Malleefowl Monitoring in Victoria: 2017/18

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; another great result! (More detail is shown in Appendix A.1). The VMRG visited 1349 Malleefowl mounds during the 2017 (2017/18) breeding season (Table 1) including 4 newly listed mounds. This result is more than last year due to the Little Desert LiDAR project adding a total of 55 newly found mounds to 5 sites (v28 Nurcong, v36 Broughtons, v38 Tooan, v42 Thorpes and v43 Cooack) and because more optional (5yr) mounds were visited in 2017 (see below).

A total of 17 regular mounds appear to have been neither sought nor found during the 2017 season (Table 1) and these were scattered through 11 sites. There were also 3 regular mounds that were searched for but could not be found although they were found in previous years.

Overall, we managed to find 98.5% of the mounds that we set out to monitor (excluding newly added mounds, but including optional '5 year' mounds that were monitored. The next time optional mounds will be mandatory will be in 2020.

Table 1. Effectiveness of the monitoring effort. 'Optional old' mounds are those that were categorised as optional (5yr) before the **2017** season, whereas 'Optional new' are mounds that were added to the optional list last year. Omitted mounds are those removed from monitoring lists last season.

	Total	*Regular*	*Optional old*	*Optional new*	*Omitted*
Sought and found	1345	1188	139	17	1
New incidental	4	3	1	0	0
Sought, NOT found	6	3	3	0	1
NOT sought or found	126	17	102	7	0
Total	1481	1211	245	24	1

Last season, 24 mounds that were monitored as regular mounds were reviewed and downgraded to optional (5 year mounds) for subsequent seasons; these mounds show up in the tables as new optional mounds this season. This brings the number of mounds on the optional list to 269, or 20% of our total monitoring target.

58% of the optional mounds were monitored this season (156 of 269). Next season the optional mounds will 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?

Of the 1349 mounds that were monitored in Victoria in 2017/18, 148 were active compared with 150 last season and 118 in 2014/15 (these totals include mounds

outside strict site boundaries). These numbers are much lower than the record of 218 set in 2012/13.

Figures 1-3 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 1) and it is clear that at these sites, mostly in the eastern Big Desert region, breeding numbers were well down. This decline is partly due to wildfires that thoroughly burnt Bronzewing v04 in 2014 which typically had 12-15 active mounds. Surprisingly, 5 mounds were active in 2017 and last season. However, the low breeding numbers in Figure 1 weren't simply due to v04 being burnt: when data from this site are excluded the poor breeding numbers at other sites is apparent. In fact, breeding numbers for this set of 6 sites was one of the lowest recorded over the past 30 years; breeding numbers were lower only in the 2002 drought and in 2014 after the fire.

Figure 2 shows the trend for a larger set of 23 sites monitored since 1996 and scattered over a much greater geographical area, albeit for a shorter period, and Figure 3 shows the same data broken down into regions. While breeding numbers have improved slightly compared to the very low numbers over the previous couple of seasons, they were less than half that recorded in 2012. There are worrying signs of continuing decline in the North East and breeding numbers are well below historical averages in the Eastern Big Desert.

Elsewhere, in the 8 main sites in and around the Little Desert (v24, v25, v28, v36, v38, v39, v41 v39 and) breeding numbers were higher than last season, and about average for previous years, although the addition of mounds found by LiDAR and extension of some sites may have inflated the 2017 numbers. At the four Wychitella sites (v29, v31, v32, v33) breeding was recorded only in the Korong Vale (v33) site where 3 mounds were active: this is still a good result for this region although there were 4 active mounds in 2009 and 2010.

Mali Dunes (v41) south of the Big Desert once again had 8 active mounds (same as 2015 and 2016).

- *Comparing 2017 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 2017 results directly with each of the previous years on a site by site basis (Figure 4a). This approach uses virtually all the data collected in the past without bias due to missing data in previous years.

Figure 4a shows that on a site by site basis, breeding numbers across Victoria in the 2017 season was much the same as last year, but nonetheless was lower than most other seasons since monitoring began. This is graphically represented by our Malleefowl Breedometer (Figure 4b) which displays the ranking of the current season breeding numbers with respect to other seasons where at least 10 sites were monitored. 2017 was the 7th worst of the 27 breeding seasons on record, much the same ranking as last year, but a little better than 2015 which was one of the worst seasons on record. This is the third season in a row where results have been much lower than the long-term average; let's hope the needle shifts to the right again soon!

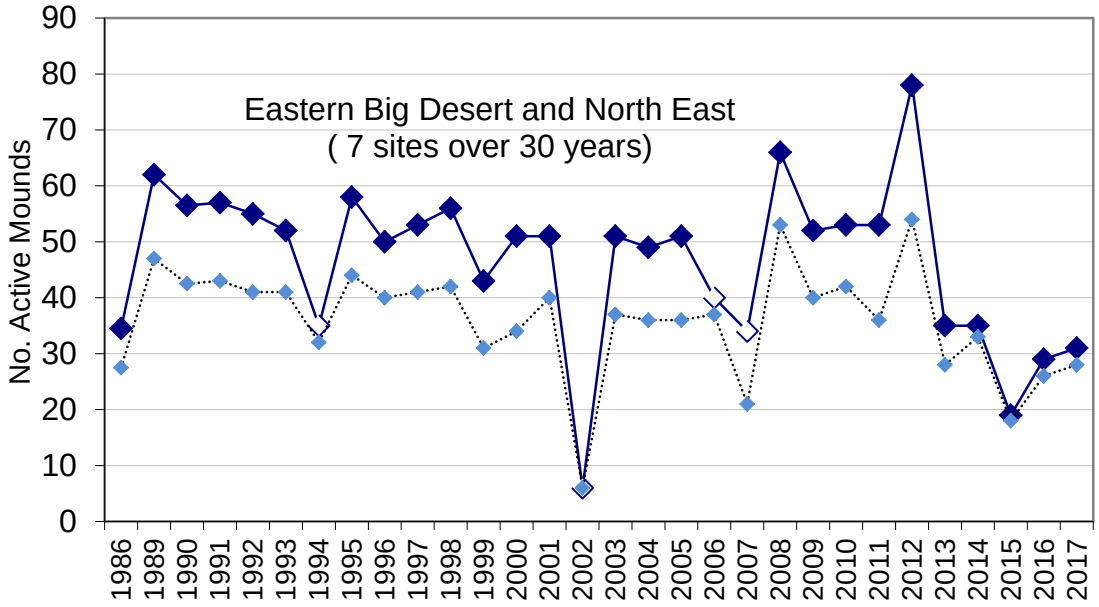

Figure 1. Trends in Malleefowl breeding numbers at 7 of the longest monitored sites over the past 30 years (upper graph), and at 6 of these sites excluding v04 (lower graph). 1994, 2002, 2006 and 2007 were major drought years (white points). Data comprise mounds in set areas across years in sites v01, v02, v03, v04, v07, v20 and v23.

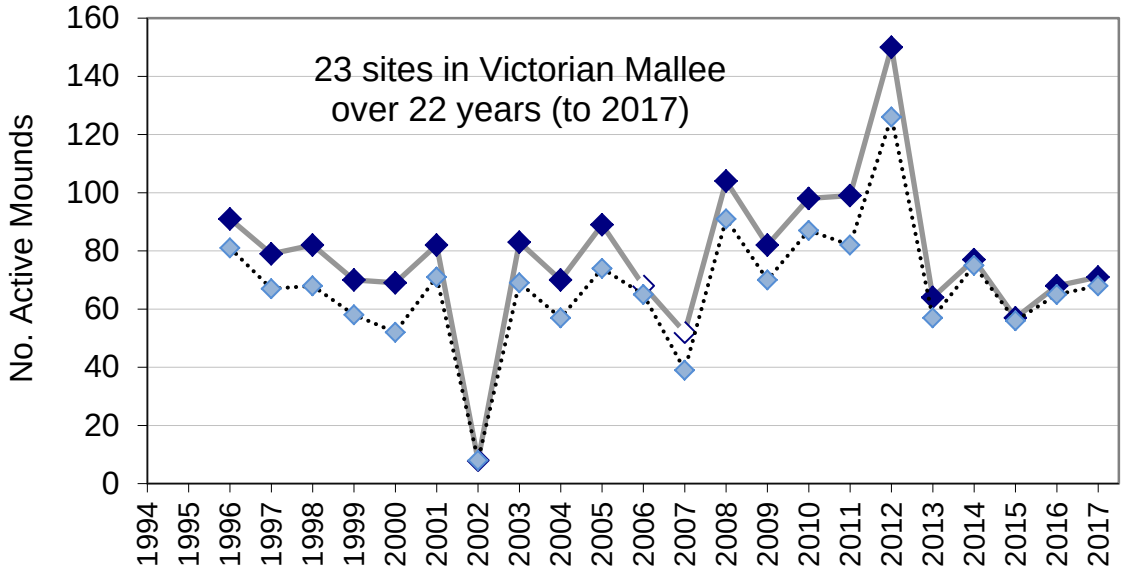

Figure 2. Trends in Malleefowl breeding numbers at 23 sites over the past 22 years (upper graph), and at 22 of these sites excluding v04 (lower graph). 1994, 2002, 2006 and 2007 were major drought years (white points). Data excludes mounds outside site boundaries. See figure 4 for regional breakdown.

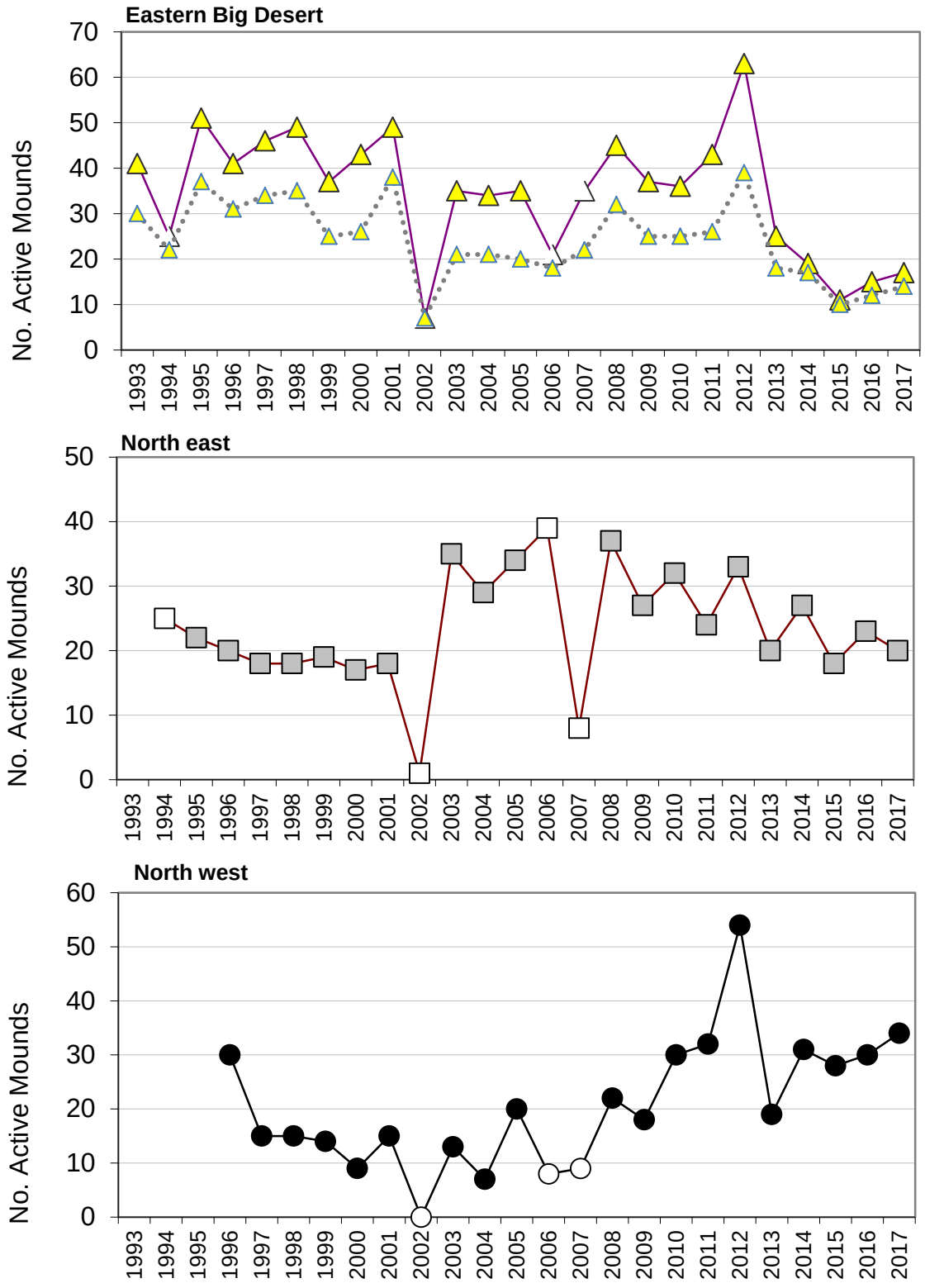

Figure 3. Trends in Malleefowl breeding numbers at 22 sites over the past 22-25 years shown by region. Eastern Big Desert (triangles) comprise 6 sites over 25 years (upper graph), and 5 sites excluding v04 (lower graph), North East comprise 4 sites over 24 years (shaded squares), and North West comprises 12 sites over 22 years (solid circles). 1994, 2002, 2006 and 2007 were major drought years in many areas. Data excludes mounds outside site boundaries.

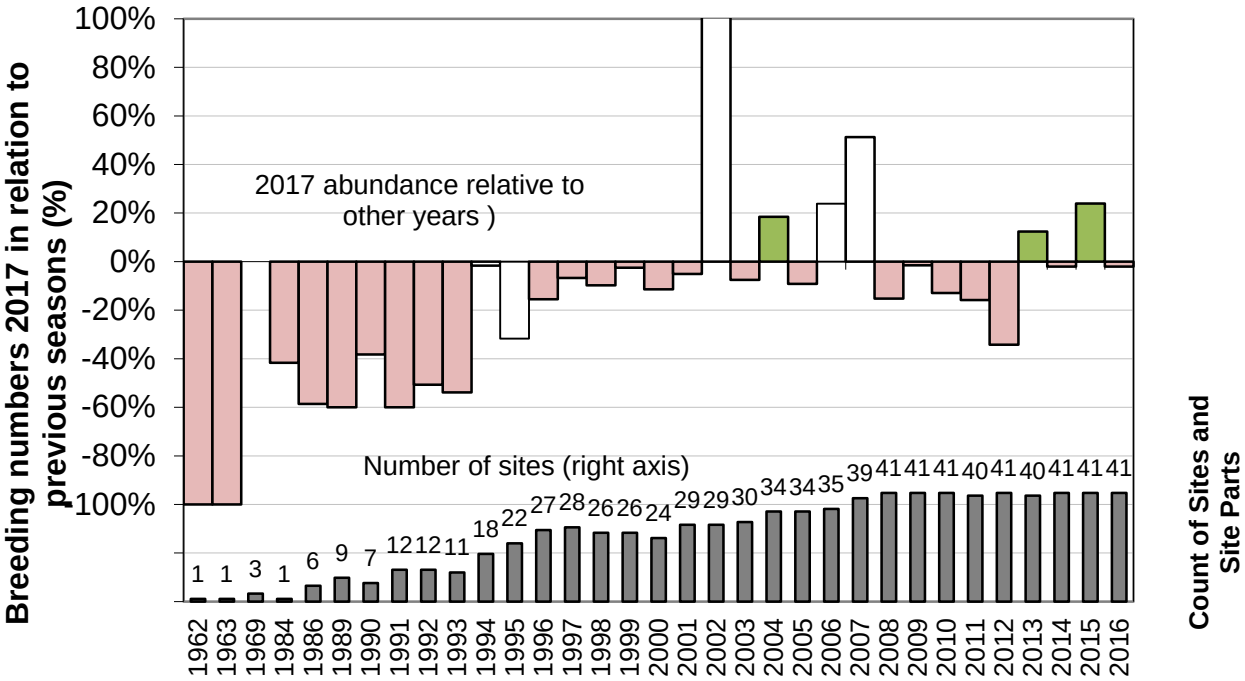

Figure 4. a) Breeding numbers of Malleefowl in the 2017 season compared with all previous seasons (upper chart) and the number of sites involved (lower chart). The zero line in the chart indicates no difference, values above zero indicate that breeding numbers in 2017 were above those in the past, and values below zero indicate a decline. For example, breeding numbers in 2017 were 34% below those in 2012 but 24% higher than those in 2015. Drought years are indicated by unfilled columns.

The bottom chart shows the number of sites involved and reflects the reliability of the comparisons: for example, the comparison with 2012 is based on 41 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.

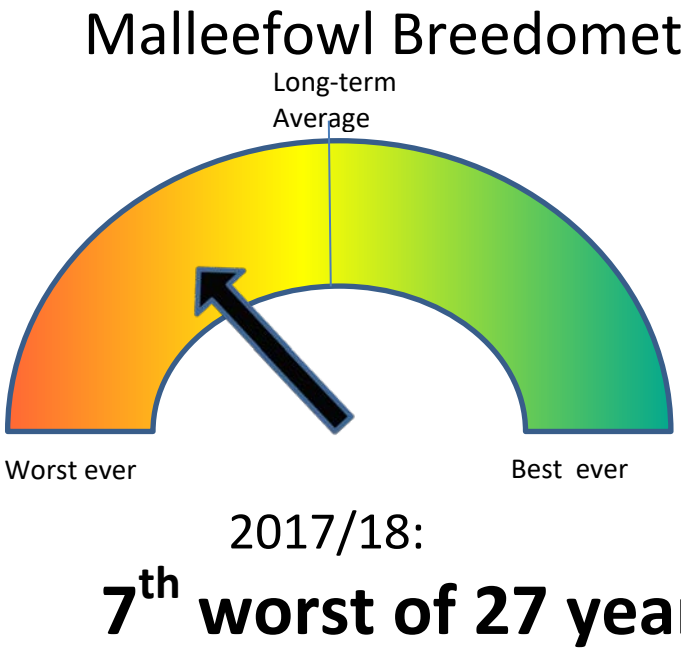

Figure 4. b) Malleefowl Breedometer summarising Figure 5a for the seasons in which there were at least 10 sites in common with 2017 data. The 2017 season was the 7th worst result of the last 27 seasons.

- *Rainfall profiles in 2017*

2017 was characterised by very dry conditions during June and July in NW Victoria: Mildura recorded only 15%, and Ouyen only 33%, of their median rainfall during these 2 months. Further south, Horsham also experienced a dry June (16% of median), but rainfall in July was more typical. As has often been the case over the past few years, rainfall patterns seems to have shifted from winter, when Malleefowl need rain, to summer when they have evolved to need it less. Whether these patterns explain the poor breeding results over the past few years is unclear, but is being examined in the national trend analysis currently underway.

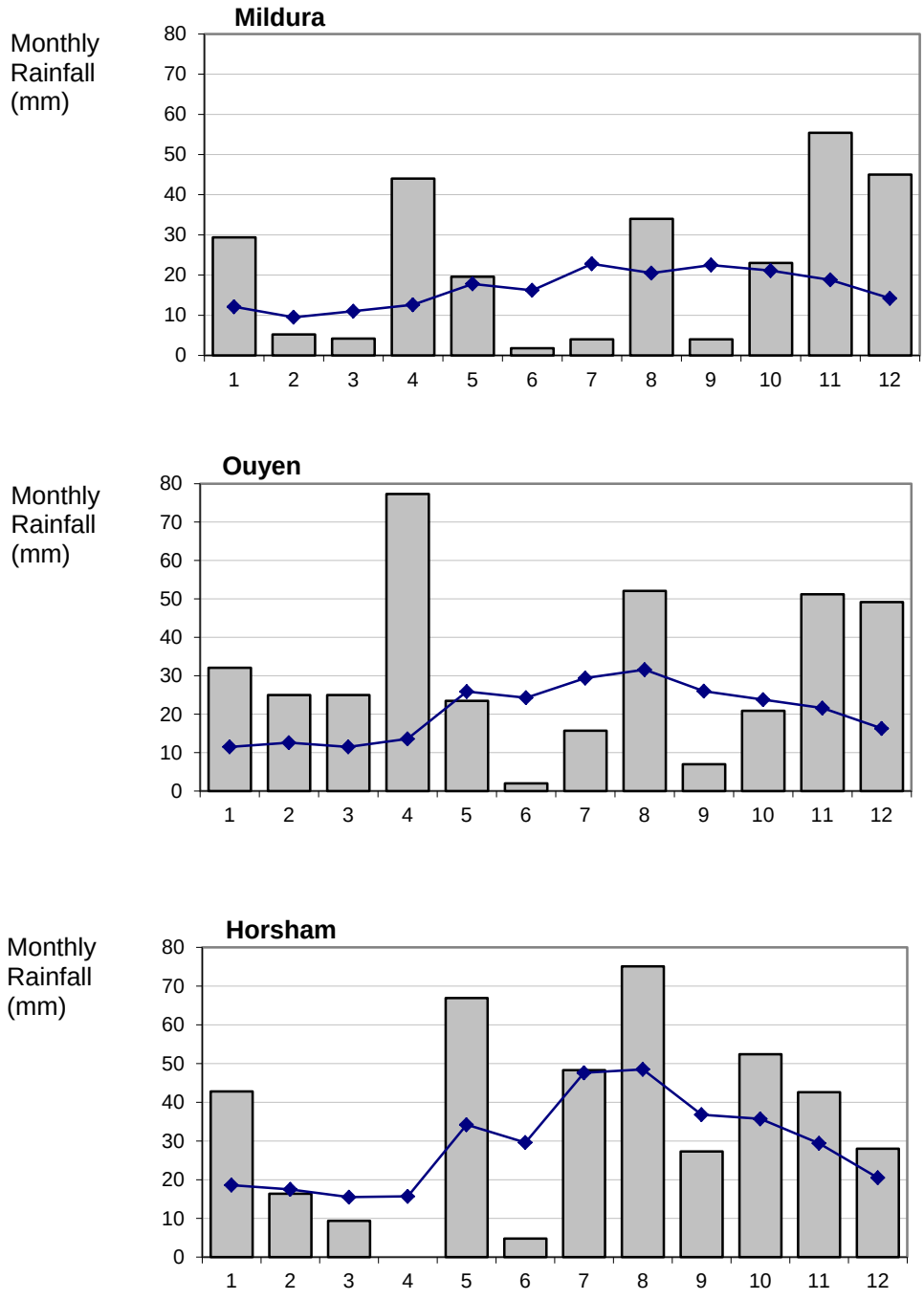

Figure 5. Rainfall at Mildura, Ouyen and Horsham in 2017 (bars) and median rainfall since early 1900s (line). (Data from the Bureau of Meteorology website).

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 and Samsung smartphones successfully. The automatic backup feature that we commissioned last year is working well. Thankfully we have not needed it, but it's nice to know it's there and will avoid data loss in the future.

4. Lerp

Lerp abundance on mounds was low: only about 5% of mounds had lerp on them in 2017 (Figure 6) when mounds were monitored (mostly October-December). Lerp was most commonly recorded in the Sunset Country sites where 19% of mounds showed some lerp, but was virtually non-existent in other regions (Figure 7). Most sites in the Sunset had few if any lerp, but at one site (South Bore v16) over 80% of mounds had lerp on them and this bolstered the regional total.

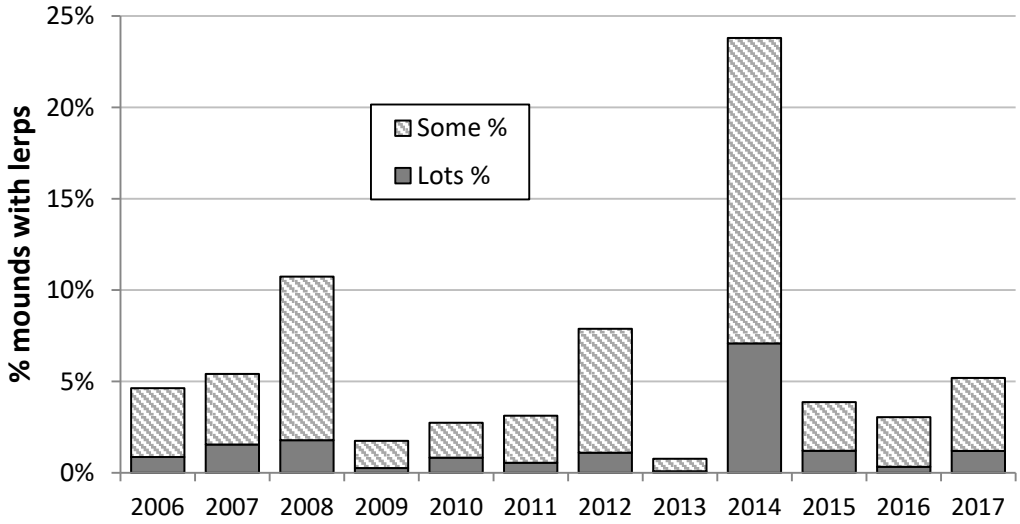

Figure 6. Proportion of mounds on which lerp were detected in each season since 2006.

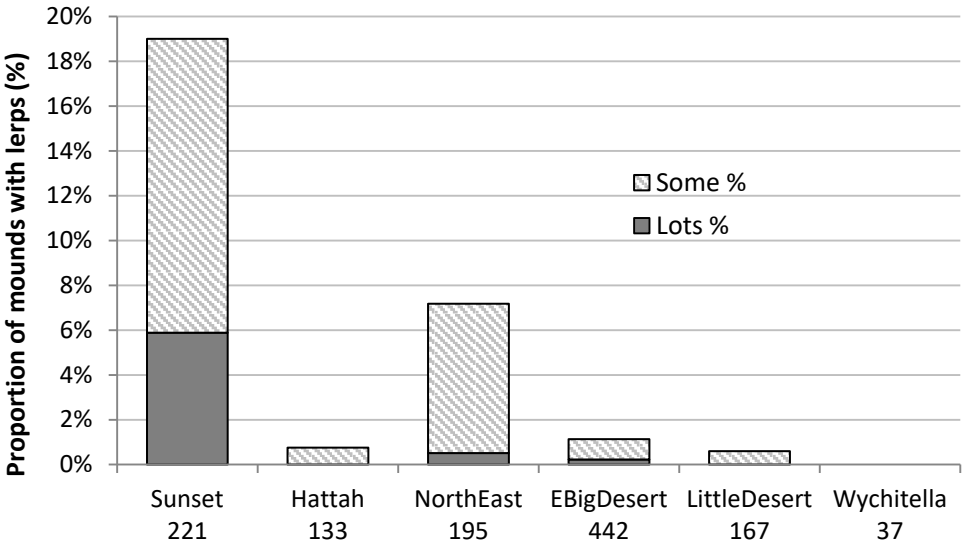

Figure 7. Regional breakdown of lerp occurrence on mounds in the 2017 season.

5. Fox scats

Fox scats were collected at 325 mounds in 2017 and weighed a total of 4.9 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. Since 2000, there was an increasing trend peaking in 2012, after which the amount of fox scat collected has steadily declined to about half of that of 2012. It is possible that the generally dry conditions over the past few years that have inhibited Malleefowl breeding have also deleteriously affected foxes.

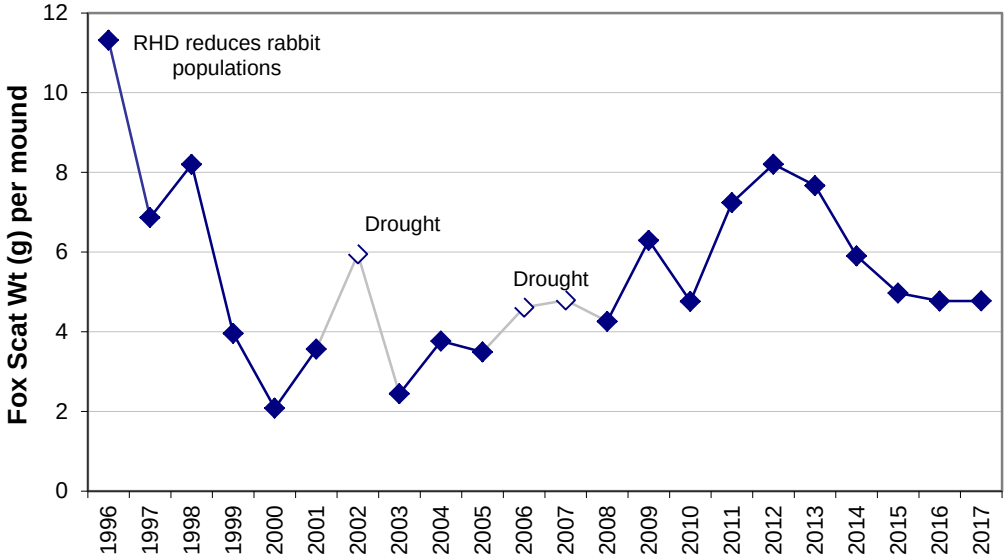

Figure 8. Trends in the average fox scat weight per monitored mound at 20 sites over 21 years. No attempt has been made to control for biases due to variations in the proportion of active mounds (more likely to be marked with fox scats) or changes in the proportion of very old and inconspicuous mounds.

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 2016 and the previous year (italics). Malleefowl scats and feathers were also collected in 2016 but are not tabulated here.

		Fox Scats			
Grid	Name	2017 Wt (g)	2017 Count	*2016 Wt (g)*	*2016 Count*
v01	Dattuck	172	17	*326*	*19*
v02	Torpeys	28	4	*20*	*2*
v03	Wathe SW	⇩ 392	24	*762*	*46*
v04	Bronzewing	⇧ 518	39	*291*	*33*
v05	Colignan	70	6	*34*	*7*
v07	Annuello	⇩ 59	2	*141*	*15*
v08	Powerline	66	5	*66*	*8*
v09	Mt Hattah	46	4	*15*	*4*
v11	Mopoke	76	6	*79*	*6*
v12	Pheeneys	⇩ 38	3	*134*	*11*
v13	Bambill	⇧ 263	19	*83*	*21*
v14	Menzies	⇧ 166	10	*0*	*1*
v15	Wandown	472	31	*408*	*42*
v16	South Bore	⇩ 128	13	*320*	*38*
v17	OneTreePlain	⇩ 3	1	*22*	*3*
v18	WashingMachine			*61*	*13*
v19	Underbool	⇧ 30	6	*6*	*1*
v20	Lowan	178	7	*182*	*18*
v21	Dumosa	⇩ 139	10	*248*	*16*
v22	Dennying	59	4	*54*	*6*
v23	Moonah	1364	62	*920*	*47*
v24	Kiata	49	3	*18*	*4*
v26	Hattah Tracks	⇩ 102	10	*307*	*23*
v27	O'Brees	62	3	*55*	*7*
v28	Nurcoung	193	9	*150*	*6*
v29	Wedderburn			*28*	*4*
v30	Hattah South	41	3	*73*	*3*
v31	Skinners Flat	14	2	*17*	*2*
v32	Wychitella	26	5	*13*	*2*
v33	Korong Vale			*19*	*1*
v34	Paradise			*417*	*15*
v35	Broken Bucket			*119*	*19*
v36	Boughtons WH	25	2	*0*	*0*
v37	Wisemans	5	1	*19*	*3*
v38	Tooan	70	8	*5*	*3*
v39	Oldfields	25	2	*46*	*3*
v40	iluka	0	0	*0*	*1*
v41	Mali Dunes	⇩ 11	1	*73*	*8*
v42	Thorpe's	40	3		
V43	Cooack				
		4930	*325*	*5531*	*461*

6. Participation and in-kind contribution

This year, VMRG members and non-members participated in the monitoring and totalled about 1429 monitoring hours in the field. In addition, VMRG members totalled at least 673 hours driving to and from monitoring sites (including passenger time). Assuming the time spent by VMRG members is worth $34.86/hr*, we estimate the field component of the monitoring represents at least $73,272 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 120 hours were contributed freely by VMRG members to the motion camera project (installing, checking and downloading camera traps and processing photos). Other large unpaid contributions in 2017 include committee meetings, training weekends or reporting back meetings, which collectively involved well over 160 unpaid hours. Together, these activities totalled about 400 hours and were worth at least another $13,944.

Thus, we conservatively estimate the in-kind value of the VMRG activities in 2017/18 to be at least $87,216.

*estimate for volunteer hour value in 2015/16 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 similar to last year but lower on a site-by-site basis than most previous years. Fox numbers appear to be low too, and it is possible that both these results are related to generally poor winter rainfall over the previous few years. We, and no doubt the mallee farmers, hope for good winter rains in 2018 and that the monitoring by the VMRG will show further improvements in Malleefowl breeding numbers (but not necessarily fox numbers!).

- *Update on the motion-sensitive camera project*

Our 48 cameras traps (with solar panels, batteries and stakes) at six sites, installed in 2015, including Wathe v03, Menzies v14, Wandown v15, Lowan v20, Dumosa v21, and Paradise v34. These camera traps are scattered through the mallee (not at mounds) and patiently take photos of any animal or other object that passes in front of them, day and night, 365 days a year. We only visit them once a year during the monitoring to swap memory cards, so the effort in the field is small, but the rewards are substantial in terms of estimating the populations of various animals such as foxes, cats, goats, pigs, rabbits and kangaroos, all of which might affect Malleefowl numbers.

In the past year VMRG members processed the photos collected last year during the 2016 monitoring and in the field swapped the memory cards at all cameras during monitoring. Overall, things went very smoothly. One problem was that quite a few cameras failed, mostly because exposed cables had been chewed (probably by goats), especially at Lowan v20 and at Paradise v34. While we fixed these camera traps at Paradise in October 2017, we were not aware of the extent of the damage at Lowan, but this became apparent during the monitoring when memory cards were swapped. We hope to repair or replace all damaged camera traps at all sites before the next monitoring season. Tim Burnard has redesigned the camera stands to avoid some of our early mistakes and these will be used at all new installations.

The photo processing by VMRG members went very well and the 15 people who volunteered their services did a really great job. About 80,000 photos were sorted with several people sorting more than one set of 10,000 photos. To ensure accuracy, our new process involves two independent people inspecting each photo; where both people don't agree on the contents of a photo a third independent person is consulted for an opinion. The new process worked very well and we found that sorters were in general agreement, and where they differed it was usually because the photo was unclear or because they had accidentally sorted the photo into the wrong species folder. Inspecting each photo at least twice is of course twice the effort, but as most people were asking for more sets of photos even after we had no more to sort, this was not a problem; people clearly had fun viewing and sorting the photos and understood its importance.

Initial results from the program are very interesting. There were 1185 photos of kangaroos, 665 of emus, 567 of foxes, and 488 of Malleefowl, as well as 964 photos of other birds. Echidnas, goats, pig, rabbits, hares, and black tailed wallabies were all also represented, and deer and a dog at Lowan. Surprisingly, there was only one photo of a cat. There were no clear patterns between species abundances, but it was interesting that the two best performing sites in terms of mound activity, Paradise and Wandown, were characterised by relatively low proportions of kangaroo photos, and higher numbers of fox photos.

The VMRG have commissioned Becky Alcorn to develop the NMMD to store camera trap data, facilitate the processing and report on the results (funds provided by the Iluka Malleefowl management Committee).

Thank you to the members who offered their services for this project! Measuring these trends is vital for understanding the threats to Malleefowl and also for measuring the effectiveness of management (e.g. whether baiting foxes actually reduces their numbers appreciably, and whether this increases cat numbers). These are important issues, and our methods are especially relevant to the AM project across the continent that also uses camera-traps.

If you have even the slightest curiosity about the camera-traps, please get involved and give photo sorting a go. Judging by how many people want to keep doing it once they have had a go, it's clearly a popular activity and it is very important to understanding how to best conserve Malleefowl.

- *Update on LiDAR and AM in the Little Desert project*

Belinda Cant (Department of Environment, Land, Water and Planning) organised a LiDAR scan of parts of the Little Desert in 2016, and VMRG members assisted by taking on the huge effort of ground-truthing hundreds of potential mounds that were detected. Iestyn Hosking (VMRG) led this ground-truthing project which has now been completed. Belinda will use the results to gain a better idea of the habitats inhabited by Malleefowl in this large landscape, and particularly the response of Malleefowl to different stages of habitat recovery after fire. Belinda also has funds to continue the project by scanning the remaining parts of the Little Desert this year.

This is very important and exciting work through which we are learning a great deal about the distribution of Malleefowl in the Little Desert. The scans added a number of new mounds in our existing monitoring sites this season, have extended some sites (such as Boughtons v36), and created a new site Cooack v43 (incorporating the old "Nurcong Farmers" mounds). Following meetings organised by Liz Fenwick between Parks Victoria, DELWP, Wimmera CMA, the VMRG and the Adaptive Management (AM) team, we have agreed to establish an AM predator experiment cluster incorporating Nurcong, Tooan and Cooack sites. We hope to install camera-traps at all three sites this winter.

Appendix A 1. 2017/18 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	1188	51	48	71	89	15	55	17	16		15	25	39	21	83	43	27	26	20	52	33	9	64	10	6	31	20	33	10	7	10	10	6	63	10	14	50	28	8	1	12	26	14
New incidental	3																																									1	2
Sought, NOT found	3						1																															1			1	
NOT sought or found	17			1	3										1	2						1									1	1			2		1		3				1
Total	1211	51	48	72	92	15	56	17	16		15	25	39	21	84	45	27	26	20	52	33	10	64	10	6	31	20	33	10	7	10	11	7	63	10	16	50	29	9	4	12	28	17

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	139	10	8	31	14	1	5	2		3	2	2			3	1		2	2		7	6	6					2		2	1			22	2		2	3					
New incidental	1														1																													
Sought, NOT found	3				1																																2						
NOT sought or found	102	18	1	1								1		9	18		4		2	8	1	1	1	7				1	2		8	8	3		1	2		1	1	1		2	
Total	245	28	9	32	15	1	5	2		3	2	3		9	22	1	4	2	4	8	8	7	7	7			3	2	2	9	8	3	22	3	2	4	4	1	1		2	

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	17	1			4		3								1							1		1	1			1		1				1			2						
New incidental																																											
Sought, NOT found																																											
NOT sought or found	7																1			3					1														2					
Total	24	1			4		3								1		1			3		1		1	2			1		1				1			2		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	1			1																																						1	
New incidental																																											
Sought, NOT found																																											
NOT sought or found																																											
Total	1			1																																					1	

Grand Total	1481	80	57	105	111	16	64	19	16	3	17	28	39	30	107	46	32	28	24	63	41	18	71	18	8	31	20	37	12	10	19	19	10	86	13	18	56	33	12	5	12	30	17

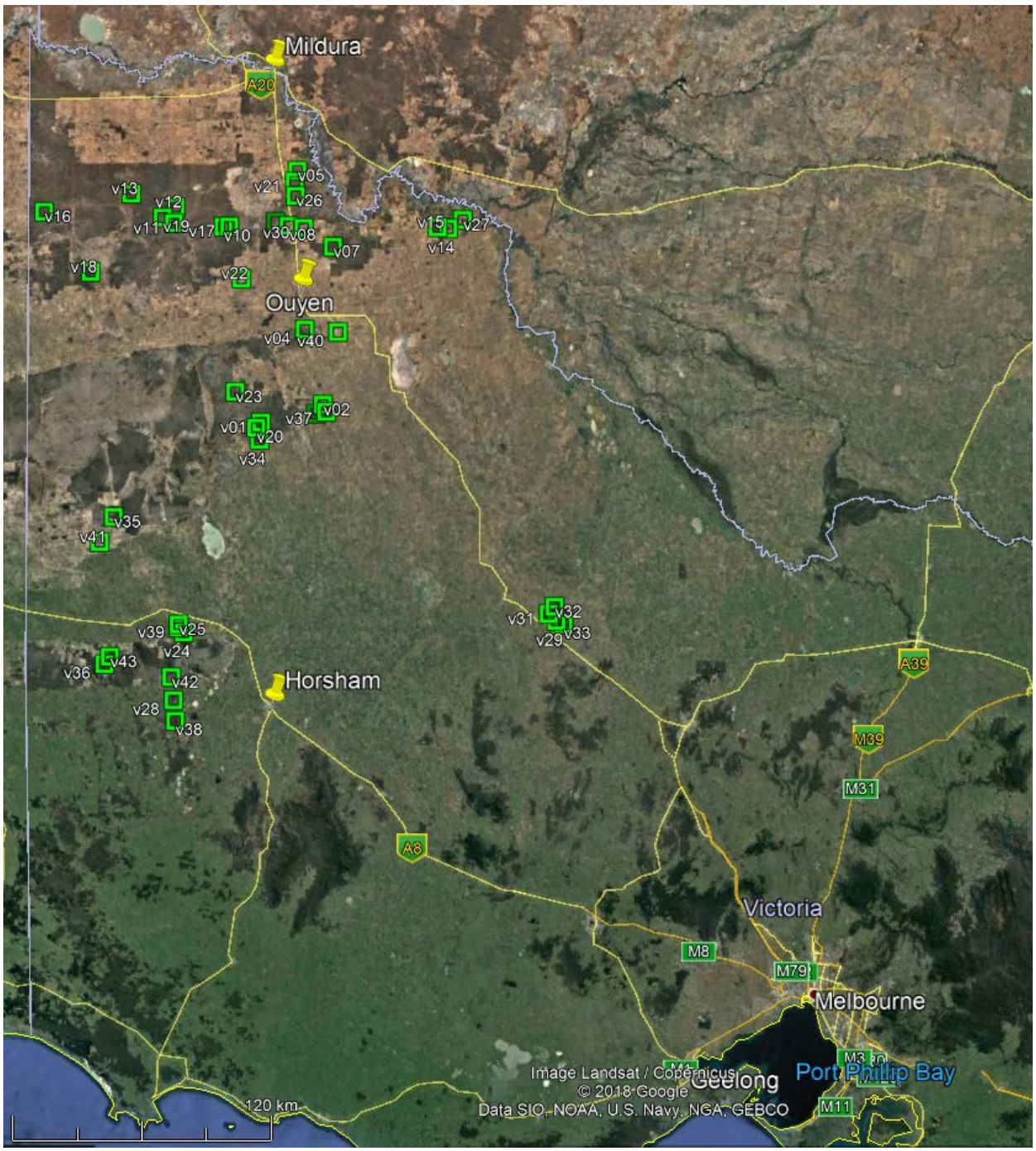

Figure 9. Location of the 42 Malleefowl monitoring sites in Victoria managed by the VMRG (green squares). Over 1300 mounds are monitored each year over a total area of about 170 km2. Image from Google Earth.