DRAFT

Waterbody Assessment

Alaska Department of Environmental Conservation

PEDERSON HILL CREEK

Background Information

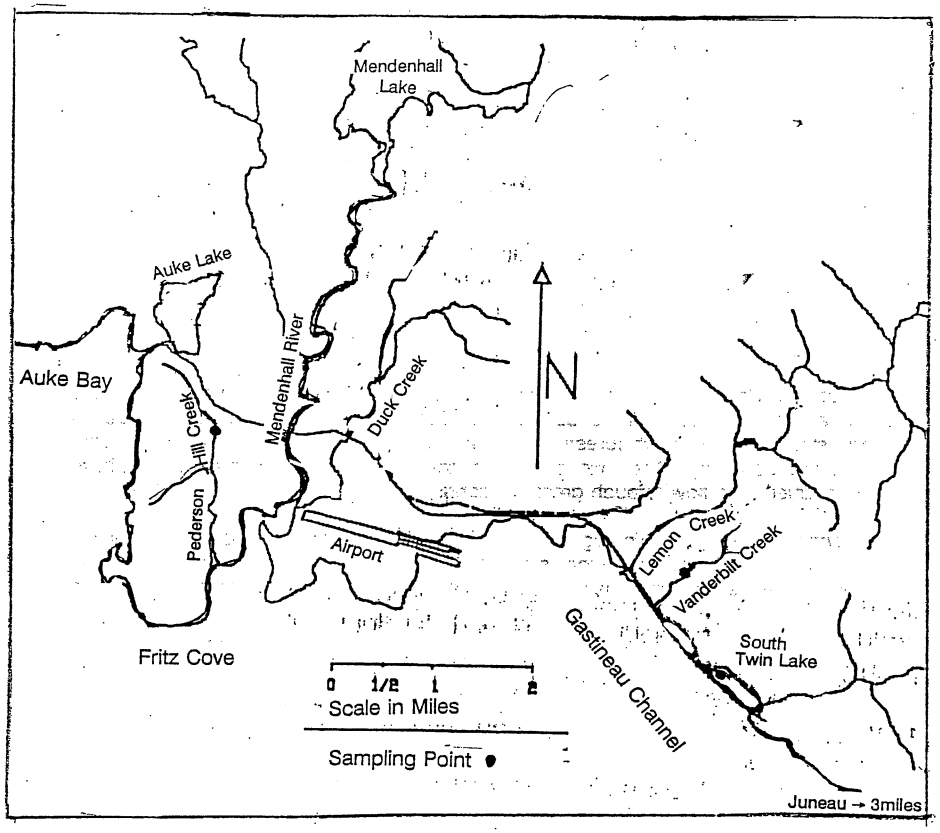
The Waterbody of concern is located about 10 miles northwest of downtown Juneau. Pederson Hill Creek, also called Casa Del Sol Creek, originates on the eastern slope of Pederson Ridge and drains an area of more than 1000 acres. The largest tributary, identified as "westfork", originates on Pederson Hill Ridge on the Mendenhall Peninsula and passes under Engineers Cutoff Road via a culvert at about .3 mile form the intersection with Glacier Highway. A smaller tributary also crosses Engineers Cutoff Road about 50 yards form the Glacier Highway Intersection and enters Pederson Hill Creek behind the small commercial development on Sherwood Lane (Bethers, Monk, and Seiffert, 1993). A number of smaller tributaries and ditch drainages originate in the wetlands south of Glacier Highway and enter Pederson Hill Creek between the parking area across the commercial building and the Juneau Golf course. Figure 1 shows the study area location.

The total length of Pederson Hill Creek is about 2 miles, including and an intertidal section of about 1 mile. The stream runs through a large wetlands area and enters saltwater in the Mendenhall Wetlands State Game refuge. On the average, both major tributaries are 3 to 4 feet wide and up to 1 foot deep. In the wetlands, they are 3 to 5 feet wide and 1 to 3 feet deep (Bethers et al., 1993).

Westfork tributary passes through an area that receives runoff from an unsewered residential area and ditches on Peninsula Road. Increased turbidity has been measured in this tributary below Peninsula Road during February (Adamus, 1987). Several smaller tributaries or drainages flow through the wetlands between Sherwood Lane and Industrial Park and enter the Pederson Hill Creek at its mid-section from the southeast (see Figure 2). During heavy rainfall, these minor tributaries carry runoff from parking lots, an industrial storage area, and a fire training center.

The study area has a temperate maritime climate, with relatively mild winter temperatures in the range of 10 - 40 °F, and cool summers with temperatures generally staying in the range of 50 to 70 °F. The area studied receives considerable precipitation throughout the year, with about 70 inches annually. Stream flow is lowest during the winter months and during several weeks in the summer.

Figure 1. Area Location Map



Most of the land along Pederson Hill Creek is under private ownership. The intertidal portion of the stream, located in the Mendenhall Wetlands State Game Refuge, is under state ownership.

Areas along the upper main stream have been developed into a small commercial center. Wetlands to the east of Sherwood Lane have been filled to accommodate parking, an industrial equipment storage area, and the Juneau Fire Department Training Center. The area is zoned for industrial development and other requests for wetland fill permits and City conditional use permits are anticipated.

Road construction has altered the streams natural flow and hydrology; all tributaries in the upper reaches of the stream system have been crossed by roads. The tributaries pass through culverts which seem to accommodate fish migration adequately. A water withdrawal dam, located upstream from Engineers Cutoff Road appears also not to be a barrier to migrating fish, except at low water levels. Rearing coho salmon have been documented above the dam on the upper main stream.

Fish Habitat

Pederson Hill Creek is a small but valuable producer of coho salmon, cutthroat trout and Dolly Varden. The stream has not been stocked (Bethers et al., 1993). The upper reaches of the stream flow through forested areas and provide excellent fish habitat for both rearing and spawning. The lower sections of the tributaries and the main stream have a low gradient and flow through grassy wetlands.

Concentrations of available nitrogen and phosphorus in the tidal portions of Pederson Hill Creek and its tributaries are high, stimulating algal growth and also resulting in low turbidity. These factors may help to support large numbers of salmonids found in this area (Adamus, 1987). This intertidal area has been found to be an important springtime habitat for pink and chum salmon fry from other local streams (Bethers at al., 1993).

Water Quality Concerns

Specific water quality concerns for Pederson Hill Creek are high fecal coliform bacteria levels and water quality degradation through runoff from roads, and wetland fills and other construction activities. Problems with high fecal coliform counts have been documented. However, interpretation of the coliform measurements needs to be made in comparison to other local area coliform levels. Suspected sources are improperly constructed septic systems, unsewered residences and animal pastures. The actual sources have never been confirmed.

Other water quality concerns include potential runoff containing chemicals from the fire training center, runoff from parking lots, wetlands losses and stream bed relocation or alteration.

Beneficial Uses Affected:

a) Fish Habitat

Although the Pederson Hill Creek is not a major fish producing stream, it provides good habitat for salmon fry from other local streams. The stream is located within a high density urban area, with an ever increasing demand for accessible fishing spots. To preserve both fishing spots and fish habitat uses, it is important that water and sediment quality are preserved. Of concern are future habitat impacts to the stream bed, resulting from additional road or driveway construction and other developmental activities. Clearing of trees adjacent to the creek to make room for construction projects could lead to a decrease in shade cover at the mid to upper portions of the tributaries, resulting in the degradation of salmon habitat. Figure 2 identifies habitat areas and pollutant sources.

b) Wetlands functions:

Most of the study area is classified as wetlands; 73% of all development in the west Mendenhall area since 1948 has occurred in wetlands at a rate of 3.3 acres per year. Further losses are expected from future development.

Destruction of wetlands and loss of their beneficial functions will impact fish habitat quality and aquatic invertebrates in the stream area and its estuaries. Loss of wetlands will decrease the retention and purification of chemicals and sediments contained in runoff from construction sites and parking lots.

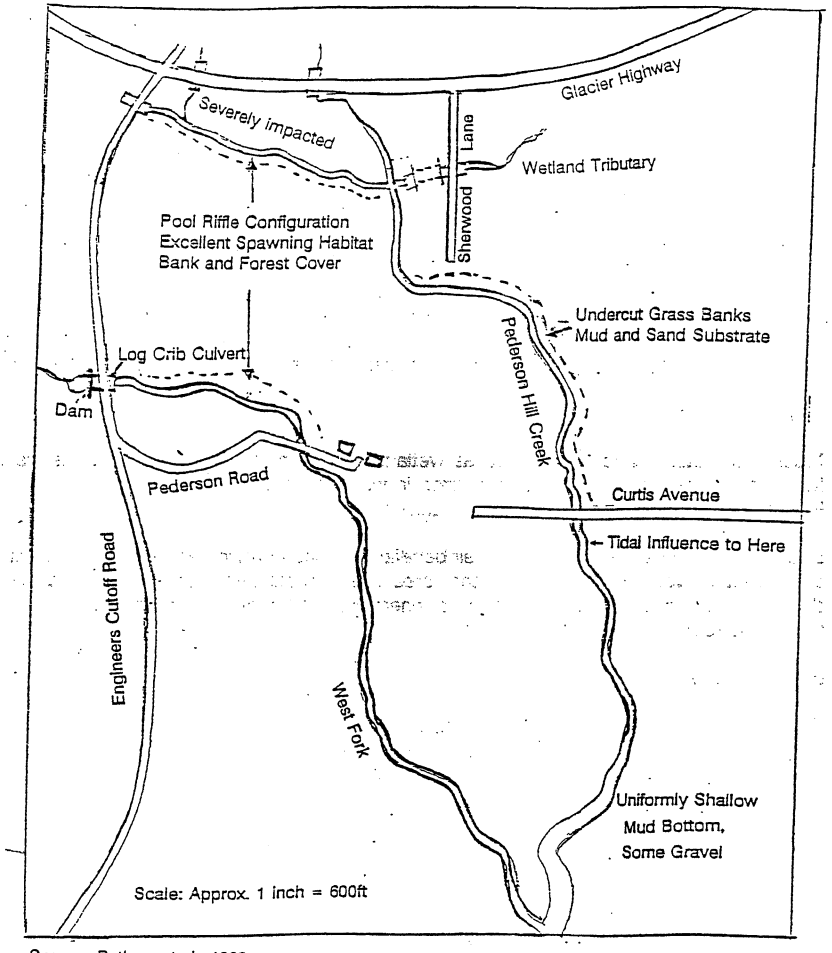
c) Recreational and residential uses:

There is little documentation of public recreational uses of Pederson Hill Creek itself. In the wetlands portion, there is heavy use by waterfowl hunters. Potential uses are fishing, wildlife watching. Other recreational uses are horseback riding along the mid-section of the stream and a golf course near the intertidal zone.

d) Commercial uses and economic development:

Commercial uses currently consist of a small commercial development that does not rely on water uses and is not directly affected by water quality impacts. However, further commercial developments and residential and other construction activities requiring wetland fills or re-channelling of the stream bed will be economically impacted by more stringent requirements for obtaining permits. The Department of Environmental

Figure 2. Habitat Map and Area Features



Source: Bethers et al., 1993

Conservation has established a policy for projects adjacent to water quality-impaired waterbodies, stating that future permits will include provisions to prevent discharges of pollutants and further destruction of fish habitat, and other potential uses (Menge, ADEC Memo 1993).

Applicable Water Quality Standards

The Alaska Department of Environmental Conservation (ADEC) has designated Pederson Hill Creek as water-quality impaired. In addition, it is listed on the Department's Section 303(d) list od waters, subject to a Total Maximum Daily Load (TMDL) assessment process. The primary pollutants of concern are fecal coliform. Other concerns are sediment discharge into the stream from non-point sources. The water quality standards that apply to Pederson Hill Creek are the State of Alaska's Water Quality Standards, as revised in 1989 (18 AAC 70). The stream is classified for multiple uses and the most stringent criteria apply. Protected water uses under 18 AAC 70.020 include water supply, water recreation, and growth and propagation of fish and shellfish, other aquatic life and wildlife. For most of Pederson Hill Creek fresh water quality standards apply. For the intertidal zone of the stream, criteria for estuarine waters apply.

Pederson Hill Creek is presently not used for drinking water supply, aquaculture, agriculture, contact recreational purposes, or for industrial water use. While all uses need to be protected unless the waterbody is exempted from a particular use, the water quality criteria for the use of fish and shellfish propagation are of principal concern. These criteria are summarized in Table 1.

Chemical Monitoring Data

Available chemical data for Pederson Hill Creek consist of monitoring data collected from one location by ADEC in 1991 and sampling in response to a spill in 1993.

In 1991, three sets of surface water data were collected from the upper portion of the main stream mid section of Pederson Hill Creek, as part of the Juneau Streams Monitoring project. Samples were collected during February, May and September. The parameters analyzed included heavy metals, inorganic non-metals, fecal coliform bacteria and volatile and methylenechloride extractable organics. The sampling location is not representative of all sources that could contribute to water quality impacts.

Table 2 summarizes the results. Metals concentrations in stream bed sediments or sediment deposition have not been measured. Copper and zinc were not included in the study. Suspended solids and dissolved solids concentrations were low, with most of the parameters not varying appreciable between the results from the three different sampling episodes. However, coliform and nitrate values were much higher for the May samples.

Table 1.
1989 Alaska Water Quality Standards for
Propagation of Fish and Shellfish - Freshwater

pH	Shall not be less than 6.5 or greater than 9.0. Shall not vary more than 0.5 pH unit from natural conditions.
Temperature	Shall not exceed 20°C at any time. The following maximum temperature shall not be exceeded, where applicable: Migration routes: 15°C Spawning areas: 13°C Rearing areas: 15°C Egg & Fry incubation: 13°C
Dissolved Oxygen	D.O. shall be greater than 7 mg/l in waters used by anadromous and resident fish. In no case shall D.O. be less than 5 mg/l to a depth of 20 cm in the interstitial waters of gravel used by anadromous or resident fish for spawning (See Note 2). For waters not used by anadromous or resident fish, D.O. shall be greater than or equal to 5 mg/l. In no case shall D.O. above 17 mg/l be permitted. The concentration of total dissolved gas shall not exceed 110% of saturation at any point of sample collection. D.O. concentrations in estuaries and tidal tributaries shall not be less than 5.0 mg/l except where natural conditions cause this value to be depressed. In no case shall D.O. levels above 17 mg/l be permitted. The concentration of total dissolved gas shall not exceed 110% of saturation at any point of sample collection.
Coliform	Not applicable to fish and shellfish propagation.
Turbidity	Shall not exceed 25 NTU above natural condition level. For all lake waters, shall not exceed 5 NTU over natural conditions.
Total Suspended Solids	No criteria in 1989. Adoption of criteria is being considered.
Total Dissolved Solids	Total dissolved solids shall not exceed a maximum of 1,500 mg/l, including natural conditions. Increase in TDS shall not exceed one-third of the concentration of the natural condition of the body of water.
Sediment	The percent accumulation of fine sediment in the range of 0.1 mm to 4.0 mm in the gravel bed of waters used by anadromous or resident fish for spawning may not be increased more than 5% by weight over natural conditions (as shown from grain size accumulation graph). In no case may the 0.1 mm to 4.0 mm fine sediment range in the gravel bed of waters used by anadromous or resident fish for spawning exceed a maximum of 30% by weight (as shown from grain size accumulation graph). (See Notes 3 and 4). In all other surface waters no sediment loads (suspended or deposited) shall be present which can cause adverse effects on aquatic animal or plant life, their reproduction or habitat.
Residue	Shall not alone or in combination with other substances or wastes cause the water to be unfit or unsafe, or cause acute or chronic problem levels as determined by bioassay or other appropriate methods. Shall not alone or in combination with other substances cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines, or cause leaching of toxic or deleterious substances, or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.

Source: 18 AAC 70.020

Table 2. ADEC Chemical Monitoring Data for Pederson Hill Creek

Parameter	Units	Aquatic Life Criteria	Date	Results	Date	Results	Date	Results
Dissolved O_2	mg/L	>7	2/19/91	13.2	5/7/91	11.6	9/5/92	10.3
Temperature	° Celsius	≤20	2/19/91	1	5/7/91	7	9/5/92	11
pH	-	6.5 - 9.0	2/19/91	5.46	5/7/91	6.65	9/5/92	6.55
Conductivity	µS/cm 25°C	-	2/19/91	80	5/7/91	85	9/5/92	60
Turbidity	NTU's	Amb. + 25	2/19/91	21	5/7/91	4.03	9/5/92	5.1
Alkalinity	mg/L $CaCO_3$	-	2/19/91	13.7	5/7/91	24.3	9/5/92	14.5
Arsenic	µg/L	≤50	2/19/91	< 2.1	5/7/91	< 2.1	9/5/92	5.1
Barium	µg/L	≤1000	2/19/91	16	5/7/91	18	9/5/92	18
Cadmium	µg/L	≤10*	2/19/91	< 0.2	5/7/91	< 0.19	9/5/92	4.3
Chromium	µg/L	≤50*	2/19/91	< 2.0	5/7/91	< 1.7	9/5/92	6.9
Lead	µg/L	≤50*	2/19/91	< 1.0	5/7/91	1.2	9/5/92	2.9
Selenium	µg/L	≤10	2/19/91	< 1.3	5/7/91	< 1.3	9/5/92	< 1.3
Silver	µg/L	≤0.12	2/19/91	< 0.3	5/7/91	1.1	9/5/92	0.6
Mercury	µg/L	≤0.012	2/19/91	< 0.11	5/7/91	0.25	9/5/92	< 0.11
TDS	mg/L	≤500	2/19/91	55	5/7/91	76	9/5/92	80
TSS	mg/L	-	2/19/91	< 11	5/7/91	< 11	9/5/92	< 4.1
VOC	µg/L	≤10 Total	2/19/91	< 1.0	5/8/91	< 1.0	9/5/92	< 1.0
MCEO	mg/L	-	2/19/91	< 1.0	-	-	9/5/92	n.a.
Nitrates	mg/L	≤10.000	2/19/91	130	5/30/91	890	9/5/92	< 0.05
Fecal Coliform	MPN	≤20/100 ml.	2/11/91	80	6/10/91	2400	9/5/92	**150

< ### = Less than the Method Detection Limit value indicated by the ###.
MCEO = Methylene chloride extractable organics.
* = Maximum contaminate level from the Drinking Water Standards.
** indicates fecal coliform analysis by membrane filter method.

Cadmium and chromium were significantly higher during September. The State freshwater quality standard for cadmium (2 µg/L at 200 mg/L $CaCO_3$) was exceeded during September 1991. The freshwater criterion for mercury (0.012 µg/L) was exceeded in May; no mercury was detected during the other two measurements at detection limits of ≤ .11 µg/L.

The ADEC data do not show any measurable water quality impact from organics in the water column. However, chemical runoff from the fire station or from the industrial storage area would have gone undetected because it enters Pederson Hill Creek below the sampling station. Ammonia, which is often associated with high coliform levels, was not included in the measurements, and need to be included in future monitoring.

In April 1993 ADEC responded to a spill on Pederson Hill Creek, coming from a shot rock gravel pad adjacent to the fire training center. Samples were collected and analyzed for organics. The presence of diesel-related petroleum hydrocarbons was confirmed.

Biological data

Biological monitoring data are reported in the Juneau wetlands study (Adamus, 1987). These include data on nutrients, fish habitat characteristics, and fish counts. Selected fish habitat characteristics data for Pederson Hill Creek (identified as Casa del Sol Creek) are summarized in Table 3.

Table 3. Pederson Hill Creek Habitat Characteristics in Comparison to Averages in Juneau Streams

	Area Averages	Pederson Hill Creek	
Overhanging Vegetation (%/reach)		50.23	59.74
Max. Depth (feet)	-	1.0+	
Gravel (2=most)	1.22	1.76	
Fines (2=most)	1.15	0.39	
Soft Sediment Depth	0.86	0.63	
Shade (4=most)	2.29	3.50	

Source: Adamus, 1987

Good shading, the presence of coarse gravel and overhanging vegetation are habitat characteristics indicative of providing good fish habitat. Shaded areas of Pederson Hill Creek are ranked highest of all Juneau area streams. Large portions of the stream is shaded and low water temperatures, necessary for good salmon habitat are maintained. Coarse gravel content and overhanging vegetation are above the average for local streams. Pederson Hill Creek is a relatively small producer of Coho and Dolly Varden. Minnow trap data for Pederson Hill Creek have been collected by the Department of Fish hand Game in April 1985, these are summarized in Table 4.

Table 4. 1985 Minnow Trap Data For Pederson Hill Creek

Area	Number of Traps	Coho	Dolly Varden
Main Stream	10	66	6
West Fork	10	12	5

Source: Bethers et al., ADFG 1993

Pollutant Sources

The main water quality impacts to Pederson Hill Creek have been documented to be from fecal coliform bacteria contamination. Other contributions to water quality impacts to Pederson Hill Creek may result from sedimentation as a result of non-point source site runoff, wetland fills, and stream bank disturbances and variety of construction activities in the past and present. Potential pollutant sources for coliform bacteria, chemical and sediment runoff are identified earlier in Figure 2.

Coliform contamination

Coliform contamination of Pederson Hill Creek is well documented. Measured values were above state water quality criteria for all designated uses. Values as high as 2400 FC/100ml were reported in 1991. No measurements were taken in 1992 or 1993.

The principal suspect sources for coliform contamination are a horse barn and pasture uphill from the smaller northeastern tributary of Pederson Hill Creek adjacent to Glacier Highway. Other horse pastures are located at the mid-section of the creek, just north of the Juneau golf course, with runoff directly into the creek. A horseback trail passes along Pederson Hill creek along the mid-section of Pederson Hill Creek could also contribute to coliform contamination.

Other sources of fecal coliform are unsewered residences or improperly constructed or maintained septic systems. A sewage problem was investigated in 1985 originating from the commercial building next the troopers building. The problem was corrected through construction of a drainage field. However, measurements taken in 1991 still showed high coliform levels. Additional monitoring at more frequent intervals and locations is needed to determine the extent and persistence of coliform contamination.

Non-point source runoff

Sources for non-point source runoff are located throughout the length of the stream, with exception of the intertidal zone. Sources for sediment runoff include Glacier Highway, new construction sites adjacent to Glacier Highway, the parking lots on either side of Sherwood Lane, an industrial storage gravel pad and the Juneau Fire Training Center. Runoff from the Parking lots behind the troopers building can enter directly into the stream, there is no vegetation barrier or drainage ditch. Construction and clearing activities between Engineers Cutoff Road and Pederson Hill Creek could result in stream bank disturbances, discharges of wood debris and a reduction in the creek's shade cover.

There is the potential for chemicals entering Pederson Hill Creek with runoff from the fire training center. Runoff from the site enters via a ditch into Pederson Hill Creek. The industrial gravel pad also may be a source for leaks, or spills. The materials stored on site have not been clearly identified. A spill occurred in this area in spring 1993, which resulted in release of diesel related petroleum hydrocarbons to the creek. There is no barrier to prevent runoff directly into a ditch draining into Pederson Hill Creek.

A new rock quarry is currently being developed just north of the Glacier Highway / Sherwood Lane intersection. Construction activities began without prior approval, with a possibility of improperly contained construction runoff. The permit status of this project is not known. The potential and route of runoff from the site draining into Pederson Hill Creek needs to be investigated.

There appear to be no impacts to Pederson Hill Creek's water quality from the Golf Course. However, there may have been some impacts in the past to the stream banks and stream beds during the construction of foot bridges and walkways on the lower, intertidal portion of the stream.

Although there is a good understanding of the general types of the pollutants and their sources, more definite information is needed to determine current pollutant discharges and to identify individual sources. A thorough survey of the whole area, routine periodic updates with monitoring at locations indicative of water quality impacts will be necessary to determine the true status of the water quality and fish habitat of the stream.

Actions to Date

State Actions

a)Sewage and agricultural runoff problems:

Historically Pederson Hill Creek has been contaminated with high levels of fecal coliform bacteria. In 1985 ADEC has investigated reported septic leaks from the commercial building on Sherwood Lane. The problem has been adequately corrected, but coliform contamination of the creek still continues. There are no records of any controls being required or implemented on the animal barn uphill from the upper portion of Pederson Hill Creek.

Generally, residential sewage discharges are controlled through state on-lot permits. Information on existing on-lot permits and related state actions needs to be reviewed to assess the status of domestic waste water discharges. Compliance with on-lot permit requirements will be necessary to control future contamination of the wetlands and Pederson Hill Creek and its tributaries.

b) ADEC Monitoring:

ADEC collected samples from one site in Pederson Hill Creek as part of the Juneau Streams Monitoring project in 1991. Samples were collected in February, May and September and were analyzed for organic and inorganic constituents. Results did not indicate gross water quality contamination. However, high fecal coliforms were measured and one set of samples exceeded state water quality standards for some of the metals (cadmium, mercury). The sampling site was chosen because it appeared to provide a good estimate of average water quality conditions of Pederson Hill Creek. However, in order to be representative of all sources and conditions throughout the stream, additional samples need to be collected to get a better description of the spectrum of water quality conditions of the whole stream.

c) Oil Spill:

In April 1993, an oily sheen on Pederson Hill Creek near the troopers' building was reported. ADEC investigated the incident and samples were taken and analyzed for

chlorinated hydrocarbons and petroleum hydrocarbons. The results indicated diesel-related petroleum hydrocarbons. The source of the spill was traced to the industrial gravel pad opposite the troopers building. The owner contained the spill and all seepage form the site by installing an intercept basin and inverted pipe coffer dam. A week after the spill some oily sheen was still observed, possibly from residual oil adhering to grass on the stream banks. The party responsible for causing the spill was not identified.

d) Site Survey:

On May 20, 1993, a cursory site survey was conducted, to document existing commercial activities, ongoing construction and general features of the terrain. The survey also included an assessment of residences along Engineers Cutoff and Mendenhall Peninsula Roads. During the survey, the stream bed of the upper tributaries were not identified. The exact location of the culverts draining runoff from the animal barn, rock quarry and a church construction site across Glacier Highway (1, 2, 16) were obscured by dense vegetation. Figure 3 identifies landmarks and observations of the site survey.

Water in Pederson Creek between location 9 and 10 was brackish with a thin white/transparent emulsion floating on the surface . This floating material was also observed further down from this location. It is likely that this sheen originated from organic plant matter; the same emulsified white material was observed in water from containers holding flowers picked from a nearby area.

The gravel pad storage area (8) was identified as a potential site for spills or runoff. Items stored on this site included trucks, a railroad container, storage tanks and cylinders of unknown contents.

Two horse pastures (9), separated by a dirt road (Curtis Avenue), were identified as potential sources for coliform contamination of the lower portion of the stream.

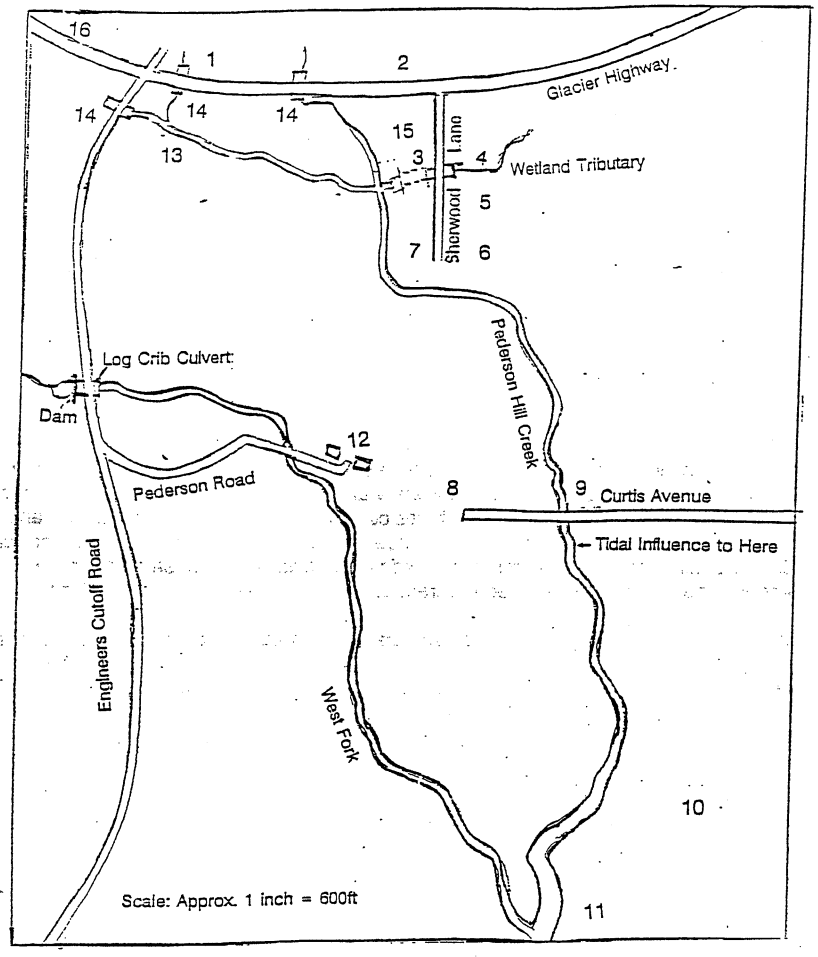
The parking areas behind the commercial buildings (3,7) were identified as a source for non-point runoff - no drainage ditches or vegetation barrier separates the parking area from the creek.

Potential problem areas exist between Engineers Cutoff Road and Pederson Hill creek (13), some old residences and structures, gravelly areas and freshly cleared woods could impact the creek.

City and Borough of Juneau

City and Borough of Juneau conditional use permit files, covering the period from 1969 to 1992, showed that the animal pasture and agricultural operations are exempt from

Figure 3. Identification of Sources and Landmarks



1. Animal Barns and Pastures
2. Church Construction
3. Forest Service Lab
4. Parking Gravel Fill
5. Grasle Storage Pad
6. Fire Training Building
7. Troopers Building
8. Industrial Storage Area
9. Horse Pasture
10. Golf Course
11. Tidal Flats
12. Residences
13. Residences, Gravel Fills, Cleared Areas
14. Culverts
15. Medical Offices
16. Rock Quarry

requiring a conditional use permit because they have operated prior to the city zoning laws and because no complaints on any adverse impacts were reported.

Records on the ongoing church construction on Glacier Highway across from Sherwood Lane intersection identify the construction of a 50 car parking lot and a wetlands fill affecting about .55 acres. The documents describe a culvert construction without identifying its exact location. Runoff from the parking area presumably drains into the wetlands northeast of Glacier Highway.Dated 1984, files on the medical building near the Sherwood Lane / Glacier Highway intersection identify a septic drainfield as a waste disposal method.

1969 records document the construction of Curtis Avenue, which crosses Pederson Hill Creek at its mid-section. The permit information did not address water quality or wetland issues.

Pollution Control Strategy

Information reviewed in this assessment indicates water quality impacts to Pederson Hill creek are minor. The main concerns are related to controlling sources of high coliform levels, which has been in excess of State water quality standards. Runoff from roads, parking lots, fills and construction activities could also contribute to water quality and fish habitat degradation, but this has not been confirmed by existing monitoring data. Development activities have resulted in some alteration of the stream bed, but it is not known whether this has resulted in a reduction in the stream's fish populations.

Water quality degradation from coliform bacteria contamination can be reversed and maintained by identifying sources and implementing adequate controls for residential sewage discharges and agricultural nonpoint source runoff. In addition, critical review of land use permit applications, restrictions on additional wetlands fills, and on-site surveys will assure that the fish habitat values of the stream are maintained.

A five step pollution control strategy is outlined in Table 5. and involves the following steps:

1.) Development and implementation of a Watershed Management Plan.
2.) Additional site surveys and water quality monitoring.
3.) Verification of compliance and enforcement of existing permit conditions and stormwater permit requirements.
4.) Implementation of ADEC's policy on adding more stringent requirements to state permits and during permit certification for activities affecting impaired waterbodies.
5.) A more formal cooperation between ADEC, other State resource agencies and the City and Borough of Juneau during the review of new permits and on permit compliance.

The proposed actions are discussed below. Specific goals and a timetable for achieving the goals will be worked out by designated ADEC staff and will be specified in a Watershed Management Plan.

Table 5. Pollution Control Strategy

Watershed Management Plan	• Identify and describe sources of contamination • Address habitat impacts • Define pollution assessment strategies • Describe implementation steps • Outline steps for prevention an restoration • Delineate responsibilities • Address Public participation
Additional Data	• Collect water quality data from representative sites • Quantify watwer quality impacts • Identify sources
Permit Conditions and Compliance	• Verify compliance with wastewater and NPDES storm water permits. • Perform Site inspections • Provide technical assistance
ADEC Policies and Guidelines	• Assure adequate controls appropriate to level of impact to the stream. • Develop guidelines and procedures applicable to existing and future activities affecting the stream.
Cooperative Effort ADEC CBJ	• Develop a processes which facilitates exchange of information early on in permitting new development. • Coordinate site inspections and compliance activities between CBJ, ADEC and ADFG.

1.) Watershed Management Plan

In order to comprehensively address water quality problems, the development of a Watershed Management Plan (WMP) will be developed for Pederson Hill Creek and adjacent wetlands and the Pederson Hill Ridge watershed. The main focus of the plan will be on identifying the sources of coliform contamination, correcting the problem and future prevention of impacts. On a larger scale, the watershed management plan will also address implementation of management strategies for assessing and controlling water

quality degradation due to other pollutants, impacts to fish habitat, and plans for maintaining and restoring fish habitat. Where appropriate, additional water quality and habitat data will be collected. To provide a basis for the above proposed strategies, a comprehensive review of information on all existing permits in the area will be performed, including evaluation of the adequacy of permit conditions and verification of compliance with sewage system approval stipulations and the effectiveness of septic sewage systems and controls for non-point source runoff.

The Watershed Management Plan will address coordination of public and private interests and education of the public and permit applicants. The Watershed Management Plan will describe available control strategies and procedures for verification of the effectiveness of controls, site inspections and enforcement of permit requirements.

The necessity and feasibility of restoring fish habitat will be explored with input from the Alaska Department of Fish and Game. Potential strategies include removal of small dams on the creek's tributaries, and a determination of the adequacy of culverts and drainages to allow adequate fish passage and stream flow. The Watershed Management Plan will weigh the benefits of restoration strategies against their potential for causing additional habitat disturbances.

Area development, land use and fills that are expected in the future need to be limited and proceed under conditions that will protect fish habitat and water quality.

2.) Collection of additional data

In order to obtain a more accurate picture of water quality impacts and to identify sources pollutant sources, additional water quality data will be collected. Requirements for monitoring discharges will be added as Department permit stipulations to new 404 permits. Additional data will also be collected through discharge monitoring requirements under the new NPDES stormwater permits, where applicable. In addition, monitoring during rain storms, in combination with site inspections and verification of properly operating sewage systems will be performed by ADEC to determine water quality and permit violations. The data will be used to quantify water quality impacts, to identify major sources, and to determine if existing controls are adequate. In addition, the data will aid in the development of the Watershed Management Plan.

The following sites are proposed for additional monitoring: a site in the ditches below the gravel pad, below the fire training center; on the south of the culvert on Glacier highway near the Sherwood Lane intersection or Engineers Cutoff; a site upstream from the troopers near the commercial building and one station further downstream near the golf course. The tributaries will also require sampling to isolate coliform sources.

3. Compliance with permit conditions and NPDES stormwater permit requirements

A thorough assessment of existing on-lot permits will be performed to determine the status and effectiveness of domestic waste disposal practices and the effectiveness of the systems in controlling bacterial discharges. ADEC will assure compliance with state waste water and NPDES stormwater permit requirements and water quality criteria through routine site inspections, review of monitoring data, and technical assistance with the implementation of appropriate pollution controls. ADEC is in the process of developing a ranking system for setting inspection priorities based on facility size, the severity of anticipated environmental impacts and past inspection and compliance histories. This will assure that facilities are reviewed on a routine basis at a frequency that is achievable with existing staff. ADEC will also develop inspection procedures and criteria.

4. Implementation of ADEC policy to restrict discharges to impaired waterbodies

ADEC will assure implementation of its policy of certifying new permits with the addition of permit stipulations which assure that the project will not cause a marked increase in water quality degradation with respect to TMDL pollutants, or cause violations of standards of other pollutants. Construction activities requiring general NPDES stormwater permits and do not require an Army Corps of Engineers permit are not subject to ADEC review. In these cases, prevention of water quality impacts can only be achieved through cooperation between ADEC and the City during the planning and permit review phase of commercial development projects.

5.) Cooperative effort between ADEC and the City and Borough of Juneau

An effective means to protect water quality is cooperation between the City and Borough of Juneau and ADEC during the review of subdivision plans and municipal conditional use permits. This will involve determining permit conditions that control and contain sediment discharges and devising routine procedures for verifying permit conditions. Follow-up and enforcement in the event of permit or water quality standard violations need to be agreed upon. It is suggested that cooperative agreements, procedures and responsibilities be defined in the form of a Memorandum of Agreement between ADEC and the City.

References

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MEMORANDUM

State of Alaska

Department of Environmental Conservation
Division of Environmental Quality

To: Ursula Spannagel

Date: August 24, 1995

File No:

Thru: Jeff Hock

Telephone No: 790-2169
Fax No: 790-2451

From: Dick Williams

Subject: Pederson Hill Creek Results

I have received all the results from the four Pederson Hill Creek Fecal Coliform (FC) sample sets analyzed by the Health and Social Services (H&SS) Laboratory at Salmon Creek using the Most Probable Number (MPN) method. These results and those from the May 16 samples analyzed by Membrane Filter Method at the Juneau Environmental Analysis Laboratory (JEAL) are compiled in Table 1.

The samples from Stations 1 through 5 are those analyzed by the H&SS Lab. The samples from Stations A through D are those analyzed at the JEAL. All station locations are shown on the attached map.

Table 1. Concentrations of Fecal Coliforms per 100 ml of Sample.

Location	May 10, '94	May 16,1994	May 24, '94	May 31, '94	Log Mean
Station 1	<2	<2	<2	2	<2
Station 2	500	500	50	30	139
Station 3	140	7	14	14	21
Station 4	5,000	5,000	170	110	827
Station 5	900	240	1600	80	408
Station A	-	3300	-	-	n/a
Station B	-	540	-	-	n/a
Station C	-	5600	-	-	n/a
Station D	-	0	-	-	n/a

RESULTS:

Station 1 samples the main stream waters after they cross from the north side of the Glacier Highway. The analytical results averaged <2 FC\100 ml. This is less than the method detection limit for MPN.

Station 2 is located about 250 feet below Station 1. The stream is parallel to and about 20 feet from the backyard of the house shown. The samples yielded concentrations as high as 500 FC/100 ml on two occasions with a logarithmic mean of 139.

Station 3 samples the tributary that crosses the southwest corner of the Swampy Acres' pasture, follows the highway eastward until crossing the road, and flows through the woods past the Family Practice Clinic to the ditch behind the Rhine Building where the sampling point is located. The sample results included a high of 140 FC/100 ml. and a logarithmic mean of 21.

Station 4 is located directly behind the Public Safety/Coast Guard building, just above the point where the tributary from Station 3 enters. It is the same point used during the Juneau Streams Study that identified Pederson Hill Creek as an impaired water body. The results show a significant increase in the coliform levels over any upstream stations. A maximum of 5,000 FC/100 ml was detected in two samples with a logarithmic mean of 827.

Station 5 is located at the discharge end of the 48 inch culvert that passes under the Public Safety building parking lot. The source of these waters was not explored. The results included a peak of 1600 FC/100 ml and a logarithmic mean of 408.

The first sample results indicated additional sampling would be necessary to more clearly identify the contaminant sources. Available analytical supplies at JEAL allowed the sampling of four additional stations on May 16. These are designated Stations A through D. These samples were analyzed using the membrane filter method.

Station A is on a small tributary flowing from the west that enters the main flow between Stations 1 and 2. Some of this water is discharged from a culvert that passes under a landscaped fill/lawn, and the remainder appears to be surfacing seepage in a swampy area. The drainage above the lawn was not inspected. The analysis detected a concentration of 3300 FC/100 ml.

Station B was located about 150 feet downstream from Station 2, and about 15 feet below an apparent sewage outfall from the adjacent long narrow residence. 540 FC/100 ml were detected in the sample from this station.

Station C is located at the discharge of the culvert crossing Engineer's Cutoff Road. A concentration of 5600FC/100ml was measured.

Station D is located on the tributary that crosses the highway in front of the Baptist Church about 50 feet above the point it enters the main fork. No fecal coliform were detected there.

FIELD OBSERVATIONS

Several obvious sources of contamination were observed during the various phases of the field work. These were:

1. The Baptist Church appears to have a septage drain field that has failed. There is a hole about two inches in diameter similar to those observed in other cases where hydraulic pressure has forced the discharge to the surface. It is located adjacent to the highway ditch at or near the property line. Normally no flow was observed from the hole except for one unofficial Sunday check by temporary employee Dan Salmon who said the flow was strong and steady.

2. The Family Practice Clinic septic system drain field is located uphill from the clinic and is a mounded, above-ground system. At the west or northwest corner, near the top of the mound is a two to three inch diameter hole with a flow path running down the side of the mound and into the tributary. The path is covered with the black and white fungus' common to septic sewage flows. The odor of sewage is also quite strong. There were small puddles along the flow path, but no active discharge at the time it was visited.

The drain field is located well above the clinic, and their system must include a sump and a pump to move the effluent to the drain field. The sump is probably sized to minimize the number of pumping cycles, which explains why no flow was observed. It may also explain why the coliform levels at Station 3 were low when we sampled, except the first time. The sampling was usually conducted early on Monday morning, except the first time. The clinic, being closed on the weekends, may not have had enough flow for the pump to cycle for as long as two days allowing the creek to flush itself before we sampled. Whether the system is contaminating the creek or not is a moot point. A failed drain field that allows septic tank effluent to surface violates the regulations and should be corrected.

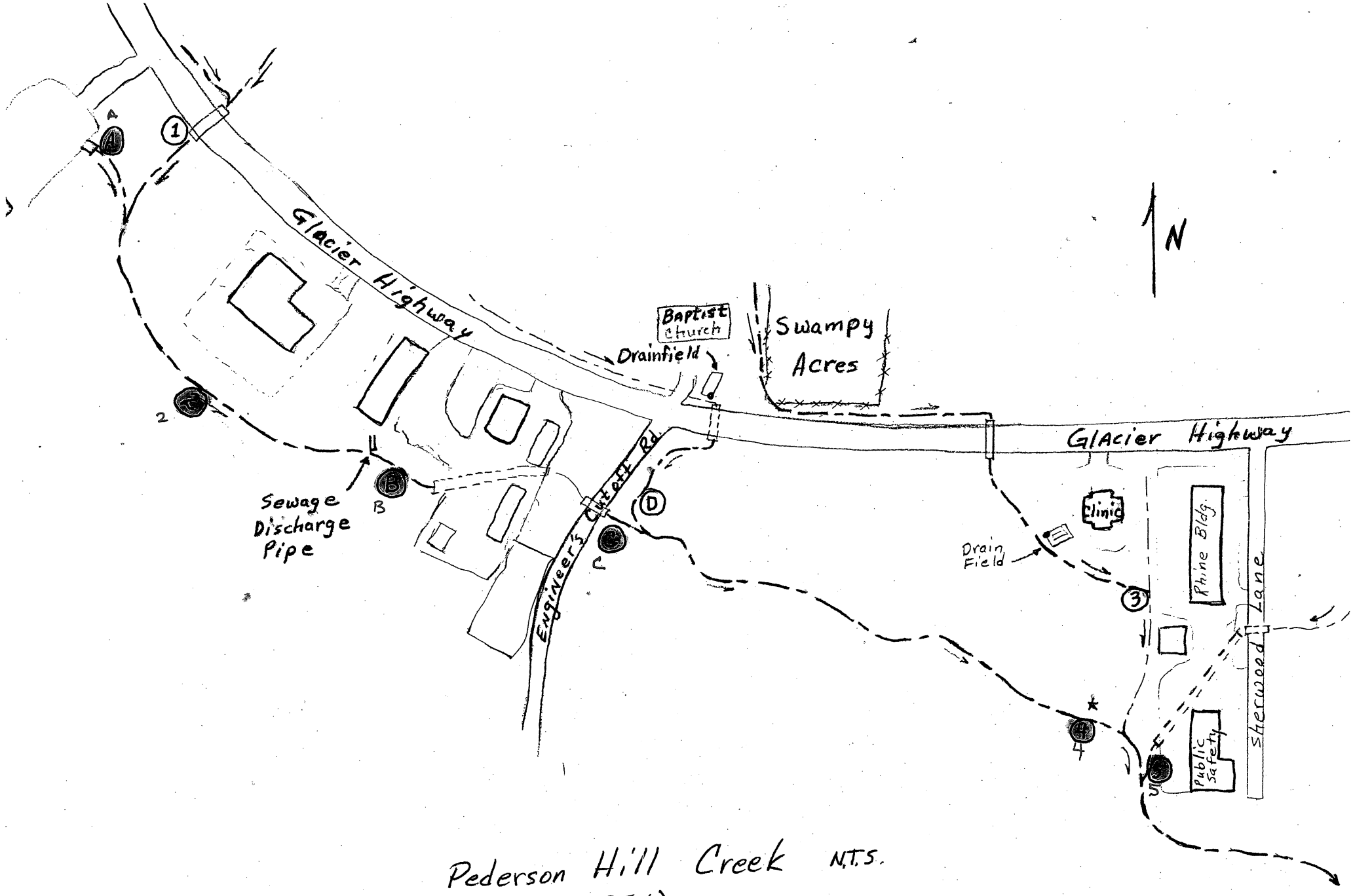
3. The long narrow house located adjacent to Station B appears to have a direct septic discharge into the creek. A PVC pipe protrudes from the fill that the residence is built on, and appeared to come directly from vent pipes sticking out of the top of the fill about 10 to 15 feet from the stream. The discharge area was coated with the black and white fungi typical of septic sewage discharges. A

Conclusions and Recommendations

Several residences and other facilities adjacent to Pederson Hill Creek and its tributaries appear to be discharging waste water that is contaminating the stream in apparent violation of the Alaska Water Quality Standards. These include one or more houses above Station A; The house adjacent to Station B; the house and construction yard (old highway maintenance facility) located just downstream from B; the Baptist Church; the Family Practice Clinic; and the unidentified sources feeding the pipe running under the Public Safety parking lot.

It is recommended that this information be given to the Juneau District Office for further investigation and necessary corrective action.

It is also recommended that additional sampling be conducted after all corrective actions are taken to assess the effectiveness of those actions.



Pederson Hill Creek N.T.S.

(6-8-94 R.T.W.)