

Celebrating 70 years of research and learning

Hopland Research & Extension Center

2020-21 Impact Report

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources





HREC acknowledges with honor, first and foremost, the **Shóqowa** and **Hopland People** on whose traditional, ancestral, and unceded lands we work, educate, and learn, and whose historical and spiritual relationship with these lands continues to this day and beyond.

A Living Laboratory

The **Hopland Research and Extension Center** (HREC) is located on the western slopes of the Mayacamas mountains, in Mendocino County, California. This 5,358 acre living laboratory, provides research and education for all through its field classes, school programs and research facilities. The site encompasses a range of habitats, including oak woodlands, chaparral, native grasslands, rangeland (grazing a flock of 200 western whiteface sheep), vernal pools, riparian corridors, and seasonal creeks. The land includes nearly 890 different plants and an estimated 275 wildlife species. HREC celebrates 70 years of field based research and learning in 2021.



John Bailey
HREC Director

It is our pleasure to present to you an overview of what the Hopland Research and Extension Center (HREC) has been working on in our 70th year of existence, and what we are planning to work on in the future.

At HREC, we work with scientists and educators from across the state, as well as individuals and organizations in our local area, to identify issues in agriculture and natural resources where research and education is needed to develop, teach, and enact solutions.

Over the years, our scope of work has changed from a focus on sheep management to broader issues such as climate change affects and adaptation, fire ecology and science, and working lands management for a variety of ecosystem and agricultural goals. We also host, even through COVID-19, diverse educational programs for various groups such as the California Naturalists and the California Conservation Corps as well as offering field trips and hikes to educate our youth and adults.

Our donors and volunteers continue to be a critical part of our work. We greatly appreciate their financial and labor contributions which have allowed us to advance our important research and extension work.

Through these challenging times and into the future, HREC is dedicated to learning and teaching about a variety of issues that affect our communities here in Northern California. We continue to engage with new and existing partners in bringing science to solve pressing problems and are excited about our current work and plans that are outlined in more detail in this report.

HREC is grateful to be surrounded by the beautiful and diverse landscapes and communities of Lake, Mendocino, and Sonoma Counties. Please reach out to us for any ways in which we might be able to support you and our community.

A handwritten signature in black ink that reads "John Bailey".

The research and education conducted at HREC is driven by the needs of our local communities and underpinned by statewide, national and global priorities. Our public values guide our work as we focus our efforts to make an impact on:

Promoting economic prosperity in California
Protecting California's natural resources
Promoting healthy people and communities
Building climate-resilient communities and ecosystems
Developing an inclusive and equitable society



The UC California Naturalist Program trains
California Conservation Corpsmembers
@ HREC

“The **Cal Naturalist** class really changed the way I view the world around me. Now that I've taken it, I don't just see plants around me, I see stories.

I understand more about the relationship that all of nature's moving parts have with each other.

The class has given me more drive to learn about the world around me, and to teach others as well.”

Will Zuniga, CCC California Naturalist
class 2020



Becoming Stewards of the Land

The UC California Naturalist Program is designed to introduce Californians to the wonders of our unique ecology, engage the public in study and stewardship of California's natural communities, and increase community and ecosystem resilience.

The first California Conservation Corps class of the UC California Naturalist Program took place at HREC in the summer of 2020, with a second class following in 2021. On each occasion, a class of 18-24 year old CCC members were immersed in this 40 hour UC accredited training program.

The pilot classes offered at HREC not only allowed these young people to access training to support their long term goals, but also provided a blueprint for similar classes to run across the state.

Learning to live with...

FIRE

HREC staff have been working with academics, teachers, Indigenous advisors, therapists, and the USFS FireWorks educational program to develop a series of lessons catering to middle school aged students. These lessons focus on three key areas:

Natural & Cultural Ecology of Fire

Wildfire Preparedness

Fire Physics

Each topic includes a series of lessons supporting the 5E learning cycle: Engage, Explore, Explain, Elaborate, Evaluate. Resource trunks to accompany the lessons are provided to teachers through HREC and local partners at the Mendocino and Lake County FireSafe Councils.



Three of the top ten largest recorded California wildfires took place in Lake, Mendocino or Sonoma counties.

The 2018 River Fire burned roughly 3,200 acres of HREC, creating a unique opportunity to study the effects of, and recovery from, wildfire on a site with thorough documentation of the pre-fire state of the landscape.

and the steps to... RECOVERY

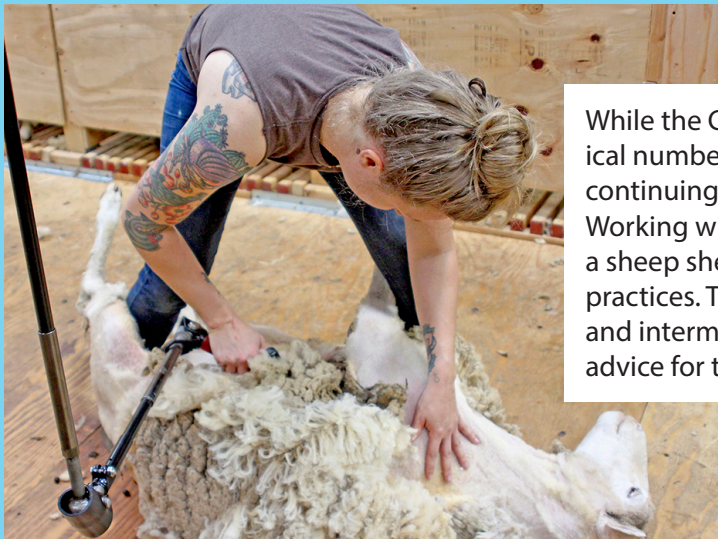
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Post-fire oak survival and regeneration in oak woodlands

Dr. Michael Jones of UC Cooperative Extension is monitoring 45 long-term sites at HREC, looking at the mortality of oak trees related to pre-fire management activities such as grazing. He is studying oak pests and disease that may injure or kill fire stressed trees, looking at fire scarring to determine if long term survival can be predicted from evidence of fire damage, examining oak regeneration from basal sprouts and seedlings, seeing if patterns and trends emerge that can help inform oak restoration and recovery efforts on other wildfire affected sites in our region.

Investigating mechanisms of wildlife community resilience

Dr. Justin Brashares of UC Berkeley is seeking to understand how megafire impacts habitat usage and recovery of wildlife communities. Using a variety of wildlife monitoring techniques, species distributions of mammals and birds across the landscape are recorded. This information is used to analyze how fire severity and extent differentially impact various species of small and large mammals, birds, invertebrates, and reptiles. Oak recruitment is also being tracked to determine how the effects of fire events, herbivory, and resulting ecosystem interactions affect the recovery of these highly important tree species after wildfires.



Maintaining Agriculture

While the California sheep industry is greatly reduced in size from historical numbers, there is still a vibrant community of producers who need continuing education to keep their operations efficient and up to date. Working with UC Davis, UCCE, and industry connections, HREC offers a sheep shearing and basic care course as well as a course in lambing practices. These multi-day trainings are focused on the needs of beginning and intermediate producers, introducing techniques and providing expert advice for targeted questions.

NorCal Climate Futures



How can we prepare for climate disruption in the future? What challenges are predicted for our region? How do people organize to enact climate legislation and create community networks for mutual aid? HREC hosted a series of webinars this year to explore the effects of climate change on Mendocino, Lake, and Sonoma counties and held discussions with local activists, scientists, and community leaders. From these community meetings, people came together to form Lake County CAN! - a new Climate Action Network in Lake County. You can watch these events on HREC's YouTube page: <https://bit.ly/NorCalClimate>



Evolution of grapevine pathogen infections

Dr. Rodrigo Almeida from UC Berkeley and **UCCE Viticulture Advisor Monica Cooper** are studying Pierce's Disease of grapevines, an economically important disease in California, seeking to answer questions such as: What is the progression of disease symptoms? How do different varieties respond to infection? Do winter temperatures affect plant infections differentially? The potential for significant breakthroughs of applied and fundamental science is great.

Ecological dynamics of cannabis

Western states are engaged in a large scale experiment by decriminalizing recreational use of cannabis. The effects of this on the environment are still unknown. Because cannabis is often grown in rural, biodiverse regions, there are increasing concerns about its impact on wildlife, especially with the rapid rise of greenhouse cultivation. This research project, led by **Dr. Justin Brashares, of UC Berkeley** is examining the effects of greenhouse lighting and fan/generator noise on multiple wildlife taxa, work which may help inform policy decisions that affect our rural communities and environments.

Addressing Climate Resiliency

Climate change is an urgent issue that is making its impact felt now, not in the future, with increasing wildfire activity, severe drought, increasingly hot summers, and ever more erratic weather patterns. At HREC we have multiple research projects looking at different impacts of climate change with an eye towards developing ways to both adapt to the changes by making our systems more resilient and figuring out ways to reduce the severity of future changes.

Effects of Disturbances in Determining Ecosystem Recovery

Understanding and managing for the resilience of California's grasslands is particularly challenging and, because of their ecosystem and agricultural importance, it is critical to develop a framework by which we can comprehend and predict the response of these annual-dominated grasslands to multiple environmental and management activities. Specifically there is a pressing need to understand the dynamic effects of and recovery from ever increasing fires. This project, led by **Drs. Valerie Eviner and Mary Cadenasso of UC Davis**, seeks to learn how gophers, ants, grazing, soil type, and fire severity interact to affect grassland ecosystem regeneration after wildfires like the River Fire that burnt large areas of HREC in 2018.



Hedgerows on Northern California Rangelands

Perennial hedgerows are an age-old agricultural technique of installing strips of diverse plants along fields for a variety of ecosystem and agricultural benefits. Blocking wind and water, sheltering and hindering livestock, sequestering carbon in and improving the health of soils, offering habitat and food sources for diverse wildlife, and providing additional cash crops are all functions delivered by hedgerows. This project, focused on education, seeks to demonstrate how drought tolerant native plants can be used to enhance biodiversity on northern California rangelands while benefiting the agricultural operator.



The Flow and Fate of Root Carbon

Soils hold a vast reservoir of carbon in different forms. Plants are continually moving carbon from the atmosphere into the soil where it is digested by an enormous variety of microbial life. As the climate warms and droughts occur, this web of soil life may change in ways that dramatically alter the fate of this carbon, with potentially huge implications for our climate. This research project, led by **Dr. Mary Firestone of UC Berkeley**, seeks to understand at a system-level how the soil carbon flows and fates change in drier soils.





"HREC offers unique opportunities for both young and old to enjoy to the wonders of nature. I sincerely appreciate the generosity of those who provide the financial support that enables the sharing of HREC's jewels of nature."

Family pod lambing visitor, HREC 2020

Hopland Scholars

In 2020 we launched "**Hopland Scholars**," a philanthropic initiative to support and expand scientific inquiry and discovery at HREC.

We define a Hopland Scholar as anyone who wishes to learn at HREC, from the kindergartner meeting our lambs to the PhD candidate learning about the impacts of megafires on wildlife.

We value life-long learning and want to seize the opportunity to advance scientific literacy and development in our community. This initiative seeks to remove the financial barriers that might limit access to HREC programming and services.

Donors have generously supported our Hopland Scholars program with over \$19k in gifts.

Citizen Science

Taking notice of the seasonal cycles of plants and animals as our climate changes requires commitment and keen observation. A group of dedicated volunteers at HREC have been visiting 30 individual plants across the site since 2016 to record observations of seasonal changes such as time of flowering, fruiting, or leaf drop. This data is shared with the National Phenology Network and is freely available to researchers studying the impacts of climate change on our ecosystems.

Volunteers at HREC have collected over 23,700 observations since the phenology project began in 2016. This kind of long term data can be used to monitor the impacts of climate change on plants and animals in the United States.

Sustainable You! 4-H Summer Camp

Twenty six campers attended the two camps, each of which allowed campers to enjoy five days of outdoor experiences, hiking, and connection to both the natural world and HREC research studies. The camp focused on sustainability, with days spent considering our use of air, water, food, energy, and land resources. Scholarships were offered to families to support access for their children.



"Once my daughter knew that camp was happening this year she tried to earn some money by doing art commissions. The partial scholarship has made a big difference to us. Thank you! My daughter doesn't make many social connections but Sustainable You! has been very important to her!"

Sustainable You! Participant's Parent



New Pastures

Cattle Leasing

As the sheep industry and related research and education funding have declined, cattle have come to dominate ranching operations in Northern California. To reflect and support this change, HREC is actively working towards introducing cattle onto our property. Future plans envision cattle for research, education, and land management purposes so that we continue to do our part in helping support our working lands and the people whose livelihood depends on healthy ecosystems.

Climate Stewards

How do we engage in local efforts to advance community and ecosystem resilience in a changing climate? The UC Climate Stewards program responds to this need. This newly developed, 40 hour class not only increases climate change literacy but also provides participants with the tools to encourage civic engagement for community and ecosystem resilience throughout California. The curriculum allows partnering organizations to give consideration to their local needs.



New Faces

As our operation and the needs of our region change over time, our staffing also needs to change. We are excited to have two new positions starting this next year.

Field Work

A **Vineyard Systems Advisor** will be stationed at HREC but work across Sonoma, Mendocino, and Lake Counties, engaging with our extensive and important vineyard industry to help them solve problems that impact viticulture across the region.

Research Support

Dr. Jacalyn Beck, Academic Program Officer, recently joined our team. Dr. Beck will help develop our research portfolio at HREC and at our sister site, the Sierra Foothill Research and Extension Center. In working with two RECs this position will develop multi-site and multi-discipline collaborations.

Donors & Volunteers

Thank you to all who contributed to HREC in 2020!

Tamara Adams
Finn Addison
John T. Bailey
Jane Ball
Daniel M. Baxter
Susan Billy
Ramón Billy, Jr.
Debby Bradford
Carre Brown
Laura Buckner
Robert and Joann Calson
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Sally Underwood
Jenny Vagt
Chuck Vaughn
Elizabeth I. Weeks
Ilene Weeks
Loraine Wilder
Stephany Wilkes
Bobbie Yokum
Jeanne Yttreness

Partners

California Conservation Corps
California Native Plant Society – Sanhedrin Chapter
California Naturalist
California Wool Growers
Community Foundation of Mendocino County
Fibershed
Hopland Band of Pomo Indians
Kiwanis Club of Ukiah

KZYX Mendocino County Public Radio
Mendocino County Cooperative Extension
Mendocino County Resource Conservation District
Mendocino County FireSafe Council
Mendocino 4-H Youth Development
Peregrine Audubon Society Ukiah
Safari Club International

A special thank you to our volunteer of the year:
Charles “Woody” Hudson

Hopland REC Staff



Director
John Bailey



Community Educator
Hannah Bird



Facilities Supr.
Tom Seward



Business Officer
Todd Merrifield



Staff Research Assc.
Alison Smith



Machinery Mechanic
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Sr. Custodian
Greg Solberg



Sr. Agricultural Tech.
Troy McWilliams



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Ruthie King



GrizzlyCorps Fellow
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