

2020 ANNUAL REPORT



IMPACT SUMMARY

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42

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OUR MISSION

Fostering land stewardship and conservation in the American West through teaching, research, outreach, and leadership.







Students involved

Partners engaged

Stewardship and conservation deliverables completed

IMPACT AREA

We provide students opportunities to develop the skills needed to be leaders in land stewardship and conservation. Students who participate in our programs collaborate with western partners and our staff to complete applied research and management projects throughout the American West. This map illustrates where our student projects impacted conservation during 2020.

No. of Student Projects





This last year has been a challenging one, bringing enormous changes to how we work and live, and introducing uncertainty about the future. These challenges have pushed us to be creative with all aspects of life, including how we spend time with another, how we communicate, and how we continue to study complex environmental issues. Community and connection have been especially vital during this last year, and both have been instrumental in providing our students with opportunities to continue to learn, research, experience, and grow. Our strong network of alumni across the American West connected YSE students to high-impact conservation efforts, allowing them to contribute to onthe-ground conservation, develop skills, and engage with professionals who are leading innovative land stewardship efforts. We thank our alumni for their service to YSE and for providing our students with opportunities that build them into the leaders, policymakers, land managers, and researchers that the environmental field needs. Below we highlight two YSE alumni who not only contributed to Western conservation efforts through our Center during their time at Yale, but also facilitated learning and development for our current students during 2020. We are sincerely grateful to them and our alumni who have extended their hand to us.



Lady Surke

Indy Burke, Carl W. Knobloch, Jr. Dean

Ben Williamson, '19 MEM

Executive Director, Northern Rockies Conservation Cooperative Jackson, Wyoming

Ben leads NRCC's education, leadership, and research programs through an approach that advances conservation by merging leadership and innovation. He works with a network of leaders to improve problem-solving skills and generate practical knowledge that leads to better outcomes for humans and wildlife.



Jaclyn Kachelmeyer, '19 MEM Landowner Liaison, Colorado Open Lands Golden, Colorado

Jaclyn helps landowners steward their conserved lands and make informed land management decisions by connecting them to resources, decision-making tools, and the best available science. Her contributions support ecological restoration, soil health, and land protection.

Big Sagebrush Recovey After Oil and Gas Extraction

Extraction of oil and gas requires installation of drilling infrastructure, which disturbs the earth's surface by removing topsoil and plants. Restoration efforts replace the topsoil and seed several plant species, but an important shrub species in this ecosystem, big sagebrush, often struggles to reestablish. Damaris Chenoweth ('21 MESc candidate) and Dr. Bill Lauenroth studied plant competition and big sagebrush recovery at oil and gas extraction sites using field and geospatial methods. The images below show how Damaris was able to use drone imaging to map sagebrush canopies (in orange) and the area a sagebrush plant uses to access water (in blue). Understanding how plants use space and resources at oil and gas extraction sites will enhance future restoration efforts.



Conservation Planning for Fishers Peak State Park in Colorado

In partnership with The Nature Conservancy-Colorado, our student team built a science-based framework to guide key elements of land use planning and management for Colorado's new Fishers Peak State Park. This 19,200-acre park is located in southern Colorado and is rich with biodiversity and recreational potential. Students Tony Cisneros, Grace Hilbert, and Lauren Sadowski created a methodology with criteria to assess the quality and applicability of published literature related to the park's ecosystems, species, and potential recreation. The team applied the methodology to literature and identified key scientific findings. In addition to providing the park's team with tools to guide land use decisions using a scientific approach, this study set an example for collaborative work between conservation and recreation.



Estimating Conifer Density in the Elkhorn Mountains of Montana

Many forest communities in western Montana have not burned in the last 100 years, increasing conifer density and encroachment, fuel availability, and wildfire risk. In an effort to mitigate these impacts, our research assistant Will Weinberg ('22 MFS candidate) assisted the USDA Natural Resources Conservation Service and Pheasants Forever by identifying areas in the Elkhorn Mountains that may benefit from mechanical forest thinning (pictured below), an alternative management practice to burning. Will used geospatial analysis and remote sensing to locate areas of high conifer density (red in map to the right) and encroachment. Conservation organizations will use this work to prioritize their outreach and efforts regarding forest thinning implementation.





Aquatic Habitat Connectivity in the Snake River

Our summer fellow Bryce Powell helped Trout Unlimited's Snake River Headwaters Initiative protect and restore fish habitat in



the Snake and Salt River watersheds in northwestern Wyoming. Bryce measured fish entrapment rates in agricultural diversions, surveyed barriers to fish migration, mobilized volunteers, and encouraged private landowners to consider their impacts on fisheries through stakeholder

engagement opportunities. Bryce's contributions help to maintain native fish populations experiencing pressures such as climate change, invasive species, and human presence.

Soil Health in Regenerative Agriculture

Darya Watnick, one of our summer fellows, helped Mad Agriculture and the Colorado Collaborative for Healthy Soils encourage soil health practices within regenerative agriculture. The grant application Darya authored will increase the number of farmers managing their land with soil health practices. Darya studied a farm and ranch carbon and greenhouse gas accounting tool, COMET-Farm, to understand how changes to the tool's input factors (e.g., planting date, yield, tillage method, etc.) affect estimated carbon sequestration amounts. This study helped farmers understand the impact of stewarding soil in agricultural systems and how the tool operates.

Feasibility of a Grassbank in the Thunder Basin of Wyoming

Our research assistants, Katie Pofahl and Humna Sharif, collaborated with YSE alumni Carli Kierstead ('18 MEM) of The



Nature Conservancy-Wyoming to study the feasibility of implementing a "grassbank" in the Thunder Basin of Wyoming. A grassbank aims to bring ranchers and conservation organizations together to support rural livelihoods and environmental efforts by offering discounted grazing leases in exchange

for conservation practices on local ranches. This study assessed environmental, economic, and social aspects of this concept and developed a tool to help TNC assess grassbank feasibility at specific locations in Thunder Basin.

ALUMNI CONNECTIONS



"Working as a Presidential Management Fellow with Superintendent Wade Vagias in Idaho at Craters of the Moon National Monument and Preserve, Hagerman Fossil Beds National Monument, and Minidoka National Historic Site, has been inspiring and exciting. I work on a wide range of interdisciplinary projects to help advance the sites' missions and support creative problemsolving. I am grateful for the tools and frameworks that YSE helped me build in preparation for this work."

EVE BARNETT, '20 MEM

PRESIDENTIAL MANAGEMENT FELLOW NATIONAL PARK SERVICE DEPARTMENT OF INTERIOR

ADDITIONAL PROJECTS

Read more about these projects at **highplainsstewardship.com**

- Collaborative Rangeland Monitoring in Montana
- Impacts of Recreation on the Greater Yellowstone Ecosystem
- Climate Vulnerability in the Crown of the Continent
- Ranchers' Perspectives of Wildlife-Friendly Ranching
- Highlighting Indigenous Relationships in the West
- Better Stewardship and Futures: Centering Native American Histories and Perspectives
- Soil Health and Carbon Storage in Regenerative Agriculture
- Non-Consumptive Water Rights as a Landscape Conservation Tool
- Solar Feasibility for a Remote TNC Preserve
- Soil Texture Consideration for Reclamation After Oil and Gas Extraction
- Large-scale Farming of Organic Grains and Pulses in the Northern Great Plains
- Conservation Planning for the Stillwater-Rosebud Water Quality Initiative
- Exploring Inherding as a Grazing Practice for the West
- Risk and Reward Sharing in Organic Food Supply Chains and Farming
- Using Geospatial Analysis to Guide Rotational Grazing Strategy
- Water Conservation Efforts Through Land Trusts

Yale school of the environment





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