KAWEKA MOUNTAIN BEECH PROJECT
ANNUAL REPORT
2015/16

Kellie Mayo
Department of Conservation
Hawke's Bay District Office

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Summary

The objectives for the Kaweka Mountain Beech Project 2015/16 season were; to review Faecal pellet Index (FPI) data in order to make an informed decision as to whether aerial deer control should be continued, and to review vegetation monitoring requirements with the view of re-measuring a proportion of tagged seedlings.

Monitoring this season was kept to a minimum and involved measuring 60 FPI lines in the current aerial deer control block in order to assess the effectiveness of the past few season's control. Results showed that aerial deer control, combined with recreational hunter efforts have resulted in reducing the deer population in the Tussock block to an acceptable level for Mountain Beech regeneration. Results from FPI monitoring in the Harkness block showed no real change in deer population. This could be due to faecal pellets from deer that were shot during 2015's aerial deer control being recorded during this seasons FPI monitoring. Re-measuring these FPI's during the 2016/17 season will hopefully provide a clearer picture of the deer population in this block.

Not all exclosure fences were checked this year due to time constraints and the need to assess the future of these fences before committing resources to maintenance.

Advice was sought about the feasibility of re-measuring tagged seedlings within the paired fenced and non fenced 10 x 10 plots. It was decided that re-measuring a proportion of tagged seedlings would add little to the overall objectives of the project, due to the fact that previous study had already concluded that deer were retarding seedling growth. For this reason, no vegetation monitoring was carried out this season.

Four options for vegetation monitoring were put forward. These options better relate to the objectives of the Kaweka Mountain Beech Project. These options require careful consideration and the preferred options need to receive sufficient funding to enable meaningful monitoring to be carried out.

The Kaweka Mountain Beech Project is at a cross roads and is at point where priorities for the future should be discussed and analysed. It is timely to now work with the Kaweka Hunter Liaison Group to determine the projects direction for the next ten years.

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 (*Fuscospora 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 (ADC) commenced in 1998 over 11,386 ha. The ADC operation has had minor changes through the years with block sizes changing depending on the results of annual monitoring. The current ADC area is 6831 ha and the control season is 1 June- 30 November 2015, this is a reduction from previous years when the ADC has been carried out from 1 October – 28th February. Since the 2009/10 season, only hinds have been 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 has been an important measure of success for this project. The mountain beech forest vegetation has been and should be consistently monitored to assess our outcome targets. Vegetation monitoring is recommended to continue at 5-7 yearly intervals.

This report presents field data and information collected over the 2015-2016 monitoring season for the following Targets and Objectives as described in *Operational Plan 2015 – Sika Deer and Red Deer control in the Kaweka Mountain Beech Operation DOC-2306504*

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 hunting opportunities.

This will be achieved by:

- raising awareness of and improving access to information on recreational hunting 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.

All objectives, performance measures, monitoring targets, and methods are as described in the *Operational Plan 2015 – Sika Deer and Red Deer control in the Kaweka Mountain Beech Operation DOC-2306504*. Any deviations from these guidelines are detailed in the text.

2. Aerial Deer Control

Objective

Control deer to densities that allow adequate mountain beech regeneration

Result Target

- Exceed 90% aerial cull rate of all hinds sighted per season
- Apply 30 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/500E or Robinson R44 helicopter.

The aerial shooting was contracted out to East Kaweka Helicopters with Dan Herries as the shooter. DOC staff member Peter Abbott went on some of the sorties as a shooter.

The Aerial hunting period was reduced to 4 months and 30 hunting hours. This is a reduction from previous years. Aerial hunting usually took place during the hours of dawn and dusk.

Aerial hunting occurred in the Tussock block and parts of the Harkness and Te Puke blocks, an area of 6831 ha of the Kaweka Mountain Beech Operational Area (20,061 ha). The 2015-2016 hunting block was agreed upon by DOC and the Kaweka Hunter Liaison Group before the shooting season commenced.

Control has been suspended in all other blocks. Faecal Pellet Index monitoring shows that recreational hunters continue to keep the deer population down to an acceptable level for beech regeneration.

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.

An agreement was made with TBfree NZ for the aerial deer control operation to recover and store as many deer carcasses as possible for TB testing. TBfree has paid for the cost of the recoveries. Approx 30 Sika hinds were recovered for TBfree from the aerial deer control operation. To date no TB has been detected in the carcasses recovered from the Kaweka Mountain Beech Operational Area.

Results

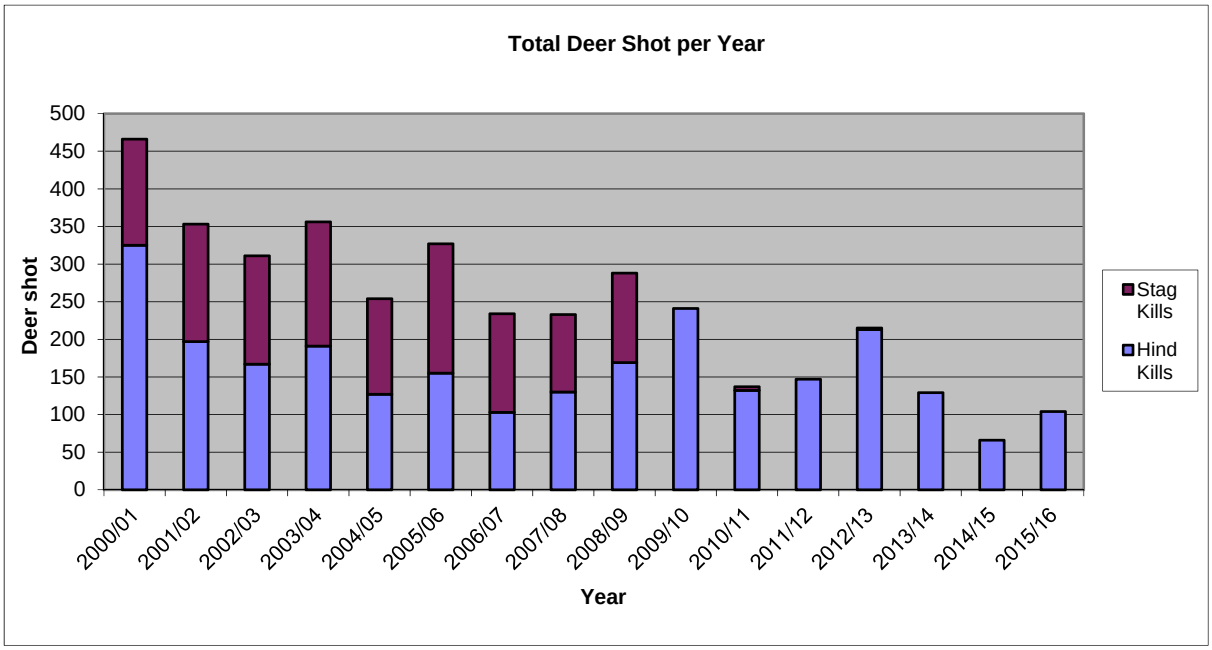
Aerial deer control continued targeting only hinds with 104 Sika hinds shot in 23 hours actual hunting time. Using the R44 resulted in some very efficient runs in terms of cost per deer.

ADC results from the 2015/16 season. 31st July 2015 – 30th November 2015

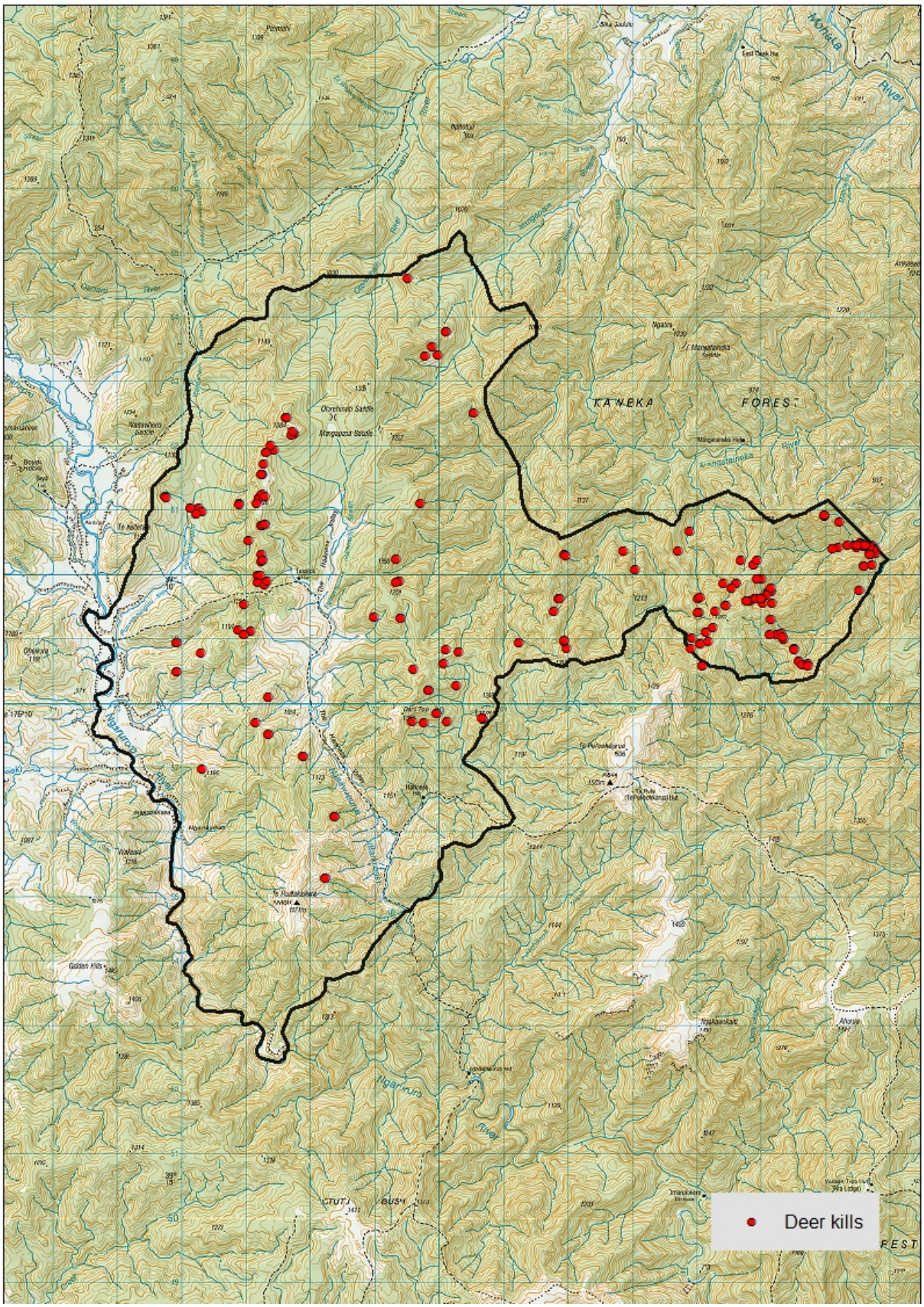
Sorties	12
Sika Stag Killed	0
Sika Hind Killed	104
Red Hind Killed	0
Red Stag Killed	0
Total Deer Shot	104
Total Deer Seen	189
Total Hunting Hours	23
Mean minutes per deer	22.78
Mean cost per deer	$410

Total deer kills increased this year, although this was because more effort was applied than last year due to staff changes. There was also a decrease in the cost per deer.
A map showing deer kill locations is shown on page 7.

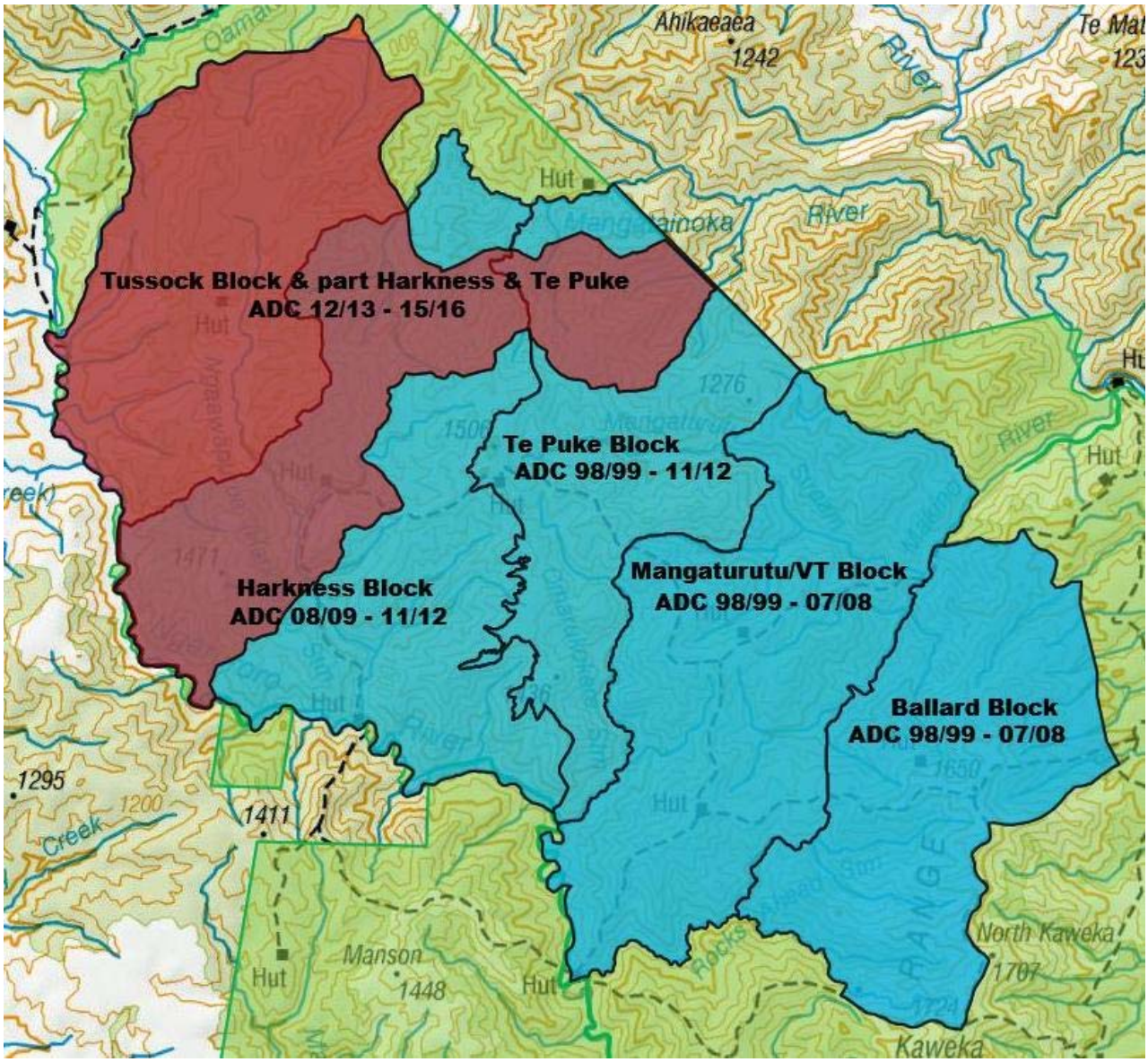
Below is a graph showing the total number of deer shot by the aerial deer control team. Note the 'hinds only policy' was introduced in the 2009/10 season.



Map showing 2015/16 Aerial Deer Control Block and deer kills this season



Kaweka Mountain Beech Project Aerial Deer Control Blocks 1998/99 – 2015/16



The above map shows the changes in ADC blocks throughout the KMB project. This is further summarised in the table below.

Years	Blocks	ha recieving control
98/99 – 07/08	Ballard, Mangatarutu/VT & Te Puke	11,024 ha
08/09 – 11/12	Harkness & Te Puke	8,899 ha
12/13 – 15/16	Tussock and parts Harkness & Te Puke	6,831 ha

3. FAECAL PELLET INDEX MONITORING

60 faecal pellet transects were measured in the 15/16 season in order to give a Faecal Pellet Index (FPI) for 2 blocks; Harkness and Tussock. These two block were chosen for monitoring this season in order to show if there had a been a reduction in FPI following aerial deer control in these blocks carried out over the past three seasons. FPI monitoring was carried out by three DOC staff members during January and February 2016. FPI results collected this season may not be a true reflection of the deer population in these blocks as some of the faecal pellets counted will be from animals shot during this season's control, 31st July – 30th November.

FPI is used to understand the correlation between relative deer abundance and vegetation health. It is a useful tool for indicating where Sika deer populations are too high and will have significant impacts on Mountain Beech regeneration.

There are 5 blocks within the Kaweka Mountain Beech Operational Area, and 2 blocks outside of the Operational Area. Each block has 30 FPI transects. The blocks inside the operational area have all received aerial deer control at some stage over the course of the Kaweka Mountain Beech project. The 2 blocks outside of the operational have received recreational hunter efforts only, these are the Manson and South Kaweka blocks.

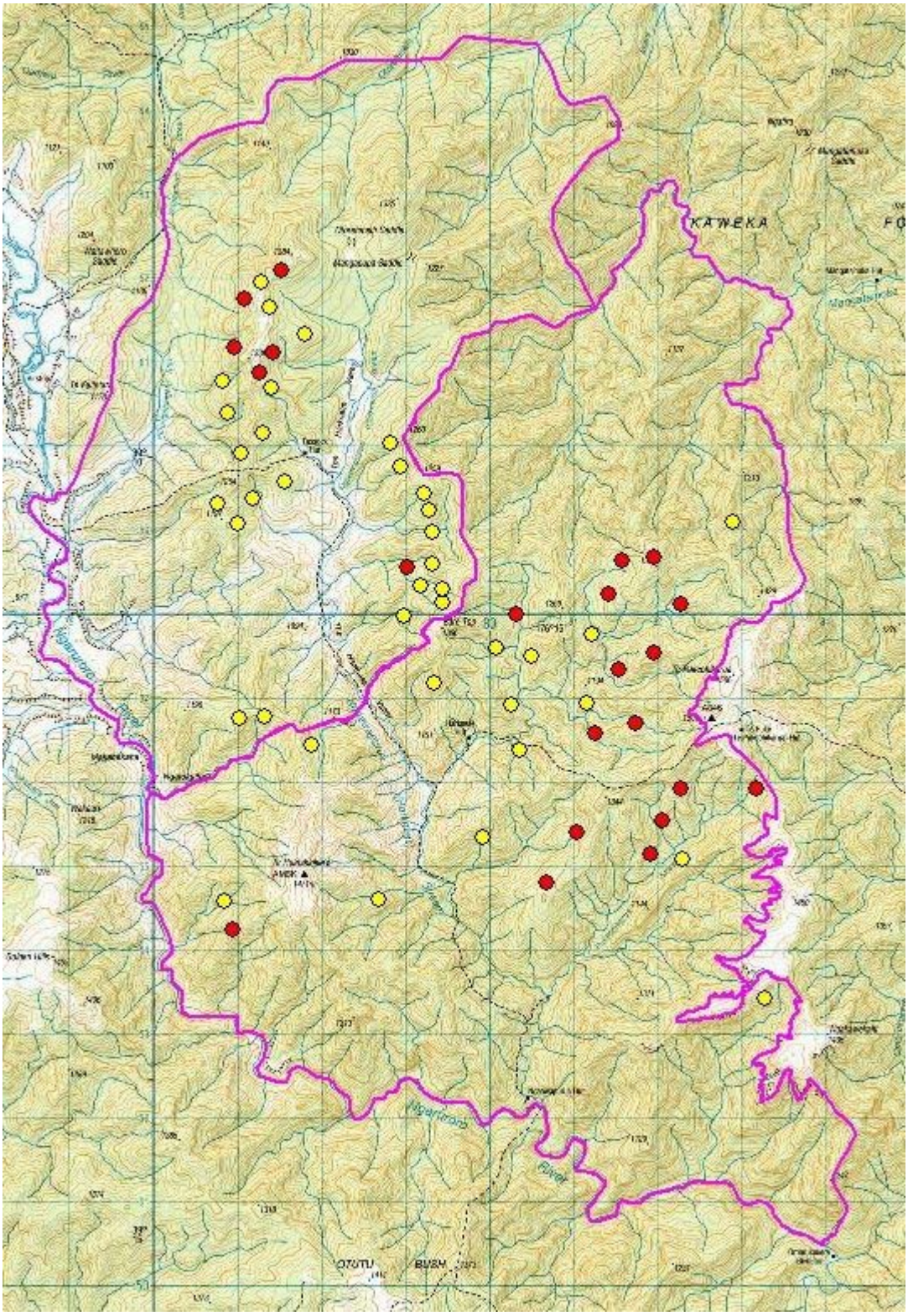
Based on data collected over the previous 15 years, an acceptable FPI range is between 5-20 FPI, at this stage we can expect deer densities to be low enough to allow mountain beech regeneration.

Table showing number of FPI transects out of 30 that had an FPI over the acceptable range (5-20 FPI)

Block	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Tussock	-	-	-	-	24	15	18	6
Harkness	15	25	14	18	7	11	18	16
Te Puke	10	17	16	13	5	-	6	-
Mangatarutu/VT	1	13	14	2	-	-	5	-
Ballard	7	7	9	2	-	-	10	-
Manson	-	-	-	-	8	-	-	-
South Kaweka	-	-	-	-	2	-	-	-

Note: – means that there were no measurements taken this season

FPI monitoring 2015/16. Tussock and Harkness blocks



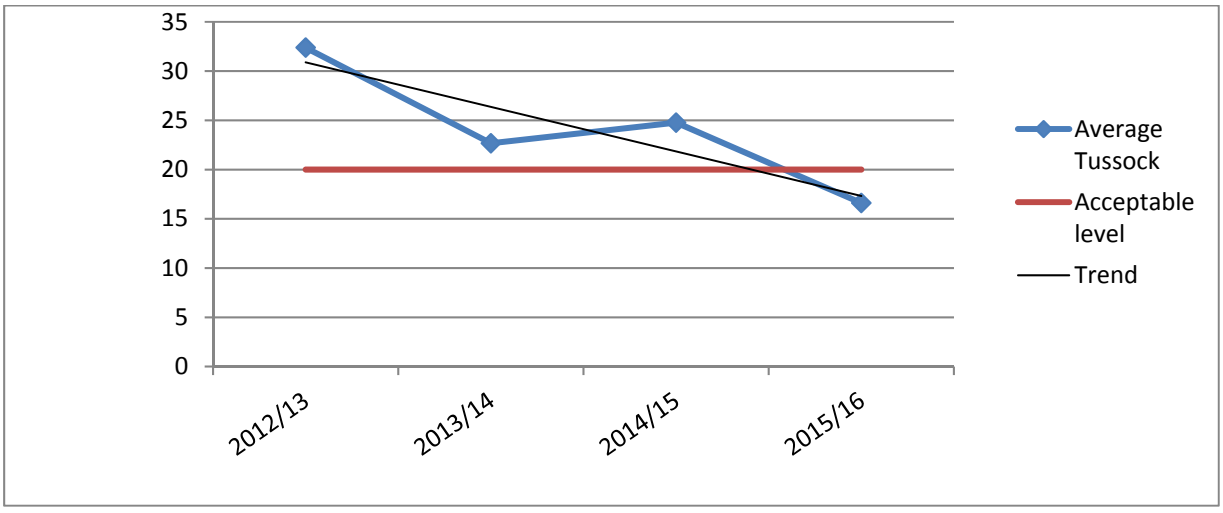
Yellow dots show FPI lines that measured 20 FPI or lower
Red dots show FPI lines that measured 21 FPI or higher

Tussock block FPI results

The Tussock block was not included into the Kaweka Mountain Beech Operational area until the 2012/13 season. The inclusion of the Tussock block into the operational area followed vegetation monitoring carried out in the 2012/13 season. This monitoring showed that the Tussock block had serious mountain beech regeneration issues. Basal area of mountain beech trees was measured in all blocks and showed that the Tussock block had the lowest basal area measurements of all blocks measured. Basal area measurements in the Tussock block showed a mean basal area of 31.5m^2/ha, the basal area which is considered healthy for mountain beech forest is 44m^2/ha.

Based on the FPI data collected this season we can say that Aerial deer control combined with recreational hunters efforts have reduced the deer population to an acceptable level for mountain beech regeneration in the Tussock block. This result could be due to the popularity of the Tussock block with recreational hunters, and the openness of the tussock vegetation which makes it easier to carry out aerial deer control.

Tussock Average FPI count



Graph showing FPI in the Tussock block trending down to below the acceptable level.

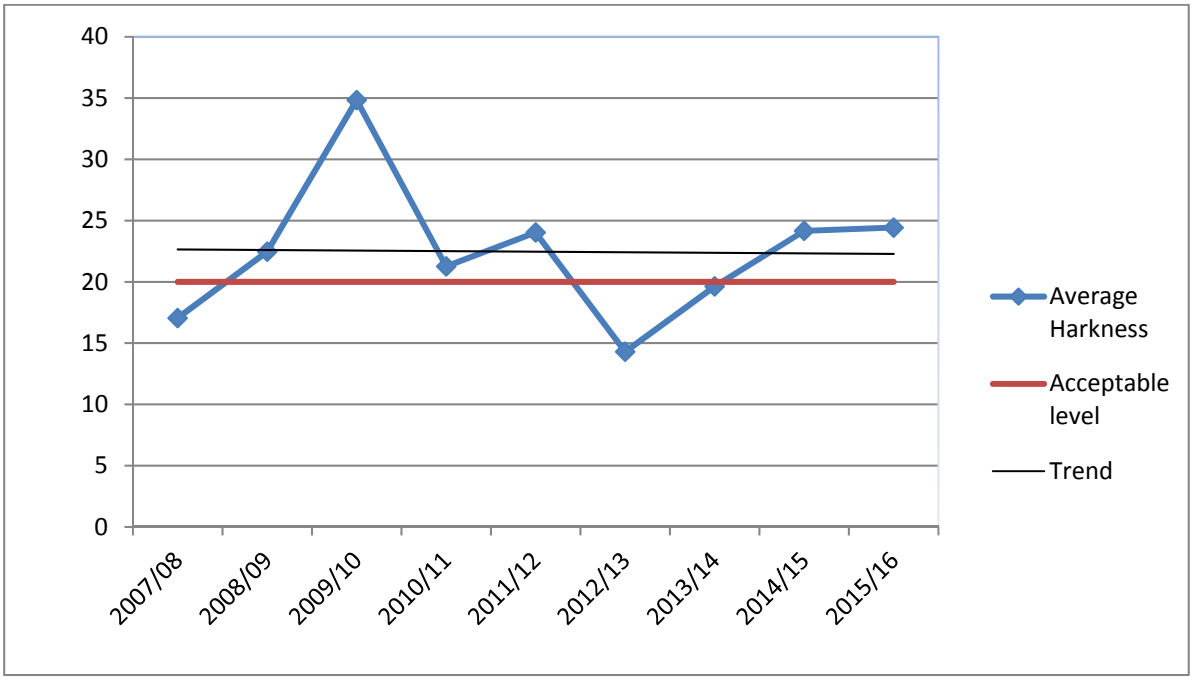
Harkness FPI Results

The Harkness block has been receiving Aerial Deer Control since 2008. Vegetation monitoring carried out in the 2012/13 season showed that regeneration of the mountain beech forest was more successful in some parts of the Harkness block than others. For this reason, the aerial deer control block was amended to include only the parts of the Harkness block which showed the need for further deer control. See map on page 8.

FPI results collected this season show no real change in deer population in the Harkness block. There are some possible reasons for this result, they include;

- 2015/16 FPI results will not be an accurate reflection of the ADC control that was carried out this season as a dry spring/summer period meant that faecal pellets from animals shot during this seasons control will not have been broken down, and therefore may have been counted during this seasons monitoring. Re-measuring these FPI lines during the 16/17 season will hopefully show a change in FPI.
- Staff changes in DOC may have resulted in a reduced aerial hunting effort during the 2014/15 season. For example, only 64 deer were shot in the 2014/15 season.
- Recreational hunters may be choosing to hunt other areas. It is well known in the hunting community that the Harkness block has received ADC over a long period. This could be deterring hunters from planning hunting trips to this area.

Harkness Average FPI count



Graph showing FPI in the Harkness block showing no change in trend since aerial deer control started in 2008 and the deer population still trending above the acceptable level.

4. VEGETATION MONITORING

Objective

The objectives for the 2015/16 season were;

1. Seek expert advice on the feasibility of re-measuring a proportion of tagged seedlings in the paired fenced and non fenced 10 x 10 plots which were set up in set up in 1997/98.
2. Carry out proposed monitoring of tagged seedlings.
3. Re-photograph photo points at all exclosures.

Method

A request for advice was sent to the DOC Science and Policy team. Advice received is contained in the document- *Kaweka Mountain Beech Project Advice DOCCM 2605233*. The key points are:

Re-measuring a proportion of tagged seedlings would add little to the overall objectives of the project for these reasons;

- Previous study has concluded that deer were retarding seedling growth. Questions around deer impacts have already been addressed.
- Re-measuring a proportion of tagged seedlings only, will bias measurements towards seedlings that have survived. This fails to measure mortality, or the proportion of seedlings that have successfully recruited to saplings.
- It has been 15 years since seedlings were last re-measured and it will hard to determine the fate of seedlings that have lost their tags or cannot be found.
- The subjective placement of the paired plots continues to be problematic because it limits the conclusions about seedling growth and deer impacts to just these plots, and not the wider forest.

Four different monitoring options were advised, these are;

<u>Monitoring Option 1</u>
To count and measure the DBH of all small trees (2.5 – 10 cm DBH) in all 99 paired plots.
<u>Monitoring Option 2</u>
To assess the percentage of open areas in each deer treatment area using ground based assessments (using basal area measurements in 10 x 10 randomly placed plots) and compare with the predictions of the rate of recovery by Duncan et al. 2006
<u>Monitoring Option 3</u>
To assess the percentage of open areas in each deer treatment area using remote sensing (satellite imagery) and compare this with the predictions of Duncan et al. 2006
<u>Monitoring Option 4</u>
Monitor the abundance of selected shrub species in the different treatment areas.

Result

It was decided that due to un-clear objectives of what we were trying to achieve by re-measuring tagged seedlings, a lack of resources to be able to carry out total re-measurements of all paired 10 x 10 plots (Monitoring Option 1), and being unable to locate original vegetation data in the NVS database, that no vegetation monitoring would be carried out during the 2015/16 season.

Photo points were not re-photographed due to the fact that not all exclosures were visited this year, and not having the time to be able to go through all the old plot photos to be able to match up new photos with old ones.

Conclusion

Vegetation monitoring covering monitoring options 2 and 4 has already been set up. This monitoring was set up during the 2012/13 season and measures basal area and palatable species within randomly placed 10 x 10 plots. See *Kaweka Mountain Beech Project Annual report 2012-2013 DOCDM-1453036*. This monitoring was set up to be re-measured every 5-7 years, with the next monitor due to be completed in the 2017/18 season.

There may be no reason to re-measure tagged seedlings in the paired 10 x 10 plots as it can be argued that the questions to do with this monitoring have already been answered. The tagged seedlings and paired non fenced 10 x 10 plots may already be too far gone to allow them to be accurately re-measured.

If the 10 x 10 fenced and non fenced plots are to be re-measured in the future, action needs to be taken to repair plots to a point where they can still be found for future monitoring to occur.

5. EXCLOSURE MAINTENANCE

Objective

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

Results

Only the exclosures in the Tussock and Harkness blocks were checked this year due to the fact that we only visited two of the five blocks to re-measure FPI's this season. Lack of resources meant that we were unable to get back in to check exclosures in the other blocks.

During our checks we noticed that the vegetation was starting to grow through and damage the wire and waratahs. We carried out a recce to see if the vegetation could be cleared up using silky saws. Some of the exclosures were quite over grown and took up to two hours and two people to clear. If the exclosures are to be maintained, they will all need to be cleared of vegetation this coming season.

Things to be considered if using a chainsaw for this work;

- Some of the exclosures are on uneven, sloping and rocky terrain and are in densely vegetated areas which may cause safety hazards.
- Some of the paired non fenced plots are very close to the fenced exclosures and are at risk of having vegetation that is inside of the plot cut down by the chainsaw. Also, the vegetation inside the fenced exclosures should be trimmed as close to the wire as possible so as not to interrupt the possible re measurement of the plot.
- Care should be taken not to cut the wire with the chainsaw.

Conclusion

Currently there is one exclosure that we know of that is not deer proof. This exclosure is located next to the Harkness Saddle heli-pad and requires a chainsaw to remove a branch which has fallen onto the wire.

A decision needs to be made as to the future of the exclosures and whether they should continue to be maintained. If the paired fenced and non fenced 10 x 10 plots are not going to be re-measured, the question should be asked as to whether resources should be continued to be put into maintaining the fences.

If the decision is made to maintain the exclosures to a deer proof standard, maintenance should be scheduled as a priority for next year before the fences degrade any further.

6. RECREATIONAL HUNTER ACTIVITY

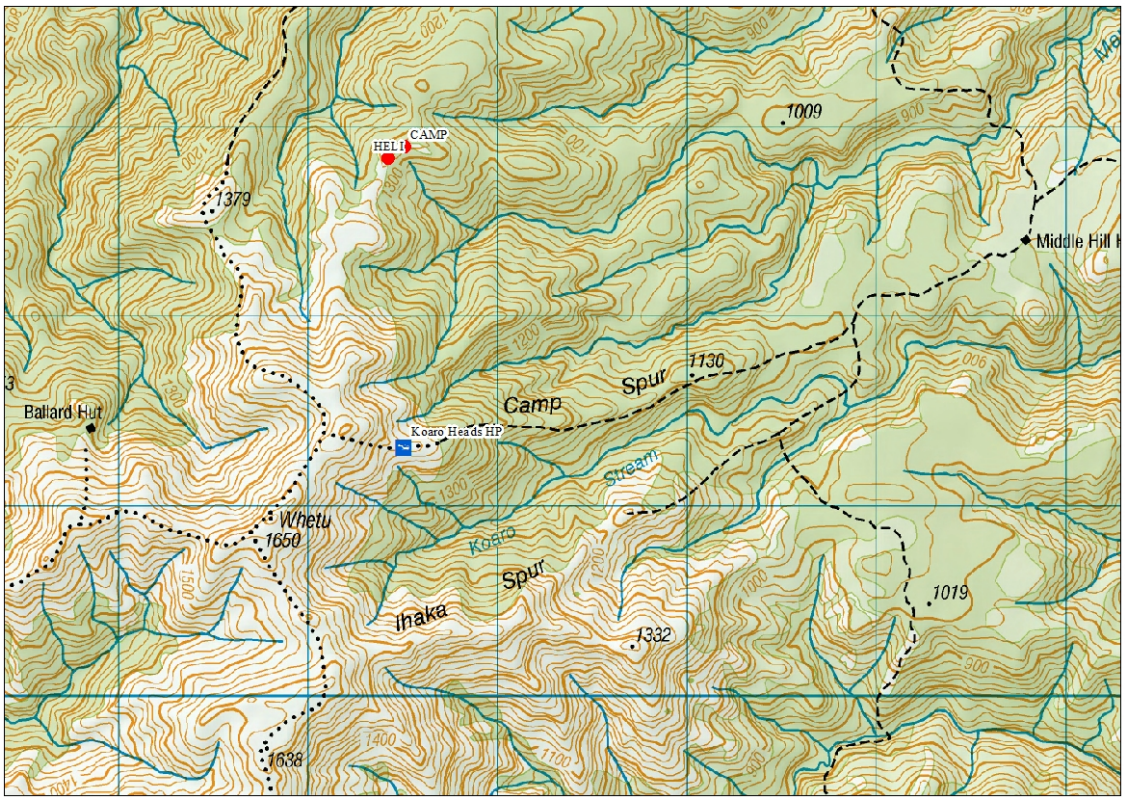
Hut booking system

The Kaweka hut notification system continues to be popular with huts used solidly through the summer, and autumn roar period.

There have been some discussions carried out as to whether there is a need to make the hut notification system viewable by the public. The public would not be able to make changes to the notification system, but would be able to use it to plan future hunting trips.

Re-located helicopter landing pad

The Koaro heads heli-pad has been shut down following feedback from concessionaires and hunters that this campsite could be better placed elsewhere. A new heli-pad has been set up at the North Whetu campsite. This opens up a lot of country that was previously difficult to get to.



Map showing location of the old Koaro Heads heli-pad (blue) and the newly allocated North Whetu heli pa (red).

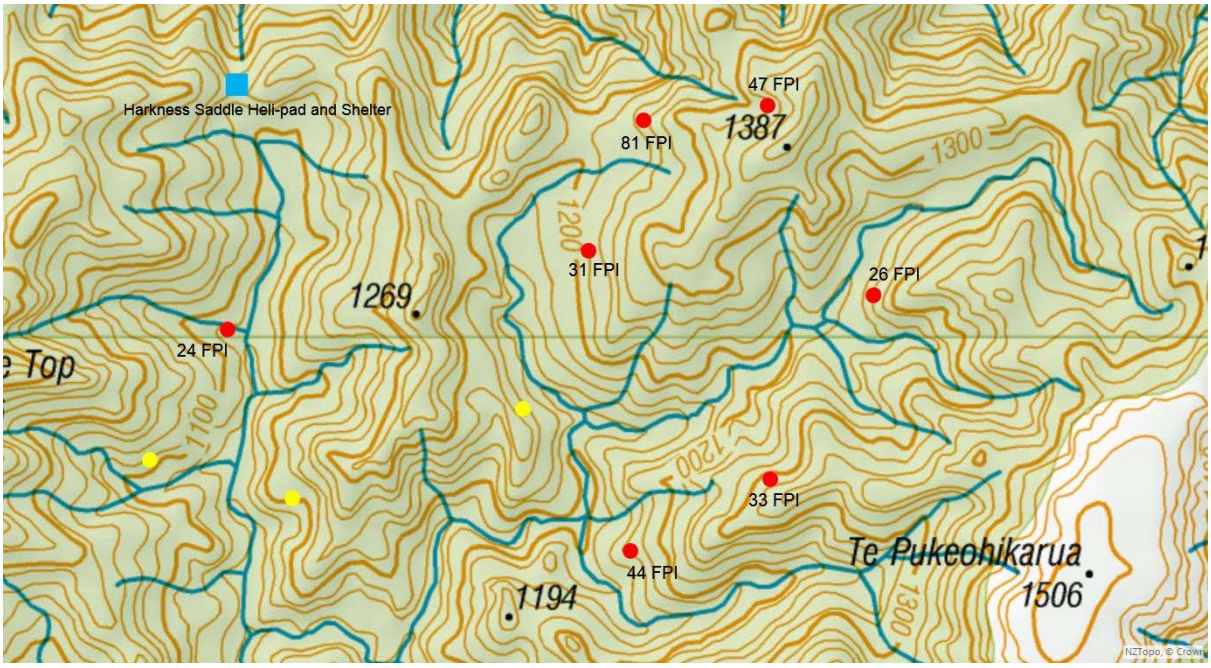
The full decision paper can be viewed: *Decision paper 22 March 2016 Koaro Heads Helicopter Landing Site DOC-2743285*

7. EXTERNAL ENGAGEMENT

Sika Show

Hawke's Bay District staff attended the Sika Show held in August 2015. The main topic of conversation at the Sika show was hunters wanting to know where the additional helipads and shelters are located. It was commented upon many times that it is hard to get access to this information as it is not recorded on the DOC website, in any DOC publications or any publicly available maps. A new ranger has been employed to update our web information. These additional heli-pads and shelters will be added to the DOC website.

The Harkness Saddle Helipad and shelter may have been under-utilised as shown in this seasons FPI results, see map below.



Red dots indicate FPI locations that had an FPI result higher than the accepted 20 FPI from monitoring carried out in February 2016.

Kaweka Hunter Liaison Group

The Kaweka Hunter Liaison Group (KHLG), representing local and national recreational hunting interests, with the aim of meeting at least twice a 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 Forest Park.

A KHLG meeting was held in the Napier DOC Office in May 2015 to discuss the season's findings and agree to changes in management and control regimes for the following year.

Minutes were recorded - *Kaweka Hunter Liaison Group Meeting Minutes May 2015. DOC-2822049*

The next Kaweka hunter Liaison Group meeting is scheduled for July 2016. Issues to be discussed at the next meeting include;

- Frequency of meetings, one meeting per year is probably not enough.
- The upcoming OSPRI, TBfree possum control operations to be carried out in the Kaweka Forest Park and how this might impact on the KMB project.
- The future of the Kaweka Mountain Beech Project.

8. SUPPORTING DOCUMENTS

Document Title	Location
Mountain Beech forest dynamics in the Kaweka Range and the influence of browsing animals (Allen & Allen 1997)	DOCDM- 470377
Kaweka Mountain Beech Project Annual report 2012-2013	DOCDM- 1453036
Kaweka Mountain Beech Project Annual Report 2010-2011	DOCDM- 755502
Operational Plan 2015 – Sika Deer and Red deer control in the Kaweka Mountain Beech Operation	DOC-2306504
Operational Plan 2009 – 2014 – Sika Deer and Red Deer Control in the Kaweka Mountain Beech Operation	DOCDM-410423
Operational Plan amendments 2013-14 (amendments to DOCDM 410423)	DOCDM- 1453022
Independent Contract Agreement, helicopter Hire for Aerial Deer Control in Kaweka Forest park	DOC-2527212
Decision paper Koaro Heads Helicopter landing site	DOC- 2743285
Minutes of the Kaweka Hunter liaison Group Meeting, May 2015	DOC-2822049
Vegetation Monitoring sheets	DOCDM-1102432
Advice on re-measurement of tagged seedlings in the Kaweka Mountain Beech Project. Oct 15 (Kate McNutt)	DOC-2605233
Kaweka Aerial Deer Control Total Data 1998-2015	DOC-2824693
FPI Raw Data Worksheet	DOC-2737113
Consequences of Deer control for Kaweka mountain beech forest dynamics (2007)	DOC-457501
Kaweka Mountain Beech monitoring review Feb 2008 (Cathy Allen)	DOCDM-260492
Kaweka Deer pellet monitoring review Feb 2008 (Cathy Allen)	DOCDM-260491