



Darwin Initiative Overseas Territories Challenge Fund Final Report

This report should be completed and submitted within a month of agreed end date of project

Darwin Ref Number	EIDCF002
Darwin Project Title	<i>Conservation of Falkland Islands raptors – reducing conflicts with sheep farming</i>
Country (ies)	Falkland Islands
Award holding Organisation	Falklands Conservation
Partner Organisations	RSPB, RZSS, Hawk Mountain Sanctuary (Pennsylvania), Boise State University, Falkland Islands Government Environmental Planning Department (EPD) and Department of Agriculture (DoA), Falkland Islands Rural Business Association (RBA)
Grant Value	£24,000
Start/end date	Nov 19 th 2010
Author(s), date	Sam Cockwell, November 2010

1. Challenge Fund Background

The Falkland Islands archipelago is a British Overseas Territory in the South West Atlantic Ocean, which has an isolated ecosystem with unique wildlife. There is a long history of livestock farming, which remains one of the key industries and is the main land use in the Falklands. With this industry comes a perceived conflict with the native predators of the islands, specifically raptorial birds. For over a hundred years several species of birds were routinely and deliberately destroyed as a result of their perceived threat to livestock. Consequently these birds were nearly eradicated from East and West Falkland, the two main islands of the Falklands archipelago. The birds survived only on smaller islands that were of lesser interest for grazing (*appendix – fig5*). More recently, legislation has been enacted to protect these raptors; however, landowners can still acquire licences to cull birds believed to be a threat to livestock.

There is a genuine lack of scientific research regarding the impact upon livestock of these species in the Falkland Islands. There are also vastly diverse opinions from policy makers and from within the farming community regarding this impact, and the best course for managing the conflict between raptors and livestock.

A comprehensive study is needed to clarify the issue, which has become clouded through lack of communication among stakeholders, and to ascertain objectively the impact of raptors upon livestock in the Falkland Islands.

The purpose of our Challenge Fund was to evaluate the conflict between livestock and raptors, and to develop best practices for effectively monitoring birds of prey so as to determine a clearer understanding of key conflict areas. Our achievements within this Challenge Fund project were intended to facilitate an application for a multi-year Darwin funded project that will build upon relationships developed during the challenge funded project.

2. Challenge Fund Activities

All activities were delivered by the Project Officer, who was supervised and assisted by raptor and wildlife biologists from Hawk Mountain Sanctuary (US), Boise State University (US), the Royal Zoological Society of Scotland, and EDM Energy (US).

Five key goals were set out in the Challenge fund application:

- Questionnaires administered to a minimum of 10 farmers to elicit their perception of lamb-sheep interactions on their farm, lamb loss levels, and conservation status of raptors (2.1)
- Preliminary census of raptor abundance to verify the utility of potential study sites with high and low levels of raptor abundance based on reports from farmers, residents, and naturalists (2.2)
- Field test various capture, marking, and tracking methods for study species and make recommendations for most suitable methods for each target species to be studied in main project. (2.3)
- Collate historical reports and summarise economic impacts of raptors on sheep farming (results of predation during lambing season and over winter period). (2.4)
- Prepare project application for round 18 of Darwin Initiative funding inclusive of logical framework, detailed budget and annotated work plan. (2.5)

2.1 Questionnaire

10 Farmers were first interviewed (Appendix 1 fig5.) with a series of general questions designed to build an understanding of farmer attitudes towards raptors and also the perceived impact raptors have on their livestock. These general questions assessed farmers' views of current Government policies and their impression of the extent to which raptor populations have or have not changed over time. We then followed with a questionnaire containing 53 statements to which the interviewee could agree or disagree on a 1-5 Likert scale designed to better understand their views on predators, conservation, policy and interactions with policy makers. The questionnaire ended with a section of multiple-choice questions to evaluate the risks to sheep of various ages and sexes. (See appendix 2 for a copy of the questionnaire)

Several key observations can be drawn from the results of the questionnaire:

1. Three species of raptors (Turkey Vultures, Striated Caracaras, and Southern Caracaras) and Southern Giant Petrels were found to be at the top when ranking birds of potential threat to livestock(Figure 1)
2. Both weather and ditches were perceived to be of greater threat to adult sheep and lambs than were birds (Figures 2 & 3)
3. Farmers interviewed are aware of the need to conserve the natural environment and will preferentially use non-lethal methods of controlling conflict with birds of prey if those methods are effective.
4. Through the interview process and meetings with stakeholders we discovered some key areas of conflict, as detailed below.

2.2 Preliminary census of species and verifying potential study sites:

Population surveys of three of the study species have been undertaken by Falklands Conservation and its associates in the past 5 years: Striated Caracara (2006), Southern Giant Petrel (2005) and Turkey Vulture (2008). These surveys provide a baseline of population numbers and distributions within the Falklands. Using existing information and the data collected through the interviews with farmers we identified several major areas of perceived conflict:

1. Teal Inlet and Hope Cottage (East Falkland): There is an apparent year-round resident population of more than 80 Southern Caracaras in the Teal Inlet settlement. The farm there is the only one to have consistently applied for a licence to shoot Southern Caracaras. Hope Cottage is immediately West of Teal Inlet and often has large numbers of these birds in their paddocks.
2. Port Stephens (West Falkland): this south western corner of West Falkland is one of the areas where Striated Caracara are commonly seen and are said to cause problems for farmers. Port Stephens farm in particular is said to have large populations of Striated Caracara and have often reported predation upon sheep in the past.
3. Saunders Island (a large island north of West Falkland): is one of the larger islands with a growing tourism industry focused on its colonies of albatrosses, penguins, and seals. These colonies provide a food source for large populations of Striated Caracara (estimates from December 2010 of more than 60 birds in one area). On Saunders there is concern that Striated Caracaras may be reducing seabird colonies due to predation upon eggs and chicks.
4. North Arm (East Falkland): May be a good farm for studying the impact of turkey vultures, and is also one of the very few farms on East Falkland where Striated Caracara are present.

Landowners at all of these sites either approached the project with an interest in raptor research or have indicated an interest in work being carried out in the future. The four farms cover a broad range of habitats and environments and areas of both East and West Falkland. Interviews were also conducted at Fox Bay (Coast Ridge Farm and Rincon Ridge farm), Hill Cove Area (The Peaks Farm and West Lagoons Farm), Port Edgar, Spring Point and Bleaker Island.

2.3 Trapping raptors

We tested four different methods for live capture (and subsequent marking) of individuals:

Cord snare- a simple cord snare similar in colour to the vegetation, in the middle of which we used Upland Goose or mutton as bait. This trap is operated by hand, with a second researcher on hand to subdue the bird.

Monofilament noose line – a series of 80 lb test monofilament snares arranged regularly along a line dark green parachute cord staked out next to or over Upland Goose or mutton as bait. Two people are needed to operate this trap and subdue the bird and handle it during marking. (Figure 6)

Carcass-dome Bal-chatri - a weighted wire circular trap with 30+ monofilament nooses similar to a noose carpet trap, can be staked down or left free. The trap is similar to a monofilament noose line and was similarly effective. (figure 7)

Box trap – a large hexagonal cage 1 metre high and 1 metre to a side, with a remotely closing door. The trap was transported flat. It is necessary to stake down the bait in this trap as it can otherwise be easily dragged out of the cage. Similarly the cage needs to be staked down to stop the cage moving in high winds. The trap has the potential to trap numerous birds simultaneously (figure 8)

The monofilament noose line and Carcass-dome Bal-chatri were most effective. The cage trap was less effective due to trap shyness in Southern Caracaras and Turkey Vultures.

During the project we caught seven Southern Caracaras, six Turkey Vultures, and more than 30 Striated Caracaras. We did not attempt to catch Southern Giant Petrels (Appendix 1 Table 1)

2.4 Handling birds

We used two methods for handling birds; in both methods a soft cotton bag was used to transport birds from the trap to the handling site in a building or other shelter.

At the handling site birds were fitted with a hood and restrained by one person while the second tagged the bird. Several caracaras were also restrained using a 3" x 36" ACE compression/tensor bandage (*figure 9*). This method assures a snug fit around the bird and does not inhibit breathing. The bandage can be customized to each individual bird by adjusting the tension; this also allows the researcher to isolate parts of the bird for tagging or sampling. Turkey Vultures by comparison are restrained using a standard, American-style newspaper tube, which allows a wing to be isolated for patagial tagging, whilst the bird remains inside the tube.

2.5 Tagging of raptors

We tested the use of patagial tags, and 2 types of leg band for identification. We used leg bands of either anodised aluminium (ACRAFT Sign and Nameplate Company, Edmonton, Alberta, CAN) or coloured Darvic plastic (Haggie Engraving, Millington, MD, USA). The aluminium bands are manufactured in sizes appropriate for Falkland Caracara species and are attached using two small rivets. The darvic bands are the same size, and are fixed using polyurethane glue. (*figure 10*) Numbered patagial tags were provided by the Hawk Mountain Sanctuary, who has used them successfully on both Turkey Vultures and Black Vultures in North and South America. Patagial tags were used on both Southern Caracaras and Turkey Vultures, and were fixed through the patagium using standard livestock ear tags. (*figure 11*)

Radio telemetry transmitters (Holohill Systems Ltd., Carp, Ontario, CAN) and i-gotU GPS loggers (MobileAction, Shindian, Taipei, Taiwan) were assembled as a single unit which was then made into a cross-over body harnesses (i.e., backpack) using Teflon ribbon with a built-in weak point (catgut) at the rear of the unit that when decomposed allowed the harness to fall free of the bird and for us to recover it after 3-12 weeks of tracking (*figure 12*). Marked Striated Caracaras are easily approached by researchers and recaptured. We observed the behaviour of all birds for up to 30 minutes after fitting with any tags or devices to ensure there was no ill effect caused by the handling or devices.

The first of the GPS units attached to Striated Caracaras was recovered at Fox Bay with 5 days of movements recorded at 10 minute increments (*figure 13*). Unfortunately, the catgut stitching resisted degradation, and the remaining three units are still attached after several months. As a result, the method has been modified to include recapturing birds to retrieve the GPS/radio unit. This technique has worked successfully with five Striated Caracaras.

2.6 Collate historical reports

There are few documented reports of the impacts of raptors on livestock. There are however some records of the numbers of raptors that were shot on some farms, in the form of beak bounty payouts. These data indicate that the level of raptor shooting from 1900 to 1950 was significantly higher than it is today, which is also supported by anecdotal evidence.

2.7 Prepare Darwin Application

Due to the delay in requests for Darwin funding we have yet to submit an application, although we have one ready for submission as soon a request for proposals is announced.

2.8 Extra work undertaken

We undertook two aspects of fieldwork that were not in the original proposal. They are:

2.81 Observations of Lambing Flocks

From the interview portion of the questionnaire it became obvious that there was a serious concern among farmers regarding the impact of raptors during the lambing season. We observed sheep at two farms for 4 days each during the peak of lambing. We used an observation point that did not overly disturb the flock, while providing as broad a vista as possible. Once in position we maintained watch over the flock and any raptors that were in the area throughout the day, recording all interactions observed.

This initial work resulted in few observations of interactions between raptors and livestock, other than some flyovers and carrion feeding. There was no direct contact or interaction between living sheep and raptors. However, as there is serious concern from landowners regarding this predation; it is crucial that more time be spent on these observations, as without a clearer understanding of these interactions it will be impossible to quantify the actual impact. A more comprehensive survey covering several farms has been incorporated into the Darwin main project funding proposal.

2.82 Behavioural Observations

As we were committing considerable time and resources to the capture of birds, we decided it would also be valuable to record observations of bird behaviour with the hopes of establishing time budgeting for each of the target species. There were two methods of behavioural observations, a short, detailed 5 minute single animal observation relating to time budget (figure 4), and a 30-min general observation of group interactions relating to social hierarchies. Data collected during these observation periods resulted in the submission of a manuscript to the Journal of Raptor Research, which is currently under review.

Main achievements

- Submitting a manuscript to the Journal of Raptor Research on hierarchies of Falklands raptors (Dwyer and Cockwell)
- first documented tagging and tracking of Striated Caracara (figure 13) with GPS technology
- Successful patagial tagging of both Turkey Vultures and Southern Caracaras, the latter never before tested in the Falkland Islands
- Questionnaires administered to 10 farms from across the Islands
- Identification of study sites for the comprehensive study and gaining landowner support to conduct research at those locations.
- Acquisition of necessary permits for trapping and marking birds from the Falkland islands Government and reporting back to them on our successes.
- Local capacity building in raptor capture and tagging for the project officer and volunteers
- Preparation of a full grant application for submission to the Darwin Initiative.

3. Outcome & Impact of Challenge Fund

Impacts on Planning

Work carried out during this challenge fund project has confirmed our raptor handling protocols, including trapping and tagging methods that were previously untried in the Falkland Islands and/or on that target species.

Problems

Working with Southern Giant Petrels proved to be more difficult than anticipated, due to their shyness and our inability to capture them without placing individual birds at risk of injury. We eventually decided to forego further attempts to tag Southern Giant Petrels. That said, they will continue to be a part of the study during livestock and bird observations. The impact of this shift in plan is not likely to affect our study goals because:

- Southern Giant Petrels are thought to be a threat to sheep in only a few isolated areas on the islands.
- The species' impact on sheep will be assessed during our observations of sheep flocks.
- Because of their large estimated population (20,000 pairs) within the Falklands, and their large foraging ranges it is likely that leg banding would be ineffective unless undertaken on a huge scale, which would be extremely difficult and time consuming.

The walk in cage trap we built did not trap any birds during this project. The other traps we used are significantly more portable and more effective in trapping birds.

We have decided that the census of target species will not be carried out for two reasons: Firstly, relatively recent surveys have been conducted for three of the four target species.

Secondly, a full census of these species will be extremely time demanding due to difficulties with access to land and difficult terrain, which we felt was not a good use of this projects resources, especially as consensus holds that numbers of these species are stable. This activity is likely to be more achievable within the comprehensive Darwin project as a more appropriate level of resources could be committed.

Other than the census the proposed project outcomes have not changed significantly from the outline laid out in the Challenge Fund application.

We are prepared to submit Stage 1 and/or Stage 2 applications to the Darwin Initiative once a request for proposals is announcing. A draft Stage 2 application is currently being reviewed by members of the steering committee. We used the round 17 format as guidance on the basis that we can adapt the format to fit in with round 18 once the documentation for that round is released.

4. Lessons

The Falkland Islands are isolated and fieldwork there requires careful planning as it is difficult to get equipment replaced or repaired. Also due to the difficult nature of the terrain it can take more time to undertake some work in the Falklands than otherwise would be the case.

Also trapping of raptors varies enormously from species to species and also from place to place. In some areas, such as near Stanley, Turkey Vultures were not at all trap shy, whereas in rural areas they were much more difficult to trap.

Sheep observations were made difficult by very large areas of grazing and uneven terrain leading to large areas of dead ground. It was apparent that teams of two people or more would be required for observing as a single observer finds it difficult to cover the whole flock vigilantly.

There is also a limitation to working with some species with regard to distribution, Turkey Vulture are ubiquitous, but are found in greater numbers nearer the larger settlements. Southern Caracara are largely concentrated in the north of East and West Falkland, while Striated Caracara are concentrated on West Falkland and its surrounding islands.

That said overall goals remain achievable.

5. Project Expenditure

Item	Budget for whole project*	Actual Expenditure	Variance** as a %	Comments
Travel Costs				Unexpected cost of flights
Subsistence costs				Landowner hospitality.
Overhead costs				
Operating Costs				
Capital Costs				Some free tag equipment
Other				
Salaries (specify by individual) Project Officer Administrator Supervising Officer				
TOTAL				

* please indicate which document you refer to if other than your project application or annual grant offer letter

** please explain any variance of +/- >10%

Travel Costs – Were higher than expected because of an increased cost of inter-island flights from quoted in the planning application

Subsistence costs – were reduced during visits to land owners due to their hospitality, often they refused to take any sort of payment for accommodation or food.

Capital Costs – Hawk Mountain Sanctuary and James Dwyer provided trapping and tagging equipment free, including tarsus bands, patagial tags, Teflon ribbon and trap material.

6. Other comments not covered elsewhere

Darwin Challenge Fund Reporting Guidelines

All Darwin projects are required to report on the work they have undertaken with Darwin funds and this offers you the opportunity to report on your achievements and lessons learnt and on any other issues you would like to raise. Your report should show how you have progressed against the activities outlined in your application, or clearly explain any changes and the reasons why these changes were necessary.

You are expected to prepare the report in conjunction with your partners and you are expected to submit a Final Report within 1 month of completion of the agreed dates for the award (max 6 pages excluding annexes).

We will acknowledge and read all reports submitted, but will only contact you about your report if there are specific concerns.

If you have any additional queries about reporting, please feel free to email or call on 0131 440 5181.

Checklist for submission

	Check
Is the report less than 5MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project reference number in the Subject line.	x
Is your report more than 5MB? If so, please advise Darwin-Projects@ltsi.co.uk that the report will be sent by post on CD, putting the project reference number in the Subject line.	
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you involved your partners in preparation of the report and named the main contributors	x
Have you completed the Project Expenditure table fully?	x
Do not include claim forms or other communications with this report.	

Appendix 1

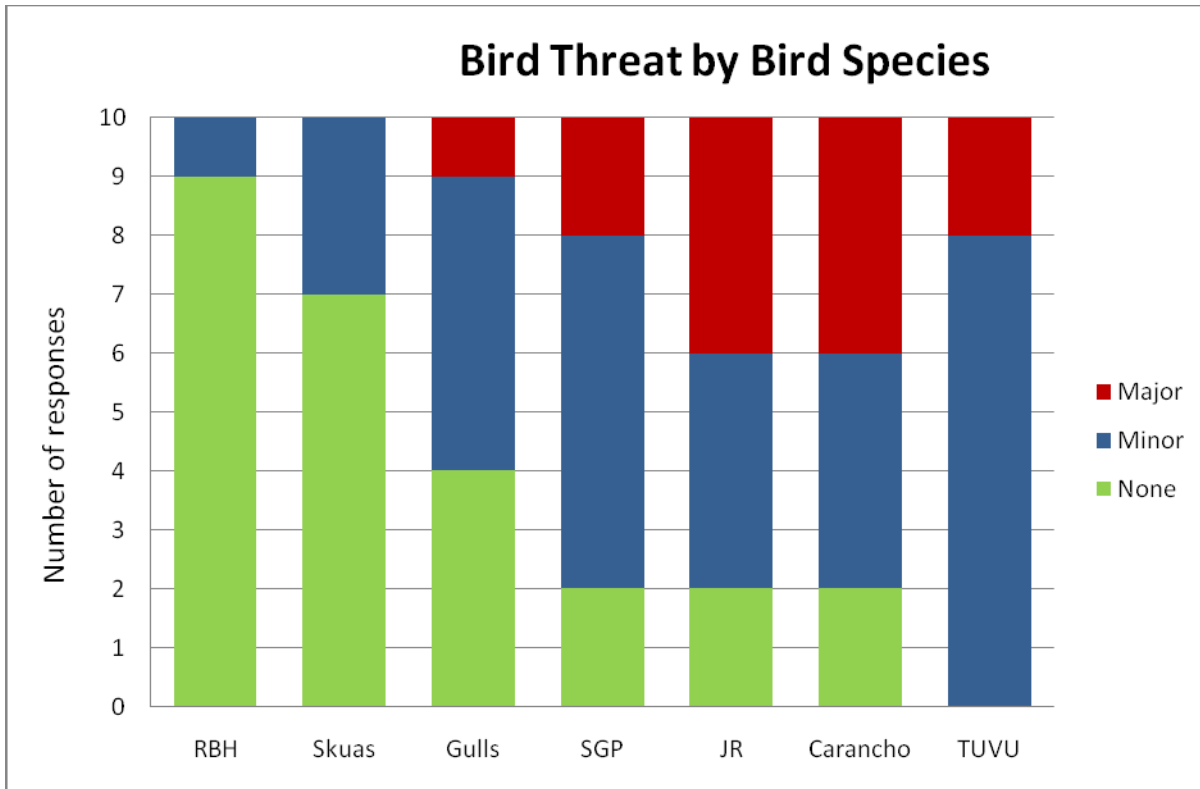
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 - 6 - Monofilament noose line
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 - 10 – Tarsus (leg) tags on Juvenile Striated Caracara
 - 11– Patagial Tag on Adult Turkey Vulture
 - 12 – Backpack mounted GPS + radio
 - 13 – GPS track of Striated Caracara at Fox Bay Settlement.
- Table 1- *Raptor capture record including tagging and capture method*

Appendix 2

Farmer interview questions and questionnaire.



(Fig 1.1) fig

Figure 1. Rating of threat by bird species

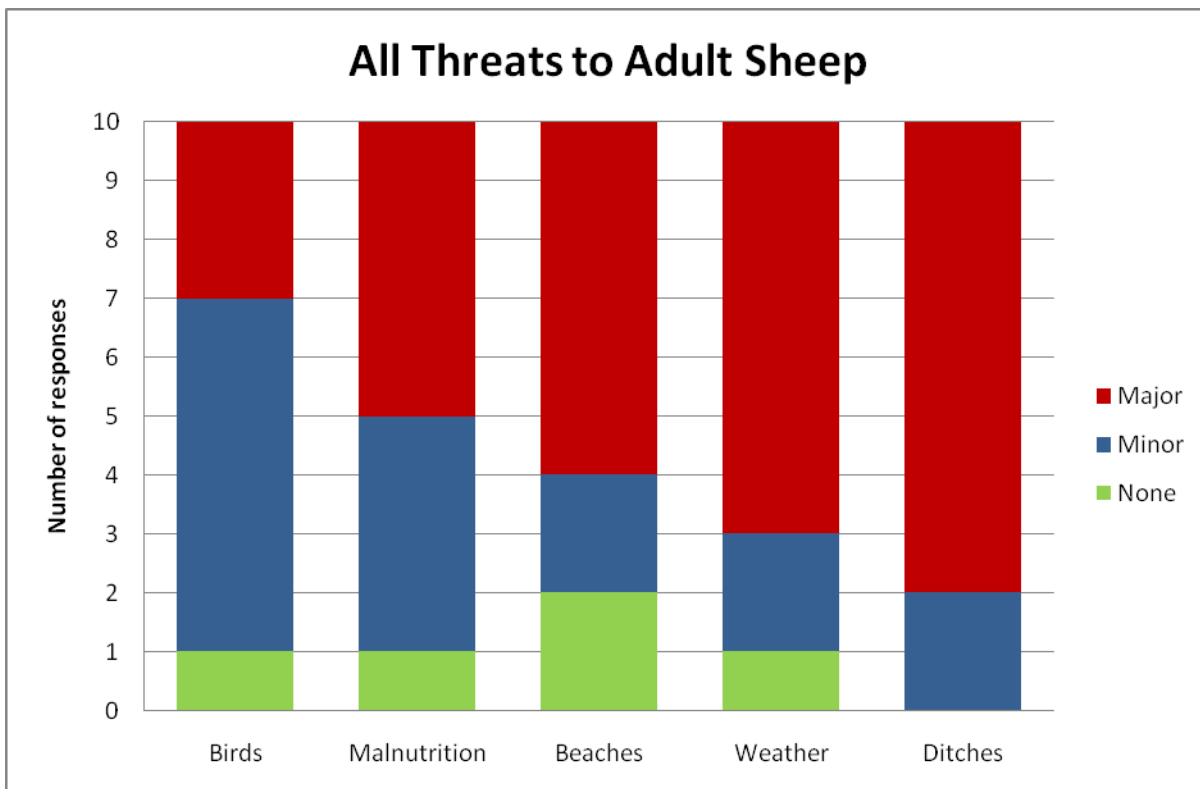


figure 2 – Rating of threats to adult sheep.

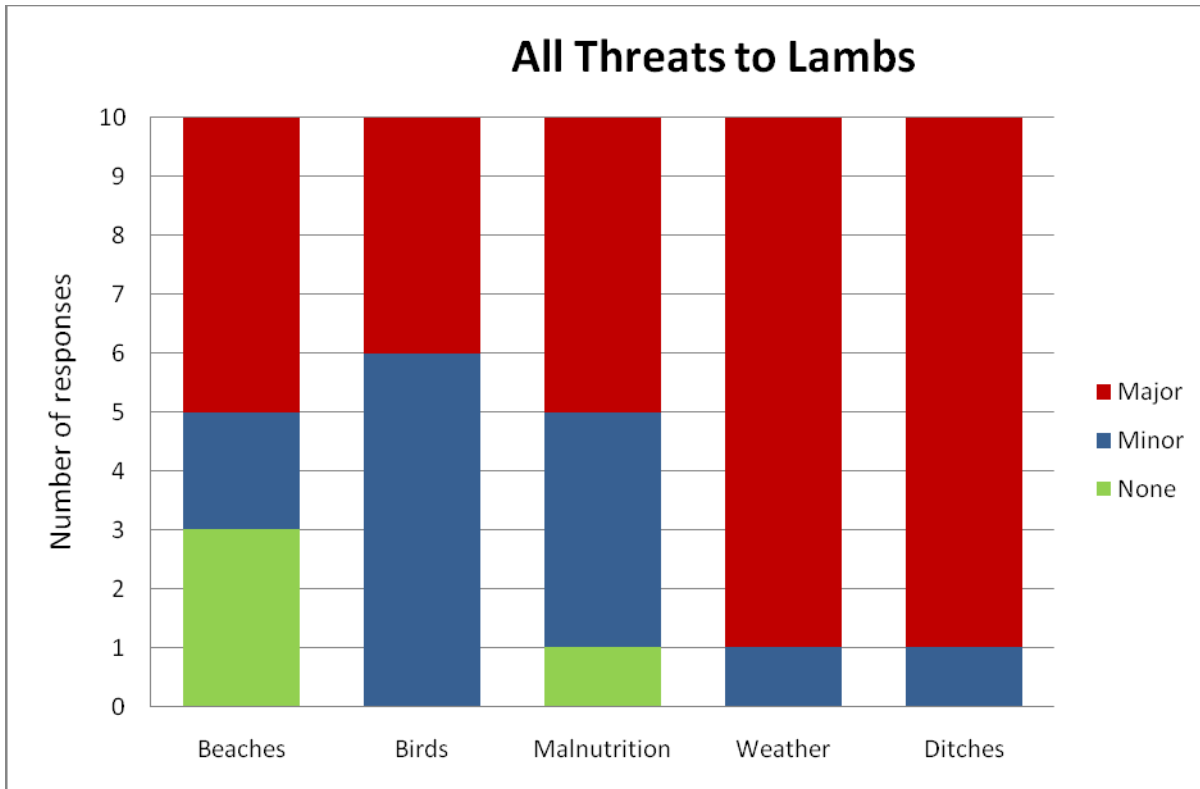


figure 3 – Rating of threats to lambs

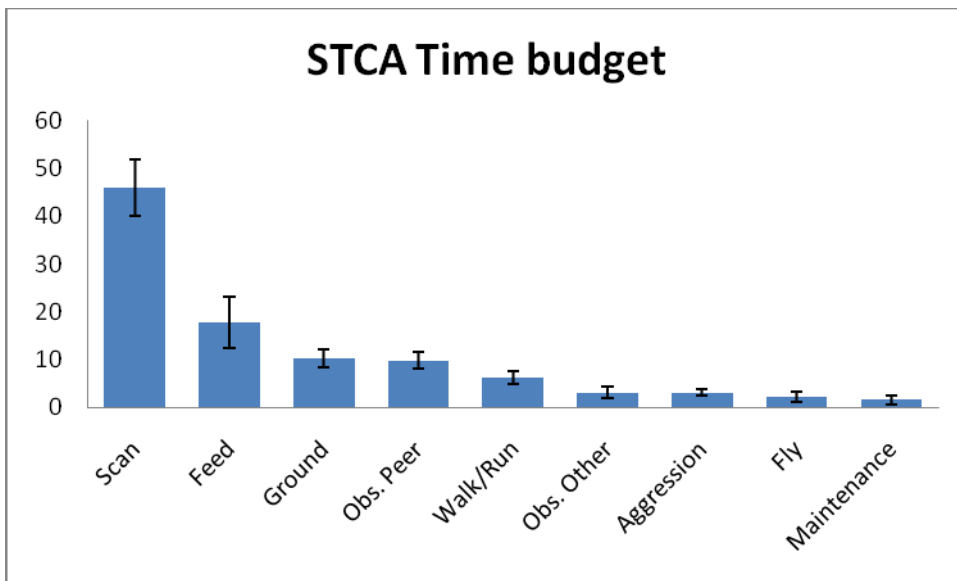


figure 4. Time budget for Striated Caracaras. N = 19 observations

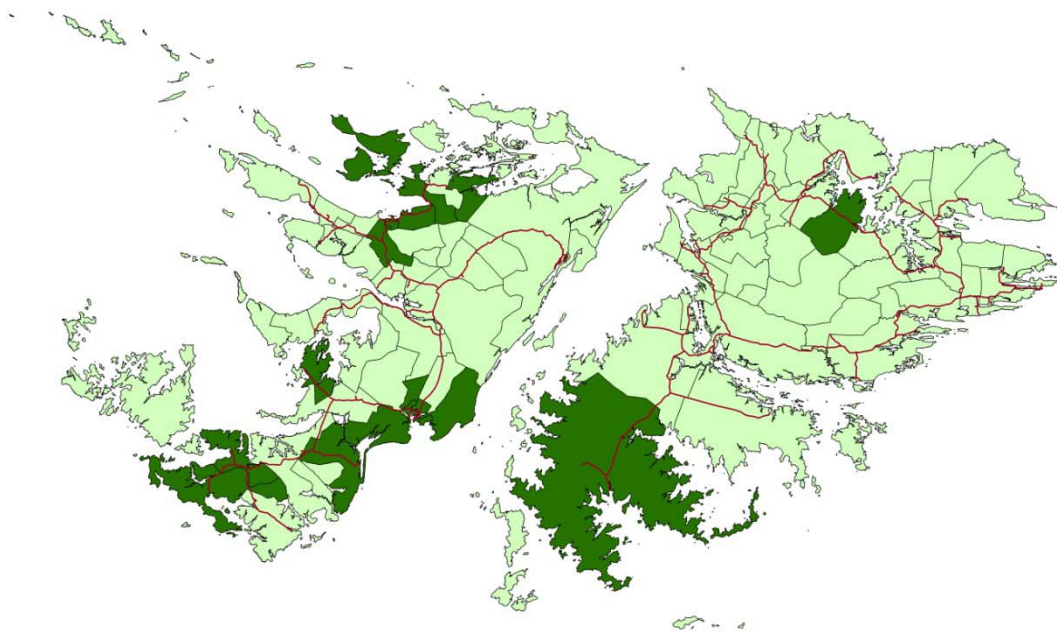


Figure 5 map showing interviewed farms that (dark green)

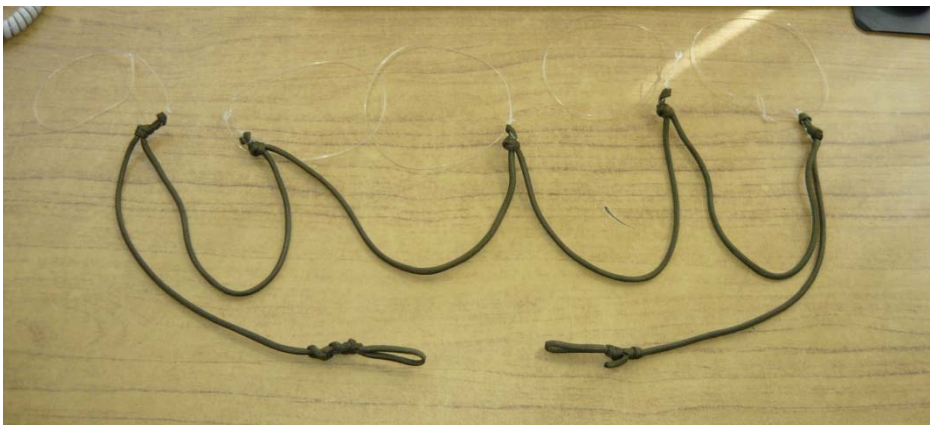


Figure 6 – monofilament noose line trap



Figure 7 – Bal-Chatri carcass dome trap



Figure 8 – Box Trap



Figure 9 – Ace Bandage method for restraining birds



Figure 10 – Tarsus bands Acraft aluminium on right tarsus, Darvic band on left tarsus



Figure 11 -Patagial tag on turkey vulture



Figure 12 – GPS and Radio backpack harness attached to Striated Caracara

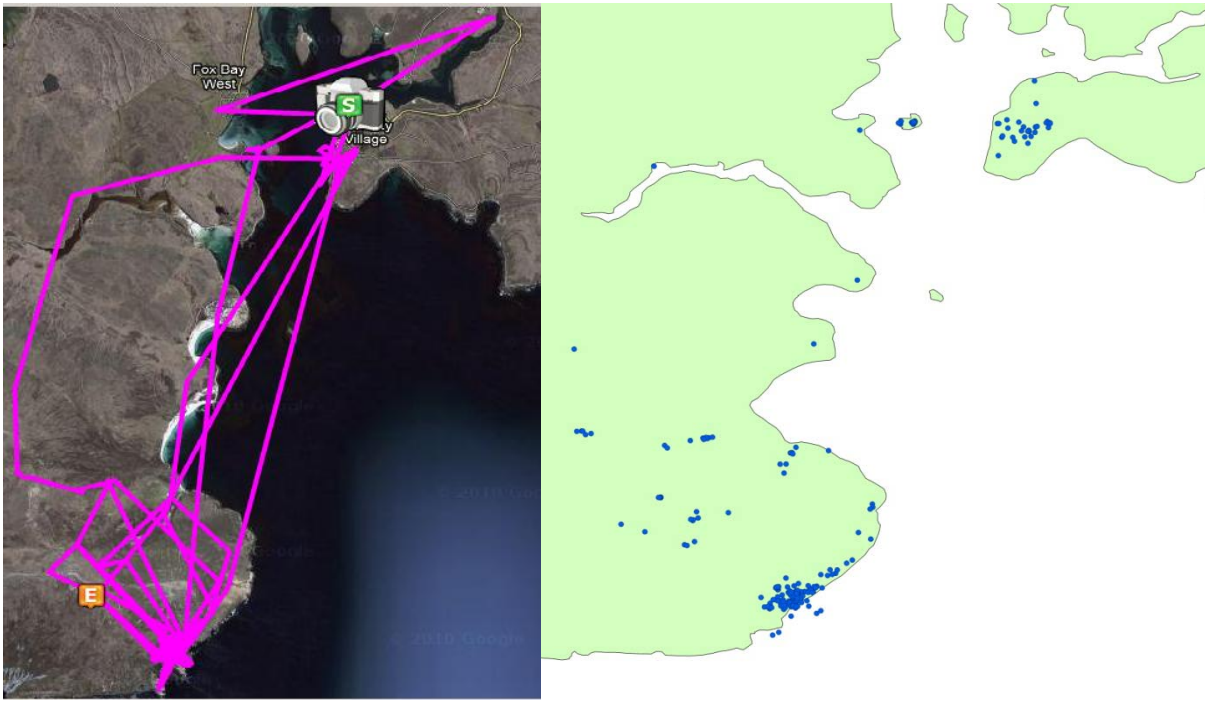


Figure 13 – indicating GPS track (left) and each recorded location (right), points recorded at 10 minute intervals

Location	Date	Trapping	Age	Weight(g)	Left Leg	Right Leg	GPS	Radio	Wing Tag	Feathers	Blood
<i>Southern Crested Caracara - Caracara plancus</i>											
Teal Inlet	07/07/2010	Line	Juvenile	1490	Z	-	no.1	164.208	-	yes	-
Teal Inlet	07/07/2010	Ring	Juvenile	1550	V	-	no.2	165.208	-	yes	-
Teal Inlet	09/07/2010	Line	Juvenile	1400	K	-	-	-	75Blue-Left	Yes	-
Teal Inlet	09/07/2010	Line	Juvenile	1560	T	-	-	-	76Blue-left	Yes	-
Teal Inlet	09/07/2010	Line	Adult	1750	X	-	-	-	77Blue-left	yes	-
Teal Inlet	19/07/2010	Line	Juvenile	1600	U	-	-	-	86-Blue-Left	-	-
Teal Inlet	19/07/2010	Line	Sub - Adult	1800	-	-	-	-	78-Blue_left	Yes	-
<i>Turkey Vulture - Cathartes aura</i>											
Eliza Cove	06/07/2010	Line	Adult	2005	-	-	-	-	7Yellow-left	-	-
Eliza Cove	09/07/2010	Line	Adult	-	-	-	-	-	9Yellow-Left	-	-
Eliza Cove	09/07/2010	Line	Adult	2150	-	-	-	-	10yellow - left	-	-
Eliza Cove	10/07/2010	Line	Adult	2100	-	-	-	-	16yellow - left	-	-
Eliza Cove	10/07/2010	Line	Adult	2050	-	-	-	-	37yellow – left	-	-
Bleaker Island	09/12/2010	Line	Adult	2300	-	-	-	-	88 Blue - Right	-	-
<i>Striated Caracara - Phalcoboenus australis</i>											
Fox Bay	16/07/2010	Line	Juvenile	1600	H	-	no.4	165.021	-	yes	-
Fox Bay	16/07/2010	Line	Juvenile	1650	P	-	no.3	165.060	-	yes	-
South Harbour	29/07/2010	Ring	Juvenile	1358	White	Blue	-	-	-	-	yes
South Harbour	29/07/2010	Hand Snare	Juvenile	1722	Green	Black	-	-	-	-	yes
Port Stephens	30/07/2010	Snare	Juvenile	860	M	Orange	-	-	-	-	yes
South Harbour	31/07/2010	Ring	Juvenile	1316	8/K	Black	-	-	-	-	yes
Saunders Island	03/08/2010	Ring	Juvenile	1508	G	White	-	-	-	-	yes
Saunders Island	03/08/2010	Ring	Juvenile	1528	Y (upsidedown)	Green	-	-	-	-	yes
Saunders Island	04/08/2010	Hand Snare	Adult	1960	White	N	-	-	-	-	yes
Saunders Island	04/08/2010	Hand Snare	Juvenile	1400	Black	S	-	-	-	-	yes

Table 1: Raptor capture record including tagging and capture method

APPENDIX 2

Date:
Interviewee:
Interviewee's e-mail address:
Farm:
Interviewer:

Raptor and Southern Giant Petrel (SGP) Interview and Questionnaire

There are two purposes for this interview:

-
1. Increase understanding of Raptor and SGP behavior and distribution on the Falkland Islands by speaking with farmers.
 2. Improve satisfaction with management of Raptors and SGP on the Falkland Islands by considering the observations, attitudes, values, perceptions and beliefs of farmers.
-

Data from these interviews will be made available to Falkland Islands policy makers so as provide a better account of Islands-wide views and experiences of Falkland Islands farmers for more informed decision-making.

This interview and questionnaire are voluntary and any sensitive information you supply will remain confidential.

I agree to participate in this interview and questionnaire

Signature

Section 1: Open Conversation

1. Where are Raptor/SGP 'hotspots' on your farm (and any numbers associated with them)?
2. What paddocks (or camps) do you use for lambing?
3. Do you use any technological methods with your sheep? AI? Embryo Transport?
4. Has the Raptor/SGP population on your farm increased or decreased recently?
5. Do you consider raptors and SGPs to be a threat to your sheep?
6. Have you seen any predatory interactions between Raptors and SGP and your sheep? Please detail.
 - a. With what frequency do you observe these interactions?
 - b. Where have these interactions occurred on your farm (map)?
 - c. Have you seen any ganging behavior by raptors and SGPs?
7. Do you practice any control of Raptors or SGP?
 - a. What type of control (e.g. shooting)?
 - b. Where do you control the raptors and SGPs (e.g. in camp, or at roosts)?
 - c. On an annual basis, how many raptors and SGPs do you control?
 - d. Any potential in alternative management?
8. What is your opinion about current raptors and SGP policy (aspects you like, dislike)?
9. Do you have any further comments regarding Raptors or SGP?

Section 2: Multiple Choice Questions

Please answer the following questions according to the following scale:

strongly disagree	disagree	neutral	agree	strongly agree
1	2	3	4	5

Worldview	Strongly Disagree				Strongly Agree
The environment has its limits, and without human protection great damage to the environment can occur.	1	2	3	4	5
The wildlife on my farm is important to my quality of life.	1	2	3	4	5
I would like to learn additional ways to make my farm more suitable for wildlife.	1	2	3	4	5
The way in which raptors and SGPs are controlled on <i>other</i> farms does not matter to me.	1	2	3	4	5

Worldview and Predation

It is unacceptable when regions completely remove predators	1	2	3	4	5
Even if I lose a few sheep, I like seeing predators on my land	1	2	3	4	5
There is no room for predators in a landscape with livestock.	1	2	3	4	5
I can live with a low level of predation occurring on my livestock.	1	2	3	4	5

Worldview and Predator Control

	Strongly Disagree				Strongly Agree
When a native species is common, permission to shoot this species should be granted easily if it is said to be a nuisance.	1	2	3	4	5
Strong evidence that a native species causes economic harm should be required before permission to shoot this species is granted.	1	2	3	4	5
Farmers should be allowed to use any means they choose to protect their livestock.	1	2	3	4	5
When there is uncertainty in the degree of harm caused by a species, it is still necessary for farmers to act to protect their stock.	1	2	3	4	5
Killing native species to protect livestock should be a last resort	1	2	3	4	5
It would be upsetting if many raptors and SGPs that did not kill livestock were shot.	1	2	3	4	5
I would prefer to manage predators on my farm using non-lethal techniques so long as these were effective.	1	2	3	4	5

Attitudes toward Turkey Vultures

	Strongly <i>Disagree</i>			Strongly <i>Agree</i>	
	1	2	3	4	5
Turkey Vultures are dirty, disgusting animals	1	2	3	4	5
It would please me if there were fewer vultures on my farm	1	2	3	4	5
The Turkey Vulture is beautiful to watch in flight	1	2	3	4	5
I like having Turkey Vultures present on my farm	1	2	3	4	5

Attitudes toward Striated Caracara (Jonny Rook)

Jonny Rook are dirty, disgusting animals	1	2	3	4	5
It would please me if there were fewer Jonny rook on my farm	1	2	3	4	5
The Jonny Rook is beautiful to watch in flight	1	2	3	4	5
I like having Jonny Rook present on my farm	1	2	3	4	5

Attitudes toward Southern Caracara (Carancho)

Carancho's are dirty, disgusting animals	1	2	3	4	5
It would please me if there were fewer carancho's on my farm	1	2	3	4	5
The carancho's are beautiful to watch in flight	1	2	3	4	5
I like having carancho's present on my farm	1	2	3	4	5

Attitudes toward Southern Giant Petrel (SGP)

SGP are dirty, disgusting animals	1	2	3	4	5
It would please me if there were fewer SGP on my farm	1	2	3	4	5
The SGP is beautiful to watch in flight	1	2	3	4	5
I like having SGP present on my farm	1	2	3	4	5

Beliefs about Raptors and SGP

Raptors and SGPs kill healthy sheep/lambs on my farm	1	2	3	4	5
Raptors and SGPs provide services that benefit the health of the farm environment	1	2	3	4	5
If no action is taken against raptors and SGPs, sheep farming will likely suffer in the future	1	2	3	4	5
There is a significant number of sheep/lambs on my farm that would survive were it not for raptors and SGPs predation	1	2	3	4	5

Without the ability to shoot raptors and SGPs of prey, farmers have no power to protect their livestock. 1 2 3 4 5

Perceptions of the People Involved

Strongly Disagree Strongly Agree

Farmers act favorably towards the health of the environment in the Falklands. 1 2 3 4 5

Falkland farmers would not kill a native species unless this species posed a significant threat 1 2 3 4 5

Policy makers should make a better effort to understand farmer viewpoints. 1 2 3 4 5

Farmers have a responsibility to act as stewards for the wildlife and plant life on their land. 1 2 3 4 5

Farmers should make a more effort to communicate their concerns to policy makers. 1 2 3 4 5

Falkland farmers take pride in the health of the environment on their farms. 1 2 3 4 5

Many urban conservationists do not understand the realities on the farm. 1 2 3 4 5

Many conservationists act 'high and mighty' regarding conservation. 1 2 3 4 5

Conservationists in Stanley make the Falklands a better place 1 2 3 4 5

Policy

Strongly Disagree Strongly Agree

Requiring a permit to shoot raptors and SGPs is good. 1 2 3 4 5

Farmers should *only* be allowed to shoot raptors and SGPs caught in the act of predated livestock. 1 2 3 4 5

Permits to shoot raptors and SGPs should cover a longer period 1 2 3 4 5

It is bothersome to apply for a permit to shoot 1 2 3 4 5

Shooting raptors and SGPs is an effective way to protect sheep 1 2 3 4 5

Farmers should *not* shoot raptors and SGP's when they are breeding 1 2 3 4 5

Permit-holders should be allowed to shoot more raptors and SGPs 1 2 3 4 5

I am satisfied with current policy 1 2 3 4 5

Section 3: Fill in the Blank, and Multiple Choice

1. Mark an "X" for the level of threat posed to sheep on your farm by each of the following:

	No Threat	Minor Threat	Major Threat
Gulls	_____	_____	_____
Skuas	_____	_____	_____
Johnny Rooks	_____	_____	_____
Turkey Vultures	_____	_____	_____
Crested Caracaras (Caranchos)	_____	_____	_____
Red-backed Hawks	_____	_____	_____
Giant Petrels (Stinkers)	_____	_____	_____

2. Mark an "X" for the level of threat posed to your ADULT SHEEP (there is a separate question for lambs below) for each of the following:

	No Threat	Minor Threat	Major Threat
Weather	_____	_____	_____
Malnutrition	_____	_____	_____
Birds	_____	_____	_____
Ditches	_____	_____	_____
Beaches/tides	_____	_____	_____
Other_____	_____	_____	_____

3. Mark an "X" for the level of threat posed to your LAMBS for each of the following:

	No Threat	Minor Threat	Major Threat
Weather	_____	_____	_____
Malnutrition	_____	_____	_____
Birds	_____	_____	_____
Ditches	_____	_____	_____
Beaches/tides	_____	_____	_____
Other_____	_____	_____	_____

4. How many sheep/lambs lost to predation would you tolerate before you decided to act to control the predator?

(write in a number)

5. **On what do you base your belief about the level of threat posed by raptors and SGPs to your livestock?** (Circle all that apply.)

your direct observations your own hunch opinions from other farmers

observations from other farmers opinions from previous generations

observations from previous generations _____ other

6. **Mark an "X" for the level of threat posed by raptors and SGPs of prey to each of the categories of sheep:**

	No Threat	Minor Threat	Major Threat
Lambs	_____	_____	_____
Birthing Ewes	_____	_____	_____
Hoggets	_____	_____	_____
Adult sheep	_____	_____	_____
Cast sheep	_____	_____	_____
Other _____	_____	_____	_____

7. **How many sheep or lambs do you think are killed by raptors and SGPs on your farm annually that would otherwise have lived?**

_____ write in a range (example 1-20 or 50-200, or 10+)