RESEARCH ARTICLE

Restoring oak woodlands through trust: Social capital and its role in successful private land conservation

Social capital, including trust among landowners, officials, and nonprofits, is key for oak woodlands conservation.

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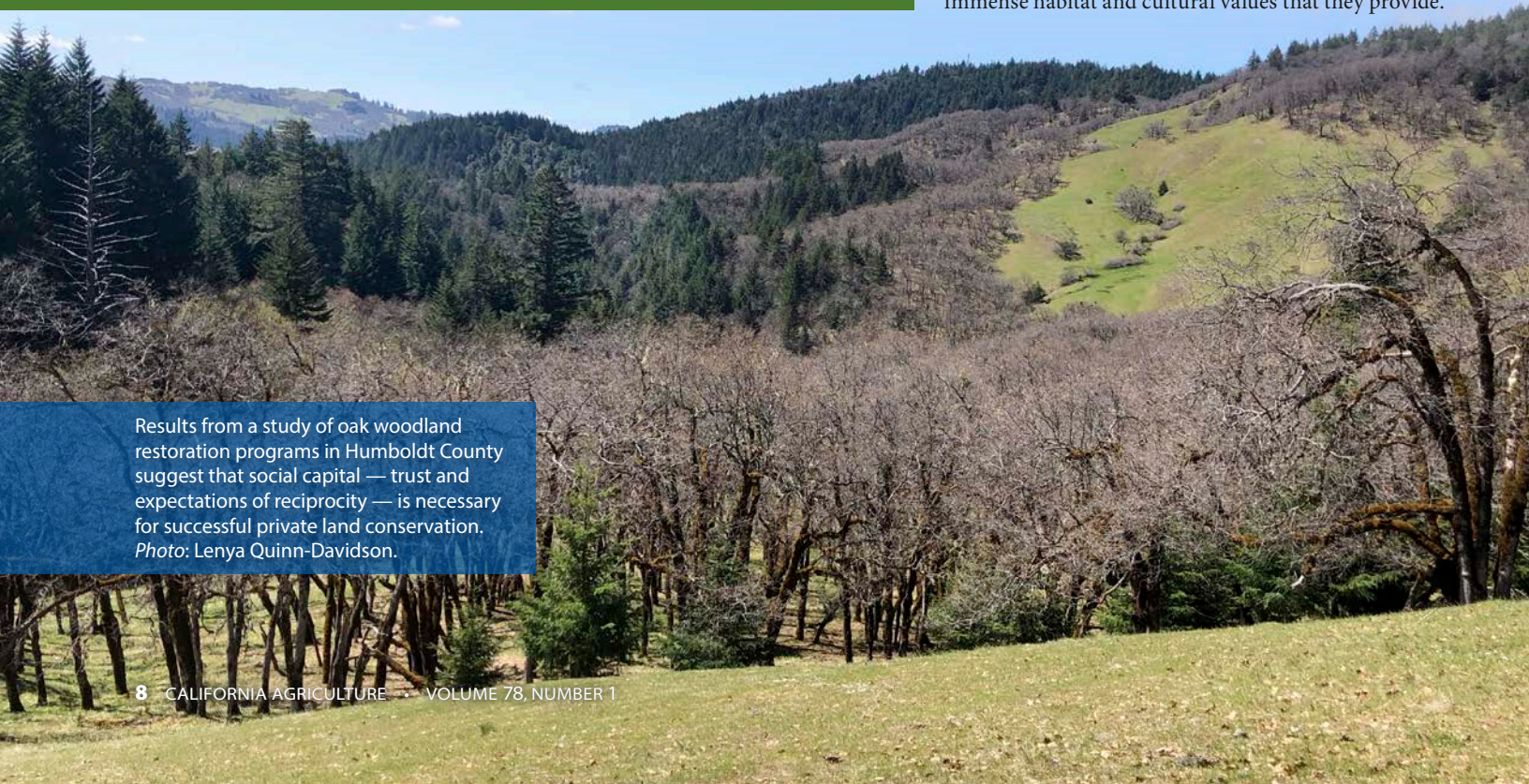
Abstract

Formal private land conservation programs can be essential for achieving conservation goals, especially in ecosystems with substantial private ownership. Most deciduous oak woodlands in Humboldt County, California, and throughout the Pacific Northwest are located on private lands. The loss of these woodlands to conifer encroachment is a critical conservation concern, with implications for wildlife habitat, range management, cultural resources, biodiversity, and fire management. Private land programs depend on both incentives and voluntary cooperation. Through interviews and participant observation, we explored how and why landowners participate in oak woodland restoration. We are particularly interested in the role of social capital, which consists of trust and expectations of reciprocity. We found that oak woodland restoration depends on building social capital in order to leverage different skill sets and gain access to resources and technical expertise. Rather than a side effect of successful private land conservation, we assert that social capital is a necessary part of it, and that building and maintaining social capital can itself constitute a conservation goal.

Restoration and conservation of deciduous oak woodlands is a priority in California. Oregon white oak (*Quercus garryana*) and California black oak (*Quercus kelloggii*) ecosystems provide ecological, economic, and cultural values, yet face multiple threats (Allen-Diaz et al. 2007; Long et al. 2016). Aside from land use conversion (for example, to real estate or wineries), oak woodlands are threatened by management decisions, such as the post-colonial suppression of cultural burning and lightning-ignited fire. This has resulted in forest densification and the invasion of Douglas-fir (*Pseudotsuga menziesii*) and other fast-growing conifer species which proliferate in the absence of disturbance (Cocking et al. 2012; Long et al. 2016).

In Humboldt County, California, oak woodlands have been a conservation priority for several decades. For instance, Redwood National Park has been a leader in oak woodland restoration and conservation, focusing significant resources on conifer removal and prescribed fire in its woodlands in recognition of the immense habitat and cultural values that they provide.



Results from a study of oak woodland restoration programs in Humboldt County suggest that social capital — trust and expectations of reciprocity — is necessary for successful private land conservation. *Photo*: Lenya Quinn-Davidson.

However, public land management can only restore a fraction of threatened oak woodlands, because approximately 80% of California's remaining oak woodlands are located on private property.

Where private lands dominate the landscape, private lands conservation programs are a central part of achieving conservation objectives (Brunson and Huntsinger 2008; Gallo et al. 2009; Santangeli et al. 2016). Landowner participation in these programs is based on a wide combination of factors, including individual characteristics of landowners (e.g., management goals, values, income, knowledge), the land (e.g., ecosystem type, ownership size), and social systems, including social networks and social capital (Lubell et al. 2013; Rosenberg and Margerum 2008; Sweikert and Gigliotti 2019). We focus on social capital in this paper because of the supportive network structure (with multiple state and non-state actors working alongside landowners) that has propelled the implementation of many oak woodland projects. In this research, we ask why private landowners implement oak woodland restoration projects and participate in private land conservation programs. We highlight the role of two types of social capital — bonding within a group and bridging across groups — in successful conservation programs.

Social capital is an asset that is built through relationships; it is the "shared knowledge, understandings, norms, rules, and expectations" that people bring to an activity in order to collaborate, especially in the long term (Ostrom 2000, 176). Social capital, which includes expectations of reciprocity and trust building, allows participants to access resources and achieve shared objectives (Putnam 2000). It generally consists of two types: *bonding*, in which a close-knit group is formed with a strong sense of trust but limited outside perspectives; and *bridging*, in which relationships are formed that span the diverse sub-groups of a network to bolster capacity and social learning (Aldrich and Meyer 2015; Henry and Vollan 2014). Both the bonding and bridging forms of social capital are important for landowner decision-making. Bonding occurs as peers and neighbors share information about programs; bridging occurs among distinct groups, allowing for "novel perspectives" and outside resources to circulate in the network (Cofré-Bravo et al. 2019). Some groups and organizations link the two; for example, watershed councils can serve as trusted intermediaries between landowners and government agencies, providing landowners with resources and knowledge about conservation programs (De Krom 2017; Mariola 2012).

Forest policy context

California's private forests are regulated by the 1973 Forest Practice Act and its administrative Forest Practice Rules (FPRs), which mandate extensive Timber Harvesting Plans (THPs) in order to conduct commercial timber harvests. In 2015, Valachovic et al. assessed California's oak woodland policies, predicting that the state's FPRs, which tend to favor conifer regeneration, could be amended to better achieve oak woodland conservation. Thompson (2017) outlined those policy changes, which have provided landowners with expedited paths through California's regulatory system for oak woodland restoration and conservation. In 2016, the state legislature passed AB 1958, which offers an exemption from certain expensive and burdensome requirements within the FPRs (such as writing THPs) for small-scale oak woodland restoration projects. As of August 2023, the exemption has been used 64 times (55 in Humboldt County), for a total of approximately 1,500 acres of oak woodland restoration. In addition, in 2017 the state Board of Forestry created a special silvicultural designation for larger-scale oak woodland projects (14 CCR 913.4[f]), which allows deciduous oaks to meet regeneration requirements in THPs. Combined, these two actions were intended to expedite and facilitate oak woodland restoration for landowners.

These regulatory changes were helpful, but were incomplete without other actions to spur landowners to take action on oak woodlands. Because landowners have to be proactive to conserve oak woodlands, they are more likely to take these steps with support and incentives from private land conservation programs. These programs involve landowners engaging with experts through incentive-based or voluntary non-monetary programs. Private landowners can practice environmental conservation regardless of their participation in formal conservation programs (Aslan et al. 2009). However, programs provide additional resources, such as financial and technical assistance, to achieve conservation objectives.

Oak conservation in Humboldt

In 2011, a survey conducted by Koski (2012) found that landowners in the North Coast region, which includes Humboldt County, identified oak trees as an "important ecological and cultural resource" but that few conducted active management to maintain them. The barriers they cited included lack of technical expertise, funding and equipment, and trust in natural resource professionals. To address these needs, in 2016 a diverse team of partners submitted a proposal to the Natural Resources Conservation Service's (NRCS) Regional Conservation Partnership Program (RCPP), which provided funding for specific regional conservation issues. The RCPP, which ended in 2022, is one funding mechanism that has been utilized by the broader oak woodland restoration network of the North Coast, and we use it as an example of how the network works. The program brought $2.68 million to the North Coast for oak woodland restoration over a five-year period. Planning funds were administered by University of California Cooperative Extension (UCCE) staff, in collaboration with local partner organizations, and implementation funds were channeled through NRCS. From 2017

Social capital, which includes expectations of reciprocity and trust building, allows participants to access resources and achieve shared objectives.

UCCE advisors have worked on oak woodland issues in Humboldt County for many years. Their most recent project, now in its final year, looks at the water demands of conifer encroachment in oak woodlands. *Photo*: Lenya Quinn-Davidson.

The strong and diverse network of participants not only facilitated on-the-ground conservation projects, but also brought about policy changes at the state level and mobilized to generate additional resources.

through 2021, a total of 33 projects were funded by NRCS across three counties, ranging in size from five acres to several hundred. In Humboldt County, efforts were coordinated at a local scale by different RCPP partners, including three nonprofit nongovernmental organizations: the Yager-Van Duzen Environmental Stewards (YES) in eastern Humboldt County; the Mattole Restoration Council (MRC) in the southern part of the county; and the Northcoast Regional Land Trust (NRLT) across the county. Other RCPP partners included the U.S. Fish and Wildlife Service (USFWS) through their Partners for Fish and Wildlife program, and the California Department of Forestry and Fire Protection (Cal Fire). Within the RCPP, private landowners and land managers were at the center of conservation efforts (fig. 1). All actors in the network communicated with each other and coordinated projects. YES is composed of landowners and partners with federal and state agencies; the other two nonprofits (MRC and NRLT) have professional staff who work with landowners. Other functions of this network included providing financial support to landowners, either directly (NRCS and USFWS) or through government grants (MRC and NRLT); providing technical expertise for project planning and monitoring (NRCS, USFWS, MRC, NRLT, UCCE, and Cal Fire); and assisting through direct implementation (MRC and Cal Fire).

Interviewing owners and partners

We utilized participant observation and semi-structured interviews to answer our research questions. All methods were reviewed and approved by the Institutional Review Board at Cal Poly Humboldt (IRB 17-021). The research began with participant observation, as two of the authors are members of multiple groups involved in the oak woodland restoration network of the North Coast, serving as board members at different times for all three nonprofits and working closely with government agency partners in the network. The RCPP was developed by the second author and involved several partnership planning meetings, as well as field visits with RCPP partners. In addition, the authors attended meetings of the North Coast Oak Network, which aimed to find ways to increase oak woodland restoration. At these meetings, barriers to restoration and ideas for improving projects were discussed.

As a result of these meetings, we selected interviewees and conducted interviews with people engaged with oak woodland restoration in the region. We developed two interview templates, one for landowners and one for agency and nonprofit employees. Landowners were asked about their properties (length of ownership, management objectives), their views of oak woodlands and oak woodland restoration, and perceived threats to the health of their woodlands. The landowners were also asked about oak woodland restoration projects they had developed and implemented, either on their own or working with others.

Agency and nonprofit employees were asked about oak woodland restoration projects they were working on and what could make it easier to implement projects. They were asked about landowners with whom they worked — their perceptions of why landowners did restoration projects, and examples of successful and failed projects.

In all, these semi-structured interviews were conducted with 13 oak woodland restoration participants, including seven landowners, four state and federal agency employees, and two nonprofit employees. All were sampled purposefully, rather than randomly (Patton 2014). Though this is a small sample size, these interviewees represented the main organizations and players involved in the oak restoration network. Interviews revolved around landowner participation in ongoing oak woodland conservation projects, with particular focus on the RCPP program; they occurred at interviewees' offices or in the field and lasted between 45 minutes and two hours. All interviews were recorded and transcribed.

Interview transcriptions were analyzed using standard qualitative coding methods (Patton 2014) on the online platform Dedoose. Initial codes were developed to organize data and create categories of findings, as transcripts were reviewed line by line.

Codes were then grouped into themes through a process of comparative analysis, as transcripts were reviewed. Interviews were wide-ranging and for this paper were coded to answer our research questions, which focused on why landowners participated in oak woodland restoration, and the role of social capital in implementing restoration projects.

What motivates landowners?

Landowners and agency members indicated that the motivations for conducting oak woodland conservation included both utilitarian reasons (e.g., improving and maintaining range values for cattle) and ecological concerns (e.g., promoting biodiversity). In the words of an agency member:

> *Improving habitat for hunting, improving habitat in general, saving the oaks from mortality, restoring viable rangeland if they're grazing cattle, which is lost to fir forest. For some people it's entirely, the concept of restoration sits well with them to start with, and that's all they need. For other people, it's really a part of their livelihood. So rangeland and having something that's grazeable matters.*

Several landowners indicated that preventing conifer encroachment on oak woodlands was a management practice that was passed down. One landowner said, "My grandfather and my great-grandfather, my dad said they always had a strict policy that if you're out riding around on a ranch and you saw a Douglas-fir seedling come up, you got off your horse and pulled it up." This shows that participating landowners were already willing to conduct oak woodland restoration, even prior to its promotion by agencies and nonprofits. One agency member indicated the importance of existing practices, saying that "you try to let partners drive . . . We don't want to be pressuring them to do projects."

For the landowners who were already on board with the concept of oak woodland restoration, there were two initial hurdles: regulatory and financial. Regulatory hurdles were addressed through reform of the California FPRs, described above. This reform was accomplished through the work of many of the eventual participants in the RCPP, including agency and nonprofit employees and landowners, who pressured the California legislature and the Board of Forestry to streamline the often-onerous requirements of the FPRs. As a landowner indicated, "We've, for years, have wanted to go ahead and do the woodland stuff . . . With them rewriting the laws on that or the regulations, it makes it easier to get more done."

Financial challenges were addressed through a mix of funding mechanisms (including RCPP) brought in by different agency and nonprofit partners. This funding allowed landowners to offset costs of restoration. As one landowner said, "When you're doing a project for simply a conservation value and there's a cost associated with doing it, then those economic incentives are huge incentives to do the right thing."

Government funding was utilized, despite some reservations of landowners; as another landowner indicated, "I don't like government money, but I take it because you're not going to get anything done if you don't." Aside from these factors, we found that interviewees repeatedly returned to the importance of building trust and sharing knowledge to successfully implement restoration projects.

Partnerships in conservation

The centrality of both bonding and bridging social capital was described by interviewees and is evident in the conceptual model of the network we developed in figure 1. Bonding social capital was illustrated by the formation of the nonprofit organizations, in which tightly knit groups, largely made up of like-minded individuals, built trust among members. MRC formed in the Mattole Watershed in 1983 among back-to-the-landers in response to declining salmon runs and erosion concerns because of timber harvesting. YES is a group of ranching landowners in the Van Duzen Watershed who joined together in 1999 to proactively address water quality issues. NRLT formed in 2000 as a group of landowners and conservationists with the common goal of protecting working landscapes across the region, including Humboldt County.

Bridging social capital then was built across nonprofits, agencies, and landowners, often through what one landowner described as "one-on-one personal relationships." These relationships served to facilitate the transfer of funding and helped with knowledge transfer, allowing for innovation and learning among multiple groups to implement restoration projects. Several landowners noted that they were willing to be more experimental, or to try new methods of oak woodland conservation, because of their trust in agency members:

> *That's what I really like about our partner agencies: NRCS, U.S. Fish and Wildlife Service Partners program, is they really have helped us a lot on this ranch implement better conservation practices . . . Through that, we've built relationships of trust, and so there's been that opportunity to go back and forth and share ideas and share concepts that maybe aren't something that initially would be comfortable for landowners.*

After viewing a neighbor's restoration project, one landowner contacted the agency member who was helping to implement the project. The landowner said that, "my opinion of [the agency member], because of the logical arguments he was making, made me much more interested in following up on what they were doing, where and why . . . I decided that based on what I

A team of UC ANR researchers visit oak woodland research sites in eastern Humboldt County, 2018. *Photo*: Lenya Quinn-Davidson.

had learned from [him] I would proceed with the restoration." When asked what incentivized the restoration project, the landowner said, "money and good science, almost in reverse order."

An agency employee described this as a two-way flow of information while providing technical assistance: "We try to teach them what we can. We learn from them at the same time, then we offer advice on ways they can improve what they're doing or conserve resources in some way." Agencies offer knowledge to landowners about two separate aspects of restoration: how and why to do work on the ground, and how to fund and implement that work. As one landowner explained:

> *Partnering [with agencies] has worked on two fronts. One, it has worked as a great funding source, but also because they have had the expertise and the background to be able to help us noodle it through and talk it through and guide us in what we're doing and where we should be treating and that sort of thing.*

These relationships were built through multiple projects. As a landowner indicated, these repeated interactions gave "a face to the agency," and "then you're willing to share with that person on a deeper level some of the things that are going on, like maybe species that you have that you're not quite sure you want to share that you have or areas of concern that you're not quite sure you want to share." Developing personal relationships with agency members made a huge difference for landowners who were wary of potential regulatory ramifications of inviting agency employees to their property.

Network of support and capacity

Social capital not only facilitated the transfer of resources, knowledge, and technical expertise; it also built capacity for doing the work of oak woodland restoration. One example was the MRC, which not only acted as an intermediary between landowners and funding agencies, but also provided workforce capacity. An MRC representative said that landowners "realize that we are a good interface because we have crews, and we've now built up a reputation" to do work. In some cases, the MRC could do a better job than agencies of coordinating landowners; as one agency person explained: "They can organize and coordinate a lot of the logistics of the projects . . . It's just a way to spread our money further." The agency member could then serve in a "conceptual, decision-maker role" while the nonprofit organization implemented work. Both of the watersheds that have been most active in oak woodland conservation have watershed groups "that speak and act for the entire watershed," and can adapt to changing priorities and interests within the watershed. As an agency member explained:

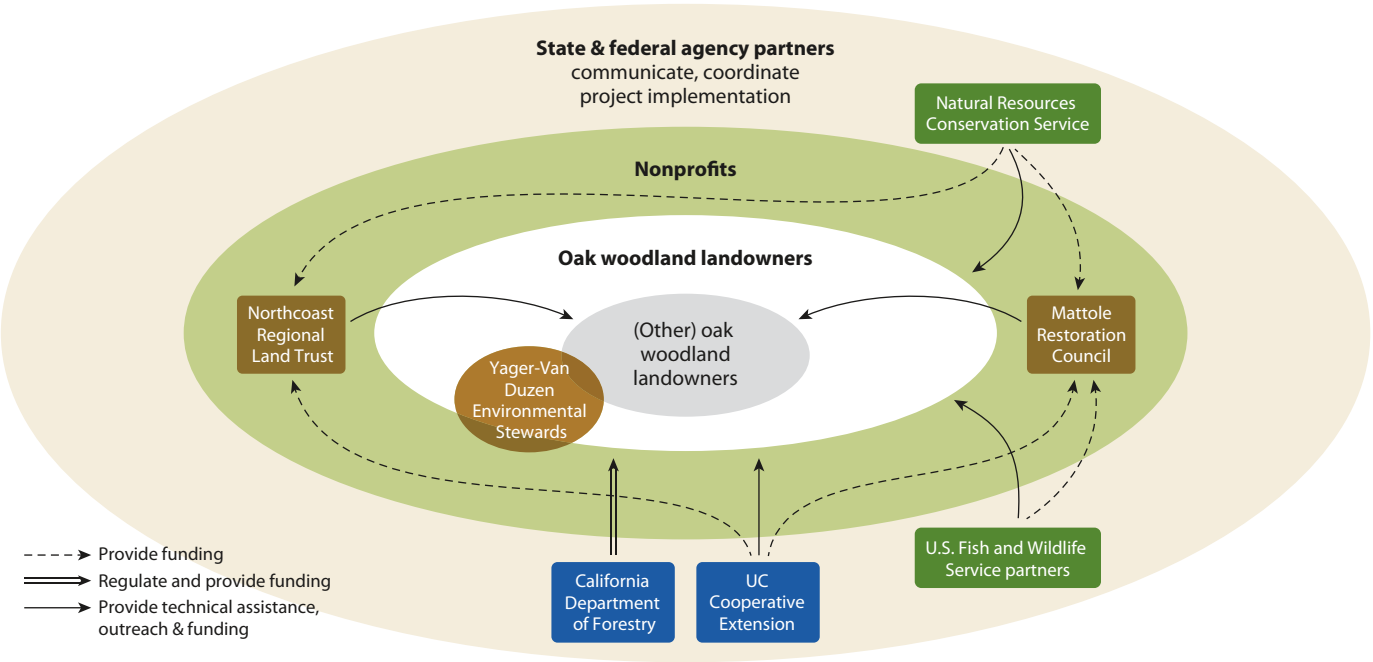


FIG. 1. Support for landowners to conduct oak woodland restoration is through three nonprofit organizations (in brown), one of which is a consortium made up of landowners (YES) and two of which have professional staff and provide funding and other support to landowners (MRC, NRLT). Landowners outside of YES are indicated in grey. These organizations and landowners work with agency partners, both federal (in green) and state (in blue). The California Department of Forestry regulates landowners and provides funding. Other agency partners provide funding (dotted lines) to MRC and NRLT, and technical assistance, outreach, implementation, and funding (solid lines) to landowners, including YES.

MRC has a lot of maps and I know a lot of the people there, and they are always looking for a willing landowner to work with, and because perhaps funding for my projects is funding for their organization too . . . They come to me with an idea, and it's either, yeah, it makes sense, or it doesn't.

This existing capacity in the Humboldt oak partnership has enabled adaptation and innovation to address emerging issues. In the oak woodland context, project maintenance has been an ongoing challenge. Oak woodland restoration does not end with a single treatment, as conifers continue to encroach into the woodlands. In the words of one landowner: "This is not something that you can go in and treat once and it's fine. It's one of those things where we will be treating it for a long, long, long time." As an agency member noted, "the landowner's expected to maintain the project . . . It's not something that gets checked up on so it's totally feasible that a lot of these projects that happened aren't getting maintained."

The same social capital that enabled initial oak woodland restoration in the North Coast was instrumental for follow-up prescribed fire work, which is a vital part of restoration and maintenance of treatments. Prescribed fire is a potentially riskier endeavor than logging or other conservation practices and requires high levels of resource-sharing and trust. Demand for prescribed fire for oak woodland maintenance and other conservation values inspired UCCE, NRCS, and local landowners to explore models for private lands burning. In 2018, these efforts resulted in the development of the Humboldt County Prescribed Burn Association (HCPBA), the first of its kind in the western United States. Many of the same partners and organizations in the RCPP are leading and supporting the HCPBA. Since its inception in 2018, the HCPBA has implemented more than 700 acres of oak woodland-focused burns in Humboldt County, with several projects in RCPP-treated areas. The development and success of the HCPBA has also inspired the formation of more than 20 similar groups throughout California in the last several years. The core guiding philosophy is neighbors helping neighbors as a way of diminishing regulatory and financial barriers and sharing knowledge about prescribed burning.

Conservation through trust

Our research shows that social capital has a key role in implementing a successful private land conservation program. While landowners can choose to do restoration projects on their own, a formal conservation program with a network of supportive partners gives landowners access to resources that allow for greater scale of projects. The oak woodlands restoration network in Humboldt County included governmental agencies that provided funding and technical support, nonprofit organizations that facilitated landowner participation and served as a link between landowners and state and federal agencies, and landowners themselves, who willingly dedicated time, resources, and effort. These participants spoke of the importance of trust and relationships in carrying out conservation projects on private land. The strong and diverse network of participants not only facilitated on-the-ground conservation projects, but also brought about policy changes at the state level and mobilized to generate additional resources. The network was receptive to emerging conservation issues and approaches; the trust built through various projects empowered actors in the network to provide leadership for riskier (but critical) efforts such as prescribed burning. Trust and reciprocity — two components of social capital — were paramount when creating and implementing restoration projects that require landowner buy-in and active management. This model of oak woodland private land conservation could be adapted for other contexts in which landowners need support to carry out conservation projects, such as wetland or native plant restoration.

An example of an area that has experienced widespread conifer encroachment. Note the conifers piercing through the canopies of the deciduous oaks, which are much older. This area has since had the conifers removed as part of a UCCE-led research project. *Photo*: Lenya Quinn-Davidson.

The oak restoration network of Humboldt County built upon existing organizations predicated on bonding social capital, or groups of people with strong similarities and connections. The three nonprofits described here, which all first convened around other conservation issues, either included landowners or worked closely with landowners and served as hubs for information, outreach, and distributing funding. This is especially important in cases where private landowners work independently across a landscape. These nonprofit organizations, alongside landowners, worked with federal and state agencies to address the common objective of oak woodland conservation and restoration. In this way, they built bridging social capital, as actors reached across social divides to leverage resources and share knowledge. Bridging social capital brought together distinct skill sets and access to resources because of the many organizations involved in the oak restoration network.

The network thus far has proven adaptive and resilient, working on new challenges over time and continuing despite the loss of some key individuals. Lubell et al. (2013) said that increasing participation in private land conservation programs involves targeting opinion leaders "who are well-connected to local social networks" (p. 618). We expand this to emphasize the

importance of building social networks over time in order to establish trust among different groups. While all three of the nonprofit organizations formed before oak woodland restoration was identified as a priority, they were activated by the issues associated with oak decline. The many partners built a conservation network capable of doing long-term work necessary for restoring and maintaining oak woodlands. Across the county, existing capacities, relationships, and partnerships enabled oak woodland conservation. Along the way, RCPP funding provided support to efforts that were already primed for further investment.

There are notable challenges to developing and maintaining social capital. Relationships take time to build and require commitment from many people who volunteer their time (especially landowners). This limits the potential to scale up efforts of this kind, both in terms of increasing the number of participating landowners and functioning across larger contexts. But this points toward the importance of investing in projects and organizations that build social capital.

There also can be issues of equity and access to resources. Some landowners or organizations may not feel welcome within a network or may be excluded from benefits. An important limitation of this work is that we did not talk to landowners who were not involved in the restoration network.

The RCPP illustrates an adaptive, resilient pathway for conservation efforts on private lands, one with a range of organizations working together, sharing resources and knowledge. A notable indicator of success of this restoration partnership has been the creation of enduring relationships. This means that the partners will continue to do work, potentially using new tools and tackling new problems. Rather than viewing partnership and trust building as a side effect of working together on conservation projects, we view it as a conservation goal in itself. Efforts to improve and expand private land conservation will likely be most successful if they center on people and relationships. Our research suggests that projects and funding will flow from social networks, enabling innovation, adaptation, and expanded conservation opportunities. CA

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