

Guide to

NORTHEAST PACIFIC Flatfishes

Families Bothidae, Cynoglossidae, and Pleuronectidae

Second Edition

**Donald E. Kramer • William H. Barss
Brian C. Paust • Barry E. Bracken**

Illustrated by Terry Josey



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Second Edition

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Dark Flounder (<i>Pleuronectes obscurus</i>)	76
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English Sole (<i>Parophrys vetulus</i>)	84
C-O Sole (<i>Pleuronichthys coenosus</i>)	86
Curlfin Sole (<i>Pleuronichthys decurrens</i>)	88
Spotted Turbot (<i>Pleuronichthys ritteri</i>)	90
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Preface

The primary purpose of this guide is to simplify the identification of flatfish found along the Pacific coast of North America. It is intended for those who do not have the experience or the time to use a scientific key for identification. The guide is useful for commercial fishermen, fish processors, and fisheries managers. Recreational fishermen can use the photographs and illustrations to identify the species they see. Divers who don't collect fish for later identification will also find the book helpful. The book is printed on water resistant paper to withstand hard wear and wet conditions.

While the guide is primarily for identification of flatfish species in Alaska waters, it includes all species along the Pacific coast of North America south to the California–Baja California border. Thirty of the forty species in this book have been reported in Alaska waters—by adding nine species the authors have extended the guide's utility over a much larger area.

Species are arranged in the book by family rather than by color or other physical character, and families are arranged alphabetically: Bothidae, Cynoglossidae, and Pleuronectidae. Users of the guide can page through the book and select all possibilities for the specimen to be identified, then determine the correct name by using the distinguishing characters in the illustrations and photos. As an aid to narrowing the possibilities, species lists based on anal spine, lateral line shape, and length of the accessory dorsal branch are presented on pages 7–9.

This guide does not include a key to flatfishes. Keys can be found in *Fishes of Alaska*, by C. Mecklenburg et al.; *Pacific Fishes of Canada*, by J.S. Hart; and *Guide to the Coastal Marine Fishes of California*, by D.J. Miller and R.N. Lea.

We hope this guide is of practical use to the fishing industry. We also hope recreational fishermen and divers can find greater enjoyment in their sport by being able to identify the flatfish they see or catch.

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Bill Barss has been a marine fish and wildlife biologist with the Oregon Department of Fish and Wildlife since 1971, working with groundfish management and research. In recent years his duties have involved underwater research with submersibles and the Pacific whiting fishery. His many publications on groundfish include a booklet on rockfish identification. He is currently north/central coast supervisor, resource monitoring and sampling.

Brian Paust worked with the Alaska Sea Grant Program in several capacities from 1978 to 2002. He has conducted a variety of practical commercial fisheries research projects and has published materials ranging from octopus fisheries to business strategies used in the development of coldwater bivalve aquaculture. Paust retired after serving as professor at the University of Alaska Fairbanks and marine advisory agent in Petersburg, Alaska.

Barry Bracken held a number of positions with the Alaska Department of Fish and Game from 1967 to 1995. As Region 1 Groundfish Project leader, he had research and management responsibility for state-managed groundfish in the eastern Gulf of Alaska. Bracken was on the North Pacific Fishery Management Council's Gulf of Alaska Groundfish Team and the Canada/U.S. Groundfish Technical Subcommittee.

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Introduction

Flatfishes are unique in that the skull is asymmetrical with both eyes on the same side of the head. Flatfish begin life like symmetrical fish, with an eye on each side of the head. A few days after hatching, one eye begins to migrate and soon both eyes are close together on one side. Flatfish spend the rest of their lives on or near the bottom with the eyed side facing up. The blind side is usually a paler color (most often white or off-white) than the eyed side. If the right eye migrates to the left side, the flatfish is left-eyed (sinistral). If the left eye migrates to the right side, the fish is right-eyed (dextral).

Flatfish are in the order Pleuronectiformes (sometimes called Heterosomata). Worldwide there are more than 500 species of flatfishes, in six or seven families. Flatfishes include flounders, soles, turbot, halibut, sanddabs, plaice, and tonguefishes. These names do not indicate that a fish belongs to a specific family; for example, species referred to as sole occur in Bothidae, Pleuronectidae, and Soleidae. Flatfishes found in North American waters are in two broad categories—one includes the families Bothidae and Pleuronectidae, and the other includes the families Cynoglossidae and Soleidae.

The Bothidae is a very large family with more than 200 species, seven of which are found along the Pacific coast of North America. The family is called the left-eyed flounders because the eyes and dark color typically are on the left side. However, in two of the seven Pacific coast species (California halibut and fantail sole), the eyes can be on the left side or the right side. The Bothidae are closely related to the Pleuronectidae.

The Cynoglossidae is made up of about 100 species of tonguefishes. Their eyes are on the left side and the dorsal and anal fins are joined to the pointed caudal fin. Only one species in the family occurs along the Pacific coast of North America, the California tonguefish. Cynoglossidae species are closely related to Soleidae; in fact the American Fisheries Society lists all members of the two families in Soleidae. Soleidae also includes species with the eyes on the right side and a distinct caudal fin that is not pointed.

The Pleuronectidae is composed of right-eyed flounders, with the eyes and dark color usually on the right side. This family includes about 100 species, 31 of which are found along the Pacific coast of North America. Only one of the 31 species (the starry flounder) regularly has the eyes on either the left or right side of the head. The Pacific halibut occasionally breaks the rule and is left-eyed.

Using This Guide to Identify Flatfish

The purpose of this guide is to provide enough information to easily identify flatfish, without using a scientific key. The photographs and illustrations showing the important features of each species can be used to identify a fish. The labeled illustrations of flatfish on pages 3–6 serve as a basis for interpreting species descriptions and illustrations throughout the book. They show external characters, how flatfish are measured, pelvic fin symmetry, caudal fin shape, and mouth position.

Three features that are easy to check can be used to narrow the range of possibilities for an unknown fish. These features are the anal spine, shape of the lateral line, and presence or absence of an accessory dorsal branch.

The anal spine is located at the front of the anal fin. It points toward the head of the fish, and may be strong or weak and exposed or embedded. Locate the anal spine by running a finger back along the abdominal ridge from the pelvic fins to the anal fin. It may be necessary to use a fingernail to find a spine that is small and embedded.

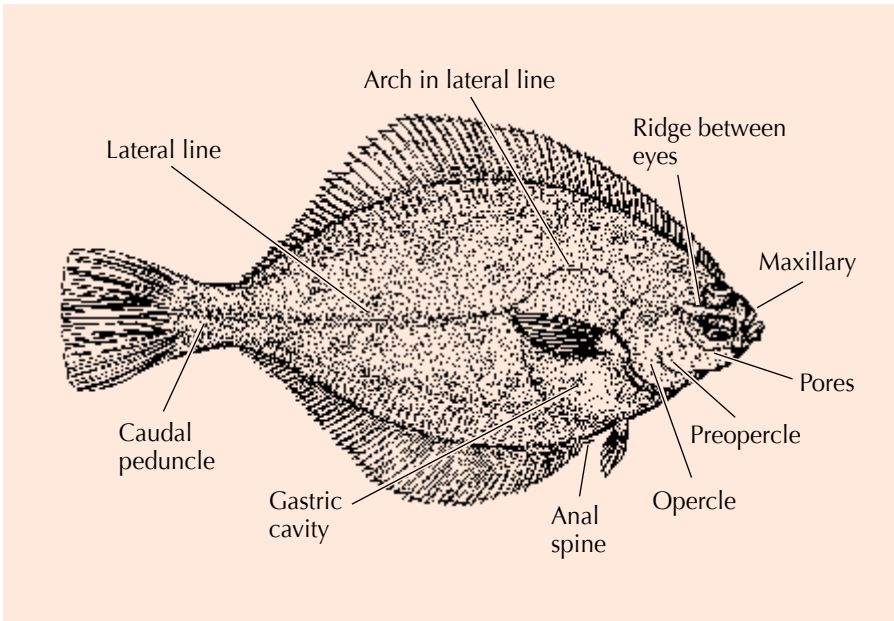
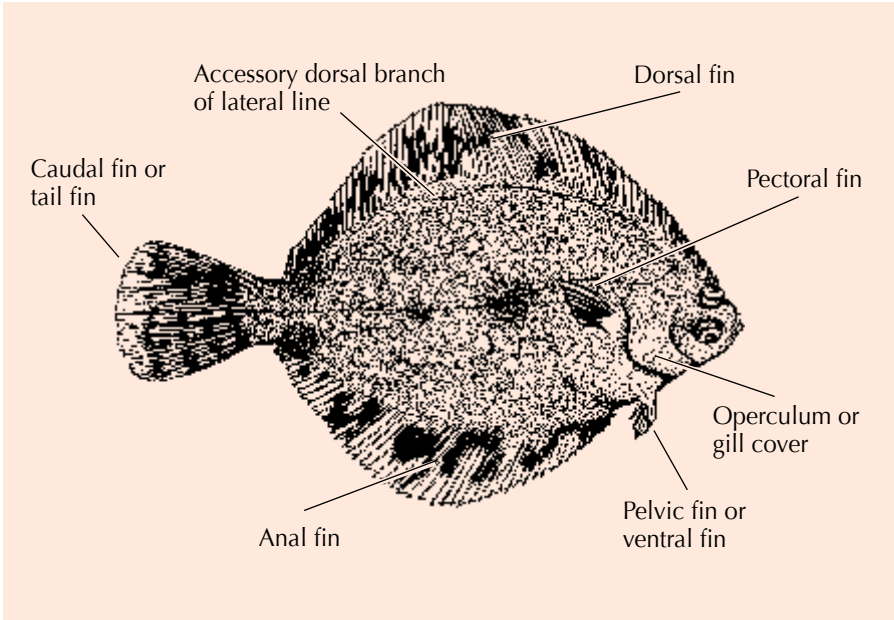
The lateral line above the pectoral fin can be straight, curved, or arched. The characteristic shape of the lateral line for each species can be seen on both the eyed and blind sides.

The accessory dorsal branch is a branch of the lateral line. It starts near the head and runs back just below the dorsal fin. It may be easier to find on the blind side, but it is sometimes shorter there so both sides should be examined.

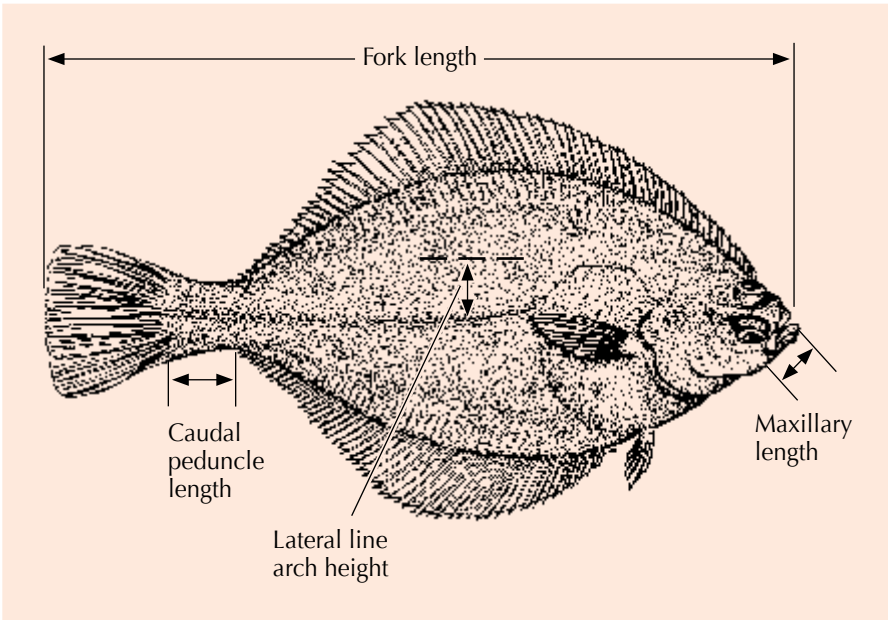
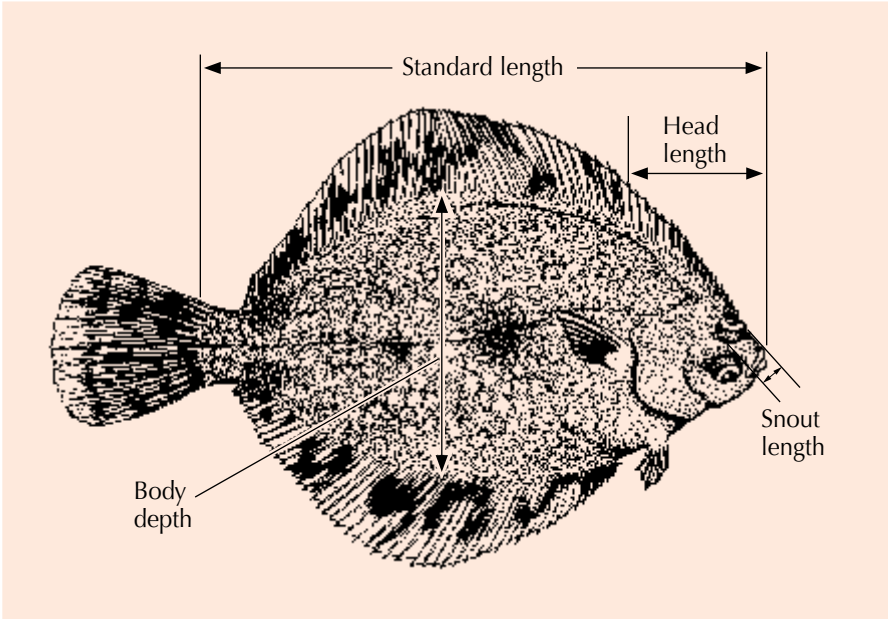
Throughout the book, the lengths given for fish are fork lengths. Depths are in fathoms (fm); 1 fathom = 6 feet.

To identify a flatfish, look for the anal spine, lateral line, and an accessory dorsal branch and use the species lists on pages 7, 8, and 9 to make a list of possible names. Then compare the fish being identified with illustrations and photographs of each species on your list, using pages 3–6 as a guide. This task will be further simplified if you know where the fish was taken, because you can use range information to eliminate some of the possible species.

External Characters of Flatfish



Flatfish Measurements



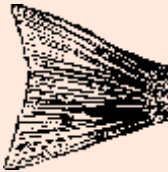
Caudal Fin Shapes



Rounded



Pointed



Lunate



Truncate



Double Truncate

Mouth Measurements



Maxillary extends to below posterior edge of eye socket; sometimes goes past posterior edge of eye socket.



Maxillary extends to below eye socket.



Maxillary extends to anterior edge of eye socket; sometimes does not reach anterior edge of eye socket.

Pelvic Fin Symmetry



Pelvic fins asymmetrically placed.
Eyed-side fin inserts on abdominal ridge.
Blind-side fin inserts off abdominal ridge.

Family Bothidae



One pelvic fin located on eyed side.
No pelvic fin on blind side.

Family Cynoglossidae



Pelvic fins symmetrically placed.
Fins insert one on each side of abdominal ridge.

Family Pleuronectidae

List of Species—Anal Spine

See page 3 for anal spine illustration.

Anal Spine Absent

- Gulf Sanddab (p. 12)
Citharichthys fragilis
- Pacific Sanddab (p. 14)
Citharichthys sordidus
- Speckled Sanddab (p. 16)
Citharichthys stigmaeus
- Longfin Sanddab (p. 18)
Citharichthys xanthostigma
- California Halibut (p. 22)
Paralichthys californicus
- Fantail Sole (p. 26)
Xysteuropsis liolepis
- California Tonguefish (p. 30)
Symphurus atricauda
- Scalyeye Plaice (p. 32)
Acanthopsetta nadeshnyi
- Kamchatka Flounder (p. 34)
Atheresthes evermanni
- Arrowtooth Flounder (p. 36)
Atheresthes stomias
- Roughscale Sole (p. 38)
Clidoderma asperimum
- Deepsea Sole (p. 40)
Embassichthys bathybius
- Dover Sole (p. 60)
Microstomus pacificus
- Greenland Halibut (p. 96)
Reinhardtius hippoglossoides

Anal Spine Present

- Bigmouth Sole (p. 20)
Hippoglossina stomata
- Slender Sole (p. 42)
Lyopsetta exilis
- Petrale Sole (p. 44)
Eopsetta jordani
- Rex Sole (p. 46)
Glyptocephalus zachirus
- Korean Flounder (p. 48)
Glyptocephalus stelleri

Anal Spine Present (continued)

- Flathead Sole (p. 50)
Hippoglossoides elassodon
- Bering Flounder (p. 52)
Hippoglossoides robustus
- Pacific Halibut (p. 54)
Hippoglossus stenolepis
- Diamond Turbot (p. 56)
Hypsopsetta guttulata
- Forkline Sole (p. 58)
Inopsetta ischyra
- Starry Flounder (p. 62)
Platichthys stellatus
- Yellowfin Sole (p. 66)
Limanda aspera
- Southern Rock Sole (p. 68)
Lepidopsetta bilineata
- Northern Rock Sole (p. 70)
Lepidopsetta polyxystra
- Arctic Flounder (p. 72)
Pleuronectes glacialis
- Butter Sole (p. 74)
Isopsetta isolepis
- Dark Flounder (p. 76)
Pleuronectes obscurus
- Longhead Dab (p. 78)
Limanda proboscidea
- Alaska Plaice (p. 80)
Pleuronectes quadrituberculatus
- Sakhalin Sole (p. 82)
Limanda sakhalinensis
- English Sole (p. 84)
Parophrys vetulus
- C-O Sole (p. 86)
Pleuronichthys coenosus
- Curlfin Sole (p. 88)
Pleuronichthys decurrens
- Spotted Turbot (p. 90)
Pleuronichthys ritteri
- Hornyhead Turbot (p. 92)
Pleuronichthys verticalis
- Sand Sole (p. 94)
Psettichthys melanostictus

List of Species—Lateral Line Shape

See pages 3–4 for lateral line illustration.

No Lateral Line

California Tonguefish (p. 30)
Symphurus atricauda

Straight to Curved Lateral Line

Gulf Sanddab (p. 12)
Citharichthys fragilis

Pacific Sanddab (p. 14)
Citharichthys sordidus

Speckled Sanddab (p. 16)
Citharichthys stigmaeus

Longfin Sanddab (p. 18)
Citharichthys xanhostigma

Kamchatka Flounder (p. 34)
Atheresthes evermanni

Arrowtooth Flounder (p. 36)
Atheresthes stomias

Slender Sole (p. 42)
Lyopsetta exilis

Petrale Sole (p. 44)
Eopsetta jordani

Rex Sole (p. 46)
Glyptocephalus zachirus

Korean Flounder (p. 48)
Glyptocephalus stelleri

Diamond Turbot (p. 56)
Hypsopsetta guttulata

Forkline Sole (p. 58)
Inopsetta ischyra

Dover Sole (p. 60)
Microstomus pacificus

Starry Flounder (p. 62)
Platichthys stellatus

Arctic Flounder (p. 72)
Pleuronectes glacialis

English Sole (p. 84)
Parophrys vetulus

C-O Sole (p. 86)
Pleuronichthys coenosus

Curlfin Sole (p. 88)
Pleuronichthys decurrens

Spotted Turbot (p. 90)
Pleuronichthys ritteri

Straight to Curved Lateral Line (continued)

Hornyhead Turbot (p. 92)
Pleuronichthys verticalis

Sand Sole (p. 94)
Psettichthys melanostictus

Greenland Halibut (p. 96)
Reinhardtius hippoglossoides

Low Arch in Lateral Line

Roughscale Sole (p. 38)
Clidoderma asperimum

Deepsea Sole (p. 40)
Embassichthys bathybius

Flathead Sole (p. 50)
Hippoglossoides elassodon

Bering Flounder (p. 52)
Hippoglossoides robustus

Butter Sole (p. 74)
Isopsetta isolepis

Dark Flounder (p. 76)
Pleuronectes obscurus

Medium to High Arch **in Lateral Line**

Bigmouth Sole (p. 20)
Hippoglossina stomata

California Halibut (p. 22)
Paralichthys californicus

Fantail Sole (p. 26)
Xystreurus liolepis

Scalyeye Plaice (p. 32)
Acanthopsetta nadeshnyi

Pacific Halibut (p. 54)
Hippoglossus stenolepis

Yellowfin Sole (p. 66)
Limanda aspera

Southern Rock Sole (p. 68)
Lepidopsetta bilineata

Northern Rock Sole (p. 70)
Lepidopsetta polyxystra

Longhead Dab (p. 78)
Limanda proboscidea

Alaska Plaice (p. 80)
Pleuronectes quadrituberculatus

Sakhalin Sole (p. 82)
Limanda sakhalinensis

List of Species—Accessory Dorsal Branch

See pages 3–4 for accessory dorsal branch illustration.

No Lateral Line

California Tonguefish (p. 30)

Symphurus atricauda

No Accessory Dorsal Branch to Lateral Line (ADB)

Gulf Sanddab (p. 12)

Citharichthys fragilis

Pacific Sanddab (p. 14)

Citharichthys sordidus

Speckled Sanddab (p. 16)

Citharichthys stigmaeus

Longfin Sanddab (p. 18)

Citharichthys xanhostigma

Bigmouth Sole (p. 20)

Hippoglossina stomata

California Halibut (p. 22)

Paralichthys californicus

Fantail Sole (p. 26)

Xystreurus liolepis

Scalyeye Plaice (p. 32)

Acanthopsetta nadeshnyi

Kamchatka Flounder (p. 34)

Atheresthes evermanni

Arrowtooth Flounder (p. 36)

Atheresthes stomias

Roughscale Sole (p. 38)

Clidoderma asperrium

Deepsea Sole (p. 40)

Embassichthys bathybius

Slender Sole (p. 42)

Lyopsetta exilis

Petrale Sole (p. 44)

Eopsetta jordani

Rex Sole (p. 46)

Glyptocephalus zachirus

Korean Flounder (p. 48)

Glyptocephalus stelleri

Flathead Sole (p. 50)

Hippoglossoides elassodon

Bering Flounder (p. 52)

Hippoglossoides robustus

No ADB (continued)

Pacific Halibut (p. 54)

Hippoglossus stenolepis

Dover Sole (p. 60)

Microstomus pacificus

Starry Flounder (p. 62)

Platichthys stellatus

Yellowfin Sole (p. 66)

Limanda aspera

Arctic Flounder (p. 72)

Pleuronectes glacialis

Dark Flounder (p. 76)

Pleuronectes obscurus

Longhead Dab (p. 78)

Limanda proboscidea

Alaska Plaice (p. 80)

Pleuronectes quadrituberculatus

Sakhalin Sole (p. 82)

Limanda sakhalinensis

Greenland Halibut (p. 96)

Reinhardtius hippoglossoides

Short ADB

Forkline Sole (p. 58)

Inopsetta ischyra

Southern Rock Sole (p. 68)

Lepidopsetta bilineata

Northern Rock Sole (p. 70)

Lepidopsetta polyxystra

Sand Sole (p. 94)

Psettichthys melanostictus

Medium to Long ADB

Diamond Turbot (p. 56)

Hypsopsetta guttulata

Butter Sole (p. 74)

Isopsetta isolepis

English Sole (p. 84)

Parophrys vetulus

C-O Sole (p. 86)

Pleuronichthys coenosus

Curlfin Sole (p. 88)

Pleuronichthys decurrens

Spotted Turbot (p. 90)

Pleuronichthys ritteri

Hornyhead Turbot (p. 92)

Pleuronichthys verticalis

North Pacific Ocean



Place names on these maps are referred to in text describing flatfish distribution, pages 12–96.

North Pacific Ocean

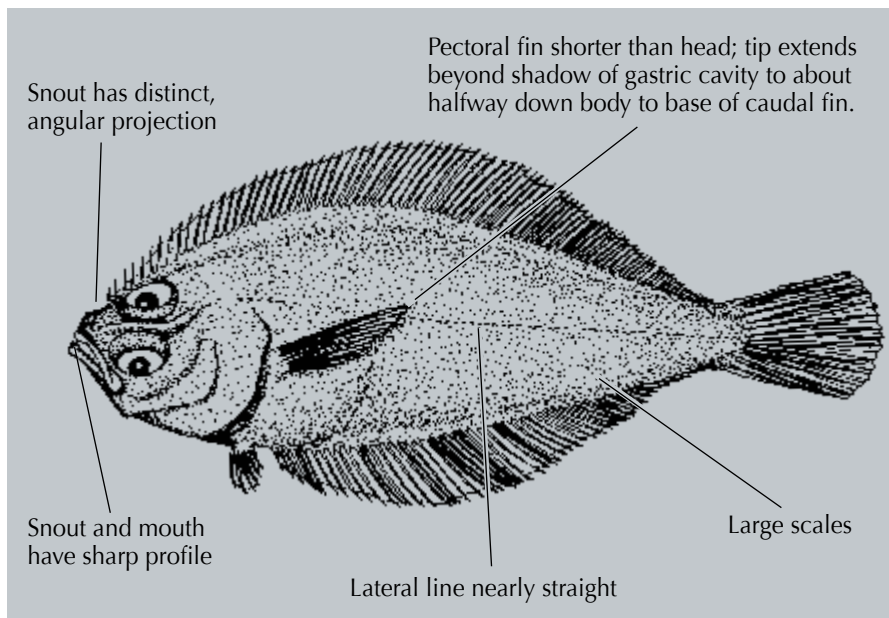


Description: Left-eyed. Eyed side uniform brownish color. Blind side off-white to light tan. Body elongate to oval. Caudal fin rounded. Lateral line nearly straight; accessory dorsal branch absent. Medium-sized mouth with head length $2 \frac{2}{3}$ times maxillary length. Anal spine absent. Gill rakers on lower limb of first arch are 16 to 21. Scale count in lateral line is 46 to 51.

Size: To 14 cm (6 inches).

Range and Habitat: From Manhattan Beach, southern California, south along the coast of Baja California and into the Gulf of California. Most common in the Gulf of California. From 10 to 190 fm.

Remarks: Similar to Pacific sanddab (which has smaller scales); to speckled sanddab (which has smaller scales and shorter pectoral fin); and to longfin sanddab (which has longer pectoral fin). Positive identification of gulf sanddab, Pacific sanddab, speckled sanddab, and longfin sanddab require gill raker and lateral line scale counts.



Family: Bothidae

PHOTO BY DARRIN GREENSTEIN



Gulf sanddab, eyed side.

PHOTO BY DARRIN GREENSTEIN



Gulf sanddab, blind side.

Pacific Sanddab

Citharichthys sordidus

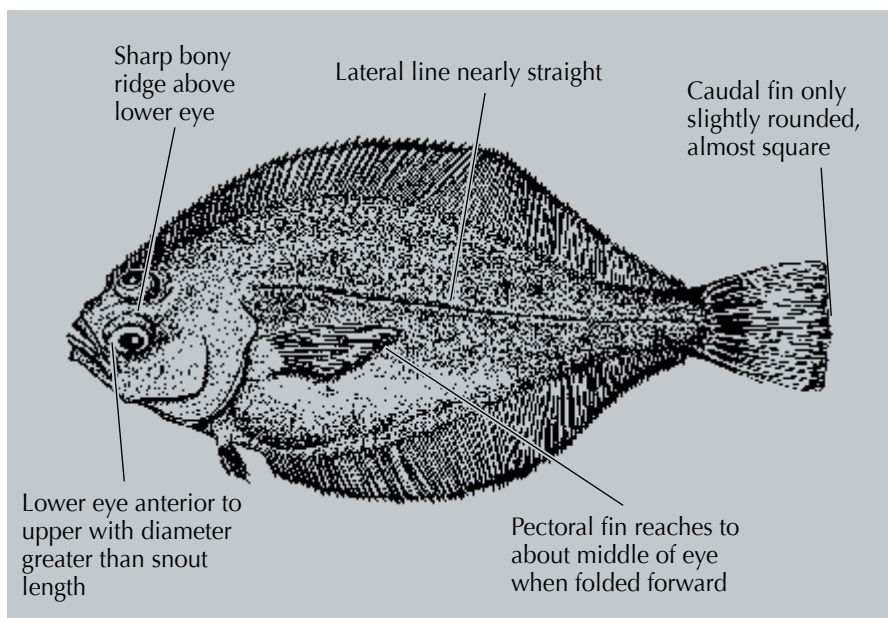
(mottled sanddab, soft flounder, melgrim)

Description: Left-eyed. Eyed side dull light brown, mottled with brown or black and sometimes yellow or orange. Blind side off-white to tan. Body elongate to oval, with large scales. Caudal fin only slightly rounded. Lateral line nearly straight; accessory dorsal branch absent. Mouth medium-sized with maxillary extending below anterior part of lower eye. Eyes large. Anal spine absent. Gill rakers on lower limb of first arch are 12 to 16. Scale count in lateral line is 61 to 70.

Size: To 41 cm (16 inches). To 2 pounds, but most weigh less than $\frac{1}{3}$ pound.

Range and Habitat: Sea of Japan, Aleutian Islands, Bering Sea, and south to Cape San Lucas, Baja California. Sand or mud-sand bottom in 5 to 300 fm; most abundant in 20 to 50 fm, rare below 100 fm. Common in shallow coastal water from British Columbia to California.

Remarks: Excellent food fish. Regarded as a delicacy in California, low commercial demand elsewhere (Oregon, Washington, British Columbia). Sometimes confused with speckled sanddab, which has black speckling on body. Positive identification of Pacific sanddab, gulf sanddab, speckled sanddab, and longfin sanddab require gill raker and lateral line scale counts.



Family: Bothidae

PHOTO BY DONALD E. KRAMER



Pacific sanddab, eyed side.

PHOTO BY DONALD E. KRAMER



Pacific sanddab, blind side.

Speckled Sanddab

Citharichthys stigmaeus

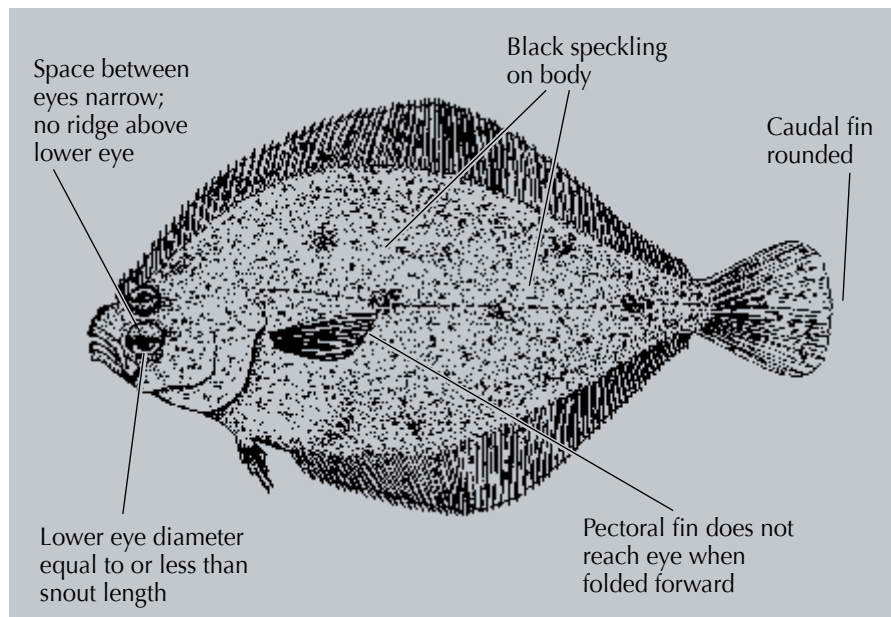
(Catalina sanddab)

Description: Left-eyed. Eyed side tan to olive brown, finely and sharply speckled with black. Blind side off-white to cream. Body elongate to oval. Caudal peduncle slender. Caudal fin rounded. Lateral line straight with slight slope over pectoral fin; accessory dorsal branch absent. Mouth medium-sized with maxillary extending below anterior part of eye. Eyes small to medium-sized. Anal spine absent. Gill rakers on lower limb of first arch are 8 to 10. Scale count in lateral line is 52 to 58.

Size: To 17 cm (7 inches), but rarely over 13 cm (5 inches).

Range and Habitat: Montague Island, Alaska, to Magdalena Bay, southern Baja California. On sand bottom from 0 to 200 fm. Most common in shallow water to 10 fm.

Remarks: Common but of no commercial importance because of small size. Serves as food for other fish, marine mammals, and seabirds. Similar to Pacific sanddab, which lacks black speckling on body. Positive identification of speckled sanddab, gulf sanddab, Pacific sanddab, and longfin sanddab require gill raker and lateral line scale counts.



Family: Bothidae

PHOTO BY DONALD E. KRAMER



Speckled sanddab, eyed side.

PHOTO BY DONALD E. KRAMER



Speckled sanddab, blind side.

Longfin Sanddab

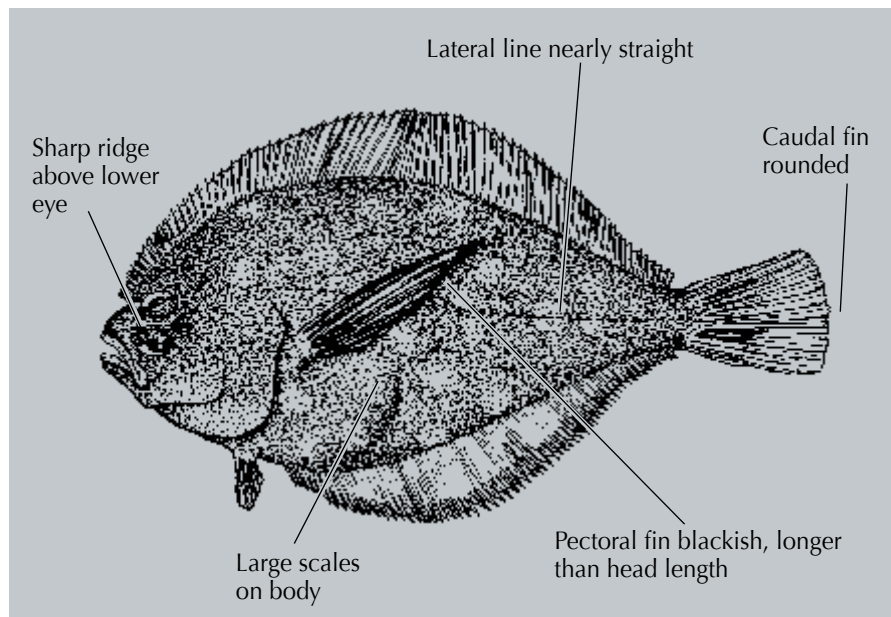
Citharichthys xanhostigma

Description: Left-eyed. Eyed side uniform dark brown with white and rust-to-orange speckles. Blind side whitish. Body shape elongate to oval. Eyed side pectoral fin is blackish with very long uppermost rays. Caudal fin rounded. Lateral line nearly straight, accessory dorsal branch absent. Mouth moderate-sized with maxillary almost to below middle of eye. Space between eyes narrow, with sharp ridge above lower eye. Anal spine absent. Gill rakers on lower limb of first arch are 10 to 12. Scale count in lateral line is 47 to 57.

Size: To 25 cm (10 inches).

Range and Habitat: Monterey Bay, California, to Costa Rica including Gulf of California. Rare north of Santa Barbara, California. On bottom to depths of 110 fm.

Remarks: Common off southern California. Distinguished from other sanddabs by very long pectoral fin on eyed side. Positive identification of longfin sanddab, gulf sanddab, Pacific sanddab, and speckled sanddab require gill raker and lateral line scale counts.



Family: Bothidae

PHOTO BY DARRIN GREENSTEIN



Longfin sanddab, eyed side.

PHOTO BY DARRIN GREENSTEIN



Longfin sanddab, blind side.

Bigmouth Sole

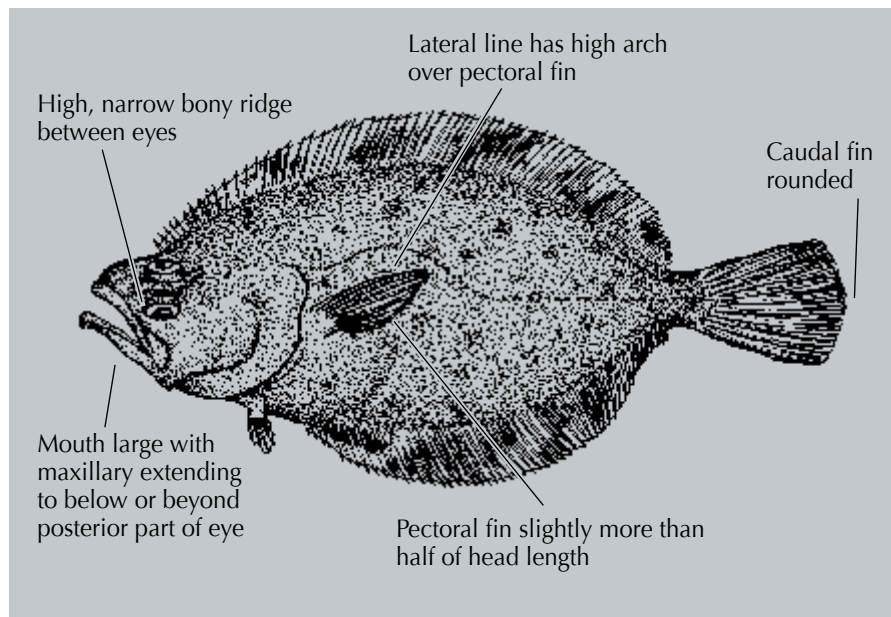
Hippoglossina stomata

Description: Left-eyed. Eyed side brown with dark blotches and sometimes with bluish speckles. Usually five pairs of large, dark brown spots near upper and lower edges of body and one pair on the caudal peduncle. Blind side whitish. Body shape elongate to oval. Caudal fin rounded. High arch in lateral line over pectoral fin, accessory dorsal branch absent. Mouth large without noticeable teeth. Anal spine present.

Size: To 40 cm (16 inches).

Range and Habitat: Monterey Bay, California, south into the Gulf of California and including Guadalupe Island. On bottom from 16 to 75 fm.

Remarks: Flesh reported to be of high quality. Fish is uncommon and of negligible commercial importance. Similar to California halibut, which has longer jaw teeth, is larger, and has different caudal fin shape.



Family: Bothidae

PHOTO BY MILTON S. LOVE



Bigmouth Sole, eyed side.

PHOTO BY MILTON S. LOVE



Bigmouth Sole, blind side.

California Halibut

Paralichthys californicus

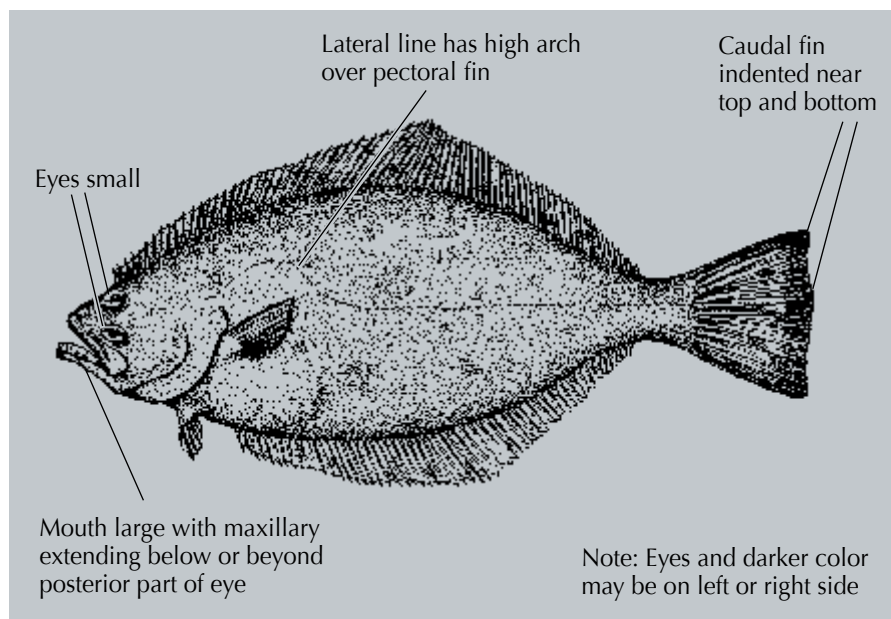
(Monterey halibut, southern halibut)

Description: Belongs to left-eyed flounder family, but can also be right-eyed (40%). Eyed side greenish or grayish brown to black; may have lighter or darker mottling. Young often have white spots. Blind side white. Body shape elongate to oval. Caudal fin slightly indented near top and bottom. Lateral line with high arch, accessory dorsal branch absent. Mouth large with numerous strong teeth. Maxillary extends below or beyond posterior part of lower eye. Small eyes with wide, flat area between eyes. Anal spine absent. Scales smooth.

Size: To 152 cm (60 inches). Reported up to 72 pounds (verified record is 61½ pounds). Average is 6 to 7 pounds.

Range and Habitat: Quillayute River, Washington, to Magdalena Bay, southern Baja California, and in Gulf of California. Sand bottom from near shore to 100 fm. Usually at depths less than 15 fm.

Remarks: An excellent food fish. Important in sport and commercial fisheries off California. Common off southern California, especially in spring. Similar to, but easily separated from bigmouth sole (which has evenly rounded tail); Pacific halibut (which has shorter maxillary); Greenland halibut (which has dark blind side); and arrowtooth flounder (which has straight lateral line).



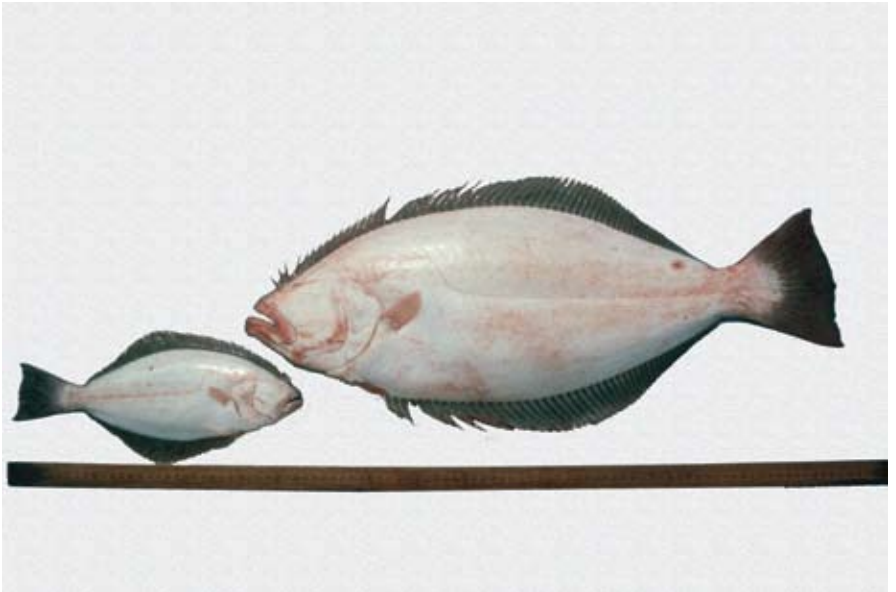
Family: Bothidae

PHOTO BY ANN DALKEY



California halibut, eyed side. Right-eyed and left-eyed specimens.

PHOTO BY ANN DALKEY



California halibut, blind side. Right-eyed and left-eyed specimens.

PHOTO BY ANN DALKEY



California halibut, eyed side. Left-eyed specimen.

PHOTO BY ANN DALKEY



California halibut, blind side. Left-eyed specimen.

Family: Bothidae

PHOTO BY ANN DALKEY



California halibut, eyed side. Right-eyed specimen.

PHOTO BY JAMES MEEHAN



California halibut, blind side. Right-eyed specimen.

Fantail Sole

Xystreurys liolepis

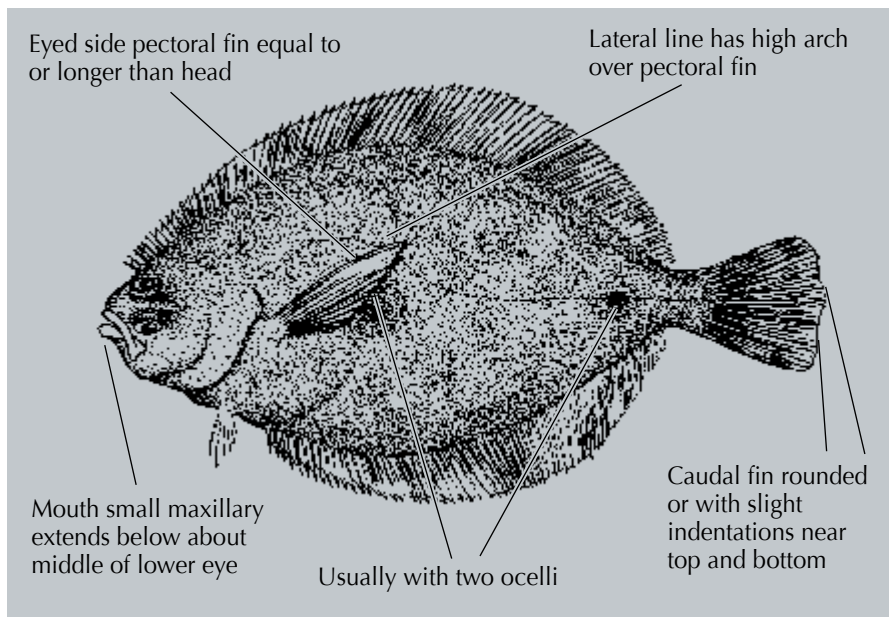
(longfin sole, true petrale)

Description: Belongs to left-eyed flounder family, but can also be right-eyed. Eyed side olive to brown with darker mottling; may have many gray or reddish-brown blotches; often has two ocelli (one behind head and one near rear of body). Blind side white. Body shape oval. Caudal fin rounded or slightly indented near top and bottom. Lateral line with high arch over pectoral fin; accessory dorsal branch absent. Mouth small with maxillary extending below about middle of lower eye. Anal spine absent.

Size: To 53 cm (21 inches). Average size is about 6 inches.

Range and Habitat: Monterey Bay, California, to central Baja California and in the northern Gulf of California. On sand or mud bottom from 2 to 44 fm. Usually buried in bottom.

Remarks: Uncommon. Rarely caught on sport fishing gear. Forms a small portion of commercial sole catch near Santa Barbara, California. Similar to bigmouth sole (which has larger mouth) and longfin sanddab (which has straight lateral line).



Family: Bothidae

PHOTO BY ANN DALKEY



Fantail sole, eyed side. Right-eyed and left-eyed specimens.

PHOTO BY ANN DALKEY



Fantail sole, blind side. Right-eyed and left-eyed specimens.

PHOTO BY ANN DALKEY



Fantail sole, eyed side. Left-eyed specimen.

PHOTO BY ANN DALKEY



Fantail sole, blind side. Left-eyed specimen.

Family: Bothidae

PHOTO BY ANN DALKEY



Fantail sole, eyed side. Right-eyed specimen.

PHOTO BY ANN DALKEY



Fantail sole, blind side. Right-eyed specimen.

California Tonguefish

Symphurus atricauda

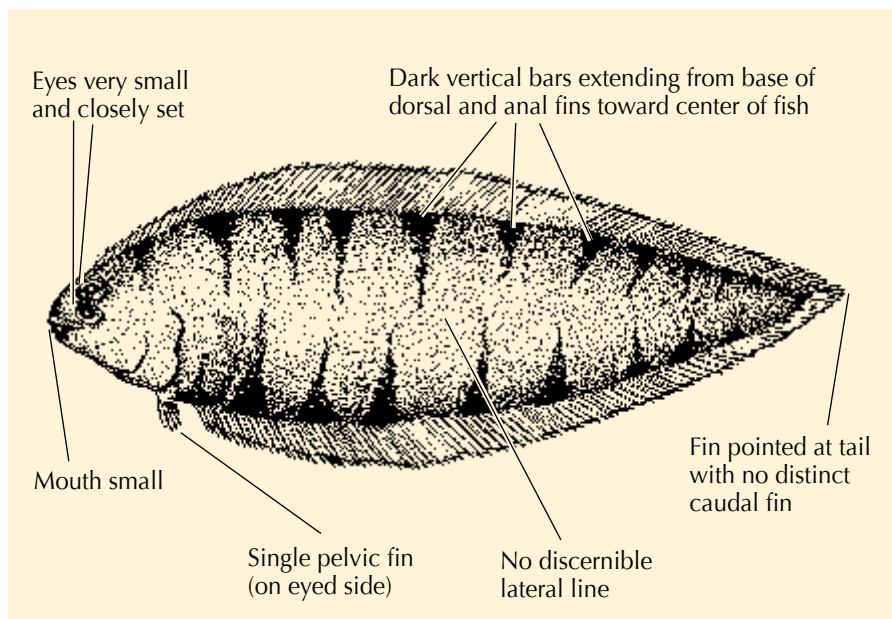
(California tongue sole)

Description: Left-eyed. Eyed side light brown to gray with dark bars extending from base of dorsal and anal fins toward center of body. Blind side white. Teardrop-shaped body with pointed tail. Dorsal and anal fins fully joined at tail with no distinct caudal fin. No lateral line or accessory dorsal branch. Mouth small, twisted toward eyed side. Eyes tiny and closely set. Anal spine absent. Pectoral fins absent. One pelvic fin (on eyed side).

Size: To 21 cm (8 inches). Most less than 6 inches.

Range and Habitat: Strait of Juan de Fuca, Washington, to Panama. On sand or mud bottom from 1 to 110 fm.

Remarks: Common off southern California; rare north of Point Conception, California. Occasionally caught by sport fishermen using small hooks. Too small to be of market value.



Family: Cynoglossidae

PHOTO BY DONALD E. KRAMER



California tonguefish, eyed side.

PHOTO BY DONALD E. KRAMER



California tonguefish, blind side.

Scalyeye Plaice

Acanthopsetta nadeshnyi

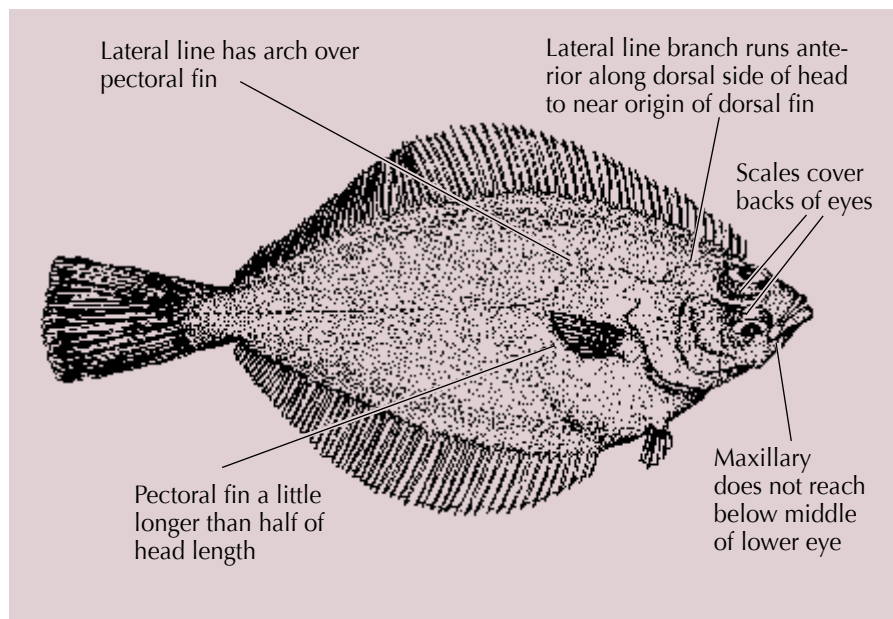
(Nadezhny's flounder)

Description: Right-eyed. Eyed side uniform brownish. Blind side white. Body shape oval. Caudal fin rounded. Lateral line arched over pectoral fin, branch runs forward along dorsal side of head to near origin of dorsal fin. Mouth small to medium. Maxillary does not reach to below middle of lower eye. Lower eye slightly anterior to upper eye. Common name due to scales covering back of eyes. Anal spine absent.

Size: To 40 cm (16 inches).

Range and Habitat: From Sea of Japan coast along Fukui Prefecture and east coast of Korea into the Gulf of Tartary and Sea of Okhotsk and from Pacific coast of Japan along Iwate Prefecture into western Bering Sea. Occurs in deeper water than most other flatfish. On sandy bottom from 16 to 400 fm. Usually found at 30 to 40 fm.

Remarks: Taken by trawl. Low commercial value due to poor flavor caused by high oil content.



Family: Pleuronectidae

PHOTO BY KUNIO AMAOKA



Scalyeye plaice, eyed side.

PHOTO BY KUNIO AMAOKA



Scalyeye plaice, blind side.

Kamchatka Flounder

Atheresthes evermanni

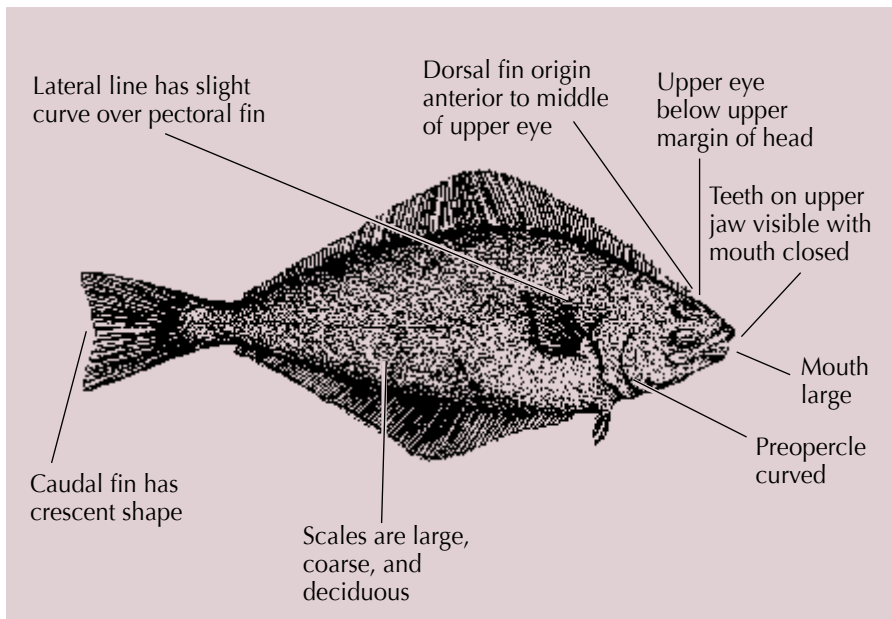
(Asiatic arrowtooth)

Description: Right-eyed. Eyed side dark brown. Blind side off-white or dirty white. Body shape elongate diamond. Caudal fin crescent-shaped. Lateral line has slight curve over pectoral fin; accessory dorsal branch absent. Mouth very large with arrow-shaped teeth. Maxillary extends to below or beyond posterior margin of lower eye. No fang-like teeth on vomer (bone in roof of mouth). Upper eye usually below dorsal ridge (not visible from blind side). Anal spine absent. Preopercle C-shaped (not angular). Anterior nostril on blind side has large flap. Dorsal fin origin at or anterior to middle of eye. Deciduous scales.

Size: To 84 cm (33 inches).

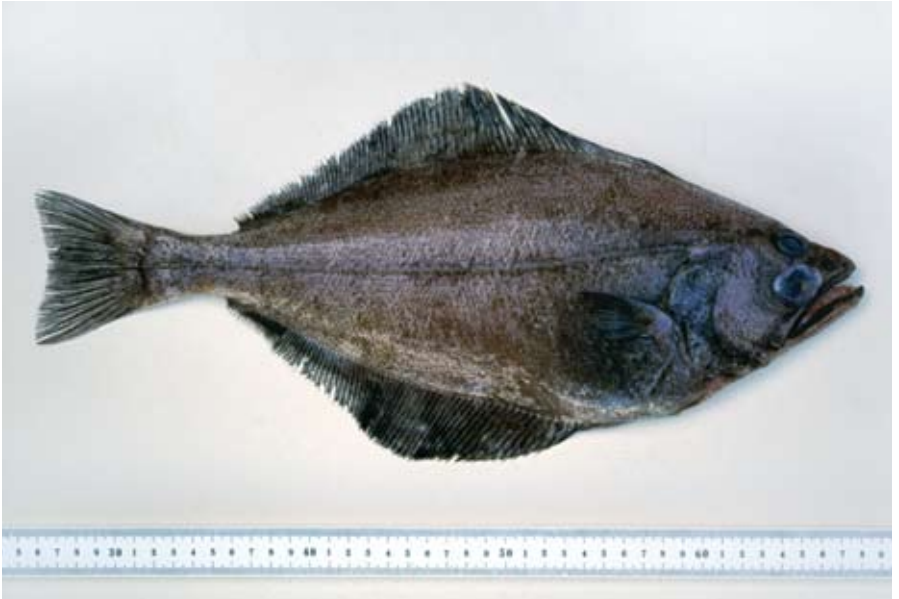
Range and Habitat: In Sea of Japan and Sea of Okhotsk north to Gulf of Anadyr. In Bering Sea east to Bristol Bay; north and south of the Aleutian Islands east to Shelikof Strait. On sand or mud bottoms from 14 to 600 fm. Most reported between 27 and 270 fm.

Remarks: Very similar to arrowtooth flounder, which has different upper eye position. Similar to Greenland halibut, which has L-shaped (angular) preopercle. Can be distinguished from arrowtooth flounder by gill raker counts.



Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Kamchatka flounder, eyed side.

PHOTO BY DONALD E. KRAMER



Kamchatka flounder, blind side.

Arrowtooth Flounder

Atheresthes stomias

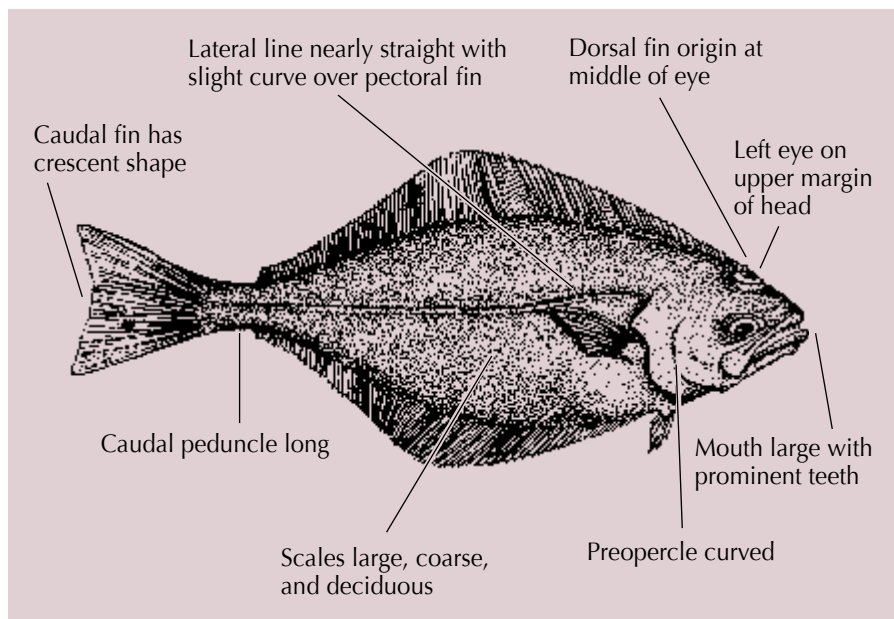
(longjaw flounder, French sole, turbot)

Description: Right-eyed. Eyed side uniform dark grayish brown to olive brown. Blind side dirty white to light gray. Scales darker at edges. Body shape elongate diamond. Caudal fin crescent-shaped. Lateral line nearly straight with slight curve over pectoral fin; accessory dorsal branch absent. Mouth very large with two rows of sharp arrow-shaped teeth. Maxillary extends below or beyond posterior margin of lower eye. No fang-like teeth on vomer (bone in roof of mouth). Left eye on dorsal ridge (visible from blind side). Anal spine absent. Preopercle C-shaped (not angular). Anterior nostril on blind side has small flap. Dorsal fin origin at middle of eye.

Size: To 86 cm (34 inches) and up to 17 pounds. Often large, and females are bigger than males.

Range and Habitat: Eastern Bering Sea to San Pedro, southern California. (San Pedro record may have been a slender sole.) North and south of Alaska Peninsula and Aleutians. One specimen reported from Chukchi Sea. On soft bottoms from 10 to 400 fm. Most common at 150 to 220 fm.

Remarks: Common in waters of Alaska through Oregon. Very abundant in the Gulf of Alaska. Taken primarily in trawls. Not of high commercial value due to poor flesh quality. Used traditionally as animal feed, but human consumption increasing.



Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Arrowtooth flounder, eyed side.

PHOTO BY DONALD E. KRAMER



Arrowtooth flounder, blind side.

Roughscale Sole

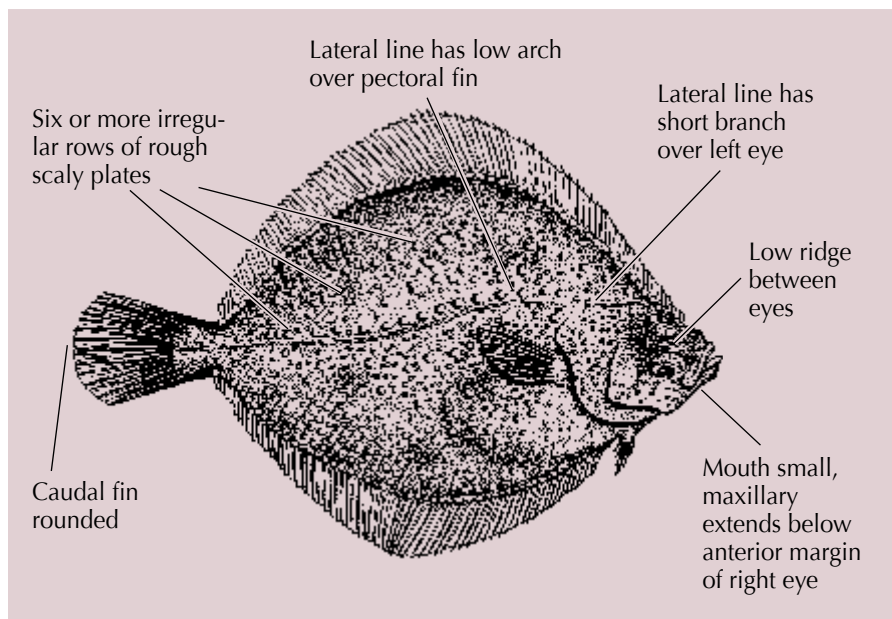
Clidoderma asperrimum

Description: Right-eyed. Eyed side uniform brown. Blind side gray. Body shape round. Caudal fin rounded. Lateral line has low arch over pectoral fin; short lateral line branch over left eye; accessory dorsal branch absent. Mouth small. Maxillary extends below anterior margin of lower eye. Eyes large with lower eye slightly anterior. Anal spine absent. Six or more irregular rows of rough, scaly plates (tubercles) on eyed side. Blind side smooth.

Size: To 55 cm (22 inches).

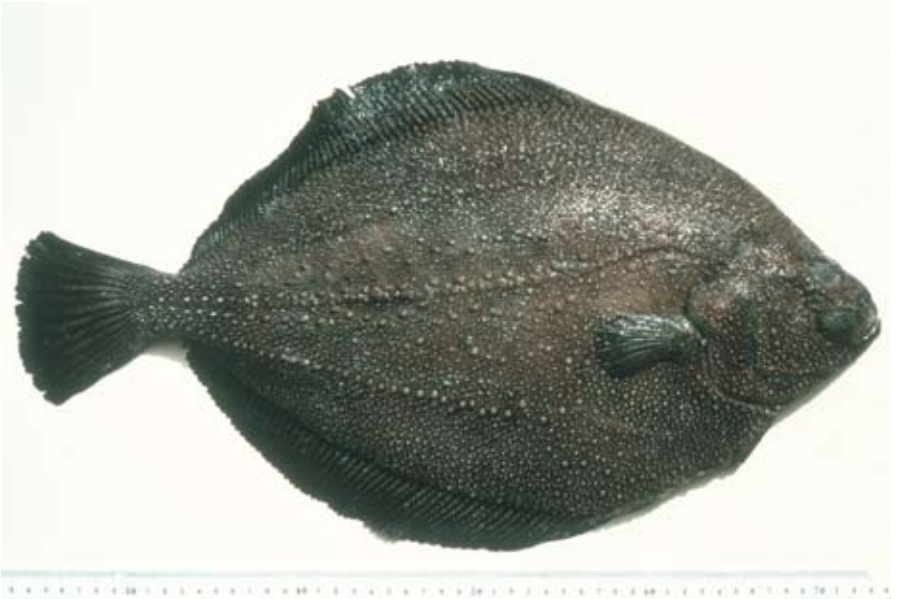
Range and Habitat: Yellow Sea and Sea of Japan north into Sea of Okhotsk. Bering Sea south to Punta Gorda, Mendocino County, California. In eastern Pacific on mud bottoms at 185 to 190 fm.

Remarks: Common off Japan, but rare in eastern Pacific waters.



Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Roughscale sole, eyed side.

PHOTO BY DONALD E. KRAMER



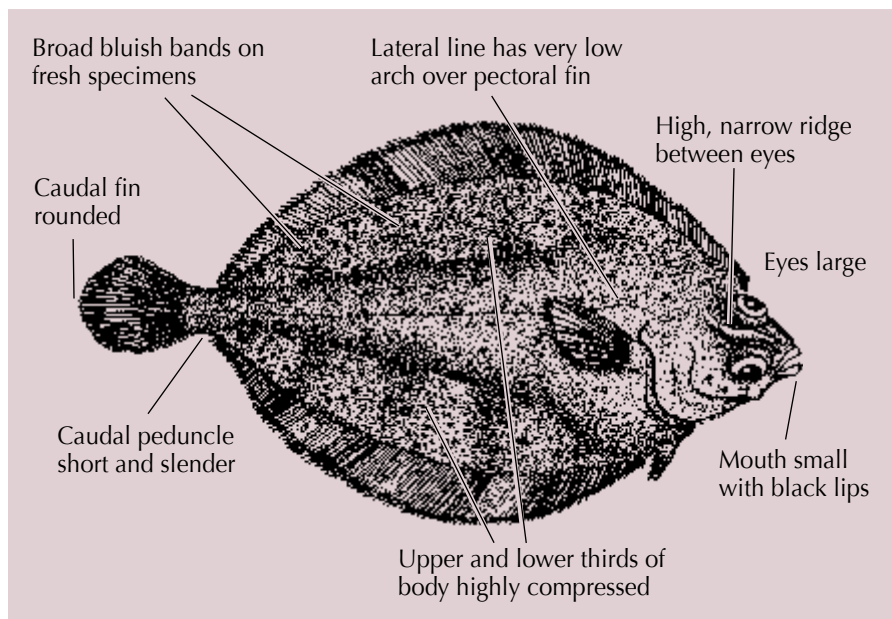
Roughscale sole, blind side.

Description: Right-eyed. Both sides colored. Eyed side dark gray to reddish brown, darker on upper and lower thirds of body; broad bluish blotches can be seen in fresh specimens. Blind side dusky gray to brown. Body shape oval with small, rounded caudal fin. Lateral line nearly straight with very low arch over pectoral fin; accessory dorsal branch absent. Mouth small with prominent black lips. Maxillary extends to below anterior part of right eye. Teeth moderately developed on both sides of both jaws. Eyes large. High ridge between eyes. Anal spine absent.

Size: To 47 cm (18.5 inches).

Range and Habitat: Northern Japan through Gulf of Alaska to California-Mexico border. A deepwater species found on mud bottoms from 185 to 750 fm; most are deeper than 350 fm.

Remarks: Extremely flabby flatfish of no commercial importance. Similar to Dover sole, which has a more slender body and teeth mostly on blind side.



Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Deepsea sole, eyed side.

PHOTO BY DONALD E. KRAMER



Deepsea sole, blind side.

Slender Sole

Lyopsetta exilis

(rough sole)

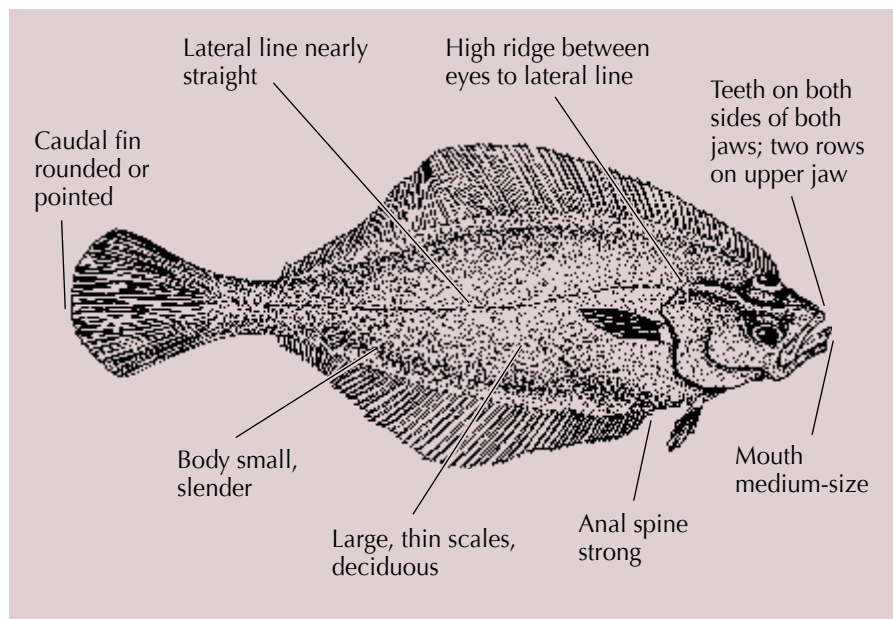
Formerly Eopsetta exilis

Description: Right-eyed. Eyed side pale olive brown to reddish brown with black speckling on edges of fins. Blind side whitish to pale yellow or orange. Body slender, elongate. Caudal fin rounded or pointed. Pectoral fins small, narrow; fins dusky, but dorsal and ventral may be pale at edges. Lateral line nearly straight; accessory dorsal branch absent. Mouth medium to large with maxillary extending to or almost to middle of lower eye. Teeth on both sides of both jaws with two rows on upper jaw. Eyes large; upper eye at top of head. High ridge running from between eyes to lateral line. Anal spine strong, sharp. Deciduous scales large, prominent (or scale pockets on trawled specimens).

Size: To 35 cm (14 inches). Small, most less than 10 inches; average size about 8 inches.

Range and Habitat: From North Albatross Bank off Alaska (east of Kodiak Island), to Cedros Island, central Baja California. One record in Bering Sea. On muddy or silty bottoms. From 5 to 437 fm; mostly at 40 to 110 fm during summer.

Remarks: Common. Excellent flavor, but too small to be of commercial importance.



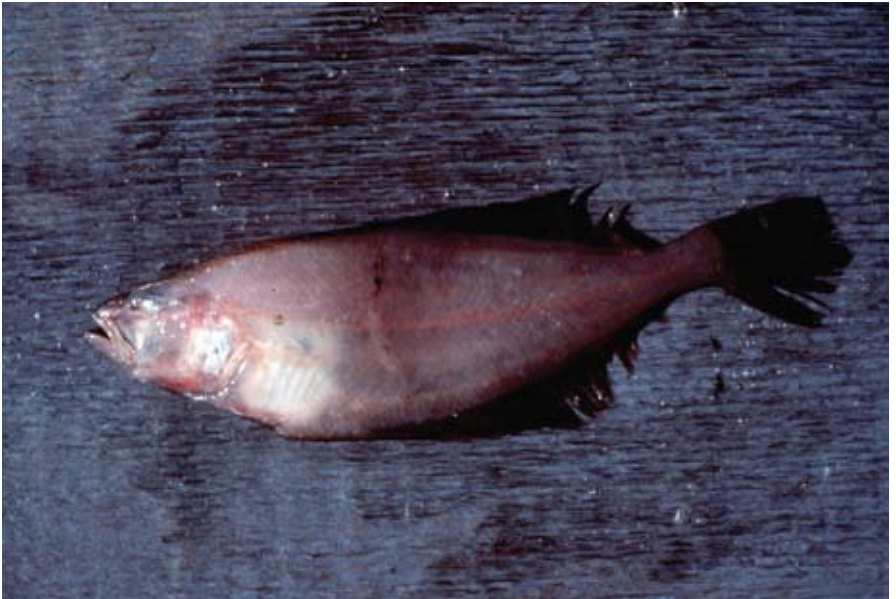
Family: Pleuronectidae

PHOTO BY DOUGLAS F. MARKLE



Slender sole, eyed side.

PHOTO BY BARRY E. BRACKEN



Slender sole, blind side.

Petrale Sole

Eopsetta jordani

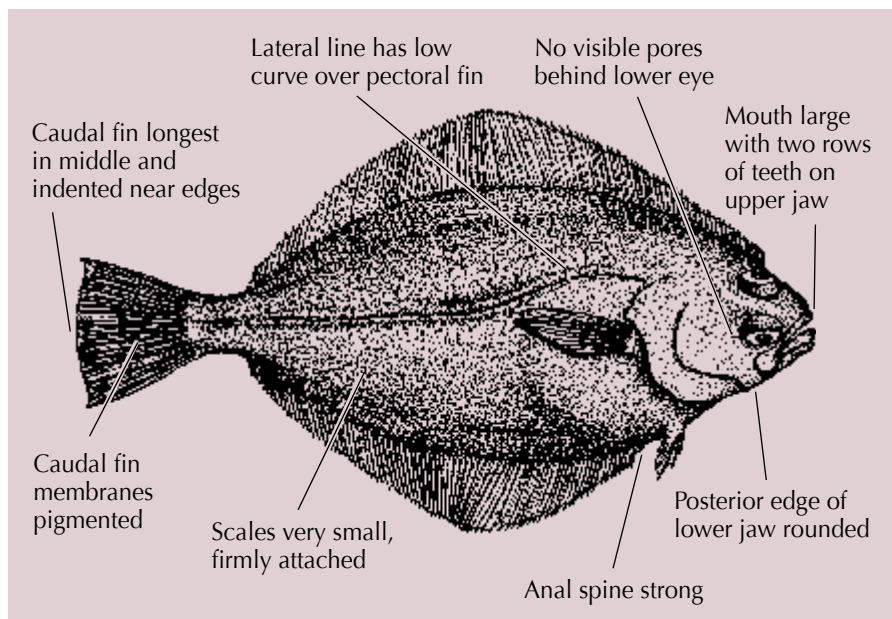
(brill, California sole, roundnosed sole)

Description: Right-eyed. Eyed side uniform light to dark brown. Blind side white, sometimes with pink traces. Body shape oval to round. Caudal fin longest in middle and slightly indented near edges. Lateral line with low curve over pectoral fin; accessory dorsal branch absent. Mouth large. Maxillary extends to below or slightly beyond middle of lower eye. Upper jaw with two rows of small, arrow-shaped teeth; one row of teeth on lower jaw. Posterior edge of lower jaw rounded. Eyes medium-sized with broad space between them. Anal spine strong.

Size: To 70 cm (28 inches) and 8 pounds. Average size in trawl catch is about 1 to 2 pounds.

Range and Habitat: Bering Sea and Aleutian Islands through Gulf of Alaska to Coronado Islands, northern Baja California. On sand and mud bottoms from 10 to 300 fm. Most abundant at 30 to 70 fm from April through October and at 150 to 250 fm during winter.

Remarks: Important commercially because of good size and excellent quality. Most caught by trawl and marketed as fresh or frozen fillets. Similar to flathead sole and Bering flounder which have one row of teeth on upper jaw.



Family: Pleuronectidae

PHOTO BY WILLIAM H. BARSS



Petrale sole, eyed side.

PHOTO BY DONALD E. KRAMER



Petrale sole, blind side.

Rex Sole

Glyptocephalus zachirus

(longfinned sole, witch sole)

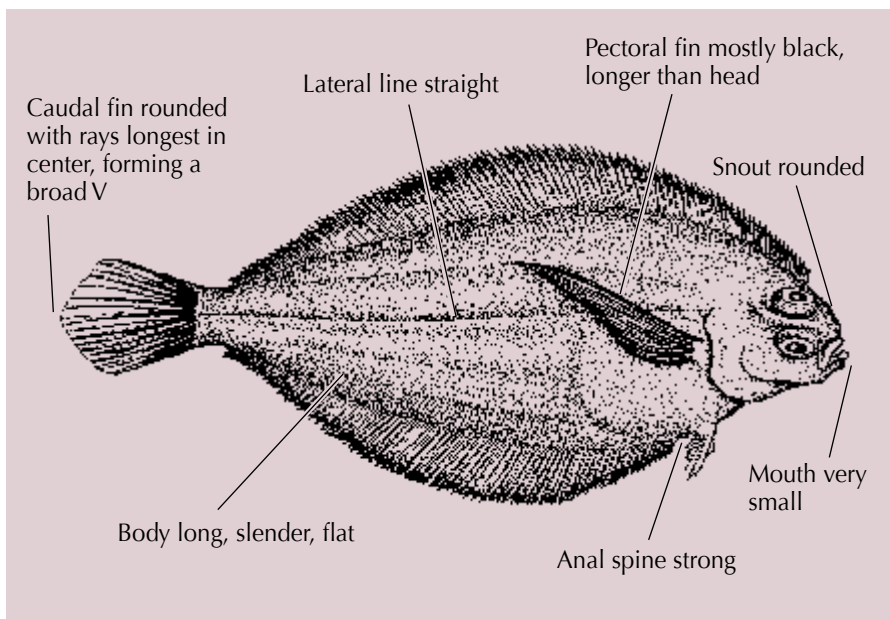
Formerly *Errex zachirus*

Description: Right-eyed. Eyed side uniform light brown to gray. Edges of dorsal and ventral fins dark or dusky. Pectoral fin on eyed side very long and mostly black. Blind side off-white to dusky. Body elongate. Caudal fin rounded with rays longest in center, forming a broad V. Lateral line straight. Mouth very small. Maxillary extends to below anterior edge of lower eye. Snout rounded. Eyes large with ridge between them. Anal spine strong. Scales small.

Size: To 61 cm (24 inches). Average size about 10 inches and ½ pound.

Range and Habitat: Bering Sea and Aleutian Islands to Cedros Island, central Baja California. Widely distributed on sand and mud bottoms from 0 to 465 fm. Most abundant at about 100 to 250 fm.

Remarks: Abundant and an excellent food fish. Not heavily used commercially because of small size and thin body. Has been used in the past for animal feed, but use as a market species is growing (frozen head off and gutted).



Family: Pleuronectidae

PHOTO BY WILLIAM H. BARSS



Rex sole, eyed side.

PHOTO BY DONALD E. KRAMER



Rex sole, blind side.

Korean Flounder

Glyptocephalus stelleri

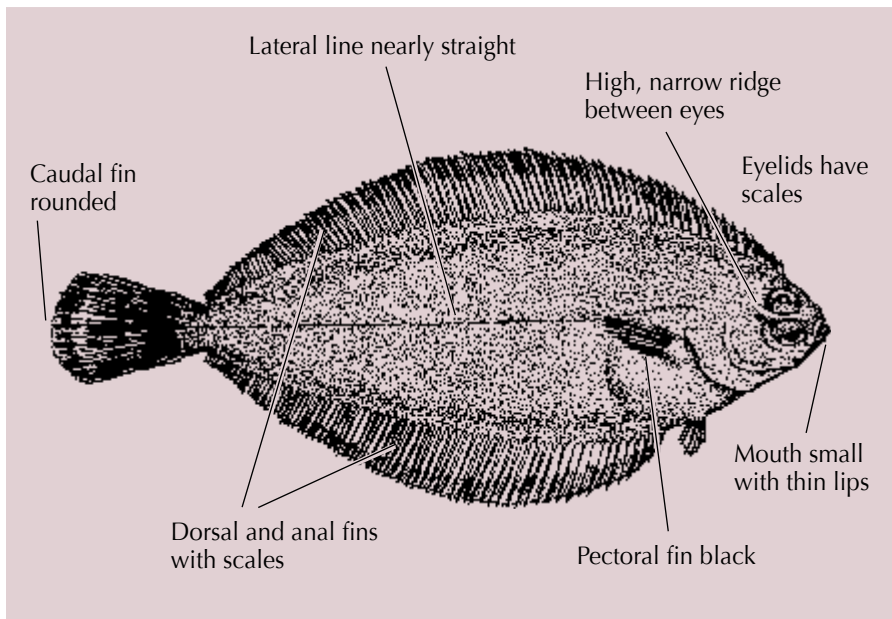
(Steller's smallmouth flounder)

Description: Right-eyed. Eyed side grayish brown. Blind side gray. Body shape elongate to oval. Caudal fin rounded. Lateral line nearly straight. Mouth small with teeth on both sides of both jaws. Maxillary extends to below anterior part of lower eye. High, narrow ridge between eyes is not scaled, but eyelids are. Anal spine present.

Size: To 60 cm (24 inches). Most common size in catches is 15 to 17 inches and 1 to 2 pounds.

Range and Habitat: From Sea of Japan into Sea of Okhotsk and from Pacific coast of Chiba Prefecture of Japan into Bering Sea. On sand and mud bottoms from 10 to 137 fm.

Remarks: Taken by trawl. A fine food fish with very good flavor. Similar to rex sole, which has much longer pectoral fin on eyed side.



Family: Pleuronectidae

PHOTO BY KUNIO AMAOKA



Korean flounder, eyed side.

PHOTO BY KUNIO AMAOKA



Korean flounder, blind side.

Flathead Sole

Hippoglossoides elassodon

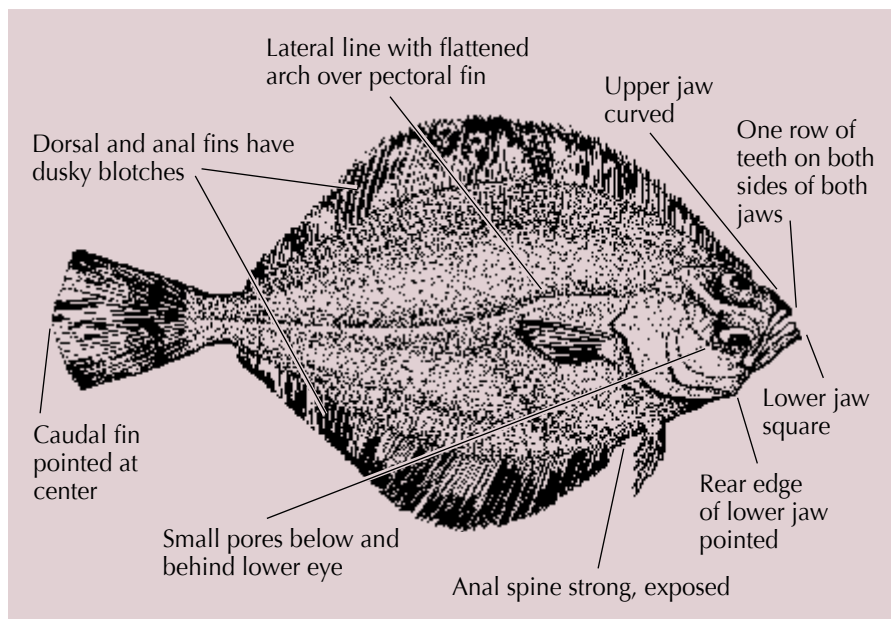
(cigarette paper, paper sole)

Description: Right-eyed. Eyed side dark olive brown to reddish gray-brown, sometimes with dusky blotches. Blind side with white and translucent areas; dorsal and anal fins have dusky blotches. Body shape oval and very flat. Caudal fin angular with longest rays at center. Lateral line nearly straight with low arch over pectoral fin; accessory dorsal branch absent but an anterior branch runs almost to rear edge of upper eye. Mouth medium to large. Maxillary extends to below middle of lower eye. Both jaws have one row of sharp, conical teeth. Eyes large with narrow ridge and 1–2 rows of scales between them. Anal spine strong. Pores below and behind lower eye may be hard to see.

Size: To 56 cm (22 inches).

Range and Habitat: Kurile Islands north to Gulf of Anadyr. In Chukchi Sea, Bering Sea, and along Aleutian Islands south to Monterey, California. On silty or muddy bottoms from 0 to 575 fm. Most common from 55 to 135 fm.

Remarks: Good food fish, but body is thin. Of limited commercial use in past, but becoming more important. Very similar to Bering flounder. Petrale sole is similar, but upper jaw has two rows of teeth and lower jaw has rounded rear edge.



Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Flathead sole, eyed side.

PHOTO BY DONALD E. KRAMER



Flathead sole, blind side.

Bering Flounder

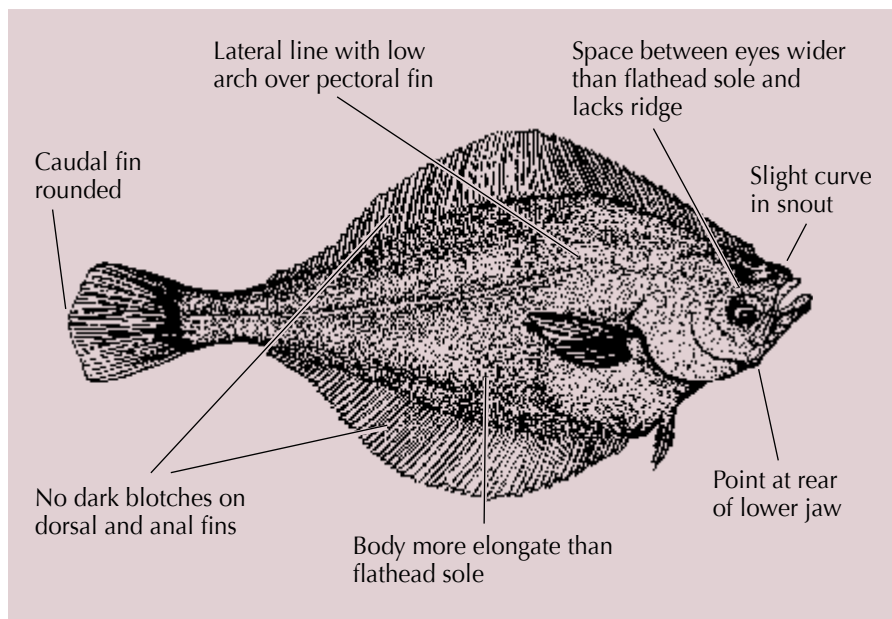
Hippoglossoides robustus

Description: Right-eyed. Eyed side reddish brown to dark grayish brown. Blind side white. Body shape elongate to oval. Caudal fin rounded. Caudal fin membranes clear, but may have dark smudges. Lateral line has low arch over pectoral fin; accessory dorsal branch absent, but anterior branch present. Mouth large with maxillary extending to below or past middle of lower eye. Upper jaw has one row of teeth. Rear of lower jaw pointed. Space between eyes flat with two rows of scales. Anal spine present. Pores ventral and posterior to lower eye may be hard to see.

Size: To 30 cm (12 inches).

Range and Habitat: From Hokkaido north into Sea of Okhotsk. From Cape Lisburne in Chukchi Sea to north side of Alaska Peninsula and Aleutian Islands. Reported from 10 to 232 fm; usually found in shallow water above 80 fm.

Remarks: Very similar to flathead sole, but has more elongate body, smaller eyes, wider space between eyes, greater curve in lateral line, and lacks raised ridge between eyes.



Family: Pleuronectidae

PHOTO BY DOYNE W. KESSLER



Bering flounder, eyed side.

PHOTO BY DOYNE W. KESSLER



Bering flounder, blind side.

Pacific Halibut

Hippoglossus stenolepis

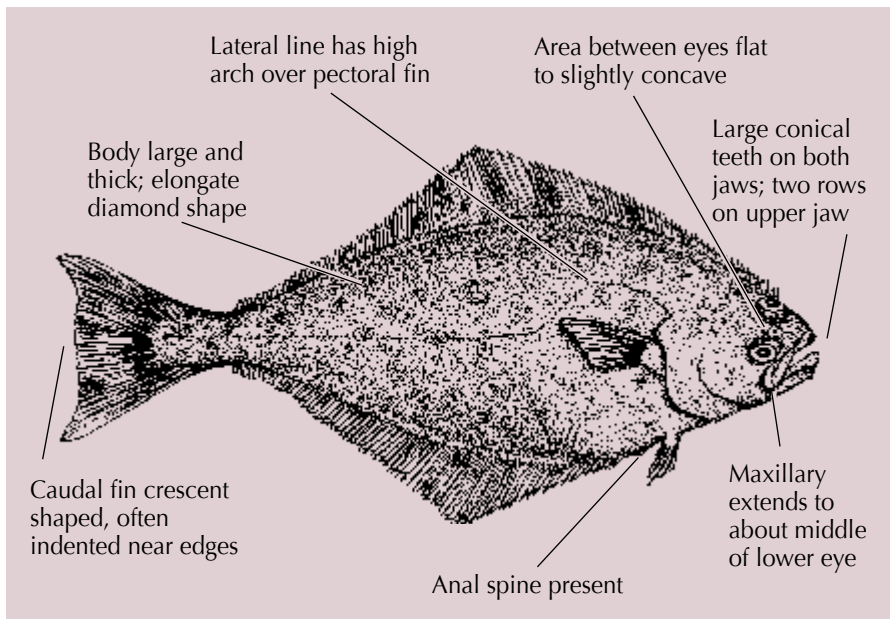
(northern halibut, right halibut)

Description: Almost always right-eyed. Eyed side greenish brown to dark brown or black with lighter blotches. Blind side white to milky white. Body large and stout with elongate diamond shape. Caudal fin has crescent shape often indented near edges (double truncate). Lateral line has high arch over pectoral fin, accessory dorsal branch absent. Mouth medium to large with two rows of teeth on upper jaw and one row on lower jaw. Maxillary reaches to below middle of lower eye. Area between eyes flat to slightly concave. Anal spine present. Scales small and smooth on both sides of body.

Size: To 267 cm (105 inches) and 500 pounds. There are unverified reports of fish over 9 feet and 700 pounds. Average size in commercial catch is 30 to 40 pounds.

Range and Habitat: Sea of Japan and Sea of Okhotsk north to Gulf of Anadyr. Bering Sea south to Point Camalu, northern Baja California. Found from 3 to 600 fm. Mostly in 15 to 150 fm in summer, but deeper in winter.

Remarks: Abundant. Largest, most valuable flatfish in the northeast Pacific; important as commercial and sport fish. Similar to California halibut, which has larger mouth and less indented tail.



Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Pacific halibut, eyed side.

PHOTO BY DONALD E. KRAMER



Pacific halibut, blind side.

Diamond Turbot

Hypsopsetta guttulata

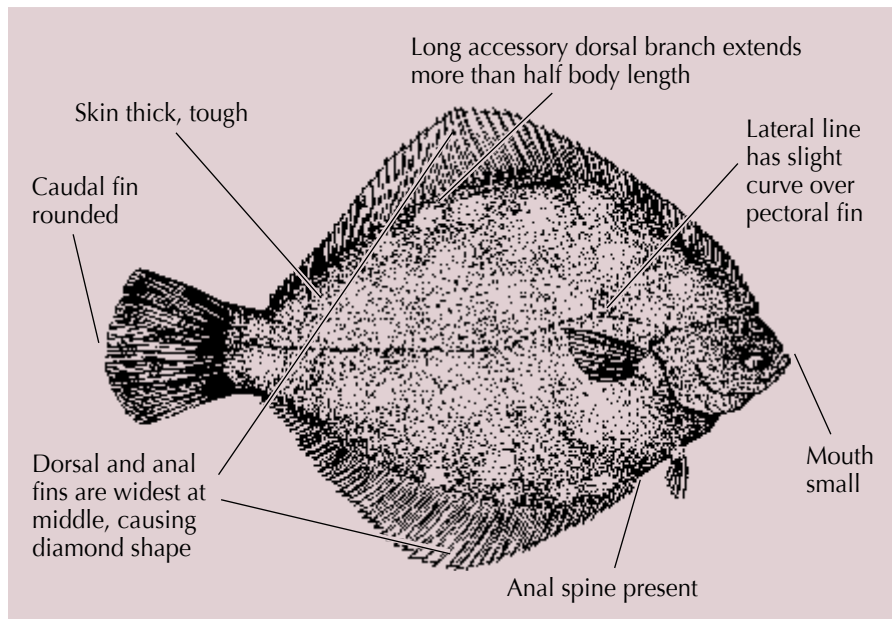
(diamond flounder)

Description: Right-eyed. Eyed side dark greenish or grayish brown with light bluish spotting. Blind side bright porcelain white with bright yellow around mouth and edge of head. Deep body with diamond shape. Caudal fin rounded. Lateral line nearly straight with slight curve over pectoral fin; long accessory dorsal branch extends more than halfway to caudal fin. Mouth small. Maxillary extends to below anterior edge of lower eye. Teeth small; very few on eyed side. Low ridge between eyes. Anal spine present.

Size: To 46 cm (18 inches) and 4 pounds. Average weight for sport catch is a little over 1 pound.

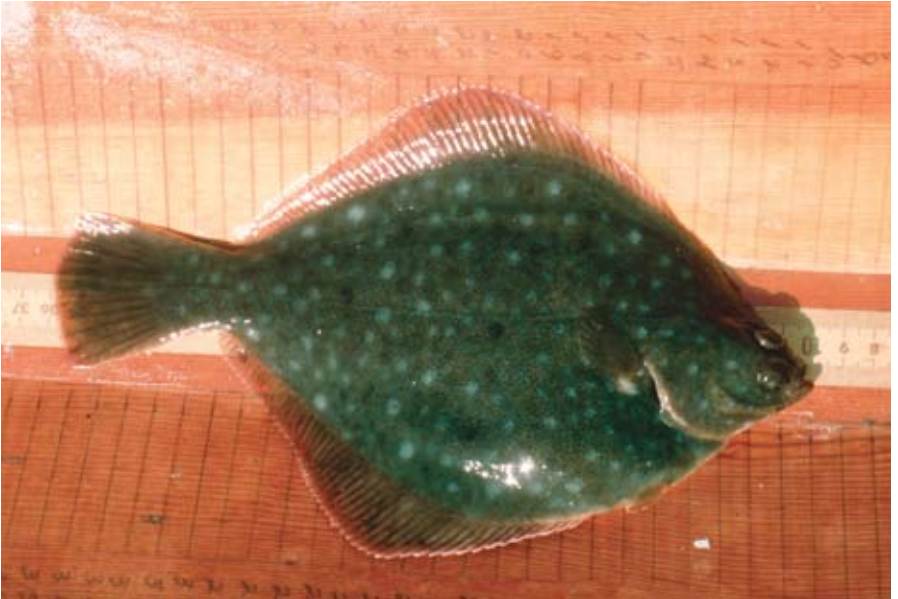
Range and Habitat: Cape Mendocino, California, to Cape San Lucas, Baja California. Isolated population in Gulf of California. On mud and sand bottoms from 0 to 25 fm. Most common in 1 to 10 fm. Often found in bays or sloughs and up rivers in brackish to fresh waters.

Remarks: Highly regarded as food because of thick body and fine flavor. Sometimes has slight iodine flavor. Other turbot in its range, spotted turbot and hornyhead turbot, have four or more anterior dorsal fin rays extending down blind side.



Family: Pleuronectidae

PHOTO BY ANN DALKEY



Diamond turbot, eyed side.

PHOTO BY DARRIN GREENSTEIN



Diamond turbot, blind side.

Forkline Sole

Inopsetta ischyra

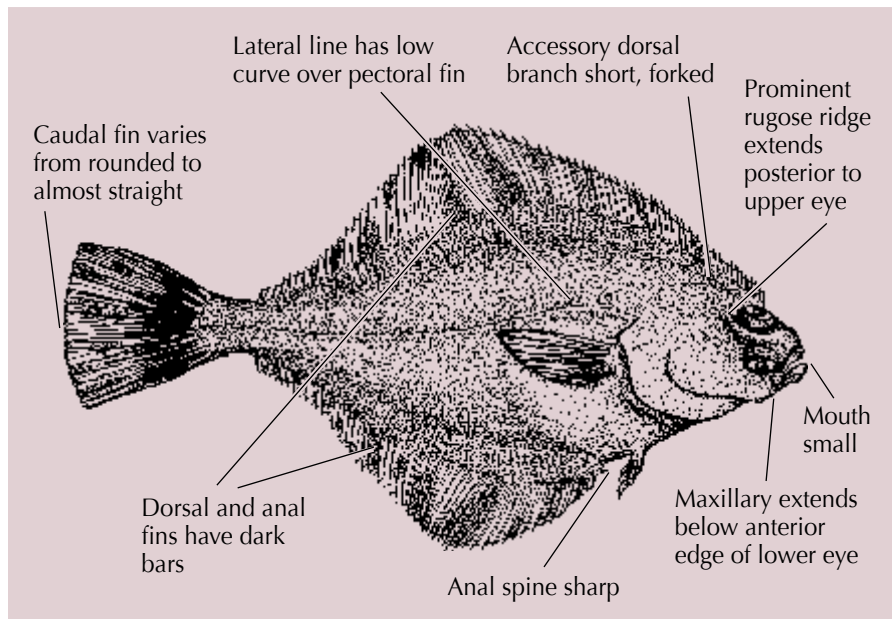
(bastard sole, hybrid sole)

Description: Right-eyed. Eyed side brown to olive brown and mottled with lighter and darker areas. Dorsal and anal fins with faint dusky bars. Blind side creamy white. Body diamond-shaped. Caudal fin varies from rounded to almost straight. Lateral line extends onto caudal fin; short, forked accessory dorsal branch does not extend past gill cover. Mouth small with maxillary extending below anterior edge of lower eye. Prominent rugose ridge runs from between eyes posterior to upper eye. Anal spine sharp. Rough scales on both sides of body and on dorsal and anal fins.

Size: To 46 cm (18 inches).

Range and Habitat: Bering Sea to San Francisco, California. Rare outside of Puget Sound. On soft bottom to depths of 360 fm.

Remarks: May be a cross between English sole and starry flounder, although rock sole has been suggested as a possible parent; quite variable, possibly due to back crosses (see Hart 1973). Distinguishable from English sole, which has no bars on fins, longer lateral line branch, and more pointed snout; and from starry flounder, which has bars on caudal fin, more distinct bars in dorsal and anal fins, and star-shaped tubercles on body.



Family: Pleuronectidae

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Forkline sole, eyed side.

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Forkline sole, blind side.

Dover Sole

Microstomus pacificus

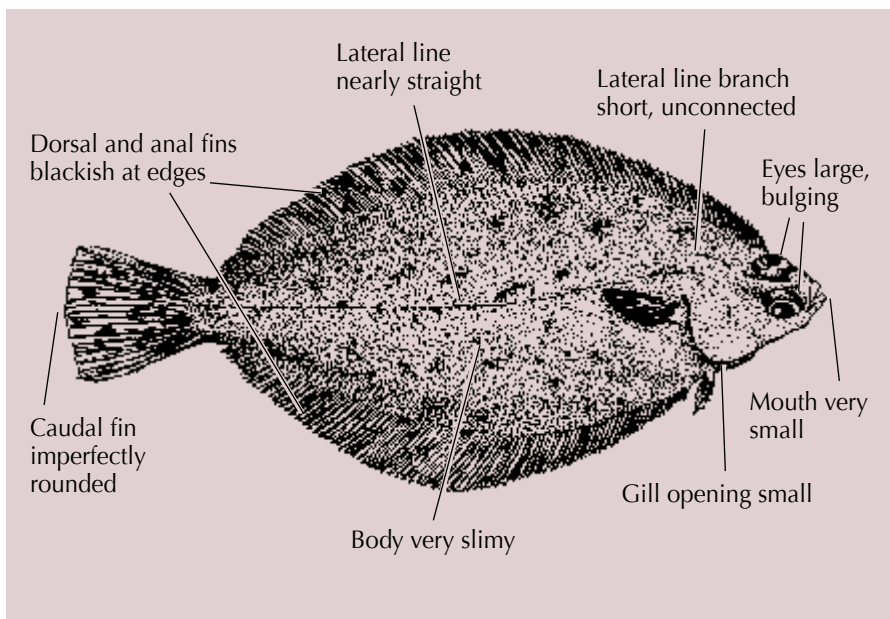
(shortfinned sole, slime sole, slippery sole)

Description: Right-eyed. Eyed side brown or grayish brown; may be mottled with darker spots. Fins blackish toward edges. Blind side smudgy off-white to dark brownish gray. Body elongate with very small scales. Caudal fin rounded. Lateral line nearly straight with short, unconnected branch near top of head which is difficult to see; accessory dorsal branch absent. Mouth very small. Maxillary extends to below anterior of lower eye. Teeth mostly on blind side; teeth flat and like incisors. Eyes large and bulging, with upper eye posterior to lower eye. Space between eyes convex. Anal spine absent. Soft, flabby body is slippery, because of large amounts of slime.

Size: To 76 cm (30 inches) and up to 10 pounds. Average size in trawl catch is about 1 pound.

Range and Habitat: Bering Sea and eastern Aleutian Islands to San Cristobal Bay, Baja California. On mud or sand bottoms from 5 to 750 fm. Commercial catches are from 40 to 550 fm.

Remarks: Common and widely distributed. Important commercially; marketed as fillets. Good flavor and good keeping qualities. Flesh quality reported to be poorer for fish caught below 300 fm.



Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Dover sole, eyed side.

PHOTO BY DONALD E. KRAMER



Dover sole, blind side.

Starry Flounder

Platichthys stellatus

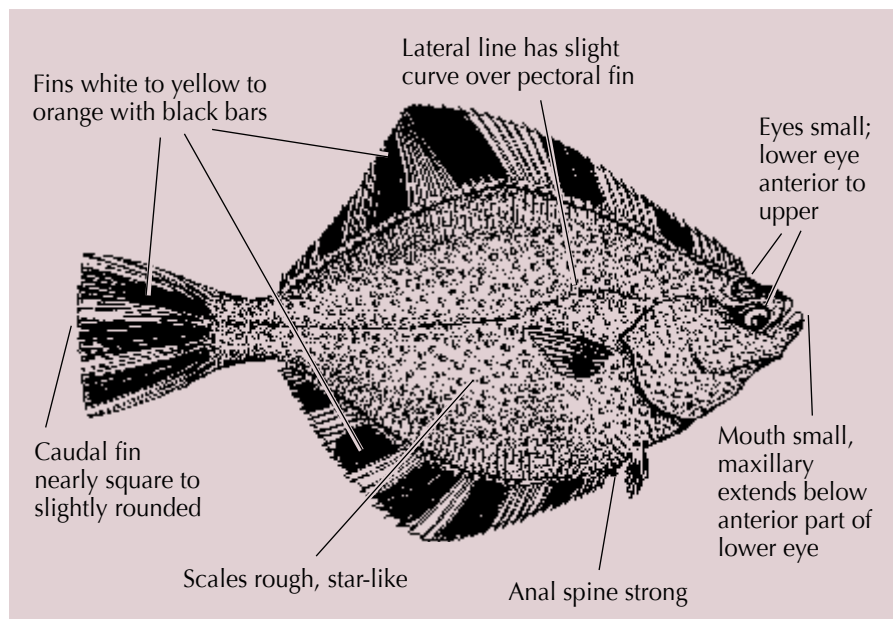
(diamond back, emerywheel, grindstone)

Description: Belongs to right-eyed flounder family, but can also be left-eyed. Eyed side olive to dark brown or almost black. Unpaired fins white to yellow to orange with black bars. Blind side white to creamy white. Body shape oval. Head slender, pointed. Caudal fin nearly square or slightly rounded. Lateral line with slight curve over pectoral fin; accessory dorsal branch absent. Mouth small. Maxillary extends below anterior part of lower eye. Eyes small with lower eye anterior to upper eye. Space between eyes flat. Anal spine strong. Scattered rough tubercles (star-like scales) on eyed and blind sides.

Size: To 91 cm (36 inches) and 20 pounds. Usual size is 12 to 14 inches.

Range and Habitat: In Sea of Japan and Sea of Okhotsk. From Chukchi Sea, Bering Sea, and Aleutian Islands south to Los Angeles Harbor, California. On mud, sand, or gravel bottoms from 0 to 205 fm; most occur above 80 fm. Usually found near shore. Often enters brackish or fresh water, and young fish are often intertidal.

Remarks: Common. Important sport fish. Highly regarded as food fish, but has moderate commercial value. Processing difficult due to rough skin, and needs to be deep skinned to remove unappealing, dark fat layer.



Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Starry flounder, eyed side. Left-eyed and right-eyed specimens.

PHOTO BY DONALD E. KRAMER



Starry flounder, blind side. Left-eyed and right-eyed specimens.

Starry Flounder

Platichthys stellatus

PHOTO BY DONALD E. KRAMER



Starry flounder, eyed side. Right-eyed specimen.

PHOTO BY DONALD E. KRAMER



Starry flounder, blind side. Right-eyed specimen.

Family: Pleuronectidae

PHOTO BY DONALD E. KRAMER



Starry flounder, eyed side. Left-eyed specimen.

PHOTO BY DONALD E. KRAMER



Starry flounder, blind side. Left-eyed specimen.