FRASER REGION

The Fraser is the second largest drainage system in BC (over 220,000 sq km) and the largest river system contained entirely within the province. Although not part of the Fraser proper, for convenience we have included here small independent drainages in the Vancouver area, including those on the Sechelt Peninsula and near Powell River as well as the BC portions of the Nooksack and Skagit rivers (Fig. 3). In the keys we refer to these systems adjacent to the lower Fraser as peripheral drainages. Fifty-two species of fish occur in the Fraser system, and of these 43 are native (Table 2). Most of the introduced species (shad, *Alosa sapidissima*; fathead minnow, *Pimephales promelas*; brown catfish, *Amieurus nebulosus*; pumpkinseed, *Lepomis gibbosus*; largemouth bass, *Micropterus salmoides*; and black crappie, *Pomoxis nigromaculatus*) are confined to the lower Fraser Valley, but carp and goldfish also occur in the Thompson region. An introduced subspecies of rainbow trout (the golden trout, *Oncorhynchus mykiss aguabonita*) occurs in Nicomen Lake, Skagit system (*pers. comm.*, R. K. Dahl, Conservation Officer).

The 43 native species represent a mixed fauna: all are postglacial immigrants; mainly from the Columbia but with at least two species (white sucker, *Catostomus commersoni* and brassy minnow, *Hybognathus hankinsoni*) from the Great Plains, and two undescribed forms (Salish sucker, *Catostomus sp.* and Nooksack dace, *Rhinichthys sp.*) from the Chehalis refugium. In addition, the landlocked smelts (*Spirinchus thaleichthys*) in Harrison and Pitt lakes may be glacio-marine relicts.

For convenience, we divide the Fraser system into four subregions: the upper, middle and lower Fraser, and the Thompson system. The upper Fraser extends from its source (Moose Lake) to the junction of the Willow River with the Fraser; the middle Fraser extends downstream from the confluence of the Fraser and Willow rivers to the end of the Fraser Canyon; the lower Fraser starts below the canyon and includes the adjacent peripheral drainages, and the Thompson system includes both the North and South Thompson rivers.

The upper Fraser rises high in the Rocky Mountain Trench and receives tributaries directly from glaciers in the Rocky and Cariboo mountains. The gradient is steep, and even in summer it is a cold, turbulent environment that contains only half as many species as the lower Fraser. Presumably, these species are all tolerant of the relatively harsh conditions. In contrast, the middle Fraser flows through the relatively flat, gently sloping Interior Plateau. It retains a heavy silt load but the gradient is less, and some tributaries are clear and relatively warm in summer. The surface of the Interior Plateau contains about half the small and medium-sized lakes in BC and 10 lakes with a surface area of over 100 sq km (Northcote and Larkin 1963). Three species (lake trout, *Salvelinus namaycush;* lake whitefish, *Coregonus clupeaformis*; and the white sucker) reach the southern limits of their BC distributions in the middle Fraser. In addition, disjunct populations of chiselmouth (*Acrocheilus alutaceus*) occur in the West Road and Chilcotin rivers, major tributaries of the middle Fraser. These populations, and the one in Nicola Lake (Thompson system), are the only chiselmouth populations known from the Fraser system.

Further south, where the river cuts through the Coast Range, the gradient increases and the river flows through a steep-sided, constricted canyon. A major clear water tributary, the Thompson River enters the muddy Fraser at Lytton. The Thompson drains the central and eastern parts of the Interior Plateau. There are three large lakes (Shuswap, Adams, and Kamloops) associated with t he Thompson system. At Kamloops the Thompson divides

into a north and south fork. The North Thompson contains one Columbia species (the torrent sculpin, *Cottus rhotheus*) that is found nowhere else in the Fraser system, and another species (the mountain sucker, *Catostomus platyrhynchus*) that is modestly common in the North Thompson but elsewhere known only from juvenile specimens in the Fraser between Chilliwack and Hope. The South Thompson contains the only native populations of Westslope cutthroat trout (*Oncorhynchus clarki lewisi*) in the Fraser system.

Not surprisingly, the Fraser Canyon is a major harrier to fish, and many anadromous species that are common in the lower Fraser are absent above the canyon. In at least two cases, however, the canyon *per se* is not the barrier. Both the coastal cutthroat (*Oncorhynchus clarki clarki*) and the coastrange sculpin (*Cottus aleuticus*) occur, but are not widespread, above the canyon. Curiously, the canyon appears as effective a barrier to downstream movement as to upstream movement. Seven species (lake trout; pygmy whitefish, *Prosopium coulteri*; lake chub, *Couesius plumbeus;* longnose sucker, *Catostomus catostomus*; bridgelip sucker, *Catostomus columbianus*; burbot, *Lota lota*; and slimy sculpin, *Cottus cognatus*) are common in either the mainstem Fraser or its tributaries, at the southern end of the Interior Plateau. Yet, none of these species have established populations in the lower Fraser, although four species (pygmy whitefish, longnose sucker, bridgelip sucker and slimy sculpin) occur more than halfway down the canyon at the mouth of Anderson Creek. In addition, single specimens of bridgelip sucker, lake trout and burbot are known from the Fraser below the canyon.

The lower Fraser consists of the approximately 180 km of river between Yale and the sea, as well as the adjacent peripheral drainages. The lower Fraser is wider and deeper than the middle and upper portions of the system, but the current is still strong even as it flows through the relatively flat Fraser Valley. The lower Fraser contains more species than the other parts of the system. Two of these species (the Salish sucker and the Nooksack dace) are of special interest. In BC, they occur only in small streams in the southern parts of the lower Fraser Valley. The Salish sucker occurs in the Salwein River near Chilliwack, Fishtrap and Bertrand creeks (Nooksack system) near Aldergrove, and the Salmon River near Langley. Historically, it also occurred in the Little Campbell River near Whiterock but now appears to be extinct in this short coastal drainage. The Salish sucker is related to the longnose sucker (*Catostomus catostomus*) but is morphologically and genetically different from this widespread species. Its taxonomic status is under review, however, similar suckers occur on the Olympic Peninsula and in other areas in western Washington. Like the Salish sucker, the Nooksack dace, is also closely related to a widespread, common species-in this case, the longnose dace (*Rhinichthys cataractae*). Again, however, it is morphologically and genetically different from the widespread species and similar to populations in western Washington. Apparently, the Nooksack dace is another member of the Chehalis fauna. In BC, the Nooksack dace is known only from Bertrand and Fishtrap creeks near Aldergrove; however, it is widespread in western Washington, especially in the Nooksack and Skagit rivers.

Another special fish in the lower Fraser is a sculpin found in Cultus Lake. The coastrange sculpin (*Cottus aleuticus*) occurs in both the inlet and outlet of Cultus Lake, and in the lake itself there are prickly sculpins (*Cottus asper*). The lake also contains a curious dwarf sculpin that apparently is related to *C. aleuticus* (Ricker 1960). This dwarf sculpin is unusual in that it migrates to the surface of the lake at night. Sculpins usually live on the bottom, and because they lack a swimbladder they are denser than water. Normal

C. aleuticus have a streamlined body as befits an animal adapted for life in fast water. The dwarf Cultus Lake form, however, is less streamlined and has reduced its density by reducing bone thickness and storing oils under the skin. It also has the enlarged head pores characteristic of lacustrine species of *Cottus* (Bailey and Bond 1963). It breeds at an exceptionally small size and has larger than normal eggs. Nothing more is known about its biology or specific relationships, but -there is a similar sculpin in Lake Washington (Larson and Brown 1975).

There are non-migratory longfin smelts, *Spirinchus thaleicthys*, in Harrison and Pitt lakes. This species normally is anadromous and these populations probably were landlocked at the end of the marine submergence that briefly flooded the Fraser Valley after the retreat of the glaciers (Armstrong 1981). Similar landlocked smelts occur in Lake Washington near Seattle.

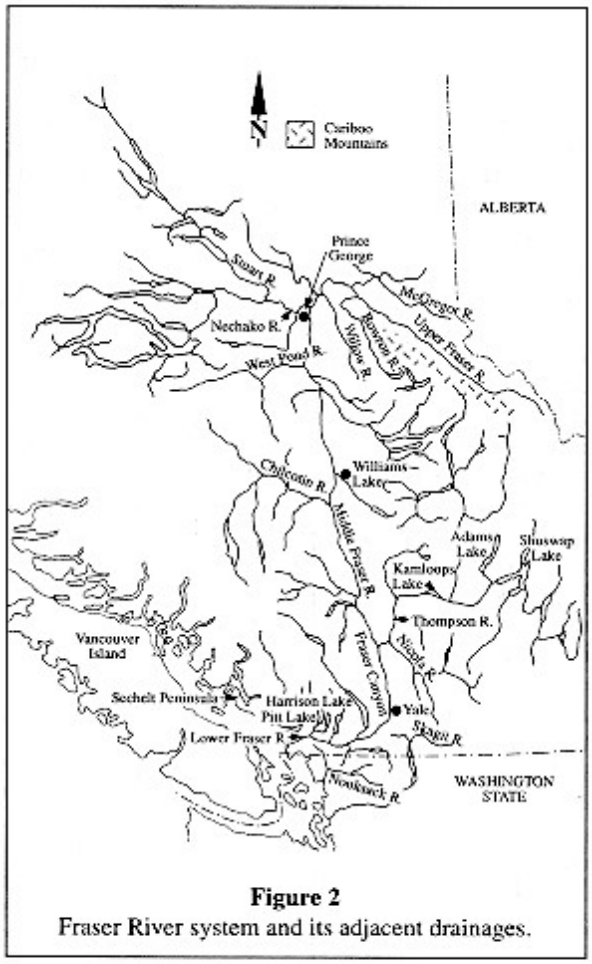


Figure 2
Fraser River system and its adjacent drainages.

Species	Lower Fraser	Middle Fraser	Thompson	Upper Fraser
Lampetra ayresi	+	-	-	-
L. richardsoni	+	-	-	-
L. tridentata	+	+	+	-
Acipenser medirostris	+	-	-	-
A. transmontanus	+	+	+	+
Alosa sapidissima	**I**	-	-	-
Acrocheilus alutaceus	-	+	+	-
Carassius auratus	**I**	-	**I**	-
Couesius plumbeus	-	+	+	+
Cyprinus carpio	**I**	**I**	**I**	-
Hybognathus hankinsoni	+	+	-	-
Mylocheilus caurinus	+	+	+	+
Pimephales promelas	**I**	-	-	-
Ptchocheilus oregonesis	+	+	+	+
Rhinichthys cataractae	**2**	+	+	+
R. falcatus	+	+	+	-
Richardsonius balteatus	+	+	+	+
Catostomus catostomus	**3**	+	+	+
C. columbianus	**R**	+	+	-
C. commersoni	-	+	+	-
C. macrocheilus	+	+	+	+
C. platyrhynchus	**R**	-	+	-
Ameiurus nebulosus	**I**	-	-	-
Hypomesus pretiosus	**1**	-	-	-
Spirinchus thaleichthys	+	-	-	-
Thaleichthys oacificus	+	-	-	-
Oncorhynchus clarki clarki	+	**R**	-	-
O. clarki lewisi	-	-	+	-
O. gorbuscha	+	+	+	-
O. keta	+	-	-	-
O. kisutch	+	+	+	-
O. mykiss mykiss	+	+	+	+
O. mykiss aguabonita	**I**	-	-	-
O. nerka	+	+	+	+

Species cont.	Lower Fraser	Middle Fraser	Thompson	Upper Fraser
O. tshawytscha	+	+	+	+
Salvelinus confluentus	+	+	+	+
S. fontinalis	**I**	**I**	**I**	-
S. malma	+	-	-	-
S. namaycush	**R**	+	+	+
Coregonus clupeaformis	**I**	+	+	+
Prosopium coulteri	-	+	+	+
P. williamsoni	+	+	+	+
Lota lota	**R**	+	+	+
Gasterosteus aculeatus	+	-	-	-
Cottus aleuticus	+	+	-	-
C. asper	+	+	+	-
C. cognatus	-	+	+	+
C. rhotheus	-	-	+	-
Leptocottus armatus	**E**	-	-	-
Lepomis gibbosus	**I**	-	-	-
Micropterus salmoides	**I**	-	-	-
Pomoxis nigromaculatus	**I**	-	-	-
Platichthys stellatus	**E**	-	-	-

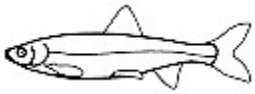
Table 2

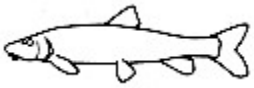
Distribution of fishes in the Fraser River and adjacent small drainages
(Nootsack and Skagit rivers, and Sechelt Peninsula).

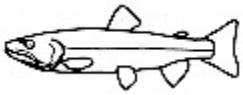
+ = present
- = absent
E = estuarine or tidal
I = introduced
R = in this area known from a single specimen

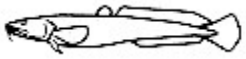
1 = The surf smelt occurs in Pitt Lake but it is not known if it spawns in the lake
2 = The longnose dace in Nootsack tributaries is genetically distinct from those in the Fraser system.
3 = The Salish sucker in the lower Fraser Valley is genetically distinct from *C. catostomus*

Pictorial Key To Families



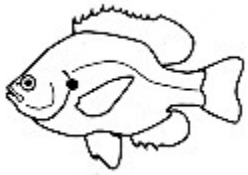




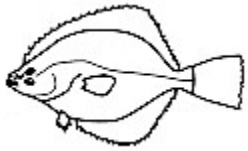


STICKLEBACKS (GASTEROSTEIDAE) 55

SCULPINS (COTTIDAE) 56



SUNFISH, BASS (CENTRARCHIDAE) 58



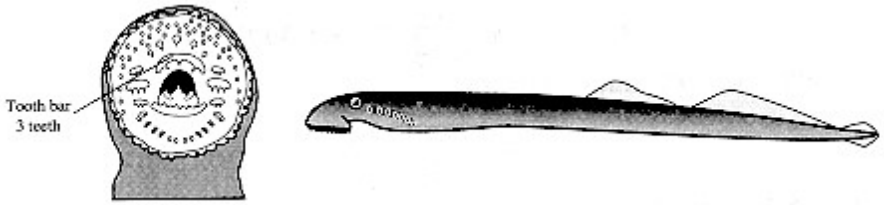
FLOUNDERS (PLEURONECTIDAE) 59

LAMPREYS
FAMILY PETROMYZONTIDAE

Lampreys are not easy to identify. Their morphology changes with each of three distinctive life-history stages: filter-feeding ammocoetes, newly transformed "macrophthalmic" juveniles, and adults. For adults, tooth patterns and body size provide reliable field guides (a handlens is useful here), but for ammocoetes and newly transformed juveniles positive identifications require morphometric and meristic comparisons. Ammocoetes usually are associated with slow currents and soft, mud bottoms. Transformation takes place from late summer through early autumn, and the macrophthalmic juveniles move into faster water over gravel substrates. In anadromous species (Pacific and river lampreys), migration of young adults to the sea occurs in the spring. Spawning usually occurs in the spring but in the non-parasitic brook lamprey the spawning period can extend into the summer. The adults of some populations of Pacific and river lampreys return from the sea in the fall and over-winter in fresh water before spawning the next spring (Beamish 1980).

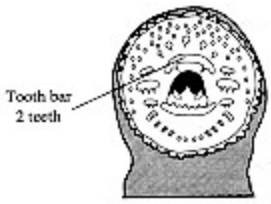
1 (6) Mouth a sucking disk; teeth and eyes present

adult or transforming lampreys
2



2 (3) Tooth bar immediately above mouth has three teeth; a large parasitic lamprey that ascends the Fraser upstream to at least the Chilcotin River; landlocked populations in Sakinaw and Ruby lakes, Sechelt Peninsula

Pacific lamprey
Lampetra tridentata

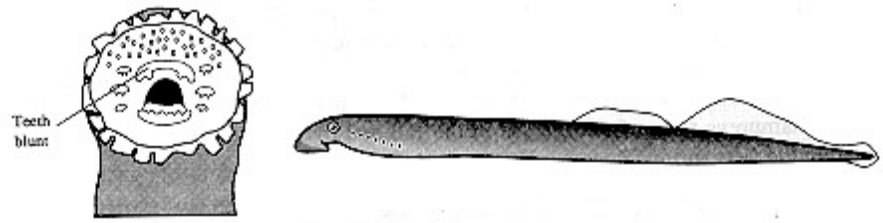


3 (2) Tooth bar immediately above the mouth has two teeth

4

4 (5) Teeth sharp, well developed; center pair of lateral teeth with three points; sharp tooth on center of tongue; a parasitic lamprey with adults usually longer than 200 mm; in Fraser system apparently confined to the lower river and its tributaries; also known from Powell River area

River lamprey
Lampetra ayresi



5 (4) Teeth blunt, poorly developed; center pair of side teeth with two points; no sharp tooth on tongue; a small non-parasitic lamprey (adults usually less than 160 mm); in Fraser system confined to the lower Fraser and Sechelt Peninsula

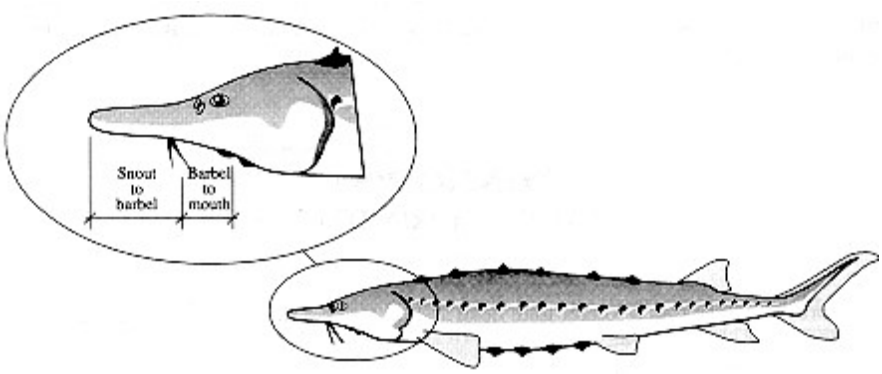
Western brook lamprey
Lampetra richardsoni

6 (1) Eyes absent or poorly developed; teeth absent; mouth not modified into a sucking disk

ammocoetes or larval lampreys
(see lamprey key in appendix, page 195).

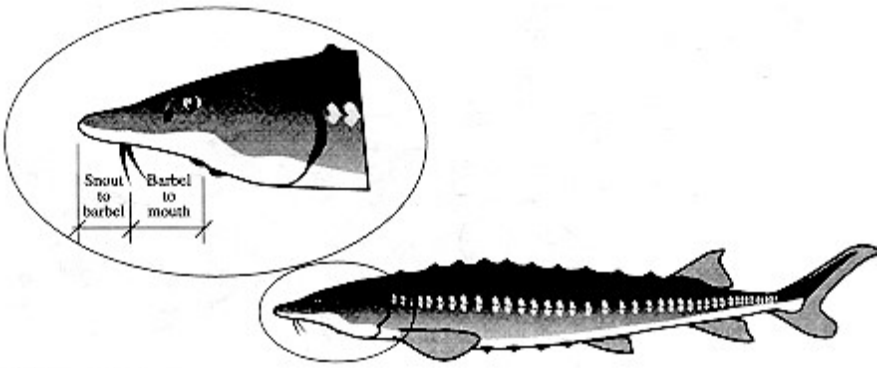
STURGEONS
FAMILY ACIPENSERIDAE

Two species of sturgeon are reported from the Fraser system (green sturgeon and white sturgeon). The white sturgeon is a freshwater species that is widespread in mainstem waters throughout the system and only rarely enters the sea; while the green sturgeon is more common in the sea and is only rarely taken in fresh water and then only in the lower river. Both species are morphologically variable, especially in snout length and snout shape. Some of this variability may be associated with sex but it can make identification difficult.



1 (2) Back green; snout usually elongate and narrow; barbels nearer to mouth than to tip of snout; sporadic in the Trait of Georgia and Fraser estuary

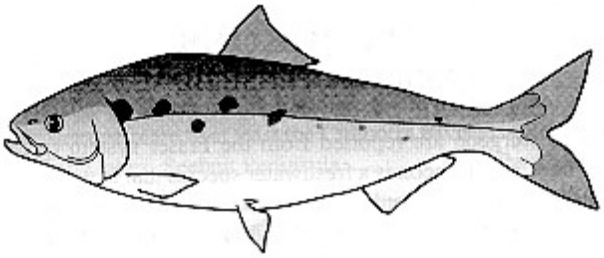
Green sturgeon
Acipenser medirostris



2 (1) Back dark grey to black; snout short and broad (except in some specimens less than 250 mm in length); barbels nearer to tip of snout than to mouth; common throughout the main river; occasional in large lakes

White sturgeon
Acipenser transmountanus

HERRINGS AND SHAD
FAMILY CLUPEIDAE

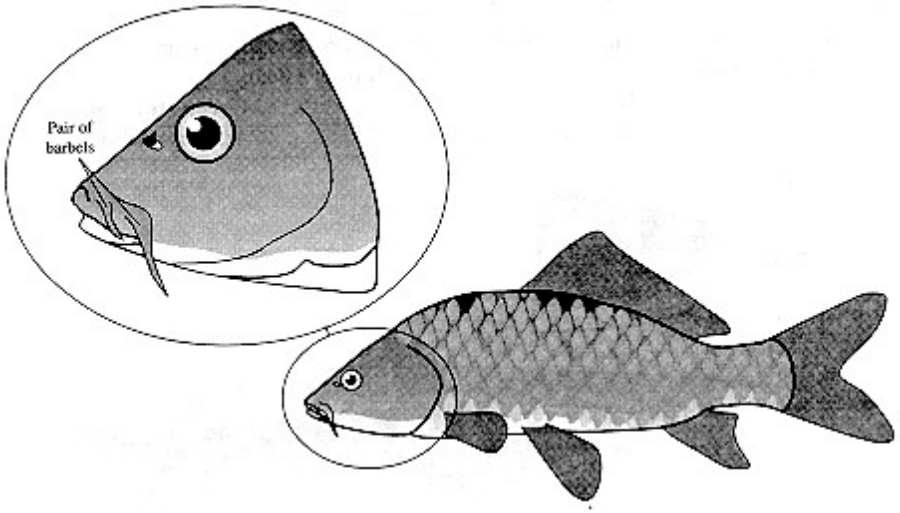


The shad (*Alosa sapidissima*), was introduced into California from eastern North America in the late nineteenth century. This species spawns in fresh water but spends most of its life in the sea. No self-sustaining runs of shad are known in BC but occasional individuals enter the lower Fraser River.

MINNOWS
FAMILY CYPRINIDAE

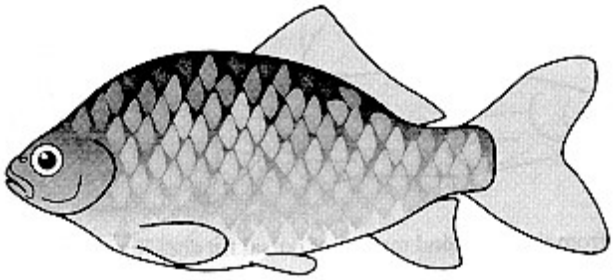
1 (4) Dorsal fin base much longer than head

2



2 (3) Two pairs of barbels on sides of upper jaw; common in the lower Fraser Valley, also in a number of lakes in the Thompson and Nicola systems

Carp
Cyprinus carpio

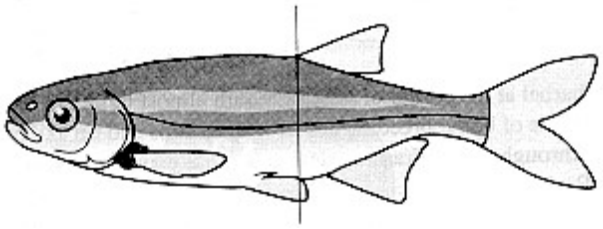


3 (2) No barbels on side of upper jaw; reported from a pond n the Salmon Arm area, and occasionally in ditches and streams in the lower Fraser Valley; probably no self-sustaining populations except in park ponds

Goldfish
Carassius auratus

4 (1) Dorsal fin base shorter than head

5

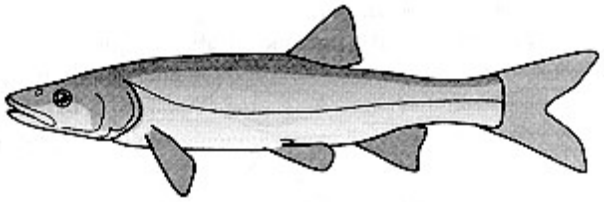


5 (6) Dorsal fin set far back on body, viewed from the side its origin is almost directly above the posterior tips of pelvic fins; widespread throughout the Fraser proper but absent from peripheral drainages

Redside shiner
Richardsonius balteatus

6 (5) Dorsal fin originates at about the middle of the body; viewed from the side the posterior tips of the pelvic fins extend well beyond the dorsal origin

7

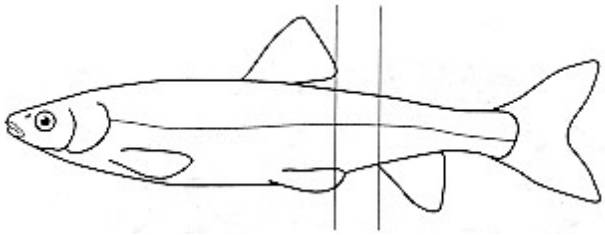


7 (8) Mouth large, upper jaw extends beyond anterior margin of eye; adults up to 450 mm in length; no dark mid-lateral strip in individuals less than 80 mm but in small fish a dark spot at base of tail; common throughout the Fraser proper but absent from peripheral drainages

Northern squawfish
Ptychocheilus oregonensis

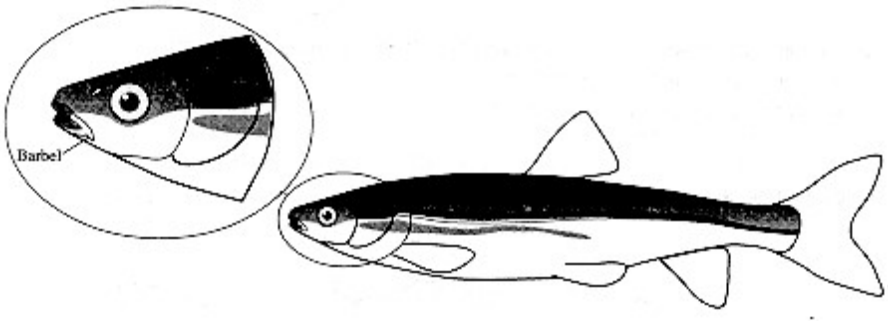
8 (7) Mouth small, upper jaw does not extend beyond anterior margin of eye

9



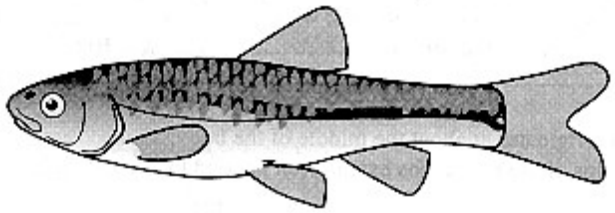
9 (12) Viewed from the side, hind margin of dorsal fin does not overlap anal fin

12



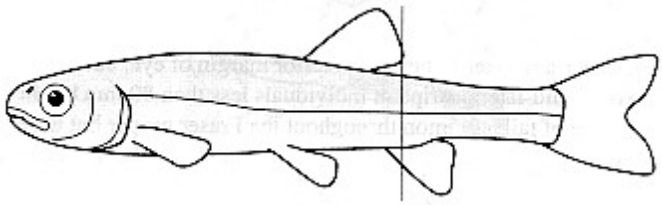
10 (11) Small barbel at the corner of mouth; mouth almost terminal; two dark horizontal stripes on side of body; breeding adults with red lips and fin axils; length to 250 mm; common throughout the Fraser system and in Sakinaw, Ruby and Waugh lakes on the Sechelt Peninsula

Peamouth
Mylocheilus caurinus



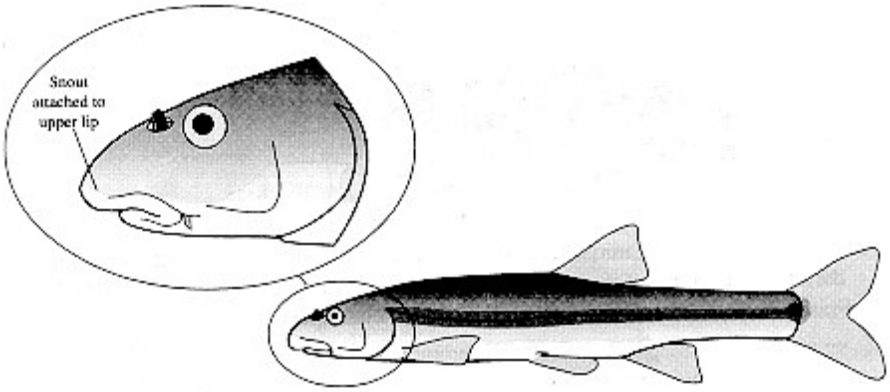
11 (10) No barbel at corner of mouth; snout overhangs mouth; flanks of breeding males with a brassy cast; length to 100 mm; locally abundant in the Vanderhoof-Prince George area and the lower Fraser Valley; rare in intervening areas

Brassy minnow
Hybognathus hankinsoni



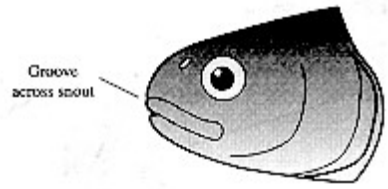
12 (8) Viewed from the side, hind margin of dorsal fin clearly overlaps anal fin

13



13 (14) Snout directly attached to upper lip; upper jaw not protractile; eyes exceptionally small, their diameter usually less than one third snout length; adults common in riffles and occasionally in large lakes throughout the Fraser proper; replaced in the Nootsack by the closely related Nootsack dace

Longnose dace
Rhinichthys cataractae

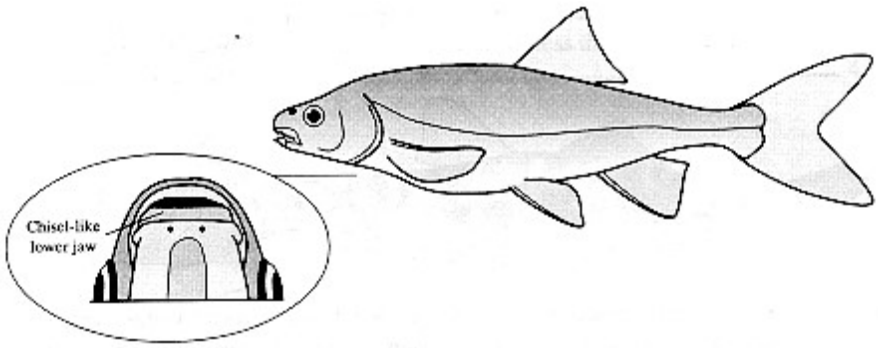


14 (13) Snout separated from upper lip by a groove across mid-line of snout; upper jaw protractile; eye diameter about half snout length

15

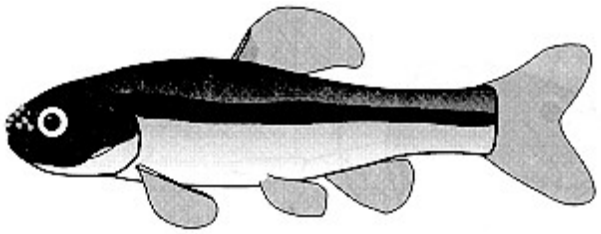
15 (18) No barbel at corner of mouth

16



16 (17) Lower jaw chisel-like, nearly straight in adults; flanks a uniform silvery colour; sporadic in the middle Fraser where it is known from the Westroad and Chilcotin rivers and from Nicola Lake in the Thompson system

Chiselmouth
Acrocheilus alutaceus

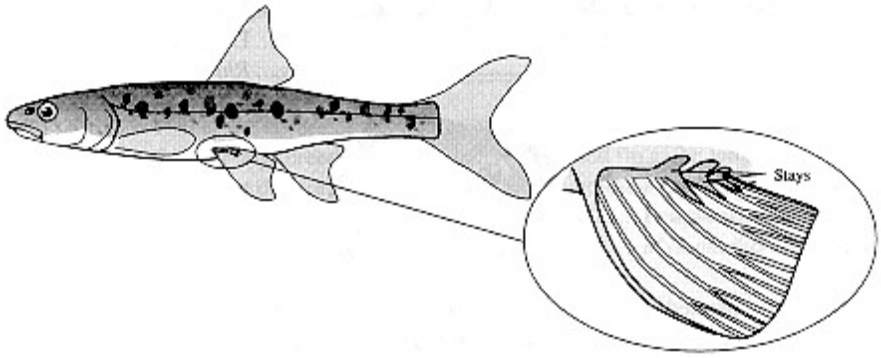


17 (16) Lower jaw normal; mid-lateral stripe in adults; breeding males with conspicuous dark head; introduced into the Little Cambell, Nootsack tributaries and the lower Fraser River, and also near Powell River (A. Peden, pers. comm.)

Fathead minnow
Pimephales promelas

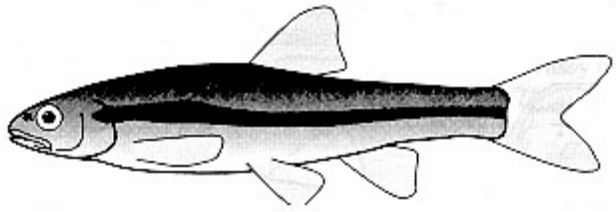
18 (15) Barbel at corner of mouth

19



19 (20) Flanks with conspicuous irregular dark blotches; fleshy membranes (stays) connect inner rays of pelvic fins to body; caudal peduncle depth less than distance from tip of snout to posterior margin of eye; abundant in the middle and lower Fraser especially in the main river, absent from peripheral drainages

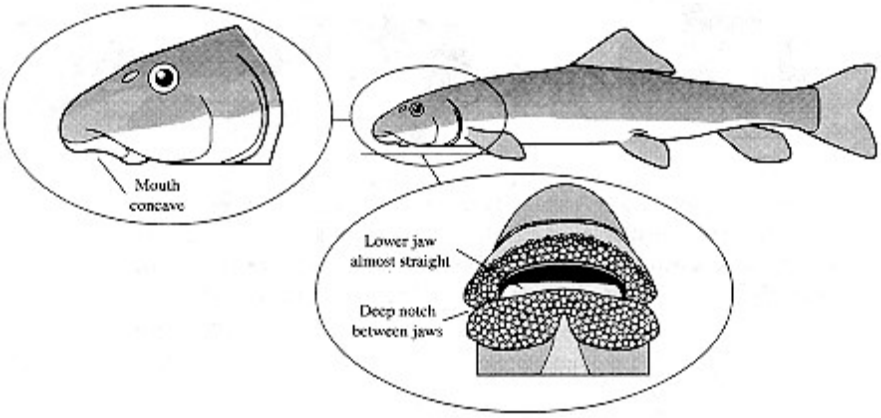
Leopard dace
Rhinichthys falcatus



20 (19) Flanks without conspicuous irregular dark blotches but juveniles often with a dark mid-lateral stripe; no fleshy membranes (stays) connecting inner rays of pelvic fins to body; caudal peduncle depth almost equal to distance from tip of snout to posterior margin of eye; common in the upper and middle Fraser and Thompson systems but apparently absent below the Fraser Canyon

Lake chub
Couesius plumbeus

SUCKERS
FAMILY CATOSTOMIDAE



1 (2) Deep notch between upper and lower lips at outer corners of mouth; lower jaw almost straight when viewed from below; viewed from the side the mouth is slightly cupped; a small species (usually less than 200 mm); in the Fraser known only from the North Thompson and the Fraser Thompson and the Fraser River between Chilliwack and Hope

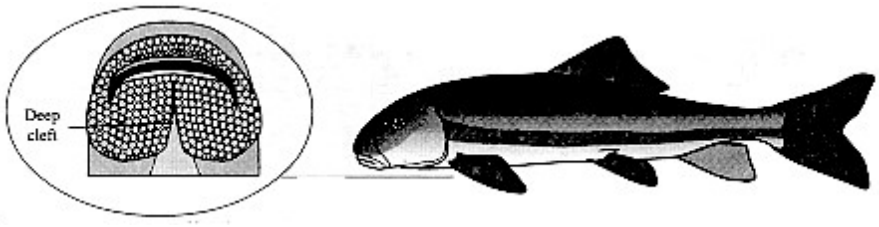
Mountain sucker
Catostomus platyrhynchus

2 (1) No deep notches between upper and lower lips at outer corners of mouth; lower jaw curved when viewed from below; viewed from the side the mouth is flat

3

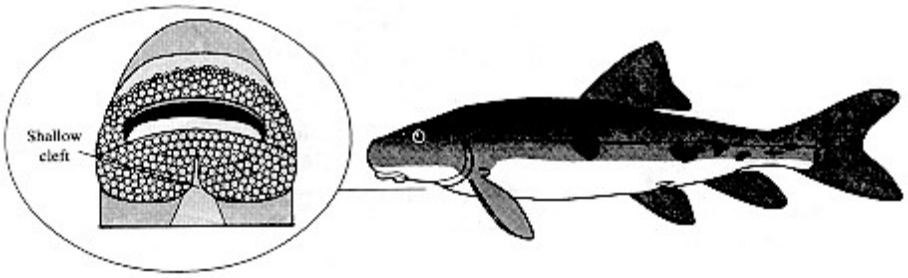
3 (7) Caudal peduncle narrow, its least depth half, or less than half, the dorsal fin base

4



4 (5) cleft in lower lip deep, usually no papillae between cleft and lower jaw; scales large on adults even those near the head are clearly visible to naked eye; juveniles with light coloured peritoneum; breeding fish with a dark lateral stripe; common throughout the Fraser proper, also in the Nootsack but absent from the other peripheral drainages

Largescale sucker
Catostomus macrocheilus

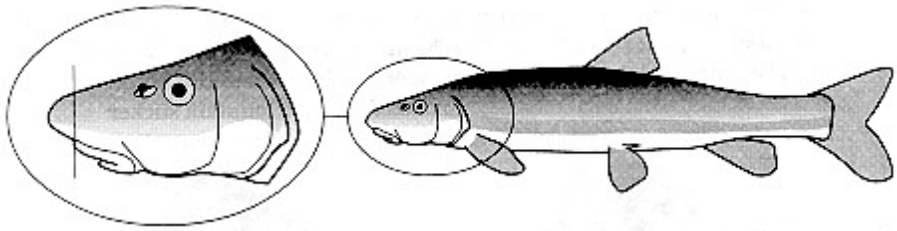


5 (4) Cleft in lower lip shallow, usually two or more rows of papillae between cleft and lower jaw; scales smaller, even on adults those near the head are hard to see; juveniles with jet black peritoneum; breeding fish with an orangish-red lateral stripe; rare in Fraser below canyon but common above; absent from peripheral drainages

Bridgelip sucker
Catostomus columbianus

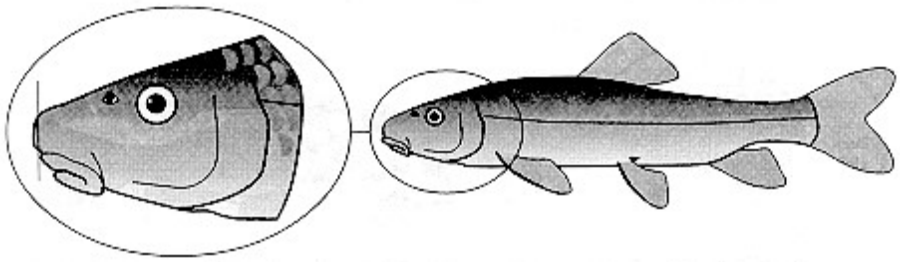
6 (3) Caudal peduncle deep; its least depth much more than half the dorsal fin base

7



7 (8) Snout long and pointed; mouth strongly subterminal (snout clearly over-hangs mouth); scales fine (those behind head barely visible); breeding fish with a rosy red lateral stripe; common in cooler waters throughout the Fraser proper; replaced in the lower Fraser and Nootsack by the closely related Salish sucker

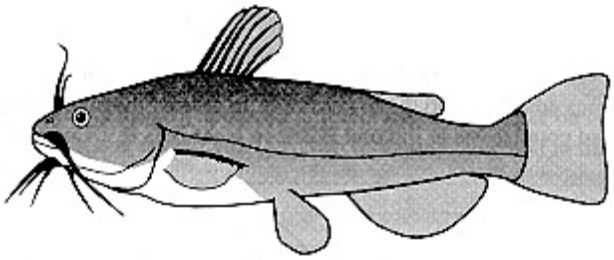
Longnose sucker
Catostomus catostomus



8 (7) Snout short and blunt; mouth not strongly subterminal (snout barely over-hangs mouth); scales large (those behind head clearly visible to naked eye); breeding fish with a bronze cast; common in upper Fraser lakes but rare south of Williams Lake; absent from peripheral drainages

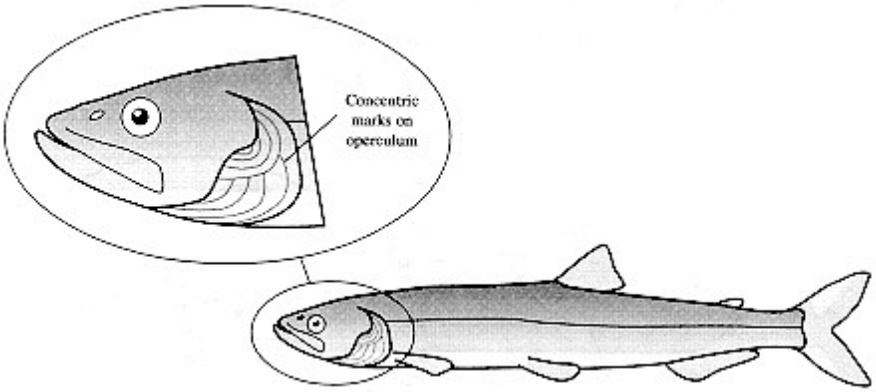
White sucker
Catostomus commersoni

CATFISH
FAMILY ICTALURIDAE



The brown catfish (*ameiurus nebulosus*) is abundant in the lower Fraser Valley. This introduced species is common in sloughs and creeks that are closely associated with the main river; however, it is also found in the Serpentine and Little Cambell rivers and in several small lakes and ponds throughout the lower Fraser Valley.

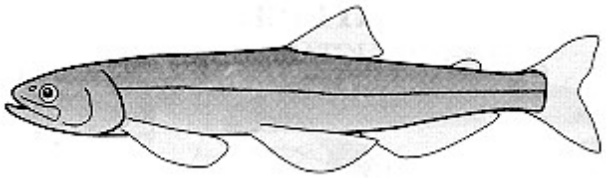
SMELTS
FAMILY OSMERIDAE



1 (2) Concentric marks on operculum; common in the mainstem lower Fraser in early spring when large numbers ascend to about Chilliwack

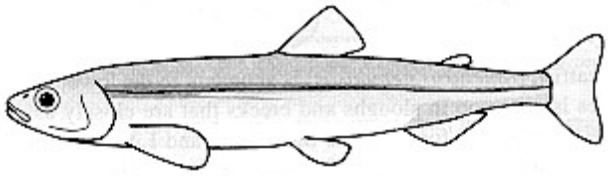
Eulachon
Thaleichthys pacificus

2 (1) No concentric marks on operculum



3 (4) Pectoral fin longer than head; lower jaw extends back to hind margin of eye; in fall anadromous adults ascend the lower Fraser to at least the mouth of the Pitt River; landlocked populations in Pitt and Harrison lakes

Longfin smelt
Spirinchus thaleichthys

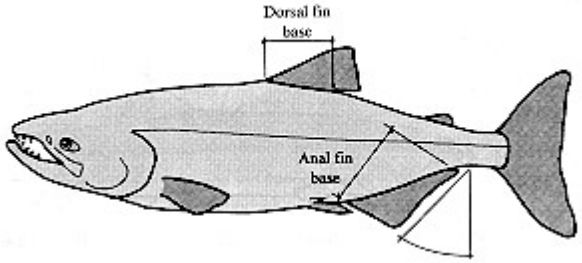


4 (3) Pectoral fin shorter than head; lower jaw does not extend back as far as hind margin of eye; ascends the lower Fraser to the mouth of the Pitt River and occasional individuals in Pitt Lake

Surf smelt
Hypomesus pretiosus

SALMON, TROUT AND CHAR
FAMILY SALMONIDAE
(SUBFAMILY SALMONINAE)

KEY TO THE ADULTS

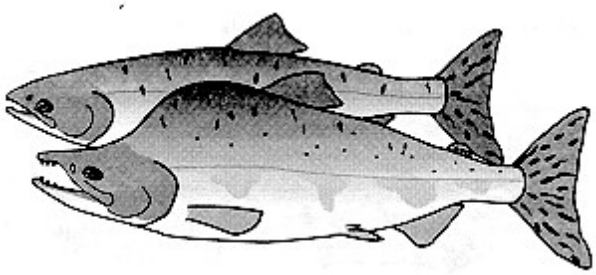


1 (10) Anal fin base longer than dorsal fin base; in profile, hind margin of anal fin slants backwards (not vertical)

2

2 (7) Distinct spots on tail

3

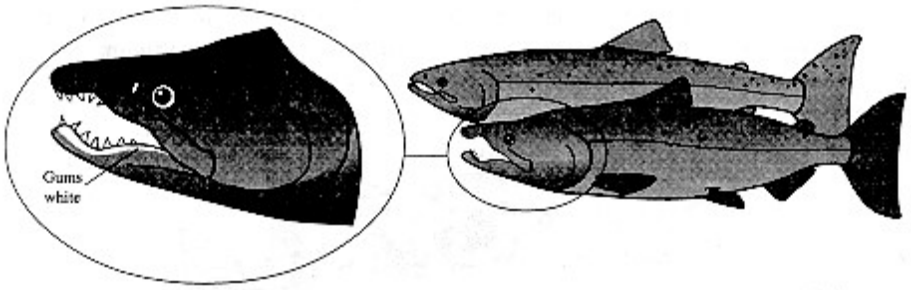


3 (4) Tail spots oblong (not round); adults common in the lower Fraser on odd numbered years; small runs ascend the canyon to spawn in Seton Creek and in the Thompson River

Pink salmon
Oncorhynchus gorbuscha

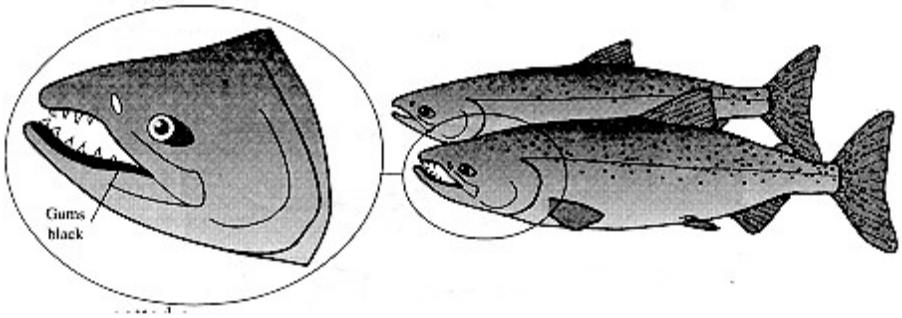
4 (3) Tail spots round (not oblong)

5



5 (6) Tail spotted on upper half; gums at base of teeth in lower jaw white; especially common in small streams throughout the lower Fraser (including peripheral drainages); adults regularly ascend the Thompson (both North and South) almost to their headwaters, but only rarely ascend the mainstem Fraser above Bridge River although there are sporadic reports as for upstream as Prince George

Coho salmon
Oncorhynchus kisutch

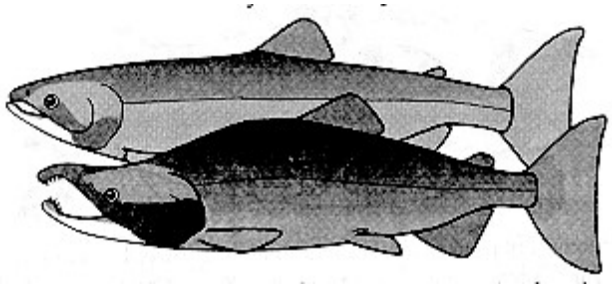


6 (5) Tail spotted on both upper and lower halves; gums at base of teeth in lower jaw black; adults ascend the mainstem Fraser and the Thompson system almost to their sources

Chinook salmon
Oncorhynchus tshawytscha

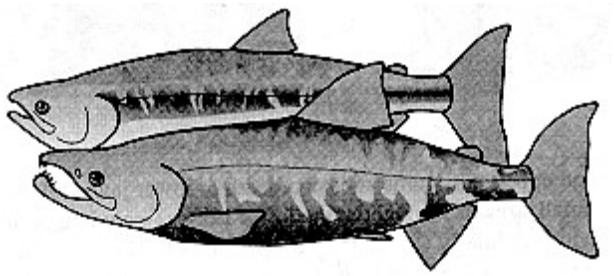
7 (2) No spots on tail, but occasionally some fine speckles

8



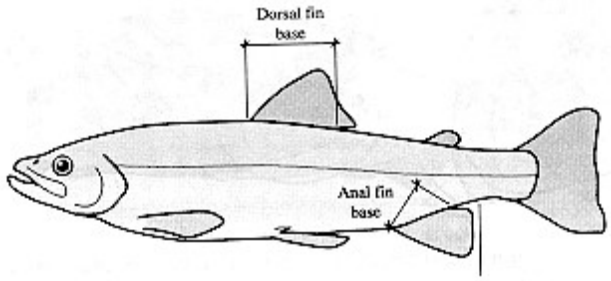
8 (9) Adults occur in fresh water both as migratory spawners (sockeye) and as residents (kokanee); flanks are uniformly coloured (silver in non-breeding kokanee, usually red in breeding sockeye and kokanee); kokanee occur in most large lakes associated with the Fraser system; anadromous adults ascend the mainstem Fraser to the McGregor and Bowron rivers (upper Fraser), and the Nechako and Stuart rivers (near Prince George) to their headwaters; the Adams River run (South Thompson) is famous for its strong four year cycle

Sockeye salmon
(Kokanee)
Oncorhynchus nerka



9 (8) Adults in freshwater only as spawners; flanks in males pale with irregular red and black blotches, females with a purplish lateral stripe; adults common in the lower Fraser (including peripheral drainages) but do not ascend the main river above Hope

Chum salmon
Oncorhynchus keta

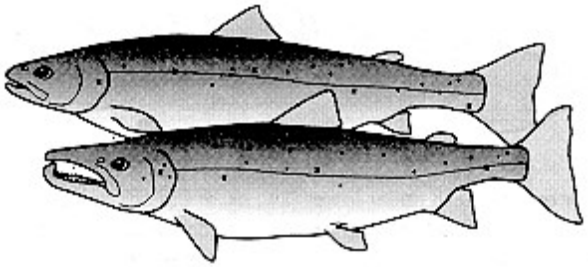


10 (1) Base of dorsal fin equal to, or longer than, anal fin base; in profile, hind margin of anal fin is vertical (no backward slant)

11

11 (18) Background colour on flanks light (silver or golden) with dark spots

12



12 (13) Relatively few spots on flanks, mostly above lateral line, some spots X-shaped; caudal fin usually without spots; spawning males with conspicuously hooked lower jaw; so far known only from the Stave River (lower Fraser

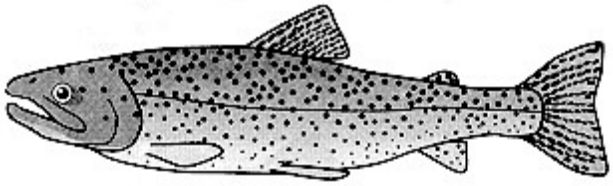
Atlantic salmon
Salmo salar

13 (12) Spots on back and sides more numerous; none X-shaped; caudal fin usually heavily spotted

14

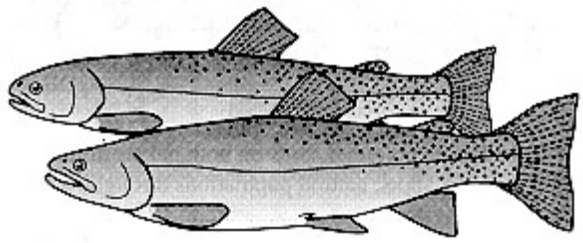
14 (17) Red or orange slash under lower jaw; upper jaw extends back past hind margin of eye; tail usually yellowish with black spots

15



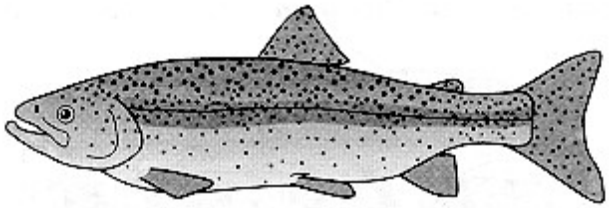
15 (16) Anterior flanks heavily spotted above and below lateral line, anal fin usually with spots; common in the lower Fraser (including the peripheral drainages except the BC portion of Skagit); ascends the Fraser as far as the Bahatlatch River near Boston Bar; one old record from the Thompson near Ashcroft

Coastal cutthroat trout
Oncorhynchus clarki clarki



16 (15) Anterior flanks lightly spotted (mostly above lateral line), anal fin usually without spots; in the Fraser system confined to headwater streams in the Shuswap drainage (South Thompson)

Westslope cutthroat trout
Oncorhynchus clarki lewisi

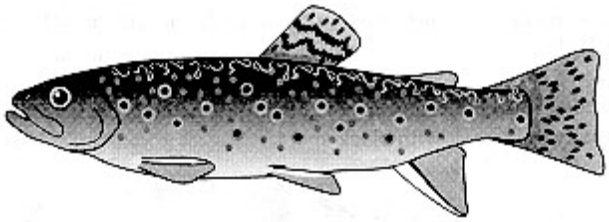


17 (14) No red or orange slash under lower jaw; except in spawning males upper jaw does not extend back beyond hind margin of eye; sides usually silver with a pink hue extending along midline; tail dusky with dark spots; common throughout the Fraser system (including the peripheral drainages)

Rainbow trout*
Oncorhynchus mykiss

18 (11) Background colour on sides dark with light or coloured spots

19

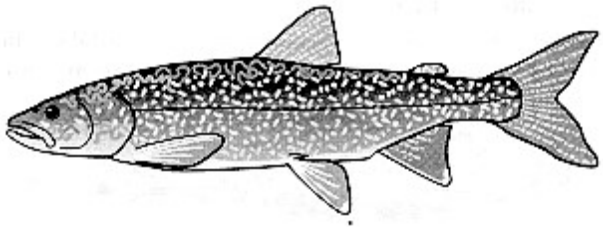


19 (20) Dorsal fin yellowish, with bold black streaks; red spots on flanks surrounded by blue haloes; introduced throughout the Fraser system

Brook trout
Salvelinus fontinalis

20 (19) Dorsal fin dusky and without bold black marks; spots on sides not surrounded by light haloes

21

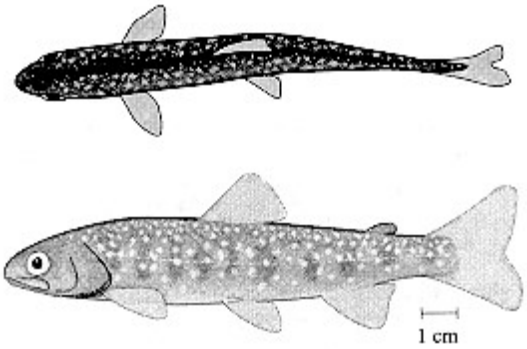


21 (22) Tail deeply forked, light coloured spots on both halves of tail; head and body covered in light irregular spots; natural populations throughout the upper and middle Fraser and Thompson system

Lake trout
Salvelinus namaycush

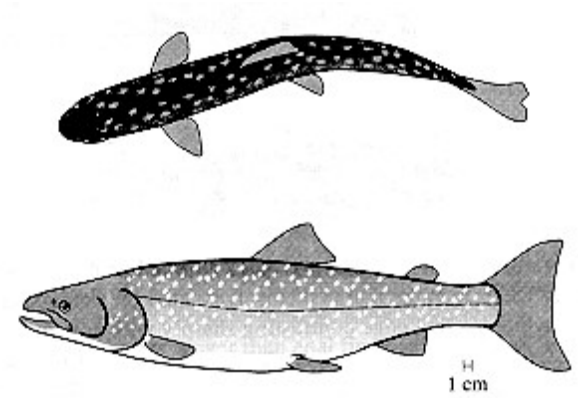
22 (21) Tail not deeply forked; spots if present only on upper half of tail

23



23 (24) Viewed from the side snout is blunt; viewed from above spots on back are small and crowded together; upper jaw short (barely reaches hind margin of eye); moderately abundant in lower Fraser lakes and streams (including peripheral drainages); absent from the middle and upper Fraser (except for the Stuart system)

Dolly Varden**
Salvelinus malma



24 (23) Viewed from the side snout is more pointed; viewed from above spots on back are large and well separated; upper jaw long (reaches well past hind margin of eye); moderately abundant in upper and middle Fraser and North Thompson lakes and streams, less common but present in the South Thompson and lower Fraser (including the BC portion of the Skagit)

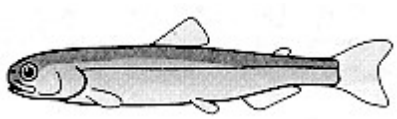
Bull trout**
Salvelinus confluentus

* In the Fraser region, the exotic subspecies (golden trout, *Oncorhynchus mykiss aguabonita*) occurs in Nicomen Lake, Skagit system.
** This species par is difficult to distinguish and often hybridize. In sympatry, Dolly Varden usually mature at less than 200 mm and typically retain parr marks into adult life; whereas, bull trout rarely mature at less than 300 mm and do not retain parr marks into adult life. For a more reliable identification see the Appendix, pages 214 - 215.

KEY TO YOUNG SALMONIDS (45-100 mm)

1 (10) Anal fin base longer than dorsal fin base; in profile, the outer margin of anal fin has a backward slant; no distinct dark spots on dorsal fin

2



2 (3) Sides silvery; no parr marks; back iridescent greenish-blue; small fish usually less than 50 mm long in freshwater

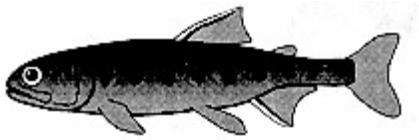
Pink salmon
Oncorhynchus gorbuscha

3 (2) Parr marks on flanks

4

4 (7) Parr marks in the form of deep bars, the largest marks deeper than the vertical eye diameter

5



5 (6) adipose fin uniformly pigmented; parr marks variable but the spaces between marks usually wider than the marks themselves; anal fin sickle-shaped with a conspicuous white leading edge contrasting sharply with adjoining dark pigment

Coho salmon
Oncorhynchus kisutch

6 (5) adipose fin with a clear unpigmented "windows"; spaces between parr marks usually wider than the marks themselves; anal fin not sickle-shaped, white leading edge not contrasting conspicuously with adjacent dark pigment

Chinook salmon
Oncorhynchus tshawytscha

7 (4) Parr marks small, oval shpaed, none much higher than the vertical diameter of the eye

8

8 (9) Size in fresh water to over 100 mm; parr marks divided roughly in half by mid-line; combined width of parr marks much less than half the combined width of light areas along the side; no greenish iridescence on sides below mid-line

Sockeye salmon
(Kokanee)
Oncorhynchus nerka

9 (8) Size in fresh water less than 50 mm; back mottled green, sides silvery, with a faint green iridescence below mid-line; combined width of dark areas along mid-line more thn half the combined width of the light areas; parr marks faint or absent below mid-line

Chum salmon
Oncorhynchus keta

10 (1) Dorsal fin base equal to or longer than anal fin base; in profile, hind margin of anal fin vertical

11

11 (17) Numerous distinct dark spots on dorsal fin; in very small specimens the first dorsal ray may be black

12

12 (15) Coloured spots (red to yellow) along mid-line or between parr marks; combined width of parr marks along mid-line about equal to or greater than the combined width of the light areas

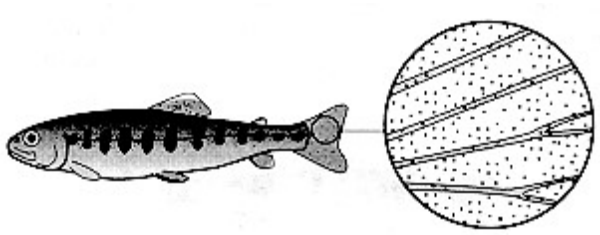
13

13 (14) No definite spots other than parr marks below the mid-line; 8 or 9 parr marks, the widest about equal to eye diameter; adipose fin dusky

Brook trout
Salvelinus fontinalis

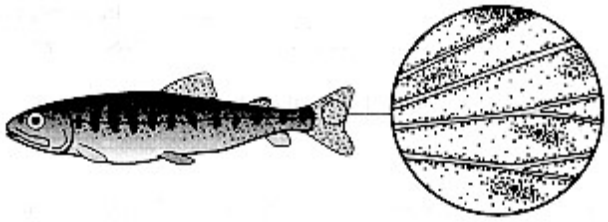
14 (13) No coloured (red to yellow) spots; width of dark areas along mid-line less than width of light areas

15



15 (16) On fish below 50 mm melanophores are distributed over entire tail; few or no spots on tail; no red or yellow marks under chin; hind margin of upper jaw not reaching hind margin of eye

Rainbow trout
Oncorhynchus mykiss



16 (15) Usually black spots on tail, even on fish less than 50 mm melanophores on tail are starting to concentrate between the rays, often forming short dark streaks (precursors of spots); usually red or yellow marks under chin; hind margin of upper jaw usually reaches to or past hind margin of eye

Cutthroat trout*
Oncorhynchus clarki clarki

17 (11) Dorsal fin without numerous dark spots; in very small specimens the first dorsal ray may be dusky but not black

18

18 (19) Black spots on back and sides; 8-10 regularly shaped parr marks; width of dark areas on mid-line about equal to width of light areas; a single red dot between each parr mark

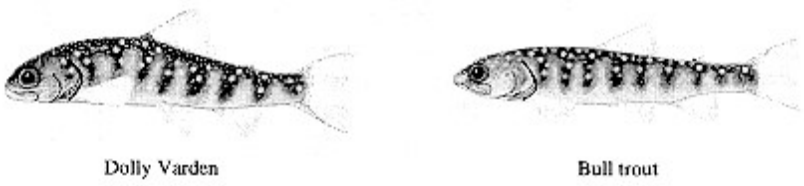
Atlantic salmon
Salmo salar

19 (18) No black spots on back and sides; parr marks are irregular blotches; width of dark areas on mid-line greater than width of light areas; parr marks not separated by single red dots

20

20 (21) Parr marks along mid-line are vertical bars with width of dark areas equal to or less than width of light areas; dorsal fin starts about middle of body (excluding tail)

Lake trout
Salvelinus namaycush



Dolly Varden

Bull trout

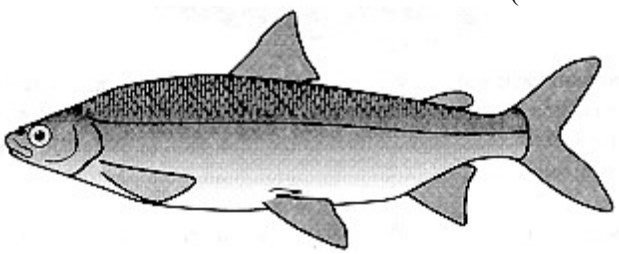
21 (20) Parr marks are irregular blotches; width of dark areas on mid-line greater than width of light areas; dorsal fin starts in front of middle of body (excluding tail)

Dolly Varden and Bull trout**
Salvelinus malma or S. confluentus

* Below the Fraser Canyon the subspecies is (*Oncorhynchus clarki clarki*); while in the Fraser system the interior subspecies (*Oncorhynchus clarki lewisi*) is confined to headwater streams in the South Thompson.

** Small specimens of these two species cannot be easily differentiated in the field (use the key in the appendix, page 223).

WHITEFISH
FAMILY SALMONIDAE
(SUBFAMILY COREGONINAE)

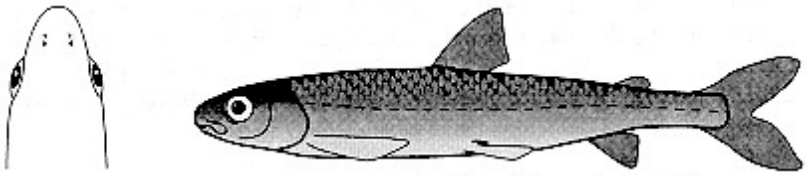


1 (2) Body deep, slab-sided; lower surface curves downward when viewed from side; common in large lakes throughout the upper and middle Fraser, absent from the lower Fraser (including peripheral drainages)

Lake whitefish
Coregonus clupeaformis

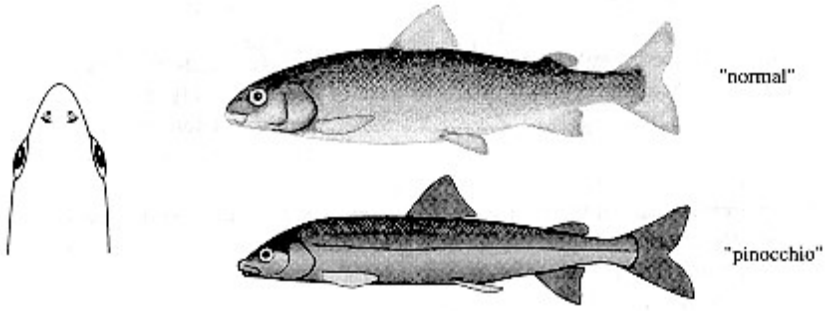
2 (1) Body slender, round in cross-section; lower surface nearly flat when viewed from side

3



3 (4) Viewed from above snout blunt, rounded; adipose fin small, base equal; to eye diameter; deep lakes in upper and middle Fraser and Thompson systems, absent from the lower Fraser (including peripheral drainages)

Pygmy whitefish
Prosopium coulteri

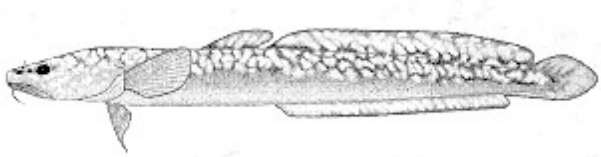


4 (3) Viewed from above snout pointed; adipose fin large, base about 1.5 times eye diameter; widespread throughout the Fraser proper; absent in BC portions of all peripheral drainages except Nootsack

Mountain whitefish*
Prosopium williamsoni

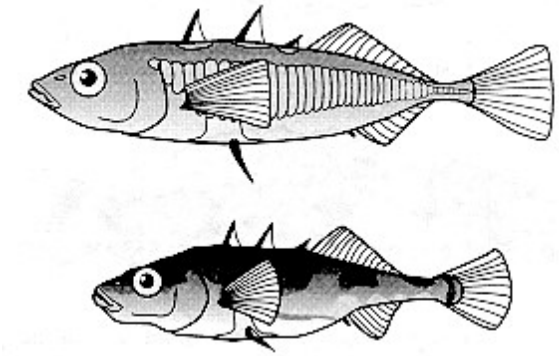
* Many fluvial populations contain two forms: normal and "pinocchio". The "pinocchio" form has a longer snout and thinner body than the normal form.

CODS
FAMILY GADIDAE



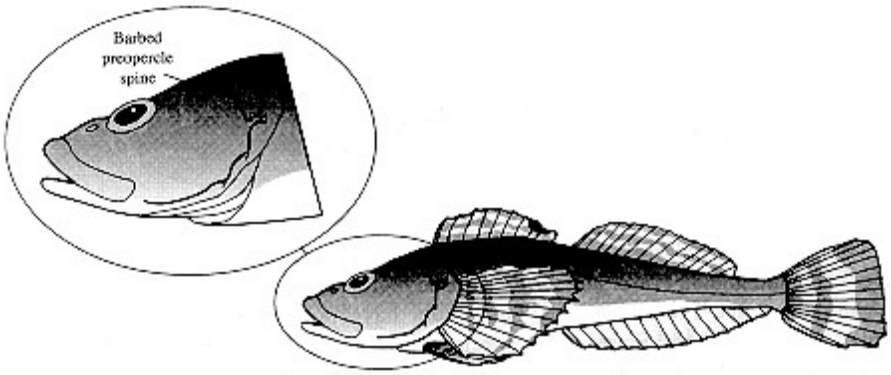
One species of cod (the burbot, *Lota lota*) is a permanent resident of lakes and rivers in the upper and middle Fraser and the Thompson region. Occasional specimens are taken downstream of the Fraser Canyon, but burbot have not established self-sustaining populations in the lower Fraser. This species is absent from the peripheral drainages. A marine species (*Microgadus proximus*) occasionally enters the Fraser estuary but never penetrates the Fraser Delta.

STICKLEBACKS
FAMILY GASTEROSTEIDAE



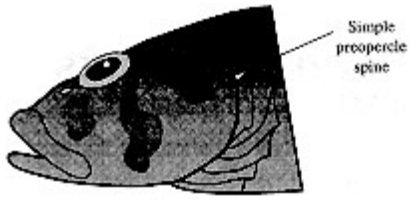
The threespine stickleback (*Gasterosteus aculeatus*) is abundant in lakes and low gradient streams throughout the lower Fraser (including the peripheral drainages except for the BC portion of the Skagit). Two genetically different life-history forms occur in the lower Fraser: a permanent freshwater resident, and a migratory marine form that in the spring ascends freshwater streams to spawn. The species is notoriously variable, and in many lower Fraser sites the two forms hybridize.

SCULPINS
FAMILY COTTIDAE



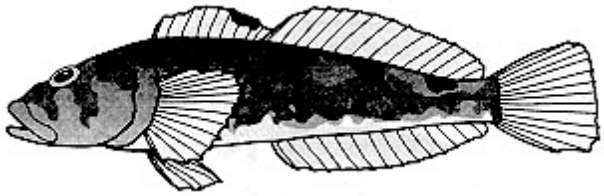
1 (2) Underside dead white; spine on preopercle with obvious hooks; pectoral fins with alternating yellow and dark bands of approximately equal width; common in estuaries

Pacific staghorn sculpin
Leptocottus armatus



2 (1) Underside light or dusky but not dead white; spine on preopercle simple; pectoral fins speckled but without broad dark bands

3

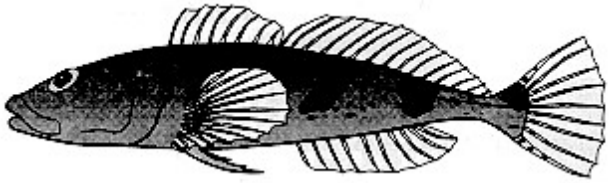


3 (4) First dorsal fin with a conspicuous black spot; anal fin base distinctly longer than head length; in streams, typically in quiet water; common in lakes and estuaries; widespread throughout the Fraser proper (including the peripheral drainages except for the BC portion of the Skagit)

Prickly sculpin
Cottus asper

4 (3) First dorsal fin without a conspicuous black spot; anal fin base about equal to head length

5

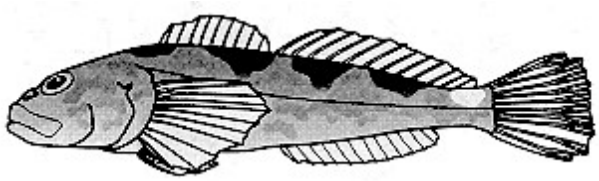


5 (6) Back and sides usually strongly prickled; chin heavily mottled; usually two distinct dark saddle marks under second dorsal fin; in the Fraser system only in the North Thompson drainage

Torrent sculpin
Cottus rhotheus

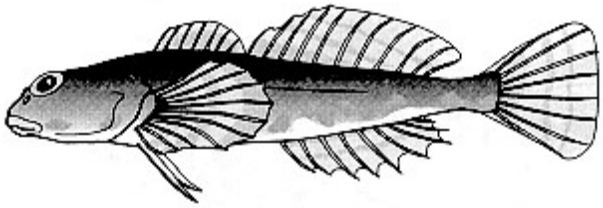
6 (5) Back and sides without strong prickles; chin pale or dusky, not heavily mottled; no conspicuous dark saddle marks under second dorsal fin

7



7 (8) Usually a conspicuous light mark on back just in front of caudal fin; lateral line complete; adults typically in riffles, although occasionally in lakes; common in the lower Fraser system but rare above the canyon where it is known only from streams tributary to the Bridge River

Coastrange sculpin*
Cottus aleuticus



8 (7) No conspicuous light mark on back just in front of caudal fin; lateral line incomplete; common throughout the middle and upper Fraser but absent in the lower Fraser (including peripheral drainages)

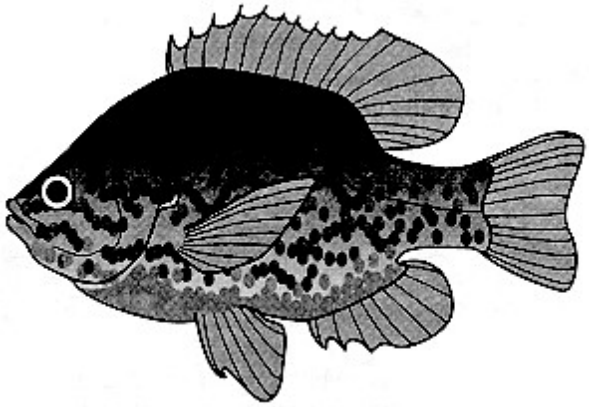
Slimy sculpin
Cottus cognatus

* There are two forms of *Cottus aleuticus* in Cultus Lake: normal sized, bottom-dwelling individuals, and vertically migrating, dwarf individuals.

SUNFISH AND BASSES
FAMILY CENTRARCHIDAE

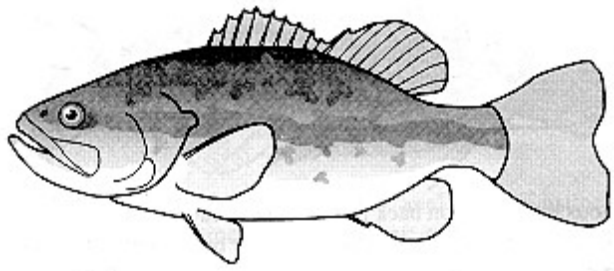
1 (4) Dorsal fin base (including both spinous and soft portions) noticeably longer than anal fin base

2



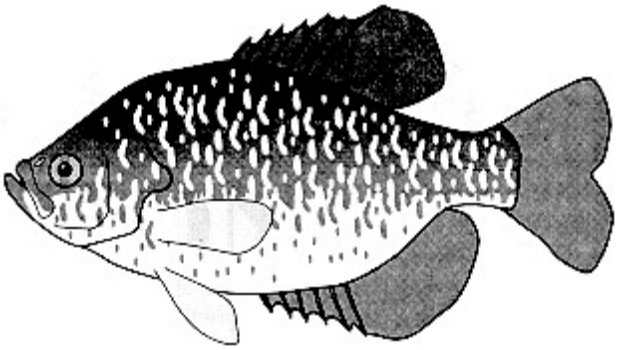
2 (3) Distinct, black opercular flap (outlined in red in mature males); pelvic fins reach vent; in Fraser system confined to the lower Fraser Valley

Pumpkinseed
Lepomis gibbosus



3 (2) No distinct black opercular flap; pelvic fins do not reach vent; in Fraser system confined to the Sumas drainage (lower Fraser)

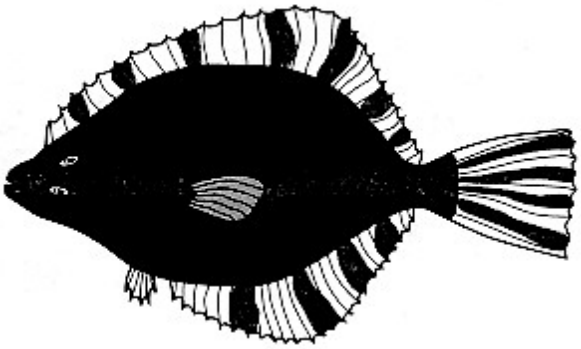
Largemouth bass
Micropterus salmoides



4 (1) Dorsal fin base (including both spinous and soft portions) about equal to anal fin base; in the Fraser system confined to sloughs and lakes of the lower Fraser Valley

Black crappie
Pomoxis nigromaculatus

FLOUNDERS
FAMILY PLEURONECTIDAE



The starry flounder (*Platichthys stellatus*) is a marine flatfish whose juveniles are common in estuaries. In the Fraser, they occur from the estuary upstream to about Mission. These flounders do not breed in fresh water and mature adults typically are found in shallow inshore marine environments.