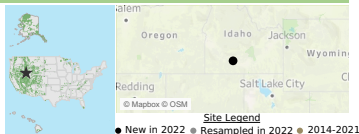




Hagerman Fossil Beds National Monument (HAFO) 2022 Data Summary

The Dragonfly Mercury Project (DMP) is a national surveillance, monitoring, and research program that brings together citizen engagement and education with scientific efforts to understand mercury (Hg) risks to protected areas. 2022 was the first year that Hagerman Fossil Beds National Monument participated in the DMP!

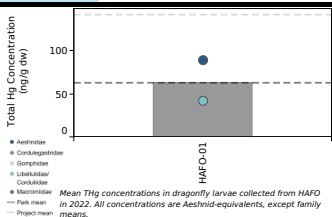


Summary

Unless noted, all Hg concentrations have been converted to their equivalent concentration in the family Aeshnidae (Eagles-Smith et al. 2020²).

The geometric mean ($\pm$ standard error) Hg concentration at HAFO in 2022 was 63.3 ± 8.3 ng/g dry weight (dw) compared to the overall (across all years of participation) park geometric mean Hg concentration of 63.3 ± 8.3 ng/g dw and the study-wide (2014–2022) geometric mean Hg concentration of 142.1 ± 0.8 ng/g dw.

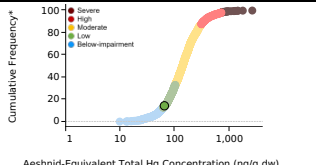
Among the one site sampled from HAFO in 2022, geometric mean dragonfly Hg concentrations ranged from 63.3 to 63.3 ng/g dw.



Integrated Impairment Index

The Integrated Impairment Index classifies Aeshnid-equivalent dragonfly total Hg (THg) concentrations into five categories based on the number of taxa estimated to exceed increasingly severe impairment benchmarks for fish, wildlife, and human health risk. Because the Integrated Impairment Index looks at potential risks to a variety of taxa it provides a more complete estimate of potential health risks than would be seen examining any single benchmark. See Eagles-Smith et al. 2020² for additional details.

- In 2022, the site sampled at HAFO was classified as 'low risk' for Hg impairment.
- Across all parks, 19% of sites sampled in 2022 were classified as 'low risk'.



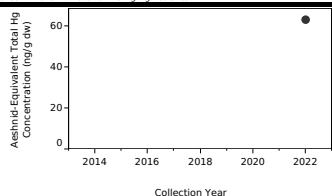
Distribution of site mean Aeshnid-equivalent THg concentrations among the five Integrated Impairment Index categories. Sites sampled from HAFO in 2022 are highlighted. *The percent of sites across all parks that have lower Hg concentrations than each of the highlighted sites.

Temporal Variation in Dragonfly Hg

2022 was the first year dragonfly THg concentrations were measured at HAFO.

What are these data and what do they mean?

- We estimated annual mean dragonfly Hg concentrations using a model that accounted for site and year differences. A Tukey HSD test identified the differences among annual means.
- These estimates enable comparisons of Hg concentrations among years and provides insights into temporal variability despite variations in yearly site selection.
- These estimates also account for variation due to sampling site as individual site characteristics have an important influence on dragonfly Hg concentrations.
- Accounting for spatial and sample size variation results in increased estimate uncertainty and the need to cautiously interpret apparent trends.

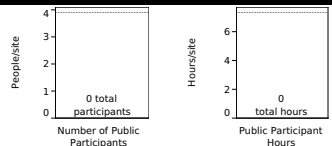


Modeled annual mean THg concentrations in HAFO Aeshnid dragonfly larvae from 2014 to 2022.

Public Engagement

The DMP engages local communities and promotes scientific curiosity while harnessing the power of public science to study mercury pollution nationwide.²

In 2022, no public participation was reported for the dragonfly collections at HAFO. Across all sites, 64% of dragonfly larvae from HAFO with field identifications were correctly identified to family.



Average (bars) and total (numbers in bars) public participants (left) and public participant hours (right) contributing to dragonfly collection at HAFO in 2022. Dotted lines indicate average values across all parks that participated in 2022.

Summary Table

Site	Site Code	Family	# of Samples	% Field ID Accuracy	Total Length Mean (mm)	Total Length Range (mm)	Total Hg Mean (ng/g dw)	Total Hg Range (ng/g dw)
Yahoo Creek wetland	HAFO-01	Aeshnidae	8	100	31.7	21.9-38.4	89.7	50-155.9
		Libellulidae/Cordulidae	7	29	18.9	12.7-25.9	30.8	25.3-43.1