

## Executive Summary

## Eena Lake 2004

A stocking assessment was conducted at Eena Lake in 2004 to determine the status of the fishery. Eena Lake is 54 ha and is situated 20 km north of Prince George. Eena Lake has good 2wd public access with a launch suitable for car-top boats. Eena Lake was chemically rehabilitated in 1990 and no other fish species have been reported prior to 2004 when lake chub were captured. The original management goal for Eena Lake was to maintain an average quality fishery.

Two standard gillnets (one floating and one sinking) 90 m in length (standard mesh) were set on September 10, 2004. The total sampling effort was 37 hours resulting in a gillnet catch per unit effort (CPUE) of 1.66 fish per net hour. The rainbow trout sampled during the 2004 assessment are reaching sizes suitable to provide for a quality angling experience as fish showed excellent growth rates reaching lengths up to 47.5 cm by three years of age. Mean fish size in the net catch was 29 cm, and the majority of these fish were under two years of age. The higher growth rates observed in 2004 may be in part due to reduced fish densities as the result of a partial winter kill at ice-off in 2004.

The stocking strain was changed from Pennask AF to Blackwater AF3N for 2006 in consultation with the Freshwater Fisheries Society of British Columbia to further enhance angling quality. Eena Lake is reputed to receive high-use in both summer and winter by anglers due to the lakes close proximity to Prince George and good fishery potential. Eena Lake is a priority for angler creel/satisfaction surveys in both the summer and winter periods to further allow us to manage this fishery more effectively. The completion of these surveys will complement the proposed aerial census flights scheduled for the spring and summer of 2005.



Figure 1. Photo of Eena Lake taken during the 2004 stock assessment.

Omineca Region Stocked Lake Assessment Report

**OMINECA REGION  
LAKE STOCK ASSESSMENT REPORT**

**LAKE NAME:** EENA LAKE **BC WBID:** 01330LSAL

**LAKE LOCATION:** *Nearest center:* N 20 Km from Prince George *Drainage:* FRASER  
*UTM:* 10.499258.5988582

**LAKE ATTRIBUTES:** *Surface Area:* 54.3 Ha *Elevation:* 762 m  
*Littoral Area:* 36.2 Ha *T.D.S.:* 40 ppm  
*Max Depth:* 23 m *Mean depth:* 5.5 m

**MANAGEMENT OBJECTIVE:**

- Objective 1 Family Fishery (High CPUE <30 cm)
- Objective 2 Average Quality (30-40 cm)
- Objective 3 Above Average (40-50 cm)
- Objective 4 Trophy (20% > 50 cm for RB, 20% > 40 cm for EB)

**MANAGEMENT/SURVEY HISTORY:**

Previous gill net assessment(s): no  yes  Schubert 1993; Barry & Schubert 1994;  
 Year(s) Surveyed: 1993;1994;1998;2004 Zimmerman 1998

**STOCKING DATA:**

*Current Stocking Rate* 92 Fish/Ha Annually  
*Stock Type* PENNASK AF  
*Species* RB  
*Previous Stocking Rate* 92

**SURVEY METHODS:**

Method	Date (yy.mm.dd)	Survey Agency	Crew
Fish	SGN 2004-09-09	BCCF	Chad Robertson, Kevin Mernickle
Chem.	DO 1979		
Physical	bathymetric 1979		
Temp.	profile 1979		

**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
<b>2004</b>	61	0	0	25	0	0	0	0	0	0
<b>1998</b>	64	0	0	0	0	0	0	0	0	0
<b>1994</b>	36	0	0	0	0	0	0	0	0	0
<b>1993</b>	32	0	0	0	0	0	0	0	0	0

Survey Year	2004	1998	1994	1993	
Effort Hours	36.75	2.38	2.92	2.5	
RB CUE:	1.66	26.89	12.33	12.80	RB/Net Hour
EB CUE:	0.00	0.00	0.00	0.00	EB/Net Hour
# of Sets:	2	1		1	

**Next Assessment 2009**

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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 checked="" type="checkbox"/>	above average fish size
3. Above Average	<input checked="" type="checkbox"/>	<input type="checkbox"/>	13% of rainbow trout exceed 400 mm in length
4. Trophy	<input type="checkbox"/>	<input type="checkbox"/>	

**RECOMMENDATIONS:**

**Assessment:** Next assessment scheduled for 2009.

**Management:** Manage as an average quality fishery for rainbow trout. An examination of length frequencies suggests that rainbow trout captured during the 2004 assessment on average are longer and reach a larger maximum size than in the assessments conducted in 1993, 1994, and 1998. The older fish in previous assessments are likely due to ageing error with scales (2004 fish were aged using otoliths). No fish older than 3+ were captured in 2004. Change stock to Blackwater AF3N for 2007 broodstock request.

**Comments:** Eena Lake was chemically rehabilitated in September, 1990 and lake assessments conducted in 1993, 1994, and 1998 only captured rainbow trout. The 2004 stock assessment determined that there are now lake chub present in Eena Lake. In spring 2004, there were reports of a partial fish kill at ice-off.

**Uncertainties:** The stock assessment conducted in 2004 suggests rainbow trout are being removed from the fishery prior to reaching 4 years of age.

**Recent Brood Request Comments:**

2005 Annual release. Changed stock to Blackwater AF3N. Assessed in '04. Prelim results indicate excellent growth of rb to 45+ cm.

**History of Angling Regulations**

Eena Lake was closed to angling between 1990-1993 after chemical rehabilitation had taken place. The current regional angling regulations apply to Eena Lake; however, only electric motors are permitted on the lake.

**Reported by:** Adrian Clarke

**Date:** Feb-05

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**Table 1. Rainbow trout physical attributes for sample years:**

Sample Year	Sample		Length (mm)				Weight (g)				Condition (k)				
	Age	Size	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Var
2004	1	44	249	195	297	28.7	204	90	360	69.7	1.27	1.11	1.50	0.1	0.01
1998	1	12	134	120	153	10.3	25	25	25		0.89	0.89	0.89		
1994	1	1	129								0.00				
2004	2	9	379	340	409	26.9	744	500	920	156.5	1.36	1.14	1.52	0.1	0.01
1994	2	11	240	185	270	23.6	152	65	200	37.9	1.07	1.02	1.16	0.0	0.00
1993	2	2	242	240	243	2.1	140	135	145	7.1	0.99	0.94	1.05	0.1	0.01
2004	3	8	423	370	475	37.7	1016	720	1520	279.2	1.31	1.21	1.43	0.1	0.01
1998	3	10	313	288	336	15.8	353	280	470	50.9	1.15	0.98	1.34	0.1	0.01
1994	3	18	315	239	421	46.7	317	150	600	122.1	0.98	0.80	1.21	0.1	0.02
1993	3	29	349	297	406	28.6	456	275	635	99.5	1.06	0.89	1.27	0.1	0.01
1998	4	34	324	274	419	25.1	394	210	645	69.7	1.16	0.56	1.39	0.1	0.02
1993	4	1	438				855				1.02				
1998	5	7	316	295	360	24.4	396	335	505	66.4	1.25	1.08	1.37	0.1	0.01
1998	6	1	290				305				1.25				

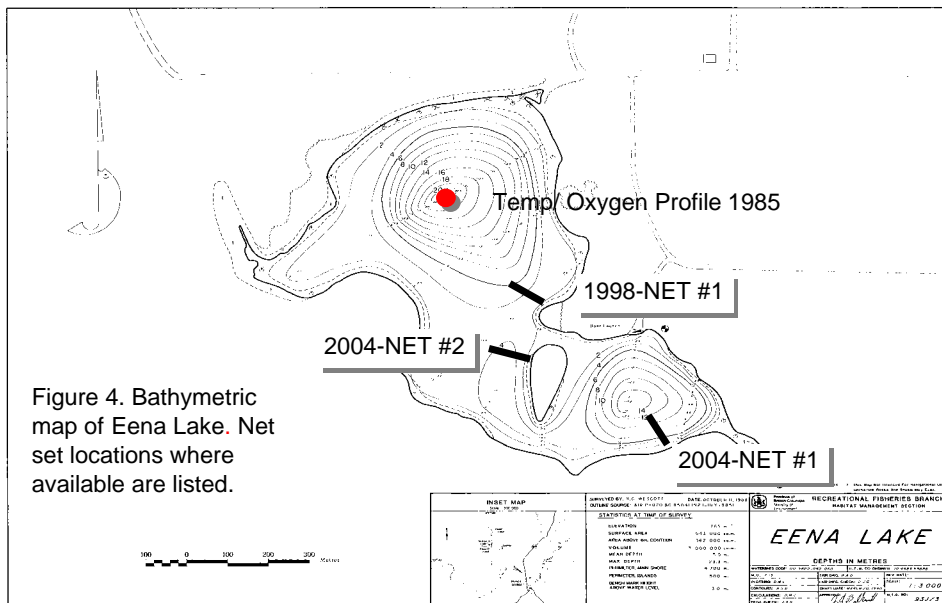
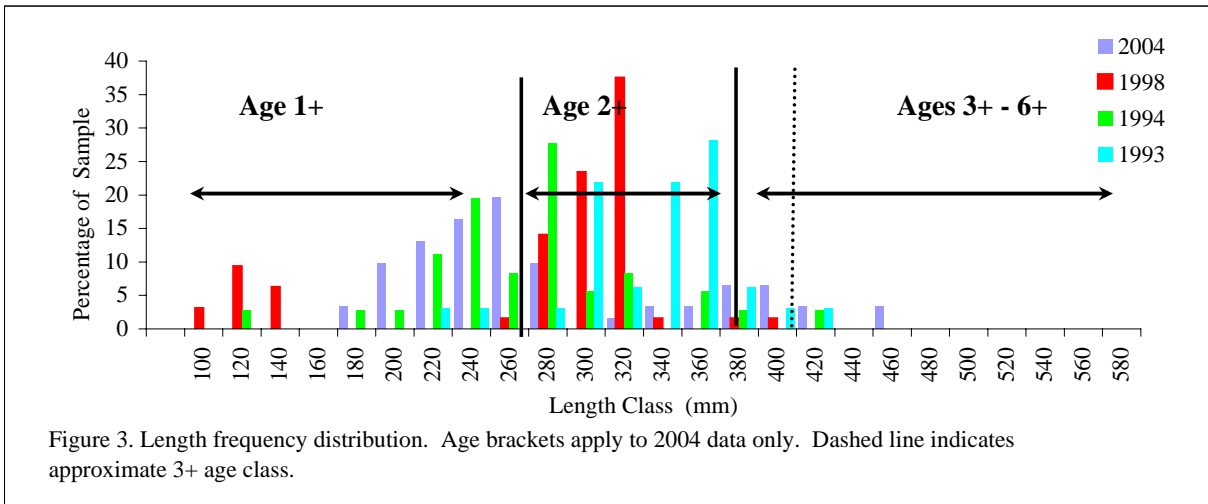
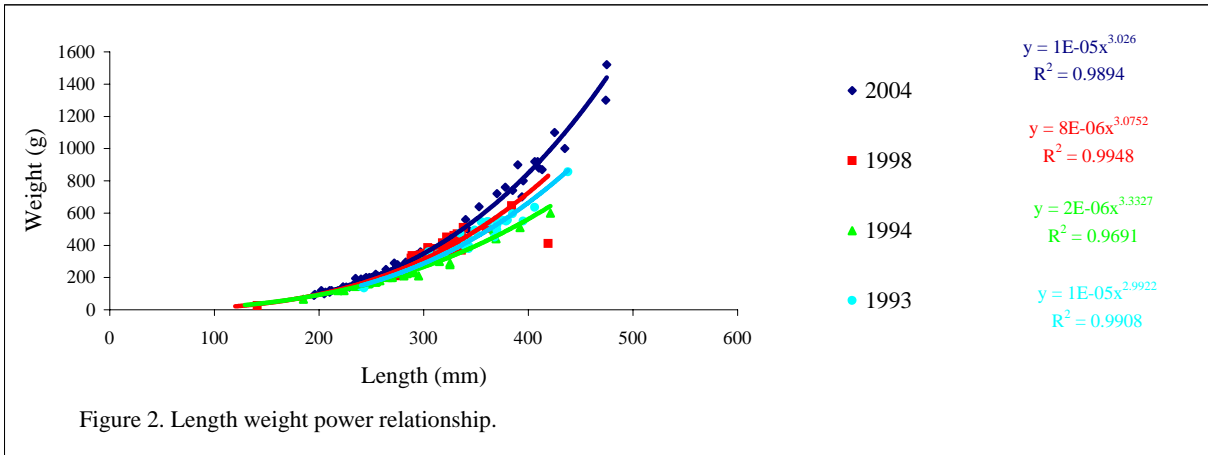
**Table 2. Catch summary for all sample years.**

Sample Year	Sample		Length (mm)				Weight (g)				Condition (k)			
	Size	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Var
2004	61	291	195	475	75.1	390	90	1520	335.1	1.29	1.11	1.52	0.09	0.01
1998	64	285	120	419	75.1	378	25	645	82.9	1.17	0.56	1.39	0.14	0.02
1994	36	279	129	421	55.9	245	65	600	118.4	0.99	0.00	1.21	0.20	0.04
1993	32	345	240	438	41.5	449	135	855	143.1	1.06	0.89	1.27	0.09	0.01

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

Survey Year	2004		1998		1994		1993	
Less than 250 mm	34.4	%	18.8	%	27.8	%	6.3	%
Between 250-350 mm	41.0	%	76.6	%	61.1	%	50.0	%
Between 250-400 mm	52.5	%	79.7	%	69.4	%	87.5	%
Greater than 400 mm	13.1	%	1.6	%	2.8	%	6.3	%
Greater than 500 mm	0.0	%	0.0	%	0.0	%	0.0	%

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**Table 4. Stocking History for Eena Lake to 2004.**

Release Date	Species Name	Fish Count	Stock	Mark	Average Size (gm)	Life Cycle Stage
3-Jun-04	RB	5000	PENNASK AF		21.76	YEARLING
11-Jun-03	RB	5000	PENNASK PENN AF		5.56	YEARLING
18-Jun-02	RB	200	PENNASK BV AF		10	YEARLING
3-Jun-02	RB	4800	PENNASK AF		6.41	YEARLING
3-Jun-01	RB	5000	PENNASK BV AF		12.72	YEARLING
2-Jun-00	RB	5000	PENNASK PENN AF		3.74	YEARLING
4-Jun-99	RB	5000	PENNASK BEAV AF		15.15	YEARLING
31-May-98	RB	4500	PENNASK AF		12.66	YEARLING
28-May-97	RB	5000	PENNASK HATH AF		17.1	YEARLING
4-Jun-96	RB	5000	PENNASK HATH AF		17.24	YEARLING
26-May-95	RB	5000	PENNASK AF		18.52	YEARLING
2-Jun-94	RB	5000	PENNASK HATH AF		25.64	YEARLING
2-Jun-93	RB	10000	PENNASK AF		20	YEARLING
16-Jun-92	RB	10000	NRT PREMIER		9.01	YEARLING

**Table 5. Dissolved Oxygen/ Temperature Profile**

02-Mar-79			16-Sep-85		
Depth (m)	DO	Temp. °C	Depth (m)	DO	Temp. °C
0			0	9.4	10
1	8.1	1	1	9.4	10
2	7.4	2.5	2	9.3	10
3	5.3	3.5	3	9.3	10
4	4.2	4	4	9.3	10
5	3.2	4	5	9.3	10
6	2.8	4	6	9.3	10
7	2.6	4	7	9.3	10
8	2.5	4	8	9.2	10
9	2.3	4	9	8.0	8.4
10	2	4	10	5.0	5.2
11	1.8	4.5	11		
12	1.7	4.5	12	1.7	4
13	1.9	4.5	13		
14	1.7	4.5	14	0.4	3.2
			15		
			16	0.3	2.9
			17		
			18	0.2	2.6

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**Table 6. Stock assessment data for 2004 (see lakes file for additional survey data).**

Lake	Sample#	Site	Number	Species Caught	Age	Length (mm)	Weight (grams)	Condition (k)	Structure	Sex	Maturity
Eena	1	1	1	rb	3	474	1300	1.2	OT	F	IM
Eena	2	1	1	rb	2	353	640	1.5	OT	F	IM
Eena	3	1	1	rb	1	274	260	1.3	OT	F	IM
Eena	4	1	1	rb	1	205	100	1.2	OT	F	IM
Eena	5	1	1	rb	2	340	560	1.4	OT	F	IM
Eena	6	1	1	rb	3	413	870	1.2	OT	F	ST
Eena	7	1	1	rb	1	240	190	1.4	OT	F	IM
Eena	8	1	1	rb	2	394	700	1.1	OT	F	IM
Eena	9	1	1	rb	3	385	740	1.3	OT	F	ST
Eena	10	1	1	rb	1	206	110	1.3	OT	F	IM
Eena	11	1	1	rb	2	395	800	1.3	OT	F	MT
Eena	12	2	1	rb	1	264	250	1.4	OT	F	IM
Eena	13	2	1	rb	1	274	240	1.2	OT	F	IM
Eena	14	2	1	rb	2	390	900	1.5	OT	F	IM
Eena	15	2	1	rb	1	223	140	1.3	OT	F	IM
Eena	16	2	1	rb	1	282	280	1.2	OT	F	IM
Eena	17	2	1	rb	1	246	190	1.3	OT	F	IM
Eena	18	2	1	rb	1	195	90	1.2	OT	F	IM
Eena	19	2	1	rb	2	342	500	1.2	OT	F	IM
Eena	20	2	1	rb	1	276	270	1.3	OT	F	IM
Eena	21	2	1	rb	3	425	1100	1.4	OT	F	M
Eena	22	2	1	rb	1	232	150	1.2	OT	F	IM
Eena	23	2	1	rb	1	259	210	1.2	OT	F	IM
Eena	24	2	1	rb	2	409	920	1.3	OT	F	IM
Eena	25	2	1	rb	1	252	190	1.2	OT	F	IM
Eena	26	2	1	rb	1	256	200	1.2	OT	F	IM
Eena	27	2	1	rb	3	410	880	1.3	OT	F	ST
Eena	28	2	1	rb	1	274	270	1.3	OT	F	IM
Eena	29	2	1	rb	1	229	140	1.2	OT	F	IM
Eena	30	2	1	rb	1	210	120	1.3	OT	F	IM
Eena	31	2	1	rb	1	223	140	1.3	OT	F	IM
Eena	32	2	1	rb	1	274	265	1.3	OT	F	IM
Eena	33	2	1	rb	1	272	290	1.4	OT	F	IM
Eena	34	2	1	rb	1	297	360	1.4	OT	F	IM
Eena	35	2	1	rb	2	406	920	1.4	OT	F	MT
Eena	36	2	1	rb	1	212	120	1.3	OT	F	IM
Eena	37	2	1	rb	1	235	195	1.5	OT	F	IM
Eena	38	2	1	rb	2	378	760	1.4	OT	F	IM
Eena	39	2	1	rb	1	275	280	1.3	OT	F	IM
Eena	40	2	1	rb	1	245	200	1.4	OT	F	IM
Eena	41	2	1	rb	1	248	200	1.3	OT	F	IM
Eena	42	2	1	rb	1	262	220	1.2	OT	F	IM
Eena	43	2	1	rb	1	278	265	1.2	OT	F	IM
Eena	44	2	1	rb	1	265	220	1.2	OT	F	IM
Eena	45	2	1	rb	1	202	120	1.5	OT	F	IM
Eena	46	2	1	rb	1	254	220	1.3	OT	F	IM
Eena	47	2	1	rb	1	226	140	1.2	OT	F	IM
Eena	48	2	1	rb	1	221	120	1.1	OT	F	IM
Eena	49	2	1	rb	1	288	290	1.2	OT	F	IM
Eena	50	2	1	rb	1	262	220	1.2	OT	F	IM
Eena	51	2	1	rb	1	243	190	1.3	OT	F	IM
Eena	52	2	1	rb	1	283	295	1.3	OT	F	IM
Eena	53	2	1	rb	1	210	110	1.2	OT	F	IM
Eena	54	2	1	rb	1	285	280	1.2	OT	F	IM
Eena	55	2	1	rb	3	370	720	1.4	OT	F	MT
Eena	56	2	1	rb	1	256	210	1.3	OT	F	IM
Eena	57	2	1	rb	1	293	340	1.4	OT	F	IM
Eena	58	2	1	rb	1	196	95	1.3	OT	F	IM
Eena	59	2	1	rb	1	250	200	1.3	OT	F	IM
Eena	60	2	1	rb	3	435	1000	1.2	OT	F	ST
Eena	61	2	1	rb	3	475	1520	1.4	OT	F	MT