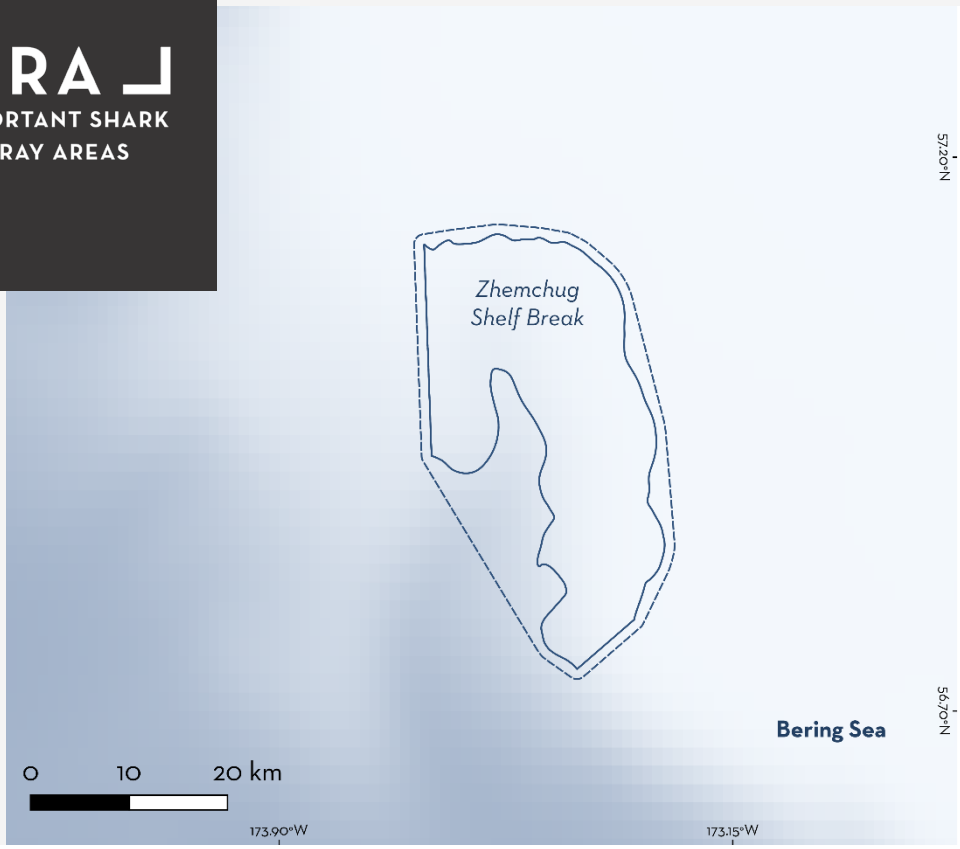
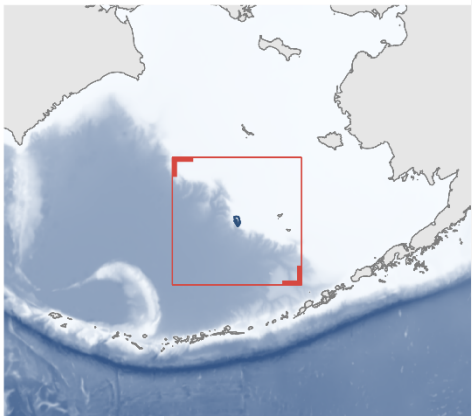
ISRA
IMPORTANT SHARK AND RAY AREAS





Blue lines indicate the area meeting the ISRA Criteria; dashed lines indicate the suggested buffer for use in the development of appropriate place-based conservation measures

ZHEMCHUG SHELF BREAK ISRA

North American Pacific Region

SUMMARY

Zhemchug Shelf Break is located in Alaskan waters of the United States of America. It sits on the shelf break of the Eastern Bering Sea and is characterised by a steep continental slope, coral and sponge communities, sandy and rock substrates, and strong eddy activity that enhances productivity. Within this area there are: **reproductive areas** (Alaska Skate *Bathyraja parmifera*); and **undefined aggregations** (Commander Skate *Bathyraja lindbergi*).

CRITERIA

Sub-criterion C1 – Reproductive Areas; Sub-criterion C5 – Undefined Aggregations

UNITED STATES OF AMERICA

200–1,100 metres

606.0 km²

DESCRIPTION OF HABITAT

Zhemchug Shelf Break is located in Alaskan waters of the United States of America. It sits in the continental shelf break of the Eastern Bering Sea between a wide shelf and the deep Aleutian Basin, ~65 km south from Zhemchug Canyon. The area is characterised by a steep slope with sandy and rocky substrates and coral and sponge communities (Karl et al. 1996; Sigler et al. 2015).

The area is influenced by the Bering Slope Current, a boundary current flowing north following the continental slope along the southeastern Bering Sea, linking the subarctic North Pacific (via the Alaskan Stream) to the Bering Sea shelf (Stabeno et al. 1999). It is a relatively warm, saline, and nutrient-rich current that brings nutrients to shelf waters. The complex structure of canyons along the slope produces the formation of eddies with stronger activity during the boreal spring influencing spring blooms and enhancing productivity in the region (Ladd et al. 2012; Sigler et al. 2015).

This Important Shark and Ray Area is benthic and subsurface and is delineated from 200–1,100 m based on the depth range of Qualifying Species in the area.

ISRA CRITERIA

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Zhemchug Shelf Break is an important reproductive area for one ray species.

This area has been reported as a potential nursery area for Alaska Skate based on the high density of egg cases recorded in fisheries-independent surveys and commercial fisheries catches in the region (Matta 2015; Hoff 2016a, 2016b; Stevenson et al. 2018; Rooper et al. 2019; NOAA-AFSC 2026).

Between 1982–2025, the Alaska Fisheries Science Center (AFSC) - National Oceanic and Atmospheric Administration (NOAA) conducted trawl surveys during the late spring and summer in the Bering Sea, the Aleutian Islands, and the Gulf of Alaska (NOAA-AFSC 2026). Temporal coverage of the surveys varies per region with most conducted annually (e.g., continental shelf surveys in the Bering Sea), or biennially (e.g., Gulf of Alaska) since 1999 (Hoff 2016b; Siple et al. 2024; Markowitz et al. 2025; Dowlin et al. 2026). The continental slope survey in the Bering Sea stopped in 2016 (Markowitz et al. 2025). Surveys were conducted at fixed stations or following a stratified random survey design and covering depths from 0–1,000 m divided in multiple depth strata across 300–500 stations per region. In general, otter trawls of ~25 m headrope and ~34 m footrope were used and tows lasted between 15–30 minutes at a speed of ~3 knots. Catch-per-unit-effort (CPUE) was estimated as the number of individuals or number of egg cases per square kilometre (no./km^2) and the area swept (km^2) as the linear distance towed, multiplied by the mean net width (Hoff 2016b; Siple et al. 2024; Markowitz et al. 2025; Dowlin et al. 2026). In addition, between 2004–2008, specific surveys looking for potential nursery habitats for skates were conducted in the Eastern Bering Sea. These surveys were done in locations that have previously recorded high abundance of egg cases in commercial fisheries (Hoff 2010).

The second largest CPUE (n = 610,064 eggs/km^2) of Alaska Skate egg cases in the whole eastern Bering Sea was reported from this area during targeted surveys for egg cases. Egg cases were recorded in higher abundances between May–June at maximum depths of 217 m and 80.2% contained embryos (Hoff 2010). Between 2004–2025, the presence of Alaska Skate egg cases was recorded in 710 tows during trawl surveys across the whole region, seven (1.7%) of which were recorded inside this area in June–July of 2010, 2012, 2016, and 2023 at depths of 150–638 m (NOAA-AFSC 2026). CPUE values ranged between 19.3–15,348.7 egg cases/km^2 (mean = 1,333.2) confirming the regular and contemporary presence of egg cases in the area (NOAA-AFSC 2026). Between 2014–

2017, this area was also highlighted as having regular presence of egg cases (CPUE = 11–50 egg cases/km^2) in the Eastern Bering Sea during monitoring of commercial fisheries by onboard fisheries observers (Stevenson et al. 2018). Young-of-the-year (22–35 cm TL; Matta & Gunderson 2007; Hass 2011) were recorded exclusively outside this area during fishing surveys conducted between 2000–2013 indicating that recently hatched individuals leave the area and move to shallow waters (Hoff 2010, 2016a). Pregnant females were also recorded in the area during surveys conducted in 2003–2005 (Matta 2015). Female Alaska Skate are regularly recorded in trawl surveys with sizes ranging between 18–114 cm TL (mean = 90 cm TL; Hoff 2016b). Size-at-maturity for female Alaska Skate is >95 cm TL (Matta & Gunderson 2007), indicating mature females are regularly caught in the area.

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Zhemchug Shelf Break is an important area for undefined aggregations of one ray species.

Skates are known to aggregate, with temporal changes in aggregations related to sex and life-stage segregations (Swain & Benoît 2006; Frisk 2010; Hoff 2010). Skate aggregations are usually related to high density areas where large catch quantities occur (Bizzarro et al. 2014). Between 1982–2025, AFSC conducted trawl surveys during late spring and summer in the Bering Sea, the Aleutian Islands, and the Gulf of Alaska (NOAA-AFSC 2026). Temporal coverage of the surveys varies per region with most conducted annually (e.g., continental shelf surveys in the Bering Sea), or biennially (e.g., Gulf of Alaska) since 1999 (Hoff 2016b; Siple et al. 2024; Markowitz et al. 2025; Dowlin et al. 2026). The continental slope survey in the Bering Sea stopped in 2016 (Markowitz et al. 2025). Surveys are conducted at fixed stations or following a stratified random survey design and covering depths from 0–1,000 m divided in multiple depth strata across 300–500 stations per region. In general, otter trawls of ~25 m headrope and ~34 m footrope were used and tows lasted between 15–30 minutes at a speed of ~3 knots. CPUE was estimated as the number of individuals/number of egg cases per square kilometre (no/km^2) and the area swept (km^2) as the linear distance towed, multiplied by the mean net width (Hoff 2016b; Siple et al. 2024; Markowitz et al. 2025; Dowlin et al. 2026).

Between 1997–2024, aggregations of Commander Skate were regularly recorded in this area. During this period, Commander Skate was recorded in 415 tows during trawl surveys across the whole region, 27 (6.5%) of which were recorded inside this area in June–July of all surveyed years up to 2016 at depths of 412–884 m (NOAA-AFSC 2026). The second highest mean CPUE of Commander Skate in the region was reported from this area (mean = 574.6 individuals/km^2; 23.9–5,402.5) compared to other areas in the surveyed region (mean CPUE outside the area = 190.5 individuals/km^2; 18.5–2,079.3) after Pervenets Canyon. Multiple individuals (>5) were recorded in 11 tows (40.7 % of the tows inside this area) with 132 being the maximum number of individuals recorded in a single tow. Further information is required to understand the nature and function of these aggregations.

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QUALIFYING SPECIES

Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met								
				A	B	C1	C2	C3	C4	C5	D1	D2
RAYS												
Bathyraja lindbergi	Commander Skate	LC	126–1,193							X		
Bathyraja parmifera	Alaska Skate	LC	15–1,116			X						

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
RAYS		
Bathyraja aleutica	Aleutian Skate	LC
Bathyraja interrupta	Bering Skate	LC
Bathyraja maculata	Whiteblotched Skate	LC
Bathyraja minispinosa	Whitebrow Skate	LC
Bathyraja taranetzi	Mud Skate	LC
Bathyraja trachura	Roughtail Skate	LC

IUCN Red List of Threatened Species Categories are available by searching species names at www.iucnredlist.org Abbreviations refer to: CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient.

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