

Executive Summary

Byers Lake 2005

A stocking assessment was conducted at Byers Lake on October 5, 2004 to determine the status of the fishery and assess the amount of ongoing natural recruitment from fertile eastern brook trout that were stocked before 1997. The management goal for Byers Lake is to maintain an above average quality eastern brook trout fishery. Byers Lake is 18.3 ha and is situated 32 km NE of Prince George in Eskers Provincial Park. Byers Lake is a hike-in lake and can be accessed using an approximately 7 km hiking trail from the main parking lot in Eskers Park. This lake can also be accessed using a canoe via the portage system starting at Camp Lake.

Three standard gillnets (two floating and one sinking) 90 m in length (standard experimental mesh) were set on October 5 and 6, 2004. The total sampling effort was 62.8 hours resulting in a gillnet catch per unit effort (CPUE) of 0.67 fish per hour. At the time of sampling the brook trout population was capable of providing an average angling experience, however the gillnet catch rate was low relative to other lakes in the region. For example gillnet catch rates on nearby lakes in Eskers Park in 2003 ranged from 1.6 to 6.0 fish per net-hour. It is also notable all fish sampled in Byers Lake in 2004 were two years old with an average length of 351 mm, indicating a relatively high rate of growth. Byers Lake has previously been stocked only in odd years and cohort of 4-year-old fish was expected to be present (stocked in 2001) but was absent from the 2004 gillnet catch. Based on anecdotal information and limited creel data from the 2003 ice-fishing season it is likely that Byers Lake is receiving a high rate of exploitation which is reducing the quality of the fishery. In winter 2003-2004 three-year-old brook trout in Byers Lake caught in the winter fishery were attaining lengths of 45 cm or more. It is possible that Byers Lake could be managed as a trophy fishery with changes to stocking frequencies and catch quotas. To maintain a higher quality fishery two new fishery regulations are recommended: 1) Change minimum size limit to 40 cm 2) Daily quota of two fish.

There is also limited evidence of natural recruitment occurring as 7% (2 females and 1 male) of the catch were mature (only sterile brook trout have been stocked since 1997). It is unlikely that these small numbers of mature fish will present a risk to other populations of fish, however, all brook trout stocked in Eskers Park beginning in 2005 will be marked with an adipose fin clip and a follow-up assessment will be completed in the fall of 2007 to determine the amount of natural recruitment in Byers Lake. Additional management strategies will then be implemented if necessary.



Figure 1. Example of a winter catch of 40 cm brook trout at Byers Lake (3 anglers).

**OMINECA REGION
LAKE STOCK ASSESSMENT REPORT**

LAKE NAME: Byers **ALIAS:** Byers **BC WBID:** 01240STUR

LAKE LOCATION: *Nearest center:* 32 km NW Prince George *Drainage:* FRASER
UTM: 10.487356.5992029

LAKE ATTRIBUTES: *Surface Area:* 18.3 Ha *Elevation:* 758 m
Littoral Area: 14.4 Ha *T.D.S.:* 140 ppm
Max Depth: 11 m *Mean depth:* 3.2 m

MANAGEMENT OBJECTIVE (mean length in gillnet (cm)):

- | | | |
|-------------|---|-------------------------------------|
| Objective 1 | Family Fishery (High CPUE <30 cm) | <input type="checkbox"/> |
| Objective 2 | Average Quality (30-40 cm) | <input type="checkbox"/> |
| Objective 3 | Above Average (40-50 cm) | <input checked="" type="checkbox"/> |
| Objective 4 | Trophy (> 50 cm for RB, 20% > 40 cm for EB) | <input type="checkbox"/> |

MANAGEMENT/SURVEY HISTORY:

Previous gill net assessment(s): no yes Philip, 1985, Zimmerman 1999
Year(s) Surveyed: 1985, 1999

STOCKING DATA:

Current Stocking Rate 164 Fish/Ha in odd years Note: Changed to 82 fish per Ha annually for 2005
Stock Type **AYLMER AF3N**
Species EB monoculture
Previous Stocking Rate 164

SURVEY METHODS:

Method	Date (yy.mm.dd)	Survey Agency	Crew
Fish	SGN 2004-10-05	mwap	cory williamson, dave merritt
Chem.	TDS, O2 etc 1985		
Physical	n/a 1985		
Temp.	n/a 1985		

Netting Specs: *Net type:* Standard Experimental *Net length:* 90m (3x30m)
Setting: Sinking and Floating *Panel Mesh:* Standard

SURVEY RESULTS:

Catch

	RB	EB	RSC	LKC	LSU	CSU	NSC	CAS	BT	LT
2004	0	42	0	0	0	0	0	0	0	0
1999	0	24	0	0	0	0	0	0	0	0
-	0	5	0	0	0	0	0	0	0	0
-	0	0	0	0	0	0	0	0	0	0

Survey Year	2004	1999	-	-
Effort Hours	62.8	20		
RB CPUE:	0.00	0.00		RB/Net Hour
EB CPUE:	0.67	1.20		EB/Net Hour
# of Sets:	3			

Next Assessment **2007**

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SURVEY CONCLUSIONS:

Objective	Objectives Achieved		Reason
	Yes	No	
1. Family	<input type="checkbox"/>	<input type="checkbox"/>	
2. Average	<input type="checkbox"/>	<input type="checkbox"/>	
3. Above Average	<input type="checkbox"/>	<input type="checkbox"/>	
4. Trophy	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No, however fish have very high growth rates; net CPUE lower than expected; regulation changes are warranted to achieve objective

RECOMMENDATIONS:

Assessment: Assess at 3 year interval; continue opportunistic winter creel surveys with seasonal parks ranger as available.

Management: Management options to stabilize quality of fishery.

- 1) Increase stocking rate to allow a more sustained harvest
- 2) Slot limit- ex. two fish per day over 40-cm
- 3) No fish under 40, 45 or 50 cm.

Consider including in public consultation process around EB management in Omineca. Recommend a two fish per day over 40 cm limit; anglers who want to fill regional quota are able to do so at nearby lakes in Eskers Park.

Comments:

Very rapid growth for Omineca Region, and high condition of samples in 2004 gn and 2003 creel data.

Anecdotally, few people fished this lake until 2002; with large increase in winter effort in '03-'04.

Low net CPUE and only one age class in '04 indicates possibility of over fishing for stated objectives.

Under a different management scenario, this lake could have potential as a trophy fishery for EB over 50 cm.

Original management objective was for a moderate use fishery.

7% of sample were diploid fish indicating a low level of natural recruitment from previously diploid hatchery stock (1988, 1989).

Uncertainties:

1999 age samples likely overestimate age by one year.

Only one age class captured in '04 with relatively high net effort.

Recent Brood Request Comments:

2004:Provincial Park Eskers. Assessed in 99, no evidence for natural recruitment. Change to annual stocking of 1500 marked fish. Assess 2005. Anecdotal evidence for natural recruitment.

History of Angling Regulations

Regional Regulations Only

Reported by: Cory Williamson

Date: Jun-05

Table 1. Brook trout physical attributes by age for each sample year.

Note: 2003 fish were from a creel sample.

Sample Year	Age	Sample Size	Length (mm)				Weight (g)				Condition (k)				
			Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Var
2004	2	42	351.3	268	393	27.8	727	280	1020	164.1	1.65	1.41	2.09	0.1	0.02
1999	2	22	185.6	148	224	19.3	100	100	100	0.0	0.00	0.00	0.00	0.0	0.00
2003	3	5	450	450	450	0.0	1078	1078	1078	0.0	1.18	1.18	1.18	0.0	0.00
1999	4	1	455				1600				0.00				

Table 2. Catch summary for all sample years. Note: 2003 fish were from a creel sample.

Sample Year	Sample Size	Length (mm)				Weight (g)				Condition (k)				
		Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Var
2004	42	351	268	393	27.8	727	280	1020	164.1	1.65	1.41	2.09	0.13	0.02
1999	24	196	148	455	27.8	207	100	1600	400.9	0.00	0.00	0.00	0.00	0.00
2003	5	450	450	450	0.0	1078	1078	1078	0.0	1.18	1.18	1.18	0.00	0.00

Table 3. Proportion of Catch (by survey year)

Survey Year	2004	1999	-	-
Less than 250 mm	0.0 %	95.8 %	0.0 %	%
Between 250-350 mm	45.2 %	0.0 %	0.0 %	%
Between 250-400 mm	100.0 %	0.0 %	0.0 %	%
Greater than 400 mm	0.0 %	4.2 %	100.0 %	%
Greater than 500 mm	0.0 %	0.0 %	0.0 %	%

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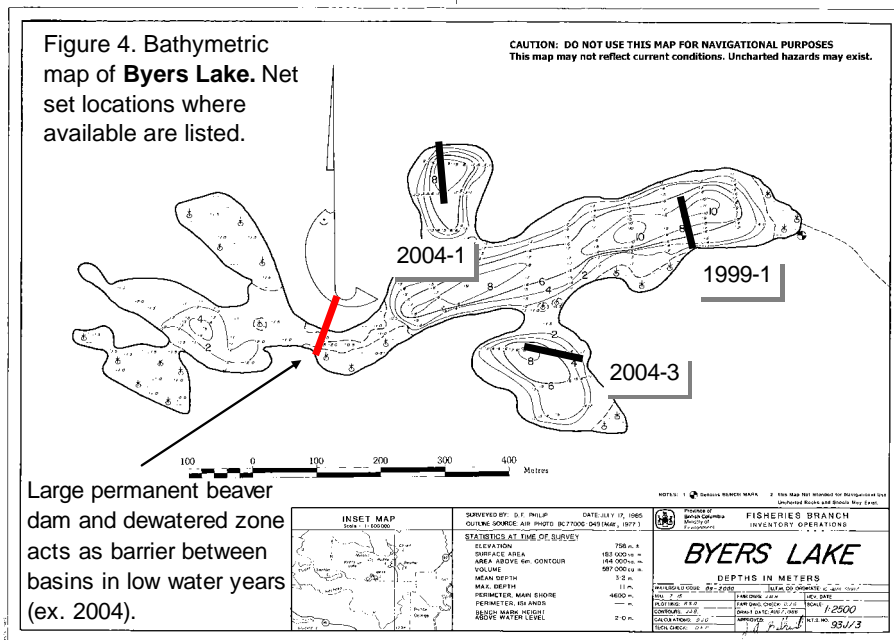
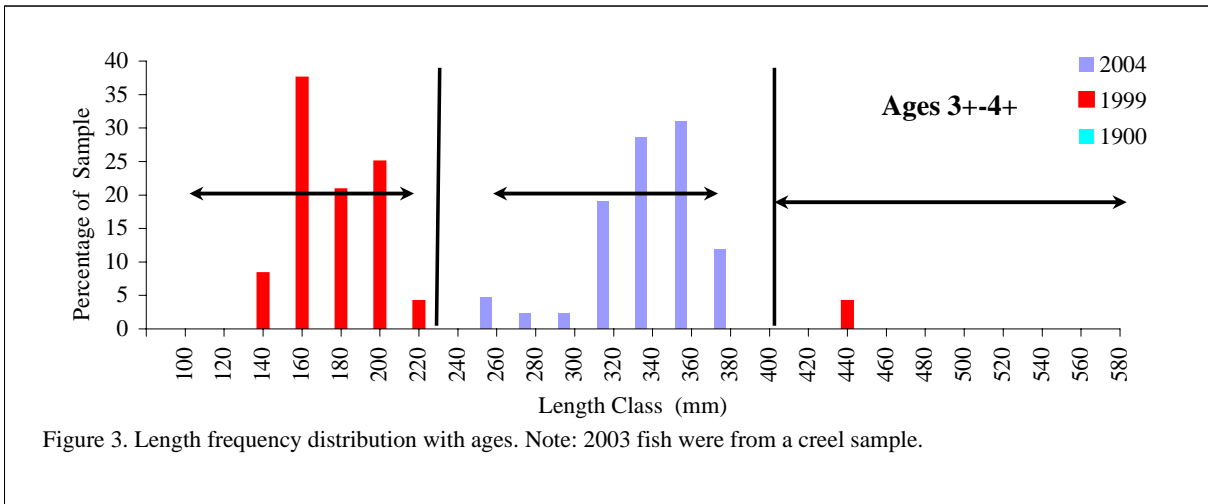
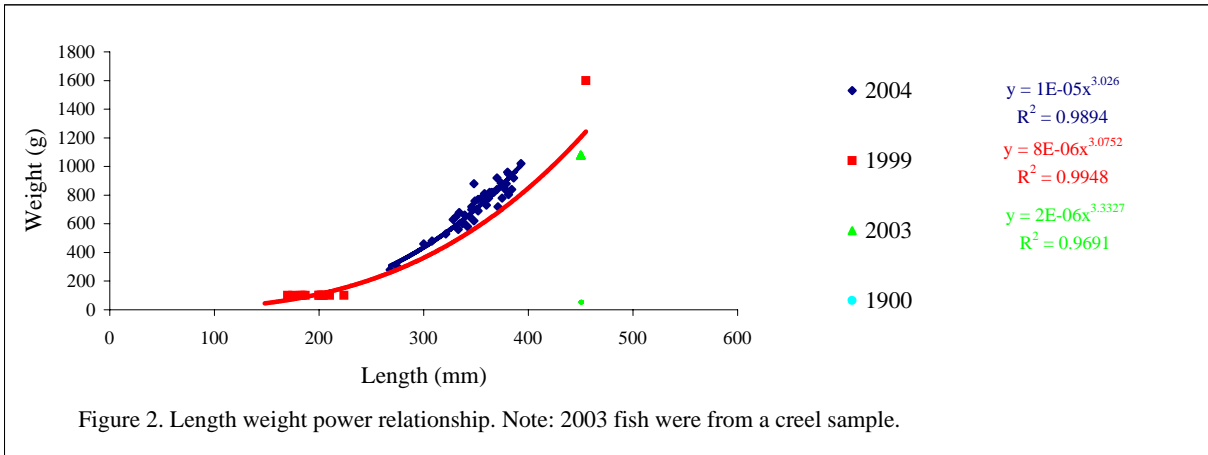


Table 4. Stocking History for Byers Lake to 2004.

Release Date	Species Name	Fish Count	Stock	Mark	Average Size (gm)	Life Cycle Stage
11-Jun-03	EB	3000	AYLMER AF3N		6.59	FINGERLING
4-Jun-01	EB	3000	AYLMER AF3N		7.84	FINGERLING
5-Jun-99	EB	3000	AYLMER AF3N		5.9	FINGERLING
17-Jun-97	EB	3000	AYLMER		3.01	FINGERLING
1-Jun-89	EB	5000	AYLMER		2.5	FRY
1-Jun-88	EB	10000	AYLMER		2.7	UNKNOWN

Table 5. Dissolved Oxygen/ Temperature Profile

18-Jul-85			Station UTM					
Depth (m)	DO	Temp. °C	Depth (m)	DO mg/L	DO %sat	Temp. °C	pH	Cond (25°C)
0	8	18.5	0					
1	8	18.5	1					
2	8	18.3	2					
3	7.8	18	3					
4	7.7	17.5	4					
5	4.1	15.3	5					
6	1.8	12.8	6					
7			7					
8	0.2	7.7	8					
9			9					
10			10					
11			11					
12			12					
13			13					
14			14					

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Table 6. Stock Assessment Data for 2004 (see lake files for additional survey data).

Lake	Sample#	Site	Number	Species		Length (mm)	Weight (grams)	Condition (k)	Scale Age	Structure	Cond.			Sex	Maturity
				Caught	Origin						Code	Clip			
Byers	1	1	1	EB		2	352	690	1.6	2+	o			m	m
Byers	2	1	1	EB		2	331	650	1.8	2+	o			f	m
Byers	3	1	1	EB		2	308	480	1.6	2++	o			af3n	im
Byers	4	1	1	EB		2	381	950	1.7	2++	o			af3n	im
Byers	5	1	1	EB		2	374	885	1.7	2++	o			af3n	im
Byers	6	1	1	EB		2	339	660	1.7	2+	o			af3n	mt
Byers	7	1	1	EB		2	349	760	1.8	2+	o			af3n	mt
Byers	8	1	1	EB		2	348	880	2.1	2+	o			af3n	mt
Byers	9	1	1	EB		2	338	610	1.6	2+	o			af3n	mt
Byers	10	1	1	EB		2	348	620	1.5	2+	o			af3n	im
Byers	11	1	1	EB		2	371	720	1.4	2+	o			af3n	im
Byers	12	1	1	EB		2	344	650	1.6	2+	o			af3n	im
Byers	13	1	1	EB		2	321	530	1.6	2+	o			af3n	mt
Byers	14	1	1	EB		2	333	560	1.5	2+	o			af3n	mt
Byers	1	3	1	EB		2	375	780	1.5	2++	o			af3n	mt
Byers	2	3	1	EB		2	378	840	1.6	2+	o			af3n	im
Byers	3	3	1	EB		2	300	460	1.7	2+	o			af3n	mt
Byers	4	3	1	EB		2	379	880	1.6	2+	o			af3n	mt
Byers	5	3	1	EB		2	337	600	1.6	2+	o			af3n	mt
Byers	6	3	1	EB		2	365	820	1.7	2+	o			af3n	mt
Byers	1	2	1	EB		2	381	805	1.5	2++	o			af3n	st
Byers	2	2	1	EB		2	393	1020	1.7	2++	o			af3n	mt
Byers	3	2	1	EB		2	363	820	1.7	2+	o			af3n	im
Byers	4	2	1	EB		2	386	920	1.6	2+	o			af3n	mt
Byers	5	2	1	EB		2	352	770	1.8	2+	o			af3n	mt
Byers	6	2	1	EB		2	362	780	1.6	2+	o			af3n	im
Byers	7	2	1	EB		2	346	700	1.7	2+	o			af3n	mt
Byers	8	2	1	EB		2	328	630	1.8	2++	o			af3n	mt
Byers	9	2	1	EB		2	334	680	1.8	2+	o			af3n	im
Byers	10	2	1	EB		2	275	300	1.4	2+	o			af3n	im
Byers	11	2	1	EB		2	346	720	1.7		o				
Byers	12	2	1	EB		2	370	920	1.8		o				
Byers	13	2	1	EB		2	355	780	1.7		o				
Byers	14	2	1	EB		2	370	840	1.7		o				
Byers	15	2	1	EB		2	367	820	1.7		o				
Byers	16	2	1	EB		2	380	960	1.7		o				
Byers	17	2	1	EB		2	384	840	1.5		o				
Byers	18	2	1	EB		2	342	580	1.4		o				
Byers	19	2	1	EB		2	358	810	1.8		o				
Byers	20	2	1	EB		2	363	800	1.7		o				
Byers	21	2	1	EB		2	360	730	1.6		o				
Byers	22	2	1	EB		2	268	280	1.5	2+	o			af3n	im



Figure 5. Eight eastern brook trout captured in the 2004 Byers Lake gillnet sample.



Figure 6. Ripe female eastern brook trout captured in the 2004 Byers Lake gillnet sample.



Figure 7. Mature male eastern brook trout captured in the 2004 Byers Lake gill net sample.



Figure 8. Mature female eastern brook trout captured in the 2004 Byers Lake gillnet sample.