NORTHWEST FISHERIES CENTER
PROCESSED REPORT
MARCH, 1976

# A GUIDE TO THE IDENTIFICATION OF SOME COMMON EASTERN BERING SEA SNAILS

NORTHWEST FISHERIES CENTER
KODIAK FACILITY
KODIAK, ALASKA

# NOTICE

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# A GUIDE TO SOME COMMON EASTERN BERING SEA SNAILS

by

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## Introduction

The following is a guide to the identification of some of the more abundant large marine gastropods of the eastern Bering Sea. While the gastropod fauna of the area is fairly well known in the taxonomic literature, there is no single readily available source of information on the identification of common species. This paper is designed for the field investigator who wishes to identify snails without resorting to the sometimes scanty and confusing literature. As regards field identification, the failings of original species descriptions and the technical literature is that various similar species are not directly compared with one another. Field identification by those not trained in taxonomy must rely heavily, not only on photographs and written descriptions of the species, but also on discussions of key distinguishing features among species. Most problems in identification arise, naturally enough, at the species level.

There is a great deal of intra-specific variation in shell shape and sculpturing in some eastern Bering Sea snails. This variation most certainly arises out of genetic and environmental diversity as well as the physical abrasion, breaking, and subsequent repair of the shell by the living snail. When the anterior canal or aperture lip of a living snail breaks, the shell gland soon begins secreting new shell material to repair the shell. Often this rebuilding is out of proportion to normal growth and undoubtedly accounts for a certain amount of variability in shell form within a species. An additional problem in identification arises when shells are covered with barnacles, bryazoans, sponge, etc., to the point where the fine sculpture and sometimes even the general shape is concealed. In most cases, these encrusting organisms can be removed without damaging the shell. Because there is a great amount of intra-specific shell variation, this report takes the form of a guide rather than a key. It would be very difficult to design a key that would accommodate the range of variation in shell structure displayed by certain eastern Bering Sea gastropods.

Species chosen for inclusion in this guide were those found to be most abundant in trawl catches made by the National Marine Fisheries Service in the eastern Bering Sea in the summer of 1975. The area covered in this survey (Figure 1) is characterized by a relatively flat sea bottom ranging in depth from 15 to 80 fathoms. Some common bottom sediments in the area are fine mud, sand, and fine gravel.

A quantitative analysis of the snail data shows that about 95% of the snails collected in the approximately 800 trawl hauls were of the 15 species treated herein. Use of 1 1/4-inch mesh in the trawl codends resulted in the retention of very few snails less than 50 mm in length. There are no commonly encountered

eastern Bering Sea snails that could be easily confused with species pictured in the guide that have not been discussed herein. Approximately 30 additional species were recorded from National Marine Fisheries Service trawl survey samples in 1975, but these species were either quite small (less than 50 mm), quite uncommonly encountered, or not confusable with the species in this guide.

The taxonomy of many of the snails collected in the 1975 survey is confusing at best. For the identification of species treated in this guide, samples (with the exception of the Neptunea) were sent to Dr. James McLean of the Los Angeles County Museum of Natural History. Dr. Clifford Nelson, associated with the Museum of Paleontology, University of California, Berkeley, identified samples of Neptunea that formed the basis for subsequent identifications by the author. Dr. Joseph Rosewater of the U. S. National Museum identified some Buccinum.

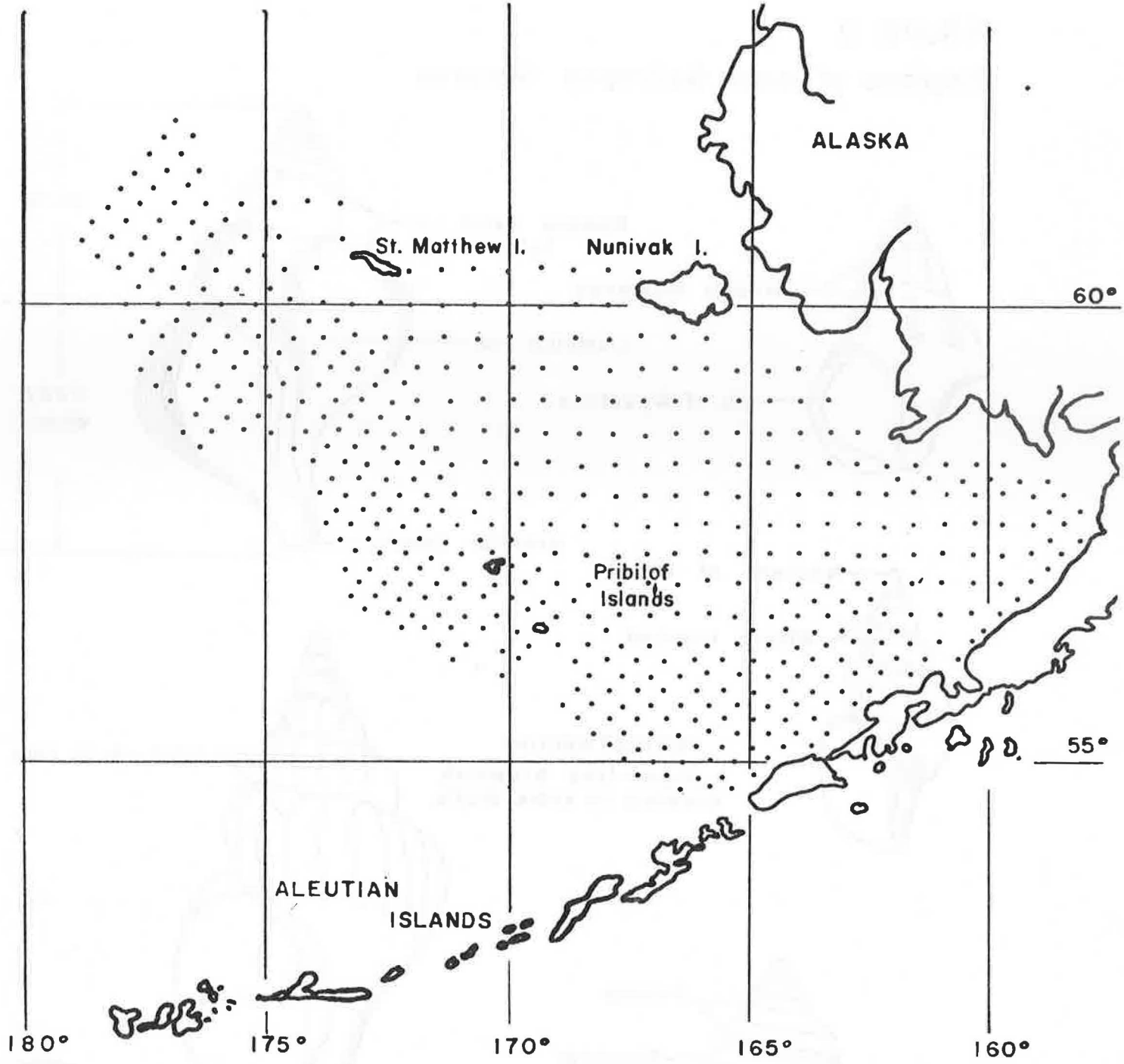
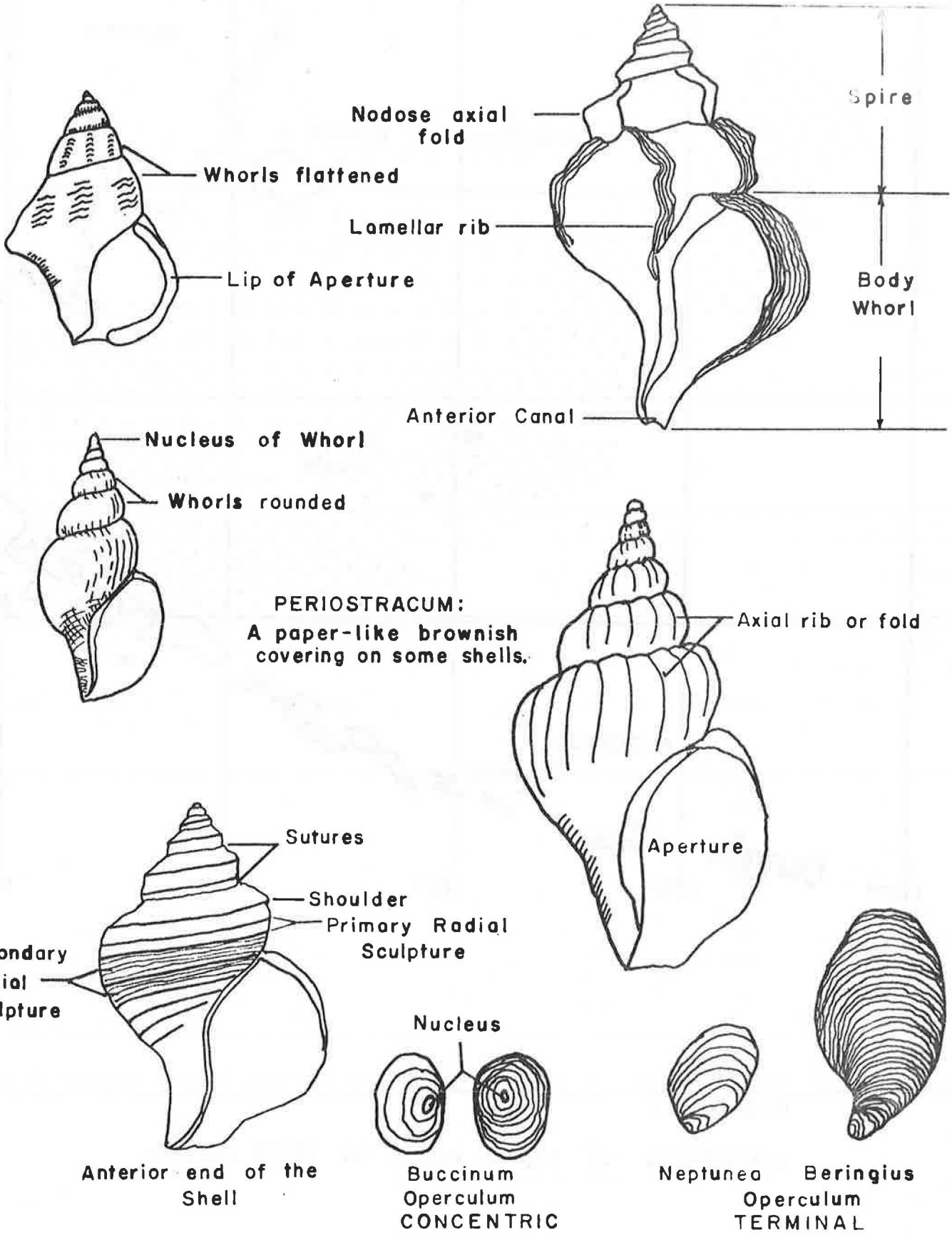



FIGURE 1

Locations of trawl hauls in 1975 survey

# FIGURE 2

## Diagrams of some Gastropod features




Buccinum scalariforme Möller, 1842

Average length 70 mm, maximum length 100 mm.

Buccinum scalariforme is identified as a Buccinum by the concentric growth rings forming around the nucleus of the operculum. The nucleus is more or less in the center of the oval operculum (Figure 2).

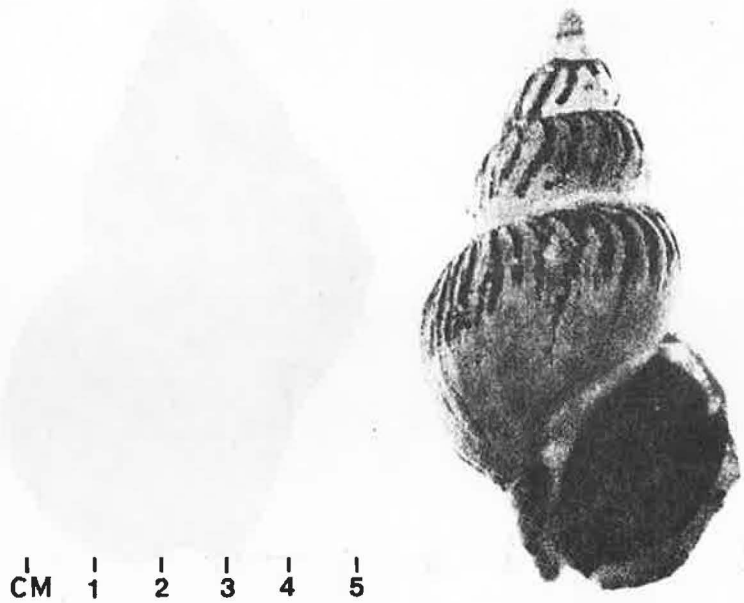
The shell is thin and breaks easily. Radial sculpture covers the entire shell and consists of very fine, close striations, so fine that they are observed only after close scrutiny. Axial sculpture consists of evenly spaced rounded ribs that can vary considerably in length. Some ribs extend from suture to suture while others are shorter or interrupted in the middle.

Similar species. The radial striations on B. scalariforme vary somewhat in coarseness from shell to shell but should never be confused with the broader flat-topped bands of spiral sculpture on B. plectrum.

B. polare can be confused with B. scalariforme but B. polare has a lighter, thinner shell; the axial sculpture is restricted to the upper whorls and is not

at all pronounced on the body whorl; the shell is almost always covered with a thin, dark, bumpy periostracum; and there are usually several radial ribs on the body whorl that are much more pronounced than the others.

Other similar Buccinum are present in the Bering Sea but they are not common enough to warrant discussion.




Buccinum plectrum Stimpson, 1865

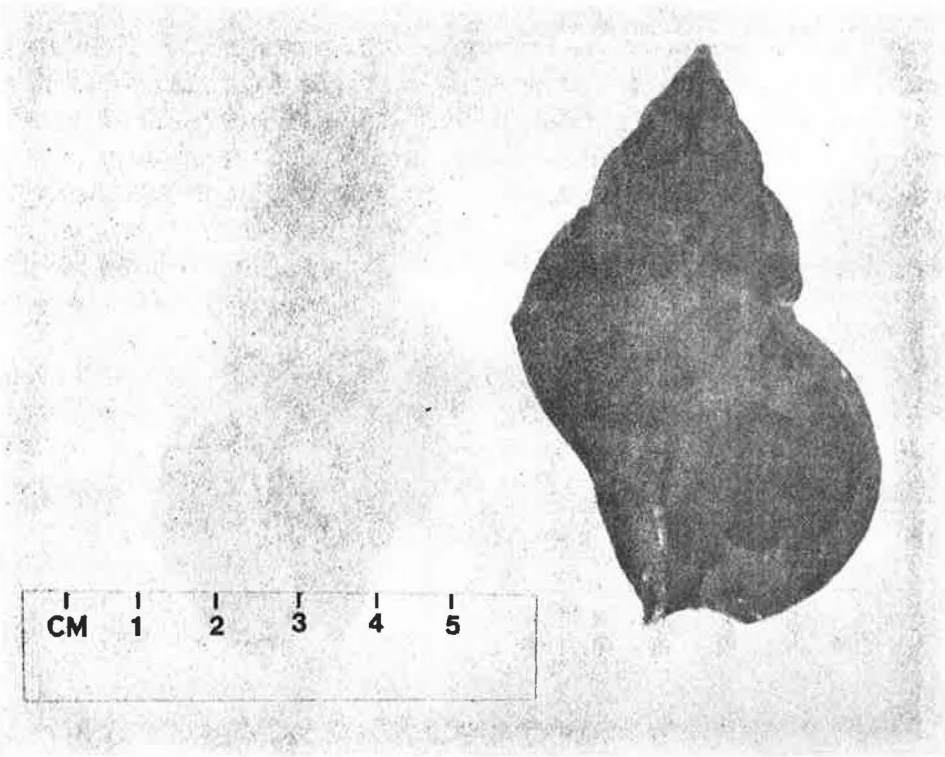
Average length 75 mm, maximum length 100 mm.

Buccinum plectrum has the characteristic concentric operculum that separates this genus from all other eastern Bering Sea genera (Figure 2).

Radial sculpture consists of very well defined (1 mm diameter) flat-topped ribs set at very regular intervals on all whorls. Axial sculpture consists of evenly spaced ribs, about 20 to a whorl.

Similar species. Another Buccinum that could be confused with this species is Buccinum scalariforme which usually has much finer spiral sculpturing.

See B. scalariforme for additional comments.




Buccinum angulossum Gray, 1839

Average length 70 mm, maximum length 100 mm.

Buccinum angulossum has the characteristic concentric operculum that separates this genus from all other eastern Bering Sea genera (Figure 2).

The shape of the body whorl is the most conspicuous feature of this common eastern Bering Sea Buccinum. In almost all cases it is strongly angled about halfway down the body whorl. The radial sculpture consists of very fine, close striations that can be interspersed at regular or irregular intervals with stronger bands. There is usually a distinct shoulder (The "angle" described above) that may or may not have nodose axial folds. Axial sculpture is normally present and consists of regularly spaced, rounded folds usually restricted to the spire and upper portion of the body whorl. The spire whorls tend to be more flattened than in the other Buccinum.

Similar species. While B. angulossum can be incredibly variable in shell shape, it is usually easily separable from the three other Buccinum commonly encountered in the eastern Bering Sea. The more or less conspicuous "angle" in the body whorl and the flattened spire whorls serve to distinguish it.

The axial rib that sometimes forms a shoulder on the body whorl of B. polare is located much closer to the suture than on B. angulossum.

B. glaciale Linnaeus, 1761, has been recorded from the eastern Bering Sea and is quite similar to some B. angulossum, differing mainly by its coarser radial sculpture which is very similar to that described for B. plectrum.

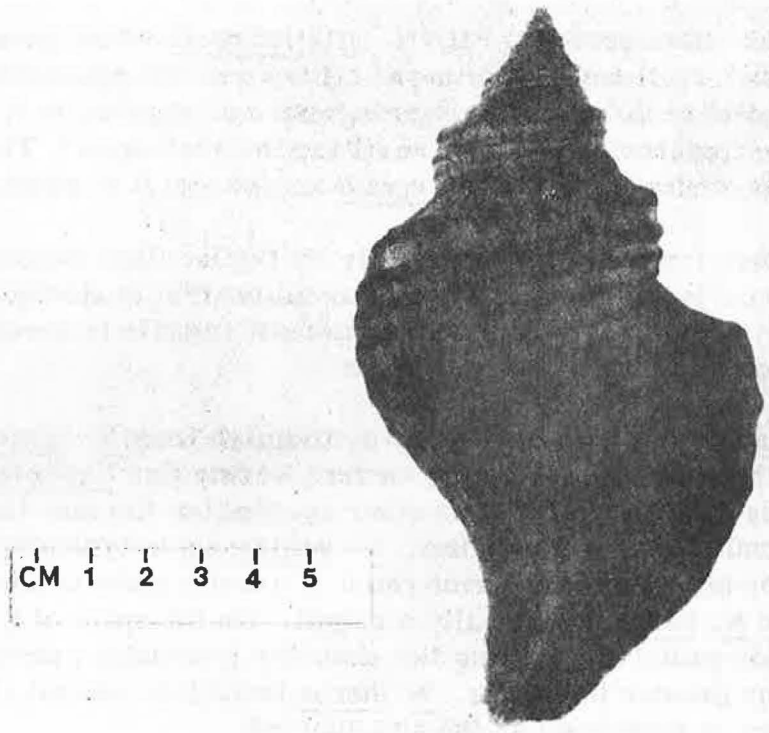

Buccinum polare Gray, 1839

Average length 55 mm, maximum length 75 mm.

Buccinum polare has the characteristic concentric operculum that separates this genus from all other eastern Bering Sea genera (Figure 2).

The shell is very thin and breaks easily. Radial sculpture consists of fine striations, interspersed at somewhat irregular intervals on the body whorl by more prominent ribs, one of which can form a definite shoulder on the whorl. The irregular strength and spacing of the radial sculpture is usually obvious; however, some shells appear smooth. Axial sculpture consists of regularly spaced, rounded ribs that are more prominent on the spire than on the body whorl. The most conspicuous feature of this shell is the thin, dark, bumpy periostracum that covers almost the entire shell. Where it flakes off, the shell underneath is white.

Similar species. See B. scalariforme.




Neptunea lyrata (Gmelin, 1791)

Average length 125 mm, maximum length 170 mm.

Neptunea lyrata has a dark brown operculum with a terminal nucleus.

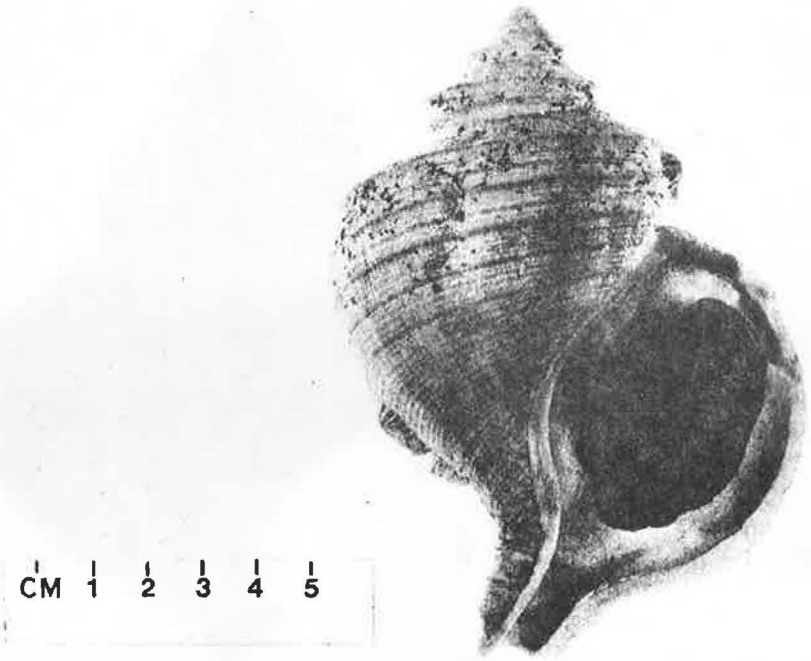
> The shell is large and is generally quite thick. All whorls have a thick radial rib forming a distinct shoulder. One to three additional ribs, usually weaker, are found below the strong shoulder rib on spire whorls. On the body whorl there are 8-12 strong radial ribs spaced at more or less regular intervals. On a few shells there is very weak, close set secondary radial sculpture between these strong ribs. There is no fine secondary radial sculpture of the first 3-4 whorls of the spire. Axial sculpture is quite variable and usually consists of weak ribs and/or nodes on the shoulder. Very rarely lamellae are present on the body whorl. The aperture is generally elongate and the anterior canal is straight.

Similar species. N. lyrata belongs to a genus represented by five species in the eastern Bering Sea. One of these N. borealis (Philippi, 1851), is only moderately abundant and reaches a maximum size of about 60 mm. The other three species are all large, abundant, and confusable to one degree or another with N. lyrata.

N. lyrata is not often confused with N. pribiloffensis which generally has a lighter, thinner shell and a much more rotund general appearance. The fine secondary radial sculpture is more prominent and regular on N. pribiloffensis and is visible from the body whorl nearly to the shell apex. The primary radial sculpturing is similar to that in N. lyrata except that it is much weaker.

N. heros differs from N. lyrata primarily by the fact that the only element of radial sculpture is a single pronounced shoulder that is strongly nodose in the later (larger) whorls. The body whorl in most animals is devoid of any radial sculpture except for the nodose shoulder.

N. ventricosa is sometimes difficult to distinguish from N. lyrata and itself seems to be the most variable of the eastern Bering Sea Neptunea. The lamellar form is usually separable from other species but the non-lamellar form with strong radial ribs is confusing. N. ventricosa is typically much more ventricose, or fat, and the anterior canal is usually quite twisted while in N. lyrata and N. heros it is usually straight. On the spire of N. ventricosa, the fairly thick radial rib forming the shoulder is usually paired with a second rib of equal or greater thickness. N. heros lacks this second rib and in N. lyrata it is not as prominent as the shoulder rib.




Neptunea pribiloffensis (Dall, 1919)

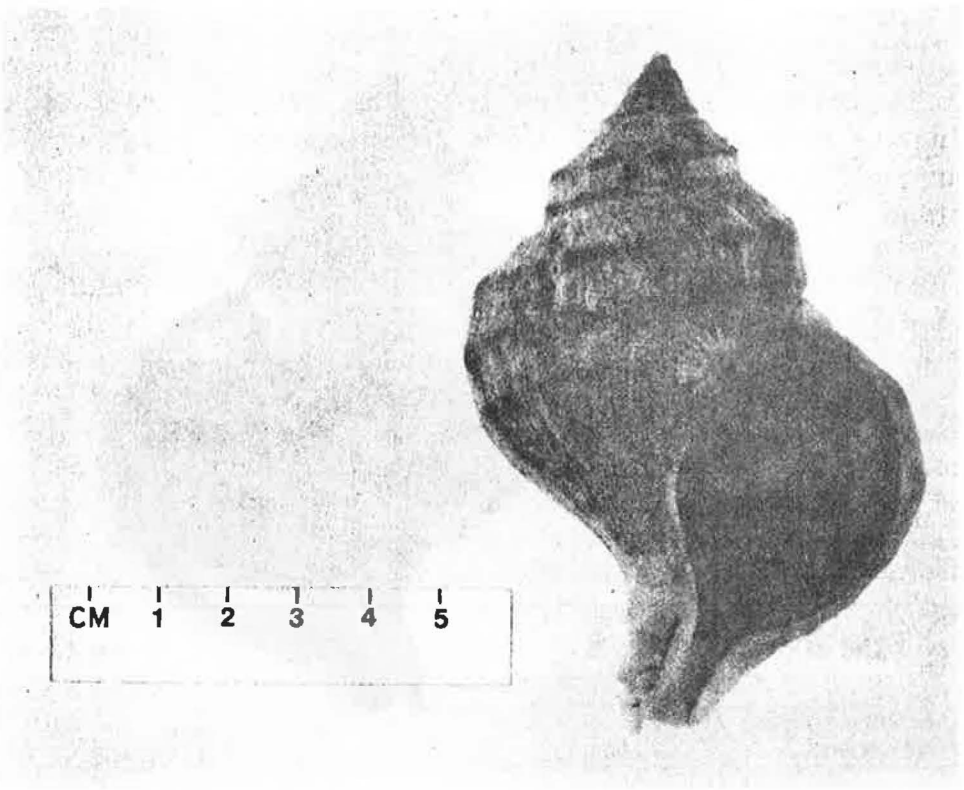
Average length 100 mm, maximum length 150 mm.

Neptunea pribiloffensis has a large, dark brown operculum with a terminal nucleus (Figure 2).

The shell is rather thin, inflated, and short spired. All whorls have a primary radial rib forming a more or less well defined shoulder. One or two additional radial ribs are found below the shoulder on spire whorls. Radial ribs on the body whorl number 8 to 10.

Secondary radial sculpture consists of 3-5 close set threads that extend from the body whorl to the uppermost whorls. Axial sculpture is essentially non-existent, lamella or nodes are never present. The aperture is broad and the outer lip is thin. Shell color is buff.

Similar species. See N. lyrata.



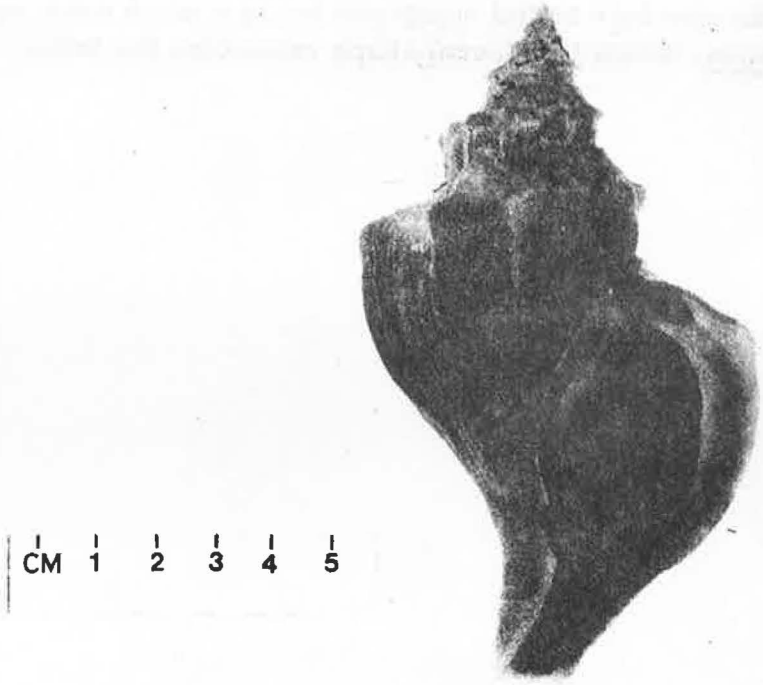

Neptunea ventricosa (Gmelin, 1791)

Average length 100 mm, maximum length 150 mm.

Neptunea ventricosa has a large, dark brown operculum with a terminal nucleus (Figure 2).

The shell is fairly thick, inflated, and short spired. Primary radial sculpture is quite variable with some shells showing no sculpture on the body whorl, but most with two thick ribs of roughly equal strength and diameter in the spire whorls and 6-10 ribs on the body whorl. Very seldom is there secondary radial sculpture between the 6-10 body whorl ribs. Axial sculpture usually consists of lamella in the body whorl and the larger spire whorls. Occasional shells lack axial lamellar sculpture (non-lamellar form). The aperture lip in larger specimens is often flared out and lamella are often spaced closer together near the aperture. The general appearance of the shell is squat because the spire is not high, the aperture is broad, and the anterior canal is usually twisted. The color is often purplish.

Similar species. See N. lyrata.




Neptunea heros (Gray, 1850)

Average length 120 mm, maximum length 170 mm.

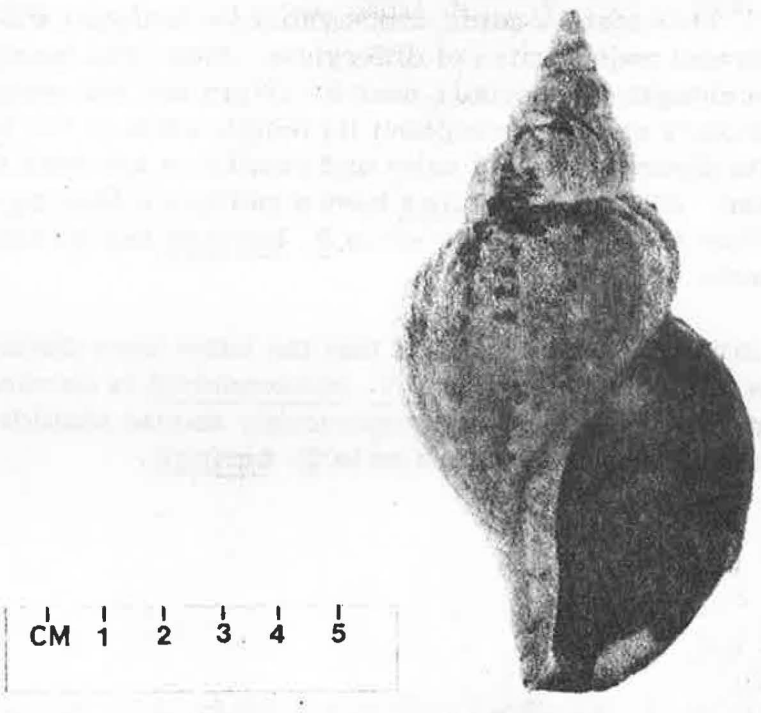
Neptunea heros has a large, dark brown operculum with a terminal nucleus (Figure 2).

The shell is fairly thick. Radial sculpture consists of a single thick rib, which is often nodose on the lower spire whorls, and a series of conspicuous shoulder nodes on the body whorl. No other spiral sculpture is present. Axial sculpture consists of strong rounded ribs or well developed lamallae on the body whorl and lower spire whorls.

Similar species. N. heros is fairly easily separated from other Neptunea in that it has no second radial rib in the spire or body whorl and it has a very prominent nodose shoulder. Sometimes what appear to be integrades between N. lyrata and N. heros are encountered that have very weak radial sculpture below the whorl shoulder, but these shells are not common.

N. ventricosa can also lack radial sculpture but is a much more squat, fat shell than N. heros, which in general shape resembles the taller, narrower N. lyrata.

See N. lyrata.




Beringius beringii (Middendorff, 1849)

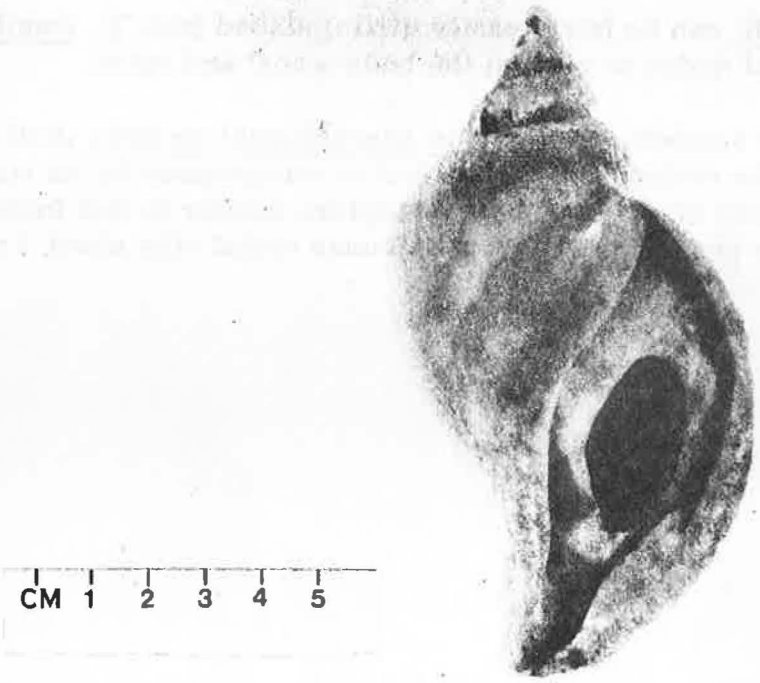
Average length 120 mm, maximum length 170 mm.

Beringius beringii has a large, dark brown, very elongate operculum that is covered with very close set growth lines throughout its length.

The shell is fairly thin and breaks easily. The spire whorls are rounded and the spire is quite high, an effect due in part to the inflated nature of the nuclear whorls (often times broken off). Radial sculpture is limited to fine threads on the body whorl. The dorsal portion of the body whorl often has fine, irregularly spaced radial threads, and often there are about 12 regularly spaced threads near the base (anterior end) of the shell. The strength of axial sculpture is quite variable but most shells have strong rounded axial ridges that extend vertically from suture to suture on all body whorls. A conspicuous feature of this shell is the thin, yellow-brown periostracum that flakes off quite readily but is rarely entirely absent when a shell is collected. The outside of the shell is whitish while the inside of the aperture is purplish.

Similar species. This species could conceivably be confused with Neptunea but there are several major points of difference. First, the operculum in B. beringii is more elongate, especially near its origin and the concentric growth lines are very closely spaced throughout its length while in the Neptunea there are usually quite distinct bands of color and relief that are each several millimeter in diameter. All of the Neptunea have a radial rib forming a distinct shoulder in at least the spire whorls while B. beringii has no radial sculpture in the spire whorls.

B. beringii is unlike the Volutopsius in that the latter have distinctly shaped and very yellow opercula (Figure 2). V. middendorffii is devoid of most all surface relief and V. fragilis has a conspicuously nodose shoulder but no axial ribs that extend from suture to suture as in B. beringii.




Volutopsius middendorffii (Dall, 1891)

Average length 100 mm, maximum length 130 mm.

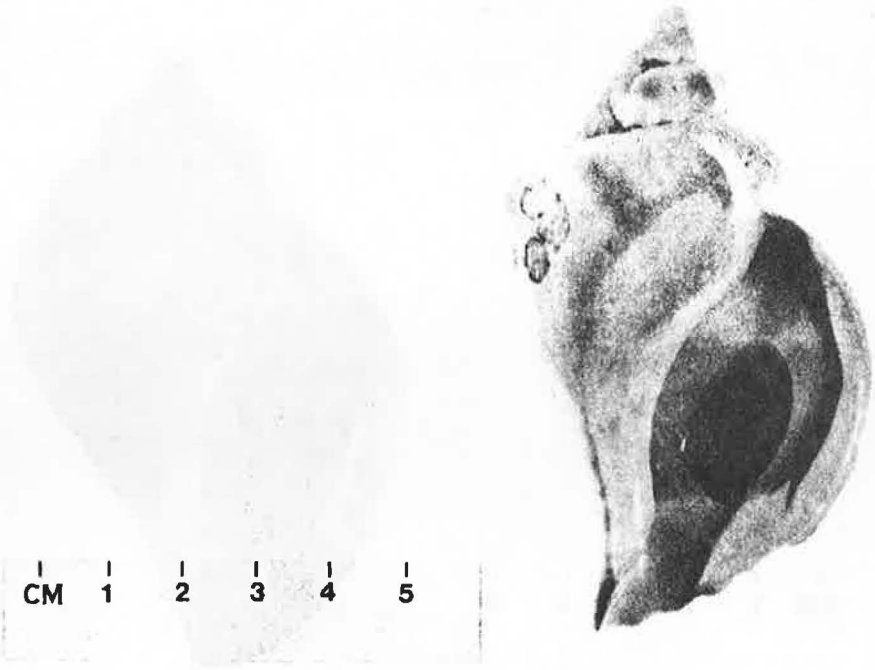
Volutopsius middendorffii has a very characteristic yellowish operculum with a terminal nucleus (Figure 2).

The shell is very thin and breaks easily. The body whorl is very long in proportion to total length. The anterior canal is short and quite broad. The nuclear whorls are inflated and are usually conspicuously pink. Radial sculpture consists of extremely fine, close set threads covering the entire surface of the shell that are sometimes obliterated by wear or encrusting organisms. Axial sculpture consists of very faint, irregularly spaced growth lines. Casual observation shows no sculpture on the shell.

Similar species. The two common Volutopsius occurring in the eastern Bering Sea are not likely to be confused with snails of any other genus because of their very yellowish opercula, thin shells, proportionately long body whorl, and bulbous nucleus.

V. middendorffii can be fairly easily distinguished from V. fragilis by its complete lack of nodes or ribs on the body whorl and spire.

A third similar species, Pyrulofusus (Harpofusus) melonis (Dall, 1891) is uncommon in the eastern Bering Sea but is conspicuous by its size. These large (to 170 mm) shells have axial sculpture similar to that found in V. fragilis but are also covered by conspicuous radial ribs about 2 mm apart.



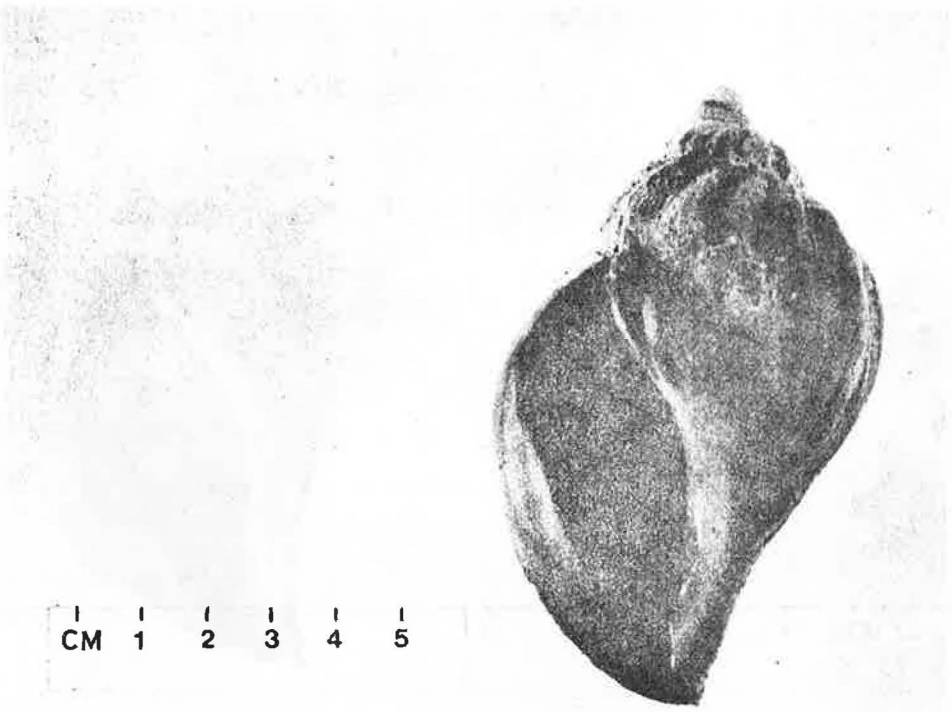

Volutopsius fragilis (Dall, 1891)

Average length 100 mm, maximum length 130 mm.

Volutopsius fragilis has a very characteristic yellowish operculum with a terminal nucleus (Figure 2).

The shell is very thin and breaks easily. The body whorl is very long in proportion to total length. The anterior canal is short and quite broad. The nuclear whorls are bulbous and are usually conspicuously pink. Radial sculpture consists of extremely fine spiral threads that are often obliterated by wear or encrusting organisms. Axial sculpture consists of shoulder nodes that often continue anteriorly as ribs on the body whorl.

Similar species. See V. middendorffii.



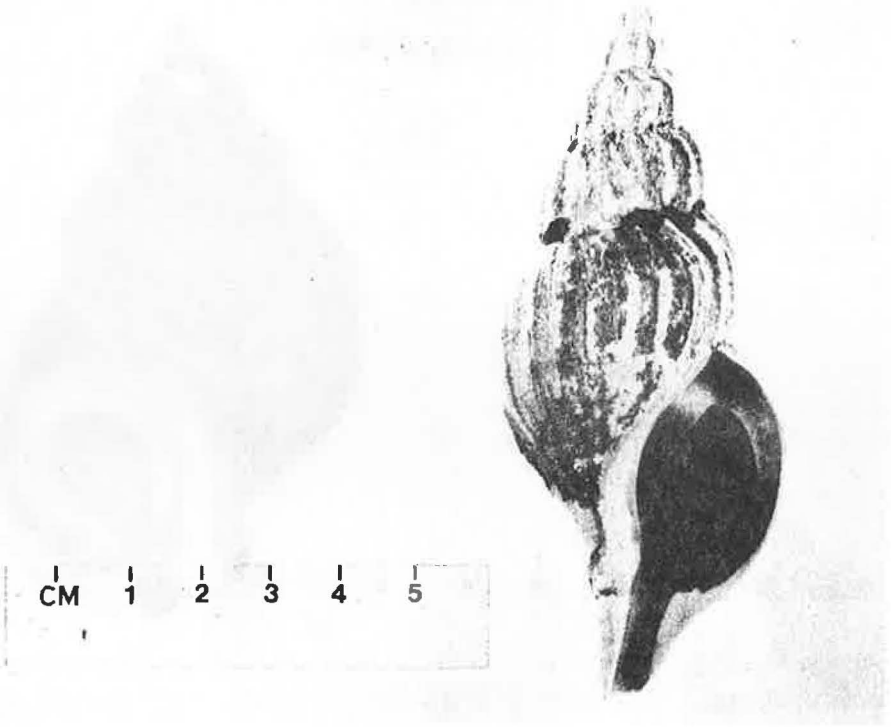

Pyrulofusus deformis (Reeve, 1847)

Average length 120 mm, maximum length 170 mm.

Pyrulofusus deformis has a small, yellow-brown operculum that is not elongate at its anterior end.

The shell is fairly thin and its most conspicuous feature is that it is coiled to the left, or sinistrally. Radial sculpture consists of very fine, close set threads that cover the entire shell but are often worn off and difficult to see. Axial sculpture consists of fairly strong, rounded axial ribs that are often most prominent in the mid-portion of each whorl.

Similar species. The only other large sinistrally coiled snail in the eastern Bering Sea is the very closely related P. harpa (Mörch, 1858), which is distinguished by its coarse and more conspicuous raidal sculpture that consists of about 20-30 ribs rather than innumerable fine threads.



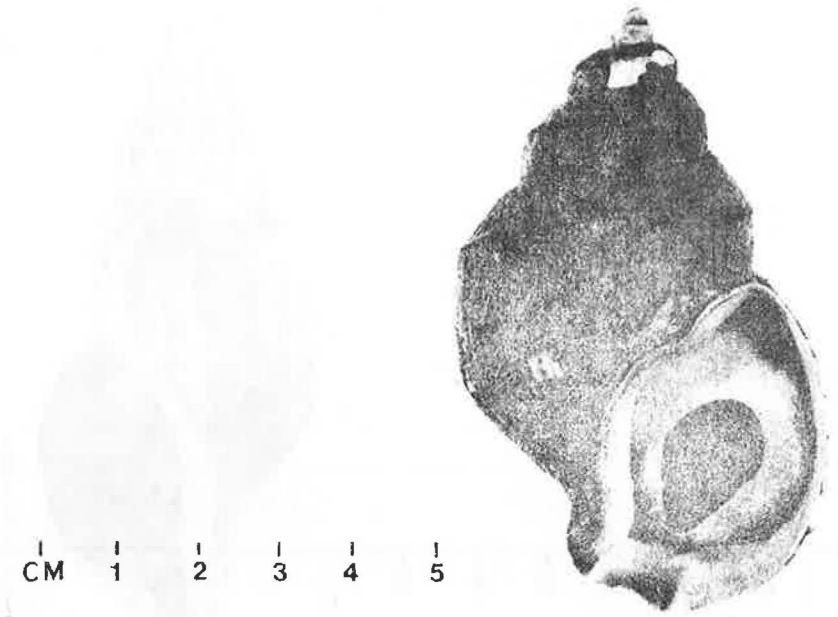

Plicifusus kroyeri (Möller, 1842)

Average length 90 mm, maximum length 110 mm.

Plicifusus kroyeri has a brownish, more or less ovate operculum with a terminal nucleus.

The shell is quite thin and is very elongate. Contributing to the narrow appearance of the shell is the rather narrow aperture and the very narrow and elongate anterior canal. In some shells there is an outward fold on the posterior margin of the aperture lip. Radial sculpture consists of very fine close set threads covering the entire surface of the shell that are sometimes obliterated by wear or encrusting organisms. Axial sculpture consists of about 20-30 rounded axial ribs that extend vertically from suture to suture in a very evenly spaced, regular pattern.

Similar species. The terminal nucleus, high spire, long straight anterior canal, thin shell, and relatively small size of this animal serve to distinguish it from all other common eastern Bering Sea snails. When the anterior canal has been broken off it can resemble Buccinum scalariforme.



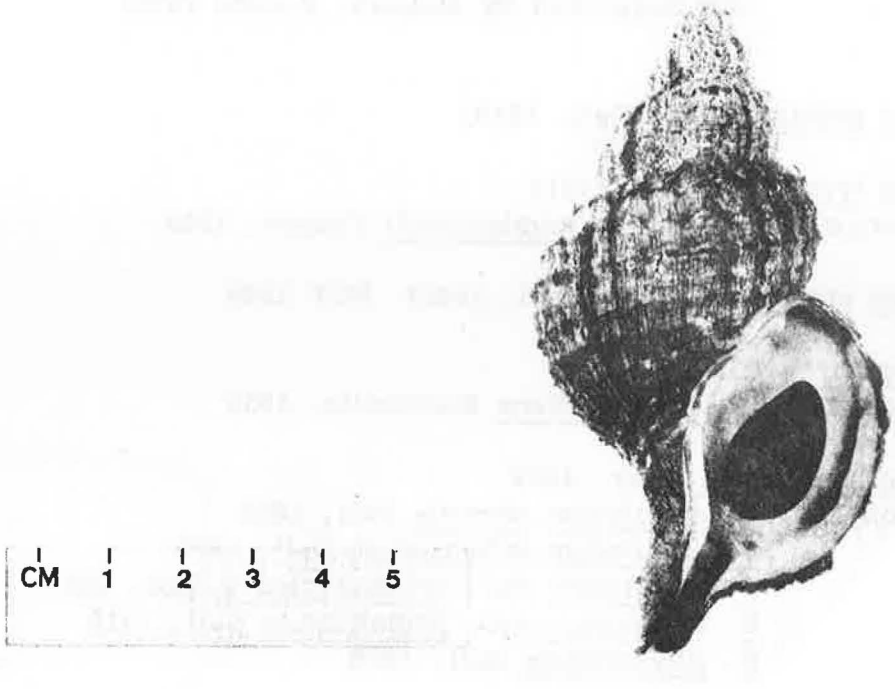

Clinopegma magna (Dall, 1875)

Average length 70 mm, maximum length 120 mm.

Clinopegma magna has a dark brown, distinctly wedge shaped operculum with a terminal nucleus.

The shell is fairly thick and covered by a thick reddish-brown adherent periostracum. The shell is quite bulbous with a wide aperture and a short and very wide anterior canal. The whorls are strongly shouldered with a single flat rib, giving them a flat sided appearance.

Similar species. There are no other common eastern Bering Sea snails with which C. magna could be confused. The wedge shaped operculum, squat shape, flat sided shouldered whorls, and reddish-brown coloration (not as conspicuous in smaller individuals) serves to distinguish C. magna from all others.




Fusitriton oregonensis (Redfield, 1848)

Average length 85 mm. maximum length 130 mm.

Fusitriton oregonensis has a fairly small, oval, grayish-brown operculum with a terminal nucleus.

The shell is fairly thick and has a conspicuous brown, bristle-like covering. The aperture and siphonal canal interiors are enamel white. Each whorl bears 16-18 axial ribs (rounded but with rough surfaces) nodulated by the crossing of smaller radial pairs of ribs.

Similar species. The bristle brush like coating on this shell sets it apart from any other encountered in the eastern Bering Sea.

List of Synonomies
(As Suggested by McLean, 9 June 1976)

Neptunea pribiloffensis (Dall, 1919)

Neptunea lyrata (Gmelin, 1791)
Synonym: Chrysodomus middendorfii Cooper, 1859

Fusitriton oregonensis (Redfield, 1846) NOT 1848

Neptunea heros (Gray, 1850)
Synonym: N. middendorffiana MacGinitie, 1959

Buccinum angulosum Gray, 1839
Synonyms: B. angulosum normale Dall, 1885
B. angulosum subcostatum Dall, 1885
B. angulosum var. cnismatopleura Dall, 1919
B. angulosum var. transliratum Dall, 1919
B. physematum Dall, 1919

Buccinum scalariforme Möller, 1842
Synonyms: Buccinum tenue Gray, 1839, not Schröter, 1805
Buccinum tenue forma elatior Tryon, 1881
B. oedematum (Dall, 1907)
B. tenue var. rhodium Dall, 1919
B. tenue var. lyperum Dall, 1919

Neptunea ventricosa (Gmelin, 1791)
Synonyms: Buccinum saturum Martyn, 1784 (non binomial)
Chrysodomus saturus var. tabularis Dall, 1919

Buccinum plectrum Stimpson, 1865
Synonym: B. planeticum Dall, 1919

Beringius beringii (Middendorff, 1849)
Synonyms: Buccinum kennicotti Dall, 1871
Volutopsius beringii var. kobelti Dall, 1902
Volutopsius kennicotti var. incisus Dall, 1907
Volutopsius rotundus Dall, 1919
Beringius marshalli Dall, 1919
Beringius indentatus Dall, 1919

Volutopsius middendorffii (Dall, 1891)
Synonym: V. middendorffii var. emphaticus Dall, 1907

Clinopegma magna (Dall, 1875)

Plicifusus kroeyeri (Möller, 1842) (kroeyeri, not kroyeri; Möller, not Moller)

Synonyms: Fusus arcticus Philippi, 1850
Chrysodomus kroyeri var. rayana Dall, 1885

Volutopsius fragilis (Dall, 1891)

Buccinum polare Gray, 1839

Synonym: B. orotundum Dall, 1907

Pyrulofusus deformis (Reeve, 1847)