HISTORICAL DATA REVIEW ON THE UPPER BULKLEY RIVER.

JOAT CONSULTING

SARAH BROCKLEHURST 1998.

J.D.A.T. CONSULTING

Executive Summary

Over the past century, changes have been occurring to the land and water courses of the Upper Bulkley Watershed. These changes, along with over-exploitation of fish stock, are attributable to the decline in the coho population in this water system.

Research was carried out to compile historical data on the Upper Bulkley in the areas of water flow, temperature, and use, as well as climate and aerial photographs. Although data available is fragmentary in extent, it is still possible to note adjustments to the historical flow patterns and discharge amounts. The confinement of analysis of hydrological and climatological data within the Upper Bulkley is limiting, however. To place the basin's climate and hydrology in a long term context, the study boundaries were expanded outside the confines of the Upper Bulkley for comparison purposes.

Overall trends were noted in the areas of declining discharge volumes and the flattening out of discharge peaks over time. When reviewing the analysis that was provided for runoff volume outside the study area, it supported the findings of within the study area, showing a 6 - 7% reduction in runoff volume below the long-term mean. In addition, atmospheric temperature has increased from April to September in the 1990s, compared to the 1960s. A decrease in precipitation of 7 to 10% below the long term mean is noted for months of October to April.

Over 100 water licenses are active within the study area. Due to a margin of error related to these licenses and their relative water usage, it is difficult to extrapolate the true impact on the discharge levels. Excessive water withdrawals, coupled with climate variation, could result in water shortages and insufficient in-stream flows for fish. In the worst case scenario, existing licenses may exceed supply during a 7 day low flow 10 year occurrence.

Aerial photographs demonstrate the changes that have occurred in the study area over time. Increased clearing of land both adjacent and away from the water systems may be contributing to the changes in discharge and may be affecting fish habitat. The mainstem of the Upper Bulkley River, like all rivers, is moving and changing all the time. However, with the presence of the CN Rail grade along its length, interference in the natural movement of the river path is evident. Meandering sections are changing and becoming straighter, which could be affecting the flow of the river, and side channels have been entirely cut off reducing available fish habitat.

Flood events continue to occur as a natural cycle, however, with the additions and changes imposed by development, those events can be more destructive and severe as we continue to tamper with the river. Flood events recorded in the Bulkley show peak discharges for those events to be on the rise.

In summary, a number of factors are at play in the decline of the coho fish stock in the Upper Bulkley River. Some of those factors, such as land development, water use, and fish exploitation, are within our control, while others, such as climate change and discharge levels are not. Nature continues on a cycle that is greater than any given generation. Although man cannot control those cycles, understanding them can aid us in making more knowledgeable decisions on how we use our natural resources. Further analysis on existing data and continuing and improving data collection, are necessary in understanding the trends and changes of fish habitat.

Acknowledgments

Great thanks are extended to all those individuals who took the time to help me in locating and compiling historical data which could at times prove to be quite elusive. A special thanks to Brenda Donas for her input, direction and enthusiasm. Also thanks to Eero Karanka for his contribution to the review in the analysis of long-term records of precipitation and streamflow from the nearby stations outside the Upper Bulkley Watershed, which help to support the trends observed of fragmentary data within the watershed.

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Historical Data Review on the Upper Bulkley Watershed

1. Introduction

1.1 Scope of Study

Salmon stocks in the Upper Bulkley River have declined substantially over the past two decades and various studies are being conducted in an attempt to define the limiting factors in this watershed. Over-exploitation, i.e. total harvest rates of up to 70%, have been common. Upper Skeena coho stocks are heavily exploited in Alaskan fisheries and have historically been heavily exploited in Canadian fisheries. Recently, changes have been made to the Canadian fisheries in order to conserve coho stocks. Over-exploitation, however, is not the sole factor contributing to the decline of Upper Bulkley River coho. Changes to the habitat have occurred over the past century.

Transportation corridors such as CN Railway and Highway 16, have impacted the river habitat. In the early 1900's, the Upper Bulkley River was moved during construction of the railway. The old river channel can still be seen today and lies in between Highway 16 and the existing railway track. The river was straightened in many places therefore removing the natural meander pattern of the water course, a pattern which assists in diffusing the energy of flow in high water events.

Land clearing for agriculture and forestry has resulted in removal of much of the riparian area and canopy cover. Removal of streamside vegetation can contribute to: streambank instability; loss of land through erosion; low water levels and flows; high sediment levels during highwater events; higher water temperature at crucial times of the salmon life cycle; and reduced recruitment of large woody debris in sections of the river.

Historical and current land and water use practices are negatively impacting the aquatic habitats in the Upper Bulkley River watershed. Some of the suspected impacts are declining water level, flow, and quality and sediment accumulation in gravel beds used in spawning and incubation. Current studies are being conducted on water quality parameters, historical side channel assessments, over-wintering capacity, adult recruitment and juvenile stock assessment. This report deals with the compiling of the historical water data.

J.O.A.T. Consulting was retained by Fisheries and Oceans Canada (DFO) to gather the relevant data on water level and flow, along with water use (allocation or licenses), and historical stream hydrological information, to assist the Department of Fisheries in determining if these factors are contributing to the decline of coho in the system. It is hoped that this report will help guide future work in regard to habitat rehabilitation, water use education and perhaps water allocation concerns.

The required scope of work, as outlined by DFO, is as follows:

⇒ comprehensive flow data from the Upper Bulkley mainstem and its tributaries where information exists;

- ⇒ comprehensive water use data from information on water licenses and other use permits broken down by reaches on the mainstem Upper Bulkley River and Buck Creek. Reach breaks Are determined by the WRP report on the Mid Bulkley River by Scott Mackay and the upper sections WRP report by AGRA Environmental Consultants;
- ⇒ copies of the WRP aerial photos of the Upper Bulkley River and Tributaries;
- ⇒ stream hydrology data where available for the Upper Bulkley River and Tributaries;
- ⇒ a discussion of the data in relation to use versus supply, probably critical use times with respect to the fish as well as the farmers etc. Suggestions on how DFO can make better use of water to ameliorate or eliminate these conflicts;
- ⇒ peak freshet data to be analyzed to determine changing trends in timing and if they are significant.

1.2 Study Area

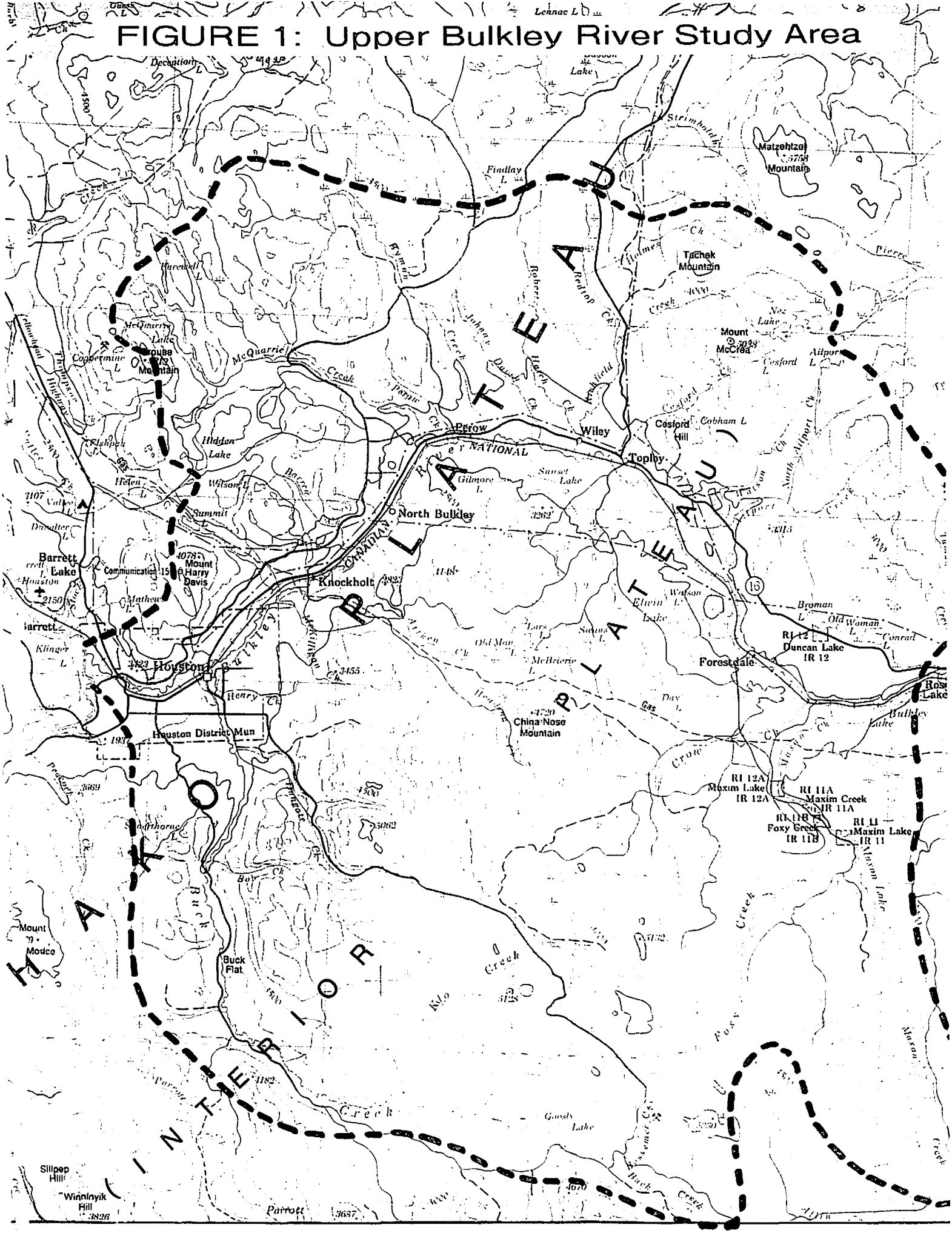
The Upper Bulkley watershed originates in the east from a sequence of lakes (Broman, Old Woman and Conrad) connected by ephemeral muskeg tributaries to each other and Bulkley Lake, which collectively form the headwaters for the Bulkley River (AGRA, 1996). Feeding directly into Bulkley Lake and joining the river approximately 1.5 km downstream from its outlet, are Maxan and Crow Creek respectively (Figure 1).

From there the river flows first northwest, then west and finally south west to the confluence of the Morice and Bulkley Rivers just west of Houston, where the watershed, for the purposes of this study, ends. A large number of tributaries and lakes contribute to this system throughout its run to Houston. The largest tributary is Buck Creek which empties into the Bulkley approximately 8 km upstream from the confluence of the Morice and Bulkley Rivers. Buck Creek is thought to be one of the most significant "nursery" streams for salmonids in the watershed (Mackay, 1997). On average Buck Creek supplies about 19% of the flows to the Bulkley River and represents about 25% (580 km^2) of the area of the watershed. Another major tributary is Maxan Creek (draining Maxan lake).

The drainage area upstream of the Highway 16 bridge crossing in Houston, which is about 2.75 km upstream from the confluence of the Morice and Bulkley Rivers, is 2380 km^2 (Northern Hydraulic Consultants(NHC), 1997). This drainage area is situated in the Nechako Plateau physiographic region. Elevations range from 570 m (1900ft.) at the mouth of the Upper Bulkley to over 1500 m (5000 ft.) at Tachek Mountain and Mount McCrea on the north side of the river. The general topography of the Upper Bulkley watershed is that of low mountains and hills with the mainstem river of a generally low gradient with frequently meandering sections and some moderate gradient sections. The tributaries are generally moderate to high gradient; many are lake-headed (Tredger, 1982). This area, as part of the Bulkley Valley, has the highest agricultural capability in the Skeena region (Remington, 1996).

The Bulkley River is a Class II stream which is defined as containing "high natural values", often in attractive natural settings (Wildlife Amendment Act, 1989).

FIGURE 1: Upper Bulkley River Study Area



1.3 Fish Populations

Although this report is not to focus on information regarding the fish and fish habitat in the Upper Bulkley, as this is covered extensively in Mackay (1997), some brief mention is made here about the salmonid population.

The impetus behind this report is largely due to the concern of the decline in the coho population in the Upper Bulkley. Other salmonid species also claim the Upper Bulkley as home. Anadromous salmonid species using the Upper Bulkley include chinook, coho, and sockeye salmon, and summer run steelhead trout (Tredger, 1982). Chinook salmon enter the Upper Bulkley in late July to early August and peak spawning occurs about the third week in August. Coho salmon begin entering the Upper Bulkley River in early September and peak spawning occurs in mid to late October.

Chinook and steelhead are also known to use the watershed for one or more life stages (Mackay, 1997). Chinook fry may remain in fresh water an additional year before migrating to sea. In the 70's, the Bulkley accounted for approximately 800 chinook spawners annually. The Upper Bulkley makes up part the system of the Skeena Watershed, which is considered as one of the most important coho producers in British Columbia (Kussat & Peterson).

Adult migratory salmonids require sufficient streamflow to allow passage over both shallow bars and obstructions such as falls. Low flows can affect fish passage in a number of ways. The most obvious of these is a delay or block in migration which depletes energy reserves and increases stress. If the block is of sufficient duration, fish may be in such poor condition that they are incapable of reaching the spawning grounds or of spawning successfully once they do arrive. Low flows also affect water temperature especially where the streamside canopy (riparian area) has been removed, i.e. water temperature increases to levels above which salmon gametes have optimum viability. Depth is probably the most serious limitation to fish passage during periods of reduced flow (Neuman & Newcombe, 1977)

2. Methods

2.1 Research Details

Extensive research was carried out in efforts to locate any and all information and/or data that may exist on the Upper Bulkley and its tributaries. Reports have been completed on the Upper Bulkley for Overview Fish and Fish Habitat Assessments (Mackay, 1997 and AGRA, 1996) and a Review and Assessment of Water Quality (Remington, 1996). Since these reports contain extensive information on the rivers and creeks that make up the Upper Bulkley, little time was spent in reiterating that information in this report.

The focus of the information gathering here, was to obtain the data on water quantity and use, and look at it over time for any changes or trends. Anecdotal information was also obtained from individuals who have lived in the area for a long period of time. Any information on water

temperature and level was also researched. Given the known paucity of that data, information on climate for the area was also compiled as a secondary factor.
Additionally, aerial photographs which exist over the years for the study area, were researched. It was decided that the earliest aerials as possible would be obtained along with a middle point and then the most recent, for comparison purposes. The aerial photographs and notes are included in Sleeves B, C, & D.

Any other historical information that was encountered during the research has been referred to where relevant.

2.2 Information Reliability

Much of the data that exists for the Upper Bulkley is inconsistent. Where complete sets of data exist for parameters such as stream flow and climate, effort has been made to provide graphical representation of what is occurring over time. However, even in those cases, there are gaps in data of up to 20 years between sets. Temperature, water level and stream flow data for the major rivers and streams in the region is limited, therefore the information detail as presented in this report is reflective of that.

Section 6.0 lists references and includes current reports that have been written on the Upper Bulkley such as Water Quality & Assessment (Remington) and Mid Bulkley Overview Assessment (Mackay). The information in this report is intended to compliment these reports.

Water use and allocation data is derived strictly from license applications and holds a significant margin of error. This margin, as referred to again later, is a result of licenses, once applied for, are entered into the database at the Ministry of Environment and remain there unless they are formally canceled. Therefore, licenses may be included that are no longer in use. Additionally, licenses that are in use are rarely ground truthed for their actual and type of usage. Readers should keep these limitations in mind when using the facts as presented in this report.

Aerial photographs covering the mainstem have been provided here.

Any other historical information presented in this report, is strictly a factual recounting. The intent is to provide as complete a picture as possible as to the events occurring on the Upper Bulkley over time.

3. Results

3.1 Water Flow Data

Water Survey Canada (WSC) has kept a number of monitoring stations over time on the mainstem and tributaries of the Upper Bulkley. These stations have been read either automatically or manually. Therefore, at some locations, the data for a full year is incomplete if manual operations were not scheduled for some months. For example, monitoring station 08EE003, in Houston is a manual recorder and is only read during the spring through fall months. For the purposes of this report, the lack of data for the winter months will not be of great concern in order to observe historical trends during freshet and spawning periods. However, it does limit the ability to look at the overall discharge annually, since completeness of the data in any given year is extremely variable.

Table 1 below, provides a list of WSC stations and the years that they have run in the Upper Bulkley area:

Table 1: WSC Stations on the Upper Bulkley and its Tributaries

Station	Years of Data
08EE003 - Bulkley River near Houston	1930 -1993 (seasonal)
08EE009 - Richfield Creek near Topley	1964 - 1974 (year round except '64/65)
08EE013 - Buck Creek at the Mouth	1973 -1993 (year round)
08EE015 - Foxy Creek above Lu Creek	1974 - 1975 (inconsistent)
08EE018 - Maxan Creek above Bulkley Lake	1975 - 1979 (year round)
08EE019 - Maxan Creek at Outlet of Maxan Lake	1976 (full year)

Appendix A contains the details of the daily discharge over the years for each site (except for Foxy Creek). This data has been used to plot the Total Discharge over time for each location through the months of April to September, as well as the daily discharge for April, May, June, September and October. Wherever the data has been sufficiently incomplete to obtain a relevant value, the site or year has been skipped over. These graphs are used to observe any trends or changes in the discharge. To truly place the basin's hydrology in a long term context, the study boundaries have to be expanded outside the confines of the Upper Bulkley Watershed. This information and its analysis, provided and summarized by Eero Karanka, DFO, can be found in Appendix B.

The annual maximum flood peak on the Bulkley River normally occurs during the month of May as a combination of snowmelt and rainfall runoff. Since no data obtained is beyond 1993, for purposes of comparison, the peak flood levels on the Bulkley River and Buck Creek during the flood of 1997 were 275m^3/s and 95.2m^3/s respectively (NHC, 1997). The Bulkley River flow in 1997 of 275 m^3/s represents the highest flood in the 32 years of available record prior to 1995 and since 1931: the second highest peak of 204 m^3/s occurred in 1951. The 1997 peak for Buck Creek is the highest in the 23 year record up to 1995 with the second highest having occurred in 1973. The ratio of Buck Creek to the Bulkley River peak is on average 0.32 (NHC, 1997). Extreme low flows have been

noted to the order of 0.37 m^3/s in the Bulkley River and 0.066 m^3/s in Buck Creek (Mackay, 1997) with some tributaries completely drying in some years (O'Neill, per. comm.).

3.1.1 Total Monthly Discharge

The following pages contain graphs showing the Total Monthly Discharge from April through to September for stations 08EE003, 08EE009, 08EE013 and 08EE018 (Maxan and Foxy Creek have not been included due to the insufficiency of the data).

An interesting trend appears in all 4 graphs. Especially during the month of May, the total discharge from one year to the next displays an evident cycle of increasing and decreasing. However, the overall trend for May, most prominent with the Houston and Buck Creek stations, is a decline in total discharge per year. Since this data only runs to 1993, it is difficult to say whether the conditions in 1997 would considerably affect this observed trend. Results from data analyzed in Appendix B by Karanka, support this observation noting that the Bulkley River near Houston stream gauge shows a 1980-1990 May to September runoff volume at about 18% lower than during 1944-52.

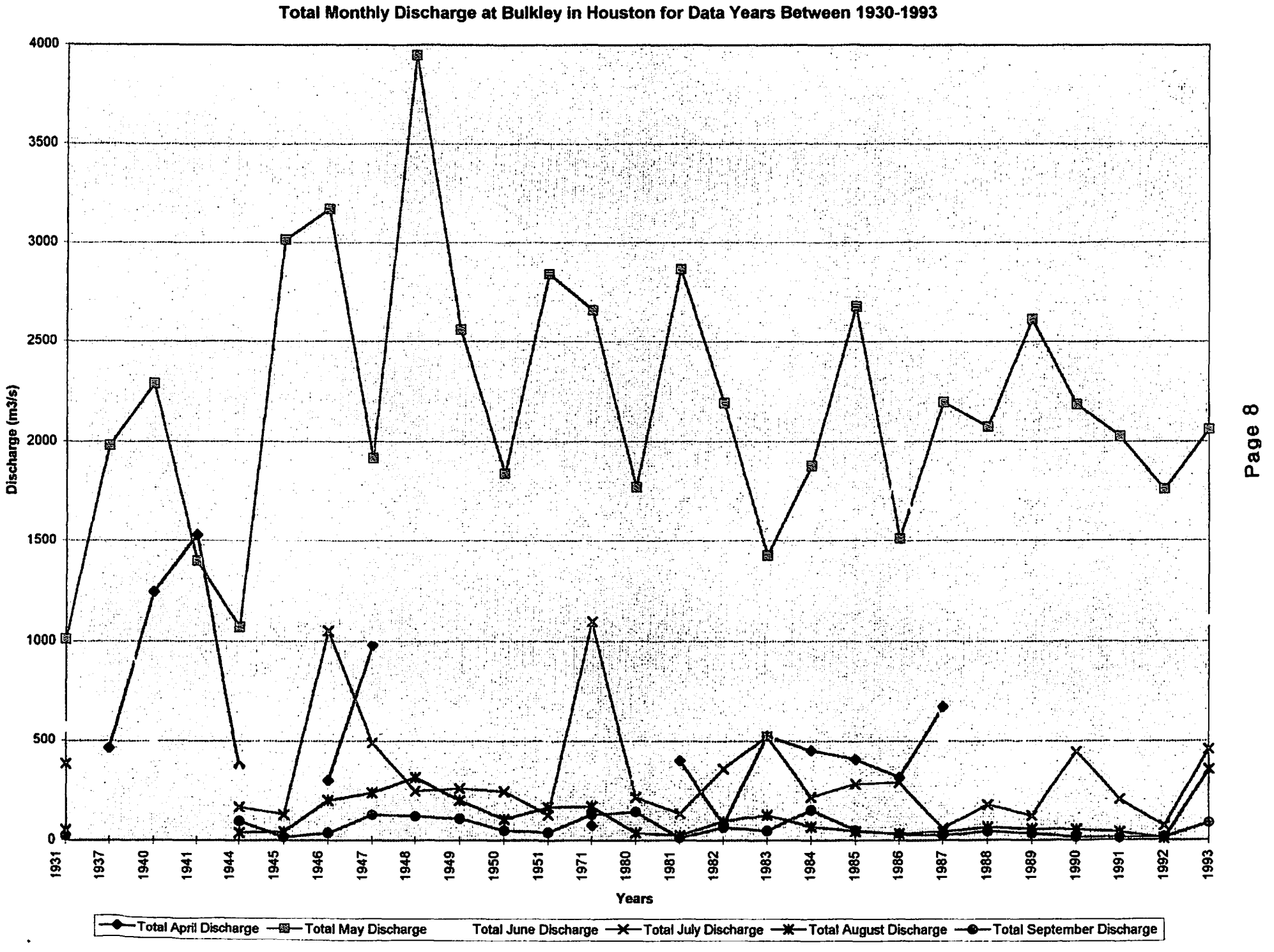
3.1.2 Daily Discharge and Freshet Occurrence

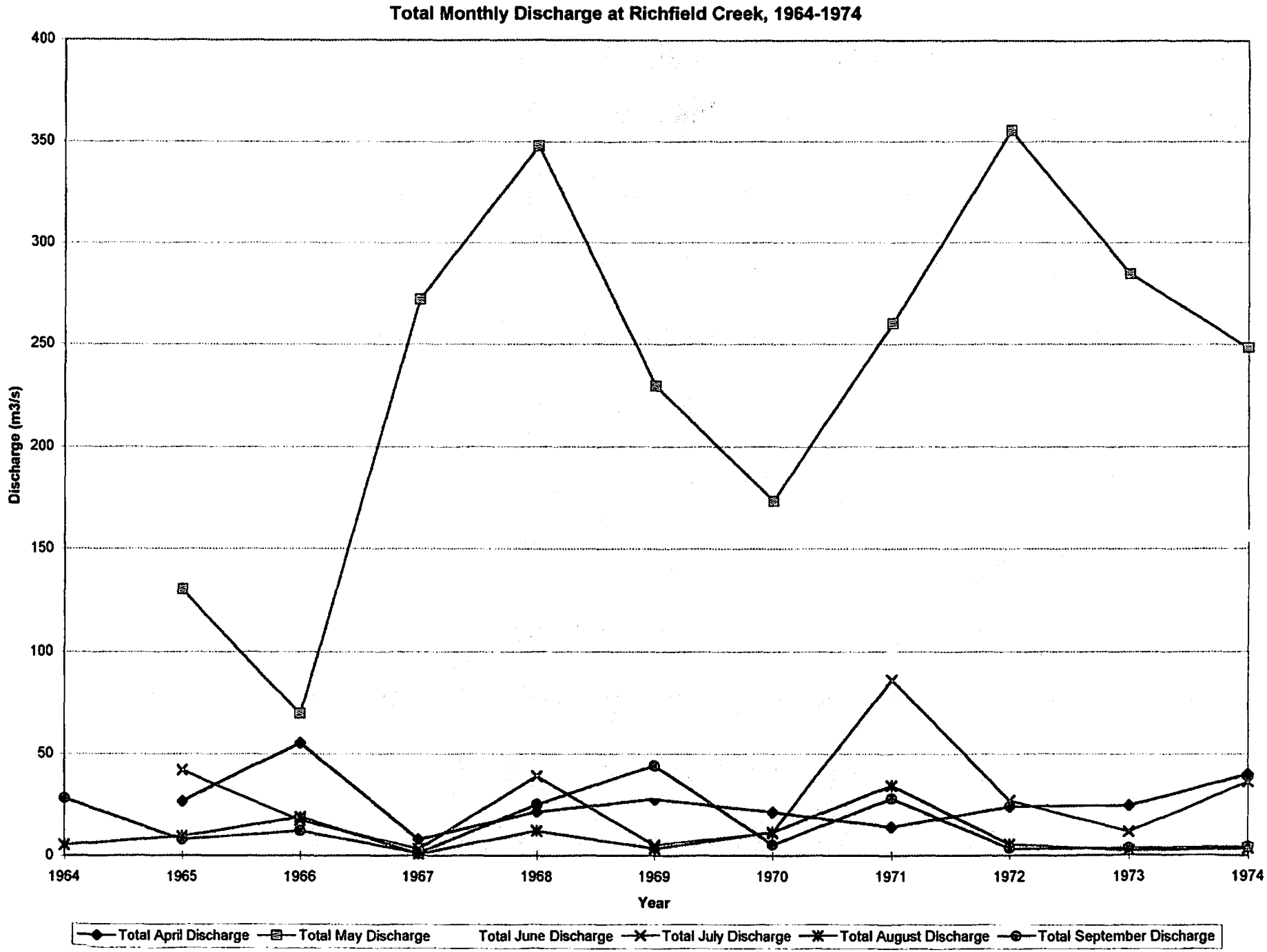
Freshet occurrence and spring discharge characteristics are significant to the young fish populations. General study of the discharge data was to determined the top three discharge days of each month of April through to June, for each year of complete data, and their relevant dates of occurrence, to observe any changes in the peak freshet timing. The results are summarized below:

Table 2: Freshet Occurrence on the Upper Bulkley River and Buck Creek

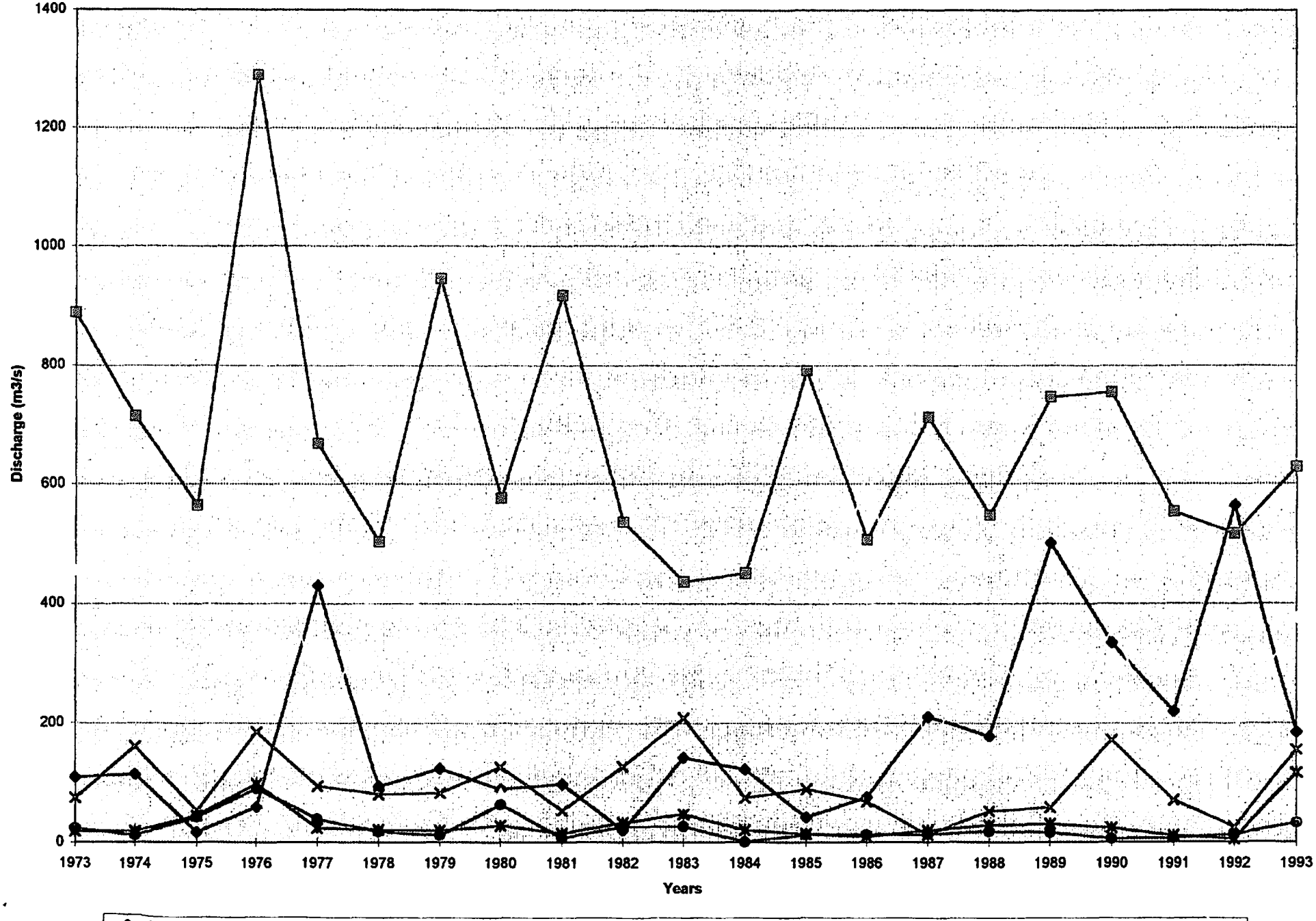
Bulkley River at Houston								
Month	Years	Data Yrs.	Freshet Occurrence W1	W2	W3	W4	Range of High m^3/s (mean)	Range of Low m^3/s (mean)
April	1935-51	7		½	½	6	96.80 - 21.80 (54.64)	11.30 - 0.57 (5.81)
	1980-87 (+'71)	8			1½	6½	45.20 - 6.23 (30.02)	1.26 - 0.520 (3.66)
May	1931-51	15	2	6½	4	2½	204.00 - 49.30 (119.22)	41.30 - 10.40 (26.63)
	1980-93 (+'71)	15	3½	5	4½	2	173.00 - 75.60 (116.31)	52.80 - 9.91 (28.19)
June	1931-51	17	13½	2	1½	1	120.00 - 19.00 (55.70)	25.80 - 5.10 (10.29)
	1980-93 (+'71)	15	9½	2	1½	2	125.00 - 19.70 (65.11)	48.10 - 3.16 (13.29)
Buck Creek								
April	1973-93	21		½	1½	19	59.20 - 2.52 (19.16)	10.00 - 0.178 (1.15)
May	1973-93	21	6	5½	6	3½	72.50 - 21.70 (39.24)	25.90 - 2.97 (10.17)
June	1973-93	21	13	3	3½	1½	56.20 - 6.35 (23.93)	17.20 - 0.29 (4.25)

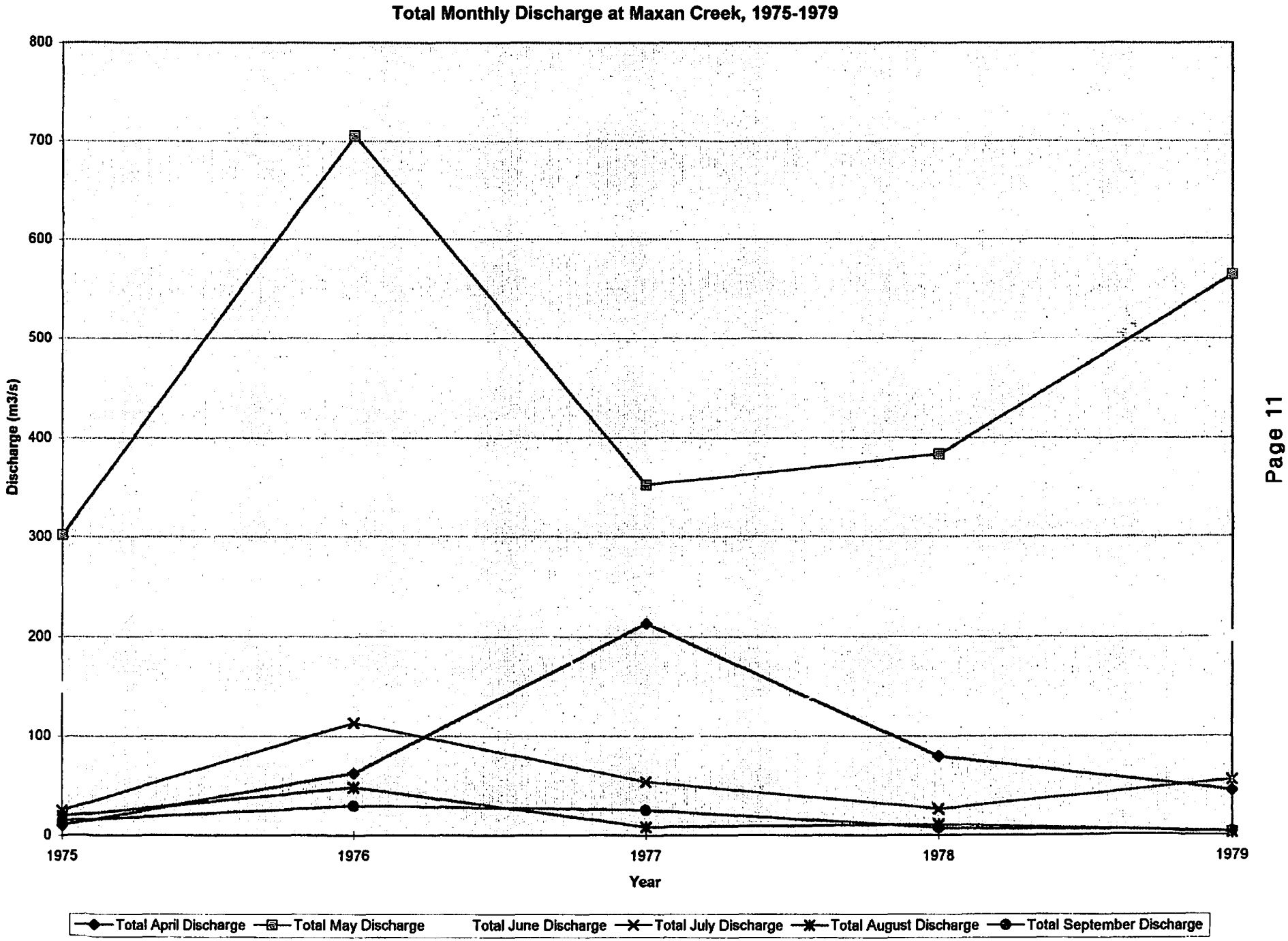
Weeks were counted off in seven day segments. Therefore, any freshet occurring in the 4th week is anytime after the 21st to the end of the month.


Total Monthly Discharge at Bulkley in Houston for Data Years Between 1930-1993
Discharge (m3/s)
4000
3500
3000
2500
2000
1500
1000
500
0
1931
1937
1940
1941
1944
1945
1946
1947
1948
1949
1950
1951
1971
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
Years
Total April Discharge
Total May Discharge
Total June Discharge
Total July Discharge
Total August Discharge
Total September Discharge


Total Monthly Discharge at Richfield Creek, 1964-1974
Discharge (m3/s)
400
350
300
250
200
150
100
50
0
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
Year
Total April Discharge
Total May Discharge
Total June Discharge
Total July Discharge
Total August Discharge
Total September Discharge

Total Monthly Discharge At Buck Creek, 1973-1993




Total Monthly Discharge at Maxan Creek, 1975-1979
800
700
600
500
400
300
200
100
0
Discharge (m3/s)
1975
1976
1977
1978
1979
Year
Total April Discharge
Total May Discharge
Total June Discharge
Total July Discharge
Total August Discharge
Total September Discharge

In general there did not appear to be a significant change in the timing of the freshet in May or the second peak in June over the long term. In the shorter time frame, from 1987 to 1993, the freshet in May was more likely to occur in the first or second week of the month instead of the usual second or third week for both Bulkley and Buck. The overall data, shows that the freshet period does seem to extend itself over more days than in the past minimizing the dramatic peaks and valleys found more often prior to 1951.

As can be seen in the comparison of the means, the overall highs from 1980 onwards, have decreased compared to highs in 1935-51 for the months of April and May, but have increased for the month of June. However, it is important to note that since means are affected by extremes, it is important to look at the total discharge before assuming that more runoff volume is occurring throughout the month and in going back to the total monthly discharge graphs, this trend is not as evident and in some cases appears to be decreasing.

The next set of graphs show the daily discharge for April through to June, for the stations at Bulkley and Buck Creek. They demonstrate discharge patterns throughout the month and thus changes in freshet characteristics over time. It is important to note again the gap in data between 1951 and 1971 for the Bulkley at Houston. This is to be kept in mind when viewing the relevant graphs.

April appears to show an increase in discharge earlier in the month, from the mid-1980s onward, which is also seen in the late 1930s. However, the extreme peaks reached in the period from 1931-1951, are not mimicked in more recent years.

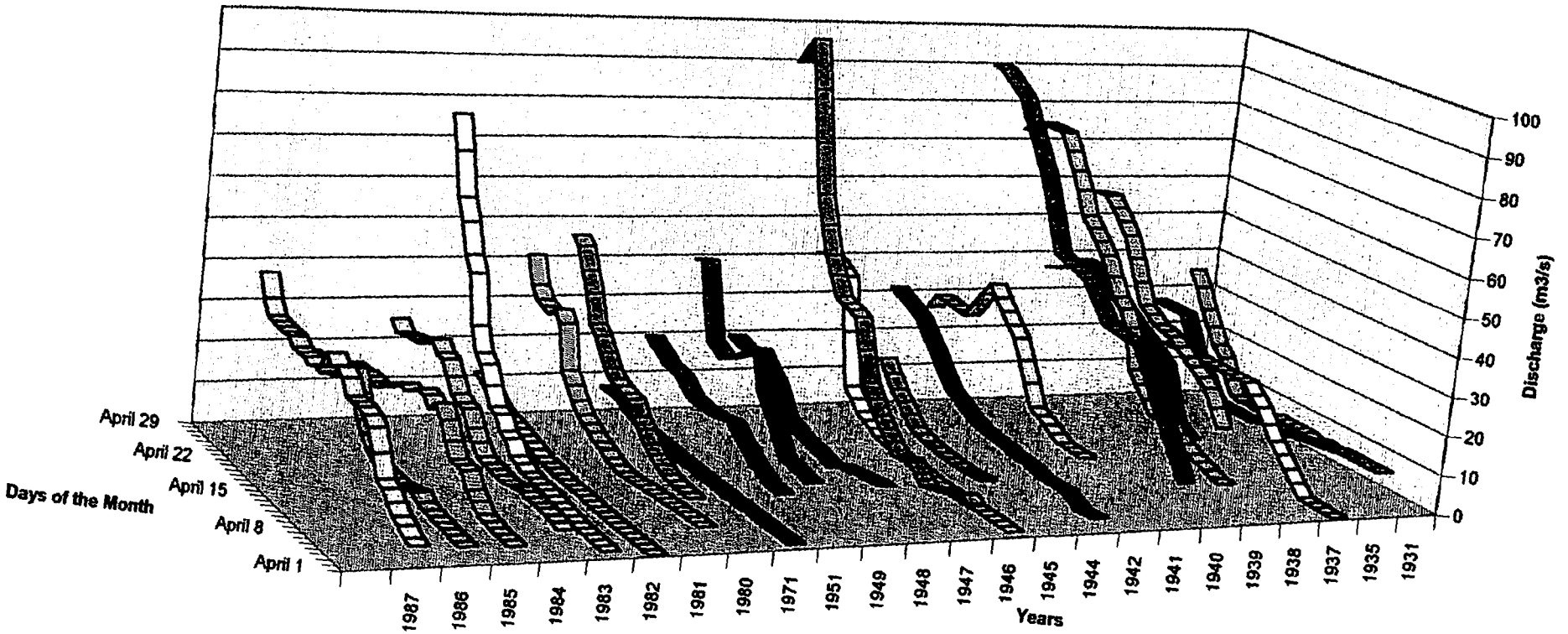
As shall be demonstrated later, since Buck Creek contributes to the Bulkley, its patterns generally mimic those found on the Bulkley but with smaller values, given that it is a smaller system. Given the lack of data for the Bulkley From 1972 - 1980, we may assume that it would be reflective of activity occurring on Buck Creek. The graph for the month of April for Buck Creek, shows an increase in runoff volume in the later 1980s to early 90s when compared to the 1970s filling in a data gap and being consistent with the pattern occurring on the Bulkley graph.

May demonstrates pronounced runoff volumes throughout the '40s and perhaps into the '70s for the Bulkley. Discharge activity then appears to stretch out with less pronounced peaks for the remainder of the years except for an exceptional year in 1985. The greater runoff volume also appear to occur earlier in the month. The Buck Creek graph also supports this trend showing dramatic peaks throughout the 1970s with discharge extremes for the month flattening out somewhat throughout the '80s and '90s, with an exceptional case in 1985. Peak freshet events appear to stay at higher levels of discharge for longer periods during this time.

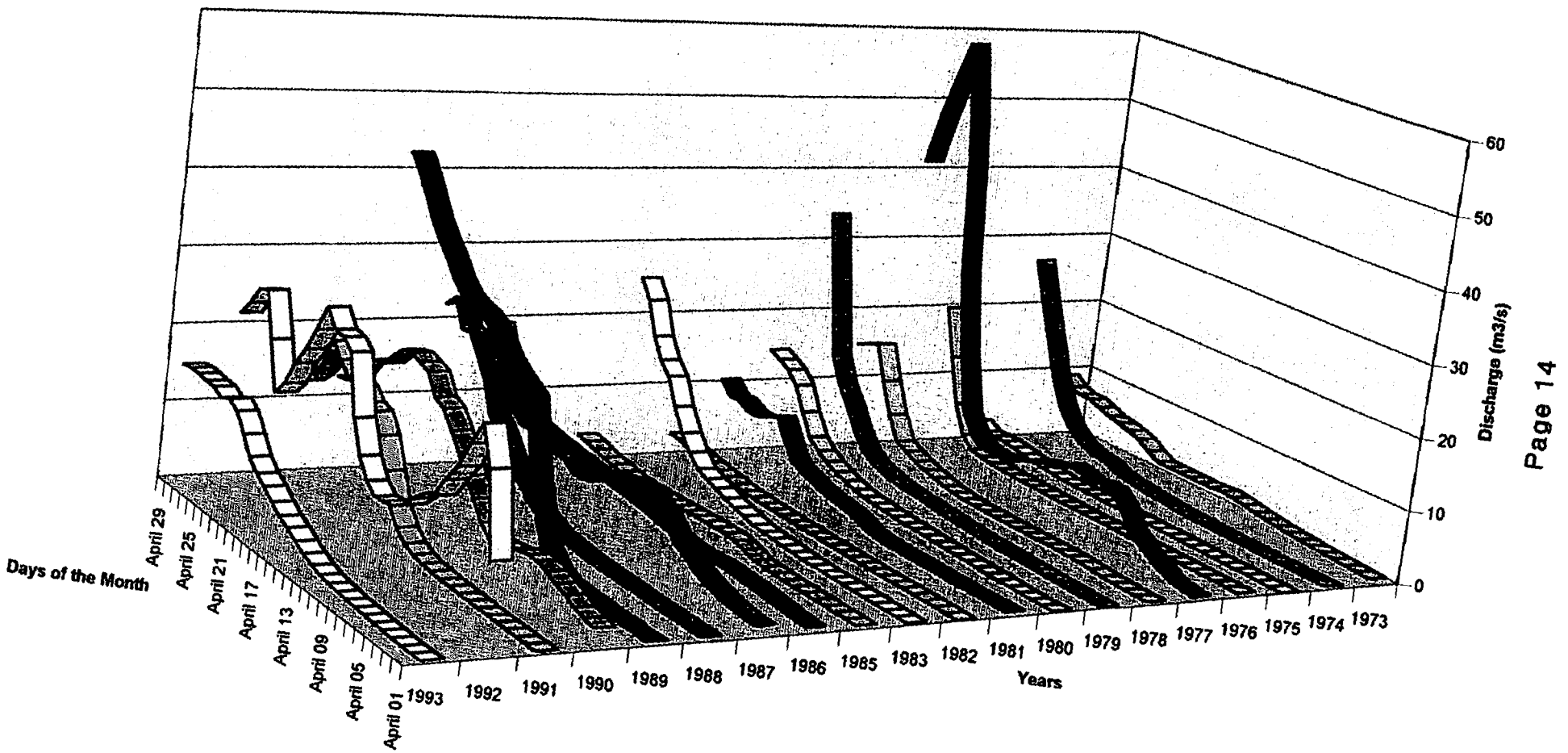
June graphs do not appear to demonstrate any significant trends in freshet timing. However, there is an overall increase in runoff volume through the years at the Houston station starting in the 1970s and peaking in the mid 1980s and then declining in the 1990's. This is supported by the discharge patterns at the Buck Creek station.

Overall, all three sets of graphs show a decrease in runoff volume in more recent years. In reviewing the analysis done by Karanka in Appendix B, this is supported by his observation of mean runoff volumes decreasing by about 7% below the long term mean post 1976.

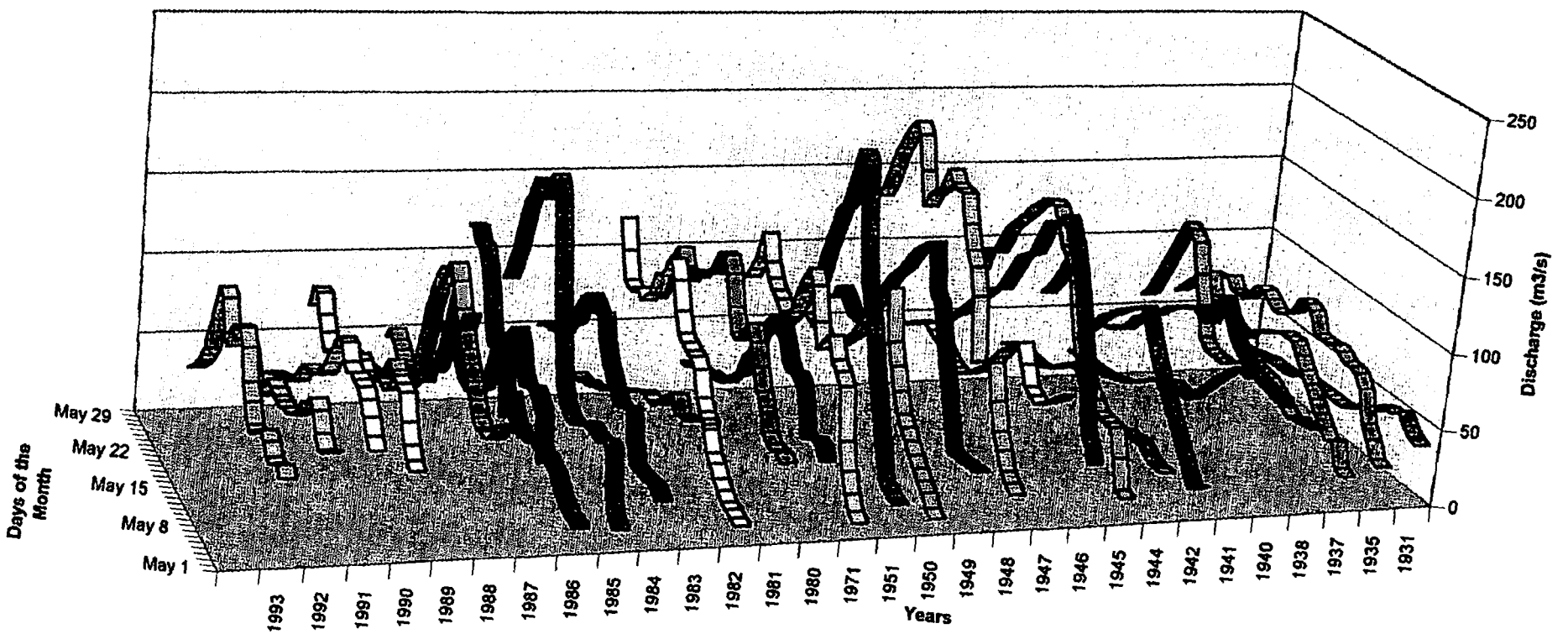
Daily Discharge in April at Bulkley in Houston, 1931- 51, 1971, 1980-87



Daily Discharge in April at Buck Creek, 1973 - 1993

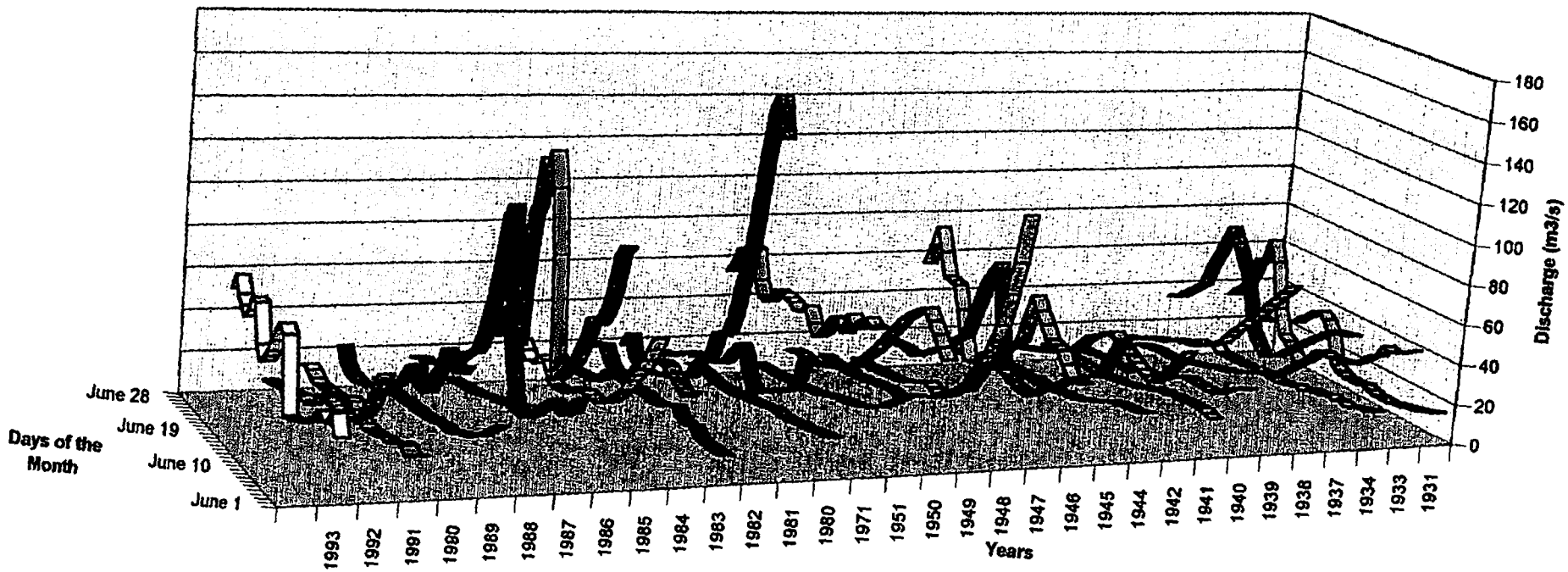


Daily Discharge in May at Bulkley in Houston, 1931 - 51, 1971, 1980-93

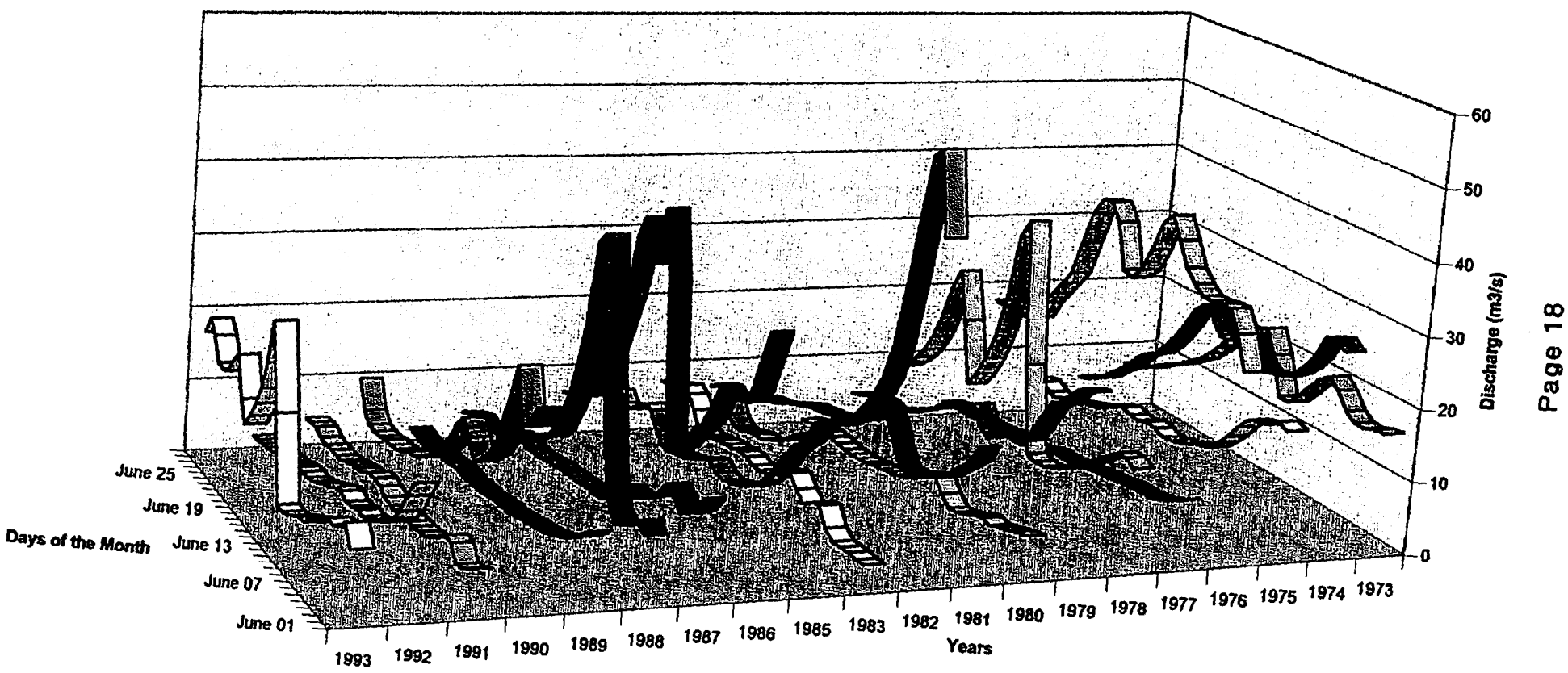


Daily Discharge in May at Buck Creek, 1973 - 1993

Daily Discharge in June at Bulkley River in Houston, 1931-51, 1971, 1980-93



Daily Discharge in June at Buck Creek, 1973-1993



3.1.3 Daily Discharge and Spawning

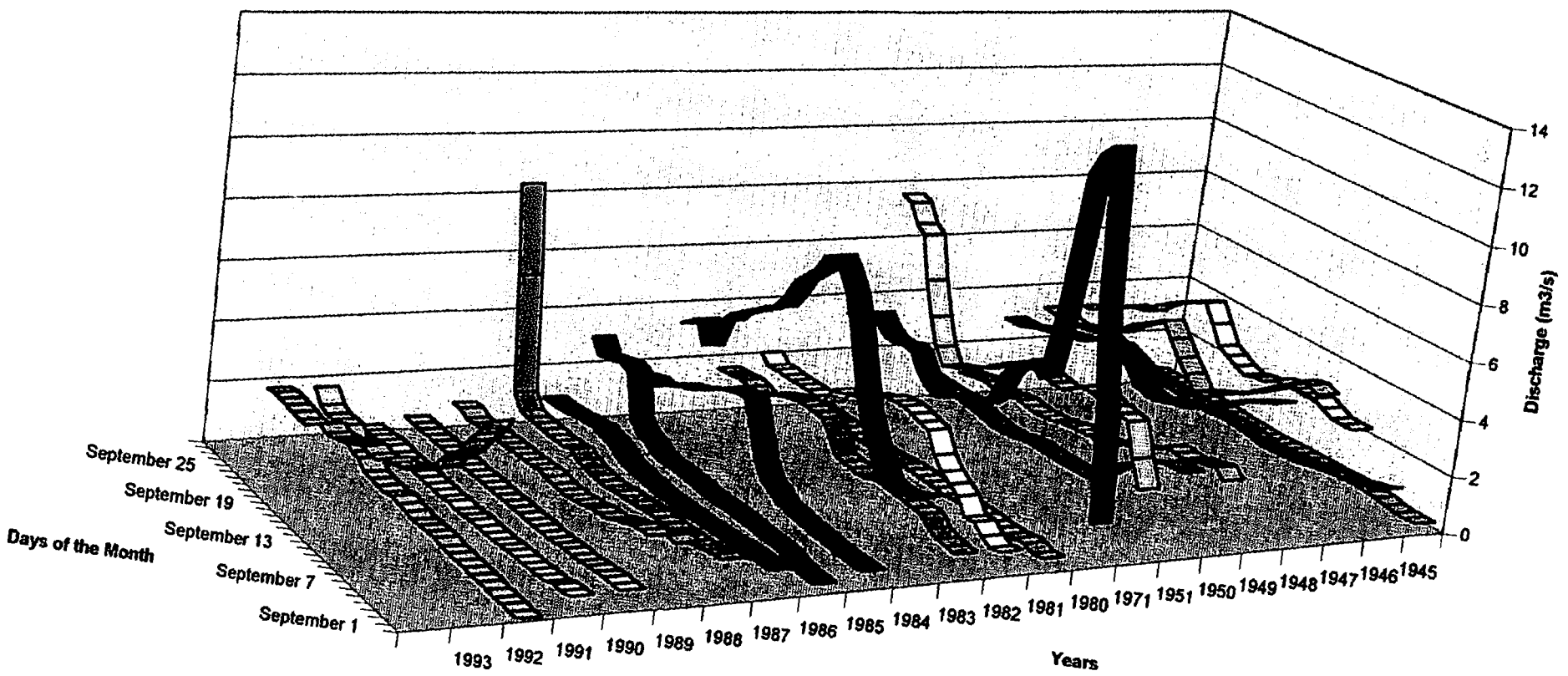
Adult coho enter the Bulkley in September and begin the trek to their spawning grounds throughout October. As mentioned previously, adult migratory salmonids require sufficient streamflow to allow passage over both shallow bars and obstructions such as falls. Low flows can affect fish passage in a number of ways. The following graphs show the discharge levels in September and October for Buck Creek and Bulkley River. The month of September has been used to compare the discharge of both Buck and Bulkley and their reflective patterns as mentioned in section 3.1.2. This allows us to extrapolate data in the 1970s and apply it to the Bulkley.

The first graphs show the daily discharge in September for both Buck and Bulkley over the years. Both graphs show a marked decrease in runoff volumes in more recent years. In addition, Buck Creek shows fewer peaks in the 1980s and 90s than were occurring in the 1970s.

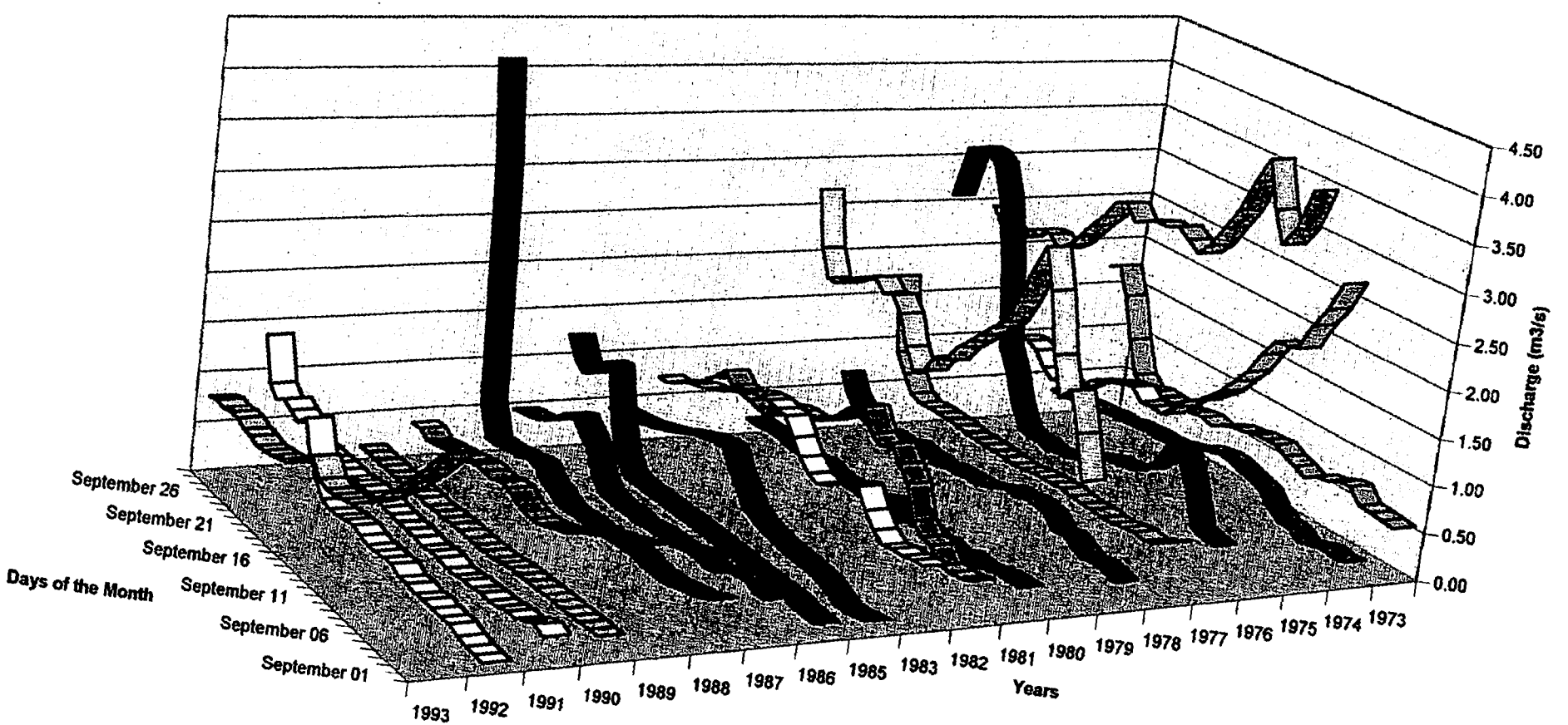
The next two graphs demonstrate the mean monthly discharge for September over the years for Buck Creek and Bulkley and then just for Buck Creek respectively. The first graph demonstrates how both systems mimic each other in their discharge patterns. The second graph allows us to extrapolate the information provided in the 1970s on Buck Creek to Bulkley River and we can see how there is a distinct decrease in the mean discharge over time.

The next four graphs are similar to September's without the comparison. The daily discharge graphs both show a general decline in runoff volume. As can be clearly seen on the graph of Buck Creek, discharge activity in the 1970s maintained a fairly high level compared to later years. Although later years do show some strong peaks, more often than not, the discharge levels are lower than pre-1980. Bulkley River also shows a decline in activity, however the data gap must be noted. Stronger support for declining runoff volumes is shown in both graphs demonstrating the mean October discharge.

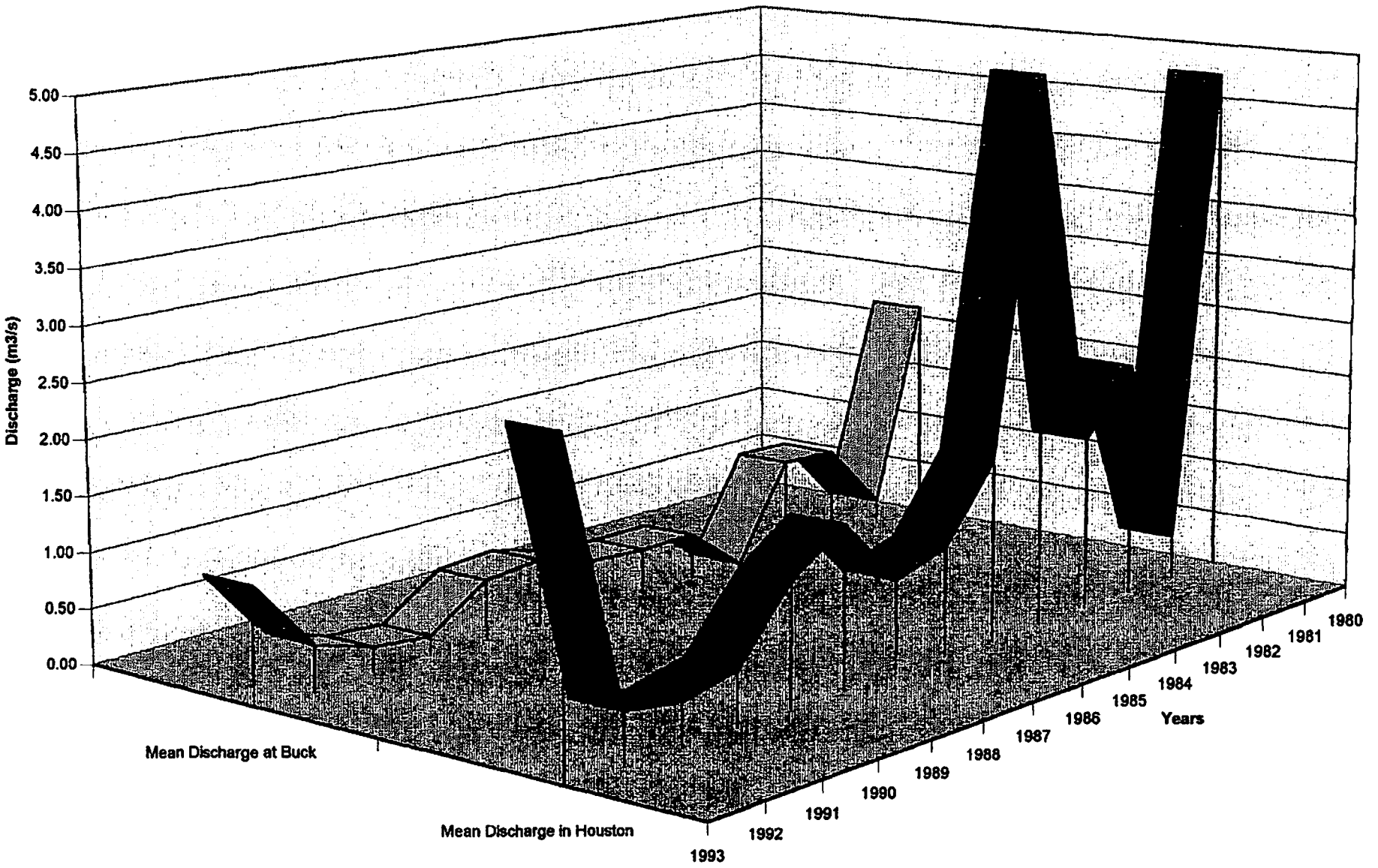
Daily Discharge in September at Bulkley River in Houston, 1945-1993

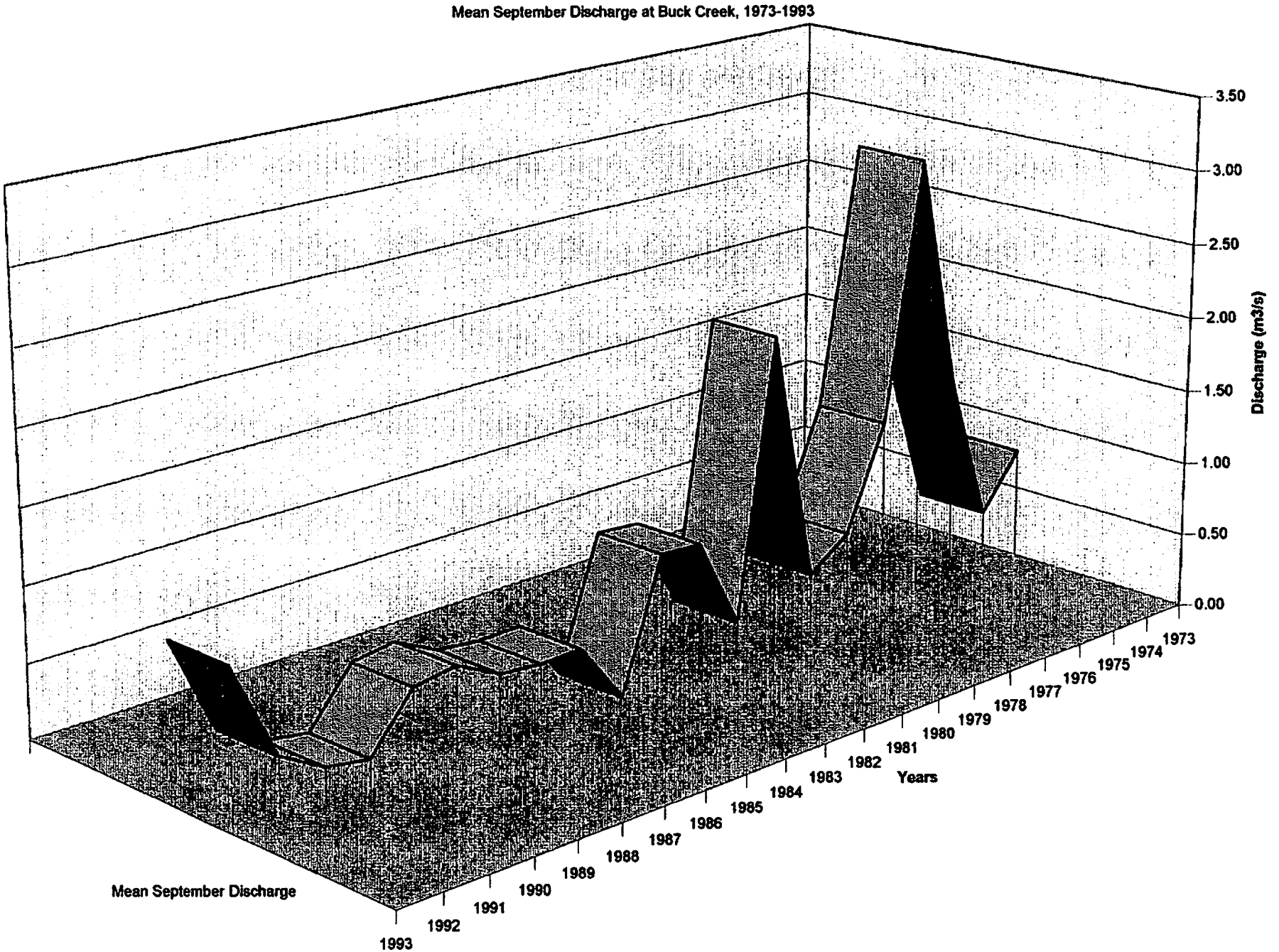


Daily Discharge in September at Buck Creek, 1973-1993

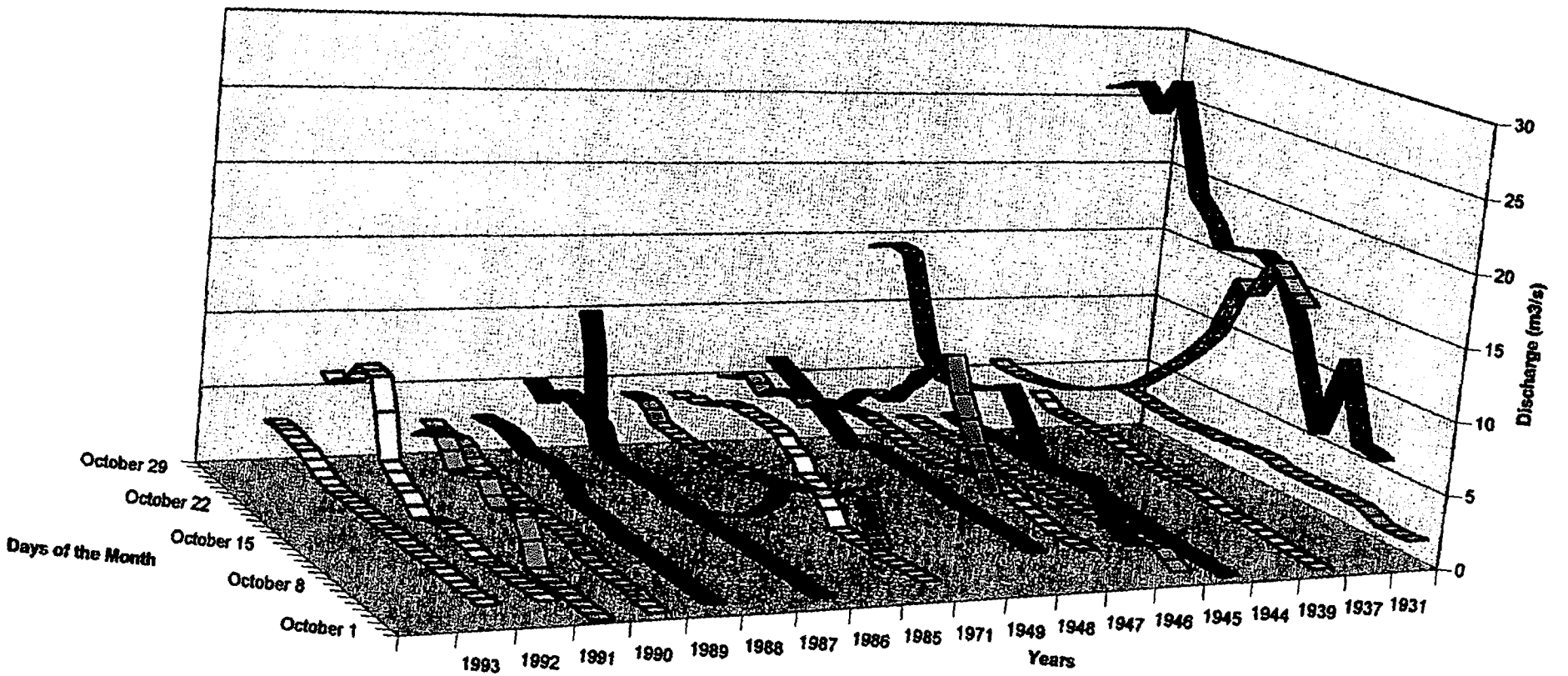


Mean September Discharge at Buck Creek and Bulkley River, 1980 - 1993

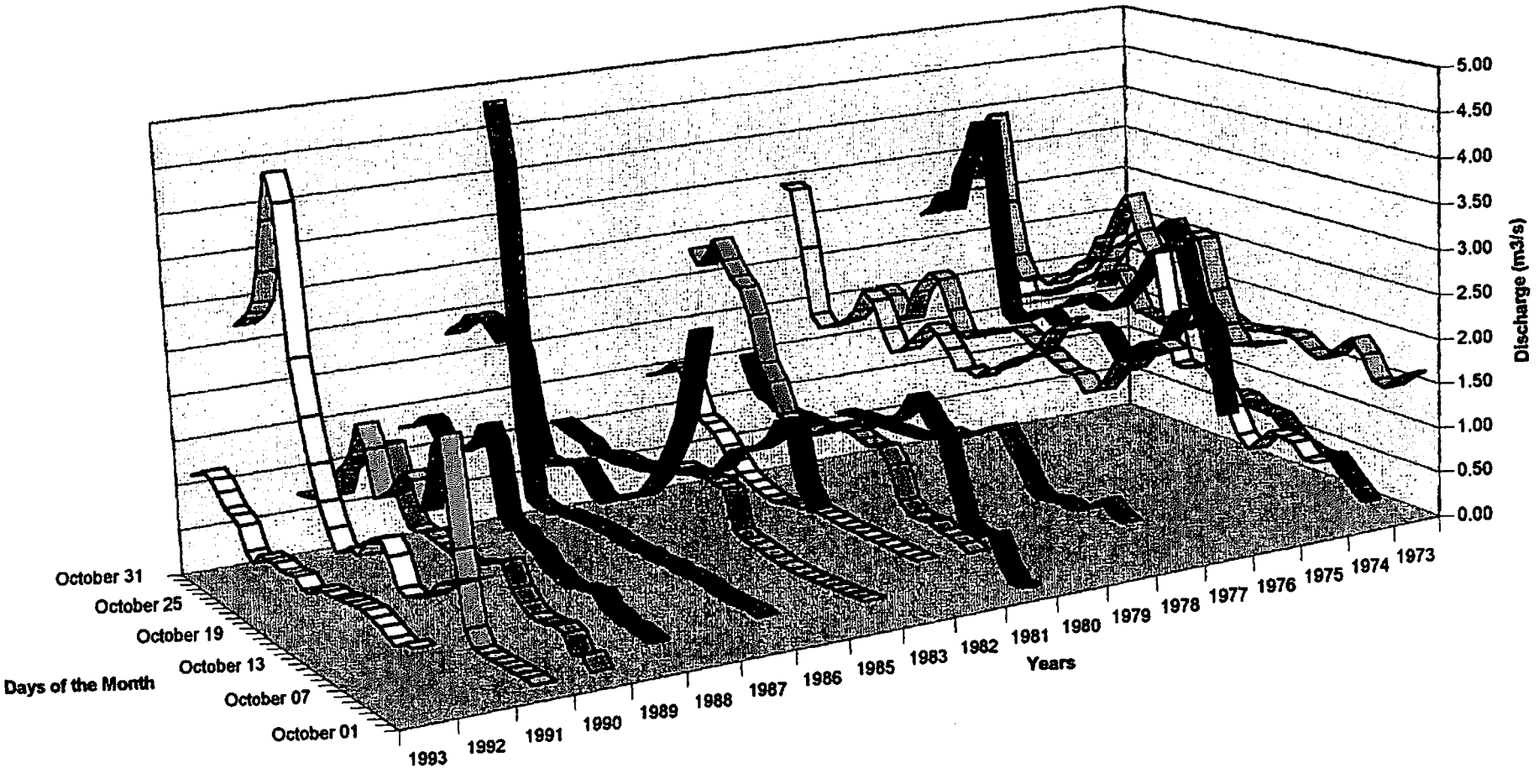



Mean September Discharge at Buck Creek, 1973-1993
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Discharge (m3/s)
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
Years
Mean September Discharge

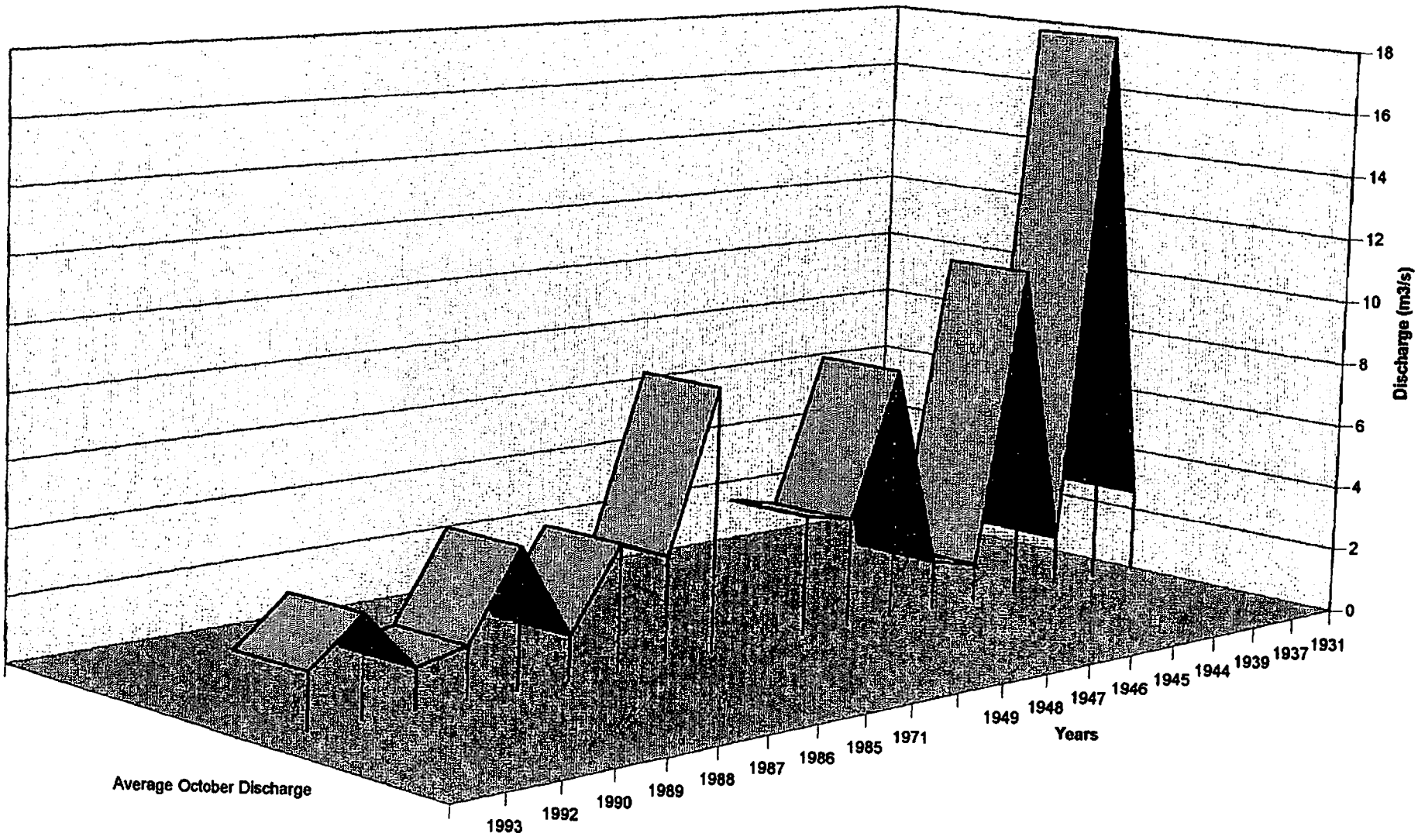
Daily Discharge in October at Bulkley River in Houston, 1931-49, 1971, 1985-93



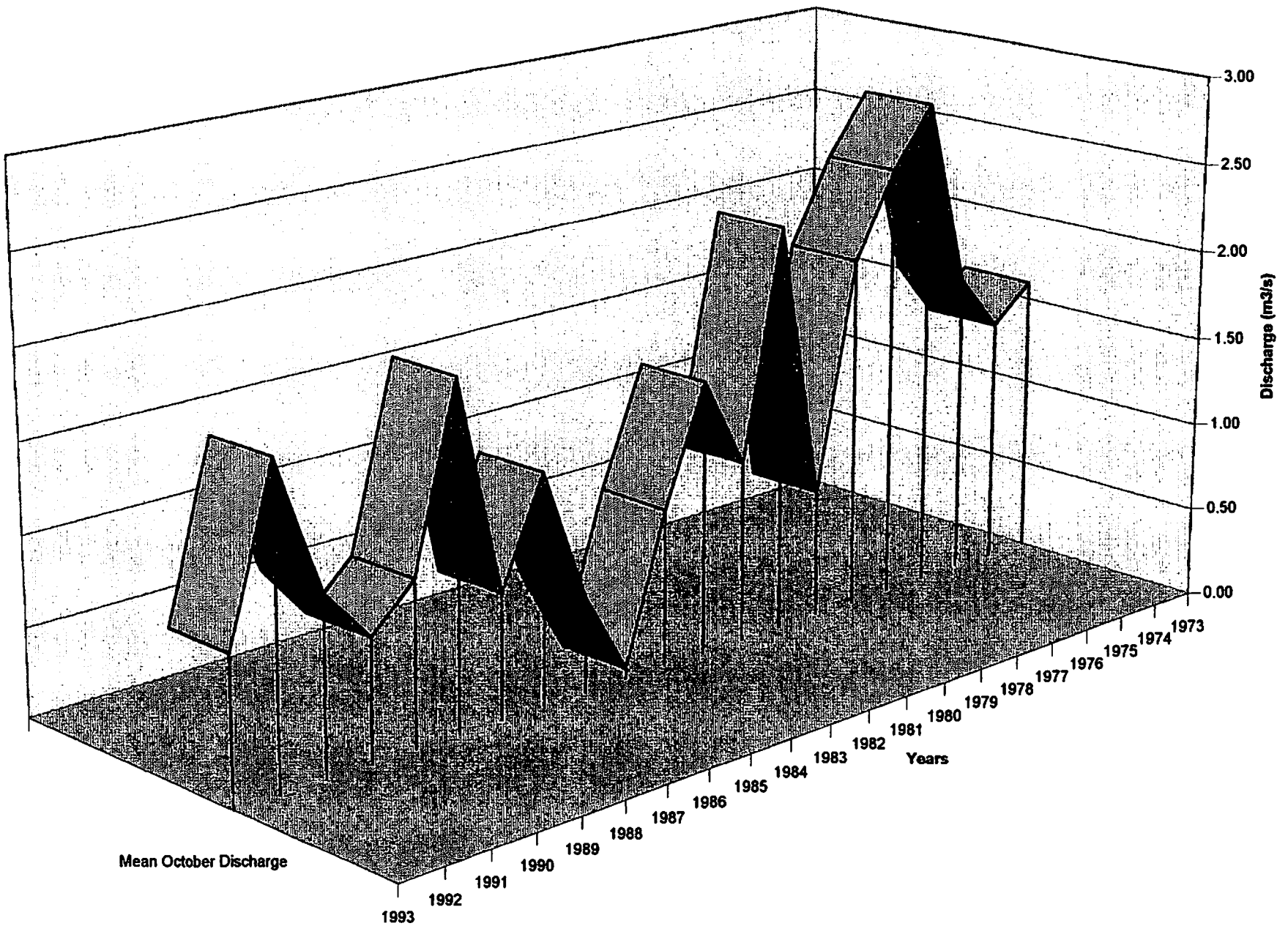
Daily Discharge in October at Buck Creek, 1973 - 1993



Mean October Discharge at Bulkley in Houston, 1931-49, 1971, 1985-93



Mean October Discharge at Buck Creek, 1973-1993



3.1.4 Forestry in Relation to Flow Data

In interior regions where snowfall is a significant component of the hydrological cycle, clear-cutting causes increased snow deposition in the opening and advances the timing and rate of snowmelt. The effect lasts several decades until stand aerodynamics approach those of the surrounding forest. Where rain on snow events cause naturally high spring runoff, the effect of clear-cutting can be pronounced (Remington, 1996). Tables 3 and 4 below list data related to sub-basin's and anthropogenic activity within the Upper Bulkley River watershed. See Appendix C for the definition of Equivalent Clearcut Area. The two tables differ slightly in their reporting due to their origin from two different reports.

Table 3: Equivalent Clearcut Areas (ECA) of most of the sub-basins and whether future harvesting will be low, moderate or high.

Sub-Basin	Tributaries	ECA (%)	Future Harvesting
Buck	Klo	38	high
	Dungate	16	
	Upper	31	
	Buck	22	
Aitken		30	low
Barren		15	low
Byman	Byman	25	low
	Perow	14	
McKilligan		15	low
McQuarrie		14	low
Johnny David		14	moderate
Richfield/Robert Hatch		14	low
Cesford	McCrea	16	low
Bulkley	McKilligan	30	low
	Summit/Raspberry	30	low

Source: Mackay, 1997

Table 4: Distribution of Anthropogenic (i.e. originated by man) Activity by Watershed within the Maxan River Basin

Watershed	No. of cutblocks	Area (ha)	Stream length (km)	Km of Logging Roads	Km of other roads
Bulkley	35	24,037	224	54	25
Crow/Foxy	55	16,795	118	114	82
Upper Foxy	20	8,292	63	52	23
Broman	25	24,099	176	108	42
Day Lake	20	9,682	141	58	31

Source: AGRA, 1996

The Upper Bulkley watershed is networked with roads and railway. The railway, built in the 1900's follows the Upper Bulkley entirely along its mainstem. Rechannelization of portions of the river occurred during the construction of this railway. Major areas of forestry operation are in the Upper Bulkley tributaries of Maxan/Foxy Creeks, Dungate Creek and Buck Creek. Bustard (1986*b*), has stated that there are more sensitive fisheries sites in active logging areas in the Morice TSA than in other interior districts in the region. Approximately 70% of the Upper Bulkley River watershed is contained in the Morice TSA. A small portion of the northwest corner lies in the Bulkley TSA and the remainder in the east is located in the Lakes TSA. Logging operations around tributaries of the Bulkley encompass high value salmon and steelhead streams.

3.2 Water Level and Temperature Data

WSC also collects water level and temperature data. Since the early 1950's the WSC field crews have had a program to take spot water temperatures whenever they take field discharge measurements, or service the recording equipment. This data (up to 1976) was published in a Four Volume report. This information is found in Appendix D. Bulkley River at Houston, has not published data because the early record occurred in a period when water temperature records were not kept, while the later period of record began after their publication ceased. Since 1976, the spot water temperature data can only be compiled from individual field forms and annual summaries, which are kept in Vancouver (Eero Karanka, 1998).

Further investigation into water temperature data yielded poor results. Some water temperature has been collected over the past 12 years, by Toboggan Creek Fish Hatchery, but only for a short period of time (approx. two weeks in spring and late summer) during fish releases (O'Neil, per. comm.). This water temperature is taken at McQuarrie Creek. Some attempt was made to collect this data however, due to the tight time frame of this report and the uncatalogued nature of the data, it was not possible. Additional water temperature data exists from the annual reports produced by Equity Silver Mines. Although, this data is again, thin in detail. Small amounts of water temperature data are also reported from the Fish Fence in Houston (NCFDC, 1997).

McNeil (1983) did conduct some data collection for a report on Maxan Lake. Irrelevant in part since the dynamics of a lake differ substantially from the dynamics of a river, however some data was collected on Foxy Creek. It was noted that Foxy Creek had an average temperature of 12°C and an average depth of 24 cm when surveyed in August, 1974. Water temperatures were also recorded monthly during 1973 and 1974 on Maxan Creek with temperatures varying from -1°C to 17°C. Water temperatures climbed in late May, peaked in late July and dropped quickly in September (McNeil, 1983).

In general, the system has been noted by Tredger (1982) as quite productive with a high estimated mean annual temperature of 7°C.

Water level data is taken by WSC in order to calculate flow data. This data is not offered with flow data and has to be specially requested. Since this was discovered just prior to the completion of this report, this information is not presented here. Some water level data has also been collected at the Fish Fence in Houston, but only for September through to October.

3.3 Water Allocation and Licenses

In 1983, the Town of Smithers was granted an Order In Council (OIC) reserve on the Bulkley River upstream of Smithers for protection of their waterworks (OIC 418-1983). This reserve was requested because Smithers draws some of its water supply from wells which are located near and charged by the Bulkley River. A clause noting the existence of this reserve is placed in water use licenses issued upstream of Smithers (Remington, 1996).

Water use records, as identified through water licenses, exist at the Ministry of Environment office in Smithers. Actual licenses were taken from the trim maps at the Ministry office and additional information was supplemented through the on-line water rights database. This can be found on the internet at http://www.env.gov.bc.ca/wats/wrs/query/licenses/licenses.htm. Appendix E contains a list of all water licenses registered on the Upper Bulkley and its tributaries as found through this process. It has been noted that there is a significant margin of error regarding this data, as it relates to water volume, since it is rarely ground truthed and many licenses may no longer be active (D. Meredith, pers. comm.). Additionally, water use in the area is often in a form that is not registered with a government body, such as groundwater and surface wells, ponds or other diverted water. Short of visiting every home owner within the study area, it is nearly impossible to have an accurate reading on the actual water use.

Table 5, on the next page, provides a summary of the water licenses by type in the Upper Bulkley.

From Remington, 1996, it was stated that the licensed water withdrawals from the Upper Bulkley totaled 0.1 m^3/s, which is about 46% of the summertime 7 day average 10 year low flow (0.216m^3/s).

Using the Remington (1996) conversion factors, on the data compiled here, it was found that licenses allocated for irrigation comprised 0.26 m^3/s during summer use (water use for irrigation occurs during dry, hot periods of that season), and 0.013 m^3/s was allocated for licenses measured in GD (gallons per day) which includes domestic, stockwatering, land improvement, water delivery and waterworks. Remington did not include licenses for conservation and storage. Conservation works are considered non-consumptive, whereas storage licenses are considered fully consumptive. Here, 10,753.63 AF (acres feet) are allocated per year for storage. Averaging out the 10,753.63 AF over the year would be 36,392.93 m^3/d or 0.42 m^3/s. Therefore assuming that the total potential water withdrawal could be 0.693 m^3/s, this would calculate out to be 321% of the summertime 7 day average 10 year low flow as deduced from Remington's information. However, it is important to keep in mind that there is no data available on the actual water utilization by licensees, therefore, this is an estimate. Field flow measurements should be conducted to determine the actual impact of licensed water withdrawal on the summertime 7 day average 10 year low flow.

According to documentation relayed by Dwayne Meredith, Dam Inspection Officer with Ministry of Environment, (pers. comm.), the average Canadian usage of water by a four person family is 1 m^3/day which is equal to approximately 400 GD. Since most domestic licenses are 500 GD, this demonstrates a 20% under utilization of water. However the GD measured licenses (of which 52% includes domestic type use) only make up 1.9% of the total water withdrawal.

Additionally it is important to consider that the additional AF of licenses over and above irrigation are mostly for storage in the shape of ponds or diversions. It is speculated that less than 50% of these allocations are truly used (D. Meredith, pers. comm.). One must keep in mind that the averaging out of the yearly allocation throughout the year is also perhaps a misnomer. Higher flows seen in the spring and fall, would easily fill the required allocation of AF.

Table 5: Summary of Water Licenses on the Upper Bulkley

Type of License	No. of Licenses Issued	Amount Allocated		Comments
		AF	GD	
Conservation-Construction	2		0.00	1AN
Conservation-Stored Water	14	4,633.00		considered non-consumptive
Domestic	68		52,400.00	
Irrigation	13	1,099.00		
Land Improvement	6	0.50	100,500.00	3@0TF
Ponds	4			all @ 0TF
Stockwatering	7		4,100.00	
Storage	9	10,753.63		
Water Delivery	1		20,000.00	
Waterworks (Dist. of Houston) (this license comes out of Matthew Lake)	1		30,758.43	109,500,000 GY
Total	**125**	**16,486.13**	**207,758.43**	

Legend
AF = Acres Foot (the amount of water required to cover an acre of land in one foot of water)
GD = Gallons per day
GY = Gallons per year
TF = Total Flow

Type of License

Conservation	Means the use and storage of water or the construction of works in and about streams for the purpose of conserving fish or wildlife.
Domestic/Stockwatering	the use of water for household requirements, sanitation and fire prevention, the watering of domestic animals and poultry and the irrigation of a garden not exceeding 1,012m2 adjoining and occupied a dwelling house
Irrigation	the beneficial use of water on cultivated land and hay meadows to nourish crops
Land Improvement	the diversion or impounding of water to protect property, to facilitate the development of a park or the reclamation, drainage or other improvement of land or to carry out a project of a similar nature.
Storage	the collection, impounding and conservation of water
Waterworks	carriage or supply of water by a municipality, improvement district, development district or person for the use of residents of an area in B.C.

(Queen's Printer, 1997)

The allocation of water use licenses for irrigation in the watershed is complicated by the fact that very few small tributaries are gauged. Excessive water removal from streams for irrigation can contribute to increased water temperatures and inadequate in-stream flows for fish (Remington, 1996).

Today there are an estimated five ranches and 20 hobby farms running approximately 500 breeding cows in the Upper Bulkley drainage. Grazing permits were issued for 3121 cattle and 48 horses in 1992 (Remington, 1996). Cattle can cause damage to water courses through eroding streambanks in efforts to get to water. Additionally they cause water pollution.

The majority of licenses have a points of diversion (POD) on creek systems other than the mainstem. Low flows in the Upper Bulkley River lead to the importance of tributaries as refuge areas for the fish. Therefore, there is a need to protect the flows in the tributaries (MIC, 1997). In addition, it has been stated that long-term changes in weather have lead to a decline in ground water levels over the last 30 years (MIC, 1997)

Sleeve A contains a map of the study area, water license locations and reach breaks. For each reach break on the Bulkley River and Buck Creek, the allocation of water due to licenses has been shown in m^3/s. Reaches are relatively homogeneous lengths of channel with similar confinement, gradient and substrate.

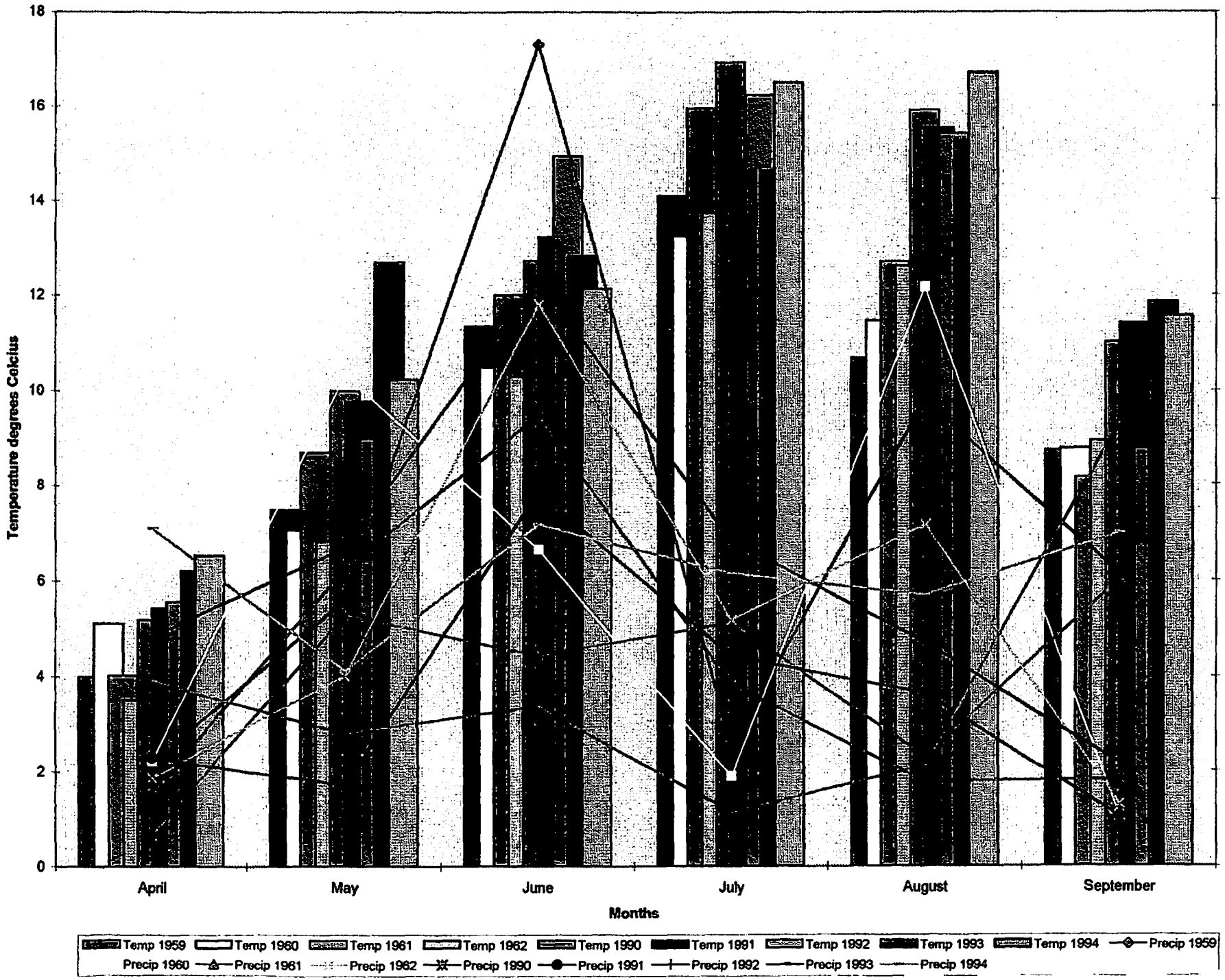
3.4 Climatological Data

The northwest corner of the Interior Plateau has a climate that is continental in nature. Temperatures range from -47°C to +32°C with relatively long, cold winters, prolonged spring and fall periods and short, warm summers. Freeze-free periods are generally short (McNeil, 1983). 44% of the annual precipitation falls between May and September. Snow depths range from 0.5 to 1.0 meters at elevations below 900 meters with snow cover extending from mid-November through late April. Peak flows in the watershed generally occur during the month of May due to precipitation patterns and snowmelt. It has been noted that discharge events are influenced approximately two days after a heavy rain event (Mackay, 1997).

Precipitation and temperature data acquired, exists from Houston station #1073615, Atmosphere Environment Canada (AES), for the years 1957 - 1963, and 1988 - 1995. It is reported that each of these periods operated at different locations (Eero Karanka, 1998). The fact that climate stations existed at different sites creates a microclimate analysis and interpretation problem. However, in combination with information and analysis provided by Eero Karanka, Habitat Management Unit, DFO, of data outside of the study area, the data in Houston has been plotted for comparison purposes. Results of information provided by Eero Karanka, are found in Appendix B.

The following graph shows the mean temperature and precipitation per month from April to September, 1959-62 and 1990-1994. Data on precipitation provided by Karanka, addresses precipitation from October to April. This would reflect the snowpack influence to the spring runoff period.

Mean Monthly Temperature and Precipitation in Houston, April to September, 1959-1962 and 1990-1994



The graph shows a general increase in temperature through the 1990s as compared to the 1950s and 1960s. This warming trend is supported by Environment Canada climate change data. Precipitation does not demonstrate any significant changes over the years however, results provided by Karanka state that regional October to April precipitation has decreased by about 7 to 10% below the long-term mean.

Climate Trends and Variations Bulletin for Canada (AES, 1997) reports that long-term cooling dominates (as seen over 48 years) in all regions of Canada except British Columbia and the far northeastern seaboard.

3.5 Aerial Photographs and Land Use

3.5.1 Aerial Photographs

Aerial photographs were obtained in 1:30,000 from the 1950's, 1:60,000 for 1971, and 1:15,000 for 1994. Copies of these aerials are found in Sleeves B, C and D respectively. Since it was too onerous to obtain copies of aerials for the complete study area, only copies of the mainstem Upper Bulkley are provided for comparison purposes. Additionally, due to lack of facilities in the Northwest to reproduce the aerials 'cut and pasted' together on a single map sheet, the best attempt was made to provide 11 x 17 numbered copies which can be put together for an overall view of the mainstem. Appendix F contains an incomplete list of the existing flightlines and years of aerials for the Upper Bulkley, as an example of available footage.

Current aerial photographs at 1:3,000 scale taken in 1997 (Mackay, 1997) provide a high level of detail of the mainstem and many of its tributaries. Due to the sheer numbers of photographs at that scale, they are not duplicated here but can be viewed through the Ministry of Environment in Smithers. The details of what is available with these photographs are included in Appendix F.

Comparison of the aerial photographs reveals the changes in the mainstem over time. Some of these changes are listed below:

- increase in cleared land right to the bank of the river, prominently seen in the area of the mainstem between the tributaries of Raspberry and McInnes and towards Johnny David Creek;
- loss of a significant amount of meandering characteristics on the mainstem causing a general straightening trend in many cases;
- development and growth in the towns of Houston, Topley and Wiley with the addition of a trailer park near the mouth of McQuarrie;
- natural path changes of the river have run into interference as the bends now bank up against the CN Rail line where previously they were further away;
- changes to the mouth of Byman Creek and its connection to the mainstem;
- clear separation of side channels from the mainstem.

3.5.2 Land Use

Along the floodplains of the Bulkley River, numerous side channels have been cut off at their upstream end from the main river channel by the rail line or Highway 16. Side channels are often very important rearing habitat for juvenile salmonids, particularly coho. In some instances the side channels have been culverted, but culverts are often the target sites for beaver dams (Remington, 1996). The Upper Bulkley stretching from the confluence of Ailport to Bulkley Lake was noted as being extensively colonized by beavers with approximately 24 dams (AGRA, 1996). Beaver dams were also noted on the reaches of Buck, Ailport and Crow. Beaver dams in the lower reaches of Buck Creek are impeding fish access (MIC, 1997).

Table 6 below summarizes many of the tributaries and the land-use associated with their basins. As mentioned previously, land-use in the Bulkley Valley has largely been oriented around agriculture-based.

Table 6: Summary of Tributaries

Tributary Name	Size (ha)	Basin Order	Bifurcation Ratio	Historical Land-Use	Comments
Buck Creek	56,333	Third		Agriculture, urbanization, forestry, mining	Thought to be most significant nursery stream. Includes Klo Creek and Dungate Creek
Aitken Creek	11,947	Second	Intermediate	Agriculture, Forestry	
Barren Creek	2,606	Second	High	Agriculture, dwellings, powerline, railway	
McQuarrie Creek	11,583	Third	Intermediate	Agriculture, dwellings, railway, Forestry	
Byman Creek	11,435	Third	High	Agriculture, dwellings railway	
Johnny David Creek	4,571	Second	Low	Agriculture	
Richfield Creek	21,634		Low	Agriculture, dwellings	Includes Robert Hatch Creek

Note: Basin Order reflects the attachment of that tributary to the fourth order basin, in this case, the Upper Bulkley Bifurcation Ratio is the relative rate at which runoff occurs without factoring in storage variables

Data from: Mackay, S., 1997

During or just after World War II, the BC government provided bulldozers to those interested in clearing land at a per-cost rate (no profit margin). This greatly increased the rate and extent of land clearing the in the watershed, and paved the way for more mechanized farming. To put a perspective on the extent of cattle ranching and hay farming, and thus show the temporal trends in possible impacts to the watershed, it was noted that between 1947 and 1967, the number of cattle in the Houston area increased from 60 head of cattle to 1500 (Houston Centennial '71 Committee (HCC), 1971). It is important to note that all of this activity has been focused in the valley bottom of the Bulkley River, on alluvial fans of most tributaries, and on the Buck Flats.

3.6 Other Historical Information

3.6.1 Major Storms and Floods

A storm of a certain magnitude may cause considerably more damage to developed property in 1990 than a similar storm might have in 1890. However, a storm in 1990 may cause less damage than a storm/flood in the 1970s because of improved road and bridge construction standards and a generally greater awareness of problems associated with development and poor road construction and maintenance practices (Septer, D. and J.W. Schwab, 1995).

Peak Flows occur in parallel with the melting of mid to high elevation snowpacks and are exaggerated by rain-on-snow events and high temperatures. Floods in the watershed which have not been gauged have been noted in May, 1924, June 1962, and May 1967. The flood of 1962 was estimated to be the largest known flood at the time and was also a rain-on-snow event (Mackay, 1997).

Late spring/early summer snow-melt floods occur when cool weather extends into the late spring/early summer months. A sudden rapid warming to hot weather extending over a period of a few weeks leads to a rapid melt of the snow-pack, which brings rivers to flood levels. These floods have historically occurred at the end of May to early June, most notably region-wide in 1894, 1898, 1936, and 1948. Smaller floods occurred in 1916, 1942, 1964, and 1972 (Septer, D. and J.W. Schwab, 1995). Rainstorms also augment snow-melt runoff in localized areas.

Icejam floods are caused by freeze-up or the break-up of ice and do cause flooding on the Bulkley Rivers and tributaries. These tend to occur from November to April. In January 1919, ice jammed the Bulkley River east of Telkwa taking out two spans of the bridge at Hubert.

Numerous floods and precipitation events are reported for the Bulkley from the Telkwa/Smithers area through to Hazelton, but few for the Houston area. This may be due to the fact that water accumulates downstream and is not as abundant near the headwaters.

Major storms and floods recorded on the Upper Bulkley or surrounding area are listed in tables 7 and 8 below:

Table 7: Major Storm and Floods Recorded on the Upper Bulkley and Surrounding Area

Spring Floods:	
June 17-19, 1931	Bulkley River and minor flooding Skeena River
May 24, 1942	minor flooding Skeena and Bulkley Rivers
May 25-June 10, 1948	major flooding Skeena and Bulkley
May 31-June 2, 1972	flooding Skeena and Bulkley Rivers and elsewhere
June 14-16, 1986	"Father's-Day Storm": Telkwa and Bulkley Rivers
Flash Floods:	
July 16-18, 1974	flash floods north and northwestern B.C.

Icejam Floods:

January 1919	Bulkley River, Hubert
April 8-12, 1966	Bulkley River, Smithers
April 1968	Morice River, Houston; Bulkley River, Telkwa
December 23-28, 1984	Bulkley River, Quick
December 23-29, 1992	Bulkley River, Smithers

Data from: Septer, D. and J.W. Schwab, 1995

Table 8: Storm and Flood Occurrences by Rivers, Creeks and Lakes in Houston Area, 1891 - 1991

Buck Creek: May 10, 1951; May 31-June 8, 1964; May 20-23, 1968

Bulkley River: November 21-25, 1914; May-June 1916; October 28-November 19, 1917;January 1919; May-June, 1928; May 4, 1931; June 17-19, 1931; November 17-24, 1933; October 21-26, 1935; November 5-8, 1935; May 29-June 3, 1936; November 9-19, 1936; May 25-26, 1942; May 15-19, 1945; May-June, 1947; May 25-June 10, 1948; June 14-18, 1950; May 10, 1951; December 2-5, 1959; May 31-June 8, 1964; June 8-11, 1964; April 8-12, 1966; October 21-24, 1966; April 9-10, 1968; May 20-23, 1968; May 31-June 2, 1972; June 12, 1972; October 29-November 1, 1978; December 23-28, 1984; June 14-16, 1986; October 6-14, 1991

Data from: Septer, D. and J.W. Schwab, 1995

Floods can have a significant impact to the fish habitat through sediment loading and erosion. Not all of the storms or floods listed above may have directly impacted the Upper Bulkley however, details of most of the events are included in Appendix G. Table 9 summarizes the events that had direct mention of Houston or the Upper Bulkley, and the peak discharge as it is reported in Appendix G along with the discharge occurring in Houston from the WSC data in Appendix A.

Table 9: Summary of Event Catalogue and Relevant Data

Date of Event	Peak Discharge Recorded at Quick	Peak Discharge Recorded at Houston
May 4, 1931		53.8 m^3/s
May 25-26, 1942	691m^3/s	96.3 m^3/s
May 15-19, 1945		156 m^3/s
May-June 1947	538 m^3/s	93.7 m^3/s
May 25-June 10, 1948	895 m^3/s on May 30.	193 m^3/s
May 10-12, 1951	634 m^3/s on May 13	204 m^3/s
August 9-11. 1951		
May 29-June 8, 1964	847 m^3/s	
June 8-11, 1964		

Date of Event	Peak Discharge Recorded at Quick	Peak Discharge Recorded at Houston
April 8-12, 1966		
May 20-23, 1968	861 m^3/s	
June 12, 1972	957 m^3/s	
June 14-16, 1986	721 m^3/s.	131 m^3/s
May 17, 1997	846 m^3/s	275 m^3/s

It is interesting to note that in general, there is an increase in the reported peak discharge at Quick during the flood events, with the highest being in 1972. Although expected, the flood in 1997 did not exceed this amount (WSC, pers. comm.) considering the peak discharge at the Houston station exceeded its previous record in 1951. A graph of this data has been included to demonstrate this trend.

4. Discussion

The results as presented in Section 3 are potentially indicative of problems occurring with the coho population in the Upper Bulkley. Reasons behind the trends or changes are discussed below and followed by potential effects to the fish life cycle and habitat.

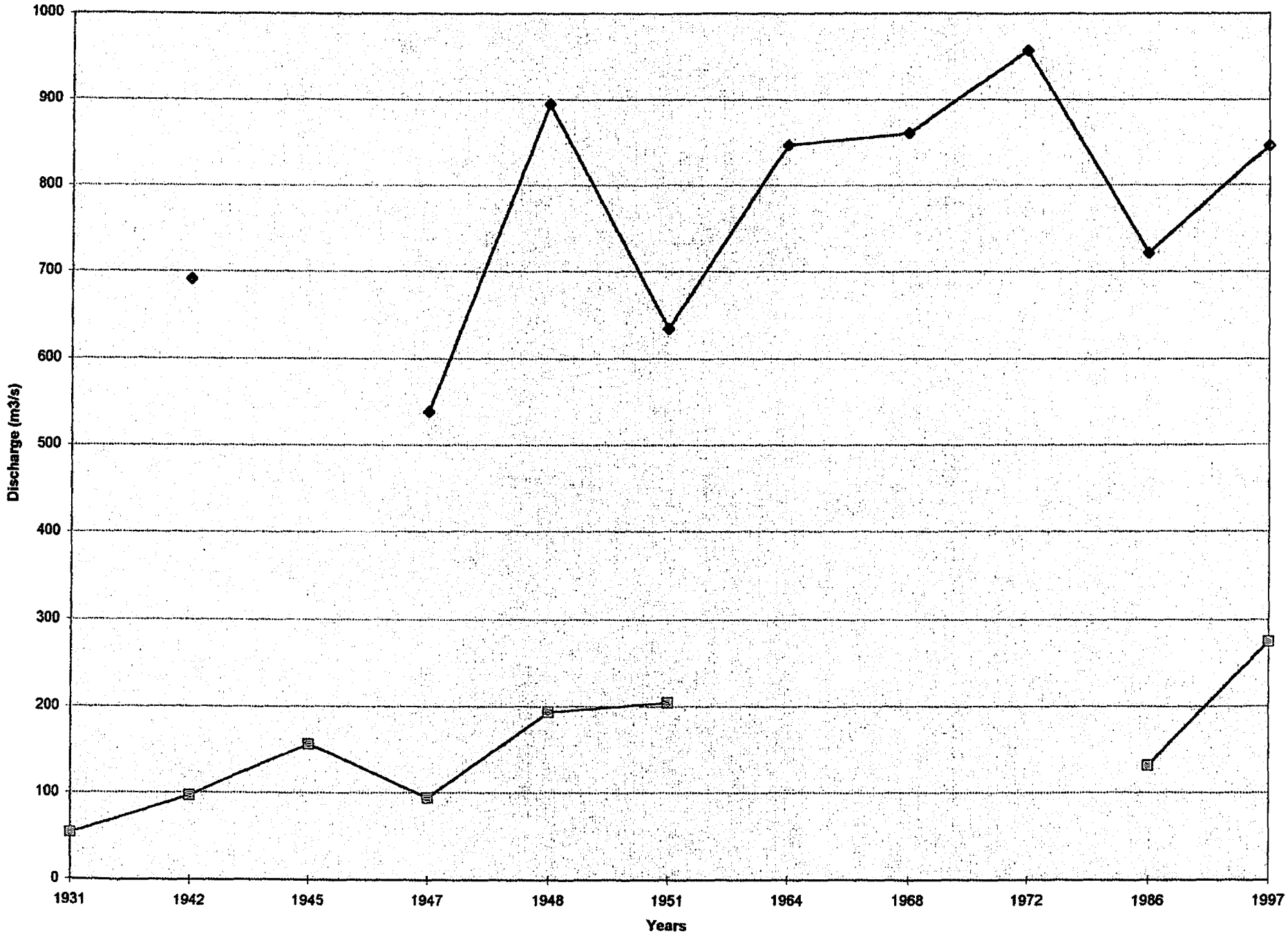
4.1 Discharge Analysis

4.1.1 Spring Discharge and Freshets

Stream flow data seems to demonstrate an overall trend of declining total discharge over time. This is supported by anecdotal evidence from long-time resident Henry Murphy. It is felt that not only is there less water, but the water that does come through, runs off faster. He noted that there used to be two distinct freshet periods in the spring; one in early May, as a result of valley bottom warming; and a higher event usually around the May long weekend, as the snow melts from the upper elevations. Now the river comes up earlier and runs fuller, but the high water spans the entire period instead of abating and reaching a second peak (Murphy, pers. comm.) This is supported by the graphs as higher discharges pick up again in the 1990s in April and the peaks are less prominent during May than they were in the earlier years. Other residents in the area still feel that the main peak period consistently occurs around the long May weekend although it does maintain itself for a longer period of time and may be starting earlier (Strimbold & Wilson, pers. comm.). As noted in the results of the peak freshet period, no significant timing changes appeared over the long term, only in the short term.

There is also consistent support for the fact that there seems to be less water overall also supported outside of the study area as shown by Karanka. Freshets often scour the spawning beds and wash away redds, while low flows may dry up redds on the periphery of spawning areas. Therefore, a longer more constant freshet period may be having a greater effect on spawning beds than in the past. A longer, highwater event occurring in mid to late spring (i.e. mid-May to early June) may affect swim-up fry leaving the redds.

Peak Discharge Levels at Bulkley River in Quick and Houston during Recorded Flood Events



Juvenile rearing is perhaps the most vulnerable phase of the salmonid life-cycle and rearing requirements are the most difficult to understand. Coho salmon stay in streams for a few months to several years. Fish which rear in streams need an easily exploitable food source and adequate living space. Production of benthic invertebrates occurs mainly in riffles and fish usually stay in pools to feed. Thus, a riffle:pool sequence is a basic requirement of productive salmon streams (Neuman & Newcombe, 1977). Therefore, it is possible that lower constant flows may not allow for the refreshing of pools necessary for the success of juvenile survival.

Reasons behind these trends, although speculative, are numerous. As mentioned earlier, clear-cutting causes increased snow deposition in the opening and advances the timing and rate of snowmelt. Additionally, there is less storage capability of that land to slow down the release of water to the river system. Some suggestion has occurred that the potential effect of climate change (warming) may reduce summer and early autumn flows in streams of the Interior Plateau hydrologic regions, such as the Upper Bulkley basin (Environment Canada, 1997). Climate warming may also account for earlier snow melts and therefore earlier freshet periods.

4.1.2 Fall Discharge and Spawning

Both the mainstem and tributaries are important habitat for salmonids. The mainstem provides a lower energy habitat that does not require a great deal of effort to maintain position in, with deeper and more constant flows during low-flow periods. The tributary theoretically provides better water quality (cooler and more oxygen due to higher gradients, larger substrate, more turbulence), more food due to better and more frequent invertebrate habitats, and both may provide an alternative habitat when there is either high concentration of suspended sediments or ice in the water column. The mainstem floodplain may provide critical overwintering habitat when there is a lack of deep pools, large substrates, and/or deep, groundwater fed off-channel areas in the tributary. (Mackay, 1997)

Spawning salmonids have at least three basic requirements which are affected by low flow. These are gravel composition, water depth, and water velocity (Neuman & Newcombe, 1977). Reduced stream flows can affect all of these spawning requirements. Successful egg incubation and fry emergence depends on adequate percolation of high quality water through the gravel where an adequate oxygen supply is essential. High flows can increase the sediment load of stream water and cause sedimentation, and low flows also reduce percolation rate. Since coho are known to spawn through late September to November, it is expected that high flow days are necessary when the fish are able to pass barriers and reach their spawning beds.

Graphs of September and October discharge characteristics, show a reduction in discharge over time. As well, dramatic peaks, especially seen on the Bulkley, are less evident. This loss of peaks may be an important factor in the success (or lack of) spawning salmonids reaching the redds as well as affecting the riffle:pool characteristics important in juvenile rearing.

4.2 Water Allocation and Licenses

Difficulty with this data is a result of the significant margin of error explained earlier. This margin of error is a result of lack of ground truthing and updating due to limited manpower and cost. Licenses are often abandoned, and under or over utilized. Additionally, water usage that is not recorded under licenses will make up a significant amount of allocation that cannot be considered due to its unknown details. These usages can take the form of diversion of water into a pond for domestic use, diversion of water that was not to be used but gets used anyway, surface wells beside or close to water courses and any groundwater use that may be water meant for the river. Therefore relying on the data derived from water licenses to determine trends or problems, is a problem in itself.

It is difficult to speculate whether water allocation causes a significant depletion in water. If it does, it is likely to be evident in low flow periods rather than in flood periods. Therefore, it would be expected that discharge data in July and August would be skewed to support this water usage. Despite the increase in monthly discharge in 1993, the monthly discharge graphs do show a slight decrease for August and September on both Buck and Bulkley. No significant change is seen in July. Overall, the peaks reached in those months in later years, are less prominent. If the overall annual discharge is down, and the overall water use is up, then it is possible that the systems may be taxed in some areas.

Since the majority of PODs occur on tributaries, it is more likely that water use is having some significant effect. Hydrometric data is necessary to the assessment of these withdrawals. Although the District of Houston holds a water license on Mathews Lake, north of Houston, it presently supplies the municipality with water from shallow wells in the floodplain next to the river (which do not show up in licenses), and there are 68 other domestic water use licenses in the watershed. Water withdrawals, mainly for agriculture and storage, are significant. Local residents however, did not suspect that more than one irrigation license (Groot Bros.) is currently in use (Strimbold, pers. comm.).

Excessive water withdrawals, coupled with climate variation, could result in water shortages and insufficient in-stream flows for fish (Remington, 1996). In the worst case scenario, existing licenses may exceed supply during a 7 day low flow 10 year occurrence.

4.3 Historical Land-Use Changes

There is the possibility that the ongoing changing of the river channel (loss of meandering sections) is allowing for a faster flow. This is merely speculative and would have to be followed up with a more in-depth analysis through aerial photographs of the changing river path. However, local residents confirm the ongoing erosion of stream banks and the subsequent log jams being created as trees from eroded banks drop into the system (Murphy, Strimbold, & Wilson, pers. comm.). Although log jams are often thought to be barriers to migrating spawners and even juveniles, this is usually untrue unless there is a marked increase in the hydraulic head behind the jam, as an indication of how impermeable it is. Basically if water can freely get through, so can fish (Mackay, 1997). However, log jams can cause the backing up of water and then the

subsequent heavy and high rush of discharge if and when it releases or the water breaches the jam. This sort of water action can potentially destroy sensitive fish habitat.

It has been found that most mainstem-rearing salmonids have lateral distributions that are skewed to the banks rather than the middle of a given channel cross-section. This distribution provides a refuge from higher velocities in the mid-channel area, better cover from predators, and represents optimum feeding area. In this way, stream banks play an extremely important role in the survival of species inhabiting the mainstem (Mackay, 1997). However, as streambanks erode, these habitats are reduced.

There has also been a marked increase in beaver dams. Long-time resident Frank Strimbold recalls how as children, it was a great event to even see a beaver. Now however, there are many beaver especially along the mainstem towards Knockholt. Beaver dams in Topley are causing siltation behind them and the fish cannot get through (Strimbold, pers. comm.). With the general ban against the hunting of beaver, and the decrease of natural predators due to human presence, it is not surprising to see a marked increase in beaver populations. The Overview Assessment done by AGRA (1996) also notes the presence of numerous beaver dams to support this anecdotal evidence.

4.4 Aerial Photographs

There has always been some concern that the clearing of land close to river banks would contribute to erosion, increased sedimentation and water temperature, which impact fish stocks. Review of aerial photographs from 1950 compared to 1994, show changes in land clearing along the river banks to have increased in certain section. Clearing of the land not directly adjacent to the mainstem still affects the river by its reduced capacity to control runoff.

It is also felt that increased use of the land for grazing purposes may also be degrading fish habitat. Local residents however, suggest that the number of head of cattle in the area is significantly less than in the past when coho stocks were still fairly healthy (Wilson, pers. comm.). In addition, erratic flood events, such as the one that occurred in 1997, cause the flooding of hay fields and subsequent siltation in the river. Therefore, there may be an indirect effect due to land use that only becomes apparent in years where severe natural hazards occur.

5. Recommendations

The data presented in this report shows trends on which speculation on the effects on salmonid populations have been made. Unfortunately data on the Upper Bulkley River and tributaries is not abundant. Many data gaps have been identified and call for the need of ongoing data collection focused on the parameters directly affecting fish and fish habitat.

Over-exploitation of salmonid stocks, especially Upper Skeena coho stocks, is a prominent factor in stock decline. The fewer adult salmon to reach spawning grounds will account for the lower

numbers of fry. Local residents support the observation that there is an evident decrease in fish numbers to the point of exclaiming that "there are no fish" (Strimbold & Wilson, pers. comm.).

Below are listed a number of recommendations for further investigation into the decline of the fish population and future monitoring of the Upper Bulkley watershed:

- Ongoing monitoring of the stream flow with a switch to automatic data collection at the Houston station to increase data consistency. Monitors should potentially be set up on tributaries which hold significant fish habitat and where water usage is high such as Buck, Richfield and Byman/Perow.
- Monitoring of water level and temperature is essential in order to fill the gap of data necessary to determine the health of fish habitat.
- Further analysis on the cumulative departures from the long-term means of climatological data and discharge of an expanded study area.
- Analysis and review of water level data related to all discharge data.
- Air photo interpretation and GIS mapping of the channel configuration, from the first aerial photographs to the present, to show how the channel dynamics also affected by the CN Railgrade, may be changing over time and thus affecting fish habitat.
- Ground truthing of the real water usage relative to the Upper Bulkley and its tributaries to determine the ratio of supply and demand. Close analysis of discharge data and water diversion would be necessary to determine any true effects on the overall flow and what seasons are more sensitive to water use relative to fish life cycles. It would be necessary to collect data on ground water in this situation.
- Closer monitoring of beaver activity in the watershed and its potential effect on data parameters such as water quality, sedimentation, flow and temperature.
- Collection of livestock numbers in the area and their effects on the water systems. Comparison of these numbers to historical numbers would be necessary to determine if there is a true maximum that the area can support without affecting fish habitat.
- Reduction in exploitation rate

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Personal Communications:

Brenda Donas, DFO, Smithers Community Advisor
Jeff Lough, Skeen Region MELP WRP Fisheries Specialist
Dwayne Meredith, Skeena Region MELP Dams Inspection Officer
Henry Murphy, Long-time Resident, Houston
Mike O'Neill, Toboggan Creek Fish Hatchery
Jim Schwab, Ministry of Forests
Frank Stimbold, Long-time Resident, Topley
Brian Wilson, Long-time Resident, Topley

Appendix A

Daily Discharge Data For Stations 08EE003, 08EE009, 08EE013, 08EE018, and 08EE019

STANUM= 08EE003
STANAME= BULKLEY RIVER NEAR HOUSTON
LATITUDE= 54:23:45N
LONGITUDE= 126:42:30W
PARAMETER= Flow m3/s

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
January 1											
January 2											
January 3											
January 4											
January 5											
January 6											
January 7											
January 8											
January 9											
January 10											
January 11											
January 12											
January 13											
January 14											
January 15											
January 16											
January 17											
January 18											
January 19											
January 20											
January 21											
January 22											
January 23											
January 24											
January 25											
January 26											
January 27											
January 28											
January 29											
January 30											
January 31											
Total January Discharge											
February 1											
February 2											
February 3											
February 4											
February 5											
February 6											
February 7											
February 8											
February 9											
February 10											
February 11											
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February 20											
February 21											
February 22											
February 23											
February 24											
February 25											
February 26											
February 27											
February 28											
February 29											
Total February Discharge											
March 1											
March 2											
March 3											
March 4											
March 5											
March 6											
March 7											
March 8											
March 9											
March 10											
March 11											
March 12											
March 13											
March 14											
March 15											
March 16											
March 17											

STANUM= 09EE003
STANAME= BULKLEY RIVER NEAR HOUSTON
LATITUDE= 54:23:45N
LONGITUDE= 126:42:30W
PARAMETER= Flow m3/s

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
March 18											
March 19											
March 20			3.230								
March 21											
March 22											
March 23											
March 24											
March 25											
March 26											
March 27											
March 28											
March 29											
March 30											
March 31											
Total March Discharge											
April 1						11.600		0.566			10.500
April 2						11.600		0.566			10.800
April 3						11.600		0.708			11.600
April 4						11.600		0.708			12.500
April 5						11.600		0.850			13.300
April 6						11.600		3.400			14.700
April 7						10.800		5.950			16.100
April 8						10.600		8.500			17.600
April 9		6.510				10.400		10.800			17.600
April 10		5.970				9.740		14.000		10.800	17.600
April 11		5.970				9.510		17.300	12.400	11.900	20.400
April 12		6.510				9.630		19.500	16.400	13.300	23.200
April 13		5.890				10.100		21.800	20.400	19.600	25.900
April 14		6.510				9.400		21.800	22.200	25.900	35.700
April 15		6.600				8.500		21.800	24.100	27.500	39.600
April 16		6.600				7.700		21.800	25.500	29.200	41.600
April 17		6.510				7.700		21.800	27.200	30.600	45.900
April 18		6.660				7.700		21.800	28.900	32.000	50.400
April 19		5.690				7.700		21.800	29.400	33.700	53.000
April 20		5.970				7.590		21.800	30.000	35.100	55.500
April 21		6.510				7.620		21.800	31.700	36.500	57.800
April 22		5.970				10.600		21.800	33.100	38.200	63.400
April 23		6.600				14.200		21.800	38.200	39.900	67.700
April 24		9.880				17.000		20.700	43.600	41.600	71.900
April 25		15.000				21.500		19.700	48.700	41.600	75.900
April 26		17.400				26.300		18.700	51.500	41.600	75.900
April 27		21.400			219.000	26.300		19.400	54.100	39.600	75.900
April 28		25.200				26.300		20.200	56.600	37.400	75.900
April 29		30.300				26.300		20.200	56.400	36.500	74.200
April 30		34.300				26.300		20.200	55.800	35.700	72.500
Total April Discharge		247.970			219.000	399.090	0.000	461.748	706.200	658.200	1244.600
May 1		40.800				28.000		22.700	55.200		72.500
May 2		43.300				29.700		24.900	53.800		72.500
May 3		47.300				39.400		39.600	52.700		73.600
May 4		53.800				46.700		37.100	51.500		74.800
May 5		49.800				66.500		42.500	50.400		75.900
May 6		49.800				73.900		47.900	53.800		77.600
May 7		48.100				75.600		54.700	56.900		79.300
May 8		41.900				75.600		61.400	60.000		83.000
May 9		40.500				79.000		68.000	63.400		86.700
May 10		39.400				80.700		74.800	64.000		94.300
May 11		34.300				79.300		81.600	64.800		102.000
May 12		31.700				79.300		81.600	66.300		110.000
May 13		30.300				79.300		81.600	62.900		98.000
May 14		30.300				92.000		78.700	59.500	86.700	86.700
May 15		30.300		122.000		94.000		75.600	56.100	126.000	88.300
May 16		30.300		121.000		94.000		73.100	52.700	139.000	90.300
May 17		30.300		120.000	47.000	83.000		70.800	52.700	152.000	87.600
May 18		30.300		119.000	42.600	79.300		67.400	52.700	143.000	85.200
May 19		30.300		119.000	39.600	75.900		60.000	52.700	135.000	83.000
May 20		30.300		118.000	35.400	75.900		62.000	57.800	126.000	79.300
May 21		26.000	57.800	116.000	32.800	79.300		63.700	76.500	116.000	75.900
May 22		24.800		81.000	30.900	83.000		65.700	95.100	116.000	71.100
May 23		24.800		81.000	29.400	83.000		67.700	114.000	114.000	68.300
May 24		24.600		71.600	28.300	75.900		69.400	120.000	111.000	62.600
May 25		24.600		64.800	27.000	69.100		71.400	122.000	108.000	58.900
May 26		23.400		76.500	26.300	69.100		85.000	110.000	105.000	55.200
May 27		21.900		93.200	24.900	69.100		81.600	98.000	102.000	48.400
May 28		20.900		77.000	23.200	75.900		75.600	85.800	102.000	41.600
May 29		19.300		68.200	22.300	72.500	45.600	69.900	73.900	101.000	38.500
May 30		18.200	50.100	55.800	20.400	69.100		64.000	61.700	97.400	35.700
May 31		17.300		50.700	18.400	69.100	46.200	58.300	56.100	90.000	34.300
Total May Discharge		1008.900	107.900	1554.600	448.700	2242.200	91.800	1978.300	2153.000	2072.100	2289.300

STANUM= 08EE003
STANAME= BULKLEY RIVER NEAR HOUSTON
LATITUDE= 54:23:45N
LONGITUDE= 126:42:30W
PARAMETER= Flow m3/s

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
June 1		16.900		48.400	19.000	65.700		57.500	50.400	82.700	32.600
June 2		15.800		46.400	17.600	60.600	36.500	56.600	45.300	78.200	31.700
June 3		14.400		44.200	17.300	57.500	29.200	55.800	41.900	73.800	29.700
June 4		13.500		43.000	15.900	57.500	27.700	54.900	38.500	69.100	27.800
June 5		12.600	34.000	44.200	14.600	65.700		51.800	35.100	64.600	24.900
June 6		11.500		37.700	15.400	57.500		48.700	31.700	60.300	22.400
June 7		11.200		36.200	14.700	49.800	23.100	45.600	29.400	56.400	22.400
June 8		10.200	26.100	32.600	15.300	49.800		42.500	27.700	52.400	22.400
June 9		10.300		29.400	13.800	51.300	20.100	39.600	25.900	48.100	22.400
June 10		10.200	21.800	27.400	13.300	52.100	15.900	36.000	24.500	43.600	22.400
June 11		11.200		26.500	13.000	57.500		32.600	23.000	39.100	22.400
June 12		12.300	19.000	26.100	11.100	57.500	19.500	29.400	21.600	37.100	20.700
June 13		11.400		25.700	11.800	56.100		27.800	20.100	35.100	19.100
June 14		11.300	16.600	26.300	10.100	54.400	16.600	25.800	18.700	33.100	17.000
June 15		11.300		25.500	9.630	53.000	15.100	30.300	17.800	31.100	15.000
June 16		12.600	13.300	21.200	8.720	51.000		34.800	17.000	30.600	13.300
June 17		14.800		17.000	9.170	49.800	18.300	48.100	16.000	29.700	13.900
June 18		29.200	11.200	14.200	9.170		21.800	61.200	15.000	29.200	14.600
June 19		35.100		18.800	9.170			68.000	14.000	27.400	12.400
June 20		37.700	9.830	22.600	9.400			74.800	13.000	25.500	10.200
June 21		36.200		24.800	8.380			81.600	11.900	24.600	9.910
June 22		32.600	9.000	38.800	7.990		15.100	73.300	10.800	23.700	9.630
June 23		29.700		59.700	7.900			64.800	9.910	22.100	9.060
June 24		26.100	7.480	69.700	7.820		15.900	56.600	9.630	20.500	9.060
June 25		24.400		56.900	7.420		15.000	48.400	9.630	18.900	9.060
June 26		23.400	6.570	56.600	7.590			43.000	9.630	17.200	8.500
June 27		22.100		45.600	10.100			39.900	9.630	16.500	7.930
June 28		20.600	6.570	39.400	8.500			36.800	8.950	13.700	7.360
June 29		19.300		36.500	7.500		41.900	33.700	7.930	13.600	7.080
June 30		19.200	6.120	32.300	7.590		40.500	32.600	6.940	13.500	6.600
Total June Discharge		**567.100**	**187.570**	**1071.700**	**338.950**	**946.800**	**372.200**	**1430.500**	**621.550**	**1131.200**	**501.890**
July 1		19.600		28.600			43.600			13.300	
July 2		23.400	5.690	24.800						13.200	
July 3		25.900		24.000						13.100	
July 4		24.800	5.690	24.000						16.700	
July 5		23.200		20.400						20.400	
July 6		22.300	5.690	17.200			33.100			25.500	
July 7		19.500		17.000			30.600				
July 8		18.100	4.500	15.900			28.600				
July 9		16.800		14.800			27.500				
July 10		14.400		14.000							
July 11		12.300		12.700							
July 12		11.500		11.600			26.800				
July 13		11.500		10.300							
July 14		11.300	3.110	9.320							
July 15		10.400		9.000							
July 16		10.400		8.070							
July 17		10.400		7.480							
July 18		10.200		7.110			15.400				
July 19		9.970		6.740							
July 20		9.150	2.500	6.290			14.600				
July 21		8.350		6.030			12.900				
July 22		7.960	1.290	5.610							
July 23		7.310		5.520						15.600	
July 24		6.430	0.377	5.130			9.850			13.000	
July 25		6.340	2.730	4.960						10.400	
July 26		6.140	2.790	4.560			6.820			9.290	
July 27		5.440		4.500						8.160	
July 28		5.270	3.770	4.130							
July 29		4.470		3.570							
July 30		4.390		3.280			12.400				
July 31		3.540		3.430			27.400				
Total July Discharge		**380.760**	**38.137**	**340.030**	**0.000**	**0.000**	**289.570**	**0.000**	**0.000**	**158.650**	**0.000**
August 1		3.540	6.650	3.280							
August 2		2.970		3.230							
August 3		2.830	6.460	3.170							
August 4		3.620		3.090							
August 5		2.150	5.440	2.920							
August 6		2.660		2.790							
August 7		2.750	4.810	2.550							
August 8		2.210		2.440							
August 9		2.070	4.190	2.340							
August 10		2.010		2.070							
August 11		1.950	3.430	1.830							
August 12		1.580		1.780							
August 13		1.500	3.370	1.830							
August 14		1.470	2.860	1.590							
August 15		1.420	2.730	1.460							
August 16		1.360		1.370							

STANUM= 08EE003
STANAME= BULKLEY RIVER NEAR HOUSTON
LATITUDE= 54:23:45N
LONGITUDE= 126:42:30W
PARAMETER= Flow m3/s

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
August 17		1.050	1.730	1.260							
August 18		1.020		1.260							
August 19		0.963	2.170	1.120							
August 20		0.963		1.200							
August 21		1.020		1.160							
August 22		1.020	2.070	0.968							
August 23		0.963		0.779							
August 24		0.934	1.590	0.779							
August 25		0.934		0.779							
August 26		0.963	1.760	0.779							
August 27		0.963		0.779							
August 28		0.934	2.170	0.779							
August 29		0.963		0.677							
August 30		0.963	2.790	0.609							
August 31		0.963		0.609							
Total August Discharge		50.686	54.240	51.337	0.000	0.000	0.000	0.000	0.000	0.000	0.000
September 1		0.934	2.280	0.609							
September 2		0.963		0.541							
September 3		0.963		0.609							
September 4		0.934		0.677							
September 5		0.934		0.779							
September 6		0.934		0.711							
September 7		0.934	2.610	0.677							
September 8		0.934		0.609							
September 9	0.142	0.934		0.541							
September 10	0.142	0.934		0.439							
September 11	0.142	0.906		0.377							
September 12	0.142	0.906	2.170	0.283							
September 13	0.057	0.651		0.190							
September 14	0.198	0.651		0.159							
September 15	0.198	0.651		0.127							
September 16	0.198	0.651		0.127							
September 17	0.425	0.651		0.439							
September 18	0.481	0.651		0.779							
September 19	0.481	0.623		0.779							
September 20	0.736	0.623		0.892							
September 21	0.680	0.623		0.968							
September 22	0.481	0.623		1.160							
September 23	0.453	0.623		1.590							
September 24	0.425	0.623		1.590							
September 25	0.425	0.623		1.730							
September 26	0.680	0.623		1.830							
September 27	0.765	0.651		1.830							
September 28	1.100	0.651		2.020							
September 29	1.300	0.708		2.070							
September 30	1.670	0.906		2.340							
Total September Dischar	11.321	23.016	7.060	27.472	0.000	0.000	0.000	0.000	0.000	0.000	0.000
October 1	2.290	2.070						7.650		0.568	
October 2	2.150	1.980						7.930		0.595	
October 3	2.150	1.980						7.990		0.651	
October 4	2.150	1.980						10.600		0.680	
October 5	2.610	2.290						13.200		0.765	
October 6	3.060	2.610						10.300		0.878	
October 7	3.060	2.610						7.500	60.600	0.963	
October 8	3.230	2.720						9.710	57.800	1.050	
October 9	3.230	2.720						11.900	55.200	1.050	
October 10	3.060	2.610						14.200	55.200	1.050	
October 11	3.060	2.610						15.700	55.200	1.220	
October 12	3.060	2.610						17.300	65.700	1.390	
October 13	3.060	2.610						17.600	76.200	1.560	
October 14	3.060	2.610						18.000	86.700	1.560	
October 15	3.370	2.860						17.800		1.560	
October 16	3.370	2.860						17.600		1.560	
October 17	3.370	2.860						17.400		1.560	
October 18	3.230	2.720						17.300		1.560	
October 19	3.230	2.720						18.700		1.560	
October 20	3.060	2.610						19.500		1.700	
October 21	3.060	2.610						20.200		1.840	
October 22	3.060	2.610						22.700		1.980	
October 23	2.920	2.490						25.100		2.120	
October 24	2.920	2.490						27.500		2.120	
October 25	2.920	2.490						26.200		2.120	
October 26	3.060	2.610						24.900		2.120	
October 27	3.060	2.610						25.800		2.120	
October 28	3.230	2.720						26.600		2.120	
October 29	3.370	2.860						26.300		2.120	
October 30	3.370	2.860						25.900		2.490	
October 31	3.540	2.970						25.600		2.830	
Total October Discharge	93.370	79.960	0.000	0.000	0.000	0.000	0.000	554.660	512.600	47.458	0.000

STANUM= 08EE003
STANAME= BULKLEY RIVER NEAR HOUSTON
LATITUDE= 54:23:45N
LONGITUDE= 126:42:30W
PARAMETER= Flow m3/s

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
November 1	3.230							22.400		3.620	
November 2	3.310							22.400		4.380	
November 3	4.050							21.200		4.390	
November 4	4.900							19.900		4.390	
November 5	5.070							19.300		4.390	
November 6	5.610							18.500		3.620	
November 7	5.610							17.800		2.830	
November 8	5.800							16.500		3.170	
November 9	6.910							15.100		3.540	
November 10	7.870							15.100		3.540	
November 11	8.640							15.100		3.540	
November 12	6.600							14.400		3.540	
November 13	6.060							13.600		3.540	
November 14								12.900		3.540	
November 15								12.800		3.960	
November 16								12.600		4.390	
November 17								12.500		4.730	
November 18										5.070	
November 19										5.380	
November 20										5.880	
November 21										6.370	
November 22										7.420	
November 23										8.500	
November 24										8.440	
November 25										8.380	
November 26										8.300	
November 27										8.210	
November 28										8.100	
November 29										8.010	
November 30										7.930	
Total November Dischar	73.660	0.000	0.000	0.000	0.000	0.000	0.000	282.100	0.000	161.120	0.000
December 1							21.200				
December 2							21.800				
December 3							19.500				
December 4							17.300				
December 5							16.300				
December 6							15.600				
December 7							15.000				
December 8							14.400				
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Total December Discharge											

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	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
January 1											
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	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
March 18											
March 19											
March 20											
March 21											
March 22											
March 23											
March 24											
March 25											
March 26				3.260							
March 27				2.970							
March 28				2.690							
March 29				3.110							
March 30				3.540							
March 31				3.960							
Total March Discharge											
April 1	11.300			3.740		1.610	8.720				
April 2	14.900			3.540		1.730	9.740				
April 3	18.400			3.340		1.840	8.720				
April 4	22.200			4.420		1.840	7.700				
April 5	26.100			5.520		1.840	7.110				
April 6	30.000			5.470		1.730	6.540				
April 7	34.000			5.410		1.640	5.950	6.370			
April 8	37.700	9.630		5.350		1.530	7.730	6.090			
April 9	37.900	9.800		5.970		1.470	9.510	5.800			2.940
April 10	38.200	10.000		6.570	2.690	1.390	9.000	5.520			3.140
April 11	38.500	10.200		6.710	2.520	1.500	8.500	5.100	2.860		3.340
April 12	38.800	11.300		6.850	2.350	1.610	10.700	4.670	3.230		4.390
April 13	41.600	12.500		7.220	2.180	1.870	12.900	4.250	3.620		5.440
April 14	44.500	13.600		7.590	2.350	2.150	15.100	2.690	3.960		6.910
April 15	47.300	14.700		7.870	2.550	2.410	18.200	3.340	4.300		8.380
April 16	48.100	19.800		8.160	2.750	2.630	21.200	3.960	7.380		9.910
April 17	48.700	24.600		8.500	2.970	2.860	28.300	4.390	10.500		11.400
April 18	49.600	29.400		9.630	3.200	3.280	35.700	4.840	13.600		10.900
April 19	50.400	31.700		10.600	3.960	3.680	36.500	5.270	16.700		10.400
April 20	56.400	34.300		11.900	4.760	4.730	37.100	6.060	24.600		10.300
April 21	62.300	36.800		13.200	6.940	5.800	37.900	6.850	25.000		10.300
April 22	68.000	39.400		15.800	9.120	6.850	42.200	10.100	22.600		10.700
April 23	71.900	35.700		18.500	11.300	9.090	46.400	13.300	21.200		11.000
April 24	75.900	32.000		21.200	14.200	11.300	53.200	15.300	19.800		12.700
April 25	79.900	28.300		23.800	17.200	24.600	60.000	17.200	18.300		14.300
April 26	84.100	28.600		26.600	15.800	37.900	72.200	19.200	19.500		14.700
April 27	85.800	28.900		27.700	14.400	39.100	84.700	18.300	20.700	4.590	15.000
April 28	87.500	29.200		28.900	14.500	40.200	96.800	17.500	30.000	5.890	16.400
April 29	89.200	29.400		29.700	14.500	41.300	93.200	18.100	39.400	7.220	17.700
April 30	89.500	25.500		30.900	14.600	40.200	89.500	18.700	38.800	8.780	19.100
Total April Discharge	1528.700	545.330	0.000	370.880	164.840	299.680	981.020	222.900	346.060	26.480	229.350
May 1	90.000	21.200		31.700	16.500	39.400	83.800	22.900	38.500	10.400	20.500
May 2	90.600	17.000		31.400	16.500	49.300	78.200	27.000	37.900	13.700	21.100
May 3	90.900	23.800		31.100	35.400	58.900	74.200	31.100	37.100	19.800	23.300
May 4	85.500	30.600		34.000	52.100	88.300	70.200	40.600	36.200	24.100	25.500
May 5	79.900	37.400		37.100	52.400	107.000	66.300	50.100	35.700	28.600	39.900
May 6	74.200	44.500		36.800	52.700	125.000	68.500	65.700	35.100	34.000	54.400
May 7	67.700	51.000		36.500	53.000	140.000	71.100	87.500	51.000	39.400	68.800
May 8	61.400	57.500		36.200	57.500	154.000	82.400	84.700	68.800	44.700	85.500
May 9	54.900	64.000		33.700	62.000	164.000	93.700	81.600	82.400	50.400	105.000
May 10	48.700	73.300		31.100	66.800	171.000	88.900	78.700	98.300	61.700	118.000
May 11	49.300	82.700		31.700	75.000	163.000	83.600	118.000	115.000	74.500	132.000
May 12	50.100	92.300		32.300	85.500	161.000	78.700	134.000	116.000	87.200	160.000
May 13	51.000	102.000		33.100	104.000	159.000	71.400	142.000	148.000	119.000	200.000
May 14	48.100	98.300		33.700	125.000	146.000	63.700	156.000	144.000	115.000	204.000
May 15	45.300	95.100		34.500	132.000	134.000	58.900	173.000	139.000	111.000	184.000
May 16	42.500	91.700		42.500	135.000	130.000	54.100	173.000	134.000	101.000	165.000
May 17	39.900	87.800		49.300	148.000	128.000	50.400	174.000	126.000	92.000	159.000
May 18	36.200	83.500		48.100	155.000	116.000	46.700	180.000	118.000	82.100	144.000
May 19	32.600	79.300		46.700	156.000	106.000	43.000	166.000	112.000	71.900	128.000
May 20	28.900	75.300		42.600	154.000	95.700	43.600	161.000	106.000	66.600	109.000
May 21	26.900	69.100		38.800	149.000	92.900	44.500	156.000	97.700	61.700	90.000
May 22	24.900	62.600		34.800	144.000	90.000	47.300	146.000	89.200	56.600	86.900
May 23	22.900	56.400		32.300	137.000	83.800	50.100	166.000	81.000	51.800	83.600
May 24	21.000	65.100		30.000	131.000	77.600	52.100	187.000	70.800	48.400	75.300
May 25	20.400	73.600		29.400	125.000	71.600	54.400	193.000	60.600	50.400	66.500
May 26	19.800	85.500		29.200	119.000	65.400	56.400	187.000	60.000	52.100	60.000
May 27	19.300	96.300		29.200	108.000	59.500	53.800	177.000	59.700	53.500	53.200
May 28	19.000	85.000		29.400	97.100	55.500	51.500	168.000	63.100	54.900	46.400
May 29	18.700	74.200		29.400	95.400	51.500	47.600	153.000	66.800	56.400	45.000
May 30	18.700	66.500		27.300	93.700	45.900	43.900	137.000	70.500	52.700	43.600
May 31	18.400	59.500		25.200	77.000	39.900	41.300	129.000	60.600	49.000	40.500
Total May Discharge	1397.700	2102.100	0.000	1069.300	3012.600	3167.200	1914.500	3946.100	2559.000	1634.800	2838.200

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	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
June 1	19.300	52.400		23.700	60.000	39.400	36.800	120.000	51.000	53.200	37.400
June 2	20.400	48.400		22.200	52.400	39.100	36.200	96.000	44.700	57.500	34.500
June 3	21.200	41.900		21.800	44.700	38.500	32.800	79.900	38.800	62.000	31.700
June 4	21.000	36.800		21.400	37.100	43.600	29.400	63.400	35.100	66.800	28.900
June 5	20.700	32.600		20.900	35.700	48.700	29.700	54.400	31.100	71.400	26.100
June 6	20.400	29.400		20.000	34.000	49.800	30.000	45.300	27.400	69.100	23.300
June 7	20.100	31.100		19.200	32.300	50.700	31.100	36.200	25.400	66.500	21.700
June 8	19.500	32.600		17.400	30.300	56.400	32.600	30.000	23.300	63.400	20.100
June 9	19.000	34.300		15.700	27.200	61.700	33.700	23.800	21.700	60.300	18.900
June 10	18.400	36.500		14.300	24.100	67.400	58.000	22.400	20.100	55.500	17.600
June 11	17.300	38.500		12.900	20.900	54.700	82.400	20.900	18.500	51.000	16.400
June 12	16.000	40.800		11.600	19.500	41.900	76.500	18.500	16.800	48.200	15.900
June 13	14.700	43.000		10.900	18.000	38.800	70.500	18.100	15.100	41.300	15.300
June 14	13.500	41.100		10.200	16.400	35.700	60.000	13.700	13.500	36.800	14.300
June 15	12.700	38.800		9.630	18.900	32.000	49.800	15.200	11.800	33.100	13.300
June 16	12.000	36.500		9.060	17.100	28.200	39.400	16.700	12.200	29.400	12.300
June 17	11.300	34.300		8.470	15.300	24.400	36.200	15.000	12.500	26.200	10.600
June 18	10.800	30.000		7.870	14.700	22.000	33.100	13.300	11.800	22.900	10.000
June 19	10.200	25.700		7.280	14.200	19.500	29.700	11.700	11.000	19.500	9.200
June 20	9.630	21.400		7.330	13.300	18.500	26.600	10.300	10.300	18.300	8.560
June 21	9.060	18.900		7.360	12.500	17.500	24.100	8.830	9.570	17.000	7.890
June 22	9.630	18.400		7.250	11.600	26.900	21.700	8.270	9.000	15.600	7.620
June 23	9.910	16.900		7.160	10.600	40.200	19.200	7.730	8.440	14.200	7.250
June 24	10.200	15.400		6.880	9.740	51.500	16.800	7.160	7.900	13.300	6.880
June 25	9.910	14.200		6.570	9.650	52.100	14.400	6.660	7.730	12.300	6.540
June 26	9.630	13.100		6.290	9.970	52.700	15.000	6.230	7.560	11.400	6.170
June 27	9.340	11.900		5.800	10.100	63.700	15.400	5.800	7.390	11.900	5.800
June 28	9.060	10.800		5.350	9.340	74.800	14.900	5.350	7.220	12.500	5.440
June 29	8.780	9.630		5.210	8.610	64.000	14.400	5.270	7.420	11.800	5.150
June 30	8.500	8.500		5.100	8.160	53.500	13.900	5.180	7.650	11.200	4.870
Total June Discharge	**422.150**	**862.830**	**0.000**	**354.910**	**648.570**	**1309.900**	**1026.300**	**789.300**	**531.980**	**1081.600**	**449.990**
July 1				5.040	7.730	42.800	12.700	5.100	8.070	10.200	4.840
July 2				5.010	7.280	36.200	11.600	4.670	8.010	9.260	4.840
July 3				4.980	6.850	33.700	10.800	4.500	7.960	8.330	4.810
July 4				4.930	6.340	31.700	9.970	4.360	7.900	7.760	4.530
July 5				4.620	5.860	30.000	10.800	4.190	8.440	7.220	4.250
July 6				4.300	5.270	28.100	11.600	4.390	9.000	6.880	4.110
July 7				5.130	4.960	26.100	12.300	4.590	8.270	6.540	3.960
July 8				5.950	4.640	24.200	12.300	4.980	7.560	8.040	4.110
July 9				5.210	4.300	21.700	12.300	5.350	6.970	9.540	4.250
July 10				4.470	3.990	19.200	11.900	5.800	6.370	11.000	3.910
July 11				5.550	3.660	17.900	11.600	6.230	5.780	12.700	3.570
July 12				6.650	3.510	16.700	11.500	6.680	5.270	14.400	3.400
July 13				8.410	3.340	17.800	11.400	10.100	4.760	13.300	3.230
July 14				10.200	3.260	19.000	11.300	13.600	4.670	11.900	3.260
July 15				9.460	3.170	20.200	11.200	13.000	4.560	10.600	3.280
July 16				8.750	3.090	55.800	11.000	12.300	4.470	9.600	3.340
July 17				8.040	2.940	91.200	10.800	11.600	4.390	8.410	4.640
July 18				7.080	2.800	84.700	10.600	10.800	4.300	7.820	5.950
July 19				6.120	2.660	78.200	15.000	10.100	7.960	7.220	5.660
July 20				5.470	2.520	64.000	19.400	8.720	11.600	7.080	5.780
July 21				4.840	3.140	49.800	23.800	7.360	11.200	6.970	5.210
July 22				4.640	3.770	35.700	25.300	7.080	10.800	6.480	4.620
July 23				4.450	4.390	32.300	26.800	6.770	11.000	6.000	4.020
July 24				4.250	4.300	28.900	28.300	6.480	11.100	5.520	3.740
July 25				4.020	4.250	25.100	25.600	6.230	11.200	5.040	3.450
July 26				3.770	3.990	21.400	23.800	5.950	11.400	4.580	3.480
July 27				3.450	3.740	20.500	22.100	9.850	11.400	4.450	3.510
July 28				3.140	3.430	19.500	20.400	13.700	11.500	4.300	3.370
July 29				2.920	3.140	18.500	18.900	11.900	11.600	4.080	3.200
July 30				2.690	2.860	18.200	17.300	10.200	11.100	3.880	3.060
July 31				2.410	2.890	17.800	15.600	9.120	10.600	3.680	2.840
Total July Discharge	**0.000**	**0.000**	**0.000**	**165.950**	**128.090**	**1048.900**	**487.970**	**245.700**	**259.210**	**242.990**	**126.520**
August 1				2.490	2.920	16.800	13.900	8.070	10.000	3.480	2.630
August 2				2.580	2.920	15.700	12.600	7.020	9.490	3.260	2.610
August 3				2.240	2.920	14.400	11.400	5.950	7.990	3.110	2.380
August 4				1.900	2.750	13.000	10.200	5.660	7.650	2.940	2.350
August 5				1.810	2.560	11.700	9.340	15.000	7.310	3.000	2.350
August 6				1.700	2.410	10.900	8.500	24.200	6.940	3.030	2.320
August 7				1.590	2.210	10.200	9.800	23.100	6.570	3.060	2.380
August 8				1.470	2.010	9.510	11.100	22.000	6.200	3.110	2.440
August 9				1.410	1.900	8.830	11.000	20.900	6.540	2.940	2.460
August 10				1.350	1.780	7.870	10.800	16.800	6.880	3.000	2.490
August 11				1.220	1.640	6.910	10.600	12.600	7.220	3.060	5.800
August 12				1.130	1.470	5.950	9.850	11.600	7.080	3.400	9.120
August 13				1.080	1.320	5.660	9.060	10.600	6.970	3.710	12.400
August 14				1.020	1.160	5.380	8.500	10.700	6.680	4.020	11.600
August 15				1.010	1.080	5.100	7.930	10.700	6.400	4.190	11.300
August 16				0.991	1.030	4.840	7.390	10.700	6.120	4.390	10.300

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	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
August 17				1.010	0.991	4.590	6.880	10.600	5.950	4.670	9.290
August 18				1.020	0.946	4.280	6.370	9.290	5.720	4.960	8.560
August 19				1.010	0.898	3.960	6.030	8.440	5.520	4.620	7.870
August 20				1.000	0.850	3.790	5.690	7.590	5.320	4.280	7.160
August 21				0.991	0.835	3.620	5.490	7.330	5.150	3.940	6.460
August 22				0.920	0.821	3.400	5.270	7.110	4.960	3.570	5.750
August 23				0.850	0.793	3.140	5.040	6.850	5.240	3.310	5.040
August 24				0.793	0.765	3.000	4.790	6.140	5.520	3.060	4.870
August 25				0.736	0.719	2.830	4.530	5.440	6.030	2.970	4.670
August 26				0.725	0.671	2.690	4.360	5.040	6.540	2.890	4.110
August 27				0.716	0.623	2.550	4.190	4.670	6.290	2.690	3.510
August 28				0.708	0.580	2.410	4.060	4.760	6.030	2.490	3.400
August 29				0.680	0.541	2.270	3.960	4.840	5.780	2.440	3.280
August 30				0.651	0.504	2.120	3.960	4.930	5.520	2.350	3.170
August 31				0.583	0.484	1.950	3.960	5.100	5.320	2.270	3.060
Total August Discharge	**0.000**	**0.000**	**0.000**	**37.384**	**43.121**	**199.350**	**236.570**	**314.130**	**200.930**	**104.230**	**165.550**
September 1				0.515	0.447	1.780	3.960	5.270	5.100	2.550	2.940
September 2				0.473	0.430	1.610	3.960	5.440	4.930	2.830	2.920
September 3				0.428	0.413	1.530	3.960	5.350	4.760	2.720	2.890
September 4				0.382	0.476	1.420	4.130	5.070	4.590	2.610	2.690
September 5				0.337	0.541	1.380	4.300	4.810	4.390	2.490	2.490
September 6				0.374	0.566	1.350	4.260	4.530	4.110	2.520	2.270
September 7				0.413	0.595	1.270	4.250	4.280	3.820	2.550	2.040
September 8				0.388	0.575	1.180	4.220	4.020	3.620	2.290	1.700
September 9				0.362	0.558	1.100	4.190	3.820	3.400	2.040	1.330
September 10				0.326	0.541	1.050	3.960	3.620	3.280	1.930	0.963
September 11				0.292	0.532	0.991	3.910	3.450	3.170	1.810	0.934
September 12				0.272	0.524	0.963	3.820	3.310	3.060	1.640	0.906
September 13				0.252	0.515	0.934	3.960	3.140	2.940	1.470	0.878
September 14				0.294	0.515	0.991	4.130	3.570	3.000	1.420	0.878
September 15				0.337	0.490	1.050	4.300	3.960	3.060	1.390	0.850
September 16				0.564	0.484	1.100	4.930	4.450	3.570	1.360	0.850
September 17				0.790	0.439	1.090	5.520	4.930	3.710	1.300	0.850
September 18				0.991	0.456	1.080	5.350	4.700	3.880	1.220	0.765
September 19				1.420	0.473	1.050	5.180	4.470	4.020	1.130	0.680
September 20				1.840	0.490	1.020	4.980	4.250	3.790	1.080	0.651
September 21				2.150	0.515	1.040	4.760	3.940	3.570	1.020	0.623
September 22				2.460	0.524	1.060	4.530	3.620	3.480	1.080	0.680
September 23				4.050	0.532	1.080	4.160	3.450	3.400	1.130	0.736
September 24				5.660	0.541	1.080	4.080	3.260	3.310	1.050	0.793
September 25				7.360	0.527	1.080	3.960	3.170	3.200	0.963	0.793
September 26				7.480	0.515	1.100	3.770	3.060	3.110	1.020	0.821
September 27				7.590	0.515	1.130	3.540	2.970	2.970	1.080	0.821
September 28				12.500	0.515	1.270	3.340	3.000	2.830	1.020	0.850
September 29				17.300	0.515	1.400	3.140	3.060	2.800	0.934	0.850
September 30				17.800	0.515	1.530	3.090	3.090	2.780	0.850	0.850
Total September Dischar	**0.000**	**0.000**	**0.000**	**95.400**	**15.254**	**35.709**	**125.660**	**119.060**	**107.650**	**48.497**	**38.292**
October 1				18.200	0.515	0.991	2.970	2.860	2.890	0.821	
October 2				18.700	0.555	1.420	2.970	2.860	2.970	0.793	
October 3				19.500	0.595	1.840	3.450	2.860	3.060	0.821	
October 4				20.200	0.623	1.730	3.960	2.860	3.060	0.850	
October 5				18.900	0.651	1.700	4.760	3.030	3.060	1.700	
October 6				17.500	0.699	1.670	5.520	3.200	3.060	1.610	
October 7				18.200	0.745	1.610	5.350	3.370	3.060	1.530	
October 8				18.100	0.793	1.590	5.180	3.540	3.090	1.610	
October 9				14.000	0.920	1.560	5.010	3.710	3.090	1.700	
October 10				13.000	1.050	1.530	4.810	3.850	3.110	1.780	
October 11				12.000	1.080	1.470	4.590	4.020	3.230	1.870	
October 12				11.200	1.100	1.470	5.720	3.820	3.340	1.930	
October 13				10.400	1.210	1.470	6.850	3.620	3.370	1.980	
October 14				9.660	1.310	1.470	7.840	3.450	3.400	1.950	
October 15				8.980	1.420	1.470	8.830	3.260	3.450	1.950	
October 16				8.270	1.440	1.470	8.380	3.230	3.480	1.930	
October 17				7.870	1.470	1.470	7.930	3.200	3.510	1.870	
October 18				7.480	1.410	1.420	7.700	3.140	3.600	1.810	
October 19				7.080	1.350	1.420	7.480	3.110	3.680	1.470	
October 20				6.680	1.320	1.390	7.250	3.090	3.230	1.130	
October 21				6.400	1.290	1.390	7.190	3.280	2.780	1.250	
October 22				6.090	1.260	1.440	7.160	3.450	3.170	1.360	
October 23				5.780	1.390	1.500	7.760	3.510	3.570	1.470	
October 24				5.610	1.530	1.560	8.380	3.570	3.960	1.590	
October 25				5.440	1.500	1.560	10.400	3.620	4.300	1.530	
October 26				5.300	1.470	1.530	12.500	3.540	4.390	1.470	
October 27				5.180	1.400	1.500	14.600	3.450	4.760	1.440	
October 28				5.150	1.330	1.470	14.700	3.280	5.100	1.420	
October 29				5.130	1.260	1.500	14.700	3.140	5.380	1.270	
October 30				5.100	1.330	1.560	14.400	2.970	5.660	1.130	
October 31				5.350	1.400	1.360	14.000	2.800	5.950	1.100	
Total October Discharge	**0.000**	**0.000**	**0.000**	**324.470**	**35.416**	**46.531**	**242.340**	**102.690**	**113.760**	**46.135**	**0.000**

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	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
November 1	9.910			5.610	1.470	1.180	13.500	2.630	6.650	1.100	
November 2	10.200			5.690	1.530	1.370	13.100	2.660	7.360	1.060	
November 3	10.500			5.780	4.220	1.590	12.600	2.690	8.070	1.530	
November 4	10.800			5.610	6.940	1.640	11.900	2.660	8.830	1.980	
November 5	11.000			5.440	9.630	1.810	11.200	2.630	9.570	2.410	
November 6	11.300			5.270	9.910	1.780	10.500	2.610	10.500	2.630	
November 7	11.600			5.100	10.200	1.810	10.600	2.610	11.500	3.110	
November 8	11.900		1.420	4.930	12.500	1.840	10.400	2.580	12.900	3.400	
November 9	12.300		1.440	4.760	14.700	1.640	10.300	2.490	14.300	4.330	
November 10	12.800		1.470	4.590		1.440	10.100	2.410	14.200	5.270	
November 11	13.300		1.500	4.260		1.260	9.740	2.440	14.200		
November 12	13.600		1.530	3.960		1.470	9.400	2.460	13.400		
November 13	14.000		1.470	3.620		1.670	9.060	2.460	12.700		
November 14	14.400		1.440	3.960		2.100	8.720	2.460	11.900		
November 15	14.700		1.420	4.300		2.520	8.580	2.460	11.100		
November 16	14.300		1.380	4.190			8.410		10.300		
November 17	13.800		1.350	4.110			8.270		10.600		
November 18	13.300		1.190	4.330			8.180		11.000		
November 19	13.300		1.050	4.560			8.100		11.000		
November 20	13.300		1.300	4.790			8.010		11.000		
November 21	13.300		1.560	5.010			7.930		11.000		
November 22	13.300		1.560	5.270					11.000		
November 23			1.530	5.520					10.700		
November 24			1.530	4.980					10.300		
November 25			1.760	4.470					9.970		
November 26			1.950	4.050					9.830		
November 27			1.900	3.620					9.680		
November 28			1.840	5.010					9.570		
November 29			1.780	6.370					9.400		
November 30			2.380	7.050					9.200		
Total November Dischar	276.910	0.000	35.750	146.230	71.100	25.320	208.600	38.250	321.730	27.040	0.000
December 1			2.970	7.700					9.000		
December 2			2.550	7.220							
December 3			2.120	6.740							
December 4			1.930	6.290							
December 5			1.700	7.110							
December 6			1.470	7.930							
December 7			2.100								
December 8			2.690								
December 9			2.920								
December 10			3.140								
December 11			3.170								
December 12			3.230								
December 13			3.260								
December 14											
December 15											
December 16											
December 17											
December 18											
December 19											
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December 29											
December 30											
December 31											
Total December Dischers											

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	1971	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
January 1	0.977										
January 2	0.963										
January 3	0.963										
January 4	0.949										
January 5	0.946										
January 6	0.943										
January 7	0.940										
January 8	0.937										
January 9	0.934										
January 10	0.934										
January 11	0.934										
January 12	0.934										
January 13	0.934										
January 14	0.934										
January 15	0.963										
January 16	0.991										
January 17	1.030										
January 18	1.060										
January 19	1.060										
January 20	1.060										
January 21	1.060										
January 22	1.060										
January 23	1.060							1.040			
January 24	1.060										
January 25	1.070										
January 26	1.070										
January 27	1.100										
January 28	1.150										
January 29	1.220										
January 30	1.270										
January 31	1.330										
Total January Discharge	31.836										
February 1	1.370										
February 2	1.400										
February 3	1.420										
February 4	1.400										
February 5	1.390										
February 6	1.350										
February 7	1.290										
February 8	1.260										
February 9	1.250										
February 10	1.220										
February 11	1.250										
February 12	1.270										
February 13	1.360										
February 14	1.530										
February 15	1.680										
February 16	1.780										
February 17	1.810										
February 18	1.840										
February 19	1.840										
February 20	1.810										
February 21	1.780										
February 22	1.760										
February 23	1.730										
February 24	1.700										
February 25	1.660							0.595			
February 26	1.640										
February 27	1.600										
February 28	1.560										
February 29											
Total February Discharge	42.950										
March 1	1.530										
March 2	1.500										
March 3	1.470										
March 4	1.440										
March 5	1.420										
March 6	1.420										
March 7	1.390										
March 8	1.370										
March 9	1.360										
March 10	1.350										
March 11	1.330										
March 12	1.320										
March 13	1.300										
March 14	1.290										
March 15	1.270										
March 16	1.270										
March 17	1.270										

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	1971	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
March 18	1.270										
March 19	1.270										
March 20	1.270							3.560			
March 21	1.270										
March 22	1.270										
March 23	1.270										
March 24	1.250										
March 25	1.250										
March 26	1.250										
March 27	1.230										
March 28	1.230										
March 29	1.230										
March 30	1.250										
March 31	1.260										
Total March Discharge	**40.870**										
April 1	1.260		6.460	0.520	1.900	7.300	4.050	4.400	5.100		
April 2	1.270		6.290	0.530	1.950	7.800	4.200	4.410	5.740		
April 3	1.300		6.200	0.540	2.020	8.150	4.350	4.700	7.290		
April 4	1.320		6.120	0.550	2.110	8.550	4.500	4.850	8.150		
April 5	1.350		5.970	0.560	2.230	8.500	4.750	5.000	10.000		
April 6	1.370		5.800	0.580	2.380	8.450	5.200	5.200	11.900		
April 7	1.400		5.690	0.610	2.650	8.710	6.600	5.400	12.800		
April 8	1.430		5.610	0.640	2.950	8.390	8.340	6.000	17.600		
April 9	1.470	2.920	5.440	0.670	3.250	7.880	11.700	7.200	22.200		
April 10	1.510	3.060	5.300	0.700	3.600	7.560	11.600	8.600	23.800		
April 11	1.560	3.260	5.150	0.800	3.820	7.750	11.900	8.000	24.600		
April 12	1.600	3.510	5.010	0.900	4.000	8.010	14.900	5.500	24.600		
April 13	1.640	3.830	4.770	1.000	4.340	8.200	18.700	5.350	24.700		
April 14	1.680	5.010	5.350	1.100	4.530	8.650	21.500	5.350	27.900		
April 15	1.760	6.240	5.680	1.200	5.410	10.800	19.100	5.650	29.600		
April 16	1.810	7.730	6.810	1.350	5.980	13.000	21.200	6.670	28.600		
April 17	1.870	10.100	7.450	1.540	8.980	16.500	21.500	7.970	30.600		
April 18	1.950	12.000	8.570	1.660	9.600	16.800	20.100	10.300	26.400		
April 19	2.010	15.300	9.600	1.900	12.600	17.800	18.900	12.300	25.500		
April 20	2.120	15.600	10.600	2.540	13.300	21.000	19.500	17.400	24.500		
April 21	2.220	16.300	12.900	3.200	17.400	24.100	18.500	22.600	25.400		
April 22	2.440	17.000	15.700	3.700	21.600	24.700	16.800	20.400	25.300		
April 23	2.690	18.700	18.300	4.200	23.300	26.900	15.800	18.100	25.500		
April 24	3.260	21.500	28.900	4.600	28.900	25.200	14.300	17.400	27.200		
April 25	3.680	24.600	31.500	5.000	40.900	23.700	14.400	17.000	27.000		
April 26	4.530	26.600	29.300	5.600	44.500	23.500	14.700	15.700	27.300		
April 27	5.660	33.400	30.100	6.600	51.600	23.300	15.000	16.400	27.600		
April 28	6.170	38.200	31.100	8.200	56.800	22.700	14.200	17.200	27.900	68.900	
April 29	6.200	43.400	33.700	9.740	67.200	22.200	14.100	17.300	31.100		
April 30	6.230	45.200	40.300	10.800	75.300	24.600	13.900	17.200	36.500		
Total April Discharge	**74.760**	**373.460**	**399.850**	**91.550**	**525.110**	**450.700**	**404.790**	**316.550**	**672.380**	**68.900**	**0.000**
May 1	9.910	49.600	49.800	12.400	75.600	29.900	13.600	16.200	56.900	80.000	146.000
May 2	14.200	56.600	53.000	14.200	75.600	33.400	16.200	18.000	84.300	72.300	134.000
May 3	22.100	58.000	51.500	16.000	71.700	34.600	24.800	18.300	88.100	65.700	143.000
May 4	32.600	53.600	51.800	17.100	68.300	33.200	54.300	20.100	91.900	62.800	157.000
May 5	48.100	51.600	56.100	21.200	65.600	32.400	55.400	21.900	89.800	64.100	165.000
May 6	79.300	67.800	68.800	24.900	64.900	32.200	50.700	26.000	87.200	62.600	158.000
May 7	85.500	80.300	75.200	31.300	62.500	32.000	51.100	30.900	91.600	65.700	157.000
May 8	89.800	82.700	87.000	34.600	72.400	42.700	51.600	32.400	106.000	73.000	150.000
May 9	102.000	80.600	99.400	46.200	68.400	60.700	52.000	34.100	113.000	81.100	138.000
May 10	95.400	85.500	108.000	53.800	64.000	59.000	50.400	32.300	107.000	88.800	125.000
May 11	87.800	95.800	97.900	59.800	58.200	55.700	48.300	32.500	102.000	94.900	105.000
May 12	102.000	101.000	92.000	74.400	52.700	55.300	42.200	32.600	97.600	106.000	89.900
May 13	122.000	104.000	93.500	79.300	52.300	60.800	41.700	29.300	94.900	107.000	73.600
May 14	130.000	97.200	107.000	80.100	53.300	66.300	43.000	28.900	75.900	124.000	67.000
May 15	121.000	87.400	125.000	82.200	52.800	71.700	48.100	26.700	66.300	100.000	60.700
May 16	109.000	82.700	134.000	85.200	49.600	80.500	55.600	27.800	54.800	85.300	61.400
May 17	93.200	68.400	133.000	96.200	45.900	96.200	78.400	29.000	50.600	72.100	58.200
May 18	87.200	62.600	122.000	113.000	43.200	93.400	106.000	35.200	46.400	61.900	61.200
May 19	88.100	48.800	114.000	124.000	41.200	97.300	136.000	41.600	44.000	58.400	65.200
May 20	93.200	44.500	112.000	114.000	37.100	100.000	167.000	23.400	45.800	65.700	58.600
May 21	96.300	40.200	110.000	107.000	35.700	94.900	173.000	58.300	48.000	44.300	51.800
May 22	101.000	33.800	103.000	106.000	31.900	88.200	164.000	68.000	52.500	44.700	47.500
May 23	109.000	31.800	104.000	90.600	28.200	73.500	153.000	58.600	58.100	45.400	45.800
May 24	125.000	30.600	94.800	86.300	25.600	68.600	154.000	56.900	58.700	45.300	42.400
May 25	106.000	29.200	101.000	80.400	23.800	64.900	160.000	69.300	57.400	40.400	39.100
May 26	95.400	28.100	111.000	85.500	21.100	57.100	148.000	88.600	60.600	39.200	38.400
May 27	88.100	25.600	102.000	79.900	19.300	55.600	140.000	102.000	58.600	39.300	37.200
May 28	86.100	24.700	95.400	79.700	18.500	53.700	123.000	109.000	57.500	43.300	35.300
May 29	83.300	23.100	78.100	82.000	15.600	52.900	104.000	109.000	57.100	47.000	33.400
May 30	79.300	20.000	71.100	98.600	15.000	51.600	90.700	116.000	52.100	50.900	33.400
May 31	73.900	19.600	63.700	117.000	14.700	47.700	79.600	115.000	47.100	43.100	33.900
Total May Discharge	**2655.810**	**1765.800**	**2863.100**	**2193.100**	**1422.900**	**1874.200**	**2673.900**	**1507.900**	**2195.800**	**2072.400**	**2610.000**

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	1971	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
June 1	69.400	19.700	56.100	157.000	14.000	42.800	68.100	110.000	42.100	38.500	31.800
June 2	69.100	18.500	45.300	175.000	13.400	39.400	61.500	105.000	34.500	34.600	28.800
June 3	71.100	17.800	38.700	168.000	13.300	41.500	55.000	88.100	32.600	32.400	26.200
June 4	68.200	17.000	37.600	146.000	13.300	43.500	49.000	77.700	30.000	29.700	23.600
June 5	63.100	16.300	34.500	119.000	13.100	45.100	44.800	71.100	32.200	29.800	21.000
June 6	68.000	15.100	33.100	93.300	13.100	47.200	40.500	67.300	33.400	29.900	18.900
June 7	58.000	14.900	32.300	81.700	16.900	47.400	34.400	68.600	30.300	42.000	16.800
June 8	63.100	14.400	29.300	65.400	15.400	48.200	31.000	58.400	27.200	60.700	15.600
June 9	62.000	13.000	27.800	57.000	15.200	45.400	27.600	50.900	23.900	118.000	14.600
June 10	56.400	12.900	25.300	53.600	16.000	42.100	24.100	44.000	21.500	111.000	12.800
June 11	51.300	12.600	31.100	53.200	19.100	38.700	22.200	39.300	21.600	92.500	11.800
June 12	48.100	13.300	39.800	41.500	18.000	37.600	20.600	35.300	20.200	74.000	10.800
June 13	52.700	13.300	44.100	38.100	15.700	32.000	20.400	31.800	18.000	62.700	10.800
June 14	59.200	11.500	40.000	35.300	14.400	30.400	20.500	28.300	16.600	52.400	10.400
June 15	55.200	11.000	35.700	30.800	13.700	28.600	21.000	85.700	15.300	43.700	9.060
June 16	54.400	9.740	31.100	23.900	12.800	27.000	19.800	115.000	14.500	39.400	8.290
June 17	56.600	9.500	28.500	23.000	13.800	25.800	18.600	131.000	13.200	38.000	7.520
June 18	57.200	8.910	27.800	22.600	13.300	24.600	14.900	120.000	11.700	35.500	6.950
June 19	58.000	7.990	26.400	18.600	12.900	20.700	13.400	125.000	11.500	32.000	6.460
June 20	58.000	7.230	27.000	17.100	12.700	17.100	12.500	103.000	10.500	28.600	6.380
June 21	52.700	6.240	24.900	16.200	12.300	14.800	12.300	96.000	9.560	25.600	5.750
June 22	49.300	5.950	23.700	14.900	12.000	14.400	12.000	69.200	8.620	25.100	5.700
June 23	50.400	5.780	23.600	13.600	11.900	14.000	16.900	30.400	7.160	22.500	5.390
June 24	56.600	5.610	22.000	12.100	13.200	13.500	20.900	58.600	6.850	20.600	4.890
June 25	70.800	5.440	19.800	11.100	14.000	12.700	21.300	45.800	5.890	19.900	4.400
June 26	70.800	6.430	18.700	10.400	17.700	12.200	16.100	40.000	5.650	17.500	3.910
June 27	68.000	6.810	15.900	13.200	22.100	11.400	15.800	30.400	4.880	15.800	3.950
June 28	66.000	6.810	14.000	14.300	20.900	11.700	14.300	26.600	4.150	16.500	4.030
June 29	57.800	6.910	13.300	23.600	18.100	12.100	17.600	30.500	3.430	15.500	4.390
June 30	52.400	5.950	13.000	16.900	18.600	12.300	21.000	24.700	3.160	13.900	4.310
Total June Discharge	**1793.900**	**326.600**	**880.400**	**1566.400**	**450.900**	**852.200**	**788.100**	**2005.900**	**520.370**	**1218.500**	**345.300**
July 1	53.000	4.360	10.700	14.300	18.400	12.400	21.700	25.600	3.070	12.700	4.690
July 2	53.000	5.350	9.860	13.200	17.200	12.100	18.800	23.600	3.010	11.600	5.300
July 3	53.000	5.010	9.150	15.900	15.700	10.600	16.100	21.200	2.470	11.500	5.730
July 4	53.000	7.120	8.570	14.300	14.300	10.400	13.900	19.800	2.180	11.400	5.630
July 5	53.000	13.000	7.230	12.900	13.400	10.700	17.500	18.500	2.190	11.200	5.020
July 6	53.200	15.700	6.910	11.300	12.300	11.600	18.800	16.400	2.200	10.600	5.230
July 7	53.500	13.300	6.810	11.500	20.500	12.300	16.700	14.200	2.220	8.920	5.320
July 8	53.500	11.200	6.330	11.200	25.800	12.700	14.700	12.700	2.370	8.270	5.870
July 9	60.300	10.500	6.240	10.000	23.000	11.900	12.900	11.600	2.630	7.480	5.990
July 10	63.100	10.300	5.950	8.950	21.500	10.500	11.600	10.400	2.690	7.100	6.130
July 11	68.000	10.200	5.610	8.880	20.900	9.160	10.800	10.300	2.630	6.740	5.710
July 12	59.500	9.980	5.100	8.420	20.900	8.450	10.700	10.200	2.530	6.080	5.220
July 13	60.000	8.570	4.520	7.630	21.400	8.010	10.600	9.290	2.420	5.720	4.920
July 14	49.600	8.100	4.280	7.820	20.500	8.070	9.410	8.330	1.720	5.240	4.570
July 15	42.500	7.770	3.760	12.800	19.500	9.350	8.200	7.760	1.470	5.040	4.080
July 16	36.200	7.340	3.430	13.200	18.600	6.340	7.510	7.250	1.500	4.390	3.820
July 17	31.700	6.720	3.220	12.000	18.200	5.560	6.830	7.040	1.320	4.100	3.570
July 18	28.900	4.930	3.110	10.700	17.700	5.040	6.220	6.550	1.160	3.910	3.180
July 19	25.300	4.280	2.450	9.540	17.300	4.940	5.340	5.890	1.160	3.740	2.950
July 20	22.500	5.100	1.780	8.480	17.000	4.730	4.610	5.230	1.170	3.260	3.250
July 21	19.600	5.350	1.870	12.000	16.800	4.580	4.150	4.530	1.280	2.780	2.940
July 22	17.400	4.600	2.400	16.000	15.400	4.130	3.700	4.380	1.220	2.660	2.620
July 23	15.200	4.360	2.450	20.100	14.200	3.670	3.740	4.190	1.170	2.630	2.480
July 24	13.600	5.180	1.950	18.500	13.700	3.290	3.710	3.810	1.150	2.740	2.340
July 25	12.300	4.690	1.870	14.800	14.000	3.170	3.670	3.540	1.190	2.870	2.220
July 26	10.300	4.280	1.830	12.300	13.700	2.350	3.630	3.260	1.310	2.690	1.960
July 27	9.430	4.050	1.910	10.600	13.200	1.960	3.590	3.010	1.430	2.450	2.430
July 28	8.210	3.830	1.610	9.610	12.900	1.920	3.550	2.770	2.050	2.400	2.860
July 29	4.390	4.130	1.420	7.760	12.200	1.840	3.510	2.590	2.440	2.240	2.450
July 30	6.540	2.930	1.530	7.160	11.300	1.770	1.940	2.560	2.130	2.190	2.380
July 31	7.930	2.800	1.480	6.930	10.700	1.630	1.800	2.530	2.020	2.110	2.300
Total July Discharge	**1095.700**	**215.030**	**135.310**	**358.780**	**522.400**	**215.160**	**279.910**	**289.010**	**59.500**	**176.770**	**123.340**
August 1	9.630	1.120	1.420	6.450	10.000	1.410	1.720	2.270	1.890	2.060	1.990
August 2	10.900	2.660	1.340	5.350	8.520	1.360	1.530	2.240	1.820	1.930	1.820
August 3	12.900	1.810	1.380	4.600	7.960	1.390	1.510	2.210	1.750	1.850	1.700
August 4	14.700	1.500	1.260	3.240	7.710	1.410	1.350	2.180	1.670	1.520	1.650
August 5	16.400	1.630	1.220	4.320	7.460	1.590	1.260	1.900	1.640	1.470	1.460
August 6	13.700	1.300	1.120	4.200	6.750	1.770	1.230	1.660	1.370	1.450	1.320
August 7	10.300	1.260	1.010	4.280	6.470	2.150	1.570	1.690	1.180	1.480	1.200
August 8	8.070	1.140	0.948	4.000	6.190	1.950	2.480	1.500	1.080	1.520	1.160
August 9	5.660	1.080	0.912	3.880	5.360	1.900	3.310	1.410	1.050	1.520	1.000
August 10	4.390	1.100	0.821	3.840	5.360	1.760	3.600	1.260	1.010	1.450	1.030
August 11	3.910	1.080	0.738	3.320	5.360	1.570	3.020	1.100	0.967	1.420	1.140
August 12	3.790	1.040	0.623	3.160	3.960	1.350	2.450	1.000	1.010	1.400	1.130
August 13	3.740	1.060	0.544	3.120	3.800	1.140	2.340	0.847	1.100	1.400	1.150
August 14	3.680	1.180	0.425	3.040	3.490	1.180	1.810	0.836	1.340	1.350	1.170
August 15	3.650	1.260	0.283	3.000	3.450	1.380	1.340	0.803	1.160	1.310	1.150
August 16	3.510	1.330	0.258	2.960	3.360	1.420	1.200	0.792	1.120	1.230	1.120

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	1971	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
August 17	3.200	1.420	0.232	3.040	3.270	1.540	1.110	0.809	1.080	1.940	1.300
August 18	3.060	1.460	0.215	3.000	3.010	1.620	1.110	0.825	1.160	2.380	1.360
August 19	3.060	1.080	0.178	3.040	2.980	1.710	1.100	0.748	1.220	3.800	1.310
August 20	3.060	0.810	0.193	2.680	2.940	1.800	1.070	0.649	1.660	3.840	1.260
August 21	2.940	0.651	0.224	2.560	2.820	1.540	0.723	0.627	1.790	3.770	1.260
August 22	2.790	0.634	0.266	2.280	2.620	1.840	0.699	0.649	2.070	3.720	1.830
August 23	2.680	0.783	0.368	2.010	2.460	3.380	0.672	0.583	1.960	3.150	3.120
August 24	2.570	0.878	0.382	1.950	2.060	3.530	0.660	0.572	1.840	2.880	3.020
August 25	2.410	0.765	1.180	1.710	1.590	3.790	0.681	0.561	1.180	2.640	2.710
August 26	2.510	0.694	1.300	1.650	1.350	3.620	0.702	0.545	1.060	2.380	2.710
August 27	2.620	0.665	1.340	1.620	1.330	3.460	0.684	0.515	1.050	2.200	2.870
August 28	2.460	0.779	1.260	1.530	1.260	3.330	0.675	0.455	1.030	2.000	3.040
August 29	2.280	0.983	0.946	1.380	1.190	3.110	0.669	0.395	1.030	1.760	2.950
August 30	2.190	1.190	0.821	1.590	0.990	3.040	0.633	0.360	0.990	1.660	2.620
August 31	2.360	1.300	0.544	1.500	0.792	2.930	0.621	0.364	0.945	1.580	2.380
Total August Discharge	**169.120**	**35.832**	**23.745**	**94.300**	**125.862**	**64.970**	**43.529**	**32.335**	**41.222**	**64.060**	**54.950**
September 1	2.510	1.500	0.510	0.850	0.920	2.860	0.620	0.368	0.945	1.430	2.050
September 2	3.340	5.440	0.459	0.780	0.960	2.730	0.618	0.370	0.956	1.390	2.110
September 3	4.390	8.100	0.578	0.960	1.000	2.600	0.606	0.368	0.922	1.290	1.880
September 4	4.450	13.300	0.544	1.230	1.120	2.550	0.606	0.398	0.911	1.210	1.660
September 5	4.530	12.900	0.476	1.170	1.400	2.600	0.642	0.525	0.870	1.140	1.640
September 6	4.590	12.100	0.459	1.650	1.400	3.010	0.648	0.545	0.818	1.110	1.570
September 7	4.640	7.660	0.459	1.860	1.430	3.580	0.669	0.544	0.765	1.080	1.430
September 8	4.640	5.010	0.510	2.070	1.450	4.180	0.696	0.543	0.745	1.090	1.320
September 9	4.390	5.440	0.476	2.440	1.470	5.420	0.723	0.567	0.725	1.090	1.150
September 10	4.160	5.010	0.459	3.080	1.490	8.660	0.768	0.578	0.685	1.070	1.130
September 11	4.220	4.930	0.411	3.160	1.360	7.560	0.792	0.578	0.655	1.020	1.100
September 12	4.280	4.360	0.354	3.240	1.260	8.130	0.966	0.548	0.638	0.981	0.995
September 13	4.300	3.400	0.382	3.320	1.300	8.520	1.130	0.518	0.626	0.937	0.936
September 14	4.160	3.000	0.396	3.280	1.320	8.330	1.620	0.513	0.614	0.915	0.877
September 15	4.160	2.800	0.396	3.240	1.360	7.690	2.460	0.508	0.606	0.854	0.857
September 16	3.940	2.740	0.425	3.040	1.870	7.330	3.280	0.543	0.638	0.845	0.868
September 17	3.710	2.740	0.425	2.920	2.220	6.980	3.260	0.548	0.660	0.838	0.910
September 18	3.450	2.440	0.382	2.680	2.240	6.280	3.150	0.556	0.700	0.900	0.949
September 19	3.200	2.320	0.340	2.560	2.260	5.750	3.040	0.548	0.720	0.952	0.890
September 20	3.000	2.500	0.311	2.400	2.240	5.580	2.830	0.528	0.868	1.110	0.871
September 21	2.830	2.600	0.275	2.340	2.160	5.310	2.640	0.567	1.010	1.010	0.841
September 22	2.720	3.340	0.283	1.710	2.040	5.100	2.460	0.743	1.060	0.999	0.832
September 23	2.570	3.400	0.326	1.740	1.890	4.860	2.280	0.820	1.160	0.966	0.813
September 24	3.060	3.270	0.354	1.770	1.710	4.630	2.220	1.090	1.070	0.979	0.795
September 25	3.960	3.270	0.354	1.770	1.470	4.200	2.000	2.590	1.050	0.990	0.774
September 26	5.100	3.470	0.326	1.740	1.600	4.060	1.840	2.710	0.956	0.991	0.755
September 27	6.540	3.630	0.311	1.740	1.660	2.990	1.630	2.590	0.908	1.040	0.696
September 28	6.770	3.610	0.311	1.770	1.610	3.720	1.660	2.500	0.880	1.470	0.676
September 29	7.360	3.470	0.283	1.710	1.560	3.470	1.570	2.420	0.840	5.310	0.817
September 30	7.500	3.270	0.266	2.010	1.520	3.220	1.460	2.870	0.830	8.250	0.828
Total September Dischar	**128.470**	**141.420**	**11.841**	**64.240**	**47.310**	**149.900**	**48.914**	**29.094**	**24.809**	**43.255**	**33.020**
October 1	8.650						1.410	3.620	0.810	7.820	0.835
October 2	7.820						1.360	4.210	0.780	6.400	0.839
October 3	9.120						1.320	6.160	0.790	5.710	0.830
October 4	10.500						1.270	6.340	0.805	5.030	0.821
October 5	11.800						1.220	5.800	0.820	4.730	0.901
October 6	14.000						1.170	5.250	0.830	4.380	0.912
October 7	13.300						1.130	4.800	0.840	3.990	0.933
October 8	12.500		1.770				1.170	4.930	0.860	3.650	0.940
October 9	11.900						1.140	4.480	0.850	3.350	0.944
October 10	10.600						1.200	4.360	0.850	3.170	0.965
October 11	10.200						1.210	4.020	0.840	3.110	0.945
October 12	9.120						2.100	3.860	0.830	2.930	0.956
October 13	9.120						2.660	3.730	0.800	3.050	0.987
October 14	9.120						3.220	3.430	0.780	3.120	1.250
October 15	8.810						3.370	3.350	0.820	3.420	1.250
October 16	8.180						4.250	3.160	0.810	3.220	1.240
October 17	7.360						4.440	3.130	0.800	3.150	1.210
October 18	6.660						4.990	2.900	0.795	3.090	1.380
October 19	6.430						5.150	2.870	0.790	3.030	2.270
October 20	6.310						5.180	2.840	0.820	2.900	2.390
October 21	5.600						5.210	2.750	0.780	3.310	2.510
October 22	6.090						5.150	2.750	0.760	4.630	2.420
October 23	5.950						5.210	2.720	0.740	4.800	2.330
October 24	5.720						5.040	2.750	0.740	4.930	2.150
October 25	5.640						4.940	2.840	0.765	5.230	2.240
October 26	4.980						4.390	2.900	0.790	5.330	2.510
October 27	5.470						4.150	2.960	0.870	5.370	2.600
October 28	5.890						3.910	3.580	0.911	4.980	2.690
October 29	5.240						3.960	3.910	2.240	3.980	2.590
October 30	5.040						3.580	3.830	7.220	4.500	2.480
October 31	4.760						3.670	3.750	9.590	4.880	2.450
Total October Discharge	**250.500**	**0.000**	**1.770**	**0.000**	**0.000**	**0.000**	**98.170**	**118.020**	**41.736**	**131.190**	**49.768**

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	1971	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
November 1	4.560						3.620	3.410	8.870	5.130	2.360
November 2	4.560						3.370	3.350	8.150	5.470	2.360
November 3	4.560						3.330	3.280	6.940	5.710	2.330
November 4	4.560						3.290	3.540	6.520	5.900	2.990
November 5	4.560						3.150	3.870	5.860	6.200	3.530
November 6	4.560						3.000	3.790	5.600	6.430	4.160
November 7	4.560						2.900	3.520	7.220	6.970	3.840
November 8	4.560								14.500	6.730	3.800
November 9	5.720								21.800	6.610	4.560
November 10	4.980								22.700	6.670	5.000
November 11	4.560								21.900	6.610	4.480
November 12	4.220								18.400	6.130	5.060
November 13	3.650								16.700	5.300	5.660
November 14	3.090									4.980	4.690
November 15	2.550									4.530	6.060
November 16	2.190									4.530	4.520
November 17	2.830									4.480	4.690
November 18	3.960									4.780	6.270
November 19	5.070									4.730	8.280
November 20	4.900									4.680	10.500
November 21	4.810									4.630	13.200
November 22	4.730									4.680	13.500
November 23	13.500										15.000
November 24	11.100										13.900
November 25	11.800										16.500
November 26	11.400										16.500
November 27	11.000										16.500
November 28	10.300										10.700
November 29	9.770										8.340
November 30	9.230										7.640
Total November Dischar	**181.840**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**22.660**	**24.760**	**165.360**	**121.880**	**226.920**
December 1	8.750										
December 2	8.010										
December 3	7.870										
December 4	7.390										
December 5	6.970										
December 6	6.570										
December 7	6.290										
December 8	6.000										
December 9	5.720										
December 10	5.470										
December 11	5.270										
December 12	5.100										
December 13	4.900										
December 14	4.730										
December 15	4.530										
December 16	4.390										
December 17	4.250										
December 18	4.160										
December 19	4.050										
December 20	3.940										
December 21	3.820										
December 22	3.740										
December 23	3.650										
December 24	3.570										
December 25	3.510										
December 26	3.450										
December 27	3.400										
December 28	3.370										
December 29	3.340										
December 30	3.280										
December 31	3.230										
Total December Discharg	**182.720**										

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	1990	1991	1992	1993
January 1				
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	1990	1991	1992	1993
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Total April Discharge	0.000	0.000	0.000	0.000
May 1	54.700	68.100	69.000	53.500
May 2	58.000	73.500	64.500	58.700
May 3	64.100	81.400	63.000	55.200
May 4	74.500	88.800	69.900	52.800
May 5	89.100	93.300	80.000	53.400
May 6	91.100	94.500	84.200	59.300
May 7	92.900	95.500	77.700	63.100
May 8	82.500	92.400	75.700	60.100
May 9	78.300	98.000	67.600	55.700
May 10	78.900	105.000	63.100	51.400
May 11	79.300	104.000	58.400	53.400
May 12	77.700	95.500	56.300	63.800
May 13	72.600	89.300	56.700	72.700
May 14	68.000	79.700	53.400	90.600
May 15	66.200	71.800	54.400	100.000
May 16	67.900	66.800	54.300	97.900
May 17	72.100	63.800	56.400	95.600
May 18	72.600	61.800	58.400	89.700
May 19	68.600	60.900	51.100	76.600
May 20	67.000	60.200	43.700	81.700
May 21	65.200	54.300	38.700	100.000
May 22	71.200	48.600	35.800	104.000
May 23	65.500	41.700	34.100	91.600
May 24	55.000	38.200	37.100	77.400
May 25	52.600	35.600	43.600	67.400
May 26	51.000	31.700	53.600	53.600
May 27	59.100	30.400	53.200	46.400
May 28	67.300	28.900	50.600	39.900
May 29	78.700	26.600	50.100	34.500
May 30	78.800	24.500	49.000	30.500
May 31	64.600	22.000	50.700	26.700
Total May Discharge	2185.900	2024.800	1754.500	2057.200

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	1990	1991	1992	1993
June 1	58.500	20.000	56.500	29.500
June 2	54.000	18.000	50.400	38.700
June 3	56.100	16.700	42.000	32.500
June 4	58.100	19.400	36.700	31.700
June 5	60.400	19.000	31.600	34.500
June 6	50.700	17.200	29.500	30.800
June 7	45.600	15.100	26.100	27.300
June 8	39.300	14.300	24.400	24.900
June 9	33.600	14.500	23.300	22.200
June 10	33.700	13.100	23.700	21.400
June 11	33.600	12.100	23.600	19.900
June 12	41.200	11.400	23.700	17.600
June 13	38.700	11.000	23.800	16.900
June 14	33.500	11.500	23.700	16.200
June 15	29.400	12.600	23.500	51.800
June 16	26.100	14.500	18.300	55.300
June 17	23.200	16.300	17.400	50.800
June 18	20.400	16.700	14.100	43.700
June 19	18.300	14.400	14.000	37.500
June 20	16.100	13.200	14.400	33.500
June 21	15.900	11.100	13.200	29.600
June 22	14.300	10.100	12.000	35.700
June 23	12.900	10.300	11.200	53.800
June 24	11.800	10.300	9.920	54.400
June 25	10.800	9.630	9.000	46.800
June 26	10.600	9.230	8.220	42.600
June 27	11.100	10.100	7.170	46.100
June 28	11.400	12.500	6.500	49.600
June 29	13.900	13.600	5.840	57.400
June 30	20.700	12.000	5.320	49.700
Total June Discharge	**904.100**	**409.860**	**629.070**	**1102.600**
July 1	30.600	11.400	4.500	40.600
July 2	41.900	10.700	4.400	34.800
July 3	35.000	9.700	4.310	30.600
July 4	30.100	8.560	4.730	27.700
July 5	25.800	8.710	4.360	24.800
July 6	25.200	8.700	4.000	22.200
July 7	24.000	8.950	3.770	19.500
July 8	22.200	8.320	3.540	18.400
July 9	20.300	7.530	3.110	17.400
July 10	18.300	6.630	3.010	15.700
July 11	16.400	6.120	2.600	14.000
July 12	14.100	5.500	2.470	12.600
July 13	14.000	6.810	2.330	12.500
July 14	13.700	8.000	2.270	11.800
July 15	11.900	8.660	2.080	11.600
July 16	10.100	8.730	1.970	11.300
July 17	9.400	7.870	1.760	10.400
July 18	8.890	6.690	1.620	9.310
July 19	8.500	6.380	1.560	8.220
July 20	8.120	5.600	1.500	7.890
July 21	7.100	5.400	1.240	7.700
July 22	6.480	4.720	1.150	7.300
July 23	5.880	4.390	1.080	7.040
July 24	5.680	3.910	0.970	6.470
July 25	5.460	3.630	0.922	5.660
July 26	4.930	3.420	0.824	5.130
July 27	4.500	3.120	0.729	4.820
July 28	4.220	3.170	0.616	4.910
July 29	4.000	3.020	0.471	6.470
July 30	3.780	2.780	0.429	7.370
July 31	3.380	2.560	0.422	32.700
Total July Discharge	**443.920**	**200.900**	**68.743**	**456.910**
August 1	3.280	2.470	0.302	29.300
August 2	2.970	2.240	0.321	26.100
August 3	2.870	2.040	0.338	20.000
August 4	2.740	1.850	0.308	18.700
August 5	2.510	1.870	0.301	16.800
August 6	2.290	1.690	0.337	14.000
August 7	2.110	1.900	0.265	12.400
August 8	2.110	1.920	0.273	12.800
August 9	1.960	2.010	0.285	13.200
August 10	1.860	1.690	0.294	12.500
August 11	1.700	1.760	0.300	11.900
August 12	1.650	1.630	0.270	10.700
August 13	1.600	1.480	0.234	9.810
August 14	1.620	1.350	0.210	9.210
August 15	1.570	1.200	0.199	8.420
August 16	1.550	1.150	0.188	7.630

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	1990	1991	1992	1993
August 17	1.550	1.090	0.174	7.430
August 18	1.470	0.900	0.169	6.720
August 19	1.410	0.795	0.154	6.150
August 20	1.350	0.778	0.149	5.130
August 21	1.310	0.744	0.143	4.690
August 22	1.200	0.654	0.148	5.150
August 23	1.230	0.584	0.140	5.610
August 24	1.310	0.546	0.133	10.300
August 25	1.170	0.501	0.113	12.400
August 26	1.110	0.486	0.108	11.000
August 27	1.060	0.449	0.105	10.100
August 28	1.040	0.539	0.101	9.470
August 29	0.946	0.553	0.109	8.850
August 30	0.900	0.648	0.109	8.210
August 31	0.853	0.678	0.109	7.490
Total August Discharge	52.299	38.385	6.389	352.170
September 1	0.732	0.660	0.110	6.200
September 2	0.730	0.642	0.106	5.640
September 3	0.734	0.624	0.139	5.250
September 4	0.688	0.495	0.114	4.720
September 5	0.658	0.479	0.138	4.380
September 6	0.598	0.460	0.160	4.060
September 7	0.569	0.429	0.185	3.620
September 8	0.570	0.425	0.205	3.510
September 9	0.518	0.422	0.216	3.210
September 10	0.475	0.379	0.235	2.970
September 11	0.450	0.343	0.241	2.860
September 12	0.436	0.342	0.307	2.780
September 13	0.431	0.341	0.297	2.710
September 14	0.431	0.341	0.289	2.480
September 15	0.427	0.300	0.266	2.430
September 16	0.421	0.273	0.302	2.520
September 17	0.420	0.333	0.356	2.380
September 18	0.420	0.284	0.407	2.200
September 19	0.420	0.289	0.306	2.080
September 20	0.409	0.298	0.336	1.970
September 21	0.400	0.306	0.363	1.920
September 22	0.399	0.302	0.390	2.030
September 23	0.400	0.299	0.626	1.830
September 24	0.403	0.298	0.650	1.620
September 25	0.404	0.300	0.811	1.590
September 26	0.406	0.355	1.120	1.650
September 27	0.409	0.321	1.100	1.690
September 28	0.410	0.290	1.100	1.700
September 29	0.417	0.262	1.210	1.730
September 30	0.434	0.240	1.610	1.660
Total September Dischar	14.619	11.132	13.695	85.390
October 1	0.452	0.238	1.630	1.560
October 2	0.469	0.236	1.710	1.560
October 3	0.458	0.234	1.660	1.540
October 4	0.743	0.267	1.600	1.510
October 5	0.636	0.309	1.550	1.510
October 6	0.622	0.300	1.510	1.530
October 7	0.643	0.291	1.510	1.590
October 8	0.665	0.315	1.350	1.540
October 9	0.686	0.453	1.260	1.520
October 10	0.794	1.820	1.460	1.500
October 11	1.050	2.940	1.540	1.470
October 12	1.240	2.900	1.620	1.500
October 13	1.220	2.590	1.700	1.490
October 14	1.220	2.420	1.630	1.470
October 15	1.210	2.670	1.460	1.410
October 16	1.240	3.620	1.210	1.390
October 17	1.160	3.380	0.873	1.380
October 18	1.260	3.310	1.340	1.380
October 19	1.270	2.900	1.910	1.370
October 20	1.350	2.810	2.010	1.360
October 21	1.360	3.700	2.510	1.320
October 22	1.370	4.300	2.840	1.380
October 23	1.430	4.180	5.700	1.530
October 24	1.560	4.020	7.750	1.780
October 25	1.710	3.410	7.830	2.070
October 26	2.180		7.890	2.320
October 27	2.360		6.980	2.370
October 28	2.180		6.210	2.530
October 29	2.000		5.960	2.670
October 30	2.090		5.390	2.690
October 31	2.270		5.830	2.660
Total October Discharge	38.898	53.813	95.443	52.900

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	1990	1991	1992	1993
November 1	2.480		5.800	2.620
November 2	2.510		5.760	4.380
November 3	1.980		5.610	18.200
November 4	2.100		5.960	18.600
November 5	2.210		5.700	15.800
November 6	2.090		5.480	13.700
November 7	2.300		5.520	12.400
November 8	1.850		4.710	11.100
November 9	1.810		3.960	9.840
November 10	1.760		4.730	8.590
November 11	1.750		4.040	8.060
November 12	1.730		4.200	7.660
November 13	1.710		4.600	7.110
November 14			4.860	6.530
November 15			4.840	5.990
November 16			4.820	4.670
November 17			4.860	4.460
November 18			4.780	5.280
November 19			4.320	5.240
November 20			4.360	
November 21			3.660	
November 22				
November 23				
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Total November Dischar	26.300	0.000	102.590	170.230
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Total December Discharg				

STANUM=	**08EE009**
PROVINCE=	**BC**
STANAME=	**RICHFIELD CREEK NEAR TOPLEY**
LATITUDE=	**54:30:59N**
LONGITUDE=	**126:20:04W**
PARAMETER=	**Flow m3/s**

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
January 01			0.048	0.113	0.110	0.181	0.413	0.119	0.292	0.314	0.020
January 02			0.048	0.108	0.108	0.181	0.402	0.119	0.278	0.311	0.019
January 03			0.048	0.108	0.108	0.181	0.391	0.119	0.266	0.309	0.018
January 04			0.048	0.105	0.108	0.178	0.385	0.119	0.255	0.306	0.018
January 05			0.048	0.102	0.105	0.176	0.377	0.119	0.246	0.303	0.017
January 06			0.048	0.096	0.105	0.173	0.371	0.119	0.235	0.300	0.017
January 07			0.048	0.093	0.105	0.170	0.365	0.119	0.227	0.300	0.016
January 08			0.048	0.091	0.102	0.167	0.360	0.119	0.215	0.297	0.016
January 09			0.048	0.088	0.102	0.159	0.354	0.116	0.204	0.294	0.016
January 10			0.048	0.079	0.102	0.153	0.345	0.116	0.195	0.294	0.016
January 11			0.048	0.071	0.099	0.147	0.343	0.116	0.187	0.292	0.015
January 12			0.048	0.065	0.099	0.142	0.340	0.116	0.176	0.292	0.015
January 13			0.048	0.062	0.099	0.136	0.337	0.116	0.167	0.289	0.015
January 14			0.045	0.057	0.096	0.133	0.334	0.116	0.159	0.289	0.014
January 15			0.045	0.054	0.096	0.130	0.331	0.116	0.150	0.286	0.014
January 16			0.045	0.051	0.096	0.127	0.326	0.116	0.144	0.286	0.014
January 17			0.045	0.048	0.099	0.125	0.317	0.116	0.142	0.286	0.014
January 18			0.042	0.045	0.105	0.122	0.314	0.116	0.136	0.283	0.013
January 19			0.042	0.045	0.113	0.119	0.306	0.116	0.130	0.283	0.013
January 20			0.042	0.042	0.125	0.116	0.303	0.116	0.125	0.283	0.013
January 21			0.042	0.042	0.136	0.113	0.300	0.116	0.122	0.280	0.012
January 22			0.042	0.042	0.147	0.110	0.297	0.116	0.116	0.278	0.057
January 23			0.042	0.042	0.156	0.108	0.289	0.116	0.113	0.275	0.091
January 24			0.042	0.042	0.164	0.105	0.283	0.116	0.110	0.269	0.091
January 25			0.042	0.042	0.173	0.105	0.280	0.116	0.108	0.266	0.088
January 26			0.042	0.042	0.181	0.102	0.278	0.113	0.105	0.261	0.085
January 27			0.042	0.045	0.187	0.099	0.275	0.113	0.102	0.258	0.085
January 28			0.042	0.045	0.193	0.099	0.269	0.113	0.099	0.249	0.082
January 29			0.042	0.045	0.193	0.099	0.266	0.113	0.099	0.241	0.082
January 30			0.042	0.045	0.195	0.096	0.261	0.113	0.096	0.232	0.079
January 31			0.042	0.045	0.190	0.093	0.258	0.113	0.093	0.218	0.079
Total January Discharge	**0.000**	**0.000**	**1.392**	**2.000**	**3.997**	**4.145**	**10.070**	**3.602**	**5.092**	**8.724**	**1.144**
February 01			0.042	0.045	0.187	0.093	0.252	0.113	0.091	0.210	0.076
February 02			0.042	0.045	0.184	0.093	0.249	0.113	0.091	0.201	0.076
February 03			0.045	0.045	0.181	0.091	0.244	0.113	0.088	0.193	0.074
February 04			0.045	0.045	0.178	0.091	0.241	0.116	0.085	0.187	0.074
February 05			0.045	0.045	0.176	0.088	0.238	0.116	0.085	0.178	0.074
February 06			0.045	0.045	0.173	0.088	0.235	0.116	0.085	0.173	0.071
February 07			0.045	0.045	0.167	0.085	0.229	0.116	0.085	0.164	0.071
February 08			0.045	0.045	0.164	0.085	0.227	0.116	0.088	0.156	0.071
February 09			0.045	0.045	0.161	0.085	0.224	0.119	0.088	0.150	0.068
February 10			0.045	0.045	0.159	0.082	0.218	0.119	0.091	0.144	0.068
February 11			0.045	0.045	0.156	0.082	0.215	0.119	0.091	0.139	0.068
February 12			0.045	0.042	0.153	0.079	0.212	0.119	0.091	0.133	0.065
February 13			0.045	0.042	0.150	0.079	0.210	0.119	0.091	0.130	0.065
February 14			0.045	0.042	0.147	0.079	0.207	0.119	0.091	0.127	0.065
February 15			0.042	0.042	0.144	0.079	0.204	0.119	0.091	0.125	0.062
February 16			0.042	0.042	0.144	0.079	0.204	0.119	0.091	0.122	0.062
February 17			0.042	0.042	0.142	0.076	0.201	0.116	0.088	0.119	0.062
February 18			0.042	0.042	0.139	0.076	0.198	0.113	0.088	0.116	0.059
February 19			0.042	0.042	0.136	0.076	0.195	0.110	0.085	0.116	0.059
February 20			0.040	0.040	0.133	0.074	0.195	0.110	0.085	0.113	0.059
February 21			0.040	0.040	0.130	0.074	0.193	0.110	0.085	0.113	0.059

STANUM=	**08EE009**
PROVINCE=	**BC**
STANAME=	**RICHFIELD CREEK NEAR TOPLEY**
LATITUDE=	**54:30:59N**
LONGITUDE=	**126:20:04W**
PARAMETER=	**Flow m3/s**

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
February 22			0.040	0.040	0.127	0.074	0.193	0.108	0.085	0.113	0.057
February 23			0.040	0.040	0.125	0.074	0.193	0.105	0.082	0.110	0.057
February 24		0.133	0.040	0.040	0.125	0.071	0.190	0.105	0.082	0.110	0.057
February 25			0.040	0.040	0.122	0.071	0.190	0.102	0.082	0.110	0.057
February 26			0.040	0.037	0.119	0.071	0.187	0.102	0.079	0.110	0.057
February 27			0.037	0.037	0.119	0.071	0.187	0.099	0.079	0.110	0.057
February 28			0.037	0.037	0.122	0.068	0.187	0.099	0.079	0.110	0.057
February 29					0.125				0.079		
Total February Discharge	**0.000**	**0.133**	**1.188**	**1.182**	**4.288**	**2.234**	**5.918**	**3.150**	**2.501**	**3.882**	**1.807**
March 1			0.037	0.037	0.127	0.068	0.184	0.099	0.079	0.110	0.054
March 2			0.034	0.037	0.127	0.068	0.184	0.099	0.079	0.110	0.054
March 3			0.034	0.037	0.130	0.068	0.184	0.099	0.079	0.110	0.054
March 4			0.034	0.037	0.133	0.068	0.184	0.096	0.079	0.110	0.054
March 5			0.034	0.037	0.136	0.068	0.184	0.096	0.079	0.110	0.054
March 6			0.031	0.040	0.144	0.068	0.184	0.096	0.079	0.110	0.054
March 7			0.031	0.040	0.156	0.065	0.184	0.096	0.079	0.110	0.051
March 8			0.031	0.040	0.164	0.065	0.184	0.096	0.079	0.108	0.051
March 9			0.031	0.040	0.176	0.065	0.184	0.096	0.082	0.108	0.051
March 10			0.031	0.042	0.184	0.065	0.184	0.096	0.082	0.108	0.051
March 11			0.031	0.042	0.201	0.065	0.184	0.096	0.085	0.108	0.051
March 12			0.031	0.042	0.212	0.065	0.187	0.096	0.091	0.108	0.051
March 13			0.031	0.042	0.227	0.065	0.187	0.096	0.096	0.108	0.051
March 14			0.031	0.045	0.238	0.065	0.190	0.096	0.105	0.108	0.051
March 15			0.031	0.045	0.255	0.065	0.193	0.096	0.116	0.108	0.051
March 16			0.031	0.048	0.266	0.065	0.193	0.096	0.147	0.108	0.051
March 17			0.034	0.048	0.283	0.065	0.193	0.096	0.190	0.108	0.051
March 18			0.034	0.051	0.306	0.065	0.198	0.099	0.235	0.108	0.051
March 19			0.037	0.054	0.328	0.065	0.201	0.099	0.309	0.108	0.051
March 20			0.042	0.057	0.348	0.065	0.204	0.099	0.408	0.108	0.051
March 21			0.051	0.059	0.368	0.065	0.210	0.099	0.490	0.108	0.051
March 22			0.059	0.062	0.405	0.065	0.215	0.102	0.623	0.108	0.051
March 23			0.076	0.065	0.430	0.065	0.224	0.102	0.745	0.108	0.054
March 24			0.096	0.068	0.453	0.065	0.232	0.102	0.714	0.108	0.057
March 25			0.125	0.071	0.481	0.065	0.238	0.102	0.682	0.110	0.059
March 26			0.187	0.076	0.524	0.065	0.249	0.102	0.668	0.113	0.065
March 27			0.278	0.079	0.504	0.065	0.255	0.099	0.648	0.116	0.071
March 28			0.348	0.085	0.481	0.065	0.263	0.099	0.634	0.119	0.071
March 29			0.436	0.091	0.459	0.068	0.269	0.099	0.623	0.122	0.074
March 30			0.680	0.093	0.436	0.071	0.278	0.099	0.614	0.125	0.079
March 31			0.940	0.099	0.411	0.076	0.283	0.099	0.603	0.130	0.085
Total March Discharge	**0.000**	**0.000**	**3.937**	**1.709**	**9.093**	**2.063**	**6.486**	**3.042**	**9.622**	**3.441**	**1.766**
April 1			1.360	0.102	0.396	0.082	0.286	0.096	0.597	0.136	0.082
April 2			2.120	0.105	0.385	0.093	0.292	0.096	0.595	0.147	0.079
April 3			1.130	0.108	0.382	0.105	0.300	0.096	0.595	0.156	0.085
April 4			1.050	0.110	0.382	0.122	0.303	0.096	0.592	0.170	0.076
April 5			0.878	0.116	0.385	0.142	0.309	0.096	0.592	0.184	0.074
April 6			1.250	0.122	0.391	0.159	0.317	0.096	0.595	0.198	0.076
April 7			1.930	0.125	0.399	0.173	0.328	0.093	0.595	0.215	0.076
April 8			1.950	0.130	0.419	0.198	0.340	0.093	0.595	0.229	0.085
April 9			1.950	0.136	0.425	0.227	0.357	0.093	0.592	0.252	0.091
April 10			2.490	0.139	0.428	0.261	0.368	0.093	0.597	0.272	0.096
April 11			2.350	0.144	0.428	0.289	0.388	0.093	0.597	0.297	0.105

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	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
April 12			2.290	0.153	0.425	0.340	0.411	0.093	0.597	0.320	0.116
April 13			1.980	0.159	0.422	0.379	0.433	0.096	0.600	0.351	0.127
April 14			1.930	0.164	0.416	0.425	0.467	0.096	0.600	0.365	0.144
April 15			1.700	0.170	0.413	0.496	0.501	0.099	0.603	0.385	0.167
April 16			1.640	0.181	0.405	0.552	0.535	0.099	0.606	0.413	0.232
April 17		0.702	1.610	0.187	0.394	0.637	0.569	0.102	0.609	0.445	0.252
April 18		0.793	1.470	0.198	0.385	0.708	0.722	0.102	0.617	0.476	0.266
April 19		0.736	1.590	0.210	0.374	0.835	0.835	0.105	0.620	0.521	0.326
April 20		0.782	1.810	0.224	0.377	0.949	1.010	0.105	0.623	0.558	0.382
April 21		0.691	2.070	0.238	0.382	1.060	1.300	0.110	0.634	0.682	0.405
April 22		0.725	2.320	0.255	0.394	1.220	1.460	0.142	0.643	0.951	0.518
April 23		0.691	2.010	0.283	0.413	1.230	1.320	0.255	0.651	1.200	0.736
April 24		0.821	2.040	0.314	0.439	1.370	1.150	0.467	0.697	1.370	0.934
April 25		0.663	2.010	0.337	0.481	1.400	1.030	0.850	0.810	1.510	1.580
April 26		3.430	2.020	0.374	0.648	1.500	1.010	1.250	1.010	1.890	3.000
April 27		5.690	2.010	0.459	0.994	2.240	0.946	1.830	1.570	2.320	4.930
April 28		4.420	2.040	0.657	2.160	2.780	1.010	2.320	2.150	2.470	6.630
April 29		3.480	2.070	0.688	3.340	3.450	1.260	2.380	2.010	2.640	7.420
April 30		2.970	2.100	1.380	4.130	4.250	1.740	2.440	1.860	3.230	10.900
Total April Discharge	**0.000**	**26.694**	**55.168**	**7.968**	**21.412**	**27.672**	**21.297**	**13.982**	**24.052**	**24.353**	**39.990**
May 1		2.700	2.100	1.420	3.940	5.410	2.330	2.780	1.780	4.420	11.200
May 2		2.860	2.150	2.210	4.360	5.210	2.790	3.820	2.250	5.890	9.970
May 3		2.860	2.270	3.170	4.530	4.020	3.310	6.230	3.110	6.990	8.240
May 4		2.340	2.320	4.280	4.840	3.940	3.570	7.930	4.420	8.210	8.180
May 5		2.060	2.380	6.230	6.120	3.650	3.940	9.490	5.970	10.200	9.510
May 6		2.260	2.890	7.080	6.120	3.650	3.510	10.500	7.760	12.400	9.340
May 7		2.860	3.340	8.890	6.940	4.470	3.620	10.400	9.400	10.900	9.800
May 8		4.250	3.310	8.160	7.500	6.990	6.400	10.000	12.600	9.000	9.680
May 9		5.270	2.780	6.570	10.100	8.500	8.100	9.060	15.100	7.870	8.210
May 10		7.820	2.520	6.510	12.400	9.880	6.000	8.410	15.200	6.880	7.360
May 11		5.610	2.350	6.290	13.600	8.550	4.960	9.910	12.300	6.200	6.740
May 12		3.110	2.180	6.710	12.700	7.840	4.590	13.600	12.500	7.250	6.230
May 13		2.300	2.110	7.790	11.000	7.280	4.930	14.400	18.100	10.100	5.800
May 14		1.530	2.040	8.350	10.700	6.030	5.690	14.800	19.500	16.400	5.240
May 15		1.330	2.040	9.430	10.600	5.660	7.280	14.200	15.400	20.700	4.980
May 16		1.740	2.040	13.600	11.900	5.920	9.800	5.950	12.900	21.000	5.130
May 17		1.630	2.070	14.400	14.100	6.170	8.160	5.660	10.300	17.200	5.660
May 18		1.780	2.100	12.700	16.800	6.850	6.510	5.950	9.340	13.500	6.370
May 19		1.820	2.150	11.000	19.300	7.500	5.640	7.080	10.900	10.600	7.080
May 20		2.300	2.120	11.200	19.300	7.840	5.270	8.500	15.700	8.440	7.790
May 21		2.780	2.040	13.300	20.300	8.350	5.890	9.680	20.000	7.590	8.640
May 22		3.540	2.010	13.400	17.900	8.270	7.250	9.630	17.600	7.080	9.490
May 23		3.820	2.010	9.800	15.200	8.350	6.970	9.540	12.500	6.800	9.060
May 24		4.420	2.070	8.210	18.100	9.660	6.460	9.060	9.680	7.820	8.780
May 25		6.340	2.150	7.650	20.400	16.700	7.500	7.160	8.550	7.160	8.500
May 26		8.040	2.240	7.700	13.000	11.700	8.010	6.770	9.150	6.170	8.640
May 27		8.330	2.240	7.700	8.500	12.700	6.370	6.770	11.800	5.800	8.920
May 28		9.910	2.150	8.720	6.630	9.800	5.210	6.400	13.600	5.610	8.980
May 29		7.560	1.950	15.200	7.360	7.930	4.470	5.950	14.600	5.610	8.580
May 30		8.350	1.730	13.200	7.020	5.970	4.190	5.490	13.400	5.610	8.180
May 31		8.520	1.760	11.000	6.650	4.670	4.280	5.010	10.100	5.100	7.820
Total May Discharge	**0.000**	**130.040**	**69.810**	**271.870**	**347.910**	**229.460**	**173.000**	**260.130**	**355.510**	**284.500**	**248.100**

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	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
June 1		8.610	2.120	10.600	6.370	4.130	4.960	4.760	7.960	4.790	8.100
June 2		7.760	3.000	10.100	5.720	3.570	6.030	4.900	6.170	5.150	8.950
June 3		5.950	3.770	8.410	5.410	3.140	5.950	4.730	5.300	5.010	8.640
June 4		4.870	4.330	6.850	3.570	2.740	5.240	4.110	4.760	5.130	8.070
June 5		4.560	3.880	6.170	3.260	2.270	3.990	3.540	5.210	5.550	7.650
June 6		3.770	3.280	5.660	2.970	1.890	3.260	3.200	4.730	6.710	7.220
June 7		3.280	3.110	5.010	2.660	1.590	2.890	3.230	3.960	7.590	6.800
June 8		2.940	2.970	4.420	3.450	1.330	2.640	3.200	3.600	6.200	6.370
June 9		2.760	3.170	3.600	3.310	1.130	2.420	2.890	3.280	5.640	6.120
June 10		2.410	3.880	2.970	4.360	0.971	2.120	2.600	3.370	4.560	7.560
June 11		2.160	2.890	2.550	9.170	0.807	1.980	2.440	6.880	3.880	8.610
June 12		1.870	2.180	2.350	7.650	0.697	1.720	2.160	20.700	4.110	8.070
June 13		1.610	1.730	2.160	6.510	0.617	1.460	2.480	15.100	5.860	7.360
June 14		1.430	1.480	1.980	5.520	0.552	1.260	2.210	9.340	6.140	7.500
June 15		1.360	1.350	1.770	4.360	0.490	1.050	2.340	7.590	5.470	8.210
June 16		1.190	1.330	1.530	3.510	0.382	0.892	2.890	6.370	4.870	6.230
June 17		1.100	1.810	1.260	3.140	0.300	0.773	3.030	5.130	4.500	5.240
June 18		0.957	1.570	1.090	2.970	0.244	0.665	2.790	3.790	3.880	4.530
June 19		0.816	1.330	0.881	3.110	0.215	0.578	2.700	2.830	3.280	3.820
June 20		0.748	1.310	0.750	2.590	0.215	0.498	2.560	2.430	2.830	3.400
June 21		0.697	1.310	0.634	2.350	0.210	0.439	2.490	2.070	2.470	3.090
June 22		0.629	1.300	0.521	1.930	0.207	0.490	2.180	1.950	2.240	2.800
June 23		0.646	1.300	0.481	1.620	0.221	0.547	3.570	1.930	1.860	2.340
June 24		0.629	1.300	0.439	1.330	0.244	0.612	4.050	1.910	1.610	1.840
June 25		0.561	1.140	0.419	1.310	0.261	0.538	5.320	1.900	1.480	1.520
June 26		0.629	1.010	0.402	1.380	0.368	0.481	5.150	1.600	1.350	1.340
June 27		0.646	0.974	0.382	1.950	0.428	0.425	5.440	1.520	1.180	1.250
June 28		0.578	1.130	0.371	2.620	0.496	0.368	4.190	1.560	1.100	1.250
June 29		0.572	1.030	0.357	2.240	0.538	0.326	3.200	1.510	1.070	1.140
June 30		0.586	1.010	0.184	1.740	0.583	0.283	2.710	1.350	1.270	1.100
Total June Discharge	**0.000**	**66.324**	**61.994**	**84.301**	**108.080**	**30.836**	**54.885**	**101.060**	**145.800**	**116.780**	**156.120**
July 1		0.614	0.906	0.108	1.500	0.538	0.246	2.770	1.190	1.110	1.030
July 2		0.634	0.748	0.108	1.110	0.368	0.212	4.160	1.030	0.960	0.966
July 3		0.634	0.680	0.108	0.827	0.244	0.181	3.650	0.886	0.966	0.929
July 4		0.643	0.569	0.093	0.697	0.300	0.187	3.880	0.807	0.949	1.460
July 5		0.646	0.501	0.093	0.665	0.263	0.164	4.420	0.796	0.855	2.120
July 6		0.657	0.476	0.093	0.654	0.232	0.142	4.110	0.790	0.733	1.770
July 7		1.220	0.459	0.093	0.637	0.207	0.139	3.740	0.784	0.648	1.780
July 8		2.100	0.462	0.099	0.631	0.195	0.119	4.080	0.787	0.617	2.020
July 9		4.420	0.476	0.093	1.310	0.184	0.099	5.040	0.900	0.532	1.650
July 10		3.260	0.501	0.088	1.500	0.176	0.091	3.740	1.140	0.459	2.080
July 11		2.220	0.595	0.082	1.310	0.167	0.091	6.510	1.140	0.413	2.690
July 12		1.930	0.617	0.076	1.440	0.159	0.079	7.730	1.290	0.360	2.090
July 13		1.900	0.617	0.074	1.110	0.153	0.071	5.270	2.080	0.323	1.580
July 14		2.220	0.617	0.065	0.946	0.144	0.062	3.680	1.950	0.261	1.320
July 15		2.040	0.603	0.062	1.110	0.139	0.057	2.830	1.590	0.218	1.310
July 16		1.780	0.580	0.062	1.950	0.136	0.051	2.540	1.060	0.187	1.150
July 17		2.040	0.558	0.071	1.620	0.130	0.045	2.190	0.906	0.161	0.985
July 18		2.410	0.552	0.082	1.310	0.125	0.048	2.060	0.750	0.147	0.988
July 19		1.950	0.561	0.428	1.130	0.122	0.048	1.930	0.648	0.130	0.985
July 20		1.610	0.660	0.428	1.330	0.116	0.045	1.670	0.569	0.113	0.929
July 21		1.300	0.552	0.144	1.830	0.110	0.045	1.400	0.476	0.102	0.799
July 22		1.060	0.467	0.150	2.240	0.108	0.042	1.300	0.490	0.096	0.716

STANUM= 08EE009
PROVINCE= BC
STANAME= RICHFIELD CREEK NEAR TOPLEY
LATITUDE= 54:30:59N
LONGITUDE= 126:20:04W
PARAMETER= Flow m3/s

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
July 23		0.850	0.459	0.088	2.830	0.105	0.040	0.988	0.504	0.116	0.685
July 24		0.714	0.459	0.076	2.140	0.102	0.113	0.824	0.521	0.156	0.643
July 25		0.595	0.462	0.028	1.590	0.099	0.283	0.835	0.665	0.144	0.691
July 26		0.498	0.464	0.028	1.230	0.096	0.736	0.779	0.674	0.133	0.603
July 27		0.433	0.470	0.028	1.060	0.091	1.280	0.742	0.682	0.116	0.544
July 28		0.402	0.484	0.025	1.020	0.088	1.750	0.858	0.578	0.102	0.450
July 29		0.368	0.501	0.025	0.844	0.082	1.810	0.816	0.476	0.091	0.402
July 30		0.345	0.541	0.025	0.682	0.082	1.570	0.725	0.428	0.085	0.343
July 31		0.340	0.580	0.025	0.569	0.082	1.240	0.850	0.382	0.085	0.283
Total July Discharge	**0.000**	**41.833**	**17.177**	**3.048**	**38.822**	**5.143**	**11.086**	**86.117**	**26.969**	**11.368**	**35.991**
August 1		0.337	0.572	0.025	0.521	0.074	0.974	1.130	0.289	0.079	0.244
August 2		0.328	0.538	0.025	0.535	0.074	0.762	1.420	0.272	0.076	0.221
August 3		0.326	0.513	0.025	0.535	0.065	0.623	1.810	0.252	0.074	0.178
August 4		0.320	0.507	0.025	0.552	0.054	0.538	2.270	0.252	0.071	0.139
August 5		0.317	0.507	0.025	0.521	0.048	0.513	3.140	0.244	0.071	0.130
August 6		0.314	0.521	0.025	0.521	0.042	0.351	2.510	0.187	0.071	0.133
August 7	5.100	0.314	0.547	0.025	0.425	0.037	0.595	1.880	0.164	0.071	0.136
August 8		0.311	0.572	0.025	0.345	0.031	0.617	1.500	0.142	0.071	0.125
August 9		0.309	0.617	0.025	0.292	0.028	0.595	1.240	0.119	0.074	0.113
August 10		0.306	0.651	0.025	0.275	0.025	0.544	0.881	0.088	0.074	0.108
August 11		0.297	0.481	0.025	0.306	0.025	0.566	0.759	0.159	0.076	0.108
August 12		0.294	0.530	0.025	0.351	0.040	0.566	0.756	0.300	0.079	0.096
August 13		0.292	0.688	0.023	0.374	0.034	0.513	0.748	0.289	0.082	0.091
August 14		0.289	0.770	0.023	0.317	0.031	0.453	0.725	0.275	0.059	0.085
August 15		0.283	0.767	0.023	0.278	0.031	0.411	0.728	0.261	0.057	0.082
August 16		0.283	0.716	0.023	0.275	0.028	0.405	0.731	0.178	0.065	0.079
August 17		0.278	0.603	0.023	0.272	0.054	0.357	0.657	0.164	0.071	0.076
August 18		0.266	0.555	0.023	0.266	0.096	0.300	0.685	0.153	0.079	0.076
August 19		0.266	0.530	0.025	0.266	0.096	0.261	0.674	0.142	0.082	0.076
August 20		0.266	0.524	0.025	0.272	0.096	0.227	0.674	0.130	0.079	0.076
August 21		0.266	0.544	0.025	0.280	0.093	0.193	0.668	0.147	0.082	0.076
August 22		0.255	0.569	0.025	0.323	0.088	0.164	0.677	0.224	0.082	0.076
August 23		0.255	0.603	0.025	0.396	0.085	0.142	0.688	0.201	0.076	0.082
August 24		0.351	0.663	0.025	0.481	0.082	0.119	0.716	0.178	0.076	0.076
August 25		0.394	0.697	0.025	0.538	0.232	0.102	0.688	0.164	0.076	0.076
August 26		0.394	0.617	0.023	0.583	0.354	0.099	0.745	0.147	0.076	0.076
August 27		0.360	0.566	0.023	0.544	0.467	0.096	0.807	0.130	0.079	0.074
August 28		0.334	0.566	0.023	0.490	0.311	0.091	0.906	0.113	0.079	0.074
August 29		0.320	0.569	0.023	0.442	0.244	0.082	0.991	0.108	0.076	0.074
August 30		0.306	1.040	0.023	0.362	0.198	0.071	1.130	0.102	0.076	0.074
August 31		0.303	0.821	0.023	0.326	0.164	0.065	1.270	0.102	0.079	0.071
Total August Discharge	**5.100**	**9.534**	**18.964**	**0.751**	**12.264**	**3.327**	**11.395**	**34.204**	**5.676**	**2.318**	**3.201**
September 1	0.595	0.300	0.697	0.023	0.311	0.184	0.074	1.380	0.088	0.079	0.071
September 2	0.566	0.286	0.595	0.023	0.297	0.198	0.085	1.230	0.085	0.085	0.071
September 3	0.564	0.292	0.586	0.025	0.289	0.536	0.099	1.080	0.082	0.088	0.068
September 4	0.538	0.280	0.569	0.025	0.317	0.971	0.105	1.300	0.079	0.079	0.065
September 5	0.530	0.286	0.561	0.025	0.391	1.090	0.105	1.120	0.076	0.076	0.079
September 6	0.521	0.275	0.493	0.025	0.566	0.946	0.105	1.010	0.074	0.074	0.088
September 7	0.518	0.261	0.450	0.025	0.510	1.020	0.102	0.898	0.076	0.071	0.088
September 8	0.518	0.246	0.419	0.025	0.467	0.864	0.099	0.895	0.076	0.068	0.110
September 9	0.513	0.252	0.476	0.025	0.428	0.714	0.096	0.733	0.076	0.071	0.246
September 10	0.513	0.246	0.484	0.023	0.405	0.600	0.091	0.767	0.079	0.076	0.405

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LONGITUDE=	126:20:04W
PARAMETER=	Flow m3/s

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
September 11	0.510	0.246	0.433	0.023	0.382	0.583	0.091	0.991	0.068	0.079	0.377
September 12	0.504	0.246	0.416	0.023	0.289	0.583	0.088	0.900	0.057	0.085	0.286
September 13	0.504	0.246	0.399	0.023	0.275	0.600	0.082	0.830	0.045	0.082	0.232
September 14	0.507	0.241	0.379	0.023	0.510	0.617	0.079	0.753	0.034	0.076	0.195
September 15	0.510	0.241	0.345	0.025	0.665	0.617	0.074	0.677	0.027	0.076	0.164
September 16	0.513	0.252	0.323	0.025	0.714	0.634	0.082	0.640	0.045	0.074	0.153
September 17	0.521	0.241	0.314	0.028	0.750	0.521	0.099	0.660	0.065	0.076	0.133
September 18	0.530	0.241	0.275	0.031	0.733	1.470	0.119	0.671	0.085	0.076	0.127
September 19	0.532	0.241	0.269	0.034	0.708	2.920	0.136	0.685	0.102	0.082	0.116
September 20	0.532	0.235	0.266	0.037	0.934	2.590	0.139	0.677	0.119	0.093	0.113
September 21	0.549	0.235	0.266	0.040	1.360	2.390	0.212	0.665	0.232	0.108	0.108
September 22	0.566	0.235	0.269	0.045	2.100	2.740	0.354	0.663	0.221	0.119	0.102
September 23	0.674	0.235	0.272	0.048	2.390	3.450	0.481	0.685	0.201	0.119	0.093
September 24	1.590	0.246	0.278	0.059	1.950	3.260	0.382	0.731	0.193	0.125	0.096
September 25	4.420	0.241	0.283	0.076	1.500	3.060	0.396	1.080	0.181	0.125	0.096
September 26	2.860	0.241	0.289	0.076	1.270	2.620	0.385	1.330	0.153	0.156	0.096
September 27	2.220	0.246	0.343	0.040	1.210	2.310	0.340	1.270	0.153	0.255	0.093
September 28	1.780	0.246	0.530	0.040	1.060	2.090	0.297	1.280	0.176	0.269	0.091
September 29	1.430	0.300	0.459	0.045	0.994	1.860	0.269	1.290	0.164	0.272	0.091
September 30	1.360	0.351	0.411	0.051	1.390	2.090	0.283	0.985	0.496	0.249	0.096
Total September Discharge	**27.988**	**7.730**	**12.149**	**1.036**	**25.165**	**44.130**	**5.349**	**27.876**	**3.608**	**3.363**	**4.149**
October 1	1.090	0.340	0.629	0.218	0.923	2.620	0.283	0.929	1.430	0.227	0.110
October 2	1.090	0.328	0.847	0.241	0.844	2.740	0.218	1.200	0.974	0.204	0.142
October 3	0.968	0.348	1.110	0.221	0.864	2.390	0.244	1.520	1.010	0.190	0.161
October 4	0.864	0.368	1.510	0.207	0.923	2.090	0.244	1.650	0.801	0.207	0.153
October 5	0.782	0.561	1.260	0.207	0.864	1.860	0.258	1.910	0.722	0.297	0.147
October 6	0.736	0.595	1.190	0.218	0.971	1.650	0.246	1.890	0.629	0.309	0.142
October 7	0.674	0.646	1.230	0.229	1.130	1.500	0.241	1.570	0.668	0.258	0.164
October 8	0.663	0.680	1.180	0.507	0.971	1.800	0.382	1.160	0.988	0.263	0.207
October 9	0.657	0.731	0.750	0.665	0.864	1.710	0.433	1.040	1.670	0.261	0.210
October 10	0.640	0.629	0.323	1.040	0.807	1.530	0.399	1.010	1.430	0.323	0.195
October 11	0.668	0.544	0.294	0.923	0.750	1.330	0.371	0.994	1.190	0.365	0.190
October 12	0.680	0.578	0.283	0.770	0.714	1.230	0.343	1.170	1.030	0.362	0.195
October 13	0.731	0.595	0.300	0.665	0.733	1.090	0.314	1.070	0.974	0.351	0.215
October 14	0.765	1.190	0.317	0.648	0.787	0.994	0.283	1.040	0.867	0.337	0.218
October 15	0.799	1.340	0.334	0.600	0.844	0.923	0.263	1.000	0.767	0.320	0.255
October 16	0.736	1.150	0.345	0.600	0.827	0.864	0.255	0.957	0.694	0.294	0.294
October 17	0.694	1.060	0.371	0.617	0.994	0.787	0.255	0.790	0.646	0.311	0.351
October 18	0.629	0.934	0.425	0.538	1.040	0.714	0.255	0.770	0.595	0.388	0.566
October 19	0.657	0.799	0.481	0.569	0.994	0.697	0.396	0.830	0.569	0.374	0.572
October 20	0.640	0.850	0.561	0.552	0.923	0.923	0.481	0.920	0.578	0.371	0.501
October 21	0.668	3.110	0.722	0.521	0.881	1.020	0.476	0.671	0.799	0.360	0.419
October 22	0.663	7.590	0.807	0.521	0.827	1.020	0.399	0.646	0.943	0.371	0.385
October 23	0.748	5.780	0.793	0.507	1.060	0.994	0.453	0.646	0.926	0.377	0.365
October 24	0.782	4.080	0.739	0.569	1.560	0.864	0.498	0.646	0.875	0.379	0.351
October 25	0.748	3.170	0.731	0.445	1.590	0.697	0.552	0.651	0.810	0.388	0.326
October 26	0.736	2.680	0.705	0.382	1.440	0.665	0.595	0.609	0.773	0.388	0.297
October 27	0.835	2.300	0.671	0.396	1.360	0.697	0.391	0.617	0.711	0.402	0.306
October 28	0.674	2.070	0.663	0.413	1.680	0.600	0.396	0.623	0.640	0.515	0.309
October 29	0.680	1.810	0.561	0.419	3.450	0.648	0.399	0.600	0.872	0.586	0.294
October 30	0.770	1.560	0.552	0.425	5.010	0.682	0.419	0.586	0.643	0.597	0.258
October 31	0.807	1.410	0.518	0.428	3.880	0.864	0.419	0.578	0.547	0.470	0.244
Total October Discharge	**23.274**	**49.826**	**21.202**	**15.261**	**40.505**	**38.193**	**11.161**	**30.293**	**26.771**	**10.845**	**8.542**

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LONGITUDE=	**126:20:04W**
PARAMETER=	**Flow m3/s**

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
November 1	0.850	1.340	0.501	0.413	3.140	1.500	0.371	0.566	0.909	0.422	0.184
November 2	0.770	1.230	0.510	0.396	2.620	2.090	0.343	0.544	1.070	0.379	0.218
November 3	0.759	1.190	0.459	0.382	2.130	2.090	0.221	0.515	1.170	0.357	0.195
November 4	0.793	1.120	0.476	0.368	1.770	1.920	0.238	0.515	1.260	0.328	0.193
November 5	0.680	1.020	0.493	0.453	1.560	1.770	0.261	0.527	1.150	0.306	0.187
November 6	0.663	0.997	0.535	0.538	1.410	1.590	0.258	0.515	1.060	0.283	0.176
November 7	0.850	0.912	0.578	0.439	1.360	1.440	0.258	0.515	0.994	0.263	0.167
November 8	1.070	0.852	0.552	0.340	1.230	1.330	0.255	0.518	0.898	0.244	0.159
November 9	1.150	0.850	0.521	0.303	1.130	1.280	0.261	0.521	0.855	0.229	0.176
November 10	0.821	0.816	0.493	0.278	1.060	1.180	0.263	0.521	0.816	0.212	0.201
November 11	0.634	0.765	0.425	0.258	0.900	1.130	0.283	0.521	0.782	0.198	0.127
November 12	0.614	0.731	0.413	0.241	0.799	1.110	0.292	0.524	0.728	0.187	0.125
November 13	0.617	0.612	0.419	0.229	0.731	1.110	0.297	0.527	0.663	0.178	0.125
November 14	0.620	0.977	0.408	0.218	0.660	1.440	0.283	0.530	0.634	0.173	0.119
November 15	0.668	2.720	0.402	0.229	0.603	1.440	0.272	0.530	0.603	0.161	0.116
November 16	0.597	2.650	0.402	0.229	0.555	1.280	0.235	0.538	0.549	0.136	0.113
November 17	0.592	1.900	0.396	0.227	0.507	1.130	0.170	0.552	0.479	0.125	0.110
November 18	0.586	1.120	0.396	0.224	0.473	1.280	0.167	0.575	0.473	0.113	0.108
November 19	0.580	0.680	0.394	0.221	0.436	1.980	0.164	0.609	0.439	0.108	0.105
November 20	0.572	0.595	0.396	0.218	0.408	2.790	0.161	0.637	0.447	0.116	0.105
November 21	0.575	1.020	0.399	0.229	0.385	2.970	0.156	0.864	0.470	0.110	0.102
November 22	0.566	3.000	0.402	0.229	0.360	2.660	0.153	1.110	0.481	0.105	0.099
November 23	0.572	2.940	0.405	0.255	0.337	2.350	0.150	1.010	0.484	0.099	0.096
November 24	0.640	2.830	0.411	0.303	0.320	1.980	0.147	0.949	0.504	0.093	0.093
November 25	0.549	2.830	0.413	0.283	0.306	1.710	0.144	0.878	0.790	0.088	0.091
November 26	0.547	2.320	0.416	0.263	0.292	1.560	0.142	0.827	0.773	0.082	0.091
November 27	0.544	1.870	0.416	0.246	0.280	1.650	0.142	0.782	0.759	0.076	0.088
November 28	0.538	1.440	0.411	0.232	0.272	1.800	0.139	0.742	0.742	0.074	0.085
November 29	0.535	1.020	0.408	0.218	0.263	2.090	0.136	0.708	0.722	0.068	0.085
November 30	0.530	0.680	0.402	0.207	0.255	2.510	0.136	0.671	0.708	0.065	0.082
Total November Discharge	**20.082**	**43.027**	**13.252**	**8.669**	**26.552**	**52.160**	**6.498**	**19.341**	**22.412**	**5.378**	**3.921**
December 1		0.595	0.396	0.198	0.249	2.590	0.133	0.640	0.411	0.059	0.079
December 2		0.578	0.388	0.190	0.244	2.350	0.130	0.612	0.399	0.057	0.079
December 3		0.663	0.385	0.184	0.238	2.130	0.130	0.595	0.385	0.054	0.076
December 4		0.782	0.371	0.178	0.232	1.770	0.127	0.580	0.379	0.051	0.076
December 5		0.629	0.360	0.176	0.227	1.440	0.127	0.566	0.374	0.048	0.074
December 6		0.561	0.351	0.170	0.224	1.380	0.125	0.566	0.377	0.045	0.074
December 7		0.544	0.343	0.167	0.221	1.310	0.125	0.566	0.377	0.042	0.071
December 8		0.527	0.328	0.164	0.218	1.280	0.125	0.569	0.377	0.042	0.071
December 9		0.544	0.320	0.161	0.215	1.130	0.122	0.572	0.377	0.040	0.071
December 10		0.527	0.306	0.159	0.212	0.946	0.122	0.572	0.377	0.040	0.068
December 11		0.481	0.297	0.156	0.210	0.883	0.122	0.572	0.377	0.037	0.068
December 12		0.459	0.283	0.150	0.207	0.821	0.122	0.572	0.377	0.037	0.068
December 13		0.450	0.275	0.147	0.204	0.776	0.122	0.575	0.374	0.034	0.065
December 14		0.430	0.263	0.144	0.204	0.736	0.122	0.575	0.374	0.034	0.065
December 15		0.402	0.252	0.142	0.201	0.694	0.122	0.575	0.374	0.031	0.065
December 16		0.411	0.244	0.142	0.198	0.671	0.122	0.566	0.371	0.031	0.065
December 17		0.430	0.232	0.139	0.198	0.663	0.122	0.538	0.371	0.031	0.065
December 18		0.481	0.224	0.136	0.195	0.654	0.122	0.518	0.368	0.028	0.065
December 19		0.442	0.212	0.133	0.195	0.646	0.122	0.496	0.365	0.028	0.065
December 20		0.442	0.204	0.133	0.193	0.631	0.122	0.473	0.362	0.028	0.062
December 21		0.442	0.193	0.130	0.190	0.612	0.122	0.450	0.362	0.027	0.062

STANUM=	08EE009
PROVINCE=	BC
STANAME=	RICHFIELD CREEK NEAR TOPLEY
LATITUDE=	54:30:59N
LONGITUDE=	126:20:04W
PARAMETER=	Flow m3/s

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
December 22		0.368	0.187	0.127	0.190	0.589	0.122	0.428	0.360	0.026	0.062
December 23		0.210	0.176	0.127	0.187	0.564	0.122	0.416	0.354	0.025	0.062
December 24		0.147	0.167	0.125	0.184	0.544	0.122	0.399	0.351	0.024	0.062
December 25		0.048	0.156	0.122	0.184	0.524	0.122	0.382	0.348	0.024	0.062
December 26		0.048	0.147	0.122	0.181	0.504	0.122	0.368	0.340	0.023	0.062
December 27		0.048	0.142	0.119	0.181	0.487	0.122	0.354	0.334	0.022	0.062
December 28		0.048	0.136	0.116	0.178	0.467	0.122	0.334	0.328	0.022	0.062
December 29		0.048	0.127	0.116	0.178	0.453	0.122	0.326	0.326	0.021	0.059
December 30		0.048	0.122	0.113	0.176	0.439	0.122	0.311	0.320	0.020	0.059
December 31		0.048	0.116	0.110	0.176	0.428	0.122	0.300	0.317	0.020	0.059
Total December Discharge	**0.000**	**11.881**	**7.703**	**4.496**	**6.290**	**29.112**	**3.828**	**15.366**	**11.286**	**1.051**	**2.065**

Station Number	**08EE013**										
Station Name	**Buck Creek at the Mouth**										
Latitude	**54:23:52**										
Longitude	**126:39**										
PARAMETER=	**Flow m3/s**										
	1973	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**
January 01	0.476	0.207	0.300	1.000	1.020	0.496	0.396	0.282	0.792	0.186	0.380
January 02	0.476	0.187	0.297	0.988	0.997	0.490	0.388	0.280	0.784	0.183	0.379
January 03	0.476	0.173	0.297	0.980	0.977	0.484	0.379	0.278	0.776	0.180	0.377
January 04	0.476	0.164	0.297	0.974	0.957	0.479	0.374	0.277	0.768	0.177	0.371
January 05	0.476	0.153	0.292	0.960	0.943	0.470	0.368	0.276	0.760	0.172	0.370
January 06	0.476	0.144	0.289	0.940	0.923	0.462	0.362	0.275	0.750	0.168	0.370
January 07	0.476	0.139	0.286	0.926	0.898	0.453	0.357	0.274	0.740	0.162	0.372
January 08	0.476	0.130	0.280	0.917	0.872	0.445	0.351	0.273	0.730	0.159	0.380
January 09	0.476	0.125	0.272	0.909	0.850	0.439	0.345	0.272	0.720	0.156	0.386
January 10	0.476	0.119	0.263	0.912	0.830	0.433	0.343	0.270	0.710	0.153	0.395
January 11	0.476	0.116	0.261	0.912	0.810	0.428	0.337	0.269	0.702	0.151	0.401
January 12	0.476	0.113	0.258	0.895	0.790	0.422	0.331	0.268	0.694	0.151	0.402
January 13	0.476	0.110	0.261	0.898	0.776	0.416	0.326	0.267	0.686	0.155	0.400
January 14	0.476	0.108	0.261	1.000	0.756	0.411	0.323	0.266	0.678	0.162	0.397
January 15	0.476	0.105	0.255	1.090	0.736	0.405	0.320	0.265	0.671	0.178	0.390
January 16	0.476	0.102	0.249	1.130	0.716	0.399	0.314	0.263	0.664	0.177	0.385
January 17	0.476	0.102	0.246	1.150	0.731	0.396	0.311	0.261	0.657	0.169	0.380
January 18	0.476	0.099	0.244	1.160	0.756	0.394	0.306	0.259	0.651	0.163	0.375
January 19	0.476	0.099	0.249	1.150	0.821	0.391	0.300	0.257	0.645	0.158	0.371
January 20	0.476	0.096	0.258	1.140	0.892	0.388	0.294	0.255	0.665	0.155	0.362
January 21	0.476	0.127	0.255	1.130	0.917	0.382	0.289	0.253	0.695	0.155	0.355
January 22	0.476	0.241	0.252	1.140	0.934	0.379	0.286	0.252	0.700	0.154	0.350
January 23	0.473	0.765	0.249	1.140	0.943	0.377	0.283	0.251	0.700	0.153	0.346
January 24	0.464	0.736	0.252	1.140	0.943	0.374	0.280	0.250	0.695	0.152	0.343
January 25	0.459	0.708	0.246	1.150	0.940	0.371	0.278	0.249	0.680	0.151	0.341
January 26	0.456	0.685	0.241	1.180	0.934	0.368	0.272	0.247	0.670	0.151	0.340
January 27	0.447	0.674	0.235	1.230	0.932	0.362	0.266	0.246	0.660	0.151	0.338
January 28	0.442	0.654	0.229	1.260	0.929	0.360	0.261	0.245	0.650	0.151	0.336
January 29	0.428	0.637	0.227	1.260	0.917	0.357	0.258	0.244	0.640	0.151	0.333
January 30	0.422	0.623	0.224	1.260	0.903	0.354	0.255	0.243	0.630	0.150	0.332
January 31	0.408	0.609	0.218	1.240	0.892	0.351	0.252	0.242	0.615	0.150	0.331
Total January Discharge	**14.471**	**9.050**	**8.043**	**33.161**	**27.235**	**12.736**	**9.805**	**8.109**	**21.578**	**4.984**	**11.388**
February 01	0.394	0.597	0.215	1.160	0.872	0.345	0.249	0.241	0.606	0.150	0.330
February 02	0.374	0.586	0.212	1.100	0.861	0.340	0.246	0.239	0.597	0.150	0.329
February 03	0.360	0.575	0.207	1.020	0.855	0.337	0.244	0.237	0.588	0.150	0.328
February 04	0.345	0.564	0.204	0.960	0.847	0.334	0.269	0.235	0.579	0.150	0.321
February 05	0.334	0.552	0.201	0.943	0.841	0.331	0.311	0.234	0.570	0.150	0.319
February 06	0.328	0.541	0.198	0.937	0.835	0.328	0.303	0.232	0.562	0.150	0.315
February 07	0.326	0.530	0.193	0.951	0.830	0.326	0.292	0.230	0.554	0.150	0.311
February 08	0.323	0.521	0.187	0.957	0.824	0.323	0.280	0.228	0.546	0.149	0.308
February 09	0.320	0.513	0.184	0.949	0.818	0.320	0.272	0.226	0.538	0.150	0.304
February 10	0.317	0.504	0.181	0.923	0.813	0.317	0.263	0.224	0.530	0.150	0.301
February 11	0.314	0.498	0.178	0.892	0.818	0.317	0.255	0.223	0.522	0.150	0.300
February 12	0.311	0.490	0.176	0.886	0.835	0.317	0.246	0.222	0.514	0.150	0.300
February 13	0.311	0.481	0.173	0.878	0.850	0.320	0.238	0.220	0.506	0.150	0.301
February 14	0.311	0.473	0.170	0.867	0.838	0.334	0.232	0.218	0.498	0.150	0.302
February 15	0.311	0.464	0.167	0.852	0.827	0.345	0.227	0.216	0.490	0.151	0.309
February 16	0.311	0.456	0.167	0.850	0.821	0.357	0.221	0.214	0.485	0.168	0.312
February 17	0.311	0.447	0.164	0.847	0.813	0.354	0.215	0.213	0.480	0.200	0.317
February 18	0.311	0.439	0.161	0.833	0.801	0.354	0.210	0.212	0.475	0.290	0.320
February 19	0.311	0.430	0.159	0.824	0.787	0.351	0.204	0.211	0.470	0.340	0.321
February 20	0.311	0.425	0.159	0.813	0.773	0.348	0.201	0.210	0.465	0.338	0.322
February 21	0.311	0.416	0.159	0.801	0.765	0.345	0.195	0.209	0.460	0.330	0.326
February 22	0.311	0.411	0.210	0.793	0.753	0.343	0.190	0.208	0.455	0.321	0.328
February 23	0.311	0.405	0.232	0.784	0.745	0.340	0.184	0.207	0.450	0.315	0.330
February 24	0.311	0.396	0.227	0.770	0.736	0.337	0.181	0.206	0.445	0.310	0.332
February 25	0.311	0.391	0.227	0.750	0.731	0.334	0.178	0.205	0.440	0.309	0.337

Station Number	**08EE013**										
Station Name	**Buck Creek at the Mouth**										
Latitude	**54:23:52**										
Longitude	**126:39**										
PARAMETER=	**Flow m3/s**										
	1973	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**
February 26	0.311	0.385	0.227	0.739	0.719	0.331	0.176	0.204	0.436	0.303	0.339
February 27	0.311	0.379	0.227	0.716	0.705	0.331	0.173	0.209	0.432	0.299	0.331
February 28	0.314	0.374	0.227	0.702	0.697	0.328	0.170	0.222	0.428	0.296	0.329
February 29				0.685				0.245			
Total February Discharge	**9.025**	**13.243**	**6.392**	**25.182**	**22.410**	**9.387**	**6.425**	**6.400**	**14.121**	**6.069**	**8.922**
March 01	0.328	0.368	0.227	0.671	0.691	0.326	0.167	0.252	0.424	0.287	0.324
March 02	0.340	0.362	0.224	0.651	0.685	0.326	0.167	0.257	0.420	0.284	0.320
March 03	0.351	0.357	0.224	0.637	0.682	0.323	0.164	0.259	0.416	0.279	0.319
March 04	0.368	0.351	0.224	0.626	0.691	0.323	0.164	0.260	0.413	0.276	0.313
March 05	0.382	0.345	0.221	0.617	0.699	0.320	0.178	0.260	0.410	0.276	0.311
March 06	0.405	0.340	0.221	0.614	0.702	0.317	0.210	0.259	0.409	0.278	0.310
March 07	0.430	0.337	0.218	0.603	0.702	0.320	0.255	0.257	0.408	0.279	0.310
March 08	0.453	0.334	0.218	0.597	0.699	0.331	0.252	0.255	0.407	0.280	0.310
March 09	0.481	0.331	0.215	0.595	0.699	0.351	0.252	0.253	0.406	0.289	0.311
March 10	0.510	0.328	0.215	0.592	0.697	0.365	0.252	0.251	0.405	0.296	0.314
March 11	0.538	0.326	0.212	0.586	0.691	0.391	0.252	0.248	0.405	0.297	0.314
March 12	0.566	0.323	0.212	0.580	0.680	0.416	0.252	0.246	0.403	0.292	0.315
March 13	0.595	0.320	0.212	0.569	0.665	0.442	0.249	0.244	0.401	0.289	0.318
March 14	0.620	0.317	0.210	0.566	0.651	0.464	0.249	0.243	0.399	0.285	0.320
March 15	0.626	0.317	0.210	0.566	0.643	0.487	0.249	0.241	0.398	0.281	0.321
March 16	0.634	0.314	0.210	0.564	0.631	0.504	0.249	0.240	0.396	0.277	0.323
March 17	0.637	0.311	0.207	0.561	0.620	0.510	0.249	0.239	0.394	0.270	0.329
March 18	0.646	0.311	0.204	0.552	0.612	0.518	0.249	0.238	0.392	0.268	0.330
March 19	0.648	0.309	0.201	0.549	0.603	0.524	0.249	0.237	0.390	0.262	0.330
March 20	0.651	0.309	0.201	0.547	0.597	0.521	0.249	0.236	0.388	0.258	0.330
March 21	0.657	0.317	0.201	0.541	0.592	0.515	0.249	0.236	0.386	0.251	0.330
March 22	0.660	0.331	0.198	0.538	0.589	0.510	0.252	0.235	0.384	0.249	0.330
March 23	0.674	0.343	0.198	0.535	0.592	0.507	0.258	0.235	0.382	0.245	0.330
March 24	0.682	0.360	0.195	0.532	0.589	0.504	0.263	0.234	0.381	0.240	0.331
March 25	0.699	0.374	0.193	0.530	0.586	0.501	0.269	0.233	0.380	0.235	0.331
March 26	0.711	0.402	0.190	0.527	0.583	0.496	0.275	0.233	0.390	0.232	0.332
March 27	0.733	0.425	0.187	0.524	0.578	0.493	0.280	0.233	0.405	0.230	0.333
March 28	0.759	0.447	0.187	0.538	0.578	0.490	0.289	0.232	0.430	0.228	0.334
March 29	0.807	0.473	0.187	0.566	0.572	0.487	0.297	0.232	0.490	0.225	0.337
March 30	0.864	0.496	0.187	0.606	0.566	0.484	0.306	0.232	0.570	0.222	0.340
March 31	0.949	0.524	0.184	0.609	0.580	0.484	0.314	0.237	0.630	0.220	0.342
Total March Discharge	**18.404**	**11.102**	**6.393**	**17.889**	**19.745**	**13.550**	**7.609**	**7.647**	**12.912**	**8.180**	**10.042**
April 01	1.030	0.510	0.181	0.597	0.603	0.487	0.326	0.244	0.650	0.220	0.344
April 02	1.130	0.479	0.178	0.592	0.708	0.496	0.337	0.250	0.655	0.220	0.350
April 03	1.230	0.464	0.178	0.589	0.991	0.510	0.348	0.260	0.650	0.220	0.356
April 04	1.330	0.447	0.178	0.580	1.700	0.532	0.362	0.275	0.635	0.221	0.365
April 05	1.440	0.439	0.178	0.580	2.550	0.595	0.377	0.290	0.615	0.221	0.372
April 06	1.590	0.445	0.178	0.580	3.540	0.736	0.405	0.325	0.600	0.222	0.380
April 07	1.710	0.456	0.181	0.575	4.810	0.850	0.436	0.355	0.590	0.224	0.390
April 08	1.870	0.476	0.184	0.569	7.360	0.906	0.467	0.390	0.585	0.229	0.403
April 09	2.020	0.504	0.190	0.566	8.580	0.906	0.498	0.430	0.580	0.231	0.420
April 10	2.210	0.538	0.198	0.566	8.810	0.892	0.530	0.487	0.580	0.233	0.440
April 11	2.410	0.575	0.210	0.566	8.380	0.872	0.575	0.540	0.585	0.239	0.488
April 12	2.700	0.609	0.224	0.564	8.950	0.844	0.637	0.600	0.595	0.243	0.542
April 13	3.000	0.660	0.235	0.564	9.200	0.810	0.714	0.670	0.650	0.254	0.640
April 14	3.170	0.688	0.255	0.564	8.040	0.799	0.821	0.730	0.850	0.263	0.740
April 15	2.970	0.821	0.289	0.561	7.900	0.787	0.934	0.780	1.470	0.278	0.840
April 16	2.920	0.934	0.320	0.561	7.360	0.782	1.050	0.860	1.950	0.289	1.010
April 17	2.940	1.080	0.354	0.564	6.820	0.816	1.160	0.980	2.160	0.310	1.390
April 18	2.940	1.250	0.377	0.564	6.000	0.963	1.360	1.120	2.260	0.325	1.760
April 19	2.890	1.440	0.368	0.569	5.750	1.130	1.500	1.240	2.680	0.360	2.200

Station Number	**08EE013**										
Station Name	**Buck Creek at the Mouth**										
Latitude	**54:23:52**										
Longitude	**126:39**										
PARAMETER=	**Flow m3/s**										
	1973	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**
April 20	2.940	1.760	0.354	0.589	5.580	1.330	1.700	1.500	3.130	0.400	2.800
April 21	3.790	2.460	0.368	0.614	5.780	1.670	1.880	2.000	3.610	0.450	3.300
April 22	4.810	2.640	0.467	0.668	6.630	2.040	2.350	2.500	4.290	0.540	3.950
April 23	5.380	3.030	0.637	0.714	9.320	2.550	2.860	3.200	6.500	0.700	5.500
April 24	5.800	3.740	0.821	0.850	17.000	3.260	3.960	4.000	9.100	0.930	7.420
April 25	6.120	5.150	1.060	1.020	28.000	3.960	5.890	5.200	8.380	1.150	10.300
April 26	6.710	7.450	1.390	1.360	48.100	7.080	8.720	8.000	7.630	1.520	13.800
April 27	7.280	11.200	1.570	2.800	59.200	11.300	11.000	11.200	7.740	1.810	15.400
April 28	7.280	16.100	1.560	6.740	53.800	15.900	14.400	12.700	8.540	2.190	18.000
April 29	7.760	21.000	1.530	12.900	48.100	15.300	24.300	13.500	8.550	2.560	22.300
April 30	8.810	26.100	2.520	19.500	40.800	14.600	33.400	14.200	10.200	2.730	24.800
Total April Discharge	**108.180**	**113.445**	**16.733**	**58.626**	**430.362**	**93.703**	**123.297**	**88.826**	**97.010**	**19.782**	**141.000**
May 01	11.000	25.600	5.640	28.300	36.200	14.000	41.900	15.200	12.600	2.970	24.700
May 02	13.900	24.000	16.700	39.600	37.400	13.500	50.100	17.200	14.000	3.080	24.200
May 03	17.000	21.700	17.000	45.300	35.700	12.900	61.200	16.700	13.800	3.200	23.500
May 04	21.500	21.400	16.700	47.600	33.700	12.100	66.000	15.700	13.700	3.430	21.700
May 05	26.100	23.500	16.000	57.200	30.300	10.200	57.500	15.200	15.600	4.180	20.500
May 06	29.200	23.800	15.300	60.600	30.900	9.660	44.700	19.800	19.500	5.380	19.900
May 07	29.200	24.100	15.000	56.400	34.000	9.970	36.000	30.800	27.300	6.310	20.700
May 08	27.000	23.200	14.900	54.400	37.900	12.300	30.900	28.900	32.800	6.840	21.500
May 09	24.100	21.300	14.800	53.200	37.700	15.600	27.400	26.900	35.800	8.120	19.700
May 10	21.400	19.300	20.900	56.600	33.400	17.400	24.900	28.200	32.800	10.400	17.700
May 11	19.100	17.800	30.300	61.200	30.300	17.800	22.500	32.400	28.500	13.800	16.000
May 12	19.000	16.400	33.700	53.800	26.200	16.800	20.700	34.600	27.400	16.500	14.500
May 13	22.200	15.100	30.300	45.900	22.000	15.400	19.000	36.000	29.100	16.600	14.200
May 14	32.800	14.000	28.000	41.100	18.400	15.100	17.600	32.600	37.000	16.400	16.400
May 15	51.800	12.900	27.100	39.100	16.000	18.300	18.100	28.100	46.800	16.900	16.800
May 16	67.100	13.100	26.100	40.800	15.500	21.100	21.000	25.500	44.400	18.200	16.300
May 17	72.500	15.000	23.200	45.900	16.700	20.800	23.000	22.300	41.700	22.500	15.100
May 18	62.300	16.600	19.900	45.300	16.100	19.800	24.800	19.200	37.300	27.300	13.200
May 19	46.400	18.500	16.800	39.600	15.900	19.700	23.000	16.500	33.600	27.400	11.800
May 20	35.700	21.400	14.900	36.000	15.700	21.200	20.600	14.200	33.500	27.600	11.200
May 21	28.900	23.400	14.200	34.000	14.400	21.700	20.500	12.400	34.100	28.300	10.700
May 22	25.600	24.900	13.600	33.400	13.300	20.200	20.600	11.000	32.500	26.300	9.710
May 23	22.800	29.200	13.000	33.100	12.700	19.600	24.000	9.910	29.400	23.300	8.820
May 24	23.500	30.600	12.000	32.600	12.700	18.900	29.700	9.700	29.800	22.000	8.050
May 25	24.200	31.100	11.800	32.600	11.800	17.400	32.600	9.570	35.600	23.500	7.410
May 26	21.500	32.000	12.200	32.000	11.100	16.000	34.800	9.170	42.000	22.900	6.730
May 27	19.500	31.700	13.300	31.100	11.300	15.900	33.700	8.560	37.000	21.100	6.230
May 28	18.100	30.600	15.800	30.900	10.700	16.600	28.000	8.140	30.000	21.700	5.710
May 29	17.800	30.600	18.300	28.900	10.400	15.400	24.200	7.840	25.200	24.600	5.180
May 30	18.200	31.100	18.800	27.400	9.740	13.900	23.000	7.270	23.200	29.800	4.690
May 31	17.700	29.700	18.200	25.900	9.600	13.800	23.000	6.710	21.100	35.200	4.190
Total May Discharge	**887.100**	**713.600**	**564.440**	**1289.800**	**667.740**	**503.030**	**945.000**	**576.270**	**917.100**	**535.810**	**437.020**
June 01	17.000	28.600	18.100	26.500	9.660	14.200	24.900	6.350	18.300	45.600	3.870
June 02	16.800	29.700	18.700	30.900	8.830	15.000	24.500	6.010	15.700	56.200	3.740
June 03	16.200	29.200	17.600	33.700	8.160	14.900	23.100	5.460	14.200	54.800	3.890
June 04	16.300	25.800	17.100	33.700	7.530	13.700	20.900	5.040	12.900	46.000	3.780
June 05	17.200	23.700	16.700	33.400	7.360	12.500	20.600	4.470	11.400	36.300	3.670
June 06	19.400	22.200	15.000	33.400	7.250	11.300	18.000	4.740	10.600	28.300	4.630
June 07	20.700	21.100	13.000	34.500	7.140	10.100	15.100	4.330	10.200	23.500	6.920
June 08	19.600	20.800	11.300	36.000	6.770	9.030	13.200	3.570	9.500	20.400	6.490
June 09	17.800	20.300	10.000	39.100	6.480	8.160	13.000	3.090	8.800	18.300	5.540
June 10	15.800	21.500	9.540	41.900	6.290	7.560	12.700	2.810	8.400	16.400	6.730
June 11	14.200	25.000	9.030	40.200	5.970	7.020	11.600	4.070	10.200	14.800	8.130
June 12	14.300	24.100	8.300	36.000	5.660	6.850	10.600	5.560	13.000	13.500	7.590

Station Number	**08EE013**										
Station Name	**Buck Creek at the Mouth**										
Latitude	**54:23:52**										
Longitude	**126:39**										
PARAMETER=	**Flow m3/s**										
	1973	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**
June 13	19.600	22.000	8.010	32.600	5.320	7.220	11.300	4.790	15.100	12.900	6.470
June 14	22.800	22.100	7.700	30.900	5.100	19.100	13.900	3.950	14.200	12.200	5.660
June 15	21.700	24.100	8.270	31.400	5.100	38.500	13.100	3.180	12.000	10.500	5.410
June 16	19.700	25.200	8.520	37.400	5.010	35.700	12.400	2.510	10.800	9.280	5.330
June 17	20.000	23.700	7.930	39.600	4.590	26.300	11.700	2.010	10.000	8.520	5.730
June 18	18.900	21.000	8.040	39.400	4.050	20.400	10.900	1.660	9.400	7.410	5.770
June 19	16.800	18.500	8.470	36.800	3.600	16.500	9.770	1.360	9.200	6.160	5.370
June 20	15.100	16.500	7.960	32.000	3.200	13.600	8.890	1.100	8.800	5.350	5.190
June 21	13.600	14.800	6.910	27.100	3.260	11.500	8.160	0.792	8.500	4.700	5.000
June 22	12.700	14.000	6.230	24.900	3.480	20.000	7.160	0.532	8.200	4.050	4.540
June 23	11.600	12.900	5.890	22.800	3.110	26.600	6.200	0.367	7.900	3.990	4.150
June 24	10.700	11.100	5.410	20.800	2.920	23.200	5.970	0.344	7.300	3.560	4.200
June 25	9.940	9.660	4.900	18.000	2.780	18.400	5.150	0.529	6.700	3.070	6.470
June 26	9.090	8.470	4.470	17.300	2.630	14.900	5.440	0.688	6.000	2.940	8.050
June 27	8.130	7.080	4.080	17.100	2.470	12.400	5.410	0.905	5.300	4.070	8.630
June 28	7.360	6.090	4.330	16.400	2.400	10.500	5.100	0.941	4.800	7.240	8.060
June 29	6.850	5.380	5.150	17.200	2.310	9.000	4.470	0.633	4.550	6.990	7.040
June 30	6.770	4.870	4.960	17.200	2.070	7.870	3.990	0.445	4.100	5.970	7.070
Total June Discharge	**456.640**	**559.450**	**281.600**	**898.200**	**150.500**	**462.010**	**357.210**	**82.236**	**286.050**	**493.000**	**173.120**
July 01	6.340	4.420	4.250	15.400	1.830	6.800	3.260	0.355	3.550	4.910	7.570
July 02	5.640	4.110	3.770	12.300	1.760	6.030	4.050	0.353	3.300	5.170	7.320
July 03	5.490	3.940	3.400	11.200	1.740	5.320	5.610	0.577	3.100	5.420	6.460
July 04	5.300	5.660	3.090	10.300	1.660	4.590	5.780	3.710	2.900	4.810	5.730
July 05	4.900	8.500	2.830	9.800	1.550	4.250	5.210	15.500	2.650	4.380	5.020
July 06	4.330	7.930	2.530	9.000	1.600	4.020	5.040	15.100	2.500	3.870	4.650
July 07	4.050	7.590	2.310	8.670	1.460	3.450	4.470	10.700	2.300	3.750	7.440
July 08	3.770	7.360	2.260	8.010	1.440	3.230	3.960	7.540	2.100	3.580	9.850
July 09	3.340	8.210	2.310	7.500	2.060	3.230	3.570	5.480	2.140	3.460	8.720
July 10	3.140	9.630	2.400	6.740	2.970	3.650	3.510	5.460	1.970	3.210	7.560
July 11	2.940	11.300	2.190	6.170	3.400	3.990	3.340	5.380	1.840	2.750	7.890
July 12	2.640	9.630	1.880	6.200	6.120	3.570	3.310	4.830	1.810	2.410	8.680
July 13	2.460	8.350	1.640	6.090	6.820	3.230	3.110	4.290	1.690	2.220	8.790
July 14	2.240	7.500	1.480	5.690	5.580	2.940	2.940	4.190	1.750	2.540	11.300
July 15	1.900	6.510	1.420	5.150	5.040	2.590	2.710	3.970	1.670	3.440	12.100
July 16	1.640	5.660	1.390	4.730	4.730	2.410	2.340	3.560	1.620	4.060	10.500
July 17	1.390	5.100	1.300	4.220	4.530	2.120	2.130	3.250	1.460	3.580	8.650
July 18	1.220	4.390	1.140	3.710	4.420	1.830	2.050	3.090	1.370	3.310	7.290
July 19	1.020	4.020	1.080	3.430	4.560	1.670	1.820	2.890	1.300	3.310	6.370
July 20	0.850	3.620	1.050	3.540	4.220	1.470	1.770	2.710	1.170	2.980	5.660
July 21	0.708	3.340	1.030	3.620	3.680	1.270	1.570	2.500	1.130	4.300	5.730
July 22	0.629	3.000	1.040	3.600	3.200	1.120	1.570	2.380	1.020	7.650	5.510
July 23	0.765	2.690	0.966	3.450	2.830	1.060	1.450	2.380	0.962	8.500	5.010
July 24	1.050	2.490	0.892	3.310	2.510	0.980	1.370	2.480	0.958	6.970	4.660
July 25	0.991	2.830	0.810	3.140	2.260	0.821	1.150	2.290	0.976	5.310	4.570
July 26	0.934	2.490	0.801	3.030	2.020	0.773	0.971	2.100	0.967	4.160	4.510
July 27	0.892	2.270	0.753	2.940	1.830	0.731	0.872	1.960	0.826	3.750	4.260
July 28	0.847	2.070	0.685	3.090	1.650	0.646	0.869	1.790	0.775	3.670	4.300
July 29	0.807	1.870	0.677	3.570	2.090	0.623	0.759	1.730	0.993	3.190	4.430
July 30	0.762	1.700	0.612	3.570	2.420	0.793	0.711	1.670	0.999	2.960	4.010
July 31	0.725	1.560	0.544	3.370	2.300	0.688	0.850	1.550	0.928	3.000	3.590
Total July Discharge	**73.710**	**159.740**	**52.530**	**184.640**	**94.280**	**79.895**	**82.122**	**125.765**	**52.724**	**126.620**	**208.130**
August 01	0.694	1.420	0.541	3.280	2.000	0.552	0.841	1.520	0.864	2.560	3.270
August 02	0.575	1.270	0.521	3.260	1.760	0.493	0.603	1.540	0.977	2.420	3.130
August 03	0.544	1.160	0.555	3.230	1.480	0.450	0.498	1.530	0.950	2.210	3.110
August 04	0.496	1.080	0.714	3.310	1.300	0.428	0.532	1.450	0.784	1.720	2.860
August 05	0.476	0.991	0.835	3.310	1.150	0.430	0.578	1.370	0.731	1.520	2.610

Station Number	08EE013
Station Name	Buck Creek at the Mouth
Latitude	54:23:52
Longitude	126:39
PARAMETER=	Flow m3/s

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
August 06	0.473	0.920	0.994	3.090	1.030	0.484	0.558	1.280	0.727	1.670	2.530
August 07	0.408	0.835	1.130	3.000	0.957	0.473	0.552	1.140	0.691	1.570	2.380
August 08	0.402	0.750	1.230	2.920	0.875	0.459	0.524	1.060	0.704	1.350	2.260
August 09	0.433	0.694	1.400	2.860	0.835	0.442	0.547	1.000	0.659	1.250	2.110
August 10	0.467	0.651	1.430	2.890	0.779	0.439	0.532	0.934	0.607	1.120	1.840
August 11	0.422	0.595	1.470	2.810	0.799	0.456	0.476	0.809	0.625	0.998	1.590
August 12	0.399	0.538	1.470	2.830	0.750	0.558	0.337	0.758	0.620	0.960	1.470
August 13	0.326	0.490	1.370	2.860	0.680	0.552	0.337	0.677	0.566	0.911	1.380
August 14	0.261	0.507	1.190	3.030	0.606	0.694	0.204	0.697	0.552	0.888	1.290
August 15	0.252	0.481	1.060	3.090	0.589	0.677	0.212	0.687	0.519	0.844	1.250
August 16	0.357	0.476	0.997	3.000	0.586	0.654	0.201	0.674	0.538	0.848	1.220
August 17	0.708	0.428	0.968	2.890	0.558	0.623	0.379	0.712	0.456	0.893	1.190
August 18	0.858	0.399	1.060	2.750	0.532	0.719	0.892	0.714	0.365	0.871	1.110
August 19	0.994	0.354	1.670	2.770	0.515	0.821	1.370	0.680	0.173	0.847	1.020
August 20	1.030	0.311	1.570	3.060	0.470	0.892	1.410	0.620	0.161	0.839	0.947
August 21	0.963	0.314	1.440	3.280	0.405	0.776	1.090	0.577	0.128	0.770	0.863
August 22	0.977	0.297	1.350	3.140	0.399	0.725	1.040	0.525	0.141	0.696	0.822
August 23	0.875	0.297	1.350	3.000	0.345	0.742	0.991	0.536	0.160	0.571	0.746
August 24	0.813	0.297	1.220	3.000	0.345	0.869	0.906	0.544	0.236	0.576	0.669
August 25	0.606	0.292	1.150	3.200	0.450	0.878	0.719	0.594	0.196	0.561	0.631
August 26	0.600	0.294	1.150	3.280	0.462	0.850	0.626	0.624	0.167	0.505	0.638
August 27	0.501	0.311	1.270	3.310	0.521	0.991	0.629	0.637	0.162	0.435	0.627
August 28	0.578	0.306	2.580	3.450	0.575	0.895	0.515	0.700	0.168	0.451	0.616
August 29	0.589	0.326	3.260	3.710	0.549	0.838	0.450	0.718	0.164	0.470	0.733
August 30	0.569	0.306	3.650	3.960	0.513	0.776	0.391	0.823	0.314	0.482	0.761
August 31	0.612	0.306	3.510	4.420	0.530	0.714	0.402	1.060	0.418	0.449	0.716
Total August Discharge	**18.258**	**17.696**	**44.105**	**97.990**	**23.345**	**20.330**	**19.342**	**27.190**	**14.523**	**32.255**	**46.389**
September 01	0.592	0.280	3.170	4.110	0.578	0.663	0.309	1.350	0.349	0.459	0.655
September 02	0.606	0.266	2.860	3.680	0.592	0.580	0.345	1.760	0.346	0.423	0.648
September 03	0.620	0.286	2.640	3.480	0.620	0.541	0.365	2.130	0.334	0.404	0.617
September 04	0.626	0.252	2.350	3.770	0.949	0.564	0.331	2.000	0.319	0.411	0.620
September 05	0.762	0.207	2.320	4.220	1.240	0.544	0.379	2.360	0.270	0.535	0.583
September 06	0.750	0.289	2.300	3.940	1.300	0.513	0.433	2.940	0.273	0.548	0.662
September 07	0.691	0.297	2.100	3.600	1.040	0.513	0.413	3.310	0.270	0.635	0.786
September 08	0.668	0.368	1.860	3.370	0.903	0.521	0.513	3.010	0.222	0.944	0.956
September 09	0.595	0.498	1.700	3.140	0.838	0.515	0.544	2.650	0.244	1.080	0.916
September 10	0.651	0.535	1.530	3.000	0.810	0.527	0.541	2.390	0.228	1.220	0.840
September 11	0.697	0.566	1.420	3.090	0.790	0.541	0.498	2.270	0.253	1.120	0.778
September 12	0.762	0.609	1.310	3.170	0.759	0.530	0.510	2.140	0.251	1.190	0.716
September 13	0.750	0.623	1.240	3.110	0.708	0.527	0.453	2.010	0.179	1.400	0.755
September 14	0.745	0.595	1.110	3.110	0.637	0.510	0.405	1.890	0.262	1.350	0.859
September 15	0.711	0.564	0.980	3.060	0.566	0.484	0.360	1.700	0.291	1.220	0.996
September 16	0.699	0.498	1.000	3.000	0.555	0.470	0.360	1.670	0.224	1.090	1.150
September 17	0.648	0.467	0.985	3.140	0.510	0.479	0.348	1.470	0.180	1.010	1.160
September 18	0.586	0.430	1.090	3.090	0.544	0.484	0.334	1.410	0.181	0.947	1.190
September 19	0.629	0.416	1.060	2.890	0.535	0.487	0.294	1.600	0.177	0.910	1.170
September 20	0.609	0.425	1.010	2.740	0.549	0.484	0.320	1.890	0.158	0.908	1.140
September 21	0.583	0.405	0.943	2.570	0.753	0.484	0.303	2.030	0.172	0.889	1.080
September 22	0.589	0.396	0.909	2.420	1.060	0.498	0.326	1.990	0.206	0.845	1.030
September 23	0.600	0.362	0.776	2.330	1.280	0.507	0.286	2.110	0.183	0.678	0.965
September 24	0.606	0.374	0.674	2.430	2.160	0.513	0.261	2.030	0.165	0.693	0.919
September 25	0.578	0.354	0.719	2.420	2.760	0.510	0.266	1.980	0.169	0.715	0.870
September 26	0.668	0.343	0.677	2.360	3.090	0.498	0.221	1.910	0.189	0.730	0.850
September 27	1.010	0.331	0.750	2.230	3.170	0.541	0.266	1.810	0.192	0.749	0.808
September 28	1.460	0.306	0.889	2.180	3.170	0.705	0.328	1.810	0.181	0.842	0.747
September 29	1.740	0.283	0.943	2.250	3.110	0.889	0.428	2.080	0.166	0.718	0.688
September 30	1.680	0.280	0.929	2.410	2.550	1.680	0.626	2.650	0.172	0.634	0.686

Station Number	**08EE013**										
Station Name	**Buck Creek at the Mouth**										
Latitude	**54:23:52**										
Longitude	**126:39**										
PARAMETER¤	**Flow m3/s**										
	1973	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**
Total September Discharge	**22.911**	**11.905**	**42.244**	**90.310**	**38.126**	**17.302**	**11.366**	**62.350**	**6.806**	**25.297**	**25.840**
October 01	1.670	0.337	0.881	2.300	1.610	2.410	0.646	2.920	0.165	0.647	0.677
October 02	1.570	0.459	0.883	2.230	2.530	2.470	0.685	2.820	0.162	0.689	0.673
October 03	1.440	0.575	1.020	2.210	2.700	2.320	0.790	2.700	0.298	0.724	0.667
October 04	1.480	0.722	1.040	2.170	2.640	2.220	0.682	2.480	0.590	0.731	0.670
October 05	1.730	0.677	1.050	2.350	2.580	2.050	0.589	2.360	0.516	0.782	0.673
October 06	1.880	0.691	0.920	2.690	2.310	2.080	0.549	2.310	0.505	0.755	0.666
October 07	1.750	0.722	0.767	3.230	2.030	1.840	0.580	2.220	0.571	0.766	0.673
October 08	1.610	0.841	0.886	3.260	2.120	1.680	0.558	2.120	0.968	0.866	0.669
October 09	1.530	0.963	1.150	3.140	2.020	1.620	0.524	2.060	1.420	1.200	0.670
October 10	1.590	0.974	1.400	3.000	1.730	1.780	0.589	1.940	1.510	1.360	0.680
October 11	1.680	0.974	1.580	2.970	1.910	1.780	0.816	1.990	1.660	1.330	0.687
October 12	1.710	1.060	1.510	2.890	2.080	1.840	0.974	1.940	1.740	1.360	0.678
October 13	1.680	1.060	1.460	3.110	2.120	1.910	1.160	2.130	1.520	1.390	0.657
October 14	1.670	1.010	1.470	3.480	2.080	1.950	1.100	2.250	1.390	1.390	0.636
October 15	1.630	1.280	1.960	3.260	2.010	2.020	1.010	2.330	1.310	1.370	0.608
October 16	1.610	1.740	2.750	2.970	1.990	2.070	0.943	2.190	1.300	1.300	0.579
October 17	1.600	2.020	2.860	2.890	2.010	2.020	0.855	2.050	1.200	1.190	0.584
October 18	1.660	2.550	2.830	2.620	2.100	1.940	0.851	1.920	1.100	1.230	0.616
October 19	1.660	2.860	2.680	2.530	2.050	1.890	0.847	1.860	1.060	1.210	0.655
October 20	1.660	2.740	2.610	2.400	1.950	1.870	0.711	2.080	1.080	1.210	0.709
October 21	1.510	2.380	2.410	2.320	1.850	1.770	0.669	2.370	1.020	1.240	0.809
October 22	1.410	2.150	2.220	2.190	1.940	1.780	0.651	2.440	0.955	1.570	0.931
October 23	1.320	1.950	2.130	2.240	2.860	2.010	0.637	2.180	0.931	1.750	1.050
October 24	1.360	1.780	2.030	2.170	4.080	2.340	0.623	2.030	0.947	2.260	1.110
October 25	1.390	1.620	1.960	2.140	4.050	2.380	0.617	1.960	0.948	2.550	1.140
October 26	1.410	1.550	1.890	2.380	3.680	2.250	0.612	1.890	0.931	2.640	1.420
October 27	1.410	1.550	1.790	2.970	3.430	2.070	0.606	1.830	0.939	2.790	1.630
October 28	1.650	1.610	1.770	3.990	2.940	1.720	0.597	1.950	1.000	2.990	1.630
October 29	1.830	1.600	1.720	3.790	3.110	1.690	0.589	2.690	1.020	2.770	1.520
October 30	1.850	1.460	1.660	3.510	2.890	1.920	0.566	3.350	1.150	2.630	1.440
October 31	1.570	1.390	2.100	3.140	2.790	2.000	0.549	3.380	1.430	2.780	1.390
Total October Discharge	49.520	43.295	53.387	86.540	76.190	61.690	22.175	70.740	31.336	47.470	27.197
November 01	1.420	1.280	2.770	3.000	2.430	4.980	0.524	3.580	1.660	2.270	1.370
November 02	1.160	1.160	3.170	2.830	2.310	6.650	0.490	3.870	1.630	2.080	1.370
November 03	1.050	1.220	3.740	2.830	1.970	5.660	0.473	3.680	1.620	2.460	1.380
November 04	0.949	1.230	3.710	3.140	1.380	4.450	0.459	4.040	1.360	2.890	1.450
November 05	0.864	1.210	3.510	3.260	1.190	3.990	0.445	6.060	1.570	2.660	1.460
November 06	0.793	1.040	2.970	2.590	1.020	3.740	0.430	8.130	1.550	1.870	1.410
November 07	0.722	1.070	3.110	2.920	0.934	3.450	0.416	9.530	1.390	1.620	1.390
November 08	0.665	0.957	2.790	2.680	0.906	3.230	0.405	9.190	1.300	1.470	1.450
November 09	0.637	0.878	2.350	2.380	0.886	3.060	0.394	8.440	1.220	1.360	1.380
November 10	0.595	0.830	4.450	2.420	0.864	2.890	0.382	7.490	1.130	1.260	1.300
November 11	0.566	0.799	4.900	2.440	0.841	2.750	0.371	6.480	1.070	1.190	1.290
November 12	0.538	0.767	3.370	2.380	0.818	2.620	0.362	5.920	1.010	1.110	1.240
November 13	0.510	0.736	4.130	2.290	0.799	2.480	0.354	5.440	0.960	1.040	1.250
November 14	0.481	0.708	5.520	2.180	0.782	2.400	0.345	5.160	0.910	0.990	1.330
November 15	0.467	0.680	5.320	1.830	0.765	2.320	0.337	4.670	0.870	0.940	1.270
November 16	0.453	0.660	4.670	2.010	0.756	2.210	0.331	4.330	0.831	0.904	1.290
November 17	0.439	0.640	4.250	2.210	0.745	2.100	0.326	4.050	0.792	0.868	1.300
November 18	0.425	0.620	3.680	2.140	0.733	1.980	0.320	3.840	0.753	0.832	1.300
November 19	0.419	0.612	3.110	2.050	0.725	1.870	0.317	2.810	0.714	0.796	1.110
November 20	0.413	0.586	2.830	1.980	0.719	1.760	0.314	2.450	0.685	0.760	0.880
November 21	0.402	0.572	2.610	1.930	0.714	1.680	0.309	2.120	0.660	0.742	0.750
November 22	0.391	0.558	2.420	1.900	0.711	1.610	0.306	1.950	0.635	0.724	0.680
November 23	0.385	0.544	2.270	1.880	0.708	1.530	0.303	1.760	0.610	0.706	0.630

Station Number	**08EE013**										
Station Name	**Buck Creek at the Mouth**										
Latitude	**54:23:52**										
Longitude	**126:39**										
PARAMETER=	**Flow m3/s**										
	1973	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**
November 24	0.379	0.530	2.100	1.850	0.708	1.460	0.300	1.640	0.585	0.688	0.580
November 25	0.374	0.515	1.980	1.800	0.719	1.390	0.297	1.520	0.560	0.670	0.550
November 26	0.365	0.501	1.880	1.730	0.731	1.330	0.292	1.440	0.540	0.656	0.515
November 27	0.360	0.487	1.780	1.680	0.759	1.270	0.289	1.350	0.520	0.642	0.490
November 28	0.357	0.473	1.670	1.640	0.816	1.220	0.286	1.280	0.500	0.628	0.470
November 29	0.351	0.459	1.600	1.580	0.827	1.160	0.283	1.240	0.480	0.614	0.445
November 30	0.343	0.447	1.500	1.530	0.824	1.100	0.280	1.200	0.460	0.600	0.425
Total November Discharge	**17.273**	**22.769**	**94.160**	**67.080**	**29.090**	**78.340**	**10.740**	**124.660**	**28.575**	**36.040**	**31.755**
December 01	0.337	0.436	1.460	1.480	0.813	1.060	0.278	1.160	0.444	0.590	0.410
December 02	0.334	0.425	1.390	1.440	0.787	1.010	0.275	1.130	0.428	0.580	0.392
December 03	0.328	0.416	1.330	1.400	0.773	0.968	0.275	1.110	0.412	0.570	0.380
December 04	0.323	0.408	1.290	1.360	0.753	0.923	0.272	1.090	0.396	0.560	0.370
December 05	0.317	0.399	1.230	1.320	0.728	0.878	0.272	1.070	0.380	0.550	0.360
December 06	0.311	0.391	1.180	1.300	0.708	0.844	0.269	1.060	0.368	0.542	0.352
December 07	0.309	0.382	1.130	1.280	0.694	0.810	0.269	1.050	0.356	0.534	0.344
December 08	0.303	0.377	1.090	1.260	0.680	0.776	0.266	1.050	0.344	0.526	0.336
December 09	0.300	0.371	1.060	1.250	0.671	0.742	0.266	1.060	0.332	0.518	0.328
December 10	0.294	0.365	1.030	1.270	0.665	0.708	0.263	1.090	0.320	0.510	0.320
December 11	0.292	0.360	0.997	1.300	0.657	0.685	0.263	1.200	0.311	0.502	0.314
December 12	0.289	0.354	0.977	1.290	0.646	0.663	0.263	1.560	0.302	0.494	0.308
December 13	0.283	0.348	0.963	1.270	0.631	0.640	0.261	1.500	0.293	0.486	0.302
December 14	0.278	0.345	0.949	1.270	0.623	0.617	0.261	1.470	0.284	0.478	0.296
December 15	0.275	0.343	0.934	1.290	0.617	0.595	0.261	1.380	0.275	0.470	0.290
December 16	0.272	0.340	0.917	1.330	0.609	0.578	0.261	1.300	0.268	0.465	0.287
December 17	0.269	0.337	0.906	1.370	0.600	0.561	0.261	1.250	0.261	0.460	0.284
December 18	0.266	0.334	0.898	1.360	0.592	0.544	0.261	1.210	0.255	0.455	0.281
December 19	0.263	0.331	0.886	1.320	0.583	0.530	0.289	1.160	0.249	0.450	0.278
December 20	0.261	0.328	0.878	1.300	0.572	0.515	0.340	1.110	0.243	0.445	0.275
December 21	0.258	0.326	0.875	1.250	0.566	0.504	0.331	1.080	0.237	0.439	0.273
December 22	0.255	0.323	0.864	1.240	0.561	0.493	0.326	1.030	0.231	0.433	0.271
December 23	0.252	0.320	0.858	1.190	0.555	0.481	0.320	0.980	0.225	0.427	0.269
December 24	0.246	0.317	0.855	1.170	0.547	0.470	0.314	0.960	0.219	0.421	0.267
December 25	0.244	0.314	0.855	1.160	0.538	0.459	0.309	0.935	0.214	0.415	0.265
December 26	0.241	0.311	0.855	1.160	0.532	0.447	0.303	0.900	0.210	0.410	0.264
December 27	0.238	0.309	0.858	1.150	0.524	0.439	0.300	0.880	0.206	0.405	0.263
December 28	0.235	0.306	0.878	1.120	0.518	0.430	0.294	0.860	0.202	0.400	0.262
December 29	0.232	0.303	0.991	1.100	0.513	0.422	0.289	0.840	0.198	0.395	0.261
December 30	0.229	0.300	1.080	1.060	0.510	0.413	0.286	0.820	0.194	0.390	0.260
December 31	0.227	0.300	1.020	1.040	0.504	0.405	0.283	0.800	0.191	0.385	0.259
Total December Discharge	**8.561**	**10.819**	**31.484**	**39.100**	**19.270**	**19.610**	**8.781**	**34.095**	**8.848**	**14.705**	**9.421**

Station Number
Station Name
Latitude
Longitude
PARAMETER=

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
January 01	0.300	0.470	0.059	0.484	0.360	0.800	2.500	0.461	0.990	0.400
January 02	0.480	0.471	0.058	0.481	0.335	0.785	2.220	0.440	0.982	0.392
January 03	0.660	0.472	0.057	0.478	0.319	0.770	2.160	0.412	0.981	0.381
January 04	0.680	0.473	0.055	0.475	0.300	0.760	2.100	0.390	0.981	0.379
January 05	0.680	0.473	0.054	0.472	0.280	0.755	2.060	0.366	0.980	0.375
January 06	0.645	0.470	0.053	0.469	0.269	0.745	2.040	0.340	0.980	0.372
January 07	0.580	0.467	0.052	0.466	0.270	0.732	2.010	0.319	0.985	0.371
January 08	0.540	0.464	0.052	0.469	0.276	0.721	1.980	0.311	0.995	0.369
January 09	0.470	0.462	0.053	0.475	0.283	0.719	1.950	0.310	1.000	0.368
January 10	0.430	0.460	0.054	0.510	0.305	0.710	1.910	0.307	1.010	0.365
January 11	0.395	0.460	0.057	0.660	0.335	0.719	1.820	0.301	1.020	0.362
January 12	0.370	0.460	0.063	0.700	0.363	0.710	1.710	0.300	1.030	0.360
January 13	0.353	0.460	0.067	0.705	0.388	0.700	1.600	0.301	1.030	0.358
January 14	0.342	0.475	0.070	0.698	0.401	0.690	1.550	0.310	1.030	0.355
January 15	0.333	0.510	0.071	0.690	0.420	0.680	1.490	0.340	1.040	0.352
January 16	0.328	0.545	0.073	0.675	0.428	0.680	1.480	0.368	1.060	0.350
January 17	0.324	0.545	0.074	0.665	0.437	0.678	1.400	0.372	1.060	0.343
January 18	0.319	0.540	0.074	0.652	0.440	0.673	1.250	0.360	1.060	0.340
January 19	0.312	0.535	0.074	0.645	0.450	0.663	1.110	0.340	1.060	0.330
January 20	0.308	0.532	0.073	0.635	0.455	0.658	1.000	0.329	1.060	0.328
January 21	0.303	0.529	0.071	0.624	0.458	0.650	0.940	0.318	1.060	0.326
January 22	0.301	0.526	0.069	0.612	0.460	0.643	0.900	0.311	1.060	0.324
January 23	0.301	0.524	0.067	0.602	0.461	0.640	0.870	0.308	1.060	0.323
January 24	0.303	0.521	0.065	0.595	0.462	0.639	0.830	0.303	1.070	0.328
January 25	0.310	0.518	0.064	0.587	0.463	0.623	0.800	0.300	1.070	0.334
January 26	0.320	0.512	0.064	0.580	0.467	0.615	0.780	0.298	1.080	0.340
January 27	0.330	0.506	0.064	0.572	0.469	0.600	0.755	0.291	1.080	0.350
January 28	0.348	0.500	0.063	0.564	0.469	0.590	0.740	0.290	1.080	0.360
January 29	0.365	0.495	0.061	0.556	0.450	0.561	0.720	0.289	1.080	0.368
January 30	0.388	0.490	0.059	0.548	0.400	0.540	0.705	0.287	1.080	0.372
January 31	0.404	0.486	0.057	0.540	0.360	0.518	0.690	0.310	1.080	0.381
Total January Discharge	**12.522**	**15.351**	**1.947**	**17.884**	**12.033**	**20.967**	**44.070**	**10.282**	**32.134**	**11.056**
February 01	0.390	0.485	0.056	0.538	0.330	0.490	0.680	0.326	1.080	0.389
February 02	0.380	0.475	0.055	0.537	0.303	0.450	0.670	0.331	1.080	0.400
February 03	0.370	0.460	0.054	0.523	0.300	0.370	0.665	0.329	1.090	0.410
February 04	0.365	0.440	0.054	0.530	0.290	0.335	0.660	0.321	1.090	0.422
February 05	0.360	0.425	0.053	0.537	0.292	0.310	0.655	0.319	1.090	0.440
February 06	0.357	0.405	0.051	0.535	0.300	0.309	0.650	0.318	1.080	0.460
February 07	0.360	0.385	0.049	0.545	0.310	0.305	0.645	0.315	1.070	0.470
February 08	0.370	0.370	0.045	0.555	0.320	0.300	0.645	0.312	1.060	0.480
February 09	0.388	0.365	0.042	0.565	0.330	0.301	0.640	0.311	1.060	0.482
February 10	0.402	0.357	0.040	0.575	0.350	0.303	0.640	0.310	1.050	0.485
February 11	0.401	0.354	0.038	0.595	0.363	0.306	0.640	0.310	1.040	0.485
February 12	0.398	0.350	0.036	0.615	0.380	0.309	0.640	0.310	1.040	0.480
February 13	0.393	0.347	0.033	0.635	0.390	0.311	0.640	0.310	1.040	0.477
February 14	0.389	0.345	0.031	0.655	0.420	0.315	0.645	0.310	1.030	0.468
February 15	0.387	0.350	0.021	0.680	0.435	0.319	0.645	0.310	1.010	0.455
February 16	0.400	0.375	0.016	0.710	0.452	0.315	0.650	0.309	1.000	0.440
February 17	0.420	0.395	0.011	0.740	0.470	0.310	0.655	0.309	0.995	0.430
February 18	0.450	0.415	0.005	0.780	0.480	0.309	0.660	0.309	0.990	0.418
February 19	0.490	0.427	0.002	0.800	0.500	0.304	0.670	0.308	0.980	0.403
February 20	0.530	0.440	0.000	0.820	0.520	0.308	0.675	0.308	0.975	0.400
February 21	0.560	0.450	0.000	0.830	0.532	0.311	0.685	0.306	0.968	0.392
February 22	0.560	0.455	0.000	0.830	0.538	0.329	0.695	0.304	0.970	0.390
February 23	0.525	0.460	0.000	0.824	0.538	0.345	0.700	0.301	0.975	0.390
February 24	0.510	0.455	0.000	0.817	0.538	0.370	0.700	0.301	1.000	0.390
February 25	0.500	0.452	0.000	0.803	0.538	0.393	0.705	0.301	1.050	0.392

Station Number
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Longitude
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	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
February 26	0.500	0.449	0.000	0.797	0.538	0.389	0.705	0.301	1.100	0.397
February 27	0.500	0.447	0.002	0.788	0.538	0.370	0.710	0.300	1.200	0.420
February 28	0.500	0.445	0.008	0.780	0.540	0.355	0.710	0.300	1.320	0.470
February 29	0.495				0.540				1.400	
Total February Discharge	**12.650**	**11.578**	**0.702**	**18.939**	**12.375**	**9.441**	**18.680**	**8.699**	**30.833**	**12.136**
March 01	0.490	0.435	0.033	0.760	0.540	0.334	0.715	0.291	1.510	0.540
March 02	0.480	0.430	0.060	0.750	0.541	0.320	0.715	0.289	1.550	0.555
March 03	0.470	0.427	0.066	0.740	0.542	0.315	0.720	0.281	1.600	0.555
March 04	0.470	0.425	0.074	0.732	0.543	0.310	0.720	0.279	1.600	0.545
March 05	0.480	0.425	0.080	0.725	0.544	0.311	0.720	0.275	1.880	0.540
March 06	0.490	0.423	0.086	0.719	0.545	0.316	0.725	0.276	1.950	0.530
March 07	0.500	0.422	0.095	0.713	0.545	0.317	0.725	0.281	2.100	0.520
March 08	0.510	0.421	0.108	0.707	0.550	0.320	0.730	0.290	2.250	0.505
March 09	0.530	0.420	0.125	0.701	0.555	0.320	0.740	0.298	2.600	0.495
March 10	0.560	0.430	0.140	0.695	0.560	0.320	0.745	0.301	2.750	0.480
March 11	0.620	0.445	0.170	0.692	0.560	0.328	0.755	0.302	3.200	0.450
March 12	0.640	0.465	0.195	0.689	0.570	0.330	0.760	0.302	3.500	0.430
March 13	0.620	0.490	0.230	0.686	0.575	0.333	0.770	0.303	4.640	0.410
March 14	0.600	0.510	0.340	0.683	0.580	0.340	0.780	0.303	5.860	0.400
March 15	0.580	0.535	0.410	0.680	0.590	0.347	0.800	0.310	7.010	0.390
March 16	0.560	0.580	0.409	0.680	0.610	0.350	0.820	0.321	8.080	0.388
March 17	0.560	0.620	0.410	0.685	0.605	0.357	0.850	0.345	9.100	0.390
March 18	0.570	0.625	0.410	0.690	0.605	0.370	0.880	0.360	10.300	0.390
March 19	0.580	0.620	0.440	0.695	0.600	0.380	0.910	0.371	10.700	0.390
March 20	0.580	0.615	0.517	0.710	0.600	0.386	0.950	0.375	9.900	0.390
March 21	0.590	0.610	0.530	0.735	0.600	0.395	1.000	0.390	9.870	0.392
March 22	0.620	0.605	0.550	0.770	0.610	0.408	1.050	0.395	10.900	0.395
March 23	0.660	0.601	0.570	0.815	0.618	0.430	1.130	0.400	11.400	0.398
March 24	0.690	0.597	0.590	0.860	0.620	0.452	1.220	0.401	10.600	0.400
March 25	0.705	0.595	0.610	0.905	0.620	0.480	1.340	0.406	10.700	0.405
March 26	0.720	0.592	0.640	0.960	0.622	0.505	1.500	0.415	11.000	0.410
March 27	0.730	0.590	0.670	1.020	0.630	0.515	1.670	0.421	10.200	0.420
March 28	0.730	0.585	0.700	1.090	0.655	0.553	1.830	0.435	9.040	0.430
March 29	0.740	0.580	0.730	1.180	0.670	0.575	2.040	0.450	8.350	0.435
March 30	0.790	0.575	0.750	1.260	0.690	0.598	2.300	0.468	8.490	0.439
March 31	0.850	0.570	0.770	1.370	0.700	0.615	2.520	0.480	8.620	0.440
Total March Discharge	**18.715**	**16.263**	**11.508**	**25.097**	**18.395**	**12.230**	**33.130**	**10.814**	**201.250**	**13.857**
April 01	0.940	0.567	0.850	1.540	0.730	0.640	2.820	0.501	11.700	0.470
April 02	1.220	0.564	0.940	1.640	0.740	0.660	3.200	0.530	21.700	0.500
April 03	1.500	0.561	1.020	1.780	0.760	0.680	3.650	0.555	26.300	0.530
April 04	1.950	0.558	1.180	2.050	0.780	0.710	4.400	0.595	23.100	0.580
April 05	2.310	0.555	1.300	2.400	0.800	0.730	4.900	0.630	19.700	0.660
April 06	1.540	0.553	1.440	2.900	0.815	0.770	5.600	0.680	17.400	0.740
April 07	1.470	0.551	1.520	3.400	0.830	0.795	6.000	0.750	14.700	0.830
April 08	1.640	0.550	1.650	4.400	0.845	0.830	6.000	0.820	14.200	0.900
April 09	1.710	0.570	1.730	5.200	0.855	0.880	5.700	0.880	12.800	1.000
April 10	1.580	0.620	1.730	6.600	0.865	1.100	5.100	0.960	11.300	1.200
April 11	1.570	0.750	1.660	8.000	0.880	1.900	4.920	1.010	10.500	1.380
April 12	1.570	1.300	1.550	8.800	0.900	3.500	4.800	1.180	10.200	1.600
April 13	1.650	1.700	1.600	9.050	1.000	7.200	6.100	1.300	10.000	2.000
April 14	3.360	1.850	1.900	9.050	1.150	12.300	8.280	1.600	11.200	2.600
April 15	4.330	1.850	2.120	8.900	1.300	20.100	10.400	2.200	13.500	3.320
April 16	5.730	1.850	2.350	8.600	1.550	21.000	12.500	3.400	17.500	4.200
April 17	5.300	1.780	2.650	8.130	2.000	21.900	14.600	5.400	24.900	4.850
April 18	5.240	1.680	2.870	6.270	2.600	23.000	16.700	9.000	26.100	5.800
April 19	5.410	1.620	3.020	5.970	3.200	24.800	17.400	12.700	26.400	7.030

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	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
April 20	6.330	1.560	3.150	6.020	4.600	26.200	19.900	15.100	28.500	7.900
April 21	7.100	1.510	3.300	6.980	5.800	27.000	20.500	15.500	25.000	9.200
April 22	7.540	1.450	3.440	6.950	7.200	27.300	21.000	16.900	21.800	11.300
April 23	7.360	1.420	3.570	7.260	9.200	28.000	20.700	17.500	19.300	13.500
April 24	6.680	1.420	3.700	7.840	11.000	29.300	19.300	18.900	16.100	14.400
April 25	6.450	1.650	3.850	8.160	15.000	31.500	17.600	20.700	14.200	13.800
April 26	6.220	1.900	4.000	8.070	17.500	33.100	17.300	17.000	20.400	14.500
April 27	6.030	2.100	4.200	9.160	19.900	35.000	16.600	15.000	26.100	14.600
April 28	5.980	2.500	4.400	11.400	19.800	37.500	14.300	13.500	25.500	14.800
April 29	6.010	2.900	4.600	14.900	23.300	40.000	12.600	12.700	23.100	14.900
April 30	6.420	3.200	4.850	19.000	21.800	42.000	12.400	12.500	21.200	14.600
Total April Discharge	**122.140**	**41.639**	**76.140**	**210.420**	**177.700**	**500.395**	**336.270**	**219.991**	**564.400**	**183.690**
May 01	7.020	3.860	5.000	25.200	18.300	43.800	13.200	13.900	19.400	14.700
May 02	8.270	4.800	5.060	30.800	15.000	45.000	15.000	16.100	18.100	14.600
May 03	8.190	7.000	5.310	30.800	14.000	47.300	18.100	19.100	18.300	13.700
May 04	7.660	9.000	5.930	28.900	14.700	48.000	23.300	21.700	19.800	13.400
May 05	7.270	18.000	7.260	26.700	14.900	47.600	28.500	23.800	21.500	14.700
May 06	7.150	17.200	9.860	25.400	15.700	46.100	31.000	28.100	23.900	16.300
May 07	7.610	16.700	11.600	29.200	17.000	46.200	31.100	28.400	23.600	17.000
May 08	10.900	16.000	12.900	36.200	19.600	42.900	28.300	24.500	21.200	16.000
May 09	15.600	15.200	14.700	38.600	22.900	37.900	27.800	26.000	19.100	15.000
May 10	15.300	14.600	13.500	35.300	25.300	32.000	28.900	28.800	17.500	14.200
May 11	14.600	13.800	12.500	30.800	27.200	25.500	27.500	27.200	15.900	16.000
May 12	14.500	13.400	11.600	29.500	30.500	20.600	26.200	24.000	15.200	18.700
May 13	15.300	13.200	10.000	26.800	33.100	17.300	25.300	21.800	14.400	24.000
May 14	16.600	13.200	8.670	24.900	34.400	15.600	24.000	19.800	14.400	31.800
May 15	17.200	13.500	7.850	20.700	28.100	15.500	23.300	18.600	14.800	34.300
May 16	19.800	16.000	7.690	18.800	22.200	16.300	23.800	17.500	15.900	32.700
May 17	20.600	20.000	8.690	15.100	19.000	15.500	24.900	17.000	17.200	30.400
May 18	20.700	26.000	11.600	14.400	16.300	18.200	24.800	18.100	17.000	26.200
May 19	21.900	34.000	15.600	13.900	15.100	19.800	24.100	19.500	15.400	23.100
May 20	23.700	42.000	24.500	13.400	13.400	17.200	23.000	19.200	13.400	29.800
May 21	22.200	54.000	27.300	13.600	11.900	14.700	23.100	17.700	11.900	33.400
May 22	19.500	51.000	23.200	15.900	12.200	13.500	24.200	15.100	10.700	34.600
May 23	17.600	48.600	17.600	17.900	12.100	12.500	22.000	13.000	10.200	30.500
May 24	16.000	49.900	16.100	19.500	10.700	11.600	18.800	11.700	11.600	23.800
May 25	14.400	49.400	19.400	20.100	10.000	11.200	16.700	10.700	15.000	19.300
May 26	13.300	45.100	26.800	20.300	10.500	10.800	17.800	10.200	17.400	15.900
May 27	13.300	40.600	31.400	19.100	10.900	10.600	20.100	9.580	17.300	13.500
May 28	13.900	36.500	31.900	19.300	12.900	10.200	22.700	8.920	16.500	11.900
May 29	14.100	32.600	32.800	18.700	15.700	10.300	31.300	8.200	16.800	10.400
May 30	14.000	28.800	34.800	17.000	13.700	11.000	35.300	7.840	16.000	9.270
May 31	12.800	25.600	35.600	15.200	10.600	11.100	30.100	7.210	16.700	8.430
Total May Discharge	**450.970**	**789.560**	**606.720**	**712.000**	**547.900**	**745.800**	**764.200**	**553.250**	**516.100**	**627.600**
June 01	11.500	23.000	34.500	13.700	9.520	10.400	26.100	6.570	17.600	9.840
June 02	10.600	20.600	29.900	11.600	10.500	9.150	23.100	5.850	15.200	12.400
June 03	10.000	18.500	25.400	10.300	9.690	8.110	22.700	5.480	12.500	11.000
June 04	12.000	17.300	23.400	9.450	8.380	7.190	29.200	7.350	10.800	10.400
June 05	14.400	15.400	23.000	11.200	7.680	6.400	24.800	7.550	9.620	10.500
June 06	14.900	13.200	22.500	11.700	8.790	5.820	20.600	6.400	8.920	9.140
June 07	15.000	11.200	23.300	9.890	13.400	5.450	16.800	5.580	8.140	8.700
June 08	15.100	9.640	20.200	8.530	24.000	5.020	15.000	4.940	7.500	8.100
June 09	14.500	8.380	17.100	7.770	42.100	4.740	13.700	4.680	7.100	6.720
June 10	14.500	7.450	15.500	6.720	40.500	4.490	12.600	4.640	7.230	6.600
June 11	13.700	6.880	13.700	6.670	29.500	4.060	15.000	4.490	6.790	5.900
June 12	11.900	6.500	11.900	6.670	22.900	3.720	16.800	4.320	6.650	5.260

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June 13	10.200	6.010	10.400	6.000	18.300	3.480	15.300	4.190	7.260	4.830
June 14	8.750	6.280	9.450	4.620	15.200	3.400	12.700	4.170	6.920	4.960
June 15	7.620	7.230	31.400	2.770	12.200	3.230	11.000	4.460	6.130	16.100
June 16	6.790	6.630	40.900	2.410	10.600	2.940	9.240	5.130	5.760	27.400
June 17	6.200	5.790	36.700	2.530	10.000	2.670	8.180	5.410	5.120	21.300
June 18	5.630	5.170	32.200	2.180	9.420	2.560	7.130	5.430	4.620	17.200
June 19	5.160	4.600	37.900	2.030	8.120	2.480	6.290	4.650	4.290	14.400
June 20	4.680	4.270	34.700	1.820	7.050	2.280	5.810	4.440	4.380	12.100
June 21	4.310	3.900	27.600	1.670	6.430	2.430	5.600	4.080	4.210	10.300
June 22	4.050	3.830	23.000	1.480	6.240	2.410	4.910	3.700	3.780	12.900
June 23	3.900	5.270	18.800	1.260	5.750	2.150	4.400	3.210	3.390	18.200
June 24	3.790	7.520	14.900	0.998	5.150	1.980	4.220	3.070	3.190	16.800
June 25	3.580	7.620	11.500	0.637	4.840	1.890	4.170	3.090	2.930	14.600
June 26	3.440	6.600	9.290	0.454	4.490	1.480	3.940	3.030	2.500	14.100
June 27	3.340	5.580	7.800	0.292	4.340	1.240	3.890	3.330	2.300	14.300
June 28	3.290	4.990	6.900	0.636	4.650	1.310	4.030	4.030	2.060	17.300
June 29	3.380	4.880	6.440	0.673	4.230	1.660	5.340	3.950	1.880	19.000
June 30	3.600	6.050	6.060	0.509	3.750	1.800	9.140	3.830	1.690	16.400
Total June Discharge	**249.810**	**260.270**	**626.340**	**147.169**	**367.720**	**115.940**	**361.690**	**141.050**	**190.460**	**376.760**
July 01	3.830	6.310	5.640	0.411	3.540	2.720	12.900	3.390	1.460	13.800
July 02	3.660	5.420	5.570	0.351	3.440	3.140	12.700	3.050	1.380	11.700
July 03	3.320	4.650	5.080	0.290	3.340	2.990	10.600	3.190	1.450	9.960
July 04	3.370	4.260	4.640	0.262	3.300	3.040	9.650	2.760	1.510	8.820
July 05	3.480	5.370	4.270	0.262	3.340	2.840	8.710	2.800	1.570	8.040
July 06	3.640	6.400	3.880	0.259	3.080	2.700	9.180	3.320	1.410	7.100
July 07	4.340	5.200	3.500	0.251	2.780	2.850	9.260	3.370	1.340	6.180
July 08	4.580	4.600	3.090	0.368	2.460	3.270	8.310	3.030	1.330	5.380
July 09	4.110	3.640	2.770	0.339	2.280	3.530	7.790	2.790	1.190	5.200
July 10	3.640	3.500	2.410	0.355	2.020	3.010	6.820	2.490	1.120	4.980
July 11	3.320	3.350	2.320	0.465	1.910	2.650	6.400	2.260	1.010	4.520
July 12	3.110	3.250	2.230	0.633	1.690	2.340	5.800	2.100	0.881	4.080
July 13	2.870	3.190	2.160	0.535	1.550	2.170	5.370	2.400	0.797	3.780
July 14	2.610	2.970	2.110	0.463	1.400	2.090	5.010	2.830	0.745	3.510
July 15	2.410	2.680	2.050	0.430	1.300	1.810	4.630	2.980	0.716	3.460
July 16	2.230	2.480	1.940	0.423	1.220	1.510	4.370	2.980	0.658	3.380
July 17	2.020	2.270	1.800	0.365	1.070	1.480	4.080	2.780	0.599	3.160
July 18	1.830	2.090	1.750	0.327	0.988	1.190	3.810	2.480	0.565	2.860
July 19	1.730	1.890	1.770	0.307	0.936	1.110	3.900	2.340	0.529	2.590
July 20	1.720	1.700	1.400	0.287	0.826	1.000	3.930	2.060	0.483	2.520
July 21	1.660	1.590	1.150	0.253	0.767	0.948	3.600	1.970	0.440	2.490
July 22	1.560	1.500	1.030	0.279	0.659	0.883	3.350	1.790	0.427	2.360
July 23	1.410	1.420	1.010	0.293	0.648	0.782	3.130	1.660	0.384	2.260
July 24	1.280	1.350	0.899	0.272	0.774	0.731	2.920	1.460	0.350	2.150
July 25	1.170	1.280	0.803	0.281	0.806	0.672	2.700	1.300	0.322	2.050
July 26	1.080	1.180	0.739	0.278	0.872	0.591	2.520	1.130	0.294	1.910
July 27	0.983	1.110	0.668	0.315	0.945	0.807	2.330	0.952	0.278	1.820
July 28	0.921	1.030	0.637	0.469	0.913	1.340	2.180	0.957	0.252	1.910
July 29	0.850	0.958	0.588	0.663	0.855	1.690	2.020	0.911	0.246	2.470
July 30	0.794	0.923	0.599	0.791	0.842	1.420	1.880	0.832	0.218	7.690
July 31	0.741	0.811	0.551	0.778	0.798	1.220	1.750	0.797	0.199	11.600
Total July Discharge	**74.269**	**88.372**	**69.054**	**12.055**	**51.349**	**58.624**	**171.600**	**69.159**	**24.153**	**153.730**
August 01	0.686	0.661	0.535	0.695	0.780	1.040	1.630	0.748	0.178	9.550
August 02	0.653	0.667	0.467	0.591	0.666	0.940	1.530	0.673	0.170	7.850
August 03	0.608	0.684	0.450	0.472	0.611	0.843	1.430	0.574	0.149	6.710
August 04	0.614	0.691	0.443	0.459	0.537	0.746	1.330	0.489	0.145	5.880
August 05	0.714	0.687	0.471	0.436	0.524	0.683	1.240	0.493	0.152	5.100

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August 06	1.070	0.676	0.417	0.419	0.520	0.587	1.150	0.459	0.173	4.380
August 07	1.190	0.664	0.388	0.482	0.482	0.534	1.080	0.552	0.182	3.810
August 08	1.290	0.696	0.338	0.468	0.598	0.472	1.010	0.608	0.204	3.990
August 09	1.090	0.824	0.295	0.372	0.668	0.425	0.955	0.589	0.203	5.080
August 10	0.944	0.883	0.272	0.322	0.794	0.400	0.900	0.586	0.202	4.910
August 11	0.859	0.802	0.247	0.315	0.749	0.414	0.855	0.517	0.194	4.230
August 12	0.766	0.710	0.231	0.327	0.646	0.504	0.800	0.455	0.176	3.740
August 13	0.686	0.540	0.225	0.382	0.705	0.459	0.755	0.383	0.160	3.400
August 14	0.663	0.410	0.206	0.411	0.627	0.592	0.705	0.337	0.154	3.210
August 15	0.872	0.380	0.201	0.591	0.711	0.703	0.670	0.264	0.151	3.010
August 16	0.861	0.365	0.200	0.631	0.715	0.896	0.640	0.233	0.145	2.780
August 17	0.954	0.358	0.196	0.491	0.972	0.893	0.605	0.217	0.128	2.600
August 18	0.995	0.350	0.199	0.439	1.020	0.786	0.580	0.192	0.124	2.260
August 19	1.110	0.310	0.200	0.424	1.700	0.685	0.555	0.177	0.117	2.050
August 20	1.020	0.250	0.200	0.807	1.980	0.609	0.540	0.144	0.109	1.920
August 21	0.915	0.225	0.203	1.120	1.970	0.557	0.530	0.139	0.097	1.800
August 22	0.967	0.215	0.211	1.380	1.790	0.948	0.520	0.137	0.092	1.770
August 23		0.206	0.209	1.340	1.440	1.880	0.510	0.144	0.095	2.190
August 24		0.195	0.204	1.220	1.230	2.680	0.480	0.140	0.095	2.960
August 25		0.186	0.204	1.020	1.010	2.390	0.430	0.144	0.090	3.370
August 26		0.177	0.205	0.866	0.889	2.010	0.390	0.175	0.090	3.280
August 27		0.172	0.201	0.703	0.775	1.660	0.365	0.157	0.092	3.080
August 28		0.166	0.200	0.628	0.708	1.450	0.335	0.158	0.094	2.910
August 29		0.165	0.197	0.580	0.698	1.350	0.305	0.217	0.102	2.740
August 30		0.171	0.194	0.519	0.619	1.280	0.285	0.362	0.108	2.480
August 31		0.172	0.193	0.523	0.579	1.170	0.275	0.330	0.118	2.260
Total August Discharge	**19.527**	**13.668**	**8.402**	**19.433**	**27.713**	**30.586**	**23.385**	**10.793**	**4.289**	**115.300**
September 01		0.167	0.193	0.473	0.521	1.090	0.265	0.312	0.117	2.050
September 02		0.140	0.196	0.460	0.473	1.020	0.255	0.361	0.120	1.930
September 03		0.118	0.201	0.512	0.417	0.928	0.250	0.313	0.122	1.780
September 04		0.118	0.225	0.492	0.397	0.874	0.243	0.260	0.144	1.650
September 05		0.171	0.220	0.474	0.365	0.832	0.238	0.261	0.187	1.530
September 06		0.224	0.220	0.379	0.338	0.787	0.232	0.233	0.182	1.390
September 07		0.230	0.227	0.350	0.334	0.752	0.228	0.216	0.191	1.300
September 08		0.235	0.223	0.368	0.327	0.681	0.223	0.222	0.204	1.180
September 09		0.240	0.222	0.372	0.357	0.637	0.217	0.203	0.183	1.090
September 10		0.250	0.224	0.331	0.356	0.565	0.212	0.206	0.209	1.010
September 11		0.267	0.224	0.304	0.341	0.497	0.209	0.179	0.206	0.938
September 12		0.285	0.221	0.300	0.329	0.460	0.185	0.177	0.263	0.915
September 13		0.320	0.222	0.299	0.305	0.415	0.159	0.213	0.254	0.890
September 14		0.370	0.223	0.275	0.280	0.381	0.160	0.207	0.245	0.874
September 15		0.490	0.225	0.258	0.288	0.363	0.150	0.183	0.235	0.903
September 16		0.620	0.224	0.285	0.284	0.371	0.146	0.202	0.260	1.060
September 17		0.800	0.221	0.254	0.261	0.417	0.150	0.208	0.290	0.987
September 18		0.790	0.220	0.269	0.270	0.470	0.150	0.206	0.277	0.898
September 19		0.760	0.221	0.274	0.326	0.467	0.143	0.212	0.251	0.793
September 20		0.730	0.215	0.360	0.353	0.428	0.135	0.220	0.239	0.770
September 21		0.680	0.213	0.603	0.458	0.439	0.127	0.249	0.268	0.736
September 22		0.630	0.217	0.694	0.461	0.445	0.137	0.227	0.369	0.721
September 23		0.580	0.344	0.799	0.419	0.410	0.136	0.227	0.570	0.702
September 24		0.540	0.616	0.758	0.400	0.391	0.135	0.215	0.878	0.733
September 25		0.500	1.160	0.650	0.370	0.370	0.137	0.185	0.775	0.738
September 26		0.460	1.140	0.566	0.356	0.346	0.134	0.199	0.831	0.784
September 27		0.435	0.989	0.503	0.351	0.322	0.133	0.207	0.876	0.783
September 28		0.410	0.904	0.470	0.646	0.295	0.133	0.197	0.812	0.760
September 29		0.390	0.982	0.452	2.980	0.353	0.140	0.202	0.910	0.778
September 30		0.380	1.190	0.429	4.070	0.347	0.145	0.194	1.340	0.746

Station Number
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PARAMETER=

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total September Discharge	**0.000**	**12.330**	**12.122**	**13.013**	**17.433**	**16.153**	**5.307**	**6.696**	**11.808**	**31.419**
October 01		0.365	1.440	0.422	3.430	0.380	0.198	0.177	1.350	0.786
October 02		0.350	1.600	0.445	2.910	0.416	0.315	0.193	1.270	0.785
October 03		0.335	2.200	0.434	2.440	0.436	0.260	0.179	1.210	0.701
October 04		0.323	2.200	0.417	2.160	0.408	0.439	0.181	1.170	0.729
October 05		0.310	1.980	0.425	1.930	0.462	0.464	0.170	1.090	0.788
October 06		0.300	1.860	0.420	1.720	0.472	0.423	0.156	0.959	0.827
October 07		0.290	1.760	0.453	1.560	0.595	0.405	0.164	0.867	0.851
October 08		0.285	1.730	0.455	1.420	0.551	0.413	0.168	0.812	0.838
October 09		0.287	1.670	0.445	1.370	0.532	0.482	0.321	0.763	0.819
October 10		0.300	1.530	0.429	1.330	0.475	0.581	1.090	0.801	0.803
October 11		0.320	1.380	0.452	1.240	0.478	0.815	2.230	1.080	0.769
October 12		0.348	1.280	0.427	1.170	0.531	0.764	2.060	1.220	0.771
October 13		0.360	1.260	0.418	1.200	0.557	0.684	1.570	1.160	0.756
October 14		0.370	1.180	0.441	1.320	0.680	0.628	1.300	1.050	0.649
October 15		0.420	1.140	0.410	1.440	0.693	0.596	1.570	0.882	0.637
October 16		0.820	1.100	0.412	1.430	0.791	0.532	1.610	0.922	0.724
October 17		0.825	1.060	0.415	1.350	0.747	0.553	1.460	0.819	0.701
October 18		0.840	1.010	0.440	1.320	0.853	0.591	1.310	0.773	0.683
October 19		0.825	0.993	0.424	1.280	1.550	0.594	1.220	0.977	0.718
October 20		0.820	0.956	0.431	1.280	1.750	0.605	1.150	1.210	0.701
October 21		0.815	0.955	0.417	1.620	1.530	0.623	1.630	1.570	0.692
October 22		0.820	0.924	0.401	2.330	1.410	0.581	1.860	2.030	0.563
October 23		0.760	0.894	0.387	2.580	1.350	0.589	1.510	2.630	0.636
October 24		0.710	0.895	0.380	2.410	1.260	0.741	1.330	4.260	0.863
October 25		0.655	0.896	0.317	2.500	1.230	0.983	1.210	4.550	0.930
October 26		0.620	0.854	0.314	2.590	1.330	1.360	0.901	4.000	0.960
October 27		0.590	0.950	0.312	2.600	1.470	1.330	0.835	3.410	1.080
October 28		0.570	0.957	0.356	2.550	1.480	1.270	0.780	3.040	1.180
October 29		0.575	0.978	1.210	2.420	1.350	1.090	0.725	2.880	1.230
October 30	0.959	0.570	1.020	4.080	2.340	1.300	1.170	0.699	2.770	1.160
October 31	0.910	0.535	1.020	4.780	2.230	1.240	0.996	0.680	2.680	1.090
Total October Discharge	1.869	16.313	39.672	21.569	59.470	28.307	21.075	30.439	54.205	25.420
November 01	0.860	0.485	1.010	4.330	2.180	1.180	0.924	0.665	2.630	1.060
November 02	0.810	0.470	1.070	3.560	2.100	1.140	0.920	0.660	2.630	2.500
November 03	0.780	0.460	1.150	3.100	2.030	1.210	0.910	0.650	2.530	7.320
November 04	0.750	0.448	1.390	2.840	1.970	1.900	0.900	0.645	2.590	6.980
November 05	0.720	0.438	1.430	2.580	1.920	2.500	0.900	0.780	2.460	5.220
November 06	0.690	0.423	1.380	2.490	1.880	2.310	0.910	0.760	2.490	4.300
November 07	0.660	0.419	1.320	2.610	1.830	2.100	0.915	0.755	2.390	3.760
November 08	0.640	0.390	1.310	4.160	1.780	1.970	0.920	0.762	2.290	3.400
November 09	0.610	0.365	1.240	8.540	1.720	2.070	0.910	0.800	1.720	3.090
November 10	0.590	0.343	1.180	8.350	1.680	1.950	0.890	0.980	1.460	2.770
November 11	0.565	0.325	1.110	7.100	1.620	1.880	0.885	1.500	1.300	2.610
November 12	0.550	0.310	0.980	6.150	1.580	1.780	0.885	1.350	1.240	2.510
November 13	0.535	0.295	0.910	5.660	1.530	1.720	0.895	1.210	1.250	2.170
November 14	0.515	0.280	0.860	5.110	1.490	1.730	0.905	1.150	1.280	1.600
November 15	0.500	0.290	0.820	4.310	1.470	1.780	0.905	1.140	1.300	1.250
November 16	0.490	0.285	0.805	3.710	1.420	2.100	0.905	1.110	1.310	1.150
November 17	0.480	0.278	0.795	3.040	1.400	2.260	0.905	1.090	1.290	1.060
November 18	0.470	0.265	0.780	2.800	1.380	3.580	0.900	1.150	1.260	0.960
November 19	0.465	0.258	0.775	2.600	1.350	9.850	0.860	1.300	1.230	0.900
November 20	0.455	0.245	0.772	2.480	1.320	10.200	0.810	1.280	1.200	0.860
November 21	0.455	0.224	0.775	2.410	1.290	7.710	0.780	1.250	1.180	0.830
November 22	0.455	0.208	0.780	2.370	1.260	7.680	0.715	1.190	1.140	0.810
November 23	0.460	0.188	0.773	2.320	1.240	7.940	0.670	1.120	1.090	0.790

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	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
November 24	0.480	0.176	0.780	2.320	1.220	7.150	0.645	1.090	1.030	0.770
November 25	0.500	0.170	0.800	2.440	1.200	7.250	0.640	1.070	0.960	0.760
November 26	0.535	0.160	0.802	2.600	1.180	7.470	0.680	1.050	0.940	0.750
November 27	0.540	0.158	0.800	2.690	1.160	8.130	0.750	1.040	0.925	0.740
November 28	0.535	0.139	0.780	2.400	1.140	7.950	0.755	1.030	0.920	0.727
November 29	0.535	0.132	0.760	2.150	1.120	4.990	0.720	1.020	0.908	0.720
November 30	0.530	0.126	0.740	1.950	1.100	4.050	0.690	1.020	0.900	0.718
Total November Discharge	**17.160**	**8.753**	**28.877**	**109.170**	**45.560**	**125.530**	**24.999**	**30.617**	**45.843**	**63.085**
December 01	0.525	0.120	0.725	1.720	1.100	3.980	0.685	1.020	0.895	0.705
December 02	0.522	0.117	0.715	1.560	1.110	3.930	0.700	1.020	0.880	0.698
December 03	0.520	0.115	0.700	1.370	1.120	4.140	0.750	1.030	0.860	0.688
December 04	0.515	0.114	0.680	1.220	1.120	4.190	0.830	1.050	0.840	0.680
December 05	0.505	0.113	0.667	1.110	1.130	4.120	0.855	1.070	0.820	0.675
December 06	0.510	0.110	0.660	1.000	1.130	3.800	0.855	1.090	0.800	0.665
December 07	0.530	0.104	0.645	0.920	1.130	3.430	0.835	1.090	0.780	0.660
December 08	0.580	0.100	0.635	0.850	1.130	3.540	0.805	1.080	0.765	0.650
December 09	0.600	0.099	0.620	0.790	1.140	3.440	0.745	1.070	0.750	0.642
December 10	0.600	0.096	0.605	0.740	1.140	3.330	0.730	1.050	0.735	0.639
December 11	0.600	0.092	0.595	0.680	1.130	3.250	0.725	1.040	0.720	0.630
December 12	0.590	0.090	0.580	0.640	1.120	3.190	0.725	1.010	0.705	0.620
December 13	0.580	0.088	0.567	0.610	1.110	3.180	0.720	1.000	0.700	0.613
December 14	0.570	0.086	0.558	0.570	1.090	3.170	0.690	0.985	0.700	0.600
December 15	0.560	0.083	0.544	0.550	1.080	3.160	0.610	0.980	0.700	0.599
December 16	0.550	0.080	0.540	0.530	1.060	3.160	0.535	0.970	0.675	0.598
December 17	0.545	0.079	0.539	0.510	1.050	3.160	0.510	0.960	0.660	0.595
December 18	0.535	0.079	0.529	0.490	1.040	3.160	0.490	0.965	0.627	0.588
December 19	0.525	0.078	0.525	0.480	1.020	3.100	0.485	0.965	0.600	0.583
December 20	0.520	0.076	0.519	0.470	0.995	2.790	0.490	0.960	0.570	0.578
December 21	0.515	0.075	0.518	0.460	0.980	2.710	0.505	0.995	0.555	0.570
December 22	0.505	0.074	0.518	0.445	0.965	2.700	0.540	1.010	0.540	0.564
December 23	0.500	0.073	0.520	0.435	0.940	2.750	0.560	1.020	0.538	0.560
December 24	0.495	0.072	0.533	0.425	0.920	3.500	0.575	1.020	0.530	0.555
December 25	0.490	0.071	0.540	0.420	0.905	5.000	0.575	1.010	0.520	0.550
December 26	0.485	0.071	0.535	0.415	0.890	7.300	0.555	1.010	0.515	0.545
December 27	0.480	0.070	0.520	0.410	0.870	7.700	0.515	1.000	0.492	0.540
December 28	0.475	0.069	0.505	0.405	0.850	7.400	0.490	1.000	0.455	0.540
December 29	0.475	0.068	0.499	0.400	0.835	7.000	0.485	1.000	0.423	0.539
December 30	0.472	0.067	0.490	0.395	0.820	4.200	0.490	1.000	0.411	0.539
December 31	0.470	0.066	0.487	0.390	0.805	2.800	0.485	1.000	0.402	0.538
Total December Discharge	**16.344**	**2.696**	**17.813**	**21.410**	**31.725**	**122.280**	**19.545**	**31.470**	**20.163**	**18.746**

Station Number	**08EE018**					
Station Name	**MAXAN CREEK ABOVE BULKLEY LAKE**					
LATITUDE=	**54:21:25N**					
LONGITUDE=	**126:10:12W**					
PARAMETER=	**Flow m3/s**					
	1974	**1975**	**1976**	**1977**	**1978**	**1979**
January 01		0.258	0.968	0.549	0.453	0.278
January 02		0.261	0.949	0.544	0.450	0.278
January 03		0.261	0.932	0.538	0.447	0.278
January 04		0.263	0.900	0.535	0.445	0.278
January 05		0.263	0.892	0.530	0.442	0.278
January 06		0.263	0.875	0.524	0.439	0.278
January 07		0.261	0.858	0.518	0.436	0.278
January 08		0.261	0.838	0.513	0.433	0.278
January 09		0.261	0.824	0.510	0.430	0.278
January 10		0.261	0.813	0.507	0.428	0.278
January 11		0.258	0.799	0.504	0.425	0.278
January 12		0.258	0.782	0.498	0.422	0.275
January 13		0.255	0.765	0.496	0.419	0.275
January 14		0.255	0.748	0.490	0.416	0.272
January 15		0.252	0.731	0.487	0.413	0.272
January 16		0.249	0.716	0.484	0.411	0.272
January 17		0.249	0.702	0.481	0.408	0.272
January 18		0.246	0.688	0.479	0.405	0.272
January 19		0.244	0.677	0.476	0.402	0.272
January 20		0.241	0.663	0.473	0.399	0.272
January 21		0.238	0.654	0.470	0.396	0.272
January 22		0.238	0.646	0.467	0.394	0.269
January 23		0.235	0.637	0.464	0.391	0.269
January 24		0.232	0.629	0.462	0.385	0.269
January 25		0.232	0.620	0.459	0.382	0.269
January 26		0.229	0.612	0.456	0.379	0.269
January 27		0.227	0.606	0.453	0.374	0.266
January 28		0.227	0.597	0.450	0.368	0.266
January 29		0.224	0.589	0.447	0.365	0.266
January 30		0.224	0.583	0.447	0.360	0.266
January 31		0.221	0.578	0.447	0.357	0.266
Total January Discharge		**7.647**	**22.871**	**15.158**	**12.674**	**8.459**
February 01		0.221	0.572	0.447	0.354	0.266
February 02		0.221	0.566	0.445	0.351	0.266
February 03		0.218	0.561	0.445	0.348	0.263
February 04		0.215	0.555	0.442	0.343	0.263
February 05		0.215	0.549	0.442	0.337	0.263
February 06		0.215	0.547	0.442	0.334	0.263
February 07		0.215	0.544	0.442	0.328	0.263
February 08		0.215	0.541	0.442	0.326	0.261
February 09		0.215	0.538	0.442	0.323	0.261
February 10		0.215	0.535	0.439	0.317	0.261
February 11		0.215	0.535	0.439	0.311	0.261
February 12		0.215	0.532	0.439	0.303	0.261
February 13		0.212	0.530	0.439	0.297	0.258
February 14		0.212	0.527	0.439	0.292	0.258
February 15		0.212	0.527	0.439	0.289	0.258
February 16		0.210	0.524	0.439	0.286	0.258
February 17		0.210	0.524	0.439	0.283	0.258
February 18		0.210	0.521	0.439	0.280	0.261
February 19		0.207	0.518	0.439	0.275	0.261
February 20		0.207	0.515	0.439	0.272	0.261

Station Number	**08EE018**					
Station Name	**MAXAN CREEK ABOVE BULKLEY LAKE**					
LATITUDE=	**54:21:25N**					
LONGITUDE=	**126:10:12W**					
PARAMETER=	**Flow m3/s**					
	1974	**1975**	**1976**	**1977**	**1978**	**1979**
February 21		0.207	0.515	0.439	0.269	0.261
February 22		0.204	0.510	0.439	0.263	0.263
February 23		0.204	0.507	0.439	0.258	0.266
February 24		0.204	0.501	0.439	0.255	0.269
February 25		0.204	0.498	0.439	0.249	0.272
February 26		0.201	0.498	0.439	0.244	0.278
February 27		0.201	0.493	0.439	0.241	0.283
February 28		0.201	0.487	0.439	0.235	0.289
February 29			0.481			
Total February Discharge		**5.901**	**15.251**	**12.330**	**8.263**	**7.406**
March 01		0.198	0.479	0.439	0.232	0.292
March 02		0.198	0.476	0.436	0.227	0.294
March 03		0.198	0.467	0.436	0.224	0.297
March 04		0.198	0.464	0.433	0.218	0.300
March 05		0.198	0.462	0.433	0.215	0.300
March 06		0.198	0.459	0.433	0.212	0.306
March 07		0.195	0.453	0.430	0.210	0.311
March 08		0.195	0.447	0.430	0.207	0.314
March 09		0.195	0.442	0.430	0.204	0.317
March 10		0.193	0.436	0.430	0.201	0.323
March 11		0.193	0.430	0.428	0.198	0.328
March 12		0.193	0.425	0.425	0.195	0.331
March 13		0.193	0.416	0.425	0.193	0.334
March 14		0.195	0.411	0.422	0.190	0.337
March 15		0.195	0.402	0.422	0.187	0.340
March 16		0.195	0.396	0.419	0.184	0.340
March 17		0.195	0.391	0.419	0.181	0.343
March 18		0.198	0.385	0.416	0.178	0.345
March 19		0.198	0.379	0.413	0.176	0.345
March 20		0.198	0.377	0.413	0.176	0.345
March 21		0.198	0.371	0.411	0.173	0.343
March 22		0.201	0.368	0.408	0.170	0.343
March 23		0.201	0.365	0.405	0.170	0.343
March 24		0.204	0.360	0.399	0.167	0.340
March 25		0.204	0.354	0.396	0.167	0.340
March 26		0.207	0.354	0.394	0.164	0.337
March 27		0.210	0.351	0.391	0.164	0.334
March 28		0.210	0.351	0.388	0.161	0.328
March 29		0.212	0.348	0.385	0.161	0.326
March 30		0.215	0.345	0.385	0.159	0.320
March 31		0.218	0.345	0.396	0.159	0.317
Total March Discharge		**6.199**	**12.509**	**12.890**	**5.823**	**10.113**
April 01		0.221	0.360	0.453	0.159	0.314
April 02		0.224	0.399	0.442	0.159	0.311
April 03		0.227	0.439	0.524	0.159	0.309
April 04		0.229	0.479	0.631	0.159	0.309
April 05		0.232	0.484	0.736	0.159	0.309
April 06		0.235	0.603	0.830	0.159	0.309
April 07		0.238	0.682	0.994	0.159	0.309
April 08		0.246	0.750	1.200	0.159	0.311

Station Number	08EE018					
Station Name	MAXAN CREEK ABOVE BULKLEY LAKE					
LATITUDE=	54:21:25N					
LONGITUDE=	126:10:12W					
PARAMETER=	Flow m3/s					
	1974	1975	1976	1977	1978	1979
April 09		0.252	0.782	1.520	0.159	0.311
April 10		0.258	0.634	2.050	0.159	0.314
April 11		0.263	0.671	2.550	0.161	0.317
April 12		0.269	0.912	3.060	0.161	0.326
April 13		0.275	1.080	3.600	0.164	0.340
April 14		0.283	1.310	3.910	0.164	0.368
April 15		0.294	1.500	4.280	0.167	0.396
April 16		0.303	1.780	4.250	0.167	0.487
April 17		0.314	2.010	4.130	0.170	0.538
April 18		0.328	2.260	3.960	0.283	0.623
April 19		0.343	2.510	3.770	0.521	0.708
April 20		0.357	2.750	3.480	0.796	0.821
April 21		0.377	2.920	3.370	1.230	0.949
April 22		0.396	2.920	3.510	1.760	1.080
April 23		0.413	3.060	4.450	2.100	1.300
April 24		0.436	3.140	6.710	2.920	1.460
April 25		0.459	3.230	11.000	5.210	1.750
April 26		0.481	3.370	22.000	8.070	2.260
April 27		0.513	3.680	31.100	10.600	2.920
April 28		0.538	4.420	31.100	13.300	4.220
April 29		0.575	5.580	28.600	14.800	7.620
April 30		0.600	7.480	25.100	15.400	13.300
Total April Discharge		**10.179**	**62.195**	**213.310**	**79.734**	**44.889**
May 01		0.813	11.300	22.700	15.400	19.500
May 02		1.220	17.100	21.700	15.000	23.900
May 03		2.100	21.800	20.900	14.100	28.300
May 04		3.540	26.600	19.500	12.700	29.700
May 05		5.410	33.100	17.500	11.500	29.200
May 06		6.680	36.200	17.600	10.500	27.400
May 07		7.140	35.700	18.000	10.400	25.100
May 08		7.530	34.300	19.500	11.600	23.000
May 09		8.380	33.100	17.700	13.000	21.000
May 10		10.900	33.700	16.100	13.400	18.900
May 11		15.400	34.300	14.800	12.900	17.000
May 12		17.200	31.100	13.000	12.600	15.600
May 13		17.000	27.300	11.100	11.800	14.400
May 14		16.600	24.400	9.680	12.200	13.300
May 15		16.500	22.900	8.670	14.000	13.000
May 16		16.000	23.100	8.780	14.300	14.000
May 17		14.300	24.100	8.750	13.800	14.800
May 18		12.700	22.700	8.130	13.400	15.100
May 19		11.100	20.800	7.760	14.000	14.200
May 20		10.500	19.300	7.480	14.800	13.900
May 21		9.850	18.100	6.850	14.200	13.500
May 22		9.320	17.400	6.430	12.600	14.100
May 23		8.470	16.700	6.090	12.100	16.300
May 24		7.530	16.400	6.200	11.800	18.700
May 25		7.480	16.400	5.690	10.900	18.100
May 26		7.500	15.700	5.520	10.600	19.300
May 27		8.440	16.000	5.800	11.000	17.600
May 28		10.300	15.500	5.300	11.200	14.100
May 29		11.300	14.300	4.930	9.570	13.200

Station Number	**08EE018**					
Station Name	**MAXAN CREEK ABOVE BULKLEY LAKE**					
LATITUDE=	**54:21:25N**					
LONGITUDE=	**126:10:12W**					
PARAMETER=	**Flow m3/s**					
	1974	**1975**	**1976**	**1977**	**1978**	**1979**
May 30		10.500	13.600	4.700	8.780	13.500
May 31		9.910	12.600	4.670	8.720	13.600
Total May Discharge		**301.613**	**705.600**	**351.530**	**382.870**	**563.300**
June 01		10.100	13.400	4.960	9.170	14.400
June 02		10.700	14.100	4.590	9.400	13.700
June 03		9.030	14.700	4.190	9.200	12.800
June 04		8.830	14.700	4.020	8.440	10.900
June 05		8.520	15.300	4.420	7.310	10.800
June 06		7.330	15.400	4.190	6.230	9.000
June 07		6.540	17.100	4.190	5.380	7.650
June 08		5.830	18.800	3.790	4.730	7.020
June 09		5.410	20.800	3.450	4.220	6.820
June 10		5.320	20.000	3.260	3.880	6.460
June 11		5.130	18.100	3.030	3.710	5.660
June 12		4.810	16.100	2.890	3.620	5.270
June 13		4.700	15.300	2.790	4.080	6.820
June 14		4.530	15.400	2.610	14.500	8.010
June 15		4.730	16.300	2.800	9.200	7.450
June 16		4.450	19.300	2.830	6.800	7.530
June 17		4.130	19.300	2.450	5.550	6.970
June 18		4.300	19.700	2.160	4.810	6.370
June 19		4.840	17.800	1.990	4.280	5.830
June 20		4.220	14.700	1.790	3.850	5.410
June 21		3.600	13.100	2.050	4.020	4.930
June 22		3.170	12.800	2.060	10.300	4.470
June 23		2.940	12.200	1.760	8.410	4.130
June 24		2.820	11.000	1.670	6.600	3.990
June 25	4.930	2.610	9.740	1.560	5.660	3.650
June 26		2.340	9.710	1.430	4.980	3.370
June 27		1.980	9.290	1.390	4.530	3.060
June 28		2.410	9.030	1.330	4.080	2.810
June 29		2.270	9.400	1.250	3.620	2.530
June 30		2.190	9.200	1.160	3.200	2.330
Total June Discharge		**149.780**	**441.770**	**82.060**	**183.760**	**200.140**
July 1		2.000	8.240	1.090	2.830	2.200
July 2		1.800	7.450	0.988	2.520	3.310
July 3		1.680	6.630	0.898	2.190	4.740
July 4		1.530	6.430	0.872	1.950	4.080
July 5		1.380	6.060	1.150	1.740	3.680
July 6		1.250	5.580	1.050	1.530	3.780
July 7		1.060	5.350	0.960	1.320	3.210
July 8		1.040	5.240	0.963	1.160	2.930
July 9		1.030	4.760	1.430	1.120	2.650
July 10		0.957	4.280	1.970	1.410	2.500
July 11		0.827	4.190	2.080	1.290	2.410
July 12		0.617	4.280	4.390	0.951	2.420
July 13		0.436	3.790	3.770	0.756	2.210
July 14		0.331	3.400	3.000	0.614	1.980
July 15		0.368	3.110	2.940	0.544	1.700
July 16		0.388	2.860	2.710	0.479	1.610
July 17		0.504	2.470	2.400	0.402	1.460

Station Number	08EE018					
Station Name	MAXAN CREEK ABOVE BULKLEY LAKE					
LATITUDE=	54:21:25N					
LONGITUDE=	126:10:12W					
PARAMETER=	Flow m3/s					
	1974	1975	1976	1977	1978	1979
July 18		0.796	2.220	2.440	0.368	1.270
July 19		0.765	2.020	2.310	0.351	1.120
July 20		0.728	2.280	2.050	0.331	0.985
July 21		0.660	2.700	1.870	0.294	0.923
July 22		0.592	2.290	1.670	0.280	0.986
July 23		0.515	2.000	1.460	0.258	0.830
July 24		0.456	1.930	1.270	0.244	0.588
July 25		0.385	1.820	1.170	0.235	0.306
July 26		0.408	1.680	1.030	0.227	0.235
July 27		0.388	1.560	0.895	0.218	0.215
July 28		0.379	1.970	0.835	0.212	0.191
July 29		0.362	2.430	1.280	0.207	0.169
July 30		0.326	2.010	1.210	0.207	0.143
July 31		0.303	1.840	1.120	0.204	0.145
Total July Discharge		24.261	112.870	53.271	26.442	54.976
August 1		0.286	1.870	0.926	0.201	0.142
August 2		0.328	1.760	0.801	0.204	0.136
August 3		0.371	2.140	0.671	0.210	0.129
August 4		0.450	2.060	0.578	0.215	0.124
August 5		0.538	1.780	0.433	0.221	0.133
August 6		0.459	1.560	0.357	0.204	0.137
August 7		0.504	1.550	0.351	0.198	0.114
August 8		0.606	1.670	0.309	0.221	0.104
August 9		0.524	1.520	0.283	0.241	0.088
August 10		0.575	1.440	0.246	0.255	0.077
August 11		0.600	1.410	0.207	0.227	0.066
August 12		0.547	1.300	0.170	0.793	0.061
August 13		0.442	1.370	0.159	0.566	0.054
August 14		0.394	1.510	0.153	0.510	0.045
August 15		0.365	1.590	0.133	0.300	0.041
August 16		0.385	1.420	0.110	0.269	0.038
August 17		0.547	1.310	0.099	0.244	0.036
August 18		0.665	1.250	0.099	0.221	0.088
August 19		0.629	1.270	0.088	0.204	0.102
August 20		0.535	1.720	0.088	0.227	0.085
August 21		0.484	1.610	0.085	0.283	0.068
August 22		0.470	1.420	0.198	0.368	0.051
August 23		0.436	1.370	0.195	0.991	0.049
August 24		0.425	1.440	0.144	1.270	0.053
August 25		0.481	1.710	0.119	0.566	0.052
August 26		0.564	1.510	0.108	0.297	0.047
August 27		1.210	1.460	0.099	0.255	0.039
August 28		1.320	1.420	0.108	0.227	0.028
August 29		1.320	1.360	0.184	0.204	0.039
August 30		1.350	1.390	0.286	0.190	0.030
August 31		1.250	1.420	0.244	0.176	0.043
Total August Discharge		19.060	47.610	8.031	10.558	2.299
September 1		1.120	1.310	0.176	0.176	0.043
September 2		0.985	1.210	0.159	0.178	0.037
September 3		0.841	1.200	0.303	0.176	0.042
September 4		0.779	1.290	0.507	0.178	0.056

Station Number	**08EE018**					
Station Name	**MAXAN CREEK ABOVE BULKLEY LAKE**					
LATITUDE=	**54:21:25N**					
LONGITUDE=	**126:10:12W**					
PARAMETER=	**Flow m3/s**					
	1974	**1975**	**1976**	**1977**	**1978**	**1979**
September 5		0.864	1.380	0.665	0.181	0.078
September 6		0.810	1.230	0.541	0.195	0.117
September 7		0.685	1.190	0.442	0.303	0.119
September 8		0.597	1.090	0.360	0.227	0.137
September 9		0.532	1.050	0.334	0.340	0.160
September 10		0.490	1.070	0.314	0.425	0.147
September 11		0.450	1.200	0.289	0.326	0.128
September 12		0.419	1.190	0.283	0.283	0.130
September 13		0.391	1.130	0.326	0.227	0.128
September 14		0.362	1.150	0.362	0.204	0.125
September 15		0.340	1.030	0.374	0.198	0.114
September 16		0.368	0.974	0.374	0.212	0.116
September 17		0.385	1.120	0.388	0.198	0.123
September 18		0.371	0.971	0.402	0.218	0.127
September 19		0.351	0.844	0.504	0.227	0.129
September 20		0.328	0.767	0.960	0.246	0.142
September 21		0.300	0.728	1.050	0.210	0.139
September 22		0.283	0.708	1.010	0.210	0.133
September 23		0.275	0.790	1.310	0.210	0.123
September 24		0.266	0.773	1.520	0.227	0.128
September 25		0.249	0.691	2.210	0.266	0.139
September 26		0.244	0.665	2.060	0.227	0.123
September 27	0.116	0.244	0.597	2.310	0.198	0.133
September 28	0.116	0.249	0.597	2.090	0.255	0.160
September 29	0.116	0.278	0.623	1.870	0.340	0.183
September 30	0.125	0.283	0.665	1.750	0.422	0.181
Total September Discharge		**14.139**	**29.233**	**25.243**	**7.283**	**3.640**
October 1	0.178	0.269	0.589	1.720	0.289	0.182
October 2	0.408	0.252	0.597	1.860	0.337	0.194
October 3	0.402	0.241	0.637	1.840	0.311	0.179
October 4	0.303	0.235	0.620	1.790	0.283	0.176
October 5	0.266	0.229	0.779	1.760	0.238	0.171
October 6	0.244	0.246	0.940	1.760	0.221	0.163
October 7	0.297	0.263	1.280	1.740	0.210	0.162
October 8	0.411	0.258	1.120	1.720	0.198	0.176
October 9	0.334	0.292	1.080	1.680	0.255	0.171
October 10	0.297	0.306	1.080	1.610	0.311	0.177
October 11	0.261	0.385	1.040	1.660	0.365	0.225
October 12	0.232	0.391	0.949	1.900	0.345	0.366
October 13	0.204	0.357	1.100	1.990	0.311	0.247
October 14	0.261	0.365	1.110	1.790	0.283	0.223
October 15	0.297	0.883	0.951	1.760	0.232	0.201
October 16	0.411	0.926	0.903	1.700	0.218	0.207
October 17	0.530	0.762	0.784	1.630	0.238	0.191
October 18	0.595	0.694	0.765	1.690	0.215	0.195
October 19	0.629	0.668	0.708	1.670	0.269	0.207
October 20	0.609	0.668	0.651	1.430	0.708	0.204
October 21	0.569	0.572	0.609	1.440	0.991	0.190
October 22	0.561	0.476	0.558	1.450	1.160	0.190
October 23	0.569	0.462	0.569	2.170	0.991	0.190
October 24	0.544	0.436	0.592	2.500	0.920	0.190
October 25	0.527	0.433	0.626	2.220	0.765	0.235

Station Number	**08EE018**					
Station Name	**MAXAN CREEK ABOVE BULKLEY LAKE**					
LATITUDE=	**54:21:25N**					
LONGITUDE=	**126:10:12W**					
PARAMETER=	**Flow m3/s**					
	1974	**1975**	**1976**	**1977**	**1978**	**1979**
October 26	0.549	0.419	0.680	2.020	0.651	0.383
October 27	0.580	0.408	0.915	1.960	0.566	0.436
October 28	0.600	0.391	1.240	2.050	0.439	0.508
October 29	0.442	0.394	1.040	1.980	0.377	0.463
October 30	0.408	0.374	0.988	1.880	0.326	0.334
October 31	0.382	0.694	0.963	1.660	0.289	0.243
Total October Discha	**12.900**	**13.749**	**26.463**	**56.030**	**13.312**	**7.379**
November 1	0.328	1.180	0.906	1.640	0.311	0.234
November 2	0.246	1.130	0.898	1.680	0.345	0.214
November 3	0.244	1.390	0.878	1.590	0.311	0.189
November 4	0.238	1.310	1.190	1.380	0.368	0.161
November 5	0.232	1.290	0.932	1.410	0.340	0.147
November 6	0.238	1.180	0.827	1.480	0.309	0.142
November 7	0.244	1.260	0.960	1.350	0.510	0.136
November 8	0.241	1.140	0.816	1.260	0.765	0.130
November 9	0.221	1.030	0.682	1.310	0.481	0.122
November 10	0.201	0.895	0.691	1.270	0.453	0.116
November 11	0.193	0.966	0.691	1.260	0.439	0.110
November 12	0.181	1.240	0.680	1.230	0.425	0.105
November 13	0.176	1.680	0.606	1.210	0.411	0.102
November 14	0.159	1.930	0.538	1.150	0.396	0.099
November 15	0.159	2.150	0.490	1.130	0.388	0.093
November 16	0.164	2.200	0.462	1.100	0.379	0.091
November 17	0.161	3.340	1.220	1.080	0.374	0.088
November 18	0.161	6.510	1.750	1.050	0.365	0.085
November 19	0.159	7.530	1.720	1.020	0.362	0.082
November 20	0.178	6.740	1.570	1.000	0.354	0.079
November 21	0.178	5.440	1.480	0.968	0.348	0.079
November 22	0.176	4.110	1.420	0.951	0.345	0.076
November 23	0.176	2.830	1.330	0.929	0.343	0.074
November 24	0.173	2.350	1.250	0.906	0.343	0.071
November 25	0.173	2.180	1.220	0.878	0.340	0.071
November 26	0.170	2.010	1.160	0.858	0.340	0.068
November 27	0.170	1.900	1.130	0.835	0.340	0.065
November 28	0.170	1.780	1.080	0.810	0.337	0.065
November 29	0.170	1.700	1.040	0.790	0.331	0.062
November 30	0.170	1.610	0.991	0.779	0.328	0.062
Total November Disch	**5.850**	**72.001**	**30.608**	**34.304**	**11.481**	**3.218**
December 1	0.173	1.530	0.957	0.756	0.328	0.062
December 2	0.176	1.470	0.934	0.736	0.326	0.059
December 3	0.176	1.420	0.912	0.714	0.323	0.059
December 4	0.178	1.360	0.892	0.705	0.320	0.057
December 5	0.181	1.330	0.855	0.680	0.317	0.057
December 6	0.181	1.300	0.821	0.665	0.311	0.057
December 7	0.184	1.260	0.816	0.648	0.309	0.054
December 8	0.187	1.230	0.793	0.634	0.306	0.054
December 9	0.190	1.200	0.779	0.620	0.303	0.054
December 10	0.193	1.160	0.762	0.609	0.300	0.054
December 11	0.195	1.130	0.750	0.595	0.297	0.051
December 12	0.198	1.110	0.736	0.583	0.297	0.051
December 13	0.201	1.090	0.725	0.572	0.294	0.051

Station Number	**08EE018**
Station Name	**MAXAN CREEK ABOVE BULKLEY LAKE**
LATITUDE=	**54:21:25N**
LONGITUDE=	**126:10:12W**
PARAMETER=	**Flow m3/s**

	1974	1975	1976	1977	1978	1979
December 14	0.204	1.070	0.708	0.564	0.294	0.051
December 15	0.210	1.060	0.691	0.552	0.294	0.051
December 16	0.212	1.050	0.680	0.544	0.294	0.051
December 17	0.215	1.030	0.665	0.535	0.294	0.054
December 18	0.221	1.030	0.651	0.527	0.292	0.057
December 19	0.224	1.020	0.646	0.518	0.292	0.059
December 20	0.227	1.020	0.637	0.510	0.289	0.065
December 21	0.232	1.010	0.626	0.504	0.289	0.071
December 22	0.235	1.010	0.620	0.498	0.289	0.079
December 23	0.238	1.010	0.609	0.490	0.286	0.088
December 24	0.241	1.010	0.600	0.487	0.286	0.102
December 25	0.244	1.010	0.592	0.479	0.283	0.108
December 26	0.249	1.010	0.580	0.473	0.283	0.113
December 27	0.252	1.000	0.572	0.467	0.283	0.119
December 28	0.252	1.000	0.564	0.464	0.280	0.127
December 29	0.255	0.997	0.558	0.459	0.280	0.130
December 30	0.255	0.991	0.555	0.456	0.278	0.136
December 31	0.255	0.977	0.552	0.453	0.278	0.136
Total December Disch	**6.634**	**34.895**	**21.838**	**17.497**	**9.195**	**2.317**

STANUM=	08EE019
STANAME=	MAXAN CREEK AT OUTLET OF MAXAN LAKE
LATITUDE=	54:19:10N
LONGITUDE=	126:06:59W
PARAMETER=	Flow m3/s

	1976		
January 01	0.906	July 1	3.620
January 02	0.900	July 2	3.400
January 03	0.889	July 3	3.170
January 04	0.878	July 4	2.940
January 05	0.861	July 5	2.720
January 06	0.850	July 6	2.610
January 07	0.835	July 7	2.460
January 08	0.821	July 8	2.350
January 09	0.793	July 9	2.210
January 10	0.787	July 10	2.100
January 11	0.770	July 11	1.970
January 12	0.762	July 12	1.930
January 13	0.736	July 13	1.780
January 14	0.722	July 14	1.700
January 15	0.694	July 15	1.610
January 16	0.682	July 16	1.540
January 17	0.674	July 17	1.470
January 18	0.651	July 18	1.420
January 19	0.637	July 19	1.360
January 20	0.623	July 20	1.310
January 21	0.609	July 21	1.250
January 22	0.595	July 22	1.190
January 23	0.580	July 23	1.150
January 24	0.569	July 24	1.100
January 25	0.561	July 25	1.070
January 26	0.544	July 26	1.030
January 27	0.535	July 27	1.010
January 28	0.521	July 28	0.957
January 29	0.510	July 29	0.920
January 30	0.498	July 30	0.892
January 31	0.487	July 31	0.864
Total January Discharge	**21.480**	**Total July Discharge**	**55.103**
February 01	0.479	August 1	0.833
February 02	0.467	August 2	0.821
February 03	0.459	August 3	0.807
February 04	0.450	August 4	0.750
February 05	0.430	August 5	0.722
February 06	0.425	August 6	0.705
February 07	0.419	August 7	0.680
February 08	0.411	August 8	0.657
February 09	0.402	August 9	0.637
February 10	0.399	August 10	0.623
February 11	0.396	August 11	0.600
February 12	0.391	August 12	0.578
February 13	0.385	August 13	0.566
February 14	0.382	August 14	0.549
February 15	0.379	August 15	0.535
February 16	0.374	August 16	0.515
February 17	0.371	August 17	0.507

STANUM=	**08EE019**
STANAME=	**MAXAN CREEK AT OUTLET OF MAXAN LAKE**
LATITUDE=	**54:19:10N**
LONGITUDE=	**126:06:59W**
PARAMETER=	**Flow m3/s**

1976

February 18	0.368
February 19	0.368
February 20	0.365
February 21	0.362
February 22	0.357
February 23	0.354
February 24	0.351
February 25	0.345
February 26	0.348
February 27	0.343
February 28	0.340
February 29	0.340
Total February Discharge	**9.644**
March 1	0.337
March 2	0.334
March 3	0.331
March 4	0.328
March 5	0.328
March 6	0.326
March 7	0.323
March 8	0.320
March 9	0.317
March 10	0.317
March 11	0.317
March 12	0.317
March 13	0.314
March 14	0.314
March 15	0.311
March 16	0.311
March 17	0.309
March 18	0.309
March 19	0.306
March 20	0.306
March 21	0.306
March 22	0.303
March 23	0.303
March 24	0.300
March 25	0.300
March 26	0.297
March 27	0.294
March 28	0.292
March 29	0.289
March 30	0.292
March 31	0.294
Total March Discharge	**9.645**
April 1	0.300
April 2	0.306
April 3	0.311

August 18	0.496
August 19	0.479
August 20	0.473
August 21	0.459
August 22	0.450
August 23	0.436
August 24	0.428
August 25	0.419
August 26	0.411
August 27	0.402
August 28	0.396
August 29	0.394
August 30	0.385
August 31	0.379
Total August Discharge	**17.092**
September 1	0.374
September 2	0.368
September 3	0.365
September 4	0.360
September 5	0.354
September 6	0.351
September 7	0.345
September 8	0.340
September 9	0.331
September 10	0.331
September 11	0.328
September 12	0.328
September 13	0.326
September 14	0.323
September 15	0.323
September 16	0.320
September 17	0.317
September 18	0.314
September 19	0.314
September 20	0.311
September 21	0.311
September 22	0.309
September 23	0.306
September 24	0.306
September 25	0.300
September 26	0.300
September 27	0.300
September 28	0.297
September 29	0.297
September 30	0.297
Total September Discharg	**9.746**
October 1	0.294
October 2	0.294

STANUM=	**08EE019**
STANAME=	**MAXAN CREEK AT OUTLET OF MAXAN LAKE**
LATITUDE=	**54:19:10N**
LONGITUDE=	**126:06:59W**
PARAMETER=	**Flow m3/s**

1976

April 4	0.314	October 3	0.297
April 5	0.323	October 4	0.297
April 6	0.337	October 5	0.300
April 7	0.354	October 6	0.303
April 8	0.368	October 7	0.306
April 9	0.394	October 8	0.309
April 10	0.416	October 9	0.311
April 11	0.453	October 10	0.317
April 12	0.481	October 11	0.317
April 13	0.538	October 12	0.320
April 14	0.609	October 13	0.323
April 15	0.674	October 14	0.323
April 16	0.779	October 15	0.326
April 17	0.906	October 16	0.326
April 18	1.090	October 17	0.323
April 19	1.560	October 18	0.323
April 20	1.930	October 19	0.323
April 21	2.320	October 20	0.320
April 22	2.550	October 21	0.317
April 23	2.690	October 22	0.317
April 24	2.790	October 23	0.314
April 25	2.830	October 24	0.314
April 26	2.970	October 25	0.311
April 27	3.140	October 26	0.314
April 28	3.450	October 27	0.314
April 29	3.680	October 28	0.317
April 30	4.250	October 29	0.320
Total April Discharge	**35.250**	October 30	0.326
		October 31	0.328
May 1	5.660	**Total October Discharge**	**9.744**
May 2	8.210		
May 3	14.200	November 1	0.334
May 4	17.600	November 2	0.334
May 5	24.500	November 3	0.337
May 6	26.900	November 4	0.337
May 7	28.300	November 5	0.337
May 8	31.100	November 6	0.337
May 9	29.400	November 7	0.337
May 10	27.800	November 8	0.334
May 11	25.800	November 9	0.331
May 12	24.500	November 10	0.328
May 13	22.700	November 11	0.328
May 14	21.500	November 12	0.326
May 15	20.400	November 13	0.331
May 16	19.300	November 14	0.337
May 17	18.400	November 15	0.351
May 18	17.300	November 16	0.368
May 19	16.600	November 17	0.396
May 20	15.900	November 18	0.453
May 21	15.300	November 19	0.552

STANUM=	**08EE019**
STANAME=	**MAXAN CREEK AT OUTLET OF MAXAN LAKE**
LATITUDE=	**54:19:10N**
LONGITUDE=	**126:06:59W**
PARAMETER=	**Flow m3/s**

	1976
May 22	14.600
May 23	13.900
May 24	13.500
May 25	13.000
May 26	12.500
May 27	12.200
May 28	11.800
May 29	11.500
May 30	11.300
May 31	11.000
Total May Discharge	**556.670**
June 1	10.900
June 2	11.000
June 3	11.200
June 4	11.300
June 5	11.600
June 6	12.000
June 7	12.700
June 8	13.600
June 9	13.000
June 10	11.600
June 11	10.800
June 12	10.400
June 13	10.500
June 14	10.900
June 15	11.600
June 16	10.800
June 17	9.910
June 18	9.060
June 19	8.350
June 20	7.650
June 21	7.220
June 22	6.650
June 23	6.230
June 24	5.780
June 25	5.380
June 26	5.040
June 27	4.730
June 28	4.470
June 29	4.160
June 30	3.910
Total June Discharge	**272.440**

November 20	0.906
November 21	0.878
November 22	0.864
November 23	0.835
November 24	0.821
November 25	0.813
November 26	0.801
November 27	0.793
November 28	0.782
November 29	0.770
November 30	0.765
Total November Discharg	**15.816**
December 1	0.742
December 2	0.733
December 3	0.725
December 4	0.716
December 5	0.708
December 6	0.694
December 7	0.680
December 8	0.671
December 9	0.660
December 10	0.648
December 11	0.643
December 12	0.634
December 13	0.629
December 14	0.623
December 15	0.617
December 16	0.609
December 17	0.600
December 18	0.589
December 19	0.580
December 20	0.578
December 21	0.572
December 22	0.566
December 23	0.561
December 24	0.558
December 25	0.552
December 26	0.549
December 27	0.544
December 28	0.538
December 29	0.535
December 30	0.530
December 31	0.524
Total December Discharg	**19.108**

Appendix B

Analysis of Climate and Hydrological Data Trends Outside of the Upper Bulkley, by Eero Karanka

Brenda Donas
Community Advisor

Security Classification – Classification de sécurité
Our File – Notre référence
Your File – Votre référence
Date
March 15, 1998

From / De

Eero Karanka
Habitat Management Unit
Prince Rupert, B.C.

Subject / Objet

Historical Data Review on the Upper Bulkley Watershed

The main limitation of this report is its confinement to analysis of hydrological and climatological data within the Upper Bulkley Watershed. As the report correctly points out, those data are fragmentary in extent. While they provide hints of trends and changes, it is difficult to interpret them in the context of continuous long-term records. To place the basin's climate and hydrology in a long term context, the study boundaries have to be expanded outside the confines of the Upper Bulkley Watershed.

I may be able to provide some of the long-term context. Several years ago, I acquired temperature and precipitation data from a number of Atmospheric Environment Service (AES) climate stations with the intent of looking at regional long-term climate trends. (The HYDAT CD-ROM provides the same capability for Water Survey of Canada (WSC) streamflow records). Among the AES records that I acquired were the monthly summary records for Quick, Burns Lake Airport, Burns Lake Decker Lake, Ootsa Lake Skins Lake Spillway, and Nadina River. I also acquired the daily records for Wistaria, which has the longest continuous records closest to the Upper Bulkley Watershed, dating back to 1926. I didn't get around to analyzing the data from those stations, partly because the Bulkley and Nechako Rivers weren't within my direct habitat responsibilities.

As my main contribution to this review, I decided to start on the analysis of these long-term records, beginning with long-term precipitation and streamflow records from the nearby stations outside the Upper Bulkley Watershed. It provides some interesting contexts for the fragmentary data from the Upper Bulkley stations.

For analysis of climate and hydrological data trends, I am a proponent of the use of cumulative departures from the long-term mean. A full discussion of this analytic method is contained in: Trends and Fluctuations in Precipitation and Stream Runoff in the Queen Charlotte Islands. Land Management Report #40. B.C. Ministry of Forests (E.J. Karanka and Associates, 1986).

I have done the cumulative departures from the mean analysis for the following:

- April/May to September runoff volume, Bulkley River at Quick (Figure 1).

- October to April precipitation at Quick, Wistaria, Nadina River, Ootsa Lake, and the 2 Burns Lake stations (Figure 2).

The interpretation of these graphs is quite straightforward:

- If the cumulative deviation from the mean fluctuates around a horizontal line, there is no long term trend.

- If the cumulative deviation from the mean shows an increasing tendency, the individual data points during that period tend to be above the long term mean for the data set.

- If the cumulative deviation from the mean shows a decreasing tendency, the individual data points during that period tend to be below the long term mean for the data set.

The analysis, in itself, does not say anything about the cause of any trends: it simply identifies them as being present in the data.

Both the April to September and May to September runoff volumes for the Bulkley River at Quick (Figure 1) show the following:

- A period from 1930 to approximately 1963 during which there are no strong trends.

- A period from 1964 to 1976 during which the runoff volumes were generally above the long-term mean.

- A period from 1977 to 1990/1993 during which runoff volumes were generally below the long-term mean.

The mean runoff volumes for the period of record, pre-1964, 1964-1976, and post-1976 are compared in Table 1. The post-1976 runoff volume for the April/May to September periods has decreased about 15 to 17% from the preceding 1964 to 1976 period, and is about 6-7% below the long-term mean.

It is interesting to note that at the Bulkley River near Houston stream gauge, the 1980-1990 May to September runoff volume is about 18% lower than during 1944-1952.

The October to April total precipitation index at Wistaria (Figure 2) shows the following:

- A period from 1926 to 1940 during which the precipitation was generally above the long-term mean.

- A period from 1941 to 1975 during which the precipitation has no strong trends.

- A period from 1976 to 1992 during which the precipitation is generally below the long-term mean.

The combined all-station precipitation index (Figure 2) was compiled by summing the deviations from the mean at individual stations. This index does not begin until the 1949-50 winter, when data from at least three regional long-term stations becomes available. This index shows the following trends:

- A period before 1965 during which there are no strong trends in regional October to April precipitation.

- A period from 1965 to 1976 during which the regional precipitation is generally above the long-term mean.

- A period since 1976 during which the regional precipitation is generally below the long-term mean.

Comparison of the individual station long term means and the periods from 1965 to 1976 and since 1976 (Table 2) suggest that the regional October to April precipitation has decreased about 15 to 21% since 1976 from the preceding 1965 to 1976 period, and is about 7 to 10% below the long-term mean.

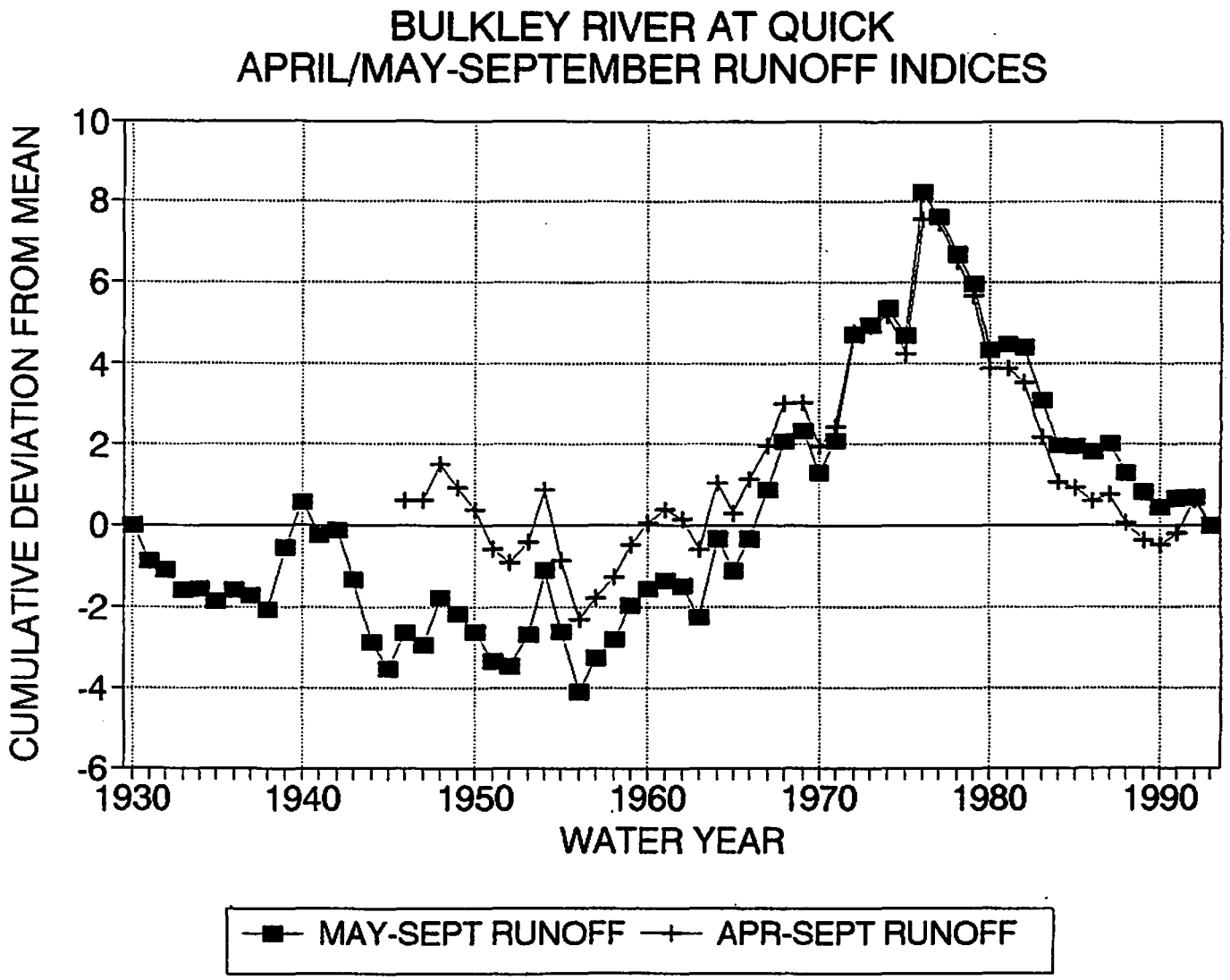
Thus the October to April regional precipitation index and the Bulkley River April/May to October runoff volume index have coincident trends since the mid 1940's.

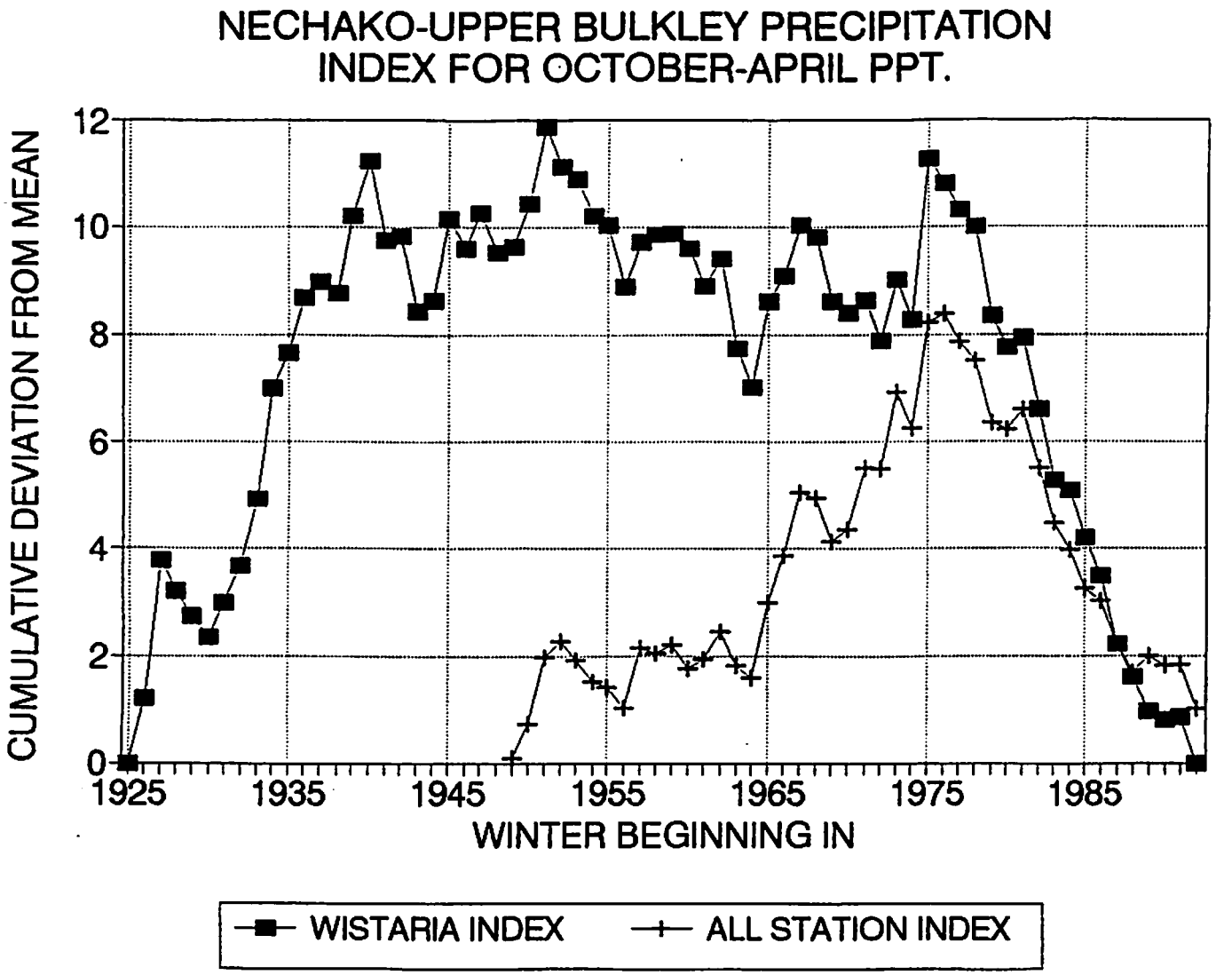
TABLE 1: BULKLEY RIVER AT QUICK
LONG TERM TRENDS

TIME PERIOD	MAY-SEPT. MEAN RUNOFF VOLUME	APR-SEPT. MEAN RUNOFF VOLUME
RECORD (1931-1993)	3046465	3258869
1931-1963	3015355	3242467
1964-1976	3412793	3557148
1977-1993	2826723	3048141

TABLE 2: REGIONAL PRECIPITATION
LONG TERM TRENDS, MEAN OCT.-APR. (MM)

TIME PERIOD	WISTARIA	QUICK	OOTSA LAKE
RECORD	256.1	259.0	233.7
1926-1940	297.2	N.A.	N.A.
1941-1963	247.8	N.A.	224
1964-1975	272.2	283.8	268.6
1976-1990/92	219.6	242.3	210.9


BULKLEY RIVER AT QUICK
APRIL/MAY-SEPTEMBER RUNOFF INDICES
CUMULATIVE DEVIATION FROM MEAN
10
8
6
4
2
0
-2
-4
-6
1930
1940
1950
1960
1970
1980
1990
WATER YEAR
MAY-SEPT RUNOFF
APR-SEPT RUNOFF


NECHAKO-UPPER BULKLEY PRECIPITATION
INDEX FOR OCTOBER-APRIL PPT.
CUMULATIVE DEVIATION FROM MEAN
12
10
8
6
4
2
0
1925
1935
1945
1955
1965
1975
1985
WINTER BEGINNING IN
WISTARIA INDEX
ALL STATION INDEX

Appendix C

Effects of Harvesting on Streamflow and Directions in Calculating Equivalent Clearcut Areas (ECA)

Appendix 8. Effects of harvesting on stream flow and directions on calculating equivalent clearcut area (ECA)

Peak flows

Most hydrologic impacts occur during periods of the peak stream flow in a watershed. Stream flow is defined as the channelized flow of water at the earth's surface. Peak flow is the maximum flow rate that occurs within a specified period of time, usually on an annual or event basis. In the interior of British Columbia, peak flows occur as the snowpack melts in the spring. Occasionally, periods of high stream flow can be caused by rainstorms and rain-on-snow events, particularly in the coast transition zone.

Snow melts from a watershed in a predictable pattern. Melt begins earlier in the season at lower elevations and proceeds upslope. Snow has generally disappeared from the lower elevations some time before the spring stream flows peak. During peak flow, snow is beginning to disappear from the mid-elevations and is actively melting at the higher elevations of a watershed.

After an area has been harvested, both winter snow accumulation and spring melt rates increase. This effect is less important at lower elevations, since the snow disappears before peak flow. At mid-elevations, the additional melt may or may not be important, depending on seasonal variations. Harvesting at high elevations will have the greatest impact and is, therefore, of most concern.

The changes in snow accumulation and melt brought about by forest harvesting are reduced as new forests grow. This is commonly referred to as hydrologic recovery.

Hydrologic recovery

Second-growth forests are said to be hydrologically recovered when snowpack conditions approximate those prior to logging and, as a result, any impact on stream flow is minimized. The most important influence of vegetation on snow accumulation is the interception of snow by the forest canopy and the subsequent loss of this snow to the atmosphere. This interception effect is a result of the combined effects of tree height and canopy closure. The rate at which the snowpack melts is affected by the extent to which the snowpack is exposed to solar radiation which, like interception, is also controlled by the canopy. Consequently, canopy closure is one of the main stand characteristics affecting snow accumulation and melt.

The degree of canopy closure is determined by tree species, height, and stocking density. Since tree height data is readily available and is closely correlated with canopy closure, it is the variable used to evaluate hydrologic recovery.

The first approximation of hydrologic recovery (Table 8-1) for the southern interior is based on theoretical estimates of the effects of canopy closure on radiation penetration and snow interception, stand growth curves relating tree height and canopy closure, and snow data from studies in the Okanagan and Kootenays. The recovery estimates apply to fully stocked stands that reach a maximum crown closure of 50–70% and height of 20–30 m when mature. The growth curves used to convert crown closure to tree height assume a stand density of 1500 stems per hectare when the main canopy is 3 m in height. Tree heights refer to the average height of the main canopy (that is, co-dominant and intermediate trees, not dominant and suppressed stems).

Table 8-1. First approximation of snow recovery in the southern interior for fully stocked stands in the snow zone that reach a maximum crown closure of 50–70%

Average height of the main canopy (m)	% Recovery
0–<3	0
3–<5	25
5–<7	50
7–<9	75
9+	90

Low flow

In the interior of British Columbia, the lowest stream flows normally occur in late summer. Summer low flows are significant to both human use and fish habitat. During late summer, water demands for irrigation and domestic use tend to be high and supply limited.

Low flows in summer or winter can harm fish populations by reducing the amount of available habitat. During the summer, this is exacerbated by the added stress of higher oxygen needs of fish and lower dissolved oxygen concentrations when the water is warmer. During the winter, low flows cause less oxygen stress, but overwintering eggs can be damaged by freezing or ice movement.

Both summer and winter low flows result from long periods during which the water being discharged from soils and bedrock is not replenished by rain or snowmelt. Trees affect low flows by intercepting rain and snow, by reducing the amount of water entering the soil and, through transpiration, by removing water from the soil.

Transpiration, however, is directly related to moisture availability. Consider what happens in a clearcut under different conditions. During a wet summer, interception loss in a clearcut is low, resulting in more water entering the soil than would occur under a forest canopy. In addition, the water that would have been transpired from the soil by trees is available for groundwater recharge and stream flow. As a result, under wet conditions, the summertime low flow after clearcutting is greater than the low flow that would have occurred in the forest.

In contrast, during a summer without rain, water input to the soil is zero regardless of whether the site is forested or not. Transpiration losses in the clearcut would probably be less than in the forest, but the forested site would have very low transpiration losses anyway. Consequently, stream flow from both sites would be very low and clearcutting would have little effect on the water balance.

There is a general public perception that clearcutting dries out soils. This is probably because the top layers of soil do, in fact, become drier upon exposure to stronger sunlight and wind. However, the deeper soil layers in the rooting zone of trees have been shown to have higher moisture content after clearcutting. The net effect is that total soil moisture tends to increase after clearcutting. This effect diminishes as a site becomes revegetated until there is no detectable difference within 10 to 15 years after logging.

Low flows may occasionally also be observed to decrease as a result of channel aggradation. In some cases, water continues to be discharged from a basin. However, it moves below the surface through the stream bed where channel aggradation has occurred.

Watershed studies have shown that tree removal tends to result in increasing mean monthly flows in August, September, and October by a moderate amount during the 10- to 15-year revegetation period. This is probably beneficial in cases where water can be impounded for human use or for delayed release downstream. However, in most cases, there may be no benefit to fish, since the very lowest flows are not increased by harvesting.

In summary, timber harvesting appears to have a negligible, or slightly positive, effect on summer low flows in most cases. Winter low flows are probably not affected by forestry activities.

Annual water yield

In the United States, where most forestry-related watershed runoff studies have been done, harvesting has been found to increase annual water yield by 100–500 mm per year. The smallest increases have occurred on warmer, drier sites where soil moisture is limited. In these areas, the removal of trees does not

make much more water available to streams. The largest increases have been observed in the Oregon Cascades where rainfall is high. Under these conditions, trees intercept a considerable portion of rainfall, allowing it to evaporate. The high rainfall also enables trees to take up and transpire large amounts of soil water. Timber harvesting reduces these large water losses and makes more available to streams.

In the Alberta Rockies and the interior of British Columbia, research has also shown increases in water yield after timber removal. In an Alberta study, harvesting 50% of the forested area resulted in a water yield increase of 27%, or 40 mm. In a paired watershed study in British Columbia's southern interior, clearcutting 30% of a watershed resulted in a 21% increase in yield.

The 1973 Eden fire near Salmon Arm burned 50% of a watershed and caused a 24% increase in the April to August runoff. The effects of this fire on water yield are assumed to be similar to those that would result from timber harvesting.

One difference between the studies in the U.S. and the ones in western Canada is that most runoff in the British Columbia interior and Alberta Rockies occurs during spring snowmelt. Because of the snow-dominated regime in these areas, tree removal effects on the annual water balance are not limited to changes in evapotranspiration, but include increases in snow accumulation and spring discharge levels.

In summary, timber harvesting can be expected to produce the largest increases in water yield in areas that have an ample supply of moisture during the growing season. In areas where runoff is dominated by snowmelt, a large part of the annual yield increase can be associated with increased snow storage in openings, faster snowmelt, and thus an increase in spring runoff volume.

Filling in the peak flow index tables

ECA below the H_{60} line (column A): The equivalent clearcut area (ECA) is defined as the area that has been clearcut, with a reduction factor to account for the hydrological recovery due to forest regeneration. To estimate this value, determine the height of regeneration in each logged polygon below the H_{60} line on the 1:20 000 forest cover map. Heights may need to be extrapolated if reference material is not up-to-date. The area of each opening will then have to be reduced by the appropriate percent hydrological recovery, as shown below.

The following assumptions can be made for the ECA calculations:

NSR (not sufficiently restocked):	–	clearcut with 0% recovery
Partial cutting:		
<30% basal area removal	–	expect 100% recovery
30–60% basal area removal	–	clearcut × 0.5
>60% basal area removal	–	clearcut with 0% recovery
clusters of trees	–	apply appropriate recovery to area occupied by clusters
Private land[2]:		
<15% of total sub-basin area	–	exclude from total sub-basin area (Form 1) and ECA calculations (Form 2)
>15% of total sub-basin area	–	include in total sub-basin area and ECA
Cultivated land:	–	same as for private land
Open range:	–	include in total sub-basin area (Form 1) but exclude from ECA calculations (Form 2)
Burn sites:	–	clearcut with 0% recovery; extrapolate if regeneration
Large slides:	–	clearcut with 0% recovery
Hydro line:	–	clearcut with 0% recovery

Tally all opening information (as shown in Table 8-2) and summarize it in columns A and D in Form 2.

[2] The IWAP has been developed to assess the impacts of land use activities on water quality and quantity. Obviously, land use impacts on private land located in the watershed above the point of interest can also have an effect on water quality and quantity. Resource development activities on private land are not regulated and the information required to answer IWAP questions is usually not available. However, if the amount of private land is significant (greater than 15% of the total sub-basin area) and it is obvious that ignoring its presence is not reasonable, the private land should be included in the ECA calculations. It may be necessary to make estimates of development based on interpretation of air photos and maps if landowners cannot be contacted.

Example ECA calculation:

Q: What is the ECA for a 0.85 km^2 fully stocked stand with an average canopy height of 4 m?

A: ECA = area of opening × (1 – appropriate percent hydrological recovery)
ECA = 0.85 km^2 × (1 – 0.25)
ECA = 0.64 km^2

ECA below the H_{60} line total sub-basin area (column B): Divide the value obtained for ECA below the H_{60} line (column A) by the area of the entire sub-basin.

Weighted ECA below the H_{60} line (column C): After an area has been harvested, both winter snow accumulation and spring melt rates increase. This effect is less important at lower elevations, since the snow disappears before peak flow. Directly transfer results from column B into column C (ECA weighting is equal to 1).

ECA above the H_{60} line (column D): To estimate this value, determine the height of regeneration in each polygon above the H_{60} line on the 1:20 000 forest cover map. Heights may need to be extrapolated if reference material is not up-to-date. The area of each opening will then have to be reduced by the appropriate percent hydrological recovery (see Table 8-1 and ECA assumptions listed above). Tally all opening information and summarize in Form 2.

ECA above the H_{60} line total sub-basin area (column E): Divide the value obtained for ECA above the H_{60} line (column A) by the area of the entire sub-basin.

Weighted ECA above the H_{60} line (column E): During peak flow, snow is beginning to disappear from the mid-elevations and is actively melting at the higher elevations of a watershed. Therefore, harvesting at high elevations will have the greatest impact and is, hence, of greater concern than at lower elevations. This value can be obtained by multiplying column E by an ECA weighting factor of 1.5.

Peak flow index (Indicator #1): The peak flow index is derived from estimates of the area which are equivalent to clearcut (ECA). Add the weighted ECAs from column C and column F to obtain the peak flow index in Indicator #1.

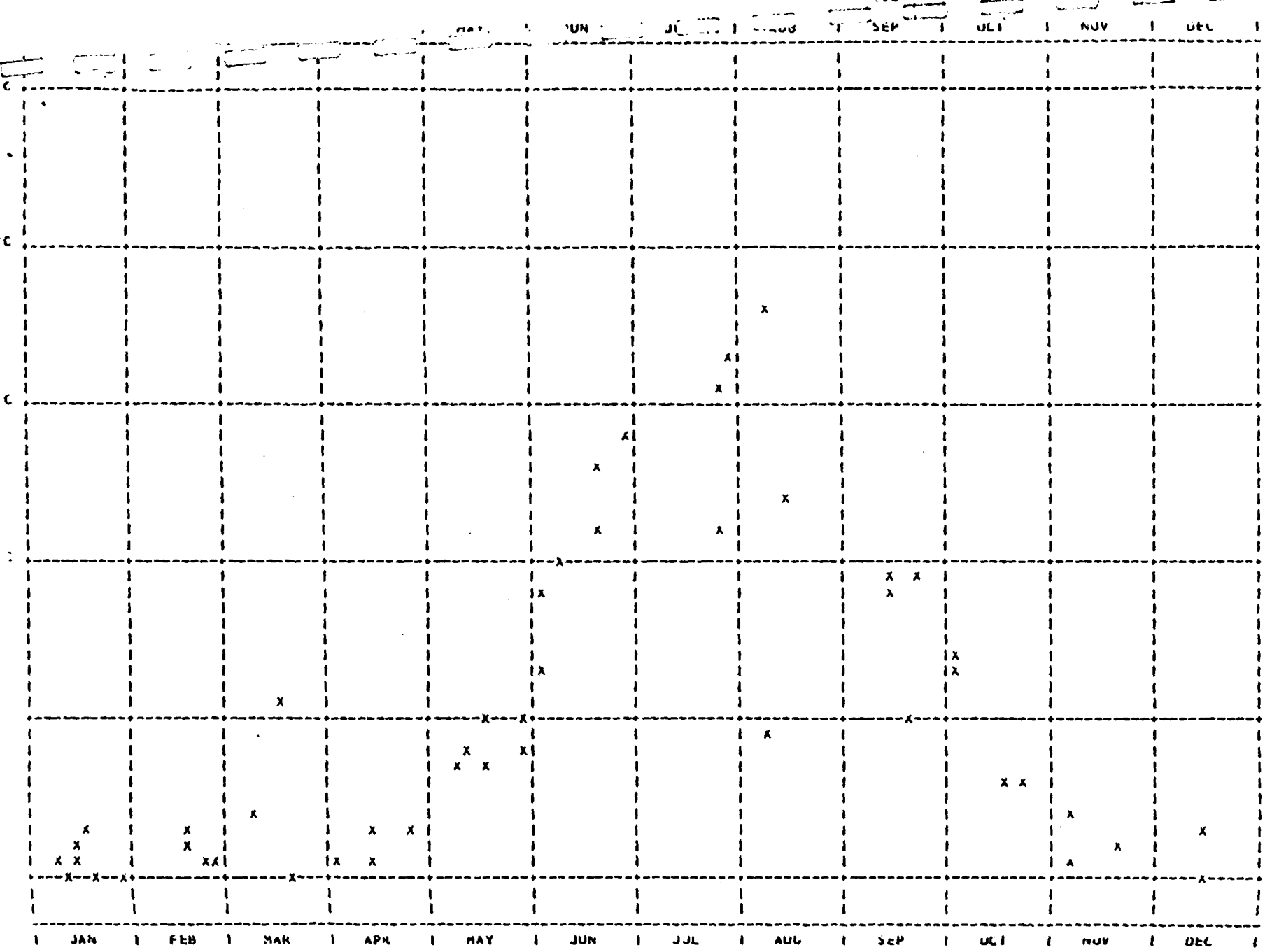
Appendix D

Spot Water Temperature Data at Sites 08EE009, 08EE013, and 08EE018

RICHFIELD CREEK NEAR TUPLEY - STATION NO. 08EE004

SPOT OBSERVATIONS OF WATER TEMPERATURES IN DEGREES CELSIUS

13 JAN 1966	1.5	2 MAR 1967	2	10 MAY 1965	4	26 JUL 1965	15.0	23 SEP 1966	9.0	3 NOV 1964	2
20 JAN 1967	3	17 MAR 1970	5.0	28 MAY 1966	4	28 JUL 1972	11	13 SEP 1972	9.0	4 NOV 1965	0.5
30 JAN 1968	3	29 MAR 1973	0	9 MAY 1972	3.0	30 JUL 1973	10.0	15 SEP 1972	9	21 NOV 1973	1
8 JAN 1969	0.5			17 MAY 1972	3.0			20 SEP 1972	5		
14 JAN 1970	1			17 MAY 1973	3						
10 JAN 1973	0			30 MAY 1973	5						
15 JAN 1974	0.5										
29 FEB 1968	0.5	14 APR 1966	0.5	28 JUN 1966	14	7 AUG 1964	9.5	1 OCT 1969	7	13 DEC 1971	1.5
16 FEB 1970	1	13 APR 1973	1.5	3 JUN 1966	7	8 AUG 1973	18	22 OCT 1971	3	13 DEC 1972	0
16 FEB 1972	1.5	23 APR 1973	1.5	3 JUN 1969	8.0	13 AUG 1974	12	17 OCT 1972	3		
25 FEB 1974	0.5	2 APR 1974	0.5	9 JUN 1970	10			2 OCT 1974	8.0		
				21 JUN 1973	13						
				20 JUN 1974	11						



RICHFIELD CREEK NEAR TUPLEY - STATION NO. 08EE009

SPOT OBSERVATIONS OF WATER TEMPERATURES IN DEGREES [illegible]

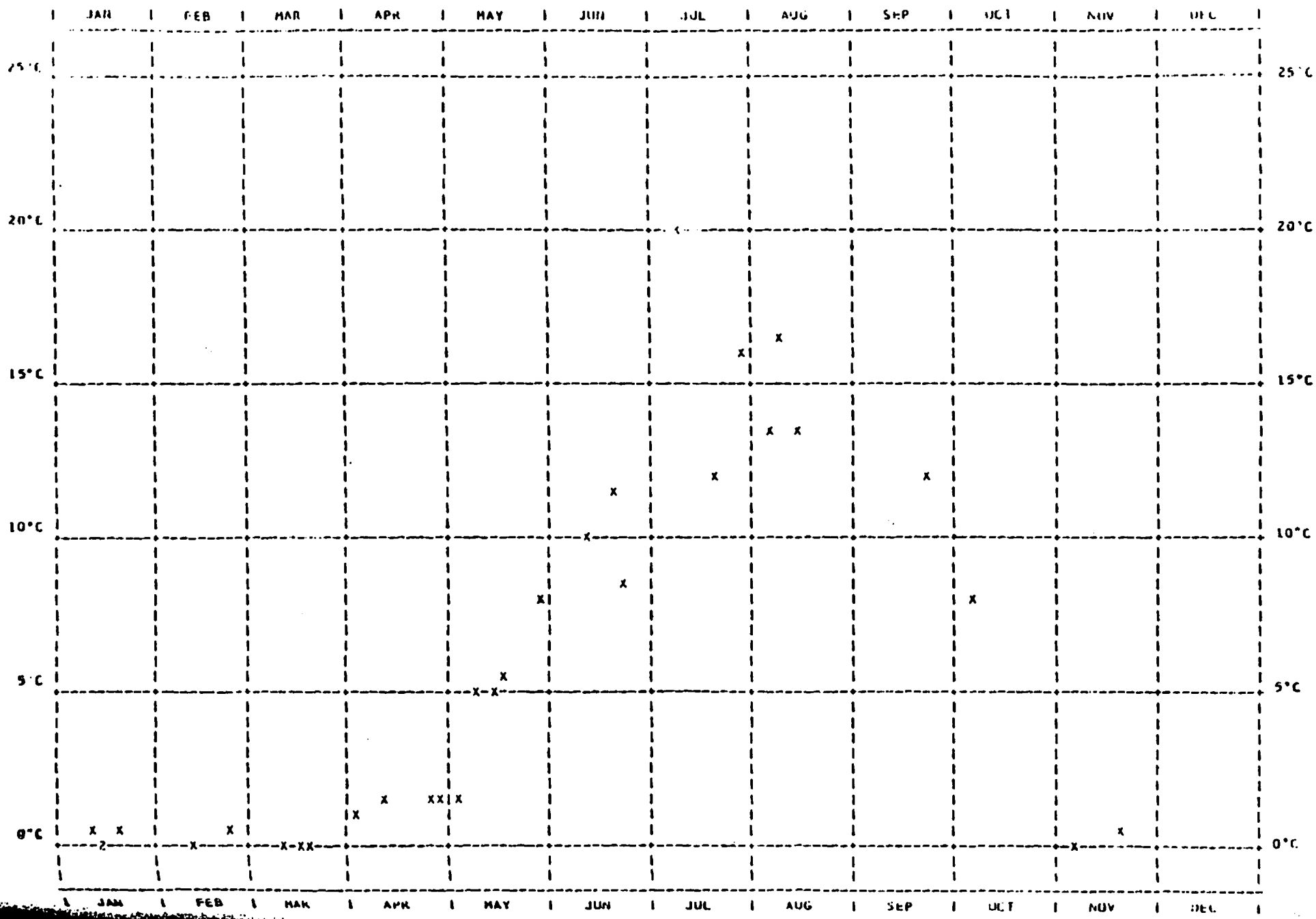
BUCK CREEK AT THE MOUTH - STATION NO. 08EE013

SPOT OBSERVATIONS OF WATER TEMPERATURES IN DEGREES CELSIUS

10 JAN 1973	0.5	20 MAR 1973	0	17 MAY 1972	5.5	30 JUL 1973	16	22 SEP 1976	12	20 NOV 1973	0.5
15 JAN 1974	0	11 MAR 1974	0	15 MAY 1973	5	7 JUL 1975	20			4 NOV 1975	0
21 JAN 1975	0.5	16 MAR 1976	0	29 MAY 1973	8	19 JUL 1976	12				
14 JAN 1976	0			3 MAY 1974	1.5						
				9 MAY 1975	5						
24 FEB 1975	0.5	12 APR 1973	1.5	21 JUN 1973	11.5	8 AUG 1973	16.5	4 OCT 1974	8		
11 FEB 1976	0	25 APR 1973	1.5	12 JUN 1975	10	13 AUG 1974	13.5				
		2 APR 1974	1	24 JUN 1976	8.5	6 AUG 1975	13.5				
		28 APR 1976	1.5								

BUCK CREEK AT THE MOUTH - STATION NO. 08EE013

SPOT OBSERVATIONS OF WATER TEMPERATURES IN DEGREES CELSIUS



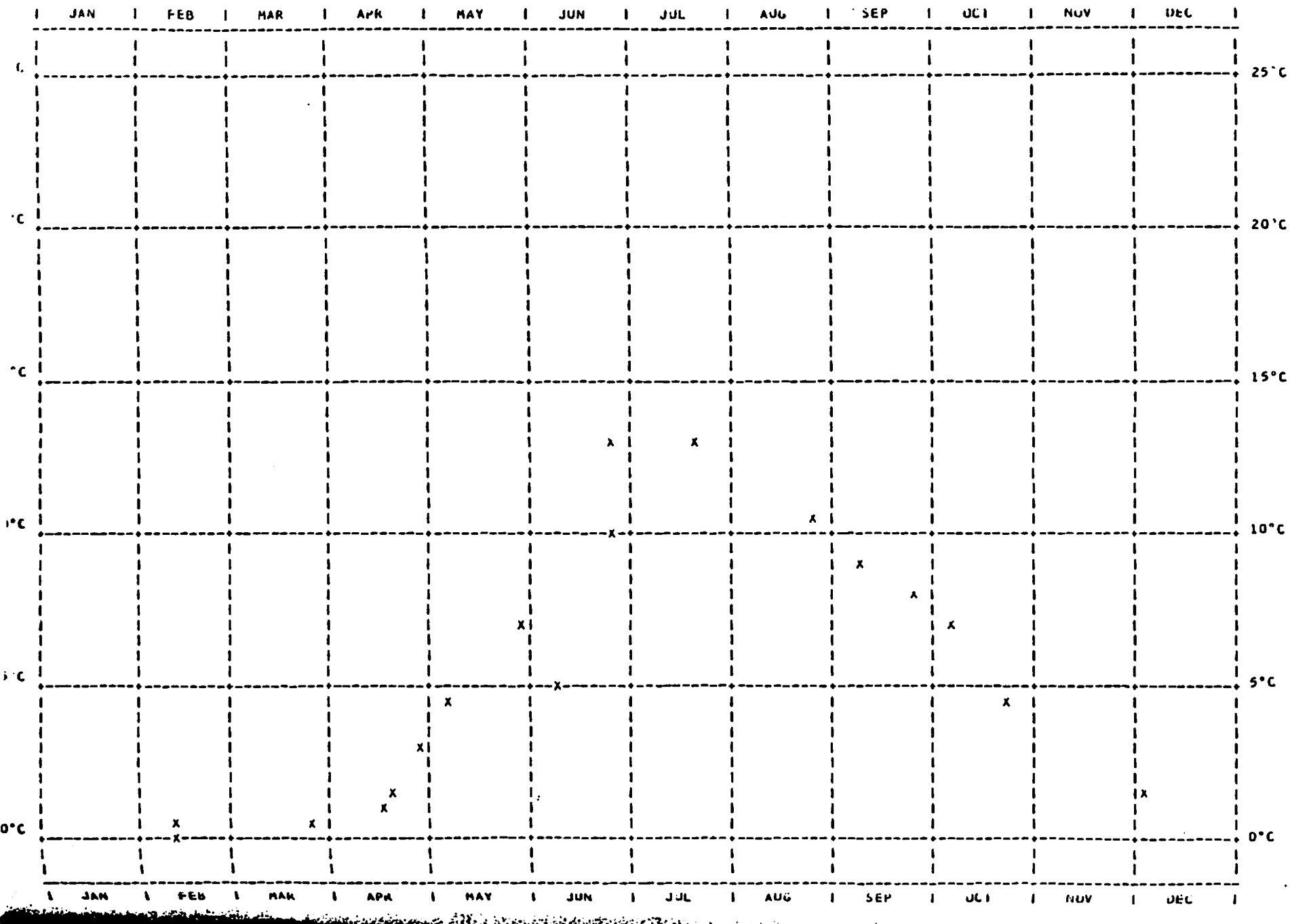
MAXAN CREEK ABOVE BULKLEY LAKE - STATION NO. 08EE018

SPOT OBSERVATIONS OF WATER TEMPERATURES IN DEGREES CELSIUS

			25 MAR 1976	0.5		26 MAY 1975	7		23 JUL 1976	13		27 SEP 1974	8				
						5 MAY 1976	4.5					9 SEP 1976	9				
12 FEB 1975	0		16 APR 1975	1		25 JUN 1974	13		27 AUG 1975	10.5		22 OCT 1974	4.5		3 DEC 1975	1.5	
12 FEB 1975	0.5		30 APR 1975	3		25 JUN 1975	13					6 OCT 1975	7				
			21 APR 1976	1.5		9 JUN 1976	9										

MAKAH CREEK ABOVE BULKLEY LAKE - STATION NO. 08EE018 1993

SPOT OBSERVATIONS OF WATER TEMPERATURES IN DEGREES CELSIUS



Appendix E

Listing of Water Licenses on the Upper Bulkley and its Tributaries

Licence No	Mapsheet POD	Use Description	NTS Mapsheet	Source Name	Quantity	Licensee	Address	District Precinct	File No	Issue Date	Priority Date
C031863	93.L.049 A	IRRIGATION	093L/8	Watson Creek	20 AF	ANAKA HAROLD P & SANDRA L	BOX 116 TOPLEY BC V0J2Y0	HAZ - S	268257	0//	1966/03/16
C031863	93.L.049 B	DOMESTIC	093L/8	Watson Creek	1000 GD	ANAKA HAROLD P & SANDRA L	BOX 116 TOPLEY BC V0J2Y0	HAZ - S	268257	0//	1966/03/16
C032882	93.L.059 A	IRRIGATION	093L/9	Richfield Creek	100 AF	GROOT BROS CONTRACTING LTD	BOX 95 HOUSTON BC V0J1Z0	HAZ - S	273468	0//	1967/05/23
C032882	93.L.059 B	IRRIGATION	093L/9	Richfield Creek	100 AF	GROOT BROS CONTRACTING LTD	BOX 95 HOUSTON BC V0J1Z0	HAZ - S	273468	0//	1967/05/23
C033128	93.L.059 F	DOMESTIC	093L/9	Wiley Brook	2500 GD	GROOT BROS CONTRACTING LTD	BOX 95 HOUSTON BC V0J1Z0	HAZ - S	273469	0//	1967/05/23
C039089	93.L.050 A	DOMESTIC	093L/8	Bulkley River	500 GD	JOHNSON J P ROLF	RR 1 BURNS LAKE BC V0J1E0	HAZ - S	296036	0//	1970/02/16
C039659	93.L.050 B	DOMESTIC	093L/8	Bulkley River	500 GD	STRIMBOLD AGNES V	RR 1 BURNS LAKE BC V0J1E0	HAZ - S	290654	0//	1969/12/04
C039853	93.L.037 E	DOMESTIC	093L/7	Boyd Creek	3000 GD	HAMBLIN FARMS LTD	BOX 4000 HOUSTON BC V0J1Z0	HAZ - S	300644	0//	1971/01/12
C039853	93.L.037 E	IRRIGATION	093L/7	Boyd Creek	75 AF	HAMBLIN FARMS LTD	BOX 4000 HOUSTON BC V0J1Z0	HAZ - S	300644	0//	1971/01/12
C039854	93.L.037 E	STORAGE	093L/7	Boyd Creek	60 AF	HAMBLIN FARMS LTD	BOX 4000 HOUSTON BC V0J1Z0	HAZ - S	300644	0//	1971/01/12
C042782	93.L.048 C	DOMESTIC	093L/8	Aitken Creek	1500 GD	PRINS CHARLES E & H SUSANNA	BOX 365 HOUSTON BC□ V0J1Z0	HAZ - S	296232	0//	1970/03/31
C042782	93.L.048 C	DOMESTIC	093L/8	Aitken Creek	1500 GD	SPLETZER STANLEY P	MORICE RV RD BOX 1413 HOUSTON BC V0	HAZ - S	296232	0//	1970/03/31
C042782	93.L.048 C	IRRIGATION	093L/8	Aitken Creek	200 AF	PRINS CHARLES E & H SUSANNA	BOX 365 HOUSTON BC□ V0J1Z0	HAZ - S	296232	0//	1970/03/31
C042782	93.L.048 C	IRRIGATION	093L/8	Aitken Creek	200 AF	SPLETZER STANLEY P	MORICE RV RD BOX 1413 HOUSTON BC V0	HAZ - S	296232	0//	1970/03/31
C042782	93.L.048 D	IRRIGATION	093L/8	Aitken Creek	200 AF	PRINS CHARLES E & H SUSANNA	BOX 365 HOUSTON BC□ V0J1Z0	HAZ - S	296232	0//	1970/03/31
C042782	93.L.048 D	IRRIGATION	093L/8	Aitken Creek	200 AF	SPLETZER STANLEY P	MORICE RV RD BOX 1413 HOUSTON BC V0	HAZ - S	296232	0//	1970/03/31
C043425	93.L.047 C	DOMESTIC	093L/7	Sjoden Spring	500 GD	SJODEN CARL	BOX 802 HOUSTON B C□ V0J1Z0	HAZ - S	322011	0//	1973/10/16
C045380	93.L.050 D	DOMESTIC	093L/8	Taman Creek	1000 GD	REYNOLDS DONALD S & ELIZABETH L	BOX 645 BURNS LAKE BC V0J1E0	HAZ - S	322681	0//	1974/03/01
C045384	93.L.027 C	DOMESTIC	093L/7	Campbell Brook	1000 GD	WERNER REBECCA M	BOX 243 HOUSTON BC□V0J1Z0	HAZ - S	316031	0//	1972/10/06
C045384	93.L.027 C	IRRIGATION	093L/7	Campbell Brook	1 AF	WERNER REBECCA M	BOX 243 HOUSTON BC V0J1Z0	HAZ - S	316031	0//	1972/10/06
C045708	93.L.048 E	DOMESTIC	093L/7	Barren Creek	1000 GD	BAMSEY BRIAN W & TANDRA R	BOX 39 HOUSTON B C V0J1Z0	HAZ - S	328671	0//	1975/04/17
C045708	93.L.048 E	LAND IMPROVE	093L/7	Barren Creek	500 GD	BAMSEY BRIAN W & TANDRA R	BOX 39 HOUSTON B C□ V0J1Z0	HAZ - S	328671	0//	1975/04/17
C045709	93.L.058 A	DOMESTIC	093L/9	Perow Creek	1000 GD	PATRICK ALBERT W	BOX 1344 HOUSTON BC V0J1Z0	HAZ - S	329826	0//	1975/04/04
C045710	93.L.058 A	DOMESTIC	093L/9	Perow Creek	1000 GD	PATRICK NORRIS	BOX 435 HOUSTON B C V0J1Z0	HAZ - S	328495	0//	1975/04/04
C046919	93.L.048 F	DOMESTIC	093L/7	McInnes Creek	600 GD	PEDERSON GORDON P	BOX 3 HOUSTON BC V0J1Z0	HAZ - S	270501	0//	1966/09/06
C046920	93.L.048 G	DOMESTIC	093L/7	Winch Creek	500 GD	HIMECH JOHN & MYRNA	BOX 72 HOUSTON BC V0J1Z0	HAZ - S	323317	0//	1974/06/27
C046921	93.L.048 G	STORAGE	093L/7	Winch Creek	.4 AF	HIMECH JOHN & MYRNA	BOX 72 HOUSTON BC V0J1Z0	HAZ - S	323317	0//	1974/06/27
C047099	93.L.058 B	DOMESTIC	093L/9	Hitchcock Spring	1000 GD	BROWN SHIRLEY A	BOX 7 TOPLEY BC V0J2Y0	HAZ - S	329794	0//	1975/10/24
C047327	93.L.027 D	DOMESTIC	093L/7	Hall Brook	1000 GD	HALL REGINALD S & BARBARA J	BOX 1031 HOUSTON BC□V0J1Z0	HAZ - S	329298	0//	1975/08/06
C047690	93.L.047 D	DOMESTIC	093L/7	John Creek	500 GD	HIMECH STEPHEN	BOX 191 HOUSTON B C□ V0J1Z0	HAZ - S	322870	0//	1974/04/05
C048349	93.L.067 B	DOMESTIC	093L/10	Annabelle Creek	1000 GD	WILLITS GORDON E	SITE 9 COMP 8 RR 1 TELKWA BC V0J2X0	HAZ - S	340351	0//	1976/10/07
C053083	93.L.029 B	LAND IMPROVE	093L/1	Lu Creek	0 TF	PLACER DOME (CLA) - EQUITY MINE	PLACER DOME CANADA DIV BOX 1450 HOU	HAZ - S	330336	0//	1976/03/26
C053889	93.L.047 P	DOMESTIC	093L/7	Florey Creek	500 GD	PEDERSEN BRIAN J & ROSANN L	BOX 126 HOUSTON BC□V0J1Z0	HAZ - S	365967	0//	1979/07/06
C053918	93.L.027 B	DOMESTIC	093L/7	Campbell Brook	500 GD	GATZKE BRIAN W & VERNELLE R	BOX 1057 HOUSTON BC V0J1Z0	HAZ - S	365219	0//	1979/02/20
C054164	93.L.019 A	LAND IMPROVE	093L/1	Bessemer Creek	0 TF	PLACER DOME (CLA) - EQUITY MINE	PLACER DOME CANADA DIV BOX 1450 HOU	HAZ - S	330340	0//	1976/03/26
C054594	93.L.058 C	DOMESTIC	093L/9	Perow Creek	500 GD	JAMES DOUGLAS P	PO BOX 75 HOUSTON BC V0J1Z0	HAZ - S	385265	0//	1979/03/05
C055785	93.L.047 S	WATER DELIVERY	093L/7	Bulkley River	20000 GD	JACKSON VENTURES LTD	BOX 2473 SMITHERS BC V0J2N0	HAZ - S	355294	0//	1979/08/28
C055913	93.L.038 A	DOMESTIC	093L/7	Henry Creek	500 GD	BELL HUGH & JOCELYN	BOX 730 HOUSTON B C□V0J1Z0	HAZ - S	366876	0//	1980/07/03
C056498	93.L.048 Q	DOMESTIC	093L/7	McKilligan Creek	1000 GD	MCKILLIGAN CARL G	BOX 98 HOUSTON BC□ V0J1Z0	HAZ - S	367733	0//	1981/01/06
C056498	93.L.048 T	DOMESTIC	093L/7	McKilligan Creek	1000 GD	MCKILLIGAN CARL G	BOX 98 HOUSTON BC□ V0J1Z0	HAZ - S	367733	0//	1981/01/06
C056888	93.L.047 V	DOMESTIC	093L/7	Barneveld Creek	1500 GD	VANDENBERG WILLIAM	BOX 261 HOUSTON BC V0J1Z0	HAZ - S	367144	0//	1980/08/25
C056888	93.L.047 X	DOMESTIC	093L/7	Barneveld Creek	1500 GD	VANDENBERG WILLIAM	BOX 261 HOUSTON BC V0J1Z0	HAZ - S	367144	0//	1980/08/25
C057174	93.L.059 H	PONDS	093L/9	McCracken Sprin	0 TF	MCCRACKEN ALVIN O & ANNE E	BOX 36 TOPLEY BC V0J2Y0	HAZ - S	367426	0//	1980/05/30
C057174	93.L.059 K	PONDS	093L/9	Hoffman Spring	0 TF	MCCRACKEN ALVIN O & ANNE E	BOX 36 TOPLEY BC□ V0J2Y0	HAZ - S	367426	0//	1980/05/30
C057174	93.L.059 L	PONDS	093L/9	Hogarth Spring	0 TF	MCCRACKEN ALVIN O & ANNE E	BOX 36 TOPLEY BC□ V0J2Y0	HAZ - S	367426	0//	1980/05/30
C057526	93.L.058 E	PONDS	093L/9	Trueman Lake	0 TF	DECKER ANDREW	1136 HAYS COVE AVE PRINCE RUPERT BC	HAZ - S	388160	0//	1981/03/27
C058266	93.L.047 CC	DOMESTIC	093L/7	Wall Brook	500 GD	BOYCE HOWARD J	BOX 782 HOUSTON B C V0J1Z0	HAZ - S	369058	0//	1981/08/18
C058545	93.L.027 G	DOMESTIC	093L/7	Campbell Brook	500 GD	WELDWOOD OF CANADA LTD	C/O PROPERTY MGMT DEPT PO BOX 2179 V	HAZ - S	368323	0//	1981/04/01
C058547	93.L.050 E	DOMESTIC	093L/8	Watson Creek	1000 GD	SAUNDERS ROBIN & ELIZABETH	BOX 208 MONTGOMERY RD TOPLEY BC V0	HAZ - S	369057	0//	1981/08/17
C059078	93.L.027 H	IRRIGATION	093L/7	Buck Creek	.5 AF	RAPP EGON R	BOX 1033 HOUSTON B C□ V0J1Z0	HAZ - S	6000011	0//	1982/05/04
C059596	93.L.047 AA	WATERWORKS LOCAL AUT	093L/7	Mathews Lake	10950000 GY	HOUSTON DISTRICT MUNICIPALITY OF	BOX 370 HOUSTON BC□V0J1Z0	HAZ - S	6000006	0//	1982/04/16
C060180	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	BANMAN GARY D	BOX 1233 HOUSTON BC□ V0J1Z0	HAZ - S	6000078	0//	1983/05/12
C060180	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	DUNGATE DRIVE WUC	C/O LEE NUSTAD BOX 1568 HOUSTON BC	HAZ - S	6000078	0//	1983/05/12
C060182	93.L.037 J	DOMESTIC	093L/7	Buck Creek	1000 GD	DUNGATE DRIVE WUC	C/O LEE NUSTAD BOX 1568 HOUSTON BC	HAZ - S	6000070	0//	1983/04/21
C060182	93.L.037 J	DOMESTIC	093L/7	Buck Creek	1000 GD	MCKENZIE KEVIN D & TRACY L	PO BOX 485 HOUSTON BC□ V0J1Z0	HAZ - S	6000070	0//	1983/04/21
C060183	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	COMPARELLI PAUL A & GERALDINE M	PO BOX 46 HOUSTON BC V0J1Z0	HAZ - S	6000071	0//	1983/04/21
C060183	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	DUNGATE DRIVE WUC	C/O LEE NUSTAD BOX 1568 HOUSTON BC	HAZ - S	6000071	0//	1983/04/21
C060184	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	DUNGATE DRIVE WUC	C/O LEE NUSTAD BOX 1568 HOUSTON BC	HAZ - S	6000074	0//	1983/04/26

Licence No	Mapsheet POD	Use Description	NTS Mapsheet	Source Name	Quantity	Licensee	Address	District Precinct	File No	Issue Date	Priority Date
C060184	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	NUSTAD LEE R & ELAINE L	PO BOX 874 HOUSTON BC V0J1Z0	HAZ - S	6000074	0//	1983/04/26
C060185	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	AATELMA ESA & NANCY	BOX 354 HOUSTON BC V0J1Z0	HAZ - S	6000075	0//	1983/04/27
C060185	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	DUNGATE DRIVE WUC	C/O LEE NUSTAD BOX 1568 HOUSTON BC	HAZ - S	6000075	0//	1983/04/27
C060188	93.L.019 B	LAND IMPROVE	093L/1	Bessemer Creek	0 TF	PLACER DOME (CLA) - EQUITY MINE	PLACER DOME CANADA DIV BOX 1450 HOU	HAZ - S	6000096	0//	1983/08/10
C060191	93.L.067 E	DOMESTIC	093L/10	Coulson Brook	500 GD	COULSON THOMAS M & EVA M	SITE 3 COMP 19 RR 1 KERR RD TELKWA BC	HAZ - S	6000083	0//	1983/06/15
C060192	93.L.067 E	STORAGE	093L/10	Coulson Brook	10 AF	COULSON THOMAS M & EVA M	SITE 3 COMP 19 RR 1 KERR RD TELKWA BC	HAZ - S	6000083	0//	1983/06/15
C060204	93.L.067 D	DOMESTIC	093L/10	Harley Creek	500 GD	GEERTSEMA MARTEN	COMP 17 SITE 3 RR 1 TELKWA BCD V0J2X0	HAZ - S	6000060	0//	1983/03/04
C060205	93.L.067 D	STORAGE	093L/10	Harley Creek	.5 AF	GEERTSEMA MARTEN	COMP 17 SITE 3 RR 1 TELKWA BC V0J2X0	HAZ - S	6000060	0//	1983/03/04
C061954	93.L.058 F	DOMESTIC	093L/9	Jensen Spring	500 GD	ANDERSON ROBERT W	BOX 584 HOUSTON BC V0J1Z0	HAZ - S	6000229	0//	1984/08/10
C061978	93.L.037 J	DOMESTIC	093L/7	Buck Creek	1000 GD	BRUNDIGE DAVID A & GLENNA J	PO BOX 281 HOUSTON BCD V0J1Z0	HAZ - S	6000109	0//	1983/10/20
C061978	93.L.037 J	DOMESTIC	093L/7	Buck Creek	1000 GD	DUNGATE DRIVE WUC	C/O LEE NUSTAD BOX 1568 HOUSTON BC	HAZ - S	6000109	0//	1983/10/20
C061995	93.L.047 KK	IRRIGATION	093L/7	Trickle Creek	.5 AF	JENKS GERALD & DEBRA	BOX 1282 HOUSTON B C V0J1Z0	HAZ - S	6000238	0//	1984/09/19
C062002	93.L.048 V	CONSERV.-STORED WATER	093L/8	Aitken Creek	1140 AF	DUCKS UNLIMITED (CANADA)	1925 S OGILVIE ST PRINCE GEORGE BC V	HAZ - S	6000213	0//	1984/05/18
C062002	93.L.048 V	CONSERV.-STORED WATER	093L/8	Aitken Creek	1140 AF	GREGG FRED & ELIZABETH	BOX 908 HOUSTON BCD V0J1Z0	HAZ - S	6000213	0//	1984/05/18
C062032	93.L.027 F	DOMESTIC	093L/7	Campbell Brook	1000 GD	MASON NEIL E & KIMBERLEY A	BOX 479 HOUSTON BCD V0J1Z0	HAZ - S	384919	0//	1978/11/28
C062045	93.L.040 A	CONSERV.-STORED WATER	093L/8	Wiggins Creek	288 AF	DUCKS UNLIMITED (CANADA)	1925 S OGILVIE ST PRINCE GEORGE BC V	HAZ - S	6000280	0//	1985/09/27
C062045	93.L.040 A	CONSERV.-STORED WATER	093L/8	Wiggins Creek	288 AF	STRIMBOLD E A	GD BURNS LAKE BC V0J1E0	HAZ - S	6000280	0//	1985/09/27
C062046	93.L.038 B	DOMESTIC	093L/7	Lansing Spring	500 GD	LUNDQUIST LOGGING INC	BOX 252 HOUSTON BC V0J1Z0	HAZ - S	6000277	0//	1985/09/13
C062046	93.L.038 B	STOCKWATERING	093L/7	Lansing Spring	1000 GD	LUNDQUIST LOGGING INC	BOX 252 HOUSTON BCD V0J1Z0	HAZ - S	6000277	0//	1985/09/13
C062379	93.L.037 K	CONSERV.-STORED WATER	093L/7	Boyd Creek	10 AF	HAMBLIN BRUCE E & GRETA J	C/O HAMBLIN FARMS LTD BOX 4000 HOUST	HAZ - S	370052	0//	1982/03/11
C062380	93.L.037 K	DOMESTIC	093L/7	Boyd Creek	500 GD	HAMBLIN BRUCE E & GRETA J	C/O HAMBLIN FARMS LTD BOX 4000 HOUST	HAZ - S	370052	0//	1982/03/11
C062380	93.L.037 K	IRRIGATION	093L/7	Boyd Creek	1 AF	HAMBLIN BRUCE E & GRETA J	C/O HAMBLIN FARMS LTD BOX 4000 HOUST	HAZ - S	370052	0//	1982/03/11
C065535	93.L.048 W	STOCKWATERING	093L/7	Raspberry Creek	500 GD	HIMECH JOHN & MYRNA	BOX 72 HOUSTON BC V0J1Z0	HAZ - S	6000383	0//	1987/05/14
C068048	93.L.027 K	DOMESTIC	093L/2	Cold Creek	500 GD	BARRON MICHAEL R & DORA	BOX 1498 HOUSTON BC V0J1Z0	HAZ - S	6000448	0//	1988/04/06
C068048	93.L.027 K	IRRIGATION	093L/2	Cold Creek	1 AF	BARRON MICHAEL R & DORA	BOX 1498 HOUSTON BC V0J1Z0	HAZ - S	6000448	0//	1988/04/06
C068048	93.L.027 K	STOCKWATERING	093L/2	Cold Creek	500 GD	BARRON MICHAEL R & DORA	BOX 1498 HOUSTON BCDV0J1Z0	HAZ - S	6000448	0//	1988/04/06
C068063	93.L.047 GG	DOMESTIC	093L/7	Florey Creek	500 GD	VAN DER WIJK GERRITT D	BOX 357 MT DAVIS WAY HOUSTON BCD V0J	HAZ - S	6000221	0//	1984/06/07
C068063	93.L.047 GG	STORAGE	093L/7	Florey Creek	1.25 AF	VAN DER WIJK GERRITT D	BOX 357 MT DAVIS WAY HOUSTON BCD V0J	HAZ - S	6000221	0//	1984/06/07
C068074	93.L.027 A	DOMESTIC	093L/7	Mitchell Creek	1000 GD	FRIESEN ISAAC & ELEONORE	BOX 1503 HOUSTON BCD V0J1Z0	HAZ - S	341975	0//	1977/08/29
C070900	93.L.047.1.3 C	DOMESTIC	093L/7	Stock Creek	500 GD	KEMPPLE WILLIAM G	BOX 328 HOUSTON BCD V0J1Z0	HAZ - S	50907	0//	1923/10/23
C072049	93.L.047 MM	DOMESTIC	093L/7	Doppler Creek	500 GD	MERKLEY WILLIAM & RITA	BOX 712 HOUSTON BC V0J1Z0	HAZ - S	6000461	0//	1988/06/01
C072049	93.L.047 MM	STORAGE	093L/7	Doppler Creek	.18 AF	MERKLEY WILLIAM & RITA	BOX 712 HOUSTON BC V0J1Z0	HAZ - S	6000461	0//	1988/06/01
C072053	93.L.047 LL	DOMESTIC	093L/7	Trickle Creek	500 GD	RODRIGUES AIRES	BOX 701 HOUSTON B C V0J1Z0	HAZ - S	6000403	0//	1987/07/15
C072236	93.L.027 E	DOMESTIC	093L/7	Hoist Creek	500 GD	STOELWINDER KENNETH B & PAMELA	BOX 223 HOUSTON BC V0J1Z0	HAZ - S	341194	0//	1977/05/02
C101211	93.L.019 C	CONSERV.-STORED WATER	093L/1	Sam Creek	126 AF	DUCKS UNLIMITED (CANADA)	1925 S OGILVIE ST PRINCE GEORGE BC V	HAZ - S	6000577	1992/	1990/01/16
C101211	93.L.019 C	CONSERV.-STORED WATER	093L/1	Sam Creek	126 AF	ENVIRONMENT LANDS & PARKS MINIST	PARLIAMENT BUILDINGS VICTORIA BCD V8	HAZ - S	6000577	1992/	1990/01/16
C101211	93.L.019 C	CONSERV.-STORED WATER	093L/1	Sam Creek	126 AF	WILDLIFE BRANCH	BAG 5000 SMITHERS BCDV0J2N0	HAZ - S	6000577	1992/	1990/01/16
C101212	93.L.020 B	CONSERV.-STORED WATER	093L/1	Maxan Creek	337 AF	DUCKS UNLIMITED (CANADA)	1925 S OGILVIE ST PRINCE GEORGE BCD V	HAZ - S	6000581	1992/	1990/02/16
C101212	93.L.020 B	CONSERV.-STORED WATER	093L/1	Maxan Creek	337 AF	ENVIRONMENT LANDS & PARKS MINIST	PARLIAMENT BUILDINGS VICTORIA BC V8	HAZ - S	6000581	1992/	1990/02/16
C101212	93.L.020 B	CONSERV.-STORED WATER	093L/1	Maxan Creek	337 AF	WILDLIFE BRANCH	BAG 5000 SMITHERS BCD V0J2N0	HAZ - S	6000581	1992/	1990/02/16
C101223	93.L.047 NN	CONSERV.-CONSTRUCT.WO	093L/7	Bulkley River	0 GD	FISHERIES & OCEANS CANADA	400 - 555 W HASTINGS ST VANCOUVER BCD	HAZ - S	6000593	1992/	1990/04/05
C101223	93.L.047 NN	CONSERV.-CONSTRUCT.WO	093L/7	Bulkley River	0 GD	FISHERIES & OCEANS CANADA	4721 LAZELLE AVE TERRACE BC V8G1R5	HAZ - S	6000593	1992/	1990/04/05
C101231	93.L.020 A	CONSERV.-STORED WATER	093L/1	Maxan Creek	126 AF	DUCKS UNLIMITED (CANADA)	1925 S OGILVIE ST PRINCE GEORGE BCD V	HAZ - S	6000580	1992/	1990/02/16
C101231	93.L.020 A	CONSERV.-STORED WATER	093L/1	Maxan Creek	126 AF	ENVIRONMENT LANDS & PARKS MINIST	PARLIAMENT BUILDINGS VICTORIA BC V8	HAZ - S	6000580	1992/	1990/02/16
C101231	93.L.020 A	CONSERV.-STORED WATER	093L/1	Maxan Creek	126 AF	WILDLIFE BRANCH	BAG 5000 SMITHERS BCD V0J2N0	HAZ - S	6000580	1992/	1990/02/16
C101281	93.L.027 D	LAND IMPROVE	093L/7	Hall Brook	.5 AF	HALL REGINALD S & BARBARA J	BOX 1031 HOUSTON BCD V0J1Z0	HAZ - S	6000412	1991/	1987/08/06
C102993	93.L.047.1.2 B	STOCKWATERING	093L/7	Evatt Creek	100 GD	MILLS JOHN J	BOX 988 HOUSTON BCD V0J1Z0	HAZ - S	6000672	1992/	1991/08/28
C104048	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	SIEMENS VICTOR D & ROBERTA L	BOX 872 HOUSTON BC V0J1Z0	HAZ - S	6000686	1994/	1991/12/16
C105969	93.L.059 C	STOCKWATERING	093L/9	Robert Hatch Cre	1000 GD	GROOT BROS CONTRACTING LTD	BOX 95 HOUSTON BCD V0J1Z0	HAZ - S	273467	1993/	1967/05/23
C105969	93.L.059 D	STOCKWATERING	093L/9	Robert Hatch Cre	500 GD	GROOT BROS CONTRACTING LTD	BOX 95 HOUSTON BCD V0J1Z0	HAZ - S	273467	1993/	1987/05/23
C105969	93.L.059 E	STOCKWATERING	093L/9	Robert Hatch Cre	500 GD	GROOT BROS CONTRACTING LTD	BOX 95 HOUSTON BCD V0J1Z0	HAZ - S	273467	1993/	1967/05/23
C107980	93.L.029 A	LAND IMPROVE	093L/1	Lu Lake	100000 GD	PLACER DOME (CLA) - EQUITY MINE	PLACER DOME CANADA DIV BOX 1450 HOU	HAZ - S	330337	1995/	1976/03/29
C107980	93.L.029 A	STORAGE	093L/1	Lu Lake	680 AF	PLACER DOME (CLA) - EQUITY MINE	PLACER DOME CANADA DIV BOX 1450 HOU	HAZ - S	330337	1995/	1976/03/29
C108087	93.L.027 M	DOMESTIC	093L/7	Horsa Creek	500 GD	MUMA ANDREW L	BOX 243 HOUSTON BCD V0J1Z0	HAZ - S	6000831	1995/	1994/05/03
C108178	93.L.040 B	DOMESTIC	093L/8	Crow Creek	500 GD	HABERMANN EGON P	RR 1 FOREST CANYON RD BURNS LAKE BC	HAZ - S	6000833	1996/	1994/05/19
C108330	93.L.027 N	DOMESTIC	093L/7	Horsa Creek	500 GD	LYONS JOHN T & BEVERLY J	BOX 1388 HOUSTON BC V0J1Z0	HAZ - S	6000839	1995/	1994/06/28
C109301	93.L.047 T	DOMESTIC	093L/7	Wall Brook	500 GD	ROGALSKY ELIZABETH G	BOX 1475 HOUSTON B CD V0J1Z0	HAZ - S	367205	1995/	1980/09/04
C110366	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	COMPARELLI PAUL A & GERALDINE M	PO BOX 46 HOUSTON BC V0J1Z0	HAZ - S	6000902	1997/	1995/10/31

Licence No	Mapsheet POD	Use Description	NTS Mapsheet	Source Name	Quantity	Licensee	Address	District Precinct	File No	Issue Date	Priority Date
C112299	93.L.037 C	DOMESTIC	093L/7	Daye Spring	500 GD	DAYE KEITH C & JUDY L	BOX 598 HOUSTON BCO V0J1Z0	HAZ - S	330430	1997/	1976/04/22
F042594	93.L.050 C	DOMESTIC	093L/8	Buildey River	500 GD	MILLER WILLIAM L & PATRICIA L	PO BOX 450 BURNS LAKE BCO V0J1E0	HAZ - S	296457	0//	1970/05/19
F044093	93.L.037 B	DOMESTIC	093L/7	Henry Creek	1500 GD	BRIENEN JOHN C	BOX 616 HOUSTON BC V0J1Z0	HAZ - S	267756	0//	1966/02/12
F044094	93.L.037 B	STORAGE	093L/7	Henry Creek	1.3 AF	BRIENEN JOHN C	BOX 616 HOUSTON BCO V0J1Z0	HAZ - S	267756	0//	1966/02/12
Z104283	93.L.047 D	DOMESTIC	093L/7	John Creek	500 GD	TOMPKINS BARRY	BOX 991 HOUSTON BCO V0J1Z0	HAZ - S	6000697	0//	1992/02/25
Z108347	93.L.049 C	DOMESTIC	093L/8	ZZ Spring (67521	300 GD	JOHNSON KENNETH E & MARGARET J	BOX 74 TOPLEY BCOV0J2Y0	HAZ - S	6000799	0//	1993/03/17
Z108259	93.L.047 C	DOMESTIC	093L/7	Sjoden Spring	500 GD	BRIENEN JOHN C & KLASKE	BOX 616 HOUSTON BC V0J1Z0	HAZ - S	6000835	0//	1994/06/09
Z108259	93.L.047 C	STORAGE	093L/7	Sjoden Spring	10000 AF	BRIENEN JOHN C & KLASKE	BOX 616 HOUSTON BC V0J1Z0	HAZ - S	6000835	0//	1994/06/09
Z110105	93.L.059 M	CONSERV.-CONSTRUCT.WO	093L/9	Richfield Creek	1 AN	SALMONID ENHANCEMENT PROGRAM	323 555 W HASTINGS ST VANCOUVER BCO	HAZ - S	6000898	0//	1995/08/28
Z112416	93.L.037 J	DOMESTIC	093L/7	Buck Creek	500 GD	MARKS ANN	C/O BOX 1059 HOUSTON BCO V0J1Z0	HAZ - S	6000935	0//	1997/06/09

Appendix F

Summary of Aerial Photographs and Flightlines available on the Upper Bulkley and Surrounding Area

Aerial Photos of Upper Bulkley Mainstem from Maxan Lake to Houston

Years	Index	Scale	Flight Line
1936-40/1949-52/1953-55/1956-57	93L	1:31,680	BC1002
			BC1003
			BC1011
			BC1012
			BC1013
			BC1014
			BC1015
1950-55/1957-63	93L/E	1:15,840	BC2100
			BC2531
			BC2532
			BC2675
			BC2676
			BC2677
1968/1969/1971	93L	1:31,680 (1968)	BC5296
		July (1968)	BC5300
		July (1968)	BC5306
		March (1969)	BC5420
		August (1971)	BC5440
1971 July	93L	1:15,840	BC7326
			BC7325
			BC7334
1975	93L/E	1:20,000 July	BC7727
		July	BC7728
		July	BC7735
		September	BC7824
1980 September	93L/E	1:10,000	BC80122
1981 July	93L/E	1:20,000	BC81049
			BC81050
1990 July	93L/E	1:15,000	BCB90061
			BCB90065
			BCB90098
1991,	93L/E		30BCB91181
			30BCB91182
1994,	93L/E	1:10,000	30BCC94036
			30BCC94057
			30BCC94062
			30BCC94072

Mid-Bulkley Photo Mosaic Index

Mackay, 1997

Waterbody	Reach	Plates	Reach Length
Bulkley River	1	1-19	11.30 km
	2	20-79	32.87 km
	3	80-98	9.50 km
	4	99-124	15.14 km
Buck Creek	1	1-10	2.7 km
	2	11-25	4.6 km
	3	26-33	1.3 km
	4	34-48	5.1 km
	5	49-66	6.2 km
	6	67-81	5.5 km
	7	82-94	6.3 km
	8	95-104	4.0 km
	9	105-120	10.2 km
	10	121-125	1.3 km
Upper Buck Creek	11	1-16	6.2 km
Klo Creek	1	1-7	2.4 km
	2	8-16	3.8 km
Dungate Creek	1	1-9	1 km
	2	10-45	5 km
	3	46-81	3.7 km
	4	82-99	
Richfield Creek	1	1-6	1 km
	2	7-20	3.5 km
	3	21-28	1.6 km
	4	29-30	0.3 km
Robert Hatch Creek	1	1-16	1 km
Johnny David Creek	1	1-9	1.9 km
	2	10-20	3.2 km
McQuarrie Creek	1	1-9	1.65 km
	2	10-24	8 km
	3	25-38	3 km
Byman Creek	1	1-20	4 km
	2	21-46	6 km
	3	47-55	2.3 km
Aitken Creek	1	1-6	1.8 km
	2	7-15	2.1 km
	3	16-37	6.2 km
Barren Creek	1	1-3	0.4 km
	2	4-21	3.3 km
	3	22-27	1.45 km

Appendix G

Major Storm and Flood Events in the Upper Bulkley Area

Historical Event *Catalogue* Relevant to the Upper Bulkley and Houston area

***Historical* Events:**

Much information is recorded regarding flood and precipitation events in the Smithers area. Although tempting, unless Houston was mention (or at least Quick) no extrapolation of evidence was reported for the Upper Bulkley.

May 4, 1931:
Spring runoff/flooding
Smithers reported a week of warm weather at the end of April. On May 4, the Bulkley River near Houston recorded a maximum daily discharge of 53.8 m3/s

May 25-26, 1942:
Precipitation
The very heavy warm rains that occurred on May 25 and 26 were described as "torrential downpours". The Skeena and Bulkley rivers reached flood levels. On May 27, the Bulkley River at Quick recorded a maximum daily discharge of 691 m3/s.

May 15-19, 1945:
Precipitation:
Rail traffic on the Smithers division was held up by heavy rains causing high water levels. The worst flooding conditions occurred east of Topley, where the Bulkley River overflowed the CN tracks and threatened to wash out a bridge. On May 19, the Bulkley River near Houston recorded a maximum daily discharge of 156 m3/s.

May-June 1947
Precipitation:
The Bulkley River at Quick and near Smithers recorded maximum daily discharges of 538 m3/s and 714 m3/s respectively.

May 25-June 10, 1948
Precipitation: spring runoff/flooding
The spring runoff due to hot weather caused sever flood conditions in B.C. Flood conditions on the Bulkley River were the worst in many years causing heavy damage to the rail line between Houston and Smithers. On May 29, the Bulkley River near Houston reached record levels and the situation was described as "serious" The Bulkley River at Quick recorded a maximum daily discharge of 895 m3/s on May 30.

May 10-12, 1951
Precipitation:
In the Bulkley Valley, steady rainfalls together with warm weather, created flood conditions on the creeks flowing in the Bulkley River. The Bulkley River at Quick recorded a maximum daily discharge of 634 m3/s on May 13. The worst situation occurred in the Forestdale-Houston area. Flood waters threatened the new $140,000 Houston Hotel and several houses were surrounded by water. Mile 16 of the highway was under 2 to 3 ft. of water and a number of homes were

threatened with evacuation. Flooding occurred at Houston, when the Buck River (Creek) flooded the highway. On May 12, numerous small washouts occurred because the culverts were too small to handle the abnormal runoff. The most serious washout was at a point 2 mi. west of Forestdale. On the evening of May 14 the high water started receding.

August 9-11. 1951
Precipitation:
The storm appears to have hit hardest towards Houston.

May 29-June 8, 1964
Precipitation: spring runoff/flooding
Between May 29 and 31, a combination of late secondary runoff and a warm front accompanied by heavy thunderstorms triggered extensive flooding comparable to that of 1948 between Topley and Houston. Two bridges were washed out and several damaged. Four large culverts were also washed out and many badly scoured. The Houston Bridge No. 35 on the Northern Trans-Provincial Highway required considerable repair on the substructures as a result of driftwood damages. On June 3, the Bulkley River at Quick recorded a maximum daily discharge of 847 m3/s

June 8-11, 1964
Precipitation: spring runoff/flooding
The second rise in the water levels of the Skeena River was described as the "worst flood since 1948".

April 8-12, 1966
Precipitation: icejam/flooding
Mostly hitting Smithers, however, the ice was also holding back in a section of the Bulkley River in the Quick-Walcott area between Telkwa and Houston.

May 20-23. 1968
Precipitation: spring runoff/flooding
Warm weather with temperatures in the high 70's F coupled with 2 days of warm rain brought rivers in the Bulkley Valley to the flood level. On May 20-21, Bulkley, Telkwa and Buck rivers went on the rampage. On May 21, the Bulkley River a Quick recorded maximum daily discharges of 861 m3/s. On May 20, floods threatened four families in Houston. Late on May 20, the approach to Buck Creek was washed out. The Buck River, fed by a heavy snowpack in an area denuded by a forest fire in 1961, was at it highest level in several years. Traffic across the temporary Bailey bridge, just east of Houston was haled as the approaches were threatened. On May 23, the Buck was reported to have dropped about 2 in. in the past 24 hours. Waters was still 6-8" deep on some of the secondary roads. Owen Lake Road south of Houston washed out.

June 12, 1972
Precipitation: spring runoff/flooding
The Houston bridge washed out making a 70 mi. detour necessary. High water washed out the foundations of the Walcott foot-bridge west of Houston. On June 13 a maximum daily discharge of 957 m3/s was recorded at Quick.

December 23-28, 1984
Precipitation: icejam/flooding
An icejam on the Bulkley River near Quick, between Smithers and Houston caused flooding near the Quick bridge. Due to a long cold spell most of the channel was occupied by ice frozen to the bottom.

June 14-16, 1986
Precipitation:
On June 14-15, heavy rain occurred in the Houston to Moricetown area. The "Father's-Day Storm" Caused extensive damage. Flood waters were reported to have risen more than 25 ft. above normal levels before receding. The Bulkley River at Quick recorded a maximum daily discharge of 721 m^3/s.