# **Executive Summary**

Echo Lake 2004

A stocking assessment was conducted at Echo Lake on October 26, 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 Echo Lake is to maintain an above average quality eastern brook trout fishery. Echo Lake is 37 ha and is situated 20 km SSE of Fort St. James. Echo Lake has special Regional regulations with a daily quota of two brook trout, one over 40 cm in length, and no power boats.

Two standard sinking gillnets 90 m in length (standard mesh) were set on October 26, 2004. The total sampling effort was 25 hours resulting in a gillnet catch per unit effort (CPUE) of 8.03 fish per hour. At this time the brook trout population appears to be providing for a trophy angling experience with 42% of the fish exceeding 400 mm and 20% exceeding 500 mm in length. In addition, there appears to be a large number of fish in the lake available for capture. There is evidence of natural recruitment occurring as many of the fish sampled were noted to be reproductive (only sterile brook trout are currently stocked). As well, two-hundred brook trout captured during the survey indicates there is a large population of fish in the lake. This poses a serious problem for effective fisheries management of Echo Lake due to the concerns regarding naturalized brook trout populations. There is a considerable risk associated with hybridization with "blue-listed" bull trout if any of these fish are moved to nearby systems such as the Stuart or Nechako Rivers. Furthermore, the fisheries management objective of maintaining a trophy fishery may be compromised as fish growth could become substantially reduced if densities of fertile brook trout increase. Brook trout will all be marked beginning in 2005 and a follow-up assessment will be completed in the fall of 2007 to determine the amount of natural recruitment. Additional management strategies will then be implemented if necessary. Echo Lake should also be given priority for angler creel/satisfaction surveys. The 2004 stock assessment crew provided limited biological information on fertile brook trout captured in the sample. The quality of the current information could therefore be improved by a well designed creel survey.



Figure 1. Photo of Echo Lake in October of 2004. Float tube angler in 1998 with a trophy size brook trout (inset).

### OMINECA REGION LAKE STOCK ASSESSMENT REPORT

LAKE LOCATION:         Nearest center:         20 km SSE Fort St. James         Drainage:         FRASER           UTM:         10.420713.6010406         Image:         FRASER           LAKE ATTRIBUTES:         Surface Area:         33.7 Ha         Elevation:         845 m           Littoral Area:         20 Ha         T.D.S.:         50 ppm           MANAGEMENT OBJECTIVE:         Objective 1         Family Fishery (High CPUE <30 cm)         Image:           Objective 2         Above Average (46.50 cm)         Image:         Image:         Image:           Objective 3         Above Average (46.50 cm)         Image:         Image:         Image:           Objective 4         Trophy (29% > 50 cm for RB, 20% > 40 cm for EB)         Image:         Image:         Image:           MANAGEMENT/SURVEY HISTORY:         Previous gin net assessment(s):         no         yes         Image:         Little 1984; Lakes Files 1988; BCCF 2004           Year(s) Surveyed:         1984; 1988; 2004         yes         Image:         Little 1984; Lakes Files 1988; BCCF 2004           Stock Type         AYLMER AF3N         Species         EB, LKC         Previous Stocking Rate         89         Fish/Ha         Annually           Stock Type         AD04-10-25         BCCF         Chad Robertson, Kevin Mern	LAKE NAME:	Echo Lake				BC WBID:	00438stur				
LAKE ATTRIBUTES:       Surface Area:       33.7 Ha       Elevation:       845 m         Littoral Area:       20 Ha       T.D.S.:       50 ppm         MAX Depth:       13.7 m       Mean depth:       5.4 m         MANAGEMENT OBJECTIVE:       Objective 1       Family Fishery (High CPUE <0 cm)	LAKE LOCATIO	ON:	Nearest center: UTM:	20 km SSE Fo 10.420713.	ort St. James 6010406	Drainage:	FRASER				
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Objective 1       Family Fishery (High CPUE <30 cm)	MANAGEMEN	T OBJECTIV	'E:								
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Year(s) Surveyed:1984; 1988; 2004STOCKING DATA:Current Stocking Rate89Fish/HaAnnually Stock TypeAYLMER AF3N SpeciesSpeciesEB, LKCPrevious Stocking Rate89SURVEY METHODS:MethodDate (yy.mm.dd)Survey AgencyCrewFishSGN2004-10-25BCCFChad Robertson, Kevin MemickleChem.DO, Cond2004-10-25Previous Stocking Rate89SURVEY METHODS:Temp.porfile2004-10-25MethodDate (yy.mm.dd)Survey AgencyCrewFishSurvey AgencyCrewTemp.porfile2004-10-25Netting SpeciesNet type:Standard ExperimentalNet length:90m (3x30m)Survey Results: CatchSurvey Year20040Net top colspan="2">Net Assessment2004198800Next Assessment2007Survey Year2004 <td></td> <td>Previous gil</td> <td>l net assessment(</td> <td>s):</td> <td>no 🗖</td> <td>ves x</td> <td>Little 1984</td> <td>4; Lakes F</td> <td>iles 1988:</td> <td>BCCF 20</td> <td>04</td>		Previous gil	l net assessment(	s):	no 🗖	ves x	Little 1984	4; Lakes F	iles 1988:	BCCF 20	04
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#### Omineca Region Stocked Lake Assessment Report

SURVEY CONCL	LUSIONS:			
	_	Objective	es Achieved	
Objective	_	Yes	No	Reason
1. Family				
2. Average				
3. Above Average				Exceeded expectations
4. Trophy		X		
RECOMMENDA	TIONS:			
Assessment:	The next asse	essment for Ec	ho Lake is sch	neduled for 2007 to determine the level of natural recruitment in the lake.
Management:	Brook trout	will be marked	d with an adipo	ose fin clip beginning in 2005.
COMMENTS:	The manager recruitment i stocks if repr	ment object of s occurring, a roductive broo	maintaining and the fertile p k trout escape	a trophy fishery at Echo Lake may be compromised if significant natural population expands. There is also a threat to the biodiversity of native fish or are physically moved from Echo Lake into other aquatic habitats.
Uncertainties:	1988 CPUE 2004 catch v	is suspect as e vas sub-sampl	equal sample si ed for lengths,	ize recorded for each age-class (catch may have been sub-sampled). weights and maturity.

#### **Recent Brood Request Comments:**

2005 Annual. Assessed '04. Excellent growth. Natural recruitment. Mark all hatchery fish and re-assess in '08

### History of Angling Regulations

Brook trout daily quota = 2 (only one over 40 cm, bait ban, single-barbless hook), power boat restriction.

Reported by: Adrian Clarke Date: Mar-05

		Length (mm)					Weight (g)				Condition (k)			
	Sample													
Sample Year	Size	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Var
2004	45	342	139	546	125.9	818	26	2975	717.6	1.31	0.89	1.83	0.26	0.07
1988	30	294	178	410	125.9	469	50	990	375.7	1.34	0.89	1.79	0.23	0.05
1900	0	0	0	0	0.0	0	0	0	0.0	0.00	0.00	0.00	0.00	0.00
1900	0	0	0	0	0.0	0	0	0	0.0	0.00	0.00	0.00	0.00	0.00

Table 1. EB Physical Attributes for Sample Years

 Table 2.
 Catch summary for all sample years.

				Len	gth (m	<b>m</b> )	Weight (g)			g)	Condition (k)				
Sample		Sample	e												
Year	Age	Size	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Var
2004	1	13	171	139	222	24.5	52	26	107	23.3	0.97	0.89	1.04	0.0	0.00
1988	1	15	208	178	235	17.0	108	50	150	31.0	1.17	0.89	1.53	0.2	0.03
2004	2	13	334	304	361	18.6	511	370	640	85.1	1.37	1.18	1.50	0.1	0.01
1988	2	15	380	353	410	15.0	830	675	990	108.2	1.50	1.30	1.79	0.1	0.02
2004	3	11	445	432	476	14.7	1312	1150	1500	106.3	1.50	1.21	1.64	0.1	0.02
2004	4	4	479	455	498	17.9	1780	1530	1940	188.5	1.62	1.53	1.74	0.1	0.01
2004	5	3	508	461	546	43.2	2058	1190	2975	893.5	1.50	1.21	1.83	0.3	0.10
2004	6	1	501				1760				1.40				

### Table 3. Proportion of Catch (by survey year)

Survey Year	2004	1988	
Less than 240 mm	27 %	37 %	
Between 240-360 mm	29 %	33 %	
Between 240-400 mm	31 %	57 %	
Greater than 400 mm	42 %	23 %	
Greater than 500 mm	20 %	0 %	





Release Date	Species Name	Fish Count	Stock	Mark	Average Size (gm)	Life Cycle Stage
1-Jun-04	EB	3000	AYLMER AF3N		7	FINGERLING
11-Jun-03	EB	3000	AYLMER AF3N		6.59	FINGERLING
22-Jun-02	EB	3000	AYLMER AF3N		11.04	FINGERLING
5-Jun-01	EB	3000	AYLMER AF3N		7.84	FINGERLING
31-May-00	EB	3000	AYLMER AF3N		4.78	FINGERLING
1-Jun-99	EB	3000	AYLMER AF3N		5.9	FINGERLING
28-May-98	EB	5000	AYLMER 3N		4.26	FINGERLING
18-Jun-97	EB	3000	AYLMER		3.01	FINGERLING
31-May-96	EB	5000	AYLMER 3N		3.85	FINGERLING
8-Jun-95	EB	5000	AYLMER		3.92	FINGERLING
12-Jun-94	EB	5000	AYLMER		3.81	FINGERLING
11-Jun-93	EB	5000	AYLMER		4.37	FINGERLING
27-May-92	EB	5000	AYLMER		2.38	FINGERLING
7-Jun-91	EB	5000	AYLMER		3.12	FINGERLING
21-Jun-90	EB	5000	AYLMER		4.4	FINGERLING
14-Jun-89	EB	5000	AYLMER		2.9	FRY
1-Jun-88	EB	10000	AYLMER		2.7	UNKNOWN
1-Jun-87	EB	10000	AYLMER		1.9	UNKNOWN

 Table 4. Stocking History for Echo Lake to 2004.

## Table 5. Dissolved Oxygen/ Temperature Profile

16-Oct-84			26-Oct-04					
Depth (m)	DO	Temp. ⁰C	Depth (m)	DO mg/L	DO %sat	Temp. ⁰C	pН	Cond (25°C)
0	11.8	5.2	0	8.82	68.4	4.95	7.1	
1	11.8	5.2	1	8.31	64.8	4.96	7.1	
2	11.9	5.2	2	8.28	64.2	4.96	7.1	
3	11.9	5.2	3	8.41	65.7	4.96	7.1	69
4	11.8	5.3	4	8.38	65.0	4.97	7.1	65
5	11.8	5.1	5	8.29	65.1	4.97	7.1	61
6	11.6	5.2	6	8.32	65.3	4.96	7.1	60
7	11.6	5.1	7	8.29	65.1	4.95	7.1	60
8	11.7	5.1	8	8.24	64.8	4.93	7.1	61
9	11.7	5	9	7.21	57.0	5.09	7.1	68
10	11.7	5	10	2.35	21.6	5.54	6.9	82
11	11.8	4.9	11	6.72	52.3	5.55	6.6	73
12	11.6	5	12					
13	11.6	4.8	13					
14	<2	4.9	14					

## Table 6. Stock assessment data for 2004 (see lakes files for additional survey data).

			Species		Length	Weight	Condition					
Lake	Sample#	Site	Caught	Age	( <b>mm</b> )	(grams)	(k)	Scale Age	Structure	Sex	Ageing Comments	Comments
Echo	1	1	EB	5	546	2975	1.8	5+	OT	F	vague 5th annulus	small skein of eggs/large fat fish
Echo	2	1	EB	5	517	2010	1.5	5+	OT	F		abundant loose eggs
Echo	3	1	EB	3	451	1500	1.6	3+	OT	AF3N		bright/fat fish
Echo	4	1	EB	6	501	1760	1.4	6+	OT	AF3N	translucent	dark fish with red undersides
Echo	5	1	EB	3	436	1310	1.6	3+	OT	AF3N		
Echo	6	1	EB	5	461	1190	1.2	5+	OT	M		small milt pouch present
Echo	7	1	EB	3	445	1290	1.5	3+	OT	AF3N		bright fish
Echo	8	1	EB	4	484	1740	1.5	4+	OT	AF3N	translucent	
Echo	9	1	EB	4	498	1940	1.6	4+	OT	AF3N	translucent	
Echo	10	1	EB	2	327	520	1.5	2+	OT	M		small milt pouches present
Echo	11	1	EB	2	340	590	1.5	2+	01	M		small milt pouches present
Echo	12	1	EB	2	361	590	1.3	2+	01	AF3N		no evidence of sex
Echo	13	1	EB	1	143	28	1.0	1++	01	AF3N		small bright fish
Echo	14	1	EB	1	178	56	1.0	1++	OT	AF3N		
Echo	15	2		2	192	1280	0.9	1++	OT	AFON		
Echo	10	2		1	432	1200	1.0	3+	OT	AFON		small bright fich
Echo	10	2	EB	1	166	46	1.0	1	OT	AFON		smail bright fish
Echo	10	2	EB	2	330	40	1.0	2+	OT			bright fish
Echo	20	2	FB	2	319	470	1.2	2+	OT	AF3N		blight hon
Echo	21	2	FB	3	476	1400	1.3	3+	OT	AF3N		fat fish/bright
Echo	22	2	FB	4	479	1910	17	4+	OT	AF3N		fat bright fish
Echo	23	2	EB	4	455	1530	1.6	4+	OT	AF3N		bright fish
Echo	24	2	EB	1	151	33	1.0	1++	OT	AF3N		5
Echo	25	2	EB	1	178	53	0.9	1++	OT	AF3N		
Echo	26	2	EB	1	153	32	0.9	1++	OT	М		small dark fish
Echo	27	2	EB	3	452	1460	1.6	3+	OT	AF3N		slightly dark colouration
Echo	28	2	EB	1	222	107	1.0	1++	OT	AF3N		
Echo	29	2	EB	1	188	69	1.0	1++	OT	AF3N		
Echo	30	2	EB	3	434	1340	1.6	3+	OT	AF3N		
Echo	31	2	EB	1	194	74	1.0	1++	OT	AF3N		
Echo	32	2	EB	2	304	370	1.3	2+	OT	AF3N		
Echo	33	2	EB	2	341	540	1.4	2+	OT	AF3N		
Echo	34	2	EB	2	350	630	1.5	2+	OT	AF3N		
Echo	35	2	EB	2	311	430	1.4	2+	OT	AF3N		
Echo	36	2	EB	2	314	440	1.4	2+	OT	M		small male gametes present/dark
Echo	37	2	EB	3	434	1150	1.4	3+	OT	F		small skein of mixed sized eggs
Echo	38	2	EB	2	348	530	1.3	2+	01	AF3N		
Echo	39	2	EB	3	432	1250	1.6	3+	01	AF3N		
Echo	40	2	EB	2	324	430	1.3	2+	01	AF3N		
⊨cno Echo	41	2	EB	1	139	26	1.0	1++				
Echo	42	2		1	145	29	1.0	1++				
Echo	43	2	ED	3	430	640	1.5	3+ 2+	OT	M		small male gametes present
Echo	44	2		2	300	1210	1.4	2+	OT			fich appears thin/no ovidence of a
ECHO	45	2	ED	3	404	1210	1.2	3+	01	ALON		nan appears min/no evidence of s