

## **Lake Owen Creel Survey 2009**

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### **Abstract**

A programmed creel survey was conducted at Lake Owen between June 4, 2009 and August 29, 2009 to evaluate the management change to catchable trout. The management objective for the lake is to provide a catch rate of 0.5 fish/hour (WGFD 2006). A total of 341 interviewed anglers captured 884 trout. Estimated angler use was 22,354 hours (SE = 1,544) between June and August with a catch rate of 0.97 fish/ hour (SE=0.89). Management recommendations implemented in 2008 changed stocking from fingerling rainbow trout (RBT) to catchable trout (TRT). Lake Owen catch rates exceed the management recommendations of 0.5 fish per hour from the 5UL Basin Management Plan (WGFD 2006). Numbers of anglers, angler hours fished and catch rates have all increased from estimates obtained from the last creel survey in 1989. The new stocking strategy is meeting objective thus no further catchable (TRT) or fingerling brook trout (BKT) stocking adjustments are warranted based on estimates from this survey. This fishery should be reevaluated in 2019 with a one month creel survey during June to determine if the fishery is still meeting objective.

### **Introduction**

Lake Owen is a small 120 acre lake located in the Medicine Bow / Routt National Forest, Albany County, Wyoming at an elevation of 9,000 feet. The lake is shallow with a maximum depth of 9 feet. It is a natural lake that was augmented in 1963 by construction of a dam, ditch and pipeline as part of the Cheyenne Board of Public Utilities (CBPU) water system. Lake Owen receives water through an 11 mile pipeline from Rob Roy Reservoir. The pipeline regulates water in the Douglas Creek-Lake Owen Pipeline system (Thybony et. al. 1986). Water can flow through the lake year round. Camping facilities, outhouses and a boat ramp are available at the lake. A handicap accessible fishing pier and path around the entire lake enhances recreation opportunities.

Management objectives in the 5UL Basin Management Plan for alpine lakes in the Medicine Bow / Routt National Forest including Lake Owen specify an angler catch rate of 0.5 fish per hour (WGFD 2010). Monitoring of angler catch rate will be accomplished by spot creel and a programmed creel survey during June every ten years.

Trout reproduction is not possible in Lake Owen so the fishery depends on fish stocking (WGFD 1969). Trout survival over multiple seasons is common. Sampling in 2005 indicated poor zooplankton production, low densities of macro invertebrates and poor growth of rainbow

trout (WGFD 2006). A recommendation to change from Basic Yield to Catchable management went into effect in 2008. The specific recommendation was to stock 5,000 catchable rainbow trout (RBT) and 5,000 fingerling (BKT) annually. BKT stocking recommendations did not change but were evaluated as part of the survey. In 2009 the fish schedule was modified to request catchable (TRT) instead of RBT to facilitate hatchery production. Yellowstone cutthroat (YSC) were stocked in 2009. YSC and RBT stocking combined make up the catchable component of Lake Owen fisheries management (Table 1).

TABLE 1. Ten year history of fish stocking in Lake Owen.

<b>Year</b>	<b>Species</b>	<b>Number Stocked</b>	<b>Length (Inches)</b>
1988	SRC	9,948	5.9
1996	FRB	13,024	4.3
	BKT	15,057	3.4
	SRC	500	9.9
2000	BKT	15,045	3.0
	ELR	14,991	2.8
2001	BKT	15,050	3.3
	ELR	16,400	3.6
2002	FRB	16,455	3.7
	BKT	16,445	3.3
2003	BKT	10,080	3.5
	FRB	16,337	4.2
2004	FRB	16,636	4.4
	BKT	1,500	3.2
2005	BKT	4,550	3.2
	ELR	4,944	7.3
2006	FRB	15,160	4.9
	BKT	5,488	2.8
2007	BKT	8,864	3.5
	FRB	1,653	7.5
2008	FRB	4,200	8.5
	BKT	5,512	2.8
2009	YSC	4,500	8.5
	BKT	2,254	3.7

Other species present in the lake include; brown trout (BNT), splake (SPK) and longnose suckers (LNS). Brown trout and SPK enter the lake from Rob Roy Reservoir through the pipeline. This programmed creel survey was conducted to evaluate the management change from stocking fingerling RBT and BKT to catchable TRT and fingerling BKT.

## Methods

A programmed creel survey for Lake Owen was designed and estimates were generated by Kevin Gelwicks, Aquatic Assessment Crew Supervisor, using stat method one of WyoCreel version 1.63, a WGFD designed computer program. Information was entered into the Fish Division's Creel.mdb Access database for statistical analysis. Empirical data were summarized using Excel and reported separately from statistical estimates. The survey ran from June 4, 2009 through August 29, 2009. Four weekdays and four weekend days were sampled each month. Counts of fishing boats, non-fishing boats and bank anglers were done at 3 selected times on each survey day. Counts were made with a spotting scope and binoculars. Counts of the entire lake could be made from a single point. Bank angler interviews were made by roving the trail around the shoreline. Boat angler interviews were obtained at the boat ramp. Data collected during interviews included time, hours fished, complete or incomplete trip, bank or boat angling, number of poles used, license type, residence, tackle, species preference and species kept or released. Harvested fish were weighed and measured when time allowed.

## Results

A total of 72 instantaneous counts were made over 24 sample days during the survey. Equal numbers of weekdays and weekend days had counts. A summary of creel survey estimates is provided in Appendix A. Weekend bank anglers and boaters were most numerous and they were more numerous during the month of June (Table 2).

TABLE 2. Average number of bank anglers and fishing boats per count for weekdays and weekend days, Lake Owen, June – August, 2009.

Month	Weekday		Weekend	
	Bank	Boat	Bank	Boat
June	5.9	0.4	18.6	2.5
July	5.8	0.4	16.7	1.3
August	5.3	0.8	17.3	1.8

A total of 341 individual anglers were interviewed. Seventy two percent of the anglers were Wyoming residents and most were from Albany and Laramie Counties. Twenty eight of the interviewed anglers were non-residents. Most were from Colorado although 15 different states were represented in the survey (Table 3). Annual licenses were the most common for residents, while daily licenses were most common among non-residents (Table 4).

TABLE 3. Residency of interviewed anglers, Lake Owen, June – August, 2009.

Resident			Non-resident		
County	#	%	State	#	%
Albany	119	49	AK	3	<1
Laramie	113	46	CA	3	<1
Carbon	2	<1	CO	58	17
Goshen	2	<1	GA	1	<1
Sheridan	1	<1	IA	2	<1
Uinta	1	<1	IL	2	<1
Campbell	4	2	KS	8	2
Fremont	2	<1	MS	1	<1
			NC	2	<1
			NE	7	2
			OK	1	<1
			OR	1	<1
			TX	3	<1
			WA	4	1
			WI	1	<1
TOTAL	244	72%	TOTAL	97	28%

TABLE 4. License summary for resident and non-resident anglers, Lake Owen, June – August, 2009.

Resident			Non-Resident		
	#	%		#	%
Annual	159	66	Annual	40	40
Daily	34	14	Daily	51	50
Underage	12	5	Underage	7	7
Youth	3	1	Youth	3	3
Pioneer	12	5			
Lifetime	20	8			
TOTAL	240		TOTAL	101	

The majority of anglers fished with bait. The second most popular terminal tackle type was flies. Very few anglers used more than one tackle type (Table 5).

TABLE 5. Summary of tackle utilized by interviewed anglers, Lake Owen, June – August, 2009.

<b>Tackle Type</b>	<b># of Anglers</b>	<b>% of Anglers</b>
Bait	204	60
Flies	60	18
Lures	26	8
Bait and Flies	17	5
Bait and Lures	19	6
Flies and Lures	7	2
Bait, Flies and Lures	8	2
<b>TOTAL</b>	<b>341</b>	<b>100</b>

An estimated 6,844 (SE=1,518) anglers spent 22,354 (SE=1,544) hours fishing from June through August (Tables 6 and 7). The number of anglers was greatest in July. The number of hours fished by anglers was greatest in June. Bank anglers outnumbered boat anglers during all three months.

TABLE 6. Estimated number of anglers (SE) by month and angler days per acre (SE), Lake Owen, 2009.

<b>Month</b>	<b>Bank</b>	<b>Boat</b>	<b>All</b>	<b>Per acre</b>
June	2,072 (211)	291 (121)	2,363 (1189)	19.7 (9.9)
July	2,265 (187)	142 (48)	2,407 (573)	20.1 (4.8)
August	1,812 (254)	263 (56)	2,075 (751)	17.3 (6.3)
<b>TOTAL</b>	<b>6,148 (380)</b>	<b>696 (142)</b>	<b>6,844 (1518)</b>	<b>57.0 (12.6)</b>

TABLE 7. Estimated hours fished (SE) by month for bank, boat and all anglers combined and angler hours per acre, Lake Owen, 2009.

Month	Bank	Boat	All	Per acre
June	6,911 (688)	1,351 (530)	8,262 (869)	68.8 (7.3)
July	6,394 (525)	710 (241)	7,104 (457)	59.2 (3.8)
August	5,768 (805)	1,221 (270)	6,989 (1064)	58.2 (8.9)
TOTAL	19,073 (1182)	3,282 (642)	2,2354 (1544)	186.3 (12.9)

Brook trout were the most frequently caught single species. Brook trout are stocked as fingerling size fish. The catchable TRT, comprised of both RBT and YSC, exceeded the BKT estimated catch (Table 8). Catchable TRT stocking replaced fingerling stocking beginning in 2007. Yellowstone cutthroat catchables were stocked on June 4, 2009, four days into the creel survey. By August 30, 2009, 2,969 (SE = 451) YSC had been caught and kept accounting for 66% of the YSC stocked. Another 2,958 (SE = 1, 014) YSC were caught and released. This indicates some fish are being caught and released multiple times (Tables 1 and 8). The number of RBT kept during the survey (4,379 SE = 699) exceeds the total number of RBT stocked in 2008 (4,200). Fish survive the winter in Lake Owen. Rainbow trout caught by anglers may have been catchables stocked in 2007 – 2008 or fingerling plants from as early as 2006. The number of fish caught, both those harvested and released, compared to the number stocked is impressive. BNT catch was incidental.

TABLE 8. Number kept (SE), Number Released (SE), and total number caught (SE) by species for, Lake Owen, June – August, 2009.

Species	Number Kept	Number Released	Total Catch
BKT	5,271 (691)	3,246 (1086)	8,517 (1338)
BNT	122 (53)	82 (50)	204 (99)
YSC	2,969 (451)	2,958 (1014)	5,927 (1119)
RBT	4,379 (699)	2,730 (601)	7,110 (933)
All	12,742 (1227)	9,017 (2206)	21,758 (2742)

The catch rates for catchable TRT for all anglers is 0.59 fish per hour. Catchable TRT were combined RBT and YSC. When catch rates for all species are combined the rate is 0.97 (SE= 0.89) fish per hour (Table 9). This catch rate exceeds the objective of 0.5 fish/hour. All species combined, boat anglers had higher catch rates than bank anglers.

TABLE 9. Season catch rate (SE) by species for bank anglers, boat anglers, and all anglers combined, Lake Owen, June – August, 2009.

Species	Bank	Boat	All anglers
BKT	0.35 (.042)	0.54 (.203)	0.38 (.053)
BNT	0.01 (.003)	0.02 (.016)	0.01 (.004)
YSC	0.20 (.033)	0.64 (.142)	0.27 (.042)
RBT	0.30 (.029)	0.43 (.056)	0.32 (.030)
All	0.86 (.056)	1.63 (.231)	0.97 (.089)

More fish were caught, kept and released in June than in July and August (Table 10). Catch rates are fastest in June but still good in July and August (Table 11). The total number of fish caught and catch rates for both kept fish and those released is summarized by month in two tables (Tables 10 and 11 ).

TABLE 10. Total number of fish caught (SE), fish kept and released, by month for all anglers, Lake Owen, June – August, 2009.

Month	Number
June	10,600 (2,319)
July	6,347 (1,190)
August	4,721 (900)
Total	21,758 (2,742)

TABLE 11. Catch per hour (SE), fish kept and released, by month for all anglers. Lake Owen, June – August, 2009.

Month	Number
June	1.29 (0.31)
July	0.89 (0.18)
August	0.68 (0.16)
Total	0.97 (0.09)

Angler use has increased considerably since the last creel survey in 1989 (Table 12). The total number of hours fished has nearly doubled since 1989. The number of anglers increased from 400 to 6,844. Catch rates improved from 0.49 to 0.97 (Table 12) (Oster 1990). Standard errors were not available for 1989 data.

TABLE 12. Number of angler hours (SE), number of anglers (SE) and catch rate (SE) at Lake Owen from creel surveys, 1989 and 2009.

Year	Angler Hours	Number	Catch Rates
1989	12,047	400	0.49
2009	22,354 (1544)	6,844 (1518)	0.97 (0.089)

During the creel survey 315 fish were weighed and measured by the creel clerk (Table 13). The mean length of YSC kept by anglers is larger than the mean length YSC stocked indicating only larger YSC were kept and smaller individuals released. The mean RBT length was 13.3 inches (stdev = 1.21). Rainbow trout were still being caught at least one year after stocking. Brook trout mean length is 12.1 inches (stdev = 1.18). Most BKT and RBT caught and kept were Stock size and many BKT had reached Quality size (Table 14). Relative weights are poor (Table 15). This is expected in an alpine reservoir with low productivity

TABLE 13. Number, mean length (n; stdev) with ranges, and means weight (n; stdev) with ranges of fish caught during creel survey, Lake Owen, June – August, 2009.

Species	Number	Mean Length	Range	Mean Weight	Range
BKT	117	12.1 (117;1.18)	8.1 - 15.0	0.67 (97;0.19)	0.24 - 1.40
BNT	2	14.7 (2;0.64)	13.2 - 16.2	1.18 (2;0.48)	0.84 - 1.52
YSC	84	10.1 (84;0.64)	8.7 - 11.7	0.31 (46;0.08)	0.05 - 0.48
RBT	112	13.3 (112;1.21)	8.5 - 16.2	0.86 (86;0.21)	0.26 - 1.32
TOTAL	315				

TABLE 14. Relative stock density of fish caught during creel survey, Lake Owen, June – August, 2009.

Species	n >= S	RSD-Q	RSD - P
BKT	117	53	
BNT	2	100	50
YSC	84		
RBT	110	1	



TABLE 15. Mean relative weights (n; stdev) with ranges and relative weights by length category (n; stdev) for selected fish species measured during creels survey, Lake Owen, June – August 2009.

Species	Mean Wr	Range	S - Q	Q - P	P-M
BKT	86 (97;8.5)	60 - 110	89 (45;7.9)	84 (52;8.4)	
BNT	84 (2;4.2)	81 - 87		87	81
YSC	79 (46;14.8)	16 - 119	79 (46;14.8)		
RBT	82 (86;7.5)	65 - 107	82 (85;7.4)		

## Discussion

Lake Owen catch rates exceed the management recommendations of 0.5 fish per hour from the 5UL Basin Management Plan (WGFD 2010). The number of fish caught, both those harvested and released, compared to the number stocked is impressive. The fishery is made up entirely of stocked fish and the evaluation of fish caught and angler catch rates indicate these fish are well utilized by anglers.

Lake Owen is very unproductive. The poor zooplankton community and low density of invertebrates resulted in less than optimal growth in RBT stocked as smaller fish when Lake Owen was managed under the Basic Yield concept. Given the low productive capacity of this water and relatively high fishing pressure, a management shift from Basic Yield to Catchable RBT was appropriate (WGFD 2006). The management change has been successful. Catchable TRT, YSC and RBT, are nearly all caught and either kept or released. Estimates suggest that many TRT are caught multiple times since the number caught exceeds the number stocked.

Brook trout stocked as fingerlings grow well given the low productivity of the lake. All measured BKT had reached Stock size and many reach Quality size. Catch estimates indicate the number of BKT caught, both kept and released, exceed the number stocked annually.

Angler numbers, number of hours fished and catch rates have all more than doubled since the last creel survey in 1989 (Oster 1990). The increased use is likely due to the fast catch rates and upgraded facilities. Lake Owen has become one of the more popular fisheries in the Snowy Range.

## Recommendations

The present management of Lake Owen produces catch rates that exceed objective. The lake should continue to be managed as a Catchable fishery with stocking of 5,000 catchable TRT annually. Stocking 5,000 fingerling BKT annually should continue.

Future creel surveys should be for a one month time period. June would be the best month to conduct the future surveys. The next creel survey is recommended in ten years, 2019.

## ***Acknowledgements***

Data was collected by fisheries technician Ross Fees. Empirical data was summarized and tables created by fisheries technician Krisan Webb. This report was greatly improved with comments from Andrew Nikirk, Nathan Cook and Mark Smith.

## ***Literature Cited***

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**APPENDIX A. Creel Survey Estimate Summaries, Lake Owen, 2009.**

Summary of Instantaneous Count Data

Sample Description	Counts Per Day	Total Count			Average Count		
		Bank	Boat		Bank	Boat	
Daily Average 06/13/20	3	53	1	0	17.7	0.3	0.0
Daily Average 06/14/20	3	72	6	0	24.0	2.0	0.0
Daily Average 06/20/20	3	55	16	0	18.3	5.3	0.0
Daily Average 06/28/20	3	43	7	0	14.3	2.3	0.0
Average for June WE		55.8	7.5	0.0	18.6	2.5	0.0
Daily Average 06/04/20	3	15	0	0	5.0	0.0	0.0
Daily Average 06/09/20	3	8	0	0	2.7	0.0	0.0
Daily Average 06/12/20	3	22	0	0	7.3	0.0	0.0
Daily Average 06/24/20	3	26	5	0	8.7	1.7	0.0
Average for June WD		17.8	1.3	0.0	5.9	0.4	0.0
Daily Average 07/05/20	3	43	8	0	14.3	2.7	0.0
Daily Average 07/11/20	3	47	3	0	15.7	1.0	0.0
Daily Average 07/25/20	3	63	2	0	21.0	0.7	0.0
Daily Average 07/26/20	3	47	2	0	15.7	0.7	0.0
Average for July WE		50.0	3.8	0.0	16.7	1.3	0.0
Daily Average 07/06/20	3	15	2	0	5.0	0.7	0.0
Daily Average 07/14/20	3	12	0	0	4.0	0.0	0.0
Daily Average 07/16/20	3	15	0	0	5.0	0.0	0.0
Daily Average 07/24/20	3	28	3	0	9.3	1.0	0.0
Average for July WD		17.5	1.3	0.0	5.8	0.4	0.0
Daily Average 08/02/20	3	34	2	0	11.3	0.7	0.0
Daily Average 08/08/20	3	73	8	0	24.3	2.7	0.0
Daily Average 08/09/20	3	50	6	0	16.7	2.0	0.0
Daily Average 08/29/20	3	51	5	0	17.0	1.7	0.0
Average for August WE		52.0	5.3	0.0	17.3	1.8	0.0
Daily Average 08/12/20	3	22	5	0	7.3	1.7	0.0
Daily Average 08/17/20	3	22	2	0	7.3	0.7	0.0
Daily Average 08/18/20	3	18	2	0	6.0	0.7	0.0
Daily Average 08/24/20	3	2	0	0	0.7	0.0	0.0
Average for August WD		16.0	2.3	0.0	5.3	0.8	0.0
Average for Entire Season		34.8	3.5	0.0	11.6	1.2	0.0

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APPENDIX A. Continued.

Summary of Interviews and Hours fished

Strata	Sample Date	Total Interviews			Complete Trip Interviews			Average Length Complete Trip		
		Bank	Boat		Bank	Boat		Bank	Boat	
1	06/13/20	10	0	0	2	0	0	1.5	0.0	0.0
1	06/14/20	27	0	0	0	0	0	0.0	0.0	0.0
1	06/20/20	24	9	0	14	8	0	3.6	4.3	0.0
1	06/28/20	10	3	0	3	3	0	2.3	4.3	0.0
June WE		71	12	0	19	11	0	3.2	4.3	0.0
2	06/04/20	7	0	0	2	0	0	1.5	0.0	0.0
2	06/09/20	4	0	0	2	0	0	3.0	0.0	0.0
2	06/12/20	12	0	0	1	0	0	1.3	0.0	0.0
2	06/24/20	19	2	0	8	0	0	6.9	0.0	0.0
June WD		42	2	0	13	0	0	5.0	0.0	0.0
3	07/05/20	27	5	0	12	5	0	2.6	5.7	0.0
3	07/11/20	22	3	0	3	3	0	4.0	4.3	0.0
3	07/25/20	21	1	0	7	0	0	2.1	0.0	0.0
3	07/26/20	9	1	0	5	1	0	3.4	4.0	0.0
July WE		79	10	0	27	9	0	2.8	5.1	0.0
4	07/06/20	8	4	0	2	4	0	2.1	4.7	0.0
4	07/14/20	5	0	0	3	0	0	3.0	0.0	0.0
4	07/16/20	12	0	0	7	0	0	3.4	0.0	0.0
4	07/24/20	10	0	0	5	0	0	4.0	0.0	0.0
July WD		35	4	0	17	4	0	3.4	4.7	0.0
5	08/02/20	9	2	0	0	2	0	0.0	4.5	0.0
5	08/08/20	18	3	0	4	3	0	2.8	2.5	0.0
5	08/09/20	16	5	0	1	5	0	3.5	6.8	0.0
5	08/29/20	15	1	0	10	0	0	3.3	0.0	0.0
August WE		58	11	0	15	10	0	3.2	5.1	0.0
6	08/12/20	4	1	0	0	1	0	0.0	3.0	0.0
6	08/17/20	7	1	0	4	1	0	3.3	2.0	0.0
6	08/18/20	3	0	0	1	0	0	3.0	0.0	0.0
6	08/24/20	2	0	0	2	0	0	4.0	0.0	0.0
August WD		16	2	0	7	2	0	3.4	2.5	0.0
Season Total		301	41	0	98	36	0	3.4	4.6	0.0

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APPENDIX A. Continued.

All Species Combined Data Summary

Strata	Sample Date	# Kept			# Released			# Caught		
		Bank	Boat		Bank	Boat		Bank	Boat	
1	06/13/20	22	0	0	20	0	0	42	0	0
1	06/14/20	52	0	0	11	0	0	63	0	0
1	06/20/20	53	16	0	30	52	0	83	68	0
1	06/28/20	13	4	0	10	0	0	23	4	0
June WE		140	20	0	71	52	0	211	72	0
2	06/04/20	10	0	0	2	0	0	12	0	0
2	06/09/20	10	0	0	0	0	0	10	0	0
2	06/12/20	25	0	0	1	0	0	26	0	0
2	06/24/20	47	7	0	0	0	0	47	7	0
June WD		92	7	0	3	0	0	95	7	0
3	07/05/20	24	15	0	29	45	0	53	60	0
3	07/11/20	34	6	0	16	0	0	50	6	0
3	07/25/20	19	3	0	16	0	0	35	3	0
3	07/26/20	13	10	0	2	0	0	15	10	0
July WE		90	34	0	63	45	0	153	79	0
4	07/06/20	7	7	0	5	10	0	12	17	0
4	07/14/20	7	0	0	3	0	0	10	0	0
4	07/16/20	9	0	0	16	0	0	25	0	0
4	07/24/20	23	0	0	11	0	0	34	0	0
July WD		46	7	0	35	10	0	81	17	0
5	08/02/20	7	4	0	10	0	0	17	4	0
5	08/08/20	18	5	0	10	0	0	28	5	0
5	08/09/20	19	28	0	1	8	0	20	36	0
5	08/29/20	14	0	0	6	3	0	20	3	0
August WE		58	37	0	27	11	0	85	48	0
6	08/12/20	2	0	0	3	5	0	5	5	0
6	08/17/20	5	0	0	9	1	0	14	1	0
6	08/18/20	7	0	0	1	0	0	8	0	0
6	08/24/20	3	0	0	0	0	0	3	0	0
August WD		17	0	0	13	6	0	30	6	0
Season Total		443	105	0	212	124	0	655	229	0

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APPENDIX A. Continued.

BKT Data Summary

Strata	Sample Date	# Kept			# Released			# Caught		
		Bank	Boat		Bank	Boat		Bank	Boat	
1	06/13/20	9	0	0	18	0	0	27	0	0
1	06/14/20	29	0	0	7	0	0	36	0	0
1	06/20/20	28	11	0	13	23	0	41	34	0
1	06/28/20	11	2	0	7	0	0	18	2	0
June WE		77	13	0	45	23	0	122	36	0
2	06/04/20	7	0	0	2	0	0	9	0	0
2	06/09/20	9	0	0	0	0	0	9	0	0
2	06/12/20	16	0	0	0	0	0	16	0	0
2	06/24/20	12	3	0	0	0	0	12	3	0
June WD		44	3	0	2	0	0	46	3	0
3	07/05/20	6	1	0	6	0	0	12	1	0
3	07/11/20	17	4	0	2	0	0	19	4	0
3	07/25/20	5	0	0	0	0	0	5	0	0
3	07/26/20	2	0	0	0	0	0	2	0	0
July WE		30	5	0	8	0	0	38	5	0
4	07/06/20	3	2	0	0	0	0	3	2	0
4	07/14/20	1	0	0	3	0	0	4	0	0
4	07/16/20	2	0	0	2	0	0	4	0	0
4	07/24/20	2	0	0	3	0	0	5	0	0
July WD		8	2	0	8	0	0	16	2	0
5	08/02/20	1	2	0	0	0	0	1	2	0
5	08/08/20	5	2	0	0	0	0	5	2	0
5	08/09/20	2	0	0	0	0	0	2	0	0
5	08/29/20	6	0	0	2	1	0	8	1	0
August WE		14	4	0	2	1	0	16	5	0
6	08/12/20	0	0	0	0	0	0	0	0	0
6	08/17/20	3	0	0	1	0	0	4	0	0
6	08/18/20	2	0	0	1	0	0	3	0	0
6	08/24/20	2	0	0	0	0	0	2	0	0
August WD		7	0	0	2	0	0	9	0	0
Season Total		180	27	0	67	24	0	247	51	0

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APPENDIX A. Continued.

BNT Data Summary

Strata	Sample Date	# Kept			# Released			# Caught		
		Bank	Boat		Bank	Boat		Bank	Boat	
1	06/13/20	0	0	0	0	0	0	0	0	0
1	06/14/20	1	0	0	1	0	0	2	0	0
1	06/20/20	0	1	0	0	1	0	0	2	0
1	06/28/20	0	0	0	0	0	0	0	0	0
June WE		1	1	0	1	1	0	2	2	0
2	06/04/20	2	0	0	0	0	0	2	0	0
2	06/09/20	0	0	0	0	0	0	0	0	0
2	06/12/20	1	0	0	0	0	0	1	0	0
2	06/24/20	2	0	0	0	0	0	2	0	0
June WD		5	0	0	0	0	0	5	0	0
3	07/05/20	0	0	0	1	0	0	1	0	0
3	07/11/20	0	0	0	0	0	0	0	0	0
3	07/25/20	0	0	0	0	0	0	0	0	0
3	07/26/20	0	0	0	0	0	0	0	0	0
July WE		0	0	0	1	0	0	1	0	0
4	07/06/20	1	0	0	0	0	0	1	0	0
4	07/14/20	0	0	0	0	0	0	0	0	0
4	07/16/20	0	0	0	0	0	0	0	0	0
4	07/24/20	0	0	0	0	0	0	0	0	0
July WD		1	0	0	0	0	0	1	0	0
5	08/02/20	0	0	0	0	0	0	0	0	0
5	08/08/20	0	0	0	0	0	0	0	0	0
5	08/09/20	0	0	0	0	0	0	0	0	0
5	08/29/20	0	0	0	0	0	0	0	0	0
August WE		0	0	0	0	0	0	0	0	0
6	08/12/20	0	0	0	0	0	0	0	0	0
6	08/17/20	0	0	0	0	0	0	0	0	0
6	08/18/20	0	0	0	0	0	0	0	0	0
6	08/24/20	0	0	0	0	0	0	0	0	0
August WD		0	0	0	0	0	0	0	0	0
Season Total		7	1	0	2	1	0	9	2	0

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APPENDIX A. Continued.

CUT Data Summary

Strata	Sample Date	# Kept			# Released			# Caught		
		Bank	Boat		Bank	Boat		Bank	Boat	
1	06/13/20	0	0	0	0	0	0	0	0	0
1	06/14/20	1	0	0	0	0	0	1	0	0
1	06/20/20	4	0	0	12	17	0	16	17	0
1	06/28/20	1	1	0	0	0	0	1	1	0
June WE		6	1	0	12	17	0	18	18	0
2	06/04/20	0	0	0	0	0	0	0	0	0
2	06/09/20	0	0	0	0	0	0	0	0	0
2	06/12/20	0	0	0	0	0	0	0	0	0
2	06/24/20	22	3	0	0	0	0	22	3	0
June WD		22	3	0	0	0	0	22	3	0
3	07/05/20	9	12	0	15	29	0	24	41	0
3	07/11/20	14	0	0	2	0	0	16	0	0
3	07/25/20	9	0	0	11	0	0	20	0	0
3	07/26/20	8	6	0	1	0	0	9	6	0
July WE		40	18	0	29	29	0	69	47	0
4	07/06/20	2	0	0	3	1	0	5	1	0
4	07/14/20	2	0	0	0	0	0	2	0	0
4	07/16/20	3	0	0	7	0	0	10	0	0
4	07/24/20	15	0	0	2	0	0	17	0	0
July WD		22	0	0	12	1	0	34	1	0
5	08/02/20	0	2	0	3	0	0	3	2	0
5	08/08/20	6	2	0	1	0	0	7	2	0
5	08/09/20	7	8	0	0	0	0	7	8	0
5	08/29/20	3	0	0	3	2	0	6	2	0
August WE		16	12	0	7	2	0	23	14	0
6	08/12/20	2	0	0	2	3	0	4	3	0
6	08/17/20	1	0	0	1	1	0	2	1	0
6	08/18/20	2	0	0	0	0	0	2	0	0
6	08/24/20	1	0	0	0	0	0	1	0	0
August WD		6	0	0	3	4	0	9	4	0
Season Total		112	34	0	63	53	0	175	87	0



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APPENDIX A. Continued.

RBT Data Summary

Strata	Sample Date	# Kept			# Released			# Caught		
		Bank	Boat		Bank	Boat		Bank	Boat	
1	06/13/20	13	0	0	2	0	0	15	0	0
1	06/14/20	21	0	0	3	0	0	24	0	0
1	06/20/20	21	4	0	5	11	0	26	15	0
1	06/28/20	1	1	0	3	0	0	4	1	0
June WE		56	5	0	13	11	0	69	16	0
2	06/04/20	1	0	0	0	0	0	1	0	0
2	06/09/20	1	0	0	0	0	0	1	0	0
2	06/12/20	8	0	0	1	0	0	9	0	0
2	06/24/20	11	1	0	0	0	0	11	1	0
June WD		21	1	0	1	0	0	22	1	0
3	07/05/20	9	2	0	7	16	0	16	18	0
3	07/11/20	3	2	0	12	0	0	15	2	0
3	07/25/20	5	3	0	5	0	0	10	3	0
3	07/26/20	3	4	0	1	0	0	4	4	0
July WE		20	11	0	25	16	0	45	27	0
4	07/06/20	1	5	0	2	9	0	3	14	0
4	07/14/20	4	0	0	0	0	0	4	0	0
4	07/16/20	4	0	0	7	0	0	11	0	0
4	07/24/20	6	0	0	6	0	0	12	0	0
July WD		15	5	0	15	9	0	30	14	0
5	08/02/20	6	0	0	7	0	0	13	0	0
5	08/08/20	7	1	0	9	0	0	16	1	0
5	08/09/20	10	20	0	1	8	0	11	28	0
5	08/29/20	5	0	0	1	0	0	6	0	0
August WE		28	21	0	18	8	0	46	29	0
6	08/12/20	0	0	0	1	2	0	1	2	0
6	08/17/20	1	0	0	7	0	0	8	0	0
6	08/18/20	3	0	0	0	0	0	3	0	0
6	08/24/20	0	0	0	0	0	0	0	0	0
August WD		4	0	0	8	2	0	12	2	0
Season Total		144	43	0	80	46	0	224	89	0

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APPENDIX A. Continued.

Season Summary for All Fishermen

Variable	Estimate	Std Err	CV	Per Acre	Std Err
Hours Fished	22354	1544.411	6.91%	186.3	12.870
Number of Anglers	6844	1518.721	22.19%	57.0	12.656
All Species Combined					
Total Catch	21758	2742.179	12.60%	181.3	22.851
Number Creeled	12742	1227.039	9.63%	106.2	10.225
Number Released	9017	2206.979	24.48%	75.1	18.391
Total Catch/hr	0.97	0.0885	9.09%		
Number Creeled/hr	0.57	0.0362	6.34%		
Number Released/hr	0.40	0.0871	21.58%		
BKT					
Total Catch	8517	1337.554	15.70%	71.0	11.146
Number Creeled	5271	691.419	13.12%	43.9	5.762
Number Released	3246	1086.172	33.46%	27.1	9.051
Total Catch/hr	0.38	0.0531	13.94%		
Number Creeled/hr	0.24	0.0264	11.18%		
Number Released/hr	0.15	0.0460	31.70%		
BNT					
Total Catch	204	99.002	48.48%	1.7	0.825
Number Creeled	122	52.929	43.25%	1.0	0.441
Number Released	82	49.743	60.80%	0.7	0.415
Total Catch/hr	0.01	0.0041	44.68%		
Number Creeled/hr	0.01	0.0022	39.76%		
Number Released/hr	0.00	0.0021	56.98%		
CUT					
Total Catch	5927	1119.222	18.88%	49.4	9.327
Number Creeled	2969	451.972	15.22%	24.7	3.766
Number Released	2958	1014.453	34.29%	24.7	8.454
Total Catch/hr	0.27	0.0422	15.90%		
Number Creeled/hr	0.13	0.0178	13.37%		
Number Released/hr	0.13	0.0419	31.64%		
RBT					
Total Catch	7110	933.442	13.13%	59.2	7.779
Number Creeled	4379	698.556	15.95%	36.5	5.821
Number Released	2730	601.112	22.02%	22.8	5.009
Total Catch/hr	0.32	0.0304	9.56%		
Number Creeled/hr	0.20	0.0270	13.76%		
Number Released/hr	0.12	0.0231	18.88%		

Season Summary for Bank Fishermen

Variable	Estimate	Std Err	CV	Per Acre	Std Err
Hours Fished	19073	1181.999	6.20%	158.9	9.850
Number of Anglers	6148	379.636	6.17%	51.2	3.164

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APPENDIX A. Continued.

Season Summary for Bank Fishermen

Variable	Estimate	Std Err	CV	Per Acre	Std Err
All Species Combined					
Total Catch	16401	1491.244	9.09%	136.7	12.427
Number Creeled	10710	1118.658	10.44%	89.3	9.322
Number Released	5691	931.894	16.37%	47.4	7.766
Total Catch/hr	0.86	0.0560	6.51%		
Number Creeled/hr	0.56	0.0359	6.39%		
Number Released/hr	0.30	0.0461	15.44%		
BKT					
Total Catch	6754	769.068	11.39%	56.3	6.409
Number Creeled	4555	617.127	13.55%	38.0	5.143
Number Released	2199	706.159	32.11%	18.3	5.885
Total Catch/hr	0.35	0.0428	12.10%		
Number Creeled/hr	0.24	0.0289	12.10%		
Number Released/hr	0.12	0.0377	32.68%		
BNT					
Total Catch	136	72.017	52.85%	1.1	0.600
Number Creeled	88	40.592	45.91%	0.7	0.338
Number Released	48	36.341	75.95%	0.4	0.303
Total Catch/hr	0.01	0.0036	50.18%		
Number Creeled/hr	0.00	0.0020	43.59%		
Number Released/hr	0.00	0.0018	73.26%		
CUT					
Total Catch	3814	738.803	19.37%	31.8	6.157
Number Creeled	2392	406.945	17.01%	19.9	3.391
Number Released	1422	545.685	38.37%	11.9	4.547
Total Catch/hr	0.20	0.0334	16.71%		
Number Creeled/hr	0.13	0.0177	14.12%		
Number Released/hr	0.07	0.0274	36.71%		
RBT					
Total Catch	5697	750.934	13.18%	47.5	6.258
Number Creeled	3675	661.706	18.01%	30.6	5.514
Number Released	2022	423.541	20.95%	16.9	3.530
Total Catch/hr	0.30	0.0297	9.93%		
Number Creeled/hr	0.19	0.0293	15.19%		
Number Released/hr	0.11	0.0204	19.25%		

Season Summary for Boat Fishermen

Variable	Estimate	Std Err	CV	Per Acre	Std Err
Hours Fished	3282	642.069	19.56%	27.3	5.351
Number of Anglers	696	141.820	20.39%	5.8	1.182

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APPENDIX A. Continued.

Season Summary for Boat Fishermen

Variable	Estimate	Std Err	CV	Per Acre	Std Err
All Species Combined					
Total Catch	5357	2301.247	42.96%	44.6	19.177
Number Creeled	2032	504.213	24.82%	16.9	4.202
Number Released	3325	2000.582	60.16%	27.7	16.672
Total Catch/hr	1.63	0.2311	14.16%		
Number Creeled/hr	0.62	0.0000	0.00%		
Number Released/hr	1.01	0.3703	36.55%		
BKT					
Total Catch	1763	1094.343	62.07%	14.7	9.120
Number Creeled	716	311.793	43.56%	6.0	2.598
Number Released	1047	825.293	78.80%	8.7	6.877
Total Catch/hr	0.54	0.2031	37.81%		
Number Creeled/hr	0.22	0.0388	17.78%		
Number Released/hr	0.32	0.1801	56.42%		
BNT					
Total Catch	68	67.934	100.00%	0.6	0.566
Number Creeled	34	33.967	100.00%	0.3	0.283
Number Released	34	33.967	100.00%	0.3	0.283
Total Catch/hr	0.02	0.0158	76.24%		
Number Creeled/hr	0.01	0.0079	76.24%		
Number Released/hr	0.01	0.0079	76.24%		
CUT					
Total Catch	2113	840.730	39.79%	17.6	7.006
Number Creeled	577	196.658	34.08%	4.8	1.639
Number Released	1536	855.186	55.68%	12.8	7.127
Total Catch/hr	0.64	0.1418	22.02%		
Number Creeled/hr	0.18	0.0587	33.38%		
Number Released/hr	0.47	0.1774	37.90%		
RBT					
Total Catch	1413	554.447	39.24%	11.8	4.620
Number Creeled	705	223.886	31.77%	5.9	1.866
Number Released	708	426.554	60.23%	5.9	3.555
Total Catch/hr	0.43	0.0563	13.06%		
Number Creeled/hr	0.21	0.0535	24.89%		
Number Released/hr	0.22	0.0734	34.01%		