Malleefowl Monitoring in Victoria: 2015/16

Report to the Victorian Malleefowl Recovery Group

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Contents

Appendices

Note: The appendices that are usually printed with this report are available for member download from the national Malleefowl monitoring database.

1. Monitoring effectiveness: how did we do?

Table 1 shows a breakdown of the effectiveness of the monitoring effort and the overall result is impressive; more detail is shown in Appendix A.1. The VMRG visited 1365 Malleefowl mounds during the 2015 (2015/16) breeding season (Table 1) including 1 newly listed mound.

A total of 13 regular mounds appear to have been neither sought nor found during the 2015 season and these were scattered through 10 sites. There were also 5 regular mounds that were searched for but could not be found although they were found in previous years.

Overall, we managed to find 97.6% of the mounds that we set out to monitor (excluding newly added mounds). This result includes the optional '5 year' mounds which were all scheduled to be monitored as 2015 (see below). The next time optional mounds will be mandatory will be in 2020.

Table 1. Effectiveness of the monitoring effort. '5yrold' mounds are those that were categorised as optional before the 2014 season, whereas '5yrnew' are mounds that were added to the optional list last year. Omitted mounds are those removed from monitoring lists last season.

	Total	*Regular*	*5yrold*	*5yrnew*	*Omitted*
Sought and found	1364	1143	183	38	0
New incidental	1	1	0	0	0
Sought, NOT found	7	5	1	1	0
NOT sought or found	26	13	8	5	0
Total	1398	1162	192	44	0

Last season 44 mounds were monitored as regular mounds and were marked as optional (5 year mounds) for this season; these mounds show up in the tables as new optional mounds this season. This brings the total number of mounds on the optional list to 236, or about 17% of our monitoring target.

Optional mounds were also well represented in the mound visits. Monitors inspected about 94% of the optional mounds this season (221 of 236), at least one of which was active so it has been promoted back to the regular category. Next season the optional mounds will once again be optional: if you can visit these optional mounds, please do, even if it's only to take a photo and move on (simply finalise the record on Cybertracker after taking a photo by selecting the down arrow).

2. Malleefowl Breeding numbers: how did the birds do?

Not well! Of the 1364 mounds that were monitored in Victoria in 2015/16, 118 were active compared with 148 last season and 218 in 2012/13 (including mounds out-of-site boundaries; see Appendix A 3a-c).

Figures 2-4 show the usual graphs that we produce each year to track the trends in breeding numbers in set areas where we have been monitoring the longest. The first comprises 7 sites that we have been monitoring since 1986 (Figure 2) and it is clear that at these sites, mostly in the eastern Big Desert region, breeding numbers were well down. One of our key sites, Bronzewing v04, which usually has 12-15 active mounds, was thoroughly burnt in January 2014 and consequently there was little breeding there this season (although, surprisingly, 3 mounds were active in 2014/15 and 2 this season). However, the low breeding numbers in the oldest set of monitored sites wasn't simply due to v04 being burnt as when data from this site are excluded the poor breeding numbers at other sites are apparent (Figure 2). In fact, breeding numbers for this set of 6 sites in 2015 was one of the lowest recorded over the past 28 years; breeding numbers were lower only in the 2002 drought.

Figure 3 shows the trend for a larger set of 23 sites scattered over a much greater geographical area, albeit for a shorter period (sites monitored since 1996), and Figure 4 shows the same data broken down into regions. Breeding numbers have declined in all regions compared to last season, particularly in the Eastern Big Desert and North East.

Elsewhere, in the six main sites in and around the Little Desert (v24, v25, v28, v36, v38 and v39) breeding numbers were only about half that recorded in previous years. At Nurcong, numbers were down to only one active mound where there are usually 6-7 active. At the four Wychitella sites (v29, v31, v32, v33) the only breeding recorded was in the Korong Vale Block (v33) where 2 mounds were active. The Wychitella sites have usually only had one or two active mounds since 210, although there were 4 active mounds in 2009 and 2010.

We made special mention of Mali Dunes (v41) in last year's report because of a spectacular rise in breeding numbers there, and we have the pleasure of reporting that numbers have increased again! Mali Dunes is located on Bernie and Sue's property south of the Big Desert and since they have been monitoring (and land-managing) there, breeding numbers have increased substantially: in 2013 there was 1 active out of 3 known mounds, in 2013 there was 2 active out of 8, in 2014 there was 7 out of 11 known mounds, and this season breeding numbers increased again to 8 out of 11 mounds!

- *Comparing 2015 results with previous seasons using ALL the data*

Another way of representing how the results of the current year measures up against previous monitoring efforts is to compare the 2015 results directly with each of the previous years on a site by site basis (Figure 5a). This approach uses virtually all the data collected, including historical data, and provides a more comprehensive way of visualising how current numbers compare with those in the past. Figure 5a shows that breeding numbers across Victoria in the 2015 season were lower than every other season since monitoring began with the exception of 2002 and 2007 drought years. This is graphically represented by our new Malleefowl Breedometer (Figure 5b) which essentially displays the ranking of the current season breeding numbers with respect to other seasons where at least 10 sites were monitored. 2015 was close to being the worst breeding season on record!

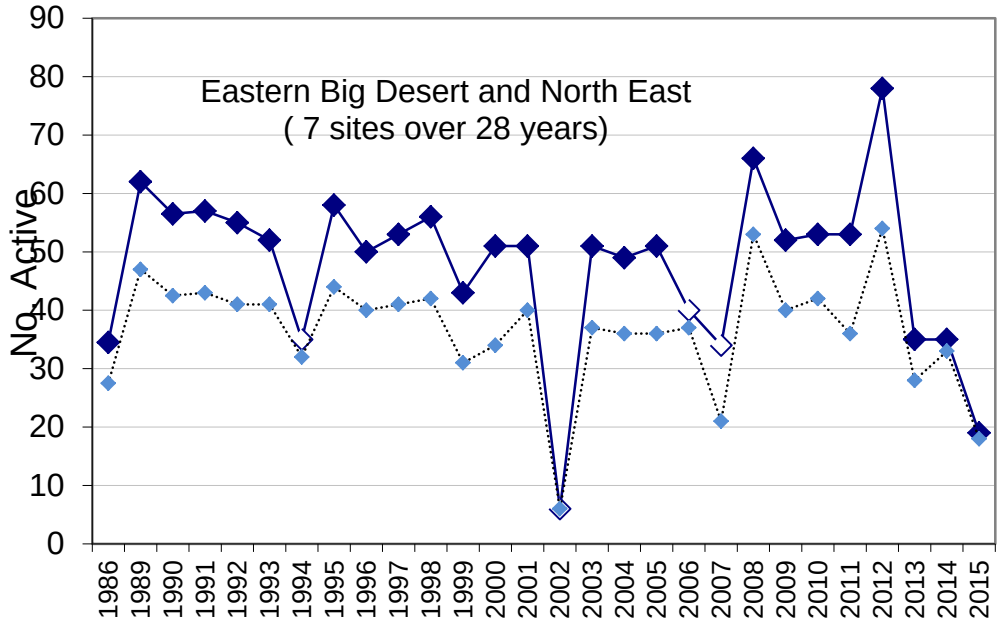

Figure 2. Trends in Malleefowl breeding numbers at 7 of the longest monitored sites over the past 28 years (upper graph), and at 6 of these sites excluding v04 (lower graph). 1994, 2002, 2006 and 2007 were major drought years (white points). Data comprise mounds in set areas across years in sites v01, v02, v03, v04, v07, v20 and v23.

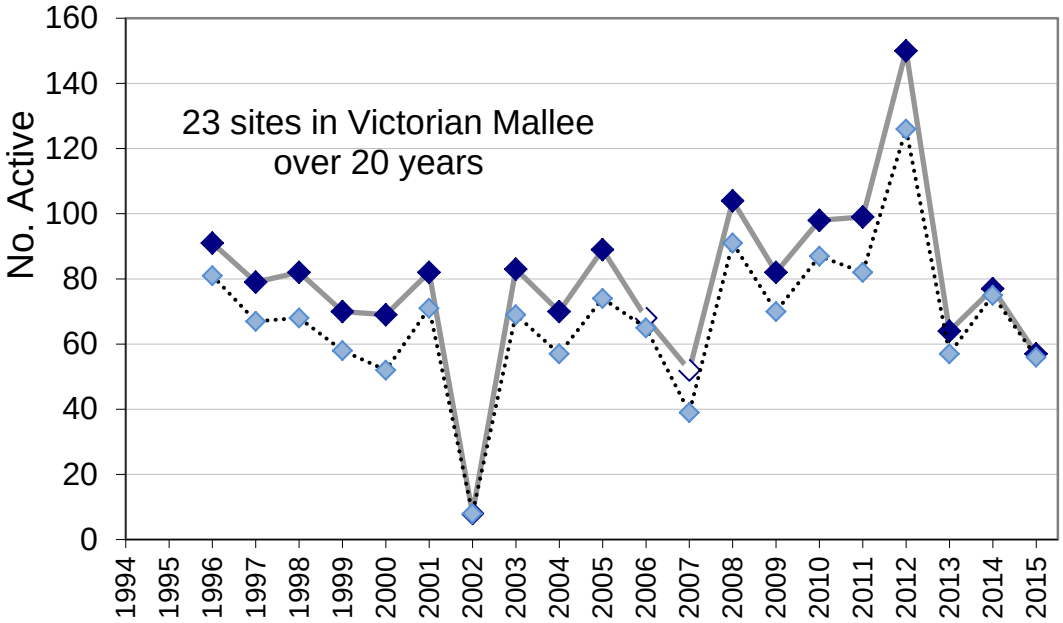

Figure 3. Trends in Malleefowl breeding numbers at 23 sites over the past 20 years (upper graph), and at 22 of these sites excluding v04 (lower graph). 1994, 2002, 2006 and 2007 were major drought years (white points). Data excludes mounds outside site boundaries. See figure 4 for regional breakdown.

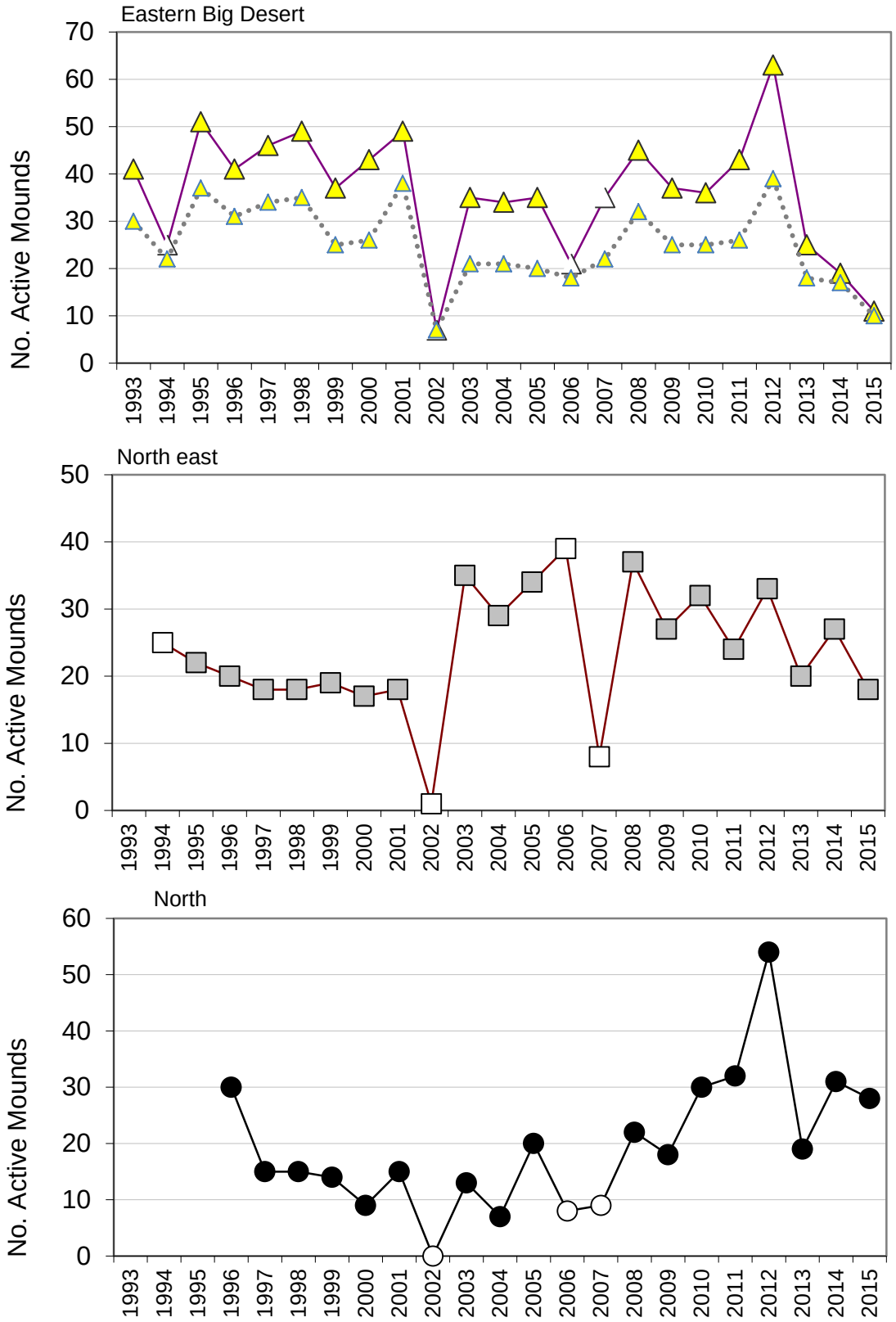

Figure 4. Trends in Malleefowl breeding numbers at 22 sites over the past 20-23 years shown by region. Eastern Big Desert (triangles) comprise 6 sites over 21 years (upper graph), and 5 sites excluding v04 (lower graph), North East comprise 4 sites over 21 years (shaded squares), and North West comprises 12 sites over 19 years (solid circles). 1994, 2002, 2006 and 2007 were major drought years in many areas. Data excludes mounds outside site boundaries.

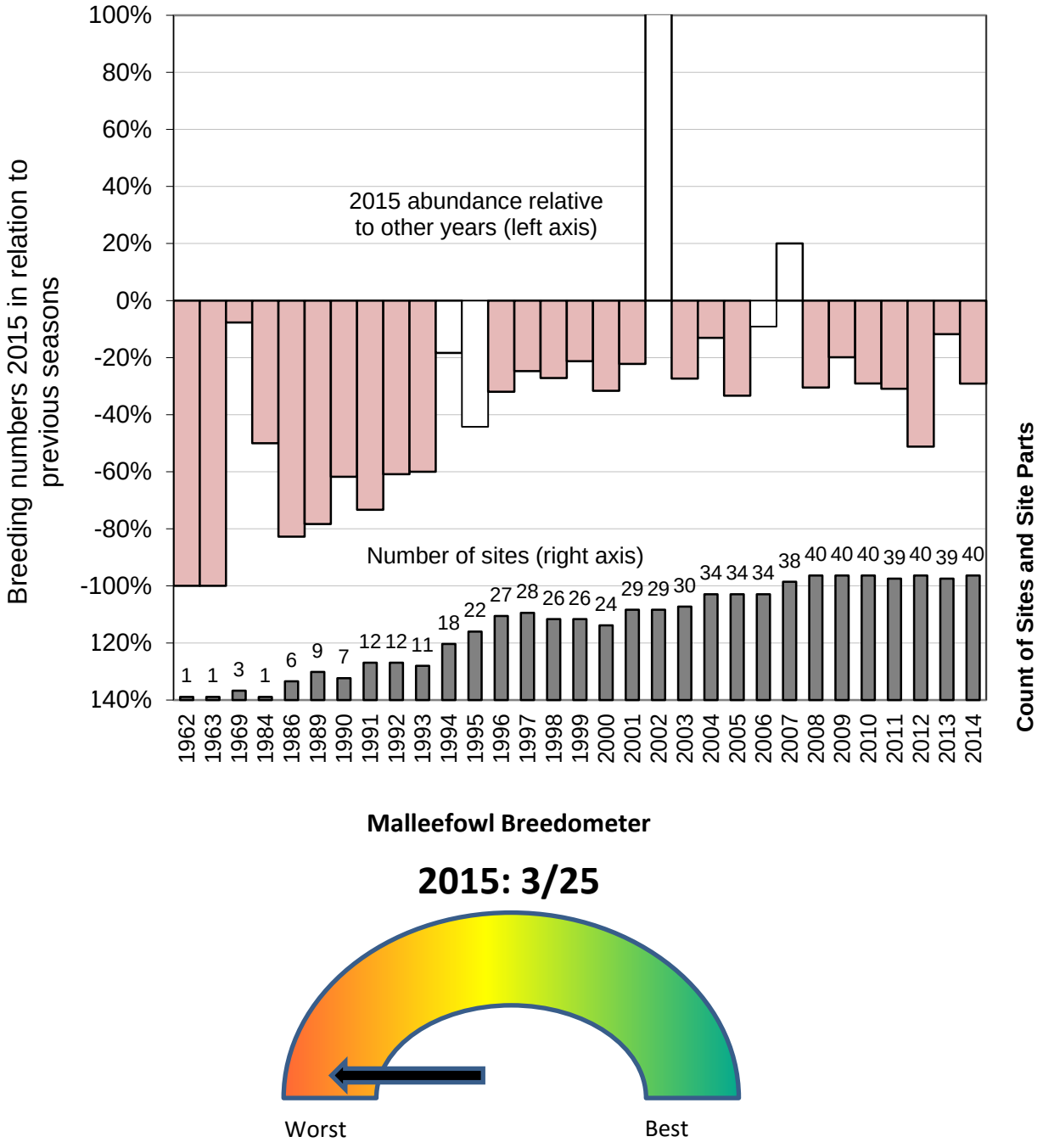

Figure 5. a) Breeding numbers of Malleefowl in the 2015 season compared with all previous seasons (upper chart) and the number of sites involved (lower chart). The zero line in the chart indicates no difference, whereas values above zero indicate that breeding numbers in the current season were above those in the past, and values below zero indicate a decline. For example, breeding numbers in 2015 were about 30% below those in 2014 but 20% higher than those in 2007. Drought years are indicated by unfilled columns.

The bottom chart shows the number of sites involved and provides an index of the reliability of the comparisons: e.g. the comparison with 2012 is based on 40 sites and is thus very reliable, whereas the comparisons with 1969 is based on only a 3 sites and probably does not reliably reflect general trends.

b) Malleefowl Breedometer summarising Figure 5a for the seasons in which there were at least 10 sites in common with 2015 data. The 2015 season was the 3rd worst result on record.

- *Reasons for the low breeding numbers in the 2015 season*

Once again, winter rains were lower than usual and this most likely led to the lower than hoped for breeding numbers. As has occurred in the past few years, there was above average rainfall early in the season, but conditions became relatively dry when Malleefowl needed it the most. Rainfall until June was generally good, but July and August were unusually dry: down by 38% at Mildura, 47% at Ouyen and 64% at Horsham.

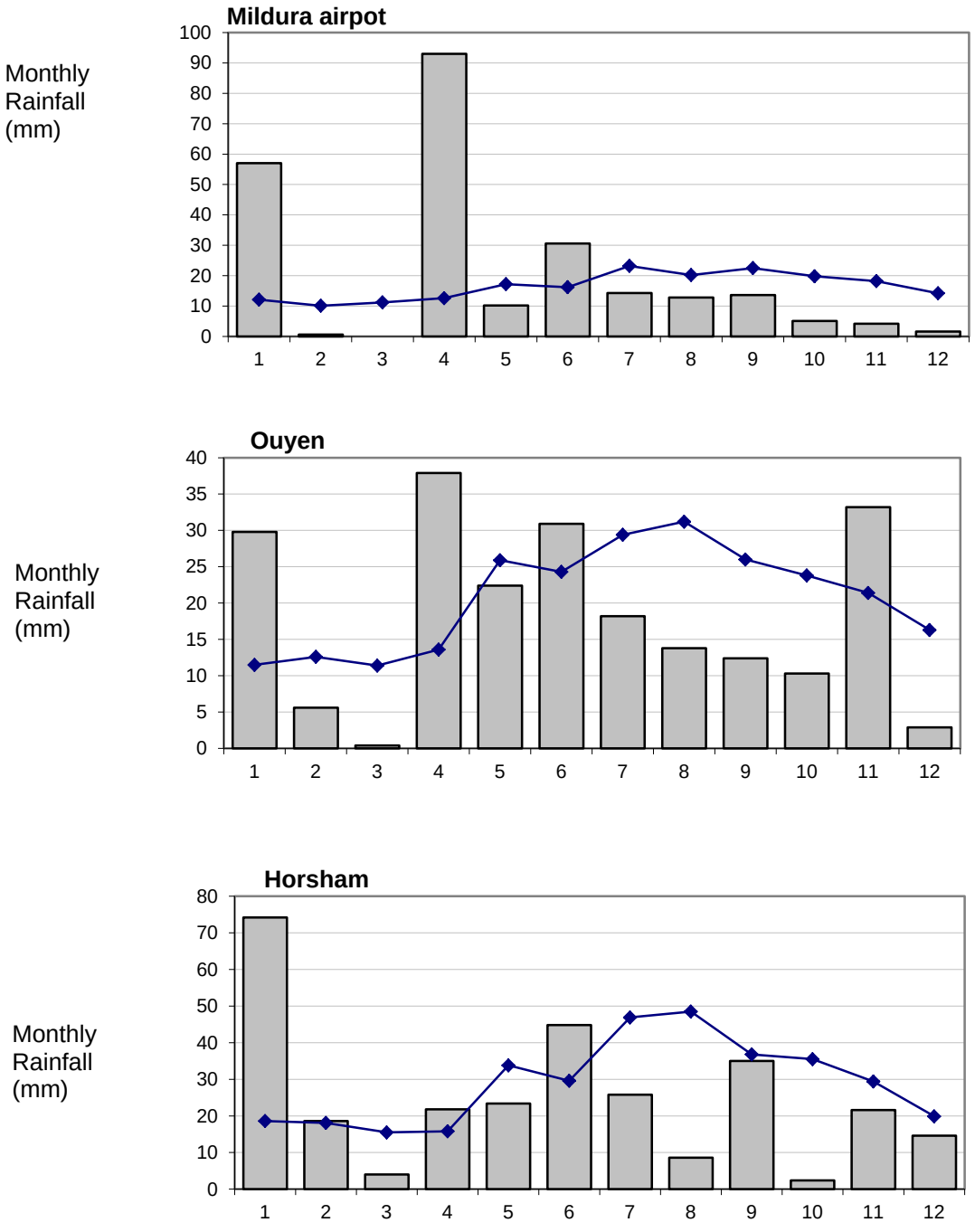

Figure 1. Rainfall at Mildura, Ouyen and Horsham in 2015 (bars) and median rainfall since early 1900s (line). (Data from the Bureau of Meteorology website).

Individual Site trends

Rather than print out the 40 odd histograms showing site trends, these will be available for download from the NMMD (National Malleefowl Monitoring database) along with all the usual database reports that comprise the appendices of previous monitoring reports.

3. Changes to data recorded in the field

There were no major changes to the Cybertracker sequence this season and most people used the LG smartphones successfully. However, a major problem was reported: on two separate occasions the smartphones underwent a spontaneous hard rest, meaning that everything was wiped from the memory. This should not happen! Fortunately, we were able to resurrect most of the data from paper sheets and photos. The smartphones in question have been dishonourably discharged from service. We will commission Cybertracker to develop a backup to the external SD card to avoid this sort of data loss in the future.

4. Lerp

This has been the 10th season in which we have recorded the occurrence of lerp on Malleefowl mounds between October and January. The results last year showed that lerp was then more common than previous years, but this year lerp abundance has returned to the usual pattern in which signs of lerp occur only rarely (less than 5% of mounds showing lerp; Figure 6).

In 2015, lerp was most commonly recorded in the Sunset Country sites with 10% of mounds showing lerp (Figure 7), but this was much less than in 2014 (40%). Last year, lerp were most common at North East sites and occurred on nearly 60% of mounds; in contrast, in 2015 lerp occurred on less than 4% of mounds.

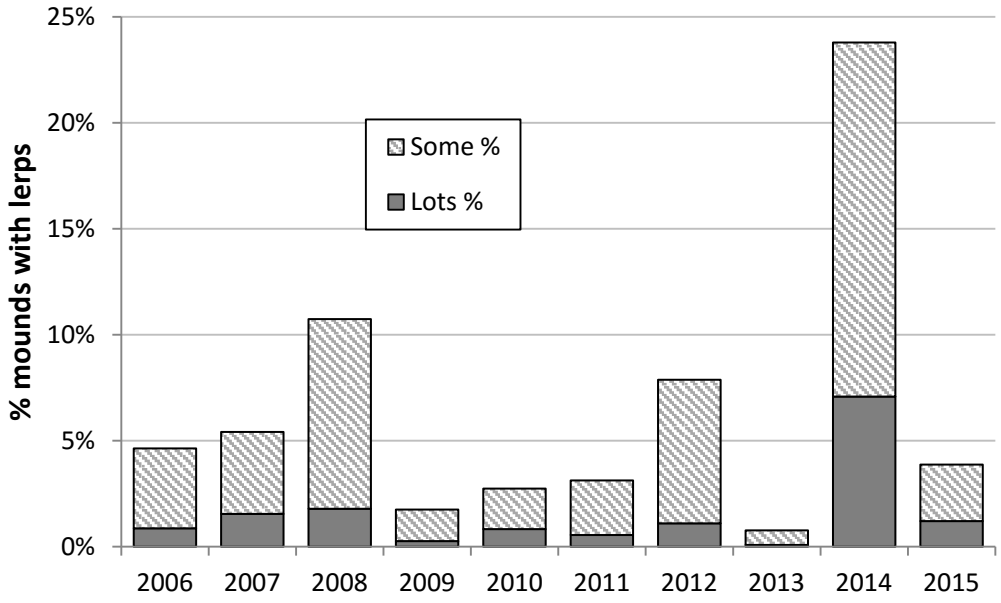

Figure 6. Proportion of mounds on which lerp were detected in each season since 2006.

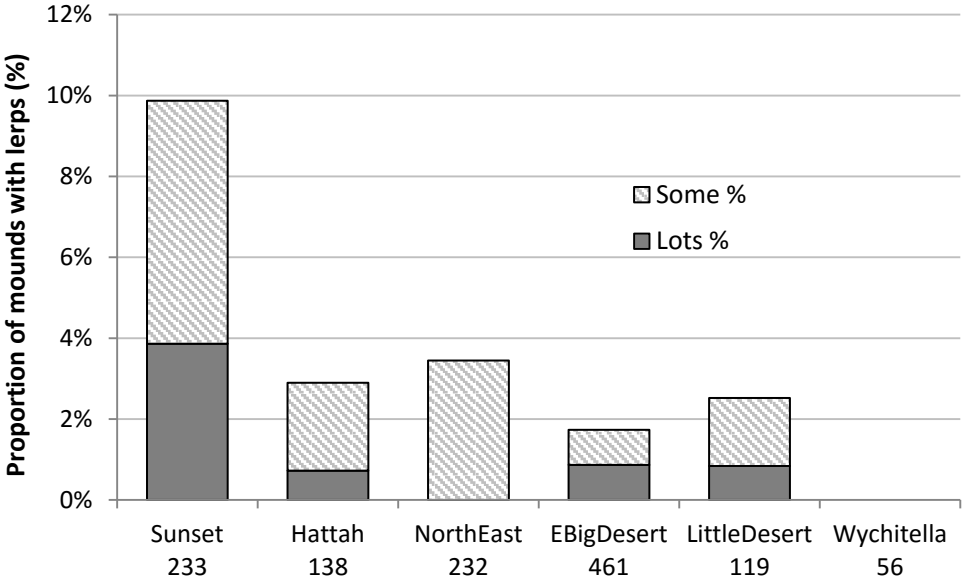

Figure 7. Regional breakdown of lerp occurrence on mounds in the 2015 season.

5. Fox scats

Fox scats were collected at 381 mounds in 2015 and weighed a total of 5.6 kg, a result that is lower than last season (Table 2). Figure 8 shows the average weight of fox scats collected per mound monitored since the mid-1990s for the same set of 20 sites and provides a better comparison across the years of data during which many sites have been added. The graph shows that there was a steep decline in fox scat weights between 1996 and 2000 which coincides with and probably reflects the decline of rabbits due to RHD and consequent adjustments to fox populations. There is also an increasing trend over the past decade suggesting that fox numbers are on the rise again, a trend certainly supported by anecdotal reports from various sources in the mallee. However, results from the last two seasons suggest that the trend may have peaked. It is possible that the generally dry conditions over the past three years that have inhibited Malleefowl breeding have also deleteriously affected foxes.

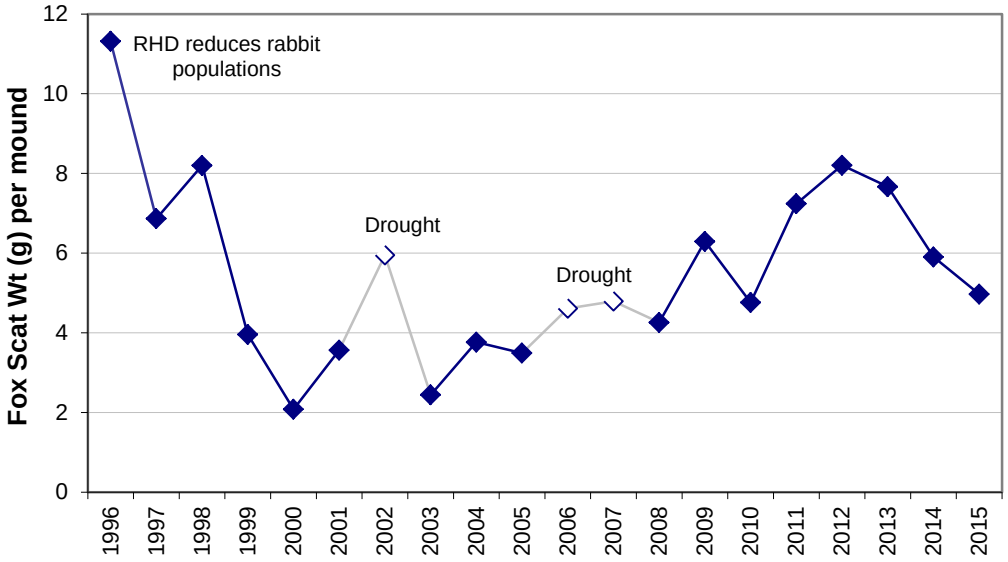

Figure 8. Trends in the average fox scat weight per mound at 20 sites over 20 years. No attempt has been made to control for biases due to variations in the proportion of active mounds (more likely to be marked with fox scats) or changes in the proportion of very old and inconspicuous mounds.

Which brings us, as always, to reiterate:

May we remind everyone once again of the importance of being very systematic with fox scat collection. We must search the mound surface very carefully <u>for a full minute</u> to be to absolutely sure that we get all the scats, as emphasised in the manual and during the training weekends.

Table 2. The total weight of fox scats, the number of mounds at which fox scats were collected, for both 2015 and the previous year (italics). Malleefowl scats and feathers were also collected in 2015 but are not tabulated here.

		Fox Scats			
Grid	Name	2015 Wt (g)	2015 Count	*2014 Wt (g)*	*2014 Count*
v01	Dattuck	244	16	*691*	*27*
v02	Torpeys	159	12	*134*	*10*
v03	Wathe SW	520	27	*607*	*40*
v04	Bronzewing	647	43	*727*	*47*
v05	Colignan	40	4	*13*	*3*
v07	Annuello	152	14	*424*	*32*
v08	Powerline	79	5	*74*	*5*
v09	Mt Hattah	23	3	*19*	*5*
v11	Mopoke	73	5	*135*	*8*
v12	Pheeneys	48	7	*270*	*13*
v13	Bambill	191	20	*189*	*14*
v14	Menzies	103	6	*51*	*6*
v15	Wandown	199	15	*196*	*17*
v16	South Bore	236	22	*303*	*19*
v17	OneTreePlain	55	7	*121*	*8*
v18	Washing	59	6	*110*	*6*
v19	Underbool	11	2	*65*	*8*
v20	Lowan	369	25	*417*	*25*
v21	Dumosa	287	19	*248*	*16*
v22	Dennying	15	2	*61*	*4*
v23	Moonah	1284	54	*857*	*49*
v24	Kiata	108	9	*163*	*5*
v26	Hattah Tracks	215	18	*300*	*20*
v27	O'Brees	125	10	*57*	*8*
v28	Nurcoung	28	4	*147*	*7*
v29	Wedderburn	15	3	*24*	*2*
v30	Hattah South	57	3	*61*	*3*
v31	Skinners Flat	10	1	*37*	*4*
v32	Wychitella	6	2	*44*	*4*
v33	Korong Vale			*13*	*1*
v34	Paradise			*310*	*11*
v35	Broken Bucket			*21*	*3*
v37	Wisemans	16	2	*185*	*11*
v38	Tooan			*96*	*6*
v39	Oldfields	83	6	*10*	*1*
v40	iluka	9	1		
v41	Mali Dunes	101	8		
		5567	*381*	*7180*	*448*

6. Participation and in-kind contribution

This year, 78 VMRG members and non-members participated in the monitoring, totalling about 1212 monitoring hours in the field. In addition, VMRG members totalled over 423 hours driving to and from monitoring sites (these hours relate to vehicles rather than individuals; often two or more people travelled in one vehicle but passenger time has not been tallied). Assuming the time spent by VMRG members is worth $29/hr*, we estimate the field component of the monitoring represents at least $47415 in in-kind support.

Of course the VMRG in-kind contribution extends further than just the field component of monitoring. We estimate that an additional 120 hours were contributed in managing the monitoring effort (preparing data and equipment, posting, uploading and managing data on the NMMD), and at least 122 hours were contributed freely by VMRG members to the motion camera project (installing, checking and downloading cameras in the field). Other large unpaid contributions in 2015/16 include committee meetings, training weekends or reporting back meetings, which collectively involved well over 160 unpaid hours, and site searches in the Nurcong region led by Jess Gardiner which involved about 50 person hours. Together, these activities totalled about 452 hours and were worth at least another $13560.

Thus, we conservatively estimate the in-kind value of the VMRG activities in 2015 to be about $60,975.

*estimate for volunteer hour value in 2011 from: Ironmonger, D. (2012). The Economic Value of Volunteering in Victoria. The Department of Planning and Community Development (Ed.): Victorian Government.

7. Concluding comments

Once again, the VMRG has collected excellent data and made a critically important contribution to Malleefowl conservation. We need information on the trends in Malleefowl breeding numbers and, realistically, this is only achievable through the efforts of a voluntary, citizen-science workforce. The VMRG continues to lead the way in Malleefowl monitoring and conservation, and the data and efforts by so many individuals in the VMRG are a credit to the group and an inspiration to others.

This season, breeding numbers were well down on previous years and this was probably related to the low winter rainfall, particularly in July and August when Malleefowl usually prepare their mounds for breeding. Hopefully, the birds are still around but simply decided not to breed as the conditions were poor. In itself, this is neither surprising nor concerning. What is concerning is that there appears to be a pattern developing – a shift from winter to summer rain – over the past couple of decades. We can only hope that this pattern is temporary rather than a permanent and continuing change caused by the changing global climate. Due to the consistent monitoring by the VMRG we at least know that Malleefowl can bounce back when conditions improve, as they did from 2009-12 after the decade long drought in the mallee. However, whether the species is able to bounce back following more

prolonged or severe droughts is yet to be seen. In any case, the need for monitoring in the conservation of Malleefowl is more important than ever.

- *Update on the motion-sensitive camera project*

As discussed in last year's report, an important area in which our data collecting could be improved is in regard to other species, especially predators such as foxes, cats, but also other pests such as rabbits, goats, and natives such as kangaroos. All of these animals are likely to affect Malleefowl to some degree. The data we have been collecting by visiting mounds is very valuable because it gives us some information on these other animals, but it is far from ideal.

Accordingly, in 2013 we conducted a trial of the motion-sensitive cameras at Wandown and Menzies (v15 and v14) to collect information on all of these animals simultaneously. The trial was successful and numerous VMRG members helped set up the cameras and sort through the very large number of photos that were collected.

On the basis of these successes, we received funding from the Iluka Malleefowl Management Committee to buy a further 50 cameras (with solar panels, batteries and stakes) and have installed these at six sites in early winter 2015, including Wathe v03, Menzies v14, Wandown v15, Lowan v20, Dumosa v21, and Paradise v34. These camera systems are scattered through the mallee (not at mounds) at our monitoring sites to patiently take photos of any animal or other object that passes in front of them, day and night, 365 days a year. The idea is that ultimately we will only visit them once a year during the monitoring to swap memory cards, so the effort by monitoring folk in the field will be small, but the rewards will be substantial in terms of estimating the populations of other animals.

The first of the card swaps occurred this season at four of the six sites (the other sites will be visited in May). In order to make it simple for everyone, we decided that a photo of the camera screen would provide all the crucial info we need on the state of each system, rather than have people try to interrogate the systems to record battery condition, time, etc. But we didn't consider how difficult it may be to deal with reflections in the bright mallee environment, so rather than make things simple and fast, the result was the opposite: apologies to all concerned!

Apart from this minor hiccup, the card swaps went very well and we are now in possession of lots of photos that will, we hope, describe the abundance of a range of species. The next phase will involve sorting all of those photos in regard to the animals within them, and to do this we will be relying on VMRG volunteers. If you have a few hours to spare over the next six months in which you could sort a few thousand photos, please let us know! The sorting proved very popular in the past because it is easy and it's fascinating to see what's about when we are not there. Most photos are empty (triggered by moving vegetation or shadows) but foxes, kangaroos and Malleefowl make regular appearances and all sorts of other species pop in frame on occasion.

Meanwhile, Rosanna van Hespen has completed her Masters at Melbourne University using the results of the initial motion-sensitive camera trial under the supervision of Jose and Cindy. Among other things, Rosanna looked at the number of cameras we need to statistically characterise fox activity at each site. It appears that eight cameras is sufficient for most purposes, and this is the number we have deployed at the six sites in Victoria.

- *Update on the LiDAR project*

In early 2015 we commissioned LiDAR scans over a number of sites in northern Victoria in order to test the technique for finding Malleefowl mounds. The technique uses airborne laser scanners to rapidly map topographical features. The Iluka Malleefowl Management Committee provided us with funds to pay for the scans that were undertaken by AAM and analysed by Umwelt. The results have been positive: Umwelt's initial analysis detected about 30% of the mounds we know about, about 75% of mounds that were more than 30cm in height (as estimated by VMRG volunteers: you see how important your data is!), and about 75% of known active mounds. Encouragingly, LiDAR picked up a few mounds that we did not know about, and there were no false positives in the mallee (i.e. everything they said was a mound was a mound). As any monitoring volunteer would know, many of our mounds are very indistinct so its not surprising that LiDAR struggled to detect them, but that most of the larger mounds were detected in the initial analysis is very encouraging, especially as the scans were not high resolution (i.e. only 4 points/msq) and high resolution systems are already becoming available (100 points/msq). We are collaborating with Umwelt to refine the detection even further and are confident that we will be able to do this, especially with higher resolution scans. This work is important as re-searching Malleefowl monitoring sites is difficult to do using volunteers (and typically only detects 60-80% of known mounds). Moreover, the LiDAR field is progressing quickly and costs are likely to come down as the equipment is fitted to smaller planes and eventually to drones.

Appendix A 1. 2015/16 Mound Inspection Report for All Victorian Sites

Mounds that will be included in future annual lists.

	Sites	1	2	3	4	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Sought and found	1143	55	49	71	98	15	56	17	16	0	14	26	39	21	82	41	27	25	21	54	33	11	63	10	8	29	20	21	9	8	10	10	5	56	12	7	52	20	10	0	11	8	3
New incidental	1																											1															
Sought, NOT found	5																																				3	1	1				
NOT sought or found	13	1	1												1	1										1						1					2	1		3		1	
Total	1162	56	50	71	98	15	56	17	16	0	14	26	39	21	83	42	27	25	21	54	33	11	63	10	8	30	20	22	9	8	10	11	5	56	12	7	57	22	11	3	11	9	3

Previously Marked Mounds that will be checked every 5th year.

	Sites	1	2	3	4	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Sought and found	183	11	4	29	12	1	1	2		3	2	3		9	16		4	1	2		8	6	7	7				2	2	1	10	7	3	25		1		3	1				
New incidental	0																																										
Sought, NOT found	1				1																																						
NOT sought or found	8																			4				1								1				1		1					
Total	192	11	4	29	13	1	1	2		3	2	3		9	16		4	1	2	4	8	6	7	8				2	2	1	10	8	3	25		2		4	1				

Newly Marked Mounds that will be checked every 5th year.

	Sites	1	2	3	4	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Sought and found	38	13	4	3											6	1		1				2						1		1				1	1	1	1					2	
New incidental	0																																										
Sought, NOT found	1																																						1				
NOT sought or found	5																			4																				1			
Total	44	13	4	3											6	1		1		4		2						1		1				1	1	1	1		1	1		2	

Mounds that will be omitted from annual lists (erroneous records, and mounds well outside grid boundaries).

	Sites	1	2	3	4	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Sought and found																																											
New incidental																																											
Sought, NOT found																																											
NOT sought or found																																											
Total																																											

Grand Total	1398	80	58	103	111	16	57	19	16	3	16	29	39	30	105	43	31	27	23	62	41	19	70	18	8	30	20	25	11	10	20	19	8	82	13	10	58	26	13	4	11	11	3