Sea Tadpole to Polar Eelpout

Sea Tadpole (*Careproctus reinhardti*)

(Krøyer, 1862)

Family Liparidae

Note: *Except for geographic range data, all information is from areas outside of the study area.*

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Unknown, as its abundance in the Arctic is poorly understood.

Physical Description/Attributes: A gelatinous, pink-translucent snailfish with a small, recessed, pelvic adhesive disk. For diagnostic details see Nozères and others (2010, p. 88) [1]. Swim bladder: Absent [2]. Antifreeze glycoproteins in blood serum: Unknown.

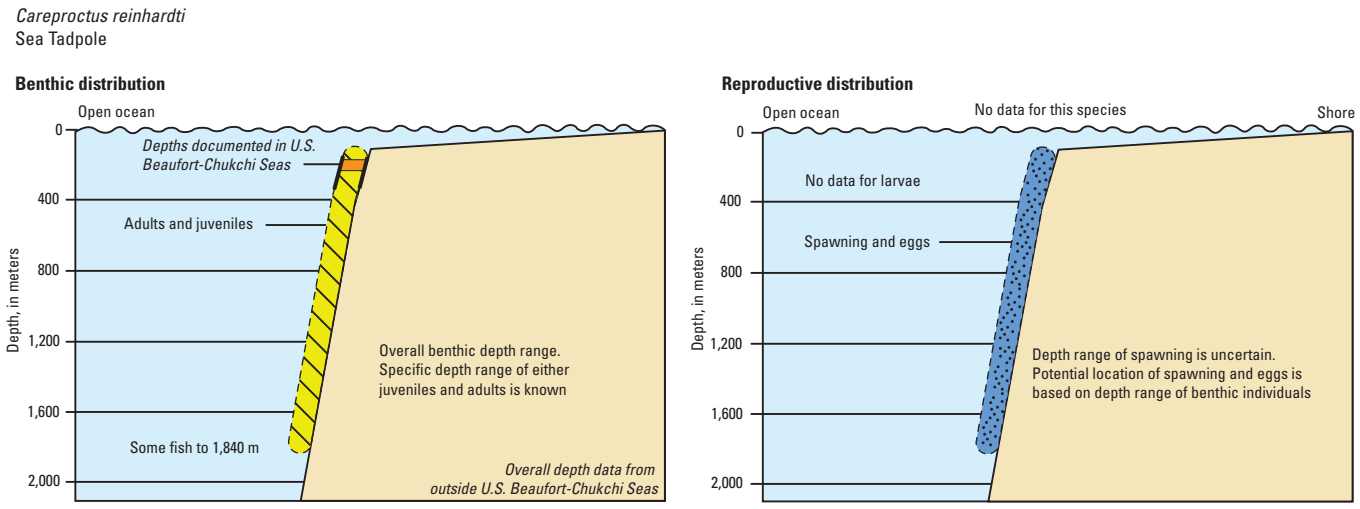
Sea Tadpole (*Careproctus reinhardti*), 170 mm TL, Chukchi Borderland, 2009. Photograph by C.W. Mecklenburg, Point Stephens Research.

Range: *Chukchi Borderland and upper continental slope of Chukchi and Beaufort Seas (to as far eastward as 71°15'N, 150°06'W)* [5]. Worldwide, found in Arctic Ocean north of Alaska, in Baffin Bay and Davis Strait, off eastern Greenland, and Kara and Laptev Seas [5].

Relative Abundance: *Not documented in U.S. Chukchi Sea. Rare in U.S. Beaufort Sea* [3]. Has been reported to be abundant in Gulf of St. Lawrence [1, 6].

Geographic distribution of Sea Tadpole (*Careproctus reinhardti*) within Arctic Outer Continental Shelf Planning Areas [4] based on review of published literature and specimens from historical and recent collections [3, 5].

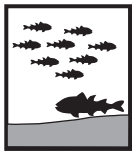
Depth Range: 100–1,840 m [3], usually 180–350 m [7]. *Taken in U.S. Beaufort Sea at 183–223 m, and north of U.S. Chukchi Sea, outside the 200-mile limit, at 227–236 m* [3, 5].



Benthic and reproductive distribution for Sea Tadpole (*Careproctus reinhardti*).

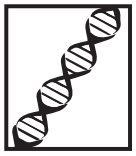
Habitats and Life History

Eggs—Size: 4.2–4.7 mm [7, 8]. Time to hatching: Unknown. Habitat: Unknown.
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Unknown.
Juveniles—Age and size: Unknown. Habitat: Unknown.
Adults—Age and size at first maturity: *Unknown*. About 120 mm TL in Atlantic Ocean [6]. Maximum age: 7 years [9]. Maximum size: 30 cm TL [10]. Habitat: Benthic and benthopelagic [7].
Substrate—Muddy bottoms [7]. Physical/chemical—Temperature: -2 to 4 °C [5, 7]. Spawning at 2–4 °C [11]. Salinity: Marine [7].



Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.



Populations or Stocks

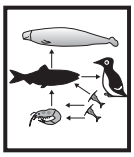
There have been no studies.

Reproduction

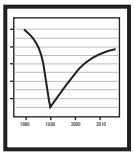
Mode—Separate sexes, oviparous [12].
Spawning season—Perhaps in spring and (or) summer in Canadian Arctic [13], in November in Barents Sea [8].
Fecundity—About 40–300 eggs [6, 7].

Food and Feeding

Food items—Smaller fish consumed more hyperiid and gammarid amphipods; larger fish consumed more pandalid shrimps. In general, amphipods and shrimps are major prey. Fishes and copepods also are reported in the diet [7, 10]. Trophic level—3.75 standard error 0.58 [14].



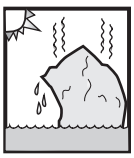
Biological Interactions
Predators—Ribbon seals eat snailfishes in the Bering Sea [16].
Competitors—Likely a range of benthic fish species, including various flatfishes, sculpins, poachers, and eelpouts.



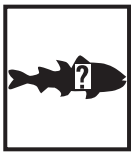
Resilience
High, minimum population doubling time: less than 15 months (Preliminary *K* or Fecundity) [14].

Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Sea Tadpole are not commercially harvested.



Potential Effects of Climate Change
The Sea Tadpole are an Arctic species and its distribution would be expected to shift northward with warming temperatures.



Areas for Future Research [B]
Little information is available regarding the biology and ecology of this species in the U.S. Arctic marine environment. Research needs include: (1) depth and location of larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

Remarks

This species may be a species complex and genetic confirmation of phylogenetic relationships is needed [3].

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Chernova, N.V., 1991, Aquarium observations of the snail fishes *Careproctus reinhardti* and *Liparis liparis*: Journal of Ichthyology, v. 31, no. 9, p. 65–70. [8]

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Mecklenburg, C.W., Møller, P.R., and Steinke, D., 2011, Biodiversity of Arctic marine fishes—Taxonomy and zoogeography: Marine Biodiversity, v. 41, no. 1, p. 109–140, Online Resource 1. [3]

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Nebulous Snailfish (*Liparis bathyarcticus*)

Parr, 1931

Family Liparidae

Nebulous Snailfish (*Liparis bathyarcticus*), 184 mm, Bering Strait, 2009. Photograph by C.W. Mecklenburg, Point Stephens Research.

***N*ote on taxonomy:** *Historical confusion with L. gibbus* (*Bean, 1881*) *makes distribution uncertain* [1].

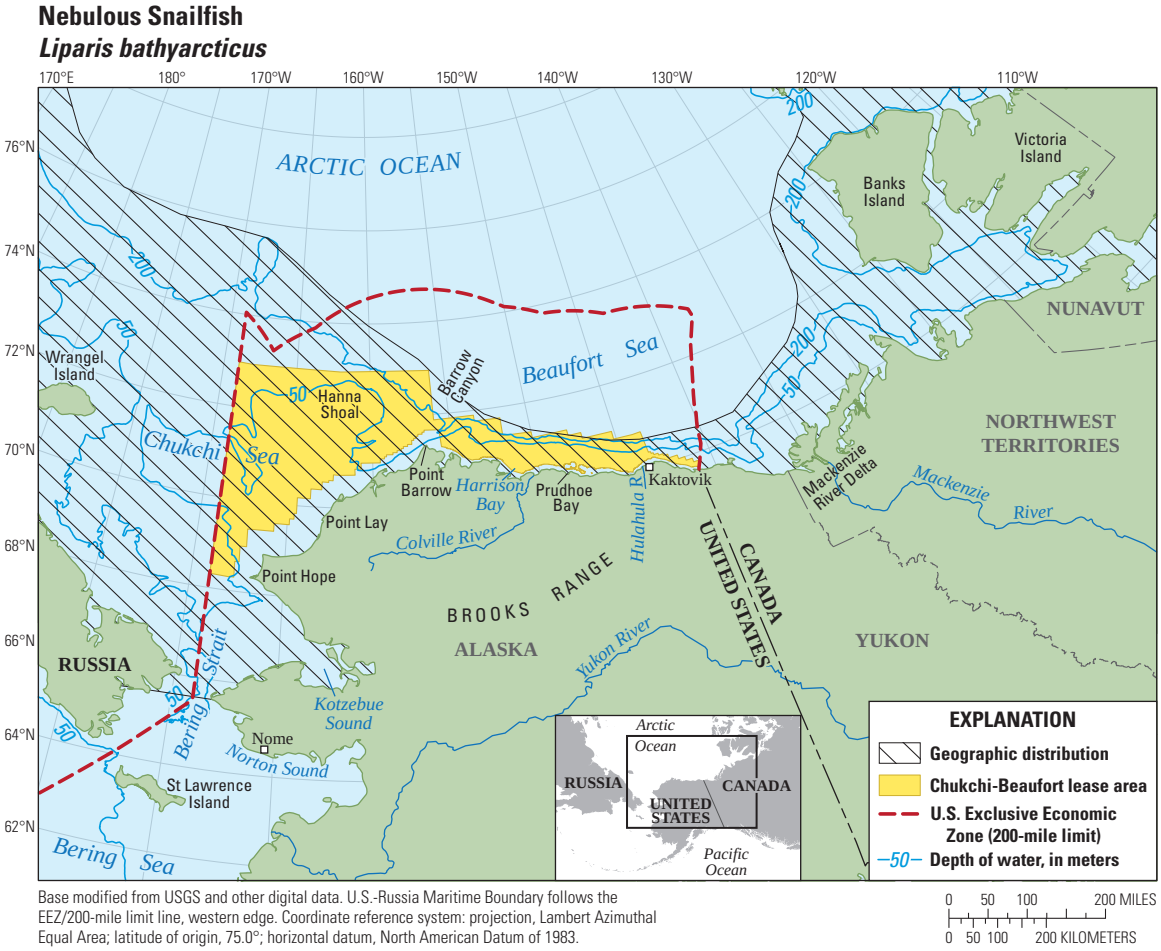
Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: The ecological significance of this species in benthic food webs is unknown, but given its widespread distribution and abundance could be regionally important.

Physical Description/Attributes: Head and body with brown mottling and metallic gold sheen; belly and underside of head white; and dorsal, anal, and caudal fins with distinct or indistinct black bands [2]. For specific diagnostic characteristics, see Parr (1931) and Chernova (2008) [3, 4]. Swim bladder: Absent [5]. Antifreeze glycoproteins in blood serum: Unknown.

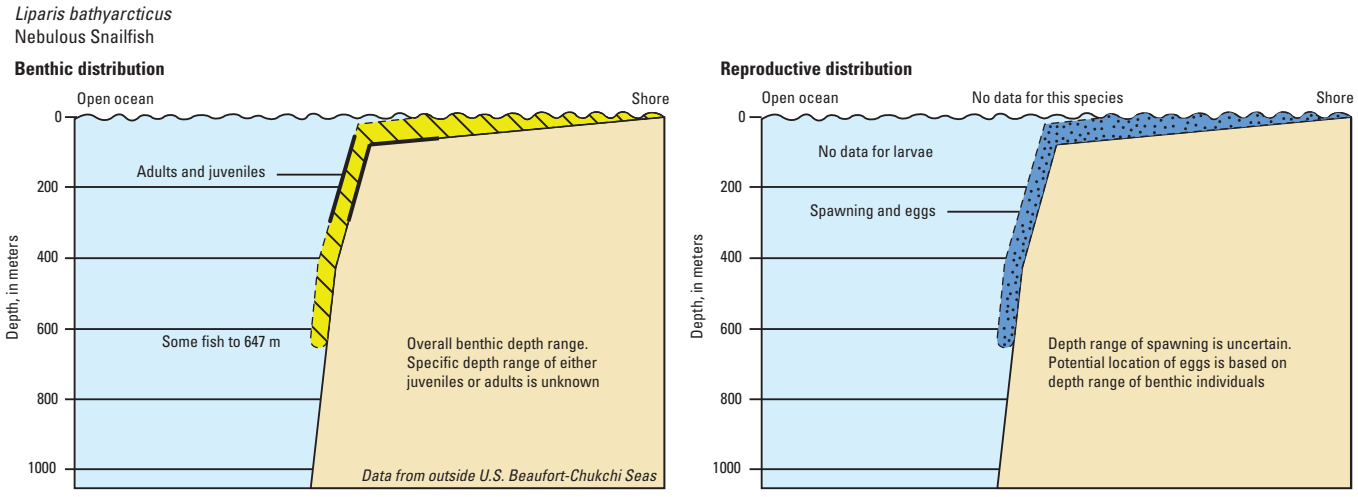
Range: *U.S. Chukchi and Beaufort Seas* [1]. Elsewhere in Alaska, to southeastern Bering Sea [3]. Worldwide, predominantly Arctic, circumpolar from west Greenland to Labrador, Greenland, Norwegian, Barents, White, and Kara Seas, and East Siberian and Chukchi Seas [1].

Relative Abundance: *Common in U.S. Chukchi and Beaufort Seas but historically confused with* L. gibbus *and other* Liparis *species* [2, 7].

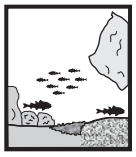


Geographic distribution of Nebulous Snailfish (*Liparis bathyarcticus*) within Arctic Outer Continental Shelf Planning Areas [6], based on review of published literature and specimens from historical and recent collections [1, 2].

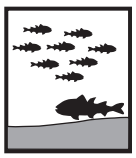
Depth Range: 8–510 m [2], typically 50–300 m [1].



Benthic and reproductive distribution of Nebulous Snailfish (*Liparis bathyarcticus*).

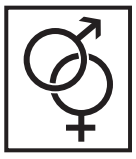


Habitats and Life History
Eggs—Size: Unknown. Time to hatching: Unknown. Habitat: Likely benthic, like other *Liparis* species [1, 9].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Likely pelagic, like other *Liparis* species [1, 9].
Juveniles—Age and size: Unknown. Habitat: Benthic [1, 9].
Adults—Age and size at first maturity: Unknown. Maximum age: Unknown. Maximum size: 27 cm [8]. Habitat: Benthic [1, 9].
Substrate—Unknown.
Physical/chemical—Temperature: -1.6–3.7 °C [2]. Salinity: Marine [2].



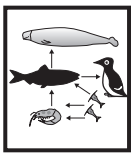
Behavior
Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.

Populations or Stocks
There have been no studies.

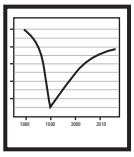


Reproduction
Mode—Separate sexes, oviparous [10].
Spawning season—Unknown.
Fecundity—Unknown.

Food and Feeding
Food items—Plankton and benthic crustaceans (euphausiids, shrimps, gammarids) for juveniles. Fishes and large decapods for adults [8].
Trophic level—3.29 standard error 0.46 (based on information for *L. gibbus*) [11].



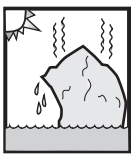
Biological Interactions
Predators—Snailfishes outside U.S. Chukchi and Beaufort Seas eaten by such predators as larger fishes and seals [12–15].
Competitors—Likely a range of benthic fish species, including various flatfishes, sculpins, poachers, and eelpouts.



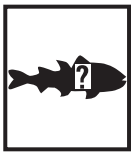
Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Fecundity=4,000-12,000) (based on information for *L. gibbus*) [11].

Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Nebulous Snailfish are not commercially harvested.



Potential Effects of Climate Change
As the Nebulous Snailfish are a predominantly Arctic species [1], a northward shift is distribution due to climate warming would be expected.



Areas for Future Research [B]

Little is known about the ecology and life history of this species from the region. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Gelatinous Seasnail (*Liparis fabricii*)

Krøyer, 1847

Family Liparidae

Note: *Liparis fabricii was proposed to be a species complex* [1], *but molecular analysis of specimens caught in the U.S. Chukchi and Beaufort Seas to Davis Strait in the Atlantic indicates they are the same species* [2].

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Unknown, as its abundance in the Arctic is poorly understood.

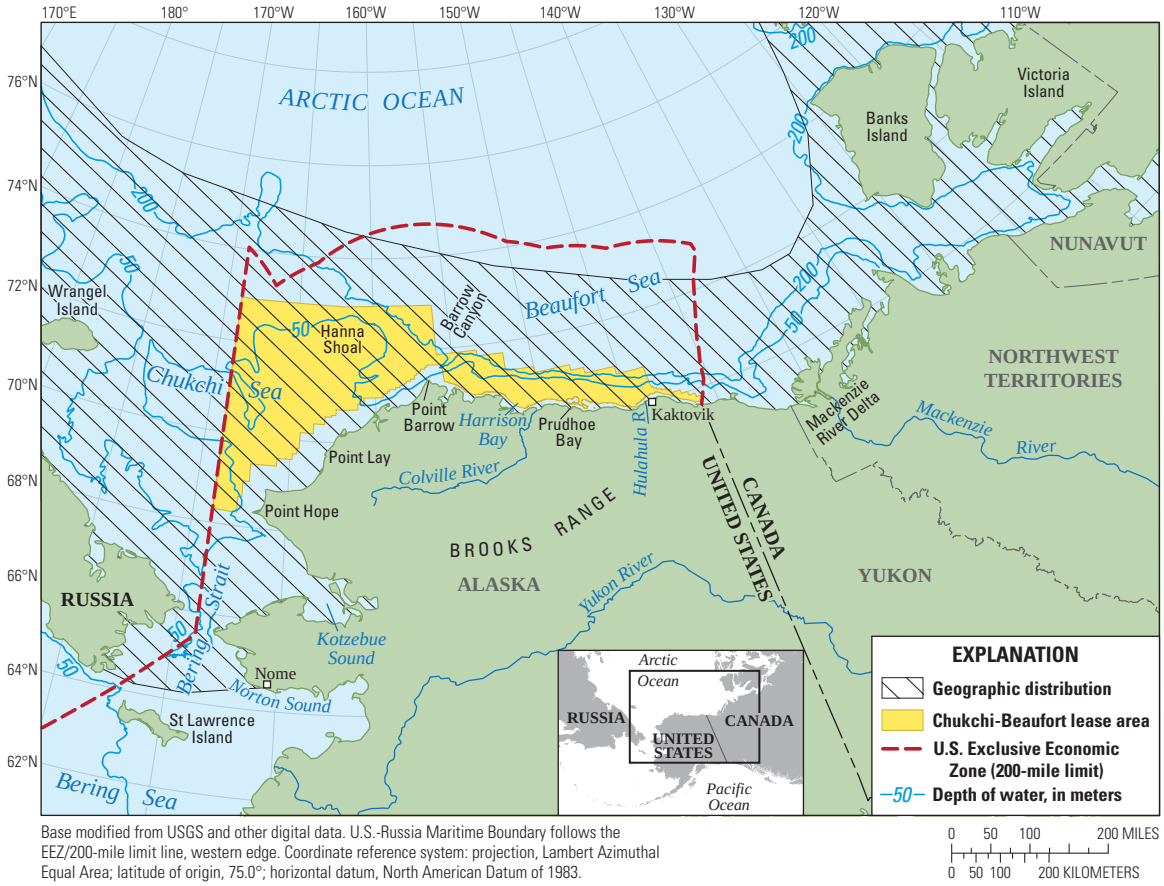
Gelatinous Seasnail (*Liparis fabricii*), 94 mm TL, western Chukchi Sea, 2004. Photograph by C.W. Mecklenburg, Point Stephens Research.

Physical Description/Attributes: Tadpole shaped, soft and covered with gelatinous tissue. Head and body uniformly brown, gray, or black with a black peritoneum. For specific diagnostic characteristics, see *Fishes of Alaska* (Meckenburg and others, 2002, p. 592) [3]. Swim bladder: Absent [4]. Antifreeze glycoproteins in blood serum: Unknown.

Range: *U.S. Chukchi and Beaufort Seas, as far north as the continental slope of the Chukchi Sea outside the U.S. 200-mile limit* [2]. Elsewhere in Alaska, southward in Bering Sea to a point south of Bering Strait west of Cape Rodney and well north of St. Lawrence Island at 64°30'N, 170°26'W. Worldwide, circumpolar in the Arctic, northward to northern Ellesmere Island, southward to Georges Bank, Canada, and Iceland [2].

Relative Abundance: *Common, usually caught at one to several stations offshore on research cruises in the U.S. Chukchi and Beaufort Seas but not in great numbers* [2, 3, 7]; relatively *large catches have been made well offshore of Point Barrow* [8] as well as off Herschel Island, Canada [9].

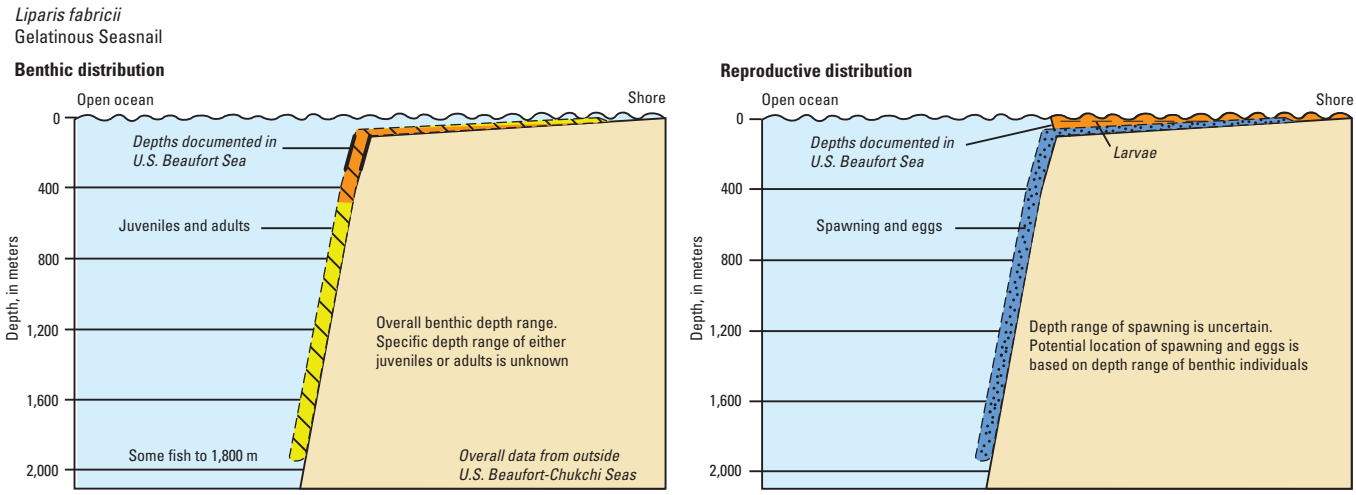
Gelatinous Seasnail
Liparis fabricii



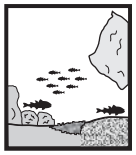
Base modified from USGS and other digital data. U.S.-Russia Maritime Boundary follows the EEZ/200-mile limit line, western edge. Coordinate reference system: projection, Lambert Azimuthal Equal Area; latitude of origin, 75.0°; horizontal datum, North American Datum of 1983.

Geographic distribution of Gelatinous Seasnail (*Liparis fabricii*) within Arctic Outer Continental Shelf Planning Areas [5] based on review of published literature and specimens from historical and recent collections [2, 3, 6, 7].

Depth Range: Less than 13 m [10] to 1,880 m, typically at 100–300 m [2, 3]. In 2004, one adult was taken at 72 m in the northwestern (Russian) Chukchi Sea [7] *and a few larvae were taken from surface to 81 m in the western and eastern Chukchi Sea* [11]. *Adults have been taken between 40–500 m in U.S. Beaufort Sea* [12].

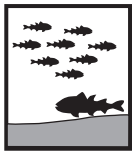


Benthic and reproductive distribution of Gelatinous Seasnail (*Liparis fabricii*).



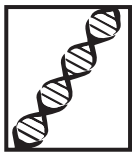
Habitats and Life History

Eggs—Size: 2.1–2.7 mm for mature eggs [13]. Ovaries can contain three sizes of eggs [13]. Time to hatching: Unknown. Habitat: Likely benthic, like other *Liparis* species [2].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: At least greater than 38 mm SL (42 mm TL) in Canadian Beaufort Sea [14]. Days to juvenile transformation: About one year [15]. Habitat: Pelagic [14]. *A few larvae were taken in midwaters in U.S. Chukchi Sea* [11].
Juveniles—Age and size: Unknown. Habitat: Benthic and pelagic [3].
Adults—Age and size at first maturity: Unknown. Maximum age: Unknown. Maximum size: 21 cm TL [15]. Habitat: Benthic and water-column species, often found swimming among ice floes [2, 16, 17]. Nearshore to beneath pack ice over bottom depths of more than 2 km. Usually more than 20 km offshore [18]. Attaches to laminarian fronds [10].
Substrate—Mud or mixed mud, sand, or detritus bottom [16].
Physical/chemical—Temperature: -1.9–3.7 °C [6, 10, 19], prefers less than 0 °C [15]. Salinity: Marine and estuarine [16, 17], but prefers 30–34 ppt [15].



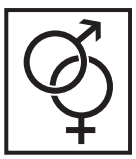
Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Swims and feeds up to 1 m above sea bottom [10].



Populations or Stocks

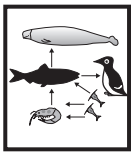
There have been no studies.



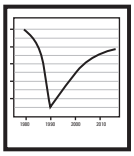
Reproduction

Mode—Oviparous; sexes are separate [20].
Spawning season—September and October in Russian Arctic [13].
Fecundity—485–735 large and medium-sized eggs per female [13].

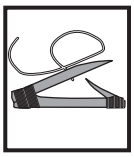
Food and Feeding
Food items—Benthic and pelagic crustaceans (for example, mysids, euphausiids, amphipods, and shrimps), polychaetes, and fishes [13, 15, 16].
Trophic level—3.33 standard error 0.42 [21].



Biological Interactions
Predators—Snailfishes outside U.S. Chukchi and Beaufort Seas eaten by such predators as larger fishes and seals [22–25].
Competitors—Likely a range of benthic fish species, including various flatfishes, sculpins, poachers, and eelpouts.

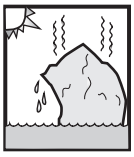


Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Assuming t_{max}>3) [21].

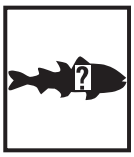


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Gelatinous Seasnail are not commercially harvested.



Potential Effects of Climate Change
Because the Gelatinous Seasnail are an Arctic species [2] climate warming might result in a northward shift in distribution and potential decreased abundance.



Areas for Future Research [B]
Little is known about the ecology and life history of this species from the region. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Variegated Snailfish (*Liparis gibbus*)

Bean, 1881

Family Liparidae

Note on taxonomy: *Snailfishes in the genus* Liparis *can be difficult to distinguish from one another and* L. gibbus *has often been confused with other species, including* L. bathyarcticus *and* L. tunicatus, *making much of the available information concerning these species uncertain* [1].

Variegated Snailfish (*Liparis gibbus*), 183 mm TL, Bering Strait 2007. Photograph by C.W. Mecklenburg, Point Stephens Research.

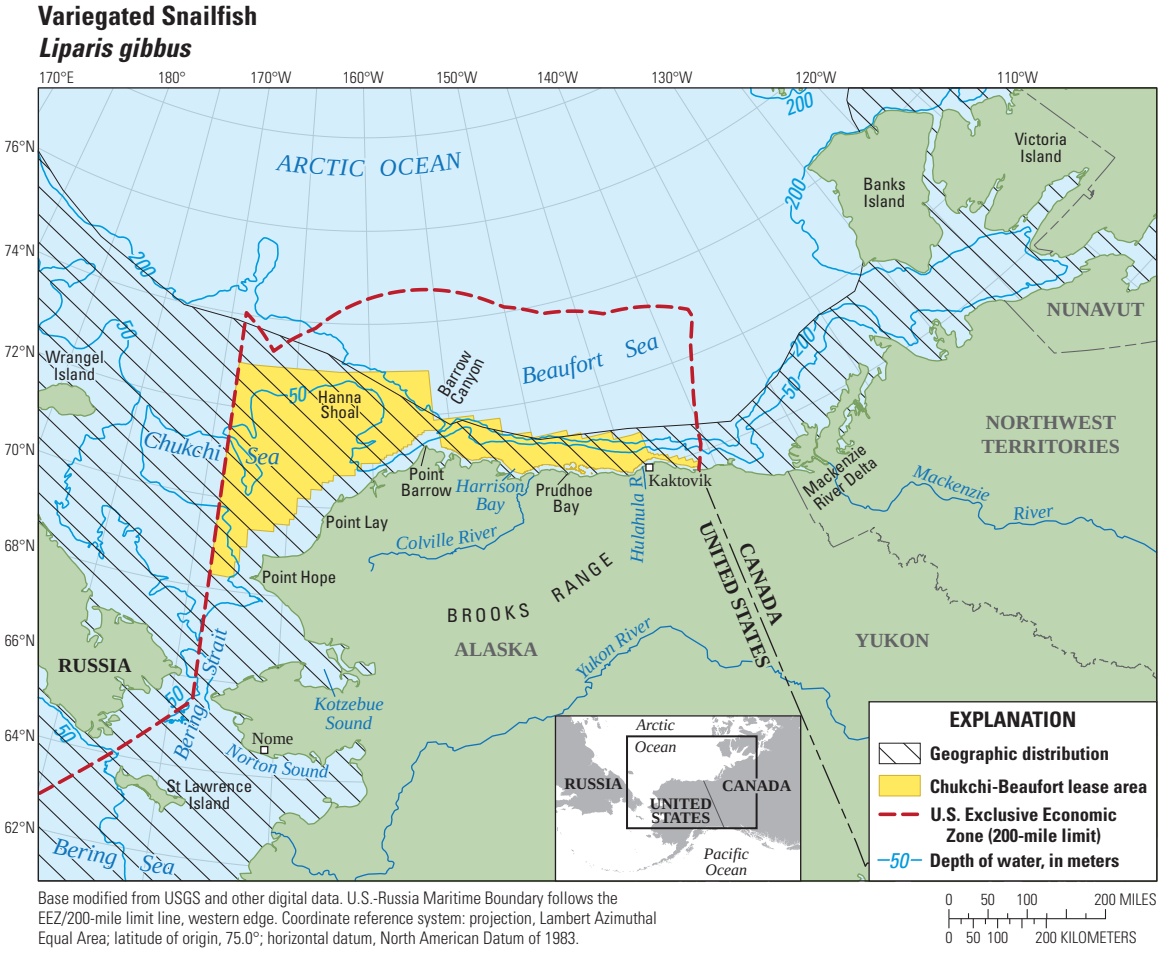
Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: It is particularly difficult to differentiate among snailfish species when found as prey. However, snailfishes are generally common and are likely of some ecological importance in the Arctic. Larval stages may be seasonally important in coastal food webs.

Physical Description/Attributes: Body tadpole shaped, soft, and covered with gelatinous tissue; and pink, with tan stripes, tan with black fin margins, or brownish with blackish spots. For specific diagnostic characteristics, see *Fishes of Alaska* (Mecklenburg and others, 2002, p. 585) [2]. Swim bladder: Absent [3]. Antifreeze glycoproteins in blood serum: Unknown.

Range: *U.S. Chukchi and Beaufort Seas* [1]. Elsewhere in Alaska, in eastern Bering Sea, along Aleutian Islands, and in Gulf of Alaska south to northern British Columbia, Canada. Worldwide, circumpolar in Arctic Ocean. There are unconfirmed reports from southeastern Kamchatka Peninsula, northern Kuril Islands, Russia, and Commander Islands [1].

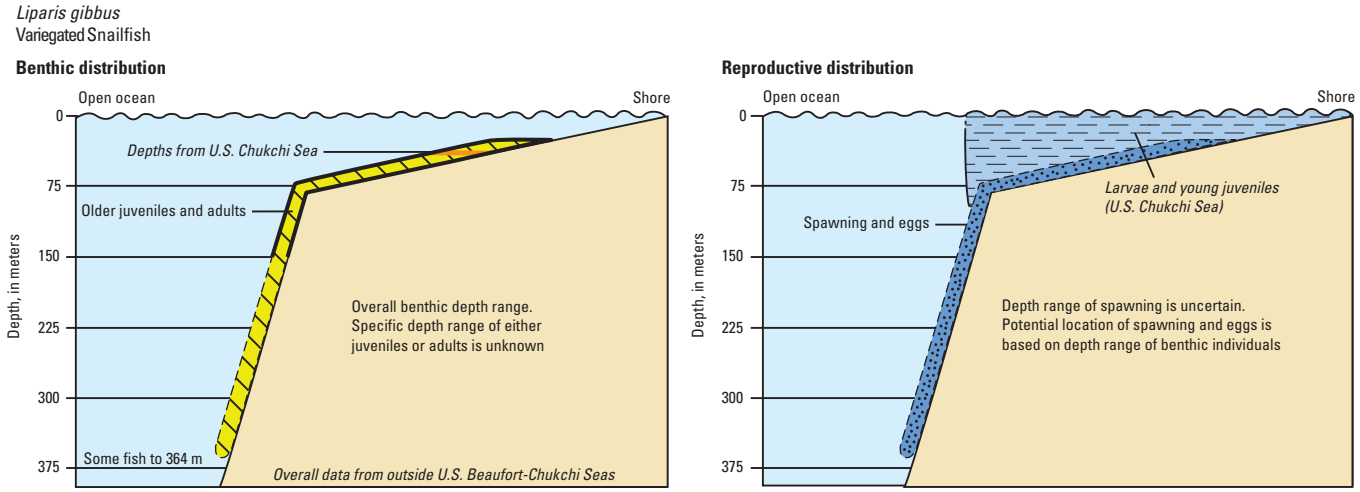
Relative Abundance: *Reported to be common in northeastern U.S. Chukchi Sea* [6], *but this is uncertain because of confusion with* L. bathyarcticus, *which may actually be the more abundant species in the study area* [5]. Common in eastern Bering Sea [7].



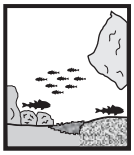
Base modified from USGS and other digital data. U.S.-Russia Maritime Boundary follows the EEZ/200-mile limit line, western edge. Coordinate reference system: projection, Lambert Azimuthal Equal Area; latitude of origin, 75.0°; horizontal datum, North American Datum of 1983.

Geographic distribution of Variegated Snailfish (*Liparis gibbus*) within Arctic Outer Continental Shelf Planning Areas [4] based on review of published literature and specimens from historical and recent collections [1, 5].

Depth Range: 25–364 m, mainly 150 m or less [1, 8]. *Three adults were taken between 48–54 m in area between Bering Strait and southern Chukchi Sea* [9]. Larvae and young juveniles were taken in midwaters of central and northern Chukchi Sea between 22–81 m and possibly as shallow as the surface [9].

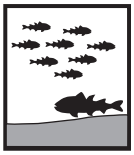


Benthic and reproductive distribution of Variegated Snailfish (*Liparis gibbus*).



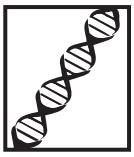
Habitats and Life History

Eggs—Size: Unknown. Time to hatching: Unknown. Habitat: Likely benthic, like other *Liparis* species [1].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: 15.2 mm SL [10]. Days to juvenile transformation: Unknown. Habitat: Pelagic [10].
Juveniles—Age and size: Unknown. Habitat: Pelagic to benthic [1, 10].
Adults—Age and size at first maturity: Unknown. Females appear to be larger at age than males [11]. Maximum age: About 6 years for both males and females. A 250 mm TL fish (much smaller than this species' maximum length) was 6 years [11]. Maximum size: 52.4 cm TL [10], but because the authors included *L. bathyacrticus* in the synonymy of *L. gibbus*, this measurement could instead pertain to *L. bathyarcticus*.
Habitat: Primarily benthic [10, 12] and possibly benthopelagic in that some large fish have been taken in midwater trawls [10].
Substrate—Soft sea floors and occasionally over rocks [10, 12].
Physical/chemical—Temperature: 0.8–10.5 °C [12, 13]. Salinity: Marine [10, 12].



Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.



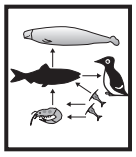
Populations or Stocks

There have been no studies.

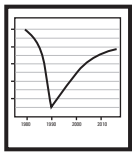
Reproduction

Mode—Separate sexes, oviparous [14].
Spawning season—Perhaps summer based on capture of small larvae in summer in St. Lawrence estuary. However, no females taken in Canadian Arctic in spring or summer had mature ovaries [10].
Fecundity—Unknown.

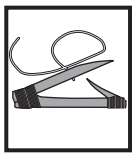
Food and Feeding
Food items—Both benthic and epibenthic, and occasionally water column prey. Crustaceans (for example, gammarid and caprellid amphipods, copepods, shrimps, and crabs), polychaetes, pteropods, and small fishes [11, 15, 16].
Trophic level—3.29 standard error 0.46 [17].



Biological Interactions
Predators—Atlantic Cod (*Gadus morhua*) in Hudson Bay [10]. Snailfishes outside U.S. Chukchi and Beaufort Seas eaten by such predators as larger fishes and seals (18–21].
Competitors—Likely a range of benthic fish species, including various flatfishes, sculpins, poachers, and eelpouts.

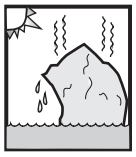


Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Fecundity=4,000–12,000) [17].

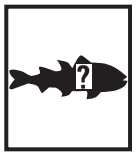


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Variegated Snailfish are not commercially harvested.



Potential Effects of Climate Change
The Variegated Snailfish are a predominantly Arctic species [1] and it is possible that climate warming could cause a retraction northward of its southern populations. If industrial fishing operations ever develop in the offshore marine, the species would be vulnerable to bycatch. Changes in energy transfers through decoupling of benthic-pelagic energy pathways could affect the availability of benthic foods.



Areas for Future Research [B]
Little is known about the ecology and life history of this species. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators. It is common enough in most habitats to be considered as a potential indicator species in long term monitoring.

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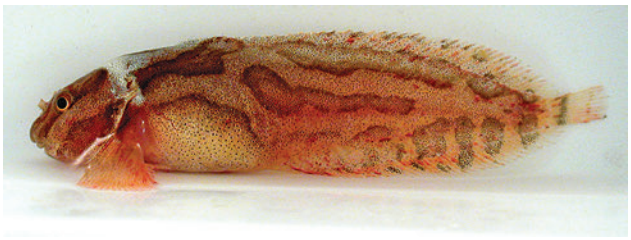
Kelp Snailfish (*Liparis tunicatus*)

(Reinhardt, 1836)

Family Liparidae

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Unknown. The life history and ecology of this species and its roles in regional ecosystems and food webs are poorly understood.

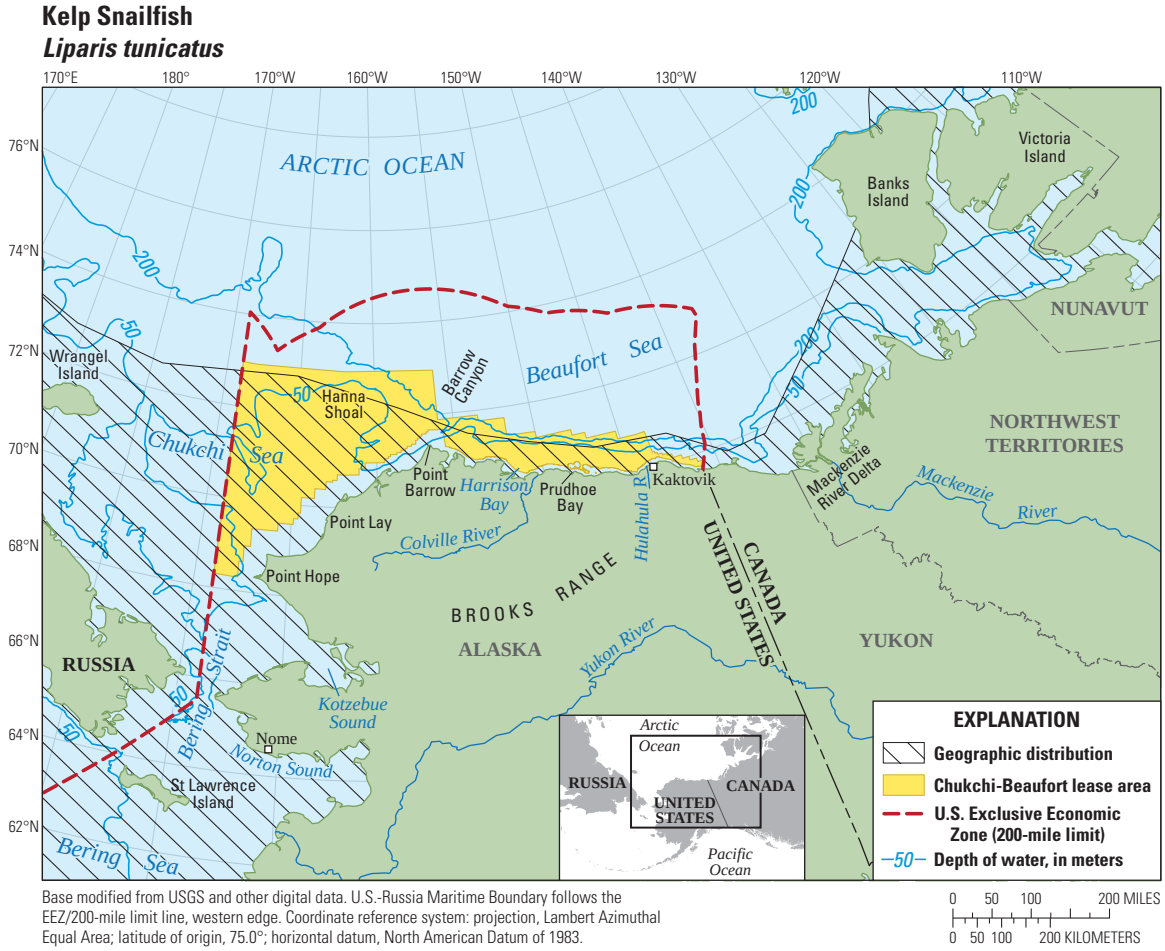


Kelp Snailfish (*Liparis tunicatus*), 76 mm TL, western Chukchi Sea, 2004. Photograph by C.W. Mecklenburg, Point Stephens Research.

Physical Description/Attributes: Body tadpole shaped, soft, and covered with gelatinous tissue. Yellowish brown, plain or patterned with dark brown blotches and bars or stripes, and usually with dark bars on caudal fin. For specific diagnostic characteristics, see *Fishes of Alaska* (Mecklenburg and others, 2002, p. 589) [1]. Swim bladder: Absent [2]. Antifreeze glycoproteins in blood serum: Unknown.

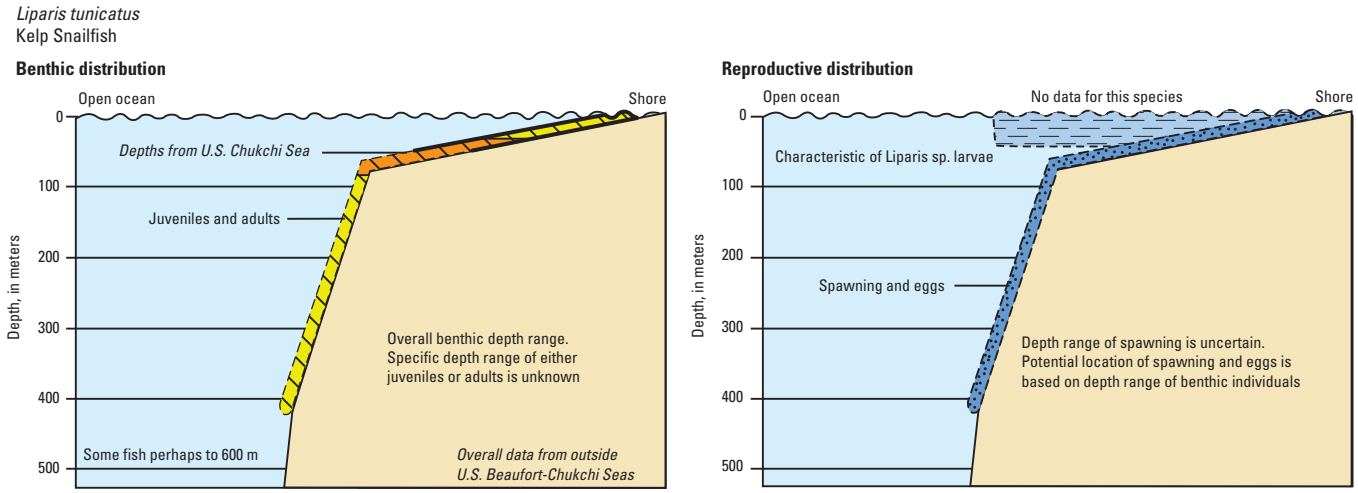
Range: *U.S. Chukchi and Beaufort Seas (as far north as 73°1'N, 174°7'W* [3]. Elsewhere in Alaska, to northern Bering Sea south of St. Lawrence Island. Worldwide, circumpolar, to as far north as 82°29'N, 62°15'W at Ellesmere Island, Canada [4]; and in Gulf of Anadyr, Russia [1].

Relative Abundance: *Patchily abundant (common) in U.S. Chukchi and Beaufort Seas* [6–8].



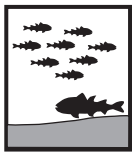
Geographic distribution of Kelp Snailfish (*Liparis tunicatus*) within Arctic Outer Continental Shelf Planning Areas [5] based on review of published literature and specimens from historical and recent collections [3, 4].

Depth Range: Intertidal, including tide pools, to 415 m [4] and perhaps to 600 m [9]. Typically shallower than 50 m [4]. In both Russian *and U.S. Chukchi Sea, 18 adults and large juveniles (68–110 mm TL) and 5 small juveniles (31–35 mm TL) were taken on the bottom between 34–72 m* [10] *and a juvenile was taken in midwaters between 51 m and the surface* [11].



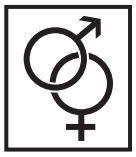
Benthic and reproductive distribution of Kelp Snailfish (*Liparis tunicatus*).

Habitats and Life History
Eggs—Size: Unknown. Time to hatching: Unknown.
Habitat: Likely benthic, like other *Liparis* species [4].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: At least 36 mm TL [12]. Days to juvenile transformation: Unknown. Habitat: Pelagic [12].
Juveniles—Age and size: Unknown. Habitat: Pelagic to benthopelagic [12].
Adults—Age and size at first maturity: Unknown. Maximum age: Unknown. Maximum size: 14.3 cm TL [3]. Habitat: Benthic to benthopelagic [1, 13]. Commonly found attached to algal blades and occasionally among rocks [14–16].
Substrate—Rock, sand, and mud [1, 10].
Physical/chemical—Temperature: -1.9–2.8 °C [10, 14]. Salinity: Marine [10, 14]; 32.41–33.52 salinity in the Chukchi Sea [10].



Behavior
Diel—Both juveniles and adults swim into surface waters at night [13].
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Despite their association with kelp, they have been observed feeding in the water column as much as 1 m above the substrate [15].

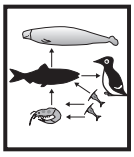
Populations or Stocks
There have been no studies.



Reproduction
Mode—Unknown.
Spawning season—Unknown.
Fecundity—Unknown.

Food and Feeding

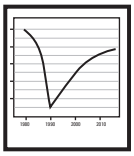
Food items—Almost entirely benthic and epibenthic crustaceans, including gammarid and lysianassid amphipods, cumaceans, cyclopoid copepods, and mysids in Canadian Arctic [17]. **Trophic level**—3.5 standard error 0.50 [18].



Biological Interactions

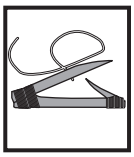
Predators—Seals in the Canadian Arctic [19]. Unknown. Snailfishes outside U.S. Chukchi and Beaufort Seas eaten by such predators as larger fishes and seals (20–23].

Competitors—Likely a range of benthic fish species, including various flatfishes, sculpins, poachers, and eelpouts.



Resilience

Medium, minimum population doubling time: 1.4–4.4 years (Assuming t_{max} = 3–10) [18].

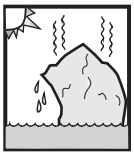


Traditional and Cultural Importance

None reported.

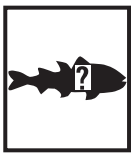
Commercial Fisheries

Currently, Kelp Snailfish are not commercially harvested.



Potential Effects of Climate Change

The Kelp Snailfish are a predominantly Arctic species [4] and climate warming could be expected to shift distributions to the north and extirpate more southern populations.



Areas for Future Research [B]

Little is known about the ecology of this species from the region. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Black Seasnail (*Paraliparis bathybius*)
(Collett, 1879)

Family Liparidae

Note: *Except for geographic range data, all information is from areas outside of the Chukchi and Beaufort Seas.*

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Not important in shelf ecosystems of the U.S. Chukchi and Beaufort Seas. Appears to be a deeper water species, of low abundance, and limited significance to regional food webs and energy flows.

Black Seasnail (*Paraliparis bathybius*), 198 mm TL, Canada Basin, 2005. Photograph by C.W. Mecklenburg, Point Stephens Research.

Physical Description/Attributes: Elongate, soft-bodied snailfish without adhesive pelvic disk, and with smooth loose skin and brownish black body and fins [1]. For specific diagnostic characteristics, see Coad and others, (1995, page 111) [1]. Swim bladder: Absent [2]. Antifreeze glycoproteins in blood serum: Unknown.

Range: *One record from the U.S. Chukchi Sea* [3]. Deep continental slope and basin waters offshore of U.S. Chukchi and Beaufort Seas. Worldwide, in Norwegian and Greenland Seas, Baffin Bay, central Arctic Basin, Canada Basin north of Alaska [3].

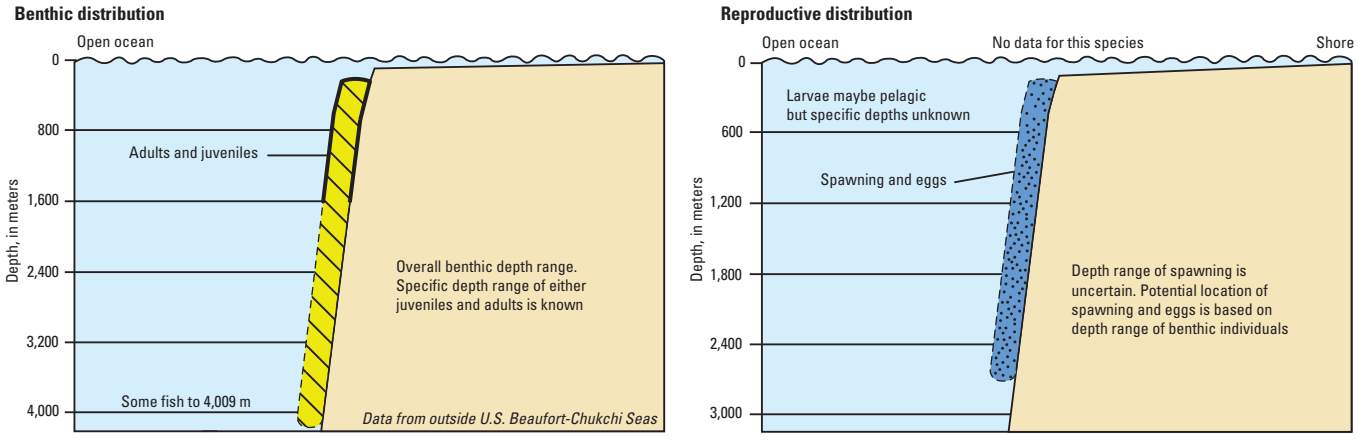
Relative Abundance: *Probably common in deep slope and basin waters adjacent to the U.S. Chukchi and Beaufort Seas.* Elsewhere, common off Greenland and Jan Mayen [3, 6]. Occurrence is rare in shelf habitats in the U.S. Chukchi and Beaufort Seas.

Base modified from USGS and other digital data. U.S.-Russia Maritime Boundary follows the EEZ/200-mile limit line, western edge. Coordinate reference system: projection, Lambert Azimuthal Equal Area; latitude of origin, 75.0°; horizontal datum, North American Datum of 1983.

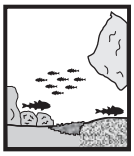
Geographic distribution within 2008–09 lease areas [4] of Black Seasnail (*Paraliparis bathybius*) based on review of published literature and specimens from historical and recent collections [3, 5].

Depth Range: 545 m [3] to about 2,824 m [5], common at 545–1,600 m off northern Greenland [3].

Paraliparis bathybius
Black Seasnail

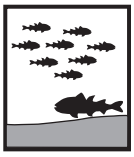


Benthic and reproductive distribution of Black Seasnail (*Paraliparis bathybius*).



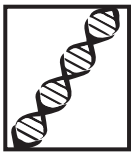
Habitats and Life History

Eggs—Size: 4 mm [6]. Time to hatching: Unknown. Habitat: Likely benthic, like those of other *Paraliparis* species [7].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Pelagic, like those of other *Paraliparis* species [7].
Juveniles—Age and size: Unknown. Habitat: Benthic to benthopelagic [3, 7].
Adults—Age and size at first maturity: Unknown. Maximum age: Unknown. Maximum size: 27 cm [8]. Habitat: Benthic to benthopelagic [3, 7].
Substrate—Unknown.
Physical/chemical—Temperature: -0.1–0.9 °C [5]. Salinity: Marine [7].



Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—May form large schools to spawn [7].
Feeding—Unknown.



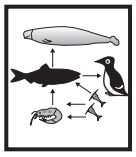
Populations or Stocks

There have been no studies.

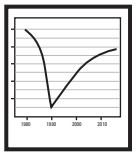
Reproduction

Mode—Oviparous; sexes are separate [9].
Spawning season—June through August off Russia [7].
Fecundity—100–434 eggs [7].

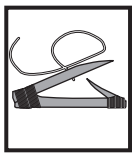
Food and Feeding
Food items—Mostly pelagic hyperiid amphipods and mysids as well as benthic gastropods [7, 10].
Trophic level—3.28 standard error 0.50 [11].



Biological Interactions
Predators—Unknown. Snailfishes outside U.S. Chukchi and Beaufort Seas eaten by such predators as larger fishes and seals [12–15].
Competitors—Likely a range of deep water benthic fish species, including various flatfishes, sculpins, poachers, and eelpouts.

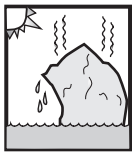


Resilience
High, minimum population doubling time: less than 15 months (Preliminary *K* or Fecundity) [11].

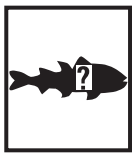


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Black Seasnail are not commercially harvested.



Potential Effects of Climate Change
The Black Seasnail are an endemic Arctic species found in deeper and less studied waters of the region [3]. There is not enough information to make an informed assessment about potential climate effects.



Areas for Future Research [B]
Little is known about the biology and ecology of this species from the region. Research needs include:
(1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Halfbarred Pout (*Gymnelus hemifasciatus*)

Andriashev, 1937

Family Zoarcidae

Halfbarred Pout (*Gymnelus hemifasciatus*), male, 142 mm TL, Chukchi Sea, 2007. Photograph by C.W. Mecklenburg, Point Stephens Research.

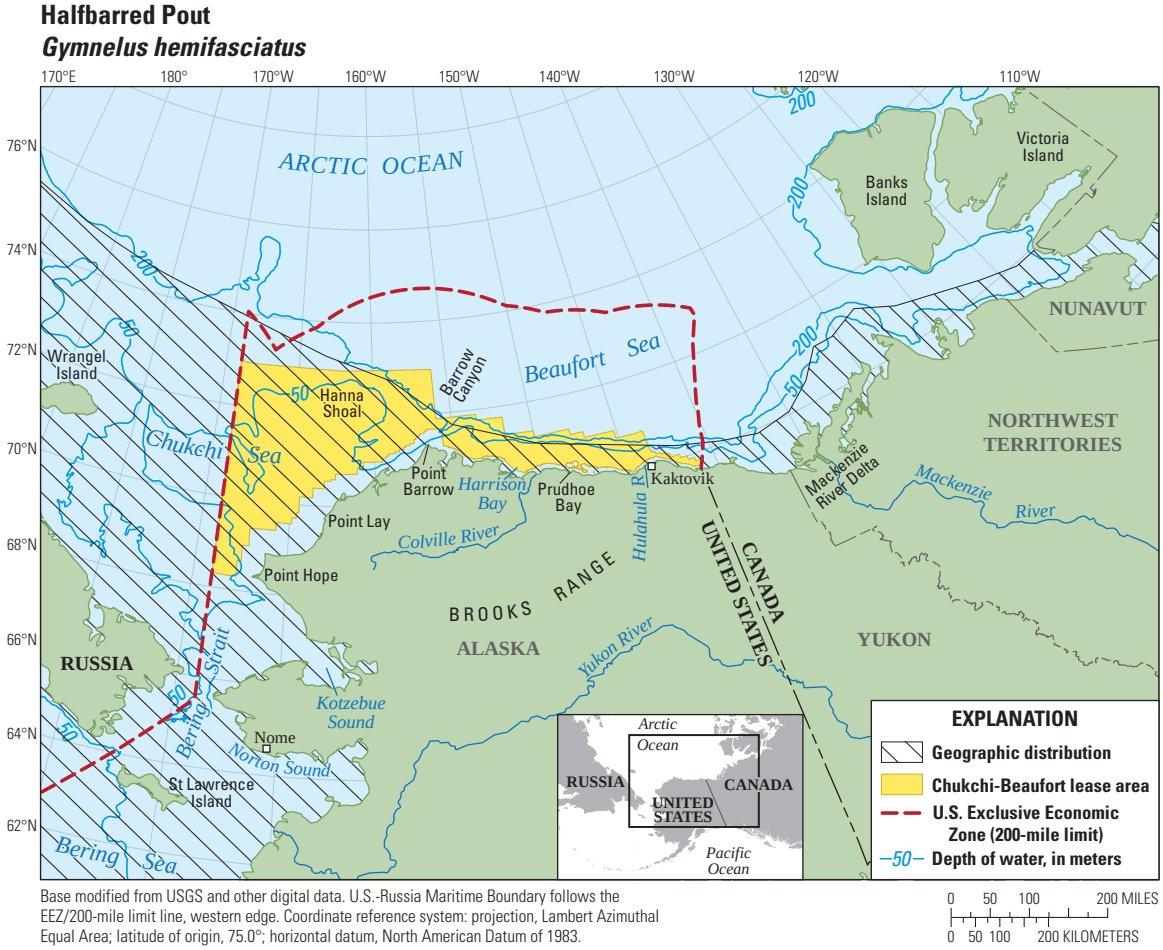
Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: The Halfbarred Pout is likely of relatively small ecological importance in the U.S. Chukchi and Beaufort Seas.

Physical Description/Attributes: An elongate body with dark bands down to lateral line or almost to anal fin on females. Dark orange bands reach anal fin on males, and anal fin changes to black [1]. For specific diagnostic characteristics, see *Fishes of Alaska*, Mecklenburg and others, 2002, p. 689) [1]. Swim bladder: Absent [1]. Antifreeze glycoproteins in blood serum: Unknown.

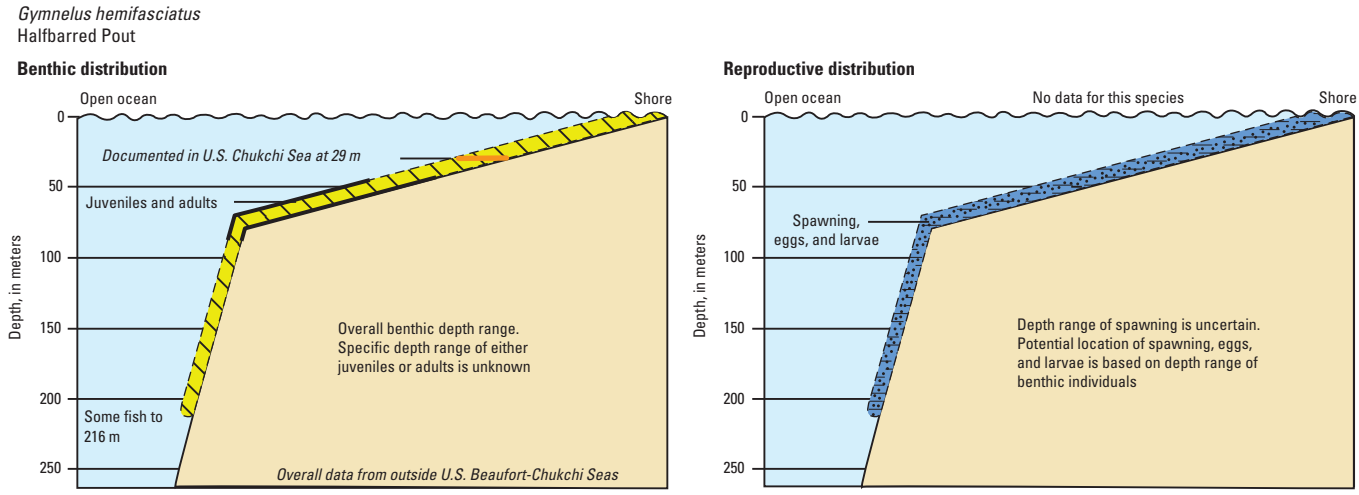
Range: *U.S. Chukchi and Beaufort Seas* [2]. Elsewhere in Alaska, Bering Sea to Prince William Sound, northern Gulf of Alaska [2]. Worldwide, Sea of Okhotsk, Commander Islands, east coast of Kamchatka Peninsula and Barents Sea [1].

Relative Abundance: *Common in U.S. Chukchi and Beaufort Seas* [4].



Geographic distribution of Halfbarred Pout (*Gymnelus hemifasciatus*) within Arctic Outer Continental Shelf Planning Areas [3] based on review of published literature and specimens from historical and recent collections [1, 2, 4].

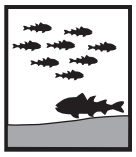
Depth Range: Intertidal to 216 m, typically at 40–80 m on inner and outer shelf [2]. *Taken in U.S. Chukchi Sea off Point Lay at 29 m* [5]. In general, eelpout spawning and larvae are at same depths that adults inhabit [1].



Benthic and reproduction distribution of Halfbarred Pout (*Gymnelus hemifasciatus*).

Habitats and Life History

Eggs—Size: 2.5–4.5 mm [6]. Time to hatching: Unknown. Habitat: Benthic [1]. Larvae: Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic [1].
Juveniles—Age and size: Unknown. Habitat: Benthic [1].
Adults—Age and size at first maturity: Age is unknown. Females mature at 70–80 mm SL [1]. Maximum age: Unknown. Maximum size: As long as 18 cm TL [4]. Habitat: Benthic [1].
Substrate—Mud and gravel [1].
Physical/chemical—Temperature: -1.8–10.5 °C [4]. Salinity: Unknown.

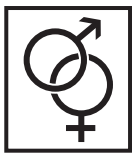


Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.

Populations or Stocks

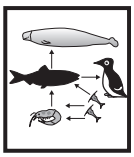
There have been no studies. An analysis of DNA barcode and morphological data confirmed the validity of this species in the Pacific Arctic Region and suggested the possibility of two morphotypes based on ecological preferences [8].



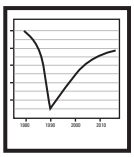
Reproduction

Mode—Separate sexes. Oviparous.
Spawning season—Late August to September.
Fecundity—8–26 eggs [6].

Food and Feeding
Food items—Gammarid amphipods, polychaetes, bivalves, other benthic invertebrates [6].
Trophic level—3.11 standard error 0.30 [7].



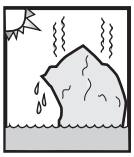
Biological Interactions
Predators—Seals, seabirds, cods and other fishes [6].
Competitors—Likely competitors include a range of small benthic-feeding fishes, including snailfishes, sculpins, flatfishes, and other eelpouts.



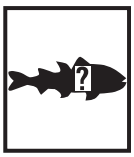
Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Assuming t_{max} = 3–10) [7].

Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, the Halfbarred Pout are not commercially harvested.



Potential Effects of Climate Change
Unknown. Halfbarred Pout occur in Arctic and Boreal Pacific waters. Climate warming would have little or no effect on its distribution but may affect abundance patterns.



Areas for Future Research [B]
This is a little-known species. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Fish Doctor (*Gymnelus viridis*)

(Fabricius, 1780)

Family Zoarcidae

Fish Doctor (*Gymnelus viridis*), male, 174 mm TL, Chukchi Sea, 2007. Photograph by C.W. Mecklenburg, Point Stephens Research.

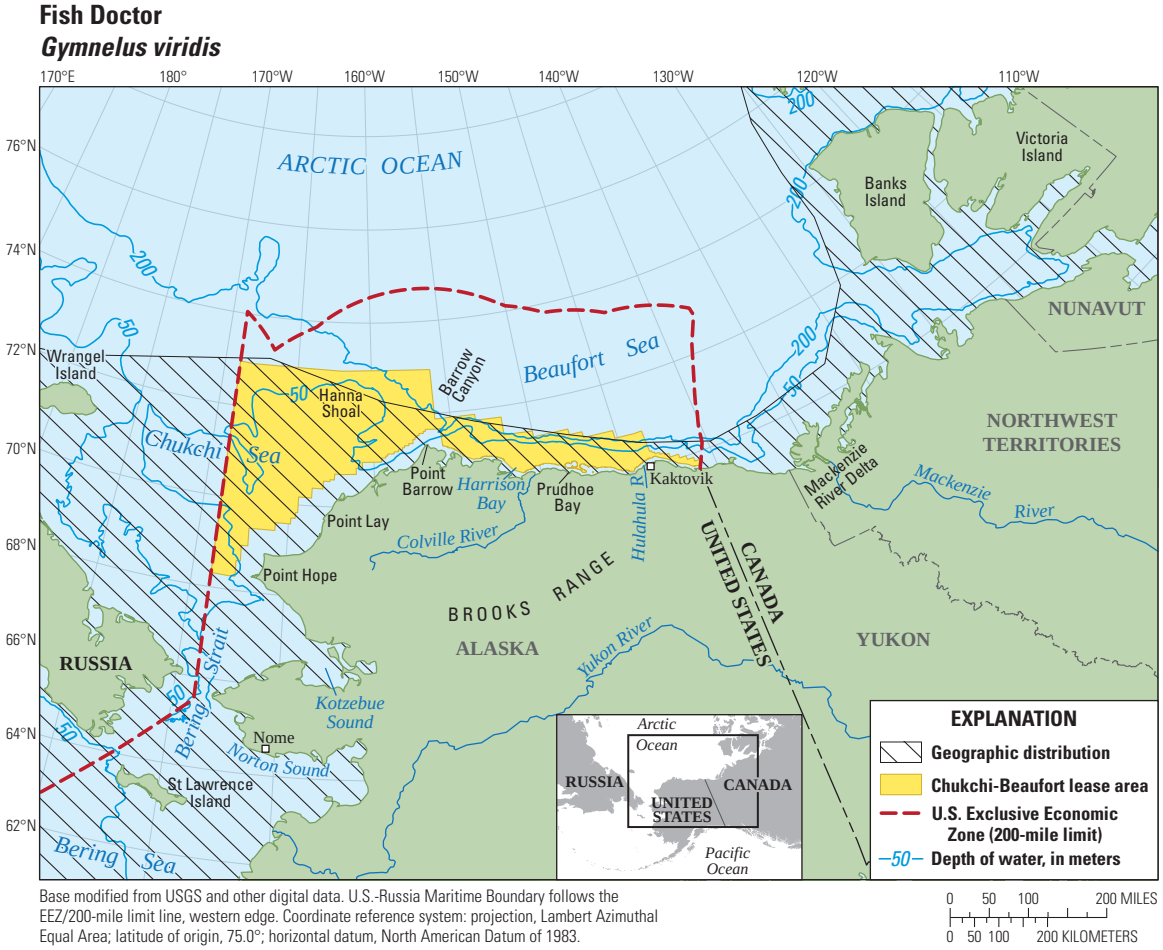
Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Unknown, although likely of minor importance.

Physical Description/Attributes: Coloration grayish to greenish brown, varying from nearly monotone to mottled overall or with broad, mottled or solid orange or reddish brown to bluish black bands [1, 2]. In mature males, anal fin is black [3, 4]. For specific diagnostic characteristics, see *Fishes of Alaska* (Mecklenburg and others, 2002, p. 690) [3]. Swim bladder: Absent [3]. Antifreeze glycoproteins in blood serum: Unknown.

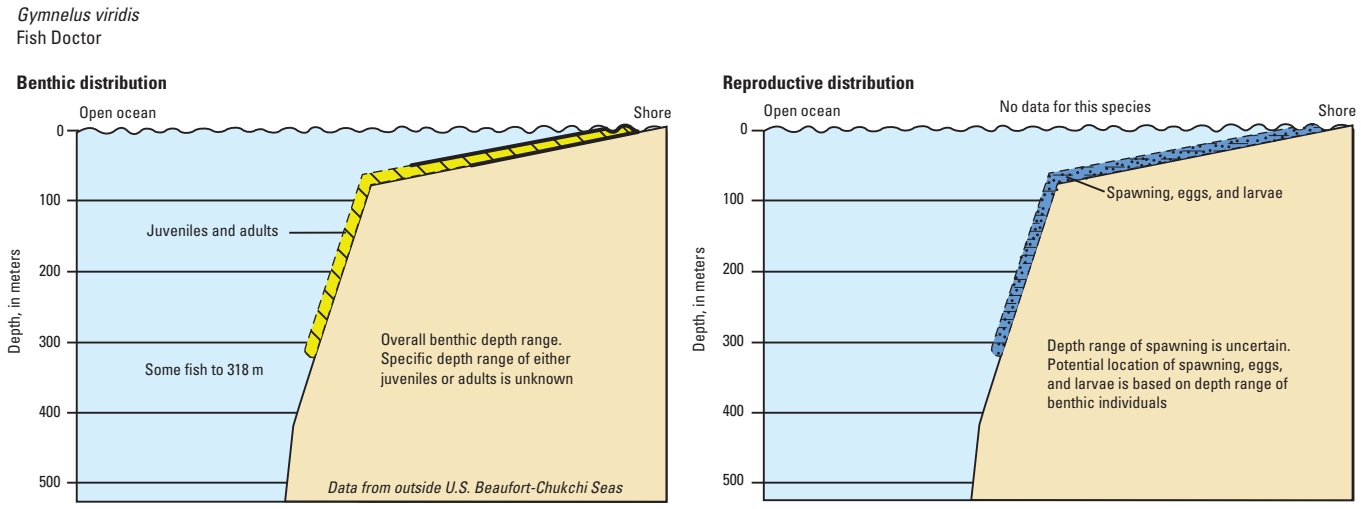
Range: *U.S. Chukchi and Beaufort Seas* [5]. Elsewhere in Alaska, southward to eastern Bering Sea and Aleutian Islands [3]. Worldwide, circumpolar in Arctic Ocean and southward to Nova Scotia, Gulf of Anadyr, and southern Bering Sea [5].

Relative Abundance: *Common with patchy distributions in both U.S. Chukchi and Beaufort Seas* [7, 8].

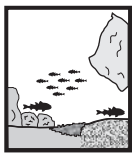


Geographic distribution of Fish Doctor (*Gymnelus viridis*) within Arctic Outer Continental Shelf Planning Areas [6] based on review of published literature and specimens from historical and recent collections [4, 5].

Depth Range: Intertidal to 318 m, typically 50 m or less [1, 3, 9, 10]. In general, eelpouts produce eggs and larvae at same depths adults inhabit [3].

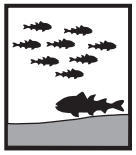


Benthic and reproductive distribution of Fish Doctor (*Gymnelus viridis*).



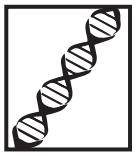
Habitats and Life History

Eggs—Size: 1.6–5.2 mm [1]. Time to hatching: Unknown. Habitat: Benthic and adhesive [1].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: 3.0 cm TL [1]. Days to juvenile transformation: Unknown. Habitat: Benthic [1].
Juveniles—Age and size: Unknown. Habitat: Benthic [1], nearshore, under debris, kelp, rocks, and other cover [2].
Adults—Age and size at first maturity: Age is unknown. *Females mature at about 9–10 cm TL* [1, 7]. Maximum age: In Northwest Territories, at least 12 years [1]. Maximum size: 26.0 cm SL, more than 26.6 cm TL. Males grow larger than females [1]. Habitat: Benthic [1], nearshore, under debris, kelp, rocks, and other cover [2].
Substrate—Boulders, cobble, and soft sea floors [1, 9–12].
Physical/chemical—Temperature: -1.9–10.5 °C [4, 12, 13]. Salinity: Mainly marine but tolerates brackish conditions with salinity as low as 27 ppt [11].



Behavior

Diel—Shelters under some form of cover, such as rocks, algae, or wood, and individuals rarely remain out in the open [1].
Seasonal—Unknown.
Reproductive—Little is known. During late summer or autumn, eggs are laid in nests and may be guarded by one or both parents [1, 14].
Schooling—Unknown.
Feeding—In Canadian Arctic, feeding activity declines in the winter [15].



Populations or Stocks

There have been no studies. An analysis of DNA barcodes and morphological data confirmed the validity of this species in the Pacific Arctic Region [19].

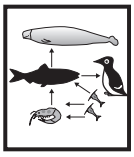
Reproduction

Mode—Separate sexes. Oviparous.
Spawning season—Late summer and early autumn [1, 11, 14].
Fecundity—20–106 eggs. Females may not spawn every year [1, 11, 14].

Food and Feeding

Food items—*Mainly gammarid amphipods, as well as caprellid amphipods, mysids, polychaetes, and copepods* [7]. In Canadian Arctic, a similar diet as well as clam siphons. Males tended to focus on amphipods and females on polychaetes.

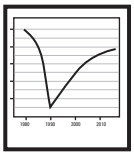
Trophic level—3.06 standard error 0.26 [16].



Biological Interactions

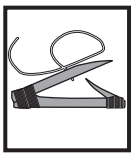
Predators—In central and eastern Canadian Arctic, cods, Thick-billed Murres, and bearded seals [17, 18].

Competitors—A range of bottom-feeding microcarnivores including sculpins, flatfishes, snailfishes, and other eelpouts.



Resilience

Low, minimum population doubling time: 4.5–14 years (t_{max} = 12) [16].

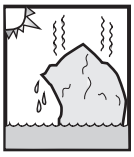


Traditional and Cultural Importance

None reported.

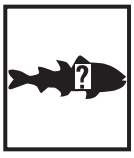
Commercial Fisheries

Currently, Fish Doctor are not commercially harvested.



Potential Effects of Climate Change

As the Fish Doctor are predominantly an Arctic species it would be expected that climate warming would shift the distribution of the species northward.



Areas for Future Research [B]

Little is known about this species in U.S. Arctic marine environment. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Adolf's Eelpout (*Lycodes adolfi*)

Nielsen & Fosså, 1993

Family Zoarcidae

Adolf's Eelpout, (*Lycodes adolfi*), 193 mm, Chukchi Borderland, 2009. Photograph by C.W. Mecklenburg, Point Stephens Research.

Note: *Except for physical description and geographic range data, all information is from areas outside of the study area.*

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: This species has been reported from slope waters of the U.S. Beaufort Sea. It is rare with an unknown but suspected minimal role in regional food webs.

Physical Description/Attributes: Brown, grading from nearly black on the head to gray-brown toward the tail, without distinctive markings [1]. For specific diagnostic characteristics, see Nielsen and Fosså (1993) [2]. Swim bladder: Absent [3]. Antifreeze glycoproteins in blood serum: Unknown.

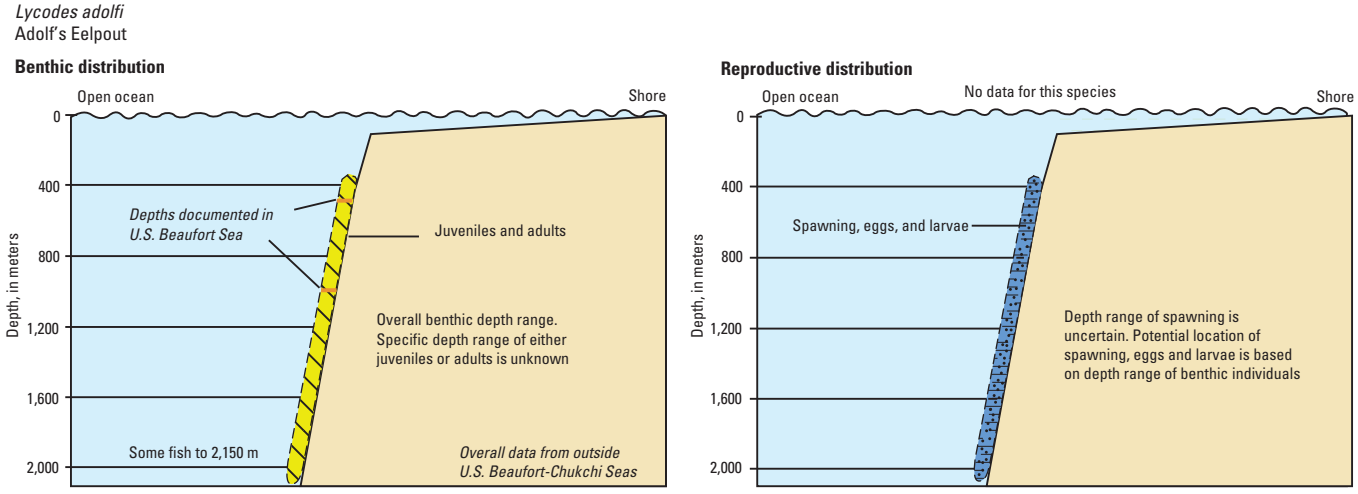
Range: *U.S. Beaufort Sea* [1]. Arctic Ocean north of the Chukchi Sea (north of the 200-mile limit); Baffin Bay off Canada and Greenland, Greenland and Norwegian Seas, and Arctic Ocean north of Spitsbergen [4].

Relative Abundance: *Common in U.S. Beaufort Sea in deep water on the continental slope, based on a few records of number of specimens per haul (as many as 36 or more)* [1]. Not found in Chukchi Sea; found far north of the Chukchi Sea, north of the 200-mile limit. Elsewhere, common in Baffin Bay [6], eastern and western sides of Greenland, eastern slope of the Yermak Plateau north of Spitsbergen, Norway [7], and Norwegian Sea [6].

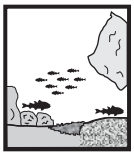
Base modified from USGS and other digital data. U.S.-Russia Maritime Boundary follows the EEZ/200-mile limit line, western edge. Coordinate reference system: projection, Lambert Azimuthal Equal Area; latitude of origin, 75.0°; horizontal datum, North American Datum of 1983.

Geographic distribution of Adolf's Eelpout (*Lycodes adolfi*) within Arctic Outer Continental Shelf Planning Areas [5] based on review of published literature and specimens from historical and recent collections [1, 4].

Depth Range: Benthic, 386–2,150 m [6, 8]. *Taken on U.S. Beaufort Sea slope at 500 m and 1,000 m* [1]. In general, eelpout spawning and larvae occur at the same depths that adults inhabit [9].

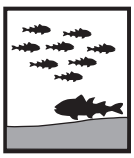


Benthic and reproductive distribution of Adolf's Eelpout (*Lycodes adolfi*).



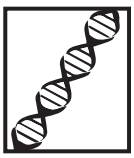
Habitats and Life History

Eggs—Size: Unknown. Time to hatching: Unknown. Habitat: Benthic [3]. Larvae: Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic [3].
Juveniles—Age and size: Unknown. Immature fish from Arctic Ocean north of Chukchi Sea were 130–193 mm TL [1]. Habitat: Benthic [3].
Adults—Age and size at first maturity: Unknown. Mature fish off Greenland were 205–238 mm TL [1]. Maximum age: Unknown. Maximum size: 28.6 cm TL [12]. Habitat: Benthic, in deep waters [4].
Substrate—*Mixture of mud, gravel, and rock* [1].
Physical/chemical—Temperature: -0.9–3.7 °C off Greenland [1]. Taken at 0.8–0.9 °C in Arctic Ocean far north Chukchi Sea [1]. Salinity: Marine, taken at 34.86 ppt in the Arctic Ocean far north of Chukchi Sea [1].



Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.



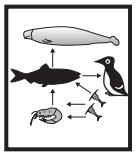
Populations or Stocks

There have been no studies.

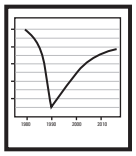
Reproduction

Mode—Oviparous [3].
Spawning season—Unknown.
Fecundity—Unknown.

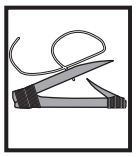
Food and Feeding
Food items—Crustaceans [10].
Trophic level—3.5 standard error **±0.50** [11].



Biological Interactions
Predators—Unknown.
Competitors—Likely other benthic microcarnivores including sculpins, flatfishes, snailfishes, and other eelpouts.

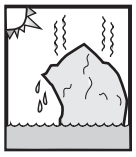


Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Preliminary *K* or Fecundity) [11].

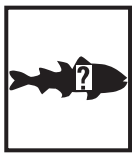


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Adolf's Eelpout are not commercially harvested.



Potential Effects of Climate Change
Because Adolf's Eelpout are a strictly deep-water, slope-dwelling Arctic species and little is known about climate change at slope depths in the Arctic, potential effects on this species has not been estimated.



Areas for Future Research [B]
Little is known about this species' ecology and life history. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Doubleline Eelpout (*Lycodes eudipleurostictus*)

Jensen, 1902

Family Zoarcidae

Note: *Except for geographic range data, all information is from areas outside of the study area.*

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Unknown, but based on occurrence, most likely of minimal importance in regional food webs.

Doubleline Eelpout, (*Lycodes eudipleurostictus*), about 255 mm TL, Svalbard Archipelago, 2011. Photograph by Arve Lynghammar, University of Tromsø, Norway.

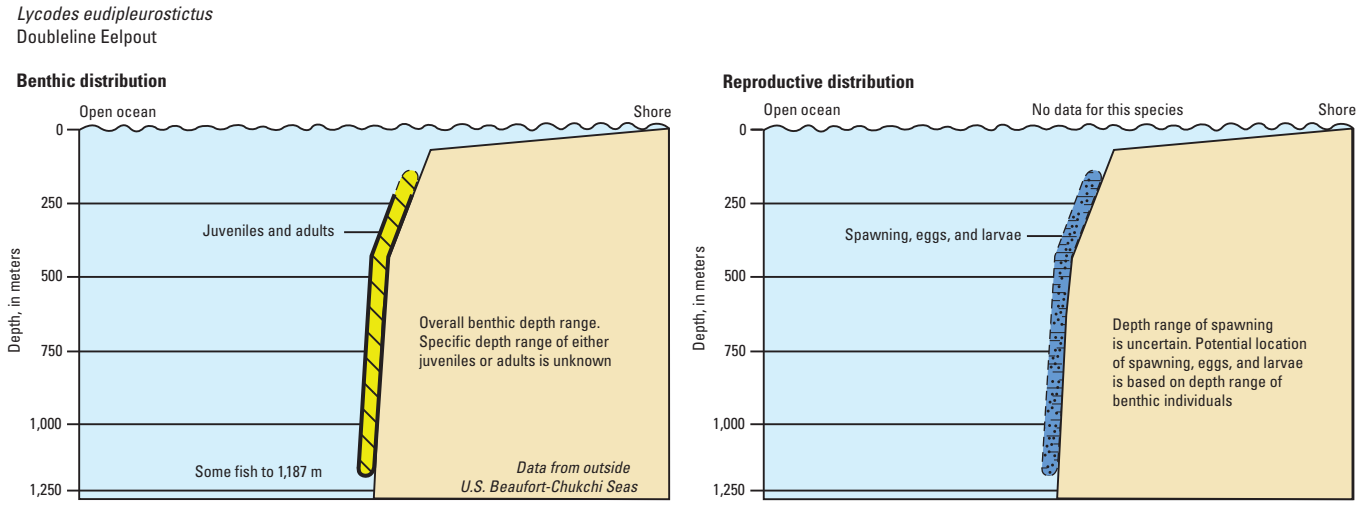
Physical Description/Attributes: Dark brown elongate body with narrow light bands passing onto dorsal fin and posteriorly onto anal fin. For specific diagnostic characteristics, see *Fishes of Alaska* (Mecklenburg and others, p. 723) [1]. Swim bladder: Absent [1]. Antifreeze glycoproteins in blood serum: Unknown.

Range: *U.S. Beaufort Sea; three records from deep water* [4]. Elsewhere, from eastern Canadian Arctic, including Baffin Bay, to western and eastern Greenland, Iceland, and to Kara Sea, northward to Svalbard Archipelago, and north of Severnaya Zemlya, Russia [1, 2].

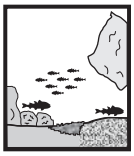
Relative Abundance: *At least occasional in U.S. Beaufort Sea* [4].Common off West Greenland [5].

Location within Arctic Outer Continental Shelf Planning Areas [3] of the one existing record of Doubleline Eelpout (*Lycodes eudipleurostictus*) [1, 2, 4].

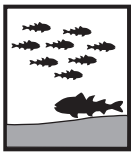
Depth Range: 54–1,280 m [2, 4], rarely less than 250 m [1]. In general, eelpout spawning and larvae occur at same depths that adults inhabit [1].



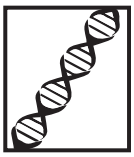
Benthic and reproductive distribution of Doubleline Eelpout (*Lycodes eudipleurostictus*).



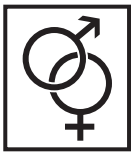
Habitats and Life History
Eggs—Size: 2.7–8 mm [5]. Time to hatching: Unknown. Habitat: Benthic [1].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic [1].
Juveniles—Age and size: Unknown. Habitat: Benthic [1].
Adults—Age and size at first maturity: Age unknown. More than 23 cm TL for females and 29 cm TL for males. Males grow larger than females. [5]. Maximum age: 9 years [6]. Maximum size: To 45 cm TL [1, 5]. Habitat: Benthic [1].
Substrate—Muddy bottoms [1, 6].
Physical/chemical—Temperature: -0.6–4.9 °C [5, 7], typically less than 2.5 °C [8]. Salinity: Marine [1, 9].



Behavior
Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.

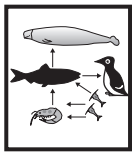


Populations or Stocks
There have been no studies.

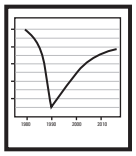


Reproduction
Mode—Separate sexes. Oviparous.
Spawning season—Unknown. In Russia, almost ripe eggs were taken in August [8].
Fecundity—120–300 orange eggs [5, 8].

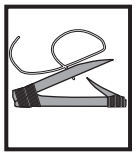
Food and Feeding
Food items—Unknown. In general, smaller eelpouts eat mainly infaunal prey; larger individuals feed more on epibenthic prey [10].
Trophic level—3.54 standard error 0.47 [10].



Biological Interactions
Predators—Unknown.
Competitors—Perhaps other eelpouts, as well as such other benthic feeding fishes as sculpins and flatfishes.

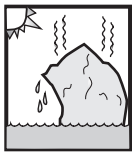


Resilience
Low, minimum population doubling time: 4.5–14 years (Preliminary *K* or Fecundity) [10].

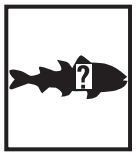


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Doubleline Eelpout are not commercially harvested.



Potential Effects of Climate Change
Unknown.



Areas for Future Research [B]
Little is known about the life history and ecology of this species. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Glacial Eelpout (*Lycodes frigidus*)

Collett, 1879

Family Zoarcidae

Note: *Except for geographic range data, all information is from areas outside of the study area.*

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

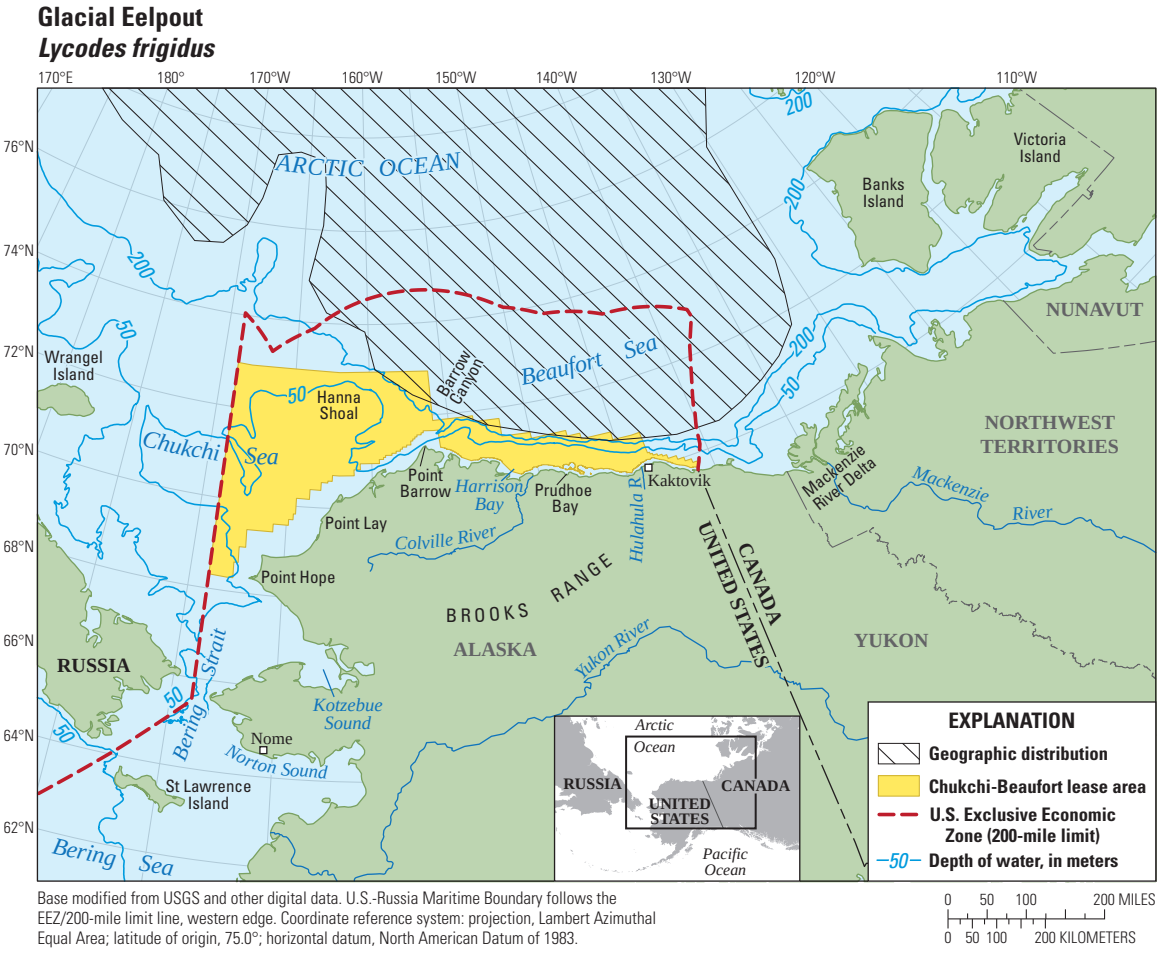
Ecological Role: Unknown, although likely of minor importance in the study area. This is possibly the most abundant eelpout in the Arctic Basin and thus is ecologically significant there.

Glacial Eelpout, (*Lycodes frigidus*), *juvenile*, 76 mm, Canada Basin, 2005. Photograph by C.W. Mecklenburg, Point Stephens Research.

Physical Description/Attributes: An elongate, tapering body with a large head (22–28 percent of body) and all ages uniformly colored dark brownish gray, brown, or gray-violet. For specific diagnostic characteristics, see *Fishes of Alaska* (Mecklenburg and others, 2002, p. 726) [1]. Swim bladder: Absent [1]. Antifreeze glycoproteins in blood serum: Unknown.

Range: *U.S. Chukchi and Beaufort Seas* [4]. Circumpolar on Arctic Ocean continental rises and basins, including Makarov Basin north of eastern Siberia, *Canada Basin north of Alaska*, Eurasian Arctic Basin, and Norwegian and Greenland Seas [2].

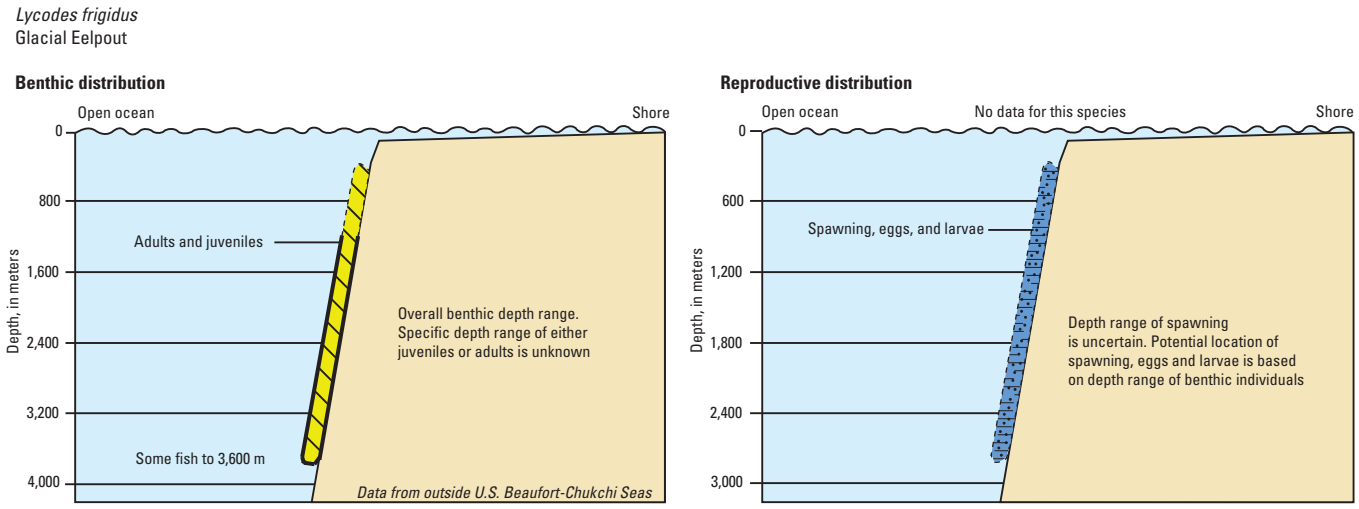
Relative Abundance: *Unknown, but may be common in very deep waters of U.S. Chukchi and Beaufort Seas* [2]. Common in deep part (>1,500 m) of Norwegian Sea [2].



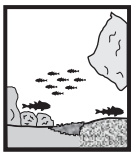
Base modified from USGS and other digital data. U.S.-Russia Maritime Boundary follows the EEZ/200-mile limit line, western edge. Coordinate reference system: projection, Lambert Azimuthal Equal Area; latitude of origin, 75.0°; horizontal datum, North American Datum of 1983.

Geographic distribution of Glacial Eelpout (*Lycodes frigidus*) within Arctic Outer Continental Shelf Planning Areas [3] based on review of published literature and specimens from historical and recent collections [1, 2, 4].

Depth Range: 475–3,600 m [2, 5], rarely at less than 1,000 m [2, 6]. *Taken in U.S. Chukchi Sea north-northwest of Point Barrow at 2,500 m* [2]. In general, eelpout spawning and larvae occur at the same depths that adults inhabit [6].

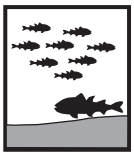


Benthic and reproductive distribution of Glacial Eelpout (*Lycodes frigidus*).



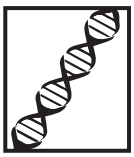
Habitats and Life History

Eggs—Size: 7 mm [6]. Time to hatching: Unknown. Habitat: Benthic [2, 6].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic [2, 6].
Juveniles—Age and size: Unknown. Habitat: Benthic [2, 6].
Adults—Age and size at first maturity: Unknown. One ripe female was 50 cm long TL [6]. Maximum age: 33 years [7]. Maximum size: 69.0 cm TL [1]. Habitat: Benthic [2, 6].
Substrate—Mud bottoms [1].
Physical/chemical—Temperature: Off Russia, found almost always at -0.6–1.6 °C [6]. Spawns from -2 to -0.6 °C [8, 9]. Salinity: Marine.



Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Moves along bottom, stirring up small prey [10].



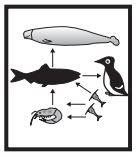
Populations or Stocks

There have been no studies.

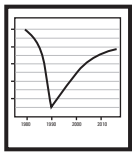
Reproduction

Mode—Separate sexes. Oviparous [11].
Spawning season—Perhaps autumn or winter [7].
Fecundity—One female taken near the Faroe Islands contained 500 ripe eggs [6].

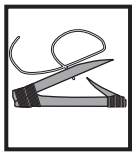
Food and Feeding
Food items—Eats various crustaceans including amphipods and shrimps, as well as fishes, brittle stars, cephalopods, sipunculids [6].
Trophic level—3.84 standard error 0.51 [12].



Biological Interactions
Predators—Unknown.
Competitors—Unknown, but likely other deeper water eelpouts, as well as flatfishes.

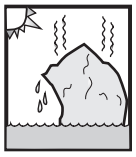


Resilience
Low, minimum population doubling time: 4.5–14 years (Preliminary *K* or Fecundity) [12].

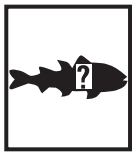


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Glacial Eelpout are not commercially harvested.



Potential Effects of Climate Change
As Glacial Eelpout are predominantly Arctic species, climate effects might result in a northward shift in its distribution.



Areas for Future Research [B]
There is very little known about this species biology or ecology species from the region. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Mecklenburg, C.W., Møller, P.R., and Steinke, D., 2011, Biodiversity of Arctic marine fishes—Taxonomy and zoogeography: Marine Biodiversity, v. 41, no. 1, p. 109–140, Online Resource 1. [2]

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Shulupaoluk (*Lycodes jugoricus*)

Knipowitsch, 1906

Family Zoarcidae

Note: *Except for geographic range data, all information is from areas outside of the study area.*

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Rarely observed in U.S. Beaufort Sea. Of potential ecological importance in brackish shallow waters of and near river mouths.

Shulupaoluk, (*Lycodes jugoricus*),156 mm, Beaufort Sea. Photograph by C.W. Mecklenburg, Point Stephens Research.

Physical Description/Attributes: Slender, elongate body, white ventrally and yellowish laterally, with wedge-shaped dark bands widening dorsally and extending onto dorsal fins. For specific diagnostic characteristics, see *Fishes of Alaska* (Mecklenburg and others, p. 706) [1]. Swim bladder: Absent [1]. Antifreeze glycoproteins in blood serum: Unknown.

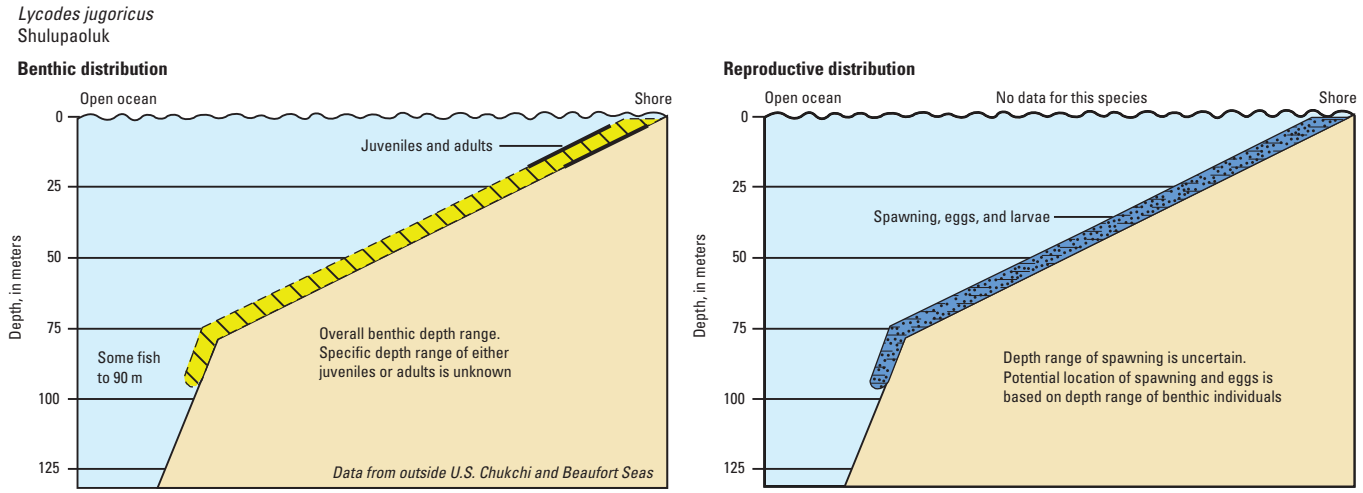
Range: *U.S. Beaufort Sea* [2]. Worldwide, in White, Kara, Laptev, and East Siberian Seas; and Canadian Beaufort Sea to Boothia Peninsula, Canada [1, 3].

Relative Abundance: *Possibly common in freshened nearshore waters of the U.S. Beaufort Sea but generally overlooked because of confusion with similar looking species* [2].Common in Canadian Beaufort Sea at Tuktoyaktuk Harbor [5].

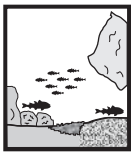
Base modified from USGS and other digital data. U.S.-Russia Maritime Boundary follows the EEZ/200-mile limit line, western edge. Coordinate reference system: projection, Lambert Azimuthal Equal Area; latitude of origin, 75.0°; horizontal datum, North American Datum of 1983.

Geographic distribution of Shulupaoluk (*Lycodes jugoricus*) within Arctic Outer Continental Shelf Planning Areas [4] based on review of published literature and specimens from historical and recent collections [1–3].

Depth Range: 3–90 m [3], typically 7–15 m [1, 5]. In general, eelpout spawning and larvae are at same depths where adults reside [1].

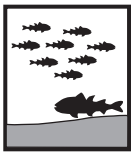


Benthic and reproductive distribution of Shulupaoluk (*Lycodes jugoricus*).



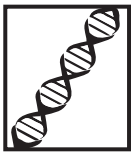
Habitats and Life History

Eggs—Size: Unknown. Time to hatching: Unknown. Habitat: Benthic, nearshore [1].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic, nearshore [1].
Juveniles: Age and size: Unknown. Habitat: Benthic, nearshore [1].
Adults—Age and size at first maturity: Unknown. Maximum age: Unknown. Maximum size: To 40.0 cm TL [1], reported without documentation to 52.1 cm TL [6]. Habitat: Benthic, nearshore [1, 3].
Substrate—Soft bottoms [7].
Physical/chemical—Temperature: Below 0 to 4.5 °C [8]. Salinity: Brackish waters of about 15–27 ppt [7, 8].



Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.



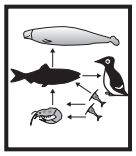
Populations or Stocks

There have been no studies.

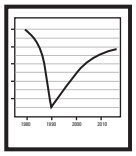
Reproduction

Mode—Separate sexes. Oviparous [9].
Spawning season—Unknown.
Fecundity—Unknown.

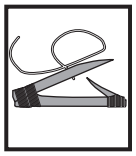
Food and Feeding
Food items—Isopods, mysids, polychaetes, bivalves, and fishes [6, 7, 10].
Trophic level—3.16 standard error 0.38 [7].



Biological Interactions
Predators—Unknown.
Competitors—Unknown, but likely other shallow-water eelpouts, sculpins, and flatfishes.

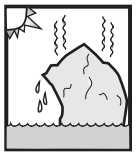


Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Preliminary *K* or Fecundity) [7].

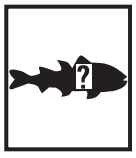


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Shlupaoluk are not commercially harvested.



Potential Effects of Climate Change
Shulupaoluk are an Arctic nearshore species inhabiting low-salinity, cold water habitats. If they are unable to adapt to warmer, brackish conditions, their population could be extremely vulnerable to effects associated with high discharges of warm freshwater to the coast.



Areas for Future Research [B]
Little is known about the biology and ecology from the region. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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White Sea Eelpout (*Lycodes marisalbi*)

Knipowitsch, 1906

Family Zoarcidae

Note: *Except for geographic range data, all information is from areas outside of the study area.*

Note on taxonomy: *Once classified as a subspecies of Lycodes pallidus but recently resurrected as a valid species* [1].

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

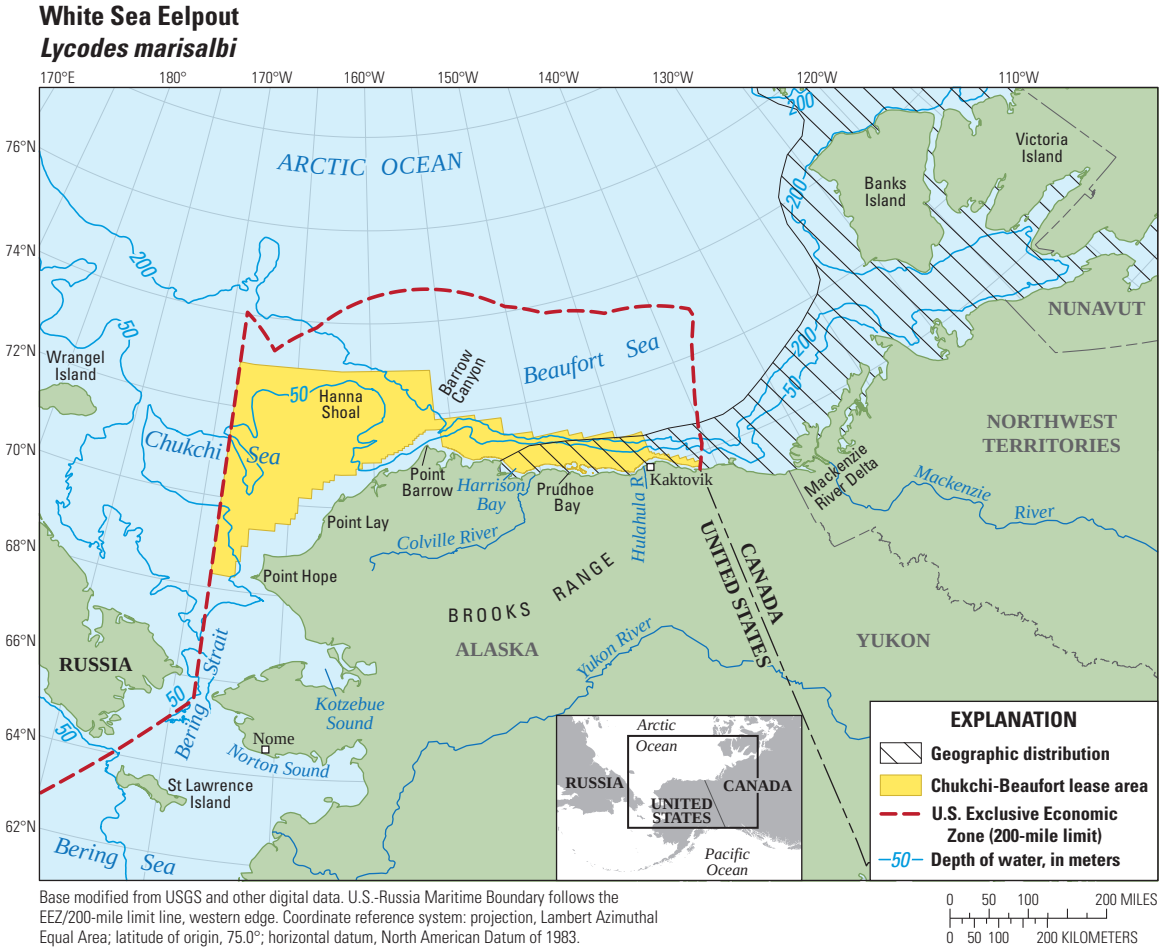
White Sea Eelpout, (*Lycodes marisalbi*), 135 mm, Beaufort Sea, 2011. Photograph by C.W. Mecklenburg, Point Stephens Research.

Ecological Role: This species appears to be rare in the U.S. Arctic and thus is likely to be of limited ecological importance.

Physical Description/Attributes: An elongate, tapering body either brownish with 6–11 white bars along each side and dorsal fin or uniformly brown. Peritoneum speckled. For specific diagnostic characteristics, see Møller (2000) [1] and *Fishes of Alaska*, (Mecklenburg and others, 2002, page 721, as *L. pallidus*) [2]. Swim bladder: Absent [2]. Antifreeze glycoproteins in blood serum: Unknown.

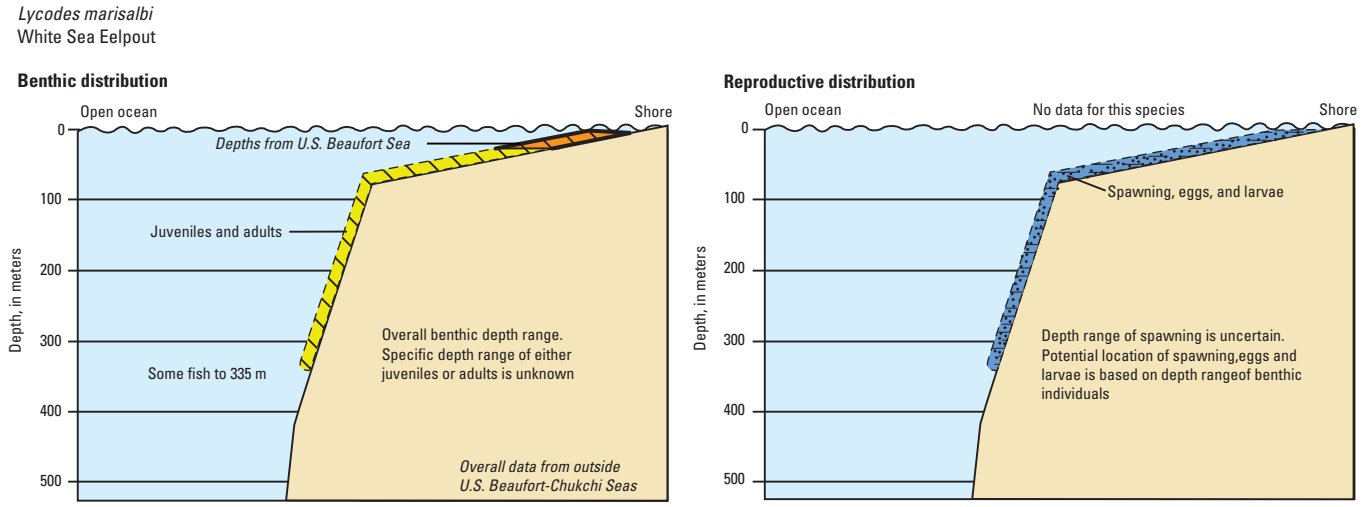
Range: *Central and eastern U.S. Beaufort Sea* [2, 3]. Elsewhere, in Canadian Arctic at Mould Bay, Prince Patrick Island, to Mackenzie Bay and eastward to Dease Strait, Bathurst Inlet; disjunct population in White Sea [1].

Relative Abundance: *Occasional, although previously misidentified as* L. pallidus, *in U.S. Beaufort Sea* [3]. Common in southeastern part of Canadian Beaufort Sea [1].

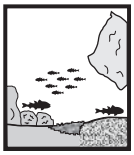


Geographic distribution of White Sea Eelpout (*Lycodes marisalbi*) within Arctic Outer Continental Shelf Planning Areas [4] based on review of published literature and specimens from historical and recent collections [2, 3, 5].

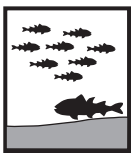
Depth Range: 6–335 m [1, 3]. *Mostly less than 50 m in U.S. Beaufort Sea* [3]. In general, eelpout spawning and larvae occur at same depths that adults inhabit [2].



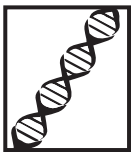
Benthic and reproductive distribution of White Sea Eelpout (*Lycodes marisalbi*).



Habitats and Life History
Eggs—Size: 2–2.5 mm [1]. Time to hatching: Unknown. Habitat: Benthic [1, 3].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic [1, 3].
Juveniles—Age and size: Unknown. Habitat: Benthic [1, 3].
Adults—Age and size at first maturity: Age unknown. At least 11.9 cm SL in females [1]. Maximum age: Unknown. Maximum size: 21.3 cm SL [1]. Habitat: Benthic [1, 3], in shallow waters influenced by major Arctic rivers [1].
Substrate—Mud or clay and stone bottoms [2].
Physical/chemical—Temperature: -1.4–3 °C [1, 5]. Salinity: Marine to slightly brackish; 27–32 ppt [1].



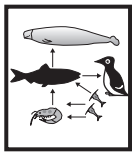
Behavior
Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.



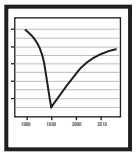
Populations or Stocks
There have been no studies.

Reproduction
Mode—Separate sexes. Oviparous.
Spawning season—Unknown.
Fecundity—32–38 orange eggs [1].

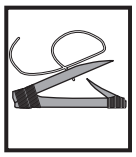
Food and Feeding
Food items—Unknown.
Trophic level—3.45 standard error 0.45 [6].



Biological Interactions
Predators—Unknown.
Competitors—Unknown.

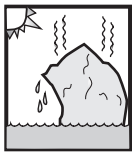


Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Preliminary *K* or Fecundity) [6].

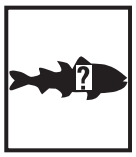


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, White Sea Eelpout are not commercially harvested.



Potential Effects of Climate Change
Unknown.



Areas for Future Research [B]
Virtually nothing is known about this species from the region. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Saddled Eelpout (*Lycodes mucosus*)

Richardson, 1855

Family Zoarcidae

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

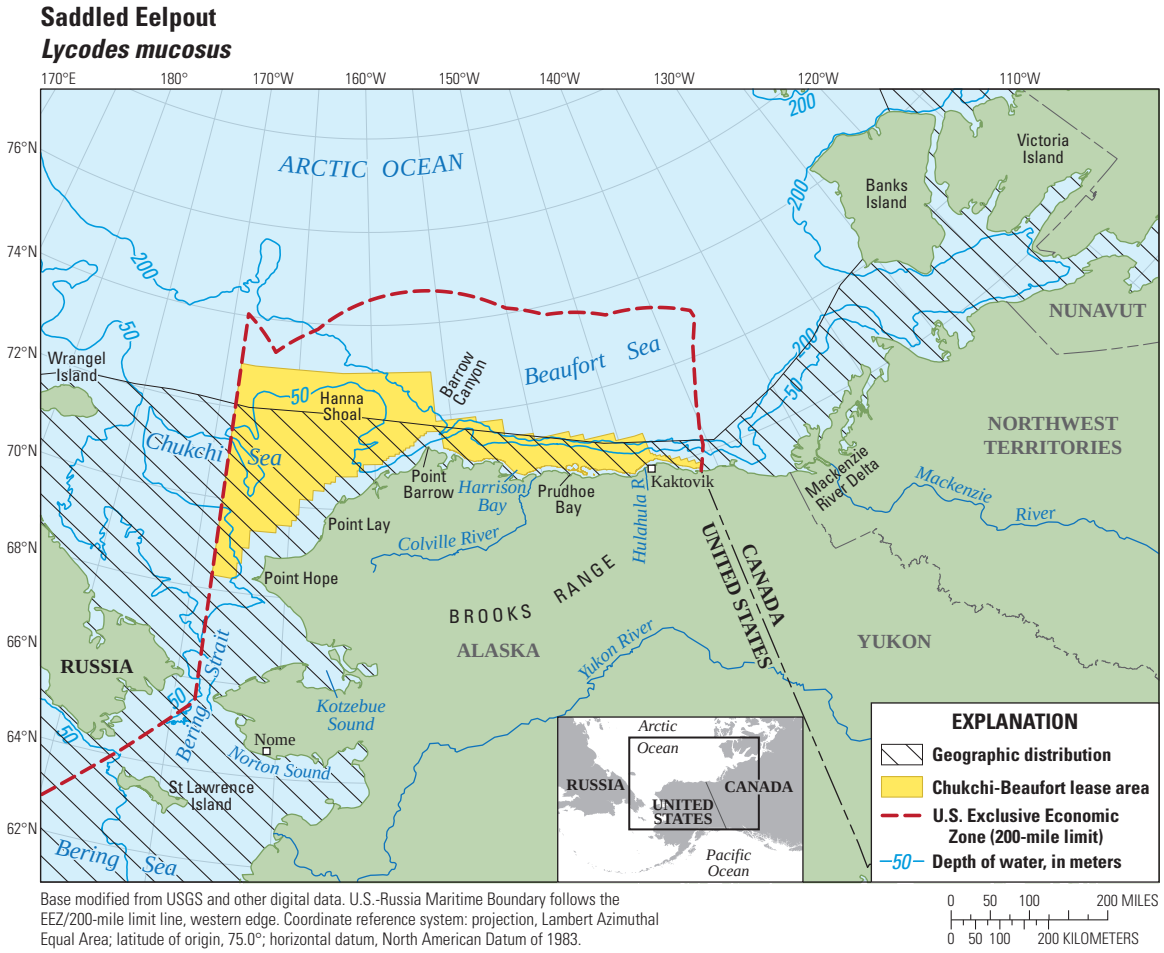
Ecological Role: Due to a lack of data on this species, it is difficult to make an assessment of its ecological role. However, it is commonly encountered in the U.S. Chukchi Sea and therefore may be of moderate significance in marine ecosystem functioning there.

Saddled Eelpout (*Lycodes mucosus*), 229 mm TL, northeastern Bering Sea, 2007. Photograph by C.W. Mecklenburg, Point Stephens Research.

Physical Description/Attributes: Elongate, cream-colored body with dark brown U- and Y-shaped marks and white underside. For specific diagnostic characteristics, see *Fishes of Alaska* (Mecklenburg and others, 2002, p. 708) [1]. Swim bladder: Absent [1]. Antifreeze glycoproteins in blood serum: Unknown.

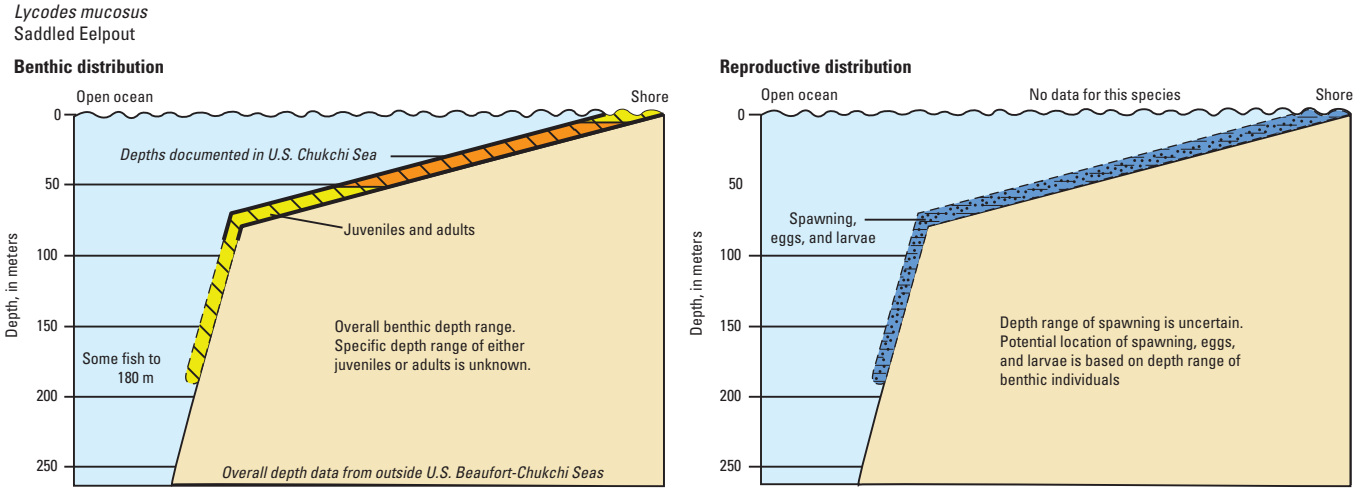
Range: *U.S. Chukchi and Beaufort Seas* [2, 3]. Elsewhere in Alaska, south in Bering Sea to near St. Matthew I. (60°N) [3]. Worldwide, Canadian High Arctic eastward to Hudson Strait and northwest Greenland; Russian Arctic southward to Gulf of Anadyr [3].

Relative Abundance: *Common in U.S. Chukchi Sea and U.S. Beaufort Sea* [3].



Geographic distribution of Saddled Eelpout (*Lycodes mucosus*) within Arctic Outer Continental Shelf Planning Areas [4] based on review of published literature and specimens from historical and recent collections [1, 3, 5].

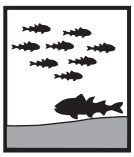
Depth Range: 0–180 m, typically less than 80 m [3]. *Documented in U.S. Chukchi Sea 20–59 m* [2, 6, 7]. In general, eelpout spawning and larvae occur at the same depths that adults inhabit [1].



Benthic and reproductive distribution of Saddled Eelpout (*Lycodes mucosus*).

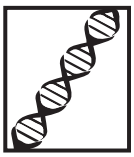
Habitats and Life History

Eggs—Size: 3 mm for almost ripe eggs [2, 8]. Time to hatching: Unknown. Habitat: Benthic [1]. **Larvae**—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic [1].
Juveniles—Age and size: Unknown. Habitat: Benthic [1].
Adults—Age and size at first maturity: Age unknown. 24–35 cm TL for females [8]. Maximum age: Unknown. Maximum size: About 49 cm TL [1, 8]. Habitat: Benthic [1], sometimes at entrance to burrows or under debris [9]. Have been found in intertidal rock pools in Greenland [3].
Substrate—Mostly on mud, also found on shell hash, mixed gravel, sand and mud, and gravel and rock [2].
Physical/chemical—Temperature: -1.9–10.5 °C [2, 9]. Salinity: Marine.



Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.



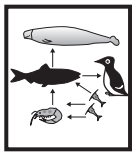
Populations or Stocks

There have been no studies.

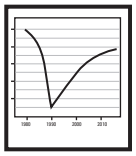
Reproduction

Mode—Separate sexes. Oviparous.
Spawning season—In Russia, likely in the autumn [8].
Fecundity—Unknown.

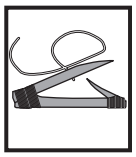
Food and Feeding
Food items—Mysids, copepods, ostracods, polychaetes [10].
Trophic level—3.92 standard error 0.64 [11].



Biological Interactions
Predators—Unknown.
Competitors—Likely such benthic microcarnivores as flatfishes, sculpins, snailfishes, and other eelpouts.

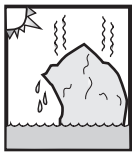


Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Preliminary *K* or Fecundity) [11].

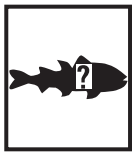


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Currently, Saddled Eelpout are not commercially harvested.



Potential Effects of Climate Change
The Saddled Eelpout is an Arctic species. Shifts in range and abundance are possible effects.



Areas for Future Research [B]
Little is known about the biology and ecology of this species from the region. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Wattled Eelpout (*Lycodes palearis*)

Gilbert, 1896

Family Zoarcidae

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Poorly understood, although based on studies outside the Arctic Ocean, may be of moderate importance as food for larger fishes.

Wattled Eelpout (*Lycodes palearis*), 152 mm TL, Chukchi Sea, 2007. Photograph by C.W. Mecklenburg, Point Stephens Research.

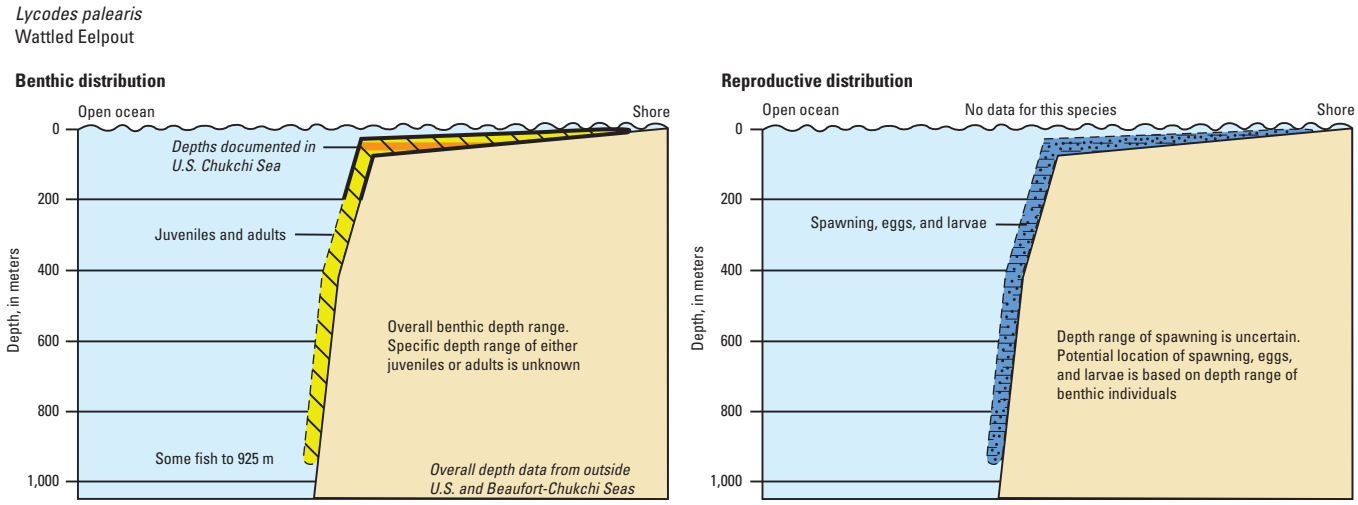
Physical Description/Attributes: Elongate brown or reddish brown body and fins with narrow, creamy white bands on upper body and dorsal fin; bands fade with growth. For specific diagnostic characteristics, see *Fishes of Alaska* (Meckenburg and others, p. 719) [1]. Swim bladder: Absent [1]. Antifreeze glycoproteins in blood serum: Unknown.

Range: *U.S. Chukchi Sea as far north as 71°17'N, 156°48'W near Barrow and western U.S. Beaufort Sea near Point Barrow at 71°22'N, 156°19'W* [2]. Elsewhere, in Bering Sea, along the Aleutian Islands and Gulf of Alaska south to Oregon, and to southeastern Kamchatka Peninsula, Russia [2, 3].

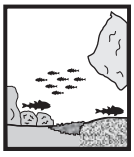
Relative Abundance: *Common as far north as northeastern U.S. Chukchi Sea* [6]. Common at least in eastern Bering Sea [7]. Uncommon in southeastern Bering Sea [8] and rare in Sea of Japan [9].

Geographic distribution of Wattled Eelpout (*Lycodes palearis*) within Arctic OCS Planning Areas [4] based on review of published literature and specimens from historical and recent collections [1, 2, 5].

Depth Range: 2–925 m, almost always less than 200 m [10]. *Taken in U.S. Chukchi Sea at 30–54 m* [3, 6, 11]. In general, eelpout spawning and larvae occur at the same depths that adults inhabit [1].

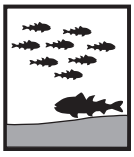


Benthic and reproductive distribution of Wattled Eelpout (*Lycodes palearis*).



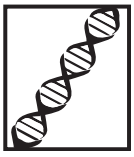
Habitats and Life History

Eggs—Size: Unknown. Time to hatching: Unknown. Habitat: Benthic [1].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic [1].
Juveniles—Age and size: Unknown. Habitat: Benthic [1].
Adults—Age and size at first maturity: Unknown. Maximum age: Unknown. Maximum size: 62.0 cm TL [12]. Habitat: Benthic [1].
Substrate—Mud or sand [1, 3, 13].
Physical/chemical—Temperature: –1.7–14.6 °C [3, 5, 13, 14]. Salinity: Marine [3, 13].



Behavior

Diel—Unknown.
Seasonal—Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.



Populations or Stocks

There have been no studies.

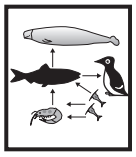
Reproduction

Mode—Separate sexes, oviparous.
Spawning season—Unknown.
Fecundity—Unknown.

Food and Feeding

Food items—In eastern Bering Sea and Gulf of Alaska, a wide range of benthic and epibenthic prey. Crustaceans (for example, gammarid amphipods, crabs, and shrimps) and fishes are often consumed, along with polychaetes, brittle stars, echiuroids, and clam siphons [15–17]. Larger Wattled Eelpouts feed more heavily on fishes than do smaller individuals [16].

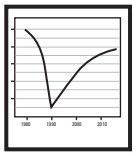
Trophic level—3.6 [18].



Biological Interactions

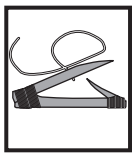
Predators—Arrowtooth Flounder, Great Sculpin, Greenland Halibut, Pacific Cod, and Pacific Halibut in eastern Bering Sea, Gulf of Alaska, and off Kamchatka Peninsula, Russia [19–22].

Competitors—Likely a range of moderate-sized benthic fishes, including flatfishes, gadids, and sculpins.



Resilience

Low, minimum population doubling time: 4.5–14 years (Preliminary *K* or Fecundity) [23].

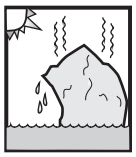


Traditional and Cultural Importance

None reported.

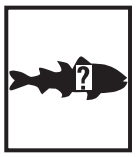
Commercial Fisheries

Wattled Eelpout are not commercially harvested currently.



Potential Effects of Climate Change

The Wattled Eelpout is a predominantly Boreal Pacific species which would be expected to become more abundant in the Chukchi Sea and possibly expand its range farther into the Beaufort Sea.



Areas for Future Research [B]

Little is known about the biology and ecology of this species from the region. Research needs include: (1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

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Polar Eelpout (*Lycodes polaris*)

(Sabine, 1824)

Family Zoarcidae

Colloquial Name: *None within U.S. Chukchi and Beaufort Seas.*

Ecological Role: Based on food habits research outside the U.S. Arctic [1, 2], Polar Eelpout may be of moderate ecological importance.

Polar Eelpout (*Lycodes polaris*), 180 mm TL, Chukchi Sea, 2004. Photograph by C.W. Mecklenburg and B.A. Sheiko, Point Stephens Research and Russian Academy of Sciences.

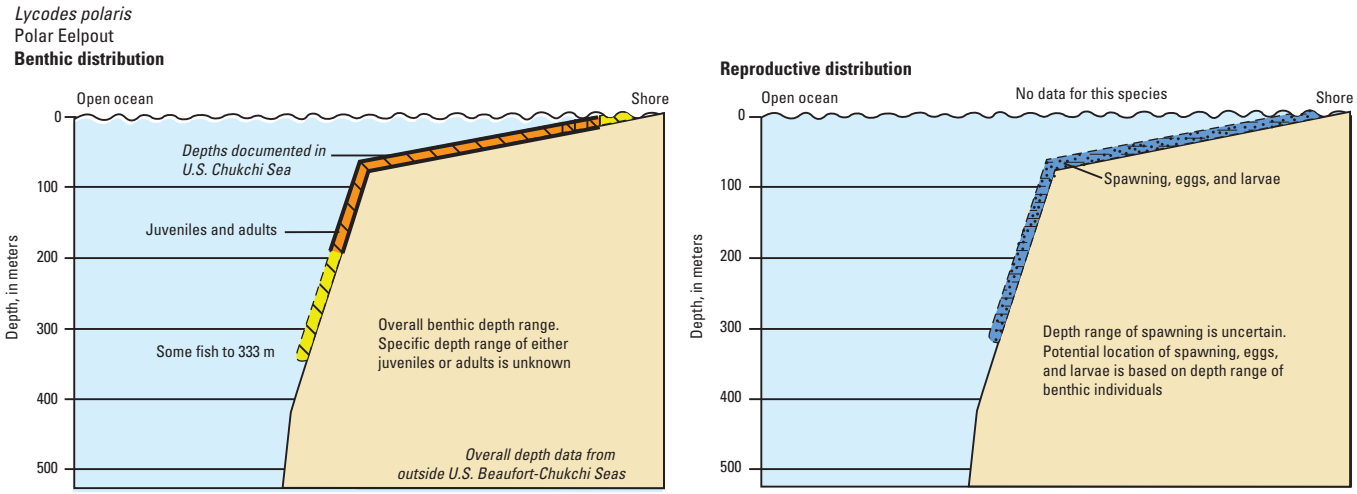
Physical Description/Attributes: Slender, elongate orange to light brown body with by 9–11 dark brown bands extending from sides onto dorsal fin. For specific diagnostic characteristics, see *Fishes of Alaska* (Mecklenburg and others, 2002, p. 710) [3]. Swim bladder: Absent [3]. Antifreeze glycoproteins in blood serum: Present [4].

Range: *U.S. Chukchi and Beaufort Seas (in Chukchi Sea, northward to at least 73°32'N)* [5]. Elsewhere in Alaska, southward in eastern Bering Sea to between Hall Island and St. Lawrence Island. Worldwide, nearly circumpolar in Arctic seas; in western Bering Sea southward to Glubokaya Bay on the Koryak Coast, Russia (about 61°N) [5–7] and in the western North Atlantic to the Gulf of St. Lawrence [7].

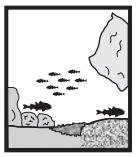
Relative Abundance: *Common in both U.S. Chukchi and Beaufort Seas* [5, 10, 11], and eastward to at least Cornwallis Island, Nunavut, Canada [12, 13].

Geographic distribution of Polar Eelpout (*Lycodes polaris*) within Arctic OCS Planning Areas [8] based on review of published literature and specimens from historical and recent collections [3, 7, 9].

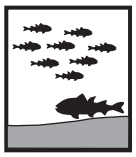
Depth Range: 0–333 m [14], typically 30–150 m [7]. *Taken in U.S. Chukchi and Beaufort Seas from 17 to 183 m* [9]. In general, eelpout spawning and larvae occur at the same depths that adults inhabit [3].



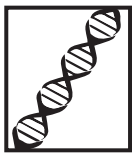
Benthic and reproductive distribution of Polar Eelpout (*Lycodes polaris*).



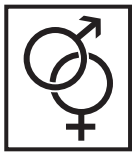
Habitats and Life History
Eggs—Time to hatching: Unknown. Size: Large (about 4–5 mm) [6]. Habitat: Benthic [3].
Larvae—Size at hatching: Unknown. Size at juvenile transformation: Unknown. Days to juvenile transformation: Unknown. Habitat: Benthic [3]. Juveniles: Age and size: Unknown. Habitat: Benthic [3].
Adults—Age and size at first maturity: Age unknown. *Probably around 15.5 cm TL* [10]. Maximum age: *At least 5 years* [10]. Maximum size *33.3 cm in U.S. Beaufort Sea* [9]. Habitat: Benthic [3].
Substrate—Mud and sandy mud [5, 6, 12].
Physical/chemical—Temperature:-1.9–2.5 °C [5, 12], usually 0 °C or less [6]. Salinity: Predominantly marine, occasionally estuarine (as low as 25.3 ppt) [6].



Behavior
Diel—Lives in burrows in upper layers of sediment and has been observed entering them tail first [6, 12].
Seasonal— Unknown.
Reproductive—Unknown.
Schooling—Unknown.
Feeding—Unknown.

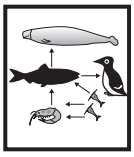


Populations or Stocks
There have been no studies.

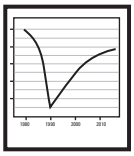


Reproduction
Mode—Separate sexes, oviparous.
Spawning season—*Likely in autumn or early winter* [6, 10].
Fecundity—*66–200 eggs* [1, 6, 10].

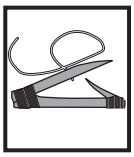
Food and Feeding
Food items—*Primarily gammarid amphipods and polychaetes, along with smaller amounts of cumaceans, caprellid amphipods, isopods, mysids, shrimps, brittle stars, and occasionally fishes* [10], including Arctic Cod [1]. A similar diet has been reported from Russian Arctic [6].
Trophic level—3.32 standard error 0.38 [16].



Biological Interactions
Predators—Seabirds [1]. Commonly eaten by bearded seals in Canadian High Arctic [2].
Competitors—Likely other benthic and epibenthic feeding fishes, including flatfishes, sculpins, and other eelpouts.

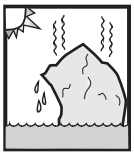


Resilience
Medium, minimum population doubling time: 1.4–4.4 years (Preliminary *K* or Fecundity) [16].

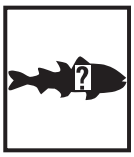


Traditional and Cultural Importance
None reported.

Commercial Fisheries
Polar Eelpout are not commercially harvested currently.



Potential Effects of Climate Change
The Polar Eelpout is an Arctic species inhabiting the continental shelf and upper slope. It is possible that climate warming could cause extirpation of local populations as distributions shift to more northern, deeper, and colder waters.



Areas for Future Research [B]
Little is known about the biology and ecology of this species from the region. Research needs include:
(1) depth and location of pelagic larvae, (2) depth, location, and timing of young-of-the-year benthic recruitment, (3) preferred depth ranges for juveniles and adults, (4) spawning season, (5) seasonal and ontogenetic movements, (6) population studies, (7) prey, and (8) predators.

Remarks

One of the most widespread, abundant, and northerly distributed continental shelf eelpouts [1].

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