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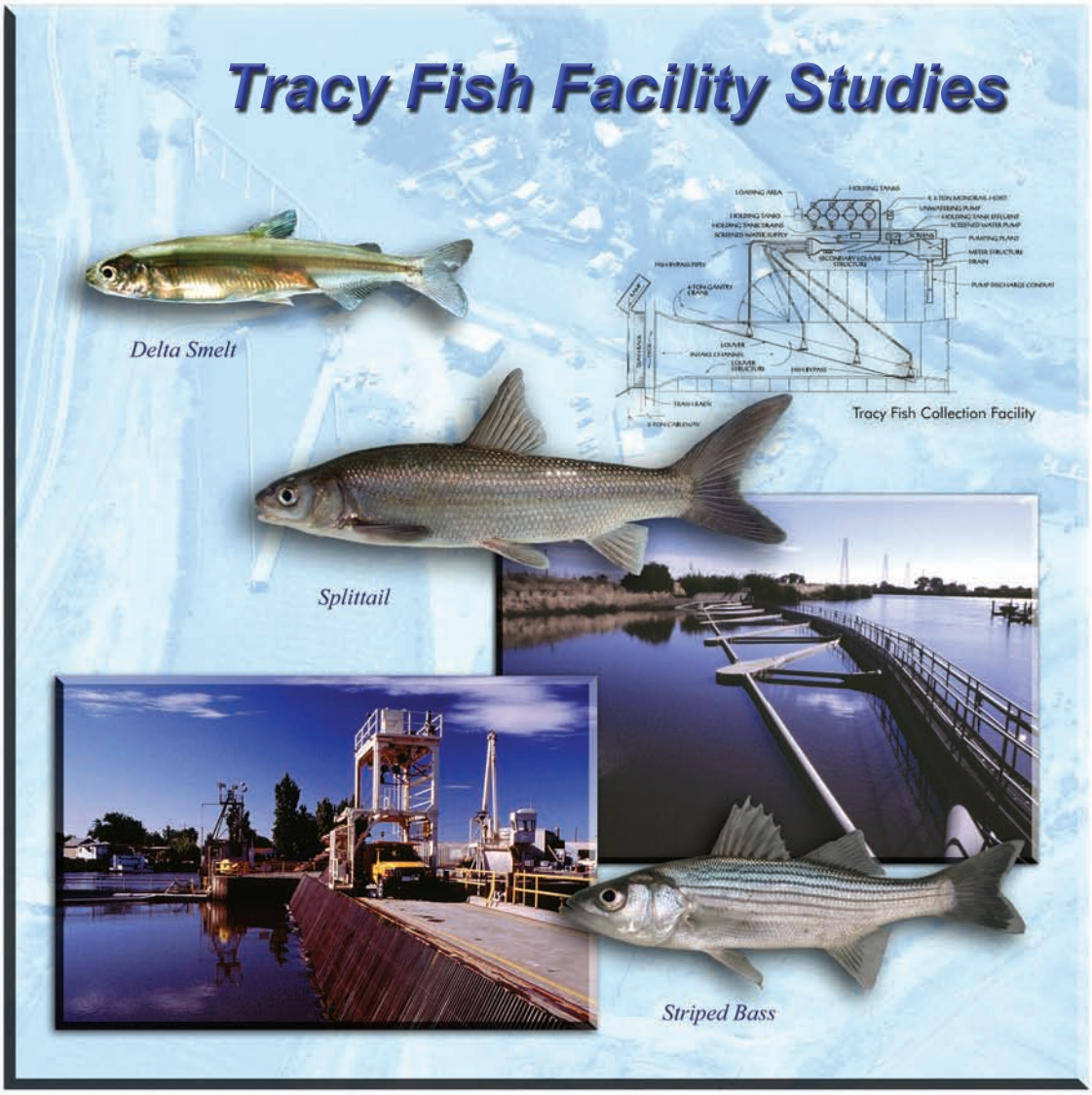

Guide to the Fishes of the Tracy Fish Collection Facility

Volume 36

U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Technical Service Center

January 2007

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Guide to the Fishes of the Tracy Fish Collection Facility

Volume 36

by

René C. Reyes[1], 2006 Revised Edition
Bart W. Bird and Paul F. Raquel[2], 1977 Original

January 2007

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EXECUTIVE SUMMARY

The fish identification key for the Tracy Fish Collection Facility (TFCF), Tracy, California, jointly prepared by Bart W. Bird and Paul F. Raquel for the U.S. Department of the Interior, Bureau of Reclamation and the U.S. Fish and Wildlife in 1977, was revised for this report. The revised key will assist employees at the TFCF to identify the different species that are captured in 10-minute collection samples used for estimating salvage. The key covers 56 species from 22 families salvaged at the TFCF. The key has a secondary purpose in that it serves as a reference for biologists working in the southern region of the Sacramento-San Joaquin Delta.

INTRODUCTION

The Tracy Fish Collection Facility (TFCF), Tracy, California, a fish salvage facility developed and built by the Department of the Interior, Bureau of Reclamation (Relcamation) as part of the Central Valley Project, is located at the head of the Delta Mendota Canal and the Tracy Pumping Plant (TPP). The TFCF operates to salvage fish that would otherwise be drawn into the Delta Mendota Canal intake channel by the TPP. To estimate the number of fish encountered at the TFCF in a 2-hour interval, 10-minute collections are conducted every 2 hours and the sample multiplied by 12. The TFCF salvages more than 50 species of fish, including endangered species such as the winter-run Chinook salmon, *Oncorhynchus tshawytscha,* and threatened species such as the delta smelt, *Hypomesus transpacificus*.

The purpose of this key is to provide a means for identifying the fishes that are found in the southern region (South Delta) of the Sacramento-San Joaquin Delta (Delta) and are salvaged at the TFCF. Employees at the TFCF are expected to identify all fish species salvaged. Proper identification of fish species is crucial, as it can influence the pumping rates by the TPP. Several species are very similar in appearance and therefore identification materials (e.g., posters and keys) are an integral part of the identification process.

A few fish species were added to this report for varying reasons. White bass, *Morone chrysops*, and northern pike, *Esox lucius*, both have yet to be identified in the TFCF, are included because of their plausible presence in the Delta. Both species are found in nearby reservoirs. Sacramento perch, *Archoplites interruptus*, last recorded in the TFCF in 1986 and most likely extirpated from the Delta, is also included because of its abundance in nearby reservoirs and because of recently attempted reintroductions in the Delta. Three more species added to this report were introduced from Japan. They are Wakasagi, *Hypomesus nipponensis*, shimofuri goby, *Tridentiger bifasciatus*, and Shokihaze goby, *Tridentiger barbatus*. They were first recorded in the TFCF in 1994, 1995, and 2004, respectively.

Certain fish species were omitted because their presence could not be confirmed, ***i.e.*** no samples were saved for species verification. They are tui chub, *Siphateles bicolor*, coho (silver) salmon *Oncorhynchus kisutch*, and the yellow bullhead, *Ameiurus natalis*. They were last recorded in the TFCF in 1979, 1985, and 1997, respectively. Tui chubs are concentrated mainly in drainages near the border of California and Nevada while the yellow bullheads are found mainly in southern California. The coho salmon, a State and Federally listed endangered species, is extremely rare in the South Delta.

Using the key

The key is dichotomous which means that it consists of a series of 55 paired choices that lead the user to the correct name of the fish being identified. The user should select the choices that best describe the fish characteristic. Once the choice is selected, the user will be prompted to either proceed to the next numbered choice or agree with the identification of the fish.

Illustrations are included to make the key easier to follow. Refer to the fish structures and terminology diagrams (figure 1) for location of body parts. For more detailed descriptions, refer to the glossary at the end of the key. The key is based on external body features such as shape, proportions, and meristic counts of adult fishes; therefore, this key may not work for fishes less than 20 mm.

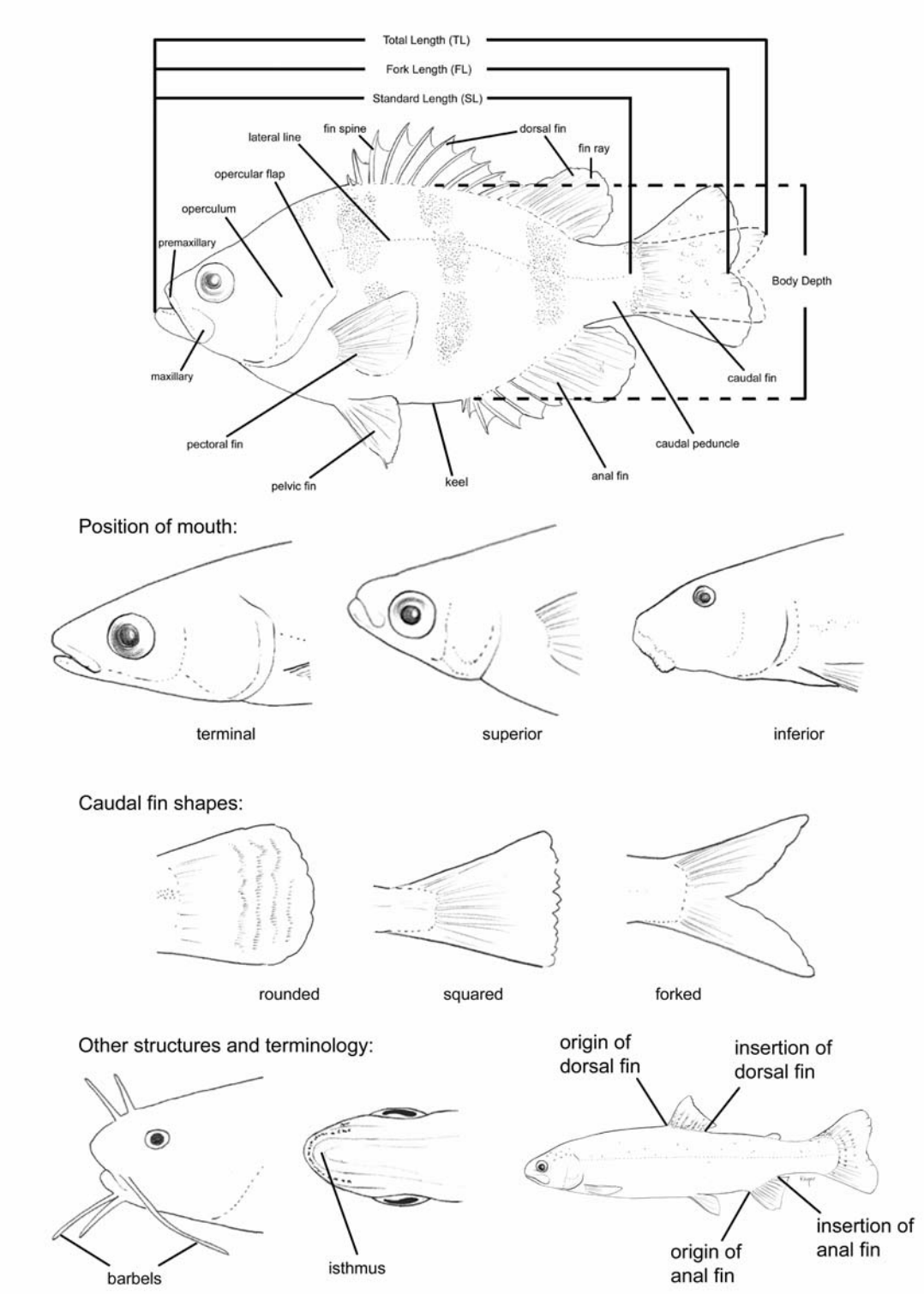


FIGURE 1.—Fish structures and terminology.

Key to the Fishes of the Tracy Fish Collection Facility

1a. Body eel-shaped (figure 2) 2
1b. Body not eel-shaped 4

FIGURE 2.—Body is eel-shaped.

2a. Mouth has true jaw ..... **American eel**, *Anguilla rostrata*
2b. Mouth a sucking disc 3

3a. Upper tooth plate with three teeth (figure 3) .. **Pacific lamprey**, *Lampetra tridentata*
3b. Upper tooth plate with two teeth (figure 3) ..... **river lamprey**, *Lampetra ayresii*

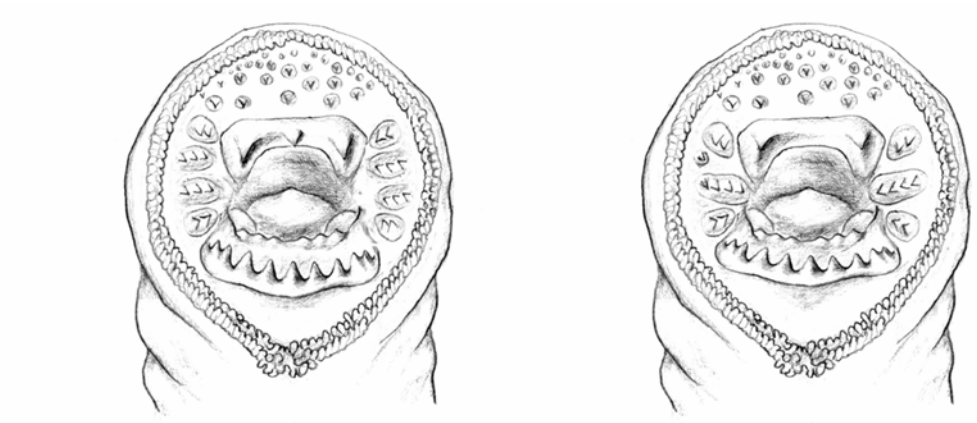


FIGURE 3.—Pacific lamprey sucking disc with three upper teeth (left), river lamprey sucking disc with two upper teeth (right).

4a. Body extremely depressed or flattened; eyes on one side of head; alternating light and dark bands on dorsal and anal fins; flat fish (figure 4) .... **starry flounder**, *Platichthys stellatus*
4b. Body not flattened; both eyes not on the same side of head.....5

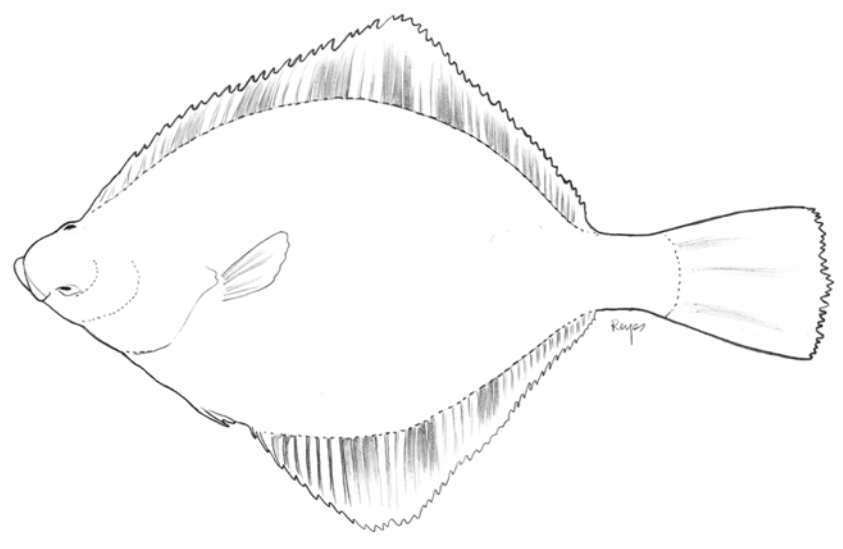


FIGURE 4.—Starry flounder.

5a. Dorsal fin preceded by three isolated spines – two long, one short; caudal fin lobes equal in length (figure 5) ..... **threespine stickleback**, *Gasterosteus aculeatus*
5b. All dorsal spines, if present, united by membranes into fins.....6

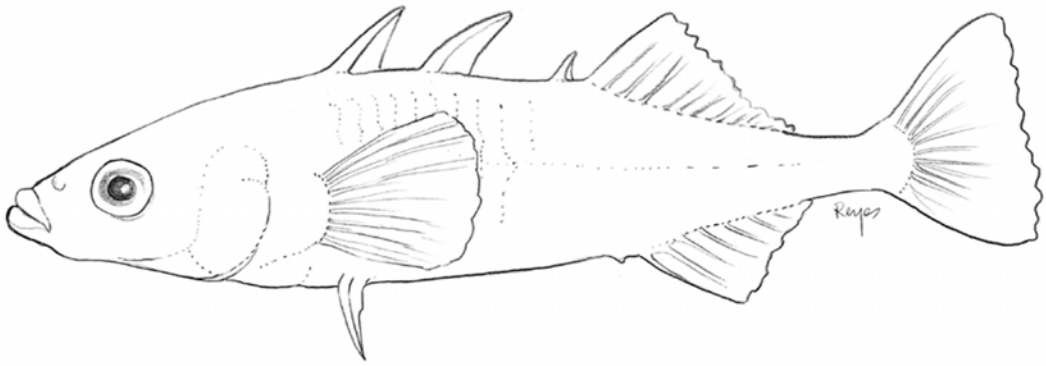


FIGURE 5.—Threespine stickleback.

6a. Body with five rows of bony plates; one dorsal row, one mid-lateral row on each side and one ventral row on each side; upper lobe of caudal fin much larger than lower lobe 7
6b. Body without rows of bony plates; caudal fin lobes variable in shape 8

7a. Mid-lateral plates 38-48 in number; snout blunt; barbels closer to snout than to mouth, no plates behind dorsal fin, abdomen white (figure 6)..... ..... **white sturgeon**, *Acipenser transmontanus*
7b. Mid-lateral plates 23-31 in number; snout pointed; barbels closer to mouth than to snout, 1-2 dorsal plates behind dorsal fin, olive green stripe on abdomen (figure 6).....**green sturgeon**, *Acipenser medirostris*

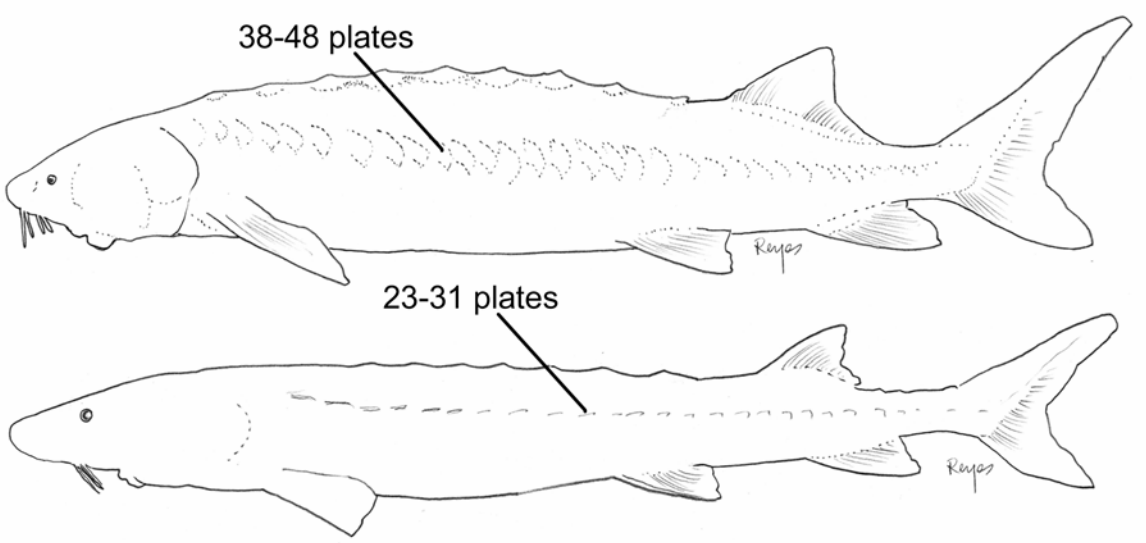


FIGURE 6.—White sturgeon (top) and green sturgeon (bottom).

8a. Adipose fin present (figure 7).....9
8b. Adipose fin absent 18

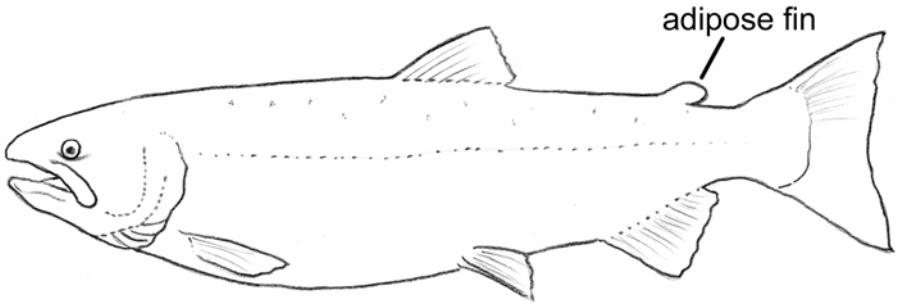


FIGURE 7.—Adipose fin.

9a. Barbels on chin; skin without scales.....10
9b. Barbels absent; scales present.....14

10a. Caudal fin forked or deeply concave (figure 8).....11
10b. Caudal fin not deeply forked; but squared or rounded (figure 8).....13

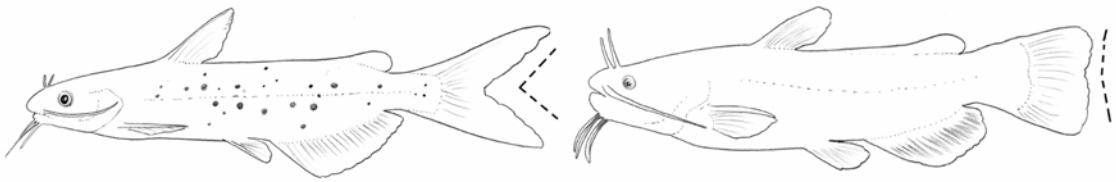


FIGURE 8.—Catfish caudal fin shape: forked (left) and squared (right).

11a. Anal fin rays 30-36; margin of anal fin nearly straight (figure 9) .... **blue catfish**, *Ictalurus furcatus*
11b. Anal fin rays less than 30 12

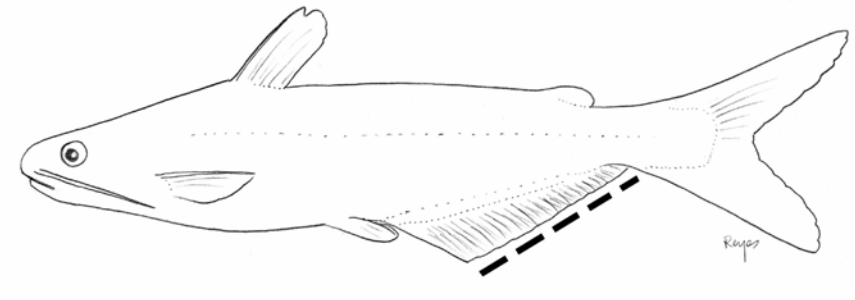


FIGURE 9.—Blue catfish.

12a. Spots on body; head narrow and pointed; anal fin ray count 24-29, caudal fin deeply forked (figure 10) ..... **channel catfish**, *Ictalurus punctatus*
12b. No spots on body; head wide; anal fin ray count 19-23, caudal fin not deeply forked (figure 10) ..... **white catfish**, *Ameiurus catus*

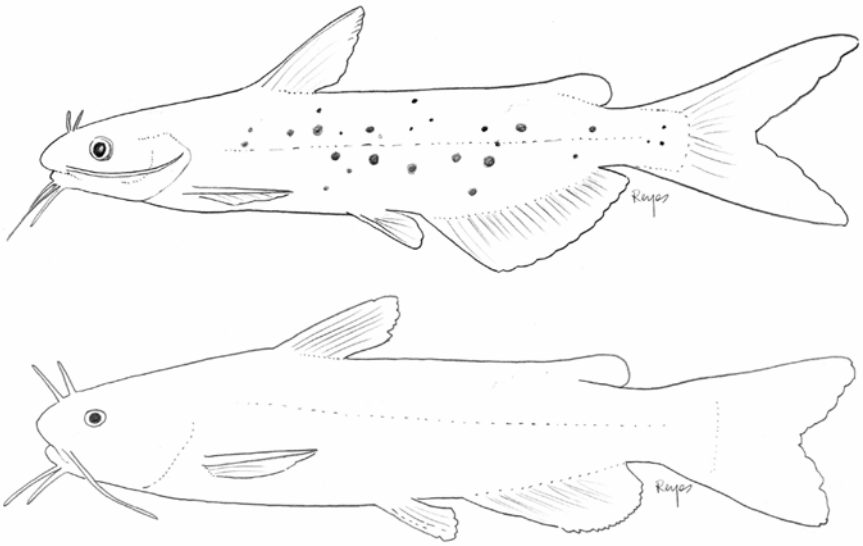


FIGURE 10.—Channel catfish (top) and white catfish (bottom).

13a. Pectoral spine strongly barbed along edge; lower chin barbel dark except for light portion next to or adjacent to chin; membrane between anal fin rays not pigmented (figure 11) ..... **brown bullhead**, *Ameiurus nebulosus*
13b. Pectoral spine smooth or weakly barbed; lower chin barbel dark; membrane between anal fin rays is pigmented (figure 11)..... **black bullhead**, *Ameiurus melas*

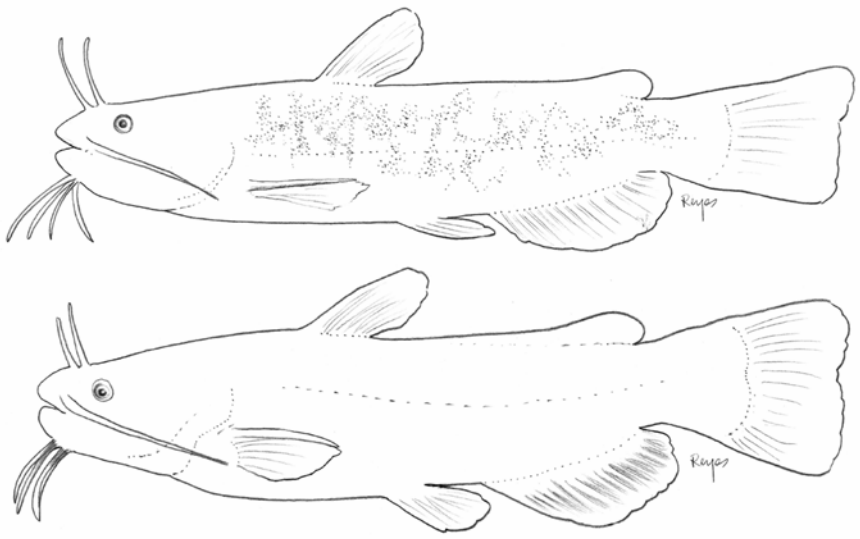


FIGURE 11.—Brown bullhead (top) and black bullhead (bottom).

14a. Scaly appendage (axillary process) present at the base of each pelvic fin (figure 12) 15
14b. No axillary process 16

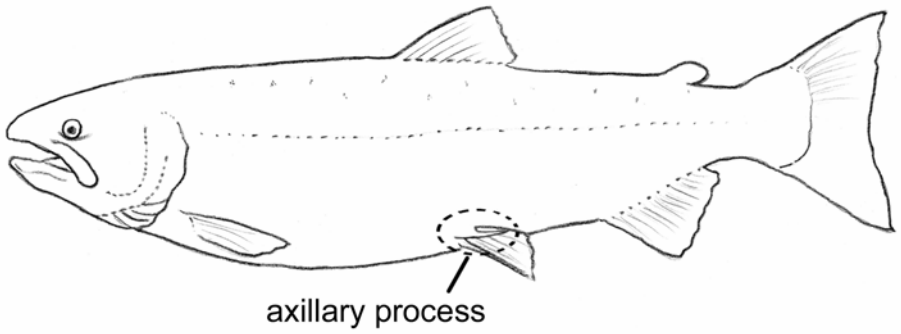


FIGURE 12.—Scaly appendage or axillary process at the base of pelvic fin.

15a. Leading edge of anal fin shorter than base of anal fin; in juveniles, no spots present on fins and parr marks oval; in adults, black spots present on dorsal and caudal fins; anal fin ray 13-20 (figure 13) .... **Chinook salmon**, **(or king salmon)**, *Oncorhynchus tshawytscha*
15b. Leading edge of anal fin longer than base; in juveniles, spots on fins and parr marks round; in adults, spots on dorsal and caudal fins; anal fin ray 8-12 (figure 13) .....**steelhead**, *Oncorhynchus mykiss*

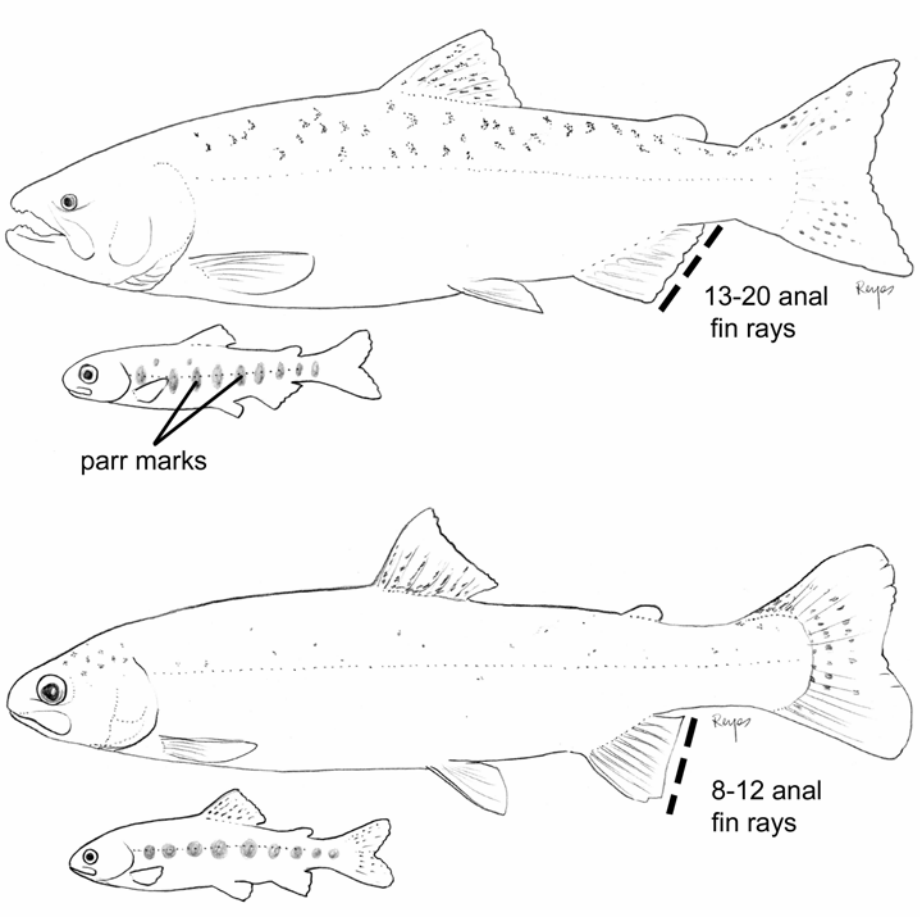


Figure 13.—Chinook salmon adult and juvenile (top). Steelhead adult and juvenile (bottom).

16a. Pectoral fins reach pelvic; maxillary extends to behind posterior margin of eye; mouth large and superior (figure 14) .....**longfin smelt**, *Spirinchus thaleichthys*
16b. Pectoral fins extend only 2/3 distance to pelvic; maxillary does not extend to middle of eye; mouth small and terminal 17

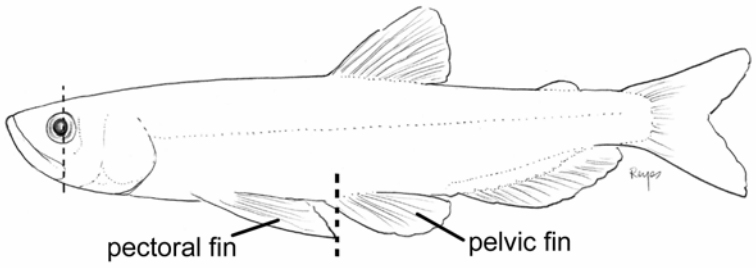


FIGURE 14.—Longfin smelt.

17a. Zero to one chromatophores (pigment spots) on the isthmus; dorsal fin rays 9-10, wider shaped; V-shaped pigmentation at caudal peduncle (figure 15)..... .....**delta smelt**, *Hypomesus transpacificus*

17b. Many chromatophores on the isthmus; dorsal fin rays 7-9, narrower shaped; no V-shaped pigmentation at caudal peduncle (figure 15)..... ..... **wakasagi**, *Hypomesus nipponensis*

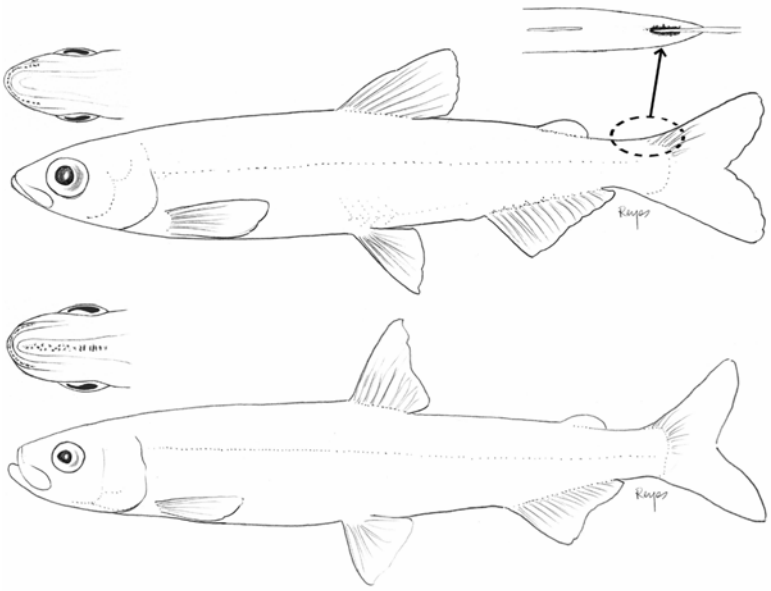


FIGURE 15.—Delta smelt with view of isthmus (top). Wakasagi with view of isthmus (bottom).

18a. Dorsal fin divided into two sections (figure 16).....19

18b. One distinct dorsal fin (figure 16) 41

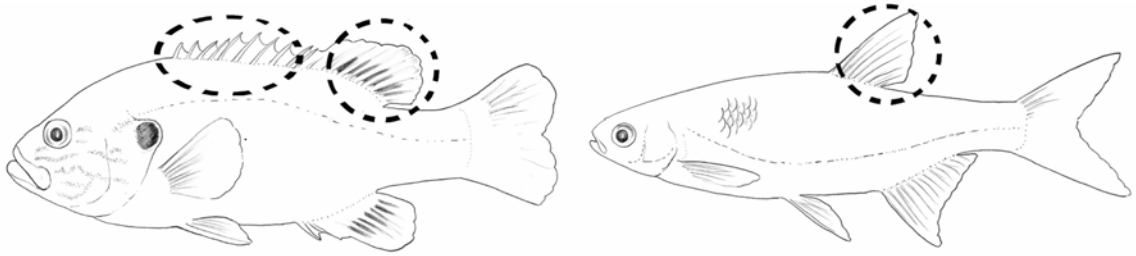


FIGURE 16.—Fish with dorsal fin divided into 2 sections (left) and fish with one distinct dorsal fin (right).

19a. Pelvic fins fused into a disc (figure 17).....20

19b. Pelvic fins not fused.....22

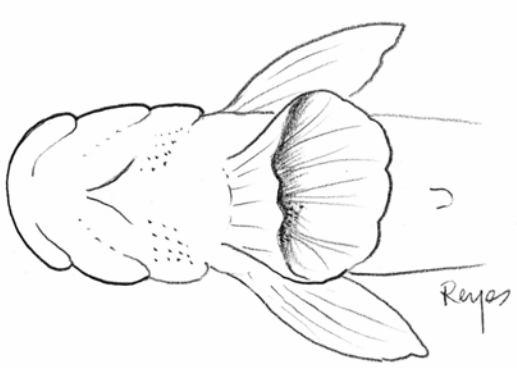


FIGURE 17.—Ventral view of fish with fused pelvic fins forming a disc.

20a. Numerous barbels around mouth (figure 18) .. **Shokihaze goby**, *Tridentiger barbatus*
20b. No barbels around mouth.....21

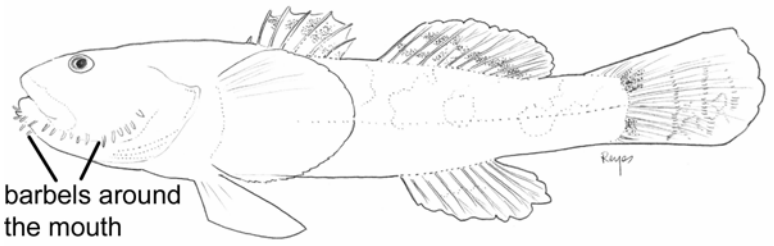


FIGURE 18.—Shokihaze goby.

21a. Eyes are close together near the top of the head, first dorsal fin with pigmented tip; first dorsal fin with eight fin rays, adults as long as 20 cm(figure 19)..... ..... **yellowfin goby**, *Acanthogobius flavimanus*
21b. Eyes not so close together, a distinct stripe running along the top of head to tail and usually a distinct dark band along the midline of each side; first dorsal fin with six fin rays, adults never longer than 9 cm (figure 19)..... ..... **shimofuri goby**, *Tridentiger bifasciatus*

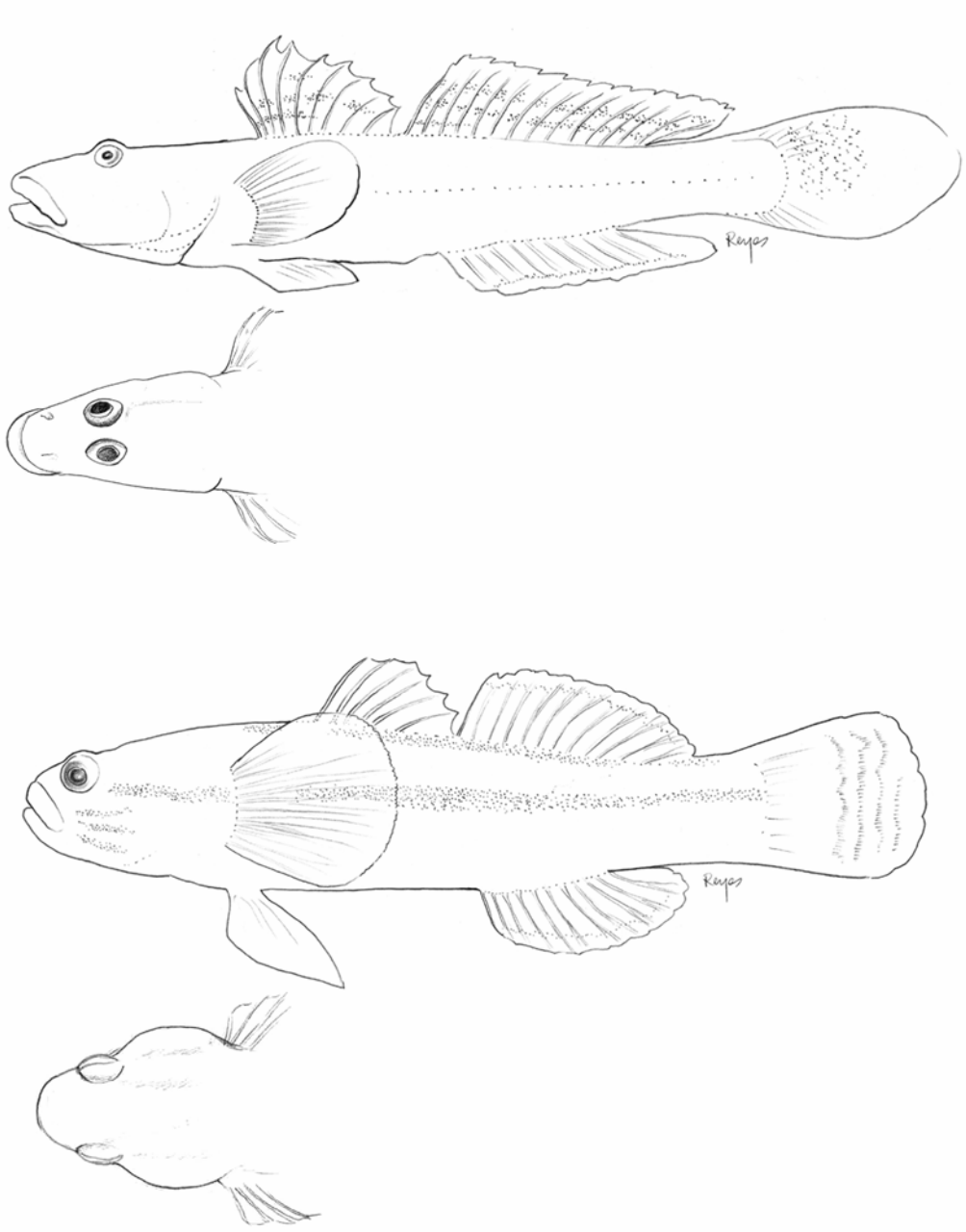


FIGURE 19.—Yellowfin goby (top) with a dorsal view of the head. Shimofuri goby (bottom) with a dorsal view of the head.

22a. Scales absent; body dorso-ventrally compressed; pectoral fins large (figure 20) 23
22b. Scales present; body laterally compressed; pectoral fins not so large (figure 20).....25

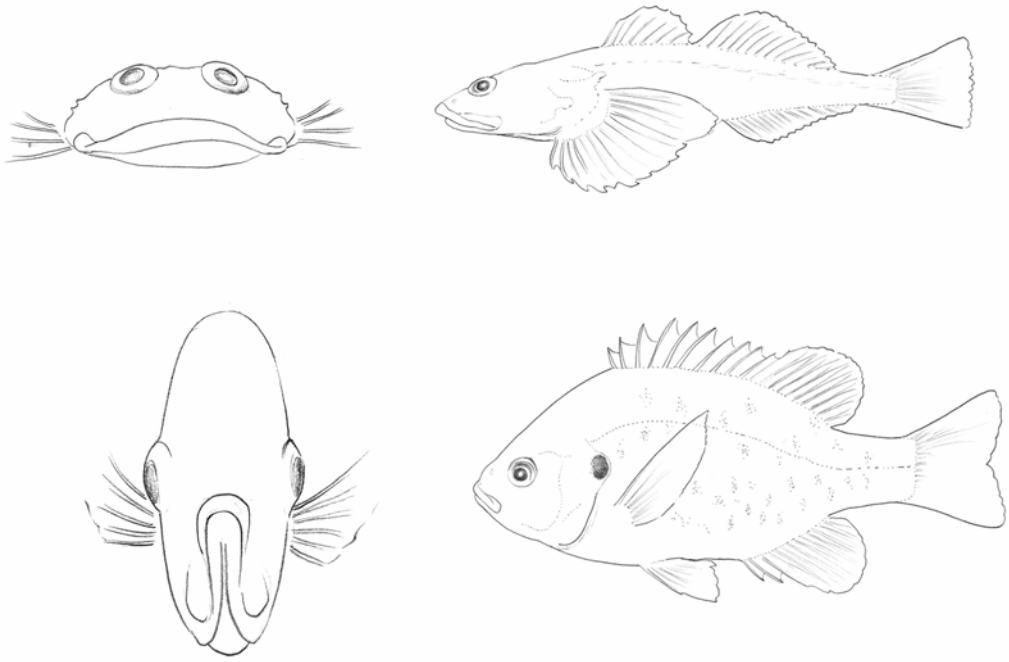


FIGURE 20.—Front profile and side profile of a dorso-ventrally compressed fish (top). Front profile and side profile of a laterally compressed fish (bottom).

23a. Preopercular spine antler-like (figure 21).....
.....**Pacific staghorn sculpin**, *Leptocottus armatus*
23b. Preopercular spine not antler-like.....24

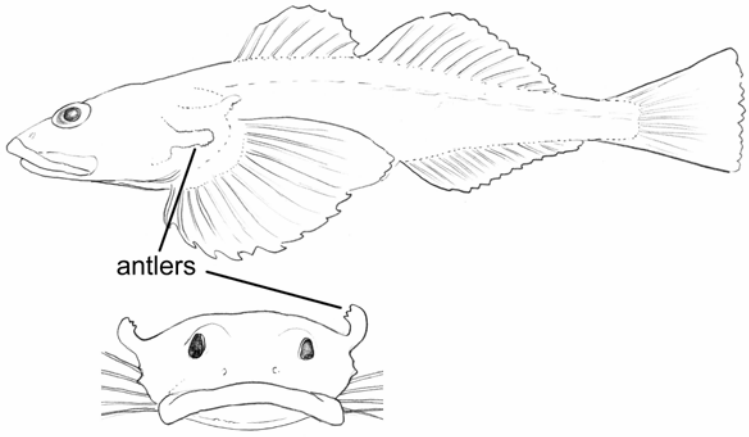


FIGURE 21.—Pacific staghorn sculpin.

24a. Long anal fin, anal fin ray 16-19 (figure 22). .....**prickly sculpin**, *Cottus asper*
24b. Shorter anal fin, anal fin rays 12-16, usually 13-15 ..... **riffle sculpin**, *Cottus gulosus*

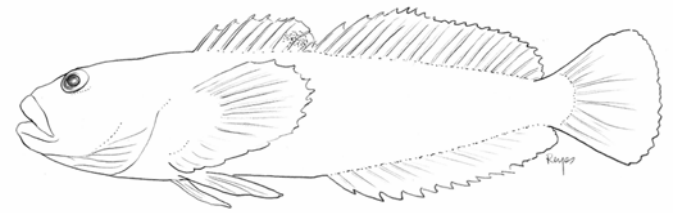
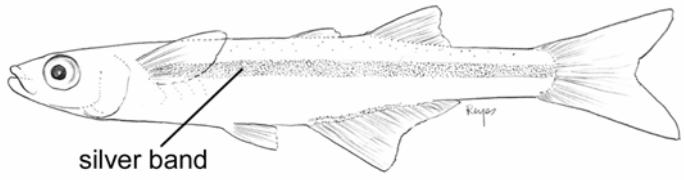


FIGURE 22.—Prickly sculpin.

25a. Silver band running along length of side (figure 23).....
.....**inland silverside**, *Menidia beryllina*
25b. No silver band along length of side 26

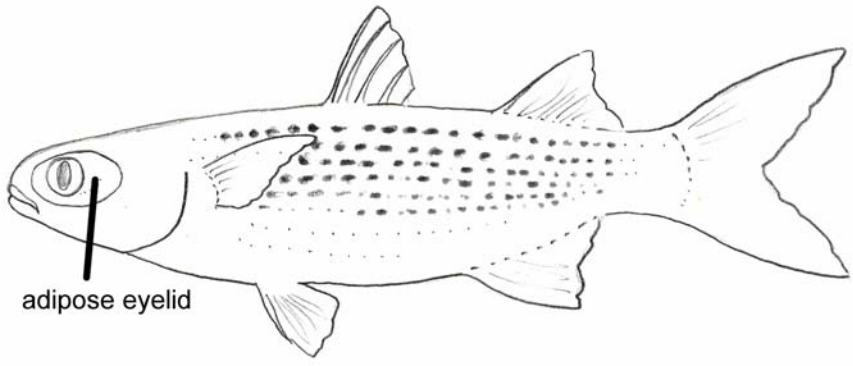
FIGURE 23.—Inland silverside.



26a. Horizontal stripes on body.....27
26b. No horizontal stripes on body.....29

27a. Anterior dorsal fin widely separated from posterior dorsal fin; adipose eyelid (figure 24) .....**striped mullet,** *Mugil cephalus*
27b. Anterior and posterior dorsal fins not widely separated; no adipose eyelid.....28

FIGURE 24.—Striped mullet.



28a. Body depth less than one-third of SL; head five times longer than second anal fin spine (figure 25) ..... **striped bass**, *Morone saxatilis*
28b. Body depth more than one-third of SL; head 3 times longer than second anal fin spine (figure 25) ..... **white bass**, *Morone chrysops*

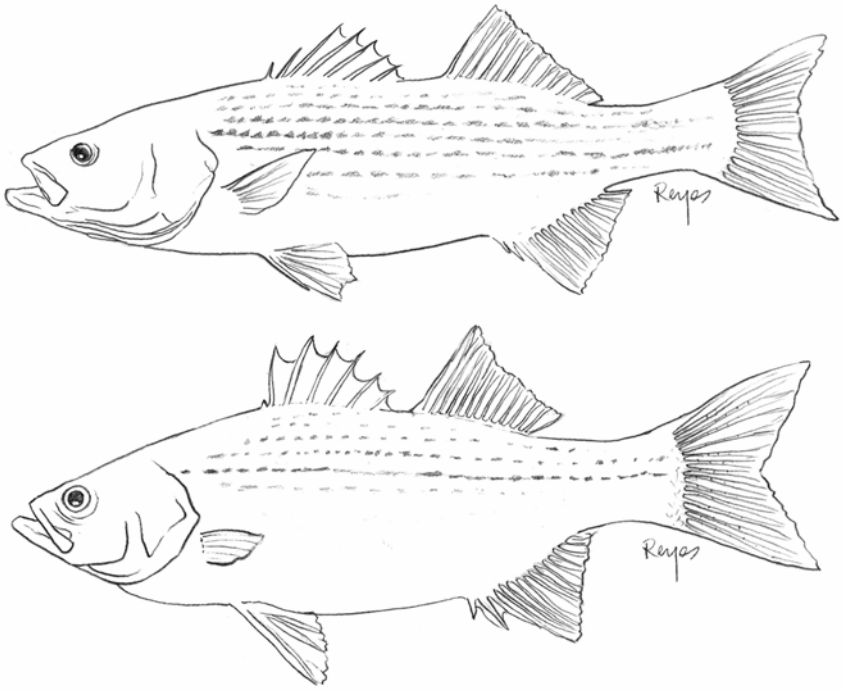


FIGURE 25.—Striped bass (top) and white bass (bottom).

29a. Body depth tubular and is equal to the girth width; 14-16 vertical stripes on sides (figure 26) ..... **bigscale logperch**, *Percina macrolepida*
29b. Body depth greater than the girth width and laterally compressed 30

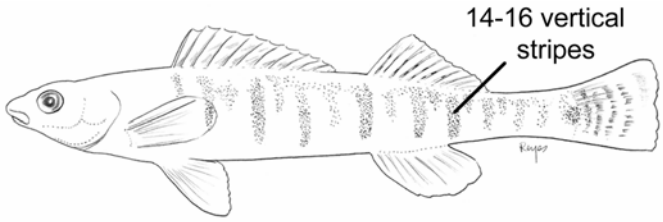


FIGURE 26.—Bigscale logperch.

30a. Body elongate and "bass" shaped, length about 3 times depth 31
30b. Body short and "panfish" shaped, length less than 2.5 depth.....33

31a. Maxillary extends beyond eye (figure 27)..... .....**largemouth bass**, *Micropterus salmoides*
31b. Maxillary does not extend past the eye.....32

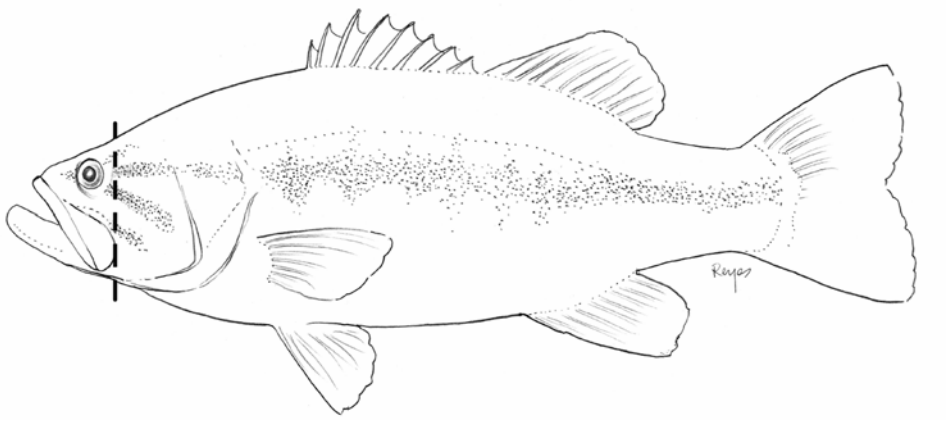


FIGURE 27.—Largemouth bass.

32a. Rays in rear portion of dorsal fin usually 13-15; 12-13 scale rows above lateral line; body has vertical bars; lateral line scales 66-78 (figure 28)..... ..... **smallmouth bass**, *Micropterus dolomieu*
32b. Rays in rear portion of dorsal fin usually 9-11; lateral band present; body has no vertical bars; lateral line scales fewer than 67(figure 28)..... ..... **spotted bass**, *Micropterus punctulatus*

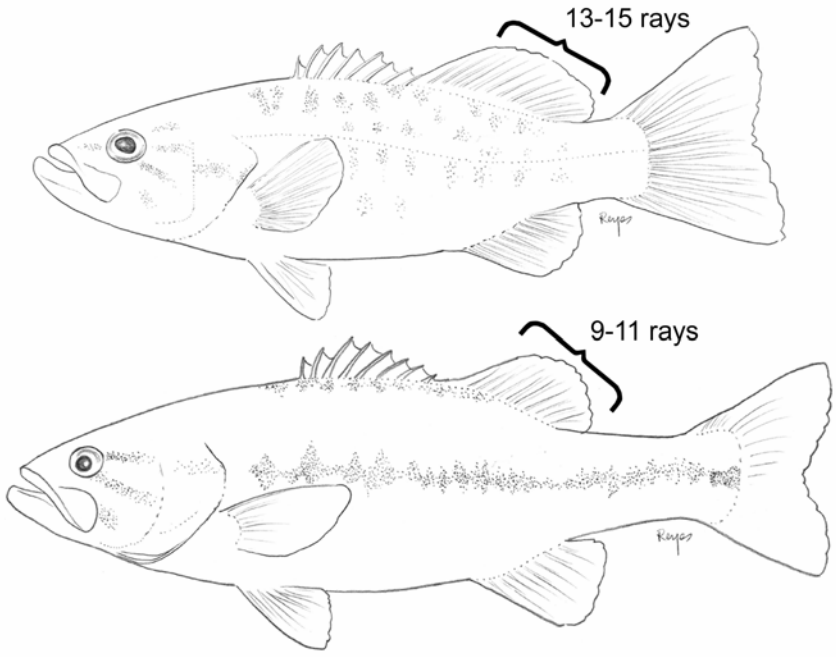


FIGURE 28.—Smallmouth bass (top) and spotted bass (bottom).

33a. Base of dorsal fin only slightly longer than base of anal fin, "concave" sloped head 34
33b. Base of dorsal fin much longer than base of anal fin, head does not have "concave" slope 35

34a. Dorsal fin spines 7-8; mottled pattern on body (figure 29) .... **black crappie**, *Pomoxis nigromaculatus*
34b. Dorsal spines 5-6; broken vertical bands on the body (figure 29)..... ..... **white crappie**, *Pomoxis annularis*

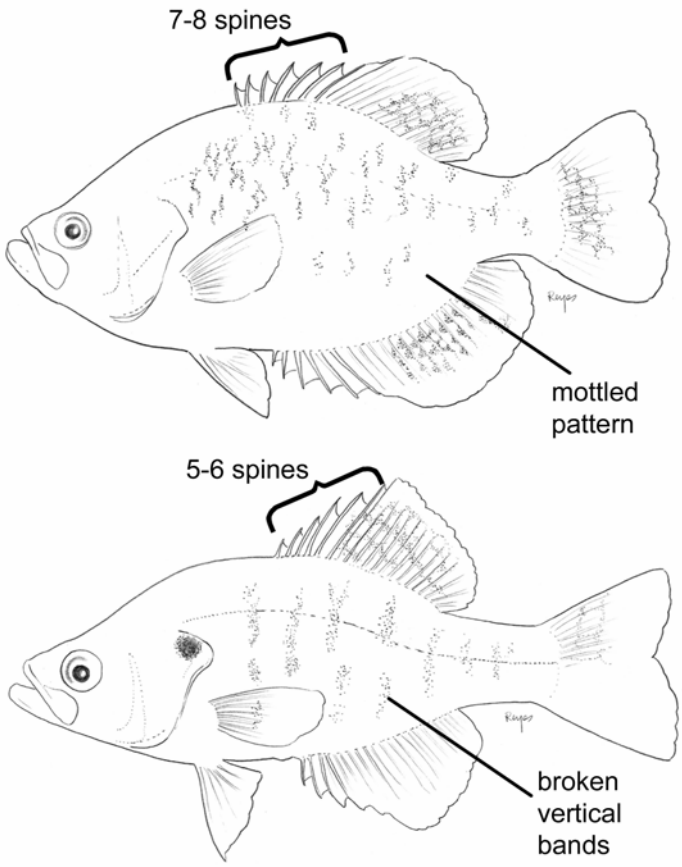


FIGURE 29.—Black crappie (top) and white crappie (bottom).

35a. Maxillary extends to at least the middle of eye (figure 30).....36
35b. Maxillary does not extend to middle of eye (figure 30) 38

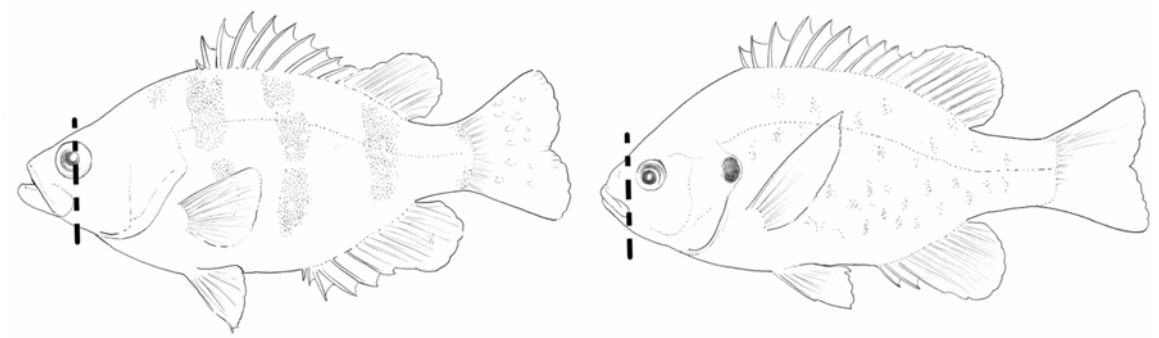


FIGURE 30.—Maxillary extends to at least middle of eye (left) and maxillary not extending to middle of eye (right).

36a. Iridescent speckles on body; maxillary extends to middle of eye; dark blotches on dorsal and anal fins on spawning males (figure 31) .... **green sunfish**, *Lepomis cyanellus*

36b. No iridescent speckles on body; maxillary extends past middle of eye; no dark blotches on dorsal and anal fins.....37

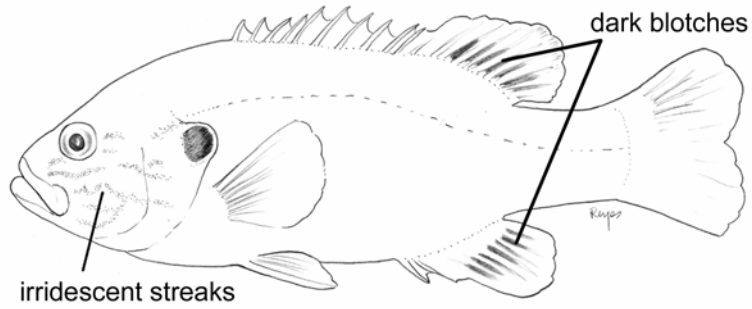


FIGURE 31.—Green sunfish.

37a. Anal spines 6-8; dorsal spines 12-14; no stripes on the operculum radiating from the eyes (figure 32)..... **Sacramento perch**, *Archoplites interruptus*

37b. Anal spines 3; dorsal spines 9-11; stripes on the operculum radiating from the eyes (figure 32) ..... **warmouth**, *Lepomis gulosus*

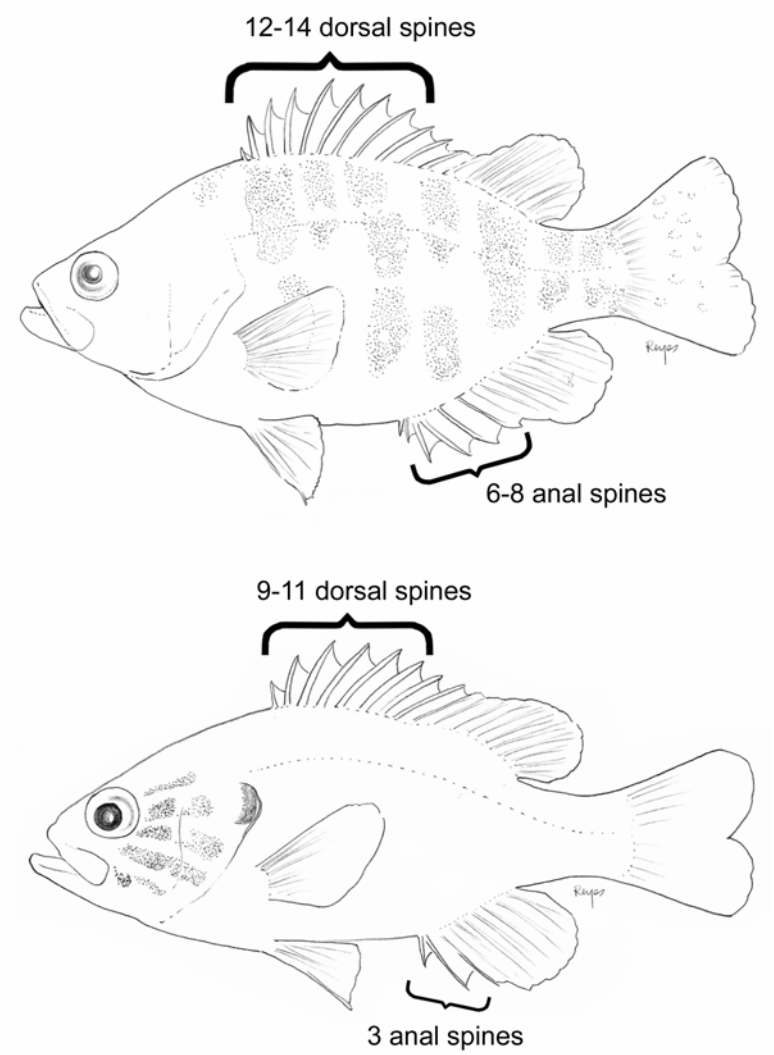


FIGURE 32.—Sacramento perch (top) and warmouth (bottom).

38a. Dorsal spines 15 or more, ridge of scale along base of dorsal fin (figure 33)..... ..... **tule perch**, *Hysterocarpus traskii*

38b. Dorsal spines 9-11, no ridge of scales along base of dorsal fin, pectoral fins pointed 39

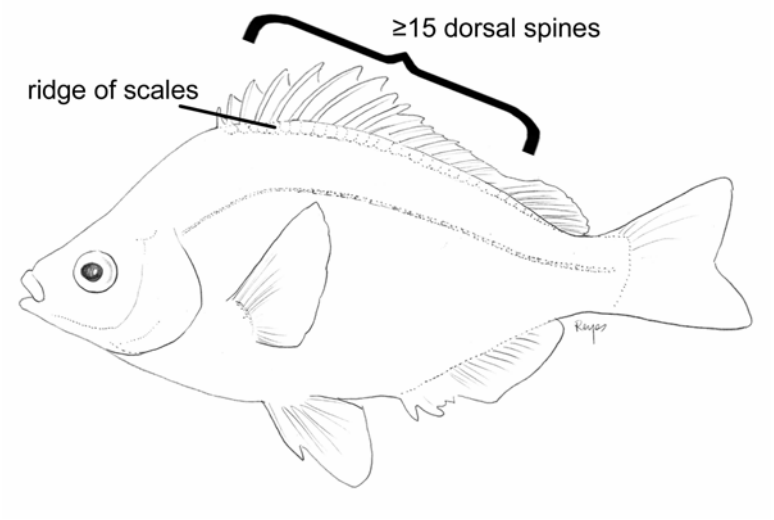


FIGURE 33.—Tule perch.

39a. Dark marking on the 2nd dorsal fin; no red or orange coloration on the opercular flap (figure 34) ..... **bluegill**, *Lepomis macrochirus*
39b. No dark marking on dorsal fin; red or orange coloration on the opercular flap.....40

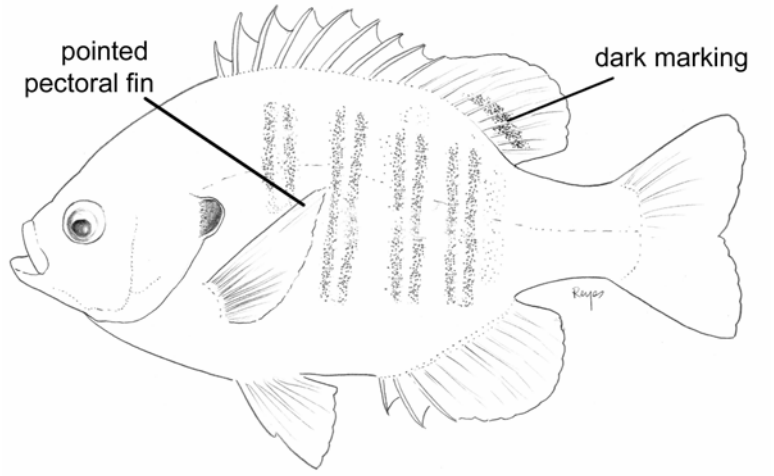


FIGURE 34.—Bluegill.

40a. Orange or red margin on opercular flap, no conspicuous stripes on operculum; body with blotches (figure 35)..... **redear sunfish**, *Lepomis microlophus*
40b. Red spot on the opercular flap, blue and orange stripes on operculum; body without vertical bars (figure 35) ..... **pumpkinseed**, *Lepomis gibbosus*

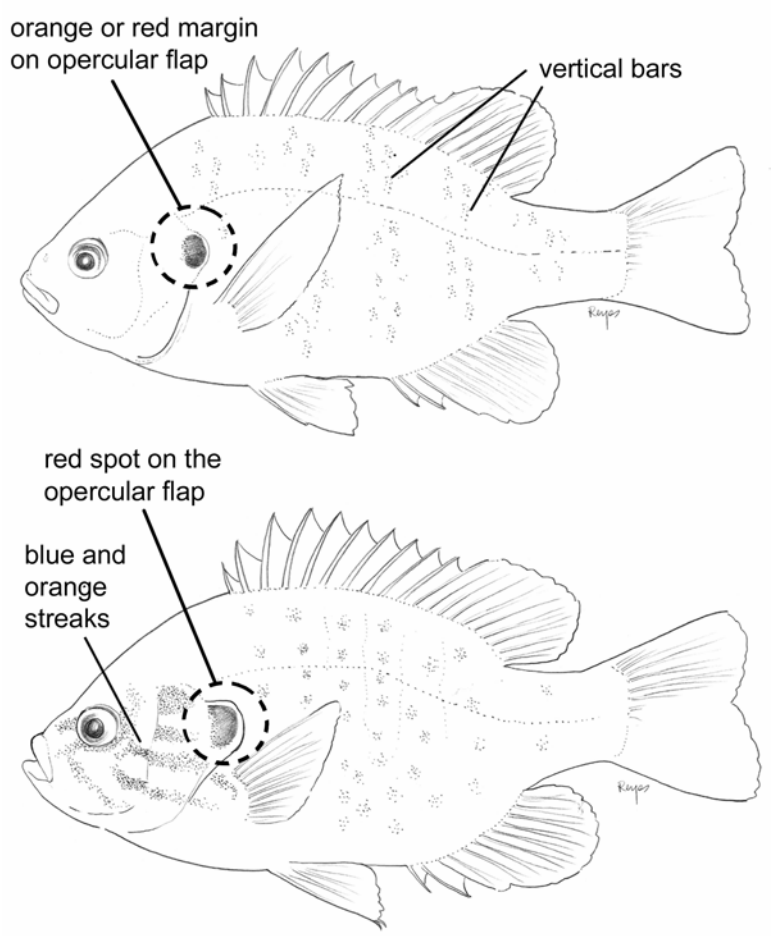


FIGURE 35.—Redear sunfish (top) and pumpkinseed (bottom).

41a. Caudal fin rounded 42
41b. Caudal fin not rounded 43

42a. Dorsal fin origin posterior to anal fin origin (figure 36) ....**western mosquitofish**, *Gambusia affinis*
42b. Dorsal fin origin anterior to anal fin origin (figure 36) .... **rainwater killifish**, *Lucania parva*

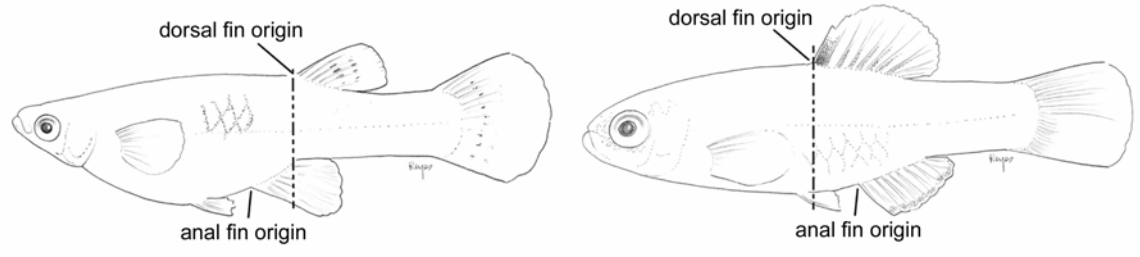


FIGURE 36.—Western mosquitofish (left) and rainwater killifish (right).

43a. Keel of body with scutes, saw-like 44
43b. Keel without scutes, smooth 45

44a. Last ray of dorsal fin greatly elongated, one spot on each side of body; body deep (figure 37).....**threadfin shad**, *Dorosoma petenense*
44b. Last ray of dorsal fin not elongated, row of spots along side of body; body elongated (figure 37).....**American shad**, *Alosa sapidissima*

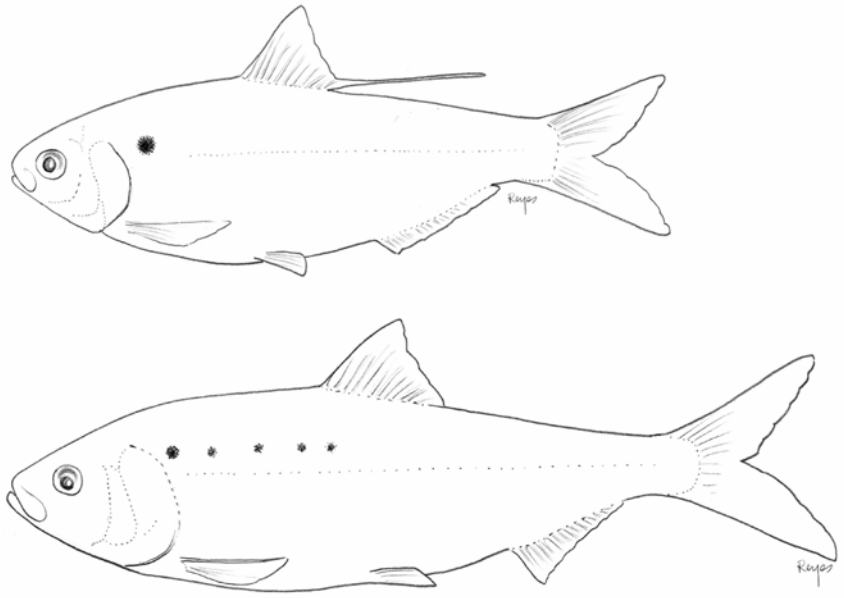


FIGURE 37.—Threadfin shad (top) and American shad (bottom).

45a. Mouth inferior or directed downward, lips thickened (figure 38)..... ..... **Sacramento sucker,** *Catostomus occidentalis*
45b. Mouth not inferior and is directed forward, lips not thickened 46

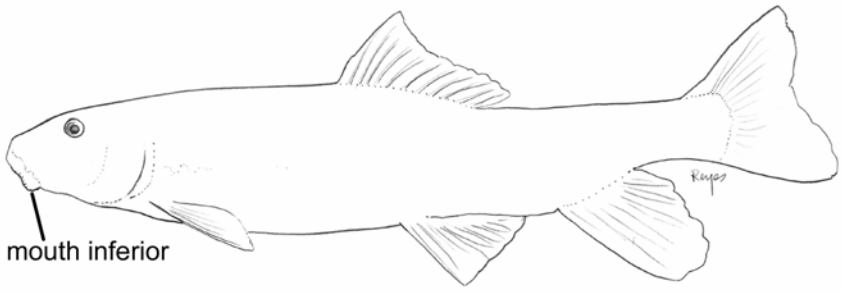


FIGURE 38.—Sacramento sucker.

46a. Dorsal fin with a hardened fin ray or "spine".....47
46b. Dorsal fin without hardened fin ray or "spine" 48

47a. Upper jaw with 1-2 pairs of barbels (figure 39) ..... **common carp**, *Cyprinus carpio*
47b. Upper jaw without barbels (figure 39)..... **goldfish**, *Carassius auratus*

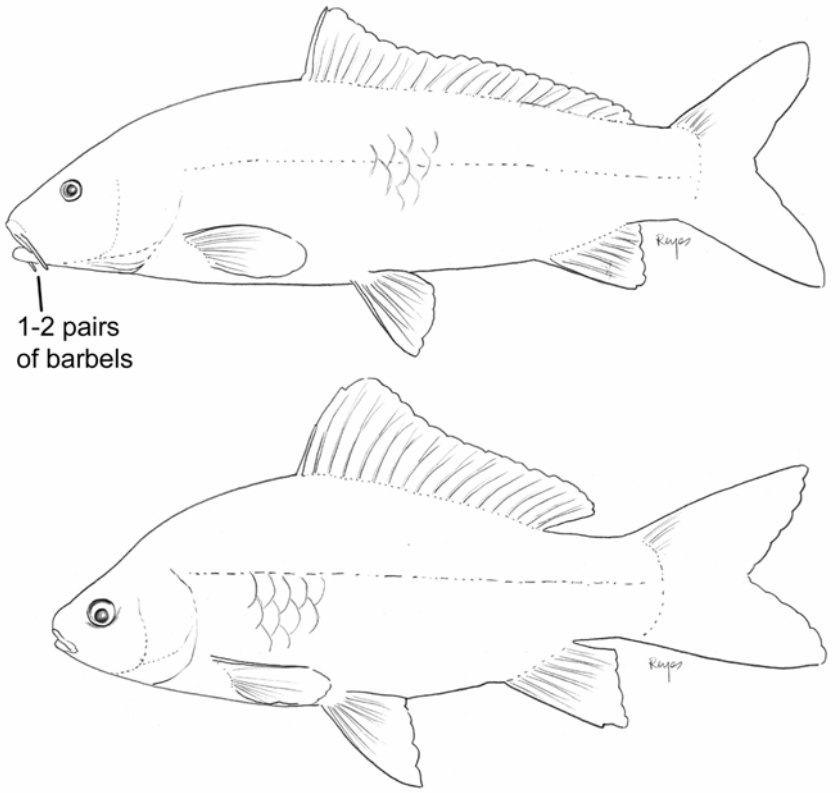


FIGURE 39.—Common carp (top) and goldfish (bottom).

48a. Fleshy keel without scales between pelvic and anal fins; anal fin forked (figure 40) ..... **golden shiner**, *Notemigonus crysoleucas*
48b. Keel with scales 49

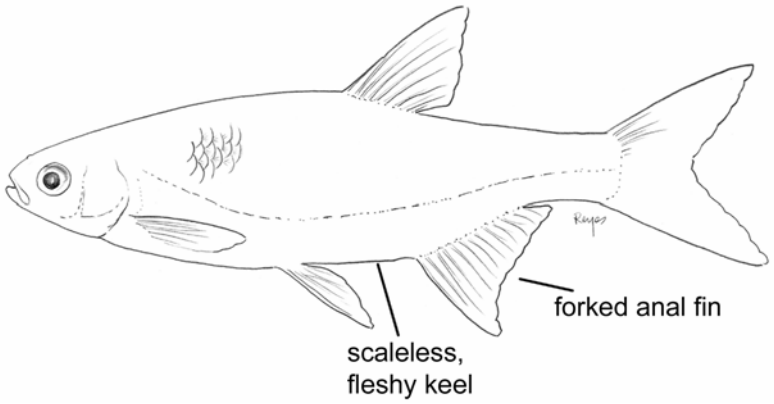


FIGURE 40.—Golden shiner.

49a. Premaxillary not separated completely from head, but connected by a bridge of skin called a frenum (figure 41) ..... **hardhead**, *Mylopharodon conocephalus*
49b. Premaxillary separated from snout by a complete groove.....50

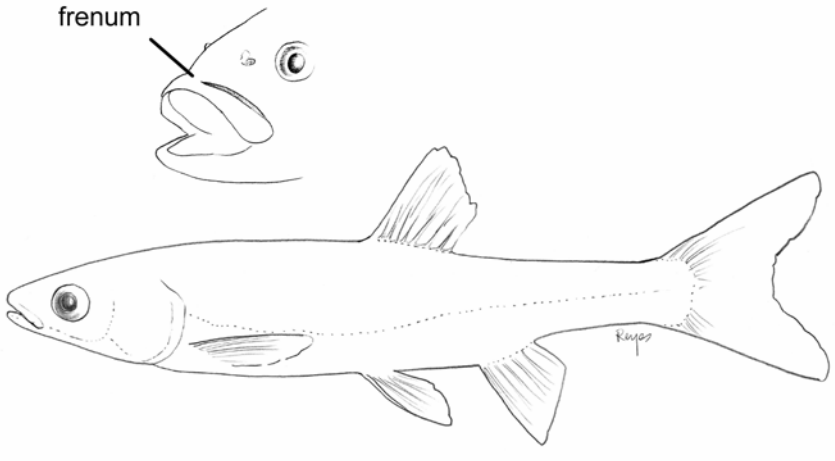


FIGURE 41.—Hardhead.

50a. Upper lobe of caudal fin longer than lower lobe (figure 42)..... ..... **splittail**, *Pogonichthys macrolepidotus*
50b. Both lobes of caudal fin equal in length 51

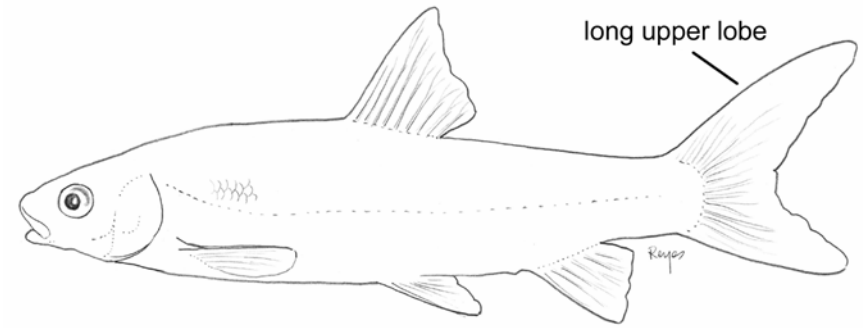


FIGURE 42.—Splittail.

51a. Mouth flattened and duckbill-like, dorsal fin located in latter half of the body, oval spots on the body (figure 43) ..... **northern pike**, *Esox lucius*
51b. Mouth neither flattened nor duckbill-like, dorsal fin located at or near the center of the body, no oval spots on the body 52

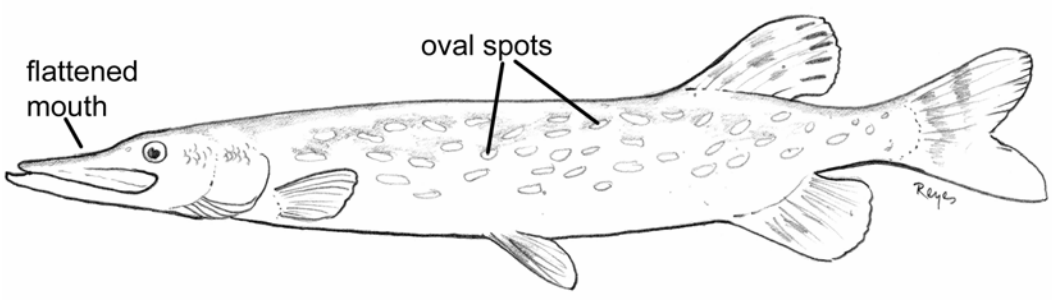


FIGURE 43.—Northern pike.

52a. Mouth large, maxillary extends to at least the anterior edge of eye(figure 44)..... ..... **Sacramento pikeminnow**, *Ptychocheilus grandis*
52b. Mouth smaller, maxillary does not extend to eye.....53

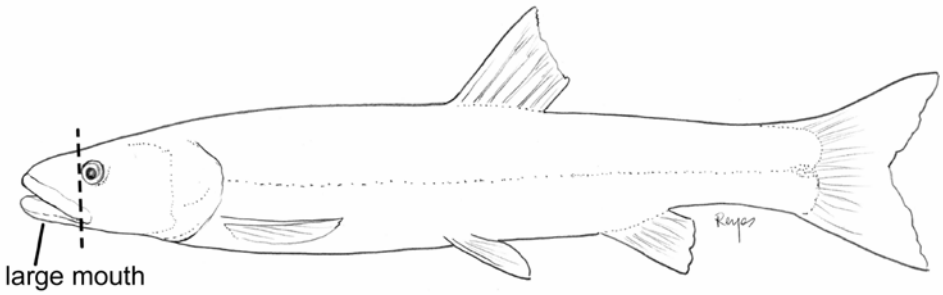


FIGURE 44.—Sacramento pikeminnow.

53a. Scales small, lateral line has more than 90 scales (figure 45) .... **Sacramento blackfish**, *Orthodon microlepidotus*
53b. Scales large, lateral line less than 90 scales.....54

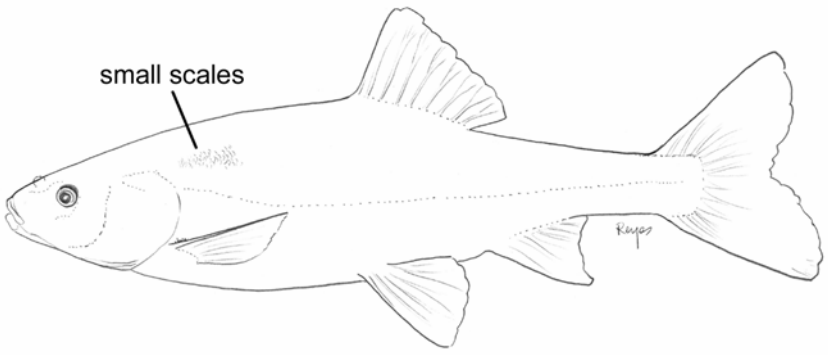


FIGURE 45.—Sacramento blackfish.

54a. Anal fin rays 10-14; anal fin not forked (figure 46) ..... **hitch**, *Lavinia exilicauda*
54b. Anal fin rays less than 10.....55

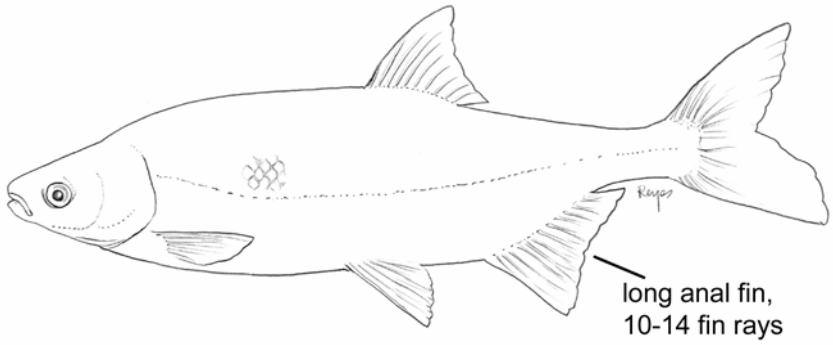


FIGURE 46.—Hitch.

55a. Head wide and round, dorsal fin rounded, dorsal scales pigmented along perimeter, small scale, lateral scales ≥ 30; breeding adult males have black heads with pale vertical bands on their sides; caudal peduncle 40 percent of body depth (figure 47) ..... **fathead minnow**, *Pimephales promelas*
55b. Head narrow and pointed, dorsal fin less rounded, edge of dorsal scales pigmented; adults may be reddish; lateral scales ≤ 30; caudal peduncle 20 percent of body depth (figure 47) ..... **red shiner**, *Cyprinella lutrensis*

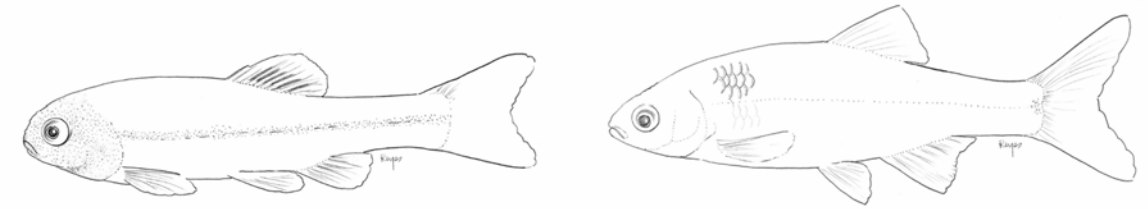


FIGURE 47.—Fathead minnow (left) and red shiner (right).

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GLOSSARY

Adipose eyelid	An immovable transparent outer covering or partial covering of the eye of some groups of bony fishes, such as mullets.
Adipose fin	A fleshy fin located between the dorsal fin and caudal fin found in the salmon, smelt, and catfish families.
Anal fin	Fin located on the "bottom" of the fish between the anus and the caudal fin.
Anterior	Towards the front.
Axillary process	A modified, pointed scale projecting from the insertion or the base of the pelvic fin. Often found in members of the Salmonidae family.
Barbel	A fleshy, elongated sensory structure located at the corner of the jaw or adjacent to the mouth.
Body depth	The greatest depth that can be measured, excluding the dorsal and anal fins.
Caudal fin	The tail fin.
Caudal peduncle	The slender portion of the body that is between the anal and caudal fins.
Chromatophore	A colorful pigment cell.
Cusp	A projection on a tooth.
Delta	Tidally influenced body of water. The Delta in this key refers to the area comprising of the Sacramento and the San Joaquin Rivers and its tributaries.
Dorsal fin	Fin located on the "top" of the fish. Fish in the Delta have one or two dorsal fins.
Dorso-ventrally compressed	Shape of a fish when the head and body are flattened horizontally. Examples are sculpins and catfish.
Fin spines	Unbranched, unsegmented supports for fins that, if present, are on the leading edge of the fin.

Forked	Term to describe the shape of the caudal fin that has two lobes.
Fork length (FL)	The distance from the tip of the snout or lower jaw to the middle of the fork of the caudal fin.
Frenum	A piece of skin joining the center of the lip to the head.
Fused	Joined; two membranes that have grown together to form a single fin.
Girth width	Measurement of the maximum thickness from side to side.
Isthmus	The narrow area below the head near the "chin".
Keel	The ventral or bottom edge of fish.
Lateral line	A line of sensory receptors that runs along the midline of the fish from the opercular opening to the base of the tail that helps fish detect water movements.
Lateral line scales	Scales bisected by the lateral line, extending from the edge of the opercular opening to the base of the tail.
Laterally compressed	Shape of a fish when the head and body are flattened sideways. Examples are the sunfishes.
Leading edge	The anterior edge.
Maxillary	Upper jaw bone located posterior to the premaxillary.
Meristic	Composing of segments or body parts.
Midlateral	The area of the body that runs parallel to the lateral line.
Midlateral plates	Bony plates in sturgeon located along the middle of the side.
Mouth inferior	Shape of the mouth when the upper jaw extends beyond lower jaw.
Mouth superior	Shape of the mouth when the lower jaw extends beyond upper jaw.
Mouth terminal	Shape of the mouth when the lower and upper jaws extend evenly at the end of the body.
Opercular flap	The posterior edge of the operculum.
Operculum	A thin bony structure covering the gills.
Origin	The most anterior point at the base of a fin.
Parr marks	Markings or patterns on the side of salmonid young.
Pectoral fin	A pair of fins located behind the operculum.

Pelvic fins	A pair of fins located ventrally and anterior to the anal fin.
Plates	In sturgeons, the individual bony structure that forms a row on the dorsal, midlateral, and ventral parts of the body. Plates on sturgeons have scutes.
Posterior	Toward the tail.
Premaxillary	The upper jaw bone located anterior to the maxillary.
Preopercular	An area on the operculum.
Rays	Soft supporting elements in fins.
Scutes	Scales formed with sharp points.
South Delta	The southern reach of the Sacramento-San Joaquin Delta where two active water diversion plants, ran by the State Water Project and the Federal Central Valley Project, are located.
Spines	Hard supporting elements made of bone and forming the inflexible portion of a fin.
Squared	Caudal fin with vertically terminal border or slightly rounded corners. syn. truncated.
Standard length (SL)	The distance from the tip of the snout or lower jaw to the end of the vertebral column.
Sucking disc	Round mouth used by some lampreys for attaching or feeding on fish.
TFCF	Abbreviation for Tracy Fish Collection Facility.
Total length (TL)	The greatest length that can be measured, from the tip of the snout or lower jaw to the end of the longest ray of the caudal fin (upper and lower lobes are squeezed together).
TPP	Abbreviation for Tracy Pumping Plant.
Ventral	The underside of the body.