5. Flapper skate (*Dipturus intermedius*)

Sensitivity Assessment

Table A11.5. Sensitivity assessment for the flapper skate (*Dipturus intermedius*). Associated sectors include activities related to offshore renewable energy (O), Fishing (F), or shipping (S). NR = not relevant, NA = not assessed, NEv = no evidence, NS = not sensitive, H = high, M = medium, L = low.

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	None	H	H	H	VL	H	H	H	H[1]	H	H	H	-
	Physical change (to another seabed type)	O, F	L	M	H	M	L	L	H	M	H[2]	L	H	M	6, 8, 15
	Physical change (to another sediment type)	O, F	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	6, 8, 15 - agrees with FeAST sensitivity 2023 assessment

Pressures		Associated sector(s)	Resistance				Resilience				Sensitivity				References
Classification	**Pressure type**		**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	
	Habitat structure change-removal of substratum (extraction)	O	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	6, 8, 15 - agrees with FeAST sensitivity 2023 assessment
	Abrasion/disturbance of substratum surface or seabed	O, F	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NR	NR	NR	6, 8, 15 - agrees with FeAST sensitivity 2023 assessment

Pressures		Associated sector(s)	Resistance				Resilience				Sensitivity				References
Classification	**Pressure type**		**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	
Physical	Penetration or disturbance of substratum subsurface	O, F	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	FeAST sensitivity assessment 2023 as 'common skate complex'; 'penetration into bedrock unlikely.'
	Changes in suspended solids (water clarity)	O, F	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NR	NR	NR	-
	Smothering and siltation changes (light)	O	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**	
	Smothering and siltation changes (heavy)	O	L	M	H	NR	M	L	H	NR	M	L	H	NR	6, 8, 15 and FeAST sensitivity assessment 2023 as 'common skate complex'
	Underwater noise	O, F, S	H	L	L	NR	H	L	L	NR	NS[3]	L	L	NR	-
Physical	Electromagnetic energy	O	NA	L	L	L	NA	L	L	L	L	L	L	L	FeAST sensitivity assessment 2023 as 'common skate complex'

Pressures		Associated sector(s)	Resistance				Resilience				Sensitivity				References
Classification	**Pressure type**		**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	
	Barrier to species movement	O, F	M	L	L	NR	H	L	M	NR	L	L	L	NR	FeAST sensitivity assessment 2023 as 'common skate complex'
	Death or injury by collision	O, F, S	M	NR	NR	NR	M	NR	NR	NR	M	NR	NR	NR	FeAST sensitivity assessment 2023 as 'common skate complex'
Hydrological	Water flow changes	O	H	M	H	NR	M	L	H	NR	L[4]	L	H	NR	6-8, 15

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	NEv	L	NR	NR	Sensitive	L	NR	NR	FeAST sensitivity assessment 2023 as 'common skate complex'
Chemical	Hydrocarbon & PAH contamination	O, F, S	NEv	L	M	NR	NEv	L	NR	NR	Sensitive	L	NR	NR	FeAST sensitivity assessment 2023 as 'common skate complex'

Pressures		Associated sector(s)	Resistance				Resilience				Sensitivity				References
Classification	**Pressure type**		**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	
	Synthetic compound contamination	O, F, S	NEv	NR	NR	NR	NEv	NR	NR	NR	sensitive	NR	NR	NR	FeAST sensitivity assessment 2023 as 'common skate complex'
	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	NS	NR	NR	NR	FeAST sensitivity assessment 2023 as 'common skate complex'

Pressures		Associated sector(s)	Resistance				Resilience				Sensitivity				References
Classification	**Pressure type**		**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	**Score**	**QoE**	**AoE**	**DoC**	
Biological	Introduction or spread of invasive non-indigenous species	O, F, S	NEv	NR	NR	NR	NEv	NR	NR	NR	NEv	NR	NR	NR	FeAST sensitivity assessment NA
	Removal of target species	F	L	H	H	H	VL	H	H	H	H[5]	H	H	H	2-5, 7, 9 – 14, 17, 18, 21 - 29
Biological	Removal of non-target species	F	L	H	H	H	VL	H	H	H	H[5]	H	H	H	2-5, 7, 9, 13, 17, 18, 21-25, 29

[1] H sensitivity assessment based MaRESA guidelines of benthic, sessile organisms. Differs from FeAST sensitivity of Not Exposed as it appears to be based on adults and juveniles only; 'mobile species and can avoid unsuitable areas.'

[2] H sensitivity assessment based on ecological understanding of the flapper skate egg laying and site fidelity of adult females. Differs from FeAST sensitivity of L as it appears to be based on adults and juveniles only; 'mobile species and can avoid unsuitable areas.'

[3] NS sensitivity assessment based on ecological understanding of elasmobranchs. Differs from FeAST sensitivity of Not Assessed.

[4] L sensitivity assessment based on ecological understanding of flapper skate egg cases. Differs from FeAST sensitivity of NS.

[5] H sensitivity assessment based on ecological understanding of the flapper skate, fishing and elasmobranch survival in fisheries captures. Differs from FeAST sensitivity of NR for removal on target species and L of non-target species.

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Literature search

Search term output (clarified) 09/02/24

AB=("blue skate" OR "Dipturus batis" OR "D. batis" OR "gray skate" OR "grey skate" OR "pocheteau" OR "pochette" OR "Glattroch*" OR "Glattskate" OR "Glattrokke" OR "Storskate" OR "Skata" OR "Razza bavosa" OR "Razza cappuccina" OR “Razza comune” OR “Raia oirega” OR “Raya noruega” OR "Vleet" OR "flapper skate" OR "Dipturus intermedius" OR "D. intermedius" OR “Raia intermedia” OR “blue grey skate” OR “Intermediate skate” OR “common skate” OR “flossada” OR “R. intermedia”) 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 "disease*" OR

"disturbance" OR "endocrine disru*" OR "eutrophication" OR “exposure” OR "heavy metals" OR "hydrocarbon" OR "hypoxia" OR "litter" OR "nitrate*" OR "nitrite*" OR "noise" OR “radionuclide” OR "nutrient*" OR "oil" OR “oil” OR "PAH*" OR "pathogen*" OR "PCB*" OR "plastic*" OR “regime” OR “salinity” OR "sedimentation" OR "silt*" OR “temperatur*” OR “translocation” OR "tributyltin" OR “turbid*” OR “visual” OR "warm*")

Generic terms such as “Raia”, “Skate” or ”Raja” were not used here as they produced 1000s of papers which were not relevant to this specific species.

Only vernacular names ranked as commonly used by Fishbase are used in the search, which includes common French, Italian and Spanish names.

Database

ISI Web of Science

Search date

09/02/2023 – 102 results (4 review articles, 20 early access, 43 open access, 7 associated data, 14 enriched cited references)

https://www.webofscience.com/wos/woscc/summary/b5420964-18cb-484b-beee-8ea168670be0-cb888c37/relevance/1(overlay:export/exbt)

Search output and screening process

Due to the common skate problem and identification problems of skate species in the literature, pressures relating to *Dipturus batis* and *Dipturus intermedius* were searched. Abstracts screened for relevance i.e. must describe common, blue or flapper skate (including other vernacular names) 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

9 February 2024: 30 (29%) abstracts passed initial screening, one (1%) could not be accessed and thus applicability could not be determined, 29 (28%) passed secondary screening and were accessible. None of the articles explicitly investigate any of the relevant pressures, although some

present information which is relevant to the common and flapper skate sensitivity assessment. Most articles make some reference to the historical impact of commercial fishing on skate populations.