts on ecosystem function (e.g. trait-based measures, size-based indicators  
391 and marine trophic index)<sup>25</sup>.

## 392 Consensus across sectors

393 We found majority support for a consensus definition for the term 'destructive fishing',  
394 irrespective of the varied background of the experts. Cross-sector consensus reflects broad  
395 understanding that fishing practices can have destructive impacts not only on habitats and  
396 ecosystems, but also on the wellbeing and economic prosperity of people (including fishers),  
397 particularly in vulnerable coastal communities and small-scale operations<sup>26-28</sup>. Several initiatives  
398 from the FAO<sup>29,30</sup> and the UN Human Rights Council<sup>31</sup> seek to bring together the ecological and  
399 societal aspects of fishing.

## 400 Impact of gears or practices

401 Broadly, we found consensus that a) there is a hierarchy of ‘destructiveness’ in gears and  
402 practices<sup>32</sup> and b) inherently destructive practices can include ‘legitimate’ gears and or practices.  
403 According to this study, the most potentially destructive gears or practices are blast/dynamite,  
404 chemicals/poisons and various forms of ‘legitimate’ towed demersal gear, specifically  
405 mechanised and towed dredges. We considered ‘legitimate’ gears/practices to be those listed  
406 within the FAO defined taxonomy of fishing gears<sup>22</sup>, as opposed to explosives, and poisons,  
407 which fall outside. Our results suggest the scope of ‘destructive fishing’ lies beyond the practices  
408 specifically mentioned as requiring “prohibiting” in the FAO CCRF.

409 Nonetheless, the notion that all fishing practices could be equally destructive (given management  
410 and ecological context) and, conversely, that only ‘illegitimate’ practices can be considered  
411 inherently destructive were consistently rejected. Thus, while context matters, it is not  
412 everything: there are ‘legitimate’ gears that could be considered inherently destructive. We found  
413 broad agreement across respondents, but we nonetheless acknowledge the environmentally-  
414 focussed positionality of our expert group and the importance of nuance and context-specificity  
415 in comparing fishing practices.

## 416 Limitations of the study

417 We note three main limitations of our expert pool, which should be addressed in any future work  
418 and before the definition is operationalised. Firstly, we lacked experts from the consumer end of  
419 the fish and seafood value chain. These end-value-chain actors will, as demand stimulators,  
420 indirectly drive fishing activities; and, through marketing and labelling<sup>33</sup>, may impact everyday  
421 consumers’ perceptions of destructive fishing. Secondly, few experts were from low- and  
422 middle-income nations, and none from China or Russia (among the global top 5 largest fishing  
423 nations and where fishing plays a critical social and economic role)<sup>34,35</sup>. Thirdly, most  
424 respondents had backgrounds in biology and ecology (rather than social sciences, policy,  
425 governance etc), even after additional participants with wider professional backgrounds were  
426 invited to the workshop to address this imbalance. Information on gender was not asked in the  
427 Delphi rounds.

## 428 Conclusion

429 To ensure healthy oceans that support sustainable fisheries, destructive and harmful practices  
430 must be addressed and clearly defined. The consensus definition presented here is a considerable  
431 step towards that goal. Significant and irreversible damage caused to the wider marine ecosystem  
432 threatens not only biodiversity but also the ability of marine systems to contribute to the  
433 wellbeing, livelihoods, and food security for millions around the world. Our results provide a  
434 basis for corporate, intergovernmental, and national discussions on the topic of destructive  
435 fishing.

## 436 References

- 437 1. Costello, C. & Ovando, D. Status, Institutions, and Prospects for Global Capture Fisheries. *Annu.*  
 438 *Rev. Environ. Resour.* **44**, 177–200 (2019).
- 439 2. FAO. *The State of World Fisheries and Aquaculture 2022 Towards Blue Transformation.*  
 440 <https://doi.org/10.4060/cc0461en> (2022) doi:10.4060/cc0461en.
- 441 3. FAO, Duke University, & WorldFish. *Illuminating Hidden Harvests: The Contributions of Small-*  
 442 *Scale Fisheries to Sustainable Development.* (FAO, Duke University, WorldFish, Rome, Italy, 2023).  
 443 doi:10.4060/cc4576en.
- 444 4. Singh, G. G. *et al.* A rapid assessment of co-benefits and trade-offs among Sustainable  
 445 Development Goals. *Marine Policy* **93**, 223–231 (2018).
- 446 5. Nakamura, J., Diz, D. & Morgera, E. International legal requirements for environmental and  
 447 socio-cultural assessments for large-scale industrial fisheries. *Review of European, Comparative &*  
 448 *International Environmental Law* **31**, 336–348 (2022).
- 449 6. Strand, M., Rivers, N. & Snow, B. Reimagining Ocean Stewardship: Arts-Based Methods to  
 450 ‘Hear’ and ‘See’ Indigenous and Local Knowledge in Ocean Management. *Frontiers in Marine Science* **9**,  
 451 (2022).
- 452 7. Strand, M., Rivers, N. & Snow, B. The complexity of evaluating, categorising and quantifying  
 453 marine cultural heritage. *Marine Policy* **148**, 105449 (2023).
- 454 8. United Nations. THE 17 GOALS | Sustainable Development. <https://sdgs.un.org/goals>.
- 455 9. Andriamahefazafy, M. *et al.* Sustainable development goal 14: To what degree have we achieved  
 456 the 2020 targets for our oceans? *Ocean & Coastal Management* **227**, 106273 (2022).
- 457 10. Hosch, G. & Macfadyen, G. Killing Nemo: Three world regions fail to mainstream combatting of  
 458 IUU fishing. *Marine Policy* **140**, 105073 (2022).
- 459 11. Willer, D. F. *et al.* ‘Destructive fishing’—A ubiquitously used but vague term? Usage and  
 460 impacts across academic research, media and policy. *Fish and Fisheries* **23**, 1039–1054 (2022).
- 461 12. FAO. *FAO Code of Conduct for Responsible Fisheries.* (FAO, Rome, Italy, 1995).
- 462 13. Hoffman, S. J. *et al.* International treaties have mostly failed to produce their intended effects.  
 463 *Proceedings of the National Academy of Sciences* **119**, e2122854119 (2022).
- 464 14. Brandi, C., Blümer, D. & Morin, J.-F. When Do International Treaties Matter for Domestic  
 465 Environmental Legislation? *Global Environmental Politics* **19**, 14–44 (2019).
- 466 15. *Convention on Biological Diversity. K3488. A35 C66 2011* (Secretariat of the Convention on  
 467 Biological Diversity, 1992).
- 468 16. Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction |  
 469 <https://www.un.org/bbnj/>.
- 470 17. Mukherjee, N. *et al.* The Delphi technique in ecology and biological conservation: applications  
 471 and guidelines. *Methods in Ecology and Evolution* **6**, 1097–1109 (2015).
- 472 18. Diamond, I. R. *et al.* Defining consensus: A systematic review recommends methodologic criteria  
 473 for reporting of Delphi studies. *Journal of Clinical Epidemiology* **67**, 401–409 (2014).
- 474 19. Josse, J. & Husson, F. missMDA: A Package for Handling Missing Values in Multivariate Data  
 475 Analysis. *Journal of Statistical Software* **70**, 1–31 (2016).
- 476 20. Dray, S. & Josse, J. Principal component analysis with missing values: a comparative survey of  
 477 methods. *Plant Ecol* **216**, 657–667 (2015).
- 478 21. Adolfsson, A., Ackerman, M. & Brownstein, N. C. To cluster, or not to cluster: An analysis of  
 479 clusterability methods. *Pattern Recognition* **88**, 13–26 (2019).
- 480 22. He, P., Chopin, F., Suuronen, P., Ferro, R. S. T. & Lansley, J. *Classification and Illustrated*  
 481 *Definition of Fishing Gears.* (FAO, Rome, 2021). doi:10.4060/cb4966en.
- 482 23. Sub-Committee on Fisheries Management Working Group | Committee on Fisheries | Food and  
 483 Agriculture Organization of the United Nations. [https://www.fao.org/about/meetings/cofi/sub-committee-](https://www.fao.org/about/meetings/cofi/sub-committee-on-fisheries-management-wg/en/)  
 484 [on-fisheries-management-wg/en/](https://www.fao.org/about/meetings/cofi/sub-committee-on-fisheries-management-wg/en/).

- 485 24. IAEG-SDGs — SDG Indicators. [https://unstats.un.org/sdgs/iaeg-sdgs/2025-comprehensive-](https://unstats.un.org/sdgs/iaeg-sdgs/2025-comprehensive-review#)  
486 [review#](https://unstats.un.org/sdgs/iaeg-sdgs/2025-comprehensive-review#).
- 487 25. UNEP-WCMC. *A Monitoring Framework for Destructive Fishing*. (2023).
- 488 26. Muallil, R. N., Mamauag, S. S., Cababaro, J. T., Arceo, H. O. & Aliño, P. M. Catch trends in  
489 Philippine small-scale fisheries over the last five decades: The fishers' perspectives. *Marine Policy* **47**,  
490 110–117 (2014).
- 491 27. Arthur, R., Heyworth, S., Pearce, J. & Sharkey, W. *The Cost of Harmful Fishing Subsidies*.  
492 (2019).
- 493 28. Stacey, N. *et al.* Developing sustainable small-scale fisheries livelihoods in Indonesia: Trends,  
494 enabling and constraining factors, and future opportunities. *Marine Policy* **132**, 104654 (2021).
- 495 29. FAO. *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of*  
496 *Food Security and Poverty Eradication*. (Rome, 2015).
- 497 30. FAO. *Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and*  
498 *Forests in the Context of National Food Security*. (FAO, Rome, 2019). doi:10.4060/i2801e.
- 499 31. UN Human Rights Council (39th sess : 2018 : Geneva). United Nations Declaration on the Rights  
500 of Peasants and Other People Working in Rural Areas :: resolution /: adopted by the Human Rights  
501 Council on 28 September 2018. (2018).
- 502 32. Chuenpagdee, R., Morgan, L. E., Maxwell, S. M., Norse, E. A. & Pauly, D. Shifting gears:  
503 assessing collateral impacts of fishing methods in US waters. *Frontiers in Ecology and the Environment*  
504 **1**, 517–524 (2003).
- 505 33. Willer, D. F., Nicholls, R. J. & Aldridge, D. C. Opportunities and challenges for upscaled global  
506 bivalve seafood production. *Nat Food* **2**, 935–943 (2021).
- 507 34. Teh, L. S. L., Cashion, T., Cheung, W. W. L. & Sumaila, U. R. Taking stock: a Large Marine  
508 Ecosystem perspective of socio-economic and ecological trends in East China Sea fisheries. *Rev Fish Biol*  
509 *Fisheries* **30**, 269–292 (2020).
- 510 35. Wang, Y. & Wang, N. Exploring the role of the fisheries sector in China's national economy: An  
511 input–output analysis. *Fisheries Research* **243**, 106055 (2021).  
512

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## 521 Author contributions statement

522 DS and CO conceived the project. AHM, NM, DW, JIB contributed to the analysis. NM, AHM, DS and  
523 HR drafted the paper. Authors who were also expert participants contributed critically to writing the  
524 manuscript. All authors have read and edited the manuscript.

## 525 Competing interest declaration

526 Authors declare no competing interests.

## 527 Additional Information

528 This manuscript has Supplementary Information.

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## 530 Inclusion and Ethics

531 The Delphi technique survey and workshop were approved by UNEP-WCMC's Ethics Panel. Participants  
532 were sent a participant information sheet along with the link to the survey (see Supplementary  
533 information SM2). The participant information sheet informed potential participants of the goal of the  
534 project, its central research questions, the voluntary nature of their contribution and how their data was to  
535 be stored, analysed and disposed of. In addition, we included a consent form at the beginning of the first  
536 round of the survey asking participants to proactively indicate their consent and agreement. Participants  
537 could leave the project at any time. The research team actively sought to include participants from the full  
538 spectrum of countries, regions, and sectors relevant to this project. Participants were also invited to  
539 contribute to writing the manuscript as authors.

## 540 Data availability statement

541 Data that breaches the anonymity of responses in this study cannot be made available. Some anonymised  
542 and summary data can be found in the Supplementary Information.

## 543 Code availability statement

544 Code for the figures and certain analyses used in this manuscript can be found at [https://github.com/arlie-](https://github.com/arlie-m/destructive_fishing_definition_delphi)  
545 [m/destructive\\_fishing\\_definition\\_delphi](https://github.com/arlie-m/destructive_fishing_definition_delphi).