

# Lia Ossanna

PHD CANDIDATE · RANGELAND AND RESTORATION ECOLOGIST

School of Natural Resources and the Environment, University of Arizona, Tucson, AZ 85719, USA

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## Education

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### University of Arizona

Tucson, AZ

PHD CANDIDATE IN NATURAL RESOURCES, ECOLOGY OF RANGELANDS

Aug. 2020 - Present

- Advisor: Dr. Elise Gornish
- Minor in Data Science
- Dissertation: Restoration solutions for dryland vegetation management

### University of Arizona

Tucson, AZ

BS IN ENVIRONMENTAL SCIENCE WITH HONORS, SUMMA CUM LAUDE

Aug. 2015 - May 2019

- Minors in Sustainable Plant Systems and East Asian Studies
- Thesis: Nitrogen dynamics as an indicator of mine waste revegetation progress

## Professional Experience

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### PhD Candidate

Tucson, AZ

UNIVERSITY OF ARIZONA

Aug. 2020 - Present

- Currently conducting analysis to measure dryland plant response to inter- and intra-annual precipitation variability at RestoreNet sites, a USGS restoration project spanning across 21 sites in the southwestern US.
- Currently sampling and analyzing invasive buffelgrass (*Pennisetum ciliare*) response to variable precipitation in the Sonoran Desert, examining variation in recovery to drought across slope and aspect.
- Conducted and published a systematic review and meta-analysis on a management technique that reduces invasive plants using soil carbon amendments.
- Analyzed 10 years of vegetation monitoring for rock detention structures to slow erosion on a southern Arizona ranch; employed structural equation modeling to analyze soil chemical and microbial responses from the 10th year. Working in collaboration with Altar Valley Conservation Alliance.
- Assisted in surveying and analyzing invasive buffelgrass (*Pennisetum ciliare*) distribution in an urban ecosystem.

### Research Specialist

Tucson, AZ

UNIVERSITY OF ARIZONA

May 2019 - Aug. 2020

- Analyzed microbial diversity, community composition, and soil microbe-plant relationships for rubber biosynthesis and hard rock mine reclamation in arid lands.
- Worked with Bridgestone Tires to optimize rubber production from guayule (*Parthenium argentatum* G.), a shrub native to the Southwest. Guayule has the potential to produce high-quality rubber from a drought-tolerant crop.
- Managed lab group's quality control standards and protocol optimization for DNA extractions and qPCR.

### Undergraduate Researcher

Tucson, AZ

UNIVERSITY OF ARIZONA

July 2016 - May 2019

- Researched mine revegetation to support sustainable reclamation management practices by analyzing quality of waste rock and capping materials (soil samples).
- Managed total nitrogen analysis and DNA extractions for soil and waste rock samples.
- Completed individual research on biogeochemical indicators of soil quality, and the effects of nitrogen cycling and fertility island on ecosystem regeneration for senior Honors Thesis.

## Skills

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- Field work** Plant surveys and rangeland monitoring, soil sampling, plant identification (for the Southwestern US).
- Software & coding** Certified Carpentries Instructor, R/RStudio, git/GitHub, Markdown, Quarto, Unix shell, high performance computing (HPC), Microsoft Office, Shiny apps,  $\LaTeX$ , ArcGIS Pro.
- Laboratory analyses** DNA extraction, PCR, qPCR, amplicon sequencing analysis, soil chemical analysis, gel electrophoresis.
- Collaboration** Experience working directly with land management stakeholders, including nonprofit members, government agencies, landowners, and industry representatives; experience presenting research to scientific and non-scientific audiences.

## Fellowships & Awards

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### FELLOWSHIPS

- 2023-2024 **Senior Data Science Ambassador**, University of Arizona
- 2022-2023 **Data Science Ambassador**, University of Arizona
- 2022 **Science Fellowship**, Altar Valley Conservation Alliance
- University Sprint Participant**, The Opportunity Project, US Census Bureau
- 2020-2024 **NSF Graduate Research Fellow**, National Science Foundation
- 2020-2021 **Graduate College Fellowship**, University of Arizona
- 2019-2020 **Superfund Research Program Training Core Fellow**, University of Arizona
- 2018-2019 **ASM Undergraduate Research Fellowship**, American Society for Microbiology

### AWARDS

- 2022 **ESA Student Travel Grant**, Ecological Society of America, Southwest Chapter
- Travel Grant**, Graduate and Professional Student Council, University of Arizona
- 2019 **2nd Place Student Poster Presentation**, Society for Ecological Restoration
- Outstanding Senior**, University of Arizona Department of Environmental Science
- Silver Award for Excellence**, University of Arizona Honors College
- 2nd Place SWESx Undergraduate Oral Presentation**, UArizona Dept. of Environmental Science
- 2018 **1st Place SWESx Undergraduate Oral Presentation**, UArizona Dept. of Environmental Science
- 2017 **2nd Place SWESx Undergraduate Poster Presentation**, UArizona Dept. of Environmental Science
- 2015-2019 **Dean's List with Distinction**, University of Arizona

## Publications

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- Ossanna LQR**, Guglielmo J, Miller M, Davis R & Gornish ES. (2024). Dryland rock detention structures increase herbaceous vegetation cover and stabilize shrub cover over 10 years but do not directly affect soil fertility. *Science of the Total Environment*, 917, 170194. <https://doi.org/10.1016/j.scitotenv.2024.170194>
- Hovanes KA, Gornish ES, Thies S, Baldwin E, **Ossanna LQR**, Dosamantes E & Lien A. (2023). Hot child in the city: Drivers of urban buffelgrass presence in Tucson AZ. *Conservation Science and Practice*. (In review)
- Lauman ST, Martyn TE, Begay MA, Hovanes KA, Rodden IE, **Ossanna LQR**, & Gornish ES. (2023). Youth engagement in ecological restoration. *Restoration Ecology*, e13916. <https://doi.org/10.1111/rec.13916>
- Ossanna LQR** & Gornish ES (2023). Efficacy of labile carbon addition to reduce fast-growing, invasive non-native plants: A review and meta-analysis. *Journal of Applied Ecology*, 60, 218-228. <https://doi.org/10.1111/1365-2664.14324>
- Ossanna LQR**, Serrano K, Jennings LL, Dillon J, Maier RM, Neilson JW (2023). Progressive belowground soil development associated with sustainable plant establishment during copper mine waste revegetation. *Applied Soil Ecology*, 186, 104813. <https://doi.org/10.1016/j.apsoil.2023.104813>

## Research Presentations

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- Ossanna LQR**, Munson SM, Gornish ES. Weedy vs. native plant response to intra- and inter-annual precipitation variation following restoration seeding in drylands. Poster presentation: National Conference on Ecosystem Restoration. April 2024. Albuquerque, NM.
- Ossanna LQR**, Munson SM, Gornish ES. Response of restoration seed mixes to intra- and inter-annual precipitation variation in drylands. Poster presentation: University of Arizona ALVSCE Research Forum. April 2024. Tucson, AZ.
- Ossanna LQR**, Guglielmo J, Miller M, Davis R, Gornish ES. Dryland rock detention structures increase herbaceous vegetation cover and stabilize shrub cover over 10 years but do not directly affect soil fertility. Poster presentation: Water Resources Research Center Conference. March 2024. Tucson, AZ.
- Ossanna LQR**, Guglielmo J, Miller M, Davis R, Gornish ES. Dryland rock detention structures increase herbaceous vegetation cover and stabilize shrub cover over 10 years but do not directly affect soil fertility. Poster presentation: Society for Range Management. January 2024. Reno, NV.
- Ossanna LQR**, Guglielmo J, Miller M, Davis R, Gornish ES. Dryland rock detention structures increase herbaceous vegetation cover and stabilize shrub cover over 10 years but do not directly affect soil fertility. Poster presentation: Society for Ecological Restoration Southwest Chapter. November 2023. Santa Fe, NM.
- Ossanna LQR**, Guglielmo J, Miller M, Davis R, Gornish ES. Effect of rock detention structures on plants and soil: A 10-year case study. Poster presentation: University of Arizona ALVSCE Research Forum. March 2023. Tucson, AZ.
- Ossanna LQR**, Guglielmo J, Miller M, Davis R, Gornish ES. Using rock detention structures to slow erosion in ephemeral streams: A 10-year case study. Oral presentation: Society for Range Management Annual Meeting. February 2023. Boise, ID.
- Ossanna LQR**, Guglielmo J, Miller M, Davis R, Gornish ES. Using rock detention structures to slow erosion in ephemeral streams: A 10-year case study. Oral presentation: Society for Range Management, Arizona Section winter meeting. February 2023. Maricopa, AZ.
- Ossanna LQR**, Gornish ES. Efficacy of labile carbon addition to reduce exotic invasive plants: A meta-analysis. Oral presentation: Ecological Society of America Annual Meeting. August 2022. Montreal, Quebec, Canada.
- Ossanna LQR**, Sittig J, Miller M, Davis R, Gornish ES. Induced meandering watershed restoration using rock structures to decrease arroyo erosion. Poster presentation: Society for Range Management Annual Meeting. February 2022. Santa Fe, NM.
- Ossanna LQR**, Serrano K, Jennings LL, Maier RM, Neilson JW. Vegetation-driven soil development during waste rock reclamation at a copper mine. Oral presentation: Soil Science Society of America Annual Meeting. November 2020. Virtual.
- Neilson JW, **Ossanna LQR**, Placido D, Elshikha DE, Dong C, Ponciano G, Maier RM, McMahan C. Associations between the Guayule (*Parthenium argentatum* G.) rhizosphere microbiome, plant growth stage, and rubber production. Oral presentation: Soil Science Society of America Annual Meeting. November 2020. Tucson, AZ (Virtual).
- Ledesma L, **Ossanna LQR**, Placido D, Elshikha DE, Dong C, Ponciano G, McMahan C, Maier RM, Neilson JW. Associations between soil rhizosphere bioavailable phosphorus, phosphorus solubilizing microorganisms, and guayule growth stage and rubber production. Poster presentation: Soil Science Society of America Annual Meeting. November 2020. Virtual.
- Ossanna LQR**, Brown KS, Chen Y, Placido D, Elshikha DE, Dong C, Ponciano G, Wang S, Waller PM, Diereg D, McMahan C, Maier RM, Neilson JW. The significance of the soil microbiome to guayule production. Oral presentation: SBAR Annual Retreat. July 2020. Tucson, AZ (Virtual).
- Jennings LL, **Ossanna LQR**, Fontana C, Farrell H, Kline A, Gornish E, Neilson JW, Maier RM. Biotic potential of degraded soil development on reclaimed mine tailings in southern Arizona. Poster presentation: American Geophysical Union Annual Meeting. December 2019. San Francisco, CA.
- Ossanna LQR**, Serrano K, Jennings LL, Neilson JW, Maier RM. Identifying biogeochemical indicators to measure fertility island effects during mine waste revegetation. Poster presentation: NIEHS Superfund Research Program Annual Conference. November 2019. Seattle, WA.
- Ossanna LQR**, Serrano K, Jennings LL, Neilson JW, Maier RM. Nitrogen dynamics as an indicator of mine waste revegetation progress. Poster presentation: Society for Ecological Restoration Southwest Chapter Annual Conference. November 2019. Tucson, AZ.

- Ossanna LQR**, Placido D, Elshikha DE, Dong C, Ponciano G, McMahan C, Maier RM, Neilson JW. Root-zone microbiome dynamics and guayule rubber production. Poster presentation: SBAR Annual Retreat. September 2019. Tucson, AZ.
- McMahan C, Placido D, Elshikha DE, Dong C, Ponciano G, **Ossanna LQR**, Neilson JW. Dormancy and the guayule (*Parthenium argentatum* G.) soil microbiome. Poster presentation: Association for the Advancement of Industrial Crops Annual Conference. September 2019. Tucson, AZ.
- Ossanna LQR**, Serrano K, Jennings LL, Neilson JW, Maier RM. Nitrogen dynamics as an indicator of mine waste revegetation progress. Poster presentation: American Society of Microbiology Annual Conference. June 2019. San Francisco, CA.
- Ossanna LQR**, Serrano K, Jennings LL, Neilson JW, Maier RM. Nitrogen dynamics as an indicator of mine waste revegetation progress. Oral presentation: University of Arizona SWESx. March 2019. Tucson, AZ.
- Ossanna LQR**, Serrano K, Jennings LL, Neilson JW, Maier RM. Nitrogen dynamics as a biogeochemical indicator of revegetation progress for mine waste rock. Poster presented at: Soil Science Society of America Annual Conference. January 2019. San Diego, CA.
- Jennings LL, **Ossanna LQR**, Theilmann ML, Neilson JW, Maier RM. Microbial bio-indicators of degraded lands on reclaimed mine tailings in southern Arizona. Invited oral presentation: Soil Science Society of America Annual Conference. January 2019. San Diego, CA.
- Serrano K, **Ossanna LQR**, Jennings LL, Neilson JW, Maier RM. Biogeochemical factors affecting phosphorous availability during revegetation of mine waste rock slopes. Poster presentation: Soil Science Society of America Annual Conference. January 2019. San Diego, CA.
- Ossanna LQR**, Serrano K, Jennings LL, Neilson JW, Maier RM. Using total nitrogen and DNA biomass content as biogeochemical indicators of incipient soil development through measuring mine waste rock revegetation. Oral presentation: University of Arizona SWESx. April 2018. Tucson, AZ.
- Ossanna LQR**, Gil-Loaiza J, Jennings LL, Maier RM, Neilson JW. Determining biogeochemical indicators of soil quality: Measuring mining waste rock revegetation progress using total nitrogen and biomass content. Poster presentation: University of Arizona SWESx. April 2017. Tucson, AZ.

## Professional Development

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### Carpentries Instructor Training

THE CARPENTRIES

*Virtual*

*Dec. 2022*

- 2-day intensive training workshop to become a certified Carpentries Instructor, and teach workshops about introductory coding skills needed for researchers.

### Rangeland Monitoring 101 Workshop

UNIVERSITY OF ARIZONA COOPERATIVE EXTENSION

*Prescott, AZ*

*Nov. 2022*

- Full day workshop to review and practice rangeland monitoring methods.

### Data Carpentry for Ecologists Workshop

UNIVERSITY OF ARIZONA

*Tucson, AZ*

*Sept. 2022*

- Served as helper for a 4-day workshop on introductory data organization, data visualization, and data wrangling in R.

### Reproducibility and Data Science Skills Workshop

UNIVERSITY OF ARIZONA

*Virtual/ Tucson, AZ*

*Feb. - Apr. 2022*

- 10-session workshop covering Git and GitHub, project management and best practices for coding, and data cleaning and visualization in R.

### Foundational Open Science Skills Workshop

CYVERSE

*Virtual*

*Sept. - Nov. 2021*

- 10-week workshop covering the principles and practice of open science, developing data management plans and metadata standards, and using CyVerse infrastructure.

- 4-week course designed to connect scientific knowledge with policymakers and practitioners through transdisciplinary research to solve complex environmental problems.

## **Leadership & Service**

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- 2023-2024 **Natural Resources Graduate Student Organization**, Co-Chair
- 2023-2024 **Young Professionals Conclave**, Chair, AZ section of Society for Range Management
- Spring 2023 **ResBaz Arizona**, Steering Committee member and conference organizer
- Tucson Women in Data Science (WiDS)**, Conference organizer
- Mar 2023 **Graduate and Professional Student Council**, Travel grant reviewer, University of Arizona
- Southern Arizona Regional Science and Engineering Fair (SARSEF)**, Judge
- 2022-2023 **Natural Resources Graduate Student Organization**, Range Management Representative
- July 2022 **ESA Early Career Outstanding Restoration Paper Award**, Judge
- Mar 2022 **Southern Arizona Regional Science and Engineering Fair (SARSEF)**, Judge
- Mar 2022 **UArizona Ecological Restoration Club**, Invited talk
- Girls on outdoor Adventures for Leadership and Science (GALS)**, Mentor
- 2021 **Reflecting on Postdoc Mentoring**, Panelist, University of Arizona
- ESA Early Career Outstanding Restoration Paper Award**, Judge
- 2019 **SBAR Project Puente**, Mentor for undergraduate intern, University of Arizona
- KXCI Thesis Thursday**, Invited guest, KXCI Community Radio

## **PROFESSIONAL MEMBERSHIPS**

Society for Range Management, Society for Ecological Restoration, Ecological Society of America