

Alberta Conservation Association
2022/23 Project Summary Report

Project Name: Owl River Fish Habitat Protection

Fisheries Program Manager: Peter Aku

Project Leader: Mike Rodtka

Primary ACA Staff on Project: Peter Aku, Jason Blackburn, Lindsay Dowbush, Troy Furukawa, Brad Hurkett, and Chad Judd

Partnerships

Cooperating landowners and leaseholders

County of Lac La Biche

Government of Alberta

Syncrude Canada Ltd. (Syncrude)

Key Findings

- The fish community in the Owl River system is comprised of walleye, white suckers, yellow perch, northern pike, and burbot.
- Walleye was the most abundant species we captured.
- Sampled individuals of walleye, white suckers, and yellow perch exhibited good condition.
- Dominant substrate was large gravel and transitioned to sand, then fines as sites progressed downstream with instream cover mostly provided by turbidity.

Abstract

In partnership with Syncrude, Alberta Conservation Association (ACA) is monitoring fish community and aquatic habitat on the Owl River from 2020 to 2045 related to riparian habitat restoration and anticipated improvement of the fish habitat. Fish community in the Owl River system consisted of five species: walleye, white suckers, yellow perch, northern pike, and burbot. Walleye was the most encountered species along the Owl River. Overall, walleye, yellow perch, and white

suckers exhibited good condition ($K > 1.0$). Dominant substrate was large gravel in the most upstream site and transitioned to sand, then fines further downstream. Instream fish cover was mostly provided by turbid waters and aquatic vegetation. Fish community composition and aquatic habitat information from this year supports previous monitoring on riparian habitat and water quality and will be used as a baseline for monitoring potential outcomes of restoration and livestock exclusion fencing zones along the river. Our work is done with the support of Syncrude, County of Lac La Biche, Government of Alberta, and the many landowners and leaseholders throughout the Owl River system.

Introduction

Alberta Conservation Association (ACA) is monitoring riparian and instream habitat on the Owl River to complement habitat restoration in partnership with Syncrude (2019). Instream portions focus on water quality, macroinvertebrates, instream habitat, and fish community along 46 km of the Owl River and sections of the Piche River and Square Creek. The fish community assessment and instream habitat were done in the summer of 2022 to supplement work we completed in 2021.

Methods

Fish community assessment

We sampled between August 16 and 19 using rafts mounted with electrofishing gear at nine sites on the Owl River and a backpack unit at a single site on the Piche River. All fish were identified to species, measured, weighed, and examined for deformities. Six baited minnow traps were set at each site to target small-bodied fish. Catch rates were expressed as catch-per-unit-effort (CPUE): fish/100 seconds for electrofishing and fish/trap hour for minnow trapping. We use Fulton's condition factor (K) to express fish health—where $K > 1.0$ indicates an individual in good condition (Neumann et al. 2012)—which is calculated as:

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

Aquatic habitat assessment

We completed habitat assessments at fish sampling sites which included measurement of wetted

and rooted widths, water depth, assessing dominant substrate, and ranking bank erosion from low (0) to high (10) (Wilhelm et al. 2005). We also estimated total instream cover for fish as a percentage and expressed each cover type as percentage of total available instream cover (GoA 2001). Water temperature, conductivity, pH, turbidity, and dissolved oxygen (DO) concentration were measured at each site.

Results

Fish community

We captured 134 fish: 52 walleye, 47 yellow perch, 32 white suckers, six northern pike, and one burbot (Table 1). Overall, CPUE ranged from 0.01 to 0.33 fish/100 sec and was highest for walleye. One yellow perch and one burbot were caught in minnow traps resulting in identical catch rates of 0.01 fish/hour.

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 from 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										
	1-W	9-W	19-W	10	11	12-W	14	15	16-W	2-W ²	All Sites ³
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 multiplied by 100.

² Backpack electrofishing method was 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.

We focused on the most abundant species for population structure and condition factor analysis. Walleye size (fork length) ranged from 58–627 mm with three size classes (173–206 mm, 355–493 mm, 515–627 mm). White suckers ranged from 36–477 mm, also with three size classes

(40–48 mm, 100–244 mm, 362–477 mm) (Figure 1). Yellow perch ranged from 40–135 mm, with most perch in the size class 40–50 mm (Figure 1).

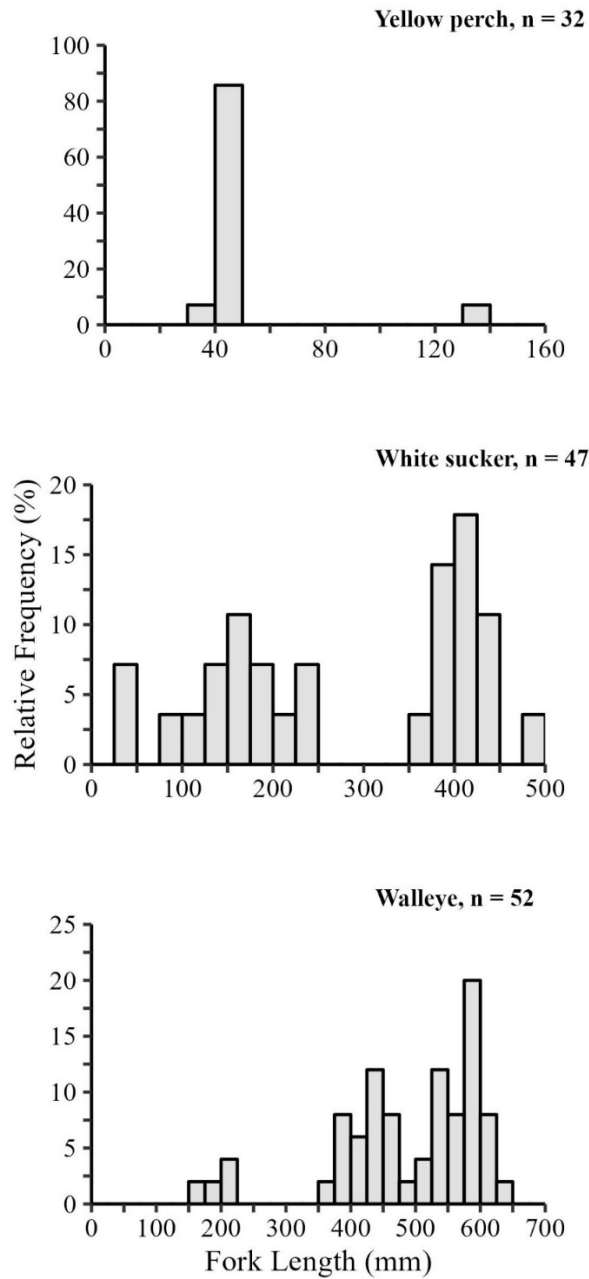


Figure 1. Length frequency distributions of the three most abundant fish species captured during the Owl River fish community survey, 2022.

Condition factor (K) is sensitive to changes in body length (Neumann et al. 2012) so we only compared within size classes for each species. Condition for walleye ranged from 0.98–1.76, with size class means (\pm SD) of 1.05 ± 0.03 , 1.23 ± 0.20 , 1.12 ± 0.10 (Figure 2). Similarly, K for white suckers ranged from 0.39–2.66, with size class means of 1.69 ± 0.10 , 1.20 ± 0.40 , and 1.55 ± 0.30 . For yellow perch, K ranged from 1.10–3.29, with a mean of 2.01 ± 0.60 for the 40–50 mm size class (Figure 2). Overall, range and mean K values for size groups indicate that populations are in good condition ($K > 1.0$).

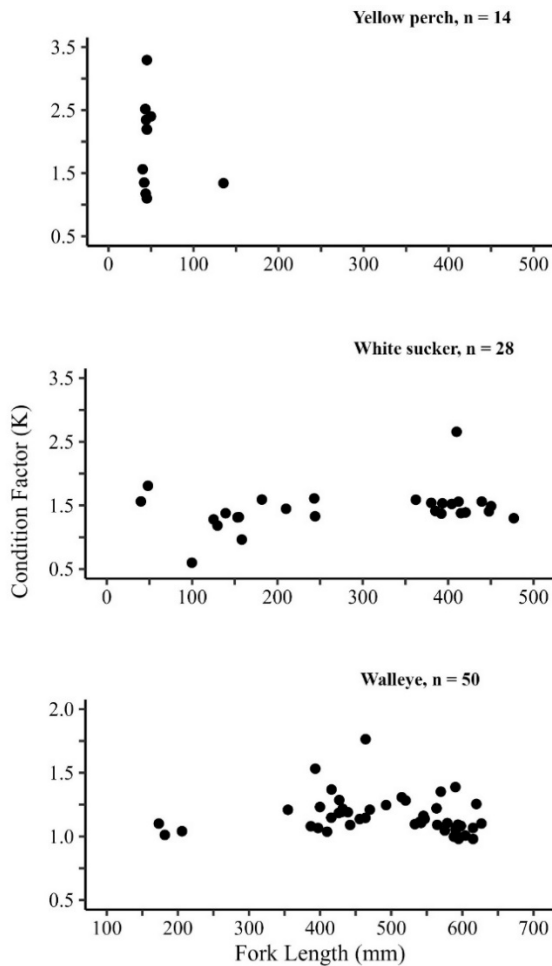


Figure 2. Condition factor (K) of the three most abundant fish species captured during the Owl River fish community surveys, 2022.

Aquatic habitat

Wetted width ranged from 18.1–39.0 m and bankfull width ranged from 19.4–72.0 m on the mainstem (Table 2). Dominant substrate was large gravel and transitioned to sand, then fines as sites progressed downstream, with instream cover mostly provided by turbidity.

Table 1. Habitat characteristics for 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	% Cover	Dominant Cover
1-W	39.0	45.0	0.88	Large Gravel	30	Turbidity
9-W	32.0	42.0	0.80	Sand	50	Aquatic Vegetation
19-W	22.0	25.0	1.12	Sand	10	Aquatic Vegetation
10	18.0	26.0	1.32	Sand	5	Aquatic Vegetation
11	19.7	27.0	1.21	Fines	15	Turbidity
12-W	18.1	19.4	1.17	Fines	25	Turbidity
13	18.1	50.0	1.09	Fines	25	Turbidity
14	19.3	21.2	1.35	Fines	15	Turbidity
15	22.5	22.5	1.29	Fines	-	Turbidity
16-W	22.0	72.0	1.60	Fines	5	Aquatic Vegetation
2-W	13.0	17.0	0.49	Cobble	40	Boulder

During our survey period, water temperature ranged from 18.6–23.0°C, DO ranged from 7.4–9.5 mg/L, conductivity ranged from 185.9–99.0 $\mu\text{s}/\text{cm}$, pH ranged from 8.16–9.95, and turbidity ranged from 0.7–8.3 NTU. There were no clear spatial trends except that turbidity was lower in the Piche River (Table 3).

Table 3. In-situ water quality measurements during aquatic habitat assessments on the Owl River, 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)
1-W	20.1	185.9	9.40	-	-
9-W	21.6	198.0	8.80	-	7.80
19	18.6	262.0	8.75	-	7.60
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	7.40
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	-	8.50
2-W	20.5	299.0	9.95	0.7	9.50

Conclusion

The Owl River fish community included walleye, white suckers, yellow perch, pike, and burbot, with walleye being the most abundant. Only four of 134 fish had tumours or lesions. Sampled individuals of walleye, white suckers, and yellow perch exhibited good condition ($K > 1.0$). This year will be a baseline for monitoring restoration and livestock exclusion fencing zones along the river.

Communications

- Submitted data to Alberta Environment and Protected Areas for inclusion in its Fisheries and Wildlife Management Information System database.
- Progress report and final project report provided to Syncrude Canada Ltd.
- A final report will be available in April 2023 at www.ab-conservation.com.

Literature Cited

- 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.

Photos



Photo 1. Juvenile walleye captured during electrofishing on the Owl River. Photo: Lindsay Dowbush, ACA



Photo 2. Example of typical habitat in the lower section of the Owl River. Photo: Lindsay Dowbush, ACA