REPORT ON A BIOLOGICAL SURVEY AND PLANNING VISIT TO THE MONTEBELLO ISLANDS, 18 MAY TO 8 JUNE, 1994

INTRODUCTION

CALM has accepted money from the Commonwealth Government to eradicate introduced Black Rats and Feral Cats from the Montebello Islands and to re-introduce two species of locally extinct mammals (see earlier report). As part of the lead up to developing detailed plans for this operation, a reconnaissance planning biological survey and visit was made to the islands in May and June 1994.

CALM Pilbara Region and Karratha District staff Stefan Fritz, Mike Osmond, Bob Taylor, and Peter Kendrick and Australian Defence Force Pilbara Regiment personnel Warrant Officer Bob Lee and Corporal Greg Dunn arrived on the charter boat *Blue Horizon* on 18 May from Dampier.

Karratha District staff erected radiation warning signs on Trimouille and Aplha Islands and made various improvements to the Hermite Island transportable building, including the erection of a radio mast and the testing of VHF radio communications to Karratha. They used a CALM Zodiac inflatable with a single 30 HP outboard for transport between islands.

Peter Kendrick and the Australian Defence Force personnel installed and serviced pit traps on Hermite (2 locations), Brooke and Ah Chong Islands. Trapping with medium-sized Elliott metal traps was also conducted on these three islands. They used a larger army inflatable with twin outboards for between-island transport.

Science & Information Division senior technical officer Phil Fuller, Nature Conservation Division officer John Blyth and I (all based at CALM's Woodvale Wildlife Research Centre) arrived by helicopter from Varanus Island on 24 May. On 25 May we accompanied Peter Kendrick and ADF personnel to Brooke and Ah Chong Islands. May 26 was a clean up day before the departure of the charter boat. Pilbara staff departed on the charter boat late on 26 May for Dampier.

Woodvale staff installed pit traps and conducted Elliott trapping on Alpha, Bluebell, Crocus, Primrose, North West, Campbell and Delta Islands. These islands were also searched on foot. Almost all the remaining islands in the archipelago were inspected briefly, either from the Zodiac or during on-land visits. We also maintained the pit traps previously installed on Hermite Island. Extensive walks were made on Hermite to search for birds and other fauna. Some hand searching for reptiles was also carried out. Woodvale staff departed by helicopter early on 8 June.

We found rats to be widespread; something commented on by all previous visitors. They appear to be absent from most of the smaller islets and may be absent from South East Island (although they were recorded there previously). However, for the purposes of the rat eradication project we should assume that rats occur on every island, islet and rock in the group. Fresh cat tracks were seen only on Hermite and Trimouille Islands; however, old scats were found on several other islands: Alpha, Bluebell, Buttercup, Campbell, Crocus, Delta, North West and an islet to the west of Hermite. It appears that cats may frequently establish on smaller islands, only to die out later. Careful checks of islands will need to be made prior to cat eradication work commencing and while it is in progress.

Detailed results of the biological survey work will be provided in a separate report.

BACKGROUND TO PLANNING FOR RAT AND CAT ERADICATION

Several factors require noting when considering plans for rat and cat eradication work:

1. **The CALM building.** The Hermite transportable building is badly sited. It is on top of a hill and is open to winds from all directions. Average wind speeds in the Montebellos in autumn, winter and spring are around 10 to 15 knots with many nights and mornings experiencing wind speeds of over 20 knots; mostly from the east to south-east, with occasional strong southerlies. Strong wind warnings are not uncommon. Sleeping on the verandah in strong winds is not something we should expect of volunteers or CALM staff. The building should have been sited on a north-west facing slope to get protection from the prevailing winter winds. To compound matters, the building is 180° out of alignment - it should face north with the verandah on the north side - it faces south with the verandah exposed to the southerly, south-easterly and easterly winds. The sun comes in the north windows, which are not shade-protected, making the building much hotter than it should be.

   There is insufficient space for eight beds inside the transportable - this could be improved if double bunk beds were installed (similar to CALM Karajini accommodation); however this would provide very cramped sleeping space and little or no space for people's personal gear. Four is the largest reasonable number of people we should expect to sleep in the building - two in the small room at the west end and two in the east end of the main room. Verandah living could be improved if the verandah was partially enclosed; however, this would be a major operation. The only sensible alternative for extra sleeping accommodation is to purchase four two-person all-weather tents of high quality and erect them in areas protected from the easterly and southerly winds (and where they will not be affected by helicopter down draught).

   The building needs work. One window has no security mesh. The soil under the fresh and salt water tanks is being eroded by the wind (there are no tank stands); both should be sand-bagged. Both the water tanks and the "seatainer" are tied down against cyclonic winds with steel rope; however, the rope loops at the point of attachment to the concrete footings are not properly bonded and will fail with minimum pressure. They need clamping properly. Extra shelving and cupboards are needed in the transportable and it has holes in the walls that could allow access by rats.

2. **Boats.** The small Zodiac supplied by Karratha District for the biological survey and reconnaissance trip is not ideal, to say the least. The Montebello Islands area is very rocky; many islands have no beaches and many beaches have exposed rocks at medium to low tide. Sharp rocks and oysters abound. The Zodiac is too easily punctured for this type of country. Frequently, during the biological survey, we had to anchor it offshore when working on an island. On 5 June, after waiting for the fresh easterly to abate, we went to use the Zodiac to service traps on Campbell and Delta Islands, only to find it partly deflated. The time taken in further deflating the leaking section, gluing on a patch, waiting for the glue to cure and reflating with a foot pump meant we were unable to check the traps that day (this led to two Elliott traps being extensively damaged by rats attempting to chew their way out). Karratha staff using the Zodiac also punctured it and had to place several patches on it - they had a

compressed air tank to reflate it; something we lacked. This also caused the loss of a day's work.

Additionally, in rough water the Zodiac bounces around to such an extent that travel times are extended and personnel are soaked through. At the Montebellos, the combination of strong tidal currents and strong winds produce steep, sharp seas. On 1 June 1994, a strong southerly blew up in the middle of the day while we were at North West Island. It took 2 hours 45 minutes to return to Hermite. To avoid very rough seas near the entrance to Stephenson Channel, we had to carry it across the isthmus between Home Lagoon and Willy Nilly Lagoon This necessitated unloading the Zodiac, removing the motor and reinstalling the motor in rough seas. On return to base we were soaked through, tired and cold.

A Zodiac may be a good craft for use as a stable diving platform and operating from sandy beaches but it is not a suitable craft for the Montebellos, especially for servicing a large party of people. What is needed are aluminium boats, which can be handled more roughly and will take reasonably rough seas. A 5 m, fairly broad beam aluminium dinghy, with a V-shaped hull, and with a forward, preferably central, control console would be the minimum; a larger boat, around 5.5 m to 7 m, is needed for access to Trimouille and the outer islands. Safety requires that there be two boats available during the rat and cat eradication work. The Zodiac could be one; the other must be larger. Is there any reason not to use the *Yapurarra*? It could be transported to Barrow on a barge and brought up to the Montebellos for the duration of the work. A jet-boat would be ideal for these shallow, rocky waters. If use of the *Yapurarra* is not possible, we could see if we can hire the Fisheries Department's jet boat *Piper*, which is used at the Abrolhos, plus an operator (Randall Owens would be ideal). At Hermite a larger boat such as the *Yapurarra* or *Piper* could be placed on one of the existing moorings and serviced with the Zodiac or aluminium dinghy.

3. **Helicopters**. For the major rat eradication work, using boats for access to many islands will be inefficient. Boat use is subject to the vagaries of weather and must be planned to fit into the tides (around 4 m rise and fall at spring tides, 2.5 m at neap tides). The rat control work can not afford any weather delays; bait stations must be kept supplied with poisoned grain. A helicopter will be essential during this phase of the work, both to establish bait dumps and to transport personnel between the base at Hermite and other islands. We need to cost and evaluate an Aerospatiale Squirrel, a Bell 206 'jet ranger' and a Bell G47 or similar as well as investigate assistance from the Army. As discussed below, I believe we need a helicopter for about nine weeks.

4. **Radio communications**. At present, these are inadequate; safety is compromised and logistics are made difficult. During the May-June 1994 visit the VHF link to the CALM Karratha repeater worked only intermittently. In overcast and windy conditions it consistently failed; it also failed at many other times. The VHF Electrophone 'seaphone' likewise would not trigger the mainland repeater most of the time. Both usually failed under the same conditions. Either the VHF needs to be made more reliable (? by raising the jack-up mast to its full height; there are two more approximately 3 m sections of the jack-up antenna that were not used) or we need an HF radio as well. In my view, an HF is essential unless the VHF can be guaranteed to work all the time under all conditions. Also the seaphone antenna is on the roof of the building - it would be better on top of the mast?

   Alternatively, a satellite telephone should be installed for the duration of the project.

5. **Fresh water** must be reasonably available. Eight people over 4 to 5 months would use about 8 000 L for drinking and cooking, and washing utensils, gear and clothes (the salt water shower (or washing in the ocean) is satisfactory, but a few cupfuls of fresh water after the salt water wash is necessary) . This can only be provided by transporting fresh water in (in a barge) or by a desalination plant. A reverse osmosis plant could be purchased or hired for the duration of the project.

6. **Food.** As well as stocking up with non-perishable food at the start of the project, a reasonably regular supply of fresh food will need to be brought in, presumably by helicopter from Varanus I. or Barrow I. Fresh food delivery must be investigated.

7. **Non-target granivores.** There are two species of non-target granivores at the Montebellos - the Bar-shouldered Dove and the Stubble Quail. Both are relatively common and widespread. Rat eradication using pindone-oats in plastic bags laid on the ground could be expected to greatly affect both species; birds are susceptible to pindone; however, there are differences between species and neither of the two mentioned above have been tested (Martin *et al.* 1994, *Wildlife Research* **21**, 85-94). APB could test Bar-shouldered Doves and Stubble Quail if we made them available, possibly from the zoo or from aviculturists (the testing is non-lethal). APB have advised that this would cost about $1 500.

   However, at this stage, it must be considered highly probable that, if baits are laid in plastic bags, both doves and quail would be totally eliminated from the archipelago. Over time, probably a long time, both might re-invade from the Lowendal Islands, or they could be translocated (are there stubble quail at the Lowendals or Barrow?). However, the benefits of rat eradication would have to be judged against the killing of native species. CALM could expect considerable criticism if it went ahead with the rat eradication program without taking steps to protect native birds. CALM is currently requiring Hadson Energy to use bird-proof bait stations during the mouse eradication project on Varanus Island and would be accused of having double standards if it did not itself use suitable bait stations at the Montebellos. Some (most?) volunteers will be unwilling to be involved in a project that involves killing native species, as would CALM staff. Most islands where pindone oats has been used previously for rat eradication did not have granivorous birds (Bedout Island, Lacepede Islands, small islands around Barrow Island, Rat Island). On Boodie, Middle and Barrow Islands, doves would, presumably, have been present. On Boodie Island a bait station was used - the doves did not enter it but they were able to eat grain scattered by the rats. On Barrow and Middle Islands, more sophisticated bait stations were used; they were designed to exclude bandicoots and wallabies. Doves did not enter these bait stations - had they done so they would not have been able to escape and no bodies were found.

   I can think of two methods of protecting at least some of the birds - capturing some and keeping them in a breeding colony for release two years later, or building a bird-proof bait station. The first method would be time-consuming. Doves could probably be captured in mist-nets set around mangroves. Quail could probably be captured in grain-baited walk-in traps. Aviaries would have to be constructed on the mainland, presumably at Karratha, and maintained for two years. Capture and captive-breeding must be considered a second best approach - bird-proof bait stations are much more preferable.

   secure aviaries!

   Bird-proof bait stations have been used during mouse eradication projects (and are currently being used on Varanus Island). Separating mice and birds is relatively easy because of the size difference. Stations that exclude birds but allow easy access by

rats need to be investigated. If bait stations are to be used at the Montebellos, about 15 000 will be required. I will arrange a survey of the literature on this subject and enquire from people who have been involved with rat eradication in eastern Australia and New Zealand.

Why not hold a competition for a suitable bait station design? Why not seek the help of the RAOU and/or aviculturists?

8. **Secondary poisoning.** Secondary poisoning of raptors is a possibility. Although observation during previous rat eradication projects on islands suggests that most rats die in places where they are not readily available to predators, the death of two juvenile Brahminny Kites (*Haliaster indus*) was observed during the Barrow Island - Middle Island work (Greg Oliver pers. comm. in Martin *et al.* 1994), although the adults were not affected. Martin *et al.* (op. cit.) state "We have demonstrated a potential for a substantial risk of both primary and secondary poisoning [by pindone] to most of the species we tested. The effect of pindone on wedge-tailed eagles and other raptors (especially rare or endangered species) requires further assessment in the field." At the Montebellos, species that could be affected by secondary poisoning include the Australian Kestrel, Brahminny Kite, Black-shouldered Kite and Spotted Harrier - all of these are relatively common, resident, breeding species. Marsh Harriers were also recorded during our visit.

9. **House Mouse.** No mice were located during our survey work. The skull of a House Mouse was found by Keith Morris in a cat scat on Hermite Island in June 1983. There are no other records of this species at the Montebellos. Even though not located during the survey, it could be present in low numbers; our work was conducted after a period of low rainfall and their numbers would be kept down by cat and rat predation.

were they known there previously?

10. **Water Rats.** We did not locate any water-rats, even though extensive searches were made for tracks. This means that water-rats can be ignored as a possible non-target species for the rat and cat eradication work.

1. **Time to lay rat bait.** The pindone oats is in bulk, stored in 200 L drums, and may need to be bagged, depending on the type of bait station used. At present the assumption is that it will be bagged at Hermite Island. This involved using a scoop (eg, a cup) to measure the required amount, placing it into a bag and then sealing the bag. Bags could be zip-seal (expensive), sealed with a tape dispenser, or heat sealed (need to buy a heat sealer). Bagging will take many person-days. A rough estimate, based on previous experience in Perth, is 56 person-days to prepare 30 000 bags, the minimum needed. (Do we have an estimate of how long it took on Barrow?) Preparing the bags in Karratha should be investigated.

Laying the bait will take a long time. Six persons walking across an island at 50 m intervals means that there will be 250 m from one end of the line to the other; visibility in the comparatively rugged terrain will be a problem. Compasses will be needed for at least the two persons on each end and one person in the middle. Can we use GPS receivers to navigate?

Example: North West Island 106 ha, six people, 50 m grid. 55 N-S transects, 650 bait stations. Average width of island 500 m. Nine x 6 person double transects of average 500 m = 4.5 km + 3 km length of island + say 2 km for getting more bait etc. = total of 10.5 km walking per person. With 250 g baits, if carry 7.5 kg = 30 baits; this allows twice across island. Could be done in one day if bait dumps put in place

with helicopter every 500 m. NOTE: This gets more complicated if we have to put bait stations out first or during first baiting.

On a similar basis, Trimouille (450 ha) can not be done all at once, since it would take 12 days straight, not allowing for days off.

1. Trimouille	1st day
2. Trimouille	2nd day
3. Trimouille	3rd day
4. Trimouille	Team 1 - rebait of 1st day, Team 2 - 4th day
5. Trimouille	Team 1 - rebait of 2nd day, Team 2 - 5th day
6. Trimouille	continue rebait
7. Trimouille	start 2nd rebait
8. Trimouille	continue 2nd rebait
9. Trimouille	continue 2nd rebait
10., 11., & 12	3rd rebait.

If using a helicopter, the pilot must have at least one day off in every seven. Apart from anything else, this prevents doing Trimouille without a break. Trimouille will have to be done in two halves: bait the southern half for two days, one day for something else, rebait for two days, one day off, rebait for two days; then start on northern half. Total time approx. 16 days.

Hermite is 836 ha, twice the size of Trimouille, but has an extremely complex shape and would take much more than twice as long. Baiting will have to start at one end and work towards the other; it will probably take more than 1 month.

We do not have enough pindone oats at present (only 1.8 tonnes was purchased; calculations suggest that 15 000 bait stations will be needed, each consuming an average of 250 g of bait, ie, 3.75 tonnes. Exact requirements are difficult to anticipate; it depends on the rate of bait consumption by the rats. However, we can not afford to run out - at the end of baiting there must be bait available on all bait stations throughout the archipelago for many months. We need to estimate the requirements, and decide whether to purchase more, or obtain one of the cheaper alternatives, eg, ICI 'Talon' or Shell 'Storm'.

12. **A project officer.** The rat and cat eradication project will need to run over at least four months. Both Woodvale and Karratha staff are heavily committed. The project is a large one, involving a lot of organising and logistics. There is no point in doing half a job; the rats and cats will re-invade any islands that are cleared unless there is total eradication. Therefore, in my view, we need to appoint a project officer to run things, under my supervision. This person would be expected to be based at the Montebellos for most of the time s/he is employed. This could be achieved by allocating a CALM employee to the position on secondment, or by employing someone.

13. **A cook.** A cook (a volunteer, hopefully) is also needed for the time that there are a large number of volunteers at Hermite. As discussed above, eight would be the maximum number that can be managed at the Hermite camp at any one time. With a cook, specialist boat handler come camp maintenance person, and helicopter pilot, this leaves five, sometimes six people to lay the rat baits. Even with eight people, it will be cramped at the Hermite Island base, especially in poor weather (strong winds or rain, see above).

14. **Volunteers.** Each needs to bring: clothing + personal effects, sleeping bag, pillowcase, fine mesh mosquito net (might be better if these were supplied, those in tents may not need them), salt-water shampoo, torch, boots, sturdy sneakers for boating and reef walking, spray jacket, hat. Need to advise each volunteer of weight limit for helicopter lift from Barrow. CALM to provide: beds and mattresses, pillows (need to be purchased), sun-screen, food and cook, transport to and from Perth or Karratha, drinks (for sale?; this needs further consideration), radiation briefing, TLD badges. Volunteers would be expected to carry out camp chores, eg, washing up, cleaning, assisting the cook. Volunteers will need a day off every week to do washing, go fishing, etc. Volunteers will need to be rotated, probably every three weeks. We could possibility arrange a rotation of two or three people every week via WAPET and Hadson Energy. This would have advantages: there would be a mixture of experienced and new people, a three week roster would prevent people becoming too jaded and limit personality clashes. It needs to be made clear to prospective volunteers that living conditions are rough and they are expected to walk long distances and carry heavy loads.

15. **Cat eradication** is necessary from at least the two largest islands. I have not discussed cat eradication techniques here since this is a matter of active research at present within CALM and elsewhere in Australia. However, it must be anticipated that poison baiting will not result in eradication; follow up trapping and hunting, over a long period of time, will be required. This will be expensive.

16. **The budget.** At present I understand that about $100 000 is available for this project from the Commonwealth grant. Chris Muller has asked that costs be minimised so the Region has funds left that can be used for management. I believe it likely that $100 000 will be insufficient for this project, noting the remoteness of the area, the large number of islands to be cleared, high cost of barges and helicopters and the need to employ a project officer. We may need to investigate additional funding once the budget is finalised.

PROPOSAL

For discussion purposes, it is proposed, that:

1. The rat eradication project commence in May 1995 and finish by September 1995.
2. The project develop and utilise bait stations that exclude doves and quail.
3. The Hermite building be improved before May 1995; this should include upgrading radio communications and/or installation of a satellite telephone.
4. We arrange for, or hire, a barge to carry heavy equipment (fuel, non-perishable food, perhaps a boat on a trailer) to the Montebellos in late April or early May 1995.
5. A helicopter be used during at least the first 9 weeks of the project (this should allow baiting of all the more remote islands: Trimouille, North West, Primrose, Bluebell; Alpha and all small islands).
6. Hermite and nearby islands (East Hermite, Buttercup, Delta, Campbell) be baited utilising boats for transport.
7. Volunteers be used on three week rotations. The assistance of WAPET and Hadson be sought to arrange personnel transport.
8. A project officer be employed at least for the period February 1995 to October 1995 to coordinate the project.
9. Cat eradication commence soon after rats are eradicated from islands where cats occur; techniques to be used to be decided after getting advice from cat researchers early in 1995.

Andrew Burbidge
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