CHAPTER

6 Landscape Considerations for Conservation Planning on Private Lands

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To many, the image of conservation brings to mind visions of wild lands managed as national parks and forests for purposes of maintaining our natural heritage. Certainly, public lands play a significant conservation role, as these lands remain the primary habitat for a number of species such as grizzly bears (*Ursus arctos horribilis*) and wolverines (*Gulo gulo*). However, the reality is that private lands offer some of the greatest opportunities for conservation planning and management. Private lands comprise 70% of the land ownership in the United States excluding Alaska (U.S. Department of Agriculture 1997), and this percentage is >90% in many states in the eastern United States. Analyses of species listed under the Endangered Species Act (ESA; Natural Heritage Data Network 1993; Groves et al. 2000) or identified as imperiled by the Natural Heritage Data Base (Groves et al. 2000) reveal that private lands are critical to the maintenance of these species, with approximately half of all listed species not occurring on federal lands. Private lands were reported by Groves et al. (2000) to have at least one occurrence of over half of the imperiled species and two-thirds of the listed species in the United States.

Very few private lands are wild lands. However, many acres exist as working lands, with private forestlands and ranchlands providing large areas where conditions can still resemble native ecosystems in the area and provide many conservation benefits. However, knowing what is on these lands, modeling their future conditions, and predicting their conservation contributions are problematic for a number of reasons. Haufler and Kernohan (2001) discussed various considerations for management of private lands for ecological purposes. In this chapter, we expand on these considerations with particular emphasis on conservation planning and modeling at landscape scales. Our experience with private land conservation is from the United States; therefore, the discussion presented here does not include considerations from other countries.

CHALLENGES TO PRIVATE LAND PLANNING FOR CONSERVATION

Despite the large amount of private land across the United States, conservation planning on these lands presents significant challenges. One significant challenge is the lack of information on what is present in terms of conservation elements on private lands, a need exacerbated by concerns for private property rights and proprietary information. Another significant challenge is that private landowners frequently have a distrust of planning conducted by and promoted to them by agencies, both state and federal. However, few private landowners have the technical skills to conduct conservation planning on their own, and funding mechanisms from state or federal sources to assist private landowners in conducting their own planning have been largely nonexistent.

Conservation planning for wildlife has largely focused on the needs of individual species of concern or special interest. Landowners have been encouraged to address the needs of a number of species, often with differing requirements, all on their individual properties. This has led to confusion by private landowners, causing them to question incentive programs offered to conduct habitat improvements. Fear of regulatory constraints if listed species or species of concern move onto private lands has limited involvement by private landowners for conservation planning. Complexities in legal agreements designed to help balance conservation objectives with economic and other objectives of private lands often prove problematic and push landowners toward avoidance of conservation initiatives rather than participation in these efforts.

Current recognition by ecologists for the need for conservation planning and management at landscape scales to address complex conservation issues is a relevant concern to managers. However, to private landowners these concerns may not be a significant inducement, particularly as they focus on their lands and economic needs, often with limited involvement or even competition with their neighbors and with distrust of agencies and their agendas. Collaborative initiatives that address these landscape complexities must overcome these landowner concerns if effective large-scale conservation planning is to be supported.

Each of these challenges can be addressed for private landowners, but only if each is recognized as a legitimate concern and if landowners are considered equal partners in conservation planning initiatives. We discuss each of the challenges in more detail and explore possible solutions in the following sections.

Private Property Rights

All private landowners have an economic investment in their land, and most expect to maintain an economic value or return from their land (Haufler and Kernohan 2001). To realize an economic return, private landowners are often

strident when it comes to private property rights. However, private landowners typically value a healthy environment, wish to contribute to the maintenance of biological diversity, and understand that their ownership is a part of a larger landscape. Because of the perceived conflict between economic return and conservation, private landowners are wary of becoming involved in conservation planning across landscapes, particularly when government agencies are involved. Economic investment, along with diverse views of the extent of reasonable government intervention in land-management decisions, has led to recent debates on property rights (Haufler and Kernohan 2001).

It should be recognized that private landowners have little obligation to engage in conservation efforts other than limited regulatory constraints. Excluding land-use conversions to development or other similar changes, the constraints currently imposed on private landowners are species or site specific. For example, the ESA requires landowners to prevent "take" of any threatened or endangered species, and forest practices acts regulate site-specific forest management activities. Although these types of constraints regulate management on private property, neither form of constraint removes the rights of private property owners or requires a landowner to engage in landscape-level conservation planning. In contrast, public land management agencies have guidelines, regulations, and legislation to guide conservation planning on public lands. Recognizing these differences, the effectiveness of conservation planning across large, mixed-ownership landscapes will require all participants to recognize and respect private landowner objectives and property rights.

Funding of Privately Led Conservation Planning

The prevailing view of conservation planning on private lands in the United States is that such planning will be conducted by federal or state agencies with funding provided to these agencies for that purpose. The results of planning are then provided to landowners so that they can put management practices in place on their lands that meet the identified planning objectives. A number of funding programs exist to support on-the-ground application of conservation practices on private lands. For example, Farm Bill practices included in the Wildlife Habitat Incentive Program, Wetland Reserve Program, and Environmental Quality Incentive Program can produce conservation benefits for wildlife (Natural Resource Conservation Service 2006). However, with very few exceptions, no funding programs exist at the federal level to pay private landowners or groups to conduct their own planning. The assumption is that landowners do not have the knowledge or abilities to conduct planning. Therefore, it is assumed that planning funds should go to the federal agencies or in some cases state agencies, where the planning expertise is perceived to exist.

This view has some merits, in that it encourages federal agencies to provide technical assistance to private landowners and consider the broader mixed-ownership landscapes that occur in many areas. However, it overlooks several

key concerns. First, many private landowners, particularly those owning sizable working ranchlands and forestlands are often distrustful of government agencies. They may strongly resist any efforts from agencies to direct what happens on their lands. They often resent the assumption that they do not know what is best for their lands and do not believe that agency personnel will provide information that will be of value to them.

A recent government focus has been the promotion of collaborative conservation initiated from the grassroots level. However, the allocation of federal funding has not shifted to support this approach. A few programs, such as the Conservation Innovation Grants of the Farm Bill, have provided some funds for nongovernment-led planning of private lands, but these are relatively small amounts (Natural Resource Conservation Service 2006). While a detailed review of all 50 state programs was not conducted, generally, the state view is the same or even more biased toward agency-conducted planning rather than landowner-led planning. For example, a majority of the recently completed State Comprehensive Wildlife Conservation Plans (required for each state to continue to receive state wildlife grant funding from the federal government) included private lands in the planning process in only a token manner through invitations to Farm Bureau representatives or other landowner-focused organizations. An exception to this has been the sage grouse (*Centrocercus urophasianus*) working groups formed under the direction of the Western Association of Fish and Wildlife Agencies that have been established within regions of each of the 11 states involved in addressing the needs of this species. This program has included private landowners as part of each working group. However, even this program is top-down driven by the state agencies and designed to conform to their approach to addressing the needs of this species.

Until the ability and value of having landowners lead conservation planning initiatives is recognized and direct funding to assist such initiatives is available, many landowners will be resistant to government-led conservation programs. While many landowners will need government assistance to complete planning projects, the prevailing attitude that landowners cannot lead planning efforts is a major impediment to acceptance of government conservation programs.

Engagement of Private Landowners

Another challenge of conservation planning across large landscapes is engaging private landowners in conservation planning. Recognizing that private landowners own a significant amount of land important for biodiversity conservation throughout the United States, the need to engage them in conservation planning efforts is not a trivial matter. Reasons why private landowners might engage in conservation planning or implementation include (1) the desire to be good environmental stewards, (2) regulatory relief, and (3) economic benefits. As mentioned previously, private landowners typically value a healthy environment and therefore are often inclined to help create such an environment by

being good stewards of their land. For private landowners that own large acreage (e.g., large industrial or private forest management companies), there is often a recognition that they have a responsibility to manage their lands in a manner that is beneficial to the communities in which they operate, much like a public land management agency would view management of public lands held within their trust.

In contrast to "doing the right thing" by being good environmental stewards, private landowners have several admittedly self-serving reasons to engage in conservation planning including regulatory relief and economic benefit. When engagement in conservation efforts can clearly result in relief from regulatory pressure (e.g., ESA), then private landowners are more inclined to participate. An example of this is enrollment of private land into a statewide safe harbor agreement for red-cockaded woodpeckers (*Picoides borealis*) in Louisiana (Louisiana Department Wildlife and Fisheries 2006) that offers assurances that landowners who provide habitat for this species would not then be restricted from normal economic activities should the species occupy their land. Similarly, the ability to realize economic return from involvement in a conservation planning effort could provide ample reason for private landowners to engage. Economic benefit might come by way of a receipt of a "social license" to operate because of their participation, or the effort might actually identify management activities that benefit the environment as well as provide a return on the investment for private landowners. Current discussions of the Cooperative Sagebrush Initiative (www.sandcounty.net) are investigating mechanisms to pay private landowners for improvements to sagebrush (*Artemisia* spp.) ecosystems that could provide off-site mitigation benefits.

Possibly the greatest challenge to engaging private landowners in conservation across large landscapes is the need to balance conservation and production through working landscapes. Private landowners might engage for the reasons stated previously, but planning for working landscapes whereby a balance is achieved between conservation and production is critical. Consider the United States as a mosaic of wild lands, urban lands, and multipurpose lands. Wild lands (e.g., wilderness, national parks) are effectively being "managed," through legislation and regulation that typically limits the management that occurs. Similarly, urban land serves a purpose, but this purpose is not to contribute to broad biodiversity conservation objectives. Consequently, what is left is the space in between that consists largely of private land intermixed with public land with a multipurpose objective.

Proprietary Information

Top-down regulatory approaches continue to mandate specific responses from private landowners in land-management practices, but typically result in increased animosity toward regulatory agencies as well as toward the environmental feature that is the focus of the regulation (Haufler and Kernohan 2001).

A secondary fallout of this model is the lack of trust in public agencies when it comes to sharing information. For example, the ESA creates a disincentive for private landowners to divulge the location of a threatened or endangered species because of fear that regulatory pressure might result. Consequently, when a private landowner becomes aware of the presence of a sensitive plant or animal species, the current regulatory environment suggests that it is best to keep that information out of the public sector for fear that the information might be used to limit economic return. This attitude extends to the point of private landowners being unwilling to allow government agencies to have access to their lands for surveys or inventory work. While advances in remote sensing are providing new sources of information with increased accuracy that include information on private lands, major gaps in information exist. Current remote sensing cannot gather information such as the composition of grasslands on private ranchlands or understory characteristics of forests on private industrial forestlands.

Data on flora are not as sensitive as data on fauna because vegetation does not carry the same level of regulation on private lands through the ESA. However, the potential loss of competitive advantage/market share is a concern, particularly within the forest industry. Industrial companies do not want competitors to know what types and amounts of forest inventory exist on their lands, information that might lead to competitive strategies concerning supply and production of certain types of forest products. Similarly, information such as inventories of commercial trees and commercial production information is subject to antitrust laws designed to prevent collusion in the market place (Thompson et al. 2004). Such laws and regulations restrict the amount of proprietary information that can be shared among competitors. Consequently, modeling landscapes and landscape management that includes private landowners are challenged by reluctance to share proprietary data and proprietary harvest schedules in the case of the forest industry. The challenge is to create mechanisms whereby information from private landowners can be shared for purposes of planning and management that does not expose them to management risks, jeopardize their rights, or subject them to legal penalties.

Focus on Species Management

The vast majority of conservation planning has focused on the needs of single species or various groupings of species. The concept of coarse filters (ecosystem focus) and fine filters (species focus) as two ways of addressing conservation planning was introduced over 20 years ago (The Nature Conservancy 1982), but effective use of coarse filters has not been widely used to date. This is due to several reasons. First, agencies have interpreted the ESA to focus on species. Their resulting emphasis on management of listed species or species of concern has overridden other conservation planning efforts. Second, most biologists have been trained with a strong focus on the species level of

biological organization, with little emphasis on community and landscape levels of organization. Consequently, biologists have the greatest comfort level working at the species level and have generated the greatest amount of information on the needs and management of species as opposed to information on ecosystems and landscapes. In contrast, foresters and range conservationists have had more focus on community and landscape dynamics, but typically for production of desired forest and range products, not as it relates to providing for the needs of species or for biodiversity conservation.

Private landowners are typically more in tune with the grass, shrub, and forest ecosystems that comprise their working landscapes than they are with the fish and wildlife using these lands. They hear about concerns for various species, but often do not have any idea what the species even looks like or why it might be important to maintain. They may be approached by private conservation organizations, suggesting that they manage their lands for a number of species of concern. Many times, these species may have habitat requirements that conflict, leaving landowners wondering what is being asked of them. The range conservationists or foresters that a landowner may be working with for economic objectives may also be unclear about what conditions are being sought by the biologists. An often heard statement by these land managers is "Just tell me what conditions you want, and I can produce them," to which the answer from a biologist may be "it's not that simple; we need lots of different conditions." Finding ways to simplify conservation planning needs and putting them in terms that engage foresters, range conservationists, and landowners is a challenge that could yield increased conservation dividends. The role of landscape models discussed in this book is crucial in this process.

Mixed Ownerships

The preceding challenges, while applicable on mixed-ownership landscapes, are primarily concerns for private lands. Mixed-ownership landscapes add further complications. Where checkerboard ownership patterns occur, what happens on one parcel of land will have an influence on adjoining parcels of lands, at various scales of influence. For example, at broad scales, Stribley and Haufler (1999) found that the conditions in the surrounding landscape determined the probability of the presence of cowbirds (*Molothrus ater*), with site conditions secondary to the landscape influences. At mid-scales, where sections of land (e.g., 250 ha) occur in a checkerboard ownership pattern, habitat requirements for many species are dependent on or influenced by the availability of habitat variables across multiple ownerships, meaning that aggregates of land parcels will be required to provide the composite needs of many species (Freemark et al. 2002, Wiens 2002). In addition, for adjoining parcels, concerns may exist that what is present or occurs on one parcel can move to or influence the adjacent parcel. Prairie dogs (*Cynomys* spp.) occurring on federal lands may spread onto adjacent private lands, causing landowners to seek their removal

from the federal lands. Conversely, noxious weeds occurring on some private lands may be a source for movement onto adjacent federal lands, stretching the ability of federal funding to control this problem. Finally, especially for rangelands, federal lands may be an important component of working landscapes, with grazing permittees using the federal lands in pastures that are of mixed ownership. In these areas, balancing economic needs with conservation objectives will require broader landscape plans that integrate the two objectives in workable solutions.

An additional challenge of mixed-ownership landscapes is providing appropriate agreements and mutual assurances across ownerships. Federal lands are managed under regulations that require specified processes, public input, interagency reviews, and similar bureaucracy. Private lands seeking to be involved in mixed-ownership conservation planning operate under very different requirements and utilize different types of agreements. Finding ways for private and federal lands to effectively coordinate and enter into parallel agreements is a challenge. The time lags and complexities of federal processes that involve extensive public input and review, while important for management of these lands, can strain cooperative relationships with private landowners who can make management decisions more quickly.

SOLUTIONS TO INCREASE EFFECTIVENESS OF CONSERVATION PLANNING

Our discussion of solutions to increase effectiveness of conservation planning on private lands focuses on a preferred approach and mechanisms to implement the approach. An ecosystem diversity approach is described that provides efficiencies in planning while effectively dealing with proprietary information concerns and concerns with single species management. Mechanisms explored to facilitate an ecosystem diversity approach include increasing incentives while recognizing regulatory constraints.

Use of an Ecosystem Diversity Approach

Haufler and Kernohan (2001) identified several principles for land management in mixed-ownership landscapes that are applicable to private lands. Two of these they termed the "coarse filter principle" and the "ecological site and historical disturbance principle." The coarse filter principle emphasized the need to use a planning approach that focused primarily on ecosystem diversity rather than on individual species. The ecological site and historical disturbance principle expanded on the coarse filter principle to provide some direction for its implementation.

There are various reasons why these principles are applicable to conservation planning for private lands. First, there are far too many species to plan

for individually, and the complexity of species complicates conservation planning, especially on private lands (Haufler and Kernohan 2001). Private landowners find management difficult when presented with a list of species for which management actions are desired, particularly when these species present different and even conflicting habitat needs. For example, ranchers willing to consider conservation planning of their grasslands might be provided habitat information about long-billed curlew (*Numenius americanus*), upland sandpiper (*Bartramia longicauda*), chestnut-collared longspur (*Calcarius ornatus*), lark bunting (*Calamospiza melanocorys*), McCown's longspur (*Calcarius mccownii*), mountain plover (*Charadrius montanus*), and short-eared owl (*Asio flammeus*). Each of these species has different habitat requirements, and some have dramatically opposing habitat requirements, such as mountain plovers and chestnut-collared longspurs. Mountain plovers occupy very open prairie sites with little vegetation, while chestnut-collared longspurs prefer sites with varying densities and heights of grasses. Producing these conditions would require substantially different types of management. The rancher may be interested in being a good environmental steward, but may be confused and frustrated by the uncertainty of what management is desired. Consequently, the lands that might have been included in a conservation initiative are not.

To address the number of species potentially required under fine filter approaches, researchers and managers have proposed a number of fine filter substitutes or surrogates to simplify the conservation planning process (Noon et al., this volume). These surrogate methods use selected species to address the needs of a broader group of species. For example, sage grouse have been suggested as an "umbrella" species for conservation planning for sagebrush ecosystems. Lambeck (1997), Noon and Dale (2002), and Groves (2003) described different types of species proposed for surrogate conservation planning. Groves (2003) listed the following categories of surrogates: declining or at-risk species (threatened, endangered, and imperiled), endemic species, flagship species, umbrella species, focal species, keystone species, and indicator species. Noon and Dale (2002) listed the additional categories of ecological engineers, link species, and phylogenetically distinct species. Carignan and Villard (2002) listed dispersal-limited species, resource-limited species, process-limited species, and species linked with specific habitat features. Recent research has investigated how well these substitutes or surrogates address the objectives of providing for all species. Numerous difficulties and limitations of using species groupings or surrogates for conservation planning have been reported (Flather et al. 1997; Niemi et al. 1997; Pearson and Carroll 1998; van Jaarsveld et al. 1998; Carroll et al. 2001; Fleishman et al. 2001, 2002; Lawler et al. 2003; Su et al. 2004). For example, Fleishman et al. (2001) evaluated the use of a set of umbrella species for selection of conservation areas and found that these were no more effective than random species when used as surrogates for cross-taxon representation.

All the preceding reasons make fine filter approaches to conservation planning problematic, both for the scientific community and for private

landowners. As an alternative, coarse filter, or ecosystem diversity approaches offer many advantages (Haufler et al. 1999). While it is not possible to describe, characterize, and track the habitat needs of all species in an area, it is feasible to classify, describe, and track ecosystem diversity in a planning landscape. Hughes et al. (2000) and Vos et al. (2002) discussed how use of ecosystem approaches is the direction in which conservation planning is generally heading. Various tests of coarse filter strategies have shown that they can be effective for biodiversity conservation planning (Nichols et al. 1998, Wessels et al. 1999, Ben Wu and Smeins 2000, Kintsch and Urban 2002, Oliver et al. 2004). However, ecosystem diversity approaches are not without their critics, as both Lindenmayer et al. (2002) and Noon et al. (2003; this volume) have questioned the use of landscape surrogates for addressing species needs and distributions.

While the scientific evaluation of coarse filter and fine filter approaches continues, coarse filter approaches offer advantages for use on private lands. One of these advantages is that landowners can often relate better to objectives described in ecosystem diversity terms than in terms of species habitat. For example, stating that a grassland be composed of a certain mix of grass and forb species and that within a specified area at least some percentage of the grassland has at least a minimum grass height maintained throughout the growing season is a description that a rancher can understand and produce. The economics of producing this condition can be identified and appropriate incentives provided to the landowner for producing these conditions. Similarly, a forest landowner can understand a prescription to apply on a certain type of site to maintain specific tree species in specified size classes and densities, and with certain understory characteristics. Further, focusing on providing appropriate ecosystem diversity opens up additional funding opportunities for on-the-ground treatments, including various practices within Farm Bill programs including prescribed burning, herbicide control of invasive species, and seeding with native species.

Another advantage to an ecosystem diversity focus is that in its basic form, it only requires mapping of private lands to an appropriate classification of ecosystem diversity. While this can be a complex task, it can preclude the need for specific information on occurrences of species of concern or detailed information such as forest inventory data. Landowners might be much more amenable to allowing this level of information to be provided or collected for their lands, allowing for more effective conservation planning and protection of proprietary information.

The examples discussed in following sections both utilize the same ecosystem diversity approach, one that has the goal of providing adequate representation of all native ecosystems in an area (Haufler et al. 1996, 1999). It identifies ecosystem diversity as a component of the differences in ecological sites in a planning area (abiotic factors), and the role that historical disturbance regimes played in maintaining various plant communities and associated animal use of these communities over time. As such, it relies on development of a historical

reference of ecosystem diversity, and compares current conditions to this reference. While the goal is not a return to historical conditions, the base assumption is that historical conditions were what the biodiversity of the area evolved with and adapted to. This ecosystem diversity approach can provide a scientifically based method of addressing biodiversity conservation in an effective and efficient manner. While the authors advocate use of this approach, they acknowledge that other ecosystem diversity approaches may also be effective in addressing many of the challenges for private lands discussed previously.

Increased Incentives Within a Regulatory Environment

Haufler and Kernohan (2001) suggested that regulation has a role in management of private lands for conservation, and possibly a central role when it comes to providing for the good of society (e.g., quality of waters downstream from private property). The debate is not whether private lands conservation can fit within a regulatory environment, but rather over how much the rights and needs of society should be dominant or subservient to the rights of property owners (Haufler and Kernohan 2001). Increased incentive programs and voluntary action are likely to produce greater conservation gains in the long term than trying to force solutions through regulation. Increased incentives partially solve private property rights, funding, and engagement challenges.

Various incentive programs exist to reduce the fear of regulatory restrictions, particularly under the ESA. Programs such as Habitat Conservation Plans, Safe Harbor Agreements, and Candidate Conservation Agreements with Assurances are designed to provide assurances to private landowners that their involvement in conservation initiatives either will reduce regulatory constraints or will not result in increased regulatory restrictions. However, even with efforts at streamlining these programs, they remain complex, time consuming, costly, and difficult to complete for all but the biggest and/or wealthiest landowners. Additional simplification of these programs and development of new programs that make involvement of landowners even easier would go a long way toward reducing the fear of increased regulatory constraints. Additionally, conservation planning that focuses on ecosystem diversity needs to be able to fit more easily into assurance programs. At present, species must be identified, and their individual conservation status assessed in order for assurance programs to be applicable. Incorporating ecosystem diversity approaches into assurance programs would encourage involvement of additional private lands.

Two levels of conservation planning need to be recognized for private lands. One level involves maintaining lands in uses that allow them to provide conservation benefits as specific conservation lands, or as lands maintained in working landscapes. The primary focus is to keep lands from being converted to development. Conservation easements are a powerful tool that can be used to achieve this objective. The second level of conservation planning addresses

the question of whether or not the right conditions exist on conservation or working lands to meet the conservation objectives. This is where the ecosystem diversity approach, discussed previously, comes into play. Where inadequacies in conditions are identified (e.g., adequate representation of specific ecosystems is lacking), incentives can be utilized to produce or maintain the desired conditions within the planning area.

Conservation easements are a flexible tool for addressing the need to maintain lands in wild and working landscapes. Conservation easements are either voluntarily sold or donated by private landowners and constitute legally binding agreements that limit certain types of uses or prevent development from taking place now and in the future (The Nature Conservancy 2006). Conservation easements are an incentive for private landowners to contribute to the conservation of natural resources while allowing them to retain certain property rights. A central attribute of easements is that their restrictions and terms can be designed to fit the needs of the underlying landowner and the easement holder so long as they retain a public purpose or intent (The Nature Conservancy 2006). Conservation easements have become an important incentive-based tool because they can address many of the challenges facing private landowners when it comes to contributing to conservation planning across landscapes while meeting economic objectives. The Nature Conservancy (TNC) alone reports conservation easement activity in 20 states across the United States (The Nature Conservancy 2006). Better understanding of the use and values of conservation easements is needed by private landowners, particularly by some in the ranching community who have seen these tools used by conservation organizations to leverage conservation concessions from landowners during times of economic difficulty, and may not recognize their value as voluntary tools.

Incentives to produce desired conditions on private lands within planning landscapes can take a variety of forms. Existing incentive programs need to be strengthened so that increased funding mechanisms are available to private landowners (Haufler and Kernohan 2001), particularly those willing to provide for biodiversity. A number of incentive programs exist to provide assistance in producing on-the-ground management, but are often inadequate to meet the demands for conservation incentives. Examples of incentive programs include various Farm Bill programs administered by Natural Resource Conservation Service (NRCS 2006) such as the Wildlife Habitat Incentive Program, the Environmental Quality Incentive Program, the Stewardship Incentive Program, the Grassland Reserve Program, and the Wetland Reserve Program; programs administered by the U.S. Fish and Wildlife Service (USFWS 2006) such as the Private Stewardship Program, the Partners Program, and the Landowner Incentive Program; programs administered by state agencies (e.g., Habitat Improvement Grants), programs administered by the National Fish and Wildlife Foundation, and other grants and programs administered by private organizations. Typically, the availability of incentive funds is predicated on a cost-share strategy (e.g., Stewardship Incentive Program [Natural Resource Conservation Service 2006]), which could be a limitation to a private landowner who may lack even

the small amount of money needed to complete the program. Some programs, such as the Stewardship Incentive Program, require approved Forest Stewardship Plans (Natural Resource Conservation Service 2006) in order to receive funding.

A current limitation of the on-the-ground incentive programs is that few of these effectively link to conservation planning at landscape scales. For example, most Farm Bill practices (Natural Resource Conservation Service 2006) are targeted at individual farms or ranches, with little regard for conservation needs across a broader landscape. While the Conservation Security Program (Natural Resource Conservation Service 2006) is designed to look at conservation within watersheds, the bulk of the Farm Bill programs, while not precluding use of broader landscape planning, do not encourage such planning. Most other on-the-ground programs operate in a similar manner. New incentives are needed that place a premium for practices conducted that directly support conservation planning conducted at landscape scales. Increasing the effectiveness of incentive programs will require adjustments to funding mechanisms and increased availability of technical support for private landowners, both by funding private landowner-led planning and through increased agency technical support to landowners interested in conducting conservation planning.

Other Solutions to Private Lands Challenges

Several solutions to private land conservation challenges can be implemented by federal agencies. One of the challenges identified previously is the need to fund private landowner planning efforts. A few sources of funds are currently available, especially for those engaged in watershed planning, where various Environmental Protection Agency programs fund water-related projects. However, more funding directed at privately led conservation planning is needed. Along with this is the need to change the prevalent view in agencies that they are the ones that do the planning and that landowners should simply accept what they are told. While technical assistance from agencies will continue to play a critical role in conservation planning, the rights, ability, and importance of landowner-led conservation planning needs to be respected and supported.

The ability to enter into parallel agreements for private and public lands in mixed-ownership landscapes needs strengthening. While the need for regulations and guidelines for planning implementation on federal lands is recognized, processes must be developed to allow federal planning and private land agreements to proceed in a more coordinated manner. Current efforts at streamlining federal planning and project implementation have primarily focused on excluding various planning or projects from review processes, using tools such as categorical exclusions. Such exclusions do little to help coordinate planning in mixed-ownership landscapes. New ways of allowing closer links and faster processing for joint private and public land conservation planning in mixed-ownership landscapes are needed that do not preclude appropriate public input and review.

MODELING OF PRIVATE LANDS

In this chapter we have focused on the challenges of conducting conservation planning involving private lands in the United States. Models used in conservation planning such as ecosystem dynamics models or species assessment models (Beck and Suring, this volume; Larson et al., this volume) should operate equally well for any ownership. The challenge is to obtain the data from private lands required to drive such models, data that may be more difficult to obtain for the reasons discussed previously.

Assumptions used for modeling outputs concerning types of land uses or management may differ between public and private lands. For example, Spies et al. (2007) assessed some of the ecological and socioeconomic effects of recently enacted forest management policies in the 2.3 million ha Coast Range Physiographic Province of Oregon and made various assumptions about the different management that would occur on public and private lands. While such differences will occur, the focus of this chapter has been on approaches that allow private lands to be more effectively integrated into conservation plans.

Examples of Private Land Conservation Planning at Landscape Scales

Private Forestlands.—Addressing the challenges described in the preceding sections and creating workable solutions is not an easy task for private forestland owners. A diverse suite of entities including small woodlot owners, family-owned timber companies, timberland investment management organizations (TIMOs), public and private real estate investment trusts (REITs), and integrated forest products companies own private forestland in the United States. Regardless of who owns the forests, landscape considerations for conservation planning on private lands remain a challenge. Most examples of conservation planning at landscape scales in forested landscapes come from large, integrated forest products companies or large, forest investment/management companies (e.g., TIMOs and REITs) (Haufler and Kernohan 2001, National Council for Air and Stream Improvement 2001, Loehle et al. 2002). Forest products companies often undertake landscape planning to demonstrate the compatibility of forest management with ecological functions and to explore viable alternatives to restrictive regulations (Loehle et al. 2002). Forest products companies have commonly used habitat conservation plans at the federal or state level to accomplish these goals. Loehle et al. (2002) reported that three companies that developed management plans at the landscape level in the Pacific Northwest found their planning efforts expensive and difficult to develop and implement, with unclear benefits. Planning efforts, whether related to federal or state laws, should have clear achievable goals, be based on scientific principles and credible data, and be driven by realistic monitoring and adaptive management.

As an alternative to habitat conservation plans and other regulatory-based tools, Haufler and Kernohan (2001), National Council for Air and Stream Improvement (2001), and Haufler et al. (2002) described an approach to conservation planning at landscape scales developed by what was then Boise Cascade Corporation, a publicly traded integrated forest products company. Described as private landowner-led collaborative programs, these projects followed the steps of an ecosystem management process described by Haufler et al. (1996, 1999, 2002) and were established in central Idaho, south-central Washington, and northern Minnesota. All three projects used the ecosystem diversity approach described previously and incorporated collaboration considerations appropriate for projects in mixed-ownership landscapes (The Keystone Center 1996, Kernohan and Haufler 1999, Haufler and Kernohan 2001).

Creation of viable planning processes in mixed-ownership landscapes was achieved largely because of the leadership of a private company. By removing the tendency of public agencies to manage using a fine filter approach through regulatory action, multiple stakeholders were able to come together and conduct ecological assessments using an ecosystem diversity approach. The ecosystem approach allowed data to be summarized and presented in a manner that was not threatening to private landowners; private property rights were respected and proprietary information was controlled. In the case of the Minnesota project, the ecosystem approach described previously paved the way for the Minnesota Forest Resources Council (2006) to effectively implement a landscape-based planning and coordination program throughout the state of Minnesota that addressed many of the challenges facing conservation planning on private lands.

Thunder Basin Grasslands Prairie Ecosystem Association.—The Thunder Basin Grasslands Prairie Ecosystem Association (Association) is a nonprofit organization composed of landowners (ranchers and energy production companies) who manage over 300,000 acres within a delineated 945,000-acre landscape in eastern Wyoming (Fig. 6-1). The Association formed to develop a collaborative, responsible, commonsense, science-based approach to long-term management of their lands. The landscape is mixed-ownership, containing private ranchlands, energy production company lands, Thunder Basin National Grasslands, Wyoming state lands, and Bureau of Land Management (BLM) lands. The area, recognized as one of the most ecologically significant grasslands in the United States, supports some of the largest remaining populations of black-tailed prairie dogs (*Cynomys ludovicianus*), mountain plovers, ferruginous hawks (*Buteo regalis*), burrowing owls (*Athene cunicularia*), upland sandpipers, loggerhead shrikes (*Lanius ludovicianus*), long-billed curlews, and many other grassland-associated species. The area is also a potential site for reintroduction of black-footed ferrets (*Mustela nigripes*). The area has a solid population of sage grouse and has large herds of pronghorn antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and elk (*Cervus elaphus*) that support considerable recreational hunting. Management

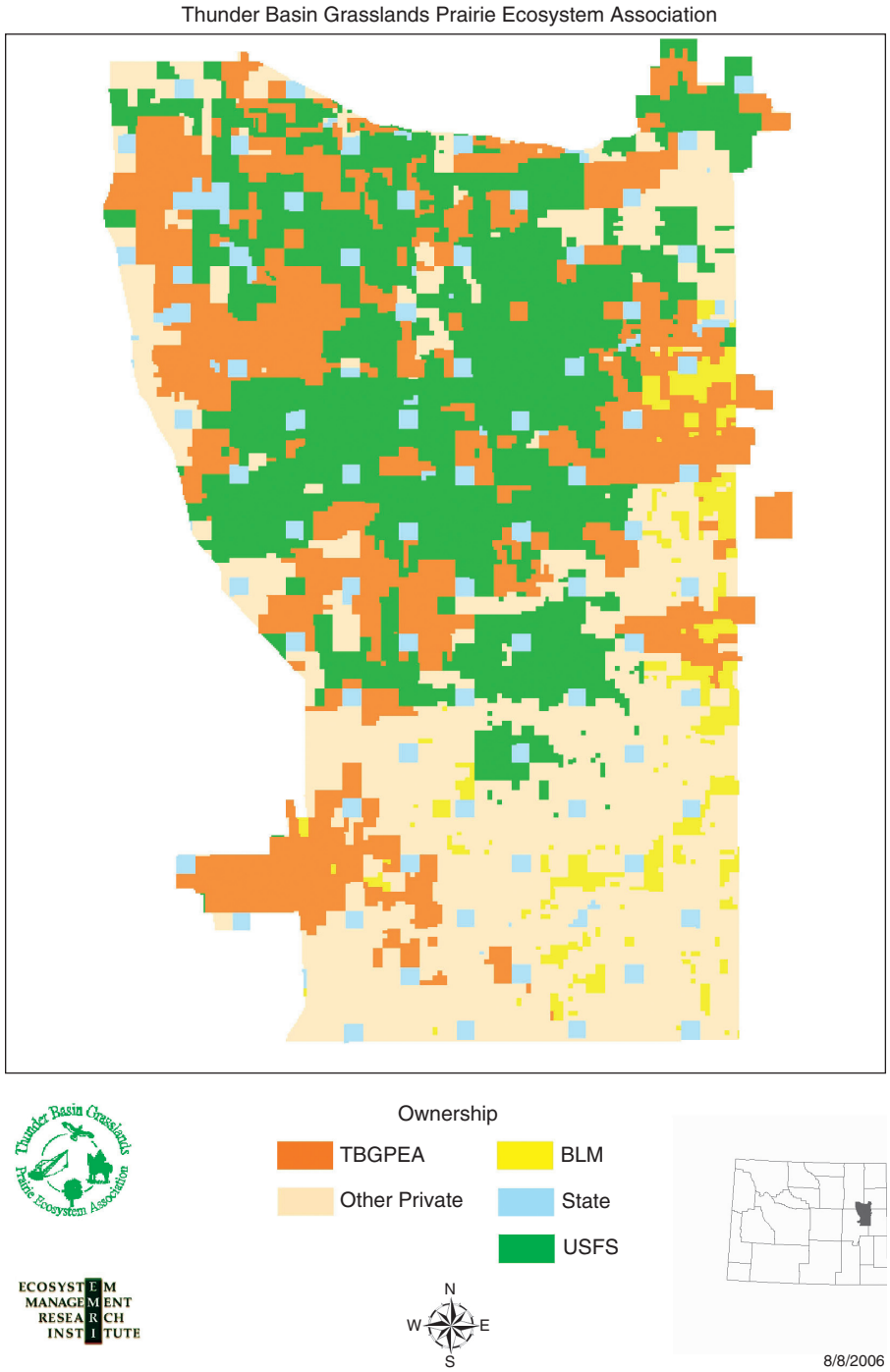

FIG. 6-1

The Thunder Basin Grasslands Prairie Ecosystem Association (TBGPEA) manages over 300,000 acres within a delineated 945,000-acre landscape in Converse, Campbell, Weston, and Niobrara Counties in eastern Wyoming, USA.

controversies including appropriate grazing practices, intensive and expanding energy developments, prairie dog management, and potential land conversions place the future productivity and ecological integrity of these lands at risk. The landowners of the Association were interested in conducting their own conservation planning for the landscape. They rejected offers from state and federal agencies as well as from conservation organizations to do the planning for them. However, they recognized that the mixed-ownership pattern necessitated cooperative management among private landowners and state and federal agencies if both effective conservation and economic vitality were to be achieved. The Association has cooperated with state and federal agencies in its efforts to produce long-term management plans. The Association has cooperative arrangements with the USFWS, U.S. Forest Service (USFS), BLM, NRCS, Wyoming Game and Fish, and Wyoming Department of State Lands. The Association has been developing an Ecosystem Diversity Plan and a Prairie Dog Plan that, when combined, could provide the basis for a Candidate Conservation Agreement with Assurances with the USFWS. The conservation measures that the landowners could provide could be the basis for receiving assurances that would allow them to continue with appropriate ranching and energy production activities, even if species occurring in the area are listed under the ESA. The USFS has been working on parallel management plans that are being implemented through Allotment Management Plans and a Grasslands Plan Amendment for the National Grasslands. The long-term objective would be to provide for the habitat needs of all species of concern in the planning landscape, while still maintaining ranching, energy developments, and recreational activities.

The Association recognized that addressing conservation concerns for one species at a time would not provide a comprehensive and consistent long-term plan for the landscape. The members of the Association also recognized that each landowner, working independently, would not be as effective as a collaborative effort that considered the cumulative contributions of all lands within the landscape for ecological, economic, and social objectives. Consequently, the Association focused its efforts on developing an ecosystem management plan that addressed the habitat needs of all species of concern while balancing these needs with sustainable economic and social activities. The ecosystem management plan, if implemented, would provide the science-based information and integration needed to meet these objectives and would provide the basis for either individual landowners or for a group of landowners to enter into appropriate conservation agreements.

The Association engaged the Ecosystem Management Research Institute (EMRI) to conduct an ecological assessment of the landscape that has characterized both a historical reference and existing ecosystem diversity. Ecosystem diversity was characterized as the native ecosystems that occurred in the area based on the influence of NRCS ecological sites (Natural Resource Conservation Service 2006) and the role of historical disturbances, specifically the influences of fire, grazing by native herbivores, and weather. The spatially explicit vegetation dynamics model SIMPPLLE (Chew et al. 2004) was used to model historical vegetation

dynamics. Initial vegetation maps were generated by overlaying ecological site information (Natural Resource Conservation Service 2006) with information derived from General Land Office survey information recorded in the original surveyor logs. Existing ecosystem conditions were delineated through new 10 m resolution satellite mapping of grass and shrub dominated areas, coupled with on-the-ground sampling of vegetation conditions. Ecosystem diversity objectives, defined as representative levels of historical ecosystem diversity for the area, were identified. Many historically occurring ecosystems were found to be adequately represented in the planning area. Ecosystem diversity that was not well represented in the planning area included plant communities resulting from light grazing, as well as more heavily grazed areas containing an acceptably low level of exotic plant species, especially cheatgrass (*Bromus tectorum*). The Association has started on-the-ground practices to correct some of these deficiencies for both grassland and sagebrush ecosystems.

The proposed levels of ecosystem diversity that might be provided by the private landowners are being evaluated using a habitat-based species viability assessment (Roloff and Haufler 1997, 2002) for selected focal species. This assessment models home ranges of varying quality for selected species within a planning landscape. For example, output of the habitat-based species viability analysis shows over 6000 high-quality home ranges for the lark bunting under existing habitat conditions (Fig. 6-2). The viability assessment compares this number to the number of high-quality home ranges that would be present following full implementation of the potential management plan, and demonstrates that the plan would provide for sufficient high-quality habitat for this species to expect the population to remain viable in the landscape.

The assumption of the plan is that the habitat needs of all species will be provided through representation of all historically occurring ecosystems. The focal species are used to assess that this is a reasonable assumption. Monitoring of vegetation and corresponding species responses would be an ongoing component of the plan. The assumptions of the plan can be evaluated through this monitoring, and an active adaptive management plan is part of the implementation process (Franklin et al. 2007).

There are several advantages to using the ecosystem diversity approach in the Thunder Basin. This approach addresses the habitat needs of all species and provides the landowners with assurance that as new species of concern are identified, they will already be addressed in their area through the provision of ecosystem diversity. The landowners understand the reasons for the specific ecosystem diversity goals and can see the benefits of treating areas to obtain these conditions, both from the standpoint of species of concern and for improvements to rangeland conditions. The ecosystem diversity goals, stated as desired grassland or shrubland conditions, can be funded using a large number of possible sources, including several Farm Bill programs and associated rangeland practices. Finally, the ecosystem diversity approach can be used to

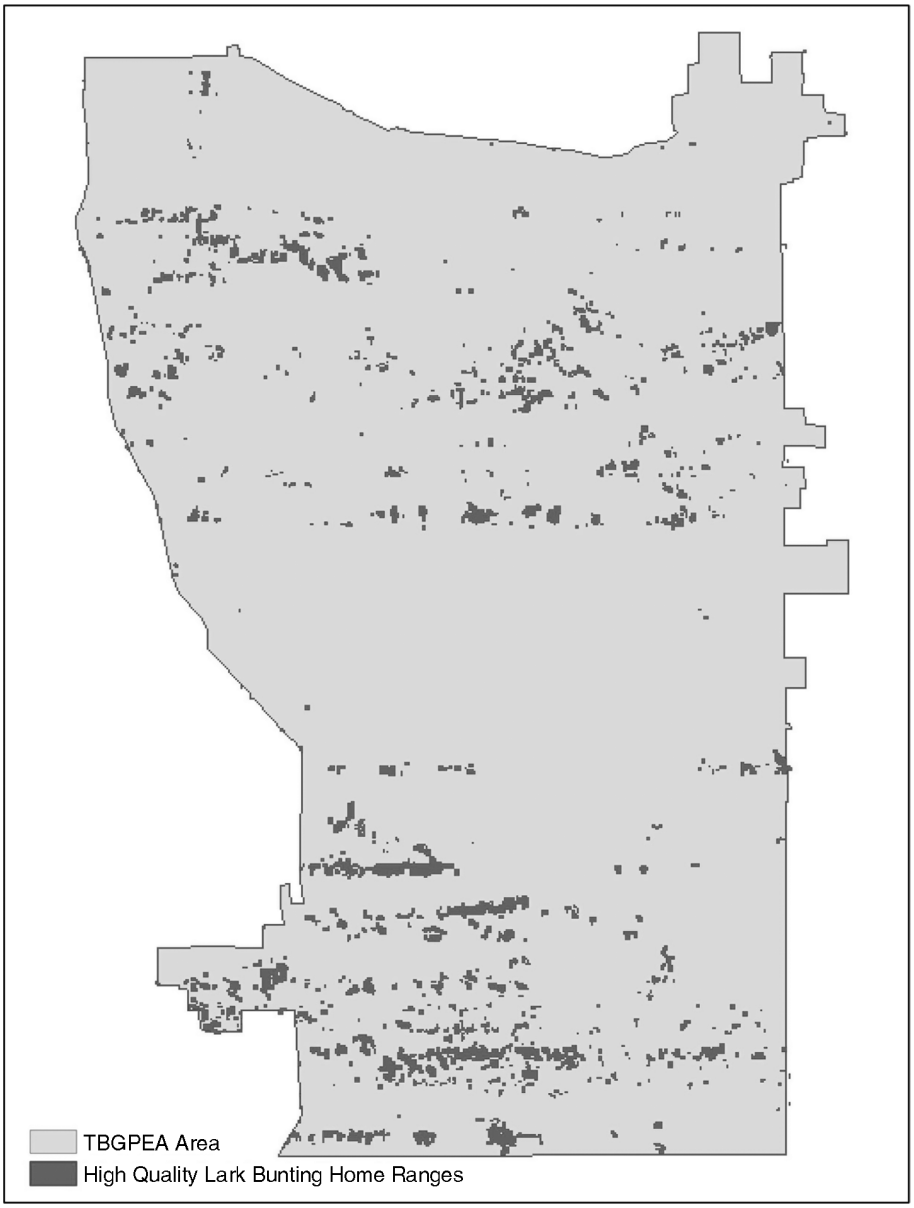

FIG. 6-2

Map of over 6000 high-quality home ranges for lark bunting determined using a habitat-based species viability approach (Roloff and Haufler 1997, 2002) within the Thunder Basin Grasslands Prairie Ecosystem Association (TBGPEA) landscape under existing habitat conditions.

address the habitat needs of species of concern, but presents goals recognized and supported by range conservationists working in the area. This approach can bring agency biologists and range conservationists to the same table where both can see and agree on the merits of the proposed actions.

The Association of private landowners also developed a conservation plan for prairie dogs with input from the USFS, BLM, Wyoming Game and Fish Department, and a number of conservation organizations. The prairie dog conservation plan was needed because prairie dogs are not limited by available habitat that is addressed by the ecosystem diversity plan. Rather they are limited by where prairie dogs are allowed to occur. The prairie dog conservation plan was designed to provide for not only prairie dogs, but also other associated species including sufficient conditions for the potential reintroduction of black-footed ferrets. The prairie dog plan was developed as a potential component of the assurances agreement between private landowners and the USFWS and it provided the basis for a Grasslands Plan Amendment by the USFS.

The Association needed to overcome a number of the challenges discussed previously to move this conservation planning initiative forward. The first obstacle that they encountered was the lack of available funding for conducting privately led conservation planning. No normal funding channels were available to provide the support needed to conduct an ecological assessment and develop the conservation plans. The Association was able to gain the support of the Wyoming Congressional delegation as well as the State Conservationist with NRCS to generate funds for this work, augmented with funding provided by a number of foundations, energy production companies, and the Association itself. However, the work required to obtain these funds slowed the overall conservation planning process by several years and highlighted the need for new funding programs to provide private landowner-led planning.

The ranching members of the Association were leery of providing information on the distribution and status of species of concern occurring on their lands, including black-tailed prairie dogs, mountain plovers, sage-grouse, and others. However, they recognized the need of having baseline information on these species. They agreed to allow access to their lands by EMRI as an independent institute. EMRI, funded by nongovernmental sources for the survey work so no federal or public claims could be made to the data, entered into individual agreements with each landowner, protecting the specific information collected on each landowner's property. EMRI was allowed to provide the Association and the general public summary information on the numbers and status of species of concern within the landscape. In this way, information needed for conservation planning was gathered while respecting the property rights and proprietary information concerns of the landowners.

The Association led all aspects of the conservation planning process. The Association was provided technical assistance by EMRI and state and federal agencies. However, they are determining what management they want to apply to their lands. One of the more contentious issues was management of prairie dogs. The ranching community was concerned about the potential spread of

this species across the planning area, with federal lands having few options for managing this species. The conservation plan developed for the area identified areas on both public and private lands where prairie dogs are encouraged to remain and expand, but also identified where prairie dogs are not desired, and should be managed to reduce their occurrence.

Incentives are a key component of the long-term implementation of the plan. For example, incentive payments by the Sand County Foundation and the Landowner Incentive Program have been provided to landowners who voluntarily agree to have prairie dog colonies on their lands. These payments are designed to offset the reduction in grazing productivity caused by the prairie dogs. Incentives for ecosystem restoration may also be a key component. To date, incentive payments for on-the-ground treatments including prescribed burning, control of exotic species, and restoration of desired plant communities have been obtained from NRCS's Environmental Quality Incentives Program (EQIP), Peabody Energy Company, Wyoming Wildlife and Natural Resources Trust Fund, and the Landowner Incentive Program administered by the Wyoming Department of Game and Fish. In addition, state lands are being included in the restoration work, and the Wyoming Department of State Lands and Investments have allocated funds.

The work of the Thunder Basin Grassland Prairie Ecosystem Association demonstrates that many challenges to conservation planning at landscape scales can be met while incorporating private landowner concerns. This collaborative process brought together different landowners with a shared mission of landscape planning. Private property rights and proprietary information were respected, while information needed for planning was produced. Funding, while an obstacle to the effort, was obtained to allow the private landowners to lead the planning effort. Agencies were engaged as cooperators, but were not allowed to drive the planning process. Sound science provided the underlying basis of any adopted plans. An ecosystem diversity approach avoided the need to address a long list of individual species, but still demonstrated how the needs of focal species and species of concern could be incorporated and assessed. The ecosystem diversity approach addressed objectives of both biologists and range conservationists. Through this effort, landowners may gain assurances that they can continue to practice appropriate ranching and energy production activities even if various species of concern are listed under the ESA. Landowners are voluntarily involved, with their involvement encouraged through incentive programs that minimize economic impacts. Cooperative planning across public and private lands will result in greater conservation, continued economic vitality of the landscape, and reduced conflicts.

SUMMARY

Private lands offer some of the best opportunities and greatest challenges for conservation planning, especially at landscape scales. Nearly all large landscapes contain significant amounts of private lands that are often the most productive

lands and offer some of the best potential for biodiversity conservation and other conservation objectives. Use of models for conservation planning of private lands at landscape scales generally parallel similar efforts on public lands. However, conservation planning on private lands presents various challenges not inherent in planning for public lands. Foremost are concerns for private property rights and proprietary information that complicate planning and model development. Distrust of planning conducted by agencies and lack of funding for planning conducted by private landowners unless paid for independently are formidable challenges. Mixed-ownership landscapes present additional challenges with respect to linking effective planning processes for both public and private lands. Various solutions exist, including the use of an ecosystem diversity focus in planning and linking planning processes and outputs to existing programs used by private landowners including various Farm Bill programs. Finally, generating interest in conservation planning by private landowners and identifying suitable incentives that can help balance conservation objectives with economic and other objectives of private lands holds promise. We presented two examples of private land conservation planning that incorporate these recommendations.

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