

## **BBC Aquatic/Fisheries Monitoring Progress Summary: August 2023 - August 2024**

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Since August 2023, MBS has accomplished all annual aquatic biological monitoring goals on Sheep Creek, the Smith River and selected tributaries using a before-after/control-impact (BACI) design with Tenderfoot and Moose Creeks as off-basin reference streams. 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 have been sampled since 2014) one to multiple times during the year based on the aquatic parameters being sampled, suitable streamflow levels and approved index period.

**August 2023.** Annual Chlorophyll-*a* and Stream Habitat Sampling occurred during the first week of August 2<sup>nd</sup>, 2023. We reported that the Chl-*a* results received in 2023 indicated algal biomass across 3 of the 5 Sheep Creek sites was at 'nuisance' levels, but less than the prior 2 years (2021 & 2022). Chl *a* levels have been over the last 5 years since being reported below these levels in 2015 and 2017 (MBS 2022).

**October 2023.** We received the Chl-*a* biomass data results from our sub-contractor, Energy Laboratories, Inc. from samples collected at 5 sites (n=5 transects per site) in August 2023. All sites except the Sheep FAS site (2 Control and 2 Impact) were significantly above the MDEQ threshold levels of 125 mg/m<sup>2</sup> (avg. 255 mg/m<sup>2</sup>).

**October-November 2023.** Fall Redd count surveys were performed over 2 dates in mid-late-October (Oct 15<sup>th</sup> & 30<sup>th</sup>) and then, an early snowstorm, anchor ice and snow cover concluded redd counts in early November 2023. These counts are used to estimate 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. Redd counts of brook trout in Little Sheep Creek were among the highest reported in 9 years, and brown trout were similar in 2023 to those reported in 2022, which have slightly increased

compared to the previous 2 years. We attribute this increase 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 summary report delivered to Tintina Montana, MT Department of Environmental Quality and MFWP in April 2024 (MBS 2024).

**November 2023.** We received the periphyton data results back from our sub-contractor, Rhithron Associates, Inc. from samples collected at 11 sites in late-July 2023 and delivered to their lab in Missoula, MT. Based on Teply's Diatom Index (TDI), only 2 Sheep Creek site (SH18.3) in 2023 had a probability of nutrient impairment; Coon Creek has consistently reported nutrient impairment TDI values for the last 5 years. Tenderfoot Creek sites approached the probability of impairment (50%) for the first time since 2014.

**December 2023.** We delivered the raw fisheries data collected during the June to July 2023 sampling of the Tintina Monitoring Sites to MT FWP in the form of a scientific collection permit report for SCP-17-2023 (Stagliano 2023).

**January-March 30<sup>th</sup>, 2024.** We processed, identified, entered data, and provided multi-metric data analysis for the 48 benthic macroinvertebrate samples following MDEQ protocols (MDEQ 2012); these were collected in July from 15 sites outlined in the AMP 2017.

**April 2024.** On April 18<sup>th</sup>, we delivered the Scientific Collection Permit (SCP) application to MT FWP for the current fish sampling year 2024. This is the 11<sup>th</sup> year of this project and the 7<sup>th</sup> year sampling under the Aquatic Monitoring Plan (AMP).

On April 22<sup>nd</sup>, we delivered the summary and analysis report of all the Aquatic and Fisheries Monitoring data collected during the prior sampling year April-October 2023 for the Tintina Project Monitoring Sites (MBS 2024) to Tintina Montana and Jason Mullan/Adam Geik, MFWP Fisheries Manager/Biologist in Great Falls.

**April-May 2024.** We were unable to conduct spring redd count surveys for spring-spawning rainbow trout on the six Sheep Creek reaches, Moose Creek and Little Sheep Creek during a visit in late-April to early-May 2024 due to turbidity because a pulse of spring snowmelt had occurred early and continued throughout May. A beaver dam constructed on lower Moose Creek in the Fall 2020 was blown out by the record high flows in May of 2023. Redd counts from previous years indicate that rainbow trout are absent from Little Sheep, while minimally using Sheep Creek and lower Moose Creek for spawning. They are likely ascending Moose Creek for many miles upstream to find suitable habitat.

**June-July 2024.** Fish population estimates and community sampling using standard electrofishing occurred in early-July (July 1<sup>st</sup> & 5<sup>th</sup>) for the smaller monitoring streams (Little Sheep {n=2 reaches}, Coon {lower} and Moose Creeks) to mid-July for the larger Sheep Creek sites and the Tenderfoot Creek reference reach (July 8-10<sup>th</sup> and July 15-17<sup>th</sup>). We followed AMP (2017) fish collection protocols using 2-pass electrofishing depletion methods for the smaller-width stream reaches and mark-recapture techniques on the mainstem Sheep Creek sites. Stream flows in the project area were about average in 2024 compared to higher flows in 2023 which had rain events into late-June. We delayed the Tenderfoot Creek 2-pass depletion sampling until July 16<sup>th</sup>, in hopes of achieving summer baseflows.

We collected and humanly euthanized five Rocky Mountain Sculpin (+5 juvenile Brook Trout from Little Sheep + 5 Rainbows <150mm) from the 6 sites for tissue metals analysis during this fish sampling period. Brook trout and Rainbow trout juveniles typically exhibited lower metal concentrations than sculpin from the same site.

**July 2024.** Benthic macroinvertebrate (BMI) sampling occurred in mid-July 2024 in accordance with the mountain ecoregional index period outlined in MDEQ

protocols (June 21<sup>st</sup> to October 1<sup>st</sup>; MDEQ 2012) and coincided with Hydrometrics water chemistry collections ( $\pm 5$  days). We collected both replicated, quantitative Hess samples (n=3) and/or a semi-quantitative EMAP reach-wide samples across all 15 sites outlined in the AMP 2017. We will process and identify these samples over the fall and winter at the MBS laboratory in Helena, MT.

**Late-July 2024.** Benthic periphyton and Chlorophyll-*a* sampling occurred during the third week of July 2024 in accordance with the mountain ecoregional index period outlined in MDEQ protocols (July 1<sup>st</sup> to Sept 30<sup>th</sup>; MDEQ 2011) and coincided with Hydrometrics water chemistry collections (within  $\pm 5$  days). We delivered these samples to our sub-contractor, Rhithron Associates, Inc in Missoula on July 18<sup>th</sup>, and to Energy Laboratories in Helena on July 23<sup>rd</sup> where they are currently being analyzed.

**August 2024.** Chlorophyll-*a* and Fish Tissue Metals Analysis results were received. Chl-*a* samples collected in late-July 2024 reported slightly less biomass than in 2023 (i.e., not all sites were at nuisance levels) despite looking very green at some sites in early-mid-July during the fish sampling.

Fish Tissue Metals Analysis samples were analyzed at Energy Labs in Helena, MT and results were delivered in early-August. Most metals were at non-detectable levels (AS, CD, CU, PB, NI) across all years, except Selenium (SE) which has increased to detectable levels across more sites in 2023, but non-detectable in the samples for 2024. Zinc concentrations also appear to be on the rise this year in both sculpin and trout samples. We will evaluate these results more fully in the Aquatics Summary Report.

All biological samples, habitat and survey data collected for the AMP from April 2024 to November 2024 will be compiled, analyzed and summarized in a report delivered to Tintina by March 31<sup>st</sup>, 2025.

#### **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://deg.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) 2024. *Aquatic Monitoring Plan and Assessment Summary 2023 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 66 pp. + appendices

Stagliano, D.M. 2023. 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-17-2023. Delivered December 28<sup>th</sup>, 2023.