

Executive Summary

Stern Lake

2006

Excerpt from 2005 Report (1999 Survey):

Stern Lake was first assessed on July 16, 1977 where it was determined that a naturally viable population of rainbow trout existed at that time. Rainbow trout up to 48 cm were captured during the assessment. On June 16, 1976 a report was provided to the Ministry of Environment that large rainbow trout up to 12 pounds were congregating at the mouth of the outlet stream where they were unable to navigate past numerous beaver dams. It was also reported that anglers were harvesting these fish fairly heavily. A second relatively inconclusive assessment was completed in 1999.

Stern Lake is 137 hectares and is located 22 km northwest of Fraser Lake. Stern Lake was stocked in 1988, 1995, and 1996 and it has since been determined that Stern Lake would be better managed as a wild rainbow trout fishery. There is considerable evidence to suggest that the benefits associated with stocking rainbow trout in mixed species lakes do not outweigh the possible risks of genetic introgression of hatchery fish with local native stocks. Stocked rainbow trout in the Omineca Region do not appear to perform well in the presence of naturally-sustaining rainbow trout populations and when other fish species are present. There are no existing data on the fish species distribution for Stern Lake other than rainbow trout, with the exception that it has been previously noted that there is a "coarse" fish population.

During the spring of 1983 Ducks Unlimited Canada requested permission to install a dam on the outlet stream in order to increase the lake elevation and improve waterfowl habitat. At that time Ducks Unlimited were willing to put in a fish-way to allow the passage of fish through their dam. Fisheries staff determined that a fish-way was unnecessary as there was limited spawning habitat available in the Stern Lake outlet. It was also determined that a small inlet stream located in the north-central portion of Stern Lake would be sufficient as a spawning location if habitat enhancements were undertaken. In fact, fisheries staff felt that a dam, maintaining at a minimum, an 18 inch vertical drop would be beneficial for two reasons: (1) coarse fish would be prevented from entering the lake; (2) the lake level would be increased, thus providing improved habitat for rainbow trout. It was felt that the lake was a good candidate for chemical rehabilitation so a coarse fish barrier would be beneficial. Chemical rehabilitation never occurred at Stern Lake. One problem that may exist as a result of the installation of the dam on the outlet stream is that Stern Lake periodically winterkills; thus, the rainbow trout population requires recruitment from an external source to maintain a viable population. The assessment conducted in 1983 suggested that the only stream suitable for natural recruitment above the dam required habitat enhancements. The habitat enhancements were not completed on this tributary.

The Stern Lake outlet and dam structure were investigated by MOE fisheries staff in 2005 and it was determined that there is no longer direct connectivity to Stern Lake as a result of construction of the outlet dam. Fisheries staff also discovered a tributary stream with a channel varying between 2-3 metres that flows into Stern Creek approximately 400 m downstream from the dam structure. Visual observation determined that the small stream contained an abundant population of rainbow trout fry.

Update on 1999 report:

A fisheries stock assessment was conducted on September 17, 2006. One standard floating and one sinking gillnet were set for a total of 2.5 hours resulting in a high gillnet catch per unit effort of 16.73 rainbow trout per net hour. Non-game species were not captured in the 2006 assessment. The maximum size of the rainbow trout captured was 43.5 cm with a mean size of 30.6 cm. Most (95.1%) of the rainbow trout sampled were between 25-40 cm. It is evident that the fishery is now self-sustaining and is capable of providing an average to an above average-angling experience based on mean fish size and abundance. It is recommended that Stern Lake should be removed from the stocking list on a permanent basis.

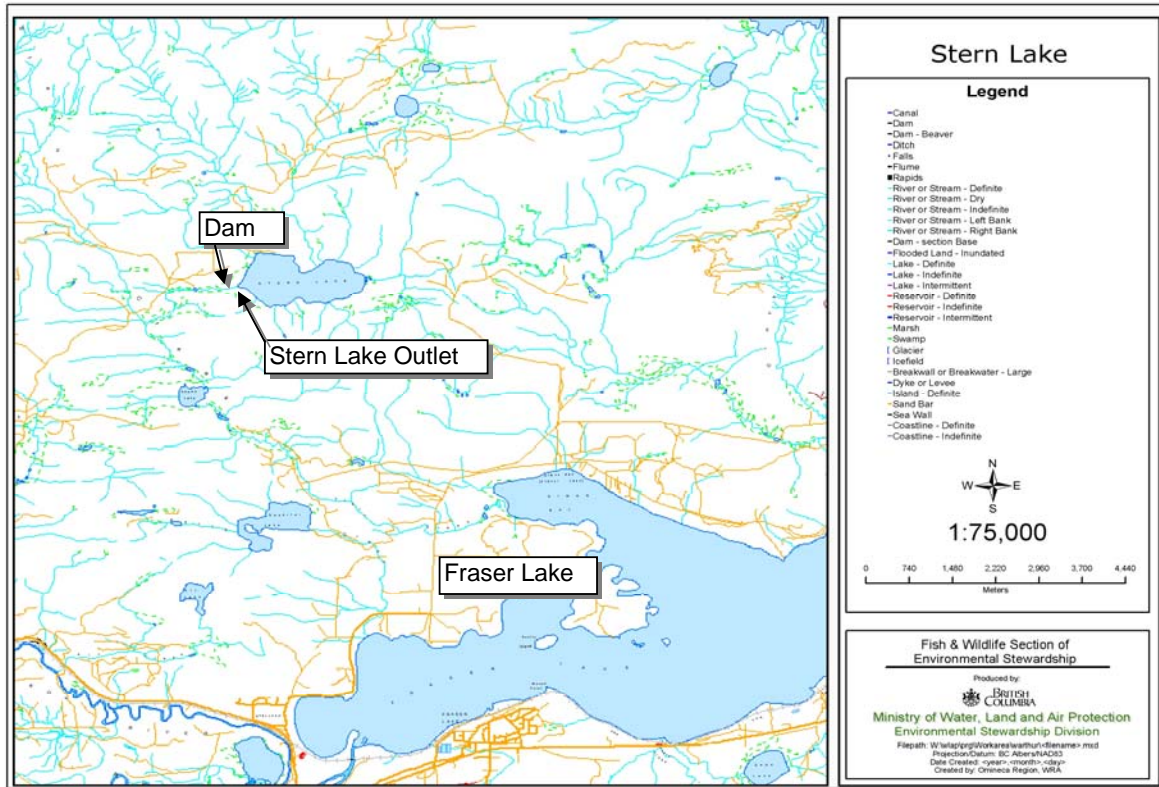


Figure 1. Map showing the location of the dam installed to improve waterfowl habitat on Stern Lake



Figure 2. Picture of dam structure located on the outlet of Stern Lake in July, 2005. The steel structure is located beneath the willow branches in the middle right side of the photo.

**OMINECA REGION
LAKE STOCK ASSESSMENT REPORT**

LAKE NAME: Stern **BC WBID:** 00563FRAN

LAKE LOCATION: *Nearest center:* 22 km NW Fraser Lake *Drainage:* FRASER
UTM: 10.375505.6000076

LAKE ATTRIBUTES: *Surface Area:* 137.4 Ha *Elevation:* 790 m
Littoral Area: 137 Ha *T.D.S.:* 68 ppm
Max Depth: 3 m *Mean depth:* 2.2 m

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

- 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
 Year(s) Surveyed: 1977, 1999

STOCKING DATA:

Current Stocking Rate Stocking ceased
Stock Type
Species RB mixed
Previous Stocking Rate 36 Fish/ha

SURVEY METHODS:

	Method	Date (yyyy.mm.dd)	Survey Agency	Crew
Fish	gillnet	2006-09-17	BCCF	Dawn Cowie, Marcel Macullo
Chem.	DO, pH	1977-06-17	MOE	unknown
Physical	bathymetric	1977-06-17	MOE	unknown
Temp.	profile	1977-06-17	MOE	unknown

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
2006	41	0	0	0	0	0	0	0	0	0
1999	150	0	0	0	0	0	0	0	0	0
1977	10	0	0	0	0	0	0	0	0	0

Survey Year	2006	1999	1977	
Effort Hours	2.45	17.5	14	
RB CPUE:	16.73	8.57	0.57	RB/Net Hour
EB CPUE:	0.00	0.00	0.00	EB/Net Hour
# of Sets:	2	1	3	

Next Assessment: 2015

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SURVEY CONCLUSIONS:

Objective	Objectives Achieved		Reason
	Yes	No	
1. Family	<input type="checkbox"/>	<input type="checkbox"/>	
2. Average	<input checked="" type="checkbox"/>	<input type="checkbox"/>	High net catch rate and mean fish size within 30-40 cm
3. Above Average	<input type="checkbox"/>	<input type="checkbox"/>	
4. Trophy	<input type="checkbox"/>	<input type="checkbox"/>	

RECOMMENDATIONS:

Assessment: Natural recruitment is sufficient to provide an average quality fishery.

Management: Stern Lake was stocked for the last time in 1996 and is now being managed as a wild fishery with no further enhancement activities planned.

Comments:

Uncertainties: An assessment needs to be completed to determine if the dam located at the outlet stream is limiting natural recruitment or re-colonization from occurring.
2006 Update: Natural recruitment appear to be sufficient to support the fishery despite the presence of the dam.

Recent Brood Request Comments:

Last stocked in 96. Assessed in 99. Slow growth, good yield. Extensive natural recruitment. May consider cessation of stocking. Reassess '04.

History of Angling Regulations

There are no special angling regulations for Stern Lake.

Reported by: Cory Williamson

Date: Mar-07

Updated From 1999 Report Prepared by Adrian Clarke in 2005.

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Table 1. Rainbow trout physical attributes for Stern Lake for 1999 and 2006 by age:

Sample Year	Sample		Length (mm)				Weight (g)				Condition (k)			
	Age	Size	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev
2006	1	14	210	180	250	19.5	118	71	184	33.0	1.25	1.06	1.79	0.2
1999	1	1	150				30				0.89			
2006	2	10	320	280	356	26.7	379	240	480	91.7	1.13	1.00	1.22	0.1
2006	3	16	376	290	435	29.5	630	270	1050	159.6	1.16	0.98	1.29	0.1
1999	3	2	265	251	278	19.1	102	98	105	4.9	0.55	0.49	0.62	0.1
1999	4	28	320	248	390	32.1	230	40	600	115.6	0.7	0.20	1.06	0.2
1999	5	13	363	321	400	24.2	360	180	498	113.5	0.74	0.41	1.10	0.2
1999	6	1	435				525				0.64			
1999	7	2	437	400	473	51.6	697	532	862	233.3	0.82	0.81	0.83	0.0

*age data not available for 1977

Table 2. Catch summary for Stern Lake for 1977, 1999 and 2006.

Sample Year	Sample		Length (mm)				Weight (g)				Condition (k)			
	Size		Mean	Min	Max	StdDev	Mean	Min	Max	StdDev	Mean	Min	Max	StdDev
2006	41		306	180	435	77.8	395	71	1050	251.0	1.19	0.98	1.79	0.13
1999	150		240	110	473	77.8	157	14	862	154.0	0.93	0.20	1.74	0.29
1977	10		395	175	478	91.9	836	80	1350	409.8	1.22	1.03	1.49	0.14

Figure 4. Bathymetric map of **Smith Lake** net set locations where available are listed.

Table 3. Proportion of Catch (by survey year)

Survey Year	2006	1999	1977
Less than 250 mm	34.1 %	51.3 %	10.0 %
Between 250-300 mm	9.8 %	11.3 %	0.0 %
Between 300-400 mm	51.2 %	34.7 %	20.0 %
Greater than 400 mm	4.9 %	2.7 %	70.0 %
Greater than 500 mm	0.0 %	0.0 %	0.0 %

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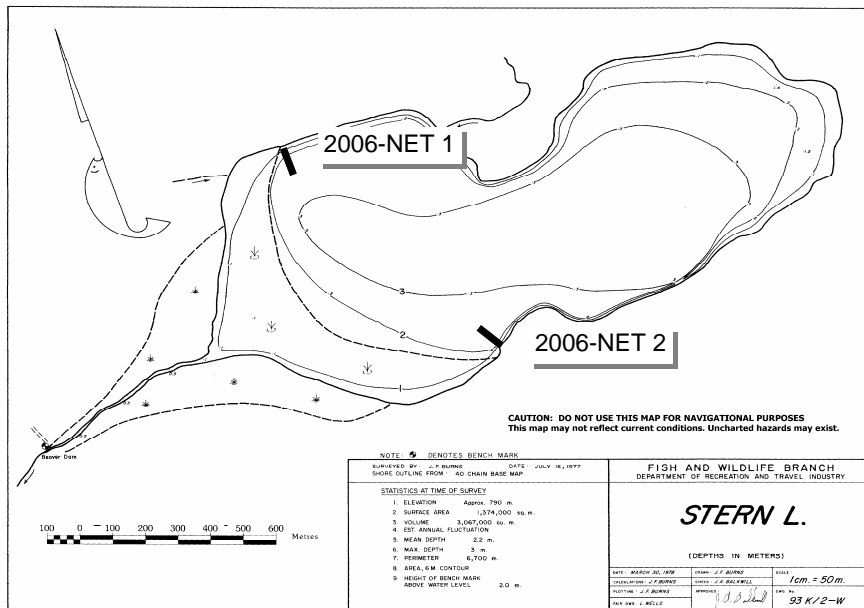
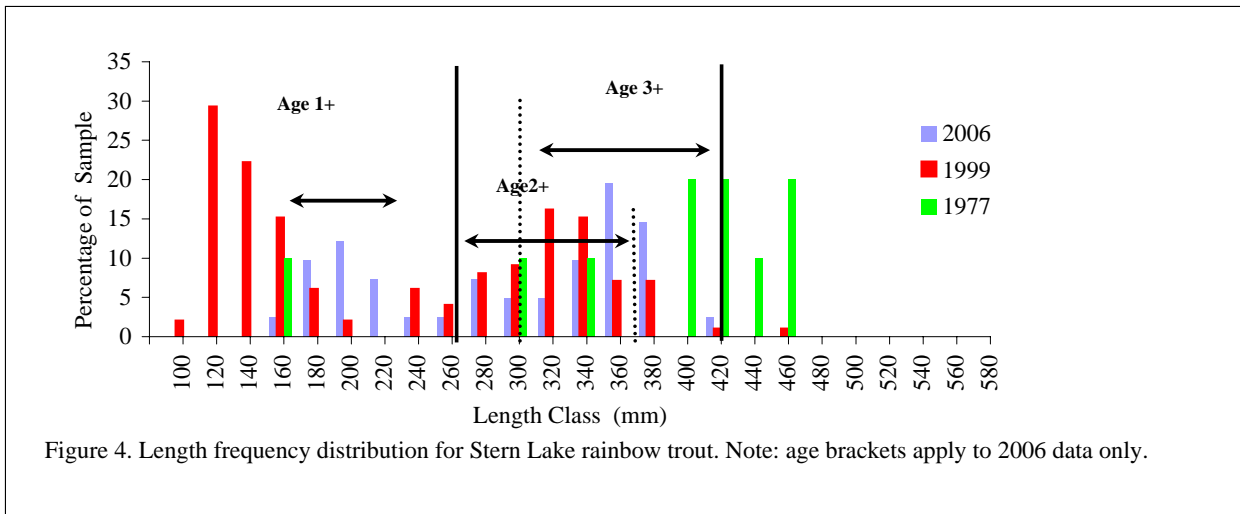
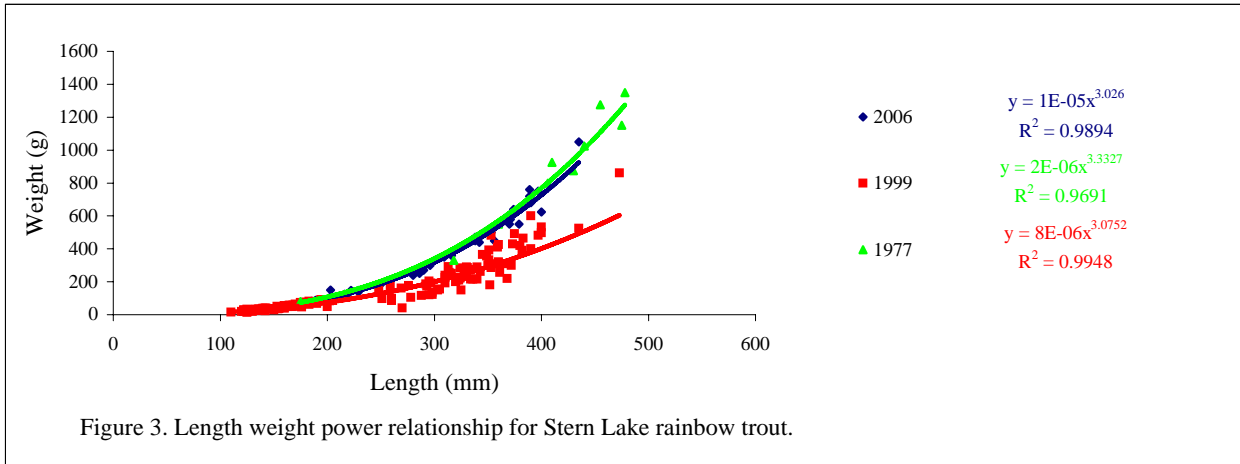


Figure 5. Bathymetric map of Stern Lake. Net set locations where available are listed.

Table 4. Complete stocking history for Stern Lake (1988-2006).

Release Date	Species Name	Fish Count	Stock	Mark	Average Size (gm)	Life Cycle Stage
31-May-96	RB	2500	BADGER TUNKWA		8.13	YEARLING
11-Jun-95	RB	5000	BLACKWATER GE		11.76	YEARLING
1-May-88	RB	5000	TUNKWA		9.9	UNKNOWN

Table 5. Dissolved oxygen/ temperature profile for Stern Lake (1977).

16-Jul-77					
Depth (m)	DO mg/L	DO %sat	Temp. °C	pH	TDS
0	6		17.2	7.0	68
1					
2					
3			17.1		
4	bottom				

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Table 6. Stock assessment data for Stern Lake in 2006 (see lake files for additional survey data).

Lake	Sample#	Site	Haul	Species Caught	Calender Age	Length (mm)	Weight (grams)	Condition (k)	Age	Structure	Cond. Code	Clip	Sex	Maturity
Stern	st1	1a	1	rb	3	353	500	1.1	3++	otolith	7		f	maturing
Stern	st2	1	1	rb	3	389	760	1.3	3++	otolith	8		m	maturing
Stern	st3	1	1	rb	3	371	580	1.1	3++	otolith	7		f	maturing
Stern	st4	1	1	rb	2	280	240	1.1	2++	otolith	7		f	maturing
Stern	st5	1	1	rb	3	370	600	1.2	3++	otolith	7		f	maturing
Stern	st6	1	1	rb	2	343	480	1.2	2++	otolith	7		f	spawnbound
Stern	st7	1	1	rb	3	400	625	1.0	3++	otolith	8		f	maturing
Stern	st8	1	1	rb	3	435	1050	1.3	3++	otolith	7		m	maturing
Stern	st9	1	1	rb	3	389	720	1.2	3++	otolith	7		f	maturing
Stern	st10	1	1	rb	n/a	390	680	1.1	n/a	otolith	-		f	maturing
Stern	st11	1	1	rb	2	316	360	1.1	2++	otolith	8		m	maturing
Stern	st12	1	1	rb	3	370	550	1.1	3++	otolith	8		f	maturing
Stern	st13	1	1	rb	2	296	300	1.2	2++	otolith	8		f	maturing
Stern	st14	1	1	rb	2	286	250	1.1	2++	otolith	7		m	immature
Stern	st15	1	1	rb	2	309	350	1.2	2++	otolith	8		m	maturing
Stern	st16	1	1	rb	3	290	270	1.1	3++	otolith	8		f	maturing
Stern	st17	1	1	rb	1	219	125	1.2	1++	otolith	8		f	maturing
Stern	st18	2	1	rb	3	397	750	1.2	3++	otolith	7		f	maturing
Stern	st19	2	1	rb	3	374	640	1.2	3++	otolith	8		f	maturing
Stern	st20	2	1	rb	3	373	620	1.2	3++	otolith	8		f	maturing
Stern	st21	2	1	rb	2	342	440	1.1	2++	otolith	8		f	maturing
Stern	st22	2	1	rb	2	338	470	1.2	2++	otolith	7		m	maturing
Stern	st23	2	1	rb	3	379	550	1.0	3++	otolith	7		f	maturing
Stern	st24	2	1	rb	3	378	630	1.2	3++	otolith	7		f	maturing
Stern	st25	2	1	rb	2	356	450	1.0	2++	otolith	8		f	maturing
Stern	st26	2	1	rb	2	338	450	1.2	2++	otolith	6		f	maturing
Stern	st27	2	1	rb	3	365	580	1.2	3++	otolith	7		f	maturing
Stern	st28	2	1	rb	3	383	660	1.2	3++	otolith	9		f	maturing
Stern	st29	2	1	rb	1	250	184	1.2	1++	otolith	7		m	immature
Stern	st30	2	1	rb	1	229	138	1.1	1++	otolith	8		m	maturing
Stern	st31	2	1	rb	1	222	147	1.3	1++	otolith	8		m	immature
Stern	st32	2	1	rb	1	229	147	1.2	1++	otolith	8		m	maturing
Stern	st33	2	1	rb	1	216	125	1.2	1++	otolith	8		f	maturing
Stern	st34	2	1	rb	1	213	112	1.2	1++	otolith	8		f	maturing
Stern	st35	2	1	rb	1	203	150	1.8	1++	otolith	8		m	maturing
Stern	st36	2	1	rb	1	202	103	1.2	1++	otolith	8		m	maturing
Stern	st37	2	1	rb	1	185	81	1.3	1++	otolith	8		m	maturing
Stern	st38	2	1	rb	1	189	87	1.3	1++	otolith	8		m	maturing
Stern	st39	2	1	rb	1	197	91	1.2	1++	otolith	8		m	immature
Stern	st40	2	1	rb	1	200	85	1.1	1++	otolith	8		m	immature
Stern	st41	2	1	rb	1	180	71	1.2	1++	otolith	8		f	maturing

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Table 7. Stock Assessment Data for 2004 (see lake files for additional survey data).

Lake	Sample#	Site	Species Caught	Age	Length (mm)	Weight (grams)	Condition (k)	Scale Age
Stern	1	1	rb	6	435	525	0.6	6
Stern	2	1	rb	4	320	200	0.6	4
Stern	3	1	rb	4	310	192	0.6	4
Stern	4	1	rb	5	352	180	0.4	5
Stern	5	1	rb	5	380	420	0.8	5
Stern	6	1	rb	5	382	390	0.7	5
Stern	7	1	rb	4	303	150	0.5	4
Stern	8	1	rb		260	90	0.5	
Stern	9	1	rb		260	100	0.6	
Stern	10	1	rb	5	340	290	0.7	5
Stern	11	1	rb	4	270	40	0.2	4
Stern	12	1	rb	4	330	290	0.8	4+
Stern	13	1	rb	4	325	150	0.4	4
Stern	14	1	rb	5	360	310	0.7	5
Stern	15	1	rb	1	150	30	0.9	1+
Stern	16	1	rb	4	316	250	0.8	4
Stern	17	1	rb	4	295	120	0.5	4
Stern	18	1	rb	4	310	225	0.8	4
Stern	19	1	rb	4	324	226	0.7	4
Stern	20	1	rb	4	336	215	0.6	4
Stern	21	1	rb	5	321	210	0.6	5
Stern	22	1	rb	3	251	98	0.6	3+
Stern	23	1	rb	4	390	600	1.0	4
Stern	24	1	rb	4	340	215	0.5	4
Stern	25	1	rb	5	383	465	0.8	5
Stern	26	1	rb	4	331	286	0.8	4
Stern	27	1	rb	4	288	116	0.5	4
Stern	28	1	rb	5	355	310	0.7	5
Stern	29	1	rb	5	360	426	0.9	5
Stern	30	1	rb	4	305	156	0.5	4
Stern	31	1	rb	4	322	226	0.7	4
Stern	32	1	rb	NS	313	292	1.0	NS
Stern	33	1	rb	5	353	482	1.1	5
Stern	34	1	rb	7	473	862	0.8	7
Stern	35	1	rb	5	334	215	0.6	5+
Stern	36	1	rb	5	400	498	0.8	5+
Stern	37	1	rb	4	298	122	0.5	4
Stern	38	1	rb	4	350	302	0.7	4+
Stern	39	1	rb	4	345	365	0.9	4+
Stern	40	1	rb	3	278	105	0.5	3+
Stern	41	1	rb	7	400	532	0.8	7
Stern	42	1	rb	4	260	86	0.5	4
Stern	43	1	rb	4	298	136	0.5	4
Stern	44	1	rb	4	248	162	1.1	4
Stern	45	1	rb	5	397	482	0.8	5
Stern	46	1	rb	4	365	310	0.6	4
Stern	47	1	rb	4	373	430	0.8	4
Stern	48	1	rb	4	349	356	0.8	4+
Stern	49	1	rb	4	324	284	0.8	4
Stern	50	1	rb	4	330	232	0.6	4



Figure 6. Representative sample of rainbow trout from the gillnet catch in 2006.