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Source: Ornithological Applications, 124(4) : 1-9

Published By: American Ornithological Society

URL: <https://doi.org/10.1093/ornithapp/duac035>

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PERSPECTIVE

Six principles for working effectively with landowners to advance bird conservation

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Submission Date: May 20, 2022 Editorial Acceptance Date: September 16, 2022 Published September 29, 2022

ABSTRACT

Private land management is an essential component of bird conservation. How private landowners manage their farms, rangelands, forests, and yards, influences the resources and hazards birds encounter, with associated impacts on bird abundance. We describe 6 principles, based on recent research, that conservation practitioners should incorporate into their bird conservation efforts with landowners: (1) use social and natural science and stakeholder input to decide how and where to work; (2) tailor strategies to local ecological and social conditions; (3) build relationships and support landowner interests; (4) reduce barriers to participation; (5) offer a menu of options to support landowner conservation behavior; and (6) promote persistence of landowner conservation behavior. These principles emphasize the importance of recognizing the considerations of landowners, customizing interventions to local conditions, and making interventions as easy to implement as possible. Developing relationships with landowners, along with a diverse menu of conservation interventions, takes time and effort but should improve both the uptake and persistence of conservation practices on private lands.

Keywords: bird conservation, conservation interventions, conservation social science, land management, private lands

LAY SUMMARY

- Slowing and potentially reversing bird declines requires that as many landowners as possible employ conservation-minded land management.
- We describe 6 principles that conservation practitioners should incorporate into their bird conservation efforts with landowners, based on recent research in both the social and natural sciences.
- The principles emphasize recognizing the interests of landowners, tailoring interventions to local conditions, and making interventions as easy to implement as possible.
- Greater integration of social and natural science knowledge in the planning and delivery of conservation programs with landowners should improve conservation outcomes although evaluation of such programs is needed.

Seis principios para trabajar eficazmente con propietarios de tierras para promover la conservación de las aves

RESUMEN

La gestión de tierras privadas es un componente esencial de la conservación de las aves. La forma en que los propietarios privados manejan sus haciendas, pastizales, bosques y jardines influye en los recursos y peligros que enfrentan las aves, con impactos asociados en la abundancia de aves. Describimos 6 principios, basados en investigaciones recientes, que los profesionales de la conservación deberían incorporar en sus esfuerzos de conservación de aves con los propietarios de tierras: (1) utilizar las ciencias sociales y naturales y los aportes de las partes interesadas para decidir cómo y dónde trabajar; (2) adaptar las estrategias a las condiciones ecológicas y sociales locales; (3) construir relaciones y apoyar los intereses de los propietarios; (4) reducir las barreras a la participación; (5) ofrecer un menú de opciones para apoyar el comportamiento conservacionista de los propietarios; y (6) promover la persistencia del comportamiento conservacionista de los propietarios. Estos principios enfatizan la importancia de reconocer las consideraciones de los propietarios de tierras, adaptar las intervenciones a las condiciones locales y hacer que las intervenciones sean lo más fáciles posible de implementar. Desarrollar relaciones con los propietarios de tierras, junto con un menú diverso de intervenciones de conservación, requiere tiempo y esfuerzo, pero debería mejorar tanto la aceptación como la persistencia de las prácticas de conservación en tierras privadas.

Palabras clave: ciencia social de la conservación, conservación de aves, intervenciones de conservación, manejo de tierras, tierras privadas

INTRODUCTION

The loss of three billion birds in North America since 1970 (Rosenberg et al. 2019), documented declines elsewhere (e.g., Thiollay 2006; Inger et al. 2015), and associated reductions in ecological function and ecosystem services (e.g., Şekercioglu et al. 2004; Harrison et al. 2013; Gaston et al. 2018) have prompted great urgency in addressing these losses. Humans have roles in both causing and potentially reversing negative bird population trends.

Approximately 61% of the land in the U.S. is in private hands (U.S. Geological Survey 2016) with public and tribal land comprising the rest. Over 55% of Mexico's land is owned by community collectives and private individuals (Landlinks 2017). In Canada, ~10% is privately owned (WorldAtlas 2019). Bird habitat in some regions is even more prevalent on private lands than public lands, including >80% of bird habitat in eastern North American forests, coasts and grasslands (North American Bird Conservation Initiative 2013). Private lands are particularly important in the conservation of biodiversity given that they are often more biologically productive than public lands; less productive and less species-rich areas are overrepresented in public lands set aside for conservation (Scott et al. 2001; Pimm et al. 2018; Robinson et al. 2019). Thus, how private landowners manage their properties influences the resources and hazards birds encounter, with associated impacts on demographic variables including abundance (e.g., Narango et al. 2018; Winder et al. 2018; Davis et al. 2020; Muñoz and Miller 2020). Conservation strategies that thoughtfully engage people who can advance bird conservation through decisions about their private lands are vital (e.g., Dayer et al. 2018).

This perspective highlights what we know from social and natural science research about how to improve uptake and, potentially, outcomes of bird conservation interventions through decision-making by landowners. We define conservation interventions as market-based or voluntary approaches to encourage people to contribute to addressing a public problem, such as habitat loss (Dayer et al. 2014). Regulations can contribute to long-term conservation success (Blomberg et al. 2022), but they can also lead to conflict over conservation (see Smith et al. 2018 for alternatives to regulations). Here, we focus on voluntary decision-making about land that can potentially improve bird conservation outcomes over a shorter time scale than is needed for policy or other structural changes. Our audience is bird conservation practitioners and others, like researchers, private lands biologists, and extension agents, whose work involves investigating or implementing conservation and management practices on private lands. Our objective is to provide a snapshot of the current state of social and natural science knowledge to increase the likelihood that conservation projects on private lands succeed.

We do not provide a comprehensive review but instead describe findings from recent studies that point to general principles we believe are particularly important. Our emphasis is on social and natural science integration because we firmly believe that together these disciplines can achieve solutions for bird conservation challenges.

PRINCIPLES FOR WORKING WITH PRIVATE LANDOWNERS

Recent research indicates that conservation practitioners should incorporate the following principles into bird conservation planning with landowners (Figure 1):

- (1) Use social and natural science and stakeholder input to decide how and where to work.
- (2) Tailor strategies to local ecological and social conditions.
- (3) Build relationships and support landowner interests.
- (4) Reduce barriers to participation.
- (5) Offer a menu of options to support landowner conservation behavior.
- (6) Promote persistence of landowner conservation behavior.

Use Social and Natural Science and Stakeholder Input to Decide How and Where to Work

Simple recommendations to prohibit, for example, agricultural intensification across wide areas to improve bird habitat (e.g., Palacín and Alonso 2018), are likely to be ignored. Reversing, or at least slowing, bird declines requires well-conceived strategies, implementation, and follow-up with integration of both social and natural science considerations. Social scientists are often brought in too late (Lischka et al. 2018), to help in marketing or evaluating a conservation effort (Fox et al. 2006), rather than meaningfully engaged from the start of a project. Social scientists can contribute to all stages of a conservation project: defining the problem and team members, finalizing goals and objectives, identifying conservation strategies, and evaluating success (Niemic et al. 2021). Social scientists can help identify stakeholders or rightsholders who should be involved, and facilitate a co-production approach, where those who create and use the science work together from problem definition to implementation (Dayer et al. 2020; Naugle et al. 2020).

Recent social science studies have identified factors that motivate landowners to engage in bird conservation projects (e.g., Ramsdell et al. 2016; Byerly et al. 2019), investigated how perceptions of birds by urban homeowners influence their backyard vegetation (Belaire et al. 2016), estimated economic benefits for fruit producers providing nest boxes for raptors in Michigan (Shave et al. 2018), and

Principles for working effectively with landowners

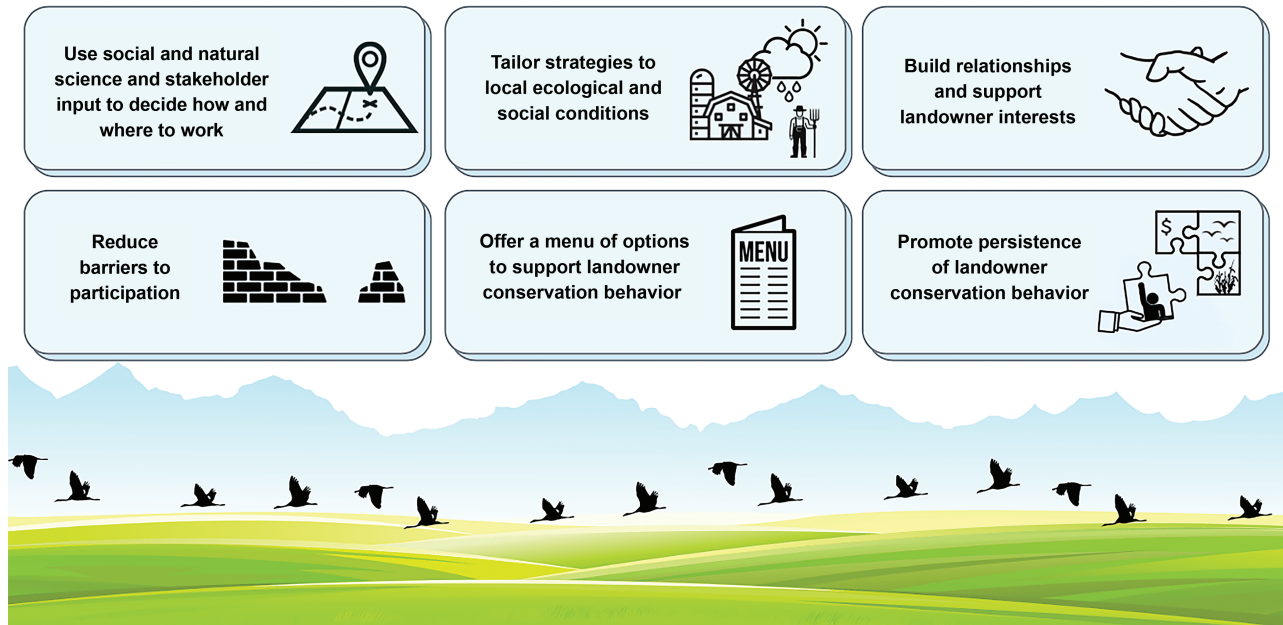


FIGURE 1. Recent research suggests that employing these principles when working with landowners should increase the likelihood of lasting landowner involvement in conservation programs and successful conservation outcomes.

identified factors that improve learning for collaborative groups of rice farmers and bird conservationists (Hardie Hale et al. 2022). The information generated by these types of projects, when integrated with natural science data, should increase the likelihood of success in future bird conservation projects on private lands.

Tailor Strategies to Local Ecological and Social Conditions

Community-based conservation projects are more likely to succeed the more closely they match local contexts, socially and ecologically (Perlut et al. 2011; Brooks et al. 2012). Tailoring strategies is challenging because it requires locale-specific social and ecological information about the optimal conservation strategies. However, when strategies are a good fit for local conditions, residents are more likely to participate and the conservation strategies are more likely to be effective. For example, optimal conservation strategies can vary geographically. A program in Vermont, USA, prescribed a delayed second hay harvest date for farmers. The delayed second harvest resulted in hay with a somewhat reduced nutritional content (for cattle) compared to the hay from the typical harvest date but dramatically increased grassland bird reproductive success. The farmers received what they felt was a fair financial incentive that covered the reduced nutritional content and met their production objectives (Perlut et al. 2011). However, the same harvest schedule in Ontario, Canada did not show

the same benefits for birds (Diemer and Nocera 2016). A proposed alternative conservation strategy for Ontario was to delay first harvest for several weeks. The investigators showed that hay harvested on the delayed scheduled had only small reductions in crude protein, an essential component of the cattle diet (Brown and Nocera 2017). Thus, farmers could potentially delay harvest and help birds substantially while incurring only a small cost in hay protein. Different areas call for different strategies.

As a second example, nest box programs to increase the presence of predatory American Kestrels (*Falco sparverius*) in fruit orchards to help deter fruit-eating birds have shown contrasting results. Kestrel nest boxes installed in sweet cherry orchards in northern Michigan showed high kestrel occupancy rates and kestrels reduced fruit-eating bird abundance while boxes in western Michigan blueberry fields had lower kestrel occupancy rates and were regularly used by non-native, fruit-eating European Starlings (*Sturnus vulgaris*) (Shave and Lindell 2017; Shave et al. 2018; Brady 2022). In addition, fruit-eating bird abundance was not lower in blueberry fields with kestrels compared to fields without kestrels (Brady 2022). Thus, western Michigan blueberry farmers would need to invest more time and management to remove starling nests and maintain the boxes for kestrels, which do not appear to provide the same pest bird deterrence in blueberry fields as in cherry orchards. These studies indicate that benefits to farmers in northern Michigan of installing and maintaining kestrel boxes are greater, and costs are lower, than to farmers in western Michigan.

Research to discover local conditions, including costs and benefits of conservation strategies to stakeholders and to target species, requires additional resources, as does building the capacity to provide locale-specific information to landowners and land managers. However, without consideration of local context, landowners are less likely to be active partners in conservation strategies.

Emphasize Relationship Building and Supporting Landowner Interests

Creating landscapes favorable to birds requires building and maintaining relationships with landowners (Hilty and Merenlender 2003; Saunders et al. 2021). Landowners who trust those offering conservation projects and programs are more likely to sign up (Lubell et al. 2013). Trust can be developed by listening to landowners about their needs and interests and through such approaches as landowner listening sessions (Sketch et al. 2020) or more informally through one-on-one interactions (Lutter et al. 2018). Such efforts take time, but landowners are also contributing their time in providing input, considering whether to sign up, allowing access to their land, and/or participating in a conservation project or program. Many conservation practitioners also have benefitted from the practical help landowners provide like pulling project trucks out of the mud or providing introductions to neighbors who participate in programs.

Reduce Barriers to Participation

Making participation as easy as possible increases conservation-related behavior (Byerly et al. 2018). Barriers to participation can include lack of time, funds, or information (e.g., Romero-de-Diego et al. 2021). For example, results from a survey of urban residents in the UK showed that the majority did not feel that they had enough information about practices that would attract birds to their properties like providing fruit-bearing plants, bird baths, and maintaining some uncultivated parts of the yard (Goddard et al. 2013). Similarly, forest landowners in New York State, U.S. reported that they would increase their early successional forest habitat management if provided with learning tools (e.g., advice, learning about benefits for wildlife) more so than basic needs tools (e.g., financial assistance, labor; Dayer et al. 2014). Other research into the adoption of farm conservation practices has similarly highlighted the need for information to facilitate implementation (e.g., Penvern et al. 2019; Park et al. 2020). A study of Michigan fruit growers indicated that a management practice may be more likely to be adopted when the timing does not interfere with other farm management tasks (Bardenhagen et al. 2020). Given that installation and maintenance of predatory bird nest boxes can be done in the off-season, it fits into the management calendar for many farmers.

Additionally, farmers who had previously adopted some conservation practices were more likely to adopt practices again or complementary practices (Prokopy et al. 2019); complementary, “bundled” conservation practices may thus be adopted more quickly (Canales et al. 2020). Providing farmers with the information and resources they need for bundled bird conservation practices that could take place during the off-season, for example, restoring ponds, increasing hedgerows, building deer fences, and removing invasive plant species, could facilitate adoption of these practices (Lewis-Phillips et al. 2020).

Offer a Menu of Options to Support Landowner Conservation Behavior

Monetary incentives like cost-share payments, rental payments, reduced taxes, and tradable development rights can encourage pro-environmental behaviors (Grilli and Curtis 2021). For example, incentives were a critical piece of improving rice farms for shorebirds during the post-harvest period in California. Farmers bid to take part in the program and farms were selected based on the predicted habitat value that would accrue per dollar invested (Golet et al. 2018). The selected farms where farmers flooded their rice fields during fallow and post-harvest periods had significantly greater density and diversity of shorebirds compared to control fields (Golet et al. 2018). Financial incentives also facilitated farmer participation in a schedule of hay harvest to improve grassland bird survival in Vermont (Perlut et al. 2011); a lack of incentives was suggested to be a potential stumbling block for Ontario farmers to adopt a bird-friendly hay harvest schedule (Diemer and Nocera 2016). However, research suggests that it is important to carefully design financial incentive programs so that they do not crowd out intrinsic motivations for participation in conservation activities (Rode et al. 2015).

Some landowners are not interested in financial rewards or such rewards may be only one motivating factor of several that may include educational programs, technical assistance, and/or recognition (e.g., Daley et al. 2004; Dayer et al. 2014). Landowners have different levels of experience with conservation interventions and different ownership objectives (Dayer et al. 2014; Danley 2019). Thus, an array of interventions should be considered and tailored to the landowners and contexts.

Promote Persistence of Landowner Conservation Behavior

Programs like the Conservation Reserve Program, and the Conservation Reserve Enhancement Program in particular states in the U.S., increase populations of grassland birds (e.g., Yeiser et al. 2018; Pavlacky et al. 2021). Thus, strategies to help landowners maintain the practices of these programs after their contracts end will be beneficial to

bird conservation. A meta-analysis of conservation behaviors outside the private lands arena showed positive and continuing effects of incentives on pro-environmental behaviors even after the incentives were stopped (Maki et al. 2016). However, whether or not landowners continue the practices of such programs after incentives end will vary with the program, the practices (Jackson-Smith et al. 2010) and the motivations of the landowners (Lutter et al. 2019). For example, landowners in conservation programs that require repeated treatments to the land may be less likely to continue these practices after the program ends than landowners in programs requiring a one-time change like a switch to a new land-cover type that requires minimal maintenance after the switch (e.g., Jackson-Smith et al. 2010; Hayes 2012).

Nearly half of landowners involved in young-forest conservation programs that benefit Golden-winged Warblers (*Vermivora chrysoptera*) and American Woodcocks (*Scolopax minor*) intended to continue to manage for young forest even after their contracts ended and cost-share was not available (Lutter et al. 2019). Landowners motivated by environmental concerns and less by cost-share concerns were more likely to state they would continue young-forest management beyond the end of their contracts. Also, clubs, associations, and other group landowners were more likely than family landowners to state they would persist in young-forest management after contracts ended (Lutter et al. 2019). In the Great Plains, landowners in the Conservation Reserve Program were often interested in re-enrolling in the program or transitioning into another conservation program after their current contract ended. However, sometimes they could not because of different criteria than when they first enrolled or competition from other landowners for slots (Barnes et al. 2019; Barnes et al. 2020). Thus, current work indicates that landowners with more resources and stronger environmental motivations are more likely to persist in the maintenance of bird-friendly habitat through conservation programs. The work further suggests that persistence of conservation practices will be more likely if practices are easy to implement and maintain and if it is easy for landowners to re-enroll in current programs or transition to other programs. Thus, determining how to promote lasting conservation for landowners with limited resources is a critical research need (Dayer et al. 2018).

Educational Activities and Other Assumptions: A Caveat

Education and awareness activities are usually the easiest and least costly to implement which probably explains why they are the most popular behavior change conservation interventions (Grilli and Curtis 2021). However, in a review

of the types of activities that encourage pro-environmental behaviors, education, and awareness activities were less successful at changing behaviors than incentives, nudges, outreach and relationship building, and social influences (Grilli and Curtis 2021). Education campaigns can be helpful when they are part of a multi-faceted, integrated conservation strategy. For example, the threatened Yellow-shouldered Amazon Parrot (*Amazona barbadensis*) experienced a large population increase on the island of Bonaire in the Caribbean from 1998 to 2018. Using surveys of stakeholders, Salazar et al. (2019) concluded that the increase resulted from the combined effects of a social marketing campaign, environmental education in schools, and enforcement of laws related to illegally keeping parrots. Additionally, education campaigns can be helpful when they build on individuals' attitudes, values, and other skills. For example, in one survey of urban residents, a majority stated that their gardening activities were influenced by neighborhood standards. The investigators suggested that these findings could be used to encourage wildlife-friendly gardening by empowering "local champions," residents who engaged in wildlife-friendly gardening and could inspire and provide information to fellow residents (Goddard et al. 2013).

Other recent work in the behavioral sciences is similarly building knowledge and challenging assumptions about how people make decisions related to conservation. For example, in contrast to expectations, maple sugar producers in Vermont who received information that other producers were participating in a bird habitat conservation program were no more likely to request information about the program than a control group who did not receive this messaging (Byerly et al. 2019). Thus, as research accumulates, our understanding about best practices to facilitate conservation-related behavior by private landowners will continue to improve.

RECOMMENDATIONS FOR MORE SUCCESSFUL BIRD CONSERVATION ON PRIVATE LANDS IN THE FUTURE

- (1) Social and natural scientists and practitioners should work together to develop bird conservation projects on private lands. They should exchange information about the social and ecological characteristics of systems where conservation interventions are being proposed to increase the likelihood those interventions will be successful.
- (2) Bird conservation researchers and practitioners should include landowners in the articulation of conservation issues, as well as the generation of a range of conservation interventions (Saunders et al. 2021). Many minds working jointly will provide a wider range of perspectives, ideas, and potential solutions.

- (3) Bird conservation researchers and practitioners should together develop a research agenda that addresses current knowledge gaps about effective bird conservation strategies and how to work more effectively with landowners. The agenda should include development of longitudinal studies to track landowner conservation activities over time and across programs (Dayer et al. 2018).

Conclusion

Working with landowners on conservation interventions is a critical part of bird conservation efforts. The principles described above emphasize the importance of recognizing the interests of landowners, tailoring interventions to local conditions, and making interventions as easy to implement as possible. Developing relationships with landowners, along with a diverse menu of conservation interventions, takes time and effort but should improve both the uptake and persistence of conservation practices on private lands. Evaluating whether there is more success with this approach will be essential.

ACKNOWLEDGEMENTS

Thank you to Sami Livingston for the figure. Thank you to the many landowners who have shared their time, knowledge, thoughts, and properties with us over the years.

Funding statement: We are grateful to our departments and universities for administrative and logistical support.

Ethics statement: No birds were used in this study and there was no original research with human subjects.

Author contributions: C.A.Lindell and A.A. Dayer developed the ideas and wrote the paper.

Data availability: Not applicable.

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