

Camera-Based Creel Surveys of Beaver, Fiesta, and Ironside Lakes, Alberta, 2012

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Camera-Based Creel Surveys of
Beaver, Fiesta, and Ironside Lakes, Alberta, 2012

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Conservation Report Series Type

Data

ISBN printed: 978-1-4601-1050-8

ISBN online: 978-1-4601-1051-5

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Suggested Citation:

Fitzsimmons, K., W. Patterson, and C. Rasmussen. 2013. Camera-based creel surveys of Beaver, Fiesta, and Ironside lakes, Alberta, 2012. Data Report, D-2013-004, produced by the Alberta Conservation Association, Sherwood Park, Alberta, Canada. 10 pp + App.

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EXECUTIVE SUMMARY

During the summer of 2012, we conducted camera-based and angler interview-based creel surveys to assess angler use and catch rates at three rainbow trout (*Oncorhynchus mykiss*) stocked and aerated lakes in west-central Alberta. Creel surveys were conducted from 15 May to 31 August 2012 at Beaver, Fiesta and Ironside lakes. Angler effort data was collected using a digital trail camera located at each lake, and angler trip length and catch data were collected from angler interviews. Estimates of angler effort and trip length were generated using bootstrapping techniques and estimates were corrected for spatial strata that were not surveyed by the trail cameras.

At Beaver Lake, we estimated anglers made 2,777 angling trips (95% CI = 2,390 – 3,215), fished for 8,666 angling-h (95% CI = 7,741 – 10,102), with an angling pressure of 286 h/ha (95% CI = 250 – 326), and a reported catch rate (harvested and released fish) of 0.54 fish/h. Anglers harvested and released an estimated 264 (95% CI = 230 – 300) and 4,547 fish (95% CI = 3,960 – 5,203), respectively.

At Fiesta Lake, we estimated anglers made 498 angling trips (95% CI = 395 – 590) trips, fished for 1,791 angling-h (95% CI = 1,498 – 2,127), with an angling pressure of 252 h/ha (95% CI = 210 – 299), and a reported released catch rate of 0.71 fish/h. Estimated total fish released was 1,264 (95% CI = 1,057 – 1,501).

At Ironside Lake, we estimated anglers made 331 angling trips (95% CI = 183 – 593), fished for 1,059 angling-h (95% CI = 664 – 1,691), with an angling pressure of 321 h/ha (95% CI = 201 – 512), and a reported released catch rate of 0.65 fish/h. Estimated total fish released was 693 (95% CI = 434 – 1,105).

Key words: aeration, angler interviews, Beaver Lake, creel survey, Fiesta Lake, Ironside Lake, stocked rainbow trout, trail camera.

ACKNOWLEDGEMENTS

We thank Alberta Conservation Association employees Ariane Cantin, Peter Jones, Chad Judd, and Adam Rathier. We thank Alberta Environment and Sustainable Resource Development for providing a camping area at the Raven Brood Trout Station. Funding for this project was provided by Alberta Conservation Association, Albert Stream Watch Conservation Coalition, and Alberta Student Temporary Employment Program.

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1.0 INTRODUCTION

Alberta has a relatively small number of fish bearing lakes; approximately 800 lakes with naturally occurring sportfish species, and an additional 300 lakes with stocked sportfish species. In 2010 Alberta had approximately 335,848 active anglers (Zwickel 2012) which is approximately 150 times greater than the estimated two anglers per lake in Manitoba, Saskatchewan, and Ontario (Sullivan 2003), placing greater demands on the angling resources in Alberta. Furthermore, Alberta lakes are typically shallow and eutrophic, which means that ice-cover and anoxia during winter months can lead to frequent winterkill events, further reducing angling opportunities. To prevent winterkill, Alberta Conservation Association (ACA) uses aeration at 17 lakes stocked with rainbow trout to ensure suitable dissolved oxygen levels during the winter season. Aeration results in year-round survival of stocked fish and the creation of sportfisheries capable of producing large trout. However, despite their apparent success and popularity among anglers, angler use has not been evaluated at these lakes. The goal of this project is to assess angling effort, catch, and harvest rates at three popular aerated lakes, Beaver, Fiesta, and Ironside lakes.

2.0 STUDY AREA

Beaver, Fiesta, and Ironside lakes are managed by Alberta Environment and Sustainable Resources Development (AESRD) as quality stocked fisheries. The objective of the quality stocked fishery classification is that 10 – 15 % of fish are over 50 cm total length (TL). All three of these lakes are accessible by gravel roads and the access sites are maintained by ACA (Table 1). The sportfishing regulation at Beaver Lake is a daily bag limit of two fish; one fish less than 40 cm TL and/or one fish greater than 40 cm TL. Both Fiesta and Ironside lakes are managed as catch-and-release (zero daily bag limit) sportfisheries.

Table 1. Location, physical characteristics, sportfishing regulations, and site infrastructure at Beaver, Fiesta and Ironside lakes.

		Beaver Lake	Fiesta Lake	Ironside Lake
UTM location	Easting	651761	656107	636784
(NAD83, Zone 11)	Northing	5764058	5763037	5790372
Surface area (ha)		31.2	7.3	3.3
Maximum depth (m)		9.3	7.0	13.0
Sportfishing season ¹		Apr. 1–Nov. 31	Apr. 16–Oct. 30	Apr. 16–Oct. 30
Sportfishing regulations ¹		1 fish < 40 cm TL and/or 1 fish > 40 cm TL ²	Catch-and-release	Catch-and-release
Fisheries access site		Parking lot	Parking lot	Parking lot
infrastructure		Garbage receptacles	Garbage receptacles	Boat launch
		Outhouse	Outhouse	
		Boat launch		

¹ Sportfishing season and harvest as outlined in the 2012 Alberta guide to sportfishing regulations, and current at time of writing.

² TL is fish total length

2.1 Beaver Lake

Beaver Lake is approximately 10 km south of the town of Caroline, and is in the Red Deer River drainage (Figure 1). It has a surface area of 31.2 ha, a maximum depth of 9.3 m, and is aerated in the winter months by 3 surface aerators. Since the mid-1970s, water levels in Beaver Lake have been maintained with a water control structure at the lake outlet. Beaver Lake is stocked with 3,500 rainbow trout annually.

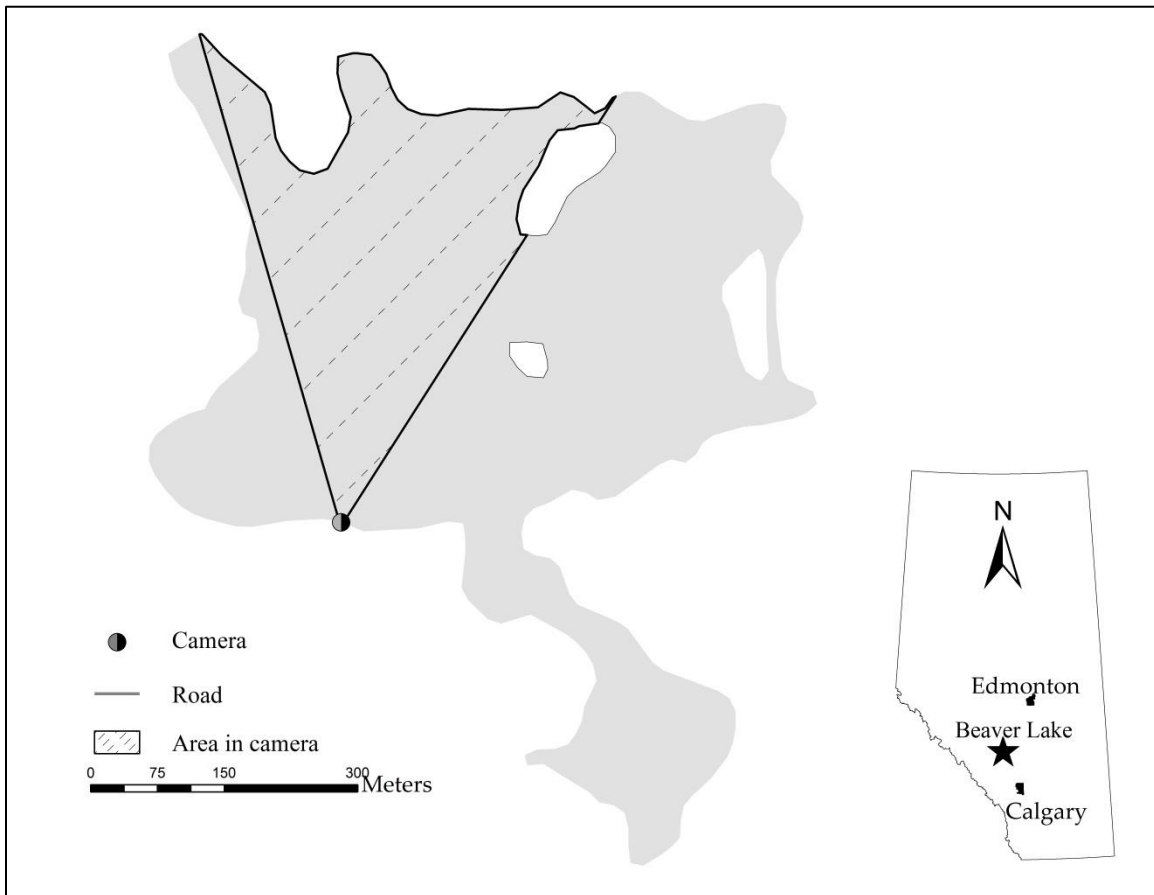


Figure 1. Map of Beaver Lake, Alberta. Shown are camera location, camera field of view, and local roads.

2.2 Fiesta Lake

Fiesta Lake is approximately 10 km south of the town of Caroline, and is in the Red Deer River drainage (Figure 2). It has a surface area of 7.3 ha, a maximum depth of 7.0 m, and is aerated in the winter months by 1 surface aerator. Fiesta Lake is stocked with 550 rainbow trout annually.

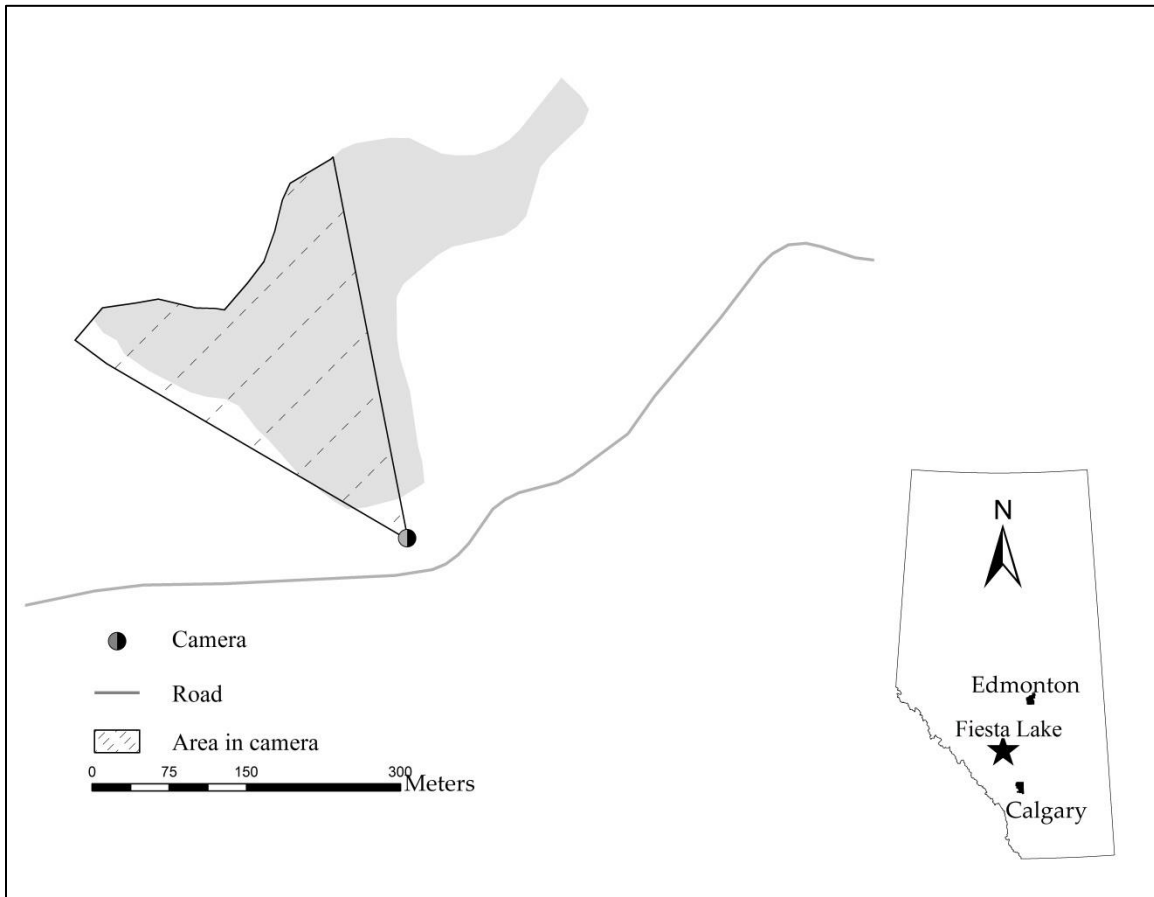


Figure 2. Map of Fiesta Lake, Alberta. Shown are camera location, camera field of view, and local roads.

2.3 Ironside Lake

Ironside Lake is approximately 15 km southwest of the town of Rocky Mountain House, and is in the North Saskatchewan River drainage (Figure 3). It has a surface area of 3.3 ha, a maximum depth of 13.0 m, and is aerated in the winter months by 1 surface aerator. Ironside Lake was stocked with 250 rainbow trout in 2009, and 2010, and 500 rainbow trout in 2011, and 2012.

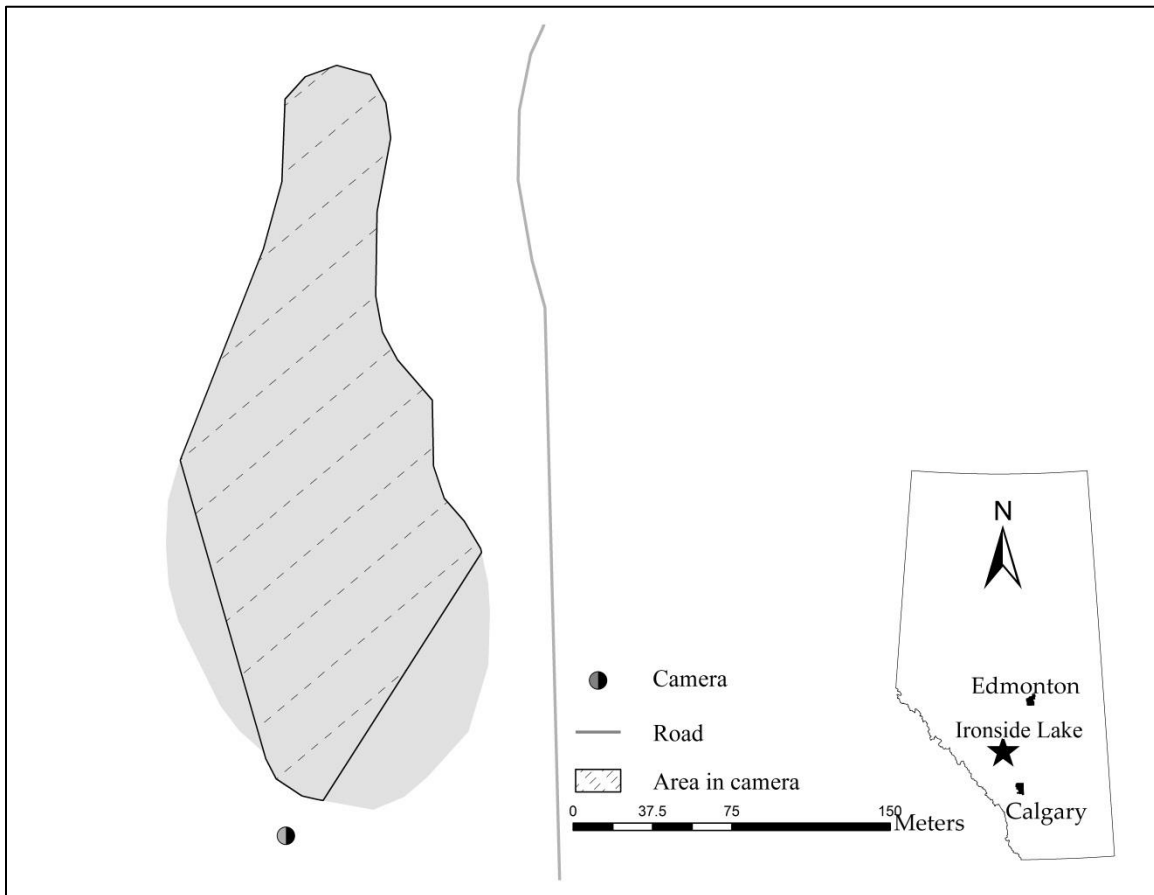


Figure 3. Map of Ironside Lake, Alberta. Shown are camera location, camera field of view, and local roads

3.0 MATERIALS AND METHODS

3.1 Angler interviews

We conducted a roving creel survey following a modified version of Pollock et al. (1994), during which seasonal creel staff visited each lake during morning (0800 – 1500 hours) and evening (1500 – 2200 hours) shifts, from 15 May to 31 August 2012. Survey effort was distributed over 12 morning and 12 evening shifts at Beaver Lake, 14 morning and 11 evening shifts at Fiesta Lake, and 13 morning and 9 evening shifts at Ironside Lake. Anglers were interviewed by creel staff upon the completion of their angling trip, and data on trip length and rainbow trout (harvested and released) was collected.

3.2 Camera-based creel parameter estimates

To increase sampling effort and reduce survey costs, we installed a digital trail camera (Reconyx PC900 Hyperfire) at each lake to estimate hourly angler count data from 0600 - 2200 hours daily (Figures 1, 2, and 3). Installed on the south shore of each lake and facing north to reduce sun glare in photos, cameras were attached to a tree at a serviceable height (approximately 3m) and locked to protect data. Data was offloaded from cameras and batteries life was assessed every two weeks.

To obtain greater precision, angling effort in the camera's field of view (FOV) was estimated for weekday (Monday – Friday) and weekend (Saturday, Sunday and holidays) strata separately. Two hundred photographs were randomly selected from both strata and the number of anglers in each photo was counted. Each photograph provided an instantaneous count of anglers on the lake, in the camera FOV. The camera counts were then bootstrapped to calculate the mean number of anglers/h from each stratum. To calculate the mean angling effort (h) in each stratum, the mean number of anglers/h was multiplied by the total number of hours in each stratum.

As each camera photographed only a portion of a lake, the camera-based estimates of angler effort were spatially corrected. To determine the spatial correction, creel staff performed instantaneous angler counts at the top of each hour during their shifts at each lake. During these counts, the number of anglers on the lake and the number of anglers inside the FOV were recorded. We used the ratio of the number of anglers within the

camera FOV to all the anglers on the lake, to extrapolate angler effort estimates to the whole lake.

Bootstrapped angler trip length data and the spatially corrected angler effort data were used to estimate mean and 95% confidence intervals (CI) for angler numbers during the survey period. Rainbow trout catch (harvested and released) was estimated using a total ratio estimate (Malvestuto 1983) of catch rate (total fish reported kept and released divided by total hours reported by anglers) and the spatially corrected angling hours. Catch at Beaver Lake was estimated for fish greater than and less than 40 cm TL, as current sportfishing regulations at Beaver Lake refer to a 40 cm TL fish harvest. At Fiesta and Ironside lakes, catch was estimated for fish greater than and less than 50 cm TL, as this refers to the quality stocked fishery objectives of AESRD. Estimates of creel survey parameters were calculated using the R software package (R Development Core Team, 2011).

4.0 RESULTS

4.1 Beaver Lake

At Beaver Lake, we interviewed 305 anglers, who reported fishing 975.5 angling-h. For the survey period, anglers made an estimated 2,777 angling trips (95% CI = 2,390 – 3,215) and fished for 8,666 angling-h (95% CI = 7,741 – 10,102) or 286 h/ha (95% CI = 250 – 326). Harvest rates for rainbow trout greater than 40 cm TL and less than 40 cm TL was 0.02 fish/h (n=17) and 0.01 fish/h (n=12), respectively and anglers harvested an estimated 264 (95% CI = 230 – 300) fish. Harvested fish had a mean TL of 391 mm (n=21) and a range of 265 – 481 mm (Figure 4). Reported release rates for fish greater than and less than 40 cm TL was 0.43 fish/h (n=416) and 0.09 fish/h (n=85), respectively and anglers released 4,547 rainbow trout (95% CI = 3,960 – 5,203). Of the anglers interviewed, 58% reported catching no fish and 22% reported catching 1 or 2 fish. A summary of angler effort and their catch is contained in Appendix 1.

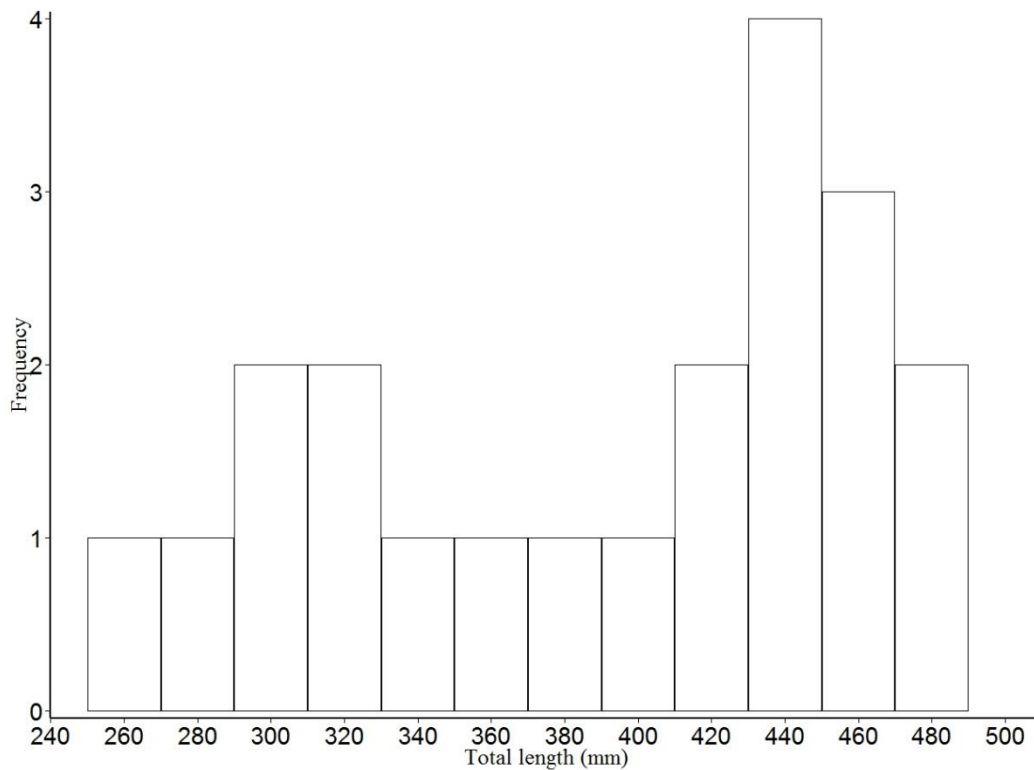


Figure 4. Total length frequency distribution of angler harvested rainbow trout at Beaver Lake, 2012.

4.2 Fiesta Lake

At Fiesta Lake, we interviewed 76 anglers, who reported fishing 279 angling-h. For the survey period, anglers made an estimated 489 angling trips (95% CI = 395 – 590) and fished for an estimated 1,791 angling-h (95% CI = 1,498 – 2,127) or 252 h/ha (95% CI = 210 – 299). Reported release rates for rainbow trout greater than and less than 50 cm TL was 0.63 fish/h (n=177) and 0.07 fish/h (n=20), respectively and anglers released 1,264 fish (95% CI = 1,057 – 1,501). Of the anglers interviewed, 30% reported catching no fish and 33% reported catching 1 or 2 fish. A summary of angler effort and their catch is contained in Appendix 2. No harvest of fish was observed at Fiesta Lake during the survey period.

4.3 Ironside Lake

At Ironside Lake, we interviewed 12 anglers, who reported fishing 40 angling-h. For the survey period, anglers made an estimated 331 angling trips (95% CI = 183 – 593) and fished for an estimated 1,059 angling-h (95% CI = 664 – 1,691) or 321 h/ha (95% CI = 201 – 512). Reported release rates for rainbow trout greater than and less than 50 cm TL was 0.60 fish/h (n=24) and 0.05 fish/h (n=2), respectively and anglers released 693 fish (95% CI = 434 – 1,105). Of the anglers interviewed, 58% reported catching no fish and 8% reported catching 1 or 2 fish. A summary of angler effort and their catch is contained in Appendix 3. No harvest of fish was observed at Ironside Lake during the survey period.

5.0 SUMMARY

Estimates of angling pressure were highest at Ironside Lake, lowest at Fiesta Lake, and pressure at all three lakes was similar to those reported by Patterson (2011), where the average angling pressure was 302 h/ha. Rainbow trout catch rates were highest at Fiesta Lake and lowest at Beaver Lake. At all three lakes, the majority of anglers reported catching fewer than two fish per angling trip.

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7.0 APPENDICES

Appendix 1. Summary of information collected from anglers during creel survey at Beaver Lake, 2012. RNTR = rainbow trout.

Date	Number of anglers	Fishing effort (h)	RNTR kept	RNTR kept <40cm (TL)	RNTR kept >40cm (TL)	RNTR released	RNTR released <40 cm (TL)	RNTR released >40 cm (TL)
15-May-12	6	38	0	0	0	37	27	10
16-May-12	10	30.25	3	2	1	3	2	1
20-May-12	65	237	5	3	2	143	111	32
21-May-12	11	36	1	1	0	25	24	1
28-May-12	3	13	0	0	0	14	7	7
31-May-12	9	24.75	5	2	3	32	27	5
4-Jun-12	9	41.5	1	1	0	49	45	4
5-Jun-12	4	11.75	0	0	0	5	4	1
6-Jun-12	0	0	0	0	0	0	0	0
14-Jun-12	6	10	0	0	0	10	10	0
15-Jun-12	4	4	0	0	0	0	0	0
19-Jun-12	14	24.25	2	2	0	6	6	0
26-Jun-12	3	4.5	0	0	0	3	3	0
28-Jun-12	16	58.5	1	1	0	27	23	4
30-Jun-12	52	146	2	1	1	25	24	1
10-Jul-12	8	29.25	1	0	1	27	21	6
11-Jul-12	12	33	0	0	0	5	4	1
16-Jul-12	9	43.5	5	2	3	16	15	1
23-Jul-12	2	2.75	0	0	0	1	1	0
24-Jul-12	2	7	0	0	0	4	2	2
29-Jul-12	39	123.75	1	0	1	31	28	3
30-Jul-12	4	4.25	0	0	0	1	1	0
6-Aug-12	4	10.5	0	0	0	7	5	2
9-Aug-12	9	27.5	1	1	0	17	15	2
13-Aug-12	4	14.5	1	1	0	13	11	2

Appendix 2. Summary of information collected from anglers during creel survey at Fiesta Lake, 2012. RNTR = rainbow trout.

Date	Number of anglers	Fishing effort (h)	RNTR released	RNTR released <50 cm (TL)	RNTR released >50 cm (TL)
18-May-12	0	0	0	0	0
19-May-12	3	6	2	0	1
22-May-12	0	0	0	0	0
29-May-12	9	37.75	33	0	2
30-May-12	6	26	18	0	2
13-Jun-12	7	20.5	6	0	1
16-Jun-12	0	0	0	0	0
20-Jun-12	5	16.75	34	0	3
25-Jun-12	5	12.5	15	0	2
27-Jun-12	7	19.25	10	0	0
13-Jul-12	3	11.5	6	0	1
14-Jul-12	7	24	15	0	1
15-Jul-12	8	32.5	16	0	2
18-Jul-12	0	0	0	0	0
27-Jul-12	0	0	0	0	0
28-Jul-12	0	0	0	0	0
8-Aug-12	2	8	8	0	1
11-Aug-12	2	4.5	1	0	0
14-Aug-12	1	5	3	0	0
15-Aug-12	2	6.5	7	0	2
23-Aug-12	5	21.5	3	0	0
28-Aug-12	1	6.5	6	0	0
18-May-12	3	20.25	14	0	2
19-May-12	0	0	0	0	0

Appendix 3. Summary of information collected from anglers during creel survey at Ironside Lake, 2012. RNTR = rainbow trout.

Date	Number of anglers	Fishing effort (h)	RNTR released	RNTR released <50 cm (TL)	RNTR released >50 cm (TL)
18-May-12	0	0	0	0	0
19-May-12	0	0	0	0	0
22-May-12	0	0	0	0	0
29-May-12	0	0	0	0	0
30-May-12	0	0	0	0	0
13-Jun-12	0	0	0	0	0
16-Jun-12	2	9.5	12	12	0
20-Jun-12	0	0	0	0	0
25-Jun-12	1	2	0	0	0
27-Jun-12	1	4.5	8	7	1
13-Jul-12	0	0	0	0	0
14-Jul-12	3	2.75	0	0	0
15-Jul-12	0	0	0	0	0
18-Jul-12	0	0	0	0	0
27-Jul-12	2	5.5	0	0	0
28-Jul-12	3	15.5	6	5	1
8-Aug-12	0	0	0	0	0
11-Aug-12	0	0	0	0	0
14-Aug-12	0	0	0	0	0
15-Aug-12	0	0	0	0	0
23-Aug-12	0	0	0	0	0
28-Aug-12	0	0	0	0	0

Alberta Conservation Association acknowledges the following partner for their generous support of this project:

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