SUMMIT LAKE PIKE INVESTIGATIONS

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ABSTRACT

The presence of northern pike (Esox lucius) in Summit Lake was first brought to the attention of the Fisheries Branch in July 1987 by reports of an angler caught specimen. To confirm pike presence, a program of extensive fish sampling was planned and undertaken in the Summit Lake and Crooked River systems in August and September 1987. In Summit Lake, only 1 pike was found among some 7500 fish captured in 45 gill net sets. No pike (adults or juveniles) were found in tributary lakes, streams or marsh areas sampled using various techniques (electrofishing, minnow trapping and gill netting). Pike were not found in sampling of lakes in the Crooked River system downstream of Summit Lake (Davie, McLeod, Tudyah, Kerry and Redrocky lakes). Whitefish from the Summit Lake and Crooked River systems were sampled for the presence of the pike parasite Triaenophorous crassus, again with none being found. These results suggest the pike population is very small in the Summit Lake - Crooked River system at this time.

Recommendations to monitor and deal with the potential pike invasion include isolation of the Summit Lake watershed and annual monitoring of the fish populations in Summit Lake and associated tributaries. Fish migration through all of the 14 tributary systems identified can be blocked, thereby isolating any pike in the Summit Lake system from entering into the Fraser system. Engineering works include construction of fish barriers on the streams and enhancement of the Fraser - Summit divide, where necessary. Fish populations in Summit Lake should be annually sampled through a gill netting program and through angler participation to monitor status of the pike population. Some headwater lakes present excellent potential for recreational fisheries management where, if a sport fishery were established, a good early warning system of pike range extension would be in place.

1.0 INTRODUCTION

Recent historic distribution of northern pike (Esox lucius) in British Columbia has commonly been understood to be downstream of Hudson Hope on the Peace-MacKenzie River system (Fig. 1). In July 1987, the Fisheries Branch was advised of an angler caught pike from Summit Lake, some 300 km outside of their reported range and within a few km of the Salmon River drainage of the Fraser River system. This raised the possibility that pike may gain access to the Fraser River system. Concern has been expressed that pike pose two Fisheries problems; predation and parasite transfer. Pike are known to eat large numbers of young fish and also are the intermediate host to a tapeworm, Triaenophorous crassus, which form unsightly cysts in salmonids. The economic detriment to commercial and sport caught salmonids in the Fraser River is incalculable. The probability of young salmonids becoming infected with this parasite is high if parasitized pike inhabit similar rearing areas. This latter problem was also a matter of concern raised earlier at the proposed McGregor Dam proposal which would have linked the Peace and Fraser systems. At that time no pike were confirmed in the Parsnip River or in Williston Lake, but were below Bennett Dam.

In view of the potential seriousness of a pike invasion into the Fraser system, the Provincial Fisheries Branch and the Federal Department of Fisheries and Oceans undertook to investigate the current status of the pike problem in the Crooked River-Summit Lake system. Objectives of the program were firstly to identify the current distribution and abundance of pike in the Crooked River-Summit Lake system, and secondly to identify any methods to eradicate, control or contain the pike in Summit Lake.

2.0 PROGRAM COMPONENTS

The Summit Lake pike investigation contained several components aimed at determining the distribution and abundance of pike in Summit Lake and Crooked River, and at determining potential methods to deal with the problem. The 4 major components of the investigation, and specific objectives included:

1. Summit Lake fish sampling

   - To determine current status of the pike population in Summit Lake.

2. Crooked River system fish sampling

   - To determine present status of the pike population in the Crooked River system downstream of Summit Lake.

3. Parasite (Triaenophorous) sampling

   - To determine the incidence of cysts containing Triaenophorous crassus in salmonids in the Crooked River/Summit Lake system.

4. Summit Lake tributary assessment

   - To determine current status of the pike population in Summit Lake tributary streams.
   - To assess potential of headwater transfer of pike to the Fraser River system.

All assessments were conducted from August through October, 1987.

3.0 RESULTS

Results of each component of the Summit Lake Pike Investigation are summarized below. Complete reports are appended.

3.1 Summit Lake Fish Sampling

An extensive program of gill netting was conducted in Summit Lake by Region 7 Fisheries Management staff in August and September 1987. A total of 45 gill nets were set, covering a total of 986 net hours. All nets were experimental monofilament gill nets of variable mesh size, 91 m in length by 2.4 m depth. Nets were set throughout Summit Lake. Results of the netting program are summarized in Table 1. Of the 7441 fish captured only 1 was a pike, found in the southwest arm of Summit Lake. This pike weighed 2.7 kg (6 lbs), was 5 to 6 years in age and had evidence of prior spawning. The parasite Triaenophorous crassus was not present in this specimen. As a note, the pike captured by angling was from the same arm of the Summit Lake.

3.2 Crooked River Fish Sampling

Fish sampling in the Crooked River system downstream of Summit Lake was conducted by private sector contract. Waters sampled included Davie, McLeod, Tudyah, Redrocky and Kerry lakes (Fig. 2). A total of 17 gill net sets were undertaken, for a total of 255 net hours in the various lakes as summarized in Table 2. In addition, 140 minnow traps were set, and 4 sites were sampled by electrofishing. No pike were found among the 4,065 fish captured.

3.3 Parasite (Triaenophorous) sampling

Samples of salmonids captured in all phases of the fish sampling programs were analyzed for the occurrence of Triaenophorous crassus. A total of 1178 salmonids were sampled, including 1006 lake whitefish (Table 3). Samples were taken from Summit Lake and its tributaries, and from the Crooked River system downstream of Summit Lake. No evidence of T. crassus was found among the fish sampled from either the Summit Lake or the Crooked River systems. The conclusion from these results was that the true incidence of T. crassus was less than 0.3% at the 95% level of confidence.

3.4 Summit Lake Tributary Assessment

Investigations were conducted in all Summit Lake tributary drainages (Fig. 3) to determine the presence/absence of pike (juveniles and adults), and to determine the potential for headwater transfer of pike to the Fraser River system. No pike were found among the over 1600 fish captured in electrofishing, minnow trapping or gill netting at 58 sites in and around the 14 tributary drainages (Table 4). Significant potential for headwater transfer of pike to the Fraser River system was determined for 5 drainages (Table 5). A preliminary engineering overview of the drainages described methods to eliminate the threat of pike transfer from within the Summit Lake system. These include construction of headwater dykes to block potential invasion routes, and instream fish barriers to prevent pike from invading the tributaries. Opportunities for the creation of recreational fisheries were evident in a number of tributary lakes. Creation of relatively high use fisheries, particularly in potential pike invasion routes, could serve as important early warning systems of pike range extension.

4.0 DISCUSSION

4.1 Present Status of the Pike Population

Results of the fish sampling programs indicate that the population pike in the Summit Lake - Crooked River system is very small at the present time. While extensive sampling within Summit Lake revealed only 1 pike, their presence is confirmed. And while no pike were found in the Crooked River program, less overall effort was expended than was the case for Summit Lake itself, so we must be less certain that the actual population is as small as that percieved for Summit Lake. We are left with many questions regarding the status of the pike population. We do not know whether the population is expanding (reproducing), or where the major concentrations of pike might be.

4.2 Options For Control

If pike do become established in Summit Lake there is little that can be done to eradicate the population. Chemical rehabilitation is not possible given the size and complexity of the lake and its tributary systems. The only alternative is to pursue methods to contain the pike within the Summit Lake system, thereby preventing access via tributary streams to the Fraser system. Engineering works outlined in the tributary assessment component should ensure that pike do not reach the Fraser system via Summit Lake tributaries.

5.0 RECOMMENDATIONS

It is recommended that steps be taken to monitor and contain the potential pike population in Summit Lake. These include:

1. The status of the pike population in Summit Lake should be monitored annually. This should be conducted through an annual gill netting program, and through angler awareness and participation.

2. Construction of barriers to pike invasion should be completed for all tributary streams with a high probability of headwater transfer. Engineering surveys are required to better define the options and costs.
3. Fisheries management options should be pursued in conjunction with pike control measures. The potential to create relatively high use recreational fisheries in possible pike invasion routes will provide an early warning system of pike range extension, as well as some excellent recreational opportunities.

The perceived impacts of a pike invasion into the Fraser River system make it necessary to act immediately. A relatively small amount of effort and money should be committed now to avoid potential serious and untreatable problems in the future. Perhaps the most likely route for pike to enter the Fraser system is that for which we have no defense. As apparently was the case in Summit Lake, transplantation by humans may be inevitable. For this reason, if pike do become established in Summit Lake, some pike population control measures may be desirable.

ACKNOWLEDGEMENTS

The Summit Lake investigation program unfolded quickly following the discovery of pike in July 1987. G.D. Taylor, Manager, Fisheries Management Section and D.H.G. Ableson, Regional Fisheries Biologist (Prince George), planned and directed the program. Field activities of all staff were coordinated by C.D. Tredger and J.C. Wightman. All participants in the Summit Lake program are to be commended for their hard work.

Table 1. Summary of Summit Lake gill net sampling program, August and September 1987.

Effort: 45 Experimental Gill nets (91 x 2.4 m)
986 net hours

Catch:

	N	%
Total Fish	7441	
Cyprinids	4912	66
Whitefish	1516	20
Suckers	911	12
Trout/char	95	1
Pike	1	

Pike Measurements:

Netted	2.7 kg (6 lbs)	5-6 years old
Angled	2 kg (4-5 lbs)	?

Table 2. Summary of Crooked River system fish sampling program, September 1987

Effort: 17 Experimental Gill nets (91 x 2.4 m)
255 net hours
Electrofishing and Minnow Trapping

Catch:

	N	%
Total Fish	4065	
Cyprinids	2484	61
Whitefish	670	16
Suckers	756	19
Trout/char/kokanee	107	3
Pike	0	0

Table 3. Summary of the Summit Lake/Crooked River parasite (Triaenophorous) Sampling Program, September 1987

	Lake Whitefish	Total Salmonids	# of Cysts
Summit Lake	502	553	0
Crooked River	504	625	0
Total	1006	1178	0

Table 4. Summary of Summit Lake tributary fish sampling program, September 1987

Effort: 12 Gill nets in Headwater Lakes
46 electrofishing/minnow trapping sites

Catch:

	N	%
Total Fish	1683	
Cyprinids	1202	71
Whitefish	120	7
Suckers	179	11
Trout	172	10
Pike	0	0

Table 5. Potential of headwater pike transfer to the Fraser River system from Summit Lake tributary drainages

Drainage No.	Headwater Transfer Potential	Comments
1	N	may connect to Crooked River
2	N	
3	L (H indirect)	joins to Crooked River system via swamp
4	M	no connecting swamp but very low divide
5	H	major swamp drains to both Fraser and Summit
6	H	Haglund Lake drains to both Fraser and Summit
7	N	may flow towards No. 6 at times
8	N	
9	H	pond/swamp connection to Fraser system
10	N (H indirect)	N.E. fork may connect to No. 11
11	H	headwater swamp may drain to both Fraser and Summit
12	N	surrounded by Summit drainages
14	N (H indirect)	swamp may connect to No. 11
15	L	