

Enhancement of Skeena Salmon Production and Habitat

Habitat enhancement has been ongoing since the native peoples first inhabited the Skeena watershed. Since the turn of the twentieth century, DFO has taken the lead role. Habitat enhancement includes major projects such as spawning channels, as well as relatively small, ongoing activities such as stream clearance projects. Many of the salmon caught that are the progeny of Skeena River stocks are produced with human assistance in hatcheries and artificial spawning channels.

Fish enhancement projects have been in operation sporadically since establishment of the first sockeye hatchery at Lakelse in 1901, which operated until 1937. The Babine Hatchery on Morrison Creek (River) operated from 1907 to 1936.

The Fisheries Research Board of Canada began investigations of sockeye salmon in the Babine system in the 1940s and extensive data have been gathered to date (e.g., McDonald and Hume 1984). Three distinct runs (early-, mid-, and late-timing) have been identified by tagging studies (Smith and Jordan 1973). We consider these runs to be subpopulations, rather than distinct populations, because they are connected by relatively high levels of gene flow as estimated from surveys of genetic variation in allozymes (Varnavskaya et al. 1994), mitochondrial DNA and microsatellite DNA (C.C. Wood, J.W. Bickham, and J.C. Patton, unpubl. data). Early investigations also revealed that sockeye salmon production from Babine Lake was limited by the availability of suitable spawning habitat (Johnson 1958). These conclusions led directly to the Babine Lake Development Project in the 1960s, an ambitious enhancement project involving the construction of flow control structures and large spawning channels in Fulton River and Pinkut Creek (West and Mason 1987).

Fulton River Spawning Channel

The Fulton River Project comprises the operation of two separate spawning channels. The original spawning channel (Channel 1) was built in 1965 and a second channel (Channel 2, which at five kilometres long is one of the largest in the world), was built in 1971. The Fulton River spawning channels produce on an average 100 million fry each year.



Pinkut Creek Spawning Channel

The Pinkut Creek Project was built in 1968. As with the channels at the Fulton River Project, the Pinkut Creek channel was built to produce additional sockeye fry that could take advantage of the rearing potential of Babine Lake. The Pinkut Creek spawning channel produce on an average 45 million fry each year.



The Pacific Salmon Foundation, May 14, 2014 report notes that **the Tahlo/Morrison Sockeye Salmon were enhanced from the 1907 - 1936 by the Babine hatchery and have likely been affected by the Pinkut and Fulton spawning channels since the 1960s.**

The Babine Salmon Hatchery

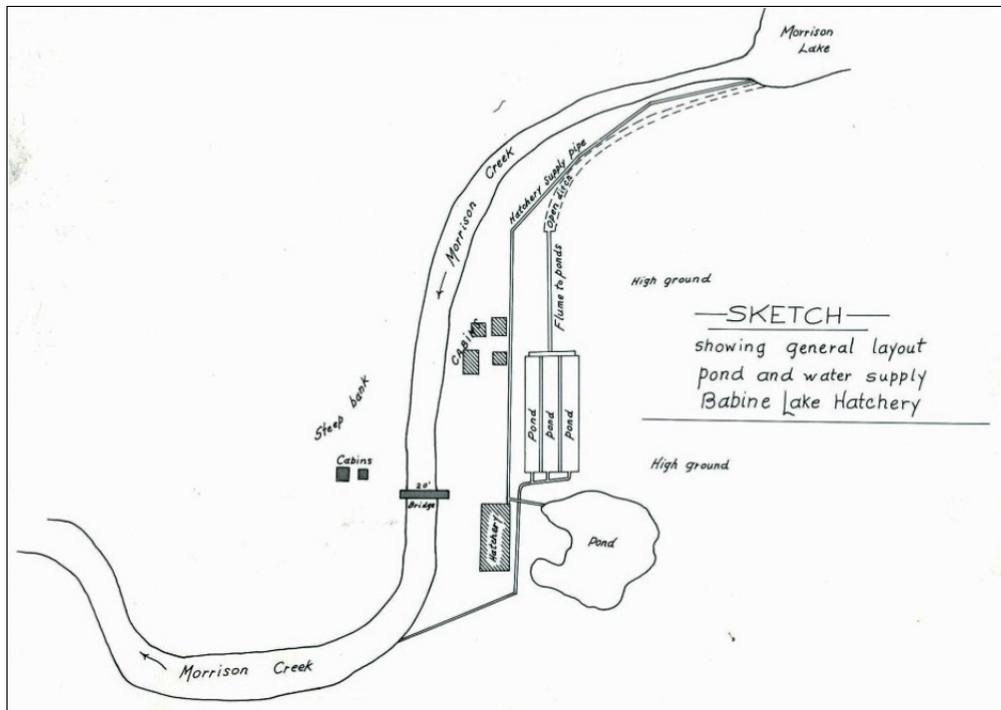
The Babine Salmon Hatchery was established in 1907 on Morrison Creek , one kilometer below the outflow of Morrison Lake. The Babine Salmon Hatchery operated until 1936, when it was shut down due to government cutbacks. In its first year of operation, the Babine Salmon Hatchery released 4.6 million fry.

Built with an 8 million annual sockeye egg capacity, the Babine Salmon Hatchery released a total of 170.9 million sockeye fry into the Morrison Watershed during its 28 years of operation. An additional 5.5 million fertilized eggs and 25 million "fingerlings" or yearlings were released.

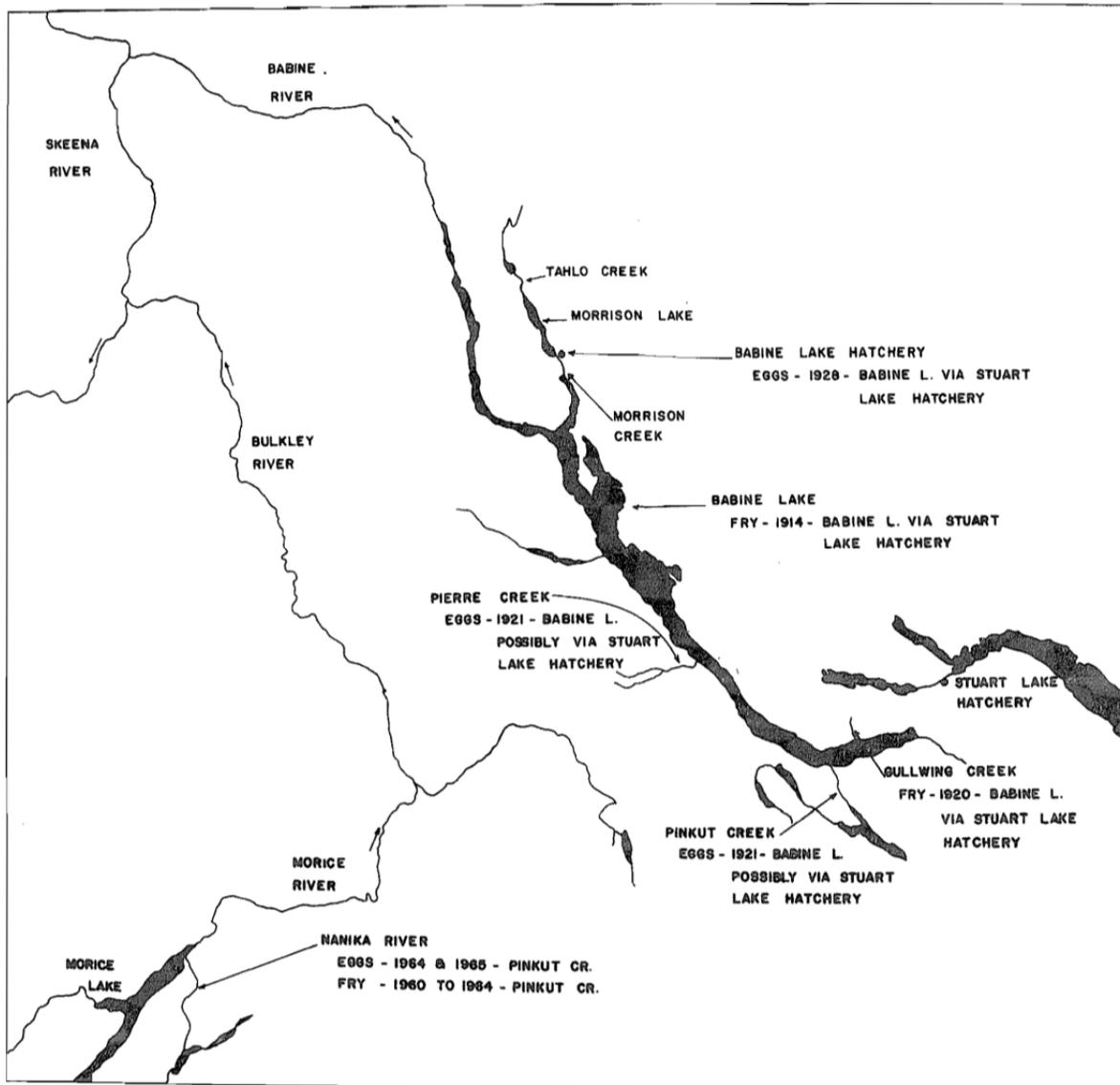
Eggs were obtained primarily from Morrison Creek and supplemented intermittently with eggs obtained from the Babine River, Fulton River, Morrison Lake, Pierre Creek, Pinkut Creek, Tachek Creek and Tahlo Creek as well as from the Stuart Lake Hatchery located in the Fraser River Watershed. In 1928, the Stuart Lake Hatchery's entire egg collection from Pierre and Pinkut creeks was transferred to the Babine Hatchery. From their own collection of eggs from Morrison Creek and eggs turned over from the Stuart Lake Hatchery the Babine Hatchery planted eggs in Tahlo Creek, fry and fingerlings in Morrison Creek, and fry in Morrison Lake.



Babine Hatchery at the Outlet of Morrison Lake, 1935



Layout of Babine Hatchery, Morrison Creek



Babine hatchery on Morrison Creek

References: "LBN Salmon Spawning Report 2010"; the "Transfers of Eggs and Young of Pacific Salmon within BC, Department of Fisheries and Oceans, March 1979, Fisheries and Marine and Service Technical Report No. 861"; "Skeena Salmon Program, Pacific Salmon Foundation May 14, 2014".

Morrison Lake Sockeye Spawning

Historically Sockeye Salmon have been observed spawning along the Shore of Morrison Lake to a limited extent (Bustard, 2004 and McMahon, V.H. 1948).

In 2010 and 2011, Pacific Booker Minerals Inc. funded Lake Babine Nation to conduct Sockeye Spawning surveys in Morrison Lake. In 2010 the Lake Babine Nation noted that the number of Morrison Lake spawners were *unknown*. In 2011, the sockeye populations of the Morrison Watershed experienced a relatively abundant return however the total number of Sockeye spawners observed in *Morrison Lake only totaled 224*. Table 3: Morrison Sockeye & Coho Escapement is extracted from the Lake Babine Nation Morrison Watershed Salmon Spawning Report 2011.

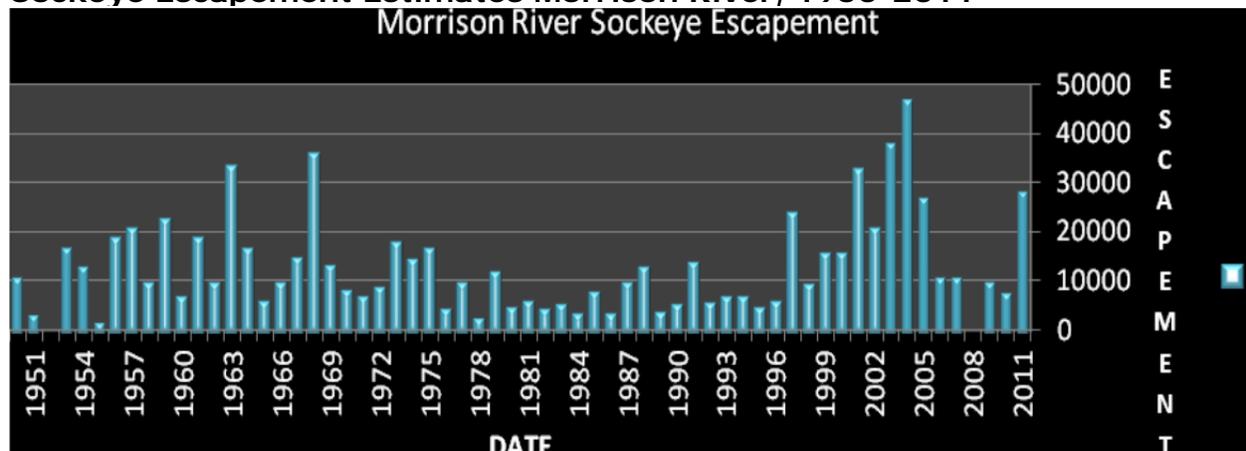
Table 3: Morrison Sockeye & Coho Escapement 2010 - 2011

	2010	2011
Morrison River - Sockeye	6,593	27,206
Morrison Lake - Sockeye	unknown	224
Lower Tahlo Cr - Sockeye	2,523	7,637
Upper Tahlo Cr - Sockeye	1,015	84
Morrison River – Coho	1,002	402

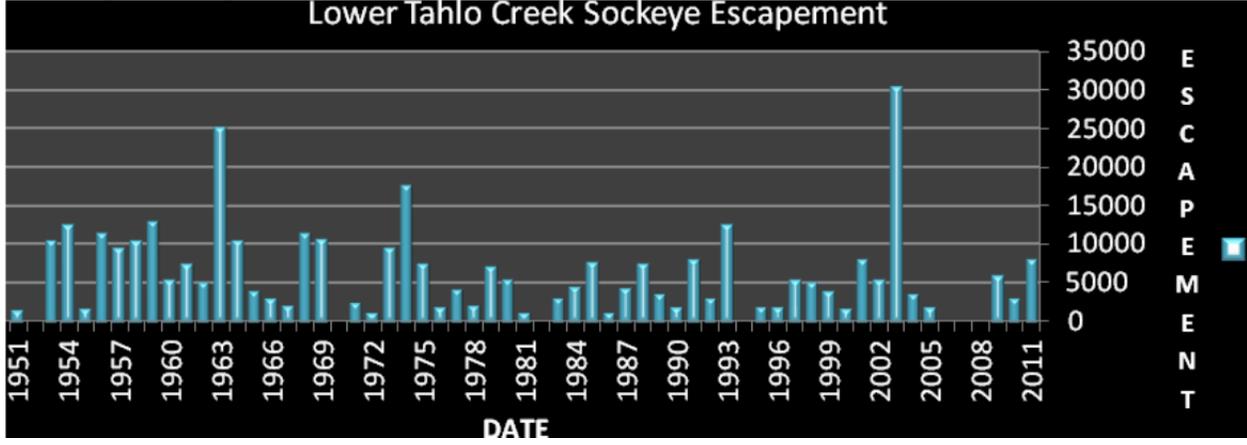
The Department of Fisheries and Oceans conducted annual salmon escapements into Morrison River and Tahlo Creeks since approximately 1930. Below are the Sockeye Salmon estimates for Morrison River, Lower and Upper Tahlo Creeks from 1950 - 2011. It should be noted that there are no escapement numbers for Morrison Lake. As noted above spawning along the shore of Morrison Lake has been observed to a limited extent.

In comparison Fulton River and Pinkut Creek draining into Babine Lake (**includes two major enhancement systems**) has a spawning capacity of capacity 381 million and 128 million spawners respectively.

Sockeye Escapement Estimates Morrison River, 1950-2011



Sockeye Escapement Estimates Lower Tahlo Creek, 1950 – 2011



Sockeye Escapement Estimates Upper Tahlo Creek, 1950 – 2011

