

ATTACHMENT #5b: Aquatics/Fisheries Monitoring Progress Summary: August 2020 - August 2021

Prepared by David Stagliano, Aquatic Ecologist, Montana Biological Survey (MBS), Helena, MT

Since August 2020, MBS has accomplished all annual aquatic biological monitoring objectives on Sheep Creek, the Smith River and selected tributaries using a before-after/control-impact (BACI) design with Tenderfoot Creek as an off-basin reference stream. We outlined this statistical design approach in the Aquatic Monitoring Plan (AMP 2017) approved by Montana Fish, Wildlife and Parks (MFWP) and adopted by Tintina Montana in December of 2017. We visited and sampled 15 long-term monitoring sites: seven Sheep Creek sites, two Smith River sites and six tributary sites (many sampled since 2014) one to multiple times during the year depending on the streamflow and approved index period of the aquatic parameters being addressed.

August 2020. Annual Chlorophyll-*a* and Stream Habitat Sampling occurred during the week of August 16th, 2020. We reported that the Chl-*a* results received in 2020 indicated algal biomass across nearly all Sheep Creek sites has been increasing to 'nuisance' levels over the last 3 years since being reported below these levels in 2015 and 2017 (MBS 2021).

October 2020. We received the Chl-*a* biomass data results from our sub-contractor, Energy Laboratories, Inc. from samples collected at 5 sites (n=5 per site) in August 2020.

October-November 2020. Fall redd count surveys were performed over three dates from late-October to mid-November 2020 to determine the number of brown trout, brook trout, and mountain whitefish using the project area streams to spawn. Brown trout spawn relatively early in Sheep Creek within the project area, and redd numbers counted in mid-October are nearly the same as those in early-November, oftentimes anchor ice and snow cover conclude redd counts by mid-November (November 6th in 2020). Redd counts of both brook and brown trout have slightly increased in 2020 compared to the previous 2 years, we attribute this to the natural breaching of a beaver dam on Sheep Creek in the project area that may have been acting as a barrier to spawning movements. We presented this data in the annual monitoring report delivered to Tintina

Montana, MT Department of Environmental Quality and MFWP in April 2021 (MBS 2021).

November 2020. We received the periphyton data results back from our sub-contractor, Rhithron Associates, Inc. from samples collected at 11 sites in late-July 2020 and delivered to their lab in Missoula, MT.

December 2020. We delivered all the raw fisheries data collected during the June to July 2020 sampling of the Tintina Monitoring Sites to MFWP in the form of a scientific collection permit report for SCP-12-2020 (Stagliano 2020).

January-March 2021. We processed, identified and provided data analysis for 48 benthic macroinvertebrate samples following MDEQ protocols (MDEQ 2012); these were collected from 12 sites outlined in the AMP 2017.

April 2021. On April 15th, we delivered a summary and analysis report of all the Aquatic and Fisheries Monitoring data collected during the prior sampling year April-October 2020 for the Tintina Project Monitoring Sites (MBS 2021) to Tintina Montana and the MFWP Fisheries Biologist in Great Falls.

April-May 2021. We conducted redd count surveys for spring-pawning rainbow trout on six Sheep Creek reaches, Moose Creek and Little Sheep Creek during two visits in late-April to early-May 2021. A new beaver dam constructed in the Fall 2020 on lower Moose Creek may add difficulty, and potentially function as a barrier, for rainbow trout attempting to access spawning areas on Moose Creek from Sheep Creek. Redd counts from previous years indicate that rainbow trout are minimally using Sheep Creek and lower Moose Creek for spawning and are ascending Moose Creek for many miles upstream to find suitable habitat.

June-July 2021. Fish population estimates and community sampling using electrofishing methods occurred in mid-June for the smaller monitoring streams (Little Sheep, Moose and Brushy Creeks) to mid-July for the larger Sheep Creek sites and the Tenderfoot Creek reference reach. We followed AMP

(2017) fish collection protocols using 2-pass electrofishing depletion methods for the smaller monitoring stream sites and mark-recapture techniques on the mainstem Sheep Creek sites. Stream flows in the project area were at record lows in July 2021 and coupled with warmer water temperatures caused us to start and end electrofishing efforts a week earlier than usual to not cause undue stress to the salmonids.

We collected and humanly euthanized five Rocky Mountain Sculpin per site from 7 sites for tissue metals analysis during this fish sampling period, and these samples are currently being analyzed at Energy Labs in Helena, MT

July 2021. Benthic macroinvertebrate sampling occurred in late-July 2021 in accordance with the mountain ecoregional index period outlined in MDEQ protocols (June 21st to October 1st; MDEQ 2012) and coincided with Hydrometrics water chemistry collections (± 5 days). We collected both replicated, quantitative Hess samples ($n=3$) and/or a semi-

quantitative EMAP reach-wide sample across 12 sites outlined in the AMP 2017.

July 2021. Benthic periphyton sampling occurred in late-July 2021 in accordance with the mountain ecoregional index period outlined in MDEQ protocols (July 1st to Sept 30th; MDEQ 2011) and coincided with Hydrometrics water chemistry collections (within ± 5 days). We delivered these samples to our sub-contractor, Rhithron Associates, Inc and they are currently being analyzed in Missoula.

August 2021. Annual Chlorophyll-*a* and Stream Habitat Sampling occurred during the week of August 2nd, 2021. Chl-*a* samples collected in 2021 are currently being analyzed at Energy Laboratories in Helena.

All biological samples and data collected for the AMP from April 2021 to November 2021 will be compiled, analyzed and summarized in a report delivered by March 31st, 2022.

LITERATURE CITED

AMP 2017. *Aquatic Biological Monitoring Plan for the Black Butte Copper Project in the Sheep Creek Basin in Meagher County, MT* prepared by Montana Biological Survey for Tintina Montana, White Sulphur Springs, MT. December 2017. 18 pages.

MDEQ 2012. *Sample Collection, Sorting, and Taxonomic Identification of Benthic Macroinvertebrates Standard Operating Procedure*. Helena, MT: Montana Department of Environmental Quality. WQPBWQM-012. <http://deq.mt.gov/wqinfo/SOPs/WQPBWQM>

MDEQ. 2011. Periphyton Sample Collection and Laboratory Analysis: Standard Operation Procedure. Water Quality Planning: WQPBWQM-011.

Montana Biological Survey (MBS) 2021. *Aquatic Monitoring Plan and Assessment Summary 2014-2020 for Streams in the Tintina Black Butte Copper Project Area of Meagher County, MT*. Report prepared for Tintina Montana, Black Butte Copper Project, White Sulphur Springs, MT 63 pp. + appendices.

Stagliano, D.M. 2020. Scientific Collection Report to MT Fish, Wildlife and Parks. Report of fish collection activities and data delivered to MFWP Region 4 Fisheries Biologist in Great Falls and Research Coordinator in Missoula, MT for SCP-12-2020. Delivered December 31st, 2020.