Common–interest community agreements on private lands provide opportunity and scale for wildlife management

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Abstract

Common–interest community agreements on private lands provide opportunity and scale for wildlife management.— Private lands are critical to conservation planning for wildlife, worldwide. Agriculture subsidies, tax incentives, and conservation easements have been successfully used as tools to convert cropland to native vegetation. However, uncertain economies threaten the sustainability of these incentives. The wildlife management profession is in need of innovative models that support effective management of populations. I argue that biologists should consider the option of facilitating the development of private reserves to reduce the dependence of conservation on public investment. Private reserves can be enhanced by creating common–interest communities, which reduce the problem posed by limited size of individual properties. Cross–property agreements between landowners can provide economic incentives through forms of ecotourism, energy production, and/or enhanced agricultural production. I share two case studies that demonstrate how cross–property agreements may be beneficial to landowner's finances and conservation of diverse wildlife communities, as well as providing an efficient structure for NGOs and management agencies to engage and support landowners.

Key words: Conservation biology, Conservancy, Economics, Landscape, Policy, Private lands.

Resumen

Acuerdos comunitarios de interés común sobre los terrenos privados proporcionan oportunidades y extensión para la gestión de la naturaleza salvaje.— En todo el mundo, los terrenos privados son críticos para la planificación de la conservación de la naturaleza salvaje. Los subsidios agrícolas, los incentivos fiscales y las servidumbres para la conservación han sido utilizados con éxito como herramientas para convertir las tierras de cultivo en vegetación nativa. Sin embargo, las incertidumbres económicas amenazan la sostenibilidad de dichos incentivos. La gestión profesional de la naturaleza salvaje precisa de la innovación de los modelos que dan soporte efectivo a la gestión de las poblaciones. Opino que los biólogos deberían considerar la opción de facilitar el desarrollo de reservas privadas, con el fin de reducir la dependencia de la conservación basada en las inversiones públicas. Puede estimularse la creación de reservas privadas creando comunidades de interés común, que reduzcan el problema impuesto por el tamaño limitado de las propiedades individuales. Los acuerdos entre propietarios sobre sus terrenos pueden proporcionar incentivos económicos en forma de ecoturismo, producción de energía y/o una mejor producción agrícola. Comparto los estudios de dos casos que demuestran cómo los acuerdos entre propiedades pueden beneficiar tanto a las finanzas de los propietarios de las tierras como a la conservación de diversas comunidades silvestres, así como proporcionar una estructura eficaz para ONGs y agencias de gestión en el compromiso de dar soporte a los propietarios.

Palabras clave: Biología de la conservación, Preservación, Economía, Paisaje, Política, Terrenos privados.

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Introduction

Private lands are critical to conservation planning for wildlife worldwide. However, conservation efforts have primarily focused on public lands (Knight, 1999; Brown, 2010). Public lands certainly offer permanency of purpose, and public lands biologists enjoy a large degree of ownership of the decision to implement management decisions on the landscape. These strategies may be effectual when public lands dominate a region or country (fig. 1, table 1).

But, private lands (defined as land under freehold or leasehold by individuals, not including land native communal lands; Swift et al., 2003) comprise the majority of many countries' land base (table 1). Thirty–six of 50 US states have > 75% of their area managed by private landowners (fig. 1). Private lands biologists work in an arena in which they can only offer support for decisions in a landscape that is highly volatile with regard to alternative land uses. Both game species and threatened species stand to gain from well–positioned strategies for conservation on private lands. Conservation on private lands has emerged as a critical direction (Knight, 1999).

Here, I describe challenges to private lands conservation from logistic and ecological perspectives. I suggest that common–interest communities should be considered as a viable option to create incentives for conservation on private reserves, while also providing scale that can support ecological processes that lead to successful conservation efforts. I assess the most common incentive tools for conservation on private lands. And, I provide two case studies to support Schultz's (2010) suggestion that society's demand for natural places may operate to encourage private landowners to work across property lines to produce goods and services that large, intact landscapes can provide.

Challenges

Challenges to provide incentives

The primary challenge to conservation on private lands is to provide an incentive to landowners, as conservation measures may conflict with ventures designed to realize economic value from the land investment. Simply stated, landowners/investors must realize a profit. Aldo Leopold, writing in the 1940s, expressed frustration with farmers in Wisconsin who did not continue to implement soil conservation measures after an initial 5–year period of public investment of labor and machinery (Leopold, 1949). That frustration pervades the ranks of conservationists today, especially those who are not empathetic with the notion that resilient conservation practices must stand on the shoulders of economically resilient farm and ranch ventures.

Wunder (2000) stated that the success of conservation incentives depends on the structure inherent in the mode of participation—how does conservation compare with other productive activities? Conservation incentives will have conservation impact only if they change labor and land allocation decisions on a sustainable basis. In the US, the incentive challenge is perhaps greatest in regions with productive soils and adequate precipitation (fig. 2), where row–crop agriculture is the wise investment on the landscape because of record high prices for corn (fig. 3; July 2012 spot market, Nebraska USA: US$275–314/metric ton), soybeans (US$588–624/metric ton), and wheat (US$293–330/metric ton).

Agriculture subsidies

The Food Security Act of 1985 ('Farm Bill'; Brown, 2010) served as a subsidy program to address concerns of soil erosion (wind and water) and price supports in the US. Conservation efforts are now implicit objectives in the current Farm Bill, and Farm Bill programs have been used as the primary method to convert cropland to native vegetation with successful short–term benefits (Haufler, 2005). Indeed, the job title of private lands biologists in the US is commonly 'Farm Bill Biologist'. The Farm Bill is an extensive government program; the Conservation Reserve Program (one program within the Farm Bill) paid US$1.7 billion in annual payments in 2012 to 737,699 contracts (most 10–year) on 409,253 farms (11,975,550 ha; United States Department of Agriculture, 2012). Similar subsidy programs are available in Europe through the Common Agricultural Policy (Pain & Pienkowski, 1997), but are not an option in most Latin American Countries because of budget priorities (Swift et al., 2003).

It is very reasonable to expect that the combination of the US' current budget shortfalls and the high rental rates now needed to compete with current rental rates offered for production purposes (fig. 3) may result in a loss of the diversity of types of direct payments in the next Farm Bill that would benefit wildlife habitat. There is no argument that subsidy programs have created benefits for wildlife on millions of acres in the US (Haufler, 2005), but the future of this program as the primary means to support conservation on private lands is in doubt.

Tax incentives

A recent development in several states in the US is the availability of tax incentives to farmers who pledge to keep their land in agricultural production or landowners with forests who pledge to manage them in an approved manner (Salkon et al., 2001). Agricultural tax credits may be useful to wildlife conservation in regions with a high degree of urban expansion, as the incentive may keep the land owner from transforming the farm into residential communities or industrial complexes.

For example, in Nebraska, USA, a Greenbelt Tax was created to reduce development of urban areas along rural, riverine corridors (T. LaGrange, Nebraska Game and Parks Commission, personal communication). Agricultural landowners typically see their property values increase if urban growth creates development potential for their farm land. A person owning 65 ha in Lancaster County, Nebraska, for example, would be levied an additional US$2600 in annual property taxes if their land's value increased from US$1200/ha to US$3600/ha. Such an increase might surpass current economic margins for crop

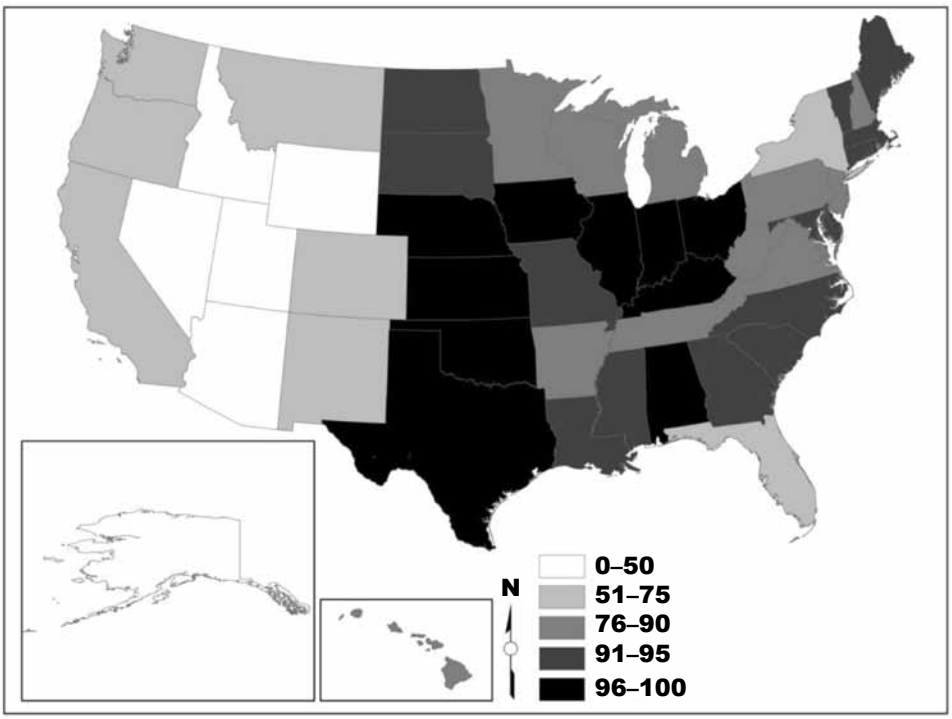


Fig. 1. Percent of area under private ownership (non–state or non–federal) in the states of the USA, based on data collected by the Natural Resource Council of Maine.

Fig. 1. Porcentaje de propiedad privada (ni estatal, ni federal) en los estados de EUA, basado en datos recogidos por el Consejo de Recursos Naturales de Maine.

production; it might be seen as especially unpalatable for a landowner interested in non–agricultural, recreational uses. A housing development or office complex could result. The Green Belt Tax status would allow the landowner to pay property taxes based on the agricultural value of the land rather than the full market value. It should be noted that the Greenbelt Tax only applies to agricultural and horticultural uses; a private nature reserve would not qualify for the incentive. However, the precedent of tax incentives exists, and state laws could be structured to provide tax incentives to private landowners who dedicate and properly manage a private nature reserve.

Salkon et al. (2001) noted that tax incentives do not provide long term security for conservation efforts (table 2). Tax incentives for conservation have been used in some Latin American countries, but they are often withdrawn in times of economic insecurity (Swift et al., 2003). Even if the tax incentive remains, the price paid by developers for land may eventually exceed the maximum compensation through tax relief.

Conservation easements

Easements are used throughout the US (Salkon et al., 2001), Latin America (Swift et al., 2003), and Europe (*conservation covenants*; Kiesecker et al., 2007) by private landowners to restrict the future uses of their property. A land trust is often created to be the recipient of the benefits of the easement (Schutz, 2010), and the recipient purchases the easement from the landowner. Easements are attractive to landowners, because the land remains in private ownership and owners continue to live on the land and derive benefit from farming, ranching, forestry, or other activities. Landowners often receive income from the sale of the easement, and this sale value varies by the market value of the land, the conservation need for the property (in fact, some landowners may find it difficult to find a third party with interest to purchase an easement), and local agreements. A landowner may donate a portion or all of the sale of the easement back to the land trust, reducing their income from the easement sale. However, their contribution may be considered a charitable donation, which can provide significant income and/or estate tax benefits derived from the state and federal government (Salton et al., 2001).

Conservation easements are usually designed to be perpetual in nature (table 2). But, as Schutz (2010) noted, such easements are enabled by state legislation, and easements are the common subject of legislation (*e.g.,* Legislature of Nebraska, 2012) that would affect their use. Of primary concern in rural districts is the potential loss of property tax, and thus support to county government and local schools. Easements are often the first step

Table 1. Percentage of land area of select countries that is in private ownership: [a] Private ownership statistics not available; percentage represents percent of country in agricultural land use; [b] China practices public land ownership with no freeholds, only leaseholds.

Tabla 1. Porcentaje de tierra de propiedad privada de los países seleccionados: [a] Estadísticas de propiedad privada no disponibles; el porcentaje representa el tanto por ciento de la tierra con uso agrícola; [b] China practica la propiedad pública de la tierra, que no permite la propiedad absoluta, sino únicamente el arrendamiento.

Country	%	Source
Australia	15	Forbes (1985)
Canada	10	Cahill & McMahon (2010)
China	0[b]	Ho (2001)
Ethiopia	10[a]	Cahill & McMahon (2010)
Germany	52[a]	Cahill & McMahon (2010)
Latin American countries (most)	> 80	Swift et al. (2003)
Namibia	43	Shaw & Marker (2011)
Spain	83[a]	Cahill & McMahon (2010)
Tanzania	11[a]	Cahill & McMahon (2010)
United Kingdom	> 80	Harrison et al. (1977)
United States, excluding Alaska	75	NRCS (2001)
Zimbabwe	42[a]	Cahill & McMahon (2010)

towards the eventual sale of the property to a state or federal wildlife agency that may pay no property taxes, or may pay property taxes at a much lower property tax rate than a private landowner (Lancaster County, Nebraska, standard rate: US$0.0027/$100 valuation; Lower Platte South Natural Resources District rate: US$0.0004/$100 valuation; Lancaster County, 2011). The loss of property tax to Lancaster County, USA for the 65–ha property in the previous example, would be $3900/year for land worth US$3600/ha. Ten landowners making a similar decision would reduce income to the County equal to one government salaried worker (*e.g.*, teacher, road maintenance, social aide). Therefore, the benefit to the individual (tax relief) is seen as a cost to the local community.

Creation of reserves

A governmental or non–governmental organization (NGO) may purchase a tract of land from an individual for the purposes of creating a nature reserve. The incentive to the individual is the fair market price (or sometimes premium price) paid by the government or NGO at the time of the sale. Thus, the land is removed from development and can be restored to native vegetation or protected in a native state. Individuals can also develop private reserves on their land, although the official recognition (and economic incentives, if any) of private reserves varies from country to country, as well as from state to state within the US (Teer, 1999; Salkon et al., 2001; Swift et al., 2003).

Private reserves are routinely considered in the set of tools available to wildlife biologists engaged with private landowners in Latin America (Swift et al., 2003) and southern Africa (Powell, 2010; Shaw & Marker, 2011), but they are not typically considered by biologists in the US (Salton et al., 2001) with the exception of the state of Texas (Teer, 1999). One factor in this shortcoming is that wildlife management students in the US are rarely required to take courses in business, tourism, or entrepreneurism, while their counterparts in nature conservation in southern Africa or Latin America (as examples) receive their education in the context of the economic benefits of properly managed populations of wildlife.

Wildlife biologists have long been aware of the potential value from hunting, bird watching, nature walks, and environmental education on private lands, although resource ownership issues are complex (Freese, 1998; Teer, 1999; Thompson & Edwards, 2009). Such values are subject to variability in tourism markets, and the size and location of the reserve will affect its value to regional biodiversity, its draw to tourists or hunters, and its capacity to provide economic benefit to the land owner. These constraints or perceived risks may lead land owners to make the decision to sell their property to a government entity or NGO. Schutz (2010) suggests that private reserves could be supported by government during initial development to reduce these risks.

The advantage to private reserves is that they are not usually dependent on public subsidies, and the reserves generate profits as a private venture (table 2). Private land conservation has typically concentrated on methods that have substantial cost in public investment (through purchase to create a public reserve or payment of annual subsidy), as well as eventual loss of agriculture productivity and contribution to taxes (Salton et al., 2001).

Challenges to support landowner decisions

Wildlife management decisions are complex and have a level of uncertainty, even when made by trained wildlife biologists. Thus, private landowners face the same challenge of making smart decisions, and should be trained in decision–making processes that include the need for clarifying objectives, assessing alternative management options, assessing potential risk of alternatives, and coordinating decisions with other current decisions (Gregory & Keeney, 2002). Monitoring to determine the level of success of a management decision is also critical (Lyons et al., 2008).

Landowners are not typically trained in concepts or techniques of wildlife management or conservation biology. Fortunately, farmers and ranchers are usually trained to manage domestic plants and animals

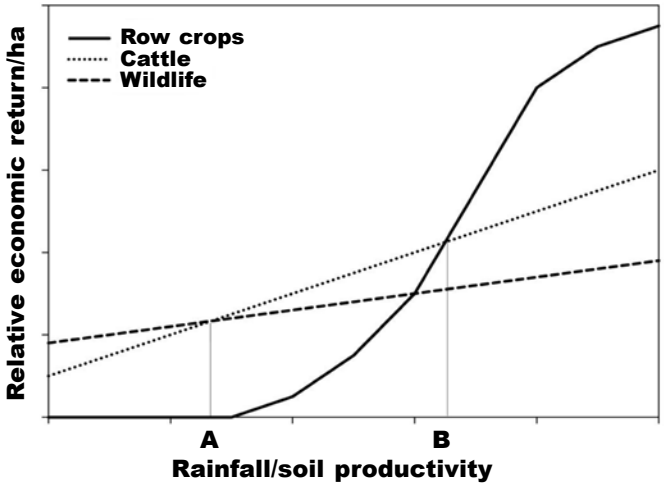


Fig. 2. Relative economic return (per ha) of three potential commodities across a gradient of rainfall and soil productivity from arid climate (left) to more mesic climate (right). A describes thresholds where cattle grazing becomes more profitable than wildlife–based entrepreneurial activities, and B is threshold where row crops become more profitable than cattle grazing. Lines showing relative economic return would be expected to shift with market conditions.

Fig. 2. Retorno económico relativo (por ha) de tres productos potenciales a través de un gradiente de precipitación y producción del suelo desde un clima árido (izquierda) a un clima más moderado (derecha). A describe los umbrales donde el apacentamiento del ganado se hace más aprovechable que las actividades emprendedoras basadas en la fauna salvaje, y B es el umbral donde las cosechas se hacen más provechosas que el pastoreo del ganado. Sería de esperar que la línea que muestra el retorno económico relativo cambiase junto las condiciones del mercado.

(Powell, 2010), so concepts of population growth, competition, and sustainable harvest are familiar. Governments, agencies, NGOs, and universities have a critical role to provide for education of landowners (Swift et al., 2001). Training needs may be significant, which will result in costs to the agencies or NGOs.

Ecological challenges to private lands conservation

Swift et al. (2001) suggested that there are implicit ecological challenges to addressing conservation concerns on private lands: (1) size limitations of private property, (2) *ad hoc* locations of reserves in relation to priority conservation areas, and (3) the need for long–term sustainability of a conservation system (table 2).

Property size limitations

Conservation of biodiversity necessitates a diverse set of habitats (Toombs et al., 2010). The potential heterogeneity of habitats on a parcel of land increases with the size of the property. Farm– or ranch–level heterogeneity can be expected to be lower than landscape–level heterogeneity, because of farm– and ranch–level management decisions (*e.g.,* type of grazing system or crop selection). As such, it would be rare for a single property to provide the diverse array of habitats needed for the conservation of a diverse community. So, biologists must engage with multiple landowners across the landscape to achieve most conservation goals in traditional incentive programs (table 2).

Second, the annual home range of most species of wildlife goes beyond the borders of a single property (*e.g.*, sage grouse [*Centrocercus urophasianus*] mean annual movements: 11.3 km: Connelly et al., 1988; typical movements of > 10 km for white–tailed deer [*Odocoileus virginianus*] and mule deer [*Odocoileus hemionus*]: Frost et al., 2009). A landowner's efforts to support the breeding needs of a deer population, for example, could be thwarted by a neighboring landowner's overharvest during the fall. Efficient and effective use of conservation funds necessitates that the scale of animal movements be contained within the scale of conservation efforts (Scott et al., 1999).

Last, private reserves that use iconic species for hunting or non–consumptive income face the challenge that many of these species occur at relatively low densities (Freese, 1998). Sustainable trophy harvest of white–tailed deer (*Odocoileus virginianus*), for example, requires that hunters follow a strategy for take that allows deer to grow older and reach trophy status, as judged by antler size (Jenks et al., 2002). A single landowner, by the merits of the number of trophy deer required for profitable operation (one multi–day hunt for a trophy deer, including meals, guiding, and lodging may be approximately US$5,000), would have to own thousands of acres to engage in a sustainable venture.

Table 2. Comparison of selected incentive programs for conservation on private lands, with respect to common ecological challenges after Swift et al. (2001). Programs are categorized with regard to the source of the motivation to meet the challenge: Landowner. Challenge overcome through internal landowner motivations; Public assistance. Challenge overcome through external motivations from government or NGOs; No. Challenge not likely to be overcome; [a] Challenge met only with considerable effort to target several neighbors; [b] Challenge met only through efforts to provide higher incentive to landowners in a selected watershed or region.

Tabla 2. Comparación de los programas de incentivación para la conservación de los terrenos privados, con respecto a los desafíos ecológicos comunes según Swift et al. (2001). Los programas están clasificados según la motivación para enfrentarse al desafío: Landlowner. Propietario, enfrentarse al desafío por las motivaciones internas del propietario; Public Assistance. Asistencia pública, enfrentarse al desafío por motivaciones externas del gobierno o las ONGs; No. No es probable que se enfrente al desafío; [a] Desafío encarado únicamente con considerable esfuerzo para incluir a varios vecinos. [b] Desafío encarado únicamente a través de los esfuerzos para proporcionar mayores incentivos a los propietarios de la tierra en una región o cuenca hidrológica determinada.

	Ecological challenge		
Incentive	Limited size	Protects priority location	Long–term sustainability
Agriculture subsidies	Public assistance [a]	Public assistance [b]	No
Tax incentives	Public assistance [a]	Public assistance [b]	No
Conservation easements	Public assistance [a]	Public assistance [b]	Landowner
Private reserve: single owner	No	No	Landowner
Private reserve: common–interest community	Landowner	No	Landowner

Ad hoc location of private lands

Conservation biologists often identify 'gaps' in the landscape that are not protected by public reserves, yet are critical to a species of conservation concern (Scott et al., 1993). Private reserves have the potential to fill such gaps, but not all private properties are positioned to connect corridors or create buffers around public areas (Swift et al., 2001) and thus complete a conservation strategy. Regardless of the tool used to provide incentive for conservation, this challenge will continue to require wildlife biologists to prioritize the geographic scope of their efforts on private lands (table 2).

The need for long–term protection

Conservation strategies should be aimed to increase resilience. Humans have reduced the resilience of agroecosystems by removing diversity and altering disturbance regimes. As altered systems, they may be more vulnerable to perturbation, and may quickly shift from a desired to less desired state (Folke et al., 2004). The perturbation may be ecological in nature (*e.g.*, drought), but also political, social, or economic.

The conservation incentives offered by agriculture subsidies, while affecting dramatic acreage of land (Barbarika, 2009), are not resilient to economic fluctuations. Grain prices (*e.g.,* maize; fig. 3) are highly unpredictable from year, which creates instability for long–term conservation because tradeoffs between subsidy payments and potential income from crop production are in constant flux. The benefits of local conservation efforts (*e.g.,* Negus et al., 2010; Matthews, 2009) can disappear when incentives become less attractive than another investment option (fig. 4). Of the incentives traditionally used by private lands biologists, only conservation easements allow for long–term landscape transformation with the assumption that enabling legislation is not withdrawn. In contrast, owners of single– and multiple–owner private reserves have internal incentives to be successful over long periods of time, because of their personal investments in their ventures (table 2).

Common interest communities

Potential

Private landowners who are interested in innovative, entrepreneurial conservation efforts will often have a need to work beyond the property limits of their land. Schutz (2010) suggested that common–interest communities may be a viable means of distributing benefits from nature–based entrepreneurial efforts on landscapes. A common–interest community is defined as an association of willing participants who accept

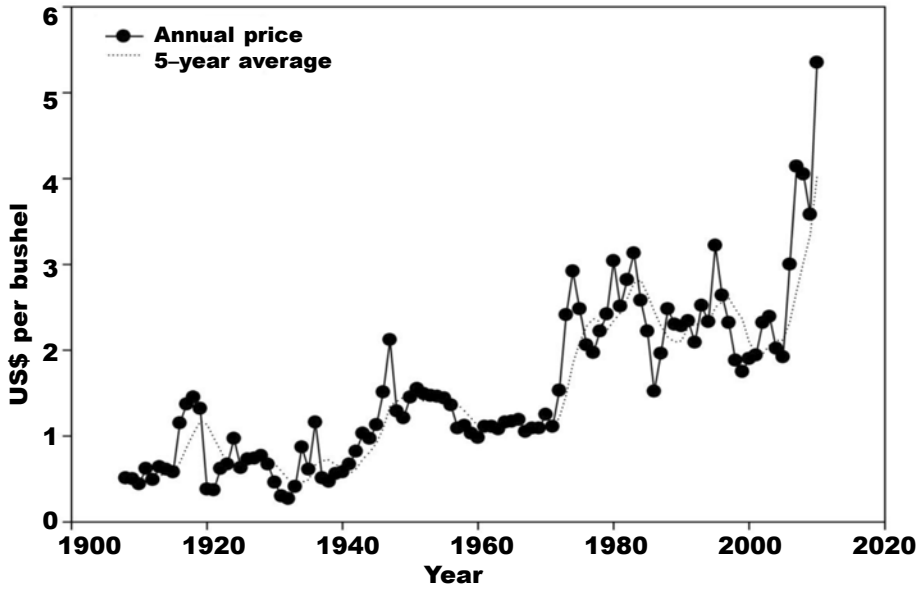


Fig. 3. Annual market price paid for corn (US$ per bushel) in Nebraska, USA during 1908–2011. The 5–year moving average is shown as a dotted line (data from the National Agricultural Statistics Service, USDA).

Fig. 3. Precio de mercado pagado anualmente por el maíz (US$ por cada 52 libras) en Nebraska, USA, durante el periodo 1908–2011. La línea de puntos muestra el promedio de la variación (datos del Servicio Estadístico Nacional de Agricultura, USDA).

rights and duties that are inherent in title to their real estate (Schutz, 2010). A common example is a homeowners' association found in urban development.

Schutz (2010) argues that the common–interest community model could easily be extended to include private lands for the benefit of wildlife populations. Owners of a parcel of land within a present–day lake association, for example, are obligated to engage in and/or refrain from certain uses of their land. The association might hold a lake as association property for the benefit of the owners in common. Management of the fishery is an example of services performed by the association for its members, who may be regulated on the type of dock or boat housing they may construct with an eye toward holding property values at high levels for all members (Korth & Klessig, 1990). Another form of common–interest community is a timber cooperative (Barten, 2001). Small, private landowners form agreements to market timber as an association to derive higher prices. The land remains in private ownership, but decisions on timber harvest are made as a group. As forest management is an indirect form of wildlife management, timber cooperatives are well–suited to develop additional income streams such as hunt leases or hiking retreats.

It is easy to imagine the formation of a common–interest community by neighboring farmers or ranchers. Such arrangements between neighbors can provide participants with geographically larger operations and greater economic return without purchasing more land, while also providing the legal framework in which to make joint decisions and to distribute costs and income among the participants. As such, common–interest communities would be well–suited to be used by private landowners with interests in creating a private reserve to support nature–based, entrepreneurial ventures.

Benefits of scale for wildlife

The formation of a common–interest community among neighbors results in the joint management of parcels of land. The co–managed landscape could be suitable for effective management of wildlife. This larger landscape under management allows structural heterogeneity of habitat to be established at multiple scales (Toombs et al., 2010), which further support diverse communities and protect rare species (Naidoo et al., 2011). In contrast, subsidy programs, tax incentives, conservation easements, and single–owner private reserves cannot, *per se*, provide the scale needed for conservation (table 2).

Large, co–managed properties allow the establishment of 'zones' for management. Zones might be constructed around habitat types. Larger reserves allow more zones for different activities; more habitat zones should also result in more species of wildlife (Toombs et al., 2010), facilitating diverse use by tourists and increasing economic return (Naidoo et al., 2011).

Zonation can also be used to set aside portions of the reserve for specific uses. For example, four

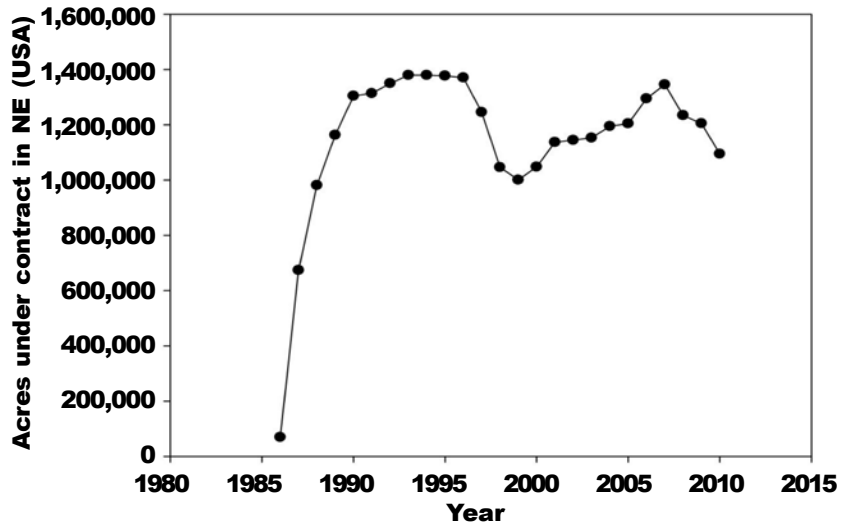


Fig. 4. Area of private land under contract in the Conservation Reserve Program (Farm Bill) in Nebraska, USA during 1986–2010. The initial year for the program was 1986 (data from the National Agricultural Statistics Service, USDA).

Fig. 4. Área de terrenos privados bajo contrato del Programa de Conservación de Reservas (Conservation Reserve Program, Farm Bill) en Nebraska, USA, durante el periodo 1986–2010. El año de inicio del programa fue 1986 (datos del Servicio Estadístico Nacional de Agricultura, USDA).

neighboring ranches in the Great Plains of the US may each support populations of greater prairie–chickens (*Tympanuchus cupido*) on grazing lands for cattle (fig. 5A). If the ranchers are individually approached by a company offering to lease lands for wind energy platforms, each rancher might want to maximize the number of turbines on their property because of direct competition with neighbors for a limited number of leases. Each ranch, then, would potentially be host to wind power (fig. 5B), and planning for siting would be conducted on a ranch–by–ranch basis. Some evidence suggests that prairie–chickens avoid large structures on the landscape (Hagen et al., 2011; Pruett et al., 2009), so it is possible that wind development on the four ranches could cause a decline in space available for prairie–chickens (fig. 5B). In addition, the access roads required for the wind development could also reduce the grazing capacity on each ranch. An alternative scenario would be for the four ranches to form a common–interest community with the purpose to provide more effective planning and profit–base from wind energy, wildlife–based enterprises, and cattle. The results of a joint effort to find the most appropriate location for wind energy could allow the concentration of wind platforms on one section of the association's lands, which would leave the majority of the prairie–chickens on the lands unaffected by foreign structures. The ranch might be able to develop a rotational grazing schedule that could allow them to maintain stocking levels, across all ranches, close to the pre–association levels (fig. 5C).

Benefits of scale to investors

Private reserves will survive as long as private landowners can maintain economic benefits. As investments, conservation done in this manner has the potential to pay for itself, but this demands that landowners have the training and education needed to make good decisions.

Marketing strategies for ecotourism can be conducted more effectively and efficiently on behalf of a set of landowners with a large land base than for a single, smaller property (Powell, 2010). If separate landowners are competing for limited tourists, each must produce marketing materials, maintain web sites, attend expositions, and provide staff to make reservations. An association of landowners can reduce these costs by cooperating. With a more diverse landscape (a better product) to market, an association may also realize more income (Naidoo et al., 2011).

Last, landowners may also find NGOs and management agencies willing to provide more time and expertise to facilitate management plans, given the history of decisions of the landowner group (Powell, 2010). The association offers the advantage of a single contact point, and a mechanism to develop one management plan that impacts multiple farms or ranches.

Case studies

Conservation through common interest communities on private reserves is a model that should be consi-

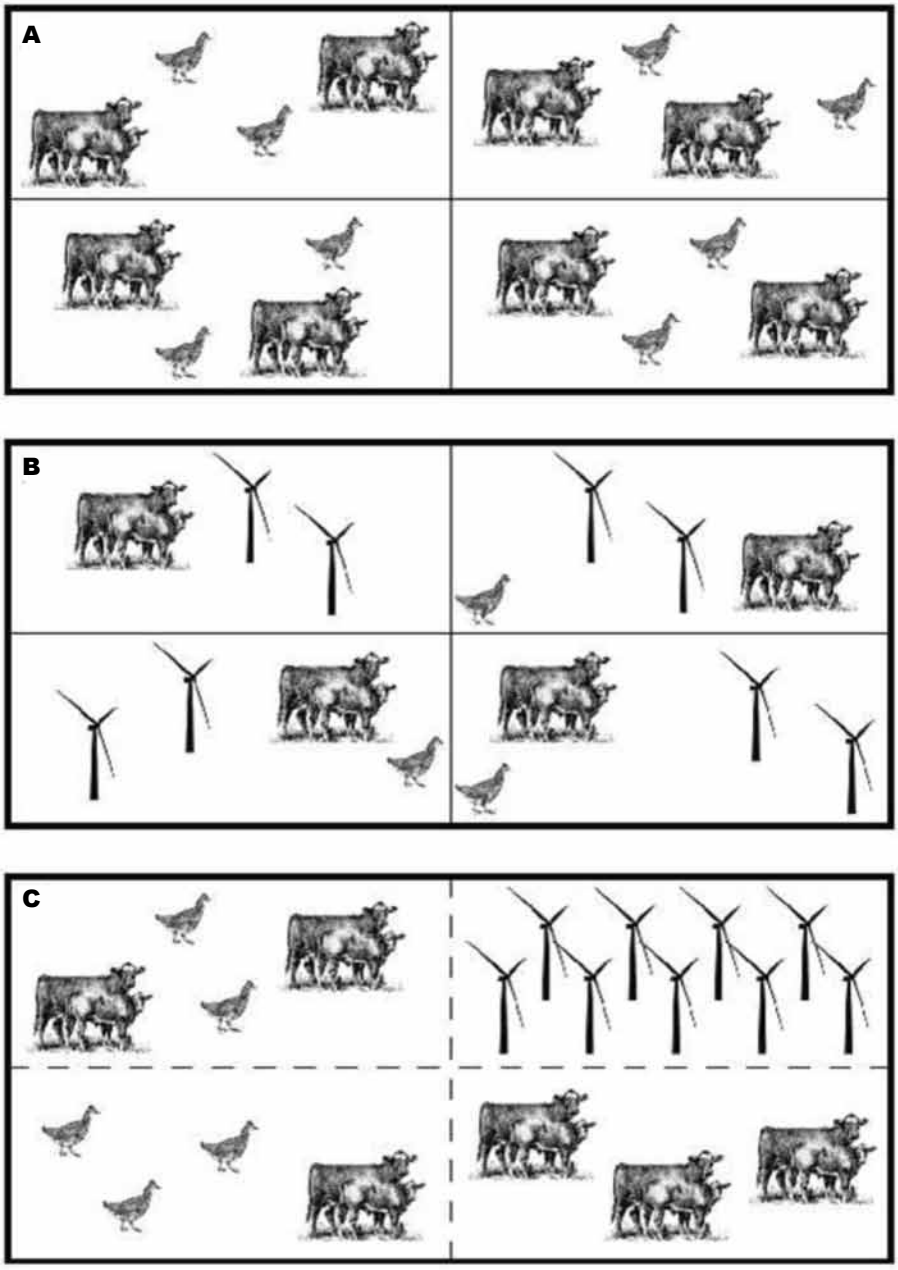


Fig. 5. Depictions of the distribution of potential sources of revenue on four ranches in the Nebraska Sandhills region: A. *Status quo*, with cattle grazing and greater prairie–chicken populations on each of the ranches; B. Introduction of wind energy development on the four competing ranches; livestock stocking is potentially reduced, and prairie–chickens could be relegated to areas away from turbines (see text); C. Distribution of elements in B, but in the context of a common–interest community that optimizes wind energy development and cattle grazing, which allows for maintenance of prairie–chicken populations. Dotted lines show property boundaries, but allow flow of income and expenses among ranches.

Fig. 5. Descripciones de la distribución de las fuentes potenciales de ingresos de cuatro ranchos en la región de Nabraska Sandhills: A. Status quo*, con ganado pastoreando y poblaciones de gallos de las praderas grandes en cada uno de los ranchos; B. Introducción de instalaciones de energía eólica en los cuatro ranchos; se observa una reducción potencial del ganado, y los gallos de las praderas podrían quedar relegados a zonas lejanas a las turbinas (véase el texto); C. Distribución de los elementos en B, pero en el contexto de una comunidad de intereses comunes que optimice el desarrollo de la energía eólica y el pastoreo del ganado, lo que permite el mantenimiento de las poblaciones de gallos de las praderas. Las líneas de puntos son los límites de las propiedades, pero permiten el flujo de entradas y salidas entre los ranchos.*

dered, especially when ecotourism efforts can result in meeting biodiversity or population goals for species of interest (Naidoo et al., 2011). Ecotourism is built on the notion that value can be realized from wildlife and landscapes (Freese, 1998). The following case studies support the theory that conservation can be achieved through the motivations of individual landowners, when the appropriate structure is in place to empower them. Other examples of common interest communities exist throughout the world, especially in Australia, western North America, and central and southern Africa (Schutz, 2010); these two case studies provide details for contrasting examples on two continents.

Freehold conservancies in Namibia

An example of a landscape–scale management system can be found in the grasslands and shrublands of Namibia, in southern Africa, where cattle farmers have joined together to form *conservancies*. Before conservancies were established, many farmers built 2–m game fences to restrict the flow of large, game animals. Conservancies provided a mechanism for neighbors to benefit from an integrated landscape (Shaw & Marker, 2011). Namibian landowners form agreements with neighbors about consumptive use limits, habitat management, water management, and ecotourism development. Namibian conservancies have from 5 to 58 farms and range from 75,650 to 500,000 ha; size is generally limited, socially, by distances that neighbors are comfortable driving for meetings (Powell, 2010).

Namibia is now home to 23 private conservancies, which are registered with the Ministry of Environment and Tourism. Each conservancy must have a constitution, which defines the relationship among its members and outlines its initial management plan. Conservancies may negotiate with the Ministry to become exempt from typical game permits and use restrictions (Shaw & Marker, 2011). Most conservancies charge member fees to support basic operation or conservation efforts, either on a per hectare or per member basis (Powell, 2010).

Namibia's conservancies each have a distinct flavor because of the heritage of their members and the landscapes in which they exist. Wildlife conservation and poaching protection are primary goals, which contribute to conservation efforts. But, members also list social networking as a goal, which indicates the importance of communication and trust between members. Last, and perhaps realistically, a goal of conservancies is profit. Powell (2010) quoted one conservancy officer, reflecting on their membership: 'In their eyes, the conservancy will only be valuable for them if the conservancy can increase their profit.'

Namibia's conservancies also exist across a gradient from arid to semi–arid to more mesic conditions. As the land becomes more productive (better soils, more precipitation), tradeoffs occur in profitability of potential ventures (fig. 5C; Brown, pers. comm., Namibian Nature Foundation). Wildlife in Namibia are uniquely adapted to more arid zones (relative to domestic animals), and tend to be preferred as an investment in that environment; some landowners in arid regions of Namibia have removed all livestock from their farms in favor of 'farming with wildlife.' However, in more productive zones, cattle co–exist with wildlife, because of the economic return that is available from livestock (fig. 2; Powell, 2010). Such a gradient creates contrasting landscapes in which for biologists to engage landowners; namely, private reserves and other conservation efforts may be easier to develop in regions with less productive lands (fig. 2). Row crops are not common in Namibia, but biologists in regions that can support row crops will encounter a situation in which the conservation trade–offs are further complicated by the high potential for return from production agriculture. Biologists are very aware of the geographic location of thresholds at which grazing becomes feasible (fig. 2A) and at which row–crop agriculture becomes more profitable than grazing (fig. 2B).

Greater Gracie Creek Landscape

An example of the emerging nature–based entrepreneurship on private reserves can be found near on a 4,800–ha ranch near Burwell, Nebraska, USA. In 2001, the younger generation of the Switzer family voiced an interest to return to the family's cattle ranch, yet economic reality demonstrated that such a decision was impossible without additional ventures. The family began to diversify their cattle ranch by building a lodge and offering bird watching, boating, guided hunting, and horseback riding. The family found economic value in the leks (breeding grounds) of sharp–tailed grouse (*Tympanuchus phasianellus*) and greater prairie–chickens, which they now share with their visitors during March and April each spring. The family business, Calamus Outfitters, provided initial opportunities for the second generation to live on the ranch, but the venture's success was limited by the size of the ranch (Sortum, 2011).

Recently, the Switzers joined with two neighboring ranches to form general agreements regarding access and use. The three ranches, as newly branded Greater Gracie Creek Landscape, have become the first private land area in Nebraska to be designated an Important Bird Area by the Audubon Society. The joint group also allows the Switzer's to market their neighbors' special beef, known as Morgan Ranch American Wagyu Kobe (Sortum, 2011). To date, the agreement between the Switzers and their neighbors has not officially reached the level of a legal association described as the common–interest community (Schutz, 2010), but those discussions continue.

The Switzers have become known as advocates for grassland conservation in the region, and will soon host the first annual Prairie Chicken Festival to showcase educational and recreational activities on their ranch. Regardless of their fondness for conservation, the reality of private lands conservation is expressed in their statement: 'If it pays, it stays'.

Conclusion

Common–interest communities, such as Namibia's conservancies and the fledgling associated ranches in Nebraska, can provide incentive and scale for effective wildlife management. Private lands biologists should consider the potential for private investment to fuel conservation efforts that can be long–lasting and robust to changing economic and political environments.

Management agencies and NGOs must train biologists to facilitate multi–owner groups to promote cross–property agreements for private reserves. The legal means to such ends will vary around the globe; in the US, the simple agreement used to form common–interest communities such as housing and lake associations can be applied in rural settings (Schutz, 2010).

The toolbox available to private lands biologists will continue to include, in some form, agriculture subsidies, tax incentives, and conservation easements. But, it is time to embrace opportunities that exist on private reserves. Coordinating and facilitating the development of private reserves in the context of a common–interest community is not easy, as it involves managing people (Powell, 2010). But, Knight (1999) argued that the easy steps in conservation have been taken, and the future will involve many tough conversations and investments of time and energy to make advances in conservation on private properties.

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