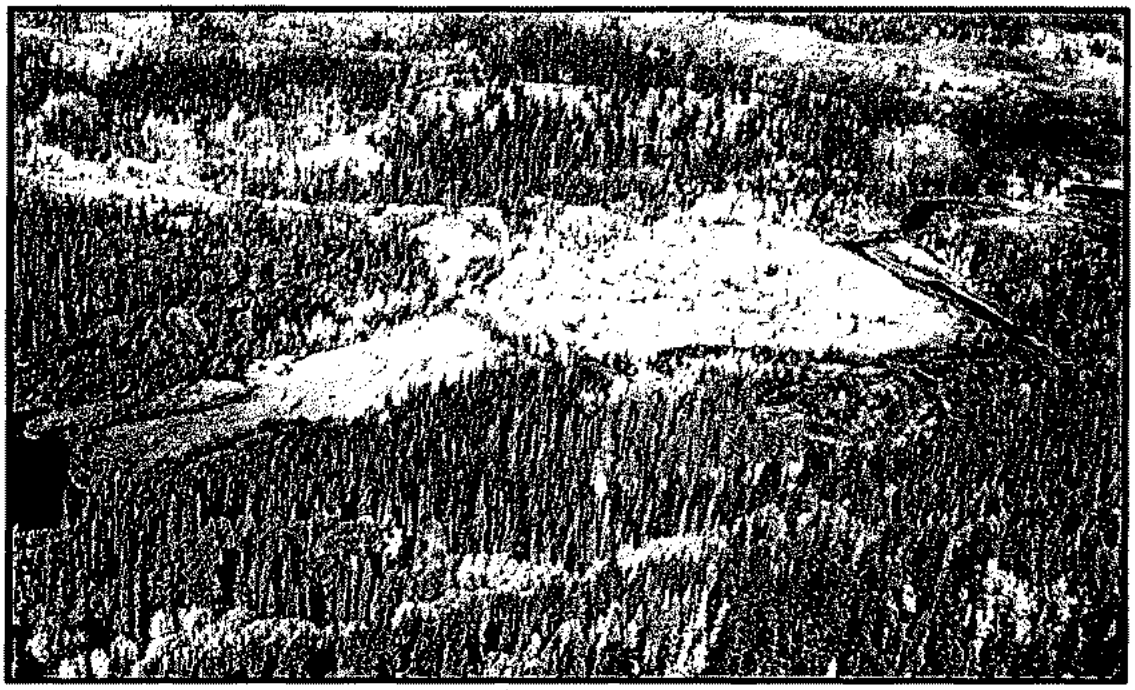
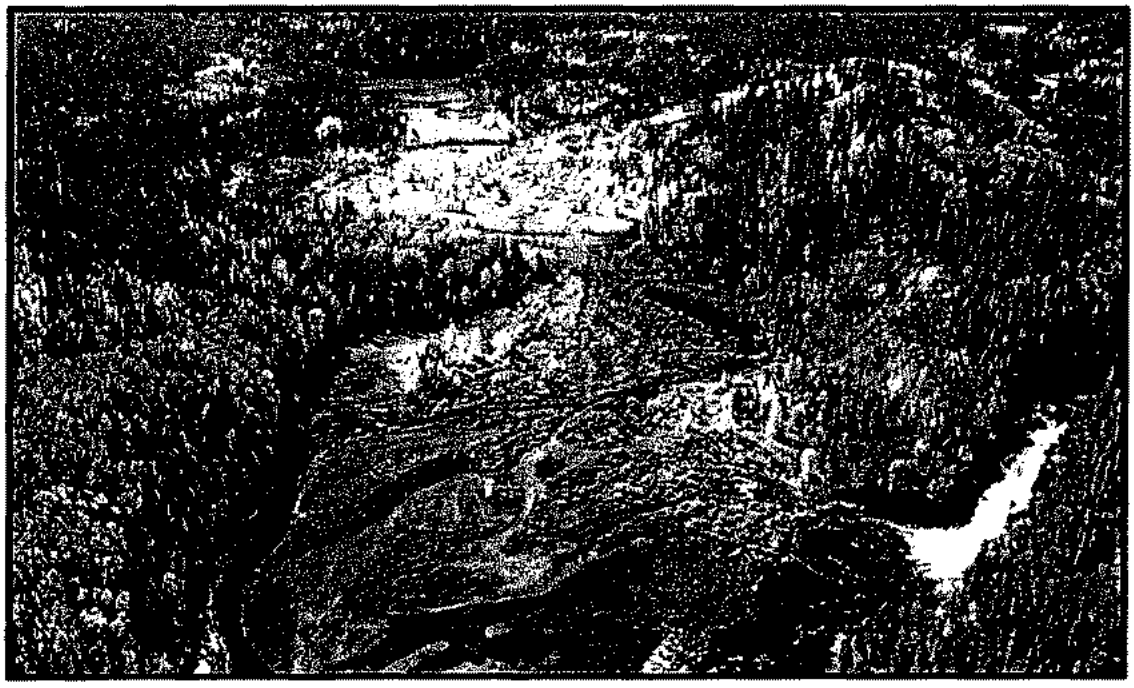


MM 02 - 91 - 7A

Plate 4.3.1-1 Looking downstream to Cheslatta Fan showing the sediment accumulations upstream of the constriction at Km 8.25



MM 02 - 91 - 26A

Plate 4.3.1-2 Looking upstream showing the sediment accumulations between the constriction at Km 8.25 and the Cheslatta River confluence

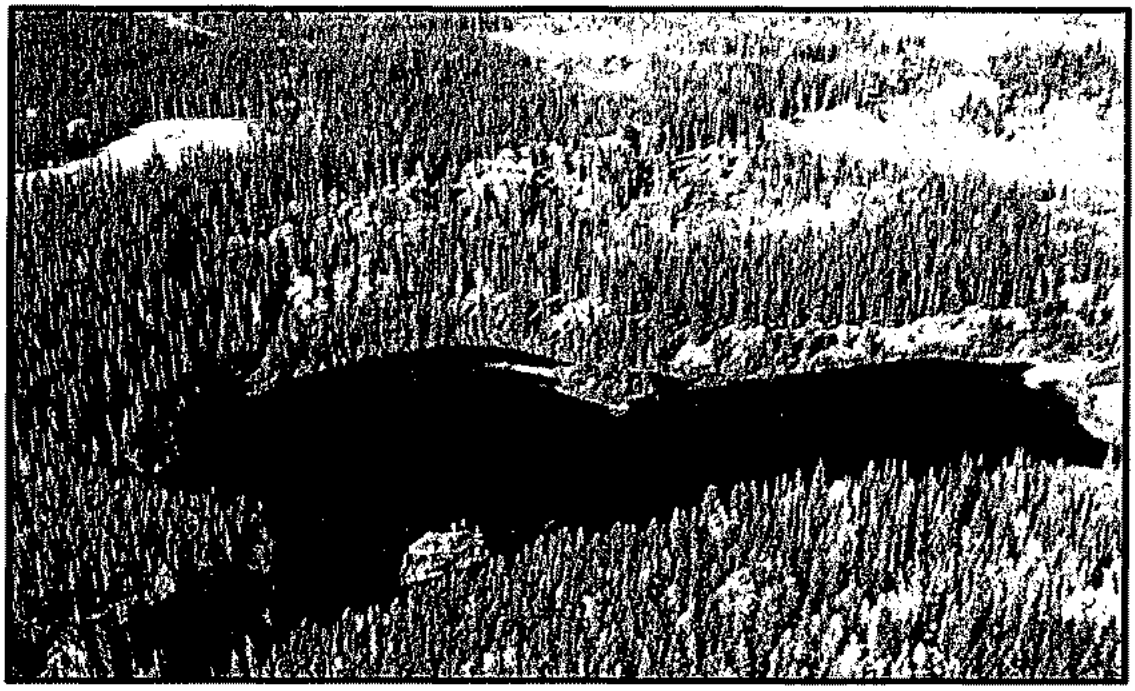
MM 02 - 91 - 35A

A) Looking downstream towards the upper end of the erosional gully.

MM 02 - 91 - 33A

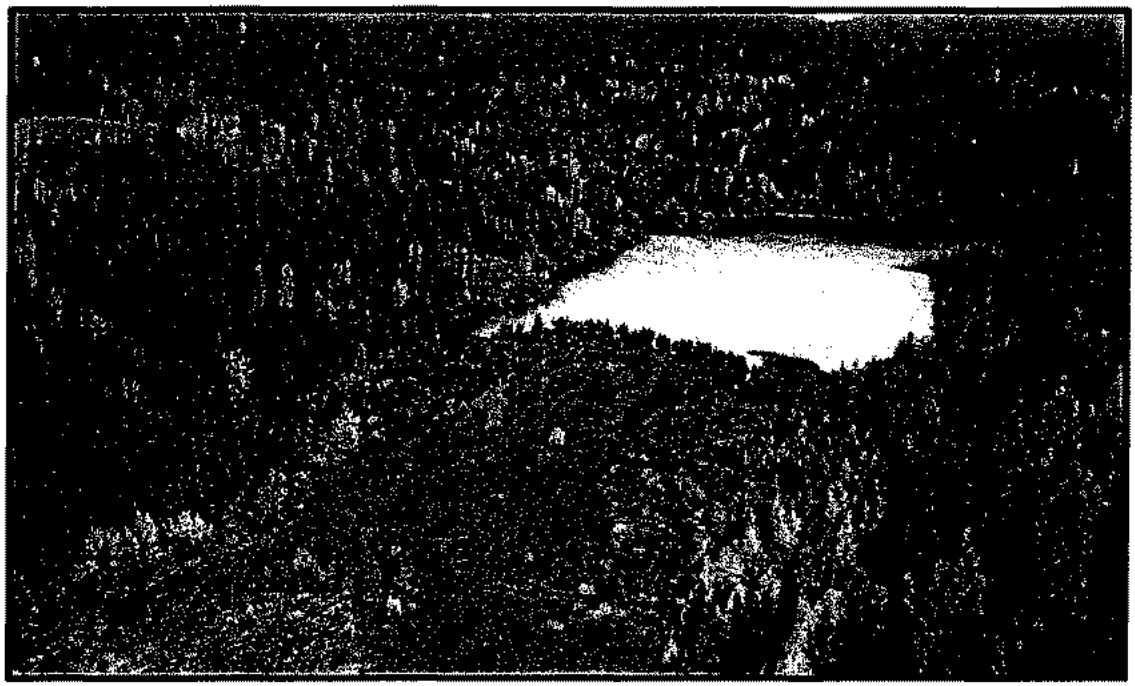
B) Looking downstream towards the lower end of the erosional gully.

Plate 4.3.1-3 Cheslatta Fan formed when Cheslatta River shifted course and downcut through a thick sequence of unconsolidated materials



MM 02 - 91 - 6A

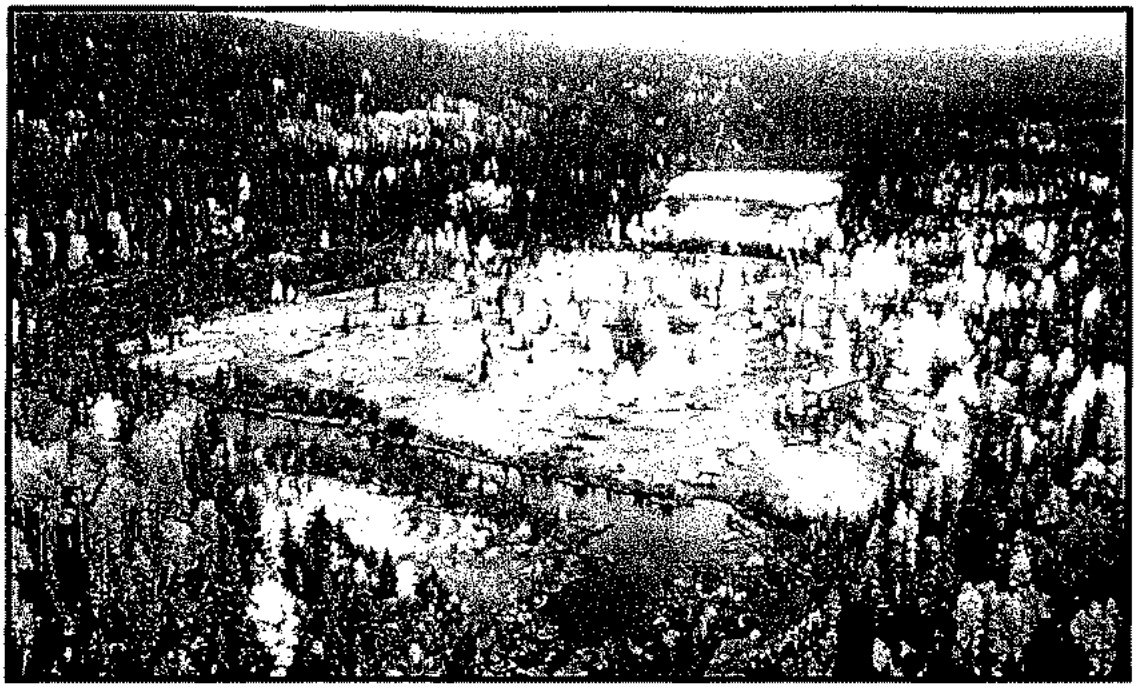
A) Looking downstream from the outlet of Nechako Canyon to Scour Hole Lake.



MM 02 - 88 - 19

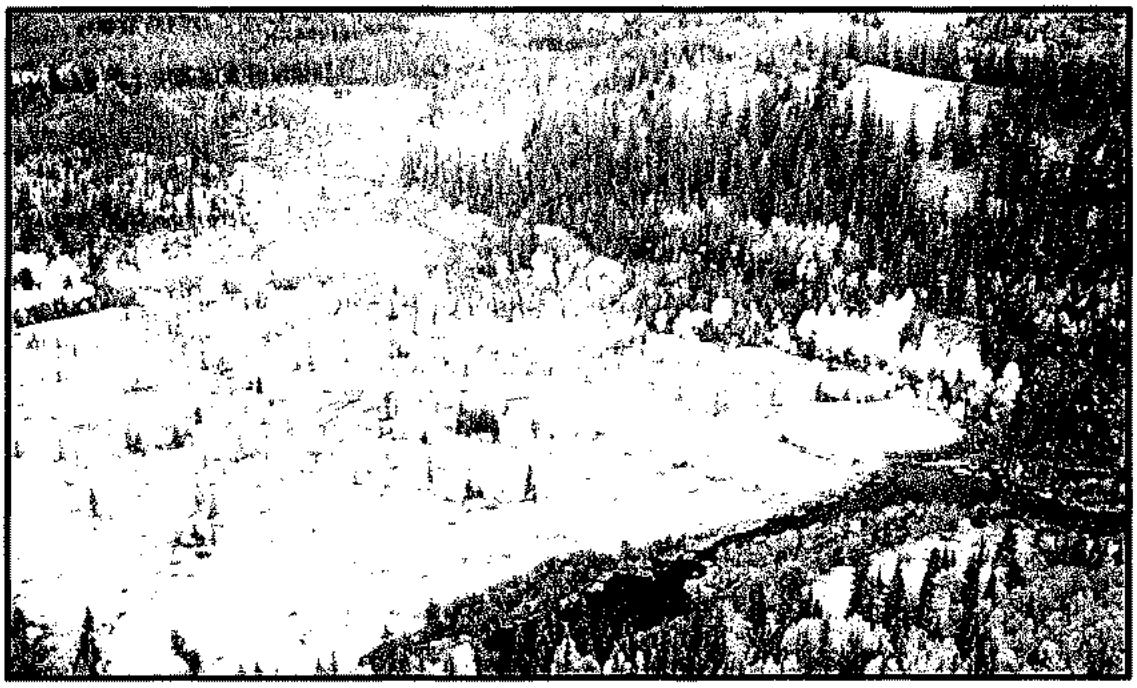
B) Looking upstream over Cheslatta Fan to Scour Hole Lake.

Plate 4.3.1-4 Scour Hole Lake is situated between the outlet of Nechako Canyon and the upstream end of Cheslatta Fan



MM 02 - 88 - 15

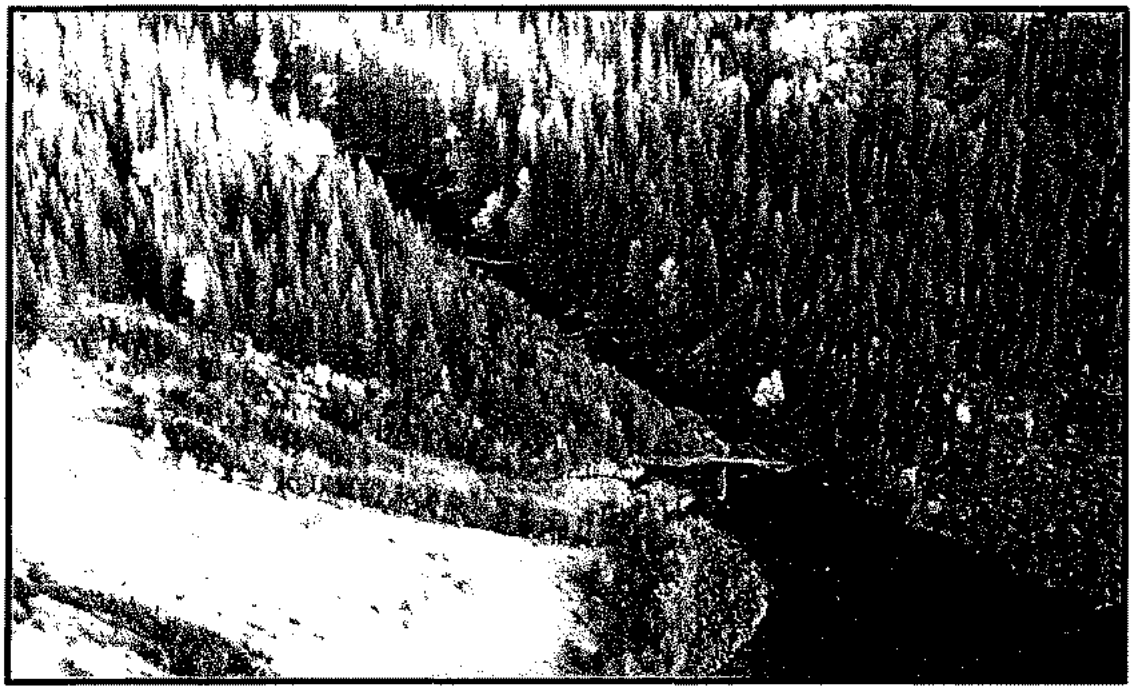
A) Looking upstream from Km 8.25



MM 02 - 85 - 16

B) Looking north from Km 8

Plate 4.3.1-5 The Cheslatta Fan slopes towards the south. This has caused the residual Nechako River channel to be located against the right bank valley wall



MM 02 - 92 - 13A

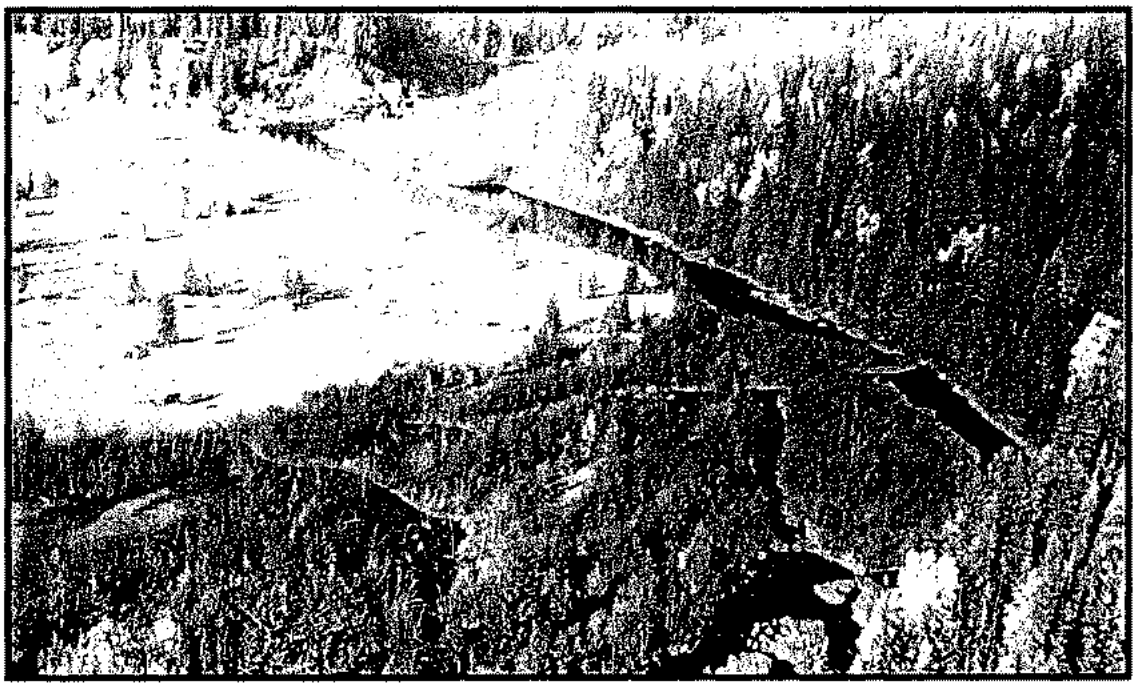
Plate 4.3.1-6 Looking downstream showing the outlet of Scour Hole Lake. This section of channel is flowing over bedrock (Km 7.3)

MM 02 - 92 - 16A

Plate 4.3.1-7 Looking downstream showing the well defined channel which occurs adjacent to the former island located immediately downstream of Scour Hole Lake

MM 02 - 92 - 18A

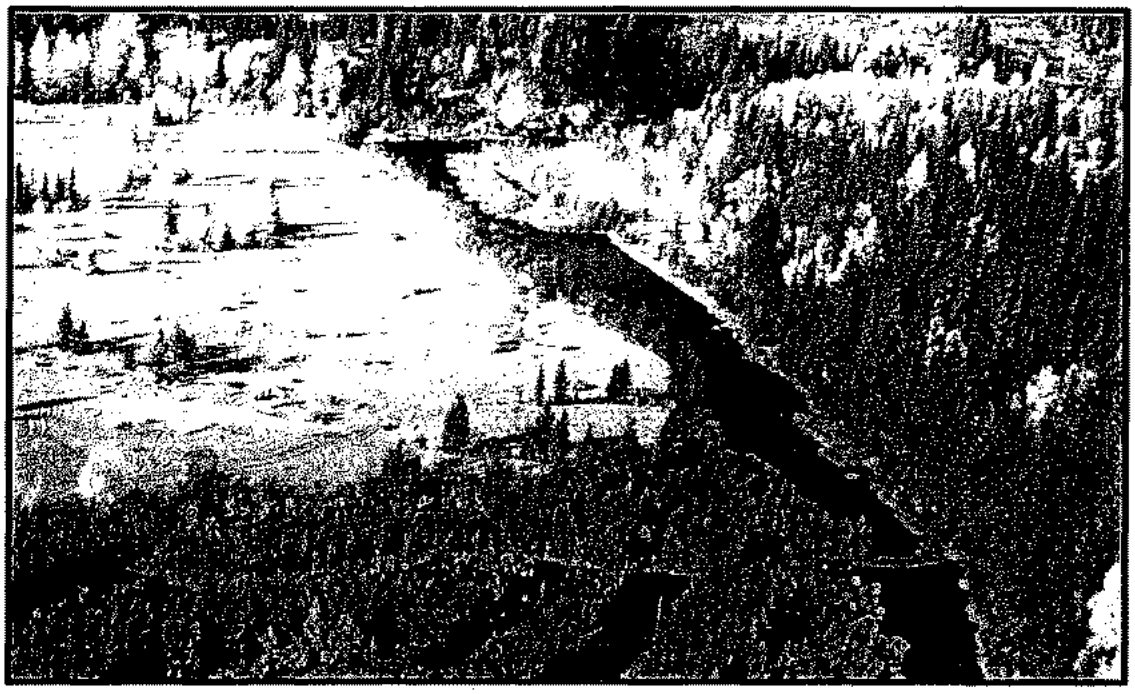
A) Looking downstream from Km 7.7



MM 02 - 92 - 19A

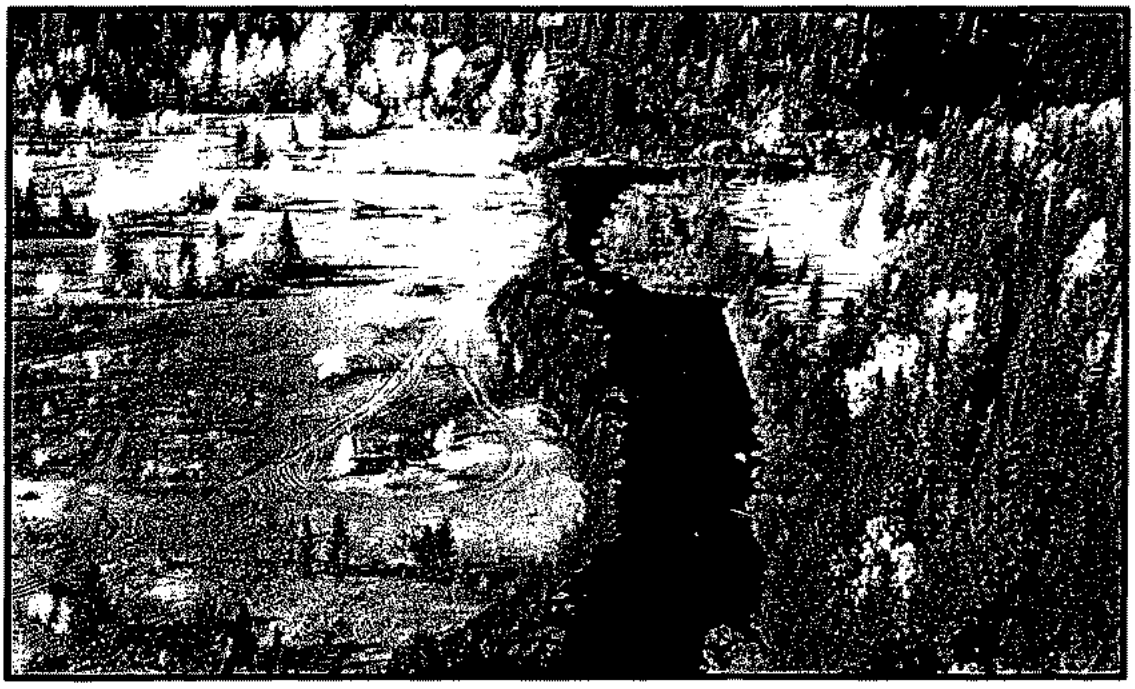
B) Looking downstream from Km 7.8

Plate 4.3.1-8 The channel is comparatively poorly defined in the middle section of the fan. Note the gentle slope of the left bank and the presence of numerous beaver dams



MM 02 - 92 - 20A

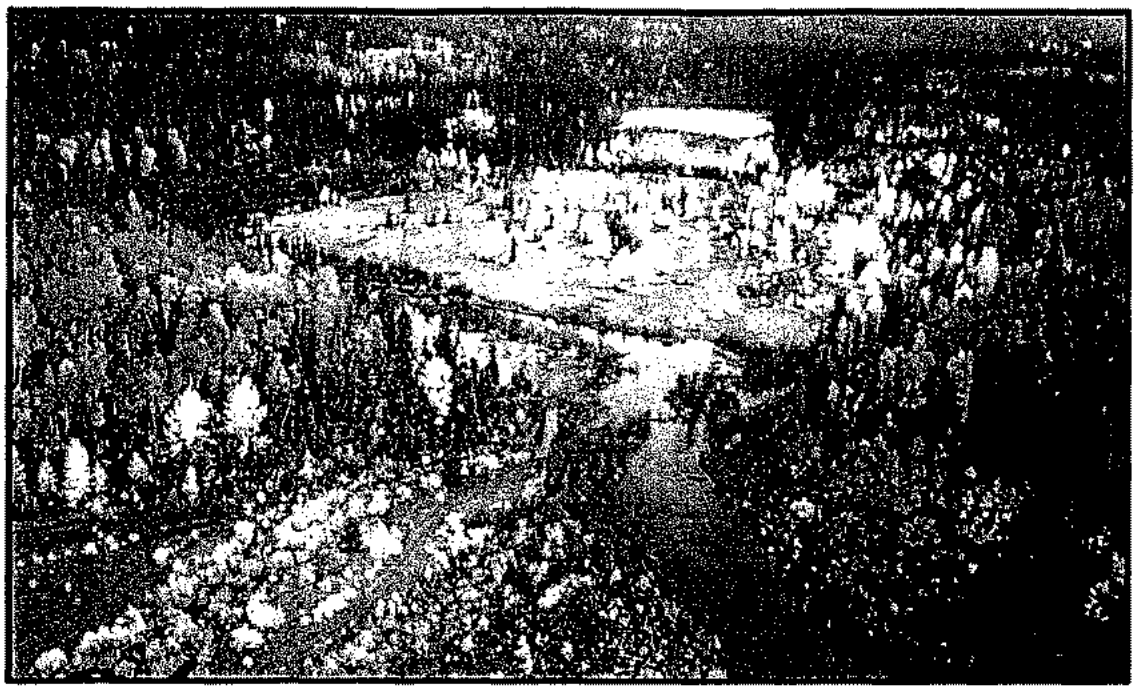
A) Looking downstream from Km 7.7



MM 02 - 92 - 21A

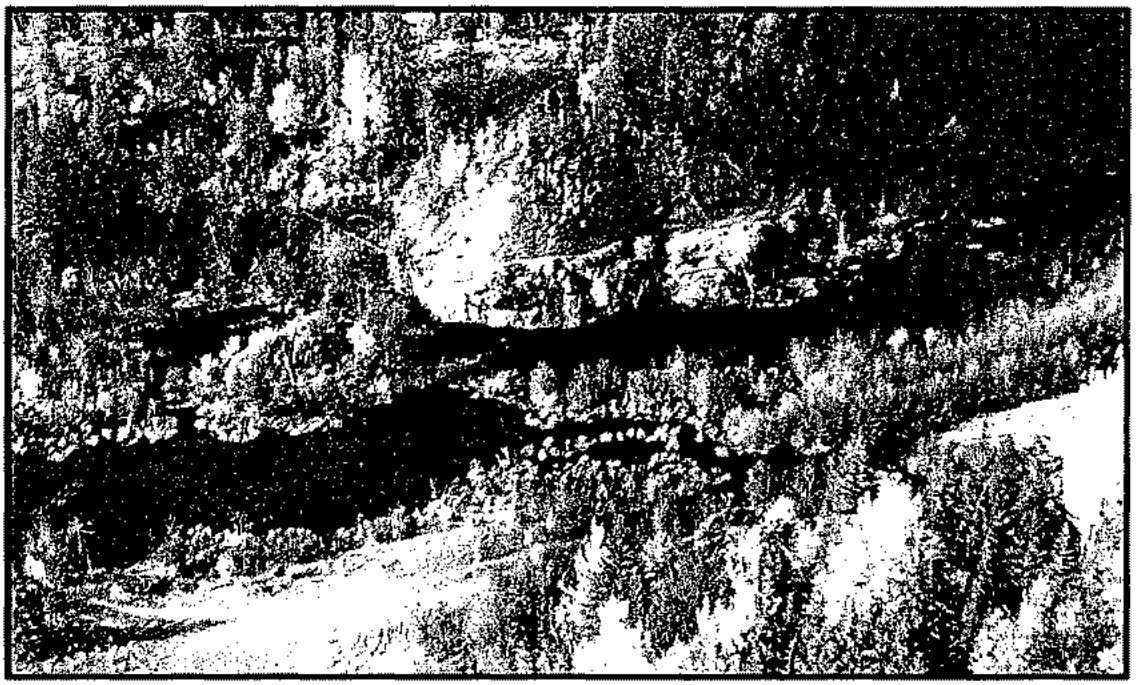
B) Looking downstream from Km 8.0

Plate 4.3.1-9 The lower section of channel around Cheslatta Fan has well defined banks and no beaver dams



MM 02 - 88 - 13

A) Looking upstream to "the neck".



MM 02 - 92 - 22A

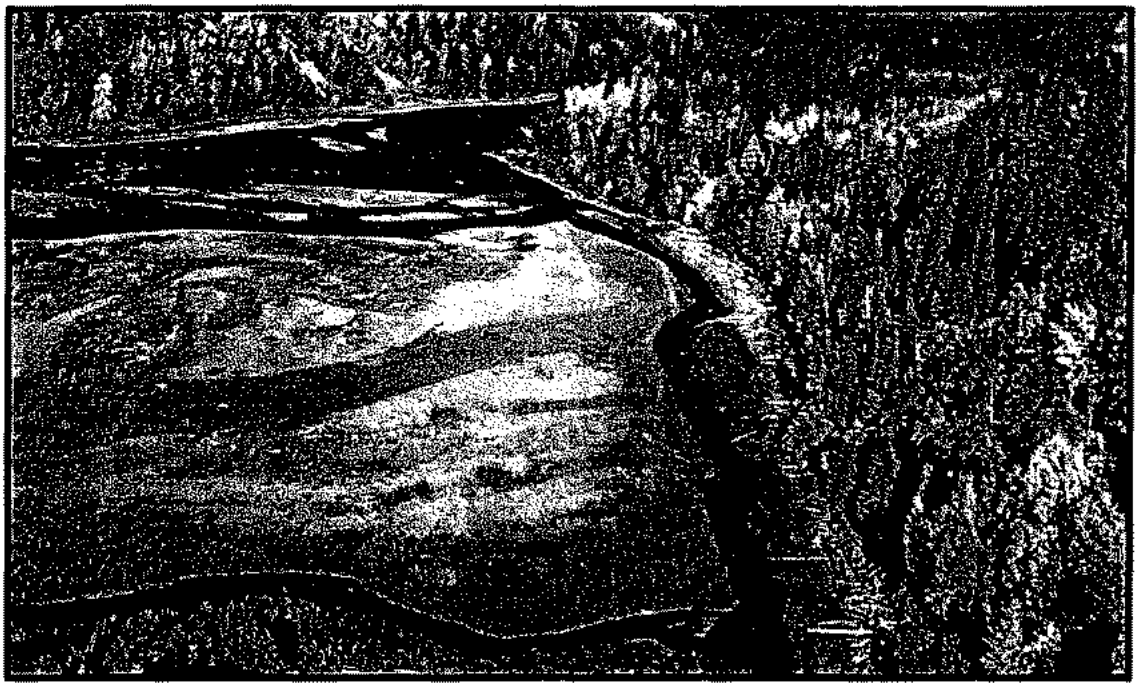
B) Looking north to "the neck".

Plate 4.3.1-10: A bedrock constriction, locally referred to as "the neck" occurs at Km 8.25.

Plate 4.3.1-11 Looking north over "the neck" showing the water washed rocks which indicate the height of former high water levels.

MM 02 - 88 - 11

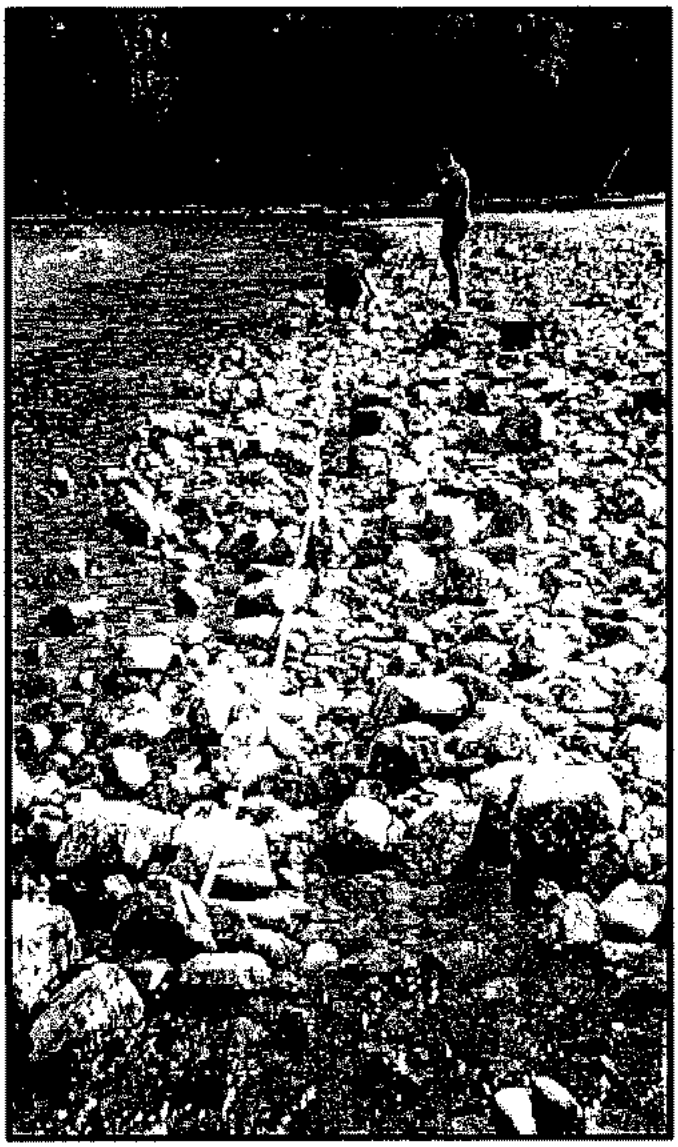
A) Looking upstream from the Cheslatta confluence.



MM 02 - 92 - 28A

B) Looking downstream to the right bank channel at Km 8.8

Plate 4.3.1-12 Photographs of the channel which has developed between "the neck" and the Cheslatta confluence



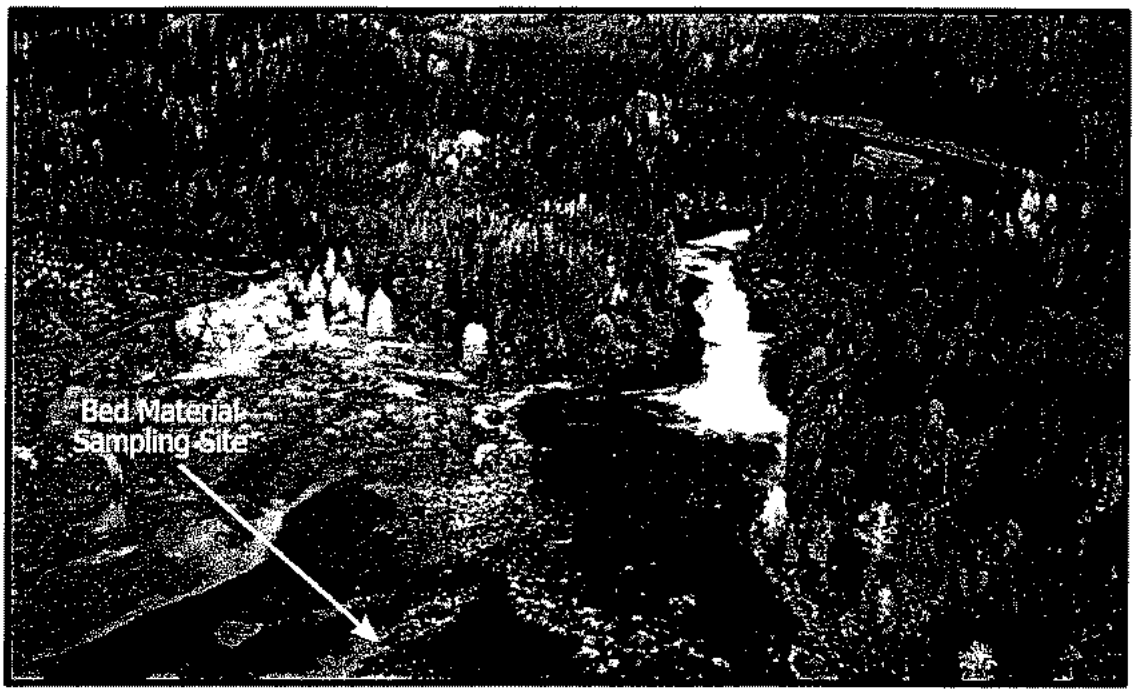
MM 02 - 84 - 16A

Plate 4.3.1-13 Bed material size analyses were taken along the waters edge and on the surface of the bar located downstream of Cheslatta Falls (see Plate 4.3.1-14)

Table 4.3.1-1 Bed Material Size on the Right Bank Gravel Bar Located downstream of Cheslatta Falls

% FINER	BED MATERIAL SIZE (mm)	
	BAR SURFACE	WATERS EDGE
100	740	380
90	130	165
84	110	145
50	60	88
16	44	48
10	37	40
0	15	17

Sample locations are shown on Plates 4.3.1-13 and 4.3.1-14.



MM 02 - 85 - 19

A) Looking upstream to Cheslatta Falls.

MM 02 - 92 - 34A

B) Looking downstream from the bridge over Cheslatta River.

Plate 4.3.1-14 Photos of Cheslatta River.

MM 02 - 91 - 31A

A) Looking towards the saddle dam at the top of the erosional gully.

MM 02 - 92 - 35A

B) Looking east (or downstream) across the top of the saddle dam.

Plate 4.3.1-15 Looking upstream to the saddle dam constructed on the right bank of Cheslatta River at the inlet to the Cheslatta Fan erosional gully

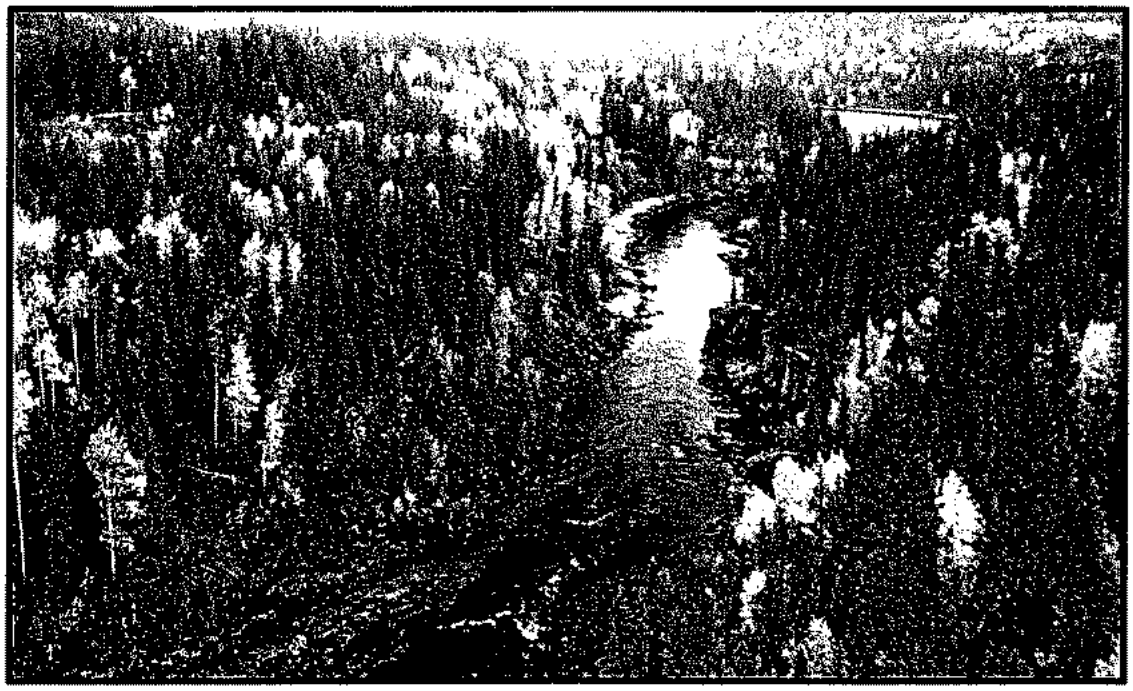
The Nechako River narrows downstream of the Cheslatta confluence and a bedrock constriction occurs between Km 9.5 and 10.2 (Plate 4.3.1-16). The river widens downstream from this point and large quantities of woody debris have been deposited on the right bank valley flat (Plate 4.3.1-17). This organic material could be derived from the Cheslatta Fan erosion gully or (more likely) post diversion bank erosion which has occurred further upstream on the Cheslatta-Skins Lake system (see Kellerhals et al. 1979).

The river forms an irregular channel downstream of Km 10.2. As indicated on Plate 4.3.1-18, there is little wood adjacent to the commonly wetted banks, the bed material is weathered or lichen covered (which suggests it is generally immobile), and riparian vegetation is developing in formerly wetted areas along the channel banks and on mid-channel bars or islands.

As discussed in Section 2.1.6, historical air photographs showing how channel conditions on Cheslatta Fan have changed over the period since 1950 have been compiled in Addendum 2. Mosaics showing conditions in 1949 and 2000 are presented as Figures 2.1.6-2 and 2.1.6-3, respectively. The pre-construction 1949 photograph provides an initial basis for estimating the morphological effects of a more natural discharge and sediment transport regime.

The analysis of the above photographs indicates that:

1. High flows will cause a scour hole to be maintained at the outlet of Nechako Canyon.
2. A channel was located along the edge of the right bank valley bottom prior to the formation of the Cheslatta Fan. A coniferous tree covered island occurred at the channel inlet. This vegetated island now forms the southeast corner of the Cheslatta Fan.
3. A laterally confined remnant channel occurs at the northeast corner of the Cheslatta Fan between Km 7.7 and 8.7. This channel, which ranges in width between 30 and 40 m, carried a substantial discharge at the time the Cheslatta Fan formed. In comparison, the bedrock outcrops on either side of the "Neck" are 42 m apart. This suggests that a channel ≥50 m wide will be required to convey the proposed flows from the CWRF.
4. Pre-regulation flood flows were sufficiently large that backwater occurred upstream of the bedrock constriction at Km 8.25. This resulted in valley bottom inundation and associated sediment deposition. This constriction also caused the formation of a sizeable scour hole in the downstream channel. This depression was infilled by sediments derived from the Cheslatta Fan erosional gully. Operation of the CWRF is likely to re-excavate this scour hole. Depending on the size of the released flows, some ponding of water may also occur upstream of the "Neck."
5. The present day Cheslatta River is much wider in comparison to conditions in 1949. This implies that redirecting all reservoir discharges through the canyon will result in a reduced or underfit channel on Cheslatta River.

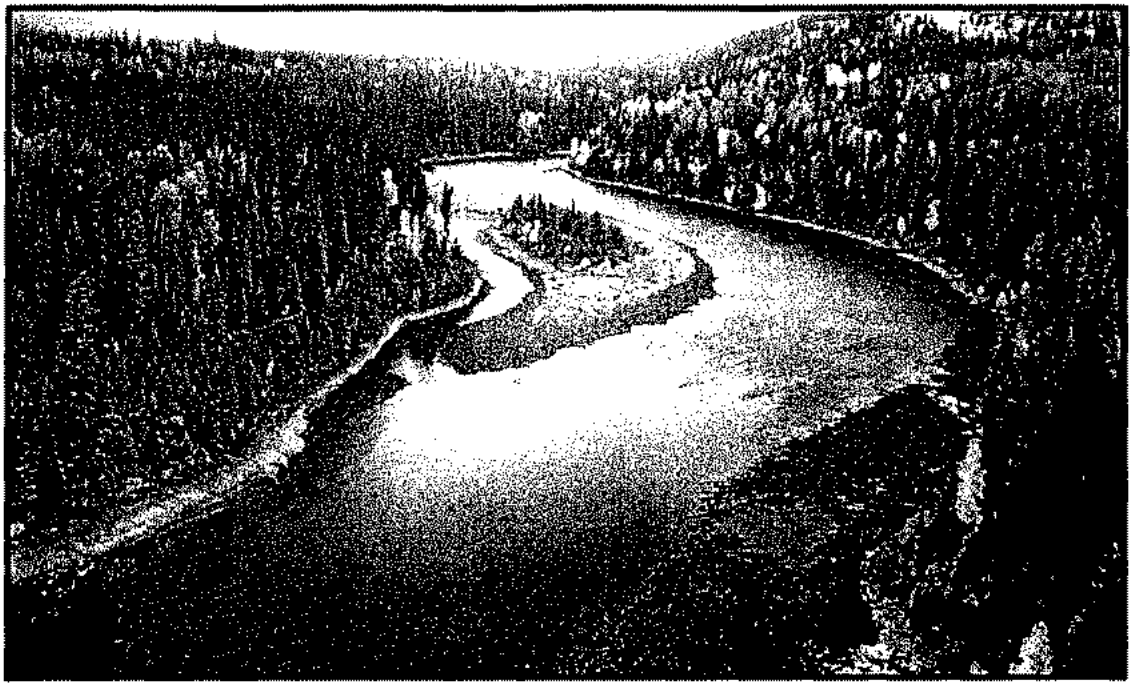


MM 02 - 87 - 15A

Plate 4.3.1-16 Looking downstream to the bedrock constriction which occurs between Km 9.5 and 10.2

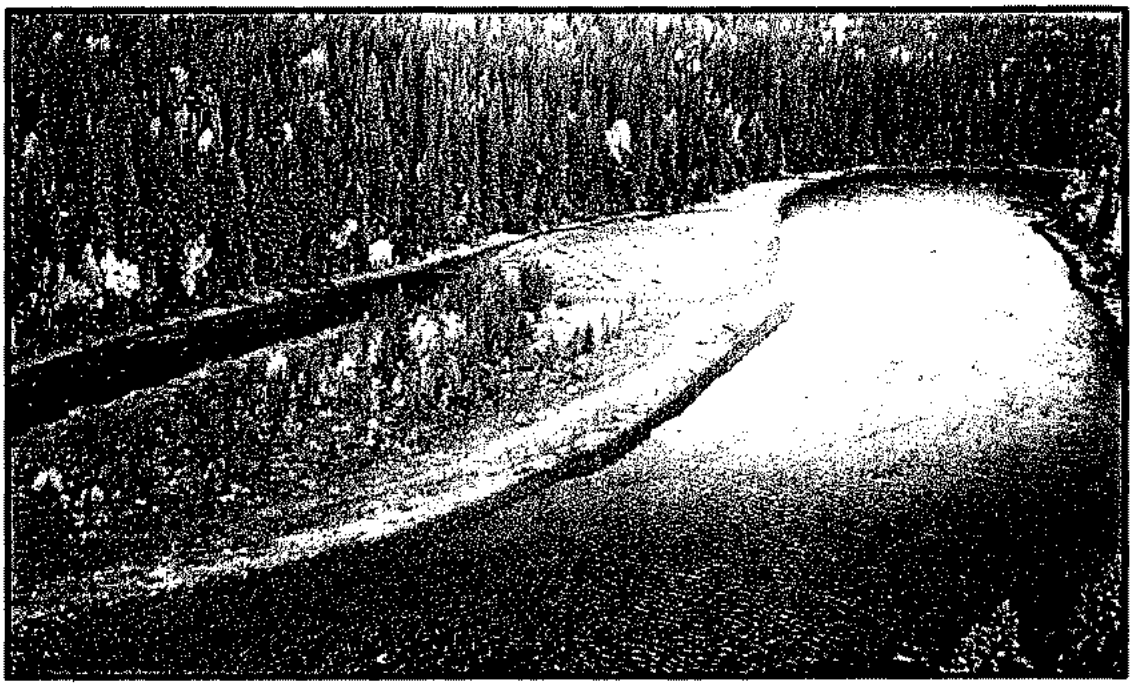
MM 02 - 87 - 24A

Plate 4.3.1-17 Looking downstream to the bedrock constriction at Km 10.2, showing the extensive large woody debris deposits



MM 02 - 87 - 25A

A) Looking downstream at Km 10.4



MM 02 - 87 - 26A

B) Looking downstream at Km 10.7

Plate 4.3.1-18 An irregular "underfit" channel has formed downstream of the bedrock constriction at Km 10.2

4.3.2 Riparian Vegetation

At the outlet of Nechako Canyon, the western margin of Scour Hole Lake displays the two distinct forest stand age classes that are typical of many locations in the canyon. Plate 4.3.2-1 shows a band of young spruce that established in the dewatered area just above the present water level in Scour Hole Lake. Larger cottonwood, spruce, and lodgepole pine occur upslope of the dewatered area.

For the entire length of the study area from Kenney Dam to the vicinity of Cheslatta Falls, the most significant accumulation of woody biomass near the potential reactivated channel is the coniferous stand at the southeastern edge of Cheslatta Fan (Plate 4.3.2-2). One of the largest trees in this stand, with a breast height diameter of 49.1 cm and an estimated height of 27 m, had a breast height age of 113 years (sample tree no. 7, Table 3.3.1-2). There was no September 2002 field tally of the total number of relatively large trees in this stand but approximate tree counts on available aerial photos indicates that between 1950 and 1990 there appeared to be at least 40 relatively large spruce in tbis stand (Table 4.3.2.1). Eight to twelve relatively large cottonwoods that were visible on 1950 and 1961 aerial photos were not present on 1974 or later photos, presumably a result of their loss during deposition of additional alluvial material on Cheslatta Fan. The degree to which this treed area may be disturbed by establishment of a self-forming natural channel in this vicinity has not been determined.

Table 4.3.2-1 Estimates from aerial photographs of numbers of large spruce and large black cottonwood on 'treed island', west side of natural channel, at soutbeastern edge of Cheslatta Fan, 7.6 km downstream from Kenney Dam.

Date of photography	Photo numbers	Estimated number of large trees	
		Spruce	Cottonwood
28 April 1950	BC 1036-67/68	46-48	8
18 September 1961	BC 4029-10/11	35-42	12
1974	BC 7601-24/25	40-45	0
31 May 1978	30 BC 78041-253/254	40-45	?
26 July 1990	30 BC 90060-112/113	38-40	?
22 September 2000	15 BC 00020-39/40	20+?	5
28 September 2002	Helicopter oblique	28-32	5

When relatively high flushing flows are activated, passage through the 'Neck' area shown in Plate 4.3.2-3 will likely involve removal of some of the conifers and broadleaf deciduous trees that occur on the southeast side of the 'Neck'. The opposite shoreline, on the northwest side of the 'Neck', would experience little vegetation disturbance, as there is presently very little vegetation cover on this rocky prominence.

Downstream of the 'Neck' area, the existing vegetation is predominantly an untreed grass and shrub cover on alluvial materials, with adjacent slopes covered by young mixed stands of spruce, birch, and aspen (Plate 4.3.2-4). Depending on the chosen location of a self-forming channel downstream of the 'Neck', and also depending on location and design of a potential gravel/boulder berm on the southeastern edge of the new channel, the area of the valley bottom portrayed in Plate 4.3.2-4 has the greatest potential for innovative assisted revegetation after the new channel's flows are established.

Plate 4.3.2-1 Vegetation adjacent to Scour Hole Lake.

There are presently two distinct forest stand age classes along the western margin of Scour Hole Lake, just south of Cheslatta Fan, where a band of young spruce has established in the dewatered area just above present lake level. Larger cottonwood (yellow foliage in photograph above), spruce, and lodgepole pine occur upslope of the dewatered area. This vegetation zonation could be altered by flushing flows that might raise the shoreline shown above or by a fully commissioned channel that might lower water levels by as much as 1 m in this lake (refer to Section 4.4.5). Location: view westward over Scour Hole Lake at the north end of Nechako Canyon, approximately 7.2 km downstream of Kenney Dam.

Plate 4.3.2-2 Vegetation on the southern portion of the Cheslatta Fan.

There is a remnant stand of relatively large old spruce is located at the southeast edge of Cheslatta Fan. On 1950 to 1971 aerial photographs, this forest stand existed on an island between channels of the Nechako River. Sample tree no. 7, with a breast height-age of about 113 years and an estimated height of 27 m (see Table 3.3.1-2), occurs near the eastern edge of this conifer stand. Location: southeastern edge of Cheslatta Fan, viewed to the southwest over Scour Hole Lake, approximately 7.6 km downstream of Kenney Dam.

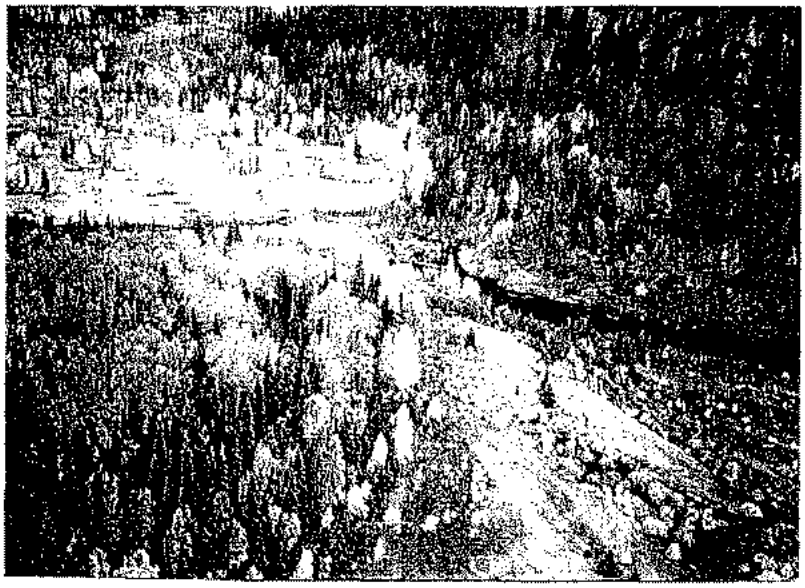


Plate 4.3.2-3 Vegetation at the "Neck," looking upstream from the Cheslatta confluence.
The edge of the mixed spruce-aspen stand on the lower left of this photograph would be subject to disturbance, depending on the design of the channel through the bedrock-controlled 'neck' that exists in the mid portion of the Cheslatta Fan. Sample tree no. 9, a large spruce with a breast height age of 135 years and estimated height of 29 m (see Table 3.3.1-2), is located near the channel margin of this mixed wood stand. Location: Cheslatta Fan approximately 8.3 km downstream from Kenney Dam.

Plate 4.3.2-4 Typical young mixed stand of spruce, birch, and aspen along the eastern edge of lower Cheslatta Fan.
The degree to which vegetation boundaries would be altered in this area by flushing flows and by a fully commissioned channel has not been determined. Location: eastern edge of present floodplain approximately 8.8 km downstream of Kenney Dam, 300 m south of Cheslatta Falls.