Appendix H – Fish Data

Table H-14: 2017 Fish Assessment Results (LNDC= Longnose dace, WHSC= White sucker, BRST= Brook stickleback, WALL= Walleye, NRPK= Northern pike, SHRH= Shorthead redhorse, SPSH, Spottail shiner, YLPR= Yellow perch)

Site #	Date of Capture	Effort (sec)	Method of Electro-Fishing	Family	Fish Spp.	Fork Length (cm)	DELTS
M1	8/23/2017	3802	Backpack with Jon boat	-	-	-	-
M2	9/2/2017	2027	Backpack	Cambaridea	Crayfish	< 15	observed
	9/7/2017	2027	Backpack	Catostomidae	WHSC	< 5	observed
M3	8/30/2017	2007	Craft boat	Esocidae	NRPK	< 15	observed
M4	8/30/2017	2005	Craft boat	Esocidae	NRPK	15.2	-
				Esocidae	NRPK	15.6	-
				Esocidae	NRPK	17.1	-
				Esocidae	NRPK	15.9	-
				Esocidae	NRPK	16.7	-
				Esocidae	NRPK	16.3	-
				Esocidae	NRPK	16.5	-
				Esocidae	NRPK	16.9	-
				Esocidae	NRPK	16.5	Black spots d.
				Esocidae	NRPK	16.6	-
				Esocidae	NRPK	14.8	
M5	8/31/2017	2155	Craft boat	Catostomidae	WHSC	34.1	-
				Esocidae	NRPK	27.7	-
				Esocidae	NRPK	15	-
				Esocidae	NRPK	15.4	-
				Esocidae	NRPK	15.1	-
				Percidae	YLPR	7.8	-
				Percidae	YLPR	11.6	-
				Catostomidae	WHSC	6.6	-
				Catostomidae	WHSC	7.1	-
				Catostomidae	WHSC	6.7	-
				Percidae	YLPR	7.3	-
				Percidae	YLPR	7	-
				Catostomidae	WHSC	6.5	-
				Catostomidae	WHSC	5	-

Site #	Date of Capture	Effort (sec)	Method of Electro-Fishing	Family	Fish Spp.	Fork Length (cm)	DELTS
				Esocidae	NRPK	< 25	observed
				Esocidae	NRPK	< 25	observed
				Catostomidae	WHSC	< 30	observed
				Catostomidae	WHSC	< 30	observed
				Catostomidae	WHSC	< 30	observed
				Catostomidae	WHSC	< 10	observed
				Catostomidae	WHSC	< 10	observed
				Catostomidae	WHSC	< 10	observed
				Catostomidae	WHSC	< 10	observed
				Catostomidae	WHSC	< 10	observed
				Catostomidae	WHSC	< 10	observed
M6	8/31/2017	2100	Craft boat	Esocidae	NRPK	50.9	-
				Catostomidae	WHSC	48.9	-
				Percidae	YLPR	14.8	-
				Percidae	YLPR	7.7	-
				Percidae	YLPR	7.1	-
				Percidae	YLPR	7.2	-
				Percidae	YLPR	8.2	-
				Percidae	YLPR	11.9	-
				Catostomidae	WHSC	< 30	observed
				Catostomidae	WHSC	< 30	observed
				Esocidae	NRPK	< 30	observed
				Catostomidae	WHSC	< 30	observed
M7	8/29/2017	2078	Craft boat	Esocidae	NRPK	28.5	Black spots d.
				Catostomidae	WHSC	7.6	-
				Catostomidae	WHSC	8.1	-
				Catostomidae	WHSC	5.2	-
				Catostomidae	WHSC	8.9	-
				Catostomidae	WHSC	5.4	-
				Catostomidae	WHSC	8.1	-
				Catostomidae	WHSC	6.8	-
				Catostomidae	WHSC	7.1	-
				Gasterosteidae	BRST	3.5	-
				Cyprinidae	SPSH	3.2	-
				Catostomidae	WHSC	6.2	-

Site #	Date of Capture	Effort (sec)	Method of Electro-Fishing	Family	Fish Spp.	Fork Length (cm)	DELTS
				Cyprinidae	SPSH	6.4	-
				Catostomidae	WHSC	7.1	-
				Cyprinidae	SPSH	6.7	-
				Catostomidae	WHSC	5.9	-
				Catostomidae	WHSC	5.9	-
				Catostomidae	WHSC	6.4	-
				Catostomidae	WHSC	< 25	observed
				Catostomidae	WHSC	< 25	observed
				Catostomidae	WHSC	< 25	observed
				Catostomidae	WHSC	< 25	observed
M8	8/29/2017	2177	Craft boat	Esocidae	NRPK	32.4	black spots d.
				Catostomidae	SHRH	26.5	-
				Catostomidae	WHSC	41.9	-
				Catostomidae	WHSC	4.9	-
				Catostomidae	WHSC	7.1	-
				Catostomidae	WHSC	5.1	-
				Catostomidae	WHSC	8.5	-
				Catostomidae	WHSC	< 25	observed
				Catostomidae	WHSC	< 25	observed
				Catostomidae	WHSC	< 25	observed
				Catostomidae	WHSC	< 25	observed
				Catostomidae	WHSC	< 25	observed
				Catostomidae	WHSC	< 25	observed
				Esocidae	NRPK	< 20	observed
M10	8/28/2017	2224	Craft boat	Catostomidae	WHSC	18.5	-
				Catostomidae	WHSC	15.7	-
				Catostomidae	WHSC	14.8	-
				Catostomidae	WHSC	13.7	-
				Gasterosteidae	BRST	3	-
				Gasterosteidae	BRST	4.1	-
				Catostomidae	WHSC	7.5	-
				Catostomidae	WHSC	24.5	-
				Catostomidae	WHSC	26.6	-
				Catostomidae	WHSC	19.3	-

Site #	Date of Capture	Effort (sec)	Method of Electro-Fishing	Family	Fish Spp.	Fork Length (cm)	DELTS
				Catostomidae	WHSC	7.6	-
				Catostomidae	WHSC	24.1	-
				Catostomidae	WHSC	21.2	-
				Catostomidae	WHSC	5.8	-
M11	8/28/2017	2001	Craft boat	Catostomidae	WHSC	22.3	-
				Catostomidae	WHSC	12.4	-
				Catostomidae	WHSC	22.5	-
				Catostomidae	WHSC	15.6	-
				Catostomidae	WHSC	19.7	-
				Catostomidae	WHSC	17.5	-
				Percidae	WALL	15.9	-
				Esocidae	NRPK	23.7	-
				Esocidae	NRPK	20.1	-
				Percidae	WALL	16.9	-
				Esocidae	NRPK	24.9	-
				Esocidae	NRPK	22.7	black spots d.
				Catostomidae	WHSC	23.9	-
				Catostomidae	WHSC	16.2	-
				Catostomidae	WHSC	4.9	-
M12	8/22/2017	2833	Backpack	Cyprinidae	LNDC	7.5	-
				Catostomidae	WHSC	5.6	-
				Cyprinidae	LNDC	3.9	-
				Catostomidae	WHSC	11.2	-
				Catostomidae	WHSC	15.9	-
				Catostomidae	WHSC	12.5	-

Brook Stickleback (*Culaea inconstans*)

- Family: **Gasterosteidae**
- native Alberta species
- distributed throughout Canada & USA

Spines are used for protection against predators (Source: Google Images)

BRSB caught at M7 (Source: CPPENV 2017)

BRST nest made from twigs & other debris (Source: Google Images)

Habitat

- generalist; found in various areas of a stream, especially areas of dense vegetation & slow-moving streams

Feeding

- predominantly an insectivore; prey mainly includes insect larvae, crustaceans and fish eggs
- also eats algae and vascular plant material (omnivore)
- researchers have found stomachs empty in the winter

Spawning

- high reproductive capacity
- spawning season: May-June
- male builds a nest, courts a female into the nest who lays the eggs and then is chased out of the nest for the male to fertilize
- fecundity: 104-451 eggs. Females spawn every 3 days over a 28-day spawning period
- male guards the nest until they are hatched and then guards the fry until they are strong enough to swim away
- incubation: 8 days
- age of maturity is after one year (live until 3 years)

General Tolerance of Environmental Factors

- high tolerance of variable environmental conditions
- pH: 4.6-9.5; prefer 5.0
- temperature: 15-19°C preferred, range 4.5-22°C
- tolerant of brackish water, low oxygen levels and fragmented streams
- soft substrate, low velocity and >60% vegetation cover

[1]Stewart, D.B., Resit, JD., Carmichael, T.J., Sawatzky, C.D., and Mochnacz, N.J. 2007. Fish life history and habitat use in the Northwest Territories: brook stickleback (*Culaea inconstans*). Can. Manuscr. Rep. Fish. Aquat. Sci. 2799: vi+30p.

[2] RAM (Royal Alberta Museum). 2015. Alberta's Fish Diversity retrieved from http://royalalbertamuseum.ca/exhibits/online/fishes/family.cfm

Longnose Dace (*Rhinichthys cataractae*)

- Family: **Cyprinidae**
- native to Alberta
- commonly distributed throughout North America except the Maritimes

The LNDC shape and large pectoral fins make it adapted for fast-flowing waters (Source: Google Images)

LNDC require rocky substrates and fast-moving streams for survival (Source: Royal AB Museum Image)

LNDC caught at M12 (CPPENV 2017)

Habitat

- inhabit the area directly above the substrate
- prefers cool, fast flowing waters with rocky bottoms; they use the crevices in between rocks for protection of fast water during fatigue
- prefer riffles but will also utilize pools

Feeding

- invertivore; aquatic insects, worms, fish eggs, crustaceans and molluscs
- night feeder

Spawning

- high reproductive capacity; however specific environment conditions make it sensitive
- June to mid-August when water temperatures between 11°C and 24°C
- spawning occurs in the riffles of a stream
- defends territory in shallow riffles until a female enters his territory
- eggs are deposited in substrate below in between the small rock crevices
- incubation take 7-10 days
- parents will continue defending territory until eggs are hatched

General Tolerance

- turbidity tolerance is unknown but the species can tolerate temporarily turbid, murky or muddy waters
- velocity and the presence of riffles are the most importance factors for the existence of LNDC

[1] RAM (Royal Alberta Museum). 2015. Alberta's Fish Diversity retrieved from http://royalalbertamuseum.ca/exhibits/online/fishes/family.cfm

[2] Edwards, E.A., H. Li, and C.B. Schreck. 1983. Habitat suitability index models: Longnosedace. U.S. Dept. Int., Fish Wildl. Serv. Fws/OBS-82/10.33. 13pp.

WHSC are among Canada's most abundant and widespread fish. (source: Google images)

WHSC are considered juvenile if less >10cm fork length (Source: RAM)

WHSC caught at M5 (CPPENV)

White Sucker (*Catostomus commersoni*)

- Family: **Catostomidae**
- native to Alberta
- commonly distributed throughout North America

Habitat

- warmer shallow waters
- bottom of streams, commonly associated with large woody debris and shady areas
- substrate consists of sand, silt-clay, cobble

Feeding

- omnivore; bottom feeders that use their sub terminal mouths allow to suck up insect larvae, crustaceans, mollusc s and annelids

Spawning

- mid-May to early July or when water temperatures are 10°C
- substrate consists of gravel, sand and decaying vegetation
- prefer shallow (<1m) sections of streams and prefer gravel riffle areas of streams; in lakes along the shoreline with rocky bottoms
- at the spawning site serval males will gather around one female; their contact stimulates her to lay eggs and the males in turn fertilize them with his milt
- fecundity is from 20 000 to over 100 000 for each female over a month of spawning
- WHSC age of maturity is from 5 to 6 and they use tributaries as spawning grounds
- adults may live until 15 years of age and return to the same spawning area each year

General Tolerance

- high tolerance able to withstand turbidity, stagnant water and the alkalinity of tiny parries lakes that would kill most other species

[1] Freshwater Fishes of Canada. 1973. W. B. Scott and E. J. Crossman. Fisheries Research Board of Canada, Ottawa, Ont. Bulletin 184.
[2]Langhorne, A.L., M. Neufeld, G. Hoar, V. Bourhis, D.A. Fernet, and C.K. Minns. 2001. Life history characteristics of freshwater fishes occurring in Manitoba, Saskatchewan, and Alberta, with major emphasis on lake habitat requirements. Can. MS Rpt. Fish. Aquat. Sci. 2579: xii+170p.

NRPK are plentiful in Alberta and a popular game fish (Source: Google images)

NRPK has an exceptionally large mouth with well-developed teeth (Source: Google images)

NRPK caught at M4 (Source: CPPENV 2017)

Northern Pike (*Esox lucius*)

- Family: **Esocidae**
- introduced to Alberta
- commonly distributed throughout Canada and the USA

Habitat

- vegetated edges of lakes and rivers
- warm stretches of river with low to moderate flow
- shallow, weedy and clear waters

Feeding

- carnivorous; ambushes prey by hiding within aquatic vegetation; hunts during the day and mainly uses its sight, prefers Yellow perch and smaller fish, also known to eat birds, rodents and amphibians.

Spawning

- early spring, often before ice is completely off water; April-May (5-11℃)
- migrate to spawning grounds during the night or late evening
- prefers heavily vegetated shallow bays or flooded areas
- one female is flanked by two or more males
- fecundity average is 30 000 eggs over several days, approximately 50-60 eggs released during each spawning act
- eggs stick to vegetation and hatch after 2 weeks but remain attached for another week for protection
- males reach maturity 3-5 years; females 4-6; live up to 25 years

General Tolerance

- moderate, vulnerable to habitat alterations that modify flooded areas for spawning season

[1]Joynt, A., and M.G. Sullivan. 2003. Fish of Alberta. Edmonton, AB: Lone Pine Publishing.
[2]Nelson, J.S and Paetz M.J. 1992. The freshwater fishes of Alberta, 2nd edition. University of Alberta Press, Edmonton, AB.
[3]Brambleltt, R.G., T.R. Johnson, A.V. Zale, and D.G Heggem. 2005. Development and evaluation of a fish assemblage index of biological integrity for northwestern Great Plains streams. Transactions of the American Fisheries Society 134: 634-640.

WALL is named for its pearlescent eye, a reflective layer of pigment, used to help see in murky water and at night (Source: Google images)

Adult WALL primarily feed on other fish, while in their younger years feed on invertebrates (Source: Google images)

Walleye (*Sander vitreus*)

- Family: **Percidae**
- introduced to Alberta
- northeastern BC to Quebec and Nebraska to northern Georgia; introduced outside this range

Habitat

- large rivers; relatively deep lakes; prefers low amounts of light

Feeding

- invertivore-carnivore; feeds on fish and invertebrates

Spawning

- April-May (5℃); moderate to fast running water or over rocky shoals in lakes
- Males migrate to spawning areas first; spawning occurs at night
- Females are flanked by one or more males
- Female rushes into shallow water and turns to her side to release eggs in a ribbon formation; males then release milt
- Spawning occurs in such shallow water that dorsal fins can be seen out of the water
- Female carries 20 000-90 000 eggs per season
- Eggs settle into gravel until they hatch in 2 ½ to 3 weeks
- males reach maturity 5-7 years; females 6-9; live up to 30 years

General Tolerance

- moderate; vulnerable to over fishing and low dissolved oxygen

[1]Joynt, A., and M.G. Sullivan. 2003. Fish of Alberta. Edmonton, AB: Lone Pine Publishing.
[2]Nelson, J.S and Paetz M.J. 1992. The freshwater fishes of Alberta, 2nd edition. University of Alberta Press, Edmonton, AB.
[3]Brambleltt, R.G., T.R. Johnson, A.V. Zale, and D.G Heggem. 2005. Development and evaluation of a fish assemblage index of biological integrity for northwestern Great Plains streams. Transactions of the American Fisheries Society 134: 634-640.

Yellow Perch (*Perca flavescens*)

YLPR are the most common species caught by anglers as per total angling time spent (Source: Google images)

Juvenile YLPR caught at M5 (Source: CPPENV 2017)

Eggs; ribbon-like gelatinous band that may be up to 2m in length (Source: Google images)

- Family: **Percidae**
- introduced to Alberta
- BC to Nova Scotia

Habitat

- Common in lakes and less common in rivers
- Young stay in weeds off shorelines; older fish inhabit deeper waters

Feeding

- invertivore-carnivore; adults eat smaller fish larvae, smaller fishes, crayfish, leeches and molluscs; young feed on zooplankton and aquatic insect larvae

Spawning

- April-May; early spring after ice break-up
- shallow, sheltered, vegetated areas in tributaries
- Females are flanked by two or more males
- Eggs are released in sticky strings and draped over vegetation or rocks while fertilized
- No parental care
- Eggs hatch in 14 days
- males reach maturity 3-5 years; females 4-6; live 15 years or more

General Tolerance

- moderate; vulnerable to over fishing and lack of aquatic vegetation for protection from predators

[1]Joynt, A., and M.G. Sullivan. 2003. Fish of Alberta. Edmonton, AB: Lone Pine Publishing.
[2]Nelson, J.S and Paetz M.J. 1992. The freshwater fishes of Alberta, 2nd edition. University of Alberta Press, Edmonton, AB.
[3]Brambleltt, R.G., T.R. Johnson, A.V. Zale, and D.G Heggem. 2005. Development and evaluation of a fish assemblage index of biological integrity for northwestern Great Plains streams. Transactions of the American Fisheries Society 134: 634-640.

Spottail Shiner (*Notropis hudonius*)

- Family: **Cyprinidae**
- introduced to Alberta
- Alberta and the Northwest Territories to Quebec with southward extension to Kansas and Georgia

SPSH are one of the most important fish prey species for northern pike. SPSH swim in schools and use the black spot at the base of the caudal fin as a form of defensive deception (looks like an eye) against predators (Source: Google images)

SPSH caught at M7 (Source: CPPENV 2017)

Habitat

- Clear rivers; streams and lakes; occasionally in silty waters

Feeding

- invertivore; feeds on plankton, aquatic and surface insects, algae and fish eggs and larvae (even its own species)

Spawning

- June-August
- spawns over sand or gravel at the mouths of rivers or streams, sometimes in groups
- females release 3000 eggs per spawning season
- eggs settle to bottom of the water column
- no nest or parental care
- mature in first year; live up to 5 years

General Tolerance

- moderate; highly sensitive to sedimentation/turbidity

[1]Joynt, A., and M.G. Sullivan. 2003. Fish of Alberta. Edmonton, AB: Lone Pine Publishing.
[2]Nelson, J.S and Paetz M.J. 1992. The freshwater fishes of Alberta, 2nd edition. University of Alberta Press, Edmonton, AB.
[3]Brambleltt, R.G., T.R. Johnson, A.V. Zale, and D.G Heggem. 2005. Development and evaluation of a fish assemblage index of biological integrity for northwestern Great Plains streams. Transactions of the American Fisheries Society 134: 634-640.
[4]Kilgour & Associates LTD. 2010. Fish Habitat Assessment-Mattamy Richmond Lands Storm Water Management Option. Kilgour and Associates LTD for Mattamy Homes. Ottawa, Ontario, Canada.

Shorthead Redhorse (*Moxostoma macrolepidtum*)

SHRH caudal tail turns bright red when spawning. (Source: Google images)

SHRH subterminal mouth that is cone-shaped. Perfect for sifting through the bottom on rivers to catch invertebrates (Source: Google images)

SHRH caught at M8 (Source: CPPENV 2017)

- Family: **Catostomidae**
- native to Alberta
- Alberta to Quebec and eastern Oklahoma to eastern New York

Habitat

- Clear waters of large rivers and their direct tributaries, deep pools, back eddys in large rivers

Feeding

- invertivore; benthic feeder; feeds on aquatic invertebrates

Spawning

- males migrate to primary tributaries beginning of May
- Males defend a small area that has a gravel or rock bottom
- Females are flanked by two males when she arrives
- Female release up to 45 000 eggs
- Fertilized eggs scatter and settle to the bottom
- No nest or parental care
- Eggs hatch in 7-10 days
- Mature at 4-5 years; live up to 14 years

General Tolerance

- moderate; sensitive to silty water and remains in less muddy tributaries when the larger rivers break in spring; can also endure warmer waters than many fishes

[1]Joynt, A., and M.G. Sullivan. 2003. Fish of Alberta. Edmonton, AB: Lone Pine Publishing.
[2]Nelson, J.S and Paetz M.J. 1992. The freshwater fishes of Alberta, 2nd edition. University of Alberta Press, Edmonton, AB.
[3]Brambleltt, R.G., T.R. Johnson, A.V. Zale, and D.G Heggem. 2005. Development and evaluation of a fish assemblage index of biological integrity for northwestern