

**Owl River Fish Community, Aquatic
Habitat Assessment, and Riparian
Enhancement 2022: Supplement to the
2021 Owl River Riparian Restoration and
Enhancement Project Report**



wildlife | fish | habitat

**ACA PROJECT
REPORT**

**Owl River Fish Community, Aquatic Habitat Assessment,
and Riparian Enhancement 2022:
Supplement to the 2021 Owl River Riparian Restoration and
Enhancement Project Report**

Lindsay Dowbush, Lance Engley, and Mike Rodtka
Alberta Conservation Association
#101, 9 Chippewa Road
Sherwood Park, Alberta, Canada T8A 6J7



Report Editors

PETER AKU

Alberta Conservation Association
#101, 9 Chippewa Rd.
Sherwood Park, AB T8A 6J7

SUE PETERS

Alberta Conservation Association
#101, 9 Chippewa Rd.
Sherwood Park, AB T8A 6J7

ISBN:

978-1-989448-19-9

ACA Project Report Type:

Final

Reproduction and Availability:

This report and its contents may be reproduced in whole, or in part, provided that this title page is included with such reproduction and/or appropriate acknowledgements are provided to the authors and sponsors of this project.

Suggested Citation:

Dowbush, L., L. Engley, and M. Rodtka. 2023. Owl River fish community, aquatic habitat assessment, and riparian enhancement 2022: Supplement to the 2021 Owl River riparian restoration and enhancement project monitoring report. ACA Project Report: Final, produced by Alberta Conservation Association, Sherwood Park, Alberta, Canada. 15 pp + App.

Cover photo credit:

ACA, Erin VanderMarel

Digital copies of conservation reports can be obtained from:

Alberta Conservation Association
#101, 9 Chippewa Rd.
Sherwood Park, AB T8A 6J7
Toll Free: 1-877-969-9091
Tel: 780-410-1999
Email: info@ab-conservation.com
Website: www.ab-conservation.com

EXECUTIVE SUMMARY

Syncrude Canada Ltd. (Syncrude) recently proposed to expand its operations at the Mildred Lake site, collectively described as the Mildred Lake Extension Project (MLX). The Owl River Project, described herein, is one of two Department of Fisheries and Oceans (DFO) authorized offsets for the MLX Project. This MLX offset builds on related habitat offset and restoration activities already conducted on the Owl River by Alberta Conservation Association (ACA) on behalf of Syncrude from 2011–2017 for the Base Mine Lake Project.

To satisfy requirements of the DFO authorization, Syncrude is required to conduct monitoring on several attributes of the Owl River: i) riparian habitat; ii) water quality and instream habitat; iii) macroinvertebrates; and iv) resident and migratory fish. In 2021, ACA, on behalf of Syncrude conducted surveys to address these requirements. However, due to abnormally low water levels in 2021, we deferred the fish community and aquatic habitat assessment to 2022. In this supplemental report, we present results from the 2022 fish community and habitat surveys, as well as updates on riparian enhancement and livestock exclusion areas. Our study area extended 46 km upstream from the mouth of the Owl River at Lac La Biche and included portions of two tributary streams of the Piche River and Square Creek.

The fish community in the Owl River system during our survey consisted of five species: walleye (*Sander vitreus*), white sucker (*Catostomus commersonii*), yellow perch (*Perca flavescens*), northern pike (*Esox Lucius*), and burbot (*Lota lota*). Walleye was the most abundant species, occurring at all sampling sites along the Owl River but not on the Piche River site. Yellow perch and white sucker occurred along much of the length of the Owl River, as well as the Piche River; northern pike occurred sporadically within the study area. Four of the 134 fish captured (two walleye and two white suckers) had tumours or lesions. The three most abundant species, walleye, white sucker, and yellow perch, ranged in size from 58 to 627 mm, 36 to 477 mm, and 33 to 135 mm, respectively; sampled individuals of all three species exhibited good condition ($K > 1.0$). Fish community composition and aquatic habitat information generated through this project will be used as a baseline for monitoring of potential outcomes of restoration and protection of degraded riparian zones along the river. Dominant substrate was large gravel in the most upstream site and transitioned to sand, then fines as sites progressed downstream. Instream fish habitat cover was mostly due to a combination of turbid waters and aquatic vegetation.

In 2022, we contacted all eleven landholders in the Owl River Project area. We signed three new 25-year Riparian Habitat Enhancement Agreements. Combined, these new agreements protect 79.63 hectares (ha) of riparian habitat and 7.37 km of riverbank along the Owl River, bringing the total protected riparian habitat to 104.93 ha and total protected riverbank to 11.74 km since this project was initiated in the fall of 2020.

Key words: Owl River, Piche River, fish community, walleye, white sucker, yellow perch, fish habitat, Lac la Biche, riparian habitat, riparian enhancement.

ACKNOWLEDGEMENTS

This work was funded by Syncrude Canada Ltd. Our work would not have been possible without the support of local leaseholders, Shane Petry (Government of Alberta), the County of Lac La Biche and private landowners who kindly provided access to their lands. We thank Jason Blackburn, Stefanie Fenson, Brad Hurkett, Chad Judd, Troy Furukawa, Garret McKen, Terri Perron, and Mike Rodtka (ACA staff) for their contributions to the project.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
ACKNOWLEDGEMENTS	iv
LIST OF FIGURES	vii
LIST OF TABLES	viii
LIST OF APPENDICES.....	ix
1.0 INTRODUCTION.....	1
2.0 STUDY AREA.....	2
3.0 MATERIALS AND METHODS	4
3.1 Fish community assessment	4
3.2 Aquatic habitat assessment.....	5
3.3 Land tenure negotiations	5
4.0 RESULTS.....	6
4.1 Fish community	6
4.2 Aquatic habitat	9
4.3 Land tenure negotiations	10
5.0 DISCUSSION.....	14
6.0 LITERATURE CITED.....	15
7.0 APPENDICES.....	16

LIST OF FIGURES

Figure 1.	Owl River system study area showing 2022 fish sampling and aquatic habitat monitoring locations. Site naming and numbering sequence reflects legacy sites from the 2011–2017 monitoring project.....	3
Figure 2.	Length frequency distributions of the three most abundant fish species captured during the Owl River fish community survey, 2022.....	7
Figure 3.	Condition factor (K) for the three most abundant fish species captured during the Owl River fish community surveys, 2022	8
Figure 4.	RCP-NE-003: 34.49 ha riparian, 1.32 ha upland, 1.41 km riverbank. Enhancements – none.....	11
Figure 5.	RCP-NE-004: 14.93 ha riparian, 0.14 ha upland, 1.40 km riverbank. Enhancements – Permanent fencing, electric fencing, mower, and off-site watering unit	12
Figure 6.	RCP-NE-005: 30.21 ha riparian, 4.56 km riverbank. Enhancements – none	13

LIST OF TABLES

Table 1. Relative abundance (catch-per-unit-effort [CPUE]) of fish in the Owl River while electrofishing in August 2022 6

Table 2. Habitat characteristics for the Owl and Piche rivers in 2022..... 9

Table 3. In-situ water quality measurements taken during fish community and aquatic habitat assessments on the Owl River in August 2022 10

LIST OF APPENDICES

Appendix 1.	Fish captured at study sites on the Owl River system using electrofishing (boat and backpack), August 16–19, 2022, including species, fork length, weight, and condition of each fish.....	16
Appendix 2a.	Physical characteristics, water quality and fish cover from habitat assessment on the Owl and Piche rivers in August 2022.	20
Appendix 2b.	Bank characteristics from habitat assessments on the Owl and Piche rivers in August 2022.....	21
Appendix 2c.	Depth and substrate profile from habitat assessments on the Owl and Piche rivers in August 2022.....	21
Appendix 3.	Site and sampling photos taken during the 2022 Owl River fish community and aquatic habitat assessment.	22

1.0 INTRODUCTION

Syncrude Canada Ltd. (Syncrude) has proposed to expand its operations at the Mildred Lake site, collectively described as the Mildred Lake Extension Project (MLX) (Syncrude 2019). The Owl River Project, described herein, is one of two Department of Fisheries and Oceans (DFO) authorized offsets for the MLX project (Authorization 14-HCAA-00569). This MLX offset builds on related habitat offset and restoration activities already conducted on the Owl River by Alberta Conservation Association (ACA) on behalf of Syncrude from 2011–2017 for the Base Mine Lake project.

The target section of the Owl River is classified by Alberta Environment and Protected Areas as a Class A watercourse (ASRD et al. 2007), as it is considered a primary spawning river for walleye (*Sander vitreus*) (Syncrude 2019). Restoring and protecting degraded riparian zones along the 30-km section of the Owl River between Lac La Biche and the upstream spawning habitats, and the associated improvements in fish habitat and water quality, provides an excellent opportunity to support provincial walleye population recovery efforts in the Lac La Biche basin. By fencing areas surrounding the 30-km section to eliminate livestock grazing and clearing activities within and/or adjacent to the watercourse, riparian and instream habitat is anticipated to improve (Syncrude 2019).

To satisfy DFO requirements, Syncrude is required to conduct monitoring on the Owl River for 25 years, starting in 2020 and focusing on several attributes: i) riparian habitat; ii) water quality and instream habitat; iii) macroinvertebrates; and iv) resident and migratory fish. In 2021, ACA, on behalf of Syncrude, conducted surveys to address these requirements. The 2021 study had three primary components:

- Characterize the overall riparian health along the Owl River system using aerial videography and riparian quality index;
- Monitor aquatic habitat characteristics, including water quality, instream habitat, macroinvertebrates, and fish community;
- Work with government agencies and landholders to protect and enhance riparian areas along the 30-km section of the Owl River between Lac La Biche and the upstream spawning habitats.

However, due to abnormally low water levels in 2021, we deferred the fish community and aquatic habitat assessment to 2022. In this supplementary report, we present results from the 2022 fish community and aquatic habitat surveys, as well as updates on riparian enhancement and livestock exclusion areas.

2.0 STUDY AREA

The Owl River is located 220 km northeast of Edmonton in the Lac La Biche sub-basin. It is the major inlet to Lac La Biche, draining an area of 3,364 km², with the Piche River and Square Creek as major tributaries (Figure 1). The Owl River is one of only 60 Class A watercourses in the province. These are critical fish habitat protection areas designated by the *Water Act* Codes of Practice (ASRD et al. 2007, AEP 2016). Our study area starts at the mouth of the Owl River with Lac La Biche and extends approximately 46 km upstream of the river, including sections of Piche River and Square Creek. The study area is composed of two sections: the uppermost 16-km section (starting at Site 9-W), which includes identified walleye spawning habitat, and the downstream 30-km section, which runs through grazing leases interspersed with stretches of private land, most of which support livestock grazing (see Syncrude 2019).

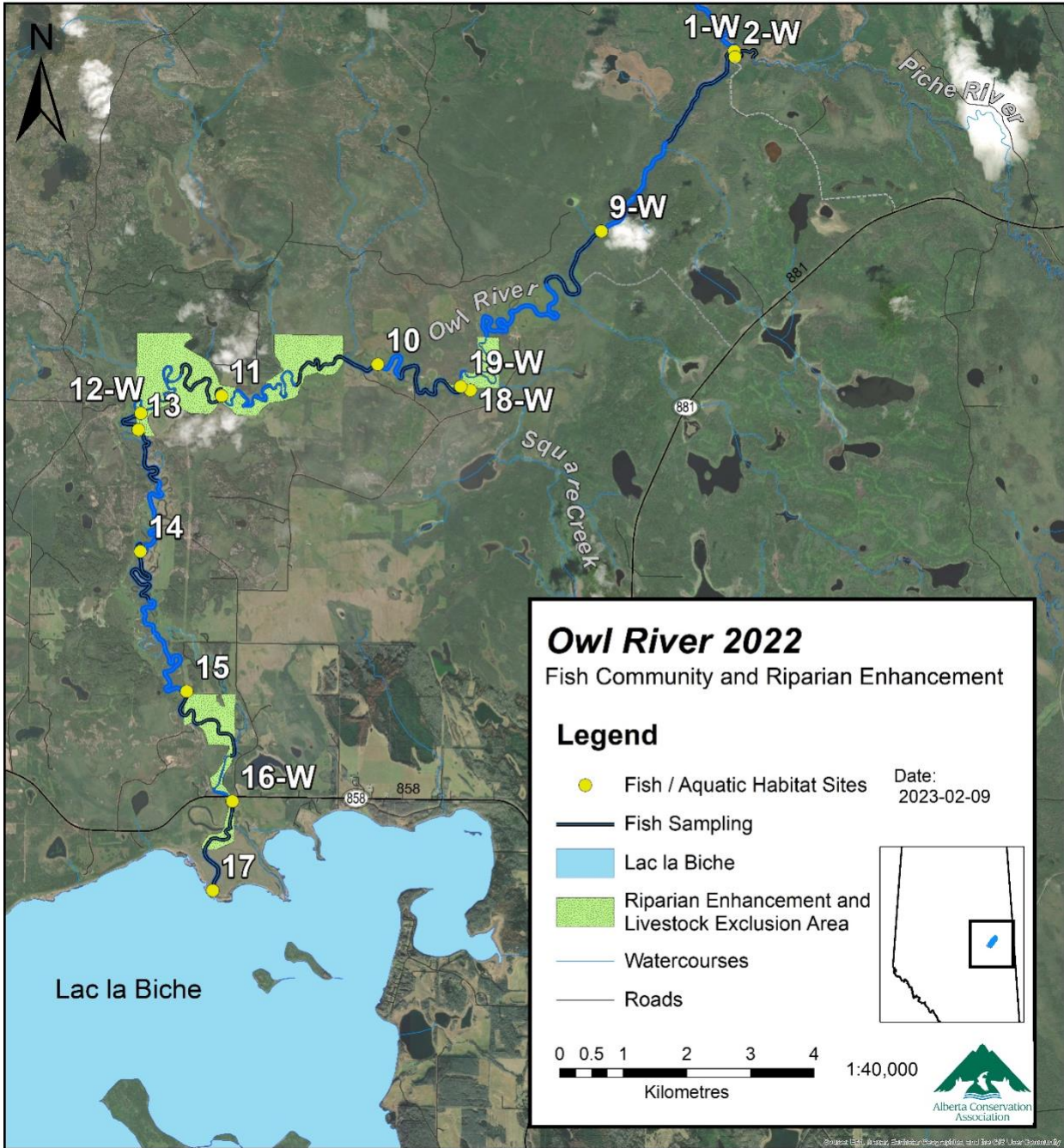


Figure 1. Owl River system study area showing 2022 fish sampling and aquatic habitat monitoring locations. Site naming and numbering sequence reflects legacy sites from the 2011–2017 monitoring project.

3.0 MATERIALS AND METHODS

3.1 Fish community assessment

ACA staff sampled on the Owl River system using electrofishing gear and minnow-traps August 16–19, 2022, to document baseline fish community composition to facilitate monitoring of changes associated with riparian habitat restoration. We surveyed a total of 18 km of river on the Owl and a 600-m section on the Piche. The fish surveys were conducted at ten previous water quality and aquatic habitat monitoring sites (Fenson et al. 2018, Dowbush et al. 2021), including one site each on the Piche River and Square Creek tributaries.

We used two, fourteen-foot, inflatable rafts equipped with electrofishing gear to sample the Owl River. Both rafts were fitted with Smith-Root 5.0 generator power pulsators (GPP) and boom-mounted anode arrays. Electrofishers were set to 60 Hz and either the low (50–500) or high (50–1,000) voltage setting, depending upon sampling conditions. Sample reaches were 2 km in length, subdivided into four, 500-m transects. Electrofishing proceeded downstream with an emphasis on alternating banks between transects (GOA 2019). We used a Smith-Root LR-20B backpack electrofisher with pulsed DC (300 volts, 35 Hz) to sample a 600-m site on the Piche River (GOA 2017). The reach was subdivided into two, 300-m transects and sampled proceeding upstream. Fish were held in a live well between transects at all sites and electrofishing effort and fish catch was recorded at each transect. After sampling, fish were returned to an area of natural cover within the transect to minimize displacement and potential recapture in subsequent transects.

We used standard Gee minnow traps to capture small-bodied fish and juvenile sport fish. We set six traps baited with cat food, either overnight or throughout the day, typically within the first 500-m transect of each electrofishing section or in suitable habitat within the 2-km sample reaches.

Each fish was identified to species, weighed (nearest 0.1 g) (Gram Precision P1-K6, Kilotech KPC 2000), and measured (fork length [FL] or total length [TL], nearest mm). We used FL measurements for all species except for burbot (*Lota lota*), for which we used TL. Maturity, sex and any incidence of disease, fin and scale erosion, lesions, or tumours were assessed from external appearances and recorded for each fish. We use Fulton's condition factor (K), as per Syncrude (2019), to express fish health, where K > 1.0 indicates an individual in good condition (Neumann et al. 2012). Condition factor (K) was calculated as:

$$K = \frac{\text{Weight} \times 10^5}{\text{Length (mm)}^3}$$

Catch rates are expressed as catch-per-unit-effort (CPUE); CPUE is calculated as number of fish/100 seconds or number of fish/trap hour for electrofishing and minnow trapping, respectively.

3.2 Aquatic habitat assessment

Along with the fish community surveys, we conducted habitat assessments at ten sites on the Owl River and one on the Piche River. These assessments were done to characterize instream habitat and facilitate monitoring changes over time associated with riparian exclusion fencing along the Owl River. We collected data from cross-sectional transects at the beginning of each fish sampling site. Data collected included wetted and bankfull widths, depth and substrate composition, bank stability and angle, and instream habitat composition. Wetted and bankfull widths were measured using a hand-held rangefinder (TruPulse® 200x Laser Technology Inc.), whereas water depth and dominant substrate were taken at seven points evenly distributed across the river channel. Bank erosion was assessed by ranking the severity from low to high, where low was rated as zero and high as ten, following procedures in Wilhelm et al. (2005). Following procedures in GOA (2001), we first estimated total available instream cover for fish as a percentage of all available habitat. We then expressed the different cover types (i.e., woody debris, boulders, instream vegetation, turbidity, and depth) as a percentage of total available instream cover. Water temperature, conductivity, pH, turbidity, and dissolved oxygen (DO) were measured at each site with a hand-held YSI™ unit (Professional PlusHobo®).

3.3 Land tenure negotiations

In fall 2020, ACA began seeking new opportunities to work with local landholders to protect riparian habitat along the Owl River. If a landholder expressed interest in participating in the Owl River riparian project, we set up a meeting to tour their land and determine what enhancements would be mutually beneficial to both the landholder and their riparian habitat along the Owl River. Fencing, either permanent wildlife-friendly or temporary electric, is the primary tool offered for riparian conservation, supplemented with portable off-site watering and tree/shrub planting, based on the needs of the landholder and habitat. In addition to these tools, participating landholders are offered a per-hectare payment for riparian habitat lands that they are willing to idle.

On private land, partnerships with landowners are for the long-term lease (25 years) of a minimum 50-m riparian buffer on each side of the river. Formal agreements signed between ACA and the landowner specify the terms of the agreement, including annual lease payments, work to be completed on the habitat lands, and the responsibilities of each party. For grazing leaseholders interested in participating in the project, we would work with Alberta Public Lands and the leaseholder to negotiate the establishment of fences and new lease boundaries and assign responsibilities to each party. Leaseholders would be given a one-time payment per hectare to compensate them for any riparian habitat lands that are removed from their current grazing lease.

4.0 RESULTS

4.1 Fish community

We captured a total of 134 fish comprising five species: 52 walleye, 47 yellow perch (*Perca flavescens*), 32 white suckers (*Catostomus commersonii*), 6 northern pike (*Esox Lucius*), and 1 burbot (Appendix 1). Overall, CPUE ranged from 0.01 to 0.33 fish/100 seconds among species and was highest for walleye and lowest for burbot (Table 1). Walleye was the most encountered species, occurring at all sampling sites along the Owl River, except at site 2-W on the Piche River (Table 1). Yellow perch and white sucker occurred along much of the length of the Owl River as well as in the Piche River; northern pike occurred sporadically within the study area (Table 1).

Table 1. Relative abundance (catch-per-unit-effort [CPUE]) of fish in the Owl River while electrofishing in August 2022. Sites are arranged left to right in most upstream (1-W) to most downstream (16-W); Site 2-W is located on the tributary Piche River near the confluence with the Owl River.

Species	CPUE by sampling site (fish/100 seconds) ¹										All Sites ³
	1-W	9-W	19-W	10	11	12-W	14	15	16-W	2-W ²	
Walleye	0.10	0.48	0.27	0.60	0.18	0.28	0.22	0.10	0.45	-	0.33
Yellow perch	0.41	0.76	0.09	0.05	0.36	0.23	0.00	-	0.07	2.01	0.29
White sucker	0.20	1.24	0.73	0.05	0.04	0.09	0.11	-	-	0.22	0.20
Northern pike	-	0.10	-	-	-	-	-	-	0.03	0.22	0.03
Burbot	-	-	-	-	-	-	0.04	-	-	-	0.01

¹ CPUE was calculated by site as total number of fish for each species divided by total effort (seconds) at that site then multiplied by 100

² Backpack electrofishing method used at Site 2-W on the Piche River

³ CPUE across all sites was calculated as total number of each species caught divided by total effort (seconds) across all sites then multiplied by 100

“-” indicates no fish captured

After a combined effort of 704.5 hours of minnow trapping across all sites, we captured only two fish (one yellow perch and one pike) at Site 11 (127 hours effort) resulting in a catch rate of 0.01 fish/hour for each species.

Two walleye had tumours on either dorsal or pectoral fins and two white suckers had lesions; no other diseases or abnormalities were observed. The site located on Square Creek (18-W) had an intact beaver dam just upstream of the confluence with the Owl River and did not have discernable flow for electrofishing, so it was not sampled.

Walleye size (FL) ranged from 58 to 627 mm, and the population structure exhibited a multimodal distribution with modes near 200, 450, and 580 mm (Figure 2). White sucker size (FL) ranged from 36 to 477 mm, and the population also exhibited a multimodal distribution with modes near 50, 175, and 400 mm (Figure 2). Yellow perch size ranged from 40 to 135 mm, with majority of individuals around 40 mm (Figure 2). We exclude northern pike and burbot from discussions of population structure and condition factor, due to low sample sizes.

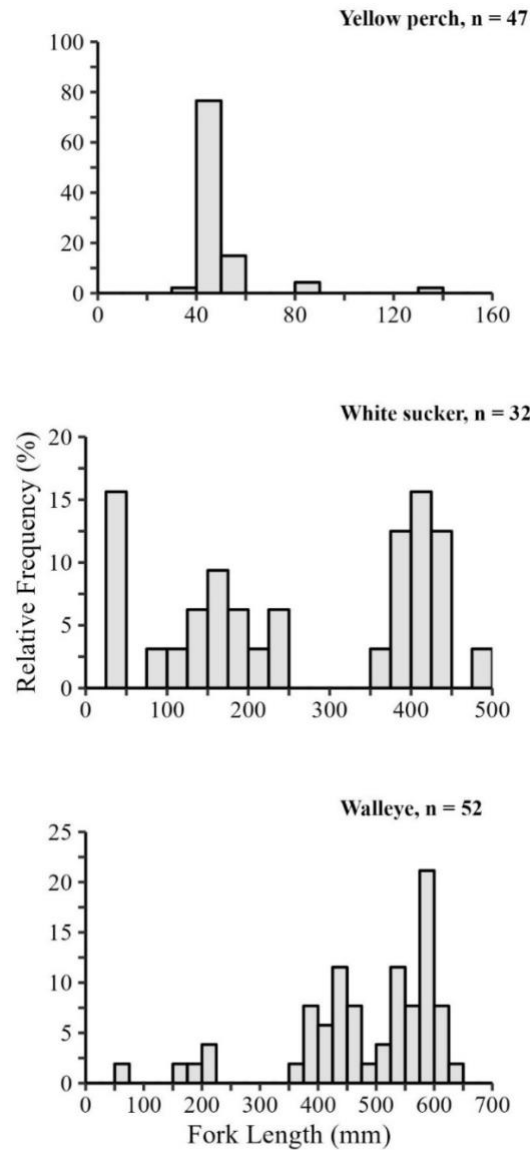


Figure 2. Length frequency distributions of the three most abundant fish species captured during the Owl River fish community survey, 2022.

Overall, condition factor (K) for walleye ranged from 0.98 to 1.76, with means (\pm SD) of 1.05 ± 0.03 , 1.23 ± 0.2 , 1.12 ± 0.1 , corresponding to the three length modes (173–206 mm, 355 – 493 mm, 515–627 mm), respectively (Figure 3, Appendix 1). Similarly, K for white sucker ranged from 0.39 to 2.66, with means of 1.69 ± 0.1 , 1.20 ± 0.4 , 1.55 ± 0.3 corresponding to the three length modes (40–48 mm, 100–244 mm, 362–477 mm), respectively (Figure 3). For yellow perch, K ranged from 1.1 to 3.29 with a mean of 2.01 ± 0.6 corresponding to the mode from 40 to 50 mm (Figure 3). As K is sensitive to changes in body length (Neumann et al. 2012), we limit calculation of mean K to similar size ranges (modes) rather than population means. Overall range and mean K values for various size groups suggests that the Owl River walleye, white sucker, and yellow perch are in good condition ($K > 1.0$).

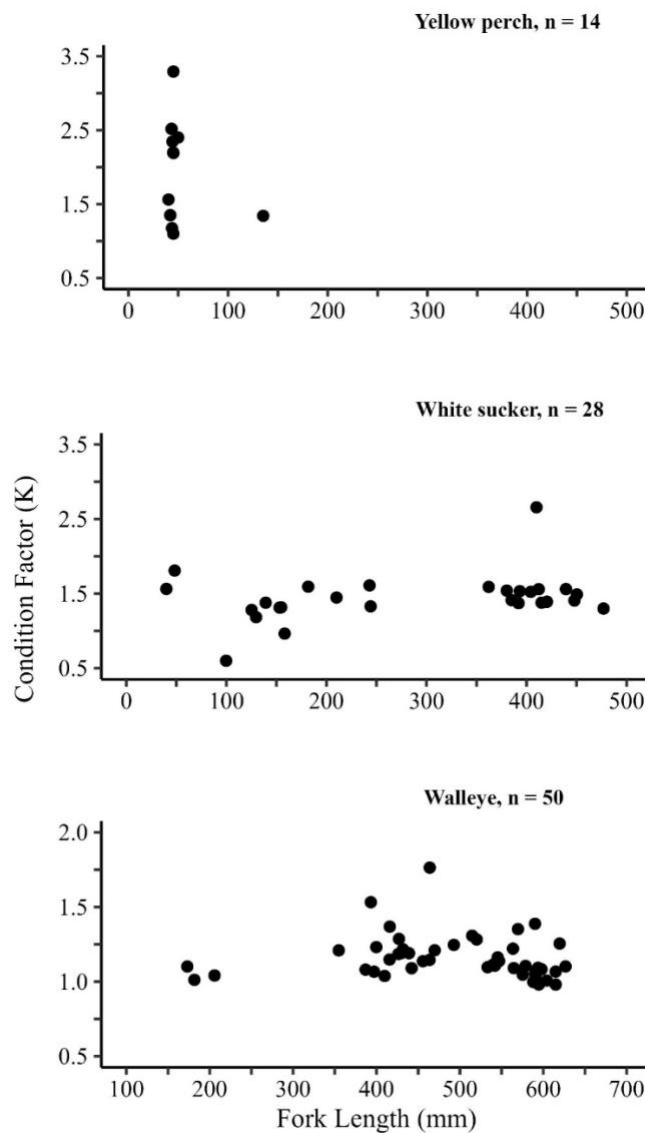


Figure 3. Condition factor (K) for the three most abundant fish species captured during the Owl River fish community surveys, 2022.

4.2 Aquatic habitat

Overall, stream wetted width ranged from 18.1 to 39.0 m and bankfull width from 19.4 to 72.0 m on the Owl River (Table 2, Appendices 2a, 2b and 2c). Dominant substrate was large gravel in the most upstream site (1-W) and transitioned to sand, then fines as sites progressed downstream. The most dominant instream cover types were provided by turbidity and aquatic vegetation (Table 2, Appendices 2a, 2b and 2c). An assessment site on Square Creek (18-W) was added to help characterize its influence on the Owl River; however, this section of the creek had no flow and had a beaver dam impounding the area so it was not assessed. Similarly, Site 17 located at the mouth of the Owl River at Lac La Biche was not sampled because the river channel was indistinguishable from the lake due to high water levels in 2022.

Table 2. Habitat characteristics for the Owl and Piche rivers in 2022. Sites are arranged top to bottom from most upstream (1-W) to most downstream (16-W). Site 2-W is on the Piche River near the confluence with the Owl River.

Site	Wetted Width (m)	Bankfull Width (m)	Average Depth (m)	Dominant Substrate	LDB ¹ Angle (°)	RDB ¹ Angle (°)	% Cover	Dominant Cover
1-W	39.0	45.0	0.88	Large Gravel	7	26	30	Turbidity
9-W	32.0	42.0	0.80	Sand	22	19	50	Aquatic Vegetation
19-W	22.0	25.0	1.12	Sand	40	6	10	Aquatic Vegetation
10	18.0	26.0	1.32	Sand	6	43	5	Aquatic Vegetation
11	19.7	27.0	1.21	Fines	74	20	15	Turbidity
12-W	18.1	19.4	1.17	Fines	83	11	25	Turbidity
13	18.1	50.0	1.09	Fines	80	10	25	Turbidity
14	19.3	21.2	1.35	Fines	85	28	15	Turbidity
15	22.5	22.5	1.29	Fines	90	0	-	Turbidity
16-W	22.0	72.0	1.60	Fines	50	6	5	Aquatic Vegetation
2-W	13.0	17.0	0.49	Cobble	52	21	40	Boulder

¹ LDB: Left downstream bank, RDB: Right downstream bank

During our survey period, water temperature ranged from 18.6°C to 23.0°C, DO ranged from 7.4 to 9.5 mg/L, conductivity ranged from 185.9 to 99.0 µs/cm, pH 8.16 to 9.95, and turbidity from 0.7 to 8.3 NTU (Table 3, Appendix 2a). There were no clear spatial trends in these water quality measures, but turbidity was several folds lower in the Piche River (Site 2-W) than within the mainstem Owl River (Table 3). Turbidity was measured at all sites; however, due to an error

some measurements were recorded as total dissolved solids and are omitted from Table 3 (but see Appendix 2a).

Table 3. In-situ water quality measurements taken during fish community and aquatic habitat assessments on the Owl River in August 2022. Sites are arranged top to bottom from most upstream (1-W) to most downstream (16-W); Site 2-W is on the Piche River near the confluence with the Owl River.

Site	Temp (°C)	Cond. (µs/cm)	pH	Turb. (NTU) ¹	DO (mg/L) ²
1-W	20.1	185.9	9.40	-	
9-W	21.6	198.0	8.80	-	7.8
19	18.6	262.0	8.75	-	7.6
10	20.1	203.0	8.34	-	7.34
11	19.8	190.2	8.92	6.6	7.34
12-W	20.9	191.2	8.74	7.7	7.4
13	21.1	191.2	8.87	7.4	7.43
14	20.4	193.7	9.67	8.3	7.45
15	21.3	194.2	9.40	6.4	7.65
16-W	23.0	200.0	8.16	-	8.5
2-W	20.5	299.0	9.95	0.7	9.5

¹Turbidity values with “-” were recorded as total dissolved solids and can be found in Appendix 2a.

²Dissolved oxygen was not recorded at site 1-W

4.3 Land tenure negotiations

In 2022, we made first contact or follow-up contact with all eleven landholders (private and grazing lessees) in the Owl River project area. We now know who is interested in participating in the project (n = 3), who is not (n = 6), and who is still considering their options (n = 2). In addition to speaking with landholders, we signed three new 25-year Riparian Habitat Enhancement Agreements. The first agreement (RCP-NE-003, Figure 4) protects 34.49 ha of riparian habitat and 1.41 km of riverbank. No additional enhancements were needed. The second agreement (RCP-NE-004, Figure 5) protects 14.93 ha of riparian habitat and 1.40 km of riverbank. For this agreement, we installed 250 m of permanent wildlife-friendly fencing, 400 m of temporary electric fencing, and purchased both a brush mower to help with electric fence installation and a portable watering unit to provide a reliable water source away from the river for the landowner’s livestock. The third agreement (RCP-NE-005, Figure 6) protects 30.21 ha of riparian habitat and 4.56 km of riverbank. No additional enhancements were needed.

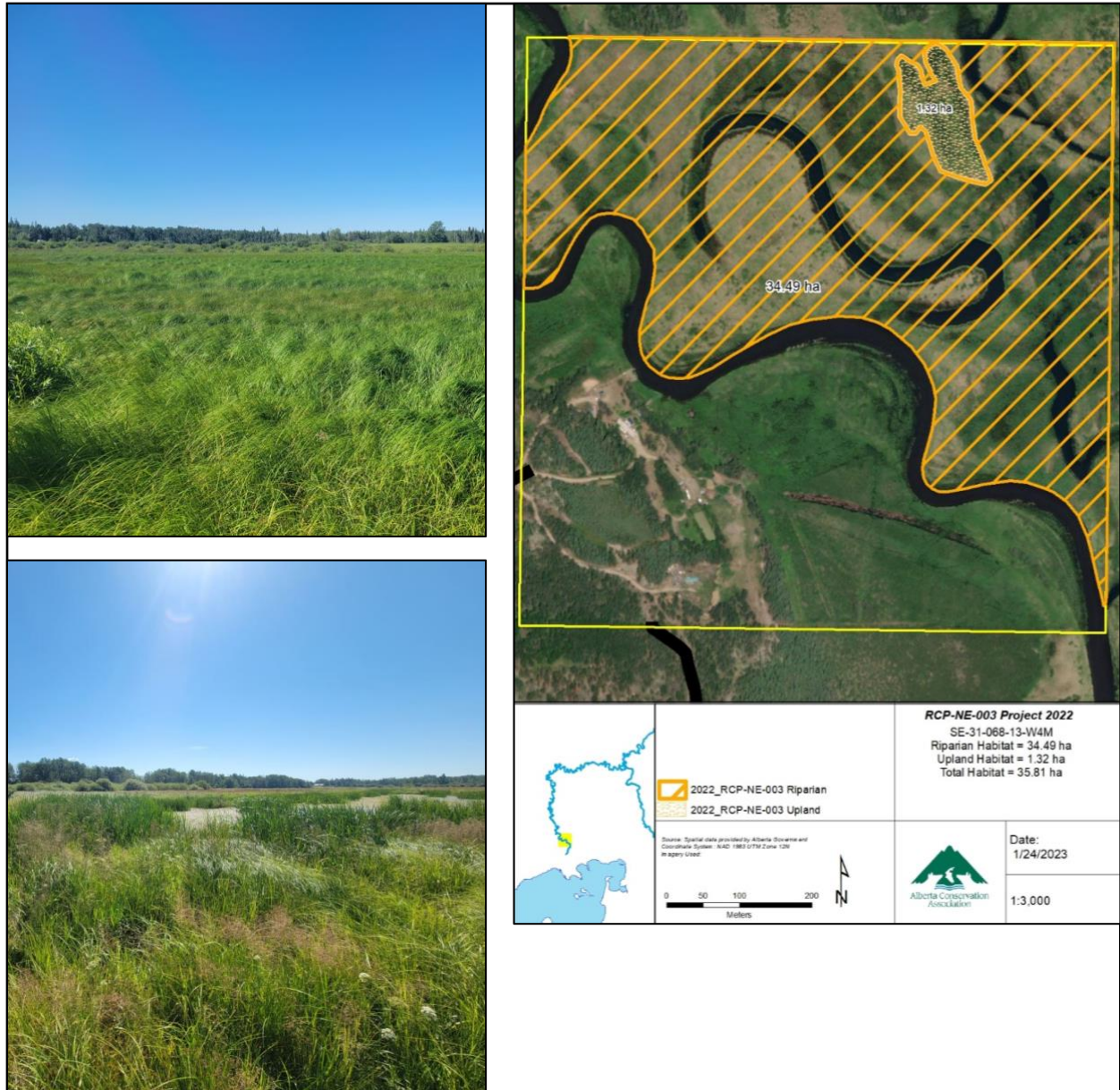


Figure 4. RCP-NE-003: 34.49 ha riparian, 1.32 ha upland, 1.41 km riverbank. Enhancements – none. Photos: Lance Engley, ACA.

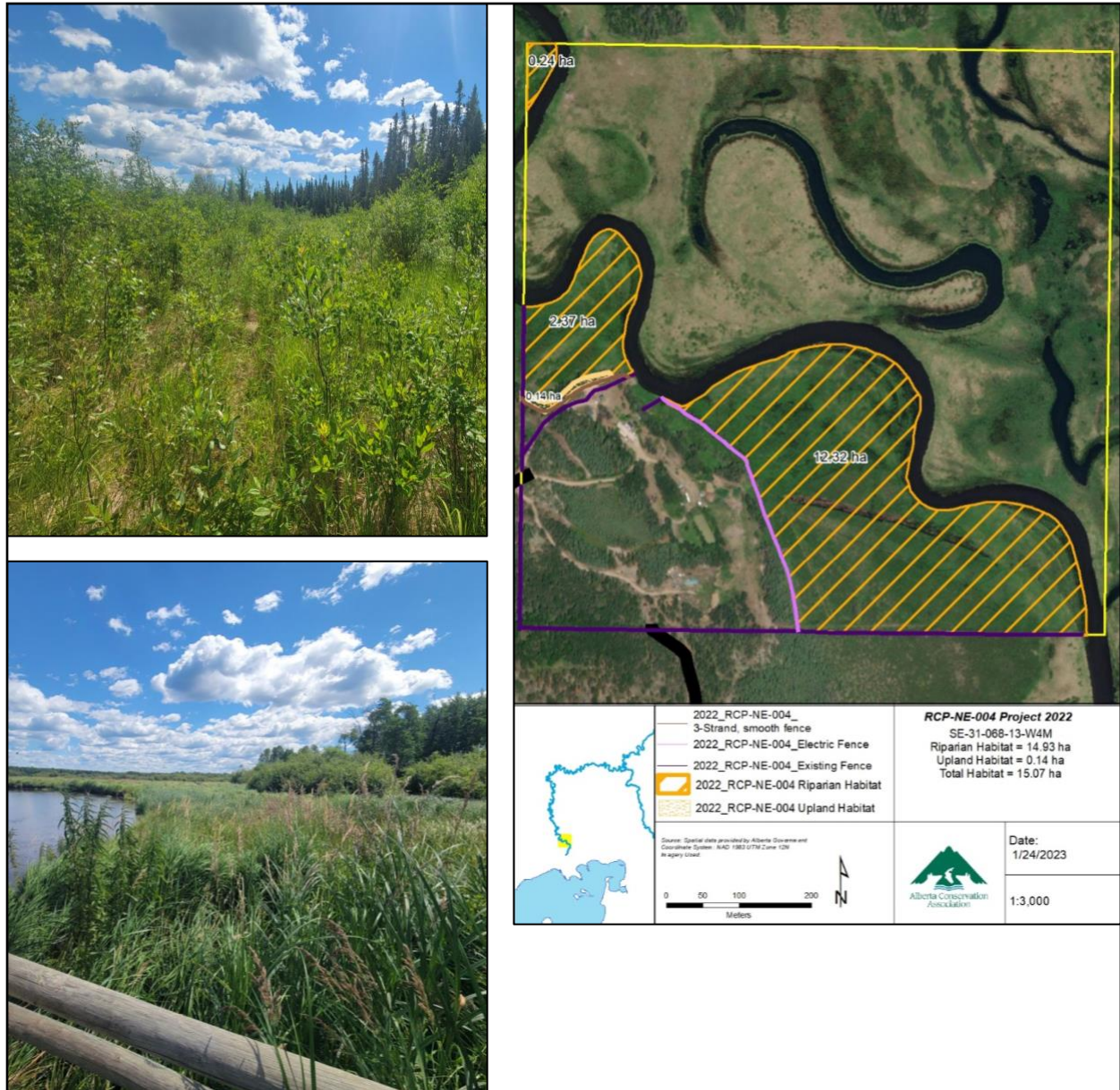


Figure 5. RCP-NE-004: 14.93 ha riparian, 0.14 ha upland, 1.40 km riverbank. Enhancements – Permanent fencing, electric fencing, mower, and off-site watering unit. Photos: Garret McKen, ACA.

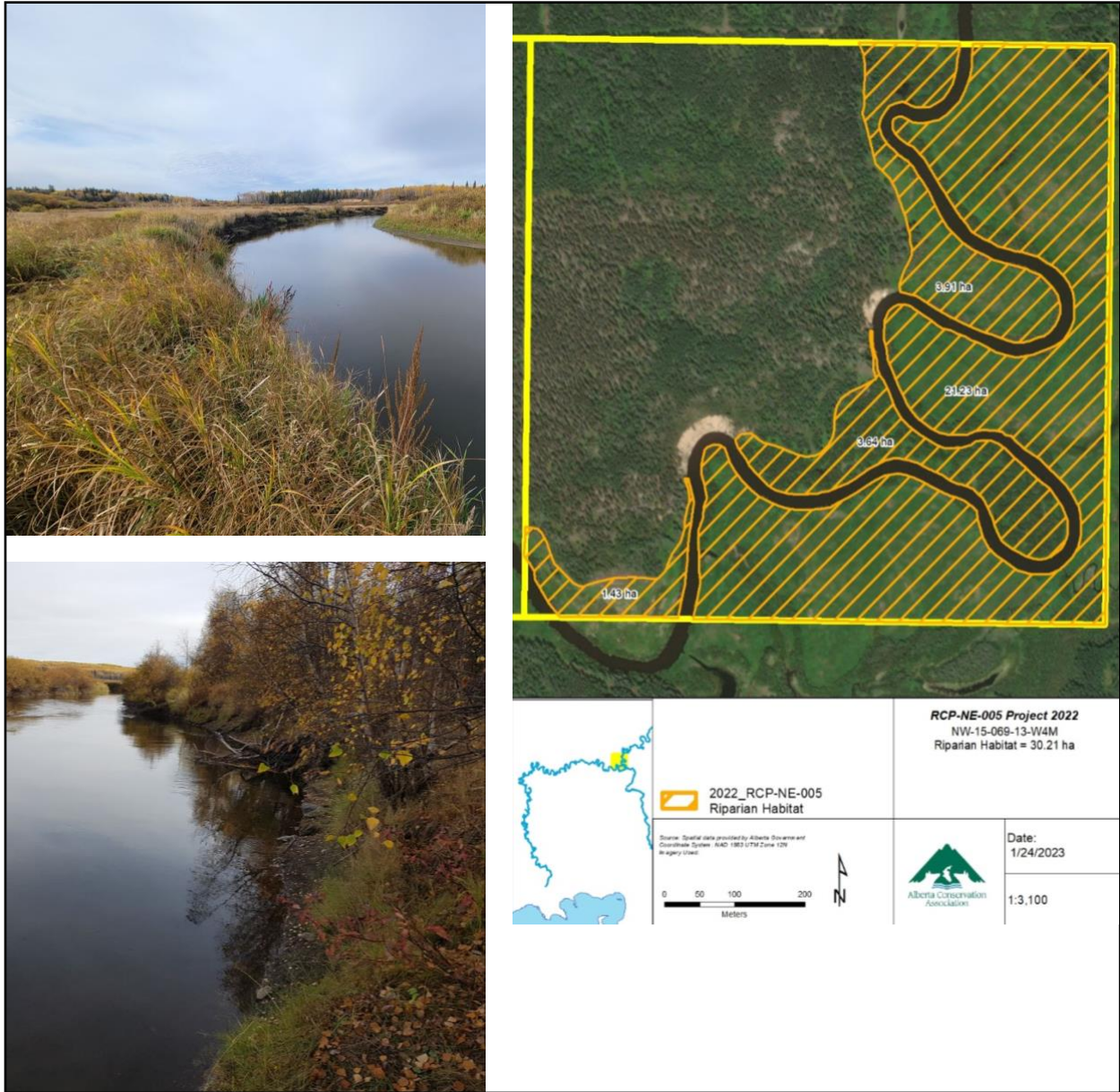


Figure 6. RCP-NE-005: 30.21 ha riparian, 4.56 km riverbank. Enhancements – none.
Photos: Garret McKen, ACA.

5.0 DISCUSSION

Sampling the Owl River fish community recorded five species in August 2022: walleye, white sucker, yellow perch, northern pike, and burbot. Walleye was the most abundant species occurring at all sampling sites along the Owl River. Similarly, yellow perch and white sucker occurred along much of the length of the Owl River, as well as in the Piche River; northern pike occurred sporadically within the study area. Four of the 134 fish captured (two adult walleye and two adult white suckers) had tumours or lesions; no other health concerns were apparent for the captured fish. Sizes of the three most abundant species, walleye, white sucker, and yellow perch, ranged from 58 to 627 mm, 36 to 477 mm, and 33 to 135 mm, respectively; individuals of all three species exhibited good condition ($K > 1.0$). Dominant substrate was large gravel in the most upstream site and transitioned to sand, then fines as sites progressed downstream with instream fish cover mostly due to a combination turbid waters and aquatic vegetation. This first year of collecting information on the fish community and aquatic habitat on the Owl River will be used as a baseline for monitoring potential outcomes of restoration and livestock exclusion fencing zones along the river.

Riparian Habitat Enhancement Agreements signed in 2022 protect a combined 79.63 ha of riparian habitat and 7.37 km of riverbank along the Owl River, bringing the total area of protected riparian habitat to 104.93 ha and protected riverbank length to 11.74 km since this project was initiated in the fall of 2020. In 2023, ACA will continue working on building relationships with landholders as we pursue new riparian agreements with existing participants and with those who are still unsure if they want to participate, all with the goal of improving riparian health, water quality and walleye spawning habitat in the Owl River.

6.0 LITERATURE CITED

- Alberta Environment and Parks (AEP). 2016. Management of Class ‘A’ watercourses in Alberta. Available online at: <https://open.alberta.ca/publications/management-of-class-a-watercourses-in-alberta#summary> [Accessed 09/01/2023].
- Alberta Environment and Sustainable Resource Development (ASRD), Alberta Environment (AE), and Fisheries and Oceans Canada (DFO). 2007. Working agreement: Class ‘A’ Watercourses. Available online at: <https://open.alberta.ca/publications/working-agreement-class-a-watercourses> [Accessed 09/01/2023].
- Fenson, S., T. Johns, and B. Schmidt. 2018. Owl River riparian restoration and enhancement project: Monitoring report II. Data Report produced by Alberta Conservation Association, Sherwood Park, Alberta, Canada. 24 pp + App.
- Government of Alberta (GOA). 2001. Fish habitat manual, guidelines and procedures for watercourse crossing in Alberta. Alberta Transportation. Revised August 2009. 15 p.
- Government of Alberta (GOA). 2017. Small Stream Backpack Electrofishing-In-stream Operations. Fisheries Management Report. Alberta Environment and Parks. Edmonton, AB. 27 p.
- Government of Alberta (GOA). 2019. Electrofishing Standard for Sampling of Rivers in Alberta. Fisheries Management Report. Alberta Environment and Parks. Edmonton, AB. 27 p.
- Neumann, R. M., C. S. Guy, and D. W. Willis. 2012. Length, weight, and associated indices. Pages 637-676 in Zale, A., Parrish, D, and T. Sutton, editors. Fisheries Techniques Third Edition. American Fisheries Society. Bethesda, Maryland, USA.
- Syncrude Canada Ltd. 2019. Revised Mildred Lake Extension Project *Fisheries Act* Application. Syncrude Canada Ltd. Calgary, Alberta. 108 pp. + App.
- Wilhelm, J. G. O., J. D. Allan, K. J. Wessell, R. W. Merritt, and K. W. Cummins. 2005. Habitat assessment of non-wadeable rivers in Michigan. *Environmental Management* 36:592–609.

7.0 APPENDICES

Appendix 1. Fish captured at study sites on the Owl River system using electrofishing (boat and backpack), August 16–19, 2022, including species, fork length, weight, and condition of each fish.

Species¹	Site Name	Waterbody Official Name	Fork Length (mm)	Weight (g)	Condition Factor (K)
WALL	1-W	Owl River	615	2,280	0.98
WALL	9-W	Owl River	540	1,753	1.11
WALL	9-W	Owl River	590	2,166	1.05
WALL	9-W	Owl River	547	1,862	1.14
WALL	9-W	Owl River	575	1,989	1.05
WALL	9-W	Owl River	520	1,803	1.28
WALL	19-W	Owl River	182	61	1.01
WALL	19-W	Owl River	579	2,145	1.11
WALL	19-W	Owl River	591	2,151	1.04
WALL	10	Owl River	439	1,007	1.19
WALL	10	Owl River	430	947	1.19
WALL	10	Owl River	442	941	1.09
WALL	10	Owl River	595	2,065	0.98
WALL	10	Owl River	173	57	1.10
WALL	10	Owl River	588	2028	1.00
WALL	10	Owl River	58	–	–
WALL	10	Owl River	206	91	1.04
WALL	10	Owl River	542	1,763	1.11
WALL	10	Owl River	393	930	1.53
WALL	10	Owl River	206	91	1.04
WALL	10	Owl River	542	1,763	1.11
WALL	11	Owl River	456	1,078	1.14
WALL	11	Owl River	590	2,850	1.39
WALL	11	Owl River	604	2,218	1.01
WALL	11	Owl River	565	1,967	1.09
WALL	12-W	Owl River	598	2,315	1.08
WALL	12-W	Owl River	545	1,881	1.16
WALL	12-W	Owl River	533	1,660	1.10
WALL	12-W	Owl River	594	2,290	1.09
WALL	12-W	Owl River	627	2,715	1.10
WALL	12-W	Owl River	592	2,238	1.08
WALL	14	Owl River	594	2,080	0.99
WALL	14	Owl River	432	981	1.22
WALL	14	Owl River	493	1,493	1.25
WALL	14	Owl River	387	626	1.08
WALL	14	Owl River	570	2,503	1.35
WALL	14	Owl River	397	667	1.07

Species¹	Site Name	Waterbody Official Name	Fork Length (mm)	Weight (g)	Condition Factor (K)
WALL	15	Owl River	615	2,481	1.07
WALL	15	Owl River	464	1,144	1.15
WALL	16-W	Owl River	564	2,190	1.22
WALL	16-W	Owl River	426	916	1.18
WALL	16-W	Owl River	416	826	1.15
WALL	16-W	Owl River	586	–	–
WALL	16-W	Owl River	464	1,762	1.76
WALL	16-W	Owl River	470	1,256	1.21
WALL	16-W	Owl River	400	788	1.23
WALL	16-W	Owl River	427	1,001	1.29
WALL	16-W	Owl River	515	1,786	1.31
WALL	16-W	Owl River	416	985	1.37
WALL	16-W	Owl River	355	541	1.21
WALL	16-W	Owl River	410	715	1.04
WALL	16-W	Owl River	620	2,990	1.25
YLPR	1-W	Owl River	50	3	2.40
YLPR	1-W	Owl River	45	3	3.29
YLPR	1-W	Owl River	45	1	1.10
YLPR	1-W	Owl River	45	2	2.19
YLPR	2-W	Piche River	46	–	–
YLPR	2-W	Piche River	47	–	–
YLPR	2-W	Piche River	50	–	–
YLPR	2-W	Piche River	48	–	–
YLPR	2-W	Piche River	46	–	–
YLPR	2-W	Piche River	50	–	–
YLPR	2-W	Piche River	44	–	–
YLPR	2-W	Piche River	46	–	–
YLPR	2-W	Piche River	49	–	–
YLPR	2-W	Piche River	42	–	–
YLPR	2-W	Owl River	86	–	–
YLPR	2-W	Owl River	89	–	–
YLPR	2-W	Owl River	45	–	–
YLPR	2-W	Owl River	54	–	–
YLPR	2-W	Owl River	51	–	–
YLPR	2-W	Owl River	48	–	–
YLPR	2-W	Owl River	48	–	–
YLPR	2-W	Owl River	44	–	–
YLPR	9-W	Owl River	43	2	2.52
YLPR	9-W	Owl River	45	2	2.19
YLPR	9-W	Owl River	43	2	2.52
YLPR	9-W	Owl River	45	2	2.19
YLPR	9-W	Owl River	40	1	1.56
YLPR	9-W	Owl River	44	2	2.35

Species¹	Site Name	Waterbody Official Name	Fork Length (mm)	Weight (g)	Condition Factor (K)
YLPR	9-W	Owl River	42	1	1.35
YLPR	9-W	Owl River	42	1	1.35
YLPR	19-W	Owl River	44	1	1.17
YLPR	10	Owl River	49	–	–
YLPR	11	Owl River	55	–	–
YLPR	11	Owl River	55	–	–
YLPR	11	Owl River	52	–	–
YLPR	11	Owl River	45	–	–
YLPR	11	Owl River	50	–	–
YLPR	11	Owl River	50	–	–
YLPR	11	Owl River	46	–	–
YLPR	12-W	Owl River	51	–	–
YLPR	12-W	Owl River	50	–	–
YLPR	12-W	Owl River	49	–	–
YLPR	12-W	Owl River	48	–	–
YLPR	12-W	Owl River	49	–	–
YLPR	16-W	Owl River	135	–	–
YLPR	16-W	Owl River	52	–	–
YLPR	11	Owl River	48	–	–
WHSC	1-W	Owl River	210	134	1.45
WHSC	1-W	Owl River	415	985	1.38
WHSC	2-W	Owl River	43	–	–
WHSC	2-W	Owl River	44	–	–
WHSC	9-W	Owl River	182	96	1.59
WHSC	9-W	Owl River	181	23	0.39
WHSC	9-W	Owl River	155	49	1.32
WHSC	9-W	Owl River	100	6	0.60
WHSC	9-W	Owl River	158	38	0.96
WHSC	9-W	Owl River	244	193	1.33
WHSC	9-W	Owl River	48	2	1.81
WHSC	9-W	Owl River	36	–	–
WHSC	9-W	Owl River	40	1	1.56
WHSC	9-W	Owl River	450	1,356	1.49
WHSC	9-W	Owl River	392	826	1.37
WHSC	9-W	Owl River	380	845	1.54
WHSC	9-W	Owl River	362	754	1.59
WHSC	19-W	Owl River	448	1,265	1.41
WHSC	19-W	Owl River	153	47	1.31
WHSC	19-W	Owl River	139	37	1.38
WHSC	19-W	Owl River	243	231	1.61
WHSC	19-W	Owl River	130	26	1.18
WHSC	19-W	Owl River	412	1,090	1.56
WHSC	19-W	Owl River	420	1,030	1.39

Species¹	Site Name	Waterbody Official Name	Fork Length (mm)	Weight (g)	Condition Factor (K)
WHSC	19-W	Owl River	125	25	1.28
WHSC	10	Owl River	393	930	1.53
WHSC	11	Owl River	439	–	–
WHSC	12-W	Owl River	439	1,320	1.56
WHSC	12-W	Owl River	477	1,410	1.30
WHSC	14	Owl River	410	1,831	2.66
WHSC	14	Owl River	385	806	1.41
WHSC	14	Owl River	404	1,004	1.52
NRPK	2-W	Piche River	156	–	–
NRPK	2-W	Piche River	171	–	–
NRPK	9-W	Owl River	158	24	0.61
NRPK	11	Owl River	310	238	0.80
NRPK	16-W	Owl River	160	55	1.34
NRPK	11	Owl River	78	–	–
BURB	14	Owl River	288	159	0.67

¹ WALL=walleye (*Sander vitreus*), YLPR= yellow perch (*Perca flavescens*), WHSC=white sucker (*Catostomus commersonii*), NRPK=northern pike (*Esox Lucius*), BURB=burbot (*Lota lota*).

Appendix 2a. Physical characteristics, water quality and fish cover from habitat assessment on the Owl and Piche rivers in August 2022.

Site	Wetted width (m)	Bank width (m)	Temperature	Conductivity	pH	Turbidity	Unit	Total Cover (%)	Bedrock	Boulder	Aquatic Vegetation	Over Hanging Vegetation	Undercut Banks	Woody Debris	Turbidity / Depth	Other
1-W	39.0	45.0	20.1	186	9.40	132	TDS	30	0	0	20	0	0	0	80	0
9-W	32.0	42.0	21.6	198	8.80	140	TDS	50	0	0	80	0	0	0	20	0
19	22.0	25.0	18.6	262	8.75	144	TDS	10	0	0	95	0	0	0	5	0
10	18.0	26.0	20.1	203	8.34	144	TDS	5	0	0	95	0	0	0	5	0
11	19.7	27.0	19.8	190	8.92	6.6	NTU	15	0	0	10	0	0	0	90	0
12-W	18.1	19.4	20.9	191	8.74	7.7	NTU	25	0	0	10	0	10	0	80	0
13	18.1	50.0	21.1	191	8.87	7.4	NTU	25	0	0	40	0	0	0	60	0
14	19.3	21.2	20.4	194	9.67	8.3	NTU	15	0	0	10	0	5	0	85	0
15	22.5	22.5	21.3	194	9.40	6.4	NTU									
16-W	22.0	72.0	23.0	200	8.16	142	TDS	5	0	0	95	0	0	0	5	0
2-W	13.0	17.0	20.5	299	9.95	0.7	NTU	40	0	70	20	10	0	0	0	0

Appendix 2b. Bank characteristics from habitat assessments on the Owl and Piche rivers in August 2022.

Site	LDB Angle ¹	LDB Bankfull Height (m)	LDB Undercut (m)	LDB Bank Erosion (0-10)	RDB Angle ¹	RDB Bank Height (m)	RDB Undercut (m)	RDB Bank Erosion (0-10)
1-W	7	0		0	26	0	0	0
9-W	22	0	0	0	19	0	0	0
19	40	0	0	0	6	0	0	0
10	6	0	0	0	43	0	0	0
11	74	1.02	0	3	20	0.6	0	4
12-W	83	0.63	0.1	5	11	0.2	0	6
13	80	0.74	0	5	10	0.6	0	6
14	85	0.95	0	3	28	0.9	0	4
15	90	0.2	0	0	0	0	0	0
16-W	50	0	0	0	6	0	0	0
2-W	52	0.5	0	0	21	0.2	0	0

¹LDB=left downstream bank, RDB=right downstream bank, Sub.= Substrate

Appendix 2c. Depth and substrate profile from habitat assessments on the Owl and Piche rivers in August 2022.

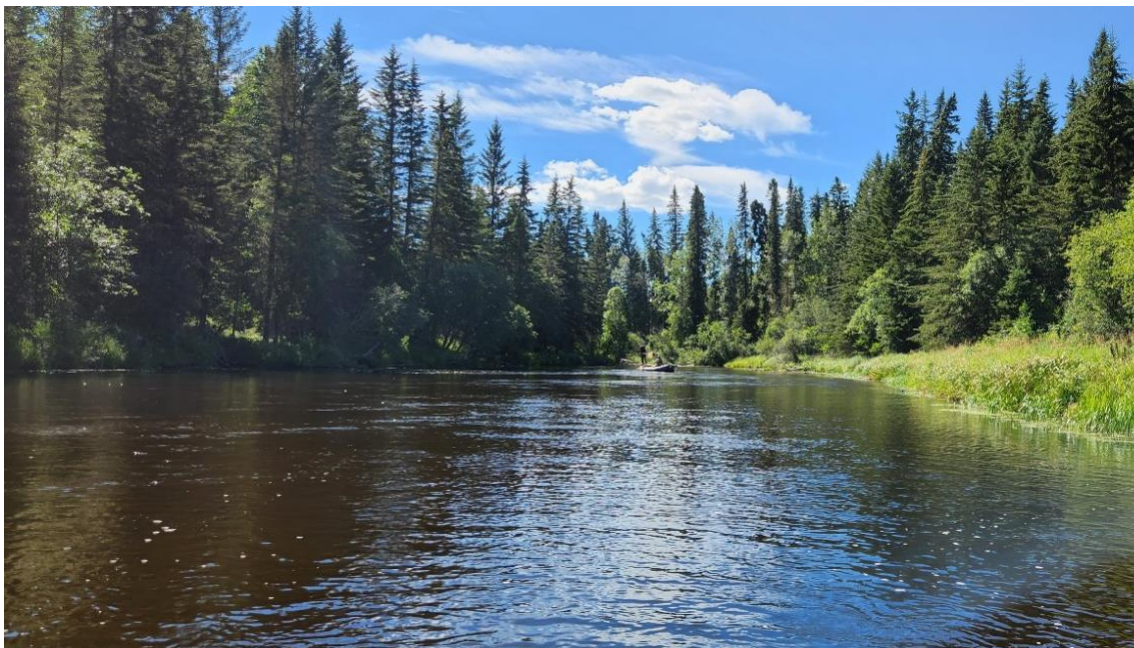
Site	Depth 1 (LDB)	Depth 2	Depth 3	Depth 4	Depth 5	Depth 6	Depth 7 (RDB)	Sub. 1	Sub. 2	Sub. 3	Sub. 4	Sub. 5	Sub. 6	Sub. 7
1-W	0.7	0.8	0.8	0.75	0.78	1.1	1.2	LG	LG	LG	Fines	Fines	Sand	Boulder
9-W	0.82	0.71	0.74	0.87	0.9	0.9	0.68	Cobble	LG	Cobble	Sand	Sand	Sand	Sand
19	0.99	1.13	1.2	1.1	1.1	1.17	1.15	Sand	Sand	Sand	Sand	Sand	Sand	Sand
10	1.02	1.15	1.14	1.21	1.72	1.64	1.39	Sand	Sand	Sand	Sand	Sand	Sand	Sand
11	0.48	1.6	1.57	1.47	1.4	1.1	0.84	Fines	Fines	Fines	Fines	Fines	Fines	Fines
12-W	0.77	1.4	1.5	1.5	1.35	1.1	0.58	Fines	Fines	Fines	Fines	Fines	Fines	Fines
13	-	-	1.45	1.3	1.1	0.9	0.72	Fines	Fines	Fines	Fines	Fines	Fines	Fines
14	1.14	1.85	2.3	2	1.42	0.5	0.21	Fines	Fines	Fines	Fines	Fines	Fines	Fines
15	-	1.35	1.65	1.45	1.95	1.3	0.05	Fines	Fines	Fines	Fines	Fines	Fines	Fines
16-W	1.3	1.6	1.5	1.6	1.7	1.8	1.7	Fines	Fines	Fines	Fines	Fines	Fines	Fines
2-W	0.32	0.5	0.53	0.55	0.57	0.52	0.47	Cobble	Cobble	Cobble	Cobble	Cobble	Sand	Sand

Appendix 3. Site and sampling photos taken during the 2022 Owl River fish community and aquatic habitat assessment.



Juvenile walleye captured during electrofishing on the Owl River.

Photo: Lindsay Dowbush, ACA.



Alberta Conservation Association crew boat electrofishing at Site 1-W on the Owl River.

Photo: Troy Furukawa, ACA.



Example of typical habitat in the lower section of the Owl River, taken at Site 12-W.
Photo: Lindsay Dowbush, ACA.



Minnow trapping along bank habitat on the Owl River.
Photo: Lindsay Dowbush, ACA.



Alberta Conservation
Association

wildlife | fish | habitat