Desneiges (Deni) Murray

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She/her/hers

EDUCATION

PhD Student – Natural Resources and Earth System Sciences 2021 - Present
University of New Hampshire – Department of Natural Resources and the Environment
NASA FINESST Recipient
Advisor: Dr. Adam Wymore GPA: 3.9 **expected graduation date May 2025*

M.S. Freshwater Ecology and Biogeochemistry 2020
Utah State University - Department of Watershed Sciences
Advisor: Dr. Janice Brahney GPA: 3.9

B.Sc. in Evolution, Ecology and Conservation Biology 2016
Minors: Environmental Studies; Environmental Science and Resource Management
University of Washington
GPA: 3.3

PUBLICATIONS

Pesantez, J., Birkel, C., Gaona, G., Arciniega-Esparza, S., **Murray, D.S.,** Mosquera, G., Celleri, R., Mora, E., Crespo, P. (2023) Spatially distributed tracer-aided modelling to explore DOC dynamics, hot spots and hot moments in a tropical mountain catchment. ***Hydrological Processes***. https://doi.org/10.1002/hyp.15020

Murray, D.S., Moges, E., Larsen, L., Shattuck, M. D., McDowell, W. H., and Wymore, A. S. (2023). Quantifying the synchrony of wet deposition N inputs and watershed N exports using information theory. *Water Resources Research*. https://doi.org/10.1029/2023WR034794

Wymore, A., Larsen, W., Kincaid, D., Underwood, K., Fazekas, H., McDowell, W., **Murray, D.S.**, et al., (2023). Revisiting the power-law analysis for the assessment of concentration-discharge relationships. *Water Resources Research.* https://doi.org/10.1029/2023WR034910

Murray, D.S., Neilson, B.T., and Brahney, J. (2023) Beaver-pond geomorphology influences sediment nitrogen retention and denitrification. *Journal of Geophysical Research: Biogeosciences.* https://doi.org/10.1029/2022JG007199

Murray, D.S., Cole, I., Nunez, N., Parker, E., Lowien, A., Herreid, A.M., Donovan, M., Fazekas, H.M., and Wymore, A.S. (2023) The Environmental Responsibility Framework: a toolbox for recognizing and elevating ecologically conscious research. *Earth's Future.* https://doi.org/10.1029/2022EF002964

Murray, D.S., Shattuck, M.D., McDowell, W.H., and Wymore, A.S. (2022) Nitrogen wet deposition stoichiometry: the role of organic nitrogen, seasonality, and snow. *Biogeochemistry*. https://doi.org/10.1007/s10533-022-00966-0

Murray, D.S., Neilson, B.T., and Brahney, J. (2021) Source or sink? Quantifying beaver pond influence on non-point source pollutant transfer in the Intermountain West. *Journal of Environmental Management, 285:112127*. https://doi.org/10.1016/j.jenvman.2021.112127

PRESENTATIONS

Murray, D.S., and Wymore, A. S. *Drivers of wet deposition organic matter concentrations and composition at the continental scale.* American Geophysical Union Fall Meeting 2023.

Murray D.S. (invited speaker) *The Environmental Responsibility Framework*. University of Puerto Rico, December 2023.

Murray D.S. (Invited speaker and panelist). *Beaver pond age and shape matter for realizing positive benefits on water quality.* Beaver Institute. August 2023.

Murray, D.S., Moges, E., Larsen, L., Shattuck, M. D., McDowell, W. H., and Wymore, A. S. S*ynchrony of nitrogen wet deposition inputs and watershed exports using information theory*. Gordon Research Conference, June 2023.

Murray, D.S., Moges, E., Larsen, L., Shattuck, M. D., McDowell, W. H., and Wymore, A. S. *Quantifying the synchrony of wet deposition N inputs and watershed N exports using information theory*. American Geophysical Union Fall Meeting 2022.

Murray, D.S., Larsen, L., Newcomer, M., and Wymore, A. S. *The Critical Zone Biogeochemistry and Hydrology Data Pipeline*. American Geophysical Union Fall Meeting 2022. ***Selected for Outstanding Student Presentation Award**

Murray, D.S. (Invited Talk) *The Critical Zone Biogeochemistry and Hydrology Data Pipeline.* CUAHSI Webinar Series, November 2022.

Murray, D.S., Shattuck, M.D., McDowell, W.H., and Wymore, A.S. *Nitrogen wet deposition stoichiometry: the role of organic nitrogen, seasonality, and snow.* Joint Aquatic Sciences Meeting, 2022, Atmospheric Nitrogen Deposition Session

Murray, D.S., N. Bouwes, B. Neilson and J. Brahney, *Can beavers mitigate NPS pollution?* AFS-TWS Joint Conference 2019, Special Session Beaver Restoration.

Murray, D.S., B. Neilson and J. Brahney, *Can beavers mitigate NPS pollution?* Society of Freshwater Science Conference 2019, Contributed Session 10 Biogeochemistry.

Murray, D.S., (Invited Talk) "Beaver Pond Water Quality and Chemistry" Bear River Water Quality Task Force. National Resources Conservation Services, Logan, UT. 2018

Murray, D.S., B. Neilson and J. Brahney, *Beaver Induced Biogeochemical Alterations in Mountain Streams* Society of Freshwater Science Conference 2018, Poster Session 10 Land-Water Boundaries.

Murray, D.S., K. Hulvey and E. Thacker, *Managing grazing practices to maintain ecosystem services in riparian areas: A case study from the Intermountain West* Ecological Society of America Conference 2017, Poster Session 38 Ecosystem Management.

GRANTS & FELLOWSHIPS

2023 National Center for Atmospheric Research Graduate Visitor Program Fellowship
2022 NASA FINESST Fellowship Recipient, $150,000
2023 Andean-Amazonian Watershed Experience Fellowship, $6,000
2022 CUAHSI Hydroinformatics Innovation Fellowship, $5,000
2018 Extension Water Initiative Grant, J. Brahney (PI), B. Neilson, D. Murray, $21,482
2014 Frye-Rigg-Hotson Undergraduate Research Grant, $1,500

SCHOLARSHIPS & AWARDS

2022 Outstanding Student Presentation Award American Geophysical Union 2022, $250
2019 Utah State University Robbins Award Master's Student Researcher of the Year
2019 Royal Society of Chemistry Water Science Forum Bursary Award, $2,530
2019, 2018 Utah State University Ecology Center Graduate Research Support, $4,800
2018 Society of Wetland Scientists, Student Research Award, $1,450
2018 Society of Freshwater Science Endowment Award, $1,000

PROFESSIONAL & RESEARCH EXPERIENCE

PhD Candidate *University of New Hampshire, Department of Natural Resources* Aug 2021-present

NASA Future Investigators in NASA Earth and Space Sciences and Technology (FINESST) recipient for work investigating the role of wet deposition in watershed-climate biogeochemical feedbacks:

- Understand the role of organic nitrogen, seasonality and snow on nitrogen wet deposition stoichiometry inter and intra-annual trends. (https://doi.org/10.1007/s10533-022-00966-0)
- Quantify the synchrony of wet deposition nitrogen inputs and watershed nitrogen outputs using information theoretic algorithms (https://doi.org/10.1029/2023WR034794)

- Data pipeline construction (Python, Jupyter Notebooks) to harmonize timeseries of watershed-scale critical zone attributes and apply this dataset to determine the influence of climate and landscape variability on watershed inputs and exports of solutes.
- Determine the spatial variability of wet deposition organic nitrogen and carbon concentrations, optical properties, and sources across U.S. ecoregions
- Assess the influence of biogenic volatile organic carbon production on properties of wet deposition organic carbon and nitrogen in the Northern Andes of South America

Advisor: Dr. Adam Wymore, ECOSHEDS lab

Freshwater Ecologist *Ryder Environmental, Dunedin New Zealand* Jan 2020-July 2021

- Writing technical reports for clients such as regional councils, Department of Conservation, and private companies
- Managing large (> 300,000 observations) timeseries datasets (e.g., Hilltop, LAWA)
- Performing field assessments and processing environmental samples

Supervisor: Dr. Ruth Goldsmith

Masters Student – *Utah State University, Department of Watershed Sciences* 2017-2020
Environmental Biogeochemistry and Paleolimnology Lab

- Quantified the effects of beaver ponds on the biogeochemical cycling of nitrogen, phosphorous, and trace heavy metals https://doi.org/10.1016/j.jenvman.2021.112127; https://doi.org/10.1029/2022JG007199
- Analyzed nutrients (DIN, NH_4, NO_3, DRP, TN, TP) in water and sediments to create nutrient budgets and analyzed trace heavy metals to understand filtering capacity of beaver ponds
- Measured biological proxy data (e.g., C and N isotopes, C: N, and chlorophyll-*a*) from sediment cores to understand the source and processing of nitrogen within beaver ponds
- Organized and completed all fieldwork and lab work independently

Advisor: Dr. Janice Brahney

Data Analyst *Utah State University* Aug 2016-Feb 2018

- Managed and analyzed a large dataset (plant species and height along 100 m transects)
- Performed preliminary statistical analysis of data, organization of files and data visualization in Microsoft Excel, SPSS and R.

Supervisor: Dr. Kristin Hulvey

Field Crew Leader *Utah State University* May-Aug 2016

- Managed a rangeland riparian ecosystem services research project in northern Utah that aimed to quantify the differences in ecosystem services across a variety of cattle grazing techniques.
- Directed water quality testing, soil sampling, vegetation sampling and data curation

Supervisor: Dr. Kristin Hulvey

Independent Research *University of Washington* June-Aug 2014

- Performed a manipulative experiment to determine relative drought stress of Sub Alpine Fir (*Abies lasiocarpa*) and Trembling Aspen (*Populus tremuloides*) to detect phenotypic plasticity vs. local adaptation.

Supervisor: Dr. Leander Love-Anderegg

Field Technician *University of Washington* Aug-Sept 2014

- Plant community ecology fieldwork (e.g., identification, height, count, diversity) as part of a project that assessed the effects of climate change on Douglas Fir and Western Red Cedar range.

Supervisor: Dr. Janneke Hille Ris Lambers

TEACHING EXPERIENCE

CONNECT STEM Technical Writing Instructor	*University of New Hampshire*	Aug 2022, 2023
Connors Writing Center Graduate Writing Assistant	*University of New Hampshire*	2021 - present
Workshop: R programming skills	*Ryder Environmental*	Mar 2021
Workshop: National Policy Statement for Freshwater Management	*Ryder Environmental*	Nov 2020
Teaching Assistant: Water and Society	*University of Washington*	2016

OUTREACH & SERVICE

Reviewer: Journal of Hydrology; Journal of American Water Resources Association		2021 -present
NRESS Student Network Committee Member	*University of New Hampshire*	2022-present
Ecology Center Seminar Committee Member	*Utah State University*	2018-2019
Graduate Student Council Member	*Utah State University*	2018-2019
Waituna Lagoon Reconsenting Technical Committee Member	*Ryder Environmental*	May 2021

RELEVANT COURSES

University of New Hampshire – Natural Resources and Earth Systems Science

- Hydrologic Data Analysis in Python; Soil Biogeochemistry; Grant Writing; Environmental Justice Cartography; Anti-racism in STEM

Utah State University – College of Natural Resources

- Advanced Limnology; Biogeochemistry; Linear Mixed Effects Modeling in R; GIS fundamentals; Data Analysis and Programming in R; Water Quality and Pollution; Communicating Science

University of Washington – Dept. of Biology; School of Environmental Forestry; School of Aquatic Fisheries

- Environmental Communication; Problems in Resource Management; Foundations in Ecology; Conservation Biology; Ornithology; Native Plant Production; Limnology; Plant Ecophysiology; Ecological Modeling

PROGRAMMING

- Python and Jupyter Notebooks
    - Data pipelines, loops, data cleaning, data visualization and plotting, time series, interpolation, gap filling, API calls from NASA, NOAA, and USGS, statistical modelling, information theoretics
- R statistical software (dplyr, tidyr, ggplot2, lme4, NADA, vegan)
    - Pipelines, loops, mixed modelling, time-series regressions, categorical analyses, time series analysis of water quality data, ordinations
- Spatial data analysis
    - ArcGIS, QGIS, R
    - Cartography and analysis of vector and raster data
    - DJI drone operation and DroneDeploy photo stitching software
- Other modelling experience
    - System of Environmental Flow Analysis stream temperature modelling
    - Rating curves for nutrient loads
    - Airmass modelling using NOAA HYSPLIT
    - National Center for Atmospheric Research Community Earth System Model

LAB & FIELD INSTRUMENTS

University of New Hampshire Water Quality Analysis Lab (supervisor: Dr. Adam S. Wymore)

- Absorbance and Fluorescence analyses; SmartChem; ion chromatography; high-performance liquid chromatography (HPLC)

Utah State University (supervisors: Dr. Janice Brahney, Dr. Bethany Neilson, Dr. Soren Brothers)

- YSI Sonde Probe, Marsh McBirney Flow meter, Picarro Greenhouse Gas Analyzer, Lachat Quikchem, SpectraMax M2e Plate Reader, Shimadzu GHG-GC

Utah State University Geochemistry Lab (supervisors: Dr. Dennis Newell and Andrew Lonero)

- Costech 4010 Elemental Analyzer, Inductively Coupled Mass Spectrometer

PROTOCOLS

Utah State University (supervisor: Dr. Janice Brahney)

- Loss on ignition; stream habitat delineation; benthic and pelagic respiration experiments (light/dark); dissolved oxygen continuous monitoring; *in-situ* nitrogen mineralization experiments; sediment oxygen demand experiments; IDEXX coliform bacteria analysis

Ryder Environmental Ltd., New Zealand (supervisor: Dr. Greg Ryder and Dr. Ruth Goldsmith)

- Periphyton monitoring (percent cover, species abundance); electric fishing (single pass and multi-pass methods); rock scrubbings for chlorophyll-*a* analysis; eDNA sample collection; fish identification

CERTIFICATIONS

Wilderness First Aid	*Desert Mountain Medicine*	2019
Wilderness First Responder	*Wilderness Medicine Training Center*	2016
AIARE 1 –	*American Institute for Avalanche Research and Education*	2016
Rock Climbing Instructor	*YMCA and University of Washington*	2013-2017