

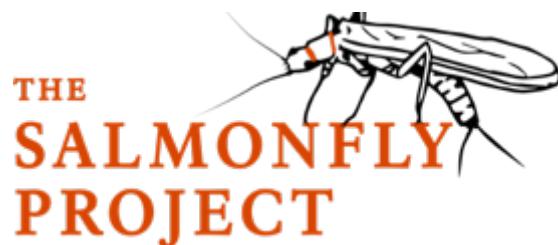
Upper Snake River Basin Aquatic Insect and Habitat Monitoring Project – 2024 Progress Report

Prepared for:
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Project Summary and Background:

The Upper Snake River Basin Aquatic Insect and Habitat Monitoring Project was initiated on the Upper Snake River in 2023 and has successfully implemented two volunteer-assisted field sampling seasons in both the Fall of 2023 and 2024. Monitoring has been generously funded by the Jackson Hole Chapter of Trout Unlimited each year. The primary objectives of the Project are to: i) track the abundance and health of aquatic insect populations over time, ii) quantify shifts in temperature, dewatering, fine sediment, water quality, and other factors that may be affecting insect populations, and iii) involve and educate local volunteers during field sampling events. For results from 2023 data collection, see our comprehensive report at salmonflyproject.org/reports.

Below, we briefly summarize progress made in 2024 and highlight plans for 2025. A full report on aquatic insect and habitat trends, along with associations between insect and habitat data, is planned for 2028, after our fifth year of data collection.

2024 Progress:

Field work:

On September 21, 2024, The Salmonfly Project (SFP) successfully led its second field sampling effort on the Upper Snake River, with collections performed 'bio-blitz style' in a single day. During sampling, six local volunteers were engaged. Volunteers were split into two teams and were led by SFP staff and Trout Unlimited Director of Engagement Partnerships, Maggie Heumann. Volunteers were trained on-site and taught basic insect biology and identification.

2024 sampling was performed at a random subset of the four sites (sites 4-7), as planned previously (Fig. 1). Sites 4-7 were in good condition and all samples were attained (24 insect samples [6 per site] and 24 fine sediment samples per site [6 per site]). Because one team finished early, they attempted to also sample at Sheep Gulch Boat Ramp (site 8). Unfortunately, however, sampling was impossible because the small riffle that had been previously targeted was buried by fine sediment likely released by a construction project at the boat ramp. This site was only of marginal quality originally, so, due to this additional disturbance, sampling at this site will be discontinued, and a nearby canyon

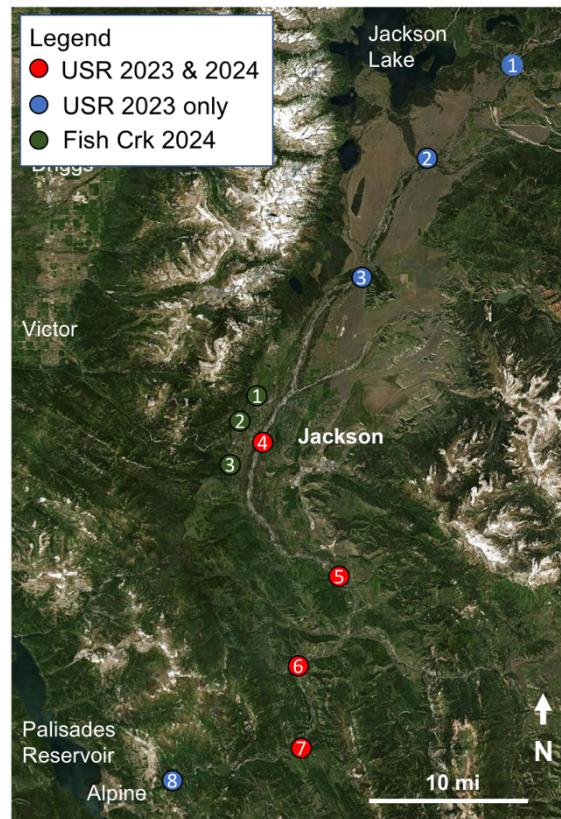


Fig. 1: Map of monitoring sites, including those sampled in 2024 – Upper Snake River (USR) (red; sites 4-7) and Fish Creek (green; sites 1-3).

site will be identified in 2025, if possible. Finding ideal sampling sites in the canyon is challenging because of the deep, constricted nature of the River through that section.

Macroinvertebrate and nutrient samples were also taken on September 21, 2024 by SFP staff at three sites on Fish Creek (Fig. 1), with sites selected according to guidance from Maggie Huemann, Trout Unlimited Director of Engagement Partnerships. Fish Creek was listed as impaired by Wyoming Department of Environmental Quality (WDEQ) in 2020 for excessive nutrient levels and *E. coli*, and our samples are intended to corroborate WDEQ results. One composite, semi-quantitative macroinvertebrate sample and one nutrient grab sample were taken at each site, using similar methods used by WDEQ. We also assessed algae and macrophyte cover, with 12 samples per site, using the same visual assessment method used to quantify fine sediment described for the Upper Snake, above.

Lab work:

Macroinvertebrates collected from the Upper Snake River were sorted, and target species were identified and enumerated in March, 2025. Additional target taxa were added in 2024, allowing for the calculation of useful macroinvertebrate-based water quality metrics, including %EPT (proportion of macroinvertebrates represented by mayflies, stoneflies, and caddisflies), %midges (proportion of macroinvertebrates represented by Chironomid midges), %Non-insect (the proportion of macroinvertebrates represented by non-insect species), total density (the number of macroinvertebrates per unit area), along with others. These additional metrics are used widely in bio-monitoring and will provide additional power to track the health of the Upper Snake River over time. For a full list of metrics we now calculate, along with the 2024 raw data, see “Upper Snake Monitoring Data 2024.csv, available at salmonflyproject.org”

Insects collected from Fish Creek were also sorted and identified in March, 2025. Macroinvertebrate-based water quality metrics were calculated for Fish Creek samples, as above, except that density was not calculated because sampling methods were semi-quantitative (see “Fish Creek Monitoring Data 2024.csv” at salmonflyproject.org). Nutrient samples from Fish Creek are currently being processed by *Science on the Fly*, a water quality monitoring nonprofit based in Massachusetts.

2024 preliminary data summary:

Although running a formal analysis on macroinvertebrate data collected in 2024 is outside the scope of this progress report, site averages for each macroinvertebrate-based water quality metric corroborate results from our full report on the 2023 data and suggest that conditions in the Upper Snake are healthy and above impairment thresholds (Table 1). %EPT, for instance, was consistently high (average = 77%), showing that the macroinvertebrates are mostly comprised of sensitive species of mayflies, stoneflies, and caddisflies. In addition, midges and non-insects, which are much more tolerant of poor water quality, had relatively low, healthy population numbers (19% and 1%, on average, respectively). Despite metrics indicating good water quality at all sites, %EPT and macroinvertebrate densities (individuals per ft²) were lower at Pritchard and Wilson. This may reflect reduced site quality, as Prichard is poorly riffled (i.e., similar to a run) and the on-going disturbance from road and bridge construction at Wilson

Bridge. Sedimentation at each site was negligible in 2024, with 0% embeddedness and 0% fine sediment measured at each site.

Table 1: Table of select macroinvertebrate-based water quality metrics from September, 2024 sampling on the Upper Snake River.

Site Name	Site #	%EPT	%Midge	%Non-insect	Density (indi/ft2)
Wilson	4	64.8%	30.5%	0.3%	801.4
South Park	5	83.1%	16.2%	0.1%	1365
Pritchard	6	70.7%	23.3%	4.8%	330.5
Elbow	7	91.4%	7.9%	0.2%	1951.8
Average	4-7	77.5%	19.5%	1.4%	1112.2

Data from Fish Creek, however, indicated poor water quality (Table 2), with only 35% EPT (the proportion of the community represented by stoneflies, mayflies and caddisflies), on average. Midges were extremely abundant, representing 54% of the community across all sites. Water quality appears to be the worst at site 2, with an average of 25%EPT, 65%midge, and 3%non-insects. Visual assessments of algae and macrophyte cover were also high, with 63% of the streambed covered by aquatic plants, on average. These results corroborate data collected by WDEQ from 2007-2011 and show that high nutrient levels are leading to the over production of algae and local macroinvertebrate communities are dominated by pollution tolerant species.

Table 2: Table of select macroinvertebrate-based water quality metrics from September, 2024 sampling on Fish Creek.

Site Name	Site #	%EPT	%Midge	%Non-insect
Wolf Mtn Ranch	1	33.93%	58.33%	4.76%
USFS	2	24.55%	64.67%	2.40%
Pine Meadow Rd	3	45.79%	41.58%	2.11%
Average	1-3	35.35%	54.22%	3.08%

2025 Plans and Expansions:

Upper Snake Monitoring:

The third macroinvertebrate and habitat sampling season for the Upper Snake River is planned for September, 2025. Our goal is to engage eight volunteers and sample at four sites, including the upper sites not sampled in 2024. Considerable effort will also be dedicated to finding a more optimal riffled sampling site near Alpine to replace site 8. A full report on insect population trends, along with associations between insect and habitat data, is planned for 2028, after our fifth year of data collection.

Idaho State University Collaboration:

SFP is collaborating with Idaho State University (ISU) professor, Dr. Colden Baxter, and Master's student, Alex Stacy, to evaluate the effects of the rapid autumn water drawdown on fish and aquatic insect populations on the Upper Snake River. This September, during the drawdown, SFP will help lead teams of volunteers to photograph and document stranding and mortality of fish and macroinvertebrates, as a result of the drawdown. SFP is currently awaiting further plans and instructions from project leadership at ISU concerning SFP's involvement and responsibilities. SFP is committed to assist in whatever way is most useful, and more details can be shared when available.

Expanded Fish Creek Monitoring Project

Further macroinvertebrate sampling is not planned for Fish Creek in 2025. This is because, after reviewing 2024 data that suggested poor water quality (summarized above), SFP reached out to the Teton Conservation District (TCD) to learn more about current monitoring efforts on the River. During initial meetings, David Lee, TCD Water Resources Specialist, suggested that additional water quality monitoring more urgently needed than macroinvertebrate monitoring so sources of nutrient pollution can be identified and mitigated. At present, TCD does not have the resources to solely lead such a monitoring effort.

TCD and SFP are now collaboratively designing a citizen science water quality monitoring project for the Fish Creek drainage, which will be led and implemented by SFP, starting in Summer, 2026. Although the program is still in early planning phases, it will likely require local volunteers to take nutrient grab samples once a month at 8-12 locations throughout Fish Creek and its tributaries. Volunteer training protocols and sampling methodology will be evaluated and approved by Wyoming Department of Environmental Quality (WDEQ) prior to data collection. WDEQ showed strong support for this project during initial meetings, and has agreed to offer guidance leading up to the evaluation and approval process. SFP is now actively fundraising for the Fish Creek Water Quality Monitoring Project (see 2025 grant proposal to JHTU), in collaboration with TCD. Project planning will continue with TCD throughout 2025, and SFP will reach out to JHTU and other groups to begin organizing and training volunteers, in Winter, 2026.

Acknowledgements:

We thank JHTU for their generous funding of the Upper Snake River Basin Aquatic Insect and Habitat Monitoring Project in 2023 and 2024. We also thank JHTU and TU staff, including Maggie Heumann, for helping organize volunteers to assist in our sampling. We thank David Lee at TCD and WDEQ staff for offering guidance and collaboration regarding monitoring of Fish Creek. We also thank Colden Baxter and Alex Stacy at ISU for inviting us to collaborate on their Upper Snake drawdown study.

Assorted Photos from 2024 Sampling

Photos:

The following photos of SFP's 2024 field sampling effort on the Upper Snake River may be shared openly on any platform to promote SFP's monitoring efforts or similar local projects.

















