Grassland Stewardship Conservation Programming on
Natural Grasslands Used for Livestock Production:
Payment for Ecosystem Services Program Review
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Prepared by Rachelle Haddock and Kimberly Good

Miistikis Institute
c/o EVDS – University of Calgary
2500 University Drive NW
Calgary, AB
T2N 1N4
Phone: (403) 220-8968
Email: institute@rockies.ca
Web: www.rockies.ca
Executive Summary

Natural grasslands are on the decline on a global scale. They are an important ecosystem that is adapted to a specific climate and are home to a wide variety of wildlife and plant life that are well adapted to live there. On an ecological service scale they provide water cycling and regulation, pollination, habitat, climate regulation, food, spiritual and cultural value to name a few. Grasslands, particularly in North America, have also been very important agriculturally. Some types of agriculture (e.g., extensive grazing) are compatible with natural grassland functions but may not have as high an immediate economic return as other more intensive land uses.

Grassland regions are often referred to as working landscapes in that socio-economic activities are tightly tied to the health of the natural resources in the region. The current economic system that drives land use in grassland regions is agricultural commodity markets. These markets provide limited recognition of the ecological services produced and managed. Given this economic reality, people who live and work in these regions are often faced with choices when managing land that may result in a short term economic gain at the expense of long term ecological health. There is a need to reconcile individual economic needs with the needs of healthy functioning natural grasslands. One way to do this is to provide incentives that align long term, sustainable land management decisions with a stable and competitive economic return.

The purpose of this review was to evaluate existing PES programs from around the world that have applicability to livestock production in grassland ecosystems. For the purposes of this report PES is defined as a voluntary transaction where a well-defined environmental service or product is being purchased by at least one buyer from at least one provider, if and only if the provider supplies the product or service.

The review determined successful attributes and lessons learned from each program. Using this information, recommendations were developed for the design and implementation of a successful PES program for livestock producers managing conservation grasslands in the northern Great Plains of Canada.

The results of this review indicate that a simple, effective, results-based, financial incentive such as Payments for Ecosystem Services (PES) can address the market failure described above.

Five PES programs were reviewed. Each implemented in different jurisdictions in a variety of ways with the intention to improve the ecological and economic health of rural communities. The programs included A. Ground Nesting Birds in the Netherlands, Cooperative Management; B. Conservation Performance Payments for Carnivore Conservation in Sweden; C. Golden Cheeked Warbler Recovery Credit System; D. Rewarding Farmers for Vascular Plant Diversity in Managed Grasslands and E. PES from Agricultural Lands in the Northern Everglades in Florida.

Fourteen consistencies between the five PES programs reviewed were identified to contribute to the successful planning, design, implementation and/or ongoing function of a PES program.
i. Purpose of the program – There is generally an environmental issue that catalyzes the creation of a PES program and becomes the base of the program ‘purpose’.

ii. Clear goal/objective identification - It is critical to identify, at the outset, the goals of the program and for these goals to inform and drive the design of the program.

iii. An identified, sustainable “buyer” is essential – It is critical for a market to have a buyer willing to pay for in the environmental service being produced for ‘sale’.

iv. Appropriate scale – Scale will be informed by the ecosystem service of interest, and regional, state/provincial, and federal policy and regulations.

v. Consistent leadership is necessary - The design and cultivation of the PES program needs a full-time paid coordinator.

vi. Commitment to time and energy required - It is important to acknowledge that the development and on-going management of a PES program will take both time and energy.

vii. Program design should be adaptable – Adaptability in the design provides stakeholders an opportunity to explore strengths and weaknesses and to apply “lessons learned” in the evolution of the program.

viii. Scientific basis for program design - In order to ensure the payments support activities that lead to the desired outcome(s) it is important to establish scientific criteria first and then figure out the payment scheme.

ix. Simple monitoring / auditing processes - Create a monitoring scheme that is as simple as possible to administer but that is robust enough to deliver results with sufficient rigor to determine if the PES program is achieving its goals

x. Involving all stakeholders early in the process is critical - It is critical to have all stakeholders involved in the design of a PES program from the very beginning.

xi. Relationships are critical - Time must be invested to build trust and relationships with all stakeholders. All stakeholders should be represented at the design table.

xii. Value threshold - The reward to participants must be above the “value threshold” at which potential participants see reason to become involved.

xiii. Consider options for how payments are calculated. Land managers must feel the payment is adequate for the service provided before they will participate in the program. “Buyers” must feel the services provided are worth the payment or they may withdraw funding.

xiv. Reward success - A PES program can be designed to reward participants who are already engaging in good stewardship.
1.0 Table of Contents

Executive Summary ............................................................................................................................................. 1
1.0 Table of Contents ........................................................................................................................................... 3
2.0 Introduction ...................................................................................................................................................... 4
3.0 Methodology ..................................................................................................................................................... 5
4.1 Program Profiles ............................................................................................................................................. 7
   A. Ground nesting birds in the Netherlands: Cooperative Management ..................................................... 7
   B. Conservation Performance Payments for Carnivore Conservation in Sweden ...................................... 14
   C. Golden Cheeked Warbler (GCWA) Recovery Credit System ................................................................. 19
   D. Rewarding Farmers for Vascular Plant Diversity in Managed Grasslands ........................................ 26
   E. PES from Agricultural Lands in the Northern Everglades ..................................................................... 33
5.0 Analysis and Recommendations ................................................................................................................ 41
6.0 Appendices ..................................................................................................................................................... 48
   Appendix A- Interviewee List .......................................................................................................................... 48
   Appendix B – Agri-environment schemes and biodiversity: lessons learnt and examples from across Europe .................................................................................................................................................. 49
   Appendix C – Other References .................................................................................................................... 50
   Appendix D – Acknowledgements ................................................................................................................ 51
2.0 Introduction

Grassland ecosystems cover 31 – 48% of the earth’s surface (Gauthier et al, 2003). They are an important ecosystem that is adapted to a specific climate of relatively low precipitation, regular winds, cold, long winters and hot, short summers (especially in the northern parts) and often deep, fertile soils. Being one of the most productive and diverse terrestrial ecosystems they are also one of the most threatened in the world. North American and, perhaps more specifically for the purposes of this report Canadian grasslands are no exception. It is estimated that less than a quarter of Canada’s natural grasslands remain\(^1\).\(^2\). Despite increased awareness of the importance of properly managed natural grasslands for the provision of ecological services (e.g., water cycling, biodiversity conservation, soil conservation, wildlife habitat, pollination, carbon sequestration, etc.) the decline continues. The decline is due to the invasion of exotic plants, cultivation, a change in the fire regime, urban expansion, climate change and overgrazing\(^3\). As a result of such conversion, the grassland regions are home to the majority of the species at risk in each of the Alberta and Saskatchewan (Saunders et al. 2006; Michalsky et al. 2009). These species at risk have survived in this region alongside livestock ranching since European settlement.

Grasslands that are still intact are in areas where there is or has been an economic activity (i.e., livestock grazing) that is compatible with their maintenance. Well managed grazing of livestock provides a natural and desirable disturbance that is compatible with the conservation of natural grasslands. It is now known that most endemic grassland wildlife benefit from a certain level of grazing that results in a heterogeneous vegetative cover\(^4\). Therefore continued land management by livestock producers who manage their grazers in a way to enhance the ecosystem services of natural grasslands may be the best way to conserve the remaining natural grasslands.

The greatest obstacle to ranchers conserving natural grassland is the market forces livestock producers work within generally provide incentives that are at odds with practices that protect and enhance ecological services. Competitive land uses (e.g., recreational and residential development, and annual cropping) increase land prices over what is cost effective for livestock production. As input costs (e.g. feed, transportation) rise and red meat markets decline, conversion of grassland to other land uses becomes more profitable.

The value of the ecosystem services provided by intact natural grasslands, such as biodiversity and carbon sequestration, are not currently captured by land values or livestock markets. Management practices that benefit ecosystem services require time and effort, and often capital, over and above input required to raise livestock. These costs are currently unrecoverable by livestock producers. While

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\(^4\) The Value of Biodiversity to Ranching on the Prairies. Agriculture and Biodiversity Fact Sheets: Nature Saskatchewan
http://www.naturesask.ca/rsu_docs/ranching-and-biodiversity.pdf
grassland conservation has progressed significantly in recent years, conservation efforts have foundered on this obstacle. To address these issues, the Ranchers Stewardship Alliance Inc. (RSAI) believes that what is required is a financial incentive mechanism that is simple, effective and results-based. Payment for ecosystem services (PES) schemes are known to provide incentives to address market failure by altering the economic incentives or overcoming disincentives faced by land managers who can affect the provision of ecosystem goods or services such as biodiversity (DEFRA 2010). For the purposes of this report PES is defined as a voluntary transaction where a well-defined environmental service or product is being purchased by at least one buyer from at least one provider, if and only if the provider supplies the product or service.

This paper looks at five PES programs that have been implemented in a variety of countries in a variety of ways with the intention to improve the ecological and economic health of rural communities. In particular, programs that reward livestock producers for desired conservation results, regardless of how they get there were of most interest. These kinds of programs provide an opportunity for producers who have maintained the natural grasslands over time as compared to the more traditional conservation programs that focus on changing behaviour (e.g., reseeding marginal land).

3.0 Methodology

Knowing that the conservation of natural grasslands and the associated ecosystem services including the maintenance of or in increase of species at risk populations are of value to the broader community and with the intention to create economic opportunities that ensure the protection of and indeed intentional management of natural grasslands in Canada this report looks at five Payment for Ecosystem Services (PES) programs.

The program selection criteria were designed to choose programs that were piloted or working on landscapes and in circumstances similar to the Canadian grassland. The criteria included: in a grassland ecosystem, on a landscape where there is livestock production, involves conserving a species at risk (may or may not be main target), voluntary participation and results based. While there were no programs that matched the selection criteria exactly, there were a number of programs that met enough of the criteria to help inform a potential application in Canada and the Great Plains.
The programs selected were:

Table 1.0: PES programs and criteria

<table>
<thead>
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<th>PES Program/Criteria</th>
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<td>Grassland ecosystem</td>
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<td>A. Ground nesting birds in the Netherlands</td>
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<td>B. Conservation Performance Payments for Carnivores Conservation in Sweden</td>
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<td>C. Golden Cheeked Warbler (GCWA) Recovery Credit System</td>
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<td>D. Rewarding Farmers for Vascular Plant Diversity in Managed Grasslands</td>
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<td>E. PES from Agricultural Lands in the Northern Everglades in Florida</td>
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Once the programs were selected an interview was designed to address a number of questions about the programs. A list of contacts for each program was compiled from research papers or the program website for each of the programs. The contacts were emailed a request for an interview and a copy of the interview guide. The email also requested if they were not the right person to interview could they suggest someone else that might be more appropriate.

There were different responses from each of the programs and some limitations (e.g., time zone differences, language barriers, retirement or job changes of key personnel, etc.) to gather information from each of the programs in exactly the same way. Four programs provided verbal interviews while one program provided only written responses. After the first round of interviews, further interviews and email exchanges with the same or different contacts associated with the programs were also carried out for clarification or additional information. Scientific journal articles and assessment reports based on some of the programs also proved to be valuable resources. The interview guide was used to ensure all the points were covered but each respondent did not respond to every question verbatim.

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5 Two programs (A and B) were implemented and are still functioning as full PES programs. Two other programs (C and D) were pilot programs that are completed and were not implemented beyond the pilot period. One of the programs (E) began as a pilot and has now transitioned into an operational program.
4.1 Program Profiles

A. GROUND NESTING BIRDS IN THE NETHERLANDS: COOPERATIVE MANAGEMENT

a) Overview
According to Aad van Paassen (adviser, Landschapsbeheer Nederland), the number of ground nesting bird (or meadow bird) breeding pairs has been on the decline in the Netherlands for several decades. There was rapid intensification on the agricultural landscape from 1945 – 1980 that reduced ground nesting bird populations significantly (van Paassen, pers. comm.). To address this decline, different agri-environmental schemes (AES) have been implemented over time. Most recently, a number of parties came together to realize a Cooperative Management program where the federal government pays neighboring farmers who work together to create a management plan for part of their land to ensure ground nesting bird breeding success. Farmers enter a six year agreement and are paid for management efforts (postponing mowing date) and the number of birds on their farms. The target EGS is ground nesting birds and their habitat.

b) Background
A rather small percentage of the Netherlands is designated as nature reserves. This is one of the primary reasons why the country must protect nature in their agricultural areas (van Paassen, pers. comm.):

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\text{Netherlands in 2008 (1 hectare = 10,000 m}\^2,:} \\
\text{Total surface: 41,524,300 hectares} \\
\text{Agriculture: 2,259,000 hectares} \\
\text{Water: 782,400 hectares} \\
\text{Nature (forests, grasslands, peat, etc.): 485,000 hectares} \\
\text{Semi-built area: 396,300 hectares} \\
\text{Infrastructure (roads, railways, etc.): 117,100 hectares} \\
\text{Recreation: 97,700 hectares} \\
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The main driver of ground nesting bird decline in the Netherlands is insufficient breeding productivity resulting from both reduced hatching success and low chick survival (Kruk et al. 1997, Schekkerman & Muskens 2000, Schekkerman et al. 2005, chapter 7). This is especially true in agricultural grasslands where 60-75% of the nesting bird population occurs.

c) Program Evolution
The programs to protect ground nesting birds are linked to the Netherlands’ obligations to the European Union (EU) to maintain areas where ground nesting birds can live (van Paassen, pers. comm.). As well there is a national Dutch policy to conserve ground nesting birds and a national program to maintain areas where there are limitations to agricultural use (especially those areas with high water levels). Also, each province has a regional nature plan policy about habitat conservation where ground nesting birds live. Thus, policy and programs at the continental, national and provincial scale have shaped the programs described herein.

Through market research it became evident that a number of farmers in the Netherlands know how to manage for ground nesting birds. Most of the farmers who are active in managing for ground nesting birds are known by local volunteers who are active in ground nesting bird conservation, so it was easy to
identify “sellers”. However, van Paassen (pers. comm.) noted that only about 25% of farmers are sympathetic to ground nesting birds. It can be assumed that those 25% may be the early adopters as each new program is released. According to van Paassen (pers. comm.), there was no specific piece of research that supported the approach taken although it was built on a general body of knowledge of markets for ecosystem goods and services. Additionally, there is an extensive body of scientific/biological research on ground nesting birds in the Netherlands and this body of knowledge helped to inform the approach taken. There have been a number of stakeholders involved in a diversity of approaches to protect ground nesting birds on farms in the Netherlands. Nature conservation organizations (responsible for organizing volunteers), volunteers, groups of farmers, the government of the Netherlands and the European Union (in terms of advising on what national and EU regulations and policy apply to managing ground nesting birds) have all been involved in multiple iterations of AES for ground nesting birds (van Paassen, pers. comm.). Four of these iterations include: nest protection, “breeding birds as a farm product,” payment for density of nests & labour, and cooperative management.

NEST PROTECTION

Nests of ground nesting birds have been protected against losses from agricultural activities in a voluntary way since World War II, especially in the province of Friesland. Due to changes in farming practices, other provinces like Noord-en Zuid Holland have followed suit since the 1980s (van Paassen, pers. comm.). In 1994 a governmental program started to organise nest protection in all provinces.

Volunteers find and mark clutches so that losses due to farming operations and trampling can be avoided by farmers (Guldemond et al. 1993, Kruk et al. 1996). Currently about 150,000 nests are protected in an area of 360,000 acres on the land of 14,000 farmers each year with the assistance of 10,000 volunteers (van Paassen, pers. comm.). Landscape Management Netherlands coordinates these volunteers under the Volunteer Meadow Bird Protection programme. The volunteers and the farmers who are active and interested in managing ground nesting birds are well known to each other. The volunteers have a website for entering data on nests and breeding success and for news and field observations of the management of ground nesting birds (www.weidevogelbescherming.nl). This website can be used to enter into a new last minute contract as a result of farmer and volunteer observations throughout the season on birds with nests or chicks in grasslands that were without a suitable contract (van Paassen, pers. comm.).

Voluntarily protecting nests was sufficient through the 1980s. However, changes in agricultural practices (e.g., bigger machines, better drainage and earlier and more massive mowing) caused the realization that the way of attaining protection for ground nesting birds should be changed also.

“BREEDING BIRDS AS A FARM PRODUCT”

As early as 1975, the government entered into agreements with individual farmers to compensate for income losses owing to managing for ground nesting birds. However, there was not a robust selection process, nor a robust auditing process. It is felt by some that a lot of resources had been wasted in the sense that dollars invested did not result in improved ground nesting bird numbers (van Paassen pers. comm).
Dutch biologists created a program to offer dairy farmers payments to protect and encourage nesting birds as a farm product (Youth 2003). The experiment, conducted between 1993 and 1996 found that it was cheaper to pay farmers to monitor and manage breeding wild birds as if they were a crop than to offer compensation for keeping farm land out of production (Musters et al. 2001). Further, the project resulted in increased breeding of lapwings, godwits, ruffs, and other meadow birds, while not interrupting the dairy business (Musters et al. 2001).

The research project was not adopted widely. One of the reasons was it was felt the assessment of the results took too much time. Additionally, natural phenomena such as predators could cause the disappearance of meadow birds and as a result led to predator control by farmers, in order to receive payment for density of ground nesting birds (Melman, pers. comm.).

Another challenge is explained in the following description by Melman (pers. comm.). The concept of payment for ground nesting birds as a farm product (i.e., paying for density) was especially supported by a group of farmers who liked to be treated as professionals, who wanted to “produce a product” according to their own “craftsmanship” and wanted to be paid for birds present on their property rather than for doing prescribed measures. However, other stakeholders felt that there were too many external and uncontrollable factors that could reduce the population regardless of what the farmer did so were more in favour of payment for management actions than payment for birds. This became a philosophical debate at a national level. Could “nature” be considered as a product or should conditions be created through management to favour nature? Those against payment for the presence of “nesting birds” believed the presence of the ground nesting birds was a consequence of the conditions created through the management actions and it was those actions that should be ‘paid for’.

**Payment for Density of Nests & Labour – “legselbeheer”**

In the “legdelbeheer” program farmers were paid in relation to nest density but not specifically for the number of nests. Rather the payment level in the scheme was related to the labour costs associated with looking for nests, marking nests, preventing damage from agricultural field activities. This system did not call for postponed mowing dates. So while the payment was tied to nest density it was not really a nature production payment but a payment for labour related to the density of nests. According to Dick Melman (Senior Researcher, Alterra, Wageningen-UR), under this system the payment level ranged between €69-129/ha for a certain year.

**Cooperative management**

In an effort to further support ground nesting birds’ long term viability, it was realized that farmers could also be provided with incentives to ensure that young birds reach adulthood by providing suitable habitat within which to mature (van Paassen, pers. comm.). As a result, the program built upon “legselbeheer” to manage larger areas of grassland for ground nesting bird habitat. Melman (pers. comm.) provided a detailed overview of cooperative management.

In practice, this approach is carried out on areas of over 100 hectares. Multiple farmers are involved through cooperatives. Farmers in the cooperatives were required to realize an average bird density on their combined parcels of land. Not every farmer’s parcel had to meet the required density, but on average the combined land parcel had to meet the required density. All money from the government is
paid by the cooperatives to farmers related to the number of nests on their fields. The amount of money paid is not related to the area of land under this scheme.

In most cases the amount of money per nest is determined by the cooperative. The cooperative ensures that the amount of money in their central fund is sufficient to pay for each nest as well as the labour costs related to realizing bird density previously described as “legselbeheer” (payment for labour related to density of nests). In many cases the cooperative decided to differentiate the amount of money paid per nest depending on the species. For instance, a modest price (e.g., €25/nest) was paid for lapwings while black-tailed godwits realized a higher price (e.g., €75/nest) as they are less common.

The government established a rule that all participating farmers were obliged to engage in certain management activities. However, if the required nest densities were realized then the prescribed management activities were not compulsory. Farmers liked this approach to payment as it gave them much flexibility to fit meadow bird management into their conduct of business. This approach realized a combination of payment for management actions and payment for results.

The government carried out education efforts regarding the program. There is a website managed by the provinces where groups of farmers can enter and see their contracts (www.portaalnatuurenlandschap.nl). There are also two organizations’ websites that provide technical and scientific information to farmers about how policy affects them, how to participate, about the biology of the birds, about actions they can take to support birds, etc. (www.veelzijdigboerenland.nl and www.boerenatuur.nl). The farmers also get together and talk about agreements and other subjects concerning nature on agricultural land (van Paassen, pers. comm.).

d) Program Description
Each of the Netherlands’ twelve provinces (as the regulator and buyer of the ecosystem service) is responsible for administering the program within their jurisdiction. In order to participate, farmers must have ground nesting birds on their land. As a cooperative, farmers submit a management plan that is approved by the government and the farmers enter into an agreement with the government for six years. The Netherlands also have land dedicated as Nature Conservation Areas (NCAs) that have ground nesting birds. These NCAs are eligible to enter into management agreements just like the farmers. Also, farmers can work with adjacent nature conservation areas just as they work with neighbouring farms to manage for ground nesting bird habitat. When a plan is submitted the province determines if the plan is appropriate to achieve the desired results. If the plan is not acceptable the farmers must adapt it and submit it again.

While there is not a direct monetary cost to participate, there is a cost to the participants in their time and resource requirements. Farmers don’t directly pay to participate but they have to join a cooperative which is eligible to receive the nesting bird payments from the government (Melman, pers. comm.). Farmers do not pay a membership fee to the cooperative. The fund pays farmers according to management efforts made (i.e., “legselbeheer”) and according to bird densities. Payment for birds is described as “nature-production” money and amounts to about €30/ha/year. If there is a regular density of ground nesting birds in the area this amount of money is sufficient to offset the costs of protecting
ground nesting birds (Melman, pers. comm.) Farmers are paid annually for their efforts (van Paassen, pers. comm.). Currently, 5,000 to 6,000 farmers are participating on an area of 50,000 hectares.

Participating farmers are randomly monitored throughout the six year time frame. If the farmers are not successful in achieving their management plan, farmers will not be able to submit the same management plan. They will have to adapt it to something achievable and, if possible, enter another management agreement for six years. Melman (pers. comm.) contends the program is poorly monitored. There are proposals in place to use acknowledged monitoring methods as well as the use of a knowledge system to plan management actions (Melman, pers. comm.).

The payments for managing for ground nesting birds represent about 5% of total income for farmers who participate (van Paassen, pers. comm.). Farmers are paid each year and after six years the total payment is adjusted based on their performance according to their management plan. Farmers may have to give money back to the government if they have been overpaid annually based on the final assessment at six years. Generally farmers do not like this part of the payment system.

Part of the money for the program comes from the European Union’s Environment Committee. The rest of the money currently comes from provincial governments. The cost of payments for ground nesting bird management amounts to $26 million Euro (approximately $32 million CAD) annually (van Paassen, pers. comm.). Not all of this money is going to farmers as this total includes money paid to Nature Conservation Areas as well. Given that financial resources are limited, in 2010 the government of the Netherlands opted to focus on only certain areas within the country based on ground nesting bird habitat (van Paassen, pers. comm.).

A great deal of maintenance/work is necessary to keep the program going from an administrative perspective (van Paassen, pers. comm.). Overseeing the management agreements and payment scheme is very time intensive. Each cooperative is obliged to make a “quality handbook.” The handbook describes how management plans are made; maintained; monitored; audited; etc. The quality handbook must be approved by a commission, and based on this approval the cooperative is certified. External audits are made by professionals and volunteers in order to maintain the certification.

According to a number of researchers (Kleijn et al., 2003; Breeuwer et al., 2010) who are cited by Melman (2010), the cooperative management approach, in combination with management for ground nesting birds on nature reserves, should stop the decline in numbers of the black-tailed godwit, amongst other species, but have not been very effective up till now. Melman (2010) suggests that a “reason for this lack of success could be, that the proposed management plans do not take into consideration the temporal and spatial relations and coherency between the management measures taken, thus evaluating whether the good quality grassland is too fragmented or not” and he cites several researchers whose work supports this claim (Melman et al., 2008; Schotman et al., 2005; Schekkerman et al., 2008).

The future of the program is uncertain and will be shaped during 2014 when talks between the Netherlands and the EU will re-negotiate agri-policy for the EU. These negotiations will cover things like money and jurisdiction for the ground nesting birds program (Youth 2003).
In 2006 there was a declaration that the decline in ground nesting birds had to be halted and that by 2010 an increase in bird numbers should be recognizable. The responsible minister set a goal of 50,000 breeding pairs of black tailed godwits. As of August 2012, it is estimated that the number is 40,000 breeding pairs. The annual decline is approximately 4-5% (Melman, pers. comm.).

e) Program Reflections

HIGHLIGHTS

There are a number of things that worked very well in the cooperative management approach (van Passen, pers. comm.).

- Regional approach – having groups of farmers organize together worked well because they take ownership of the goals and also gives them a kind of “social” control and incentive to participate (influencing each other in positive ways). A regional approach also enabled adequate communications about the program and what is going on in the field with the ground nesting birds (i.e., how to be as successful as possible in taking actions to get breeding success).
- Appropriate landscape scale – working with groups of farmers on at least 100 hectares (although noted above 100 hectares may not be enough) is effective as it is the only way to get a big enough area where ground nesting bird habitat can be managed for successful hatching and rearing. Managing isolated individual grasslands had not been effective.
- Flexibility of agreement – Farmers can adapt their management on an annual basis to account for changes in bird numbers. Another aspect of flexibility in this program is the option of last minute additional contracts so that farmers can adapt to seasonal changes in bird performance.
- Involvement of professionals and volunteers for monitoring – Volunteers help offset some of the costs of monitoring. Enthusiastic volunteers also engage in positive interactions with the farmers about their mutual appreciation for ground nesting birds.

CHALLENGES

There are a number of things that present challenges with this approach (van Paassen, pers. comm.).

- Needing to ensure that management activities are well known to provide a benefit in increasing bird viability rates. If they are not then producers can spend a lot of time and energy and the program can spend a lot of money doing things that do not ultimately achieve the desired outcomes.
- Transition between generations – there are farmers who believe in the program, but it is uncertain what will happen when their children take over the farm. The children may have different ideas about managing for ground nesting birds. As a result, it is necessary to bring income from managing for ground nesting birds to a level that is relevant in an economical way. Further, in the last 20 years the countryside has undergone a gradual change in use: residential, employment and recreational uses are on the rise at the expense of farming (Nature Balance 2006). Given these pressures, it may be even more important to make managing for ground nesting birds a relevant source of income for farmers.
- Commitment – there is a need to have ongoing commitment from farmers, society and government to make the program work.
• Time and energy intensive – a lot of maintenance/work goes into keeping the program running. There is a need for simpler arrangements.
• Exploring value added component of the program – A certification program is currently under consideration however it is hard to deal with the logistics of bringing certified ground nesting bird-friendly products to market. Further, there is uncertainty as to whether citizens would be willing to pay more for these products. It is worthwhile exploring this option as it could enable managing for ground nesting birds to be more economical to farmers.
• Payment – the contracts should be longer to give more certainty to farmers and for nature.

f) Resources
http://www.landschapsbeheer.nl/english/landscape-management-netherlands
www.potaalnatuurenlandschap.nl
www.weidevogelbescherming.nl
www.veelzijdigboerenland.nl
www.boerenatuur.nl
http://www.vogelbescherming.nl/vogels_beschermen/landelijk_gebied/weidevogels

g) References
http://www.birdlife.org/eu/pdfs/Agrienvironment_schemes_lesson_learnt.pdf


B. CONSERVATION PERFORMANCE PAYMENTS FOR CARNIVORE CONSERVATION IN SWEDEN

a) Overview
This program is focused on pastoralists (reindeer herders) whose practices could affect species at risk (carnivores) in Sweden. In the early 1990s the Swedish government recognized that certain practices used by rural reindeer herders (the Sami people) were having an impact on carnivore species at risk present on reindeer grazing grounds. Previously a conventional compensation payment scheme was established based on reindeer loss. It was flawed in several ways so both the nature protection agency and the reindeer herders were interested in replacing it. The government launched a performance based agri-environmental scheme called “Conservation Performance Payments for Carnivores” in 1996. Recognizing that there is a public desire to have specific species (e.g., wolverine, lynx, bear, golden eagle and wolves) on these landscapes and given Sweden’s requirement to abide by ratified international biodiversity agreements, the Swedish government allocated funding to support the presence of these species. It is designed to increase species at risk biodiversity by addressing the conflict between carnivores and the local reindeer herders. Instead of villagers receiving compensation payments for dead reindeer that were killed by a carnivore, they are paid for the number of carnivore
reproductions that are certified on the reindeer grazing grounds. The payments are made regardless of predation occurrences or any other impact to the reindeer. The focus is entirely on the number of offspring produced by the identified species at risk on the land. The actions that lead to the conservation result are irrelevant.

b) **Background**

In Sweden, predators are allowed to disperse within the limits of their natural range. In particular, carnivores ought to be able to recolonize forested areas in southern and central Sweden where they were extirpated in the 20th century. However, Swedish Parliament has decided that their status in reindeer areas should be managed so that organised reindeer husbandry is not rendered impossible. For the purposes of protecting livestock and preventing damage, hunting of carnivore species is allowed in Sweden. The Swedish Environmental Protection Agency issues controlled orders and licensed hunting on brown bear, wolf and lynx on the basis of hunting legislation. Controlled hunting for wolverine is also allowed.

The Conservation Performance Payments for Carnivores program was set up to address Sweden’s goals for predator populations and to enable the sustainability of reindeer husbandry for the Sami people. The average annual wolverine and lynx kills are approximately 40 reindeer (Swenson & Andrén 2005). This results-based payment scheme was set up to replace the more traditional compensation-for-losses payment scheme that did not provide incentives for carnivore conservation (Zabel and Holm-Müller 2008).

Conservation performance payments are monetary or in-kind payments made by a paying agency to individuals or groups and are conditional on specific conservation results (Albers and Ferraro 2006). Performance payments are made strictly on the presence of the desired carnivore species. The amount paid is dependent on the level of conservation result and the actions that led to the conservation result are not relevant (Zabel and Holm-Müller 2008).

The conservation performance payments are issued to groups of Sami people for presence of carnivores and carnivore breeding success. The target EGS are reproductions of wolverine, wolf and lynx. The payments are made to groups of Sami people instead of to individuals as the responsibility for the conservation results cannot be attributed directly to individual reindeer herders (Zabel and Holm-Müller 2008). The amount provided is intended to offset all future damage the carnivores are expected to cause.

c) **Program Evolution**

According to Jordbruksdepartementet (Department of Agriculture) and Sametinget (the Sami Parliament) (2004), reindeer herding has been central to Sami livelihoods for centuries and continues to be deeply

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rooted in their culture. About 20,000 Sami people live in Sweden and approximately 2,500 work full time in the reindeer business (ibid). Only Sami people are allowed to engage in reindeer husbandry, and the reindeer herders are organized in villages with clearly defined boundaries (Zabel and Holm-Müller 2008).

According to Astrid Zabel (Postdoctoral Researcher, Swiss Federal Institute of Technology), the main scheme design was done by Naturvårdsverket (the Swedish Environmental Protection Agency or EPA) and the Sametinget who are the elected Sami representatives. Scientists were also involved to provide background information. The main goals of the program are to reach the national carnivore population goals and to provide the Sami villages compensation for the presence of carnivores and particularly for breeding success of carnivores (Zabel, pers. comm.).

According to Zabel (pers. comm.), the EPA realized that a conventional compensation scheme did not provide incentives to conserve carnivores. They wanted a new system that would change this. The program designers were not aware of any similar programs and designed this one completely to fit the local circumstances of the Sami reindeer herders.

There is significant research on the carnivore-reindeer prey relationship and carnivore ecology that was used to create the program. This research is ongoing and the results are used to continuously refine the program (Zabel, pers. comm.).

This program is enshrined in the governmental carnivore policy as described above. This policy sets the national carnivore population goals in terms of lynx and wolverine numbers. The design process was very involved. It was built on trust between the Swedish government and the reindeer herder representatives (Zabel, pers. comm.).

The Sami reindeer herder villages are paid for the number of lynx and wolverine offspring that are counted on their grazing grounds. The number of animals is verified each year by annual inventory done involving reindeer herders together with county field experts. They mainly search for tracks in the snow, and sometimes they find the dens. There are very explicit rules according to which tracks in the snow are counted as a family group (i.e., adults with offspring) or only lone animals and also to differentiate whether there are one or two groups in the same area (Zabel, pers. comm.).

 d) **Program Description**

The program is administered by the Swedish EPA and all 51 Sami villages\(^8\) participate. There is no application process as it is non-voluntary.

The conservation performance payments are made by the Swedish state to Sami villages based upon the number of carnivore reproductions that are certified on the villages’ reindeer grazing grounds. The payments are made regardless of actual predation incidents (Zabel, pers. comm.). In 2007, the payment per certified wolverine and lynx reproduction was SEK70,000 (approximately $10,368 CAD). Payments are also made for the regular and occasional occurrence of lone wolverines and lynx. These payments are

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\(^8\) Payments are made to villages not individuals.
SEK70,000 and SEK35,000 (approximately $5,184) respectively (Zabel and Holm-Müller 2008). Once the money has been paid, the Sami villages have the authority to decide on the use and internal distribution of the money (Regerinegens Proposition 2000/01:57).

The intent is that the payments are high enough to ensure full compensation and allow the internal Sami payment-distribution scheme 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 the resulting performance payments for these offspring in the next year (Zabel and Holm-Müller 2008).

While there is not a direct monetary cost to participate, there is a cost to the participants in their time and resource requirements (Zabel, pers. comm.). The Sami people spend a considerable amount of time on the annual carnivore inventory and at many meetings for which they are not directly compensated. In addition, many Sami feel the current feel the carnivore payment is insufficient.

In 2010, 48.5 million Swedish krona (approximately $7.2 million CAD) was allocated to the 51 Sami communities by the Sami Assembly. Compensation varies with carnivore species as indicated above. The Government sets compensation levels annually in its appropriation to the Sami Assembly. Explicit laws have been created on how to assign the conservation performance payments if a carnivore reproduces in a border region between villages (Naturvårdsverket 2004). The villages have complete rights to manage, use and distribute the performance payments how they believe is best (Regerinegens Proposition 2000/01:57). Each village designed its own money-distribution scheme to suit its specific circumstances and context. The money could be distributed to individuals or invested in community projects that would benefit the whole group (Zabel and Holm-Müller 2008).

e) Program Reflection

Zabel and Holm-Müller (2008) concluded it was not possible to confirm the success of the Swedish conservation performance-payment scheme. There seemed to be an upward trend in certified wolverine reproductions beginning in 2000, but it was challenging to determine whether this was due to the performance-payment scheme, natural factors, or improved methods of data collection. In a long-term study of more than 200 radio-marked wolverines, 60% of adult mortality was ascribed to illegal poaching (including “sure” and “likely” cases) (Persson 2007). Between 1996 and 2002, research on 245 radio-collared lynx in Sweden and Norway revealed that 46% of adult mortality was attributable to certain and probable illegal poaching (Andrén et al. 2006). Although most reindeer herders may not have any connection to poaching activities, a review of verdicts on illegal poaching found that there were reindeer herders among the culprits (Forsberg and Korsell 2005).

Even though Sametinget were involved in the negotiation the interviewee reported that the Sami people do not generally believe the payments per carnivore offspring fairly compensate for the reindeer deaths.

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that do occur or the losses caused by the stress of carnivore presence (Zabel, pers. comm.). As a cultural community it seems the Sami do not attribute “value” to carnivores. They are willing to tolerate the number of carnivores that would kill at maximum five percent of their herd. Currently losses are at 20-30% of their reindeer herds annually. How the Sami people value carnivores, whether that is a monetary or cultural value, it may seem that it is not enough at this point in time; particularly if the poaching activity is providing a higher valued result than the payments are providing.

HIGHLIGHTS
- Stakeholders, including the Sami leaders and government, worked together to create the program.
- There is ongoing research on carnivore populations and compensation levels are set annually.
- There is public support for using government funding to support carnivore conservation.

CHALLENGES
- There seems to be a misalignment between what the reindeer herders expect or believe is fair and what their leaders expect or believe is fair with respect to compensation and carnivore management.

f) Resources


C. **Golden Cheeked Warbler (GCWA) Recovery Credit System**

a) **Overview**

This program provided payment for ecosystem services through reverse auction\(^{10}\) to private land owners to engage in recovery measures for golden cheeked warbler (an endangered bird species in the USA). It was designed as a “proof of concept” program to test how such a design might work. The following summary of the GCWA Recovery Credit System is a direct excerpt from the “Third Party Evaluation of the Recovery Credit System Proof of Concept” created by Robertson Consulting in 2010:

The Recovery Credit System is a framework for federal agencies to implement recovery measures for threatened and endangered species under which federal agencies may offset adverse effects of agency actions taken elsewhere for that species. The proof of concept was implemented at Fort Hood Military Reservation. Developed by a working group, it allowed the Department of Defense to receive credit for recovery measures implemented by private land owners to offset adverse effects from training activities pertaining to the conservation of the golden-cheeked warbler (Dendroica chrysoparia). Model elements tested in the proof of concept were as follows:

- Federal agencies may offset adverse effects of agency activities to a listed species by beneficial effects of actions taken elsewhere for that species. The combined effects of the crediting (beneficial) and debiting (adverse) actions must provide a net benefit to recovery of the species. The biological opinion for debiting (United States Fish and Wildlife Service, March 3, 2009) defined the net benefit to recovery for the proof of concept.

- Credits are acquired through conservation and management actions on private lands. In the proof of concept, credits were determined by applying weighting criteria to conservation units (up to 20 acres = one unit) for habitat; a wildlife management plan identified required management actions\(^{11}\).

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\(^{10}\) Reverse Auction – an auction where the seller puts in the price they are willing to accept as compared to a forward auction where the buyer puts in the price they are willing to pay.

\(^{11}\) The crediting system is described in detail under the program description section. For a complete description of the crediting methodology, please see Robertson Consulting Group. “Third Party Evaluation of the Recovery Credit System Proof of Concept.” March 2010.
In the proof of concept, private land owners enrolled their properties through a reverse auction; competitive elements included contract term, cost per recovery credit year (credits determined multiplied by contract term), and land owner cost share.

Perpetual loss of habitat due to federal agency actions will be offset by perpetual credits while temporary habitat loss may be offset via term credits. The proof of concept tested term credits (up to 25 years).

Compliance and effectiveness monitoring, as well as fund and credit accounting, are required through the life of the credit contracts. (p. i)

The model provided important contributions for conservation and to the military through working toward species recovery, extending conservation beyond the boundaries of Fort Hood by engaging private land owners, formalizing a market-based tool for trading credits, and providing an additional method for removing restrictions on training (Robertson Consulting 2010).

b) Background
According to Omar Bocanegra (staff, US Fish and Wildlife Service), stakeholders in Texas were looking for a new way to address endangered species issues. In this case, the issue had to do with a military base that is very large in size and has two populations of endangered birds including the Golden Cheeked Warbler (GCWA) and the black capped vireo. The GCWA was listed in 1990, and it only breeds only in Texas. It is the only warbler in North America that breeds in a single state. The military base has the largest population of these birds under a single management authority. The program provided another way to address military training and management of the GCWA on the base.

The US Army, state government (Texas Department of Agriculture), Texas A & M University, non-profit organizations (including environmental groups and land owners’ groups) and the US Fish and Wildlife Service (USFWS) were involved in creating the program. The program started in February 2006 and was carried out as a three-year pilot project. This represented something different that had not been done before. The program officially came to conclusion in March 2009 (Bocanegra, pers. comm.). The target EGS of the program was GCWA habitat of significant size where GCWA are present.

c) Program Evolution
The program was first initiated when the core commander at Fort Hood reached out to the Texas Department of Agriculture for help in working with private land owners to address the challenge of managing the GCWA on Fort Hood. At the time Fort Hood was very active training troops for deployment to the Middle East. The training occurred on land which contained habitat for the GCWA. A science committee, a policy committee and an economics committee were formed. These committees were made up of scientists, federal and state agency staff, and non-governmental organizations. According to Brian Hays (Extension Program Specialist, Texas A & M University) and Justin Tatum (Texas Watershed Management Foundation), the result of their work was the recovery credit system which was formalized as federal policy in 2008 through the USFWS Recovery Crediting Guidance creating the policy tool used to mitigate for GCWA (Hays and Tatum, pers. comm.). The program was established at very high level
through communications between the Department of the Interior and US Military (Bocanegra, pers. comm.).

This approach was chosen because it allowed the USFWS and the US Army to work within the confines of the existing regulatory framework set out in the Endangered Species Act or ESA. It is specifically linked to section 7 of the ESA\footnote{USFWS consultation – section 7 of ESA – if a federal action would adversely affect a listed species, USFWS can legally authorize take if it won’t jeopardize the species through a biological opinion. The Army had to have section 7 in place in order to impact habitat and issue credits to land owners.} which involves federal agency responsibility. This section applies to federal agencies. It gives federal agencies certain responsibilities and flexibility with regard to actions that may affect listed species (Bocanegra, pers. comm.).

Bocanegra (pers. comm.) stated that aspects of this program were initially modelled after the Conservation Reserve Program\footnote{Housed in the Farm Bill, the Conservation Reserve Program (CRP) started during the dust bowl era to preserve soil. Through the Conservation Reserve Program the government pays people to not farm certain parcels of land and to plant perennial plants to keep soil and land intact. Farmers bid to get into the program.} in that farmers submit bids to participate in the program. The program is also loosely based upon conservation banking. Conservation banking provides credits for impacts to listed species, usually for non-federal actions (although federal agencies can and do use banks) and it almost always requires perpetual preservation\footnote{http://www.fws.gov/endangered/esa-library/pdf/conservation_banking.pdf}, although the GCWA program only involved temporary agreements.

Fort Hood was the buyer for the credits. Fort Hood was interested in exploring the use of temporary credits (25 years or less) through this program to address training actions that would result in temporary impacts to the GCWA. Additionally, leading up to development of the program Texas A & M did research on land owners’ willingness to participate in the program. They learned that land owners did not want to commit to a perpetual agreement if there was an option for a temporary agreement (Bocanegra, pers. comm.). In support of this, Hays and Tatum (pers. comm.), gave the analogy if there were 100 land owners and the talk turned to conservation 65 would stay to listen. If endangered species came up only 30 would be left. When the conversation turned to perpetual agreement, there would be 2 land owners left in the room.

According to Hays and Tatum (pers. comm.), temporary agreements are a good precursor for future permanent conservation. They are a good tool to get landowners comfortable with the idea of endangered species conservation. Further, during the last two bidding rounds of the program several of the landowners asked if they could enroll for longer than 25 years (Hays, pers. comm.).

At a local level, farmers learned about the program through word of mouth (Robertson Consulting 2010). More formal communications were carried out by Texas Watershed Management Foundation (TWMF), a not-for-profit organization. Over 100 land owners were visited by TWMF/Texas A & M University staff to discuss the program.
d) Program Description

The Texas Watershed Management Foundation (TWMF) carried out communications and administration. TWMF created the management plans for participating landowners. They were also the liaison with land owners and carried out monitoring to ensure compliance with the management plans. The USFWS made sure that the program complied with the ESA.

In order to participate in the program land owners had to be in one of the six pilot counties, meet the program requirements of being part of a large enough patch of suitable GCWA habitat, provide their cost share as described below and sign a contract. Parcels of land as small as 20-acres could be in the program, but they had to be part of at least a 250-acre block of habitat (Bocanegra, pers. comm.).

Land owners interested in participating submitted a bid through a competitive reverse auction process (Hays and Tatum, pers. comm.). Assistance was available from TWMF to help interested land owners create and submit a bid. Land owners put forward a bid that outlined an annual payment they expected for the credits, any funds they required to invest in management activities specific for the warbler (as outlined in a management plan for the warbler) and they could include funds that they would allocate to stewardship activities that would contribute to general ecological benefits not specific to the GCWA (e.g., prescribed burns, roads for prescribed burns, cross fencing, etc.). If a bid was successful the rancher would receive their annual payment for their credits as well as receive assistance to complete the management activities.

There was no cost to apply, however both the land owners and the TWMF invested time and resources into creating bids. There was a mandatory cost-share of 25% by the land owner on management activities included in the bid. In some cases, the funds for the management actions/projects flowed through the TWMF and were never provided directly to land owners; this was done to lessen any potential tax burden on land owners. Some landowners chose to receive their funds directly (Hays and Tatum, pers. comm.). This mechanism appealed to a number of land owners who were simply interested in doing management activities regardless of the existence of GCWA on their property. It provided them with a financial means to do something that they wanted to do anyway (Robertson Consulting 2010).

Over the three-year pilot 20 land owners were involved. While this is a small percentage of the thousands of land owners in the six-county pilot area, available funds for the pilot limited the number of land owners who could participate. By the end of the pilot program, Fort Hood had debited 230 acres and used credits from five properties. There are still 15 properties with temporary credits remaining in the “bank” at the Texas Watershed Management Foundation. Fort Hood may sell these credits to another entity that will be doing debiting in GCWA habitat (Hays and Tatum, pers. comm.). In other words, the credits belong to Fort Hood and they are being held in the “bank” at TWMF.

Unfortunately for this project, we were unable to speak to any of the land owners owing the guarantee of privacy and anonymity that was extended to land owners when they signed on to the pilot program. However, the Robertson Consulting third party evaluation (2010) included interviews with several land owners. Some of the comments put forward by land owners through those interviews are presented here:
• Land owners reported an increased level of knowledge about GCWA and their habitat. Some land owners did not even know that they had the birds on their land, and one land owner commented that the GCWA “is now their favorite bird.”
• Some land owners commented on their preference for a temporary agreement as they did not want to bind their next generations to a perpetual agreement.
• Some land owners primarily put forward a bid to enable them to do desirable management on their land.
• Some land owners reported that the program changed an endangered species from a liability into an asset. One in particular noted that it changed how they viewed development after their involvement in the program as a proposed power line through their property may have jeopardized the GCWA habitat on their land.

Funding came from US Army, US Department of Defense, US Department of Agriculture, and the National Fish and Wildlife Foundation ($3.4 million US dollars total). Table 2.0 (Robertson Consulting, 2010, p. 5) outlines the funding sources and use of funding for the GCWA pilot program.

<table>
<thead>
<tr>
<th>Table 2.0 Funding sources and use of funding for GCWA pilot program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Figure 2: Funding for the three-year proof of concept.</strong></td>
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<tr>
<td><strong>Funding Sources:</strong></td>
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<tr>
<td>Department of Defense/U.S. Army</td>
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<tr>
<td>USDA-Natural Resource Conservation Service</td>
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<tr>
<td>National Fish and Wildlife Foundation</td>
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<tr>
<td><strong>Total Funding</strong></td>
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<tr>
<td><strong>Funding Uses</strong>:</td>
</tr>
<tr>
<td>Administrative costs (agency overhead to Texas AgriLife Research and Extension)</td>
</tr>
<tr>
<td>Research and monitoring conducted by Texas A&amp;M University Institute of Renewable and Natural Resources (IRNR)</td>
</tr>
<tr>
<td>Program costs (habitat assessment, management plan development, attorney fees, Texas Wildlife Management Foundation and IRNR staff, and operating costs)</td>
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<tr>
<td>Expended landowner contracts (will extend beyond the three-year proof of concept but are funded in full)</td>
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<td><strong>Total Uses</strong></td>
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*Includes actual to date and budgeted
Source: Recovery Credit System operator

Staff from the TWMF reported that the day to day operations were streamlined, flexible and efficient. They worked with the land owners to get their conservation programs going and to line up contractors to do the work. Texas A&M University extension personnel were involved in research and monitoring, and writing annual reports (Hays and Tatum, pers. comm.).

Grassland Stewardship Conservation Programming on Natural Grasslands Used for Livestock Production: Payment for Ecosystem Service Program Review
The monitoring of EGS is described in detail by Robertson Consulting (2010). The Recovery Credit Guidance describes monitoring the credits. There are four types of monitoring occurring:

1) monitoring of management practices,
2) species monitoring,
3) fund accounting, and
4) credit accounting.

With regard to monitoring of management practices, TWMF personnel make weekly visits to the enrolled properties while the work is occurring. Upon completion of the work, both TWMF personnel and Texas A&M representatives visit the property to ensure compliance with the management plan. TWMF personnel also make an annual visit to verify that the habitat is still intact and then complete a written annual inspection report; this is typically completed after the species has left central Texas for its winter range and the graduate students have completed their summer work. In addition to the annual visit, both TWMF and Texas A&M University extension personnel review aerial photos to assess compliance.

With regard to species monitoring, Robertson Consulting (2010) noted that Texas A&M field technicians and graduate students were paid a stipend to visit each site to review habitat and determine if the GCWA is present on the habitat patches enrolled in the recovery credit program. Then, on a subset of all properties, the students also determined the abundance of the birds through point counts and productivity (nesting status and fledgling success). The final result is a data set that includes presence/absence, abundance, and productivity on both the Recovery Credit System properties and 25 non-Recovery Credit System properties.

In addition to assisting with the monitoring, graduate students also conducted research projects that contribute to the general knowledge of the species and were the source of the scientific information used to inform the program (Robertson Consulting 2010). The monitoring and research that has been carried out as a result of the recovery credit program have led to an increased knowledge about the GCWA predominantly because researchers previously did not have access to these private properties (Hays and Tatum, pers. comm.).

An accounting firm hired by the TWMF accounts for both the money and the credits. Recently, the foundation commissioned an audit of both the funds and the credits separately (Robertson 2010).

e) Program Reflection

While the pilot program ended in 2009 and Fort Hood has returned to their previous management approach (i.e., managing under biological opinion under Section 7 of the ESA), there were mixed reviews on the success of the program by the interviewees.

While recorded GCWA numbers were higher at the end of this pilot program, this increase may be attributed to researchers being able to report populations of birds on private lands that were previously inaccessible. There was concern expressed that the program was not designed in a way that would support an improved GCWA population. One of the interviewees identified a misalignment between biology of the GCWA and length of habitat protection. The GCWA is a climax community species and it may take a long time (25-100 years) for its habitat to regenerate following substantial impacts, but the
credits were for agreements 10-25 years in length. To account for the short term protection, impacts due to training had to be substantially limited to fit within the timeframe for habitat restoration following the impact. It was suggested that in order for the program to work, one of two things would have to change: 1) use a different species more suited to temporary protection; or 2) use a different time frame, most likely perpetual for the GCWA (Bocanegra, pers. comm.). However, Texas A & M University has done some research that has been documented to show this perspective to be false (Tatum, pers. comm.). The science committee determined that since the areas disturbed at Fort Hood were not completely devoid of trees, instead only the understory manipulated for troop movement, and so the habitat could rejuvenate within 25 years.

On the positive it appears from the outside that the return to managing under biological opinion was owing to internal policy at Fort Hood (Hays and Tatum, pers. comm.) not as an indication of the validity of the program. As noted in the Robertson Consulting report (2010), leadership at Fort Hood changes frequently and different leaders bring different perspectives to bear on managing endangered species.

The pilot operated in six counties and was received well by land owners. Even though understanding of endangered species and conservation banking is generally not high among the public, by some land owners and some state institutions, this pilot program brought something new to Texas and it highlighted the importance of outreach and education to a number of audiences (Hays and Tatum, pers. comm.). TWMF has been working with Environmental Defense Fund to create a GCWA and black capped vireo market for the whole state of Texas. Environmental Defense Fund sees the potential for this type of program to go state-wide because of the benefit to species and private land owners (94% of Texas is privately held land). They are also exploring a similar program for prairie chicken for the five state area. The GCWA pilot program is the starting point for these additional efforts and for other recovery credit programs outside of Texas, including a recovery credit program in Utah for the Utah Prairie Dog (Hays and Tatum, pers. comm.).

**Highlights**

- Section 7 of ESA provided the regulatory framework that enabled this program to work. It worked well as it has regulatory timeframes that have to be met and the decisions and actions have to occur in a timely fashion (Bocanegra, pers. comm.).

- The model provided important contributions for conservation and to the military through working toward species recovery, extending conservation beyond the boundaries of Fort Hood by engaging private land owners, formalizing a market-based tool for trading credits, and providing an additional method for removing restrictions on training (Robertson Consulting 2010). The model also allowed for addressing GCWA recovery in a holistic fashion by enrolling private lands across which the species is distributed.

- Using temporary credits was appealing to a number of land owners. If the pilot had focused on perpetual agreements, a number of land owners would not have participated in the program.

- Land owners became educated and involved in GCWA conservation enabling a transition from viewing an endangered species as a liability to an asset (Hays and Tatum, pers. comm.).

- Researchers are involved in this program through monitoring and research on private lands enrolled in the program and a great deal more has been learned about this species as a result. Without the program, researchers would not have gained access to these private properties. In
some cases, researchers did not know birds existed on certain parcels of land simply because no one had looked for them there before (Hays and Tatum, pers. comm.).

CHALLENGES
A number of challenges from a USFWS perspective were identified by Bocanegra (pers. comm.):

• There may not have been a full understanding of the species biology and project impacts being matched to policy objectives. For example the GCWA requires climax habitat that may take longer than 25 years to develop from degradation. All non-federal actions requiring mitigation credits for the GCWA use permanent protection.
• Key decisions were made at very high levels before input regarding locally specific information could be provided. There was little to no flexibility for the local knowledge to be incorporated.
• Concern that some accountability was lost due to confidentiality concerns and requirements. As a private land state and property rights state many Texan land owners do not want government involved. To accommodate this concern USFWS was kept out of knowing specific information about credit properties, including location. A third party was hired to do this work. This highlights the need for a more transparent process and data that can be shared while still respecting individuals.

f) Resources

g) References


D. REWARDING FARMERS FOR VASCULAR PLANT DIVERSITY IN MANAGED GRASSLANDS

a) Overview
Through a study, researchers developed and implemented a market based payment scheme that was comprised of a payment by results approach with an auction mechanism. Farmers in Germany were rewarded (in monetary terms) for delivering vascular plant diversity that is used as a proxy for ecological services provided by grassland and arable farmland. Instead of applying fixed-priced payments, auctions were used to purchase these ecological services from farmers.

The researchers’ results demonstrated that an appropriately designed payment scheme at a regional scale could support farming systems that are managed to deliver ecological services in addition to the production of market goods such as food and fibre. Instead of maximising economic profit through high-
input management practices, farmers within the case-study region had, for the first time, the ability to diversify their total income risk by producing verifiable ecological goods and services of grassland plant diversity.

b) Background

According to Horst-Henning Steinmann (Research Centre for Agriculture and the Environment, University of Göttingen, Germany), agri-environmental schemes began in the agriculture sector in Europe during the 1990s, however there was a lack of variety in the payment schemes that existed. For example, farmers were not paid for voluntary ecosystem services and there was a gap for things not paid for by the market like plant diversity or biodiversity (Steinmann, pers. comm.).

Many stakeholders (e.g., politicians, farmers, NGOs, etc.) were involved through the creation of a regional board. Representatives of these groups came together in a regional advisory board that discussed all steps and all issues, including money distribution (Steinmann, pers. comm.). The advisory board is made up of local representatives of government agencies, nature conservation and farmers groups; the board was meant to represent society and incorporate the social preferences for ecological services (Ulber et al. 2010). This represented a good compromise for all groups interested in landscape & administration issues.

The researchers interviewed people in the county (i.e., those who couldn’t participate on the board but were represented by politicians on the board). They were provided with questionnaires about issues and awareness. One of the questions focused on who is best to negotiate with farmers as it was thought that farmers did not trust government ministries. The regional board was deemed to be the most appropriate negotiator (Steinmann, pers. comm.). The research scientists had no vote on the regional board but brought the ideas forward and effectively drove and steered the process with board input and guidance. They provided all scientific information and suggestions.

The target EGS was vascular plant diversity as a proxy for biodiversity. The program aimed at having an indicator which was easy to calculate. They decided to work with plant species number: if plant biodiversity is high then other processes must be supported as well (e.g., pollination, reduced need of fertilizer, etc.) (Steinmann, pers. comm.).

c) Program Evolution

According to Steinmann (pers. comm.), the researchers wanted to create a market for the services that normally do not have a market and to establish a system which creates a market. The researchers knew that they could not ask each citizen to give money to farmers for ecosystem services so they created an intermediate group through the advisory board. This approach was appropriate because the government authority that usually sets up environmental services was not willing to establish such a system. They were of the opinion that the traditional EU agri-environmental schemes (AES) are a best fit to deal with environmental services in these landscapes.

The approach was regional and only focused on one county. AES generally have a much broader frame (i.e., a complete province); however in the researchers’ views a province would be too big and too diverse to accomplish their goals. The researchers opted to focus on an approach that allows regional
administration & regional indicators. The regional frame and tender process to bring money to farmers was a different approach (Steinmann, pers. comm.) than in the past.

Some parts of the program were modeled after other programs including: the Bush Tender program in Australia and the Conservation Reserve Program in the United States. The program was not the first to set up tender procedures nor was it the first to provide a results-based approach\(^\text{15}\) but it was the first to combine a tender process with a payment for results approach. The local/regional governments embraced the payment for results part of the approach (Steinmann, pers. comm.).

The researchers promoted a tender bid approach because of the issue of information asymmetry (Ulber and Associates 2010). This means that a farmer’s opportunity costs typically vary in time and space and are generally unknown to the conservation planner who sets fixed-price payments for typical AES schemes. However, through a reverse auction procedure each farmer is able to submit a sealed bid with an associated payment he or she is willing to accept for the production of ecological services on his/her land.

The researchers started with a null hypothesis that there is no market and that consumers don’t know about value and price so it is better to have an intermediate player (scientists) establish the market. The regional board advised on the program, but the researchers carried out the complete administration of the program. The advisory board was the buyer. The researchers set up this system because the agricultural/relevant government authority would not (Steinmann, pers. comm.).

The researchers carefully studied European legislation. They thought that the project could work within the framework of European and German law in principle. In the end it was quite difficult for the provincial ministries to accept the program. The ministries said that it would not work to negotiate such a program with Brussels because of the uncertainty of money which is to be paid each year. The researchers identified additional political challenges to this approach (Steinmann, pers. comm.).

The researchers organized some events to bring farmers together and provide information. They hosted one two hour field session with the objective to inform farmers about plant species. They had two or three evening events where scientists went to pubs and were willing to answer questions, and some farmers came, had a beer and asked their questions. However, there was not a huge response to this approach. The field day was more successful. It was thought this was in part because it was tangible and people could see the plants. The researchers promoted the program through flyers and a brochure. The researchers also used an advisory service publication; this was the most successful communications tool (Steinmann, pers. comm.).

The program was included in a larger project. It started in 2000 and ran until 2010. There were tender processes in 2005, 2006 and 2008 and 2009 resulting in four tender processes in total.

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\(^{15}\) Other parts of Germany had programs paying for results.
d) **Program Description**

Five to six researchers (scientists and PhD students) administered the program. Each farmer from a given county with a suitable grassland(s) or arable field(s) could participate. The researchers ran two tenders for grasslands and two tenders for arable field diversity (Steinmann, pers. comm.). Bertke (2005) outlined the definition of ecological goods for this program and the definition is summarized in Table 3.0.

### Table 3.0 Summary of levels of ecological goods for rewarding farmers for vascular plant diversity

<table>
<thead>
<tr>
<th>Quality-level of ecological goods</th>
<th>Grassland fields</th>
<th>Arable fields - conventional(^{16})</th>
<th>Arable fields - organic(^{17})</th>
</tr>
</thead>
<tbody>
<tr>
<td>EG 1</td>
<td>Minimum requirement of at least eight forb species per inspection plot</td>
<td>Minimum requirement of at least ten arable species per each inspection plot</td>
<td>Minimum requirement of at least 14 arable species per each inspection plot</td>
</tr>
<tr>
<td>EG 2</td>
<td>Minimum requirement of at least eight forb species per inspection plot plus two indicator species</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>EG 3</td>
<td>Minimum requirement of at least eight forb species per inspection plot plus two species indicating rare grassland communities</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The scheme rewarded those farmers who already had diverse plant stands. Just having started management practices was not enough, because the results have to be present in the fields. Therefore the development of a species poor grassland plot to become species rich is to be seen as an investment by the farmer (Steinmann, pers. comm.).

The tender was a public one. The deadline was set and each farmer could provide a bid. The farmer determined their bid by identifying their price, describing their field and the level of plant diversity. As identified earlier, three levels of plant diversity were assessed for grasslands. The first level was easy to achieve while the third level was more difficult. The tender process addressed this through differential pricing. Farmers responded to this and bid higher prices for higher levels of diversity. The researchers received a broad set of tenders and levels of plant diversity (Steinmann, pers. comm.).

The auditing process involved field checks where nearly every field was counted. Counting the number of plant species was done according to a pre-designed counting scheme. The number of inspection plots varied with the size of the sites: small fields had a lower number of inspection plots while bigger fields had more inspection plots. A guidance document regarding the auditing process was provided as part of the contract. This was quite labour intensive and costly in terms of time and labour. In other schemes the authority usually only checks a small number of fields (Steinmann, pers. comm.).

\(^{16}\) Occurrence of one red-listed species counts for two species.

\(^{17}\) Occurrence of one red-listed species counts for two species.
High levels of success were found through the audits. For the grassland tenders, the success rate was quite high—up to 90% achieved plant numbers. For arable fields, only 70% succeeded but the challenges around planning plant diversity on arable fields one year in advance when farmers submitted their tender was recognized (Steinmann, pers. comm.).

The greatest cost to land owners was the creation of the tender. Farmers were required to know their plant species, do pre- and post-field inspections, design their bid (many hired professional expertise to help), and decision-making costs to form a monetary valuation for the bid (Mettepenningen et al. 2009). Those farmers involved in the arable field tenders must allow for competition with their crop and allow for loss of yield in designing their tender. These costs should be compensated by the results payments. No farmer should have a loss owing to participation in this program (Steinmann, pers. comm.).

According to Steinmann (pers. comm.), there were 40 farmers who participated in the grassland tender and 18 farmers who participated in the arable tender. This represents a small number of the 800 farmers in the county. However it was a good number for a pilot. It provided scientific rigor but was not too onerous for administration.

According to Ulber and associates (2010), although the combination of a payment by results approach with an auction mechanism was a novel and challenging approach, the uptake of the scheme by farmers was remarkable. The growth in number of bids submitted from the first to the second auctions can be interpreted as a growing interest and acceptance by farmers (Ulber et al. 2010).

Money for payments to land owners was raised through research funds (scientific grants from institutions that normally give grants for student research). Some of it came from the county, and some from a foundation which supports grassroots approaches to biodiversity conservation, while most came from an environmental foundation which supports research and development of ideas to enhance biodiversity. There was no money from the higher levels of government authority (e.g., national, EU).

All the money raised went toward paying for the tenders which amounted to € 120,000 for four years of running the program. Administrative costs were paid for by the other money in the scientific project. PhD students administered the program and were compensated through their academic funding. When all the costs (more than just the tender costs) are considered, it was quite an expensive program (Steinmann, pers. comm.).

The following table from Ulber and associates (2010) (p.322) summarizes the results of the two targeted auctions for both grassland sites:
Table 4.0 Results of two targeted auctions for grassland plant diversity

<table>
<thead>
<tr>
<th></th>
<th>1st auction grassland</th>
<th>2nd auction grassland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EG1</td>
<td>EG2</td>
</tr>
<tr>
<td><strong>Submitted bids</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of farms</td>
<td>27</td>
<td>16</td>
</tr>
<tr>
<td>No. of sites</td>
<td>130</td>
<td>32</td>
</tr>
<tr>
<td>Total area (ha)</td>
<td>221.2</td>
<td>53.3</td>
</tr>
<tr>
<td>Min bid price (€ ha⁻¹)</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>Max bid price (€ ha⁻¹)</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>Mean bid price (€ ha⁻¹)</td>
<td>100.9</td>
<td>141.7</td>
</tr>
<tr>
<td>CV of bid price (%)</td>
<td>46.7</td>
<td>42.0</td>
</tr>
<tr>
<td>Sum of bid prices (€)</td>
<td>20 385.6</td>
<td>6 974.0</td>
</tr>
<tr>
<td><strong>Accepted bids</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of farms</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>No. of sites</td>
<td>109</td>
<td>32</td>
</tr>
<tr>
<td>Total area (ha)</td>
<td>198.3</td>
<td>53.3</td>
</tr>
<tr>
<td>Min bid price (€ ha⁻¹)</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td>Max bid price (€ ha⁻¹)</td>
<td>145</td>
<td>300</td>
</tr>
<tr>
<td>Mean bid price (€ ha⁻¹)</td>
<td>84.6</td>
<td>141.7</td>
</tr>
<tr>
<td>Sum of bid prices (€)</td>
<td>16 100.8</td>
<td>6 974.0</td>
</tr>
<tr>
<td><strong>Non-compliance with requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of sites</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Total area (ha)</td>
<td>14.3</td>
<td>7.4</td>
</tr>
</tbody>
</table>

* Acceptance of bids according to budget constraints (€30 000 and €26 000 for the first and second bidding round, respectively).

The researchers cannot say if the farmers’ financial situations improved. The financial contribution to farm overall income was very small. As this was only a pilot study most farmers were participating to try this type of approach out and only had small proportions of their land involved. Land owners did not identify non-direct payment benefits however if the system was set up for a longer time period, some farmers may have used it for value added or niche marketing opportunities for their products. According to Steinmann (pers. comm.), farmers did not use their land management practices as a marketing asset during the pilot project. There is some thought that consumers may be more interested in supporting those farmers who manage for plant diversity.

d) Program Reflections

Farmers were compensated with the price that they requested. An audit determined what species were present and if the farmers achieved the stated level of vascular plant diversity. Farmers were paid for the results achieved. Farmers in this region generally seemed to appreciate any practice which is in line with markets. So selling biodiversity as a market good with an acceptable price (from the view of the farmers) seemed like a good idea for most of the farmers. The public’s opinions on the pilot were sought out through an inquiry and the public was sympathetic toward the regional approach (Steinmann, pers. comm.).
The researchers were not successful in establishing the program as a real AES program. It was disappointing that overall success in a political sense was not realized (Steinmann, pers. comm.). The researchers concluded it was a good idea but in the end the politicians were too reluctant to embrace the complete system (board, tender, negotiation at regional scale). Most ministry officers found it too complicated. In particular ministry staff were reluctant because of the uncertainty of the financial commitments/requirements. Distribution of EU AES money requires very precise financial planning and forecasting to a couple of years. Tender procedures in general are incompatible with this (Steinmann, pers. comm.).

**HIGHLIGHTS**
- Working with farmers went well. Farmers were willing participate in marketing their ES (Steinmann, pers. comm.).
- It was successful to work with the advisory board. There was very positive thinking in these groups and this offered a good chance to bring these groups together. Beneath all other conflicts that might be present in a region, the advisory group established discussion on how to improve biodiversity without talking too much about conflicts- where you can think on new and promising things. Farmers and other stakeholders were willing to talk to each other in this setting (Steinmann, pers. comm.).
- Pilot testing was good – the researchers developed very specific details on the tender procedure and gained lots of experience in this realm. However each program needs its own experience as all situations are different: differing farmers’ attitudes and different landscapes. It is worthwhile to have a testing phase and to set up system in a way that can be adjusted (Steinmann, pers. comm.).
- Short time-scale of the auctions may have increased farmer’s participation (Ulber et al. 2010).

**CHALLENGES**
- The time-frame was limited to one year conservation contracts which may threaten the long-term security of plant diversity if a farmer’s attitude has not changed at the end of the scheme, they may return to their prior less biodiversity friendly practices (Bräuer et al. 2006).
- It takes time for a program like this to be recognized. It was not easy to establish such a system. Each approach or each group has to think carefully and to consider which parts of the approach are best for their own needs (Steinmann, pers. comm.).
- It is not easy to set up system where the price is not clear at the beginning as this is a big obstacle for officers in the agricultural ministry. European legislation says it is possible to administer AES in this way (Steinmann, pers. comm.).
- It is very difficult to contact the inhabitants (citizens) as real buyers for biodiversity – one needs to think very carefully on that (Steinmann, pers. comm.).
- The program was not so good for the strict European budget frame. The EU has very little experience with tendering agri-environmental goods. Through some more pilot projects, this could become better. With the next funding period, it seems possible to also pay for farmers groups rather than only for single farmers. Perhaps this would encourage farmers to participate with some proportions of their fields (Steinmann, pers. comm.).
- “As I said at the end, you are well advised having a training phase or a pre-test. Payment by result and tendering are not easy to handle and, therefore, each situation might require specific adjustments. And: have stakeholder groups with you. This makes everything more easy, than running a lone wolf approach” (Steinmann, pers. comm.).
f) **Resources**

g) **References**

E. **PES from Agricultural Lands in the Northern Everglades**

a) **Overview**
The Florida Ranchlands Environmental Services Project (FRESP) is a coalition of partners that developed a PES program to compensate and reward cattle ranchers for providing water storage and nutrient retention on private lands. The partners include non-governmental environmental organizations, state and federal agencies, ranchers, and researchers. State agencies pay ranchers for producing the environmental services of water storage and reduced nutrient loading on private ranchlands in south-central Florida. The concept behind FRESP is to pay ranchers for providing documented ecosystem services that result from management decisions or actions they make. This is different than the more traditional cost-sharing options for the adoption of prescribed practices (e.g., building dams to catch water). In this situation, there was a clear public demand for these water-related environmental services and that demand is matched by government agencies (both state and federal) with the authority and the available budget to purchase these services from private land owners. The program is also supported by private sources of funds (e.g., the W.K. Kellogg Foundation).

b) **Background**
According to Sarah Lynch (Director, Agriculture – Markets Unit, World Wildlife Fund), beginning in 2003 the World Wildlife Fund (WWF) and a group of partners created a pilot project to field test ideas for a PES program for water quantity and quality in Florida. Over the course of the pilot, a design for a PES program was developed and it has now been launched and administered by the state of Florida. The collaborative group field tested a number of approaches with eight ranchers. The challenge from a WWF perspective was how to improve the health of Lake Okeechobee and the St. Lucie and Caloosahatchee estuaries. These areas are critical assets with regard to the health of the Florida Everglades. The chief threats to the Florida Everglades are water shortages and pollution. Cattle ranching is the dominant land use in the region and it was a goal of WWF’s to keep ranching as a viable land use instead of
transitioning to a different land use. The pilot program had two chief goals: 1) improve the economic
viability of cattle ranching and 2) improved ecological function of the Everglades.

Florida receives 52 to 54 inches of precipitation per year. Federal and state agencies have created a
system of infrastructure that drains the landscape through public and private interventions (e.g., diking,
canals, ditches, pumping, etc.). When it rains there is too much water that is flushed through the system
by pumping it east or west through rivers or canals to the coast where it is dumped into the ocean. It is
highly polluted when it enters the ocean (Lynch, pers. comm.).

According to Lynch (pers. comm.), everyone involved recognized that “this situation is a mess,” and that
they were not creating a safe and secure water supply. The state of Florida and the federal agencies
involved decided to come up with a plan to build more infrastructure and engage in more engineering to
undo damage from the first set of infrastructure. The plan involved buying more land and building
systems to be managed and manipulated in order to provide water for the environment, especially
Everglades State Park to the south, and for a growing population and associated development in rural
areas.

Within this context it was recognized that land owners with big acreage could contribute to managing for
water quantity and quality, however there were no mechanisms for involving them. The project evolved
from the questions: can ranchers manage water to move more slowly thereby changing the phase and
timing of water delivery and enable increased absorption of nutrients AND can we pay them to do that
(Lynch, pers. comm.)?

c) Program Evolution

The main regulatory considerations driving FRESP are the National Environmental Policy Act (NEPA), the
Endangered Species Act (ESA), and the Clean Water Act (CWA) (Horne 2011). In 2004-2005, the
collaborative came up with the concept and started talking to people about it. However, there was a
general mistrust between the environmentalist community and the rancher community. In their effort to
raise the profile of the need for Everglades restoration the environmental community had targeted the
negative impacts of the sugar industry, another dominant land use south of Lake Okeechobee. Many
environmentalists had generalized all facets of agriculture as negative for the Everglades, including
ranching (Lynch, pers. comm.), and this resulted in a rather acrimonious relationship between all
agriculturalists and the environmentalists. However, one of the core tenets of FRESP is that ranching and
Greater Everglades restoration can be mutually compatible (Horne 2011).

In 2005 the collaborative started doing assessments exploring the question “Could ranchers effectively
manage for water and reduced nutrient loads?” They looked at some water retention and nutrient
reduction projects that a rancher might do to realize these goals. The results were convincing enough
that they applied to different funding sources and raised two million dollars in 2005 with a goal to design
a PES pilot (Lynch, pers. comm.).

This was a large scale and complex project. The collaborative knew that they could not figure out the
details of the program design until they had consensus and buy-in on what ranchers could do to manage
for water quantity and quality on their land (Lynch, pers. comm.). Once they had that established, the
collaboration needed to figure out the regulatory piece, how to design a contract, how to determine price, how ranchers could integrate this concept into their operations and a verification system.

An initial group of four ranchers, expanded to eight, helped design the pilot. As WWF was simply known as environmentalists from DC and not well known to the ranching community, it took two to three years to develop trust with the ranchers (Lynch, pers. comm.) through many meetings and interactions. The same ranchers who were involved in the ad hoc group that had formed to talk about common ground and the idea of on-ranch water management volunteered to try out the program. WWF called them “environmental pioneers.” Of the four original pilot projects, only one rancher had not been involved in the group from the very beginning. This was a group effort and everyone worked together to take this positive next step10 (Lynch, pers. comm.).

The ranchers got to decide what they wanted to do and where they wanted to do it on their properties to promote water quantity and quality. The collaborative started testing different approaches and by talking to the buyer (i.e., State of Florida) about what they needed (Lynch, pers. comm.). The program manager (Sarah Lynch) and her colleague spent a great deal of time meeting with people and talking about this issue and bringing more people into the conversation. Eventually they had a cadre of individual ranchers who were willing to participate in the conversation. They had also secured grant money from both the state and federal government. The people who were at the table were leaders/entrepreneurs/pioneers in their own professional fields who were willing to go to bat for an innovative idea. Agency people were critical to making connections on the inside to deal with the tweaks and twists of policy that were necessary (Lynch, pers. comm.).

Table 5.0 is an excerpt from Horne (2011, p. 7) that outlines the characteristics of the ranches that participated in FRESP. Table 6.0 is also an excerpt from Horne (2011, p. 13) that outlines the revenue streams for Buck Island Ranch (one of the FRESP participants).

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10 During the next iteration of the program in 2007 when they received funding from the State of Florida for pilot projects, they advertised the program and asked volunteers to submit their ideas. They received five projects and selected four.
TABLE 5.0 CHARACTERISTICS OF FRESP RANCHES

<table>
<thead>
<tr>
<th>Ranch</th>
<th>Total Size (acres)</th>
<th>Primary Service</th>
<th>WMA Size (acres)</th>
<th>% of Ranch Under WMA</th>
<th>Retention per WMA acre (acres)</th>
<th>Annual Estimated Phosphorous Reduction (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIR</td>
<td>10,494</td>
<td>Retention</td>
<td>3,748</td>
<td>36%</td>
<td>0.45</td>
<td>3,342</td>
</tr>
<tr>
<td>2</td>
<td>783</td>
<td>Retention</td>
<td>367</td>
<td>47%</td>
<td>0.62</td>
<td>111</td>
</tr>
<tr>
<td>3</td>
<td>3,230</td>
<td>Retention</td>
<td>364</td>
<td>11%</td>
<td>0.64</td>
<td>154</td>
</tr>
<tr>
<td>4</td>
<td>5,074</td>
<td>Retention</td>
<td>1,624</td>
<td>32%</td>
<td>0.52</td>
<td>555</td>
</tr>
<tr>
<td>5</td>
<td>9,094</td>
<td>Retention</td>
<td>659</td>
<td>7%</td>
<td>0.46</td>
<td>132</td>
</tr>
<tr>
<td>6</td>
<td>3,062</td>
<td>Retention</td>
<td>2,197</td>
<td>72%</td>
<td>0.43</td>
<td>638</td>
</tr>
<tr>
<td>7</td>
<td>3,353</td>
<td>Retention</td>
<td>322</td>
<td>10%</td>
<td>0.43</td>
<td>30</td>
</tr>
<tr>
<td>8</td>
<td>342,247</td>
<td>Phosphorous reduction</td>
<td>2,368</td>
<td>1%</td>
<td>2.36</td>
<td>7,220</td>
</tr>
</tbody>
</table>

TABLE 6.0 SUMMARY OF A PARTICIPATING RANCH’S REVENUE INCLUDING FRESP REVENUE

<table>
<thead>
<tr>
<th>Source</th>
<th>2009</th>
<th>2008</th>
<th>Year 2007</th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle Sales</td>
<td>$1,623,560</td>
<td>$1,197,606</td>
<td>$1,736,601</td>
<td>$1,300,714</td>
<td>$1,429,501 (83%)</td>
</tr>
<tr>
<td>Other Agricultural Revenue</td>
<td>$42,164 (2%)</td>
<td>$85,761 (6%)</td>
<td>$34,283 (2%)</td>
<td>$148,176 (10%)</td>
<td>$147,776 (8%)</td>
</tr>
<tr>
<td>Tours and Facilities Revenue</td>
<td>$90,164 (5%)</td>
<td>$28,449 (2%)</td>
<td>$50,985 (3%)</td>
<td>$38,637 (3%)</td>
<td>$40,360 (2%)</td>
</tr>
<tr>
<td>Hurricane Damage Insurance Reimbursement</td>
<td>$0 (0%)</td>
<td>$0 (0%)</td>
<td>$0 (0%)</td>
<td>$21,510 (19%)</td>
<td>$146,903 (8%)</td>
</tr>
<tr>
<td>FRESP</td>
<td>$93,353 (5%)</td>
<td>$85,353 (7%)</td>
<td>$53,829 (3%)</td>
<td>$0 (0%)</td>
<td>$0 (0%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$1,646,221</td>
<td>$1,405,150</td>
<td>$1,877,758</td>
<td>$1,509,037</td>
<td>$1,764,530</td>
</tr>
</tbody>
</table>

The ranch began receiving FRESP payments in 2007. The numbers in parentheses are the percentages of annual income.
d) **Program Description**

According to Lynch (pers. comm.), the approach was unique because it involved a ten year contract instead of an easement, and it didn’t really build on other programs. They aimed to create something more “market-like.” In the case of the pilot, the seller decides: if they would participate, how much they would participate and where on their land they would produce the service. Water management alternatives could include flashboards riser and/or weirs in existing uncontrolled ditches that drain by gravity from a site; constructing or improving earthen berms; constructing aboveground impoundments or enhanced utilization of existing impoundments; rehydration of wetlands; collecting surface runoff from off-site areas that typically bypass the site and diverting it to the connected onsite storage; and/or site improvements that increase the potential for horizontal and vertical seepage from the site. Additionally, the buyer would only buy services that met their objectives: the buyer is selecting those projects where they get the most cost-effective value. This approach was used to encourage innovation.

In the beginning, the partners thought they were going to measure the actual service provided and/or exact nutrient load. However, there is tremendous variation within precipitation over ten years. This amount of variation in precipitation would require a variation in the state agency’s budget for PES. This was unacceptable so they created a model that determined what an average (water retained or nutrients reduced) over 10 years on this site would be and this is the amount that the state used to create the rancher’s contract. Ranchers were paid 10% of that value on an annual basis over the ten year contract if they met the requirements of the verification process (Lynch, pers. comm.).

FRESP had a field team made up of technicians from the MacArthur Agro-ecology Research Center who collected data on hydrologic and water quality data when exploring potential verification processes. The team realized that this resulted in too much data – data that was not needed and was expensive. They decided to only monitor what was essential: their verification design was driven by asking what was the minimum monitoring necessary? They kept reducing the variables that they were planning to monitor until they landed on what was “good enough” for monitoring. The key question was: what measure could be done that would provide the most information they needed and still be affordable (i.e. not a lab test)? They decided to measure rainfall and depth of water (stage) (Lynch, pers. comm.).

There is a monthly visit by a field team. They pick up a rancher report (which includes anything that needs to be reported that could affect the performance of the water management alternative), do a general look around and check a rain gauge and stage recorder to get a general sense if there is a relationship between rainfall and stage (i.e., if the water management action is having the desired effect of retaining water). If this relationship is not evident, it warrants a next step. The field team would look for changes to the infrastructure or other mechanisms that result in a breach of contract. The field staff was seen by all participants as an independent, third-party who knew their way around a ranch (Lynch, pers. comm.).

From a regulatory perspective this pilot was closely linked to wetlands and the management of threatened and endangered species. One of the upfront concerns of the land owner was if “I do the right thing now but at the end of the contract I opt to go back to baseline conditions will I be penalized for reducing wetlands and/or habitat?” Through negotiations the collaborative was able to reach a point where it was decided that there will be no regulatory surprise at the end of the contract for both the land
owner and the regulator. It will simply be viewed as “execute and exit.” It took five years to work with state and federal agencies to harmonize and create these streamlined permitting processes (Lynch, pers. comm.). This harmonization was critical given the number of state and federal agencies involved in this program. There was the potential for permitting to greatly hinder the program.

Agencies bought into the vision and a streamlined process once they saw that: a) although individual projects would not have much effect on threatened and endangered species collectively all of the projects could have a positive effect on these species and b) it was in the agencies’ best interests with respect to mission and workload to streamline the process (Lynch, pers. comm.).

With regard to the infrastructure built on ranches for water management alternatives (WMAs), the assumption is that the investment in the infrastructure has been recouped by the buyer. At the end of the ten year contract there is not an expectation of investment cost recovery, even though the life of a culvert or berm is more likely 15 to 20 years. The only exception is for pumps. If purchased by the buyer they will be removed and reused (Lynch, pers. comm.).

Two ranchers who were involved in both the pilot program and the current NE-PES\(^\text{19}\) scheme were interviewed. The ranchers indicated that they were involved in the process from the very beginning. Sarah Lynch came to them in 2003 and showed interest in joining forces with private land owners and ranchers to make ranching more sustainable in the Florida Everglades. Trust was built through many meetings. Everyone involved came from different walks of life. It took multiple meetings and hashing out ideas for the program. The group kept looking for commonalities and they focused on their goal to restore ecological function while providing another funding stream to Florida ranchers. Over time everyone learned to work together. It was realized that everyone involved would never see all things from the same perspective, and the group worked through that by continuing to look for common ground.

The payments were sufficient from the ranchers’ perspectives, although there is always room for more compensation. There was a recognition that each rancher’s financial threshold is different and that whatever the payment amount there is has to work for the buyer and the seller.

Ranchers like that the program gives them an additional revenue source. It also allows them to do things that otherwise they would not be able to do because the capital costs of the management efforts were covered. Sometimes these management efforts were things that the ranchers would have liked to do, but couldn’t afford to do without the help in paying for capital investment and the help to maintain and operate that investment over the long-term. One rancher noted that the participants like the concept of receiving a payment for service. Also, this program works to keep private lands in the hands of agricultural producers. As a result, these lands are still generating agricultural products and are on the tax roll.

One rancher noted that they like the flexibility of a ten year agreement. There are escape hatches on both sides (for the rancher and the government), and there is the option to leave at the end of the

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\(^{19}\) NE-PES is the program that evolved out of the FRESP pilot.
agreement unlike a conservation easement\textsuperscript{20}. On a different but still positive note, there is not much required of the rancher on a regular basis to receive payment.

One rancher noted that they dislike dealing with bureaucracy as it is tough for government agencies to move as fast as the private sector needs to move to remain viable from a business perspective. For instance, this rancher is ready to sign another agreement but the bureaucracy keeps delaying the start date of the next agreement; in this case the timing of implementation is problematic. It would be ideal to streamline the process even more. From the rancher’s perspective, although this program is not generally on the public radar, there were some media stories on the project and they portrayed the project in a favorable fashion.

The Florida Ranchlands Environmental Services Project (FRESP) that Sarah managed has transitioned beyond a pilot program. Its purpose was to design, through a collaborative process that included ranchers, NGOs, state and federal agencies, and researchers, a PES program that would be implemented by the state of Florida. The South Florida Water Management District, an agency of the state of Florida responsible for water quality, flood control, water supply and Everglades restoration is the buyer of services, and now administrator of a new program, the Northern Everglades Payment for Environmental Services (NE-PES) Program that was launched in 2011. The NE-PES program design was a result of the FRESP pilot project (Lynch, pers. comm.).

In January 2011, the South Florida Water Management District (SFWMD) issued the first solicitation under the new Northern Everglades-- Payment for Environmental Services (NE-PES) program. As part of the agency’s Dispersed Water Management program, the solicitation invited eligible cattle ranchers in the Northern Everglades to propose water management alternatives (WMAs) that would provide either acre feet of water retention or pounds of nutrient (phosphorus (P) or nitrogen (N)) removed over a ten-year contract. Interested ranchers were invited to submit proposals that included a project description, an estimate of the annual average water retention (acre feet) or nutrient removal (lbs phosphorus or nitrogen) service and a payment request in two parts. The two parts included an amount that would reimburse costs to implement the WMA and an annual service payment to be made each year over the life of a 10-year contract\textsuperscript{21}.

This program is solidly based on the success of FRESP. It is being implemented in collaboration with the Florida Department of Agriculture and Consumer Services (FDACS), the Florida Department of Environmental Protection (FDEP), and the United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS). Building on the experience gained with the pilot projects, the FRESP staff continue to provide technical assistance and support to the ranching community in support of this effort\textsuperscript{22}.

The SFWMD’s fiscal year 2011 budget for the first solicitation includes $7 million for the design, permitting and construction costs of selected WMAs. In addition, an estimate of the annual service

\textsuperscript{20} Conservation easement (CE) – a voluntary, contractual agreement that restricts and/or requires specific land uses and management activities. They are registered on the land title and run with the title regardless of owner.

\textsuperscript{21} \url{http://www.fresp.org/program_launched.php}

\textsuperscript{22} \url{http://www.fresp.org/program_launched.php}
payment obligation over the life of the expected contracts is $43 million. Subject to available budgets, the intent is to offer additional solicitations in future years.

**Program Reflections**

**Highlights**

- Had influential, action oriented people involved in the process/pilot/program
- All stakeholders and influences were involved from the start
- There was a full-time project manager to establish and manage a program
- Recognized early on the importance of and the time requirements to build trust and relationships with all stakeholders

**Challenges**

- Taking care of the details to create and administer the pilot program takes a dedicated project manager: people don’t realize how much time this takes and that it needs someone to manage the process. A rancher is not going to do this nor is an agency person. You need a program manager for the day in and day out, herding cats stuff.
- You need a buyer! You can’t build it and they will come. Also, this is not a universal solution – most places are not there yet with the buyers as there is not enough recognition of ecosystem services and money available to pay for services
- You need funds to develop a pilot and a program
- You need to keep moving if you meet an impasse – keep your eye on the big picture

**Resources**


**References**


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5.1 Analysis and Recommendations

In 2004, Unisfera International Centre completed an assessment of PES for the Commission for Environmental Cooperation of North America. They concluded that the design of PES schemes plays a central role in guaranteeing their success. PES schemes tend to work best when they have the following characteristics:

- They are based on clear and consensual scientific evidence linking land uses to the provision of services;
- They clearly define environmental services to be provided;
- Their contracts and payments are flexible, ongoing and open-ended;
- Their transaction costs do not exceed potential benefits;
- They rely on multiple sources of revenues delivering money flows that are sufficient and sustainable in time;
- Compliance, land use changes, and the provision of services are closely monitored; and
- They are flexible enough to allow adjustments to improve their effectiveness and efficiency and to adapt to changing conditions.

Much experience has been gained around the world related to PES schemes since this review was completed, but many of the lessons learned from this analysis remain valid. RSAI’s goal for the evaluation of programs in this report was to determine characteristics that define successful PES schemes and to further focus on success specific to livestock production on natural grasslands.

As described in the introduction, natural grasslands are on the decline on a global scale. They are an important ecosystem that is adapted to a specific climate and are home to a wide variety of wildlife and plant life that are well adapted to live there. On an ecological service scale they provide water cycling and regulation, pollination, habitat, climate regulation, food, spiritual and cultural value to name a few from which humanity benefits. Globally and in particular, North American grasslands have been very important agriculturally. Some types of agricultural are compatible to natural grassland functions but may not have as high an immediate economic return as other more intensive land uses.

Grassland regions are often referred to as working landscapes in that socio-economic activities are tightly tied to health of the natural resources in the region. The current economic system that drives land use in grassland regions is commodity markets, within which is no recognition of the ecological services produced and managed. Given this economic reality, people who live and work in these regions are often faced with choices when managing land that may result in a short term economic gain at the expense of long term ecological health. There is a need to reconcile individual economic needs with the need of healthy functioning natural grasslands. One way to do this is to provide incentives that align long term, sustainable management decisions with an economic return that matches or surpasses returns from the current commodity markets. One tool that can be considered is payment for ecological services (PES) programs.

In consideration of the five PES programs reviewed, 14 consistencies were identified that contribute to the successful planning, design, implementation and/or ongoing function of a PES program. Some of the
programs reviewed managed the topic area very well and may provide a template to follow while other programs perhaps did not put enough emphasis on that area and therefore provide a learning opportunity for others wishing to design a PES program. It is not the intention of the authors to suggest the success or failure of the individual programs; rather the following are simply observations that result from reviewing the five programs together as well as the advice from individuals interviewed. The consistencies that were evident from this review are further supported by work BirdLife did reviewing European AES programs (Appendix C).

Following the identification and description of each consistency is a recommendation specific to the potential application of a PES program to protect the natural grassland region of North America.

i. **Purpose of the program** - In order to create a payment for ecosystem services program there must be an issue to address. Often the issue is the result of societal direction valuing that portion of the environment as expressed through policy (e.g., guiding rules, management plans, regulations, legislation, etc.). In other words, there is something to trigger the development of a PES program besides simply wanting to create a market for ecosystem services. The trigger may be that there is a law such as the Endangered Species Act in the United States that forces people to do “something” about an impending impact.

The programs profiled within the report were each established to address a problem or issue (i.e., species conservation in the face of declining populations (ground nesting birds, carnivores and golden-cheeked warblers), watershed management and biodiversity). They were also each supported by a variety of levels of policy. From as high as European Union directives and Federal ESA to agency mandate and direction, each had a foundation to build upon.

**Recommendation 1:** Develop an issue statement for natural grassland conservation in North America. Based on the issue statement generate awareness of relevant policy - legislation, regulations, management plans, guiding documents, etc. (e.g., Species at Risk Act, Species at Risk management plans, Migratory Birds Act, NAWMP, Prairie Action Plans, etc.) that provide a policy framework or foundation for the development a PES program.

ii. **Clear goal/objective identification** - It is critical to identify the goals of a PES program at the outset and for these goals to inform and drive the entire design of the program. Clear goals also help the design group test the program to ensure it is not getting side tracked and stays focused. And help to ensure program efficiency. For example in the FRESP program in Florida (which transitioned into the NE-PES program), the two goals that guided the design of the pilot program were to: i) provide a means to keep ranching as a viable land use, and ii) to enable Everglades restoration. These goals were clear and easy to test against each decision to ensure it was contributing to the end goals.

**Recommendation 2:** Flowing from the issue statement, identify refined, workable and achievable goals specific to the PES program. Specific results-based biodiversity schemes are more effective when a program is targetted to a species or group of species and a specific geographic location. Often successful programs target specific habitat requirements. Targeting helps ensure
programming is effective in accomplishing its intent and maximizes the efficiency of scarce dollars.

iii. An identified, sustainable “buyer” is essential - This is a critical component of a successful PES program. Someone interested in the environmental service being “produced” for “sale” must be willing to pay for that credit or unit, otherwise half the market is missing. If a program does not have a buyer it will not succeed in the long-term. Additionally, the design of the PES program must align with the source of funding. One of the key reasons the plant diversity PES program in Germany did not transition from a pilot project into a long-term PES program was because the design of the program did not fit the EU’s approach to budgeting (the EU is the primary distributor of agri-environmental scheme funds in Europe). Subsequent to the need for a buyer, the design of a PES program also needs to consider the sustainability of the buyer. Is there a guarantee of funding over the long-term? If not, are there other promising options for sustaining funding to the PES program? Some interviewees alluded to the idea of individual citizens supporting PES programs as informed consumers buying products from PES participants over products from other producers, although there was an acknowledgement that the public may not be informed and willing to do so at this time. If this approach were pursued, there is also the challenge of creating “infrastructure” to keep PES products separate from other products (e.g., keeping ground-nesting bird PES milk separate from other milk in cheese production).

Recommendation 3: Based on the policy framework identify potential buyers. In the projects reviewed the “buyers” were government agencies; however, this does not have to be the case, for example, in the Texas example the remaining credits can be bought by a private developer.

iv. Appropriate scale - In designing the program, a great deal of thought should be invested in considering the appropriate scale for the program. In the cases reviewed here, a regional approach was common although they were often driven by federal and state/provincial-level policy and regulations. In the German plant diversity example, scale was a result of geographic range of the desirable vegetation and funding availability.

Recommendation 4: In determining the appropriate scale, consider the issue statement, policy framework, and potential buyers to determine the most appropriate geographic (e.g., species range, watershed, natural region, etc.) and jurisdictional scale (e.g., municipal, regional, provincial, federal).

v. Consistent leadership is necessary - The design and cultivation of the PES program needs a full-time leader. Taking care of the details to create and administer the program takes a dedicated project manager. This kind of work takes a considerable about of time that requires a person(s) who will build relationships; understand technical aspects and who will bring the right people together to keep the program moving forward in a timely fashion.

Recommendation 5: Secure sufficient multi-year funding to retain a dedicated project manager to realize the creation, evolution and on-going administration of a PES program.
vi. Commitment to time and energy required - It is important to acknowledge that the development of a PES program will take both time and energy. It can sometimes take years and many meetings and conversations to create the foundation for a successful PES program. Furthermore, it is important to continue to apply concerted effort and seek shared solutions with all stakeholders whenever the process meets an impasse. Seeking out these solutions also takes time. The benefit of this realization is very evident in the Florida FRESP program.

Recommendation 6: Knowing the issue statement, policy framework and project goals as well as many of the potential stakeholders (see below) plan for a realistic time frame to establish the PES program. Securing funding to help cover the time and costs of stakeholder participants could be very helpful.

vii. Program design should be adaptable – Given the scale and complexities involved in most PES programs, adaptability in the design provides stakeholders an opportunity to explore how well it functions and to apply any “lessons learned” to the evolution of the program or to a potential next version of the program. This can be done using an adaptive management approach or as a pilot. Using an adaptive management approach to create a PES program involves the design of a program with periodic reviews ensuring the program can be revised and updated over time. Considering a PES program is the formalization of a market this approach can demonstrate longer term commitment to the objectives of the program. A pilot program is often thought of as having a finite start and end date with the results being reported at the end, on occasion momentum can be lost if a programs ‘ends’.

It may be a good idea for the initial program launch to occur using a subset of the larger potential program. This allows shortcomings in the design to be exposed. Successful programs addressed the shortcomings in the next implementation phase. Adaptable programming is particularly important when dealing with biotic communities and ecological systems as they change rapidly and often.

Recommendation 7: Based on the issue statement, program goal and policy, develop a program at an appropriate scale to test the program design, demonstrate successes and challenges, provide learning opportunities and fine tune the details for broader application. At this stage is it critical to demonstrate success to policy makers and other potential buyers, and to create broad scale buy-in to the concept. The design phase includes determining geographic area; identifying people who are interested in testing a proof of concept and attempting to mitigate for potential limitations that come when the program is expanded to a larger scale (e.g., data availability may be limited at larger scales, greater number of participants may increase administrative workload beyond what is manageable, limitations to the current regulatory environment, etc.).

viii. Scientific basis for program design - In order to ensure the payments support activities that lead to the desired outcome it is important to establish scientific criteria first and then figure out the payment scheme. It is critical to know that the design of the program will enable actions or products that scientific research shows will garner results. In the Netherlands, some concern has been expressed that the blocks of managed grasslands may be too fragmented to fully support the populations of ground nesting birds they want to encourage. Further scientific research in this
area will inform the program designers if changes need to be made to the minimum block size. In the case of the FRESP pilot program, once the collaborative determined what water quantity and quality requirements they had, they then had to develop consensus and buy-in on what ranchers could do to manage for water quantity and quality on their land. After they understood the scientific requirements they began to work on the payment scheme.

Recommendation 8: With a focus on program goals, analyze the current body of research and identify any research gaps in order to determine what will work to achieve the environmental goal and is do-able by the participating land owners.

From the research results develop a monitoring or verification process. This is a critical component of successful PES programming. ‘Buyers’ of an ecosystem service need to have assurance that programs are having the intended results. Successful market-based programs often define science-based indicators of success and measure those. Examples of indicators of success for biodiversity PES might include habitat attributes, evidence of presence or successful reproduction of species, management activities and fiscal efficiency.

ix. Simple monitoring / auditing processes - Create a monitoring scheme that is as simple as possible to administer but that is robust enough to deliver results with sufficient rigor to determine if the PES program is achieving its goals. In many of the programs described, the auditing and/or monitoring processes are described as onerous, time-consuming and/or complicated. As a result, monitoring/auditing was often described as a challenge to the programs.

Recommendation 9: Refine monitoring/auditing processes to a point where the information gained is maximized, yet monitoring efforts/costs are minimized. The monitoring/auditing must have a strong scientific basis so that the resulting information can be used to determine if the program is achieving its goals.

x. Involving all stakeholders early in the process is critical - It is critical to have all stakeholders involved in the design of a PES program from the very beginning. The success of the FRESP program in Florida (which has transitioned into the NE-PES program) provides a prime example of the importance of bringing everyone into the process from the beginning. In the case of the GCWA program, one interviewee suggested that this program did not move beyond the pilot stage because key personnel were not involved from the beginning as the program took shape at a very high bureaucratic level. Local level expertise and input were not incorporated early in the process. If local expertise and input had been incorporated a different species (the black capped vireo) may have been selected for testing out the credit program approach to endangered species conservation. In the case of the Swedish program for carnivore conservation, it seems that the elected representatives of the Sami and the Swedish government did not achieve broad program buy-in from the Sami reindeer herders. The Sami reindeer herders do not feel that they are fairly compensated for the losses to their herds (through stress and predation), and it would be revealing to observe how many herders would participate in this program if it was not mandatory.
Having all stakeholders involved in the design of the program can also serve to recruit program participants. In the case of the FRESP pilot, the ranchers who participated in the design of the program were also some of the first participants.

**Recommendation 10:** Identify and gather stakeholders (e.g., land owners, non-governmental organization representatives, policy makers, potential buyers, appropriate government decision-makers, researchers, etc.) to discuss the potential development of a PES program and to generate buy-in.

**xi.** Relationships are critical - There is often mistrust between many of the stakeholders who are necessary to make these programs work so time must be invested to build trust and relationships with all stakeholders. It is important that all stakeholders are represented and are at the design table. Within that group of stakeholders it is critical to include influential people who can encourage their peers to participate or support an idea—whether they are land managers or staff within the regulating agency. A PES program needs all sorts of champions.

**Recommendation 11:** Retain a project manager skilled in collaborative approaches, conflict resolution, and attaining common ground. Capitalize on the networks of key people to engage a broader community in the design and implementation of the PES program.

**xii.** Value threshold - The reward to participants must be above the “value threshold” at which potential participants see value in becoming involved. This value threshold will be quite variable between potential participants, but in order for a program to realize target numbers for participation this threshold value needs to be understood and incorporated. While financial values are important, the value threshold may not strictly refer to financial value; it can also refer to cultural or personal values amongst others (i.e., do participants buy into the purpose of the program for reasons beside financial gain).

A PES program should be designed with the understanding that participants may have different motivations for becoming involved. This point underpins the idea of making a program appealing to more than just the early adopters. In the case of the GCWA program, some land owners became involved owing to concern about the GCWA while others did not even know that they had the bird species on their land but saw the program as an opportunity to engage in landscape stewardship activities through a cost-share program that lessened their tax burden and would provide them with a source of income through the payment for credits. The design of the GCWA program addressed both of these motivations. Further, because this program was designed in such a way, it enabled land owners who were not participating initially because of the GCWA to learn more about and participate in endangered species conservation and to begin to view their landscapes and endangered species differently.

**Recommendation 12:** Engage in social science research to gain an understanding of potential participants’ values, attitudes and behaviours in order to support the goals and objectives of the PES program. Refine program design based on this research.
xiii. Consider options for how payments are calculated. Ranchers must feel the payment is adequate for the service provided before they will participate in the program. ‘ Buyers’ must feel the services provided are worth the payment or they eventually withdraw funding. There are a number of methods that can be used to determine payments including compensation for opportunity costs, reverse auctions and established market costs for similar services.

Recommendation 13: The design team needs to answer the following questions: Consider “who and how to pay”. Does the program make payments to individual ranchers or to a cooperative structure which then redistributes payments? What exactly are the measures of success that will trigger payment? Will there be tiered payment levels for different results (e.g., level 1 = suitable habitat; level 2 = breeding species present)? How often will payments be made (e.g., annually, every 5 years)? What is the term of agreements or contracts? Agreements need to be long enough to see results or trends, yet short enough to allow for redesign to address shortcomings and inequities.

xiv. Reward success - A PES program can be designed to reward participants who are already engaging in good stewardship. For example, in the German plant diversity program those producers who were already managing their landscapes so they had higher plant biodiversity were able to submit a bid that was lower than a neighbour who needed to work (e.g., expend resources) to improve the plant diversity, but that in the long run was more valuable as they did not have the same expenses associated with working to improve the plant diversity. In the GCWA program, if the land owners had been managing their landscapes in a way that provided good GCWA habitat, their bid could be more competitive (and more likely to be selected) because they would not need to include as many dollars in their bid for management activities. Even though their specific credit value they may be higher, the overall value of the bid is less due to lower management costs. These situations help the program realize cost: benefit efficiencies.

Recommendation 14: Design your program to recognize the current contribution of well managed landscapes to ecological services provision as this can be more cost-effective and ecologically efficient than targeting the reclamation of degraded landscapes. This is not to say that reclamation projects cannot be a part of the program. This approach can also create a community of participants where increased co-learning is possible as early adopters can interact and influence those who may not be managing their landscapes for ecological services.
6.1 Appendices

APPENDIX A- INTERVIEWEE LIST

A. Groundnesting birds in the Netherlands - Interviewees: Aad van Paassen – Adviser, Landschapsbeheer Nederland; and Dick Melman – Senior Researcher, Alterra, Wageningen-UR

B. Conservation Performance Payments for Carnivore Conservation in Sweden – Interviewee: Dr. Astrid Zabel – Postdoctoral Researcher, Swiss Federal Institute of Technology

C. Golden Cheeked Warbler (GCWA) Recovery Credit System - Interviewees: Omar Bocanegra – US Fish and Wildlife Service, Arlington, TX; Brian Hays – Extension Program Specialist, Texas A & M University; and Justin Tatum – Texas Watershed Management Foundation

D. Payments for Vascular Plant Diversity – Interviewee: Dr. Horst-Henning Steinman – Research Centre for Agriculture and the Environment, University of Göttingen, Germany

E. Northern Everglades PES Program - Interviewees: Dr. Sarah Lynch – Director, Agriculture, Markets Unit, World Wildlife Fund; Gene Lollis – Buck Island Ranch; and Jim Alderman – Alderman-DeLoney Ranch
APPENDIX B – AGRI-ENVIRONMENT SCHEMES AND BIODIVERSITY: LESSONS LEARNT AND EXAMPLES FROM ACROSS EUROPE

Agri-environmental schemes have been applied in Europe for long enough now to be able to learn from their design and implementation. BirdLife partners have been working with Ministries throughout Europe to help develop schemes that address biodiversity decline and are able to deliver on their objectives. From this experience, we have learnt that the following eight points are crucial to the success of agri-environmental schemes:

1. The scheme rewards farmers for delivering public goods
2. Schemes must be backed by a budget sufficient to deliver their aims
3. The scheme design should be based on good science
4. Management required should be agronomically feasible and practical
5. The scheme design should be an iterative process
6. Schemes should be targeted initially at existing biodiversity interest or areas where is can be demonstrated that there is real potential for habitat recreation or species recolonisation
7. Monitoring of the environmental impact of agri-environmental schemes is necessary, and the results should feed into further design stages
8. Stakeholders, including farmers and environmental experts, should be consulted and involved throughout scheme design and implementation

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24 http://www.birdlife.org/eu/pdfs/Agrienviornment_schemes_lesson_learnt.pdf
APPENDIX C – OTHER REFERENCES


DEFRA. 2010. Payments for Ecosystem Services: A Short Introduction. The Department for Environment, Food and Rural Affairs, United Kingdom. 11pp


APPENDIX D – ACKNOWLEDGEMENTS

We would like to acknowledge all of the individuals who kindly shared their time and expertise:

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- Dick Melman - Centrum Ecosystemen, Alterra
- Dr. Horst-Henning Steinmann - Research Centre for Agriculture and the Environment, University of Göttingen, Germany
- Justin Tatum - Texas Watershed Management Foundation
- Aad van Paassen - Adviser, Landschapsbeheer Nederland
- Dr. Astrid Zabel - Postdoctoral Researcher, Swiss Federal Institute of Technology

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