

2.1.1 FISHERIES AND BENTHIC INVERTEBRATES

Background

The first synoptic survey of the fish in the Milk and North Milk rivers was made by Willock in the late 1960s. Willock (1969) undertook fish collections in the mainstem and North Milk rivers, plus most of creeks in the Alberta portion of the Missouri drainage. Over the last four decades there have been a number of studies that were undertaken for specific purposes and thus not synoptic in nature. Studies completed in the 1970s and 1980s were undertaken in relation to water storage project proposals; these studies tended to focus primarily on areas identified as likely dam sites. Studies completed since 2000 have primarily been to assess the status of species at risk. There have not been any collections comparable to Willock's, and as such, it is difficult to compare the various studies to determine how the fishery has changed since the 1960s.

Capture methodology differed between Willock's collections and most of the later studies. Willock's sampling was done primarily with a beach seine, although set lines were used at some locations. An electric shocker was tried with little success in the Milk and North Milk rivers. Both traps and gill-nets were used but current and debris rendered them impractical for most of the field season. In comparison, most of the studies done since then have employed backpack or boat electrofishers and seines as the key gear. Downstream of Writing-on-Stone Provincial Park the substrate is much finer, thus lending itself better to employing seine nets.

Another variable that has changed has been fish species stocked into Fresno Reservoir in Montana. This reservoir is the farthest upstream impoundment on the Milk River, and there is approximately 75 kilometres of lotic (flowing) habitat between the International Boundary and it. There are not any physical barriers to upstream movement into Alberta for fish in Fresno Reservoir. Fish species occurring in Fresno Reservoir that have not been reported from the Milk River in Alberta are listed on subsequent pages.

Species Composition

One method that can be used to describe the state of the watershed is change over time in species composition. Willock (1969) reported that he captured 20 fish species in the Milk River and tributaries. These included five species that are considered today as sport fish, and 15 non-sport fish species. Table 1 lists the species reported by Willock (1969), and captured in recent studies (i.e., since 2000).

In comparison, studies conducted since 2000 have resulted in the capture of 22 species. Two species were collected by Willock (1969) that were not captured recently; these were cutthroat trout (*Oncorhynchus clarki*) and finescale dace (*Phoxinus neogaeus*). In Willock's study, both of these species were represented by one fish, and as such, it is not surprising that these very rare species were not collected recently. The cutthroat trout most likely originated from the St. Mary River, was diverted into the St. Mary Canal and ended up in the North Milk River. There were four fish species taken in the last few years that were not collected by Willock (1969). These included: trout-perch (*Percopsis omiscomaycus*), yellow perch (*Perca flavescens*), lake whitefish (*Coregonus clupeaformis*), and walleye (*Sander vitreus*). Both lake whitefish and walleye were represented by single specimen captures, while only a few yellow perch were collected. Trout-perch are becoming more common in collections undertaken near the Town of Milk River.

Table 1. Fish species that occur in the Milk River and tributaries.

Common Name	Scientific Name	Willock	Recent
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		(1969)	Studies
Brassy minnow	<i>Hybognathus hankinsoni</i>	X	X
Brook stickleback	<i>Culaea inconstans</i>	X	X
Burbot	<i>Lota lota</i>	X	X
Cutthroat trout	<i>Oncorhynchus clarki</i>	X	
Fathead minnow	<i>Pimephales promelas</i>	X	X
Finescale dace	<i>Phoxinus neogaeus</i>	X	
Flathead chub	<i>Hybopsis gracilis</i>	X	X
Iowa darter	<i>Etheostoma exile</i>	X	X
Lake chub	<i>Couesius plumbeus</i>	X	X
Lake whitefish	<i>Coregonus clupeaformis</i>		X
Longnose dace	<i>Rhinichthys cataractae</i>	X	X
Longnose sucker	<i>Catostomus catostomus</i>	X	X
Mountain sucker	<i>Catostomus platyrhynchus</i>	X	X
Mountain whitefish	<i>Prosopium williamsoni</i>	X	X
Northern pike	<i>Esox lucius</i>	X	X
Northern redbelly dace	<i>Phoxinus eos</i>	X	X
Sauger	<i>Sander canadensis</i>	X	X
Eastslope sculpin (or St. Mary sculpin)	<i>Cottus sp.</i>	X	X
Stonecat	<i>Noturus flavus</i>	X	X
Trout-perch	<i>Percopsis omiscomaycus</i>		X
Walleye	<i>Sander vitreus</i>		X
Western silvery minnow	<i>Hybognathus argyritis</i>	X	X
White sucker	<i>Catostomus commersonii</i>	X	X
Yellow perch	<i>Perca flavescens</i>		X

Selected Species Collected from the Milk and North Milk Rivers

In the Milk and North Milk rivers, the four most common species collected by Willock (1969) were white sucker (27%), longnose sucker (21%), longnose dace (19%), and flathead chub (9%); in total Willock captured 18 species.

RL&L undertook collections for species at risk in the Milk and North Milk rivers in 2000 and 2001. In these rivers they captured a total of 14 species, and the four most common species were flathead chub

(74%), longnose dace (14%), white sucker (3%), and longnose sucker (3%).

Species collected by Willock (1969) but not by RL&L (2002) included mountain whitefish, cutthroat trout, northern pike, northern redbelly dace, fathead minnow, and Iowa darter. Brassy minnow and trout-perch were captured by RL&L, but not by Willock.

The differences in most abundant species between the late 1960s and the early 2000s can be explained by capture methods. Willock (1969) primarily utilized seining, whereas backpack electrofishing and seining were both employed by RL&L. Backpack electrofishing is the most suitable methodology for sampling cobble/boulder habitats, which are common in the North Milk River and riffle habitat around the Town of Milk River.

Nonetheless, the top four species collected in the late 1960s and early 2000s had not changed, just the percentages of each species. This suggests that over the three decades between the studies, there had not been any substantial changes in the most abundant species.

Selected Species Collected from Writing-on-Stone Provincial Park to Eastern Border Crossing

Clayton and Ash (1980) divided the mainstem Milk River into 6 reaches, based on stream gradient and substrate size. The farthest downstream reach of the mainstem Milk River began upstream of Writing-on-Stone Park and extended to the Eastern International Border Crossing. The gradient in this reach was approximately 0.65 m/km, and the substrate was dominated by fines (i.e., silt and sand). The gradient was substantially lower than in upstream reaches, and the substrate had a much higher percentage of fines than upstream reaches. As such, it was dominated by different species than were collected farther upstream. Also, it has had more consistent sampling in the last decade, due to concern over the status of some fish species at risk.

The earliest records of fish collection in this reach are those of Willock (1969). Downstream of Police Creek, which is located near the western edge of Writing-on-Stone Park, Willock (1969) reported the four most common species were flathead chub (42%), fathead minnow

(18%), mountain sucker (12%), and longnose sucker (11%). Overall, he caught 12 species.

RL&L (2002) conducted surveys on the lower Milk River in 2000 and 2001, with the principal collection techniques being backpack electrofishing and seining. The four most common species collected were flathead chub (79%), longnose dace (12%), white sucker (3%), and longnose sucker (2%). In these surveys they captured 14 species.

Sikina and Clayton (2006) reported on a survey undertaken from June to October 2005 in the mainstem Milk River, downstream of Police Creek, and the four most common species collected were flathead chub (38%), lake chub (37%), longnose sucker (10%) and longnose dace (4%). The principal collection method was seining, similar to Willock's study. The 2005 survey resulted in the capture of 17 species, in comparison with Willock's 12 species downstream of Police Creek. Species captured downstream of Police Creek in 2005 that were not taken in the late 1960s included trout-perch, burbot, St. Mary sculpin, brassy minnow, and brook stickleback. There were never any more than four individuals of the aforementioned five species captured, so these species are relatively rare downstream of Police Creek.

Fisheries and Oceans Canada (DFO) conducted surveys in July 2005, and May, August and October of 2006. The collections from July 2005 and May 2006 were from the Hwy 880 bridge (near Aden), approximately 40 river kilometres downstream of Police Creek, to the Eastern International Border Crossing. The primary collection method was boat electrofishing, and the secondary method was seining. In the July survey, the four most common species collected were flathead chub (38%), western silvery minnow (19%), longnose sucker (15%), and white sucker (3%). In the May study, the four most common species collected were western silvery minnow (52%), flathead chub (42%), sauger (2%), and white sucker (2%). There were 10 fish species collected in July 2005, and 9 species taken in May 2006.

Over the last four decades flathead chub have remained as the most numerous species downstream of Police Creek. Surveys conducted recently by DFO would seem to suggest that western silvery minnow numbers have been increasing, since this species appears to be

contributing a larger percentage to the catch over time. However, a substantial amount of survey effort by DFO was in the farthest downstream part of the river, and this section had relatively little sampling effort in surveys conducted by Willock (1969), RL&L (2002), and Sikina and Clayton (2006). In addition, the primary sampling method by DFO was boat electrofishing, in comparison to the two other studies, which relied mainly on seining. It appears that boat electrofishing is the preferred methodology for capturing western silvery minnow in the Milk River. Differences in the relative ranking (i.e., percentage abundance) for other species between years probably reflects the physical habitat present at the time of sampling.

Introduced Species

For the purposes of this report, all of the fish species captured by Willock in the late 1960s will be considered as native fish, regardless of whether they entered and became established in Alberta via the St. Mary Canal, were present in headwaters since glacial times, or they arrived by some other method.

Two fish species, lake whitefish and trout-perch, likely reached the Milk River drainage by downstream movement, via the St. Mary Canal. (Mogen and Kaeding 2001) reported that trout-perch are native to the St. Mary River, and that lake whitefish were stocked into waters within the drainage and have become self-sustaining. Walleye have likely moved upstream from Fresno Reservoir into the Milk River in Alberta, and although yellow perch were also stocked into Fresno Reservoir, how the original source of yellow perch in the Alberta portion of the drainage arrived remains uncertain.

Other species present in Fresno Reservoir that have yet to be collected in the Milk River in Alberta include rainbow trout (*Onchorhynchus mykiss*), black crappie (*Pomoxis nigromaculatus*), emerald shiner (*Notropis atherinoides*), and spottail shiner (*Notropis hudsonius*). There are no migration barriers upstream of Fresno Reservoir in Montana. Predatory species that live in Fresno Reservoir, and that could move upstream into Alberta, include walleye, sauger, northern pike, yellow perch, burbot, rainbow trout, and black crappie.

Species at Risk in the Milk River Drainage

In Alberta there are five fish species that have been approved for an at-risk listing. These are western silvery minnow, St. Mary/eastslope sculpin, stonecat, lake sturgeon, and shortjaw cisco. Of these five, three occur in the Milk River drainage.

Western Silvery Minnow

This species is a small fish that grows to a total length of approximately 15 cm. These minnows live for about four years, and it spawns in its second summer. It feeds mainly on microscopic organisms such as diatoms, green algae, blue-green algae, and plant remains. The spawning habits of the western silvery minnow are unknown, and has not been determined where young-of-the-year minnows rear. It is native to large plains streams in west-central North America, and in Canada, it only occurs in the Milk River drainage. Its known distribution in the Alberta portion of the Milk River is from the Eastern International Border Crossing to about 20 river km above the Town of Milk River. The abundance of western silvery minnows in the Milk is not known, but greater numbers are found in the lower portion of the river.

In 2003 it was listed in the Federal *Species At Risk Act*, under Schedule I, as “Threatened”. Provincially it has been approved for listing as “Threatened”. The Milk River Fish Species at Risk Recovery Team was formed in 2004 to develop a joint federal/provincial recovery strategy for the western silvery minnow which would address the requirements of both the federal and provincial recovery processes. The species is at risk due to its extremely limited range in Canada. The goals and objectives of the recovery strategy are directed at the protection and maintenance of the existing population, rather than increasing abundance and restoring habitat. The key objectives are to quantify and maintain current population levels, identify and protect critical habitat, and to determine potential threats from human activities and ecological processes and then develop plans to eliminate or mitigate these threats.

Eastslope/St. Mary Sculpin

The eastslope/St. Mary sculpin is a small, benthic (bottom-dwelling) fish that occurs in southern Alberta only in the Milk and St. Mary rivers. It occurs in the Saint Mary River in Montana, and may inhabit

the Flathead River drainage in British Columbia. Another species, the spoonhead sculpin, occurs in the Oldman, Belly, and lower St. Mary rivers (i.e., below the St. Mary Dam). It grows to a total length of about 11.5 cm (4.5 inches), and does not have a swim bladder. It is a nocturnal feeder, consuming aquatic insects, molluscs and fish eggs. It prefers habitats with gravel, cobble or boulder substrates, and they usually avoid sand or silt substrates. The Eastslope/St. Mary sculpin spawns in the late spring. In various collections and writings about the fish species present in the Milk River, it has also been called the mottled sculpin and the shorthead sculpin.

This species was approved for listing as “Threatened” in Alberta in 2004. In 2006 it was listed in the Federal *Species At Risk Act*, under Schedule I, as “Threatened”. This sculpin was one of the fish species reviewed by the Milk River Fish Species at Risk Recovery Team, formed in 2004 to develop a joint federal/provincial recovery strategy for Milk River fish species at risk which would address the requirements of both the federal and provincial recovery processes. The species is at risk due to its extremely limited range in Canada.

Stonecat

The stonecat is the only member of the Catfish Family that occurs in Alberta, where it is found only in the Milk River. Stonecats are found in southern Manitoba, Ontario and Quebec. The maximum size recorded in Alberta is 25 cm (10 inches). They have spines in the pectoral and dorsal fins, and the pectoral fins have an associated venom gland. Stonecats have eight long barbels, with four being found on the chin, two in the corners of the mouth, and the remaining two in front of the nostrils.

Stonecats are primarily associated with cobble or boulder substrates. They feed at night, mainly on aquatic insects and small fish. They are occasionally caught by anglers. They are reported to spawn in late spring and summer, although some reports suggest they spawn later, during the peak summer water temperatures. Some degree of parental

guarding of the eggs is thought to occur. It is not known where the young rear.

This species was approved for listing as “Threatened” in Alberta in 2004. It is unlikely to have a future “at-risk” listing under SARA, since it occurs in a number of other provinces where its numbers are higher than in Alberta. It was one of the fish species reviewed by the Milk River Fish Species at Risk Recovery Team. The stonecat is at risk due to its extremely limited range in Alberta.

Tributaries

The mainstem Milk River has a number of tributaries which support fish populations. Some of the tributaries enter the Milk River mainstem outside of Alberta, and these will not be discussed in this document. Table 2 provides a listing of the tributaries in which fish collections have occurred, and the fish species they are known to support. Kennedy Creek does join the Milk River a few hundred metres south of the International Boundary, and the species listed below occur in the Alberta portion of the creek.

Table 2. Fish species collected in selected tributaries of the Milk River.

Tributary	Fish Species Collected
Shanks	fathead minnow, lake chub, white sucker
Lonely Valley	fathead minnow, northern pike, white sucker
Red	brassy minnow, brook stickleback, fathead minnow, Iowa darter, lake chub, longnose sucker, northern redbelly dace, white sucker, yellow perch
Van Cleeve	brook stickleback, fathead minnow, lake chub, longnose dace, white sucker
Police	fathead minnow, lake chub, white sucker
Breed	brook stickleback, Iowa darter, lake chub, longnose dace, longnose sucker, white sucker
Bear	lake chub
Kennedy	brassy minnow, fathead minnow, Iowa darter, lake chub, white sucker

Red Creek is the largest tributary in terms of discharge, and it supports the most diverse fish assemblage. One uncommon fish species inhabits Red Creek and some of the other tributaries; it is the brassy minnow. Brassy minnow have a sporadic distribution pattern in Alberta, since they occur in south-eastern Alberta, in the House and Athabasca rivers near Ft. McMurray, and in Musreau Lake near Grande Prairie. Brassy minnow are often found in conjunction with fathead minnow, and the juveniles of the two species are difficult to distinguish. It has been proposed that the provincial government complete a status report on the species, given its distribution and relative rarity in waters it does inhabit. This small minnow grows to about 8 cm in total length, and feeds on algae.

The occurrence of yellow perch in Red Creek is puzzling. They are often plentiful in lentic (standing) waters such as lakes and ponds, and do occur in slow-moving lotic (flowing) waters, such as the margins of larger rivers. They are, however, much less common in creeks. In the latter instance they are usually found in the confluence area with mainstem rivers, but in Red Creek they were collected a fair distance from the Milk River. Nelson and Paetz (1992) in the Fishes of Alberta did not report yellow perch occurred in the Milk River drainage.

There have been very few systematic collections of fish from Milk River tributaries. As such it is difficult to determine if the species composition has changed over time. All of the species in these creeks are native fish to Alberta, although as mentioned above, the origin of yellow perch in Red Creek is unclear.

Benthic Invertebrates

Apparently there has only been one study of Milk River benthic invertebrates, which was conducted in the spring and fall of 1986. The results of the study were contained in a report titled “Benthic invertebrate communities in the Milk River, Alberta and potential effects of a proposed impoundment”, authored by B. Cornish in 1988.

Cornish (1988) reported that the invertebrates collected in the North Milk and Milk rivers were ecologically tolerant and typical of taxa found in areas with high sediment deposition. Less tolerant families,

such a mayflies and stoneflies, occurred at all sites but in lower numbers. The less tolerant families occurred in higher abundance in the North Milk River, where water temperatures were cooler due to the input of St. Mary River water from the canal. In the spring, the highest abundance of invertebrates was found at the Weir Bridge, and the second highest abundance was at the Aden Bridge. The lowest abundance in the spring and fall occurred below the town in the Goldsprings Park Pond vicinity.

The most common taxa were Crustacea (crustaceans), Chironomidae (midges), Oligochaeta (freshwater earthworms), and Nematoda (roundworms). As H.F. Clifford said in the Aquatic Invertebrates of Alberta, “the word worm has no taxonomic significance. In fact anything that is round, wriggles, and too small to be hit with a club is sometimes called a worm.” The most common crustaceans were cyclopod copepods.

Entire Milk River
but not tributaries

- burbot
- flathead chub
- sauger
- stonecat
- trout-perch

Entire Milk River
and some tributaries

- brassy minnow
- brook stickleback
- fathead minnow
- lake chub
- longnose dace
- longnose sucker
- mountain sucker
- northern redbelly dace
- northern pike
- white sucker

Sporadic
Milk River
distribution

- yellow perch
- walleye

Eastern
Tributaries Species

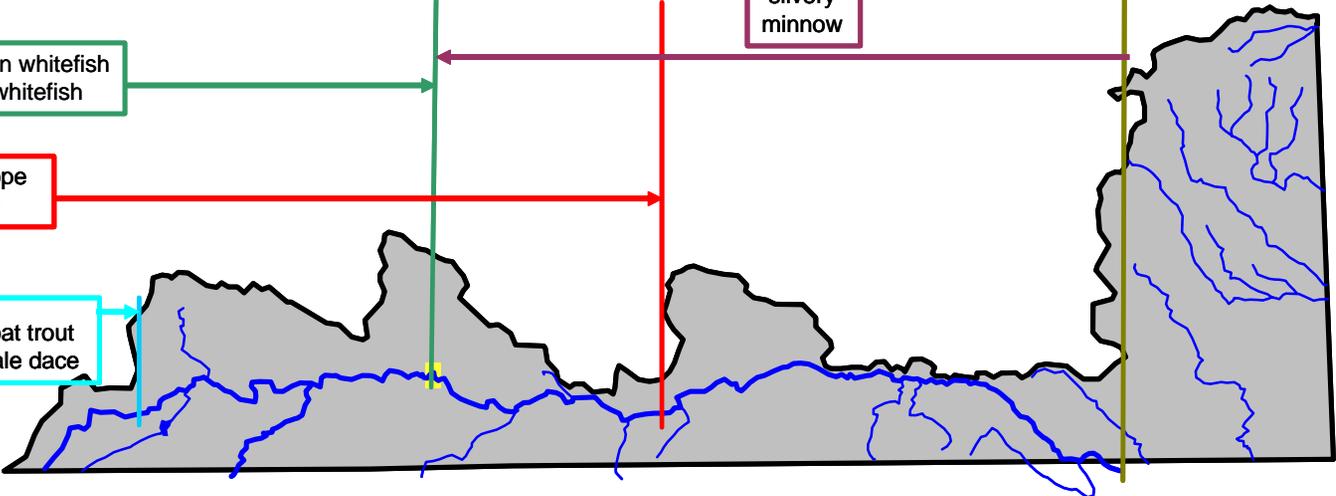
- brook trout
- rainbow trout

western
silvery
minnow

mountain whitefish
lake whitefish

eastslope
sculpin

cutthroat trout
finescale dace



Southern
Tributaries Species

- Iowa darter

