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GUIDE TO ORDERS AND FAMILIES

by K.E. Carpenter

This guide is designed to help find the family identity of a fish in 2 steps. First, the appropriate order should be found by comparing the characters listed under each order until a match is found. Second, the characters listed to distinguish the families within the order should be compared with the fish in hand until a match is found. Volume and page numbers for the family account are listed after each family to refer to further information about the family and its species. The volume number is listed first, followed by the page number in the volume. The orders and families are listed in phylogenetic order. Key characters for the order are presented only on the first family listed in the order but are generally applicable to all families in the order. **These order-specific characters are presented in capital letters and highlighted in grey. This will help distinguish the ordinal characters from the unhighlighted, uncapitalized characters useful in distinguishing among the families within the order.** These family characters are presented with a general diagram representing the family and point to the area on the fish where the character can be found, if appropriate. The diagram representing the family can, in most cases, help with identification through its generalized shape. However, in some families, the general shape of particular genera and species varies widely within the family and therefore particular care should be paid to examination of the characters. In some cases, additional diagrams of morphological details are presented to help clarify the use of the character. Characters used are not only key characters but also those characters most useful in distinguishing the family from similar looking families. This guide is specifically designed to work for those orders and families found in the Western Central Pacific area and may not work well for identification to this level outside the area.

Identification hints: The orders and families are listed in phylogenetic sequence. Therefore, it is helpful to be able to distinguish a primitive or ancestral fish from an advanced or derived fish to quickly find the appropriate order. This is not always an easy task but certain characters can be examined to give a general impression. For example, more ancestral fishes generally have the position of the pelvic fins more abdominal while advanced fishes usually have them thoracic or jugular (Fig. 17 above). Primitive fishes also tend to lack true spines (Fig. 15), have the maxilla with teeth and a prominent part of the gape (Fig. 6), and have non-protrusible mouths (Fig. 5). There are some exceptions to this, however, and these characters should be used cautiously. An example are the barracudas (family Sphyraenidae) that have true spines and the premaxilla predominant in the gape but that have abdominal pelvic fins and non-protrusible jaws. Since barracudas are considered advanced fishes, the primitive characteristics are thought to have evolved secondarily from more advanced character states.

Class ACTINOPTERYGII - Ray-finned fishes

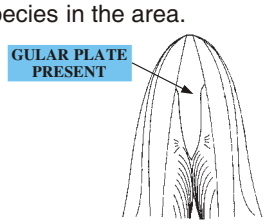
This class represents by far the majority of living bony fishes, all characterized by non-fleshy fins supported by fin rays. A single marine representative of the class Sarcopterygii (p. 1618), easily distinguished by its fleshy, lobed fins and unique diphycercal caudal-fin arrangement, was recently discovered in the WCP area.

Order ELOPIFORMES - Tarpons and allies

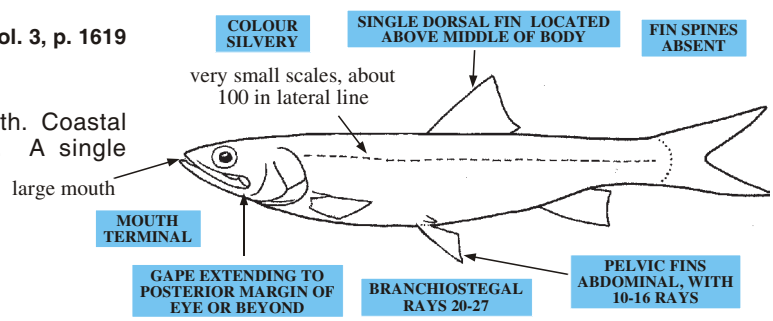
ELOPIDAE **Vol. 3, p. 1619**

Tenpounders

To almost 1 m standard length. Coastal marine waters and estuaries. A single species in the area.



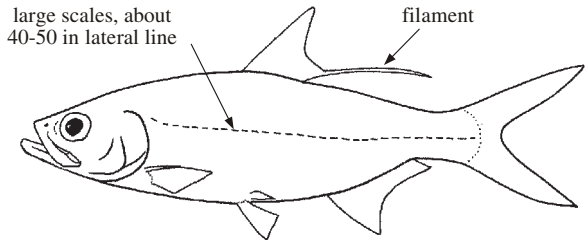
ventral view of head



MEGALOPIDAE Vol. 3, p. 1621

Tarpons

To 55 cm. In coastal marine waters, estuaries and fresh water; pelagic. A single species in the area.

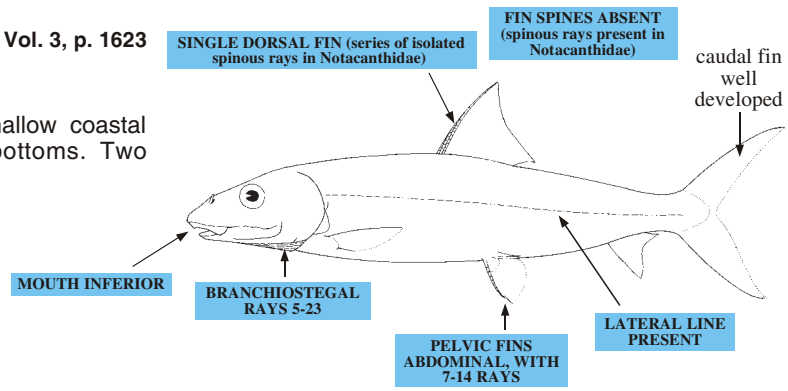


Order ALBULIFORMES - Bonefishes and allies

ALBULIDAE Vol. 3, p. 1623

Bonefishes

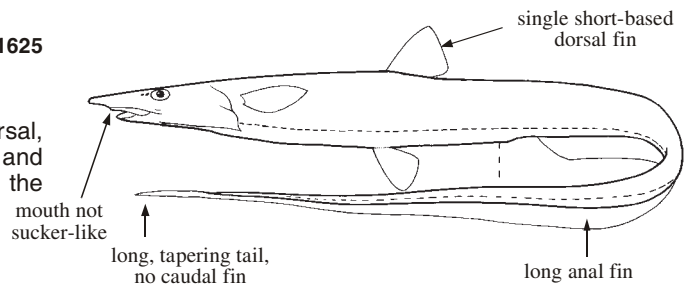
To about 1 m. Mostly in shallow coastal waters over sand or mud bottoms. Two species in the area.



HALOSAURIDAE Vol. 3, p. 1625

Halosaurs

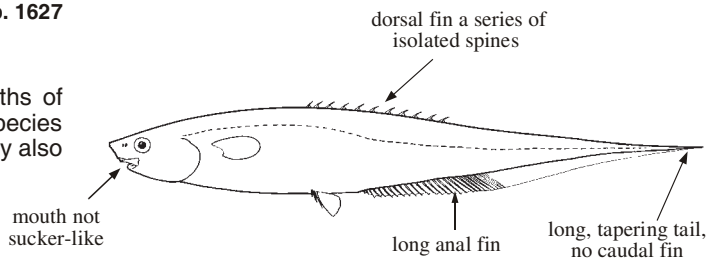
To at least 50 cm. Deep-water demersal, usually from depths between about 500 and 3 000 m. Four species recorded from the area.



NOTACANTHIDAE Vol. 3, p. 1627

Spiny eels

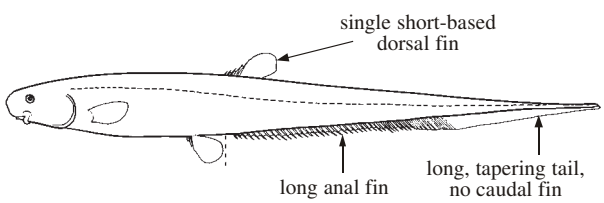
To at least 60 cm. Demersal in depths of around 200 to 3 500 m. Only 1 species recorded from the area but 3 others may also eventually be found.

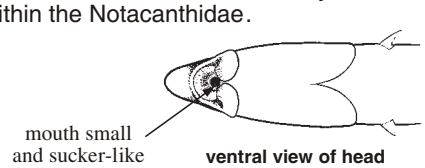


LIPOGENYIDAE Vol. 3, p. 1629

Spiny sucker eel

To about 50 cm total length. Demersal at depths between 600 and 2 000 m. A single species. Sometimes this family is included within the Notacanthidae.





ventral view of head

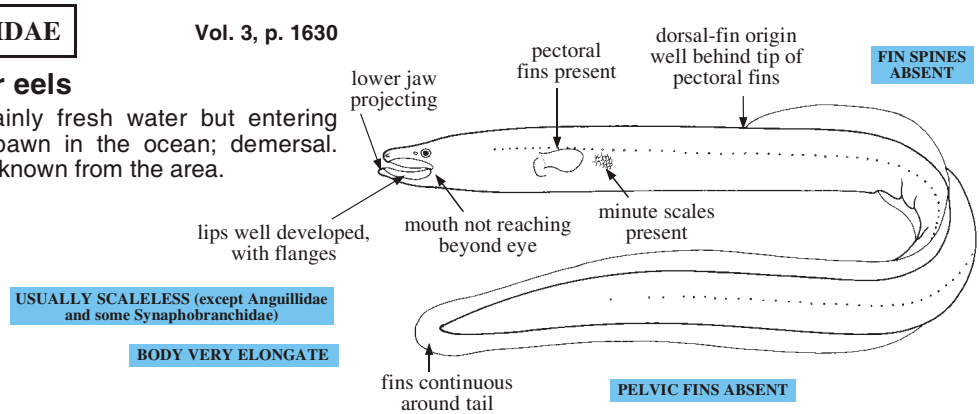
Order ANGUILLIFORMES - Eels

ANGUILLIDAE

Vol. 3, p. 1630

Freshwater eels

To 2 m. Mainly fresh water but entering estuaries; spawn in the ocean; demersal. Ten species known from the area.

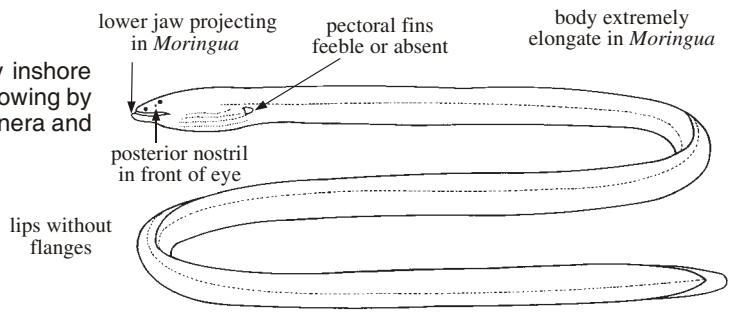


MORINGUIDAE

Vol. 3, p. 1637

Spaghetti eels

To about 90 cm. Demersal, mostly inshore waters, common on coral reefs; burrowing by day, free swimming at night. Two genera and an unknown number of species.

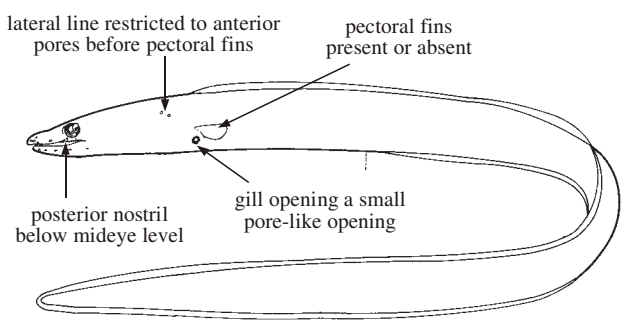


CHLOPSIDAE

Vol. 3, p. 1639

False morays

To at least 30 cm, most species less than 20 cm. Small, cryptic eels living mostly on coral reefs, but also in seagrass beds and among rock and rubble from shallow depths to around 200 m. At least 6 species known from the area, more expected. Formerly known as the Xenocongridae.

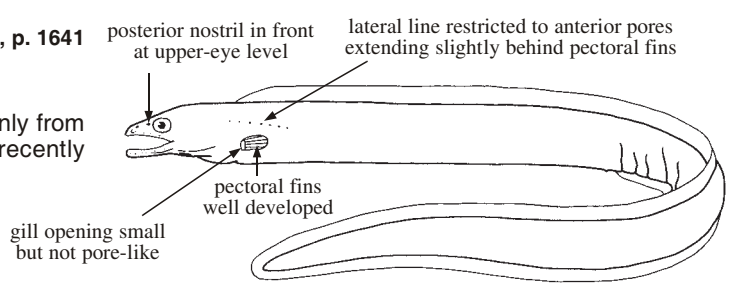


MYROCONGRIDAE

Vol. 3, p. 1641

Thin morays

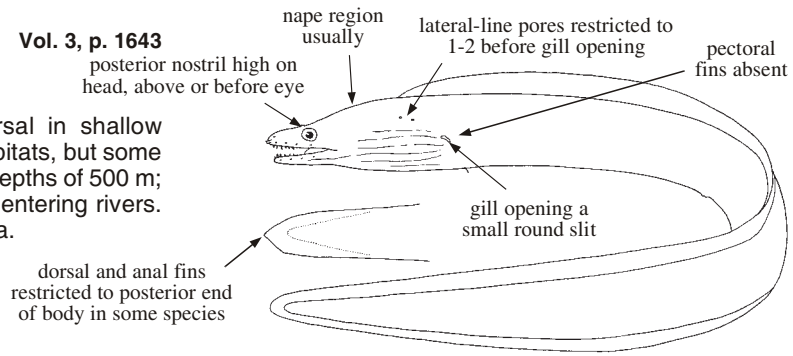
Rare, species of this family known only from a few specimens. One species recently described from the area.



MURAENIDAE Vol. 3, p. 1643

Morays

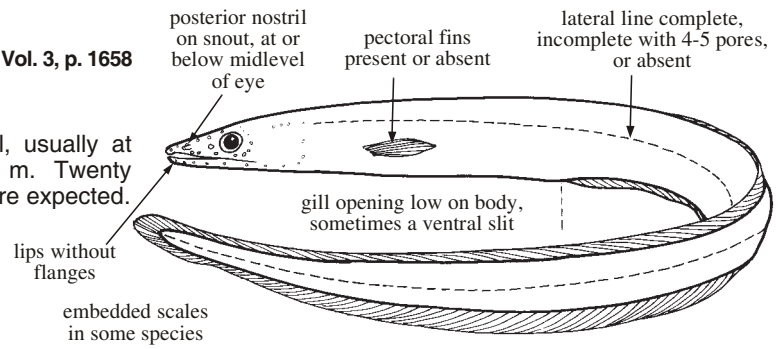
To 375 cm. Mostly demersal in shallow coastal rocky or coral reef habitats, but some occur over sand and mud to depths of 500 m; some in brackish waters and entering rivers. At least 88 species in the area.



SYNAPHOBRANCHIDAE Vol. 3, p. 1658

Cutthroat eels

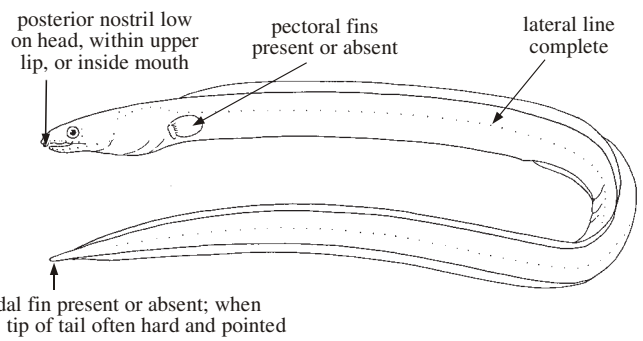
To around 120 cm. Demersal, usually at depths between 100 and 2 000 m. Twenty species listed from the area, more expected.

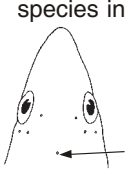


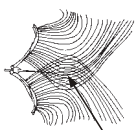
OPHICHTHIDAE Vol. 3, p. 1662

Snake eels, worm eels

To 250 cm but most species less than 1 m. Mostly demersal and borrowing in sand and mud in coastal habitats including estuaries and coral reefs; some in depths down to 800 m; some in midwater. At least 102 species in the area.



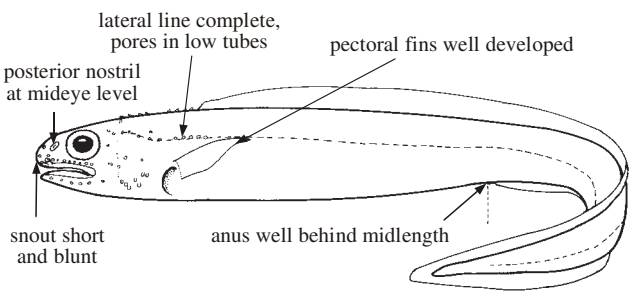




COLOCONGRIDAE Vol. 3, p. 1670

Colocongrids

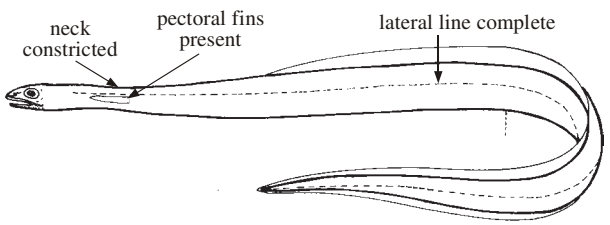
To 50 cm. Mostly over muddy bottoms at depths from 300 to 1 000 m. Three species in the area.



DERICHTHYIDAE Vol. 3, p. 1671

Longneck eels

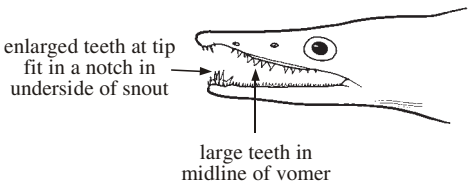
To about 60 cm. Open ocean at depths of several hundred metres. Three species listed from the area.

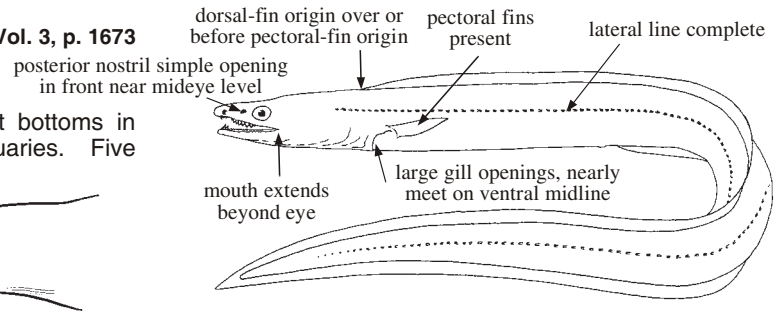


MURAENESOCIDAE Vol. 3, p. 1673

Pike congers

To 250 cm. Demersal on soft bottoms in shallow coastal waters and estuaries. Five species in the area.

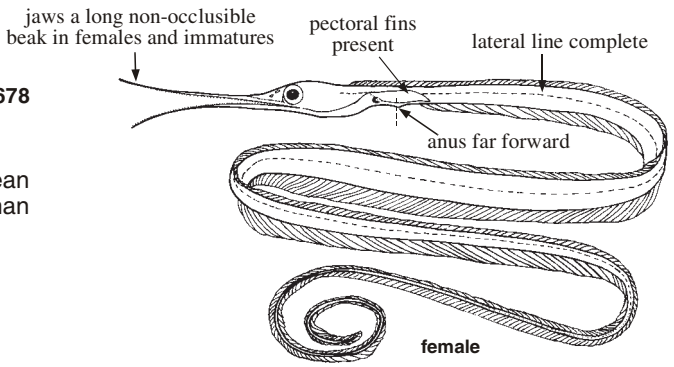




NEMICHTHYIDAE Vol. 3, p. 1678

Snipe eels

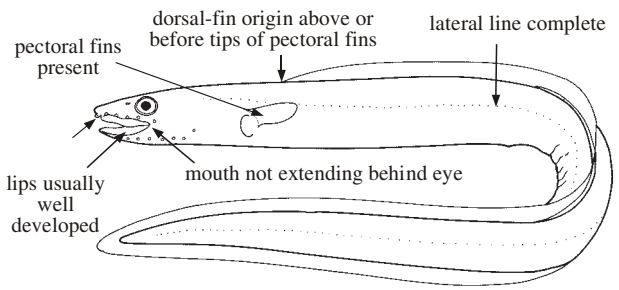
To at least 1 m. Midwater in the open ocean from depths of several hundred to more than 2 000 m. At least 6 species in the area.



CONGRIDAE Vol. 3, p. 1680

Conger eels

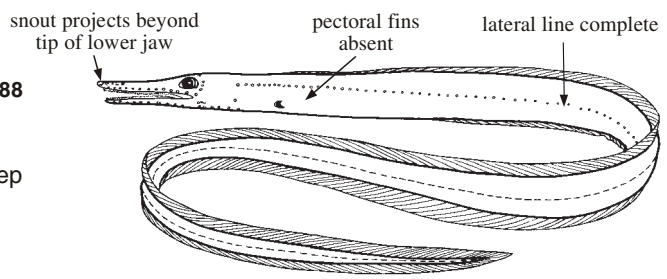
Some to 2 or 3 m, most smaller. On sand or mud bottoms from the coastline to depths of 2 000 m. At least 39 species from the area, but several more expected.



NETTASTOMATIDAE Vol. 3, p. 1688

Duckbill eels

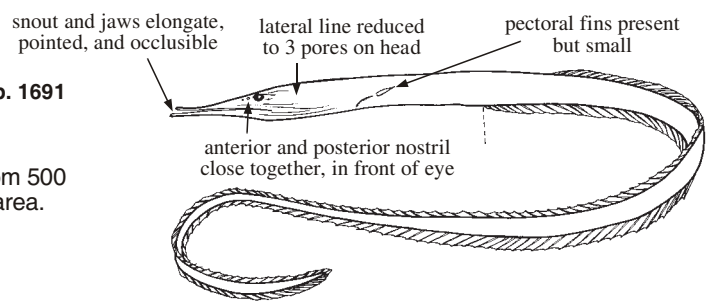
To about 1 m. On or near the bottom in deep water. At least 6 species in the area.



SERRIVOMERIDAE Vol. 3, p. 1691

Sawtooth eels

To about 60 cm. Midwater at depths from 500 to 1 000 m. Six species listed from the area.



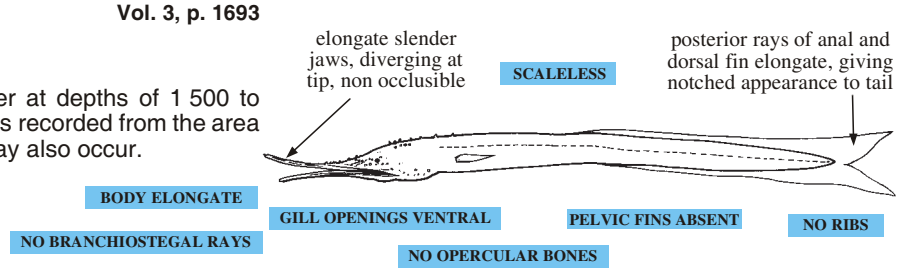
Order SACCOPHARYNGIFORMES - Gulpers and allies

CYEMATIDAE

Vol. 3, p. 1693

Bobtail eels

To 15 cm. Midwater at depths of 1 500 to 3 000 m. One species recorded from the area but other species may also occur.

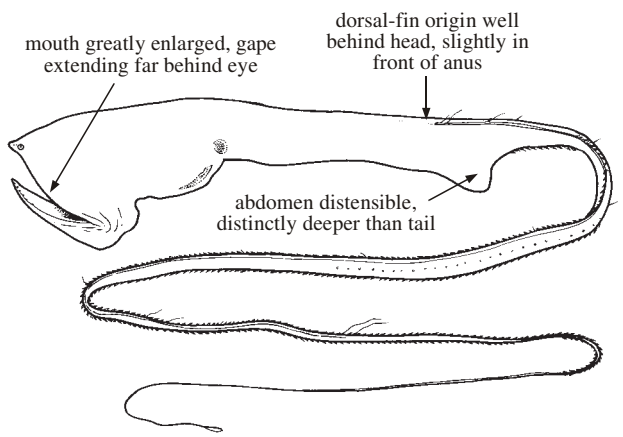


SACCOPHARYNGIDAE

Vol. 3, p. 1694

Swallower eels

To about 2 m. Pelagic at depths from 1 000 to 3 000 m. No species as yet officially recorded from the area, but some representatives of this family are thought to occur.

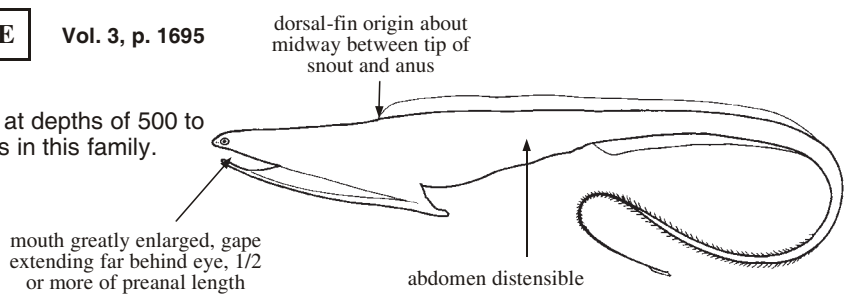


EURYPHARYNGIDAE

Vol. 3, p. 1695

Gulper eels

To about 80 cm. Pelagic at depths of 500 to 3 000 m. A single species in this family.

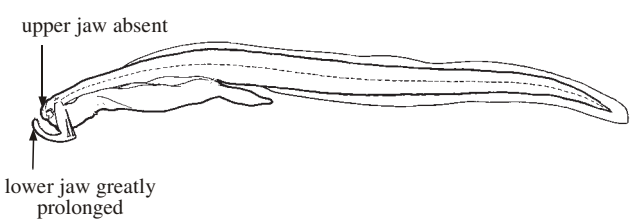


MONOGNATHIDAE

Vol. 3, p. 1696

Monognathids

To about 16 cm. Pelagic at depths from 2 000 to 5 400 m. Two species recorded from the area, at least 7 more species suspected to occur and additional new species suspected.



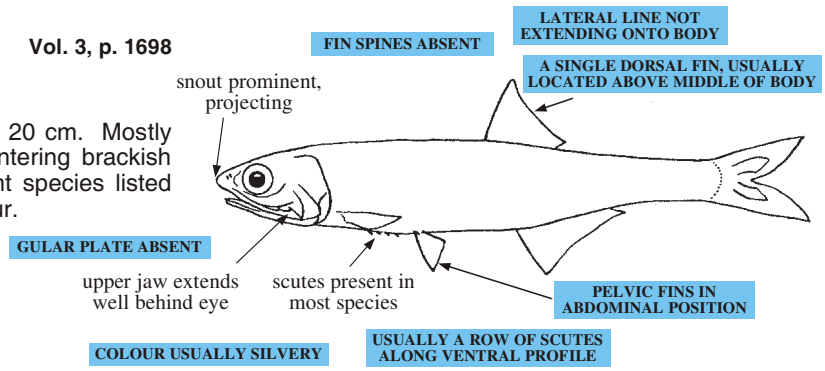
Order CLUPEIFORMES - Herrings and allies

ENGRAULIDAE

Vol. 3, p. 1698

Anchovies

To 37 cm, but usually 10 to 20 cm. Mostly coastal pelagic but some entering brackish and fresh water. Forty-eight species listed but others suspected to occur.

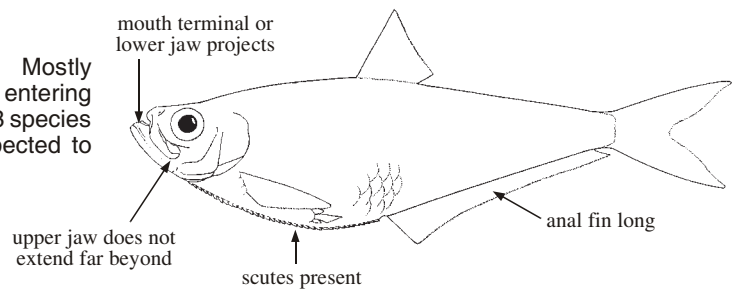


PRISTIGASTERIDAE

Vol. 3, p. 1754

Ilishas, pellonas

To 41 cm, usually less than 25 cm. Mostly coastal and demersal, some species entering brackish and fresh water. At least 13 species recorded from the area, other suspected to occur.

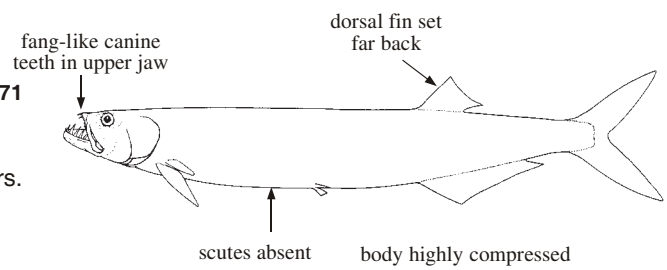


CHIROCENTRIDAE

Vol. 3, p. 1771

Wolf-herrings

To about 1 m. Pelagic in coastal waters. Two species in the family.

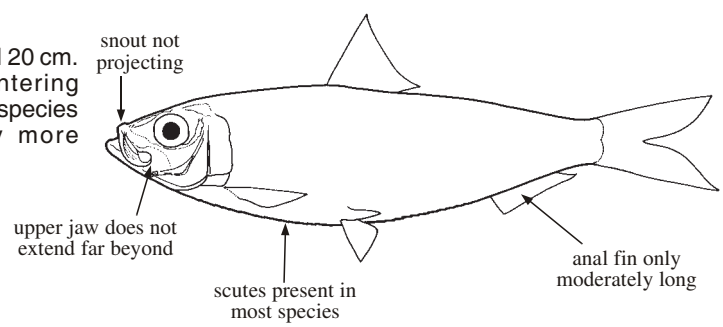


CLUPEIDAE

Vol. 3, p. 1775

Sardines, sardinellas

To 60 cm, but usually between 10 and 20 cm. Mostly coastal pelagic, some entering brackish and fresh water. Forty-three species known from the area but many more suspected to occur.

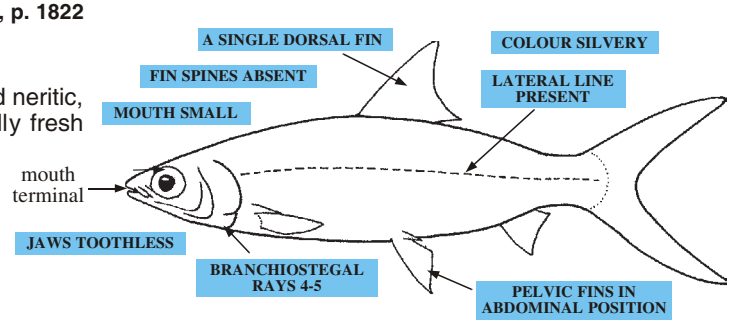


Order GONORYNCHIFORMES - Milkfish and allies

CHANIDAE Vol. 3, p. 1822

Milkfish

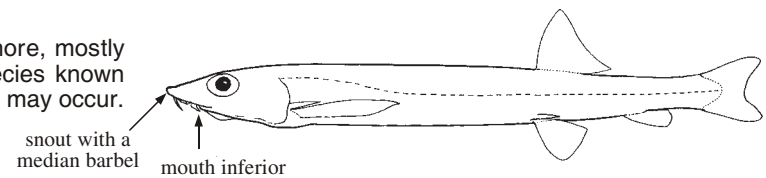
To about 150 cm. Mostly pelagic and neritic, but also in estuarine and occasionally fresh water. A single species.



GONORYNCHIDAE Vol. 3, p. 1825

Beaked sandfish

To about 50 cm. Demersal inshore, mostly over sand bottom. A single species known from the area but 3 other species may occur.

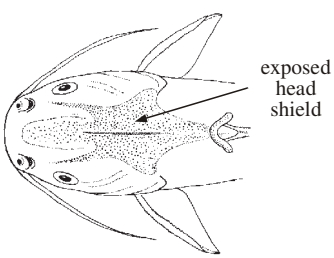


Order SILURIFORMES - Catfishes

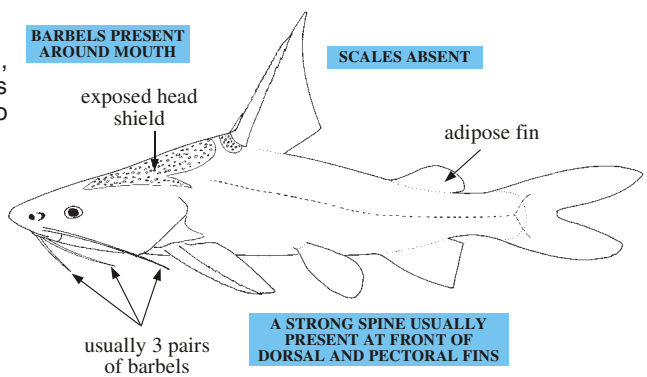
ARIIDAE Vol. 3, p. 1827

Sea catfishes

To 180 cm. Benthic in coastal waters, estuaries, and fresh water. Forty-four species listed from the area but others suspected to occur.



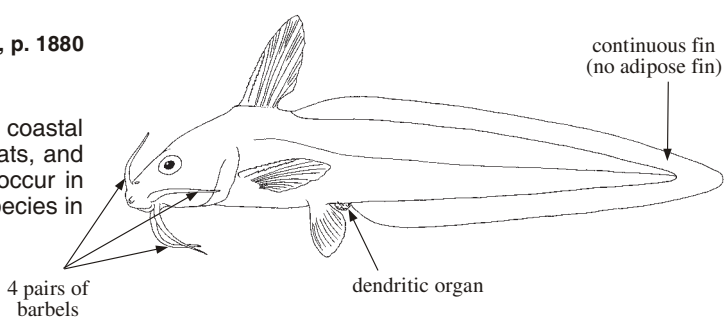
dorsal view of head



PLOTOSIDAE Vol. 3, p. 1880

Eeltail catfishes

To 150 cm. Demersal in a variety of coastal habitats including coral reefs, sand flats, and estuaries; fresh-water species also occur in Australia and New Guinea. Seven species in the area.



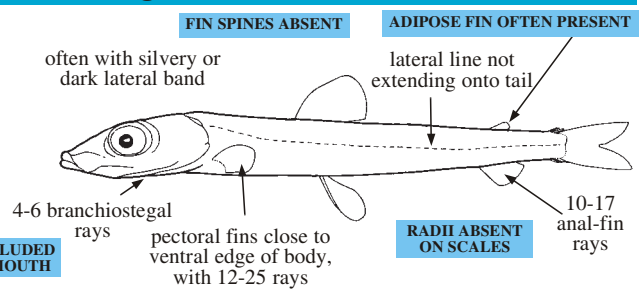
Order OSMERIFORMES - Argentines and allies

ARGENTINIDAE

Vol. 3, p. 1884

Argentines

To 60 cm standard length. Benthopelagic on the outer shelf and upper slope, to a maximum depth of 1 400 m. At least 2 species known from the area, 1 of them undescribed.

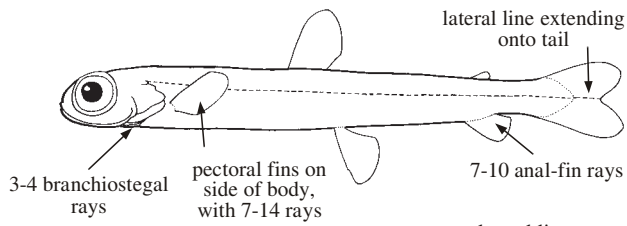


MICROSTOMATIDAE

Vol. 3, p. 1885

Microstomatids

To perhaps 25 cm. Mesopelagic, perhaps also near the bottom along continental slopes. Three species known from the area.

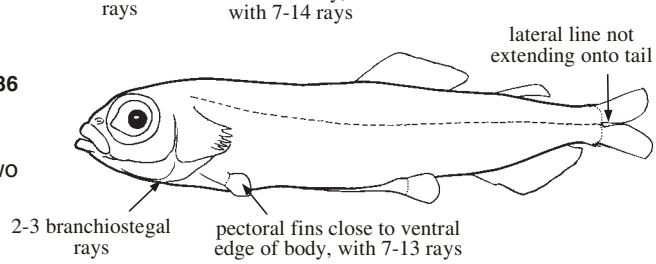


BATHYLAGIDAE

Vol. 3, p. 1886

Deepsea smelts

To 20 cm. Meso- and bathypelagic. Two species known from the area.

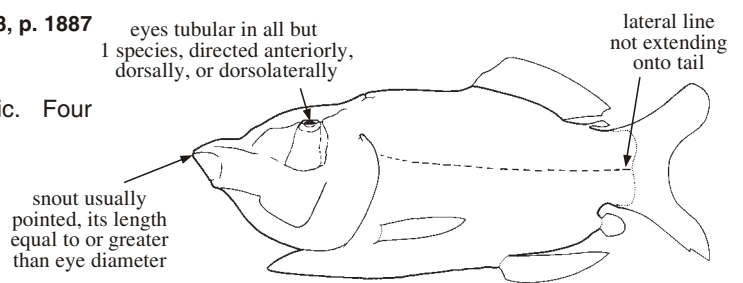


OPISTHOPROCTIDAE

Vol. 3, p. 1887

Barreleyes

To 16 cm. Meso- and bathypelagic. Four species recorded from the area.

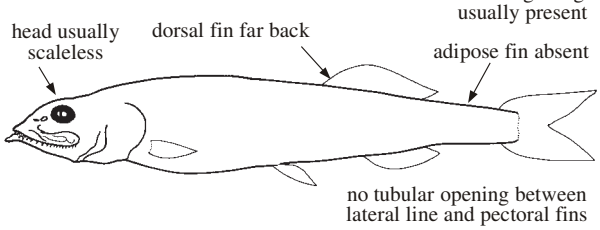


ALEPOCEPHALIDAE

Vol. 3, p. 1888

Slickheads

To about 60 to 70 cm. Benthopelagic, mesopelagic, and bathypelagic from depths of 100 to 5 000 m; usually between 800 and 2 500 m. At least 44 species in the area, with an additional 15 suspected to occur.

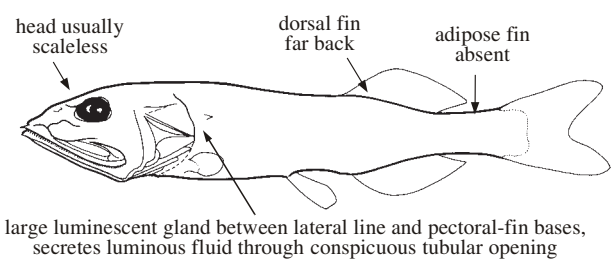


PLATYTROCTIDAE

Vol. 3, p. 1894

Tubeshoulders

To about 35 cm. Benthopelagic, mesopelagic, and bathypelagic, most commonly between depths of 800 and 2 000 m. Thirteen species known from the area with an additional 8 expected to occur there.

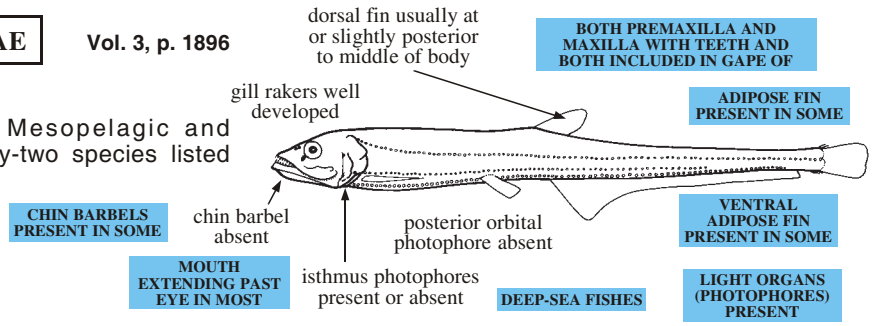


Order STOMIIFORMES - Bristlemouths and allies

GONOSTOMATIDAE Vol. 3, p. 1896

Bristlemouths

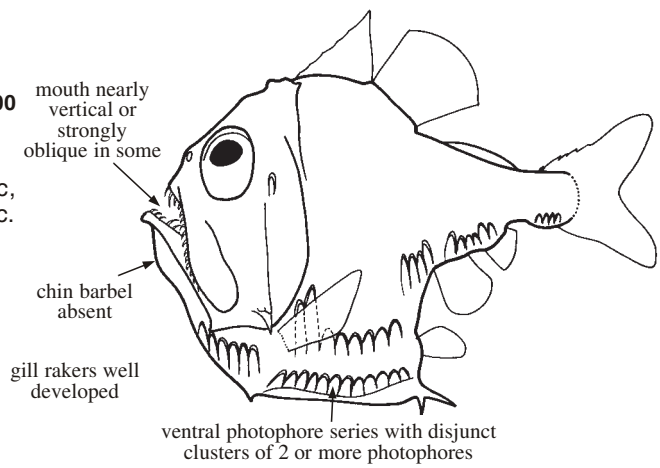
To about 36 cm. Mesopelagic and bathypelagic. Twenty-two species listed from the area.



STERNOPTYCHIDAE Vol. 3, p. 1900

Hatchetfishes

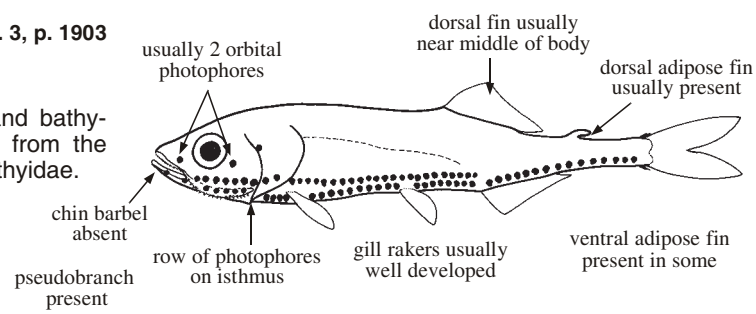
To about 10 cm. Mostly mesopelagic, occasionally bathypelagic or benthopelagic. Forty species listed from the area.



PHOSICHTHYIDAE Vol. 3, p. 1903

Lightfishes

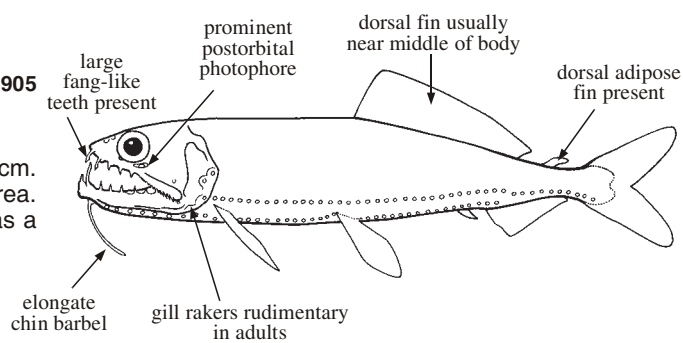
To about 30 cm. Mesopelagic and bathypelagic. Fourteen species listed from the area. Sometimes listed as Photichthyidae.



ASTRONESTHIDAE Vol. 3, p. 1905

Snaggletooths

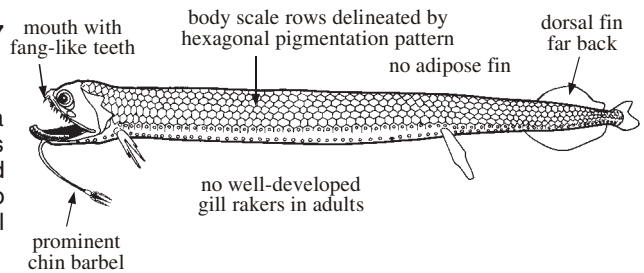
To 21.5 cm, but usually smaller than 15 cm. Mesopelagic. Sixteen species in the area. This family also sometimes considered as a subfamily of the Stomiidae.



STOMIIDAE Vol. 3, p. 1907

Scaly dragonfishes

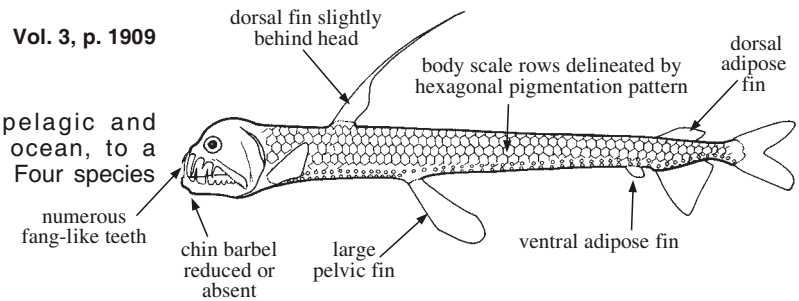
To about 41 cm. Mostly mesopelagic to a depth of 1 000 m, but some species bathypelagic to 2 000 m. Five species listed from the area. This family also considered to include the family Astronesthidae and all remaining families listed below in this order.



CHAULIODONTIDAE Vol. 3, p. 1909

Viperfishes

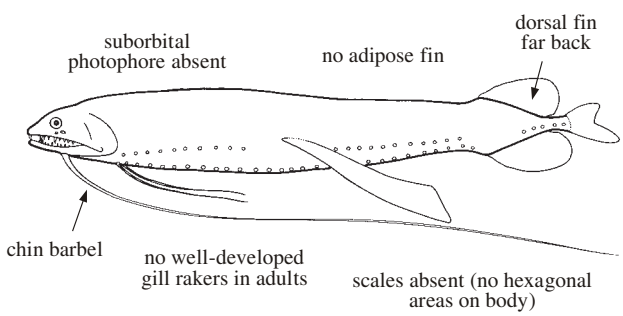
To about 30 cm. Mesopelagic and bathypelagic in the open ocean, to a maximum depth of 2 800 m. Four species listed from the area.



MELANOSTOMIIDAE Vol. 3, p. 1911

Scaleless black dragonfishes

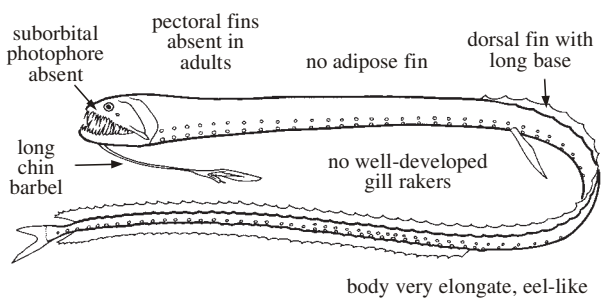
To 50 cm standard length. Mostly mesopelagic to depths of 1 000 m, although some caught to depths of 4 500 m; some species migrate to surface at night. Fifty-six species listed from the area.



IDIACANTHIDAE Vol. 3, p. 1914

Black dragonfishes

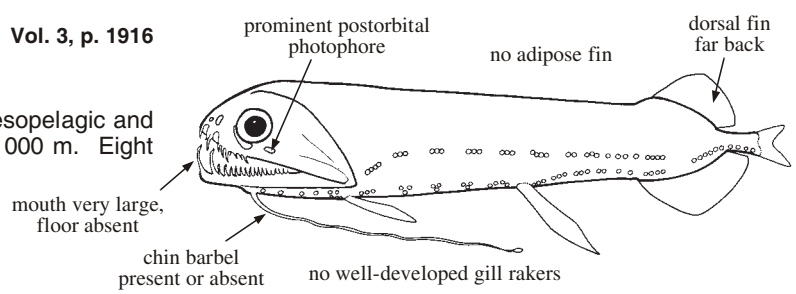
To about 48 cm standard length. Mesopelagic and bathypelagic to a depth of 2 000 m. Three species in the area.



MALACOSTEIDAE Vol. 3, p. 1916

Loosejaws

To 24 cm standard length. Mesopelagic and bathypelagic to depths of 4 000 m. Eight species listed from the area.



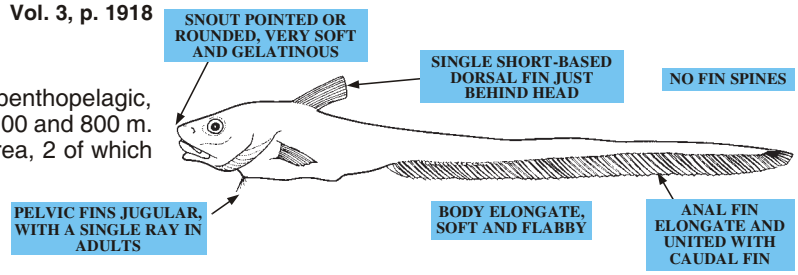
Order ATELEOPODIFORMES - Jellynoses

ATELEOPODIDAE

Vol. 3, p. 1918

Jellynoses

To about 2 m. Demersal or benthopelagic, usually from depths between 200 and 800 m. Five species listed from the area, 2 of which are undescribed.



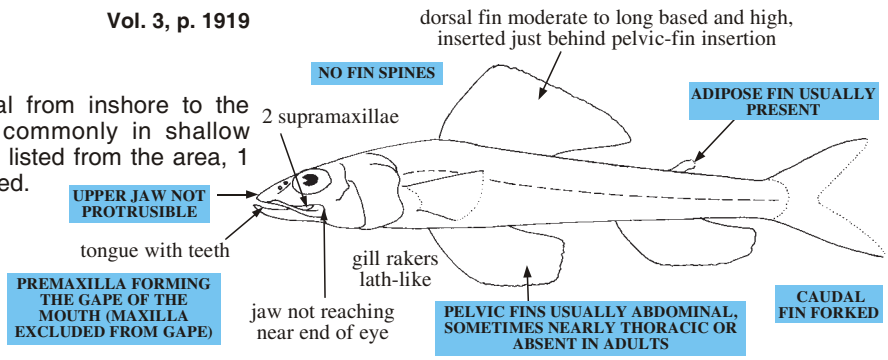
Order AULOPIFORMES - Greeneyes and allies

AULOPIDAE

Vol. 3, p. 1919

Aulopus

To 60 cm. Demersal from inshore to the upper slope; most commonly in shallow waters. Four species listed from the area, 1 of which is undescribed.

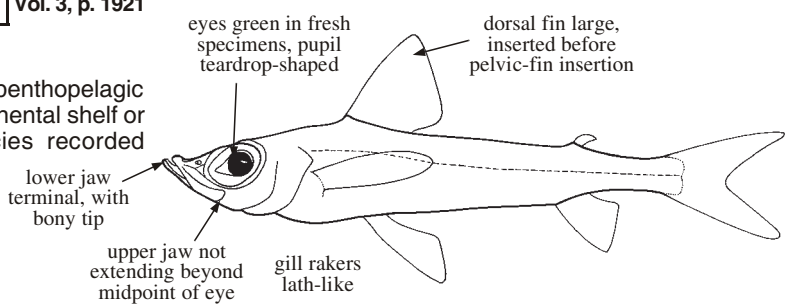


CHLOROPHTHALMIDAE

Vol. 3, p. 1921

Greeneyes

To about 30 cm. Demersal or benthopelagic in deep water on the outer continental shelf or continental slope. Nine species recorded from the area.

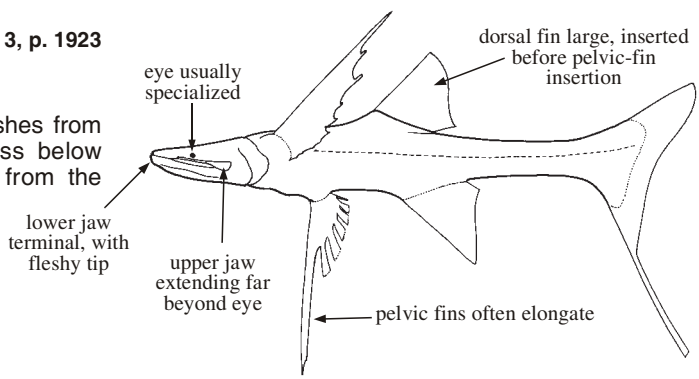


IPNOPIDAE

Vol. 3, p. 1923

Tripod fishes

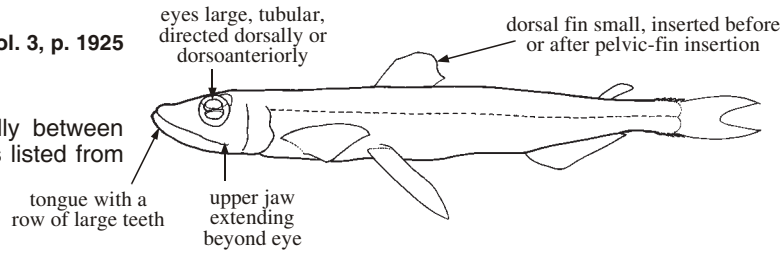
To 45 cm. Demersal deep-sea fishes from the continental slope to the abyss below 5 000 m. Thirteen species listed from the area.



SCOPELARCHIDAE Vol. 3, p. 1925

Pearleyes

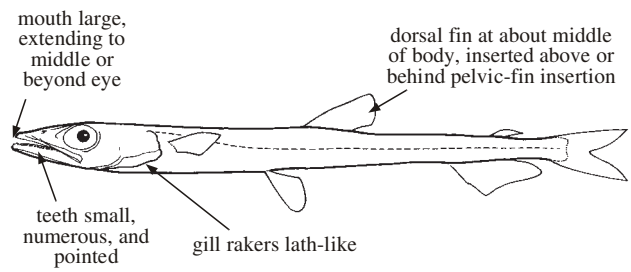
To 23 cm. Mesopelagic, usually between 500 and 1 000 m. Eight species listed from the area.



NOTOSUDIDAE Vol. 3, p. 1927

Waryfishes

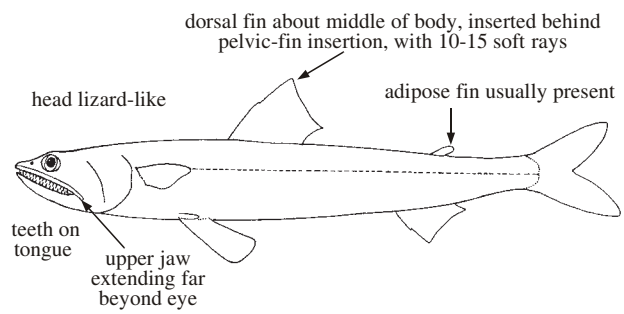
To 50 cm. Mesopelagic, bathypelagic, benthopelagic, or insular epipelagic. Eight species listed from the area. Sometimes listed as the family Scopelosauridae.



SYNODONTIDAE Vol. 3, p. 1928

Lizardfishes

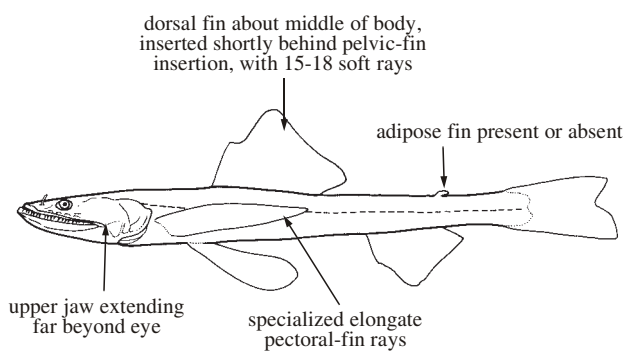
To about 70 cm. Demersal, in estuarine, inshore, and continental shelf waters on coral reef, rock, sand, and mud bottoms to depths of about 300 m. Thirty species in the area.



BATHYSAURIDAE Vol. 3, p. 1946

Deepsea lizardfishes

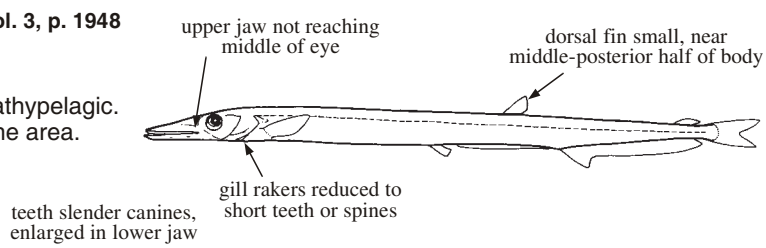
To about 84 cm in standard length. Demersal at depths below 1 000 m. Two species in the area.



PARALEPIDIDAE Vol. 3, p. 1948

Barracudinas

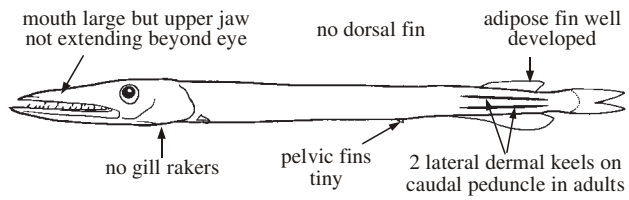
To 100 cm. Mesopelagic and bathypelagic. Twenty-four species listed from the area.



ANOTOPTERIDAE **Vol. 3, p. 1950**

Daggertooth

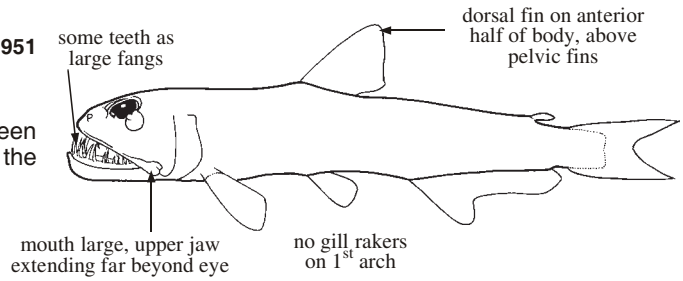
To 90 cm. Epipelagic and mesopelagic. A single species.



EVERMANNELLIDAE **Vol. 3, p. 1951**

Sabertooth fishes

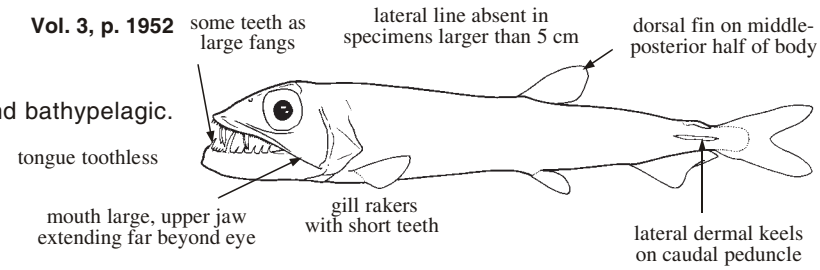
To 19 cm. Mesopelagic, usually between 400 and 800 m. Five species listed from the area.



OMOSUDIDAE **Vol. 3, p. 1952**

Omosudid

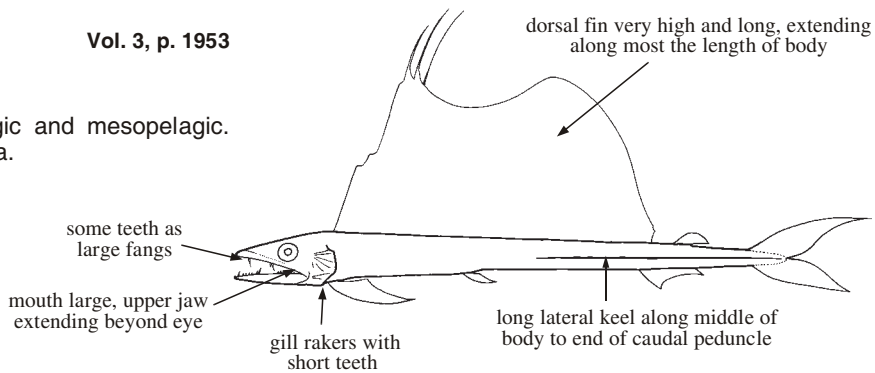
To 30 cm. Mesopelagic and bathypelagic. A single species.



ALEPISAURIDAE **Vol. 3, p. 1953**

Lancetfishes

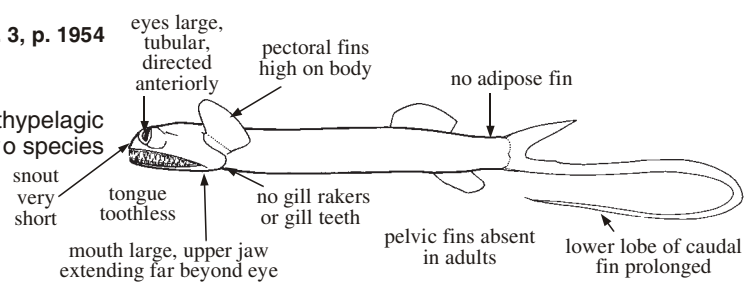
To 210 cm. Epipelagic and mesopelagic. Two species in the area.



GIGANTURIDAE **Vol. 3, p. 1954**

Telescope fishes

To 22 cm. Mesopelagic and bathypelagic from depths of 700 to 2 000 m. Two species in the area.



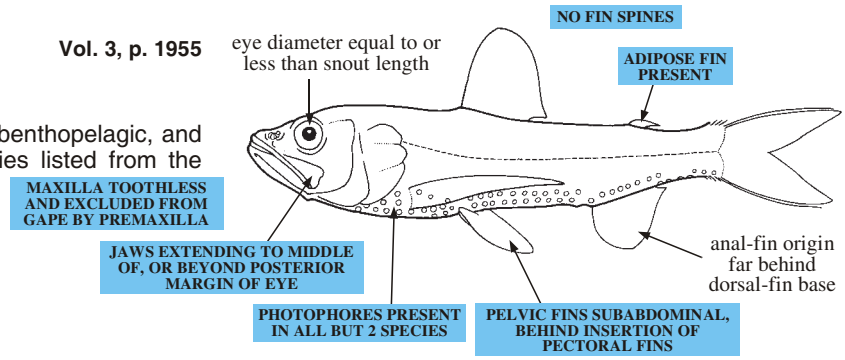
Order MYCTOPHIFORMES - Lanternfishes and allies

NEOSCOPELIDAE

Vol. 3, p. 1955

Neoscopelids

To 30 cm. Mesopelagic, benthopelagic, and bathypelagic. Five species listed from the area.

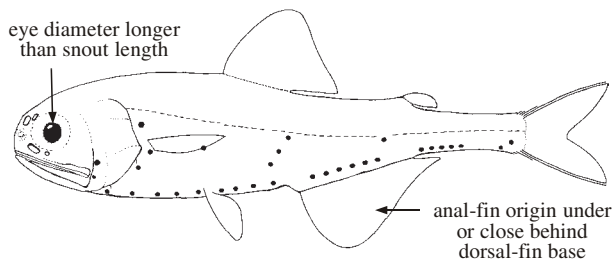


MYCTOPHIDAE

Vol. 3, p. 1957

Lanternfishes

To 20 cm, but most species less than 12 cm. Mostly mesopelagic, undergoing vertical migration to the upper 200 m at night; some bathypelagic and benthopelagic species. At least 150 species known from the area with more species expected.



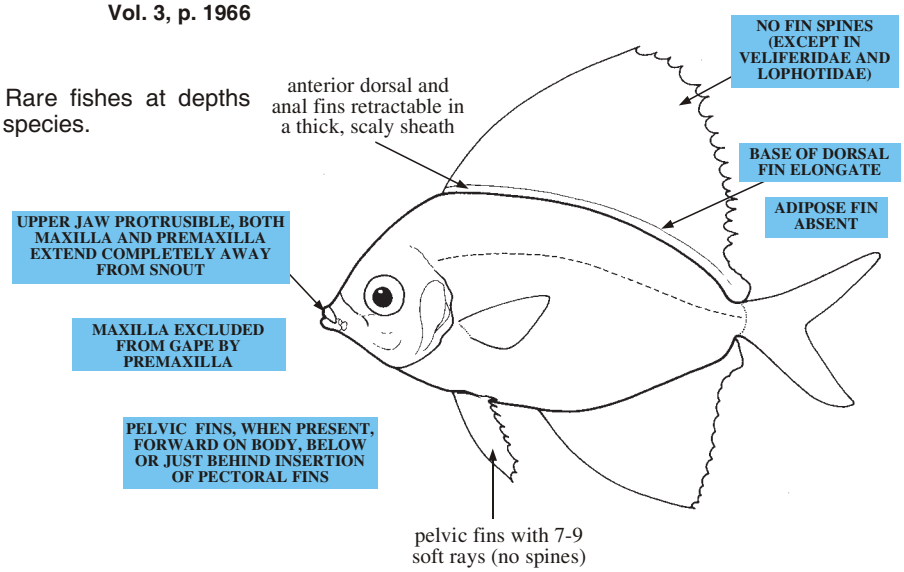
Order LAMPRIDIFORMES - Opahs and allies

VELIFERIDAE

Vol. 3, p. 1966

Velifers

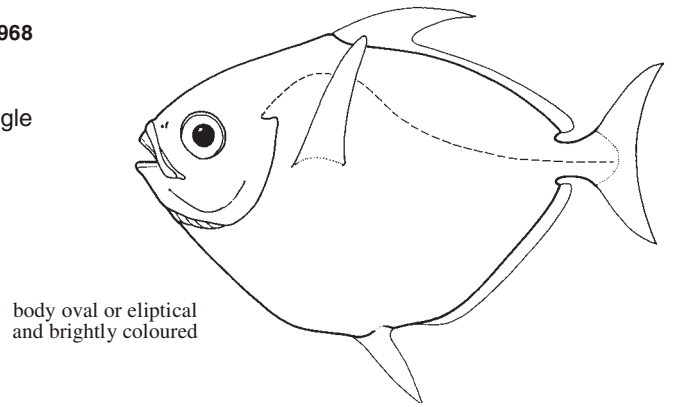
To around 40 cm. Rare fishes at depths down to 110 m. Two species.



LAMPRIDIDAE Vol. 3, p. 1968

Opahs

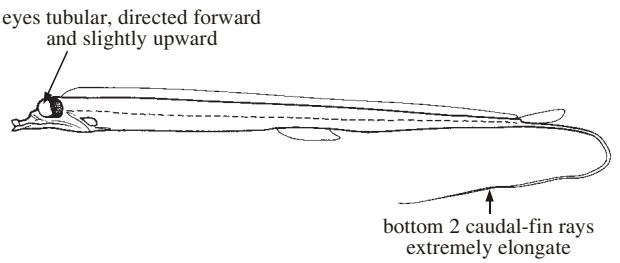
To 180 cm. Open ocean epipelagic. A single species in the area.



STYLEPHORIDAE Vol. 3, p. 1969

Tube-eyes

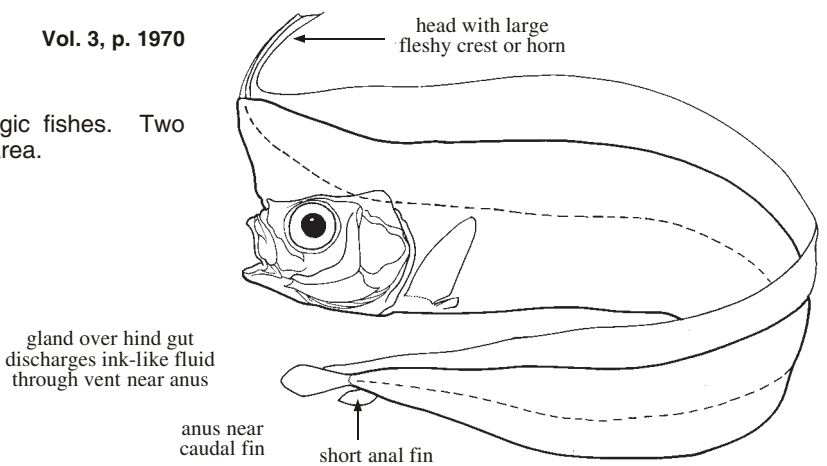
To 30 cm. Rare mesopelagic or bathypelagic usually found at depths between 300 and 800 m. A single species.



LOPHOTIDAE Vol. 3, p. 1970

Crestfishes

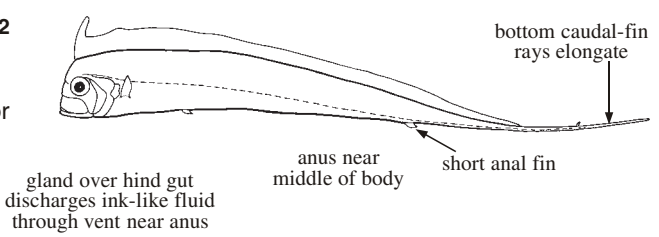
To 2 m. Rare mesopelagic fishes. Two species recognized in the area.



RADIICEPHALIDAE Vol. 3, p. 1972

Taper tails

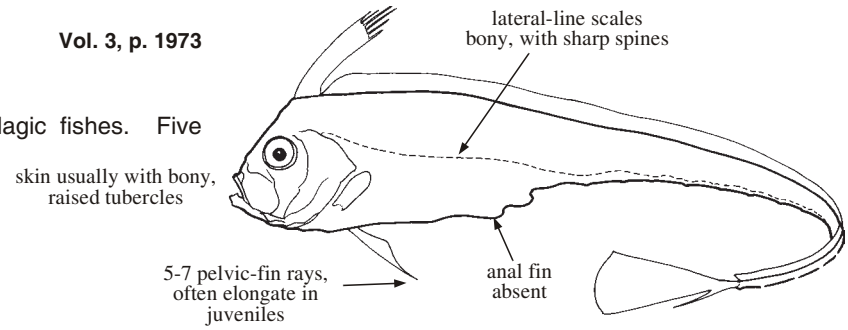
To around 80 cm. Rare mesopelagic or bathypelagic fishes. A single species.



TRACHIPTERIDAE **Vol. 3, p. 1973**

Ribbonfishes

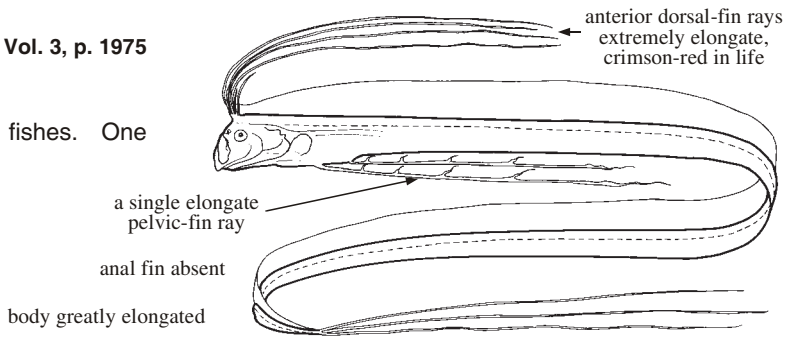
To 2 m. Rare mesopelagic fishes. Five species in the area.



REGALECIDAE **Vol. 3, p. 1975**

Oarfishes

To 17 m. Rare mesopelagic fishes. One species known from the area.

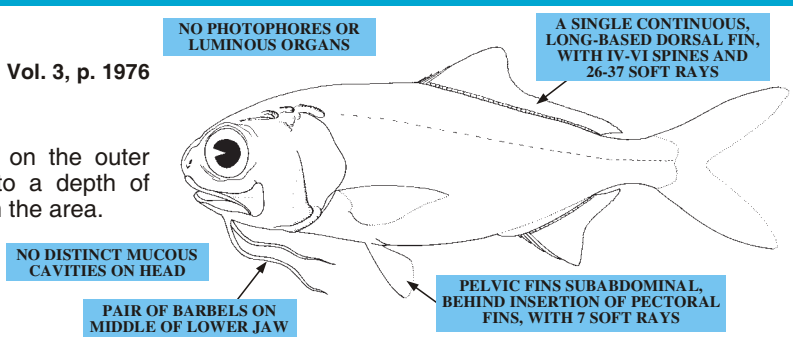


Order POLYMIXIIFORMES - Beardfishes

POLYMIXIIDAE **Vol. 3, p. 1976**

Beardfishes

To 50 cm. Demersal fishes on the outer continental shelf and slope to a depth of around 800 m. Two species in the area.

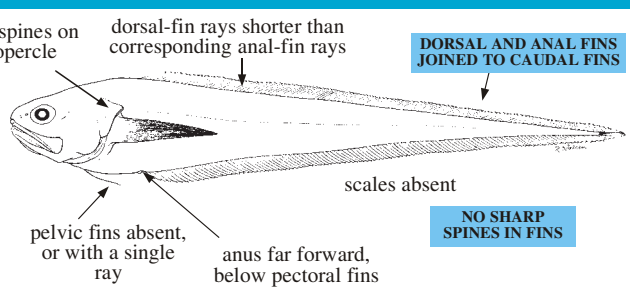


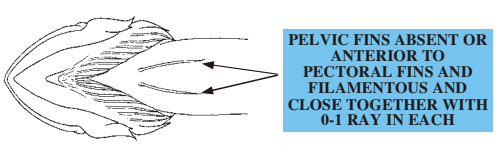
Order OPHIDIIFORMES - Cusk Eels and allies

CARAPIDAE **Vol. 3, p. 1978**

Pearlfishes

To about 50 cm, generally much smaller. Adults demersal, mostly cryptic in shallow coastal waters; some species living as commensals in holothurians, molluscs, and ascidians. Fourteen species listed from the area.



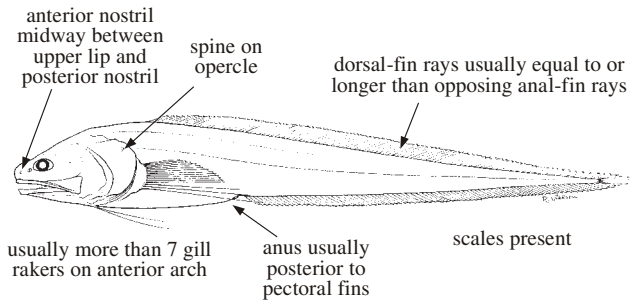


ventral view of head

OPHIDIIDAE **Vol. 3, p. 1979**

Cusk eels

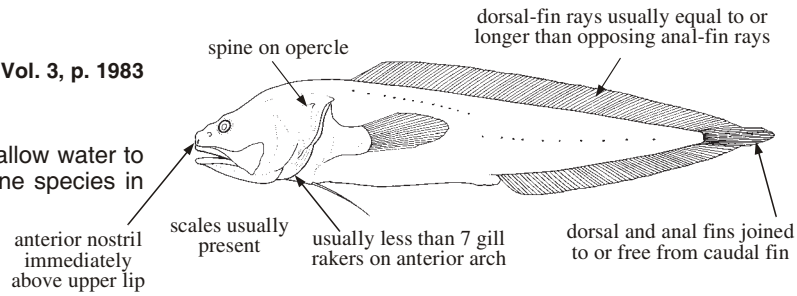
To about 2 m. Mostly demersal from shallow water to depths of 8 370 m. Sixty-three species listed from the area.



BYTHITIDAE **Vol. 3, p. 1983**

Brotulas

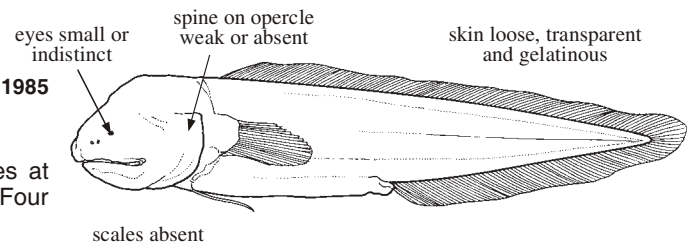
To about 1 m. Demersal in shallow water to a depth of 2 000 m. Twenty-one species in the area.



APHYONIDAE **Vol. 3, p. 1985**

Aphyonids

To about 20 cm. Rare demersal fishes at depths between 800 and 6 000 m. Four species in the area.

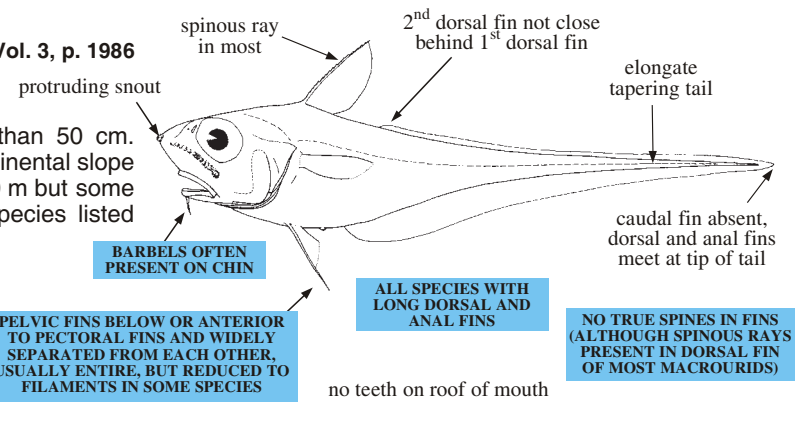


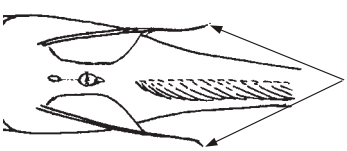
Order GADIFORMES - Cods, Hakes, and allies

MACROURIDAE **Vol. 3, p. 1986**

Grenadiers

To about 150 cm, most less than 50 cm. Benthopelagic on the upper continental slope mostly at depths of 250 to 2 000 m but some below 5 000 m. Around 94 species listed from the area.



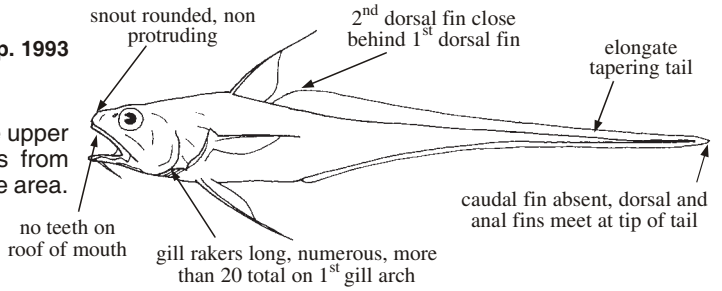


underside of body

BATHYGADIDAE **Vol. 3, p. 1993**

Bathygadids

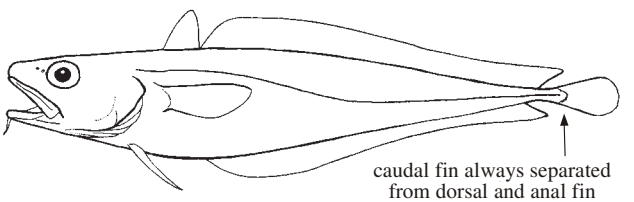
To about 55 cm. Benthopelagic on the upper to middle continental slope at depths from 250 to 2 000 m. About 11 species in the area.



MORIDAE **Vol. 3, p. 1995**

Moras

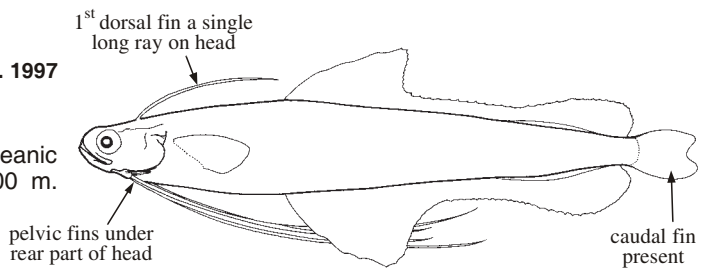
To about 80 cm. Mostly benthopelagic at depths between 150 and 3 000 m. Nine species listed from the area.



BREGMACEROTIDAE **Vol. 3, p. 1997**

Codlets

To 10 cm. Epipelagic in coastal and oceanic waters at depths down to around 300 m. Seven species listed from the area.

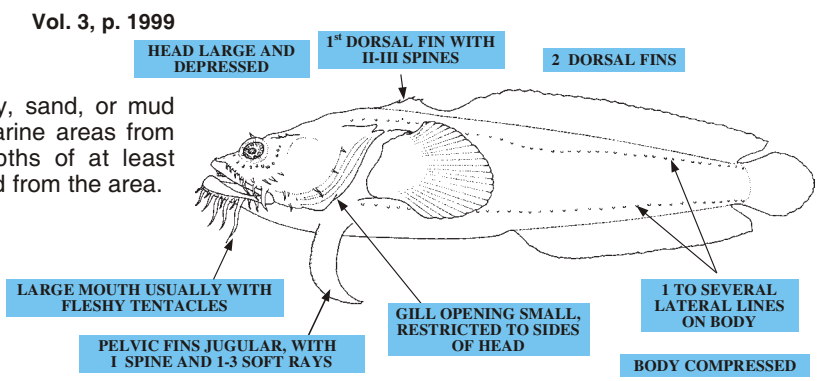


Order BATRACHOIDIFORMES - Toadfishes

BATRACHOIDIDAE **Vol. 3, p. 1999**

Toadfishes

To about 26 cm. On rocky, sand, or mud bottom in coastal and estuarine areas from the shoreline down to depths of at least 140 m. Seven species listed from the area.



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