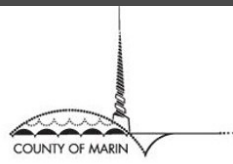


2021

ANNUAL
REPORT

UC Cooperative Extension
Marin

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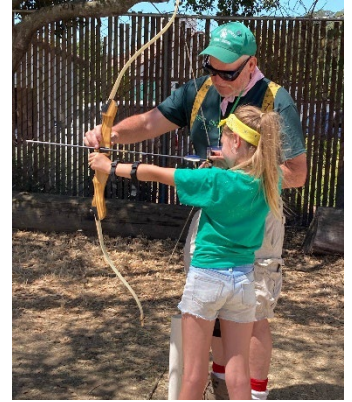


UC Cooperative Extension Marin

2021

Farm Advisor

The mission of the University of California Cooperative Extension Marin County Office is to sustain Marin's vital agriculture, environment, and communities. We do this by providing University of California research-based information in agriculture, natural resource management, healthy living, and youth development. Networked with the expertise of UC campuses, our educational programs use practically-applied research to solve community problems.



Step into 4-H projects in 2021 focused on citizenship, healthy living, and Science Technology Engineering and Math (STEM).



380

volunteers donated
41,917
hours public service
— estimated value
of
\$1,692,608



5,390

total educational
interactions with the
public



13

peer-reviewed and
audience-requested
publications



7

activities bringing
research to policy



64

academic-led
workshops, field
days, and classes



26

news media
programs/
mentions



UCCE Marin

David Lewis, Director
1682 Novato Blvd., Ste
150-B
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cemarin.ucdavis.edu



Partnering for Change

UC ANR builds partnerships based on deep and long-lasting relationships with local, state and federal governments, community-based organizations, schools, nonprofits and private industry.

UCCE Funding



\$764,846
University



\$438,387
County



\$217,867
Advisor generated
(grants, gifts,
other, etc.)



Volunteers raised
\$59,545
to support local
programs

It is estimated that for every

\$1

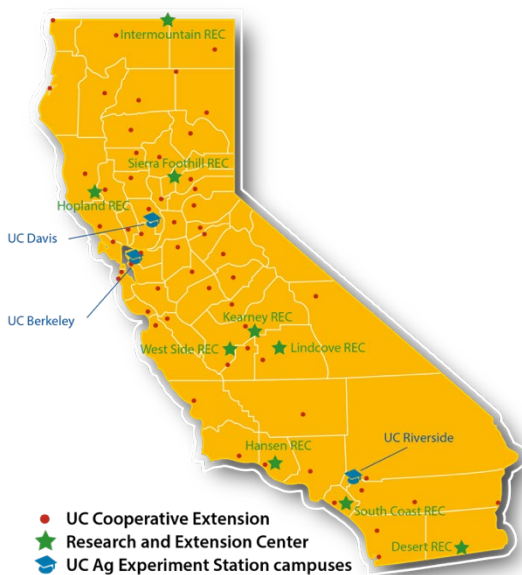
invested in agricultural
research and extension
there is a return of

\$20

to the community.

Alston, Anderson et al (2010)

Leveraging the Power of the UC System



"Please continue with the same positive attitude helping more people like me to be trained in green gardening and irrigation, and in everything that you do."

— Workshop participant

"I was looking at your website outlining the selling whole animals for custom processing and just wanted to commend you all for doing such a great job."

— Farmer describing new Grown in Marin online resource

"Our garden has been transformed and the school is delighted to return to a useful space after summer. The food was so appreciated by the community at our San Geronimo Valley Community Center Food Distribution Site. Huge thanks from West Marin!"

— Julie Young and the Lagunitas Team

"Very helpful, gained useful information re water use and also gardening topics of interest to me."

— Homeowner after a Garden Walk

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Reaching Marin

Educational Offerings and Consultations

In 2021, nearly 5,390 participants were served in 94 workshops, conferences, and tours organized with our community partners. These offerings were both in person and via webinar platforms. Participants included over 240 youth during in-person after school and virtual online offerings.

In addition to education through workshops, our program teams provided technical consultations to Marin agricultural producers, tree and landscape professionals, homeowners, and educators. In 2021, we provided approximately 1,030 consultations either in our office, through our gardening help desk, or in the field on farms and properties.



Collaborating with school garden teams across the county to further education and outreach.

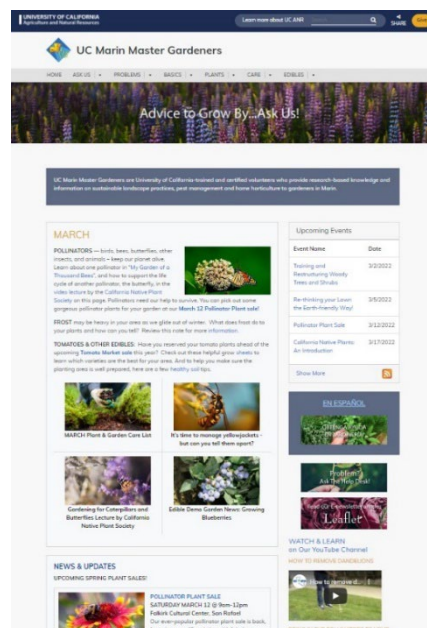
Online Resources

Complementing our educational offerings are the portfolio of web resources we curate to make up-to-date information available for use by Marin residents. These include:

- [UCCE Marin](#)
- [UC Marin Master Gardeners](#)
- [Grown In Marin](#)
- [Sudden Oak Death](#)
- [Marin Knotweed Action Team](#)
- [Marin Food Policy Council](#)

During 2021, these websites had more than 334,832 discreet views. Popular webpages include:

- [Drought Management for Farmers](#)
- [Fire-Smart Landscaping](#)
- [Solving Plant Problems](#)
- [Oak identification](#)
- [Sudden Oak Death Diagnosis and Management](#)
- [Choosing Plants for your Garden](#)
- [Find Marin Ag Products](#)
- [Build Your Basic Gardening Skills](#)
- [Sustainable Practices for Farmers](#)
- [Monthly Plant & Garden Care Checklist](#)
- [Farm Labor Requirements Resources](#)

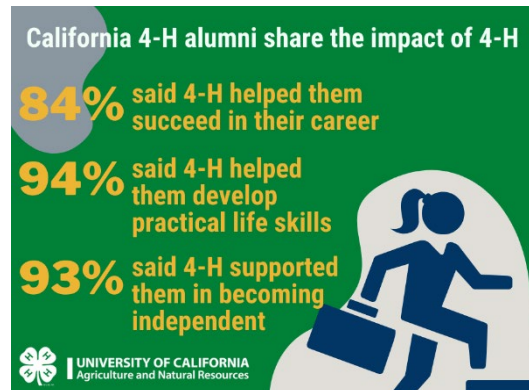


The Marin Master Gardener website was redesigned in 2021, providing home gardeners with a comprehensive online repository of all things garden-related.

Bringing Value Through Programs

Developing a Qualified Workforce for California

UC ANR's youth and community development programs equip the next generation for college, successful careers, and to be active participants in their communities. Growers and land managers learn cutting-edge skills that increase workforce competency and advance innovation. UC ANR helps develop a qualified workforce to increase opportunities for individuals to ensure a robust and thriving state economy.



Increasing workforce retention and competency

“Green Gardener” training, education opportunity and access for those caring for the landscape

Covering topics like post-fire landscape management, proper pruning, and Integrated Pest Management, our Environmental Horticulture team ran the first Spanish Bilingual Landscapers' class for 14 participants. These individuals came from small, independent landscaping companies and contractors and whose primary language is Spanish. The program consisted of 9 evening classes (2.5 hours each) and two Saturday field days (4 hours each), in which participants learned and practiced the finer points of soil conservation and management, increasing irrigation efficiency, and proper pruning techniques. Upon completion of the classes, participants passed an exam on the content and materials before receiving their [Green Gardener Certification](#).



Landscapers moving vegetation during a field day as part of the Green Gardener training.

Increasing effective public leaders

Opportunities for youth to take a step in setting their goals

In the spring and summer of 2021, our 4-H Youth Development Team launched a series of short-term programs for youth called “Step Into 4-H”. Short term 4-H projects focused on horses, archery, citizenship, healthy living, and outdoor hiking. These short-term programs allowed over 80 youth to discover their passions, adopt a growth mindset, practice self-reflection and goal setting.

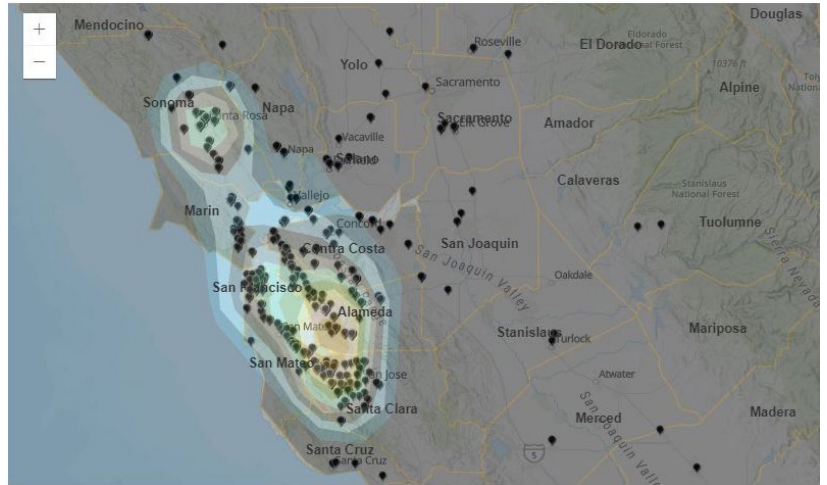


Short-term 4-H projects.

Improving college readiness and access

Youth discover science virtually through the 2021 North Bay Science Discovery Day

Our 4-H Youth Development Advisor partnered with the Buck Institute for Research on Aging to organize and host the 2021 North Bay Science Discovery Day virtually. A total of 18 organizations provided [37 STEM demonstrations, talks, and activities](#) to spark over 1,000 young people's interest in science, technology, engineering, and mathematics in both English and Spanish. Demonstrators exposed youth to STEM concepts in everyday life. Exhibits included presentations and activities on local wildlife, climate science, medical technology, anatomy, rocket science, engineering, the physics and musicality of sound waves, how vaccines work, and many other topics. Recordings from almost all sessions are [online](#). The majority of event attendees indicated that they plan to continue or spend more time doing STEM activities and learning about the STEM topics.



GIS heatmap of the 1,000 young people who participated in the 2021 North Bay Science Discovery Day.

Tools for engaging and effective online and virtual learning

Youth, parents, and teachers were contending with an all virtual and online learning environment because of the Pandemic. In response, our 4-H Youth Development Advisor organized and co-authored a series of factsheets that provided the current knowledge on making digital learning dynamic and engaging. Marin 4-H clubs and educational projects had to transition to online programming. Professionals working with 4-H volunteers had to learn quickly how to adapt place-based education to a virtual environment. The published factsheet series translated research in online teaching to the out-of-school time 4-H environment including:

- [Supporting productive educator practices for out-of-school time in online settings](#)
- [Promoting positive youth development in online settings](#)
- [Integrating experiential education into the digital realm](#)

UC ANR Publication 8699 | January 2021

4-H FACT SHEET SERIES

Online Learning Fact Sheet for the 4-H Youth Development Program

Integrating Experiential Education into the Digital Realm

STEVEN M. WORKER, 4-H Youth Development Advisor, UC Agriculture and Natural Resources

Online learning environments may provide opportunities for youth to develop their agency, competence, and belonging that are similar to the opportunities provided in physical learning environments. Youth development programs are well positioned to foster innovation for online learning that utilizes experiential education.

Experiential education—also known as hands-on learning and learning by doing—is a cycle composed of three phases: experience, reflection, and application (Kolb 1984).

Practices

Experiential education may be implemented in online learning environments with adaptations to ensure core instructional principles are integrated (Carver 1996).

- **Authenticity:** Selection of hands-on activities relevant and meaningful to young people's lives; activities fit within constraints posed by online environments (e.g., materials are available at home, activities may be completed by one person and not require group work); educator provides scaffolding to assist youth in completing activities (e.g., regular opportunities to ask questions and receive feedback); occasions for adult, parental, and/or family involvement.
- **Connection to the future:** Educators ensure selection of activities most likely to support future learning. Youth reflect on their experience and how they might use what they have learned in the future.

UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources | 4-H Youth Development Program

<https://doi.org/10.3733/ucanr.8699>
<https://anrcatalog.ucanr.edu>

One of the factsheets in a series to support engaging, effective online learning.

Promoting Economic Prosperity in California

UC ANR partners with public, nonprofit, and private groups to create and extend new knowledge about agricultural and natural resource management. Participants change practices that result in increased yield and efficiency as well as reduced inputs, thus increasing economic return. UC ANR also conducts research and education leading to improvements in individual and household financial management practices. These changes improve individual and business financial stability, increasing the viability of California's economy and maintaining our role as a global leader.

The estimated annual value of adoption of the UC Integrated Pest Management Program recommendations is **\$323-500M** to California agriculture
Giannini Foundation of Agricultural Economics (2016)

Improved animal management, productivity, and efficiency

Filling a gap through expansion of local meat processing infrastructure

After guiding a group of ranchers through a market survey and financial analysis, concluding with the

composition of a business plan for a cooperatively held mobile slaughter facility, our Sustainable Agriculture team coordinated resources and stakeholders to facilitate the formation of a rancher cooperative. Now known as the [Bay Area Ranchers Cooperative or "BAR-C"](#), the cooperative consists of over 40 member ranchers from Marin, Sonoma, and the broader Bay Area. Helping to form governance structures, including a board of directors, our team collaborated with BAR-C through multiple aspects of startup, including: Permitting for land use, site development, and waste management; Capital campaign for acquisition of equipment; Recruitment of additional member ranches; and Acquisition of

USDA grant for conversion of waste products into revenue. BAR-C and its facility remove a bottleneck in processing, making it possible for its small-scale member producers to direct market their products to local customers.



Bay Area Ranchers Cooperative or "BAR-C" members.

Safeguarding Sufficient, Safe, and Healthy Food for all Californians

UC ANR's research creates practical solutions leading to improvements in food production and processing practices. Given one out of every eight Californians does not know where their next meal will come from, UC ANR educational programs enable individuals and households to improve their food budgets and food management practices. As a result, Californians have increased access to abundant, affordable, safe, and healthy food.

Enhancing food assistance programs such as school food programs, food banks, and CalFresh acceptance at farmers markets increases access to fruits and vegetables.
County Health Rankings

Expanded Food and Nutrition Education Program (EFNEP) graduates reported an average of **\$58.10** monthly food cost savings. In one year California EFNEP families collectively saved over **\$1.5M** on food costs.
EFNEP

Improved food security

Coordinating cross-county pandemic emergency food response

From the start of the pandemic, our Food Systems team has supported food policy councils, VOADs, and emergency food providers to coordinate and collaborate on responding to emergency food needs from the pandemic, discuss preparation for current and future emergencies, and share emerging promising practices regionally. This included hosting Cross-County Pandemic Emergency Food Response Planning Meetings in the fall of 2020 and seeking funding opportunities to establish a 6-county Emergency Food Systems Network, spanning from Marin to Del Norte Counties. This network supports emergency food system planning, coordination, collaboration, and policy development.



Emergency Food Systems Network counties.

Providing food relief one row at a time

Our Food Systems and School and Community Garden team, partnering with the UC Marin Master Gardeners, connected across Marin on a Grow An Extra Row campaign in the summer of 2021. Through growing plant starts, coordinating donations of starts and seeds, and providing technical support to backyard, school, and community gardeners this partnership provided local food relief. The effort resulted in 14 garden sites located in 4 communities with high rates of food insecurity, 13 part-time paid and volunteer growers, 11 food donation sites supporting families in need across the county with fresh local produce, and 3,797 pounds of fresh, healthy, and local food donated to families in need. Additionally, program support made it possible for participating school sites to open the school year with their gardens flourishing and ready for fall harvest. The first year of the program formed new connections and relationships within gardens and across Marin to continue and expand this effort.



Child weighing produce from a school garden.

Promoting Healthy People and Communities

UC ANR produces tools, programs, and policy-relevant research that result in healthy living for individuals and communities. Program participants adopt healthier lifestyles and communities gain improved access to green spaces and healthy foods. Benefits also include safe drinking water, clean air, and reduced exposure to pesticides. In this way, UC ANR promotes public health for people and the communities where they live, learn, work, and play. Collectively these efforts contribute to a healthier California, improving public health and reducing healthcare costs.

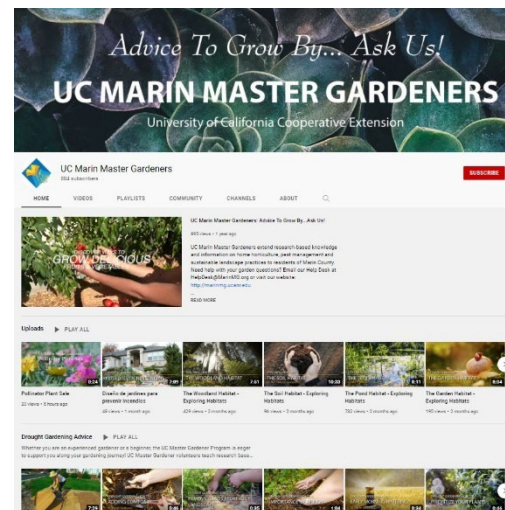
Studies show that for every **\$1** invested in EFNEP, more than **\$8** is saved in current and future healthcare costs. *Pradhan and Goldman (2006)*

UC Master Gardener participants improved green spaces on **3.8 million** square feet of home, school, and community gardens across California. *UC Master Gardener Program*

Improved community health and wellness

Moving our “grow-how” to the how-to video platform

Our UC Marin Master Gardeners continue to be a go-to source of information and learning for Marin’s home gardeners. For those wanting sound advice to grow more fruits and vegetables, make habitat for wildlife and pollinators, use water more efficiently, and manage pests and diseases in ecologically sound ways, our [HelpDesk](#) and the beautifully revamped [Marin MG website](#) are great places to start. Prior to the pandemic, our UC Marin Master Gardener volunteers provided in-person presentations and learning opportunities throughout Marin. These volunteers, partnering with Marin Free Library and other organizations, quickly moved these presentations to online and virtual formats. The [UC Marin Master Gardener YouTube channel](#) has a wonderful and comprehensive collection of short how-to videos and longer educational lectures to help gardeners learn and explore about gardening in Marin County.



Marin Master Gardener YouTube channel provides wonderful how-to videos for earth friendly gardening in Marin.

Protecting California's Natural Resources

UC ANR translates research into actionable management strategies to protect our farming, ranching, forestry, and urban environments. Through outreach and education, participants learn to adopt recommended practices, such as grazing and rangeland management, sustainable use of forest and wildland resources, protection against fire, and water conservation. These measures contribute to improving air, soil, and water quality while also protecting wildlife and plant habitat. Increased ecological sustainability of agriculture, forestry, and urban landscapes helps California realize the many benefits of the state's rich and diverse natural resources.

Adoption of California Irrigation Management Information Systems (CIMIS) weather station data can save California nearly **147 billion** gallons of water annually
Zilberman, et al. (2019)

UC Master Gardener participants improved **4 million** square feet pollinator habitat statewide
UC Master Gardener Program

Improved management and use of land

Developing and delivering climate solutions with animal agriculture

In December 2020, the Marin Board of Supervisors approved the [Marin Climate Action Plan 2030](#). This plan includes a precedent setting chapter on Agriculture and Working Lands that our Watershed Management team co-authored with the Marin County Sustainability Team and Marin Carbon Project partners, including the Marin Resource Conservation District, Marin Agricultural Land Trust, and Carbon Cycle Institute. With aspirations to make a significant beneficial impact, this chapter sets the goal of implementing a combination of carbon beneficial practices across a third of Marin's farms and ranches by 2030. If achieved, the carbon sequestration and draw down that would result from this scaling up of carbon farming would contribute to Marin surpassing California emissions goals for 2030 and 2045. Including agriculture in this plan and partnering with Marin's agricultural community makes it possible to realize the climate management benefits and opportunities of its open, preserved working landscape.



The Marin Climate Action Plan 2030 includes practices such as stream restoration to contribute to meeting Marin goals.

Improved management and use of land (continued)

The relationship between animal agriculture and climate management

[Dairying, Ranching, and Climate](#)

[Management](#) was a half-day webinar for Marin's ranching community and stakeholders to better understand climate change and how animal agriculture fits within it. Our Dairy Science and Watershed Management teams partnered with the Marin Carbon Project to organize and host this offering. Researchers from UC Davis presented the current science on animal agriculture greenhouse gas emissions and alternative feed sources to reduce those emissions. Marin and Sonoma planning agency representatives presented current Climate Action Plans, discussing the

contributions that local livestock operations can make in meeting county climate goals. Conservation planning experts, including the Marin Resources Conservation District and Carbon Cycle Institute, detailed methods to implement important climate smart practices on-farm. Attended by more than 50 participants, the webinar was recorded and is [available online](#).



This webinar is a useful starting place to learn about agricultural solutions for climate management.

Protected and conserved soil quality

Collaborating with ranchers on healthy soil

Managing soil health and the organic matter levels is key to individual farm productivity and resiliency in the face of extremes in precipitation. To improve on-farm soil management, our Livestock & Range team provided technical assistance services to 53 growers, ranchers, and farmers. This included technical recommendations for practices these producers could take themselves, and assistance to apply for funding from California Department of Food Agriculture's Climate Smart - Healthy Soils Program for larger, capital-intensive soil management projects. Practice examples include compost application, range planting (seeding), and hedgerows. These and other practices improve soil health and sequester carbon on farm and ranch lands and contribute to increased water holding capacity in soils.



Using compost to improve soil health and sequester carbon.

Increased ecological sustainability of agriculture, landscapes, and forestry

Leadership recognized for safeguarding environmental restoration from plant pathogens

Our Forest Health team continued its collaboration and coordination with partners, including USDA Forest Service, San Francisco Public Utilities District, and Santa Clara Valley Water District, to bring solutions to native plant nursery operators and restoration practitioners that reduce the spread of introduced *Phytophthoras*, known plant pathogens. The same *Phytophthoras* that can cause Sudden Oak Death and other tree and shrub diseases can be hosted in nursery stock and then introduced into restoration sites. The [Phytophthoras in Native Habitats Work Group](#) formed to take steps needed to protect wildlands and assist the restoration industry. The Work Group was recognized by the California Environmental Protection Agency Department of Pesticide Regulation with a 2020 Integrated Pest Management Award for its nursery certification program and positive impacts through education to reduce the spread of these pathogens. A recording of the award presentation is available [here](#).



The Work Group was recognized for its nursery certification program and education efforts to reduce disease spread.

Responding to elevated tree mortality with an information hub and partner coordination

In 2020 and 2021, observations of increased tree die-off have been made throughout the Bay Area including in Marin. The scale of the impact has been said to rival that of Sudden Oak Death in its earliest years, more than 25 years ago. Using the framework of tools and network of partners and stake holders, our Forest Health team has published the [Bay Area Tree Mortality webpage](#) and hosted a half-day [virtual conference](#) to gather researchers and managers to discuss the impacts and options in the face of this die-off. Additionally, our team is collaborating in the collection and analysis of tree tissue samples from the field to confirm disease agents and guide management options.

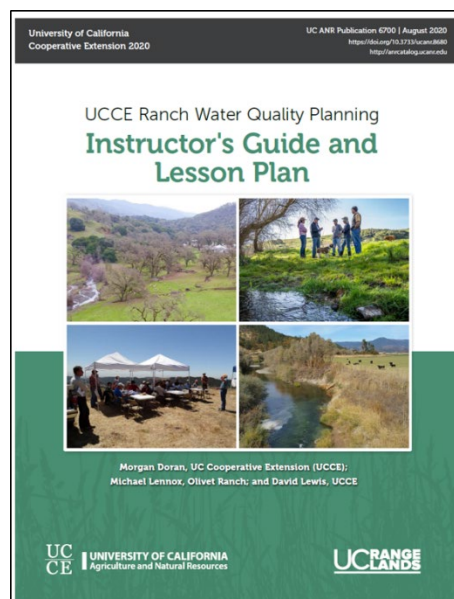


This tree shows the classic U (or sometimes V) shaped discoloration deep in the wood that is characteristic of diseases impacting trees.

Improved water quality

Improving Ranch Water Quality with New Educational Tools

The Ranch Water Quality Planning (RWQP) program has been a very successful UCCE program since 1995, helping thousands of ranchers throughout the state address water quality issues on grazing lands and comply with water quality regulations, such as in Tomales Bay. In 2020, our Watershed Management Team led an update of RWQP curriculum and materials. This included adding the most recent scientific findings, improving clientele accessibility and reaching a broader audience. The RWQP Instructor's Guide and Lesson Plan is now available [online](#), including 19 lesson plans organized into 6 learning modules. This content is complemented with [29 video presentations](#) covering scientific topics about ranch water quality, practices to enhance water quality, and instructions on how to create a Ranch Water Quality Plan. The RWQP Instructor's Guide offers a flexible platform for organizations to deploy ranch water quality programming through remote or in-person venues.



Ranch Water Quality Planning Instructor's Guide and Lesson Plan

Building Climate-Resilient Communities and Ecosystems

UC ANR conducts research to understand and develop solutions to increase the resilience of agriculture, communities, and natural ecosystems to extreme weather and climate change. Our programs assist communities, farmers, and ranchers in implementing climate-smart soil and water management practices, reducing greenhouse gas emissions in forested and working landscapes, and expanding public awareness of climate risks and effective adaptation strategies. As a result, communities are better prepared and able to deal with the growing risk of fire, droughts, and flood hazards. Our work leads to a safer, more climate-resilient California.

UC Climate Smart
Agriculture Educators
helped growers statewide
reduce greenhouse gas
emissions equivalent
to removing
7,000
cars from the road
Based on CDFA calculators
(SWEET and HSP)

Increased preparedness and resilience to extreme weather and climate change

Supporting ranchers with near and long-term actions in response to the drought

Low rainfall amounts in 2020 and 2021 contributed to the most severe on-farm drought conditions since 1976 and 1977. Working collaboratively with local industry, funding agencies, and land and livestock managers across Marin and Sonoma counties, our Dairy and Sustainable Agriculture Program Team organized and hosted a two-part webinar series on farming in a drought. Part one detailed near-term practices that specialty crop producers and livestock operations could implement right away to mitigate the crisis. Emergency relief funding was also explored. Part two detailed long-term practices for specialty crop growers and livestock operators to build up their capacity to withstand severe drought in the years to come. Both programs were delivered in English with Spanish interpretation. More than 160 producers and stakeholders participated in the webinar. Resources and information from this series are compiled and available on our [Drought Management webpage](#).



Our Dairy and Sustainable Agriculture Program Team organized and hosted a two-part webinar series on farming in a drought.


Increased preparedness and resilience to extreme weather and climate change (continued)

Increasing home and home garden fire resiliency through defensible space

["Reducing the Vulnerability of Buildings to Wildfire: Vegetation and Landscaping Guidance"](#) is a recently published go-to source of research-based information for homeowners striving to reduce the impacts of wildfire in their gardens and landscapes. As a co-author of this publication, our Horticulture Team uses the content to facilitate homeowner understanding of the different landscape zones surrounding a home and how to design and manage their landscape to reduce fire fuels and therein the severity of potential fire. This information coupled with other guidance provided by the [UC Marin Master Gardener's Fire-smart Landscaping program](#) has provided 1,000s of Marin homeowners the guidance and direction they need to create defensible space while achieving the habitat, food production, and beautification goals they have for their home gardens.

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<https://anrcatalog.ucanr.edu>



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Reducing the Vulnerability of Buildings to Wildfire: Vegetation and Landscaping Guidance

Introduction

What can Californians do to improve the chances that their homes will survive a wildfire? The good news is that research demonstrates that a home's odds of surviving a wildfire can be substantially improved through careful attention to three principles: (1) thoughtful landscape design aimed at reducing and separating combustibles (vegetation, lawn furniture, and other landscape assets) within the defensible space on a property, (2) retrofitting homes to resist wildfire, and (3) implementing ongoing maintenance of the home and landscaping to reduce combustible materials (for example, leaves and needles) and to address the wear and tear that homes incur over time.

This publication acknowledges the importance of a coupled approach to improving the odds of home survival—an approach that encompasses the home as well as the vegetation and other combustible materials on the property. However, this publication focuses primarily on landscaping issues on a property; more detail about home hardening can be found in publications listed in the reference section (IBHIS 2019; Quarles et al. 2010).

Preparing for wildfire does not have to be costly. The first step is to understand the three types of exposures that can threaten a home during a wildfire so that actions specific to the context of an individual's home and landscape can be prioritized.

This newly published resource offers steps to reduce the severity of fire in home landscapes.

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Marin youth on the "From the Redwoods to the Ocean" hike as part of a Step Into 4-H short-term project. Youth hiked all the way from Pantoll Ranger Station on Mt Tamalpais, down the Steep Ravine Trail, and to Stinson Beach.