



Pacific Northwest Environmental DNA Laboratory

Columbia River Basin Aquatic Invasive Species Webinar

December 2, 2020

David Pilliod & Matthew Laramie

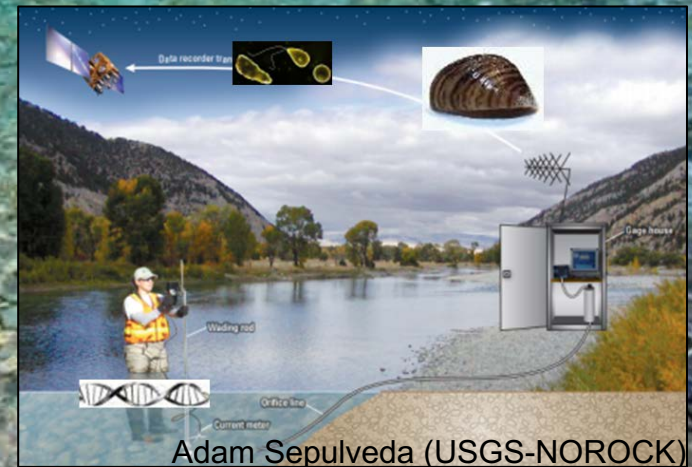
Pacific Northwest Environmental DNA Laboratory

USGS - Forest and Rangeland Ecosystem Science Center

Boise, Idaho

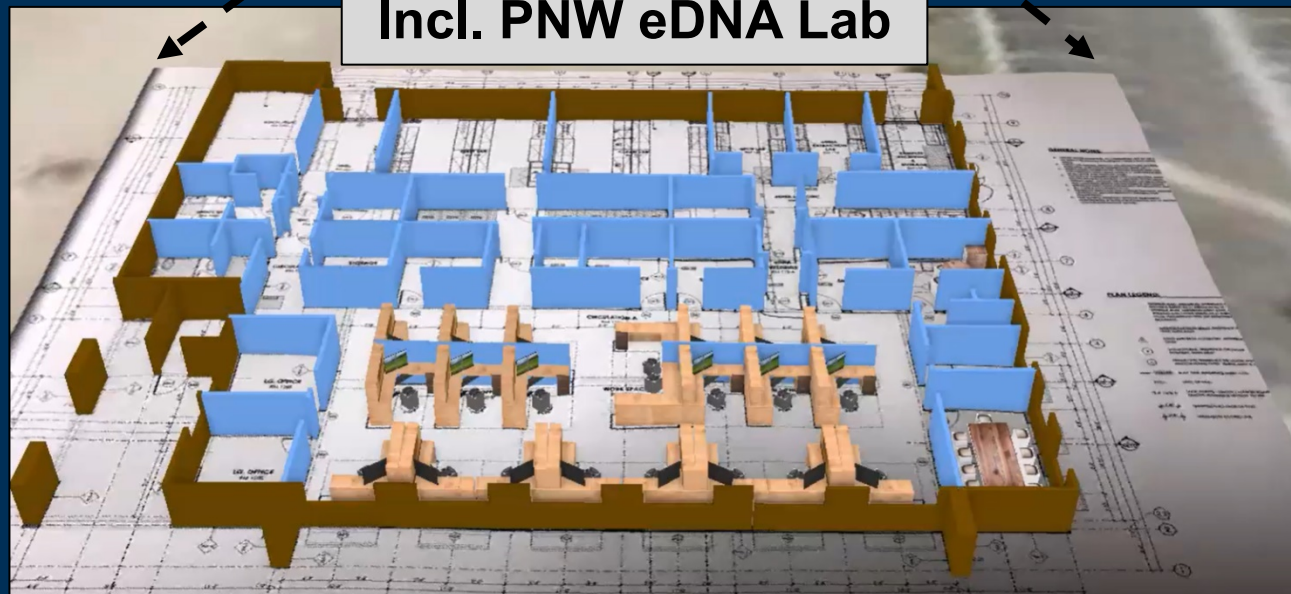
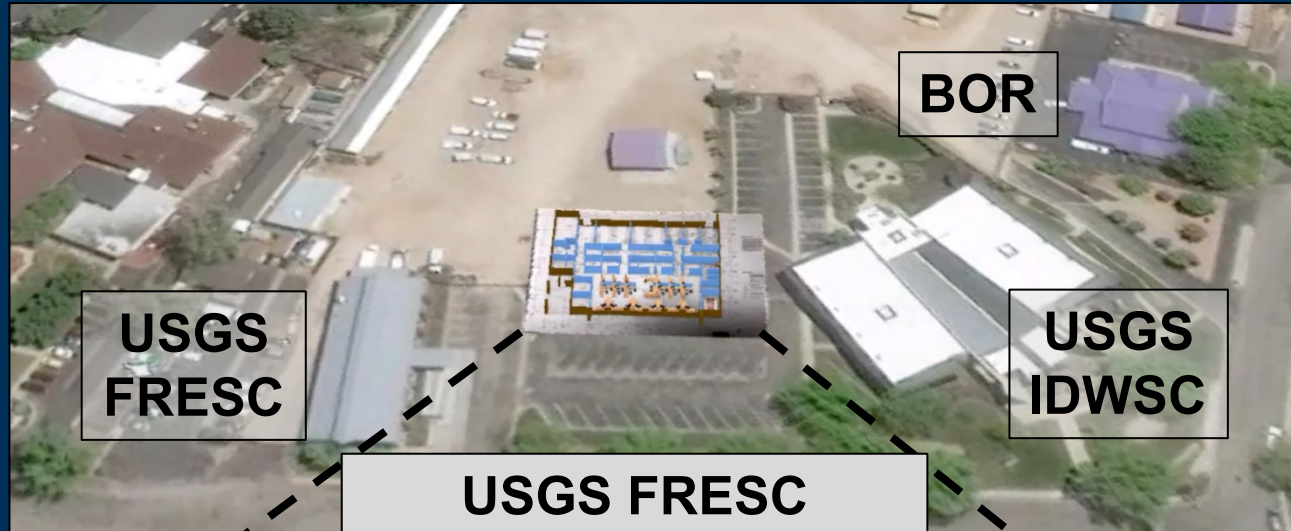
Email: dpilliod@usgs.gov, mlaramie@usgs.gov

Environmental DNA (eDNA)



PNW eDNA Laboratory - Boise, Idaho

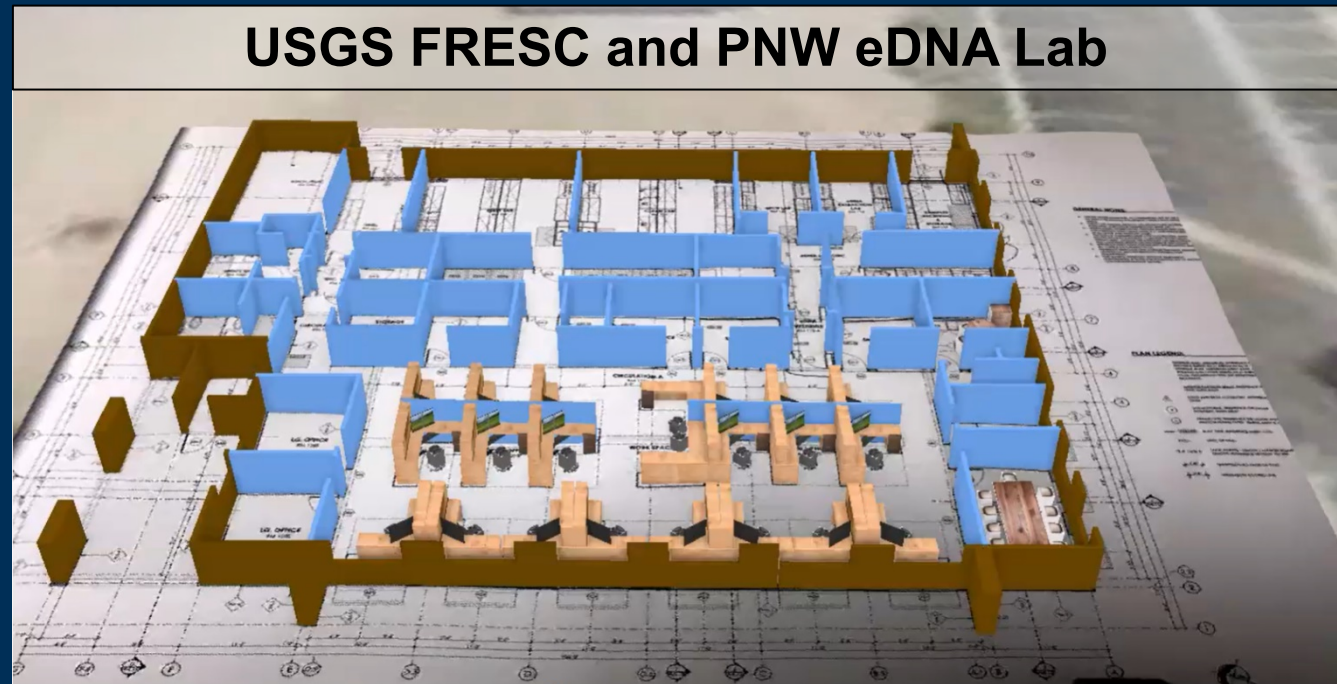
Estimated completion date: May 2021



What makes this lab different?

Built from ground up with eDNA in mind

- Informed facility design
 - Isolated cleanrooms
 - Independent air flow
 - Automatic UV sterilization
 - PCR/HEPA hoods
 - qPCR
 - USGS striving to raise the standards for eDNA



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Relevant Projects:



Monitoring the distribution of reintroduced spring-Chinook in a large transboundary basin



Photo by Ron Nichols, NRCS

Laramie, M.B., Pilliod, D.S., Goldberg, C.S., 2015, Characterizing the distribution of an endangered salmonid using environmental DNA analysis: *Biological Conservation*, v. 183, p. 29-37, <https://doi.org/10.1016/j.biocon.2014.11.025>.

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Relevant Projects:

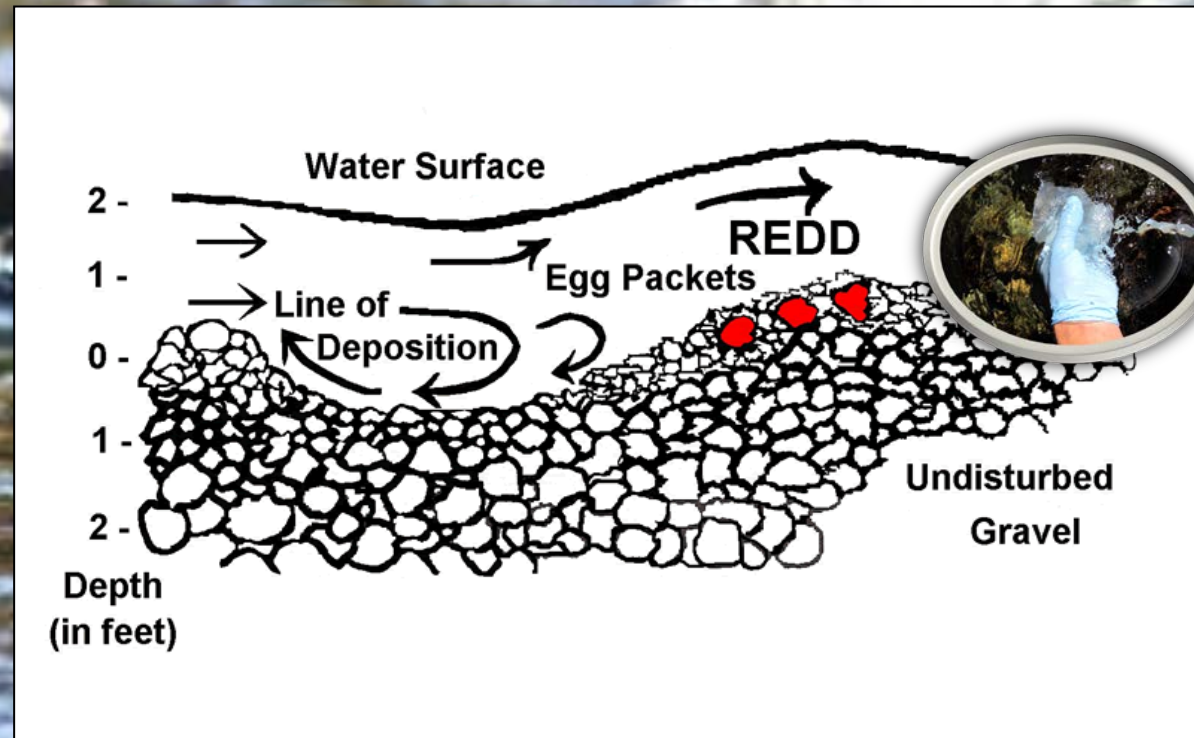
Pacific Lamprey 'Back-in-Time' (2012 to present)
and Translocation



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Relevant Projects:

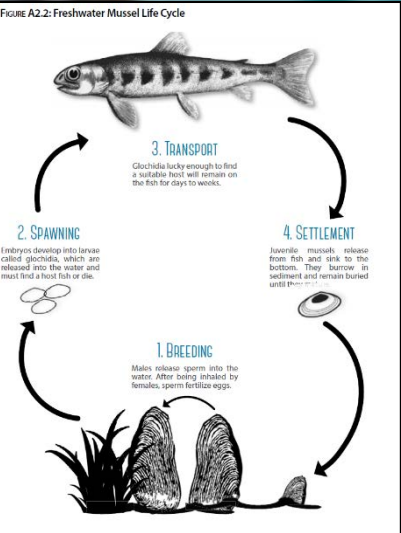
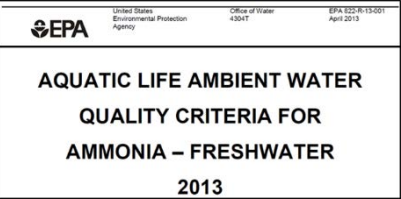
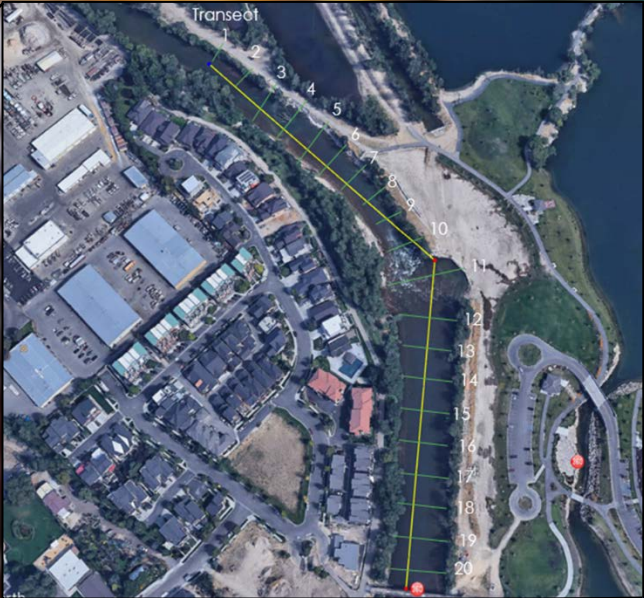
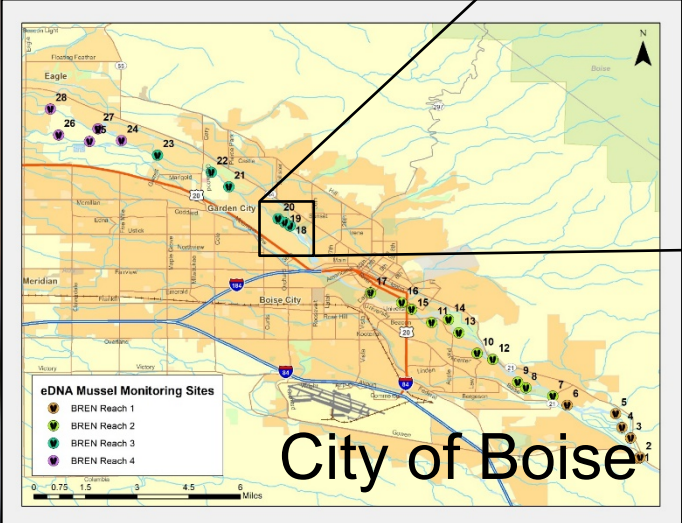
Distinguishing coho and Chinook salmon redds using eDNA



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Relevant Projects:

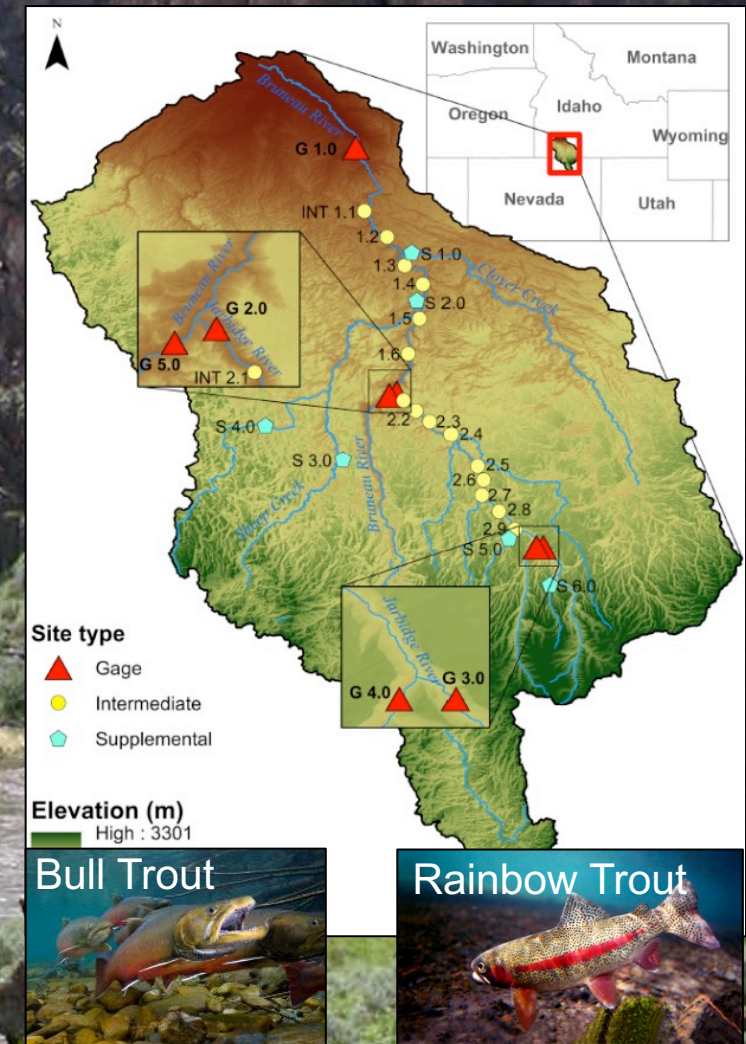
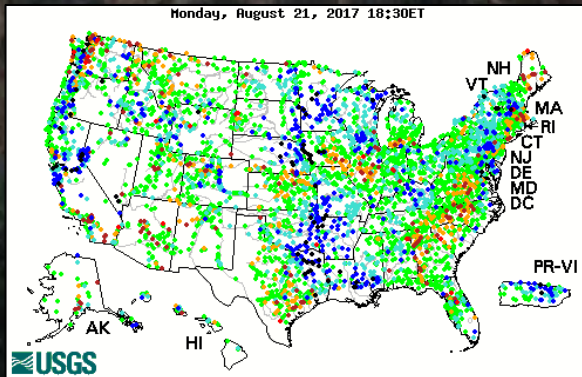
The search for freshwater mussels in the lower Boise River



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Relevant Projects:

Integration of eDNA monitoring within the USGS National Streamgauge Network



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Relevant Projects:

**Biosurveillance of reservoirs by eDNA
monitoring at downstream USGS
streamgages**



Sepulveda, A. J., C. Schmidt, J. Amberg, P. Hutchins, C. Stratton, C. Mebane, M. B. Laramie, and D. S. Pilliod. 2019. Adding invasive species biosurveillance to the U.S. Geological Survey streamgage network. *Ecosphere* 10(8):e02843. 10.1002/ecs2.2843

PNW eDNA Lab is regional hub for eDNA research and monitoring

Partners include:

- City & municipalities
- States
- Federal agencies
- Indigenous tribes
- Colleges and Universities
- Private companies
- and Non-profit organizations



And others...

Potential for science/research laboratory *and* a service facility

Research Laboratory -
advance the science

- Protocol and assay development
- Biological & environmental mechanisms
- Study design & ecological interpretation

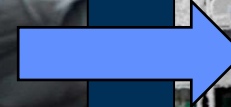


Service Facility -
established monitoring

- High throughput sample processing
- Timely reporting to meet partner needs

Archive of species distribution

- Each sample is archive in itself with timestamp
- Opportunity to mine samples
(e.g., pre/post-disturbance, extinction, AIS invasion)
- Requires retention and physical storage



Moving forward ...



How can eDNA help to tackle AIS issues?

- Early detection & assessing efficacy of treatments





Questions?

David S. Pilliod

Supervisory Research Ecologist

Pacific Northwest Environmental DNA Laboratory

USGS Forest and Rangeland Ecosystem Science Center

970 Lusk Street, Boise, ID 83706

Phone: 208-426-5202

Email: dpilliod@usgs.gov

Website: <https://www.usgs.gov/staff-profiles/david-s-pilliod>

Matthew B. Laramie

Ecologist & Laboratory Manager

Pacific Northwest Environmental DNA Laboratory

USGS Forest and Rangeland Ecosystem Science Center

970 Lusk Street, Boise, ID 83706

Phone: 208-426-5230

Email: mlaramie@usgs.gov