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Annual Report to Montana Fish, Wildlife, and Parks (2019)
Permit Number: 09-2019
Yellowstone River Side Channel Sampling for Age-0 Smallmouth bass

Foreword: We submit this brief report in partial fulfillment of an End of Year report as required by Montana Fish, Wildlife, and Parks (FWP) Scientific Collector's Permit (SCP) policy. We hope that the following summary of sampling methods and fish data will satisfy the immediate needs of FWP staff with regards to SCP 09-2019. Our 4-year project on the population dynamics of non-native smallmouth bass in the Yellowstone River involved the capture and enumeration of well over 150,000 small-bodied fishes, and we feel that a comprehensive submission of our diverse and atypically-structured fish data, metadata, and datasheets will occur most effectively upon completion of N. Voss's Master's Thesis (expected May 2020). This thesis will be submitted as a detailed final report to FWP collaborators, along with all associated data and materials. Nevertheless, we recognize and appreciate that our efforts would not be possible without the close collaboration of Montana FWP, therefore we will readily submit further documentation before project completion if this timeline is not satisfactory.

Summary of field sampling: We used a variety of techniques to sample age-0 smallmouth bass in side channels of the Yellowstone River across the spring, summer, and autumn 2019. We conducted all sampling alongside or in close collaboration with FWP fisheries staff, and all electrofishing conformed to FWP Electrofishing Policy.

In April 2019, we targeted age-0 smallmouth bass in side channels in attempt to quantify overwinter survival. We used FWP-owned electrofishing jet and drift boats operated by FWP staff to electrofish the lower 300 meters of five randomly-selected side channels. We only netted age-0 smallmouth bass, which we measured, weighed, and sacrificed using an overdose of buffered MS-222 at a concentration of 500mg/L (IACUC permit no. 2016-26). We only captured 20 individuals across this three-day sampling period (Table 1).

In late August and early September 2019, we used electrofishing and fyke netting techniques to capture age-0 smallmouth bass in side channels for diet analysis. However, the very small sizes of age-0 individuals at this time prevented the live-sampling of stomach contents, so we sacrificed captured individuals using the same methods as above to allow analysis of stomach contents in the laboratory. We only netted age-0 smallmouth bass while electrofishing, and did not electrofish upstream of the

Clark's Fork confluence when water temperatures exceeded > 15 °C. When seining, we did not enumerate non-target fish species and quickly released all bycatch (Table 1).

We conducted electrofishing surveys in the late autumn of 2019 with the goal of describing age-0 size at the onset of winter, which is a known determinant of age-0 overwinter mortality. Here, we sampled the same habitat and followed the same sampling methods as in April 2019, with the exception that we independently operated a large river fixed-electrode electrofishing raft owned by Montana State University. Despite low water temperatures, we captured and sacrificed 122 age-0 individuals across the three sample locations (Table 1).

Table 1: Summary of age-0 smallmouth bass sampling that occurred in 2019 in accordance with IACUC permit no. 2016-26 and SCP no. 09-2019 (allowing the sacrifice of ≤ 480 individuals). Sampling methods, locations (i.e., waterbody names, FWP Fishing Access Sites [FAS] and GPS coordinates [WGS 84]), numbers of fish captured, numbers of smallmouth bass sacrificed, and mean smallmouth bass lengths are provided for each sampling location.

Date	Sampling method	Waterbody name	Location (FAS)	Latitude	Longitude	No. fish captured	No. smallmouth bass killed	Mean smallmouth bass length (mm)
4/3/19	Large River Fixed-Electrode Electrofishing	Yellowstone River	Captain Clark	46.0759601	-107.7217625	7	7	79.6
4/4/19	Large River Fixed-Electrode Electrofishing	Yellowstone River	Duck Creek	45.6878110	-108.6515975	12	12	80.3
4/5/19	Large River Fixed-Electrode Electrofishing	Yellowstone River	Bratten	45.7264730	-109.6479893	1	1	60.0
8/19/19	Seining and Backpack Electrofishing	Yellowstone River	Captain Clark	46.0759601	-107.7217625	64	60	42.1
8/20/19	Seining and Backpack Electrofishing	Yellowstone River	Duck Creek	45.6878110	-108.6515975	52	52	45.5
8/21 - 9/5 2019	Seining and Backpack Electrofishing	Yellowstone River	Bratten	45.7264730	-109.6479893	61	60	52.8
10/23/19	Large River Fixed-Electrode Electrofishing	Yellowstone River	Captain Clark	46.0759601	-107.7217625	68	67	72.7
10/24/19	Large River Fixed-Electrode Electrofishing	Yellowstone River	Duck Creek	45.6878110	-108.6515975	24	24	78.3
10/25/19	Large River Fixed-Electrode Electrofishing	Yellowstone River	Bratten	45.7264730	-109.6479893	30	30	69.9