

Conservation Performance Payments for Carnivore Conservation in Sweden

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Introduction

Many carnivores require vast territories, and as human population increases, more pristine natural areas are being developed and converted into agricultural land. Unsurprisingly, carnivores that live at the fringe between wild and agricultural land occasionally prey on livestock. Predation of livestock can result in severe economic losses (Mishra 1997; Thirgood et al. 2005; Woodroffe et al. 2005). Herders, whose livelihoods depend on livestock, often seek to kill predators to prevent further damage. Conservationists, on the other hand, engage in measures to protect endangered carnivores because they are appreciated as an important component of biodiversity. Viable solutions to make coexistence of wildlife and livestock acceptable to conservationists and livestock owners are much needed and are likely to be increasingly sought after as human sprawl increases.

Schemes that provide ex post compensation to livestock owners for losses to predation have been implemented in many places around the world, but they have not proven to be widely successful. Most of the schemes' deficiencies can be ascribed to one or several of the following problems: moral hazard (Cozza et al. 1996; Swenson & Andrén 2005), high transaction costs (Saberwal et al. 1994; Blanco 2003), long time lags (Fourli 1999; Madhusudan 2003), and problems of trust and transparency (Montag 2002; Western & Waithaka 2005). Mainly due to these problems, practitioners and analysts have denounced ex post compensation schemes as inadequate, fraudulent, and cumbersome (Naughton-Treves et al. 2003). Drawing on empirical insights into a conservation performance-payment scheme in Sweden, we

discuss this approach as an alternative strategy to conventional ex post compensation to alleviate carnivore-livestock conflicts.

Conservation Performance Payments

In search of new solutions to alleviate carnivore-livestock conflicts, a performance-payment scheme was developed and implemented in Sweden. Conservation performance payments are monetary or in-kind payments made by a paying agency to individuals or groups and are conditional on specific conservation outcomes (Albers & Ferraro 2006). Performance payments are made on a strict quid pro quo basis, and the amount depends on the level of conservation outcome. Their focus is completely on outcome; the actions that led to the conservation outcome are not relevant. In the context of carnivore conservation, the conservation outcome can readily be defined as the number of carnivore offspring in a certain area. This conditionality concept gives the paying agency the possibility to pay exactly and solely for the conservation goal it strives for and is thus an interesting solution to the prevailing principal-agent problem.

A well-known problem of ex post compensation schemes is moral hazard (Cozza et al. 1996; Swenson & Andrén 2005), which leads to suboptimal levels of livestock protection. Conservation performance payments do not give rise to moral hazard because the payments are contingent on conservation outcomes and not livestock losses.

The conservation performance payments are issued for carnivore offspring and the amount is calculated to offset

all the future damage that the animals are expected to cause. Hence, compensation can be counted on and there are no time lags, which is not always the case in ex post compensation. Furthermore, herders do not have to bear the transaction costs of searching for animals killed by carnivores and the subsequent filing for compensation. Thus, the incentives to keep carnivores alive and let them reproduce are likely to be higher under a performance-payment scheme than under an ex post compensation scheme. Nevertheless, the assessment and verification of the defined conservation outcome, for example carnivore offspring, are likely to give rise to substantial transaction costs for the conservation agency. In certain cases this may be a serious drawback of these schemes.

Another problem arises when the responsibility for the conservation outcome cannot be attributed directly to individuals. In these cases groups rather than individuals can be granted the conservation performance payments. This approach was chosen in the Swedish scheme discussed later. Rewarding groups can in turn give rise to problems of collective action. Finding solutions to these problems is a crucial prerequisite for a conservation performance-payment scheme to work.

After a short description of the Swedish system of performance-based compensation we present our analysis of strategies developed in Sweden to circumvent the collective-action problem. We do this with reference to a set of criteria defined by Ostrom (1990). Our aim was to evaluate the common-pool regimes of the Swedish reindeer herders and to provide an assessment of the workability of the ex ante compensation scheme.

The Swedish Case

In 1996 the Swedish government implemented a new performance-payment strategy to attain and maintain stable populations of wolverines (*Gulo gulo*), lynx (*Lynx lynx*), and wolves (*Canis lupus*) within the country. Wolverines, which are listed as vulnerable on the World Conservation Union Red List of endangered species (Mustelid Specialist Group 1996), and lynx roam the wilderness areas in the northern parts of Sweden. They share the premises with reindeer (*Rangifer tarandus tarandus*) that are herded by the indigenous Sami people. Reindeer herding has been central to Sami livelihoods for centuries and is still deeply enrooted in their culture. Today about 20,000 Sami people live in Sweden and approximately 2,500 work full time in the reindeer business (Jordbruksdepartementet & Sametinget 2004).

Wolverines and lynx prey on reindeer (Persson 2005; Danell et al. 2006) and especially during the winter are assumed to essentially depend on the abundance of reindeer (Pedersen et al. 1999). Roughly estimated, each wolverine and lynx annually kills around 40 reindeer

(Swenson & Andr en 2005). Our recent survey revealed that, on average, herders lose nearly 20% of their reindeer flocks to carnivore attacks each year.

The conservation performance payments are made by the Swedish state to Sami villages contingent on the number of carnivore reproductions that are certified on the villages' reindeer grazing grounds. The payments are made irrespective of actual predation incidents. Incentives to apply optimal levels of livestock protection are not distorted and consequently the scheme does not give rise to moral hazard. Furthermore, there are no problems with time lags because payments are made for carnivore offspring (i.e., while the animals are too young to cause damage). The amount of payment is determined according to the monetary damage that the offspring are expected to cause throughout their lifetime. In 2007 the payment per certified wolverine and lynx reproduction was SEK200,000 (approximately US\$29,000). In Sweden payments are also made for the regular and occasional occurrence of lone wolverines and lynx. These payments of SEK70,000 and SEK35,000 (approximately US\$10,150 and US\$5,075), respectively, are lower than the payments for offspring. Once the money has been paid, the Sami villages have the authority to decide on the use and internal distribution of the money (Regeringens Proposition 2000/01:57).

Internal Management of Payments

If payments are set high enough to assure full compensation, the internal payment-distribution scheme needs to create a situation in which each individual herder has an incentive to refrain from killing carnivores to reduce the risk of predation incidents. Poaching carnivores would simultaneously reduce the likelihood of obtaining offspring and performance payments for these offspring in the next year. This makes strategies to solve the prisoner's dilemma of collective action necessary. Our main interest was to determine whether the Sami villages in Sweden have set up common-pool regimes to manage the distribution of the payments toward collective action in conservation and whether there are interdependencies among the villages' structural characteristics and their modalities of distributing the money.

The indicators we chose for the identification of common-pool regimes were derived from Ostrom's analysis of several long-term, common-pool systems of resource management around the world. Ostrom (1990) devised 7 design principles for institutional arrangements that are hypothesized to help make systems of resource management persist over the long term. The 4 principles we decided to investigate in the Swedish context were clearly defined boundaries, minimal recognition of rights to organize, collective-choice management, and congru-

ence between appropriation and provision rules and local conditions. The 3 excluded design principles are monitoring, graduated sanctions, and conflict-resolution mechanisms. Questions on these were deemed too sensitive for a mail survey.

Some of the information necessary to discuss these 4 principles in the Swedish context was available in legal documents. To obtain information on the last 2 design principles, we developed a survey with questions on the villages' modalities of distributing the conservation performance payments and their decision-making processes. The survey also included questions on structural characteristics such as the size of the villages' population and the severity of carnivore attacks on reindeer.

After discussing the questionnaire with a member of the Sami government, we sent it to the ombudsmen of the 51 villages. The first questionnaires were returned after a week. The ombudsmen who had not returned the questionnaire after 3 weeks were called and kindly asked to respond to the mail survey. Finally, questionnaires from 21 (41%) of the villages were obtained. To make sure there was no nonresponse bias, we controlled for the number of reindeer enterprises per village between responding and nonresponding villages. The results did not indicate any sample-selection bias.

"Clear boundary rules," the first design principle, were provided both in a geographical sense and with respect to the group of people. The reindeer herders are organized in villages with clearly defined geographical borders. Explicit laws have been formulated on how to assign the conservation performance payments if a carnivore reproduces in a border region between villages (Naturvårdsverket 2004). In addition, only Sami people are allowed to engage in reindeer husbandry.

"Minimal recognition of rights to organize" was met in this program because the villages have full rights to manage, use, and distribute the performance payments in whatever way they believe is best (Regeringens Proposition 2000/01:57). Their decisions on the use of the money cannot be overruled.

Theory suggests that collectively designed and frequently revised rules are likely to be well adapted to local circumstances and considered fair by most group members (Ostrom 1990). The questionnaire results revealed that in 13 villages (62%), all members collectively decide on the use and distribution of the performance payments. In 4 villages (19%) an elected committee makes this decision. The remaining 4 villages had other modalities. Concerning the frequency of the decisions, 13 (62%) of the villages annually decide on the use of their conservation performance payments. Three villages only discuss revisions of their rules if someone submits a proposal to change the current system. In 5 villages (24%) the decision has only been made once since the implementation of the performance-payment scheme in 1996. Nevertheless, none of the respondents in these 5 villages

mentioned that they were aware of unsatisfied members. These results suggest that many villages are flexible and adapt and revise their institutions to suit current circumstances.

To evaluate the fourth criterion, congruence between appropriation and provision rules and local conditions, we assessed whether there was an interrelationship between the allocation of payments to individuals and differences in the exposure to carnivore attacks between reindeer herders in a community. In 14 (67%) of the villages, all herders' reindeer were equally exposed to carnivore attacks, whereas in 7 (33%) villages they were not. The respondents of the 7 villages with an unequal distribution of carnivore attacks all explained that, especially in winter, not all reindeer are kept on the same pasture. Interestingly, the majority (79%) of the villages with equal exposure invested their conservation performance payments in the communities' common expenses. Only 3 (21%) of these villages directly allocated money to individuals. In the majority (57%) of the villages with unequal exposure to carnivore attacks, at least a share of the money was directly apportioned to individuals. When money was given to individuals, it was always distributed proportionally to the number of animals a herder owned. Although distributing the money only according to actual predation incidents would create perfect congruence, the observed strategy may be a second-best solution that has the advantage of low transaction costs.

The existence of these 4 design principles within this conservation performance-payment scheme gives some indication that prospects for the endurance of common-pool systems of resource management are promising in Sami villages. On theoretical grounds, the chances that the ex ante compensation can fulfill its purpose are thus equivalently good.

Up to now only very sparse empirical information has been available on which to base an evaluation of the effect of performance payments on carnivore offspring. Figure 1 illustrates the number of certified wolverine reproductions from 1996 to 2006. The performance-payment scheme was implemented in 1996. Until 2000 there was a cap on the total amount of money that was to be spent on performance payments irrespective of the number of reproductions. There seems to be an upward trend beginning in 2000, but it is difficult to ascertain whether this is due to the performance-payment scheme, natural factors, or improved methods of data collection.

On the other hand, in a long-term study of more than 200 radio-marked wolverines, 60% of adult mortality was ascribed to illegal poaching (this included sure and likely cases of illegal poaching) (Persson 2007). Research carried out between 1996 and 2002 on 245 radio-collared lynx in Sweden and Norway revealed that 46% of adult mortality was attributable to sure and probable illegal poaching (Andrén et al. 2006). Caution must be taken

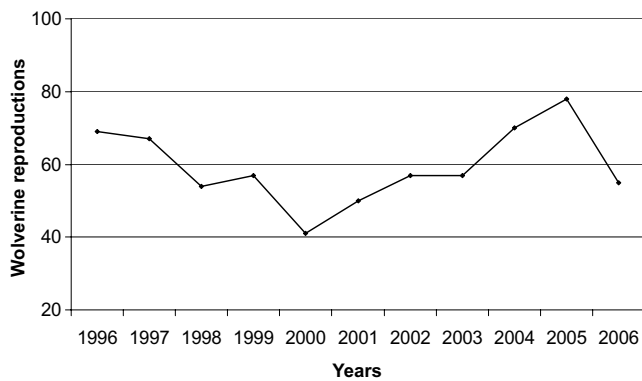


Figure 1. Certified wolverine reproductions 1996–2006 (source: Viltskadecenter 2006).

not to superficially and indiscriminately accuse all reindeer herders of illegal poaching. Although most may not have any connection to poaching activities, a review of recent verdicts on illegal poaching found that there were reindeer herders among the culprits (Forsberg & Korsell 2005). Thus, for the time being it is not possible to affirm the success of the Swedish conservation performance-payment scheme. What we can say is that the internal management in most of the surveyed Sami villages creates favorable conditions for the functioning of such a scheme. Further research will be necessary to assess the forces driving individual behavior.

Scheme Transferability

Whether a performance-payment scheme is likely to be a viable solution for wildlife-livestock conflicts in other parts of the world is another interesting question for further research. Deciding on how to allocate the payments may prove the most intricate problem. Payments for a defined conservation outcome should be made to those who are responsible for the outcome. In general there are two possibilities to allocate the payments: they can either be distributed to individuals or to groups of people (e.g., communities).

Making payments to an individual can be reasonable if the payment recipient is the person who indisputably has the greatest influence on the defined conservation outcome. The advantage of this approach is that it circumvents the prisoner's dilemma of collective action. In the carnivore conservation context, discerning who is responsible for the conservation outcome is likely to be cumbersome. Land titles can be used to determine whom to pay. Nevertheless, this is only be an expedient solution if private properties are large enough to contain the territories of several carnivores and changes of conservation outcome can be directly attributed to the respective landowner.

Tying payments to individuals' properties could be a major problem in developing countries with weak institutions and uncertain property rights (Ferraro & Kiss 2002). Under such circumstances local elites may take advantage of the unclear property rights situation and claim land titles on common land, thereby excluding less-influential, poor livestock owners, who are more vulnerable to livestock losses. Area-based schemes of direct payments for environmental services have been confronted with situations in which elites muscled out poor, less-influential people (Landell-Mills & Porras 2002; Pagiola et al. 2005). Thus, in cases of densely populated areas with small plots or unclear property rights, paying groups of people for performance outcomes may be more practical. The Swedish case study exemplified this approach. Each village was empowered to design a money-distribution scheme that was well adapted to its particular situation. The money could be distributed to individuals or invested in community projects that are beneficial to the whole group.

The institutional settings in other regions of the world may be less fitting for the installation of community-payment schemes. In particular, group boundaries may be less well defined, which could give rise to welfare magnet problems (i.e., people explicitly move to the community in hope of benefiting from the payment scheme). Nevertheless, for some regions, conservation performance payments may be an interesting alternative to conventional ex post compensation.

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