

**FIELD KEY TO THE  
FRESHWATER FISHES  
OF BRITISH COLUMBIA**

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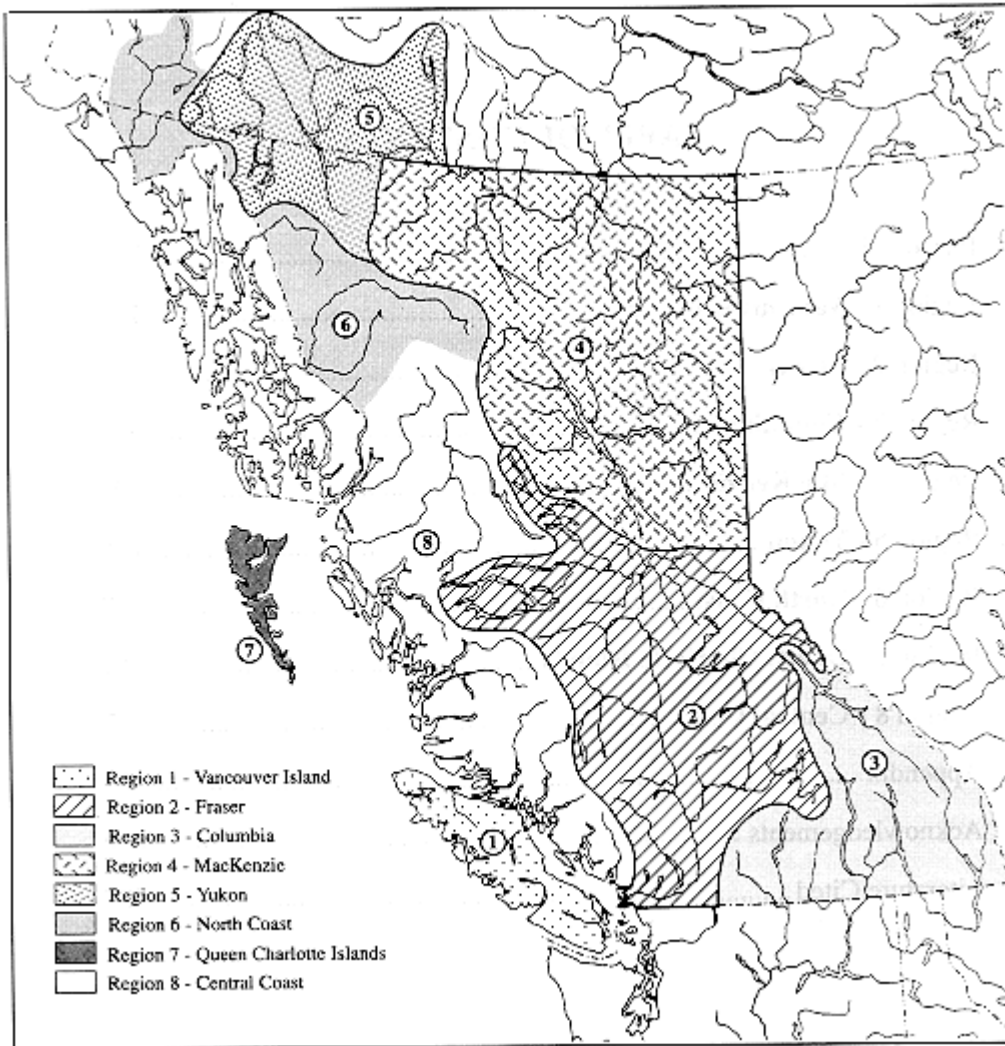
"Admitted that some degree of obscurity is inseparable from both theology and ichthyology, it is not inconsistent with profound respect for the professors of both sciences to observe that a great deal of it has been created by themselves."

Sir Herbert Maxwell

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## INTRODUCTION



**Figure 1**  
British Columbia's eight zoogeographical regions

Traditionally, keys are constructed by taxonomists to provide identification guides. Unfortunately, these keys usually bristle with obscure jargon and arcane counts and measurements such that non-taxonomists, even those who are professional biologists, give up and guess at identifications based on the pictures. In the past it didn't matter much if identifications made by non-taxonomists were correct or not. They rarely became public and the only consequence of a mistake was a little personal embarrassment. Recently, however, things have changed. With the advent of consultants, word processors, and copy machines even unpublished reports can receive wide circulation, and this "grey" literature often contains lists of species collected at specific sites.

Usually, for important recreational or commercial species these lists are accurate, but for small "unimportant" species, mistakes are common. At one time these misidentifications were a minor nuisance, of concern only to academics and museum personnel. Now, with growing public concern about biodiversity and conservation, sloppy identifications are more serious. Conservation managers need reliable distributional and inventory data on all native species, and the first step in acquiring such data is accurate identification.

This set of keys is an attempt to provide rapid and dependable field identifications of BC freshwater fish. Traditional keys are not very useful in the field, since they are designed for use on preserved specimens - a definite drawback when working with rare or threatened species. Because field identifications are essential in inventory work, we've tried to design keys that work in the field. To this end we have included information that is rarely incorporated in traditional keys. For example, information on where a fish was caught (both the geographic locality and site-specific habitat) and what it looks like when alive, can make the identification of even complex species groups easy. For instance, sculpins ("bullheads" of the genus *Cottus*) are notoriously difficult to identify. In most keys you have to examine chin pores, make judgements about tubular nostrils and the degree of separation of the dorsal fins, as well as count dorsal, anal and pectoral fin rays, and determine if there are palatine teeth, before you can make an identification. In many cases this detail is unnecessary. First, there is no place in BC where all seven of our *Cottus* species coexist. Since there are only two or three species in most drainage systems, as long as you know where you are there is no need to work through a key that includes all seven species. Also, many sculpin species have distinctive life-colours and usually occur in specific habitats. Consequently, geographic locality, together with habitat and colour pattern, often are enough for a reliable field identification.

To simplify our keys we have divided the province into eight zoogeographic regions (Fig. 1): Vancouver Island, Fraser, Columbia, Mackenzie, Yukon, North Coast, Queen Charlotte Islands and Central Coast. Generally, the regions correspond to major drainage basins, but for islands and coastal drainages this was not possible. Thus, the Vancouver Island key includes the Gulf Islands and all other islands in the straits between Vancouver Island and the mainland; while the North and Central Coast keys cover a number of separate drainage systems.

Clearly, field keys that use geography assume that we know enough about the distribution of fishes in BC that we are certain about what species occur in what major drainage systems. Generally, this is true but our confidence isn't absolute. Therefore, we have included a conventional key in the Appendix. This key is designed for use on preserved material and includes all the species known to occur in BC. When in doubt about a field identification, you should preserve a sample and try running the specimen through this key. If still in doubt, send the specimen to the Fish Museum, Department of Zoology, 6270 University Boulevard, University of British Columbia, Vancouver, V6T 1Z4.

VANCOUVER ISLAND

# VANCOUVER ISLAND



For this key, Vancouver Island includes the islands that lie between Vancouver Island and the adjacent mainland (Fig. 2). The entire island is mountainous, except for narrow lowland strips on the east, west and north coasts. These ranges effectively divide the island's waters into east and west-flowing drainage systems. The climate is mild but very wet. Consequently, most island rivers are short with steep gradients and the lakes have high flushing rates. Usually, the water is clear but in some lowland areas, particularly the Nahwitti Lowland at the north end of the island, there are blackwater regions.

Not surprisingly, Vancouver Island supports relatively few freshwater fish. There are 16 native and ten introduced species (Table 1). With the exception of one small population of brown trout in the Eve River and sporadic records of Atlantic salmon, *Salmo salar*, near Port Hardy, the introduced species (brook trout, *Salvelinus fontinalis*; brown trout, *Salmo trutta*; goldfish, *Carassius auratus*; carp, *Cyprinus carpio*; fathead minnow, *Pimephales promelas*; brown catfish, *Ameiurus nebulosus*; pumpkinseed, *Lepomis gibbosus*; and smallmouth bass, *Micropterus dolomieu*) are confined to the southern half of the island (from Campbell River south).

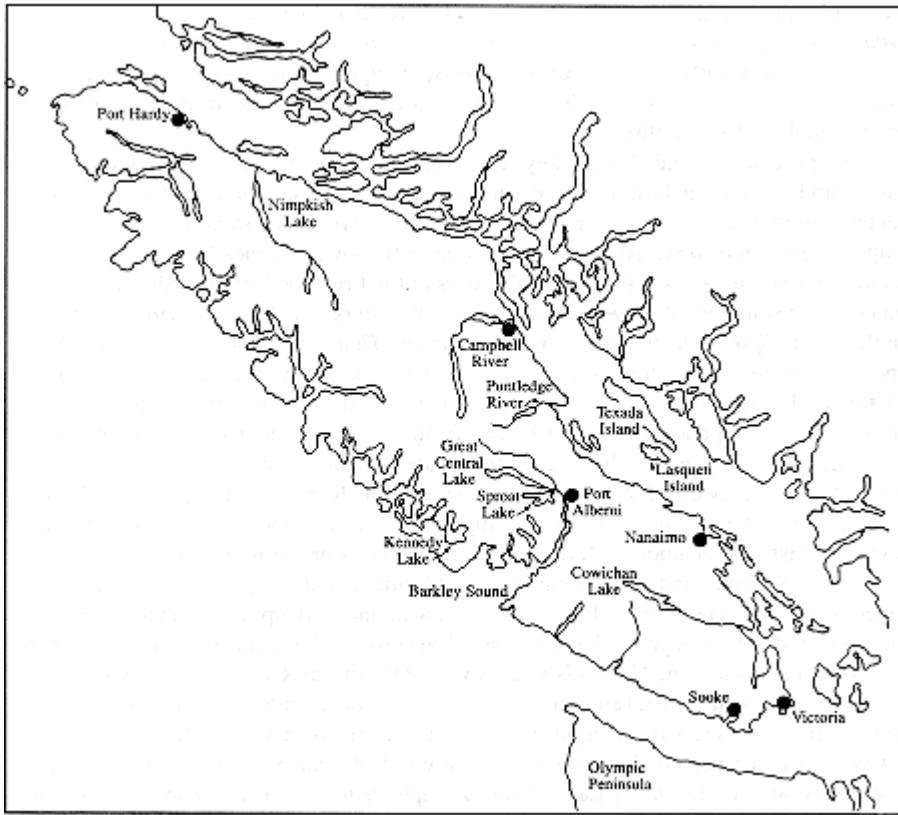
We have also included in the key seven euryhaline species that are known from the seas around Vancouver Island but are not recorded from fresh water in this area. These include common estuarine species (starry flounder, *Platichthys stellatus*; and staghorn sculpin, *Leptocottus armatus*) that frequently enter the lower reaches of rivers, as well as anadromous species known from coastal waters but not recorded from fresh water on the island (green sturgeon, *Acipenser medirostris*; white sturgeon, *Acipenser transmontanus*; longfin smelt, *Spirinchus thaleichthys*; and eulachon, *Thaleichthys pacificus*). At low tide, especially where small streams cross shingle beaches, many marine species (usually cottids and stichaeids) temporarily occur in fresh water. Since such species are not regular components of the freshwater fauna, we've not included them in the keys.

The main reason for the sparse freshwater fauna on Vancouver Island is the difficulty that freshwater fish have in dispersing through the sea. To "pure" freshwater species, salt water presents an almost impassable barrier. Indeed, only one primary freshwater fish, the peamouth (*Mylocheilus caurinus*), is native to Vancouver Island. It occurs near Nanaimo and in the Kennedy and Cecilia lake drainages on the west side of Vancouver Island. The peamouth is one of the few minnows (Cyprinidae) that can tolerate saltwater, and it is thought to have reached Vancouver Island and other isolated areas (e. g. Sechelt Peninsula and Nelson Island) by way of the Fraser River "plume". Apparently, the peamouth's salt tolerance is such that it could ride the brackish Fraser plume across the Strait of Georgia and survive the trip (Clark and McInerney 1974); however, how the peamouth reached the west coast of Vancouver Island is a mystery. It occurs as far north as Ozette Lake on the Olympic Peninsula, and perhaps crossed from there to the west coast of Vancouver Island during some low salinity period associated with melting ice-sheets after the last glaciation. All of the other native species on the island are salt tolerant and probably dispersed directly through the sea.

Although there are relatively few species on Vancouver Island, the low biodiversity may be an illusion. It is a region where postglacial conditions have favoured rapid evolution. For example, on southern Vancouver Island biological species of sticklebacks and lampreys have evolved since the last glaciation, and on northern Vancouver Island a



pair of distinctive lake and stream sticklebacks that may warrant specific recognition (Lavin and McPhail 1993). Also, there is no reason to expect that the postglacial divergences of lampreys and sticklebacks are unique; isolated populations of trout, char and sculpins on the island probably were subject to the same evolutionary opportunities as sticklebacks and lampreys. Consequently, when these recent divergences are better studied, more diversity maybe apparent in the Vancouver Island region.



**Figure 2**  
Vancouver Island river systems.

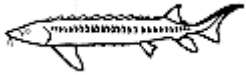
Species	Status
<i>Lampetra ayresi</i>	+
<i>L. richardsoni</i>	+
<i>L. tridentata</i>	+
<i>Acipenser medirostris</i>	+
<i>A. transmontanus</i>	*
<i>Alosa sapidissima</i>	*
<i>Carassius auratus</i>	*
<i>Cyprinus carpio</i>	<b>I</b>
<i>Mylocheilus caurinus</i>	<b>I</b>
<i>Pimephales promelas</i>	+
<i>Ameiurus nebulosus</i>	<b>I</b>
<i>Osmerus dentex</i>	<b>I</b>
<i>Spirinchus thaleichthys</i>	*
<i>Thaleichthys pacificus</i>	*
<i>Oncrohynchus clarki clarki</i>	*
<i>O. gorbuscha</i>	+
<i>O. keta</i>	+
<i>O. kisutch</i>	+
<i>O. mykiss</i>	+
<i>O. nerka</i>	+
<i>O. tshawytscha</i>	+
<i>Salmo salar</i>	+
<i>S. trutta</i>	<b>I</b>
<i>Salvelinus fontinalis</i>	<b>I</b>
<i>S. malma</i>	<b>I</b>
<i>Gasterosteus aculeatus</i>	+
<i>Cottus aleuticus</i>	+
<i>Cottus aleuticus</i>	+
<i>C. asper</i>	+
<i>Leptocottus armatus</i>	<b>E</b>
<i>Lepomis gibbosus</i>	<b>I</b>
<i>Micropterus dolomieu</i>	<b>I</b>
<i>Platichthys stellatus</i>	<b>E</b>
<b>Table 1</b> Fishes of Vancouver Island	
+ = present <b>E</b> = estuarine	<b>I</b> = introduced * = inshore marine record

**Pictorial Key To Families**



**LAMPREYS (PETROMYZONTIDAE)**

5



**STURGEONS (ACIPENSERIDAE)**

8



**HERRINGS (CLUPEIDAE)**

9



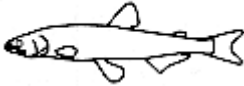
**MINNOWS (CYPRINIDAE)**

9



**CATFISH (ICTALURIDAE)**

11



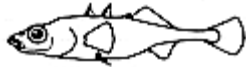
**SMELTS (OSMERIDAE)**

11



**SALMON, TROUT, CHAR (SALMONIDAE)**  
(SUBFAMILY SALMONINAE)

12



**STICKLEBACKS (GASTEROSTEIDAE)**

20



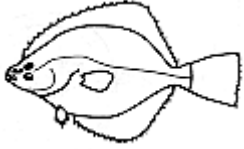
**SCULPINS (COTTIDAE)**

21



**SUNFISH, BASS (CENTRARCHIDAE)**

22



**FLOUNDERS (PLEURONECTIDAE)**

23

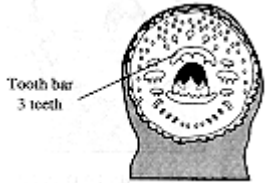
**LAMPREYS**  
**FAMILY PETROMYZONTIDAE**

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.)



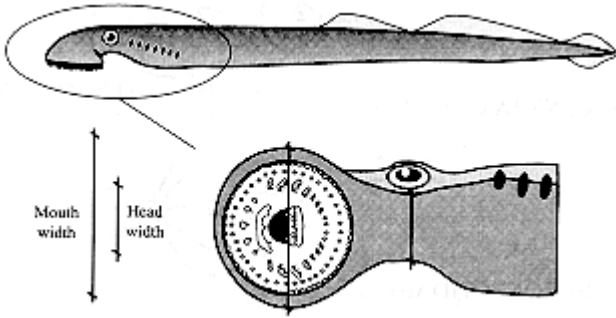
1 (8) Mouth a sucking disk; teeth and eyes present

adult or transforming lampreys  
2



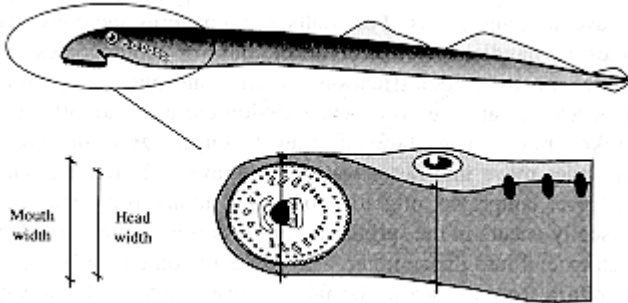
2 (5) Tooth bar immediately above mouth has three teeth

3



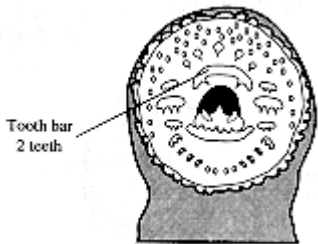
3 (4) From above, diameter of mouth noticeably wider than head; Cowichan and Mesachie lakes

**Cowichan lamprey**  
*Lampetra macrostoma*

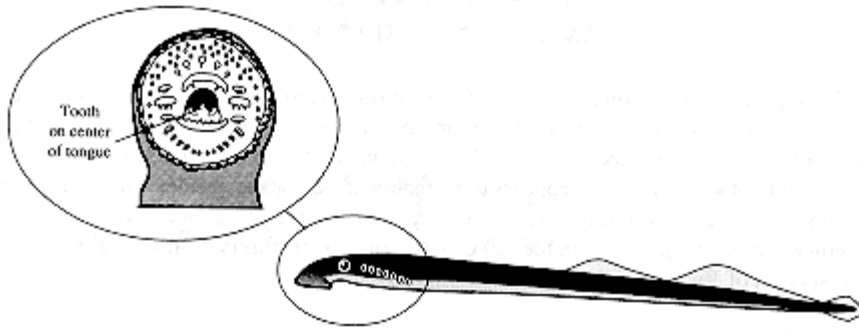


4 (3) From above, diameter of mouth not wider than head or body; most of the larger rivers on Vancouver Island

**Pacific lamprey**  
*Lampetra tridentata*

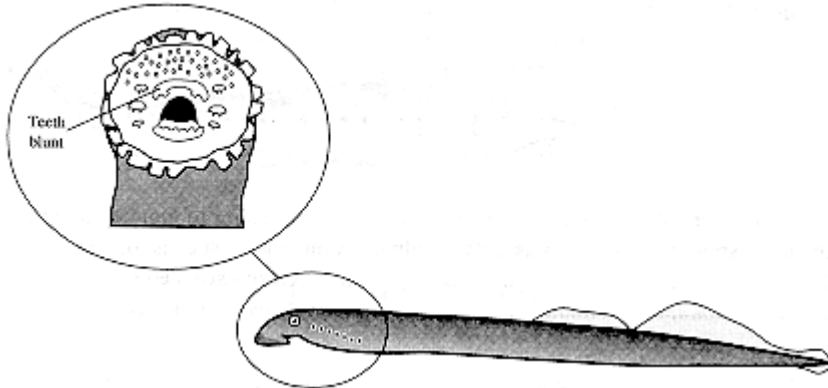


5(2) Tooth bar immediately above mouth has two teeth



6 (7) Teeth sharp, well developed; center pair of lateral teeth with three points; sharp tooth on center of tongue; adults usually longer than 200 mm

**River lamprey**  
*Lampetra ayresi*\*



7 (6) Teeth blunt, poorly developed; center pair of side teeth with two points; no sharp tooth on tongue; adults usually less than 160 mm in length

**Western brook lamprey**  
*Lampetra richardsoni*\*

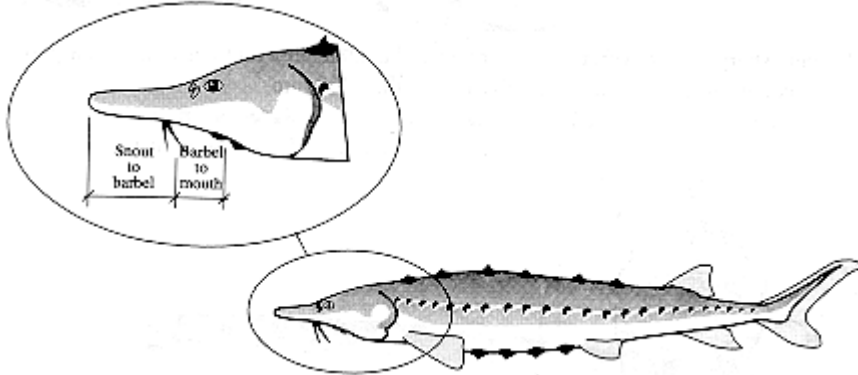
8 (1) Eyes absent or poorly developed; teeth absent; mouth not modified into a sucking disk

ammocoetes or larval lampreys  
( see lamprey key in Appendix, page 199 ).

\* Beamish ( 1985 ) reports the presence of an unusual non-migratory, parasitic lamprey in Morrison Creek, a Puntledge River tributary. In some aspects of its life-history and morphology it resembles both the river and brook lampreys.

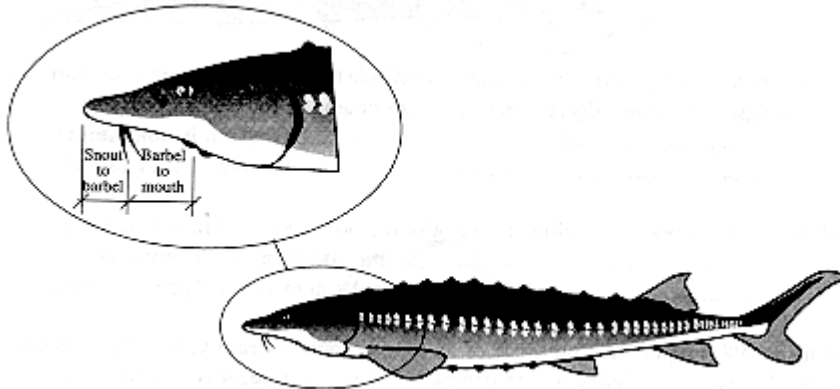
**STURGEONS**  
FAMILY ACIPENSERIDAE

Two species of sturgeon are reported from the waters around Vancouver Island (green sturgeon and white sturgeon). Both species are morphologically variable and some of this variability may be associated with sex. We know very little about their life histories in this area, but the white sturgeon appears to be mainly a freshwater species while the green sturgeon is more common in the sea. However, most Vancouver Island records of white sturgeon are from the sea but, in the fall of 1995, they were observed in several rivers on the west coast of Vancouver Island.



1 (2) back green; snout usually elongate and narrow; barbels nearer to mouth than to tip of snout; sporadic in the Juan de Fuca strait and along the west coast of Vancouver Island

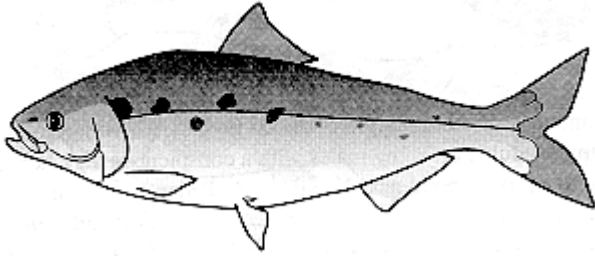
**Green sturgeon**  
*Acipenser medirostris*



2 (1) back dark grey to black; snout short and broad ( except in some specimens less than 250 mm in standard length); barbels nearer to tip of snout than to mouth; rare in the Juan de Fuca strait and perhaps in Barkley Sound, much less common in these areas than the green sturgeon

**White sturgeon**  
*Acipenser transmontanus*

**HERRINGS AND SHAD**  
FAMILY CLUPEIDAE

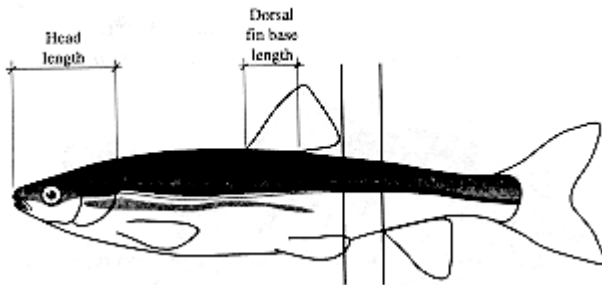


The shad (*Alosa sapidissima*) was introduced into California from eastern North America in the late nineteenth century. This species spawns in fresh water but spends most of its life in the sea. The shad spread rapidly along the Pacific coast of North America and eventually reached Alaska. In recent years, however, it has contracted its North Pacific range and now is rare north of Puget Sound. Although the first record of shad in BC was from the sea off Vancouver Island, there is no recent record of this species in the fresh waters of the island.

**MINNOWS**  
FAMILY CYPRINIDAE

1 (4) Dorsal fin short, fin base much shorter than head

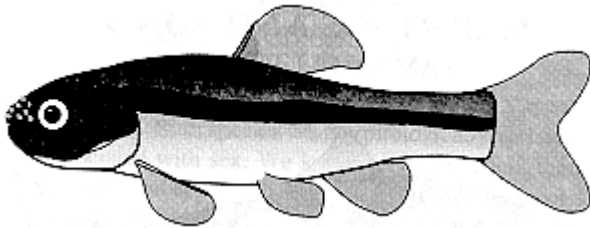
2



2 (3) Viewed from the side, hind margin of dorsal fin does not overlap anal fin; two dark stripes on side of body; Greenway, Holden and Quennell lakes in the Nanaimo area, Kennedy Lake system near Ucluelet and Cecilia Lake off Stewardson Inlet

**Peamouth**  
*Mylocheilus caurinus*



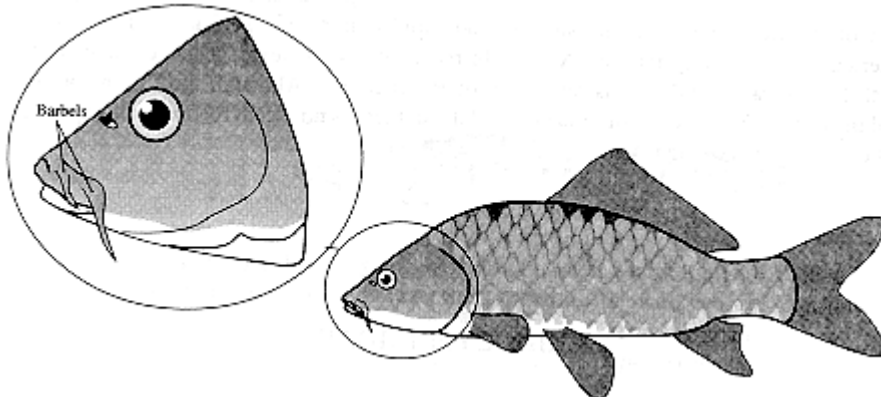


3 (2) Viewed from the side, hind margin of dorsal fin clearly overlaps anal fin; one mid-lateral stripe in adults; breeding males with a conspicuous dark head; apparently introduced to a private pond near Nanaimo ( A. Peden, pers. comm.)

**Fathead minnow**  
*Pimephales promelas*

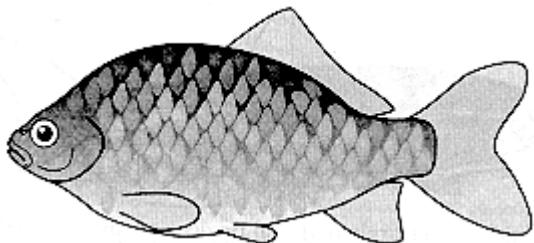
4 (1) Dorsal fin long, fin base much longer than head

5



5 (6) Conspicuous barbels on sides of upper jaw; Glen Lake near Victoria, population now extinct; occasional in the sea within the influence of the Fraser River plume (e.g. off Saturna Island )

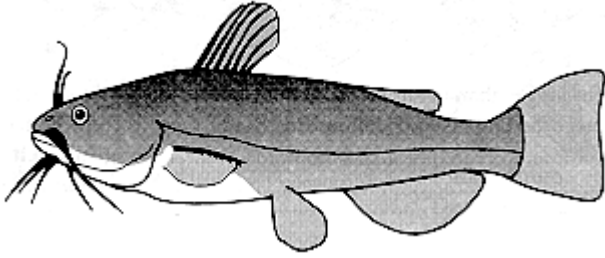
**Carp**  
*Cyprinus carpio*



6 (5) No barbels on sides of upper jaw; appears sporadically in small lakes and streams around Victoria and Nanaimo; probably no self-sustaining populations except in private ponds

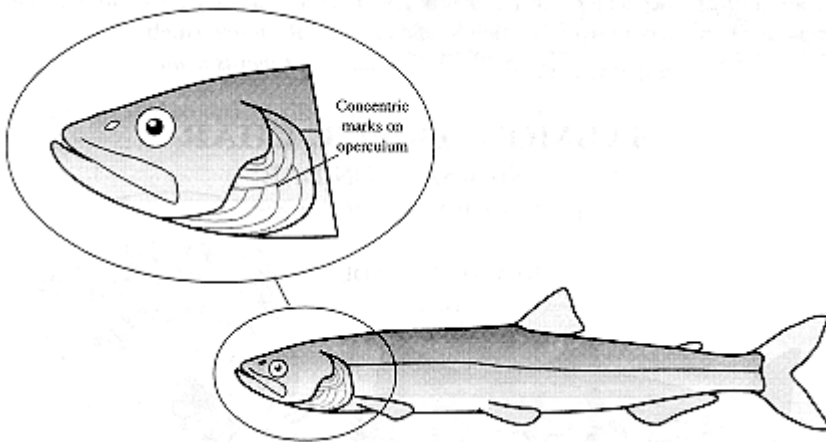
**Goldfish**  
*Carassius auratus*

**CATFISH**  
FAMILY ICTALURIDAE



The brown catfish ( *Ameiurus nebulosus* ) is established in many small lakes from Sooke north to about Nanaimo. This exotic species also occurs in a few large, oligotrophic lakes ( e.g. Great Central, Sproat and Shawnigan Lakes ) but apparently does not do well in such environments.

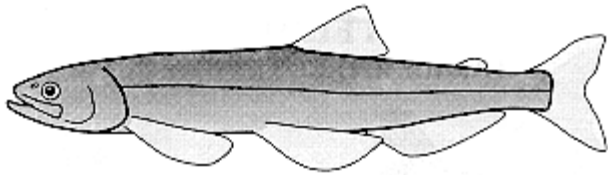
**SMELTS**  
FAMILY OSMERIDAE



1 (2) Concentric marks on operculum; abundant in coastal waters but no freshwater records from Vancouver Island

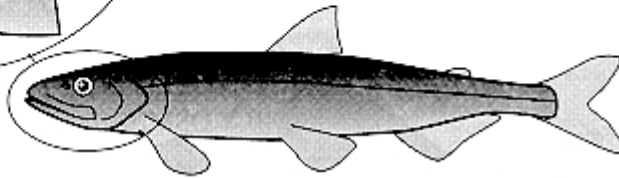
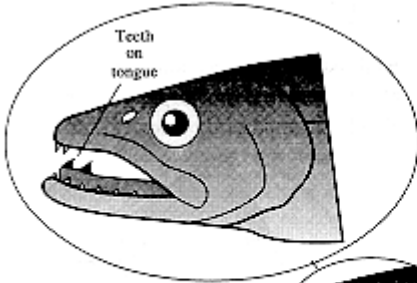
2 (1) No concentric marks on operculum

**Eulachon**  
*Thaleichthys pacificus*



3 (4) Pectoral fin longer than head; no prominent canine teeth on tongue; juveniles common near the Gulf Islands but no freshwater records from Vancouver Island

**Longfin smelt**  
*Spirinchus thaleichthys*

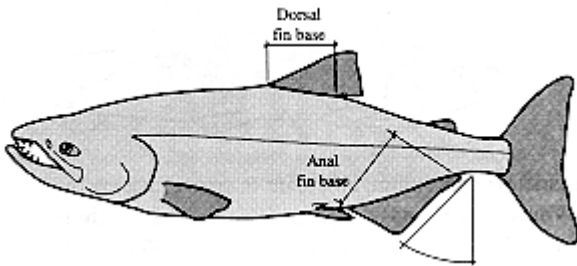


4 (3) Pectoral fin smaller than head; 1 or 2 prominent curved canine teeth on tongue; rare in our area, one record from Barkley Sound

**Rainbow smelt**  
*Osmerus dentex*

**SALMON, TROUT, CHAR**  
FAMILY SALMONIDAE  
(SUBFAMILY SALMONINAE)

KEY TO THE ADULTS

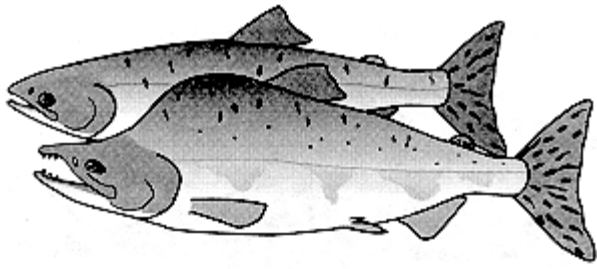


1 (10) Anal fin base longer than dorsal fin base; in profile, hind margin of anal fin slants backwards ( not vertical)

2

2 (7) Distinct spots on tail

3

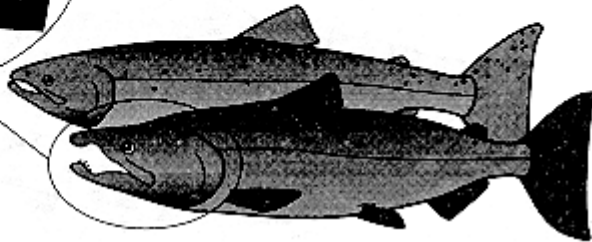
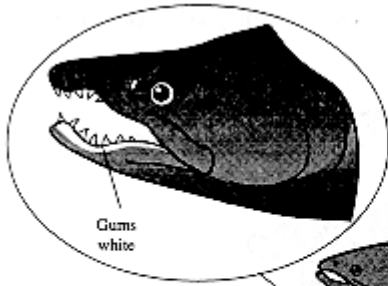


3 (4) Tail spots oblong ( not round)

4 (3) Tail spots round ( not oblong )

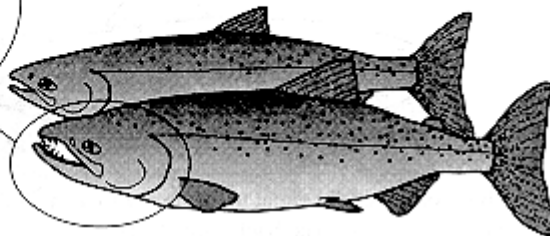
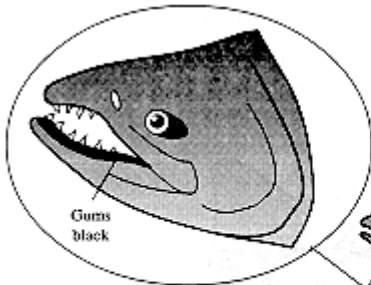
**Pink salmon**  
*Oncorhynchus gorbuscha*

5



5 (6) Tail spotted on upper half; gums at base of teeth in lower jaw white

**Coho salmon**  
*Oncorhynchus kisutch*

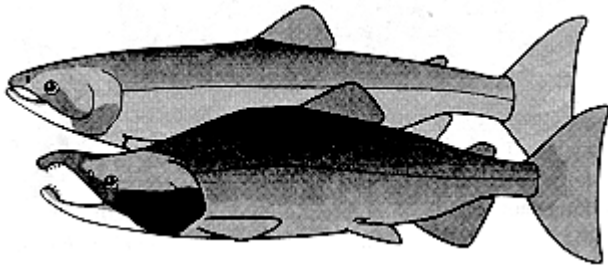


6 (5) Tail spotted on both upper and lower halves; gums at base of teeth in lower jaw black

**Chinook salmon**  
*Oncorhynchus tshawytscha*

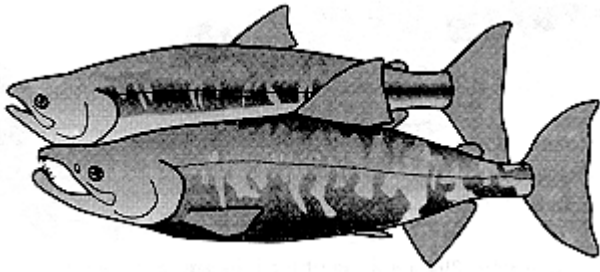
7 (2) No spots on tail, but occasionally some fine speckles

8



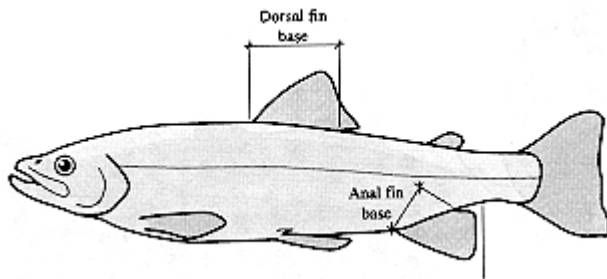
8 (9) Adults occur in fresh water both as migratory spawners (sockeye) and as residents (kokanee); flanks are uniformly coloured (silver in non-breeding kokanee, usually red in breeding sockeye and kokanee)

**Sockeye salmon**  
(Kokanee)  
*Oncorhynchus nerka*



9 (8) Adults in fresh water only as spawners; flanks pale, male with irregular red and black blotches; female with broad dark purplish stripe

**Chum salmon**  
*Oncorhynchus keta*

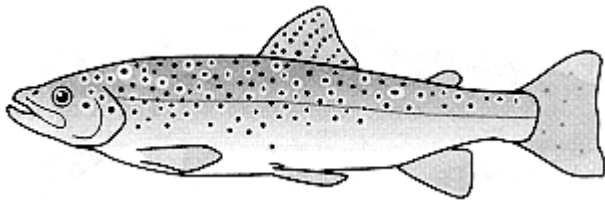


10 (1) Base of dorsal fin equal to, or longer than, anal fin base; in profile hind margin of anal fin is vertical ( no backward slant )

11

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

12

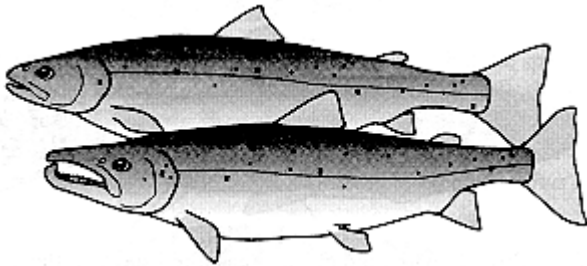


12 (13) Spots on flanks mostly dark surrounded by conspicuous light haloes; some spots along side are red; established in Cowichan system, Cameron Lake and in Eve River

**Brown trout**  
*Salmo trutta*

13 (12) Spots on flanks black (no red spots); spots not surrounded by light haloes

14

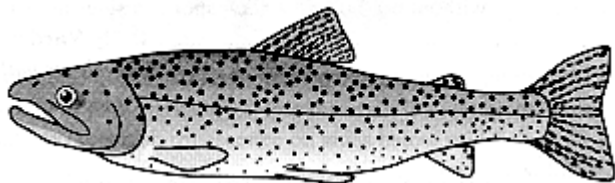


14 (15) Relatively few spots on flanks, mostly above lateral line, some spots X-shaped; caudal fin usually without spots; spawning males with conspicuously hooked lower jaw; so far known only from northern Vancouver Island streams (Cayeghle Creek, Kokish River and Quatse River)

**Atlantic salmon**  
*Salmo salar*

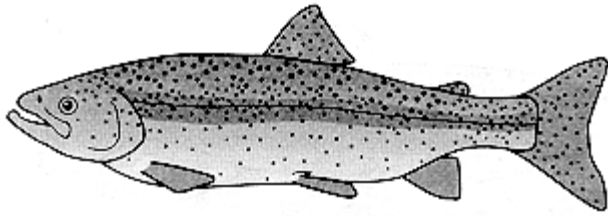
15 (14) Spots on back and sides numerous with many below lateral line, none of the spots are X-shaped; spawning males without conspicuously hooked lower jaw

16



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

**Coastal cutthroat trout**  
*Oncorhynchus clarki clarki*

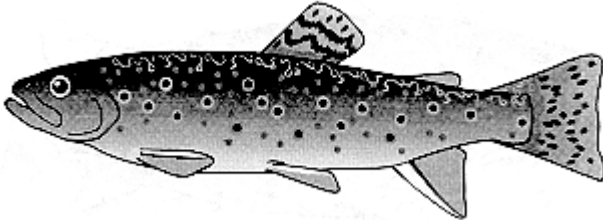


17 (16) No red or orange slash under lower jaw; except in spawning males, upper jaw does not extend back beyond hind margin of eye; sides usually silver with a pink hue extending along midline; tail dusky with dark spots

**Rainbow trout**  
*Oncorhynchus mykiss*

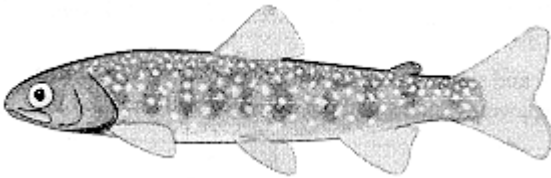
18 (11) Background colour on back and flanks dark with light or coloured spots

19



19 (20) Dorsal fin yellowish, with bold black streaks; red spots on flanks surrounded by blue haloes; established in several lakes on southern Vancouver Island

**Brook trout**  
*Salvelinus fontinalis*



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

**Dolly Varden**  
*Salvelinus malma*

#### KEY TO YOUNG SALMONIDS (45-100mm)

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 fresh water

**Pink salmon**

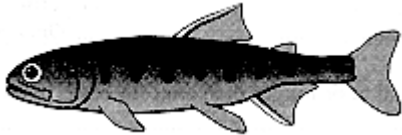
*Oncorhynchus gorbuscha*

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 that contrasts sharply with dark pigment behind

**Coho salmon\***

*Oncorhynchus kisutch*



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

**Chinook salmon\***

*Oncorhynchus tshawytscha*

7 (4) Parr marks small, oval shaped, 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*

\* In many Vancouver Island systems some newly emerged coho and chinook fry migrate



to estuaries. These fry are especially difficult to identify, but usually coho have larger eyes and shorter., more rounded snouts than chinook of the same size. In addition, chinook fry usually migrate a week or two earlier than coho fry.



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 than 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 (18) Numerous distinct dark spots on dorsal fin; in very small specimens only 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 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*

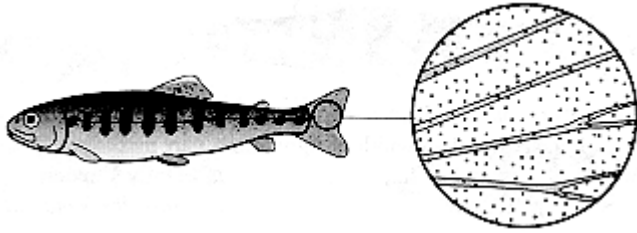


14 (13) Small black spots above and below mid-line ( in addition to parr marks); 9 to 11 parr marks, none as wide as eye diameter; adipose fin orange

**Brown trout**  
*Salmo trutta*

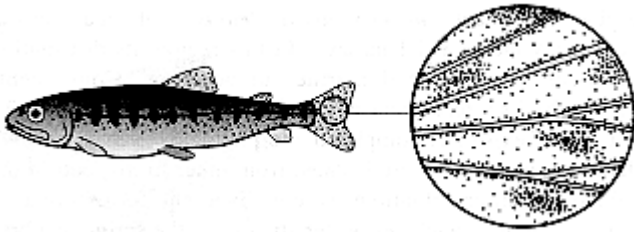
15 (12) No coloured (red to yellow) spots; width of dark areas along mid-line less than width of light areas

16



16 (17) On fish below 50 mm melanophores are evenly 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*



17 (16) 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

**Coastal cutthroat trout**  
*Oncorhynchus clarki clarki*

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

19



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

**Atlantic salmon**  
*Salmo salar*

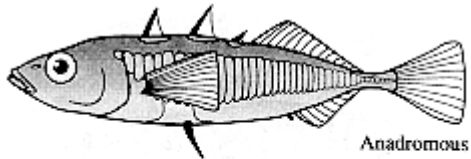


20 (19) No black spots on back and sides; parr marks are irregular blotches; width of dark areas on mid-line greater than width of light areas; parr marks not separated by a single red dot

**Dolly Varden**  
*Salvelinus malma*

**STICKLEBACKS**  
FAMILY GASTEROSTEIDAE

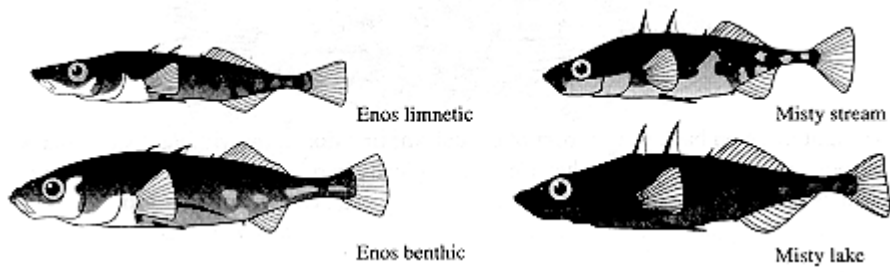
The threespine stickleback *Gasterosteus aculeatus* is abundant in quiet, lowland waters throughout the Vancouver Island area. In this region, its distribution is strongly associated with areas of postglacial marine submergence. Consequently, natural populations of sticklebacks rarely occur at altitudes much above 200 m. The species is notoriously variable, and exists as a complex of morphological, ecological and behavioural forms. Most divergent populations are isolated from other forms, but in the Vancouver Island region there are three situations where divergent forms come into contact. 1) Anadromous populations ascend freshwater streams in the spring and breed alongside some freshwater resident populations. This situation is common on southern Vancouver Island but rare at the north end of the island. 2) In Misty Lake, Keogh River system, sticklebacks in the inlet and outlet stream are genetically distinct from those in the lake. The two forms are ecologically and morphologically differentiated and rarely interbreed. 3) In Enos Lake near Nanoose, and in several lakes on Texada Island and in Hadley Lake on Lasqueti Island, littoral, benthic-feeding sticklebacks and limnetic plankton-feeding sticklebacks coexist. In these lakes, genetic and ecological divergence is also accompanied by a high degree of reproductive isolation.



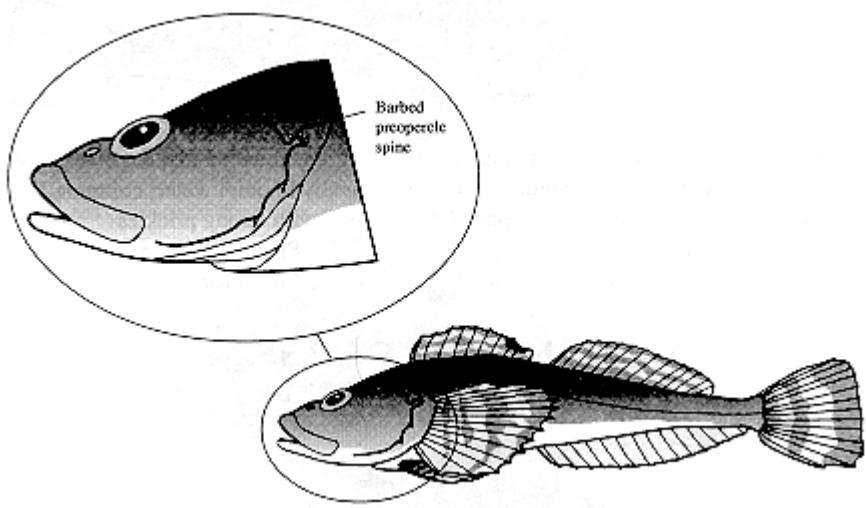
Anadromous



Stream resident



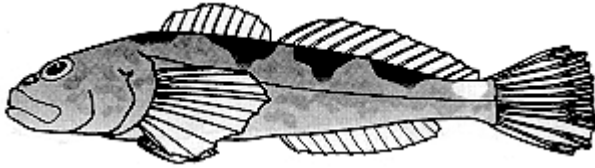
**SCULPINS**  
FAMILY COTTIDAE



1 (2) underside dead white; spine on preopercle with obvious hooks; pectoral fins with alternating yellow and dark bands of approximately equal width; only in estuaries or areas under tidal influence

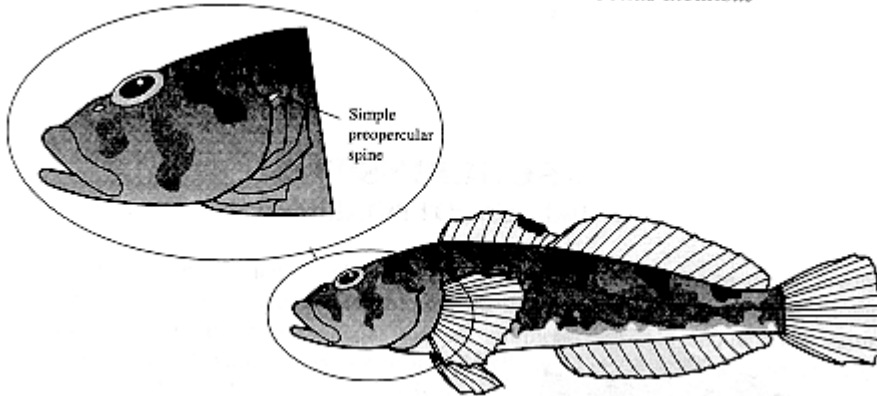
**Pacific staghorn sculpin**  
*Leptocottus armatus*

2 (1) Underside light or dusky but not dead white; spine on preopercle simple; pectoral fins speckled but without broad dark bands; rivers, streams, lakes and estuaries.



3 (4) Light marks on back jaw just in front of caudal fin; first dorsal fin without distinct black spot; anal fin about equal to head length; typically in riffles, rarely in lakes and never in estuaries

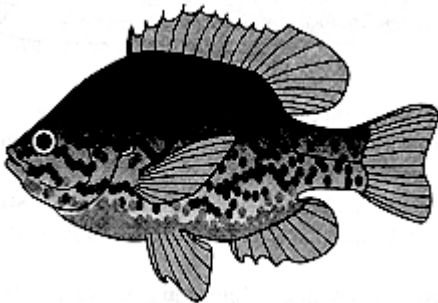
**Coastrange sculpin**  
*Cottus aleuticus*



4 (3) No light mark on back in front of caudal fin; first dorsal with a distinct black spot; anal fin longer than head length; in streams, typically in quiet water; common in lakes and estuaries; sometimes upper side of body with strong prickles

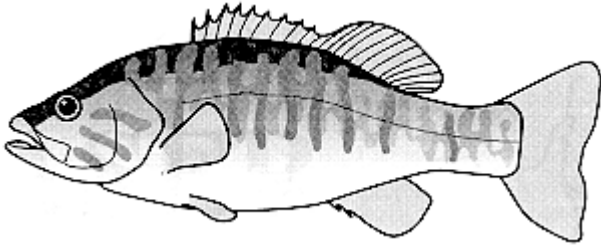
**Prickly sculpin**  
*Cottus asper*

**SUNFISH AND BASS**  
FAMILY CENTRARCHIDAE



1 (2) Distinct, black opercular flap (outlined in red in mature males); pelvic fins reach vent; established in small lakes in the Victoria, Nanaimo and Alberni areas

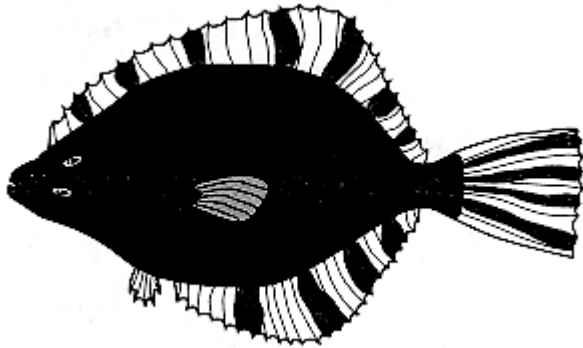
**Pumpkinseed**  
*Lepomis gibbosus*



2 (1) No black opercular flap; pelvic fins do not reach vent; established in lakes in the Sooke, Victoria area as well as St. Mary's Lake on Saltspring Island and Spider Lake near Qualicum Beach

**Smallmouth bass**  
*Micropterus dolomieu*

**FLOUNDERS**  
FAMILY PLEURONECTIDAE



The starry flounder (*Platichthys stellatus*) is a common inshore marine species. Juveniles are especially abundant in estuaries and, on Vancouver Island, they regularly penetrate low gradient rivers up to the limits of tidal influence.

# FRASER REGION



FRASER

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, *Amiurus 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 the 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.

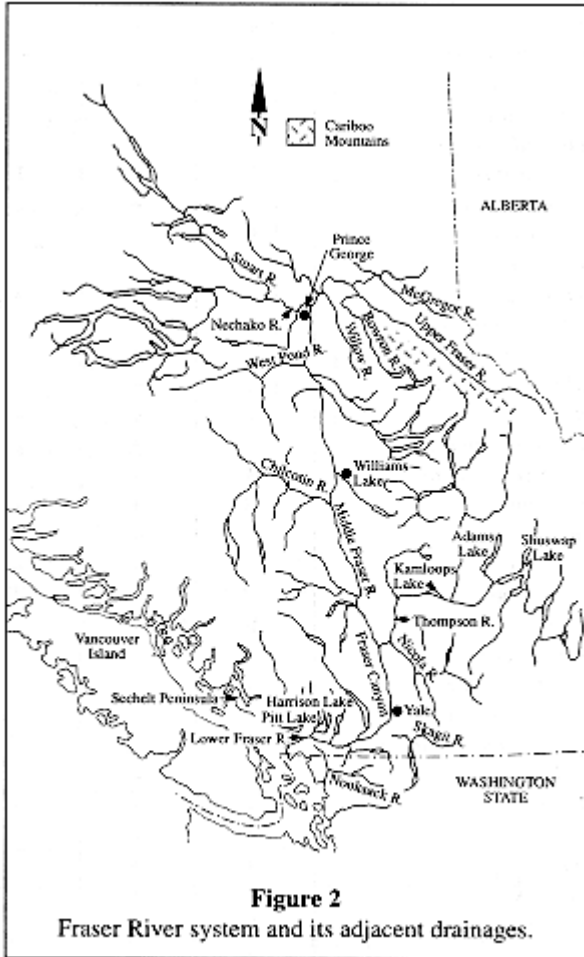
Not surprisingly, the Fraser Canyon is a major barrier to fish, and many anadromous species that are common in the lower Fraser are absent above the canyon. In at least two cases, however, the canyon *per se* is not the barrier. Both the coastal cutthroat (*Oncorhynchus clarki clarki*) and the coastrange 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 Salween 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 thaleichthys*, 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.



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

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

**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



**LAMPREYS (PETROMYZONTIDAE)**

33



**STURGEONS (ACIPENSERIDAE)**

35



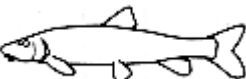
**HERRINGS (CLUPEIDAE)**

36



**MINNOWS (CYPRINIDAE)**

36



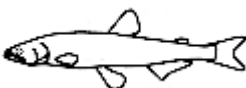
**SUCKERS (CATOSTOMIDAE)**

41



**CATFISH (ICTALURIDAE)**

43



**SMELTS (OSMERIDAE)**

43



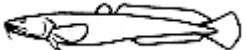
**SALMON, TROUT, CHAR (SALMONIDAE)  
(SUBFAMILY SALMONINAE)**

44



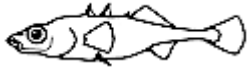
**WHITEFISH (SALMONAIDAE)  
(SUBFAMILY COREGONINAE)**

54



**CODS (GADIDAE)**

55



**STICKLEBACKS (GASTEROSTEIDAE)**

55



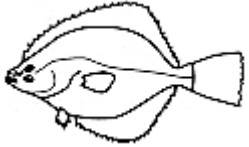
**SCULPINS (COTTIDAE)**

56



**SUNFISH, BASS (CENTRARCHIDAE)**

58



**FLOUNDERS (PLEURONECTIDAE)**

59

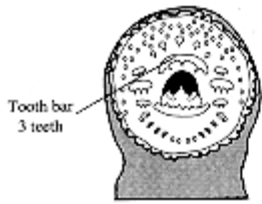
**LAMPREYS**  
**FAMILY PETROMYZONTIDAE**

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).



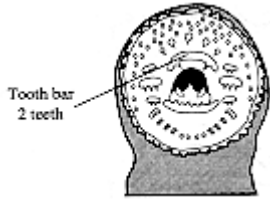
1 (6) Mouth a sucking disk; teeth and eyes present

adult or transforming lampreys



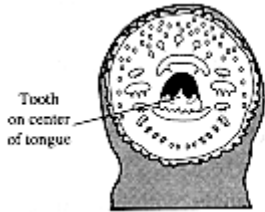
2 (3) Tooth bar immediately above mouth has three teeth; a large parasitic lamprey that ascends the Fraser upstream to at least the Chilcotin River; landlocked populations in Sakinaw and Ruby lakes, Sechelt Peninsula

**Pacific lamprey**  
*Lampetra tridentata*



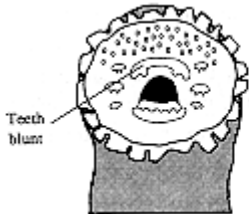
3 (2) Tooth bar immediately above the mouth has two teeth

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

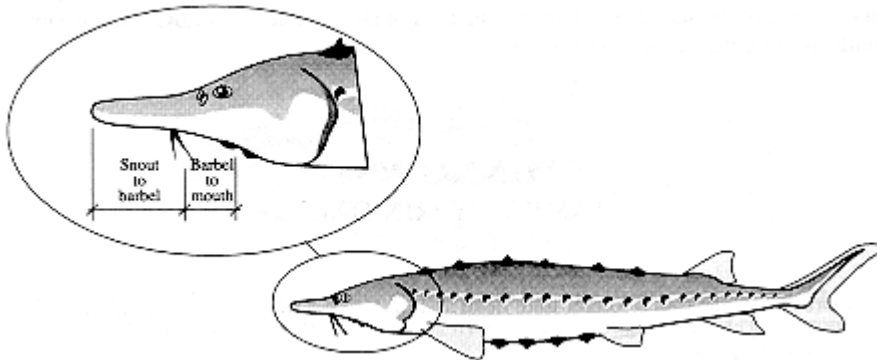
**Western brook lamprey**  
*Lampetra richardsoni*

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).

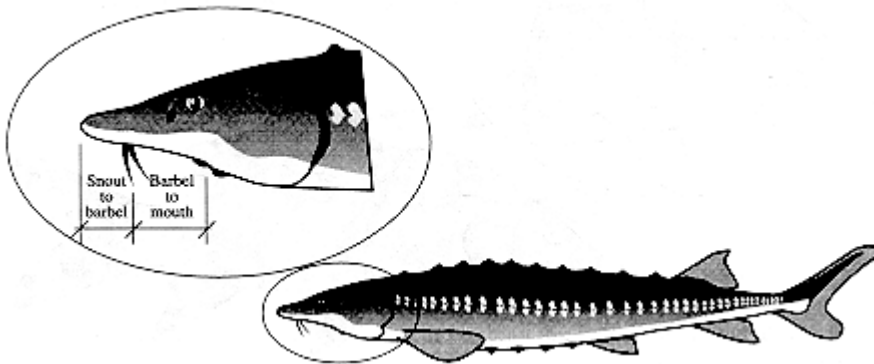
## STURGEONS FAMILY ACIPENSERIDAE

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*

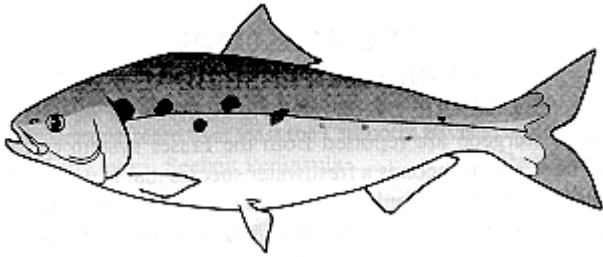


2 (1) Back dark grey to black; snout short and broad (except in some specimens less than 250 mm in length); barbels nearer to tip of snout than to mouth; common throughout the main river; occasional in large lakes

**White sturgeon**  
*Acipenser transmontanus*



**HERRINGS AND SHAD**  
FAMILY CLUPEIDAE

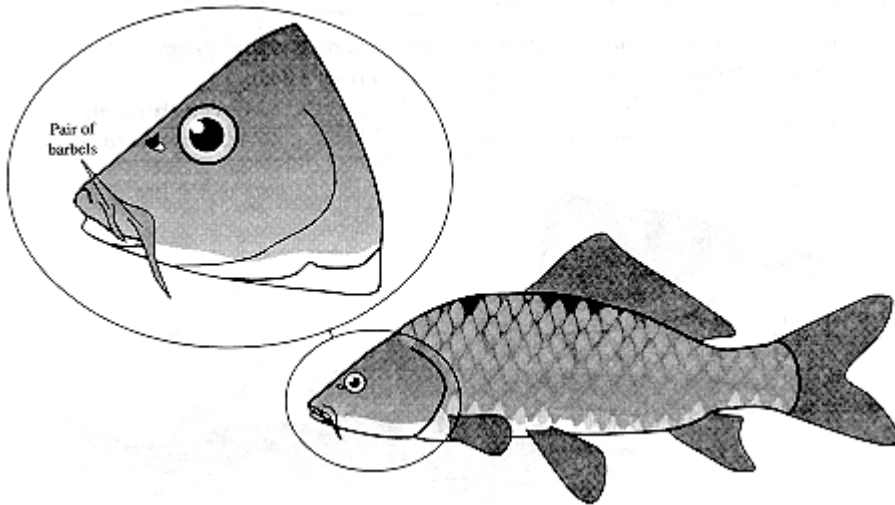


The shad (*Alosa sapidissima*), was introduced into California from eastern North America in the late nineteenth century. This species spawns in fresh water but spends most of its life in the sea. No self-sustaining runs of shad are known in BC but occasional individuals enter the lower Fraser River.

**MINNOWS**  
FAMILY CYPRINIDAE

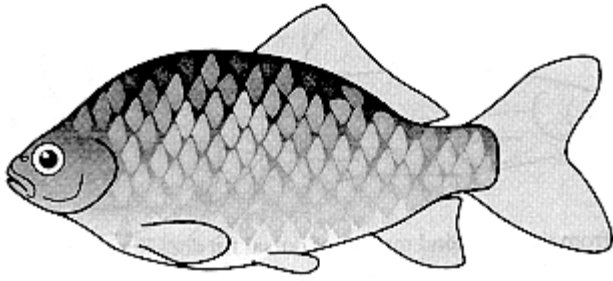
1 (4) Dorsal fin base much longer than head

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*

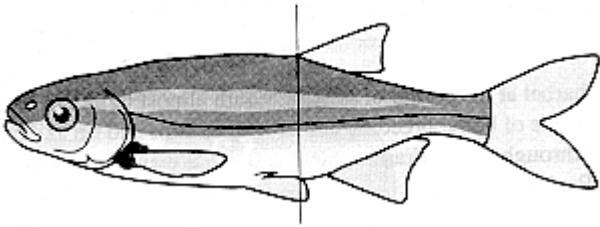


3 (2) No barbels on side of upper jaw; reported from a pond in the Salmon Arm area, and occasionally in ditches and streams in the lower Fraser Valley; probably no self-sustaining populations except in park ponds

**Goldfish**  
*Carassius auratus*

4 (1) Dorsal fin base shorter than head

5

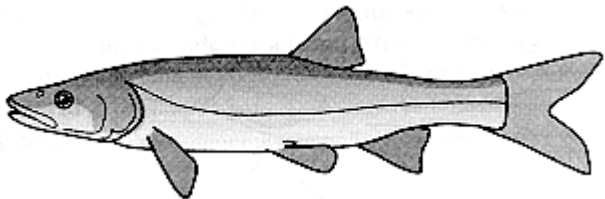


5 (6) Dorsal fin set far back on body, viewed from the side its origin is almost directly above the posterior tips of pelvic fins; widespread throughout the Fraser proper but absent from peripheral drainages

**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

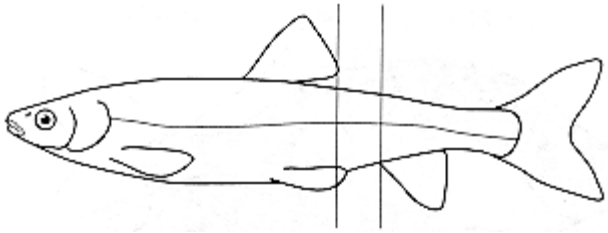


7 (8) Mouth large, upper jaw extends beyond anterior margin of eye; adults up to 450 mm in length; no dark mid-lateral strip in individuals less than 80 mm but in small fish a dark spot at base of tail; common throughout the Fraser proper but absent from peripheral drainages

**Northern squawfish**  
*Ptychocheilus oregonensis*

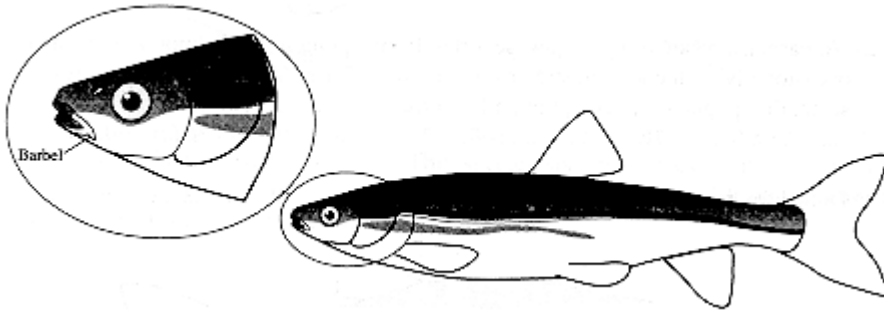
8 (7) Mouth small, upper jaw does not extend beyond anterior margin of eye

9



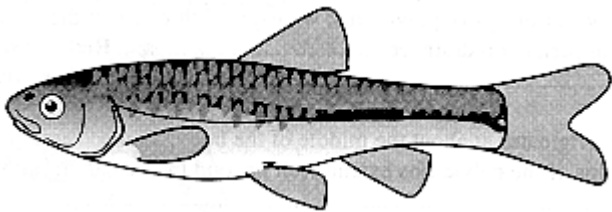
9 (12) Viewed from the side, hind margin of dorsal fin does not overlap anal fin

12



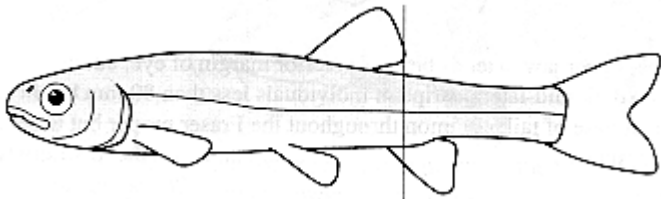
10 (11) Small barbel at the corner of mouth; mouth almost terminal; two dark horizontal stripes on side of body; breeding adults with red lips and fin axils; length to 250 mm; common throughout the Fraser system and in Sakinaw, Ruby and Waugh lakes on the Sechelt Peninsula

**Peamouth**  
*Mylocheilus caurinus*



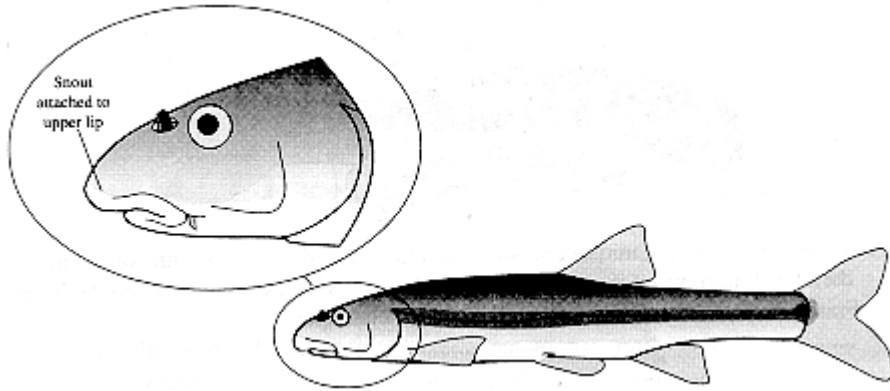
11 (10) No barbel at corner of mouth; snout overhangs mouth; flanks of breeding males with a brassy cast; length to 100 mm; locally abundant in the Vanderhoof-Prince George area and the lower Fraser Valley; rare in intervening areas

**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*

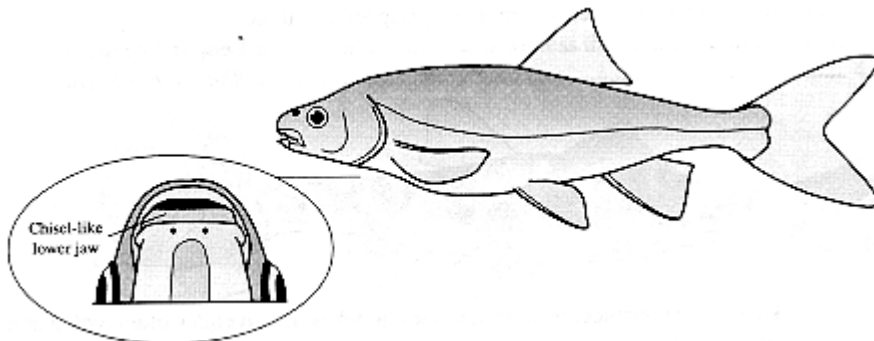


14 (13) Snout separated from upper lip by a groove across mid-line of snout; upper jaw protractile; eye diameter about half snout length

15

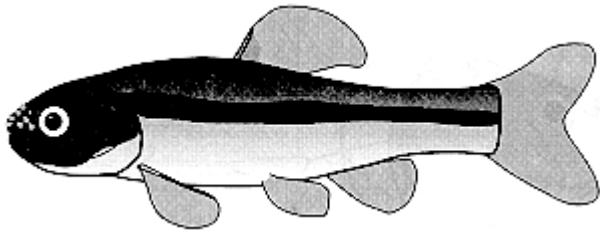
15 (18) No barbel at corner of mouth

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*

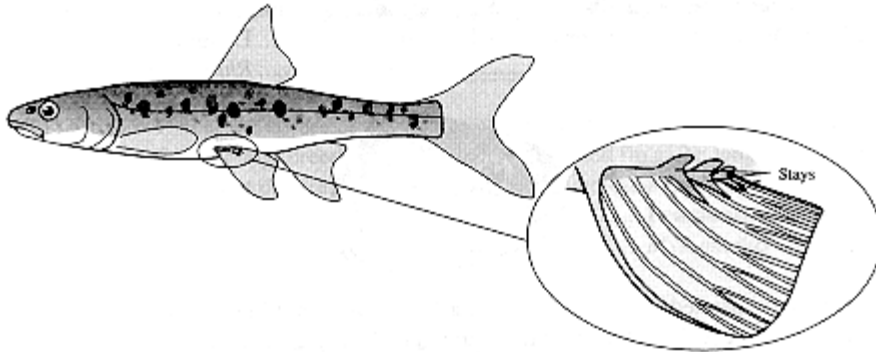


17 (16) Lower jaw normal; mid-lateral stripe in adults; breeding males with conspicuous dark head; introduced into the Little Cambell, Nootsack tributaries and the lower Fraser River, and also near Powell River (A. Peden, pers. comm.)

**Fathead minnow**  
*Pimephales promelas*

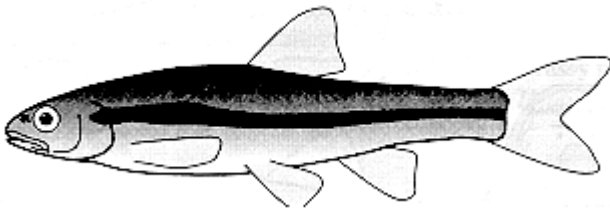
18 (15) Barbel at corner of mouth

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

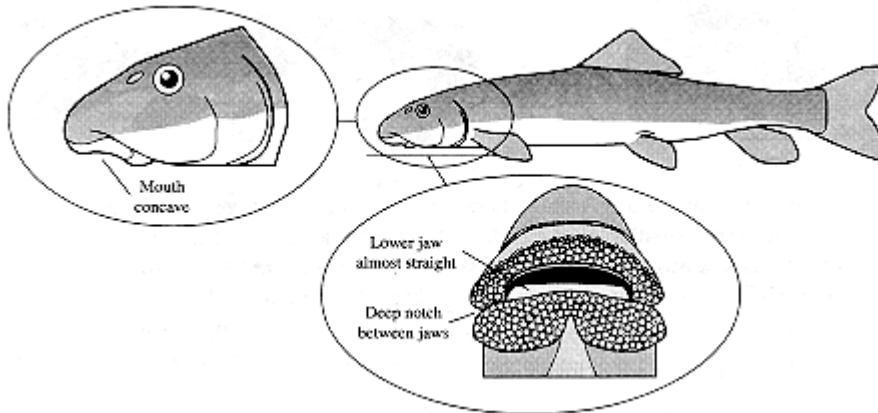
**Leopard dace**  
*Rhinichthys falcatus*



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

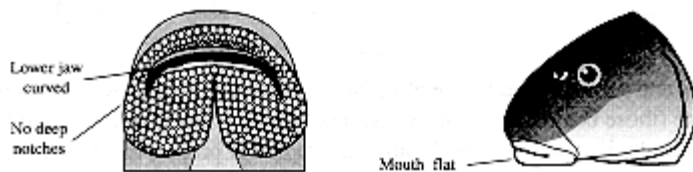
**Lake chub**  
*Couesius plumbeus*

**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*

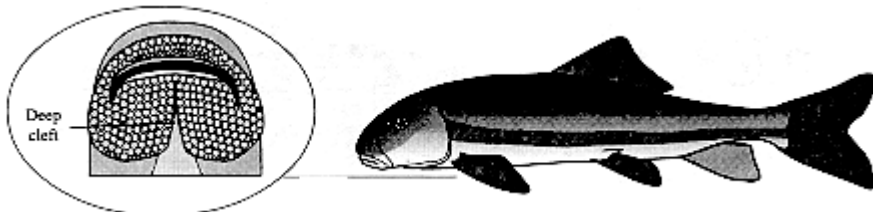


2 (1) No deep notches between upper and lower lips at outer corners of mouth; lower jaw curved when viewed from below; viewed from the side the mouth is flat

3

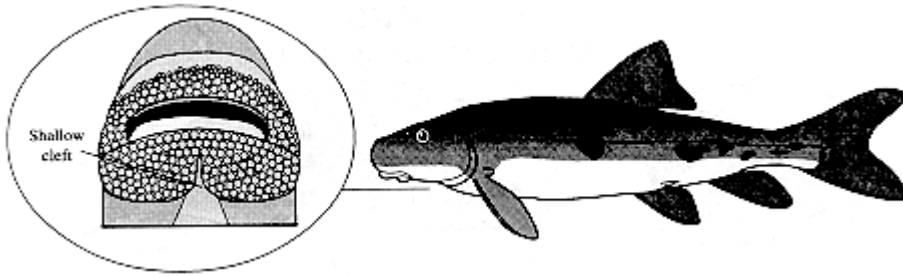
3 (7) Caudal peduncle narrow, its least depth half, or less than half, the dorsal fin base

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*



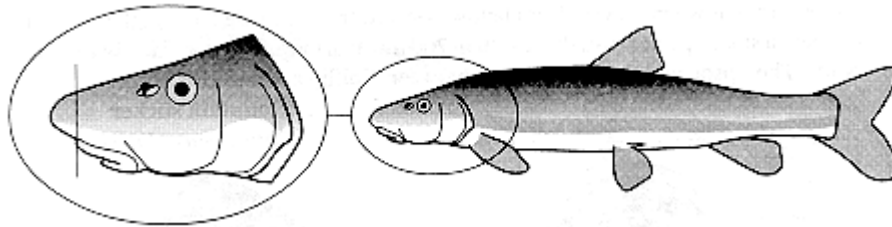
5 (4) Cleft in lower lip shallow, usually two or more rows of papillae between cleft and lower jaw; scales smaller, even on adults those near the head are hard to see; juveniles with jet black peritoneum; breeding fish with an orangish-red lateral stripe; rare in Fraser below canyon but common above;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

**Bridgelip sucker**

*Catostomus columbianus*

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

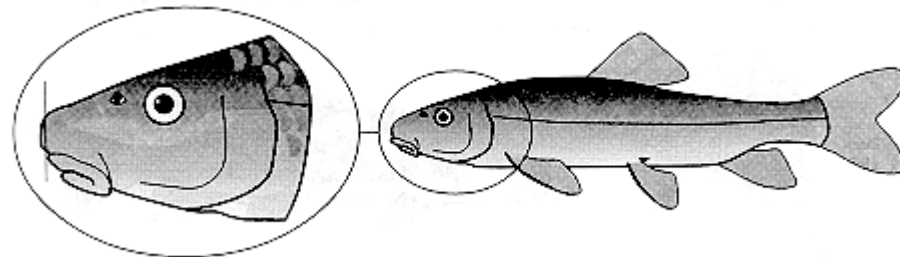
7



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*

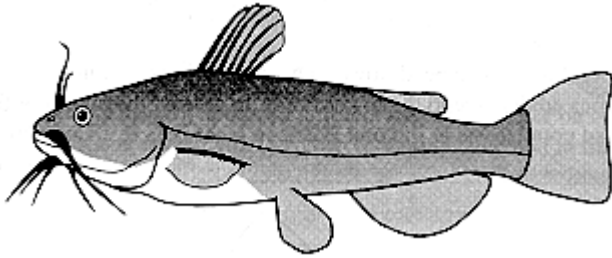


8 (7) Snout short and blunt; mouth not strongly subterminal (snout barely over-hangs mouth); scales large (those behind head clearly visible to naked eye); breeding fish with a bronze cast; common in upper Fraser lakes but rare south of Williams Lake; absent from peripheral drainages

**White sucker**

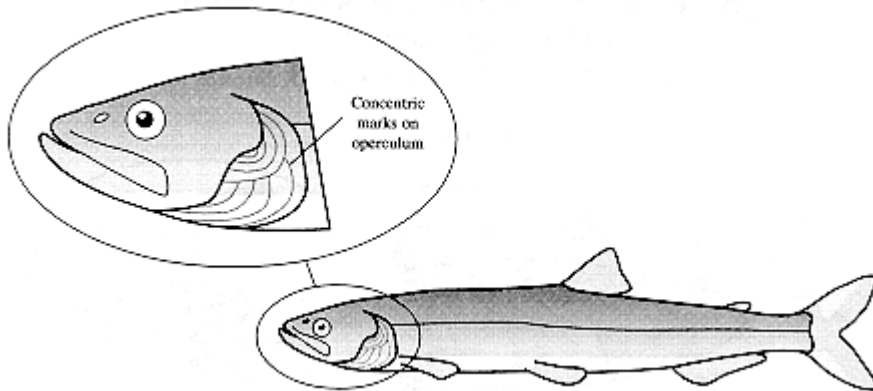
*Catostomus commersoni*

**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

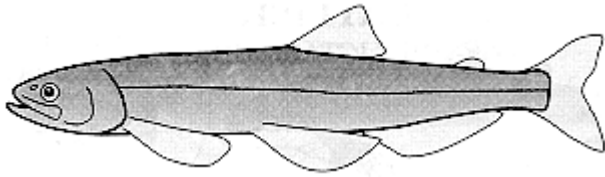


1 (2) Concentric marks on operculum; common in the mainstem lower Fraser in early spring when large numbers ascend to about Chilliwack

2 (1) No concentric marks on operculum

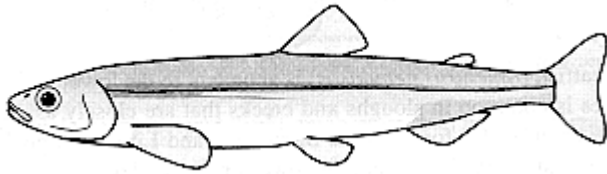
**Eulachon**  
*Thaleichthys pacificus*





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*

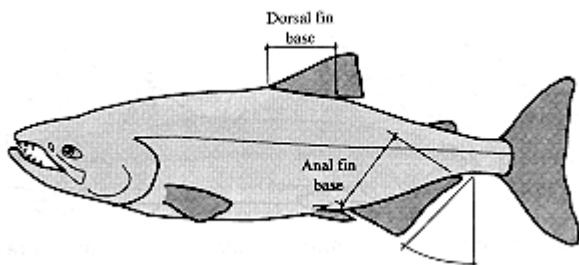


4 (3) Pectoral fin shorter than head; lower jaw does not extend back as far as hind margin of eye; ascends the lower Fraser to the mouth of the Pitt River and occasional individuals in Pitt Lake

**Surf smelt**  
*Hypomesus pretiosus*

**SALMON, TROUT AND CHAR**  
FAMILY SALMONIDAE  
(SUBFAMILY SALMONINAE)

KEY TO THE ADULTS

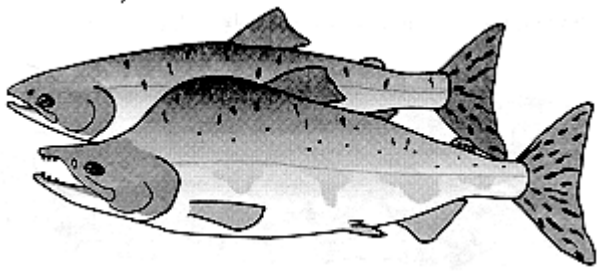


1 (10) Anal fin base longer than dorsal fin base; in profile, hind margin of anal fin slants backwards (not vertical)

2 (7) Distinct spots on tail

2

3

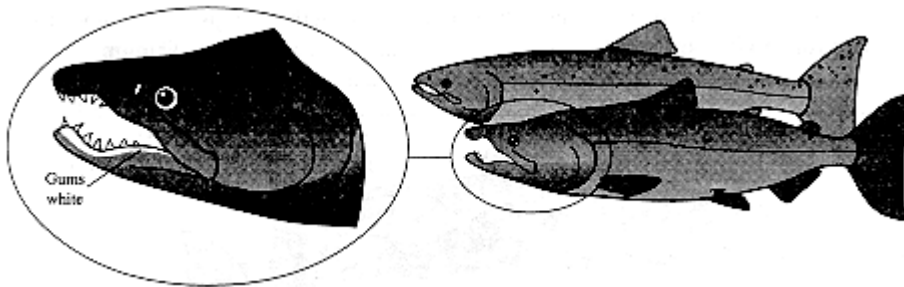


3 (4) Tail spots oblong (not round); adults common in the lower Fraser on odd numbered years; small runs ascend the canyon to spawn in Seton Creek and in the Thompson River

**Pink salmon**  
*Oncorhynchus gorbuscha*

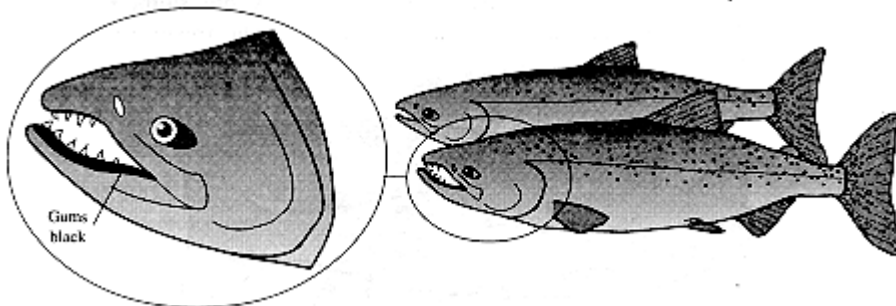
4 (3) Tail spots round (not oblong)

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*

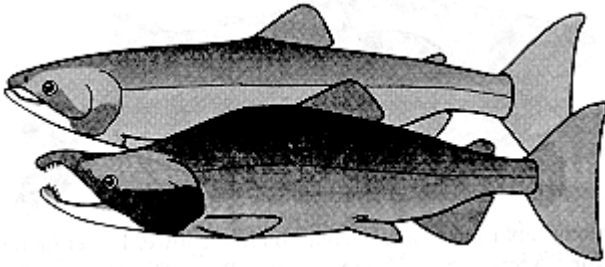


6 (5) Tail spotted on both upper and lower halves; gums at base of teeth in lower jaw black; adults ascend the mainstem Fraser and the Thompson system almost to their sources

**Chinook salmon**  
*Oncorhynchus tshawytscha*

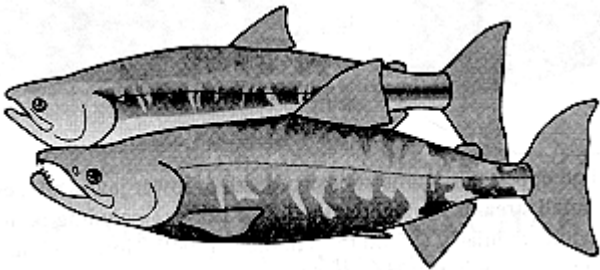
7 (2) No spots on tail, but occasionally some fine speckles

8



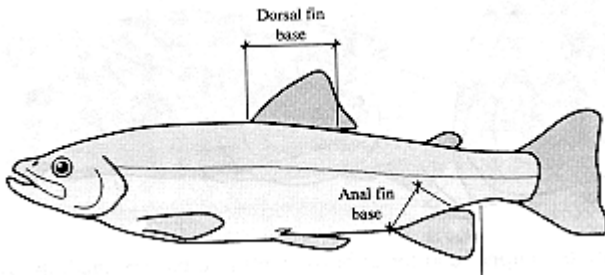
8 (9) Adults occur in fresh water both as migratory spawners (sockeye) and as residents (kokanee); flanks are uniformly coloured (silver in non-breeding kokanee, usually red in breeding sockeye and kokanee); kokanee occur in most large lakes associated with the Fraser system; anadromous adults ascend 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*

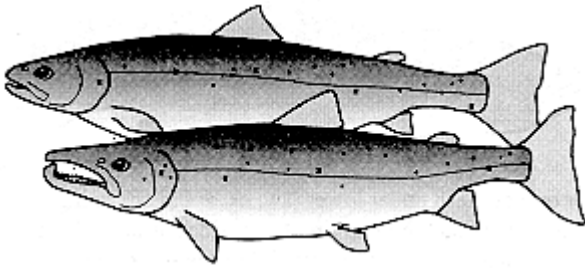


10 (1) Base of dorsal fin equal to, or longer than, anal fin base; in profile, hind margin of anal fin is vertical (no backward slant)

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)

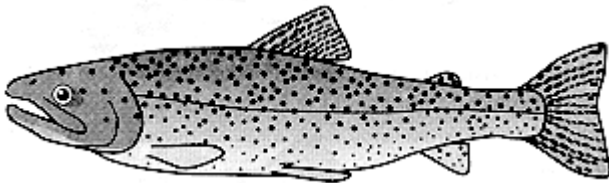
Atlantic salmon  
*Salmo salar*

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

14

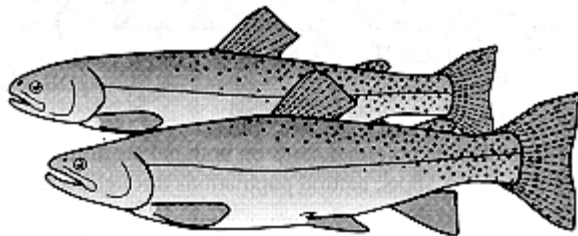
14 (17) Red or orange slash under lower jaw; upper jaw extends back past hind margin of eye; tail usually yellowish with black spots

15



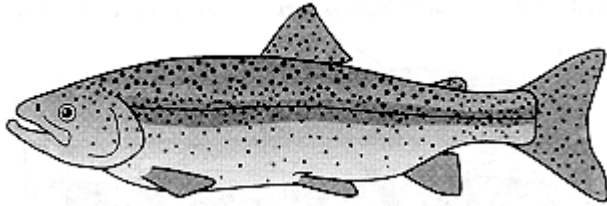
15 (16) Anterior flanks heavily spotted above and below lateral line, anal fin usually with spots; common in the lower Fraser (including the peripheral drainages except the BC portion of Skagit); ascends the Fraser as far as the Bahatlatch River near Boston Bar; one old record from the Thompson near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

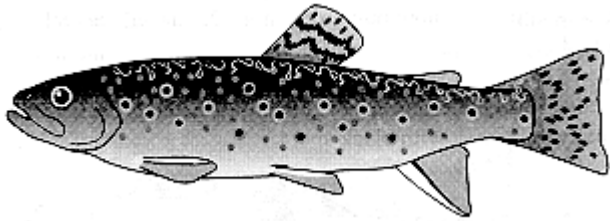


17 (14) No red or orange slash under lower jaw; except in spawning males upper jaw does not extend back beyond hind margin of eye; sides usually silver with a pink hue extending along midline; tail dusky with dark spots; common throughout the Fraser system (including the peripheral drainages)

**Rainbow trout\***  
*Oncorhynchus mykiss*

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

19

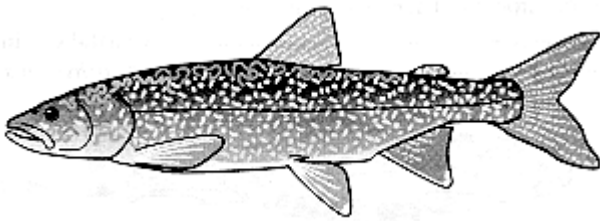


19 (20) Dorsal fin yellowish, with bold black streaks; red spots on flanks surrounded by blue haloes; introduced throughout the Fraser system

**Brook trout**  
*Salvelinus fontinalis*

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

21

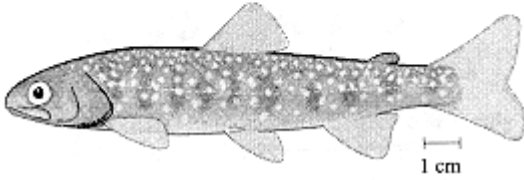


21 (22) Tail deeply forked, light coloured spots on both halves of tail; head and body covered in light irregular spots; natural populations throughout the upper and middle Fraser and Thompson system

**Lake trout**  
*Salvelinus namaycush*

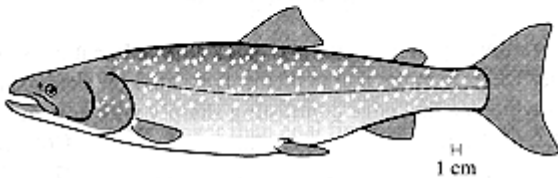
22 (21) Tail not deeply forked; spots if present only on upper half of tail

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*

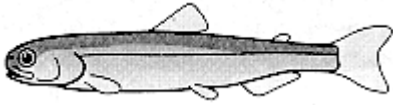
\* In the Fraser region, the exotic subspecies ( golden trout, *Oncorhynchus mykiss aguabonita*) occurs in Nicomen Lake, Skagit system.

\*\* This species pair 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**

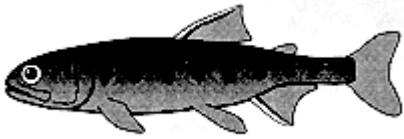
*Oncorhynchus gorbuscha*

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 shaped, none much higher than the vertical diameter of the eye

8

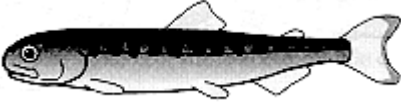


8 (9) Size in fresh water to over 100 mm; parr marks divided roughly in half by mid-line; combined width of parr marks much less than half the combined width of light areas along the side; no greenish iridescence on sides below mid-line

**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 than 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



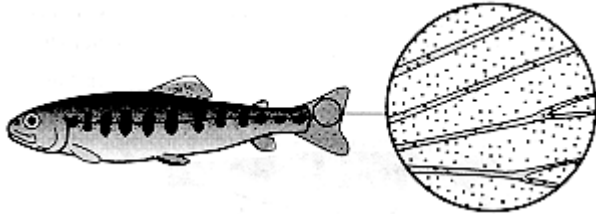


13 (14) No definite spots other than parr marks below the mid-line; 8 or 9 parr marks, the widest about equal to eye diameter; adipose fin dusky

**Brook trout**  
*Salvelinus fontinalis*

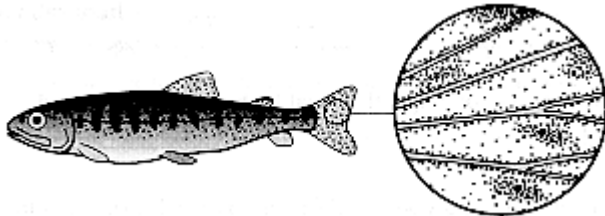
14 (13) No coloured (red to yellow) spots; width of dark areas along mid-line less than width of light areas

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)

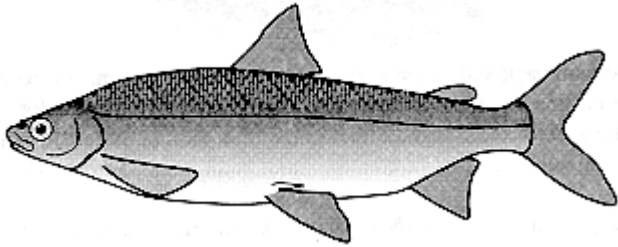
**Dolly Varden and Bull trout\*\***

*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)

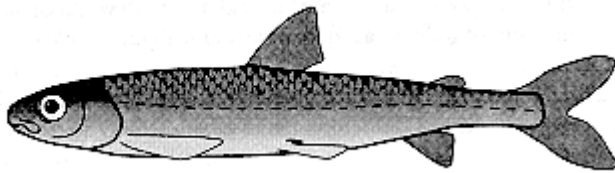


1 (2) Body deep, slab-sided; lower surface curves downward when viewed from side; common in large lakes throughout the upper and middle Fraser, absent from the lower Fraser (including peripheral drainages)

**Lake whitefish**  
*Coregonus clupeaformis*

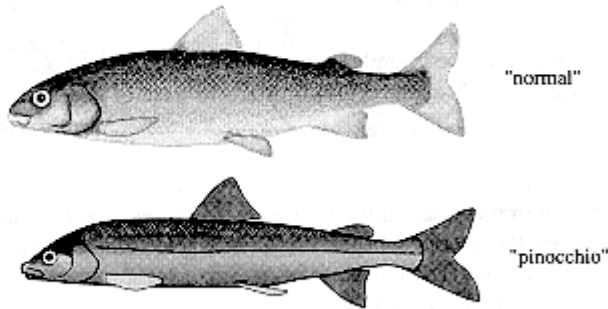
2 (1) Body slender, round in cross-section; lower surface nearly flat when viewed from side

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*

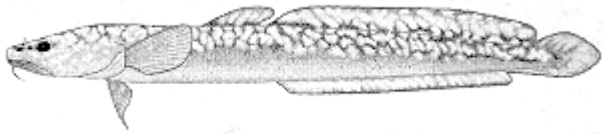


4 (3) Viewed from above snout pointed; adipose fin large, base about 1.5 times eye diameter; widespread throughout the Fraser proper; absent in BC portions of all peripheral drainages except Nootsack

**Mountain whitefish\***  
*Prosopium williamsoni*

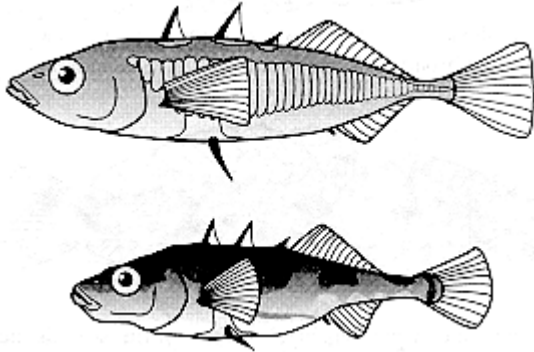
\* Many fluvial populations contain two forms: normal and "pinocchio". The "pinocchio" form has a longer snout and thinner body than the normal form.

**CODS**  
FAMILY GADIDAE



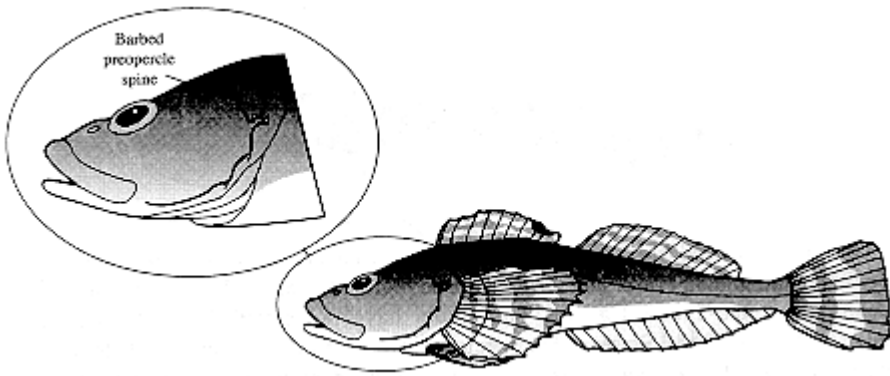
One species of cod (the burbot, *Lota lota*) is a permanent resident of lakes and rivers in the upper and middle Fraser and the Thompson region. Occasional specimens are taken downstream of the Fraser Canyon, but burbot have not established self-sustaining populations in the lower Fraser. This species 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



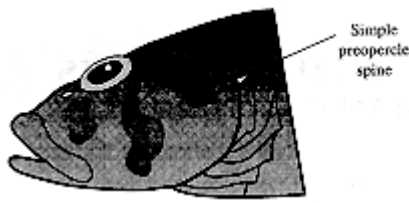
The threespine stickleback (*Gasterosteus aculeatus*) is abundant in lakes and low gradient streams throughout the lower Fraser (including the peripheral drainages except for the BC portion of the Skagit). Two genetically different life-history forms occur in the lower Fraser: a permanent freshwater 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



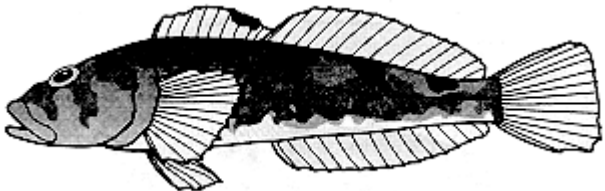
1 (2) Underside dead white; spine on preopercle with obvious hooks; pectoral fins with alternating yellow and dark bands of approximately equal width; common in estuaries

**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

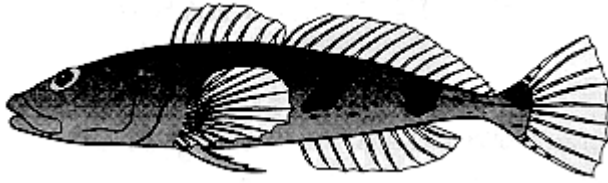


3 (4) First dorsal fin with a conspicuous black spot; anal fin base distinctly longer than head length; in streams, typically in quiet water; common in lakes and estuaries; widespread throughout the Fraser proper (including the peripheral drainages except for the BC portion of the Skagit)

**Prickly sculpin**  
*Cottus asper*

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

5



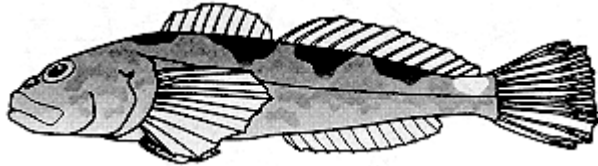
5 (6) Back and sides usually strongly prickled; chin heavily mottled; usually two distinct dark saddle marks under second dorsal fin; in the Fraser system only in the North Thompson drainage

**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

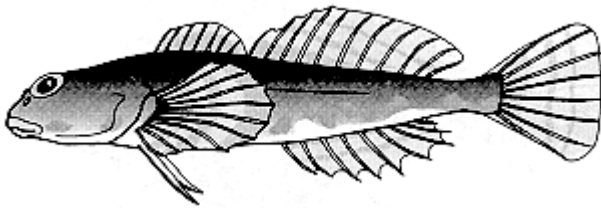
7



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**

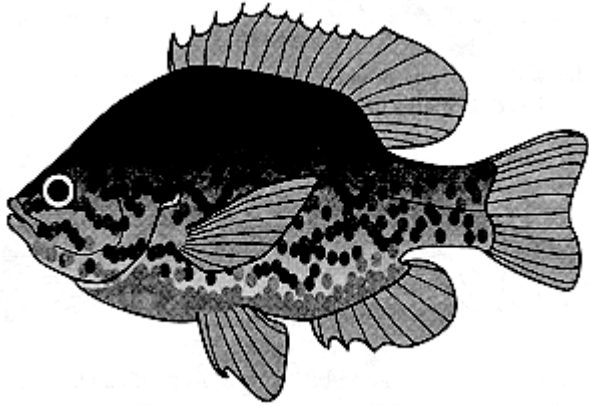
*Cottus cognatus*

\* 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

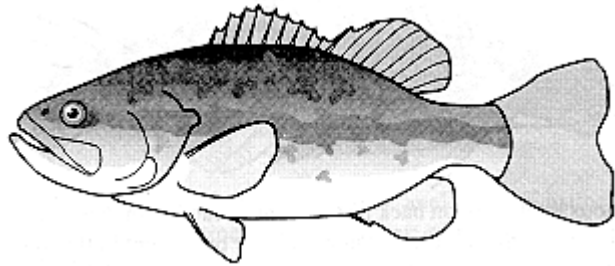
1 (4) Dorsal fin base (including both spinous and soft portions) noticeably longer than anal fin base

2



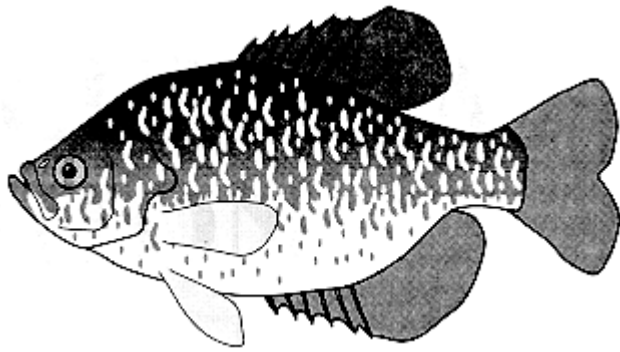
2 (3) Distinct, black opercular flap (outlined in red in mature males); pelvic fins reach vent; in Fraser system confined to the lower Fraser Valley

**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)

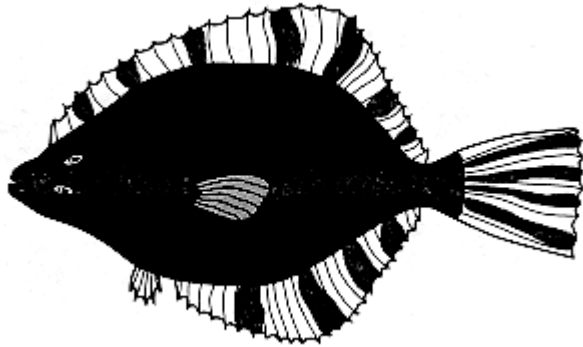
**Largemouth bass**  
*Micropterus salmoides*



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*

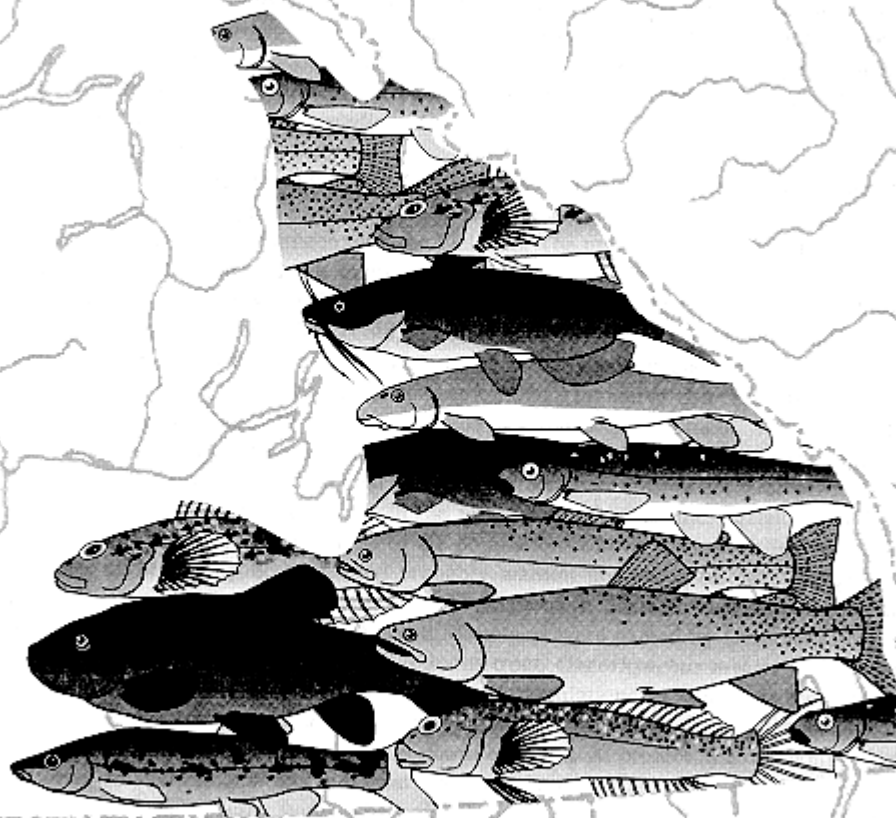
**FLOUNDERS**  
FAMILY PLEURONECTIDAE



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.



# COLUMBIA REGION



COLUMBIA

The Columbia is the third largest drainage basin in BC with over 100,000 sq km inside provincial boundaries. The Columbia River rises near Canal Flats and flows north through the Rocky Mountain Trench to about Mica Creek. It then swings south and flows through the Arrow Lakes and crosses the border just south of Trail (Fig. 4). The BC portion of the Columbia system contains 43 species of fish, of which 27 are native and 16 are introduced (Table 3). The indigenous fishes of the Columbia and its tributaries form one of the most distinctive fish faunas in North America (Miller 1965), and all 27 native species probably survived glaciation somewhere within the Columbia system. There are also more introduced species in the Columbia than anywhere else in BC. The majority of introduced species (brown trout, *Salmo trutta*; lake trout, *Salvelinus namaycush*; lake whitefish, *Coregonus clupeaformis*; carp, *Cyprinus carpio*; goldfish, *Carassius auratus*; tench, *Tinca tinca*; brown catfish, *Ameiurus nebulosus*; black catfish, *Ameiurus melas*; pumpkinseed, *Lepomis gibbosus*; black crappie, *Pomoxis nigromaculatus*; largemouth bass, *Micropterus salmoides*; smallmouth bass, *Micropterus dolomieu*; yellow perch, *Perca flavescens*; and walleye, *Stizostedion vitreum*) are found in the lower Columbia, Kettle and Okanagan drainages.

For convenience we divide the Columbia system in BC into eight subregions: the upper Columbia; the upper Kootenay; the lower Columbia; the lower Kootenay; the Kettle; the Okanagan; the Similkameen; and the Flathead. The upper Columbia extends from its source (Columbia Lake) downstream to the Arrow Lakes. The upper Columbia rises at high altitude and receives tributaries directly from glaciers in the Rocky and Purcell mountains. Even in summer it is a cold, turbulent and silt-loaded environment that probably resembles the meltwater channels and streams of early postglacial time more than the clear, less turbulent lower reaches of the same river. The native fish fauna is sparse and limited to the few species that can tolerate the harsh environment. Because of the mountainous terrain, there are barriers (falls and rapids) on most upper Columbia tributaries. Usually, only trout or char occur above these barriers, but occasionally there are sculpins. The native cutthroat trout in the upper Columbia are the westslope cutthroat (*Oncorhynchus clarki lewisi*). Many of the populations of this subspecies isolated above falls are exceptionally beautiful and probably warrant protection on aesthetic grounds alone. Some of the isolated rainbow trout populations in this area also are unusual, and those in high altitude lakes in the Selkirk Mountains were named by Dymond (1931) as a distinct subspecies: the mountain Kamloops trout, *Oncorhynchus mykiss whitehousei*. Dymond (1931) also described some isolated populations of cutthroat trout in the Revelstoke area (from both Columbia and Fraser tributaries) as a distinct subspecies: the mountain cutthroat trout, *Oncorhynchus clarki alpestris*. At present, the taxonomic status of these isolated rainbow and cutthroat trout populations is not clear, but they probably do not warrant subspecific status. The isolated char populations in the upper Columbia are all bull trout (*Salvelinus confluentus*).

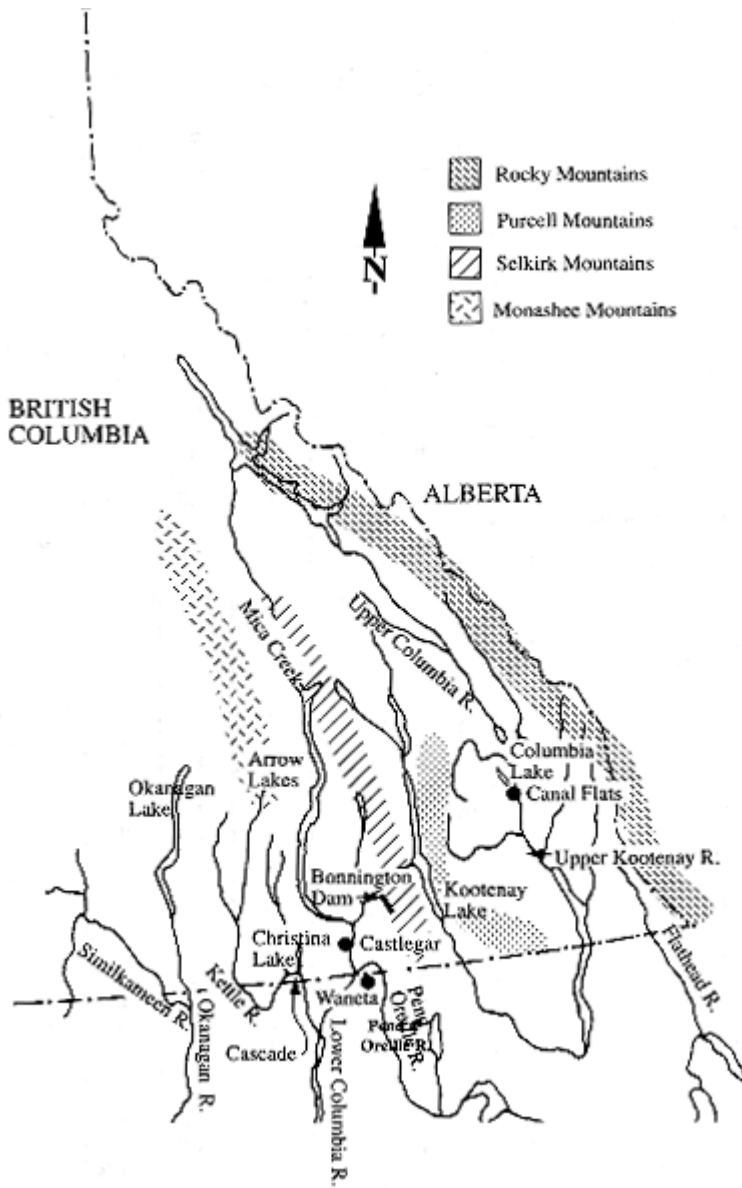
Like the Columbia, the Kootenay River rises high in the Rocky Mountains but, unlike the Columbia, the Kootenay flows south into the US before re-entering BC to join the Columbia at Castlegar. The upper Kootenay extends from its source downstream to the first border crossing. In terms of its ecology and climate, the upper Kootenay is similar to the upper Columbia and shares the same sparse fish fauna. The lower Kootenay is that part of the river that extends from the second border crossing (where it re-enters BC) to the

confluence with the Columbia at Castlegar. Ecologically, the lower Kootenay is very different from the upper Kootenay: it is clear and less turbulent, although still strongly flowing, and its major feature is a large oligotrophic lake—Kootenay Lake. The fauna of the lower Kootenay is more diverse than that of the upper Kootenay and contains species like the white sturgeon (*Acipenser transmontanus*) and bridgelip sucker (*Catostomus columbianus*) that are absent in the upper river. In addition, Kootenay Lake contains a population of exceptionally large rainbow trout, the famous Gerrard stock.

The lower Columbia stretches from the Arrow Lakes south to the US border. Like the lower Kootenay, it is a much more benign environment than the upper river and, again, its most striking feature is a pair of large oligotrophic lakes—upper and lower Arrow lakes. Most of the smaller tributaries of the lower Columbia have high gradients, and there are often falls or other velocity barriers isolating them from the main river. The fauna isolated above these falls is more diverse than that found in similar circumstances in the upper river. For example, although trout and char are common above barriers, sometimes there are also sculpins, minnows and suckers. Occasionally there are barriers on major tributaries. Bonnington Falls on the Kootenay River between Kootenay Lake and the mainstem Columbia was clearly a barrier to the upstream dispersal of several species (Table 3), as was the velocity barrier where the Pend d' Oreille River enters the Columbia at Waneta.

The Flathead, Kettle, Okanagan and Similkameen subregions each are defined by their respective drainage basins. In BC, the Flathead subregion is isolated from the rest of the Columbia system by the Border Ranges. The Flathead River is one of the major headwaters of the Pend d' Oreille system, and like many headwater drainages it contains a relatively sparse fish fauna (Table 3), but one sculpin found in this subregion is of taxonomic interest. Originally, this sculpin was reported as *Cottus confusus*, the shorthead sculpin, and several sites in the Flathead drainage were the only known localities for this species in Canada (Carl *et al.* 1958, Peden and Hughes 1984). Recently, however, Peden *et al.* (1989) have called these records into question and suggest that the sculpin in the Flathead may be *Cottus bairdi*, the mottled sculpin.

The remaining three subregions (the Kettle, Okanagan and Similkameen) drain the southern parts of the Interior Plateau and the Monashee Mountains. These systems are smaller, less turbulent and warmer in summer than most other Columbia subregions. These differences are reflected in their fish faunas. For example, one species (the bull trout, *Salvelinus confluentus*) is abundant in the upper and lower Columbia and Kootenay systems but is absent from the Kettle, Okanagan and Similkameen rivers. Generally, however, their fish faunas are similar to that in the lower Columbia. Still, there are falls and rapids on these rivers that act as barriers to fish dispersal. For example, the velocity barrier at Cascade on the Kettle River appears to have prevented the upstream dispersal of widespread species such as the longnose dace (*Rhinichthys cataractae*) and torrent sculpin (*Cottus rhotheus*). The same is true of Okanagan Falls, where four species that occur below the falls are absent above the barrier (Table 3). A similar barrier on the Similkameen (Similkameen Falls) is much farther upstream, but only two native species (rainbow trout and longnose dace) are found above the falls. Such barriers not only prevent upstream dispersal, but also isolate upstream populations from gene flow with downstream populations of the same species. This isolation can accelerate the process of divergence, and in at least one case (a largescale sucker, *Catostomus macrocheilus*) in the Kettle River the upstream form is morphologically distinct from populations below the barrier.



**Figure 3**  
Columbia River system and its adjacent drainages

Species	Upper Columbia	Lower Columbia	Upper Kootenay	Lower Kootenay	Kettle	Okanagan	Similkameen	Flathead
Acipenser transmontanus	-	+	-	+	-	?	-	-
Acrocheilus alutaceus	+	<b>B</b>	-	<b>B</b>	+	<b>B</b>	<b>B</b>	-
Carassius auratus	-	<b>I</b>	-	-	-	<b>I</b>	-	-
Couesius plumbeus	-	+	-	+	+	+	<b>B</b>	-
Cyprinus carpio	-	<b>I</b>	-	<b>I</b>	<b>I</b>	<b>I</b>	-	-
Mylocheilus caurinus	+	+	+	+	+	+	<b>B</b>	-
Ptchocheilus oregonesis	+	+	+	+	+	+	<b>B</b>	-
Rhinichthys cataractae	+	+	+	+	<b>B</b>	+	+	-
R. falcatus	-	<b>B</b>	-	+	<b>B</b>	+	<b>B</b>	-
R. osculus	-	<b>B</b>	-	-	+	-	-	-
R. umatilla	-	<b>B</b>	-	+	<b>B</b>	?	<b>B</b>	-
Richarsonius catostomus	+	+	+	+	+	+	<b>B</b>	-
Tinca tinca	-	<b>I</b>	-	-	<b>I,B</b>	<b>I,B</b>	-	-
Catostomus catostomus	+	+	+	+	+	+	<b>B</b>	+
C. columbianus	-	+	-	+	-	<b>B</b>	<b>B</b>	-
C. macrocheilus	+	+	+	+	+	+	<b>B</b>	-
C. platyrhynchus	-	-	-	-	-	-	<b>B</b>	-
Ameiurus melas	-	<b>I</b>	-	<b>I</b>	-	<b>I,B</b>	-	-
A nebulosus	-	?	-	-	-	?	-	-
Oncorhynchus clarki lewisi	+	+	+	+	-	-	<b>I</b>	+
O. mykiss	+	+	+	+	+	+	+	+
O. nerka	-	+	-	+	<b>I</b>	+	<b>B</b>	-
O. tshawytscha	<b>E</b>	<b>E,I</b>	-	-	-	<b>B</b>	-	-
Salmo trutta	-	-	-	-	<b>I</b>	-	<b>I</b>	-
Salvelinus confluentus	+	+	+	+	-	-	-	+
S. fontinalis	-	<b>I</b>	-	<b>I</b>	<b>I</b>	<b>I</b>	<b>I</b>	-
S. namaycush	-	<b>I</b>	-	<b>I</b>	-	<b>I</b>	-	-
Thymallus arcticus	-	-	-	-	-	-	-	<b>I</b>
Coregonus clupeaformis	-	<b>I</b>	-	<b>I</b>	-	<b>I</b>	-	-
Prosopium coulteri	+	+	+	+	-	+	-	-
P. williamsoni	+	+	+	+	+	+	<b>B</b>	+
Lota lota	+	+	+	+	-	+	<b>B</b>	-
Cottus asper	-	<b>B</b>	-	<b>B</b>	<b>B</b>	+	<b>B</b>	-
C. bairdi (hubbsi?)	-	<b>B</b>	-	<b>B</b>	<b>B</b>	-	<b>B</b>	+
C. cognatus	+	+	+	+	+	+	<b>B</b>	+
C. confusus	-	<b>B</b>	-	<b>B</b>	<b>B</b>	-	-	-
C. rhotheus	+	+	+	+	<b>B</b>	<b>B</b>	<b>B</b>	-
Lepomis gibbosus	-	<b>I</b>	-	<b>I</b>	<b>I,B</b>	<b>I,B</b>	-	-
Micropterus dolomieu	-	<b>I</b>	-	-	<b>I,B</b>	<b>I</b>	-	-
M. salmoides	-	<b>I</b>	-	<b>I</b>	<b>I,B</b>	<b>I</b>	-	-
Pomoxis nigromaculatus	-	-	-	-	-	<b>I,B</b>	-	-
Perca flavescens	-	<b>I</b>	<b>I</b>	<b>I</b>	-	<b>I</b>	<b>I</b>	-
Stizostedion vitreum	-	<b>I,B</b>	<b>I</b>	-	<b>I,B</b>	-	-	-

**Table 3**  
Distribution of fishes in the Columbia River and adjacent small drainages.

+	= present	?	= uncertain record	<b>B</b>	= below barriers
-	= absent	<b>I</b>	= introduced	<b>E</b>	= extinct

## Pictorial Key To Families



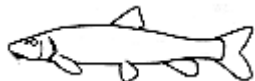
**STURGEONS (ACIPENSERIDAE)**

68



**MINNOWS (CYPRINIDAE)**

68



**SUCKERS (CATOSTOMIDAE)**

73



**CATFISH (ICTALURIDAE)**

74



**SALMON, TROUT, CHAR (SALMONIDAE)  
(SUBFAMILY SALMONINAE)**

75



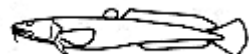
**WHITEFISH (SALMONIDAE)  
(SUBFAMILY COREGONINAE)**

80



**GRAYLINGS (SALMONIDAE)  
(SUBFAMILY THYMALLINAE)**

81



**CODS (GADIDAE)**

82



**SCULPINS (COTTIDAE)**

82



**SUNFISH, BASS (CENTRARCHIDAE)**

84



**PERCH (PERCIDAE)**

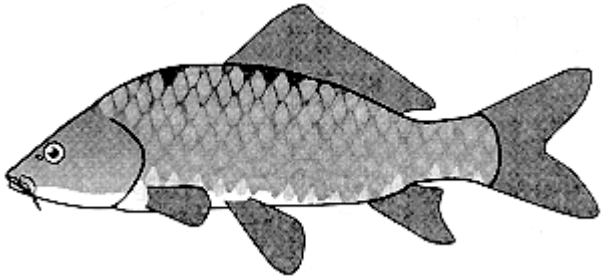
86

**STURGEONS**  
FAMILY ACIPENSERIDAE



The white sturgeon (*Acipenser transmontanus*) is the only sturgeon in the Columbia system in BC. It is relatively common in the mainstem Columbia and Kootenay rivers and sporadic in large lakes such as the Arrow Lakes and Kootenay Lake. Presumably, the population in the Kootenay above Bonnington Falls has been isolated from the main Columbia population since the origin of the falls. There are also unconfirmed reports of sturgeon in Okanagan Lake.

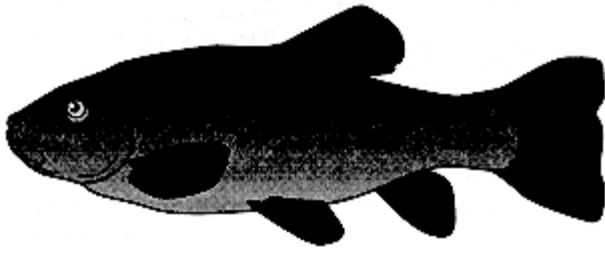
**MINNOWS**  
FAMILY CYPRINIDAE



1 (2) Dorsal fin base much longer than head; established throughout the Okanagan system and Similkameen, also in the lower Columbia and in Christina Lake (Kettle system)

2 (1) Dorsal fin base shorter than head

**Carp**  
*Cyprinus carpio*

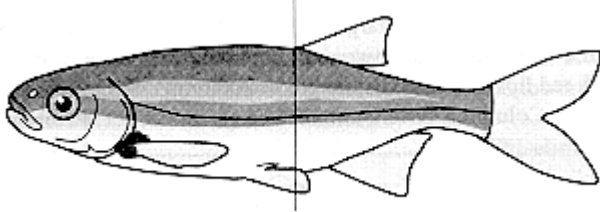


3 (4) Caudal peduncle deep, its depth more than half of head length; all fins are dark; established in the Okanagan system below Okanagan Falls, in Christina Lake (Kettle system) and the reservoir above Waneta Dam (Pend d'Oreille system)

**Tench**  
*Tinca tinca*

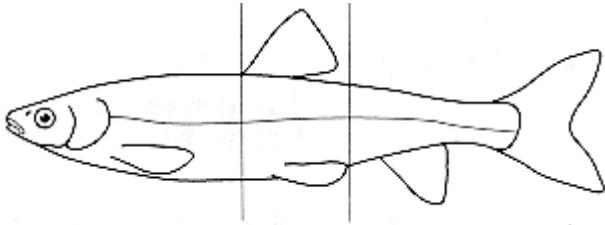
4 (3) Caudal peduncle slender, its depth less than half head length; not all fins are dark

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 Columbia system in BC

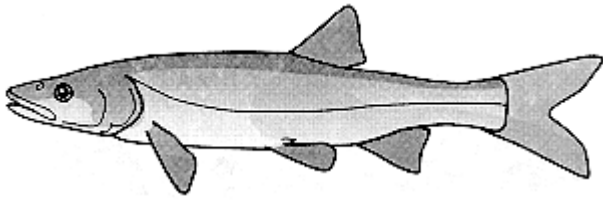
**Redside shiner**  
*Richardsonius balteatus*



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





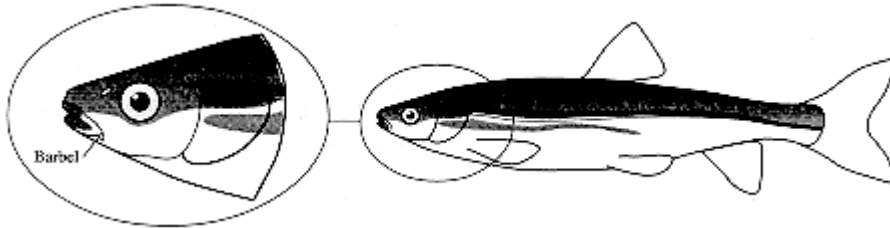
7 (8) Mouth large, upper jaw extends beyond anterior margin of eye; adults up to 300 mm in length; no dark mid-lateral stripe in individuals less than 80 mm but in small fish a dark spot at base of tail; common throughout the BC portion of the Columbia system

**Northern squawfish**

*Ptychocheilus oregonensis*

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

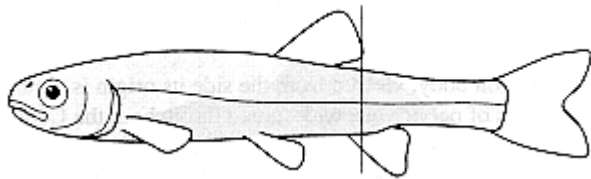
9



9 (10) Viewed from the side, hind margin of dorsal fin does not overlap anal fin; small barbel at the corner of mouth; two dark horizontal stripes on side of body; breeding adults with red lips and fin axils; length to 200 mm; common throughout the BC portion of the Columbia system

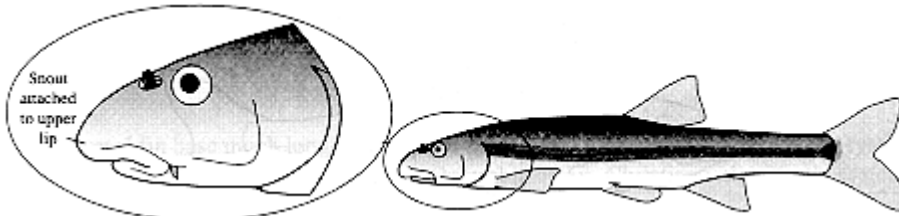
**Peamouth**

*Mylocheilus caurinus*



10 (9) Viewed from the side, hind margin of dorsal fin clearly overlaps anal fin

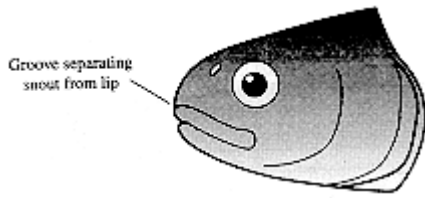
11



11 (12) 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 most of the Columbia system; absent from the Kettle (above the barrier at Cascade) and Flathead systems

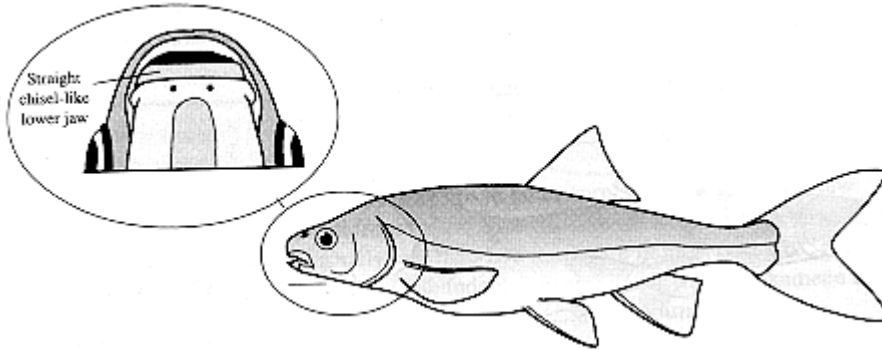
**Longnose dace**

*Rhinichthys cataractae*



12 (11) Snout separated from upper lip by a groove across mid-line of snout; upper jaw protractible; eye diameter about half snout length

13



13 (14) Lower jaw chisel-like, nearly straight in adults; flanks a uniform silvery colour; sporadic in the Okanagan, Similkameen, Kettle and upper and lower Columbia systems; absent from the Kootenay and Flathead systems

**Chiselmouth**

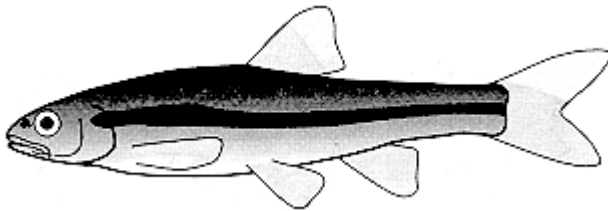
*Acrocheilus alutaceus*

14 (13) Lower jaw normal, not chisel-like; flanks speckled, or with an indistinct mid-lateral band, or conspicuous irregular dark blotches

15

15 (18) Mouth terminal (snout does not overhang mouth)

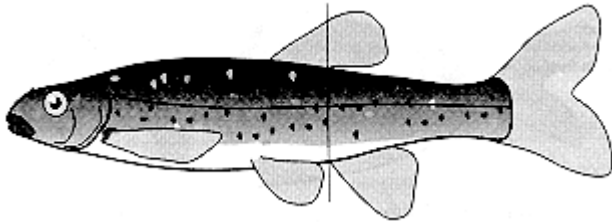
16



16 (17) Small barbel at corner of mouth; origin of anal fin well behind hind end of dorsal fin base; juveniles usually with a dark mid-lateral stripe; sporadic in small lakes in the Similkameen, Okanagan and Kettle systems; absent from the lower and upper Columbia, and the lower and upper Kootenay systems

**Lake chub**

*Couesius plumbeus*

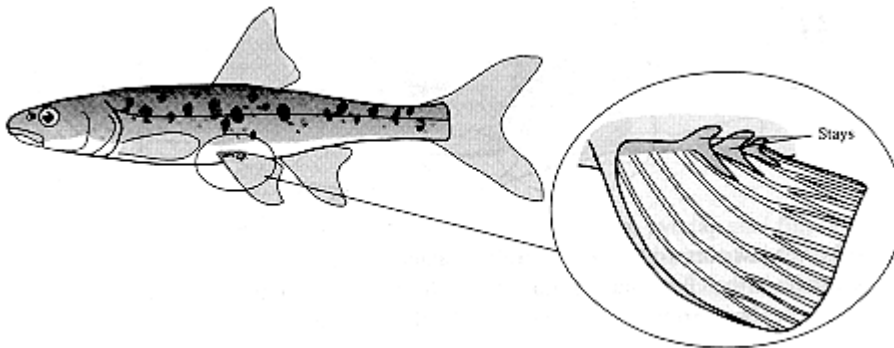


17 (16) No barbels at corner of mouth; origin of anal fin almost directly below the hind end of dorsal fin base; in BC known only from the Kettle system where it occurs both above and below the barrier at Cascade

**Speckled dace**  
*Rhinichthys osculus*

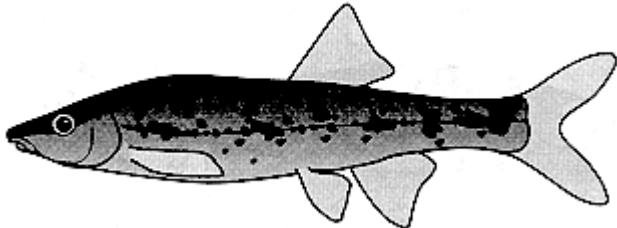
18 (15) Mouth subterminal (snout overhangs mouth)

19



19 (20) Barbel conspicuous, protrudes beyond corner of mouth; well developed fleshy membranes (stays) connect inner rays of pelvic fins to body; caudal peduncle depth only slightly wider than interorbital width; present in the Similkameen, Okanagan, lower Columbia and lower Kootenay (below Bonnington Falls) systems

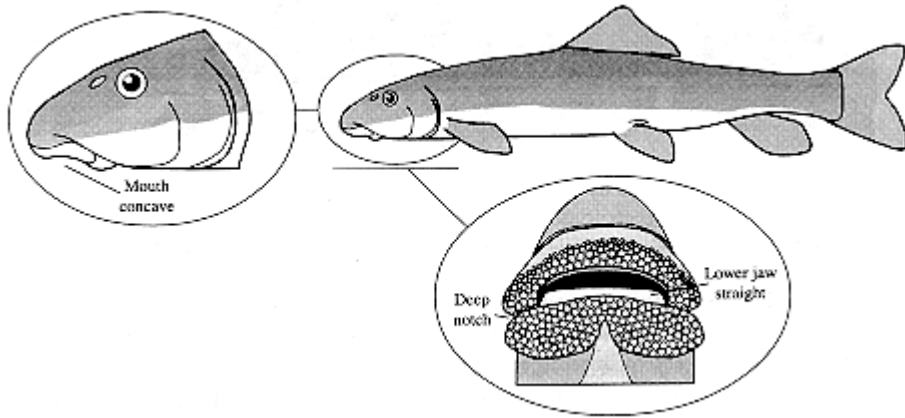
**Leopard dace**  
*Rhinichthys falcatus*



20 (19) Barbel inconspicuous, does not protrude beyond corner of mouth; fleshy membranes (stays) not well developed; caudal peduncle depth conspicuously wider than interorbital width; in BC, known from the Similkameen, Kettle (below barrier at Cascade), lower Columbia and lower Kootenay (below Bonnington Falls) systems

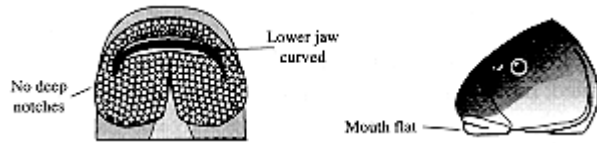
**Umatilla dace**  
*Rhinichthys umatilla*

**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); rare in most of the BC parts of the Columbia system but modestly abundant at some sites in the Similkameen River

**Mountain sucker**  
*Catostomus platyrhynchus*

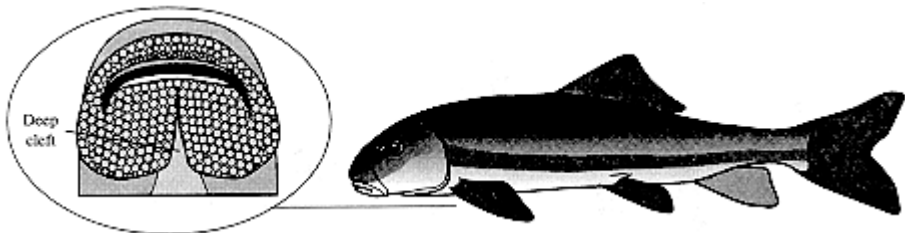


2 (1) No deep notches between upper and lower lips at outer corners of mouth; lower jaw curved when viewed from below; viewed from the side the mouth is flat

3

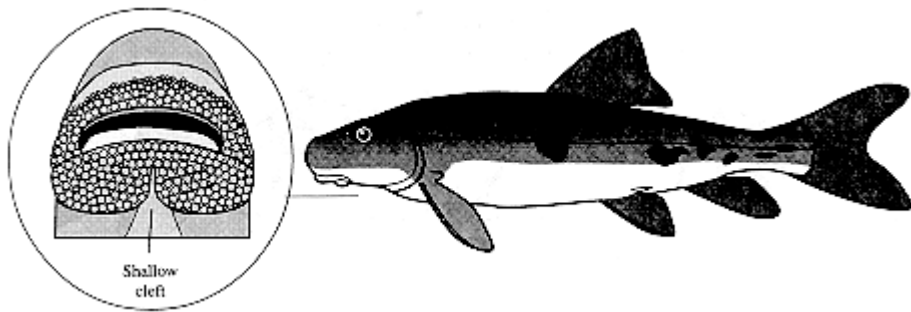
3 (6) Caudal peduncle narrow, its least depth half, or less than half, the dorsal fin base; snout blunt; mouth not strongly subterminal (snout barely overhangs mouth)

4



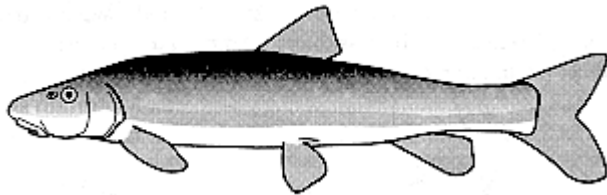
4 (5) Cleft in lower lip deep, usually no papillae between cleft and lower jaw; scales large, on adults even those near the head are clearly visible to naked eye; juveniles with light coloured peritoneum; breeding fish with a dark lateral stripe; common in lakes and larger streams throughout the Columbia system, even above major barriers

**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; abundant in the lower Columbia below barriers but absent from the upper Columbia and the Kootenay system above Bonnington Falls, also absent above the falls on the Okanagan, kettle and Similkameen systems

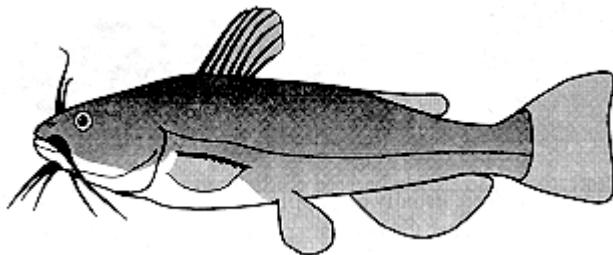
**Bridgelip sucker**  
*Catostomus columbianus*



6 (3) Caudal peduncle deep, its least depth much more than half the dorsal fin base; snout long and pointed; mouth strongly subterminal (snout clearly overhangs mouth); breeding fish with a rosy red lateral stripe; moderately common in cooler waters throughout the Columbia system

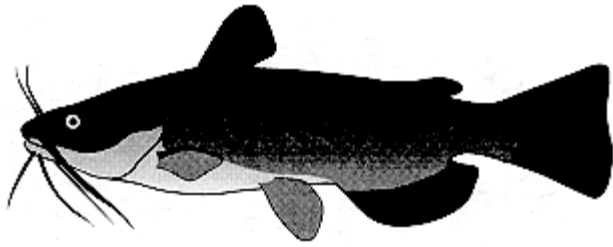
**Longnose sucker**  
*Catostomus catostomus*

**CATFISH**  
FAMILY ICTALURIDAE



1 (2) Hind margin of pectoral spine with strong hooks near the tip; membranes between dorsal rays dusky

**Brown catfish\***  
*Ameiurus nebulosus*



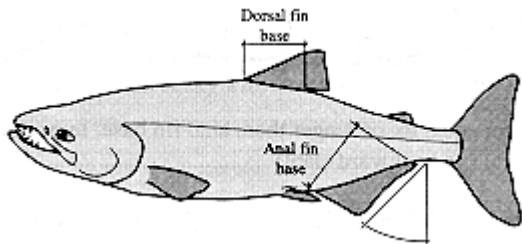
2 (1) Hind margin of pectoral spine with weak hooks, often almost smooth near the tip; membranes between dorsal rays usually black; established in lower Columbia, lower Kootenay River and Okanagan system below Okanagan falls

**Black catfish\***  
*Ameiurus melas*

\* these species are often confused, and at present the distribution of brown catfish in the BC portion of the Columbia system is unclear.

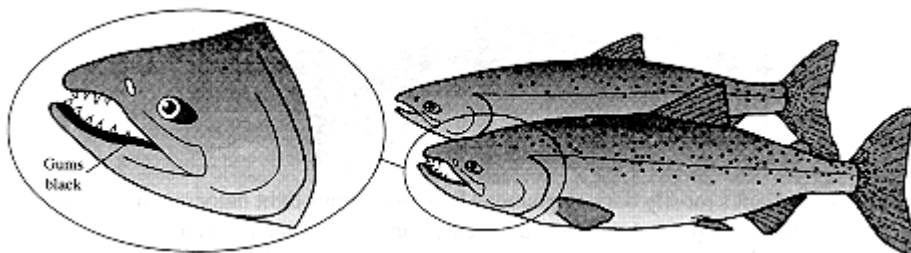
**SALMON, TROUT AND CHAR**  
FAMILY SALMONIDAE  
(SUBFAMILY SALMONINAE)

KEY TO THE ADULTS



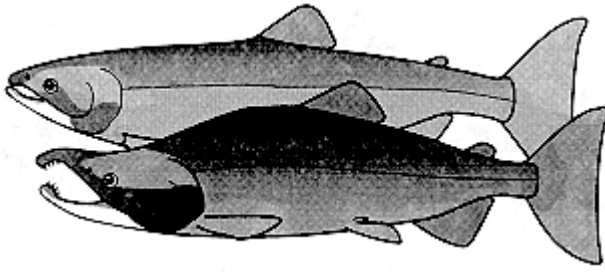
1 (4) Anal fin base longer than dorsal fin base; in profile, hind margin of anal fin slants backwards (not vertical)

2



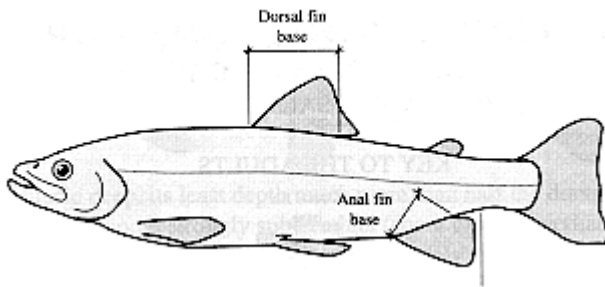
2 (3) Tail spotted on both upper and lower halves; gums at base of teeth in lower jaw black; introduced into Roosevelt Reservoir in Washington, occasional individuals occur in the lower Columbia near Trail

**Chinook salmon**  
*Oncorhynchus tshawytscha*



3 (2) No spots on tail, but occasionally some fine speckles; gums at base of teeth in lower jaw light; 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 Columbia system, but in the BC portion of the Columbia anadromous sockeye spawn only in the Okanagan River between Osoyoos and Vaseaux lakes

**Sockeye salmon**  
(Kokanee)  
*Oncorhynchus nerka*

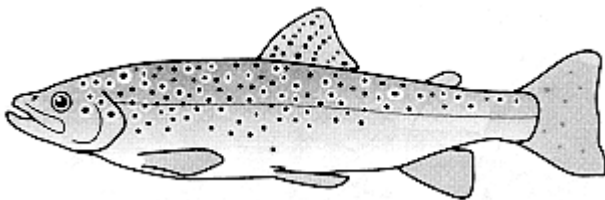


4 (1) Base of dorsal fin equal to, or longer than, anal fin base; in profile, hind margin of anal fin is vertical (no backward slant)

5

5 (10) Background colour on flanks light (silver or golden) with dark spots

6

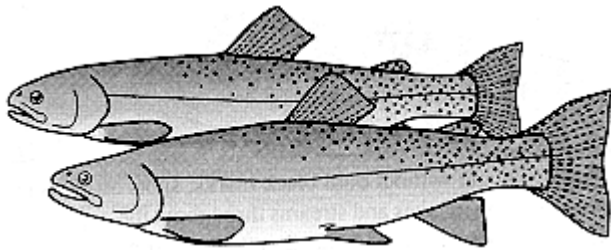


6 (7) Spots on flanks mostly dark surrounded by conspicuous light haloes; some spots along side are red; established in the Kettle and Similkameen systems

**Brown trout**  
*Salmo trutta*

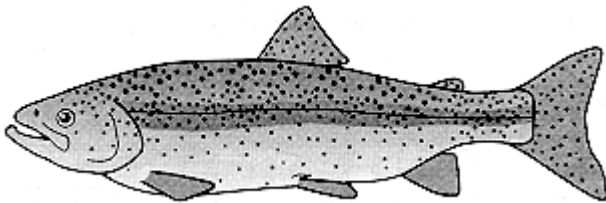
7 (6) Spots on flanks black (no red spots); spots not surrounded by light haloes

8



8 (9) Red or orange slash under lower jaw; upper jaw extends back past hind margin of eye; tail usually yellowish with black spots; common in the upper Columbia, upper Kootenay and Flathead systems; sporadic populations in the lower Columbia and lower Kootenay; perhaps present in the Kettle, but natural populations absent in the Okanagan and Similkameen systems

**Westslope cutthroat trout**  
*Oncorhynchus clarki lewisi*

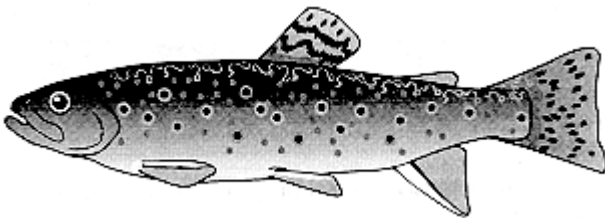


9 (8) No red or orange slash under lower jaw; except in spawning males, upper jaw does not extend back beyond hind margin of eye; sides usually silver with a pink hue extending along midline; tail dusky with dark spots; common throughout the Columbia system

**Rainbow trout**  
*Oncorhynchus mykiss*

10 (5) Background colour on sides dark with light or coloured spots

11



11 (12) Dorsal fin yellowish, with bold black streaks; red spots on flanks surrounded by blue haloes; introduced throughout the Columbia system

**Brook trout**  
*Salvelinus fontinalis*





12 (11) Dorsal fin dusky and without bold black marks; spots on sides not surrounded by light haloes; common in lakes and streams throughout the upper and lower Columbia, upper and lower Kootenay and Flathead systems; absent from the Kettle, Okanagan and Similkameen systems

**Bull trout**  
*Salvelinus confluentus*

KEY TO YOUNG SALMONIDS (45-100 mm)

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

**Chinook salmon**  
*Oncorhynchus tshawytscha*



3 (2) Parr marks small, oval shaped, non much higher than the vertical diameter of the eye

**Sockeye salmon**  
(Kokanee)  
*Oncorhynchus nerka*

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

5

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

6

6 (9) Coloured spots (red to yellow) along mid-line about equal to or greater than the combined width of the light areas

7



7 (8) 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*

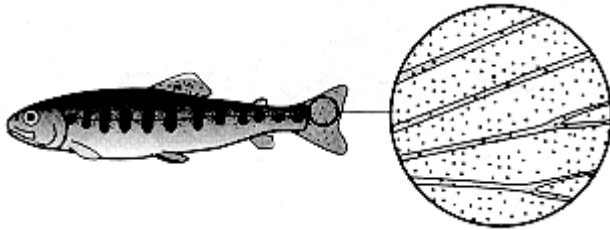


8 (7) Small black spots above and below mid-line ( in addition to parr marks); 9 to 11 parr marks, none as wide as eye diameter; adipose fin orange

**Brown trout**  
*Salmo trutta*

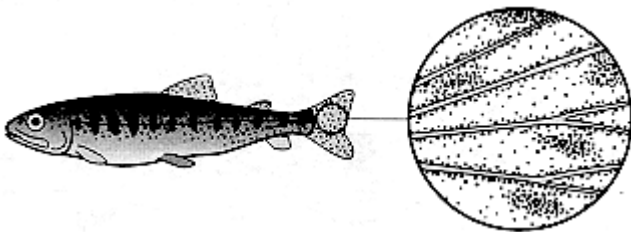
9 (6) No coloured (red to yellow) spots; width of dark areas along mid-line less than width of light areas

10



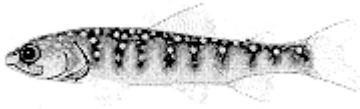
10 (11) On fish below 50 mm melanophores are evenly distributed over entire tail; few or no spots on tail; no red or yellow marks under chin; hind margin of upper jaw not reaching hind margin of eye

**Rainbow trout**  
*Oncorhynchus mykiss*



11 (10) 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

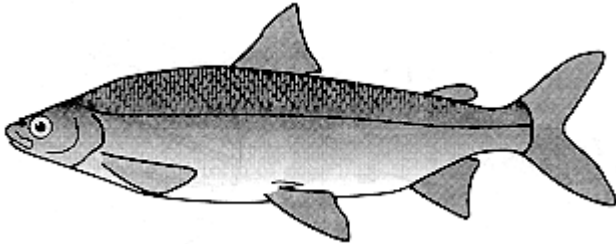
**Westslope cutthroat trout**  
*Oncorhynchus clarki lewisi*



12 (5) Dorsal fin without numerous dark spots; in very small specimens the first dorsal ray may be dusky but not black; parr marks are irregular blotches; width of dark areas on mid-line greater than width of light areas

**Bull trout**  
*Salvelinus confluentus*

**WHITEFISH**  
FAMILY SALMONIDAE  
(SUBFAMILY COREGONINAE)

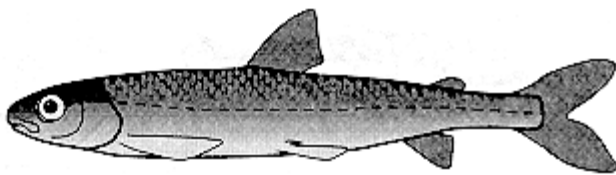


1 (2) Body deep, slab-sided; lower surface curves downward when viewed from side; introduced into Arrow Lakes, Kootenay Lake, and large lakes throughout the Okanagan system

**Lake whitefish**  
*Coregonus clupeaformis*

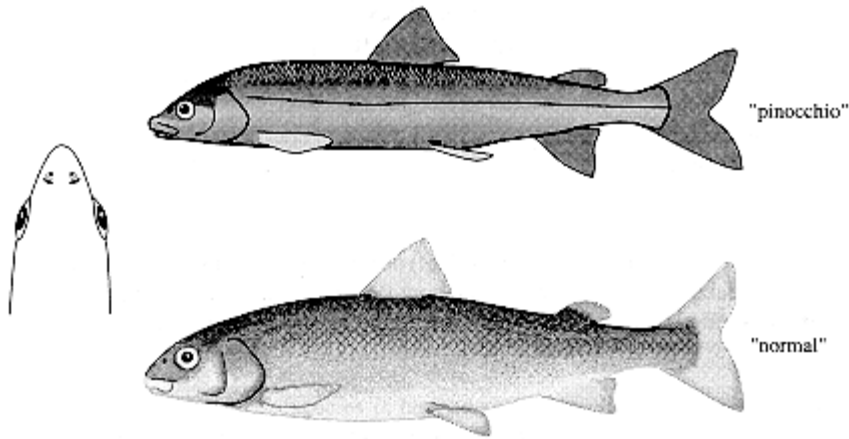
2 (1) Body slender, rounder in cross-section; lower surface nearly flat when viewed from side

3



3 (4) Viewed from above snout blunt, rounded; adipose fin small, base about equal to eye diameter; lakes and rivers in the upper Columbia and upper Kootenay systems, also in Kootenay Lake, Arrow Lakes and Okanagan, Skaha and Osoyoos lakes in the Okanagan system

**Pygmy whitefish**  
*Prosopium coulteri*



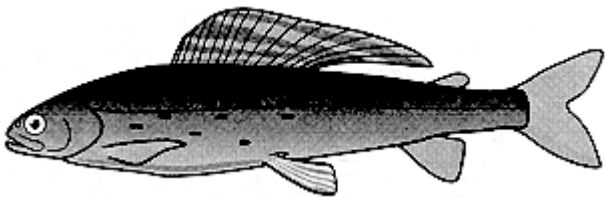
4 (3) Viewed from above snout pointed; adipose fin large, base about 1.5 times eye diameter; widespread in lakes and rivers throughout the Columbia system

**Mountain whitefish\***

*Prosopium williamsoni*

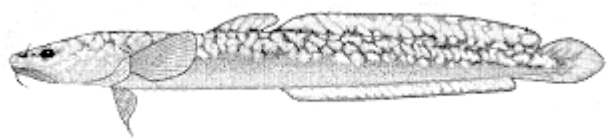
\* Many fluvial populations contain two forms: normal and "pinocchio". The "pinocchio" form has a longer snout and thinner body than the normal form.

**GRAYLINGS**  
 FAMILY SALMONIDAE  
 (SUBFAMILY THYMALLINAE)



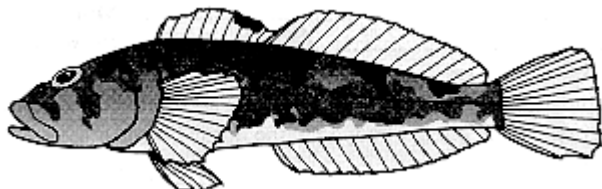
The Artic grayling (*Thymallus arcticus*) is not a native of the Columbia system; however, it occurs naturally across the Continental Divide in headwaters of the Missouri system. From there it was introduced into the Flathead River in Glacier National Park, western Montana. Presumably, it then spread into southeastern BC, but there have been no recent reports of grayling in the BC portion of the Flathead and it now may be extinct in this area.

**CODS**  
FAMILY GADIDAE



One species of cod (the burbot, *Lota lota*) occurs in the Columbia system. The burbot is common in lakes and large rivers throughout the upper Columbia and upper Kootenay, but in more southerly parts of the system it is found mostly in large, deep lakes.

**SCULPINS**  
FAMILY COTTIDAE

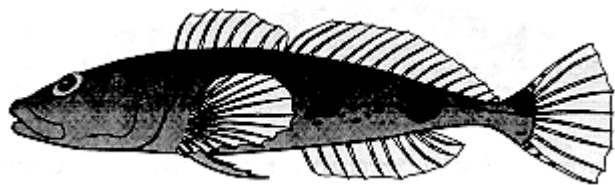


1 (2) Anal fin base distinctly longer than head length; abundant below barriers in the lower Columbia and Arrow Lakes but absent in the upper Columbia; also absent above barriers on the Kootenay (Bonnington Falls), Pend d'Oreille and Kettle rivers; common in streams and lakes throughout the Okanagan system

**Prickly sculpin**  
*Cottus asper*

2 (1) Anal fin base about equal to head length

3



3 (4) Head large (less than 3 times into standard length); caudal peduncle narrow (less than interorbital width); usually heavily prickled on back and sides; abundant in upper and lower Columbia and upper and lower Kootenay, but absent above barriers on the Pend d'Oreille, Kettle, Okanagan and Similkameen systems

**Torrent sculpin**  
*Cottus rhotheus*

4 (3) Head smaller (more than 3 times into standard length); caudal peduncle deeper ( greater than interorbital width); prickles, if present, reduced to a patch behind pectoral fin

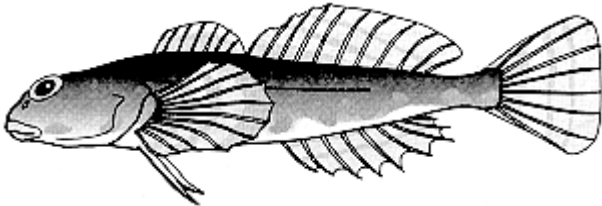
Three species

**Mottled sculpin**  
*Cottus bairdi*;

**Slimy sculpin**  
*Cottus cognatus*;

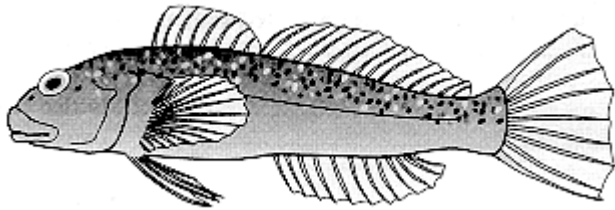
**Shorthead sculpin**  
*Cottus confusus*.

At present, a field key to these species is beyond our capability. These species coexist in various combinations in the BC portion of the Columbia system, and our attempts to construct a key have foundered on problems with site-to-site variation within species and hybridization among species. For example, the fish identified as *C. confusus* in the Flathead River (McAllister and Lindsey 1961; Peden and Hughes 1984) are not the same species as the fish identified as *C. confusus* in the Columbia and Kettle rivers (Alex Peden, pers. comm.). Based on allozyme data, the Flathead fish appear to be *C. Bairdi* (Alex Peden, pers., comm.). To make matters worse, fish that apparently are hybrids between *C. confusus* and *C. bairdi* in this region are the typical Columbia form (originally described as *C. hubbsi*) and not the same fish as the *C. Bairdi* in the Flathead River (if, indeed, the fish in the Flathead really are *C. bairdi* and not *C. confusus*). With this level of taxonomic clarity, a field key is clearly premature. If indentifications are absolutely necessary, a few specimens should be preserved and run through the key in the Azppendix (page 228). What we know about the distribution of these species in the Columbia system is summarized below.



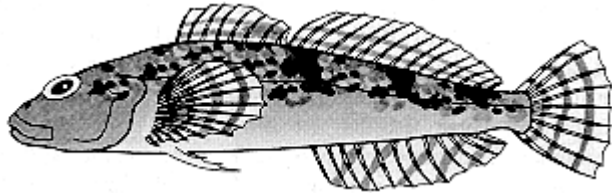
Common above barriers in the lower Columbia, Kettle and Okanagan systems; widespread throughout the upper Columbia and upper Kootenay; abundant in the upper Flathead River

**Slimy sculpin**  
*Cottus cognatus*



Common in low gradient sections of streams tributary to the Columbia River below Keenleyside Dam; in the Kootenay River and tributaries below Bonnington Falls, in the Kettle River below the barrier at Cascade, and in the Flathead River and tributaries

**Shorthead sculpin**  
*Cottus confusus*

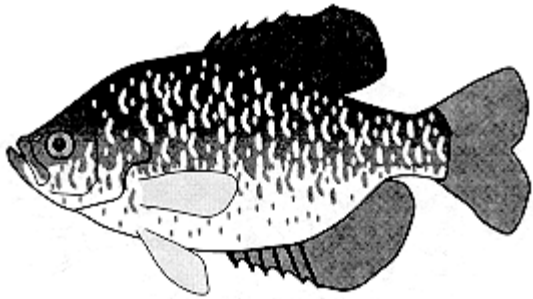


Common below barriers in the lower Columbia, Kettle and Similkameen systems; absent from the Kootenay River (above Bonnington Falls) and the Okanagan system above Okanagan Falls

**Mottled sculpin**  
*Cottus bairdi*

**SUNFISH AND BASS**  
FAMILY CENTRARCHIDAE

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

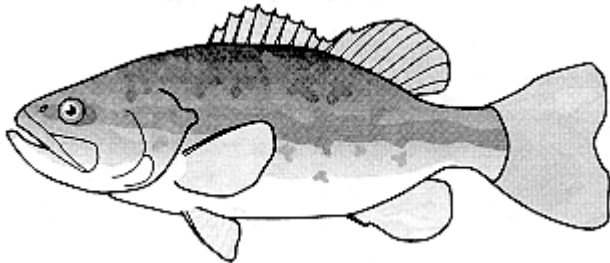


2 (3) Distinct, black opercular flap (outlined in red in mature males); pelvic fins reach vent; established in the lower Columbia, lower Kootenay, Kettle and Okanagan systems

**Pumpkinseed**  
*Lepomis gibbosus*

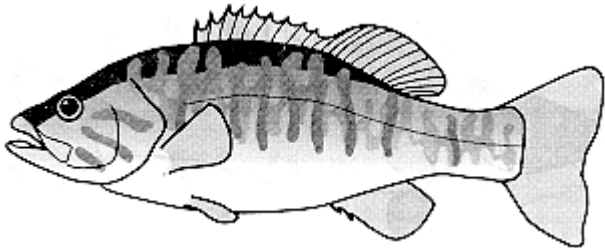
3 (2) No distinct black opercular flap; pelvic fins do not reach vent

4



4 (5) Upper jaw reaches to beyond hind margin of eye; eye brown; young with black band continuous across snout and gill cover but broken along sides; established in lower Columbia, lower Kootenay, upper Kootenay, Kettle and Okanagan system

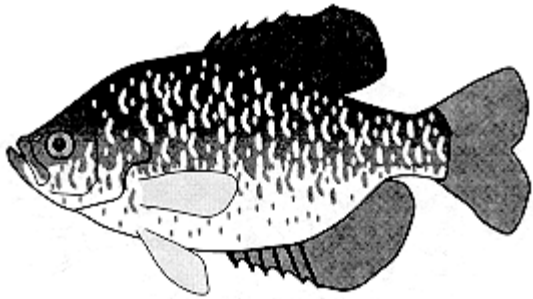
**Largemouth bass**  
*Micropterus salmoides*



5 (4) Upper jaw reaches back to about mid-eye; eye red to orange; young with dark, radiating bands on gill cover; established in lower Columbia, lower Kootenay, Kettle and Okanagan system

**Smallmouth bass**  
*Micropterus dolomieu*

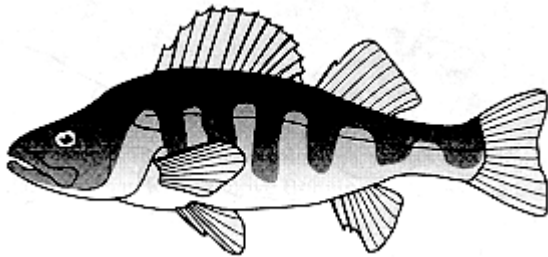




6 (1) Dorsal fin base (including both spinous and soft portions) about equal to anal fin base; established in the Okanagan system below Okanagan Falls

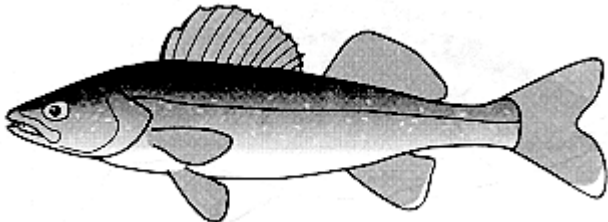
**Black crappie**  
*Pomoxis nigromaculatus*

**PERCHES**  
FAMILY PERCIDAE



1 (2) Sides in adults with 6 to 9 dark vertical bars; lower lobe of tail without a conspicuous white mark; jaws without prominent canine teeth; established in the lower Columbia (including the Pend d'Oreille), upper and lower Kootenay and Okanagan systems

**Yellow perch**  
*Perca flavescens*



2 (1) Sides in adults without dark vertical bars (irregular bars in juveniles); lower lobe of tail with a conspicuous white mark; jaws with prominent canine teeth; established in the lower Columbia and unconfirmed reports from Wasa sloughs in the upper Kootenay

**Walleye**  
*Stizostedion vitreum*

MACKENZIE



# MACKENZIE REGION

The Mackenzie system (Fig. 5) is the largest drainage basin in BC (over 270,000 sq km). Its two major BC tributaries, the Peace and Liard, flow eastward and there are velocity barriers where these rivers cut through the mountains. These barriers form natural divisions between the upper and lower reaches of both rivers. Thus, the Mackenzie system in BC is divisible into four subregions: the upper Peace, above Peace Canyon Dam, drains much of the Rocky Mountain Trench; the lower Peace, below Peace Canyon Dam drains the Rocky Mountain foothills and the southern portion of the Alberta Plateau; the BC portion of the upper Liard, above Liard Canyon, rises near Dease Lake and drains the east slopes of the Stikine and Kechika ranges; and the lower Liard, below the canyon, with its major tributary, the Fort Nelson River, drains the northern half of the Alberta Plateau.

Forty-three species of fish occur in the BC portion of the Mackenzie; of these 39 are native and three (Westslope cutthroat, *Oncorhynchus clarki lewisi*; brook trout, *Salvelinus fontinalis*; and fathead minnow, *Pimephales promelas*) are introduced (Table 4). The faunas of the lower Peace and lower Liard are dominated by Great Plains species, 13 of which occur nowhere else in the province. Thus, after the Columbia, the Mackenzie system in BC contains the most distinctive fish fauna in the province.

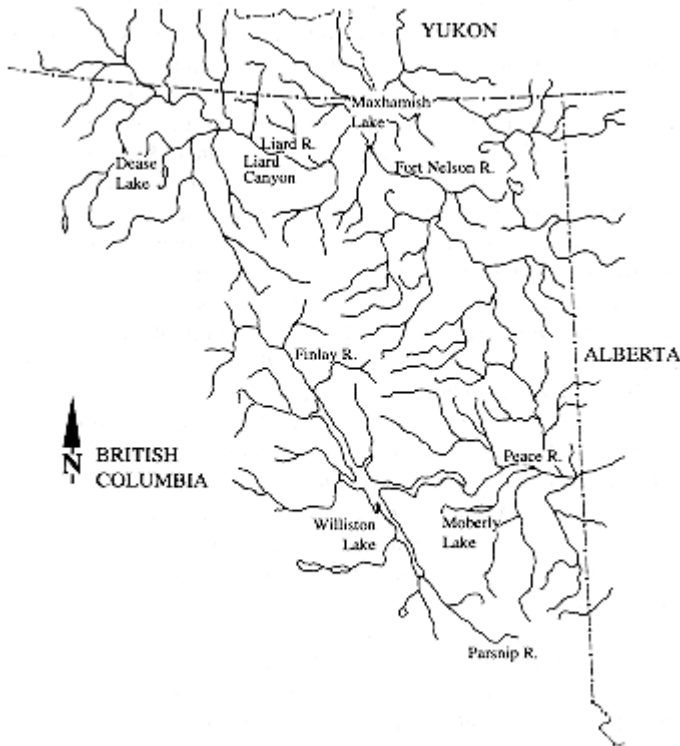
Originally, the upper Peace was a high-gradient, silt-laden river formed by the junction of two rivers in the Rocky Mountain Trench: the south-flowing Finlay and the north-flowing Parsnip. A large reservoir, Williston Lake, now covers the upper Peace from Hudson Hope (where it cuts through the mountains) to well up both the Parsnip and Finlay rivers. The upper Peace contains a mixed fish fauna. Seven species (mountain whitefish, *Prosopium williamsoni*; kokanee, *Oncorhynchus nerka*; largescale sucker, *Catostomus macrocheilus*; peamouth, *Mylocheilus carinus*; redbelly shiner, *Richardsonius balteatus*; squawfish, *Ptychocheilus oregonensis*, and prickly sculpin; *Cottus asper*) are clearly of Columbia origin. Two species (white sucker, *Catostomus commersoni*, and brassy minnow, *Hybognathus hankinsoni*) are of Great Plains origin; while one species (Arctic grayling, *Thymallus arcticus*) probably is of northern origin. Populations of three other species (longnose sucker, *Catostomus catostomus*; lake chub, *Couesius plumbeus*; and longnose dace, *Rhinichthys cataractae*) show some morphological differences above and below the barrier on the Peace, and this suggests that they probably dispersed into the system from the Great Plains and Columbia refuges.

The lower Peace flows through the rolling, highly dissected terrain of the Alberta Plateau. Fourteen Great Plains species (goldeye, *Hiodon alosoides*; pike, *Esox lucius*; flathead chub, *Platygobio gracilis*; northern redbelly dace, *Phoxinus eos*; finescale dace, *Phoxinus neogaeus*; pearl dace, *Margariscus margarita*; trout perch, *Percopsis omiscomaycus*; brook stickleback, *Culaea inconstans*; walleye, *Stizostedion vitreum*; yellow perch, *Perca flavescens*; and spoonhead sculpin, *Cottus ricei*) that are absent from the upper Peace occur in the lower Peace.

The upper and lower Liard are separated by a velocity barrier in the Liard Canyon just downstream of the Alaska Highway. The 17 species found in the upper Liard are of mixed origins. Four species (rainbow trout, *Oncorhynchus mykiss*; Dolly Varden, *Salvelinus malma*; bull trout, *Salvelinus confluentus*; and mountain whitefish) clearly came from the south. Three other species (white sucker, longnose dace, and spoonhead sculpin) are Great Plains species, and four species (pygmy whitefish, *Prosopium coulteri*; round whitefish, *Prosopium cylindraceum*; lake whitefish, *Coregonus clupeaformis*; and Arctic grayling) are of Yukon origin. The remaining species are of uncertain origin. In the Liard

system, rainbow trout, Dolly Varden, and pygmy whitefish are found only in the Upper Liard.

The lower Liard and its tributaries drain the relatively flat northern half of the Alberta Plateau. Here the main rivers are less turbulent, although still heavily silted and strongly flowing, but on the Fort Nelson Lowlands there are large muskeg areas with blackwater streams, ponds and lakes. The fauna of the lower Liard is dominated by species of eastern origin, four of which are found nowhere else in BC (lake cisco, *Coregonus artedi*; spottail shiner, *Notropis hudsonius*; emerald shiner, *Notropis atherinoides*; and ninespine stickleback, *Pungitius pungitius*); however, there are also two Columbia species (bull trout and mountain whitefish), and two arctic species (arctic cisco, *Coregonus autumnalis*, and inconnu, *Stenodus leucichthys*). In addition, there is a sporadic run of chum salmon, *Oncorhynchus keta*, in the lower Liard. There are also persistent rumours of lampreys in the lower Liard. No reliable records exist, but since the Arctic lamprey (*Lampetra japonica*) occurs in the Mackenzie system above and below the confluence of the Liard and Mackenzie rivers, it is possible that this species occurs in BC.



**Figure 5**  
MacKenzie River systems.

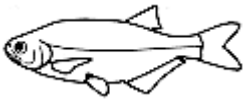
Species	Upper Liard	Lower Liard	Upper Peace	Lower Peace
<i>Hiodon alosoides</i>	-	+	-	+
<i>Couesius plumbeus</i>	+	+	+	+
<i>Hybognathus hankinsoni</i>	-	-	+	-
<i>Platygobio gracilis</i>	-	+	-	+
<i>Mylocheilus caurinus</i>	-	-	+	+
<i>Notropis atherinoides</i>	-	+	-	-
<i>N. hudsonius</i>	-	+	-	<b>I</b>
<i>Phoxinus eos</i>	-	-	-	+
<i>P. neogaeus</i>	-	+	-	+
<i>Pimephales promelas</i>	-	-	-	<b>I</b>
<i>Ptychocheilus oregonensis</i>	-	-	+	+
<i>Rhinichthys cataractae</i>	+	+	+	+
<i>Richardonius balteatus</i>	-	-	+	+
<i>Margariscus margarita</i>	-	-	-	+
<i>Catostomus catostomus</i>	+	+	+	+
<i>C. commersoni</i>	+	+	+	+
<i>C. macrocheilus</i>	-	-	+	+
<i>Esox lucius</i>	+	+	-	+
<i>Oncorhynchus clarki lewisi</i>	-	-	-	<b>I</b>
<i>O. keta</i>	+	+	-	-
<i>O. mykiss</i>	+	-	+	+
<i>O. nerka</i>	-	-	+, <b>I</b>	+
<i>Salvelinus confluentus</i>	+	+	+	+
<i>S. fontinalis</i>	-	-	<b>I</b>	<b>I</b>
<i>S. malma</i>	+	-	+	-
<i>S. namaycush</i>	+	-	+	+
<i>Coregonus artedi</i>	-	+	-	-
<i>C. autumnalis</i>	-	+	-	-
<i>C. clupeaformis</i>	+	+	+	+
<i>Prosopium coulteri</i>	+	-	+	+
<i>P. cylindraceum</i>	+	+	-	-
<i>P. williamsoni</i>	+	+	+	+
<i>Stenodus leucichthys</i>	-	+	-	-
<i>Thymallus arcticus</i>	+	+	+	+
<i>Percopsis omiscomaycus</i>	-	+	-	+
<i>Lota lota</i>	+	+	+	+
<i>Culaea inconstans</i>	-	+	-	+
<i>Pungitius pungitius</i>	-	+	-	-
<i>Cottus asper</i>	-	-	+	+
<i>C. cognatus</i>	+	+	+	+
<i>C. ricei</i>	+	+	-	+
<i>Perca Flavescens</i>	-	-	-	+( <b>I?</b> )
<i>Sizostedion vitreum</i>	-	+	-	+

**Table 4**

Distribution of fishes in the four subregions of the MacKenzie system in BC.

+ = present	- = absent	<b>I</b> = introduced
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## Pictorial Key to Families



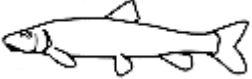
**GOLDEYES** (HIODONTIDAE)

93



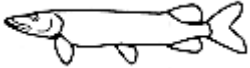
**MINNOWS** (CYPRINIDAE)

94



**SUCKERS** (CATOSTOMIDAE)

99



**PIKES** (ESOCIDAE)

100



**SALMON, TROUT, CHAR** (SALMONIDAE)  
(SUBFAMILY SALMONINAE)

100



**WHITEFISH** (SALMONIDAE)  
(SUBFAMILY COREGONINAE)

106



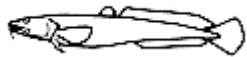
**GRAYLINGS** (SALMONIDAE)  
(SUBFAMILY THYMALLINAE)

108



**TROUT-PERCH** (PERCOPSIDAE)

109



**CODS** (GADIDAE)

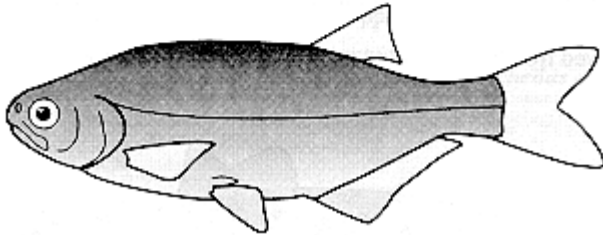
109



**STICKLEBACKS** (GASTEROSTEIDAE)

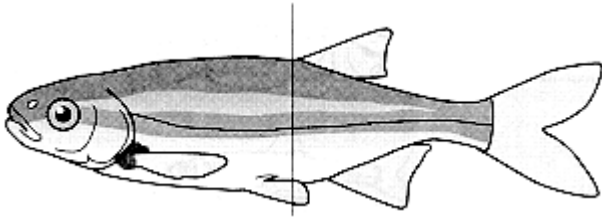
110

### Pictorial Key to Families



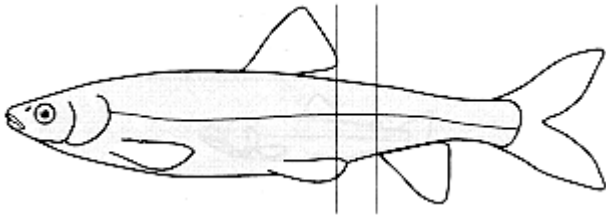
The goldeye (*Hiodon alosoides*) is a native of the large, muddy rivers of the Great Plains. In the Mackenzie region it is found only in the lower Liard and the lower Peace below Taylor.

**MINNOWS**  
FAMILY CYPRINIDAE



1 (2) Dorsal fin set far back on body, viewed from the side its origin is almost directly above posterior tips of pelvic fins; in the Mackenzie system confined to the upper and lower Peace

**Redside shiner**  
*Richardsonius balteatus*

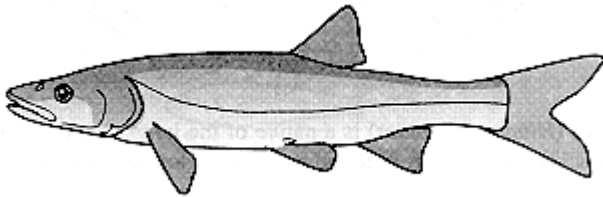


2 (1) Dorsal fin originates about the middle of the body, viewed from the side the posterior tips of the pelvic fins extend well past dorsal origin

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

3

4



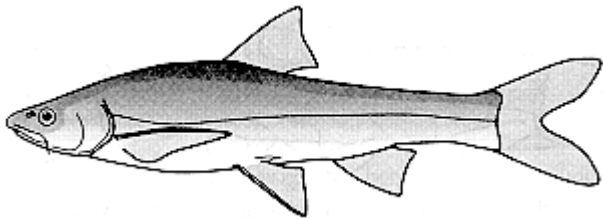
4 (5) Mouth large, upper jaw extends beyond from margin of eye; adults up to 300 mm in length; juveniles with a dark spot at base of tail; in the Mackenzie system confined to the upper and lower Peace

**Northern squawfish**  
*Ptychocheilus oregonensis*

5 (4) Mouth small, upper jaw does not extend beyond from margin of eye

6



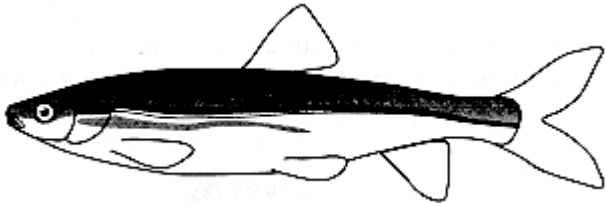


6 (7) Outer pectoral rays long and pointed, equal to head length and nearly reaching pelvic fins; top of head flat; snout overhangs mouth; prominent barbels at each corner of mouth; typical of larger turbid tributaries and the main-stem Peace and Leard downstream of their canyons

**Flathead chub**  
*Platygobio gracilis*

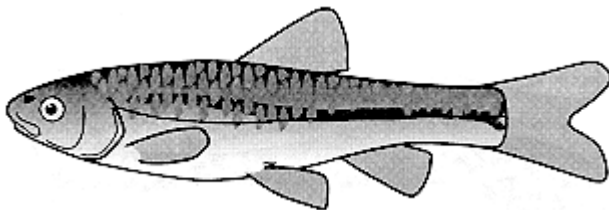
7 (6) Outer pectoral rays not long and pointed, not equal to head length; top of head not flat

8



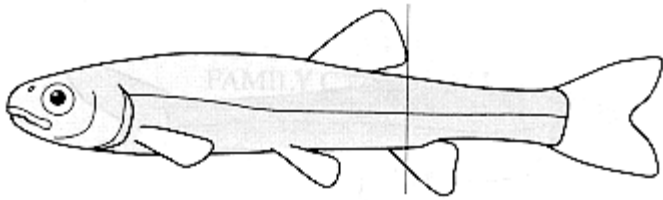
8 (9) Small barbel at the corner of mouth; snout barely overhangs mouth; two dark horizontal stripes on side of body; breeding adults with red lips and fin axils; length to 200 mm; in Mackenzie system confined to the upper and lower Peace

**Peamouth**  
*Mylocheilus caurinus*



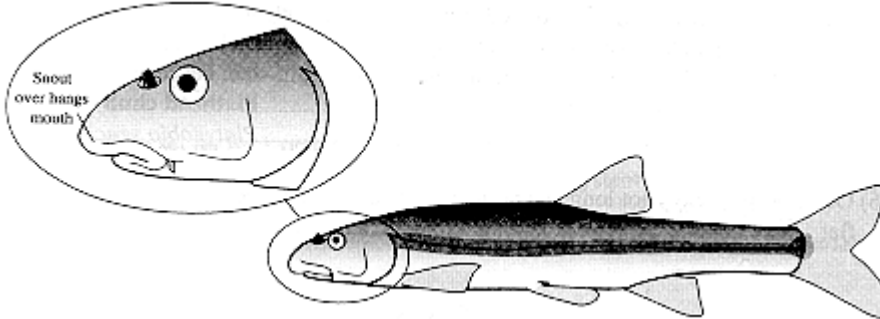
9 (8) No barbel at corner of mouth; snout overhangs mouth; flanks of breeding males with a brassy cast; length to 100 mm; in the BC parts of the Mackenzie system this species is known only from the upper Peace (Summit Lake area) but it is recorded from the lower Peace in Alberta

**Brassy minnow**  
*Hybognathus hankinsoni*



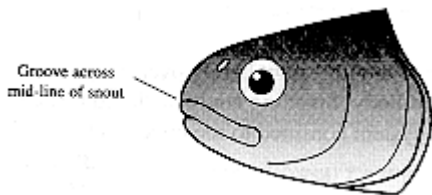
10 (3) Viewed from the side, hind margin of dorsal fin clearly overlaps anal fin

11



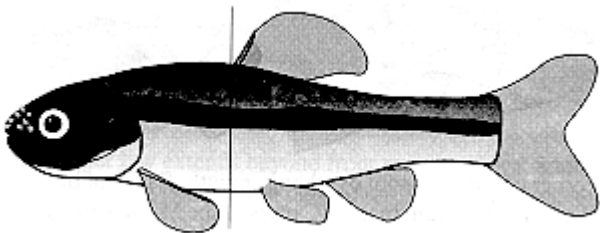
11 (12) Snout over hangs mouth and is directly attached to upper lip; juveniles with a distinct dark lateral stripe; widespread, adults typically associated with fast water

**Longnose dace**  
*Rhinichthys cataractae*



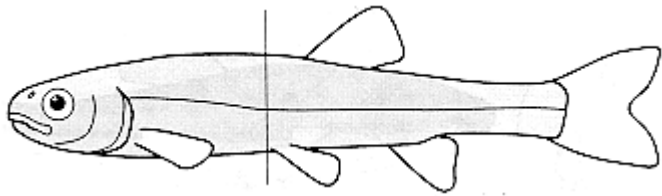
12 (11) Snout does not over hang mouth and is separated from upper lip by a groove across mid-line of snout

13



13 (14) Viewed from the side, dorsal fin originates directly above or slightly in front of pelvic fins; introduced into One Island Lake (lower Peace)

**Fathead minnow**  
*Pimephales promelas*

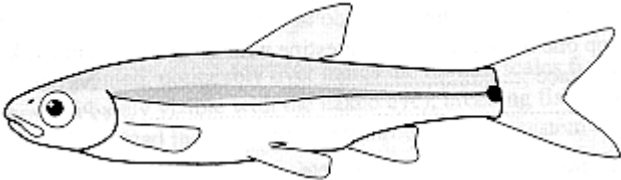


14 (13) Viewed from the side, dorsal fin originates behind origin of pelvic fins

15

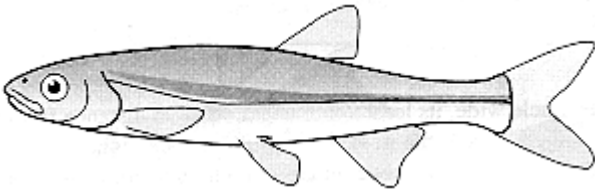
15 (18) Distinct silver or, depending on the light, emerald green mid-lateral band

16



16 (17) Prominent black spot directly in front of tail; anal fin short, usually 8 rays (7-9); in BC known only from Maxhamish Lake (lower Liard) but introduced into Charlie Lake near Ft. St. John

**Spottail shiner**  
*Notropis hudsonius*



17 (16) No prominent black spot directly in front of tail; anal fin longer, usually with 11 rays (10-12); in BC known only from a small stream about three km downstream from Old Fort Nelson (lower Liard)

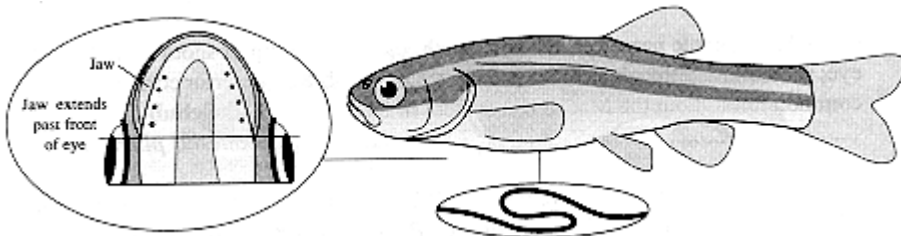
**Emerald shiner**  
*Notropis atherinoides*

18 (15) No silver midlateral band

19

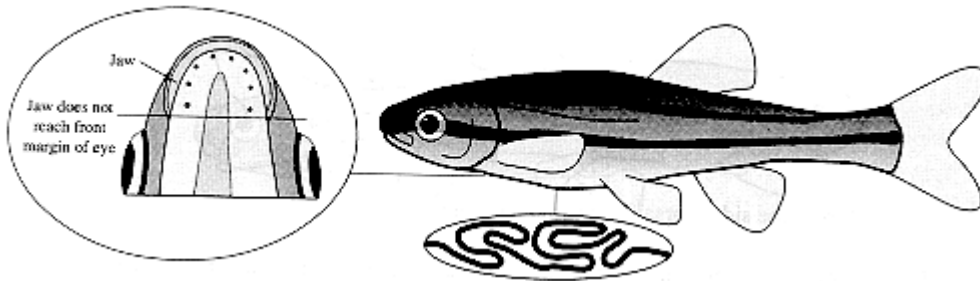
19 (22) Barbels absent; lateral line incomplete

20



20 (21) Hywen viewed from below, jaws extend beyond front margin of eye; single dark lateral stripe; intertine with a single loop; scattered records throughout the lower Peace and lower Liard, most common in boggy lakes and streams but also occasionally in large turbid rivers

**Finescale dace**  
*Phoxinus neogaeus\**

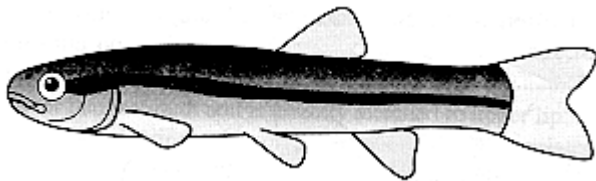


21 (20) When viewed from below, jaws do not reach front margin of eye; two dark lateral stripes (top one often indistinct); intestine with several coils; in BC known only from the lower Peace

**Northern redbelly dace**  
*Phoxinus eos*\*

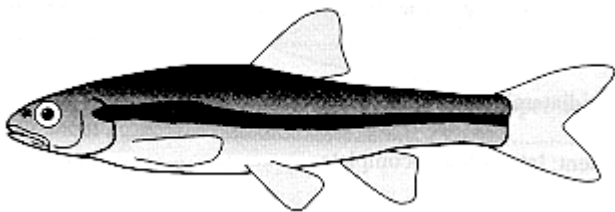
22 (19) Barbels present; lateral line complete

23



23 (24) Caudal peduncle narrower, its least depth about equal to distance from tip of snout to hind margin of eye; snout blunt; small flap-like barbel slightly in front corner of mouth rarely visible to naked eye; in BC known only from a few localities in the lower Peace

**Northern pearl dace**  
*Margariscus margarita*\*\*



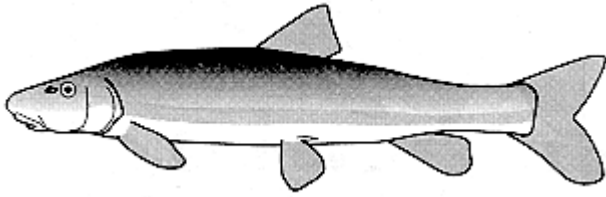
24 (23) caudal peduncle narrower, its least depth reaches from tip of snout to middle of eye; snout more pointed, a barbel; usually clearly visible at posterior corner of mouth; common throughout the Mackenzie system in BC

**Lake chub**  
*Couesius plumbeus*

\* Positive identification of *Phoxinus* is difficult in BC. The two species hybridize extensively and in BC no "pure" population of *P. eos* is known; however, *P. neogaeus* occurs at many sites without *P. eos*.

\*\* *Couesius plumbeus* and *M. margarita* commonly hybridize in BC and, again, no "pure" populations of Pearl dace are known from the province.

**SUCKERS**  
FAMILY CATOSTOMIDAE



1 (2) Snout long and pointed, noticeably over hangs the muth; scales fine (just behind the head they are barely visible with the naked eye); breeding fish pink to red lateral stripe; widespread in lakes and rivers throughout the system

**Longnose sucker**  
*Catostomus catostomus*

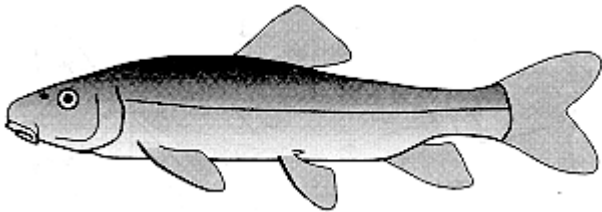
2 (1) Snout short and rounded barely over hanging the mouth; scales on body large, in adults even those behind the head are easily seen with the naked eye

3



3 (4) Caudal peduncle narrow its least depth half, or less than half, the dorsal fin base; breeding fish with a dark lateral stripe; confined to the Peace River and the lower reaches of its tributaries; most common in, and upstream of, Williston Reservoir

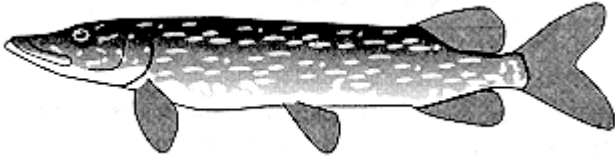
**Largescale sucker**  
*Catostomus macrocheilus*



4 (3) Caudal peduncle deeper, its least depth almost equal to dorsal fin base; breeding fish with a bronze cast, no dark lateral stripe; common in lakes and streams throughout the Peace system and lower Liard but only one record (Barney Lake) from the upper Liard

**White sucker**  
*Catostomus commersoni*

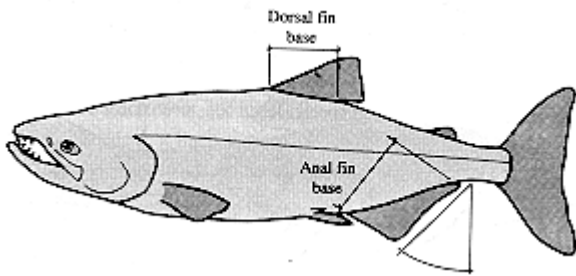
**PIKES**  
FAMILY ESOCIDAE



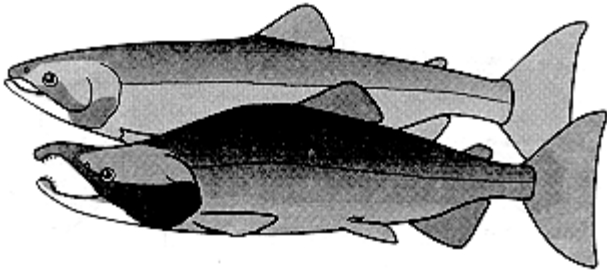
In BC, except for the upper Peace, the northern pike (*Esox lucius*) is found throughout the Mackenzie system. It is particularly abundant in shallow weedy lakes and slow flowing streams. This species was illegally introduced into the upper Peace but, fortunately, does not appear to have established a self-sustaining population.

**SALMON, TROUT AND CHARS**  
FAMILY SALMONIDAE  
(SUBFAMILY SALMONINAE)

**KEY TO THE ADULTS**

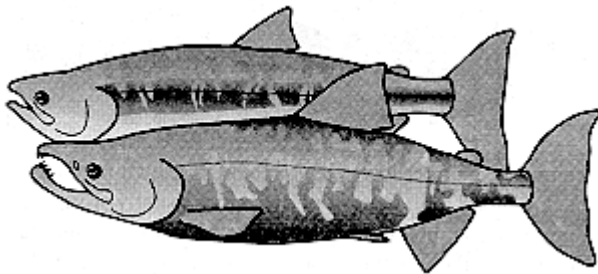


1 (4) Anal fin base longer than dorsal fin base; in profile, hind margin of anal fin slants backwards (not vertical)



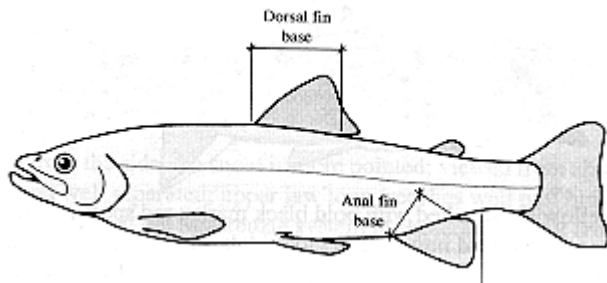
2 (3) Silver bright adults in fresh water are usually less than 38 cm; spawning fish usually with bright red flanks; in the Mackenzie system in BC native populations are known only from the upper Peace: Arctic Lake (headwaters of the Parsnip River), and Thutade Lake (headwaters of the Finlay River); since the formation of Williston Reservoir, Kokanee have dispersed downstream in the Peace into Alberta.

**Sockeye salmon**  
(Kokanee)  
*Oncorhynchus nerka*



3 (2) Adults only in fresh water as spawners, flanks in males pale with irregular red and black blotches, females with a purplish lateral stripe; adult size is usually much greater than 38 cm; in the Mackenzie in BC there is a small run that ascends the Liard River to above the Liard Canyon

**Chum salmon**  
*Oncorhynchus keta*

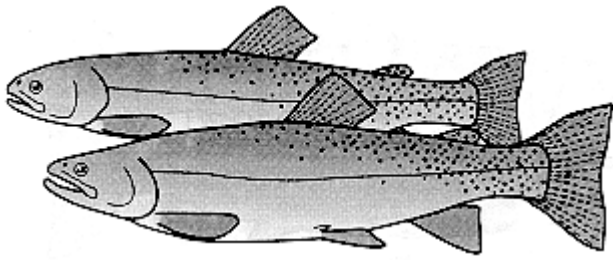


4 (1) Dorsal fin base equal to or longer than anal fin base; in profile, hind margin of anal fin is vertical (no backward slant)

5 (8) Background colour on sides light (silver or golden) with dark spots

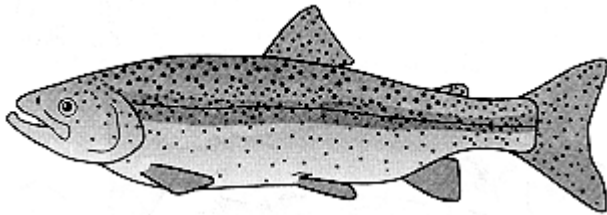
5

6



6 (7) Red or orange slash under lower jaw; upper jaw back past hind margin of eye; black spots on flanks concentrated near the tail; tail usually yellowish with strong black spots; introduced into Onion and Paxton lakes in the lower Peace

**Westslope cutthroat trout**  
*Oncorhynchus clarki lewisi*

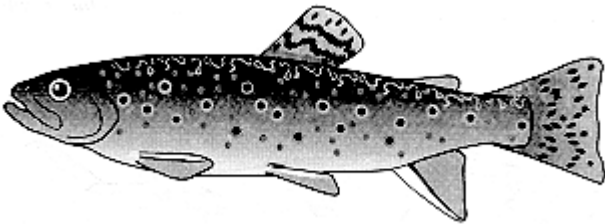


7 (6) No red or orange slash under lower jaw; except in spawning males upper jaw does not extend back beyond hind margin of eye; sides usually silver with a pink hue extending along midline; black spots on flanks evenly dispersed; tail dusky with dark spots; native populations throughout the Peace system and also in the upper Liard

**Rainbow trout**  
*Oncorhynchus mykiss*

8 (7) Background colour on sides with light or colored spots

9



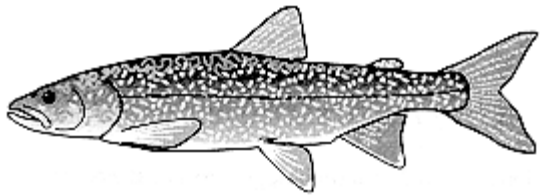
9 (10) Dorsal fin yellowish, streaked with bold black marks; red spots on sides surrounded by blue haloes; introduced into several closed lakes in both the upper and lower Peace systems

**Brook trout**  
*Salvelinus fontinalis*

10 (9) Dorsal fin dusky, without bold black marks; spots on side not surrounded by light haloes

11



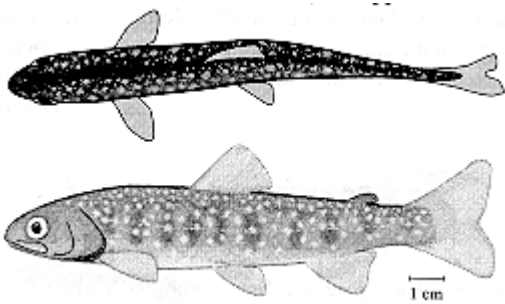


11 (12) Tail usually deeply forkey, light coloured on both halves of tail; head and body covered in light ireegular spots; common in lakes associated with the upper Peace and upper Liard systems, also present in a few Peace lakes

**Lake trout**  
*Salvelinus namaycush*

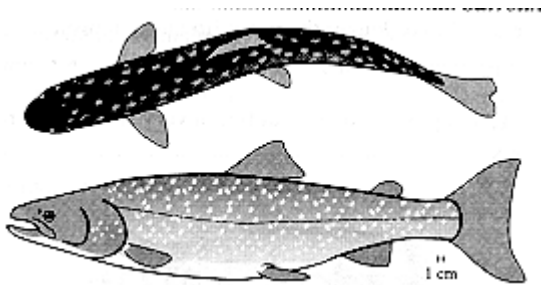
12 (11) Tail not deeply forkey; spots if present only on upper half of tail

13



13 (14) Viewed from the side, the snout is blunt; viewed from above spots on bacvk are small and crowded together; upper jaw short (barely reaches hind margin of eye); in the Mackenzie system in BC known only from the upper Finlay and upper Liard rivers.

**Dolly Varden\***  
*Salvelinus malma*



14 (13) Viewed from the side, the snout is more pointed; viewed from above on back are large and well sparated; upper jaw long (reaches well past hind margin of eye); abundant throughout the Mackenzie system in BC

**Bull trout\***  
*Salvelinus confluentus*

\* These species are difficult to distinguish except where they coexist, In sympatry, Dolly Varden 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 use the key in the Appendix, pages 214-215.

KEY TO YOUNG SALMONIDS (45-100 mm )

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

2



2 (3) 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*



3 (2) Parr marks faint or absent below mid-line; combined width of dark areas along mid-line more than half the combined width of the light areas; back mottled green, sides silvery with a faint green iridescence below mid-line

**Chum salmon**  
*Oncorhynchus keta*

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

5

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

6

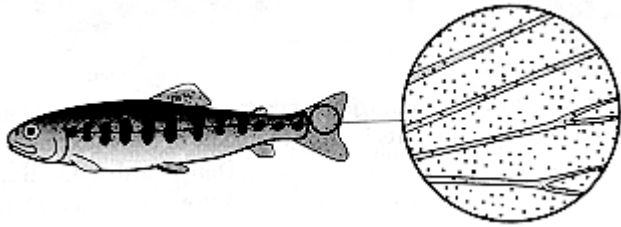


6 (7) Coloured spots (red to yellow) along mid-line or between parr marks; combined width of parr marks along mid-line about equal to or greater than the combined width of the light areas

**Brook trout**  
*Salvelinus fontinalis*

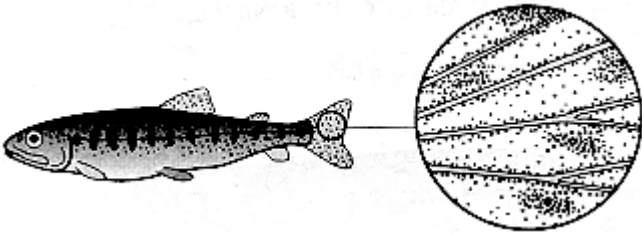
7 (6) No coloured (red to yellow) spots along mid-line; width of dark areas along mid-line less than width of light areas

8



8 (9) On fish below 50 mm melanophores are evenly 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*



9 (8) 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

**Westslope cutthroat trout**  
*Oncorhynchus clarki lewisi*

10 (5) Dorsal fin without dark spots; first dorsal ray not black

11



11 (12) 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 middle of body (excluding tail)

**Lake trout**  
*Salvelinus namaycush*



Dolly Varden



Bull trout

12 (11) 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*

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

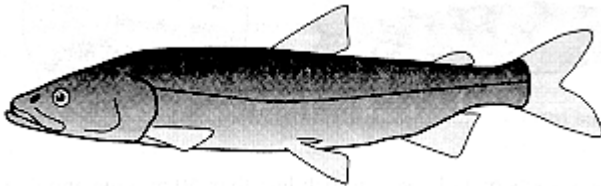
**WHITEFISH**

FAMILY SALMONIDAE

(SUBFAMILY COREGONINAE)

1 (6) Lower jaw equal to, or projects beyond, upper jaw

2



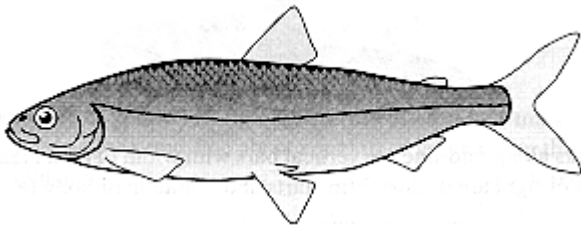
2 (3) Viewed from above, mouth almost as wide as head at eyes and snout hardly tapers; occasionally in the lower Liard

**Inconnu**

*Stenodus leucichthys*

3 (2) Viewed from above, mouth nowhere near as wide as head at eyes and snout distinctly tapered

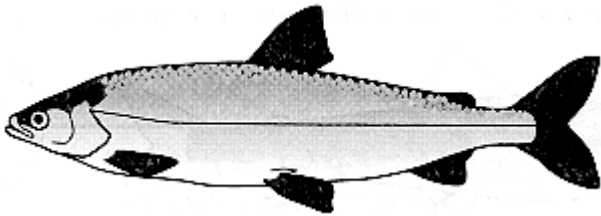
4



4 (5) Eye large, its diameter just a little less than the width of space between the eyes; in the Mackenzie system in BC known only from Maxhamish Lake (lower Liard)

**Lake cisco**

*Coregonus artedii*

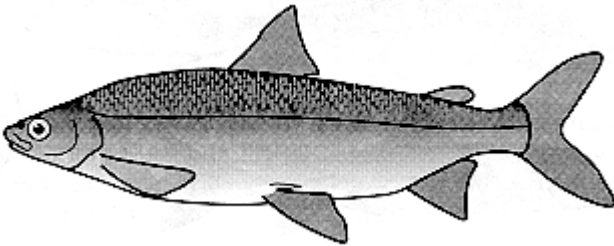


5 (4) Eye small, its diameter almost half the width of the space between the eyes; in the Mackenzie system in BC known only from a spawning run into the lower Liard

**Arctic cisco**  
*Coregonus autumnalis*

6 (1) Snout clearly overhangs mouth

7

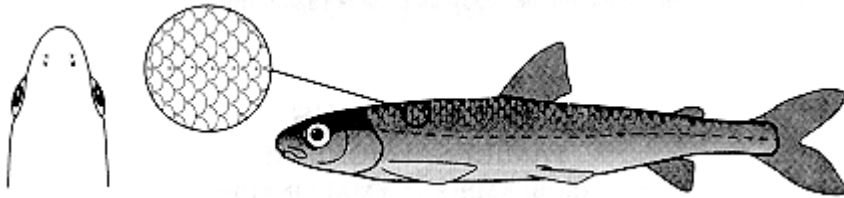


7 (8) Body deep, slab-sided; when viewed from side the ventral surface clearly curves downward; widespread in lakes and large rivers

**Lake whitefish**  
*Coregonus clupeaformis*

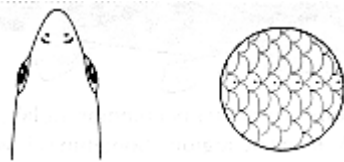
8 (7) Body slender, round in cross-section; when viewed from the side the ventral surface appears almost flat

9



9 (10) Viewed from above, snout blunt, rounded; anterior lateral line scales about the same size as scales immediately above and below the lateral line; usually in deep lakes but occasionally in rivers

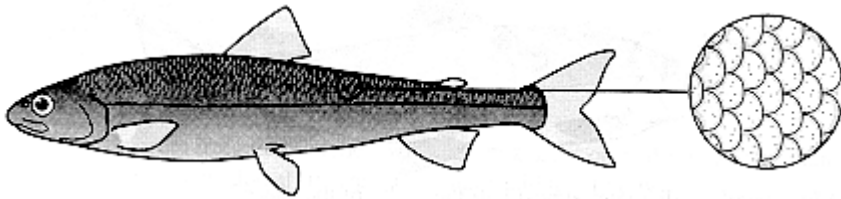
**Pygmy whitefish\***  
*Prosopium coulteri*



10 (9) Viewed from above, snout pointed; anterior lateral line scales about half the size of scales immediately above and below lateral line

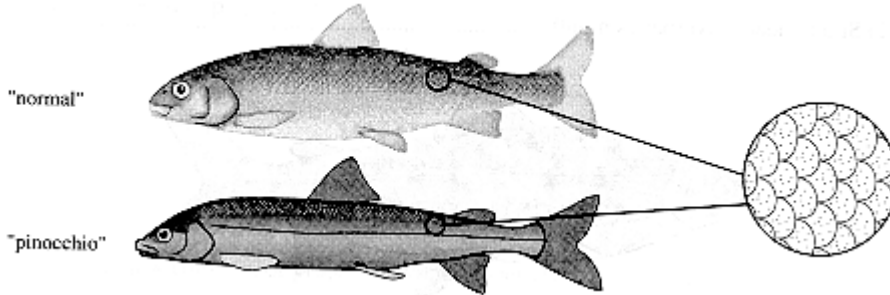
11

\* Hybrids between *P. coulteri* and *P. williamsoni* occur in the Peace River system



11 (12) Adipose fin small, base almost equal to eye diameter; scales on flanks above lateral line noticeably edged with dark pigment; in lakes and streams throughout the Liard, apparently absent from the Peace

**Round whitefish**  
*Prosopium cylindraceum*

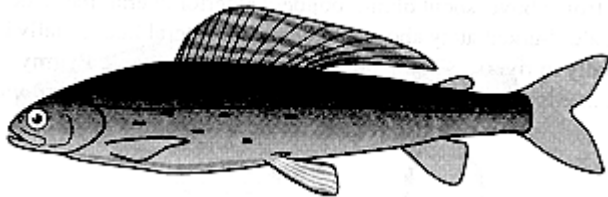


12 (11) Adipose fin large, base more than 1.5 times eye diameter; scales on flanks above lateral line not edged with dark pigment; common in the Peace but also in the Liard

**Mountain whitefish\*\***  
*Prosopium williamsoni*

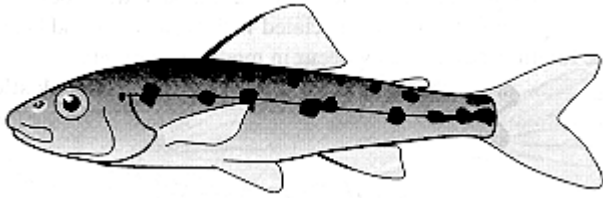
\*\* There are two body forms in fluvial populations: normal and "pinocchio". The "pinocchio" form has a longer snout and thinner body than the normal form.

**GRAYLINGS**  
FAMILY SALMONIDAE  
(SUBFAMILY THYMALLINAE)



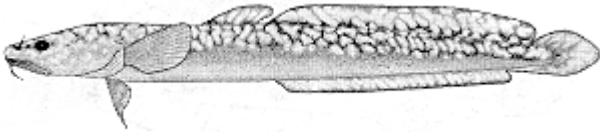
The Arctic grayling (*Thymallus arcticus*) is common in lakes and moderate to fast-flowing streams throughout the Mackenzie region. Sometimes juvenile grayling are easily confused with young *Prosopium*; however, juvenile grayling possess well developed jaw teeth while juvenile whitefish have, at best, weak teeth.

**TROUT-PERCH**  
FAMILY PERCOPSIDAE



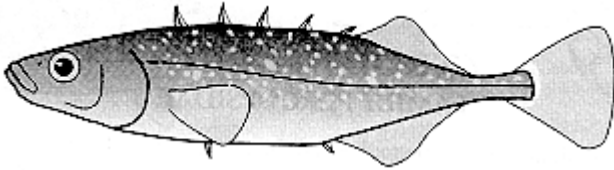
Trout-perch (*Percopsis omiscomaycus*) are common in turbid streams throughout the lower Peace and lower Liard. In life this small fish is almost transparent. In the Mackenzie system in BC, trout-perch also are known from Moberly (lower Peace) and Maxhamish (lower Liard) lakes.

**CODS**  
FAMILY GADIDAE



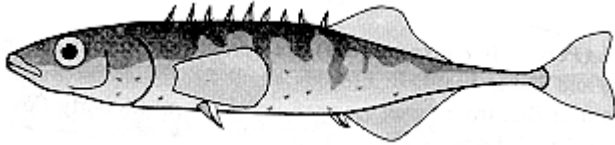
In the Mackenzie system in BC, adult and juvenile burbot (*Lota lota*) are common in both lakes and streams.

**STICKLEBACKS**  
FAMILY GASTEROSTEIDAE



1 (2) Four to six isolated dorsal spines that fold straight back when depressed; lower Peace and lower Liard; typically associated with slow water and heavy vegetation but in some foothills streams they occur in moderate currents

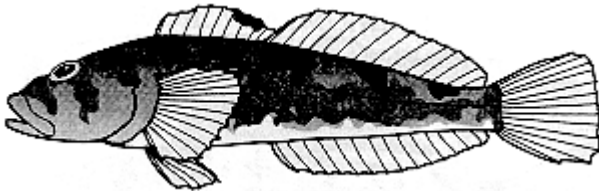
**Brook stickleback**  
*Culaea inconstans*



2 (1) Seven to eleven isolated dorsal spines that fold alternately from side to side when depressed; in BC known only from a small stream, about three km downstream from Old Fort Nelson (lower Liard)

**Ninespine stickleback**  
*Pungitius pungitius*

**SCULPINS**  
FAMILY COTTIDAE

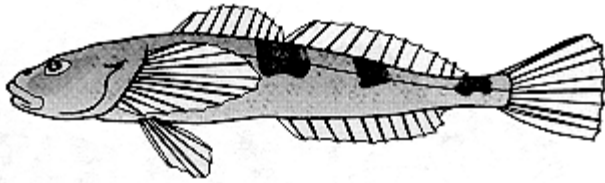


1 (2) Conspicuous dark spot at back of first dorsal fin; anal fin base distinctly longer than head length; in the BC portion of the Mackenzie system known only from the upper and lower Peace

**Prickly sculpin**  
*Cottus asper*

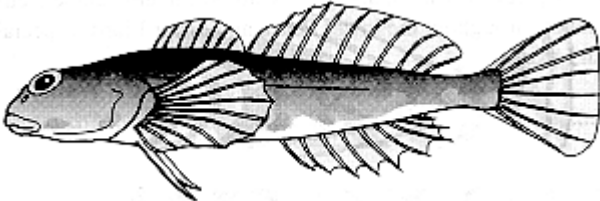
2 (1) No dark spot at back of first dorsal fin; anal fin base about equal to head length





3 (4) Viewed from above, head noticeably flattened; preopercular spines stongly hooked; lateral line complete; adults associated with fast water in both the lower Peace and upper and lower Liard

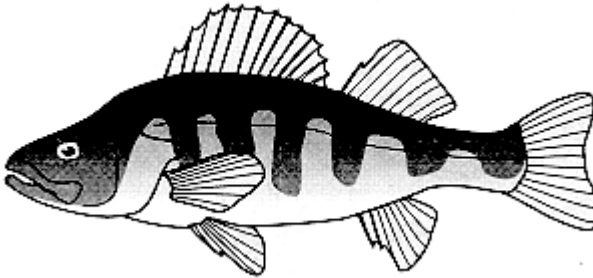
**Spoonhead sculpin**  
*Cottus ricei*



4 (3) Viewed from above, head not flattened; preopercular spines not stongly hooked; lateral line incomplete; lakes and streams throughout the Mackenzie system

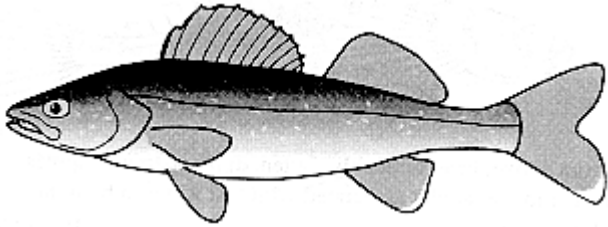
**Slimy sculpin**  
*Cottus cognatus*

**PERCHES**  
FAMILY PERCIDAE



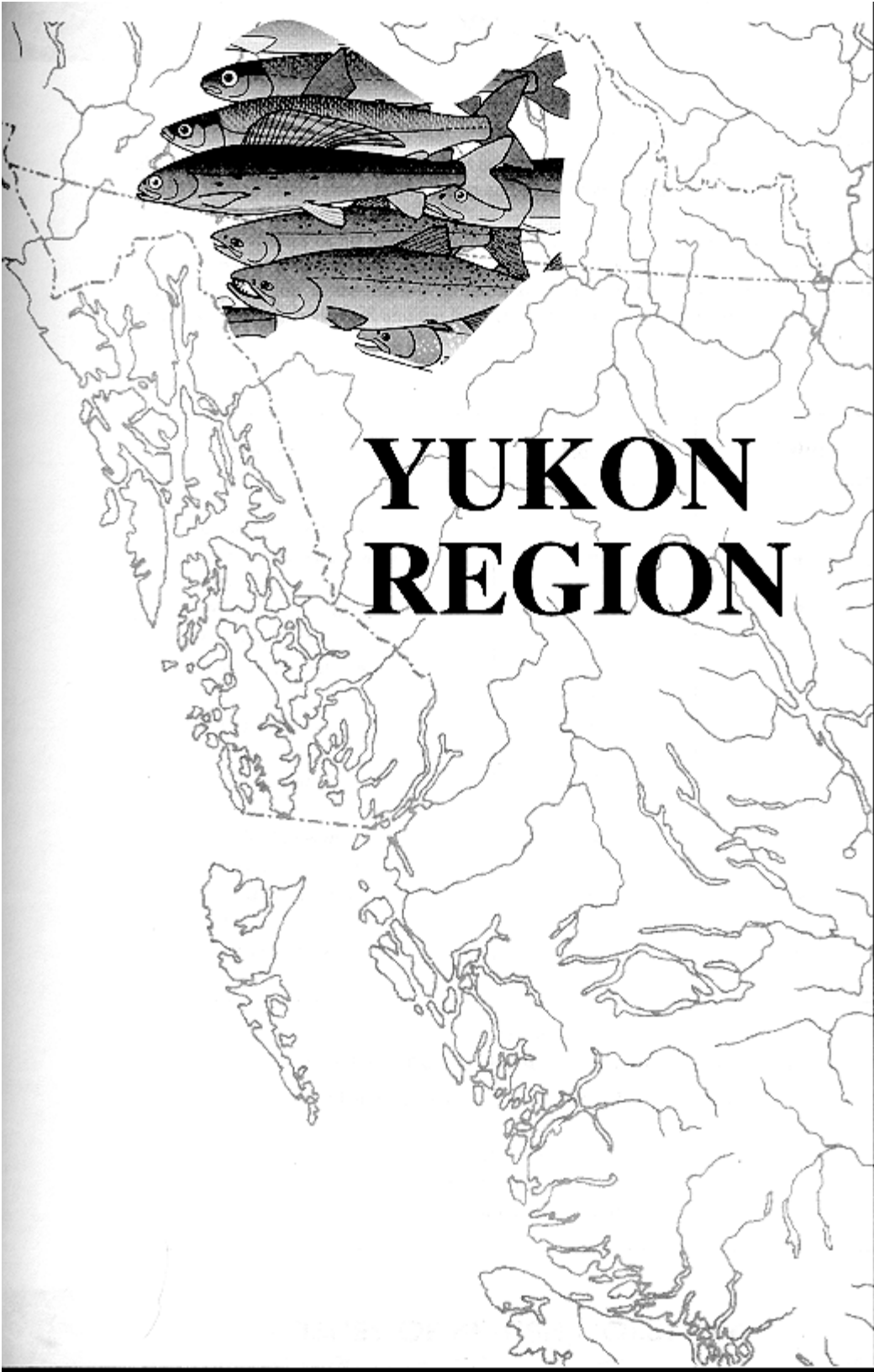
1 (2) Sides in adults with 6 to 9 dark vertical bars; lower lobe of tail without a conspicuous white mark; jaws without prominent canine teeth; in the Mackenzie system in BC known from Swan Lake near Pouce Coupe and introduced into Charlie Lake near Fort St. John

**Yellow perch**  
*Perca flavescens*



2 (1) Sides in adults without dark vertical bars (irregular bars in juveniles); lower lobe of tail with a conspicuous white mark; jaws with prominent canine teeth; sporadic in rivers and lakes throughout the lower peace and lower Liard (especially abundant in Maxhamish Lake)

**Walleye**  
*Stizostedion vitreum*



**YUKON**

# **YUKON REGION**

The Yukon is the smallest major river system in BC with a drainage basin of only about 25,000 sq km. Two major Yukon tributaries rise in BC: the Lewes and Teslin rivers (Fig.6). Three large lakes (Atlin, Teslin and Tagish) are the dominant features of the BC portion of the Yukon drainage.

Sixteen species occur in the Yukon system in BC (Table 5), and it is the only major drainage basin in the province without introduced species. Two Yukon species that survived glaciation in the Bering refuge and occur nowhere else in BC are the broad whitefish, *Coregonus nasus*, and the least cisco, *Coregonus sardinella*.

Species	Lewes	Teslin
<i>Couesius plumbeus</i>	+	-
<i>Catostomus catostomus</i>	+	+
<i>Esox lucius</i>	+	+
<i>Oncorhynchus keta</i>	-	?
<i>O. tshawytscha</i>	+	+
<i>Salvelinus confluentus</i>	-	+*
<i>S. namaycush</i>	+	+
<i>Coregonus clupeaformis</i>	+	+
<i>C. nasus</i>	-	+
<i>C. sardinella</i>	+	+
<i>Prosopium coulteri</i>	-	+*
<i>P. cylindraceum</i>	+	+
<i>Stenodus leucichthys</i>	-	+
<i>Thymallus arcticus</i>	+	+
<i>Lota lota</i>	+	+
<i>Cottus Cognatus</i>	+	+

**Table 5**

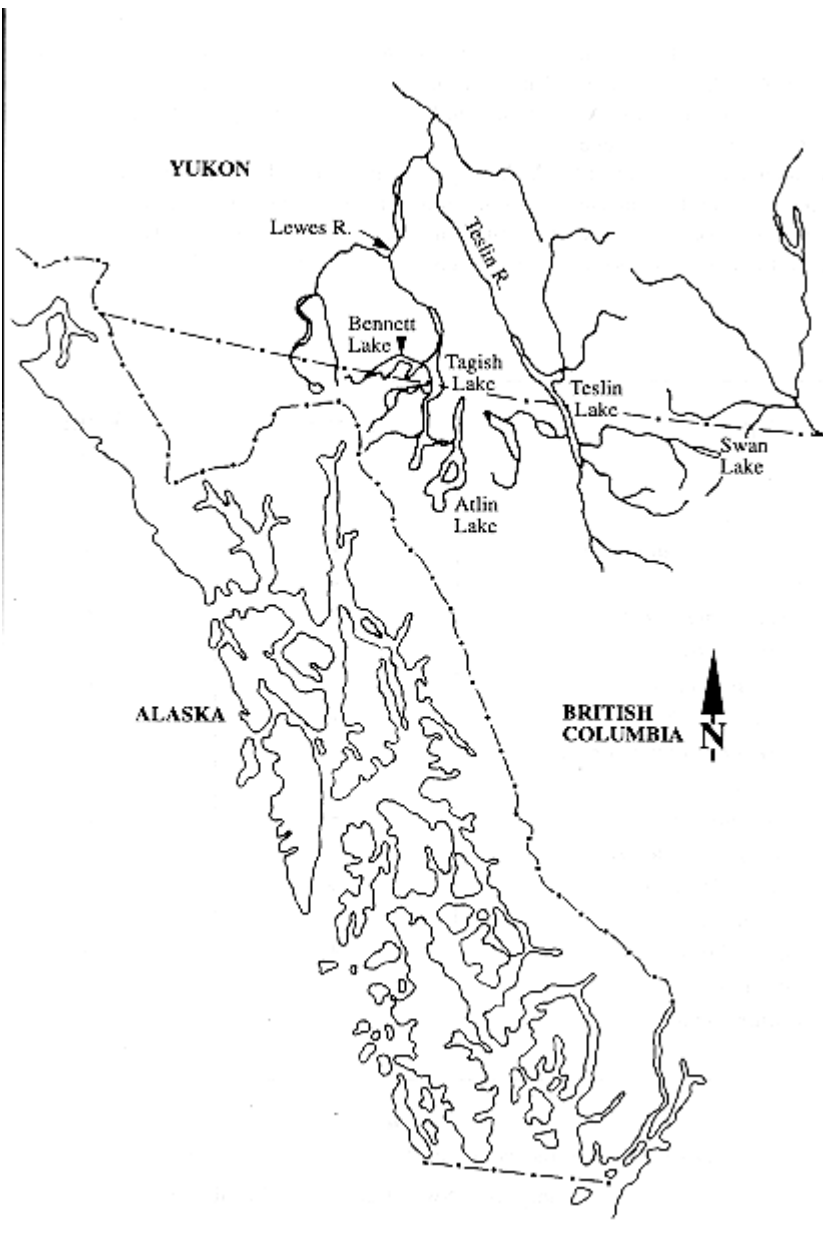
Distribution of fishes in the BC portion of the Yukon system.

\* known only from Swan Lake, a Teslin tributary

+ = present

- = absent

? = uncertain record



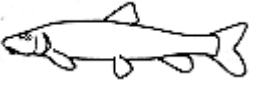
**Figure 6**  
Yukon River system in British Columbia

**Pictorial Key to Families**



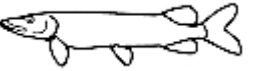
**MINNOWS (CYPINIDAE)**

118



**SUCKERS (CATOSTOMIDAE)**

118



**PIKES (ESOCIDAE)**

118



**SALMON, TROUT, CHAR (SALMONIDAE)**  
(SUBFAMILY SALMONINAE)

119



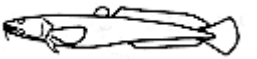
**WHITEFISH (SALMONIDAE)**  
(SUBFAMILY COREGONINAE)

121



**GARYLINGS (SALMONIDAE)**

123



**CODS (GADIDAE)**

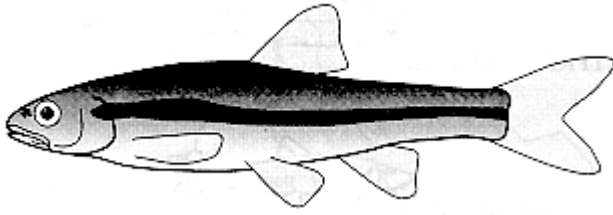
124



**SCULPINS (COTTIDAE)**

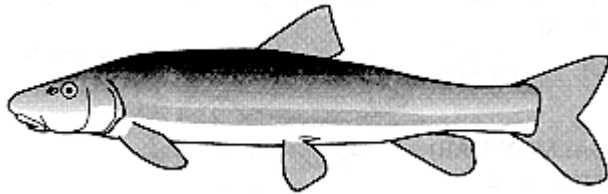
124

**MINNOWS**  
FAMILY CYPINIDAE



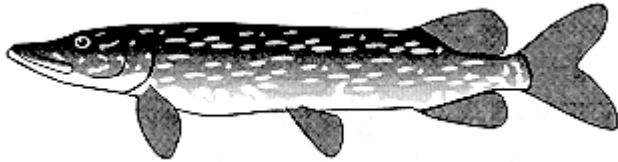
The lake chub (*Couesius plumbeus*) is the only cypinid found in the BC portion of the Yukon system. It occurs in Atlin and Tagish lakes but apparently is absent from Teslin Lake.

**SUCKERS**  
FAMILY CATOSTOMIDAE



The only sucker in the Yukon system is the longnose sucker (*Catostomus catostomus*). It is abundant in lakes, rivers and streams throughout the region.

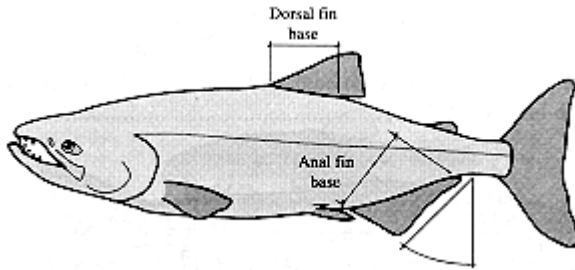
**PIKES**  
FAMILY ESOCIDAE



The pike (*Esox lucius*) occurs in lakes and quiet streams throughout the upper Yukon system in BC.

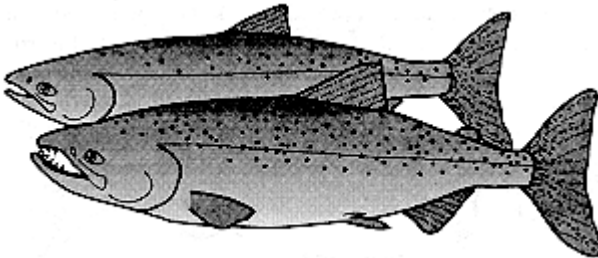
**SALMON, TROUTS AND CHARS**  
FAMILY SALMONIDAE  
(SUBFAMILY SALMONINAE)

KEY TO THE ADULTS



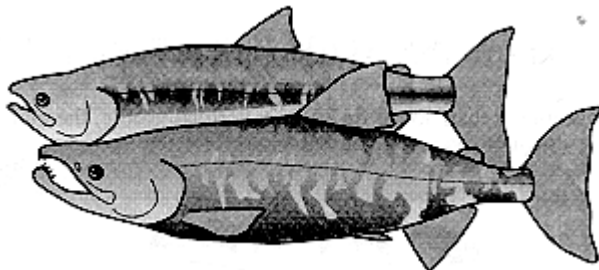
1 (4) Anal fin base longer than dorsal fin base; hind margin of anal fin slants backwards (not vertical)

2



2 (3) Distinct spots on both upper and lower halves of tail; in BC portion of the Yukon this species spawns in tributaries of Bennett and Teslin lakes

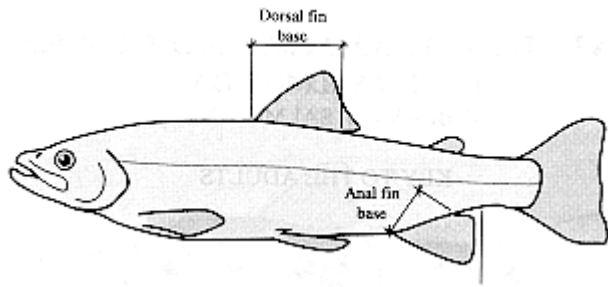
**Chinook salmon**  
*Oncorhynchus tshawytscha*



3 (2) No spots on tail; flanks in males pale with irregular red and black blotches, females with a purplish lateral stripe; early report from Teslin Lake is now in doubt (Lindsey *et al.* 1981)

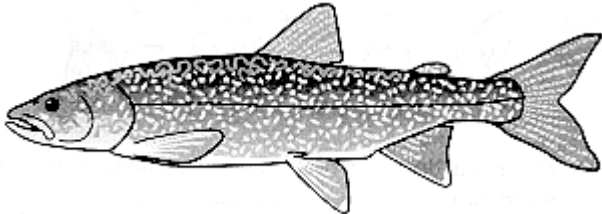
**Chum salmon**  
*Oncorhynchus keta*





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

5



5 (6) Tail deeply forked, light coloured spots both halves of tail; head and body covered in light irregular spots; abundant in the large lakes of the BC portion of the Yukon system

**Lake trout**  
*Salvelinus namaycush*



6 (5) Tail not deeply forked; spots if present only on upper half of tail; known only from Teslin and Swan lakes in the BC portion of the Yukon system

**Bull trout**  
*Salvelinus confluentus*

**KEY TO YOUNG SALMONIDS (45 - 100 mm)**

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

2



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

**Chinook salmon**  
*Oncorhynchus tshawytscha*



3 (2) Parr marks small, oval shaped, faint or absent below mid-line

**Chum salmon**  
*Oncorhynchus keta*

4 (1) Anal fin base equal to or shorter than dorsal fin base; in profile hind margin of anal fin vertical

5



5 (6) 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 confluentus*



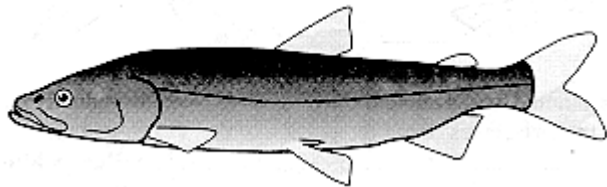
6 (5) Parr marks are irregular blotches; width of dark areas on mid-line greater than width of light areas; dorsal fin starts in front of middle of body (excluding tail)

**Bull trout**  
*Salvelinus confluentus*

**WHITEFISH**  
FAMILY SALMONIDAE  
(SUBFAMILY COREGONINAE)

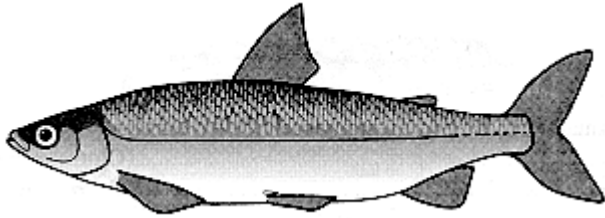
1 (4) Lower jaw projects beyond upper jaw when mouth closed

2



2 (3) Mouth larges; snout squarish when viewed from above; upper jaw reaches hind margin of eye; in the BC portion of the Yukon known only from Teslin Lake

**Inconnu**  
*Stenodus Leucichthys*



3 (2) Mouth moderate; snout pointed when viewed from above; upper jaw does not reach hind margin of eye; in the BC portion of the Yukon known only from Atlin, Teslin and Swan lakes

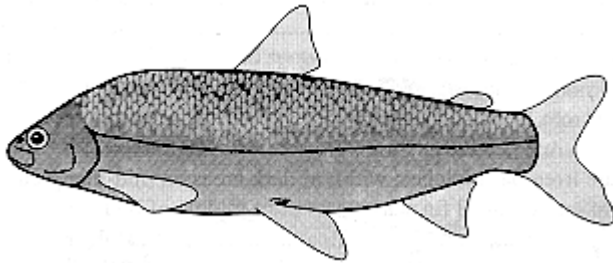
**Least cisco**  
*Coregonus sardinella*

4 (1) When mouth closed, snout clearly overhangs upper jaw

5

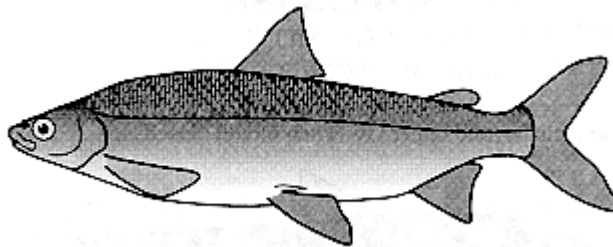
5 (8) Body deep, slab-sided in cross section

6



6 (7) Snout blunt ("sheep-nosed"), brow rounded when viewed from side; in the BC portion of the Yukon known only from Teslin Lake

**Broad whitefish**  
*Coregonus nasus*

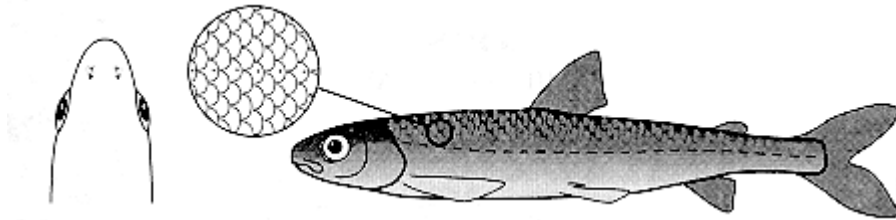


7 (6) snout more pointed, when viewed from side brow slopes gradually backwards; abundant in the large lakes of the BC portion of the Yukon system

**Lake whitefish**  
*Coregonus clupeaformis*

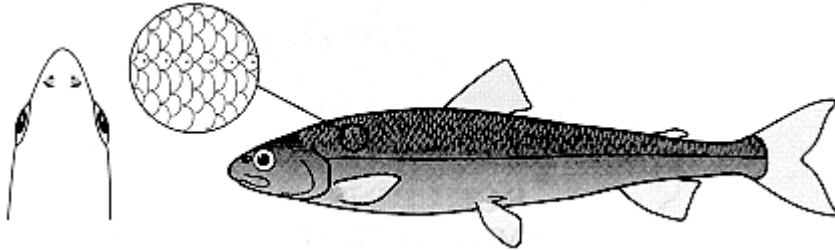
8 (5) Body slender, round in cross section

9



9 (10) Viewed from above snout blunt, rounded; anterior lateral line scales almost as large as the scales immediately above and below the lateral line; in the BC portion of the Yukon known only from Teslin and Swan lakes

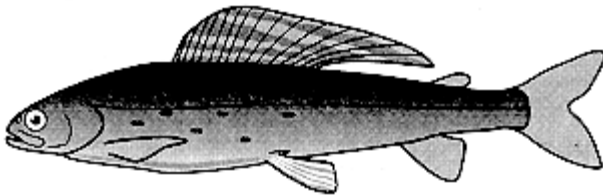
**Pygmy whitefish**  
*Prosopium coulteri*



10 (9) Viewed from above snout pointed; anterior lateral line scales noticeably smaller than the scales immediately above and below the lateral line; abundant in the large lakes of the BC portion of the Yukon system

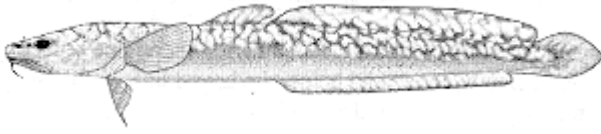
**Round whitefish**  
*Prosopium cylindraceum*

**GRAYLINGS**  
FAMILY SALMONIDAE  
(SUBFAMILY THYMALLINAE)



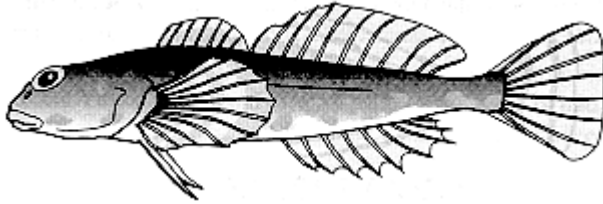
The Arctic grayling (*Thymallus arcticus*) is abundant in lakes and streams throughout the Yukon system in BC.

**CODS**  
FAMILY GADIDAE



In The BC portion of the Yukon system, burbot (*Lota lota*) are common inhabitants of both lakes and streams

**SCULPINS**  
FAMILY COTTIDAE



In the BC portion of the Yukon system there is only one species of sculpin (the slimy sculpin, *Cottus cognatus*). It is abundant in both lakes and streams.

**NORTH COAST**

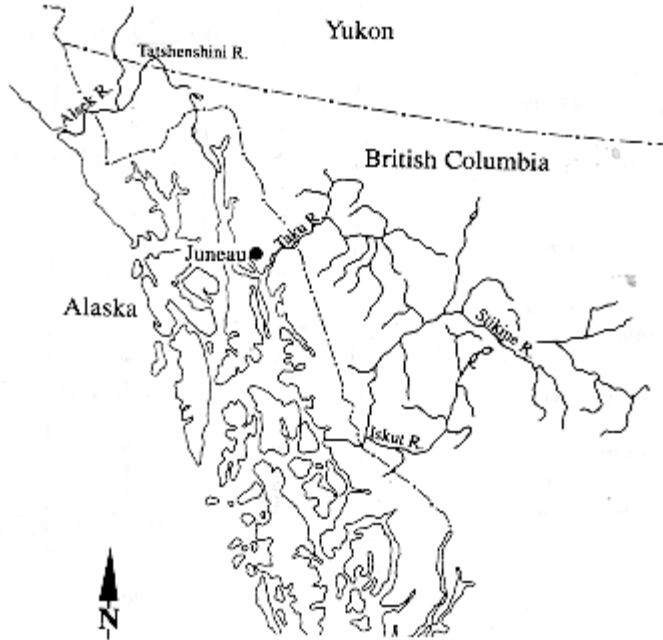


**NORTH  
COAST  
REGION**

The image features a detailed map of the North Coast Region of British Columbia, Canada, showing its intricate coastline and numerous islands. Overlaid on the map are several black and white illustrations of fish, including salmon and halibut, arranged in a curved path across the upper portion of the map. A dashed horizontal line is drawn across the map, likely representing a latitude line. The text 'NORTH COAST REGION' is printed in a large, bold, sans-serif font across the middle of the map. A vertical black bar on the right side of the image contains the text 'NORTH COAST' written vertically.

Three large rivers are grouped together as north coast drainages. These are the Alsek, Taku and the Iskut-Stikine rivers (Fig. 7). The Alsek River and its major tributary, the Tatshenshini, flow through the extreme northwestern part of the province. They are wild, high gradient rivers still very much affected by local glaciers. The Taku is similar except that it rises entirely in BC on the Taku Plateau and flows west through the Coast Range to enter the sea near Juneau, Alaska. The Iskut-Stikine is the largest of the three north coast rivers. It rises at an elevation of about 1200 m on the southern end of the Spatsizi Plateau and flows about 800 km to enter the sea near Wrangell, Alaska.

Thirty-two species occur in the north coast rivers (Table 6). Eighteen of these species regularly enter the sea, and are widespread along the entire north coast. These euryhaline (salt tolerant) species dominate the lower reaches of the north coast rivers. In contrast, the majority of the purely freshwater species are confined to the upper reaches of the Taku and Stikine rivers. They are of mixed origins. Some, like Arctic grayling (*Thymallus arcticus*); pike (*Esox lucius*), and round whitefish, (*Prosopium cylindraceum*), clearly are of Yukon origin; while the mountain whitefish (*Prosopium williamsoni*) and bull trout (*Salvelinus confluentus*) are of Columbia origin. Others, like lake whitefish (*Coregonus clupeaformis*), burbot (*Lota lota*), and slimy sculpin (*Cottus cognatus*) probably are of Yukon origin.



**Figure 7**  
North Coast River systems


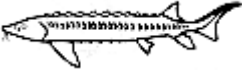


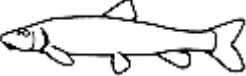
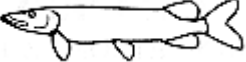
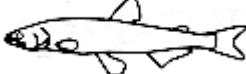



Species	Stikine	Taku	Alek
<i>Lampetra ayresi</i>	+	-	-
<i>L. richardsoni</i>	+	-	-
<i>L. tridentata</i>	+	?	?
<i>Acipenser medirostris</i>	+	+	?
<i>A. transmontanus</i>	?	?	?
<i>Alosa sapidissima</i>	<b>I</b>	<b>I</b>	<b>I</b>
<i>Couesius plumbeus</i>	+	-	-
<i>Catostomus catostomus</i>	+	+	+
<i>Esox lucius</i>	-	+	+
<i>Osmerus dentex</i>	+	?	?
<i>Spirinchus Thaleichthys</i>	?	+	?
<i>Thaleichthys pacificus</i>	+	+	+
<i>Oncorhynchus clarki clarki</i>	+	+	?
<i>O. gorbuscha</i>	+	+	+
<i>O. keta</i>	+	+	+
<i>O. kisutch</i>	+	+	+
<i>O. mykiss</i>	+	+	+
<i>O. nerka</i>	+	+	+
<i>O. tshawytscha</i>	+	+	+
<i>Salvelinus confluentus</i>	+	+	-
<i>S. malma</i>	+	+	+
<i>S. namaycush</i>	+	+	+
<i>Coregonus clupeaformis</i>	-	-	+
<i>Prosopium coulteri</i>	-	-	+
<i>P. cylindraceum</i>	-	+	+
<i>P. williamsoni</i>	+	-	-
<i>Thymallus arcticus</i>	+	+	+
<i>Lota lota</i>	+	-	+
<i>Gasterosteus aculeatus</i>	+	+	+
<i>Cottus aleuticus</i>	+	+	?
<i>C. asper</i>	+	+	?
<i>C. cognatus</i>	+	+	+
<i>Leptocottus armatus</i>	<b>E</b>	<b>E</b>	<b>E</b>
<i>Platichthys stellatus</i>	<b>E</b>	<b>E</b>	<b>E</b>

**Table 6**  
Distribution of fishes in North Coast drainages.

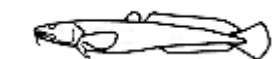
+ = present	<b>I</b> = introduced	<b>E</b> = estuarine
- + absent	? = uncertain record	



**Pictorial key to Families**

	<b>LAMPREYS (PETROMYZONTIDAE)</b>	130
	<b>STURGEONS (ACIPENSERIDAE)</b>	132
	<b>HERRINGS (CLUPEIDAE)</b>	133
	<b>MINNOWS (CYPINIDAE)</b>	133
	<b>SUCKERS (CATOSTOMIDAE)</b>	134
	<b>PIKES (ESOCIDAE)</b>	134
	<b>SMELTS (OSMERIDAE)</b>	135
	<b>SALMON, TROUT, CHAR (SALMONIDAE)</b> (SUBFAMILY SALMONINAE)	136
	<b>WHITEFISH (SALMONIDAE)</b> (SUBFAMILY COREGONINAE)	143
	<b>GARYLINGS (SALMONIDAE)</b> (SUBFAMILY THYMALLINAE)	145

**Pictorial Key to Families**



**CODS (GADIDAE)**

145



**STICKLEBACKS (GASTERTOSTEIDAE)**

146



**SCULPINS (COTTIDAE)**

146



**FLOUNDERS (PLEURONECTIDAE)**

148

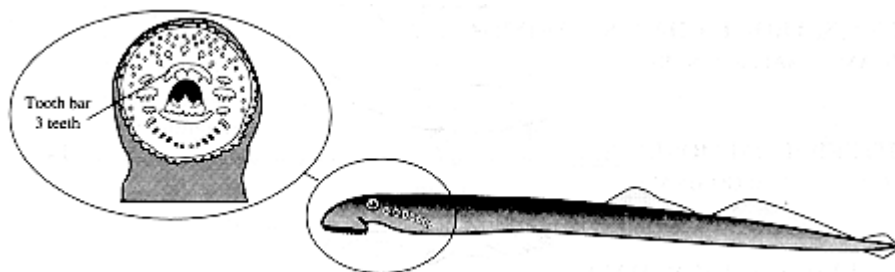
**LAMPREYS**  
**FAMILY PETROMYZONTIDAE**



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

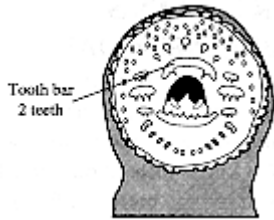
adult or transforming lampreys

2



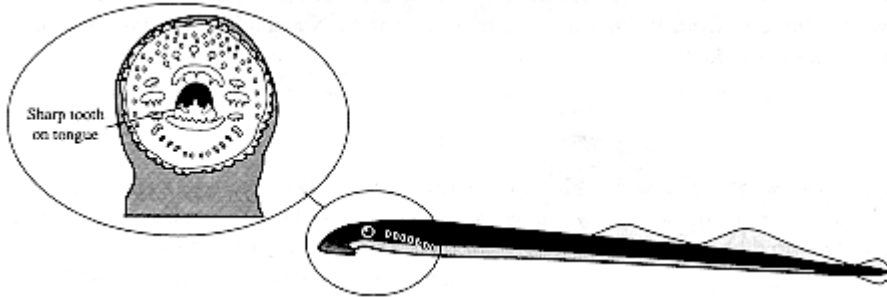
2 (3) Tooth bar immediately above mouth has three teeth; ascends the lower reaches of most north coast rivers in the spring

**Pacific lamprey**  
*Lampetra tridentata*



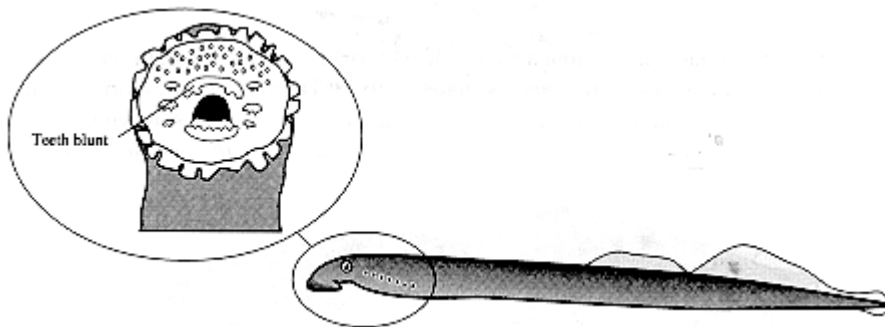
3 (2) Tooth bar immediately above mouth has two teeth

4



4 (5) Teeth sharp and well developed; center pair of lateral teeth with three points; sharp tooth on center of tongue; adults usually longer than 200 mm; known from the sea near the mouth of the Taku River

**River lamprey**  
*Lampetra ayresi*



5 (4) Teeth blunt, poorly developed; center pair of side teeth with only two points; no sharp tooth on tongue; adults usually less than 160 mm; one record from southeastern Alaska just south of the Iskut-Stikine system

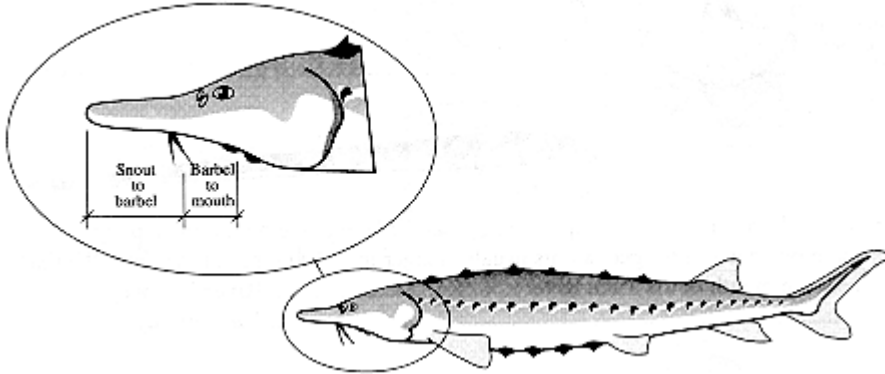
**Western brook lamprey**  
*Lampetra richardsoni*

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

Ammocoetes or larval lampreys  
(see key in appendix, page 199).

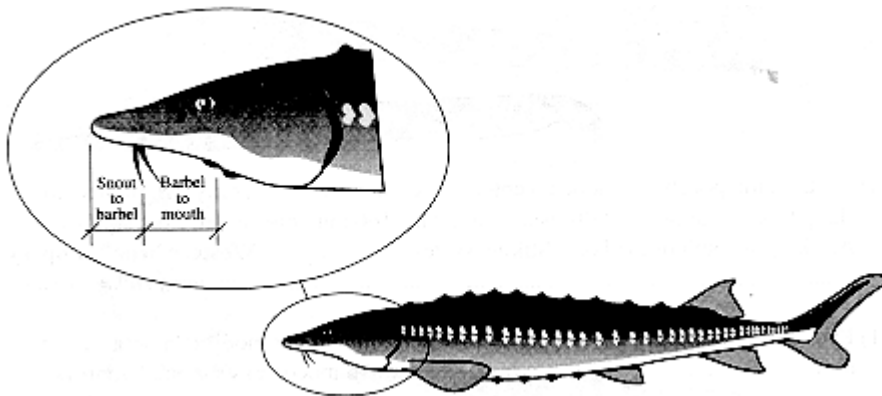
**STURGEONS**  
FAMILY ACIPENSERIDAE

Two species of sturgeon are reported from river mouths along the north coast (green sturgeon and white sturgeon). Both species are morphologically variable and some of this variability may be associated with sex. We know little about their life histories along the north coast, but in other areas the white sturgeon is mainly a freshwater species while the green sturgeon is more common in the sea. Since all north coast records are from tidal waters, and the only museum specimens from the area are green sturgeons, the records of white sturgeon from the north coast may be errors. Nonetheless we have included both species in our key.



1 (2) Back green; snout usually elongate and narrow; barbels nearer to mouth than to tip of snout; sporadic in tidal regions associated with the Takyu and Iskut-Stikine systems

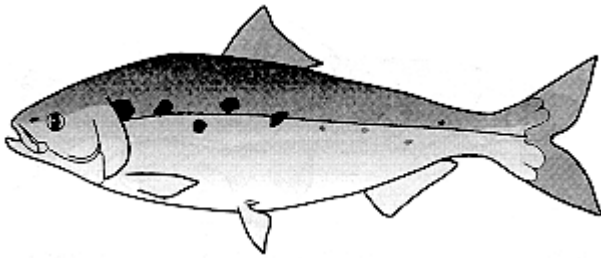
**Green sturgeon**  
*Acipenser medirostris*



2 (1) Back dark grey to black; snout short and broad (except in some specimens less than 250 mm in standard length); barbels nearer to tip of snout than to mouth; rare, or perhaps absent, in the lower reaches of north coast rivers

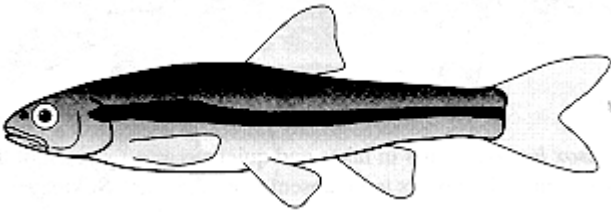
**White sturgeon**  
*Acipenser transmontanus*

**HERRINGS**  
FAMILY CLUPEIDAE



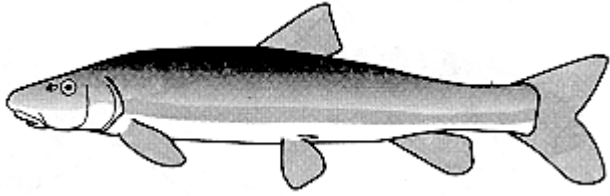
The shad (*Alosa sapidissima*) was introduced to the Pacific coast of North America in 1871. It spread rapidly and by the turn of the century was recorded from the sea as far north as the Gulf of Alaska. In our area, shad were redorded near the mouth of the Stikine in 1891 but have not been seen in recent years.

**MINNOWS**  
FAMILY CYPINIDAE



The only minnow recorded from north coast rivers is the lake chub (*Couesius plumbeus*). In this area it is restricted to the upper Stikine River. It appears to be absent from the Taku and Alsek river systems.

**SUCKERS**  
FAMILY CATOSTOMIDAE



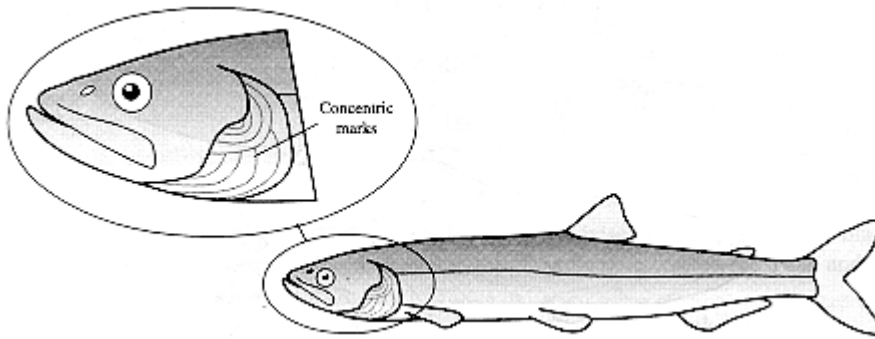
The only sucker recorded from north coast rivers is the longnose sucker (*Catostomus catostomus*). It is abundant in lakes, rivers and streams throughout the upper reaches of the Alsek, Taku and Iskut-Stikine river systems.

**PIKES**  
FAMILY ESOCIDAE



The pike (*Esox lucius*) occurs in lakes and quiet streams throughout the upper Alsek and Taku river systems. It appears to be absent from the Iskut-Stikine system.

**SMELTS**  
FAMILY OSMERIDAE

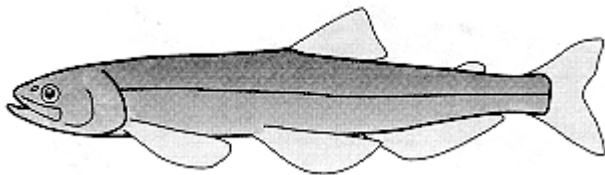


1 (2) Concentric marks on operculum; seasonally abundant in the lower Taku and Iskut-Stikine river systems

**Eulachon**  
*Thaleichthys pacificus*

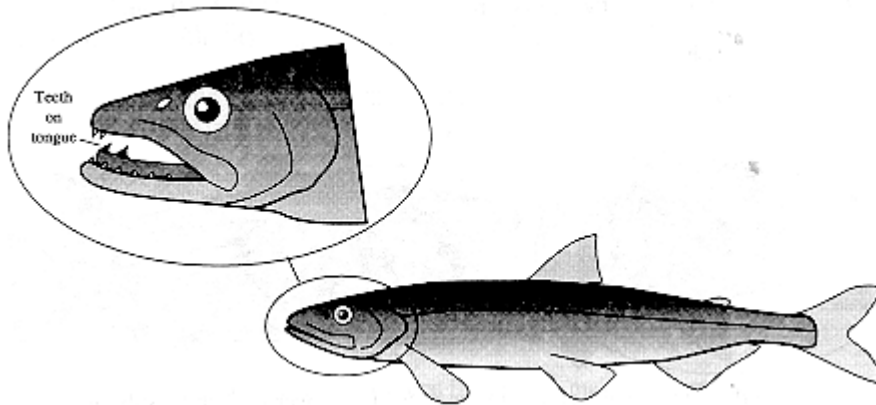
2 (1) No concentric marks on operculum

3



3 (4) Pectoral fin longer than head; no prominent teeth on tongue; one record from the Taku estuary

**Longfin smelt**  
*Spirinchus thaleichthys*

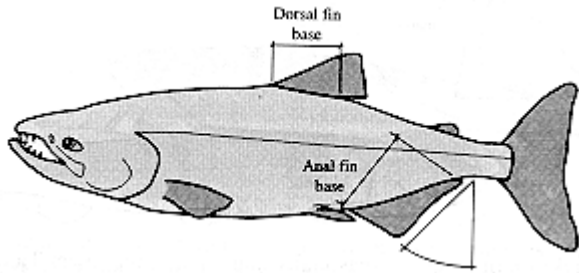


4 (3) Pectoral fin smaller than head; 1 or 2 prominent curved canine teeth on tongue; rare, one record from the Stikine estuary

**Rainbow smelt**  
*Osmerus dentex*

**SALMON, TROUTS, AND CHARS**  
**FAMILY SALMONIDAE**  
**(SUBFAMILY SALMONINAE)**

**KEY TO THE ADULTS**

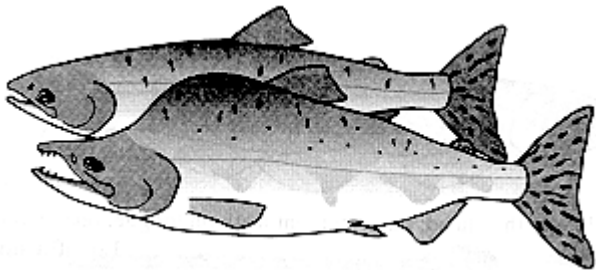


1 (10) Anal fin base longer than dorsal fin base; in profile, hind margin of anal fin slants backwards (not vertical)

2

2 (7) Distinct spots on tail

3



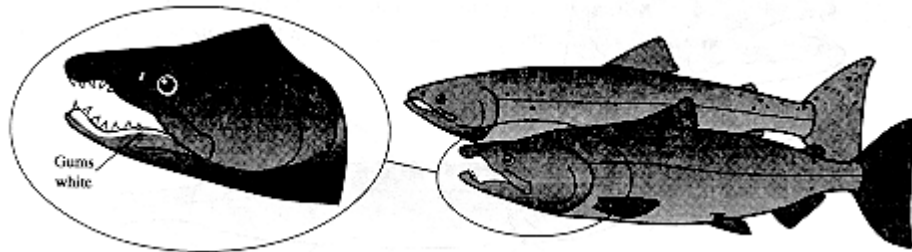
3 (4) Tail spots oblong (not round); small runs of pinks spawn in the lower reaches of the Alsek, Taku and Iskut-Stikine systems

**Pink salmon**

*Oncorhynchus gorbuscha*

4 (3) Tail spots round (not oblong)

5

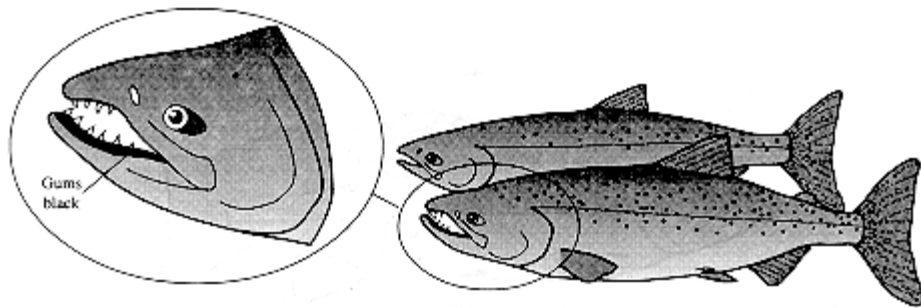


5 (6) Tail spotted on upper half; gums at base of teeth in lower jaw white; substantial runs of coho spawn in the Taku and Iskut-Stikine systems

**Coho salmon**

*Oncorhynchus kisutch*



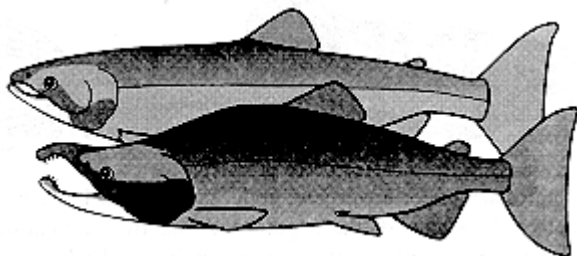


6 (5) Tail spotted on both upper and lower halves; gums at base of teeth in lower jaw black; substantial numbers of chinook spawn in the Canadian portions of the Taku and Iskut-Stikine systems, and smaller numbers in the Aasek

**Chinook salmon**  
*Oncorhynchus tshawytscha*

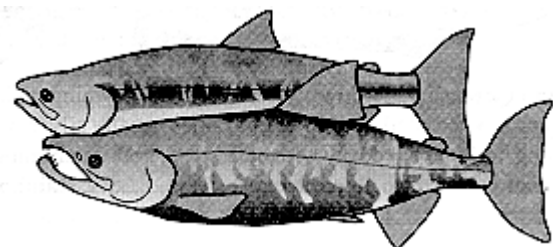
7 (2) No spots on tail, but occasionally some fine speckles

8



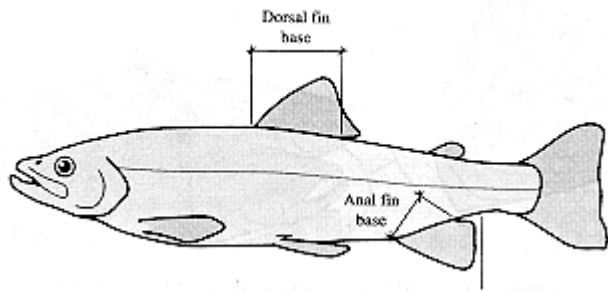
8 (9) Adults occur in freshwater both as migratory spawners (sockeye) and as residents (kokanee); flanks are uniformly coloured (silver in non-breeding kokanee, usually red in breeding sockeye and kokanee); a small run of sockeye spawn in the Tatshenshini River (Aasek system) and larger runs enter the Taku and Iskut-Stikine systems; in the latter system there are sockeye that rear in side channels rather than in lakes

**Sockeye salmon**  
(Kokanee)  
*Oncorhynchus nerka*



9 (8) Adults in fresh water only as spawners; flanks pale, males with irregular red and black blotches, females with a purplish lateral stripe; chum spawn in the lower reaches of all the north coast rivers

**Chum salmon**  
*Oncorhynchus keta*

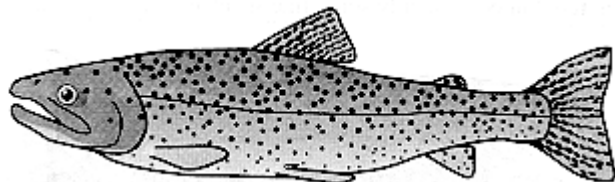


10 (1) Base of dorsal fin equal to, or longer than, anal fin base; in profile, hind margin of anal fin is vertical (no backward slant)

11

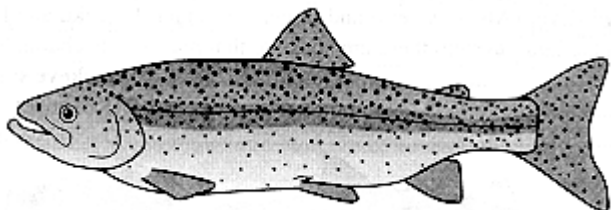
11 (14) Background colour on flanks light (silver or golden) with dark spots

12



12 (13) Red or orange slash under lower jaw; upper jaw extends back past hind margin of eye; tail usually yellowish with black spots; cutthroat trout are known from the lower and middle reaches of all north coast rivers except the Alsek where they have probably been overlooked

**Coastal cutthroat trout**  
*Oncorhynchus clarki clarki*

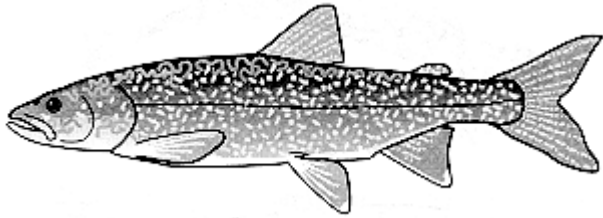


13 (12) No red or orange slash under lower jaw; except in spawning males upper jaw does not extend back beyond hind margin of eye; sides usually silver with a pink hue extending along midline; tail dusky with dark spots; both anadromous (steelhead) and resident populations occur in all north coast rivers

**Rainbow trout**  
*Oncorhynchus mykiss*

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

15

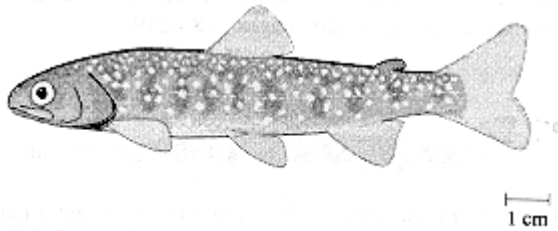


15 (16) Tail deeply forked, light coloured spots on both halves of tail; head and body covered in light irregular spots; headwater lakes in teh Iskut-Stikine, Taku and Alsek systems

**Lake trout**  
*Salvelinus namaycush*

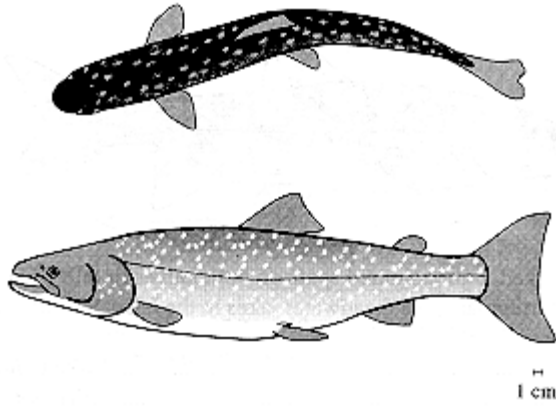
16 (15) Tail not deeply forked; usually no spots on tail, but if spots present then only on upper half of tail

17



17 (18) When 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); lower reaches of the Iskut-Stikine, Taku and Alsek systems

**Dolly Varden\***  
*Salvelinus malma*



18 (17) When 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); headwaters of the Iskut-Stikine and Taku systems, apparently absent from the Alsek system.

**Bull trout\***

*Salvelinus confluentus*

\* These species are difficult to distinguish except where they coexist. In sympatry, Dolly Varden usually mature at less than 200 mm and 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. Both species reported from Winter Creek in the Stikine system. If in doubt about identification use the key in the Appendix, pages 218-219.

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 fresh water

**Pink salmon**

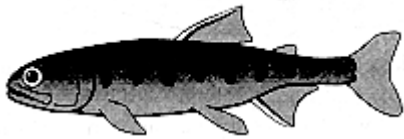
*Oncorhynchus gorbuscha*

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 that contrasts sharply with dark pigment behind

**Coho salmon**

*Oncorhynchus kisutch*



6 (5) Adipose fin with a clear unpigmented "window"; spaces between parr marks usually wider than the marks themselves; anal fin not sickle-shaped. White leading edge not sharply contrasting with dark pigment behind

**Chinook salmon**

*Oncorhynchus tshawytscha*

7 (4) Parr marks small, oval shaped, 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 than half the combined width of the light areas; parr marks faint or absent below mid-line

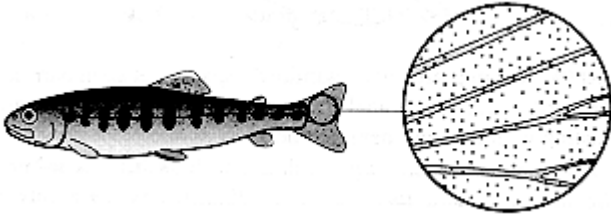
**Chum salmon**  
*Oncorhynchus keta*

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

11

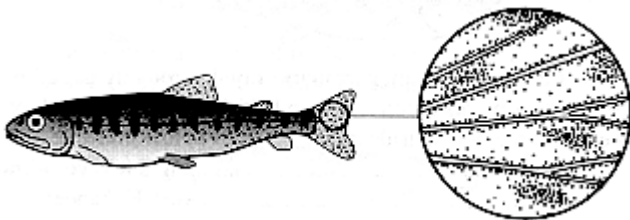
11 (14) Numerous distinct dark spots on dorsal fin; in very small specimens the first dorsal ray may be black

12



12 (13) On fish below 50 mm melanophores are evenly 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*



13 (12) 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

**Coastal cutthroat trout**  
*Oncorhynchus clarki clarki*

14 (11) Dorsal fin without dark spots; first dorsal ray not black

15



15 (16) Parr marks along mid-line are vertical bars, 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



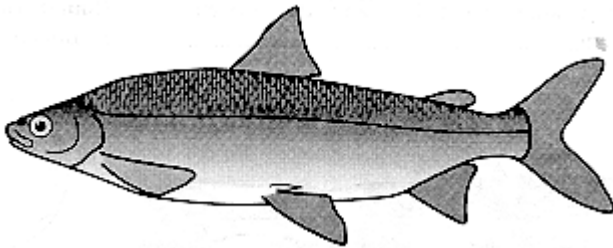
Bull trout

16 (15) 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*

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

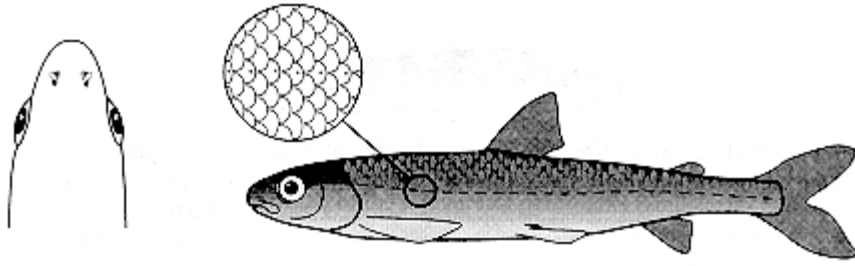
**WHITEFISH**  
FAMILY SALMONIDAE  
(SUBFAMILY COREGONINAE)



1 (2) Body deep, slab-sided in cross section; among the north coast rivers this species is apparently confined to the Alsek system

**Lake whitefish**  
*Coregonus clupeaformis*

2 (1) Body slender, round in cross section



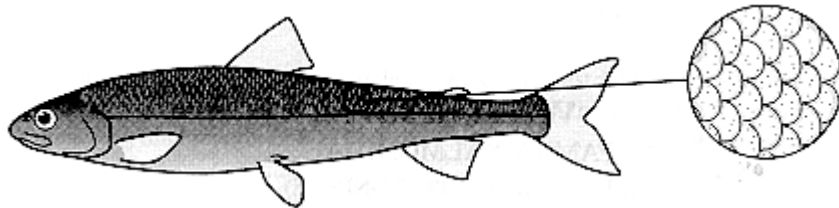
3 (4) Viewed from above, snout blunt, rounded; anterior lateral line scales about the same size as scales immediately above and below lateral line

**Pygmy whitefish**  
*Prosopium coulteri*



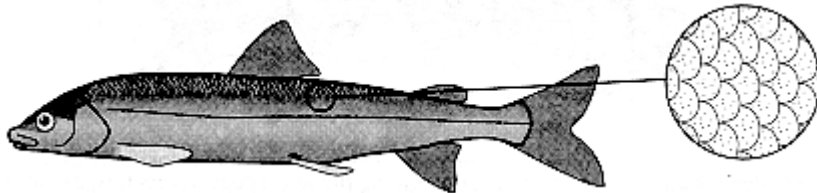
4 (3) Viewed from above, snout pointed; anterior lateral line scales noticeably smaller than scales immediately above and below lateral line

5



5 (6) Adipose fin small, base almost equal to eye diameter; scales on flanks above lateral line edged in dark pigment; Taku and Alesk systems

**Round whitefish**  
*Prosopium cylindraceum*



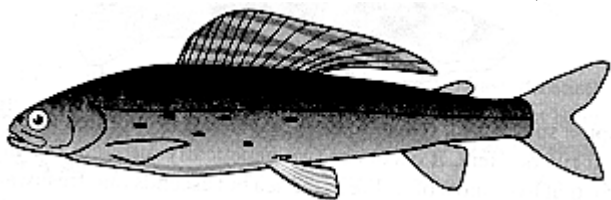
6 (5) Adipose fin large, base mre than 1.5 times eye diamter; scales on flanks above lateral line not edged in dark pigment; Iskut-Stikine systems.

**Mountain whitefish\***  
*Prosopium williamsoni*



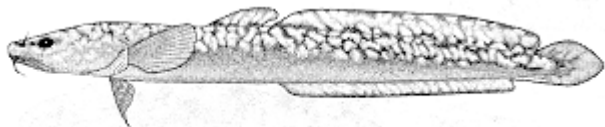
\* Fluvial populations of this species often contain two body forms: normal and "pinocchio". The "pinocchio" form has a longer snout and thinner body than the normal form.

**GRAYLINGS**  
FAMILY SALMONIDAE  
(SUBFAMILY THYMALLINIAE)



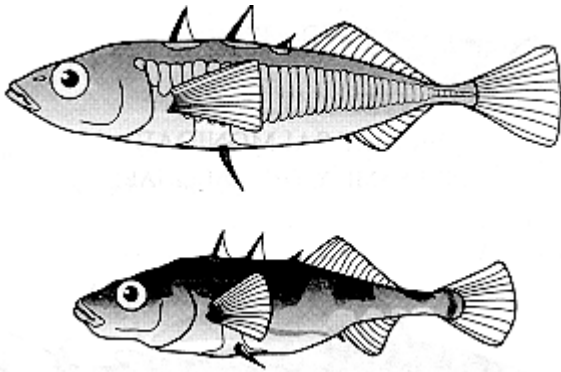
The Arctic grayling (*Thymallus arcticus*) is abundant in the headwaters of the Iskut-Stikinem Taku and Alsek rivers.

**CODS**  
FAMILY GADIDAE



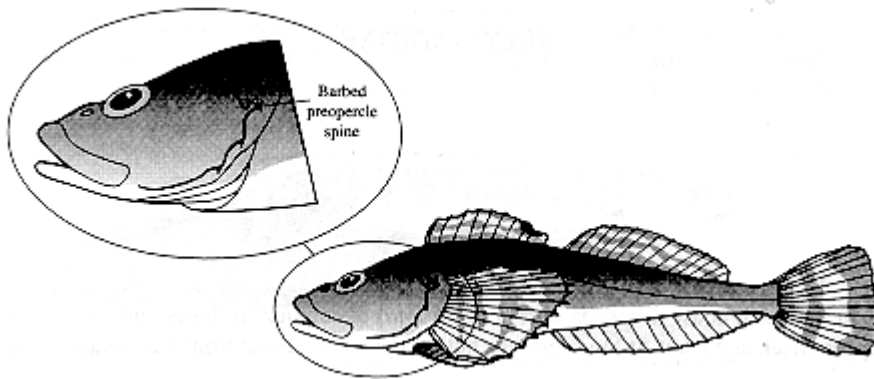
In the north coast rivers the burbot (*Lota lota*) is common in lakes and streams in the upper Alsek and Iskut-Stikine systems, but is apparently absent from the Taku system.

**STICKLEBACKS**  
FAMILY GASTEROSTEIDAE



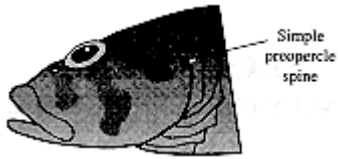
The threespine stickleback (*Gasterosteus aculeatus*) is confined to the lower reaches of the north coast rivers. Here, it occurs as two genetically different life-history types: an anadromous form that lives most of its life in the sea but ascends into freshwater in the spring to spawn, and as a permanent freshwater resident. In north coast rivers the migratory marine form predominates, but in some lowland lakes (e.g. Twin Glacier Lake, Taku system) anadromous and freshwater residents breed alongside one another and still maintain themselves as discrete entities.

**SCULPINS**  
FAMILY COTTIDAE



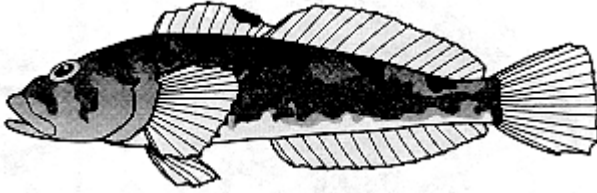
1 (2) Underside dead white; spine on preopercle with obvious hooks; pectoral fins with alternating yellow and dark bands of approximately equal width; only in estuaries or areas under tidal influence

**Pacific staghorn sculpin**  
*Leptocottus armatus*



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

3

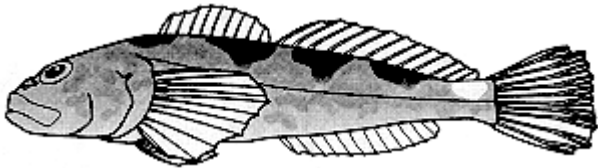


3 (4) First dorsal fin with a conspicuous black spot; anal fin base distinctly longer than head length; typically in low gradient streams, also common in lakes and estuaries; known from the lower reaches of the Iskut-Stikine and Taku systems, probably also in the lower Alsek

**Prickly sculpin**  
*Cottus asper*

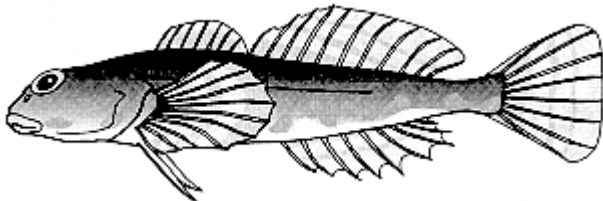
4 (3) First dorsal fin without a conspicuous black spot; anal fin base about equal to head length

5



5 (6) 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 reaches of the Iskut-Stikine and Taku systems, probably also in the lower Alsek

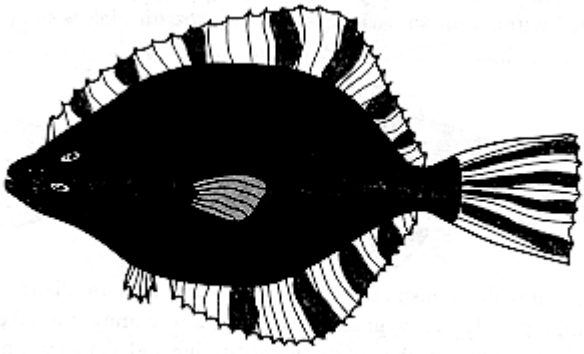
**Coastrange sculpin**  
*Cottus aleuticus*



6 (5) No conspicuous light mark on back just in front of caudal fin; lateral line incomplete; common throughout the middle and upper reaches of all north coast drainages

**Slimy sculpin**  
*Cottus cognatus*

**FLOUNDERS**  
FAMILY PLEURONECTIDAE



The starry flounder (*Platichthys stellatus*) is common in north coast estuaries, but rarely penetrates rivers above tide-waters.