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Key to the Estuarine and Marine Fishes of Texas

SECOND EDITION

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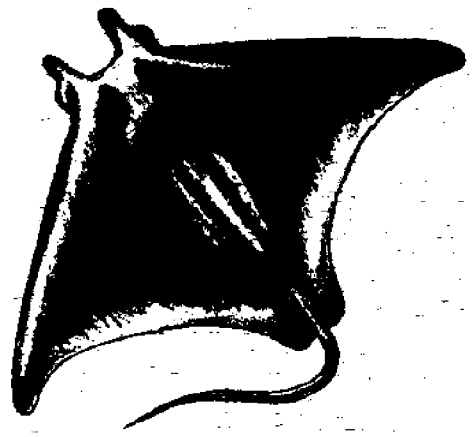

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Edited by
JACK C. PARKER

Prepared by
BENNY J. GALLAWAY, JACK C. PARKER, DONALD MOORE

TEXAS A&M UNIVERSITY • A SEA GRANT COLLEGE • TEXAS AGRICULTURAL EXTENSION SERVICE

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KEY TO THE ESTUARINE AND MARINE FISHES OF TEXAS

EDITED BY: JACK C. PARKER[1]

PREPARED BY: BENNY J. GALLAWAY[2]

JACK C. PARKER[1]

DONALD MOORE[3]

May 1972

[1]Texas Agricultural Extension Service, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas.
[2]Texas Agricultural Experiment Station, Department of Wildlife and Fisheries Sciences, Texas A&M University, College Station, Texas.
[3]National Marine Fisheries Service, Gulf Coastal Fisheries Center, Galveston, Texas.

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Thanks are also expressed to Bob Cullen, Thilbert Green, and John Mounce, of Texas A&M University's Agricultural Communications Art Section, who inked the fish drawings; Kirk Strawn who provided access to his personal library and offered many helpful suggestions; Dale Caldwell and Ronald Hodson who tested the key and offered numerous improvements; and the many students and fishery biologists who, in using the key, offered helpful suggestions for improvement. The personnel of the Photographic and Visual Aids center of Texas A&M University are thanked for their prompt and courteous services in reproducing drawings.

Acknowledgment is also extended to the Department of Wildlife and Fisheries Sciences and the Galveston Marine Laboratory of Texas A&M University; the National Marine Fisheries Service Laboratory at Galveston; and the Texas Parks and Wildlife Department Marine Laboratory at Seabrook for the use of their museum collections.

INTRODUCTION

Persons attempting to identify estuarine and marine fishes found along the Texas coast face a serious handicap because the pertinent literature is vast and scattered through a variety of books and technical journals. This key is a compilation of that literature into a single volume and includes only those adult fishes known or expected to occur along the Texas coast. The key was first published as an unillustrated laboratory manual for marine ichthyology (Parker, Gallaway and Moore, 1970). The second edition includes illustrations, additional species, and improvements in the utilization of diagnostic characters.

The area of coverage extends from Sabine Pass to the mouth of the Rio Grande River, and includes all estuarine waters and that part of the Gulf of Mexico above the continental shelf to a depth of 200 meters (656 feet). The compilation of species was obtained from the checklists of Hoese (1958), Briggs *et al.* (1964) and Parker (1965) and supplemented by more recent records from the literature. A few marine species that have been reported only from waters beyond the continental shelf are included because the location at which they were collected was close enough to the 200 meter boundary to indicate that they may venture into the area of coverage. These species are denoted by an asterisk as they appear in the text. Some families of freshwater fishes were also included to facilitate identification in the low salinity regions of the estuaries. For a key to the freshwater species, the reader is referred to the freshwater fish keys of Hubbs and Lagler (1949), Knapp (1953), Moore (1957) or Hubbs (1964).

PLAN OF GUIDE

The format consists first of a key to the orders, then families within orders, and finally species within families. Depending on their distribution, the families and species are distinguished as being freshwater (F), estuarine (E), marine (M), or any combination thereof.

The orders are presented systematically, according to the American Fisheries Society's "List of Common and Scientific Names of Fishes from the United States and Canada" (1970). Ordinal names of the Goodrich system (-iformes ending) are given first, followed, enclosed in parentheses, by equivalent names employed by Regan, Jordan, Romer, or others. When appropriate, common names of aggregrates within orders are also given in the order key. Both common and scientific names of families and species are given, except in certain instances where common names for species were unavailable. Basically, the nomenclature in this key follows that of the American Fisheries Society's checklist. Departures from that list are noted in the text.

IDENTIFICATION

To determine the species of a fish the following procedure is recommended:

(1) Familiarize yourself with the sections on Morphology, Basic Counts and Measurements, Diagnostic Characters and Glossary of Selected Technical Terms since the information contained there is essential to understand the technical language used in the keys. Words not explained in the glossary will be found in a standard dictionary.

(2) Key the fish from the largest group (key to orders) through successively smaller groups (keys to families and species) until a scientific and common name is found.

(3) Compare the fish in question with the outline drawing of the determined species. If they correspond the identification is probably correct. If after repeated attempts, the fish cannot be satisfactorily identified it should be preserved in a 10% formalin solution with data on the time, place and date of capture and sent to a museum. Both the Department of Wildlife and Fisheries Sciences, Texas A&M University in College Station and the Department of Zoology, University of Texas in Austin have museums interested in Texas fishes.

HOW TO USE THE KEY

This key provides a rather simple method for identifying a fish and requires elimination, by a series of alternate choices, all groups of fishes (orders, families, species) except the one in question. When the final choice is made, the key will provide a common and scientific name for the fish being identified.

The key consists of consecutively numbered couplets. Each couplet has an a and b choice. Begin with couplet 1 of the Key To Orders and compare the fish at hand according to the criteria described in both a and b choices. Select that description which is most appropriate and proceed as indicated by the notation at the end of the choice. If the notation is a number, proceed in the same key to the couplet with that number and continue. If the notation is an order name (-iformes

ending), turn to the indicated page on which the key to that order is found and begin again with couplet 1. Proceed as above until an appropriate family name (-idae ending) is selected, turn to the indicated page, begin with couplet 1 and proceed as before to an appropriate choice followed by a common and scientific name. If your selection of characters has been accurate, your fish is identified. Your identification can be verified by referring to the drawing on the indicated page. When a family is represented by a single species in Texas waters, the common and scientific name along with the drawing are given in the family key.

MORPHOLOGY

In order to identify fishes it is necessary to know something about their structure, especially those parts used in classification. Some general terms are applicable to all animals. Anterior refers to before or to the front end of the body or structure. Posterior refers to behind or to the back end of the body or structure. Dorsal refers to the back or upper surface. Ventral refers to the under part or lower surface and lateral refers to the sides or towards the sides. The diagnostic characters most commonly used in identification are illustrated on pages *viii* and *xi*.

Fishes have both paired and unpaired fins. In the sharks, skates and rays, the fins are covered by thick skin such that the skeletal supports are not visible without dissection. The skeletal supports in the fins of bony fishes, however, are easily visible and may be present as hard, sharp-pointed spines or soft rays or both. The number of spines and/or rays in a given fin is frequently a useful diagnostic character.

The pectoral and pelvic fins, when present, are paired. The pectoral fins are usually located on the sides behind or near the gill openings and the pelvic fins along the belly. Variations in the length and shape of these fins are useful characters in identification as is the placement of the pelvic fins. The position of the pelvic fins is termed abdominal when they are inserted near the anus, thoracic when inserted near or under the pectoral fins and jugular when inserted anterior to the pectoral fins. Some bony fishes have an axillary scale at the base of the pectoral and pelvic fins.

The unpaired fins of fishes consist primarily of the dorsal, anal and caudal fins. The dorsal fin extends along the midline of the back and may be divided into several parts. The anal fin is located along the ventral midline just behind the anus. The tail usually terminates in a caudal fin. There are many vairations in the shape of the caudal fin, but, for purposes of identification in this key, the reader needs to only distinguish between the heterocercal types. In the heterocercal tail, the vertebral column extends into the upper portion of the fin and is characterized as strongly heterocercal in sharks and sturgeons and abbreviate heterocercal in the gars and bowfin. A singular adipose fin or a series of finlets may be present behind the dorsal fin in some fishes. The adipose fin is fleshy and without spines or rays whereas finlets are supported by a single soft ray.

The scales of bony fishes serve as an important tool in identification. Their presence or absence, number along a given line and type are utilized frequently. The types of scales differentiated in this key are

ganoid, cycloid, and ctenoid. Ganoid scales are hard, rhomboid or diamond-shaped and do not overlap. Cycloid scales are rounded, smooth, thin and overlapping. Ctenoid scales are similar to cycloid scales, but their exposed portion is covered with tiny spines called cteni.

The head of a fish includes the gill region and corresponds to the head, neck, and throat of higher vertebrates. Many diagnostic characters are found in the head region. The snout is that portion of the head projecting forward from the anterior rim of the eye. It contains the nostrils which are a pair of blind pits that function primarily as small organs. Each nostril usually has two openings, but in some fishes only one aperature is present. The upper jaw is under the snout and in bony fishes consists of several paired bones. The front pair are the premaxillae which are followed by the spatula-shaped maxillae. A splint-like bone, the supplementary maxilla, may be present on the upper edge of the maxilla. The lower jaw or mandible consists of several bones, the largest being the paired dentary bones. In some bony fishes a prominent bone, the gular plate, is present between the lower jaws. Some fishes may have fleshy, thread-like structures called barbels around the mouth and snout regions of the head.

The gill area offers another important region for differentiation. In sharks, skates and rays each gill chamber has a separate opening to the outside whereas the gills of bony fishes are usually enclosed in a chamber covered by a bony flap called the operculum. The preopercular bone is located on the operculum and is often referred to in this text. A thin membrane supported by a series of slender bones called branchiostegal rays connect the lower edge of the operculum on to a region of the throat called the isthmus. This branchiostegal membrane may be nearly free from the isthmus or broadly joined. The gill chamber is located under the operculum and contains the gills. Each set of gills consists of a pair of bony arches (pharyngeal arches) which support a double row of red gill filaments on their outer edge and a row of finger-like structures called gill rakers on their inner edge. Gill rakers range in shape from knob-like bumps to filamentous hairs. The number of gill rakers and their shape and size are useful in the identification of many fishes.

Fishes have an external set of sensory structures known as the lateral line system. The most obvious part of this system is a series of pores extending in a line along the sides of the trunk and tail. Collectively these pores are called the lateral line and its presence or absence as well as its configuration are useful in identification.

BASIC COUNTS AND MEASUREMENTS

The number of fin spines and/or rays are frequently used as diagnostic characters. For the purpose of this key, spines are unpaired structures without segmentation. They are usually stiff, but may be rudimentary or flexible. Rays are usually branched and flexible and are both paired and segmented. Frequently the last ray of the dorsal and anal fins may be split to the base of the fin. If a ray is divided to the base of the fin but appears to arise from a single origin, it is considered to represent a single ray. When counting the rays of paired fins, include the smallest one at the lower or inner end of the

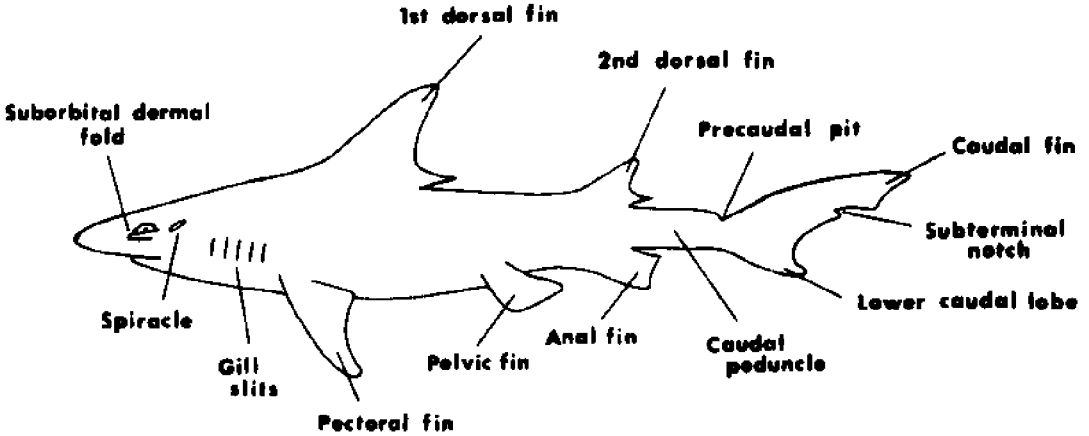
fin base. This count may sometimes require some dissection to be accurate. Counts on the pectoral and pelvic fins are usually made on the left side of the body.

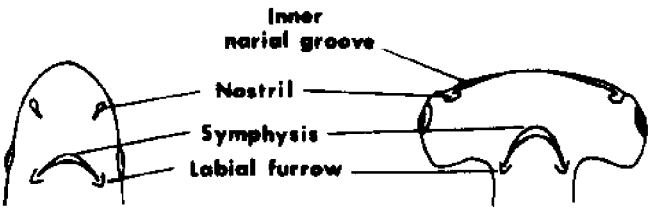
The most common scale count used in this text is the number of scales along the lateral line or along an imaginary line in the position that would normally be occupied by a typical lateral line. The count originates with the scale touching the shoulder girdle and ends at the base of the caudal fin. The base of the caudal fin is determined by the presence of a crease which is clearly visible when the tail is bent to either side. Lateral-line scales behind that crease are not counted and if a scale lied directly over the crease it is not counted if the middle of the scale falls behind the crease.

Gill-raker counts are made on the first gill arch and may consist of all gill rakers or only those on the lower limb. Gill rakers that straddle the angle of the gill arch are included in the count for the lower limb. All rudimentary rakers are included in the count unless stated otherwise.

The most common measurements called for in the text are standard length, head length and body depth. Standard length is the greatest distance in a straight line from the tip of the snout to the base of the caudal fin. Head length is the greatest distance from the tip of the snout to the posterior most point of the opercular membrane. Body depth is the greatest vertical distance in a straight line exclusive of fins or any fleshy or scaly structures associated with fin bases.

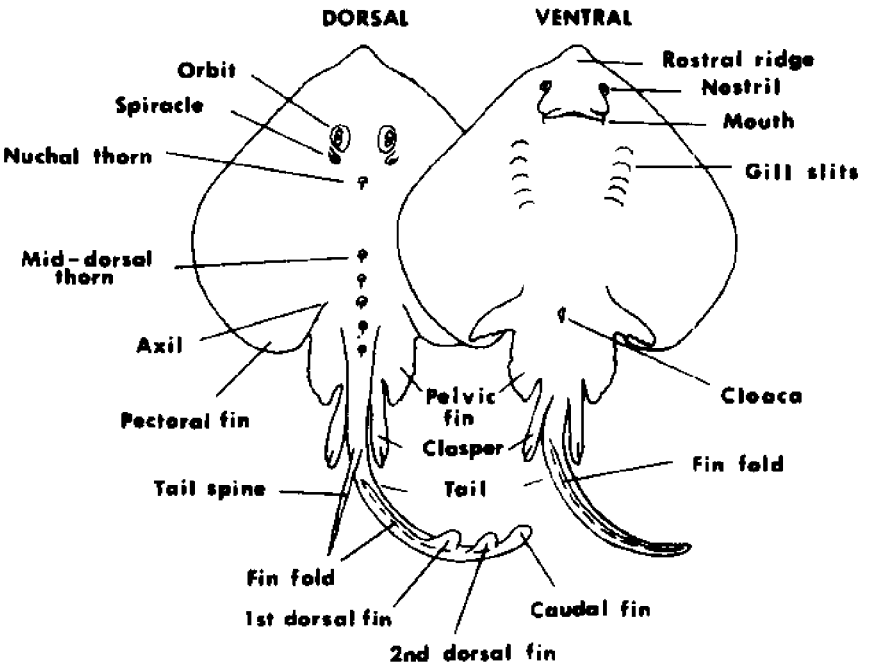
DIAGNOSTIC CHARACTERS



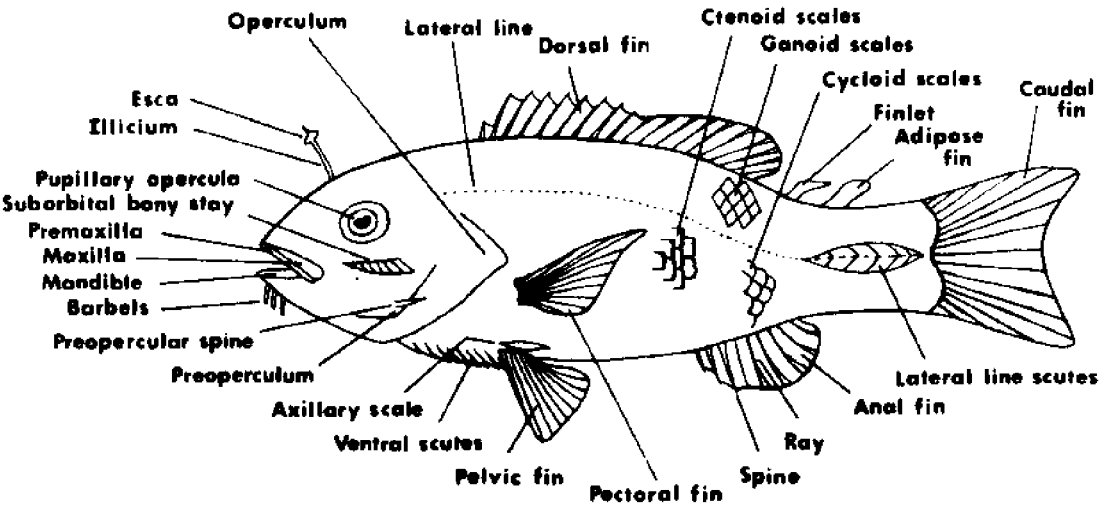


VENTRAL VIEW OF HEAD

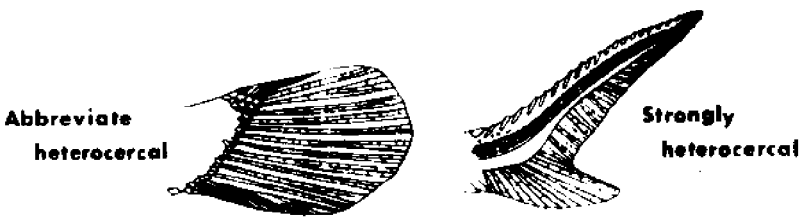
SHARKS



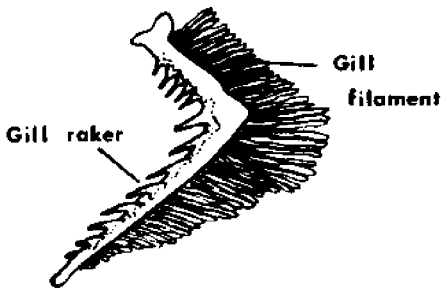
SKATES AND RAYS



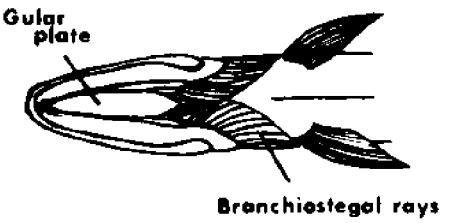
BONY FISHES



HETEROCERCAL TAIL TYPES



GILL ARCH



VENTRAL VIEW OF HEAD WITH GULAR PLATE

GLOSSARY OF SELECTED TECHNICAL TERMS

Axillary scale. An enlarged accessory scale attached to the upper or anterior base of the pectoral or pelvic fins in certain fishes, e.g., menhaden.

Branchiostegals or branchiostegal rays. Elongated, slender bones that support the branchiostegal or gill membranes.

Buccal spine. A spine found on the cheek of some searobins.

Esca. The fleshy "bait" found at the distal end of the illicium or angling apparatus characteristic of goosefishes, batfishes, and frogfishes.

Humeral scale. A large, scale-like structure immediately behind the head and above the origin of the pectoral fin, it is a part of the shoulder girdle.

Illicium. The angling apparatus or "fishing pole" of goosefishes, batfishes, and frogfishes. This structure represents the remains of the spinous dorsal fin.

Inner narial groove. An external groove along the front margin of the head of some hammerhead sharks extending from the narial opening back towards the median part of the head.

Interorbital. The region of the top of the head between the eyes.

Isthmus. The narrow portion of the breast lying between the gills and separating them.

Laciniate. Bearing deep, irregular, usually spine-shaped lobes. This term applies to the posterior margin of the scales of some silversides.

Lappets. Small fleshy tabs found on the back and posterior part of the body of some puffer fishes.

Mailed. Covered by bony plates as is the head and body of certain searobins.

Nape. The region on the back between the occiput (back part of the head) and the origin of the dorsal fin.

Nictitating membrane. Thin membrane at the inner angle of the eye of some groups of sharks.

Occiput. The posterior portion of the top of the head beginning above or immediately behind the eyes and extending to the beginning of the nape.

Pelvic bone. A large bone in the pelvic girdle of triggerfishes and filefishes which in some species supports an external spine.

Post ocular spine. A spine located on top of the head just behind the eye on certain scorpion fishes.

Precaudal pit. A depression or indentation on the tail of sharks located on the dorsal and/or ventral midline just in front of the caudal fin.

Preopercular spine(s). A posteriorly-directed spine found at the angle of the preopercular bone, or the series of spines located along the posterior margin of the preopercle.

Preorbital. Large bone in front of the eye, it is a part of the circumorbital series of bones. In scorpion fishes it may be characterized by having two or three spinous points.

Pseudobranchiae. Small gill-like structures found on the underside of the operculum near its dorsal junction with the preoperculum.

Pupillary opercula. Irregular lobes on the iris of the eye of batfishes. These structures represent a specialization of the iris which permit it to decrease the size of the pupil by extending the lobes, giving the pupil an irregular shape.

Rostral spines. The two spines, one behind the other, found along the sides of the snout in some species of searobins.

Scute. A horny or bony plate which is usually keeled. Scutes are found along the ventral midline of some species and along the lateral line of others.

Suborbital bony stay. A bony ridge usually with spinous points which is located in the area of the head immediately below the eye.

Supplemental preopercular spine. An accessory spine on the preopercular spine of some scorpion fishes.

Supraocular spine. A spine located on top of the head immediately above the eye of some scorpion fishes.

Vomer. An unpaired bone immediately behind the maxillaries in the front part of the roof of the mouth; if tooth bearing, the teeth are called vomerine teeth.

MARINE FISHES OF TEXAS

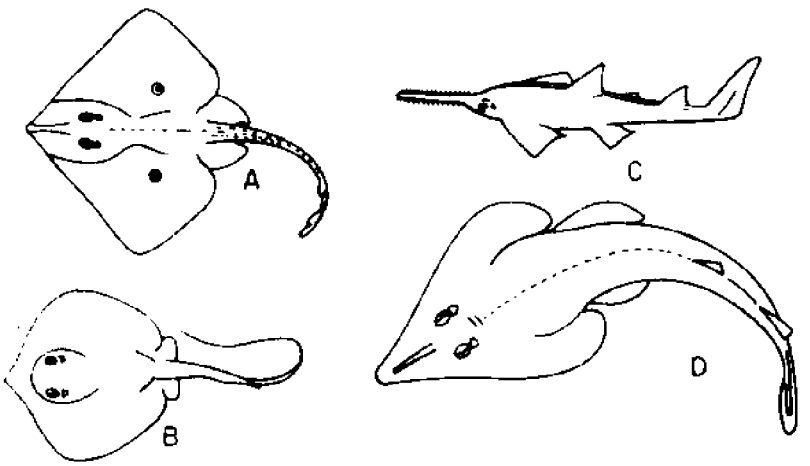
KEY TO THE ORDERS

1. a. Five to seven pairs of gill openings. ---------- 2

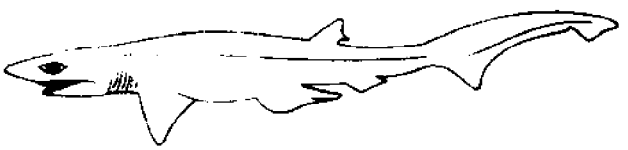
   b. One pair of gill openings. ---------- 4

2. a. Gill openings lateral, on side of head; front margin of pectoral fins free from head. ---------- 3

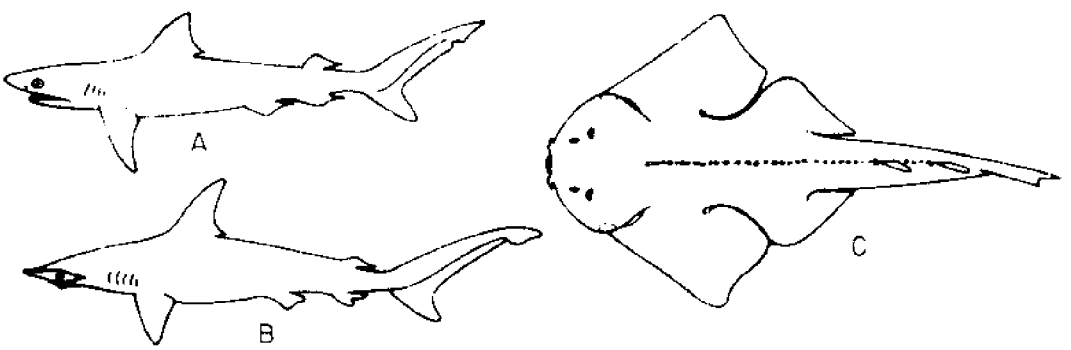
   b. Gill openings ventral, on under side of head; front margin of pectoral fins fused to head. SKATES (A), RAYS (B), SAWFISHES (C), and GUITARFISHES (D). RAJIFORMES. Page 21



3. a. Gill openings 7; head narrow with pointed snout. COW SHARKS. HEXANCHIFORMES. Page 10



   b. Gill openings 5; head and snout variable. SHARKS (A), HAMMERHEAD SHARKS (B), and ANGEL SHARKS (C). SQUALIFORMES. Page 10



4. a. Caudal fin strongly heterocercal or abbreviate heterocercal. ---------- 5

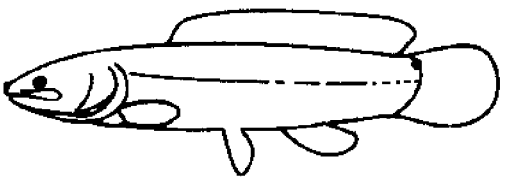
   b. Caudal fin present or absent, when present, never as above. ---------- 7

5. a. Caudal fin strongly heterocercal. STURGEONS (A) and PADDLEFISH (B).
   ACIPENSERIFORMES. Page 28

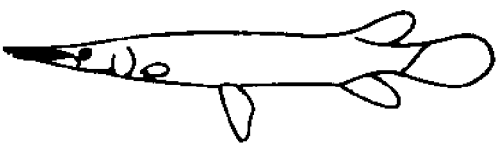
A B

   b. Caudal fin abbreviate heterocercal. ---------- 6

6. a. Body covered with cycloid scales; length of base of dorsal fin at least 1/2 of total body length; snout not beak-like. BOWFINS.
   AMIIFORMES. Page 30



   b. Body covered with thick, rhombic, ganoid scales; length of base of dorsal fin less than 1/2 of total of body length; snout beak-like. GARS.
   SEMIONOTIFORMES (LEPISOSTEIFORMES). Page 30

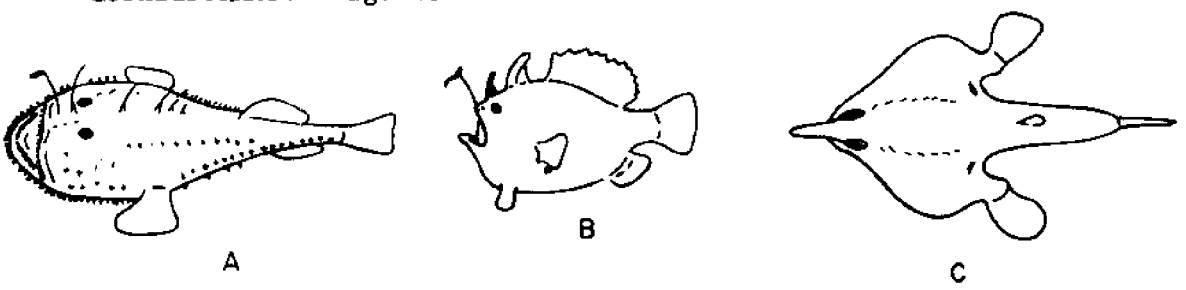


7. a. Snout a protruding tube with short jaws at the end. PIPEFISHES (A), SEAHORSES (B), and CORNETFISHES (C).
   GASTEROSTEIFORMES. Page 68

A B C

b. Snout not formed into a protruding tube (but may be formed into a beak whose jaws extend to its base). ---------- 8

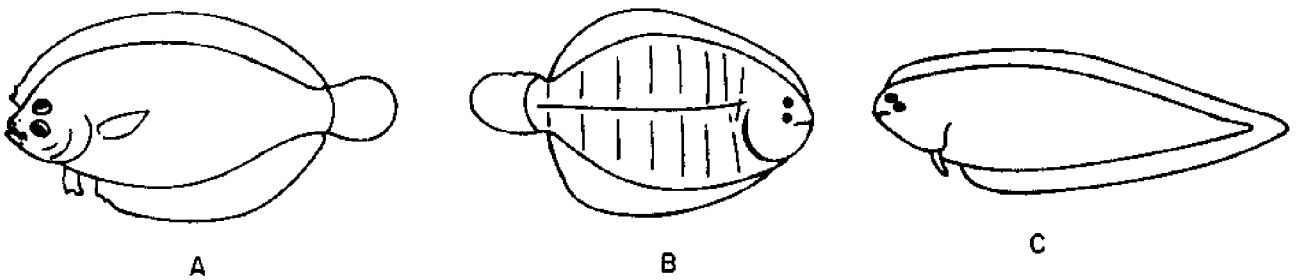
8. a. Gill openings represented by a small hole behind base of each pectoral fin; illicium (angling apparatus) always present but sometimes retracted under snout. GOOSEFISHES (A), FROGFISHES (B) and BATFISHES (C). LOPHIIFORMES. Page 48



A B C

b. Gill openings in front of base of pectoral fins; illicium absent. ---------- 9

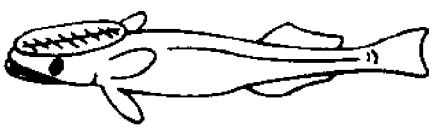
9. a. Body asymmetrical and flat, with eyes on one side of head. FLOUNDERS (A), SOLES (B), and TONGUEFISHES (C). PLEURONECTIFORMES. Page 140



A B C

b. Body symmetrical, one eye on each side of head. ---------- 10

10. a. Top of head with a flat, oval-shaped, laminated sucking disc containing transverse septa. REMORAS. PERCIFORMES (in part = ECHENEIDAE, ECHENEIFORMES). Page 97

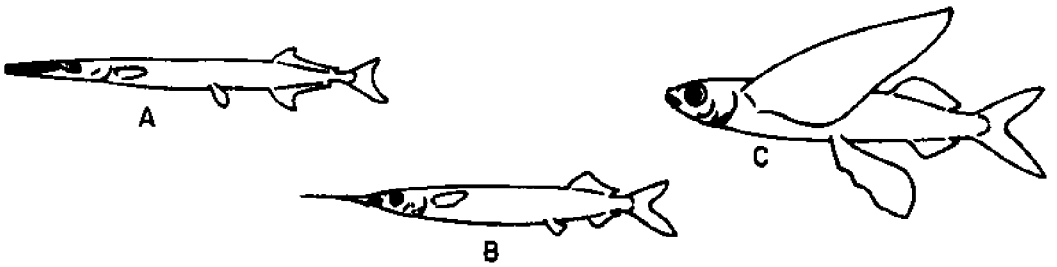


b. Top of head without sucking disc. ---------- 11

11. a. Breast with large sucking disc. CLINGFISHES. GOBIESOCIFORMES. Page 48

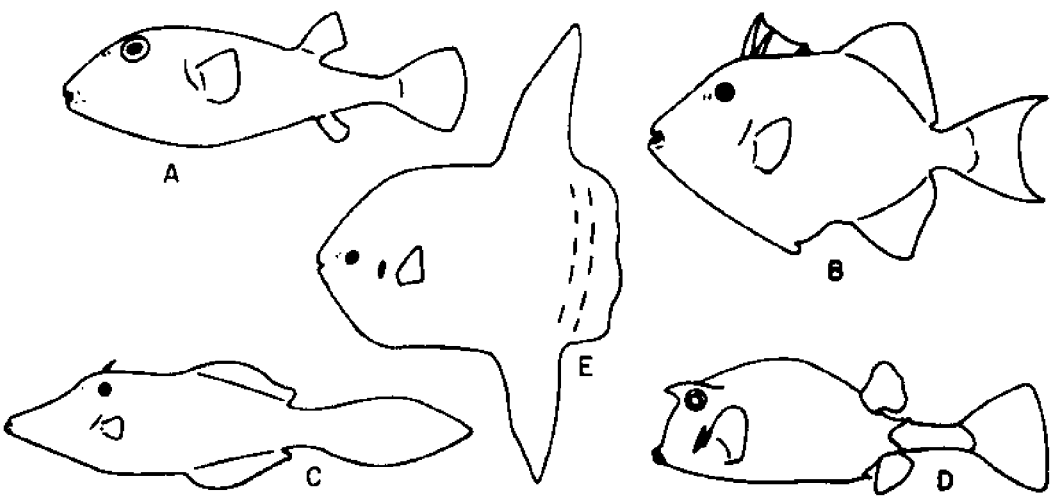
b. Breast without a sucking disc. ---------- 12

12. a. Lateral line single, located well below longitudinal midline its entire length. NEEDLEFISHES (A), HALFBEAKS (B), and FLYINGFISHES (C).
ATHERINIFORMES (in part = BELONIFORMES). Page 57



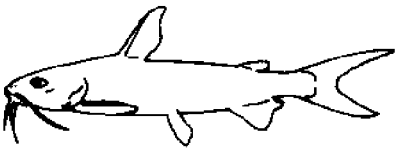
b. Lateral line present or absent, when present, single or multiple and located at least partly along or above longitudinal midline. ---------- 13

13. a. Gill opening an ear-like hole or slit just forward of or slightly above the base of each pectoral fin and seldom much longer than the width of the base of the pectoral fin; body form <u>never</u> eel-like. PUFFERS (A), TRIGGERFISHES (B), FILEFISHES (C), COWFISH (D), and OCEAN SUNFISH (E).
TETRAODONTIFORMES. Page 148



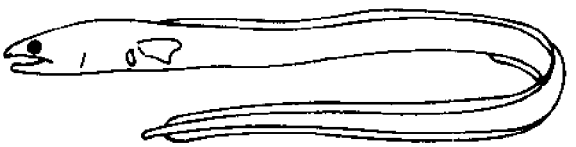
b. Gill opening not as above, except in eel-like forms. ------ 14

14. a. Pectoral and dorsal fins each with a single strong front spine (hard ray); head barbels well developed and elongate; body naked; adipose fin present. CATFISHES. SILURIFORMES. Page 47



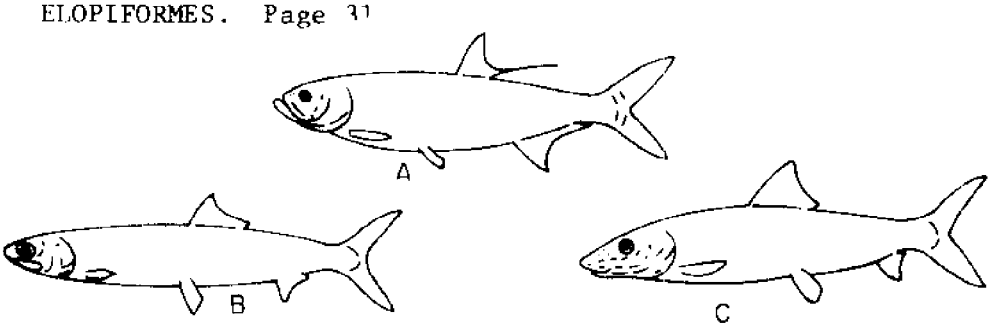
b. Spines of pectoral and dorsal fins, when present, not in above combination; head barbels present or absent; body naked or with scales; adipose fin present or absent. ------ 15

15. a. Body eel-like, only slightly compressed if at all; anus in normal position (just forward of anal fin); operculum reduced; gill openings small and restricted; pelvic fins absent. EELS. ANGUILLIFORMES. Page 31



b. Body usually not eel-like, <u>if so</u>, either body greatly compressed or anus near throat; operculum usually well developed; pelvic fins present or absent. ---------- 16

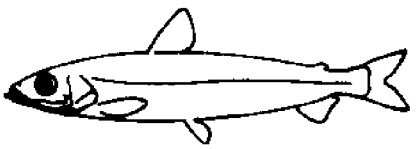
16. a. Gular plate (a large bone in the throat between the angle formed by the lower jaws) present. TARPONS (A), LADYFISH (B), and BONEFISH (C). ELOPIFORMES. Page 31



Note: The gular plate of the bonefish, although present, is not easily seen. This fish is rare in Texas waters and can be readily recognized from the drawing, noting its pig-like snout.

b. Gular plate absent. ---------- 17

17. a. Eye with a cresent of white tissue over upper part of iris; trunk of body elongated and angular (a cross-section at mid-trunk would show either a polygon or a square). ARGENTINES. SALMONIFORMES. Page 43



b. Eye not as above; trunk of body not as above (a cross-section at midtrunk would be oval or circular). ---------- 18

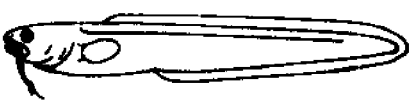
18. a. Upper jaw formed into a bony sword-like bill. BILLFISHES. PERCIFORMES (in part). Page 72

b. Upper jaw not as above. ---------- 19

19. a. Pelvic fins, <u>when present</u>, without spines, <u>when absent</u>, anus near throat and trunk of body nearly cylindrical (eel-like). 20

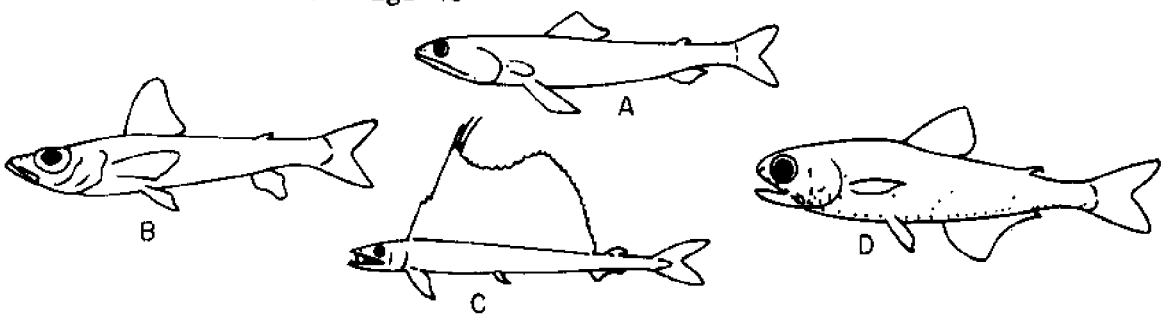
b. Pelvic fins, <u>when present</u>, with spines, <u>when absent</u>, anus in normal position (just forward of anal fin) and trunk of body usually compressed. ---------- 23

20. a. Pelvic fins present or absent, <u>when present</u>, inserted (location of fin base) directly under, or in front of, pectoral fin insertion, if inserted slightly behind pectoral insertion, body tapering to a point behind. JUGLARFISHES. GADIFORMES. Page 53



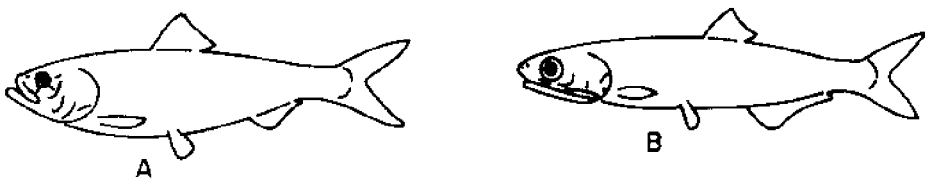
b. Pelvic fins present and inserted behind pectoral fin base, if only slightly behind, body not tapering to a point behind. ---------- 21

21. a. Adipose fin or a detached finlet present. LIZARDFISHES (A), GREENEYES (B), LANCETFISHES (C), and LANTERNFISHES (D). MYCTOPHIFORMES. Page 43

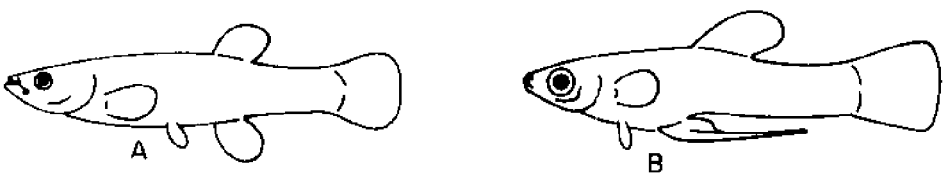


b. Adipose fin or detached finlet absent. ---------- 22

22. a. Caudal fin forked; adipose eyelid usually present; scales absent from head and operculum. HERRRINGS (A) and ANCHOVIES (B).
CLUPEIFORMES. Page 37



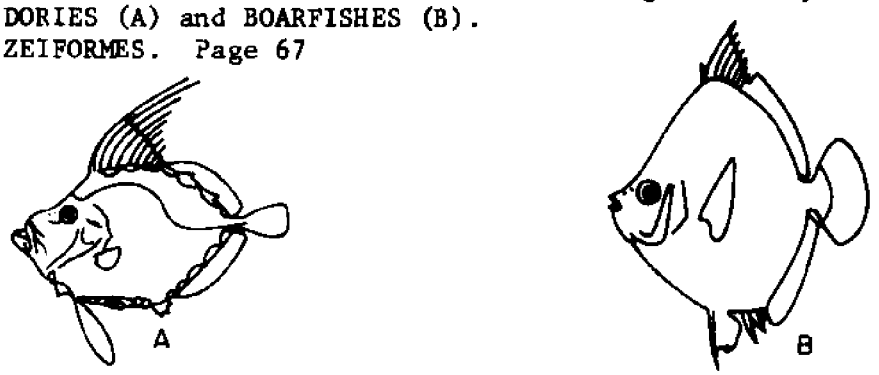
b. Caudal fin rounded or truncate; adipose eyelid absent; scales present on head and/or operculum. KILLIFISHES (A) and LIVEBEARERS (B).
ATHERINIFORMES (in part = CYPRINODONTIFORMES). Page 57



23. a. Gill-bearing arches 3; dorsal fin divided into two parts, the spinous dorsal short with 2 or 3 low stout spines, the soft dorsal long with many segmented rays. TOADFISHES (A) and MIDSHIPMEN (B). BATRACHOIDIFORMES. Page 47

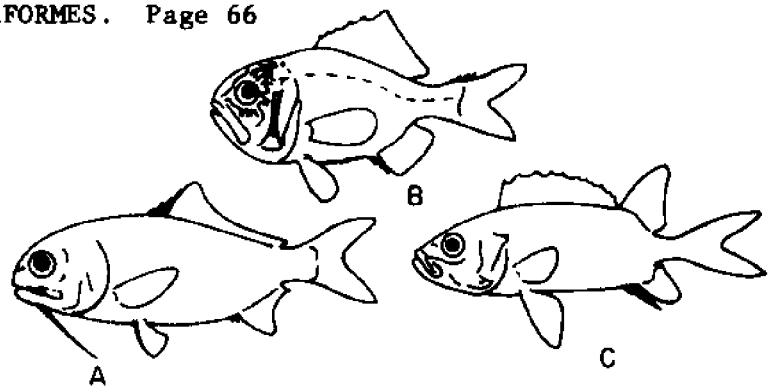
b. Gill-bearing arches 4; dorsal fin either continuous or divided, lengths variable. ---------- 24

24. a. Body very deep and compressed; anal fin divided into two parts, the first with 3 stout spines connected by membranes and the second with 24 to 33 soft rays; body either covered with rough, spiny scales or naked except for bony plates along base of dorsal fin and ventral margin of body. DORIES (A) and BOARFISHES (B). ZEIFORMES. Page 67



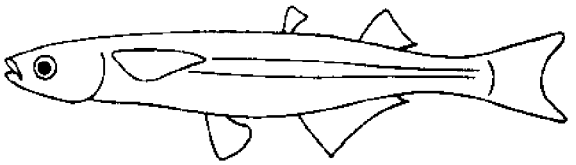
b. Not fitting the above description. ---------- 25

25. a. Pelvic fins present, with 1 spine and 6 to 10 rays (membrane bones of head often spinate or with conspicuous mucous cavities; eyes usually large). BEARDFISHES (A), ARMORHEADS (B), and SQUIRRELFISHES (C). BERYCIFORMES. Page 66



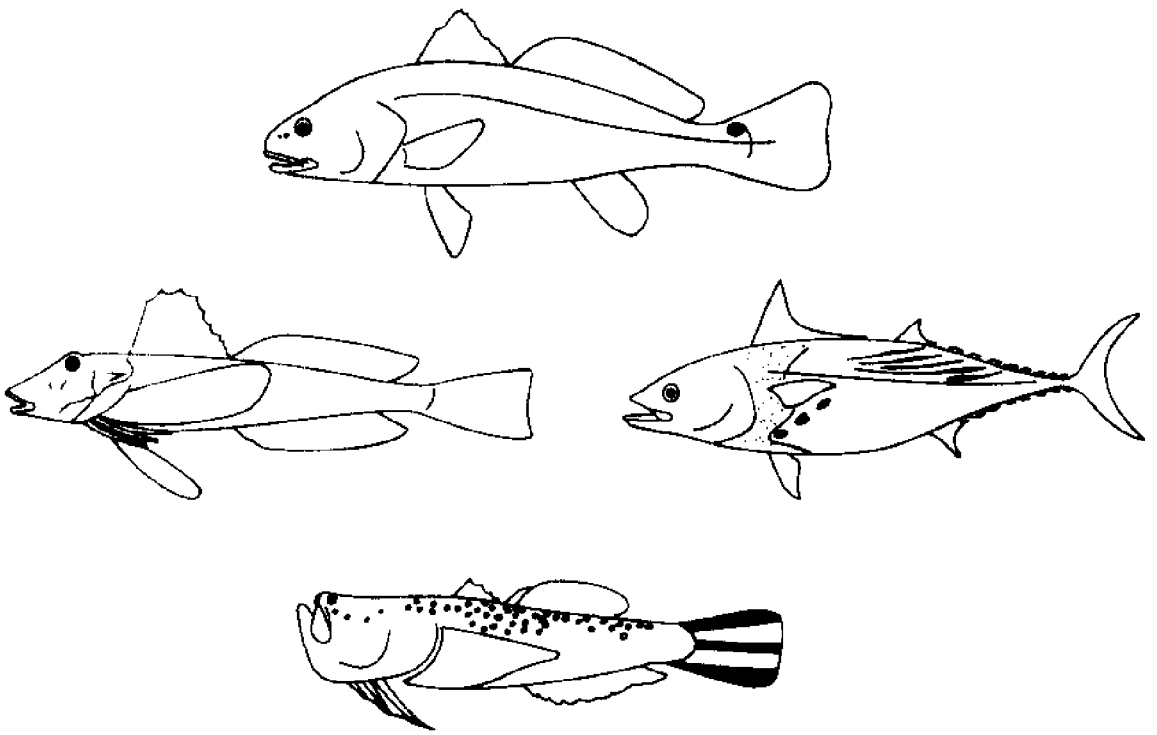
b. Pelvic fins present or absent, when present, with 1 spine and not more than 5 rays. ---------- 26

26. a. Caudal fin present; pectoral fins located high on sides; dorsal fin divided into two well-separated parts, the spinous dorsal with 4 to 8 slender spines or unsegmented hard rays; anal fin with 1 weak spine or unsegmented ray; lateral line absent; sides with a prominent dark or silvery longitudinal band. SILVERSIDES. ATHERINIFORMES (in part = ATHERINIDAE). Page 57



b. Not fitting the above description in its entirety. PERCIFORMES. Page 72

Note: The order Perciformes is a large and diversified group with no singularly distinguishing characteristics.

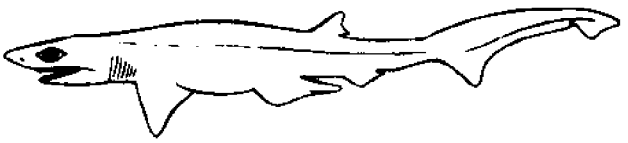


ORDER - HEXANCHIFORMES

Represented by one family.

FAMILY - HEXANCHIDAE - COW SHARKS

One species in Texas waters. (M)
Heptrachias perlo (Bonnaterre)*



ORDER - SQUALIFORMES (SELACHII)

KEY TO FAMILIES

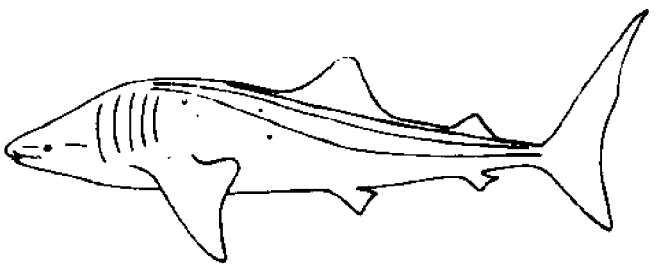
1. a. Anal fin present. ---------- 2

   b. Anal fin absent. ---------- 10

2. a. Origin of base of pelvic fins well in front of termination of base of first dorsal fin. ---------- 3

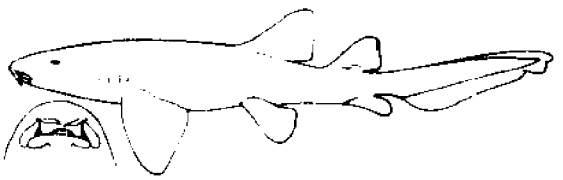
   b. Origin of base of pelvic fins under or behind termination of base of first dorsal fin. ---------- 5

3. a. Caudal fin lunate (shaped like a new moon), large; gill arches connected by masses of spongy tissue. WHALE SHARKS. (M)
   RHINCODONTIDAE.
   One species in Texas waters. WHALE SHARK. (M)
   Rhincodon typus Smith

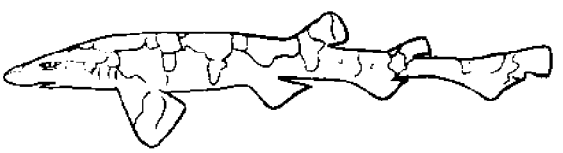


   b. Caudal fin not lunate, not very large; gill arches not connected by masses of spongy tissue. ---------- 4

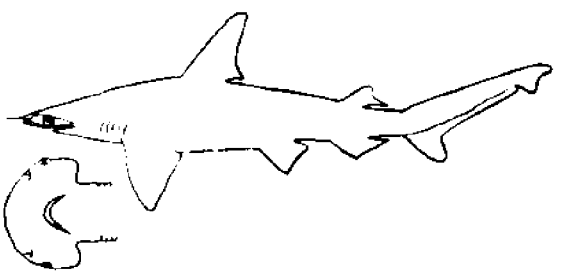
4. a. Deep external grooves present connecting nostrils and mouth; front margin of nostrils with well-developed barbels. CARPET SHARKS. (M)
ORECTOLOBIDAE.
One species in Texas waters. NURSE SHARK. (M)
Ginglymostoma cirratum (Bonnaterre)



b. Grooves absent; front margin of nostrils without well-developed barbels. CAT SHARKS. (M)
SCYLIORHINIDAE. Page 14

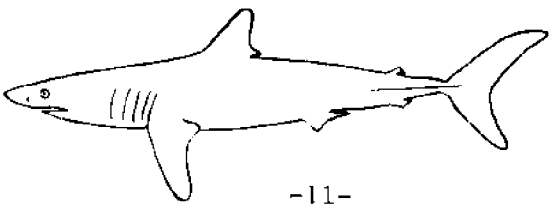


5. a. Head greatly expanded laterally, either spade-shaped or hammer-shaped. HAMMERHEAD SHARKS. (M)
SPHYRNIDAE. Page 19



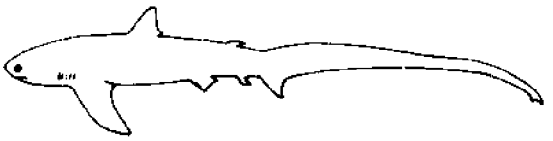
b. Head pointed or rounded, not spade- or hammer-shaped. ----- 6

6. a. Caudal fin lunate (shaped like a new moon), its axis steeply raised. MACKEREL SHARKS. (M)
LAMNIDAE. Page 13



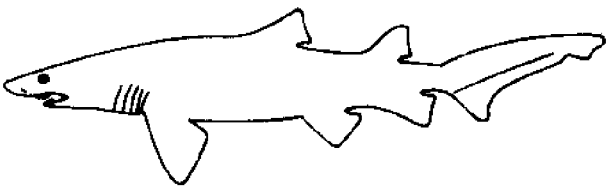
b. Caudal fin not lunate, its axis only slightly raised at most. ---------- 7

7. a. Caudal fin exceedingly long, its length about 1/2 of total body length. THRESHER SHARKS. (M)
ALOPIIDAE.
One species in Texas waters. THRESHER SHARK. (M)
Alopias vulpinus (Bonnaterre)



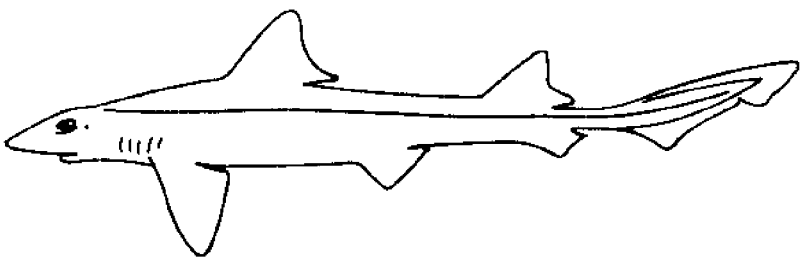
b. Caudal fin length less than 1/2 of total body length. ----- 8

8. a. Last gill opening (fifth) well in front of origin of pectoral fin; eye without nictitating fold or membrane. SAND TIGERS. (M)
ODONTASPIDIDAE.
One species in Texas waters. SAND TIGER. (M)
Odontaspis taurus (Rafinesque)

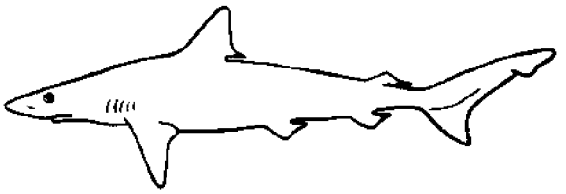


b. Last gill opening over or behind origin of pectoral fin; eye with a nictitating fold or membrane. ---------- 9

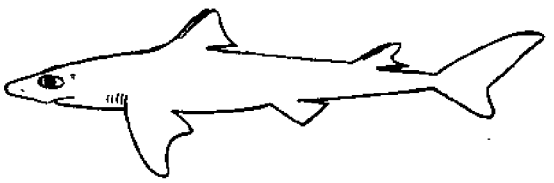
9. a. Eye appears dorso-ventrally flattened, with a distinct sub-orbital dermal fold; spiracles present; nictitating membrane visable only in front and back corners of eye. SMOOTH DOGFISH SHARKS.* (M)
TRIAKIDAE (=CARCHARHINIDAE, in part, in AFS 1970). Page 14



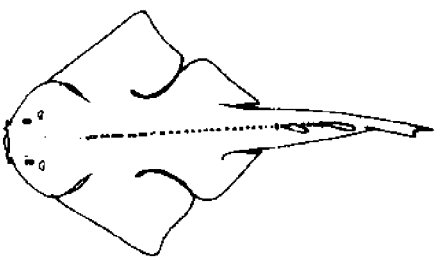
b. Eye appears rounded, without a suborbital dermal fold; spiracles present or absent; nictitating membrane covering lower front of eye. REQUIEM SHARKS. (M, E)
CARCHARHINIDAE. Page 14



10. a. Eyes lateral; trunk nearly round (subcylindrical); front margin of pectoral fins not overlapping gill openings. DOGFISH SHARKS. (M)
SQUALIDAE. Page 19



b. Eyes dorsal; trunk flattened (dorso-ventrally compressed); front margin of pectoral fins overlapping gill openings. ANGEL SHARKS. (M)
SQUATINIDAE.
One species in Texas waters. ATLANTIC ANGEL SHARK. (M)
Squatina dumerili Lesueur



FAMILY - LAMNIDAE - MACKEREL SHARKS

Key to Species

1. a. Teeth in front part of upper jaw broadly triangular, with serrate edges; base of second dorsal fin terminates above or slightly in front of origin of anal fin. WHITE SHARK. (M)
Page 16
Carcharodon carcharias (Linnaeus)

b. Teeth in front part of upper jaw slender, with smooth edged cusps; base of second dorsal fin terminates slightly behind origin of anal fin. SHORTFIN MAKO. (M) Page 16
Isurus oxyrinchus Rafinesque

FAMILY - SCYLIORHINIDAE - CAT SHARKS

Key to Species

1. a. Color uniformly black except for lighter or darker fins. BLACK CAT SHARK.* (M) Page 16
Apristurus indicus (Brauer)*

   b. Color variegated above (with spots, blotches, or saddles) and lighter below. ---------- 2

2. a. Crest of enlarged denticles present along upper edge of caudal fin. CAT SHARK.* (M) Page 16
Galeus arae (Nichols)*

   b. Crest of enlarged denticles absent. CHAIN DOGFISH. (M) Page 16
Scyliorhinus retifer (Garman)

FAMILY - TRIAKIDAE - SMOOTH DOGFISH SHARKS

Key to Species

1. a. Lower front corner of caudal fin sharp-pointed and directed rearward. FLORIDA SMOOTHHOUND. (M) Page 17
Mustelus norrisi Springer

   b. Lower front corner of caudal fin rounded. SMOOTH DOGFISH. (M) Page 17
Mustelus canis (Mitchill)

FAMILY - CARCHARHINIDAE - REQUIEM SHARKS

Key to Species

1. a. Spiracles present. TIGER SHARK. (M) Page 17
Galeocerdo cuvieri (Peron and Lesueur)

   b. Spiracles absent. ---------- 2

2. a. Cusps of upper and lower teeth smooth-edged (A) (caution should be exercised not to confuse serration at the base of the tooth with serration on the cusp). ---------- 3

b. Cusps of upper teeth serrate (B), lower teeth either serrate or smooth. ---------- 5

3. a. Base of second dorsal fin at least 3/4 as long as base of first dorsal fin, the two fins nearly equal in size. LEMON SHARK. (M) Page 17
Negaprion brevirostris (Poey)

b. Base of second dorsal fin less than 1/2 as long as base of first dorsal fin, second dorsal fin much smaller than first. 4

4. a. Longest gill opening nearly 1/2 as long as base of first dorsal fin, teeth in sides of jaw slender, symmetrical, and erect. FINETOOTH SHARK. (M) Page 17
Aprionodon isodon (Valenciennes)

b. Longest gill opening only about 1/4 as long as base of first dorsal fin; teeth in sides of jaw oblique and with notched edges. ATLANTIC SHARPNOSE SHARK. (M) Page 17
Rhizoprionodon terraenovae (Richardson)

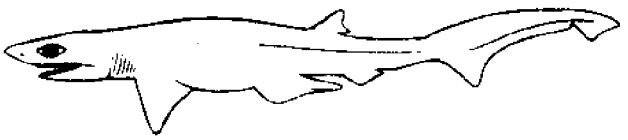
5. a. Origin of second dorsal fin decidedly behind origin of base of anal fin. SMALLTAIL SHARK. (M) Page 17
Carcharhinus porosus (Ranzani)

b. Origin of second dorsal fin over or in front of origin of anal fin. ---------- 6

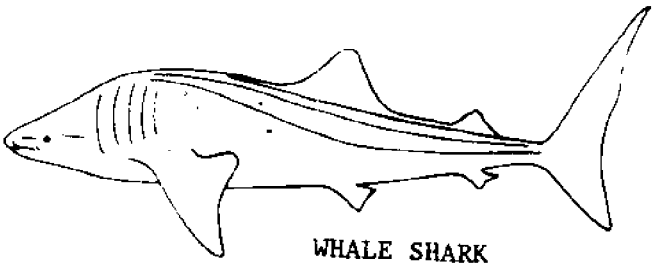
6. a. Midline of back between dorsal fins with a low but distinct ridge of skin. ---------- 7

b. Midline of back between dorsal fins smooth, without ridge of skin. ---------- 10

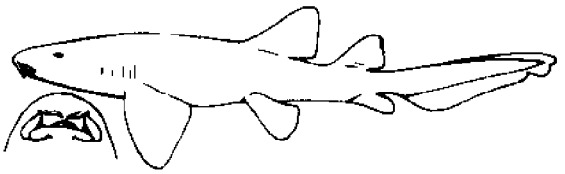
7. a. Free rear corner of second dorsal fin notably slender and more than twice as long as vertical height of fin. SILKY SHARK. (M) Page 17
Carcharhinus falciformis (Bibron)



Heptrachias perlo

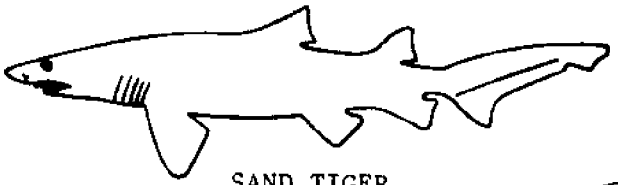


WHALE SHARK
Rhincodon typus



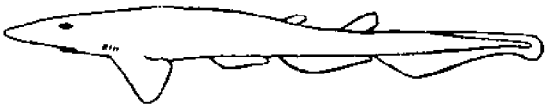
NURSE SHARK
Ginglymostoma cirratum

THRESHER SHARK
Alopias vulpinus



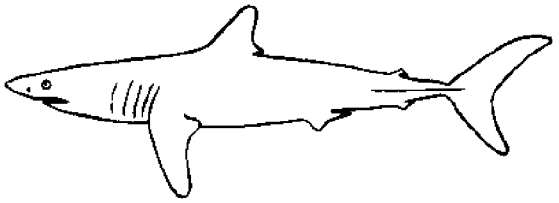
SAND TIGER
Odontaspis taurus

CHAIN DOGFISH
Scyliorhinus retifer

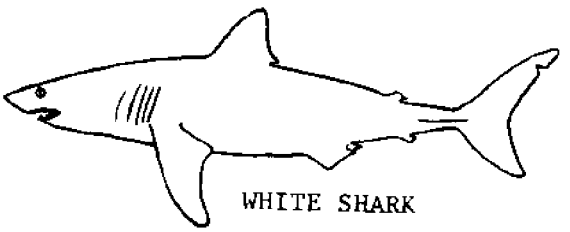


BLACK CAT SHARK
Apristurus indicus

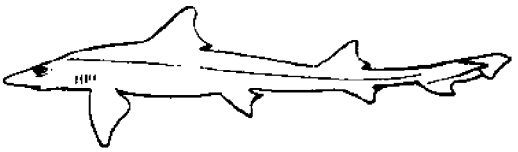
CAT SHARK
Galeus area



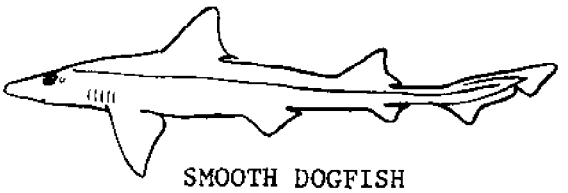
SHORTFIN MAKO
Isurus oxyrinchus



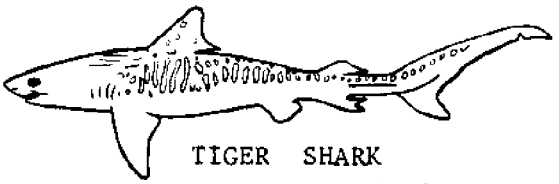
WHITE SHARK
Carcharodon carcharias



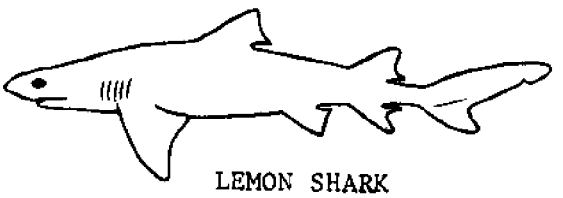
FLORIDA SMOOTHHOUND
Mustelus norrisi



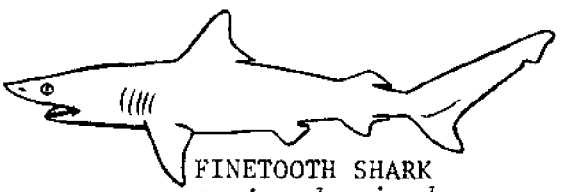
SMOOTH DOGFISH
Mustelus canis



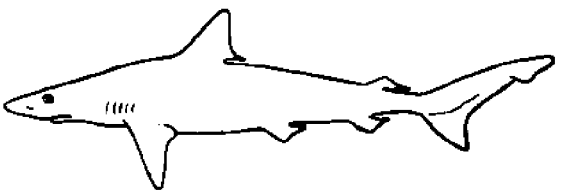
TIGER SHARK
Galeocerdo cuvieri



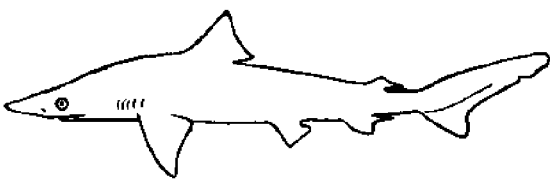
LEMON SHARK
Negaprion brevirostris



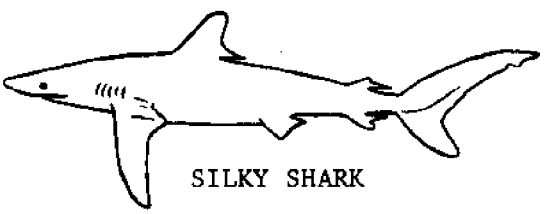
FINETOOTH SHARK
Aprionodon isodon



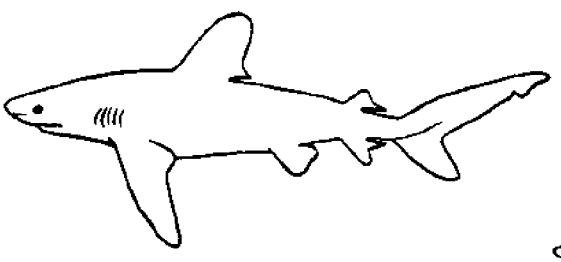
ATLANTIC SHARPNOSE SHARK
Rhizoprionodon terraenovae



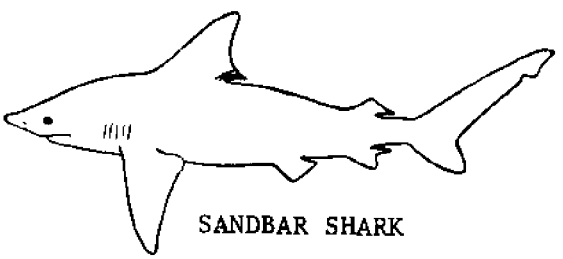
SMALLTAIL SHARK
Carcharhinus porosus



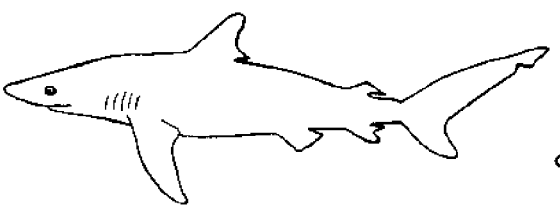
SILKY SHARK
Carcharhinus falciformis



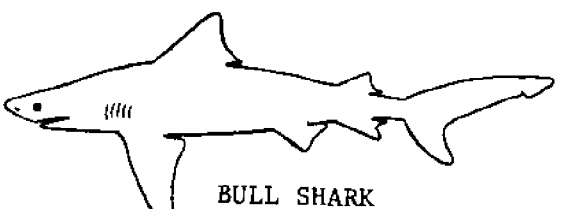
OCEANIC WHITETIP SHARK
Carcharhinus longimanus



SANDBAR SHARK
Carcharhinus milberti



DUSKY SHARK
Carcharhinus obscurus



BULL SHARK
Carcharhinus leucas

b. Free rear corner of second dorsal fin not notably slender and considerably less than twice as long as vertical height of fin. ---------- 8

8. a. Uppermost tip of first dorsal fin very broadly rounded; tip of anal fin reaches nearly to base of caudal fin. OCEANIC WHITETIP SHARK. (M) Page 17
Carcharhinus longimanus (Poey)

b. Uppermost tip of first dorsal fin nearly pointed or very narrowly rounded; tip of anal fin separated from base of caudal fin by a distance at least as long as diameter of eye. ---------- 9

9. a. Origin of first dorsal fin over termination of base of pectoral fins; vertical height of first dorsal fin at least as great as distance from eye to third gill opening. SANDBAR SHARK. (M) Page 17
Carcharhinus milberti (Valenciennes)

b. Origin of first dorsal fin decidedly behind termination of base of pectoral fins; vertical height of first dorsal fin less than distance from eye to first gill opening. DUSKY SHARK. (M) Page 17
Carcharhinus obscurus (Lesueur)

10. a. Uppermost tip of first dorsal fin very broadly rounded; tip of anal fin reaches nearly to base of caudal fin. OCEANIC WHITETIP SHARK. (M) Page 17
Carcharhinus longimanus (Poey)

b. Uppermost tip of first dorsal fin nearly pointed or very narrowly rounded; tip of anal fin separated from base of caudal by a distance at least as long as diameter of eye. - 11

11. a. Snout short and broadly rounded, its length in front of an imaginary line connecting outer ends of nostrils, less than 1/2 as long as distance between inner ends of nostrils. BULL SHARK. (M, E) Page 17
Carcharhinus leucas (Valenciennes)

b. Snout sharper, when measured as above, at least 2/3 of the distance between the inner ends of nostrils. ---------- 12

12. a. Fins without black tips; upper teeth strongly asymmetrical, with notched outer margins. BLACKNOSE SHARK. (M) Page 20
Carcharhinus acronotus (Poey)

b. Fins with conspicuous black tips; upper teeth nearly symmetrical, without notched outer margins. ---------- 13

13. a. Eyes relatively large, their horizontal diameter more than 1/3 as long as first gill opening; edges of lower teeth very finely serrate. BLACKTIP SHARK. (M, E) Page 20
Carcharhinus limbatus (Valenciennes)

b. Eyes relatively small, their horizontal diameter less than 1/4 as long as first gill opening; edges of lower teeth smooth. SPINNER SHARK. (M) Page 20
Carcharhinus maculipinnis (Poey)

FAMILY - SPHYRNIDAE - HAMMERHEAD SHARKS

Key to Species

1. a. Head spade-shaped, front contour of head evenly rounded at the midline. BONNETHEAD. (M, E) Page 20
Sphyrna tiburo (Linnaeus)

b. Head hammer-shaped, front contour of head indented or scalloped at the midline. ---------- 2

2. a. Inner narial groove absent; back margin of pelvic fin falcate (curved like a sickle); teeth strongly serrate. GREAT HAMMERHEAD. (M) Page 20
Sphyrna mokarran (Rüppell)

b. Inner narial groove present; back margin of pelvic fin straight; teeth smooth (sometimes very weakly serrate). --- 3

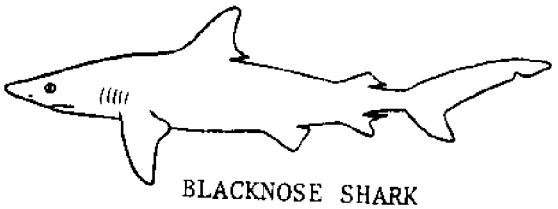
3. a. Fifth gill slit about as long as first gill slit, both somewhat shorter than three middle slits; origin of pectoral fin under fifth gill slit; lower (ventral) precaudal pit always present. SMALLEYE HAMMERHEAD. (M) Page 20
Sphyrna tudes (Valenciennes)

b. Fifth gill slit shorter than first gill slit; origin of pectoral fin in front of fifth gill slit; lower precaudal pit often absent. SCALLOPED HAMMERHEAD. (M) Page 20
Sphyrna lewini (Griffith and Smith)

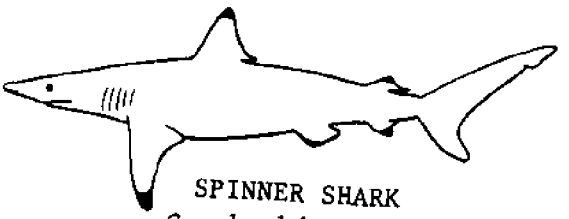
FAMILY - SQUALIDAE - DOGFISH SHARKS

Key to Species

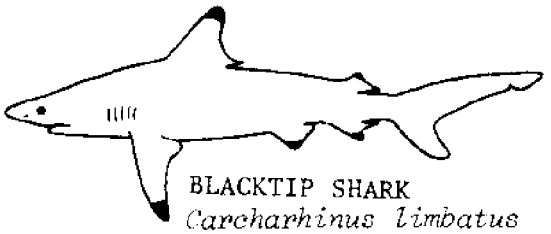
1. a. Upper teeth with only one cusp; caudal peduncle with longitudinal ridges and precaudal pit above. CUBAN DOGFISH. (M) Page 20
Squalus cubensis Howell Rivero



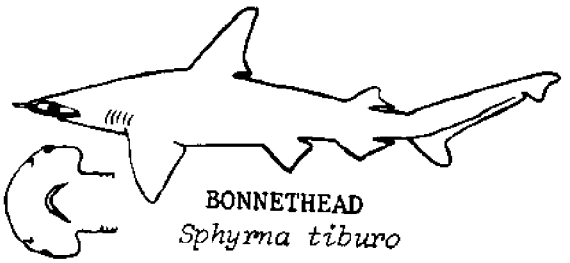
BLACKNOSE SHARK
Carcharhinus acronotus



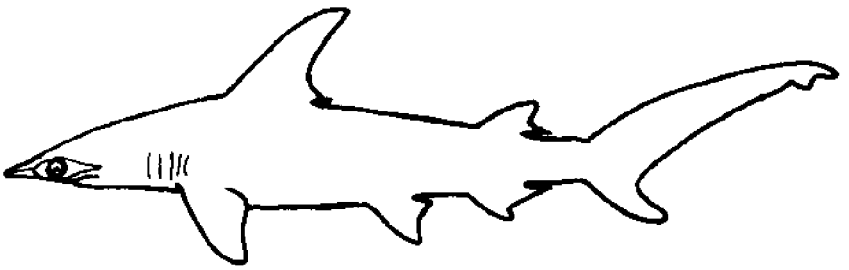
SPINNER SHARK
Carcharhinus maculipinnis



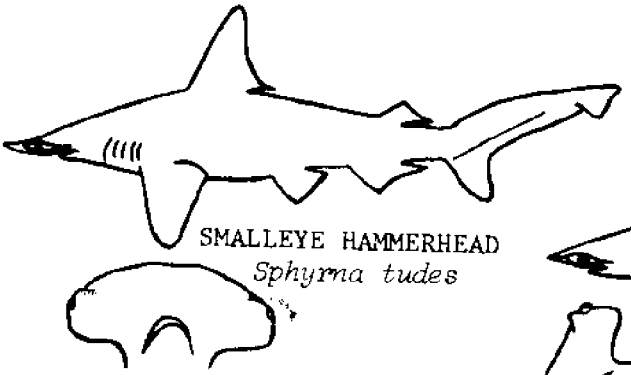
BLACKTIP SHARK
Carcharhinus limbatus



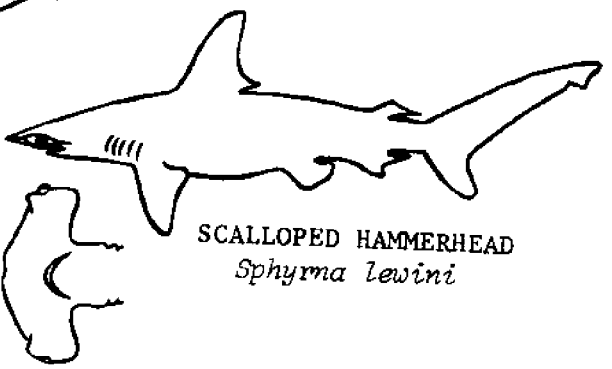
BONNETHEAD
Sphyrna tiburo



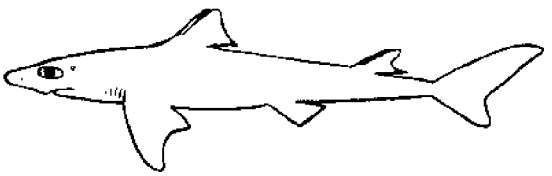
GREAT HAMMERHEAD
Sphyrna mokarran



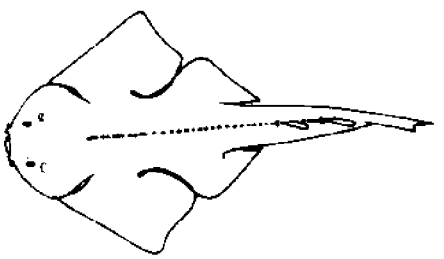
SMALLEYE HAMMERHEAD
Sphyrna tudes



SCALLOPED HAMMERHEAD
Sphyrna lewini



CUBAN DOGFISH
Squalus cubensis



ATLANTIC ANGEL SHARK
Squatina dumerili

b. Upper teeth with 3-7 cusps; caudal peduncle without ridges or a precaudal pit. DOGFISHES. (M)
Etmopterus sp.*

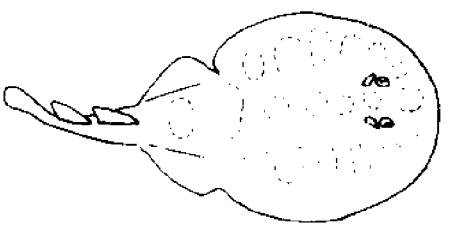
ORDER - RAJIFORMES (BATOIDEI)

KEY TO FAMILIES

1. a. Snout lengthened into a flat blade with teeth-like structures on its lateral edges. SAWFISHES. (M)
PRISTIDAE. Page 24

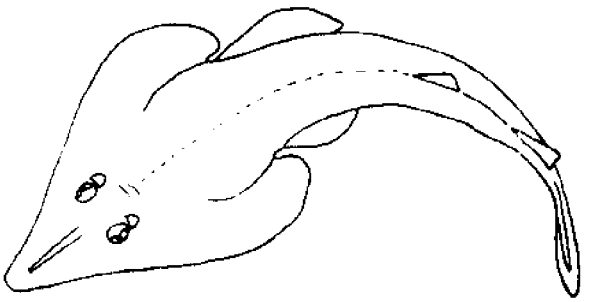
b. Snout rounded or pointed but never a long, flat blade. ---- 2

2. a. Snout supported by branched or reticulated cartilage (easily felt); electric organs present between head and forward extension of pectorals; body naked. ELECTRIC RAYS. (M)
TORPEDINIDAE.
One species in Texas waters. LESSER ELECTRIC RAY. (M)
Narcine brasiliensis (Olfers)



b. Snout supported by no more than a single rostril cartilage; electric organs absent; body usually with scales, thorns, or spines. ---------- 3

3. a. Tail very stout, not distinctly differentiated from body; dorsal fins inserted well forward of caudal fin and spaced widely apart. GUITARFISH. (M)
RHINOBATIDAE.
One species in Texas waters. ATLANTIC GUITARFISH. (M)
Rhinobatos lentiginosus (Garman)

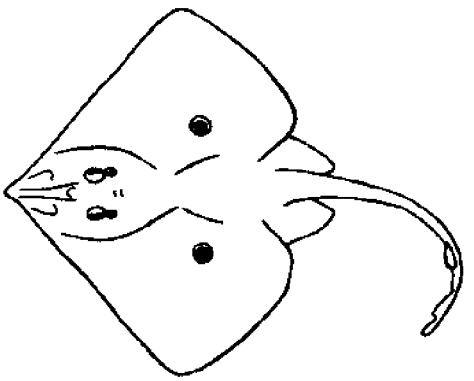


b. Tail slender, sharply differentiated from body; dorsal fins, if present, inserted just in front of tip of tail and spaced closely together. ---------- 4

4. a. Eyes and spiracles on top of head; fusion of pectoral fins (disc wings) to body continuous along sides of head and extending to tip of snout. ---------- 5

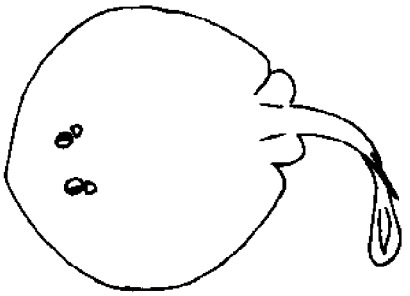
b. Eyes and spiracles on sides of head; fusion of pectoral fin (disc wings) to body extending only to a point just behind the eyes. ---------- 8

5. a. Dorsal fins (on tail) 2; spiracles with traces of gill folds. SKATES. (M, E)
RAJIDAE. Page 25



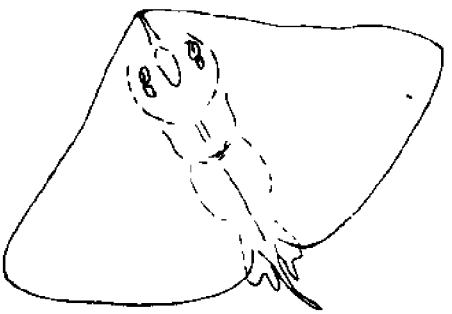
b. Dorsal fin (on tail) single or absent; spiracles without traces of gill folds. ---------- 6

6. a. Caudal fin (on tail) present and well developed. YELLOW STINGRAYS. (M, E)
UROLOPHIDAE (=DASYATIDAE, in part, in AFS 1970).
One species in Texas waters. YELLOW STINGRAY. (M, E)
Urolophus jamaicensis (Cuvier)

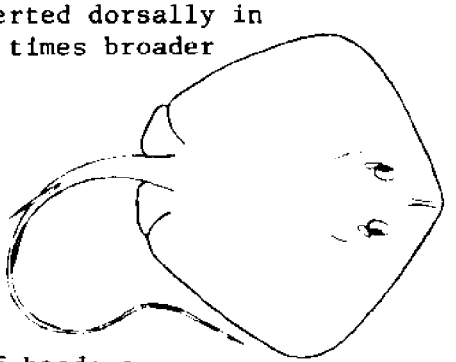


b. Caudal fin absent. ---------- 7

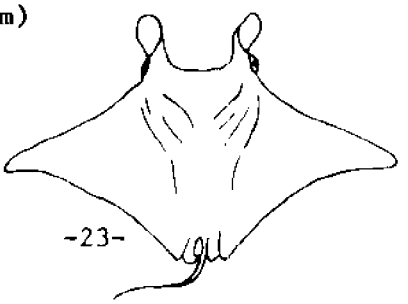
7. a. Tail without serrate spine or spines; disc much broader than long. BUTTERFLYRAYS. (M)
GYMNURIDAE (=DASYATIDAE, in part, in AFS 1970).
One species in Texas waters. SMOOTH BUTTERFLY RAY. (M)
Gymnura micrura (Bloch and Schneider)



b. Tail with serrate spine or spines inserted dorsally in front half of tail; disc less than 1½ times broader than long. STINGRAYS. (M, E)
DASYATIDAE. Page 25

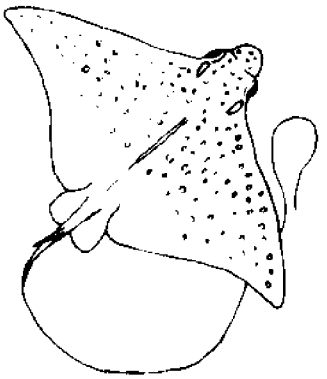


8. a. Mouth extending across front margin of head; a thin, narrow, fin-like structure (cephalic fin) projecting forward from each side of head. MANTAS. (M)
MOBULIDAE.
One species in Texas waters. ATLANTIC MANTA. (M)
Manta birostris (Walbaum)

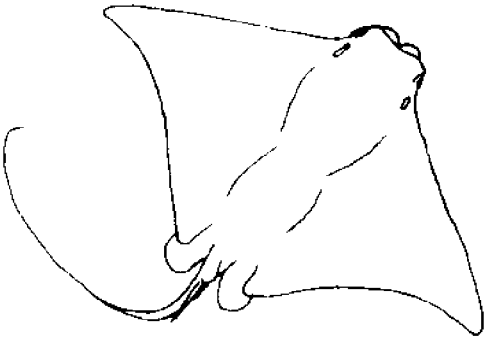


b. Mouth on underside of head; a short, snout-like projection (subrostral lobe of pectoral fins) of 1 or 2 lobes extending forward from underside of head. ---------- 9

9. a. Snout-like projection of 1 lobe; dorsal surface of disc with white spots. EAGLE RAYS. (M)
MYLIOBATIDAE.
One species in Texas waters. SPOTTED EAGLE RAY. (M)
Aetobatus narinari (Euphrasen)



b. Snout-like projection of 2 lobes; dorsal surface of disc without white spots. COWNOSE RAYS. (M)
RHINOPTERIDAE (=MYLIOBATIDAE, in part, in AFS 1970).
One species in Texas waters. COWNOSE RAY. (M)
Rhinoptera bonasus (Mitchill)



FAMILY - PRISTIDAE - SAWFISHES

Key to Species

1. a. Caudal fin with a definite lower lobe; origin of first dorsal fin well forward of origin of pelvic fins. LARGETOOTH SAWFISH. (M, E) Page 26
Pristis perotteti Müller and Henle

b. Caudal fin without definite lower lobe; origin of first dorsal fin over or slightly forward of origin of pelvic fins. SMALLTOOTH SAWFISH. (M, E) Page 26
Pristis pectinata Latham

FAMILY - RAJIDAE - SKATES

Key to Species

1. a. A single, conspicuous dark-centered occellar (eye-like) spot on the inner upper surface of each disc wing ROUNDEL SKATE. (M) Page 26
Raja texana Chandler

b. Prominent ocellar spot absent, upper surface of disc wings plain or with many irregular dark dots and narrow bars. --- 2

2. a. Thorns absent on mid dorsal surface between nuchal region (area immediately behind spiracles) and axils of disc wings. SPREADFIN SKATE. (M) Page 26
Raja olseni Bigelow and Schroeder

b. Thorns present in mid dorsal region described above. ------ 3

3. a. Translucent area present along each side of snout (rostral cartilage); upper surface of disc wings normally marked with distinctive dark bars. CLEARNOSE SKATE. (M) Page 26
Raja eglanteria Bosc

b. Translucent area absent on either side of snout; upper surface of disc wings with many small brown and white spots. FRECKLED SKATE. (M) Page 26
Raja lentiginosa Bigelow and Schroeder

FAMILY - DASYATIDAE - STINGRAYS

Key to Species

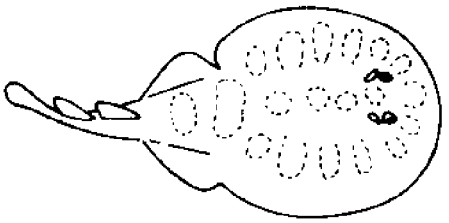
1. a. Outer corners of disc wings broadly and evenly rounded. --- 2

b. Outer corners of disc wings only narrowly rounded or abrutly subangular. ---------- 3

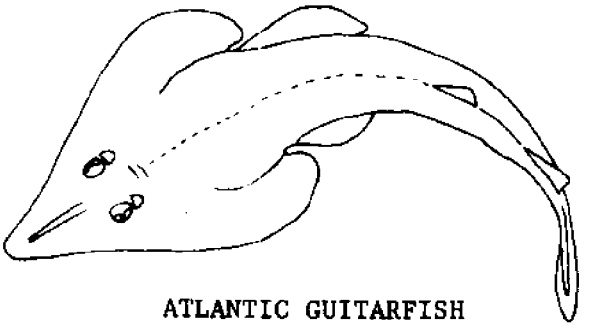
2. a. Distance from eye to tip of snout considerably longer than distance between spriacles; front outline of disc wings concave on either side of tip of snout. ATLANTIC STINGRAY. (M, E) Page 27
Dasyatis sabina (Lesueur)

LARGETOOTH SAWFISH
Pristis perotteti

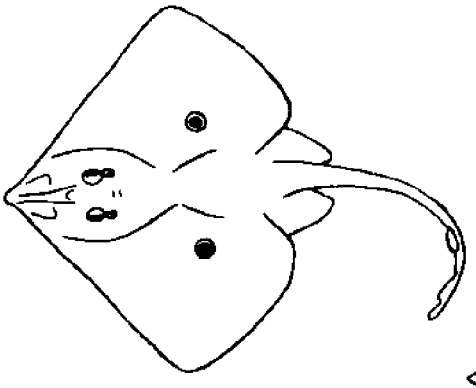
SMALLTOOTH SAWFISH
Pristis pectinata



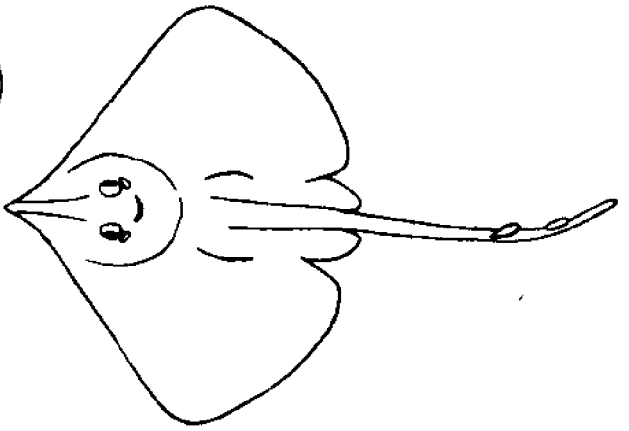
LESSER ELECTRIC RAY
Narcine brasiliensis



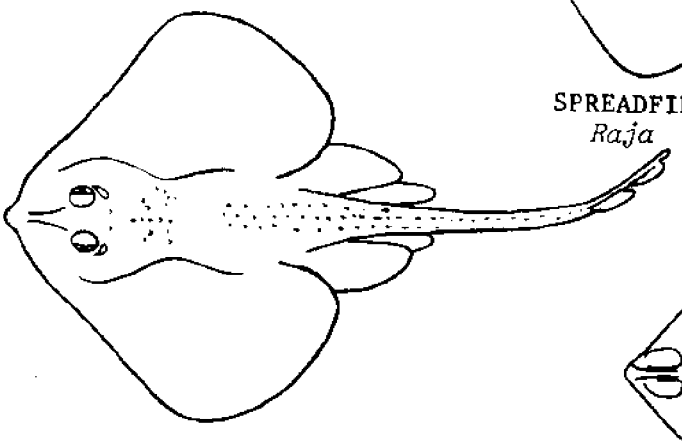
ATLANTIC GUITARFISH
Rhinobatos lentiginosus



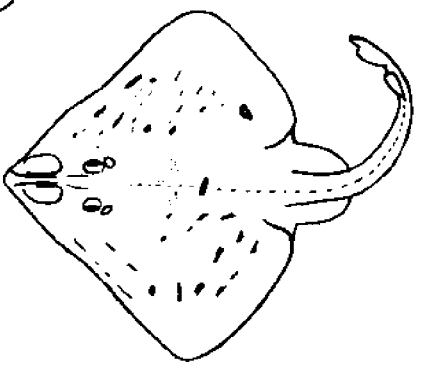
ROUNDEL SKATE
Raja texana



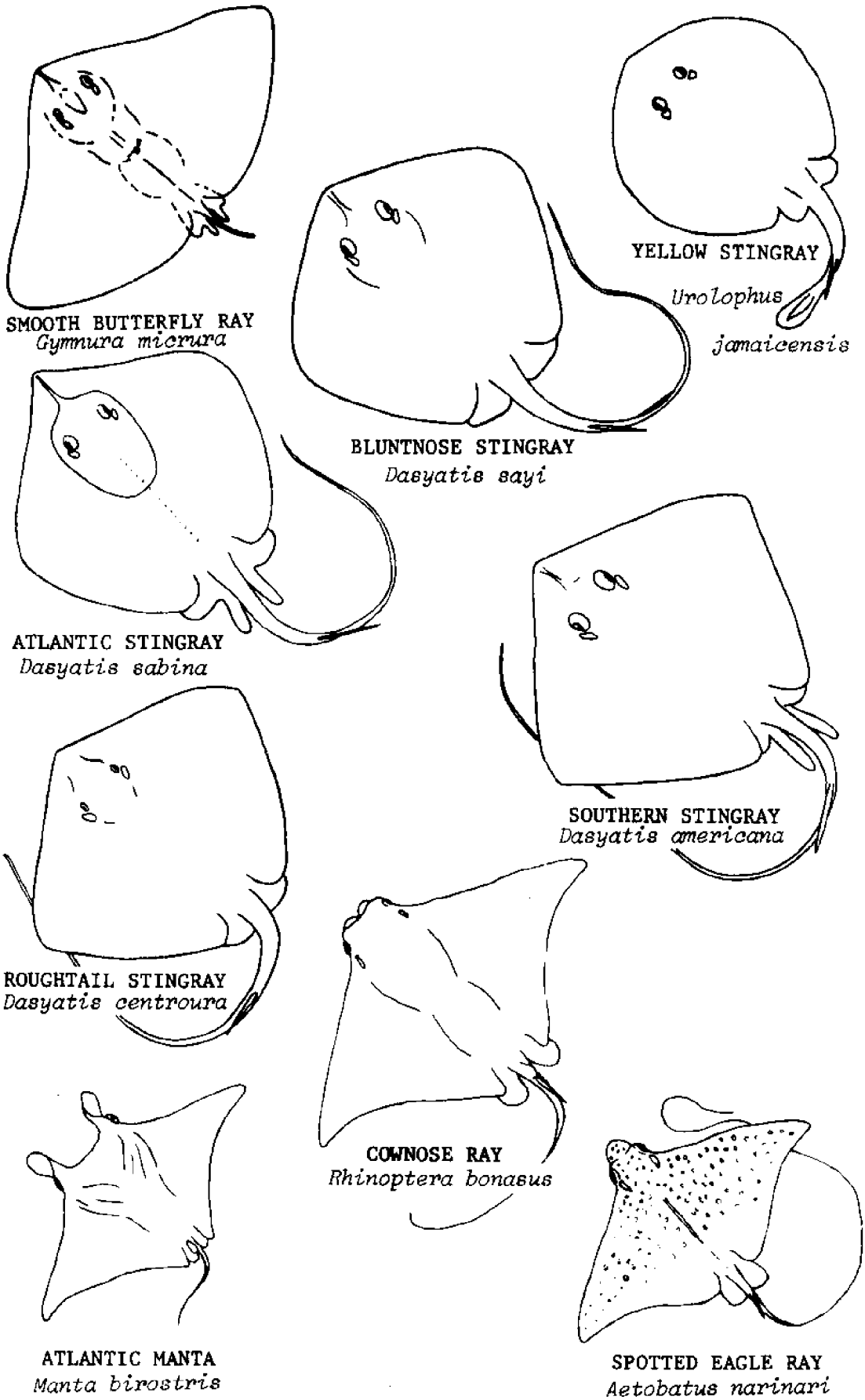
SPREADFIN SKATE
Raja olseni



FRECKLED SKATE
Raja lentiginosa



CLEARNOSE SKATE
Raja eglanteria


SMOOTH BUTTERFLY RAY
Gymnura micrura
YELLOW STINGRAY
Urolophus
jamaicensis
BLUNTNOSE STINGRAY
Dasyatis sayi
ATLANTIC STINGRAY
Dasyatis sabina
SOUTHERN STINGRAY
Dasyatis americana
ROUGHTAIL STINGRAY
Dasyatis centroura
COWNOSE RAY
Rhinoptera bonasus
ATLANTIC MANTA
Manta birostris
SPOTTED EAGLE RAY
Aetobatus narinari

b. Distance from eye to tip of snout shorter than distance between spiracles; front outline of disc wings weakly convex on either side of tip of snout. BLUNTNOSE STINGRAY. (M, E) Page 27
Dasyatis sayi (Lesueur)

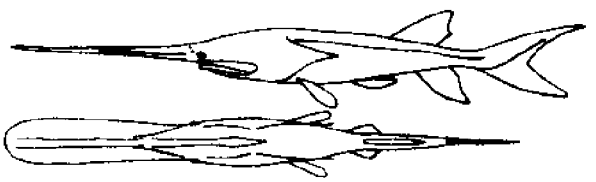
3. a. Fin-like fold of skin along under side of tail about as wide as height of tail; upper surface of tail with a single or keel behind the spine; sides of tail without spines. SOUTHERN STINGRAY. (M, E) Page 27
Dasyatis americana Hildebrand and Schroeder

b. Fin-like fold of skin along under side of tail only about half as wide as height of tail; upper surface of tail without ridge or keel; in larger specimens sides of tail with spines. ROUGHTAIL STINGRAY. (M, E) Page 27
Dasyatis centroura (Mitchill)

ORDER - ACIPENSERIFORMES

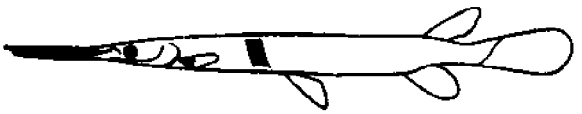
Key to Families

1. a. Snout extremely long and paddle-like; bony plates on body absent. PADDLEFISH. (F)
POLYODONTIDAE



b. Snout short, not paddle-like; bony plates on body present. STURGEONS. (F)
ACIPENSERIDAE

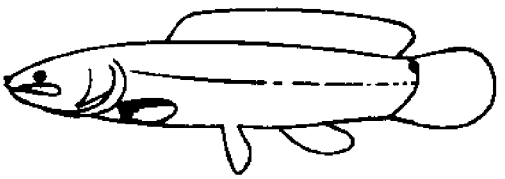
ALLIGATOR GAR
Lepisosteus spatula



LONGNOSE GAR
Lepisosteus osseus

SPOTTED GAR
Lepisosteus oculatus

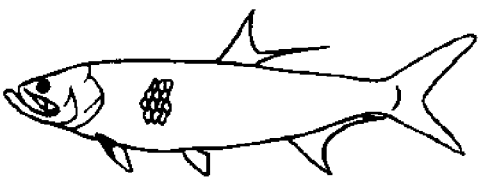
SHORTNOSE GAR
Lepisosteus platostomus



BOWFIN
Amia calva

BONEFISH
Albula vulpes

LADYFISH
Elops saurus



TARPON
Megalops atlantica

ORDER - SEMIONOTIFORMES (LEPISOSTEIFORMES)

Represented by one family.

FAMILY - LEPISOSTEIDAE - GARS

Key to Species

1. a. Large teeth in upper jaws in 2 rows on each side in adult. ALLIGATOR GAR. (F, E) Page 29
Lepisosteus spatula Lacépède

   b. Large teeth in upper jaw in a single row on each side in adult. ---------- 2

2. a. Snout long, 1.3-1.4 in head; young speckled underneath and with a broad band on sides, which breaks up into longitudinal blotches as fish matures. LONGNOSE GAR. (F, E) Page 29
Lepisosteus osseus (Linnaeus)

   b. Snout short, about 1.6 in head. ---------- 3

3. a. Top of head and snout with large brownish-black spots or blotches; lateral line scales 54-57; predorsal scales 46-49; scale rows from anal plate to middorsal scale inclusive 17-20. SPOTTED GAR. (F, E) Page 29
Lepisosteus oculatus (Winchell)

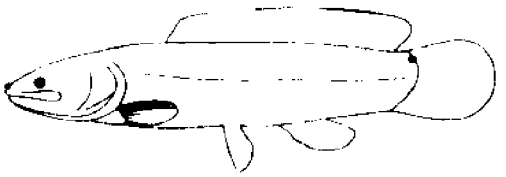
   b. Top of head and snout not darkly blotched or spotted; lateral line scales 59-63; predorsal scales 50-54; scale rows from anal plate to middorsal scale inclusive 20-23. SHORTNOSE GAR. (F, E) Page 29
Lepisosteus platostomus Rafinesque

ORDER - AMIIFORMES (AMIIDA)

Represented by one family.

FAMILY - AMIIDAE - BOWFIN

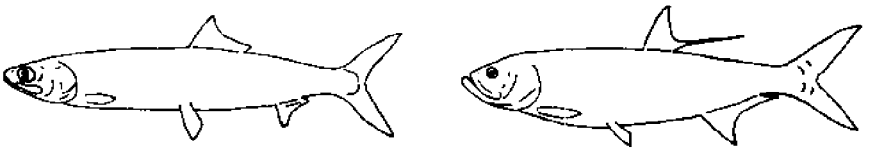
One species in Texas waters. BOWFIN. (F, E)
Amia calva Linnaeus



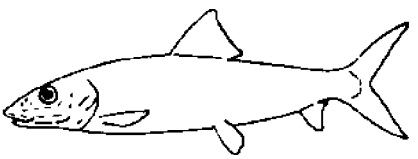
ORDER - ELOPIFORMES

KEY TO FAMILIES

1. a. Origin of dorsal fin directly over or behind pelvic fin base; mouth terminal or superior (angled upward); branchiostegals 23-35. TARPONS. (M, E)
ELOPIDAE. Page 31



b. Origin of dorsal fin well in advance of pelvic fin base; mouth inferior (underslung); branchiostegals about 14. BONEFISH. (M, E)
ALBULIDAE.
One species in Texas waters. BONEFISH. (M, E)
Albula vulpes (Linnaeus)



FAMILY - ELOPIDAE - TARPON AND LADYFISH

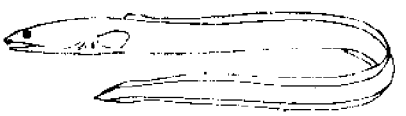
1. a. Last ray of dorsal fin elongated and filamentous; scales large; mouth superior. TARPON. (M, E) Page 29
Megalops atlantica Valenciennes

b. Last ray of dorsal fin not elongated; scales small; mouth terminal. LADYFISH. (M, E) Page 29
Elops saurus Linnaeus

ORDER - ANGUILLIFORMES (APODES AND LYOMERI)

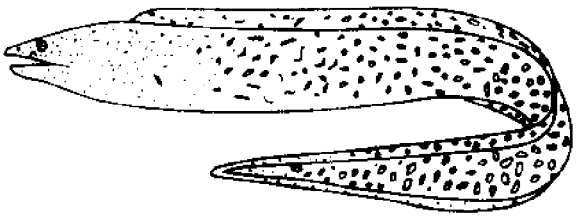
KEY TO FAMILIES

1. a. Posterior nostril located on upper lip or in that position if lip undifferentiated, and with a wide flaring margin. SNAKE EELS. (M, E)
OPHICHTHIDAE. Page 35



b. Posterior nostril located above upper lip, on a horizontal through lower margin of eye or higher, and with or without a slightly raised rim. ---------- 2

2. a. Gill opening subequal to or smaller than eye; pectoral fin absent. MORAYS. (M)
MURAENIDAE. Page 33

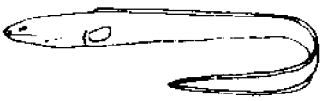


b. Gill opening larger than eye; pectoral fin present. ------- 3

3. a. Scales present; lower jaw projecting slightly beyond upper jaw. FRESHWATER EELS. (M, F)
ANGUILLIDAE
One species in Texas waters. AMERICAN EEL. (M, F)
Anguilla rostrata (Lesueur)

b. Scales absent; upper jaw slightly or notably projecting beyond lower jaw. ---------- 4

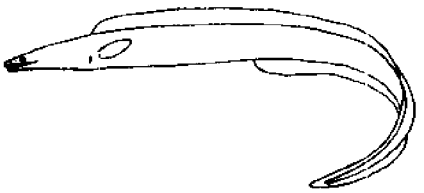
4. a. Anal opening well forward, on a vertical through tips of pectoral fins. ARROWTOOTH EELS. (M)
DYSOMMIDAE
One species in Texas waters. SHORTBELLY EEL. (M)
Dysomma aphododera Ginsburg



b. Anal opening behind tips of pectoral fins. ---------- 5

5. a. Palatal teeth (teeth on the midline of roof of mouth) small, not canine like; lower jaw about as wide as upper jaw. CONGER EELS. (M)
CONGRIDAE. Page 34

b. Palatal teeth large and canine-like, in a median row but widely spaced; lower jaw narrower than upper jaw. PIKE CONGERS. (M)
MURAENESOCIDAE. Page 34



FAMILY - MURAENIDAE - MORAYS

Key to Species

1. a. Teeth along jaws not serrated (notched like a saw), palate with 2 or 3 median anterior fangs on midline; color pattern usually light reticulations against a dark background, large specimens may be entirely dark. SPOTTED MORAY. (M)
Page 36
Gymnothorax moringa (Cuvier)

b. Teeth along jaws serrate; palate without median fangs; color pattern of white spots against a darker background. ------- 2

2. a. Anal fin usually with a series of short curved bars resembling segments of circles; dorsal fin typically with a series of oblique bands arranged in pairs. OCELLATED MORAY.* (M)
Gymnothorax ocellatus Agassiz*

b. Anal fin nearly always solid black or brown; dorsal fin typically with a broad, interrupted dark margin. BLACKEDGE MORAY. (M) Page 36
Gymnothorax nigromarginatus (Girard)

FAMILY - MURAENESOCIDAE - PIKE CONGERS

Key to Species

1. a. Lateral vomerine teeth present on either side of median vomerine teeth (A); maxillary and dentary teeth in 3 non-parallel rows, the outer-most row shorter than the 2 inner rows (B); visceral peritoneum black. SLENDER PIKE CONGER.* (M)
Hoplunnis tenuis Ginsburg*

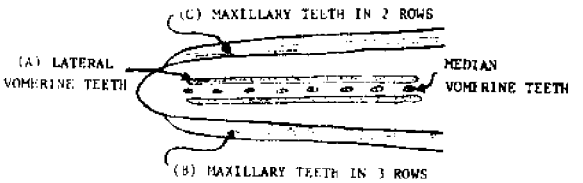


DIAGRAM OF UPPER JAW OF A PIKE CONGER SHOWING TOOTH PATTERNS

b. Lateral vomerine teeth absent; maxillary and dentary teeth in 2 distinctly parallel rows (C); visceral peritoneum transparent. SILVER CONGER. (M)
Hoplunnis macrurus Ginsburg

FAMILY - CONGRIDAE - CONGER EELS

Key to Species

1. a. Origin of dorsal fin over or a short distance in front of anus; tail shorter than body. SLENDER PIKE EEL. (M)
Neoconger micronatus Girard

b. Origin of dorsal fin either over gill openings, pectoral fins or a short distance behind pectoral-fin tips; tail longer than body. ---------- 2

2. a. Origin of dorsal fin over or somewhat in front of gill openings; snout projecting well beyond lower jaw. --------- 3

b. Origin of dorsal fin distintly behind gill openings, either over pectoral fins or a short distance behind pectoral-fin tips; snout projecting slightly beyond lower jaw. --------- 4

3. a. Posterior part of tail almost hairlike; tail length 73% of total length. WHIPTAIL CONGER. (M)
Congrina gracilior Ginsburg

b. Posterior part of tail not hairlike; tail length 63-73% of total length. YELLOW CONGER. (M) Page 36
Congrina flava (Goode and Bean)

4. a. Diameter of eye about equal to snout length; upper edge of gill openings on a level with, or slightly above, upper edge of pectoral-fin base. MARGINTAIL CONGER. (M) Page 36
Paraconger caudilimbatus (Poey)

b. Diameter of eye less than snout length; upper edge of gill openings on a level with, or slightly above, middle of pectoral-fin base. ---------- 5

5. a. Palatal teeth in an oblong patch; trunk of body without a row of dark spots; dorsal and anal fins with dark margins. CONGER EEL. (M) Page 36
Conger oceanicus (Mitchill)

b. Palatal teeth extending posteriorly in a single row; trunk of body with a lengthwise row of small, dark spots; caudal fin and posterior part of dorsal and anal fins black. (M) Page 36
Uroconger syringinus Ginsburg*

FAMILY - OPHICHTHIDAE - SNAKE EELS

Key to Species

1. a. Caudal fin present; tip of tail flexible. SPECKLED WORM EEL. (M, E) Page 38
Myrophis punctatus Lütken

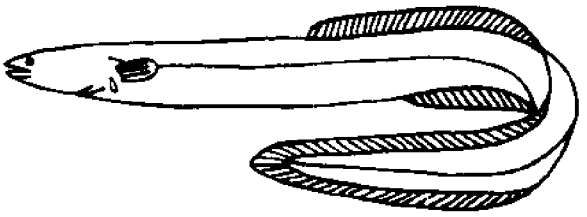
b. Caudal fin absent; tip of tail stiff. ---------- 2

2. a. Pectoral and anal fins absent. SAILFIN EEL. (M) Page 38
Letharchus velifer Goode and Bean

b. Pectoral and anal fins present, either well developed or rudimentary. ---------- 3

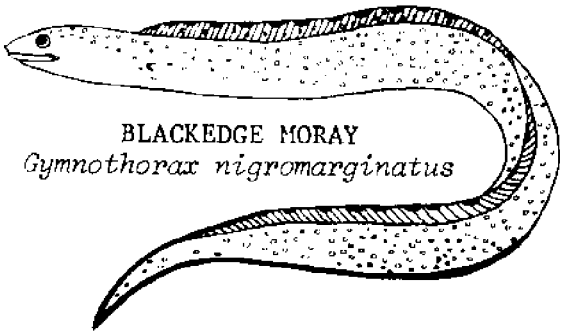
3. a. Origin of dorsal fin in front of gill openings; pectoral fins rudimentary. ---------- 4

b. Origin of dorsal fin above or behind gill openings; pectoral fins well developed. ---------- 5



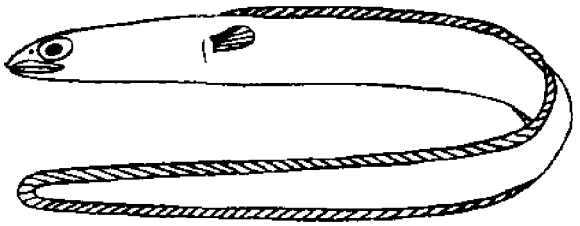
AMERICAN EEL
Anguilla rostrata

SPOTTED MORAY
Gymnothorax moringa

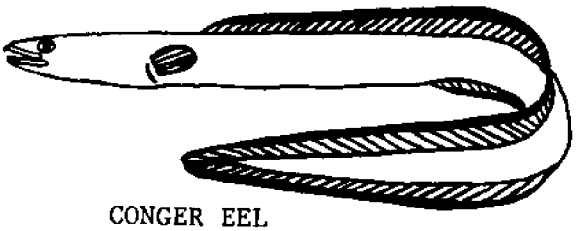


BLACKEDGE MORAY
Gymnothorax nigromarginatus

YELLOW CONGER
Congrina flava



MARGINTAIL CONGER
Paraconger caudilimbatus



CONGER EEL
Conger oceanicus

Uroconger syringinus

4. a. Body depth (measured at a point just in front of the anus) 1.7 to 2.6% of the total length, 2.2 to 3.1 times in head; upper jaw length (tip of jaw to corner of mouth as observed externally) 1.2 to 1.8 times in depth. SOOTY EEL. (M)
Bascanichthys teres (Goode and Bean)

   b. Body depth 1.1 to 1.6% of total length, 3.4 to 5.4 times in head; upper jaw length 0.7 to 1.0 times in depth. WHIP EEL. (M) Page 38
Bascanichthys scuticaris (Goode and Bean)

5. a. Eyes superior and located forward of middle of upper jaw (mouth large). ---------- 6

   b. Eyes not superior and located over middle of upper jaw. --- 8

6. a. Largest spots on body slightly smaller than length of snout (from tip of snout to anterior margin of eye), on specimens 890 to 1190mm total length, largest spots smaller then eye; spots roughly in 6 lengthwise rows. STIPPLED SPOON-NOSE EEL. (M) Page 38
Mystriophis punctifer (Kaup)

   b. Largest spots on body about equal to or larger than length of snout; spots roughly in 3 lengthwise rows. ---------- 7

7. a. Largest spots on body about equal to distance from snout tip to posterior margin of eye. SPOTTED SPOON-NOSE EEL. (M) Page 38
Mystriophis intertinctus (Richardson)

   b. Largest spots on body about equal to snout length. SNAPPER EEL. (M) Page 38
Mystriophis mordax (Poey)

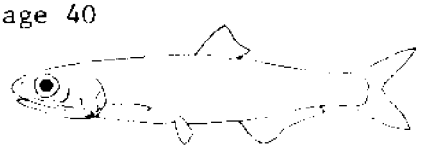
8. a. Origin of dorsal fin over or just in front of end of pectoral fins; tail much longer than body (tail greater than 55% total length). SHRIMP EEL. (M) Page 38
Ophichthus gomesi (Castelnau)

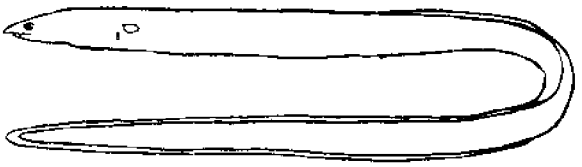
   b. Origin of dorsal fin behind end of pectoral fins; tail about as long as body (tail less than 55% total length).
Ophichthus new species

ORDER - CLUPEIFORMES

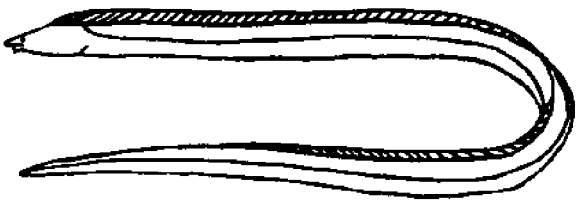
KEY TO FAMILIES

1. a. Mouth large; maxilla (upper jaw bone) extending well behind posterior margin of eye. ANCHOVIES. (M, E)
ENGRAULIDAE. Page 40



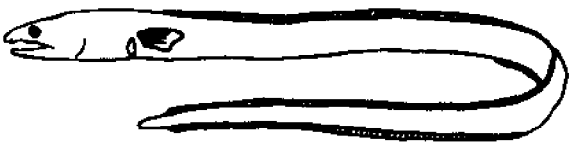


SPECKLED WORM EEL
Myrophis punctatus

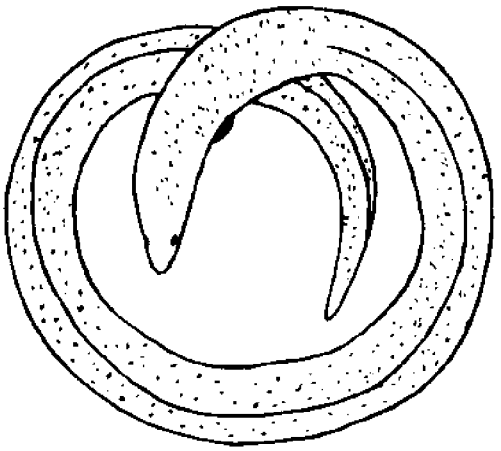


SAILFIN EEL
Letharchus velifer

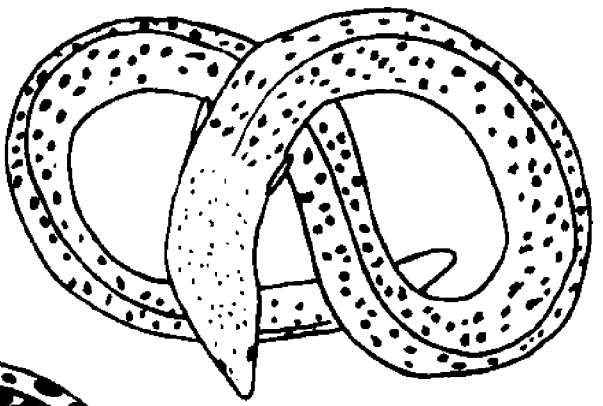
WHIP EEL
Bascanichthys scuticaris



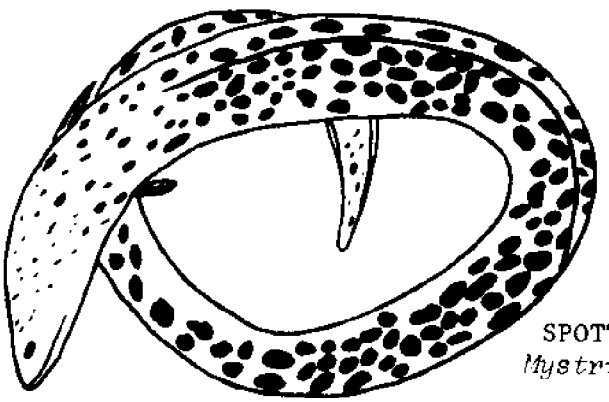
SHRIMP EEL
Ophichthus gomesi



STIPPLED SPOON-NOSE EEL
Mystriophis punctifer

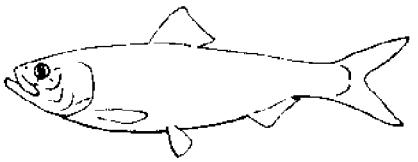


SNAPPER EEL
Mystriophis mordax



SPOTTED SPOON-NOSE EEL
Mystricphis intertinctus

b. Mouth small; maxilla not extending behind posterior margin of eye; ventral midline of belly usually with a sawtooth margin of scutes. HERRINGS. (M, E)
CLUPEIDAE. Page 39



FAMILY - CLUPEIDAE - HERRINGS

Key to Species

1. a. Midline of belly without bony scutes, abdomen rounded, covered with ordinary scales. ROUND HERRING. (M) Page 41
Etrumeus teres (DeKay)

   b. Midline of belly with bony scutes, chest and abdomen compressed. ---------- 2

2. a. Last ray of dorsal fin greatly elongated. ---------- 3

   b. Last ray of dorsal fin not elongated. ---------- 5

3. a. Back crossed with scales in front of dorsal fin; pectoral fins folding back into a groove formed by modified scales. ATLANTIC THREAD HERRING. (M, E) Page 41
Opisthonema oglinum (Lesueur)

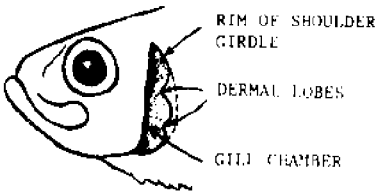
   b. Back naked in front of dorsal fin; pectoral fins not folding back into a groove. ---------- 4

4. a. Anal fin rays 25-36; mouth subterminal or inferior; ventral edge of upper jaw with a pronounced notch (except in young); prepelvic scutes 17-20. GIZZARD SHAD. (E, F) Page 41
Dorosoma cepedianum (Lesueur)

   b. Anal fin rays 17-27: mouth terminal; ventral edge of upper jaw smooth; prepelvic scutes 14-17. THREADFIN SHAD. (E, F) Page 41
Dorosoma petenense (Günther)

5. a. Rim of shoulder girdle underneath free edge of gill cover with 2 dermal lobes on its vertical edge (see figure below). ---------- 6

b. Rim of shoulder girdle underneath free edge of gill cover without dermal lobes on its vertical edge. ---------- 7



LATERAL VIEW OF HEAD WITH GILL COVER REMOVED TO SHOW DERMAL LOBES ON RIM OF SHOULDER GIRDLE

6. a. Last 2 rays of anal fin enlarged (finlet-like); pelvic fin rays 9. SPANISH SARDINE. (M) Page 41
Sardinella anchovia Valenciennes

b. Last 2 rays of anal fin not enlarged; pelvic fin rays 8. SCALED SARDINE. (M, E) Page 41
Harengula pensacolae Goode and Bean

7. a. Region of back in front of dorsal fin with scales like those on rest of body; exposed part of scales not much deeper (vertical height) than long; posterior margins of scales slightly irregular. SKIPJACK HERRING. (E, F) Page 41
Alosa chrysochloris (Rafinesque)

b. Region of back in front of dorsal fin with a row of enlarged, modified scales on each side of median line; exposed part of scales much deeper than long; scale margins serrate to pectinate. ---------- 8

8. a. Operculum with definite radiating striae; scales large and relatively evenly placed, 35 to 56 along midlateral line; shoulder spot usually followed by one or more spots. GULF MENHADEN. (M, E) Page 41
Brevoortia patronus Goode

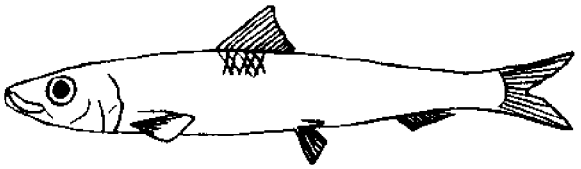
b. Operculum not striated; scales small and unevenly placed, 60 to 75 along midlateral line; shoulder spot not followed by additional spots. FINESCALE MENHADEN. (M, E) Page 41
Brevoortia gunteri Hildebrand

FAMILY - ENGRAULIDAE - ANCHOVIES

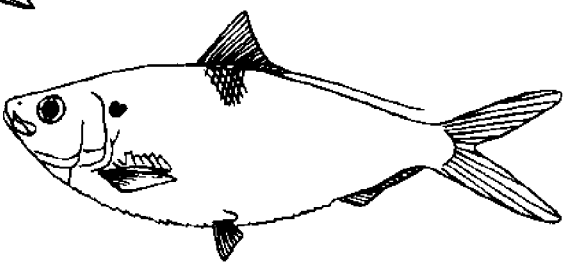
Key to Species

1. a. Origin of anal fin about under origin of dorsal fin; anal fin rays 23-31; pectoral fin rays 11-12; head length 3.8 to 4.3 times in total length. BAY ANCHOVY. (M, E) Page 42
Anchoa mitchilli (Valenciennes)

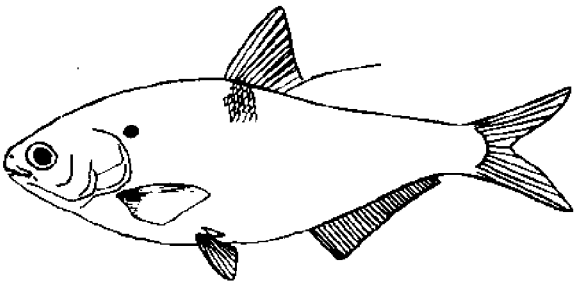
b. Origin of anal fin near termination of base of dorsal fin anal fin rays 18-23; pectoral fin rays 12-15; head length 3.3-4.0 times in total length. ---------- 2



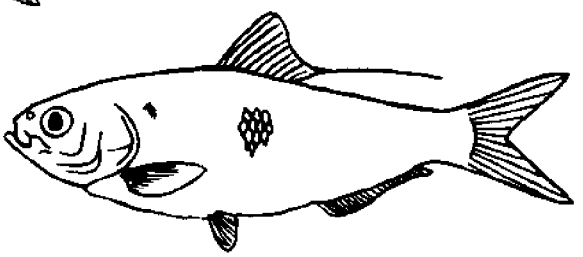
ROUND HERRING
Etrumeus teres



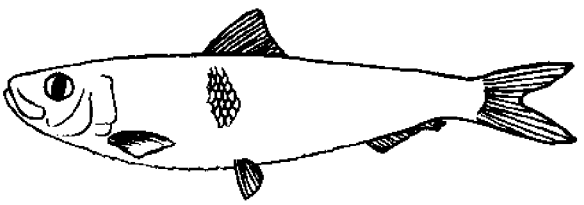
ATLANTIC THREAD HERRING
Opisthonema oglinum



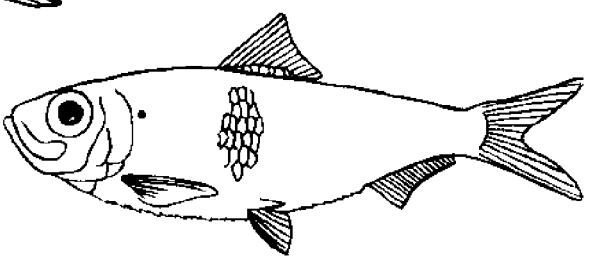
GIZZARD SHAD
Dorosoma cepedianum



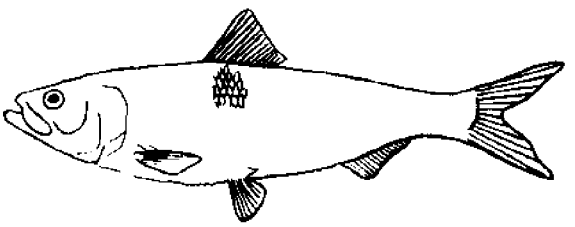
THREADFIN SHAD
Dorosoma petenense



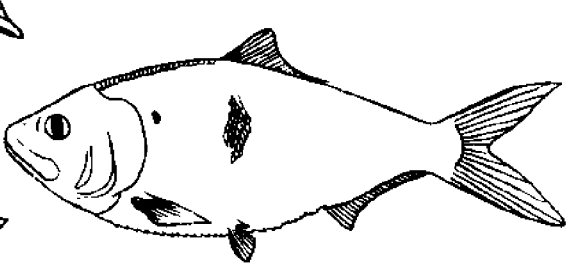
SPANISH SARDINE
Sardinella anchovia



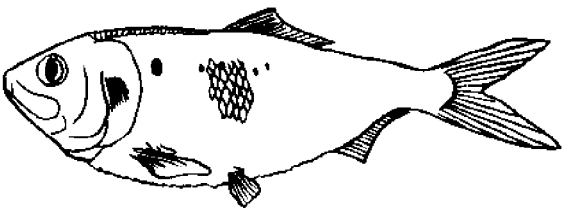
SCALED SARDINE
Harengula pensacolae



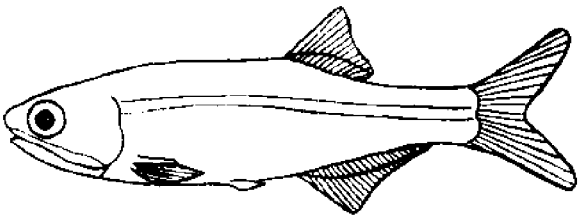
SKIPJACK HERRING
Alosa chrysochloris



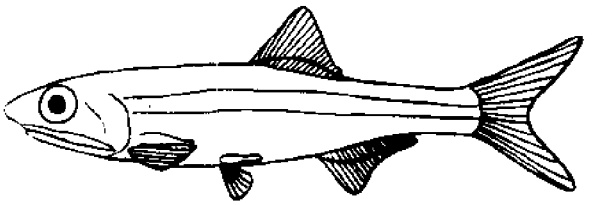
FINESCALE MENHADEN
Brevoortia gunteri



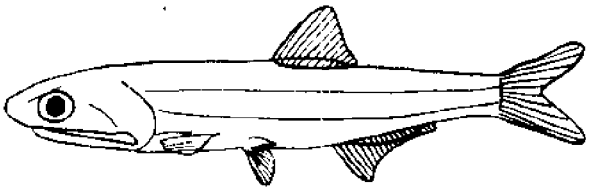
GULF MENHADEN
Brevoortia patronus



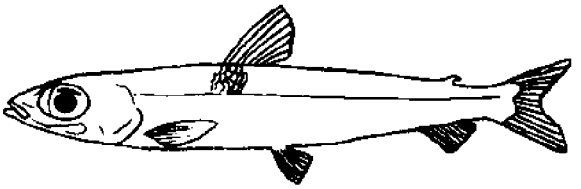
BAY ANCHOVY
Anchoa mitchilli



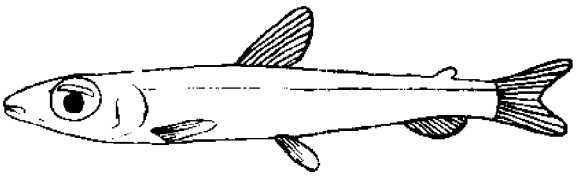
STRIPED ANCHOVY
Anchoa hepsetus



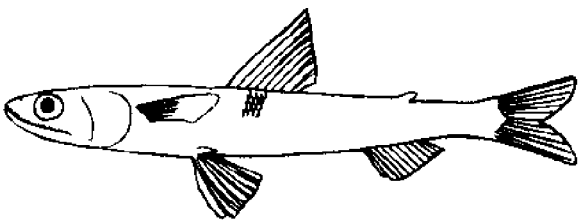
DUSKY ANCHOVY
Anchoa lyolepis



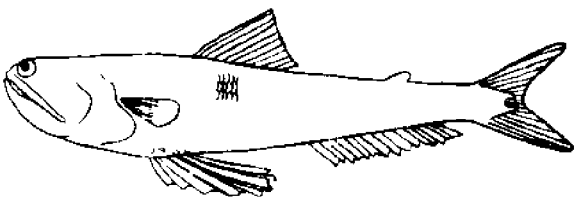
ATLANTIC ARGENTINE
Argentina silus



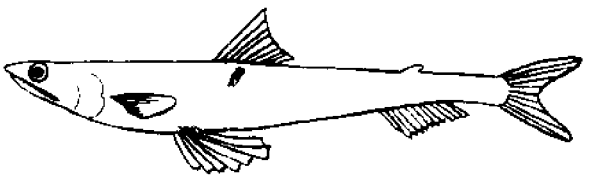
Argentina striata



LARGESCALE LIZARDFISH
Saurida brasiliensis



SNAKEFISH
Trachinocephalus myops



INSHORE LIZARDFISH
Synodus foetens

2. a. Axillary scale of pectoral fin long and narrow, generally failing to reach tip of longest pectoral fin ray by less than diameter of pupil of eye; silvery band on sides narrower than eye. STRIPED ANCHOVY. (M, E) Page 42
Anchoa hepsetus (Linnaeus)

b. Axillary scale 1/2 to 2/3 as long as longest pectoral fin ray; silvery band on sides as broad as eye. DUSKY ANCHOVY. (M) Page 42
Anchoa lyolepis (Evermann and Marsh)

ORDER - SALMONIFORMES

Represented by one family.

FAMILY - ARGENTINIDAE - ARGENTINES

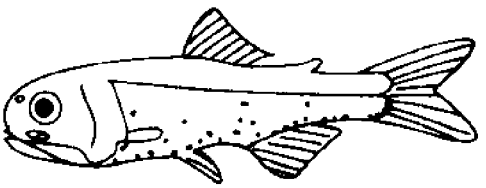
1. a. Branchiostegal rays 6; scales with spines; gill rakers on lower limb of first arch 11 to 17. ATLANTIC ARGENTINE. (M) Page 42
Argentina silus Ascanius

b. Branchiostegal rays 5; scales without spines; gill rakers on lower limb of first arch usually 6. (M) Page 42
Argentina striata Goode and Bean*

ORDER - MYCTOPHIFORMES (INIOMI)

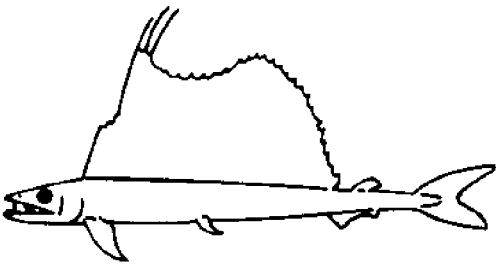
KEY TO FAMILIES

1. a. Photophores present. LANTERNFISHES. (M) MYCTOPHIDAE. Page 47



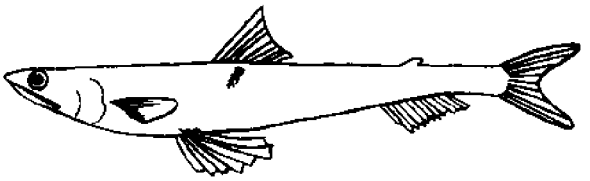
b. Photophores absent. ---------- 2

2. a. Pectoral fins inserted near ventral outline; length of base of dorsal fin more than 2/3 of standard length, fin high appearing sail-like; body without scales. LANCETFISHES. (M)
ALEPISAURIDAE
One species in Texas waters. LONGNOSE LANCETFISH
Alepisaurus ferox Lowe

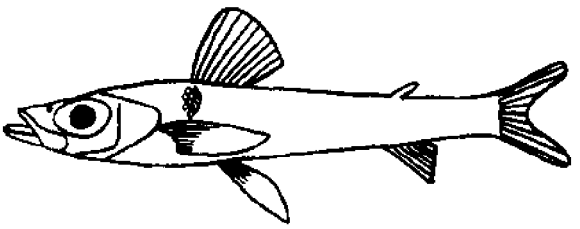


b. Pectoral fins inserted laterally; length of base of dorsal fin much less than 2/3 of standard length, fin not sail-like; body with scales. ---------- 3

3. a. Maxillary very narrow its entire length; origin of pelvic fins anterior to origin of dorsal fin. LIZARDFISHES. (M, E)
SYNODONTIDAE. Page 44



b. Maxillary broad behind; origin of pelvic fins under or behind origin of dorsal fin. GREENEYES. (M)
CHLOROPHTHALMIDAE. Page 45



FAMILY - SYNODONTIDAE - LIZARDFISHES

Key to Species

1. a. Inner pelvic fin rays about as long as outer rays. LARGESCALE LIZARDFISH. (M) Page 42
Saurida brasiliensis Norman

b. Inner pelvic fin rays about twice as long as outer rays. -- 2

2. a. Origin of anal fin about midway between base of caudal fin and pectoral fin origin; anal fin rays 14-15. SNAKEFISH. (M) Page 42
Trachinocephalus myops (Forster)

b. Origin of anal fin much nearer to base of caudal fin than to pectoral fin origin; anal fin rays 10-12. ---------- 3

3. a. Scales small, 58-68 in lateral line; pectoral fins short, not reaching base of pelvic fins. INSHORE LIZARDFISH. (M) Page 42
Synodus foetens (Linnaeus)

b. Scales large, 43-50 in lateral line; pectoral fins reaching base of pelvic fins or nearly so. ---------- 4

4. a. Scale between upper anterior part of eye and nostril heavily ridged with posterior margin serrated; lower jaw without fleshy knob at its tip. SAND DIVER. (M) Page 46
Synodus intermedius (Agassiz)

b. Scale described above without heavy ridges, its posterior margin smooth; lower jaw with a fleshy knob at its tip. OFFSHORE LIZARDFISH. (M) Page 46
Synodus poeyi Jordan

FAMILY - CHLOROPHTHALMIDAE - GREENEYES

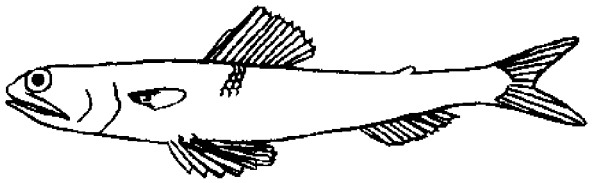
Key to Species

1. a. Eyes very large, diameter about 2 in length of head; lateral line scales 60-63. SHORTNOSE GREENEYE. (M) Page 46
Chlorophthalmus agassizi Bonaparte

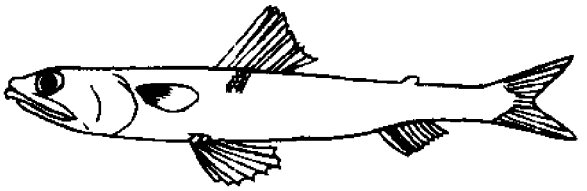
b. Eyes moderate, diameter about 3 in length of head; lateral line scales 45-52. ---------- 2

2. a. Dorsal fin rays 11; body depth 6 1/4 in standard length. (M) Page 46
Chlorophthalmus chalybeius (Goode)*

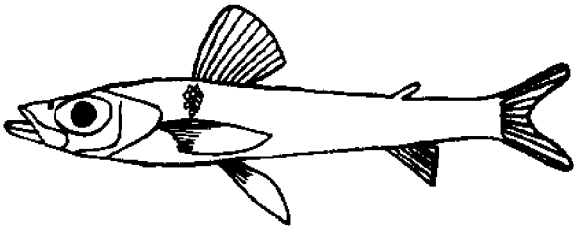
b. Dorsal fin rays 8; body depth 5 1/2 in standard length. LONGNOSE GREENEYE. (M) Page 46
Parasudis truculenta (Goode and Bean)



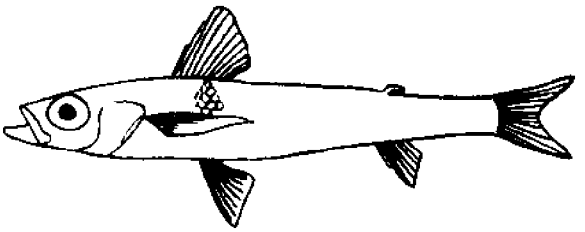
SAND DIVER
Synodus intermedius



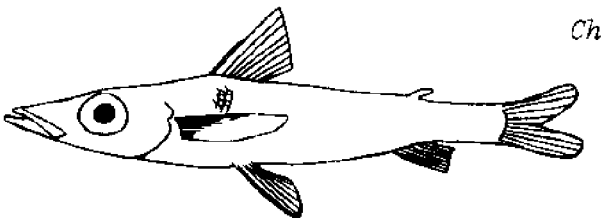
OFFSHORE LIZARDFISH
Synodus poeyi



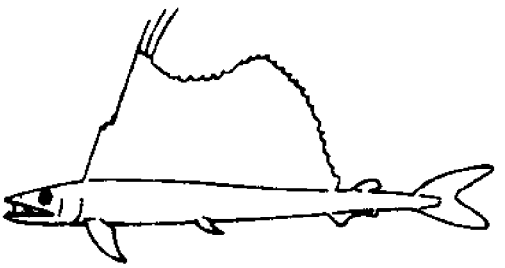
SHORTNOSE GREENEYE
Chlorophthalmus agassizi



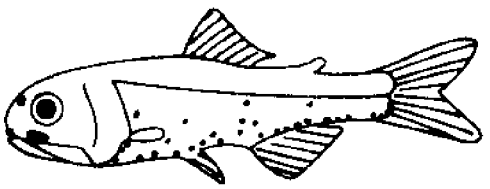
Chlorophthalmus chalybeius



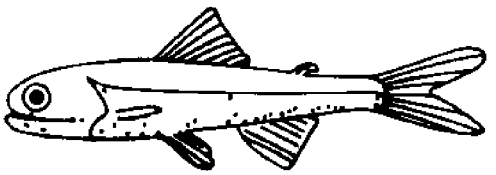
LONGNOSE GREENEYE
Parasudis truculenta



LONGNOSE LANCETFISH
Alepisaurus ferox



Diaphus intermedius



Diaphus dumerili

FAMILY - MYCTOPHIDAE - LANTERNFISHES

Key to Species

1. a. First anal photophore not elevated; photophore above base of pectoral fin nearer lateral line than base of fin. (M) Page 46
Diaphus dumerili (Bleeker)*

   b. First anal photophore elevated; photophore above base of pectoral fin nearer base of fin than lateral line. (M) Page 46
Diaphus intermedius (Borodin)*

ORDER - SILURIFORMES - (NEMATOGNATHI, OSTARIOPHYSI, in part)

Represented by one family.

FAMILY - ARIIDAE - SEA CATFISHES

Key to Species

1. a. Barbels on head 4; first soft ray in dorsal and pectoral fins greatly elongated. GAFFTOPSAIL CATFISH. (M, E) Page 49
Bagre marinus (Mitchill)

   b. Barbels on head 6; rays in dorsal and pectoral fins not greatly elongated. SEA CATFISH. (M, E) Page 49
Arius felis (Linnaeus)

ORDER - BATRACHOIDIFORMES (HAPLODOCI)

Represented by one family.

FAMILY - BATRACHOIDIDAE - TOADFISHES

Key to Species

1. a. Dorsal fin spines 2; body with rows of well developed mucous glands that appear to be light producing organs. ATLANTIC MIDSHIPMAN. (M, E) Page 49
Porichthys porosissimus (Valenciennes)

   b. Dorsal fin spines 3; body without rows of "light organs". GULF TOADFISH. (M, E) Page 49
Opsanus beta (Goode and Bean)

ORDER - GOBIESOCIFORMES - (XENOPTERYGII)

Represented by one family.

FAMILY - GOBIESOCIDAE - CLINGFISHES

Key to Species

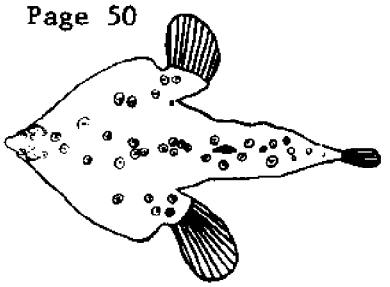
1. a. Central margin of upper lip with definate protrusions or lobe-like papillae; pectoral fin rays 22 to 26, usually 24. SKILLETFISH. (M, E) Page 49
Gobiesox strumosus Cope

   b. Central margin of upper lip smooth, without protrusions or lobe-like papillae; pectoral fin rays 19 to 22, usually 21. STIPPLED CLINGFISH. (M) Page 49
Gobiesox punctulatus (Poey)

ORDER - LOPHIIFORMES (PEDICULATI)

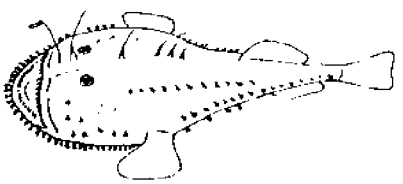
KEY TO FAMILIES

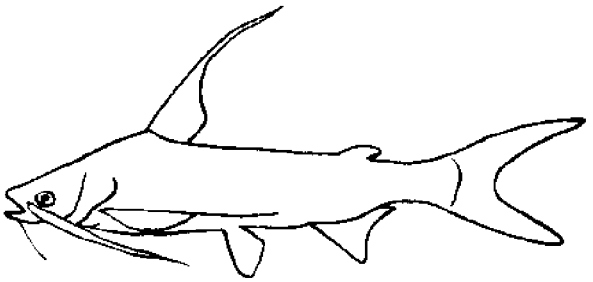
1. a. Mouth small, inferior, gill openings in or behind upper axil of pectoral fin. BATFISHES. (M)
OGCOCEPHALIDAE. Page 50



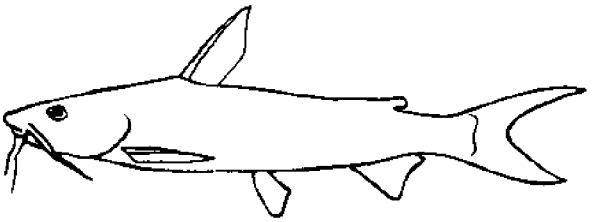
   b. Mouth large, terminal; gill openings in or behind lower axil of pectoral fin. ---------- 2

2. a. Head broad, depressed; pseudobranchia present. GOOSEFISHES. (M)
LOPHIIDAE
One genus in Texas waters. (M)
Lophiomus sp.*

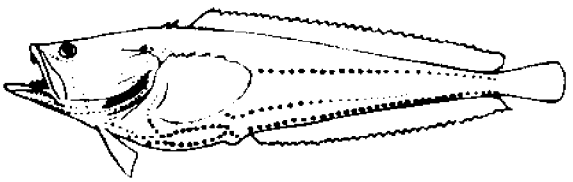




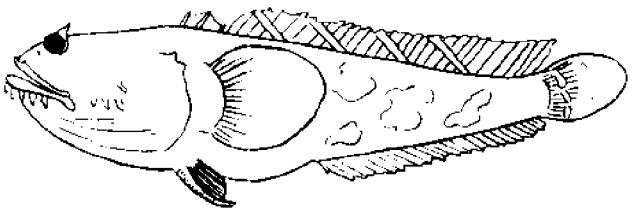
GAFFTOPSAIL CATFISH
Bagre marinus



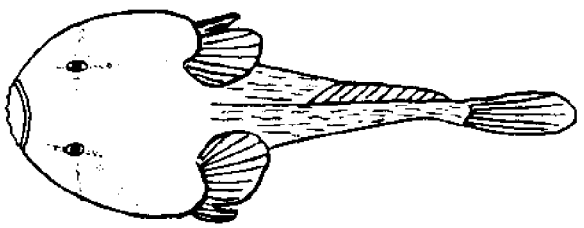
SEA CATFISH
Arius felis



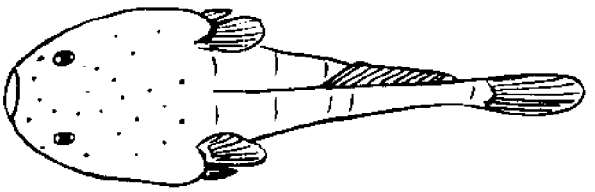
ATLANTIC MIDSHIPMAN
Porichthys porosissimus



GULF TOADFISH
Opsanus beta

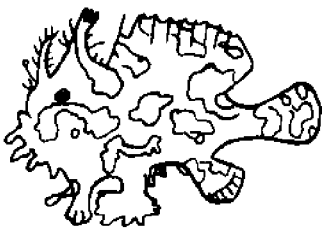


SKILLETFISH
Gobiesox strumosus



STIPPLED CLINGFISH
Gobiesox punctulatus

b. Head somewhat compressed; pseudobranchia absent. FROGFISHES. (M)
ANTENNARIIDAE. Page 50



FAMILY - ANTENNARIIDAE - FROGFISHES

Key to Species

1. a. Middorsal line of snout with 2 fleshy cirri present in front of base of illicium (angling apparatus). SARGASSUMFISH. (M) Page 52
Histrio histrio (Linnaeus)

   b. Snout without fleshy cirri in front of base of illicium (angling apparatus). ---------- 2

2. a. Back with a prominent ocellated spot; dorsal fin rays 13; anal fin rays 8; pectoral fin rays 13-14. SINGLESPOT FROGFISH. (M) Page 52
Antennarius radiosus Garman

   b. Back without prominent ocellated spot; dorsal fin rays 11-12; anal fin rays 6-7; pectoral fin rays 10-11. ---------- 3

3. a. Color, black or dark brown. (M) Page 52
Antennarius nuttingi (Garman)*

   b. Body striped with dark brown markings that resemble the pattern on a zebra; fins with dark brown spots. SPITLURE FROGFISH. (M) Page 52
Antennarius scaber (Cuvier)

FAMILY - OGCOCEPHALIDAE - BATFISHES

Key to Species

1. a. Frontal region of disc (anterior part of body) elevated; rostrum more or less produced, long and prominent in some species; eyes lateral; dorsal fin normally with 4 or 5 rays. ---------- 2

b. Frontal region of disc not elevated; rostral process or spine absent, snout rounded; eyes partly superior; dorsal fin normally with 6 rays. ---------- 5

2. a. Bait of angling apparatus (esca) not distinctly three-lobed in frontal view (A); ventral surface of tail with 2 to 4 rows of large scales; pupillary opercula absent; dorsal fin rays normally 5. TRICORN BATFISH. (M) Page 52
Zalieutes mcgintyi (Fowler)

(A) ESCA NOT DISTINCTLY TRILOBED IN FRONTAL VIEW

(B) ESCA DISTINCTLY TRILOBED IN FRONTAL VIEW

b. Esca distinctly trilobed in frontal view (B); scales on ventral surface of tail numerous and very small; pupillary opercula present or absent; dorsal fin rays normally 4. (*Ogcocephalus*; species in need of revision). ---------- 3

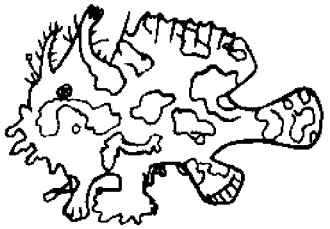
3. a. Pectoral fin rays 10-11. ROUGHBACK BATFISH. (M) Page 52
Ogcocephalus parvus Longley and Hildebrand

b. Pectoral fin rays 13. SHORTNOSE BATFISH. (M) Page 52
Ogcocephalus nasutus (Valenciennes)

4. a. Bait of angling apparatus (esca) cone-shaped in frontal view (A); pupillary opercula present; ventral surface of disc (anterior part of body) smooth; "wrist" of pectoral fin attached to body by skin; pectoral fin rays 16; back dotted with white and brown streaks. PANCAKE BATFISH. (M) Page 52
Halieutichthys aculeatus (Mitchill)

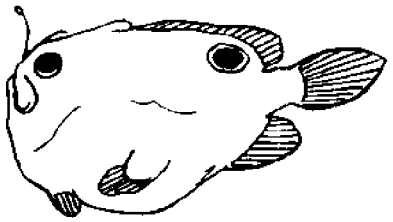
(A) ESCA CONE-SHAPED IN FRONTAL VIEW

(B) ESCA TRILOBED IN FRONTAL VIEW

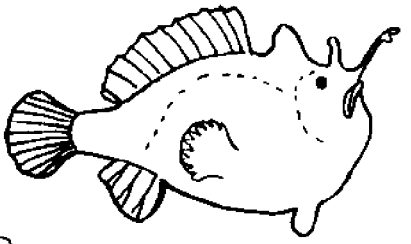


SARGASSUMFISH
Histrio histrio

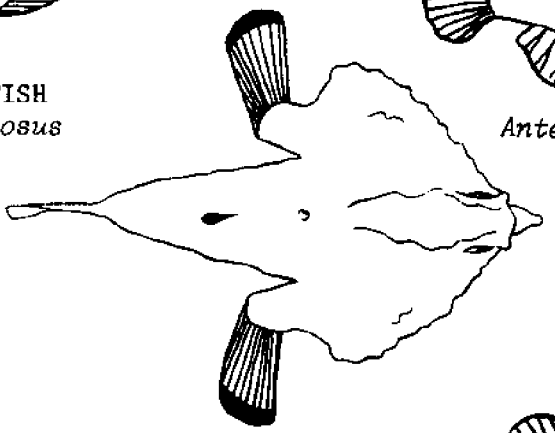
SPLITLURE FROGFISH
Antennarius scaber



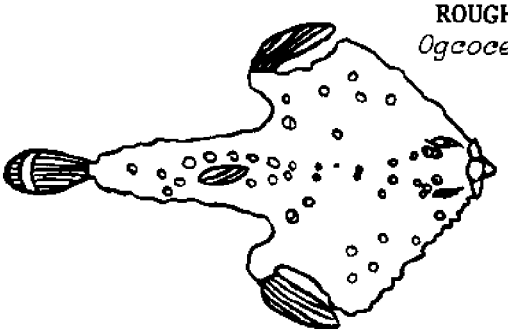
SINGLESPOT FROGFISH
Antennarius radiosus



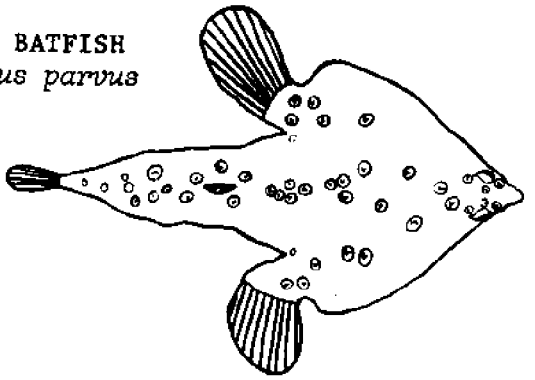
Antennarius nuttingi



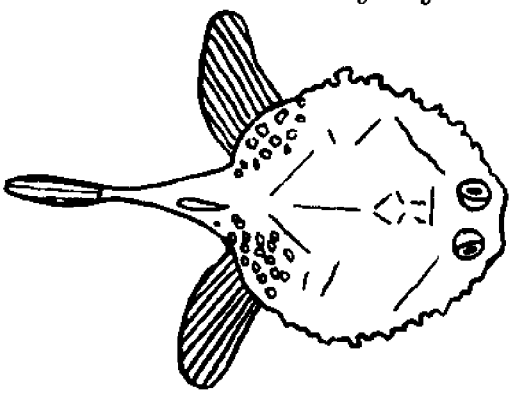
ROUGHBACK BATFISH
Ogcocephalus parvus



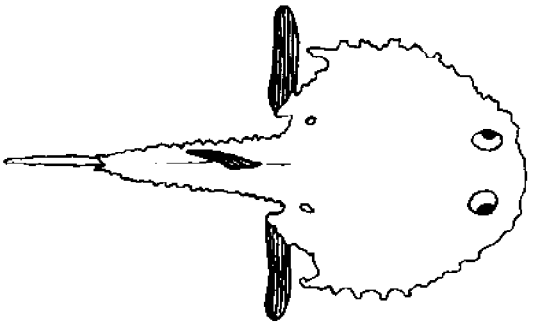
TRICORN BATFISH
Zalieutes mcgintyi



SHORTNOSE BATFISH
Ogcocephalus nasutus



PANCAKE BATFISH
Halieutichthys aculeatus



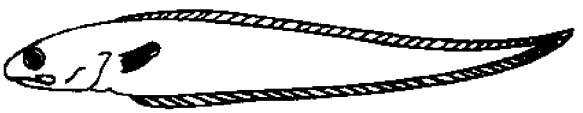
Dibranchus atlanticus

b. Esca three-lobed in frontal view (B); pupillary opercula absent; ventral surface of disc rough; "wrist" of pectoral fin largely free from body; pectoral fin rays 13; back, gray, without streaks. (M) Page 52
Dibranchus atlanticus Peters*

ORDER - GADIFORMES (ANACANTHINI)

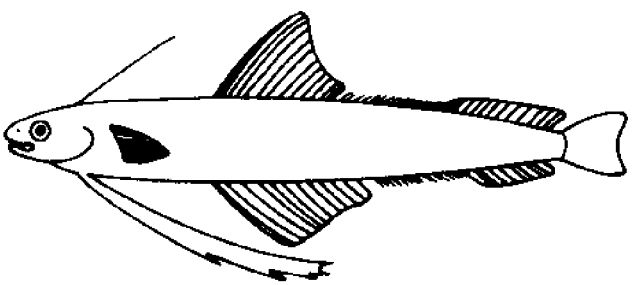
KEY TO FAMILIES

1. a. Anus near throat; pelvic fins absent. PEARLFISHES. (M)
CARAPIDAE
One species in Texas waters. PEARLFISH. (M)
Carapus bermudensis (Jones)



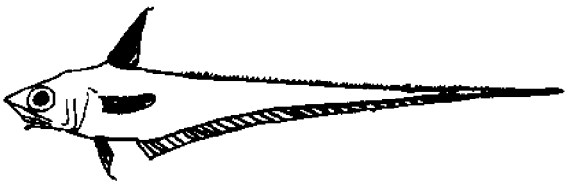
b. Anus in normal position; pelvic fins present, sometimes filamentous. ---------- 2

2. a. Dorsal surface of head with a long filament. CODLETS. (M)
BREGMACEROTIDAE
One species in Texas waters. ANTENNA CODLET. (M)
Bregmaceros atlanticus Goode and Bean



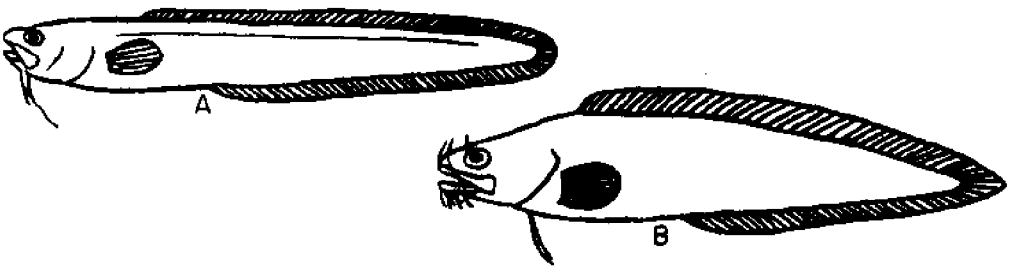
b. Dorsal surface of head without filament. ---------- 3

3. a. Caudal fin absent; body tapering into a long compressed tail which ends in a point. GRENADIERS (M)
MACROURIDAE
One species in Texas waters. MARLINSPIKE. (M)
Nezumia bairdi (Goode and Bean)

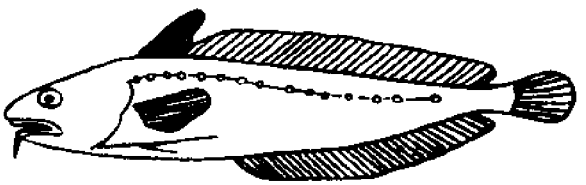


b. Caudal fin present although it may be confluent with dorsal and anal fins; body moderately tapering. ---------- 4

4. a. Caudal fin confluent with dorsal and anal fins; dorsal fin single. CUSK-ELLS (A) and BROTULAS (B). (M)
OPHIDIIDAE (includes BROTULIDAE) Page 55



b. Caudal fin separate from dorsal and anal fins; dorsal fins usually 2. CODFISHES. (M)
GADIDAE (includes MORIDAE) Page 54



FAMILY - GADIDAE - CODFISHES

Key to Species

1. a. Margin of soft-dorsal and anal fins deeply indented or notched, the middle rays shorter than the anterior and posterior rays. (M) Page 56
Merluccius magnoculus Ginsburg*

b. Margin of soft-dorsal and anal fins not notched. ---------- 2

2. a. Pelvic fin rays 6-7. ---------- 3

b. Pelvic fin rays 2-3. ---------- 4

3. a. Chin with a well-developed barbel; teeth in jaws villiform (having the shape of finger-like processes). (M) Page 56
Physiculus fulvus Bean*

b. Chin without barbel; teeth in jaws unequal and not villiform; outer series enlarged. (M) Page 56
Gadella maraldi (Risso)*

4. a. Lateral line without dark coloring and white spots; filamentous part of pelvic fins reaching far past the origin of anal fin to about middle of anal fin base. GULF HAKE. (M) Page 56
Urophycis cirratus (Goode and Bean)

b. Lateral line dark colored, interrupted by white spots, resembling a series of dark dashes down the sides, filamentous part of pelvic fins reaching to, or only slightly past, the origin of anal fin. ---------- 5

5. a. First dorsal fin supported by 13 elements; scales small, about 120 in lateral line series. SOUTHERN HAKE. (M) Page 56
Urophycis floridanus (Bean and Dresel)

b. First dorsal fin supported by 8 elements; scales moderate, about 90 to 95 in lateral line series. SPOTTED HAKE. (M) Page 56
Urophycis regius (Walbaum)

FAMILY - OPHIDIIDAE - CUSK-EELS AND BROTULAS

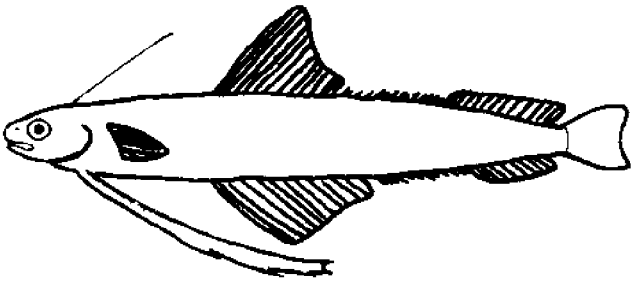
Key to Species

1. a. Origin of pelvic fins below or anterior to eyes; pseudobranchia well developed (CUSK-EELS). ---------- 2

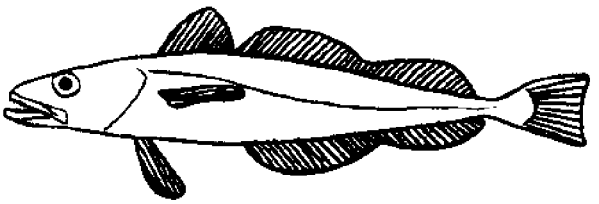
b. Origin of pelvic fins posterior to eyes; pseudobranchia sometimes absent (BROTULAS). ---------- 5

2. a. Head with scales; snout with decurved hook or spine at its tip (easily felt by pressing on tip of nose). SHORT-BEARDED CUSK-EEL.* (M) Page 58
Lepophidium brevibarbe (Cuvier)*

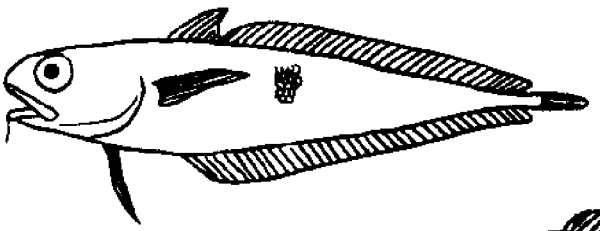
b. Head without scales; snout without hook or spine at its tip. 3



ANTENNA CODLET
Bregmaceros atlanticus

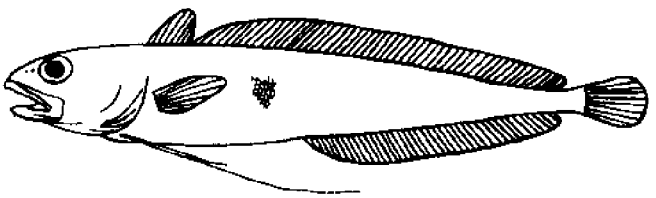


Merluccius magnoculus

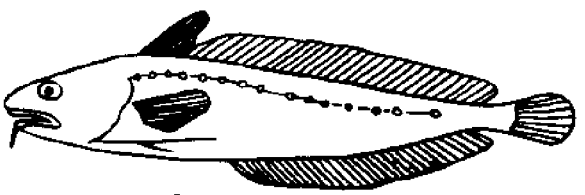


Physiculus fulvus

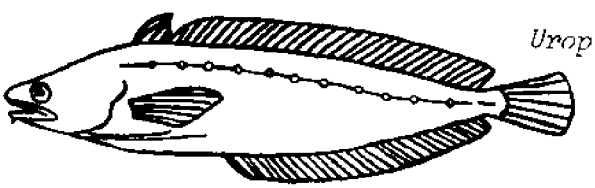
Gadella maraldi



GULF HAKE
Urophycis cirratus



SOUTHERN HAKE
Urophycis floridanus



SPOTTED HAKE
Urophycis regius

3. a. Opercle with a flat, sharp spine concealed beneath the skin; larger specimens with sides striped and a pronounced "hump" on top of head. CRESTED CUSK-EEL. (M, E) Page 58
Ophidion welshi (Nichols and Breder)

   b. Opercle without spine; sides not striped and head without hump. ---------- 4

4. a. Longest ray of pelvic fins (pelvic fins are reduced and appear as branched barbels at the throat) about equal to head length; shortest pelvic fin ray about 1/2 length of longest; air bladder short and broad, either spherical or kidney shaped. STRIPED CUSK-EEL. (M) Page 58
Rissola marginata (DeKay)

   b. Longest ray of pelvic fins shorter than head length, equal to a distance from center of eye to end of operculum; shortest pelvic fin ray nearly 2/3 length of longest; air bladder long and pointed. BANK CUSK-EEL. (M) Page 58
Ophidion holbrooki (Putnam)

5. a. Snout and lower jaw with well developed barbels. BEARDED BROTULA. (M) Page 58
Brotula barbata (Bloch and Schneider)

   b. Snout and lower jaw without barbels. ---------- 6

6. a. Pectoral fin rays in 2 groups, the lowermost 7 or 8 not connected by membranes. (M) Page 58
Dicrolene intronigra Goode and Bean*

   b. Pectoral fin rays in 1 group, connected by membranes for most, or all of their length. (M) Page 58
Neobythites marginatus Goode and Bean*

ORDER - ATHERINIFORMES

KEY TO FAMILIES

1. a. Pectoral fins normal; jaws normal, or both jaws produced to form a needle-like beak. ---------- 2

   b. Pectoral fins exceedingly long, forming "wings" for flight; or, if normal, lower jaw considerably produced. ---------- 5

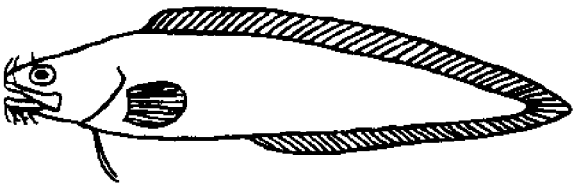
2. a. Both jaws produced to form a needle-like beak. NEEDLEFISHES. (M, E)
BELONIDAE. Page 63

SHORT-BEARDED CUSK-EEL
Lepophidium brevibarbe

CRESTED CUSK-EEL
Ophidion welshi

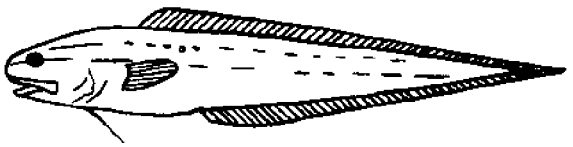
STRIPED CUSK-EEL
Rissola marginata

BANK CUSK-EEL
Ophidion holbrooki



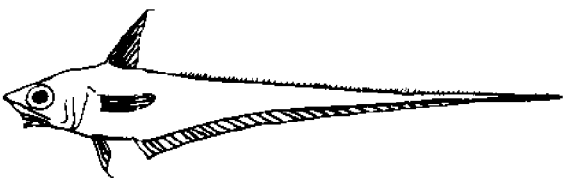
BEARDED BROTULA
Brotula barbata

Dicrolene intronigra



Neobythites marginatus

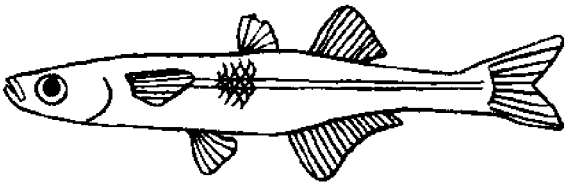
PEARLFISH
Carapus bermudensis



MARLINSPIKE
Nezumia bairdi

b. Jaws not produced into a needle-like beak. ---------- 3

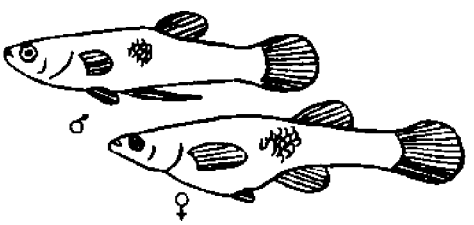
3. a. Dorsal fins 2. SILVERSIDES. (M, E)
ATHERINIDAE. Page 66



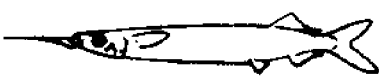
b. Dorsal fin single. ---------- 4

4. a. Third anal fin ray branched; anal fin of male normal.
KILLIFISHES. (M, E)
CYPRINODONTIDAE. Page 63

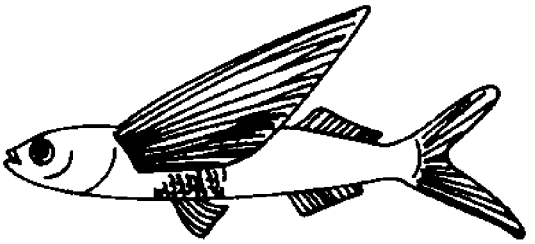
b. Third anal fin ray not branched; anal fin of male prolonged into an intrommittent organ. LIVEBEARERS. (M, F)
POECILIIDAE. Page 64



5. a. Lower jaw considerably produced in Texas species; pectoral fins long to short; teeth tricuspid. HALFBEAKS. (M)
HEMIRAMPHIDAE (=EXOCOETIDAE, in part, in AFS 1970).
Page 60



b. Lower jaw only slightly produced if at all; pectoral fins exceedingly long and wing-like; teeth conical. FLYINGFISHES. (M)
EXOCOETIDAE. Page 60



FAMILY - HEMIRAMPHIDAE - HALFBEAKS

Key to Species

1. a. Pectoral fins long, more than half the length of lower jaw; pelvic fins small, not longer than diameter of eye; dorsal fin rays 22; anal fin rays 21. FLYING HALFBEAK. (M)
Euleptorhamphus velox Poey

   b. Pectoral fins less than half the length of lower jaw; pelvic fins longer than diameter of eye; dorsal fin rays 12-14, anal fin rays 12-15. ---------- 2

2. a. Origin of dorsal fin well forward of origin of anal fin; origin of pelvic fins closer to base of caudal fin than to opercle; caudal fin rather deeply forked, the lower lobe almost twice as long as upper. BALYHOO. (M)
Hemiramphus brasiliensis (Linnaeus)

   b. Origin of dorsal fin only slightly forward of origin of anal fin; origin of pelvic fins about midway between opercle and base of caudal fin; caudal fin moderately forked, the lower lobe only slightly longer than upper. HALFBEAK. (M)
Hyporhamphus unifasciatus (Ranzani)

FAMILY - EXOCOETIDAE - FLYINGFISHES

Key to Species

1. a. Pectoral fins short, scarcely reaching origin of pelvic fins. SMALLWING FLYINGFISH. (M) Page 62
Oxyporhamphus micropterus (Valenciennes)

   b. Pectoral fins long, reaching beyond origin of dorsal fin. - 2

2. a. Pectoral fins reaching only to about middle of dorsal fin base; pelvic fins just reaching origin of anal fin. SAILFIN FLYINGFISH. (M) Page 62
Parexocoetus brachypterus (Richardson)

b. Pectoral fins reaching well beyond end of dorsal fin base; pelvic fins short, failing to reach anal fin origin by about their length, or long, reaching well beyond anal fin origin. ---------- 3

3. a. Pelvic fins short, inserted nearer snout than caudal fin base and failing to reach anal fin origin by their length. OCEANIC TWO-WING FLYINGFISH. (M) Page 62
Exocoetus obtusirostris Günther

b. Pelvic fins long, inserted nearer caudal fin base than snout and reaching well beyond anal fin origin. ---------- 4

4. a. Origin of dorsal fin over origin of anal fin, dorsal fin base about equal to anal fin base. BLACKWING FLYINGFISH. (M) Page 62
Hirundichthys rondeleti (Valenciennes)

b. Origin of dorsal fin forward of origin of anal fin, dorsal fin base longer than anal fin base. ---------- 5

5. a. First and second rays of pectoral fins simple, the third ray branched. BLUNTNOSE FLYINGFISH. (M) Page 62
Prognichthys gibbifrons (Valenciennes)

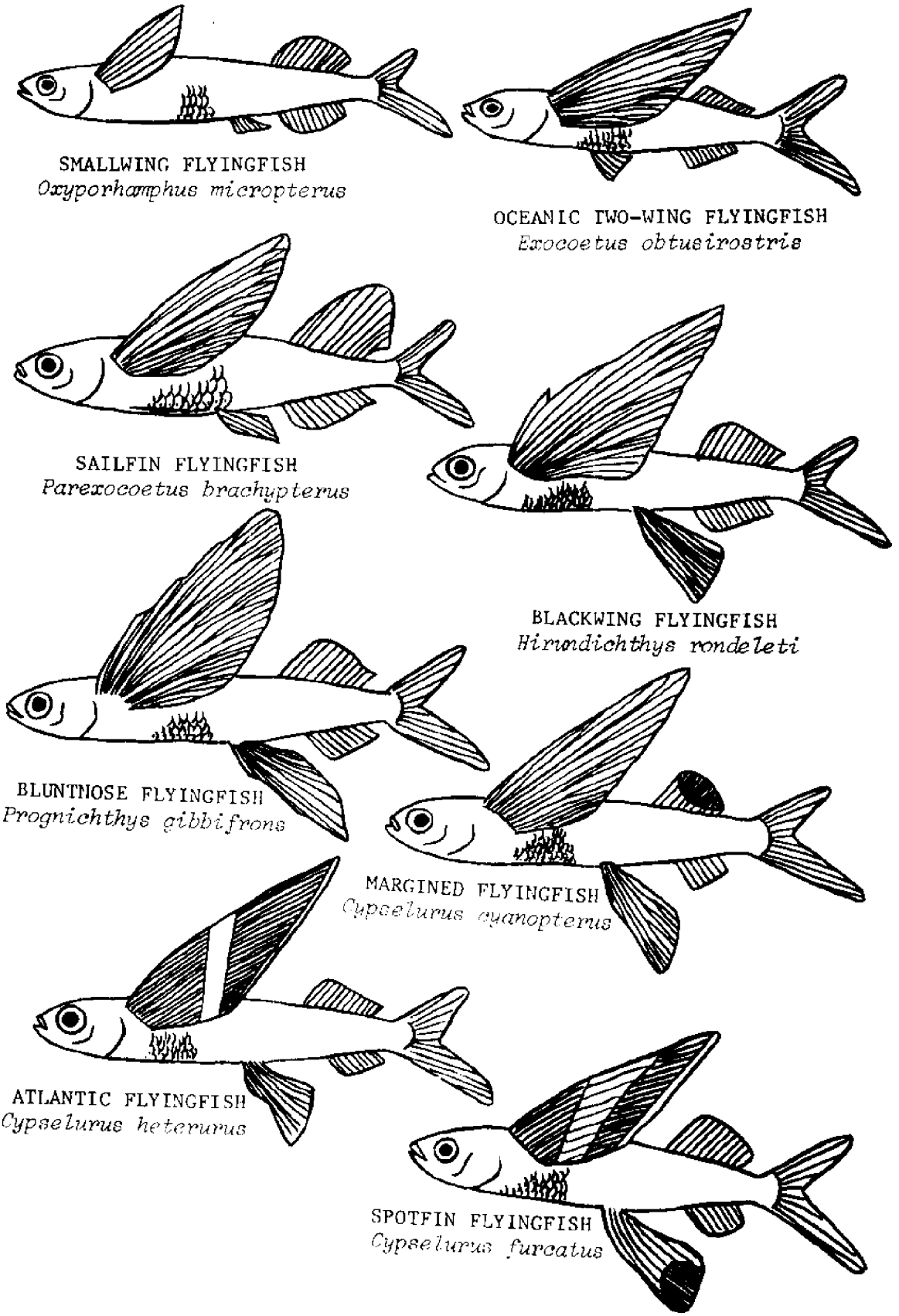
b. First ray of pectoral fins simple, the second ray branched. 6

6. a. Dorsal fin with a prominent dark spot, height of the fin more than 10% of standard length. MARGINED FLYINGFISH. (M) Page 62
Cypselurus cyanopterus (Valenciennes)

b. Dorsal fin without spot, height of the fin equal to or less than 10% of standard length. ---------- 7

7. a. Pectoral fins grayish with a narrow light outer margin whose width is less than diameter of pupil, and with a light, but not conspicuous, cross band. ATLANTIC FLYINGFISH. (M) Page 62
Cypselurus heterurus (Rafinesque)

b. Pectoral fins nearly black with a broad light outer margin whose width is greater than diameter of pupil, and with a light, but very prominent, cross band. SPOTFIN FLYINGFISH. (M) Page 62
Cypselurus furcatus (Mitchill)


SMALLWING FLYINGFISH
Oxyporhamphus micropterus
OCEANIC TWO-WING FLYINGFISH
Exocoetus obtusirostris
SAILFIN FLYINGFISH
Parexocoetus brachypterus
BLACKWING FLYINGFISH
Hirundichthys rondeleti
BLUNTNOSE FLYINGFISH
Prognichthys gibbifrons
MARGINED FLYINGFISH
Cypselurus cyanopterus
ATLANTIC FLYINGFISH
Cypselurus heterurus
SPOTFIN FLYINGFISH
Cypselurus furcatus

FAMILY - BELONIDAE - NEEDLEFISHES

Key to Species

1. a. Dorsal fin rays 12-17. ---------- 2

   b. Dorsal fin rays 21-26. ---------- 3

2. a. Anal fin rays 13-16; maxillaries completely covered by preorbitals. REDFIN NEEDLEFISH. (M)
   Strongylura notata (Poey)

   b. Anal fin rays 16-20; ventral margins of maxillaries not covered by preorbitals. ATLANTIC NEEDLEFISH. (M, E, F)
   Strongylura marina (Walbaum)

3. a. Anal fin rays 19-23; body not strongly compressed laterally. HOUNDFISH. (M)
   Tylosurus crocodilus (Peron and Lesueur)

   b. Anal fin rays 25-28; head and body strongly compressed laterally. FLAT NEEDLEFISH. (M)
   Ablennes hians (Valenciennes)

FAMILY - CYPRINODONTIDAE - KILLIFISHES

Key to Species

1. a. Teeth wedge-shaped and incisor-like with 3 cusps (points); humeral scale (modified scale just behind upper edge of gill opening) very large. SHEEPSHEAD MINNOW. (E, F) Page 65
   Cyprinodon variegatus Lacépède

   b. Teeth conical or pointed; humeral scale usually small or absent. ---------- 2

2. a. Body stout, depth 2 to 3 times in standard length, usually about 3. DIAMOND KILLIFISH. (E, F) Page 65
   Adinia xenica (Jordan and Gilbert)

   b. Body slender; depth more than 3 times in standard length. - 3

3. a. Teeth in a single row; scales very large, 25-26 in a horizontal row along middle of side of body; pores absent on lower jaw. RAINWATER KILLIFISH. (E, F) Page 65
   Lucania parva (Baird)
   Note: Small fish (37-50mm) have a prominent diamond-shaped pattern formed by melanophores on the edge of scale pockets; the males have a dark spot at the front of base of the dorsal fin.

   b. Teeth in more than one row; scales smaller, 30 or more in a horizontal row along middle of side of body; pores present on lower jaw. ---------- 4

4. a. Origin of dorsal fin over or slightly forward of anal fin origin. ---------- 5

   b. Origin of dorsal fin distinctly behind anal fin origin. --- 7

5. a. Snout long and pointed, in adults the tip is well below an imaginary horizontal line through middle of eye; black spot normally present near base of caudal fin; body with 10-15 dark cross bars. LONGNOSE KILLIFISH. (E, F) Page 65
   Fundulus similis (Baird and Girard)

   b. Snout shorter and blunter, in adults the tip is slightly below, level with, or above an imaginary horizontal line through middle of eye; black spot near base of caudal fin absent; body with crossbars, spots, or plain. ---------- 6

6. a. Predorsal stripe present from origin of dorsal fin to back of head; body with crossbars (males) or dark spots (females). BAYOU KILLIFISH. (E, F) Page 65
   Fundulus pulvereus (Evermann)

   b. Predorsal stripe absent or very short and not reaching to back of head; body with crossbars or plain. GULF KILLIFISH. (E, F) Page 65
   Fundulus grandis Baird and Girard

7. a. Anal fin rays 11-13; body with large dark spots in 2 irregular rows (spots occasionally merge to form short, indistinct vertical bars). SALTMARSH TOPMINNOW. (E, F) Page 65
   Fundulus jenkinsi (Evermann)

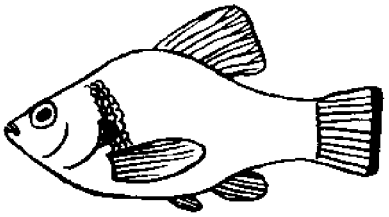
   b. Anal fin rays 10; body with 6-10 distinct crossbars (males) or small, scattered "pearl" spots (females). GOLDEN TOPMINNOW. (E, F) Page 65
   Fundulus chrysotus (Günther)

FAMILY - POECILIIDAE - LIVEBEARERS

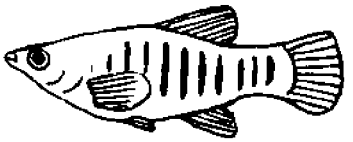
Key to Species

1. a. Origin of dorsal fin behind anal fin origin; dorsal fin rays 7-8. MOSQUITOFISH. (E, F) Page 65
   Gambusia affinis (Baird and Girard)

   b. Origin of dorsal fin in front of anal fin origin; dorsal fin rays 13-14. SAILFIN MOLLY. (E, F) Page 65
   Poecilia latipinna (Lesueur)

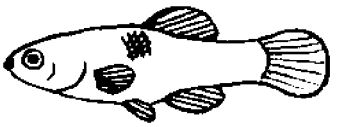


SHEEPSHEAD MINNOW
Cyprinodon variegatus

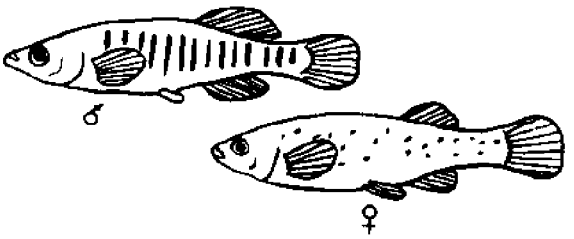


DIAMOND KILLIFISH
Adinia xenica

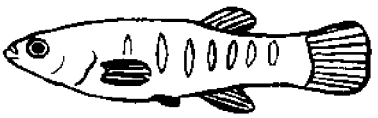
LONGNOSE KILLIFISH
Fundulus similis



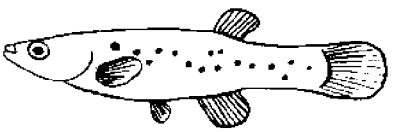
RAINWATER KILLIFISH
Lucania parva



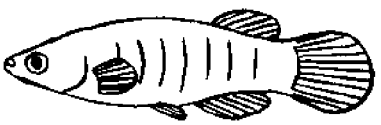
BAYOU KILLIFISH
Fundulus pulvereus



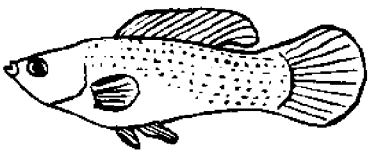
GULF KILLIFISH
Fundulus grandis



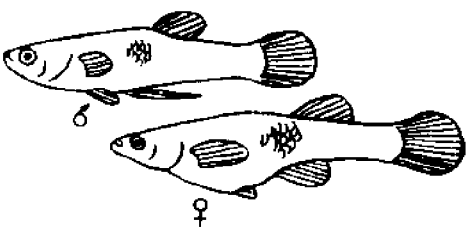
SALTMARSH TOPMINNOW
Fundulus jenkinsi



GOLDEN TOPMINNOW
Fundulus chrysotus



SAILFIN MOLLY
Poecilia latipinna



MOSQUITOFISH
Gambusia affinis

FAMILY - ATHERINIDAE - SILVERSIDES

Key to Species

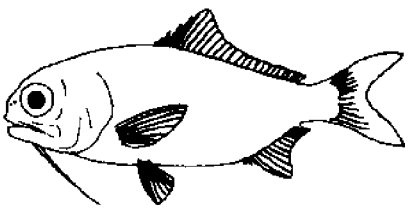
1. a. Scales feel rough when rubbed from back to front, their posterior margins with irregular, pointed projections (laciniate). ROUGH SILVERSIDE. (E, M) Page 69
Membras martinica (Valenciennes)

   b. Scales feel smooth when rubbed. TIDEWATER SILVERSIDE. (E, M, F) Page 69
Menidia beryllina (Cope)

ORDER - BERYCIFORMES (BERYCOMORPHI)

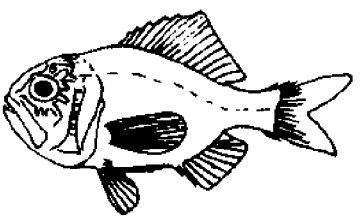
KEY TO FAMILIES

1. a. Chin with 2 long barbels; branchiostegal rays 4. BEARDFISHES. (M)
POLYMIXIIDAE
One species in Texas waters. BEARDFISH. (M)
Polymixia lowei Günther

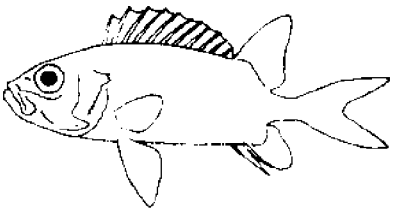


   b. Chin without barbels; branchiostegal rays 7 or 8. --------- 2

2. a. Abdomen with bony scutes; dorsal fin spines usually 6. ARMORHEADS. (M)
TRACHICHTHYIDAE*
One species in Texas waters. ARMORHEAD.* (M)
Hoplostethus mediterraneus Cuvier*



b. Abdomen without bony scutes; dorsal fin spines usually 11. SQUIRRELFISHES. (M)
HOLOCENTRIDAE. Page 67



FAMILY - HOLOCENTRIDAE - SQUIRRELFISHES

Key to Species

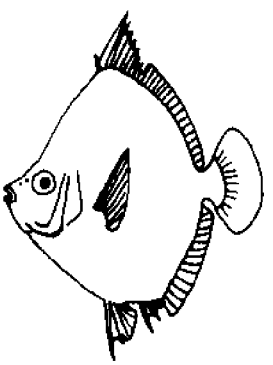
1. a. Preopercular spine not reaching past posterior margin of gill cover. SQUIRRELFISH. (M) Page 69
Holocentrus ascensionis (Osbeck)

b. Preopercular spine reaching past posterior margin of gill cover, nearly to base of pectoral fin. LONGSPINE SQUIRRELFISH. (M) Page 69
Holocentrus rufus (Walbaum)

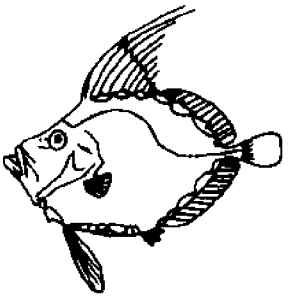
ORDER - ZEIFORMES (ZEOMORPHI)

KEY TO FAMILIES

1. a. Body deep, compressed, its depth greater than its length; body covered with moderate sized rough ctenoid scales; branchiostegal rays 6. BOARFISHES. (M)
CAPROIDAE
One species in Texas waters. DEEPBODY BOARFISH. (M)
Antigonia capros Lowe



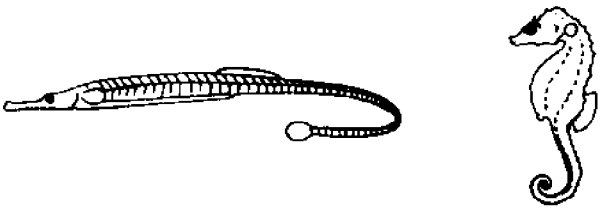
b. Body deep, compressed, but depth not greater than length; body naked or with minute smooth scales; branchiostegals rays 7-8. DORIES. (M)
ZEIDAE
One species in Texas waters. AMERICAN JOHN DORY. (M)
Zenopsis ocellata (Storer)



ORDER - GASTEROSTEIFORMES (THORACOSTEI; HEMIBRANCHII; LOPHOBRANCHII; SOLENICHTHYES)

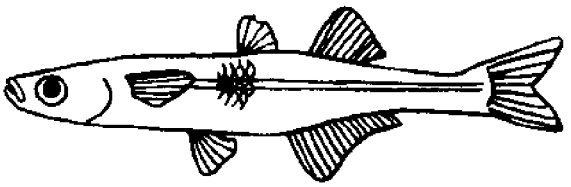
KEY TO FAMILIES

1. a. Body covered with bony plates which are firmly connected, forming a bony exoskeleton. PIPEFISHES and SEAHORSES. (M, E)
SYNGNATHIDAE. Page 70

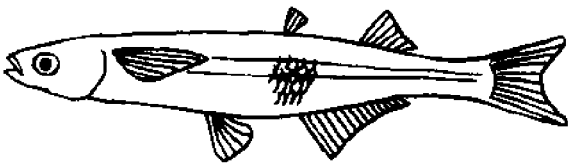


b. Body covered mostly by skin, bony plates absent or present only in certain areas. ---------- 2

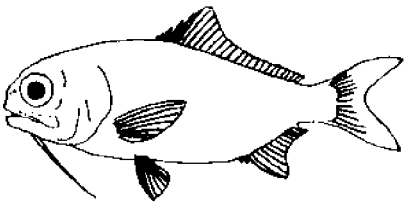
2. a. Body scaleless; lateral line present. CORNETFISHES. (M)
FISTULARIIDAE
One species in Texas waters. BLUESPOTTED CORNETFISH. (M)
Fistularia tabacaria Linnaeus



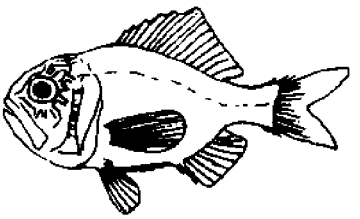
TIDEWATER SILVERSIDE
Menidia beryllina



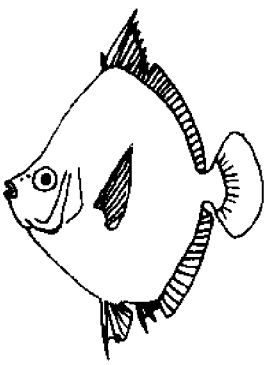
ROUGH SILVERSIDE
Membras martinica



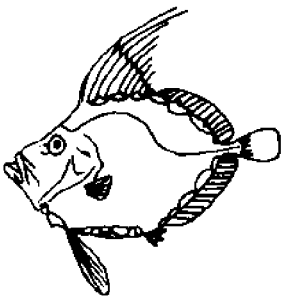
BEARDFISH
Polymixia lowei



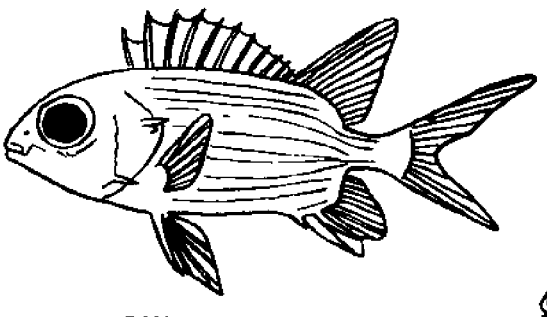
ARMORHEAD
Hoplostethus mediterraneus



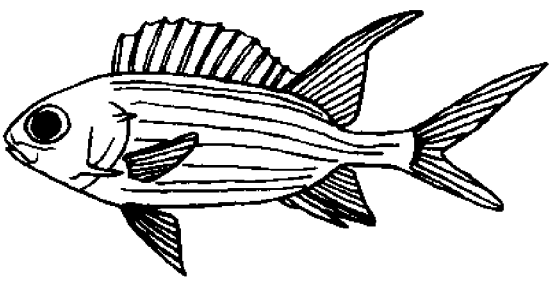
DEEPBODY BOARFISH
Antigonia capros



AMERICAN JOHN DORY
Zenopsis ocellata

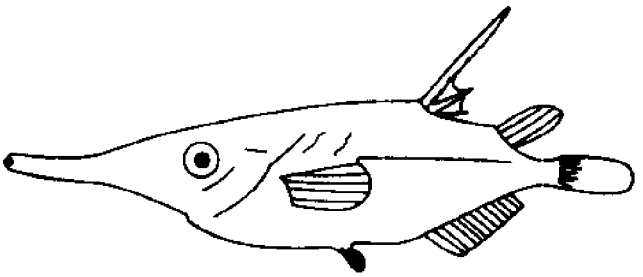


SQUIRRELFISH
Holocentrus ascensionis



LONGSPINE SQUIRRELFISH
Holocentrus rufus

b. Body covered with small rough scales; lateral line absent. SNIPEFISHES. (M)
CENTRISCIDAE
One species in Texas waters. LONGSPINE SNIPEFISH. (M)
Macrorhamphosus scolopax (Linnaeus)



FAMILY - SYNGNATHIDAE - PIPEFISHES and SEAHORSES

Key to Species

1. a. Tail prehensile; caudal fin absent. ---------- 2

   b. Tail not prehensile; caudal fin present. ---------- 3

2. a. Dorsal fin rays 19. LINED SEAHORSE. (M, E) Page 71
   Hippocampus erectus Perry

   b. Dorsal fin rays 12. DWARF SEAHORSE. (M, E) Page 71
   Hippocampus zosterae Jordan and Gilbert

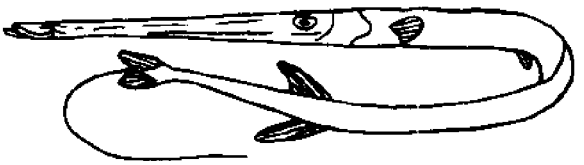
3. a. Trunk rings 19-21, rarely 18 (the first trunk ring is the ring which bears the pectoral fins and the last trunk ring is the ring on which the anus is located); dorsal fin rays 35-43. ---------- 4

   b. Trunk rings 15-18, rarely 19; dorsal fin rays 27-35. ------ 5

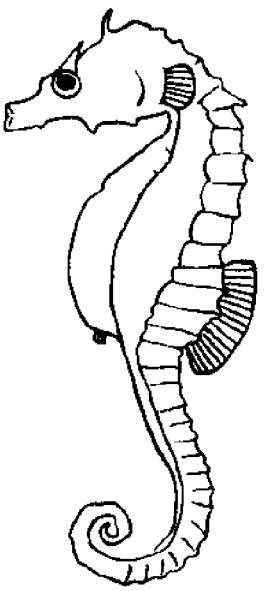
4. a. Trunk rings 20, occassionally 19 or 21; dorsal fin on 2 1/2 to 3 1/2 trunk rings and 4 to 6 tail rings, usually 3 + 4; snout long, 1.58 to 1.88 in head; reticulated chain-like color pattern characteristic. CHAIN PIPEFISH. (M, E)
   Syngnathus louisianae Gunther

   b. Trunk rings 19, occassionally 18 or 20; dorsal fin on 4 to 6 trunk rings and 4 1/2 to 6 tail rings; snout moderate, 1.7 to 2.3 in head; banded color pattern characteristic. NORTHERN PIPEFISH. (M, E)
   Syngnathus fuscus Storer
   Note: This species is represented in Texas by an isolated population at Corpus Christi.

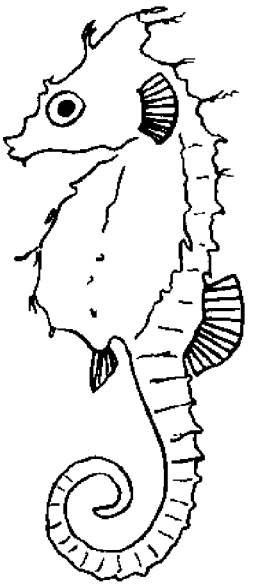
5. a. Snout-in-head usually 2.2 to 2.5. GULF PIPEFISH. (M, E, F)
   Syngnathus scovelli (Evermann and Kendall)



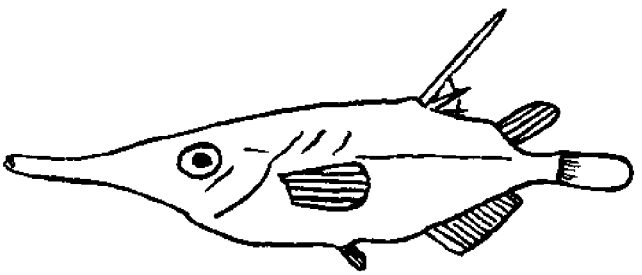
BLUESPOTTED CORNETFISH
Fistularia tabacaria



LINED SEAHORSE
Hippocampus erectus



DWARF SEAHORSE
Hippocampus zosterae



LONGSPINE SNIPEFISH
Macrorhamphosus scolopax

b. Snout-in-head usually 1.5 to 2.1. DUSKY PIPEFISH. (M, E)
Syngnathus floridae (Jordan and Gilbert)

Note: Another pipefish may be present in Texas waters. Springer and Hoese (1958) list 3 specimens of *Syngnathus pelagicus* Linnaeus that were collected offshore the Texas coast, but according to Herald (1966) this species does not occur in the Gulf of Mexico.

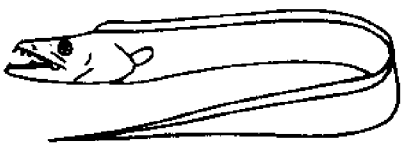
ORDER - PERCIFORMES (PERCIMORPHI; ACANTHOPTERYGII)

KEY TO FAMILIES

1. a. Pelvic fins absent. ---------- 2

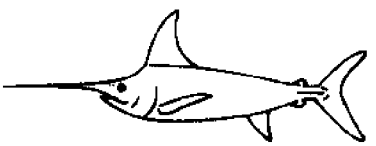
   b. Pelvic fins present. ---------- 4

2. a. Caudal fin absent; dorsal and anal fins continuous around tip of tail. CUTLASSFISHES. (M, E)
   TRICHIURIDAE
   One species in Texas waters. ATLANTIC CUTLASSFISH. (M, E)
   Trichiurus lepturus Linnaeus

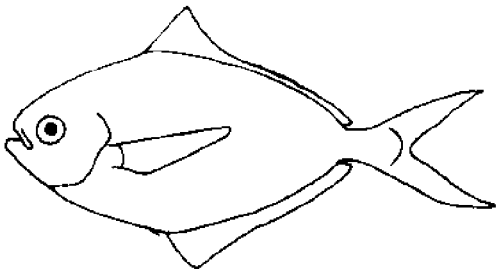


   b. Caudal fin present. ---------- 3

3. a. Upper jaw formed into a "sword-like" bill. SWORDFISHES. (M)
   XIPHIIDAE
   One species in Texas waters. SWORDFISH. (M)
   Xiphias gladius Linnaeus



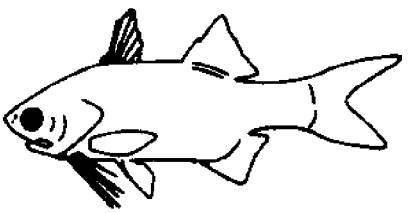
b. Upper jaw not "sword-like". BUTTERFISHES. (M, E)
STROMATEIDAE (in part) Page 133



4. a. Origin of pelvic fins abdominal (well behind origin of pectoral fins). ---------- 5

b. Origin of pelvic fins thoracic or jugular (nearly below or forward of origin of pectoral fins). ---------- 7

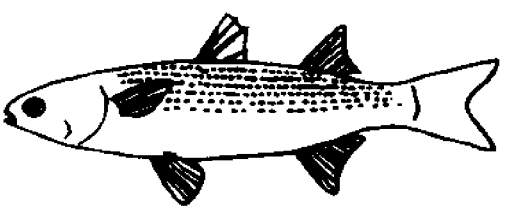
5. a. Lowermost 5 to 8 rays of pectoral fin detached and filamentous. THREADFINS. (M, E)
POLYNEMIDAE
One species in Texas waters. ATLANTIC THREADFIN. (M, E)
Polydactylus octonemus (Girard)



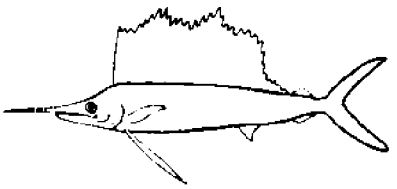
b. Pectoral fin entire, without detached filamentous rays. --- 6

6. a. Lateral line present; teeth large, unequal. BARRACUDAS. (M)
SPHYRAENIDAE. Page 122

b. Lateral line absent; teeth small or absent. MULLETS. (M, F)
MUGILIDAE. Page 122

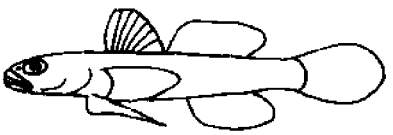


7. a. Upper jaw formed into a "sword-like" bill.
BILLFISHES. (M)
ISTIOPHORIDAE. Page 133



b. Upper jaw not "sword-like". ---------- 8

8. a. Pelvic fins united to form a "sucking" disc. GOBIES. (M, E, F)
GOBIIDAE. Page 127

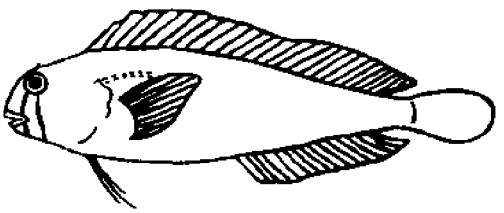


b. Pelvic fins distinctly separate, or if joined, not forming a disc. ---------- 9

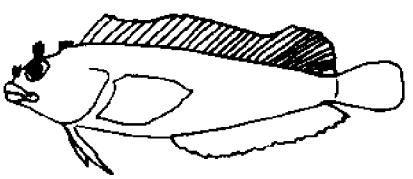
9. a. All segmented rays (soft rays) in pelvic, dorsal, and anal fins simple, unbranched. ---------- 10

b. At least some (usually most) segmented rays in either pelvic, dorsal, or anal fins branched. ---------- 11

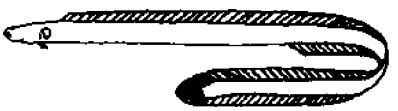
10. a. Scales absent from body. COMBTOOTH BLENNIES. (M)
BLENNIIDAE. Page 123



b. Scales present on body. CLINIDS. (M)
CLINIDAE
One species in Texas waters. HAIRY BLENNY. (M)
Labrisomus nuchipinnis (Quoy and Gaimard)



11. a. Pelvic fins with one small spine and 3 rays; body extremely long; dorsal and anal fins joined to the caudal fin. WORMFISHES. (M)
MICODESMIDAE
One species in Texas waters. PINK WORMFISH. (M)
Microdesmus longipinnis (Weymouth)

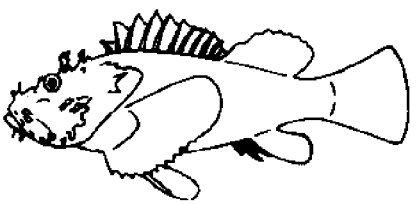


b. Pelvic fins with one spine and 4 or 5 rays; body, dorsal, and anal fins not as above. ---------- 12

12. a. Suborbital with a horizontal bony stay (ridge) extending across cheek; cheeks, head, or entire body covered by bony plates; head large, with prominent ridges terminating in spines (SCORPAENIFORMES of many authors). ---------- 13

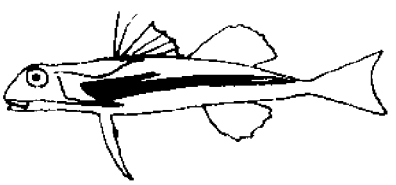
b. Suborbital stay absent; cheeks, head, or body without bony plates; head without prominent ridges. ---------- 16

13. a. Pectoral fins entire, neither divided into 2 unequal parts, nor with detached, finger-like rays; cheeks with bony plates. SCORPIONFISHES and ROCKFISHES. (M, E)
SCORPAENIDAE. Page 134



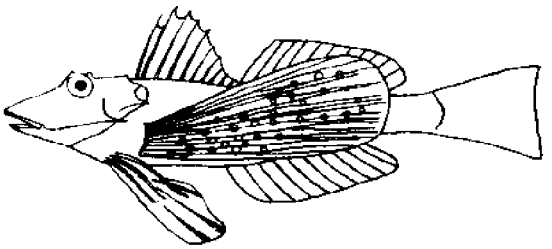
b. Pectoral fins not entire, either divided into 2 unequal parts, or lowermost 2 or 3 rays completely separated and finger-like. ---------- 14

14. a. Pectoral fins divided into 2 unequal parts; pelvic fins with 1 spine and 4 rays; first 2 dorsal spines separate from the rest. FLYING GUNARDS. (M)
DACTYLOPTERIDAE
One species in Texas waters. FLYING GUNARD. (M)
Dactylopterus volitans (Linnaeus)

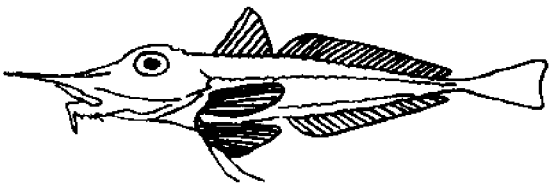


b. Lowermost 2 or 3 pectoral rays completely separted, thickened and finger-like; pelvic fins with 1 spine and 5 rays; all dorsal spines united by membranes. ---------- 15

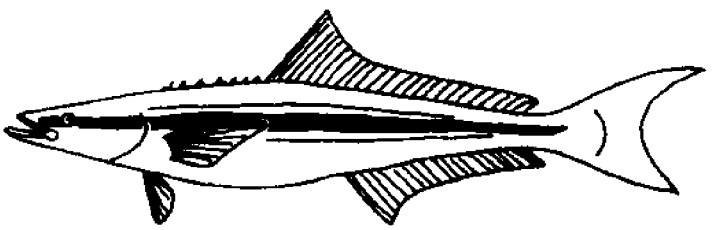
15. a. Lowermost 3 pectoral fin rays separated, head with bony plates. SEAROBINS. (M, E)
TRIGLIDAE. Page 138



b. Lowermost 2 pectoral rays separated; head and entire trunk of body with bony plates. ARMORED SEAROBINS. (M)
PERISTEDIIDAE (TRIGLIDAE, in part, in AFS 1970).
Page 136



16. a. Spinous dorsal fin represented by 8 or 9 free, or nearly free, spike-like spines that are depressible into a groove; body long and spindle-shaped; head depressed. COBIAS. (M, E)
RACHYCENTRIDAE
One species in Texas waters. COBIA. (M, E)
Rachycentron canadum (Linnaeus)

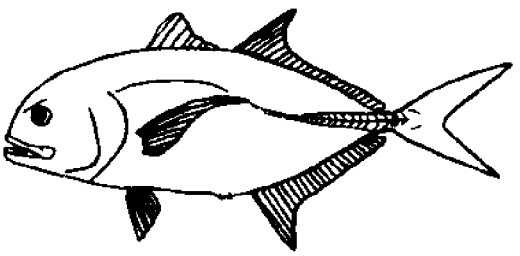


b. Not fitting above description in its entirety. ---------- 17

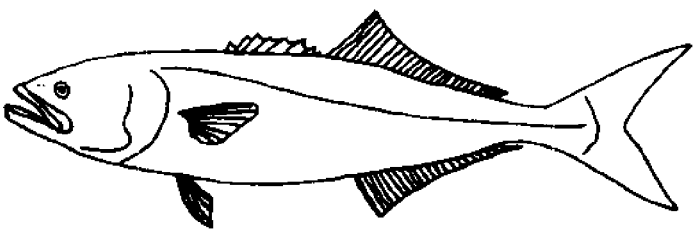
17. a. Anal fin usually preceeded by 2 detached spines set off from rest of fin except in young (these may be grown over or absent in some species); dorsal spines depressible into a slit-like groove or grooves (the spines either slender and connected by membranes, or spike-like and fewer then 8); soft dorsal and anal fins not followed by more than 1 detached finlet (usually none); posterior part of lateral line with or without bony scales. ---------- 18

b. Anal fin not preceeded by 2 detached spines; dorsal spines usually not depressible into a slit-like groove, if so, either the spines strong, fitting into a scaley sheath rather than a slit-like groove, or the soft dorsal and anal fins each followed by a series of several finlets; posterior part of lateral line without bony scutes. ---------- 19

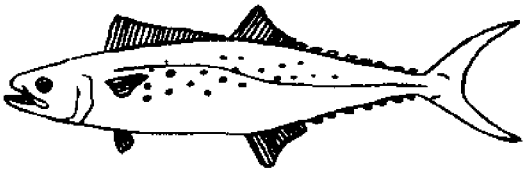
18. a. Scales small, cycloid, or absent; lateral line sometimes armed with bony plates; teeth, if present, moderately developed, not canine-like. JACKS and POMPANOS. (M, E)
CARANGIDAE. Page 98



b. Scales moderate, weakly ciliate; lateral line unarmed; jaws with a row of strong canine-like teeth. BLUEFISHES. (M)
POMATOMIDAE
One species in Texas waters. BLUEFISH. (M)
Pomatomus saltatrix (Linnaeus)

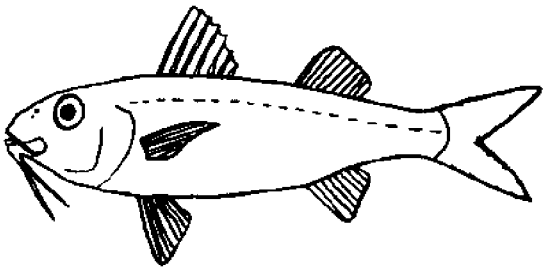


19. a. A series of detached finlets present behind dorsal and anal fins. MACKERELS and TUNAS. (M)
SCOMBRIDAE. Page 130



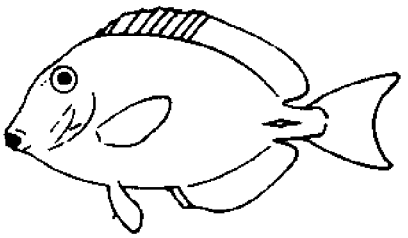
b. Finlets absent. ---------- 20

20. a. Throat with 2 long unbranched barbels attached behind symphysis of lower jaw. GOATFISHES. (M)
MULLIDAE. Page 116



b. Throat without long barbels. ---------- 21

21. a. Sides of caudal peduncle armed with a single erectile, "lancet-like" spine. SURGEONFISHES. (M)
ACANTHURIDAE
One species in Texas waters. DOCTORFISH. (M)
Acanthurus chirurgus (Bloch)

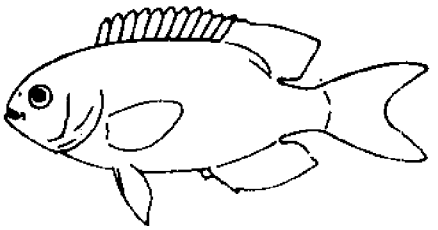


b. Sides of caudal peduncle without an erectile spine. ------- 22

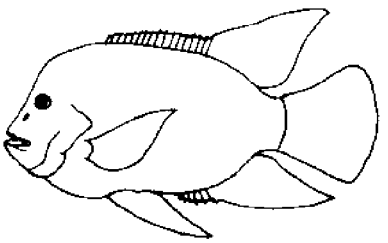
22. a. Nostrils with a single opening on each side. ---------- 23

b. Nostrils with two openings on each side. ---------- 24

23. a. Anal fin with 2 spines. DAMSELFISHES. (M)
POMACENTRIDAE. Page 118



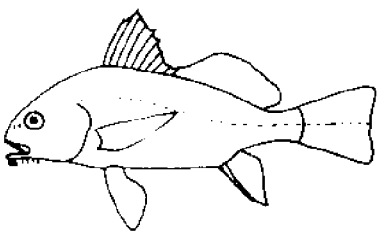
b. Anal fin with 3 to 11 spines. CICHLIDS. (F)
CICHLIDAE



24. a. Lateral-line extending to end of middle rays of caudal fin. 25

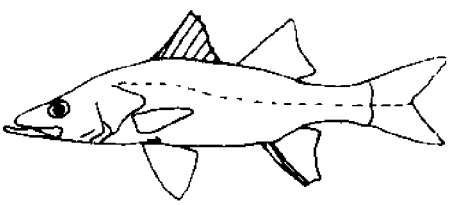
b. Lateral-line usually not extending beyond base of caudal fin, and never to end of fin rays. ---------- 27

25. a. Anal fin with 1 or 2 spines, the second moderate or small.
DRUMS. (M, F)
SCIAENIDAE. Page 112

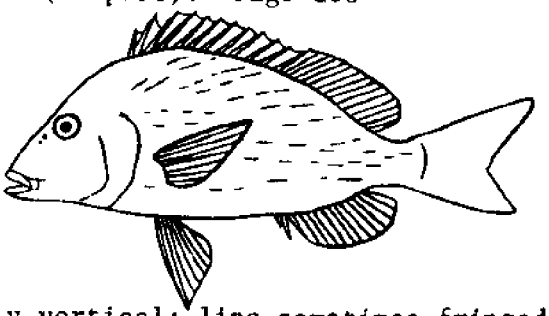


b. Anal fin with 3 spines, the second usually large. --------- 26

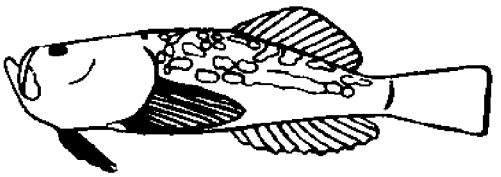
26. a. Dorsal fin divided into 2 separate parts. SNOOKS. (M, E, F)
CENTROPOMIDAE
One species in Texas waters. SNOOK. (M, E, F)
Centropomus undecimalis (Bloch)



b. Dorsal fin not divided, but sometimes deeply notched.
GRUNTS. (M)
POMADASYIDAE (in part). Page 108



27. a. Mouth nearly vertical; lips sometimes fringed; eyes superior (looking up); or, lower edge of preopercle developed as a long, flattened, wing-like appendage. STARGAZERS. (M, E)
URANOSCOPIDAE. Page 123

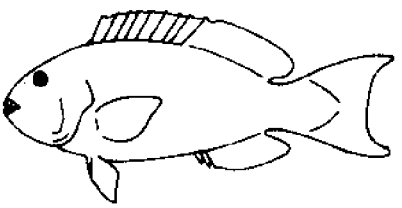


b. Not fitting either of above descriptions. ---------- 28

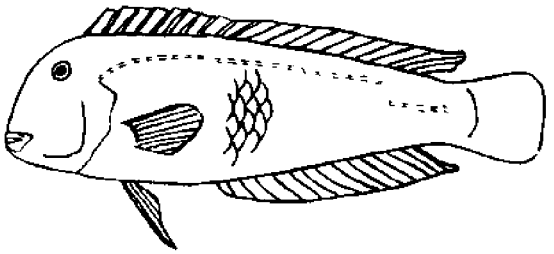
28. a. Slit behind the last gill arch absent or not apparent. ---- 29

b. Slit behind the last gill arch present, visible without magnification. ---------- 30

29. a. Teeth in jaws fused to form a "parrot-like" beak.
PARROTFISHES. (M)
SCARIDAE
One species in Texas waters. BUCKTOOTH PARROTFISH. (M)
Sparisoma radians (Valenciennes)



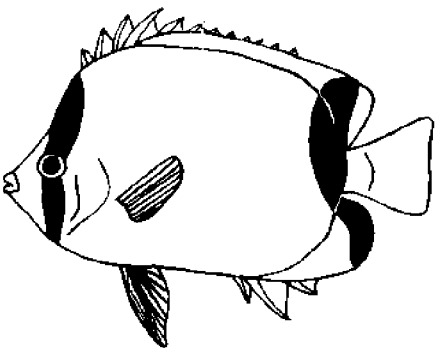
b. Teeth in jaws distinctly separate, canine-like, conical or tubercular. WRASSES. (M)
LABRIDAE. Page 120



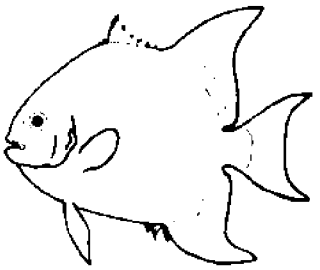
30. a. Teeth setiform (like the teeth of a brush); soft fins covered with scales. ---------- 31

b. Teeth not setiform; soft fins usually not covered with scales. ---------- 32

31. a. Dorsal fin not divided. BUTTERFLYFISHES. (M)
CHAETODONTIDAE. Page 116



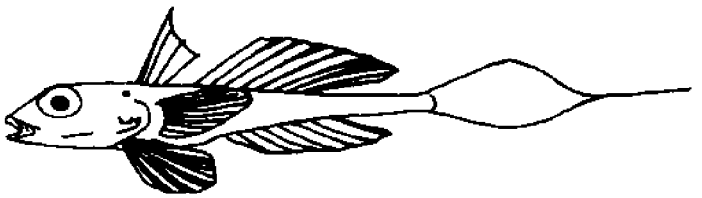
b. Dorsal fin divided into 2 parts. SPADEFISHES. (M, E)
EPHIPPIDAE
One species in Texas waters. ATLANTIC SPADEFISH. (M, E)
Chaetodipterus faber (Broussonet)



32. a. Gill membranes broadly joined to the isthmus. ---------- 33

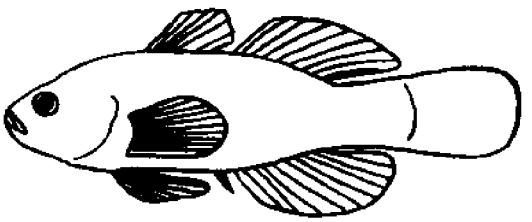
b. Gill membranes free from isthmus or nearly so. ---------- 35

33. a. Gill openings restricted to small, roundish, apertures high on sides of head; body without scales. DRAGONETS. (M)
CALLIONYMIDAE
One species in Texas waters. SPOTFIN DRAGONET. (M)
Callionymus agassizi Goode and Bean

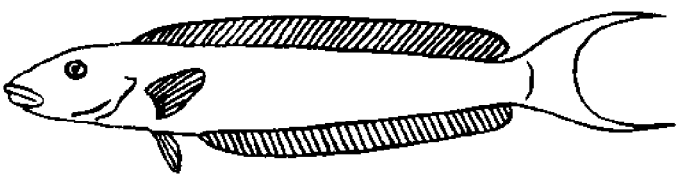


b. Gill openings not as above, more like vertical slits; body with scales. ---------- 34

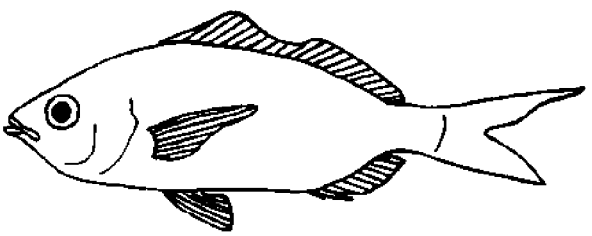
34. a. Dorsal fin divided into 2 parts or continuous and deeply notched. SLEEPERS. (E, F)
ELEOTRIDAE. Page 125



b. Dorsal fin not divided or notched. TILEFISHES. (M)
BRANCHIOSTEGIDAE (in part). Page 95

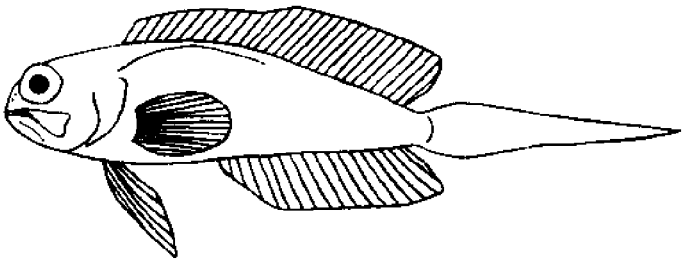


35. a. Premaxillaries excessively protractile, their basal processes very long, fitting into a groove on top of head. MOJARRAS. (M, E)
GERREIDAE
(LEIOGNATHIDAE) Page 106



b. Premaxillaries, if protractile only moderately so. -------- 36

36. a. Lateral line incomplete, running close to dorsal fin; dorsal fin base long, its spinous portion with slender spines and continuous with the soft rayed portion; caudal fin long and pointed; anal fin base long. JAWFISHES. (M)
OPISTOGNATHIDAE
One species in Texas waters. SWORDTAIL JAWFISH. (M)
Lonchopisthus lindneri Ginsburg

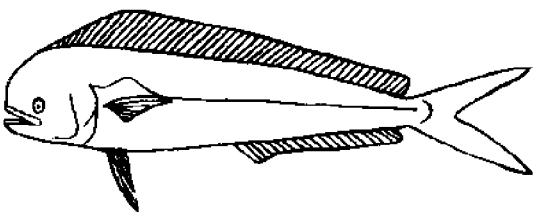


b. Lateral line present or absent, usually not incomplete and not near dorsal fin, if so, not fitting the remainder of above description. ---------- 37

37. a. Pseudobranchiae present or absent, if present, either small, or covered by skin. ---------- 38

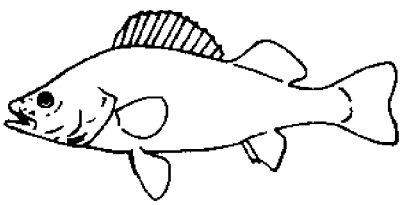
b. Pseudobranchiae present, well developed, and not covered by skin. ---------- 41

38. a. Dorsal fin composed of only soft rays, its origin appearing as a crest on the head. DOLPHINS. (M)
CORYPHAENIDAE. Page 103



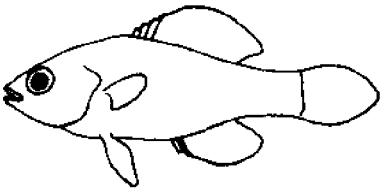
b. Dorsal fin with spines anteriorly, its origin behind head. 39

39. a. Anal fin with 1 or 2 spines. PERCHES. (F)
PERCIDAE

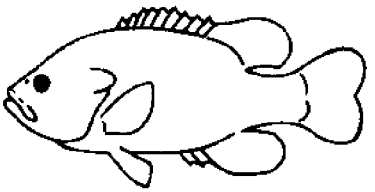


b. Anal fin with 3 to 10 spines. ---------- 40

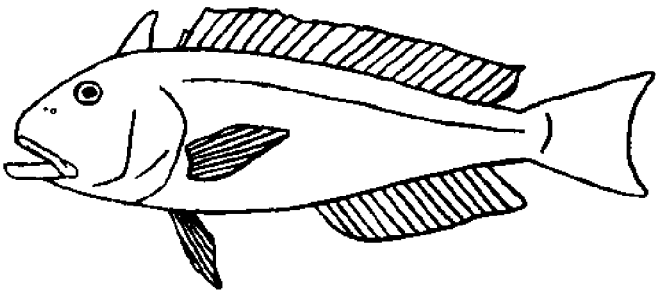
40. a. Lateral-line absent; dorsal fin with 4 or 5 spines. PIGMY SUNFISHES. (F)
ELASSOMIDAE (=CENTRARCHIDAE, in part, in AFS 1970).



b. Lateral-line well developed, but may be interrupted; dorsal fin with 6 to 12 spines. SUNFISHES. (F)
CENTRARCHIDAE

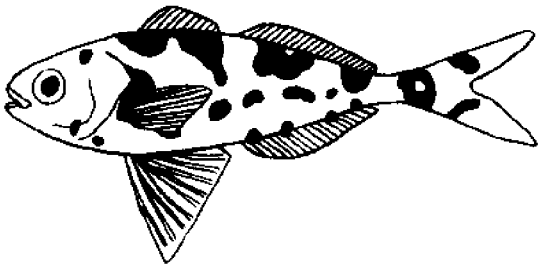


41. a. Dorsal fin preceded by an "adipose-like" appendage. TILEFISHES. (M)
BRANCHIOSTEGIDAE (in part) Page 95



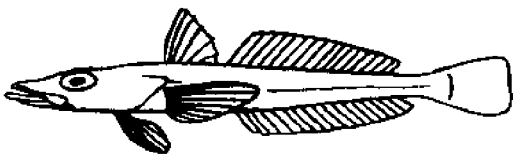
b. "Adipose-like" appendage absent. ---------- 42

42. a. A toothed saccular outgrowth present in gullet immediately behind last gill arch (requires dissection to be seen); and, in addition, either, body blotched and spotted, and pelvic fins attached to abdomen their entire length, or, musculature soft and flabby, and long, knife-like teeth present in lower jaw, or, base of caudal fin with 2 poorly-defined fleshy keels and caudal peduncle square in cross-section. BUTTERFISHES. (M, E)
STROMATEIDAE (in part). Page 133



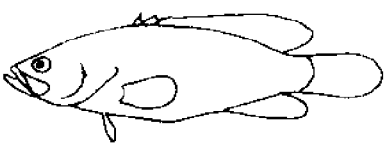
b. Toothed outgrowth absent in gullet; not fitting any of the 3 supplemental statements in their entirety. ---------- 43

43. a. Head flat and depressed, snout spatulate; eyes very large, close together, superior; free end of maxillary with a dermal flap. FLATHEADS. (M)
PERCOPHIDIDAE. Page 123



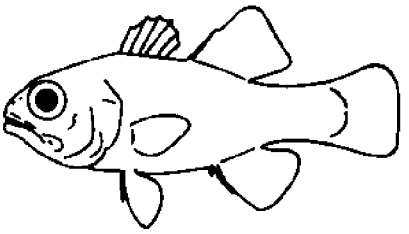
b. Not as above. ---------- 44

44. a. Anal fin spines absent; dorsal fin spines 2 to 3. SOAPFISHES. (M)
GRAMMISTIDAE
One species in Texas waters. GREATER SOAPFISH. (M)
Rypticus saponaceus (Bloch and Schneider)



b. Anal fin spines present; dorsal fin spines more than 3. --- 45

45. a. Anal fin with 2 spines; dorsal fin of 2 well separated parts, first dorsal fin with 5 to 9 spines, second dorsal fin with 1 spine and 7 to 17 rays. CARDINALFISHES. (M) APOGONIDAE. Page 95



b. Anal fin with 3 spines; dorsal fin of 1 or 2 parts, if 2 parts, fins usually very close together. ---------- 46

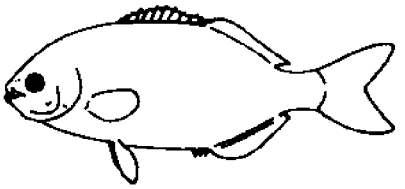
46. a. Maxillary slipping into a distinct sheath under edge of preorbital for most of its length when mouth is closed. --- 47

b. Maxillary not covered for most of its length by preorbital when mouth is closed. ---------- 50

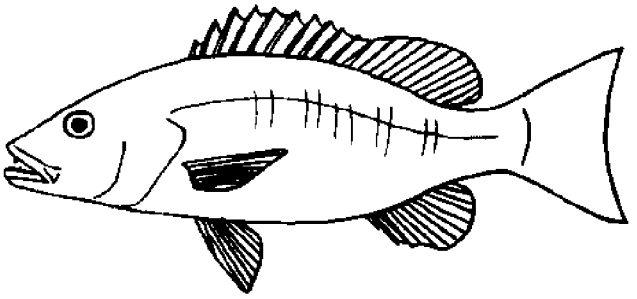
47. a. Vomer with teeth, these sometimes very small. ---------- 48

b. Vomer without teeth. ---------- 49

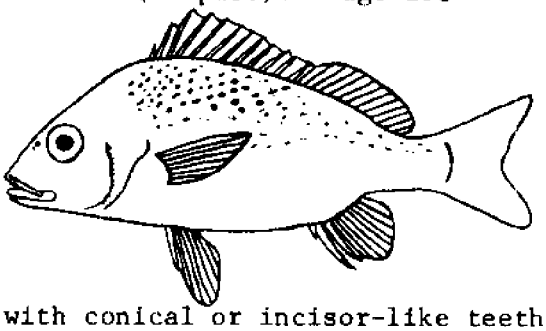
48. a. Incisor-like teeth present in front of jaws; no molars or canines. SEA CHUBS. (M) KYPHOSIDAE. Page 116



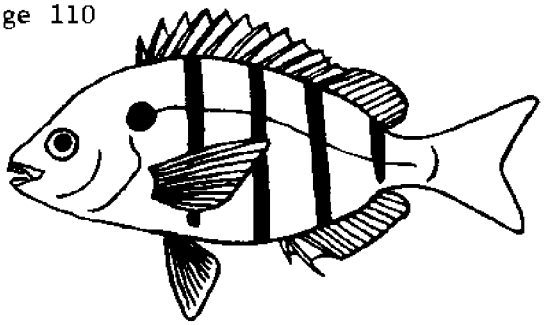
b. Incisor-like teeth absent, teeth in jaws various, sometimes "canine-like." SNAPPERS. (M) LUTJANIDAE. Page 105



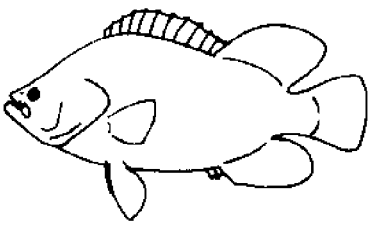
49. a. Jaws with only pointed teeth, no molars or incisors; preopercle finely to strongly serrate. GRUNTS. (M, E) POMADASYIDAE (in part). Page 108



b. Jaws with conical or incisor-like teeth in front, molars in sides; preopercle not serrate. PORGIES. (M, E) SPARIDAE. Page 110

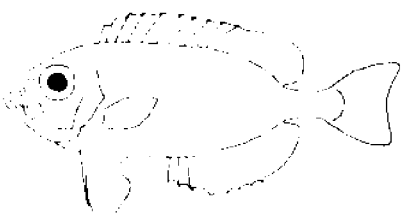


50. a. Vomer without teeth; soft dorsal and anal fins alike and opposite each other. TRIPLETAILS. (M)
LOBOTIDAE
One species in Texas waters. TRIPLETAIL. (M)
Lobotes surinamensis (Bloch)



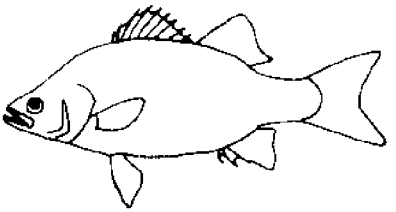
b. Vomer with teeth; soft dorsal and anal fins sometimes similar, but usually not as above. ---------- 51

51. a. Anal fin base scarcely shorter than dorsal fin base and similar to it; head and body entirely covered with very small, rough scales; eyes noticably large. BIGEYES. (M)
PRIACANTHIDAE
One species in Texas waters. BIGEYE. (M)
Priacanthus arenatus Cuvier

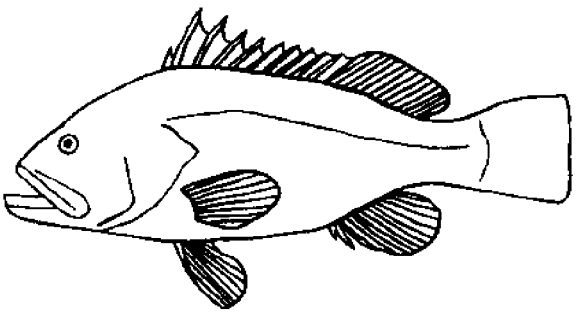


b. Anal fin base shorter than dorsal fin base, the fins not very similar; head without scales in some areas; eyes large to small. ---------- 52

52. a. Dorsal fin separated or nearly so. TEMPERATE BASSES. (F, E, M) PERCICHTHYIDAE. Page 88



b. Dorsal fin single, may be moderately notched. SEA BASSES. (M) SERRANIDAE. Page 89



FAMILY - PERCICHTHYIDAE - TEMPERATE BASSES

Key to Species

1. a. Dorsal fin deeply notched, but connected; teeth absent on base of tongue. YELLOW BASS. (F, E)
Morone mississippiensis Jordan and Eigenmann

b. Dorsal fin separated into two parts; teeth present on base of tongue. ---------- 2

2. a. Length of second anal fin spine about 3 in head length; teeth on tongue in a single patch. WHITE BASS. (F, E)
Morone chrysops (Rafinesque)

b. Length of second anal fin spine about 5 in head length; teeth on tongue in 2 parallel patches. STRIPED BASS. (M, F, E)
Introduced into some freshwater lakes of Texas.
Morone saxatilis (Walbaum)

FAMILY - SERRANIDAE - SEA BASSES

Key to Species

1. a. Branchiostegal rays 6 (in serranids the first branchiostegal is often small and close to the second). PYGMY SEA BASS. (M) Page 91
   Serraniculus pumilio Ginsburg

   b. Branchiostegal rays 7. ---------- 2

2. a. Anal fin with 7 soft rays. ---------- 3

   b. Anal fin with 8-13 soft rays. ---------- 12

3. a. Dorsal fin with 8 spines. SPANISH FLAG. (M)
   Gonioplectrus hispanus (Cuvier)

   b. Dorsal fin with 10 spines. ---------- 4

4. a. Mouth very oblique, superior; upper and lower jaws with a canine tooth in front on each side directed forward and outward (genus *Hemanthias*, these fishes usually have 8 soft rays in the anal fin). ---------- 5

   b. Mouth moderately oblique, not superior; canine teeth, if present, not as above. ---------- 6

5. a. Several of the dorsal fin spines ending in long fragile dermal filaments; gill rakers on lower limb of first arch about 30. RED BARBIER. (M)
   Hemanthias vivanus (Jordan and Swain)

   b. Dorsal fin spines with short filaments or short fleshy "tabs"; gill rakers on lower limb of first arch about 26. LONGTAIL BASS. (M)
   Hemanthias leptus (Ginsburg)

6. a. Preopercle with numerous, strong, spines diverging from 1 or 2 centers near the angle. ---------- 7

   b. Preopercle serrate, spines rather evenly distributed. ----- 8

7. a. Preopercle with a single center of diverging spines at its angle. DWARF SAND PERCH. (M)
   Diplectrum bivittatum (Valenciennes)

   b. Preopercle with 2 centers of diverging spines, one at the angle, the other above the angle. SAND PERCH. (M) Page 91
   Diplectrum formosum (Linnaeus)

8. a. Dorsal fin with 11 soft rays; caudal fin of large specimens with 3 lobes, caudal fin of small specimens rounded or truncate. ---------- 9

   b. Dorsal fin with 12 to 13 soft rays; caudal fin lunate, rounded, or truncate, never with 3 lobes. ---------- 10

9. a. Dorsal fin spines with short, fleshy tabs rarely extending beyond tips of spines; base of last 3 dorsal spines without distinct black spot; center of fourth vertical bar will distinct black blotch just below lateral line. BANK SEA BASS. (M) Page 91
   Centropristis ocyurus (Jordan and Evermann)

   b. Dorsal fin spines with long fleshy filaments which are yellow, orange, or red in life; distinct black spot present at base of last 3 dorsal spines; fourth vertical bar without black blotch at center. ROCK SEA BASS. (M) Page 91
   Centropristis philadelphica (Linnaeus)

10. a. Inner surface of opercle with black, lanceolate, spot, easily visible from the outside. BLACKEAR BASS. (M) Page 91
   Serranus atrobranchus (Cuvier)

   b. Opercle without black "ear-spot." ---------- 11

11. a. Dorsal fin with 13 (rarely 12) soft rays; sides without a vertical white bar; caudal, soft dorsal, anal and pectoral fins spotted. BELTED SANDFISH. (M) Page 91
   Serranus subligarius (Cope)

   b. Dorsal fin with 12 or fewer (rarely 13) soft rays; sides with a prominent vertical white bar just anterior to anus (except in young); fins not spotted. TATTLER. (M) Page 91
   Serranus phoebe Poey

12. a. Dorsal fin with 9 spines. ---------- 13

   b. Dorsal fin with 10 or 11 spines. ---------- 14

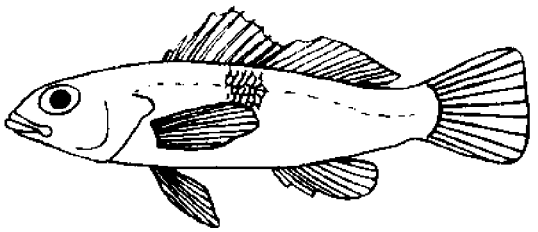
13. a. Caudal fin deeply forked. CREOLE-FISH. (M) Page 91
   Paranthias furcifer (Valenciennes)

   b. Caudal fin rounded or squared. GRAYSBY. (M) Page 94
   Petrometopon cruentatum (Lacépède)

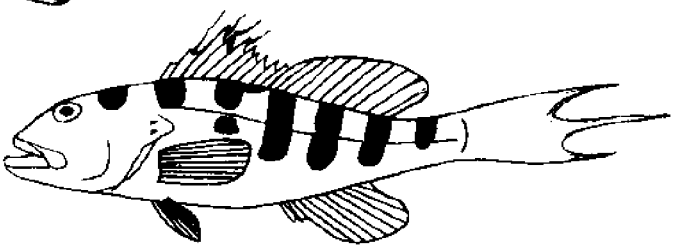
14. a. Anal fin usually with 10 to 13 rays. ---------- 15

   b. Anal fin with 8 to 10 (usually 8 or 9) rays. ---------- 19

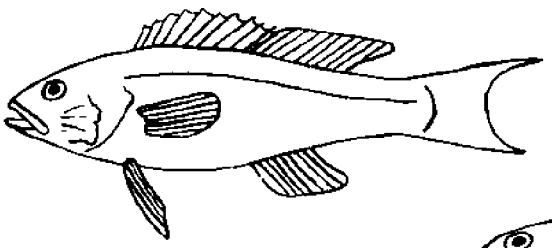
15. a. Lower limb of first gill arch with more than 30 gill rakers; edge of maxillary with a black "mustache." (M) Page 94
   Mycteroperca rubra (Bloch)*



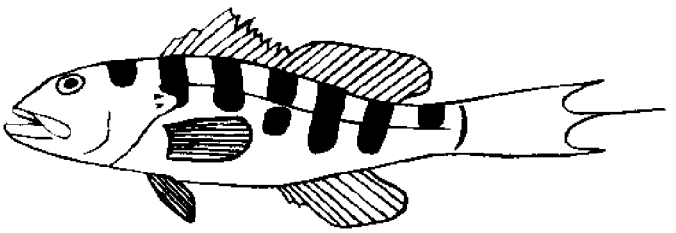
PYGMY SEA BASS
Serraniculus pumilio



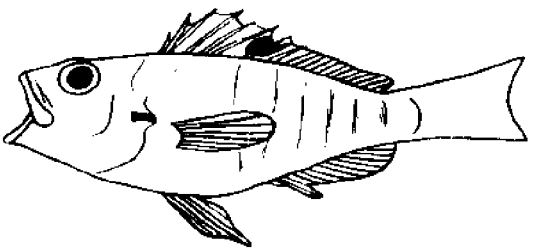
ROCK SEA BASS
Centropristis philadelphica



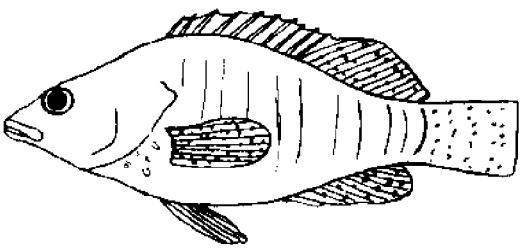
SAND PERCH
Diplectrum formosum



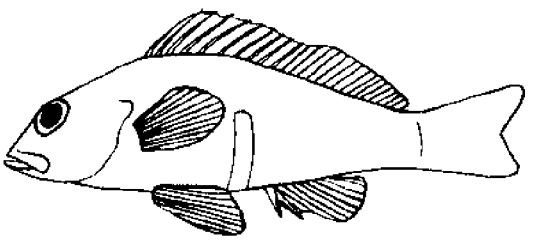
BANK SEA BASS
Centropristis ocyurus



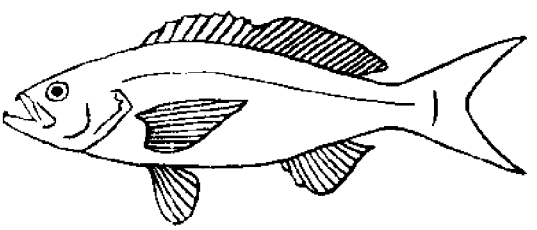
BLACKEAR BASS
Serranus atrobranchus



BELTED SANDFISH
Serranus subligarius



TATTLER
Serranus phoebe



CREOLE-FISH
Paranthias furcifer

b. Lower limb of first gill arch with 7 to 18 gill rakers; black "mustache" absent. ---------- 16

16. a. Preopercle rounded, without a distinct spiny lobe or abrupt angle; body with a pattern of brassy green to brownish hexagonal spots surrounded by a network of light-colored lines. BLACK GROUPER. (M) Page 94
Mycteroperca bonaci (Poey)

b. Upper and lower limbs of preopercle meeting at nearly a right angle, with a serrated lobe at the angle and a slight notch above. ---------- 17

17. a. Scales very small, 120 to 140 in lateral line series; anterior and posterior nostrils about equal in size, the posterior nostril a little larger; tips of spines in dorsal and anal fins not protruding from the membranes in larger specimens. GAG. (M) Page 94
Mycteroperca microlepis (Goode and Bean)

b. Scales larger, usually fewer than 120 in lateral line series; anterior nostril much smaller than posterior nostril in specimens greater than 240mm; tips of spines in dorsal and anal fins protruding from the membranes in larger specimens. 18

18. a. Color light grayish brown, with distinct small spots arranged in square or round clusters. SCAMP. (M) Page 94
Mycteroperca phenax Jordan and Swain

b. Color dark brown, uniform or with a reticulum of light lines separating small spots that are not arranged in clusters. YELLOWMOUTH GROUPER. (M) Page 94
Mycteroperca interstitialis (Poey)

19. a. Mouth very oblique, superior; upper and lower jaws with a canine tooth in front on each side directed forward and outward. ---------- 20

b. Mouth moderately oblique, not superior; canines, if present, not as above. ---------- 21

20. a. Several of the dorsal fin spines ending in long, fragile dermal filaments; lower limb of first gill arch with about 30 gill rakers. RED BARBIER. (M)
Hemanthias vivanus (Jordan and Swain)

b. Dorsal fin spines with short filaments or fleshy "tabs"; lower limb of first gill arch with about 25 gill rakers. LONGTAIL BASS. (M)
Hemanthias leptus (Ginsburg)

21. a. Dorsal fin with 10 spines; inner teeth of jaws not depressible or hinged; maxillary without a supplemental bone; body short and deep, back evelated. ---------- 22

b. Dorsal fin with 11 (rarely 10) spines; inner teeth of jaws depressible or hinged; maxillary with a supplemental bone; body robust or oval. ---------- 23

22. a. Head in front of eye with violet spots; sides of caudal preduncle with a round black spot; body light olive green above, reddish below. YELLOWBELLY HAMLET. (M)
Hypoplectrus aberrans Poey

b. Head in front of eye without violet spots; body black with violet shades. YELLOWTAIL HAMLET. (M)
Hypoplectrus chlorurus (Valenciennes)

23. a. Dorsal fin with very short spines, in specimens greater than 250mm, shorter than the shortest anterior soft rays. JEWFISH (M) Page 94
Epinephelus itajara (Lichtenstein)

b. Dorsal fin with some spines as long or longer than the anterior dorsal fin soft rays. ---------- 24

24. a. Body light with dark red spots which are largest on the ventral surface; base of dorsal fin and top of caudal peduncle with a total of 3 saddle-shaped blotches; scales usually absent from exposed surface of maxillary. ROCK HIND. (M) Page 94
Epinephelus adscensionis (Osbeck)

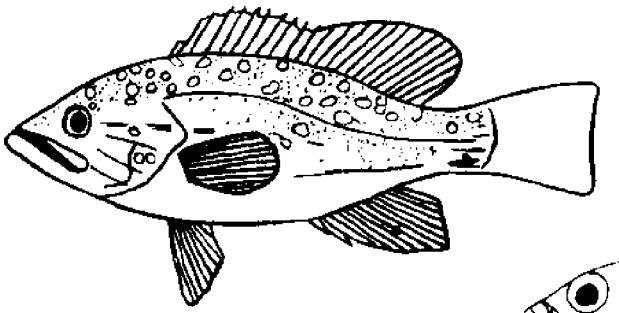
b. Body variously colored, if red spots are present, the largest are not on the ventral surface; maxillary usually scaled on its exposed surface; a single saddle-shaped dark blotch present or absent on caudal peduncle. ---------- 25

25. a. Dorsal fin membrane not indented between the spines, margin of spinous dorsal almost straight. RED GROUPER. (M) Page 96
Epinephelus morio (Valenciennes)

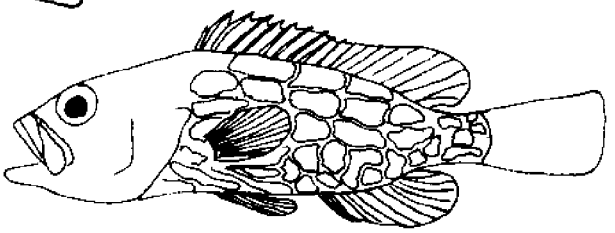
b. Dorsal fin membrane indented between the spines, margin of spinous dorsal fin saw-tooth-like. ---------- 26

26. a. Body coloration nearly uniform, black or reddish brown above, ligter below, young with scattered white spots; never with a saddle-shaped blotch on caudal peduncle, dorsal fin spines sometimes 10. WARSAW GROUPER. (M) Page 96
Epinephelus nigritus (Holbrook)

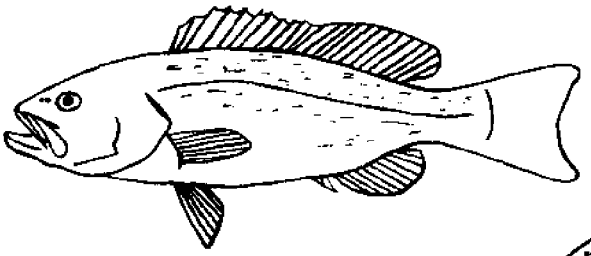
b. Body either plain or covered with numerous white spots, or with 5 vertical bars; saddle-shaped blotch on caudal peduncle present or absent. ---------- 27



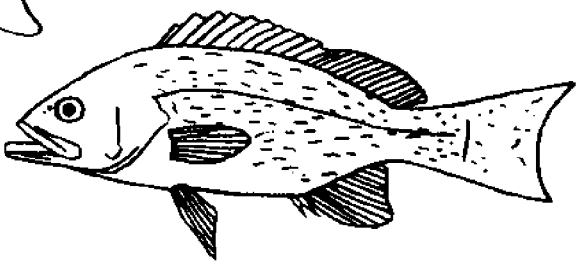
Mycteroperca rubra



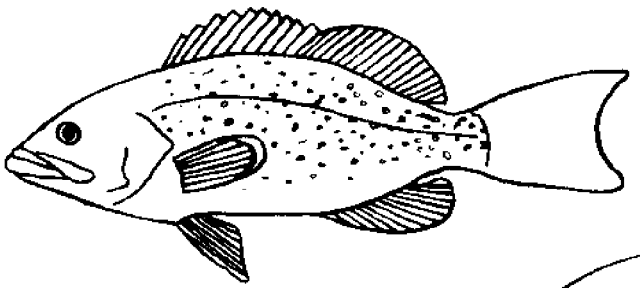
BLACK GROUPER
Mycteroperca bonaci



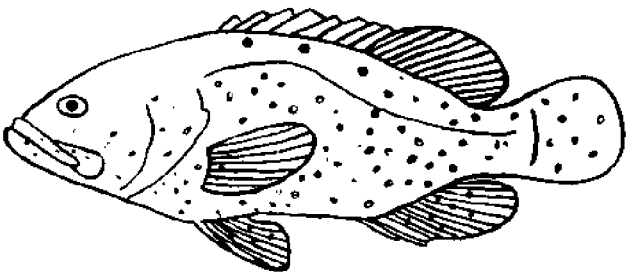
GAG
Mycteroperca microlepis



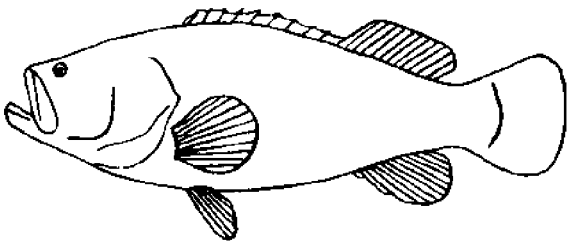
SCAMP
Mycteroperca phenax



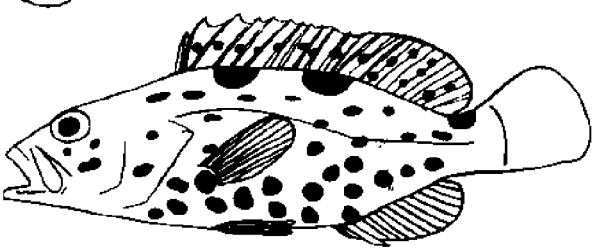
YELLOWMOUTH GROUPER
Mycteroperca interstitialis



GRAYSBY
Petrometopon cruentatum



JEWFISH
Epinephelus itajara



ROCK HIND
Epinephelus adscensionis

27. a. Body sometimes plain, but usually with 5 vertical bars, caudal peduncle with a saddle-shaped blotch. NASSAU GROUPER. (M) Page 96
Epinephelus striatus (Bloch)

b. Body covered with numerous white spots, those below smaller and nearly round. SPECKLED HIND. (M) Page 96
Epinephelus drummondhayi Goode and Bean

FAMILY - APOGONIDAE - CARDINALFISHES

Key to Species

1. a. Canine teeth present in jaws. ---------- 2

b. Canine teeth absent. ---------- 3

2. a. Anterior edge of second spine of first dorsal and anal fins serrated. (M)
Synagrops spinosa Schultz*

b. Anterior edge of second spine in dorsal and anal fins not serrated. BLACKMOUTH CARDINALFISH. (M) Page 96
Synagrops bella (Goode and Bean)

3. a. Scales cycloid; preopercle with single edge, its margin entire or nearly so (not serrate); palatine teeth absent. (M) Page 96
Epigonus pandionis (Goode and Bean)*

b. Scales ctenoid; preopercle appears to have a double edge, its margin serrate: palatine teeth present. ---------- 4

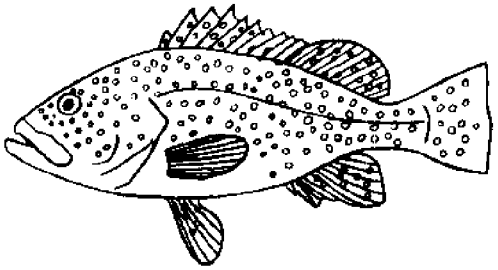
4. a. Dark pigment on body in form of blotches or saddle-shaped bands; gill rakers 12 to 16 on lower limb of first arch. FLAMEFISH. (M) Page 96
Apogon maculatus (Poey)

b. Dark pigment on body in form of "peppering," no large blotches or bands; gill rakers 10 or 11 on lower limb of first arch. BRIDLE CARDINALFISH. (M) Page 96
Apogon aurolineatus (Mowbray)

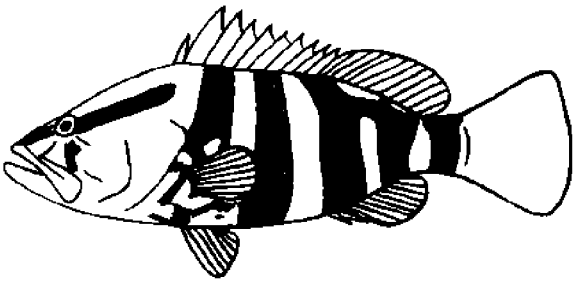
FAMILY - BRANCHIOSTEGIDAE - TILEFISHES

Key to Species

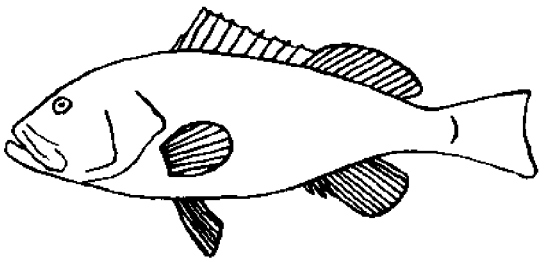
1. a. Large adipose appendage present on nape (predorsal region). TILEFISH. (M) Page 100
Lopholatilus chamaeleonticeps Goode and Bean



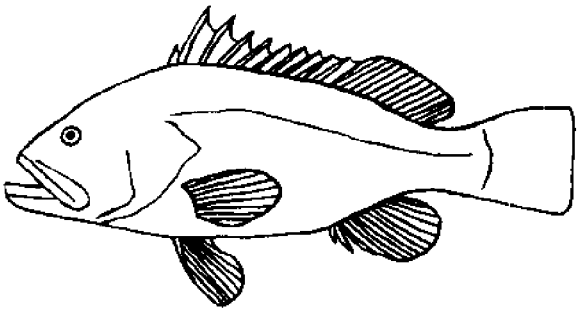
SPECKLED HIND
Epinephelus drummondhayi



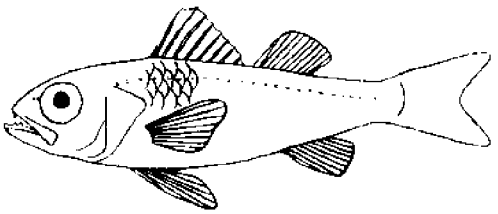
NASSAU GROUPER
Epinephelus striatus



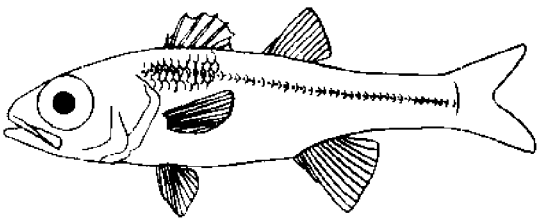
RED GROUPER
Epinephelus morio



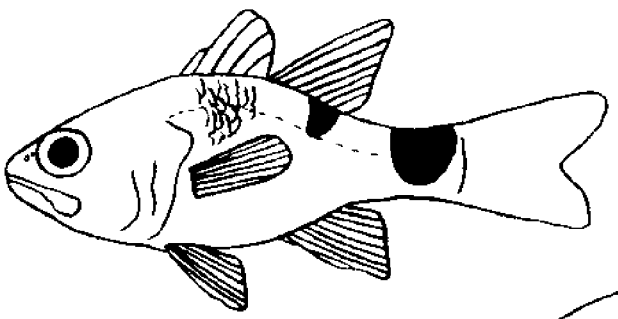
WARSAW GROUPER
Epinephelus nigritus



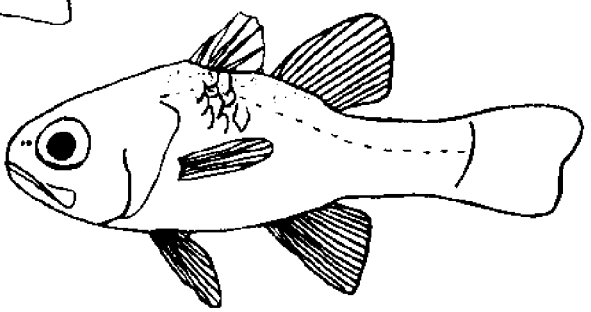
BLACKMOUTH CARDINALFISH
Synagrops bella



Epigonus pandionis



FLAMEFISH
Apogon maculatus



BRIDLE CARDINALFISH
Apogon aurolineatus

b. Adipose appendage absent from nape. ---------- 2

2. a. Preopercle not serrate; soft dorsal and anal fins with more than 40 rays. SAND TILEFISH. (M) Page 100
Malacanthus plumieri (Bloch)

b. Preopercle serrate; soft dorsal and anal fins with 22 to 27 soft rays. ---------- 3

3. a. Caudal fin distinctly rounded. (M)
Caulolatilus intermedius Howell Rivero*

b. Caudal fin slightly forked or emarginate. BLACKLINE TILEFISH. (M) Page 100
Caulolatilus cyanops Poey

FAMILY - ECHENEIDAE - REMORAS

Key to Species

1. a. Body depth 11 to 12 in standard length; pectoral fins pointed; pelvic fins attached to belly for less than one-third of their length. SHARKSUCKER. (M)
Echeneis naucrates Linnaeus

b. Body depth 5 to 7 in standard length; pectoral fins rounded; pelvic fins attached to belly for more than half their length. ---------- 2

2. a. Pectoral fin rays stiff. MARLINSUCKER. (M)
Remora osteochir (Cuvier)

b. Pectoral fin rays soft and flexible. ---------- 3

3. a. Laminae (transverse ridges) of head disc 24 to 27; anal fin rays 21 to 23. WHALESUCKER. (M)
Remora australis (Bennett)

b. Laminae of head disc 16 to 20; anal fin rays 24 to 26. REMORA. (M)
Remora remora (Linnaeus)

FAMILY - CARANGIDAE - JACKS AND POMPANOS

Key to Species

1. a. Maxillary not protractile; scales narrow and long, not rounded; most dorsal and anal rays modified to form a number of finlets partly attached to each other. LEATHERJACKET. (M, E) Page 100
Oligoplites saurus (Bloch and Schneider)

   b. Maxillary protractile; scales normally rounded, those in the lateral line variously modified; dorsal and anal fin rays normally attached to each other or at most a single detached dorsal and anal finlet present. ---------- 2

2. a. Lateral line without well developed spinous scutes, the posterior scales sometimes with a slight or moderate longitudinal ridge or forming a few modified scutes on the sides of the caudal peduncle. ---------- 3

   b. Posterior part of lateral line with well developed spinous scutes beginning well forward of caudal peduncle. --------- 12

3. a. Body deep, with anterior dorsal contour notably elevated, being oblique or nearly vertical. ---------- 4

   b. Body elongate or deep, but with anterior contour tapering forward to snout. ---------- 5

4. a. Anterior lobes of dorsal and anal fins not greatly elongated; upper part of body scaleless. ATLANTIC MOONFISH. (M) Page 100
Vomer setapinnis (Mitchill)

   b. Anterior lobes of dorsal and anal fins notably elongated; body with scales except in anterodorsal area. LOOKDOWN. (M) Page 100
Selene vomer (Linnaeus)

5. a. Gill rakers on lower limb of first gill arch 31-35; ventral contour of anterior body notably convex. ATLANTIC BUMPER. (M, E) Page 100
Chloroscombrus chrysurus (Linnaeus)

   b. Gill rakers on lower limb of first gill arch less than 28; ventral contour of body only slightly convex. ---------- 6

6. a. Second dorsal fin with 7-19 more rays than anal fin, snout tapering forward. ---------- 7

   b. Second dorsal fin with 1-4 more rays than anal fin; snout broad and blunt. ---------- 10

7. a. Dorsal and anal fins each followed by a detached finlet. RAINBOW RUNNER. (M) Page 100
Elagatis bipinnulata (Quoy and Gaimard)

b. Dorsal and anal fins not followed by detached finlets. ---- 8

8. a. Total developed gill rakers 24 to 28 in specimens up to 16 inches long, 18 to 25 in specimens over 16 inches long; body depth 35 to 37% of standard length for specimens up to 16 inches long, 30 to 35% of standard length for specimens greater than 16 inches long. ALMACO JACK. (M) Page 100
Seriola rivoliana Valenciennes

b. Total developed gill rakers 12 to 20 in specimens up to 16 inches long (may range to 24 in specimens up to 4 inches long), 12 to 14 in specimens over 16 inches long; body depth 25 to 33% of standard length for specimens up to 16 inches, 22 to 30% of standard length for specimens greater than 16 inches. ---------- 9

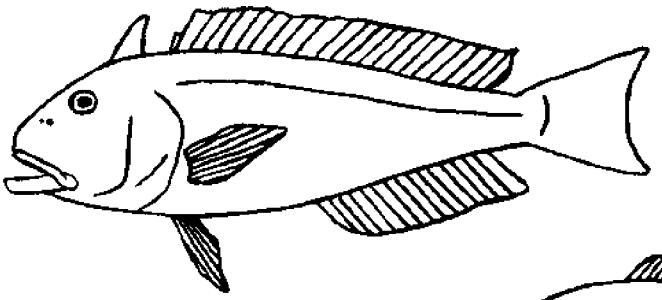
9. a. Base of anal fin about 50% of length of base of second dorsal fin; specimens up to about 10 to 12 inches with six, dark, distinct solid vertical bars, some extending into webs of second dorsal and anal fins; body depth about 25% of standard length for specimens about 16 inches long. BANDED RUDDERFISH. (M) Page 102
Seriola zonata (Mitchill)

b. Base of anal fin about 62% of length of base of second dorsal fin; vertical bars absent (rarely 5 to 6 split bands that do not extend into webs of second dorsal and anal fins present on specimens slightly over 8 inches long); body depth about 32% of standard length for specimens about 16 inches long. GREATER AMBERJACK. (M) Page 102
Seriola dumerili (Risso)

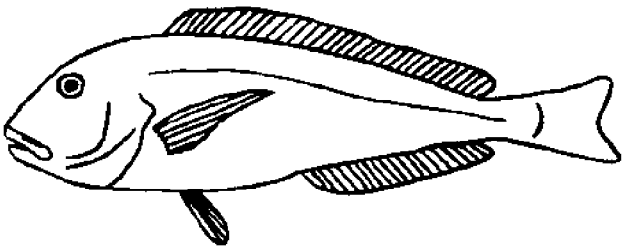
10. a. Dorsal fin rays 23 to 27; anal fin rays 20 to 23. FLORIDA POMPANO. (M) Page 102
Trachinotus carolinus (Linnaeus)

b. Dorsal fin rays 18 to 21; anal fin rays 16 to 18. --------- 11

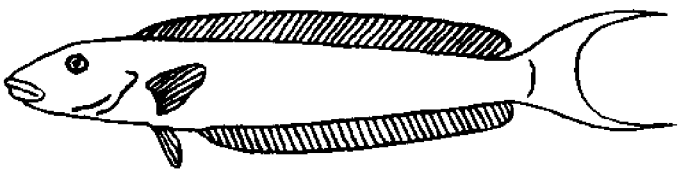
11. a. Body without vertical bars; dorsal fin lobe not reaching past base of caudal fin; for specimens less than 6 inches, body depth more than 50% of standard length. PERMIT. (M) Page 102
Trachinotus falcatus (Linnaeus)



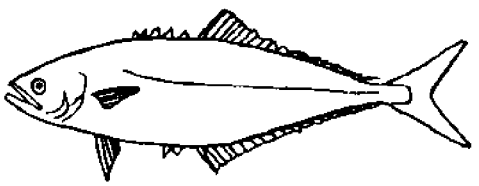
TILEFISH
Lopholatilus chamaeleonticeps



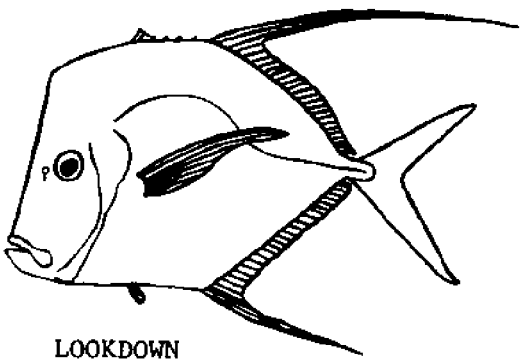
BLACKLINE TILEFISH
Caulolatilus cyanops



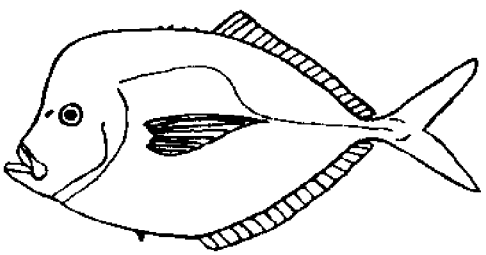
SAND TILEFISH
Malacanthus plumieri



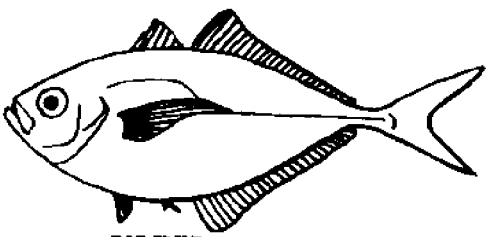
LEATHERJACKET
Oligoplites saurus



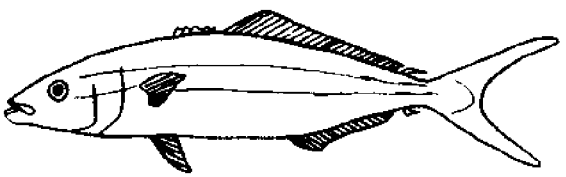
LOOKDOWN
Selene vomer



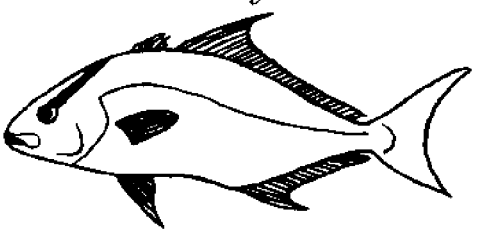
ATLANTIC MOONFISH
Vomer setapinnis



BUMPER
Chloroscombrus chrysurus



RAINBOW RUNNER
Elagatis bipinnulata



ALMACO JACK
Seriola rivoliana

b. Body usually with 4 narrow vertical bars; dorsal fin lobe reaching well past base of caudal fin; for specimens less than 6 inches, body depth less than 50% of standard length. PALOMETA. (M) Page 102
Trachinotus goodei Jordan and Evermann

12. a. Spinous dorsal fin absent or if greatly reduced, second dorsal and anal fins with many long filamentous rays. AFRICAN POMPANO. (M) Page 102
Alectis crinitus (Mitchill)

b. Spinous dorsal fin well developed, second dorsal and anal fins without long filamentous rays. ---------- 13

13. a. Interorbital region and interopercle partly or wholly covered by scales; pectoral fins reaching a vertical only through origin of soft anal fin or falling short; anterior curve in lateral line low or moderately rising. — 14

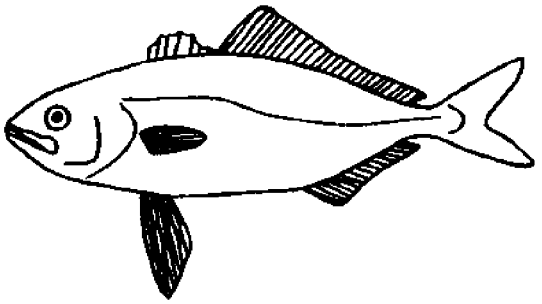
b. Interorbital and interopercle without scales; pectoral fins normally reaching beyond a vertical through origin of soft anal fin; anterior curve in lateral line well developed, comparatively high. ---------- 16

14. a. Scales in anterior part of lateral line large, transversely expanded, similar to posterior scutes; anterior edge of shoulder girdle (beneath free edge of operculum) without 2 thick dermal projections. ROUGH SCAD. (M) Page 104
Trachurus lathami Nichols

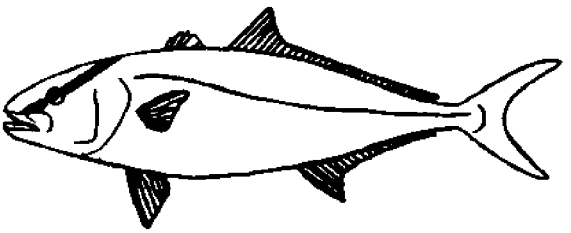
b. Scales in anterior part of lateral line not large and not transversely expanded; anterior edge of shoulder girdle with 2 thick dermal projections (see figure under couplet 5b, page 40). ---------- 15

15. a. One detached finlet present behind dorsal and anal fins; dermal projections on shoulder girdle about equal in size. ROUND SCAD. (M) Page 104
Decapterus punctatus (Agassiz)

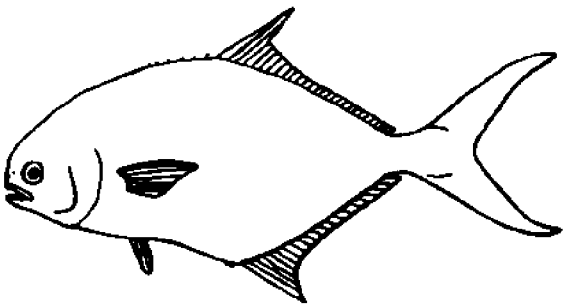
b. Detached finlet absent behind dorsal and anal fins; lower dermal projection on shoulder girdle larger than upper projection. BIGEYE SCAD. (M) Page 104
Selar crumenophthalmus (Bloch)



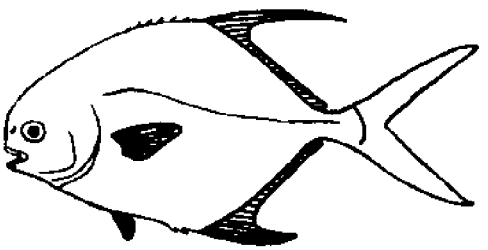
BANDED RUDDERFISH
Seriola zonata



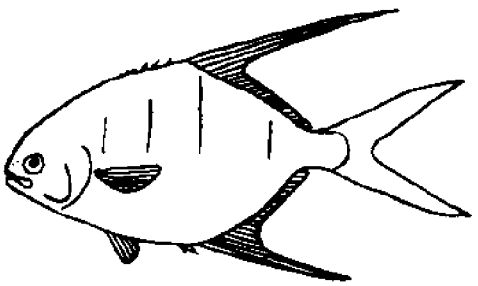
GREATER AMBERJACK
Seriola dumerili



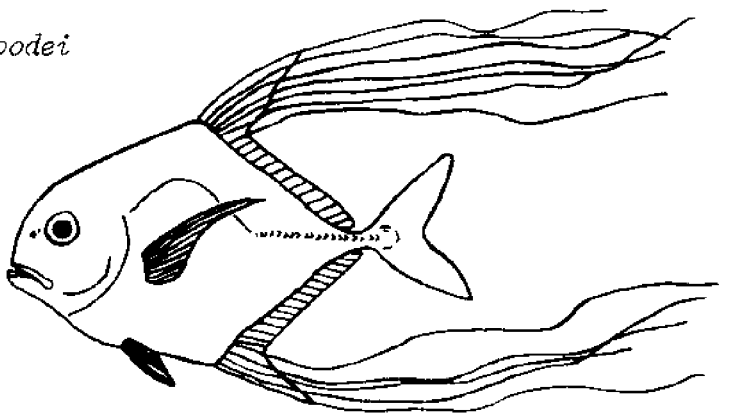
FLORIDA POMPANO
Trachinotus carolinus



PERMIT
Trachinotus falcatus



PALOMETA
Trachinotus goodei



AFRICAN POMPANO
Alectis crinitus

16. a. Vomerine teeth absent; widest part of maxillary bone less than diameter of pupil of eye; outer teeth in jaws not enlarged; caudal peduncle without keels. BLUNTNOSE JACK. (M) Page 104
Hemicaranx amblyrhynchus (Cuvier)

b. Vomerine teeth present; widest part of maxillary bone wider than pupil; outer teeth in jaws moderately enlarged; caudal peduncle with 2 short keels (not evident in small specimens). ---------- 17

17. a. Anal fin rays 16 to 18; dorsal fin rays 19 to 22. ---------- 18

b. Anal fin rays 19 to 26; dorsal fin rays 23 to 30. ---------- 19

18. a. Chest completely covered by scales on specimens greater than 25mm standard length. HORSE-EYE JACK. (M) Page 104
Caranx latus Agassiz

b. Chest with only a small patch of scales before pelvics on specimens greater than 25mm standard length. CREVALLE JACK. (M) Page 104
Caranx hippos (Linnaeus)

19. a. Gill rakers on lower limb of first arch 31 to 35; dorsal fin rays 26 to 30; anal fin rays 23 to 26. BAR JACK. (M) Page 104
Caranx ruber (Bloch)

b. Gill rakers on lower limb of first arch 18 to 28; dorsal fin rays 22 to 28; anal fin rays 19 to 24. ---------- 20

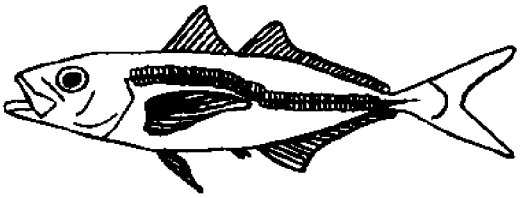
20. a. Gill rakers on lower limb of first arch 23 to 28; dorsal fin rays 22 to 25; anal rays 19 to 21. BLUE RUNNER. (M) Page 104
Caranx crysos (Mitchill)

b. Gill rakers on lower limb of first arch 18 to 21; dorsal fin rays 25 to 28; anal fin rays 21 to 24. YELLOW JACK. (M) Page 104
Caranx bartholomaei Cuvier

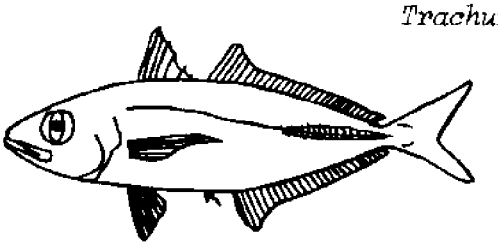
FAMILY - CORYPHAENIDAE - DOLPHINS

Key to Species

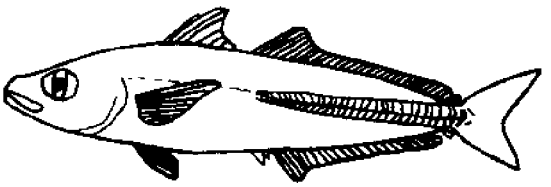
1. a. Dorsal fin elements 56 or more; lateral line scales more than 200, usually 245-280. DOLPHIN. (M) Page 107
Coryphaena hippurus Linnaeus



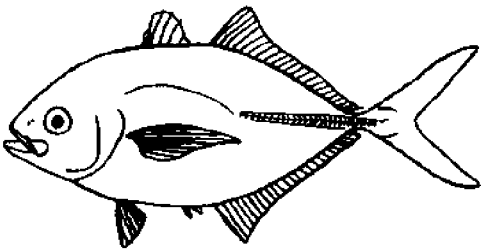
ROUGH SCAD
Trachurus lathami



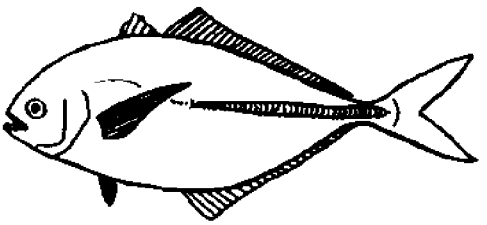
BIGEYE SCAD
Selar crumenophthalmus



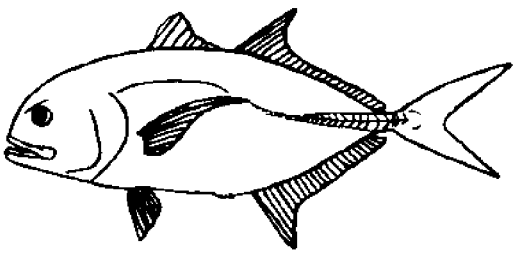
ROUND SCAD
Decapterus punctatus



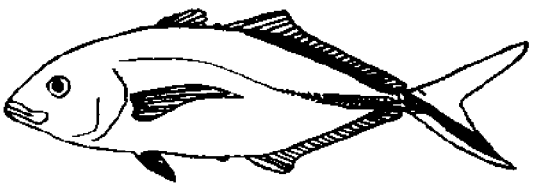
HORSE-EYE JACK
Caranx latus



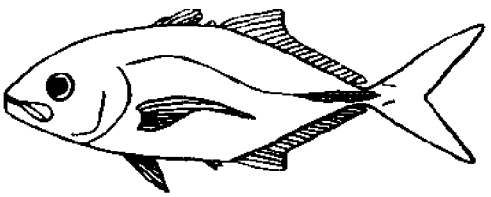
BLUNTNOSE JACK
Hemicaranx amblyrhynchus



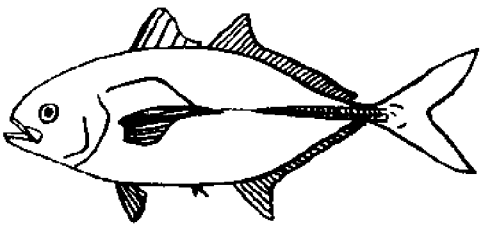
CREVALLE JACK
Caranx hippos



BAR JACK
Caranx ruber



YELLOW JACK
Caranx bartholomaei



BLUE RUNNER
Caranx crysos

b. Dorsal fin elements 55 or fewer; lateral line scales less than 200, usually 170-200. POMPANO DOLPHIN. (M) Page 107
Coryphaena equiselis Linnaeus

FAMILY - LUTJANIDAE - SNAPPERS

Key to Species

1. a. Dorsal fin spines 12, rarely 13. VERMILION SNAPPER. (M) Page 107
Rhomboplites aurorubens (Cuvier)

   b. Dorsal fin spines 10, rarely 9 or 11. ---------- 2

2. a. Last ray of dorsal and anal fins moderately produced; scales absent from soft dorsal and anal fins. WENCHMAN. (M) Page 107
Pristipomoides aquilonaris (Goode and Bean)

   b. Last ray of dorsal and anal fins shorter than preceeding ray; scales normally present on soft dorsal and anal fins. 3

3. a. Gill rakers on lower limb of first arch (excluding rudiments) 17 to 22; broad yellow band from snout to caudal peduncle, widening posteriorly to cover peduncle and caudal fin, this stripe fading in preservative. YELLOWTAIL SNAPPER. (M) Page 107
Ocyurus chrysurus (Bloch)

   b. Gill rakers on lower limb of first arch (excluding rudiments) 16 or fewer; broad lateral yellow band absent. ---------- 4

4. a. Dorsal fin normally with 12 soft rays, rarely 11 or 13; black spot below anterior part of soft dorsal fin present and persisting throughout life. LANE SNAPPER. (M, E) Page 107
Lutjanus synagris (Linnaeus)

   b. Dorsal fin normally with 14 soft rays, rarely 13 or 15; black spot below anterior part of soft dorsal fin present or absent. ---------- 5

5. a. Anal fin rounded at all sizes, the middle rays considerably less than 1/2 of head length; black spot absent from sides of body. ---------- 6

   b. Anal fin angular in larger specimens, the middle rays produced, the longest almost 1/2 or more of head length (if anal fin rounded, length less than 50mm and black spot present below soft dorsal); black spot always present on sides of smaller specimens, present or absent on larger specimens. ---------- 7

6. a. Body relatively slender, greatest depth 2.6 to 3.2 times in standard length; pectoral fin length 3.7 to 4.2 times in standard length; lateral line scales having pores usually 44 to 47, rarely 43. GRAY SNAPPER. (M, E, F) Page 107
Lutjanus griseus (Linnaeus)

   b. Body relatively deep, greatest depth 2.3 to 2.8 times in standard length; pectoral fin length 3.0 to 3.5 times in standard length (except for specimens 75 to 96mm standard length which are about equal to that of gray snapper of similar size); lateral line scales having pores 41 to 45, rarely 40. SCHOOLMASTER. (M) Page 107
Lutjanus apodus (Walbaum)

7. a. Vomerine tooth patch anchor-shaped, with a median posterior extension. RED SNAPPER. (M) Page 107
Lutjanus campechanus (Poey)

   b. Vomerine tooth patch in shape of "V" pointed anteriorly, without a median posterior extension. MUTTON SNAPPER. (M) Page 107
Lutjanus analis (Cuvier)

FAMILY - GERREIDAE - MOJARRAS

Key to Species

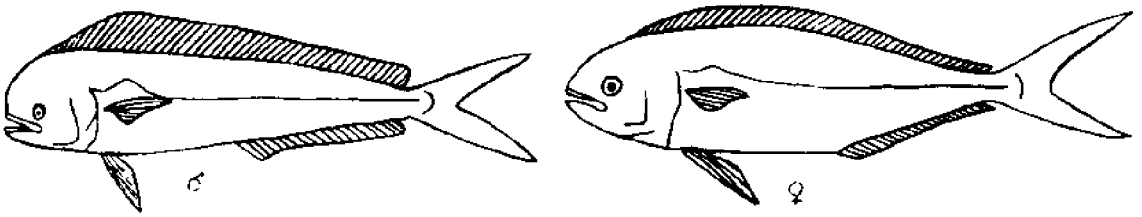
1. a. Narrow, dark, vertical bars present on body, (bars become faint in preservative). YELLOWFIN MOJARRA. (M, E) Page 109
Gerres cinereus (Walbaum)

   b. Dark vertical bars absent, body sometimes mottled or blotched, or with irregular diagonal bars. ---------- 2

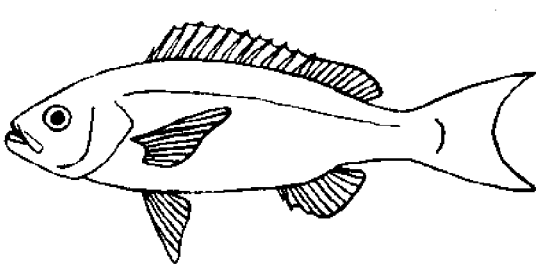
2. a. Anal fin with 2 unbranched spines and 8 branched rays. MOTTLED MOJARRA. (M, E) Page 109
Eucinostomus lefroyi (Goode)

   b. Anal fin with 3 unbranched spines and 7 branched rays. ---- 3

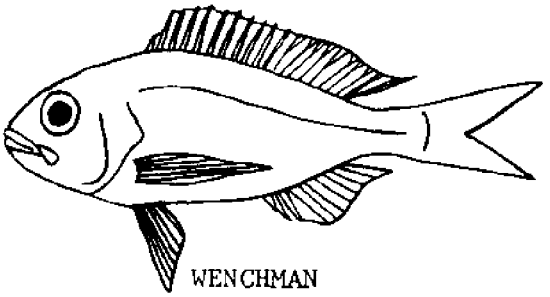
3. a. Premaxillary groove (a median depression on top of snout extending into interorbital region) with two naked areas separated by a band of scales across the middle, the posterior end of the naked groove (in interorbital region) thus completely surrounded by scales. SILVER JENNY. (M, E) Page 109
Eucinostomus gula (Quoy and Gaimard)



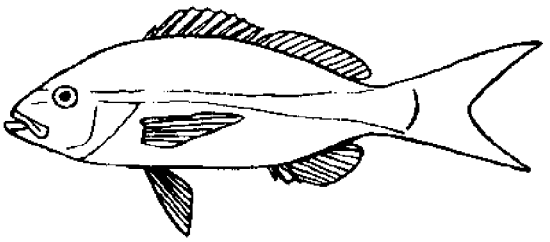
DOLPHINS
Coryphaena hippurus and *C. equiselis*



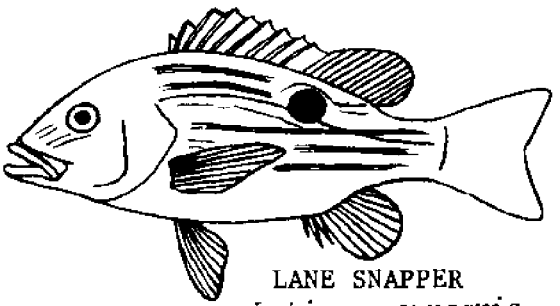
VERMILION SNAPPER
Rhomboplites aurorubens



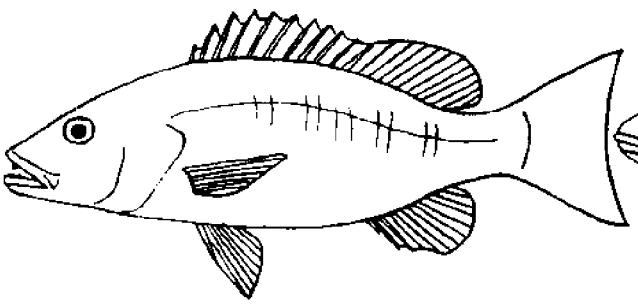
WENCHMAN
Pristipomoides aquilonaris



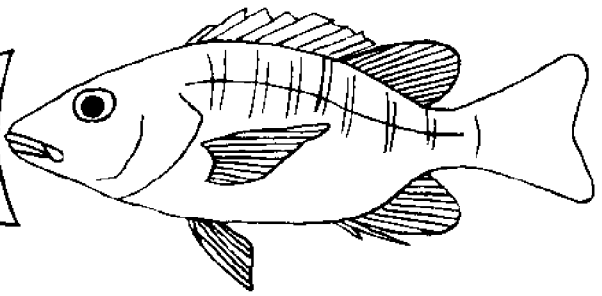
YELLOWTAIL SNAPPER
Ocyurus chrysurus



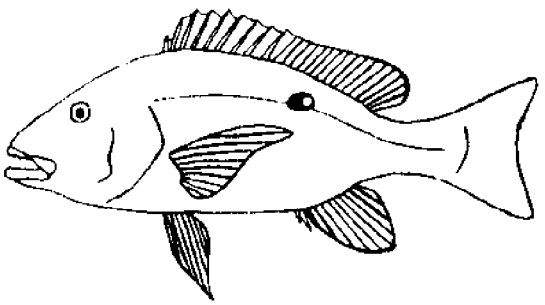
LANE SNAPPER
Lutjanus synagris



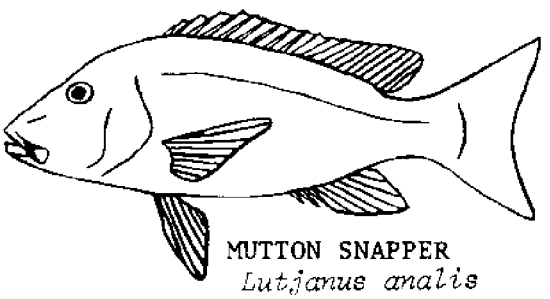
GRAY SNAPPER
Lutjanus griseus



SCHOOLMASTER
Lutjanus apodus



RED SNAPPER
Lutjanus campechanus



MUTTON SNAPPER
Lutjanus analis

b. Premaxillary groove completely naked, not crossed by a band of scales. SPOTFIN MOJARRA. (M, E) Page 109
Eucinostomus argenteus Baird and Girard

FAMILY - POMADASYIDAE - GRUNTS

Key to Species

1. a. Preopercle margin strongly serrate, two of the spines at its angle greatly enlarged, the serrae on lower margin directed forward. BARRED GRUNT. (M) Page 109
Conodon nobilis (Linnaeus)

   b. Preopercle margin moderately to finely serrate, none of the serrae directed forward. ---------- 2

2. a. Soft parts of dorsal and anal fins with dense scales out to their distal margins; mouth red inside (genus *Haemulon*, if specimen less than 65mm in standard length, see Courtenay, 1961, for identification to species).---------- 3

   b. Soft parts of dorsal and anal fins without scales, or with only a few scales at their base; mouth not red inside. ---- 6

3. a. Dorsal fin spines 13 (12 + 1). ---------- 4

   b. Dorsal fin spines 12 (11 + 1). ---------- 5

4. a. Base of caudal fin with a large, dark blotch; anal fin rays usually 9. TOMTATE. (M) Page 109
Haemulon aurolineatum Cuvier

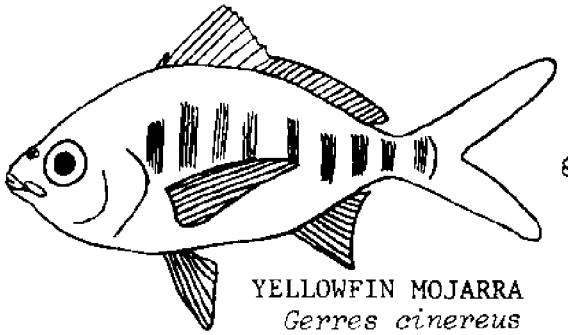
   b. Base of caudal fin without a large, dark blotch; anal fin rays 7 or 8. STRIPED GRUNT. (M) Page 109
Haemulon striatum (Linnaeus)

5. a. Pectoral fins covered with scales for at least 1/3 of their length. SAILORS CHOICE. (M) Page 109
Haemulon parrai (Desmarest)

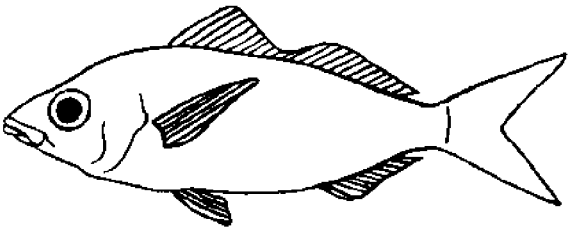
   b. Pectoral fins without scales. SPANISH GRUNT. (M) Page 109
Haemulon macrostomum Günther

6. a. Anal fin with 12 or 13 soft rays; second anal spine only slightly enlarged. PIGFISH. (M, E, F) Page 109
Orthopristis chrysoptera (Linnaeus)

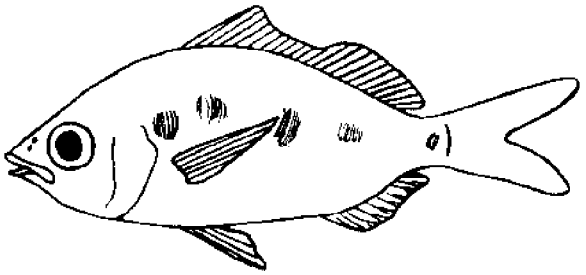
   b. Anal fin with 6 to 11 soft rays; second anal spine greatly enlarged. ---------- 7



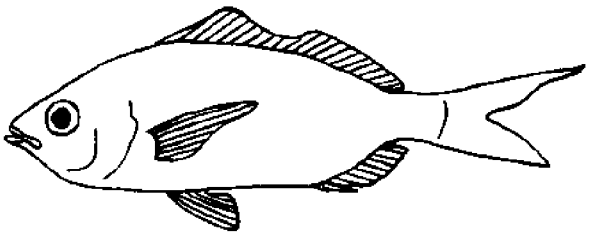
YELLOWFIN MOJARRA
Gerres cinereus



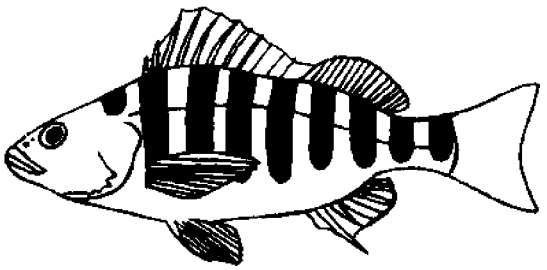
MOTTLED MOJARRA
Eucinostomus lefroyi



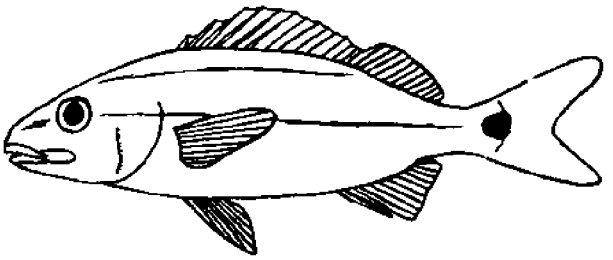
SILVER JENNY
Eucinostomus gula



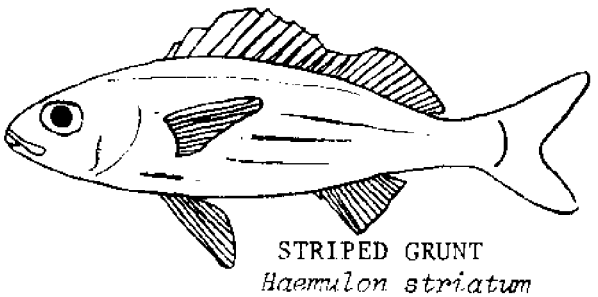
SPOTFIN MOJARRA
Eucinostomus argenteus



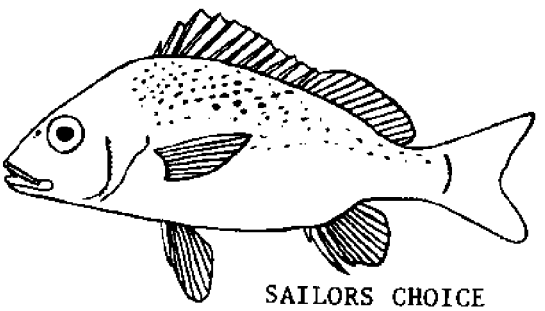
BARRED GRUNT
Conodon nobilis



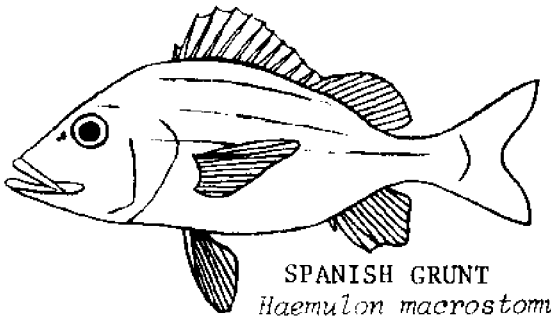
TOMTATE
Haemulon aurolineatum



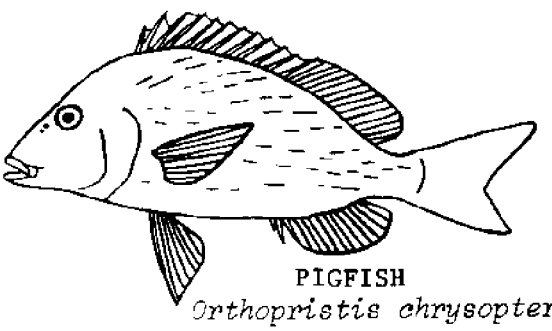
STRIPED GRUNT
Haemulon striatum



SAILORS CHOICE
Haemulon parrai



SPANISH GRUNT
Haemulon macrostomum



PIGFISH
Orthopristis chrysoptera

7. a. Dorsal fin normally with 13 spines and 11 to 13 soft rays; anal fin soft rays 6 or 7. BURRO GRUNT. (M)
Pomadasys crocro (Cuvier)

b. Dorsal fin normally with 12 spines and 16 or 17 soft rays; anal fin soft rays 8 to 11. ---------- 8

8. a. Adults with alternating blue and yellow stripes on sides of body; young with a distinct saddle-shaped blotch behind dorsal fin base (this blotch is always disconnected from upper lateral stripe). PORKFISH. (M) Page 111
Anisotremus virginicus (Linnaeus)

b. Adults without stripes; young without blotch (may have lateral stripe extending around back of dorsal fin base). BLACK MARGATE. (M) Page 111
Anisotremus surinamensis (Bloch)

FAMILY - SPARIDAE - PORGIES

Key to Species

1. a. Anterior teeth compressed, more or less incisor-like. ----- 2

b. Anterior teeth conical or canine-like. ---------- 5

2. a. Incisor teeth lance-like; third dorsal spine much elongated, longer than head. LONGSPINE PORGY. (M) Page 111
Stenotomus caprinus Bean

b. Incisor teeth not lance-like, more like those of humans; no elongated dorsal spines. ---------- 3

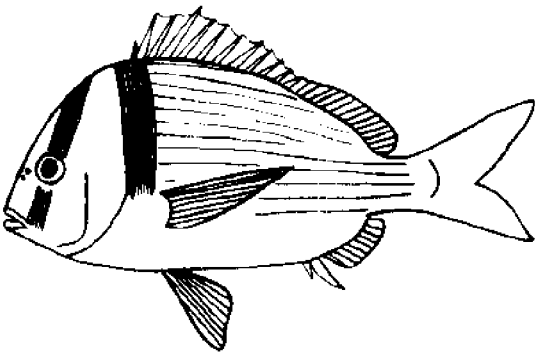
3. a. Incisors conspicuously notched. PINFISH. (M, E, F) Page 111
Lagodon rhomboides (Linnaeus)

b. Incisors entire (smooth) or with a very shallow notch. ---- 4

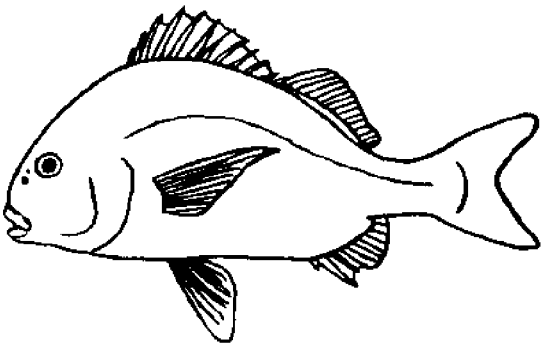
4. a. Body predominately silver, without dark cross bands; black saddle-shaped blotch on top of caudal peduncle. SPOTTAIL PINFISH. (M) Page 111
Diplodus holbrooki (Bean)

b. Body with 4 to 6 broad, vertical dark bands; "black saddle" absent from caudal peduncle. SHEEPSHEAD. (M, E, F) Page 111
Archosargus probatocephalus (Walbaum)

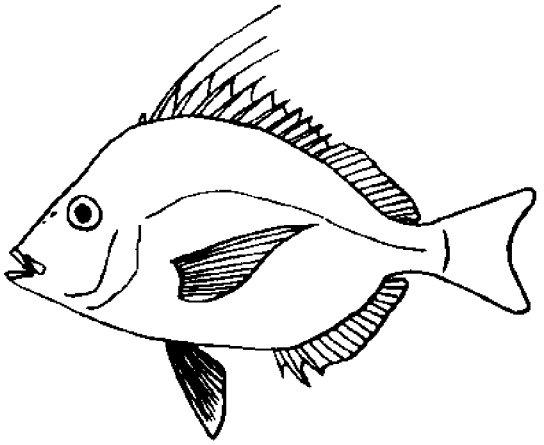
5. a. Lateral line scales 43 to 49; pectoral fin rays usually 15 or 16, rarely 14; anterior canines not enlarged. ---------- 6



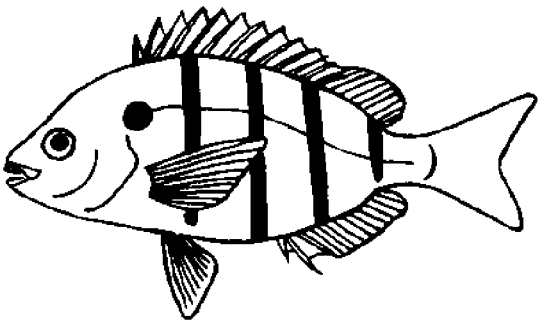
PORKFISH
Anisotremus virginicus



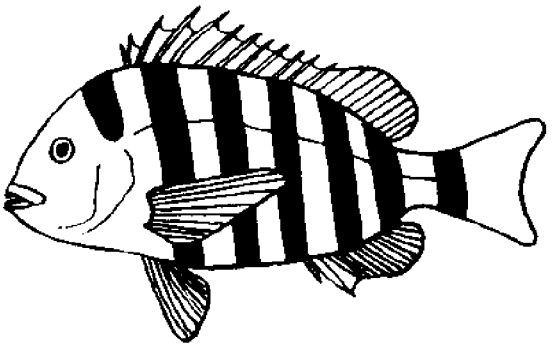
BLACK MARGATE
Anisotremus surinamensis



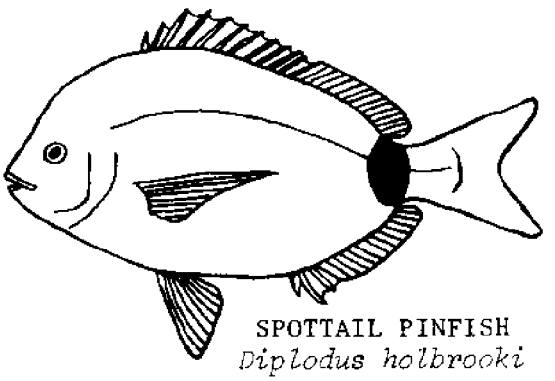
LONGSPINE PORGY
Stenotomus caprinus



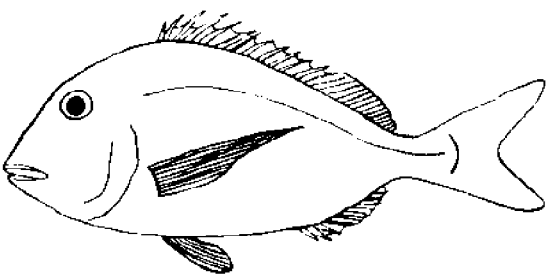
PINFISH
Lagodon rhomboides



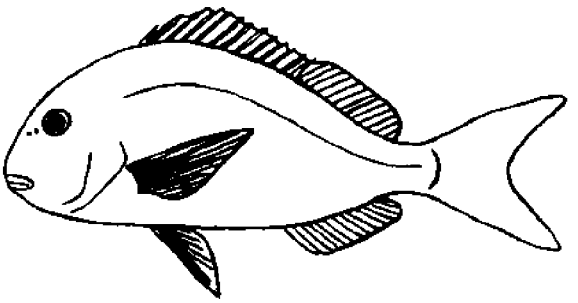
SHEEPSHEAD
Archosargus probatocephalus



SPOTTAIL PINFISH
Diplodus holbrooki



WHITEBONE PORGY
Calamus leucosteus



SHEEPSHEAD PORGY
Calamus penna

b. Lateral line scales 50 to 57; pectoral fin rays usually 14 or 15, rarely 13 or 16; 1 or 2 anterior canine teeth much enlarged. ---------- 7

6. a. Pectoral fin rays usually 16; prominent dark spot at upper base of pectoral fin absent; body relatively deep, depth 1.85 to 2.3 in standard length. WHITEBONE PORGY. (M) Page 111
Calamus leucosteus Jordan and Gilbert

b. Pectoral fin rays usually 15; a small but prominent black spot present at upper base of pectoral fin; body not very deep, depth 2.0 to 2.6 in standard length. SHEEPSHEAD PORGY. (M) Page 111
Calamus penna (Valenciennes)

7. a. Pectoral fin rays 15, rarely 14 or 16; no outcurved canine teeth in adults; dorsal profile of snout not markedly steep. JOLTHEAD PORGY. (M) Page 113
Calamus bajonado (Bloch and Schneider)

b. Pectoral fin rays 14, rarely 13 or 15; third or fourth canine tooth from symphysis on each side of upper jaw of adults outcurved; dorsal profile of snout very steep. SAUCEREYE PORGY. (M) Page 113
Calamus calamus (Valenciennes)

FAMILY - SCIAENIDAE - DRUMS

Key to Species

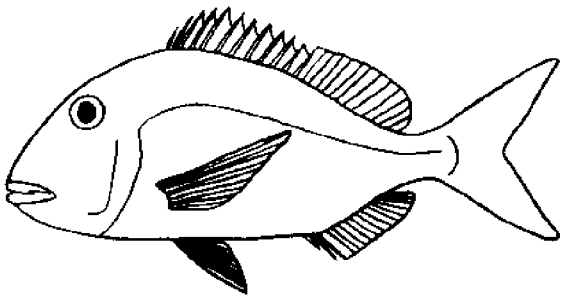
1. a. Lower jaw with one or more barbels (sometimes minute and easily overlooked). ---------- 2

b. Lower jaw without barbels. ---------- 7

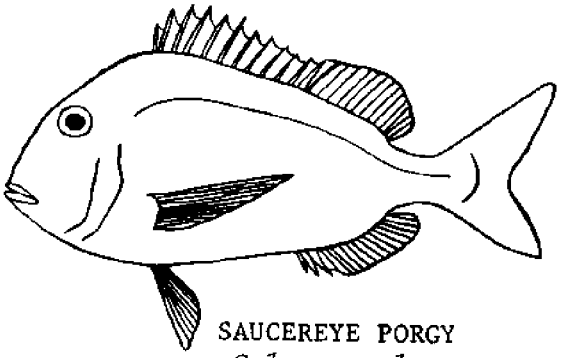
2. a. Preopercular margin entire, without spines or bony "teeth" along its margin (lower jaw with numerous large barbels along inner edge, sides of young with about 5 broad, vertical bands). BLACK DRUM. (M, E) Page 113
Pogonias cromis (Linnaeus)

b. Preopercular margin strongly to finely serrate, with spines or bony "teeth" along its margin. ---------- 3

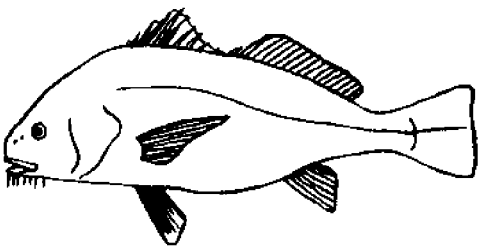
3. a. Lower jaw with a row of minute barbels on each side; preopercular margin with strong serrae. ATLANTIC CROAKER. (M, E) Page 113
Micropogon undulatus (Linnaeus)



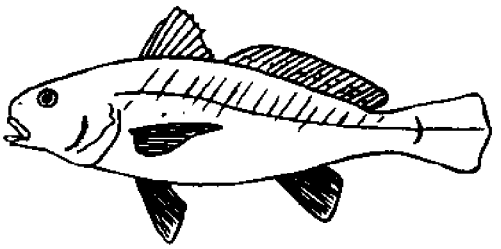
JOLTHEAD PORGY
Calamus bajonado



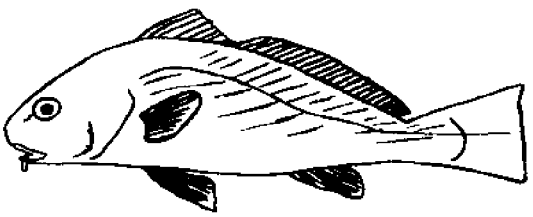
SAUCEREYE PORGY
Calamus calamus



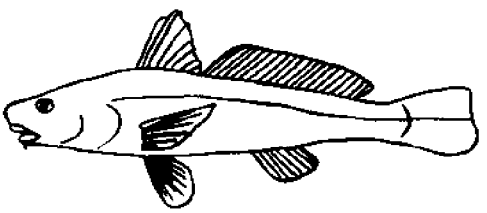
BLACK DRUM
Pogonias cromis



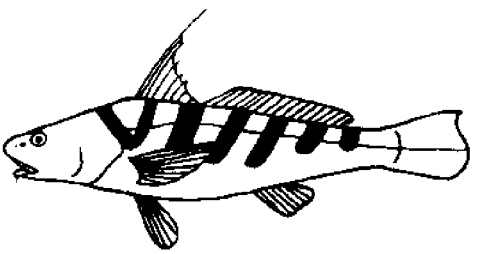
ATLANTIC CROAKER
Micropogon undulatus



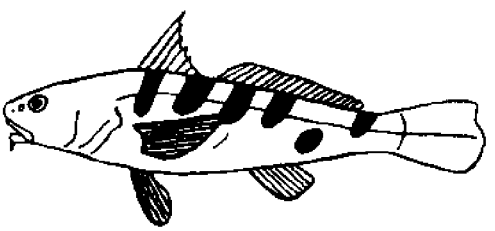
SAND DRUM
Umbrina coroides



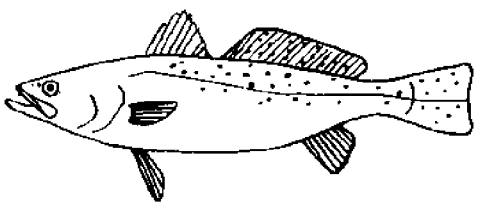
GULF KINGFISH
Menticirrhus littoralis



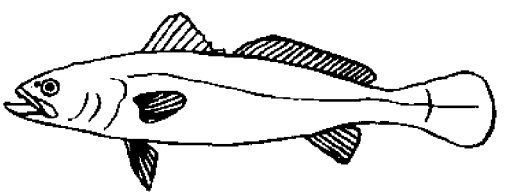
MINKFISH
Menticirrhus focaliger



SOUTHERN KINGFISH
Menticirrhus americanus



SPOTTED SEATROUT
Cynoscion nebulosus



SILVER SEATROUT
Cynoscion nothus

b. Lower jaw with a single thick barbel at the tip; preopercular margin with fine serrae. ---------- 4

4. a. Anal fin with 2 spines. SAND DRUM. (M) Page 113
Umbrina coroides Cuvier

b. Anal fin with 1 spine. ---------- 5

5. a. Scales on chest much smaller than those on sides above lateral line, scales in middle of chest much larger than those in front of each pelvic fin base; pectoral fins short, failing conspicuously to reach tips of pelvic fins. GULF KINGFISH. (M) Page 113
Menticirrhus littoralis (Holbrook)

b. Scales on chest not much smaller than those on sides above lateral line, scales in middle of chest not much larger than those in front of each pelvic fin base; pectoral fins long, reaching to or past tips of pelvic fins. ---------- 6

6. a. Anal fin usually with 8 soft rays, sometimes 9; the longest dorsal fin spine produced in adults reaching far past origin of the second dorsal fin; sides usually with black bars, the one on the nape and the one below the spinous dorsal fin meeting on the side forming a V; pectoral fin rays 18-21. MINKFISH. (M) Page 113
Menticirrhus focaliger Ginsburg

b. Anal fin usually with 7 soft rays, rarely 8; none of the dorsal fin spines especially produced in adults, none reaching far if at all beyond origin of second dorsal fin; sides plain or with dull bars that may form a faint V; pectoral fin rays 21-22. SOUTHERN KINGFISH. (M) Page 113
Menticirrhus americanus (Linnaeus)

7. a. Upper jaw with 1 or 2 canine teeth. ---------- 8

b. Upper jaw without canine teeth. ---------- 10

8. a. Upper sides with well defined spots; soft dorsal and anal fins without scales. SPOTTED SEATROUT. (M, E) Page 113
Cynoscion nebulosus (Cuvier)

b. Sides without spots; soft dorsal and anal fins with scales. 9

9. a. Anal fin rays 8-10; pigment spots on dorsal surface of tongue usually evenly distributed. SILVER SEATROUT. (M) Page 113
Cynoscion nothus (Holbrook)

b. Anal fin rays 10-12; pigment spots on dorsal surface of tongue more dense near edge of tongue. SAND SEATROUT. (M, E) Page 117
Cynoscion arenarius Ginsburg

10. a. Dorsal fin with more than 35 rays. HIGH-HAT. (M) Page 117
Pareques acuminatus (Bloch and Schneider)
(=*Equetus acuminatus* in AFS, 1970)

b. Dorsal fin with less than 32 rays. ---------- 11

11. a. One or more black spots at dorsal base of caudal fin; total gill rakers on first arch about 12 (5 + 7). RED DRUM. (M, E) Page 117
Sciaenops ocellata (Linnaeus)

b. No spots at base of caudal fin; total gill rakers on first arch 20-36 (6-13 + 14-22). ---------- 12

12. a. Dorsal fin rays 30-31. ---------- 13

b. Dorsal fin rays 20-26. ---------- 14

13. a. Anal fin rays 12; total gill rakers on first arch about 30 (8 + 22); a dark shoulder spot usually present. SPOT. (M, E) Page 117
Leiostomus xanthurus Lacépède

b. Anal fin rays 7; total gill rakers on first arch about 20 (6 + 14) dark shoulder spot absent. FRESHWATER DRUM. (F) Page 117
Aplodinotus grunniens Rafinesque

14. a. Preopercle entire or weakly serrate; lower jaw protruding, mouth large, often very oblique; sides marked with 7 to 9 dark vertical bars. BANDED DRUM. (M)
Larimus fasciatus Holbrook

b. Preopercle strongly serrate; mouth not large and oblique; sides without dark vertical bars. ---------- 15

15. a. Anal fin rays 7 or 8; skull cavernous and spongy to touch. STAR DRUM. (M, E)
Stellifer lanceolatus (Holbrook)

b. Anal fin rays 10; skull not cavernous or noticably spongy to touch. SILVER PERCH. (M, E, F) Page 117
Bairdiella chrysura (Lacépède)

FAMILY - MULLIDAE - GOATFISHES

Key to Species

1. a. Teeth present on upper jaw; dorsal and caudal fins with dark diagonal crossbands. DWARF GOATFISH. (M) Page 117
Upeneus parvus Poey

   b. Teeth absent on upper jaw; dorsal and caudal fins without dark crossbands. RED GOATFISH. (M) Page 117
Mullus auratus Jordan and Gilbert

FAMILY - KYPHOSIDAE - SEA CHUBS

Key to Species

1. a. Total number of soft rays in dorsal and anal fins 24 or less (dorsal fin soft rays usually 12, rarely 11 or 13, and soft rays 11, rarely 9 or 12); gill rakers on lower limb of first arch 17 or 18 (rarely 16 or 19).
BERMUDA CHUB. (M)
Kyphosus sectatrix (Linnaeus)

   b. Total number of soft rays in dorsal and anal fins 25 or more (dorsal fin soft rays 13 or 14, rarely 15, anal fin soft rays 12 or 13); gill rakers on lower limb of first arch 19-22, rarely 23. YELLOW CHUB. (M)
Kyphosus incisor (Cuvier)

FAMILY - CHAETODONTIDAE - BUTTERFLYFISHES

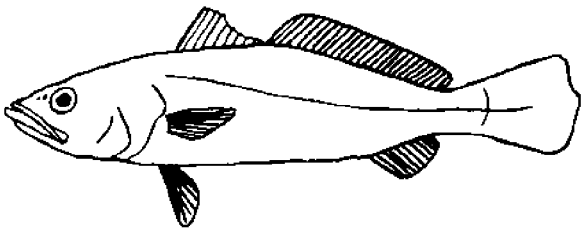
Key to Species

1. a. Preopercular margin without a strong spine at its angle. --- 2

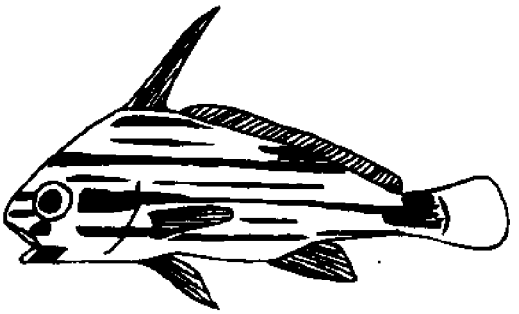
   b. Preopercular margin with a strong spine at its angle. ------ 3

2. a. Base of soft dorsal fin with a large black spot; an indistinct band extends vertically from this spot to base of anal fin; distinct black spot present on posterior-distal edge of soft dorsal fin. SPOTFIN BUTTERFLYFISH. (M) Page 119
Chaetodon ocellatus Bloch

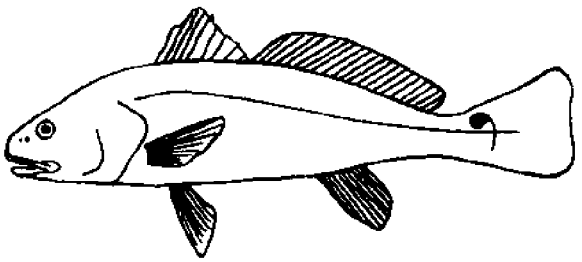
   b. Base of soft dorsal fin without a large black spot; a very broad, dark-brown, vertical band extends from distal extremity in posterior half of soft dorsal fin, across tail to posterior half of anal fin; no distinct black spot on posterior distal edge of soft dorsal fin. REEF BUTTERFLYFISH. (M) Page 119
Chaetodon sedentarius Poey



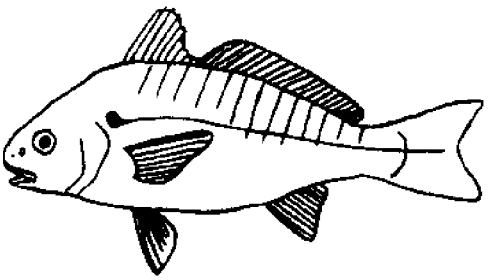
SAND SEATROUT
Cynoscion arenarius



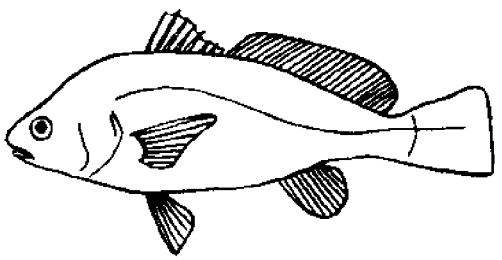
HIGH-HAT
Pareques acuminatus



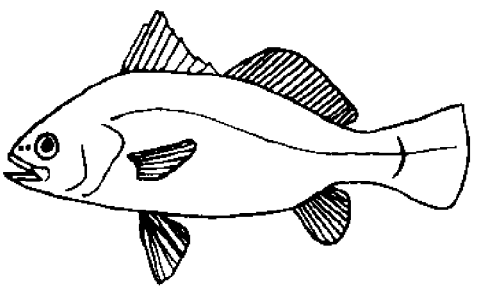
RED DRUM
Sciaenops ocellata



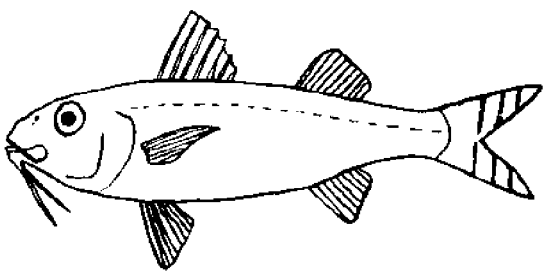
SPOT
Leiostomus xanthurus



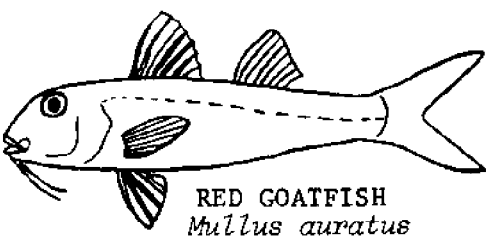
FRESHWATER DRUM
Aplodinotus grunniens



SILVER PERCH
Bairdiella chrysura



DWARF GOATFISH
Upeneus parvus



RED GOATFISH
Mullus auratus

3. a. Vertical margin of preopercle with short stout spines. BLUE ANGELFISH. (M) Page 119
Holacanthus bermudensis Goode

b. Vertical margin of preopercle entire or finely serrate. --- 4

4. a. Dorsal fin spines usually 9; body coloration either steel gray or yellowish in adults or with 4 whitish crossbands in young. GRAY ANGELFISH. (M) Page 119
Pomacanthus arcuatus (Linnaeus)

b. Dorsal fin spines usually 10; body coloration either black with each scale yellow-edged in adults or with several yellowish crossbands in young. FRENCH ANGELFISH. (M) Page 119
Pomacanthus paru (Bloch)

FAMILY - POMACENTRIDAE - DAMSELFISHES

Key to Species

1. a. Teeth conical, in a band 2 to 3 teeth wide anteriorly. ---- 2

b. Teeth incisor-like, in a single series. ---------- 3

2. a. Dark stripe present on each caudal lobe (along the upper and lower margin of the fin); dark blotch present on base of pectoral fin; white spot present on back behind last dorsal fin ray. BROWN CHROMIS. (M) Page 121
Chromis multilineatus (Guichenot)

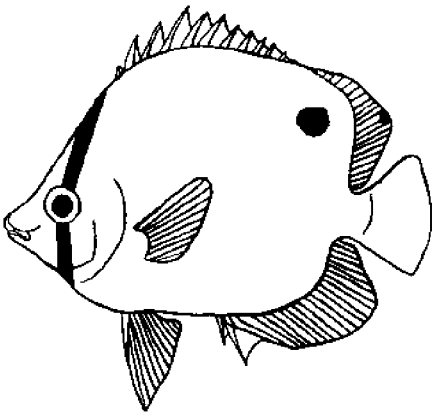
b. Dark stripe absent from lobes of caudal fin; dark blotch absent from base of pectoral fin; white spot on back behind last dorsal fin ray absent. SUNSHINE FISH. (M) Page 121
Chromis insolatus (Cuvier)

3. a. Preopercle entire, not serrated; teeth distinctly bilobed (notched). ---------- 4

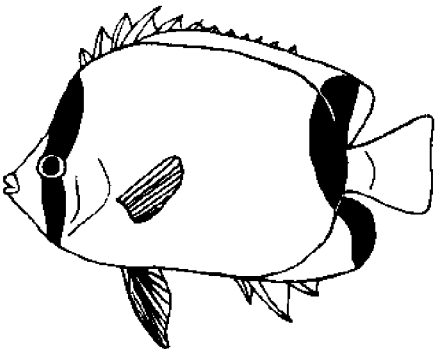
b. Preopercle serrated; teeth slightly emarginate or entire, not distinctly notched. ---------- 5

4. a. Segmented anal fin rays 12 or 13, usually 12. SERGEANT MAJOR. (M) Page 121
Abudefduf saxatilis (Linnaeus)

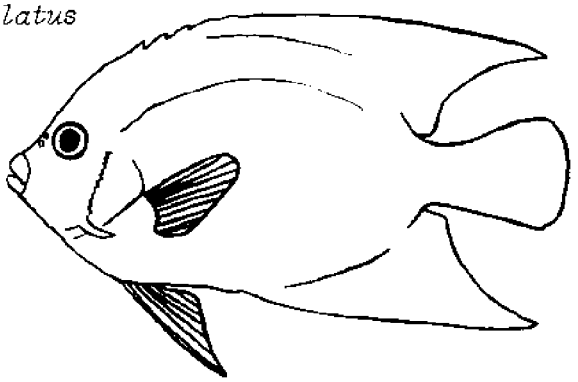
b. Segmented anal fin rays 9 or 10, usually 10. NIGHT SERGEANT. (M) Page 121
Abudefduf taurus (Muller and Troschel)



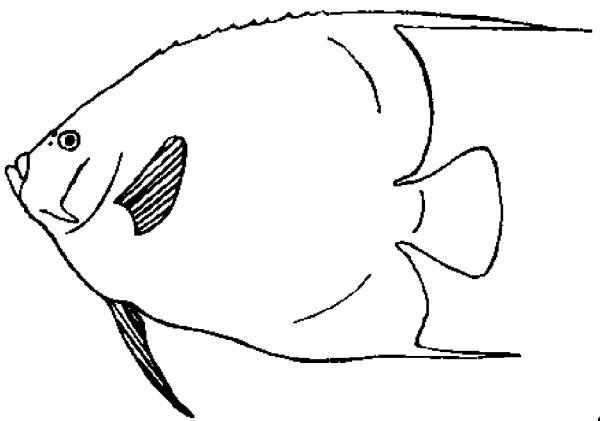
SPOTFIN BUTTERFLYFISH
Chaetodon ocellatus



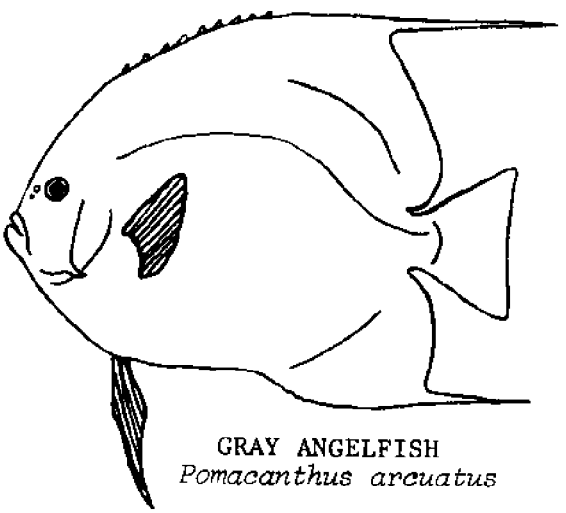
REEF BUTTERFLYFISH
Chaetodon sedentarius



BLUE ANGELFISH
Holacanthus bermudensis



FRENCH ANGELFISH
Pomacanthus paru



GRAY ANGELFISH
Pomacanthus arcuatus

5. a. Anal fin short, the longest rays reaching to or only slightly behind caudal fin base; pectoral fin rays 20 to 22, rarely as few as 20. DUSKY DAMSELFISH. (M) Page 121
Pomacentrus fuscus Cuvier

b. Anal fin longer, the longest rays reaching well beyond caudal fin base; pectoral fin rays 17 to 20, rarely as many as 21. ---------- 6

6. a. Pectoral fin rays usually 20 (19-21); dorsal fin spot, when present, extending onto back; black spot on top of caudal peduncle usually present. COCOA DAMSELFISH. (M) Page 121
Pomacentrus variabilis (Castelnau)

b. Pectoral fin rays usually 18 (17-19); dorsal fin spot, when present, not extending onto back; black spot on top of caudal peduncle never present. BEAUGREGORY. (M) Page 121
Pomacentrus leucostictus Müller and Troschel

FAMILY - LABRIDAE - WRASSES

Key to Species

1. a. Dorsal fin spines 11 to 14. ---------- 2

b. Dorsal fin spines 8 or 9. ---------- 3

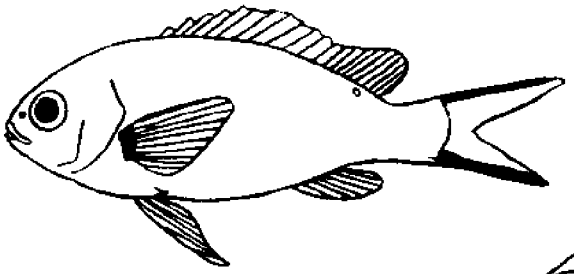
2. a. Dorsal fin spines 14; the anterior spines extended into long streamers; back greatly elevated. HOGFISH. (M) Page 124
Lachnolaimus maximus (Walbaum)

b. Dorsal fin spines 11 or 12, rarely 13, none produced and streamer-like; back not greatly elevated. RED HOGFISH. (M)
Decodon puellaris (Poey)

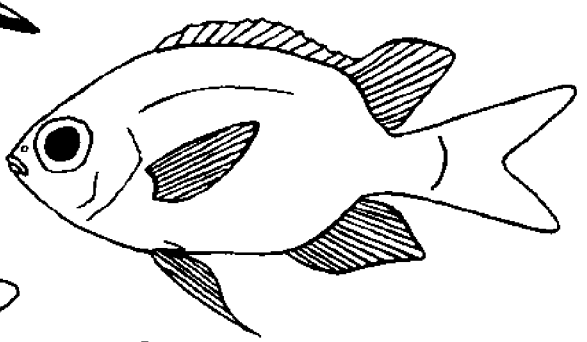
3. a. Lateral line interrupted posteriorly, the posterior section a midlateral segment on caudal peduncle. PEARLY RAZORFISH. (M) Page 124
Hemipteronotus novacula (Linnaeus)

b. Lateral line complete, not interrupted, but with a distinct downward arch posteriorly. ---------- 4

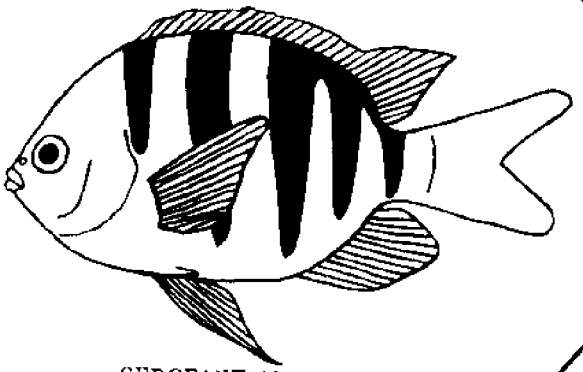
4. a. Scales in anterior part of lateral line with more than 1 pore, usually 3; two dark stripes running length of body; no dark spot behind eye. SLIPPERY DICK. (M) Page 124
Halichoeres bivittatus (Bloch)



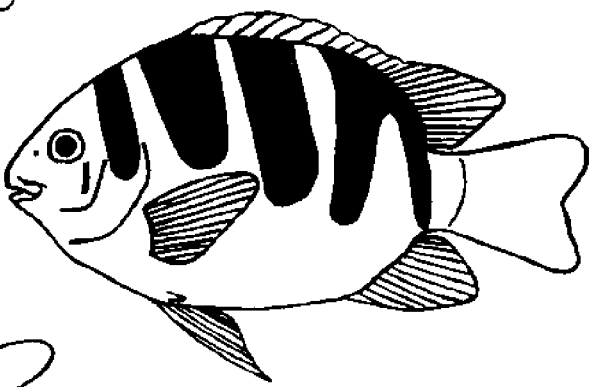
BROWN CHROMIS
Chromis multilineatus



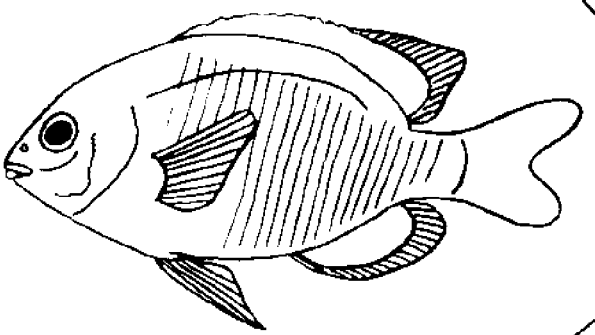
SUNSHINE FISH
Chromis insolatus



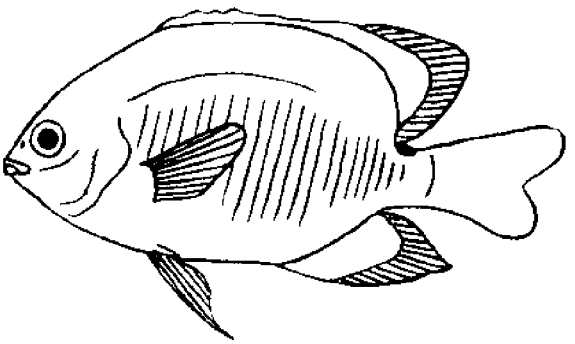
SERGEANT MAJOR
Abudefduf saxatilis



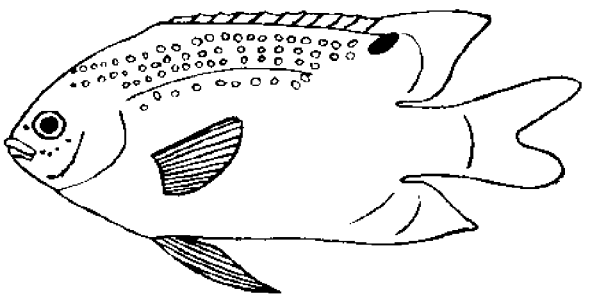
NIGHT SERGEANT
Abudefduf taurus



DUSKY DAMSELFISH
Pomacentrus fuscus



COCOA DAMSELFISH
Pomacentrus variabilis



BEAUGREGORY
Pomacentrus leucostictus

b. All scales in lateral line with a single pore; no dark stripes running length of body; dark spot present behind eye. PAINTED WRASSE. (M) Page 124
Halichoeres caudalis (Poey)

FAMILY - MUGILIDAE - MULLETS

Key to Species

1. a. Lower lip thick, without a thin edge; lower jaw rounded, without a knob at its symphysis; adipose eyelid absent. MOUNTAIN MULLET. (M, E, F) Page 124
Agonostomus monticola (Bancroft)

   b. Lower lip with thin edge; lower jaw angular with a distinct knob at its symphysis; adipose eyelid well developed in adults. ---------- 2

2. a. Anal fin elements total 11, larger specimens with 3 spines and 8 soft rays (III, 8), small juveniles with 2 spines and 9 soft rays (II, 9); soft dorsal and anal fins with few scales all located on proximal third of fin membranes; larger specimens with dark longitudinal stripes on sides. STRIPED MULLET. (M, E, F) Page 124
Mugil cephalus Linnaeus

   b. Anal fin elements total 12, larger specimens with 3 spines and 9 soft rays (III, 9) small juveniles with 2 spines and 10 soft fins (II, 10); soft dorsal and anal fins with many small scales covering much of fin membranes; larger specimens without dark longitudional stripes on sides. WHITE MULLET. (M, E) Page 124
Mugil curema Valenciennes

FAMILY - SPHYRAENIDAE - BARRACUDAS

Key to Species

1. a. Scales small, 108 to 114 in lateral line series; no inky blotches on sides; posterior rays of second dorsal and anal fins usually produced, when fins are depressed the posterior rays extend back beyond the anterior rays. GUAGUANCHE. (M) Page 124
Sphyraena guachancho Cuvier

   b. Scales larger, 75 to 87 in lateral line series; inky blotches on sides; posterior rays of second dorsal and anal fins little produced, when fins are depressed the anterior rays extend back beyond the posterior rays. GREAT BARRACUDA. (M) Page 124
Sphyraena barracuda (Walbaum)

FAMILY - PERCOPHIDIDAE - FLATHEADS

Key to Species

1. a. Dorsal fin rays 14 to 15; body with a lateral row of about 10 spots; larger males with the second dorsal fin spine long and filamentous. DUCKBILL FLATHEAD. (M) Page 124
Bembrops anatirostris Ginsburg

   b. Dorsal fin rays 17 to 18; body without lateral row of spots; males without filamentous dorsal spine. GOBY FLATHEAD. (M) Page 124
Bembrops gobioides (Goode)

FAMILY - URANOSCOPIDAE - STARGAZERS

Key to Species

1. a. Spinous dorsal fin present with 3 to 5 spines. SOUTHERN STARGAZER. (M, E) Page 126
Astroscopus y-graecum (Cuvier)

   b. Spinous dorsal fin absent. ---------- 2

2. a. Lower edge of preopercle developed as a flattened wing-like appendage; pectoral fin rays 20 to 24; anal fin rays 16 to 17. FRECKLED STARGAZER. (M) Page 126
Gnathagnus egregius (Jordan and Thompson)

   b. Ventral margin of preopercle with 3 protruding spines; pectoral fin rays 13 to 16; anal fin rays 12 to 15. LANCER STARGAZER. (M) Page 126
Kathetostoma albigutta (Bean)

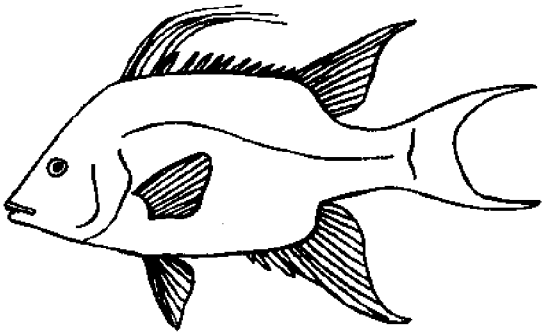
FAMILY - BLENNIIDAE - BLENNIES

Key to Species

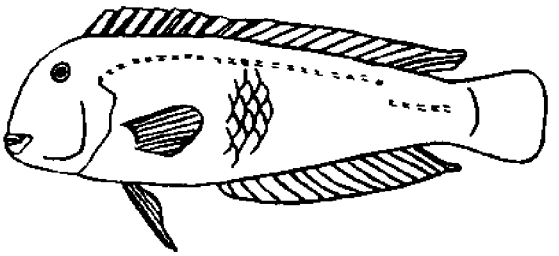
1. a. Branchiostegal membranes not fused with body, but forming a well developed free margin across the breast under which a probe can be inserted. ---------- 2

   b. Branchiostegal membranes fused with body, at most, a slight indication of a fold across the breast under which a probe cannot be inserted. ---------- 3

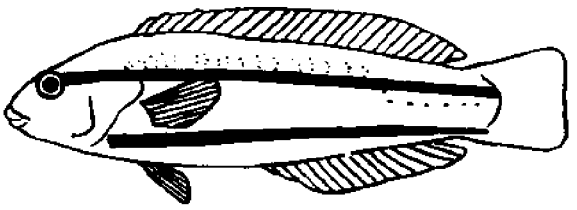
2. a. Median row of cirri present on top of head. MOLLY MILLER. (M) Page 126
Blennius cristatus Linnaeus



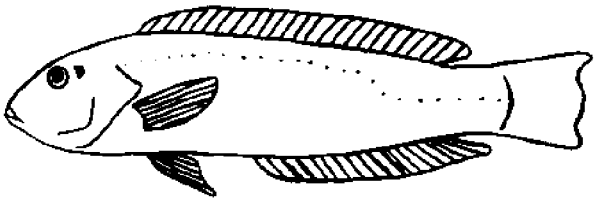
HOGFISH
Lachnolaimus maximus



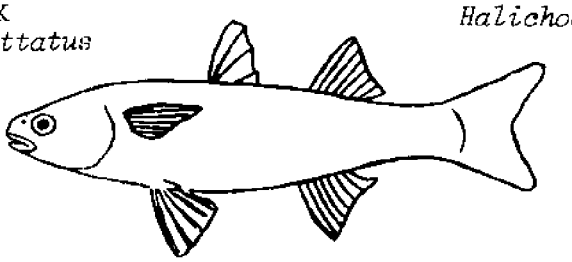
PEARLY RAZORFISH
Hemipteronotus novacula



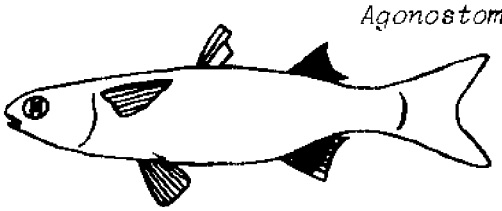
SLIPPERY DICK
Halichoeres bivittatus



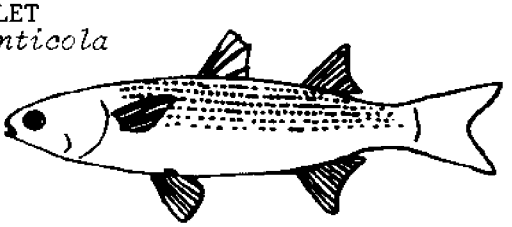
PAINTED WRASSE
Halichoeres caudalis



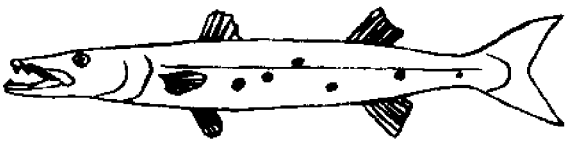
MOUNTAIN MULLET
Agonostomus monticola



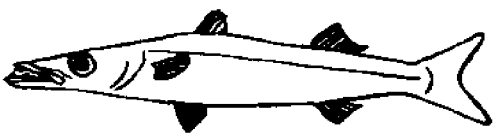
WHITE MULLET
Mugil curema



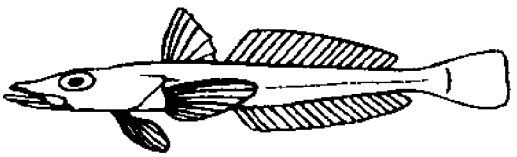
STRIPED MULLET
Mugil cephalus



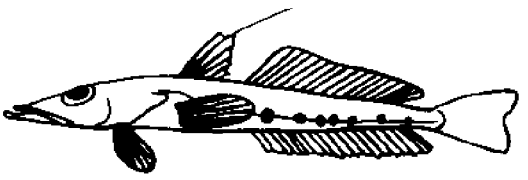
GREAT BARRACUDA
Sphyraena barracuda



GUAGUANCHE
Sphyraena guachancho



GOBY FLATHEAD
Bembrops gobioides



DUCKBILL FLATHEAD
Bembrops anatirostris

b. Median row of cirri not present on top of head. SEAWEED BLENNY. (M) Page 126
Blennius marmoreus Poey

3. a. Pectoral fin rays usually 12; interorbital region flat; anterior lateral line pores in a single series, not paired dorsally or ventrally; no canines posteriorly in jaws. STRIPED BLENNY. (M, E) Page 126
Chasmodes bosquianus (Lacépède)

b. Pectoral fin rays usually 14; interorbital region concave (spherotics raised); anterior lateral line pores in a paired series; canines present or absent posteriorly in jaws. ---- 4

4. a. Canine teeth present in posterior part of one or both jaws. CRESTED BLENNY. (M) Page 126
Hypleurochilus geminatus (Wood)

b. Canine teeth absent from jaws. ---------- 5

5. a. Orbital cirrus not forked at tip (simple); conspicuous angular bar behind and below eye; head 3.5 in standard length. FRECKLED BLENNY. (M, E) Page 126
Hypsoblennius ionthas (Jordan and Gilbert)

b. Orbital cirrus forked at tip, long in males; bar behind and below eye indistinct; head less than 3.5 in standard length. FEATHER BLENNY. (M) Page 126
Hypsoblennius hentzi (Lesueur)

FAMILY - ELEOTRIDAE - SLEEPERS

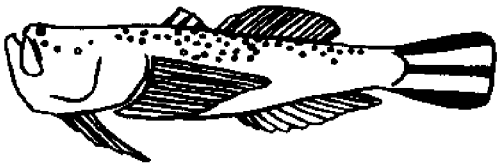
Key to Species

1. a. Dorsal fin spines 7; maxillary not reaching to middle of eye; body robust; mouth small. FAT SLEEPER. (E, F) Page 129
Dormitator maculatus (Bloch)

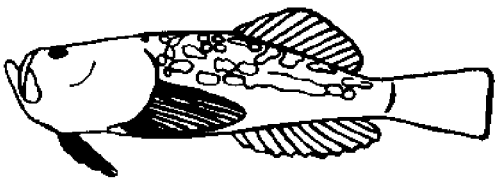
b. Dorsal fin spines 6; maxillary reaching to middle of eye or beyond; body slender; mouth large. ---------- 2

2. a. Preopercle with a small, ventrally directed spine (partially concealed, easily found with a probe). ---------- 3

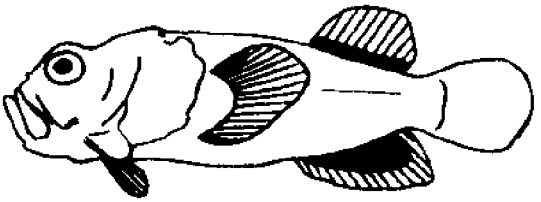
b. Preopercle without spine as described in 2a. BIGMOUTH SLEEPER. (E, F) Page 129
Gobiomorus dormitor Lacepede



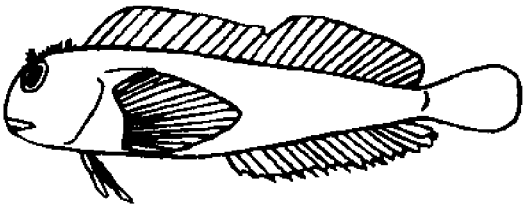
SOUTHERN STARGAZER
Astroscopus y-graecum



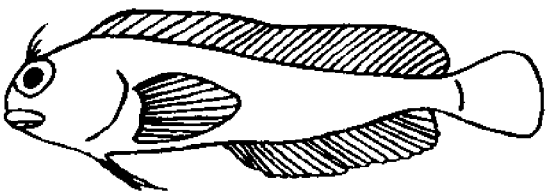
LANCER STARGAZER
Kathetostoma albigutta



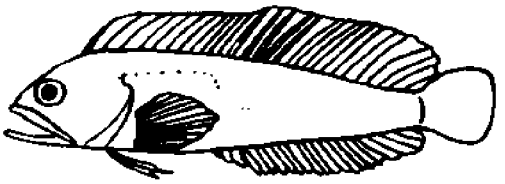
FRECKLED STARGAZER
Gnathagnus egregius



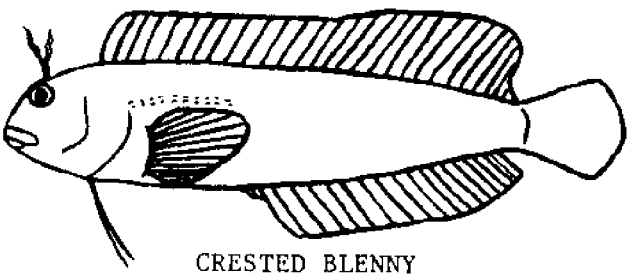
MOLLY MILLER
Blennius cristatus



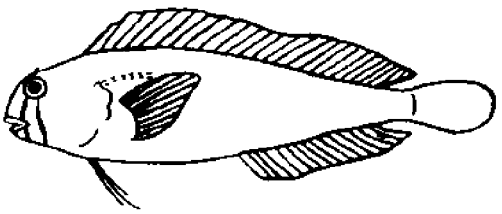
SEAWEED BLENNY
Blennius marmoreus



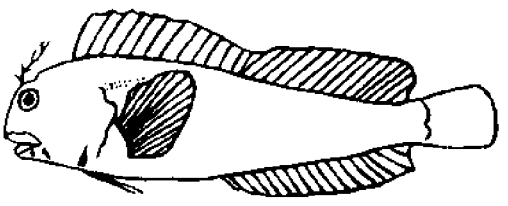
STRIPED BLENNY
Chasmodes bosquianus



CRESTED BLENNY
Hypleurochilus geminatus



FRECKLED BLENNY
Hypsoblennius ionthas



FEATHER BLENNY
Hypsoblennius hentzi

3. a. Scales ctenoid on posterior part of body; second dorsal fin with 9 rays. SPINYCHEEK SLEEPER. (F, E) Page 129
Eleotris pisonis (Gmelin)

b. Scales cycloid on posterior part of body; second dorsal fin with 12 rays. EMERALD SLEEPER. (M, E) Page 129
Erotelis smaragdus (Valenciennes)

FAMILY - GOBIIDAE - GOBIES

Key to Species

1. a. Dorsal fin continuous; body slender, very elongate; lateral body with 25 or more dark chevron-like markings. VIOLET GOBY. (M, E, F) Page 129
Gobioides broussonneti Lacépède

b. Dorsal fins separate; body moderately elongate to robust; lateral body without repeated chevron-like markings. ------ 2

2. a. Upper pectoral fin rays free for most of their length; tongue distinctly notched in front. FRILLFIN GOBY. (M, E) Page 129
Bathygobius soporator (Valenciennes)

b. All pectoral fin rays united by membranes for most of the length; tongue occassionally emarginate in front, but never notched. ---------- 3

3. a. Body without scales. ---------- 4

b. Body with scales. ---------- 5

4. a. Dorsal fin rays 12; anal fin rays 10; pectoral fin rays 17; body pallid or with narrow irregular vertical bars on sides and a midlateral series of dark dots and dashes. CODE GOBY. (M, E, F) Page 129
Gobiosoma robustum Ginsburg

b. Dorsal fin rays 13; anal fin rays 11; pectoral fin rays 18; body with 9 or 10 broad vertical bars and narrow light interspaces, without a series of midlateral dots and dashes. NAKED GOBY. (M, E, F) Page 129
Gobiosoma bosci (Lacépède)

5. a. Dorsal fin spines 7; pectoral fin rays 21 or 22. ---------- 6

b. Dorsal fin spines 6; pectoral fin rays 16 to 19. ---------- 8

6. a. Predorsal region, cheek, opercle and chest with scales or with evident scale pockets (the scales easily lost): dorsal fin rays 14. RAGGED GOBY. (M, E) Page 132
Bollmannia communis Ginsburg

b. Predorsal region, head and chest without scales; dorsal fin rays 16. ---------- 7

7. a. Sides of body with large dark blotches; either second dorsal and anal fins with a dark band on or near their margins (males) or both dorsal fins and the upper region of caudal fin with dark spots and blotches (females). CLOWN GOBY. (M, E, F) Page 129
Microgobius gulosus (Girard)

b. Sides of body without spots and blotches; either anal fin with a row of small black spots near its margin (males) or first dorsal fin with a few dark blotches near its margin (females). GREEN GOBY. (M, E, F) Page 129
Microgobius thalassinus (Jordan and Gilbert)

8. a. Dorsal fin rays 14; anal fin rays 15; pectoral fin rays 12; a distinct anterolateral spot present below first dorsal fin; 73 or more scales in lateral line series; body elongate. SHARPTAIL GOBY. (M, E) Page 132
Gobionellus hastatus Girard

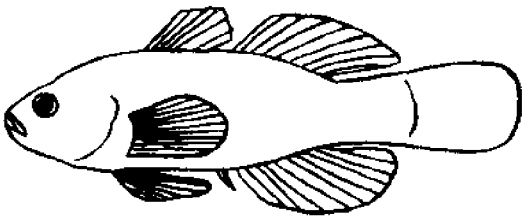
b. Dorsal fin rays 11 or 12; anal fin rays 12 or 13; pectoral fin rays 16 or 17; no distinct anterolateral spot below first dorsal fin; 29 to 40 scales in lateral line series; body not elongated. ---------- 9

9. a. Mouth subterminal, blunt snout projecting a little beyond upper jaw; two large spots on base of caudal fin with a light area separating them anteriorly but often connected posteriorly; anterior dorsal fin spines markedly produced, more so in males. LYRE GOBY. (M, E) Page 132
Evorthodus lyricus (Girard)

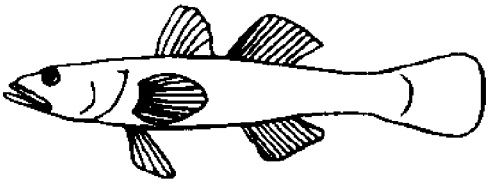
b. Mouth terminal, snout not projecting; spot on caudal base not divided by a distinct light area; dorsal fin spines little produced in either sex. ---------- 10

10. a. Dorsal fin rays 11; anal fin rays 12; pectoral fin rays 16; usually with a dark spot above upper opercular angle; sides with prominent V-shaped markings. DARTER GOBY. (M, E, F) Page 132
Gobionellus boleosoma (Jordan and Gilbert)

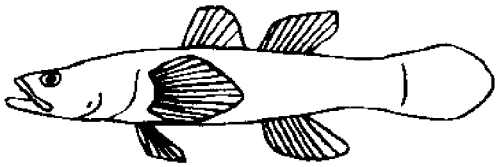
b. Dorsal fin rays 12; anal fin rays 13; pectoral fin rays 17; cheek usually with a longitudional dark bar below eye; sides with midlateral blotches. FRESHWATER GOBY. (M, E, F) Page 132
Gobionellus shufeldti (Jordan and Eigenmann)



FAT SLEEPER
Dormitator maculatus



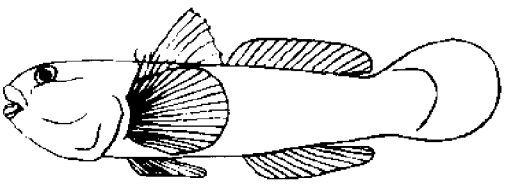
BIGMOUTH SLEEPER
Gobiomorus dormitor



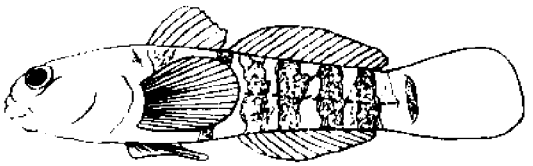
SPINYCHEEK SLEEPER
Eleotris pisonis

EMERALD SLEEPER
Erotelis smaragdus

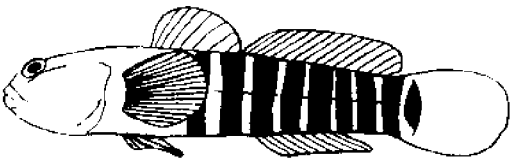
VIOLET GOBY
Gobioides broussonneti



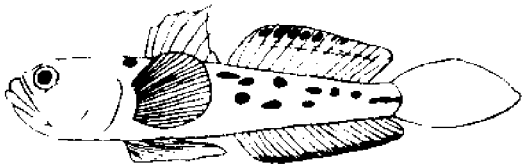
FRILLFIN GOBY
Bathygobius soporator



CODE GOBY
Gobiosoma robustum



NAKED GOBY
Gobiosoma bosci



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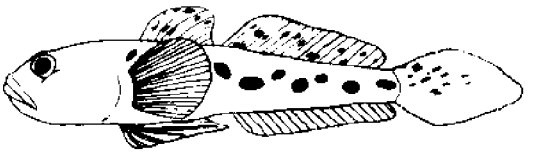

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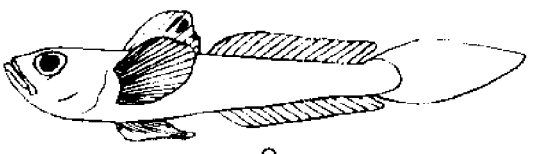
CLOWN GOBY
Microgobius gulosus



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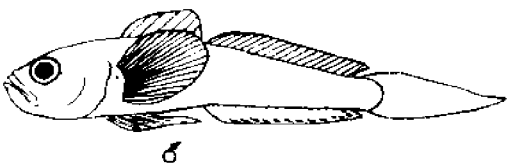

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GREEN GOBY
Microgobius thalassinus

FAMILY - SCOMBRIDAE - MACKERELS AND TUNAS

Key to Species

1. a. Dorsal fins widely separated, distance between base of last spine of first dorsal fin and origin of second dorsal fin much longer than snout. ---------- 2

   b. Dorsal fins close together, distance between base of last spine of first dorsal fin and origin of second dorsal fin shorter than snout. ---------- 3

2. a. Scales covering entire body; base of caudal fin with 2 keels on each side. CHUB MACKEREL. (M) Page 132
   Scomber japonicus Houttuyn

   b. Scales present only on anterior part of body and along lateral line; caudal peduncle with a median keel on each side, in addition to the 2 described above in 2a. FRIGATE MACKEREL. (M) Page 132
   Auxis thazard (Lacépède)

3. a. Teeth in jaws feebly to moderately developed, when moderately developed conical and only slightly compressed, not knife-like. ---------- 4

   b. Teeth in jaws very strong, much compressed and knife-like. 9

4. a. Scales absent from posterior part of body. ---------- 5

   b. Entire body covered with small scales. ---------- 6

5. a. Lateral line abruptly curved downward below soft dorsal fin; 3 to 5 dark longitudional stripes along lower sides and belly, converging towards caudal peduncle. SKIPJACK TUNA. (M) Page 132
   Euthynnus pelamis (Linnaeus)

   b. Lateral line straight below soft dorsal fin or becoming wavy at, and past that point; posterodorsal portion of body with diagonal wavy lines which never pass anteroventrally below lateral line or onto belly. LITTLE TUNNY. (M) Page 132
   Euthynnus alletteratus (Rafinesque)

6. a. Dorsal fin spines 20 to 22; back with numerous dark stripes running obliquely forward. ATLANTIC BONITO. (M) Page 132
   Sarda sarda (Bloch)

   b. Dorsal fin spines 12 to 15; back without dark, oblique stripes. ---------- 7

7. a. Pectoral fin not reaching beyond a vertical from origin of second dorsal fin; total gill rakers on first arch 34 to 43. BLUEFIN TUNA. (M) Page 132
Thunnus thynnus (Linneaus)

b. Pectoral reaching beyond a vertical from origin of second dorsal fin; total gill rakers on first arch 19 to 33. ----- 8

8. a. Second dorsal and anal fins about the same height as spinous dorsal fin; total gill rakers on first arch 19 to 25. BLACKFIN TUNA. (M) Page 132
Thunnus atlanticus (Lesson)

b. Second dorsal and anal fins much higher than spinous dorsal fin; total gill rakers on first arch 27 to 33. YELLOWFIN TUNA. (M) Page 135
Thunnus albacares (Bonnaterre)

9. a. Dorsal fin spines 24 to 26; sides of body with numerous, narrow vertical, dark bars. WAHOO. (M) Page 135
Acanthocybium solanderi (Cuvier)

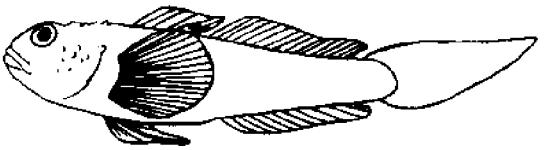
b. Dorsal fin spines 15 to 18; sides of body without numerous, vertical, dark bars. ---------- 10

10. a. Lateral line abruptly curved downward below soft dorsal fin; gill rakers on lower limb of first arch 7 to 9; dorsal fin spines 15 to 17; sides of adult without spots (young with spots). KING MACKEREL. (M) Page 135
Scomberomorus cavalla Cuvier

b. Lateral line gently curved downward below soft dorsal fin; gill rakers on lower limb of first arch 10 to 13; dorsal fin spines 17 or 18; sides of adults and young with orange or brown spots. ---------- 11

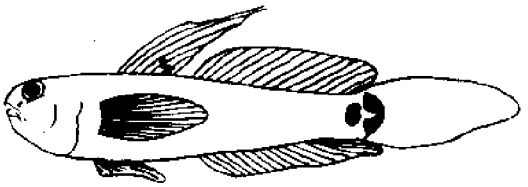
11. a. Gill rakers on lower limb of first arch 12 to 13; pectoral fins covered with scales; sides of body with spots and 1 or 2 longitudinal stripes. CERO. (M) Page 135
Scomberomorus regalis (Bloch)

b. Gill rakers on lower limb of first arch 10 to 11; pectoral fins not covered by scales; sides of body with spots but without longitudinal stripes. SPANISH MACKEREL. (M) Page 135
Scomberomorus maculatus (Mitchill)



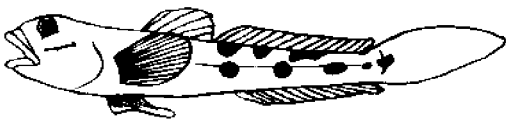
RAGGED GOBY
Bollmannia communis

SHARPTAIL GOBY
Gobionellus hastatus

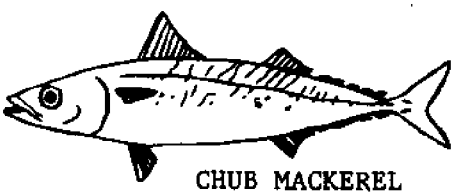


LYRE GOBY
Evorthodus lyricus

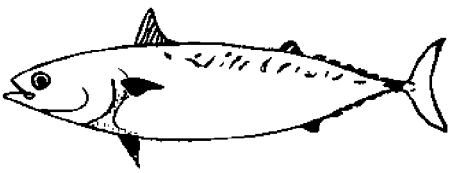
DARTER GOBY
Gobionellus boleosoma



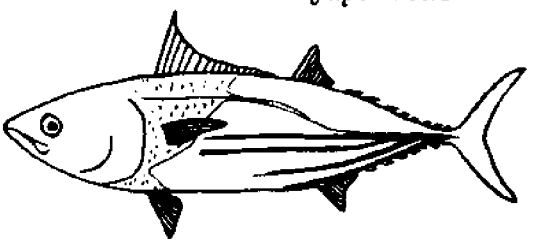
FRESHWATER GOBY
Gobionellus shufeldti



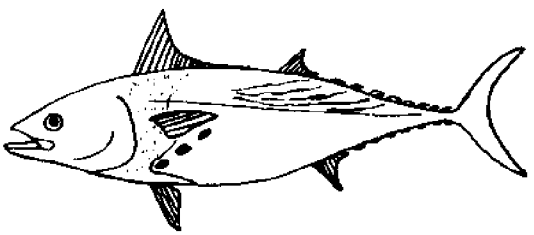
CHUB MACKEREL
Scomber japonicus



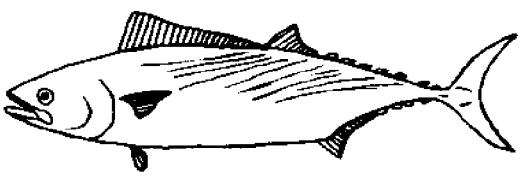
FRIGATE MACKEREL
Auxis thazard



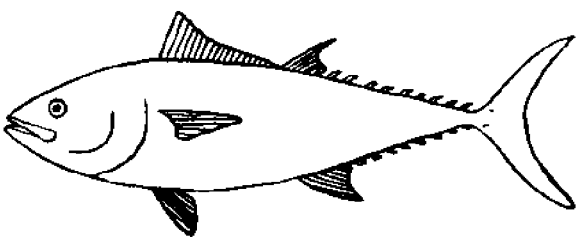
SKIPJACK TUNA
Euthynnus pelamis



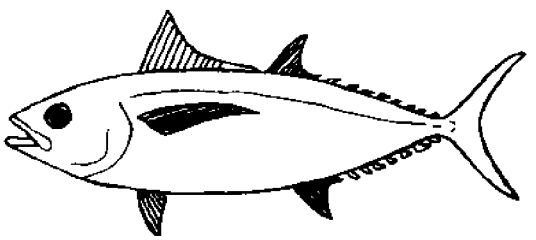
LITTLE TUNNY
Euthynnus alletteratus



ATLANTIC BONITO
Sarda sarda



BLUEFIN TUNA
Thunnus thynnus



BLACKFIN TUNA
Thunnus atlanticus

FAMILY - ISTIOPHORIDAE - BILLFISHES

Key to Species

1. a. Spinous dorsal fin greatly elevated and sail-like, some of the middle rays decidely the longest. SAILFISH. (M)
Istiophorus platypterus (Shaw and Nodder)

   b. Spinous dorsal fin moderately or not elevated, the middle rays equal to the anterior ones or much shorter. ---------- 2

2. a. Lateral line either not evident externally (large specimens) or, if discernible (small specimens, up to 30 pounds) very complex, forming hexagons on the body; anterior lobe of spinous dorsal fin usually low and pointed; flesh pale; size of large specimens reaching 2,000 pounds. BLUE MARLIN. (M)
Makaira nigricans Lacépède

   b. Lateral line visable externally as a single lateral canal which arches in the region of the pectoral fin; anterior lobe of spinous dorsal fin usually high, either rounded or pointed; flesh red; size of large specimens usually much less than 300 pounds. ---------- 3

3. a. Anus placed anteriorly, in front of anal fin origin by a distance equal to or greater than the anal fin height; dorsal fin spines 46 to 53. LONGBILL SPEARFISH. (M)
Tetrapturus pfluegeri Robins and deSylva

   b. Anus not placed anteriorly, distance between anus and anal fin origin decidedly less than anal fin height; dorsal fin spines 38 to 43. WHITE MARLIN. (M)
Tetrapturus albidus Poey

FAMILY - STROMATEIDAE - BUTTERFISHES

Key to Species

1. a. Pelvic fins absent. ---------- 2

   b. Pelvic fins present. ---------- 3

2. a. Dorsal and anal fins, especially the anal fin, greatly elongated anteriorly, the length of the longest rays much longer than head length; no pores below dorsal fin base. HARVESTFISH. (M, E)
Page 135
Peprilus alepidotus (Linnaeus)

b. Dorsal and anal fins slightly elongated anteriorly, their longest rays somewhat shorter than head length; a series of well developed and conspicuous pores present below dorsal fin base. GULF BUTTERFISH. (M, E) Page 135
Peprilus burti Fowler

3. a. Pelvic fins fan-like, attached to the abdomen for their entire length, depressible into a groove; body and fins blotched and spotted. MAN-OF-WAR FISH. (M) Page 135
Nomeus gronovii (Gmelin)

b. Pelvic fins not attached to the abdomen for their entire length, some are partially attached anteriorly and depressible into a groove. ---------- 4

4. a. Anal fin rays 15; caudal peduncle square in cross section with 2 low, ill-defined keels on each side; musculature firm. SILVER-RAG. (M) Page 135
Ariomma bondi Fowler

b. Anal fin rays 26 to 31; caudal peduncle compressed, without lateral keels; musculature flabby. BLACK RAG. (M) Page 135
Psenes pellucidus Lütken

FAMILY - SCORPAENIDAE - SCORPIONFISHES

Key to Species

1. a. Lateral line modified, consisting of a ditch-like depressions roofed over by a membranous cover, without channeled scales; supraocular and postocular spines absent. (M) Page 137
Setarches guentheri Johnson*

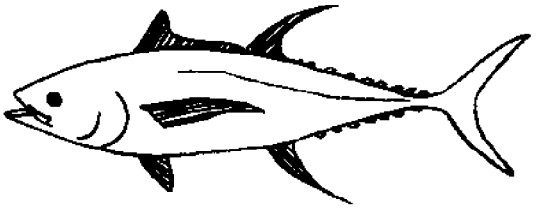
b. Lateral line normal, consisting of a series of modified channeled scales; supraocular and postocular spines present. ---------- 2

2. a. All pectoral fin rays unbranched; occiput with scales; scales ctenoid. LONGSPINE SCORPIONFISH. (M) Page 137
Pontinus longispinis Goode and Bean

b. Pectoral fin with 5 to 10 uppermost rays branched; occiput without scales; scales cycloid. ---------- 3

3. a. Preorbital with 2 spinous points above maxillary; caudal peduncle pigmented. ---------- 4

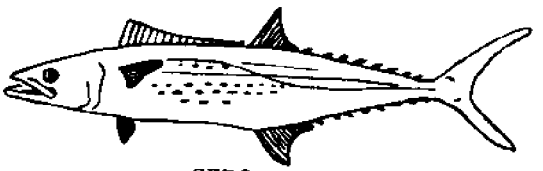
b. Preorbital usually with 3 spinous points above maxillary, if 2 spinous points present, caudal peduncle without pigment and appearing white. ---------- 5



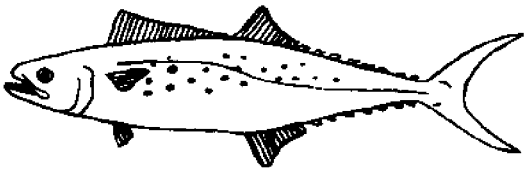
YELLOWFIN TUNA
Thunnus albacares

WAHOO
Acanthocybium solanderi

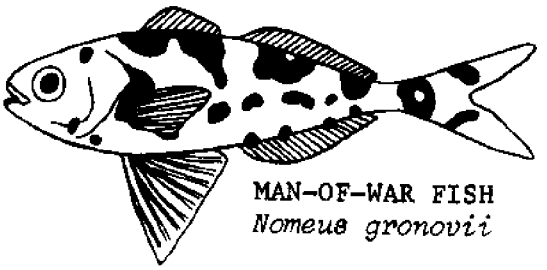
KING MACKEREL
Scomberomorus cavalla



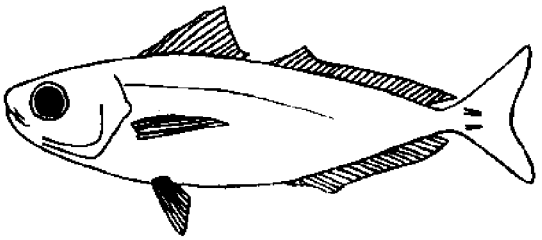
CERO
Scomberomorus regalis



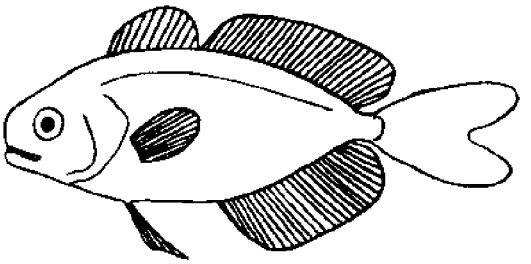
SPANISH MACKEREL
Scomberomorus maculatus



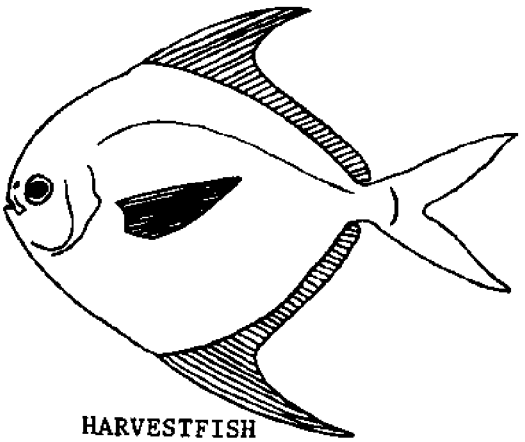
MAN-OF-WAR FISH
Nomeus gronovii



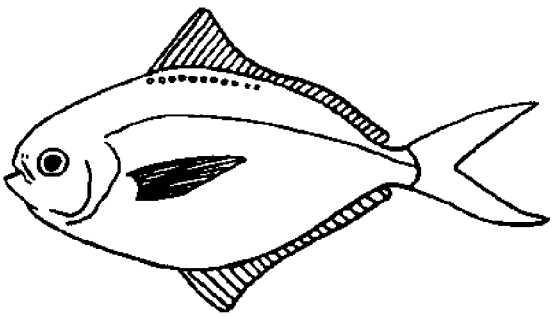
BLACK RAG
Psenes pellucidus



SILVER-RAG
Ariomma bondi



HARVESTFISH
Peprilus alepidotus



GULF BUTTERFISH
Peprilus burti

4. a. Occiput broadly depressed, without a definite pit; supplemental preopercular spine absent; lateral line scales 41 to 49. SMOOTHHEAD SCORPIONFISH. (M) Page 137
Scorpaena calcarata Goode and Bean

b. Occiput with a well developed pit; supplemental preopercular spine present; lateral line scales 50 to 62. BARBFISH. (M) Page 137
Scorpaena brasiliensis Cuvier

5. a. Region at inner lower pectoral fin angle black with white spots or irregular blotches on specimens over 30mm standard length; a pit present under anterior margin of eye, just over suborbital ridge; eye smaller than interorbital; body spotted and mottled with light and dark areas; head and anterior part of body notably tumescent; juveniles lack pigment on caudal peduncle. SPOTTED SCORPIONFISH. (M) Page 137
Scorpaena plumieri Bloch

b. Region at inner lower pectoral fin angle unmarked; no pit under eye· eye larger than interorbital; body almost plain colored; head and anterior part of body compressed; juveniles with pigmented caudal peduncle. HUNCHBACK SCORPIONFISH. (M) Page 137
Scorpaena dispar Longley and Hildebrand

FAMILY - PERISTEDIIDAE - ARMORED SEAROBINS

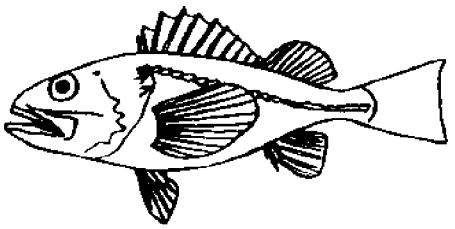
Key to Species

1. a. Rostral processes (bony projections from each side of snout) short, about equal to horizontal diameter of eye; longest barbel on lower jaw about 3 times as long as horizontal diameter of eye. ARMORED SEAROBIN. (M) Page 137
Peristedion miniatum Goode

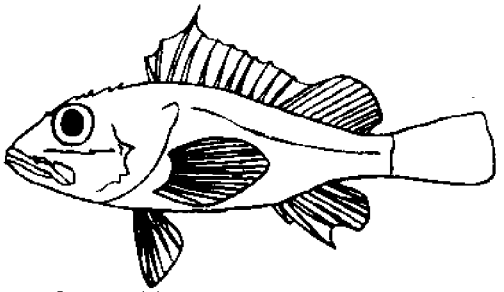
b. Rostral process longer, much longer than horizontal diameter of eye; longest barbel on lower jaw no more than twice as long as horizontal diameter of eye. ---------- 2

2. a. Body markedly robust anteriorly; outline of forehead descending abruptly and rapidly in front of eyes; longest barbel about twice as long as horizontal diameter of eye. - 3

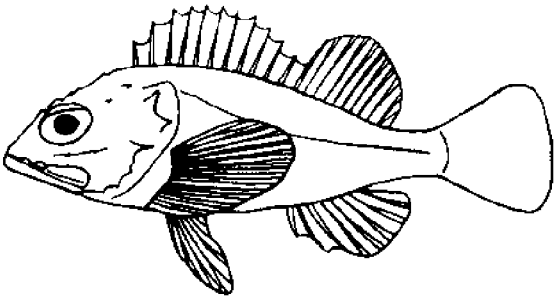
b. Body slender, not markedly robust anteriorly; forehead gently descending in front of eyes; longest barbel about equal to or barely longer than horizontal diameter of eye. SLENDER SEAROBIN. (M) Page 137
Peristedion gracile Goode and Bean



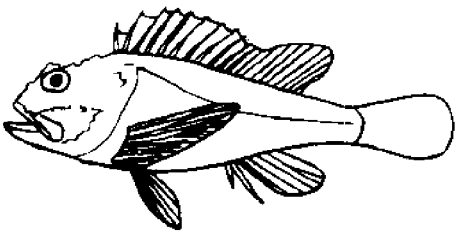
Setarches guentheri



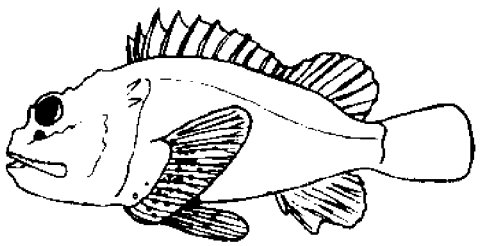
LONGSPINE SCORPIONFISH
Pontinus longispinis



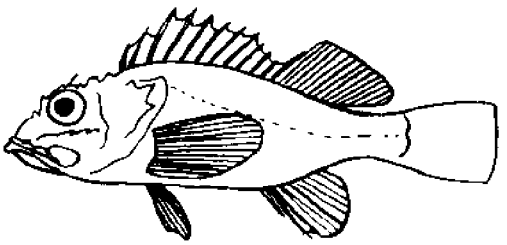
SMOOTHHEAD SCORPIONFISH
Scorpaena calcarata



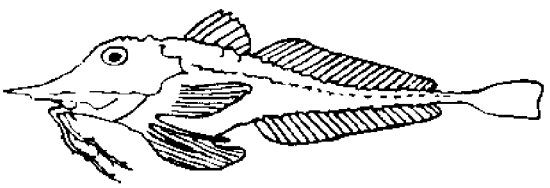
BARBFISH
Scorpaena brasiliensis



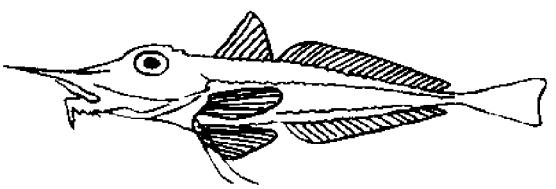
SPOTTED SCORPIONFISH
Scorpaena plumieri



HUNCHBACK SCORPIONFISH
Scorpaena dispar



ARMORED SEAROBIN
Peristedion miniatum



SLENDER SEAROBIN
Peristedion gracile

3. a. Rostral extensions strongly diverging; longest free ray of pectoral fin not reaching origin of anal fin. (M)
Peristedion longispathum (Goode and Bean)*

b. Rostral extensions only slightly diverging; longest free ray of pectoral fin reaching past origin of anal fin. PRICKLY ARMORED SEAROBIN*. (M)
Peristedion greyi Miller*

FAMILY - TRIGLIDAE - SEAROBINS

Key to Species

1. a. Dorsal fin normally with 11 spines and 11 soft rays. HORNED SEAROBIN. (M) Page 139
Bellator militaris (Goode and Bean)

b. Dorsal fin normally with 10 spines and 12 or 13 soft rays. 2

2. a. Posterior margin of pectoral fins emarginate, the middle rays shorter than those above and below. MEXICAN SEAROBIN. (M) Page 139
Prionotus paralatus Ginsburg

b. Posterior margin of pectoral fins not emarginate, either moderately convex or almost truncate. ---------- 3

3. a. Anal fin rays usually 12; dorsal fin rays usually 13. ----- 4

b. Anal fin rays usually 11; dorsal fin rays usually 12. ----- 5

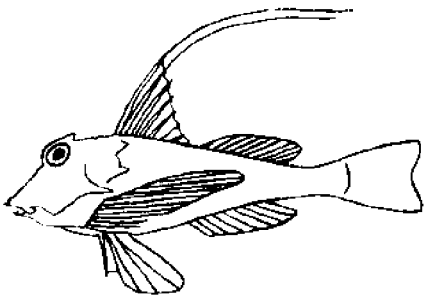
4. a. Soft dorsal, anal, and caudal fins without spots; attached pectoral fin rays usually 14; chest completely covered by scales. BARRED SEAROBIN. (M) Page 139
Prionotus martis Ginsburg

b. Soft dorsal, anal, and caudal fins covered with small dark "leopard-like" spots; attached pectoral fin rays usually 13; chest incompletely covered by scales. LEOPARD SEAROBIN. (M, E) Page 139
Prionotus scitulus Jordan and Gilbert

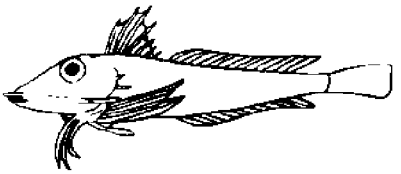
5. a. Rostral, supplemental preopercular and buccal spines normally absent, a single rostral spine may persist in some. ------- 6

b. Two rostral, supplemental preopercular and buccal spines present, the buccal may disappear with growth. ---------- 8

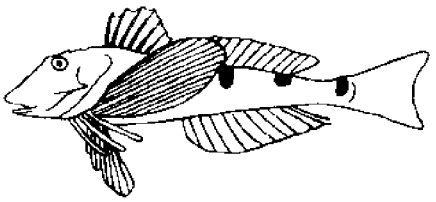
6. a. Pectoral fin short, reaching no farther than base of second anal fin ray; lateral line scales 78 to 93; gill rakers on lower limb of first arch 9 to 11. SHORTWING SEAROBIN. (M) Page 139
Prionotus stearnsi Jordan and Swain



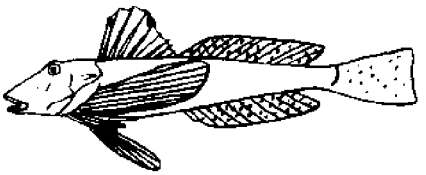
HORNED SEAROBIN
Bellator militaris



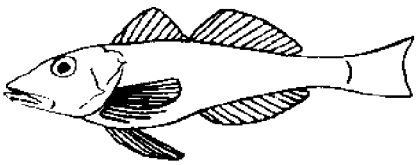
MEXICAN SEAROBIN
Prionotus paralatus



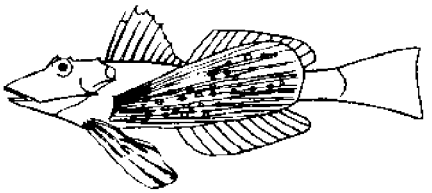
BARRED SEAROBIN
Prionotus martis



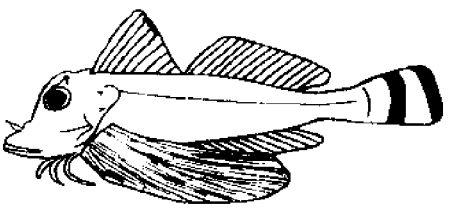
LEOPARD SEAROBIN
Prionotus scitulus



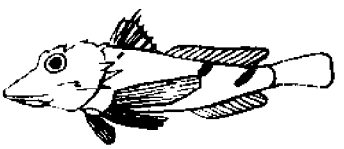
SHORTWING SEAROBIN
Prionotus stearnsi



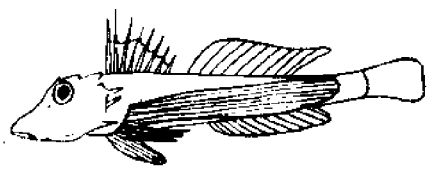
BLUESPOTTED SEAROBIN
Prionotus roseus



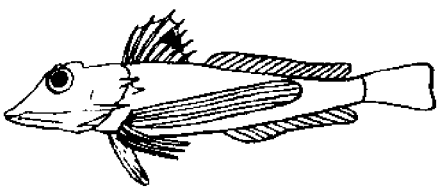
BANDTAIL SEAROBIN
Prionotus ophryas



BIGHEAD SEAROBIN
Prionotus tribulus



BLACKWING SEAROBIN
Prionotus salmonicolor



BLACKFIN SEAROBIN
Prionotus rubio

b. Pectoral fin long, reaching to a point between base of sixth and ninth anal fin rays; lateral line scales 89 to 105; gill rakers on lower limb of first arch 6 to 10. ----- 7

7. a. Attached pectoral fin rays usually 13; eye without a tentacle; nostril without a filament; gill rakers on lower limb of first arch usually 8 to 10; pectoral fin usually with blue spots. BLUESPOTTED SEAROBIN. (M) Page 139
Prionotus roseus Jordan and Evermann

b. Attached pectoral fin rays usually 14; upper part of eye with a stout tentacle; nostril with a rather long filament; gill rakers on lower limb of first arch 6 to 7; pectoral fin without blue spots. BANDTAIL SEAROBIN. (M) Page 139
Prionotus ophryas Jordan and Swain

8. a. Lateral line scales 69 to 85; diagonal black bar present before caudal peduncle. BIGHEAD SEAROBIN. (M, E) Page 139
Prionotus tribulus Cuvier

b. Lateral line scales 88 to 116; no diagonal black bar before peduncle. ---------- 9

9. a. Dorsal fin with a black spot; pectoral fin 1.8 to 2.5 in standard length; lateral line scales 88 to 106. BLACKFIN SEAROBIN. (M) Page 139
Prionotus rubio Jordan

b. Dorsal fin without a black spot; pectoral fin 1.4 to 1.8 in standard length; lateral line scales 103 to 115. BLACKWING SEAROBIN. (M) Page 139
Prionotus salmonicolor Fowler

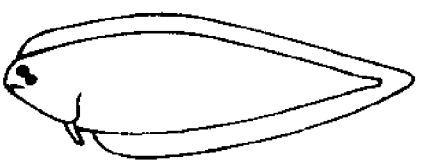
ORDER - PLEURONECTIFORMES - (HETEROSOMATA)

KEY TO FAMILIES

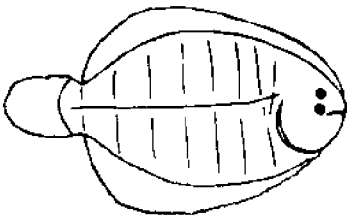
1. a. One or both pectoral fins absent; margin of preopercle not free. ---------- 2

b. Both pectoral fins present; margin of preopercle free. ---- 3

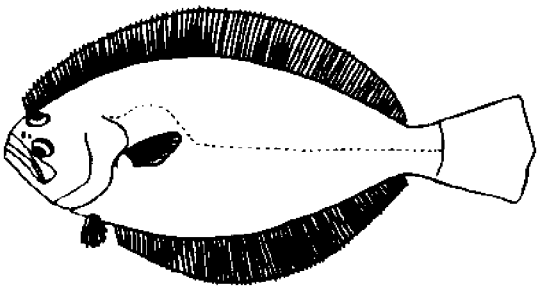
2. a. Eyes on left side of head (sinistral); median fins continuous with caudal fin; lateral line absent; both pectoral fins absent in adult. TONGUEFISHES. (M, E)
CYNOGLOSSIDAE. Page 146



b. Eyes on right side of head (dextral); median fins separate from caudal fin; lateral line present or absent. SOLES. (M, E)
SOLEIDAE. Page 146



3. a. Eyes on left side of head (sinistral). LEFTEYE FLOUNDERS. (M, E)
BOTHIDAE. Page 141



b. Eyes on right side of head (dextral). RIGHTEYE FLOUNDERS. (M)
PLEURONECTIDAE
One species in Texas waters. (M)
Poecilopsetta beani Goode*

FAMILY - BOTHIDAE - LEFTEYE FLOUNDERS

Key to Species

1. a. Pelvic fins asymmetrical, that of eyed side inserted on the ventral midline. ---------- 2

   b. Pelvic fins symmetrical, both inserted the same distance from the ventral midline. ---------- 12

2. a. Lateral line with a distinct anterior arch. ---------- 3

   b. Lateral line not arched anteriorly. ---------- 5

3. a. Scales cycloid; base of pelvic fin long, reaching to near urohyal; dorsal fin rays 64 to 71. WINDOWPANE. (M)
Scophthalmus aquosus (Mitchill)

b. Scales ctenoid; base of pelvic fin short, not reaching urohyal; dorsal fin rays more than 75. ---------- 4

4. a. Gill rakers long and slender; anal fin rays 69 to 75; dorsal fin rays 89 to 95. SASH FLOUNDER. (M) Page 143
Trichopsetta ventralis (Goode and Bean)

b. Gill rakers very short; anal fin rays 60 to 67; dorsal fin rays 74 to 83. SPINY FLOUNDER. (M) Page 143
Engyophrys senta Ginsburg

5. a. Dorsal, anal, and caudal fins with large, round spots, the spots as large as or usually larger than the eye. --------- 6

b. Dorsal, anal, and caudal fins without large, round spots. - 7

6. a. Lateral line scales firmly attached, 83 to 88; posterior margin of left pectoral fin oblique; no large spot in center of caudal fin (3 spots on distal edge); large black blotch present on side under ocular pectoral fin. MEXICAN FLOUNDER. (M) Page 143
Cyclopsetta chittendeni Bean

b. Lateral line scales deciduous, 69 to 71; posterior margin of pectoral fin subtruncate; large black spot present in center of caudal fin (3 smaller spots may be on distal edge); pectoral fin of ocular side with a large black blotch on its distal edge. SPOTFIN FLOUNDER. (M) Page 143
Cyclopsetta fimbriata (Goode and Bean)

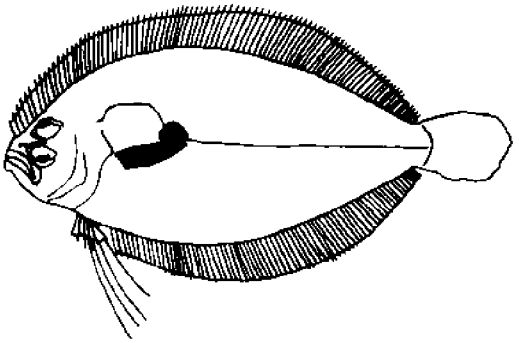
7. a. Upper jaw very short, its length about 25% of head length; maxillary reaching posteriorly to anterior edge of lower eye. FRINGED FLOUNDER. (M, E) Page 143
Etropus crossotus Jordan and Gilbert

b. Upper jaw larger, its length usually greater than 35% of head length; maxillary reaching posteriorly to at least middle of lower eye. ---------- 8

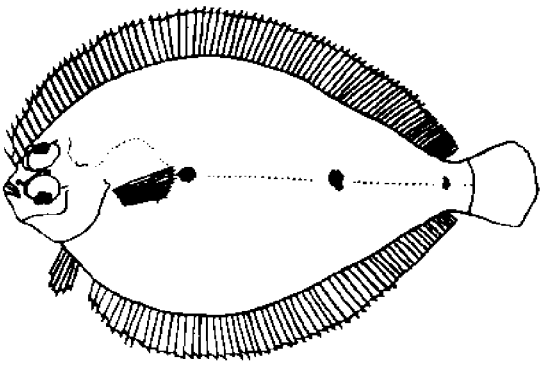
8. a. Teeth of upper jaw in 2 rows; eyes widely separated in some, but snout and anterior orbital rim never with conspicuous spines. ---------- 9

b. Teeth of upper jaw in a single row; eyes usually close together, if widely separated, snout and anterior orbital rims with conspicuous spines. ---------- 10

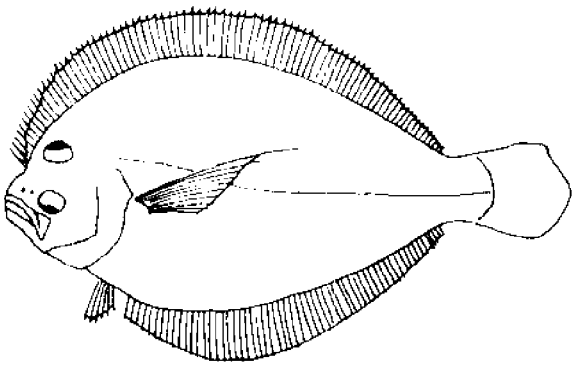
9. a. Body depth 48 to 55% of standard length; dorsal fin rays 74 to 85; anal fin rays 59 to 68; gill rakers moderately long and thick. SHOAL FLOUNDER. (M) Page 143
Syacium gunteri Ginsburg



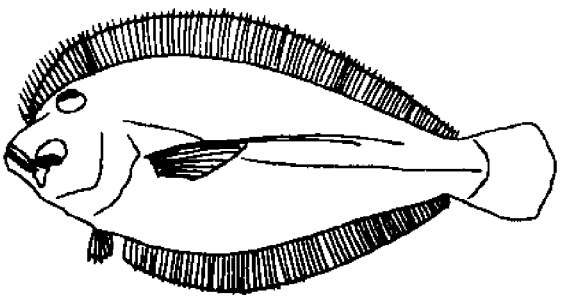
SASH FLOUNDER
Trichopsetta ventralis



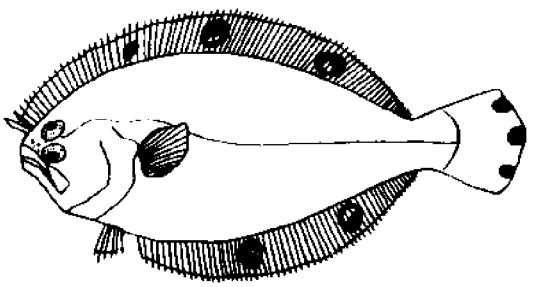
SPINY FLOUNDER
Engyophrys senta



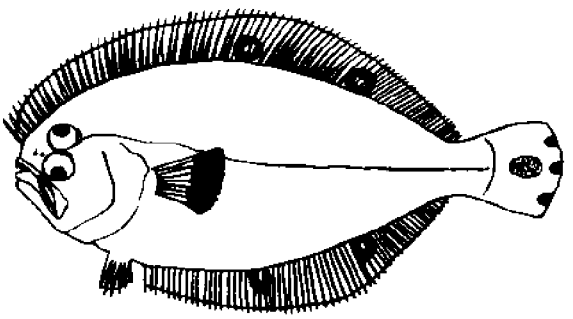
SHOAL FLOUNDER
Syacium gunteri



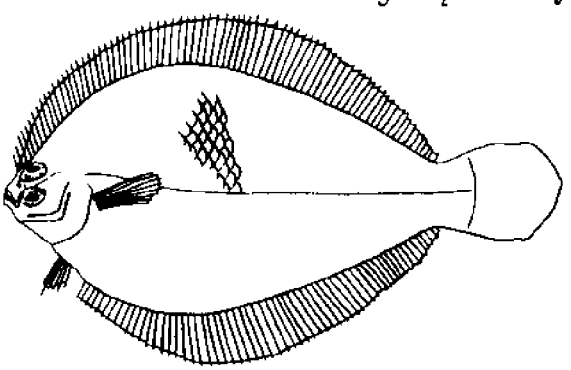
DUSKY FLOUNDER
Syacium papillosum



MEXICAN FLOUNDER
Cyclopsetta chittendeni



SPOTFIN FLOUNDER
Cyclopsetta fimbriata



FRINGED FLOUNDER
Etropus crossotus

b. Body depth usually 45% or less of standard length (rarely to 47%); dorsal fin rays 82 to 94; anal fin rays 64 to 75; gill rakers short and stout. DUSKY FLOUNDER. (M) Page 143
Syacium papillosum (Linnaeus)

10. a. Spaces between first 3 rays of dorsal fin obviously greater than the remaining spaces; adult males with widely separated eyes and prominent head spines on snout and anterior orbital rims. HORNED WHIFF. (M) Page 145
Citharichthys cornutus (Günther)

b. All spaces between rays of dorsal fin about equal; head and snout never with prominent spines. ---------- 11

11. a. Dorsal profile of head convex; first ray of dorsal fin may be slightly longer than other anterior rays and detached from them; body and fins profusely spotted. SPOTTED WHIFF. (M) Page 145
Citharichthys macrops Dresel

b. Dorsal profile of head slightly concave; first ray of dorsal fin usually shorter than other anterior rays; body and fins with or without spotting. BAY WHIFF. (M) Page 145
Citharichthys spilopterus Günther

12. a. Scales ctenoid; 3 or 4 ocellated spots with white centers present on ocular side; left pelvic fin produced. --------- 13

b. Scales cycloid; ocellated spots, if present, without white centers; left pelvic fin subequal to right. ---------- 14

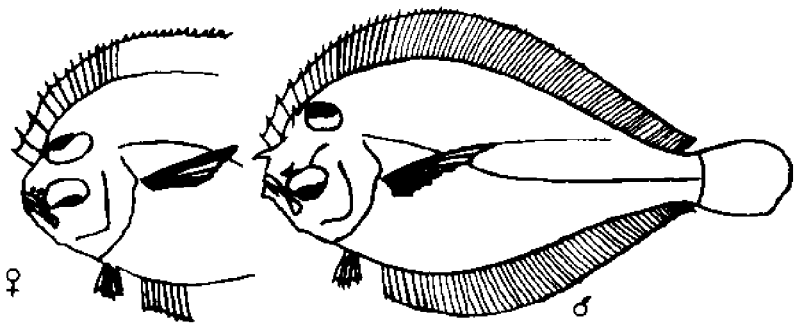
13. a. Pelvic fin on ocular side about as long or longer than head, at least twice as long as that of blind side; 3 ocellated spots on ocular side; dorsal fin rays 68 to 79; anal rays 53 to 60. THREE-EYE FLOUNDER. (M) Page 145
Ancylopsetta dilecta (Goode and Bean)

b. Pelvic fin on ocular side less than 1/2 as long as head, not much longer than that of blind side; 4 ocellated spots on ocular side; dorsal fin rays 67 to 76; anal rays 54 to 61. OCELLATED FLOUNDER. (M, E) Page 145
Ancylopsetta quadrocellata Gill

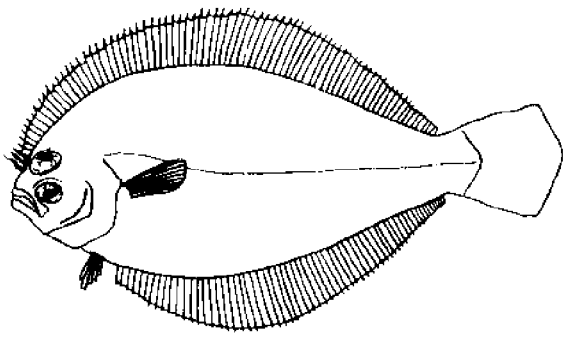
14. a. Ocular side of body with 3 small prominent ocellated spots. 15

b. Ocular side of body without ocellated spots. ---------- 16

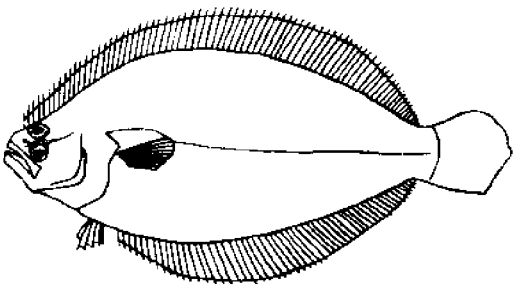
15. a. Interorbital region a flat space, eyes well separated; anal fin rays 53 to 63; gill rakers on lower limb of first arch 9 to 12. GULF FLOUNDER. (M, E) Page 145
Paralichthys albigutta Jordan and Gilbert



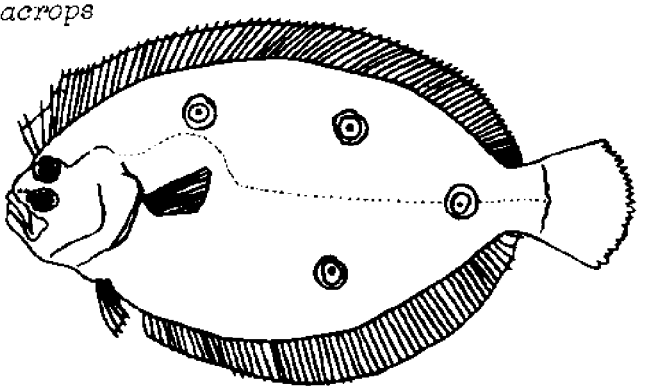
HORNED WHIFF
Citharichthys cornutus



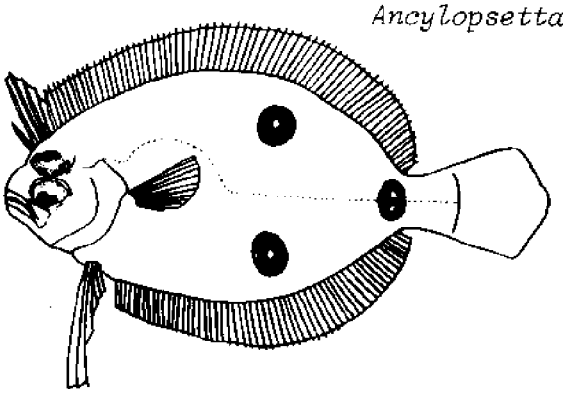
SPOTTED WHIFF
Citharichthys macrops



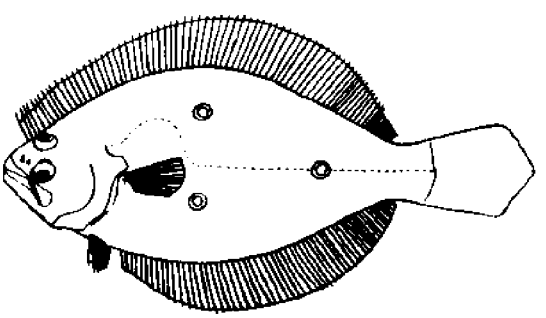
BAY WHIFF
Citharichthys spilopterus



OCELLATED FLOUNDER
Ancylopsetta quadrocellata



THREE-EYE FLOUNDER
Ancylopsetta dilecta



GULF FLOUNDER
Paralichthys albigutta

b. Interorbital region reduced to a narrow ridge; eyes very close together; anal fin rays 67-69; gill rakers on lower limb of first arch 8 or 9. (M)
Paralichthys triocellatus Ribeiro*

16. a. Lateral line scales about 115; body deep, more than 47% of standard length; gill rakers on lower limb of first arch 13 to 16. BROAD FLOUNDER. (M) Page 147
Paralichthys squamilentus Jordan and Gilbert

b. Lateral line scales 85 to 100; body moderately deep, 47% of standard length or less; gill rakers on lower limb of first arch 10 to 13. SOUTHERN FLOUNDER. (M, E) Page 147
Paralichthys lethostigma Jordan and Gilbert

FAMILY - SOLEIDAE - SOLES

Key to Species

1. a. Body naked. FRINGED SOLE. (M)
Gymnachirus texae Gunter

b. Body with scales. ---------- 2

2. a. Right pectoral fin present; neither eye in advance of the other. LINED SOLE. (M, E) Page 147
Achirus lineatus (Linnaeus)

b. Right pectoral fin absent; upper eye in advance of lower. HOGCHOKER. (M, E) Page 147
Trinectes maculatus (Bloch and Schneider)

FAMILY - CYNOGLOSSIDAE - TONGUEFISHES

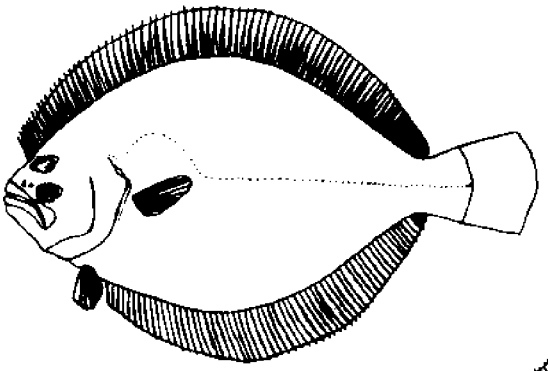
Key to Species

1. a. Dorsal fin rays 72 to 84; anal fin rays 56 to 68. -------- 2

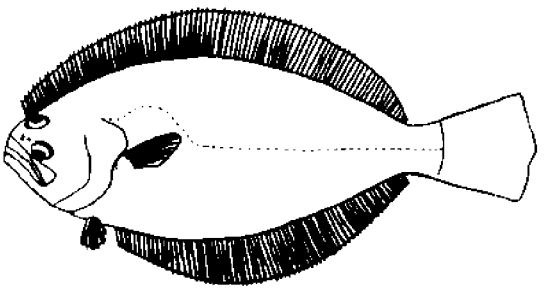
b. Dorsal fin rays 85 to 101; anal fin rays 69 to 85. -------- 3

2. a. Caudal fin rays 10 to 11; length of caudal fin 6.5 to 7.7 in standard length. PYGMY TONGUEFISH. (M)
Symphurus parvus Ginsburg

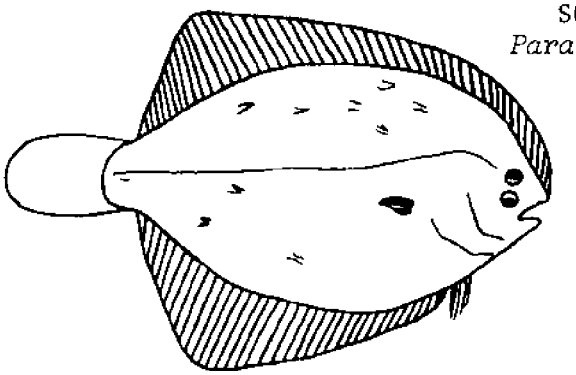
b. Caudal fin rays 12; length of caudal fin 5.7 in standard length. LONGTAIL TONGUEFISH. (M)
Symphurus pelicanus Ginsburg



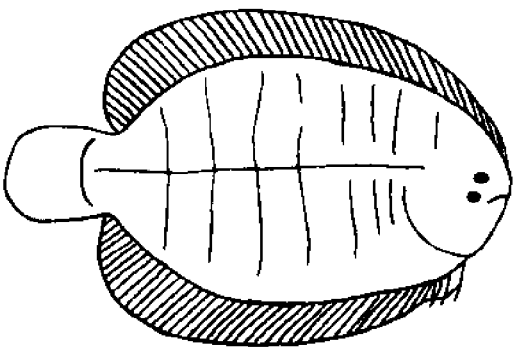
BROAD FLOUNDER
Paralichthys squamilentus



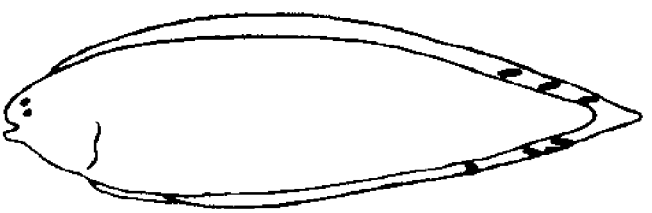
SOUTHERN FLOUNDER
Paralichthys lethostigma



LINED SOLE
Achirus lineatus



HOGCHOKER
Trinectes maculatus



SPOTTEDFIN TONGUEFISH
Symphurus diomedianus

3. a. Caudal fin rays normally 10. ---------- 4

   b. Caudal fin rays normally 12. ---------- 5

4. a. Vertical scale rows along body 86 to 98; dorsal and anal fins with definite spots posteriorly, well marked in light colored specimens, obscure in dark colored fish; no black spot on opercle. SPOTTEDFIN TONGUEFISH. (M) Page 147
   Symphurus diomedianus (Goode and Bean)

   b. Vertical scale rows along body 71 to 86; dorsal and anal fins without well-marked spots; many specimens having a black spot on opercle. BLACKCHEEK TONGUEFISH. (M, E)
   Symphurus plagiusa (Linnaeus)

5. a. Teeth extending over the greater part of the lower jaw on ocular side. DEEPWATER TONGUEFISH. (M)
   Symphurus piger (Goode and Bean)

   b. Teeth absent on lower jaw on ocular side. OFFSHORE TONGUEFISH. (M)
   Symphurus civitatus Ginsburg

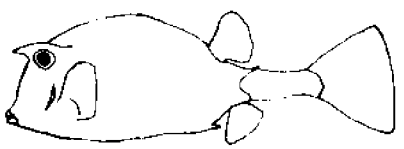
ORDER - TETRAODONTIFORMES (PLECTOGNATHI)

KEY TO FAMILIES

1. a. Jaws with distinct teeth. ---------- 2

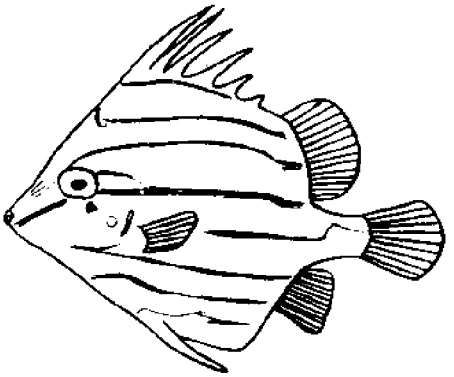
   b. Jaws without distinct teeth, but modified into a short beak having an enamel-like covering. ---------- 5

2. a. Spinous dorsal fin absent; body "box-shaped" and covered by immovable hexagonal bony plates with only the jaws, fins, and tail free. BOXFISHES. (M)
   OSTRACIIDAE
   One species in Texas waters. SCRAWLED COWFISH. (M)
   Acanthostracion quadricornis (Linnaeus)
   (=*Lactophrys quadricornis* in AFS, 1970)



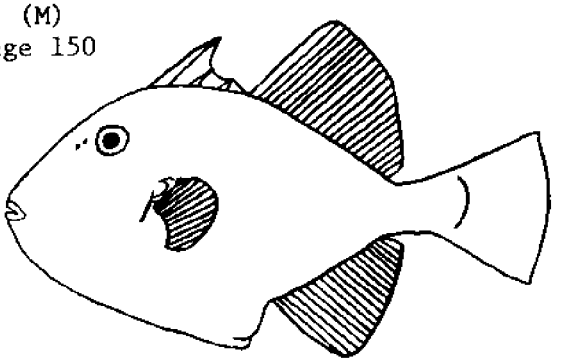
   b. Spinous dorsal fin present; body covered with scales or movable bony plates. ---------- 3

3. a. Pelvic fins formed into two large spines. SPIKEFISHES. (M)
TRIACANTHODIDAE
One species in Texas waters. JAMBEAU. (M)
*Paraholl*ardia *lineata* (Longley)

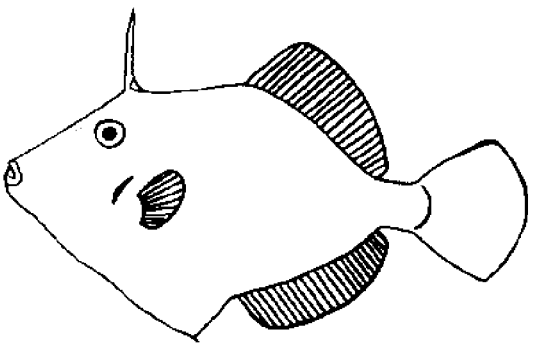


b. Pelvic fins absent or the pair united to form a single spine. ---------- 4

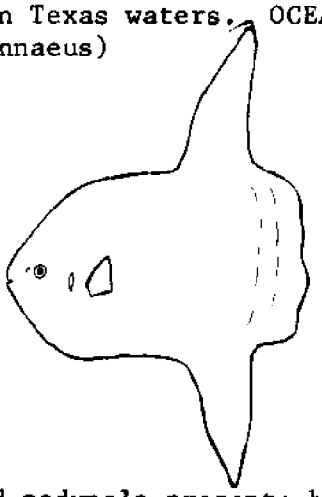
4. a. First dorsal fin with 3 spines; scales comparatively large, bony, rough, forming a very flexible coat of mail.
TRIGGERFISHES. (M)
BALISTIDAE. Page 150



b. First dorsal fin with one or two spines; scales minute, not bony, appearing velvety. FILEFISHES. (M)
MONACANTHIDAE (=BALISTIDAE, in part, in AFS, 1970) Page 151

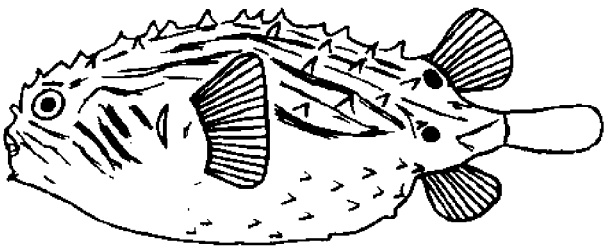


5. a. Caudal fin and peduncle absent; body compressed. MOLAS. (M)
MOLIDAE
One species in Texas waters. OCEAN SUNFISH. (M)
Mola mola (Linnaeus)

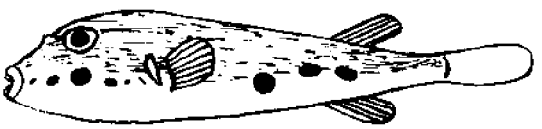


b. Caudal fin and peduncle present; body rotund and capable of great inflation. ---------- 6

6. a. Body covered with prominent spines; beak not divided in either jaw. PROCUPINEFISHES. (M)
DIODONTIDAE. Page 154



b. Body naked or with small spines or prickles; beak divided bilaterally in front of each jaw. PUFFERS. (M, E)
TETRAODONTIDAE. Page 153



FAMILY - BALISTIDAE - TRIGGERFISHES

Key to Species

1. a. Gill opening with two or more enlarged scales or plates behind it; pelvic process with a flexible joint. ---------- 2

b. Gill opening with only ordinary scales behind it; pelvic process not flexible. ---------- 4

2. a. About 8 to 10 horizontal rows of ridged scales bearing anteriorly directed spines along sides of and just forward of caudal peduncle; anal fin rays 29 to 31; dorsal fin rays 31 to 35; pectoral fin rays 15 to 17. BLACK TRIGGERFISH. (M) Page 152
Melichthys niger (Bloch)

b. No horizontal rows of ridged scales bearing anteriorly directed spines; anal fin rays 23 to 28. ---------- 3

3. a. Head with two prominent dark bands on cheek; anal fin rays 27 to 28; dorsal fin rays 29 to 31. QUEEN TRIGGERFISH. (M) Page 152
Balistes vetula Linnaeus

b. Head without prominent bands on cheek; anal fin rays 23 to 26; dorsal fin rays 26 to 29. GRAY TRIGGERFISH. (M) Page 152
Balistes capriscus Gmelin

4. a. Scales on cheek fused together in horizontal rows, between which are narrow and parallel naked areas or grooves; least distance from eye to first dorsal fin spine 8 to 10% standard length; peduncle depth 7 to 8% standard length. SARGASSUM TRIGGERFISH. (M) Page 152
Xanthichthys ringens (Linnaeus)

b. Cheek competely covered by scales, without horizontal grooves; least distance from eye to first dorsal fin spine 12 to 18% standard length; peduncle depth 10 to 15% standard length. ---------- 5

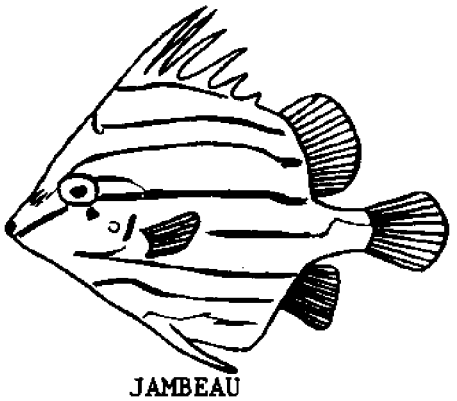
5. a. Dorsal fin rays 25 to 28; anal fin rays 23 to 25. OCEAN TRIGGERFISH. (M) Page 152
Canthidermis sufflamen (Mitchill)

b. Dorsal fin rays 23 to 25; anal fin rays 20 to 22. ROUGH TRIGGERFISH. (M) Page 152
Canthidermis maculatus (Bloch)

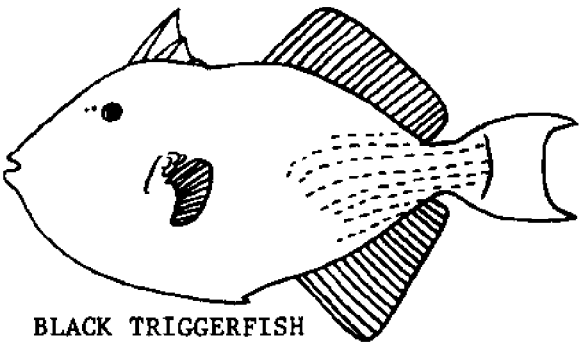
FAMILY - MONACANTHIDAE - FILEFISHES

1. a. Pelvic bone with a prominent external spine; anal fin rays 29 to 35. ---------- 2

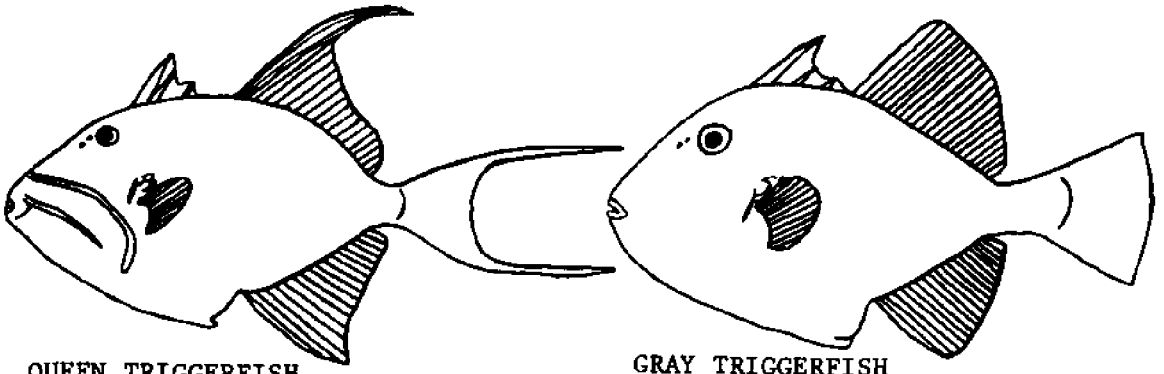
b. Pelvic bone without an external spine or with only a very small rudimentary barbed spine present; anal fin rays 35 to 52. ---------- 3



JAMBEAU
Parahollardia lineata

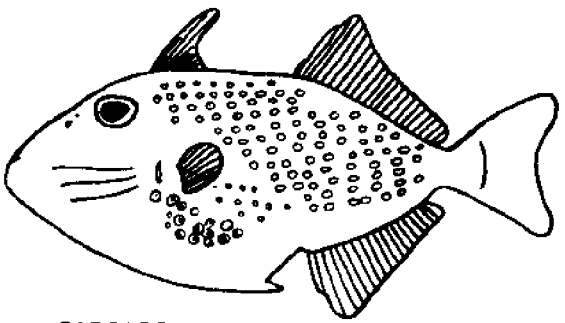


BLACK TRIGGERFISH
Melichthys niger

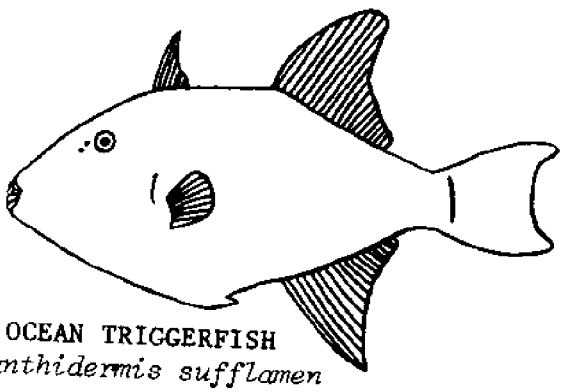


QUEEN TRIGGERFISH
Balistes vetula

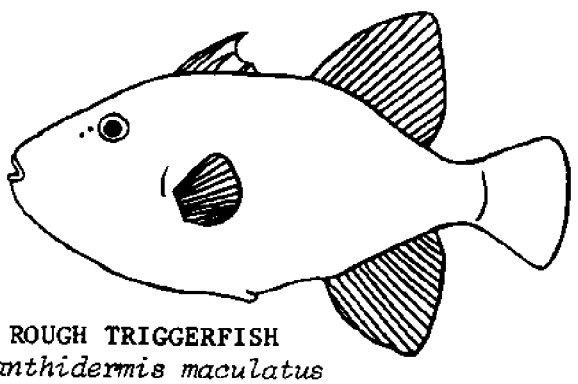
GRAY TRIGGERFISH
Balistes capriscus



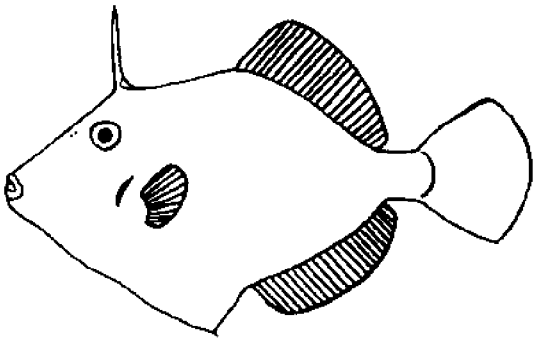
SARGASSUM TRIGGERFISH
Xanthichthys ringens



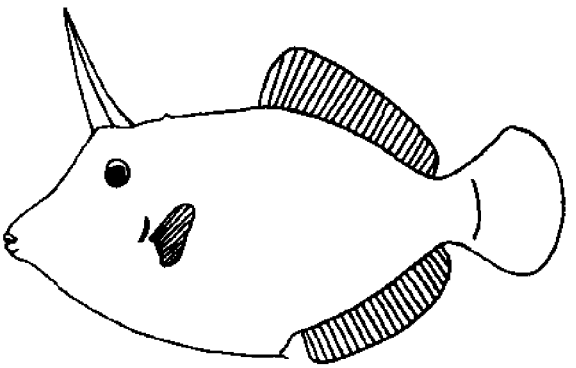
OCEAN TRIGGERFISH
Canthidermis sufflamen



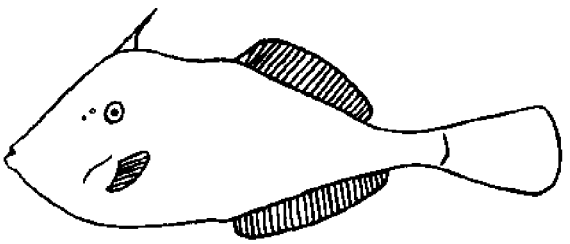
ROUGH TRIGGERFISH
Canthidermis maculatus



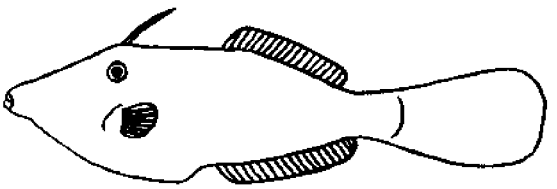
PLANEHEAD FILEFISH
Monacanthus hispidus



ORANGESPOTTED FILEFISH
Cantherhines pullus

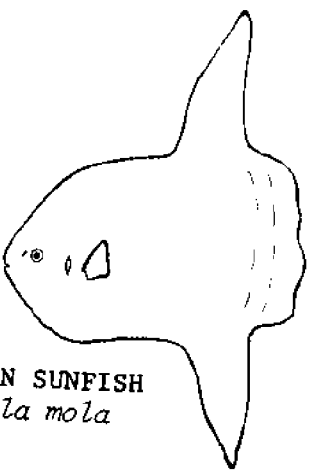


ORANGE FILEFISH
Aluterus schoepfi



SCRAWLED FILEFISH
Aluterus scriptus

SCRAWLED COWFISH
Acanthostracion quadricornis



OCEAN SUNFISH
Mola mola

2. a. Pelvic spines movable; first dorsal fin spine inserted over posterior part of eye; no deep groove behind dorsal fin spines. PLANEHEAD FILEFISH. (M, E) Page 153
Monacanthus hispidus (Linnaeus)

b. Pelvic spine not movable; first dorsal fin spine inserted over anterior part of eye; a deep groove present behind the dorsal fin spines into which they can be depressed. ORANGE-SPOTTED FILEFISH. (M) Page 153
Cantherhines pullus (Ranzani)

3. a. Dorsal fin rays 43 to 49; anal fin rays 46 to 52; pectoral fin rays 13 to 15. SCRAWLED FILEFISH. (M) Page 153
Aluterus scriptus (Osbeck)

b. Dorsal fin rays 32 to 39; anal fin rays 35 to 41; pectoral fin rays 11 to 14. ORANGE FILEFISH. (M) Page 153
Aluterus schoepfi (Walbaum)

FAMILY - TETRAODONTIDAE - PUFFERS

Key to Species

1. a. Dorsal and anal fins with 12 to 15 rays; lower sides of caudal peduncle with a cutaneous fold. SMOOTH PUFFER. (M, E) Page 156
Lagocephalus laevigatus (Linnaeus)

b. Dorsal and anal fins with 6 to 8 rays; lower sides of caudal peduncle without a distinct fold. ---------- 2

2. a. Lappets (small fleshy tabs) present on body, either one black pair located side by side on the back about 1/2 the distance between the posterior part of the orbits and the dorsal fin origin, or many tan lappets (most easily seen when specimens are immersed in water) scattered on the posteriolateral and dorsolateral surfaces. ---------- 3

b. Lappets absent. ---------- 4

3. a. One pair of black lappets in front of dorsal fin origin; cheeks often marbled; from 1 to 5 poorly defined dark blotches present on the lateral body surface posterior to the pectoral fin. MARBLED PUFFER. (M) Page 156
Sphoeroides dorsalis Longley

b. Many tan lappets present on the posterior portions of the body, usually concentrated near the ventrolateral body angle; no marbled pattern on cheeks; 5 to 8 (usually 6 to 7) sharply defined, rounded lateral spots posterior to the pectoral fin and bordering the ventrolateral body angle. BANDTAIL PUFFER. (M) Page 156
Sphoeroides spengleri (Bloch)

4. a. One or two distinct, white, interorbital bars, the posterior bar often connected by a perpendicular posterior extension to a pattern of coarse white arches and circular markings on the dorsal surface. CHECKERED PUFFER. (M) Page 156
Sphoeroides testudineus (Linnaeus)

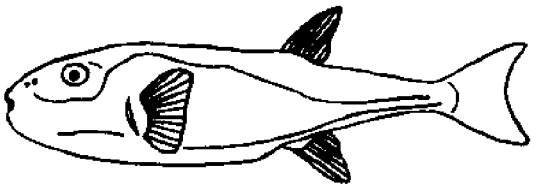
   b. One vague, dark interorbital bar; no pattern of coarse white arches on the dorsal surface. LEAST PUFFER. (M, E) Page 156
Sphoeroides parvus Shipp and Yerger

FAMILY - DIODONTIDAE - PORCUPINEFISHES

Key to Species

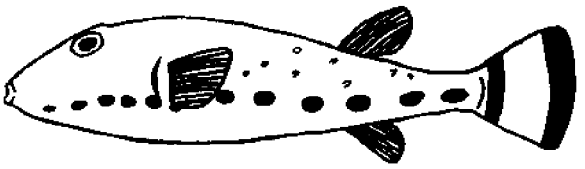
1. a. Body spines slender, movable, and two-rooted. PORCUPINEFISH. (M) Page 156
Diodon hystrix Linnaeus

   b. Body spines stout, immovable, and three-rooted. STRIPED BURRFISH. (M) Page 156
Chilomycterus schoepfi (Walbaum)

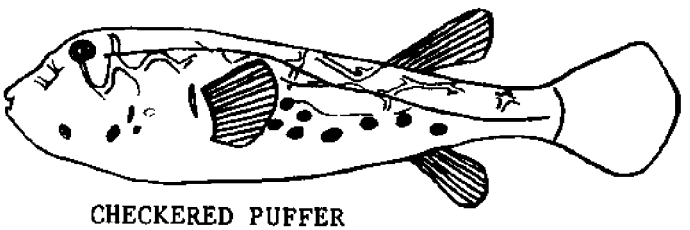


SMOOTH PUFFER
Lagocephalus laevigatus

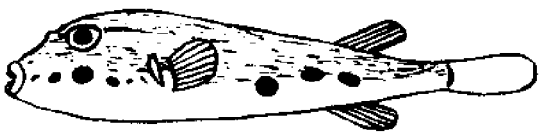
MARBLED PUFFER
Sphoeroides dorsalis



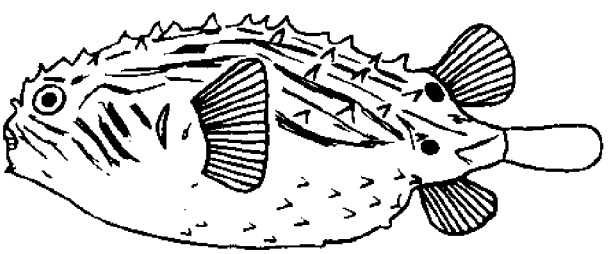
BANDTAIL PUFFER
Sphoeroides spengleri



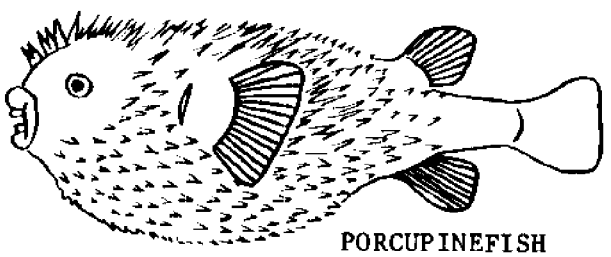
CHECKERED PUFFER
Sphoeroides testudineus



LEAST PUFFER
Sphoeroides parvus



STRIPED BURRFISH
Chilomycterus schoepfi



PORCUPINEFISH
Diodon hystrix

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