NHT Malleefowl Project - Year Two Milestone One Report

- Review and refinement of monitoring program.
- Preliminary draft manual for national monitoring system.
- Volunteer Workshop

A report to the Mallee CMA and the multi-regional Steering Committtee for the "National Malleefowl Monitoring, Population Assessment and Conservation Action Project"

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Acknowledgements:
This is a collaborative project and the VMRG acknowledges, and is appreciative of the input and cooperation of a large number of people and groups across Australia. In particular we would like to acknowledge the efforts of the following people:
From South Australia: Grant Geyer, Sharon Gillam, Kevin Keltie, Vicki Natt, Dave Setchell, Kevin Smith, and Jason van Weenen.
From Western Australia: Carl Danzi, Kevin Jones, Gordon McNeill and Judy O'Neill.
From Victoria: Richard Alcorn, Greg Currie, Bernie Fox, Natalie Holland, Gil Hopkins, Neil Macfarlane, Ralph & Wendy Patford, Peter Stokie, and Ron & Gwyn Wiseman.

Introduction

The multi regional "National Malleefowl Monitoring, Population Assessment and Conservation Action Project" is a two year NHT funded project that implements key components of the National Recovery Plan. The general objects of the project are:

- Collate existing Malleefowl monitoring data for analysis.
- Interpret breeding density trends in the light of management practices and environmental variables.
- Develop a consistent national monitoring system and a national database, and foster on-going and self-sufficient monitoring that facilitates government, private and community monitoring programs.
- Develop the monitoring program in the future so that management actions that are most beneficial to Malleefowl conservation can be identified and demonstrated, and integrate this knowledge into outcomes for conservation on private and public land across Australia.
- Involve all stakeholders in this project and provide advice to regional NRM bodies on how best to promote Malleefowl conservation within their region.

The First year of the project focused on point one and two above, and resulted in a detailed trend analysis of Malleefowl monitoring data. The second year of the project will use the data and findings of the first year to concentrate upon the other points listed. This document reports on the third of the above reports. The report documents the commencement of a significant period of review and consultation with volunteer groups and agencies across Australia to refine the malleefowl monitoring program and produce a national monitoring manual suitable for use in all places where malleefowl monitoring is undertaken.

I. Review and refinement of the monitoring program.

We have reviewed both the data collected, and the system and procedures, which comprise the Malleefowl monitoring program.
We have employed two approaches to conduct the review and refinement of the monitoring program. The first was to critically examine the usefulness of the data currently collected, thus providing an end-use perspective on the monitoring program. The second was to consult volunteers who have been using the monitoring system in all areas where monitoring sites have been established across Australia for the past several years. This consultation provides a users perspective on the program and is an on-going process which we expect will culminate with resolutions at the Malleefowl Forum in September.

I.a Data collection fields

1. Critical examination of usefulness of data

The current monitoring program has been in operation for many years and is currently used in South Australia, Victoria and Western Australia. While SA and Vic have been using similar systems since 1989, other systems were in place in WA until recently when the more detailed standard used in SA and Vic was adopted as part of the first year of the current NHT Malleefowl Project. The effectiveness of the data and the data fields were put to the test for the first time in the trend analysis process of milestone 3 (2006).
The key features of the data fields found to be most useful to vet records in regard to whether mounds were used for breeding were:

Features	Nest is active	Nest is not active
Scraped	Yes	No
Crust(in) or Herbs	No	Yes
Mound Height	>30cms	<20cm
Profile	Dome(profile #4) or filling with sand (profile #5)	Dug Out (profile #2) of filling with litter (profile #3)
Radical change in shape between years	Yes	No
Xsticks in place from the previous year	No	Yes

From this analysis, it was found that the most useful, in fact essential, elements of the data fields currently in use are whether a mound had been recently scraped, whether it had crust and/or herbs and whether the Xsticks were in place from the previous year. The mound profile, the mound height and any radical shape between years were also important in vetting records.

In addition, we have used the Victorian dataset to statistically examine the value of individual data fields in regard to diagnosing current and past activity of mounds. In short, this analysis confirmed and validated the approach used to vet records in the trends analysis, and has also provided a ranking of the fields in regard to their usefulness in diagnosing activity in the current season, and how features change in time when mounds are not used. This information will form the basis for redesigning the monitoring system.

Community representatives have been alerted that the next volunteer workshop (scheduled for April in Adelaide) will focus on developing and agreeing on a new national standard. We intend to circulate information on the statistical usefulness of data fields at least one month before this meeting so that representatives are in a position to make fully informed decisions. Apart from providing objective assessments and rankings of data fields, we will also provide information on where efficiency might be improved, and develop rules for discriminating mounds (eg. rules for omitting mounds from regular monitoring and for discriminating between mounds that require different levels of description).

2. The Volunteer Workshop

The Volunteer Workshop participants present at the meeting held on 22/1/07 discussed this aspect of the report and agreed that all the fields outlined above were essential to be included in the refinement of the data fields in monitoring program. Participants also discussed many aspects of the trend analysis and the data gap analysis (Milestone 2 and 3 in 2006) and were provided with a summary of the statistical examination of data fields in regard to diagnosing activity to arrive at decisions on the usefulness of other data collected at mounds. The group briefly reviewed malleefowl and fox data, predator and competitor data, and other mound condition data. The following assessments were agreed upon in principal:

Features	Essential	Not Essential
Malleefowl signs	Scat & Prints scraped	
Fox signs	Scat & Prints Egg Predation signs	
Other predator signs (where possible)	Scat & Prints	
Competitor Signs (esp goats, sheep, rabbits)	Scat & Prints	
Mound condition data	Profile, scraped, Crust & herbs	Moss, shrubs & trees
Measurement	Height	Perimetre, rim and depth

The next workshop will examine these data fields in greater detail and an agreement will be reached on the minimum mound data to be collected in the future, and the formulation of rules that are required to make decisions about the treatment of individual mounds, and when sites should be re-searched. While we can provide the information needed to evaluate these issues, the decisions on the form of future monitoring must be made collectively by the community representatives.

I.b. The monitoring system, standards and procedures

Participants discussed the desirable features of a monitoring program required to maintain the highest standards whilst monitoring and the features of an adequate and comprehensive range of sites and frequency of visits to ensure sufficient data was collected annually. Information from milestones 2 and 3 (2006) were rated according to what was considered essential, highly desirable and desirable:

1. Data standards for monitoring malleefowl mounds

Data standards	Trend Analysis	Monitoring effectiveness
Accurate records of nests used for breeding	Essential	Highly Desirable
Nest Description data	Highly Desirable	Essential
Consistency in study sites	Essential	Desirable
Monitoring site locations	Highly Desirable	Desirable
Several years of data	Essential	Essential
Annual monitoring	Desirable	Highly Desirable
All nests usually checked in areas	Highly Desirable	Desirable
Regular re-searching of sites	Highly Desirable	Highly Desirable
Fox and other species abundance data	Highly Desirable	Highly Desirable

Accurate records of breeding mounds and nest description data are covered in the previous section, but were again stressed as important standards to be met.

In considering any refinement to the monitoring program, it was agreed that a common set of data be collected from all mounds and data should be collected on palm rather than paper. It was agreed that monitoring sites should be located in appropriate areas where malleefowl exist in sufficient numbers to be useful for trend analysis and be defined by consistent borders. Annual visitation should be undertaken in all of these sites and all nests should be checked within the site. Very old mounds could have limited, but essential data taken including photograph, print and scat records. Training of Volunteers ought to be involved in a training program on an annual basis. Sites need to be monitored for several years to ensure sufficient data exists for useful analysis, and fox and other species data should be collected as well as malleefowl data. The searching of sites needs to occur on a regular basis, and three to five years was suggested as the norm.

Protocols need to be developed for:

- Taking mounds off a monitoring lists
- Discriminating between mounds that require full monitoring description and those that may be described only in brief.
- Setting up new sites, and
- Recording data on opportune nests that are monitored outside of agreed sites.

It was agreed that such protocols and the requirements for the on-going monitoring of sites should be outlined in the National Monitoring Manual and that these issues will be resolved at the next national volunteer workshop (scheduled for April in Adelaide).

2. Data standards for monitoring the environment around Malleefowl sites

While the core task of the monitoring program is to describe changes in Malleefowl populations, information on the environment is also important and provides the potential

to identify the causes of changes in Malleefowl abundance. Various types of information have been discussed (see milestones 2 and 3 of first year of project) and are summarized below:

Type of environmental information	Desirability for explaining trends
Fox abundance and control near monitoring sites	Highly Desirable
Major herbivore change and control	Desirable
Landscape context	Highly Desirable
Climate	Highly Desirable
Fire history	Highly Desirable
Food pulses	Desirable
Environmental GIS attributes (soil,habitat, EVC)	Desirable

Landscape context, fire history and environmental GIS attributes require an initial assessment that becomes part of the site history records, and may change overtime. If change occurs the site history will be amended to reflect the change. The most likely change would be as a result of fire.

Climate may vary from year to year, especially rainfall, and records of such variations need to be added to the site history each year. Over time a detailed set of changes and/or repeated patterns will be available for analysis: these records are especially useful when matching malleefowl breeding numbers with climatic conditions. Over a considerably longer time the data may be useful as part of a study of climate change.

Fox abundance and control near monitoring sites and major herbivore change and control will require surveying of a different type to annual visits by volunteer monitors. Fox abundance could be monitored by conventional methods such as sand-pads, and kangaroos by scat counts; we shall need to consult with experts in these methods, and trial the techniques, before these methods could be considered as part of the national Malleefowl monitoring standard. The fox control records of regional NRM offices, and the personal observations of local landholders, will need to be collated and stored each year.

Monitoring of food and food pulses will require seasonal visits to sites, although observations and records are possible during annual monitoring if climatic conditions at the time of the visit cause an abundance of food to be available. This is useful data, but does not give a complete annual history of food availability and variation. In any case, developing methods for identifying and monitoring food pulses during our brief visits to sites is a considerable challenge. A realistic target is to focus on a few food sources that are considered to be important (such as acacia seed production) and particularly foods that are occasionally super abundant and not closely tied to rainfall (such as lerp abundance and crop cycling).

As much of the data collection discussed in this section will require the involvement from catchment management bodies, state agencies, and regional groups, the strategies to

enable the data to be collected will be addressed in milestone 3 as recommendations to relevant authorities. However it may be possible for trial projects to collect some of this data as part of the mound monitoring during the next seasons data gathering process.

3. Future additional data collection to be assessed for inclusion.

Additional data collected on ground by volunteers could include:

Food and food pulses:

Annual herbs, on and off the mound

Shrubs could be inspected for seed productivity

Predators and competitors:

Fox abundance data could be monitored from sand pads

Kangaroo abundance could be monitored by scat count quadrats

Additional data collected from other sources

A standard survey with prepared list of items with a yes/no indicator, and follow up questions (for yes response) distributed to appropriate people beyond the monitoring group.

A standard form completed by monitors containing key pieces of information sought annually not covered by monitoring sequence.

A list of the occurrence of possible extreme events (e.g., rain, wind, frosts, locusts, etc) sent out to locals annually for feedback before monitoring

Some forms of additional data could be recorded by the use of digital photos wherever possible for later analysis.

A consideration of the implementation of additional data needs to assess the difficulty of collecting good data without it taking too much time, and the necessity to visits sites at times other than the monitoring period on a regular basis.

The logistics of gathering additional useful data needs to be assessed. Sampling issues can be challenging to reach statisticians requirements. For data to be most useful, random sampling in significant quantity and frequency, and with consistent common interpretation, will be required

II. Preliminary Draft Manual for the National Monitoring System

Background information.

A detailed but readable manual is essential in order to standardize methods and to define the meaning of monitoring terms.

A manual for monitoring malleefowl was prepared by Joe Benshemesh in 1995 for the use of monitors. It was based on the existing circumstances of grids set out with gridlines and no electronic equipment to aid navigation. It explained all the data items collected during a nest visitation including definitions and ways to record data. It contained information about setting up grids and conducting grid searches, but again without the assistance of technologies available to us now.

A revised version of this manual was prepared by the VMRG in 2003 to incorporate monitoring using palms and GPS units, and followed the format of the first manual, but included no information relating to grid searching or establishing new sites. It did include information relating to safety. Much of the detail is general in nature, such as carrying sufficient water but a significant section is designed to meet the requirements set down by Parks Victoria to meet the regulatory safety requirements for volunteers working in public land managed by them.

A new manual is required for the monitoring program in order to define and underpin the new standards being developed.

Preliminary Draft Manual development.

The starting point for the development of a national manual was a detailed discussion of the appropriate details of the current contents of the existing manual. Currently the manual is used extensively in Victoria, has been distributed widely to agencies and volunteers in South Australia., and has been made available to groups involved in malleefowl conservation in Western Australia.

There was agreement that much of the content and detail of the current manual be retained. Any changes to the current monitoring data collection sequence will however need to be reflected in the final version of the manual when it is completed later in the year.

The current manual's specific purpose is to assist volunteers in the field in Victoria, and it is recognized that the contents adequately meet this purpose for monitoring in all states. What the manual does not address are issues outside of the actual monitoring process, and it was agreed that additional sections of the manual need to be developed as protocols

and procedures to be adopted and implemented nationally to reflect common approaches and to avoid divergent approaches become established contrary to agreed standards and procedures.

A series of protocols were discussed at the volunteer workshop (held at Tullamarine, 22 Jan 07) and consensus reached to include them in the new manual. Some suggestions as to the draft content of some protocols were discussed and others were left to be developed as drafts by those with the expertise to decide what would constitute appropriate content.

Develop protocol for mound visitation. Protocol to include:

- Every mound to be visited every year, but not necessary to collect full data set on old mounds. Issues to be resolved include defining circumstances when mounds may be dropped from monitoring lists, and what mounds require full description as opposed to a quick check and photo.
- Monitors must follow protocol, and not be permitted to omit mounds at their choosing
- All data fields should be gathered once revision of current fields is completed. Issues to be resolved include defining data that need only be collected once as opposed to data that needs to be collected every season.

Develop protocols for setting up new sites. Protocol to include:

- Basic rule to establish a site where under representation occurs, eg rainfall, locality
- Surveying a site without it becoming a monitoring site could be considered
- A planned survey to establish a monitoring site needs to consider the presence of malleefowl, the actual location with a patch, a focus on where there are gaps, needs to be appropriate mf country, and needs a commitment to be researched every five years which must be able to be sustained.
- If local people are interested they shouldn't be discouraged, even if area is less than suitable.
- If the surveyed site is to become a monitoring site, it should be given a site number, nests should be numbered on a return visit and site monitored annually once established. No site should become a monitoring site without a proper grid search.
- If new surveyed sites are to be monitored, they must be monitored by suitably trained people.

Develop protocol for researching sites. Protocol could include:

- Frequency (5 years suggested),
- Techniques, and
- Training procedures for searchers.

- Develop a protocol for the training of volunteers, and minimum requirements for inclusion in a training program

- Develop detailed guidelines for the use of Cybertracker & use of equipment, including a set of instructions on how to rectify the palm if it crashes

- Develop a pro-forma for note taking for monitors in addition to the palm

- Develop a means of easily accessing nest history from the palm, and investigate whether to include in the manual the Murray/Mallee nest sheet format as back up to palm, and as a replacement of current nest sheets

In addition to the above, there is a need to investigate new and improved technology of palms, digital cameras with voice tag capabilities, combined palms/GPS and camera units to help data collection. If they are to be used, operating instructions need to be included in the manual. The current system of nest identification using photos ID boards needs to be reviewed to determine if there is a more efficient way to record information.

Decisions need to be made on the format and binding for manual, possible production on CD using a help menu, and a field guide booklet or palm based version of the guide needs to be investigated. Provision needs to be made for individual states to add their specific protocols on safety and other matters relevant to each state. The Victorian safety protocol is well established. For South Australia, where monitoring occurs largely in parks and reserves, but also on some heritage agreement private properties, and in Western Australia where monitoring occurs mostly on private land, specific safety sections subject to their own regulations will need to be developed.

The Monitoring Manual will need to extend to directions on the development and uses of a database. It was agreed that data needs to be held centrally and in a form that can be accessed at different levels for different purposes. Richard Alcorn is investigating the design of a central database, and will ascertain what type of information is required at different levels to ensure that a new national database can accommodate peoples' needs.

It was also agreed that the form of the manual should be investigated with support for the manual being produced in electronic format to allow for easy, fast and cheap distribution and communication. This would also offset the disadvantage of distribution given the wide geographic spread of the stakeholders involved in malleefowl conservation

III. Volunteer Workshop Report

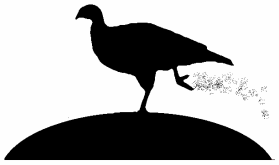
A one day volunteer workshop was held on Monday 22nd January. All states except New South Wales were represented (personnel from NSW were interested but unable to attend). Copies of the meeting notes have been forwarded to participants, and their further input has been sought into the on-going considerations of this project.

Twenty four people attended the workshop representing the majority of areas where monitoring is conducted in Australia. The locations and groups represented are included in the meeting notes attached to this report.

A further meeting will be held on 23rd April to bring together all of the states to discuss and approve the new National Monitoring System as set out in the National Monitoring Manual.

The following are the meeting notes that have been circulated to participants:

Natural Heritage Trust
Helping Communities Helping Australia
An Australian Government Initiative



NHT Multi-Regional Malleefowl Monitoring and Conservation Project – 2006 & 2007

Volunteer Workshop – Monday 22nd January 2007

Meeting Report

National Malleefowl Monitoring and National Malleefowl Monitoring Manual

Welcome and Introductions

Ann Stokie, NHT Malleefowl Project Manager, welcomed all participants, and commented on the fact that this is the first time that volunteers from across Australia

have specifically come together to discuss malleefowl ecology and monitoring procedures currently in use and to determine future directions of malleefowl conservation.

The participants spoke briefly on their backgrounds and level of involvement and interest in malleefowl conservation.

Natalie Holland:	Recent appointment (6 weeks) to WWF in Victoria, as Threatened Species Coordinator, formerly from Trust for Nature.
Kevin Smith:	Malleefowl monitor in several sites in SA Riverland, and a volunteer helper as a Friend of Riverland Parks and Gluepot Reserve.
Greg Currie:	Lives and works in Victorian Mallee, and monitors with the VMRG for past few years.
Dave Setchell:	Farms in the Northern Mallee of SA Riverland, and works as a contractor with DEH (Berri) to coordinate the monitoring of all the mf sites in the Riverland.
Judy O'Neill	Farms in the Ongerup area in WA, has worked for 15 years with malleefowl and recent appointment as President of the Mallefowl Preservation Group.
Jason van Weenen:	Works with DEH SA in Adelaide, as has a role to support malleefowl conservation in SA.
Sharon Gillam:	DEH, SA. Key role is SA State Malleefowl Coordinator.
Kevin Keltie:	Lives in Adelaide, a volunteer monitor and has monitored the sites of Baccara and Shorts in the Riverland for many years.
Vicki Natt:	Contractor for Malleefowl conservation in SE SA, lives in Kingston SE.
Grant Geyer:	Community Land Management for Calperum and Taylorville Station, and coordinates monitoring of sites in this locality.
Neil Macfarlane:	Lived and farmed in Victorian Mallee around Boundary Bend, now lives in Nyah, and has a life long interest in observing and studying mallee flora and fauna.
Richard Alcorn:	Interested in developing National Malleefowl database, lives in Melbourne.
Gil Hopkins:	Lives in Wimmera, and monitors for the VMRG in the area of the Little Desert. Newsletter editor for VMRG.
Gordon McNeill:	Farmer from Dalwallinu, 270km north east of Perth, Member of NCMPG, involved in coordinating local area fox baiting and malleefowl monitoring in 5 local sites.
Kevin Jones:	Farmer from Dalwallinu, and member of NCMPG, involved in fox and malleefowl projects. Coordinates data collection for group.
Gwyn Wiseman:	Lives in Hopetoun, Vic. Lifetime interest in malleefowl since primary school days, and promotes its conservation through involvement with VMRG.
Wendy Patford:	Member of VMRG and regular monitor of mf sites
Ralph Patford:	VMRG Treasurer and Website coordinator for the group.

Ron Wiseman:	Current President of VMRG, and involved in mf monitoring in the Hopetoun area since 1997.
Peter Stokie:	Involved with VMRG as monitor for 6 years, and recently managing equipment and data transfer to the database.
Ann Stokie:	Secretary VMRG.
Joe Benshemesh:	Long term interest in mf since PHD studies. A life time interest in collecting and interpreting long term data, and involved in current NHT project as analysist of past data and helping to determine future action plans for on going mf conservation efforts.
Carl Danzi:	Lives in Perth WA, with a long term interest in environmental issues, mf monitoring for past two and half years, recently offered the State Malleefowl coordinator's role for WWF in WA.
Bernie Fox:	VMRG member, and current president of VNPA. Owner of Trust for Nature covenanted property on southern edge of the Big Desert. Mf recently been seen on property for first time.

Brief State by State round up of recent monitoring efforts.

Victoria: VMRG

are monitoring just over 1000 mounds in 30 sites across Victoria in NW, Little Desert and Wychitella FFR. All sites are on public land. In recent years mf breeding numbers have fluctuated with severe downturn in drought of 2002, and a slow recovery in years following. The 2006 drought has affected breeding numbers, but not as drastically as in 2002.

A feature of the comments from various monitors indicated the emphasis on visiting every nest in every site, the benefit of monitors visiting the same site for several consecutive years, and a personal pride in collecting accurate data. The emphasis on annual training, and compulsory attendance at training weekend was stressed as important to maintain quality of data collected.

Western Australia: NCMPG

Have monitored every site established in their locality for the very first time, more than 200 mounds. All sites within 50km radius, all on private land, and all remnant patches with varying degree of limited, and sometimes not connected, corridors. NCMPG supported researching of a site in the Peron Peninsula (Shark Bay), and will work further to establish this as a monitoring site in the future.

Anecdotal observations by on NCMPG member on Malleefowl trends in his area over the past 30 years:
1972 – 1990: rare to see mf,
1991: a big spike in population often seeing 15/20 birds grazing in wheat paddocks.

1997: approx 10 active mounds in one grid area.
2004: many road kill noted
2005: no active mounds, birds and tracks occasionally seen

Drought frequency increasing, and level of population very low during drought.

MPG

No ongoing annual monitoring in most sites, but where it occurs generally only previously known mounds with activity visited. More intense observation at Foster Road site to support Jessica Van Der Waag's PHD work in study of chick survival upon release. Generally 5 active mounds within this site, but pressure noted from kangaroo grazing, and predation of currawongs, eagles and large goannas. Birds often seen feeding in fields

Carl Danzi

Involved in searches since 2004 at Mt Jackson and Yeleerie, and recently at Merriden where a 300 hectare site was searched locating many mounds, with six mounds indicating signs of activity. None of these searches have resulted in annual monitoring.

South Australia

Yorke Peninsula

One site, 47 mounds, and 11 active for 2006/7. Often only 6/7

Eyre Peninsula

5 sites, all monitored with palm, all with active mounds, 3 to 5 in each site. Stable pattern of breeding over years noted. Six local landholders involved in extensive fencing, funded by NHT Project to protect mf habitat.

Coorong, Mt Scott & Gum Lagoon

3 sites all monitored. Coorong has no active mounds 2006/7, but 5 five years ago. Suspected 2 road kill this year. Mt Scott has had boundary redefined with 39 mounds included and 5 active mounds. Gum Lagoon new site with 16 mounds and 3 active, affected in one corner by recent wildfire. An additional new site is to be added at Gum Lagoon.

Calperum

Lost 4 grids to fire this year, 6 grids surveyed with no active mounds

Danggali & Chowilla

Community Land Management organized monitoring of these sites with one active mound in each, first for some time.

Riverland

24 sites monitored, including 3 new/re-established sites. Third year of monitoring with palm. Activity in most sites, but no active mounds, increased rabbit & fox presence noted. New sites established on two heritage agreement properties and one on Dept of Defence land.

First Year of the Project, a summary from Joe Benshemesh

Joe presented an outline of the processes and outcomes of the project to date, and a series of points are recorded in these notes, covering data collation, data gap analysis and trend analysis.

- Monitoring has been occurring for quite some time, across many sites in many states, but this is the first chance to bring it together and study what it is telling us.
- The first challenge was to collect the data from various sources, scattered in various locations, in various forms, and to search for some data that appeared lost. Some data has vanished.
- Some data was still on paper, and efforts were made to get this data into electronic form. Some data could not be accessed and has therefore been excluded from analysis. The reliability of some data had to be questioned, and different levels of interpretation accounted for. In some cases different measures were collected in the field.
- Another challenge was identifying the gaps, determining what was missing and identifying the problems with some of the data collected.
- There were issues with variability of data and difficulty in interpretation. This may in part have arisen from inadequate training of those collecting data, lack of a clear manual, and collectors of data not having a clear understanding of data definitions.
- The way data was stored and managed created difficulty of access and determining when to cease a search for data and rule it out for analysis.
- There were some major gaps, including poor understanding of what fox baiting records were held over time. Recent records much more easily accessed.
- Communications between groups was lacking, so some groups were going in different directions

Data Trend Analysis

- Analysis focused on four areas: Landscape, Fire, Rainfall, Fox baiting
- Data analysis findings are established, but are still being assessed for refinement
- **Patch size** has no obvious effect on malleefowl presence. Closeness to cleared land seems to be helping mf. Some patches are possibly on better land, providing mf with better access to good cleared land for food
- **Small patches** are good for mf if they are well managed, especially if connected to other patches, and maybe provide opportunity for re-introduction

- **Fire frequency and intensity** have a highly significant effect on mf. Although not many sites were burned, statistically sufficient were burned to be useful to draw valid inferences.
- **Rainfall analysis** brought surprising results. Good winter rainfall in one season will have a lasting positive effect on mf for up to four years. Poor winter rain will cause a lag in food and recruitment for up to four year. Poor winter rain may affect mf for up to four years.
- **Fox analysis** brought another surprising result. Baiting and/or no baiting seemed to make no difference to numbers of malleefowl. More or less foxes do not seem to make much difference to mf numbers. Low level baiting is not making a difference, even high level baiting doesn't seem to make a difference. We are not arguing for no fox baiting, but an assessment to improve what we are doing, for what we are currently doing doesn't seem to make any difference.
- **Baiting** was looked at within 100 sq kms area with the site at the centre (ie. within 5.6 km radius of site centre)
- **The conservation question is:**

  Are breeding numbers going down because of foxes?, and the answer seems to be NO.

  Yet malleefowl are declining across Australia.

  So what we need to do is to look beyond foxes to find the reasons.

Lessons for future monitoring and improvements of procedures

- **Useful data we currently collect**
  - Accurate records of nests used for breeding
  - Malleefowl signs (scrapes, scats and prints)
  - Fox signs (scats and prints)
  - Information on predators (scats and prints) and other threatening species (goats, sheep, rabbits etc)

- Monitoring effectiveness is improved by consistency in study sites, monitoring all site locations annually and checking all nests within a site.
- Some data could be omitted from monitoring sequence including some mound condition data (moss, shrub and tree presence), and some or all measurement details, but height most useful.
- If we trim some things off the data collection, we may be able to add other things, and determine how much extra time it will take

- **The monitoring System, Standards and Procedures**

- A common set of data to be collected from all mounds
- Data to be collected on palm
- All mounds within site to be monitored
- Annual visitation
- Very old mounds could have limited, but essential data taken, including photograph, print and scat records
- Training of volunteers undertaken annually
- Protocols to be developed for taking mounds off the monitoring list, setting up new sites, recording opportune nests outside of sites that are monitored regularly
- The protocols to be included in national manual

Other data we could be collecting

- Additional data takes two forms, data collected on ground and data collected from other sources
- **Data collected on ground could include**:
  Food and food pulses,
  Annual herbs, on and off the mound
  Shrubs, could be counted whilst monitoring
  Fox data from sand pads
  Kangaroo impact
- **Data collected from other sources could include:**
  Fox abundance and control near monitoring grid
  Major herbivore changes and control
  Information on climate
  Rain data from weather map tracking from BoM.
  Information on fire history

- Other suggestions were raised at the meeting
  A prepared list of items with a yes/no indicator, and follow up questions.
  Standard form containing key pieces of information that is sought annually
  A list of possible extreme events (eg rain, wind, frosts, locusts, etc) sent out to locals before monitoring for occurrence information.
  Herb count by using collapsible square metre box placed on ground and photo taken
  Use of digital photos wherever possible for later analysis

- It is difficult to collect good data without it taking too much time, and will probably need visits to sites at other times than monitoring period.
- Random points across sites might be needed to collect more information.
- Sampling issues can be challenging to reach statisticians requirements. For data to be useful, random sampling in significant quantity and frequency, and with consistent common interpretation, will be required

Development of a National Monitoring Manual

- Current Manual contains useful detail, but could concentrate solely on monitoring with palm, leaving out references to paper sheets. Discuss whether to omit paper sheets in future
- Details of nest history from palm needs to be explained, and investigate the Murray/Mallee sheets as back up to palm, and replacement of current nest sheets
- Develop a minimum data set for old mounds, and a definition of what constitutes an old mound.
- Develop protocol for mound visitation. Protocol to include:
  - Every mound to be visited every year, but not necessary to collect full data set on old mounds.
  - Monitors must follow protocol, and not be permitted to omit mounds at their choosing
  - All data fields should be gathered once revision of current fields is completed.
- Develop protocol for removing known mounds from list
- Develop protocol for researching sites. Protocol could include frequency (5 years suggested), techniques, and training procedures for searchers.
- Develop protocols for setting up new sites. Protocol to include
  - Basic rule to establish a site where under representation occurs, eg rainfall, locality
  - Surveying a site without it becoming a monitoring site could be considered
  - A planned survey to establish a monitoring site needs to consider the presence of malleefowl, the actual location with a patch, a focus on where there are gaps, needs to be appropriate mf country, and needs a commitment to be researched every five years which must be able to be sustained.
  - If local people are interested they shouldn't be discouraged, even if area is less than suitable.
  - If the surveyed site is to become a monitoring site, it should be given a site number, nests should be numbered on a return visit and site monitored annually once established. No site should become a monitoring site without a proper grid search.
  - If new surveyed sites are to be monitored, they must be monitored by suitably trained people.

- Develop a protocol for the training of volunteers, and minimum requirements for inclusion in a training program
- Develop detailed guidelines for the use of Cybertracker & use of equipment, including a set of instructions on how to rectify the palm if it crashes
- Develop a pro-forma for note taking for monitors in addition to the palm

- The current system of nest identification using photos ID boards needs to be reviewed.

In addition to the above, there is a need to investigate new and improved technology of palms, digital cameras with voice tag capabilities, combined palms/GPS and camera units to help data collection. If they are to used, operating instructions need to be included oin the manual.

Decisions need to be made on the format and binding for manual, possible production on CD using a help menu, and a field guide or palm based version needs to be investigated. Provision needs to be made for individual States to add their specific protocols on safety and other matters.

Development of a Data Base

A list of potential uses of the database was discussed, including feedback to volunteers & departments, data management, data security. Past experience has indicated a tendency for the data to fragment when held in various locations. This must be avoided by centralizing the data, but be available to be distributed to various users.

The database could be set up to do the manual verification automatically, by accepting data if it meets set specifications, and highlighting the data that needs further manual checking.

Low level public access to the database ought to be possible, and various degrees of increased access for others depending on their role and circumstances.

Richard Alcorn outlined a comprehensive list of possible uses of a central malleefowl database by a variety of users from the government and departments to the general public and has agreed to develop a document for the group's consideration, outlining potential uses, with examples, and seeking our responses

The Next Steps

Ann Stokie outlined the components of the milestone tasks for year two of the project, and referred to the National Forum in Katanning WA in September this year. The National Monitoring System and its implications will form a significant part of the agenda of the National Forum.

The next volunteer workshop will be held in April, this time in Adelaide.

Potential agenda items will include follow up matters to this meeting:

The Draft Manual
Monitoring protocols from this meeting
Safety protocols

Discussion of potential adaptive management projects
Discussion of how to implement mf conservation strategies within various departments and agencies, and the role of volunteers in this process.

An Issues Response Sheet will be distributed with these meeting notes to provide participants with the opportunity to add further comments and feedback to matters raised at the meeting,

Ann closed the meeting at 4:20 pm, thanking every one for their contributions.