

NRMRA Meeting | June 5, 2024 | Historical Museum at Fort Missoula

Barry Hicks called the meeting to order.

Michael Cummings went through the treasurer's report. In order to save money, the newsletter will start being printed in black ink only. The account balance is doing ok, but there are anticipated costs in 2024, including fall newsletter layout (\$75), Museum of Mountain Flying contributions (\$300), and fall newsletter printing and distribution.

There is a new [NRMRA webpage](#) which can be found here: [Northern Rocky Mountain Retiree Association \(nrmra.org\)](#)

Justin Jimenez, R1 Fisheries Program Manager, was the Forest Service Speaker. Justin covered a variety of topics including:

Bull Trout: Listed in 2008. USFS has over 50% of Bull Trout habitat. Bull Trout need the 4 C's: cold water, clean habitat, complex habitat, connected habitat.

Westslope Cutthroat Trout: USFS has over 80% of Westslope Cutthroat Trout habitat.

Partnerships are the key to a healthy fish and watershed program. In June 2023, the Forest Service participated on a Bull Trout Interagency Recovery Team made up of governmental and non-governmental organizations. This team is helping decide where to invest and focus resources, and is committed to a collective approach to best benefit the watersheds and fish.

There is also a nationwide keystone agreement with Trout Unlimited to improve habitat.

One of the tools being used to monitor native and non-native organisms in our watersheds is called eDNA which allows scientists to take a water sample and determine which organisms are in that water body. Justin will follow-up with additional info re: eDNA.

Notes by Tim Stauffer

-In attendance: Michael and Sue Cummings, Joe and Barb Gorsch, Barry Hicks, Tom Blunn, Bo Neilsen, Fred and Cheri Cooper, Mike Oliver, Pat and Sharon Sweeney, Tim Stauffer (FS), Justin Jimenez (FS)

Additional information about DNA work being done on fish:

From: Isaak, Daniel – FS, ID <daniel.isaak@usda.gov>

Sent: Wednesday, May 22, 2024 12:11 PM

Subject: The Aquatic eDNAAtlas Project: New database update published online with thousands of additional species occurrence results across the U.S.

Hi Everyone, Just sending word regarding the latest update of species occurrence results published online in the Aquatic eDNAAtlas, which is an open-access, crowd-sourced database being jointly developed by dozens of natural resource agencies across the U.S. The database at the eDNAAtlas Project website (<https://www.fs.usda.gov/rm/boise/AWAE/projects/the-aquatic-eDNAAtlas-project.html>) now hosts eDNA results for 51,798 species determinations associated with 30,882 unique water samples taken from streams, rivers, lakes, ponds, and wetlands for 117 species of fish, mussels, amphibians, reptiles, and even a few mammals. For a complete list of all eDNA markers that exist or are under development go here <https://www.fs.usda.gov/research/sites/default/files/2024-05/rmrs-ednatlas-assay-ngc.pdf>. Note that most species presently have results for <100 sites but more than a dozen species have data from hundreds to thousands of sites & thousands of new results are added with each periodic database update. Moreover, all the eDNA samples are archived and can be reprocessed to accommodate new species queries in the future. Also note that this update doesn't yet include results from samples collected after May of 2023 as we've spent much of the last year redesigning the database underpinning the eDNAAtlas to accommodate its growth and to make future maintenance & updates more efficient. We hope to get caught up later this year and post last summer's results before year's end and thereafter push annual updates before summer field seasons.

Species occurrence results in the eDNAAtlas are processed through the [National Genomics Center for Wildlife and Fish Conservation](#), which is a science collaborative within the Rocky Mountain Research Station of the U.S. Forest Service. All field samples were collected using the same standardized field protocol (<https://www.fs.usda.gov/treesearch/pubs/52466>), are georeferenced to reaches in the National Hydrology Dataset (<https://www.usgs.gov/core-science-systems/ngp/national-hydrography>), are accompanied by comprehensive metadata, and are easily downloadable as shapefile geodatabases using this nifty ArcGIS dynamic mapping tool (<https://usfs.maps.arcgis.com/apps/webappviewer/index.html?id=b496812d1a8847038687ff1328c481fa>). The website also contains information about the peer-reviewed publications supporting aquatic eDNA science and species-specific markers, a predefined national sampling grid at 1-km resolution for rivers and streams to facilitate planning new eDNA surveys, and contact information for project staff to assist those interesting in collecting samples to contribute to the eDNAAtlas effort. Brief non-technical descriptions of the eDNAAtlas project and example applications are contained in the attached summary papers.

The original funding to develop the eDNAAtlas database was provided by the [National Fish and Wildlife Foundation Bring Back the Natives Program](#). The database was developed to increase the efficiency & cost-effectiveness of collecting & sharing data among agencies as eDNA sampling becomes widespread and because concrete and precise information about species distributions is fundamental to addressing many questions about the status and trends of popular sport-fishes, sensitive species, and invasive species. If you have additional questions, please contact any of us & forward this email to others that may be interested in eDNA sampling of aquatic environments.

Best regards, Dan Isaak, Mike Young (retired), Taylor Wilcox, Jennifer Hernandez, Tommy Franklin, Kellie Carim, Joe Dysthe, Kristine Pilgrim, Gwynne Chandler, Dave Nagel, Sherry Wollrab, Sharon Parkes-Payne, Dona Horan, Mike Schwartz, Kevin McKelvey (retired)

Below are a few examples of how eDNA data are being used & most of the accompanying datasets are permanently archived & downloadable from the Atlas website.

1. Dysthe et al. 2018. [Repurposing environmental DNA samples—detecting the western pearlshell \(*Margaritifera falcata*\) as a proof of concept](#). *Ecology and Evolution*, 8:2659–2670.
2. Franklin et al. 2018. [Inferring habitat occupancy of the western toad \(*Anaxyrus boreas*\) species complex using environmental DNA](#). *Global Ecology and Conservation*, Doi: 10.1016/j.gecco.2018.e00438.
3. Isaak et al. 2022. [Do metapopulations and management matter for relict headwater bull trout populations in a warming climate?](#) *Ecological Applications*, p.e2594.
4. McKelvey et al. 2016. [Sampling large geographic areas for rare species using environmental DNA: a study of bull trout *Salvelinus confluentus* occupancy in western Montana](#). *Journal of Fish Biology*, 88:1215-1222.
5. Wilcox et al. 2018. [Fine-scale environmental DNA sampling reveals climate-mediated interactions between native and invasive trout species](#). *Ecosphere* 9: e02500.
6. Carim et al. 2020. [Environmental DNA Sampling Informs Fish Eradication Efforts: Case Studies and Lessons Learned](#). *North American Journal of Fisheries Management* 40:488–508.
7. Robinson et al. 2019. [Environmental DNA sampling of small-bodied minnows: performance relative to location, species, and traditional sampling](#). *North American Journal of Fisheries Management*. 39: 1073-1085.
8. Carim et al. 2019. [Using environmental DNA sampling to monitor the invasion of nonnative *Esox lucius* \(northern pike\) in the Columbia River basin, USA](#). *Environmental DNA* 1:215-226.
9. Winkowski et al. 2024. [Integrating spatial stream network models and environmental DNA to estimate current and future distributions of nonnative Smallmouth Bass](#). *Transactions of the American Fisheries Society*. 153: 180-199.

10. Young et al. 2022. [Broad-scale eDNA sampling for describing aquatic species distributions in running waters: Pacific Lamprey in the upper Snake River, USA.](#) Journal of Fish Biology 101: 1312-1325.
11. Yates et al. 2023. [Interspecific allometric scaling in eDNA production among northwestern Atlantic bony fishes reflects physiological allometric scaling.](#) Environmental DNA 5: 1105-1115.
12. Kronenberger et al. 2024. [Large-scale validation of 46 invasive species assays using an enhanced in silico framework.](#) Environmental DNA 6: e548

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Websites: [National Stream Internet project](#) [Climate Shield](#) [NorWeST Stream Temperature](#)
[The Aquatic eDNA Atlas for the American West](#) [SSN/STARS – Spatial Statistics on Stream Networks](#)

Google Scholar Profile: <http://scholar.google.com/citations?user=mnzmXpUAAAAJ&hl=en>

ResearchGate Profile: https://www.researchgate.net/profile/Daniel_Isaak/contributions?ev=prf_act
