



# FEATURE FISH

the

Brassy minnow

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## **Brassy minnow** *Hybognathus hankinsoni*



Photograph by Peter Mylechreest

The brassy minnow (Fig. 1) is an dainty little fish found in many sloughs and ditches throughout the lower Fraser Valley. It is also an enigma — how did a fish of the Great Lakes and north-central Plains get to BC? Remember, “fish gotta swim” they can’t walk and they can’t fly, and the Rocky Mountains lie between their homeland and the Fraser River. There are other questions associated with this little fish: why is it called the brassy minnow? The populations in the lower Fraser Valley are a dull silver colour throughout their lives. Also, where and when does it breed, why does it appear in large numbers at some sites and then disappear, often for decades? Unfortunately, we know little about its ecology and life history, and this article is not going to provide a lot of answers; however, if we are serious about preserving biodiversity in this province, some effort must be made to study lesser known fish like the brassy minnow.

So, how did the brassy minnow get to BC? The species was first described from Michigan in 1929 and until 1952 it was thought to be restricted to the Great Lakes region and the north-central plains (Fig. 2A). In 1952, however, brassy minnows were discovered in a

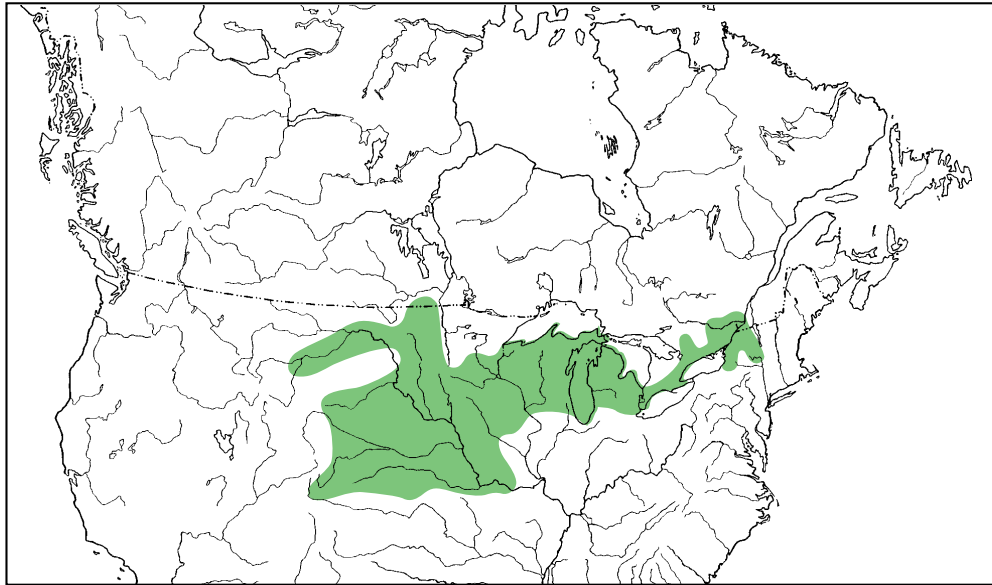


Figure 2A - known distribution\* of the brassy minnow circa 1950. \*NB: brassy minnows occur within the outlined areas as scattered isolated populations.

slough alongside the Lougheed Highway in the lower Fraser Valley. At first, the BC population was assumed to be an illegal “bait-bucket” introduction but, as more information accumulated, this explanation became less plausible. Through the next decade brassy minnows were collected in many small streams and ditches between Steveston and Chilliwack, and in sloughs near Prince George, in the Esker Lakes near Vanderhoof, and in lakes and streams associated with the Crooked River (a Parsnip River tributary; Fig. 2B). Thus, the BC distribution included two major river systems — the Fraser and Peace drainages. This distribution was just too wide and scattered for a recent introduction. Some other explanation was needed to account for the presence of brassy minnows on the west side of the Continental Divide!

As the BC distribution of brassy minnows was becoming clearer, workers in the prairie provinces were discovering similarly scattered populations in Saskatchewan and southern Alberta (Fig. 2B). Additionally, late-Pleistocene fossils placed the brassy minnow within Glacial Lake Agassiz’s drainage basin. This meant that they had had access to the complex, shifting series of drainage connections that accompanied ice-retreat on the northern plains. These connections gave brassy minnows access to the Peace drainage system, and it is known that a major exchange of fishes occurred between the Peace and Fraser systems during deglaciation. Brassy minnows probably reached the Fraser system by this route. More recently, the discovery of brassy minnows in both the Athabasca and Peace drainages in northern Alberta has provided support for this natural dispersal scenario. Thus, a fish once thought to be restricted to north-central North America and introduced into BC is now known to be widely, albeit sporadically, distributed across western Canada (Fig. 2C) and indigenous to BC.

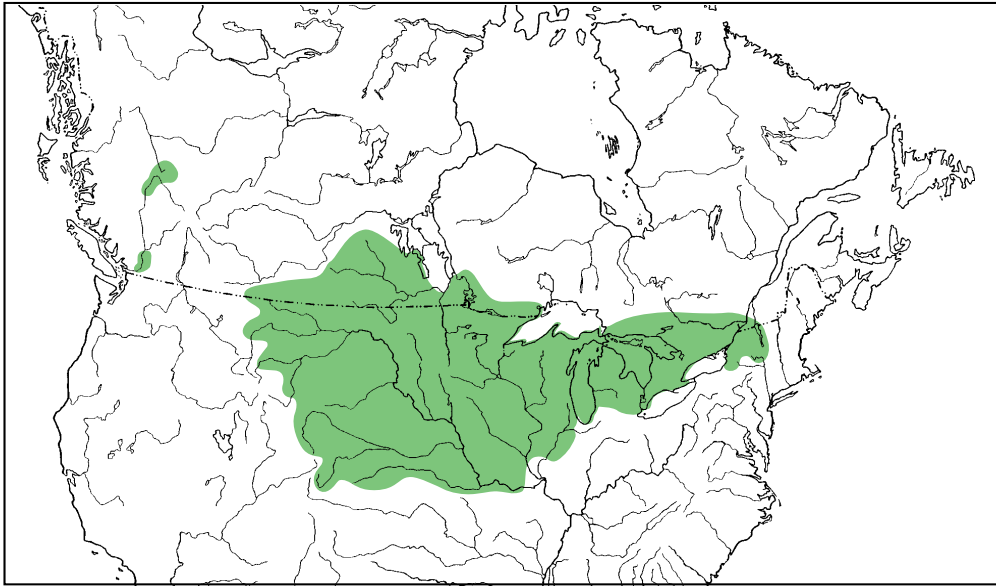


Figure 2B - known distribution of the brassy minnow circa 1970.

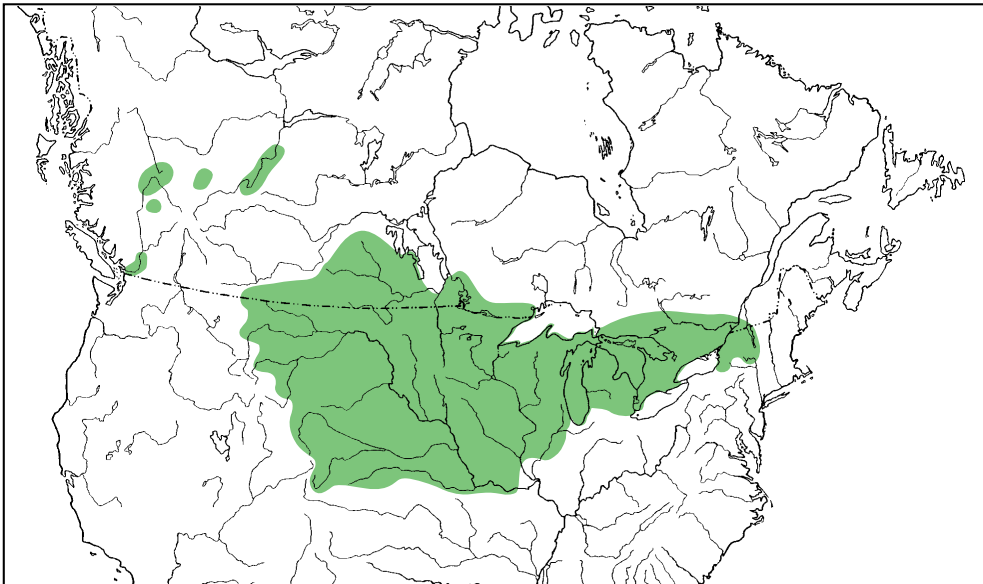


Figure 2C - known distribution of the brassy minnow circa 1990.

What about the name, brassy minnow? It turns out to be appropriate under some conditions. In stained muskeg waters, such as those occurring on the swampy divide between the Fraser and Crooked rivers, males display a polished-brass gleam that would warm the heart of a regimental sergeant-major. Interestingly, females in this area display the same dull silver colour characteristic of both males and females in the lower Fraser Valley. Presumably, since the brassy colour is confined to breeding males, it is some kind of reproductive signal, but why is there a difference in male colour between the upper and lower Fraser populations? Perhaps it has something to do with signal transmission in stained water but, at present, there is no clear answer to this question.

Although we know little about the biology of the brassy minnow, some observations on habitat-use and life history have been made in the lower Fraser Valley and in the Prince George area. Typically, brassy minnows are found in small lakes, slow-moving streams, beaver ponds and drainage ditches. They are usually associated with mud bottoms and dense vegetation. There does not appear to be any habitat difference between young-of-the-year and adults, except that the young tend to occur in shallower water than adults. The long intestine and black peritoneum suggest that plant material is an important part of their diet. In Fraser Valley specimens, the intestine usually is filled with algae and organic detritus but may include occasional insects.

In April and May they are abundant in some ditches and streams, but absent in adjacent, connected waters. At some sites (e.g., ditches in Richmond) they are seasonally abundant every year, while at other sites (e.g., Deer Lake) they appear sporadically in large numbers and then disappear for several years. Even at the sites where they are abundant every year, brassy minnows abruptly vanish in July and then reappear in September or October. This sporadic appearance of brassy minnows at different sites, and their regular seasonal appearances and disappearances at other sites, suggests that migrations are a common feature of their life history.

In the lower Fraser Valley, spawning occurs from mid-May (when water temperatures reach about 14°C) to early June, while in the Prince George region spawning begins in early June and continues into early August. Aquarium observations indicate that several males are involved in the spawning of a single female, and that the eggs are released in mid-water or near the surface. Depending on body size, females produce about 2,000 to 5,000 eggs; however, not all the eggs are released in a single spawning and females probably spawn several batches of eggs over a period of about a week. The ripe eggs are about 1 mm in diameter, but once fertilized they swell to about 2 mm. Spawning occurs in, or near, vegetation, and the eggs either sink to the bottom or are caught up in the vegetation. In aquaria, adults that are not spawning accompany the spawning fish and excitedly dash about eating sinking eggs.

Once fertilized, embryo development is rapid — hatching occurs within 70 hours at 18°C. The newly-hatched larvae are small (about 4 mm in length), transparent and lack eye pigment. Pigment develops over the next four days and, by day six, the larvae have filled their swim-bladders. By day eight they are about 6 mm long and begin to feed. Growth in the first months of life is rapid, and by October in the lower Fraser Valley, when they return from wherever they disappeared to in the summer, the young-of-the-year average about 42 mm in length. In contrast young-of-the-year brassy minnows in the Prince George region rarely reach 40 mm by the end of the growing season. This difference in body size between upper and lower Fraser fish is maintained throughout life and, presumably, reflects the longer growing season in the lower Fraser Valley. The entire population (adults and young-of-the-

year) appear to over-winter at breeding sites and spawn again the next spring. Both males and females reach sexual maturity after one winter and the maximum age recorded in British Columbia is four years.

The scattered distribution of brassy minnows in BC suggests that there is little genetic contact between populations. Consequently, populations in decline are unlikely to receive immigrants from other populations. In the lower Fraser Valley the primary cause of declines in brassy minnow numbers probably is habitat loss. Ditches and sloughs with connections to the Fraser River were once abundant in Richmond, Delta, and North Surrey but, with urbanization, these are rapidly vanishing habitats. In the Prince George area, urbanization is again the primary cause of declines although agricultural and industrial pollution may also be involved. Ironically, the only known extinctions of brassy minnow populations are associated with park development. Brassy minnows were abundant in the small lakes lacking surface drainage connections in the esker region between Prince George and Vanderhoof. When this region became a provincial park, brook trout — an exotic species — were introduced into these supposedly “fishless” lakes. The rationale for the introductions was to provide angling opportunities; however, the result was the extinction of brassy minnows in the esker lakes.

Although the brassy minnow is declining in numbers near urban centres and some local populations are now extinct, it is presently at no risk of extirpation from the province. Indeed, the recent discovery of the species in a small stream in the Horsefly system suggests that there probably are as yet undiscovered populations in the area between Prince George and Chilliwack.

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