Executive Summary Square Lake 2004

A stocking assessment was conducted on Square (formerly squaw) Lake during the fall of 2004. The original management goal for Square Lake was for a heavy-use fishery for rainbow trout between 3-5 pounds. The objectives of this assessment were to document the status of the fishery and to evaluate our stocking protocol to date. Square Lake is 13.5 ha and is located within Crooked River Provincial Park close to Hart Lake. Square Lake is accessed by hiking for approximately 1-km from the Provincial Park Campsite. This lake is predominantly used by anglers with float tubes. There is also a dock situated on the lake which is suitable for angling.

Both a standard sinking and a floating gillnet 90 m in length were set on September 15, 2004. The total sampling effort was 46.75 hours resulting in a gill-net catch per unit effort (CPUE) of 1.54 fish per hour. The rainbow trout sampled during the 2004 assessment had a mean length of 295 mm and a maximum length of 385 mm. No fish captured were older than three years of age. At this time Square Lake appears to be providing for a high-yield fishery for average sized rainbow trout. The stock was changed to Pennask AF3N (sterile) from AF for 2006 in consultation with the Freshwater Fisheries Society of British Columbia. It is recommended that in future this lake be stocked with fall fry (180 fry/ha) to save cost as it is a monculture lake.

The original management goal of a heavy-use fishery combined with large rainbow trout appears unrealistic considering there were no catch and release regulations on this small lake. Square Lake should be given priority for an angler creel/satisfaction survey during the summer angling period of 2005. At this time, we are unable to determine how anglers are responding to this fishery. One other lake located within Crooked River Provincial Park is managed as a quality fishery for rainbow trout exceeding 500 mm in length.

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

OMINECA REGION
LAKE STOCK ASSESSMENT REPORT

LAKE NAME: Square ***Alias*** Squaw ***BC WBID:*** 00936CRKD

LAKE LOCATION: *Nearest center:* 80 km N of Prince George *Drainage:* FRASER
UTM: 10.519645.6037269

LAKE ATTRIBUTES:

Surface Area:	13.5 Ha	*Elevation:*	710	m
Littoral Area:	na Ha	*T.D.S.:*	50	ppm
Max Depth:	10 m	*Mean depth:*	4.4	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 ☒ Little 1984;
Year(s) Surveyed: 1984; 1968

STOCKING DATA:

Current Stocking Rate	111	Fish/Ha	annual
Stock Type	**PENNASK AF**		
Species	RB		
Previous Stocking Rate	111		

SURVEY METHODS:

Method		Date (yy.mm.dd)	Survey Agency	Crew
Fish	sgn	2004-09-15	BCCF	Chad Robertson, Kevin Mernickle
Chem.	na			
Physical	bathymetric	1968-07-28	MOE	M. Whately
Temp.	na			

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	71	0	0	0	0	0	0	0	0	0
1984	97	0	0	0	0	0	0	0	0	0
1968	69	0	0	0	0	0	0	0	0	0

Survey Year	**2004**	**1984**	**1968**	
Effort Hours	46.75	21.75	10	
RB CPUE:	1.52	4.46	6.90	RB/Net Hour
EB CPUE:	0.00	0.00	0.00	EB/Net Hour
# of Sets:	2	1	1	

Next Assessment **2009**

SURVEY CONCLUSIONS:

Objective	Objectives Achieved Yes	No	Reason
1. Family	☐	☐	
2. Average	☑	☐	66% of rb between 250-400 mm and relatively high gill-net CPUE
3. Above Average	☐	☐	
4. Trophy	☐	☐	

RECOMMENDATIONS:

Assessment: The next stock assessment survey is scheduled for 2009.

Management: The original management goal for Square Lake was for a heavily used fishery for rainbow trout 3-5 pounds. In recent years the management has been for a high-yield fishery for rainbow trout of average quality. Rainbow trout are showing good growth but none of the sampled fish were older than 3 years.

Comments: Square Lake would benefit from an angler creel/satisfaction survey.
Change stocking rate to 2400 BW AF3N FF annual.

Uncertainties:

Recent Brood Request Comments:

2005 Annual. Assessed '04 . Provincial Park. Prelim Results indicate growth lower than expected. Changed stock to Pennask AF3N vs AF for 2006 in consultation with FFSBC.

History of Angling Regulations

There are no power boats permitted on Square Lake.

Reported by: Adrian Clarke
Date: Mar-05

Table 1. Rainbow trout physical attributes for sample years:

			Length (mm)				Weight (g)				Condition (k)				
Sample Year	Age	Sample Size	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Var
2004	1	20	217	185	245	19.2	110	59	140	24.9	1.06	0.93	1.29	0.1	0.01
1984	1	1	163				50				1.15				
2004	2	15	286	238	318	24.4	260	154	360	60.5	1.10	1.01	1.25	0.1	0.00
1984	2	10	212	172	264	36.2	119	50	225	69.9	1.11	0.98	1.33	0.1	0.01
2004	3	26	361	334	385	17.1	508	400	700	84.1	1.07	0.95	1.24	0.1	0.00
1984	3	7	288	262	334	27.4	290	210	400	69.9	1.20	1.07	1.34	0.1	0.01
1984	4	6	311	268	355	31.7	344	250	475	85.3	1.14	1.05	1.31	0.1	0.02
1984	5	6	353	331	369	13.0	504	425	575	55.6	1.15	1.09	1.24	0.1	0.00

Table 2. Catch summary for all sample years.

		Length (mm)				Weight (g)				Condition (k)				
Sample Year	Sample Size	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Var
2004	61	295	185	385	65.7	316	59	700	187.1	1.08	0.93	1.29	0.07	0.01
1984	64	256	163	369	65.7	279	50	575	162.5	1.15	0.98	1.34	0.10	0.01
1968	69	285	120	460	56.2	302	20	1125	191.6	1.18	0.99	2.88	0.23	0.05

Table 3. Proportion of Catch (by survey year)

Survey Year	2004	1984	1968
Less than 250 mm	34.4 %	40.6 %	27.5 %
Between 250-350 mm	37.7 %	51.6 %	60.9 %
Between 250-400 mm	65.6 %	59.4 %	68.1 %
Greater than 400 mm	0.0 %	0.0 %	4.3 %
Greater than 500 mm	0.0 %	0.0 %	0.0 %

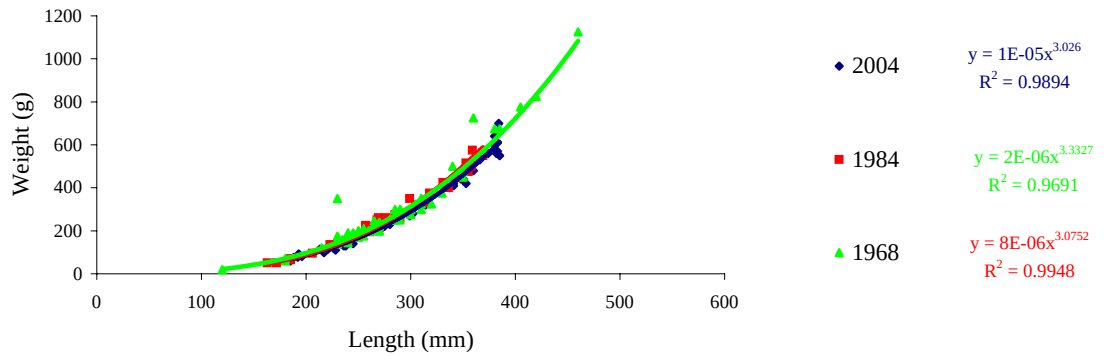

Figure 2. Length weight power relationship.

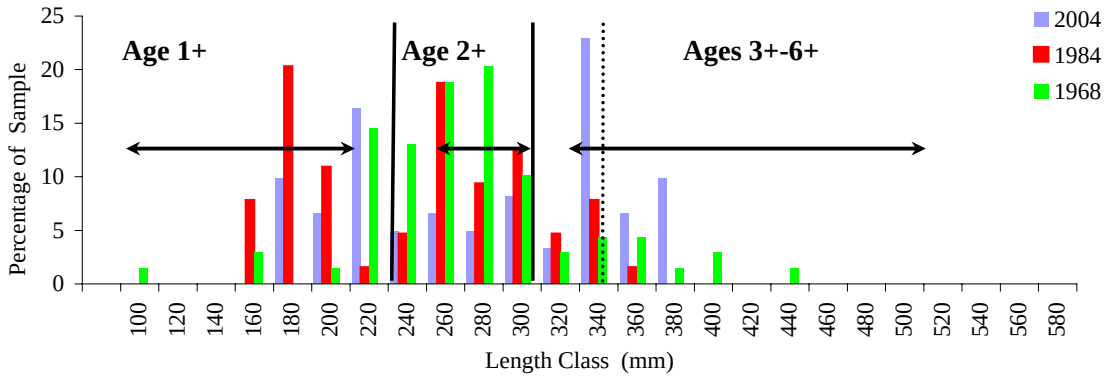

Figure 3. Length frequency distribution. Age brackets apply to the 2004 data only. Dashed line indicates approximate 3+ age class.

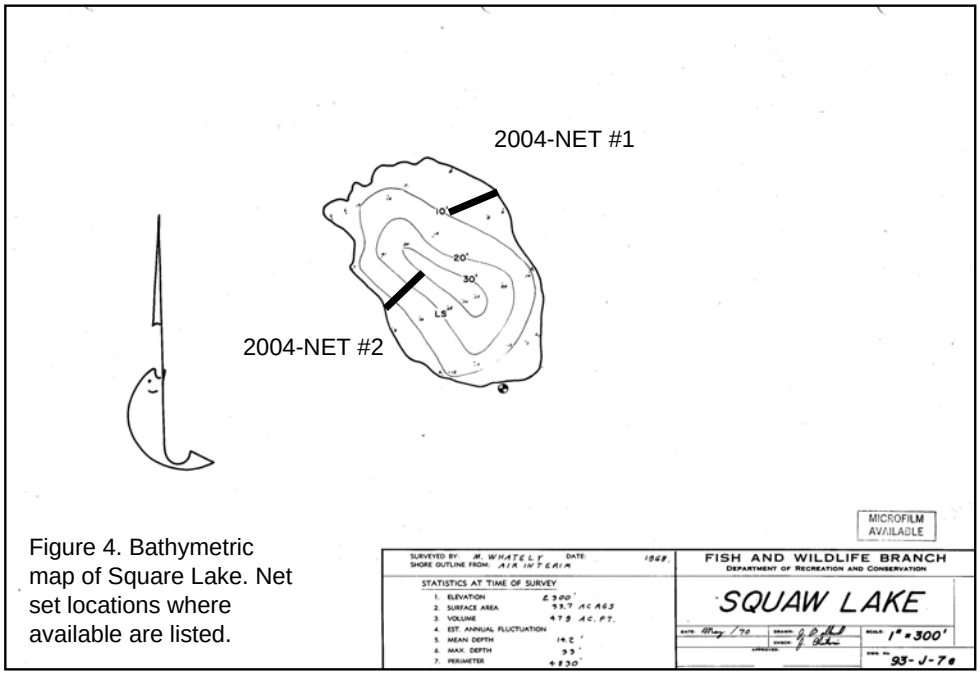

Figure 4. Bathymetric map of Square Lake. Net set locations where available are listed.

Table 4. Stocking History for Square Lake to 2004.

Release Date	Species Name	Fish Count	Stock	Mark	Average Size (gm)	Life Cycle Stage
3-Jun-04	RB	1500	PENNASK AF		21.76	YEARLING
12-Jun-03	RB	1500	PENNASK PENN AF		5.56	YEARLING
21-Jun-02	RB	1500	PENNASK BV AF		10	YEARLING
1-Jun-01	RB	1500	PENNASK BV AF		12.72	YEARLING
4-Jun-00	RB	1500	PENNASK PENN AF		4.78	YEARLING
3-Jun-99	RB	1500	PENNASK BEAV AF		15.15	YEARLING
31-May-98	RB	1500	PENNASK AF		12.66	YEARLING
28-May-97	RB	1500	PENNASK HATH AF		17.1	YEARLING
4-Jun-96	RB	1500	PENNASK HATH AF		17.24	YEARLING
25-May-95	RB	1500	PENNASK AF		18.52	YEARLING
1-Jun-94	RB	1500	PENNASK AF		25.64	YEARLING
2-Jun-93	RB	1500	PENNASK AF		20	YEARLING
31-Aug-92	RB	2500	DRAGON		0.88	FALL FRY
28-Aug-90	RB	10000	DRAGON		0.6	FALL FRY
1-Aug-88	RB	2500	DRAGON		0.9	UNKNOWN
1-Aug-87	RB	2500	DRAGON		0.9	UNKNOWN
1-Aug-86	RB	2500	TUNKWA		0.6	UNKNOWN
1-Aug-85	RB	2500	NRT PREMIER		0.8	UNKNOWN
1-Aug-84	RB	5000	NRT PREMIER		0.8	UNKNOWN
1-Sep-83	RB	5000	DRAGON		1.9	UNKNOWN
1-Sep-82	RB	5000	NRT PREMIER		1.3	UNKNOWN
1-Sep-81	RB	5000	BEAVER		1.5	UNKNOWN
1-Jun-80	RB	5000	BADGER		6.3	UNKNOWN
1-Jan-79	RB	5000	NRT PREMIER		3.4	UNKNOWN
1-Jan-78	RB	5000	NRT PREMIER		4	UNKNOWN
1-Jan-76	RB	6640	PENNASK		1.4	UNKNOWN
1-Jan-75	RB	10000	SWALWELL		1.5	FRY
1-Jan-73	RB	5000	MIXED-NATIVE		2.5	FRY
1-Jan-70	RB	5000	TUNKWA		2.5	FRY
1-Jan-68	RB	4000	SWALWELL		2.5	FRY
1-Jan-67	RB	5000	SWALWELL		2.5	FRY
1-Jan-66	RB	5000	SWALWELL		1.5	FRY
1-Jan-65	RB	5000	SWALWELL		1.5	FRY
1-Jan-64	RB	6000	MCLEARY		16	YEARLING
1-Jan-63	RB	6000	WASHINGTON		2.5	FRY
1-Jan-62	RB	5000	OREGON		30	YEARLING
1-Jan-61	RB	5000	DREW-WASH.		2.5	FRY

Table 5. Stock assessment data for 2004 (see lakes files for additional survey data).

Lake	Sample#	Site	Species Caught	Age	Length (mm)	Weight (grams)	Condition (k)	Scale Age	Structure	Sex	Maturity
Squaw	1	1	rb	3	347	450	1.1	3+	ot	f	mt
Squaw	2	1	rb	3	380	600	1.1	3+	ot	f	mt
Squaw	3	1	rb	3	374	560	1.1	3+	ot	f	mt
Squaw	4	1	rb	3	358	500	1.1	3+	ot	f	mt
Squaw	5	1	rb	3	334	410	1.1	3+	ot	f	mt
Squaw	6	1	rb	3	353	490	1.1	3+	ot	f	im
Squaw	7	1	rb	3	359	510	1.1	3+	ot	f	mt
Squaw	8	1	rb	3	382	560	1.0	3+	ot	f	mt
Squaw	9	1	rb	3	354	480	1.1	3+	ot	f	mt
Squaw	10	1	rb	3	350	440	1.0	3+	ot	f	im
Squaw	11	1	rb	3	356	490	1.1	3+	ot	f	mt
Squaw	12	1	rb	3	341	410	1.0	3+	ot	f	mt
Squaw	13	1	rb	2	318	360	1.1	2++	ot	f	im
Squaw	14	1	rb	2	275	220	1.1	2++	ot	f	im
Squaw	15	1	rb	2	272	210	1.0	2++	ot	f	im
Squaw	16	1	rb	2	254	180	1.1	2++	ot	f	im
Squaw	17	1	rb	2	280	230	1.0	2++	ot	f	im
Squaw	18	1	rb	1	236	130	1.0	1++	ot	f	im
Squaw	19	1	rb	1	233	140	1.1	1++	ot	f	im
Squaw	20	1	rb	2	260	220	1.3	2++	ot	f	im
Squaw	21	1	rb	1	238	130	1.0	1++	ot	f	im
Squaw	22	1	rb	1	245	140	1.0	1++	ot	f	im
Squaw	23	1	rb	1	222	122	1.1	1++	ot	f	im
Squaw	24	1	rb	1	219	117	1.1	1++	ot	f	im
Squaw	25	1	rb	1	218	109	1.1	1++	ot	f	im
Squaw	26	1	rb	1	193	93	1.3	1++	ot	f	im
Squaw	27	1	rb	1	192	78	1.1	1++	ot	f	im
Squaw	28	1	rb	1	213	115	1.2	1++	ot	f	im
Squaw	29	1	rb	1	196	80	1.1	1++	ot	f	im
Squaw	30	1	rb	1	188	76	1.1	1++	ot	f	im
Squaw	31	1	rb	1	217	99	1.0	1++	ot	f	im
Squaw	32	1	rb	1	233	140	1.1	1++	ot	f	im
Squaw	33	1	rb	1	192	79	1.1	1++	ot	f	im
Squaw	34	2	rb	2	314	320	1.0	2++	ot	f	im
Squaw	35	2	rb	3	341	440	1.1	3+	ot	f	mt
Squaw	36	2	rb	3	341	420	1.1	3+	ot	f	mt
Squaw	37	2	rb	3	366	530	1.1	3+	ot	f	mt
Squaw	38	2	rb	3	384	700	1.2	3++	ot	f	mt
Squaw	39	2	rb	3	383	610	1.1	3++	ot	f	mt
Squaw	40	2	rb	3	353	420	1.0	3+	ot	f	mt
Squaw	41	2	rb	3	383	660	1.2	3+	ot	f	mt
Squaw	42	2	rb	3	348	450	1.1	3+	ot	f	mt
Squaw	43	2	rb	3	337	400	1.0	3+	ot	f	mt
Squaw	44	2	rb	3	380	640	1.2	3+	ot	f	mt
Squaw	45	2	rb	3	385	550	1.0	3+	ot	f	mt
Squaw	46	2	rb	2	315	340	1.1	2++	ot	f	mt
Squaw	47	2	rb	3	348	440	1.0	3+	ot	f	mt
Squaw	48	2	rb	3	383	570	1.0	3+	ot	f	im
Squaw	49	2	rb	2	304	320	1.1	2++	ot	f	im
Squaw	50	2	rb	3	360	480	1.0	3+	ot	f	mt
Squaw	51	2	rb	2	299	270	1.0	2++	ot	f	im
Squaw	52	2	rb	2	297	290	1.1	2++	ot	f	mt
Squaw	53	2	rb	2	292	280	1.1	2++	ot	f	mt
Squaw	54	2	rb	2	265	220	1.2	2++	ot	f	mt
Squaw	55	2	rb	2	302	280	1.0	2++	ot	f	im
Squaw	56	2	rb	1	226	120	1.0	1++	ot	f	im
Squaw	57	2	rb	1	239	140	1.0	1++	ot	f	im
Squaw	58	2	rb	1	228	110	0.9	1++	ot	f	im
Squaw	59	2	rb	2	238	154	1.1	2++	ot	f	im
Squaw	60	2	rb	1	221	114	1.1	1++	ot	f	im
Squaw	61	2	rb	1	185	59	0.9	1++	ot	f	im