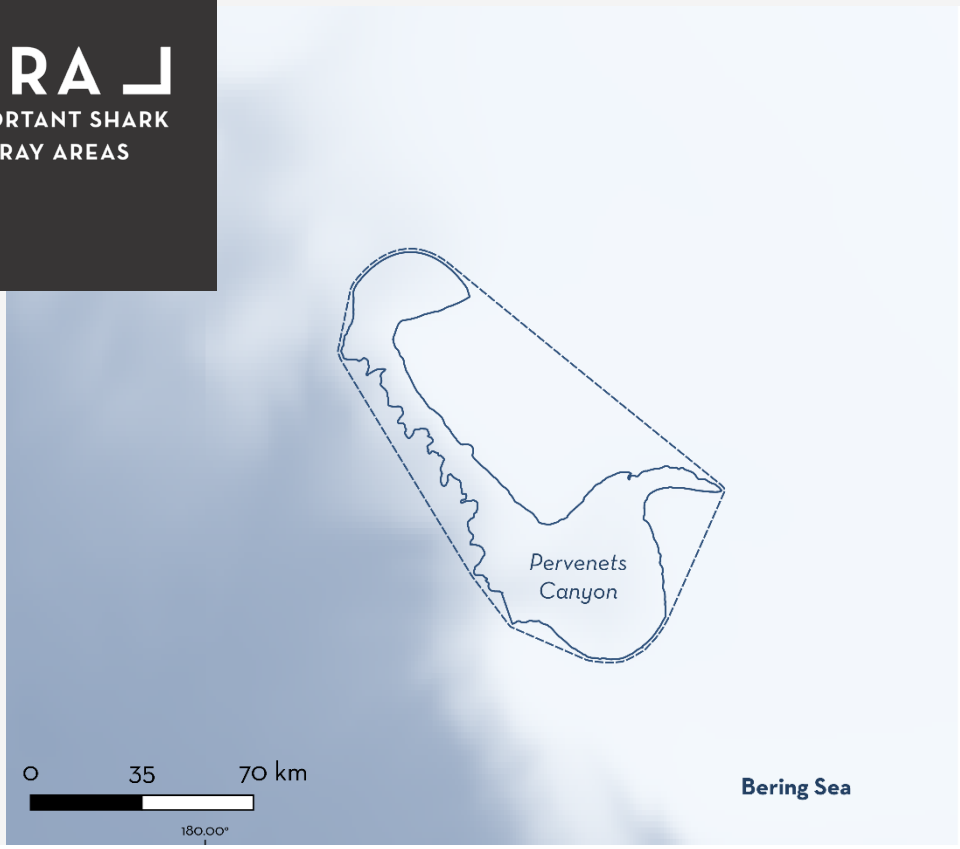
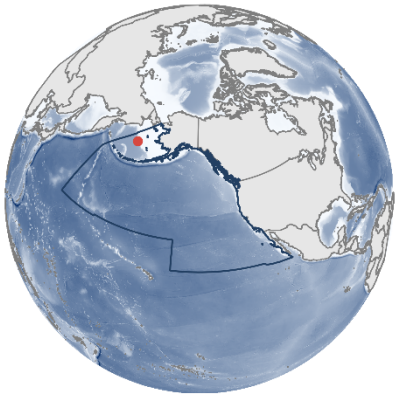
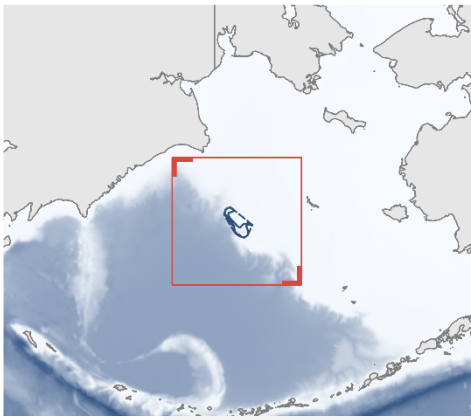
ISRA
IMPORTANT SHARK AND RAY AREAS







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

PERVENETS CANYON ISRA

North American Pacific Region

UNITED STATES OF AMERICA

200–1,100 metres

3,603.9 km²

SUMMARY

Pervenets Canyon is located in Alaskan waters of the United States of America. It sits on the continental shelf break of the Eastern Bering Sea and is characterised by a gentle slope, sandy substrates, and strong eddy activity that enhances productivity. Within this area there are: **reproductive areas** (e.g., Bering Skate *Bathyraja interrupta*); and **undefined aggregations** (e.g., Commander Skate *Bathyraja lindbergi*).

CRITERIA

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

DESCRIPTION OF HABITAT

Pervenets Canyon is located in Alaskan waters of the United States of America. It sits on the continental shelf break of the Eastern Bering Sea between a wide shelf and the deep Aleutian Basin. The area is characterised by a gentle slope with an amphitheatre shape and sandy substrates (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

Pervenets Canyon is an important reproductive area for four ray species.

This area has been reported as a potential nursery area for Aleutian Skate, Bering Skate, Commander Skate, and Alaska Skate based on the high density of egg cases recorded in fisheries-independent surveys and commercial fisheries catches in the region (Hoff 2010; Matta 2015; 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 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 largest CPUE (n = 81,927 egg cases/km^2) of Aleutian 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 depths of 250–320 m and 68.0% contained embryos (Hoff 2010). Between 2014–2017, the highest CPUE (>51 egg cases/km^2) of egg cases in the Eastern Bering Sea was also recorded in this area during monitoring of commercial fisheries by onboard fisheries observers (Stevenson et al. 2018). Pervenets Canyon has been highlighted as an area with high habitat suitability for nursery areas of skates across the region (Rooper et al. 2019). In addition,

between 2004–2025, 160 tows recorded the presence of Aleutian Skate egg cases during trawl surveys, 11 (6.8%) of which were recorded inside this area in 2008, 2010, 2012, 2016, and 2022 at depths between 248–641 m (NOAA-AFSC 2026). CPUE values ranged between 23.1–54.9 egg cases/km^2 (average = 31.9 egg cases/km^2) confirming the regular presence of egg cases in the area (NOAA-AFSC 2026). Aleutian Skate is a species associated to the slope and since slope surveys in the area stopped in 2016, more recent records of egg cases are not available (Markowitz et al. 2025). Young-of-the-year (YOY) were also recorded during fishing surveys conducted between 2000–2013 (Hoff 2016a). Size-at-birth for Aleutian Skate is 22–25 cm total length (TL; Teshima & Tomonaga 1986; Hoff 2009) and YOY size for the region is ~35 cm TL (Matta & Gunderson 2007; Hass 2011). The second highest abundance of YOY across the Eastern Bering Sea was also recorded in this area, after Pribilof Canyon, suggesting that recently hatched individuals stay in the same area before moving to deeper waters (Hoff 2010, 2016a). Female Aleutian Skates are regularly recorded in trawl surveys with sizes ranging between 22–150 cm TL (mean = 99 cm TL; Hoff 2016b). Size-at-maturity for female Aleutian Skate is >109 cm TL (Hass 2011), indicating mature females are regularly caught in the area although pregnancy has not been assessed.

The largest CPUE (n = 49,567 egg cases/km^2) of Bering 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 depths of 200–337 m and 33.0% contained embryos (Hoff 2010). Between 2014–2017, the highest CPUE (>51 egg cases/km^2) of egg cases in the Eastern Bering Sea was also recorded in this area during monitoring of commercial fisheries by onboard fisheries observers (Stevenson et al. 2018). Pervenets Canyon has been highlighted as an area with high habitat suitability for nursery areas of skates across the region (Rooper et al. 2019). In addition, between 2004–2025, the presence of Bering Skate egg cases was recorded in 569 tows during trawl surveys across the whole region, 47 (8.3%) of which were recorded inside this area in 2004, 2008, 2010, 2012, 2016, and 2022 at depths between 134–737 m (NOAA-AFSC 2026). CPUE values ranged between 19.3–4,126.1 egg cases/km^2 (mean = 339.2 egg cases/km^2) confirming the regular presence of egg cases in the area (NOAA-AFSC 2026). Female Bering Skate are regularly recorded in trawl surveys with sizes ranging between 18–85 cm TL (mean = 52 cm TL; Hoff 2016b). Size-at-maturity for female Bering Skate is ~70 cm TL (Last et al. 2016), indicating mature females are regularly caught in the area although pregnancy has not been assessed.

Between 2008–2024, the presence of Commander Skate egg cases was recorded in seven tows during trawl surveys across the whole region, five (71.4%) of which were recorded inside this area in June and July 2008, 2010, and 2016 at depths of 340–532 m (NOAA-AFSC 2026). The highest CPUE of Commander Skate egg cases was reported from this area (mean = 50.1 egg cases/km^2, 23.6–41.4 egg cases/km^2) compared to adjacent areas (mean CPUE outside the region = 30.2 egg cases/km^2, 25.1–1,816.7 egg cases/km^2). This is the only area where egg cases of Commander Skate were recorded across multiple years.

The second largest CPUE (n = 334,163 egg cases/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 depths of 250–316 m and 62.6% contained embryos (Hoff 2010). Between 2014–2017, the third highest CPUE (>51 egg cases/km^2) of egg cases in the Eastern Bering Sea was also recorded in this area during monitoring of commercial fisheries by onboard fisheries observers (Stevenson et al. 2018). Pervenets Canyon has been highlighted as an area with high habitat suitability for nursery areas of skates across the region (Rooper et al. 2019). In addition, between 2004–2025, 710 tows recorded the presence of Alaska Skate egg cases during trawl surveys across the whole region, 35 (4.9%) of which were recorded inside this area in 2008, 2010, 2012, 2016, 2019, 2023, and 2025 at depths between 135–823 m (NOAA-AFSC 2026). CPUE values ranged between 20.5–1,259.1 egg cases/km^2 (mean = 96.4 egg cases/km^2) confirming the regular

presence of egg cases in the area (NOAA-AFSC 2026). YOY individuals (22–35 cm TL; Matta & Gunderson 2007; Hass 2011) were recorded exclusively outside this area during fishing surveys conducted between 2000–2013 suggesting that recently hatched individuals leave the area to shallow waters (Hoff 2010, 2016a). Pregnant females were also recorded in the area during surveys conducted in 2003–2005 (Matta 2015). Female Alaska Skates 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

Pervenets Canyon 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. 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, 113 (27.2%) of which were recorded inside this area in June–August of 2002, 2004, 2008, 2010, 2012, and 2016 at depths of 409–1,054 m (NOAA-AFSC 2026). The highest mean CPUE of Commander Skate in the region was reported from this area (average = 327.2 individuals/km^2; 22.3–2,079.3) compared to adjacent areas in the region (average CPUE outside the region = 173.6 individuals/km^2; 18.5–5,402.5). Multiple individuals (>5) were recorded in 63 tows (55.8% of the tows inside this area). Additional information is required to understand the nature and function of these aggregations.

Acknowledgments

Thomas J Farrugia (Alaska Ocean Observing System), Cindy Tribuzio (Independent Researcher), Bruce Wright (Knik Tribe), and Emiliano García-Rodríguez (IUCN SSC Shark Specialist Group – ISRA Project) contributed and consolidated information included in this factsheet. We thank all participants of the 2026 ISRA Region 11 – North American Pacific region workshop for their contributions to this process.

This factsheet has undergone review by the ISRA Independent Review Panel prior to its publication.

This project was funded by the Shark Conservation Fund, a philanthropic collaborative pooling expertise and resources to meet the threats facing the world's sharks and rays. The Shark Conservation Fund is a project of Rockefeller Philanthropy Advisors.

Suggested citation

IUCN SSC Shark Specialist Group. 2026. Pervenets Canyon ISRA Factsheet. Dubai: IUCN SSC Shark Specialist Group.

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 aleutica	Aleutian Skate	LC	15–1,602			X						
Bathyraja interrupta	Bering Skate	LC	100–1,372			X						
Bathyraja lindbergi	Commander Skate	LC	126–1,193			X				X		
Bathyraja parmifera	Alaska Skate	LC	15–1,116			X						

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
RAYS		
Bathyraja minispinosa	Whitebrow 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.

SUPPORTING INFORMATION

There are additional indications that this is an important reproductive area for one ray species and important for undefined aggregations of one ray species.

Between 2008–2024, the presence of Whitebrow Skate egg cases was recorded in 73 tows during trawl surveys, nine (12.3%) of which were recorded inside this area in June and July 2008, 2012, and 2016 at depths of 323–535 m (NOAA-AFSC 2026). The second highest average CPUE of Whitebrow Skate egg cases was reported from this area (average = 143.7 egg cases/km^2, 26.2–468.7 egg cases/km^2) compared to the whole region (average CPUE outside the region = 64.8 egg cases/km^2, 19.9–537.6 egg cases/km^2) only after Pribylov Canyon (average CPUE = 163.1 egg cases/km^2, 19.9–1,444.9 egg cases/km^2). Additional information is needed to confirm the importance of the area for this ray species.

Between 1991–2024, aggregations of Whitebrow Skate were recorded in this area. During this period, Whitebrow Skates were recorded in 541 tows during trawl surveys, 111 (20.5%) of which were recorded inside this area in June–July of all surveyed years at depths of 219–1,100 m (NOAA-AFSC 2026). The second highest mean CPUE of Whitebrow Skate in the region was reported from this area (average = 104.7 individuals/km^2; 19.9–394.9) compared to adjacent areas in the region (average CPUE outside the region = 76.8 individuals/km^2; 16.8–1,094.6). Multiple individuals (>5) were recorded in 26 tows (23.4% of the tows inside this area). Additional information is needed to confirm the importance of the area for this ray species.

REFERENCES

Bizzarro JJ, Broms KM, Logsdon MG, Ebert DA, Yoklavich MM, Kuhnz LA, Summers AP. 2014. Spatial segregation in Eastern North Pacific skate assemblages. *PLoS ONE* 9: e109907. https://doi.org/10.1371/journal.pone.0109907

Dowlin AN, Siple MC, von Szalay PG. 2026. Data Report: 2024 Aleutian Islands bottom trawl survey. AFSC Processed Rep. 2026-03. Seattle: NOAA-NMFS Alaska Fisheries Science Center.

Frisk MG. 2010. Life history strategies of batoids. In: Carrier JC, Musick JA, Heithaus MR, eds. *The biology of sharks and their relatives II*. Boca Raton: CRC Press, 283–316.

Hass DL. 2011. Age, growth, and reproduction of the Aleutian skate, *Bathyraja aleutica,* from Alaskan Waters. Unpublished Master Thesis, California State University - Monterey Bay, Moss Landing.

Hoff GR. 2009. Embryo developmental events and the egg case of the Aleutian skate *Bathyraja aleutica* (Gilbert) and the Alaska skate *Bathyraja parmifera* (Bean). *Journal of Fish Biology* 74: 483–501. https://doi.org/10.1111/j.1095-8649.2008.02138.x

Hoff GR. 2010. Identification of skate nursery habitat in the eastern Bering Sea. *Marine Ecology Progress Series* 403: 243–254. https://doi.org/10.3354/meps08424

Hoff GR. 2016a. Identification of multiple nursery habitats of skates in the eastern Bering Sea. *Journal of Fish Biology* 88: 1746–1757. https://doi.org/10.1111/jfb.12939

Hoff GR. 2016b. Results of the 2016 Eastern Bering Sea upper continental slope survey of groundfish and invertebrate resources. NOAA Technical Memorandum NMFS-AFSC: 339. Seattle: NOAA-NMFS Alaska Fisheries Science Center.

Karl HA, Carlson PR, Gardner JV. 1996. Aleutian Basin of the Bering Sea: styles of sedimentation and canyon development. In: Gardner JF, Field ME, Twichell DC, eds. *Geology of the United States seafloor: the view from GLORIA*. Chicago: Cambridge University Press, 305–332.

Ladd C, Stabeno PJ, O'Hern JE. 2012. Observations of a Pribilof eddy. *Deep Sea Research Part I: Oceanographic Research Papers* 66: 67–76. https://doi.org/10.1016/j.dsr.2012.04.003

Last PR, White WT, de Carvalho MR, Séret B, Stehmann MFW, Naylor GJP. 2016. *Rays of the world.* Clayton South: CSIRO Publishing.

Markowitz EH, Rohan SK, Wasserman S, Charriere NE, Anderson CB, Stevenson DE. 2025. Results of the 2010 Eastern and Northern Bering Sea Continental Shelf Bottom Trawl Survey of Groundfish and Invertebrate Fauna. NOAA Technical Memorandum NMFS-AFSC-499. Seattle: NOAA-NMFS Alaska Fisheries Science Center.

Matta ME. 2015. Reproductive biology of the Alaska skate *Bathyraja parmifera,* with comments on an intersexual individual. *Journal of Fish Biology* 87: 664–678. https://doi.org/10.1111/jfb.12747

Matta ME, Gunderson DR. 2007. Age, growth, maturity, and mortality of the Alaska skate, *Bathyraja parmifera*, in the eastern Bering Sea. *Environmental Biology of Fishes* 80: 309–323. https://doi.org/10.1007/s10641-007-9223-8

NOAA Fisheries Alaska Fisheries Science Center (NOAA - AFSC). 2026. Fisheries One Stop Shop Public Data: RACE Division Bottom Trawl Survey Data Query. Available at: https://www.fisheries.noaa.gov/foss Accessed March 2026.

Rooper CN, Hoff GR, Stevenson DE, Orr JW, Spies IB. 2019. Skate egg nursery habitat in the eastern Bering Sea: A predictive model. *Marine Ecology Progress Series* 609: 163–178. https://doi.org/10.3354/meps12809

Sigler MF, Rooper CN, Hoff GR, Stone RP, McConnaughey RA, Wilderbuer TK. 2015. Faunal features of submarine canyons on the eastern Bering Sea slope. *Marine Ecology Progress Series* 526: 21–40. https://doi.org/10.3354/meps11201

Siple MC, von Szalay PG, Raring NW, Dowlin AN, Riggle BC. 2024. Data Report: 2023 Gulf of Alaska bottom trawl survey. AFSC Processed Rep. 2024-09. Seattle: NOAA-NMFS Alaska Fisheries Science Center.

Stabeno PJ, Schumacher JD, Ohtani K. 1999. The physical oceanography of the Bering Sea: A summary of physical, chemical, and biological characteristics, and a synopsis of research on the Bering Sea. In: Loughlin TR, Ohtani K, eds. *Dynamics of the Bering Sea: a summary of physical, chemical, and biological characteristics, and a synopsis of research on the Bering Sea*. Fairbanks: University of Alaska Sea Grant, 1–28.

Stevenson DE, Hoff GR, Orr JW, Spies I, Rooper CN. 2018. Interactions between fisheries and early life stages of skates in nursery areas of the eastern Bering Sea. *Fishery Bulletin* 117: 8–14. https://doi.org/10.7755/FB.117.1.2

Swain DP, Benoît HP. 2006. Change in habitat associations and geographic distribution of thorny skate (*Amblyraja radiata*) in the southern Gulf of St Lawrence: Density-dependent habitat selection or response to environmental change? *Fisheries Oceanography* 15(2): 166–182. https://doi.org/10.1111/j.1365-2419.2006.00357.x

Teshima K, Tomonaga S. 1986. Reproduction of Aleutian skate, *Bathyraja aleutica* with comments on embryonic development. In: Uyeno T, Arai R, Taniuchi T, Matsuura K, eds. *Proceedings of the second international conference on Indo-Pacific fishes*. Tokyo: Ichthyological Society of Japan, 303–309.