

Water Quality and Fishery Habitat Condition Survey of Hawk Inlet
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~ 3.5 sq mi.
or
~ 2,240 ac.

Hawk inlet is located on the northwest end of Admiralty Island. It is a relatively shallow and narrow inlet approximately 7 miles long. Greens Creek enters the inlet from the southeast about a mile from the inlet mouth. The Greens Creek watershed covers 23.5 sq mi and is by far the largest drainage to enter Hawk Inlet. The main stem of Greens Creek is about 10 miles long with an average gradient of 2.7 percent. The Zinc Creek watershed covers 4.7 sq mi and is adjacent to Greens Creek on the west. A small channel connects the two watersheds near their mouths, and some maps show Zinc Creek as a tributary of Greens Creek. These creeks periodically change their channels and exchange flows over time, as a function of the depositional processes that continue to form their delta. Cannery Creek encompasses about 1 sq mi and is adjacent to Zinc Creek.

Greens Creek Zinc Creek and Cannery Creek are the only streams tributary to Hawk Inlet that have the potential to be impacted by management activities. The Greens Creek Mine operation is situated adjacent to Greens Creek approximately 5 miles from the mouth. The mine docking facilities are located adjacent to the old cannery near the mouth of Cannery Creek.

Greens Creek and its tributaries are generally characterized as high quality water of low alkalinity and hardness. Most water quality parameters have low values and dissolved metal concentrations are frequently at or below the detection limits. Greens Creek has a very high natural sediment load for a non glacial stream. The average annual suspended load is estimated to be 9,400 tons per year. Estimates of average annual bed load range from 4,400 to 16,000 tons per year. Thus total sediment load is estimated to range from 14,000 (USFS) to 26,000 tons per year (Norand). The majority of Greens Creek sediment is believed to originate from numerous landslides, some of which encroach upon the stream channel (USDA, 1983).

Zinc Creek was named for the high concentration of zinc found in its sediments. The stream has very high levels of tannins, lignins, and total organic carbon, which exceed the maximum color criteria established for drinking water under state water quality standards. In addition high levels of arsenic, zinc, and aluminum are present, but they do not exceed the EPA aquatic life criteria.

Cannery Creek shows high levels of color and organic carbon similar to Zinc Creek. These levels are attributed to the large proportion of muskeg found in the drainage basin.

Measurements of marine water quality near the cannery indicate concentrations of inorganic nutrients are low or below detection limits at the surface but increased with depth to 27 fathoms. High surface nitrate and iron values near the mouth of Hawk Inlet are attributed to the influx of fresh water from Greens Creek. Limited ongoing baseline marine water quality studies show the metal concentrations in Hawk Inlet and outside the sill vary with location, from below detection limits to near acute levels (for lead). Most measurements outside the sill approach average world ocean quality.

Greens Creek substrate ranges from uncompacted deep sand near the mouth, to pebble/cobble with some sand upstream. There are few pools, and periodic floods

flush the stream bed preventing silted areas. Greens Creek below the lower falls (4 miles upstream from mouth) provides good to excellent spawning habitat for pink salmon, chum salmon, coho salmon, and Dolly Varden char. Rearing habitat for juvenile coho salmon and Dolly Varden char is generally fair to good, with good to excellent habitat occurring in braided channel sections.

Zinc Creek contains finer sediments due to its low gradient. Zinc Creek meanders through a flat meadow for much of its length, and has a tea color from muskeg drainage. An anadromous fish barrier exists 2.2 miles from the mouth. Zinc Creek has good to excellent spawning habitat for pink and chum salmon, and good spawning habitat for coho salmon, Dolly Varden Char, and anadromous cutthroat trout. Excellent coho salmon rearing habitat occur in brackish pools and tributaries within the delta near the mouth of Zinc Creek.

The large tidal variation (maximum 26 feet), and the presence of the shallow Greens Creek delta, strongly influence the circulation patterns near the mouth of Hawk Inlet. Maximum current velocities of 2 to 3 feet per second occur at the Greens Creek sill on flooding tides. Current patterns are complex and velocities decrease with depth.

Salinity and temperature profiles in Hawk Inlet indicate that the waters are well mixed. No true estuarine environment exists at the mouths of Greens Creek, Zinc Creek, or within Hawk Inlet. Baseline samples from the mouth of Hawk Inlet indicate the water is similar to normal sea water. However, silver, lead, and copper may be slightly higher than suggested criteria for aquatic life.

Baseline sediment data from Hawk Inlet indicate higher than normal amounts of lead, chromium and zinc, and reflect the mineral composition of the drainage area. Marine benthic organisms in general reflect the metal concentrations in the sediments, with the exception of silver which is also high in tissue samples

Greens Creek Mine has an ongoing water quality monitoring program. Data and reports are submitted to the Alaska Department of Environmental Conservation. Occasional violations of the NPDES point source discharge requirements have occurred, but the company reacted quickly to correct the problems. With the exception of elevated cadmium levels (0.04 ppm) in Greens Creek, no pollutants attributable to the mining operation have been detected in the receiving water. However, elevated copper, lead, and zinc levels, probably associated with an ore spill, have been measured in the sediments near the loading dock.

Professional judgment indicates that the waters of Greens Creek, Zinc Creek and Hawk Inlet are unimpaired from both the water quality and fisheries habitat standpoints. However a vigorous water quality program that tests both effluent, receiving water and background water quality needs to be maintained.

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Bibliography

USFS, Greens Creek Final EIS, Jan 1983; pgs 3-1 thru 3-14

GREENS CREEK PROJECT EIS

PRINCIPAL SITES

- | NO. | LOCATION |
|---------------------|--|
| ① | UPPER GREENS CREEK |
| ② | B&W SORE CREEK |
| ③ | LOWER EAST MINE DRAINAGE |
| ④ | UPPER WEST MINE DRAINAGE |
| ⑤ | LOWER WEST MINE DRAINAGE |
| ⑥ | MIDDLE GREENS CREEK |
| ⑦ | LOWER GREENS CREEK |
| ⑧ | ZINC CREEK ABOVE TRIBUTARY |
| ⑨ | ZINC CREEK TRIBUTARY |
| ⑩ | ZINC CREEK BELOW TRIBUTARY |
| ⑪ | CANNERY CREEK |
| MISCELLANEOUS SITES | |
| NO. | LOCATION |
| ⑫ | MINE ADIT DISCHARGE EAST |
| ⑬ | MINE ADIT DISCHARGE EAST BELOW SEDIMENT POND |
| ⑭ | MINE ADIT DISCHARGE WEST (DISCONT) |
| ⑮ | DRILL STATION NO. 7 |
| ⑯ | DRILL STATION NO. 9 |
| ⑰ | DRILL STATION NO. 18 - CROSSCUT |
| ⑱ | BIG SORE SEEP |
| ⑲ | PILEDRIVER TAILINGS DRAINAGE NORTHEAST |
| ⑳ | PILEDRIVER TAILINGS DRAINAGE SOUTHWEST |
| ㉑ | ZINC CREEK TRIBUTARY EAST FORK |

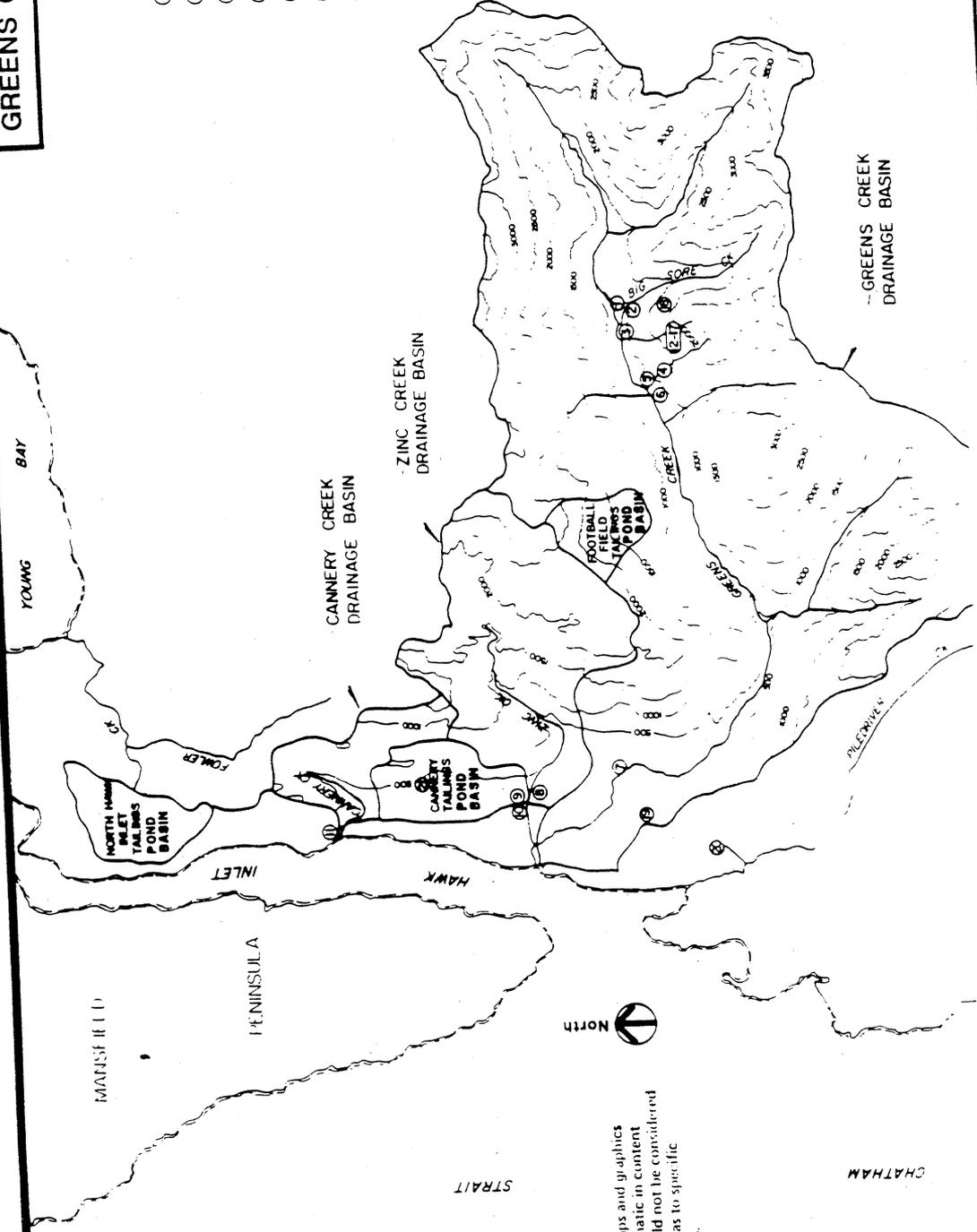


Figure 2-17

Water Quality and Flow Monitoring Sites