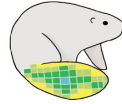


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ECOHYDROLOGY

BEAVERS

REMOTE SENSING

EDUCATION

Ph.D. Geological Sciences, University of Colorado Boulder (2015 – 2019)
Certificate in Hydrologic Sciences
Certificate in College Teaching
NDSEG Fellow

B.A. Physics & Chemistry (*double major*), Carleton College (2010 – 2014)
cum laude

APPOINTMENT HISTORY

California State University Channel Islands
Environmental Science and Resource Management
Assistant Professor (2019 – present)

University of Colorado Boulder
Geological Sciences
Lecturer (2019)
ASSETT Fellow (2018 – 2019)
NDSEG Fellow (2015 – 2018)

UNAVCO
Professional Development Instructor (2019)
RESESS Graduate Fellow (2018)

Los Alamos National Laboratory
Systems Engineer (2014 – 2015)

RESEARCH

Peer Reviewed Publications

* = undergraduate student supervised

Fairfax, E., & *Whittle, A. (in revision), Calculating Landscape-Scale Surface Water Storage in Beaver Ponds Using Google Earth: a Case Study and Discussion of Uncertainties

Fairfax, E. & *Whittle, A. (2020), [Smokey the Beaver: beaver-dammed riparian corridors stay green during wildfire throughout the western USA](#). Ecological Applications. doi:10.1002/eap.2225

Fairfax, E., & Brown, M. R. M. (2019), [Increasing Inclusion and Accessibility in Undergraduate Geology Labs Through Scenario-Based TA Training](#). Journal of Geoscience Education. DOI: 10.1080/10899995.2019.1602463

Fairfax, E., & Small, E. E. (2018), [Using remote sensing to assess the impact of beaver damming on riparian evapotranspiration in an arid landscape](#). Ecohydrology 11(7). doi:10.1002/eco.1993

Published Data

* = undergraduate student supervised

Fairfax, E. & *Whittle, A. (2020): Google Earth Path Files of Beaver Dams and Ponds in Laramie Ranger District, Medicine Bow Routt National Forest, WY. PANGAEA, <https://doi.pangaea.de/10.1594/PANGAEA.913923>

Fairfax, E. & *Whittle, A. (2019): Normalized Differenced Vegetation Index (NDVI) of riparian areas with and without beaver damming within wildfire perimeters in Western US. PANGAEA, <https://doi.pangaea.de/10.1594/PANGAEA.900944>

Invited Speaking

(upcoming) Natural Area Association Beaver and Fire Symposium. April 22nd, 2021.

(upcoming) California Beaver Summit. April 9th, 2021.

(upcoming) California Fire Science Webinar Series. March 16th, 2021

(upcoming) ASWM Beaver Restoration Webinar. March 10th, 2021

(upcoming) University of Colorado Boulder Gamification Community of Practice Presentation – Gamifying Your Classroom. March 2nd, 2021

(upcoming) Beavers and Climate Change Panelist and Presenter for San Luis Obispo Beaver Brigade and Beaver Believers. February 21st, 2021

Beavers and Climate Change Panelist and Presenter for Scott River Watershed and Beaver Believers. January 21st, 2021

[California Naturalist Program Seminar \(CONES\) – Smokey the Beaver.](#) January 19th, 2021

[NOAA Monster Seminar Jam – Smokey the Beaver.](#) January 14th, 2021

[Oxford Real Farming Conference: Farming and Climate Change – How Beavers Can Help.](#) January 10th, 2021

[University of Nevada Reno Ecology and Evolutionary Biology Colloquium.](#) November 12th, 2020

[CSUCI Mathematics Colloquium.](#) October 26th, 2020

Beavers and Climate Change Panelist for Friday Harbor Film Festival and Beaver Believers. October 21st, 2020

[Bark! Smokey the Beaver.](#) October 15th, 2020

Beavers and Climate Change Panelist for Beaver Coalition and Beaver Believers. October 5th, 2020

[AGU H3S and CUAHSI Panel on Scientific Communication at Conferences.](#) June 26th, 2020

[Beavers without Borders.](#) BeaverCON 2020. March 3rd, 2020

[Smokey the Beaver: Can Beaver Dams Help Protect Riparian Vegetation During Wildfire?](#) Webinar for the U.S. Forest Service. January 28th, 2020

[Dam Big Data.](#) CSUCI Computer Science Colloquium. October 15th, 2019.

[Beavers: the other professional engineer.](#) AEG (Association of Environmental and Engineering Geologists) Mile High Chapter Meeting. May 14th, 2019.

Conference Presentations

* = *undergraduate student supervised*

Fairfax, E. and *Whittle, A. (2019) Smokey the Beaver: Can Beaver Dams Help Protect Riparian Vegetation During Wildfire?, AGU Annual Fall Meeting 2019

Fairfax, E. (2019) How Can You Talk About Your Research and Tell a Story Without Saying Any Words? With a Little Bit of Patience and Whole Lot of Felt: Lessons Learned from Creating and Sharing an Elevator Video, AGU Annual Fall Meeting 2019

Fairfax, E. (2018) Roll a Water Check! Using Games to Teach Hydrology, submitted for Pop-Up Talk at AGU Annual Fall Meeting 2019

Fairfax, E. and E. E. Small. (2018) Over, Under, or Through: How the leakiness of a beaver dam influences groundwater-surface water interactions, AGU Annual Fall Meeting 2018

Fairfax, E. and M. R. M. Brown. (2018), Increasing Inclusion and Accessibility in Undergraduate Geology Labs Through Scenario-Based TA Training, AGU Annual Fall Meeting 2018

- M. R. M. Brown. and **Fairfax, E.** (2018), Assessing Accessibility Climate: What under- graduates think about accessibility in the geoscience classroom, AGU Annual Fall Meeting 2018
- *Whittle, A., & **Fairfax, E.** (2018), Beaver Ponds are a Major Contributor to Surface Water Storage in the Medicine Bow-Routt National Forest, Laramie Ranger District, WY, USA. AGU Annual Fall Meeting 2018
- Fairfax, E.** (2018), Roll a Water Check! Using Game-Based Learning to Correct Common Alternate Conceptions of the Hydrologic Cycle. Center for STEM Education 10th Annual Symposium, Boulder, CO.
- Fairfax, E.** and E. E. Small. (2017), The Role of Beaver Ponds in Maintaining Vegetation Health During Droughts: A Case Study at Susie Creek and Maggie Creek, NV, GSA Fall Meeting Abstracts 2017
- Fairfax, E.** and E. E. Small. (2016), Hyporheic Exchange in a Stream Dammed by Beaver: A 1D Simulation with Spatial Energy Head Gradients and Heterogeneous Hydraulic Conductivity as Drivers, AGU Fall Meeting Abstracts 2016
- Fairfax, E.** and E. E. Small. (2016), 1D Simulation of Hyporheic Exchange in a Stream Dammed by Beaver, GSA Fall Meeting Abstracts
- Fairfax, E.,** et al. (2015), PBO H2O: Monitoring the Terrestrial Water Cycle with reflected GPS signals recorded by the Plate Boundary Observatory Network, AGU Fall Meeting Abstracts.

Funding

Pending Funds (\$150,000)

Sadegh, M., **Fairfax, E.,** Asanjan, A. (2021-2022). Remote Sensing of Beaver Dams in Northwestern U.S. with Very-High-Resolution Satellite Imagery. NASA SmallSat. Pending (\$150,000)

Awarded External Funds (\$202,500)

Fairfax, E. (2020-2021) Research Grant: Beavers, Climate Change, and Ecosystem Resilience. Special Project. (\$18,725)

Fairfax, E. (2020). Remote Sensing to Identify Beaver Dams in Priority Areas in Newfoundland and Labrador, Canada. World Wildlife Fund Canada Special Contract. (\$5000)

Fairfax, E. (2018) AWG (Association for Women Geoscientists) Takken Student Research Presentation Travel Award (\$500)

Fairfax, E. (2018) RESESS (Research Experience in Solid Earth Science for Students) Geological Sciences Graduate Fellowship (\$7000)

Fairfax, E. (2017) GSA (Geological Society of America) Rocky Mountain Section Travel Grant (\$75)

Fairfax, E. (2017) GSA (Geological Society of America) Graduate Student Research Grant, Geological Society of America: Drought Buffering in Riparian Areas Along Susie Creek, Nevada: The Role of Beaver Damming (\$2100)

Fairfax, E. (2015-2018) National Defense Science and Engineering Graduate Fellowship (NDSEG), Army Research Office, Air Force Office of Research, and ASEE (\$169,500)

Awarded Internal Funds (\$106,256)

Fairfax, E. (2021). Climate Change Be Dammed – the role of beavers in a warming arctic. CSUCI Summer SURF Student Research Program. (\$14,000)

Fairfax, E. (2020-2021) Undergraduate Research Funding via HSI-SMART: STEM Model for Research and Teaching Undergraduate-intervention Program (*PI David Gillespie, \$2.5M award*) (\$26,200)

Fairfax, E. (2020) Teaching and Learning Innovations Fellowship. CSUCI. (\$19,292)

Fairfax, E. (2020) Your B.S. isn't BS: ESRM Speaker Series (ESRM 496). CSUCI Instructionally Related Activities Fund. (\$6,800)

Fairfax, E. and Patsch, K. (2019). Data without Borders: Establishing a Collaborative Cross-Border Environmental Drone and GIS Research Program in Todos Santos, Baja California Sur, Mexico. CSUCI Faculty Research & Development Mini-grant. 2019-2020. (\$7,979)

Blackwood, E., Fairfax, E., and Patsch, K. (2019). In a Repository Far, Far Away: Using virtual reality to bridge the gap between Santa Rosa Island data and the people who care about it. CSUCI Faculty Research & Development Mini-grant. 2019-2020. (\$7,990)

Fairfax, E. and Patsch, K. (2019). I See CI: Virtual Reality Exploration of Santa Rosa Island. CSUCI Summer SURF Student Research Program. (\$14,000)

Fairfax, E. (2018) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: ET Across Beaver-Dammed Landscapes. (\$1000)

Fairfax, E. (2018) United Government of Graduate Students Travel Grant (\$500)

Fairfax, E. (2018) Conference Travel Grant, CU Boulder Department of Geological Sciences (\$800)

Fairfax, E. (2018) Penny E. Patterson Graduate Research Grant, CU Boulder Department of Geological Sciences: Using the Leakiness of Beaver Dams to Assess their Hydrologic Function in a Landscape (\$1095)

Fairfax, E. (2018) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: Surface Water Storage in Beaver Ponds (\$1000)

Fairfax, E. (2017) University of Colorado Graduate School Travel Grant (\$300)

Fairfax, E. (2017) Birkeland Graduate Scholarship Research Grant, CU Boulder Department of Geological Sciences: Using Remote Sensing to Evaluate the Role of Beaver Ponds in Buffering the Effects of Drought on Nearby Riparian Vegetation (\$1500)

Fairfax, E. (2016) Conference Travel Grant, CU Boulder Department of Geological Sciences (\$800)

Fairfax, E. (2016) Spetzler Research Grant, CU Boulder Department of Geological Sciences: Beaver Dam Shallow Subsurface Hydrology (\$2000)

Fairfax, E. (2016) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: Beaver Dam Catalogue (\$1000)

Student Mentorship and Advising

Undergraduate Students

Beaver Dam Hydrology

Cooper Lienhart. *Cal Poly*. (2020-present)
Ramie Klocko. *CSUCI*. (2020-present)
Sizzinette Hernandez. *CSUCI*. (2020-present)
Brandon Osorio. *CSUCI*. (2020-present)
Keitreice Kirksey. *CSUCI*. (2020-present)
Viviana Celeya. *CSUCI*. (2020-present)
Natalie Perez. *CSUCI*. (2020-present)
Kyle Ball. *CSUCI*. (2019-2020)
Jaquie Lazeau. *CSUCI*. (2019-2020)
Andrew Whittle. *CU Boulder*. (2017-2019)
Sean Will. *CU Boulder*. (2018)
Alexis Ahlert. *CU Boulder*. (2017)
Danya Abelhameid (2017)
Sage Basiri. *CU Boulder*. (2017)
Connor Jansen. *CU Boulder*. (2017)
Claire Czarnecki. *CU Boulder*. (2016)

Virtual Reality and Field Accessibility

Emily Orsborn. *CSUCI*. (2020-present)
April Hoberg. *CSUCI*. (2020-present)
Alyssa Connaughton. *CSUCI*. (2019-present)
Jenny Shirhall. *CSUCI*. (2019-2020)
Jen Bayes. *CSUCI*. (2019-2020)

Data Visualization

Jenny Shirhall. *CSUCI*. (2019)
Nikolette Dussault-Martin. *CSUCI*. (2019)
Alyssa Connoaughton. *CSUCI*. (2019)

REU Program Involvement

CSU Channel Islands Summer SURF (2020, 2021)
Research Experiences in Solid Earth Sciences for Students (RESESS) (2017 - 2019)
Geo-Launch Pad (2018 - 2019)
Research Experiences for Community College Students (RECCS) (2018)

TEACHING

Teaching Experience

California State University Channel Islands

ESRM 100: Introduction to Environmental Science and Resource Management

ESRM 203: Environmental Statistics

ESRM 303: Data Visualization and Climate Communication

ESRM 328: Introduction to GIS (Geographic Information Systems)

ESRM 400: Analytics Studio

ESRM 463: Water Resources Management

University of Colorado Boulder

GEOL 1010: Introduction to Geological Sciences

GEOL 2001: Planet Earth (Teaching Assistant)

GEOL 4241: Geomorphology (Teaching Assistant)

UNAVCO RESESS and GeoLaunchPad Internships

Research Skill Development for Community College Interns

Professional Communication Skills for All Interns

Field and Off-Campus Programs

3-Day Field Trip to Santa Rosa Island, CA, USA. For ESRM 328: Introduction to GIS. (2019)

2-Week Program in Todos Santos, Baja California Sur, Mexico. UNIV 392: Data Without Borders. Partnership with Colorado State University. Scheduled January 2021. Postponed due to COVID-19.

Professional Development

Full Courses

URGE (Unlearning Racism in Geoscience) CU Boulder Pod. (2021)

THRIVE Online Educator Training. CSU Channel Islands. (2020)

Equity in STEM for All Genders. CIRTL. (2018)

Addressing Implicit Bias in STEM. CIRTL. (2018)

Practicing Scientific Teaching. CU Boulder. (2018)

Evidence-Based Teaching. CIRTL. (2018)

Teaching and Learning in Geoscience. CU Boulder. (2017)

Pedagogy in Environmental Science. CU Boulder. (2017)

Workshops and Short Courses

60+ hours focused primarily on equity, accessibility, and technology in higher education

COMMUNITY ENGAGEMENT

Organization Advising and Working Relationships

[The Beaver Trust](#): Scientific Advisory Board. (2020-present)

[The Beaver Coalition](#): Science and Technical Information Committee (STIC) Member. (2020-present)

[SLO Beaver Brigade](#): Partner Scientist. (2020 – present)

[Biodiversity First!](#): Project Scientist. (2020 – present)

Public Outreach Presentations

[Guided Beaver Nature Walks](#). Atascadero, CA.

- > Three walks on June 27, 2020.
- > One walk on Aug 2, 2020.
- > Two walks on October 23, 2020

Virtual Presentation for 4H Hiking Club New Jersey. May 2020

[Public research talk for CSUCI Library Lecture Series at Camarillo Public Library](#). Smokey the Beaver: Can Beavers Prevent Wildfires? Scheduled March 2020, cancelled due to COVID-19

[Public research talk for CSUCI Library Lecture Series at Ojai Public Library](#). Smokey the Beaver: Can Beavers Prevent Wildfires? October 2019

[Lens on Climate Change](#) Mentor and Interviewee. 2018, 2019

Creative Pieces

[Finding a Home](#). Digital Art. 87 Beavers Project. (2020)

[What do beavers have to do with wildfire?](#) Stop-Motion Animation. (2019)

[#HaikuYourResearch](#). Poetry. (2018)

MEDIA COVERAGE

Video Media

KEYT, CBS LA, affiliate networks. [CSUCI study shows beavers can help prevent wildfires](#). (2020)

Yale Climate Connections. [Creative Climate Communication: 4 Scientists, 4 Approaches](#). (2019)

Radio and Podcasts

KQED Science Radio. Beavers and wildfire. (2021)

KVTA Radio. Beavers and wildfire. (2020)

Artemis: Hunt to Eat. [Beaver Believers \(!\) with Emily Fairfax](#). (2020)

Water Talk. [Beaver Hydrology and Management](#). (2020)

Ask a Scientist. [Dr. Emily Fairfax - Beavers](#). (2020)

SciPod. [Oh Dam Look, That Beaver Just Put Out A Forest Fire!](#) (2019)

Curiosity Hour. [Emily Fairfax, PhD](#). (2019)

The Irrelevant Information Podcast. [Beavers](#). (2019)

Written and Online Media

[Frequent features](#) on Martinez Beavers: Worth a Dam. (2018 – present)

[Frequent features](#) on SLO Beaver Brigade. (2019 – present)

Wikipedia article: "[Environmental Impacts of Beavers](#)"

Wikipedia article: "[Beaver](#)"

aeon. [Evolution's Engineers](#). (2021)

BBC Wildlife. [Beavers' activities can create oases and limit spread of US wildfires](#). (2020)

Bark!. [A Tale of Two Streams](#). (2020)

Fire Adapted Network. [If fire were an animal, it would be a beaver](#). (2020)

KEYT. [CSUCI study shows beavers can help prevent wildfires](#). (2020)

New Times SLO. [SLO County Beaver Brigade raises awareness of beavers in the Salinas River](#). (2020)

The Atascadero News & Paso Robles Press. [SLO Beaver Brigade Sets the Stage for Academic Research](#). (2020)

Wildlife Society. [Beavers create fire-resistant forest patches](#). (2020)

The Register-Guard. [Smokey Beaver?](#) (2020)

Le Monde. [Les castors font barrage aux feux de forêt](#). (2020)

Nature Daily Briefing. [Why beavers make great firefighters](#). (2020)

- National Geographic. [How beavers became North America's greatest firefighter](#). (2020)
- National Association of Science Writers. [Let beaver's do the work: fighting wildfire one dam at a time](#). (2020)
- Edible Magazine Ojai and Ventura County. [Dammed if They Don't](#). (2020)
- Edible Magazine Ojai and Ventura County. [Tour a Stream with a Beaver Expert](#). (2020)
- Popular Science. [Beavers might be making the arctic melt even faster](#). (2020)
- Natural Resources Defense Council (NRDC): Rockies Dispatch. [The Humble Beaver: troublemaker or climate superhero?](#) (2020)
- University of California Cooperative Extension Forestry. [From being an engineer to researching nature's engineers](#). (2020)
- The Confluence. [From being an engineer to researching nature's engineers](#). (2020)
- Medium. [God Dam: Why Rivers Need Beavers](#). (2020)
- Climate Ready Missoula. [Ecosystems and Wildfire](#). (2020)
- Global Weather and Climate Center. [Relationship between beavers and wildfire](#). (2020)
- San Francisco Estuary Magazine. [Beaver dams may offer wildfire protection to western watersheds, in addition to providing better-known benefits such as groundwater recharge, wetland and habitat creation, and riparian restoration](#). 2020
- Landscape Architecture Magazine. [Smokey the Beaver](#). (2020)
- Clark Fork Coalition. [Beaver Habitat Surveys in Western Montana](#). (2020)
- Eos. [Finding Wildfire's Fingerprint in the Atmosphere](#). (2020)
- NASA Landsat Science News. [Smokey the Beaver? Beaver Dams and Wildfire](#). (2019)
- Eos. [Are beavers nature's "little firefighters?"](#). (2019)
- Colorado Arts and Sciences Magazine. [Instructors improve accessibility of geology](#). (2019)
- Ojai Valley News. [Wildfire? Drought? Leave it to Beavers](#). (2019)
- USGS and NPS. [Fire History of the Jemez Mountains](#). (2019)
- Mountain West News. [Scientists turn to video, art, graphics to convey data](#). (2019)
- Yale Climate Connections. [Four scientists make creativity a key to communicating their research](#). (2019)
- The Singing Wilderness. [What do beavers have to do with wildfire?](#) (2019)
- The Coloradan Magazine. [Emily Fairfax wants you to appreciate beavers](#). (2019)
- The Verge. ['Dam good' video shows how beavers could fight fires](#). (2019)
- Edge Effects Magazine. [How a beaver became a twitter star](#). (2019)
- Cottage Life Magazine. [PhD student's creative video shows how beavers help prevent fires](#). (2019)
- The Kids Should See This. [Beaver dams and wildfire, a stop motion demonstration](#). (2019)
- Lake Superior Magazine. [Smokey the Beaver?](#) (2019)

- ClimateCocks.com. [What do beavers have to do with wildfire?](#) (2019)
- cnBeta.com. [A cute video showing how beavers fight wildfires raises attention on twitter.](#) (2019)
- LangweileDich.net. [Stopmotion zeigt positive Nebeneffekte von Biber-Dämmen.](#) (2019)
- LetemSvětém Applem. [Twitter válčuje naučné stop-motion video. Mrkněte na něj i v.](#) (2019)
- Beavers and Brush. Beavers: [California's Missing Keystone to Mitigate Wildfire Risk.](#) (2019)
- CU Arts and Sciences Magazine. [CU Boulder's geoscientists, ranked world's best, show- case rock-it science.](#) (2019)
- Eos. [Can you express your science in 17 syllables?](#) (2018)
- CU Boulder Today: [Drones, beaver dams help community college students get involved in research.](#) (2018)
- Earth Magazine. [Beavers preserve wetlands in water-stressed areas.](#) (2017)

PROFESSIONAL SERVICE

Campus Leadership

Justice and Equity With an Environmental Lens (JEWEL) Student Club Faculty Advisor, California State University Channel Islands. (2020-present)

Committee Membership

California Beaver Summit Planning Committee. (2021)

Curriculum Committee, California State University Channel Islands. (2019-present)

Hydrologic Sciences Committee Member, University of Colorado Boulder. (2018-2019)

Colloquium Committee Member, University of Colorado Boulder. (2016-2019)

One-Time Events (Workshops, Panels, etc.)

AGU Outstanding Student Presentation Award Judge (2019)

Building Educational Computer Games – Faculty Workshop: Workshop Creator and Facilitator (2019)

Gamifying Your Class - Faculty Workshop: Workshop Creator and Facilitator. (2019)

Accessibility and Inclusion Training for New Teaching Assistants, Organizer and Facilitator. (2018, 2017)

Panelist for Professional and Educational Developers (PED) Learning Community at CU Boulder (2018)

Advisory Board Graduate Student Poster Session Organizer (2018)

Geological Society of American Annual Fall Meeting Student Volunteer (2017)

Peer Reviewer

Ecohydrology

Hydrologic Processes

Journal of Geoscience Education Research

Journal of the American Water Resources Association

Legislative-Citizen Commission on Minnesota Resources

NSF Hydrologic Sciences Division

River Research and Applications

Scientific Reports

Wetlands

Professional Society Membership

American Geophysical Union (2015 – present)

Geological Society of America (2015 – present)

Ecological Society of America (2020 – present)

The International Association for Geoscience Diversity (2016 – present)

National Association for Geoscience Teachers (2016 – present)

Association for Women Geoscientists (2016 – present)