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**Report by the British Trust for Ornithology to
Plincke/Warwick District Council:
Review of ground-nesting bird surveys and protection
management at St Mary's Lands, Warwick**

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1. Introduction

This report is an evaluation of the management proposals and work aimed at protecting and increasing populations of ground nesting birds, namely Skylark and Meadow Pipit, at St Mary's Lands, Warwick. This document will give an independent review of the rationale for the measures, suitability and effectiveness of survey methodology, agents of potential disturbances and impacts, and whether the chosen management actions are appropriate for achieving the intended objectives.

2. Background

St Mary's Lands (SML) is situated within Warwick Racecourse, Warwick, Warwickshire and is an area of approximately 78 hectares (Appendix 1 - 6), centred on national grid reference: SP273647. Within SML are Lammas Fields, consisting of two parcels of semi-improved grassland which are managed on a two-year rotational basis. Part of Lammas Fields has been designated as a Local Wildlife Site (LWS), with the remaining areas to the north of the racecourse and plantation designated as a potential LWS. A number of breeding bird species have been found within the site, including Skylark and Meadow Pipit.

Given SML's location within the racecourse and its proximity to urban areas, ground-nesting bird species share the space with recreational visitors to the site. This includes people attending events such as races, model fliers, and dog walkers, amongst others. Urbanisation has been found to have a negative impact on ground nesting birds (Lakatos, et al, 2018; Loretto, et al 2019) and the ground-nesting nature of Skylark and Meadow Pipit makes them more susceptible to disturbance by users of the site, either intentionally or unintentionally, both potentially resulting in impacts to nesting success. However, as Skylark and Meadow Pipit are predominantly farmland species, little research has been carried out into the impact of recreational disturbance (Loretto, et al, 2019) and existing data on the impact of these potential disturbances is predominantly qualitative as opposed to quantitative. As a result of anecdotal observations from users of the site, one of the most discussed forms of disturbance across the literature around SML is from dogs (Appendix 1 – 9a, 13, 17), with or without owners. This includes reported observations of dogs flushing birds, with the potential to prevent feeding activity or present a potential predation risk (Appendix 1 - 13). Additionally, there have been concerns raised about increased levels of disturbance on public event days during summer, and a low to medium impact from model aircraft (Appendix 1 - 13).

In an attempt to mitigate anticipated disturbance impacts upon breeding Skylark and Meadow Pipit by users of the site, a number of actions have been proposed. These form part of the management masterplan for St Mary's Land, developed by Warwick District Council (Appendix 1 – 6), covering the period between 2011 and 2029. This masterplan is linked to the greenspace strategy for Warwick for the period 2012-2026, which aims to ensure greenspaces benefit both nature and people (Appendix 1 - 6). Details of the biodiversity related objectives and actions are elaborated on in the Biodiversity Action Plan (Appendix 1 – 9a). One key element involves the fencing of a large area within St Mary's Lands for the entirety of the breeding season, in order to prevent humans and dogs from disturbing breeding birds, and to reduce the predation risk. This was intended to be complemented by informing and educating the public on the topic through signage, and continued long-term monitoring of Skylark and Meadow Pipit, amongst other wildlife. This will help to identify population changes, impacts of human activity and effectiveness of the management measures. The aim of this management work is to ensure that the current breeding populations of Skylark and Meadow Pipit are maintained, if not increased, into the future (Appendix 1 – 9a, 15, 20).

Formal Skylark and Meadow Pipit monitoring commenced in 2019, with regular surveys taking place in 2019, 2021, and 2023. Fencing was erected for the first time in 2021, prior to the breeding season, and enclosing the area in the centre of SML, also known as the Lammas Fields (figure 1). Prior to the use of temporary fencing in 2021, nesting habitat were demarcated by ropes strung between metal poles, however reports indicated that dogs and their owners still regularly entered

these protected compartments. Fencing consists of metal stakes and green plastic fencing. Laminated posters were attached to temporary fencing to inform other users of their purpose and inform them that this area should not be accessed and encourage them to use other routes. Seasonal temporary fencing has continued until 2024 and has been considered a success due to an increase in Skylark territories detected over the three survey years, and greater numbers of Skylark determined as nesting inside versus outside the fenced areas. Given these results, the fencing is set to be trialled until 2025, after which a decision will be made on whether to continue in the existing manner or implement other management options. Alternative options include permanent fencing or a removal of the fencing altogether, if it can be shown that fencing has not led to increased Skylark and Meadow Pipit numbers. In addition to the fencing, grassland management has taken place since 2012. The grassland is cut on a two-year rotation, and it has been confirmed that hay cutting takes place in late summer to avoid the breeding season (Appendix 1 – 2a).

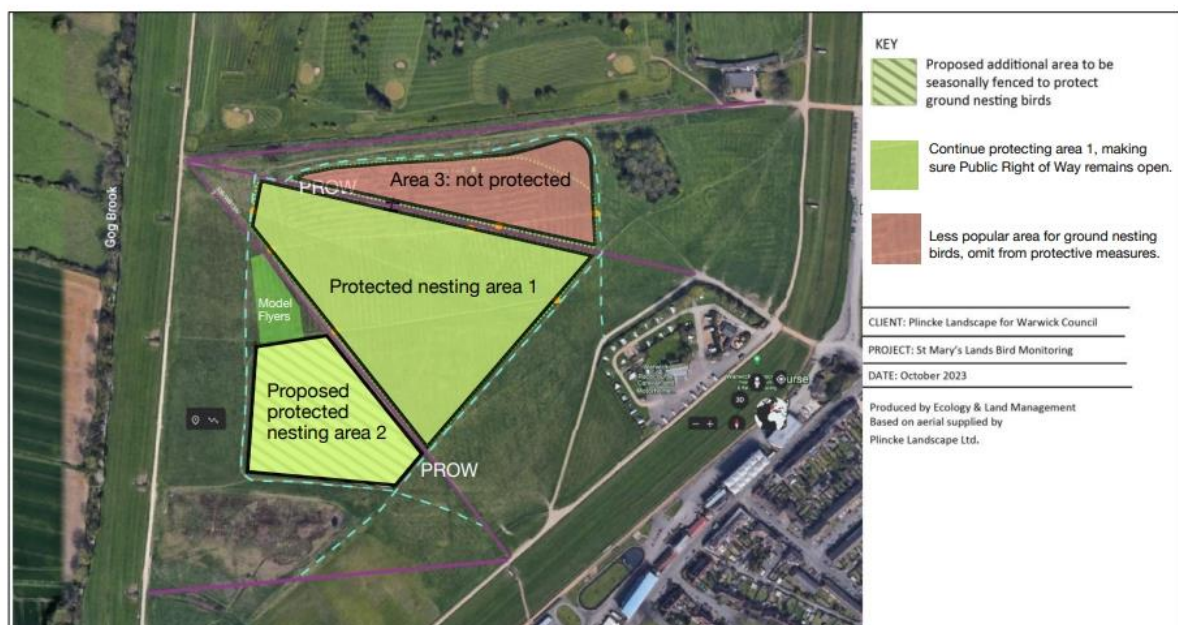


Figure 1: Map showing the existing protected, proposed protected, and unprotected areas, as of 2023/24 (Appendix 1 – 18). Note that the 'proposed protected – area 2' was implemented in 2023 / 24 to replace area 3, which appeared to be less attractive to the nesting birds.

3. Methods and scope of work

A total of 25 documents relating to St Mary's Lands were provided by Plincke/Warwick District Council, for evaluation in this report. Documents were listed by name, author and type and catalogued in an excel spreadsheet in chronological order (Appendix 1). These were reviewed systematically and summarized according to the following criteria: background, methods, findings, suggestions, and keywords; identifying omissions as well as recommendations and potential solutions. The review was broken down into four sections as outlined below:

a. Review of rationale for ground nesting bird protection

When examining the rationale for protection of ground nesting birds, the following were considered: identification of potential causes of disturbance, identification of potential impacts as a result of these, background literature, and sources and quality of data evidencing these disturbance/impacts.

b. Review of breeding bird surveys

Breeding bird surveys were evaluated based on the following criteria: suitability of the survey methodology, comparability of data between surveys, reproducibility, referencing, and data quality. Bird surveys, including visits undertaken during the breeding season were carried out by ASW Ecology Limited in the years 2019, 2021, and 2023 (Appendix 1 – 13, 15, 20, 21). The reports were written by ASW Ecology in conjunction with Ecology and Land Management and were commissioned by Plincke for Warwick District Council. Visits were carried out in the morning following the Common Bird Census (CBC) methodology (Marchant, 1983) for observation recording and mapping territories.

c. Review of disturbance assessments

Disturbance assessments were reviewed based on the suitability of the methodology, quantity and quality of data, and comparability of the data.

i. Dogs

No formal surveys were carried out into the use of the site by dogs/dog walkers, and only incidental data was provided. During the 2023 bird survey (Appendix 1 – 20), incidental dog records were noted involving just six dog observations across three morning visits. Incidental observations or lack of were also reported for 2019, however no figures were provided (Appendix 1 – 13). A brief count was also conducted in 2024 (dog warden, as per C Burden), counting 8 dogs, however activity was said to be limited by weather conditions.

ii. Model planes

A structured survey into the impact of model planes on breeding season Skylark and Meadow pipit was carried out in 2019 (Appendix 1 – 13). A total of three visits were made, one on each of the following dates: 17/04/2019, 24/05/2019, and 22/06/2019. These visits were carried out either in late morning or early afternoon and consisted of observing bird activity and any suspected alterations to this due to the model plane activity. Each model plane flight lasted 5 minutes due to battery limitations, however multiple flights were made in quick succession. Flights were made with one or more model aircraft airborne simultaneously.

d. Review of critique made by the Friends of St Mary's Lands

Critiques of the bird surveys were made by Friends of St Mary's Lands (FoSML) (Appendix 1 – 19, 22, 23). These were evaluated based on their objectiveness, accuracy of the counter-information provided and validity of supporting references. Appendix 1 documents 19 and 22 are evaluated in section 4.

4. Analysis and assessment

a. Review of rationale for ground nesting bird protection

The majority of the proposed rationale for the protective measures were centred on valid concerns for the safety of ground nesting birds but not necessarily supported by a robust evidence base (Appendix 1 – 13, 15, 17, 20, 21). Direct actions are proposed, and information on potential outcomes were the management not to take place, though these are not supported by references to related studies or prior data, either from SML or elsewhere.

Skylark and Meadow Pipit number recorded for SML, both historically and recently, are derived from a mixture of speculative reports (Appendix 1 – 2a, 6, 15), and *ad hoc* observational records from regular surveys (Appendix 1 – 13, 15, 20, 21 (Table 1). Prior to the erection of the fences in 2021, no apparent structured or repeatable survey of breeding Skylark had been carried out, however territory figures for this period are provided for this period (Table 1). Note - Ideally, a standardised survey should have been undertaken prior to the trials to establish a robust baseline against which to measure future change. It is unclear what surveys or analysis methods were used to determine the pre 2019 territory totals, limiting the use of these figure for assessing how the numbers had changed on the site. According to the data included in table 1 (Appendix 1 - 20), a strong decline in breeding territories was observed from 1961 onwards. This purported downward trend is stated as fully justifying the fenced area (Appendix 1- 21), however a source for the 1960's data is not provided, and it is unclear if the boundaries/area within which these reported territories fell were the same as those of the 2019, 2021, and 2023 studies.

Table 1. Comparative breeding territories during three surveys (table 3) (Appendix 1 – 20).

Species	1961	2011	2019	2021	2023
Skylark	60-70	8+	8	11	14
Meadow pipit	Not known	2-4	3	2	1

Where discussed in the various documents, the decline in Skylark numbers between 1961 and 2019 is not directly linked to any evidence of disturbance, nor is it compared directly with wider trends, at local, regional, or national level. Looking first at the breeding territory data (table 1). the lack of data between 1961 and 2011 means that while a decline is evident, it is unclear whether numbers have undergone a sustained decline or fluctuated across this period on SML, however the large reduction in numbers does align with the national trends for both species (Figure 2). Simultaneously, no data is presented on changes that the site may have undergone in terms of management or number and type of user, both prior to and since 1961. It is uncertain whether lower numbers of breeding skylark reflect wider trends due external factors, or local habitat changes and disturbance at SML. A regional trend for meadow pipit in West Midlands is not available and so comparison at regional level is instead made with East Midlands, which shows a slight decline between 1994 and 2020, when numbers begin to increase slightly. In contrast, England trends show a relatively stable Meadow Pipit population over the period of the three bird surveys (2019 to 2023). Following the sharp decline in Skylark for England up until the early 2000s, numbers begin to increase gradually from the mid 2010's. This aligns with the findings of the three surveys (2019 - 2023) which showed a slight increase in Skylark numbers, perhaps responding to a wider regional increase rather than a response to habitat protection at SML. According to table 1, the number of

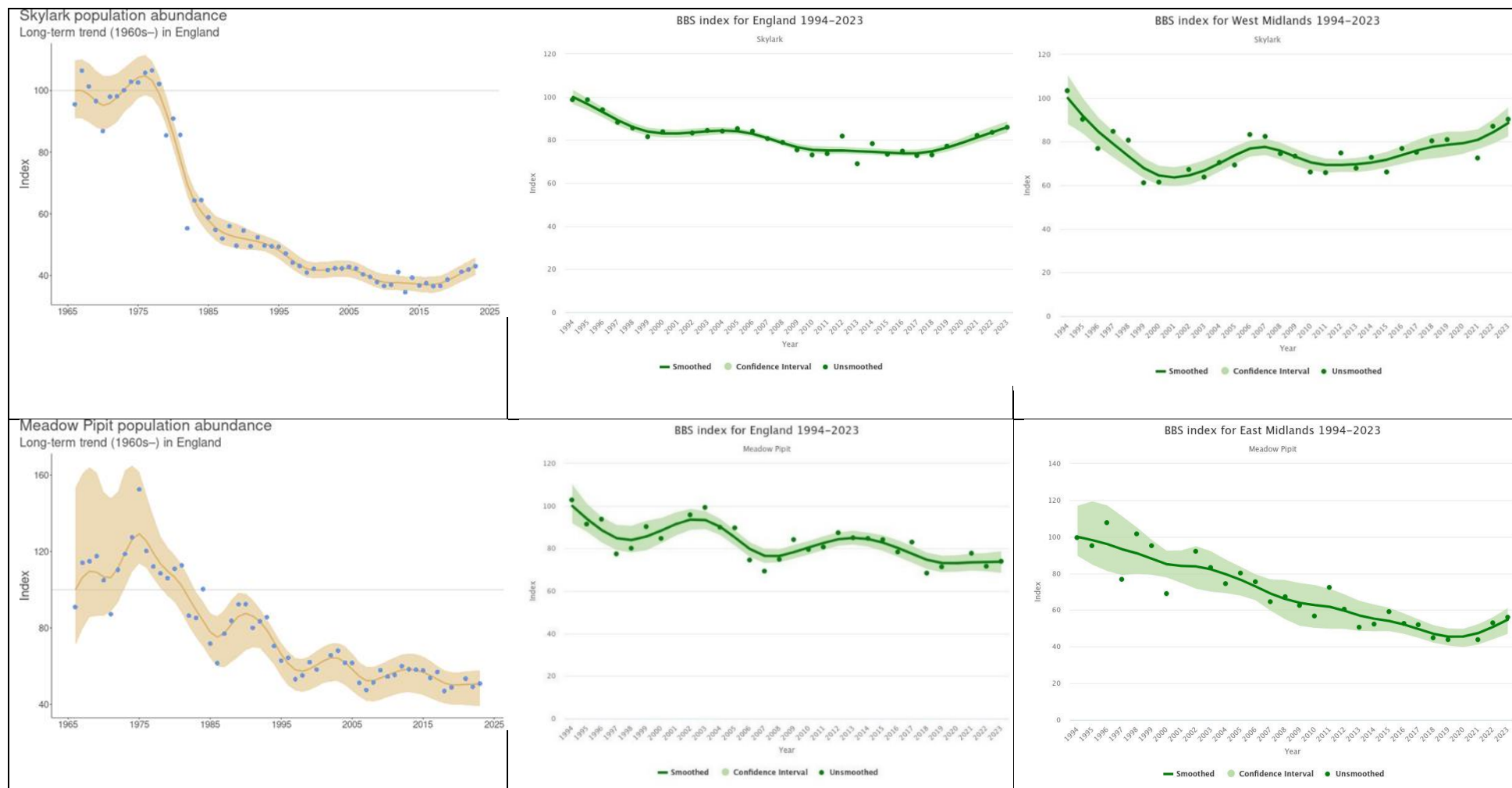
Skylark territories at SML were the same in 2011 and 2019, however, the study of potential effect of user activities on ground nesting birds from 2020 mentions a decrease in the breeding skylark within the period 2014-2019 (Appendix 1 - 13). Records between 2014 and 2019 are credited to one observer, however there is no information on the methodology used and therefore these data cannot be compared with the results from subsequent surveys.

While several sources of disturbance are discussed across the documentation and provided as rationale for carrying out the protective management (Appendix 1), information directly justifying the approach is lacking. References discussing the impact of potential disturbance are provided only on occasion and the comparability of these with SML is not always apparent or possible. The impact of dogs on ground-nesting birds, references a study by University of Hull (2009) (in Appendix 1 – 13) which is reported to have found significant disruption caused by dogs; however, this study is not directly comparable due to the bird taxa studied, different habitat type, and forms of disturbance present. This report is not included in the reference list, and so further information could not be consulted.

Nonetheless, the precautionary approach, in the absence of available data, to enacting protection measures that may help minimise the potential impact of disturbance from dogs is commendable.

Three existing studies were referred to, which investigate the effect of model planes on birds; however, two of these are stated as not being directly comparable with SML (Appendix 1 - 13). One of these is a study carried out at Tring which according to the reference showed no impact of model planes on birds retaining territories, though no author or publication date are provided, and comparability is limited due to the site being more rural than SML. The second reference is to Kempf and Huppop (1996), who are reported to have found limited habituation to model planes, with an increased impact when combined with other sources of disturbance, and the potential to bring about physiological changes negatively affecting reproduction, life expectancy and population size. This study is stated as not being comparable, however further information on the reasons for this is not provided. A third study referenced took place at St Mary's Lands in 2018, finding that a minor impact was caused by model aircraft impeding feeding activity, however comparability is limited due to two of three survey months falling outside of the breeding season, and a lack of provided methodology. Other claims are made with reference to research but no specific bibliography e.g. impact of aeroplane flight depending on a combination of speed and trajectory and the effect of changes in volume on frequency of disturbance.

Figure 2. England and West Midlands (East Midlands for Meadow Pipit) long term CBC/BBS (1965–2023) and mid-term BBS (1994–2023) population abundance trends for Skylark and Meadow Pipit. Source: BTO, 2024. BirdTrends 2023: trends in numbers, breeding success and survival for UK breeding birds. www.bto.org/birdtrends



b. Review of bird surveys

Data from three formal breeding season bird surveys, undertaken between 2019 and 2023 (Table 2) (Appendix 1 – 15, 20, 21), were collected for SML. As territory mapping was required for both Skylark and Meadow Pipit, the CBC method (Marchant, 1983) was chosen by the surveyor. While the aim underlying this methodology is fit for purpose, in assessing the number of territories present, the protocol has not been adhered to sufficiently to provide a detailed assessment of the number of birds using the site. The two or three visits per survey year are insufficient to provide sufficient data to detect the majority of birds present and provide a robust estimate of the number of territories present. The CBC method typically requires 10-12 visits during the breeding season, however, for a small number of species occurring at low density (i.e. Skylark and Meadow Pipit) a minimum of 4 or 5 visits is sufficient to detect the majority of individual and provide a reproducible estimate of the number of territories present per summer. The variation in number of visits mean that territory estimates are not directly comparable between years and likely to represent an underestimate of the number of territories present on site.

Table 2. Number and date of bird survey visits from the three survey years.

Survey year	No. of visits	Visit time	V1	V2	V3
2019	3	Morning	06/04/2019	01/06/2019	26/06/2019
2021	2	Morning	20/04/2021	09/06/2021	-
2023	3	Morning	22/03/2023	23/04/2023	24/06/2023

On reviewing the methods section for the bird surveys, basic information is provided on how the survey was carried out however sufficient detail to accurately reproduce the survey is omitted. Without a clear idea of the route taken, area covered, and time spent, it is not possible to determine whether the survey effort, and resulting detection, was consistent among survey. The survey area covered is assumed to be the entirety of SML, however this is not explicitly stated in any of the documentation or clear from any of the maps, which show only the boundaries of protected and unprotected areas within the site, and bird observations and territories. This limits the value and comparability of the survey data collected.

Territories were mapped according to observations of singing males on the three visits. The numbers of observations are broken down by visit and in the 2021 and 2023 surveys by whether these were observed inside or outside of the fenced area. While this information is gathered in a table in each of the reports, it is not shown on the map. In order to visualise how different territories have been determined, it is important to consider the distribution of the different bird registrations detected on each visit. As territories of both Skylark and Meadow Pipit typically span up to 200m, or more, it is not possible to associate territories with fence and unfenced areas definitively with confidence, unless nest sites have been located to determine habitat selection. Bird maps are provided in each of the three reports; however, the information shown on these is unclear. According to the 2019 and 2021 reports, the maps show 'singing males in occupied territories' in addition to pairs, nests, territorial behaviour, and young birds. It is uncertain whether the points on the map refer to territory centroids, determined from the location of singing males across the visits, or just

the observed location of singing males. The 2023 survey bird map shows breeding bird territories, so it is assumed that these represent territory centroids.

Looking at criteria for establishing territories, in addition to location of birds across the different visits, it is crucial to have information on the activity being undertaken by each individual, as without this it is not possible to determine whether the breeding is taking place. The observation of active nests and associated behaviour is the most accurate way to achieve this information, however according to the findings provided for the three survey years, the only nests observed were a meadow pipit nest, encountered in 2019 (Appendix 1 – 15), and meadow pipit nest encountered during visit 3 in 2023 (Appendix 1 – 20) with an adult transporting food.

The main aim of the bird surveys is to determine whether the fencing has been effective in retaining and, where possible, increasing breeding populations of ground-nesting birds. While both bird maps and site maps are provided, they are not shown together and so it is difficult to visualise which and how many territories fall within and outside of the protected areas. As outlined above, the data collected and presented in the three surveys does not permit assignment of territories to habitat or management (i.e. fenced vs unfenced areas).

c. Review of disturbance assessments

i. Dogs

No formally collected data is presented on frequency of dogs and their owners using the site, as well as the area that is predominantly used, despite this being stated to cause a moderate-high level of disturbance on ground-nesting birds at the site. Incidental observations of dogs using the site are provided for 2019 and 2023 (Appendix – 13, 20), as well as a brief further count from 2024 (Park warden report per C Burden), however the data provided is extremely limited, where figures have been provided. Likewise, birds being flushed by dog walkers are mentioned throughout the existing documentation however no numbers are provided on these nor any direct impact on ground-nesting birds. Observations of behaviour (Park warden report per C Burden) indicate that while some dogs remain leashed, others are allowed to roam across the site and regularly stray off established footpaths. In order to be able to understand the direct impact that dogs and walkers have upon ground nesting birds at, it would be necessary to monitor active nests with covert cameras. However, few studies have attempted to examine this directly, with indirect effect upon densities of breeding birds showing no difference where sites with dogs on or off leads were studied (e.g. Forest & St Clair 2006). A nest camera study of 147 Woodlark nests in Thetford Forest, only found one nests predated by a dog out of the 47 nests that were predated (Dolman 2010). Additionally, standardised monitoring of dog and owner activities would be required to establish the level of disturbance exerted across the site, and permit comparison of intensity on and off footpaths as well as within fenced areas. The latter would provide a basis for assessing the amount of protection afforded by fenced areas.

ii. Model planes

A semi-structured survey was carried out into the response of skylarks and meadow pipits to model aircraft activity (Appendix 1 – 13). While the survey was carried out over three separate visits, the comparability of the data between the visits and quality of data generated is limited. Looking first to comparability, it is important that certain factors are kept the same across visits to prevent these from skewing the data. In the model aircraft experiment, all factors other than flight path, varied across visits, meaning only a small quantity of data is available for each set of conditions (table 3). Referring to table 3, it is first important to consider temporal fluctuations in skylark activity both at a daily and season level. In order to be representative of the whole breeding season, where possible an equal separation should be left between visits in order to ensure that behavioural changes due to different needs can be considered. Looking at day level, bird surveys should generally be carried out when bird song activity is at its highest, beginning at least half an hour before sunrise and finishing before late morning. During the breeding season, flight times are restricted in order to avoid peak periods of bird activity, and flying is permitted from 10:00 to 19:00 or dusk on weekdays, and 11:00 to 16:00 on weekends. In the case of this study, flight and observation sessions were carried out either late morning (visit 2) or early afternoon (visit 3) as opposed the period of peak activity earlier within the allowed window. Surveys should also be carried out at a similar time for each visit to ensure that a potential reduction in bird activity is not attributed to model aircraft activity where this may simply be due to fluctuations across the day.

Table 3. Information on the model plane survey carried out in 2019.

Date	Start time	Total obs.	Total flight time	No. fliers	No. models
17/04/2019	13:00	60 minutes	55 minutes	2	3
24/04/2019	11:00	Unclear	20 minutes	1	1
22/06/2019	14:30	90 minutes	Unclear	8	6

In order to be able to compare the data collected from the different visits the same models and combinations of models should have been flown for each, and the duration of these should be the same in order to account for potential habituation. Likewise, a control survey of the same duration should be carried out on a control site/control area in order to provide baseline data on Skylark and Meadow Pipit flight duration and height where flight activity does not take place or has potentially led to a long-term behavioural response. Skylark display flight is stated as lasting between 2 and 5 minutes, however no references are provided to validate this figure.

d. Suitability of fenced area

Skylarks can have up to four broods per breeding season spanning April to August (Ferguson-Lees, et al 2011), so it is important that suitable habitat is available throughout the period. In the case of SML, the two parcels of grassland are mown in alternate years. Suitable habitat needs to include different sward heights, between 20cm and 50cm, and with access to bare ground. While the area was a suitable height earlier in the year, the density and sward height are suggested to have reached unsuitable levels by May, measuring over 100cm in some cases (Appendix 1 – 23).

e. Review of critique made by Friends of St Mary's Land.

Critiques of the bird survey work in 2021 and 2023 (Appendix 1, documents 22, 19), as well as a public opinion survey on the management work at SML was carried out by Friends of St Mary's Lands and presented to Plincke/Warwick District Council. The points raised in the critique documents, provided for review, directly related to the ground nesting birds and protection measures were evaluated, and alongside responses, are presented in this section. Statements from the critique documents are in **bold**, and responses can be found below each. The individual items from the original critique documents are presented as written but grouped by topic.

e.i Number of visits:

Only two visits re made to the site on 20th April 2021 and 9th June 2021.

Bibby et al, 2005.is cited as the method outlined for territory mapping in this survey. Yet this source acknowledges that the Common Bird Census (CBC) has adopted ten visits as standard and that ideally, they would be spread fairly uniformly at about weekly intervals.'

It is also noted that no visits were undertaken after the 9th June 2021 so there is no record covering the second half of the breeding season (March-August) (Appendix 1 - 22).

This is a valid point regarding good survey practice. In order to successfully carry out a full territory analysis, the number of visits should be sufficient to ensure that the observations are consistent and to give a clear idea of the area that is being used by individual birds. At least four visits spread throughout the entire breeding season are required to detect the majority of birds and territories present and minimise under-counting.

e.ii Timing of visits:

The first visit on March 22nd was a Race Day at Warwick. The public has to evacuate SML three hours before the first race. Race goers are allowed to park up on the land up to six hours before racing. Horses and horse boxes are unloaded. Jockeys walk the course. Not ideal for carrying out a bird survey. Poor timing and no mention of this is in his report. Why not?

Following on from the previous point. There is a plethora of dog walkers on the land on Race Days to beat the three-hour curfew. Despite this the ecologist reports only 1 male dog walker seen walking through the unfenced area. Really? (Appendix 1 – 19)

This is a valid point regarding good survey practice. It is important that bird surveys are carried out in optimal conditions in order to limit factors which may serve as disturbance reduce bird activity. Regarding the number of dog walkers observed by the surveyor (1 observation), this point is not entirely valid, as the dog observations are stated by the surveyor as being incidental. A dedicated dog survey methodology and survey would be required to get data representative of dog use at the site.

e.iii Survey technique:

The relative density of Skylarks is usually measured by counting the birds singing during a 10-minute observation period. However this method is not ideal as a count of the birds in the air does not take into account the number of birds on the ground (Bibby et al 2005), nor are all the males likely to be airborne at the same time.

For these reasons the survey conducted by the FoSML on the enclosure of this nesting site on St. Mary's Lands during 2021 breeding season did not attempt to quantify the number of breeding pairs of skylark but simply noted the presence of singing males, on a weekly basis, until their disappearance at the end of May/beginning of June. (Appendix 1 - 22)

This point cannot be substantiated, as it is unclear of the exact methodology being referred to. A survey using multiple Ten-minute point counts is unsuitable for carrying out this kind of survey, as they are insufficient to fully detect all individuals and activity across the site and the data is difficult to analyse with respect to determining the number of territories – stated as a disadvantage of the method in Bibby et al 2005. The methodology employed by the surveyor, the CBC method (Marchant, 1983), involves recording all birds present or flying over the survey area and is a suitable methodology for territory mapping for the target species. However, as insufficient visits were carried out and no skylark nests or related activities were detected, it is not possible to establish if the birds observed were breeding despite the methodology being appropriate when followed correctly.

e.iv Lack of photographic evidence:

There is no photographic evidence of any visits in April and June. In this day and age everyone has a mobile camera. Why is there no visual evidence of these visits? (2023) (Appendix 1 – 19)

Lack of photographic evidence from the second site visit - Why are there NO photographs of the enclosed area from the June visit? (2021) (Appendix 1 - 22)

This is a valid point, as photographs for these visits were not included in the reports. However, while including photos for each of the visits is beneficial in illustrating the study area and the changes that occur throughout the season, this should be supplementary to a section of the report detailing the habitat management within and outside the fenced area, with measurements for sward height and vegetation type.

e.v Maps:

Appendix Map A

This map is of such poor quality that it is impossible to understand even when referring back to Table A in Chapter 3.

Questions raised

A) The way Map A has been presented means that the reader is unable to relate each 'blob' to a bird species.

B) Does map A refer to visit 1 (20/04/2021) or visit 2 (09/06/2021) or is it a conglomerate of the two visits?

This should be clearly stated, and a key added.

It would seem very serendipitous that on both visits nearly all active males were again displaying and in exactly the same spots.

C) Why are the boundaries of the enclosed area (Zone 4) not shown on Map A if the whole point is to show which birds were observed inside and outside the fenced off area?

When I have attempted to place these sightings upon the map it would be seen that 2 were inside the area others on the fence line. Odd. (Appendix 1 – 22)

Why only one aggregate map of sightings?

Good practice would require a separate map for each visit to compare nesting sites as the season progressed. (Appendix 1 -19)

Points A, B, and C relate to the critique of the 2021 bird survey (Appendix 1 - 22). Point A referring to the markers on the map A of the 2021 bird report being impossible to link to a bird species, is invalid. On the source document, different bird species are noted by the two-letter code within the markers. Point B raises a valid point, that it is unclear what the points on the map are showing, e.g. sightings of singing males across both visits, or centroids of potential territory polygons. This point is also raised in the 2023 bird survey critique (Appendix 1 - 19) which correctly suggests illustrating observations separately to allow for comparison, however with regards to nesting sites, no sites were detected during the 2021 or 2023 visits (Appendix 1, documents 20, 21). Point C is valid, a map clearing showing the observations and territory centroids in relation to the fenced and unfenced areas should be included.

e.vi Habitat suitability:

What should have been very apparent was the height of the grasses inside the fenced off area. Had the height of the grass sward been noticed this ought have raised, in the mind of any ornithologist, doubts about the ability of the skylarks to raise a second or third brood and therefore the success of this initiative (referring to vegetation in the fenced area being taller than the fence (i.e. greater than 60cm) in photographs taken by FoSML later in the year) (Appendix 1 – 22)

This is a valid point. Vegetation should not exceed 50cm,(RSPB, 2017) and bare ground should be accessible in order to provide a suitable breeding habitat otherwise further nesting attempts in this location will be abandoned.

e.vii Effect on Meadow Pipit:

It would appear that the Meadow Pipit population has not thrived as hoped since the fencing was erected. Only one solitary pair was noted - down from 3 breeding pairs in 2019. Yet the ecologist does not address this in his summary and indeed suggests the fenced off areas should continue and expand as this would be 'invaluable' to 'ground nesting birds.' (Appendix 1 - 19)

This point is valid. Changes in breeding population of ground nesting species on SML cannot be linked directly to the fencing and other factors need to be studied. There is no baseline data showing long-term trends for meadow pipit, including in the period prior to the fencing being erected. It is important that further studies compare the data for SML with data sets and trends for the wider area. Note, that when just a few birds remain, they can disappear from a site completely due to natural process within and outside the breeding season. This is also dependent upon the state of the local population, if few are present then repopulation is unlikely even if the breeding habitat is still suitable.

e.viii Effect on Skylark:

Our members noted the complete absence of nesting skylark in the newly fenced off area between footpath WB13 and the golf course. The decision to fence off this area was on the recommendation of the 2021 report by the ecologist. This lack of breeding pairs was also noted in the ecologist's report of 2023, and he recommended that fencing now be discontinued in this area. There was no analyses of why skylarks might have abandoned this area. Our members report increase corvid activity, magpies in particular, who nest in the trees adjacent to the golf course.

They are often spotted on the fence posts which provide them with ideal perches for hunting eggs and chicks. (Appendix 1 - 19)

As with the previous point regarding meadow pipit, the fact that there is no baseline data for comparison means it is not possible to link fluctuations in breeding skylark numbers with the fenced areas. The point regarding corvids as a potential source of predation is not invalid, however as with the potential impact of dogs, needs to be investigated fully with a structured survey methodology and supporting literature.

e.ix Ecologist age and experience:

Finally. We are confused by the ecologist's statement that he has been studying wildlife for 40 years as his profile on another website lists his age at 52. (Appendix 1 – 19)

This point is invalid. While it is not possible the surveyor has been carrying out wildlife surveys at a commercial or professional level for the entirety of this period, it is completely viable that, given the vocational nature of birdwatching and bird surveys and lack of age restrictions, they have been carrying out structured wildlife monitoring on a voluntary basis since the age of 12.

5. Discussion

While several studies have been carried out onto effect of disturbance on different bird groups, many of these have focused on ground-nesting non-passerines such as the Nightjar, and wading birds (e.g. plovers). Several studies have found dog predation of chicks in a number of wading bird species (Showler, et al, 2010). In contrast, while dogs have been shown to flush other ground-nesting birds (Langston, et al., 2003) there is little evidence of predation in ground nesting farmland species such as the Skylark or Meadow Pipit. In contrast, predation events were more frequently a result of predation by corvids such as carrion crow (Kruger, et al, 2018; Showler, et al, 2010, Jokimäki and Huhta, 2000). In the case of St Mary's Lands, while potential predators are discussed, no predation involving either Skylark or Meadow Pipit is documented at the site, however obtaining such data is difficult even with much observation. In addition, while flushing due to dogs has occurred, this has not been sufficiently documented to provide data on the frequency of this taking place, and of any detrimental effect on breeding attempts or a reduction in bird activity. Smith-Castro and Rodewold (2010) found no relationship between flushing and nest survival in their study on the Northern Cardinal (*Cardinalis cardinalis*) in Ohio, USA.

While gathering evidence of potential local scale impacts, for example through disturbance from dog walkers or model aircraft, it is important to consider other factors which may limit breeding numbers or lead to fluctuations. It is crucial to have baseline and control data on which to base any comparisons, as well with an understanding of what other factors may correlate with an area of higher disturbance, such as fewer resources (Gill, 2007). While the upward trend for skylark correlates with the installation of the fencing at SML, it also fits in with the wider trends for the West Midlands and England (figure 2). The same can be said for the fairly stable trend in Meadow Pipit in England, and nearby in the East Midlands (figure 2). Given the small, purported breeding population of both species at the site, it cannot be discounted that these changes between visits may be naturally occurring fluctuations that may have arisen on a wider scale due to a particularly successful or unsuccessful year for the species. Another potential reason for these fluctuations could be due to individuals choosing to nest in suitable habitat outside of the survey area, within or outside of Warwick racecourse. Currently, there is no direct evidence to determine whether either species nests within SML, or how many of the observed territories relate to paired or nesting birds, which is key information required for a successful species recovery strategy.

As with studies on the potential for predation, much of the literature investigating the impact of fencing on birds is focused on wading birds. Malpas, et al. (2013) found that fencing excluding terrestrial predators (e.g. Fox, Badger, etc) reduced predation and increased nest productivity in Lapwings (*Vanellus vanellus*), and in their review of predator-exclusion studies, Smith, et al. (2011) found the use of fencing (often electrified) or nest cages increased hatching-success, however it is crucial that the habitat within these areas is managed correctly. In many cases, wader nests are more exposed, and so the findings cannot be compared directly. Looking at a larger farmland species, Homberger, et al. (2017) found increased hatching-success in grey partridge and suggests a potential benefit to other ground-nesting species where predation due to terrestrial predators is an issue, though stresses in the importance of abundant resources to support breeding activity. In order to choose an adequate management strategy, it is first crucial establish if there is a problem with nest predation, and what the key source of this is, as fencing may only be suitable for excluding certain terrestrial mammalian species, based on its design, and will not impede aerial predators. Permanent

fencing can in fact encourage avian predators (Koenen, et al., 1996, cited in Homberger, et al., 2017), as it provides a vantage point for foraging and hunting individuals, but provides some benefit in the form of perches that can be used by none predatory species, for use by displaying and feeding individuals (Lesinki, 2000; Kamath, et al., 2018, cited in McInturff, et al., 2020).

6. Conclusions and recommendations

- The bird surveys conducted between 2019 and 2023 only provide a general summary of territories across the site and there is insufficient detail in the recorded observations to assess whether Skylarks were nesting within or outside the fenced areas. The small number of survey visits (2 or 3) between late March and late June only cover the early part of the breeding season and provide insufficient visits data to determine territory extents and habitat used with any confidence. Potentially, prospecting birds may have moved away later in the summer if the grass was too long.
- The bird surveys conducted to date have occurred after the protection management had commenced, so do not provide a baseline again to measure change or success of the fencing measures and habitat management. Annual bird surveys should follow the same consistent method and survey effort/site coverage, ideally comprising five visits spread through the breeding season to maximise detection of all birds present. Also, on each visit full detail of bird activity and indications of nesting behaviour should be logged and plotted for all individuals.
- Data on intensity of dog (and owner) use is also lacking and would be beneficial to quantify how many are on and off-lead or on and off path. It is also important to consider how activity varies with time of day, day of week and between months and use this information to inform any strategy to minimise dog disturbance/impact.
- Habitat condition is also a key determinant for use by ground nesting birds. Bare ground or very short swards are required for feeding, while short swards with tussocks, or swards with varied structure are required for nesting. Habitat height and structure should be measured across the sites and particularly for fenced/unfenced areas, which should be repeated through the breeding season. Grassland habitat management should ensure that optimal nesting and feeding opportunities are provided for Skylark and Meadow Pipit.

Survey options for consideration

- 1) Commence with a full baseline ground nesting bird survey (5 visits) in 2025 [to establish how many territories are supported by the site], with all fencing removed to see how ground nesting birds use the site without any intervention. Then follow up with a repeat bird survey (5 visits) in 2026 with some areas of temporary fencing installed during Jan/Feb 2026. This would indicate whether there was any use of or a preference for the use temporary fenced sites – i.e. redistribution based on the assumption that fenced areas are less disturbed! Unfenced control plots should also be included in 2026 to improve inference – see 4).

- 2) Start with a full baseline ground nesting bird survey (5 visits) in 2025 but with some temporary fenced areas in situ. This would permit an examination of habitat preference, where the fenced areas ought to be used disproportionately more than unfenced areas, if disturbance is having a substantial impact. Additionally, unfenced control plots should also be included in 2025 to improve inference and determine if the mowing regime or fencing has more influence of territory location – see 4). A repeat survey in 2026 would be recommended to strengthen the inference over use of fenced and unfenced areas, given the likely small number of Skylark territories present on the site each year.
- 3) Additional breeding bird observations could be collected by the local bird group outside the main survey visits. These could provide useful evidence of breeding activity (not proven or documented in reported surveys) as well as provide more data on habitat use (fenced vs unfenced). Observers would need to plot locations accurately and records standard CBC activity codes. A training session could be provided to outline the recording procedures and how to determine the key activities (breeding and feeding).
- 4) Habitat measurements should be undertaken across the sites during the breeding season to assess habitat structure and height. This is important to control for variation that may exist between fenced and unfenced areas, which may dictate location use to a greater degree than disturbance. In addition, if temporary fenced areas are mown before fence erection, then one or two control plots should be created (i.e. mown areas but without fencing). These would further help to establish the benefit and use made of the fenced areas – to be included in 1) during 2026 or 2) during 2025. This could be undertaken with the bird survey visits and would provide the best combination of data to link bird locations with habitat used.

7. References

- Dolman, P.M., 2010. *Woodlark and Nightjar Recreational Disturbance and Nest Predator Study 2008 and 2009 Final Report to Breckland District Council* [online]
- Forrest, A. and St Clair, C.C., 2006. Effects of dog leash laws and habitat type on avian and small mammal communities in urban parks. *Urban Ecosystems*, 9, pp.51-66.
- Ferguson-Lees, J., Castell, R., Leech, D., 2011. *A field guide to monitoring nests*. BTO
- Gill, J.A., 2007. Approaches to measuring the effects of human disturbance on birds. *Ibis*, 149, pp.9-14.
- Homberger, B., Duplain, J., Jenny, M. and Jenni, L., 2017. Agri-environmental schemes and active nest protection can increase hatching success of a reintroduced farmland bird species. *Landscape and Urban Planning*, 161, pp.44-51.
- Jokimäki, J. and Huhta, E., 2000. Artificial nest predation and abundance of birds along an urban gradient. *The Condor*, 102(4), pp.838-847.
- Krüger, H., Väänänen, V.M., Holopainen, S. and Nummi, P., 2018. The new faces of nest predation in agricultural landscapes—a wildlife camera survey with artificial nests. *European Journal of Wildlife Research*, 64(6), p.76.
- Lakatos, T., Chamberlain, D.E., Garamszegi, L.Z. and Batary, P., 2022. No place for ground-dwellers in cities: A meta-analysis on bird functional traits. *Global Ecology and Conservation*, 38, p.e02217.
- Langston, R.H.W., Liley, D., Murison, G., Woodfield, E. and Clarke, R.T., 2007. What effects do walkers and dogs have on the distribution and productivity of breeding European Nightjar *Caprimulgus europaeus*? *Ibis*, 149, pp.27-36.
- Loretto, M.C., Schöll, E.M. and Hille, S., 2019. Occurrence of Eurasian Skylark *Alauda arvensis* territories in relation to urban area and heterogeneous farmland. *Bird Study*, 66(2), pp.273-278.
- Malpas, L.R., Kennerley, R.J., Hirons, G.J., Sheldon, R.D., Ausden, M., Gilbert, J.C. and Smart, J., 2013. The use of predator-exclusion fencing as a management tool improves the breeding success of waders on lowland wet grassland. *Journal for Nature Conservation*, 21(1), pp.37-47.
- Marchant, J.H., 1983. BTO Common Birds Census Instructions. BTO [online]
- McInturff, A., Xu, W., Wilkinson, C.E., Dejid, N. and Brashares, J.S., 2020. Fence ecology: Frameworks for understanding the ecological effects of fences. *Bioscience*, 70(11), pp.971-985.
- RSPB, 2017, <https://www.rspb.org.uk/skylark-advice-for-farmers>
- Showler, D.A., Stewart, G.B., Sutherland, W.J. and Pullin, A.S., 2010. What is the impact of public access on the breeding success of ground-nesting and cliff-nesting birds. *Systematic Review*, 16.
- Smith, R.K., Pullin, A.S., Stewart, G.B. and Sutherland, W.J., 2011. Is nest predator exclusion an effective strategy for enhancing bird populations? *Biological conservation*, 144(1), pp.1-10.

Smith-Castro, J.R. and Rodewald, A.D., 2010. Behavioral responses of nesting birds to human disturbance along recreational trails. *Journal of Field Ornithology*, 81(2), pp.130-138.

Appendix 1. Documentation presented for assessment in this report.

Doc no.	Document	Author	Year	Period referenced	Type
1	Warwick Racecourse Proposed Lake: Ecological survey of site and surrounding land.	Cambridge Associates, Middlemarch Environmental	1997	Aug-97	Survey
2a	Management Plan for St Mary's Lands (Racecourse and Environs)	Ecology and Land Management	2005	2005 onwards	Management plan
2b	SML Schedule	Unknown	2005	2005 onwards	Schedule
3	St Mary's Lands Working Group - SWOT Analysis	Unknown	2016	2016 onwards	SWOT analysis
4	St Mary's Lands Outline Proposals	SML Working Group, Warwick District Council	2016	2016 onwards	Proposal
5	Appendix 01 - Consultation Outcomes Report	Plincke for Warwick District Council	2016	Until 2016	Report (draft)
6	Masterplan for SML Warwick	Plincke for Warwick District Council	2017	2011-2029	Plan
7	Site Brief Descriptions	Warwickshire Biological Records Centre	2016	Until 2015	Brief
8	SML Species records	Warwickshire Biological Records Centre	2016	Until 2016	Records
9a	Biodiversity Action Plan	Ecology and Land Management	2020	2020 onwards	Plan
9b	Tender for the provision of ecological appraisal	Plincke	2018	2018 onwards	Tender
10a	SML Ecological improvement suggestions	Unknown	2018	2018 onwards	Breakdown
10b	Notice of Decision of District Planning Authority	Warwick District Council	2020	2020 onwards	Planning permission
13	Study of Ground Nesting Birds and Potential Effects of User Activities e.g. Model Plane Flying/Dog Walking - Final C	Ecology and Land Management	2020	April 2019-January 2020	Interim report
14	SML Non-technical summary of Study of Ground Nesting Birds and Potential Effects of User Activities e.g. Model Plane Flying/Dog Walking	Unknown	2020	April 2019-January 2020	Summary
15	SML Bird Report	Ecology and Land Management	2020	April 2019-January 2020	Report
16	EA Invertebrate Report	Environment Agency	2005	1998-2004	Report
17	Local Wildlife Sites Evaluation Form	Warwick Racecourse?	2011	Until 2011	Evaluation
18	Plan of proposed additional seasonally fenced area	Ecology and Land Management	2023	2023 onwards	Map
19	Comments on SML Monitoring of Ground Nesting Birds 2023	Friends of St Mary's Lands	2023	2023	Comments
20	SML Monitoring of Ground Nesting Birds 2023	ASW Ecology Limited and Ecology and Land Management	2023	March-June 2023	Report
21	Monitoring of Ground Nesting Birds during April and June 2021	ASW Ecology Limited and Ecology and Land Management	2021	April 2021-June 2021	Report
22	Concerns re the findings of Monitoring of Ground Nesting Birds During April and June 2021	Friends of St Mary's Lands	2021	April 2021-June 2021	Critique
23	Findings and Conclusions of FoSML survey	Friends of St Mary's Lands	2021	April 2021-June 2021	Critique
26	Map of flying club area	Unknown	2016	Ongoing	Map