Australian Government

Tasmania
Explore the possibilities

TASMANIAN COMMUNITY FOREST AGREEMENT

RESEARCH INTO ALTERNATIVES TO 1080

NEWSLETTER 14 **October 2008**

PROJECT MANAGER'S INSIGHTS 1
COMMUNICATION ACTIVITIES 1
ALTERNATIVES TO 1080 WORKSHOP 1
14TH AUSTRALASIAN VERTEBRATE PEST CONFERENCE PRESENTATIONS 2
WILDLIFE BROWSING ON PASTURES 3
TRIALS IN NW AND NE TASMANIA 3
MIDLANDS TRIAL 3
KING ISLAND TRIALS 3
LOOKING FORWARD 4
FERATOX™ TRIALS 4
TRAPPING TRIALS 5
DR EDWARDS TRIALS 5
TRAPPING INTENSITY TRIAL 6
GENETIC BROWSING RESISTANCE 8
NEXT STEPS 9
NON-LETHAL BROWSING MANAGEMENT9
SHOOTING TECHNOLOGY TRIALS 10
NIGHT VISION SCOPE TRIAL 10
SILENCERS 11
REPELLENT TRIALS 11
MULTI AGENT REPELLENTS 11
DINGO URINE TRIALS 12
FORESTRY TASMANIA REPELLENTS WORK 13
NEXT STEPS 13
PERFORMANCE BASED CONTROL 13
MAIN FINDINGS AND CONCLUSIONS 14
NEXT STEPS 14
1080 RESEARCH & DEMONSTRATION WORK 14
1080 SIMULATION TRIAL 14
1080 CASE STUDIES 16
ALTERNATIVES TO 1080 EXTENSION WORK 17
'BEST PRACTICE' FENCING MANUAL COMMENCED 17
WOMBAT GATE EVALUATION 18
COMMERCIAL USE OF WILDLIFE 18
NEW RESEARCH PROJECTS 18
WALLABY HOME-RANGE SHIFTS IN RESPONSE TO LETHAL CONTROL 18
THE DEVELOPMENT AND TRIALS OF NIGHT VISION FILMING TECHNOLOGIES 19
STAFF CHANGES 19

Project Manager's Insights

If it seems like you haven't heard from the Alternatives to 1080 Program for some time, then you're right.

Between a hectic period for the first few months of this year followed by a three-month cycling holiday in Europe, a few things slipped, this newsletter amongst them. However, everything's now back on track and we've got a bumper October edition which should bring you up-to-date on key developments.

As always, if you want to know more about anything you read or have ideas or questions: then contact me: john.dawson@dpiw.tas.gov.au or by phone on 03 62336728.

Communication Activities

Alternatives to 1080 Workshop

In April this year, over fifty invitees from the Stakeholder Advisory Panel, Technical Advisory Panel, research recipients and other key individuals attended a two-day workshop in Launceston to review the progress of the Alternatives to 1080 Program.

This was the first opportunity in two years for this larger group to get together to see how the Program was progressing. It also marked the halfway mark of the Program.

The workshop was headlined by presentations from:

- Rural Development Services who presented their findings into **landholder attitudes to the use of 1080** with an emphasis on understanding how those who have wildlife browsing problems perceive, monitor, react, and implement control strategies either with or without 1080

(see the December 2007) for more on this project);

- Landcare Research presented their research report into whether the **Performance Based Shooting models used in New Zealand** to control Brushtail Possums could be adapted for use in Tasmania; and
- The CRC for Forestry presented their research findings into the **effectiveness of genetic selection of eucalypt species in reducing palatability of plantations to Brushtail Possums**.

More details on these last two papers are included in this newsletter, and full copies of the papers are available by contacting the Project Manager (1080 Alternatives).

The workshop also included presentations and demonstrations from most of the other deed recipients.

The second day allowed for a field trip to Pyengana where one of the major demonstration projects is being run by NRM North. The day also included a stop at a forest coupe near Scottsdale for some feedback on the forestry trials progress to date.

Figure 1 Workshop participants hearing it "as it is" from local Pyengana landholders.

Overall, it was an excellent two days, with plenty of questions, discussions and input and a real spirit of co-operation and enthusiasm from all present.

14th Australasian Vertebrate Pest Conference Presentations

The Alternatives to 1080 Program had a strong representation at the 14th Australasian Vertebrate Pest Conference held in Darwin in June.

The Implementation Committee provided grants of up to $1,500 for researchers to present at this conference as they saw it as an ideal opportunity to present some of the research being funded by the Program to the scientific community for feedback and review.

Three deed recipients presented papers at the conference, with a further five posters presented as listed below.

Papers

- *Understanding landholder decision making about control of native browsing animals in Tasmania*, Mooney C, Fulton A.
- *1080 Alternatives for Tasmania (Humane Toxins)*, Eason C et al
- *Advances in trapping for control of pest possums and wallabies in Tasmania as an economic alternative to 1080*, Edwards, I.

Posters

- *Your ass is grass! Investigating sustainable management of native herbivores on King Island, Bass Strait.* Branson, M.
- *New approaches to developing humane toxins; our rationale, questions and answers.* Eason C et al.
- *1080 Alternatives in Tasmania – baiting strategies*, Statham M et al
- *Different possum populations show the same aversions for genetically resistant seedling stock*, Wiggins N et al
- *Responses of red-bellied pademelon (Thylogale billardierii) and red-necked wallaby (Macropus rufogriseus) populations to lethal control*, Wiggins N et al.

Copies of most of these papers and posters are available through the Project Manager (1080 Alternatives).

Wildlife browsing on pastures

The Tasmanian Institute of Agricultural Research (TIAR) held a workshop on the 8th of August to present the findings of their work to-date into quantifying the impacts of wildlife browsing on pastures in Tasmania.

As noted at the workshop, this research, funded by the Alternatives to 1080 Program, is the first known attempt at a long-term study to quantify the impacts of native wildlife browsing on pastures in Tasmania.

Trials in NW and NE Tasmania

Pasture loss trials are being carried out on 12 sites, and a range of agricultural systems, in the NE and NW of the State. The effectiveness of wildlife fencing is being looked at on a further four sites.

Pasture percentage loss expressed as kg dry matter/ha due to wildlife browsing varied according to agricultural system, location, and wildlife abundance at all 12 trial sites.

Pasture loss to wildlife browsing ranged from 12% to 100%, with an average of 65% over the 12 sites for the six month monitoring period.

'Edge effects' were evident at all 12 of the main sites, with browsing generally higher near the bush line. The higher the abundance of wildlife, the greater the likelihood of browsing impacts away from the 'edge'. It is apparent from the trials that edge effects can influence both pasture production and pasture species composition, however the full nature and degree of preferential browsing is currently unclear.

These findings indicate that wildlife management may be one of the most important factors influencing production and profitability, and confirms the importance of having an adequate understanding of wildlife number and movements/impacts on a property.

While wallaby proof fencing, which was present at some of the trial sites, has proven to be effective, the researchers have yet to test the benefits and costs on both an environmental and economic level.

Midlands Trial

Another trial is being run on a large property in the midlands to gain an understanding of the impacts of native/introduced wildlife on the area.

Results so far indicate that the wildlife appears to be preferentially grazing cocksfoot and ryegrass rather than phalaris.

Observations of wildlife grazing patterns has been consistent with previous studies. The interactions between sheep and wildlife vary, and while fencing erected for the trial has resulted in less interactions between wildlife and sheep than normal, it is apparent that the degree of interaction is dependent upon the quality and availability of feed.

The work so far indicates that resting paddocks appears unproductive unless wildlife is managed. The current level of wildlife culling on the property, if intended to reduce pasture browsing pressure, appears ineffectual, but may have both direct and indirect environmental and animal welfare benefits.

King Island Trials

In November 2007, The Alternatives to 1080 Program provided funding for the first phase of a research project to examine the effectiveness of different culling intensities on reducing browsing damage on King Island.

Undertaken by Mark Branson of NRM King Island in collaboration with Tasmanian Farmers and Graziers Association (TFGA) King Island and TIAR, this first phase utilised contemporary methods of population monitoring to determine wallaby population levels on the Island as a baseline for any culling trials.

This trial has indicated that the population of pasture-foraging Bennetts Wallaby on King Island is between 440,000 and 540,000 individuals. In contrast, Tasmanian Pademelon were fewer in numbers (18,000 – 31,000) and have more restricted distribution as they prefer different habitat to Bennetts Wallabies, and are possibly

more susceptible to diseases such as toxoplasmosis. Brushtail possum numbers on King Island were again surprising, with an estimated pasture-foraging population between 55,000 and 93,000.

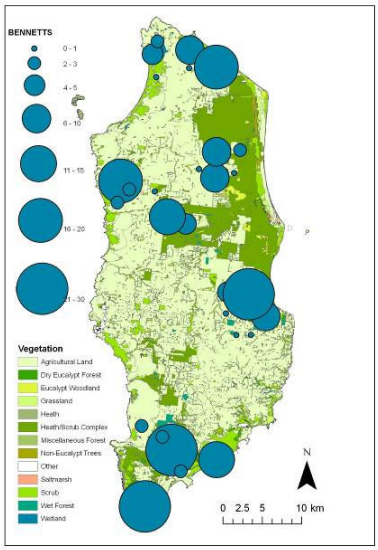

Figure 2 Estimated Bennetts Wallaby densities on trial sites on King Island

These figures are based on a pasture area of 71,000 hectares on King Island, and do not take into account the animals foraging in nature reserves or vegetation on private property, which represent 35% of the island. Densities of macropods and possums foraging within vegetated areas of the island are suspected to be substantially lower than those in pasture.

However, these figures clearly show why landholders on King Island see these species as a huge grazing problem and the utilisation of wallabies as a potential commercial resource.

The full report is available from the Project Manager (1080 Alternatives).

Looking Forward

The work to develop a decision support system for herbivory monitoring and control will run until June 2010, with the overall aim to develop decision support tools to enable landowners to better measure and predict browsing losses to native animals under different scenarios and therefore decide on browsing animal management options.

A second phase of the King Island project has also commenced which will run for one year and look at quantifying the relationship between different culling intensities (normal low level control, commercial harvesting and targeting low residual population levels) and pasture losses.

For more information on this project, contact Project Manager (Alternatives to 1080), or the lead TIAR researcher, Prof. Tony Norton tony.norton@utas.edu.au

Feratox™ Trials

As regular readers will be aware, Feratox™, an encapsulated form of cyanide specially developed to target brushtail possums in New Zealand, is being examined as one of the possible Alternatives to 1080 poison.

Feratox™ has many advantages over 1080 with animals becoming unconscious within just a few minutes of breaking a Feratox™ capsule. It also has the advantage in that once an animal has had a dose of cyanide it breaks down very quickly and the chances of secondary poison, particularly of dogs, which eat a poison carcass are almost non existent.

The Alternatives to 1080 Program has been funding work into species specific delivery mechanism trials. This is a joint DPIW/TIAR trial being run by Dr Mick Statham and Helen Statham in collaboration with DPIW scientists. This work looked at how to target delivery of Feratox™ to possums and wallabies, and produced very encouraging results.

Following the successful completion of this work, pen trials examining the efficacy and humaneness of the use of Feratox™ against Bennetts Wallabies were carried out in New Zealand in May and June this year.

These trials were carried out under a NZ Animal Ethics Committee approval, with two Animal Ethics Committee ?AEC veterinarians present to observe the trials.

The 16 Bennett's wallabies used in the trial all died quickly and humanely.

Unconsciousness occurred in less than 10 minutes and death in fewer than 20 minutes.

By way of comparison, in another trial brushtail possums taking 1080 poison took on average 9.5 hours to unconsciousness and 11.5 hours to death.

In parallel to the research contracted by the Alternatives to 1080 Program, Connovation have completed identical trials on Tamar wallabies in pens in Rotorua with the NZ Department of Conservation. Almost identical results were obtained providing further confidence in the ability to humanely kill possums and wallabies with Feratox™.

Two small field trials using Feratox™ have just been completed in Tasmania under a DPIW Animal Ethics Committee (AEC) approval.

Figure 3 Wallaby taking non toxic baits from a 'Striker' at latest trial site.

The first of these trials took place in the last two weeks of August 2008, and despite very high counts of wallabies when spotlighting prior to the trial, none were filmed at the bait station, or found having taken the baits. This result contradicted that found in previous bait trials where wallabies actively ate from the bait stations. Ideas ranging from the more aggressive brushtail possums preventing wallabies reaching the bait station (around 20 possums were killed at the bait stations), a reluctance for wallabies to eat near possum carcasses, and a much higher density of devils in the area making wallabies more nervous are all possible reasons for this result.

A change was therefore submitted to the AEC to trial the use of an alternative feeding mechanism called the 'striker'. This was accepted and a second trial undertaken which was much more successful with 51 pademelons and 13 possums found dead over the five days of the trial.

Unfortunately there was a high spillage rate of the capsules from the strikers onto the ground and on the fifth night of the trial it appears a potoroo scavenged a dropped pellet and was killed (the height of the striker would have precluded the potoroo from directly reaching the capsule in the striker).

These two trials have confirmed our understanding of the effectiveness and humaneness of Feratox™, but the issue of spillage has to be addressed if Feratox is to become one of the alternative tools for crop protection.

The results from this and other trials recently undertaken in New Zealand are being reviewed and a series of meetings are planned over the next two months to decide on how to address spillage and delivery issues.

Connovation also have some field trials planned in New Zealand with toxic pellets, and they are now giving a greater emphasis to ways of preventing spillage of pellets by wallabies.

Non-toxic pellet trials will be the priority for any future research in Tasmania before further consideration of toxic trials.

Trapping trials

Dr Edwards Trials

Dr Edwards has prepared a report "*Trapping Browsers as an Economic 1080 Poison Alternative - 2008 Interim Report* summarising his ongoing work into trapping as an Alternative to 1080.

Dr Edwards has continued to refine his analysis of the costs and benefits of shooting, trapping and 1080 as browsing control options, and through this has identified the travel time and number of visits to a site as key cost drivers, rather than the cost of traps themselves.

This finding has led him to focus much of his work looking at trap designs which may cost more to build, but which maximise the average catch per night and minimise on site time and visits.

This work has looked at different free feeding options, and the use of long term positioning of traps on a site rather than short term placement of traps. Other options he's been examining include multiple catch traps, permanent feeders, and multiple banks of traps set up with sufficient food to provide several days of free feeding from a single visit, but set to automatically trigger the traps to catch animals after several days.

More recently Dr Edwards has been working on a new design of trap targeting Bennett's wallabies. This species is very wary of anything that looks like a trap - ie. where they have to enter a structure to access food. The idea of this new design is that the trap is nearly flat when set, and is camouflaged with something like ground litter, leaves, pine needles, or straw.

Figure 4 Latest Bennetts Wallaby trap design from Dr Edwards

Dr Edwards is happy to discuss his research with interested people and can be contacted at isedwards@southcom.com.au.

His latest report is also available from the Project Manager (Alternatives to 1080) or directly from Dr Edwards.

Figure 5 Trap captured closing around a wallaby in early trials.

Trapping Intensity Trial

In 2007-08 the Alternatives to 1080 Project Officer Program conducted a trial in the north-east of Tasmania, which looked at the relative effectiveness of different trapping intensities in removing animal numbers on farmland.

Some of the trial results are shown in figures 6 & 7, which show the average spotlight counts of brushtail possums and rufous wallabies at the highest intensity trapping site.

The red bar in these figures represents the combined number of each species removed over four trapping sessions at the trapping site. No animals were culled at the control site.

Spotlight counts were conducted immediately before the first trapping event (mid July) and immediately after the last one (end August), with follow up surveys approximately two months and five months after the end of the trapping.

Spotlight counts were conducted over three nights, and the numbers shown here are the average sightings for the three nights.

It can be seen that for both species, the number of animals seen at the treatment site immediately after the trapping event was lower than before the trapping activities. Numbers were also consistently lower than the numbers seen at the control site.

However for both species, the number of animals at the two and five month post-trapping surveys were comparable to that before the trapping event.

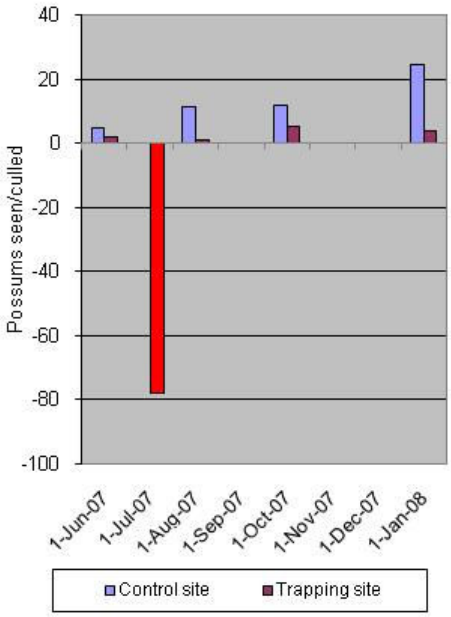

Figure 6 Average brushtail possum spotlight counts and removals over time.

So despite the number of animals removed being far in excess of the average number of animals seen prior to spotlighting, there seems to have been a very small impact, if any, on the number of the target species present in the trapped area.

Pasture readings were also taken inside and outside five exclosure plots on each of the control and treatment sites to measure changes in pasture losses.

These readings were taken using an electronic pasture meter which allowed for analysis of relative changes.

However, taking into account stock presence in the areas, it is possible to estimate the daily loss of pasture to native animal browsing at the control and treatment sites.

Figure 3 shows the estimated daily pasture loss for (1) the trapping period, (2) for the first two months following trapping and (3) for the period 2–5 months after trapping.

Both the control and treatment areas lost approximately the same pasture during the trapping operation, but in the two months immediately following the trapping operation the trapped area actually had a higher pasture loss than the control site where numbers hadn't been culled.

For the period 2–5 months after the trapping however, the situation was exactly the opposite with the treatment site being less browsed.

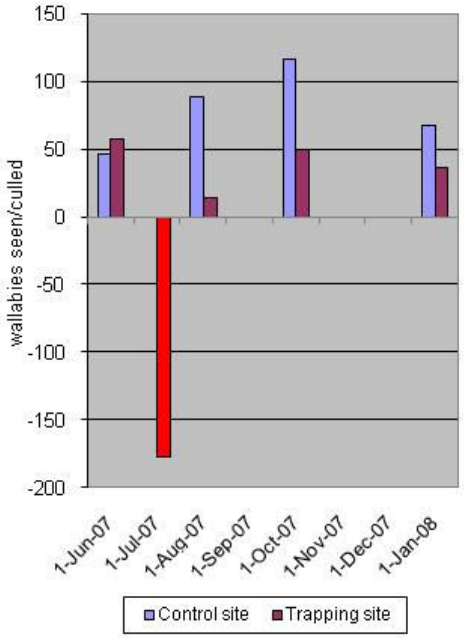

Figure 7 Average Rufous wallaby spotlight counts and removals over time.

Discussion

Whilst not shown here, all three trapping sites had similar results in terms of a very quick bounce back in population numbers at the treatment sites after trapping indicating that none of the trapping operations, in isolation, provided a short to medium term effectiveness against browsing numbers.

There could be many reasons for these results. It could indicate that the area being trapped was too small to undertake effective control, and the number of nearby animals able to quickly shift into the area has simply overwhelmed the experiment.

This is supported by previous research that has found home ranges for brushtail possums of up to 47ha, and for rufous wallabies of up to 169ha.

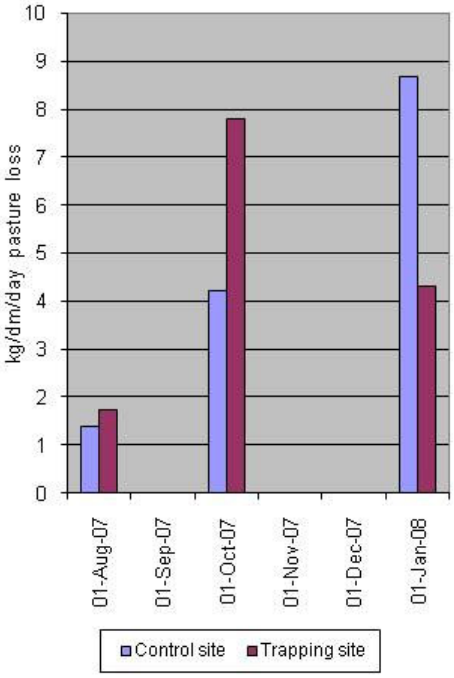

Figure 8 Estimated daily pasture loss index for control and treatment sites (kg dm/ha/day).

It is also entirely possible that seasonal factors have affected the trial. Very high rainfalls in July 2007 forced the abandoning of the trapping for two weeks, and would have also resulted in a lot of extra growth in the bush area during the subsequent trapping period which may have lead to a less successful trapping event.

Regardless, given the inability to demonstrate a clear gain in pasture growth following trapping, the large effort required to trap an area of this size in this way would be hard to justify on a financial basis.

Having said this, one of the three property owners has reported that whereas prior to the trapping they were unable to keep on top of their browsing damage, they do now feel that this initial knockdown has let them get back on top of animal numbers through their shooting effort.

From a practical perspective the Project Officers have reported that if doing this work commercially, they would have shot the area first (particularly for brushtail possums) and then utilised the traps to 'mop up' any gun-shy animals they were unable to shoot. This approach is likely to trialed in the future.

Finally, undertaking this control during the July – August period resulted in the capture of a very high number of female wallabies (89%) and possums (88%) that were carrying pouch young.

From a browsing control perspective, this increases the effectiveness of trapping because it is also removing a large proportion of the next generation of browsers for no additional effort. However from an animal welfare perspective, we have to ask ourselves whether it raises any specific welfare issues around the removal of pouch young.

Genetic browsing resistance

Research into a trees natural resistance to possum browsing has been ongoing for many years, with indications that some tree stock is more resistant to native animal browsing than others.

A common practical concern raised by tree growers is whether this aversion to genetically sourced seedling stock is consistent state-wide, or whether different populations of brushtail possums show different levels of aversion depending on whether they have coexisted with particular populations of eucalypts.

The Alternatives to 1080 Program funded an investigation carried out by Dr Natasha Wiggins of the CRC for Forestry, into the seedling preferences of two populations of the common brushtail possum that have coexisted with two blue gum (*Eucalyptus globulus*) populations that are of genetic extremes in their susceptibility to mammal browsers:

Seed was sourced from south-east Tasmania (Blue Gum Hill; foliage with high levels of defensive chemistry) and north-east Tasmania (St Helens; foliage with low levels of defensive chemistry) and grown under standard nursery conditions.

Additionally, seed from two Australian mainland populations in Victoria, Jeeralang North and Parker Spur, were selected for use in the trial to include foliage that both possum populations were unfamiliar with.

Possums were offered each of the four foliage types as a no-choice feeding trial for four consecutive nights and their browsing preferences were recorded.

Brushtail possums ate significantly more St Helens foliage (low-level defensive chemistry) than any other foliage locality.

Possums sourced from the Blue Gum Hill population ate more foliage across the duration of the trial than possums sourced from the St Helens population, most likely attributed to differences in body mass between the two populations.

Importantly, the results indicated that foliage susceptibility to possum browsing was stable across the two different possum populations.

The findings of the research demonstrate that there are genetic based differences in the susceptibility of seedlings of E. globulus to possum browsing.

Full copies of the final report are available from the Project Manager (1080 Alternatives).

Next Steps

Genetically resistant seedling stock was also included as part of a larger field trial, funded by the Alternatives to 1080 Program, comparing the effectiveness of several non lethal browsing resistance factors. See the next article for more information.

Non-lethal browsing management

The aim of this project, being run by Dr Alison Miller of the CRC for Forestry, is to compare various combinations of non-lethal management options known to reduce browsing and then use the best combinations in demonstration sites.

The first trial involved planting out *Eucalyptus nitens* and *E. globulus* seedlings in eight Forestry Tasmania coupes across the state in Spring 2007. Plantings comprised 14 different combinations of the four major 'browsing resistance' factors, being:

1. natural 'genetic' resistance levels;
2. nursery fertiliser treatments to reduce palatability;
3. chemical repellents; and
4. seedling stockings.

Experimental seedlings were planted in a single row around coupe perimeters to allow for maximum browsing. The remainder of each coupe was planted as an operational *E. nitens* plantation. Sites were paired, with one in each pair going without the usual pre-plant shoot. After planting, shooting/trapping was performed as deemed necessary by Forestry Tasmania.

Experimental seedlings were treated the same as the operational seedlings; most were fertilised around six weeks after planting. Seedlings were monitored fairly intensively for six months after planting. This consisted of browsing damage being scored, as the percentage of foliage removed from seedlings, weekly for the first six weeks and then fortnightly. Seedling heights (cm), and the cover, height and type of vegetation within a 30 cm radius of each seedling were assessed monthly. Tree height and form will also be assessed at 12 months after planting (Spring 2008).

All four major 'browsing resistance' factors were found to have a significant effect on browsing damage. The most effective treatment at reducing browsing was stockings. Repellent was also very effective, with its effectiveness greatly increased when applied to seedlings with low nursery fertiliser.

Figure 9 One of the trial sites in N.E Tasmania

After discussions with forest industry stakeholders, six 'demonstration' coupes were planted in Autumn/Winter 2008 with *E. nitens*, using the most effective, operationally feasible treatments identified in the first trial (i.e. stockings and repellent). Four coupes were provided by Forest Enterprises Australia, and two by Great Southern Plantations. Seedlings were supplied and planted by industry partners.

Due to the last-minute addition of stockings (at industry request) to the first trial, they were not tested in combination with other methods, and we were unable to compare the cost-effectiveness of repellent and stockings. These issues have been remedied in this second trial, along with assessing the possibility of re-applying repellent in the field. There are, therefore, a total of seven treatments in the second trial, consisting of all combinations of repellent and stocking, with and without repellent reapplication in the field.

Seedlings were planted in the same style as the first trial, and again the remainder of each coupe is an operational *E. nitens* plantation. There are 100 replicates of each treatment on each site. These seedlings were scored for browsing weekly for the first 6 weeks, and are currently being scored fortnightly. Repellent is being reapplied where appropriate 3 months after planting.

Preliminary results show that control (untreated) seedlings are far more vulnerable to browsing than those with repellent and/or stockings, and that the stocking + repellent treatment is the most effective. Intensive monitoring will continue until late December 2008, and it is expected that a final report will be prepared by February 2009.

Based on a recommendation from the Technical Advisory Panel, The Alternatives to 1080 Implementation Committee has decided to provide a supplementary grant of around $5,000 to the CRC for Forestry to allow a PhD student to incorporate longer term monitoring of these sites into their work. This will allow us to see if the benefits identified from the additional controls are still apparent up to two years after the initial planting and also may answer operational concerns over nursery fertiliser treatments impacting on growth of seedlings.

Shooting technology trials

This part of the Program is looking at trials to investigate if established and accepted controls such as professional shooters with Night Vision Scopes and/or silencers can be cost effective alternatives to 1080 poison in reducing a local animal population.

Night Vision Scope Trial

The field work examining the use of a night vision scopes as an alternative to 1080 by Tasmanian Plantation Management Services has now been completed with some early results having been provided to the Alternatives to 1080 Technical Advisory Panel.

Essentially this trial attempted to compare whether a shooter using a rifle Night Vision Scope (NVS), could be more effective at animal control than more traditional approaches using a vehicle and spotlight.

The idea behind this is that native animals become accustomed to 'danger cues' and that those animals who have survived previous shooting have learnt that vehicle noises, gun shots or white spotlights essentially mean "run for cover quickly".

A hunter on foot, using just a night vision scope to spot and shoot animals, removes the cues of vehicle noise and spotlights. Furthermore, animals may not be able to identify exactly where the gun shot comes from and so don't flee as quickly or as far, thus also increasing the effectiveness of a shooting operation.

Although a complete analysis of the data is still forthcoming, the data on animals seen and shot between the two methods is very interesting.

The number of animals seen under both methods was very similar with a total of 358 target animals seen during 39.3 hours of spotlighting and 352 target animals seen from 44.1 hours using a night vision scope.

There had been some concern that fewer animals would be seen with the use of a night vision scope because of less eye-shine, but on face value this doesn't appear to be that significant with, on average, 8 animals seen per hour using a night vision scope and 9 animals seen per hour using a spotlight.

More importantly, using the night vision scope, the shooter was able to kill 97% of the animals seen, compared to only 62% when using a vehicle and white spotlight.

The relative effectiveness for wallabies was even more apparent, with only 51% of wallabies seen with a spotlight being shot compared to 96% of wallabies seen being shot using a night vision scope. For possums which tend to be slower and less prone to flee than wallabies, the relative proportions were less pronounced at 88% versus 98%.

These results, although indicative only, suggest that technologies like night vision scopes can increase the effectiveness of controlling target species in particular circumstances, and may be a useful alternative acute management tool to 1080 poison in rapidly reducing high population levels, especially for professional game controllers who may be able to justify the expense ($2,000-$4,000) for such equipment.

Silencers

The Alternatives to 1080 Program has now gained permission from the Tasmanian Police Commissioner to utilise a firearm silencer for a similar effectiveness trial carried out for the night vision scope.

These trials will focus on the use of the effectiveness of using a silencer on a 22 rifle.

The use of a silencer on a centrefire rifle was carefully looked at due to the advantages it might give through a greater shooting range over a 22. However, it was identified that specially weighted subsonic ammunition would be required to achieve Tasmanian animal welfare standards for the minimum muzzle energy. Costs are prohibitively high for this kind of ammunition. Furthermore, as this ammunition fires differently than normal supersonic ammunition, any shooter wanting to use a silencer would have to have a dedicated rifle set up and sighted in to the ammunition and silencer. Because of these issues, it was decided to first look at the more adaptable 22 option.

There is a clear emphasis on targeting this sort of technology at professional wildlife controllers.

Repellent Trials

Multi Agent Repellents

Connovation Ltd. have recently completed a draft report titled "*Improving the effectiveness of contact repellents by combining the best into a single formulation*".

The aim of this research was to develop a more effective multi-action repellent formulation targeting possums and wallabies to provide more prolonged multi-species browsing control.

The submission for this project funding had noted that previous research tended to focus on the comparative merits of alternative deterrent action, for example bitter agents versus odour based repellents, rather than looking at how combinations of repellency action could be utilised to increase repellent effectiveness.

Repellent research has had mixed results with some products working against some species in some situations, but not in others.

In this study, five of the most promising contact repellents were tested for their lack of phytotoxicity on *Pinus radiata* and *Eucalyptus nitens* and their effectiveness at repelling wallabies and possums.

No phytotoxicity was identified for the formulations which included egg powder, bitrex, capsicum, skunk odour and predator odour over a five week observation period.

Different repellent combinations were then assessed against brushtail possums and bennetts wallabies in enclosures and cage trials. These combination repellents were found to be more effective at repelling wallabies than possums and those combination mixes that contained predator odours were the most effective.

An optimised final formulation was provided to the Alternatives to 1080 TIAR research team in Prospect who carried out further trials of this formulation (alongside dingo urine provided by Dr Michael Parsons) in repelling bennetts and rufous wallabies. These studies have shown similar repellency in pen trials, and it is now intended to undertake some observational field trials in 2009 of the effectiveness of these new repellents, and tree stockings in reducing browsing damage in plantations.

The pen trials in Tasmania also form the basis of an honours research project being conducted by Amelia Fowles and being funded by the Alternatives to 1080 Program.

Dingo Urine Trials

The Alternatives to 1080 Program also funded a small investigative trial into the effectiveness of the Dingo Urine products being developed by Dr Michael Parsons of Curtin University in repelling wallabies and possums.

This trial was conducted with the assistance of Dr Edwards who made his research site at Maydena and night vision monitoring equipment available for the trial.

At this trial site, wild wallabies and possums have become accustomed to entering a compound through a gate and then feeding freely from a large 44 gallon drum of food. They can exit the compound at any time through a separate gate. Possums are also able to enter or exit the compound by climbing the compound walls.

For this trial, dingo urine was provided by Dr Parsons and placed around the entrance door to the compound, and also directly around the feed, giving the animals two choices: (1) would they go past the urine repellent at the gate to enter the compound, and then (2) would they feed with the repellent surrounding the field trays.

The trial was run for three nights, with further monitoring before and after this time to compare animal behaviour with and without the repellent present.

Reviewing the behaviour during the night, it is unquestionable that the dingo urine created a repellent effect. With the possums, there was a lot of tail twitching, which occurs when they're agitated, and most animals were very cautious, often approaching and retreating the gateway and circling the enclosure trying to find alternative entrances without going near the urine.

Figure 10 Dr Parsons (very carefully) placing dingo urine gel outside enclosure entrance. Note 44 gallon drum in the background is the feeder where more repellent gels were placed.

In line with other trials, the wallabies appeared to have an even stronger response, commonly approaching to within four to six metres and then turning and heading back into the bush.

However, even on the first night a number of animals of both species entered the compound after what appeared to be a period of assessment of the repellent. A much smaller number entered and ate the food without any noticeable affect from the repellent.

This trial was not intended as a definitive examination of dingo urine repellency, but to identify whether it had any effect which it certainly did.

What I found most interesting from the trial was both the variation in response between different animals and also that a visual assessment of the amount of feed taken each night would make an observer feel that browsing had been unaffected by the repellent. It's only the video evidence showing a very real response in the number

of animals entering the enclosure and eating food whilst the repellent was present that tells us that the repellent is working.

Forestry Tasmania Repellents Work

Andrew Walsh of Forestry Tasmania has also recently published a technical paper titled "*Trials evaluating mammal browsing repellents 2001-2005*". Technical report 06/2008 by Andrew Walsh, Division of Forest Research and Development, May 2008.

As the title implies, this report summarises several field trials examining the use of repellents to manage mammal browsing in Tasmanian eucalypt plantation establishment operations.

The report contains two recommendations of areas for further research, namely:

1. the effect on animal's foraging patterns by placing repellent only on seedlings in parts of plantations at high browsing risk, and
2. investigations into an optimum diversionary food source to provide browsers with an alternative to eating repellent-treated seedlings.

It is a very useful document for those of us who are now following along on their footsteps, particularly when looking at integrated control Programs.

Forestry Tasmania has already distributed this report to several Alternatives to 1080 Technical Panel members, and it is also available from their Library.

Next Steps

As Dr Parsons commented in an interview about this and other trials he has conducted in Tasmania "*I think it's a big ask* [for dingo repellents] *to replace 1080. I think what we're tasked with doing is beginning that process. We would like to create a toolbox of alternatives*".

For me this work to date opens the question of thinking about how we use repellents in conjunction with other forms of control. If repellents can prevent 40-60% of animals (the shyer ones) from browsing in an area, perhaps fewer animals need to be killed to achieve browsing control if shooting and repellents can be used together. This appears to be in line with the Forestry Tasmania thinking, and also Dr Parsons idea of a toolbox of alternatives.

Dr Parsons has identified the need to produce 'carriers' that can deliver the specific repellent signatures consistently for a period of time as a key priority for his research to achieve longevity of control.

Connovation Ltd. and its research partners are very interested in the development of new delivery mechanisms for repellents such as 'sticky fibres' which might be cheaply and easily sprayed over trees in order to protect new foliage growth.

Forestry Tasmania's work identifies the need to understand the animals response to repellents in field conditions.

Essentially there do appear to be areas where we could continue to examine this area of research, and the Technical Advisory Panel has been asked to provide advice to the Implementation Committee on which way to go, or if in fact the funds might be better spent looking at other alternatives to 1080 such as seedling stockings if they're proving more effective.

Performance based control

New Zealand has a $NZ50 million per year possum control industry, with a highly developed contract and monitoring system.

Landcare Research were given a grant to examine performance based models for Brushtail possum control in New Zealand and to look at if and how such a model might be used in Tasmania for browsing animal control.

In the report, the biological and economic fundamentals for a monitoring and control system were outlined, information on how the performance based control system works in New Zealand examined and finally the applicability of some or all of this type of wildlife control was examined in the Tasmanian context.

Main Findings and Conclusions

To be cost-effective, animal damage management needs to be based on a set of key economic and biological principles that are supported by knowledge of what the critical animal pest(s) are, what reduction in the pest population abundance is required to obtain the desired reduction in impacts, and, especially for production systems, what the costs and benefits are of the management action.

For performance contract systems to be developed as an option for addressing the Tasmanian browsing mammal problem, clear performance targets need to be able to be set and they need to be measurable.

For Tasmania's two production systems (plantation forestry and farming) that are impacted by browsing and grazing animals, Landcare Research found little information on the relationships between pest densities and their impacts.

There is no ideal monitoring methodology available, but strip-transects using spotlight counts might be sufficiently robust and cost-effective to support the development of a contract system. Alternatively, WaxTags® (see newsletter 8) might provide a very low cost and effective method for monitoring control operations.

Landcare Research found that because of the high level of uncertainty related to target densities and monitoring methodology it would be unrealistic to develop a performance-based contract system and place the major component of risk on the control contractor. As an alternative, and as a way of increasing the rate of learning about the critical information needs, an input contract system should be established and formalised within an adaptive management framework.

There is a wealth of information in New Zealand related to the contracting process, and this could easily be adapted for use in Tasmania

Next Steps

Some small trials have already been undertaken into the use of Waxtags® as a monitoring tool, and the core of the reports recommendations has been picked up in phase 2 of the King Island trial which will now be using input based contracts to compare different control intensities to achieve different targets, and how this relates to pasture loss.

More information on this trial is available from the Project Manager (Alternatives to 1080), as is Landcare Research's final report.

1080 Research & Demonstration Work

Without an understanding of the effectiveness of 1080 poisoning against which to compare other alternatives, it is very difficult to talk about finding commercially viable alternatives to 1080.

1080 Simulation Trial

A collaborative project, lead by the Project Officer program, was therefore set up to run a simulated 1080 poison trial to try and estimate the number of animals that came to the line on the 'poisoning' night and the relative costs and effectiveness of a 1080 poisoning versus shooting.

A property with high animal numbers was identified in the north east of the State, and a simulated 'best practice' 1080 operation was carried out, with the exception that a non-toxic rhodamine dye was used instead of 1080 for the 'poison night' and an attempt made to actually estimate the number of animal visits to the poison line (through non-intrusive video monitoring) on the poisoning night.

For the night of the poison operation and also the night after, six motion sensitive cameras were put on random carrot piles by Dr Statham's TIAR team to provide a count of visits and species to these bait piles. Dr Edwards wide area night-vision monitoring camera was also used on the site to capture

the bigger picture of browsing behaviour around the poison line.

This was then to be followed up by a shooting operation to see if the two Project Officers could achieve a similar or better control result to a 1080 poison operation through shooting, and what the relative cost of the two operations would be.

Rhodamine dye was used in the trial as it can be detected using ultraviolet light, thereby making it possible to identify whether each animal shot had been to the 'poison' line on the previous night.

Unfortunately, a number of external factors greatly affected the trial:

- Contrary to advice provided by the landholder, professional shooters were moved into a neighbouring coupe resulting in shooting immediately before and during the trial and affecting animal numbers and behaviour.
- The landowner also chose to burn a large number of log heaps in the surrounding area on the night of the simulated poisoning thus disturbing the animals.
- On mixing the carrots and rhodamine there was some concern that the smell and taste of the rhodamine may have been distasteful to the animals.
- Just to show that the gods really weren't smiling on this trial, 5 of the 6 motion-sensitive cameras failed to capture any footage on the night of the 1080 poisoning, leaving us with only the wider area footage from Dr Edwards camera.
- Furthermore the next night when shooting was to take place, first the officers were reduced to using shotguns as a fog rolled in, and then had to abandon the exercise completely when they noticed another spotlight shooter in the vicinity.

To try and salvage the trial, the Project Officers ran out 48 Mersey Box traps the next week and trapped for three days.

Results

Unfortunately, but not surprisingly, we were unable to get an estimate of the number of animals that came to the bait line, however using Dr Edwards camera it was possible to observe animal visits and behaviour around one bait pile.

Over the 7.5 hours of footage, 76 wallabies, 2 rabbits and a wombat passed within the first 50 metres of the cameras viewing frame. 29 of these wallabies (38%) visited the bait pile, spending on average 3 minutes at the pile (range 0 -11 minutes).

From 1:25am to 3:25am wallabies that passed close to the bait pile visits were further analysed. Of the 17 wallabies that passed close to the bait pile 11 stopped and ate at the pile, and 6 carried past

12 wallabies and 1 possum were shot the following night, with 10 of the wallabies and one of the possums having rhodamine traces.

In the following trapping operation 32 wallabies and 17 possums were trapped. 27 of the wallabies and 14 of these possums had rhodamine traces.

Discussion

Despite the problems, many useful observations were still made from this trial.

The high rate of rhodamine traces on shot and trapped animals, and the number of visits to the bait pile that we were able to record using Dr Edwards' camera, indicates that the 'poisoning' would have had a high success rate compared to the other methods.

There was no video evidence of behavioural aversion to the smell or taste of the rhodamine with animals calmly approaching the pile and eating several pieces of carrot before leaving, but it was very interesting to see that all of the wallabies consistently remained there for a short time, and only ate a small amount. There was also evidence that a number of wallabies will pass right past the bait pile without stopping to eat.

The Project Officers (both being experienced shooters) noted that when

initially shooting they found the animals to be 'light shy' (See figure 11), but that the trapping exercise then caught the older, dominant animals and broke the cycle of lightshy animals. It was reported that after the trapping, the animals seen when spotlighting were mostly juvenile and could have been easily shot.

We also carried out an analysis of the impacts of the shooting on animal numbers. The video footage was stopped every 8 minutes and the number of animals in frame counted (Figure 11). This was one of the first times that we were actually able to observe animal response to a shooting event.

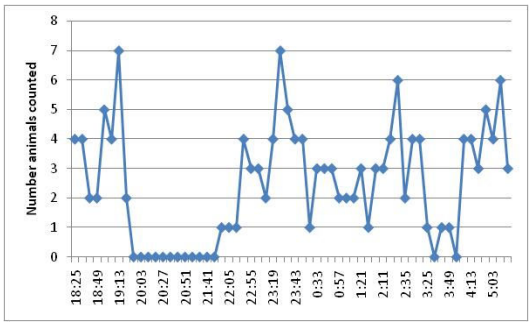

Figure 11 Animal count on shooting night

The project officers entered the area and commenced shooting around 8pm, 16 shots were taken, and 13 animals killed. Due to weather conditions and the other shooter in the area, the project officers left about an hour later. Whilst this level of control was ineffective for our purposes, it is probably similar to the sort of effort a recreational or landowner might make in such an area.

As can be clearly seen in Figure 11, as soon as the project officers entered the area and commenced shooting (we were able to observe the spotlights and hear shots taken) the animals left the area, but returned 40 minutes to an hour after the project officers left.

This level of once of shooting effort didn't even really reduce grazing activity even on the night it took place. Another interesting observation was that at around 1am, several shots can be clearly heard from the contractor working in the nearby plantation, however there was no response from the animals in frame.

1080 Case Studies

Following the simulated 1080 poison trial, the Project Officers became involved in several opportunistic trials where landowners had permits for 1080 permits.

With the landowners consent, the Project Officers assisted with monitoring the laying of the poison, and a very detailed collection of carcases afterwards on the sites, and for two of these operations the landowners shared all of their cost and time data.

Some preliminary analysis of these two operations show that had the landowner run the operations 'normally' (so excluding the additional effort put in by the Project officers) the cost per animal killed was around $6 per animal at one site, and $8 per animal at the other. These figures need to be treated with some caution as in determining these figures, the Project officers conservatively estimated they found only 50% of carcasses. Given the openness of the locations and the thoroughness of the search, they believe they found closer to 80% of carcasses which would mean the cost per animal killed to around $9-$10.

These cost for the two sites broke down into 1080 costs 18%/17%, carrot costs 9%/26%, independent assessment officer costs 12%/7% and landholders time (inspection and permits, free feeding, poisoning and pick up valued at $40 per hour) 51%/43%.

A key issue here is that if a landowner ignores the opportunity cost of their own time spent doing the operation, then they would consider the operation to only cost $3-$5 per animal.

Spotlight counts conducted by the Project Officers two weeks after each of the poisons found a large refill of animals at both sites, though it was observed that on at least one of the sites, most of the animals were juvenile, and very easily approached (and hence shot).

This is a similar result found to the N.E. trapping trial, and continues to support the need for follow up control to effectively reduce animal numbers.

Following up on the small amount of carrot it was observed that wallabies ate in the 1080 simulation trial, a visual gut content analysis was carried out on a sample of animals from the sites. The amount of carrot consumed appeared quite consistent, with most possum stomachs completely full of carrot, (estimated at between 300-350grams) whilst the wallabies appeared to have only consumed very small quantities of carrot, described as a table spoon (20 grams) supporting what we saw in the simulation trial.

This information was collected to see if the number of animals killed could be estimated knowing the amount eaten per animal and the total bait uptake on the poison night to provide more accurate estimates of control effectiveness.

Alternatives to 1080 Extension Work

The final involvement with 1080 work has been some extension work carried out by the Program's Project Officer and other Game Management Services Unit (GMSU) staff.

Two sites were visited during July and August 2008 where landowners had applied for the usage of 1080 poison. On one site browsing damage by predominately rufous wallaby had caused significant loss (50%) to a private forestry plantation. The landowner was planning a pre-emptive poison as he was about to plant wheat, barley and poppies crops. Despite significant efforts to fence off the intensive cropping area, wallabies and possums had continued to breach the fence and cause damage to crops.

Working together the landowner and 1080 Alternatives Project Officers trialled a coordinated and strategic shooting strategy which has resulted in no need to apply for the use of 1080 poison. Interesting in this trial was that it was only a small amount of browsing animals which were causing significant damage (Below 30).

On another site in the NW of the state, an agricultural landowner called a GMSU officer for access to use 1080 poison. Similar to the example provided above this property owner was about to plant poppies and felt he could not control the browsing damage to his current fodder crops soon to be poppies.

Despite using spotlighting shooting as a browsing control, he had gun shy animals and was only able to shoot a few wallabies before they all fled. He is unable to reduce the amount of browsing damage caused by this crops.

In this case, the GMSU helped to coordinate two recreational hunter teams (hound owners) to visit the site and assist with controlling the numbers of wallaby.

Unfortunately the terrain, topography and location of this property has proved a challenge even for the dedicated recreational hunter teams who have tried to help with the problem. We may still receive an application for the use of 1080 poison on this property but the landowner and recreational hunters were willing to work with our program and give alternatives a try.

The Alternatives to 1080 Program is also lending out small quantities of Mersey Box traps to landowners, particularly those with rufous wallaby problems and difficulties with shooting, to trial as an alternative before using 1080 poison.

This is proving to be a very useful exercise for both the landowner and for the Program to get real life feedback on the pros and cons of using these traps in the farming environment.

'Best Practice' Fencing Manual Commenced

As mentioned briefly earlier, under a recently signed research agreement, Mick and Helen Statham of the Tasmanian Institute of Agricultural Research (TIAR) will be undertaking a number of research projects for the Program.

One of the first projects will be to compile a practical handbook into best practice wildlife proof fencing around Tasmania.

The first phase of this work is well underway, with the TIAR team meeting with farmers and groups around the State to evaluate and document existing wildlife proof fencing.

Anyone with wildlife proof fencing who is interested in being interviewed is encouraged to contact Mick or Helen Statham on 03 6336 5339.

Wombat Gate Evaluation

Negotiations are also underway with a landowner with extensive wallaby proof fencing in the North-East of Tasmania, to trial the effectiveness of different wombat gates and to evaluate the effect of wombat breaches on the effectiveness of wallaby proof fencing.

Commercial use of wildlife

The commercial harvesting of wildlife has a potentially valuable role in the management of wildlife on properties, and hence in the overall strategy to reduce the need to use 1080 poison.

There's been a number of interesting articles just recently on the commercial use of wildlife.

A recent paper written by George Wilson & Melanie Edwards and published in the international journal *Conservation Letters* has quantified the impact on greenhouse gas emissions if 7 million cattle and 36 million sheep were removed from the rangelands where kangaroo harvesting occurs and kangaroo numbers were increased to 175 million to produce the same amount of meat.

The paper reports that by 2020, this would lower Australia's greenhouse gas emissions by 16 megatonnes, or 3% of Australia's annual emissions.

The full paper is available at http://www3.interscience.wiley.com/cgi-bin/fulltext/120775899/PDFSTART.

Also *The Mercury* newspaper (Wallaby is menu mover: Aussie tastes changing , 26 Sept 2008. p. 19) has reported that data from the ABS is showing that the consumption of wallaby meat is increasing in Australia. In the article, Flinder's Island Meats reported a doubling of wallaby meat sales in two years, and Lenah Game Meats in Launceston reported 15-20% increase in sales for the past four years.

New research projects

As mentioned briefly in the December 2007 Newsletter, two new funding deed offers were made to advance our understanding of how animals respond to lethal controls.

As demonstrated by the NE trapping trial, this is a key area in which we need to increase our understanding if we are to improve the effectiveness of lethal controls.

These deeds have now finalised and are outlined in a bit more detail below.

Wallaby Home-Range Shifts in Response to Lethal Control

Prof. Hamish McCallum, University of Tasmania, $300,000.

This deed aims to further understanding of how home-range of Bennett's (Macropus rufogriseus) and Rufous (Thylogale billardierii) wallabies changes following lethal control programs. The study design will

a) study the seasonal movements and habitat usage of GPS collared individuals (including different demographics) from areas adjacent to a lethal control

b) quantify movement rates of animals i.e. the re-emergence of a browsing population of wallabies into a controlled area to measure the effectiveness of short-term culls on browsing pressure and consequently plant survival.

c) compare population density of Bennett's and Rufous wallabies both in and adjacent to areas in which lethal control is applied

This multi-pronged approach will:

- enable determination of the nature and utilisation of home ranges for the two main wallaby species in Tasmania;
- show how these species populations respond to a lethal control event in the short and medium term; and
- develop an improved understanding of the effectiveness of lethal control events in managing native animal browsing damage

The study aims to provide the necessary information to enable landowners to formulate evidenced-based strategies to reduce wallaby browsing damage, and build scientific capacity to perfect these strategies.

The development and trials of night vision filming technologies

Dr Ivo Edwards, $35,000.

It is believed that wallaby home range studies, and browser presence location investigations generally, may be able to yield significantly more, and more practically useful, data by long range night-time filming than from any stand alone radio-telemetric method, traditional spotlighting method, or capture-recapture method.

Some of the uses of the technology has already been discussed in the Dingo Urine Repellent trial and 1080 effectiveness trial reported in this newsletter.

The primary purpose of the study will be to trial recent advances in night vision filming technology, involving high intensity lighting at a wavelength invisible to nocturnal animals, to allow large-area night time monitoring of wallaby and possum populations to take place.

The trials for this technology will involve the use of this technology in a number of other Alternatives to 1080 research projects to enhance their research outcomes.

Staff Changes

One of the main reasons why this is the first newsletter for several months is that the Project Manager took the opportunity to sneak away to Europe for three months cycling between contracts.

Other key staff changes since the last newsletter:

- Brett Donlan who, along with Greg Blackwell worked all hours and all weather conditions carrying out control and monitoring activities, has moved on to greener pastures (we all hope). Brett's departure is a huge loss to the Program.
- Both John Whittington (DPIW) and Tony Bartlett (DAFF) who constituted the Implementation Committee for the Program have taken up new positions, and have been replaced by Penny Wells (DPIW) and John Talbot (DAFF).