2. Blonde ray (*Raja brachyura*)

Sensitivity Assessment

Table A11.2. Sensitivity assessment for blonde ray *(Raja brachyura*). Associated sectors include activities related to offshore renewable energy (O), Fishing (F), or shipping (S). NR = not relevant, NA = not assessed, NEv = no evidence, H = high, M = medium, L = low, NS = not sensitive.

Pressures		Associated sector(s)	Resistance				Resilience				Sensitivity				References
Classification	**Pressure type**		**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	
Physical	Physical loss (to land or freshwater habitat)	O	M	L	L	NR	M	L	L	NR	M	L	L	NR	-
	Physical change (to another seabed type)	O, F	M	L	L	NR	M	L	L	NR	M	L	L	NR	-
	Physical change (to another sediment type)	O, F	M	M	H	NR	H	M	H	NR	L	M	H	NR	6, 8, 10, 15, 16, 18, 19
	Habitat structure change-removal of substratum (extraction)	O	M	M	H	NR	NEv	M	H	NR	L	M	H	NR	5, 18
	Abrasion/disturbance of substratum surface or seabed	O, F	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NR	NR	NR	-

Pressures		Associated sector(s)	Resistance				Resilience				Sensitivity				References
Classification	**Pressure type**		**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	
	Penetration or disturbance of substratum subsurface	O, F	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	-
	Changes in suspended solids (water clarity)	O, F	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NR	NR	NR	-
Physical	Smothering and siltation changes (light)	O	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NEv	NR	NR	-
	Smothering and siltation changes (heavy)	O	M	L	L	NR	M	L	L	NR	M	M	L	L	-
	Underwater noise	O, F, S	H	L	L	NR	H	L	L	NR	NS	H	L	L	-
	Electromagnetic energy	O	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NEv	NR	NR	-
	Barrier to species movement	O, F	M	L	L	NR	H	L	L	NR	L	M	L	L	-
	Death or injury by collision	O, F, S	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NEv	NR	NR	-
Hydrological	Water flow changes	O	M	L	M	NR	H	L	M	NR	L	L	M	NR	6, 7

Pressures		Associated sector(s)	Resistance				Resilience				Sensitivity				References
Classification	**Pressure type**		**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	
Chemical	Transition elements & organo-metal contamination	O, F, S	NEv	L	M	NR	H	L	M	NR	Sensitive	NEv	L	M	-
	Hydrocarbon & PAH contamination	O, F, S	NEv	L	M	NR	H	L	M	NR	Sensitive	L	M	NR	-
	Synthetic compound contamination	O, F, S	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NR	NR	NR	-
	Introduction of other substances	O, F, S	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NR	NR	NR	-
	Deoxygenation	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	-
Biological	Introduction or spread of invasive non-indigenous species	O, F, S	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NR	NR	NR	-
	Removal of target species	F	L	H	H	H	L	H	H	H	H	H	H	H	1, 3, 4, 6, 9, 14, 15, 17, 20, 21
	Removal of non-target species	F	L	H	H	H	L	H	H	H	H	H	H	H	2, 5, 11, 12, 13, 14, 15, 17, 18, 21

References for sensitivity assessment

1. Alonso-Fernández, A., Mucientes, G., & Villegas-Ríos, D. (2022). Discard survival of coastal elasmobranchs in a small-scale fishery using acoustic telemetry and recapture data. *Estuarine, Coastal and Shelf Science*, 276, 108037. https://doi.org/10.1016/j.ecss.2022.108037

2. Catalano, B., Dalu, M., Scacco, U., & Vacchi, M. (2007). New biological data on *Raja brachyura* (Chondrichthyes, Rajidae) from around Asinara Island (NW Sardinia, Western Mediterranean). *Italian Journal of Zoology*, 74, 55–61. https://doi.org/10.1080/11250000600831600

3. Biton-Porsmoguer, S., & Lloret, J. (2020). Potential impacts of bottom trawling on species of skates (Rajiformes: Rajidae): the case of the Gulf of Cadiz and the Western Mediterranean. *Cybium*, 44, 255–263. https://doi.org/10.26028/cybium/2020-443-006

4. Porcu, C., Bellodi, A., Cannas, R., Marongiu, M., Mulas, A., & Follesa, M. (2015). Life-history traits of the commercial blonde ray, *Raja brachyura*, from the central-western Mediterranean Sea. *Mediterranean Marine Science*, 16, 90–102. https://doi.org/10.12681/mms.898

5. Figueiredo, I., Moura, T., Bordalo-Machado, P., Neves, A., Rosa, C., & Gordo, L. (2007). Evidence for temporal changes in ray and skate populations in the Portuguese coast (1998-2003) - its implications in the ecosystem. *Aquatic Living Resources,* 20, 85–93. https://doi.org/10.1051/alr:2007019

6. Quero, J. (1998). Changes in the Euro-Atlantic fish species composition resulting from fishing and ocean warming. *Italian Journal of Zoology*, 65, 493–499. https://doi.org/10.1080/11250009809386873

7. Dedman, S., Officer, R., Brophy, D., Clarke, M., & Reid, D. (2017a). Advanced spatial modeling to inform management of data-poor juvenile and adult female rays. *Fishes*, 2(3), 12. https://doi.org/10.3390/fishes2030012

8. Dedman, S., Officer, R., Brophy, D., Clarke, M., & Reid, D. (2017b). Towards a flexible decision support tool for MSY-based Marine Protected Area design for skates and rays. *ICES Journal of Marine Science*. 74, 576–587. https://doi.org/10.1093/icesjms/fsw147

9. Biton-Porsmoguer, S. (2020). Fisheries and ecology of the Skates (Rajiformes: Rajidae) in the English Channel. *Vie Ie Et Milieu-Life and Environment,* 70, 133–140.

10. Farias, I., Figueiredo, I., Moura, T., Gordo, L., Neves, A., & Serra-Pereira, B. (2006). Diet comparison of four ray species (*Raja clavata*, *Raja brachyura*, *Raja montagui* and *Leucoraja naevus*) caught along the Portuguese continental shelf. *Aquatic Living Resources*, 19, 105–114. https://doi.org/10.1051/alr:2006010

11. Machado, P., Gordo, L., & Figueiredo, I. (2004). Skate and ray species composition in mainland Portugal from the commercial landings. *Aquatic Living Resources*, 17, 231–234. https://doi.org/10.1051/alr:2004015

12. Marandel, F., Lorance, P., & Trenkel, V. (2019). Determining long-term changes in a skate assemblage with aggregated landings and limited species data. *Fisheries Management and Ecology*, 26, 365–373. https://doi.org/10.1111/fme.12367

13. Dedman, S., Officer, R., Brophy, D., Clarke, M., & Reid, D. (2015). Modelling abundance hotspots for data-poor Irish Sea rays. Ecological Modelling, 312, 77–90. https://doi.org/10.1016/j.ecolmodel.2015.05.010

14. Ellis, J., Morel, G., Burt, G., & Bossy, S. (2011). Preliminary observations on the life history and movements of skates (Rajidae) around the Island of Jersey, western English Channel. *Journal of the Marine Biological Association of the United Kingdom,* 91, 1185–1192. https://doi.org/10.1017/S0025315410001906

15. Serra-Pereira, B., Erzini, K., Maia, C., & Figueiredo, I. (2014). Identification of potential essential fish habitats for skates based on fishers' knowledge. *Environmental Management*, 53, 985–998. https://doi.org/10.1007/s00267-014-0257-3

16. Porcu, C., Marongiu, M., Bellodi, A., Cannas, R., Cau, A., Melis, R., Mulas, A., Soldovilla, G., Vacca, L., & Follesa, M. (2017) Morphological descriptions of the eggcases of skates (Rajidae) from the central-western Mediterranean, with notes on their distribution. *Helgoland Marine Research*, 71. https://doi.org/10.1186/s10152-017-0490-2

17. Amelot, M., Batsleer, J., Foucher, E., Girardin, R., Marchal, P., Poos, J., & Sys, K. (2021). Evidence of difference in landings and discards patterns in the English Channel and North Sea Rajidae complex fishery. *Fisheries Research,* 242, 106028. https://doi.org/10.1016/j.fishres.2021.106028

18. Phillips, S., Scott, F., & Ellis, J. (2015). Having confidence in productivity susceptibility analyses: A method for underpinning scientific advice on skate stocks? *Fisheries Research*, 171, 87–100. https://doi.org/10.1016/j.fishres.2015.01.005

19. Simpson, S., Humphries, N., & Sims, D. (2021). Habitat selection, fine-scale spatial partitioning and sexual segregation in Rajidae, determined using passive acoustic telemetry. *Marine Ecology Progress Series,* 666, 115–134. https://doi.org/10.3354/meps13701

20. Simpson, S., Humphries, N., & Sims, D. (2020). The spatial ecology of Rajidae from mark-recapture tagging and its implications for assessing fishery interactions and efficacy of Marine Protected Areas. *Fisheries Research*, 228, 105569. https://doi.org/10.1016/j.fishres.2020.105569

21. Thys, K.J.M., Lemey, L., & Bogaert, N.V. (2023). Blondes do it better? A comparative study on the morphometry and life-history traits of commercially important skates blonde ray *Raja brachyura*, thornback ray *Raja clavata*, and spotted ray *Raja montagui*, with management implications. *Fisheries Research*, 263, 106679. https://doi.org/10.1016/j.fishres.2023.106679

Literature search

Web of Science search terms

AB=(“blonde ray*” OR “blonde skate*” OR “Raja brachyura” OR “R. brachyura”) AND AB=("angl*" OR “beam” OR "bottom trawl*" OR "by-catch" OR "dredge*" OR "fish*" OR “gear” OR "gillnet*" OR "hook*" OR “injury” OR "net*" OR "otter trawl*" OR “remov*” OR "aggregate*" OR "anchor*" OR "ballast" OR "barrier*"OR "beach*" OR "launch*" OR "moor*" OR "noise" OR “ship*” OR "steaming" OR "collision*" OR "construction" OR "electro*" OR "turbine*"OR "renewable*" OR "wave" OR "wind" OR "wind farm*" OR "anoxia" OR "copper" OR "current*" OR “deoxy*” OR "disease*" OR "disturbance" OR "endocrine disru*" OR "eutrophication" OR “exposure” OR "heavy metals" OR "hydrocarbon" OR "hypoxia" OR “litter*” OR “non-native*” OR "nitrate*" OR "nitrite*" OR "noise" OR “radionuclide” OR "nutrient*" OR "oil" OR "PAH*" OR "PCB*" OR “regime” OR "sedimentation" OR "silt*" OR "tributyltin" OR “turbid*”)

Search date

1st March 2023 - 28 results

8th February 2024 - 29 results

https://www.webofscience.com/wos/woscc/summary/0b00f8f6-ddbe-4cb9-afad-dc14d8527a84-74aadd4e/relevance/1

Search output and screening process

Abstracts screened for relevance i.e. must describe porbeagle sharks and mention of one of the listed sectors and/or pressures from MarESA. Workflow follows the Rapid Evidence Assessment approach. The title and all auxiliary information (including abstract) were downloaded from ISI Web of Science in a .ris and excel format. In Excel, abstracts were read and listed to either pass or fail the initial screening process with a reason provided.

Outcome from screening

March 2023

Of the 28 articles, 25 (89%) passed initial screening. Of these 25, three (12%) were excluded during secondary screening for relevance, and one (4%) text was unavailable. In total, 20 papers were used to conduct the subsequent sensitivity assessment.

February 2024

Of the 28 articles, 26 (93%) passed initial screening. Of these 25, three (12%) were excluded during secondary screening for relevance, and one (4%) text was unavailable. In total, 21 papers were used to conduct the subsequent sensitivity assessment.