

Incentivizing stewardship in a biodiversity hot spot: land managers in the grasslands

Raphael Anammasiya Ayambire^{a*}, Jeremy Pittman^a, and Andrea Olive^b

^aSchool of Planning, Faculty of Environment, University of Waterloo, 200 University Avenue West, Waterloo, ON N2L 3G1, Canada; ^bDepartment of Political Science and Department of Geography, Geomatics & Environment, University of Toronto Mississauga, 3359 Mississauga Road, Mississauga, ON L5L 1C6, Canada

*raayambire@uwaterloo.ca

Abstract

Federal and provincial governments of Canada recently signed onto a Pan-Canadian Approach to Transforming Species at Risk Conservation. The approach is based on collaboration among jurisdictions and stakeholders to enhance multiple species and ecosystem-based conservation in selected biodiversity hot spots. In this review paper, we focus on one of the biodiversity hot spots—the South of the Divide area in the province of Saskatchewan—to propose appropriate mechanisms to incentivize stewardship on agricultural Crown lands. Through a focused review and synthesis of empirical studies, we propose a range of policy instruments and incentives that can help deliver multi-species at risk conservation on Crown agricultural lands in Saskatchewan. We outline a range of policy instruments and incentives that are relevant to conservation on Crown agricultural lands and argue that a portfolio of options will have the greatest social acceptability. More germane is the need to foster collaboration between the government of Saskatchewan, other provincial/territorial governments, and the federal government, nongovernmental organizations, and land managers. Such collaboration is critical for enhanced decision-making and institutional change that reflects the urgent call for creating awareness of species at risk policies, building trust, and leveraging the local knowledge of land managers for conservation.

Key words: species at risk conservation, grassland ecosystems, land stewardship, incentives, policy

OPEN ACCESS

Citation: Ayambire RA, Pittman J, and Olive A. 2021. Incentivizing stewardship in a biodiversity hot spot: land managers in the grasslands. FACETS 6: 1307–1322. doi:[10.1139/facets-2020-0071](https://doi.org/10.1139/facets-2020-0071)

Handling Editor: Karen Beazley

Received: August 28, 2020

Accepted: February 25, 2021

Published: August 5, 2021

Note: This paper is part of a collection titled “Conservation in Canada: identifying and overcoming barriers”.

Copyright: © 2021 Ayambire et al. This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

Published by: Canadian Science Publishing

Introduction

In 2019, the federal government and provinces agreed to a Pan-Canadian Approach to Transforming Species at Risk Conservation in Canada. The approach, based on collaboration among jurisdictions, is a move toward multiple species and ecosystem-based conservation ([Environment and Climate Change Canada 2018](#)). A key feature of the approach is the designation of priority places for conservation. These places of “high biodiversity value” are a “distinct place with a common ecological theme [determined] by the people who live and work there.” These priority places are to serve as areas to target conservation efforts. There are 11 priority places identified nationwide.

This paper focuses on one priority place in Canada—the “South of the Divide”—a grasslands ecosystem in southwestern Saskatchewan. These grasslands are among the most imperilled ecosystems on Earth ([Henwood 2010](#); [Sweikert and Gigliotti 2019](#)). As of the year 2014, at least 23 of the listed species at risk were occurring on grasslands within the South of the Divide area, making the region one of the most important hot spots for species at risk conservation ([Environment and Climate Change](#)

Canada 2016). We recognize that there exists legislation at federal and provincial levels to guide the implementation of this new approach. However, these existing legislations require policy instruments and incentives that can enhance the delivery of multi-species at risk conservation. Therefore, our objective in this paper is to offer a range of policy instruments for the delivery of multi-species at risk conservation on Crown agricultural lands in Saskatchewan. We use Crown agricultural lands in this paper to mean agricultural lands that are publicly owned by the province but leased to individuals, cooperatives, or corporations. We begin with a short literature review that explores all empirical research on land stewardship from the region. The review generally focuses on case studies of land managers in Saskatchewan in relation to property rights, wildlife, land management, and attitudes toward public land. While the focus of the research is the stewardship of Crown lands, we included papers that discussed land stewardship within the context of private lands in the review. This is because there are important similarities between public and private lands conservation, including the need for trust between land managers and the government (Henderson et al. 2014), the pursuit of local autonomy (Pittman 2019), and the payment of compensation for the delivery of ecosystem services (Engel et al. 2008; Olive 2015, 2016). Lessons learnt from the conservation of private lands will be useful to craft policy instruments and incentives for conservation on Crown lands. Based on the review, we provide a range of promising policy instruments and incentives for the delivery of multi-species at risk conservation on Crown agricultural lands in Saskatchewan.

Developing collaborative partnerships for implementing the Pan-Canadian Approach

The Pan-Canadian Approach to Transforming Species at Risk Conservation signifies a move towards multiple species and ecosystems-based conservation in selected priority areas. This move also necessitates the creation of new partnerships with all stakeholders and the renewal of existing ones to help maximize conservation efforts and outcomes. These partnerships are being developed and strengthened among the federal, provincial, and territorial governments, Indigenous Peoples, the private sector, nongovernmental organizations (NGOs), municipalities, landowners, and the public (Environment and Climate Change Canada 2018). As partners in species at risk conservation, they will help identify priority initiatives, design tools for implementing the framework, monitor results, and foster the integration of Indigenous knowledge and science for conservation decision-making. This focus on developing and renewing partnerships is in response to calls for more collaborative approaches to conservation, where the interests of different stakeholders, especially Indigenous Peoples and land managers whose lifestyles are connected to these priority lands, are well represented (Berkes et al. 2007; Olive and Rabe 2016). The current article focuses on incentivizing land managers, only one category of partners required to implement the Pan-Canadian Approach to species at risk conservation. However, it is crucial to note that if the policy instruments and incentives proposed in this article are to succeed in incentivizing land managers to undertake species at risk conservation, they must be supported by the other partners. For example, the incentive schemes (and conservation in general) have a cost that may be paid using public tax dollars (Olive 2015) or from industry groups. Therefore, such incentive schemes must appeal to the public and the private sector by, for example, demonstrating some form of additionality (Ferraro and Pattanayak 2006; Börner et al. 2017). —“the benefits induced by the policy [incentive] that would not have occurred without the policy” (Pates and Hendricks 2020, p. 281).

Literature review

There are very few empirical case studies of landowners in Saskatchewan in relation to property rights, wildlife, land management, and attitudes toward public land. We know from a wider, mainly American, literature that there can be serious tension between private landowners (e.g., agricultural

producers) and the government over endangered species issues because of misinformation, fear of regulation, and intrusion on property rights (see [Raymond and Olive 2008](#) and [Brignon et al. 2019](#) for reviews). The extent to which this is true in Canada, where land ownership, access to public lands, and species at risk policy work very differently, seems likely, as the studies below illustrate. This short research synthesis examines existing empirical studies involving Saskatchewan landowners and conservation programs in the past decade (six studies in total).

[Henderson et al. \(2014\)](#) conducted interviews with 42 landowners in the Milk River watershed regarding their awareness and perceptions of the federal *Species at Risk Act* (SARA). The 42 landowners who completed the interview were predominately male, and 93% had at least one previous generation of their family involved in ranching. In total, 95% claimed to be aware of SARA, but most were unfamiliar with specific details. For example, 50% thought that the main provisions of SARA apply to all land in Canada, including private and provincial land. This is a common finding in wider literature about SARA and the US *Endangered Species Act* (see [Olive 2014](#)). Only 10% knew about the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the listing process for species at risk. This is despite the fact that 40% had participated in a wildlife stewardship program in the past, and 33% had used a land management strategy to support a known species at risk (90% could correctly name at least two species at risk in Saskatchewan).

Perhaps more germane, 79% had positive attitudes toward species at risk and showed support for government involvement in species at risk recovery. That said, 67% felt that declining species should only be listed “at risk” if there are no changes to producers’ economic well-being or management approach. Overall, 12% of respondents had negative attitudes toward species at risk and did not support government involvement. They also felt that species were not truly at risk—either because they believed the species was not native or because they believed fluctuation in species number is normal.

Essentially, [Henderson et al. \(2014\)](#) developed four thematic groups of landowners in southwest Saskatchewan based on their perspectives: “producers as stewards,” “economic risk” producers, “lack of trust and communication” producers, and the “do not disturb” producers. Of the 42 participants, 86% believe that species at risk are still alive today because of the stewardship of ranchers, 60% identify money as the primary constraint to new management techniques, 55% expressed attitudes of fear, lack of trust, and poor communication with the government on species at risk issues, and 36% think landowners should be left alone.

Producers are willing to support species at risk recovery under the conditions that “producer privacy, independence, and the financial stability of their operation be maintained and wildlife species not be harmed by increased attention” ([Henderson et al. 2014](#), p. 24). Older producers (aged 60–69 years and those who had ranched for more than 50 years) were less willing to support species at risk ([Henderson et al. 2014](#)). In addition, producers with formal education are more willing to support species at risk ([Henderson et al. 2014](#)). This suggests that younger and more educated producers are the most likely participants in species at risk programs.

Finally, [Henderson et al. \(2014\)](#) found that “[r]anching was portrayed as more than merely a business; rather, it was described as a way of life that includes a connection to the land” (p. 27). This culture of ranching, a common finding in the literature, suggests that the economics of conservation is not straightforward. Lifestyle attributes can rank above profit maximization as motives for ranching and land management decisions. Of note, [Henderson et al. \(2014\)](#) also pointed to the finding that producers had detailed knowledge of their land and were familiar with wildlife, including local population changes and the behaviours of species at risk on their lands. This is the type of “community knowledge” or “local embedded knowledge” that can complement western scientific knowledge and

Indigenous knowledge in the development of conservation practices (Henderson et al. 2014; see also Knapp and Fernandez-Gimenez 2009).

A lot of what Henderson et al. (2014) found in their study was confirmed by Olive (2015), who conducted a mail survey with residents in Regina, Saskatoon, Moose Jaw, and Swift Current (369 respondents) and in-person interviews with 12 landowners (7 farmers and 5 ranchers) in southwest Saskatchewan as well as 15 government or NGO representatives. Olive (2015) compared the urban and rural respondents' knowledge and attitudes toward species at risk and policy in the province. Regarding the agricultural producers, Olive (2015) found familiarity with the *Wildlife Act* but not SARA (keeping in mind these interviews happened prior to the Emergency Protection Order for the Sage Grouse). It was also clear from the interviews that landowners consider private property an "absolute right" that should not be infringed upon by the government. They also felt that it is unfair to expect landowners to bear costs associated with conservation and, instead, that compensation should be the policy norm.

Unlike their urban counterparts, rural landowners did not support the regulation of property or government involvement in species at risk conservation. However, "this is not to say that agricultural landowners are hostile to endangered species, conservation, or stewardship in general" (Olive 2015, p. 200). Instead, rural landowners see themselves as stewards with a duty to care for the land. Their concerns around government intervention are based upon the fear of regulation and indicate a breakdown in trust and communication between producers and government.

Olive (2015) suggested, in conclusion, that "since farmers and ranchers do not favour government on their land, NGOs might be able to assist landowners who are willing to steward a species in exchange for compensation or other rewards and incentives" (p. 201). Moreover, the study also noted that there is support from urban residents, in the four cities, for species at risk and government policy. This is good news because ultimately, conservation "comes with a price tag that must be supported by larger society through public tax dollars" (Olive 2015, p. 202).

This thread is picked up in Pittman (2019), who used interview data in a descriptive format and other forms of discourse (e.g., media, reports) in a case study of southwestern Saskatchewan to examine the governance of species at risk and critical habitat in the province. He argued that we can see a move away from top-down command-and-control governance regimes to a more locally rooted and locally acceptable governance approach, which includes innovative economic incentive programs for conservation. He suggests that this is a positive development in the province and that other actors and levels of government should support "innovative locally driven portfolios of conservation measures" in the future (Pittman 2019, p. 184).

Henderson et al. (2014), Olive (2015), and Pittman (2019) each acknowledged the importance of economic stability for landowners. The issue is really that landowners incur private costs while providing public benefits (like wildlife habitat and carbon sequestration). In a study of Manitoba, Lawly (2019) illustrated that the value of land with habitat features, such as wetlands, are devalued over time (less profitable on the market as compared to cropland). This creates an incentive to convert land to its highest market value: crops. Indeed, Yu and Belcher (2011) used as a starting point that a landowner will only take steps toward conservation outcomes "when the utility provided by adopting conservation is at least as great as the next best alternative land allocation" (p. 209). In 2011, they surveyed 212 respondents from farmers in the southwest region (specifically in Statistics Canada Census Agriculture Regions CAR 8B and 3AN). Interestingly, Yu and Belcher (2011) concluded that the magnitude of conservation payments is not the only factor that influences landowners' willingness to participate in a conservation payment plan. Instead, programs that can enhance private benefits (mitigate

soil erosion, forage provision, water availability) and (or) minimize private costs will have a greater probability of adoption by farmers.

However, the amount of funding that farmers and ranchers require for participation is a difficult question. Thus far, no published studies exist. However, in an unpublished thesis, [Ingram \(2018\)](#) addressed this question. He interviewed 30 ranchers in southern Saskatchewan (phone, email, and in-person) about their willingness to accept compensation for conservation on their land (in this study there was no statistical difference in attitudes between property owners and lessees of Crown land). It should be noted that the sample was well educated—50% had a university degree compared to the 7.2% of agricultural producers in Saskatchewan that have a university degree. In addition, the average herd of cattle was 380, and acres managed was 2282 on average—both numbers higher than the average ranch. Thus, selection bias is a problem.

When asked about conservation payment schemes, the findings are interesting. [Ingram \(2018\)](#) argued that ranchers want compensation, management flexibility, and short-term agreements. In terms of policy, “cost-share programs were the most preferred policy option (79%), followed by extension programs, and then conservation easements¹” ([Ingram 2018](#)). Speculation is that the contract length of conservation easements is the deterrent for that option. The average maximum agreeable contract length was 7.7 years.

Regarding the cost-share programs for increasing ecosystem services, landowners would require between 38.3% and 61.8% of the costs to be covered” ([Ingram 2018](#), p. 43). In terms of which ecosystem services the ranchers prioritized, water quality was ranked first by 57%, then wildlife and habitat conservation (33%) and carbon sequestration (10%) were second and third, respectively. Examining attitudes toward landowner responsibility, respondents “indicated that they strongly believe landowners have a responsibility to manage their land in a sustainable manner that conserves or enhances ecosystem services” (p. 51). The most common reasons were sustainability, conservation, the environment, and the good of future generations ([Ingram 2018](#)).

These answers harken back to a much earlier survey study by [Davis et al. \(2005\)](#), with 148 landowners enrolled in the Native Prairie Stewardship Program. Mostly, landowners participate in conservation programs because they want to steward their land responsibly. Specifically, [Davis et al. \(2005\)](#) found that 36% participate because they want to preserve their prairie, 33% thought it sounded like a good idea, 9% value their native prairie, and 9% joined because it was something they were already doing. Related, landowners also said they “joined the program because it was nonthreatening”—as the voluntary agreements are not legally binding ([Davis et al. 2005](#)).

There are a number of key points to draw from the aforementioned literature. First, all empirical studies found evidence that ranchers see themselves as stewards. This is a common finding in the broader literature as well. Most landowners in Saskatchewan have positive attitudes toward species at risk and

¹[Ingram \(2018\)](#) defined for landowners “cost share programs” as “a subsidy where the government refunds participants a portion of the management costs they voluntarily undertake to maintain or increase ecosystem services. The cost-share would be a one-time payment to the participant for each approved management action or development the participant undertakes.” He defined “extension programs” as “the government or a conservation organization provides free information about the benefits of grassland and grazing management practices” and then the landowners “chooses whether or not to voluntarily implement the practices” (p. 77). And “conservation easements” were defined as “a voluntary legal agreement between a landowner and government or conservation agency that permanently limits how the land may be used, for example prohibiting any kind of development on the land, in order to protect its conservation values and provide ecosystem services. How landowners are compensated can vary based on the structure of the agreement, but landowners are most commonly compensated through tax benefits” (p. 77).

wildlife. There is a genuine sense of duty, perhaps morally motivated, to care for the land. In addition, this stewardship persona is at the basis of why local autonomy is preferable for landowners from a governance perspective (see [Pittman 2019](#)). However, the stewardship ethos must be balanced against the “utilitarian” approach to land management found among the Plains and Prairie Pothole Ecoregion landowners in the United States ([Sweikert 2017](#); [Gigliotti and Sweikert 2019](#)). Some landowners see land and wildlife as theirs to use. The extent to which this attitude is prevalent in southern Saskatchewan is unknown, but some, probably a small minority, of landowners do feel this way and manage their land accordingly.

Moreover, stewardship, while a value, is not going to be voluntary at the level required for the conservation of grassland species. Economics always loom large for landowners. Indeed, a majority of landowners in the existing studies want compensation from the public for providing societal goods like wildlife habitat. Compensation can be direct or through other programs, but some evidence suggests that contracts should be less than 10 years and include flexible land use mechanisms.

Communication issues were another finding in the Saskatchewan studies. Indeed, we can surmise that landowners have low levels of knowledge regarding SARA and its application to nonfederal lands. There are reasons to suspect much confusion around policy details. This might be causing fear for landowners who hear stories about the US *Endangered Species Act* and make false assumptions about property regulations or restrictions (see [Olive 2015](#) and [Olive and McCune 2017](#)). Saskatchewan landowners are probably more familiar with the *Wildlife Act* but would not be able to say with any authority how it affects critical habitat in the province.

Despite unfamiliarity with policy, landowners are familiar with wildlife. The studies, especially [Henderson et al. \(2014\)](#) and [Pittman \(2019\)](#), pointed to valuable local and community knowledge that landowners have and that should be shared with scientists and government officials. There is a good reason to suspect that ranchers in southern Saskatchewan have detailed knowledge of their land, including species at risk and wildlife patterns. They are also likely to leverage their positive attitude to conservation and social networks to share information with their neighbours about conservation-friendly land management practices.

Finally, the degree to which Saskatchewan landowners either do not trust the government or do not want the government involved with land management seems high ([Henderson et al. 2014](#); [Olive 2015](#)). We know from [Henderson et al. \(2014\)](#) that ranchers value privacy and independence. Even on leased Crown land, producers prefer to be given local autonomy regarding land management decisions ([Pittman 2019](#)). [Pittman \(2019\)](#) provided evidence that landowners reject top-down command and control policy and mistrust the government, especially after the federal Emergency Protection Order for the Sage Grouse in 2014. [Pittman \(2019\)](#) suggested that landowners have been advocating for more local autonomy in the region and are working with NGOs to achieve conservation goals. Therefore, NGOs, particularly those that promote grassroots participation and local autonomy (e.g., the South of the Divide Conservation Action Program (SODCAP Inc.), Rancher’s Stewardship Alliance, Sustainable Canada), can support government agencies by serving as intermediaries between the government and land managers for conservation purposes.

Promising policy instruments

This section outlines promising policy instruments for the delivery of multi-species at risk conservation on Crown agricultural lands in Saskatchewan. Because of the focus on Crown lands, we only review and describe policy instruments and incentives that are appropriate for leased Crown lands, which are not at immediate risk of being converted to cropland but that still require stewardship. Saskatchewan’s agricultural Crown lands are at minimal risk of conversion from grasslands to

croplands, which means that to deliver on conservation, we are mostly trying to incentivize the “care, management and maintenance of ecosystems, habitats, wildlife species and populations” (IUCN 2003). In the context of species at risk, we are trying to “[maintain] and [recover] viable populations of species in their natural environments” (IUCN 2003). While there are some existing pieces of provincial legislation with relevance to the project (see Appendix 1) and the federal Species at Risk Act, the focus here is on developing new instruments and incentives that work in collaboration with existing legislation and policy.

We also focus on policy instruments and incentives within the jurisdiction or purview of the Government of Saskatchewan, specifically the Ministries of Agriculture and Environment. We limited the discussion to the Government of Saskatchewan because it is the closest institution to the issue of interest. Thus, the Government of Saskatchewan has the most legislated responsibility regarding leased Crown lands within Saskatchewan, more specifically, the biodiversity hot spot under consideration. We propose the following promising options for integrating multiple incentives to advance species at risk conservation on Crown lease lands. These options are described below and examined in detail in Tables 1 and 2.

Structuring policy incentives

There is a diverse set of incentives to help advance conservation on leased lands. We examine four types of incentives with particular relevance to species at risk conservation in southern Saskatchewan (Table 1). In an unpublished report, Pittman (2020) examined producers’ preferences for annual payments, cost-sharing, one-time payments, legal assurances, and market-based incentives. He found that annual payments are preferred by producers and help recognize and support good stewardship of the lands. Tax or fee reduction is a form of annual payment with potential. Cost-sharing also has potential and can be used to facilitate practice change, where necessary or appropriate. Legal incentives are of interest to certain individuals and can be used to provide lessees with legal certainty that they will not be subject to future federal Environmental Protection Orders (EPOs) or Safety Nets (under SARA) if they are following good stewardship practices. One-time payment is also an option, but it has less applicability to Crown lands. In sum, Pittman (2020) concluded that producers prefer different types of incentive programs, and there is no single dominant incentive scheme that can satisfy all producers. Therefore, rather than selecting any single type of incentive, it is likely that a portfolio of options would have the greatest social acceptability—the willingness of producers to accept and participate in incentive programs.

Policy instruments for species at risk conservation on Saskatchewan’s Crown lands

In addition to the policy incentives examined in Table 1, we propose five policy instruments that can be applied to guarantee species at risk conservation on Crown lands under the management of lessees. These policy instruments are described below and examined in detail in Table 2.

Results-based or outcome-based approaches

Results-based or outcome-based approaches provide incentives based on the achievement of habitat targets or other conservation outcomes rather than actions (Engel et al. 2008; Hanley et al. 2012). The SODCAP Inc., in collaboration with the Saskatchewan Stock Growers Association, has successfully implemented results-based conservation agreements in the South of the Divide area under Environment and Climate Change Canada’s Species at Risk Partnerships on Agricultural Lands program. Additionally, other grassroots stewardship groups (e.g., Rancher’s Stewardship Alliance) in the province have also demonstrated support for this approach. Hanley et al. (2012) suggested outcome-based approaches can help ensure the efficient use of public funds by ensuring investments have

Table 1. Types of incentives, their strengths, and weaknesses.

Type of incentives	Description	Strengths	Weaknesses
Annual payment	Payments provided annually to producers for the delivery of conservation on leased lands (e.g., the achievement of habitat targets).	Highly acceptable to many producers (Pittman 2020). Advances “justice through recognition” for producers’ conservation efforts (Olive 2016).	Requires a sustainable source of funding. Potentially increases the monitoring burden to ensure additionality. Must not be viewed as an agricultural subsidy.
Fee or tax reduction	Reducing grazing fees or property taxes to compensate for conservation actions. Fee or tax reduction is similar to an annual payment but occurs through a different mechanism.	Since similar to an annual payment, it is likely to be acceptable to many producers (Pittman 2020).	Could require significant transaction costs to set up with multiple levels of government. Must not affect the existing tax base of small, rural municipalities. Could cause perceived inequities in local communities due to changes to the distribution of taxation and tax burden. In many areas of Saskatchewan, the land tax is relatively low and thus not a significant incentive.
Cost sharing	Producers receive payments for the partial costs associated with undertaking conservation-friendly practices or developing conservation-friendly infrastructure.	Acceptable to many producers (Pittman 2020). Provides clear additionality for public investments.	Producers are usually compensated for portions of their capital costs, but not their time or ongoing maintenance costs associated with the practice or infrastructure. Can sometimes be viewed as top-down or overly prescriptive by producers. Timelines for reimbursements to producers can be dissuasive (Hurlbert and Pittman 2014). In the case of conservation infrastructure projects, it tends to promote new infrastructure instead of improving, completing, or maintaining existing ones. May result in half-completed projects.
Legal protection	Providing landowners with legal certainty that they will not be adversely impacted by future species at risk legislations.	Provides producers with the guarantee that they will not be adversely affected by future species at risk legislation. Reduces stress and provides peace of mind to producers already dealing with multiple, uncertain, and stressful factors (e.g., weather, markets, trade).	SARA Section 11 agreements provide potential legislative backing but are just starting to be applied, and there are considerable uncertainties as to whether or not this type of incentive could be provided.

already achieved the desirable ecological outcomes before payments are made. However, these approaches may also require an added investment in monitoring the outcomes. The additional monitoring cost results from the relative difficulty on the side of the regulator to observe conservation outcomes (e.g., counting birds) as opposed to management actions (e.g., whether a land manager complies with water infrastructure standards) (Hanley et al. 2012).

Table 2. Promising options for maintaining Crown lands.

Option	Description	Strengths	Weaknesses
Results- or outcome-based approaches	Using the achievement of a desired results or outcome (e.g., habitat provision) to trigger a payment to producers.	Only provides incentives for proven habitat outcomes. Aligns conceptually with Saskatchewan’s results-based approach to environmental regulation. It is nonprescriptive, which aligns with producers’ values.	Increases monitoring burden. Requires a sustainable source of funding.
Tax shifting	Shifting the tax burden from producers that are undertaking conservation to other producers or other members of society, who are not meeting stewardship requirements.	Does not reduce municipal tax base, which is particularly important in small, rural municipalities. Has a sustainable source of funding. Simultaneously provides incentives for conservation and disincentives for not practicing conservation. Helps equitably distribute the costs and benefits of conservation between private individuals and the general public.	Difficult to develop the institutional structure required to implement across multiple jurisdictions and levels of government. Could potentially face political backlash from people required to pay additional taxes.
Adjustments to lease agreements	Making adjustments to the lease agreements to incentivize conservation (e.g., reduced fees for achieving habitat targets).	The institutional mechanism is already in place.	Increases monitoring burden. Reduces the amount of revenue from the program.
Conservation extension services	Providing free information to land managers on land stewardship for species at risk conservation.	It respects land manager autonomy, which aligns with producers’ values.	There is no guarantee that land managers will use extension information.
Grass banking	Occurs when reduced grazing fees on public lands are used to incentivize conservation measures on private lands.	Expands the land base under conservation programs because both public and private lands are included.	Would require additional monitoring of habitat and (or) species on private lands. Can require significant costs to set up and maintain (Gripne 2005a).

Tax shifting

Tax shifting provides opportunities to be reimbursed for property taxes if certain practices are met or targets achieved (Schuster et al. 2018). Tax shifting can be a simple scenario where lessees are reimbursed for their land tax if demonstrating conservation practices or outcomes. Alternatively, tax shifting can be complex, where the taxes of good stewards are shifted onto those not demonstrating conservation practices or outcomes (Schuster et al. 2018). The approach provides a sustainable funding source that can be implemented through an existing mechanism; however, it could be complicated

to set up from a governance standpoint and could result in perceived inequities between those left paying taxes and those being reimbursed.

Adjustments to lease agreements

Adjustments to lease agreements can provide multiple incentives for conservation through the main existing mechanism used to manage access to Crown lands. In previous interviews with lessees conducted by the authors, lessees have expressed concerns that they are not able to graze at the recommended rates and maintain a sustainable operation. These concerns suggest the need for more flexibility from the Crown in setting and enforcing grazing rates. In addition, there is the need for the Crown to re-examine its Animal Unit Month (AUMs) in the light of climatic trends and rangeland health to ensure that they promote sustainable grazing. We suggest two points for discussion regarding the adjustment of lease agreements:

- Could lessees pay per use of AUMs? Some producers already voluntarily use fewer AUMs than included in their lease agreements to promote sustainable grazing. Challenges to this approach include the need for monitoring and adaptive management of AUM limits (i.e., requires more frequent evaluation and updating of the AUMs in the lease).
- Could agreements include provisions to maintain landscape heterogeneity through grazing practices? Challenges to this approach include the need to apply rangeland monitoring techniques, which are currently in development but not yet operational.

Conservation extension services

Conservation extension provides an avenue for knowledge sharing on the benefits and approaches of land stewardship for species at risk conservation. Conservation extension programs can take several forms, including visits to specific land managers or organized workshops, presentations, newsletter articles, and radio interviews. The SODCAP Inc. has undertaken several extension activities on species at risk habitat management in southern Saskatchewan (SODCAP Inc. 2018). Ingram (2018) suggested that land managers in Saskatchewan generally accept extension programs because extension programs enhance management flexibility and do not infringe on land manager autonomy. However, there are no guarantees that extension information will be used on the ground.

Exploring linkages with private lands: grass banking

Conservation on private and public lands are mostly treated as different and independent of each other. However, they are inseparable. For example, when private lands adjacent to public lands are well-managed, they support habitat connectivity and hence species movement (Burger et al. 2019). Also, given that many species at risk exist on private lands and that majority of the land is managed by private individuals (Henderson et al. 2014), species at risk conservation must necessarily address private lands conservation. Therefore, finding ways to link public lands conservation to private lands conservation will support conservation on public lands and expand the total quantity of land under conservation. One of the instruments that can help link public and private land conservation in Saskatchewan is grass banking.

Grass banking is an arrangement where producers provide conservation outcomes on their private lands in exchange for reduced grazing fees on public lands (Grippe 2005b; White and Conley 2007). The Saskatchewan Stock Growers Association and the Grasslands National Park have pilot-tested grass banking in the province since 2018, and The Nature Conservancy has operated the Matador Grass Bank in Montana since 2002. The Nature Conservancy Canada is also currently operating a grass bank in southern Saskatchewan (Wood 2017). Grass banking is a potential option to explore more broadly in the Saskatchewan context and could provide a promising means of linking private and public land conservation.

Pathway forward

Regardless of which option or combination of options the Government of Saskatchewan chooses to incentivize conservation, it must do so through “engagement, consultation, and outreach”—or participation—with land managers ([Environment and Climate Change Canada 2018](#)). Participation is crucial for creating awareness, building trust, and leveraging land managers’ local and community knowledge for species at risk conservation. These have been concerns expressed throughout the empirical studies in Saskatchewan ([Henderson et al. 2014](#); [Olive 2015](#); [Pittman 2019](#)). Without them, any policy instrument that the Government of Saskatchewan chooses to implement may not yield positive results.

There are no precise rules or procedures for engaging land managers. However, as suggested by [Henderson et al. \(2014\)](#), public agencies can foster engagement by ensuring the early and active participation of land managers in program planning. Also, increasing “face-to-face time” and encouraging informal interactions with land managers could help develop trust and enhance communication ([Ansell and Gash 2008](#); [Henderson et al. 2014](#); [Lutter et al. 2018](#)). We see enormous potential for NGOs that promote grassroots participation and local autonomy to play a crucial role in the process since some land managers do not favour the government ([Olive 2015](#)). Specifically, NGOs can assist in outreach activities and administer incentives to land managers. This calls for enhanced collaboration between the provincial and federal governments and the NGOs ([Pittman 2019](#)). Care must, however, be taken to avoid increasing government oversight and diminishing land managers’ local autonomy since that might negatively affect the legitimacy of species at risk conservation programs ([Morrison 2017](#)).

Furthermore, the issue of fostering collaboration among the partners for species at risk conservation has gained increased traction in the national policy discussions. For example, the Section 11 Conservation Agreements of SARA allow the federal government to “enter into a conservation agreement with any government in Canada, organization or person to benefit a species at risk or enhance its survival in the wild.” Also, the Pan-Canadian approach, the focus of this article, is based on collaboration among federal, provincial, and territorial governments for species at risk conservation. However, the Section 11 Agreement has hardly been used, prompting questions over the commitment of the federal government to collaborate for species at risk conservation ([McFatrige and Young 2018](#)). Also, tensions between federal government legislation and aspirations of land managers directly involved in species at risk conservation remain and could hinder the recovery and protection of species at risk and their habitats. This is especially true if the government is to successfully link conservation on Crown lands to conservation on private lands. For example, the application of the provision in SARA (section 80 and subsection 97(2)) that allows the Minister of Environment and Climate Change Canada to invoke an Emergency Protection Order if “he or she believes that the species faces imminent threats to its survival or recovery” has posed challenges to species at risk conservation involving private landowners. [Pittman \(2019\)](#) argues that the Greater Sage Grouse Emergency Protection Order had “serious ramifications” on landowners who felt “portrayed as criminals.”

Legislations with such top-down and command-and-control underpinnings risk creating disincentives for species at risk conservation ([Innes and Frisvold 2009](#)). As further indicated by [Pittman \(2019\)](#), the land managers in Saskatchewan rejected top-down approaches and began to work at the grassroots level, together with some environmental NGOs, to influence public discourse. Therefore, effective species at risk conservation requires that the Government of Saskatchewan work with the federal government to ensure that such tensions in the species at risk legislation are removed. One way of removing such tensions could be to leverage the Section 11 Agreements to improve

collaboration and provide legal assurances that “good stewards” will not be subjected to future EPOs. This may require clarifying in the legislation what comprises good stewardship.

Finally, adopting incentive mechanisms, especially annual payments, to enhance species at risk conservation on agricultural land might potentially be perceived as an agricultural subsidy, which could have negative repercussions for international trade. This is particularly crucial since Saskatchewan’s agricultural sector is export-dependent ([Government of Saskatchewan 2019](#)). For example, the World Trade Organization’s agreement on agriculture restricts governments from providing agricultural subsidies that are trade-distorting in nature. To avoid breaching these trade agreements, it is important to structure incentive schemes such that they are not confused with or perceived as agricultural subsidies. In doing this, the Government of Saskatchewan could structure incentive schemes as Rewards for Ecosystem Services ([van Noordwijk et al. 2007](#); [Leimona et al. 2009](#)), where payment is tied directly to specific environmental services and good stewardship behaviours.

Conclusion

This synthesis paper provides inputs towards the implementation of the Pan-Canadian Approach to Transforming Species at Risk Conservation. In particular, we propose a range of policy instruments and incentives for the delivery of multi-species at risk conservation on Crown agricultural lands in Saskatchewan. We outline four types of incentives that are relevant to conservation on Crown lands. These include annual payments, cost-sharing, fee or tax reduction, and legal protection. We believe that a portfolio of options would have the greatest social acceptability. In addition, we outline four policy instruments that can help deliver multi-species at risk conservation on Saskatchewan’s Crown lands, including results- or outcome-based approaches, tax shifting, conservation extension services, and adjustments to lease agreements. Finally, we recommend that the government of Saskatchewan should explore approaches to link conservation on private lands to conservation on Crown lands using grass banking.

Due to the varied nature of actors whose interests and actions affect species at risk conservation, an essential prerequisite for success is to foster collaboration among the partners. Such collaboration is critical for enhanced decision-making and institutional change that reflects the urgent call for creating awareness of species at risk policies, building trust, and leveraging the local knowledge of land managers for conservation.

While the focus of this synthesis is Saskatchewan, the lessons could be relevant for species at risk conservation on all Crown agricultural lands across Canada. Most Crown grasslands in Canada, like Saskatchewan’s, are at lower risk of conversion from grasslands to croplands compared to private grasslands ([Nernberg and Ingstrup 2005](#)). This means that species at risk conservation on Crown lands across Canada will focus on trying to “[maintain] and [recover] viable populations of species in their natural environments” ([IUCN 2003](#)). However, the preferences of land managers ([Pittman 2020](#)), as well as the socio-economic and environmental conditions, may differ across jurisdictions ([Nernberg and Ingstrup 2005](#)); therefore, care must be taken when applying the proposed policy instruments and incentives in other jurisdictions. Also, given the new focus on a nationwide approach to species at risk conservation, there is a utility for identifying the “things” that work for species at risk on Crown grasslands and other agricultural lands across all jurisdictions. Future studies should survey workable solutions for conservation on Crown agricultural lands across Canada.

Acknowledgements

The authors would like to thank their funders. JP and AO were funded by the Government of Saskatchewan through a grant from Environment and Climate Change Canada’s Species at Risk on

Agricultural Partnerships program. JP was additionally funded by a grant from the Social Sciences and Humanities Research Council of Canada (430-2018-00247). The authors would also like to thank the reviewers, who provided constructive and helpful comments.

Author contributions

RAA, JP, and AO conceived and designed the study. RAA, JP, and AO performed the experiments/collected the data. RAA, JP, and AO analyzed and interpreted the data. JP and AO contributed resources. RAA, JP, and AO drafted or revised the manuscript.

Competing interests

Andrea Olive is one of the Guest Editors for this collection.

Data availability statement

All relevant data are within the paper.

References

- Ansell C, and Gash A. 2008. Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, 18: 543–571. DOI: [10.1093/jopart/mum032](https://doi.org/10.1093/jopart/mum032)
- Berkes F, Berkes MK, and Fast H. 2007. Collaborative integrated management in Canada's North: the role of local and traditional knowledge and community-based monitoring. *Coastal Management*, 35: 143–162. DOI: [10.1080/08920750600970487](https://doi.org/10.1080/08920750600970487)
- Börner J, Baylis K, Corbera E, Ezzine-de-Blas D, Honey-Rosés J, Persson UM, et al. 2017. The effectiveness of payments for environmental services. *World Development*, 96: 359–374. DOI: [10.1016/j.worlddev.2017.03.020](https://doi.org/10.1016/j.worlddev.2017.03.020)
- Brignon WR, Schreck CB, and Schaller HA. 2019. Structured decision-making incorporates stakeholder values into management decisions thereby fulfilling moral and legal obligations to conserve species. *Journal of Fish and Wildlife Management*, 10: 250–265. DOI: [10.3996/062017-JFWM-051](https://doi.org/10.3996/062017-JFWM-051)
- Burger LW, Evans KO, McConnell MD, and Burger LM. 2019. Private lands conservation: a vision for the future. *Wildlife Society Bulletin*, 43: 398–407. DOI: [10.1002/wsb.1001](https://doi.org/10.1002/wsb.1001)
- Davis SK, Springer B, Lohmeyer J, Hall L, and Harrison T. 2005. A stewardship approach to grassland bird habitat conservation in Saskatchewan, Canada. USDA Forest Service General Technical Report PSW-GTR-191.
- Engel S, Pagiola S, and Wunder S. 2008. Designing payments for environmental services in theory and practice: an overview of the issues. *Ecological Economics*, 65: 663–674. DOI: [10.1016/j.ecolecon.2008.03.011](https://doi.org/10.1016/j.ecolecon.2008.03.011)
- Environment and Climate Change Canada. 2016. Action plan for multiple species at risk in southwestern Saskatchewan: South of the Divide [Proposed]. Species at Risk Act Action Plan Series. Environment and Climate Change Canada, Ottawa, Ontario. xi + 127 p.
- Environment and Climate Change Canada. 2018. Pan-Canadian approach to transforming species at risk conservation in Canada. Environment and Climate Change Canada, Gatineau, Quebec.

- Ferraro PJ, and Pattanayak SK. 2006. Money for nothing? A call for empirical evaluation of biodiversity conservation investments. *PLoS Biology*, 4: e105. PMID: [16602825](#) DOI: [10.1371/journal.pbio.0040105](#)
- Gigliotti LM, and Sweikert LA. 2019. Wildlife value orientation of landowners from five states in the Upper Midwest, USA. *Human Dimensions of Wildlife*, 24(5): 433–445. DOI: [10.1080/10871209.2019.1632991](#)
- Government of Saskatchewan. 2019. Saskatchewan Agriculture Exports 2017. Regina, Saskatchewan.
- Grippe SL. 2005a. Grassbanks: an evaluation of a conservation tool.
- Grippe SL. 2005b. Grassbanks: bartering for conservation. *Rangelands*, 27: 24–28. DOI: [10.2111/1551-501X\(2005\)27<24:GBFC>2.0.CO;2](#)
- Hanley N, Banerjee S, Lennox GD, and Armsworth PR. 2012. How should we incentivize private landowners to “produce” more biodiversity? *Oxford Review of Economic Policy*, 28: 93–113. DOI: [10.1093/oxrep/grs002](#)
- Henderson AE, Reed M, and Davis SK. 2014. Voluntary stewardship and the Canadian Species at Risk Act: exploring rancher willingness to support species at risk in the Canadian prairies. *Human Dimensions of Wildlife*, 19: 17–32. DOI: [10.1080/10871209.2013.819595](#)
- Henwood WD. 2010. Toward a strategy for the conservation and protection of the world’s temperate grasslands. *Great Plains Research*, 20: 121–134.
- Hurlbert M, and Pittman J. 2014. Exploring adaptive management in environmental farm programs in Saskatchewan, Canada. *Journal of Natural Resources Policy Research*, 6: 195–212. DOI: [10.1080/19390459.2014.915131](#)
- Ingram S. 2018. Policy development to support ecosystem services on pasture systems in Saskatchewan. Master’s thesis, University of Saskatchewan.
- Innes R, and Frisvold G. 2009. The economics of endangered species. *Annual Review of Resource Economics*, 1: 485–512. DOI: [10.1146/annurev.resource.050708.144207](#)
- IUCN. 2003. IUCN definitions—English.
- Knapp CN, and Fernandez-Gimenez ME. 2009. Knowledge in practice: documenting rancher local knowledge in Northwest Colorado. *Rangeland Ecology & Management*, 62: 500–509. DOI: [10.2111/08-175.1](#)
- Lawly C. 2019. Land use change in agricultural landscapes: incentives and conservation programs. Paper prepared for The Canadian Agri-Food Policy Institute.
- Leimona B, Joshi L, and van Noordwijk M. 2009. Can rewards for environmental services benefit the poor? Lessons from Asia. *International Journal of the Commons*, 3: 82. DOI: [10.18352/ijc.121](#)
- Lutter SH, Dayer AA, Heggenstaller E, and Larkin JL. 2018. Effects of biological monitoring and results outreach on private landowner conservation management. *PLoS ONE*, 13: e0194740. PMID: [29617388](#) DOI: [10.1371/journal.pone.0194740](#)
- McFatrige S, and Young T. 2018. Species in the balance: partnering on tools and incentives for recovering Canadian Species at Risk. Smart Prosperity Institute, Ottawa, Ontario.

Morrison TH. 2017. Evolving polycentric governance of the Great Barrier Reef. *Proceedings of the National Academy of Sciences of the United States of America*, 114: E3013–E3021. PMID: 28348238 DOI: [10.1073/pnas.1620830114](https://doi.org/10.1073/pnas.1620830114)

Nernberg D, and Ingstrup D. 2005. Prairie conservation in Canada: the prairie conservation action plan experience. *In Proceedings of the Third International Partners in Flight Conference*, Asilomar Conference Grounds, California, 20–24 March 2002. USDA Forest Service General Technical Report PSW-GTR-191. pp. 478–484.

Olive A. 2014. *Land, stewardship and legitimacy: endangered species policy in Canada and the United States*. University of Toronto Press, Toronto, Ontario.

Olive A. 2015. Urban and rural attitudes toward endangered species conservation in the Canadian prairies: drawing lessons from the American ESA. *Human Dimensions of Wildlife*, 20: 189–205. DOI: [10.1080/10871209.2015.1004207](https://doi.org/10.1080/10871209.2015.1004207)

Olive A. 2016. It is just not fair: the Endangered Species Act in the United States and Ontario. *Ecology and Society*, 21: 13. DOI: [10.5751/ES-08627-210313](https://doi.org/10.5751/ES-08627-210313)

Olive A, and McCune JL. 2017. Wonder, ignorance, and resistance: landowners and the stewardship of endangered species. *Journal of Rural Studies*, 49: 13–22. DOI: [10.1016/j.jrurstud.2016.11.014](https://doi.org/10.1016/j.jrurstud.2016.11.014)

Olive A, and Rabe A. 2016. Indigenous environmental justice: comparing the United States and Canada's legal frameworks for endangered species conservation. *American Review of Canadian Studies*, 46: 496–512. DOI: [10.1080/02722011.2016.1255654](https://doi.org/10.1080/02722011.2016.1255654)

Pates NJ, and Hendricks NP. 2020. Additionality from payments for environmental services with technology diffusion. *American Journal of Agricultural Economics*, 102: 281–299. DOI: [10.1093/ajae/aaz028](https://doi.org/10.1093/ajae/aaz028)

Pittman J. 2019. The struggle for local autonomy in biodiversity conservation governance. *Journal of Environmental Planning and Management*, 62: 172–188. DOI: [10.1080/09640568.2018.1511416](https://doi.org/10.1080/09640568.2018.1511416)

Pittman J. 2020. *Conservation program survey preliminary report: Saskatchewan*. Regina, Saskatchewan.

Raymond L, and Olive A. 2008. Landowner beliefs regarding biodiversity protection on private property: an Indiana case study. *Society and Natural Resources*, 21: 483–497. DOI: [10.1080/08941920801905203](https://doi.org/10.1080/08941920801905203)

Schuster R, Law EA, Rodewald AD, Martin TG, Wilson KA, Watts M, et al. 2018. Tax shifting and incentives for biodiversity conservation on private lands. *Conservation Letters*, 11: e12377. DOI: [10.1111/conl.12377](https://doi.org/10.1111/conl.12377)

SODCAP Inc. 2018. *The South of the Divide Conservation Action Program Inc.'s annual report (2017–2018). Providing habitat on a working landscape*. Regina, Saskatchewan.

Sweikert LA. 2017. *Human dimensions of habitat loss in the plains and prairie potholes ecoregion*. Ph.D. dissertation, South Dakota State University. 207 p.

Sweikert LA, and Gigliotti LM. 2019. Evaluating the role of Farm Bill conservation program participation in conserving America's grasslands. *Land Use Policy*, 81: 392–399. DOI: [10.1016/j.landusepol.2018.10.023](https://doi.org/10.1016/j.landusepol.2018.10.023)

van Noordwijk M, Leimona B, Emerton L, Tomich T, Velarde S, Kallesoe M, et al. 2007. Criteria and indicators for environmental service compensation and reward mechanisms: realistic, voluntary, conditional and pro-poor: CES Scoping Study Issue Paper No. 2. ICRAF Working Paper No. 37. DOI: [10.5716/wp14964.pdf](https://doi.org/10.5716/wp14964.pdf)

White C, and Conley C. 2007. Grassbank 2.0. *Rangelands*, 29: 27–30. DOI: [10.2111/1551-501X\(2007\)29\[27:G\]2.0.CO;2](https://doi.org/10.2111/1551-501X(2007)29[27:G]2.0.CO;2)

Wood C. 2017. Adapting grass banking as a conservation tool for southern Saskatchewan acknowledgements [PowerPoint slides]. In *Native Prairie Restoration & Reclamation Workshop*. 10 p.

Yu J, and Belcher K. 2011. An economic analysis of landowners' willingness to adopt wetland and riparian conservation management. *Canadian Journal of Agricultural Economics*, 59: 207–222. DOI: [10.1111/j.1744-7976.2011.01219.x](https://doi.org/10.1111/j.1744-7976.2011.01219.x)

Appendix 1

Table A1. List of provincial legislations relevant to the Pan-Canadian approach.

Provincial legislation	Description	What it does
<i>The Wildlife Act</i> , 1998	"An Act respecting the Protection of Wildlife and Wild Species at Risk and making consequential amendments to other Acts."	Establishes procedures for the administration, licensing, and prohibition of all wild species Set procedures that determine the at-risk status of species, establishing recovery plans, monitoring and enforcement.
The Wild Species at Risk Regulations	Regulations based on the <i>Wildlife Act</i> . "These regulations apply to all wild species at risk in Saskatchewan."	Provides a list of species at risk in Saskatchewan and their respective levels of risks
<i>The Provincial Lands Act</i> , 2016	"An Act respecting Provincial Lands, repealing certain Acts and making consequential amendments to certain Acts."	Establishes the terms for the disposition (i.e., sale, lease, or transfer) of provincial land (Division 2 & 5, Part 2) Establishes the terms for taxation related to provincial lands (Division 3, Part 2) Establishes the terms for improvements and restoration of provincial lands (Division 4, Part 2) Establishes the terms for the designation, disposition or use of ecological reserves (Division 1, Part 3)
<i>The Wildlife Habitat Protection Act</i>	"An Act respecting the Protection and Management of Crown Lands for Agriculture and Wildlife."	Sets the terms for the designation of Crown lands as wildlife habitat and ecological lands. Determines the management and use, and disposition of lands classified as wildlife habitat and ecological lands
<i>The Pastures Act</i>	"An Act respecting the Operation of Pastures and making consequential amendments to <i>The Department of Agriculture Act</i> ."	Sets out conditions for the designation, acquisition, use and maintenance of Pastures
<i>The Agricultural Credit Corporation of Saskatchewan Act</i>	"An Act to provide Financial Assistance to Encourage and Promote the Development and Expansion of the Agricultural Industry and to establish the Agricultural Credit Corporation of Saskatchewan."	Sets the terms for granting credit to farmers/ corporations, determines loan limits and repayment modalities.