

**KAWEKA MOUNTAIN BEECH PROJECT
ANNUAL REPORT
2010-2011**



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SUMMARY

120 FPI Lines were measured throughout the Kaweka Mountain Beech Operational Area utilising Area, Conservancy and Regional DOC Staff and also volunteers. Data has been analysed and presented in this report.

Aerial deer control continued targeting only hinds with 132 hinds shot and 5 stags shot. Only 27 aerial hunting hours were used as most of the optimum hunting times were spent live capturing deer to apply GPS tracking collars.

16 mature sika hinds and 14 mature sika stags were each caught using a net gun fired from a helicopter, fitted with a GPS tracking collar, permanently ear tagged and a hair sample taken. The project attracted a significant amount of external funding and support.

All 30 deer exclosures were inspected for damage and repaired as necessary.

DOC staff maintained relationships and regularly met with Kaweka Forest Park user groups. Local DOC staff attended and presented information at NZDA club meetings, attended and presented information at Forest and Bird branch meetings, coordinated regular meetings with the Kaweka Hunter Liaison Group. Again Hawke's Bay Area and Tongariro Taupo Area combined to be a major supporter of the Annual Sika Show in Taupo.

This season's findings contribute towards answering the major question; what relative abundance of deer is required in the Kaweka mountain beech forest in order to have adequate mountain beech regeneration.

1. INTRODUCTION

The Kaweka Mountain Beech Project is designed to protect the mountain beech forest in the Kaweka Forest Park from the impacts of deer and to promote resilience of the forest by maintaining adequate seedling recruitment and growth rates that allow for ongoing sufficient regeneration. Sufficient regeneration is defined as a seedling growth rate that leads to canopy and gap closures, at most open sites, within 40 years.

A study was conducted in the 1990's titled "*Mountain Beech Forest Dynamics in the Kaweka Range and the Influence of Browsing Animals*" (Allen and Allan 1997). The key finding illustrated that browsing by deer was having a widespread detrimental influence on regeneration and species composition of mountain beech (*Nothofagus solandri var. cliffortioides*) forest.

Following this report a working party was established to work with DOC to address the management of the mountain beech forest. This working party consisted of Tangata Whenua, New Zealand Deerstalkers Association (NZDA), helicopter concessionaires, Federated Mountain Clubs, Forest and Bird, Hawke's Bay Conservation Board and scientific advisors from Landcare Research. The working party determined that Kaweka Forest Park (KFP) had a deer induced problem and that aerial hunting using DOC staff would be the method used to control deer numbers.

Aerial deer control commenced in 1998 over 11,386 ha and has involved a consistent effort of control every year for the period 01 October – 28 Feb. The deer control operation has had minor changes which took effect on 01 July 2009. The current Aerial Deer Control Area is 8,900 ha and the control season is 1 July- 28 February. Only hinds are targeted for control.

We have adopted an adaptive management approach to operational planning in which project objectives and operational results and outcomes will be periodically reviewed, and research undertaken, to progressively inform management decision making over time.

Vegetation (particularly mountain beech) monitoring is an important measure of success for this project. The mountain beech forest vegetation has been and will be consistently monitored to assess our outcome targets. Vegetation monitoring will continue at 5-7 yearly intervals. The next vegetation monitoring season is scheduled to commence in October 2012.

This report presents field data and information collected over the 2010-2011 monitoring season for the following Targets and Objectives as described in Operational Plan – Kaweka Mountain Beech Project DOCDM-410423:

Objective One

Maintain adequate seedling recruitment and growth rates that allow for ongoing regeneration.

Adequate mountain beech regeneration is identified as seedling growth rates that lead to canopy and gap closures at most open sites within 40 years.

This will be achieved by:

- continuing to control deer to densities that allow for adequate mountain beech regeneration
- employing a deer density monitoring programme to assess the results
- employing a vegetation monitoring programme to assess the objectives
- reviewing management options and researching methods to increase protection of the mountain beech forest and the biodiversity of the Kaweka Forest Park

Objective Two

Increase visitor use in the Kaweka Forest Park and actively promote and enhance all recreational opportunities.

This will be achieved by:

- raising awareness of and improving access to information on recreational opportunities
- maintaining relationships and regularly meeting with Kaweka Forest Park user groups including NZDA, Tramping Clubs, concessionaires, Forest and Bird, Iwi, Federated Mountain Clubs and the Kaweka Hunter Liaison Group.
- working within Conservancy towards a more holistic approach to all issues relating to the Kaweka Forest Park.

Recommendations have been made for future work and should guide future project coordinators or managers.

All objectives, performance measures, monitoring targets, and methods are as described in the Operational Plan – Kaweka Mountain Beech Project ([DOCDM-410423](#)). Any deviations from these guidelines are detailed in the text.

2. DEER DENSITY MONITORING

Objective

Employ a deer density monitoring programme to assess the results

Monitoring Target

Remeasure 120 FPI lines that have been established within the Kaweka Mountain Beech Operational Area over the past 4 years.

Method

The monitoring methodology applied was Dr. David M. Forsyth's 'Protocol for estimating changes in the relative abundance of deer in New Zealand forests using the Faecal Pellet Index (FPI)' [Landcare Research Contract Report: LC0506/027](#). This protocol provides a method of estimating long-term changes in the relative abundance of deer.

The F.P.I monitoring area encompasses 16,486 hectares. This is referred to as the 'Kaweka Mountain Beech Operational Area'. This area is divided into four blocks; Harkness, Te Puke East, Mangaturutu/VT and Ballard Block. There are a total of 120 F.P.I lines, 30 lines in each of the 4 blocks.

The method involves navigating to random start points then following a designated bearing for 150m, stopping every 5 m and counting groups of intact deer pellets in a 1 metre radius. Lines on average were completed in 45min – 1hr 30min. The average time taken from the hut to the start of a line was 2 hours.

A total of 18 staff and volunteers made up the faecal pellet monitoring team this year. The team consisted of; 8 HB Area DOC Staff, 1 WHB Conservancy DOC Staff, 1 R&D DOC Staff and 8 volunteers. The team was split into pairs. Each DOC Staff member was given training over 1 day in the FPI protocol to ensure consistency with counting intact pellet groups.

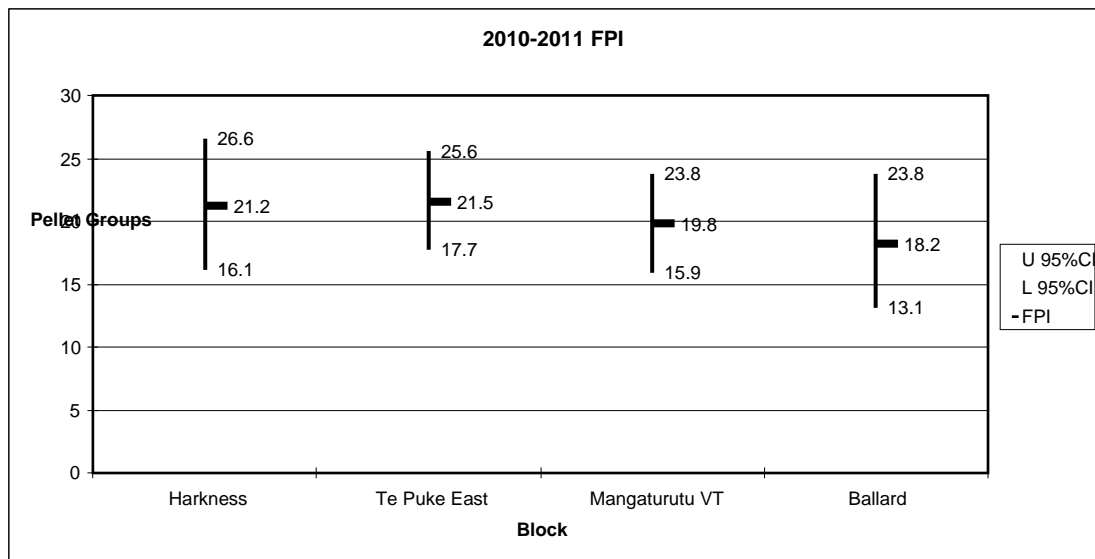
The majority of the data was collected on waterproof notepads, then manually entered into Microsoft excel. However Trimble mobile devices were also used by some staff and proved to be very effective when it came to collecting, storing and downloading data for further analysis and GIS display.

All data was input into ArcGIS to display deer abundance spatially. These maps are used for operational discussions and for public display.

Results

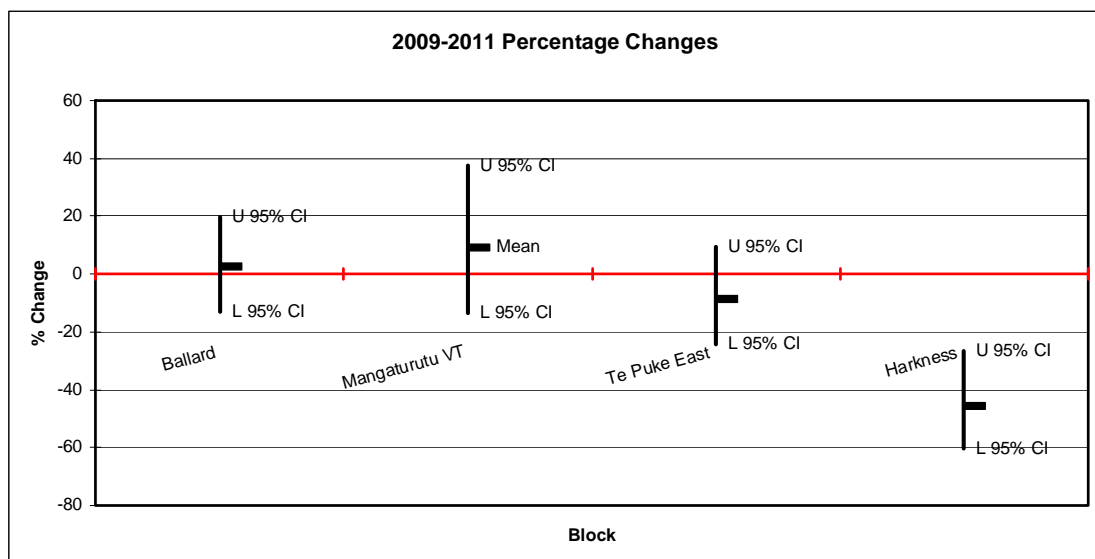
The relative deer abundance for each block is shown on Graph 1 below. The Harkness Block has received deer control for two seasons, while the Te Puke East Block has received deer

control for 12 seasons. Both Mangaturutu VT and Ballard Block have had deer control suspended for the last two seasons after ten seasons of control.



Graph 1

The FPI did not vary greatly between blocks. Further analysis was done to estimate the relative change in deer density between this season and last season for each block. This change is displayed in Graph 2



Graph 2

Discussion

This is the first year that the FPI for the Harkness Block has been brought down to a level similar to the other blocks. This is most likely as a result of the aerial deer control that targets hinds only.

It is promising to see the change in FPI in the two blocks that receive control (Te Puke East, Harkness) lower than the changes in the blocks that don't receive aerial control (Ballard, Mangaturutu VT).

We have been watching the change in FPI for the Ballard and Mangaturutu Block very closely as the deer density in these two blocks has been significantly reduced by 10 years of aerial deer control. Aerial deer control was suspended two years ago and the only form of deer control has been enhanced recreational hunting. While the FPI data suggests the deer density is most likely rising, it is at a much slower rate than was predicted.

This season was a particularly wet spring and summer. This meant that deer and plants appeared to be in better condition than previous seasons. As a result I would expect hinds to be in better condition than last year and therefore more likely to cycle and be serviced by a stag. This could mean that next year will see more fawns being born.

Most of the FPI lines were established in 2007 and are starting to suffer from the impacts of tree growth and weather. A few start points are also becoming hard to locate due to GPS inaccuracies on their setup. Therefore some lines will need remarking and reflagging next season.

The structure of the monitoring team worked well this year. It took a higher level of planning and preparation but the benefits outweighed the risks. Overall it took 18 people five days field work to complete the lines. The key to making a large monitoring team successful is to pick a week of good weather forecast in January, and give thorough training in the FPI protocol to field staff.

Conclusions

- In the Harkness Block, there was strong evidence that the density of deer declined between the two surveys: the mean estimate was that the population almost halved between the two surveys, but the decline may have been as little as 27% or as much as 60%. This is most likely as a result of two years of aerial deer control.
- In the blocks that don't receive aerial deer control (Ballard, Mangaturutu VT) there is strong evidence that the density of deer changed very little. However a decline of 13% or an increase of 38% may have occurred.
- Casual observations along with rainfall records indicate that plant growth and deer condition has improved this season.
- All 120 lines were located, measured and analysed this year.
- All four blocks now have a similar FPI.

Recommendations

- Continue to measure 120 FPI lines in January 2012, this will give four consecutive years of deer density data.
- Continue to utilise Area staff and volunteers for the field work. Ensuring adequate training is given to all staff involved in the data collection.
- Continue to encourage recreational hunters into the Kaweka Mountain Beech Operational Area

- Remark start points of lines with pink triangles and TAG pen. Remark access and close proximity of start point with pink flagging tape.

3. AERIAL DEER CONTROL

Objective

Control deer to densities that allow for adequate mountain beech regeneration

Result Target

- Exceed 90% aerial cull kill rate of all hinds sighted per season
- Apply 50 aerial hunting hours to the treatment block

Monitoring the effectiveness of the operation will be achieved by monitoring the % reduction in deer density, measured using the change in FPI.

Method

Aerial deer control was conducted using a .308 calibre semi-automatic rifle and a 12 gauge semi-automatic shotgun fired from a Hughes 500D or Robinson R44 helicopter.

The aerial shooting team consists of four suitably trained and qualified DOC staff members. Generally two shooters will be used for any one hunt, although there may be occasions where only one shooter is used due to local weather conditions.

Aerial hunting takes place during the hours of dawn and dusk.

Aerial hunting occurred in the Harkness and Te Puke East block (aerial deer control block for 2010-2011 season) which has been pre-determined by DOC and the Kaweka Hunter Liaison Group before the shooting season commences. The public must be notified of any changes to the control area at least 6 months prior to the changes being implemented.

Control has suspended in the Mangaturutu_VT and Ballard Blocks. Recreational hunters continue to target this particular area to ensure the current deer population remains at a similar level. Recreational hunters are also encouraged to hunt the aerial deer control block and compliment the aerial shooters work by controlling the stags.

All deer kills and sightings are recorded by the aerial hunting team and the information is presented to the public annually or as requested.

An agreement was made with the Animal Health Board for the aerial deer control operation to recover and store as many deer carcasses as possible for TB testing. The Animal Health Board will pay for the cost of the recoveries as this is often a significant amount of time and can not be absorbed by the operation if the targets are to be met.

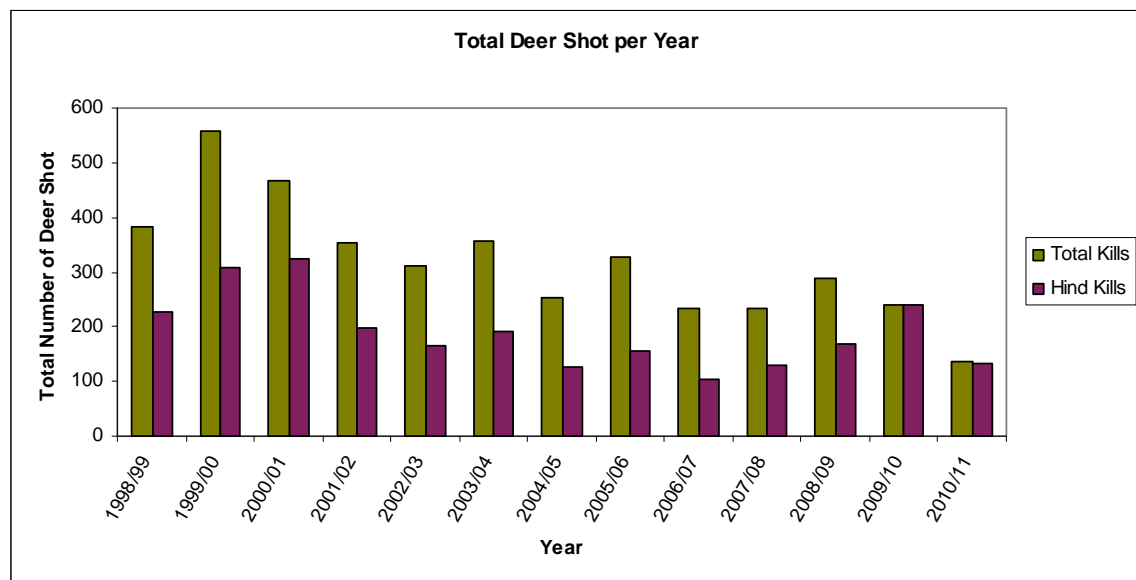
Age, Sex, Species, Action (killed or seen) and GPS location is recorded for each deer encounter. A GPS track log is also kept for the duration of each sortie.

Results

Aerial deer control continued targeting only hinds with 132 sika hinds shot and 5 sika stags shot. Only 27 aerial hunting hours were used as most of the optimum hunting times were spent live capturing deer to apply GPS tracking collars.

A map showing deer kill location is attached as Appendix 2

Sorties	14
Sika Stag Killed	5
Sika Hind Killed	132
Red Hind Killed	0
Red Stag Killed	0
Total Deer Shot	137
Total Deer Seen	323
Total Hunting Hours	27
Mean minutes per deer	15.42
Mean cost per deer	\$325.05



Discussion

The target of applying 50 aerial hunting hours was not met this year. This was the reason for the relatively low number of total deer shot. The target was not met because the helicopter, staff and hunting times were given the priority of capturing sika and fitting GPS tracking collars.

The Robinson R44 that was used towards the end of the season proved to be very effective and efficient. The cost per hour for the R44 (\$800) is significantly less than the Hughes 500D (\$1350). Also the different sound of the aircraft appeared to mystify the deer and therefore many deer were shot while standing still rather than on the run. A disadvantage of the R44 is its manoeuvrability and power is not as great as the Hughes 500D and therefore only one shooter could be taken and not all of the control block could be hunted as intensely as is possible with the 500D.

Recommendations

- Apply 50 aerial hunting hours in the Harkness and Te Puke East Blocks, utilising both a Hughes 500 and an R44 (Hughes 500 = 80%, R44=20%)
- Continue to use historical deer kill data, deer tracking data, optimum weather and the vast experience of the senior aerial shooters to select optimum hunting times where greatest results will be achieved.
- Continue to target hinds only for aerial deer control.
- Continue to use ArcGIS to input and display data collected by the aerial deer control team. Example shown below.

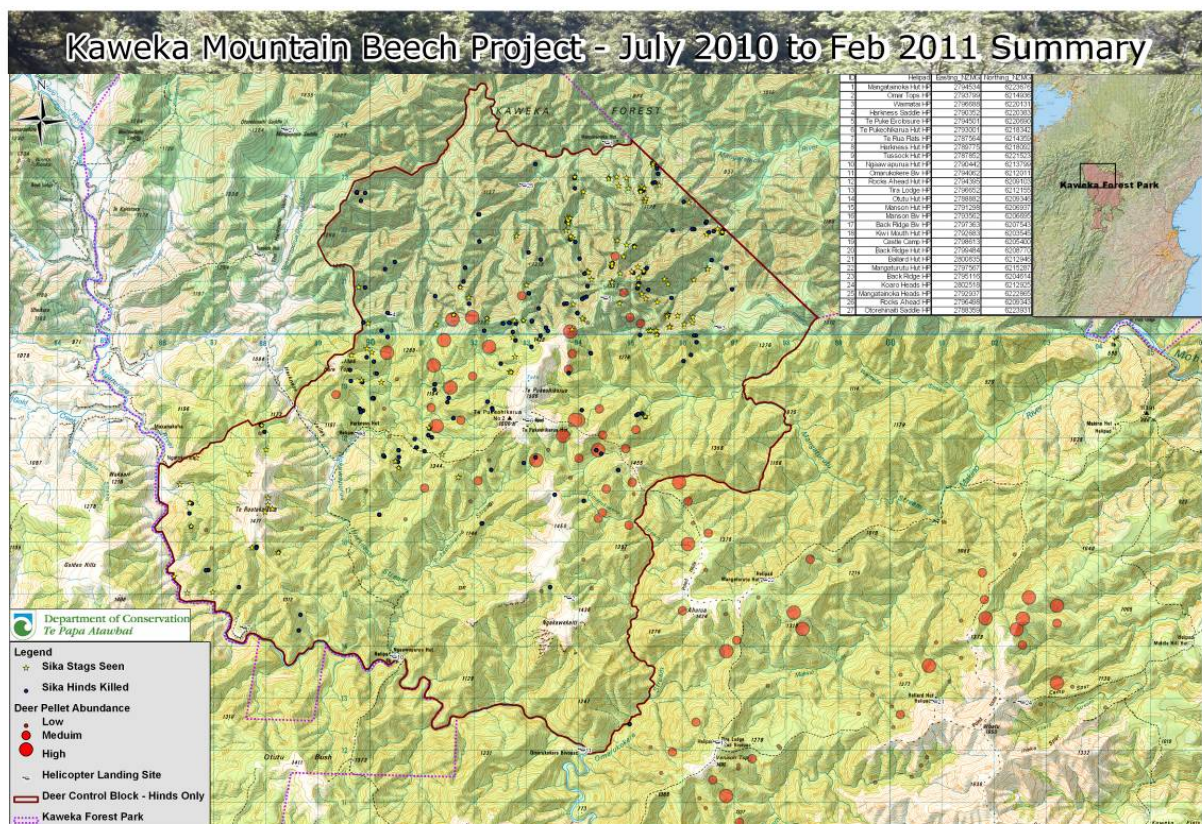


Figure 1 Annual Season Summary Map

4. GPS TRACKING SIKA

Objective

To determine how time of day, weather, seasonality, population density, hunting pressure, sex, age and breeding cycles influence habitat use, dispersal and home range ranges of sika deer in the Kaweka Forest Park.

Method

1. 16 sika hinds and 14 sika stags will be captured from the Kaweka Forest Park and each fitted with a collar carrying a GPS unit and a mortality transmitter.
2. Animals will be captured using nets fired from Hughes 500D helicopter by competent net gun operators. To reduce the risk of harming and/or stressing captured deer or entangling helicopter rotors, net-gun operators will be selected on the basis that they have recent deer catching experience and have each caught at least 3000 deer. To further minimise adverse effects on animal welfare the follow protocols will be followed.
 - only healthy looking mature animals (older than 3 years) will be targeted for this study.
 - hinds in the months of late pregnancy will not be captured
 - deer will be held for no more than 10 minutes following capture.
 - animals will be blindfolded and have leg restraints applied to minimise the potential for stress and injury while GPS collars is fitted and hair sample collected.
 - trained DOC Kaweka Aerial Deer Control Team staff will manage the attachment of the GPS collars and ear tags, and will take samples and measurements from captured deer
 - the study will only use GPS collars that have previously been tested deer and have been shown to cause no significant adverse behavioural or health effects.
3. All deer caught will have a hair sample taken for DNA analysis, a brass ear-tag placed in the top left ear and photograph taken. This will allow deer that were used in this study to be identified if they get shot once the collars have dropped off.
4. Deer will be caught in 3 specific areas. Area 1 (10 sika to be collared) has had a history of aerial control and we expect animal behaviour to be affected by helicopters Area 2 (10 sika to be collared) has never had aerial control and we expect animals to be naïve about helicopters. Area 3 (10 sika to be collared) is under current control and we expect animals to be learning about helicopters and perhaps to be dispersing into the area since density is being reduced.
5. A pilot study of 5 deer will be conducted in October and will last for one month. At which time the collars will drop off and be analysed. At this point changes can be made to collar design, catching procedure and other aspects of the study. Once there are no problems to overcome, the study will commence.
6. In order to overcome selection bias, we will attempt to catch the first mature deer we see until we reach our target sample size from each area. Deer carrying any injuries or abnormalities will not be collared if caught but will be ear-tagged and hair sample and photo taken.

7. Animal location and survival will be monitored throughout the study. Once collars have automatically detached (programmed for; hinds 28th February 2012, stags 1 May 2012) or found collars will be collected. These tasks will be a major volunteer opportunity for the supporters of the project.
8. Complete Animal Ethics Application for operation.

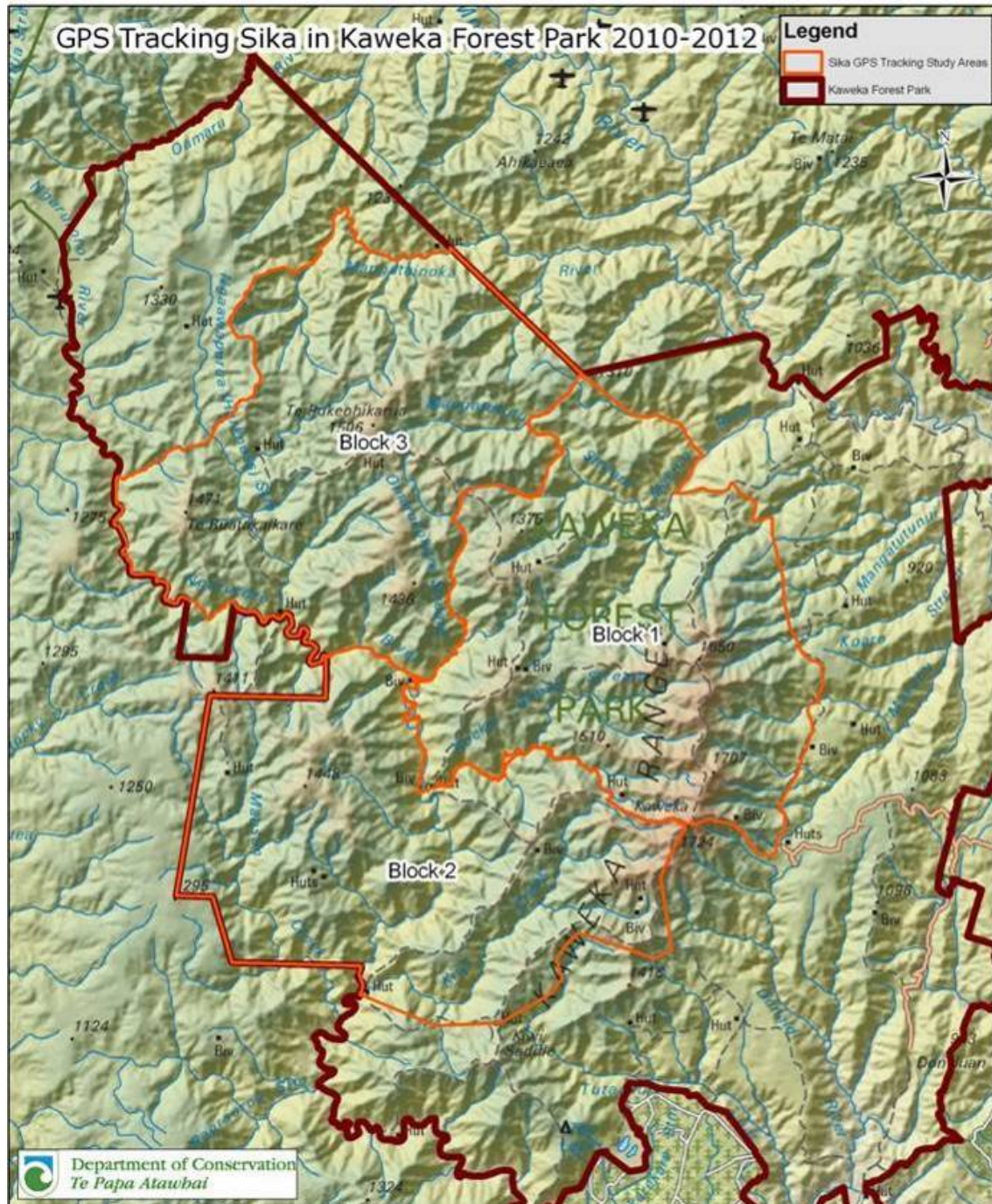


Figure 2 GPS Tracking Sika Blocks

Results

Five sika were captured in October 2010 and tracked for one month to test the efficiency of the tracking collars. Following this pilot study, 16 hinds and 14 stags were captured and fitted with GPS tracking collars as described in the methods above. Three deer had to be euthanized during the catching due to injuries.

The results of this project will not be known until the data is collected and analysed from each collar. However rough locations have been collected using the VHF component to the collar and can give some useful dispersal information. To date we have at least 3 locations for each deer; Capture location, VHF location on 30/03/2011 and VHF location on 10/05/2011 Distances moved between these 3 locations are:

Hinds Max - 3581m

Hinds Mean - 1756m

Hinds Min - 47m

Stags Max - 14164m

Stags Mean - 4622m

Stags Min - 1174m

One large collared stag (sponsored by NZDA - Tutira Branch) was shot by a recreational hunter on 10 April 2011. The collar was returned but unfortunately is not able to be redeployed on another stag as the actual collar was shot and is beyond repair. Fortunately the data was not destroyed for the time it was deployed and will still be valuable to the study.

Discussion

The live deer capture operation was completed within the timeframe and budget allocated. Animal Ethics Application 215 (DOCDM-617287) was completed and approved.

Recommendations

- Update on progress and share results with supporters and hunters using colour maps on the web page, in public talks, magazine articles, at the Sika Show and regular newsletters.
- Form a Kaweka Learning Group that looks at the information gained from this study and other information collected from the Kaweka Mountain Beech Monitoring programme and produce a plan of how Sika can be more efficiently controlled in the Kaweka Forest Park and how this learning may be applied to other deer herds in New Zealand.
- Produce a final report for public distribution.
- Monitor survival and location of collared deer monthly during spring and summer and every 2-3 months during autumn and winter, utilising external support, volunteers, Skyranger aircraft, Kaweka Kiwi staff and local staff where practical.

5. EXCLOSURE MAINTENANCE

Objective

Maintain 5 20mx20m and 33 10mx10m deer exclosures to a deer proof standard. Check annually or as soon as possible following a severe weather event, repair as necessary.

Results

- The majority of the exclosures were repaired and maintained by the deer pellet monitoring crew during the pellet monitoring season.
- 2 exclosures needed major repairs due to wind throw damage.
- Many of the exclosures require repair to bring them up to a more permanent deer proof standard (a result of many “patch-up jobs’ over the years).

Recommendations

- Maintain 5 20mx20m and 33 10mx10m deer exclosures to a deer proof standard.
- Undertake permanent repairs on 8 of the exclosures (resources allocated in 2011-2012 business plan).
- Continue to utilise Puketitiri FC staff, pellet monitoring staff, volunteers and the aerial shooting team to complete annual exclosure checks.

6. EXTERNAL ENGAGEMENT

Kaweka Hunter Liaison Group

The Kaweka Hunter Liaison Group (KHLG), representing local and national recreational hunting interests, met with DOC three times this year. This provides a forum for regular discussions between park users and DOC to discuss the KMB Project and other issues relating to the Kaweka FP.

The KHLG were very supportive of the changes to the KMB operation that were implemented last year, and the new GPS Tracking Sika Project that was initiated this year, they continue to work positively with DOC to overcome issues as they arise.

Methods which have improved the function and purpose of this group are;

- setting clear objectives of the group
- inviting new members to cover all relevant parties
- setting clear guidelines on the role and responsibility of the group members
- establishing a system for information from these meetings to be passed on to other hunters and the wider community

Recreational Hunters

We have continued to distribute the season’s; hind kills, stag sightings deer abundance hotspots and access points and other relevant information in a variety of ways, such as:

- We have continued to supply, local NZDA clubs, hunting and fishing outlets in HB/Taupo, DOC HB Visitor Centre, and helicopter concessionaires updated information on deer “hotspots” and areas we require recreational hunters to target to further suppress deer abundance.
- Supplying maps and information to hunting magazines, as a result NZ Hunter and NZ Outdoor have published positive and informative articles about the Kaweka Mountain Beech Project.
- Dan Herries, Eddie Te Kahika, Barbara Curtis, Jack Mace and Don Stephens were part of the DOC stand at the National Sika Show which was held in Taupo in September 2010 over 2 days. Again, we took along information regarding the KMB Project and large informative maps for us to discuss with punters. Over 9000 people attended this show and this was our most effective way for building relationships and informing hunters on what DOC is about. (Photos can be found on the Hawke’s Bay Area Office S:/)

Substantial effort has been spent rebuilding and maintaining a positive and trusting relationship between DOC and recreational hunters in Hawke’s Bay and I particularly want to acknowledge Eddie Te Kahika for continuing to lead this with such a professional approach.

Volunteer Input

Volunteers support has continued to grow. A total of X volunteers days were utilised throughout the year. Volunteers were primarily recreational hunters. Volunteers assisted in a range of tasks including:

- FPI monitoring
- Tracking sika with VHF equipment.
- Filming for promotional media
- Helicopter flying for GPS Tracking
- Helicopter flying for filming
- Exclosure inspections

GPS Tracking Sika Project

A significant amount of external support and sponsorship has been received for the GPS Tracking Sika Project. To date the major supporters of the project are:

- SIRTRACK
- Kiwitrack Limited
- Guns’n’Tackle – Hunting and Fishing
- NZ Outdoor Hunting Magazine
- NZDA Hastings Branch
- NZDA Tutira Branch
- Parkwood Industries
- Lakeland Aviation
- Crafty’s Rods and Guns
- Ridgeline
- NZ HUNTER Magazine

- Hammils – Hastings
- Paradise Pure Pictures
- Game and Forest Foundation
- Forest and Bird – Hastings/Havelock Nth Branch
- East Kaweka Helicopters

The supporters have contributed financially in a range of ways. Most often in the form of purchasing GPS tracking deer collars, but also a significant amount of helicopter time has been donated.

7. SUPPORTING DOCUMENTS

<i>Document Title</i>	<i>Location</i>	<i>Comments</i>
Kaweka Deer FPI Data - Master	DOCDM-415847	Used to input raw pellet count data to calculate FPI
Kaweka Total Deer Kills - Master	DOCDM-436492	All raw deer kill data for GIS input
Kaweka Deer Aerial Control Total Data Worksheets	DOCDM-142266	Initially developed by Ken Hunt
Operation Plan GPS Tracking Sika	DOCDM-617307	For ADC team to record deer kill data
Consequences of deer control for Kaweka mountain beech forest dynamics (2007)	DOCDM-457501	2007 Landcare Report LC0607/021
Mountain beech forest dynamics in the Kaweka Range and the influence of browsing animals. (1997)	DOCDM-470377	1997 Landcare Report Science for Conservation:44
KMB Brief Key Facts	DOCDM-352532	Key facts for the KMB project in bullet points
2010 Season Report	DOCDM-586798	A summary of the 2010 monitoring season
KMB Check in and out form	DOCDM-379984	Form used prior to any party entering the backcountry for KMB monitoring
K.M.B Emergency Procedures 2009	DOCDM-453885	H&S information included
Kaweka Mountain Beech Exclosure Plots	DOCDM-138771	Exclosure inspection details
Kaweka mountain beech monitoring review Feb 2008	DOCDM-260492	Cathy Allen's vegetation monitoring review
Kaweka deer pellet monitoring review Feb 2008	DOCDM-260491	Cathy Allen's deer pellet monitoring review
HB0806 Helicopter Hire For Aerial Culling	DOCDM-316694	Tender documents for aerial culling contract
KMB Communication Plan Sept 08	DOCDM-359598	Plan to communicate the major changes to the operational plan.