Chapter 9.4—Strategies for Job Creation Through National Forest Management

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Summary

This chapter explores the ways in which national forest managers may contribute to community well-being by designing projects that accomplish forest management in ways that not only meet their ecological goals, but also create economic opportunities for nearby communities. The chapter summarizes a number of strategies for enhancing the economic benefits to communities of forest restoration work, infrastructure maintenance and improvement projects, and recreation and tourism; these strategies are also summarized near the end of the chapter in the "Management Implications" section. The strategies include (1) making better use of existing authorities and tools; (2) being strategic when deciding where and how projects are accomplished; (3) implementing projects that build on local community capacities and priorities; and (4) maintaining and developing sustainable recreation opportunities, infrastructure, and partnerships. If managers consider how to enhance job creation associated with forest management when planning projects, they may increase the overall socioeconomic benefits of national forest management while helping contribute to community resilience. Investing in communities can also benefit the health of forest ecosystems.

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Introduction

The literature on community-based forestry in the United States suggests that healthy forest ecosystems and healthy forest communities are interdependent (Baker and Kusel 2003, Kelly and Bliss 2009, Kusel and Adler 2003). The focus of this chapter is on how national forest management may contribute to the socioeconomic health and resilience of forest communities in the Sierra Nevada through job creation associated with forest restoration, recreation and tourism, and infrastructure maintenance and improvement on national forest lands. This chapter also draws attention to the ways in which investing in job creation through forest management may contribute to the health and resilience of forest ecosystems. Forest communities are defined here as communities having social, cultural, and economic ties to nearby forest lands.

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Creating forest-based jobs by providing a broad range of economic opportunities in local communities is consistent with current Forest Service direction from the U.S. Department of Agriculture (USDA) to generate jobs through recreation and natural resource conservation, restoration, and management in rural areas (USDA 2010). It also responds to the USDA's strategic plan goal of helping rural communities create prosperity so that they are self-sustaining and economically thriving. The Forest Service 2012 Planning Rule states that national forest plans must provide for social and economic, as well as ecological, sustainability within the plan area (Section 219.8), thereby supporting vibrant communities and rural job opportunities. The Forest Service is working to increase the pace of restoration on national forest lands and associated job creation (USDA FS 2012). There are additional strategies that can be used to enhance job creation through national forest management. What follows is a synthesis of the published literature about how forest managers may help create economic opportunities in local communities to promote both healthy communities and forest ecosystems.

In the 1990s, forest restoration became the focus of federal forest management in order to restore watersheds, control invasive species, reduce fire hazard, enhance wildlife habitat, and improve forest health. Growing awareness of the importance of connecting people to nature, appreciation of and demand for the broad range of ecosystem services that federal forests provide, and the backlog of infrastructure maintenance and improvement projects on national forest lands have also come to inform management priorities. Thus, current economic opportunities for communities linked to federal forest management in the Sierra Nevada are most likely to be in the forest restoration sector, in recreation and tourism, in infrastructure maintenance and improvement (facilities, roads, trails), and from the production of timber, biomass, nontimber forest products, and livestock, as addressed in chapter 9.5. Payment programs and emerging markets for ecosystem services from federal lands (carbon, water quality, fish and wildlife habitat) could potentially yield payments to outside organizations that would use these payments to fund needed restoration activities on national forests (Deal et al. 2012). However, these programs are still under development and do not yet constitute a source of jobs for forest community residents.

The chapter begins with an overview of how understandings of the relationship between national forest management and forest community well-being have evolved since the mid-1900s. This overview is followed by a discussion of strategies for promoting job creation through forest management that could be considered by Sierra Nevada national forest managers. It concludes by discussing how these strategies can contribute to the resilience of forest communities and ecosystems. The

focus is on rural communities, because the majority of California counties in which Sierra Nevada national forest lands are concentrated are classified by the USDA's Economic Research Service as nonmetropolitan.[2] Because published literature on the links between forest management and community well-being from the Sierra Nevada is relatively scarce, findings from the wider literature are also presented here that can help inform forest management in the synthesis area.

Forest-Community Relations

Understanding of the relations between federal forest management and forest community well-being has changed over time. For much of the latter half of the 20th century, timber harvesting on national forests was thought to be an important contributor to economic stability in forest communities. This thinking gave way in the 1990s to a focus on how the multiple uses and values of national forests contribute to the well-being of forest communities and their capacity to adapt to change. More recent thinking embraces the idea of community resilience as an important component of overall socioecological resilience in forest ecosystems.

Community Stability

The Sustained Yield Forest Management Act of 1944 gave the Secretaries of the Departments of Agriculture and the Interior the authority to create Sustained Yield Units on federal, or combined federal and private, lands to encourage a continuous supply of timber that would stabilize forest industries, employment, and communities (16 U.S.C. Section 583). As reflected in the act, from the 1940s through the 1980s, the dominant paradigm was one in which national forest management was thought to be important in contributing to "community stability," defined in terms of stable timber industry employment and income in forest communities (see papers in Le Master and Beuter 1989). Contributing to community stability through a policy of sustained yield timber harvesting to provide a nondeclining, even flow of forest products and associated jobs and income was one goal of national forest management. The importance of community stability as a management goal waxed and waned between the 1940s and 1980s (Le Master and Beuter 1989).

The notion that national forest management alone can ensure community stability is flawed for several reasons (Charnley et al. 2008a, Nadeau et al. 2003, Power 2006, Sturtevant and Donoghue 2008). As Power (2006) noted, jobs in the forest products industry are not simply a function of timber supply; demand for

[2] For definitions and more information, see http://www.ers.usda.gov/Data/RuralUrbanContinuumCodes/.

wood fiber and wood products plays an important role in influencing harvest and production levels and associated jobs. In addition, changes in harvesting and wood processing technology have increased productivity and reduced labor demands, displacing workers. The 1970s and 1980s saw many such changes in the wood products industry. Furthermore, trees harvested in one location do not always get processed in nearby communities. Federal managers must generally sell to the highest bidder, who may not be local. And mills typically obtain logs from a variety of sources, including private forest lands over which federal managers have no control (Power 2006). Finally, a number of variables influence social and economic conditions in forest communities; federal forest management is only one of these variables (Charnley et al. 2008a, Nadeau et al. 2003). For all of these reasons, national forest managers cannot expect to ensure community economic stability through their management actions alone. Timber production on national forest lands continues to make an important contribution to community economies in some parts of the Sierra Nevada, however.

Community Well-Being and Community Capacity

The 1990s saw a dramatic decline in timber production on national forest lands in the Pacific Northwest and in California, stemming from concerns about the effects of timber harvesting on old-growth forest ecosystems, watershed health, and threatened species, such as the northern and California spotted owls, on public lands (Berck et al. 2003, Charnley 2006). As the Forest Service adopted ecosystem management as its new management paradigm, it grappled with how to create quality jobs in ecosystem management and restoration that would provide new economic opportunities for displaced timber workers and communities affected by this transition in forest management (Spencer 1999). The Jobs in the Woods program, associated with the Northwest Forest Plan and Northwest Economic Adjustment Initiative, was an early attempt to do this. At the same time, amenity migration to communities around national forests was influencing the economic opportunities and social values associated with national forest management (fig. 1). Thus, the 1990s gave rise to new understandings of community-forest relations that acknowledged the diverse contributions federal forests make to "community well-being." Community well-being studies recognized that (1) well-being in forest communities was based on more than just jobs and income, and included other quality of life attributes, such as health, safety, political participation, social equity, and access to social services; and (2) national forests can contribute to community well-being in multiple ways that include both the commodity (e.g., timber, grazing, minerals, nontimber forest products) and amenity (e.g., outdoor recreation, scenic beauty,

clean air and water, open space, landscape) values associated with them (Kusel 2001, Nadeau et al. 2003, Sturtevant and Donoghue 2008).

In the context of these shifts in forest management and rural community dynamics, community capacity—defined as the ability of community residents to respond to internal and external stresses, create and take advantage of opportunities, and meet the needs of residents (Kusel 2001)—was found to be critical to well-being in forest communities. Community capacity, in turn, is a function of a community's physical, financial, human, cultural, and social capitals (see Kusel 2001 for definitions). Put another way, community capacity is a function of a community's foundational assets (e.g., physical infrastructure, natural resources, and other attributes of a community) and mobilizing assets (e.g., civic and organizational infrastructure, social processes and interactions) (Donoghue and Sturtevant 2007). Building on these concepts, Beckley et al. (2008) defined community capacity as the collective ability of a community to combine various forms of capital within particular institutional and relational contexts to produce desired results or outcomes.

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Figure 1—Forest community in the northern Sierra Nevada.

Community Resilience

In the early 2000s, concerns over the impacts of wildland fire and climate change on forests and forest communities prompted social scientists studying these communities to think in terms of social vulnerability, adaptive capacity, and "community resilience" (e.g., Daniel et al. 2007, Lynn et al. 2011). In general, rural communities in the United States tend to be more vulnerable to climate change than urban communities because of their demographic characteristics, available occupations, lower earning rates, greater incidence of poverty, and higher level of dependence on government transfer payments (Lal et al. 2011). In California, people residing in the wildland-urban interface (WUI) are also especially vulnerable to fire (Sugihara et al. 2006). Climate change and fire risk make the concept of community resilience relevant because of its focus on a community's ability to cope with and adapt to natural disturbances and change. The concept of community resilience is also relevant in the context of socioeconomic stressors and change, however, as the impacts on forest-dependent communities of reduced timber harvesting on federal lands illustrated in the 1990s. If local or regional economies are based on a single extractive industry, they are more vulnerable to changes in conditions that support that industry—such as market fluctuations, new technology, resource depletion, or changes in management policy—than if economies are diversified, making them less resilient as a result (Chapin et al. 2009). "Resilience thinking" at the community level is not well developed, however (Berkes and Ross 2013).

More recent thinking about resilience characterizes it as the capacity of socioecological systems to cope with, adapt to, and shape change; to persist and develop in the face of change or disturbance while retaining their basic function and structure; or to innovate and transform into new, more desirable configurations in response to disturbance.

The notion of resilience as applied to social systems has been criticized because of its use in the biological sciences to refer to the ability of a system to respond to stress and shocks in order to maintain function, implying stability and a return to equilibrium following disturbance (Folke 2006). Its applicability to social systems has also been questioned because social and ecological systems do not necessarily exhibit the same properties or behave in the same ways (Davidson 2010). More recent thinking about resilience characterizes it as the capacity of socioecological systems to cope with, adapt to, and shape change; to persist and develop in the face of change or disturbance while retaining their basic function and structure; or to innovate and transform into new, more desirable configurations in response to disturbance (Folke 2006, Walker and Salt 2006). A formulation by Magis (2010) defines community resilience as "the existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise" (Magis 2010: 402). Following Magis (2010), Folke (2006), and Walker and Salt (2006), community resilience is defined here as the ability of a community to successfully cope with,

adapt to, and shape change and still retain its basic function and structure. Community capacity influences resilience in that communities having the capacity to recover from, and implement change in response to, stress and disturbance have greater resilience (Berkes and Ross 2013, Folke et al. 2010). It is difficult to identify critical thresholds beyond which social systems will lose their resilience and break down, however (Davidson 2010). Because resilience within socioecological systems is multiscalar and interconnected, community resilience can enhance the overall resilience of a socioecological system operating at other (e.g., landscape) scales (Berkes and Ross 2013).

Job Creation Through National Forest Management

Given that rural communities in the Sierra Nevada, like rural communities elsewhere, are continually subject to social, economic, and ecological change, their ability to take advantage of job opportunities associated with national forests and their management can help strengthen their resilience. Creating and sustaining economic opportunities in forest communities contributes to a more diverse employment base there; leaves future opportunities for participating in forest-based livelihoods open; encourages innovation in developing ways to invest in local communities; and helps communities adapt to change—all features that contribute to resilience (Walker and Salt 2006). It also maintains a local workforce that has the capacity to carry out forest management work that is needed to improve and restore ecological integrity and resilience in forest ecosystems (Kelly and Bliss 2009). This section covers four broad job creation strategies: (1) making better use of existing authorities and tools; (2) investing in project work strategically; (3) implementing projects that build on local community capacities and priorities; and (4) investing in recreation infrastructure, opportunities, and partnerships.[3]

Make Better Use of Existing Authorities and Tools

Between 1994 and 2004, there were at least six regional or national legislative and administrative directives that gave the Forest Service authority to consider benefits to local communities when undertaking forest restoration work (Moseley and Toth 2004). These included (1) the Jobs in the Woods program of the 1990s (applicable in northern California, Oregon, and Washington counties affected by the Northwest Forest Plan); (2) the Secure Rural Schools and Community Self- Determination Act of 2000, which made it possible to establish local Resource Advisory Committees

[3] Further ideas and guidance on how forest managers may facilitate job creation through national forest management can be found at http://ewp.uoregon.edu/sites/ewp.uoregon.edu/files/WCF_JobCreation_QG.pdf.

(RACs) that could use act funding to pay for forest restoration work benefitting federal lands, creating local jobs as a result; (3) the 10-year stewardship contracting authority approved by Congress in the fiscal year (FY) 2003 appropriations bill; (4) the National Fire Plan of 2000; (5) the Healthy Forests Restoration Act (HFRA) of 2003 (Moseley and Toth 2004, Steelman and DuMond 2009); and (6) the Tribal Forest Protection Act (TFPA) of 2004. Since 2005, two more can be added to this list: the American Recovery and Reinvestment Act (ARRA) of 2009, designed to maintain and create jobs and provide an economic stimulus in counties most adversely affected by the economic recession that began in 2007; and Title IV of the Omnibus Public Land Management Act of 2009, which established the Collaborative Forest Landscape Restoration Program (CFLRP). Several of these directives were initiated in response to declines in federal timber harvesting, acknowledgment of the impacts of these declines on jobs in forest communities, and the shift to forest restoration as a potential new source of local jobs. The Jobs in the Woods Program, the ARRA economic stimulus program, and the Secure Rural Schools Act have expired (proposed reauthorization of the Secure Rural Schools Act is pending at this time). The other authorities are discussed in more detail below.

Stewardship contracting—
Congress authorized a series of pilot stewardship contracting projects as part of the FY 1998 appropriations, and gave the Forest Service stewardship contracting authority until FY 2013 in the FY 2003 appropriations bill (currently being considered for reauthorization by Congress). Stewardship contracting is a set of authorities that were designed to foster integrated forest restoration and local community benefit (Moseley and Charnley 2014). It does the latter in a number of ways: (1) through the "goods for services" authority, which allows the Forest Service to combine the sale of timber and the purchase of services into a single contract, and use the value of timber sold for restoration purposes to pay for services acquired, creating a new source of funding for forest restoration; (2) by requiring the use of best value contracting (most timber sale instruments call for the lowest bid); (3) by allowing the Forest Service to enter into 10-year contracts (as opposed to 5 years, the limit for traditional service contracts); (4) by allowing the Forest Service to enter into stewardship agreements with nonprofit organizations and other government entities to perform restoration activities; and (5) by calling for collaboration in the development and implementation of stewardship projects (Moseley and Charnley 2014). Although stewardship contracting can be a beneficial tool, it may not be appropriate or useful on every national forest.

The non-peer-reviewed literature that has been generated in association with required governmental reviews (US GAO 2008) and monitoring (PIC 2011) of stewardship contracts points to many successes, both environmental and social. Existing peer-reviewed literature concurs that stewardship contracting can be an effective administrative tool for enhancing the social and economic benefits to local communities associated with national forest management (Donoghue et al. 2010, Hausbeck 2007, Kerkvliet 2010). The Eldorado National Forest was an early adopter of stewardship contracting, and to date, it is one of the top users of stewardship contracts in the National Forest System (Moseley and Charnley 2014). Much can be learned from the Eldorado by other Sierra Nevada forests interested in using this tool.

The National Fire Plan and best-value contracting—
Under the National Fire Plan, Congress gave the Forest Service authority to direct fire hazard reduction work to local contractors and businesses, creating an opportunity for them to hire and train local workers (Moseley and Toth 2004). With the shift in agency management focus from timber production to forest restoration, the Forest Service has made less use of timber sale contracts for accomplishing work on the ground, and increased its use of procurement contracts. Procurement contracts are a mechanism for purchasing goods and services from private businesses. The Forest Service can use "best-value contracting" criteria—selecting contractors who provide the best value to the government rather than those who offer the lowest bid—as a tool for directing work to local communities by asking contractors how they would create economic opportunities in local communities if awarded a Forest Service procurement contract (Moseley and Toth 2004). The use of National Fire Plan authorities to target local contractors and businesses for jobs in fire management is a strategy that could be used by Sierra Nevada national forests when undertaking fuels reduction and fire suppression work. Doing so would have the added benefit of providing training and work experience that could help communities build their capacity to undertake such work on both public and private lands.

Healthy Forests Restoration Act—
The HFRA was passed by Congress in 2003, authorizing $760 million per fiscal year for hazardous fuels reduction activities aimed at reducing wildfire damage to communities and at-risk lands (Steelman and DuMond 2009). The HFRA was one in a series of new policies in the early 2000s that shifted the focus from wildfire suppression to hazardous fuels reduction (Steelman and Burke 2007). It was designed in part to benefit local communities (especially those within the WUI). The act encourages community involvement through community wildfire protection

plan (CWPP) provisions and other measures that give local communities a voice in the decisionmaking process regarding fuels reduction treatments in the WUI (see chapter 9.6, "Collaboration in National Forest Management"). Once a CWPP is developed, communities are eligible to apply for HFRA funding to support hazardous fuels reduction projects (Steelman and Burke 2007, Steelman and DuMond 2009). Projects funded through HFRA provide opportunities for local employment in the forestry sector. The act also authorized spending in the amount of $5 million per fiscal year through the "Rural Revitalization Through Forestry" program to encourage adoption of technologies using biomass, and to create and support small-scale businesses and community-based enterprises that make use of biomass and small-diameter materials (H.R. 1904, Section 202). Steelman and Burke (2007) suggested that if agencies set aside more funds for community assistance programs such as this, they could help ensure that these programs remain funded, even in bad fire years when additional resources are needed for suppression activities.

Tribal Forest Protection Act—

A survey of 31 of the 42 federally recognized tribes in Oregon, Washington, and Idaho found that tribes had a strong interest in taking advantage of jobs in fire management, including working on wildland fire suppression crews and undertaking hazardous fuels reduction work (Rasmussen et al. 2007). Developing projects with tribes using the 2004 TFPA authorities is one potential avenue for creating jobs for tribe members in fuels reduction and postfire rehabilitation activities. The act allows tribes to propose fire mitigation and environmental restoration activities on national forest lands adjacent to or bordering tribal trust lands in order to protect tribal lands from fire, insects, disease, and other threats (ITC 2013). The Forest Service may enter into contracts or agreements with tribes for this purpose. Today, lands owned and controlled by California Indians in the Sierra Nevada are small and dispersed (fig. 2), creating potential for exploring use of these authorities for collaborative fire management and ecosystem restoration projects in the synthesis area. Nationwide, TFPA authorities have been underutilized (ITC 2013). Forest Service Region 5 is encouraging the development of contracts or agreements with tribes under the TFPA to reduce environmental threats in areas of mutual interest.[4]

Lands owned and controlled by California Indians in the Sierra Nevada are small and dispersed, creating potential for using Tribal Forest Protection Act authorities for collaborative fire management and ecosystem restoration projects in the synthesis area.

Tribes face several obstacles that limit their capacity to engage in fire management work, however (Rasmussen et al. 2007). These obstacles include the seasonality of the work, obtaining the necessary training required for employees and contractors, the cost of investing in the equipment necessary for undertaking the

[4] Tribal Forest Protection Act in Brief, http://www.fs.usda.gov/detail/r5/workingtogether/tribalrelations?cid=stelprdb5351850.

Figure 2—California tribal lands and reservations (source = Environmental Protection Agency, http://www.epa.gov/region9/air/maps/ca_tribe.html).

work, a lack of financial capital with which to start businesses, and supportive tribal leadership to help form partnerships with public agencies (Rasmussen et al. 2007). Differences in communication and operating styles, and Forest Service bureaucratic processes—such as contracting and reporting requirements, timelines, and business plans—can also create barriers (Charnley et al. 2007). To the extent that the Forest Service can assist tribes in addressing some of these obstacles, it may help build the capacity of tribal communities to engage in fire management.

Collaborative Forest Landscape Restoration Program—
The CFLRP has a number of goals: to encourage social, economic, and ecological sustainability; to support forest restoration activities that meet ecological objectives and ultimately reduce fire management costs; to encourage investments in capturing the value of restoration byproducts that help contribute to local economies while reducing the costs of fuels treatments; and to leverage resources to help support social, economic, and ecological goals associated with forest restoration across ownerships (Schultz et al. 2012). One criterion for funding eligibility is that projects must provide economic benefits to local communities, including supporting local jobs through the use of proposed or existing infrastructure to handle restoration byproducts. Socioeconomic monitoring to track these benefits is required (Schultz et al. 2012). As of FY2012, three CFLRP projects had been funded in California, all in the Sierra Nevada.[5] These projects provide an opportunity to make local job creation through forest restoration a management priority in the area they cover. Additional information about the CFLRP appears in chapter 9.6.

Other administrative tools—
Different administrative tools for accomplishing forest restoration have different implications for local community benefit. Stewardship contracts and best-value contracting have already been discussed. Agreements are useful for targeting specific local recipients that the Forest Service would like to develop working relationships with, direct economic benefits to, and invest in capacity building with because they do not have to be awarded competitively. Charnley et al. (2011) provided a number of examples—both fire- and nonfire-related—in which national forest managers have used agreements to successfully target work to local groups to help build their capacity and provide local workers with jobs in forest restoration on national forest lands.

Agreements and stewardship contracts are not only useful administrative tools for creating local jobs; they are also mechanisms that can make it more cost effective for the Forest Service to accomplish mission-related work. Agreements are instruments that require a cost share by the partner, and therefore help leverage external resources to fund project work. Stewardship contracts make it possible to retain receipts from the sale of timber and use any excess income to pay for additional restoration work. Acquisition management staff could be better integrated into project planning activities as a means of helping forest managers determine how to accomplish their work in the most efficient way while enhancing local job opportunities through strategic use of the administrative tools available to them.

[5] Collaborative Forest Landscape Restoration Program, http://www.fs.fed.us/restoration/CFLRP/.

Invest in Project Work Strategically

Target project work to communities in need—
One method of creating local jobs in specific places is to geographically target projects to communities in need. Low-capacity communities, communities with high levels of poverty and unemployment, and those with underserved populations are examples of places where project investments could potentially make a difference in helping communities gain access to increased economic opportunities. The Forest Service used this strategy in implementing ARRA projects. These projects were targeted to counties that had experienced high impacts associated with the economic recession, under the rationale that these were the most important places to create jobs (Charnley et al. 2011). The agency did this by developing economic distress rankings for every county in the Nation on the basis of four unemployment indicators from the U.S. Census Bureau. Counties were ranked on a scale of 1 to 10, with 10 signifying the highest economic distress (fig. 3). Capital improvement and maintenance projects were funded on the basis of the economic distress ranking of the county in which they were located, with the vast majority of projects going to counties that ranked between 7 and 10. Wildland fire management projects were funded on the basis of a different index that weighted county economic distress ranking at 50 percent, insect and disease hazard at 25 percent, and wildfire hazard at 25 percent (Charnley et al. 2011).

Economic distress rankings are one method of targeting project work to create jobs in forest communities that have high economic need. They are not necessarily the best method; there may be other socioeconomic criteria that are more appropriate for strategically funding projects in communities. Another consideration is the ability of the community to respond and take advantage of job opportunities provided by the agency. Where they lack this capacity, workforce training programs can be one effective means of helping communities build their capacity to engage in forest restoration (Nielsen-Pincus and Moseley 2013).

Forest Service social scientists are currently developing methods for undertaking climate change social vulnerability assessments, which may be useful for helping the Forest Service invest strategically in highly vulnerable communities and help them adapt to climate change. In the context of fire, social scientists have developed indicators of social vulnerability and adaptive capacity that can be useful for evaluating how to allocate agency resources to communities to help them reduce their fire risk (e.g., Ojerio et al. 2011).

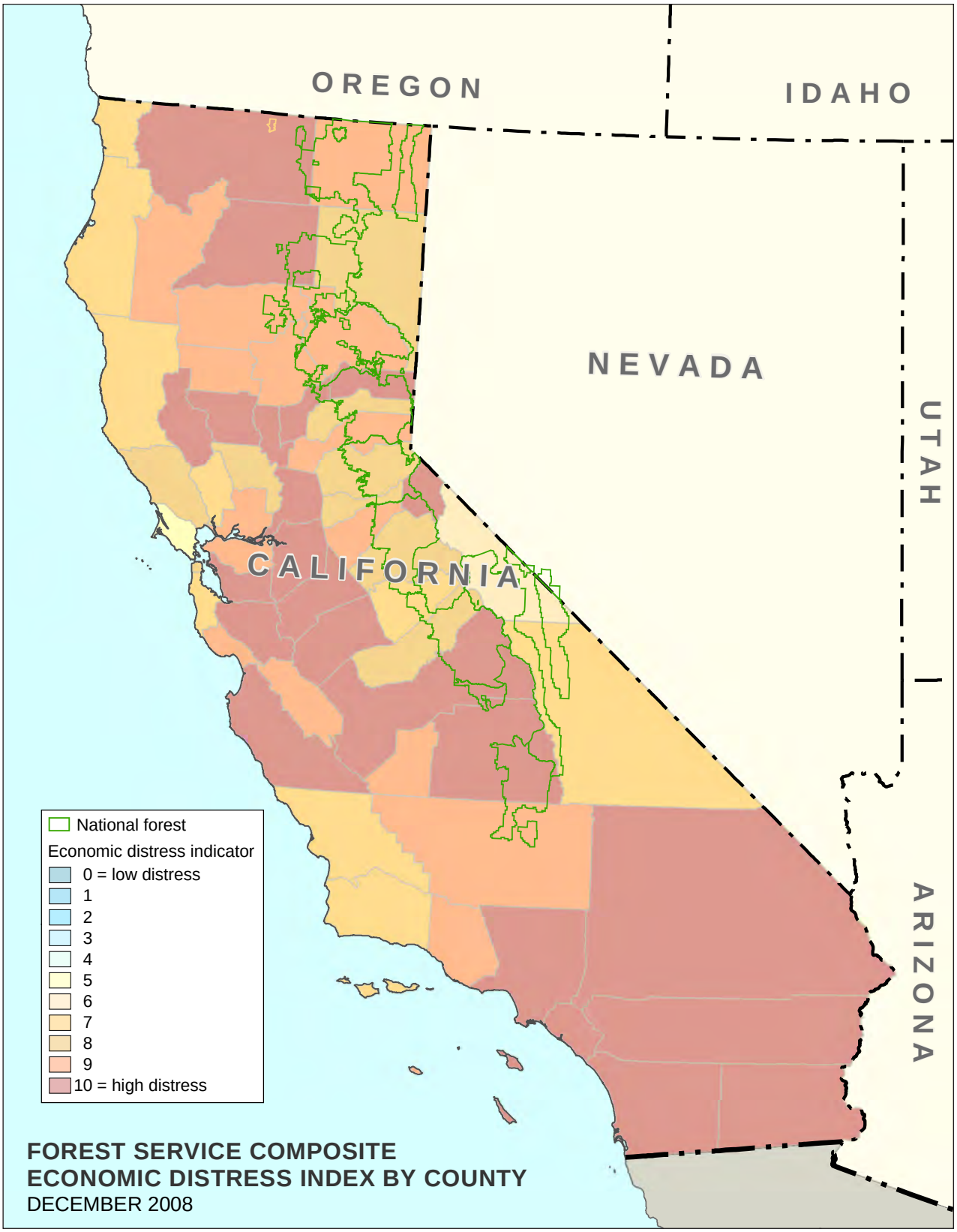

Figure 3—Economic distress rankings of California counties, 2008 (Sierra Nevada national forests are shown in green).

Structure work in ways that are accessible to local communities—Another strategy for promoting local job creation is to structure forest restoration work in a way that is accessible to local communities and can benefit multiple recipients. This strategy entails breaking down project work into different sizes and types as appropriate to match local capacity. One example is road maintenance work. Many national forests consider roadside brush removal as one component of road maintenance, and therefore include it in larger road maintenance contracts. In contrast, the Six Rivers National Forest in northern California separates roadside brush removal from other types of road maintenance work, making it possible for small operators with less diversified equipment to bid on the projects (Charnley 2011).

Another strategy for promoting local job creation is to structure forest restoration work in a way that is accessible to local communities and can benefit multiple recipients.

Another example comes from the Rogue-Siskiyou National Forest in southern Oregon, which received over $30 million in ARRA funding for hazardous fuels reduction. Much of this work was labor intensive, because it was located on steep terrain and entailed hand thinning, pruning, piling, and pile burning (Davis and Moseley 2011). In the four-county area that contains Rogue-Siskiyou National Forest lands, there are over 20 local businesses that engage in forestry support work. These businesses range in size and experience, having from just a few employees to roughly 200 employees. There are also several nongovernmental organizations (NGOs) that have natural resource crews in the region. To provide job opportunities for this diverse array of local businesses, the Rogue-Siskiyou broke the hazardous fuels reduction work up into 53 contracts and seven agreements. Contracts ranged in size from $100,000 to $1 million. Agreements were used to target specific recipients that the Rogue-Siskiyou wanted to assist, such as youth job corps programs. The agreements and contracts were sorted into different sets of activities and into work at different scales to enable a number of businesses to compete for them (Davis and Moseley 2011). Implementing projects in a way that breaks the work into different sizes and types and uses different funding mechanisms spreads the benefits by taking advantage of a range of skills and capacities in local communities. This strategy can be scaled to the availability of funding for project work; it does not rely on a large infusion of funding, as happened in this case under ARRA.

Assess the relative merits of labor-intensive versus equipment-intensive work—The shift from timber production to forest restoration on national forest lands has brought about an associated shift from labor-intensive to equipment-intensive work (Moseley and Reyes 2008). Labor-intensive work has traditionally been associated with intensive timber management in which crews perform tasks such as small tree thinning with chain saws and tree planting. Restoration work such as road maintenance and decommissioning tends to be accomplished with equipment. Labor-intensive work creates more jobs than equipment-intensive work; however, job quality

is typically better with equipment-intensive work, and equipment-intensive work is more likely to go to local contractors because of the cost of hauling equipment long distances (Moseley and Reyes 2008).

Sometimes Forest Service decisionmakers have choices about whether to accomplish specific management tasks in labor- versus equipment-intensive ways. Despite the general shift mentioned above, there are many opportunities for labor-intensive work associated with forest restoration. In the context of wildland fire management, restorative understory burning is typically accomplished by fire suppression crews who are employed seasonally by the Forest Service in the spring or fall, when not fighting fires (Moseley and Toth 2004). Mechanical fuels treatments can be accomplished by hand crews or with equipment. Labor-intensive work is more common when fuels reduction occurs on steep slopes, entails thinning of small-diameter trees with no commercial tree removal, or involves tree planting in rehabilitation efforts (Moseley and Toth 2004). Labor-intensive work is also common in habitat improvement and watershed restoration projects (Nielsen-Pincus and Moseley 2013). Brush removal along forest roads can also be accomplished either mechanically or by hand (Charnley 2011). In these cases, decisionmakers may choose to accomplish work in a manner that creates more jobs, assuming that doing so is cost effective and meets management objectives.

When deciding how to accomplish restoration work, decisionmakers should be aware of the relative merits and drawbacks associated with labor- versus equipment-intensive work. Labor-intensive work creates more jobs than equipment-intensive work, which is important in forest communities with high unemployment rates. It also creates opportunities for workers who would not otherwise have access to jobs on national forests because they lack the financial capital to invest in equipment. During the economic recession of 2007–2009, one way that the Forest Service used ARRA funds to create jobs in communities experiencing economic distress was by choosing to carry out work in labor-intensive ways (Charnley 2011). However, researchers have found that labor-intensive jobs in the forestry services sector often go to distant workers, are relatively low paying, create less total local economic impact than other jobs, may entail poor working conditions and worker abuse, can be dangerous, and are seasonal (Moseley 2006, Moseley and Reyes 2007, Nielsen-Pincus and Moseley 2013, Sarathy 2012). In contrast, equipment-intensive work tends to be better paid and is more often carried out by local businesses (Moseley and Reyes 2008), though it also is typically seasonal. Forest decisionmakers who are aware of these patterns can make an effort to overcome them by targeting local workers, by ensuring that contracting and labor laws are enforced so that workers are paid the required wages, and by promoting fair and safe working conditions.

Another strategy for job creation is the direct hire of workers using Forest Service "1039" employment authority (the employee may not work more than 1039 hours in one service year), especially in places where there are few forestry support businesses (Jakes 2011). Even when jobs—be they labor or equipment intensive—are short term or seasonal in nature, they can have many benefits beyond short-term job creation. These include providing employees with training, skills, and experience for future jobs; improving employee access to the federal job network; improving employee physical and mental health; building teamwork and safety skills; and building awareness of nature, national forests, and resource management issues among local residents (Charnley et al. 2012).

Implement Projects That Build on Local Community Capacities and Priorities

Design projects collaboratively—
A number of researchers have found that when the Forest Service works collaboratively with local communities to develop forest restoration projects that build on local community infrastructure, resources, values, culture, and collaborative relationships, and address local needs and priorities, it can be especially effective in creating local community benefits and contributing to community well-being (Abrams 2011, Burns et al. 2011, Charnley et al. 2012, Hardigg 2011). It is not always easy to collaborate, given declines in agency staffing and resources, and there can be challenges in the process. Nevertheless, when opportunities exist to develop projects collaboratively and align them with community needs and capacity, they are more likely to create local economic opportunities.

When the Forest Service works collaboratively with local communities to develop forest restoration projects that build on local community infrastructure, resources, values, culture, and collaborative relationships, and address local needs and priorities, it can be especially effective in creating local community benefits and contributing to community well-being.

Encourage agency decisionmakers at the national forest level to create local jobs linked to forest management—
Individual decisionmakers at the ground level make decisions about whether and how to implement policies based on direction from above, as well as their own interpretations, values, experience, and local circumstances (Moseley and Charnley 2014). This implies that if contributing to social and economic sustainability in forest communities is a priority for the management of Sierra Nevada national forests, then doing more to encourage local-level decisionmakers to enhance job creation associated with project development and implementation may also help. Decisionmakers who have a thorough knowledge of local social and economic conditions will also be better positioned to make decisions that draw on the existing capacity in a community, and help build local capacities that need to be developed by directing resources accordingly. As Charnley et al. (2012) found in the case of ARRA projects, national forest employees at the ground level developed a number

of strategies for increasing the socioeconomic benefits of projects to local communities, innovating and exhibiting leadership in the process. Individual employees make a difference, and those who are committed to enhancing job creation through forest management may be able to make choices to implement project work in ways that are more likely to do so.

Invest in Recreation Infrastructure, Opportunities, and Partnerships

Maintain existing and invest in new recreation and tourism opportunities—Some social scientists have argued that natural amenity values can be drivers of economic development in rural communities near federal lands because rural communities having desirable physical and social environments attract tourists, new residents, and new businesses, which increases the financial and human capital of communities and creates jobs, thereby stimulating local economic development (Charnley et al. 2008b). As a result, "jobs follow people" (Goodstein 1999, Nelson 1999, Vias 1999). National forests are important in this regard because of the natural amenities they provide, including recreation, scenic beauty, open space, clean air and water, and desirable environmental features, such as mountains, water bodies, and forests (see chapter 9.1, "Broader Context for Social, Economic, and Cultural Considerations," for a discussion of amenity migration and a detailed discussion of the social, economic, and ecological dimensions of recreation and tourism in the Sierra Nevada).

Recreation and tourism have brought new economic opportunities to many communities whose economies were formerly timber based (Charnley et al. 2008a, 2008b). In places experiencing high levels of recreation and tourism, local economies may be extremely dependent on these activities. For example, an estimated 38 percent of all jobs in Mammoth Lakes and the Lake Tahoe Basin are directly tied to tourism, and 74 percent of all jobs, and 68 percent of all wage payments, are indirectly tied to tourism (Löffler and Steinicke 2006). Forest Service managers may contribute to recreation and tourism-related development in forest communities through job creation associated with road, trail, and facilities maintenance and improvement projects (fig. 4). Trails and facilities projects in particular are conducive to hiring youth through job corps programs like the California Conservation Corps. Working on such projects provides youth an opportunity to spend time in the woods, build job skills, learn about and connect with the Forest Service, and prepare for future jobs (Charnley 2011). Managers may also contribute to local community development by maintaining and developing recreation opportunities and infrastructure on national forest lands and in local communities that attract

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Figure 4—Student Conservation Association intern doing trail work on a national forest.

visitors, who in turn spend money locally, supporting local businesses (e.g., Burns et al. 2011, Sturtevant et al. 2011). In communities that lack local businesses that could take advantage of the economic opportunities associated with Forest Service investments in recreation and tourism, additional assistance may be needed so that they can capture these benefits.

Although recreation and tourism can contribute to local economies, they may also have drawbacks. One potential drawback is environmental; recreation and tourism impacts can have negative impacts on soils, vegetation, wildlife, and aquatic environments if carried out in an unsustainable and ecologically insensitive manner (Monz et al. 2010) (see chapter 9.1). Another is economic. Jobs created in association with recreation and tourism are often in the services sector (English et al. 2000, Shumway and Otterstrom 2001). Although some services jobs pay well (Holmes and Hecox 2004), many jobs associated with recreation and tourism are seasonal and low wage (McKean et al. 2005). Even if people living in high-growth amenity and recreation counties have higher incomes, these may be offset by higher costs of living (English et al. 2000, Hunter et al. 2005) (see chapter 9.1 for a discussion of housing costs compared to incomes). Nevertheless, recreation and tourism are an important component of many rural economies in the Sierra Nevada (Duane 1999, Stewart 1996). Investing in them by maintaining and improving recreation-related infrastructure is one way of helping to diversify the local economic benefits

associated with national forest management. However, it is critical to do so in a manner that is ecologically sustainable and that minimizes environmental impacts.

Encourage recreation partnerships—
The Forest Service is increasingly accomplishing recreation management through partnerships that build relations with local groups and leverage the resources needed to maintain recreation opportunities and facilities in the face of declining agency budgets (Seekamp and Cerveny 2010). Seekamp et al. (2011) identified 35 common types of recreation partners with whom the Forest Service works. Although volunteerism is common, many partners have a financial relationship with the Forest Service, providing the agency with revenue for projects or, conversely, making a living from federal lands. These partners include outfitters, guides, concessionaires, contractors, environmental groups, and outdoor recreation groups (e.g., all-terrain vehicle, equestrian, and trail associations). Recreation partnerships can contribute to both forest community and forest ecosystem health. On the community side, they provide jobs, job skills, organizational capacity building, and stronger collaborative relations with diverse groups. On the national forest side, they support stewardship and conservation activities and help build a conservation ethic among members of the public (Seekamp and Cerveny 2010, Seekamp et al. 2011).

Conclusions

Conducting restoration, recreation, and infrastructure maintenance and improvement projects in ways that enhance economic opportunities for residents of forest communities can potentially contribute to socioecological resilience.

This chapter has examined ways that managers may facilitate job creation associated with national forest management in forest communities to contribute to community well-being, summarized in "Management Implications" below. Its goal is to encourage managers to consider how to integrate job creation in forest communities with other project objectives when planning and carrying out projects. Conducting restoration, recreation, and infrastructure maintenance and improvement projects in ways that enhance economic opportunities for residents of forest communities can potentially contribute to socioecological resilience. Indicators of resilience include social and economic diversity, new business and employment opportunities, community infrastructure, innovation, connections between people and places, and keeping options open for the future (Berkes and Ross 2013, Chapin et al. 2009, Magis 2010, Walker and Salt 2006). Developing diverse economic opportunities associated with national forests (including jobs associated with the production of forest products; see chapter 9.5) may help foster these characteristics, while at the same time addressing some of the underlying causes of social vulnerability in rural communities (e.g., poverty, unemployment, lack of economic diversification), thereby increasing resilience.

Management Implications: Strategies for Improving Job Creation Through National Forest Management

Make better use of existing authorities and tools—

- Use National Fire Plan authority to direct fuels management work to local contractors and businesses using best-value contracting; ask contractors how they would create economic opportunities in local communities if awarded a Forest Service procurement contract
- Use 2004 Tribal Forest Protection Act authorities to collaboratively develop fire mitigation and environmental restoration projects with tribes, and to enter into contracts or agreements with tribes to reduce environmental threats on national forests bordering Indian trust lands in areas of mutual interest.
- Increase use of stewardship contracts and stewardship agreements.
- Make use of agreements (which can be awarded noncompetitively) to target work to specific local recipients in order to develop working relationships with them, provide local workers with jobs, and build their capacity to accomplish work on national forests.
- Integrate acquisition management staff into project planning activities to help identify how work can be accomplished in ways that enhance local economic opportunities through strategic use of available administrative tools.

Invest in project work strategically—

- Geographically target project work on national forest lands near communities in need, where this work can make a difference in contributing to local economies through job creation
- Implement projects in a way that breaks the work into different sizes and types, and uses different funding mechanisms, to spread the benefits by taking advantage of the range of skills and capacities present among local businesses, NGOs, and other workers.
- Assess the costs and benefits of accomplishing project work in a labor-intensive versus an equipment-intensive manner.
- Promote fair and safe working conditions for forest workers by ensuring that labor and safety laws are enforced.

Implement projects that build on local community capacities and priorities—

- Work collaboratively with local communities to develop projects that build on local community infrastructure, resources, values, culture, and collaborative relationships, and address local needs and priorities.

- Encourage agency decisionmakers at the national forest level to consider job impacts when making decisions about how and where to implement projects.

Invest in recreation infrastructure, opportunities, and partnerships—

- Maintain and develop sustainable recreation opportunities and infrastructure on national forests and in local communities to create jobs and attract visitors who support local businesses.
- Invest in recreation partnerships with diverse groups.

Developing and implementing forest management work in a manner that promotes local economic opportunities may sometimes require making tradeoffs between promoting socioeconomic goals and meeting other agency objectives and requirements (Charnley et al. 2012). Nevertheless, the long-term benefits of investing in local communities, helping them build their resilience, and increasing their capacity to engage in forest management work may outweigh the short-term tradeoffs associated with making community considerations of secondary importance in accomplishing projects. This is because forest-based jobs can benefit national forests. Jobs in forest restoration help maintain the local workforce and business capacity needed to perform restoration work on federal, private, and tribal forest lands, making it more feasible to achieve landscape-scale forest restoration goals across ownerships (Charnley et al. 2011). Keeping local mills running and maintaining local jobs and a local market for wood products produced through forest restoration activities make restoration of national forests more economical. Recreation projects that improve trail design and construction, replace ineffective waste facilities, and provide developed access to lakes and streams help reduce the natural resource impacts of forest recreation by reducing erosion, protecting water quality, and contributing to the control of invasive species. Recreation projects that enhance the visitor experience can also help build public support for national forests and foster values associated with forest stewardship among visitors (Charnley et al. 2012). Thus, doing more to prioritize the social and economic benefits associated with forest management work can ultimately be good for both rural communities and national forests.

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