

Rocky Mountain Research Station Science You Can Use *(in 5 minutes)*

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One Year After Launch, eDNAtlas Proves Its Worth

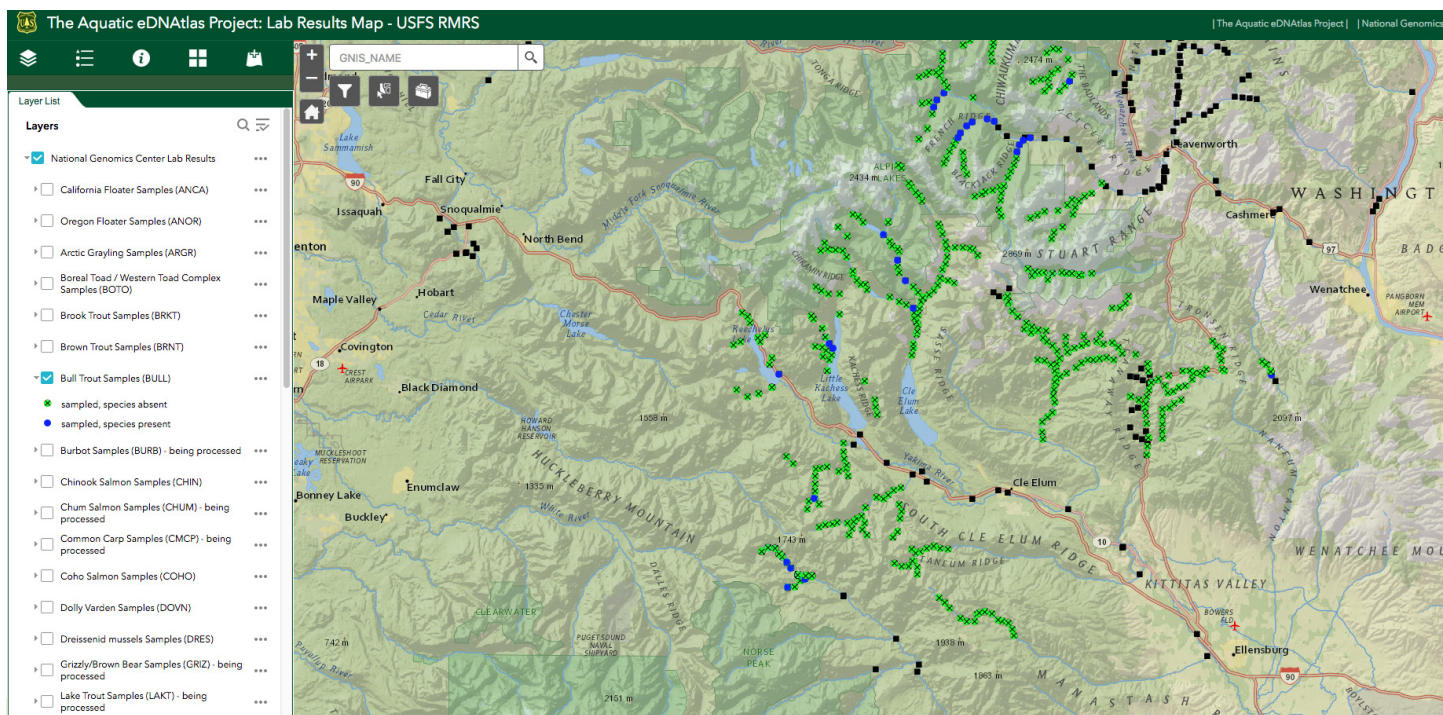
In less time than it takes a barista to make a latte, you can locate the confirmed presence of chinook salmon in Western Washington and Oregon, or the distribution of bull trout throughout the Pacific Northwest. In the coming months, you can search for the locations of slimy sculpin in freshwater streams and grizzly bear. With its interactive interface and crowdsourcing approach, the eDNAtlas is providing researchers with an unprecedented opportunity to determine where organisms are located on the landscape.

What Is the eDNAtlas?

Launched in October 2018, the eDNAtlas is an online database powered by 15,000 (and counting ...) eDNA

samples collected through multiagency partnerships with the National Genomics Center for Wildlife and Fish Conservation. These samples represent 40 species of fishes and amphibians, mussels, birds, and mammals in both the Western and Eastern United States.

By looking at hundreds or thousands of eDNA records, the public, land managers, and researchers can recognize patterns in the distribution of organisms such as bull trout and North American river otter and use that information to predict other locations where species may be present or to follow changes in habitat occupancy over time.



Through eDNAtlas' web application, you can view the confirmed locations of a certain species, as well as the sites that have been sampled but yielded no positive results. This image shows the location of bull trout in the area surrounding the city of Cle Elum in Eastern Washington State. With this geographic data, researchers and land managers can create species distribution models.



More Samples Means More Questions Can Be Answered

Michael Young is a Research Fisheries Biologist with the USDA Forest Service Rocky Mountain Research Station and project co-lead of the eDNAtlas project. He has seen positive reaction to the availability of the eDNAtlas. “Everybody is excited about having the information available,” he said. “They recognize the value of having other people see the data and being able to use it for their own conservation purposes.

“As the eDNAtlas grows in size, each datapoint becomes more valuable because now there’s more context for thinking about presence or absence at each one of those points,” Young added. “It becomes more feasible for managers to build species distribution models because we have much more comprehensive data now.”

Managers need these species distribution models to inform a variety of management planning and decision-making. One such example: “When you get into Endangered Species Act species consultations, it removes a lot of uncertainty by knowing definitively whether a species is there or not,” said Daniel Isaak, a Research Fisheries Biologist and project co-lead with the USDA Forest Service Rocky Mountain Research Station.

Updates Are Already in the Works

Isaak describes the eDNAtlas as a living database that will grow over time. An eDNA sampling grid for the lower 48 states has already been built, and there are plans to incorporate data from Alaska, Hawaii, and even Puerto Rico. Also coming soon are samples from other kinds of habitats. “Right now, we’re focused on rivers and streams, but people are also collecting samples from ponds and seeps and wetlands and lakes and we will be incorporating those samples in a future update,” Isaak said.



The basic equipment to collect an eDNA sample consists of a water pump, battery, and tubing to siphon water from the stream. The equipment fits in a small day pack that is easily carried by a hiker (Photo: USDA Forest Service, D. Isaak).

PROJECT LEADS

Daniel Isaak is a Research Fisheries Biologist and project co-lead with the USDA Forest Service Rocky Mountain Research Station. Isaak can be contacted at Daniel.isaak@usda.gov or connect with him at <https://www.fs.usda.gov/rmrs/people/disaak>.

Michael Young is a Research Fisheries Biologist and project co-lead with the USDA Forest Service Rocky Mountain Research Station. Young can be contacted at Michael.young@usda.gov or connect with him at <https://www.fs.usda.gov/rmrs/people/mkyoung>.

KEY MANAGEMENT CONSIDERATIONS

- The eDNAtlas contains over 15,000 samples from the Western and Eastern United States. Because the samples are archived, biologists can later test the samples for the presence of other species.
- The use of eDNA to confirm the absence or presence of a species is valuable when determining the success of a habitat restoration project, assessing the presence of federally listed species, or evaluating local distributions.
- The public, researchers, and land managers can download results from the eDNAtlas website for dozens of species in different portions of the United States through a dynamic ArcGIS online mapping tool, <https://www.fs.fed.us/rm/boise/AWAE/projects/eDNAtlas/edna-atlas-contacts.html>
- Land managers, resource biologists, and citizen science groups with projects of interest can contribute and participate in this collaborative project: <https://www.fs.fed.us/rm/boise/AWAE/projects/eDNAtlas/edna-atlas-contacts.html>

FURTHER READING

Dysthe, J.; Rodgers, T.; Franklin, T.; [et al.]. 2018. Repurposing environmental DNA samples—detecting the western pearlshell (*Margaritifera falcata*) as a proof of concept. Ecology and Evolution. 8: 2659–2670. www.fs.usda.gov/rmrs/publications/repurposing-environmental-dna-samples-detecting-western-pearlshell-margaritifera

McKelvey, K.; Young, M.; Knotek, W.; [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. www.fs.usda.gov/rmrs/publications/sampling-large-geographic-areas-rare-species-using-environmental-dna-study-bull-trout

Wilcox, T.; Young, M.; McKelvey, K.; [et al.]. 2018. Fine-scale environmental DNA sampling reveals climate-mediated interactions between native and invasive trout species. Ecosphere. 9: e02500. www.fs.usda.gov/rmrs/publications/fine-scale-environmental-dna-sampling-reveals-climate-mediated-interactions-between

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