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**STUDY OF THE TRIBUTARIES OF THE
NORTH AND SOUTH ALOUETTE RIVERS**

By
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April 1996

Funded by
Fraser River Action Plan
Urban Salmon Habitat Program

INTRODUCTION

The Alouette River Management Society (ARMS) is an environmental stewardship group based in Maple Ridge, B.C. ARM's primary goal is to ensure the health and sustainability of the Alouette River watershed, particularly its fisheries resource. To this end, in 1995 ARMS obtained a grant from the Department of Fisheries and Oceans (DFO) to identify and catalogue the Alouette's feeder streams.

A technician was hired to undertake the background research and fieldwork, under the direction of the ARMS Watershed Coordinator. Field activities were carried out during February and March of 1996. These included groundproofing tributary locations where necessary, establishing species presence by means of electroshocking, general habitat assessment, and identification of habitat enhancement opportunities.

The purpose of this report is to summarize the data gathered during this project.

METHODS

Study Area (Figure 1): The South Alouette tributaries examined during this study ranged from McKenney Creek in the west to Alouette Lake in the east. North Alouette tributaries ranged from Cattell Brook in the west upstream to U.B.C. Research Forest. This included Anderson Creek (Blaney Creek tributary).

Protected areas such as Golden Ears Park and U.B.C. Research Forest were not inspected during the study due to time constraints and the fact that the primary objective of the study was to identify those tributaries which have either been impacted or face the potential threat of future impacts.

Stream Descriptions:

Each stream was evaluated in the following manner:

- Location: A brief summary of the headwaters, direction, and confluence.
- Length: (kilometers)
- Wetted width: in meters, as observed at the time of study.
- Description: Habitat types and locations within the watercourse; important features such as obstructions.
- Flow Regime: All year, seasonal, or intermittent.
- Land Use: Present land activities adjacent to the watercourse along with future designations.
- Fish Presence: The majority of field identification was carried out by electroshocking during February and March of 1996.
- Habitat Enhancement Possibilities: Based on field observations made during February and March of 1996.

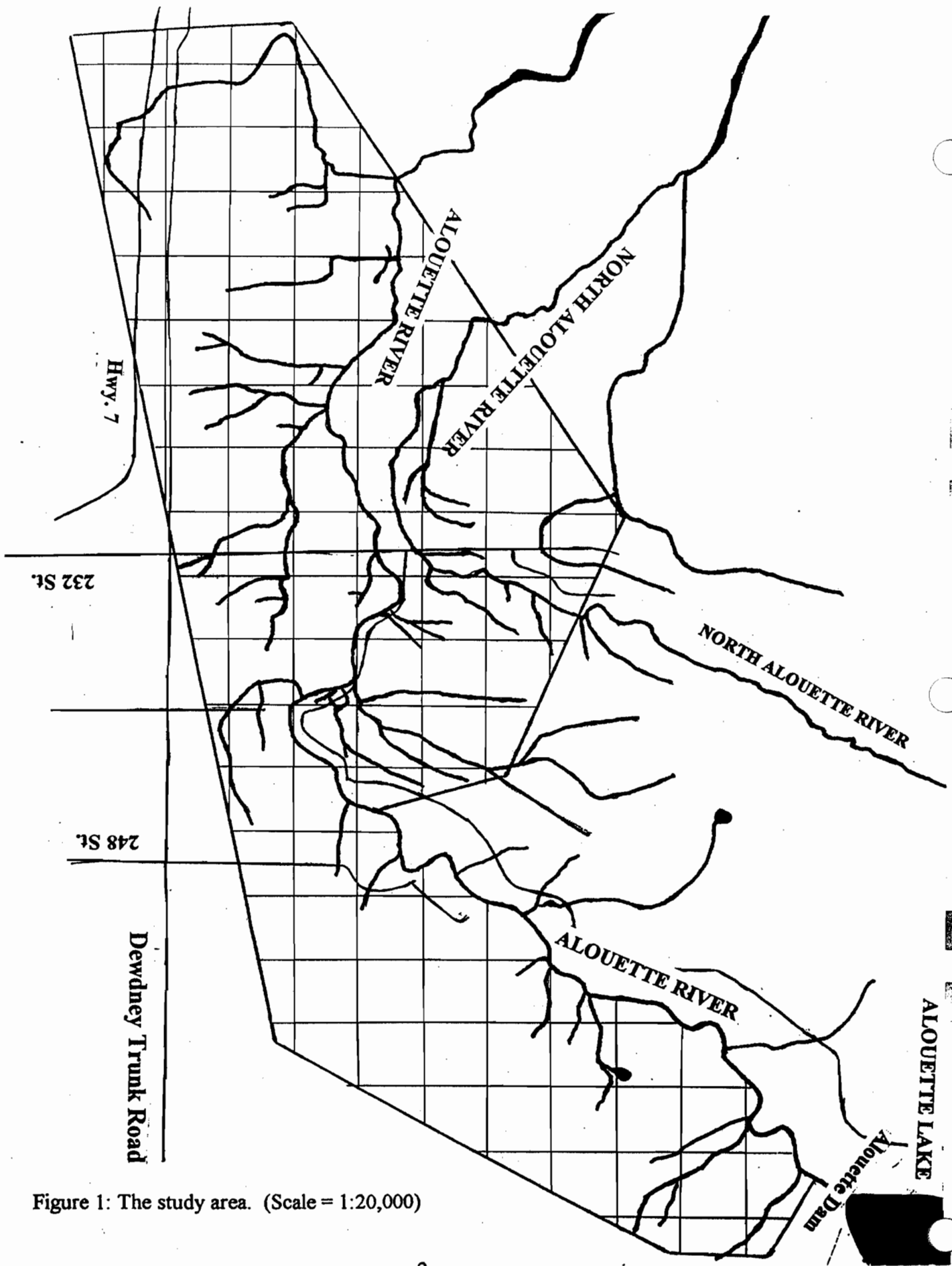


Figure 1: The study area. (Scale = 1:20,000)

TRIBUTARIES: SOUTH ALOUETTE RIVER - Left (south) bank

McKENNEY CREEK

Location (Figure 2): This stream originates near the cemetery north of Loughheed Highway and west of 216 St. From there, it flows southwesterly to near 117 Ave. and 210 St., then north to northwesterly to Powell Ave. near 205 St., and finally north to northeasterly to the Alouette River confluence roughly 0.5 km east of 210 St.

Length: 6.0 km

Wetted Width: 2-4 m

Description: This is one of the larger Alouette tributaries and perhaps the best known. The two major reaches include an extended pool-riffle habitat extending from the headwaters to the vicinity of Powell St., and a slough-like section from the Powell St. area to the mouth, where much of the riparian area has been cleared. In the upper reach, gradients are fairly consistent and gentle. Substrates are primarily fines and small gravels with areas of clay and cobble. A notable feature is an extremely long culvert downstream of Laity St. This structure is a barrier to fish migration. The lower reach is extensively channellized and confined. Substrates consist of mostly fines with occasional areas of gravel. This section is basically a long slough-like glide with occasional scour pools at culvert outlets.

Flow Regime: All year.

Land Use: Residential and commercial throughout the upper section and agricultural with some residential in the lower section. The section north of 128 Ave. is adjacent to the Alouette dike system and is therefore popular with walkers.

Fish Presence: Coho salmon up to Loughheed Highway, occasional pink and chum salmon in lower sections, rainbow and cutthroat trout up to the culvert barrier previously mentioned. Three sections of the stream were electroshocked on February 27/96: in the first section, east of Laity St. at Maple Ridge Hospital, no fish were observed; in the second section, immediately south of Dewdney Trunk Road, cutthroat trout ranging in size from 10 to 20 cm were captured; and in the third section adjacent to 208 St. and 128 Ave. no fish were observed.

Habitat Enhancement Possibilities: Due to the extensive urbanization along this stream, riparian restoration opportunities are abundant. Activities such as streamside planting and debris placement could benefit this watercourse. One example is the section north of Maple Ridge Hospital, where non-native blackberries and accumulating garbage are limiting both the aesthetic and fisheries values of the stream. The stream also lends itself admirably to signage and public interpretation, especially in the area of the Alouette dike walking path.

Due to the long culvert barrier, headwater stocking may be an attractive option for the area near Maple Ridge Hospital.

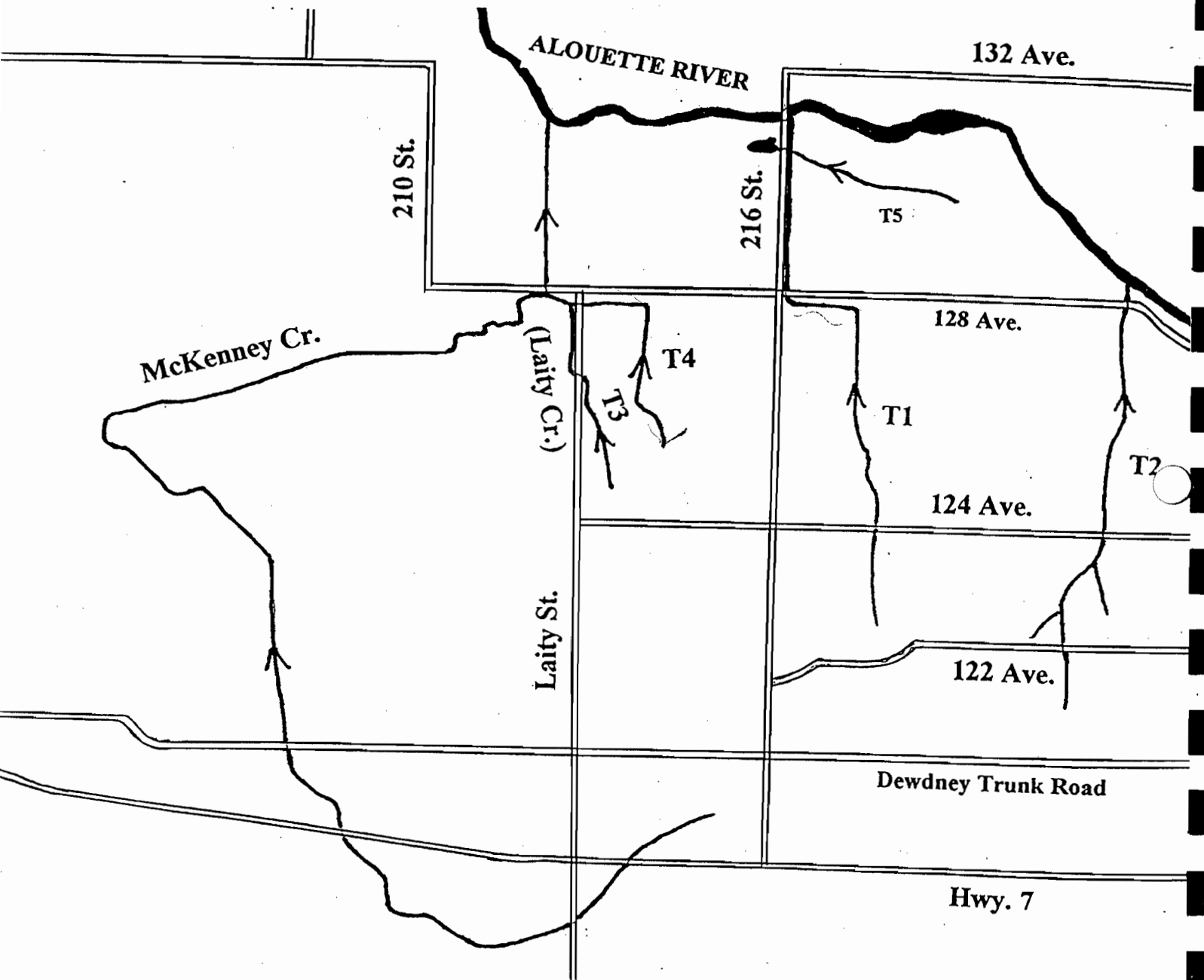


Figure 2: McKenney Cr., Laity Cr., T1,T2,T3,T4,T5. (Scale = 1:20,000)

T3 (Also known as Laity Creek)

Location (Figure 2): This stream originates near Douglas Ave. and Carlton St. It then flows north and crosses Laity St. at Thornton Ave. From this point, it is an open ditch flowing north to 128 Ave., then west along 128 Ave. to its confluence with McKenney Creek.

Length: 0.8 km

Wetted Width: 0.5-1.5 m

Description: This watercourse consists of two reaches. The upper reach is pool-riffle habitat with mainly small to medium sized gravels and some clay. This is an urban greenbelt area with relatively undisturbed riparian habitat. The lower, ditched section is a long, channellized riffle with a combination of gravels and clay. Streamside vegetation is limited to grasses. Gradients are consistently low throughout both reaches.

Flow Regime: All year.

Land Use: Residential in upper section; ditched section borders on agricultural land. This area is extremely popular with walkers and joggers.

Fish Presence: Electroshocking on February 21/96 revealed rainbow and cutthroat trout throughout, and coho juveniles near the mouth. The cutthroat in particular occurred in considerable numbers. In fact, this stream at the time of this study contained the highest fish density per meter of any tributary examined during field examinations. Sizes were near 8 cm for coho and 6 to 20 cm for trout. In addition, landowners in the area have observed adult coho and chum in the stream.

Habitat Enhancement Possibilities: The ditched section could be improved by streamside planting and the construction of artificial bank overhangs. Signage would be quite effective and desirable due to the areas' heavy use by walkers and the fact that most are unaware of the salmonid presence in what appears to be a storm drain.

T4

Location (Figure 2): This small watercourse is a tributary of T3. Its headwaters are near Exeter Ave. and 214 St. It then flows in a north to northwesterly direction to 128 Ave.; at this point it becomes an open ditch and flows west along 128 Ave. to the confluence with T3.

Length: 0.75 km

Wetted Width: 1 m

Description: This is a very small watercourse upstream of 128 Ave. Wetted widths during February of 1996 averaged 30 cm. Substrate material above 128 Ave. consists of small gravels with areas of fines and clays. Since the area has undergone development, riparian habitat varies from "manicured" to undisturbed. The ditched section along 128 Ave. has no riparian habitat. Certain culverts are providing cover and/or creating small scour pools. Stream gradients are gentle throughout.

Flow Regime: Unknown. The creek was observed to be completely ice-free during a prolonged cold snap in early February of 1996.

Land Use: Residential in upper sections; agricultural in lower sections.

Fish Presence: Electroshocking on February 21/96 in the ditched section along 128 Ave. revealed rainbow and cutthroat trout sized between 6 and 18 cm. Most of these fish were residing in culverts.

Habitat Enhancement Possibilities: The ditched section of this stream could be improved in a similar manner as described for T3. Although the section above 128 Ave. may be too small to support salmonids, it would be desirable to attempt to enhance water quality through landowner education.

T1

Location (Figure 2): The headwaters of this stream are located directly north of the 21800 block of Mountainview Crescent (west of Maple Ridge Senior Secondary). The stream then flows north to 128 Ave., where it swings west and becomes an open ditch. It turns north at 216 Ave. and flows as an open ditch alongside the east side of 216 Ave. until the confluence with the Alouette River.

Length: 2.2 km

Wetted Width: 1-2 m

Description: Two main reaches describe this stream. The upper section above 128 Ave. is a pool-riffle mixture with small to medium gravel substrates and areas of exposed clay. Gradients are fairly uniform and gentle. Streamside habitat varies from undisturbed to manicured. The

Length: 1.5 km

Wetted Width: 1.0-1.5 m

Description: Virtually the entire length of this watercourse is contained within private property. As a result, the stream has undergone extensive manipulation and channellization. It is also quite probable that sporadic enhancement efforts have been undertaken by landowners. The stream has been degraded upstream of 122 Ave. due to development-related infilling and refuse dumping. The culvert under 224 St. at Abernethy Way extends under several adjacent properties and is a salmonid migration barrier due to its excessive length.

Flow Regime: All year.

Land Use: Some commercial near the headwaters; residential elsewhere.

Fish Presence: The section between Abernethy Way and the Alouette confluence was electroshocked February 20/96. Species observed included coho salmon juveniles averaging 6 cm in length and cutthroat and rainbow trout of 7 to 12 cm. Residents report the presence of salmonids upstream of the long culvert at 224 St. These are likely cutthroat trout. Chum salmon adults have occasionally been observed downstream of Abernethy Way.

Habitat Enhancement Possibilities: The possibility of daylighting a portion of the 224 St. culvert should be explored. The stream could also benefit from landowner education, signage, and a cleanup effort in the area upstream of 122 Ave.

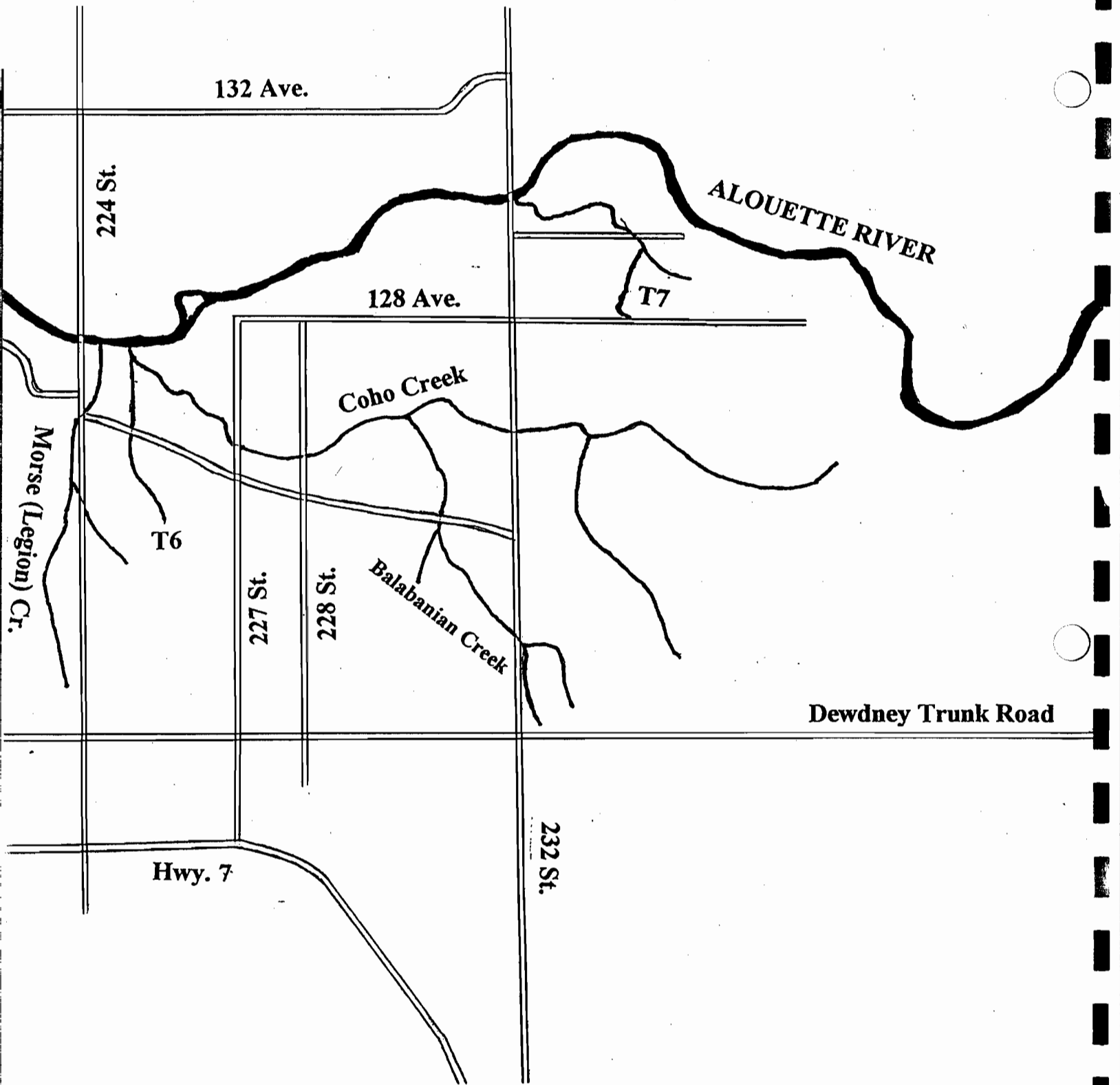


Figure 3: Morse, Balabanian, Coho, T6, T7. (Scale = 1:20,000)

COHO CREEK

Location (Figure 3): Coho Creek drains most of the rural areas west of 237 St., north of Dewdney Trunk Road, and south of 126 Ave. The stream flows west to enter the Alouette River roughly 200 meters east of the 224 St. bridge.

Length: 4.1 km

Wetted Width: 1.5-3.0 m

Description: Coho Creek begins as several branch streams that descend moderately steep gullies in the residential area near 124 Ave. North of 124 Ave. the streams converge into one main watercourse which then flows west through farmland. In this area, the creek is fairly slow-moving and meandering. Substrates are mostly fines and clay with isolated pockets of gravel. The riparian vegetation is sporadic and in some cases non-existent. There are cattle on a property immediately west and north of 232 St. These animals have free access to the stream and are causing bank erosion and sedimentation.

Below 230 St., the stream is principally riffle habitat and enters a relatively pristine wooded area that extends to the urban area near 228 St., where the stream has been somewhat manipulated and manicured. Downstream of 227 St. the stream enters an urban greenbelt area which extends to the Alouette River confluence. Substrates from 230 St. to the mouth are mostly small to medium sized gravels with areas of fines and exposed clay.

Flow Regime: All year.

Land Use: Agricultural and rural residential in upper sections, residential and urban greenbelt in lower sections.

Fish Presence: Coho Creek is known to contain coho salmon, which ascend the stream to at least 232 St. Chum salmon have been observed spawning below 227 St. The stream also contains rainbow and cutthroat trout. Electroshocking in the vicinity of 232 St. on February 20/96 revealed coho juveniles 4 to 6 cm in length.

Habitat Enhancement Possibilities: The upper sections above 230 St. could be improved by streamside planting, debris placement, and cattle fencing where access is a concern. Although the wooded area downstream of 230 St. is fairly undisturbed, an inspection during October of 1995 revealed several debris jams composed mainly of refuse that had been washed downstream during high water. Careful removal of these obstructions during the summer low flow period is recommended.

Streamside landowners could be educated and encouraged to conduct riparian restoration activities.

BALABANIAN CREEK

Location (Figure 3): This stream is a tributary of Coho Creek. The headwaters are located northeast of Dewdney Trunk Road and 232 St. The stream flows in a northwesterly direction until the confluence with Coho Creek near 230 St. and 126 Ave.

A small tributary enters the stream from the southwest just upstream of Abernethy Way.

Length: 1.8 km

Wetted Width: 1-2m

Description: This stream is fed predominantly by groundwater and consequently has a very stable temperature regime. Observations by the Harry Hooge Streamkeepers suggest that water temperatures rarely drop below 7 degrees or rise above 16. Most of the watercourse is contained within an urban greenbelt area. As a result, streamside cover is generally good, although isolated areas do exist where property owners have cleared land to the waters' edge. The dominant habitat is a pool-riffle regime with substrates composed of small to medium gravels. There is also a prominent clay component. The banks of gullies appear to be very susceptible to erosion. The small tributary stream near Abernethy Way has similar habitat.

The culvert under 232 St. may be a barrier to upstream salmonid migration.

Flow Regime: All year.

Land Use: Residential, urban greenbelt.

Fish Presence: Coho salmon adults have been observed in the stream up to 232 St. Other known salmonid species include rainbow and cutthroat trout. Electroshocking took place in two locations on February 20/96. At the first location, 200 meters downstream from 232 St., coho juveniles 5 to 12 cm in length were captured along with a solitary rainbow trout of 12 cm. The second location upstream of 232 St. produced no fish. Gee trapping on March 13/96 at Harry Hooge School produced one 10-cm coho (2 traps).

Habitat Enhancement Possibilities: The Harry Hooge School has formed a Streamkeepers group on Balabanian Creek. At present, they are monitoring water quality, conducting stream cleanups, and planning an interpretive trail network in the watershed.

T6

Location (Figure 3): This small watercourse is a tributary to Coho Creek. It originates near 124 Ave. and Edge St. and then flows north to the confluence with Coho Creek.

Length: 0.7 km

Wetted Width: 0.5 m

Description: An extremely small stream with a wetted width of 30 cm at the time of field survey.

Flow Regime: Unknown.

Land Use: Residential.

Fish Presence: Unknown, although it is likely that trout and coho juveniles utilize the lower section downstream of Abernethy Way at times.

Habitat Enhancement Possibilities: Although this stream provides a very modest amount of salmonid habitat directly, it nevertheless contributes to the water quality in Coho Creek and Alouette River. Signage and/or landowner education could be carried out in conjunction with other public involvement projects in the area.

T7 (also known as Dogwood Creek)

Location (Figure 3): This watercourse drains the area north of 128 Ave. and west of 234B St. It enters the Alouette River immediately east of the 232 St. bridge.

Length: 1.1 km

Wetted Width: 1-2 m

Description: This stream consists of a series of ponds and slow-moving riffles. The majority of the stream is on private property, and the streamside habitat varies with the activities of the individual landowners. Spawning areas are limited but the stream does provide stable off-channel rearing habitat.

Flow Regime: Ponds tend to be wetted all year; stream sections may temporarily dry up.

Land Use: Residential.

Fish Presence: This stream was electroshocked February 20/96. At 130 Ave., coho juveniles of 4 to 6 cm in length were observed along with a 14 cm cutthroat trout. Coho juveniles were also captured at Dogwood Ave.

Habitat Enhancement Possibilities: The property on the south side of Dogwood Ave. has been cleared to the waters' edge. Streamside planting and/or debris placement could be undertaken subject to the landowner's approval.

LATIMER CREEK

Location (Figure 4): This stream originates east of 244 St. and south of 124 Ave. It flows west to 240 St., then northwest to join the Alouette River via Latimer Channel near 128 Ave. and 239 St.

A second branch drains the hillside between 240 St. and 241 St. north of 124 Ave. This branch joins the main stream near the north end of 240 St.

Length: 2.9 km

Wetted Width: 1.5-2.5 m

Description: From the headwaters down to 240 St., the stream consists of a pool-riffle habitat flowing through an urban greenbelt area. The stream descends into a gully near 240 St. before flattening out near the north end of 239 St. Substrates are mostly small to medium gravels with a prominent clay component. This stream is quite susceptible to erosion, especially in the gully near 240 St.

The branch stream consists of pools and riffles confined in a gully. The culvert at 240 St. may not be fish passable. The branch stream has been diverted at the 240 St. culvert.

Flow Regime: All year.

Land Use: Mainly rural residential.

Fish Presence: Latimer Creek is known to contain rainbow and cutthroat trout as well as coho and chum salmon. Chum are present in the lower reaches downstream of the gully while coho adults migrate at least to 240 St. An exposed clay barrier near 244 St. would seem to prevent further upstream migration.

The diversion of the branch stream at the 240 St. culvert has periodically re-directed a portion of the streamflow into a ditch alongside the horse trail on the 240 St. alignment. Electroshocking in this ditch on February 16/96 revealed the presence of coho juveniles that were stranded in the ditch at the time. It is not known if these fish arrived via the culvert diversion or entered from the Alouette River during a high water event.

Habitat Enhancement Possibilities: A chronic problem currently exists at Meadowridge School on 240 St., where development has led to the disturbance of a groundwater source and subsequent siltation of Latimer Creek. This is one of the major sources of turbidity in the South Alouette.

Another situation has occurred on the west side of 239 St. north of 128 Ave., where land clearing for residential development has infringed on the required setback from the streambank. This area should be seeded with native grasses and shrubs as soon as possible.

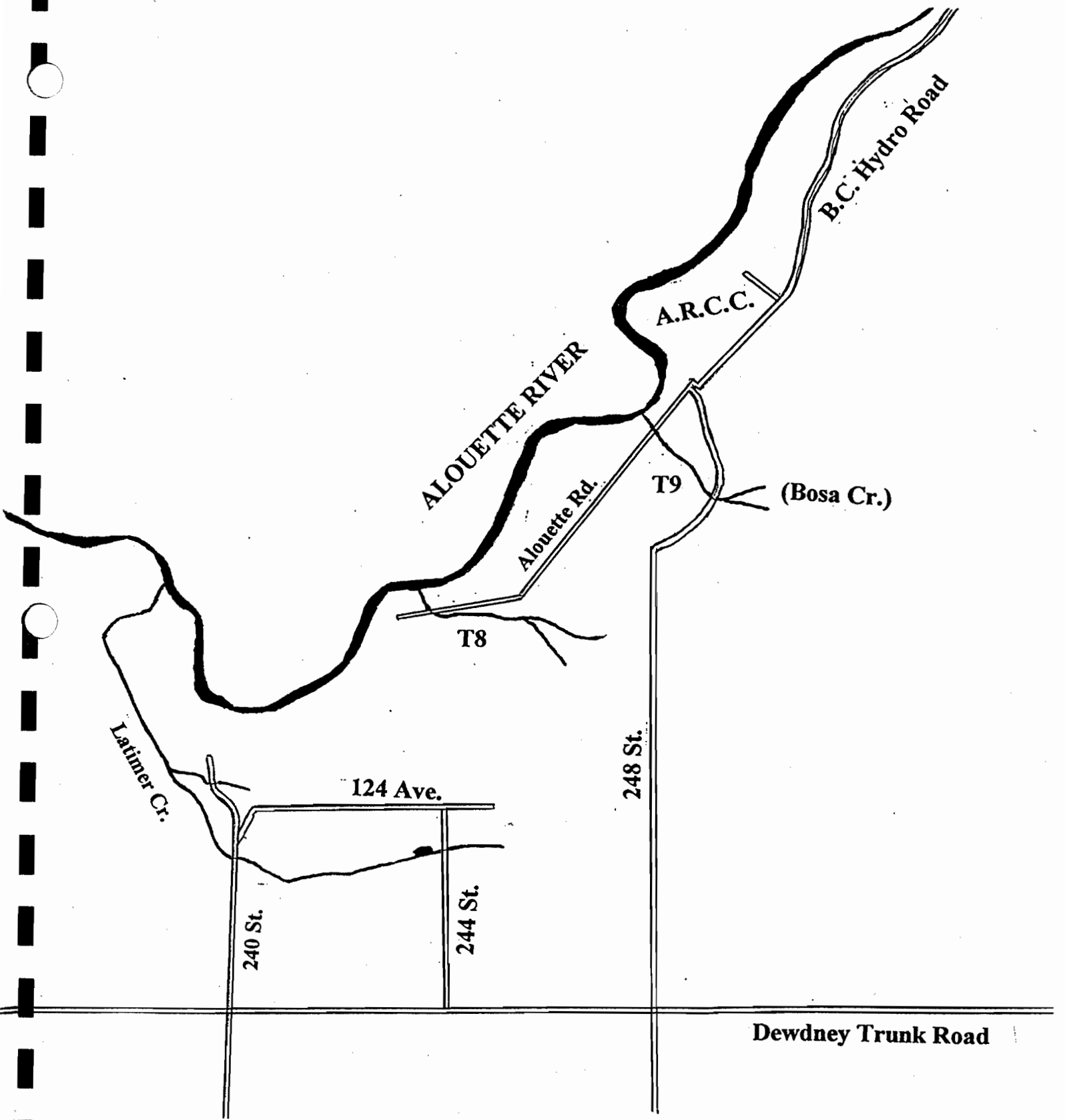


Figure 4: Latimer Cr., T8, T9. (Scale = 1:20,000)

T8

Location (Figure 4): This watercourse flows from its point of origin near 248 St. and 128 Ave. in a westerly direction to join the Alouette River near the west end of Alouette Road.

Length: 1.2 km

Wetted Width: 1-2 m

Description: From 248 St., the stream descends down a shallow gully to benchland along Alouette Road. Streamside cover is mainly forest and substrates are exposed clays with areas of small gravel. Near Alouette Road the stream is channelled into an open ditch which runs alongside the road for 200 to 250 meters until the stream turns north and empties into Alouette River. There are two barriers to salmonid passage: the first is a culvert drop at Alouette Road and the second is a 2 meter waterfall near the Alouette confluence.

Flow Regime: Unknown.

Land Use: Presently either undeveloped or rural residential.

Fish Presence: Electroshocking was carried out in the vicinity of Alouette Road on March 4/96. No fish were observed.

Habitat Enhancement Possibilities: A series of jump pools could be constructed at both the waterfall and the culvert barrier to promote fish passage. The ditched section could be improved by streamside planting, the installation of artificial bank overhangs, debris placement, or a combination of these methods.

T9 (also known as Bosa Creek)

Location (Figure 4): The headwaters of this stream are rather obscure due to extensive land clearing and groundwater disturbance. The flowing portion first appears in the 25100 block of 130 Connector. The stream then descends down a steep gully to a settling pond north of 248 St. From there, it flows roughly northwesterly to Alouette River.

Length: 0.8 km

Wetted Width: 1-2 m

Description: This stream has suffered the most serious level of degradation in the watershed. Extensive land clearing east of 248 St. along 130 Connector has altered the hydrology of the stream, causing increased flows, downcutting, and erosion. The settling pond downstream of 248 St. is unable to deal with the incoming sediment loads. As a result, this watercourse is probably the largest source of turbidity in the South Alouette (with the possible exception of Mud Creek). The stream is inaccessible to salmonids due to the impassable cascade at the mouth and the culvert under Alouette Road.

Flow Regime: Unknown.

Fish Presence: This stream was not sampled for fish presence during the study.

Habitat Enhancement Possibilities: The sedimentation problem could be at least partially addressed by diverting a portion of the flow at the 248 St. culvert to an area where additional settling ponds could be constructed.

Headwater stocking is not recommended due to the heavy sediment loads and the probability of smolts sustaining injuries while descending the cascade at the Alouette confluence.

T10

Location (Figure 5): This stream drains a portion of the southwest slope of Blue Mountain. It crosses the 256 St. Forest Service road roughly 1 km north of the B.C. Hydro powerline, then flows almost due west to Alouette River.

Length: 1.8 km

Wetted width: 1-2 m

Description: From its' headwaters on Blue Mountain, the stream descends steeply down to the benchland area where the Forest Service road is located. In the bench area, the stream consists of a series of pools and gentle riffles, with small to medium gravel substrates. Logging and road-building activities in this area have contributed to moderate amounts of blowdowns and debris in the stream channel, although streamside vegetation and cover is generally good. This habitat type extends for approximately 800m until the stream plunges into a steep gully that continues to the Alouette confluence. The gully has numerous waterfalls and cascades and is most likely impassible to salmonids.

Flow Regime: Unknown.

Land Use: Area is zoned for industrial development.

Fish Presence: The stream was electroshocked in the vicinity of the Forest Service road on March 10/96. Cutthroat trout of 8 to 12 cm in length were observed.

Habitat Enhancement Possibilities: A more detailed inspection of the logging debris mentioned above could determine areas where debris removal would result in improved habitat.

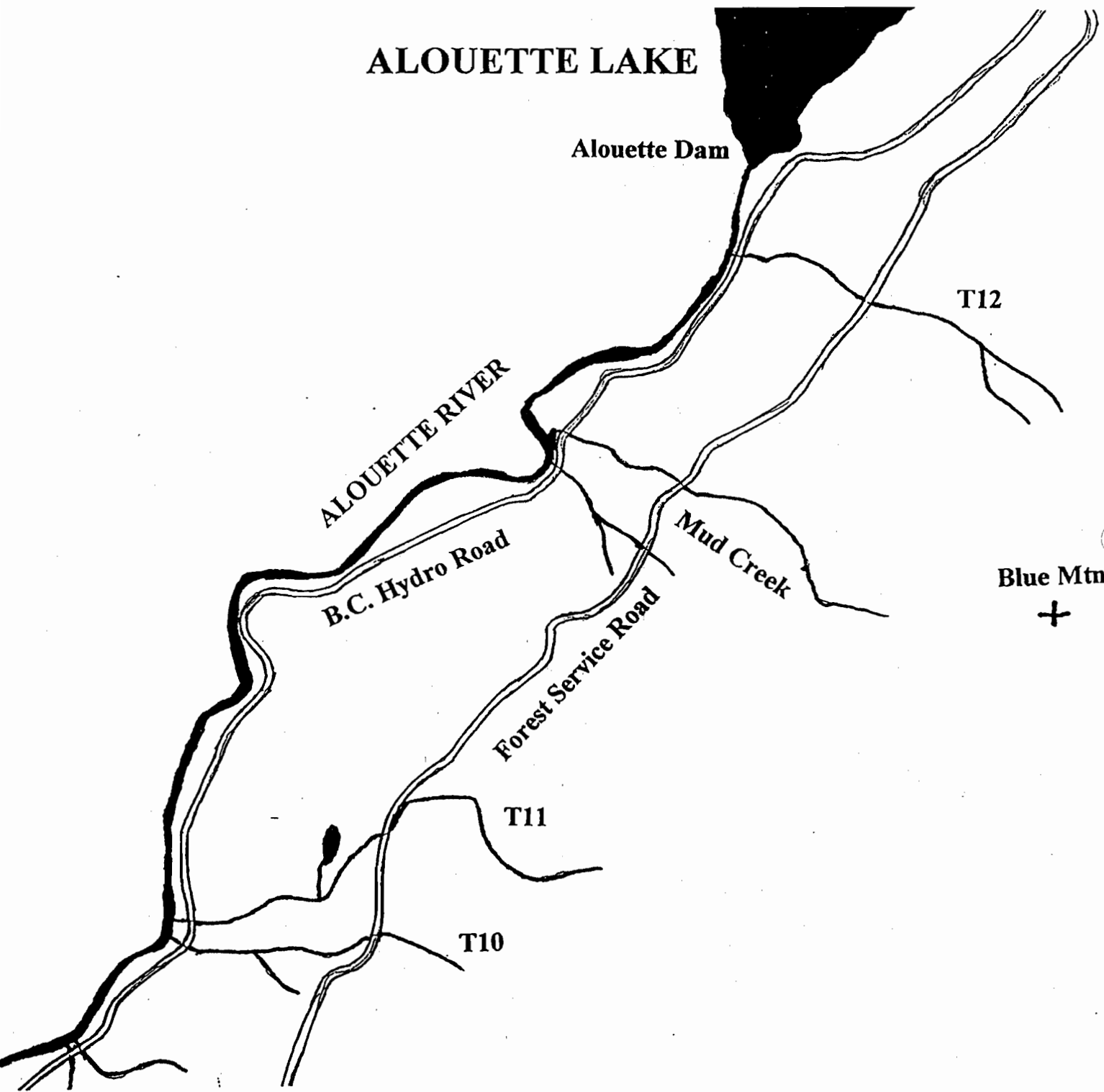


Figure 5: T10, T11, T12, Mud Creek. (Scale = 1:20,000)

T11

Location (Figure 5): This stream drains a portion of the southwest slope of Blue Mountain. It crosses the 256 St. Forest Service road roughly 1.4 km north of the B.C. Hydro powerline. The stream then flows in a west to southwesterly direction until the Alouette River confluence.

Length: 3.1 km

Wetted Width: 1.5 to 2.5m

Description: From its' headwaters on Blue Mountain, the stream descends steeply at first, then enters a much flatter benchland area where the Forest Service road is located. The habitat in this 800m section consists of a series of pools and riffles with substrates of small or medium gravels. Streamside vegetation cover is generally good in this forested area. Logging activities adjacent to the riparian zone along the left bank of the stream have resulted in extensive blowdowns and debris jams, particularly in the lower portions of the reach where the stream begins to descend into a ravine. Once the ravine begins, the terrain becomes very rugged, and the stream descends in a series of cascades and waterfalls that appear to be of sufficient gradient and severity to prevent salmonid migration. There is considerable instability in the ravine, with several recent slides noted as well as areas of minor but active slumpage. The ravine extends more or less to the Alouette confluence.

Flow Regime: Lower sections, unknown; upper sections (near Forest Service road) likely wetted all year.

Land Use: The benchland area of this stream is presently zoned for industrial development.

Fish Presence: Electroshocking was carried out February 28/96 in several locations between the Forest Service road and the upstream end of the ravine. Cutthroat trout of 8 to 14 cm in length were observed, as well as Eastern brook char of 10 to 14 cm. The char were possibly introduced in the 1950's (pers. comm. J. Heaven).

The small lake shown in Figure 5 is said to contain cutthroat trout; the presence of char in the lake is also quite likely.

Habitat Enhancement Possibilities: Selective removal of logging debris may be beneficial. The lake should be properly assessed to determine stocking capabilities and the ability to provide a recreational fishery.

Headwater stocking of anadromous species is probably inappropriate due to the difficult fish passage conditions in the ravine.

MUD CREEK AND TRIBUTARIES

Location (Figure 5): Mud Creek drains a portion of the west slope of Blue Mountain, and flows west to northwest into the Alouette River about 1300 meters downstream from Alouette Lake.

Length: 2.5 km

Wetted width: 2 m

Description: From its headwaters down to the 256 St. Forest Service road, Mud Creek is a small, relatively benign tributary. Downstream of the Forest Service road, it quickly picks up several other tributaries and gradients increase significantly until the stream becomes a canyon with extremely unstable walls. Debris torrents and slumping events are very common, particularly during the fall and winter months. Salmonid habitat is non-existent. A settling pond has been constructed at the outlet of the canyon adjacent to the Alouette confluence in an attempt to temporarily detain the clay-based runoff; however, Mud Creek continues to be one of the primary sources of turbidity in the South Alouette.

Flow Regime: Little or no summer flows; flow regimes explosively variable during other periods.

Land Use: Some logging has taken place near the Forest Service road. The area is otherwise undeveloped.

Fish Presence: Mud Creek is not considered to a fish bearing stream.

Habitat Enhancement Possibilities: Studies are currently underway to explore possibilities of reducing erosion in Mud Creek canyon by diverting a portion of the flow into an adjacent watercourse.

Accumulated gravel in the settling pond could be extracted, cleaned, and placed in the Alouette River.

T12

Location (Figure 5): This watercourse drains a portion of the northwest slope of Blue Mountain and flows in a west to northwesterly direction into Alouette River 400 meters downstream from Alouette Lake.

Length: 1.5 km

Wetted Width: 1.5-2.5 m

Description: From its headwaters on Blue Mountain, the stream descends steeply at first down a series of cascades and waterfalls before levelling into a pool-riffle area in the vicinity of the 256 St. Forest Service road. This pool-riffle habitat extends for approximately 300 meters before the stream again descends rapidly down a shallow gully to the Alouette confluence. Substrates range

from small and medium gravels in the pool-riffle area to cobbles and boulders in the gully downstream. Streamside cover and forest canopy is undisturbed throughout.

Flow Regime: Wetted all year in vicinity of Forest Service road, occasionally dry in lower gully.

Land Use: Undeveloped.

Fish Presence: Electroshocking took place February 22/96 in a 50 meter section downstream of the Forest Service road. Cutthroat trout ranging in size from 10 to 14cm were observed.

Habitat Enhancement Possibilities: The gully in the lower sections of this stream should be assessed in greater detail to determine if sufficient fish passage exists to warrant headwater stocking of anadromous species.

MISCELLANEOUS ALOUETTE RIVER TRIBUTARIES, LEFT BANK, B.C. HYDRO POWERLINE TO ALOUETTE LAKE

In addition to the watercourses previously mentioned, there are several other tributaries that were not assessed. Most of these drain into the Alouette via steep cascades, and many are only visible during storm events, when flows may be considerable. It is recommended that any development in the area be preceded by ground investigations that ideally take place during periods of heavy runoff.

TRIBUTARIES: SOUTH ALOUETTE RIVER - Right (north) bank

AL1

Location (Figure 6): This tributary drains an area northeast of 236 St. and 132 Ave. and flows roughly southwest through Maple Ridge Campground to join Alouette River 0.7 km upstream of the 232 St. bridge.

Length: 1.0 km

Wetted Width: 0.5-1.0 m

Description: Two branches of this tributary join near 236 St. and 132 Ave. The west branch has been affected by horse trail construction near the north end of 236 St. This watercourse may have originally been part of the North Alouette watershed. At the time of this study, the stream was being directed into an open ditch which flows alongside 236 St. before joining the east branch near 132 Ave.

The upper sections of both tributary branches above 236 St. and 132 Ave. are characterized by riffle habitat with occasional small pools. Below 236 St. and 132 Ave. the stream descends into a fairly steep gully before leveling out in Maple Ridge Campground. The stream enters Alouette River via a fish-impassable drop.

Streamside cover is generally undisturbed in the upper sections and the gully above the campground with the exception of the ditched section along 236 St. The campground has reasonable forest canopy but little or no immediate streamside vegetation.

Flow Regime: Seasonal; often dry during summer and early fall.

Land Use: Currently rural residential; the area is designated for future commercial development and residential development at 8 to 30 units per hectare.

Fish Presence: No fish were observed in this tributary during the study.

Habitat Enhancement Possibilities: Creative use of detention ponds could be incorporated into the anticipated development of the headwaters of this stream. In addition to controlling development related runoff, these ponds could provide storage to enhance the yearly flow regime and contribute to the overall water quality of Alouette River. The culvert outlet at Alouette River could be modified.

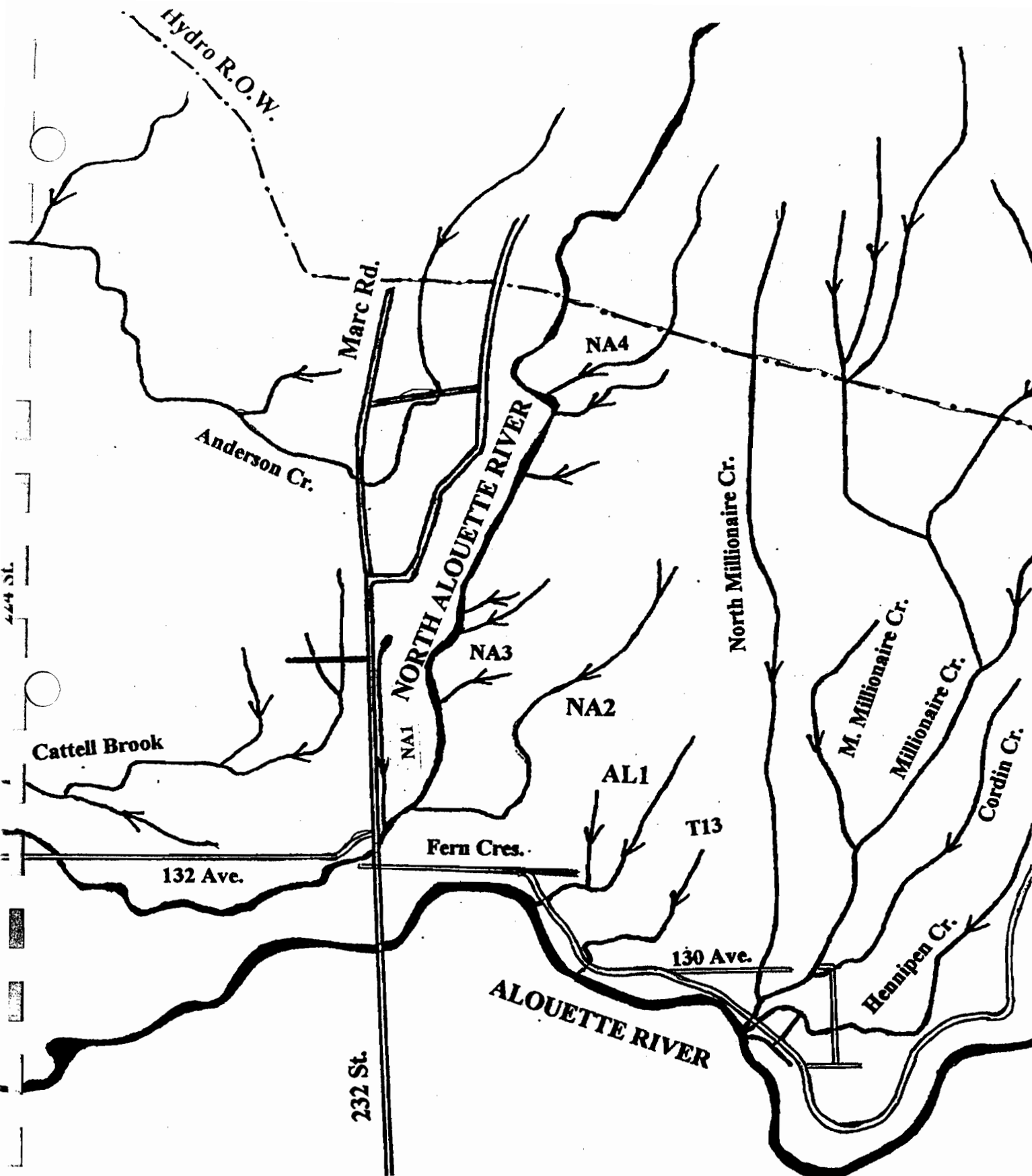


Figure 6: Silver Valley area streams. North Alouette tributaries: Anderson Cr., Cattell Brook, NA1, NA2, NA3, NA4. South Alouette tributaries: Millionaire Cr. and tributaries, Cordin Cr., Hennipen Cr., AL1, T13. (Scale = 1:20,000)

T13

Location (Figure 6): This stream originates north of 132 Ave. near the 237 St. alignment and flows generally southwest to join Alouette River 1.0 km east of the 232 St. bridge.

Length: 0.8 km

Width: 0.5-1.0 m

Description: This small watercourse is confined to shallow gullies for much of its length, with mainly cobble substrates and reasonable streamside cover. After crossing Fern Crescent at 236 St., the stream becomes a shallow riffle which extends to the Alouette confluence.

Flow Regime: Intermittent.

Land Use: Currently rural residential; the area is designated for future residential development at 8 to 18 units per hectare.

Fish Presence: Salmonid juveniles frequently utilize the riffle section downstream of Fern Crescent during winter months and / or high water events in the Alouette.

Habitat Enhancement Possibilities: Development activities should be designed to minimize the effects on the natural flow regimes and water quality of the watercourse, particularly in the critical winter rearing stage.

NORTH MILLIONAIRE CREEK

Location (Figure 6): This stream originates in U.B.C. Research Forest 0.5-1.0 km east of North Alouette River. It flows more or less in a southerly direction to join Millionaire Creek near 129 Ave. and Fern Crescent.

Length: 3.2 km

Wetted Width: 1-2 m

Description: The habitat from the B.C. Hydro powerline down to 130 Ave. is for the most part a pool-riffle regime with occasional small drops. Streamside vegetation is undisturbed and there is a good forest canopy, with the exception of an area about 1.0 km upstream of the Millionaire Creek confluence, where logging has resulted in removal of the overstory. There are several debris jams in this area.

From 130 Ave. down to the Millionaire Creek confluence, the stream becomes a series of cascades and some channellization has occurred. The culvert under 130 Ave. may limit upstream salmonid migration.

Flow Regime: All year.

Land Use: The stream is located in an area designated as an urban greenbelt. Adjacent lands are designated for residential development at 5 to 18 units per hectare.

Fish Presence: This stream was electroshocked on February 19/96 approximately 1 km upstream of the mouth. Cutthroat trout of 5 to 25 cm in length were observed. Electroshocking also took place on February 21/96 between 130 Ave. and the Millionaire Creek confluence; cutthroat trout averaging 10 cm were captured along with one 35 cm individual.

Landowners report that steelhead trout have occasionally entered the lower sections of the stream in the past, and probably do today. It would appear that anadromous fish are capable of migrating at least as far upstream as the 130 Ave. culvert.

Habitat Enhancement Possibilities: As development progresses, education of new landowners and developers alike may significantly reduce the impacts of these activities on streams such as North Millionaire Creek.

The presence of anadromous (sea-run cutthroat) fish near 130 Ave. would suggest that improvement of the 130 Ave. culvert outlet could provide increased upstream habitat for anadromous salmonids.

Headwater stocking of this stream could be carried out as far upstream as the B.C. Hydro powerline.

MIDDLE MILLIONAIRE CREEK

Location (Figure 6): This stream is a tributary of Millionaire Creek which originates midway between North Millionaire and Millionaire Creeks about 1.6 km north of the South Alouette River. The stream flows basically south until the confluence with Millionaire Creek, 900 meters north of Alouette River.

Length: 1.0 km

Wetted Width: 1 m

Description: This stream flows through undeveloped forest with the exception of a logged-off strip about 0.5 km upstream of the Millionaire Creek confluence. This logging has resulted in several debris jams. The horse/skidder trail creek crossing at this location includes an undersized culvert with an impassable drop at the outlet.

Stream habitat 0.5 km north of the Millionaire Creek confluence was a pool-riffle complex with substrates primarily consisting of small gravels.

Flow Regime: Unknown.

Land Use: Lower 350-400 meters are located in an area designated as an urban greenbelt; upper sections of the stream and lands adjacent to the greenbelt are designated for residential development at 12 to 18 units per hectare.

Fish Presence: Electroshocking in the vicinity of the horse trail crossing produced no fish.

Habitat Enhancement Possibilities: The culvert at the horse/skidder trail mentioned previously should be replaced. The logging debris jams in the same area should be assessed in detail and removed if necessary.

MILLIONAIRE CREEK

Location (Figure 6): This watercourse begins as a series of tributaries that drain a significant portion of the southeastern section of the U.B.C. Research Forest and the southwestern section of Golden Ears Park. These tributaries become a single stream which then flows southwesterly for 1.8 km until the Alouette River confluence.

Length: 7.0 km (including tributaries)

Wetted Width: 2.5-3.5 m

Description: Millionaire Creek is one of the largest tributaries in the South Alouette watershed below Alouette Lake. The stream is confined to a gully of varying depths for much of its length, and habitat is composed of a series of pools and riffles with substrates of small to medium gravel, cobbles, and some boulders. Streamside cover and vegetation is generally excellent above 130 Ave. as the stream flows through mature forest. One exception is a property about 100 meters north of 130 Ave. on the east bank, where the streambank has been cleared to the water's edge. According to local landowners, subsequent erosion of this steep bank caused considerable sedimentation to occur. At the time of this study the bank was still almost devoid of vegetation. Downstream of 130 Ave. the stream flows through a residential area until the Alouette River confluence. Riparian habitat in this section has been somewhat manicured in places.

Flow Regime: All year.

Land Use: Upper sections are in U.B.C. Research Forest or Golden Ears Park. The lower 1.8 km is designated for residential development at 8 to 18 units per hectare. The stream itself has been designated as an urban greenbelt corridor.

Fish Presence: Coho salmon migrate at least 2 km upstream from the Alouette confluence. Chum and occasionally pink salmon ascend the stream to 130 Ave. Other salmonid species include rainbow (steelhead) and cutthroat trout, and mountain whitefish.

Habitat Enhancement Possibilities: Streamside planting is recommended at the property north of 130 Ave. where bank clearing has occurred. Other planting opportunities exist in places between 130 Ave. and the Alouette confluence.

CORDIN CREEK

Location (Figure 6): Cordin Creek drains a relatively small watershed east of the Millionaire Creek drainage, and is a tributary of Millionaire Creek. From its headwaters near the southern boundary of Golden Ears Park, it flows southwest for 1.4 km until the confluence with Millionaire Creek near Mill Road and 130 Ave.

Length: 1.4 km

Wetted Width: 1.0 m

Description: This stream has two major reaches. In the section upstream of Mill Road, the stream is confined within a shallow gully in a forested area. The stream habitat is pools, some riffles, and occasional small drops. Substrates are predominantly gravels and cobbles. Near Mill Road the stream flattens out and meanders in a series of riffles and small glides until the Millionaire Creek confluence. Riparian vegetation and cover in this lower section is adequate with the exception of a section east of Mill Road, where the streambanks have been completely cleared.

An interesting feature is a pond located on a property southwest of Mill Road and 130 Ave. At the time of study, the pond was inaccessible to fish.

Flow Regime: Unknown.

Land Use: Presently rural residential. This area is designated for residential development at 8 units per hectare.

Fish Presence: Electroshocking was carried out on March 1/96 between the Millionaire Creek confluence and a point 200m east of Mill Road. Coho salmon juveniles of 6 to 8 cm in length were captured as well as cutthroat trout of 10 to 15 cm. Coho fry were observed in late March (1995 brood.)

Habitat Enhancement Possibilities: Streamside planting and debris placement would improve the cleared section east of Mill Road.

HENNIPEN CREEK

Location (Figure 6): This stream originates in Golden Ears Park, adjacent to the Golden Ears Parkway about 1.5 km northeast of the park entrance. It then flows southwest until splitting into two channels which enter Alouette River 50 and 100m east of Millionaire Creek.

Length: 2.4 km

Wetted Width: 1.0 m

Description: The upper 1.0 kilometer of this stream is a pool-riffle habitat flowing through a shallow gully in a forested area. Substrates in this upper section are mainly small gravels. There is also a significant presence of clay.

The lower sections of the stream are almost exclusively on private land. Channellization and riparian clearings have occurred in a number of locations. Substrates in the lower sections are a mixture of fines and small gravels.

The stream splits into two separate watercourses at the north end of Sheldrake Court. The eastern channel flows south on Sheldrake and under Fern Crescent before descending a steep cascade and meandering west across several properties before reaching Alouette River. The eastern channel is also fed by a groundwater pond located southeast of Fern Crescent and Sheldrake Court. The western channel flows west through private property until crossing Fern Crescent 100m east of 129 Ave. The culvert at this location is undersized and there are a series of cascades and drops that may limit fish passage at times.

Development occurring in 1980 or 1981 at the north end of Sheldrake caused a significant portion of Hennipen Creek to be diverted to the western channel. As a result, adult coho escapements to the sections of the eastern channel downstream of Fern Crescent were eliminated. The creek began to re-establish its original course in 1995; coho spawning subsequently took place in the fall of that year.

Flow Regime: All year.

Land Use: Upper sections in Golden Ears Park; lower sections residential. Future residential development is expected at 8 to 18 units per hectare.

Fish Presence: Coho and occasionally chum salmon ascend the stream at least to Mill Road. Electroshocking near the southern boundary of Golden Ears Park produced cutthroat of 10 cm. Overwintering coho, cutthroat and steelhead parr frequently enter the eastern channel. Cutthroat fry (1996 brood) were observed in the eastern channel in May 1996. Emerging coho fry began to appear in the same area in mid-March of 1996.

Habitat Enhancement Possibilities: The section north and east of Sheldrake Court should be channellized in such a manner as to provide a flow regime that would maximize the available habitat in the eastern and western channels.

Access could be improved at two locations: the cascades south of Fern Crescent in the eastern channel, and the culvert crossing under Fern Crescent in the western channel. Landowners should be educated and encouraged to undertake riparian restoration activities.

GOLDEN EARS PARK

In addition to the watercourses examined, several streams enter the right (north) bank of the South Alouette between the Golden Ears Park boundary and Alouette Lake. Time constraints did not permit the inclusion of these watercourse in this study.

TRIBUTARIES - NORTH ALOUETTE RIVER

CATTELL BROOK

Location (Figure 6): This stream originates south of 136 Ave. and west of 232 St. It then flows south to near 132 Ave., then west until the North Alouette confluence west of 224 St.

Length: 3.7 km

Wetted Width: 1 m

Description: This watercourse flows through agricultural land and residential acreages. It is mainly composed of a series of small ponds and glides with a few scattered riffles. Substrates are mostly fines with occasional pockets of small gravel. Riparian vegetation has been cleared in a number of locations.

Flow Regime: Reduced to areas of standing water during summer low flow period.

Land Use: Agricultural, rural residential. Lands adjacent to upper 70% of watercourse are designated for residential development at 18 to 30 units per hectare.

Fish Presence: Coho adults occasionally ascend at least to the 23000 block of 132 Ave. Overwintering salmonid juveniles frequently utilize the lower sections between 224 St. and the 23000 block of 132 Ave.

Habitat Enhancement Possibilities: Riparian restoration activities such as debris placement and streamside planting would be beneficial in many areas.

NA1

Location (Figure 6): This small watercourse begins as a pond on a property northeast of 136 Ave. and 232 St. It flows as an open ditch along the east side of 232 St. until the North Alouette confluence at the 232 St. bridge.

Length: 0.8 km

Wetted Width: 0.5 m

Description: The stream is an open ditch with gravel substrates. Cover is limited to roadside grasses.

Flow Regime: Sporadic.

Land Use: Presently rural residential; area is designated for residential development at 18 units per hectare.

Fish Presence: Salmonid juveniles have been observed in the lower sections of the stream, especially during high water events in the North Alouette.

Habitat Enhancement Possibilities: Since salmonid juveniles in general and coho in particular will aggressively seek out off-channel habitat at times, the lower sections of municipal ditches such as NA1 should be designed to accommodate the immigration and emigration of these fish.

NA2

Location (Figure 6): This stream originates at roughly the 141 Ave. and 236 St. alignment and flows southwest to join the North Alouette 200 meters upstream of 232 St.

Length: 1.8 km

Wetted Width: 0.5 m

Description: From its headwaters, NA2 descends into a small gully in which several areas of bank erosion and minor slumping were noted. This gully extends for approximately 800 meters. The stream in this section is a pool-riffle mix with gravel and clay substrates. Streamside cover is mainly mature forest. There is one area north of Larch Ave. where cattle had access to the stream for a number of years; these animals are no longer present and the area is revegetating. Near the intersection of Balsam St. and Larch Ave., the stream levels out and becomes a meandering riffle with minimal banks. Stream cover in the lower section is forest with the exception of a property at 23271 Fern Crescent, where horses have free access to the stream and are causing bank degradation.

Flow Regime: Believed to be all year above Balsam St. and Larch Ave. and seasonal below this point.

Land Use: Presently rural residential in section below Balsam St. and Larch Ave. Upstream area is designated for residential development at 18 to 40 units per hectare.

Fish Presence: Landowners have observed coho adults as far upstream as Balsam St. The removal of the cattle north of Larch Ave. has resulted in improved flow regimes and increased fish presence.

Habitat Enhancement Possibilities: The property owner at 23271 Fern Crescent should be approached about the possibility of limiting horse access to the stream on that property.

Improving the flow regime of NA2 may be feasible by diverting a portion of AL1 near the 236 St. and 133 Ave. alignment. This endeavor could occur in conjunction with the anticipated development of the area.

NA3

Location (Figure 6): This watercourse drains a portion of east slopes of North Alouette River. It enters the North Alouette near the 139 Ave. alignment.

Length: 0.7 km

Wetted Width: 0.5 m

Description: This small stream flows from its headwaters through a very shallow gully in the upper sections. Habitat is mainly riffles with a few small pools. This section is forested as is the entire watercourse.

The confluence with the North Alouette is marked by an abrupt cascade down a very steep bank to the river. Fish access into NA3 is highly unlikely.

Flow Regime: Unknown.

Land Use: Undeveloped at present; upper section of watercourse lies within land designated for residential development at 18 units per hectare.

Fish Presence: NA3 is not believed to be a fish bearing stream.

Habitat Enhancement Possibilities:

NA4

Location (Figure 6): This stream drains a portion of U.B.C. Research Forest between North Alouette River and North Millionaire Creek.

Length: 1.3 km

Wetted Width: 0.5-1.0 m

Description: The stream flows from its headwaters in U.B.C. Research Forest through a mostly forested area with gentle gradients. Stream habitat is primarily riffle with occasional small pools. The substrates are composed of gravels. This habitat type extends for approximately 400m downstream of the B.C. Hydro powerline, at which time the stream plunges down a steep cascade and into North Alouette River. It would appear that the possibility of salmonids ascending this cascade is remote.

Flow Regime: Unknown in lower sections; likely wetted all year in upper sections.

Land Use: Undeveloped. A small section near the North Alouette confluence is designated for residential development at 5 units per hectare.

Fish Presence: Unknown.

Habitat Enhancement Possibilities: Although the outfall at North Alouette River is probably impassable to inbound salmonids, it could probably be negotiated by seaward smolts. Headwater stocking is therefore a possibility.

ANDERSON CREEK

Location (Figure 6): This stream is a tributary of Blaney Creek. It drains a southern portion of U.B.C. Research Forest and flows south until the 13900 block of 232 St., where it swings west to northwest and flows to the floodplain and eventually Blaney Creek.

Length: 3.0 km

Wetted Width: 0.5-1.0 m

Description: This stream flows through a mostly forested area from the headwaters down to 232 St. Stream habitat in this area is a mix of pools and riffles. Substrates are small to large gravels with some boulders and cobbles. A number of landowners in this section have constructed instream ponds, presumably for a summer water supply. Downstream of 232 St. the stream continues down a shallow gully until reaching the North Alouette floodplain approximately 500 meters west of 232 St. The gully includes several waterfalls and cascades; the largest of these is a 3 meter drop roughly midway down the gully. This feature may not be passable to upstream migrating salmonids. The remainder of the gully habitat consists of pools and small drops with gravel and cobble substrates, boulders, and areas of exposed bedrock.

At the lower end of the gully, the stream levels out and becomes predominantly riffle habitat with some pools. This reach includes excellent spawning and rearing habitat and extends downstream to the floodplain, where the stream becomes a slough near the Blaney Creek confluence.

Flow Regime: All year.

Land Use: Rural residential downstream of U.B.C. Research Forest; agricultural in lower sections. Land adjacent to the watercourse is designated for residential development at 5 to 18 units per hectare. The stream itself is in a greenbelt corridor to the lower end of the gully west of 232 St.

Fish Presence: Cutthroat trout are known to be present throughout. Coho salmon ascend the stream up to the lower sections of the gully west of 232 St. The stream west of 232 St. was inspected March 26/96; at this time coho fry were observed in considerable numbers throughout the riffle habitat at the lower end of the gully.

Habitat Enhancement Possibilities: A more detailed inspection of upstream sections of this watercourse should be undertaken in order to determine if improvements to fish passage in the gully west of 232 St. are warranted. This stream is a candidate for headwater stocking of anadromous salmonids.