

Appendix C

1996 Operating Plan

Bob

SINMAX CREEK WATER USERS ASSOCIATION

**SINMAX CREEK
WATER USERS ASSOCIATION
OPERATIONAL REQUIREMENTS
AND OPERATIONS LOG
FOR THE JOHNSON LAKE
STORAGE WEIR AND FISHWAYS**

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**OPERATIONAL REQUIREMENTS
AND OPEARIONS LOG FOR THE
JOHNSON LAKE STORAGE WEIR AND FISHWAYS**

1.0 GENERAL

Although the system requires a minimum amount of constant management, it requires ongoing part-time surveillance and adjustment, particularly during the spring, summer and fall. Releases from storage have to be allocated on a weekly basis in accordance with fisheries requirements. Although fisheries requirements vary from year to year, a generalized schedule of Johnson Lake rainbow trout biology is shown in Figure 1. Since the site is relatively remote, and sometimes inaccessible during the winter, an operational schedule has been devised (Figure 2) that allows for periodic inspection and manipulation during the accessible portion of the year.

In order to optimize available water, flows should be allocated generally as follows:

Jan, Feb, Mar, Apr and Dec	Natural base flows, natural minimum low flows for fisheries	0.031m ³ /s	(average)
May	Recharge of lake storage, lake filling followed by spilling of excess	0.192m ³ /s	
June	Natural flows, excess flows spilled for adult spawning	0.453m ³ /s	
July	Natural flows, supplemented for adult return	0.250m ³ /s	
Aug and Sep	Natural flows, supplemented for fry migration and irrigation	0.154m ³ /s	
Oct and Nov	Natural flows, supplemented for fry migration and salmon spawning in Sinmax Creek	0.060m ³ /s	

2.0 PRIOR TO FRESHET

- The area around the lake outlet is normally ice free prior to the onset of freshet. Accumulated debris is to be removed from in front of the trash boom and weir and properly disposed of on land.
- The low level outlet hand wheel axle are to be greased and the staff gauges cleaned with a scrub brush such that they can be easily read.
- The entire set of stop logs are to be checked to ensure that they are fully functional for use when freshet arrives.

- The fry fishway, grates and screens are to be cleaned and the system checked to ensure that there is no blockage to flows or fish.
- Repairs or upgrading of the facility is to be carried out as appropriate.

3.0 START OF FRESHET

- In order to recharge the lake storage, stop-logs are to be inserted in the adult fishway to the full height of the weir opening (0.4 m) as freshet commences.
- The low level outlet is to be partially closed such that the maximum outflow is limited to 0.050 m³/s.
- The fry fishway is to be opened.
- Staff gauge readings are to be recorded on a weekly basis.

3.0 FRESHET

- Once the lake storage has been filled and the adult fishway has been over topped, the low level outlet is to be closed.
- The date that the lake fills and overflow commences is to be recorded.
- The date of the first spawners to migrate to the spawning area and the date spawning commences is to be recorded.
- Staff gauge readings are to be recorded on a weekly basis.

4.0 POST FRESHET

- The dates that peak spawning occurs, and the number of spawners, is to be recorded.
- Flows over the adult fishway are to be maintained at 0.250 m³/s throughout the spawning period (July) by gradually removing and re-arranging stop-logs.
- Once spawning ceases and all adults have returned to the lake, the adult fishway can be closed with stop logs
- The date the last spawner returns to the lake is to be recorded.
- Combined flows over the adult fishway and fry fishway are to be reduced from 0.250 m³/s to 0.154 m³/s (August and September) by gradually removing and re-arranging stop-logs or adjusting the low level outlet opening.
- Fry fishway operation is to be observed on a periodic basis and fry movement noted.
- The date fry commence migration is to be recorded.
- Staff gauge readings are to be recorded on a weekly basis.

5.0 FALL LOW FLOWS

- Combined flows over the spawning area are to be reduced in from 0.154 m³/s in August and September to 0.060 m³/s in October and November or until all stop-logs have been removed and lake storage has dissipated.
- Fry fishway operation is to be observed on a periodic basis and fry movement noted.
- Staff gauge readings are to be recorded on a weekly basis.

6.0 WINTER OPERATIONS

- At the start of December, the low level outlet is to be opened such that lake inflows are automatically released over the winter through the fry fishway and low level outlet.
- Any remaining fry will access the lake through the low level outlet.
- The area around the lake outlet is to be cleaned up and accumulated debris is to be removed from in front of the trash boom and weir and properly disposed of on land.
- The fry fishway, grates and screens are to be cleaned and the system checked to ensure that there is no blockage to flows or fish.
- The entire set of stop logs are to be checked to ensure that they are fully functional.

7.0 MONTHLY FLOWS AND LAKE ELEVATIONS

A schedule of mean monthly flows and lake elevations for the beginning of each month are shown in Figures 3, 4, and 5. These are presented as guidelines only to track available storage and lake outflows, and are expected to vary from year to year, with changes in annual runoff. A stage discharge curve for Johnson Creek immediately below the weir is presented in Figure 6 and a preliminary recommended monthly release schedule is shown in Table 1.

8.0 RECORD KEEPING

The storage of water in Johnson Lake and the release of water from Johnson Lake is subject to a Water Reserve established with the Adams River Watershed in the public interest by Order-in-Council No. 1511, dated November 12, 1919 and Conditional Water Licences, as follows:

JOHNSON LAKE WEIR AND FISHWAY OPERATION

- Sinmax Creek Water Users Association, File No. 0185689, Licence No. 19956, dated February 1, 1951 and June 22, 1972 (Precedence Date August 28, 1950).
- Ministry of Environment, Lands and Parks, File No. 3001141, Licence No. 70862, dated October 20, 1989 (Precedence Date December 2, 1987).

Consequently, it is critical that the operators maintain comprehensive records of the facility's operations, records of how much and when water is stored in the reservoir and records of the distribution of that storage (rates and periods), such that all those with a legal interest in the water can determine if their rights under the Conditional Water Licences shown above have been met.

The best means of maintaining records is through the use of an Operations Log in which weekly records of the following are recorded:

- Record of Maintenance of Physical Works
- Record of Facility Configuration and Operations Mode
- Record of Changes in Fisheries Activities (Spawning, Rearing, Migration)
- Record of Changes in Hydrological Conditions (Storage and Releases)
- Record of Clarifying Notes and Observations

This "Operations Log" contains a series of Spreadsheets, in which weekly measurements and observations are to be recorded. Each Spreadsheet covers one entire year of operation. The data are a valuable tool for tracking the volume of water in storage and the volume of water released at any time during the year.

An example is given based on a typical year and experience to date. However, operational requirements are expected to vary from year-to-year in accordance with variations in annual runoff and fisheries activity.



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Table 1

RECOMMENDED MONTHLY FLOWS
 FOR JOHNSON CREEK IMMEDIATELY BELOW WEIR
 AND OVER SPAWNING AREAS

Average Monthly Flow and Gauge Height	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Average Monthly Flow in m ³ /s	0.022	0.063	0.211	0.064	0.182	0.453	0.259	0.154	0.154	0.060	0.060	0.031	0.062	0.067
Average Monthly Gauge Height (m)	0.287	0.287	0.328	0.271	0.294	0.769	0.556	0.470	0.470	0.245	0.245	0.249	0.247	0.247

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Table 2

OPERATIONAL PLAN FOR THE JOHNSON LAKE WIER, ADULT AND FRY FISHWAY

Inflow/Outflow	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	Annual Total
Days/Month	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	30.5	-
Inflow To Lake (m ³ /s)	0.062	0.062	0.031	0.234	0.406	0.453	0.156	0.031	0.016	0.031	0.047	0.031	0.130	-
Inflow To Lake (m ³)	194578	194578	82288	617160	1069744	1193176	411440	82288	41144	82288	123432	82288	-	4,114,400
Base Low Flow (Low Level Outlet or Fry Fishway m ³ /s)	0.062	0.062	0.031	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.031	0.047	-
Base Low Flow (Low Level Outlet or Fry Fishway m ³)	194578	194578	82288	131760	0.000	0.000	0.000	0.000	0.000	0.000	0.000	81691	-	624,891
Inflow To Storage (m ³)	0.000	0.000	0.000	485400	1069744	1193176	411440	82288	41144	82288	123432	597	-	3,489,509
Storage At Beginning of Month (m ³)	0.000	0.000	0.000	0.000	485400	1050000	1050000	802640	479107	114430	39606	3926	-	-
Storage At End of Month (m ³)	0.000	0.000	0.000	485400	1050000	1050000	802640	479107	114430	39606	3926	4523	-	-
Releases or Excess Spill Over Adult Fishway (m ³ /s)	0.000	0.000	0.000	0.000	505144	1193176	411440	0.000	0.000	0.000	0.000	0.000	-	2,109,760
Releases or Excess Spill Over Adult Fishway (m ³)	0.000	0.000	0.000	0.000	0.192	0.453	0.000	0.000	0.000	0.000	0.000	0.000	-	-
From Storage To Maintain Adult Return (m ³ /s)	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.148	0.150	0.068	0.059	0.000	-	-
From Storage To Maintain Adult Return (m ³)	0.000	0.000	0.000	0.000	0.000	0.000	247360	390010	395280	152842	155477	0.000	-	1,340,968
Flows Through Fry Fishway (m ³ /s)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.062	0.001	0.000	0.003	-
Volume Through Fry Fishway (m ³)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15811	10541	5270	2635	0.000	-	34,258
Lake Elevation at Beginning of Month (m)	0.000	0.000	0.000	0.000	0.185	0.399	0.399	0.305	0.182	0.044	0.015	0.001	0.128	-
Lake Elevation at End of Month (m)	0.000	0.000	0.000	0.185	0.399	0.399	0.305	0.182	0.044	0.015	0.001	0.002	0.128	-
Total Flow Over Spawning Beds (m ³ /s)	0.062	0.062	0.031	0.050	0.192	0.453	0.250	0.154	0.154	0.060	0.060	0.031	0.130	-

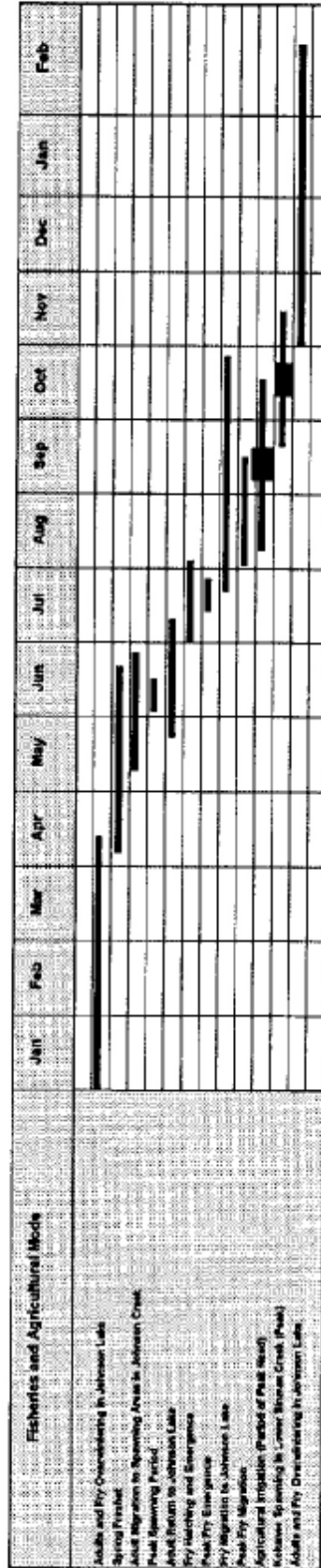
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Figure 1

JOHNSON LAKE FISHERIES SPAWNING, REARING AND MIGRATION PATTERNS

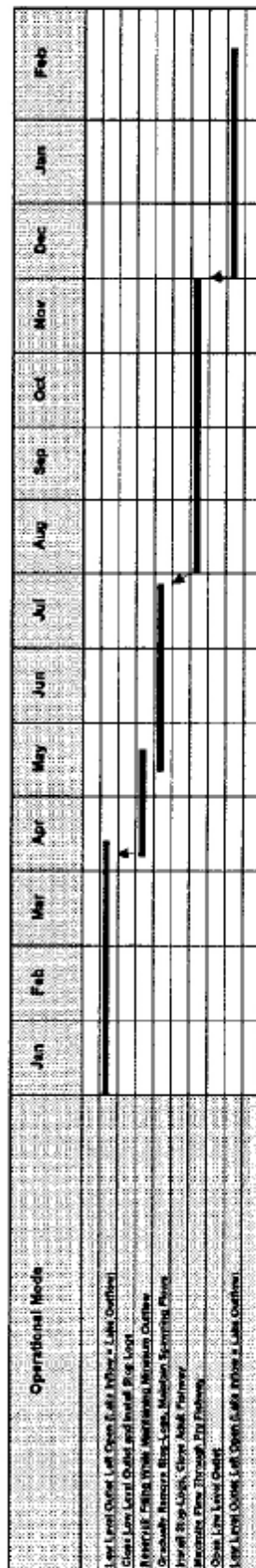




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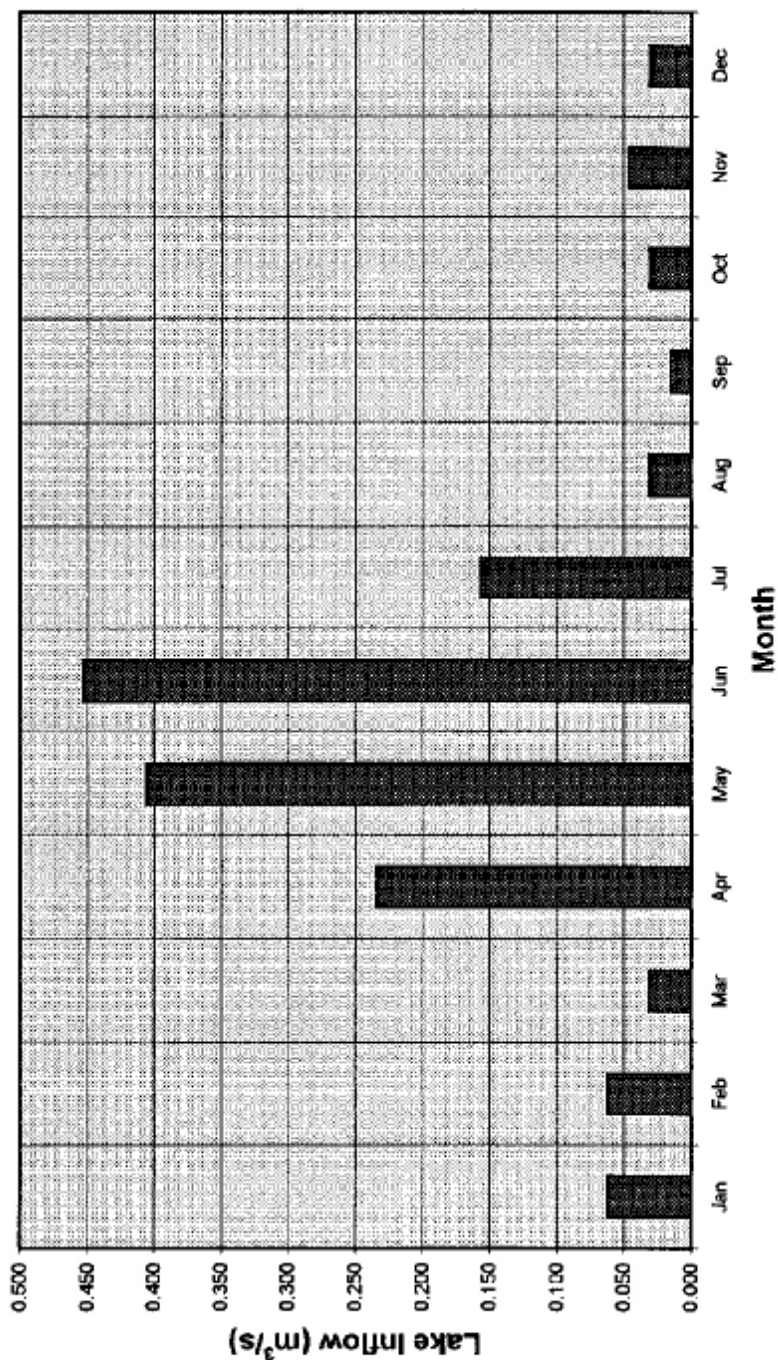
Figure 2

OPERATIONAL PLAN FOR THE JOHNSON LAKE WIER, ADULT AND FRY FISHWAY



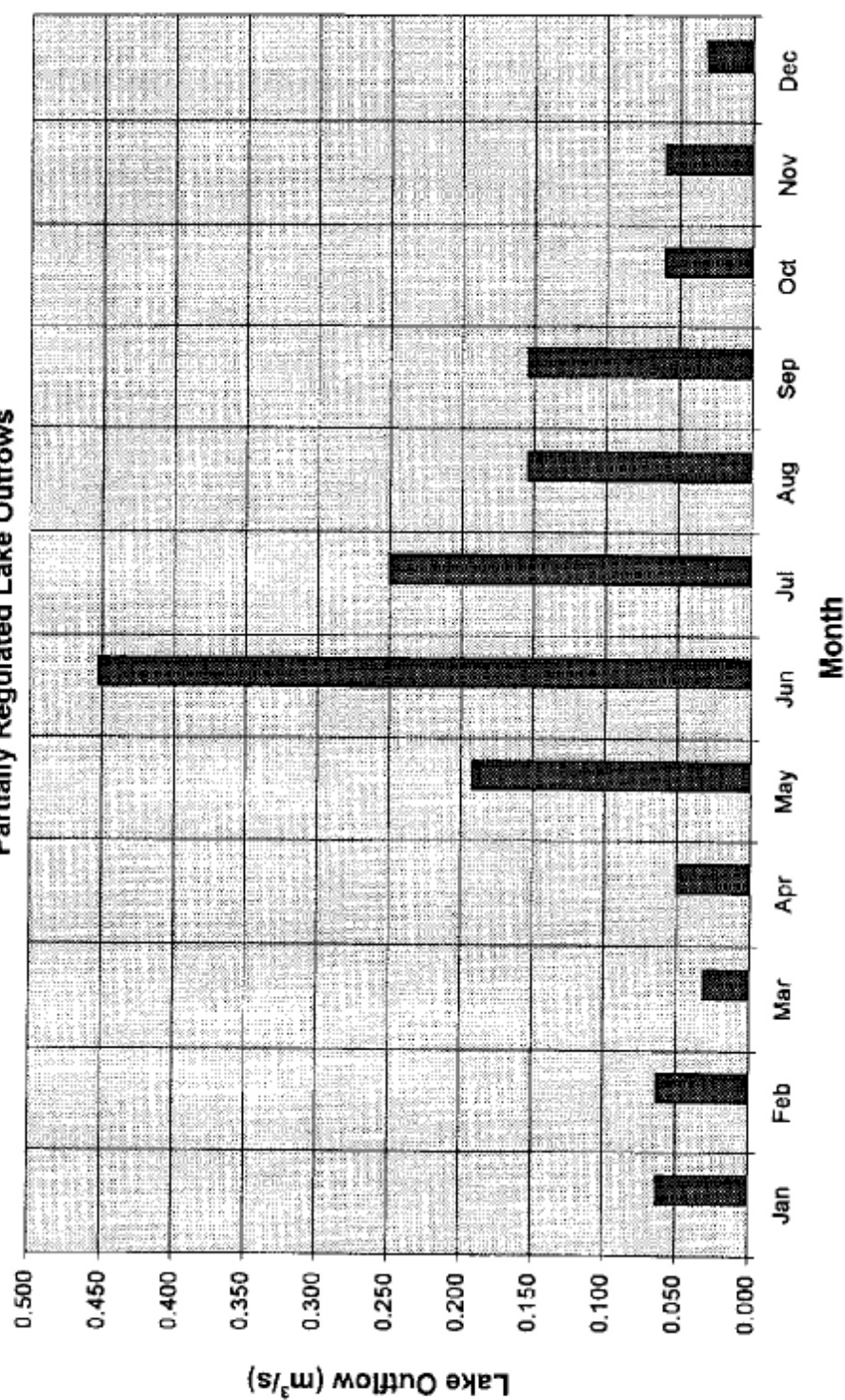
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Figure 3
Johnson Lake
Average Annual Lake Inflow



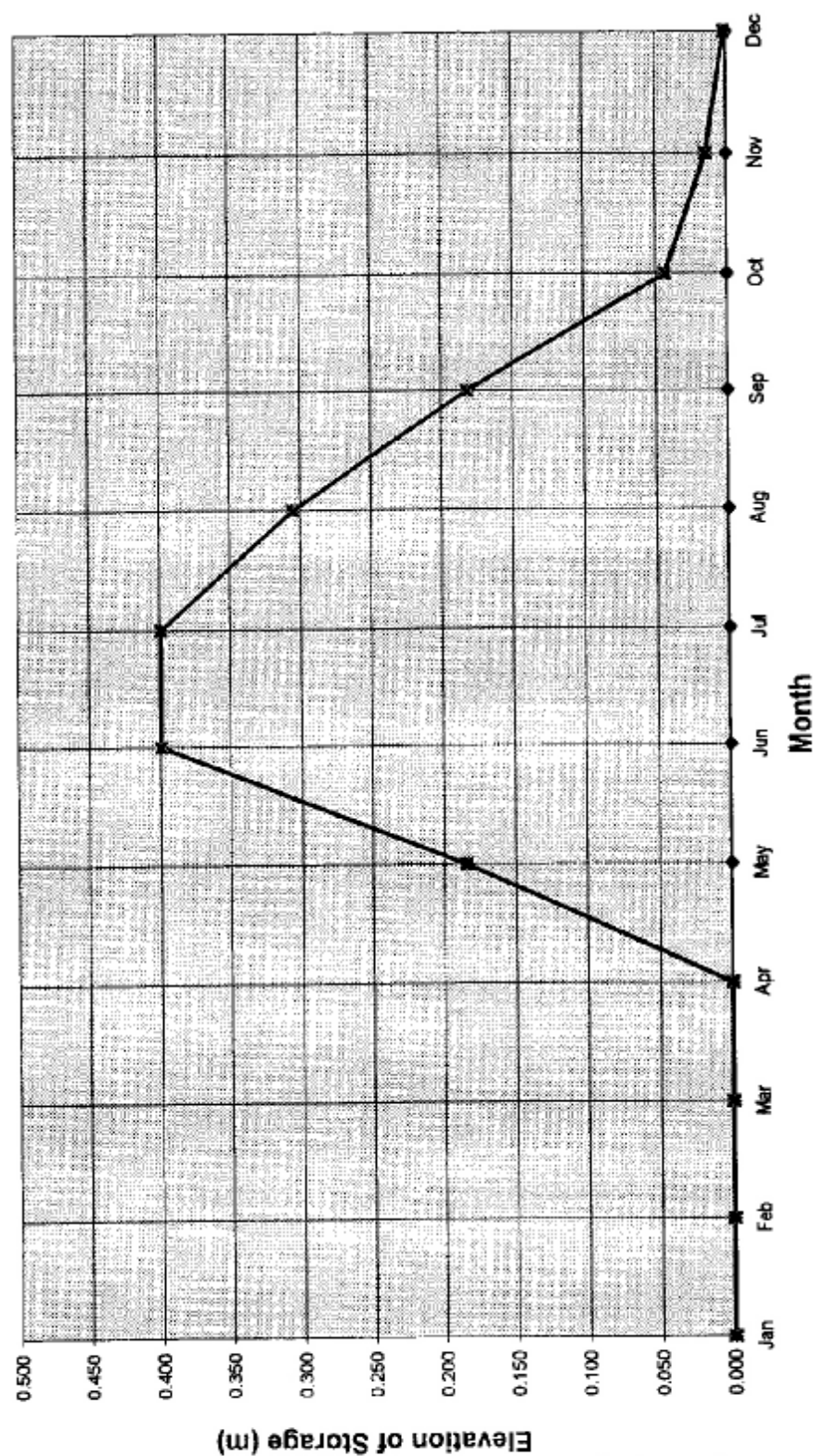
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Figure 4
Johnson Lake
Partially Regulated Lake Outflows



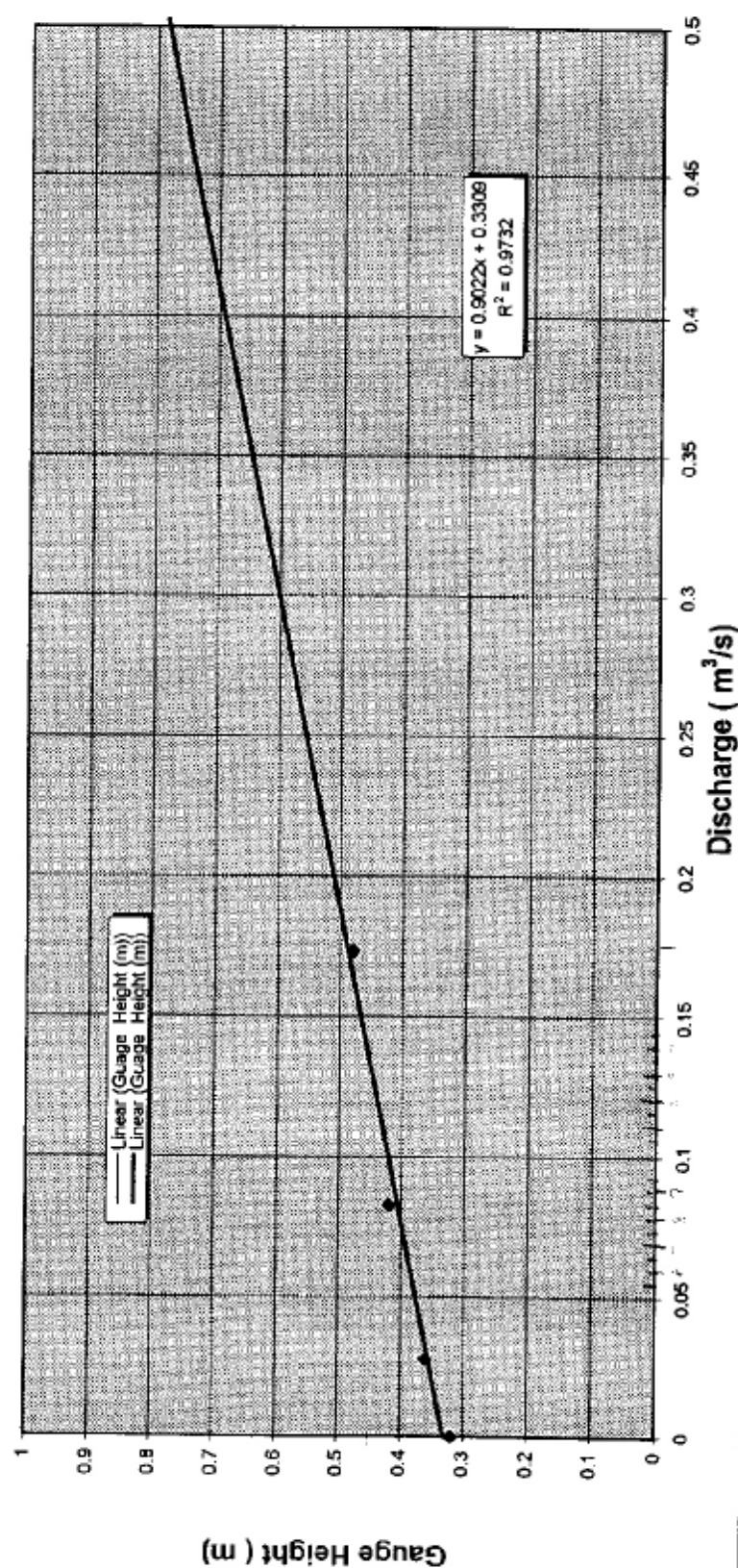
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Figure 5
Johnson Lake Storage
Lake Levels at Beginning of Month



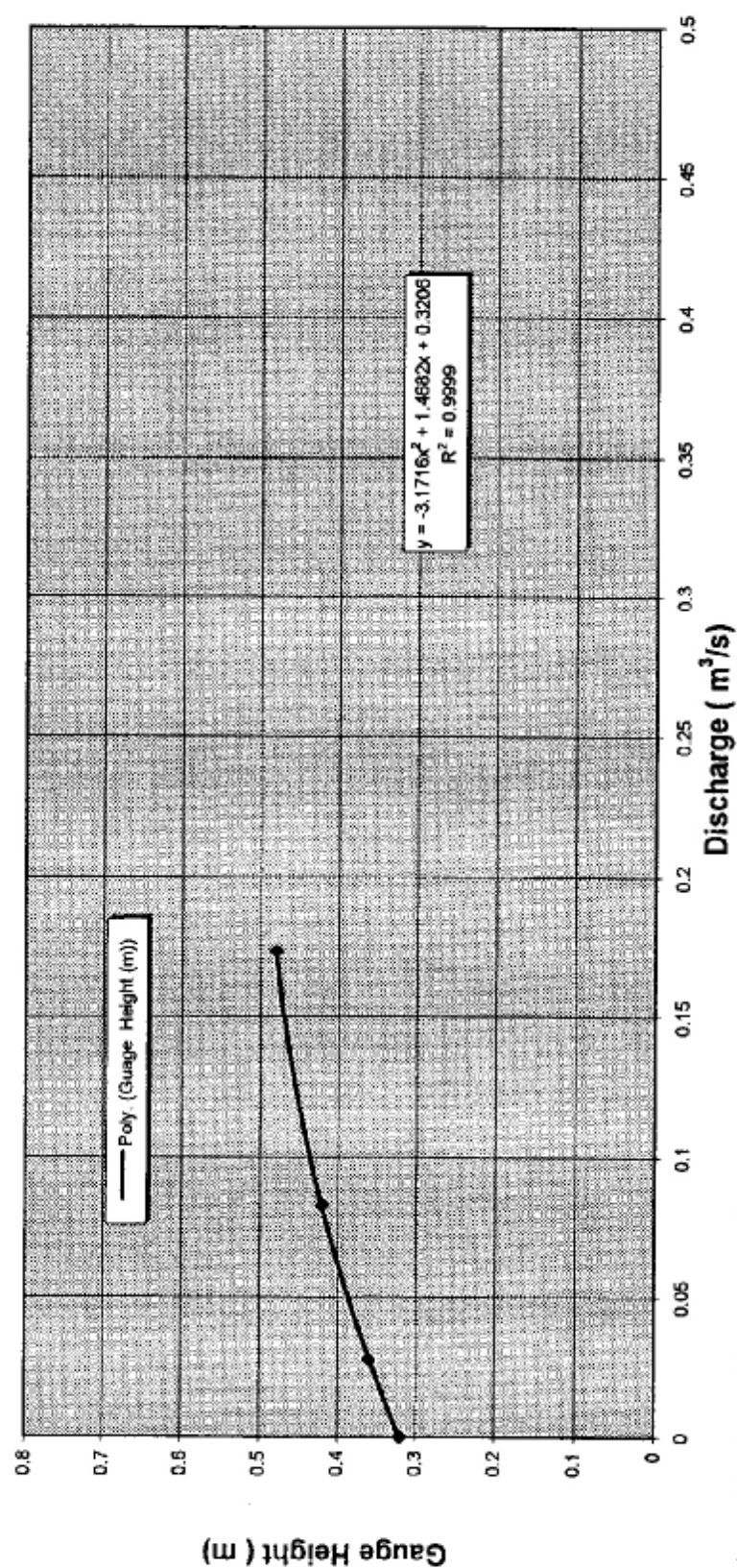
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Figure 6
Stage Discharge Curve For Johnson Creek
Immediately Below Wier



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Figure 6a
Stage Discharge Curve For Johnson Creek
Immediately Below Wier



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EXAMPLE ANNUAL MONITORING LOG
JOHNSON LAKE WEIR AND FISHWAY
1996 OPERATIONS LOG

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