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Keys to Oregon Freshwater Fishes

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Keys to Oregon Freshwater Fishes

Introduction

These keys for the identification of Oregon fresh-water fishes were originally designed for use in ichthyology classes at Oregon State University and are an outgrowth of the Oregon Agricultural Experiment Station research project on Oregon fishes. Included in the key are the fishes known to occur in the fresh waters of the state and a few species which, although marine, occasionally move into fresh water at the head of tidewater. The grayling is included although all of the introduced populations of this species have probably disappeared without reproducing. Also included is the green sunfish, which is found in California near the Oregon border but has not yet been reported from Oregon.

The keys are arranged in two sections. The first is a key to families, and the second a key to species of each family. Identification is usually carried to the species level, but in some cases easily identifiable subspecies are included. A dichotomous arrangement is used throughout, so that a choice can be made between sets of alternative characters which are designated by a numeral and "a" or "b". To facilitate comparison, the sets—such as "1a" and "1b"—are kept together.

Generally, the features dealt with are those of adult fishes; many characteristics of juveniles are included. As most of these fishes develop adult characters at a length of 5 inches or more, difficulty may be encountered in identification of specimens up to 2-3 inches in length.

Common names used are those listed in Special Publication No. 2 of the American Fisheries Society. Fish not treated in that publication are referred to by local names, and for some species local common names are included for reference. Ranges are given for the State of Oregon only.

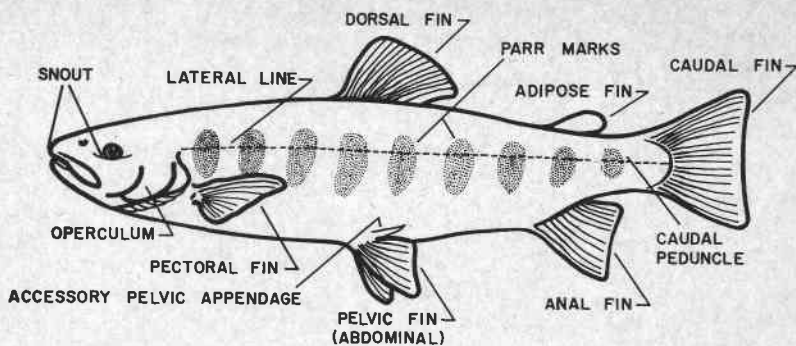


Figure 1. Soft-rayed fish showing external features.

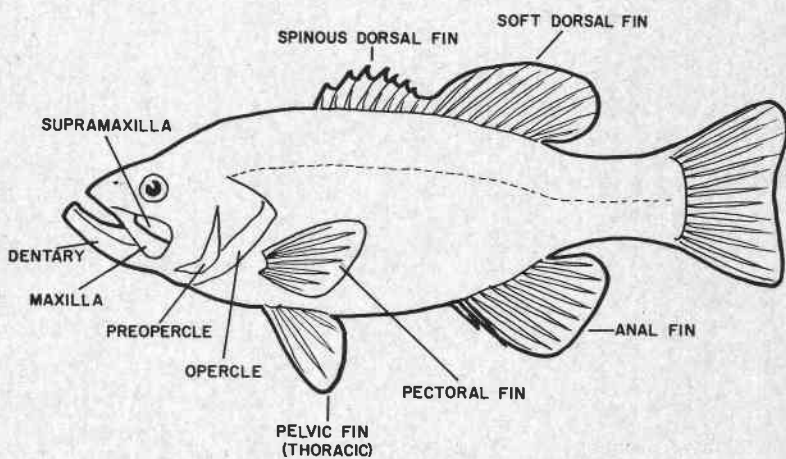


Figure 2. Spiny-rayed fish showing external features.

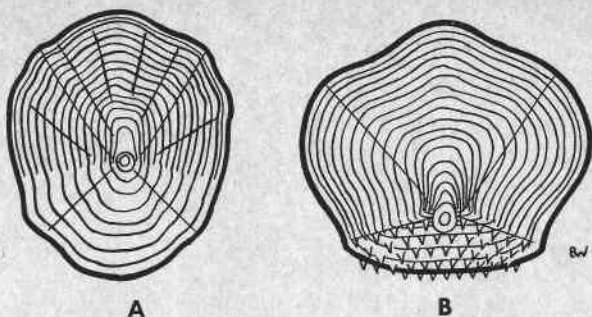
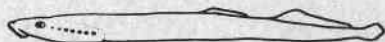


Figure 3. (A) Cycloid scale showing several radii. (B) Ctenoid scale showing "teeth" or ctenii.

Section 1. Key to Families

- 1a. No paired fins, jaws, or scales; 7 round gill openings on each side of pharyngeal region.

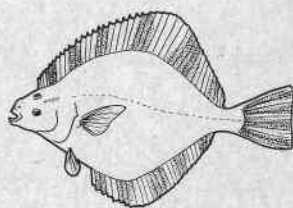
Family PETROMYZONTIDAE—lampreys, page 13.



- 1b. Paired fins and jaws present; scales usually present; 1 gill opening on each side. see 2

- 2a. Both eyes on same side of head; body very flat.

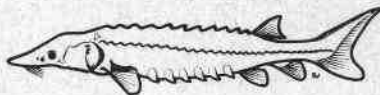
Family PLEURONECTIDAE—flounders, mostly marine, page 39.



- 2b. One eye on each side of head. see 3

- 3a. Tail heterocercal; body with bony scutes; snout produced into rostrum; 4 barbels in advance of inferior mouth.

Family ACIPENSERIDAE—sturgeons, page 14.



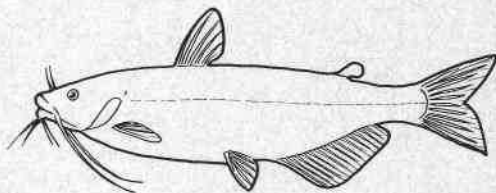
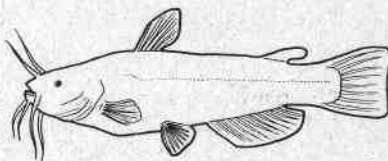
- 3b. Tail not heterocercal, both lobes of caudal fin nearly the same length; if scutes are present, the mouth is terminal. see 4

- 4a. An adipose fin present. see 5

- 4b. No adipose fin. see 9

- 5a. Scales absent, several barbels in region of mouth.

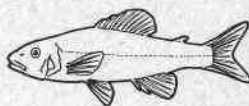
Family ICTALURIDAE—catfishes, page 31.



- 5b. Scales present, no barbels. see 6

- 6a. Sharp spines present in dorsal, anal, and pelvic fins; scales ctenoid.

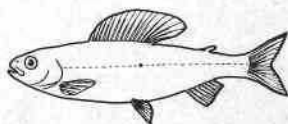
Family PERCOPSIDAE—troutperch, page 32.



6b. No spines in fins; scales cycloid. see 7

7a. Dorsal fin with more than 20 rays, long and high; spotting sparse, mainly on anterior part of sides.

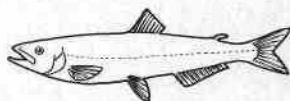
Family THYMALLIDAE—grayling, page 20.



7b. Dorsal fin with fewer than 20 rays. see 8

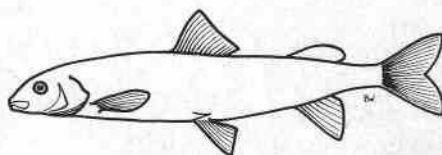
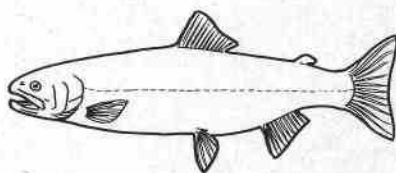
8a. No accessory pelvic appendage; mouth moderately large, the lower jaw projecting; no spotting, though fine stippling may be present.

Family OSMERIDAE—smelts, page 21.



8b. Accessory pelvic appendage present; spotting or parr marks present in most forms.

Family SALMONIDAE—salmons, trouts, whitefishes, page 15.



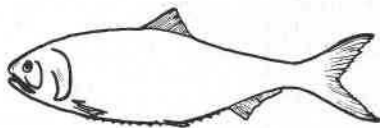
- 9a. A barbel at point of lower jaw; two dorsal fins, the first short, the second reaching about half the length of the back; pelvic fins long, jugular.

Family GADIDAE—burbot, page 32.



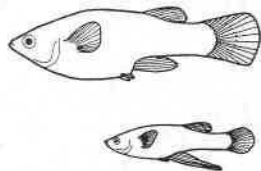
- 9b. No barbel at point of lower jaw; pelvics abdominal, thoracic, or jugular (if jugular, pelvics are minute). see 10
- 10a. Dorsal fin single, with no more than 1 large spinelike structure, usually none; pelvic fins abdominal; scales present. see 11
- 10b. Dorsal fin or fins with 3 or more true spines, these stiff or flexible; pelvic fins thoracic, jugular, or subabdominal. see 15
- 11a. Lateral line of sensory pores along sides of body imperfectly developed or absent. see 12
- 11b. Lateral line present, well developed on sides of body. see 14
- 12a. Caudal fin forked, midline of belly with ridged scutes which may give ventral midline a serrate appearance.

Family CLUPEIDAE—herrings, shad, page 15.



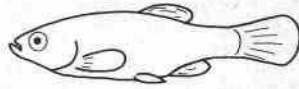
- 12b. Caudal fin truncate or rounded, belly without sharp scutes. see 13
- 13a. Anal fin origin in advance of dorsal origin, males with anal fin modified into a slender intromittent organ.

Family POECILIIDAE—livebearers, page 32.



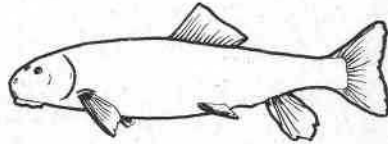
- 13b. Anal fin origin posterior to dorsal origin, anal fins of males and females similar.

Family CYPRINODONTIDAE—killifishes, page 32.



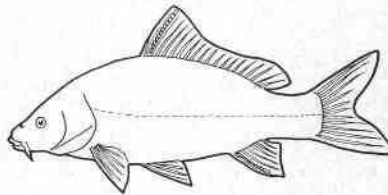
- 14a. Never with barbels or serrated spine-like rays in dorsal and anal fins; lips generally thick and papillose; distance from the origin of the anal fin to middle of caudal fin base contained 3 or more times in the distance from the origin of anal fin to tip of snout; pharyngeal teeth in single row, comblike, numbering 15 or more.

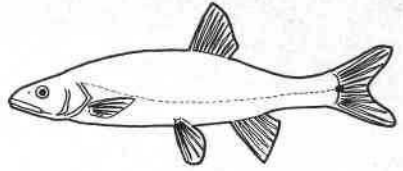
Family CATOSTOMIDAE—suckers, page 21.



- 14b. Distance from origin of anal to middle of base of caudal fin contained less than 2.5 times in the anal fin-to-snout distance, except in carp and goldfish which have stiff, serrated spinelike rays at anterior part of dorsal and anal fins; pharyngeal teeth in 1 to 3 rows, fewer than 10 on each bone; barbels may be present.

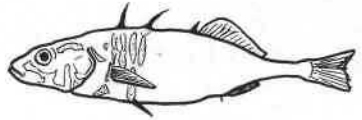
Family CYPRINIDAE—minnows, carps, daces, chubs, etc., page 25.





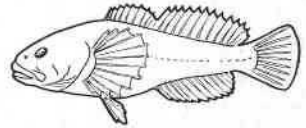
- 15a. Two prominent spines in advance of dorsal fin and not connected to it, a third at anterior edge of dorsal; a few to many bony plates on sides.

Family GASTEROSTEIDAE—sticklebacks, page 39.



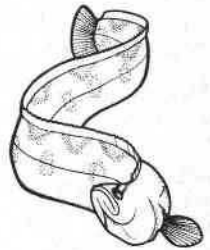
- 15b. All spines in dorsal fins connected by membranes; no bony plates on sides. see 16
- 16a. No scales on body; eyes placed close together high on head, which is flattened; dorsal spines flexible.

Family COTTIDAE—sculpins, page 35.

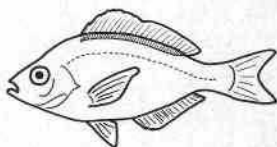


- 16b. Scales present; eyes on sides of head; dorsal spines usually stiff and rather sharp. see 17
- 17a. Body somewhat ribbonlike, long and compressed with long dorsal fin of more than 70 spines which begins close behind head and extends to caudal fin.

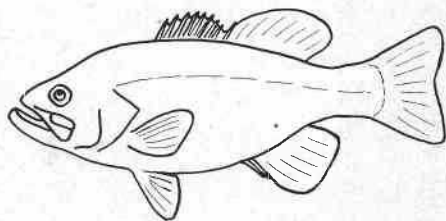
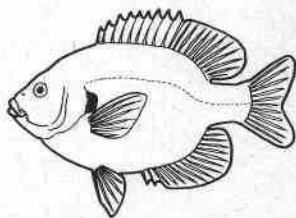
Family PHOLIDAE—gunnels, mostly marine, page 35.



- 17b. Body not ribbonlike, dorsal fin with no more than 20 spines. see 18
- 18a. Dorsal fin single (sometimes with deep notch near juncture of spinous and soft portions) ; no spine on opercle or serrations on preopercle. see 19
- 18b. Two separate dorsal fins. see 20
- 19a. Dorsal fin base with scaly sheath separated from body scales by a definite groove ; anal fin rays III, 23 to 25.
 Family EMBIOTOCIDAE—surfperches, mostly marine, page 35.

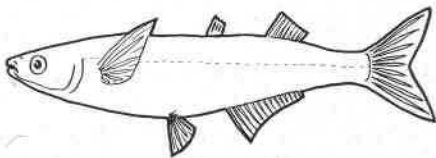


- 19b. Dorsal fin base not delineated by a groove ; anal with fewer than 20 soft-rays.
 Family CENTRARCHIDAE—sunfishes and bass, page 33.



- 20a. Spinous dorsal weak, about twice its length in front of the small soft dorsal; body elongate; dorsal surface rather wide.

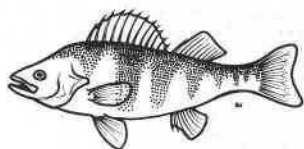
Family ATHERINIDAE—silversides, mostly marine, page 35.



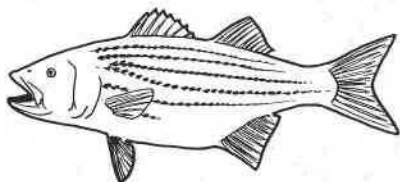
- 20b. Spinous dorsal strong, immediately in advance of soft dorsal; body rather robust. see 21

- 21a. Color pattern not of horizontal stripes, sides yellowish; sharp spine on operculum, or else canine teeth present.

Family PERCIDAE—perches, page 34.



- 21b. Color pattern of many dark horizontal stripes, sides silvery.
Family SERRANIDAE—bass, mostly marine, page 35.



Section 2. Key to Species

Family 1. PETROMYZONTIDAE

- 1a. Eyes present; mouth not hooded; buccal funnel evident, teeth visible. see 2

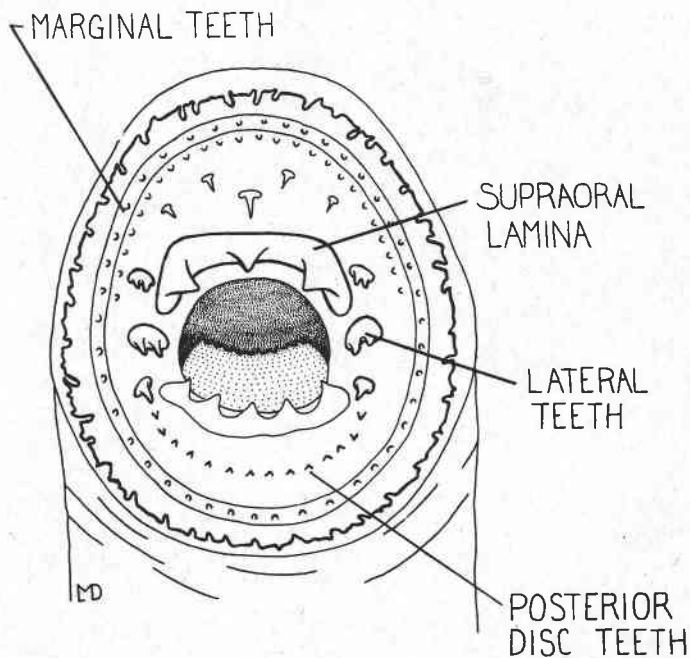


Figure 4. Oral disc or buccal funnel of lamprey showing positions of teeth.

- 1b. No eyes evident; mouth provided with a "hood"—larval specimens (ammocoetes).
- 2a. Series of small teeth, parallel to marginals in posterior portion of disc, more or less continuous with laterals. In parasitic forms, supraoral lamina has 3 cusps. see 3
- 2b. No such series of small teeth in the posterior portion of the disc. see 4

- 3a. All teeth sharp and functional, supraoral lamina with 3 cusps, the middle smaller than lateral ones; parasitic. Trunk myomeres of larvae about 60 to 70; dark pigment in caudal fin forms a dark line above and below tip of tail in larvae.

Pacific lamprey, *Lampetra tridentata* (Gairdner)

Most streams with access to the ocean, as well as a few landlocked situations. Probably one or more of the landlocked forms are worthy of subspecific recognition.

- 3b. Teeth dull, supraoral lamina with two widely separated cusps; body rather stout and deep; snout area rough and wrinkled in spawning specimens; dorsal fins barely separated by a notch. Nonparasitic. Larvae with dark pigment outlining tip of tail; dorsal fin of larvae low and with little variation in height, so that caudal fin is not well delineated. Trunk myomeres of larvae about 65 to 70.

"Klamath brook lamprey," *Lampetra* sp.

Klamath and Pit river systems.

- 4a. Teeth sharp and functional; disc large; adults over 8 inches in length; dorsal fins well separated. Parasitic. Trunk myomeres of larvae about 65 to 70. Larvae with black blotch in membranes at tip of tail.

River lamprey, *Lampetra ayresi* (Gunther)

Columbia River and coastal streams; not common.

- 4b. Teeth dull; disc relatively small; adults usually 8 inches or less in length; dorsal fins separated by a notch; usually nonparasitic. Trunk myomeres of larvae about 50 to 60. Tail of larvae without black blotch.

Western brook lamprey, *Lampetra planeri* (Bloch)

Widely distributed, especially in western Oregon.

Family 2. ACIPENSERIDAE

- 1a. Rostrum short and rounded; barbels closer to end of rostrum than to mouth; dorsal rays 44 to 48; plates between pelvics and anal fin in 2 rows of 4 to 8; lateral plates 38 to 48.

White sturgeon, *Acipenser transmontanus* Richardson

Columbia River and larger tributaries, occasionally in coastal streams and lakes near the ocean.

- 1b. Rostrum long and narrow; barbels closer to mouth than to end of rostrum; dorsal rays 33 to 35; plates between pelvics and anal fin in 1 or 2 rows of 1 to 4; lateral plates 23 to 30.

Green sturgeon, *Acipenser medirostris* Ayres

Marine, occasionally entering fresh water.

Family 3. CLUPEIDAE

- 1a. Body deep; scutes on midline of belly strong; row of dark spots on body close behind pectoral girdle.

Shad, *Alosa sapidissima* Wilson

Introduced, anadromous, entering coastal streams, Columbia and lower Willamette rivers.

- 1b. Body depth about equal to head length; scutes weak; no row of spots on body.

Pacific herring, *Clupea harengus pallasi* Valenciennes

Marine, occasionally entering fresh water.

Family 4. SALMONIDAE

- 1a. Scales large, fewer than 100 in lateral line; mouth small, teeth weak; no spotting in adults; round parr marks in young.

Mountain whitefish, *Prosopium williamsoni* (Girard)

Columbia River drainage and Harney Basin.

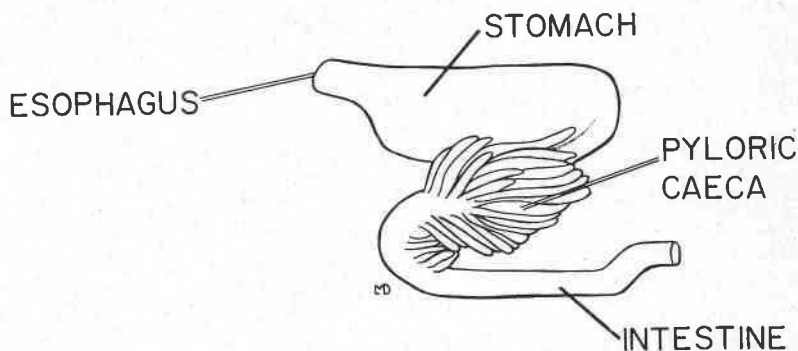


Figure 5. Position and appearance of pyloric caeca.

- 1b. Scales small, more than 100 in lateral line; mouth moderate to large; spotting evident in most species; parr marks of young generally ovoid. see 2
- 2a. Light marks or spots on a darker background; vomerine teeth on head of bone only. see 3
- 2b. Dark spots on a lighter background; if spots are lacking, anal rays number more than 13; teeth on head and shaft of vomer. see 5
- 3a. Back and dorsal fin with wavy marks or vermiculations, not spotted; crimson spots usually present on sides; anterior edge of anal and pelvic fins bordered with white.
 Brook trout, *Salvelinus fontinalis* (Mitchill)
 Introduced. Colder streams and lakes; most abundant in mountains.
- 3b. Marks on back not running together to form vermiculations. see 4
- 4a. Vomer with prominent raised crest; spots gray, irregular, large, extending onto fins; caudal fin deeply forked, peduncle slender.
 Lake trout, *Salvelinus namaycush* (Walbaum)
 Introduced. Odell, Crescent, Three-creeks, Big, and other high mountain lakes.
- 4b. Crest on vomer small or absent; spots cream to crimson, round, about the size of pupil of eye, not extending on fins; no vermiculations; body usually slender; caudal fin not deeply forked.
 Dolly Varden, *Salvelinus malma* (Walbaum)
 Colder streams and lakes, not found in Coast Range of Oregon.
- 5a. Interior of mouth white; anal rays usually fewer than 13*; young specimens with numerous black spots on body and dorsal fin, in addition to parr marks. see 6
- 5b. Interior of mouth dark in adults; anal rays 13 or more; young specimens with prominent parr marks and no spotting in dorsal fin. (An exception is the young of the pink salmon, which has no parr marks and no spots.) see 12

* The last ray may be branched at the base and thus appear superficially as two; but should be counted as one.

- 6a. Basibranchial ("hyoid") teeth present behind the tongue; a pronounced red to orange streak under each side of lower jaw, spots usually large, round, and distinct; vertebrae usually 61 or fewer; head usually long; mouth large. see 7
- 6b. Basibranchial teeth absent; red dashes under lower jaw usually absent. see 9
- 7a. Body profusely spotted except in fresh sea-run individuals which are silvery with blue-green backs overlaid with black spots. Scales above lateral line 25 to 38, anal fin rays 10 to 12.
Coastal cutthroat trout, *Salmo clarki clarki* Richardson
Western Oregon, Columbia River.
- 7b. Body sparsely spotted anteriorly, little spotting below lateral line; scales above lateral line 32 to 43; anal rays 9 to 10. see 8
- 8a. Parr marks persistent in individuals up to a foot in length; little spotting on sides; scales in lateral line 115 to 130.
Lahontan cutthroat trout, *Salmo clarki henshawi* Gill and Jordan
Alvord Lake drainage, portions of the Lahontan Basin in southeastern Oregon.
- 8b. Parr marks usually only in juveniles; spots fairly large; scales in lateral line usually over 130.
Yellowstone cutthroat trout, *Salmo clarki lewisi* (Girard)
Snake River and tributaries; John Day River, Grant County.
This subspecies is native to the Snake River drainage and was introduced to other parts of the state with little success.
- 9a. Spots usually lacking in caudal fin; red spots may be present on body, spots may have halos or be large and C- or X-shaped; a few very large spots on operculum; anal rays usually 8 or 9; color generally brownish. see 10
- 9b. Spots small, round (if X-shaped, small) without halos; spotting on caudal fin usually profuse; red spots absent; usually a red or rosy streak down sides; anal rays 10 to 12; vertebrae usually 60 to 65. see 11

- 10a. Color yellow-brown; red spots and/or spots with halos present; dorsal fin with 8 to 10 branched rays; 13 to 16 scales between base of adipose fin and lateral line, counting diagonally down and forward; caudal peduncle deep; young with orange adipose fin.

Brown trout, *Salmo trutta* (Linnaeus)

Introduced into several river systems and lakes.

- 10b. Adults somewhat brown above, silvery on sides; large X-shaped spots present; dorsal fin with 10 to 12 branched rays; 10 to 13 scales between base of adipose fin and lateral line, counting diagonally downward and forward; young quite dark in color, with about 10 heavy parr marks, red spots present on sides, 2 heavy black spots on operculum; caudal fin deeply forked, peduncle slender; pectoral fins disproportionately large.

Atlantic salmon, *Salmo salar* Linnaeus

Introduced to a few landlocked waters in the Deschutes drainage.

- 11a. Highly colored, with yellow and reddish wash; large parr marks evident on sides; spotting on sides sparse; scales in lateral line usually more than 160.

Golden trout, *Salmo aguabonita* Jordan

Introduced in high lakes and streams of Wallowa County and a few other localities.

- 11b. Color usually consisting of red or rosy stripe down the sides; spotting profuse; scales on lateral line usually fewer than 160; parr marks usually evident only in young.

Rainbow trout, *Salmo gairdneri* Richardson

Several races of rainbow occur in the state. Sea-run individuals are called steelhead and are usually given the subspecific name *S. g. gairdneri*. Some native inland stocks show a heavy wash of red-orange down the sides and are called redsides. Some long-headed, fine-scaled stocks superficially resembling cutthroat trout occur in isolated eastern Oregon drainages. The Klamath Lake rainbow, which can be distinguished by the short anal fin of 8 or 9 rays and small X-shaped spots, is called *S. g. newberryi*. The kamloops trout, *S. g. kamloops*, has been introduced, as have several hatchery-developed strains.

- 12a. Sea run individuals without spots; fine stippling, red coloration or "calico" markings may be present. (In landlocked situations, the sockeye salmon may develop spotting during its last year of life. It may be distinguished by its 30 or more gill-rakers and fewer than 100 pyloric caeca.) Young with small irregular parr marks above lateral line. see 13
- 12b. Sea run individuals with black spotting on back and occasionally in dorsal and caudal fins. Young with long vertical parr marks extending well below lateral line, or with no parr marks. see 14
- 13a. Gill rakers 30 or more; pyloric caeca 95 or fewer; caudal peduncle fairly slender.
 Sockeye salmon, blueback salmon, red salmon, *Oncorhynchus nerka* (Walbaum)
 Columbia River, may stray into other streams. The landlocked form *O. nerka kennerlyi* is known as the kokanee, yank, "silver trout," little red fish, and by many other names. It was native to a few Oregon lakes but now has been transplanted to several others.
- 13b. Gill rakers fewer than 30; pyloric caeca 140 or more; caudal peduncle very slender; fine black stippling on back of head in adult.
 Chum salmon, dog salmon, *Oncorhynchus keta* (Walbaum)
 Columbia River and lower tributaries; many coastal streams. Young remain in fresh water only a few weeks after hatching.
- 14a. Teeth of adults set in a white rim around gums; pyloric caeca 45 to 85; spotting usually absent from lower lobe of caudal fin and from upper half of dorsal fin. Young with parr marks vertical, elongate, usually narrower than interspaces; young with first few rays of anal fin (sometimes dorsal, also) elongate; in the young the anterior rays of anal, when depressed, reach well past insertion of anal; leading edge of anal fin of young is white.
 Coho, silver salmon, *Oncorhynchus kisutch* (Walbaum)
 Coastal streams, Columbia River and tributaries.

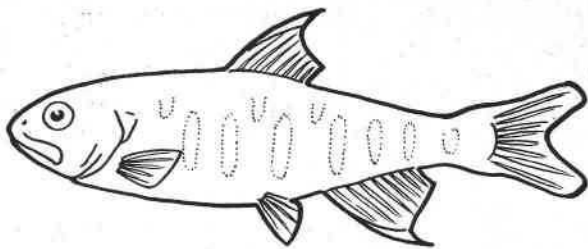


Figure 6. Juvenile silver salmon illustrating elongate rays in anal and dorsal fins.

14b. Teeth of adults set in dark mouth lining, no white gum-line evident; pyloric caeca more than 140; spotting heavy, typically in both lobes of caudal fin. see 15

15a. Scales in lateral line 131 to 151; in first row above lateral line 140 to 153; gill rakers 20 to 28; spotting usually over most of dorsal fin and caudal fin. No narrow fleshy hump developed in breeding males. Young with elongate vertical parr marks which are usually wider than interspaces. In the young, anterior rays of anal, when depressed, do not reach insertion of anal.

Chinook salmon, king salmon, *Oncorhynchus tshawytscha* (Walbaum)

Coastal streams, Columbia River and tributaries.

15b. Scales in lateral line 150 to 198, in first row above lateral line 170 to 229; gill rakers 26 to 34; spots very large, occurring on back and caudal fin. Males develop a large fleshy hump behind head when in breeding condition; young without parr marks.

Pink salmon, humpback salmon, *Oncorhynchus gorbuscha* (Walbaum)

Columbia River, straying into coastal streams.

Family 5. THYMALLIDAE

Grayling, *Thymallus arcticus montanus* (Richardson)

Introduced, possibly present in a few mountain lakes where planted; none have been seen since about 1945.

Family 6. OSMERIDAE

- 1a. Mouth small, the maxillary not reaching past middle of eye, fins small, the pectorals not reaching half way to insertion of pelvics.
Surf smelt, *Hypomesus pretiosus* (Girard)
Mostly marine, occasionally in fresh water.
- 1b. Mouth large, the maxillary reaching past middle of eye; fins moderate or large, the pectorals reaching at least halfway to the origin of pelvics. see 2
- 2a. Fins moderate in size, the pectoral much shorter than the head; gill rakers 17 to 22 on first arch; concentric striae on operculum conspicuous.
Eulachon, Columbia River smelt, *Thaleichthys pacificus* (Richardson)
Enters Columbia River, Sandy River, and, occasionally, other lower Columbia tributaries and coastal streams.
- 2b. Fins large, the pectoral as long as the head; gill rakers 36 to 44 on first arch. No striae on operculum.
Longfin smelt, *Spirinchus dilatatus* Schultz and Chapman
Enters streams of north coast in fall. Not common in Oregon.

Family 7. CATOSTOMIDAE

- 1a. Mouth inferior, overhung by snout, opening downward; lips thick, papillose. see 2
- 1b. Mouth terminal and oblique or subterminal and opening forward, not greatly overhung by snout; lips fairly thin, papillae moderately developed; internal structure of premaxillaries cause definite hump on snout; nuptial tubercles in breeding specimens excessively developed. see 11
- 2a. Mouth large, notches separating upper and lower lips; lower lip about half or less divided by incision; edge of lower jaw inside lower lip with prominent hard cartilaginous plate. Genus *Pantosteus* see 3
- 2b. Mouth moderate; no notches separating upper and lower lips; edge of lower jaw with small cartilaginous plate or none. Genus *Catostomus* (except *luxatus*.) see 4

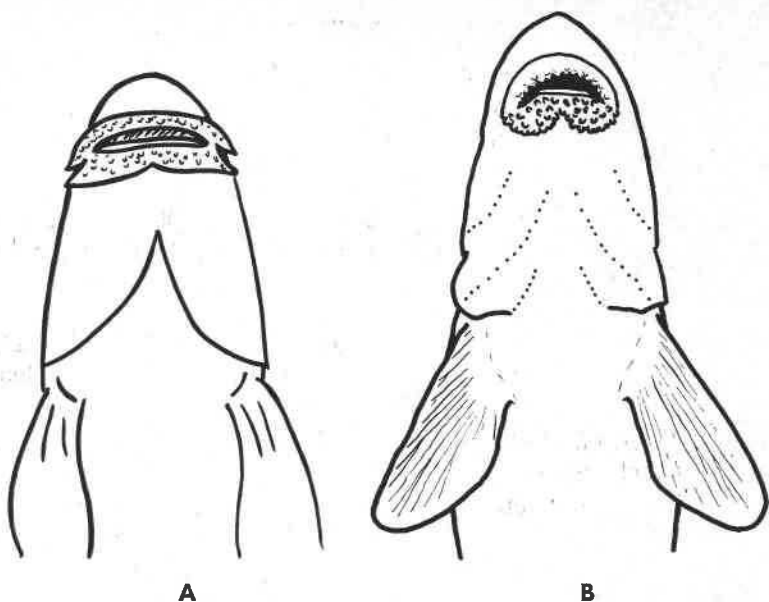


Figure 7. Typical mouth shape in (A) *Pantosteus*, and (B) *Catostomus*.

- 3a. Width of lower lip equals about $\frac{3}{4}$ of pelvic fin length, and is greater than depth of caudal peduncle. Incision in lower lip shallow, dividing lip about $\frac{1}{3}$ of the antero-posterior dimension.

Mountain sucker, *Pantosteus platyrhynchus* (Cope)
Columbia River drainage, including Willamette River.

- 3b. Width of lower lip equals about $\frac{1}{2}$ or less of the length of pelvic fin, and is less than the depth of the caudal peduncle; incision in lower lip divides lip about $\frac{1}{2}$ of the antero-posterior dimension.

Lahontan sucker, *Pantosteus lahontan* Rutter
Streams of Lahontan Basin in southeastern Oregon near McDermitt.

- 4a. Scales in lateral line more than 95; parietal fontanelle present; incision in lower lip cuts about half way through lip; peritoneum jet black. Caudal peduncle depth about $\frac{1}{3}$ head length.

Bridgelip sucker, *Catostomus columbianus* (Eigenmann)
Columbia River drainage, mostly east of Cascade Mountains; Harney Basin.

- 4b. Scales in lateral line usually fewer than 95. see 5

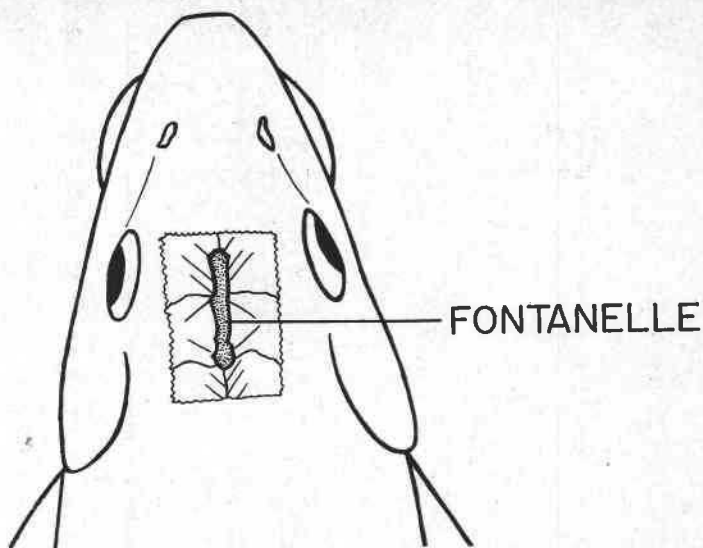


Figure 8. Appearance of parietal fontanelle in *Catostomus*.

- 5a. Length of dorsal fin base shorter than, or about equal to, snout length; eye $1/7$ to $1/8$ head length; scales in lateral line 80 or more; 1 or 2 rows of papillae crossing midline of lower lip. Fontanelle closed in adults; snout conical.

Modoc sucker, *Catostomus microps* Rutter

Goose Lake drainage.

- 5b. Length of dorsal fin base greater than snout length; eye $1/6$ head length or larger. see 6

- 6a. Fontanelle closed in adults; lower lip incised about $\frac{1}{2}$ way through so that several rows of papillae cross the midline. Scales in lateral line more than 80.

Klamath smallscale sucker, *Catostomus rimiculus* Jordan and Snyder

Klamath Basin below falls, Rogue River.

- 6b. Fontanelle open in adults; lower lip incised over $\frac{1}{2}$ way through so that no more than 2 rows of papillae are continuous across the midline. see 7

- 7a. Scales in lateral line usually more than 80 (73-100); peritoneum black.

Tahoe sucker, *Catostomus tahoensis* Gill and Jordan
Lahontan Basin.

- 7b. Scales in lateral line fewer than 80 (62-79); peritoneum white to dusky. see 8

- 8a. Lower lip incised about $\frac{2}{3}$ through so that 2 rows of papillae cross the midline; scales below lateral line 14 or 15; dorsal base equals distance from tip of snout to hind margin of eye; dorsal rays 10 or 11.

Warner sucker, *Catostomus warnerensis* Snyder
Warner Valley.

- 8b. Lower lip incised $\frac{3}{4}$ or more through so that no more than 1 row of papillae crosses midline; scales below lateral line 12 or fewer.
..... see 9

- 9a. Pectoral fin reaches to below origin of dorsal fin and $\frac{2}{3}$ of distance to pelvic fins; caudal peduncle depth more than $\frac{1}{3}$ head length; dorsal rays usually 11; scales below lateral line 10 to 12.

Klamath largescale sucker, *Catostomus snyderi* Gilbert
Klamath Basin above the falls.

- 9b. Pectoral fins not reaching to below origin of dorsal fin and less than $\frac{2}{3}$ distance to pelvics; caudal peduncle slender, its depth $\frac{1}{3}$ head length in young; scales below lateral line 8 to 10. see 10

- 10a. Incision in lower lip very deep so that usually no row of papillae crosses the midline; caudal peduncle depth in adults is nearly $\frac{1}{2}$ head length; (this and the following species are quite similar).

Goose Lake sucker, *Catostomus occidentalis lacus-anserinus*
Fowler

Goose Lake drainage.

- 10b. Usually a row of papillae crosses midline of lower lip; caudal peduncle slender, depth about $\frac{1}{3}$ head length in adults as well as young.

Largescale sucker, *Catostomus macrocheilus* Girard
Columbia River drainage, coastal streams south to Sixes River, but absent from central coast from Tillamook to Yachats River; Harney Basin.

- 11a. Head short and deep, the eye tending to be closer to end of snout than edge of operculum; lips thin; papillae little developed; adults to 20 inches in length; gill rakers fringed.

Shortnose sucker, *Chasmistes brevirostris* Cope

Upper Klamath Lake.

- 11b. Head long, snout long, the eye tending to be placed in the posterior half of the head; lips fairly thin, with moderately developed papillae; adults to 3 feet or more in length; gill rakers delta shaped, smooth.

Lost River sucker, "Mullet," *Catostomus luxatus* Cope

Upper Klamath Lake.

Family 8. CYPRINIDAE

- 1a. Dorsal fin long, extending along a third or more of back; a serrated "spine" present in anterior part of both dorsal and anal fin. see 2

- 1b. Dorsal fin short, the base being no longer than head; anal and dorsal fins without serrated spine. see 3

- 2a. Barbels developed around mouth.

Carp, *Cyprinus carpio* Linnaeus

Introduced, common in most of the warmer waters of the state.

- 2b. No barbels, color variable, from olive green to gold or black and gold.

Goldfish, *Carassius auratus* Linnaeus

Introduced.

- 3a. Scales on lateral line 100 or more; maxillary barbel present, large; mouth very oblique; depressed anal nearly reaching caudal fin.

Tench, *Tinca tinca* Linnaeus

Introduced, Columbia River; probably in lower Willamette River.

- 3b. Scales on lateral line fewer than 100, if maxillary barbel is present, it is small; mouth horizontal or slightly oblique; depressed anal not nearly reaching caudal fin. see 4

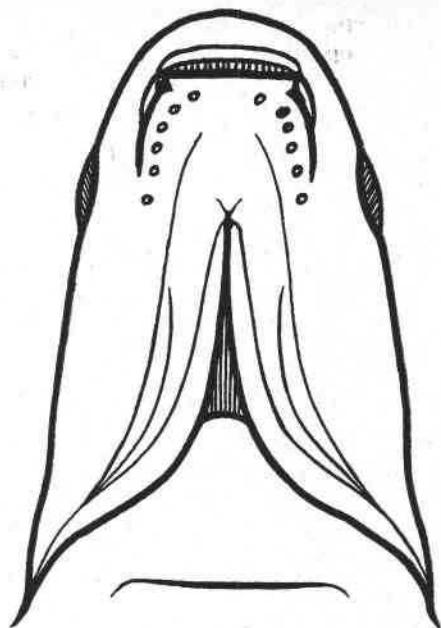


Figure 9. Ventral view of *Acrocheilus* head illustrating straight-edged lower jaw and sensory pores along dentaries.

- 4a. Lower jaw of adults squared off as seen from below and provided with a hard plate just inside the lip. (In juveniles the plate is present but edge of lower jaw is not straight.) Mouth opening about as wide as long, caudal peduncle slender, contrasting with flaring caudal fin; alimentary canal long, with more than 1 loop; peritoneum black; pharyngeal teeth in single row; mandibular sensory pores about 6 along each dentary.

Chiselmouth, *Acrocheilus alutaceus* Agassiz and Pickering
Columbia River and tributaries; Harney Basin.

- 4b. Lower jaw rounded as seen from below, without horny plate.
..... see 5

- 5a. Scales large, fewer than 40 on lateral line, not well imbricated; each scale on dorsal surface outlined with dark pigment. Fresh specimens somewhat translucent; caudal peduncle narrow as

compared with body depth; a minute barbel present on maxillary; pharyngeal teeth in 2 rows.

Oregon chub, *Hybopsis crameri* Snyder

Willamette and Umpqua rivers.

5b. Scales smaller; more than 40 on lateral line. see 6

6a. Head long, mouth large, the maxillary extending to below front edge of eye; body moderately heavy, not much compressed; no barbels; top of head somewhat flattened; no definite arch to back; upper lip thick. Pharyngeal teeth in two rows, 2 teeth in outer row; mandibular sensory pores about 15 to 20 along each dentary. Young with black spot at base of caudal fin.

Northern squawfish, *Ptychocheilus oregonensis* Richardson

Most lowland waterways in Columbia drainage; Harney Basin; absent from Klamath drainage and most of coastal streams. (The fine-scaled form of the Umpqua, Siuslaw, and intervening waters is known as *Ptychocheilus umpqua* Snyder, but probably should be considered a subspecies of *P. oregonensis*.)

6b. Mouth smaller, the maxillary not reaching to vertical dropped from front edge of eye. see 7

7a. Anal fin with 10 or more rays, the base of the anal equal to or longer than the distance from tip of snout to angle of preopercle; mouth oblique; body compressed. see 8

7b. Anal fin with fewer than 10 rays, the base not especially long. see 9

8a. Anal rays 12 to 22, D. 9 to 11.

Redside shiner, *Richardsonius balteatus balteatus* (Richardson)

Columbia River system, streams of central and southern coast, Harney Basin.

8b. Anal rays 10-13, D. 8 or 9.

Redside shiner, *Richardsonius balteatus hydrophlox* (Cope)

Various eastern Oregon localities in Columbia River drainage, Harney Basin.

- 9a. Mouth terminal, usually somewhat oblique, snout does not overhang upper lip; body robust or compressed; no barbels; pharyngeal teeth in 1 or 2 rows. see 10
- 9b. Mouth subterminal, snout long or moderately so, at least overhanging upper lip; at least half of specimens have minute barbel on the maxillary; pharyngeal teeth in two rows. see 13
- 10a. Pharyngeal teeth in two rows, sharp; body rather compressed without a definite arch to dorsal profile. see 11
- 10b. Pharyngeal teeth in single row, body robust with arched dorsal profile. see 12
- 11a. Mandibular sensory pores about 9 on each side; scales on lateral line 60 to 67; head conical, interorbital convex and narrow.
 Blue chub, *Gila bicolor* (Girard)
 Klamath Lake and tributaries, Klamath River.
- 11b. Mandibular sensory pores 5 or 6 on each dentary; scales on lateral line fewer than 60; head not especially conical; interorbital rather broad and flat; color pattern of two dark horizontal bands; breeding specimens with red-orange on sides.
 Lahontan redbreast, *Richardsonius egregius* (Girard)
 Lahontan Basin.
- 12a. Eight or nine blunt gill rakers on first arch; scales with radii in all fields.
 California roach, *Hesperoleucis symmetricus* (Baird and Girard)
 Goose Lake drainage.
- 12b. Thirteen or more gill rakers on first arch.
 Tui chub, *Siphateles bicolor* (Girard)
 At least 5 forms of the roach are generally recognized within the state. They are *S. bicolor bicolor*, in the Klamath system; *S. bicolor columbianus* in the Columbia system; *S. bicolor formosus* in the Sacramento system (Goose Lake); *S. bicolor oregonensis* in south central Oregon lakes; and *S. bicolor obesus* in the Lahontan Basin (extreme southeastern Oregon). (In addition, an undescribed species inhabits Catlow Valley and Alvord Lake drainage.)

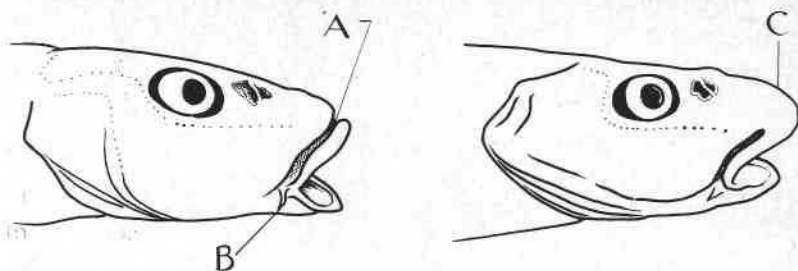


Figure 10. (A) Groove between snout and upper lip of fish with protractile premaxillae. (B) Minute maxillary barbel. (C) Frenum binding upper lip to snout.

- 13a. Mouth inferior, a frenum present on upper jaw, the premaxillaries therefore being nonprotractile. see 14
- 13b. No frenum present, the premaxillaries protractile. see 15
- 14a. Dorsal rays 9 or 10, fewer than 60 scales in lateral line; caudal peduncle depth about $1/10$ standard length.
 Umpqua dace, *Rhinichthys evermanni* Snyder
 Umpqua River and tributaries.
- 14b. Dorsal rays usually 8, more than 60 scales in lateral line; caudal peduncle depth about $1/3$ standard length.
 Longnose dace, *Rhinichthys cataractae dulcis* (Girard)
 Columbia River system; Harney Basin.
- 15a. Caudal peduncle narrow; caudal fin forked, cleft about half the length of the fin; pelvic fins not reaching anus; pharyngeal teeth blunt and molar-like in adults, blunt and hooked in young.
 Peamouth, *Mylocheilus caurinus* (Richardson)
 Columbia River drainage.
- 15b. Caudal peduncle deep; caudal fin emarginate to slightly forked; the cleft being $1/3$ or less fin length; pelvic fins reaching anus; pharyngeal teeth sharp. see 16
- 16a Dorsal and anal fins (to a lesser extent, pelvic fins) concave or falcate on distal edge; caudal fin large, usually longer than the head; color pattern generally of large blotchy spots on a light background, although some specimens may show a dark lateral band. see 17

- 16b. Dorsal and anal fin with distal edges straight to rounded, seldom concave; color pattern of a dark lateral band and/or small specklings. see 18
- 17a. Scales in lateral line more than 60; caudal peduncle deep, the least depth more than half the distance from anterior edge of eye to posterior edge of opercle.
 Umatilla dace, *Rhinichthys osculus umatilla* (Gilbert and Evermann)
 Columbia River drainage east of Cascades.
- 17b. Scales in lateral line fewer than 60; caudal peduncle not especially deep, the least depth less than half the distance from anterior edge of eye to posterior edge of opercle.
 Leopard dace, *Rhinichthys falcatus* (Eigenmann and Eigenmann)
 Columbia River drainage, including Willamette River and tributaries.
- 18a. Dark lateral band extending along sides, speckling or spotting absent or very sparse.
 Blackside dace, *Rhinichthys osculus nubilus* (Girard)
 Lower Columbia River drainage, Umpqua River and certain other coastal streams. (The form found in the Alsea, Yaquina, and Suislaw rivers appears to be distinct in having a much larger adult size, longer snout, and deeper caudal peduncle, as well as showing a lack of barbels in a large percentage of specimens.)
- 18b. Color markings of dark speckles or splotches, dark lateral band variable, usually lacking.
 Speckled dace, *Rhinichthys osculus* subsp.
 Two more or less distinct forms occur in the Klamath Basin and Lahontan Basin, the former being known as *R. o. klamathensis*, and the latter as *R. o. robustus*. A third name, *R. o. carringtoni*, has been used for many forms in eastern and southern Oregon, in the Columbia River drainage as well as in many interior lake basins. Possibly several populations are worthy of subspecific recognition.

Family 9. ICTALURIDAE

(Introduced)

- 1a. Caudal fin forked. see 2
- 1b. Caudal fin slightly emarginate to rounded. see 3
- 2a. Anal rays (including all rudiments) 19 to 22; no black spotting on sides.
 White catfish, *Ictalurus catus* (Linnaeus)
 Introduced, planted locally in western Oregon, probably in Columbia River.
- 2b. Anal rays (including all rudiments) more than 25; black spotting on sides.
 Channel catfish, *Ictalurus punctatus* (Rafinesque)
 Introduced, Columbia, Snake, and Umpqua rivers.
- 3a. Adipose fin adnate to back with no free posterior edge; adults very small.
 Tadpole madtom, *Noturus gyrinus* (Mitchell)
 Introduced, Snake River and tributaries.
- 3b. Adipose fin with free posterior edge; not adnate; adults usually 6 inches in length or more. see 4
- 4a. Head elongate and greatly flattened; anal rays (including all rudiments) fewer than 18; adipose fin large, nearly as large as anal.
 Flathead catfish, *Pylodictus olivaris* (Rafinesque)
 Introduced, Snake River. (Establishment uncertain.)
- 4b. Head short, moderately flattened; anal rays (including all rudiments) usually more than 18; adipose fin much smaller than anal. see 5
- 5a. No barbs on posterior edge of pectoral spine; membranes of fins jet black, the rays lighter; mental barbels gray to black.
 Black bullhead, *Ictalurus melas* (Rafinesque)
 Introduced, Snake, Columbia, and Chewaucan rivers; probably in other localities.

- 5b. Barbs on posterior edge of pectoral spine strong in young, weaker in adults; color of fin membranes not especially contrasting with rays. see 6
- 6a. Mental barbels usually white; anal rays 24 to 27, counting all rudiments.
Yellow bullhead, *Ictalurus natalis* (LeSueur)
Introduced, planted locally, abundant in Willamette Valley.
- 6b. Mental barbels usually light at base and grey to black at tips; anal rays 17 to 24, counting all rudiments; lower sides clouded or mottled.
Brown bullhead, *Ictalurus nebulosus* (LeSueur)
Introduced, common throughout the state.

Family 10. CYPRINODONTIDAE

(Introduced)

Rainwater killifish, *Lucania parva* (Baird and Girard)
Introduced, in ditches tributary to Yaquina Bay.

Family 11. POECILIIDAE

(Introduced)

Mosquitofish, *Gambusia affinis*, (Baird and Girard)
Introduced into a number of western Oregon localities.

Family 12. PERCOPSIDAE

Sandroller, *Percopsis transmontana*, (Eigenmann and Eigenmann)
Columbia River and tributaries.

Family 13. GADIDAE

Burbot, *Lota maculosa* (LeSueur)
Columbia River, not common in Oregon.

Family 14. CENTRARCHIDAE

(Introduced)

- 1a. Fewer than 58 scales on lateral line; body much compressed.
..... see 2
- 1b. More than 58 scales on lateral line; body elongate or robust. see 7
- 2a. Anal fin about as long as dorsal fin, anal spines V or more. .. see 3
- 2b. Anal fin much shorter, about half as long as dorsal fin; anal
spines III. see 4
- 3a. Length of base of dorsal fin less than the distance from origin of
dorsal to eye; dorsal spines usually V or VI.
 White crappie, *Pomoxis annularis* Rafinesque
 Widely introduced.
- 3b. Length of base of dorsal fin equal to or more than distance from
origin of dorsal to eye; dorsal spines usually VII or VIII.
 Black crappie, *Pomoxis nigromaculatus* (LeSueur)
 Widely introduced.
- 4a. Mouth small; the maxilla barely extending to front edge of eye;
supplemental maxilla very small or absent; pectoral fins slender
and pointed. see 5
- 4b. Mouth large, the maxilla extending to middle of eye; supple-
mentary maxilla present, may be well developed; pectoral fins
rounded. see 6
- 5a. A crimson spot on edge of opercular flap (this appears white in
preservative); no black blotch in posterior part of dorsal fin;
gill rakers short, their length less than the diameter of the pupil.
 Pumpkinseed, *Lepomis gibbosus* (Linnaeus)
 Widely introduced.
- 5b. A dark blotch in posterior part of dorsal fin; no crimson spot on
edge of opercular flap, which is uniform blue-black; gill rakers
about as long as diameter of pupil.
 Bluegill, *Lepomis macrochirus* Rafinesque
 Widely introduced.

- 6a. Teeth on tongue and pterygoids; coloration variable, usually with stripes radiating backward and downward from eye; dorsal fin mottled; preorbital somewhat serrate; length of supramaxilla greater than width of maxilla.

Warmouth, *Chaenobryttus gulosus* (Cuvier)

Widely introduced.

- 6b. No teeth on tongue or pterygoids; coloration greenish with faint vertical bars; soft dorsal, anal, and caudal sometimes dark with light edge; preorbital not serrate; length of supramaxilla less than width of maxilla.

Green sunfish, *Lepomis cyanellus* Rafinesque

Introduced in California, present in Klamath River near Oregon border.

- 7a. Dorsal fin almost divided, the spines of unequal length; maxilla extending well beyond posterior edge of eye in adult specimens; young specimens with intense lateral band; scales on lateral line 69 or fewer; pyloric caeca branched at base.

Largemouth bass, *Micropterus salmoides* (Lacepede)

Widely introduced.

- 7b. Dorsal fin with slight emargination, shortest spines greater than $\frac{1}{2}$ the length of longest; mouth not extending beyond posterior edge of eye; color pattern of vertical bars; scales on lateral line 68 or more; pyloric caeca unbranched.

Smallmouth bass, *Micropterus dolomieu* (Lacepede)

Columbia, Snake and tributaries, Willamette River, and Tahkenitch Lake.

Family 15. PERCIDAE

- 1a. Canine teeth present, mouth large; body slender, without distinct cross bands.

Walleye, *Stizostedion vitreum* (Mitchell)

Columbia River, introduced

- 1b. No canine teeth, mouth moderate; body moderately compressed with several dark vertical bars across back; lower fins usually orange.

Yellow perch, *Perca flavescens* (Mitchell)

Widely introduced.

Family 16. SERRANIDAE

Striped bass, *Roccus saxatilis* (Walbaum)

Introduced, euryhaline; in Coos and Umpqua estuaries, occasionally entering other waterways.

Family 17. EMBIOTOCIDAE

Shiner perch, *Cymatogaster aggregata* Gibbons

Mostly marine, often entering rivers.

Family 18. ATHERINIDAE

Topsmelt, *Atherinops affinis* (Ayres)

Mostly marine, occasionally found in fresh water.

Family 19. PHOLIDAE

Saddleback gunnel, *Pholis ornata* (Girard)

Marine, occasionally found in waters of very low salinity.

Found in Columbia up to Woodson, Columbia County.

Family 20. COTTIDAE

- 1a. Preopercular spine with 3 or 4 barbs pointing upward.

Staghorn sculpin, *Leptocottus armatus armatus* Girard

Marine, often found in fresh water at head of tidewater.

- 1b. Preopercular spine without antlerlike barbs. see 2

- 2a. Pelvic I,3* with at least one ray branched; dorsal V to VII, 17 to 19; preopercular spines 3; palatine teeth rarely present.

Slender sculpin, *Cottus tenuis* (Evermann and Meek)

Klamath Basin.

- 2b. Pelvic without branched rays, I,3 or I,4; dorsal spines VII to X.
..... see 3

* The minute spine and the first soft ray are bound closely together so that only the soft rays are evident.

- 3a. Posterior nostril tubular, equaling anterior in height; preopercular spine single or with a second low spine; lateral line complete; pelvic fins long, reaching or nearly reaching the vent; no palatine teeth.

Coastrange sculpin, *Cottus aleuticus* Gilbert

Coastal streams, lower Columbia River.

- 3b. Posterior nostril low or slightly raised; preopercular spines 1 to 4; pelvic fins usually not reaching vent. see 4

- 4a. Sensory pores on head very large, preorbital pores longer than interspaces; dorsal soft rays 20 to 23; anal rays 16 to 18; prickles well developed; preopercular spine single and blunt or lacking; no palatine teeth.

Klamath Lake sculpin, *Cottus princeps* Gilbert

Klamath Lake.

- 4b. Sensory pores on head not enlarged; if preopercular spine is blunt, prickles are not well developed and there are fewer than 20 soft dorsal rays. see 5

- 5a. Palatine teeth present, usually visible without dissection, rarely absent. see 6

- 5b. Palatine teeth absent, rarely present. see 10

- 6a. Dorsal fins conjoined; dark blotch present only in posterior section of spinous dorsal. see 7

- 6b. Dorsal fins well separated at base; dark blotches present at anterior and posterior parts of spinous dorsal or lacking. see 8

- 7a. Anal fin rays 16 or more; dorsal soft rays 19 or more; caudal peduncle narrow, rounded, except in large individuals; body well covered with prickles, especially in inland waters and in young individuals from coastal waters; pectoral and dorsal rays not branched.

Prickly sculpin, *Cottus asper* Richardson

Coastal streams and bays; Columbia River drainage.

- 7b. Anal rays 14 to 16; dorsal rays 16 to 19; caudal peduncle usually deep and compressed (as is the posterior third of the body); prickles present in axil of pectoral fin.

Riffle sculpin, *Cottus gulosus* (Girard)

Coastal streams; lower Columbia (below St. Helens).

- 8a. Head small, usually less than $\frac{1}{3}$ standard length; body rather slender; preopercular spines usually 2; lateral line complete to under posterior part of dorsal fin (about 15th ray), then interrupted or undeveloped.

Shorthead sculpin, *Cottus* sp.

Columbia drainage.

- 8b. Head large, usually more than $\frac{1}{3}$ standard length; mouth large; body rather robust; preopercular spines usually 3 or 4; lateral line usually complete or nearly so in Oregon specimens (except for *bairdi* of the Harney Basin). see 9

- 9a. Caudal peduncle very slender, its depth about $\frac{1}{3}$ head length; two dark bars crossing dorsal surface under soft dorsal fin, slanting obliquely forward; preopercular spines 3 or 4; maxilla long and slender; skin on dorsal surface of head and eye nubbly; prickles variable; spinous dorsal without dark blotches.

Torrent sculpin, *Cottus rhotheus* (Smith)

Columbia drainage, Fish Lake (Harney County), Nehalem and Necanicum rivers.

- 9b. Caudal peduncle moderately slender, depth about $\frac{1}{4}$ head length; 3 small vertical dark bars crossing back at soft dorsal fin; preopercular spines usually 3; spinous dorsal with 2 dark blotches, 1 anterior, 1 posterior; skin of eye without nubbly appearance; usually prickles in small patches on each side.

Mottled sculpin, *Cottus bairdi semiscaber* (Girard)

Columbia drainage, Harney Basin.

- 10a. Dorsal fins separated at base; preopercular spine at angle usually long and slender; mouth rather wide; median chin pore absent. see 11

- 10b. Dorsal fins confluent or slightly joined; preopercular spine at angle variously developed, often blunt; dark blotch present in posterior portion of spinous dorsal; mouth usually not as wide as body immediately behind origin of pectorals; median chin pore present or absent. see 12
- 11a. Lateral line complete, prickles present in axillary patch; preopercular spines 2 or 3; anal rays 13 to 15.
 Pit River sculpin, *Cottus* sp.
 Goose Lake tributaries.
- 11b. Lateral line incomplete, prickles absent; preopercular spines 1 or 2; anal rays 11 to 13.
 Piute sculpin, *Cottus beldingi* Eigenmann and Eigenmann
 Columbia drainage.
- 12a. Preopercular spine usually single; median chin pore lacking; body very deep and robust in adults; pectorals with checked pattern; caudal fin rounded.
 Marbled sculpin, *Cottus klamathensis* Gilbert
 Klamath Basin.
- 12b. Preopercular spines usually 2; median chin pore variable, usually present; body moderately robust; caudal fin truncate.
 see 13
- 13a. Preopercular spines usually 2—short and blunt; 4th pelvic ray usually reduced or absent (I,3 in 75% of specimens).
 Margined sculpin, *Cottus marginatus* (Bean)
 Walla Walla and Umatilla rivers, possibly in neighboring streams.
- 13b. Preopercular spines usually 2 or 3, sharp, but may be blunt in some localities in Willamette Valley; pelvics I,4.
 Reticulate sculpin, *Cottus perplexus* Gilbert and Evermann
 Coastal streams including Rogue River; lower Columbia, Willamette Valley, and Crescent Creek of the Deschutes system.

Family 21. GASTEROSTEIDAE

- 1a. Only a few bony plates on sides immediately behind head.
Three-spined stickleback, *Gasterosteus aculeatus microcephalus* Girard
Most lowland waterways.
- 1b. Bony plates or scutes usually extending to caudal peduncle.
Three-spined stickleback, *Gasterosteus aculeatus aculeatus* Linnaeus
Marine and brackish water, occasionally in fresh water near influence of tides.

Family 22. PLEURONECTIDAE

Starry flounder, *Platichthys stellatus* (Pallas)
Euryhaline, in bays, rivers, and ocean.

Glossary

- Abdominal pelvics.** Pelvic fins located on the abdomen far behind the pectoral fins; pelvic bones do not attach to pectoral girdle.
- Accessory pelvic appendage.** A tapered fleshy lobe above the base of the pelvic fin.
- Adipose fin.** A fleshy fin with no rays, located behind the dorsal fin.
- Anal fin.** Unpaired fin located behind the anus on the ventral margin.
- Barbel.** A slender tactile process located about the head.
- Basibranchial.** The bones behind the tongue with which the gill arches articulate.
- Buccal.** Pertaining to the cheeks or the cavity of the mouth.
- Caudal.** Near the tail. (Caudal fin = tail fin.)
- Caudal peduncle.** The tapered portion of the body between the posterior edge of the anal fin and the base of the caudal fin.
- Ctenoid.** Having a comblike margin. (Said of scales having a rough margin on the posterior field.)
- Distal.** Remote from the point of attachment or origin.
- Dorsal.** Pertaining to the back, or situated near or on the back. (Dorsal fin = median fin (s) on the back.)
- Emarginate.** Having the margin notched.
- Euryhaline.** Having wide salinity tolerance.
- Falcate.** Hooked or curved like a sickle.
- Fontanelle.** One of the intervals between the incompletely angles of the parietal bones.
- Frenum.** A connecting fold of membrane binding the lip to snout or lower jaw.
- Gill rakers.** The series of projections placed along the front edge of the gill arch.
- Heterocercal.** Said of the tail when the back bone curves upward into the upper lobe of the caudal fin.
- Imbricated.** Lying lapped over each other in regular order, like tiles or shingles on a roof.
- Inferior mouth.** Said of the mouth when it opens on the ventral surface, as in sturgeon.
- Interorbital.** The space between the eyes.
- Juglar pelvics.** Said of the pelvic fins when located anteriorly to the pectorals.
- Lateral line.** A series of sensory pores opening to the exterior along the sides of a fish.

- Mandibular.** Pertaining to the lower jaw.
- Maxilla or maxillaries.** The upper jaw, the upper jaw bones extending back to the farthest or hindmost.
- Mental.** Pertaining to the chin or mentum.
- Myomeres.** The muscle segments. Counted in lampreys from last gill opening to anus.
- Opercle.** The largest bone in the operculum.
- Operculum.** The gill cover.
- Palatines.** Paired, tooth-bearing bones on the roof of the mouth.
- Papilla.** A small fleshy projection.
- Papillose.** Covered with papillae.
- Parietals.** Paired bones on roof of skull, lateral to supraoccipital.
- Parr marks.** Vertical dark bars found on sides of young Salmonoids.
- Pectoral fins.** The anterior-most of the paired fins of fishes, connected with the pectoral girdle.
- Pelvic fins.** Posterior paired fins of fishes; location variable.
- Peritoneum.** Membrane lining the coelom.
- Pharyngeal teeth.** Teeth situated on the bones behind the gills and at the beginning of the esophagus.
- Premaxilla.** The paired bone forming the front of the upper jaw.
- Preopercle.** The membrane bone lying in front of and parallel to the opercle.
- Preorbital.** The large membrane bone lying in front of and below the eye.
- Pterygoids.** Bones of the roof of the mouth lying behind and articulating with the palatines.
- Pyloric.** Pertaining to that part of the stomach from which the intestine leads.
- Pyloric caecum.** (pl. caeca). A projection in the form of a blind sac attached to intestine near the posterior end of the stomach.
- Ramus.** A branch; a projecting part.
- Ray.** One of the supports of the fins. A soft ray is technically distinguished from a spine in that it is double in structure and may be jointed or branched, soft or stiff.
- Scute.** An external bony plate, usually keeled.
- Spine.** A single, median supporting element of a fin, usually stiff. Distinguished from a ray in that it is single, median, never branched or jointed. Spine counts are recorded in Roman numerals.

Standard length. The straight line distance between the tip of the snout and the base of the caudal fin rays.

Subabdominal pelvic fin. Said of pelvic fins when placed forward on abdomen but not attached internally to pectoral girdle.

Supramaxilla. The scale-like bone lying on the posterior dorsal end of the maxilla.

Terminal mouth. Said of the location of the mouth when it opens at the end of the head, as in trout.

Thoracic pelvics. Said of the pelvic fins when attached immediately below the pectorals and connected with the pectoral girdle.

Truncate caudal. Said of the margin of the caudal fin when it is squared off as in some catfish.

Vermiculations. Irregular lines or impressions like worm tracks.

Vomer. The most anterior bone of the roof of the mouth; may have teeth.