Fish Community Assessment of Corkery (Crystal) Lake

File Report

Meghan Powell
Ministry of Natural Resources
Bracebridge

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Corkery Lake, also known as Crystal Lake (Figure 1), is a small (71 ha) and moderately deep (20 m) lake located within Ballantyne Township. Access to this lake can be found by travelling north on Highway 11 to South River and turning east onto Ottawa Ave. This road turns into Chemical Rd and should be followed for 20 km. There is a dirt road on the left with a sign for Corkery Lake, turn left and travel for 4 km to find the boat launching area to the right in a large turn-around area.

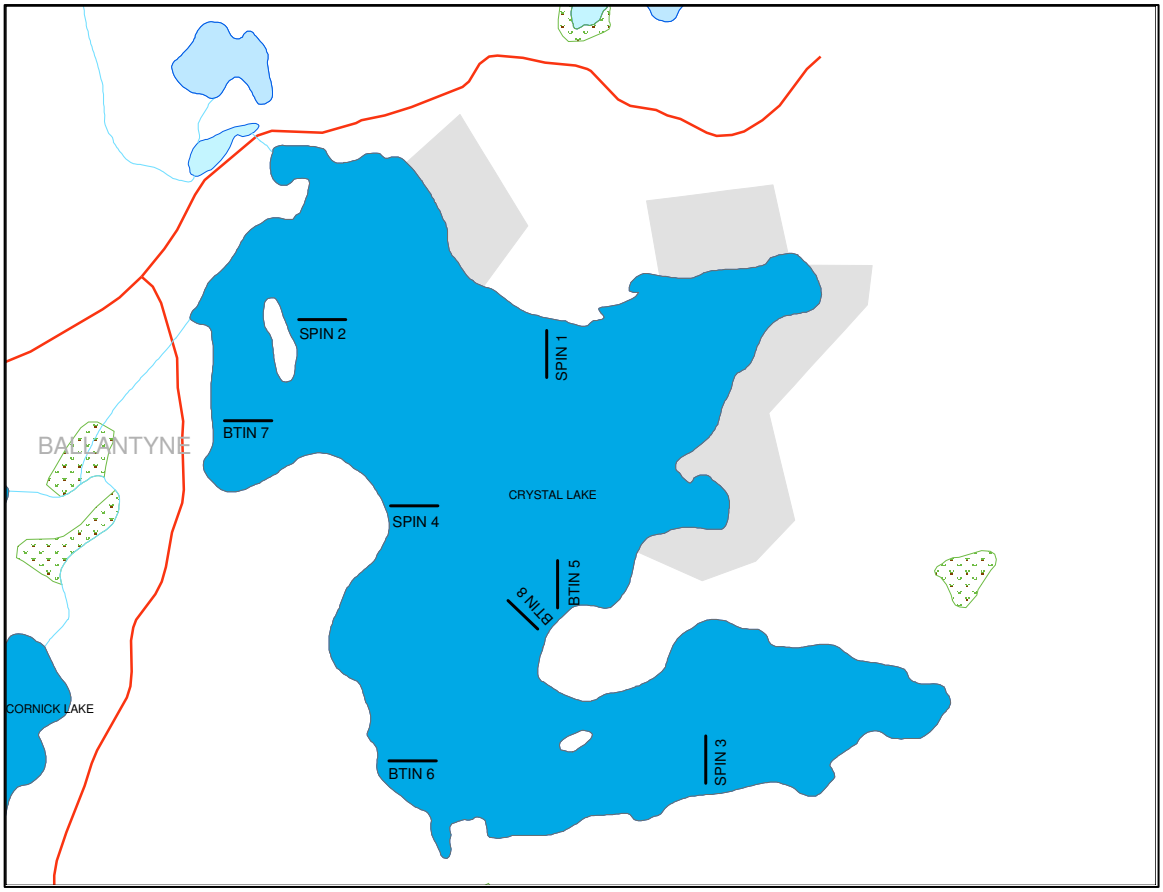


Figure 1 Map of Corkery Lake showing net set placement, 2010.

Corkery Lake historically supported a native brook trout (*Salvelinus fontinalis)* population. Stocking started in 1951 and fish were stocked every year until 1955 and then biennially until 1966. The stocking of brook trout then halted until 1973 when 200 fingerlings were stocked, and then was stocked followed by 17,000 in 1976.

An assessment was done in 2003 to determine if the lake was suitable for stocking splake *(Salvelinus frontinalis x S. namaycush)*. This project found that smallmouth bass (*Micropterus dolomieui)* had become established in the lake, and brook trout were no longer present.

Splake were introduced in 2005 and from that point have been stocked biennially. An assessment was conducted in June 2010 to determine the status of the splake population; specifically to determine whether stocking efforts were successful and the overall current status of the fish community.

METHODS

Aspects of the Brook Trout Index Netting (BTIN) and Summer Profundal Index Netting (SPIN) protocols were used.

The BTIN gear used for this protocol consisted of monofilament gillnet sets that were 45.6 m long by 2.4 m high, consisting of gangs of 3 panels (Monroe, 2005). The mesh sizes used were 2.0 and 2.5 in. Three BTIN nets were set for a period of 2 hours focusing on depths ranging from 4 to 15 m. One net was set overnight focusing on depths ranging from 6.5 to 10.4 m.

SPIN protocol (Sandstrom and Lester, 2009) was also followed. The gear consisted of 4 SPIN nets that were 64 m long by 1.8 m high and had the following stretch mesh sizes; 2.25, 2.50, 2.75, 3.00, 3.50, 4.00, 4.50 and 5.00 in. There were 8 panels in each SPIN gain and the mesh sizes were randomly arranged. Three SPIN nets were set for 2 hour periods focusing on depths ranging from 5 to 17 m. An additional net was set overnight at depths ranging from 7 to 9 m.

Both BTIN and SPIN nets were set perpendicular to shore.

Captured fish species were measured for fork length and age structures were taken as well from target species.

A Secchi disc measurement was taken to determine water clarity and a temperature and dissolved oxygen profile was conducted to determine suitable habitats for net placement.

A small sub-sample of lake whitefish *(Coregonus clupeaformis)* was retained and sampled at a later date due to time constraints. There was no effort to match the fork lengths from the data sheets with the fish envelopes due to fish being frozen previously.

RESULTS

Netting was conducted between June 28 and June 29, 2010. Weather conditions were sunny with heavy rain at times during the set duration. Two dissolved oxygen and temperature profiles were taken on Corkery Lake. One taken in depths of 0.5 to 22 m and the other taken in a bay

with depths from 0.5 to 6 m. Water temperatures ranged from 21.6 to 5.8℃ and dissolved oxygen readings ranged from 11.5 to 0.1 mg/L throughout the water column (Table 1 and 2). The Secchi disc measurement was 5.1 m.

Table 1. Temperature and Dissolved Oxygen Profile, Main Basin, Corkery Lake, June 28, 2010.

Depth (m)	Temp.(mg/L)	D.O. (mg/L)
0.5	21.7	9.3
1	21.6	9.3
2	21.3	9.3
3	21.2	9.3
4	20.1	9.7
5	17.3	10.7
6	13.9	11.5
7	12.3	10.8
8	10.6	11.0
9	9.4	10.9
10	8.3	10.2
11	7.2	8.9
12	6.7	7.8
13	6.4	6.5
14	6.2	5.4
15	6.1	5.5
16	6.0	4.1
17	5.9	2.3
18	5.9	1.6
19	5.9	1.3
20	5.8	1.2
21	5.8	0.2
22	5.8	0.1

Table 2. Temperature and Dissolved Oxygen Profile, South Basin, Corkery Lake, June 28, 2010.

Depth (m)	Temp.(mg/L)	D.O. (mg/L)
0.5	21.6	9.2
1	21.6	9.2
2	21.5	9.2
3	21.5	9.2
4	21.4	9.1
5	17.2	10.2
6	15.7	5.9

Details of net set data can be found in the following Table 3.

Table 3. Net Set Details, Corkery Lake, 2010.

Effort #	Gear Type	Date	Zone	Easting	Northing	Depth 1 (start) (m)	Depth 2 (mid) (m)	Depth 3 (end) (m)	Set Time	Lift Time	Duration (hrs)
1	SPIN	28-Jun-10	17	641599	5089515	5.0	7.0	9.0	12:15	14:15	2
2	SPIN	29-Jun-10	17	641288	5089615	10.2	15.7	17.8	10:45	12:45	2
3	SPIN	29-Jun-10	17	641864	5088903	5.8	6.5	6.7	11:15	13:15	2
4	SPIN	29-Jun-10	17	641378	5089296	7.8	8.5	9.2	14:30	13:00	22.5
5	BTIN	28-Jun-10	17	641613	5089173	4.0		8.0	12:30	14:30	2
6	BTIN	29-Jun-10	17	641417	5088869	8.9		15.2	11:45	13:45	2
7	BTIN	29-Jun-10	17	641113	5089434	5.4		7.3	12:15	14:15	2
8	BTIN	29-Jun-10	17	641560	5089110	6.5		10.4	14:30	11:00	20.5

A total of 4 BTIN nets were set in Corkery Lake. The first BTIN was successful in producing 6 white sucker (*Catostomus commersoni), 6* lake whitefish, 1 smallmouth bass and 1 splake. Two more BTIN nets were set and lake whitefish, white sucker and smallmouth bass species were caught. One overnight set was set due to low splake catch efforts, but there was no change in species caught.

Four SPIN nets were also set in Corkery Lake. Net sets were in the water for a period of 2 hours and lake whitefish, white sucker and smallmouth bass species were caught. One SPIN net was set overnight in hopes of catching more splake, but there was no change in species composition. The total catch of fish sampled from both BTIN and SPIN efforts can be found in Table 4.

Table 4. Catch Summary of Corkery Lake, 2010.

Effort #	Gear Type	Lake Whitefish	White Sucker	Smallmouth Bass	Splake
1	SPIN	15	2	0	0
2	SPIN	9	0	0	0
3	SPIN	3	11	3	0
4	SPIN	67	11	0	0
5	BTIN	6	6	1	1
6	BTIN	0	3	0	0
7	BTIN	1	1	0	0
8	BTIN	80	19	0	0
Total Catch		181	53	4	1

The summary of minimum, maximum and mean fork length of species caught can be found in Table 5.

Table 5. Minimum, Maximum and Mean Fork Lengths, by Fish Species, Corkery Lake, 2010.

Species	Sample Size	Min Fork Length	Max Fork Length	Mean Fork Length
Lake Whitefish	243	239	400	314
White Sucker	82	380	520	422
Smallmouth Bass	4	244	405	303
Splake	1	444	473	444

DISCUSSION

The SPIN and BTIN gear were successful in producing a catch characteristic of Corkery Lake. By conducting a temperature profile, we were able to determine where the thermocline was located (between 4 to 10 m). Nets were placed strategically in both deep and shallow water in order to cover the thermocline area, as well as to target some fish that were residing in the deeper waters. Unfortunately only one splake was caught.

The survival of stocked splake in Corkery Lake has been low. Adequate cold water habitat with sufficient oxygen appears to be available. The presence of another cold water species supports this. Competition for food could have been a factor due to the smallmouth bass and dense lake whitefish populations present. Direct predation by bass may also be an important factor; exacerbated by the high water clarity. Brook trout were also unable to sustain themselves, as there were none caught within the SPIN or BTIN netting efforts. However, a local fisherman claimed that 2 years previous a brook trout had been caught, as well as a few splake over the years, but there were no pictures or any other sort of documentation to confirm these findings.

In the past lake herring *(Coregonus coregonus)* were documented as being abundant within Corkery Lake. In 2010, we confirmed that there is an abundant population of lake whitefish, not lake herring. The whitefish were a small-bodied form, with a mean fork length of 314 mm (Figure 2). Ageing structures were collected from a small sub-sample. Ages ranged from 10 to 21 years old, indicative of an unexploited population (Table 6).

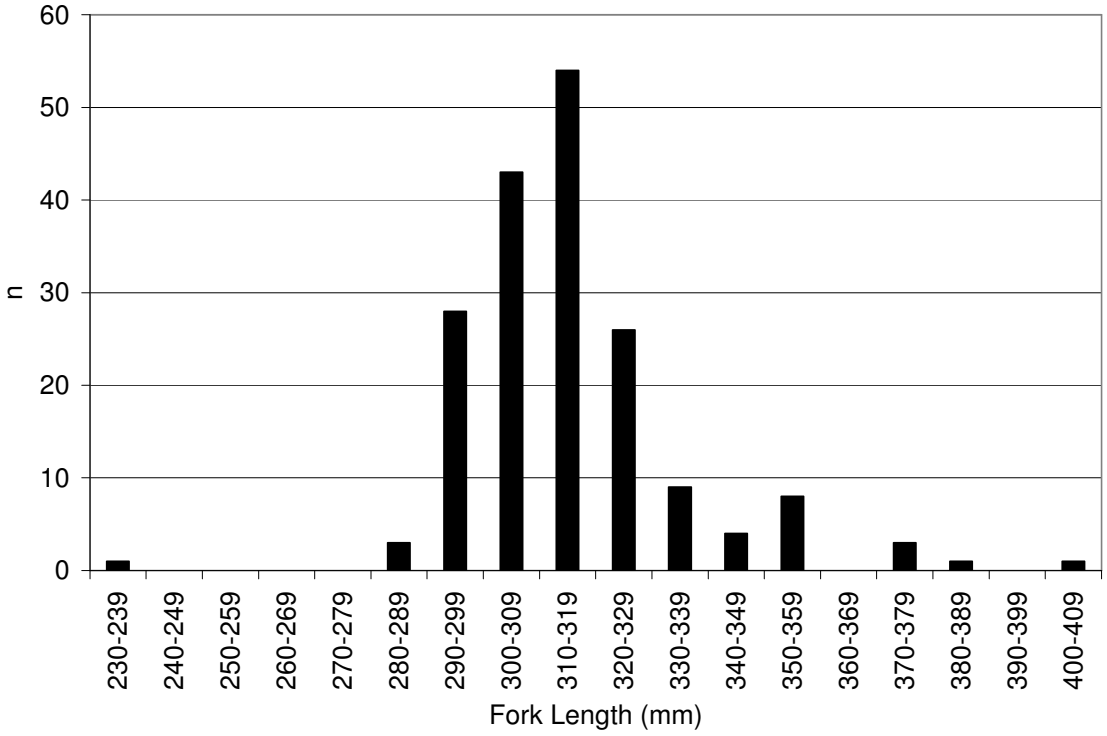


Figure 2. Fork length distribution of lake whitefish, Corkery Lake, 2010.

Table 6. Size and age details of a sub-sample of lake whitefish, Corkery Lake, 2010..

SPECIES	FISH	FL	TL	RWT	Sex	Mat	AGE
091	1	312	355				21
091	2	304	338	320	1	2	18
091	3	310	345	350	1	2	18
091	4	288	323	300	1	2	20
091	5	280	316	280	1	2	18
091	6	298	331	290	2	2	15
091	7	330	372				18
091	128	300	335	300	2		21
091	229	310	344	310	2		18
091	231	312	347	350	2		18
091	232	320	355	370	2		18
091	233	304	337	300	1		18
091	234	314	352	350	1		10
091	235	315	354		1		13
091	236	314	347	330	2		11
091	237	319	357	370	1		16
091	239	295	331	300	1		17

It was observed that some of the male white suckers caught were still in spawning condition; having tubercles and freely flowing milt. We speculate that this occurrence, so late after the typical spring spawning season, may be a result of spawning occurring in the relatively cold lake and not in tributaries which warm more quickly as the lake does not have any significant inflows.

RECOMMENDATIONS

As stated in the fish stocking guidelines, splake should not be stocked in lakes containing pelagic species, such as lake whitefish (OMNR, 2002). This is due to the fact that they are inter-specific competitors of splake and compete for food sources and preferred habitats of splake (Kerr, 2000). In order for splake to survive in Corkery Lake, it is recommended that a larger size of splake be stocked. This may give them a chance to compete with the healthy lake whitefish population. If the splake population continues to fail, termination of splake stocking is recommended.

REFERENCES

Monroe, B. 2005. Manual of instructions: brook trout index netting. Fish and Wildlife Branch. Ontario Ministry of Natural Resources, Peterborough, Ontario.

OMNR, 2002. Guidelines for stocking fish in inland waters of Ontario. Ontario Ministry of Natural Resources, Peterborough.

Sandstrom, S. and N. Lester. 2009. Manual of instructions for Summer Profundal Index Netting (SPIN): a lake trout assessment tool. Ontario Ministry of Natural Resources, Peterborough, Ontario. Version 2009.1. 22 p. + appendices.

Appendix Fish data, Corkery Lake, 2010.

Effort	Gear	Mesh Size	Species	Fish #	Fork Length	Fate
5	BTIN	2.50	82	135	444	D
1	SPIN	2.50	91	2	316	D
1	SPIN	2.50	91	3	325	D
1	SPIN	2.50	91	4	317	D
1	SPIN	2.50	91	5	293	D
1	SPIN	2.50	91	6	303	D
1	SPIN	2.50	91	7	330	D
1	SPIN	2.75	91	8	323	D
1	SPIN	2.75	91	9	307	D
1	SPIN	2.25	91	10	323	D
1	SPIN	2.25	91	11	318	D
1	SPIN	2.25	91	12	311	D
1	SPIN	3.00	91	14	312	D
1	SPIN	3.00	91	15	335	D
1	SPIN	3.00	91	16	304	D
1	SPIN	3.00	91	17	350	D
2	SPIN	2.50	91	18	306	D
2	SPIN	2.50	91	19	321	D
2	SPIN	2.50	91	20	335	D
2	SPIN	2.50	91	21	315	D
2	SPIN	2.50	91	22	329	D
2	SPIN	2.75	91	23	353	D
2	SPIN	3.50	91	24	353	D
2	SPIN	3.50	91	25	345	D
2	SPIN	3.50	91	26	324	D
3	SPIN	2.50	91	32	293	D
3	SPIN	2.50	91	35	239	D
3	SPIN	2.50	91	36	300	D
4	SPIN	3.00	91	52	305	D
4	SPIN	3.00	91	53	307	D
4	SPIN	3.00	91	54	320	D
4	SPIN	3.00	91	55	317	D
4	SPIN	3.00	91	56	313	D
4	SPIN	3.00	91	57	335	D
4	SPIN	3.00	91	58	295	D
4	SPIN	3.00	91	59	305	D
4	SPIN	3.00	91	60	327	D
4	SPIN	3.00	91	61	334	D
4	SPIN	3.00	91	62	319	D
4	SPIN	2.50	91	63	320	D
4	SPIN	2.50	91	64	290	D
4	SPIN	2.50	91	65	295	D
4	SPIN	2.50	91	66	311	D
4	SPIN	2.50	91	67	345	D
4	SPIN	2.50	91	68	295	D
4	SPIN	2.50	91	69	315	D
4	SPIN	2.50	91	70	293	D
4	SPIN	2.50	91	71	316	D
4	SPIN	2.50	91	72	310	D
4	SPIN	2.50	91	73	310	D
4	SPIN	2.50	91	74	303	D

Effort	Gear	Mesh Size	Species	Fish #	Fork Length	Fate
4	SPIN	2.50	91	75	329	D
4	SPIN	2.50	91	76	317	D
4	SPIN	2.50	91	77	302	D
4	SPIN	2.50	91	78	302	D
4	SPIN	2.50	91	79	314	D
4	SPIN	2.50	91	80	294	D
4	SPIN	2.50	91	81	323	D
4	SPIN	2.75	91	84	306	D
4	SPIN	2.75	91	85	317	D
4	SPIN	2.75	91	86	315	D
4	SPIN	2.75	91	87	284	D
4	SPIN	2.75	91	88	305	D
4	SPIN	2.75	91	89	317	D
4	SPIN	2.75	91	90	295	D
4	SPIN	2.75	91	91	308	D
4	SPIN	2.75	91	92	287	D
4	SPIN	2.75	91	93	305	D
4	SPIN	3.50	91	94	380	D
4	SPIN	3.50	91	95	354	D
4	SPIN	3.50	91	96	317	D
4	SPIN	3.50	91	97	400	D
4	SPIN	3.50	91	98	325	D
4	SPIN	3.50	91	99	330	D
4	SPIN	3.50	91	100	370	D
4	SPIN	3.50	91	101	320	D
4	SPIN	2.25	91	103	303	D
4	SPIN	2.25	91	104	375	D
4	SPIN	2.25	91	105	315	D
4	SPIN	2.25	91	106	356	D
4	SPIN	2.25	91	107	330	D
4	SPIN	2.25	91	108	300	D
4	SPIN	2.25	91	109	356	D
4	SPIN	2.25	91	110	316	D
4	SPIN	2.25	91	111	290	D
4	SPIN	2.25	91	112	296	D
4	SPIN	2.25	91	113	340	D
4	SPIN	2.25	91	114	315	D
4	SPIN	2.25	91	115	316	D
4	SPIN	2.25	91	116	330	D
4	SPIN	2.25	91	117	326	D
4	SPIN	2.25	91	118	312	D
4	SPIN	2.25	91	119	299	D
4	SPIN	2.25	91	120	312	D
4	SPIN	2.25	91	121	295	D
5	BTIN	2.50	91	127	312	D
5	BTIN	2.50	91	128	303	D
5	BTIN	2.50	91	129	300	D
5	BTIN	2.50	91	132	310	D
5	BTIN	2.50	91	133	298	D
5	BTIN	2.50	91	134	312	D
7	BTIN	2.50	91	139	319	D
8	BTIN	2.50	91	145	308	D
8	BTIN	2.50	91	146	310	D
8	BTIN	2.50	91	147	314	D

Effort	Gear	Mesh Size	Species	Fish #	Fork Length	Fate
8	BTIN	2.50	91	148	306	D
8	BTIN	2.50	91	149	298	D
8	BTIN	2.50	91	150	303	D
8	BTIN	2.50	91	151	312	D
8	BTIN	2.50	91	152	329	D
8	BTIN	2.50	91	153	290	D
8	BTIN	2.50	91	154	303	D
8	BTIN	2.50	91	155	310	D
8	BTIN	2.50	91	156	302	D
8	BTIN	2.50	91	157	326	D
8	BTIN	2.50	91	158	307	D
8	BTIN	2.50	91	159	303	D
8	BTIN	2.50	91	160	300	D
8	BTIN	2.50	91	161	299	D
8	BTIN	2.50	91	162	324	D
8	BTIN	2.50	91	163	325	D
8	BTIN	2.50	91	164	294	D
8	BTIN	2.50	91	165	303	D
8	BTIN	2.50	91	166	316	D
8	BTIN	2.50	91	167	325	D
8	BTIN	2.50	91	168	298	D
8	BTIN	2.50	91	169	315	D
8	BTIN	2.50	91	170	304	D
8	BTIN	2.50	91	171	307	D
8	BTIN	2.50	91	172	337	D
8	BTIN	2.50	91	173	315	D
8	BTIN	2.50	91	174	303	D
8	BTIN	2.50	91	175	322	D
8	BTIN	2.50	91	176	312	D
8	BTIN	2.50	91	177	310	D
8	BTIN	2.50	91	178	297	D
8	BTIN	2.50	91	179	297	D
8	BTIN	2.50	91	180	350	D
8	BTIN	2.50	91	181	306	D
8	BTIN	2.50	91	182	307	D
8	BTIN	2.50	91	183	320	D
8	BTIN	2.50	91	184	302	D
8	BTIN	2.50	91	185	300	D
8	BTIN	2.50	91	186	320	D
8	BTIN	2.50	91	187	295	D
8	BTIN	2.50	91	188	312	D
8	BTIN	2.50	91	189	310	D
8	BTIN	2.50	91	190	287	D
8	BTIN	2.50	91	191	310	D
8	BTIN	2.50	91	192	299	D
8	BTIN	2.50	91	193	312	D
8	BTIN	2.50	91	194	304	D
8	BTIN	2.50	91	195	303	D
8	BTIN	2.50	91	196	370	D
8	BTIN	2.50	91	197	315	D
8	BTIN	2.50	91	198	317	D
8	BTIN	2.50	91	199	324	D
8	BTIN	2.50	91	200	320	D
8	BTIN	2.50	91	201	350	D

Effort	Gear	Mesh Size	Species	Fish #	Fork Length	Fate
8	BTIN	2.50	91	202	315	D
8	BTIN	2.50	91	203	315	D
8	BTIN	2.50	91	204	295	D
8	BTIN	2.50	91	205	300	D
8	BTIN	2.50	91	206	323	D
8	BTIN	2.50	91	207	306	D
8	BTIN	2.50	91	208	296	D
8	BTIN	2.50	91	209	297	D
8	BTIN	2.50	91	210	318	D
8	BTIN	2.50	91	211	349	D
8	BTIN	2.50	91	212	305	D
8	BTIN	2.50	91	228	300	D
8	BTIN	2.50	91	229	310	D
8	BTIN	2.50	91	230	295	D
8	BTIN	2.50	91	231	312	D
8	BTIN	2.50	91	232	320	D
8	BTIN	2.50	91	233	304	D
8	BTIN	2.50	91	234	314	D
8	BTIN	2.50	91	235	315	D
8	BTIN	2.50	91	236	314	D
8	BTIN	2.50	91	237	319	D
8	BTIN	2.50	91	238	299	D
8	BTIN	2.50	91	239	300	D
1	SPIN	4.50	163	1	459	RG
1	SPIN	3.50	163	13	405	RG
3	SPIN	4.00	163	27	446	RG
3	SPIN	4.00	163	28	474	RG
3	SPIN	2.25	163	29	441	RG
3	SPIN	2.50	163	30	520	RG
3	SPIN	2.50	163	33	380	RG
3	SPIN	2.50	163	38	401	RG
3	SPIN	2.50	163	39	383	RG
3	SPIN	2.50	163	40	410	RG
3	SPIN	2.50	163	41	418	RG
3	SPIN	2.50	163	42	405	RG
3	SPIN	3.00	163	43	428	RG
4	SPIN	4.00	163	44	409	D
4	SPIN	4.00	163	45	411	D
4	SPIN	4.00	163	46	400	D
4	SPIN	4.00	163	47	417	D
4	SPIN	4.00	163	48	410	D
4	SPIN	4.00	163	49	410	D
4	SPIN	4.00	163	50	440	D
4	SPIN	3.00	163	51	395	D
4	SPIN	4.50	163	82	410	D
4	SPIN	4.50	163	83	435	D
4	SPIN	2.25	163	102	390	D
5	BTIN	2.50	163	122	420	RG
5	BTIN	2.50	163	123	385	RG
5	BTIN	2.50	163	124	385	RG
5	BTIN	2.50	163	126	475	D
5	BTIN	2.50	163	130	412	D
5	BTIN	2.50	163	131	395	D
6	BTIN	2.50	163	136	460	RG

Effort	Gear	Mesh Size	Species	Fish #	Fork Length	Fate
6	BTIN	2.50	163	137	394	RG
6	BTIN	2.50	163	138	465	RG
7	BTIN	2.50	163	140	434	RG
8	BTIN	2.50	163	141	460	RG
8	BTIN	2.50	163	142	479	RG
8	BTIN	2.50	163	143	405	RG
8	BTIN	2.50	163	144	434	RG
8	BTIN	2.50	163	213	460	D
8	BTIN	2.50	163	214	460	D
8	BTIN	2.50	163	215	415	D
8	BTIN	2.50	163	216	391	D
8	BTIN	2.50	163	217	425	D
8	BTIN	2.50	163	218	410	D
8	BTIN	2.50	163	219	390	D
8	BTIN	2.50	163	220	400	D
8	BTIN	2.50	163	221	405	D
8	BTIN	2.50	163	222	395	D
8	BTIN	2.50	163	223	420	D
8	BTIN	2.50	163	224	406	D
8	BTIN	2.50	163	225	400	D
8	BTIN	2.50	163	226	461	D
8	BTIN	2.50	163	227	407	D
3	SPIN	2.50	316	31	247	RG
3	SPIN	2.50	316	34	315	RG
3	SPIN	2.50	316	37	244	RG
5	BTIN	2.50	316	125	405	RG