

**Angler Survey of Single- and Multi-Species
Stocked Ponds in the Greater
Edmonton Area, 2015**

**CONSERVATION
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Alberta Conservation
Association

Conserving Alberta's Wild Side

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Angler Survey of Single- and Multi-Species Stocked Ponds in the
Greater Edmonton Area, 2015

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EXECUTIVE SUMMARY

During the summer of 2015, we assessed angler use and catch rates at three ponds near Edmonton, Alberta, that are stocked by Alberta Conservation Association as part of our Enhanced Fish Stocking project. Heritage Pond was stocked with rainbow trout (*Oncorhynchus mykiss*), and Beaumont and Morinville ponds were stocked with both rainbow and brown trout (*Salmo trutta*). Angler effort was estimated using digital trail cameras, and information on trip length and catch data was collected from angler interviews during roving creel surveys from May 1 to August 18. 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 Beaumont Pond, we estimated that anglers made 2,595 trips (95% CI = 2,161 – 3,115) and fished for 5,395 angling-h (95% CI = 4,690 – 6,239), with an angling pressure of 2,158 h/ha (95% CI = 1,875 – 2,495). The reported catch rates (harvested and released fish) were 0.95 rainbow trout/h and 0.06 brown trout/h. Anglers harvested an estimated 1,542 rainbow trout (95% CI = 1,340 – 1,783) and 48 brown trout (95% CI = 40 – 53), and released an estimated 3,562 rainbow trout (95% CI = 3,096 – 4,119) and 274 brown trout (95% CI = 240 – 317). Social questionnaire responses indicated that 94% of anglers were satisfied with fishing at this pond, and 56% fished this location because it was close to home.

At Morinville Fish and Game Pond, we estimated that anglers made 905 trips (95% CI = 676 – 1,215) and fished for 1,445 angling-h (95% CI = 1,123 – 1,891), with an angling pressure of 657 h/ha (95% CI = 511 – 860). The reported catch rates were 0.19 rainbow trout/h and 0.02 brown trout/h. Anglers harvested an estimated 41 rainbow trout (95% CI = 32 – 54) and released 227 rainbow trout (95% CI = 177 – 298) and 23 brown trout (95% CI = 18 – 30). Social questionnaire responses indicated that 75% of anglers were satisfied with fishing at this pond, and 70% fished this location because it was close to home.

At Heritage Pond, we estimated that anglers made 2,993 trips (95% CI = 2,121 – 4,239) and fished for 5,772 angling-h (95% CI = 4,224 – 8,061), with an angling pressure of 435 h/ha (95% CI = 321 – 607). The reported catch rate was 0.18 rainbow trout/h. Anglers harvested and released an estimated 724 (95% CI = 530 – 1,011) and 306 (95% CI = 224 –

428) rainbow trout, respectively. Social questionnaire responses indicated that 80% of anglers were satisfied with fishing at this pond, and 64% fished this location because it was close to home.

Key words: angler interviews, trail camera, creel survey, Beaumont Pond, Heritage Lake, Morinville Fish and Game Pond, stocked trout.

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1.0 INTRODUCTION

In 1994, Alberta Environmental Protection and Alberta Fish Farmers Association initiated the Enhanced Fish Stocking Program (EFSP) to supplement the existing government stocking program, provide private industry with market opportunities and provide larger trout for put-and-take ponds. In 1998, Alberta Conservation Association (ACA) assumed responsibility for delivering the EFSP, hereafter referred to as Enhanced Fish Stocking (EFS), with the objective of providing increased angling opportunities to Albertans by stocking catchable-sized (≥ 20 cm) rainbow trout (*Oncorhynchus mykiss*) in the white zone of Alberta into ponds that frequently winterkill. ACA currently stocks 61 ponds and continues to explore opportunities for new stocking sites. Most stockings occur east of Highway 2 in put-and-take waterbodies that frequently winterkill. All waterbodies are outside the green zone to prevent interaction with native stocks.

In 2015, ACA expanded EFS to include the stocking of brown trout (*Salmo trutta*) into seven ACA stocked ponds, in addition to annually stocked rainbow trout. Brown and rainbow trout tend to use different food sources, making them compatible in the same waterbody (Lucas 1993). Brown trout are more challenging to catch than rainbow trout, thereby providing anglers with a diverse fishing experience (Nelson and Paetz 1992). Furthermore, because of their elusive nature, brown trout are better able to sustain a high-pressure fishery throughout the season and, if able to overwinter, grow into larger fish for future seasons (Nelson and Paetz 1992).

ACA began evaluating the success of EFS activities in the mid-2000s to determine if the angling public is accessing and enjoying fishing at stocked ponds and to quantify fish survival over the angling season. In 2015, ACA continued these efforts, assessing angling effort and catch and harvest rates at three stocked ponds: Beaumont, Morinville Fish and Game (hereinafter referred to as Morinville) and Heritage. All three ponds are near Edmonton, making them popular destinations for anglers. Heritage was stocked with rainbow trout, whereas Beaumont and Morinville were stocked with both rainbow and brown trout and provided the first opportunity to examine angling effort and catch and harvest rates in ponds stocked with multiple species.

2.0 STUDY AREA

Beaumont, Morinville and Heritage ponds (Figure 1) are easily accessible from a highway and provide ample parking and shoreline access. All three ponds have the same sport fishing regulations, with a maximum bag limit of five trout.

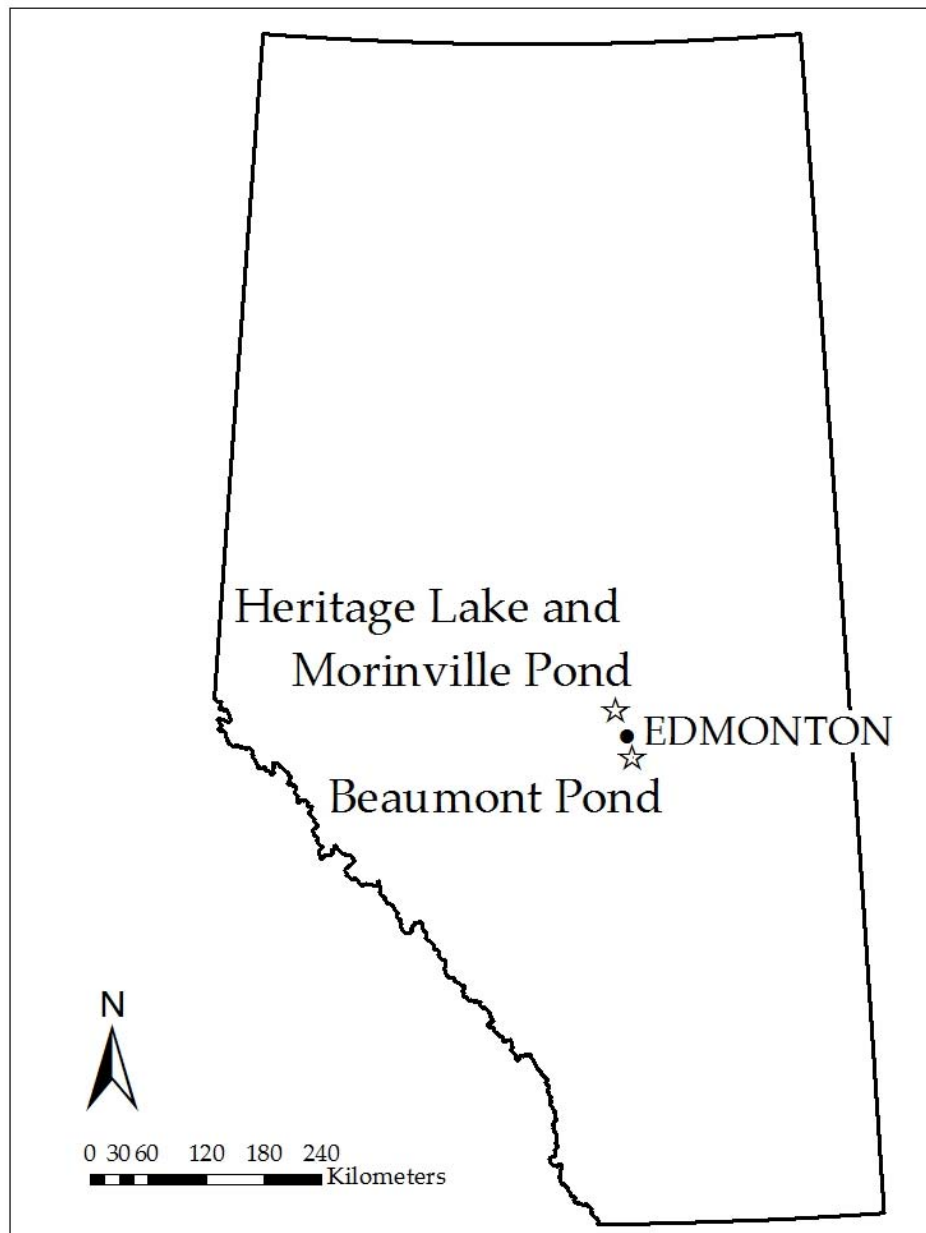


Figure 1. Location of Beaumont, Morinville (Fish and Game) and Heritage fish ponds.

2.1 Beaumont Pond

Beaumont Pond (UTM 12U, 338296, 5913642) is located in the town of Beaumont, approximately 10 km southeast of Edmonton. It has a surface area of 2.5 ha and a maximum depth of 8.3 m (Figure 2). It was stocked with 2,500 rainbow trout on April 28 and 1,000 brown trout on May 5, 2015.

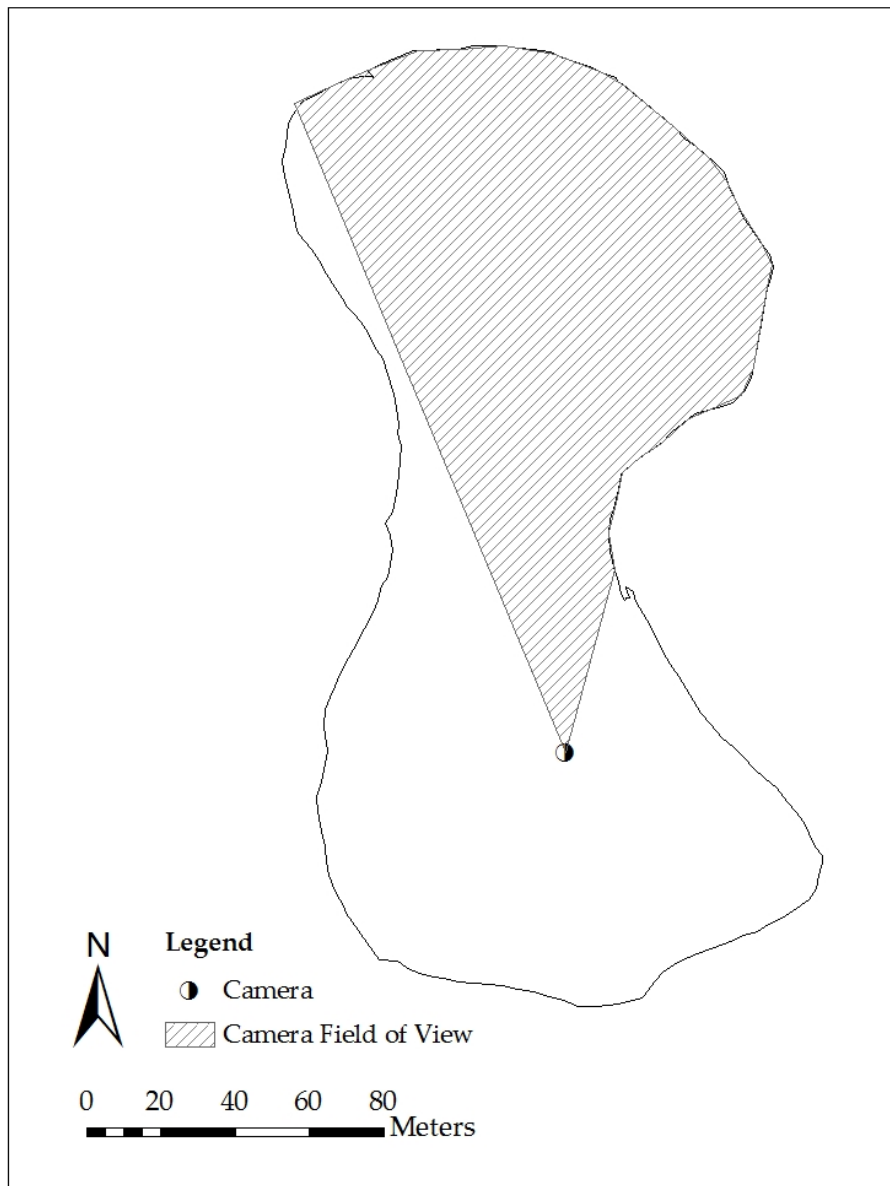


Figure 2. Map of Beaumont Pond in Alberta showing camera location and field of view.

2.2 Morinville Fish and Game Pond

Morinville Fish and Game Pond (UTM 12U, 325014, 5965799) is located within the town of Morinville, approximately 40 km north of Edmonton. The pond has a surface area of 2.2 ha and a maximum depth of 16.6 m (Figure 3). It was stocked with 1,250 rainbow trout on May 5 and 600 brown trout on May 7, 2015.

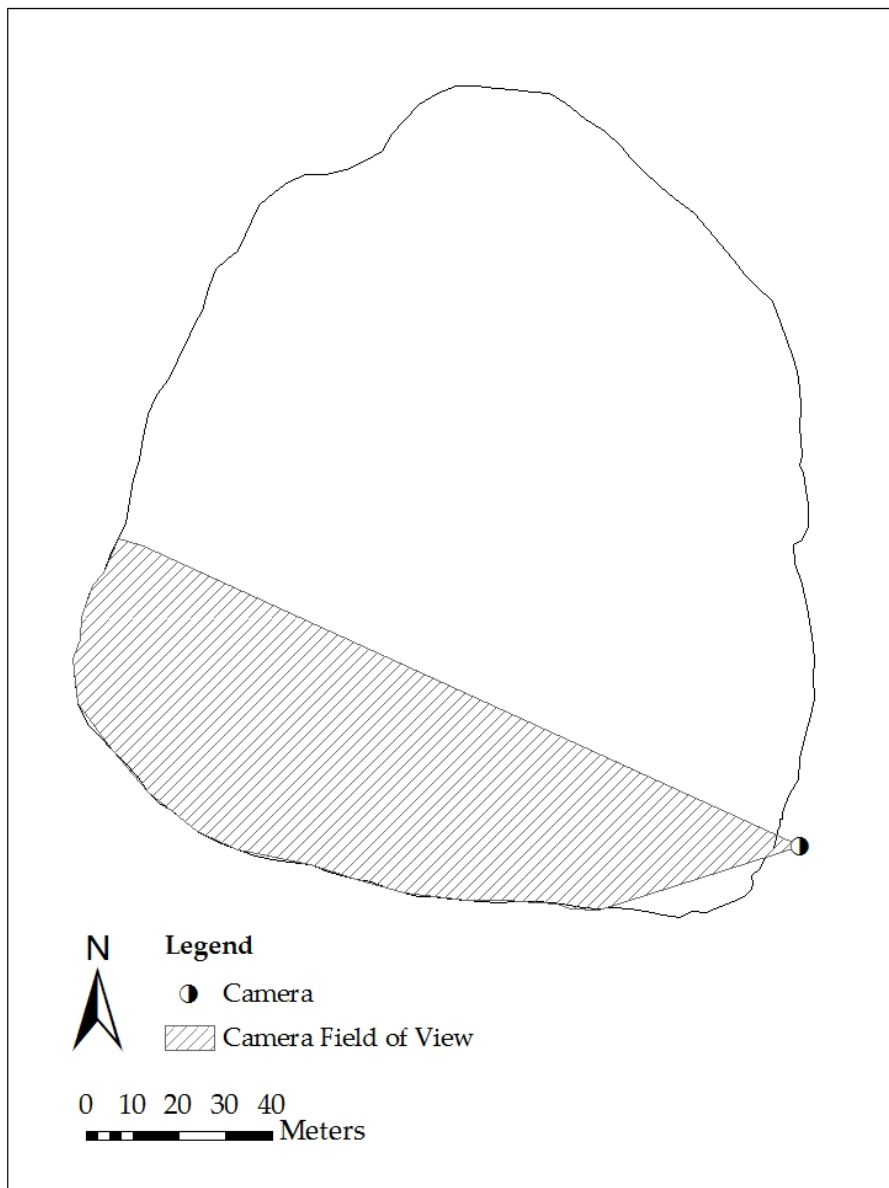


Figure 3. Map of Morinville Fish and Game Pond in Alberta showing camera location and field of view.

2.3 Heritage Lake

Heritage Lake (UTM 12U, 324493, 5964298) is located less than 1 km west of Morinville. The lake has a surface area of 13.3 ha and a maximum depth of 7.0 m (Figure 4). It was stocked with 2,500 rainbow trout on May 5 and another 2,500 rainbow trout on June 5, 2015.

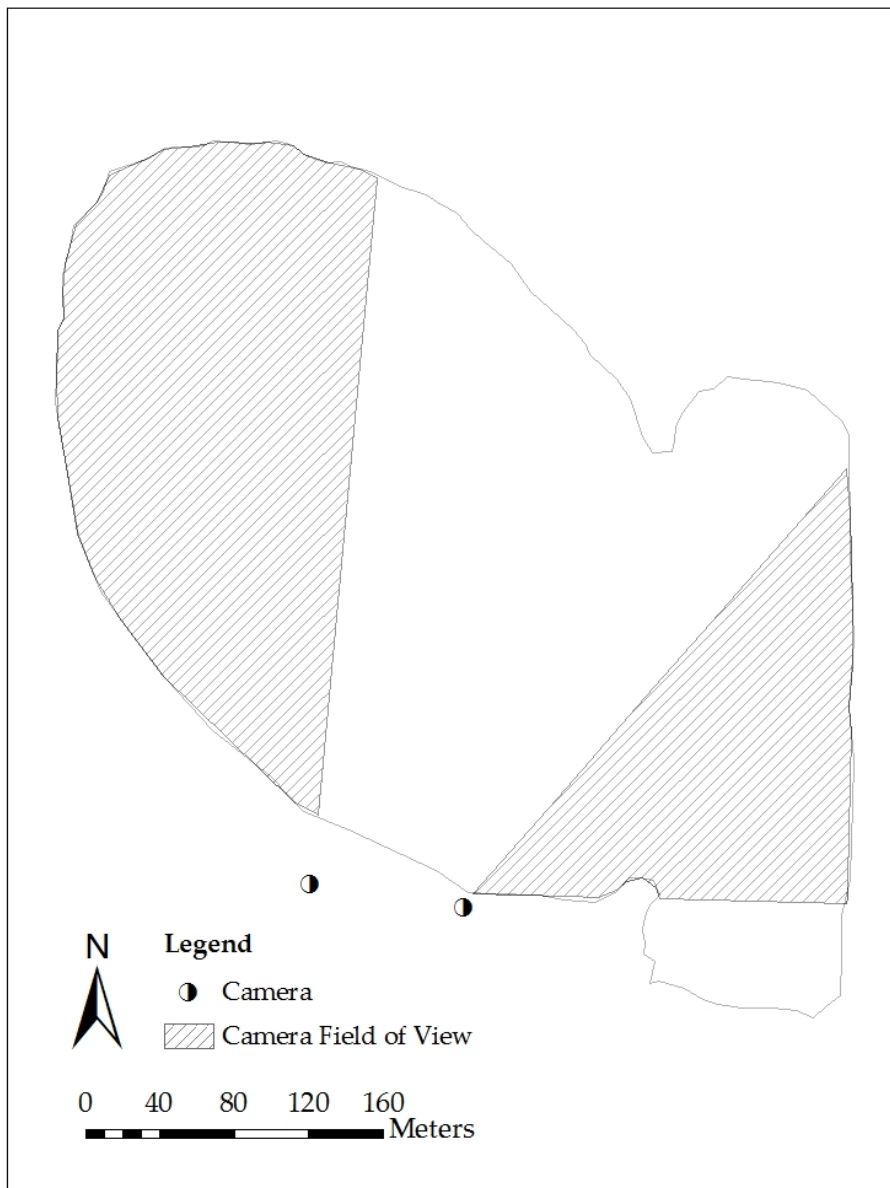


Figure 4. Map of Heritage Lake in Alberta showing camera locations and fields of view.

3.0 MATERIALS AND METHODS

3.1 Creel survey

We conducted a roving creel survey following a modified version of Pollock et al. (1994), during which seasonal creel staff visited waterbodies from May 12 to July 25, 2015. Shifts were distributed randomly between morning (9:00 – 15:00) and afternoon (15:00 – 22:00), with equal coverage between ponds. Anglers were interviewed by creel staff upon the completion of their angling trips, and data on trip length and trout captured (harvested and released) were collected to estimate total angling hours and fish harvest and release rates at each waterbody.

3.2 Camera-based creel parameter estimates

We installed digital trail cameras (Reconyx PC900 Hyperfire) at each pond (Figures 2, 3 and 4) programmed to take a photo hourly from May 1 to August 18, 2015, from 8:00 to 22:00 hours daily (ranging from 1,624 to 1,638 hours in the creel period). A second camera was added at Heritage Lake on June 29 and took hourly photos until August 18. Cameras were attached to a post or structure at a serviceable height (approximately 3 m) and locked to protect data. Although the camera at Morinville Fish and Game covered a small fraction of the total pond area (Figure 3), its location was chosen as a result of both limited options for installation and the camera's ability to capture the two primary areas used by anglers. Data were downloaded from cameras and battery life was assessed approximately every two weeks.

In-camera angling effort was estimated for weekday (Monday to Friday) and weekend (Saturday, Sunday and holidays) strata separately. In each hourly photo, the number of anglers was counted, providing an instantaneous count of anglers on the lake, within the camera field of view (FOV). Counting anglers in each photo was streamlined using Timelapse software (Greenberg 2016). Photos that did not allow anglers to be counted (e.g., where fog, glare or insufficient light obscured the view) were excluded from the analysis. Each photograph provided an instantaneous count of anglers on the pond, within the camera FOV. Camera counts were then bootstrapped (10,000 replicates), producing a distribution of mean counts, which when multiplied by the total number of

hours in the survey period gave a distribution of mean effort (h) in the camera FOV during the survey period.

Because each camera photographed only a portion of a lake (1.2, 0.6 and 6.9 ha at Beaumont, Morinville and Heritage ponds, respectively), 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 pond. During these counts, the number of anglers on the pond and the number of anglers inside the camera FOV were recorded. We used the ratio of the number of anglers within the camera FOV to the number of all anglers on the pond to extrapolate angler effort estimates to the whole pond.

Bootstrapped angler trip length data and the spatially corrected angler-effort camera data were used to estimate mean and 95% confidence intervals 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. Estimates of creel survey parameters were calculated using the R software package (R Core Team 2015).

3.3 Angler social questionnaire

In addition to the creel survey, a subset of anglers was also asked to complete a questionnaire designed to assess angler satisfaction with the stocked waterbody and to gain insights related to their fishing experience. We used a simple question-and-answer format to minimize biases caused by misinterpretation by respondents or seasonal staff conducting the survey (Appendix 1). Anglers were asked to indicate their satisfaction with catch rates and the size of fish caught using a five-point Likert scale (Likert 1932) (i.e., very satisfied, satisfied, neutral, unsatisfied, very unsatisfied). The survey also asked anglers to indicate why they decided to fish the pond (i.e., attributes of fishing site) and whether they knew what species of fish were stocked in the pond.

4.0 RESULTS

4.1 Beaumont Pond

At Beaumont, we interviewed 146 anglers, who reported fishing for 306.5 angling-h (Appendix 2). For the survey period, anglers made an estimated 2,595 trips (95% CI = 2,161 – 3,115) and fished for 5,395 angling-h (95% CI = 4,690 – 6,239), with a fishing pressure of 2,158 h/ha (95% CI = 1,875 – 2,495). Anglers caught an estimated 5,103 rainbow trout (95% CI = 4,435 – 5,901) at a rate of 0.95 rainbow trout/h and 319 brown trout (95% CI = 278 – 369) at a rate of 0.06 brown trout/h. In total, anglers harvested an estimated 1,542 rainbow trout (95% CI = 1,340 – 1,783) and 48 brown trout (95% CI = 40 – 53), with corresponding harvest rates of 0.29 fish/h (n = 146) and 0.0085 fish/h (n = 75), respectively. Of the fish stocked into Beaumont, 62% (n = 2,500) of rainbow trout and 5% (n = 1,000) of brown trout are estimated to have been harvested by anglers. Anglers released 3,562 rainbow trout (95% CI = 3,096 – 4,119) and 274 brown trout (95% CI = 240 – 317), with a reported release rate of 0.66 fish/h (n = 146) and 0.051 fish/h (n = 75), respectively. Of the 146 anglers interviewed, 56% reported catching one or more fish. Of those anglers who caught fish, less than 1% caught brown trout. Based on responses by 31 anglers to the social questionnaire, 94% of anglers were satisfied with their fishing experience. Anglers were motivated to fish Beaumont due to its proximity to their homes (Figure 5).

BEAUMONT POND

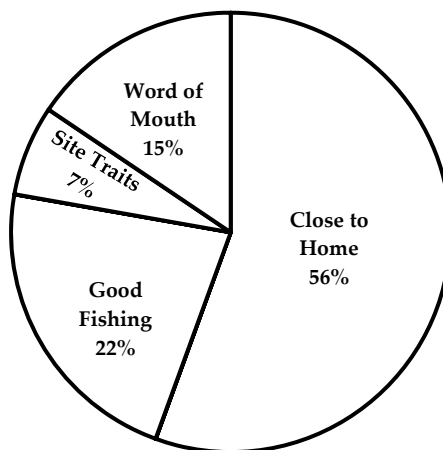


Figure 5. Angler responses to creel questionnaire that asked "Why did you decide to fish this pond?" at Beaumont Pond, 2015.

4.2 Morinville Fish and Game Pond

At Morinville, we interviewed 89 anglers, who reported fishing 143.25 angling-h (Appendix 3). For the survey period, anglers made an estimated 905 trips (95% CI = 676 – 1,215) and fished for 1,445 angling-h (95% CI = 1,123 – 1,891), with a fishing pressure of 657 h/ha (95% CI = 511 – 860). Anglers caught an estimated 269 rainbow trout (95% CI = 208 – 351) at a rate of 0.19 rainbow trout/h and 23 brown trout (95% CI = 18 – 30) at a rate of 0.02 brown trout/h. Anglers harvested an estimated 41 (95% CI = 32 – 54) rainbow trout, with a harvest rate of 0.03 fish/h (n = 87). Anglers did not report harvesting any brown trout. Of the fish stocked into Morinville, 3% (n = 1,250) of rainbow trout are estimated to have been removed by angler harvest. Anglers reported releasing 227 rainbow trout (95% CI = 177 – 298) and 23 brown trout (95% CI = 18 – 30) at rates of 0.16 fish/h and 0.016 fish/h, respectively. Of the 89 anglers interviewed, 14% reported catching one or more fish. Based on responses by 16 anglers to the social questionnaire, 75% of anglers were satisfied with their fishing experience. Anglers were motivated to fish Morinville due to its proximity to their homes (Figure 6).

MORINVILLE FISH AND GAME POND

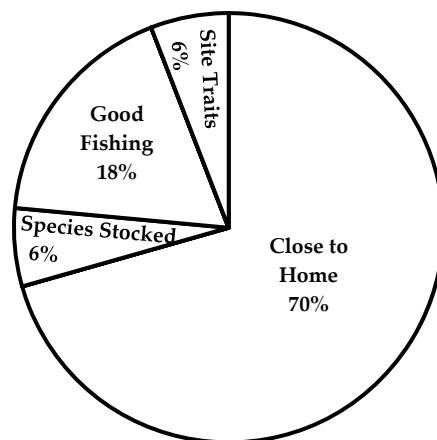


Figure 6. Angler responses to creel questionnaire that asked "Why did you decide to fish this pond?" at Morinville Fish and Game Pond, 2015.

4.3 Heritage Lake

At Heritage, we interviewed 107 anglers, who reported fishing 207.25 angling-h (Appendix 4). For the survey period, anglers made an estimated 2,993 trips (95% CI = 2,121 – 4,239) and fished for 5,772 angling-h (95% CI = 4,224 – 8,061), with a fishing pressure of 435 h/ha (95% CI = 321 – 607). Anglers caught an estimated 1,033 rainbow trout (95% CI = 762 – 1,441) at a rate of 0.18 rainbow trout/h. Anglers harvested an estimated 724 rainbow trout (95% CI = 530 – 1,011) at a rate of 0.13 fish/h (n = 107). Of the 5,000 rainbow trout stocked into Heritage, 14% were estimated to have been removed by angler harvest. Anglers reported releasing 306 rainbow trout (95% CI = 224 – 428) at a rate of 0.053 fish/h (n = 107). Of the 107 anglers interviewed, 19% reported catching one or more fish. Based on responses by 20 anglers to the social questionnaire, 80% of anglers were satisfied with their fishing experience. Anglers were motivated to fish Heritage due to its proximity to their homes (Figure 7).

HERITAGE LAKE

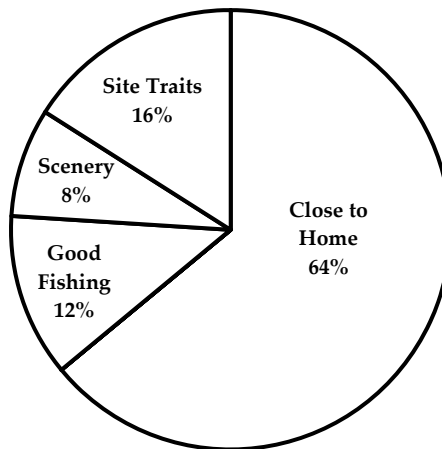


Figure 7. Angler responses to creel questionnaire that asked "Why did you decide to fish this pond?" at Heritage Lake, 2015.

5.0 SUMMARY

Angling pressure was highest at Beaumont and lowest at Heritage. Conversely, Heritage had the highest total number of angling trips and angling hours over the study period. Rainbow trout catch rates were highest at Beaumont and lowest at Heritage. At Beaumont and Morinville ponds (both stocked with brown trout), brown trout catch rates were considerably lower than those for rainbow trout.

Overall, angling pressure was high on all three EFS ponds, indicating their popularity among the angling public. Although Beaumont and Morinville were stocked with multiple species, most fish captured were rainbow trout; very few brown trout were caught. Similar to our previous findings, anglers indicated being satisfied with their fishing experience and chose to fish these EFS ponds primarily due to their convenient proximity to home.

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7.0 APPENDICES

Appendix 1. Angler questionnaire form.

Waterbody: _____ **Date:** _____

1. This year, how many trips have you made to this pond? _____
2. How many trips did you make to this pond last year? _____
3. Will you fish this pond again this year? YES NO
4. Are you satisfied with the fishing at this pond? YES NO
5. Are you satisfied with the access, parking, and other facilities at this pond?
YES NO
6. How do you feel about the numbers of fish you are catching?
A) Very satisfied B) Satisfied C) Neutral D) Unsatisfied E) Very unsatisfied
7. How do you feel about the sizes of fish you are catching?
A) Very satisfied B) Satisfied C) Neutral D) Unsatisfied E) Very unsatisfied
8. Why did you decide to fish this pond?
A. ___Number of fish stocked ___Species of fish stocked ___Good fishing
B. ___Close to home (City/Town _____) ___Scenery
C. ___Found it in the *Discovery Guide* ___Other – Please list: _____
9. Do you know what species of fish are stocked in this lake? YES NO
If yes, what species? _____
10. Do you know who stocks this lake with fish? YES NO
(Who _____)
11. How do you categorize yourself as an angler?
A) Rarely go fishing B) Family-oriented C) Recreational D) Avid E) New Angler
12. What age group are you in (circle one)? 20 20–24 25–34 35–44 45–54 55–64 65+
13. Do you require a fishing licence? YES NO
If no, why? _____
14. What would you change about the fishing at this lake?
A) Nothing B) Increase numbers of trout C) Increase size of trout D) Improve services E) Other – Please clarify _____

Comments

Appendix 2. Summary of information collected from anglers during the creel survey at Beaumont Pond, 2015. RNTR = rainbow trout; BNTR = brown trout.

Date (y/m/d)	Number of anglers	Fishing effort (h)	RNTR kept	RNTR released	BNTR kept	BNTR released
2015/05/12	7	17.5	0	1	0	0
2015/05/12	7	17.5	0	1	0	0
2015/05/15	20	71.25	15	31	0	0
2015/05/15	20	71.25	15	31	0	0
2015/05/19	22	51.5	11	95	0	3
2015/05/19	22	51.5	11	95	0	3
2015/05/31	28	55.5	13	37	0	2
2015/05/31	28	55.5	13	37	0	2
2015/06/01	2	3	1	0	1	0
2015/06/01	2	3	1	0	1	0
2015/06/02	6	15	6	15	0	0
2015/06/02	6	15	6	15	0	0
2015/06/03	2	5	4	5	0	0
2015/06/03	2	5	4	5	0	0
2015/06/09	4	10.5	8	0	0	0
2015/06/09	4	10.5	8	0	0	0
2015/06/13	11	13.5	10	6	0	0
2015/06/16	8	13.25	15	5	0	1
2015/06/23	8	10	0	4	0	0
2015/06/24	8	13	4	1	0	0
2015/07/08	1	1.5	0	0	0	0
2015/07/09	9	10.5	0	0	0	0
2015/07/14	1	1	0	0	0	0
2015/07/24	4	5	0	1	0	0
2015/07/25	5	7.5	0	0	0	0

Appendix 3. Summary of information collected from anglers during the creel survey at Morinville Fish and Game Pond, 2015. RNTR = rainbow trout; BNTR = brown trout.

Date (y/m/d)	Number of anglers	Fishing effort (h)	RNTR kept	RNTR released	BNTR kept	BNTR released
2015/05/16	6	5.5	0	0	0	0
2015/05/17	32	61	1	5	0	2
2015/05/18	7	8.25	0	2	0	0
2015/05/28	2	1	0	0	0	0
2015/05/29	1	2	0	0	0	0
2015/06/11	1	1	0	2	0	0
2015/06/12	8	13.25	3	13	0	0
2015/06/15	2	4.5	0	0	0	0
2015/06/30	6	11	0	0	0	0
2015/07/11	12	21.75	0	0	0	0
2015/07/21	6	6.5	0	0	0	0
2015/07/25	4	4	0	0	0	0

Appendix 4. Summary of information collected from anglers during the creel survey at Heritage Lake, 2015. RNTR = rainbow trout; BNTR = brown trout.

Date (y/m/d)	Number of anglers	Fishing effort (h)	RNTR kept	RNTR released	BNTR kept	BNTR released
2015/05/14	3	1.5	0	0	0	0
2015/05/30	4	6.5	0	0	0	0
2015/06/10	11	16	3	1	0	0
2015/06/14	19	33.25	1	2	0	0
2015/06/25	5	4	0	0	0	0
2015/06/27	5	17	10	4	0	0
2015/06/28	8	21	6	0	0	0
2015/06/29	7	11	0	1	0	0
2015/07/07	4	6.5	2	0	0	0
2015/07/12	12	16	0	1	0	0
2015/07/22	4	8.75	2	1	0	0
2015/07/25	25	65.75	2	1	0	0

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